



**THE JOURNAL OF  
THE ELECTRICAL HOROLOGY SOCIETY**  
CHAPTER #78  
NATIONAL ASSOCIATION OF WATCH & CLOCK COLLECTORS

**VOLUME XXXI #1, MARCH 2005**

Fellow Horologists:

This issue of the Journal of the Electrical Horology Society will complete the series on the Silent Electric Clock Company and will continue publishing the series on the 1923 Self-Winding Clock Company Manual entitled "Instructions for Installation and Maintenance of Self-Winding Synchronized Clocks" and on the ECO Magneto Clock Company.

If European travel plans are in your future, you may wish to consider visiting Switzerland to take-in an exhibit on electric clocks. (See "Museum Wanderings" on pg. 23.)

The NAWCC Time Symposium concerning electrical horology planning continues. However, the powers that be at NAWCC Headquarters have decided that the electrical horology symposium should be held in 2008 - not the originally announced 2006. This change is not all bad since it will provide us with the time to do a "bang-up" job. Please change your calendar to reflect the new 2008 Symposium.

Currently, Les MacAlister and I are making the initial contacts. Springfield, Illinois looks like an excellent location for the Symposium. The Sangamo and at least some of the Illinois Watch factory buildings still exist although they are now used for different purposes. The Sangamo Employee Club is still functioning and there is a distinct possibility of at least holding a reception in this facility. (This is not the original location for the Employee Club but the current facility is in a very interesting old building.) The Springfield Public Library has a large collection of early Sangamo documents and photographs and they would probaby mount a display of some of their material. It is hoped that we will be able to put together a catalog of all of the various models of Sangamo Clocks that can serve as a handout at the Symposium.

Continued on Page 23.

Bill Ellison.....President  
Harvey Schmidt, FNAWCC,.....Secretary-Treasurer ) Co-Editors  
Dr. George Feinstein, FNAWCC..Chapter Historian )

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HARVEY SCHMIDT, FNAWCC, Secretary-Treasurer, 75-80 179<sup>th</sup> ST. FLUSHING NY 11366

## DIRECTIONS FOR REGULATING CLOCKS HAVING DIFFERENT LENGTHS AND TYPES OF PENDULUMS

### 60 Beat Pendulum with 10-lb. Brass Bob and Wood Rod

One turn of regulating nut changes rate 40 seconds in 24 hours either fast or slow. If clock is equipped with front regulating bracket, one turn of regulating rod changes rate 20 seconds in 24 hours either fast or slow.

### 60 Beat—15-lb. Mercurial Compensated Pendulum

One turn of regulating nut changes rate 30 seconds in 24 hours either fast or slow. Two divisions of indexed nut changes rate 1 second in 24 hours either fast or slow. If equipped with front regulating bracket, one turn of regulating rod changes rate 15 seconds in 24 hours either fast or slow.

### 80 Beat Pendulum with 2-lb. Brass Bob and Wood Rod

One turn of regulating nut changes rate 55 seconds in 24 hours either fast or slow.

### 120 Beat Pendulum with 2-lb. Brass Bob and Wood Rod

One turn of regulating nut changes rate 1 minute and 50 seconds in 24 hours either fast or slow. If equipped with front or top regulating bracket, one turn of regulating rod changes rate 1 minute and 10 seconds in 24 hours either fast or slow.

### 140 Beat Pendulum with 2-lb. Brass Bob and Wood Rod

One turn of regulating nut changes rate 2 minutes and 20 seconds in 24 hours either fast or slow. If equipped with front or top regulating bracket, one turn of regulating rod will change rate 2 minutes in 24 hours either fast or slow.

### 140 Beat Pendulum with Small 10-oz. Nickel Finished Bob and Wood Rod

One turn of regulating nut changes rate 2 minutes in 24 hours either fast or slow. If equipped with front or top regulating bracket, one turn of regulating rod will change rate 2 minutes and 10 seconds in 24 hours either fast or slow.

**Fast:** If clock gains time turn regulating nut to the left.

**Slow:** If clock loses time turn regulating nut to the right.

*Any subdivision of a complete turn of the regulating nut will affect the rate in proportion to the above schedule.*

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## STYLE No. 18 CLOCK Interior Wiring and Connections 12" Dial—80 Beat Movement

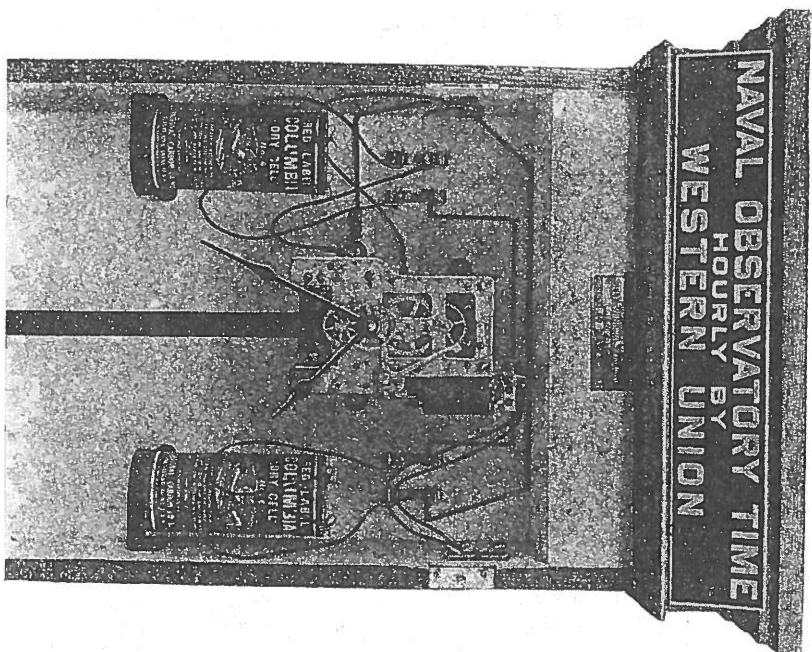


Fig. 5

All clocks leaving the factory are regulated to run within a rate of 10 to 15 seconds (either fast or slow) in 24 hours. However, many contributing causes tend to change this regulation. For instance, a clock after being installed may not be fastened rigidly to the wall or it may be hung out of plumb. The regulating nut or the check nut might have loosened during transportation, thereby changing the adjustment. The pendulum suspension spring may have become buckled in transportation. The wall on which the clock is

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### STYLE No. 29 CLOCK

Interior Wiring and Connections

12" Dial—140 Beat Movement

14" Dial and larger—120 Beat Movement

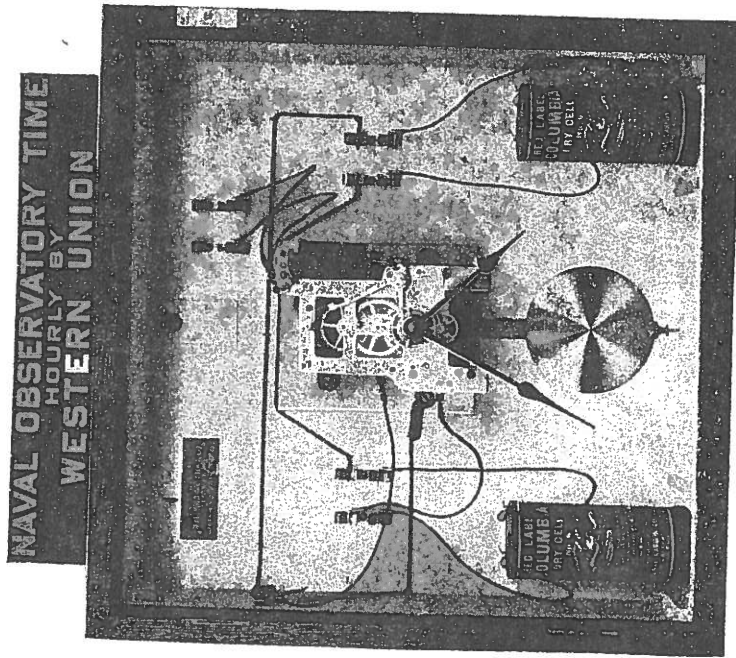


Fig. 6

hung might be subjected to slight continuous vibration or heavy intermittent shocks, the former caused by heavy machinery operating in the building and the latter by elevator or railroad trains or heavy trucking passing the building. Different locations as to latitude would also cause a change in the running rate. As it is practically impossible to guard against the different causes influencing change in rate, all clocks after they are permanently installed should be given a regulating test of several days before connecting to Western Union time service circuits.

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### STYLE No. 33 CLOCK

Interior Wiring and Connections

14" Dial—140 Beat Movement

18" Dial—120 Beat Movement

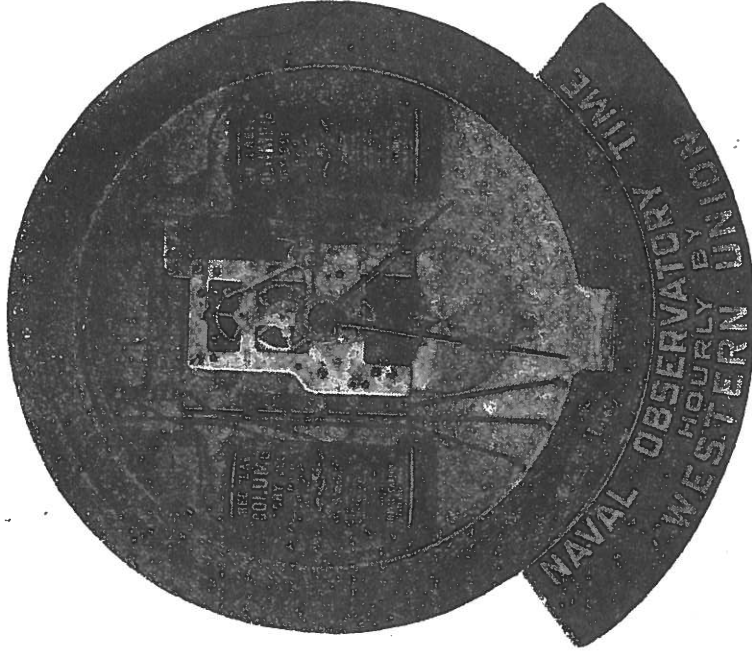


Fig. 7

### TYPES OF PENDULUMS USED WITH DIFFERENT STYLES OF CLOCKS

No. 9	60	beat pendulum
No. 10	120	beat pendulum
No. 18	80	beat pendulum
No. 29	140	beat pendulum
No. 29	120	beat pendulum
No. 33	140	beat pendulum
No. 33	120	beat pendulum
No. 33	140	beat pendulum
No. 33	120	beat pendulum

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in the spiral contact spring (J) has a flat side and is fitted to a flat on the insulated contact stud. If contact spring is bent to the right position, it may be taken off and put back at any time without changing the adjustment, or a defective spring may readily be replaced with a new one. When the armature touches the upper banking spring (T) the spiral contact spring (J) should clear the pin on spring (K) about  $\frac{1}{16}$ ". Both contacts on front and back plates are adjusted alike. The circuit break pins (U) on armature should raise both spiral contact springs at the same instant. If for any reason the motor magnets have become displaced, they can be quickly readjusted by loosening the four yoke screws holding them to the movement plates.

Hold the armature against the upper banking spring, move the magnets forward in the slot (V) until the end of the magnet cores clear armature by  $\frac{1}{64}$ ", then tighten down the four yoke screws, connect motor to battery and see that the armature has a steady vibration and does not touch the magnet cores. The adjustment should be such that the armature can swing past the magnet cores  $\frac{1}{8}$ " to  $\frac{3}{16}$ " before striking same.

#### Synchronizer—Style "F" Movement

The synchronizing lever (D and C) shown on Fig. 9 with heart shape seconds socket (R) and cam (Q and Q') on cannon socket are the same as in our older style movements. The synchronizing magnets and the method of operation of the synchronizing lever are different. The magnet (A) has a flat ended core. The armature (B) is made of flat iron pivoted to stud (P) fastened to synchronizing frame. The armature (B) is connected to the synchronizing lever (D and C) by a connecting rod (E) and two Pitman screws. Synchronizing lever arm (F) has an oblong slot allowing the armature to be lowered or raised  $\frac{1}{16}$ ". The synchronizing lever (D and C) is placed on a steel stud (G) fastened to the front plate and held in position by a brass nut. The synchronizing magnets (A) are fastened to yoke (H). The yoke is screwed to the synchronizing frame by four iron screws (I). The holes in synchronizing frame are oblong, allowing the yoke (H) and magnets (A) to be raised or lowered  $\frac{1}{16}$ ". The spring (J) on top of armature is used to throw it back quickly and also prevents armature from freezing to magnets. The screw (K) in stud (P) is used to screw up against magnet head, preventing any spring that might take place on armature stud. Binding posts (L and L') are screwed to synchronizing frame and the ends of the magnet coils are fastened thereto with metal clips. The brown flexible cords have metal clips soldered to them. They connect direct by these clips to binding posts (L and L') thus making a firm connection.

When replacing synchronizing magnets which for any reason have become damaged, remove the old pair at screw (M) and then loosen all four screws (I) in yoke (H), pushing same up against top

## SYNCHRONIZER—STYLE "F" MOVEMENT

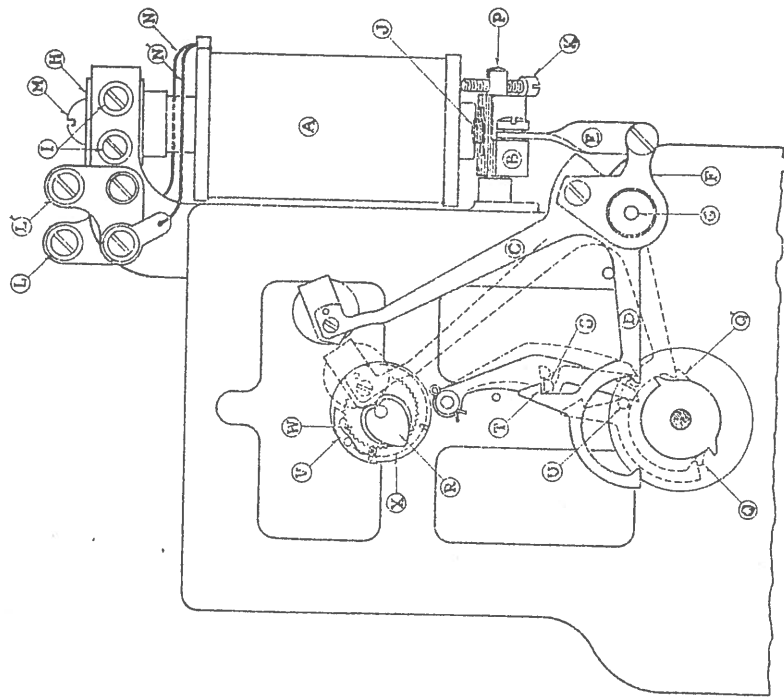


Fig. 9

of oblong holes. Then tighten down lightly and fasten the new pair of magnets with screw (M) to yoke (H) with the inner ends (N and N') of the coils showing front. Press armature (B) upward until synchronizing lever arm (D) locks tightly on cam ears (Q and Q'). With these adjustments made, loosen yoke screws (I) and press magnets down on spring (J) on top of armature.

Then tighten yoke screws (I) firmly and see that the back and front magnets clear armature by  $\frac{1}{100}$ ", after which screws in back of yoke (H) can be set down firmly. The adjustment screw (K) may then be screwed up until it presses lightly against magnet head. When current is passed through the magnets and held there, the armature must clear the magnets without touching. Wires (N and N') must then be connected to their respective binding posts (L and L') by slipping the metal clips soldered to them under the rubber bushing and making metallic connection with the binding plates. Fasten screws tightly to insure good connection. Magnets for these movements are always shipped with the metal clips soldered to the wire coils.

#### "H" Seconds Synchronizing Attachment—Ratchet and Pawl Type

##### Pawl Type

*Now Used on Style "A," "C" and "F" Movements*

*See Fig. 9*

In this type of attachment, the seconds or heart shape socket (R) is held to the seconds arbor by a steel pawl (V) resting between two teeth of a star wheel ratchet. This pawl is mounted on a stationary disc (which latter is fastened to the escape wheel arbor by a small set screw) and is held in this position by a light steel spring (X) which is attached to the rear of the stationary disc. The heart shape seconds socket (R) with star wheel ratchet should have a play of about  $\frac{1}{100}$ " to  $\frac{1}{64}$ " between the face of the stationary disc and the under side of the seconds arbor nut when latter is screwed down firmly to a shoulder on the seconds arbor. This type of seconds socket requires very little adjustment as a light tension on the pawl spring will hold seconds socket and hand without driving. Should this occur, however, a slight increase in the tension on the spring which presses on the pawl will add sufficient friction to correct the trouble.

The synchronizing lever arm (F) should be adjusted in such a manner that when pressing down on the double prong cam (Q and Q') on cannon socket, there will remain a very small play between the outer diameter of the seconds roller and the bottom of the heart shape cam. This adjustment is essential as the clock is liable to be stopped by the action of the synchronizing lever should the adjustment be such that the roller completely locks the bottom of the heart shape cam (R) and in doing so binds the escapement pivot in its bearing. All heart shape cams are now fitted with square stems and seconds hand sockets with tapered square hole to prevent seconds hands from shifting.

Note: For adjusting movements equipped with friction spring type synchronizer, see "General Information."

#### Cleaning and Oiling Style "F" Movements

Virtually all parts needing periodic cleaning and oiling can be reached without taking the movement apart. Remove dial train, heart shaped seconds socket, and synchronizing lever. Brush out all the bearings and pivot holes thoroughly with Pyrene, using a stiff marking brush. After applying the Pyrene, let it soak for a minute or two, then blow it off. This will force all the old oil and gum out of the holes on the plates.

With a piece of cheesecloth wrapped around a small piece of flat wood, clean the dirty Pyrene and old oil from the plates and arbors. Then apply fresh oil to all the pivots and bearings. Replace the dial train, heart shaped seconds socket and synchronizing lever and see that motor and center winding contact springs are clean and free from Pyrene and old oil.

If for any reason the movement must be taken apart, do not start the screws in the back plate. Remove front plate only. When taking out center arbor be careful that the center winding contact and knockway pieces do not drop off the arbor. If they do, put them back with five or six turns taken up on main spring.

#### Exchanging Movements

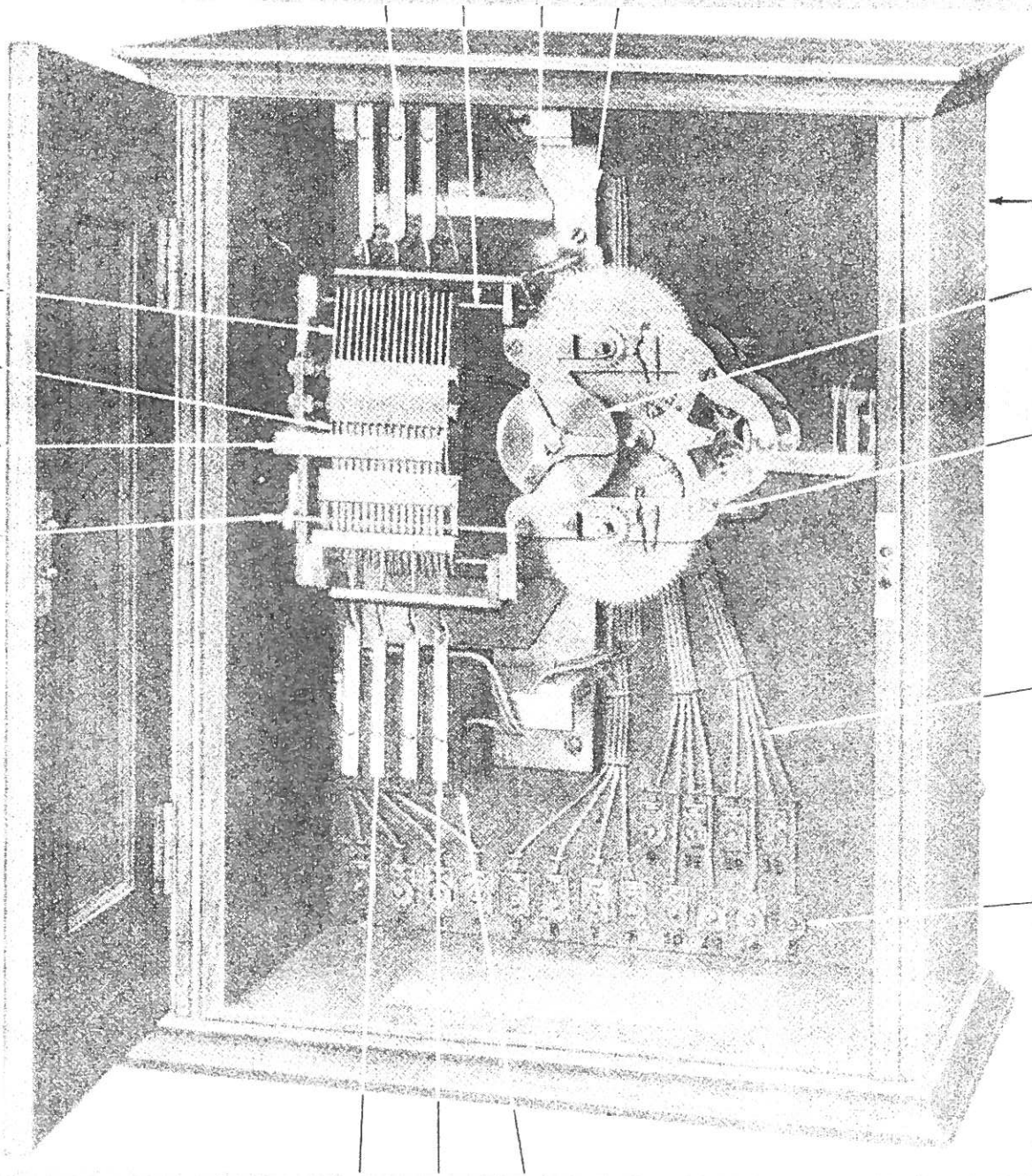
It is of utmost importance that numbers on metal property tags in clock cases should correspond with numbers of clock movements. When movements are exchanged, the metal property tag must be removed with the movement and returned with same. When a new movement is installed, there must be a new property tag bearing same number as new movement. Managers and Inspectors should immediately report such changes to their immediate superior so that records can be properly corrected.

Old movements with metal tags, taken out of clock cases should be carefully packed and promptly sent to the Self Winding Clock Company, 205 Willoughby Avenue, Brooklyn, New York, with notice of such shipment specifying serial number of movement, cause for removal and route. When new movement and property tag are installed, the Clock Company should be promptly notified through the Superintendent's Office, with number of movement clearly indicated on such report.

When *exchanging movements* do not remove old bracket from clock case as this movement will also fit the old style bracket. Fasten style "F" movements to old style brackets with *three* screws only, and omit the brass clamp such as is used on the new style bracket for "F" movements.

When ordering material for these movements, always mention style "F," specify beat of movement, size of dial and order by number as indicated in booklet entitled:

"SCHEDULE OF PARTS STYLE 'F' MINUTE AND  
STYLE 'F' (H-SECONDS)  
SYNCHRONIZED MOVEMENTS"



## 12- OR 24-HOUR RECORDER, 15-STATION -- FIG. 3

General -- This recorder is similar to the 48-hour, except a circular graph is used.

1. Electromagnet -- Identical to Item 15, Fig. 1.
2. Armature Arm -- Brass, 1/16 in. thick, engages punch arm, see Item 6, which operates on fulcrum bar, Item 4.
3. Armature -- Magnetic iron, riveted to arm, see Item 2.
4. Fulcrum -- Serves as pivot point for punch bar, see Item 6.
5. Guide Bar -- Integral with frame supports record being punched.
6. Punch Bar -- Operates upward to perforate recording disc when deflected by armature bar, Item 2.
7. Guide Comb -- Provides compartments for moving parts punching record.
8. Armature Bar Assembly -- See Items 1, 2, and 3, operates on fulcrum, Item 4. Two groups of four assemblies each, not visible under comb, Item 7.
9. Fulcrum -- See Item 4.
10. Magnet Bracket -- Secured to base, Item 11, by four screws, magnets secured to bracket by one screw each.
11. Base and Frame Assembly -- Base, cast-iron frame, steel bars, substantial construction.
12. Case -- See Items 2 and 6, Fig. 1.  
Over-all dimensions as follows:
 

<u>Stations</u>	<u>Height</u>	<u>Width</u>	<u>Depth</u>
2-10	14-1/4	12-5/8	8-3/8
11-20	17-3/4	15-1/4	8-7/8
21-30	21-3/4	17-3/4	8-7/8
13. Record Holder -- Provided with spring clamp.
14. Clock Mechanism -- See Item 7, Fig. 1.
15. Leads -- See Item 15, Fig. 1.
16. Terminals -- See Item 14, Fig. 1.



T E S T R E C O R D

DESCRIPTION OF SAMPLES

The devices described in the preceding sections of this report have been labeled for a number of years and no tests were considered necessary.

C O N C L U S I O N

The magneto watchman's system covered by this report has been found to comply with the present requirements covering the class and is judged to be acceptable for listing under Label Service of Underwriters' Laboratories, Inc.

Examination and Report by:

Reviewed by:

*R. G. Wells*

*L. H. Horn*

R. G. WELLS  
Asst. Elect. Engr.

L. H. HORN  
Asst. Elect. Engr.

RGW:ssh

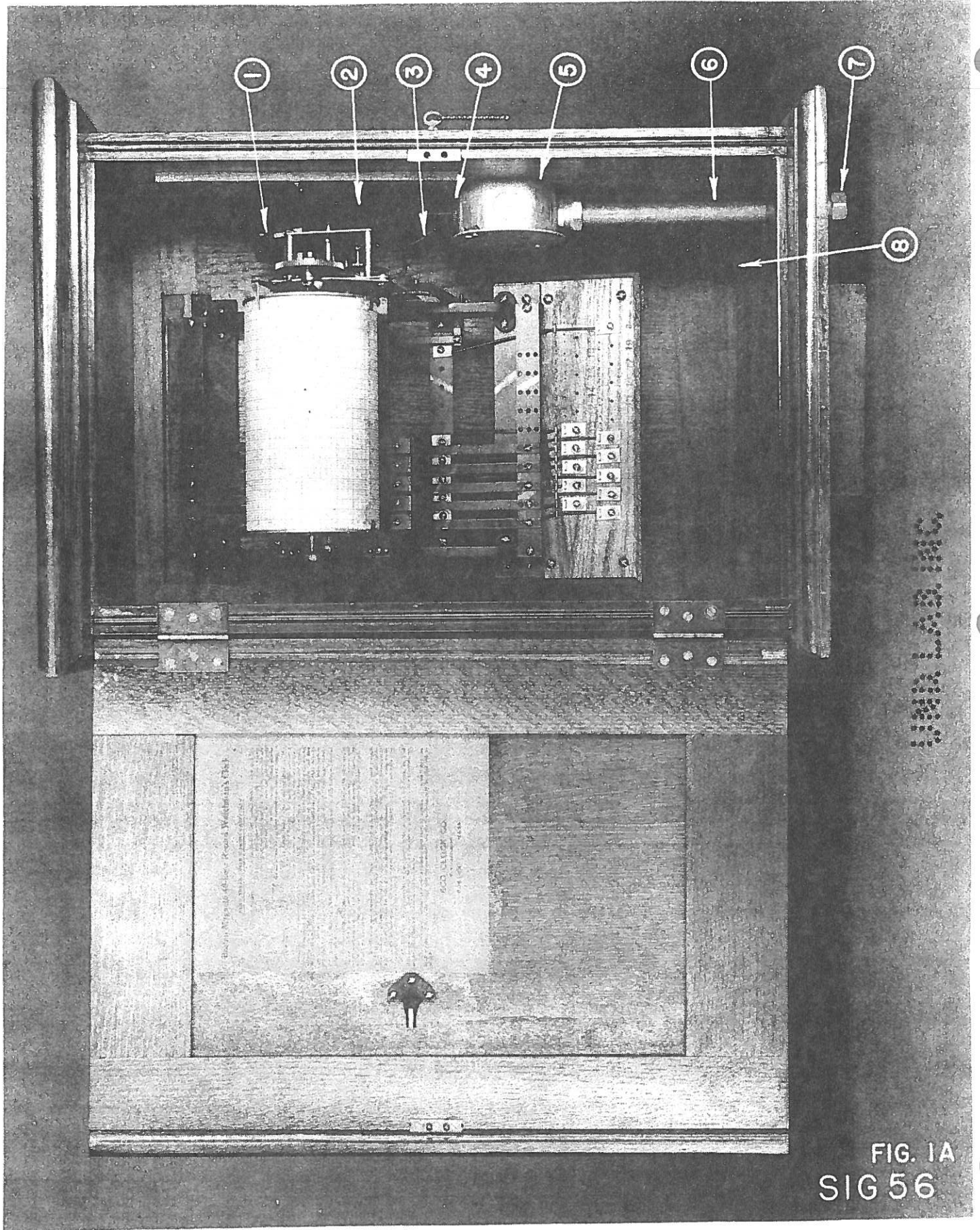
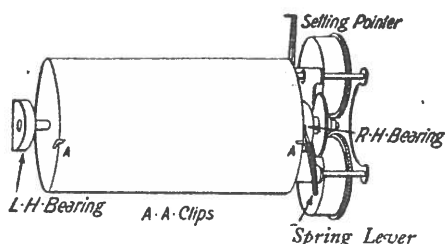


FIG. 1A  
SIG 56

# Boston Magneto 48-hour Record Watchman's Clock.

## READ THESE INSTRUCTIONS CAREFULLY



1.—**To Remove and Replace Drum.** Throw back setting pointer, pull down spring lever at right of drum, making sure to release that end of shaft first; drum will then lift out. In replacing, enter left end of shaft first and pull the lever down to allow right end to enter bearing. **Setting pointer should always be up, when removing or replacing drum.**

2.—**To Attach Dial.** After removing drum, lift the clips A.A. at side of flanges. Place spots on dial (indicated by arrows) over the small projecting pins on face of drum, then moisten along the gummed edge and carry dial tightly around drum; fasten securely, making sure that perpendicular ruled lines meet. Replace drum, bring down setting pointer, and **turn drum until setting figures on right hand side of dial correspond with time of day.** Slide drum to the right as far as it will go, and dial will then be in proper position to record time when stations are operated for first period. The automatic shift takes care of subsequent recording positions.

3.—**To Detach Dial.** Slide envelope opener (or something similar) carefully between gummed edges, and dial can be removed intact.

4.—**Revolution of Drum.** A complete revolution is made every 12 hours, this takes care of the records for four successive twelve-hour watching tours. The drum is actuated by friction, and when in motion with the clock movement, revolves **from front to back upwards.** If turned by hand, must be revolved in the same direction. It can be removed and replaced without interfering with the mechanism.

5.—**Winding and Regulating the Clock.** Wind clock in both springs once a week through the small door at side of cabinet, which must be fastened before locking front door. If clock runs slow, push arm of balance wheel **down** a trifle; if fast, push arm **up.** Clean and oil movement at least once every two years, **but never put oil on the recording mechanism.** Notify us when movement needs cleaning and we will furnish loan movement (free of rental charge) for use while your movement is returned to us for attention.

6.—**Tell-Tale.** The mechanical tell-tale registers in the columns on the dial, every time front door is opened or closed. If more than the proper number of punch marks is shown, investigate, as clock must then have been opened irregularly.

7.—**Generators.** Generators should be oiled at least every six months, or oftener if they turn hard or rattle. Remove the cover from the generator, and the four bearings to be oiled will be in sight.

DETEX WATCHCLOCK CORPORATION SUCCESSOR

**ECO CLOCK CO.**

MANUFACTURERS

BOSTON - MASS.

BOSTON

CHICAGO

NEW YORK

5A56 FIG. 1A

Signal 56  
Detex Watchclock Corporation  
Chicago, Illinois

-3A-

Issued: Aug. 9, 1949  
\*New Page: Oct. 6, 1950

ELECTRIC MOVEMENT ASSEMBLY - FIG. 1A  
(See Fig. 1 for Recorder Details)

1. Clock Motor - Listed (Telechron Type B2) screwed to gear assembly.
2. Motor Leads - 1/64 in. rubber with outer cotton braid or two cotton serves with outer cotton braid, impregnated. Free length in box 6 in., provided with strain relief knot.
3. Ground Lead - Bonds frame to box Item 5 secured by screws and lock washers.
4. Bushing - Phenolic composition, listed.
5. Outlet Box - Listed, 3 in., screwed to side panel, provided with cover.
6. EMT - 1/2 in. labeled.
7. Coupling - Listed EMT fitting.
8. Back - Screwed to frame.

\* This is a New Page.

RGW:am

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207 E. OHIO ST., CHICAGO 11, ILLINOIS

IN REPLYING  
PLEASE REFER TO

Sig. 56

October 19, 1950

Detex Watchclock Corporation  
4147 Ravenswood Ave.  
Chicago, Ill.

Attention: Mr. Sullivan

SUBJECT: Watchman's Time-Recorder Apparatus


Gentlemen:

We enclose the pages listed below, for the description of your subject product.

Please examine the pages carefully, and notify us promptly regarding any inaccuracies or omissions. If you find the pages satisfactory in all respects, kindly file in our Label Service Procedure, observing that revised pages replace present pages of like identity, while new pages should be filed in their numerical sequence. Your prompt acknowledgment of receipt will be appreciated.

New pages 57A and 57B dated October 6, 1950  
for the Label Service Procedure Sig. 56.

Very truly yours,

  
E. Brown,  
Asst. to Supt.  
Label Service

EB:hp  
enc.

cc Detex Watchclock Corp. at Boston, Mass. - with enc.  
cc " " " " New York, N. Y. - with enc.

REPORT ENCLOSURE
NEW REPORT AND/OR REVISED REPORT PAGES COVERING ABOVE ENCLOSED WITH THIS LETTER.

*OK. T. Mag*

October 27, 1950

Underwriters' Laboratories, Inc.  
207 E. Ohio St.,  
Chicago, Ill, Illinois

Attention: Mr. E. Brown  
Asst. to Supt.  
Label Service

Gentlemen:

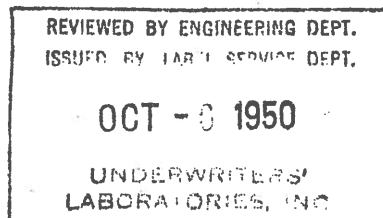
We have received new pages 57A and 57B dated  
October 6, 1950 for the Label Service Procedure Sig. 56 and  
find that no inaccuracies or omissions exist.

Very truly yours,

DETEX WATCHCLOCK CORPORATION

Arthur F. Gmitro,  
Assistant Works Manager

AFG:vl



To be continued.

## SPECIAL DESIGNS.

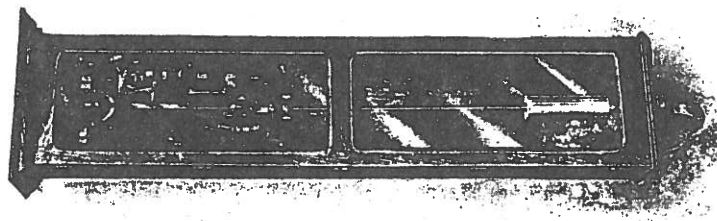


Fig. 58.

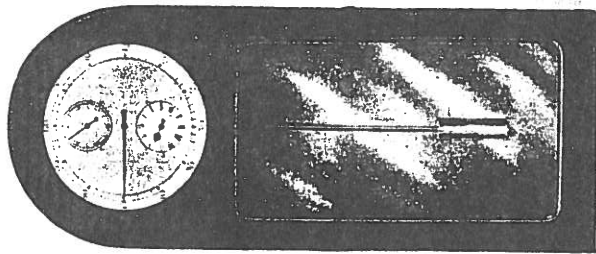


Fig. 59.

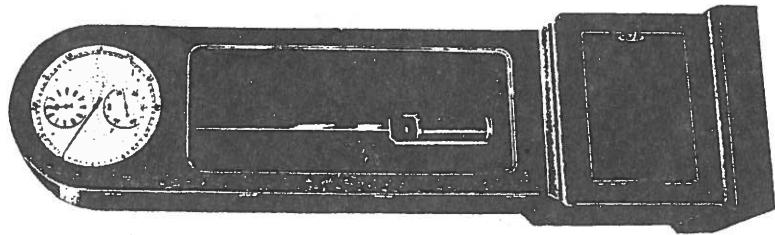


Fig. 60.

We have carried out a large number of special design CLOCKS, among these being the CHRONOPHER CLOCK of the Post Office, which, at St. Martins-le-Grand, controls the entire Greenwich Time Service in this country, and which was built by us in 1912. Fig. 58 illustrates another special Post Office design, a seconds beating clock arranged to record the time upon Trunk Telephone calls. Figs. 59 and 60 are Regulator faced Clocks, the former built for the Aberdeen Town Council to control the big striking clock, and itself synchronised to Greenwich Mean Time. Fig. 60 is an example of Steel and Mercury Pendulum Regulator Clock as made by us for several private houses, where exceptionally accurate time was a study.

## SYNCHRONISED MASTER CLOCKS.

A SYNCHRONISED "Master" clock enables the entire installation of "Receiving" clocks to be kept exactly to Greenwich Mean Time (or summer time), by means of a daily automatic operation.

The Post Office Daily Time Signal is utilised, and the signal thus obtained from the General Post Office acts upon an electro-magnet whose armature is arranged to zero-ise the count-wheel of the "Master" clock by means of a cam action.

The mechanism is carefully designed so that if the "Master" clock be absolutely "on time" at the second when the signal comes through, the latter will not affect the count-wheel at all. Further, to prevent stray signals coming in at

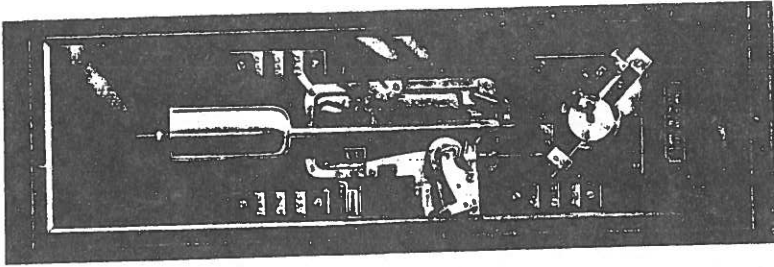


Fig. 61.  
The Post Office "Sub-Chronophor Control" Clock, as manufactured by us.

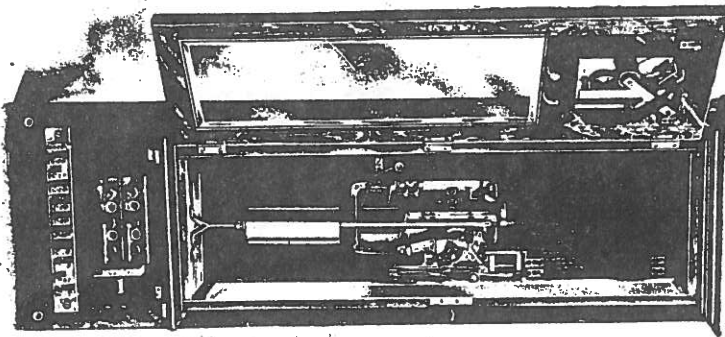


Fig. 62.  
Special "Master" Clock, Half-seconds Beat fitted with automatic synchronising attachment.



## Synchronised Master Clocks (continued).

wrong times, a further mechanism can be added, by which the "Master" clock is automatically cut off from receiving the signal except within a space of a minute and a half, during which time the Post Office line is cleared and the signal should appear.

Visitors to our Head Office can see one of these Automatically Synchronised "Master" clocks at work. The clock (illustrated by Fig. 63) controls all our indoor "Receiving" clocks as well as the two large illuminated outside clocks which now for years have been well-known "truthful" public clocks. A truly synchronised "Master" clock means not only UNIFORM but also TRUE TIME throughout the installation.

By a slight modification of the design, a similar "Master" clock can be supplied

suitable for reception of an Hourly signal—such, for instance, as that supplied by the Standard Time Co. in London.

Of other patterns, Fig. 61 illustrates the Post Office Standard Sub-chronopher Control Clock, all of which have been made by us, and which are installed in various provincial Post Offices to receive the daily signal from London and distribute it to their own circuit of local offices.

Fig. 62 is an example of another method of synchronisation, in which the armature of an electro-magnet arrests the progression of the count-wheel for exactly the length of time it has gained since previous correction. In this instance, the clock must be given a "gaining rate," and our standard pattern (Fig. 63) has the advantage in that it synchronises whether the clock be slow or fast.

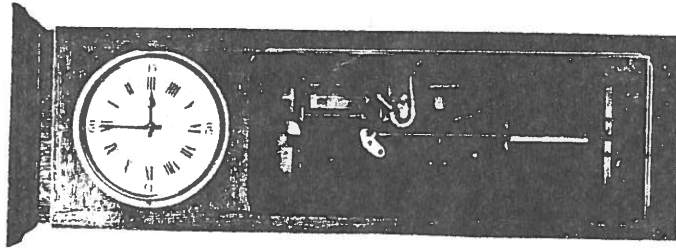


Fig. 63.

Standard Synchronising  
Half-seconds "Master"  
Clock as used at our Head  
Office. CODE H.S. 6.

## BATTERY WARNING INDICATORS.

ONE of the simplest, and therefore most efficient, forms of Battery Warning devices is as supplied by us in the form of a small milliamperemeter and switch key. This is fitted in the dial circuit to enable a reading to be taken at any half-minute—a red line indicating the proper Battery strength (250 milliamps).

CODE B.W.1.

Another standard pattern with *audible* warning, mounted neatly in oak case, complete with bell, is generally preferred. The Indicator is fitted in circuit with the "Receiving" clocks and is arranged so that as soon as the current falls below proper strength, the bell gives a single stroke of warning at each half-minute.

CODE B.W.2.

## STRIKING MECHANISMS.

WE have frequently supplied substantial Striking Mechanisms, motor driven but controlled as to time by the "Master" clock of the installation.

Fig. 64 is an example of motor-driven mechanism, arranged for striking the Hours and Ting-Tang Quarters upon large bells, and was supplied to the order of D. Hanbury, Esq.

For house systems where only an "Hour strike" is required we can make special "Receiving" mechanism to control the number of strokes on a gong for each hour. A tubular gong hung in the Hall and controlled by one of these mechanisms will strike the hours, but can be switched off at night if desired.

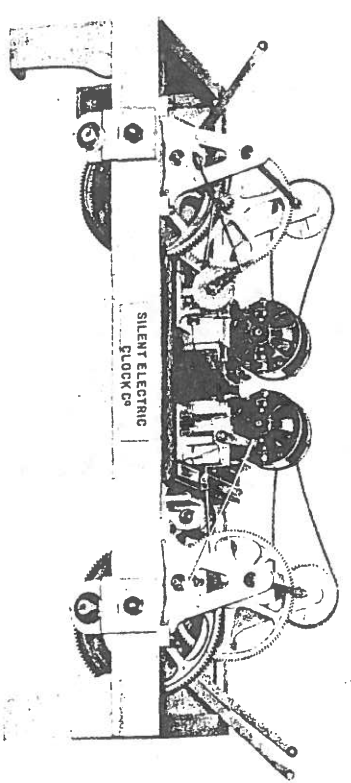


Fig. 64.

## MUNICIPAL TIME SERVICE.

**I**N addition to manufacturing apparatus for the simpler classes of Electric Clock installations, we also manufacture and can supply apparatus suitable for use in connection with Public Time Services upon an extensive scale. Such apparatus varies according to local conditions, but we are always pleased to prepare a scheme to suit any conditions when made acquainted with requirements. In general, arrangements are made for a number of distributing centres, at each of which a small (half-seconds) "Master" clock is installed, such being controlled by a main clock, which transmits periodical Synchronising Currents to the "Master" clocks at the distributing centres. This scheme enables the circuits to be so divided as to guard effectually against any risk of breakdown.

The distribution lines are of course metallic circuits, and suitable testing apparatus—together with convenient test boxes located where necessary—facilitate the localisation of line faults. All these accessories are of

Standard pattern and ensure the utmost simplicity of the whole plant.

Apart from the foregoing arrangement of the electrical circuits, which affords the most durable results, it is well to emphasise two points in particular in which our "Master" clock and dial mechanisms are specially suitable for use in connection with a Public Time Service installation, viz. :—

(1) The simple, but effective, magnetic lock and drive in our dial mechanism obviates any risk of failure due to the use of Sliding, Striking, or Spring actuated parts which, in exposed positions where rusting (even to a slight extent) may occur, cannot be considered to be entirely reliable.

(2) Our "Master" clocks, although inexpensive, are provided with contact mechanism which may justly be claimed as far superior to that in any other type of Electric Clock.

The following List gives the names of a number of purchasers of **SILENT ELECTRIC CLOCKS**. It is, however, very incomplete, because a large number of our clocks are sold through well-established Agents. Buyers need only see that the words "SILECTOCK PATENT" are on the face of each clock :—

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Adams, William & Co.	Cobb, Munro	Eastman Kodak Co., U.S.A.
Alexandria Post Office, Egypt	Colombo Observatory, Ceylon	Egyptian States Railways, Alexandria Station, &c.
Appleby, E. G., Esq.	Cornish, C. H.	Egyptian Postal Administration
Admiralty	Cox, C. W., Esq.	Electro-Technische Industrie, Holland
Armstrong, Thos. & Bro., Ltd.	Crosswell, H. B., Esq.	
Archer, A. B., Esq.	Crown Agents for the Colonies	
Australian Post Office	Cammell, Laird & Co.	
Agent-General for South Australia	Cox, W., Esq.	Ferrier, C. W., Esq.
	Cox Walkers, Ltd.	Frodsham, Chas. & Co.
Balrerssea Telephone Exchange	Cash, H. J.	Fullerton, J. (Larne)
Baker, A. F., Esq.	Ceylon Railways	
Bell, Joseph	Coltingham, E. T.	
Bexhill Golf Club	Cumberland County Council	Gerristion Station, South Africa
Bexley Heath U.D.C.	Christ's Hospital	Gaiffe, Major
Birmingham Fire Brigade	Coneron, C.	Gilbey, W. & A.
Blackburn, Starling & Co., Ltd.	Cox & Co. (R.A.F. Bank)	Gilbey, Sir Walter, Bart.
Blythe, Mrs.	Chaler, Lea, Ltd.	Gleedhill-Brook Time Recorders, Ltd.
Boldero, Mrs.	Chorley, John	Gold, Sir Charles
Bolton, Thos.	Chichester Asylum	Gold, Sir A. G.
Briscoe & Co. (Agents for Australia)		Gowring, G. H., M.A.
British Syphon Co.		Grant, Sir J. Macpherson
Buckmaster, R., Esq.		Great Northern Railway
Bramfontein Station, South Africa		Green, Thos. & Co.
Beckett, G. F. & Co.		Guy's Hospital
Borlter, C. & Co.		Grafton, A., Esq.
Benton, Thos. & Co.		Gorton Shops, Perez (C.A.R.)
Burrell & Co.		
Birmingham Metal & Munitions Co.		Haberdashers' School
Barnes, G. & Co.		Harrison, Messrs.
		Hanbury, D., Esq.
		Haycock, William
		Healing, L. J. & Co. (Agents for Japan)
Cairo Post Office, Egypt		Heart Hospital
Central Argentine Railway	Earl Grey Schools, Sask., Canada	

## Purchasers of Silent Electric Clocks (continued).

Healty & Gresham (Agents for India)  
 Helbert, L., Esq., M.A.  
 H.M. Prison Commissioners  
 H.M. Post Office.—Since 1910 we have supplied several thousands of clocks to this important Department, including The Chronopher Clock (controlling the entire G.M.T. service throughout the country), and *all* the Sub-Chronopher Clocks distributing official Post Office time.  
 Holmes, J. H. & Co.  
 Hospital for Gentlewomen  
 Hong-Kong and Shanghai Bank  
 Hovis, Ltd.  
 Hayward, A. M., Esq.  
 H.M.S. "Vernon."  
 Harrison & Robinson, Ltd.  
 Hawkins, G. T., Ltd.  
 Hawkes, O. C., Ltd.

Imperial Japanese Railways  
 Indian Telegraph Department  
 Johannesburg Town Hall, South Africa  
 Javeri & Co.  
 Jefferis, A. H.  
 Jelf, C. R., Esq.  
 Johns, E. F., Esq., M.A.  
 Joyce, J. B. & Co.  
 Jackson, J., Ltd.  
 Keay, Thos., Esq.  
 Kobe Club, Japan  
 Kilpatrick, J. & Son  
 Lambourne, Messrs.  
 Lancashire and Yorkshire Railway

Larne Council Schools  
 London & South-Western Railway  
 Love, A. H., Esq.  
 Lewis, Dr. C.  
 Leopoldina Railway Co., Brazil  
 Leeds P.O.  
 Liverpool (Central and Exchange) Telephone Exchanges  
 Leach, G., Esq., M.A.  
 Leeming Bros.

Macnamara, J. B., Cairo  
 Mackenzie, J. W., Esq.  
 McNeil, A., Melbourne, Australia  
 Manchester Ship Canal  
 Manifold Printing Co., Ltd.  
 Melville, Dundas & Whitson  
 Miller Hospital  
 Machardy, the late Prof. M.  
 Moose Jaw Schools, Sask., Canada  
 Municipal Power Station, Johannesburg  
 Morrison, Messrs. (Valparaiso)  
 Muirhead, H. J.  
 Margate College  
 Margate Ladies' College  
 Max Minck  
 Mackerzie, J. & Co.  
 Manchester P.O.  
 Museum Telephone Exchange  
 Mayfair Telephone Exchange

Nicole Neilson  
 Newfoundland Post Office  
 New Zealand Public Works Department  
 National Provident Institution  
 National Hospital for Heart  
 National Institution for Blind  
 National Projectile Factory, Nottingham

Newcastle G.P.O. (Australia)  
 New Cordoba Station, C.A.R.  
 Orchard, P.  
 Oldham P.O.  
 Osaka Electric Club, Japan  
 Office of Public Works, Dublin  
 Parliament Buildings, Regina, Canada  
 Peare, W. F., Ltd.  
 Piccadilly Hotel (over 300 dials)  
 Price, Rev. W. G., M.A.  
 Prior, A. V., Esq.  
 Pursell, H. V., Esq. (New York)  
 Ponders End Munition Works  
 Park Royal Munition Works  
 Parsons, A. E.  
 Paton, Calvert & Co.  
 Park Telephone Exchange  
 Queen's Highcliffe Hotel, Margate  
 Queen Alexandra's Hospital for Officers  
 Rampton Asylum, Notts  
 Rashleigh, Dr.  
 Regina Schools, Canada  
 Ranchi P.O., India  
 Ruismond, Ltd.  
 Retiro Terminus, Argentine  
 Richards, J. & Co.  
 Robertson, C. J.  
 Robinson, Captain  
 Rimman's Motor Works  
 R.N. Barracks, Portsmouth  
 Salomons, Sir David, Bart.  
 Saldon, A., Esq.  
 Siam State Railway

**Purchasers of Silent Electric Clocks (continued).**

Saunders, J. B. & Co.  
 Shaftesbury Hotel  
 Self Winding Clock Co., of America  
 Smith, William, Holland  
 Stockall, Marples & Co.  
 Swan, Hunter & Richardson  
 Singer, A. Mortimer  
 Swinden & Sons  
 Southern Automobiles, Ltd.  
 Stephens, A., Esq.  
 Summers, John & Sons  
 Sedgwick, Collins & Co.  
 Sheffield University  
 Signal Schools, Portsmouth  
 Smith, J. & Sons  
 Siam Electricity Co. (Agents for Siam)  
 South, B. W., Ltd.  
 South African Railways  
 Standard Time Co.  
 S.S. "Doña Isabella de Bourbon"  
 S.S. "Reina Victoria Eugenia"  
 Stockton P.O.  
 S.E. District P.O.  
 S.W. District P.O.

Taunton P.O.  
 Taylor, Rev. A., M.A.  
 Thanet Tramways

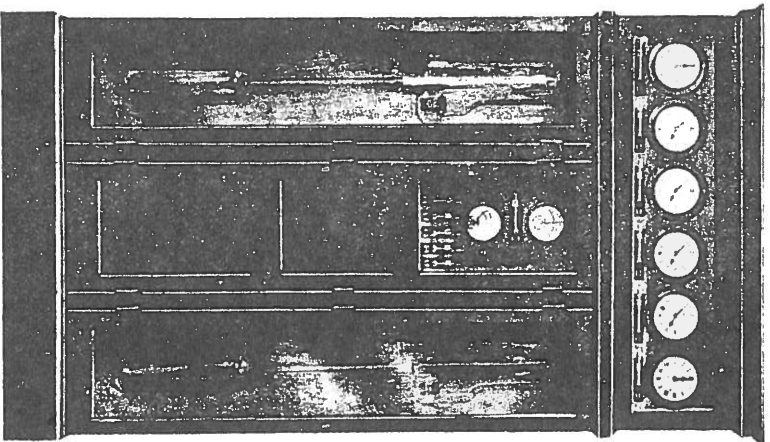


Fig. 65.

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 Tozer, Kenesley & Melbourne, Ltd.

Vivian, Younger & Bond  
 Vulcan Globe Match Co.  
 Victoria Telephone Exchange

Walker, Ltd.  
 Westgate Town Hall  
 Wilson, A. J., Esq.  
 Wilson, R. G., Esq.  
 Wadkin & Co.  
 Wiseman, A. S.  
 Whitehead, Morris & Co., Ltd.  
 Wollmann, G. H., Esq.  
 Woodley, J. H., Esq.  
 Wray, Son & Perry  
 Walker Brothers  
 Wood Green Public Library  
 Workington Technical College  
 Wright, J. C., Esq.  
 W.C. District P.O.  
 Walker, A. (Australia)

Y.W.C.A., Melbourne  
 Ye., W., & Co.



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THE JOURNAL OF  
THE ELECTRICAL HOROLOGY SOCIETY  
CHAPTER #78  
NATIONAL ASSOCIATION OF WATCH & CLOCK COLLECTORS

VOLUME XXXI #2, JUNE 2005

Fellow Horologists:

This issue of the Journal of the Electrical Horological Society completes the series on the ECO Magneto Clock Company and also completes the 1923 Self-Winding Clock Company manual entitled "Instructions for Installation and Maintenance of Self-Winding Synchronized Clocks." We are starting an article submitted by Mr. Rodney King. This article was written by Mr. Frank Kerfoot and the article is entitled "History of the National Self-Winding Clock Company."

This is a good opportunity to ask all members of Chapter 78 to submit articles for publication in the Journal. **Please remember that we depend on members contributions for Journal articles.** Be on the lookout for published articles dealing with electric clocks, original articles are always welcomed, and electric clock catalogues and manuals are of great value. If you liked the article or learned something from it, others members will also benefit by reading the same article. Currently, we are running low on articles for publication and we do not wish to suspend the Journal of the Electrical Horological Society for want of articles.

Along the same lines, our editors need help in translating some technical articles written in French. Unfortunately, computer translations have a hard time with technical articles so we need help from someone familiar with technical French. As a quick example of the problems with computer translations, in French the analogy between electricity and flowing water is maintained so that an open circuit conducts electricity while in English an open circuit does not conduct electricity. Please help with these translations if you can.

To add to the brief mention in our last issue, the Swiss exhibit on electric clocks will continue until September 18, 2005. They have published a catalog of the exhibit in French with appendices in English and German. We will keep you informed when we learn more about this catalog.

Please enjoy this issue of the Journal and have a happy and safe summer.

Yours very truly,

Bill Ellison

Bill Ellison.....President

Harvey Schmidt, FNAWCC,.....Secretary-Treasurer )

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## History of the National Self Winding Clock Company

Frank Kerfoot  
June, 2004

### Overview

The National Self Winding Clock Company made a series of spring-driven, solenoid-wound pendulum clocks typical of those made by a number of other manufacturers, just after the turn of the 20<sup>th</sup> century. Their clocks included (as an option) the capability for hourly synchronization, as employed widely by the Self Winding Clock Company of New York. The National SWCC models included a range of mantle and wall clocks. One distinguishing feature of the company's clocks was the ability to provide time and strike clocks using the electrically self-winding approach.

### Company History

The company history begins with the issue of three patents on Feb. 19, 1895 to C. M. Crook. This date is referenced on many (if not all) of the clocks which exist today. Not long thereafter, on June 6, 1895, Charles S. Burton, E. J. Wray and L. W. Johnstone petitioned the State of Illinois to form a corporation named the National Self Winding Clock Company<sup>1</sup>. Burton was the patent attorney on these early patents (as well as almost all of the later ones). The connection of Wray and Johnstone is not known. Of the 800 shares of stock initially issued (at \$100 each), 799 are shown as being subscribed by C. M. Crook, the inventor on the initial patents and many later patents associated with the company as well. Crook's ownership perhaps represented payment for the use of his patents (the early examples of which were not assigned). The State of Illinois granted incorporation on Feb. 13, 1896. The initial offices were in Suite 1410, Marquette Building, Chicago Ill. In March, 1896 Burton was appointed as president, and the board of directors established as Burton, Wray and Donald. M. Carter. Carter's connection is unknown. Also in March 1896 the capitalization of the corporation was increased from \$80,000 to \$150,000, but it is not stated who received the additional stock (if anyone). Additional patents whose dates are referenced on some surviving examples of National SWCC clocks were granted to Crook in 1897 and 1898, and assigned to Burton.

The next reference to the company that has been identified is a testimonial from the C. B. & Q. Railway Co. dated January, 1898, which shows a month of daily time errors for a "Nat'l S-W clock"<sup>2</sup>. The worst daily error shown was 3 seconds, and this was stated by the Railway Co. as "being good enough for use". It is not clear what clock was tested, since no clock from the company has surfaced which shows Chicago manufacture or can be clearly associated with this time period. As will be seen, most of the early known examples are labeled as being from Bristol, Ct., which doesn't enter the picture for a year or more. Perhaps one or a few hand-made models were made specifically to seek such testimonials. There is one surviving example of a movement (no case) which appears to predate the known Bristol examples, and perhaps this could be one of these early models. Its latest patent listing is Jan. 1897, making it plausible that it could have been evaluated by the railroad in 1898.

No Illinois records have been found between the incorporation in 1896 and the first of a group of annual reports in early 1902 (conforming to a mid-1901 Illinois law requiring annual reports). The 1902 report shows the officers of the company included Anson L. Clark (a Physician from Elgin, Ill.) as President and Treasurer, and Burton as Secretary<sup>3</sup>. They remained in those positions until early 1906.

While the company was incorporated initially in Illinois and continued to have offices there, a parallel history in Bristol Ct. is first recorded in the town directory in 1900 (so the company may have come to town in late 1899)<sup>4</sup>. They maintained offices in a variety of buildings in Bristol over the next few years, settling in the Laport Hubbel's old marine clock factory building in the Forestville section of Bristol as of the 1902 directory. They did not pay taxes in Bristol until 1903 (a date mentioned for the company origination in some other references).

During this same period a patent (also by Crook) was filed in March 9, 1901 and issued July 1, 1902. The assignment was to the National SWCC, and indicates the company is in Elgin Illinois, and a corporation of Illinois. Meanwhile, the annual corporate filings in Illinois continue to show the same Marquette Building address in Chicago, so the Elgin reference at this stage is to some extent a mystery. However, the President and Treasurer, A. L. Clark, lived in Elgin, perhaps explaining the reference.

To add to the confusion, an incorporation of the same company was granted in New Jersey on Sept. 4, 1901<sup>5</sup>. Supporting this is a patent filed Sept. 30, 1901 and issued Oct. 28, 1902, assigned to the company, and showing it to be of Jersey City, NJ and Bristol, Ct., and a corporation of New Jersey. New Jersey incorporation continues until 1906, when the charter in that state was revoked for non-payment of taxes<sup>5</sup>.

It appears that a significant number of clocks were manufactured at the Forestville factory in Connecticut from 1902 or so until late 1905. More than half of the National SWCC clocks that are known to exist today are shown as being made in Bristol. In 1904 the company (in Illinois and still in the Marquette Building in Chicago) expanded their stock capitalization from \$150,000 to \$1,000,000 and the board of directors from 3 to 7 members<sup>3</sup>. Presumably the former represented confidence that they were at least to some extent successful in the clock business as of 1904. This may also have been in preparation for the construction of their own factory building in Champaign Ill., as discussed below.

Also in 1904, the full set of company stockholders was reported as A. L. Clark (the President), Emma L. Clark (wife of the President's son Percy L. Clark), and Herbert T. Clark, whose relationship to the other Clarks is unknown<sup>3</sup>. Crook is no longer shown as a stockholder, issues no further patents associated with the company, and in about the same time period appears as the principal designer of a time stamp machine for Stromberg Electric, of Chicago<sup>6</sup>.

On Feb. 4, 1905 the Champaign Daily Gazette, in Champaign Illinois, published an article discussing the National Self Winding Clock Company moving their factory to Illinois<sup>7</sup>. Other cities in Illinois were also in contention, but the article stated that if Champaign-Urbana residents purchased \$100,000 in company bonds that Champaign would be chosen. The clock was stated in the article to be the invention of Dr. P. L. Clark (despite almost all of the patents to that date showing C. M. Crook as inventor). The stated reason for the move back to Illinois was that more than 50% of the sales were being shipped to the west, and that raw materials would be cheaper than in the east. Clark was quoted as saying that manufacturing costs would be 30-40% cheaper in Illinois than in Connecticut. One of Champaign's small advantages was seen as the ready supply of University of Illinois (at Champaign-Urbana) students as a source of labor.

Apparently, shortly thereafter Champaign was chosen as the site for the new factory. On August 10, 1905 the *Bristol Press* (in Bristol, Ct.) reported<sup>4</sup>:

"Dr. Percy L. Clark, president of the National Self Winding Clock Company, arrived in town last Saturday and is staying at the Gridley House. Dr. Clark told the Press reporter

that the concern would move its business from the present factory now used by the company in Forestville to a new factory being erected in Champaign Ill. The new factory will afford room for the manufacture of cases as well as movements. The factory here has been under the management of David. L. Crammond, who is a clock expert and has brought the mechanism of the self-winding clock to perfection. He will move to Champaign and supervise the works there. The machinery and tools of the company are now being packed in Forestville and the move is expected within six weeks”

Among other things, this quote indicates that the company was buying cases for its clocks made in Bristol, and also that they were manufacturing and not buying movements. The Dr. Percy L. Clark referenced as the President of the company appears to be a misquote. Percy L. Clark (who was also a physician) was in fact from other information the General Manager, and (from census records) the son of Anson L. Clark, the company President and Treasurer<sup>3</sup>. Percy Clark already lived in Bristol at this time (from both census and patent records), so presumably he would not have been staying in the hotel. Therefore this reference was probably to Dr. Anson L. Clark (who was, as stated, the president).

It is interesting to note that although Percy Clark was a physician, as was his father, he was the inventor of record on several patents relevant to the company, beginning with a patent filed in June 1900 and issued July 9, 1901.

The new factory in Champaign was an impressive complex, including a 2-story main building about 200' x 50', several auxiliary warehouse buildings, a powerhouse, and its own freight siding<sup>8</sup>. It was located (and perhaps still is- it was still there, although much modified, in the 1950's) at 602 North Market Street, opposite the end of Eureka Street (the building numbering has since changed).

The move back to Illinois (to Champaign) is documented in many other references. Two patents, one filed Nov. 26, 1902 and issued Sept. 26, 1905 and the other filed Oct. 13, 1902, renewed Jan. 8, 1906 and issued Sept. 4, 1906, are both assigned to the company in Champaign Ill., and the incorporation is shown as Illinois. A letter to a potential customer dated April 4, 1906 on a company letterhead showing the officers of the company as well as its Champaign Ill. location, indicates that the company is in business in Champaign at that time<sup>9</sup>. A significant number of surviving clocks are labeled as being manufactured in Champaign Ill., indicating that the new factory was operational for a reasonable period of time.

In early 1906 the slate of officers changed completely. The new President was E. S. Swagart, and both A. L. Clark and Burton disappeared from the scene<sup>3</sup>. The April, 1906 letter referenced above lists these new officers, but still show Percy L. Clark as General Manager.

On April 25, 1906 the Champaign Daily Gazette published another article on the company<sup>7</sup>. The title was “Just Winds Itself”, a variation on a company advertising slogan, and the subtitle was “Business at the Clock Factory Humming along Beautifully”. The overall tone of the article was optimistic. There was a comment that the factory was still getting up to speed, but Percy Clark was quoted as saying that 44 clocks were shipped that week, he expected to reach 70 clocks a day in 4 weeks, and 100 a day before the beginning of June. The article stated that 70 men were employed, and more might be needed. There was mention of perhaps needing an extension to the building. The article stated that the reason why the clocks were not available for sale in Champaign was that they had so many orders from other areas of the country, and it was easier to explain to locals that clocks were not available due to demand elsewhere. There was also a cryptic comment about in the future finding “a time when we can invite our friends to come out

here and inspect the place, and see what we are doing". The lack of clocks for local sale, the apparent secretiveness up to that time, and later events make me wonder if all of the statements made by Clark were accurate.

Also a bit surprising (to me) was an article, also in April, 1906, in the Champaign County News stating that a \$500,000 mortgage against the property had been filed recently<sup>7</sup>. The article seems to say that the mortgage was made on Feb. 1, 1904, but presumably the money wasn't drawn until about the time of this article. If the factory was completed and the business was booming it seems a bit of a surprise that large amounts of additional capital were required at that point.

Regardless of the actual state of the company in early 1906, the matter came to a head later in 1906. A letter dated Aug. 21, 1906 (from T. J. Burrill, of the Univ. of Illinois, head of a committee representing the bondholders, to C. S. Burton) discusses the insolvency of the company<sup>10</sup>. No record of the details has been found, but apparently Shelby S. Besore assumed the operation of the company. The Burrill letter says that insolvency appears inevitable, but that the bondholders would prefer a private arrangement to court action, and that appears to be what happened. Shelby Besore's obituary describes him as "...receiver for the old self winding clock factory", and other documents describe him as receiver, manager or custodian of the company, making it appear that he ran the company either as part of a court proceeding (but for which the appropriate US district court archives can find no record) or perhaps at the request of the bondholders. No record has surfaced that indicates that Besore had an equity position in the company.

On October 12, 1906 the Champaign Daily Gazette published the following:<sup>7</sup>

**"PUSHING SALE OF CLOCKS**

**Champaign Factory is Still in Operation for Business**

The National Self Winding Clock Company is now pushing the sales of the office clock manufactured at the factory in this city and has taken space in several trade journals.

The output of the factory is not large, but the plant is kept in operation as long as there is a demand for the product. Up to this time there has been very little complaint about the office clocks and they are selling regularly."

Clearly there have been big changes since the booming business of April, 1906. No newspaper article has been identified describing what happened. It is not clear from this article if Besore is at the helm by October of 1906, or if this is the last gasp of the old management. A small article in the Champaign county Gazette on March 7, 1907 indicates that the factory of the company would be sold to the highest bidder on the courthouse steps on March 23<sup>7</sup>. It is not clear how this sale relates to Besore's position as receiver/manager.

The city directory for Champaign-Urbana shows the company in existence in 1908 (at the same factory address, with Besore as manager), but no reference in Champaign for 1909 and beyond<sup>11</sup>. By 1909 the factory building was occupied by a piano company<sup>7,8</sup>. Interestingly, the 1908 directory shows the "National Self Winding Clock Factory, S. S. Besore mgr" in the "names" section of the directory, not the business section (where the company was listed in the 1906 directory). There is evidence that the company, under Besore's management, continued to manufacture clocks, rather than just selling existing inventory. Some surviving examples show a patent date of March 12, 1907, indicating that movements were made (or at least stamped) after that date.

Coincident with Besore's apparent departure from the Champaign factory in 1908, a reference to "S. S. Besore, Manufacturer" appears at 502 High St. in next-door Urbana, Illinois<sup>11</sup>. This same

terminology appears on one of the surviving catalogs and other literature, discussed later. This or similar references continue at that address in Urbana until 1910. By 1910 Besore is described as manager of a retail store but also doing clock repair. There are no Champaign-Urbana references to Shelby Besore by 1912. The building at the stated address in Urbana was in 1909 a modest (~900 Sq. Ft, 1 story) residence, indicating that not much if any manufacturing was conducted there.

The New Jersey incorporation had already been revoked in 1906 (perhaps as a consequence of the move from Bristol). Illinois records show the Illinois incorporation was cancelled in March 1907 for failure to file a 1907 Annual Report. Presumably Besore operated the company as a sole proprietorship (or perhaps a partnership, in some way involving the bondholders), since the incorporation was revoked. A letter from the Chancery Court dated 1918 indicates that nothing further has been heard from the company since the missing Annual Report of 1907, and that the incorporation remains revoked. Records show the company was formally dissolved by the courts in Illinois in 1926.

Although there is evidence that Besore continued in business with some remnants of the company until perhaps 1909 or 1910, there is no evidence that clocks were made after about 1908, or sold after 1910. There are other references to Besore after 1910 related to the company. There is a patent filed June 22, 1910 and issued on July 9, 1912 (reproduced in the EHS Journal<sup>12</sup>) with Besore as the inventor that is clearly an extension of previous company patents (and which shows his address as Urbana). However it has no assignment. No clocks referencing this patent or practicing this invention have surfaced.

A personal letter also exists from Besore dated June 28, 1915<sup>13</sup>. In this letter Besore discusses delivering a self winding clock. The addressee sounds from the tone of the letter like a personal friend, and Besore discusses farming and disposing of merchandise as his business, not clockmaking. He bemoans being unable to sell his clock patent (presumably the 1912 patent referenced above). Overall it sounds to me like he is repairing a friend's clock, or perhaps selling the last of the inventory from his farm.

#### **Catalogs and Other Company Literature**

Several copies of catalogs have survived, as well as other literature. There is a copy of a catalog of the company from the Champaign era (as determined by a lithograph of the factory it contains)<sup>2</sup>. This appears to be from circa 1906, before the insolvency and subsequent involvement of Besore. Another catalog survives which is very similar to the previous one, except that it has (rather crudely) stamped on it "S. S. Besore, successor"<sup>14</sup>. I expect this was a catalog of the company before bankruptcy that was stamped subsequently. The second of these catalogs lists essentially the same clock models (a few were removed), but for each clock listed as providing time and strike there is a separate "special" which offers the same clock with time only for a few dollars less.

A copy of a sales document has survived over the same letterhead as the April 6, 1906 letter, also showing the location of the company as Champaign<sup>15</sup>. Since it still shows the 1906 corporate officers it presumably predates the bankruptcy. This document offers additional insight on the time-only offerings in the second catalog mentioned above. The sales document indicates that striking clocks are not available, but time-only versions of the clocks in the catalog shown as time and strike can be ordered. The only reasonable explanation I can find (given that time and strike clocks were made previously and some survive) is that a patent infringement was involved. I assume that by the time the catalog referencing Besore as successor was published, a patent

To be continued.

## DESCRIPTION OF STYLE "C" ROTARY MOTOR MOVEMENTS

(Style "A" same as Style "C" except that Style "A" has Solid Plates)

### Method of Operation

The spring of this movement is wound once every hour by a three magnet rotary motor (see Fig. 10). The motor is connected by gearing to the toothed wheel on spring box. In the operation of winding, this spring box makes one revolution, thus taking up one turn of the main spring. This turn, which is the working turn, is given off in driving the train one hour.

The circuit is closed by arm (A), see Fig. 11, loosely mounted on the center arbor and carried around by a pin (D) in the center wheel until it is upright, when it makes contact with the

## ROTARY MOTOR—STYLE "A" AND "C" MOVEMENTS

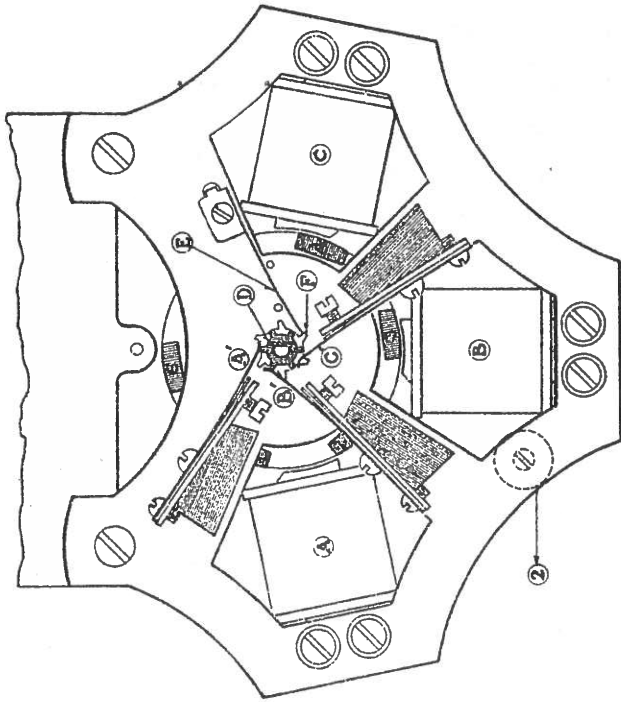


Fig. 10

## WINDING CONTACT—STYLE "A" AND "C" MOVEMENTS

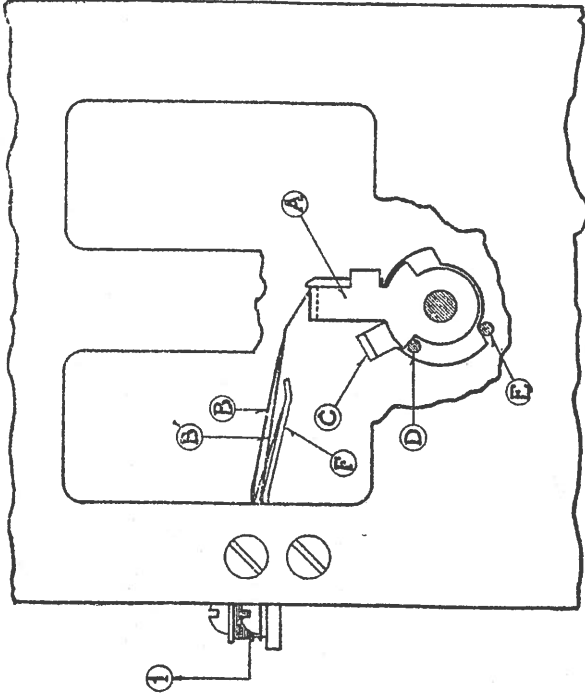


Fig. 11

insulated finger (B) in *old style* contact, or insulated finger (B) and plate finger (B') in *new style*. The circuit then remains closed until the spring box has turned a full revolution and pin (E) brings up the knockaway piece (C) which moves the arm (A) forward from under the fingers (B and B') thus breaking the circuit. The fingers (B and B') must lie firmly on banking pieces (F) and should be so adjusted that when they leave the arm (A) they will drop about  $\frac{1}{16}$ " below contact table. This adjustment insures a firm contact.

The angle at the point of fingers (B and B') must not be too abrupt, otherwise it will retard the action of the clock while contact is being made.

### Description of Motor

See Fig. 10

On the front end of the armature drum arbor is a commutator (D) having six points, corresponding to the six armatures (1, 2, 3, etc.) in the drum. There are three magnets marked (A, B and C). Each magnet has its own brush (A', B' and C'). When an armature

## SYNCHRONIZER—STYLE "A" AND "C" MOVEMENTS

approaches a magnet, the brush makes contact with a point of the commutator, and remains in contact until the magnet has done its work and the next magnet has come into action. When properly adjusted, brush (B) will make contact when armatures (1 and 2) are in position shown, with (2) in line with edge of core of magnet (A), and break when the armature has advanced into the position shown by armature (3), the front edge of armature being about  $\frac{1}{16}$ " from corner of magnet core (B), armature (4) being entirely out of circuit as brush (C) is not touching the commutator.

The back stop spring (E) must be adjusted so that brush (B) is in full contact with a point of the commutator when the motor is at rest, with a tooth of the ratchet (F) touching the end of the spring as shown.

*For wiring and connections, see Figs. 4, 5, 6 and 7, illustrating interior wiring and connections of clocks with style "F" movements.*

### Synchronizer—Friction Spring Type—On Style "A" and "C" Movements

*See Fig. 12*

At predetermined times the signal is sent through magnet (A) actuating the armature (B) to which the lever (C and D) is attached, moving it down until the points on arm (D) engage the two projections (E and E') on the minute disc, and arm (C) engages with heart shape cams (F) on the seconds arbor, thus causing both minute and seconds hands to point to the numeral XII.

Fixed on latch (G) is a pin arranged to drop under synchronizing lever hook (H). When locked, this prevents any action of the synchronizing parts. A pin (I) on back of cannon socket unlocks the latch at beginning of synchronizing range and locks again at end of range.

The latch (G) prevents all impulses other than the synchronizing impulse actuating the hands of the clock and must be left attached to the movement.

(J) is a light spring attached to the synchronizing frame to help start the armature back after hands are set.

### "H" Seconds Synchronizer—Ratchet and Pawl Type

*Now Used on Style "A," "C" and "F" Movements*

*See page 18 for Description*

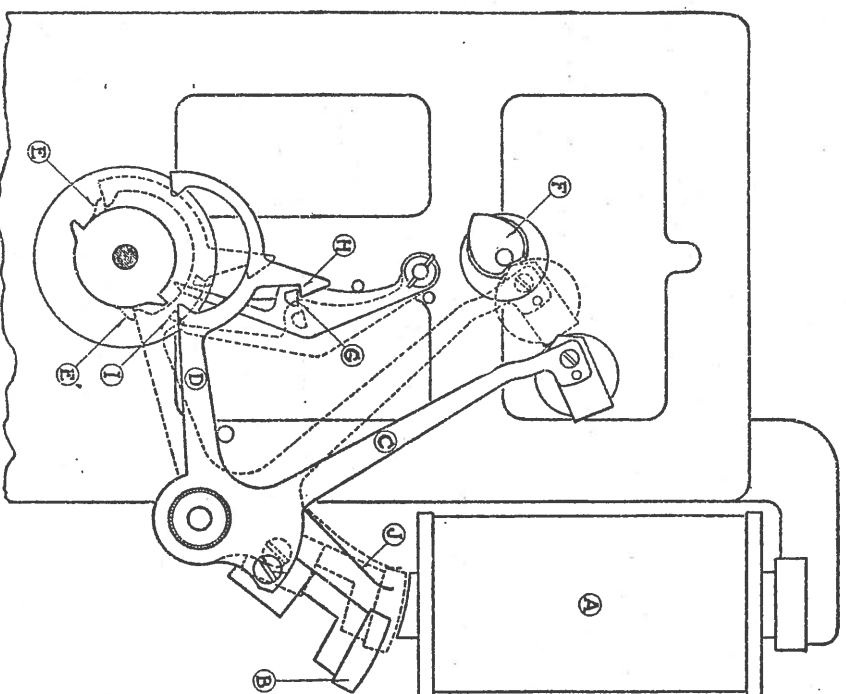


Fig. 12

### Cleaning and Oiling Style "A" and "C" Movements

Take movement from case. Take out the pallet arbor button and allow train to run down slowly so as not to break the pins. Never let the clock run down backward as this will cause the arm (A) to be carried back against the brush (B), see Fig. 11, and bend it out of adjustment. Remove the motor. Take off front plate and separate all parts. Wash the plates and all parts in Pyrene and let them dry thoroughly before assembling. The motor must not be taken



apart, but may be washed in Pyrene using a small brush freely about the bearings, commutator and brushes. Put oil in all the pivot holes but not so much that it will run. The motor bearings and the ends of the pallet should also be oiled.

Inspect carefully to see that center winding contact is right and that the motor has no dead points. Dust out the case and put the movement back in place. Before attaching the dial, try the winding to be sure that it is right, also see that the disc on cannon socket is in the correct position to open the latch at beginning of synchronizing range.

#### Exchanging Movements

When style "A" or "C" movements are exchanged, follow carefully the directions on Page 19.

When ordering material for "A" and "C" movements, always mention style "A" or style "C," specify beat of movement, size of dial and order by number as indicated in booklet entitled:

"SCHEDULE OF PARTS STYLE 'A' AND 'C'  
MINUTE STYLE 'A' AND 'C' ('H') SECONDS  
SYNCHRONIZED MOVEMENTS"

## STYLE No. 9 MASTER CLOCK

Interior Wiring and Connections

60 Beat Wood Rod, Brass Bob Pendulum or Mercurial Compensated Pendulum.

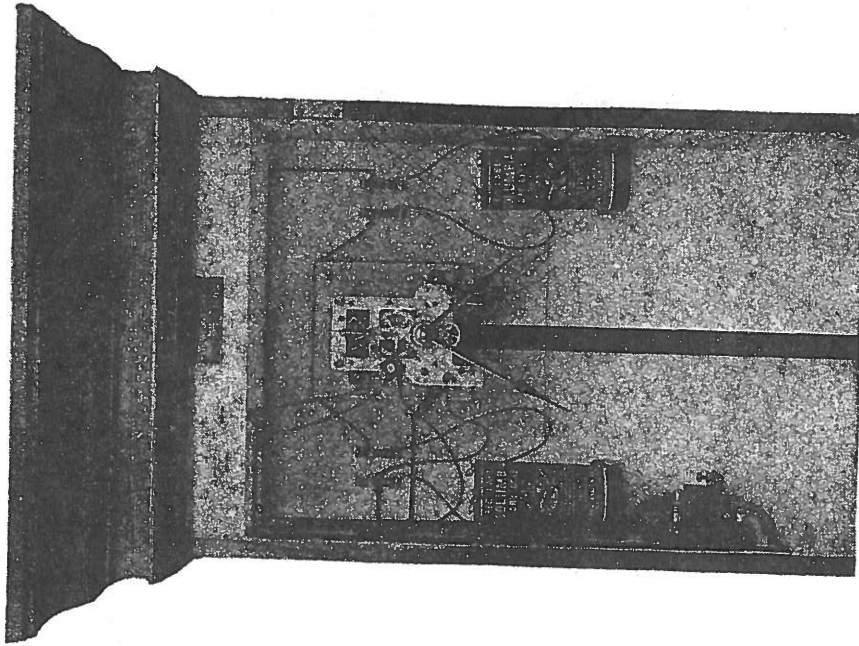


Fig. 13

This clock has a sixty beat movement with Mercurial Compensating pendulum.

At the left and near the center of movement is a device for closing the synchronizing circuit once each hour. This device consists of a stud on which is an insulator having two insulated spring fingers, one above the other, see Fig. 14, except at the points where they are

cut away to lie side by side on an insulated support. On these fingers and near the insulator, are two platinum pieces so adjusted as to be held apart except at the time of synchronizing.

Arm (D) rests on the edge of a disc (E) at the center arbor. At ten seconds before the hour, a notch in this disc allows the retractile spring to draw the support downward, leaving the points of the fingers resting on the raised part of the rubber cam (F) on the escape wheel arbor.

The end of finger (A) is made shorter than finger (B), and at the 59th second finger (A) drops and closes the circuit. At the next beat of the pendulum, the long finger drops and opens the circuit. In this position both fingers (A and B) must clear rubber table (C) by at least  $\frac{1}{4}$ ". When seconds arbor has completed one revolution, arm

### TILTING CONTACT—STYLE 'F' MASTER CLOCK MOVEMENT

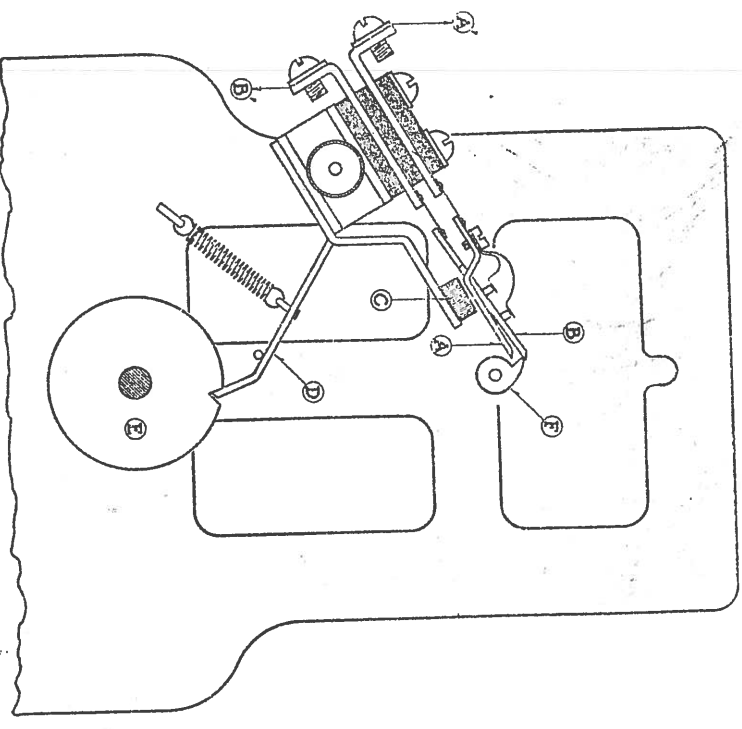


Fig. 14  
26

(D) must have raised on top of disc (E). Both fingers (A and B) must rest firmly on rubber table (C) and clear top of cam (F) at least  $\frac{1}{4}$ ".

The winding is the same as in our regular self-winding clocks and they are wired and connected as shown in Fig. 15. These Master Clocks are manually corrected by comparing their running rate with the time beats as received over the main line relay and local sounder.

#### Directions for Installing Master Clock

**First:** Remove the clock from the packing box and hang it on the wall by the hanger at the top of the case.

**Second:** Take off the dial and hands. Take the movement from the case, and hang the pendulum rod.

**Third:** If clock is equipped with Mercurial Compensating pendulum, roll the mercury jars gently, and end them up carefully to expel air bubbles; then set them in their places and see that the screws are set well down so as to hold the jars firmly, but not too tightly.

**Fourth:** If clock is equipped with Wood Rod Brass Bob pendulum, remove regulating nut from rod and slip brass bob in position and replace regulating nut. Brass bob should be screwed up until upper edge of front of bob is in exact line with lead penciled mark on front of rod. Hang pendulum on suspension spring and proceed with installation in the same manner as for clock equipped with Mercurial Compensating pendulum. With pendulum ball in position as described above, clock will show a very close running rate. It will, however, need final regulation, as no clock will run at the same rate in two different locations. In selecting location for Master Clock, always mount on a brick wall if possible, and on side of building which is least subject to vibration.

**Fifth:** Plumb the case by the pendulum, the lowest point of which must stand in front of the center line of the degree scale, and the rod must be parallel with the back of the case. When plumb, secure the lower end of the case to wall. Use two screws for this purpose. Wood screws may be used to fasten to wood lath and plaster. Toggle bolts should be used in terra cotta or wire lath walls. Lead anchors or expansion bolts should be used in brick or stone walls.

**Sixth:** Return the movement to the case, being careful not to bend the crutch, and see that the fork is in the rod.

**Seventh:** Before putting on the dial it is best to see that contacts are working correctly. Wind the clock and start it going. Stop it when the long finger drops. Put on the second hand pointing directly up,

## MASTER CLOCK CONNECTIONS

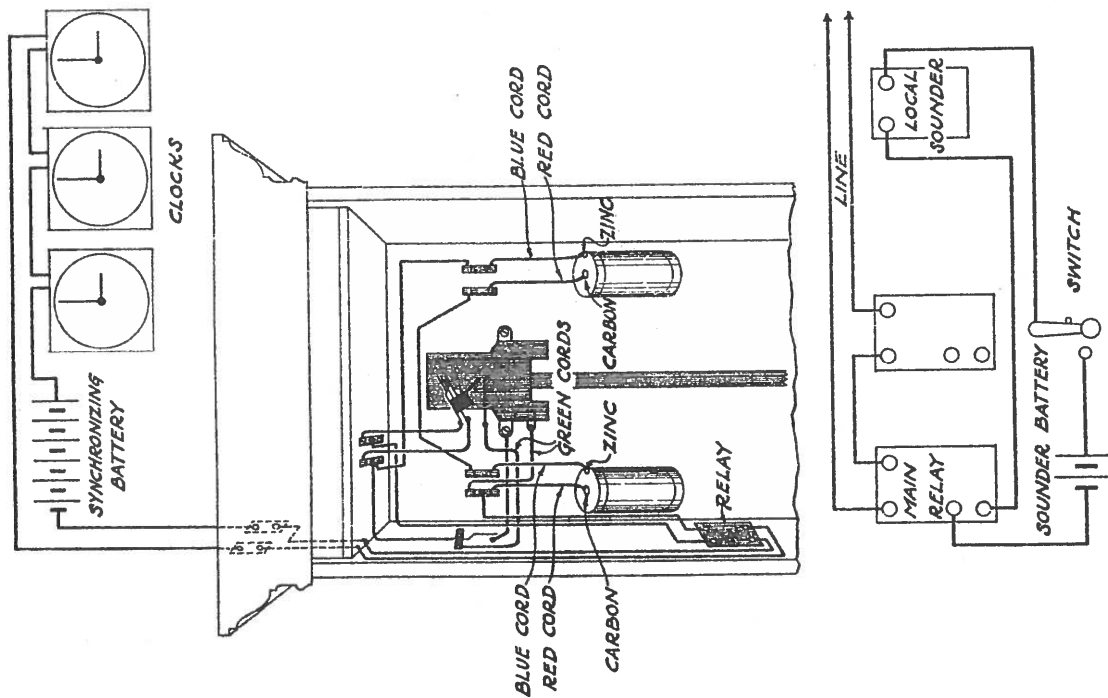


Fig. 15

and minute hand on the square, so that the notch in the disc is right for the synchronizing device to drop at the hour. Start the clock going and try it with sounder.

**Eighth:** When contacts are working correctly, stop the clock again with the hands pointing to twelve. Put on dial and hands, and before connecting to the line, regulate to Observatory time.

### Directions for Regulating Master Clock

**First:** If clock is equipped with a Mercurial Compensating pendulum, regulate at first by the nut at the bottom of the rod until it runs about one second slow in twenty-four hours. Two divisions on the nut will change the rate about one second per day. After the pendulum has been stopped to turn the nut, comparisons must not be made for several hours, giving time enough to be sure it has settled to its normal arc, otherwise an error will appear.

**Second:** We send with each Mercurial Compensating pendulum clock a set of weights in pairs, the largest weighing one gram each, the next size five decigrams and the smallest two decigrams each. When regulated to one second per day slow, make the fine regulation by placing small weights on the top of the jars.

**Third:** On the Mercurial Pendulum two weights of one gram each placed on the jars will make the clock gain about one second per day and the smaller weights in proportion. Care must be taken when putting on or taking off weights not to disturb the swing of the pendulum, as any change of the arc changes the rate.

**Fourth:** To start the clock after it is regulated, stop it, with the second hand at the fiftieth second; move the hands forward to the hour at which the signal comes from the Observatory; then press the minute hand back gently until it is stopped by the extension on the hour contact, and beat the clock up to the hour. This insures the hour contact being in position to send the synchronizing signal.

**Fifth:** A good way to start it with Observatory time is (with all the hands pointing to the "signal" hour) hold the pendulum to one side and when the signal comes, let it go.

**Sixth:** For regulation of sixty beat Wood Rod, Brass Bob pendulum, see Page 10. This type of pendulum is fitted with a small brass table fastened about the middle of the rod. We send with each clock a single set of weights, the largest weighing one gram, the next in size five decigrams and the smallest, two decigrams. By placing the one gram weight on this table, the clock will gain one second per day, and the smaller weights in proportion. The same precaution must be taken with this as with the Mercurial Pendulum when putting on or taking off weights, not to disturb the swing of the pendulum, as any change of the arc changes the rate.

## RAILROAD STATION CLOCK CONNECTED TO MORSE WIRE

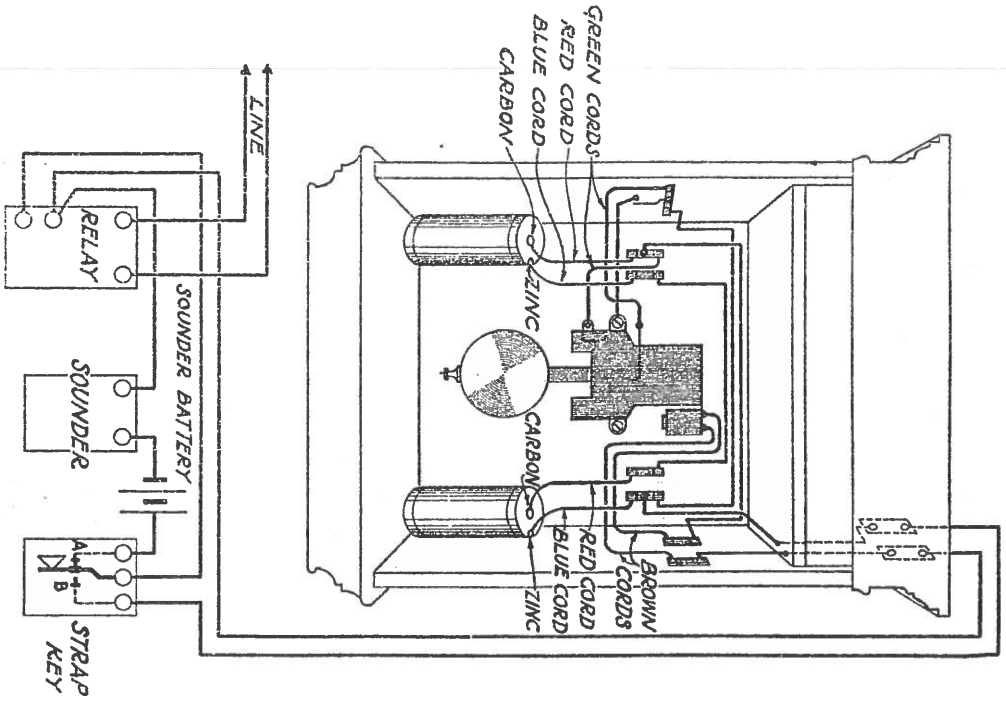


Fig 16.

## CLOCKS IN RAILROAD STATIONS RECEIVING SIGNALS FROM MORSE WIRE

These clocks are connected to the Morse wire as shown in Fig. 16. When the strap key is at contact point (A) the Morse wire is in circuit to receive the seconds beat from Washington.

During the last pause before the hour, the strap key must be moved to contact point (B), thus putting the clock in circuit to be synchronized by the Meridian signal from Washington. Immediately after the signal has been received, the strap key must be returned to contact point (A).

## GENERAL INFORMATION

### Remounting Clock Hands

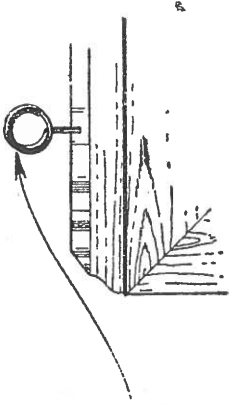
To determine if the minute hand is on the proper square of the cannon socket, slightly turn minute hand forward until it passes the even hour approximately 1½ to 2 minutes, when a slight sound should be noted, which is an indication that the latch has dropped off the latch pin on the cannon socket disc and locks the synchronizing lever until 2 minutes before the even hour. In this position, the hand is placed correctly. If however, this sound occurs on any other quarter hour, carefully remove center nut by holding on to minute hand, then remove minute hand being sure not to change the position of the cannon socket. Replace the minute hand on the cannon socket. In this position the hand will point to the even hour. Be sure that the minute hand is pressed down slightly below face of the cannon socket and replace center arbor nut. Next see that the hour hand is pushed down slightly below the top of the hour wheel sleeve. When moving hour hand back and forth, there should be at least 1/64" clearance between back of minute hand socket and top of hour wheel sleeve. Test hands to see that neither hour nor minute hand touches the dial and that the hour hand does not touch the back of the minute hand.

### Clock Stopped

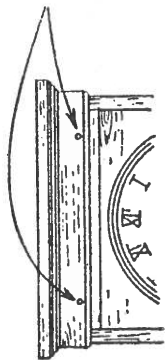
When clocks are found stopped it is of the utmost importance to locate the cause of the trouble. To do this, test as follows:

- First:** Set pendulum swinging to see if hands move; if not, see if dial is warped so as to touch hands.
- Second:** Turn hands to see if they bind in any way.
- Third:** If hands are free and yet do not move when pendulum swings, wind the clock by contact key.
- Fourth:** If clock winds slowly in this way, the battery is weak and the clock is run down.
- Fifth:** If clock winds rapidly, it shows that the trouble is caused by the center winding contact or motor brushes being out of adjustment.
- Sixth:** Take off hands and dial and examine all the parts closely.
- Seventh:** Touch contact key in case a number of times to see if the motor starts from every point.
- Eighth:** Take off front pallet arbor button, hold the escape wheel and raise pallet, then let the clock run down slowly until it makes on the center contact. This will show whether that part is right.
- Ninth:** If the fault is found and cannot be easily and surely corrected, take the movement out and make a thorough job of it.

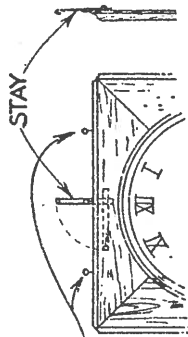
## INSTRUCTIONS FOR MOUNTING TIME SERVICE SIGNS ON CLOCK CASES



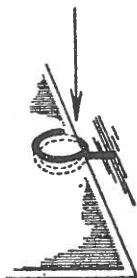
All W. U. Clocks are equipped with rings to hold the Time Service Sign.



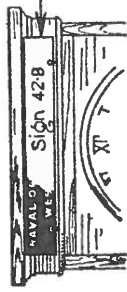
On Nos. 9, 10 and 18 Clocks, these rings are located in the moulding.



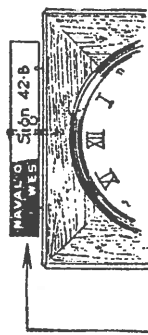
On No. 29 Clocks, the rings are located on top of the case. The stay is located on back at top of case front and is swung down into dotted position shown when clock is shipped



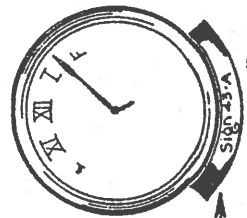
The sign should be mounted between the coils of the ring.



Steel Sign 42-B should be mounted on Clocks Nos. 9, 10 and 18.



Steel Sign 42-B should be mounted on Clocks No. 29.



Clock No. 33 should be equipped with cardboard sign 43-A. Do not use Steel Signs on this Clock.

These Instructions issued by

W. C. TITLEY  
General Supt. of Plant,  
W. U. Tel. Co.

August 13, 1923.

Fig. 17

## Back Stop Spring Broken or Bent on Rotary Type Motor

*Used on Style "A" and "C" Movements Only*

When this occurs it is usually from overwinding. It must be replaced by a new spring, or by straightening the old one by burnishing with a screwdriver. Set the spring so that it will catch about half way down the ratchet tooth.

## Seconds and Minute Hand Friction Springs Adjusted

**Too Light or Too Heavy**

The friction is very carefully adjusted at the factory, being weighed by hanging a small standard weight on the point of the hand. If it becomes too light and the hand drives or slips backward, losing time, it can be made stronger by laying it on a piece of wood and rubbing the inner faces of the points with a smooth screwdriver. If too heavy and the clock will not set, the points may be straightened a little. These instructions also apply to the minute hand friction spring.

If the seconds hand sleeve does not hold on the seconds socket, pinch it a little with a pair of pliers.

If the seconds hand is loose on the sleeve, put on a new one or repair the old one by soldering it on the under side.

**Note:** All new types of seconds synchronized clocks are now furnished with a square stem heart shaped seconds socket and a seconds hand with a square hole sleeve to fit the heart shaped socket. This construction prevents the seconds socket or the seconds hand driving or being jarred loose by the action of the synchronizing lever.

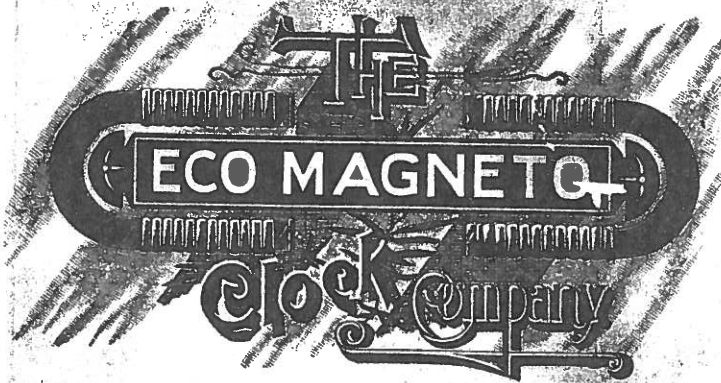
## Synchronizing Current

All clocks are adjusted in the factory to synchronize 2 minutes either fast or slow on a current discharge of 180 to 200 milliamperes. Current supplied over the Western Union Telegraph Company time service wires to be not less than 230 milliamperes.

Where *sold* clocks are installed, it often becomes necessary to furnish slightly increased synchronizing current for the reason that dial diameters are larger and hands are heavier than those furnished with rental clocks. In such cases, sold clocks are equipped with additional dry cell or cells and are synchronized through the local battery by means of a relay which is furnished and installed in the clock case or in a separate cabinet containing the battery. The relay is connected directly in series with Western Union time service wires and will operate on the same current furnished for standard clock units. The increased current necessary for synchronizing the hands is furnished by the dry cells provided with each clock.

Sold clocks of this type are also furnished with a cut-out which prevents seconds beat signals or testing signals from disturbing the clock hands.

TELEPHONE 947.



Office, 620 ATLANTIC AVENUE,

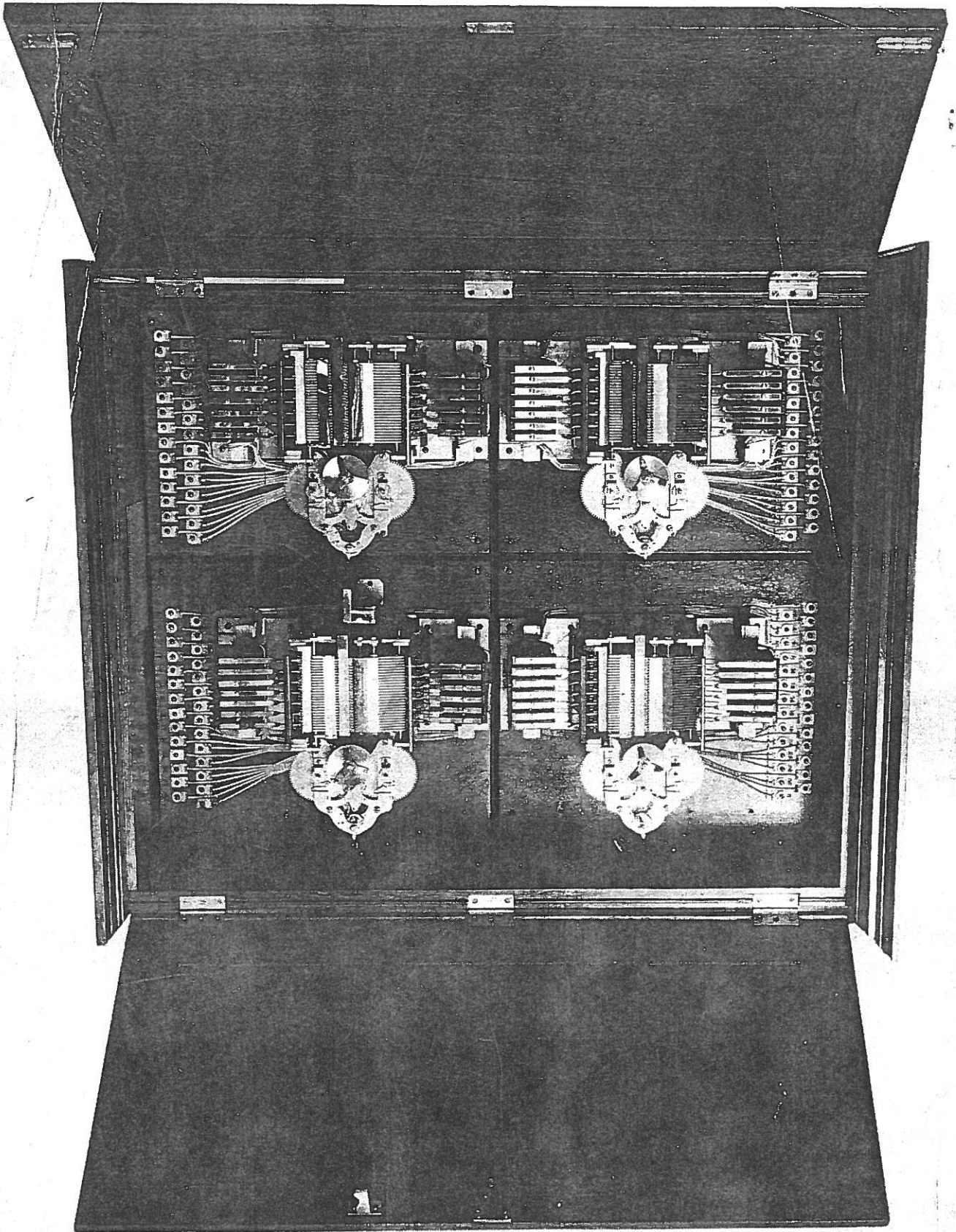
ROOM No. 77.

Boston, *Aug 27<sup>th</sup>* 1896

We guarantee our Watchman's Clock System to work perfectly and without expense for repairs for five years. By this we mean that we guarantee you against faults of construction in the apparatus, and against any wear and tear necessary to its use, but not against accidents or malicious mischief, but if any part of the apparatus, either recorder or generators, fail to give perfect satisfaction during this time, with proper usage, it will be made good at our expense. We expect the apparatus will receive care necessary to any valuable machinery, and that the generators will be oiled once a year, at least, or whenever they turn hard or rattle, and that the clock movement will be cleaned whenever necessary. Any local jeweller can attend to this.

We have to insist that no dials except those made by us shall be used. Our dials are printed on paper manufactured for our use, and our recorders are carefully adjusted so as to give best results on this paper. It is only just to ourselves, as well as to the good of our customer, to confine them to the use of our dials. If dials are used not authorized by us, we shall consider ourselves absolved from our warrant.

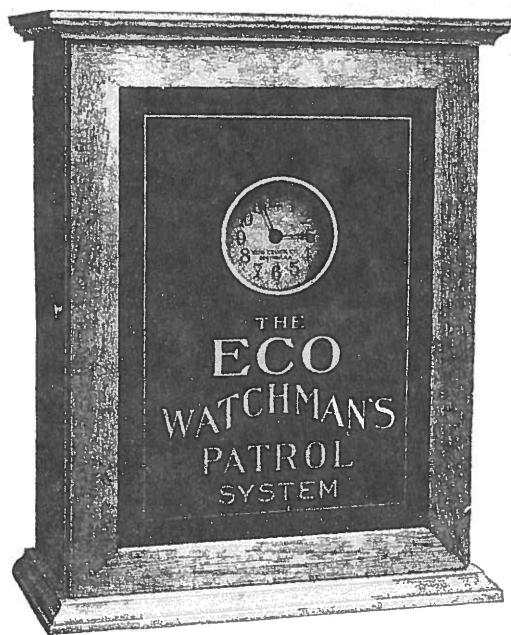
*George B. Fessenden*







**ECO WATCHMAN'S CLOCK  
CABINET**



Lock your Portable Clock in this Cabinet when not in use, as a protection against theft or damage.

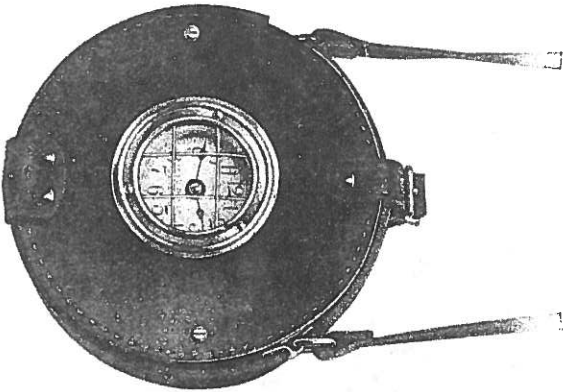
Dust and Dirt proof; and provides a reliable timepiece for your office during the day.

**Price \$6.50**



**THE ECO PORTABLE  
CLOCK**

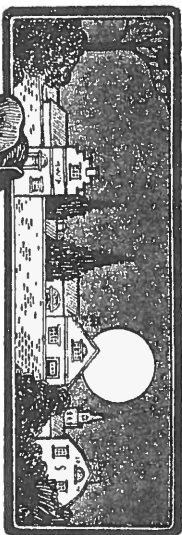
Is made in seven sizes ranging from  
six to thirty stations.



**THE** Eco Portable Clock is built to give  
*continuous service* three hundred sixty-  
five days in the year.

**ECO CLOCK CO.**

26 CORTLANDT ST., NEW YORK CITY

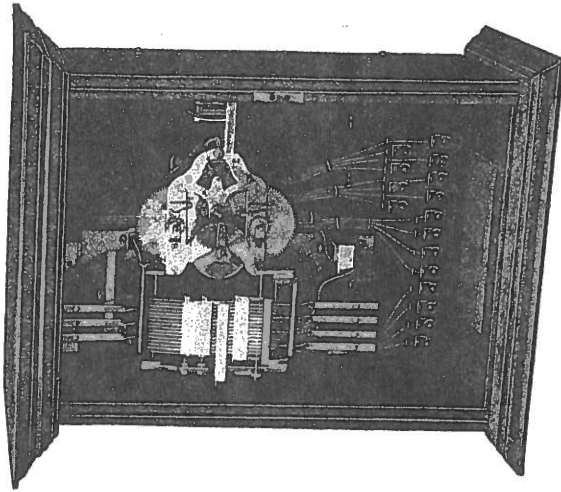


**WHO  
WATCHES  
YOUR  
WATCH-  
MAN**

**ECO WATCHMAN'S CLOCKS**

*will furnish infallible records of watchmen's  
rounds. Will tell you at what times they  
visited stations, or omitted them.*

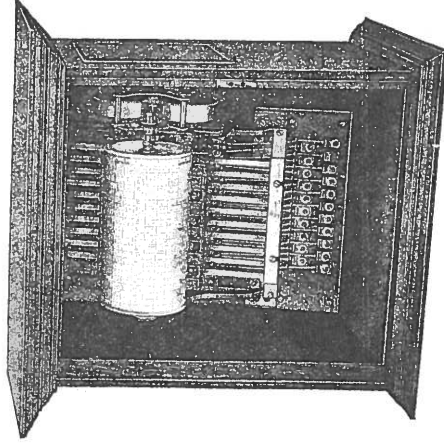
THE ECO MAGNETO  
RECORDER



STANDARD STYLE (Mechanism exposed)

**I**MPROVED and simplified, this is the best constructed circular-dial type of recorder. No adjustments needed, needles cannot stick in the dial, all parts readily accessible. The record is clear, distinct, and compact.

THE BOSTON MAGNETO  
RECORDER



STANDARD STYLE (Mechanism exposed)

**T**HIS *Forty-eight Hour Clock* furnishes a clear and separate registration for Saturday afternoon, Saturday night, Sunday and Sunday night without changing the dial.

The *Seventy-two Hour Recorder* is our latest model of this type of rectangular dial clock, giving separate registrations for six consecutive watching periods, which is desirable when a holiday occurs on either Saturday or Monday.

THE  
ECO MAGNETO CLOCK  
COMPANY

Manufacturers of

ELECTRIC AND PORTABLE

WATCHMAN'S  
CLOCKS



MAIN OFFICES AND FACTORY:  
289 CONGRESS ST., BOSTON, MASS.

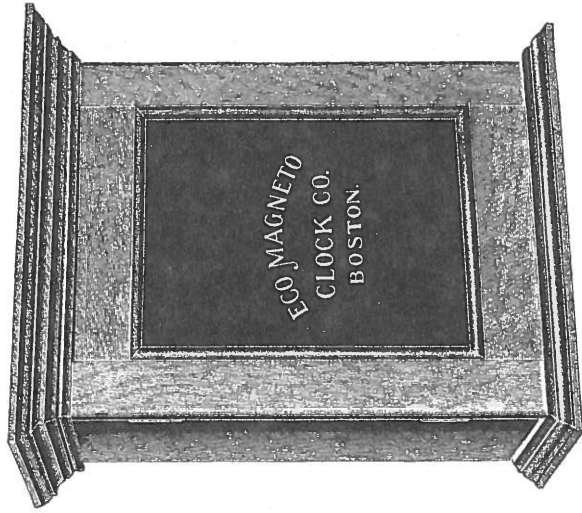
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Branch Offices:

NEW YORK    BUFFALO    PITTSBURG  
RICHMOND, VA.    MONTREAL, CAN.

# THE ECO MAGNETO

ELECTRIC  
WATCHMAN'S  
CLOCK

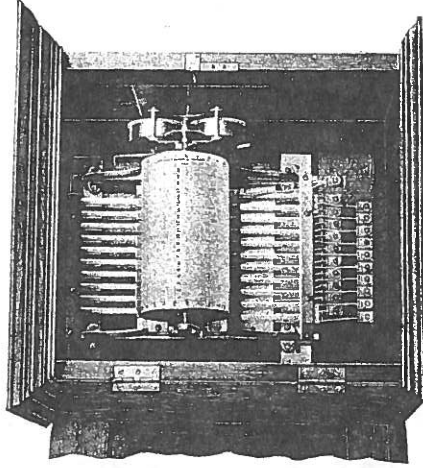


**U**SES the usual style of Round Dial. This is the clock we have been manufacturing for the past twenty years, now improved and simplified in construction.

The pioneer of all magneto watchman's clocks and still in the lead of such devices.

# THE BOSTON MAGNETO

TRI-RECORD ELECTRIC  
WATCHMAN'S CLOCK



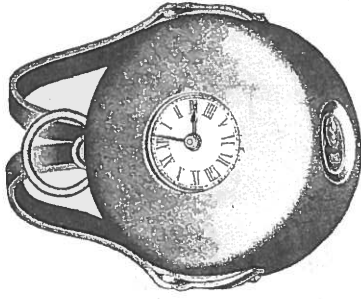
**U**SES a rectangular dial, taking care of three successive twelve-hour watching trips.

The only satisfactory clock now on the market, that fulfills all the requirements of a clear and separate registration, from Saturday afternoon to Monday morning, *without changing the dial.*

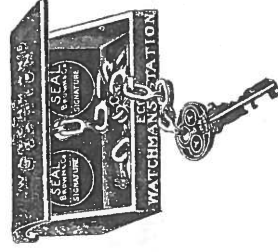
In addition, the BOSTON MAGNETO has a number of features of mechanical superiority which commend its use in preference to any other watchman's clock made.

# THE ECO PORTABLE

WATCHMAN'S CLOCK



MADE IN TWO  
SIZES  
(STYLES C AND D)



FITTED WITH  
REQUIRED NUMBER  
OF KEYS

**G**IVES Legible Punched Records in Separate Circles on the Dial. Keys are fastened in Iron Boxes to prevent irregular removal.

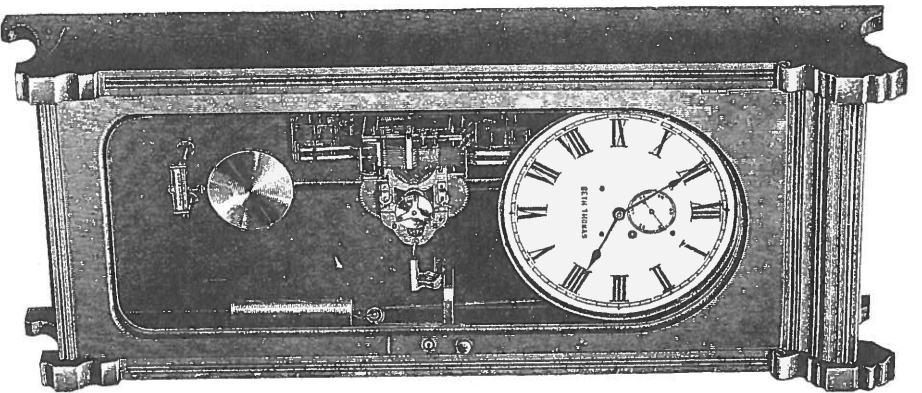
Has no springs (the cause of trouble in most portable clocks), and is arranged, so that additional stations can be added when required.

STYLE C

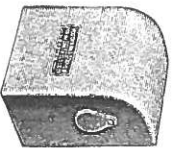
Registering 1 to 10 Stations in Independent circles.

STYLE D

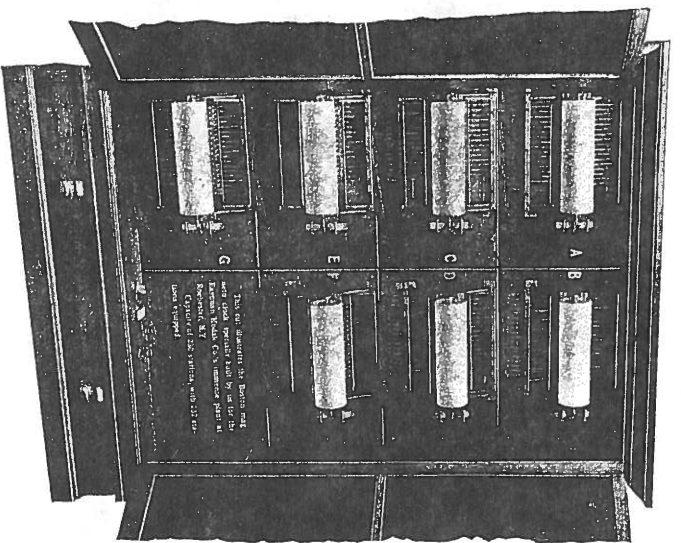
Registering 1 to 20 Stations in Independent circles.



OUR RECORDERS CAN BE COMBINED WITH  
OFFICE REGULATORS WHEN DESIRED



WATCHMAN'S MAGNETO STATION



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CLOCK ARE

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| D. M. Read & Co.'s Dept. Store | Bridgeport, Conn.  |
| Bullard Machine Tool Co.       | Bridgeport, Conn.  |
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| Warrenton Woolen Co.           | Torrington, Conn.  |
| Belding Bros. Co.              | Belding, Mich.     |
| Trenton Brass and Machine Co.  | Trenton, N.J.      |
| Horse Shoe Lumber Co.          | River Falls, Ala.  |
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**THE JOURNAL OF  
THE ELECTRICAL HOROLOGY SOCIETY**  
CHAPTER #78  
NATIONAL ASSOCIATION OF WATCH & CLOCK COLLECTORS

**VOLUME XXXI #3, SEPTEMBER 2005**

Fellow Horologists:

This issue of the Journal of the Electrical Horology Society will complete the article by Frank Kerfoot on the "History of the National Self Winding Clock Company." We are stating to publish a series of materials from the 1940's on the Cincinnati-Landis clocks.

We are also beginning a copy of a Stromberg Time Corporation catalog published in the 1940's. This catalog was made available by Chapter #78 member Rodney King. Thank you very much for this interesting material. We are always looking for material suitable for use in the EHS and ask all our member to help by keeping their eyes open for any catalogs, instruction manuals, advertising, etc.

Although Chapter #78 conducts its official business by mail, informal chapter meetings are held at several regionals. For example, informal meetings were held this year at the Southern Ohio Regional held near Cincinnati, Ohio; at the Eastern States Regional held at Syracuse, New York, and at the Great Lakes Regional held in Dearborn, Michigan. These meetings typically consist of a brief presentation followed by open discussion, questions (and hopefully answers), and show and tell. These informal meetings are very enjoyable and often help solve electric clock problems in addition to providing the opportunity to meet fellow collectors. Please consider hosting an informal Chapter #78 meeting at the Regionals that you attend. Thanks to all who participated in these meetings.

Enjoy this issue of the Journal.

Bill Ellison.....President  
Harvey Schmidt, FNAWCC,.....Secretary-Treasurer ) Co-Editors  
Dr. George Feinstein, FNAWCC..Chapter Historian )

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HARVEY SCHMIDT, FNAWCC, Secretary-Treasurer, 75-80 179<sup>th</sup> ST. FLUSHING NY 11366



# STROMBERG

## *Master Clock*

TIME STAMPS • EMPLOYEES TIME RECORDERS • JOB TIME RECORDERS • CLOCKS • PROGRAM INSTRUMENTS • TIMERS

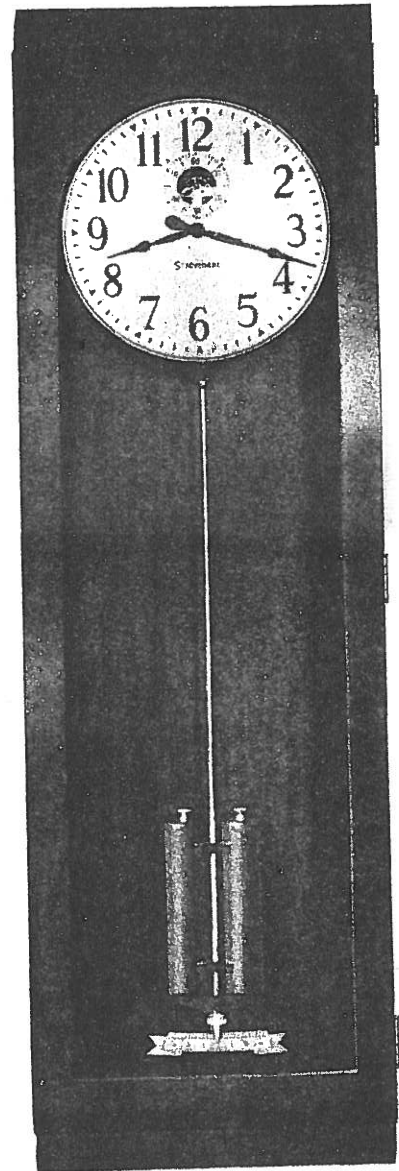
BULLETIN MC-1

### **Master Clock**

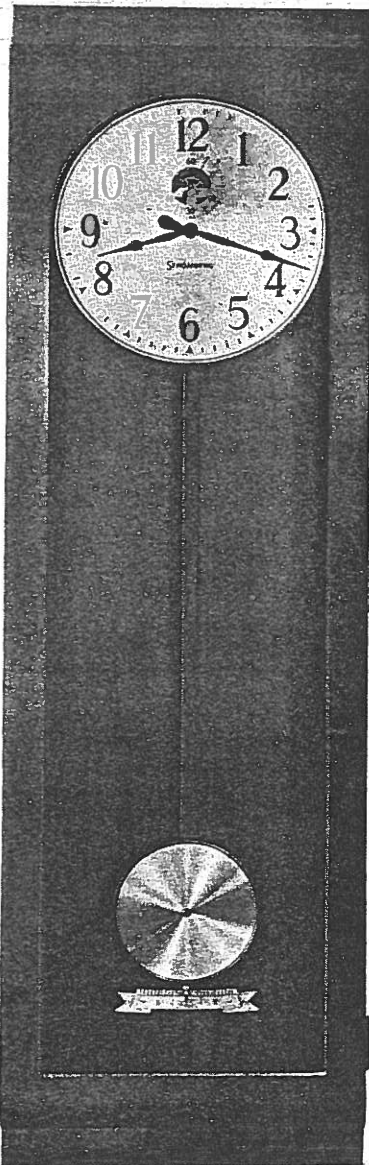
Stromberg Master Clocks provide the source of correct time for an entire time system, supervising the accurate performance of all secondary apparatus. They contain a substantially constructed clock movement fabricated from hard clock brass and equipped with Graham deadbeat escapement. All arbors and pinions are accurately cut and all pivots are burnished.

Once each minute the Master Clock releases an electric impulse which is relayed to all units on the system. Automatically wound from the same source of current which operates the clock system, it is provided with ample reserve power to insure its continuous operation during any normal current failure. *Autoset* Master Clocks automatically check the secondary devices once each hour, maintaining positive synchronism between all units.

Either Model No. 65 or No. 60 Master Clocks can be furnished with or without this exclusive Stromberg Autoset feature.



**Model No. 65**



**Model No. 60**

### **Model No. 65 Master Clock**

Sunburst aluminum dial, 14" diameter; black Arabic numerals and black hands; Invar metal rod and chrome finished mercurial compensating pendulum; 60-beat movement, electrically wound. Guaranteed capable of regulation to within ten seconds per month of correct time. Glass panelled door, hard wood case — standard golden oak or mahogany finish. Special finishes also available at extra charge.

Dimensions: 60 $\frac{1}{4}$ " high, 18 $\frac{1}{8}$ " wide, 7-5/16" deep.  
Approximate shipping weight: 165 lbs.

### **Model No. 60 Master Clock**

Sunburst aluminum dial, 14" diameter; black Arabic numerals and black hands; wood rod and metal bob pendulum, 60-beat movement, electrically wound. Guaranteed capable of regulation to within twenty seconds per month of correct time. Glass panelled door, hard wood case — standard golden oak or mahogany finish. Also furnished at additional cost in special finishes.

Dimensions: 60 $\frac{1}{4}$ " high, 18 $\frac{1}{8}$ " wide, 7-5/16" deep.  
Approximate shipping weight: 150 lbs.

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109 LAFAETTE STREET

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# STROMBERG

## *Autoset Users*

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BULLETIN AU-3

### **Autoset Clock System Users**

Accurate, dependable and uniform time keynotes the efficiency of the modern Industries and Institutions that rely on an Autoset System. It provides them with automatic correction from a central control which synchronizes all clocks and time devices. The following list is representative of the many users of Autoset:

- |   |   |
|---|---|
| <b>Allis-Chalmers Manufacturing Company</b><br>West Allis, Wisconsin                | <b>Colt's Patent Fire Arms Mfg. Company</b><br>Hartford, Connecticut        |
| <b>Aluminum Company of America</b><br>Vancouver, Washington                         | <b>Container Corporation of America</b><br>Fernandina, Florida              |
| <b>American Viscose Corporation</b><br>Meadville, Pennsylvania                      | <b>The Crosby Corporation</b><br>Buffalo, New York                          |
| <b>Atlas Imperial Diesel Engine Co.</b><br>Mattoon, Illinois                        | <b>Crosby Radio Corporation</b><br>Cincinnati, Ohio                         |
| <b>Beech-Nut Packing Company</b><br>Canajoharie, New York                           | <b>John Deere Tractor Company</b><br>Waterloo, Iowa                         |
| <b>Bendix-Products Aircraft</b><br>Div. of Bendix Aviation Corp.<br>Wayne, Michigan | <b>The DeLaval Separator Company</b><br>Poughkeepsie, New York              |
| <b>Bethlehem Steel Company</b><br>Lebanon, Pa.                                      | <b>Delco-Appliance, Div. of General Motors</b><br>Rochester, New York Corp. |
| <b>Bissell Carpet Sweeper Co.</b><br>Grand Rapids, Michigan                         | <b>Delco-Remy, Div. of Gen. Motors Corp.</b><br>Anderson, Indiana           |
| <b>Blaw-Knox Division of Blaw-Knox Co.</b><br>Blaw-Knox, Pennsylvania               | <b>Denby High School</b><br>Detroit, Michigan                               |
| <b>Bucyrus Erie Company</b><br>So. Milwaukee, Wisconsin                             | <b>Denoyer-Geppert Company</b><br>Chicago, Illinois                         |
| <b>Bundy Tubing Company</b><br>Detroit, Michigan                                    | <b>Douglas Aircraft Company, Inc.</b><br>Santa Monica, California           |
| <b>Canadian National Carbon Co., Ltd.</b><br>Toronto, Canada                        | <b>Dunn Hospital</b><br>Dunn, North Carolina                                |
| <b>Carbide and Carbon Chemicals Corp.</b><br>Texas City, Texas                      | <b>Durkee Famous Foods</b><br>Elmhurst, New York                            |
| <b>Chain Belt Company</b><br>Milwaukee, Wisconsin                                   | <b>Eastman Kodak Company</b><br>Rochester, New York                         |
| <b>Chevrolet — Tarrytown</b><br>No. Tarrytown, N. Y.                                | <b>Ecusta Paper Corporation</b><br>Pisgah Forest, North Carolina            |
| <b>The Cleveland Pneumatic Tool Co.</b><br>Cleveland, Ohio                          | <b>Equitable Life Insurance Co. of Iowa</b><br>Des Moines, Iowa             |
| <b>Coldwater Hospital</b><br>Coldwater, Michigan                                    | <b>The Fanner Manufacturing Co.</b><br>Cleveland, Ohio                      |
| <b>Coleman Furniture Corporation</b><br>Pulaski, Virginia                           | <b>Fashion Park, Inc.</b><br>Rochester, New York                            |
|   | <b>Gar Wood Industries, Inc.</b><br>Detroit, Michigan                       |

- Goodyear Aircraft Corporation**  
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**Goodyear-Tennessee Company**  
 Nashville, Tennessee  
**Grover-Cronin**  
 Walton, Mass.  
**Harvill Aircraft Die Casting Corp.**  
 Los Angeles, Calif.  
**Haynes Steelite Company**  
 Kokomo, Indiana  
**Henry Heide, Incorporated**  
 New York, New York  
**William Dean Howells School**  
 Cleveland, Ohio  
**Indiana Lumbermens Mutual Insur. Co.**  
 Indianapolis, Indiana  
**Industrial Rayon Corporation**  
 Painesville, Ohio  
**Johns-Manville Products Corporation**  
 Jarratt, Virginia  
**Kelsey-Hayes Wheel Company**  
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**Lima Locomotive Works, Inc.**  
 Lima, Ohio  
**Line Material Company**  
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**Millers Falls Company**  
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 Houston, Texas  
**Moore Equipment Co.**  
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**Morganton Full Fashioned Hosiery Co.**  
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**Nash Kelvinator Corp.**  
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**National Carbon Co., Inc.**  
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**Statler Hotel**  
 Buffalo, New York  
**Symington-Gould Corporation**  
 Depew, New York  
**Thomaston High School**  
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**Thompson Aircraft Products Co.**  
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**Timken Roller Bearing Co.**  
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**The Toledo Steel Products Co.**  
 Toledo, Ohio  
**Tropic-Aire, Inc.**  
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 St. Louis, Missouri  
**Weber Showcase & Fixture Co., Inc.**  
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**J. J. White Mfg. Company**  
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**Whitmell Farm Life School**  
 Whitmell, Virginia  
**H. A. Wilson Company**  
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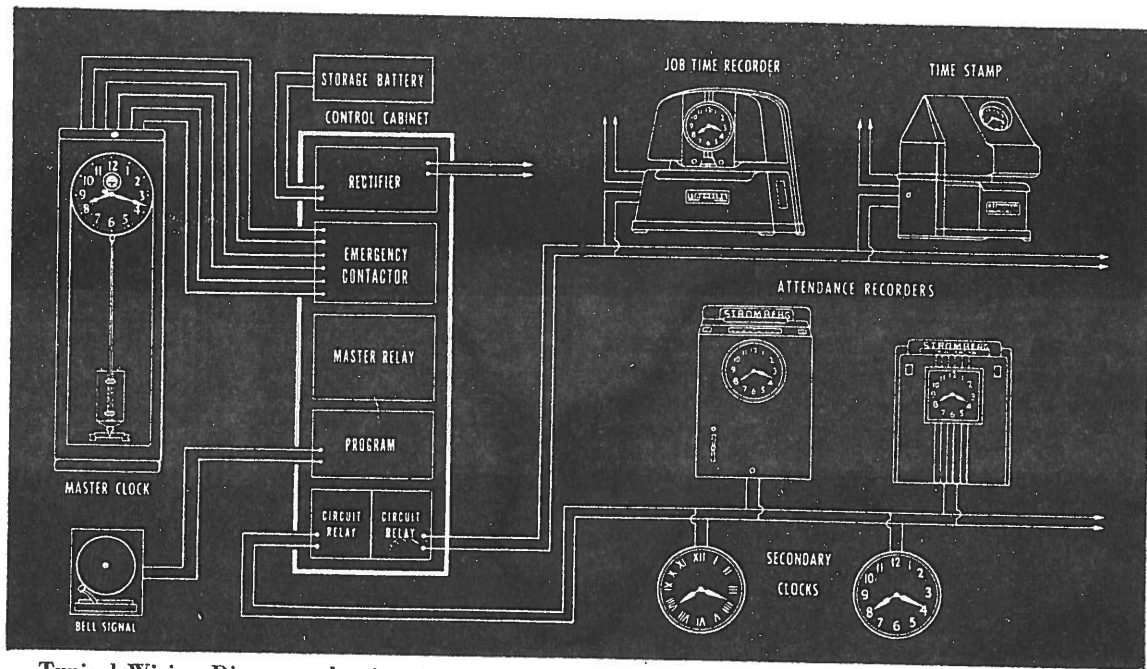
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# STROMBERG *Autoset System*

TIME STAMPS • EMPLOYEES TIME RECORDERS • JOB TIME RECORDERS • CLOCKS • PROGRAM INSTRUMENTS • TIMERS

BULLETIN ASB

## Rectifier and Storage Battery System



Typical Wiring Diagram, showing Autoset Master Clock, Autoset Control Cabinet, Storage Battery, and various Stromberg Timing Devices

*Autoset* is a master clock supervised minute impulse time system that *automatically resets* all secondary apparatus after a current interruption. This system operates on *two-wire* circuits and is based on the polarized relay principle, the secondary movements being controlled by reversing the direction of the current flow. No contacts, selectors, switches, or valves are needed by the secondary units. Every hour the movement of each secondary device locks when reaching its 58th minute. During the 58th minute, fifteen extra impulses are released by the master clock. Slow devices are stepped up to their 58th minute where they lock. Units that may have been set fast, automatically lock themselves against further advance when reaching their 58th minute. On the 59th minute impulse, the current is reversed, all movements unlock and the system proceeds with all units synchronized.

Maximum assurance of *continuous operation* and synchronized time is provided by an Autaset System operating from a storage battery. The rectifier charges the battery, which provides the system with a continuous source of current, and the Autaset feature keeps each device at exactly the same time as the Master Clock. This type of control is recommended, when there are long interruptions in the current supply, or where the time system is so large that a converter is not practical.

An emergency synchronous motor contactor is included to further safeguard the continuous operation of the system. This device will supply time for the secondary apparatus, if the master clock must be stopped for any reason.

### Specifications and Features

- Based on time-tested polarized relay principle.
- Completely automatic hourly correction.
- Synchronized time.
- Two-wire system.
- Hourly correction of 15 minutes slow and 7 minutes fast.
- Full correction of 45 minutes slow or 15 minutes fast.
- No contacts, selectors, switches, or valves in secondaries.
- Electromagnetic secondary movements.
- Strong steel cabinets.
- Controls mounted on high grade insulated panels.

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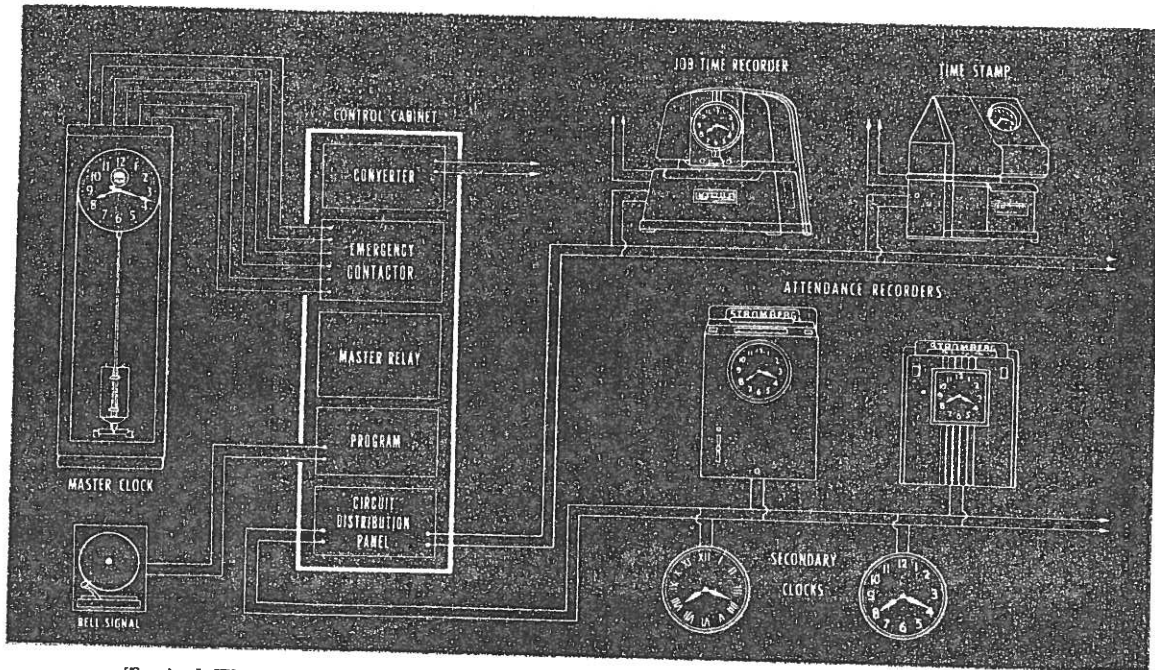


# STROMBERG *Autoset System*

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BULLETIN ASC

## Converter System



Typical Wiring Diagram, showing Autoset Master Clock, Autoset Control Cabinet, and various Stromberg Timing Devices

*Autoset* is a master clock supervised minute impulse time system that *automatically resets* all secondary apparatus after a current interruption. This system operates on *two-wire* circuits and is based on the polarized relay principle, the secondary movements being controlled by reversing the direction of the current flow. No contacts, selectors, switches, or valves are needed by the secondary units. Every hour the movement of each secondary device locks when reaching its 58th minute. During the 58th minute, fifteen extra impulses are released by the master clock. Slow devices are stepped up to their 58th minute where they lock. Units that may have been set fast automatically lock themselves against further advance when reaching their 58th minute. On the 59th minute impulse, the current is reversed, all movements unlock and the system proceeds with all units synchronized.

The simple *converter system* operates satisfactorily in locations having a reliable source of alternating current subject only to infrequent and brief interruptions. It requires no attention and there are no batteries to be maintained. If the power supply is interrupted, the time system will stop, except for the Master Clock which will continue running on spring power. Secondary units will resume operation when the current is restored and be automatically reset to agree with the Master Clock, provided the period of interruption is not greater than the Autoset correction range of 45 minutes.

An emergency synchronous motor contactor is included to further safeguard the continuous operation of the system. This device will supply time for the secondary apparatus, if the master clock must be stopped for any reason.

### Specifications and Features

- Based on time-tested polarized relay principle.
- Completely automatic hourly correction.
- Synchronized time.
- Two-wire system.
- Hourly correction of 15 minutes slow and 7 minutes fast.
- Full correction of 45 minutes slow or 15 minutes fast.
- No contacts, selectors, switches, or valves in secondaries.
- Electromagnetic secondary movements.
- Strong steel cabinets.
- Controls mounted on high grade insulated panels.

To be continued.

**STROMBERG TIME CORPORATION**

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Continued from June, 2005 issue.

license was executed, but the license fees were sufficiently high to offer versions at a discount without the strike feature.

This same sales document also states that "thousands have been sold", giving some indication of the total number manufactured. I assume the company would have found different wording if the total was closer to 5000-10,000, so a good guess is in the range of a few thousand clocks. This seems a bit at odds with the 1906 newspaper report of manufacturing ~50 clocks a day and growing soon to 100 a day, unless that volume only continued for a short time. The Burrill letter discussing insolvency came only a few months after the optimistic newspaper report, so perhaps this all fits together.

A third catalog also exists which is labeled as being from "S. S. Besore, Manufacturer", and the location as Urbana, dating it as late-1908 to 1910<sup>14</sup>. It only contains two case designs. One looks similar to the office regulator shown in the earlier catalogs, but with a different door. The other is a substantially different case design not seen in any surviving previous catalog. The catalog mentions both self winding and 8 day clocks, but doesn't say which can be purchased in which case.

A copy of a set of (undated) operating instructions showing Besore's name has also survived<sup>16</sup>. It also shows the attribution as "S. S. Besore, Manufacturer" and the address is Urbana, so these directions also date from late-1908 to 1910.

One interesting aspect is that the prices shown in all these catalogs (especially the earlier ones) are substantially cheaper (less than half) of the prices for similar clocks shown in other catalogs of the era, such as the Electro Clock Company and the Self Winding Clock Company of New York. It appears this was true even while the company was still solvent (and thus perhaps a contributing cause of the bankruptcy). In Besore's last catalog from Urbana he has raised the prices significantly, but still not to the level of other self winding clocks at that time. Interestingly, this last catalog shows no price difference between 8 day spring wound and self winding movements.

### **Technical Details**

All of the movements from known surviving National SWCC clocks appear to utilize a similar overall design (except the very early example mentioned earlier, which has significant differences), with a range of tooth counts to accommodate different pendulum lengths. The movements use dead-beat Graham escapements, but use lantern pinions. The winding mechanism is simpler than that on Self Winding Clock Company of New York clocks, performing a simple, one motion winding of a spring concentric with the main shaft by perhaps 40-50 degrees of arc, every 6-7 minutes. A switch was closed when the spring required rewinding, actuating an electromagnet which performed the winding in one simple stroke.

As noted earlier, one of the unique characteristics of National Self Winding Clocks is their ability to provide time and strike. The strike train was powered by a separate spring, also wound by the

same electromagnet. Each operation of the winding armature advances the strike spring one tooth of a ratchet wheel via a pawl. The strike spring separately drives the strike mechanism. Winding every 6-7 minutes provides enough winding of the strike spring (averaged over 12 hours) to provide continuous striking. A more detailed description of the time and strike feature is provided by Hanff<sup>7</sup>. Hanff also published a list of National SWCC patents with comments<sup>18</sup>.

The National Self Winding Clock Company also provided an optional synchronizing means. Clocks so equipped had a second set of coils and a second armature. This second armature reset both the minute hand and the seconds bit using a patented specific technique, but not one radically different than that used by the Self Winding Clock Company of New York. At least one clock with this synchronizing equipment is known to have survived.

Although the 1906 catalog indicates that a master clock capable of driving other slave clocks could be ordered, no description or picture is provided and no example is known to have survived, so the particular means is unknown.

The sales literature indicates that the clocks were designed to operate from three 1 ½ V. dry cells, unlike the 2 cell configuration of many other self-winding clocks of the era. Most surviving examples appear to follow the 3 cell design. However, one surviving example operates from a significantly higher voltage, apparently 48 V.

The dominant variation among known examples is in the implementation of the switch used to apply power to the winding solenoid and remove it after winding is complete. Based on patent dates as well as the specific claims of the patents referenced on the movements it appears that the earliest clocks used a dry-contact switch. One example of such a clock (a wall regulator model) has a separate auxiliary time-delay relay to interrupt the solenoid current after winding. Later clocks (still marked "Bristol") use a tilting mercury switch, for which there are several specific patents referenced on those clocks.

There is evidence (in the operating instructions attributable to Besore) that still later clocks returned to dry-contact switching. Several examples exist which have a bracket clearly intended for the mercury switch but which have no such switch (and now use a dry-contact arrangement for switching), but it is not clear (at least to me) if these were made that way at the factory or were later retrofits. A reference to a patent issue exists in the Burrill letter to Burton concerning the insolvency, and the reference is to an apparently licensed patent shown on many surviving clocks which applies to a tilting mercury switch in a self winding clock. I suspect that the patent license was revoked, either just before or during the bankruptcy, and thus the tilting mercury switch could no longer be used.

- <sup>1</sup> Incorporation papers, Illinois State Archives
- <sup>2</sup> Company catalog, undated but believed to be ca. 1906,  
Electrical Horology Society Journal, July 1986, Vol. XII, No. 5 & 6, pg. 2-12
- <sup>3</sup> Annual Reports, 1902-1906, Illinois State Archives
- <sup>4</sup> Courtesy Chris Bailey, Curator, American Clock and Watch Museum, Bristol, Ct.
- <sup>5</sup> New Jersey State Archives
- <sup>6</sup> *150 Years of Electric Horology*, E. G. Crum et al, pg. 70
- <sup>7</sup> Archives of the Urbana Free Library
- <sup>8</sup> Sanborn Fire Insurance Map, 1909, Champaign Illinois, Sheet 4
- <sup>9</sup> See letter on the next page.
- <sup>10</sup> Archives of University of Illinois at Champaign-Urbana
- <sup>11</sup> Champaign-Urbana City Directories (various years), Archives of the Urbana Free Library
- <sup>12</sup> Electrical Horology Society Journal, Dec. 1994, Vol. XX, No. 4, pg. 22-24.
- <sup>13</sup> *ibid.*, Dec. 1994, Vol. XX, No. 4, pg. 14
- <sup>14</sup> Collection of the American Clock and Watch Museum, Bristol, Ct.
- <sup>15</sup> NAWCC Bulletin No. 234, June, 1989
- <sup>16</sup> Electrical Horology Society Journal, Dec. 1994, Vol. XX, No. 4, pg. 21.
- <sup>17</sup> *ibid.*, Newsletter #10, Sept. 1974, pg. 7-8; Nov. 1974, Vol. I, No. 1, pg. 2.
- <sup>18</sup> *ibid.*, Newsletter #8, Feb. 1974, pg. 2-3.

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NATIONAL SELF-WINDING CLOCK COMPANY

Manufacturers of

Self-Winding and Synchronizing Clocks

CHAMPAIGN, ILLINOIS

PERCY L. CLARK, GENERAL MANAGER

TELEPHONE CENTRAL 97

April 2, 1906.

Mr. S. L. Brown,  
Prospect Ave., Chestnut Hill,  
Philadelphia, Pa.  
Dear Sir:-

Your favor of recent date received and herewith hand you latest Catalog and Booklet, telling all about the "clock that winds itself". We know you are familiar with the difficulties and troubles caused by the old-fashioned Key-winding clocks. A "clock that winds itself" and strikes the hour and half-hour too, is interesting. We take pleasure in telling how you may have one in your home to try out and judge for yourself for 30 days at our expense.

It would be an easy matter for us to write pages of laudatory matter on the National Self-Winding Clock. We know positively just how good it is and want you to test and investigate this Self-Winding Clock yourself. This we intend you shall do at our expense. Select any clock shown in our Catalog, tell us which one, and we will place it in your home for 30 days. It will prove how accurate a time keeper it really is. The great satisfaction and convenience secured from the "clock that winds itself," will be demonstrated to you.

Kindly select the style clock you want and with your letter enclose \$2.00 to show your good faith in the transaction. This amount will be taken as a deposit which will be refunded to you in full if, at the end of 30 days you decide to return the clock. But we know you will be so well satisfied that you will pay the small balance due - and keep the clock. We pay express charges both ways. You judge for yourself. We are willing to be governed by your judgment. Progressive people after seeing the "clock that winds itself", appreciate instantly the superior advantages it possesses over the common old-fashioned Key-winding clock.

We want your order. Our clock is as represented. It costs you nothing to prove our claims. Your order will receive prompt attention. We know you will be pleased with the clock in your home that "winds itself." Awaiting your order for which we thank you, we remain,

Very truly yours,

National Self-Winding Clock Co.

*P. B. Miller*

Sales Mgr.

# CINCINNATI-LANDIS

ELECTRIC TIME SYSTEMS AND EQUIPMENT

Controlling • Indicating • Signalling • Recording

MASTER CLOCKS

SECONDARY CLOCKS

PROGRAM MACHINES

SIGNALLING DEVICES

ATTENDANCE TIME RECORDERS — TIME STAMPS

AUXILIARY APPARATUS (RELAYS RECTIFIERS, ETC.)

UNIFIED SYSTEMS, LARGE OR SMALL, INCORPORATING ANY OR ALL OF  
ABOVE TYPES OF TIME INSTRUMENTS

FOR

SCHOOLS, COLLEGES, INSTITUTIONS, STORES, OFFICES, INDUSTRIAL  
PLANTS, TRANSPORTATION COMPANIES

BUILT, SOLD AND GUARANTEED BY

**THE CINCINNATI TIME RECORDER COMPANY**

ESTABLISHED 1896

CINCINNATI, OHIO, U. S. A.

## Foreword

Accurate division and control of the use of Time is of the essence of Efficiency — in institutional Education; in all the organized Business of mankind, whether it be production of goods, rendering of service, or practice of professions.

Since time immemorial the passage of the hours has been considered a matter of supreme importance; has been measured and noted by means of all sorts of devices from the earliest crude sun's position markers to today's highly accurate and dependable electro-mechanical time instruments.

It is no longer enough simply to be able to know the time of day by looking at a dial. Many of the organized activities of life require that the arrival of certain points of time be automatically brought to the attention in more positive fashion than by the silent progress of clock-hands. For this have we Program Machines, to sound audible signals at certain periods on a pre-determined schedule, operated by a Master Clock, the controlling instrument which measures off the passage of time and indicates it visually. Schools, colleges and certain industries cannot be conducted efficiently without Schedule Signalling Systems.

Other organizations (including practically all businesses and industries and many educational and other institutions) need to have the time of numerous acts and facts permanently print-recorded. For this have we Time Stamps, Employes' Attendance and Payroll Recorders, Job Time Recorders.

CINCINNATI-LANDIS products for Time Indicating, Controlling, Signalling, Recording, incorporate the latest and greatest advancements in the science of doing these things. A number of the most valuable (to the user) features are patented and exclusively to be had in the instruments built by The Cincinnati Time Recorder Co., famous for high precision time equipment for more than 40 years.

Every school and every business will be better time-served if their equipment is CINCINNATI or CINCINNATI-LANDIS.



# CINCINNATI-LANDIS

## TIME KEEPING AND SIGNALLING EQUIPMENT

### TYPES OF EQUIPMENT

The CINCINNATI-LANDIS line includes every electro-mechanical device for synchronized multiple-station showing of time and signalling of schedule periods. Any size system, from a simple two or three station installation for the small school to the most elaborate, many-station kind required for the numerous buildings on a far-flung university campus, can be selected entirely from CTR-built LANDIS time and program instruments, and guaranteed accessories; all procurable from this single source.

In addition to Master Clocks, Program Machines, and Secondary Clocks (with or without bells or other signalling devices) for marking class and lecture periods, the CINCINNATI-LANDIS line includes other electrical equipment particularly useful in science instruction in schools. Athletic Timers and accurate timekeeping scoreboard Clocks for gymnasiums and playing fields are also available.

### CONTROL OF EMPLOYEES' TIME

School management definitely is Big Business. Supervision of employes is just as necessary and valuable in institutional work as in industry. Any school with a number of employes will find the use of a CINCINNATI Employes' Attendance and Payroll Recorder, or a Job Time Recorder, or both, a valuable factor in insuring promptness, efficiency, and in conserving labor costs.

### FOR ADMINISTRATIVE EFFICIENCY

The administrative and business offices of colleges and universities, and the principal's office in every school can and should have the same convenience and efficiency devices demanded for modern commercial and industrial offices.

A CINCINNATI Electric Time Stamp will be found invaluable in offices which handle many papers and documents, for printing thereon the exact time of receipt or forwarding.

### A UNIFIED SYSTEM

A CINCINNATI electric time recording (printing) instrument can be hooked up in circuit and synchronized in a CINCINNATI-LANDIS Time Signalling System. Every instrument is a clock as well as a printer, and with CINCINNATI-LANDIS time control and correction, you have the comfortable assurance that the time shown, sounded or recorded anywhere on the system is accurate and identical with the time at every other point on the system.

Let a Cincinnati Time Recorder Company sales engineer survey your time service needs and suggest a systematic installation.

# CINCINNATI-LANDIS

## MASTER CLOCK CONTROLLED TIME SYSTEMS

Extreme flexibility and infinite variety of combinations of time instruments is afforded by the use of CINCINNATI-LANDIS equipment. Any number of Secondary Clocks (Time Indicating), Program Machines (Time Signalling) with Bells, Buzzers, Horns, Gongs (Signal Sounding), and Attendance Recorders and Time Stamps (Time Printing), located anywhere, can be connected with, operated and controlled by one Master Clock.

Each system can be individualized to the user, — made comprehensive enough fully to take care of all of his requirements, but excluding all superfluous instruments and equipment that would involve useless expense.

### OPERATING PRINCIPLE

Electrical impulses, one each minute, sent out over the wires from the Master Clock cause the time progression machinery — and, of course, the hands on the clock dial — of every secondary instrument hooked up in the circuit to advance with the master instrument.

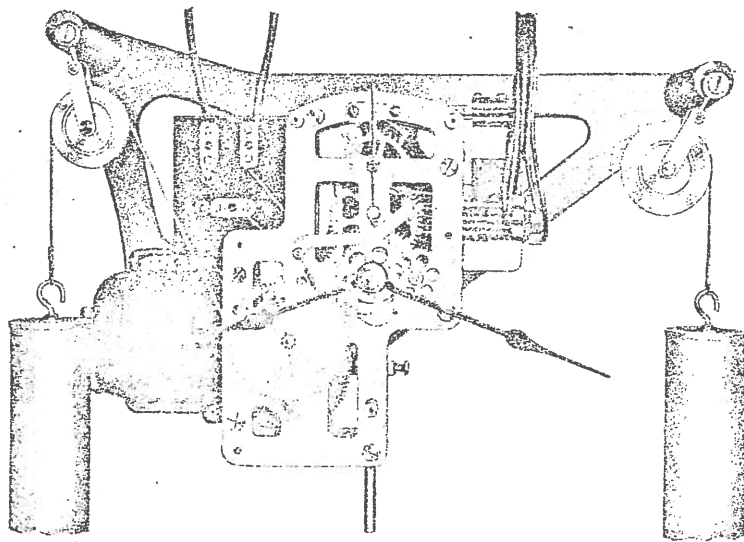
### AUTOMATIC RESETTING

A synchronization control device automatically switches on once each hour to reset any or all secondary instruments which, through failure of the electric current or other causes, may not be exactly in time with the Master Clock. Range of correction — 10 minutes fast or 27 minutes slow corrected within one hour, or 47 minutes slow within two hours.

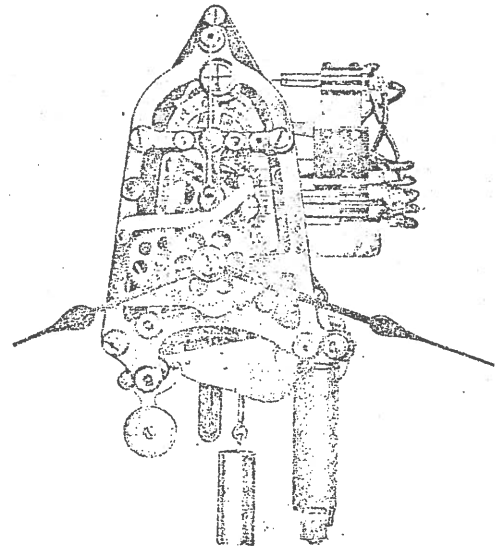
## MASTER CLOCK MOVEMENTS

Sixty beat master clocks can be furnished with either of the following types of movement: (a) Self-winding magnet wound weight driven movement which winds from the secondary equipment impulse and carries 2½ hours reserve to keep master clock in operation in case of current failure. (b) Self-winding magnet wound spring driven movement

with reserve power up to 72 hours. (c) Automatic motor wound weight driven movement which winds once every 24 hours from 110-120 volts A.C. or D.C. supply. This movement carries 7 days' reserve in weights to keep clock in operation in case of current failure and will fully rewind whenever current to winding motor is restored.

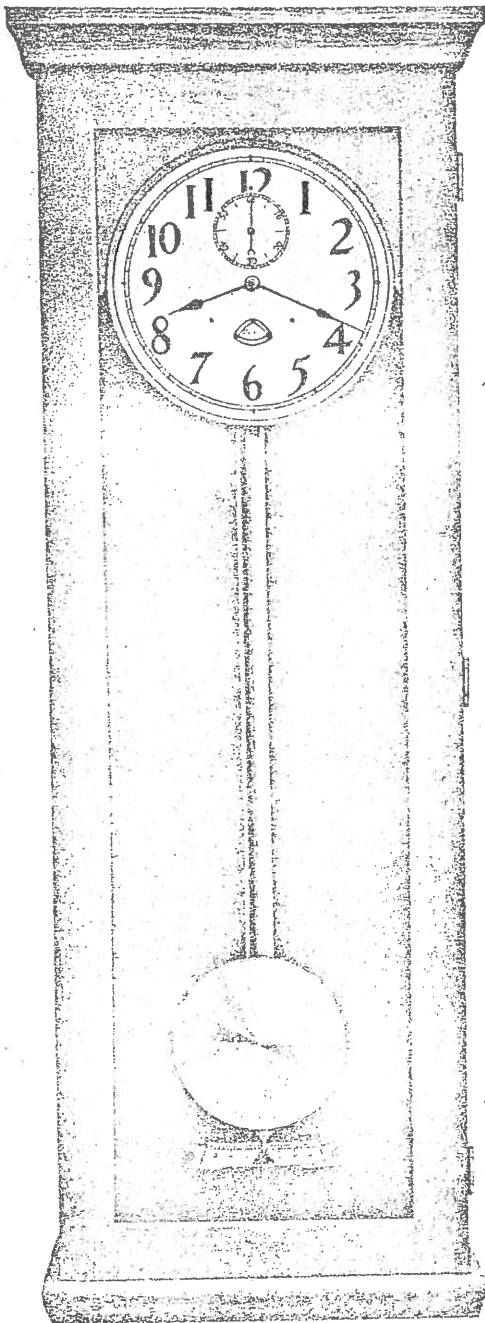


Motor Wound Weight Driven Movement



Magnet Wound Movement

# MASTER CLOCKS



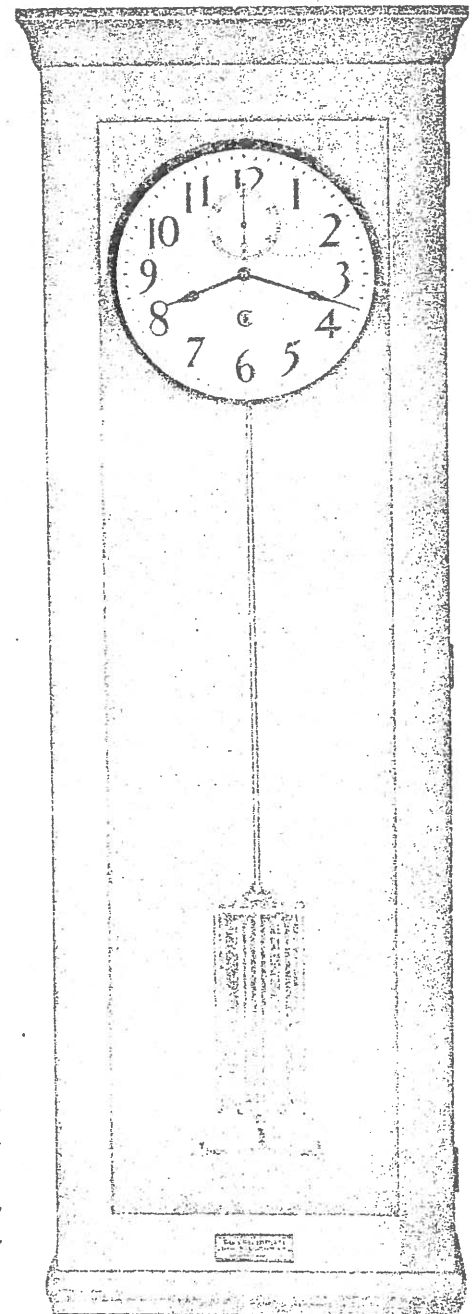
METAL BALL PENDULUM TYPE  
LM—60 T Motor Wound Weight Driven  
L—60 T Magnet Wound

## *Finest Quality Construction*

Sixty beat types with wall hanging surface or flush type case and full length heavy glass paneled door. Case of oak with standard finishes of light, medium or dark oak. Case of gumwood with standard finishes of brown walnut or dark mahogany. Special finishes to sample can be furnished. Master clocks regularly furnished with 12" white enameled dial with seconds circle. When specified, a 12" satin silvered dial with black numerals and seconds circle can be furnished. Satin silvered dial with raised bronze numerals and fancy hands also available at special prices.

### DIMENSIONS

Dial .....	12"
Height .....	60"
Width .....	20"
Depth	
LM60 T&D .....	10"
L60 T&D .....	8 $\frac{5}{8}$ "



MERCURIAL PENDULUM TYPE  
LM—60 TD Motor Wound Weight Driven  
L—60 TD Magnet Wound

*Types of Pendulums.* Any sixty beat master clock can be furnished with either: (a) Metal ball and wood rod pendulum making master clock capable of regulation within 30 seconds per month, (b) double jar mercurial compensating pendulum, (c) Invar pendulum having nil coefficient of expansion. Mercurial and Invar pendulums are equipped with both coarse and fine adjustment and make master clock capable of regulation within 10 seconds per month.

# CINCINNATI-LANDIS

## AUTOMATIC TIME SIGNALLING EQUIPMENT

### DEFINITIONS

"Interval" — minimum time between periods at which signals may be sounded; frequency of signal settings provided.

"Circuit" — any group of bells or horns which are all to be sounded at the same times.

"Calendar Periods" — 12 hours — 6 A. M. to 6 P. M. and 6 P. M. to 6 A. M.

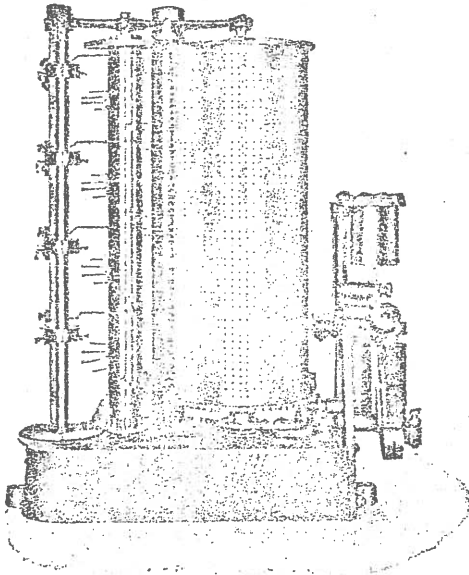
### PROGRAM MACHINES

For sounding bells, buzzers, horns, etc., single or in circuit, at any certain predetermined times, exactly on the minute, *automatically*, without any button pressing or human attention. No need for clock-watching; no tardy or forgotten signals when a CINCINNATI-LANDIS Program Machine is on the job.

In **SCHOOLS** it will announce the time for calling and dismissing classes, accurately, impersonally, relieving teachers and principal of that responsibility.

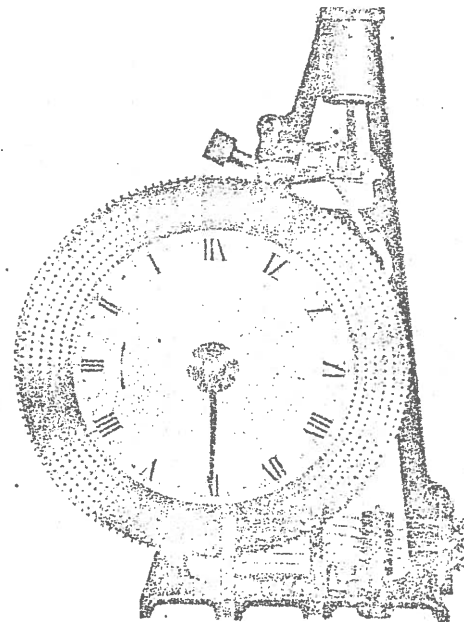
In **INDUSTRY** and **BUSINESS** its signals will admit of no argument when used for starting and stopping work, changing shifts, etc.

Bells or other signal sounding devices, as many as needed, may be located anywhere, at any distance from the Program Clock — in separate rooms, departments, corridors, outside of building.



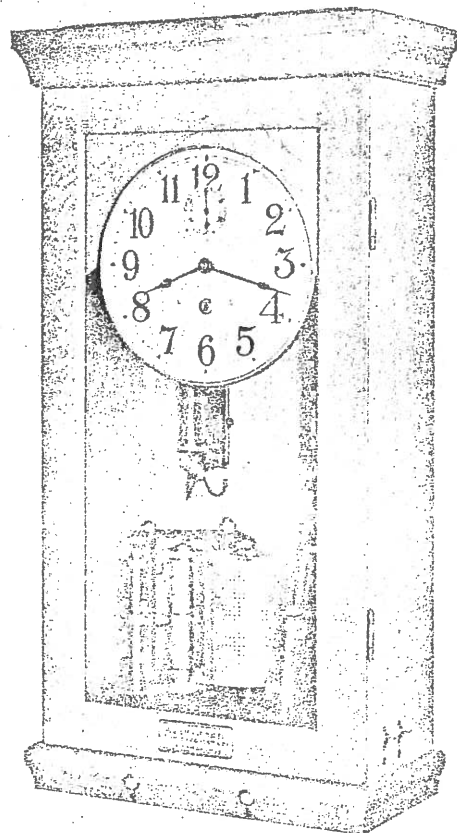
One Minute Interval Type  
With Automatic Calendar Switch

Shown here isolated, but to operate it must be connected with and controlled by either a Master Clock or a synchronous motor driven clock. If Master Clock controlled, the Program Machine may be mounted either in a separate case or in the same case with the Master Clock. If controlled by synchronous motor driven clock, the Program Machine invariably is mounted in the clock case. (See illustrations on page 7.)



Five Minute Interval Type  
With Automatic Calendar Switch

Shown here isolated, but to operate it must be mounted in same case with either a Master Clock or a synchronous motor driven clock. (See illustration on page 7.)

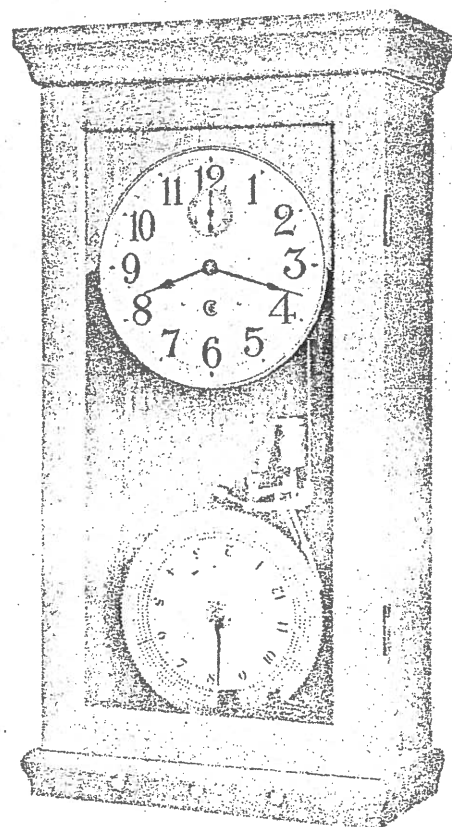


## PROGRAM CLOCKS

(LEFT) STYLE SMP  
ONE MINUTE INTERVAL  
SYNCHRONOUS MOTOR  
PROGRAM CLOCK  
Available in 1 to 6 Circuit  
Sizes.

(RIGHT) STYLE SFP  
FIVE MINUTE INTERVAL  
SYNCHRONOUS MOTOR  
PROGRAM CLOCK  
Available in 1 to 6 Circuit  
Sizes.

These Program Clocks are complete operating units independent of a Master Clock. They operate directly from 110 volt, A.C. electric power supply (common building lighting circuit).  
10" Dial. Case 17" x 37 $\frac{3}{4}$ " x 8 $\frac{5}{8}$ " deep.



Program Machines are always connected and operate synchronously with a clock, but the connection is provided in several different ways:

1. Program Machine in separate wood or metal, surface or flush type case, wired to and operated by a Master Clock. PROGRAM MACHINE.
2. Program Machine mounted in same case with Master Clock which may be wired to and control other time indicating and printing clocks. COMBINATION MASTER AND PROGRAM CLOCK.
3. Program Machine mounted in a case with an electric clock, actuated by self-starting, synchronous motor. PROGRAM CLOCK.

CINCINNATI-LANDIS Program Machines are of the all metal type and schedules are set up by inserting specially machined pins in the holes on the machine. These machines are made in two styles:

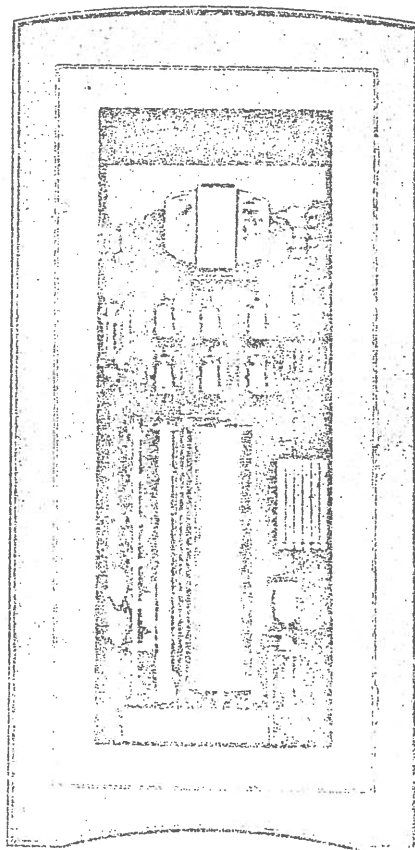
- (a) One minute interval drum type whereby signals can be sounded automatically at any desired minute of the day or night.
- (b) Five minute interval type whereby signals can be sounded automatically at any desired even five minute period of the day or night.

All Program Machines are equipped with automatic calendar switch to silence any program during any 12 hour period. The calendar shifts at 6 A. M. and 6 P. M.

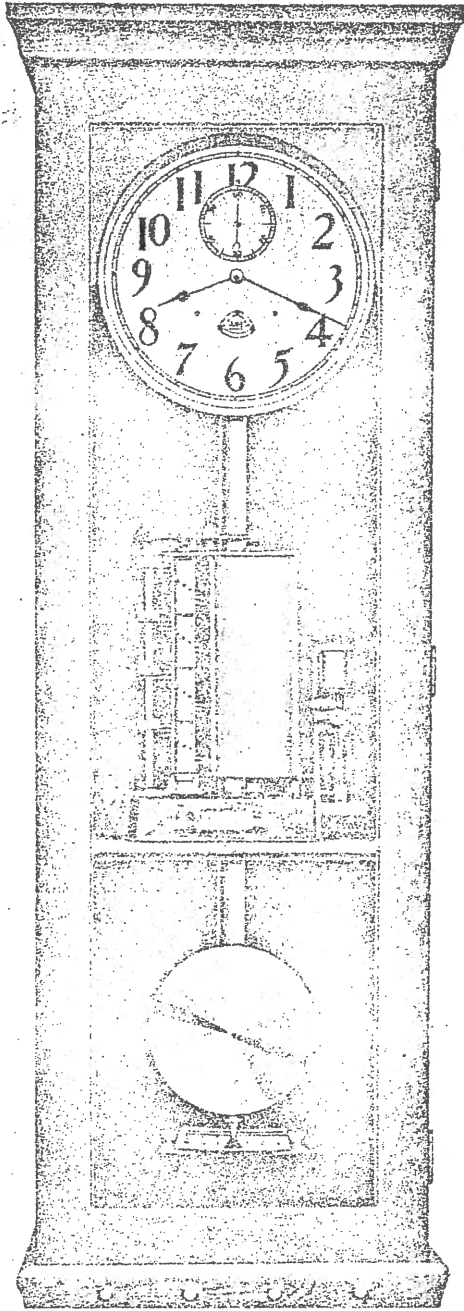
Each machine is equipped with a signal duration contact which does not require any special wiring and which may be adjusted without the use of tools or removing any parts in the clock.

(RIGHT) 6 CIRCUIT PROGRAM MACHINE WITH  
SYSTEM CONTROL EQUIPMENT

Mounted in flush type case. For use with a Master Clock.  
Also made in 1 up to 8 Circuit Sizes.



# COMBINATION MASTER AND PROGRAM CLOCKS



STYLE L 60 TM or LM 60 TM

WITH METAL BALL PENDULUM  
COMBINATION MASTER AND ONE MINUTE  
INTERVAL PROGRAM CLOCK

Available with either Motor Wound  
or Magnet Wound Clock Movement.

The function of a MASTER CLOCK is to transmit power impulses to operate other electricity driven time instruments which are wired in circuit with the MASTER, e. g. SECONDARY CLOCKS (simple time-tellers), EMPLOYEES' TIME CLOCKS, TIME STAMPS (time printing recorders), etc., and automatically to control and when necessary reset them so that all are synchronized with the MASTER. The exercise of the function of a MASTER CLOCK is in no wise dependent on or affected by the inclusion of a PROGRAM MACHINE in its circuit. The PROGRAM MACHINE becomes simply another secondary time instrument, with functions different from those of simple SECONDARY CLOCKS and TIME RECORDERS.

When a FIVE MINUTE INTERVAL PROGRAM MACHINE is to be operated by a MASTER CLOCK, it *must* be mounted in the same case, because it is mechanically, *not* electrically, driven by the clock works. While a ONE MINUTE INTERVAL PROGRAM MACHINE, which is operated by self-contained electric magnet, *may* be mounted in a case separate from the MASTER CLOCK and connected with the MASTER only by circuit wiring, it is often expedient to put this type into the same case with the MASTER CLOCK. This is customary when the PROGRAM MACHINE is not over 4 circuit size. The 6- and 8-circuit sizes commonly are mounted in separate cases.

N. B. Bear in mind that a PROGRAM MACHINE does not have to be incorporated in a MASTER CLOCK SYSTEM to perform its special function of sounding circuits of station signals. It may be operated as an independent unit in connection with a synchronous motor driven clock not arranged to operate other secondary instruments. See pages 6 and 7.



--- **MART** ---

All MART Ads are FREE, Send copy to the attention of the Editor:  
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 email mjanoff@optonline.net (914) 997-5670

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 Dennis Roberts (630) 761-9286 or WeaverB51@AOL. Com

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 (773)275-2563. Also available from most Watch Parts Suppliers.

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Just arrived glass dome for the large **Bulle** clock. We also have glass domes for the **Tiffany Never Wind, Barr, Poole, & Kundo** clocks. If I don't have it in stock I'll try to get it. E-mail [www.glassdomes.com](http://www.glassdomes.com)  
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Electronic "master clock" for old slave dials: \$50. "Governor" makes Eureka clocks keep quartz-accurate time with no change to the clock: \$95. Voltage regulators: \$35 to \$55.  
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**THE JOURNAL OF  
THE ELECTRICAL HOROLOGY SOCIETY**  
CHAPTER #78  
NATIONAL ASSOCIATION OF WATCH & CLOCK COLLECTORS

**VOLUME XXXI #4, DECEMBER 2005**

Fellow Horologists:

It is time for our yearly dues payments. Dues remain **\$10.00** for US members and **\$15.00** for foreign members, due to the higher postage. Dues have not been raised in over 30 years.  
**Please pay promptly as it makes our Secretary-Treasurer's job much easier.**

The next issue of the Journal is our Mart cleanup issue. Please send a note to either George Feinstein or Harvey Schmidt if you wish to continue your ad in the Mart. Thank you for your cooperation.

This issue of the Journal continues the series of materials from the 1940's on the Cincinnati-Landis clocks and the Stromberg Time Corporation catalog published in the 1940's. We are starting the publishing of a catalog describing the products of the Telephone Manufacturing Company, Ltd, an English company. The original material for this article was provided by EHS member, Mr. Rodney King. Our sincere thanks are extended to Mr. King. Our editors are always looking for new material on electric clocks and we depend upon the help of members and friends such as Mr. King as a source of this information. Please keep your eyes open for potential articles and then, please make them available to the JEHS.

The next issue of the Journal will contain an updated and complete index of the articles that have been published in the Journal of the Electrical Horology Society. The JEHS is the largest source of material pertaining to electrical timekeeping. We have been publishing continuously since 1972 and it is interesting and educational to review what has been accomplished over these 34 years.

Enjoy this issue of the Journal and have a happy and healthy New Year.

Yours very truly,

Bill Ellison

Bill Ellison.....President

Harvey Schmidt, FNAWCC,.....Secretary-Treasurer )

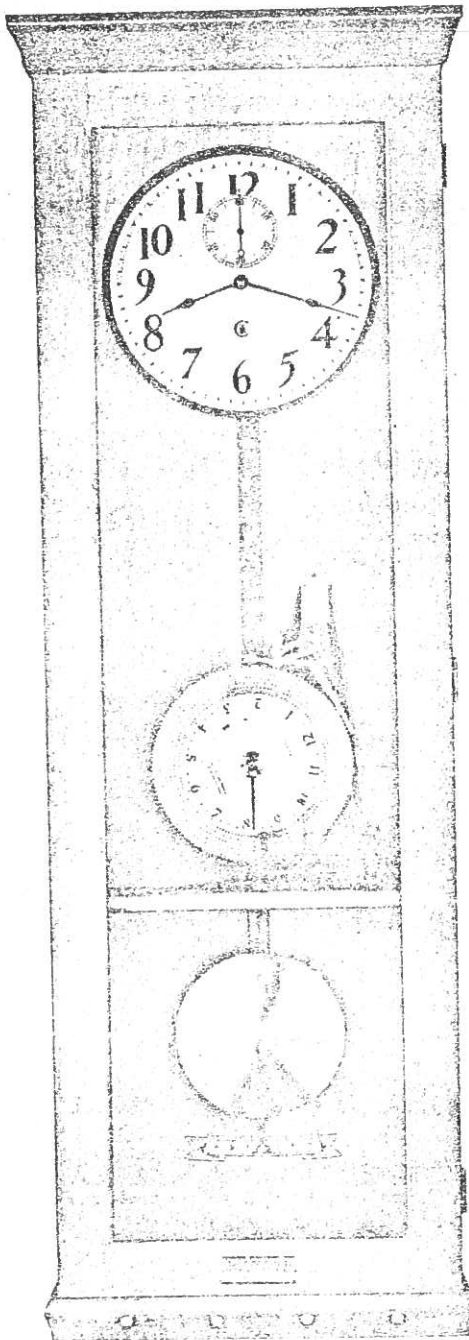
Dr. George Feinstein, FNAWCC..Chapter Historian )

Co-Editors

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HARVEY SCHMIDT, FNAWCC, Secretary-Treasurer, 75-80 179<sup>th</sup> ST. FLUSHING NY 11366

# COMBINATION MASTER AND PROGRAM CLOCKS



STYLE L 60 TF or LM 60 TF

WITH METAL BALL PENDULUM  
COMBINATION MASTER AND FIVE MINUTE  
INTERVAL PROGRAM CLOCK

*Finest Quality  
Construction*



*High Accuracy*

*Dependability*

*Ruggedness*



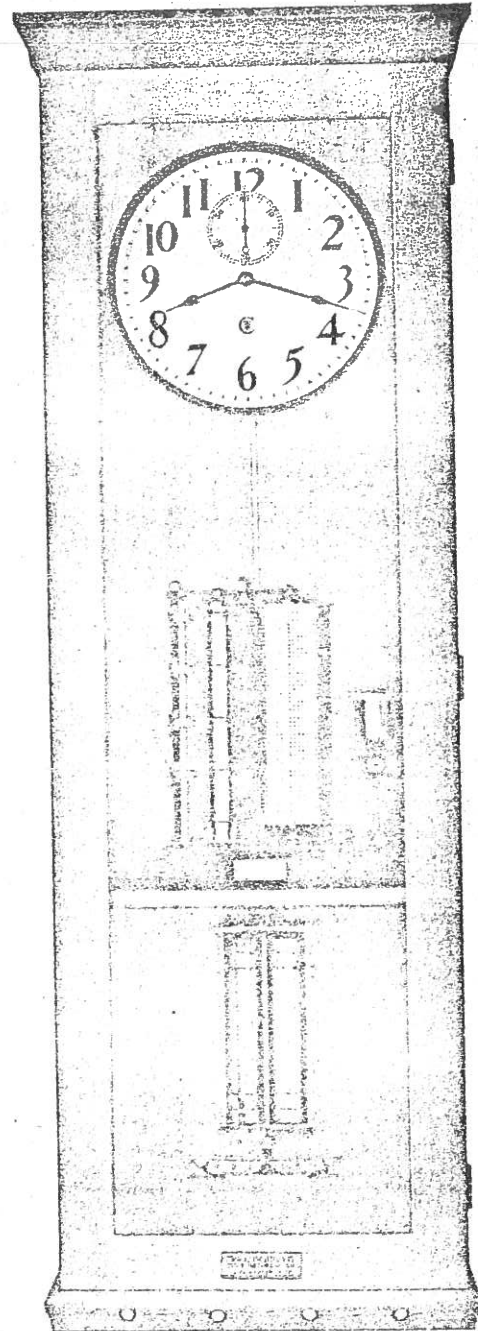
*Finishes*

*Light, Medium  
or Dark Oak  
Brown Walnut  
Dark Mahogany*



*Motor Wound  
Weight Driven  
Movement  
or  
Magnet Wound  
Movement*

*Metal Ball  
or  
Mercurial  
Pendulum*



STYLE L 60 TMD or LM 60 TMD

WITH MERCURIAL PENDULUM  
COMBINATION MASTER AND ONE MINUTE  
INTERVAL PROGRAM CLOCK

OVERALL DIMENSIONS OF CASES:

Height, 60"; Width, 20"; Depth, 10"; Dial, 12".

# CINCINNATI-LANDIS

## TIME INDICATING INSTRUMENTS

### SECONDARY CLOCKS

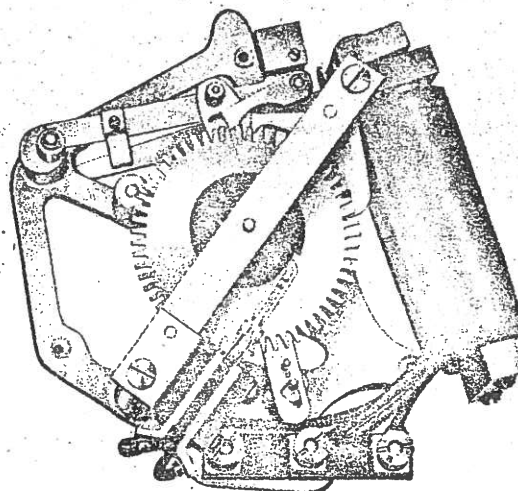
Secondary Clocks are simply time-tellers. They perform no other function. The difference between an ordinary clock and a SECONDARY CLOCK is that whereas an ordinary clock contains within itself ALL the driving works necessary to make it run and is therefore independent of any other instrument, a SECONDARY CLOCK needs controlled, spaced, electric impulses from a MASTER CLOCK to move its hands, and so must be wired in circuit with the MASTER CLOCK in order to run and to keep time.

#### THE MOVEMENT

The CINCINNATI-LANDIS Secondary Clock Movement is entirely free from springs of any kind. The escapement is of the ratchet and pawl type, gravity actuated. Pawl release is controlled by magnetic coil, animated by electric impulses sent out over the circuit by the Master Clock at 60 second intervals. Thus the hands of Secondary Clocks advance in one-minute steps instead of in continuous motion.

Since automatic hourly synchronization is a feature of the CINCINNATI-LANDIS Master Clock, Secondary Clocks in circuit with it are of course automatically reset once every hour to make their time correspond with that of the Master Clock. This type of operation and control of secondary instruments requires a 3-wire multiple circuit.

Every CINCINNATI-LANDIS Secondary Clock Movement is durable and trouble-free. Gears and parts are machine-cut and heavily plated to prevent rust. Coils are moisture-proof. Movements are made in two sizes or capacities. The heavy duty size is used for large clock dials and unusually heavy clock hands. All regular wood and metal case clocks up to and including 18" sizes, also 12" and 14" marble and skeleton dial clocks are furnished with regular size movements. Wood and metal case clocks 24" and larger, and skeleton and marble dial secondary clocks larger than 14" are equipped with heavy duty movements.



Cincinnati-Landis Secondary Clock Movement

#### STYLES AND SIZES

The variety of case designs, sizes of dials, types of hands, and possibilities of purpose and placement of Secondary Clocks to be operated in a CINCINNATI-LANDIS Master Clock System is practically unlimited.

A partial list of the varieties:

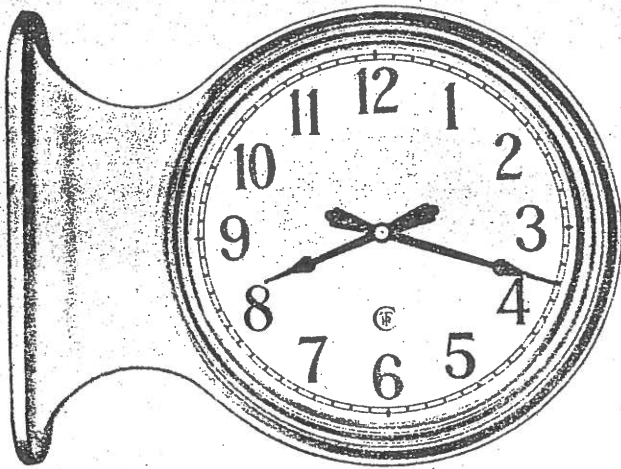
- Indoor and Outdoor Clocks
- Round and Square, Wood and Metal Cases
- Marble Dials, Skeleton Dials
- Regular Metal and Fancy Bronze Hands
- Surface and Semi-Flush Wall Cases
- Double-Dial, Right-Angle Wall Mounted Cases
- Chain-Hung Clocks
- Illuminated Dial Clocks
- Gauge Type Clocks
- Moisture-Proof, Fume-Proof and Weather-Proof Clocks
- Dials 6 Inches to 48 Inches in Diameter

Special dial protections — wire guard, wired glass, convex plate glass — for cased secondary clocks can be furnished if desired.

The makers of CINCINNATI-LANDIS time equipment can supply Secondary Clocks and Systems to satisfy any requirements, any taste. Obviously it is impractical to list every possible combination of specifications. The best way to be sure you will get exactly what you want is to consult a CINCINNATI TIME RECORDER COMPANY representative.

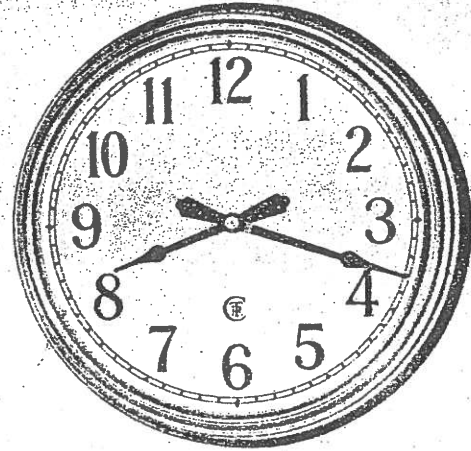
# SECONDARY CLOCKS

Shown on these pages are illustrations of a few CINCINNATI-LANDIS Secondary Clocks which are standard items.



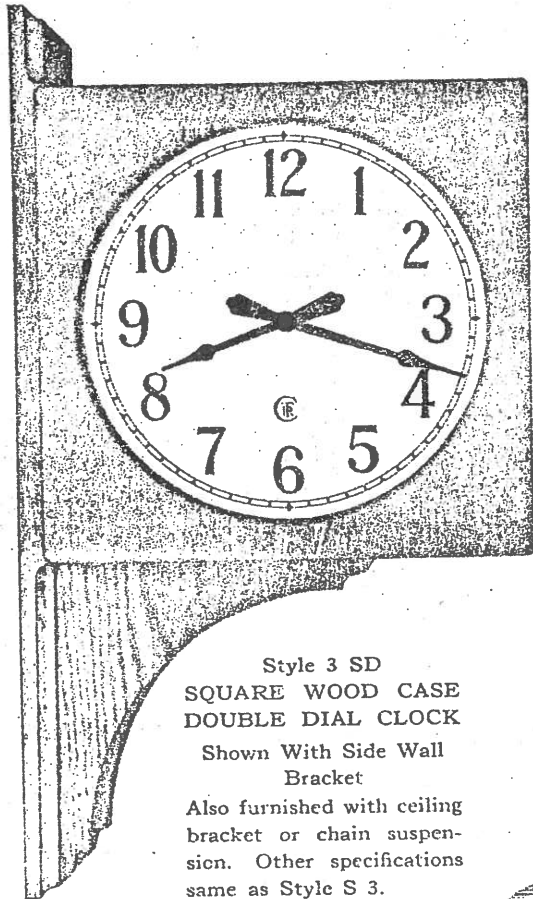
Style 2 MD

**ROUND METAL CASE DOUBLE DIAL CLOCK**  
For Ceiling or Side Wall Mounting  
Spun metal cases. Available in various Dial sizes.



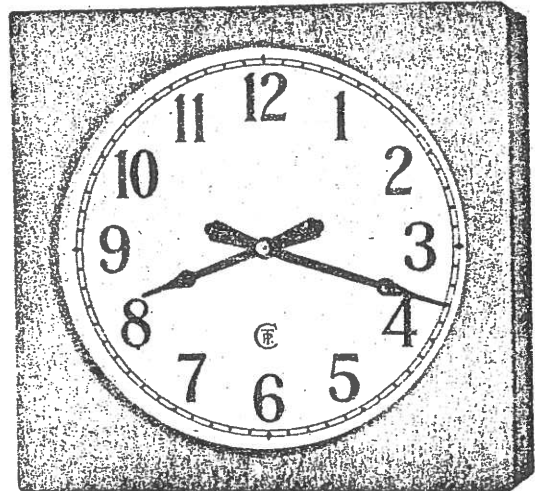
Style 2 M (Surface); 2 FM (Semi-flush)  
**ROUND METAL CASE SECONDARY CLOCK**

Furnished with 8, 10, 12, 14, 18 or 24 inch white enamel dial. Case of spun metal finished to sample. Surface type clocks fitted with bracket for buzzer or small bell.



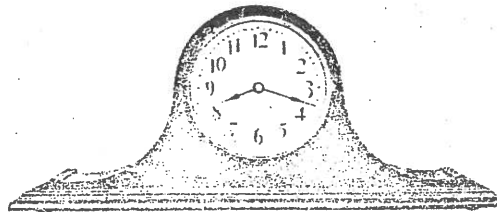
Style 3 SD  
**SQUARE WOOD CASE DOUBLE DIAL CLOCK**

Shown With Side Wall Bracket  
Also furnished with ceiling bracket or chain suspension. Other specifications same as Style S 3.



Style S 3  
**SQUARE WOOD CASE SECONDARY CLOCK**

For Wall Surface Mounting  
With 8, 10, 12, 14, 18 or 24 inch white enameled dial. This case is fitted (inside) with mounting plate for buzzer or small bell (up to 4 inches).

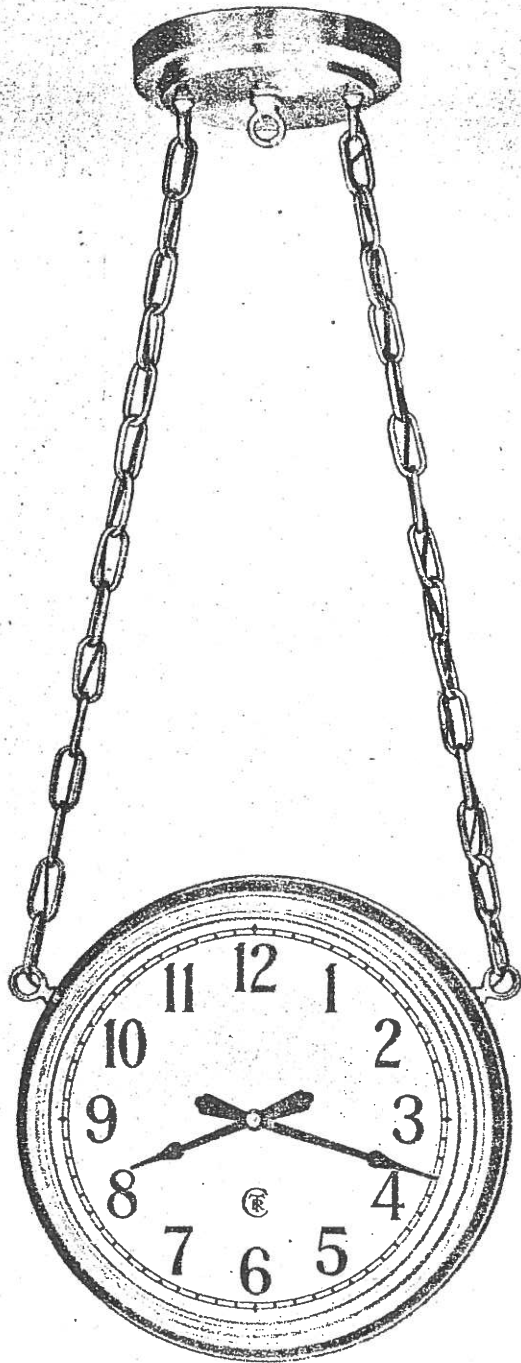


Style 6 M 1  
**(Left) MANTEL TYPE SECONDARY CLOCK**

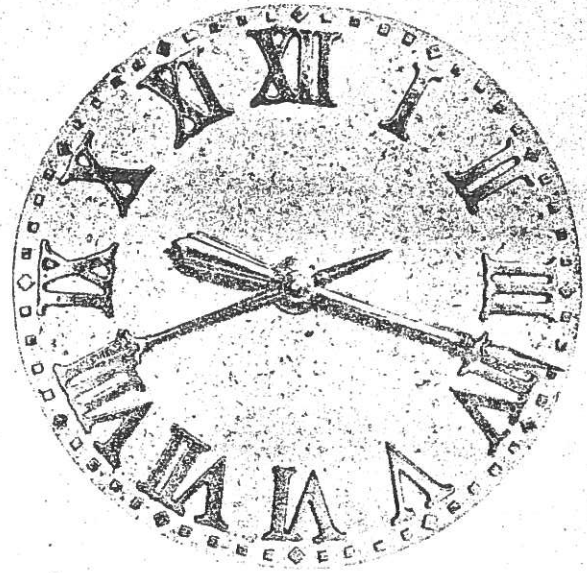
Brown walnut or dark mahogany finished wood case. Silvered dial. Standard size — 22 3/4" wide, 9 3/8" high, 5" dial. Other sizes also available.

# ORNAMENTAL SECONDARY CLOCKS

12, 14, 16, 18, 24, 30, 36, 42 AND 48 INCH DIALS

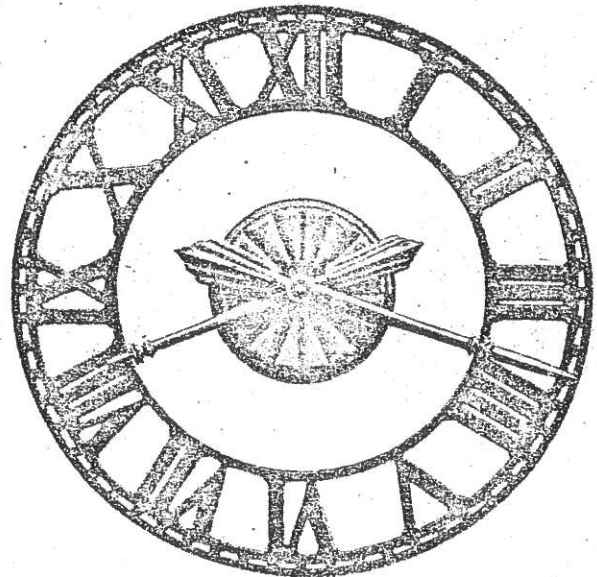


ROUND METAL CASE DOUBLE DIAL CLOCK  
With Chain Suspension



Style 7  
MARBLE DIAL

Can be furnished in all different kinds and colors of marble; raised bronze (as illustrated) or etched-in-the-stone Arabic or Roman numerals and minute marks; cast bronze hands.



Style SD  
SKELETON DIAL

Can be furnished with numerals and numeral rings, or numerals only with template for mounting the numerals. Center rosette and cast bronze hands are standard.

# PUSH BUTTON AND CROSS-CONNECTING BOARDS

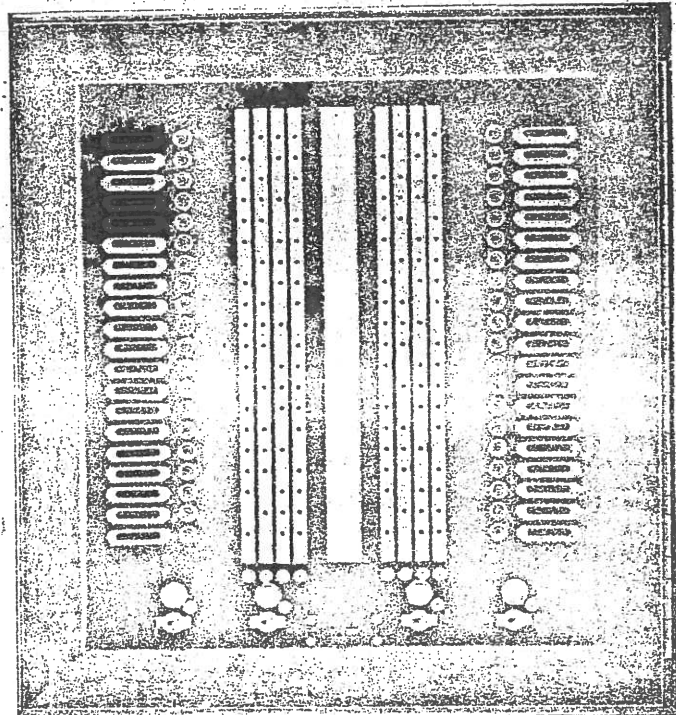
Enabling any bell, buzzer, horn, or group of these to be shifted from any program circuit to any other program circuit, quickly, easily, without the use of tools.

The use of a cross-connecting board makes it possible temporarily or permanently to remove any signal-sounding station from any program and circuit, and either leave it silent or put it into another program and circuit, without any resettings or adjustments in the Program Machine itself. This is a great convenience for schools where on certain days or for special occasions it is desirable to alter the ringing schedule in certain rooms or stations. System wiring must conform to Board capacity and requirements.

Boards carry nickel-plated contact bus bars, one for each program circuit on the system, i. e. each bar is cable-connected with its own separate program circuit in the Program Machine.

In each circuit bar are switch-plug holes, one for each bell or other signal-sounding device in the system. Opposite each hole is a card holder into which may be inserted a card bearing the name of the location, or other identification mark, of that particular signal-sounding device. One knurled, nickel-plated screw-plug is furnished for each signal-sounding device provided for on the board. When a screw plug is inserted in a hole on a certain circuit bar, the effect is to put the bell or other sound device wired to that switch-plug hole in circuit with the program to which that bar is connected. Any bell may be silenced from all sounding simply by removing its plug from the board entirely.

Push buttons, one for each signal-sounding device, normally are included on Cross-Connecting Boards, but may be omitted, if not required, at a small saving in cost. Push buttons enable the individual signal devices to be sounded at will, manually, independently of the operation of the Program Machine circuits.



**PUSH BUTTON AND CROSS-CONNECTING BOARD**  
With Individual and Circuit Buttons  
4-Circuit, 40-Station, Double Row Panel  
Available in Various Sizes

Cross-connecting Boards are made with 4, 6 or 8 circuit bars, with any number of signal device switch points (plug holes) from 15 up. Circuit bars, push buttons and card-holders are mounted on the front of a polished bakelite panel, with all wires and inter-connectors on the back of the panel. Panel is mounted in a hardwood frame and hinged to a wall mat. All boards carrying connections for 35 signal stations or less, have bars, buttons and card-holders mounted vertically in single rows. Where more than 35 station connections are provided, the bars, etc., are divided into two or more vertical rows.

Boards can be furnished for either surface or semi-flush mounting. Semi-flush types are complete with wall box.

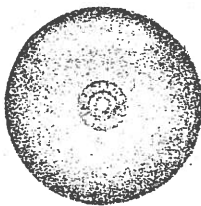
Dimensions of boards naturally vary with the number of station connections carried. In general, a single row board will be approximately 12 inches wide; a double row board 18 inches wide. Allow about 22 inches of overall height for a minimum 20 station board; or 31 inches for a maximum 35 station board.

# CINCINNATI-LANDIS

## TIME SIGNALLING EQUIPMENT

### INDIVIDUAL STATION SIGNALLING DEVICES

### BELLS • BUZZERS • HORNS



"ADAPTABEL"

No. 560 — for A.C.

No. 561 — for D.C.

Underdome type electric bell. Vibrating or single stroke optional. Movement enclosed in cast aluminum housing. Gong of pressed steel, rust-proofed. Sizes—3", 4", 6", 8", 10", 12". Ease of installation is a valuable characteristic of the Adaptabel. Gong and movement, a single solid unit, are simply press-snapped onto flat base plate previously screwed to wall and wire-connected.

Audible signalling of the arrival of points of time on a pre-determined schedule ("program") can be accomplished through numerous types of signal-sounding devices—Bells, Buzzers, Gongs, Horns, Whistles—located wherever desired and wired in one or more circuits to the master sounding controller—Program Machine or Program Clock.

Sounding devices are available in a wide range of sizes and degrees of loudness to meet the requirements of location and purposes for which they are installed.

Signal sounding devices supplied with CINCINNATI-LANDIS systems are of reliable manufacture, dependable, long-wearing.

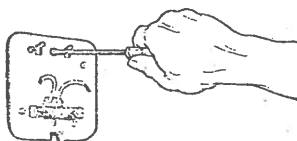
Indoor bells of small or medium size can be had for mounting directly in wall outlet boxes. Newest, neatest method of mounting a school class-room bell is to install it in the class-room secondary clock case where it will be out of sight and protected from dust and moisture. CINCINNATI-LANDIS secondary clock cases are equipped with mounting plates to take program bells or buzzers.

Illustrated on these pages are a few standard, widely used signal sounding devices, as examples only. An almost limitless variety of other models and sizes is available. The CINCINNATI TIME RECORDER COMPANY will recommend the most satisfactory installations to meet any requirements when they know the signal sounding problem in detail.

#### Here's How ADAPTABELS ARE INSTALLED

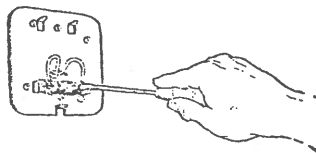
##### 1st STEP

Screw plate to wall, outlet box or any type fitting.



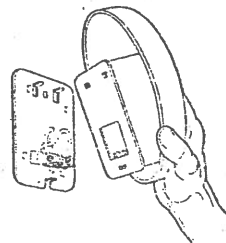
##### 2nd STEP

Connect wires to binding posts.

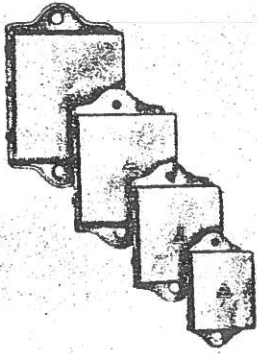


##### 3rd STEP

Hang the ringing unit on the two lugs at top of plate, then press down until it snaps into place.



## SIGNAL SOUNDING DEVICES



No. 115 — A.C. LUNGEN BUZZERS  
Insulated — No Contact — Adjustable  
Tone — Chrome Finish. May be in-  
stalled on metal desks or partitions.  
Binding posts and all parts completely  
covered; bug- and dust-proof. Wire  
entrances are provided for either con-  
cealed or surface wiring.

Four sizes — No. 1— $2\frac{1}{8}$ " x  $1\frac{5}{8}$ "; No.  
2— $2\frac{3}{8}$ " x  $1\frac{3}{4}$ "; No. 3—3" x 2"; No.  
4— $3\frac{1}{2}$ " x  $2\frac{1}{4}$ ".

Volume of sound increases and pitch  
of tone lowers in each size from No. 1  
up. Sound volume of each buzzer  
may be adjusted over a 100% range.



"FLUSHCALL" (Cat. No. 760)

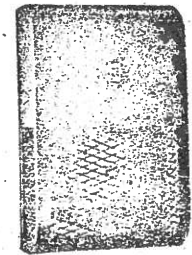
A signal bell with distinctive mellow  
tone that fits into a standard outlet  
box and can be covered by a standard  
wall plate. Fully insulated, contact-  
protected. Rust-proof throughout.



Cast Grid for Adaptabel.  
Sizes — 6", 8", 10", 12".

Yard Type Metal Box and Screen  
Cover, for weather protection.

For bell sizes — 3", 4", 6", 8", 10", 12".



CHIME (Cat. No. 578)

An agreeable one-note musi-  
cal signal at a very low price,  
for use where the loudness  
and insistence of an ordinary  
bell or buzzer are unneces-  
sary.



"BUZACALL"

(Cat. No. 761)

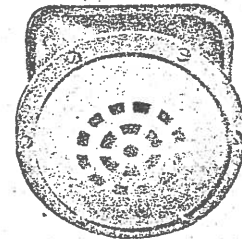
A "Flushcall" type buzzer,  
with better tone and more  
carrying power than the old-  
fashioned buzzer.



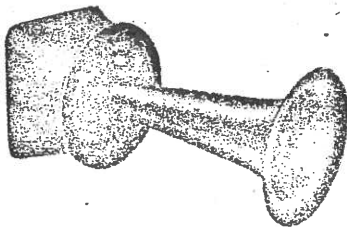
## INDUSTRIAL HORNS

These horns are designed for sure hearing over the noise of  
machinery, etc. They have oversize ( $5\frac{1}{2}$ " ) diaphragms of special  
formula steel, and powerful mechanisms. They are adjustable  
after installation to provide the correct intensity of sound  
required.

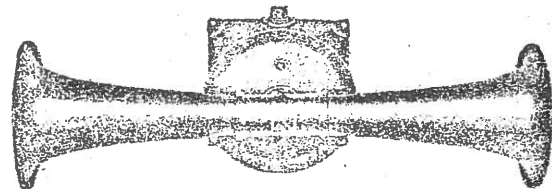
Mounting and hanging the horn is a simple job, similar to that  
of the Adaptabels. (See preceding page.)



No. 311 with grille front. A powerful  
signal, for indoor use. Size of horn,  $5\frac{1}{2}$ "  
diameter,  $3\frac{5}{8}$ " deep.

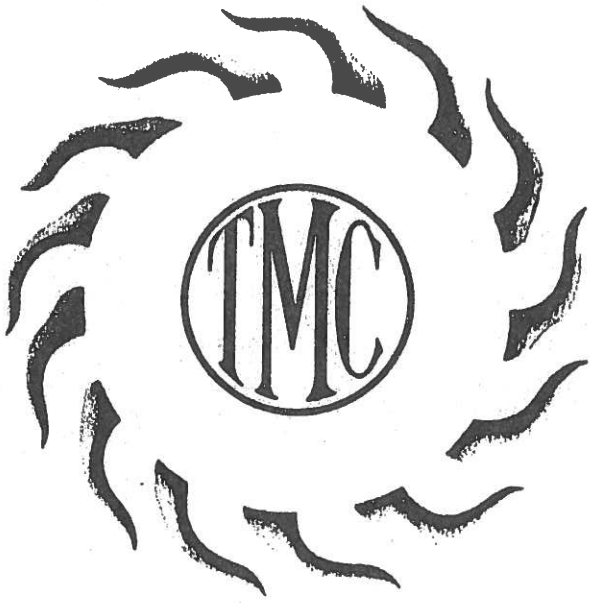


No. 310 with megaphone projector for greater volume, for  
indoor use. Size — 6" high, 6" deep,  $10\frac{3}{4}$ " long.

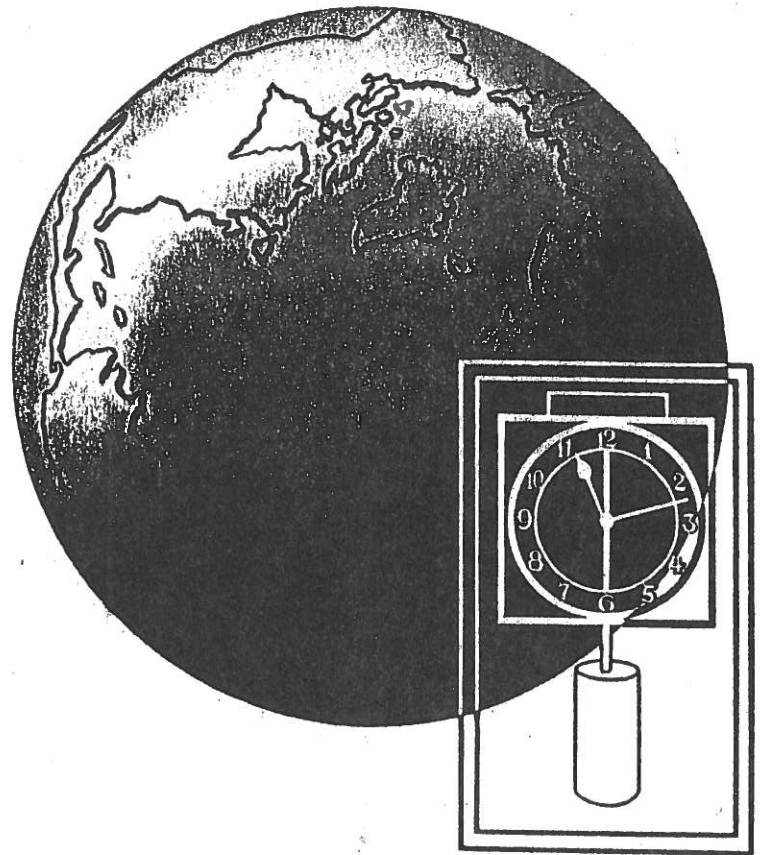


No. 313 — Weatherproof — Outdoor Type. With two-direc-  
tion megaphone. Has cast iron back box. Size —  $5\frac{1}{2}$ " high,  
9" deep,  $17\frac{1}{2}$ " long.



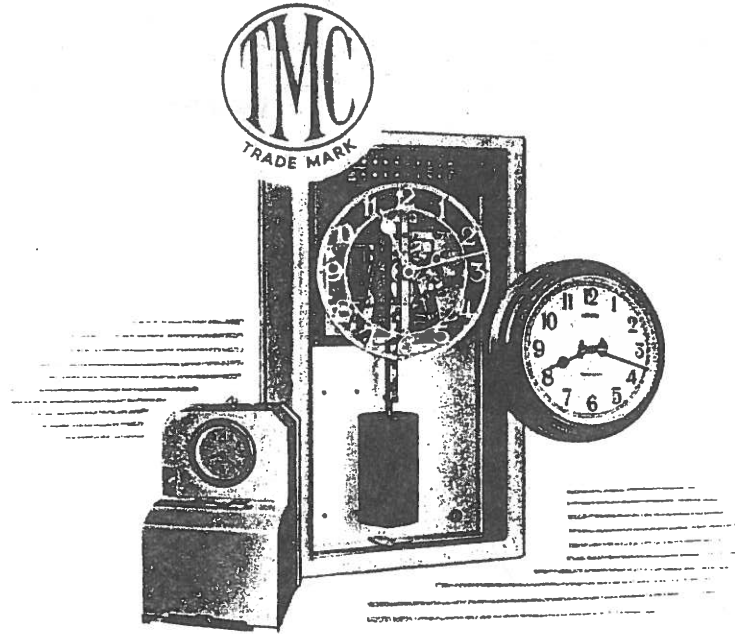


*electric  
clock  
systems*



**TELEPHONE MANUFACTURING CO. LTD.**

# T.M.C. ELECTRIC CLOCK SYSTEMS



*Designed & Manufactured by*

**TELEPHONE MANUFACTURING CO. LTD**

HOLLINGSWORTH WORKS, DULWICH, LONDON, S.E.21, ENGLAND  
TELEPHONE: GIPSY HILL 2211      CABLES: BUBASTIS, LONDON

*T.M.C. Electric Clock Systems can be supplied to meet every practical requirement for a public, private, industrial, or commercial time service.*

THE basis of each system is a T.M.C. Master Clock, which is electrically operated, either from dry cells or trickle-charged accumulators. By distributing periodic impulses of the requisite duration and spacing, it can automatically control any or all of the following equipment:

Impulse-operated Clock Dials  
 Staff and Watchmen's Time Recorders  
 Turret Clocks  
 Outdoor Publicity Clocks  
 Work Starting and Stopping Signals  
 Alarms and Sirens  
 Process Timers  
 Synthetic Timing Apparatus  
 Solar Switching Dials  
 Moving Signs and Advertising Displays.

In fact, any mechanism, process, or operation, which is fundamentally dependent on time-controlled impulses can be operated by a T.M.C. Electric Clock.

Clock systems may be operated on any convenient battery voltage with very economic current consumption, and may be classified by the source of time determination used :—

- (a) *T.M.C. Master Clock Systems*, which employ as a fundamental time-source a T.M.C. Master Clock arranged as an Impulse Transmitter, to operate independently of any extraneous form of control.
- (b) *T.M.C. "Controlled Pendulum" Master Clock Systems*, which use either a T.M.C. Mains-controlled Master Clock synchronized with controlled-frequency a.c. Mains—or a T.M.C. Impulse-controlled Master Clock synchronized by periodic impulses from some extraneous source, for example, a Radio Station, a quartz-crystal oscillator, signals transmitted by land line from an Observatory or a time announcing system, such as the British Post Office Speaking Clock.

From these basic systems, installations can be planned, varying from the very simple to the most complex, and the Manufacturers are always pleased to advise how T.M.C. Electric Clock Systems can be adapted to suit individual needs.

## MASTER CLOCK

### Impulse Transmitter

ELECTRIC CLOCK SYSTEMS



The excellent performance of this Clock is due to the inherently sound principles of its design. Important contributing factors are:

- (a) The arrangement of "on-demand" sustaining, that is, the method of re-energizing the pendulum when the amplitude falls to a fixed minimum.
- (b) The elimination of errors in registering the number of swings by locking the time recording device to the pendulum.
- (c) The use of heavy-duty contacts to distribute the various periodic impulses. These have a quick make-and-break action. They are non-reactive, that is, they do not absorb energy from the pendulum at one portion of the swing and return it at another; the maximum load is imposed by the contacts when the pendulum is over the zero position and has thus reached its highest speed.
- (d) The use of a heavy pendulum bob and an Invar rod to ensure stability of rate.

The clock is constructed on the unit principle, thus permitting easy interchangeability of the various individual units, for service or maintenance.

A 7-inch skeleton comparator dial, and a small seconds dial, for adjusting and checking the operation of the impulse distributing contacts, are standard fittings. If desired the comparator dial can be provided with a centre seconds-hand at an extra charge.

#### THE PENDULUM

The Invar pendulum has a periodicity of  $\frac{1}{2}$ -second. It engages with the clock mechanism through a crutch, can be quickly detached for shipment and is easily replaced. Removal or replacement of the pendulum does not disturb the mechanism or affect the adjustments.

#### IMPULSING CONTACTS

The clock can be equipped with a maximum of eight sets of contacts. Each set operates independently and can distribute impulses of any specified duration or interval spacing.

#### CABLING

The battery leads, and the wiring to and from the clock, are terminated on a moulded connecting block mounted above the clock mechanism.

#### THE CASE

The whole of the assembly is housed in a metal case, enamelled medium grey outside, and white inside, to match the modern trend in design of office furniture and equipment. The glazed front cover is hinged at the top and quickly detachable.

#### FIXING

Full instructions for the installation and testing of the clock are given in the appropriate technical specification (T.73A) supplied with each order.



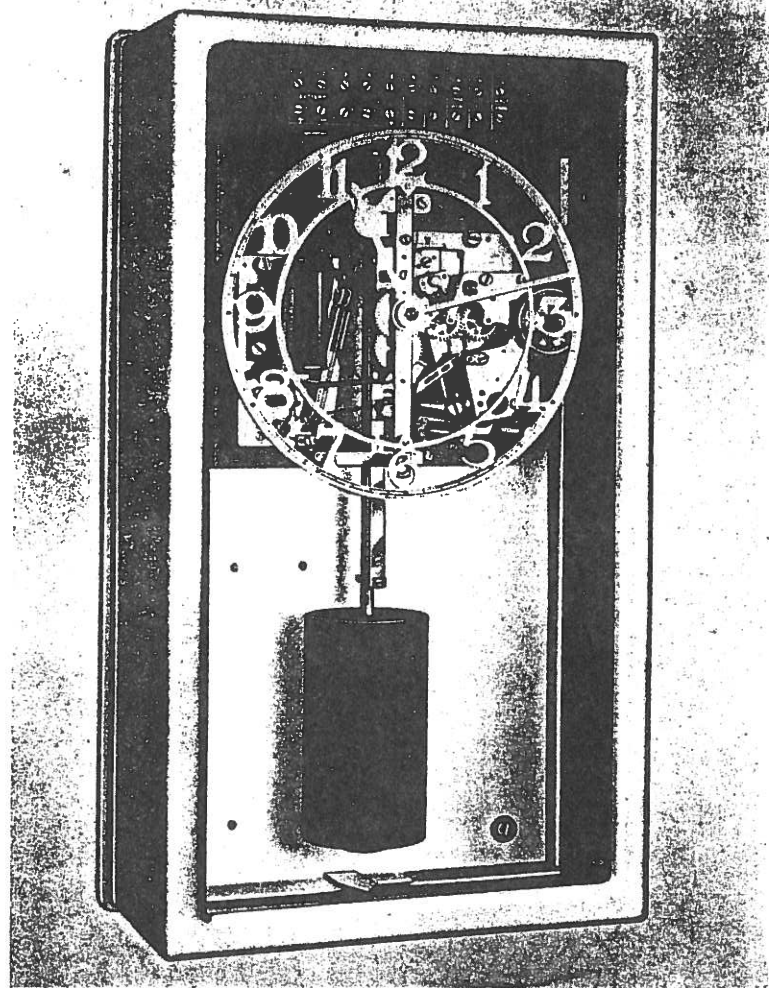
ELECTRIC CLOCK SYSTEMS

**MASTER CLOCK  
IMPULSE TRANSMITTER**

This Master Clock has a special heavy pendulum bob with Invar rod for independent operation. The glazed cover is shown in position. The 7 in. skeleton dial is a standard fitting: it is mechanically operated and is detachable. Alternatively, a dial with centre seconds-hand can be provided, if required, at extra cost.

**DIMENSIONS**

Height : 16 in. (40·64 cm)  
 Width : 8½ in. (21·59 cm)  
 Depth : 4½ in. (11·43 cm)



**W**HEN no reliable source of extraneous control is available for synchronizing a master clock, as for example, controlled-frequency a.c. Mains, or periodic impulses from an Observatory or Radio Station, we recommend the use of this T.M.C. Master Clock arranged for independent operation and driven by dry cells or trickle-charged accumulators.

This clock is capable of determining and distributing a time service of the highest standard, with a performance equivalent to that of the best long-pendulum Master Clocks. It will maintain its time-keeping rate over very long periods, with an absolute minimum of attention.

The various units of the clock mechanism are mounted on a substantial panel; individual units are interchangeable for servicing purposes and thus replacement of parts becomes a simple matter.

## MASTER CLOCK Mains Controlled

## ELECTRIC CLOCK SYSTEMS



A 7-inch skeleton comparator dial, and a small seconds dial, for adjusting and checking the operation of the impulse distributing contacts, are standard fittings. If desired the comparator dial can be provided with a centre seconds-hand at an extra charge.

### THE PENDULUM

The pendulum has a periodicity of  $\frac{1}{2}$ -second, and provides the motive force for driving the mechanically-operated contact units from which electrical impulses are transmitted to the secondary circuits.

The pendulum engages with the clock mechanism through a crutch; it can be quickly detached for shipment and is easily replaced. Removal, or replacement of the pendulum does not disturb the mechanism or affect the adjustments.

### IMPULSING CONTACTS

The clock can be equipped with a maximum of eight sets of contacts. Each set operates independently and can distribute impulses of any specified duration or interval spacing.

### CABLING

The battery leads, and wiring to and from the clock, are terminated on a moulded connecting block mounted above the clock mechanism.

### SUSTAINING

Interference which might be detrimental to the performance of the clock is avoided by an arrangement of "on-demand" sustaining, that is, re-energizing the pendulum when the amplitude falls to a fixed minimum. To eliminate errors in recording the number of swings, the driving unit is locked to the pendulum.

### SYNCHRONIZATION

Interference with the swing of the pendulum which synchronization must necessarily involve, does not adversely affect the performance of the clock because a special method of control is used. This is a mains-driven a.c. motor used in conjunction with a mechanism which accelerates or retards the pendulum as required. Ample margin is provided to compensate for all normal fluctuations in the frequency of the mains.

### THE CASE

The whole of the assembly is housed in a metal case, enamelled medium grey outside, and white inside, to match the modern trend in design of office furniture and equipment. The glazed front cover is hinged at the top and is quickly detachable.

### FIXING

Full instructions for the installation and testing of the clock are given in the appropriate technical specification (T.73A) supplied with each order.



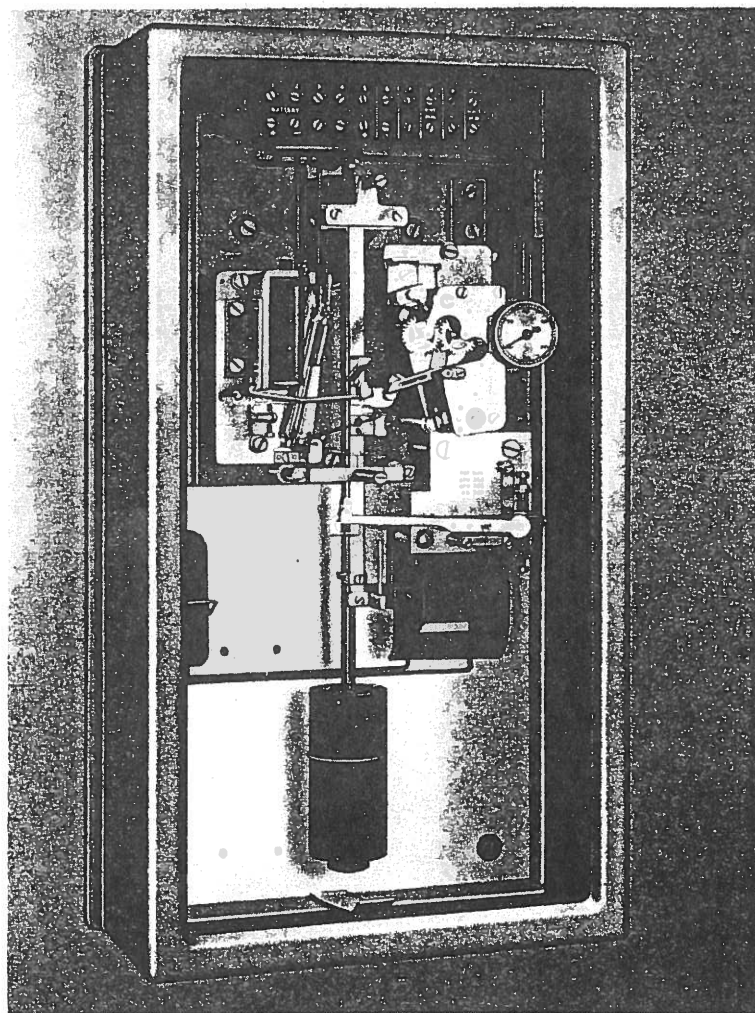
ELECTRIC CLOCK SYSTEMS

## MASTER CLOCK MAINS CONTROLLED

This clock has a half-second beat pendulum synchronized by controlled-frequency a.c. mains. The standard comparator dial has been removed to show the impulsing, sustaining and synchronizing mechanisms.

### DIMENSIONS

Height : 16 in. (40·64 cm)  
 Width : 8½ in. (21·59 cm)  
 Depth : 4½ in. (11·43 cm)



**T**HIS Master Clock is electrically operated by dry cells or accumulators, and held in synchronism with the a.c. mains by a self-starting motor. In the event of failure of the mains supply, the clock continues to maintain a reliable time service, and when the mains supply is restored the clock readily falls into step. Special motors can be fitted to order for operating on non-standard voltages provided the a.c. mains supply is frequency-controlled.

The various units of the clock mechanism are mounted on a substantial panel; individual units are interchangeable for servicing purposes and thus replacement of parts becomes a simple matter.

## MASTER CLOCK Impulse Controlled

ELECTRIC CLOCK SYSTEMS



A 7-inch skeleton comparator dial, and a small seconds dial, for adjusting and checking the operation of the impulse distributing contacts, are standard fittings. If desired the comparator dial can be provided with a centre seconds-hand at an extra charge.

### THE PENDULUM

The pendulum has a periodicity of  $\frac{1}{2}$ -second and provides the motive force for driving the mechanically-operated contact units from which electrical impulses are transmitted to the secondary circuits.

The pendulum engages with the clock mechanism through a crutch; it can be quickly detached for shipment and is easily replaced. Removal or replacement of the pendulum does not disturb the mechanism or affect the adjustments.

### IMPULSING CONTACTS

The clock can be equipped with a maximum of eight sets of contacts. Each set operates independently and can distribute impulses of any specified duration or interval spacing.

### CABLING

The battery leads, and wiring to and from the clock, are terminated on a moulded connecting block mounted above the clock mechanism.

### SUSTAINING

The arrangement of "on-demand" sustaining, that is, re-energization of the pendulum when the amplitude falls to a fixed minimum, avoids interference which would be detrimental to the performance of the clock, and to eliminate errors in recording the number of swings, the driving unit is locked to the pendulum.

### SYNCHRONIZATION

Interference with the swing of the pendulum which synchronization must necessarily involve, does not adversely affect the performance of the clock, because a special method of control is used. This is an electromagnet, the armature of which responds to impulses received from the remote source of control, and synchronizing "feet" act on the pendulum to accelerate or retard its motion as required.

### THE CASE

The whole of the assembly is housed in a metal case, enamelled medium grey outside, and white inside, to match the modern trend in design of office furniture and equipment. The glazed front cover is hinged at the top and quickly detachable.

### FIXING

Full instructions for the installation and testing of the clock are given in the appropriate technical specification (T.73A) supplied with each order.

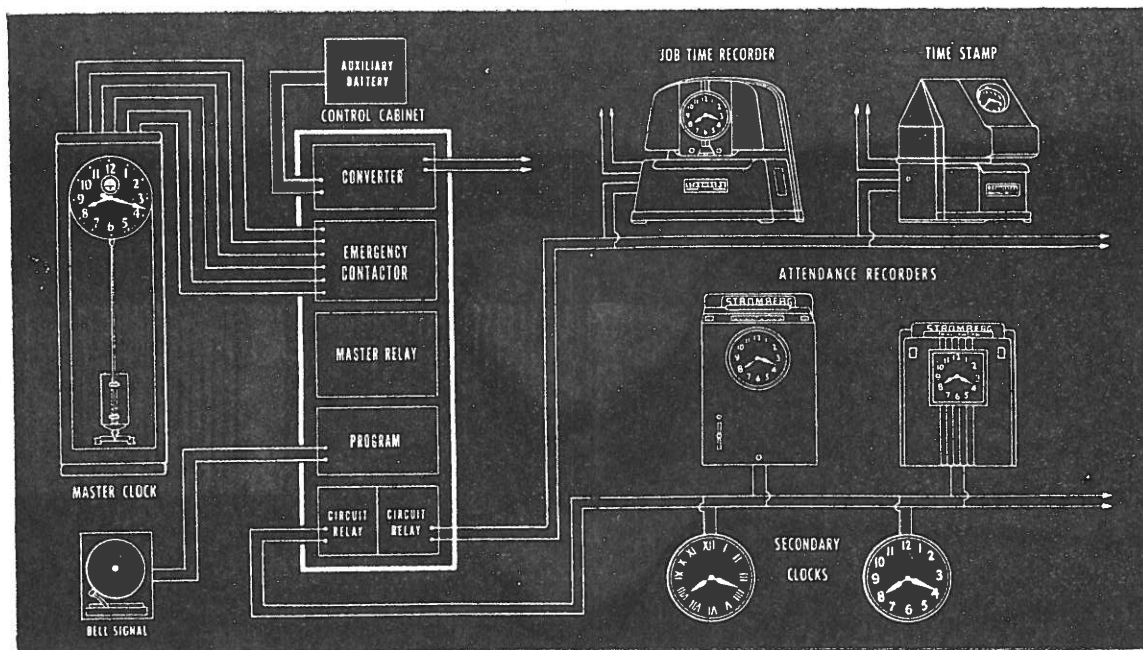


# STROMBERG *Autoset System*

TIME STAMPS • EMPLOYEES TIME RECORDERS • JOB TIME RECORDERS • CLOCKS • PROGRAM INSTRUMENTS • TIMERS

BULLETIN ASCR

## Converter with Reserve Current Supply



Typical Wiring Diagram showing Autoset Master Clock, Autoset Control Cabinet, Current Reserve, and various Stromberg Timing Devices.

*Autoset* is a master clock supervised minute impulse time system that *automatically resets* all secondary apparatus after a current interruption. This system operates on *two-wire* circuits and is based on the polarized relay principle, the secondary movements being controlled by reversing the direction of the current flow. No contacts, selectors, switches, or valves are needed by the secondary units. Every hour the movement of each secondary device locks when reaching its 58th minute. During the 58th minute, fifteen extra impulses are released by the master clock. Slow devices are stepped up to their 58th minute where they lock. Units that may have been set fast automatically lock themselves against further advance when reaching their 58th minute. On the 59th minute impulse, the current is reversed, all movements unlock and the system proceeds with all units synchronized.

*Continuous operation* of the secondary devices, even during a supply current failure, is provided by the reserve current feature. The Autaset System normally operates on direct current furnished through a converter from the regular alternating current supply. Upon failure of this source current, the system automatically and instantly transfers to the stand-by battery current, returning to normal operation upon the resumption of the regular supply. During this emergency operation, a warning buzzer sounds with each minute impulse.

An emergency synchronous motor contactor is included to further safeguard the continuous operation of the system. This device will supply time for the secondary apparatus, if the master clock must be stopped for any reason.

### Specifications and Features

- Based on time-tested polarized relay principle.
- Completely automatic hourly correction.
- Synchronized time.
- Two-wire system.
- Hourly correction of 15 minutes slow and 7 minutes fast.
- Full correction of 45 minutes slow or 15 minutes fast.
- No contacts, selectors, switches, or valves in secondaries.
- Electromagnetic secondary movements.
- Strong steel cabinets.
- Controls mounted on high grade insulated panels.
- Automatic transfer to and from battery operation.
- Audible signal denoting emergency operation.

PRINTED IN U.S.A.

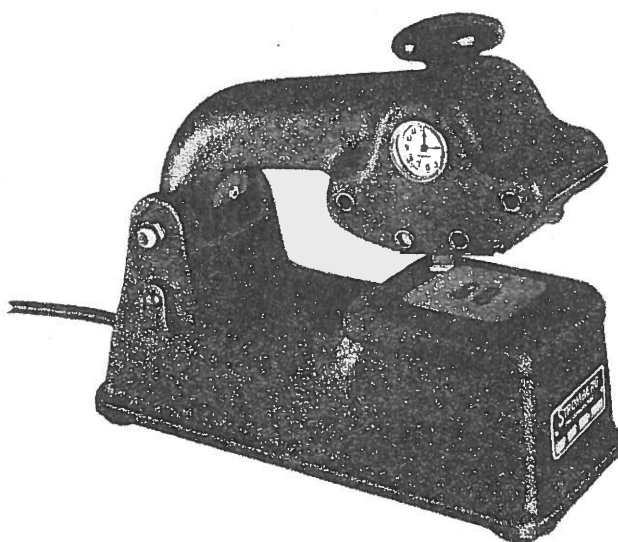
# STROMBERG TIME CORPORATION

SUBSIDIARY OF GENERAL TIME INSTRUMENTS CORPORATION  
109 LAFAYETTE STREET . . . NEW YORK 13, N. Y.

# STROMBERG *No. 3 Time Stamp*

TIME STAMPS • EMPLOYEES TIME RECORDERS • JOB TIME RECORDERS • CLOCKS • PROGRAM INSTRUMENTS • TIMERS

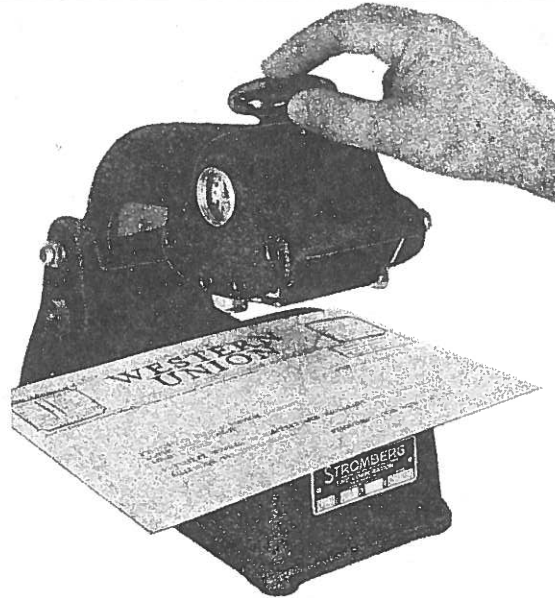
BULLETIN 3-1



## **No. 3 Time Stamp**

An extremely adaptable time stamp of simple design with carefully engineered construction features that permit long hard service. This machine accommodates documents and mail of any size — from calling cards to bulky blueprints — with equal ease. Registrations are made by placing the matter to be stamped in the throat of the machine and pressing down sharply on the smooth knob.

The No. 3 is electrically operated from an independent synchronous motor unit; as part of a Stromberg Master Clock System; or by a Western Union Clock.



### Specifications and Features

- Black Morocco finished case.
- Depth of throat, approximately five inches.
- Imprint set with a special key, preventing unauthorized changes.
- Pilot dial geared directly to the typewheels for positive synchronism.
- Prints on the face of the paper.
- Automatic ribbon reverse and day to day change.
- Geneva Geared typewheels, for precise alignment of characters.
- Prints year, month, date, A.M. or P.M. hour and minutes.
- Accommodates permanent and changeable inscription plates, identification prefixes, or removable slugs.

Dimensions: Width  $4\frac{3}{8}$ ", Length 10", Height  $8\frac{1}{2}$ "

Approximate shipping weight: 15 lbs.

PRINTED IN U.S.A.

# STROMBERG TIME CORPORATION

SUBSIDIARY OF GENERAL TIME INSTRUMENTS CORPORATION  
109 LAFAYETTE STREET . . . NEW YORK 13, N. Y.

# STROMBERG

## *Autospeed*

TIME STAMPS • EMPLOYEES TIME RECORDERS • JOB TIME RECORDERS • CLOCKS • PROGRAM INSTRUMENTS • TIMERS

BULLETIN 12-1



### **Trigger Type Autospeed**

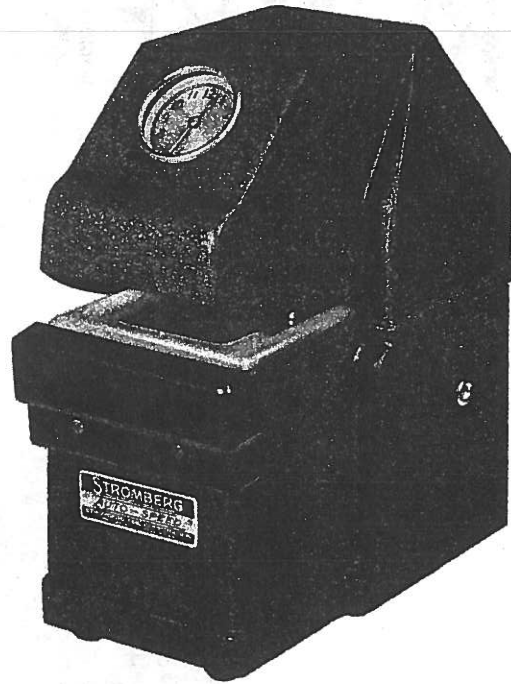
The Stromberg Autospeed Time Stamp provides maximum speed, reliability and convenience for *automatically* stamping the exact time and date of receipt or disposition of correspondence, legal or business papers, or forms of all types. Compact, heavy duty construction throughout assures lasting, dependable service. Imprints are made by electromagnetically controlled lever action, activated by a trigger, push bar, or remote control switch, depending on the adaptation required.

The Trigger Type Autospeed is entirely self-operating, the automatic trigger in the throat of the stamp is actuated by the edge of the paper when inserted, causing the mechanism to print.

The Push Bar Type Autospeed enables the operator to position the paper before stamping. A bar, located under the throat of the stamp is nudged lightly to make the impression.

The Remote Control Autospeed *automatically* produces registrations each time a remote or a self-contained contact is closed. This type is used extensively in conjunction with a moving tape in brokerage offices, police and fire alarm systems and radio stations.

Stromberg Autospeeds can be furnished to operate as an individual unit from regulated alternating current, or as part of a Stromberg Autoset Master Clock System. It may also be operated by a Western Union Clock.



**Push Bar Type Autospeed**

### **Specifications and Features**

- Black Morocco finished case protects the mechanism from dust, dirt or injury.
- Compact and heavy to prevent creeping.
- Pilot dial geared to printing unit for positive synchronization.
- Geneva geared typewheels, for precise alignment of characters.
- Automatic positive ribbon reversing mechanism.
- Key type setting of time and date wheels.
- Unit construction, simplifies alterations or repairs.
- Electromagnetic power units drive the time and printing mechanisms.
- Throat designed to simplify insertion of papers.
- Trigger mechanism automatically breaks circuit after each registration.
- Safety switch cuts imprint circuit when cover is removed.
- Prints date and meridian or continental time.
- Accommodates inscriptions, prefix characters and removable slugs.

Dimension: Width 5", Length 8 $\frac{3}{8}$ ", Height 9 $\frac{7}{8}$ "

Approximate Shipping Weight — 28 lbs.

PRINTED IN U.S.A.

To be continued.

# STROMBERG TIME CORPORATION

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