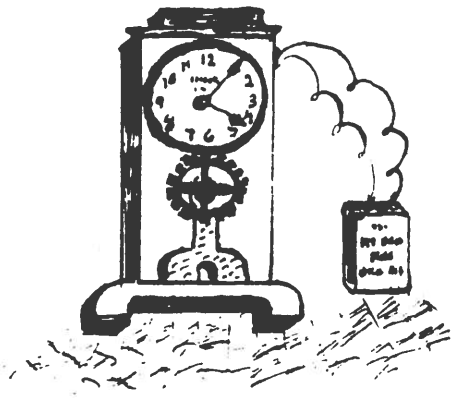
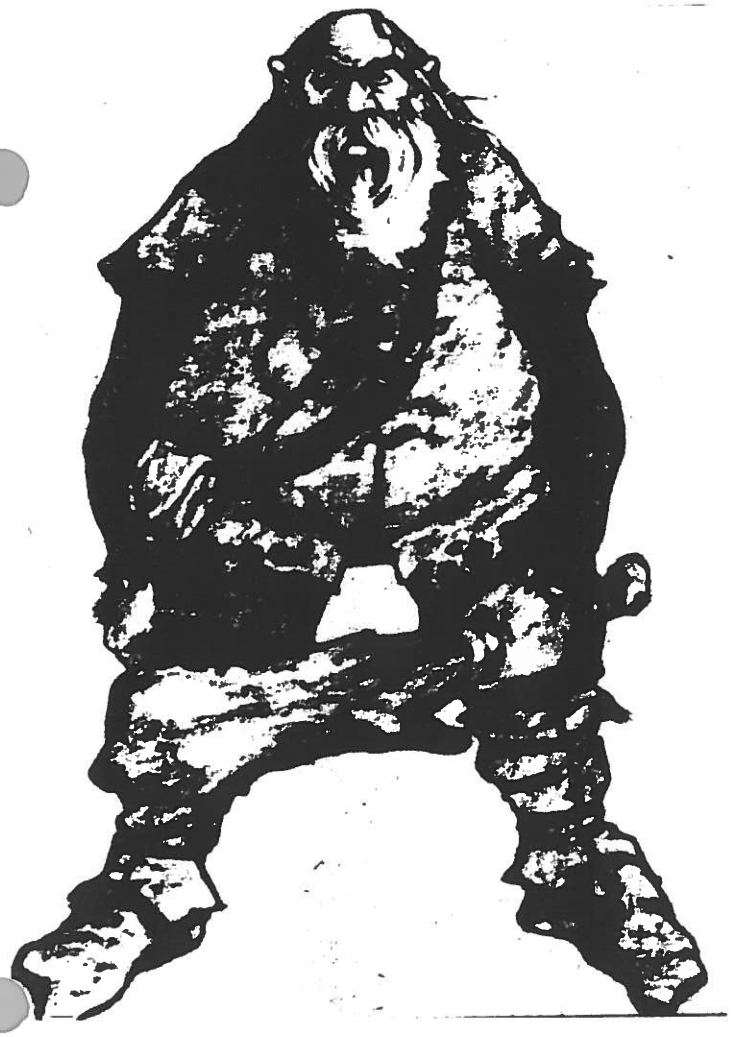
The JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY

Chapter No 78

February, 1982
VOLUME VIII--ISSUE #1
Martin C. Feldman, Editor





Hello fellow enthusiasts:

This issue of our Journal marks the beginning of our 10th year of publication. While editing and writing has not always been easy, the resulting articles, patents, repair manuals and other information has, I hope, been educational and useful.

Dr. George Feinstein has translated the manual of the Zenith "Calora" clock. This will be published in the original and in translation in two parts. The index of the JEHS from 12/79-12/81 has been compiled and there are back issues available (see Mart).

The ELECTRICAL HOROLOGY EXHIBIT at the N.Y. Regional in March is very exciting and we hope many of you will participate (see Mart page 12).

A committee of John Cammarata (516-921-3919), Alar Marx (914-632-5986) and Charles Roth (212-255-637C has been formed to formulate our By-Laws and to propose equitable representation and incorporatior of our newly formed Branches. Your input is desired and very welcome. We shall postpone elections until their recommendations are completed; hopefully they will be printed in the April Journal.

Lastly, 1982 Chapter dues for renewal should have been paid in December, 1981. We thank those that have sent Charles Roth, 2 Circle Lane, Roslyn,NY 11577 their dues. For others, our friend (left inset) may be making collection personally.

Enjoy this issue!

Electromagnetically yours,

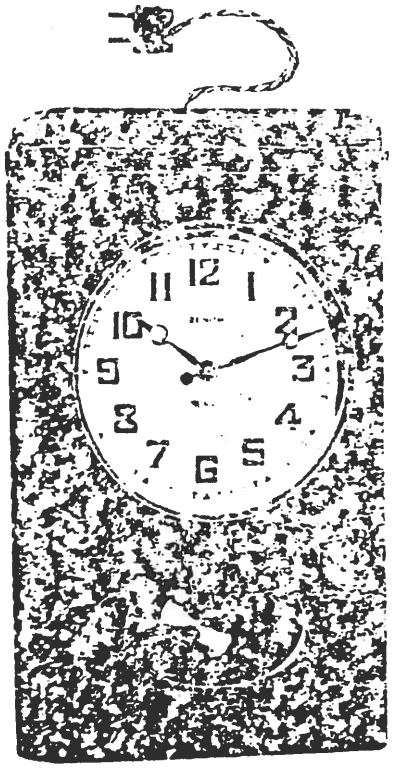
Marty Feldman

The Electric Clock

ZENITH

"CALORA"

Translated by Dr. G. Feinstein



Individual clock for a
branch on the lighting network.

ZENITH Watch Factory

Le Locle Switzerland

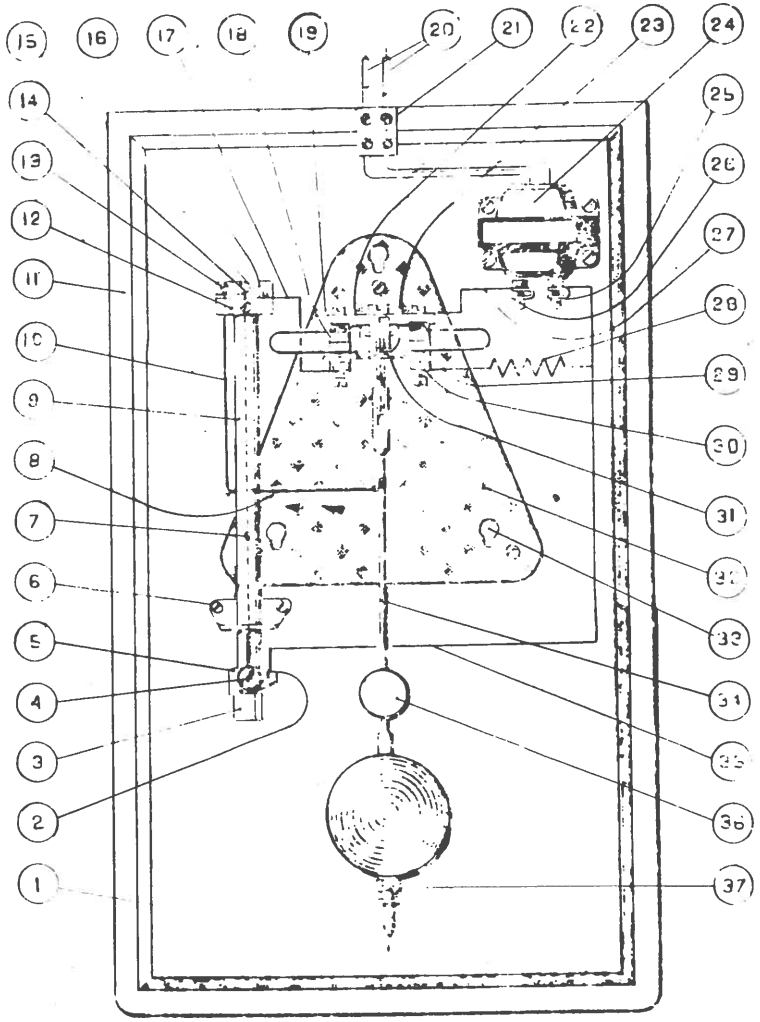


Fig. 2

Plan behind wall-clock.
Dial with movement removed.

LEGEND

1 Vertical axis
2 Wire binding screw
3 Cap
4 Clamping screw
5 Clamping ring
6 Bracket
7 Thermic wire
8 Silk cord
9 Protection tube
10 Wire spring
11 Inside of the cabinet
12 Insulation collar
13 Rocker arbor
14 Thermic wire fastening
15 Rocker
16 Bracket for the rocker and tube
17 Supply wire
18 Contact spring bracket
19 Bracket insulation
20 Supply wire
21 Junction box
22 Contact
23 Contact
24 Transformer
25 Transformer terminal
26 Transformer terminal
27 Connecting wire
28 Resistance
29 Connecting wire
30 Contact spring bracket
31 Contact bridge
32 Base plate
33 Pillar hole
34 Pendulum rod
35 Connecting wire
36 Slider
37 Regulating nut

The Electric Clock

ZENITH

"CALORA"

Until now the public wasn't acquainted, so to speak, with electric clocks maintained by a central system. These systems require installation and special care. The upkeep is expensive, unsuitable for domestic use.

The individual clocks in use up to the present show some disadvantages. It is sustained by some dry cells or a storage battery, after some months the first must be replaced while the latter should be recharged periodically to keep it from running down.

Each of these clocks have been more or less abandoned by reason of their complicated mechanisms, some of which show coils, some motor, and some magnets. So that both the clockmakers lack of clear information and the extensive electrotechnical complications clash to produce difficulties of every kind during installation and repair of such clocks.

Now, the ZENITH WATCH FACTORY is coming out in the market-place with an absolutely novel electric clock, patented in all countries. This clock has none of the conspicuous disadvantages, which makes it superior to all the electric clock systems known to this day.

The new invention consists of a thermic wire periodically opening and closing the regulating part of the clock. accordingly as the current passes or is interrupted. The elongation and the contraction of the thermic wire are used to impart a mechanical impulse to the pendulum.

The ZENITH clock is made as a salon bracket clock with a wood cabinet or as a round clock. It has a special destiny in private apartments, nevertheless it finds employment in offices, stores, schools, or any such establishments.

The ZENITH electric clock is sold for a moderate price. Its consturction is so simple, it has such a high degree of precision and of security of rate, that it is noted for great advantages over usual bracket-clocks.

The "CALORA" clock's particular destiny is to be a branch on an alternating current distribution network for electric lights. By request, each is supplied with cord and plug. The branching on a direct current distribution network for electric lights is also possible. In this case the clock transformer is replaced by a resistance which absorbs the excess voltage. One can also supply the clock by means of a storage battery composed of two cells. However none of the installations run as well as the one that comprises of transformed alternating current.

The ZENITH WATCH FACTORY builds two types of electric clocks:

the clocks without power-reserve, and
the clocks with power-reserve.

The clocks without power-reserve can be installed wherever a distributing network exists which rarely produces an interruption of current.

It appears from Fig. 3 that these clocks have an extremely simple movement, thus they are cheap and require no maintenance. The pendulum is impulsed directly by the spring arm of the movement.

The clocks with power-reserve can be installed everywhere, but with special advantage, where the interruptions of current are very frequent. The movement of this clock is similar to the movements of customary clocks and the size of the power-reserve spring provided is such as to make sure the clock runs for 50 hours. In this case, the pendulum isn't impulsed directly by the switch, but entirely by the wound spring which drives a very well compensated precision escapement. The pendulum always starts automatically, whether this is after the interruption or the return of the current.

The compensation for the variations in the ambient temperature of the thermic wire takes place by means of the brass protection tube 6.

For the compensation of the pendulum, the rod 34 is of invar, the well known alloy of nickel-steel, whose coefficent of expansion is so to speak null. At the bottom is to be found a nut 37 for the regulation of the pendulum bob.

In order to regulate the clock to within a fraction of a second per day, avail yourself of the small slider situated over the pendulum bob. Its displacement by about one millimeter corresponds to a difference of one second per day.

One has to give a triangular shape to the steel plate upon which the dial is fixed. This triangle supports the movement of the clock (Figs. 3 and 4). The whole is fixed, with the aid of the 3 pillars, into the holes 33 of the base plate 32. A special arrangement to prevent the movement from falling.

The ingenious separation of the front part from the rear part of the clock therefore permits their immediate examination at any instant, and that without the aid of any tools.

The motion of the current is shown in Fig. 2 and is easily made clear.

The hand assembly, when one forgets so easily and which unfavorably affects the running doesn't exist for the "CALORA" clock. The driving force is always uniform, assuring for the clock not only a precise rate but also excellent timing. Therefore it is equal to the most difficult demands.

The main difficulty in the creation of an electric clock thus far consisted in the construction of a contact apparatus which functions in a durable and certain manner. But, the ZENITH individual electric clock establishes without any doubt, today, the ideal for a time machine. It runs without sparks, and protects its precise rate from the variation in voltage normally experienced. Its construction is so simple that it is within the comprehension of any clockmaker.

We reproduce hereafter several views of the clock with a succinct description for these latter.

The transformer fastened to the clock (see Fig. 2, No. 24), transforms to about 3.0 volts the voltage of the alternating current for the electric lights. A current of about 0.25 amperes is sufficient to heat the thermic wire. The ZENITH FACTORY attaches a very particular importance to the construction of a faultless transformer. The latter is guaranteed against short circuits and has separate primary and secondary windings. The windings between them and the laminated core to ground undergo a 1000 volt test.

The consumption of current is so minimal, that it scarcely enters into consideration.

The arrangement of the contacts (Fig. 2) is such that the contacts are closed when the pendulum is found in the position of a plumb line.

The purpose of this arrangement is on the one hand, to prevent the formation of sparks, at the moment of the interuption of the current from the thermic wire, and, on the other hand, to create a second circuit with which a resistance No. 28 is switched in place of the individual clock. You can substitute, for this resistance, the thermic wire of a secondary clock. This scheme doesn't waste any current. In addition to which the cost of the secondary clock is cheaper, since it doesn't require contacts. The connection of the two clocks can be accomplished with the aid of two fine wires conducting a current which doesn't exceed about 4 volts.

One can obviously increase the number of secondary clocks: however, it is necessary in such a case to install a separate transformer with which the voltage and power will be proportionately raised.

The dimensions of the normal cabinet of the wall-clock are the following:

Height 48 cm. depth 8 cm. width 27 cm.

Without the power-reserve, the wall-clock weighs 4.5 kg. and the round clock only about 2.3 kg.

The weight of the clocks is increased for the power-reserve by about one kg.

In order that it shows the time with ZENITH precision, before its shipment, every clock is hung for a sufficiently long time to be observed and regulated.

Every clock shipped is accompanied by instructions for its setting up and maintenance.

With the order, it is well always to indicate precisely the kind of current, the voltage in volts and the number of cycles in the alternating current distribution network.

The "CALORA" movements can also be ordered with a special cabinet, or with a richly ornamented cabinet.

The various parts of the clock are standardized and consequently interchangeable.

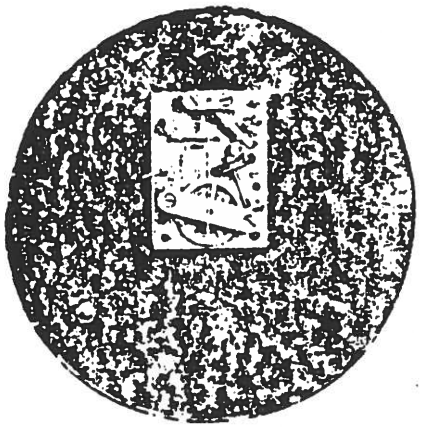


Fig. 3 Movement without power-reserve.

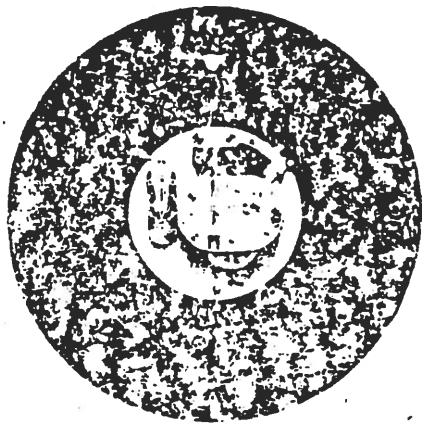


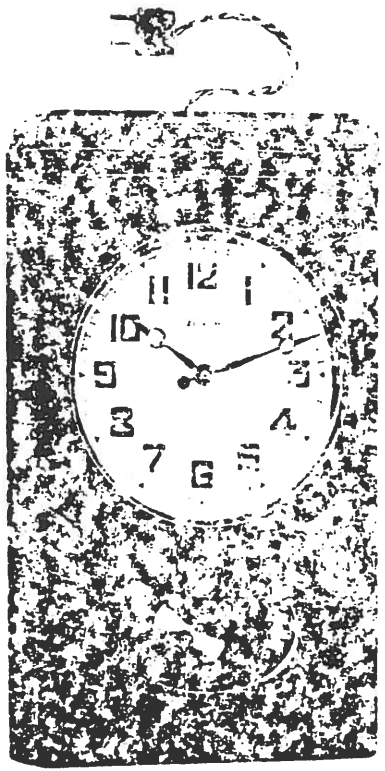
Fig. 4 Movement with power-reserve

MOVEMENT fixed to the base plate of the dial.

L'Horloge Electrique

ZENITH

„CALORA"



Horloge individuelle pour
embranchement sur réseau de Lumière.

FABRIQUES DES MONTRES ZENITH

LE LOCLE SUISSE

L'Horloge Electrique

ZENITH

„CALORA"

Jusqu'à ce jour, le public ne connaissait pour ainsi dire que les horloges électriques alimentées par un système central. Or, ce système exige une installation et des soins particuliers. Son entretien coûteux ne convient pas aux usages domestiques.

Les horloges individuelles usitées jusqu'ici présentent des inconvénients. Sont-elles alimentées par des éléments ou par des batteries d'accumulateurs, il faut alors remplacer les premiers après quelques mois déjà, tandis que les dernières doivent être chargées périodiquement, ce qui est peu pratique et coûteux.

Toutes ces horloges ont été plus ou moins abandonnées en raison de leur mécanisme compliqué, qui présente des bobines, des moteurs et des aimants. Tant et si bien que l'horloger qui ne possède pas des notions exactes et étendues d'électrotechnique se heurte à des difficultés de toutes sortes lors de l'installation et du rhabillage de pareilles horloges.

Or, les FABRIQUES DES MONTRES ZENITH viennent de lancer sur le marché une horloge électrique absolument nouvelle et brevetée dans tous les pays. Cette horloge ne présente aucun des inconvénients signalés, ce qui la rend supérieure à tous les systèmes d'horloges électriques connus jusqu'à ce jour.

La nouvelle invention consiste en un fil thermique ouvrant et fermant périodiquement l'organe régulateur de l'horloge, suivant que le courant passe ou est interrompu. L'allongement et l'accourcissement du fil thermique sont employés pour imprimer au pendule les impulsions mécaniques.

L'horloge ZENITH se fabrique comme horloge-applique de salon avec cabinet en bois, ou comme horloge ronde. Elle est destinée spécialement à l'appartement particulier, cependant elle trouve son emploi dans les bureaux, magasins, écoles ou dans n'importe quel établissement.

L'horloge électrique ZENITH est vendue à un prix modique. Sa construction est si simple, elle possède un degré de précision et de sécurité de marche si élevé, qu'elle se distingue fort avantageusement des horloges-applique ordinaires.

L'horloge „CALORA" est surtout destinée à être branchée sur un **réseau distributeur de lumière électrique à courant alternatif.** Sur demande, nous la fournissons avec cordon et fiche. Le branchement sur réseau distributeur de lumière électrique à courant continu est également possible. Dans ce cas le transformateur de l'horloge est remplacé par une résistance qui absorbe l'excès de tension. On peut encore alimenter l'horloge par le moyen d'une batterie d'accumulateurs composée de deux éléments. Toutefois aucune installation n'est aussi bon marché que celle qui comporte un courant alternatif transformé.

Le remontage à la main, que l'on oublie si facilement et qui influence défavorablement la marche n'existe pas pour l'horloge „CALORA". La force motrice toujours égale assure à l'horloge non seulement une marche exacte mais encore un réglage excellent. Aussi suffit-elle aux exigences les plus difficiles.

La grande difficulté que les horloges électriques suscitent jusqu'ici consistait dans la construction d'un dispositif de contact fonctionnant d'une manière durable et sûre. Or, l'horloge électrique individuelle ZENITH constitue sans nul doute, aujourd'hui, l'idéal d'un appareil horaire. Elle marche **sans étincelles** et garde sa précision de marche même si des variations de tension se produisent dans la pratique. Sa construction est si simple qu'elle n'échappe à la compréhension d'aucun horloger.

Nous reproduisons ci-après quelques vues de l'horloge avec une description succincte de cette dernière.

Un transformateur fixé dans l'horloge (voir fig. 2 n° 24), transforme à 30 volts environ la tension du courant alternatif de la

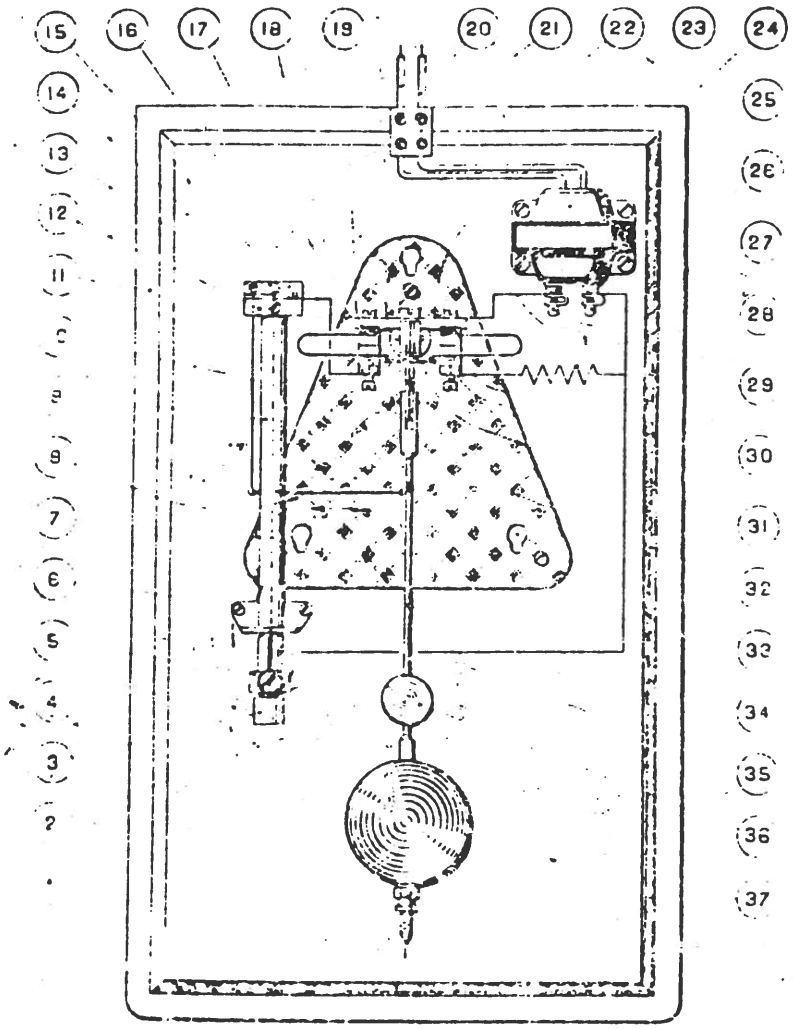


Fig. 2

Partie postérieure de l'horloge-applique
Cadran avec mouvement enlevé

To be continued

INDEX: Of the JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY
(December 1979 through December 1981), VOLUMES V-VII
Compiled by: Martin C. Feldman,FNAWCC

Seth-Thomas Electric Clock--Model 86AF (Partial patent & Descriptive material)	JEHS Vol VII #1	Feb.1981
Standard Electric Time Systems (Master & Slave Clock Descriptions)	JEHS Vol VII #2	April 1980
Stromberg Autoset System--Instructions for installing and operating--Part I	JEHS Vol VII #4	Aug.1981
Stromberg Autoset System--Instructions for installing and operating--Part II	JEHS Vol VII #5	Oct.1981
Stromberg Time Corporation-Unispeed Recorder (Directions for the installation & setting of)	JEHS Vol VII #5,	Oct.1981
Synchronome Master Clock by Charles Aked (reprinted from JEHS July 1973)	JEHS Vol VI #2	April 1980
Telefonbau & Normalzeit of Berlin and Frankfort Q & A by George Feinstein (The Electric Time Machine)	JEHS Vol VII #3	June 1981
A History of the Time Service of the Western Union Telegraph Co. SWCC, 1934	JEHS Vol VII #6	Dec. 1981
Western Union Time & Messenger Service by Joseph J. Singer	JEHS Vol VII #1	Feb. 1981

SPECIAL ANNOUNCEMENT

ELECTRICAL HOROLOGY EXHIBIT

The theme for the exhibit at the upcoming New York Regional in March is ELECTRICAL HOROLOGY, offering the EHS an excellent opportunity to publicize our Chapter and the special interests of its members.

All members planning attendance at this regional are requested to bring electrical clocks for display in the "Mini Electrical Museum"; provisions will be made for the display of wall clocks as well as shelf models. Uncased movements of special interest are also encouraged for entry in the display. Each item will be described with a brief technical and historical description on pre-typed cards, so advance commitments are essential! Full insurance coverage will be provided to exhibitors, but we must provide the insurers with advance estimates of the coverage required, which is another reason that we must have advance information from exhibitors. Roung-the-clock security will be provided as well, so concern for loss or theft should be minimal.

It is expected that the exhibit entries will be photographed and ultimately become the basis for a monograph to be published by the EHS, thereby increasing the exposure and stature of the society and increasing the value of the clocks illustrated therein. Exhibitors will be acknowledged or kept anonymous with respect for their individual preferences. Everyone offering a clock for display will be given a Certificate acknowledging the entry in the regional exhibit as a token of appreciation by the committee.

Let's all get behind this, our first opportunity to put our special interests up with the rest of the "true collectables", and prove to the membership that Electro-Mechanicals merit their own niche in the clock collecting fraternity.

TIME & PLACE: March 19, 20, 21, 1982 at Colonie Hill in Hauppauge, L.I.
EXHIBIT CHAIRMAN: Martin Swetsky, 1910 Coney Island Ave., Brooklyn, NY 11230
Phone, days: 375-2700; Eves. 646-7489
DEADLINE FOR ENTRY COMMITMENTS: February 20, 1982

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MART

FOR SALE: JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY--1975-1980--ORIGINAL COPIES
50¢ a copy-minimum $4.00. Inquiries, SASE or send money payable to EHS
% C. Roth., 2 Circle Lane, Roslyn Heights, N.Y. 11577

WANTED: Unusual Electrical Clocks. A. Marx, 105 Bayeau Rd., New Rochelle, NY 10804

FOR SALE: VERY HIGH QUALITY EARLY BATTERY CLOCKS for the serious collector by
Synchronome, Gents, Vaucanson. Fully restored
Charles W. Roth, 2 Circle Lane, Roselyn Heights, NY 11577

FOR SALE: Seth Thomas Self-Winding Electric, Model 86AF in 18" square mahogany case.
Fine condition and in G.R.O.---$460 ppd. Martin C. Feldman

WANTED: "Junker" early battery clocks, movements, parts, etc. Send details and $ wanted. ELECTRICAL CLOCK LITERATURE for possible reprinting in our Journal.

Electrical Horological Literature of any type.

Hahl-Wenzel pneumatic clock face and weights. Will buy entire clock if Necessary. Martin C. Feldman

REPAIRS: ALL EARLY BATTERY CLOCKS including Pooles, Barrs, Tiffany Never-Winds, Eurekas, etc. SPECIALIZING IN BULLE CLOCK REPAIRS USING ORIGINAL PARTS. One month maximum time for all repairs.
Martin C. Feldman, 620 Reiss Place-7E.,Bronx, N.Y. 10467

The JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY
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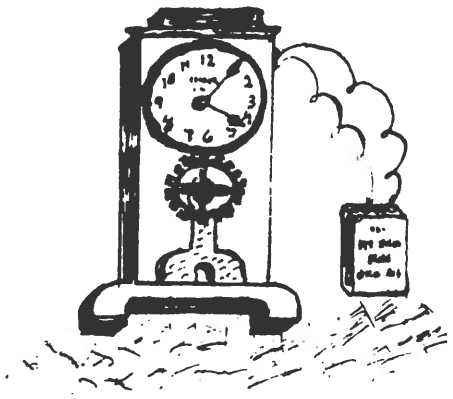
April, 1982
VOLUME VIII--ISSUE #2
Martin C. Feldman, Editor



Hello fellow enthusiasts:

We are coming to you a bit later than we expected as we had hoped to have had the By-laws of our Chapter written up for your approval by now. This is taking longer than we had anticipated and we expect that by the June issue this work will have been completed. We also had hoped to hold elections but shall defer same until the By-laws are accepted by the membership. Interestingly, my request for Officer nominations in the December issue of the Journal has not had any response nor has there been any response towards the request made in the February Journal regarding suggestions and/or comments concerning the formation of our By-laws!

This month we complete the translation by Dr. George Feinstein, The Electrical Clock--ZENITH "CALORA". We also feature an interesting discovery made, as many discoveries are, accidentally while responding to a question about an American clock patent. It seems the patent taken out April 2, 1895 by M.V.B. Ethridge and J.H. Eastman featured a mercury switch in its winding mechanism. Up until now we had assumed that the mercury switch was invented and applied to American clocks exclusively by Henry Warren as used in his famous "mystery" battery clock, patented in 1915. The entire Ethridge/Eastman patent is reproduced including the article by Harold Cherry. Harold publishes the Journal of the Tandem Winders which is sent out quarterly by The Tandem Winders, a special-interest group of members of the NAWCC, Inc. devoted to the study of the clocks of companies in which Joseph Eastman was a principal. Membership is $5.00 a year. Editor: Harold Cherry, 3217 Wynsum Avenue, Merrick, N.Y. 11566. We gratefully acknowledge permission to reprint this portion of their Journal and trust this information will be of interest to many of you.

A wiring diagram for the Self-Winding Clock Company's program circuit clock is reprinted which should be useful for those restoring this type of clock. Some of the information available will help in understanding the wiring diagrams of other SWCC master clock systems. We are devoting one

cont. Pg.2

page to the Electrical Horology Exhibit which was primarily the work of Marty and Lou Swetzky featured at the recent New York Regional on March 19-21, 1982. Members of the N.Y. Branch of the EHS contributed to the exhibit which was quite successful and showed the general clock collector what was available in electrical horology. We hope to be able to publish a fully illustrated description of the exhibit sometime in the future. The educational theme of the regional was Electrical Horology and being such I was delighted to present a slide program describing various early battery clocks and some methods of restoration.

We all look forward to the warming trend as summer approaches and wish everyone "happy hunting" for early electrics!

Enjoy this Issue!

Electromagnetically yours,

Martin C. Feldman,FNAWCC

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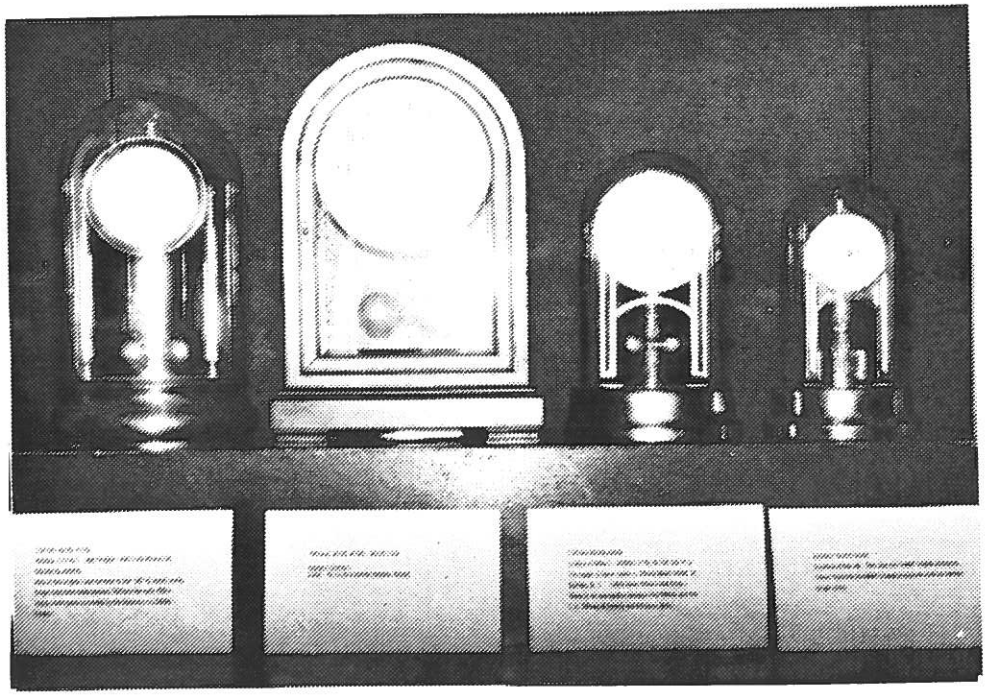
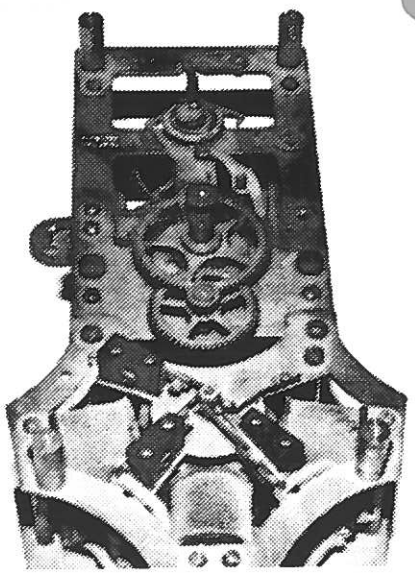
PHOTOS FROM THE ELECTRICAL HOROLOGICAL SOCIETY EXHIBIT AT THE N.Y.REGIONAL



Collection of Tiffany Never-Wind Clock Co. with (left to right) 2 double contact types followed by 2 single contact types.



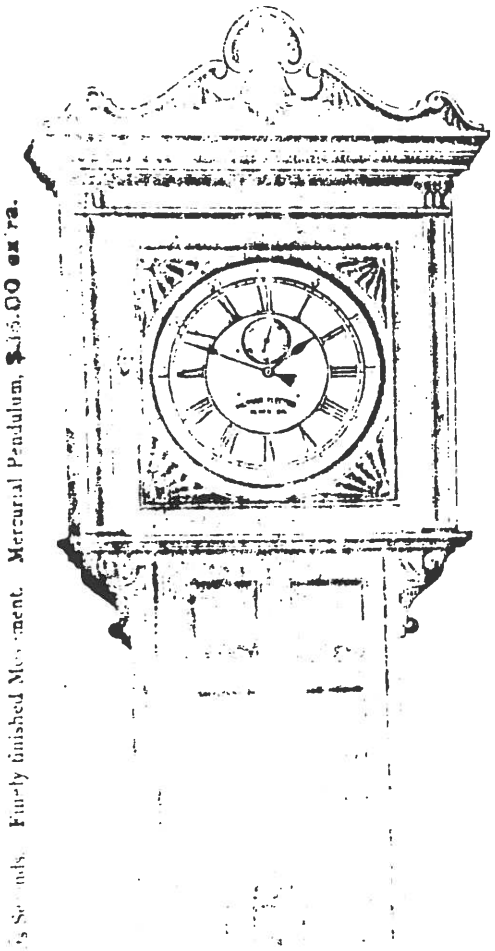
Style "A" Self- Winding Clock Co. movement with rotary motor;ca 1884.

From: The Keystone magazine, April 1892

We are printing the Waltham Electric Clock Company information in lieu of the two pages of French material from Dr. George Feinstein's Calora Clock article. Our printer found the copies unsuitable for reproduction. We thank the NAWCC Museum and Library and, in particular, Stacy B. Wood--Director.

AHR 92

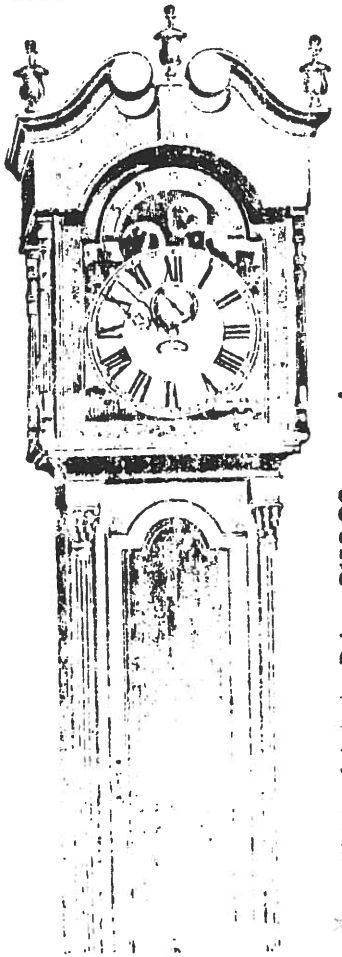
EVERY JEWELER NEEDS ONE!



...s Seconds. Finely finished Movement. Mercurial Pendulum, $15.00 extra.

...0. Jewelled, $25.00 extra. In Oak, Cherry or Mahogany. Beveled Glass.

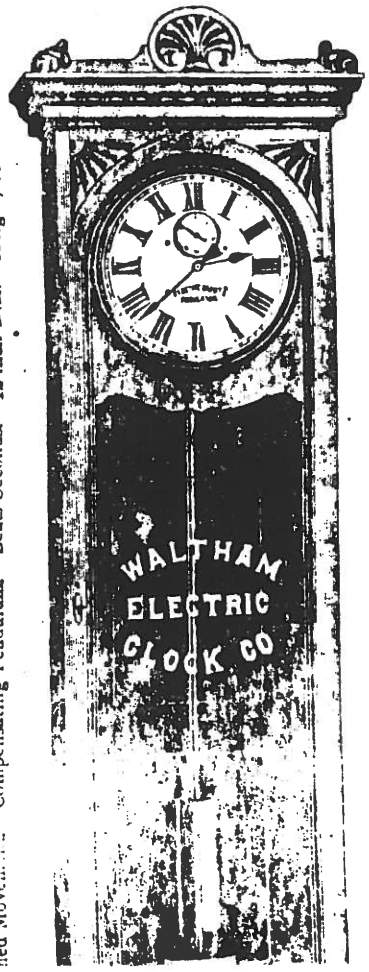
We will ship you one of our Clocks for inspection, and if not satisfactory,



...ed Movement. Strike on Cathedral or Cup Bell. Beveled Glass.

...Weights of Jewel. Price, $150.00 upwards.

Send for Our Illustrated Catalogue.

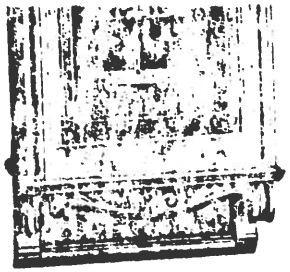


...hed Movement. Compensating Pendulum. Beats Seconds. 12-inch Dial. Height, 70 inches.

In Cherry, Oak or Mahogany. Price, $75.00. Grade B, $50.00.

4

13-inch



No. 15.

Price,

the same at our expense

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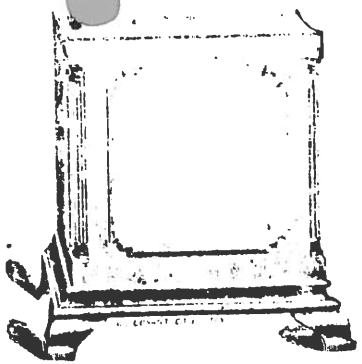
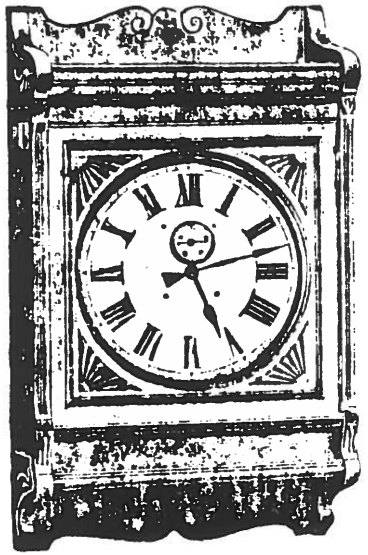


No. 20. HALL CLOCK.

Fig

No. 14.

12-inch Dial. 120 Beats. Height, 39 inches.



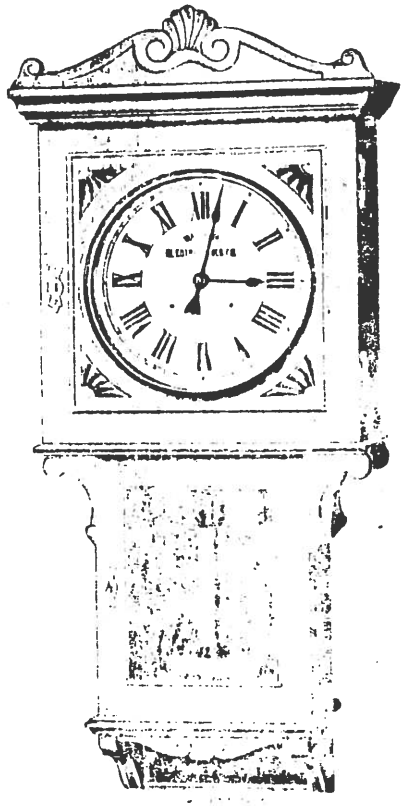
Price, $25.00.

In Cherry, Black Walnut, Oak or Mahogany.

No. 10. GALLERY.

10-inch Dial. 94 Beats. Height, 35 inches. **Price, $25.00.**

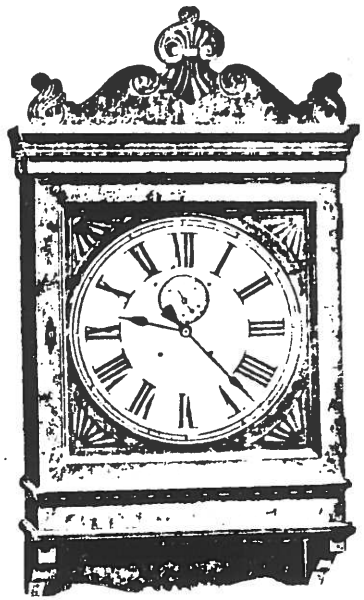
In Cherry, Oak or Black Walnut.



12-inch Dial. 90 Beats. Height, 38 inches. **Price, $26.00.**

In Cherry, Oak or Black Walnut.

No. 8.



No. 11.

In Cherry or Oak. **Price, $25 00.**

Office of Wood, Barker & Co., Lumber Dealers.

Waltham Electric Clock Co.

Gentlemen:—We have two of your clocks now in use, one at our yard in Waltham, and another in Boston, both of which have given us entire satisfaction. Yours truly, WOOD, BARKER & CO.

Waltham, Dec. 28, 1871.

Gents.—Last April I had a new set up one of your office clocks on trial; it proved such an excellent timekeeper that I purchased it, and it is running much closer than my watch. Yours truly,

Cor. Moody and Cushing Streets. E. I. JENNISON, Druggist.

Office of Hall & Lyon, Druggists,
Waltham, Mass., and Providence, R. I.

Waltham, December, 1871.

Gents:—The electric clock purchased of you some time last April has given us the best of satisfaction, and is running with the same cell of battery which has not been touched since it was set up. The clock has not been set for over three months, and is about one minute fast at present writing, which we think is pretty good for a small clock. Yours truly, HALL & LYON.

A Brief Description of the

WALTHAM ELECTRIC CLOCK.

It has long been a recognized fact that the nearest approach to absolute perfection in timekeeping has been obtained by the force of gravity acting on a compensated pendulum, receiving its impulses from a small weight following the pendulum an arbitrary distance and replaced in its normal position, to be released upon the return beat of the pendulum. It is upon this principal that **The Waltham Electric Clock** is constructed. The impelling weight being raised and the impulse arm locked on the detent by the action of an electro magnet, where it remains until released by the pendulum. The circuit being closed less than one eighth of a second at every alternate beat, the expenditure of battery is reduced to a minimum, enabling us to use one of the many forms of dry battery now in use, which is placed in the clock case. It is hardly necessary to remark that these clocks require no winding, as there is nothing to wind. All the attention needed is to replace the battery when exhausted, or in the case of a sal ammoniac battery, like the Samson, or other forms of the Leclanche battery, simply to renew the solution once a year, at the cost of about six cents.

These Clocks can be fitted to existing Cases.

EXTRAS:

Minute Contact,	$5.00.	Silvered Dial,	$8.00.	Mercurial Pendulum,	$35.00.
Two-Second Contact,	8.00	Ithaca Perpetual Calendar,	6.00.	Movement, including Pendulum, Dial and Hands, 90, 94 or 120 Beats.	10.00.

WALTHAM ELECTRIC CLOCK CO., Waltham, Mass.

-588-

JOSEPH EASTMAN: ELECTRICAL HOROLOGIST?

Among the patents obtained by Joseph H. Eastman is a rather surprising one: an electrical clock winding mechanism. This is patent no. 536,926 dated April 2, 1895, with Martin V.B. Ethridge listed as coinventor. The patent was assigned to the Century Clock Company of North Berwick, Maine. Fig. 5 is a fragment of the patent.

The inventors said that the invention's objective was "first, to provide a simple and accurate time movement, the impelling power of which shall be constant, so that there will be no variation in the time-keeping qualities caused by variations in the strength or force of the motor, and, secondly, to provide improved means for automatically maintaining the force which impels the said movement."

Basically, the invention consists of a motor combined with a time train, an electromagnet, an armature and a circuit controller. In operation, the motor raises an arm which compresses a spring and impels the time train at the same time. When the arm descends by gravitation, the spring provides the power to the time train. Thus, power is applied continuously to the timetrain, "first by the direct action of the arm, and then by the action of the spring, the arm and spring acting alternatively."

We asked Martin C. Feldman, president of the Electrical Horology Society (Chapter No. 78), to examine the Ethridge/Eastman patent. His comments follow:

"This is the first time that I have seen a mercury switch used as a contact breaker prior to Henry Warren's use of the same method in his battery clock patented during 1915. This is a rather interesting method of maintaining power, as the mercury switch opens and closes an electromagnetic circuit which in turn raises an arm to wind a ratchet connected to a small spring which ultimately furnishes the power to run this balance wheel clock. If the inventors were trying to get away from contact problems such as oxidation and/or wear, they failed in that they are using a collar and arbor system to deliver the current from the battery to the mercury switch. Nevertheless, it is indeed an interesting system and does present the first American use of the mercury switch in this regard. ... Mr. Warren made most of his money from the patent of the mercury switch, which the General Electric Company eventually used for silent light switching -- this is still in use today."

It is possible that Joseph Eastman's interest in electrical horology, evidenced by the 1895 patent, stemmed from his association with James H. Gerry. Gerry and Eastman were two of the original organizers of the Harvard Clock Company in 1880. (See article on page 3 of this issue and obituary on Gerry in the first issue.) In about 1887, Gerry joined the Self-Winding Clock Company in New York and was with them until his retirement in about 1903. During this time, he patented a number of horological inventions, including several of an electrical nature that were assigned to his company. Thus, it is quite possible that Gerry and Eastman shared an interest in electrical horology during their association at Harvard.

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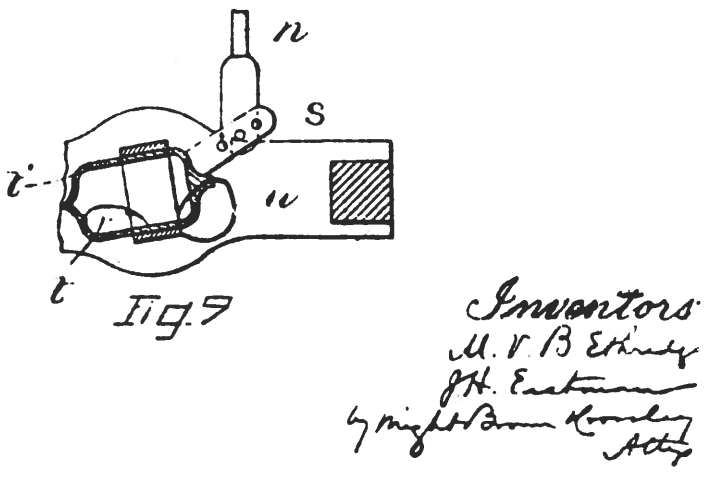


Fig. 5. Portion of Ethridge/Eastman Patent.

(No Model.) 2 Sheets—Sheet 1.

M. V. B. ETHRIDGE & J. H. EASTMAN.

ELECTRIC CLOCK WINDING MECHANISM.

No. 536,926. Patented Apr. 2, 1895.

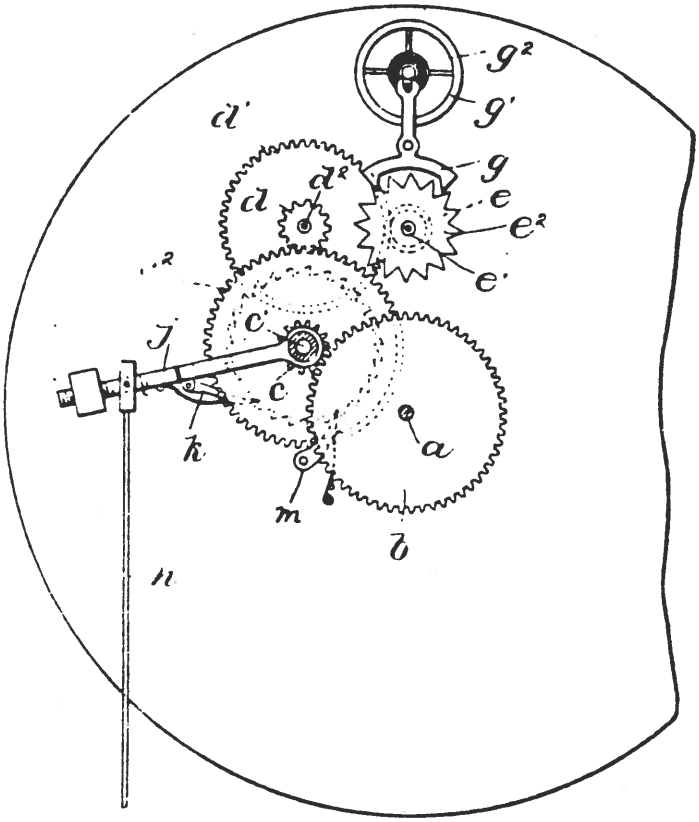


Fig. 1.

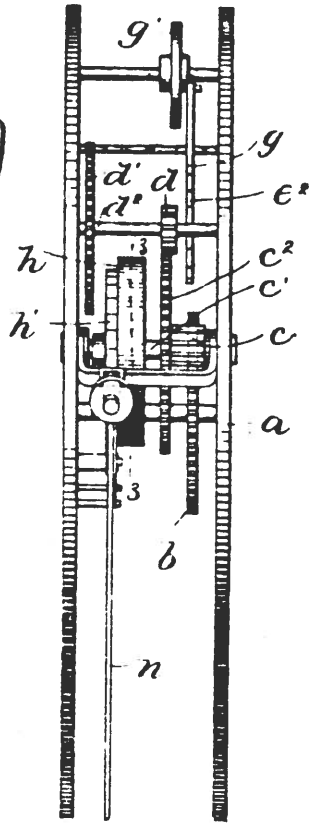


Fig. 2.

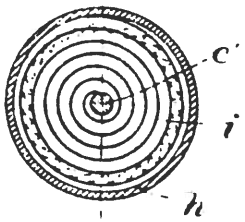


Fig. 3.

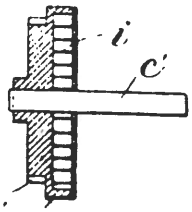


Fig. 4.

Witnesses:
H. A. Hall.
[illegible]

Inventors:
M. V. B. Ethridge
J. H. Eastman
by Wright Brown Quinby & Hall
Attys.

(No Model.) 2 Sheets—Sheet 2.

M. V. B. ETHRIDGE & J. H. EASTMAN.

ELECTRIC CLOCK WINDING MECHANISM.

No. 536,926. Patented Apr. 2, 1895.

Fig. 5.

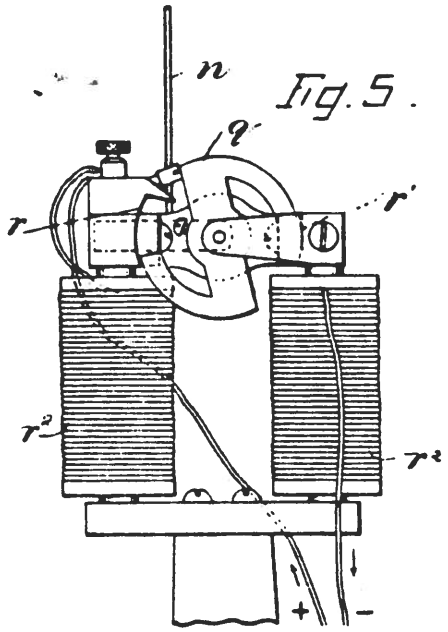
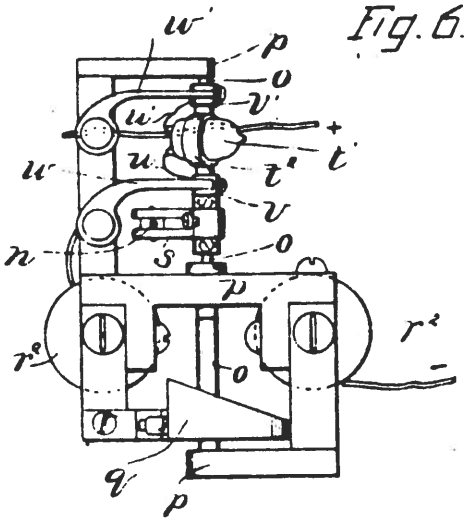


Fig. 6.



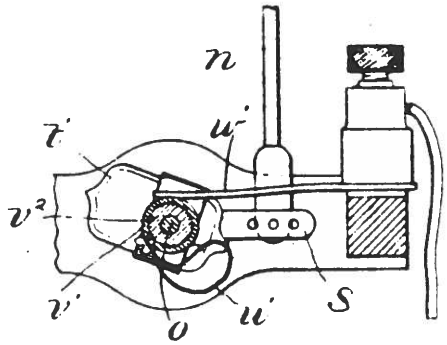


Fig. 7.

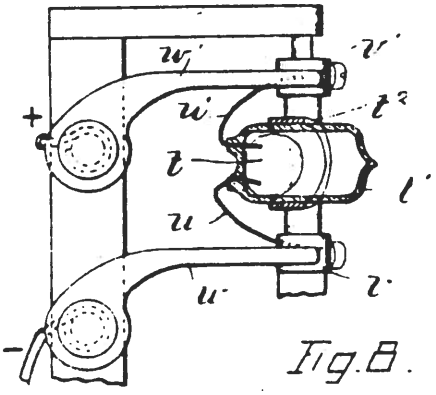


Fig. 8.

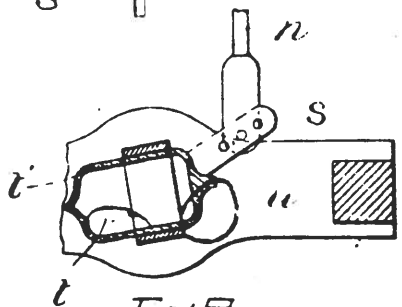


Fig. 9.

Witnesses:
H. A. Hall.
A. D. Harrison.

Inventors
M. V. B. Ethridge
J. H. Eastman
by Wright Brown Quinby & Ady
Attys

UNITED STATES PATENT OFFICE.

MARTIN V. B. ETHRIDGE, OF EVERETT, AND JOSEPH H. EASTMAN, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE CENTURY CLOCK COMPANY, OF NORTH BERWICK, MAINE.

ELECTRIC CLOCK-WINDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 536,926, dated April 2, 1895.

Application filed April 28, 1894. Serial No. 509,326. (No model.)

To all whom it may concern:

Be it known that we, MARTIN V. B. ETHRIDGE, of Everett, in the county of Middlesex, and JOSEPH H. EASTMAN, of Boston, in the county of Suffolk, in the State of Massachusetts, have invented certain new and useful Improvements in Clocks, of which the following is a specification.

This invention has for its object, first, to provide a simple and accurate time movement, the impelling power of which shall be constant, so that there will be no variation in the time-keeping qualities caused by variations in the strength or force of the motor, and, secondly, to provide improved means for automatically maintaining the force which impels the said movement.

The invention consists in the improvements which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side view of a part of a clock movement embodying our invention. Fig. 2 represents an edge view of the same. Fig. 3 represents a section on line 3—3 of Fig. 2. Fig. 4 represents a section on line 4—4 of Fig. 3. Figs. 5 to 9, inclusive, represent views of our improved mechanism for maintaining the operation of the time movement.

The same letters of reference indicate the same parts in all the figures.

In carrying out our invention, we provide a time train which as here shown, comprises a center arbor a; a center wheel b on said arbor; a pinion c, usually known as the third pinion, affixed to an arbor c', carrying a gear wheel c^2 known as the third wheel; a pinion d known as the fourth pinion, meshing with the third wheel c^2; a wheel d' known as the fourth wheel, affixed to the arbor d^2 carrying the pinion d; a pinion e affixed to the arbor e' which carries the escape wheel e^2; and a pallet g; balance wheel g'; and hair spring g^2 controlling the movement of the said train.

The parts above mentioned comprise a simple train adapted for use in connection with our improvements hereinafter described; but we desire it understood that we do not limit ourselves to the particular time train here shown, and may use any other with which our said improvements are capable of use.

h represents a barrel which is mounted loosely upon the arbor c', and contains a spiral spring i, the outer end of which is affixed to said barrel, while the inner end is affixed to the arbor c', the said spring constituting a connection between the barrel and the arbor c', so that power is imparted to the arbor through said spring. Affixed rigidly to the barrel h is a ratchet h'.

k represents a pawl mounted upon an arm j, which is adapted to oscillate on the arbor c'. The arm j is weighted, so that when raised and then allowed to descend by gravitation, it will impart to the barrel h and spring i, through the pawl k and ratchet h', a sufficient force to compress the spring i and impart through the latter and the arbor c' a sufficient force to impel the time train, the spring being compressed by the described action of the arm j, so that it is in effect a rigid connection between the barrel and the arbor c' during the downward movement of said arm. When the arm j is raised, the ratchet h' is prevented from rotating backward by a stop pawl m engaged with it as shown in Fig. 1, so that the spring i is caused to act upon the arbor c', and continues the rotation of said arbor and of the other arbors of the train. It will be seen, therefore, that power is applied continuously to the train, first by the direct action of the arm j, and then by the action of the spring, the arm and spring acting alternately. The arm may be operated by means of a connecting-rod n engaged with the lower end of the slide, said rod being connected with a suitable motor adapted to alternately raise and release it. A motor suitable for this purpose is shown in Figs. 5 to 9 inclusive, in which o represents a horizontal shaft journaled in fixed bearings $p\ p\ p$. To said shaft is affixed an armature q which is formed to oscillate between the curved pole pieces $r\ r'$ of the electro magnet $r^2\ r^3$. Said magnet is included in an electric

circuit, which also includes a battery or other source of electricity. To the shaft *o* is affixed an arm *s* to which the rod *n* is pivotally connected.

When the circuit is closed and the electro-magnet energized, the poles *r r'* attract the armature *q*, giving the latter and the shaft *o* a movement which raises the arm *s* and rod *n*, thus raising the weighted arm *j*. This movement of the shaft also causes a circuit controller carried thereby to break the circuit, so that as soon as the rod *n* and arm *j* are raised, the armature is released by the magnet, and permits the descent of said arm and rod, the armature being thus gradually moved away from the poles *r r'*. When the arm *j* and rod *n* have reached the lowest point in their movement, the circuit controller acts to close the circuit, and thus cause the upward movement of the rod *n* and arm *j*. The operation is thus continued, the magnet being energized at the end of each downward movement of the weighted arm *j* and demagnetized at the end of each upward movement, so that said arm is alternately raised and released, with the result above described.

We prefer to employ as the circuit controller a body *t* of metallic mercury, a hermetically sealed glass tube *t'* inclosing said body, and contact wires *u u'* included in the circuit and projecting into the tube *t'*. The tube *t'* is arranged so that when the weighted arm *j* and rod *n* reach the lower end of their movement the body *t* will gravitate to the position shown in Figs. 7 and 8, and establish an electrical connection between the wires *u u'*, thus closing the circuit. When the arm *j* and rod *n* reach the upper end of their movement the tube *t'* is inclined as shown in Fig. 9, thus separating the body *t* from the wires *u u'* and breaking the circuit.

The tube *t'* is held in a ring or clamp t^2 affixed to the shaft *o*, and may be readily removed from said clamp, so that a new circuit controller may be applied in case of necessity. Air is exhausted from the tube to prevent oxidation of the mercury. As the wires *u u'* necessarily have an oscillating motion, it is desirable to connect them with the fixed parts of the circuit, by means which will offer practically no resistance to said motion. To this end we connect the wires *u u'* with metallic collars *v v'* attached to the shaft *o* and insulated therefrom by insulating collars v^2 (Fig. 7), and employ springs *w w'* bearing on said collars *v v'* and connected with fixed parts of the circuit.

The weighted arm *j* may be termed a primary motor, and the spring *i* may be termed a secondary motor, through which power is transmitted from the train to the primary motor, said secondary motor acting on the train when the primary motor is being set for action; or in other words, when the arm *j* is being raised.

It will be seen that the shaft *o*, arm *s*, and rod *n* constitute a mechanical connection between the armature and the primary motor, whereby the action of the armature when the circuit is closed is caused to set the motor for action, and that said shaft, arm, and rod constitute also a mechanical connection between the motor and the circuit controller, whereby the motor is caused, after it has been set, to again close the circuit, so that the action of the armature in setting the motor breaks the circuit, while the action of the motor closes the circuit.

We believe it to be new with us to combine with a time train a motor such as the weighted arm *j*, a train impelling spring adapted to be wound by the action of said arm, an electric circuit including an electro-magnet, an armature controlled by said magnet and mechanically connected with the motor so that the movement of the armature caused by its attraction to the poles of the magnet sets the motor for action, and a circuit controller also mechanically connected with the motor and with the armature, and adapted to be operated by the motor to close the circuit when the motor has nearly spent its force, and by the armature to break the circuit after the motor has been set. We do not, therefore, limit ourselves to the mechanical details of construction here shown, and may vary and depart from the same without departing from the spirit of our invention.

We claim—

1. The combination, with a time train, of a motor, an electric circuit including an electro-magnet, an armature controlled by said magnet, a circuit controller composed of a hermetically closed tube mechanically connected with the armature, a gravitating circuit closing and breaking device, and circuit terminals within said tube, and mechanical connections between the motor and the connected armature and circuit controller, through which the motor is set for action by the armature when the circuit is closed, and the circuit controller is caused to close the circuit when the motor is expending its force, as set forth.

2. The combination, with a time train, of a motor, an electric circuit including an electro-magnet, a shaft provided with an armature, a circuit controller supported by said shaft and composed of an exhausted tube, a gravity circuit closing and breaking device in said tube, and circuit terminals connected with the tube, insulated collars on said shaft connected with said terminals, springs bearing on said collars and connected with fixed parts of the circuit, and mechanical connections between the shaft and motor, as set forth.

3. A circuit controller composed of an exhausted tube of insulating material, circuit wires projecting into the tube and normally separated and insulated from each other thereby, and a gravity circuit closing and

breaking device, such as a body of mercury located in said tube, adapted to electrically connect said wires, as set forth.

4. The combination of a balance, an escapement, a train connected with said escapement, a spring adapted to impel said train, a ratchet wheel connected with said spring and having a stop pawl to prevent retrograde movement, a vertically movable weight such as *j* provided with a pawl engaging said ratchet, an electric circuit, an electro magnet included therein, a shaft carrying the armature of said magnet and provided with an arm *s*, a rod connecting said arm with the weight *j*, and a circuit controller actuated by the movements of said shaft as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 23th day of April, A. D. 1894.

MARTIN V. B. ETHRIDGE.
JOSEPH H. EASTMAN.

Witnesses:
C. F. BROWN,
E. BATCHELDER.

****

****

MART

WANTED: Style "A" Self-Winding Cl.Co. movement. 12" dial and pendulum for same movement needed as well. Movement bracket would have to have holes lining up with those in 72 beat case.
Royce Hulsey,6563 Maplegrove St.Agoura, CA. 91301

FOR SALE:JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY--1975-1980--ORIGINAL COPIES 50¢ a copy-minimum $4.00. Inquiries,SASE or send money payable to EHS, % C.Roth, 2 Circle Lane, Roslyn Heights,NY 11577

WANTED: Unusual Electrical Clocks, A.Marx,105 Bayeau Rd, New Rochelle,NY10804

FOR SALE:VERY HIGH QUALITY EARLY BATTERY CLOCKS for the serious collector by Synchronome,Gents,Vaucanson. Fully restored
Charles W. Roth, 2 Circle Lane, Roslyn Heights, NY 11577

FOR SALE:Seth Thomas Self-Winding Electric, Model 86AF in 18" square Mahogany case. Fine condition and in G.R.O.--$460 ppd. Martin C. Feldman

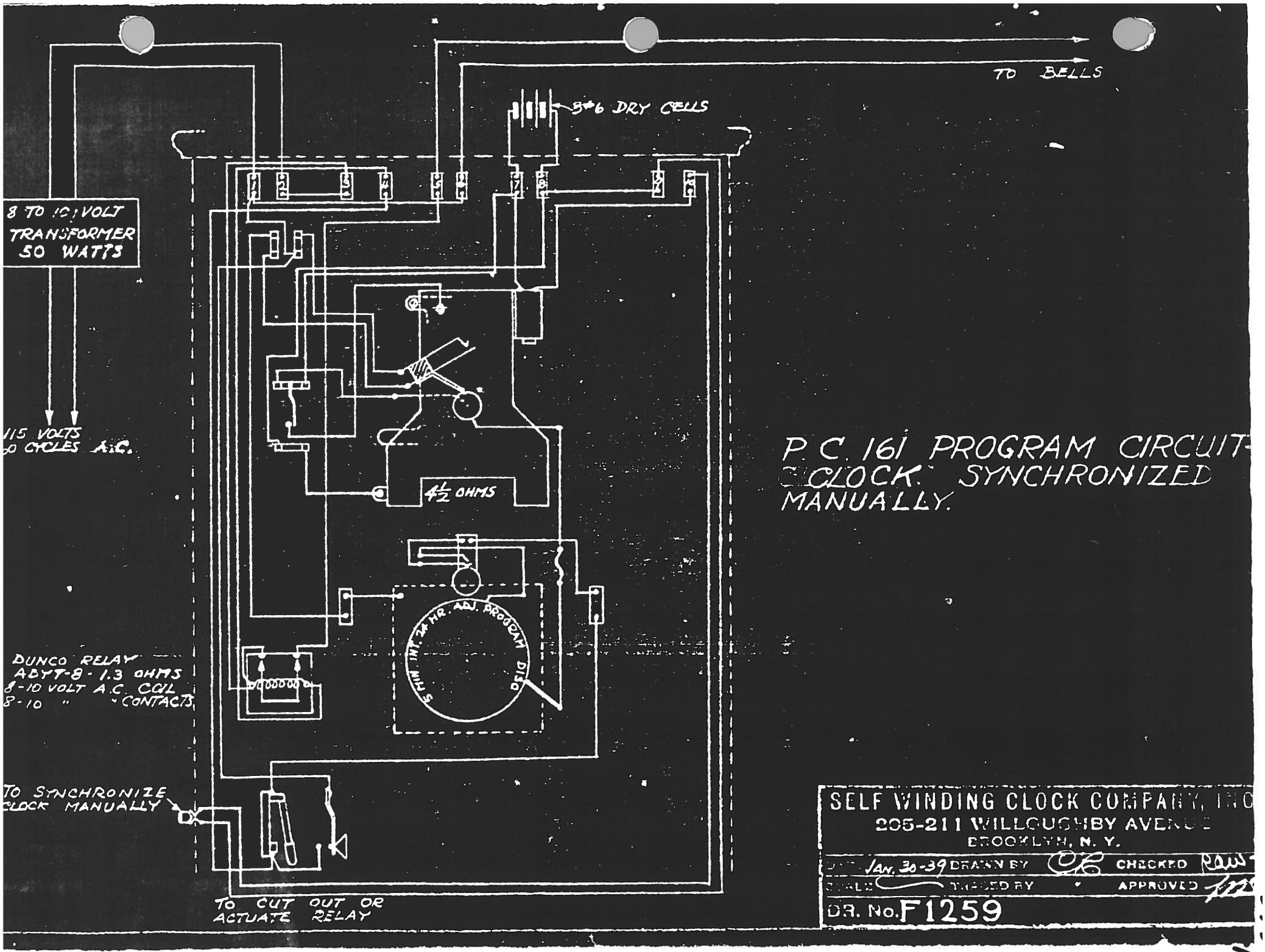
WANTED: "Junker" early battery clocks, movements, parts,etc.Send details and $ wanted.ELECTRICAL CLOCK LITERATURE for possible reprinting in our Journal.

Electrical Horological Literature of any type.

Hahl-Wenzel pneumatic clock face and weights. Will buy entire clock if necessary. Martin C. Feldman

REPAIRS: ALL EARLY BATTERY CLOCKS including Pooles, Barrs, Tiffany Never-Winds, Eurekas, etc.SPECIALIZING IN BULLE CLOCK REPAIRS USING ORIGINAL PARTS. One month maximum time for all repairs.
Martin C. Feldman,620 Reiss Place-7e.Bronx, NY 10467

FOR SALE: Clock Service company long established with very good advertised name. To be sold complete with stock and name.Excellent opportunity for 2nd business or mail-order business. Modest investment buys all Knowledge of elect. horo. useful.Can be expanded as per wishes and abilities of new owner.Info:C.Terwilliger,%Horolovar,Box 400,Bronxville, NY 10708



P.C. 161 PROGRAM CIRCUIT-CLOCK. SYNCHRONIZED MANUALLY.

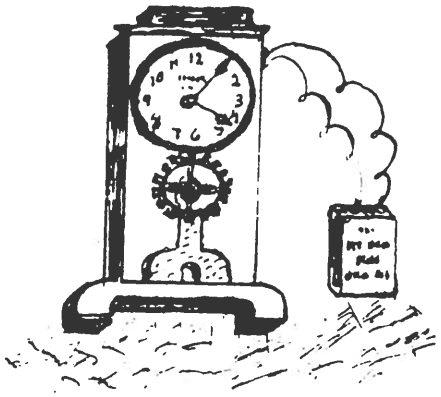
SELF WINDING CLOCK COMPANY, INC.
205-211 WILLOUGHBY AVENUE
BROOKLYN, N. Y.

DATE JAN. 30-39 DRAWN BY OK CHECKED
SCALE TRACED BY APPROVED
DR. No. F1259

The JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY

Chapter No 78

June, 1982
VOLUME VIII --ISSUE #3
Martin C. Feldman, Editor



Hello fellow enthusiasts:

As you know the New York Branch of the Electrical Horological Society in conjunction with Chapter II will be publishing a monograph in the early fall. The contents will include various clocks from the Electrical Horology Exhibit at the recent New York Regional with a large portion dedicated to the identification, description and illustration (wherever possible) of American Electric Clocks. Dr. George Feinstein has compiled an exhaustive list of American manufacturers and companies who produced electric clocks from the latter part of the 19th century onward. This list is being published not only for information but for the following request. A work such as that being planned needs many researchers as well as writers and editorial staff. We would appreciate receiving answers regarding any one or any number of clocks listed along with black and white photos if possible. The information required is:

1. Name of Inventor;
2. Assignees if any (Company to whom patent was signed over);
3. Patent number and date;
4. Name of Company producing clock if any;
5. Years of operation of Company or production run time;
6. Type of movement;
7. Case styles;
8. Principle or method of operation (electric rewind, gravity reset, etc.)
9. Voltage used;
10. Location of Company or production centers.

We realize that not all the information for any particular clock will be available from any one person. However, any amount of information no matter how trivial or incidental you may think it is will be of help. If you have a source of documentation please include this along with your information. All researchers and contributors will be acknowledged in the monograph. We would like the help and cooperation of all our members as this is not a one branch undertaking. The completed project will ultimately reflect upon the good

Con't. 12

American Electric Clock Makers

List Compiled by Dr. G. Feinstein

1. American Bank Protective Co., Minneapolis, Minn.

2. American Business Machine Corp., New York, N. Y.

3. American Electric Novelty and Manufacturing Co., New York, N. Y.

4. Automatic Clock Co., Danville, Pa.

5.a) Automatic Electric Clock Co., Kansas City, Mo.
b) American Clock Co., Chicago, Ill.

6. Atlantic Clock Co.

7.a) Bangor Electric Clock Co., Bangor, Maine
b) New England Electric Clock Co.; Bangor, Maine

8. Blodgett Clock Co., Boston, Mass.

9. Century Clock Co., North Berwick, Maine

10.a) Cincinnati Electric Clock Co., Cincinnati, Ohio
b) Cincinnati Time Recording Co., Cincinnati, Ohio

11. Collins Electric Clock Co., St. Louis, Mo.

12. Columbia Clock Co., Boston, Mass.

13. Chas. Cory and Son,Inc.; New York, N. Y.

14. Daniel Drawbauch; Eberly's Mills, Pa.

15. Electric Clock Corp. of American; Chicago, Ill.

16. Electric Corp.; Chicago, Ill.

17. Electric Time Co.; Grand Rapids, Mich.

18. Electric Time Recorder Co.; Chicago, Ill.

19. Electro Clock Co.; Baltimore, Md.

20. Electro-Pneumatic Time Co., New York, N. Y.

21.a) Fred Frick Clock Co.; Waynesboro, Pa.
b) Landis Clock Co.; Waynes boro, Pa.

22. General Electric Co.

23. Gold and Stock Telegraph Co.; New York,N.Y.

24. Grav-Elec. Clock Co.; New York, N.Y.

25.a) Hahl Mfg. Co.; Baltimore, Md.
b) Hahl Automatic Clock Co.; Chicago, Ill.

26. Herschede Hall Clock Co.; Cincinnati, Ohio

27.a) Holtzer-Cabot Electric Co.; Boston, Mass.
b) Holtzer Magneto Clock Co.; Chicago, Ill.

28. E. Howard Watch and Clock Co.; Boston, Mass.

29. O. Howard Co.; Boston, Mass.

30. Howard and Morse

31.a) Imperial Electric Clock Co.; Granite, Ill.; St.Louis, Mo.;Collinsville, Ill.
b) Hug Mfg. Co.; Springfield, Ill.

32. E. Ingraham Co.; Bristol, Conn.

33.a) International Time Recording Co. of N.Y..; Endicott, N.Y.
b) International Business Machines Corp.; New York, N.Y.

34. Joliet Clock Mfg. Co.; Joliet, Ill.

35. Kennedy Electric Clock Co.; New York, N.Y.

36. Manhattan Clock Co.; Colorado

37. Manning Bowman Co.; Meriden, Conn.

38. Meyer Electric Manufacturing Co.; Houston, Texas

39. Middleburg Electric Clock Corp./ Chicago, Ill.

40. Minerallac Electric Co.; Chicago, Ill.

41. Monarch Telephone Manufacturing Co.; Chicago, Ill.

42. Mountain State Electric Co., No-Key; Wheeling, W.Va.

43. National Clock and Electric Manufacturing Co.; St. Louis.Mo.

44. National Display Systems,Inc.; Memphis, Tenn.

45.a) National Self-Winding Clock Co.; Elgin,Ill.; Champaign,Ill.;Jersey City,N.J.
Bristol, Conn.
b) Self-Winding Clock Co.; Bristol,Conn.
c) Electric Self-Winding Clock Co.; Bristol,Conn.

46. New Haven Clock Co.; New Haven, Conn.

47.a) New York Standard Watch Co.; Jersey City, N.J.
b) Fisher Electric Clock Co.,Inc.; New York, N.Y.

48. Pennwood Co.; Pittsburgh, Pa.

49. Perpetual Self-Winding Watch Co. of America,Inc.; New York, N.Y.

50. Philadelphia Time Telegraph Co.; Philadelphia, Pa.

51. Phinney-Walker Co.; Inc.; New York, N. Y.

52. Plumb and Marcus; Newark, N.J.

53.a) Poole Manufacturing Co., Inc.; Wesport, Conn.; Ithaca, N.Y.
b) Morse Products Inc.; Ithaca, N.Y.
c) Barr Mfg. Co.; Weedsport, N.Y.

54.a) Prentiss Clock Co.; New York, N.Y.
b) Prentiss Clock Improvement Co.; Jersey City, N.J.

55. Program Clock Co.; Illinois

56. Radio Electric Clock Corp.; New York, N.Y.

57 Rempe Mfg. Co.; Danville, Pa.

58. Revere Clock Co.; Cincinnati, Ohio

59. Rupley Patents

60.a) Sangamo Electric Co.; Springfield,Ill.
b) Hamilton Sangamo Clock Co.; Springfield, Ill.

61.a) Self-Winding Clock Co.; Brooklyn, N.Y.
b) American Mfg. and Supply Co.;Ltd.; New York, N.Y.

62. Sempire Clock Co.; St. Louis,Mo.,Chicago,Ill.

63. Sercice Clock Co.,Inc.

64.a) Seth Thomas; Thomaston,Conn.
b) Thompson Electric Clock Co.; Memphis, Tenn.

65. Simplex Time Recorder Co.; Gardner, Mass.

66.a) Sohm Electric Signal and Recording Co.; Spokane, Wash.
b) Sohm Electric Co.; Chicago,Ill.

67. Spellier Electric Time Co.; Philadelphia, Pa.

68. Standard Electric Clock Co.; New York, N.Y.

69.a) Standard Time Co., Ne Haven, Conn.
b) Standard Electric Time Co.; New Haven,Conn.; Springfield,Mass.

70. Stanford Products,Ltd.; San Francisco,Calif.

71. Sterling Clock Co.,Inc.

72. Stromberg Electric Co.; Chicago,Ill.

73. Synchronomous Time Co.; Portland,Me., Boston,Mass.

74. Telegraph Supply Co.; Cleveland,Ohio

75. Telegraph Time Co.; New York, N.Y.

76. Telemeter Co.; New York, N.Y.

77. Thrasher Clock Co.; Manchester, Conn.

78.a) Tiffany Electric Mfg.Co.;Buffalo,N.Y.
b) Tiffany Never Wind Clock Co.; Buffalo,N.Y.
c) Cloister Mfg.Co.; Buffalo,N.Y.
d) Niagara Mfg. Co.; Buffalo,N.Y.
e) National Magnetic Clock Co.; New York, N.Y.

79. Time Systems Co.; Detroit,Mich.

80. Time Telegraph Co.; New York, N.Y.

81. Trinity Electric Clock Co.; Chicago,Ill.

82. United Clock Co.; Chicago,Ill.

83. United Electric Clock Corp.; Brooklyn, N.Y.

84. Unit ed States Electric Clock Co./ New York, N.Y.

85. Universal Electric Clock Co.; New York, N.Y.

86. Victor Electric Products,Inc.; Cincinnati,Ohio

87. Wallace and Tiernan Products Inc.; Belleville,N.J.

88. Waltham Electric Clock Co.; New Hampshire

89. Warner

90.a) Warren Clock Co.; Portland,Maine
b) Warren Telechron Co.; Ashland,Mass.

91. Waterbury Clock Co.; Waterbury, Conn.

92. Wenzel Co.; Washington D.C., Baltimore, Md.

93. Western Clock Co.; Peru,Ill.

94. Westinghouse Electric and Mfg. Co.; E.Pittsburgh, Pa.

DESCRIPTION OF AN ELECTRIC DESK CLOCK

J. J. Singer (OH)

As a collector of electric clocks, I have a special interest in clocks manufactured by the Self Winding Clock Company of New York. The origin of this company was so aptly documented in a prvious issue of the Bulletin (1) but little else has appeared in print. The SWC Co. provided most of the clocks used by the Western Union's Time service as well as installations that were not. The purpose of this article is to share some information with fellow collectors concerning a particular clock, the "Dale Type RM Marine Escapement Movement" S/N 50089. The clock is in a walnut case of dimensions given in the accompanying sketch; the depth being about 4½". The all brass construction is similar - but not identical - to the SWC Comany's type "F" Movement (2) with the following differences:

1. The type "F" movement has a vibrating motor, this clock's winding mechanism consists of a small DC motor presumably powered by the 1½ volts. The motor, unlike the type I have seen in later versions consisting of an enclosed permanent magnet stator and wound rotor, is of the open type construction. It consists of a stator field coil wound around laminations that from the stator field with air gaps and a 3/4" opening for the rotor. The rotor and its commutator is missing. A pair of brushes mounted in a plastic housing is fastened to the front plate. The entire winding motor assembly is attached to the main clock plates by two locating pins in back and two screws in front.

2. The battery (there is room for a #6) is placed in a horizontal position below the movement in the case as shown by the dotted lines in the sketch of the rear elevation.

3. Setting hands to the desired time is done by pressing in and turning the handsetting knob (located on the right hand side of the movement) to the right or left as required.

4. The contact sector piece is fabricated from laminations and riveted together - unlike what is normally found in type "F" movements which are either punched out brass or cast metal pieces.

5. The main spring is 1/8" wide and .009" in thickness.

6. The entire marine escapement assembly is missing; however, some information about it appears on a paper nailed to the back door:

> "These movements are 95% self starting. As the balance wheel can not be seen from the rear - Listen for a ticking sound. If none is heard hold clock with both hands and give it a few circular rocking motions - which will start the movement.
>
> To regulate: Move pointer on the index plate to right for fast and to left for slow. One division on the index plate changes the rate one second in one hour - either fast or slow."

7. There is evidence that this clock was capable of being corrected to time. A line on the paper reads "The flexible cord is for connecting to Telegraph Company Synchronizing Line Terminal Block". Also the cannon socket has the cam that, in conjunction with the minute Synchronizing Lever, was capable of synchronizing the clock on the hour. Unfortunately, level assembly and synchronizing magnet assembly are missing.

8. The entire clock assembly is mounted to an aluminum back plate that fastens to the case by means of four mounting screws shown in the sketch of the rear elevation.

The Western Union Telegraph Company was able to sell this clock for $36.00 (3) and rent it to customers for $1.50 per month (4). The paper fastened to the back door gives the address of the Self Winding Clock Company as 205 Willoughby Avenue, Brooklyn, New York. I have seen reference to this address on publications dated 1923. By 1963 the company's address changed to 41 East 11th Street, New York (5). However, there is confusion in my mind because of an entry appearing in the New York Times stating that the SWC Co. has been purchased by the E.J. Mauville Machine Company of Waterbury Conn. (6). Perhaps some better informed reader could shed light on the corporate history of this period.

REFERENCES

1. NAWCC Bulletins #199; "Chester Henry Pond, Who Started it All" by B. E. Honning.

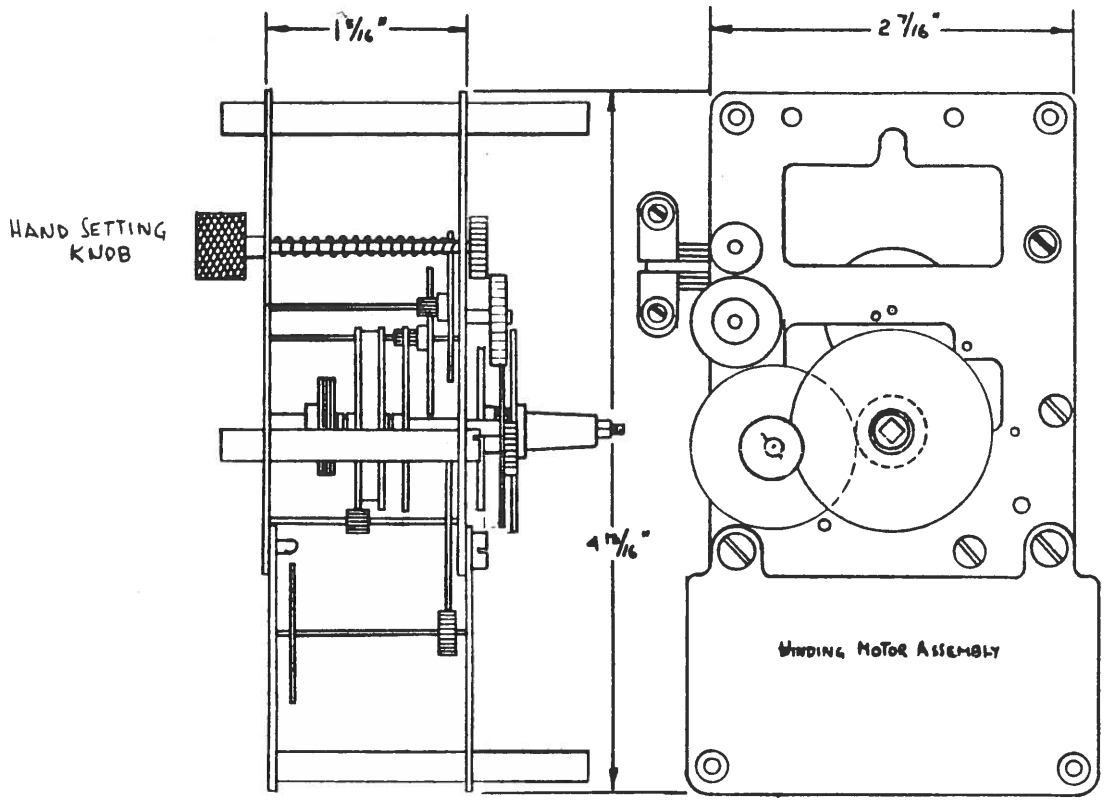
2. 1908 Catalog "Self Winding Clocks" republished by Self Winding Clock Publications, 622 E. San Antonio Drive, Long Beach, CA. 90807.

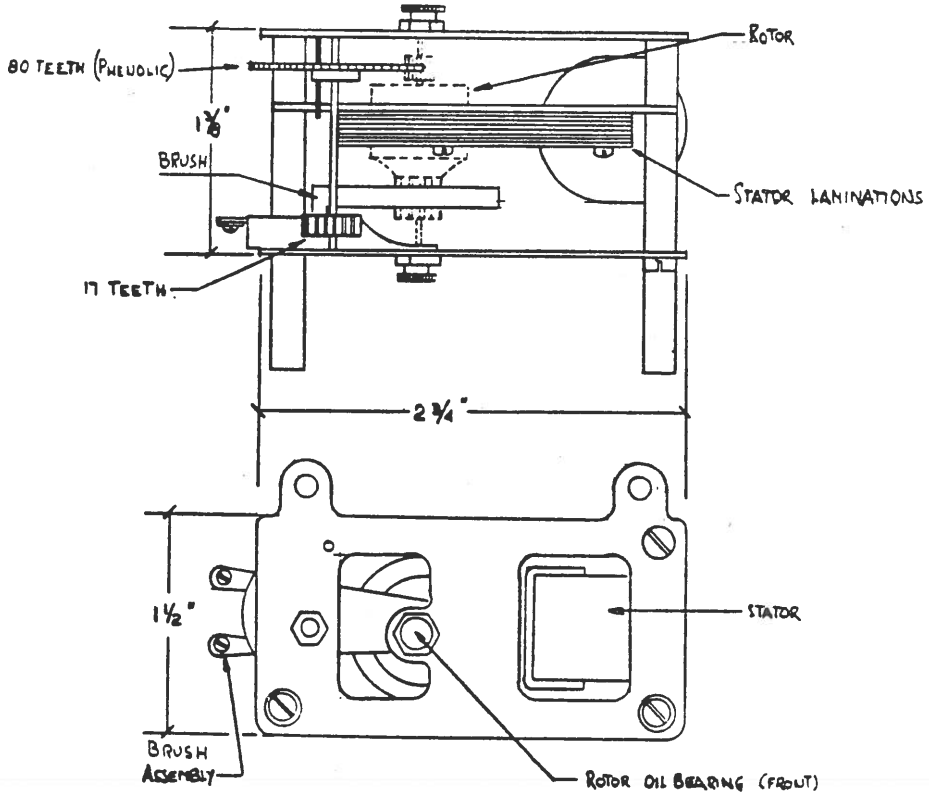
3. Time Service Plant, "Cost of Clocks and Clock Parts List" Stencil #1490-R May 20, 1941; W.U.

4. Advertising brochure; "Western Union Time Service", marked R-62.

5. 1963 Poor's Register.

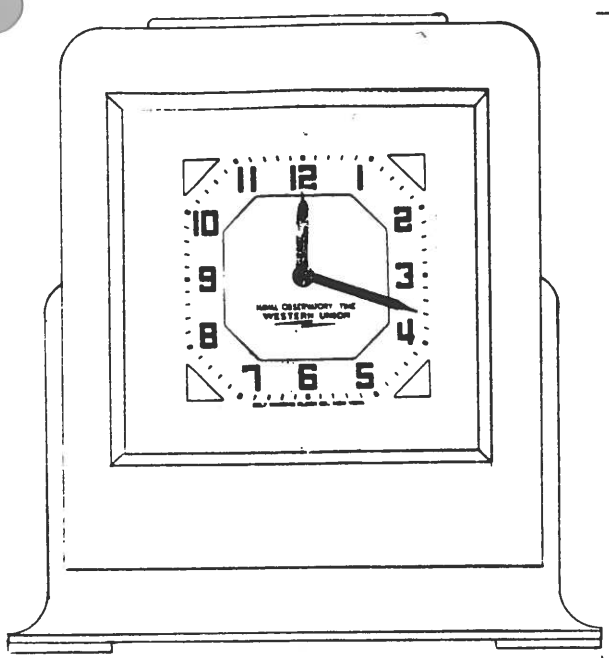
6. New York Times, January 6, 1943 pg.29:8.



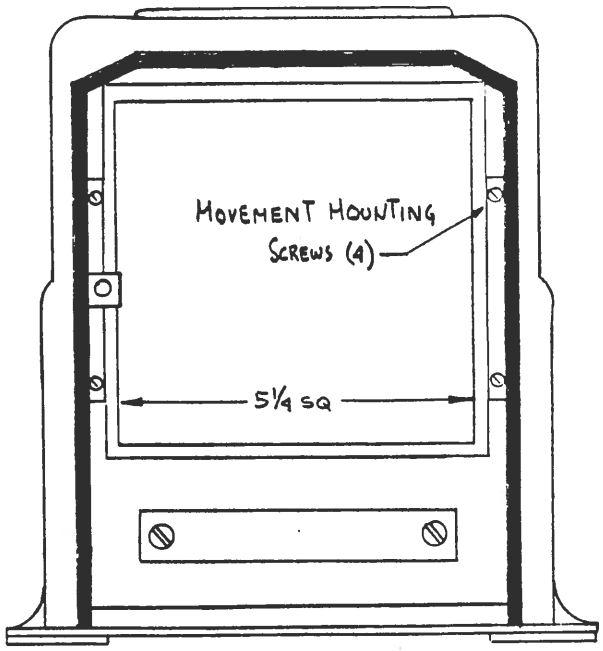


JTC '81

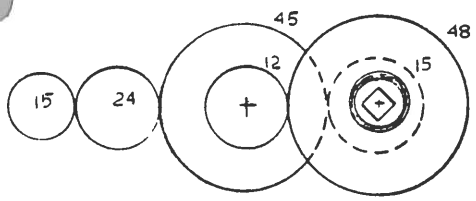
WINDING MOTOR ASSEMBLY

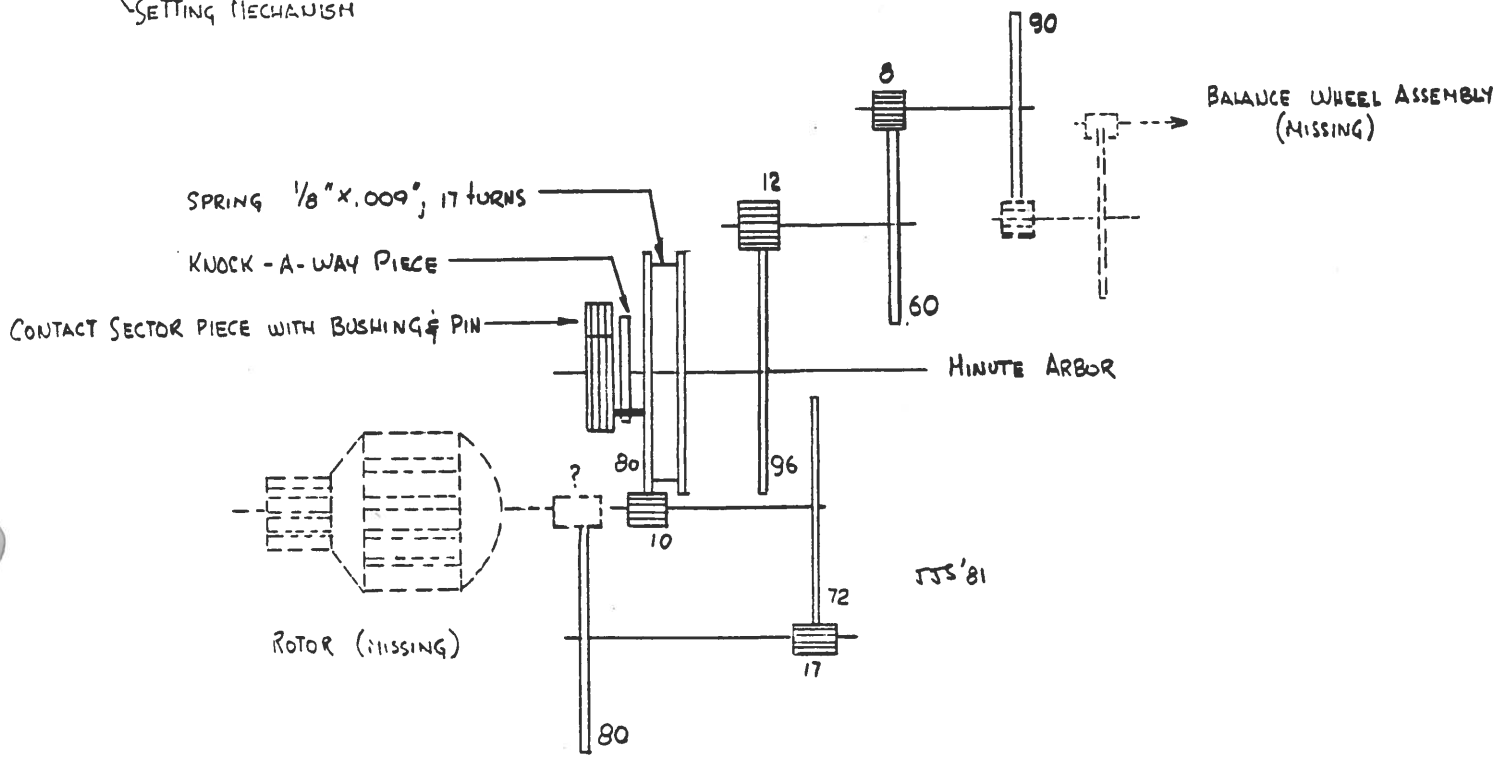


FRONT ELEVATION



REAR ELEVATION
(DOOR REMOVED)





(No Model.) 2 Sheets—Sheet 1.

W. K. MENNS & W. J. DUDLEY.

ELECTRIC CLOCK.

No. 457,030. Patented Aug. 4, 1891.

FIG. 1.

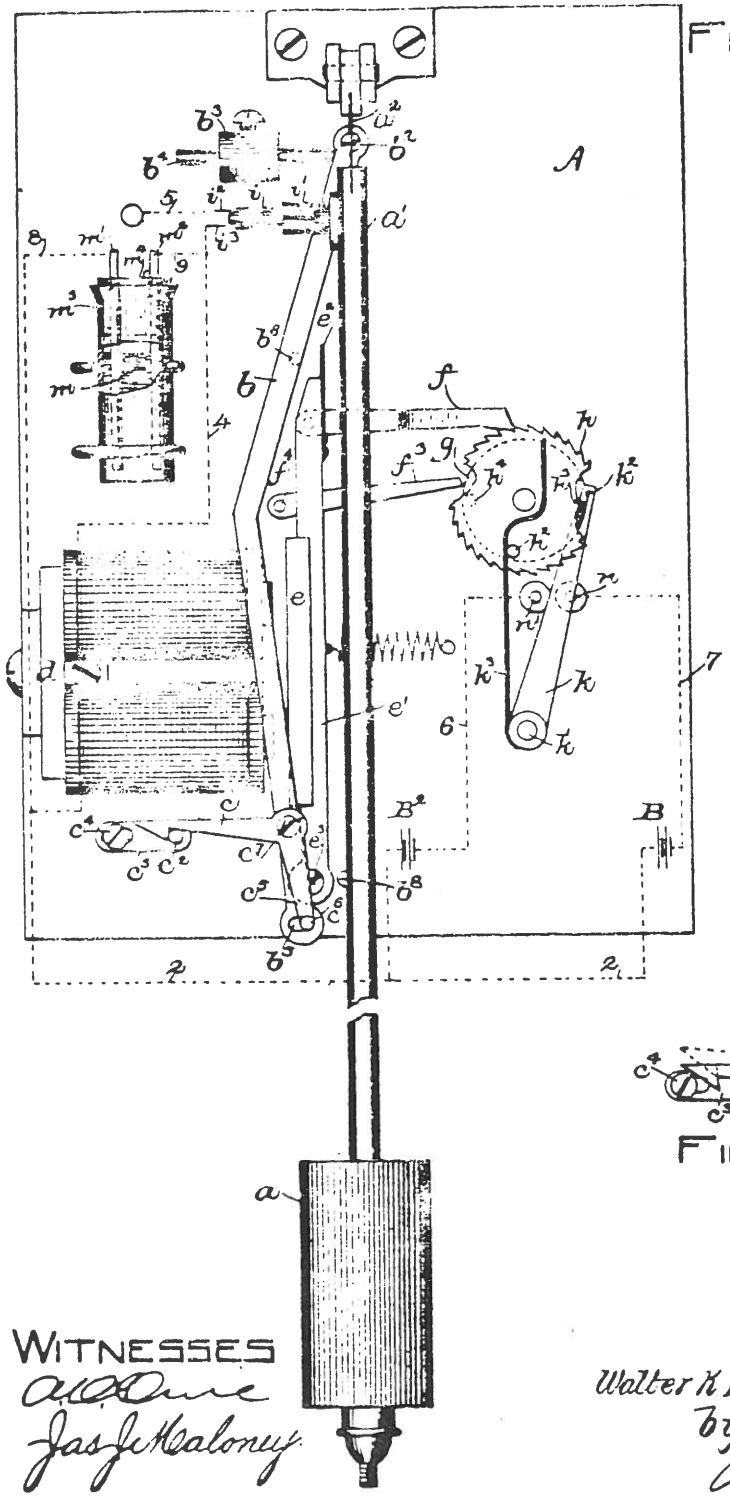


FIG. 2.

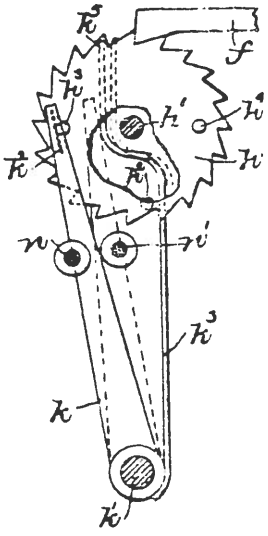
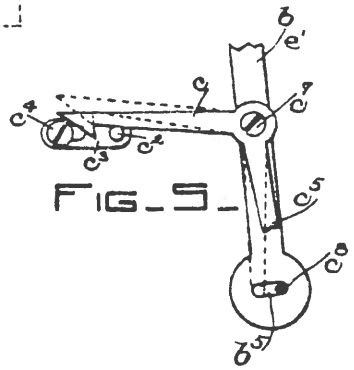


FIG. 3.



WITNESSES

A. D. Cline

Jas. J. Maloney.

INVENTORS

Walter K. Menns & Walter J. Dudley

by Jno. P. Livingston

Att'y.

-607-
-11-

(No Model.) 2 Sheets—Sheet 2.

W. K. MENNS & W. J. DUDLEY.

ELECTRIC CLOCK.

No. 457,030. Patented Aug. 4, 1891.

FIG. 2.

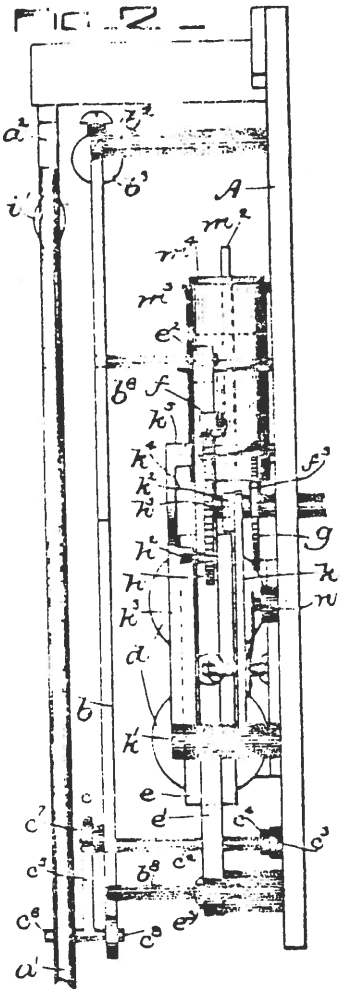


FIG. 3.

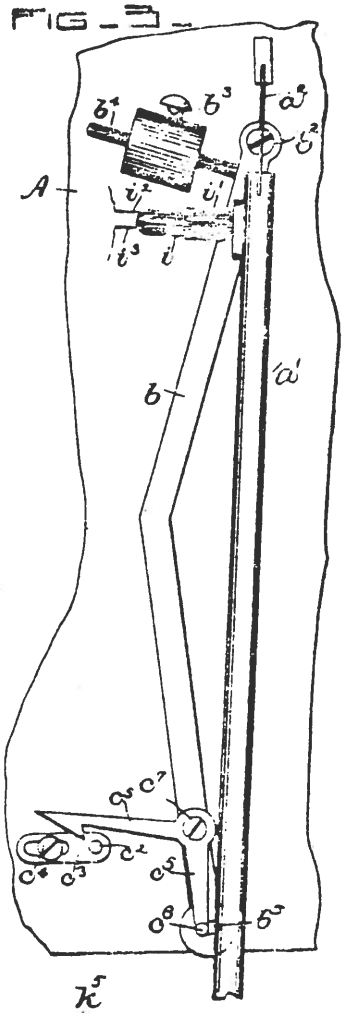
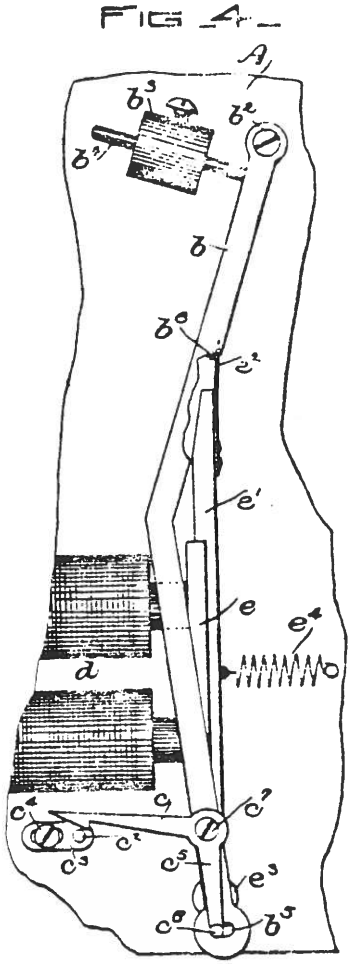


FIG. 4.



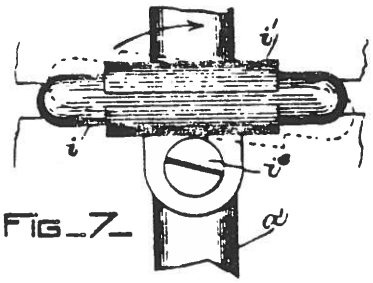


FIG. 7.

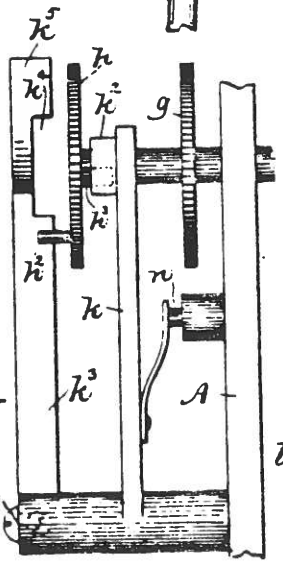


FIG. 9.

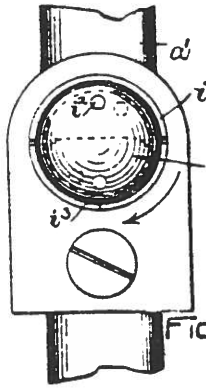


FIG. 6.

WITNESSES

Arthur

Jas. J. Maloney.

INVENTORS

Walter K. Menns & Walter J. Dudley

by Jno. P. Livingston

Att'y

works and reputation of our Chapter! Please send your information to me, Martin C. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467. Once received the information will be credited and distributed to the Editorial Board and research people for the inclusion in the monograph. On behalf of all those working towards the success of this project may I thank you in advance for your help and cooperation.

This month we feature a very interesting article written by member and good friend J. J. Singer describing a unique and fairly rare SWCC clock. Just when we thought that the earliest patent using a mercury switch in operation of an early battery clock was the one taken out by Martin Ethridge and Joseph Eastman of April 2, 1895, we learned recently that W. K. Menns and W. J. Dudley patented a clock using a mercury switch on August 4, 1891. This was brought to our attention by Stacy Wood of our NAWCC Museum and Library. We thank him and the Museum for the information and the fine copy of the patent sent to us.

Until the August Issue, may I take this opportunity on behalf of the Officers of the Electrical Horology Society to wish you all a very happy and healthy summer. Good hunting!

Enjoy this Issue!

Electromagnetically yours,

Martin C. Feldman,FNAWCC

MART

FOR SALE: JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY--1975-1980--ORIGINAL COPIES 50¢ a copy-minimum $4.00. Inquiries, SASE or send money payable to EHS, % C. Roth, 2 Circle Lane,Roslyn Heights, N.Y.11577

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WANTED: "Junker" early battery clocks, movements, parts, etc.Send details and $ wanted. ELECTRICAL CLOCK LITERATURE for possible reprinting in our Journal.

Electrical Horological Literature of any type.
Hahl-Wenzel pneumatic clock face and weights, Will buy entire clock if necessary. Martin C. Feldman

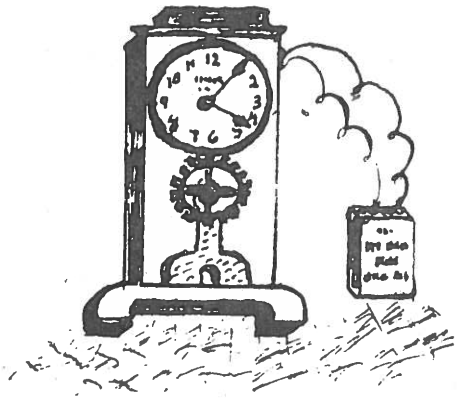
REPAIRS: ALL EARLY BATTERY CLOCKS including Pooles, Barrs, Tiffany Never-Winds, Eurekas, etc. SPECIALIZING IN BULLE CLOCK REPAIRS USING ORIGINAL PARTS. One month maximum time for all repairs.
Martin C. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467

WANTED: Unusual Electrical Clocks, A. Marx,105 Bayeau Rd. New Rochelle,NY 10804

The JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY

Chapter No 78

August, 1982
VOLUME Vlll-- ISSUE #4
Martin C. Feldman, Editor



10th ANNIVERSARY

★SPECIAL EDITION

Hello fellow enthusiasts:

September marks the 10th Anniversary of the formation of the Electrical Horology Society. In looking back it hardly seems possible that the time has passed so quickly but time does have a tendency to move forward whether or not it is measured by mechanical, electromechanical or very highly sophisticated devices.To our credit, I believe, that we are the only Chapter in the NAWCC which has published information continuously describing all aspects of electrical horology. Our NEWSLETTER which had a run of ten issues was followed by our JOURNAL presently in print as Volume VIII. Our publications have contained over 90 separate subjects and more than 600 pages! Indeed, a prodigious amount of work by many dedicated members and friends went into the publication of so much important information. We have been honored by the NAWCC by twice winning Chapter Achievement Awards for our contributions in the enhancement of electrical horology and, I am also proud to have received a personal award for my work as well. More collectors have an increased respect as well as greater knowledge about electrical clocks which has saved many rare and fine examples from the "junk" heap. While this has, of course, contributed to increasing their value, not to mention MART prices, it nevertheless will preserve this very important group of clocks which heretofore was almost virtually ignored. With the increase in interest local groups have met and formed branches in various parts of the country to share with each other their common interest in electrical horology. We are very proud to be

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NATIONAL ASSOCIATION of
WATCH and CLOCK COLLECTORS, INC.

OFFICE — MUSEUM — LIBRARY
514 Poplar Street — P. O. Box 33
COLUMBIA, PA. 17512
(717) 684-8261

June 19, 1982

To NAWCC Chapters Awarded the Presidential Citation:

Enclosed you will find the NAWCC Presidential Citation awarded to you at the annual national meeting of the Association in Jackson, Mississippi.

This Citation is made in recognition of acts or on-going activities of the Chapter as a whole, or of Chapter members acting as a committee on behalf of the Chapter, to provide benefits to others. Such actions are seen as honoring all in the Chapter, as well as honoring the good name and purposes of the Association. The net result of such commendable projects is always very much the same: knowledge and understanding of horology increases, and the hobby of collecting clocks and watches is enhanced.

Your Chapter's record of activities includes benefits both to the public and to your fellow members, and that record makes me proud to share membership with you. Well done--keep up the good work! I am firmly convinced that increasing such Chapter activities helps us all, through Chapter growth, the Association's future strength, and personal growth and satisfaction for those involved.

If each Chapter were to produce, say, a single tape/slide program or publication, or foster a local restoration or community activity, every year or even every other year, how wealthy we would be! Thank you for the example your Chapter is setting for us all.

Sincerely,

Ward Francillon

Ward Francillon
President

THE NATIONAL ASSOCIATION OF WATCH AND CLOCK COLLECTORS, INC.
1982
Year
Ward Francillon
President
June 19, 1982
Date

Comparison of "Schedules of Parts" Pamphlets for the Self-Winding Clock Company's Type "F" Movement

J. J. Singer, OH

I had the opportunity of studying an original 1917 and 1929 copy of the above referenced publication. The pamphlets measure 4 3/4" x 6 1/2", containing 12 pages each. The 1917 printing has a tan cover and gives a 161-163-165 Grant Ave., Brooklyn, N.Y. address, while the 1929 version has a green cover and gives a 205-211 Willoughby Ave., Brooklyn, N.Y. address. On page 1 of the 1929 copy is a notation that 5000 copies were printed on 4-29 (I interpret this as April 1929).

The enclosed tabulation shows some of the differences between components of 1917 and 1929 type "F" movements. By printing the 1929 schedule, the Self-Winding Clock Company made several changes in the presentation of the material:

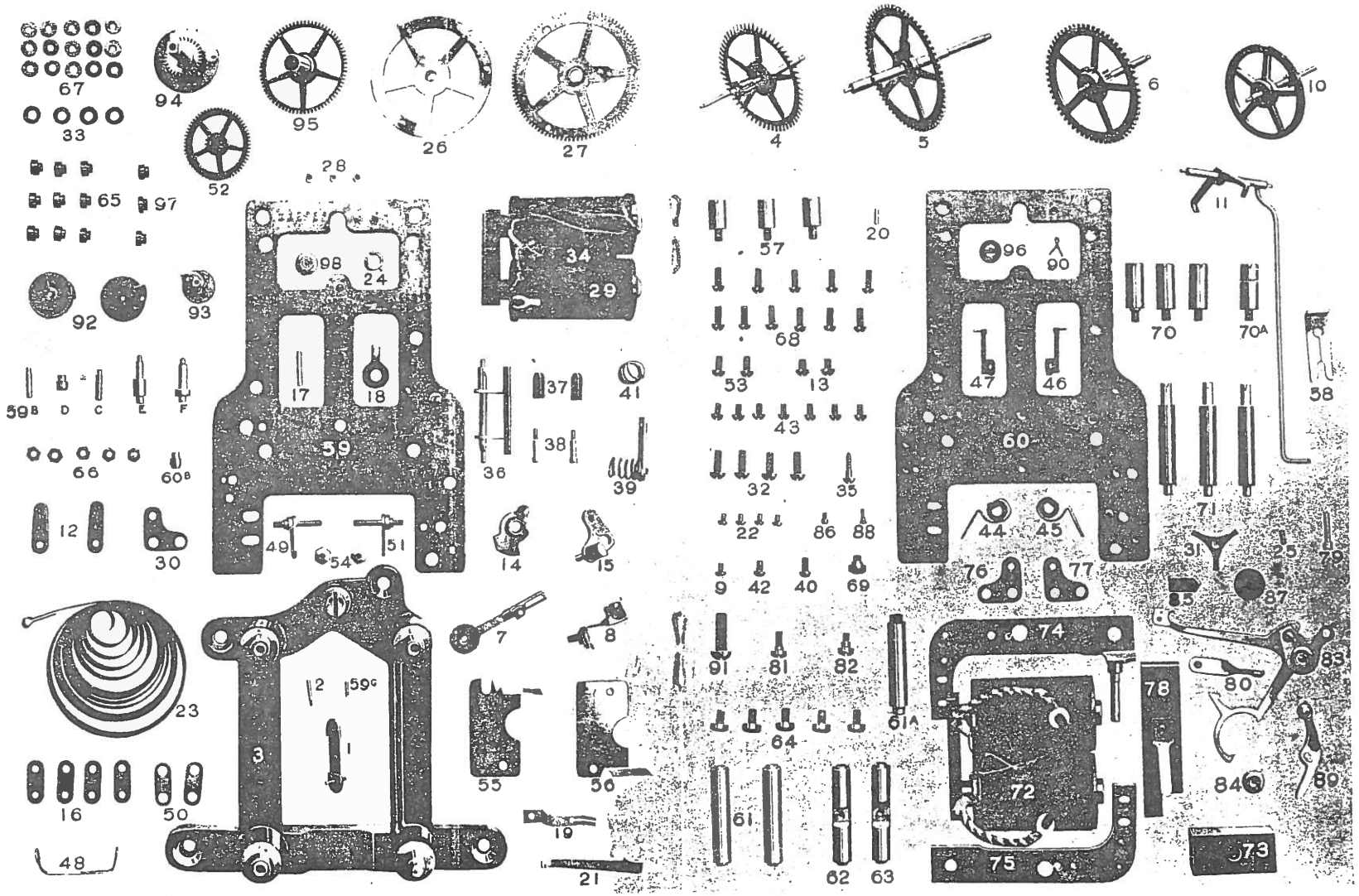
1. Entries were simplified - only assembly names were used as compared to breaking items into sub-assemblies.
2. The illustration on pages 6 and 7 was better organized.
3. Different beat movements were taken into consideration.

I am interested in date of manufacture to movement serial number, not enough information is available to use to establish such a correlation.

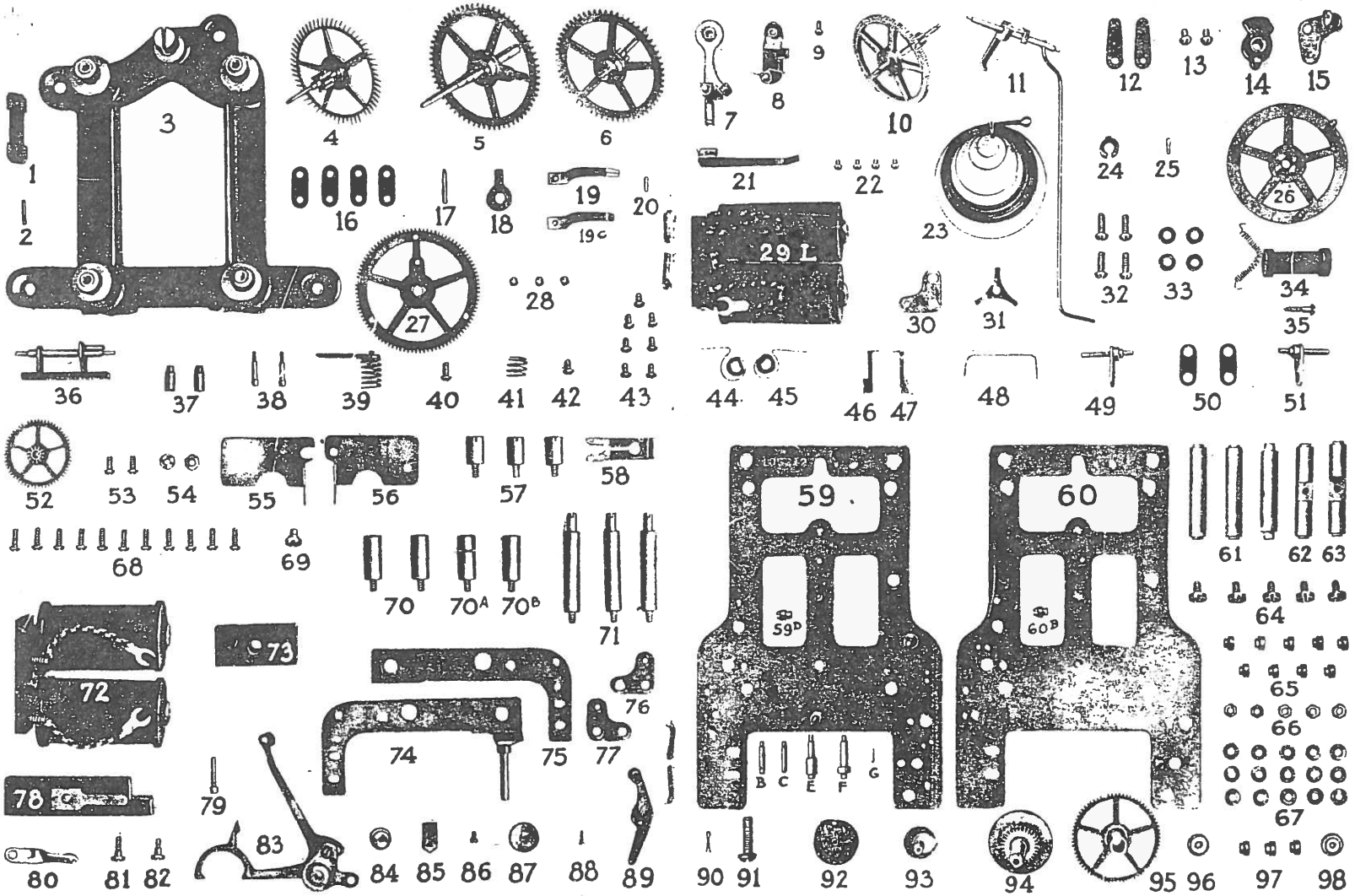
8-27-82

Item	Description	1917 Printing	1929 Printing	Remarks
1	Suspension Spring	.003" thick Rounded brass clamps holding spring.	.005" thick for 60 beat .003" thick for all others Six-sided brass clamps holding spring	
3	Bracket	Casting contains rounded fillets.		This may be due to the way the photograph was taken.
4	Escape Wheel		Pamphlet refers to 60, 80, 120 and 140 beat movements.	Both printings show a 60-tooth wheel.
7	Winding Lever	Straight lever less pawl and spiral spring.	Straight lever with added curved portion added to center of lever, includes pawl and spiral spring.	
8	Back Stop	Right angled bracket	Straight bracket	
12	Pallet Arbor Buttons	Parallel sides	Tapered sides	May be the way photograph was taken.
19	Top Center Winding Contact	One contact shown	Two contacts shown; the second contact labeled 19C and appears to have smaller bifurcated contacts.	
20	Seconds Arbor Nut			Both printings show a round stud; this stud may be internally threaded - but neither slot or threads can be discerned from the illustrations.
29	Motor Magnets	Magnet leads shown with solid colored insulation.	Magnet leads shown with striped insulation; part identified as "29L".	
37	Hard Rubber Insulator	One end gently rounded	One end tapered	

Item	Description	1917 Printing	1929 Printing	Remarks
59	Front Plate	S/N 112058	S/N 198212, two extra holes.	
60	Back Plate		One extra hole	
70	Dial Pillars	3 pillars labeled "70"; one slotted pillar labeled "70-A"; one of the pillars labeled 70 has a shoulder between the threaded portion and the pillar.	Two pillars are labeled 70; one slotted, one as 70A and one as 70B.	I assume the 70B one has the slotted shoulder.
72	Synchronizing Magnet	This shows a fuller wound solenoid than the 1929 version.		
74	Back Synchronizing Frame	Has one additional hole braking into a larger hole.		
75	Front Synchronizing Frame	Has one additional hole braking into a larger hole.		
92	Stationary Disc	Front and back shown	Front shown only	
F-114	Synchronizing Magnet Assembly	Omitted	On rental clocks shipped after February 1, 1929; has rectangular punched lamina-tions.	
F-115	Minute Synchronizing Lever Assembly	Omitted	Small punching different from Item #83.	
F-116	Second Synchronizing Lever Assembly	Omitted	Small punching different from Item #83.	



Group of Parts Style "F" Minute and Style "F" (H-Seconds) Synchronized Movements



Group of Parts Style "F" Minute and Style "F" (H-Seconds) Synchronized Movements

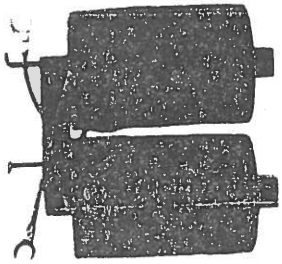
1929

SELF WINDING CLOCK COMPANY

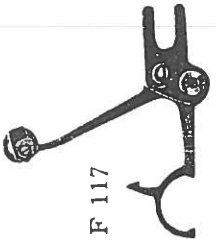
TYPE "K"

SYNCHRONIZING PARTS

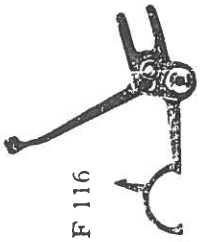
WITH LARGE MAGNETS FURNISHED WITH *RENTAL CLOCKS ONLY*, SHIPPED ON AND AFTER FEBRUARY 1, 1929



F 114



F 117



F 116

F 114. Synchronizing Magnet Assembly.
F 116. Minute Synchronizing Lever Assembly.
F 117. Seconds Synchronizing Lever Assembly.

12

****

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witness to the formation of other groups of collectors sharing a common interest in very specific aspects of horology. Such groups have been forming at a rapid rate during the past few years which we hope in some part, may have been due to our influence and success. The ultimate result of such specialization is the discovery and conservation of horological examples as well as information long buried and forgotten but nevertheless extremely valuable.

Now, at the beginning of our 11th year we look forward to your continued support by your membership, your kind letters and very importantly, your contributions to the JOURNAL. Those members who regularly contribute to our JOURNAL which is the life-blood of our internationally-membered organization are particularly thanked for their outstanding work. I do not wish to embarrass anyone by listing individual names--a short scan through the last few years of our JOURNALS will readily identify these good people!

Thank you again for your support, help and good wishes. We do look forward to a long and prosperous existence. On behalf of our Officers and myself we wish all our Jewish friends a very Happy New Year.

Enjoy this Issue.

Electromagnetically yours,

MC Feldman

Martin C. Feldman, FNAWCC

BRANCH REPORT

The first meeting of the Puget Sound Branch of the Electrical Horologists was called to order in the living room of the President, Mr. Richard Warburton. Other officers present were besides the President Mr. Warburton, the Vice-President also Mr. Warburton and the Secretary, again Mr. Warburton. In attendance at the meeting was besides the above mentioned officers, the president's son Tag, who was sleeping one off on the davenport and the president's cat, Loleta who was paying more attention to a flea on her back than the lecture.

The lecture delivered by Guest Speaker, Richard Warburton, was entitled "The Care and Feeding of the Swainfard Impulsed Pendulum Clock". Notes on the lecture are enclosed below...

The Swainford clock was built in the 1880's in small quantities mainly due to the fact that Mr. Swainfard had only the kitchen table to work on and having a large family, the table was in use most of the time. The movement has a cast iron back plate with the pivots set in brass bushings held in place with pork chop gravy left on the table by mistake. The movement consists of four wheels, two of which do nothing except to give the thing a larger look to justify the price. The pendulum is of second nature and has a large bob which resembles a gravy boat, again due to an accident in the work area. The impulse is applied at the top end of the left swing so as to upset the timing of the swing arc as much as possible. The contacts consist of two knife blades, one of silver-the other resembling that of a butter knife (again due to an accident) which close on the upper reach of the swing. This causes a large magnet to drop a small weight consisting of a silver tea ball (more accidents) filled with plum jelly; this lands in a rather messy fashion on the spout of the pendulum and impulses it on the return swing.

As soon as the pendulum is clear of the weight a windshield wiper motor from a 1936 Hudson-Terraplane is switched into the circuit, retrieves the ball-weight and sets it for the next swing. (At this point in the lecture Mr. Warburton attempted to start the clock that was being used for the demonstration but it failed to function). A careful examination of the movement and its wet battery on the floor showed a total lack of the six volts required to operate the movement. An even more careful examination of the entire project showed that the president's son hearing that the battery contained acid poured it all out in an attempt to get high on it. Since the effects were rather strong, the lad spilled the stuff down his shirt front burning a large hole in the living room rug and causing the family cat, Loleta, to lose what was left of her whiskers. The meeting was adjourned when it was discovered that the boy was going into convulsions and was taken to the hospital. It hasn't yet been determined whether he will be sterile or not.

Respectfully submitted,
Richard Warburton, Sec'y.

Improved System of Self-winding Electric Clocks.

THE illustrations here represent a complete system of winding up clocks and setting the hands to the correct time (synchronizing) by means of entirely new devices. The principal and new features of this invention are:

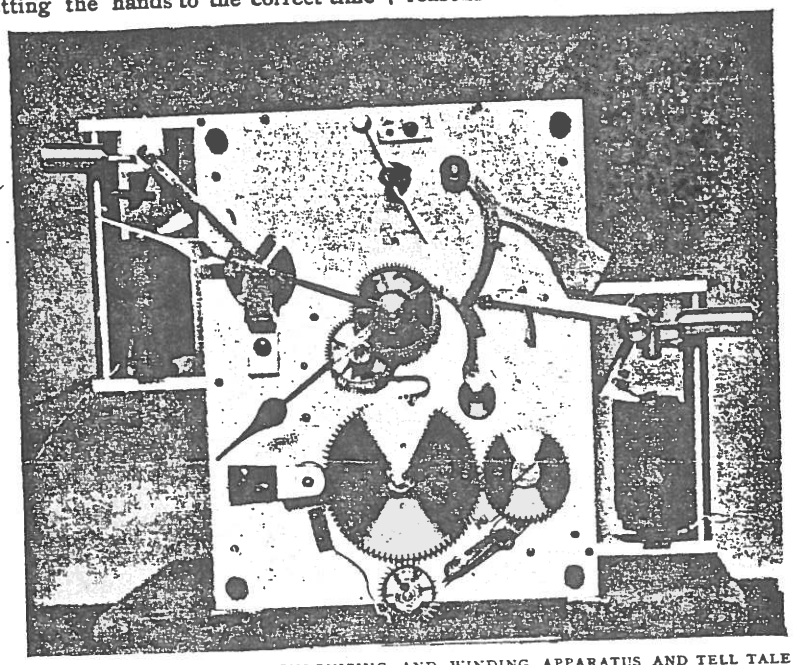
1. The combination of electric currents, when obtainable, with an ordinary clock, running 8, 15, 21 or 30 days; the model or clock is a 30-day timepiece, in which lack of electricity by accident in wires, or by inefficiency of batteries, cannot cause the clock to stop; at the same time this clock can be wound by a key; and is thus by itself of intrinsic value. Therefore such a clock can be sold without restriction, as it can be used with or without the help of electric force.

2. The results obtained show that the clock can be wound by means of an electric current taken from a local or far distant battery or station; that a current sent from a dynamo or battery in a station can wind up a number of such clocks with one single wire, forming a current. There are, therefore, two systems:

A. A central system, controling a number of clocks placed on a line and connected with one single wire to a dynamo or battery.

B. A local system, in which a current from a local battery or a converted illuminating electric light current is used for power for the winding motor; perhaps telephone circuits may be also utilized by making necessary changes in the telephone circuit, so as not to interfere with the telephone system in synchronizing in business hours, as winding can be done during the night.

Before describing the two systems, we will describe the mechanism of the electric winding train, which is entirely new. Instead of using an electric motor, as in existing systems, in which the motor is a fly wheel set revolving by means of magnets and commutators, so as to obtain the momentum necessary to move the winding train, the electric motor is in these systems suppressed for the following reasons: The brushes which, when the armature revolves, act as commutators and reverse the current or break or close the circuit, collect dust and grease, which in time get hard so as to make connection altogether



FRONT VIEW SHOWING SYNCHRONIZING AND WINDING APPARATUS AND TELL TALE CALENDAR BELOW.

cient; besides, the pivots of the rotating axle of the motor also corrode in their bearing, especially when the clock frame is used as a conductor. Such motors are very delicate and get out of order frequently; they must be taken out of the clock to be cleaned, therefore rendering the clock useless for some time, and causing also dissatisfaction and expense.

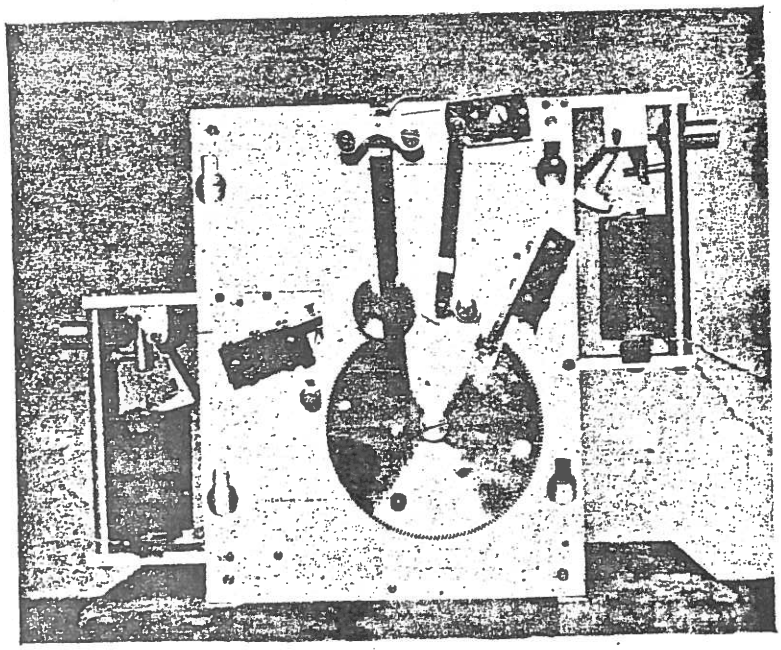
At the axle of the armature is rivited a segment of a wheel; when the magnets attract the armature, the sweep given to the armature gives the same motion to the radius or arm of the wheel segment. This wheel segment moves a pinion and a fly wheel, which, in receiving a momentum, sets the winding train in motion. But the armature must be released, and when the current is stopped, as is necessary, a counter weight helps the segment to follow the motion upward to the armature. On the fly wheel shaft is a ratchet, into which drops a pawl or click, which then carries the fly wheel on the downward motion and on the return of the armature goes over the teeth, thus permitting the fly wheel to keep its momentum.

Consequently the first impulse, lasting one second, will set the fly wheel revolving and its momentum continuing about another second, during which the current is stopped, will keep on moving the winding train, if currents or impulses are sent every other second in the magnet. This is called step by step winding.

It can be shown in the two systems that, in the central system, the currents will be only impulses sent by a key or master clock, and in the self winding by automatic make and break operated by the pendulum.

CENTRAL SYSTEM.

This system, comprising the synchronizing and the winding by the current sent by same wire into the clock from a central station, will permit of placing a number of clocks on a circuit on one single wire. The clocks will automatically close the circuit *each* hour for a length of several minutes, during which they receive the correcting signal. At a different time and every six



BACK VIEW SHOWING COMBINATION OF A MASTER SELF WINDING CLOCK MAKING AND BREAKING CONTACT BY THE PENDULUM; ALSO A SECONDARY CLOCK RECEIVING ELECTRICAL IMPULSES FROM THE CENTRAL OFFICE.

hours the clock will again automatically close the circuit for a length of time necessary, during which impulses sent from the central station every other second will wind in all the clocks on the line such part of the springs as has been used; therefore the clocks can be every six or twenty-four hours, fully wound up again to run 30 days. The time necessary to wind up such part of the spring as has been used up during 24 hours will demand about six minutes during which impulses lasting one second each with breaks of one second between the impulses, or 180 seconds, therefore, three minutes of current. If desired, clocks need not be wound up as often as every 24 hours.

The synchronizing system is also of a new construction, which permits the synchronizing setting lever to be released immediately after the noon or synchronizing stroke has been received, even if the current is maintained in the magnet by carelessness or accident as in case of crossed wires. This is another notable improvement, removing the trouble and expense which occur in existing constructions of synchronizers, where the hands are kept tied by the armature remaining on the magnet; the clocks in such cases must stop.

SELF-WINDING

This system has no synchronizing, and is only intended to be used for locations where wire connection is not practicable. For this system there is on the six hour wheel a lever raising or placing a make and break contact near a pin or arm attached to the escape staff. This pin on every other oscillation of the pendulum closes the circuit during one second, and the current taken from a local battery or converted illuminating electric light will get in motion the winding armature, as in the central system.

Either of these two systems can be applied to all old clocks, and can be used in the largest tower clocks, post and station clocks, etc.

A calendar moved one notch every 24 hours will give the date of the month and indicate that the electric winding is working in good order, as the calendar is moved by the electric winding train and not by the time train, which is another novelty.

Charles Jacques, Havemeyer building, New York, controls this system.

Workshop Notes.

To Bush a Hole.—To bush a hole, broach it out in the plate. Turn up a bush in the lathe to fit. My way of putting in a bush is to turn the bush tapering a little with a hole in the plate to match, drive the bush in from the inside of the plate; having countersunk the hole in the plate on the outside, take a large punch from your staking tool and rivet the bush on the outside just enough to force the metal out in the countersink. Put the plate in the lathe and turn off even with plate. I center and drill the bush before putting in, and then broach out to fit pivot; after putting in and finishing up, countersink the whole a little at both ends so as to hold oil.

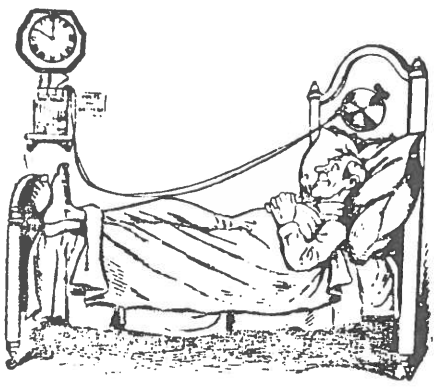
Cracks in Steel.—The cracks which often appear when steel is dipped into water do not always seem to be due to the sudden contraction which the latter experiences, while the interior portion remains expanded by the heat, and retains its increase of volume for another moment after the exterior has been brought in contact with the water.

Thickness of Jewel Holes.—When adjusting a watch, the thickness of the jewel holes is quite an important factor. Unduly thick jewel holes cause difference of rate between the horizontal and perpendicular positions; they must either be replaced by new or reduced to proper size, should they be too thick. This reduction is done with a copper chamfer, and diamond powder (not to be mistaken for diamantine), mixed with oil. This diamond powder can be bought at every watch material store; there are three numbers, Nos. 1, 2, and 3. No. 1 is used for grinding; No. 2 for first polishing, and No. 3 for fine polishing. The reduction of the hole is continued until the hole is as thin as the length of the pivot. The sharp edge of the hole produced by the correction of the jewel is chamfered with a pivoted copper chamfer, by twirling the tool.

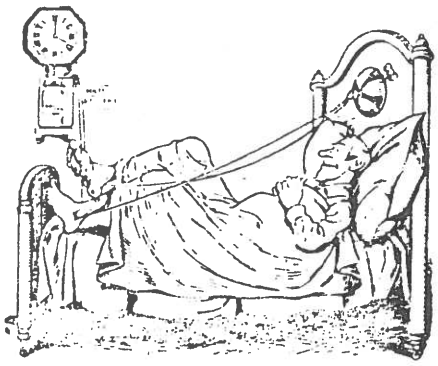
The clock in the article sent by the NAWCC Museum remains unidentified. Can anyone shed any light in this regard?

****

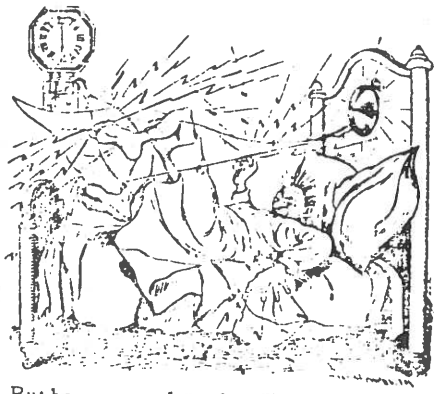
THE SCHEME WORKED.



Prof. Volt, the electrician, has perfected an ingenious device to supplant the old-fashioned alarm clock. He knows he will be awakened at six.



Being a restless sleeper, his feet become entangled in the wires.

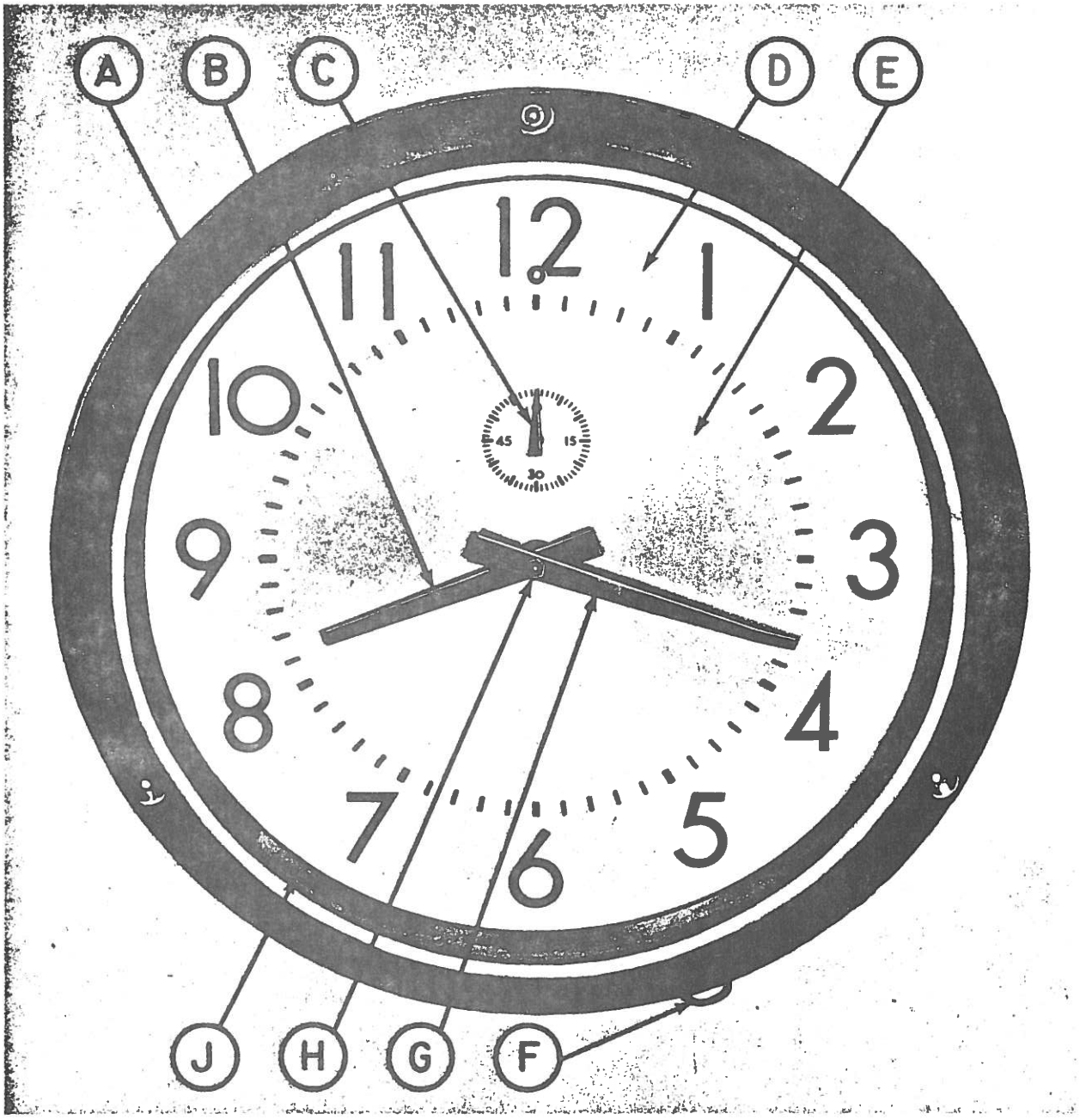


But he was awakened at six.- *Life.*

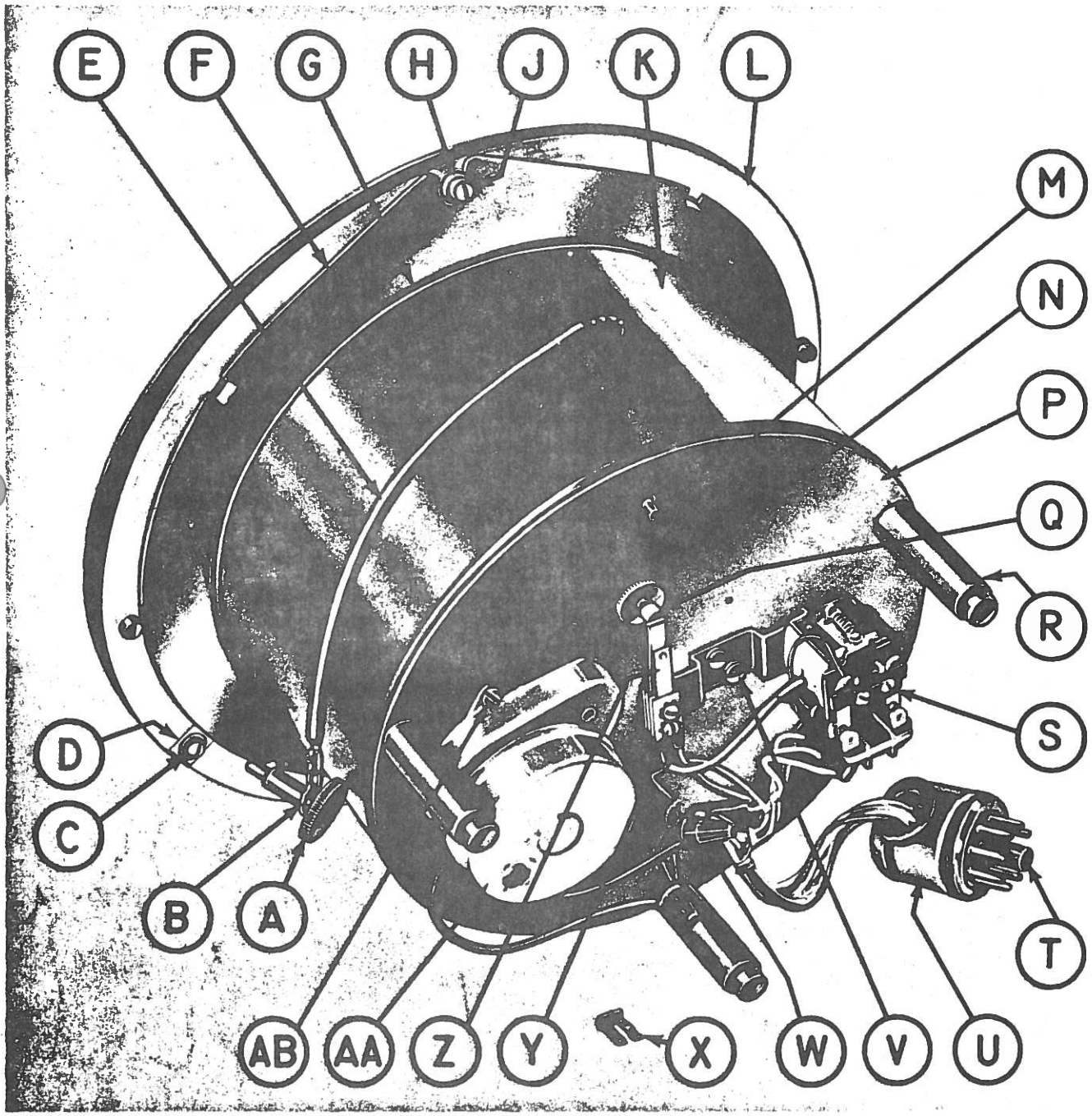
--from,The Jewelers' Circular,Nov. 16,1892

STROMBERG PARTS CATALOG

Model No.50 SYNCHRONOUS MASTER CLOCK



A -	S330-611	Bezel Spacer
B -	S330X625	Hour Hand
C -	S330X632	Second Hand
D -	S330-608	Dial Glass - Use with 3 S330-662 Glass Gaskets
E -	S330-612	Meridian Dial
	S330-660	Pilot Dial
F -	S330-606	Bezel Lock - Use S330-607 Retaining Ring
G -	S330X631	Minute Hand
H -	S330-659	Minute Shaft Nut
J -	S330-600	Bezel & Glass Assembly - Complete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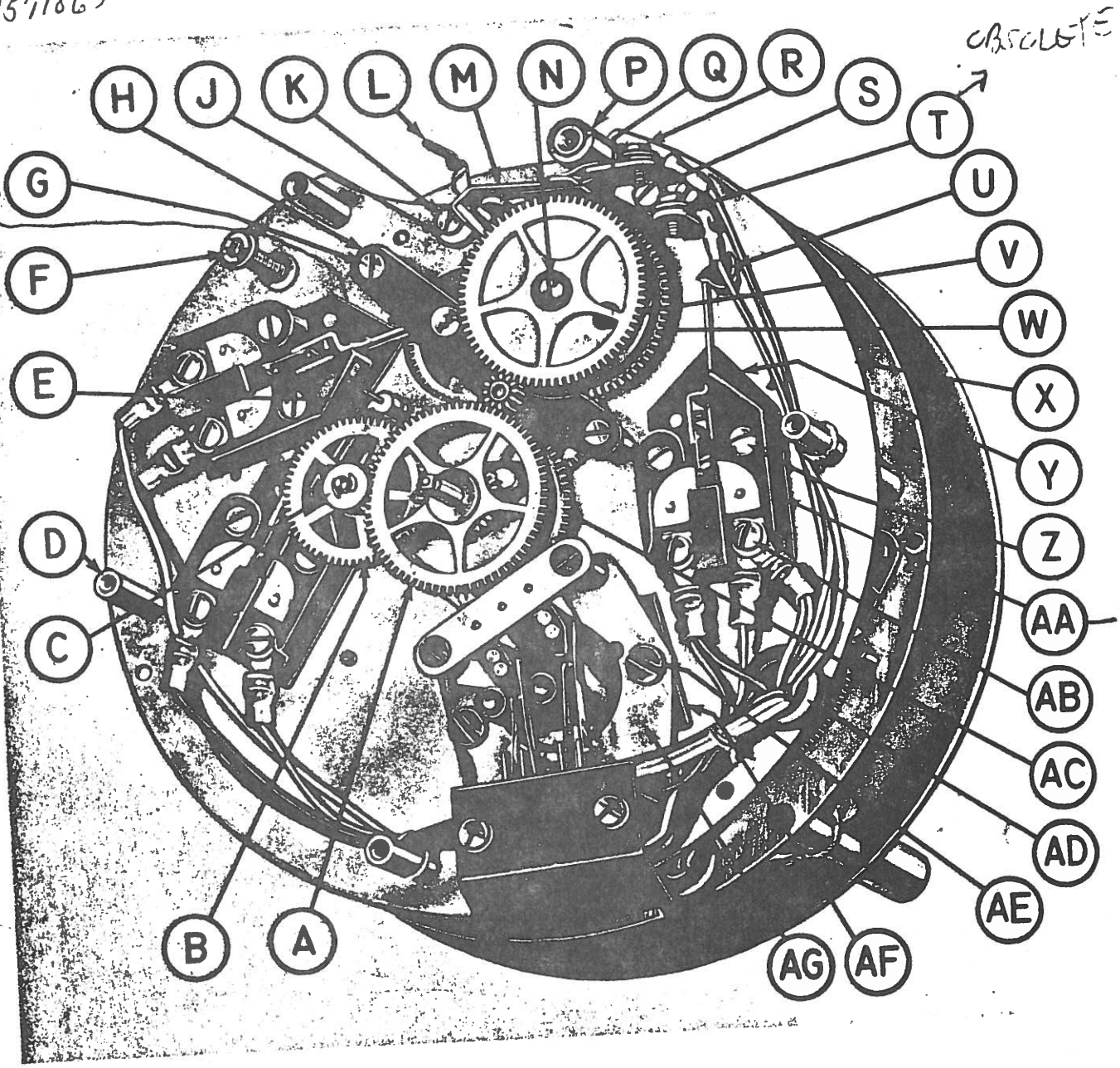
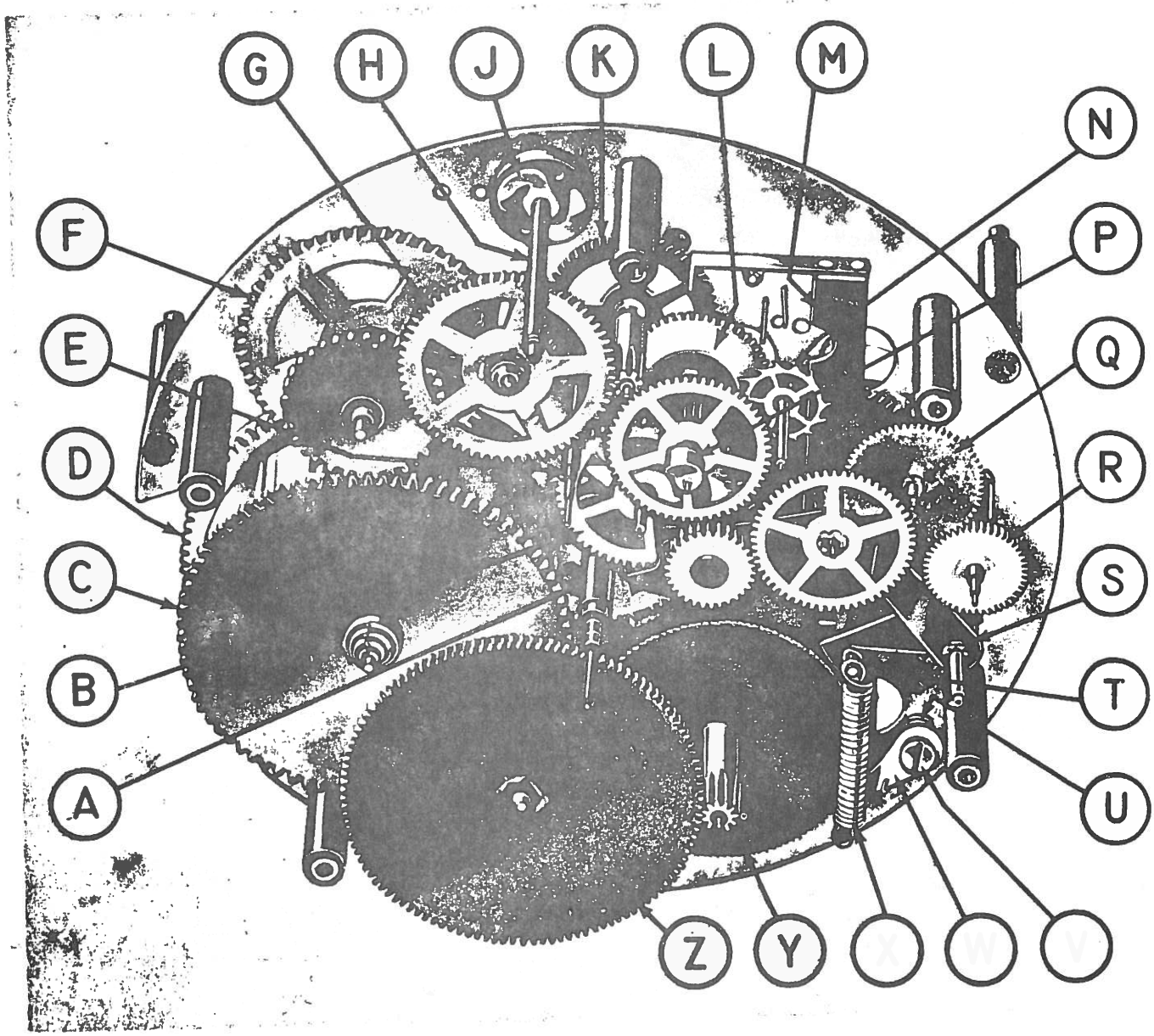
A	-	S330-647	Reset Knob
B	-	2943	Retaining Ring
C	-	2901	Screw - Use with 2906 Lockwasher & 4969 Washer
D	-	S330-609	Glass Spring Clip
E	-	S330-648	Reset Knob Chain - Use with S330-650 Tube & S330-649 Sleeve
F	-	S330-613	Dial Back - Use 2999 Screws
G	-	S330-506	Dust Cover Gasket
H	-	S330-610	Bezel Hanger
J	-	2901	Screw - Use with 2906 Lockwasher & 4969 Washer
K	-	S330X646	Dust Cover - Use 2935 Screws - Includes S330-506 plus Reset Knob and Knob Components
L	-	S330X600	Bezel & Glass Assembly - Complete
		S330X601	Bezel Assembly only
M	-	S330-736	Shipping Clip Shaft
N	-	6856	Nut
P	-	S330X666	Rear Plate Assembly - Without Accumulator
		S330X684	Rear Plate Assembly - With Accumulator - Octal Plug - for standard Autoset - Less S330X694 Actuator - Specify 50 or 60 cycles
		S330X720	Rear Plate Assembly - With Accumulator - 11 Prong Plug. For TRANSACTER Autoset - Less S330X694 Actuator - 60 cycles only
Q	-	S330X694	Actuator and Rod
R	-	S330-686	Anchor Stud - Use 2 S503-108 Washers for alignment
S	-	S330X696	Relay and Switch Assembly - Complete on Bracket
		S520-150	Relay - Use 2908 Screw - 2982 Lockwasher & S360-365 Insulating Sleeves
T	-	S330-294	Octal Plug - 8 Prong
		S401-174	11 Prong Plug
U	-	S330-293	Plug Cap
V	-	7527	Screw - Use R11599 Lockwasher
W	-	S311-228	Wire Nut
X	-	6832	Clip - Use on S330-736 when shipping movement
Y	-	2763	Screw - Use 9038 Lockwasher
Z	-	S515-137	Switch
AA	-	S330-356	Accumulator Motor - 115 volts-60 cycles
		S330-369	Accumulator Motor - 115 volts-50 cycles Use 330-350 Motor Pinion with 2992 Screw
AB	-	651	Screw

5330K305
UPPER CONTACT FINGER - 2.10
LOWER 1.65
50192
(57186)



A	-	S330X623	Hour Wheel
B	-	X1586	Minute Wheel
C	-	1615	Washer
D	-	S330-617	Dial Pillar
E	-	S330-196	Signal Duration Cam - 2 required
F	-	S330-734	Set Shaft - 2948 Retaining Ring - 855 Washer - S330-653 Spring
G	-	S300-151	Screw
H	-	S330X399	Intermediate Gear Bridge
J	-	R585	Regulator Washer - Use with 2 R584 Washers
K	-	R17758	Balance Jewel Screw - Front
L	-	R2396	Regulator
M	-	S330X379	Contact Finger Assembly - Standard
		S330X810	Contact Finger Assembly - ARC 6000 - Remote Control Panel
N	-	2234	Screw
P	-	S330-375	Fibre Pillar Insulator
Q	-	S330-373	Contact Bracket Insulator
R	-	1030	Screw - Use with 1031 Washer on S330X379
		S016-307	Screw - Use with 1031 Washer on S330X810
S	-	1029	Screw - Use with S330-371 Insulator Sleeve
T	-	~~S330X384~~	~~Contact Bracket Assembly~~ — OBSOLETE 11-71
U	-	S330-194	Two Second Impulse Cam
V	-	S330X387	12 Hour Wheel and Disc Assembly
W	-	S330X741	1 Hour & 5 Minute Disc Assembly - Electronic
		S330X742	1 Hour & 5 Minute Disc Assembly - Wired Synchronous
		S330X803	1 Hour & 5 Minute Disc Assembly - ARC 6000 - Remote Control Panel
X	-	S330X410	Front Plate Assembly
Y	-	S330-201	Contact Switch Insulator
Z	-	1029	Contact Switch Screw
AA	-	~~S330X220~~	~~Contact Switch - cut off top lever arm for 2 second contact only~~ OBSOLETE 11-71
X1020 SAME			
AB	-	1030	Screw - Use with 1031 Washer
AC	-	S330X620	Minute Hand Socket - Complete with 2992 Set Screw
AD	-	S330-267	Grommet
AE	-	7332	Shoulder Screw
AF	-	S330-158	Autoset Control Plate
AG	-	S330X204	Autoset Control Assembly



(TO BE CONTINUED)

MART

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WANTED: Unusual Electrical Clcoks, A. Marx, 105 Bayeau Rd.,New Rochelle,NY 10804

WANTED: "United Electrical" motor (push to start - Circa early 30s) or coil. Also interested in buying or trading electrical novelty/animated clocks. Warren Wissemann,521 S. Dyre Ave.,West Islip,NY 11795

The
JOURNAL
OF THE
ELECTRICAL HOROLOGY SOCIETY
Chapter No 78

October, 1982
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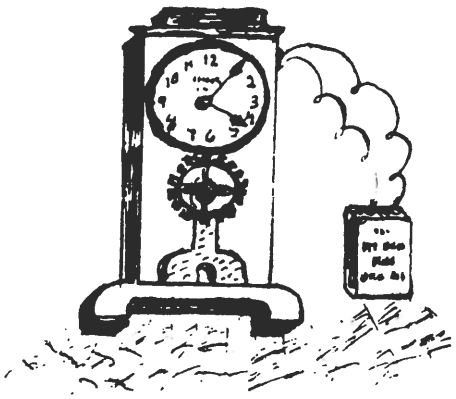
Martin C. Feldman, Editor



Hello fellow enthusiasts:

This month we complete the Stromberg Parts Manual for the Model No.50 Synchronous Master Clock. In addition we are also publishing the parts list for the Stromberg Drum Program Clock--Model No.6C. Both Manuals have been sent to us with our appreciation by fellow member and friend Joe Singer. While these clocks are both A.C. operated, nevertheless they are becoming harder to find and will shortly be collectible if not already! The battery electrics are quite scarce--at least the more exotic types--and even the more common and well-known examples are not being offered as frequently. When they are the prices are quite high. Clocks, by and of themselves have an intrinsic value which is two-fold; when their commercial value drops due to market conditions they can always be enjoyed for their own qualities. If the market is right and there is a need to sell then the price one receives for an electric clock gives it its second value!

Work is proceeding slowly on our By-laws. When they are ready for publication we shall do so and elections will also be held.

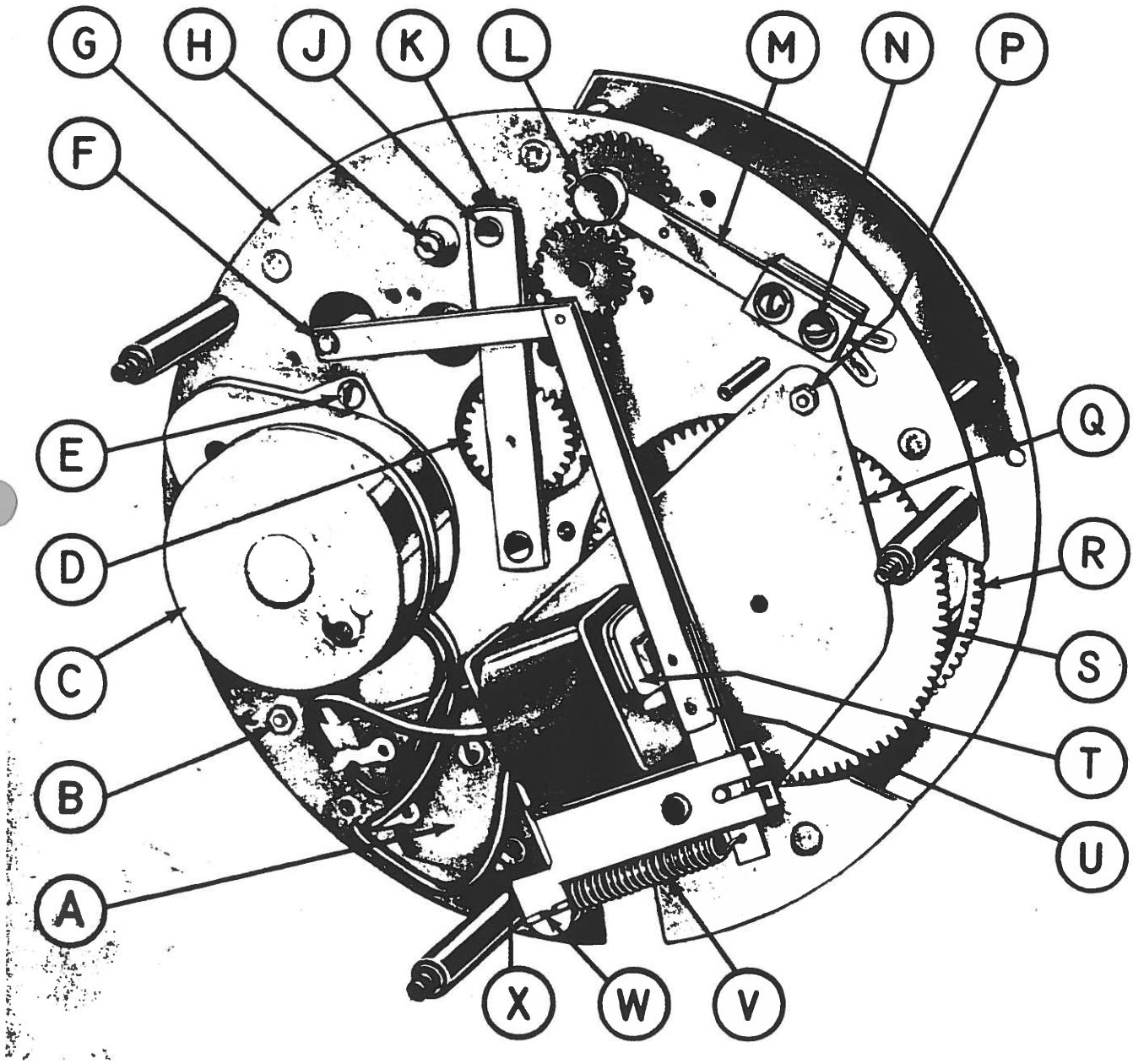
Enjoy this Issue!

Electromagnetically yours,

Marty Feldman

Martin C. Feldman, FNAWCC

A	-	S330X618	Center Shaft
B	-	S330X139	Intermediate Pinion Shaft
C	-	S330X189	Main Spring Box Assembly
D	-	S330-192	Second Winding Wheel
E	-	S330-128	Second Hand Pinion ✓
F	-	S330X343	First Pinion & Second Wheel
G	-	S330X127	Second Pinion & Third Wheel
H	-	S330-734	Set Shaft
J	-	S330-733	Setting Clutch
K	-	S330X850	Third Pinion & Fourth Wheel
L	-	S330X129	Clutch & Cam Shaft Assembly - Includes 1020
M	-	S330X144	Third Shaft Assembly - Motor
N	-	R13264	Escape Pinion & Wheel
P	-	1020	Minute Cam
Q	-	S330X~~160~~ 899	Second Shaft Assembly - Motor - SEE NEW IN FRONT with Bushing #12426 — $2.75
R	-	S330X164	Motor Drive Shaft
S	-	S330X169	Rocker Arm Assembly
T	-	S330-174	Pawl Spring
U	-	S330-107	Holding Pawl Spring
V	-	S330-108	Holding Pawl Screw Stud
W	-	S330X104	Holding Pawl
X	-	S330-195	Wind Spring
Y	-	S330X118	Ratchet Wheel & Pinion
Z	-	S330X121	First Winding Wheel & Pinion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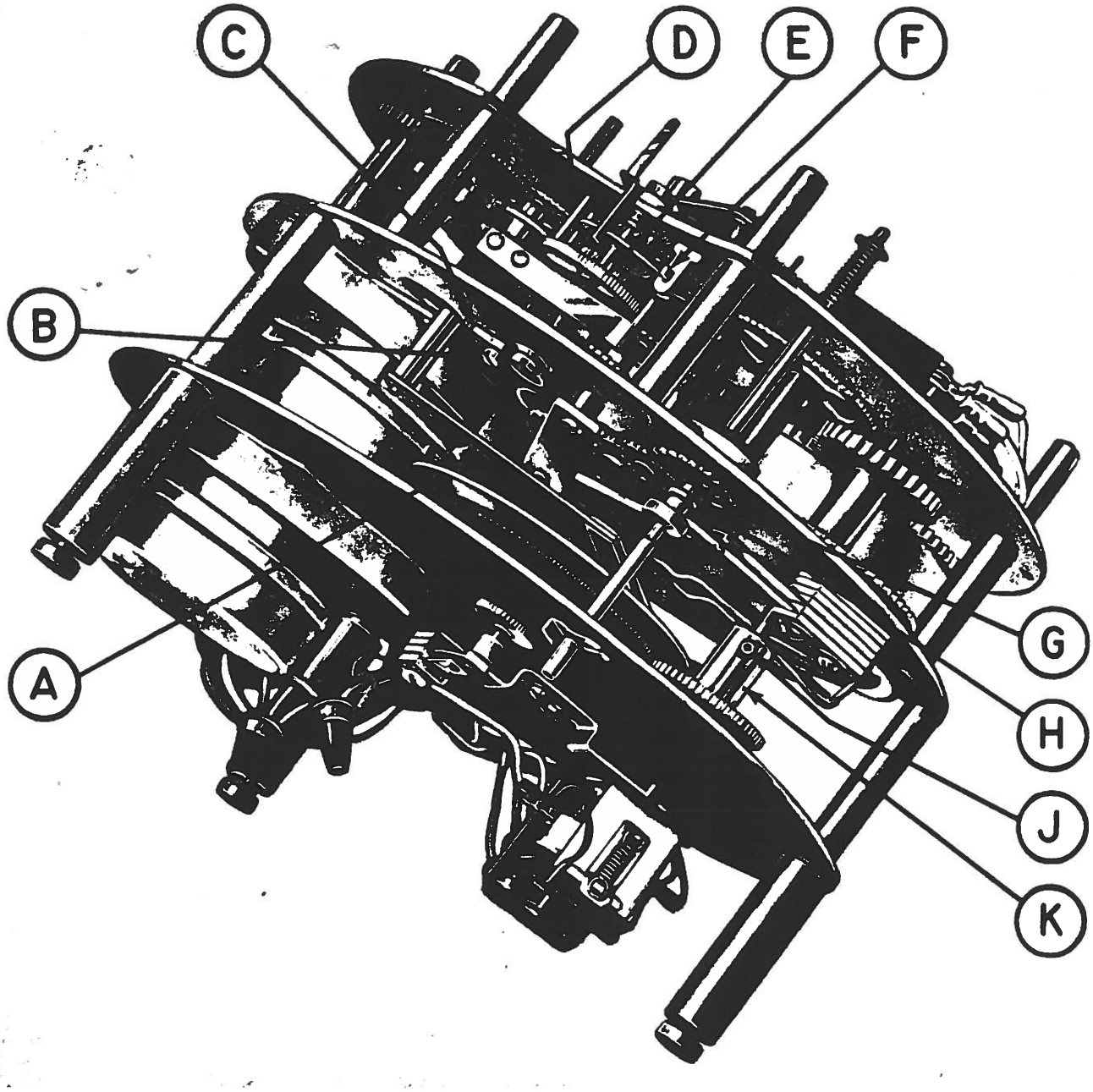
A -	S330X615	Terminal Plate Assembly
B -	R17543	Nut - Use with S330-108 Holding Pawl Screw Stud
C -	S330X273	Motor - 115 volts - 60 cycles
	S330X274	Motor - 115 volts - 50 cycles
D -	S330X139	Intermediate Pinion Shaft
E -	2905	Motor Mounting Screw
F -	R78080	Retaining Ring
G -	S330X731	Intermediate Plate Assembly
H -	R17797	Balance Jewel Screw - Back - Use with 2 R584 Washers
J -	S330-151	Screw
K -	S330-188	Bridge
L -	S330-735	Handset Nut
M -	S330-643	Switch
N -	2985	Screw
P -	R17543	Nut - Use with S330-281 Bridge Screw
Q -	S330-193	Spring Box Bridge
R -	S330X189	Main Spring Box Assembly
S -	S330-192	Second Winding Wheel
T -	S330X233	Magnet Assembly - Complete - Includes S330X234, S330X348 and 5087
	S330X234	Magnet Coil & Frame - S330X239 Magnet Coil only
U -	S330X348	Magnet Armature
V -	5087	Spring
W -	R78087	Cotter Pin
X -	S301-118	Screw - Use S330-249 Magnet Spacers



A -	S330X336	Disc & Chaser Assembly - Use S330-342 Mounting Stud
	S330-341	Chaser - Use S330-340 Pin with 2 R78080 Retainer Rings
B -	R41	Screw
C -	R1322	Verge Bridge
D -	R16049	Verge Shaft
E -	S330X324	Balance Assembly
F -	L703-164	Hair Spring Pin
G -	S330-639	Hand Set Shaft Sleeve
H -	S330-198	Hand Set Washer
J -	2992	Set Screw
K -	S330X329	Accumulator Pinion - includes 2992

Replacement Parts For Free Running Synchronous Program Clock

56	Movement Mounting Screw
3061	Anchor Post Screw
4969	Cable Clamp Washer
S016-307	Cable Clamp Screw
S330X600	Bezel & Glass Assembly
S330-659	Lock Nut - Minute Hand
S330X701	Hour Hand
S330X703	Minute Hand
S330-705	Dial
S330-706	Dial Back
S330-707	Adapter Plate
S330-708	Anchor Post
S330X710	Movement Assembly - 120 volts - 60 cycles
S330X711	Movement Assembly - 240 volts - 50 cycles
S331-149	Cable Clamp

The ZENITH WATCH FACTORY builds two types of electric clocks:

the clocks without power-reserve, and
the clocks with power-reserve.

The clocks without power-reserve can be installed wherever a distributing network exists which rarely produces an interruption of current.

It appears from Fig. 3 that these clocks have an extremely simple movement, thus they are cheap and require no maintenance. The pendulum is impulsed directly by the spring arm of the movement.

The clocks with power-reserve can be installed everywhere, but with special advantage, where the interruptions of current are very frequent. The movement of this clock is similar to the movements of customary clocks and the size of the power-reserve spring provided is such as to make sure the clock runs for 50 hours. In this case, the pendulum isn't impulsed directly by the switch, but entirely by the wound spring which drives a very well compensated precision escapement. The pendulum always starts automatically, whether this is after the interruption or the return of the current.

The compensation for the variations in the ambient temperature of the thermic wire takes place by means of the brass protection tube 6.

For the compensation of the pendulum, the rod 34 is of invar, the well known alloy of nickel-steel, whose coefficent of expansion is so to speak null. At the bottom is to be found a nut 37 for the regulation of the pendulum bob.

In order to regulate the clock to within a fraction of a second per day, avail yourself of the small slider situated over the pendulum bob. Its displacement by about one millimeter corresponds to a difference of one second per day.

One has to give a triangular shape to the steel plate upon which the dial is fixed. This triangle supports the movement of the clock (Figs. 3 and 4). The whole is fixed, with the aid of the 3 pillars, into the holes 33 of the base plate 32. A special arrangement to prevent the movement from falling.

The ingenious separation of the front part from the rear part of the clock therefore permits their immediate examination at any instant, and that without the aid of any tools.

The motion of the current is shown in Fig. 2 and is easily made clear.

The hand assembly, when one forgets so easily and which unfavorably affects the running doesn't exist for the "CALORA" clock. The driving force is always uniform, assuring for the clock not only a precise rate but also excellent timing. Therefore it is equal to the most difficult demands.

The main difficulty in the creation of an electric clock thus far consisted in the construction of a contact apparatus which functions in a durable and certain manner. But, the ZENITH individual electric clock establishes without any doubt, today, the ideal for a time machine. It runs without sparks, and protects its precise rate from the variation in voltage normally experienced. Its construction is so simple that it is within the comprehension of any clockmaker.

We reproduce hereafter several views of the clock with a succinct description for these latter.

The transformer fastened to the clock (see Fig. 2, No. 24), transforms to about 3.0 volts the voltage of the alternating current for the electric lights. A current of about 0.25 amperes is sufficient to heat the thermic wire. The ZENITH FACTORY attaches a very particular importance to the construction of a faultless transformer. The latter is guaranteed against short circuits and has separate primary and secondary windings. The windings between them and the laminated core to ground undergo a 1000 volt test.

The consumption of current is so minimal, that it scarcely enters into consideration.

The arrangement of the contacts (Fig. 2) is such that the contacts are closed when the pendulum is found in the position of a plumb line.

The purpose of this arrangement is on the one hand, to prevent the formation of sparks, at the moment of the interuption of the current from the thermic wire, and, on the other hand, to create a second circuit with which a resistance No. 28 is switched in place of the individual clock. You can substitute, for this resistance, the thermic wire of a secondary clock. This scheme doesn't waste any current. In addition to which the cost of the secondary clock is cheaper, since it doesn't require contacts. The connection of the two clocks can be accomplished with the aid of two fine wires conducting a current which doesn't exceed about 4 volts.

One can obviously increase the number of secondary clocks: however, it is necessary in such a case to install a separate transformer with which the voltage and power will be proportionately raised.

The dimensions of the normal cabinet of the wall-clock are the following:

Height 48 cm. depth 8 cm. width 27 cm.

Without the power-reserve, the wall-clock weighs 4.5 kg. and the round clock only about 2.3 kg.

The weight of the clocks is increased for the power-reserve by about one kg.

In order that it shows the time with ZENITH precision, before its shipment, every clock is hung for a sufficiently long time to be observed and regulated.

Every clock shipped is accompanied by instructions for its setting up and maintenance.

With the order, it is well always to indicate precisely the kind of current, the voltage in volts and the number of cycles in the alternating current distribution network.

The "CALORA" movements can also be ordered with a special cabinet, or with a richly ornamented cabinet.

The various parts of the clock are standardized and consequently interchangeable.

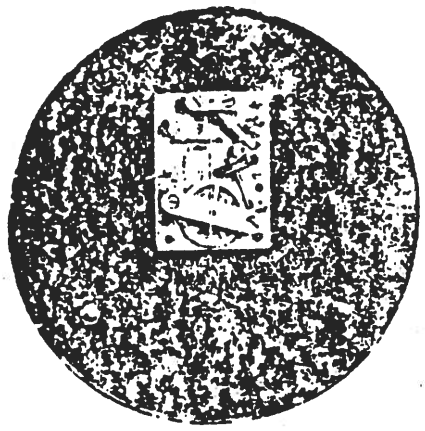


Fig. 3 Movement without power-reserve.

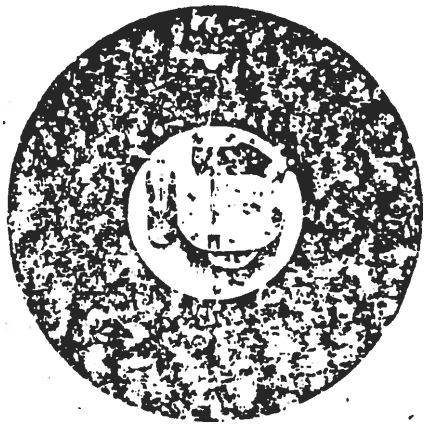


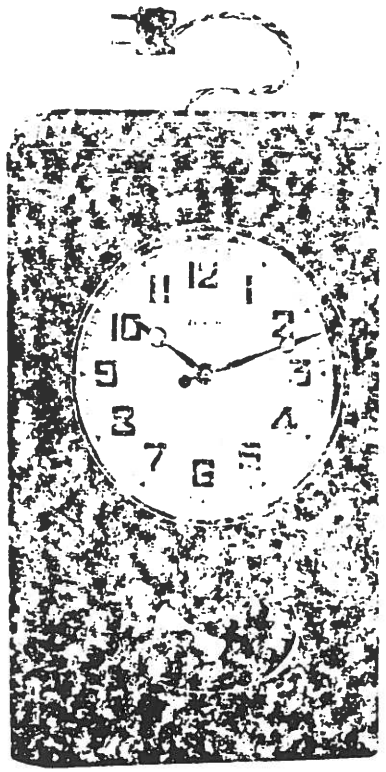
Fig. 4 Movement with power-reserve

MOVEMENT fixed to the base plate of the dial.

L'Horloge Electrique

ZENITH

„CALORA"



Horloge individuelle pour
embranchement sur réseau de Lumière.

FABRIQUES DES MONTRES ZENITH

LE LOCLE SUISSE

L'Horloge Electrique

ZENITH

„CALORA"

Jusqu'à ce jour, le public ne connaissait pour ainsi dire que les horloges électriques alimentées par un système central. Or, ce système exige une installation et des soins particuliers. Son entretien coûteux ne convient pas aux usages domestiques.

Les horloges individuelles usitées jusqu'ici présentent des inconvénients. Sont-elles alimentées par des éléments ou par des batteries d'accumulateurs, il faut alors remplacer les premiers après quelques mois déjà, tandis que les dernières doivent être chargées périodiquement, ce qui est peu pratique et coûteux.

Toutes ces horloges ont été plus ou moins abandonnées en raison de leur mécanisme compliqué, qui présente des bobines, des moteurs et des aimants. Tant et si bien que l'horloger qui ne possède pas des notions exactes et étendues d'électrotechnique se heurte à des difficultés de toutes sortes lors de l'installation et du rhabillage de pareilles horloges.

Or, les FABRIQUES DES MONTRES ZENITH viennent de lancer sur le marché une horloge électrique absolument nouvelle et brevetée dans tous les pays. Cette horloge ne présente aucun des inconvénients signalés, ce qui la rend supérieure à tous les systèmes d'horloges électriques connus jusqu'à ce jour.

La nouvelle invention consiste en un fil thermique ouvrant et fermant périodiquement l'organe régulateur de l'horloge, suivant que le courant passe ou est interrompu. L'allongement et l'accourcissement du fil thermique sont employés pour imprimer au pendule les impulsions mécaniques.

L'horloge ZENITH se fabrique comme horloge-applique de salon avec cabinet en bois, ou comme horloge ronde. Elle est destinée spécialement à l'appartement particulier, cependant elle trouve son emploi dans les bureaux, magasins, écoles ou dans n'importe quel établissement.

L'horloge électrique ZENITH est vendue à un prix modique. Sa construction est si simple, elle possède un degré de précision et de sécurité de marche si élevé, qu'elle se distingue fort avantageusement des horloges-applique ordinaires.

L'horloge „CALORA" est surtout destinée à être branchée sur un **réseau distributeur de lumière électrique à courant alternatif**. Sur demande, nous la fournissons avec cordon et fiche. Le branchement sur réseau distributeur de lumière électrique à courant continu est également possible. Dans ce cas le transformateur de l'horloge est remplacé par une résistance qui absorbe l'excès de tension. On peut encore alimenter l'horloge par le moyen d'une batterie d'accumulateurs composée de deux éléments. Toutefois aucune installation n'est aussi bon marché que celle qui comporte un courant alternatif transformé.

Le remontage à la main, que l'on oublie si facilement et qui influence défavorablement la marche n'existe pas pour l'horloge „CALORA". La force motrice toujours égale assure à l'horloge non seulement une marche exacte mais encore un réglage excellent. Aussi suffit-elle aux exigences les plus difficiles.

La grande difficulté que les horloges électriques suscitent jusqu'ici consistait dans la construction d'un dispositif de contact fonctionnant d'une manière durable et sûre. Or, l'horloge électrique individuelle ZENITH constitue sans nul doute, aujourd'hui, l'idéal d'un appareil horaire. Elle marche **sans étincelles** et garde sa précision de marche même si des variations de tension se produisent dans la pratique. Sa construction est si simple qu'elle n'échappe à la compréhension d'aucun horloger.

Nous reproduisons ci-après quelques vues de l'horloge avec une description succincte de cette dernière.

Un transformateur fixé dans l'horloge (voir fig. 2 n° 24), transformateur à 30 volts environ la tension du courant alternatif de la

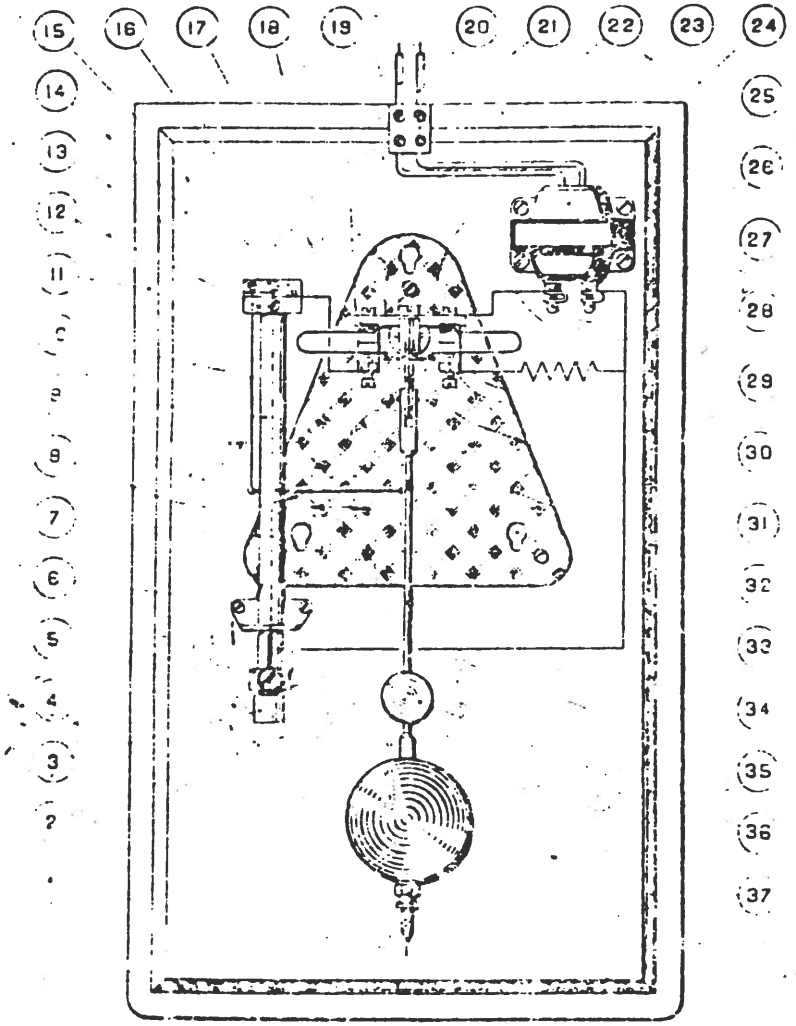


Fig. 2

Partie postérieure de l'horloge-applique
Cadran avec mouvement enlevé

To be continued

INDEX: Of the JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY
(December 1979 through December 1981), VOLUMES V-VII
Compiled by: Martin C. Feldman,FNAWCC

Seth-Thomas Electric Clock--Model 86AF (Partial patent & Descriptive material)	JEHS Vol VII #1	Feb.1981
Standard Electric Time Systems (Master & Slave Clock Descriptions)	JEHS Vol VII #2	April 1980
Stromberg Autoset System--Instructions for installing and operating--Part I	JEHS Vol VII #4	Aug.1981
Stromberg Autoset System--Instructions for installing and operating--Part II	JEHS Vol VII #5	Oct.1981
Stromberg Time Corporation-Unispeed Recorder (Directions for the installation & setting of)	JEHS Vol VII #5	Oct.1981
Synchronome Master Clock by Charles Aked (reprinted from JEHS July 1973)	JEHS Vol VI #2	April 1980
Telefonbau & Normalzeit of Berlin and Frankfort Q & A by George Feinstein (The Electric Time Machine)	JEHS Vol VII #3	June 1981
A History of the Time Service of the Western Union Telegraph Co. SWCC, 1934	JEHS Vol VII #6	Dec. 1981
Western Union Time & Messenger Service by Joseph J. Singer	JEHS Vol VII #1	Feb. 1981

SPECIAL ANNOUNCEMENT

ELECTRICAL HOROLOGY EXHIBIT

The theme for the exhibit at the upcoming New York Regional in March is ELECTRICAL HOROLOGY, offering the EHS an excellent opportunity to publicize our Chapter and the special interests of its members.

All members planning attendance at this regional are requested to bring electrical clocks for display in the "Mini Electrical Museum"; provisions will be made for the display of wall clocks as well as shelf models. Uncased movements of special interest are also encouraged for entry in the display. Each item will be described with a brief technical and historical description on pre-typed cards, so advance commitments are essential! Full insurance coverage will be provided to exhibitors, but we must provide the insurers with advance estimates of the coverage required, which is another reason that we must have advance information from exhibitors. Roung-the-clock security will be provided as well, so concern for loss or theft should be minimal.

It is expected that the exhibit entries will be photographed and ultimately become the basis for a monograph to be published by the EHS, thereby increasing the exposure and stature of the society and increasing the value of the clocks illustrated therein. Exhibitors will be acknowledged or kept anonymous with respect for their individual preferences. Everyone offering a clock for display will be given a Certificate acknowledging the entry in the regional exhibit as a token of appreciation by the committee.

Let's all get behind this, our first opportunity to put our special interests up with the rest of the "true collectables", and prove to the membership that Electro-Mechanicals merit their own niche in the clock collecting fraternity.

TIME & PLACE: March 19, 20, 21, 1982 at Colonie Hill in Hauppauge, L.I.
EXHIBIT CHAIRMAN: Martin Swetsky, 1910 Coney Island Ave., Brooklyn, NY 11230
Phone, days: 375-2700; Eves. 646-7489
DEADLINE FOR ENTRY COMMITMENTS: February 20, 1982

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MART

FOR SALE: JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY--1975-1980--ORIGINAL COPIES
50¢ a copy-minimum $4.00. Inquiries, SASE or send money payable to EHS
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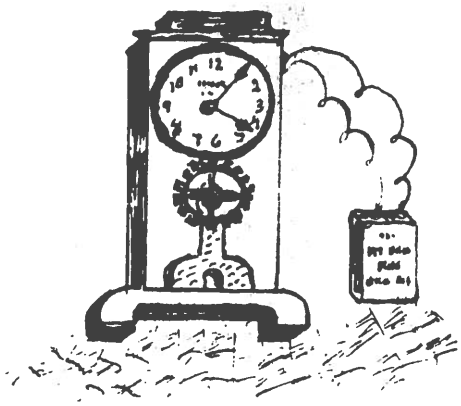
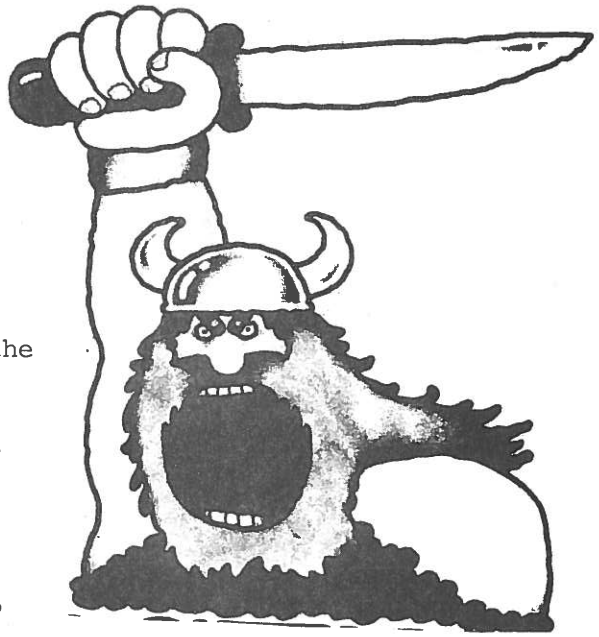
The JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY

Chapter No 78

December, 1982
VOLUME VIII--ISSUE #6
Martin C. Feldman, Editor





Hello fellow enthusiasts:

This Journal marks the last issue for Vol.VIII and for 1982. With the February 1983 issue we shall begin Vol.1X.

As our Norse friend illustrated on the right seems to be saying--yes, let's get those checkbooks out and pay our 1983 dues. We have been able to keep the costs down and thus the dues remain at $10 for at least another year. Most of you know that it is very difficult for our Secretary Treasurer Charles Roth to send out reminders--so please, while you are reading this page, write out your check and mail it to C.Roth, 2 Circle Lane,Roslyn,NY 11577. You will thus guarantee another year's membership and our sword-wielding friend is guaranteed not to turn up on your doorstep during the coming months.

This month through the good offices of Mr. J. E. Bosschieter and by permission of another old friend and member, O. R. Hagans, we bring you two articles which had appeared in the U.A.A.A. Technical Bulletin; the first describing the ATO clock and the second describing an experimental clock. Mr. Bosschieter also, in his quest for a Barr clock escape wheel, drew the diagram which we are enclosing of the escape wheel which should be of interest to those who may wish to construct this unique wheel. From the NAWCC Museum and Library, Stacy Wood sends us an interesting early electric which I have not seen before and if anyone has I would appreciate hearing about it. To conclude this Journal we begin the first part of a 14-page reprint of the MAGNETA Clock Manual which will be continued in future issues of the Journal.

Thus we round out our year with a fine Journal edition comprised of diverse electrical horological articles. With best wishes from the Officers and myself for a very Happy and Healthy Holiday Season as well as a Peaceful New Year, I remain

Electromagnetically yours,

Martin C. Feldman,FNAWCC

U. H. A. A.

Technical Bulletin

-2-

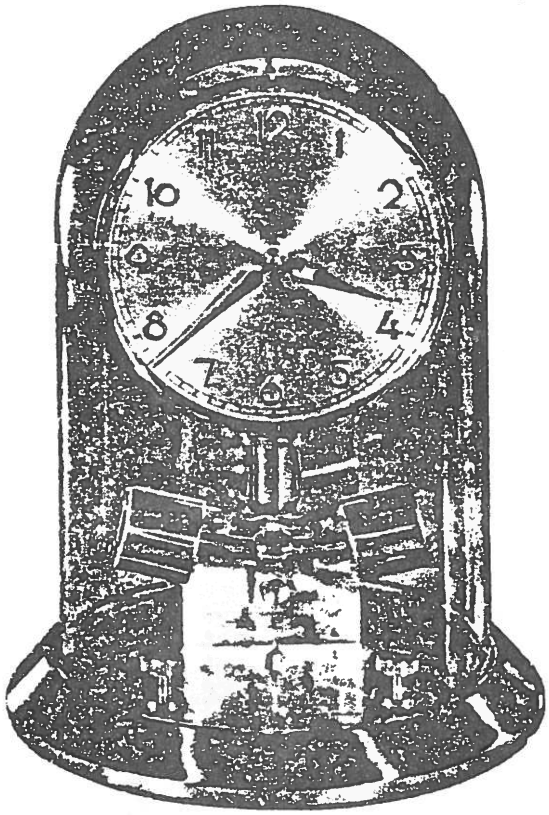
ORVILLE R. HAGANS
EXECUTIVE SECRETARY

1901 E. COLFAX AVENUE
DENVER 6, COLORADO

An Association service designed to advance the technical knowledge and skill of the Horological Craftsman

EXCLUSIVE TO MEMBERS OF THE UNITED HOROLOGICAL ASSOCIATION OF AMERICA

Vol. VIII No. 1 | Bulletin 75 | January 1, 1954



The Ato thousand-day battery operated electric clock by Junghans, has glass dome case which reveals the movement. Dial is silvered and has raised gilt numerals, pierced hands

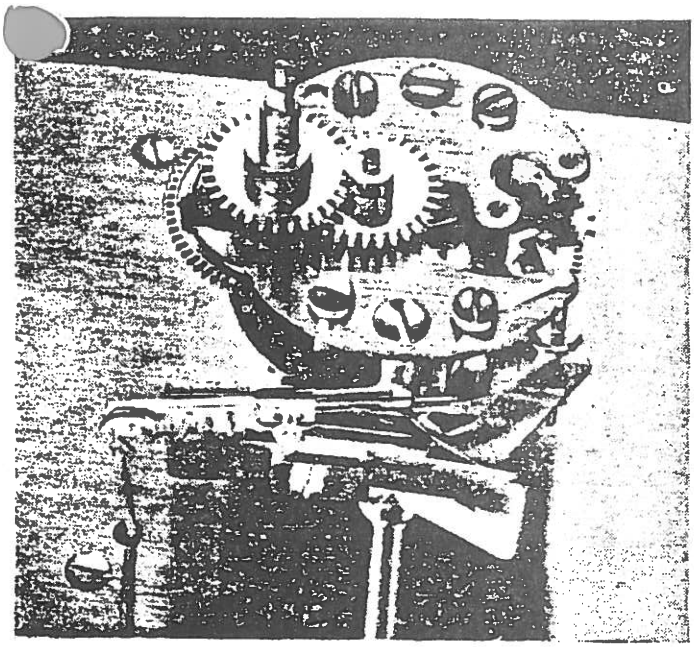
THOUSAND-DAY CLOCK

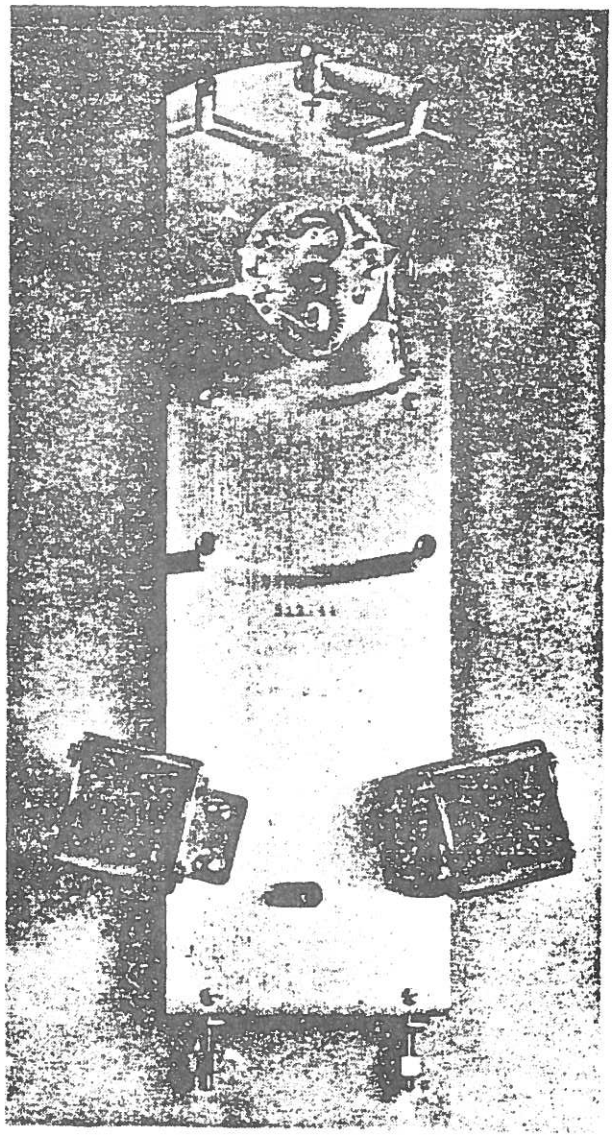
INDEPENDENT OPINION BY R. W. PIPE, F.B.H.I.

A new battery operated electric clock made by Junghans has now appeared on the market, and is a great improvement on other similar types of battery clock. It is electrically driven, that is to say, the current from the battery causes the pendulum to swing, and the pendulum drives the clock. This is just the opposite of the spring driven clock, in which the mechanism drives the pendulum.

The Ato pendulum consists of a rod with a hollow brass boss on it through which is fixed a round rod permanent magnet, slightly curved, made of high grade cobalt steel. When the pendulum is swinging, the end of this rod dives into a soleniod attached to the back plate on the left, below the figure 8 on the dial. The mechanism above causes a contact to be made so that current from the battery energises the coil comprising the solenoid just as the rod is entering, and gives the pendulum a short, sharp pull. This provides the impulse which keeps the pendulum swinging. On the other side of the back plate is a similar cylindrical coil but without a wire connecting it to the battery. This is added chiefly to make the pendulum drive look symmetrical, but the rod magnet by swinging into this dummy coil produces whirl currents, usually called Foucault currents, which have a compensating effect on the pendulum. This improves the steadiness of the going of the clock when small variations in the driving power occur.

Near the top of the pendulum rod is attached a trailing pawl which pushes the last wheel of the train, known as the switchwheel, round one tooth at each swing of the pendulum to the left. A polished steel roller attached to an arm pivoted between the plates holds the escape wheel still while the pendulum moves to the right. The other end of the pivoted arm carries a platinum pin. When the steel roller





Above: movement showing switchwheel with ratchet-like teeth which are pushed round by pawl. Gold-tipped spring contacts are seen to right with wire below going through the plate to battery. Right: back plate with small movement and pendulum suspension spring at top. The four pillars hold dial plate. Note coils—left hand one is activated by negative wire from battery. Right hand one is dummy

is depressed by the switchwheel tooth turning, the lever turns sufficiently to cause the platinum pin to make a short contact with a gold spring to which is attached the positive battery lead. This closes the electrical circuit and energises the solenoid. The pendulum gets its pull as the magnet rod is entering the solenoid and immediately afterwards the circuit is broken by the roller, which drops behind the switchwheel tooth, causing the pivoted arm to move back and the platinum pin to disengage from the spring contact. The pendulum then swings free to the right. This ingenious arrangement ensures that only one tooth of the switchwheel can be pushed round at each swing of the pendulum, irrespective of the amplitude of the swing. The pendulum also gets its impulse just when it has to push the train of wheels round.

To ensure the pendulum working perfectly, it is essential that the clock stands level. This is arranged by the clock standing on three feet. The rear foot is fixed, but the two front ones are screws which can be easily adjusted. A small pointer is set in the centre of the base, and the pointed end of the pendulum is lined up over this. The solenoids, too, can be adjusted slightly so that the curved magnetic rod runs in the centre. The cylindrical mass of the pendulum is above the magnetic bar and is threaded on the pendulum rod. The top of the mass is milled to enable it to be turned in either direction to effect regulation. A hole is drilled through the pendulum rod just below the magnetic bar, and through this can be fitted a locking screw to hold the pendulum still while the clock is being transported.

The battery, 1½in. square and 4 in. high, is housed behind the back plate. It is covered by a brass box secured by a screw at the bottom and one on each side. The green covered

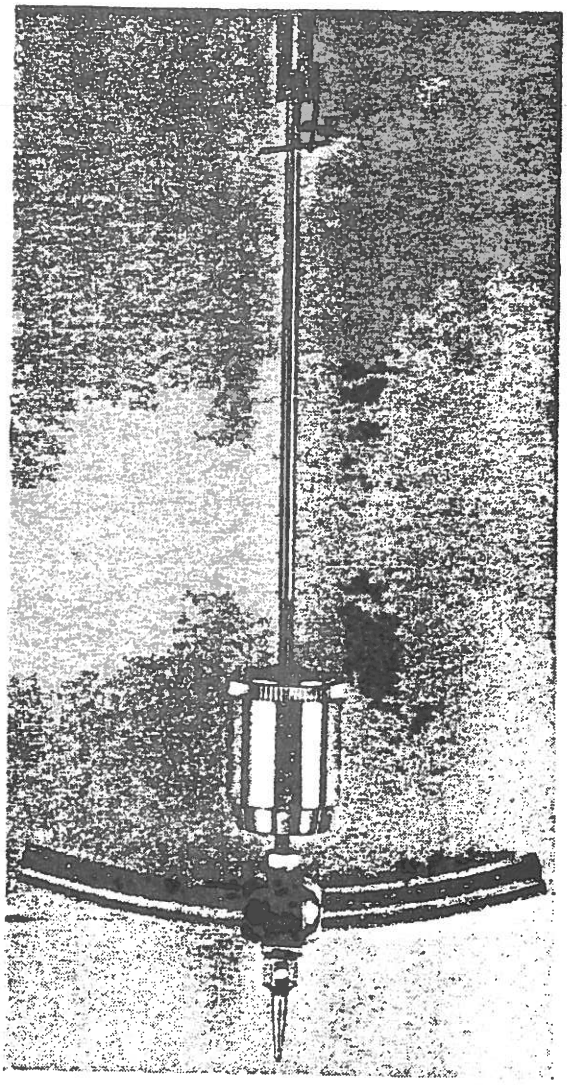
negative wire from the battery to the solenoid comes through a slot in the side of the box, and care must be taken when removing the box to ease this wire clear of the slot. The red positive wire, which is detached from the battery when the clock is packed, goes through the back plate to the gold contact spring. When the clock is to be set going, it is only necessary to take out the pendulum locking screw and attach the red wire to the centre terminal of the battery. The locking screw can be stored in a hole provided at the base of the battery case.

The makers strongly recommend that only the Ato battery be used to drive the clock. Although it has the standard 1.5 volt output, it is designed with a specially high storage capacity and small current consumption. It is most important that the battery should not be accidentally short circuited. Also, if the clock is not in use, the positive wire should be disconnected from the battery in case the switchwheel has stopped with the circuit closed. The actual rate of current consumption when the clock is going is so small that the battery's life is equal to its shelf life. Since all dry batteries last longer if stored in a cool dry place, it follows that it will last longer if the clock is not set up in a damp place or over a fire.

Just a few hints to the clock adjuster concerning oiling. Ato clocks are sent out oiled ready for use. When the time comes for the movement to be cleaned, oil the pivot holes of the train with watch oil. A light oil such as this is all that is required, as there is no motive power pressure on these pivots. On no account get any oil on the switchwheel teeth, and do not overoil these pivots, or the oil may creep along and finally reach the teeth. Do not oil the contacts, the steel roller or the pawl.

Servicing the movement presents no problems. The train of wheels, three of them driven by the switchwheel, terminate with the standard pattern motion work. The pendulum suspension spring is a two-blade steel one. If this should be damaged at all, or one blade cracked, it will produce a wobble in the pendulum swing, or a slight turning movement. This is fatal to efficient timekeeping, and a new suspension spring should be fitted.

The clock can be adjusted to keep very good time, and once set will retain its rate. The motive power is constant and, for the pendulum rod, an alloy with a small co-efficient of expansion is used. In the model described the



The pendulum. The trailing pawl is at the top, with the threaded mass below on the rod, and the curved permanent magnet just below that. The hole is for a set screw when the clock is being moved

pendulum beats ½ seconds, and when adjusting the timekeeping it will be found that one revolution of the pendulum mass will alter the rate 70 seconds in 24 hours. Turning the mass one partition line will equal 7 seconds in 24 hours.

The actual movement is small and very nicely made. The whole clock is well finished, and the raised chapter dial most attractive. Being entirely self-contained and having no connection to electric mains, it suffers none of the faults due to erratic power distribution.

U. H. A. A.

Technical Bulletin

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Vol. XI, No. 5 | Bulletin 115 | June 1, 1957

IN SEARCH OF A FRICTION FREE PENDULUM

ELECTRICAL TIMEKEEPING DEVELOPMENTS DESCRIBED BY S. J. WISE, F.B.H.I.

In previous articles, I have considered methods of pendulum regeneration, and for many years various ingenious ideas have been devised to eliminate mechanical friction when operating contact devices, thus freeing the pendulum from objectionable harnessing.

One outstanding method employs a system of self-induction brought about by a short permanent magnet carried by the pendulum and arranged to thread a pivoted copper ring at each power stroke performed. By this means, sufficient regenerated e.m.f. is created to deflect the ring, by which function a pair of contacts are closed on the power stroke and opened on the free stroke.

Now first let me explain more thoroughly the principle involved in this device, which is generally referred to as an "eddy current ring." According to the accepted law of induced currents, whenever there occurs a change in magnitude of magnetic flux linkage with an electrical circuit, energy expended in changing the flux linkage is partially converted into electrical energy, or electro-motive force. This e.m.f. may be induced by movements of a permanent magnet, an electro-magnet, or adjacent current carrying conductor.

A simple example is shown in figure 1. A coil of wire A, is connected to a sensitive galvanometer B. When the magnet C is stationary, no e.m.f. is induced and, therefore, no indication is shown on the meter. On dropping the magnet into the coil, a magnetic flux progressively links with each turn of the winding, thus, during the time when flux linkage is changing, induced e.m.f., brings about a flow of current with a resultant deflection on the galvanometer. When, however, the magnet comes to rest after threading the coil, induced e.m.f. falls to zero. On withdrawing the magnet, a reversed change of linkage occurs, which again produces a momentary e.m.f., but in an opposite direction, thus deflecting the galvanometer in a counter direction.

A copper ring, or preferably one composed of a light alloy, possesses similar inductive properties to that of a wire-wound coil and it is, which is much more important, of considerably less weight. Now, if such a ring is fitted with an extended arm, as shown in figure 2, and the complete assembly is capable of free oscillation, by being mounted on light pivots, when the magnet enters the ring, energy is expended in building up an induced e.m.f., but since the ring is free to oscillate in a plane parallel to movements of the magnet, it is dragged behind an intense magnetic field presented by the latter while performing its work of induction; neutral polarity is, however, reached when the magnet reaches a mid-pole position, i.e., when the ring is exactly disposed between N. and S. poles. When, however, withdrawal of the magnet takes place, deflection of the ring is in an opposite direction, which is continued until the magnet leaves the ring.

It is now only necessary to utilise these oscillations to close a pair of contacts on the power stroke, and open them on a free stroke, so that we have an arrangement whereby an all-important switching function is operated through an air gap and, there-

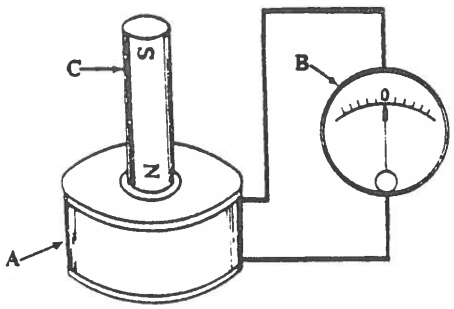


Figure 1: methods of generating e.m.f. by means of a permanent magnet and coil wire A is joined to a sensitive galvanometer B. C is the magnet

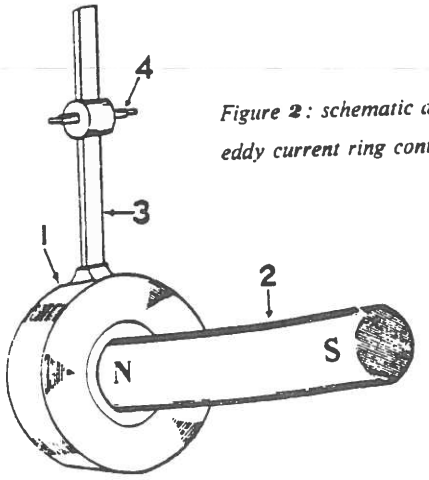


Figure 2: schematic diagram of eddy current ring contactor

fore, translates no mechanical harnessing whatever upon the pendulum.

Figure 2 shows the lay-out of this system. An alloy conductive ring is shown at 1; 2 is a curved permanent magnet of high flux density; 3 is an extended arm, rigidly attached to 1; 4 is a short pivoted staff upon which the ring assembly is free to operate. Fitted to the upper arm extension is one of a pair of mating contacts, which are not shown in the diagram, and will be described later.

Figure 3 shows a clear picture of an electrically propelled pendulum containing Foucault or eddy current switching. Here, a pendulum A derives its working forces from a wound solenoid B, reacting with a curved permanent magnet C on a power stroke only. A second, but smaller, permanent magnet D, carried by the pendulum, threads the core of Foucault ring E on each power stroke. An arm F, rigidly fixed to ring E, is pivoted at G, thus allowing a free oscillating movement of the assembly with a minimum of friction. A pair of contacts HI and HII, one of which is carried by the ring arm, are arranged to close an electrical circuit on, or just before, a power stroke takes place, and remain closed throughout a complete impulsing function.

Assuming that a left-hand arc is performed, magnet D in threading Foucault ring E at high velocity, closes the contacts HI and HII. At an identical instant of time, impulsing solenoid B is in a favourable position to react with permanent magnet C. By this means, an impulse is imparted to the pendulum in a gentle "sweeping" manner, free from sudden acceleration or shock.

The pendulum now reverses its motion to perform its free stroke, during which an e.m.f. of opposite sign is induced within the ring, which then, of course, becomes deflected to the right, thus bringing about a separation of the contacts HI and HII, and consequent interruption of the electrical circuit a fraction of time before solenoid B reaches a reversed polarity of magnet C, after which the above sequence is repeated ad longum.

It is interesting to note that movements of the contact assembly are small, being limited to that required to ensure safe separation of contact surfaces only; a stop shown on the drawing limits travel to the necessary requirements. Actually, movements of the magnet in threading the ring are many times greater than that required for separation of the contacts. This extra travel, during which the ring is stationary, is utilised in balancing the pendulum by induced regeneration.

By no stretch of imagination can the above idea be classed as a free pendulum, but it does definitely bring to light one method of eliminating mechanical friction, in so far as definite contacting is concerned. The advantage of such an arrangement can be summed up in the words of my old friend, the late Mr. Frank Hope Jones, who said of pendulum interference: "Interference with a pendulum is inevitable when it is expected to perform its own contacting; it is, therefore, far better to make this interference consistent and uniform, than to apply an erratic and unreliable contact in a futile attempt to further free the pendulum."

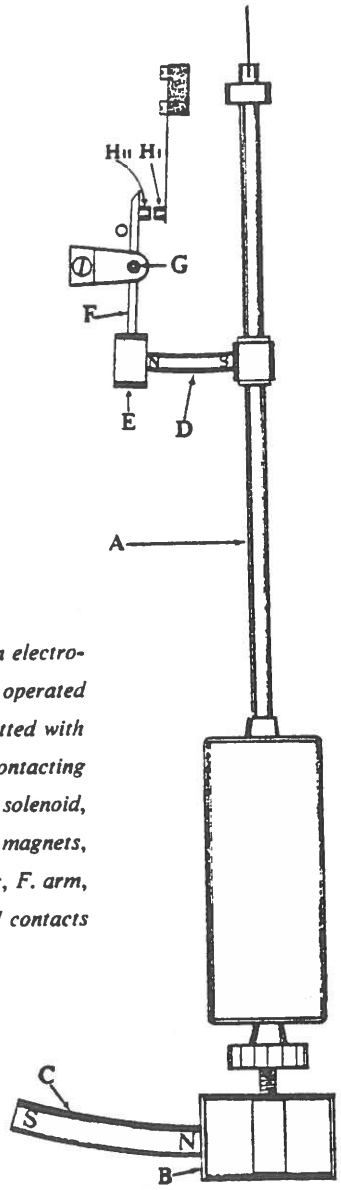


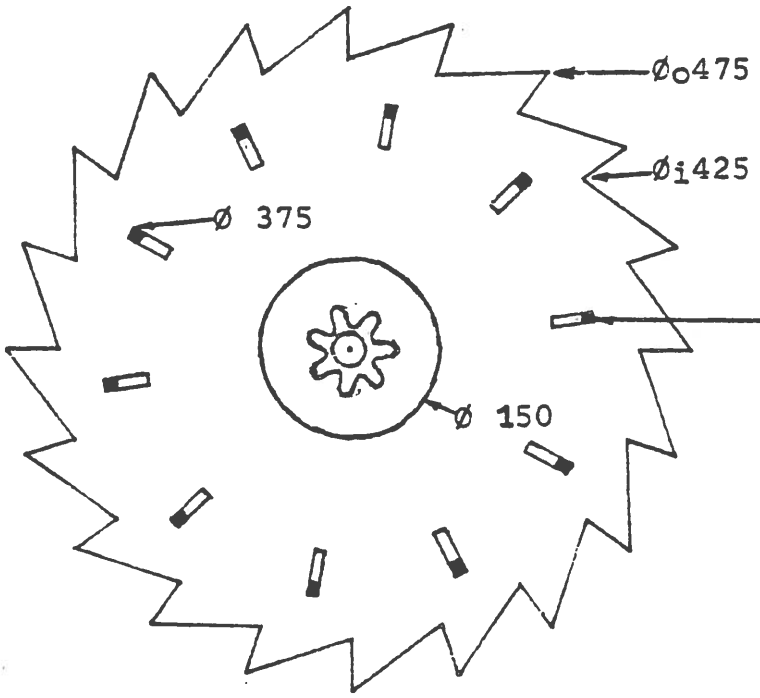
Figure 3: an electromagnetically operated pendulum fitted with Foucault ring contacting A. pendulum, B. solenoid, C. & D. permanent magnets, E. Foucault ring, F. arm, G. pivot, HI & HII contacts

This article reprinted from ... WATCHMAKER, JEWELLER & SILVERSMITH FEBRUARY. 1957
London England

Pin-wheel:

BARR MFG. CORP. WEEDSPORT, N.Y., U.S.A.

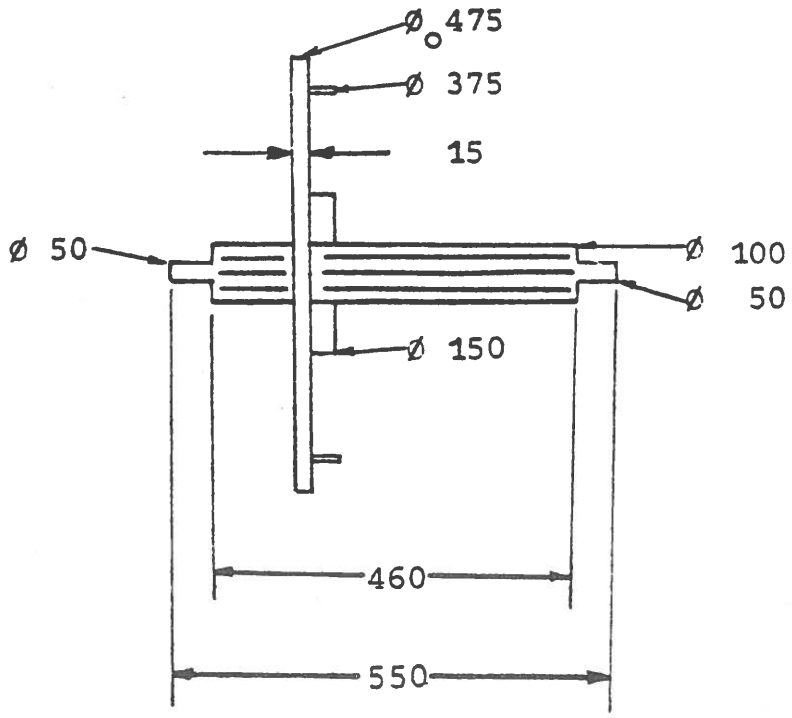
(no serialnumber, no patentnumber)



stamped-out pins:
Ø 15 x 15
length 60

Approximate dimensions:
inch x 0.001

Not drawn to scale



Drawn by: J.E.Bosschieter

April, 1884

Electric Clock.

[Patented in Germany by A. EGTS, Burhave.]

HAVING BEEN solicited by various parties to give a description, illustrated by drawings, of the electric clock with seconds pendulum, constructed by me, I comply with their solicitations. Before doing so, however, I would state that I did not design to construct a clock for astronomical purposes, but I simply essayed to manufacture a useful, reliable and cheap regulator for the regulating of a number of clocks, both for the services of my colleagues and myself. It is very well known that the ordinary weight regulators often give rise to vexations, be it either by reason of neglect to wind them, or by reading the time incorrectly, since the different positions to the minute hand of the regulator which the operator assumes in regulating, easily give rise to equivocations, especially if the minute hand moves at a distance from the dial.

At the same time I sought to solve the problem of constructing a cheap and serviceable show-window timepiece, without interfering with the standard clock, and to bring the former into accord with the latter, and to dispense with the frequently disagreeable winding and setting of the window timepiece. How far I have succeeded in my endeavor of constructing a timepiece complying with these requisites, I leave to the judgment of my brother watchmakers.

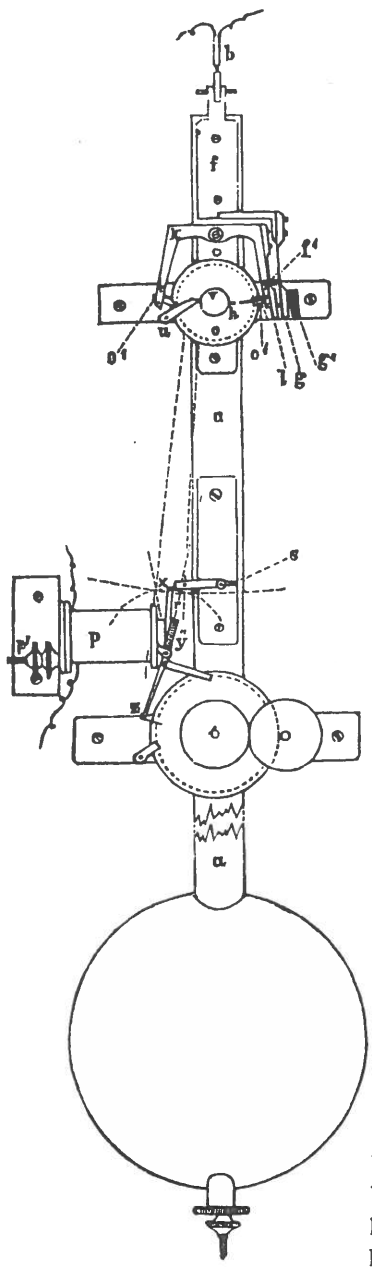


FIG. 1.

The seconds pendulum *a* (fig. 1), is suspended from a double spring *b*, which is composed of 2 pieces spring steel b^1 b^1, 4 small ivory plates *c c* and 4 small brass plates *d d*. The springs, therefore, are insulated from each other by the ivory plates; with the brass plates, however, they are united to form a conduit, by means of rivets and the protruding pins *e e*. In front upon the wooden pendulum rod (fig. 1), is the brass piece *f* (at the same time the front suspension hook, is screwed on, which ends below in the spring *g* with the milled screw g^1. Behind on the pendulum rod another such a piece, the rear suspension hook *i* (fig. 2) is screwed on, so that the two hooks are insulated from each other by the pendulum rod, but by supposing the pins *e e* with the springs b^1 b^1, they are brought into a conducting union, however.

By means of the bolt h^1, *i* is brought into a conducting connection with the anchor *k* (figs. 1 and 2), which carries the feeble spring *l*.

An insulating piece f^1, located on the anchor, supports the spring *g*. Upon the bridge, behind which the pendulum freely oscillates, the wheel *o*, with 30 pins, is mounted upon a long and thin staff in such a manner that it can easily revolve, and by the oscillations of the pendulum it is alternately propelled by the wedge-shaped jewel pallets o^1 o^1 of the anchor, which is firmly united with the pendulum, which is effected with a very trifling friction and little loss of power.

A conduit wire passes from the battery to the front pendulum

The spring g possesses a certain power of resistance, so that the current is closed with sufficient power, while the irregularities which can arise by an insufficient closing of contact are obviated, especially since the position of the springs to each other is that of an acute angle, whereby the points of contact are retained bright, that is, as is the case here if the closing of the contact ensues with sufficient force.

The wheel c, which is composed of aluminum bronze, and, therefore, is very light, carries upon its long canon (internally lined with ivory), upon its front end a light, well-equipoised steel hand, which, upon its own dial, shows seconds. Fig. 4 shows the arrangement of the dials.

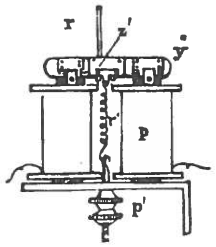


FIG. 3.

At an appropriate distance, farther down below, a second bridge is mounted with screws, which on fixed pivots carries a minute work, upon the canon pinion of which is riveted a light wheel with 60 pins.

The second arm of the anchor on the electro-magnet by means of an ivory cone, at each closing of the current, pushes this wheel by one pin forward, whereby springing minutes are produced.

The cone u protects the wheel o against a return motion, by gently bracing itself, by reason of its small weight, against the disc v surrounded with an india rubber ring.

The arm z prevents that at the closing of the current more than one tooth is propelled forward.

spring, and another such a wire passes from the back spring to the electro-magnet p, and another one goes from here back to the battery. When, now, the wheel o has been pushed round so far that by the inclination of the pendulum toward the left, the pin situated on the spring l locates itself to the jewel h, l inclines backward and places itself with its platinum-soldered face against the platinum point of the milled screw g^1, whereby also the spring g is raised by a trifle and the circuit is closed. This now passes from the battery through the front suspension spring, the front suspension hook, the spring g and milled screw g^1, back through the spring l, the anchor, the bolt, the rear suspension hook and rear suspension spring to the electro-magnet, and from hence to the battery.

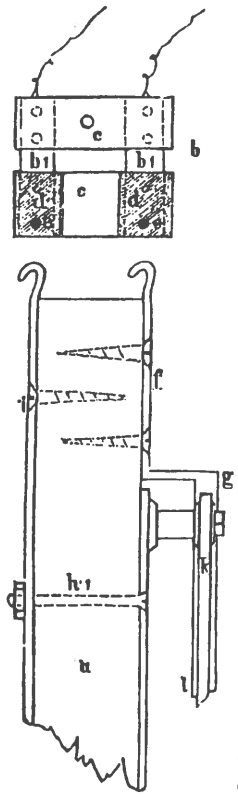


FIG. 2.

The current is closed at the moment when the pivot of the cone s is at the pivot x, the electro-magnet is hereby inducted, the anchor y together with the impulse lever r connected with it is attracted, and the coil spring $r\ l$ tightened. The cone s is raised by a trifle, until r has passed, lets it drop and comes to a rest in the direction of the dotted line to the left, and thus permits the cone s to oscillate above it.

By the return motion of the pendulum, when the point of the cone s has arrived again at x, the current is interrupted, the lever is liberated, applies itself attracted by the coil spring against cone s, and, lifting this a little, with a gentle pressure conducts the pendulum to the right where it drops, and comes to a stand-still in the dotted line until the next closing of the current. Owing to the fact that the cone s follows the circular motion of the impulse lever, the friction is at this place almost reduced to nothing.

Since the contact is established only every 60 seconds, and then only for the fraction of a second, the consumption of electricity is exceedingly small. In consequence of this, the clock may advantageously be impelled with manganese elements, which remains constant from 1½ to 2 years.

MAGNETA

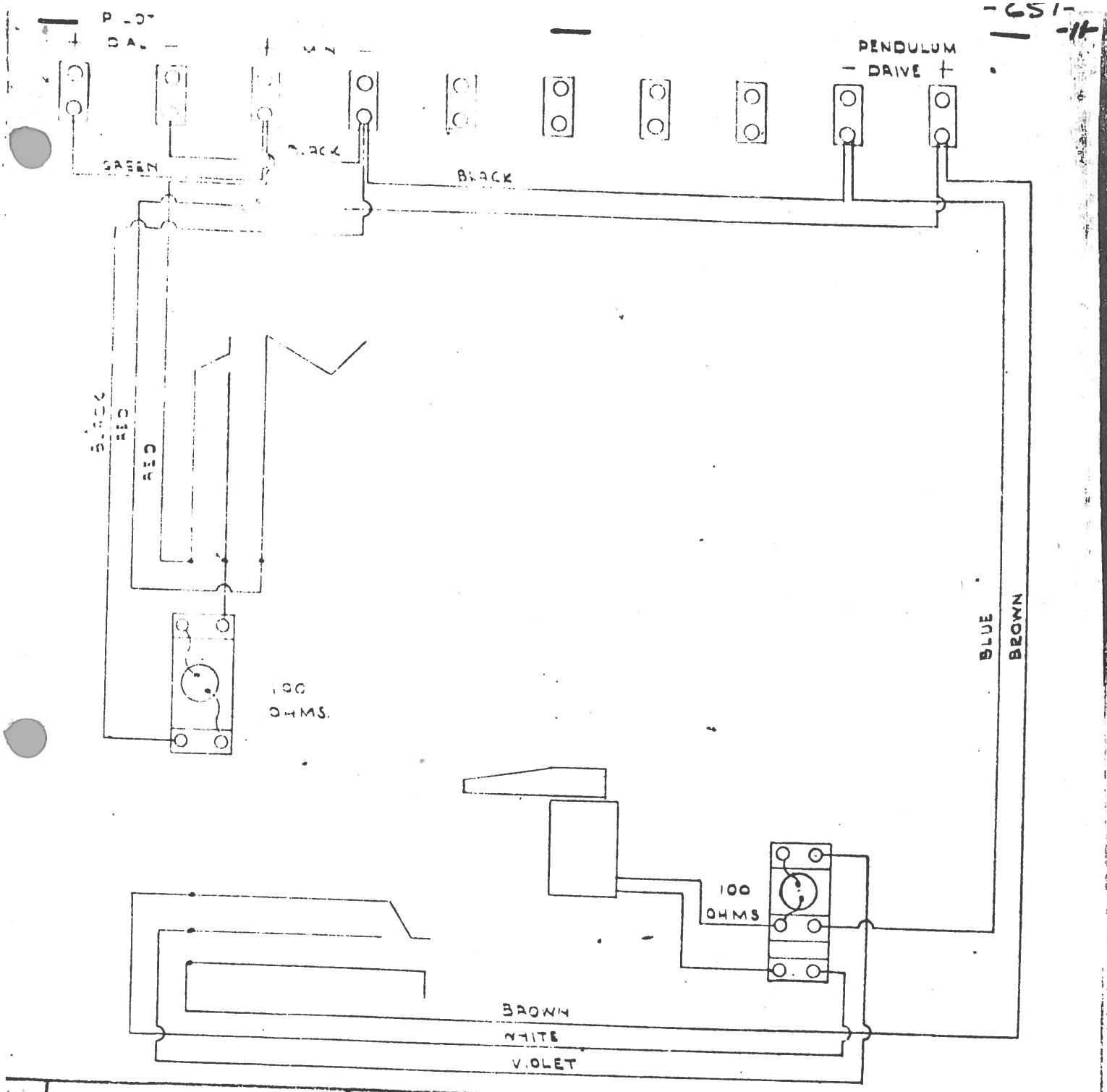
CLOCK MANUAL

The Magneta Time Co., Ltd.

Goblin Works - Leatherhead - Surrey - England

Printed in England

MAY, 1958



		Magneta MASTER CLOCK Model No. 36	Assembly No.	
			Drawn	Date 6·9·43
2	REVISED COLOURS 15-11-44	Descpn of Compt. INTERNAL WIRING 1 MINUTE. NO RELAYS! PILOT DIAL 4½ VOLTS.	Checked	Comp't No. 2759
	Modifications		Traced D.V.W.	
			Scale	
		MAGNETA TIME CO. LTD. LEATHERHEAD. SURREY.		

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