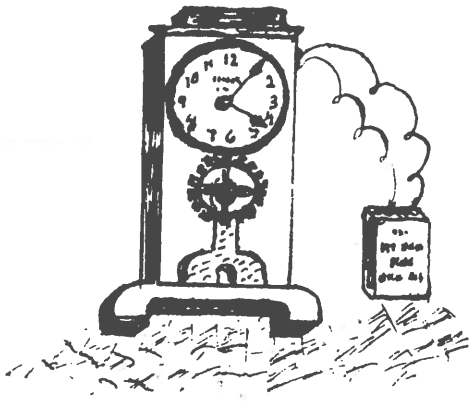
The
JOURNAL
OF THE
ELECTRICAL HOROLOGY
SOCIETY
Chapter No 78

February, 1984
VOLUME X---ISSUE #1
Martin C. Feldman, Editor



Hello fellow enthusiasts:

It is always a pleasure to start a new Volume of our Journal especially when we have such interesting material to print. Now that the holidays are behind us we shall all have more time to devote to the collection and conservation of early electrical clocks as well as the dissemination of information relating to this aspect of horology. Our Chapter has the latter, dissemination of information relating to electrical horology, as one of its main goals. To this end we need your support by being members, paying dues on time, sending in articles and questions. Those who have not sent dues yet, please do so. To all of you who have supported us with dues for 1984--thank you very much.

We are pleased to publish two original pieces of research by Joseph J. Singer relating to, a) the SWCC #34 shunt for movement type "F"; b) a graph showing Battery Voltage (no load and full load) and Winding Time Plotted against Battery Life in Weeks. Two technical articles printed in the U.H.A.A. Technical Bulletin during July and August 1957 respectively follow. We wish to acknowledge with thanks permission to reprint these articles given to us by Orville R. Hagans. The first, A MERCURY SWITCH FOR PENDULUM CONTROL alleges that except for the Warren Clock no other example of a mercury switch controlled pendulum existed in the United States. Our own Journal has printed in Volume VIII-Issue #3--June, 1982 a partial copy of Menn's & Dudley's patent #457,030 of August 4, 1891 showing a mercury switch in use at the top end of the pendulum for impulse control. Another mercury switch was used in the winding mechanism of the Ethridge & Eastman Electric Clock (Volume VIII-Issue #2--April 1982). The second article deals with experiments leading up to the invention of the electric watch. However, the mechanism as illustrated would make a very interesting electric chronometer. Al Stevens has sent us copies of polaroid pictures he took of the Brillié Master Clock used at the Bell Laboratories in N.J. This clock has now been retired and resides at the Bell Lab's.Museum. It is included in this Journal for its intrinsic interest and for the measurements included which Al so carefully made. Finally, we begin

cont'd. pg.12

SELF WINDING CLOCK CO.

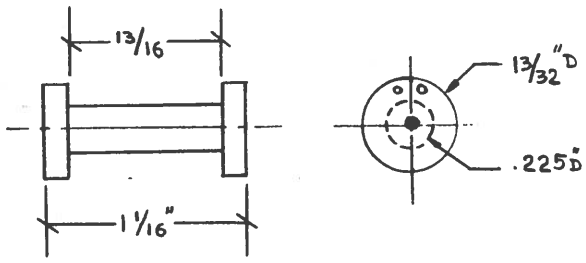
TOPIC

J. J. Singer 10-30-83

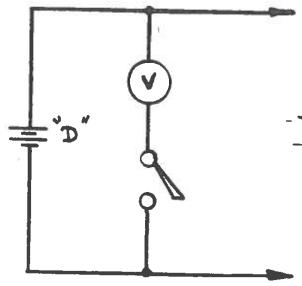
Movement: Type "F"

Item: #34 shunt

This shunt consists of a resistance wire wound around a wooden bobbin of approximate dimensions as shown in the accompanying sketch. The wire used is of a German silver alloy, .005" in diameter, with a resistance of about 60 to 70 ohms. In order to achieve this resistance value about 7 1/2 feet of wire was used, wound around the bobbin in a non-inductive (bifilar) manner. This is accomplished by folding the wire in half and then coiling it around the bobbin. About 1940 molded composition resistors were starting to be manufactured and occasionally one can see this type of resistor (color coded blue, gray, black, and silver) instead of the wire wound type. The color coding indicates a 68 ohm $\pm$ 10% resistor (about 1 watt).



If, on examining the spiral contacts and pins show evidence of arcing, it is a good idea to check the resistor. An open resistor provides no arc suppression and that eventually results in damaged vibrating motor armature contacts.



TO WINDING CIRCUIT OF A TYPE "F" MOVEMENT.

BATTERY VOLTAGE (NO LOAD & FULL LOAD) AND WINDING TIME PLOTTED AGAINST BATTERY LIFE IN WEEKS.

T. J. Singer 11-9-83

U. H. A. A.

Technical Bulletin

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. XI, No. 6 | Bulletin 116 | July 1, 1957

A MERCURY SWITCH FOR PENDULUM CONTROL

A DEVICE DEVELOPED AND DESCRIBED BY S. J. WISE, F.B.H.I.

THERE HAVE BEEN many attempts in the past to control a pendulum by means of a simple mercury in glass switch. The incorporation of such a device in a clock circuit would possess several advantages, the chief being freedom from mechanical friction and oxidisation trouble. It seems to be simple enough to attach a small tubular mercury switch to a pendulum, so that when a right-hand arc is being performed, the globule of mercury is displaced to one end of the tube, thus closing an electric circuit, on a power stroke, and by a counter displacement on a free stroke, the mercury is returned to its central well.

As stated, such a switch creates no mechanical friction whatever, and contact trouble would appear to be practically non-existent. There is, however, considerably more in it than that; one very serious snag is that created by the weight of the mercury, which must necessarily produce a comparatively large centre-gravity displacement of the pendulum, when the former is in its contacting position at an extremity of the tube.

Unfortunately, this contacting position is unfavourable from an impulsing viewpoint, because the pendulum at this point is at, or near, the end of its free stroke, which means that actual impulsing would normally occur very near the start of the power arc, with the result that insufficient energy would be applied to return the mercury to its centre well after zero has been passed—an action made even more difficult by a displaced centre-gravity.

In the system about to be described, both displaced centre-gravity and end of arc contacting are utilised in what may be termed, assisted impulse boost. In the course of experimenting with this idea, I have found that the nearer the tube is placed to the centre axis of the pendulum, progressively less arc is required to attain sufficient tilt for displacement of the mercury. For example, no displacement whatever is possible when the tube is fixed near the lower end of the pendulum—even with a large arc. This is partly due to centrifugal force, and partly to lack of axial oscillation of the tube.

The layout shown in figure 1 was designed by me several years ago, and it works very well indeed, provided amplitude is not less than 3 degrees each side of zero, which unfortunately rules it out for a seconds pendulum. In the diagram, a half seconds pendulum, A, carries, about two-thirds down its length, a declivity shaped Stalloy armature, B, which is arranged to "sweep" an extended pole piece, C, the latter forming part of an electro-magnet, D.

To the upper end of pendulum rod, A, is clamped a mercury switch, E, containing an internal barrier, F, which is slightly offset from the centre as shown. A globule of mercury, G, is normally retained in a shallow central well, when the pendulum is vertical. Two contact pins, H, are fixed through the glass tube, a construction used for all tube switches.

Now, to attain a satisfactory performance, it is essential to provide adequate adjustment for the switch unit, both in height and axial tilting, each of which is very critical. Also important is the centralisation of the mercury globule, G, with centre-gravity of the pendulum when it is at rest.

In figure 2, the pendulum is assumed to be swinging on a left-hand arc, during which the mercury globule, now numerated 1, has, in rolling down an

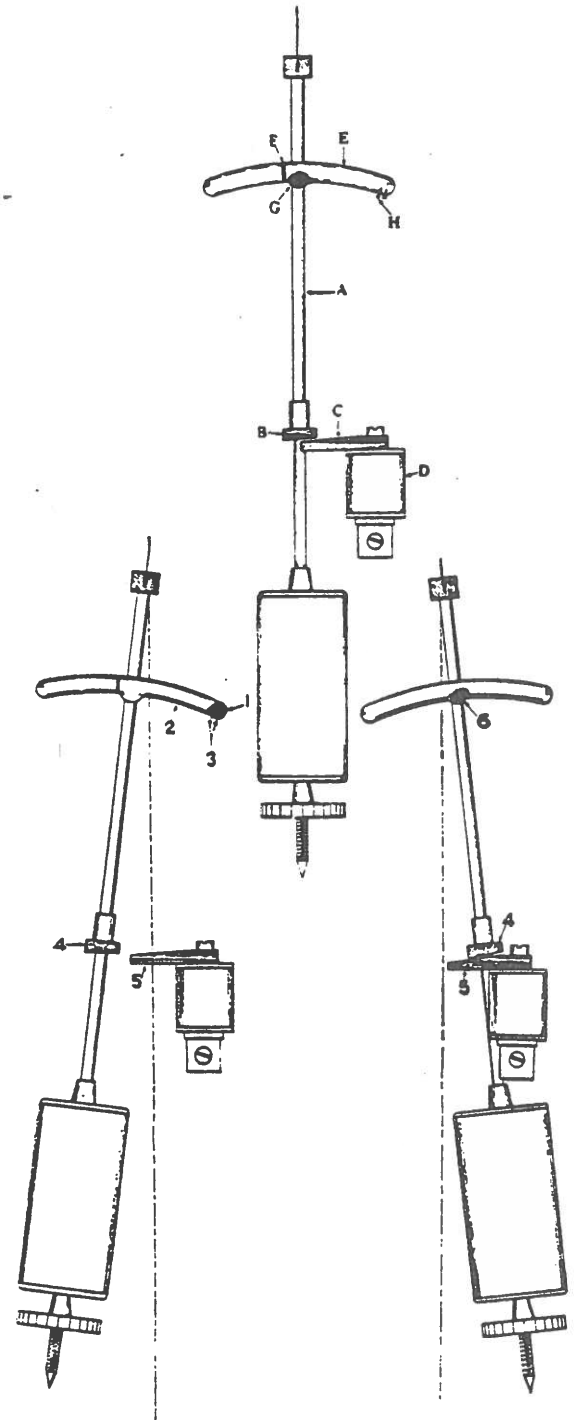


Figure 1, centre: pendulum in vertical position with globule of mercury, G, retained in central well. Figure 2, left, shows pendulum swinging on a left-hand arc, with mercury rolling to bridge contacts at 3. Figure 3 shows resultant power stroke which replaces mercury

inclined plane formed by the bore of the tube, 2, imparted a slight impulse to the pendulum by displacement of its normal centre-gravity. Almost identically with completion of the arc, the contacts, 3, become bridged, thus closing the electric circuit on, or just before, the outward arc is completed.

It will be seen in the diagram that actual contacting takes place at a moment when an appreciable distance exists between the declivity surface of the armature, 4, and the pole piece, 5; this is because closure of the electrical circuit and, therefore, energisation of the electro-magnet can actually take place just before the pendulum reverses its motion on a free stroke. Reactance between points 4 and 5 is almost negligible with the pendulum in the position shown.

During the resultant power stroke, tube 2 is tilted upwards as shown in figure 3, thus displacing the mercury back to its central well as shown at 6. In the meantime, impulse reaction armature, 4, and pole piece, 5, have been sustained over a complete power stroke, thus exerting more than sufficient power to (i) gently prolong the pendulum impulse, and (ii) centralise the mercury globule to its position of normal centre-gravity. The tube used in this ingenious arrangement, it will be noticed, is made slightly curved, so as to allow for an easy run-down of the globule, and therefore a more definite gravity-displaced impulse is imparted across the zero.

There is just one other point before passing: the application of a mercury switch for contacting lends itself admirably to electro-magnetic wheelwork impulsing and secondary dial operation.

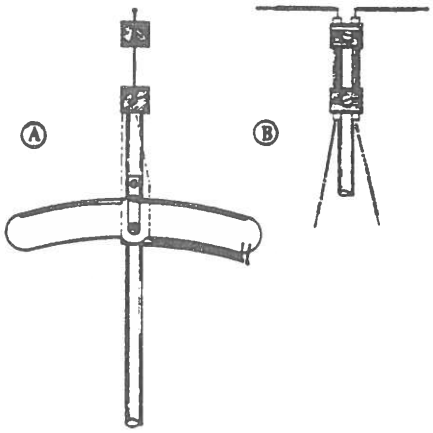


Figure 4: showing how circuit leads are wired from both tube contacts via back of pendulum to suspension springs

Figure 4, at A, shows how the circuit leads are wired from both tube contacts, via the back of the pendulum rod to the suspension springs; these leads must, of course, be as light as possible—actually about 35 s.w.g. silk sheathed. The pendulum suspension is shown at B; this consists of two separate springs clamped between insulated blocks.

Finally, I think I am correct in stating that there exists only one other example of a mercury switch controlled pendulum: this is the Warren clock, made in the United States many years ago. This type, however, did not make use of mercury displacement to boost impulsing.

Reprinted from:
Watchmaker, Jeweller & Silversmith
March, 1957

U. H. A. A.

Technical Bulletin

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Vol. XI, No. 8 | Bulletin 117 | August 1, 1957

ELECTRICAL EXPERIMENTS

S. J. WISE. F.B.H.I.

describes how the method of balance propulsion he has devised works in practice

WATCHMAKER, JEWELLER & SILVERSMITH, OCTOBER, 1954

Beginning a series of technical articles to acquaint readers with the history of experiments leading up to the present electric watch.

ASSUMING a battery of 3 volts is connected to the appropiate terminals, Figs. 1 and 2, and the balance has been given an initial start, the following sequence takes place :

1. The unlocking jewel C deflects outwards the co-acting detent L sufficiently far to clear the jewel pin G, thus releasing impulse lever F, which function is performed a fraction of a second after the zero line is reached.
2. The impulse lever complete with jewel roller E now being free is rapidly deflected downwards, due to energy exerted by the spring.
3. This is identical with the above action. The impulse pallet D has reached an angular position whereby the tip of its curved profile is coincident with the axis of roller E at which instant impulse is imparted to the balance by a rolling action of E down the profile of D.
4. Slightly before the roller E reaches the root of D the contacts, K and K1, meet, thus closing the electrical circuit.
5. The electro-magnet J now becomes energised and re-acts with the armature I, thus throwing upwards the impulse lever F, through the medium of the contacts K and K1. The progress of the armature, however, is suddenly arrested by a stop M, at which instant the contacts are instantly broken by further upward movement brought about by the momentum of the lever.
6. The slot in the co-acting detent again retains the impulse lever in its normal position by re-engaging jewel pin.
7. The balance now completes its arc freely, but on the return swing the gold spring is

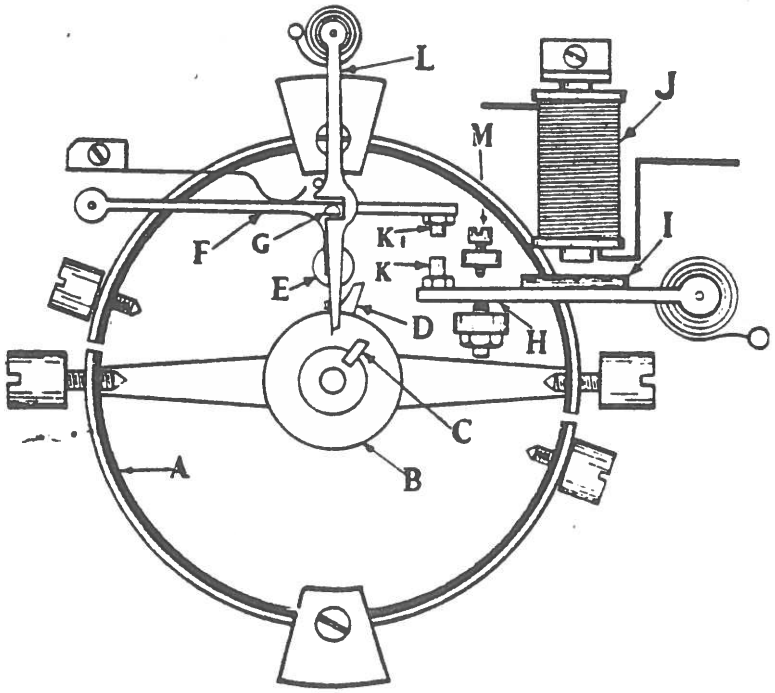


Figure 1 : general arrangement of the electro-mechanically controlled balance

A balance
B roller combinations
C unlocking jewel
D impulse pallet
E jewel roller
F impulse detent
G ruby pin
H resetting lever
I armature
J electro-magnet
K contact
K1 mating contact
L retaining lever
M stop

slightly deflected to permit a free travel of the unlocking jewel.

As already mentioned, the balance used in this construction was of early design and, in actual fact, measured only 1¼ in. diameter, thus necessitating very light construction of the impulsing and retention gear. In spite of this, however, a very reasonable time-rate is possible, actually within one second per day.

The secrets of success here are: a light but snappy action of both impulse and co-acting detents, combined with extremely light construction and perfect workmanship. A slightly heavier construction of the re-setting lever and armature. A practically uniform arc performed by the balance due to the method of impulsing, and exhausting the glass containing cylinder down to a barometric pressure of approximately 2 to 3 in. of mercury, thus decreasing air friction.

The actual period of contact is about 1/50th of a second, but a clean and almost perfect function is assured, both for impulsing the balance and for transmitting to slave dials, etc.

All lead-in wires had, of course, to be cemented through the base to enable the covering cylinder to be exhausted.

Slave dial mechanism

Owing to the rapid actions of contacting, the slave dial mechanism had to be designed to function in slightly less than 1/50th of a second. This is shown in Fig. 3. The drawing, however, is purely diagrammatical. It will, no doubt, be realised that with such a small contacting period very rapid action of the armature is brought about. Fortunately, the actual arc of oscillation required to progress one tooth is small, thus reducing considerably the magnetic reluctance at the beginning of the impulse, where normally the pull is at a minimum, due to the excessive distance at which the armature is situated from the core.

An examination of Fig. 3 shows an electro-magnetic system A which contains pole pieces of very shallow traverse. An energising coil B, fitted with a central core, links up the two stator poles by nuts as shown at D. An armature C composed of M.U. metal, contains pole extremities of the same width and traverse as those on the stator. A right-angle arm E has pivoted to its upper end a progression pawl as shown—this pawl is very lightly spring loaded as also is the back-stop, but for the sake of clearness this is not shown. A 60-tooth ratchet wheel F is pivoted in jewelled bearings and so disposed as to be in line with the underside of the pawl, thus permitting the advancement of one tooth at each impulse, starting from the positions shown, with the lever abutting its stop, and ending when the poles of the armature are in line, when for an instant, they are magnetically locked.

For mechanical limiting only, an adjustable nose stop G is fitted. This, however, is purely a precautionary measure, since the system will function on magnetic limiting alone. There is, however, the risk of the armature being traversed beyond its magnetic limits by momentum. An axis spring fitted to the arbor of F is normally "set up" sufficiently to ensure that E abuts its stop sharply after impulsing.

In Figure 4 it will be seen that the ratchet wheel and rocker-arm pivots occupy identical

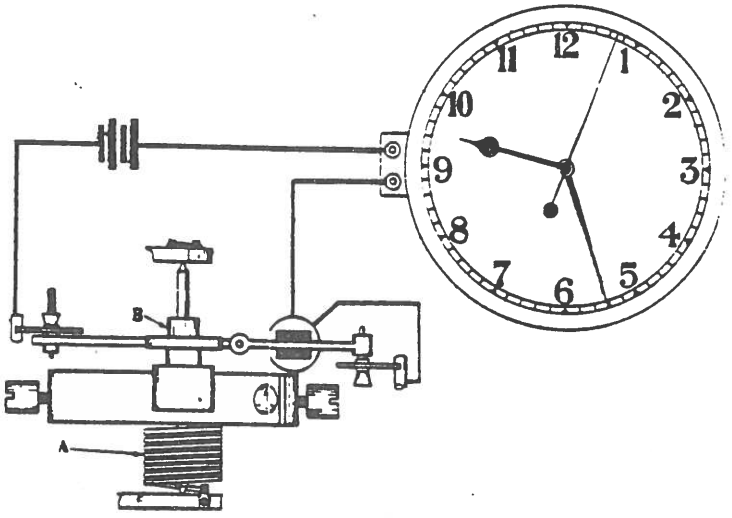


Figure 2 : schematic drawing showing balance, ccrol spring and slave dial

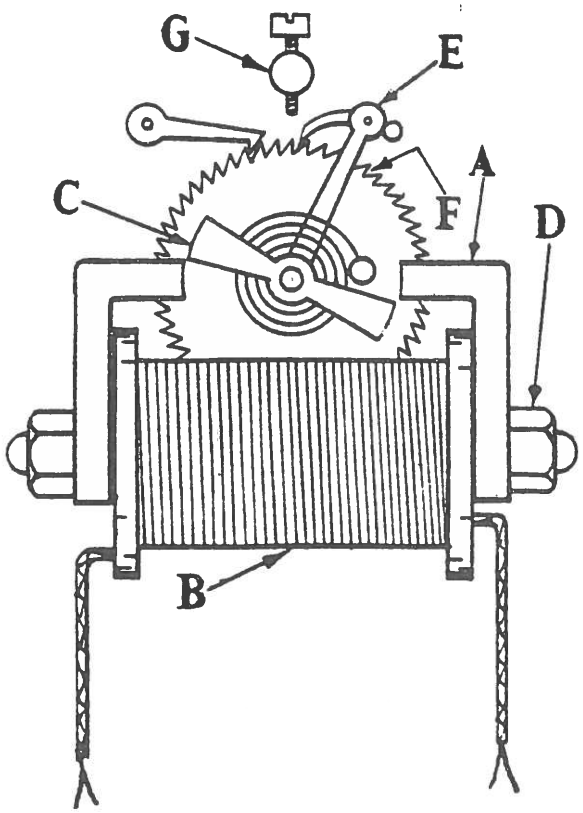


Figure 3 : general layout of the slave dial mechanism.
A electro-magnetic system
B energising coil
C armature
D nuts linking stator poles
E right-angle arm
F ratchet wheel
G adjustable nose stop

aug 1, 1957

centres, the supporting bridge being sufficiently thick to accommodate ring jewels on both inner and outer faces. The ratchet wheel arbor extends through the centre wheel boss, where internally a second jewel is fitted—this, however, is not shown on the drawing. An eight-toothed pinion fitted to the inner of the arbor gears with an intermediate wheel of 80 teeth which wheel has a pinion of 10 leaves finally meshing with the centre wheel of 60 teeth. It is interesting to note that with this design the position of the pawl arm axis is truly concentric with the ratchet wheel pivot, and, unlike many other designs, propulsion takes place during the power stroke.

Action

1. At the instant of impulse the electro-magnet becomes active and the armature is rapidly rotated over its small arc until the re-active faces of C and A are coincident, at which position mutual magnetic polarity is reached.
2. Identical with the above action, the pawl at E propels forward one tooth of the ratchet wheel, when further progression is arrested by magnetic locking of the armature, assisted by abutment of the pawl with the underside of the stop G. At this instant the torque is stored in the axis spring at maximum tension.
3. The impulse ceases, and the pawl instantly returns to its outer stop, due to energy stored in the spring.

The fact that the maximum tension on the return spring is exerted at the end of the impulse stroke instead of the start, as in many present designs, ensures a rapid "pull out" of the pawl nose at the instant of release, i.e., maximum power is applied at a point where mechanical friction is greatest, but as magnetic opposition increases, stimulation is added to the slowing down process by a further tensioning of the spring, thus bringing about a gentle abutment of the pawl against its stop. So rapid is the action of this device that complete propulsion is possible when an A.C. circuit of 50 cycles per second is used ; through a transformer of course.

In conclusion, may I state that an instrument constructed on the lines described above would make a very attractive time standard of unique construction combined with a close time-rate at normal ambient temperatures. At the same time I strongly suggest the use of Nilo 36 for the construction of both balance and control spring, the former being at least 2½ in. diameter.

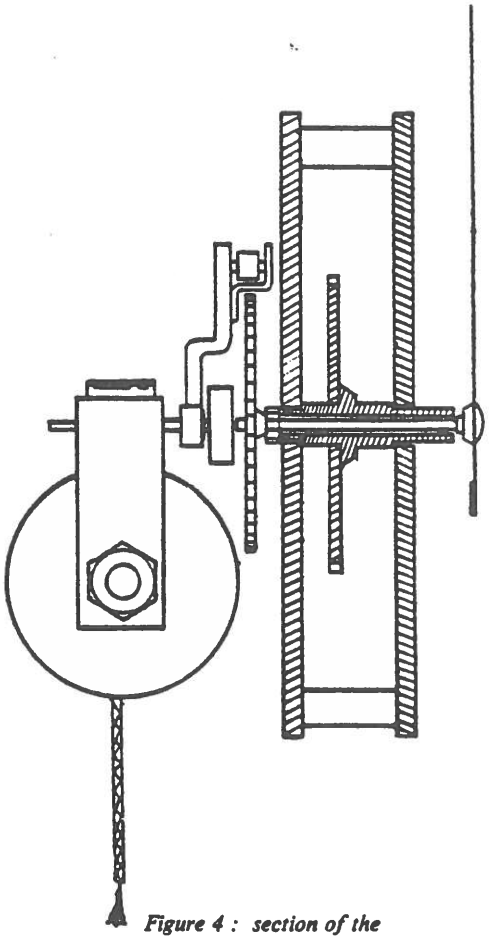


Figure 4 : section of the slave dial mechanism showing concentric location of seconds arbor with centre wheel and sweep seconds hand

Technical data

The following data is applicable to a balance corresponding to that shown. In the case of a larger balance, however, progressive increases in weight of the moving parts are necessary, also of the coil and armature, since an increase in watt-second consumption will be essential to operate a heavier re-setting number.

Resistance of working coil = 1000 ohms
Resistance of slave dial coil = 250 ohms.
Applied potential = 2 volts
Applied current = 0.002 amps for 1/50th sec.
Applied watts = 4 milliwatts 1/50th sec.

Mechanical details

The impulse roller consists of a centre wheel ring jewel about pocket watch size, or the largest procurable.

The impulse pallet should be of high-grade steel, hardened and polished.

An exit pallet stone of a large size should be used for the unlocking jewel.

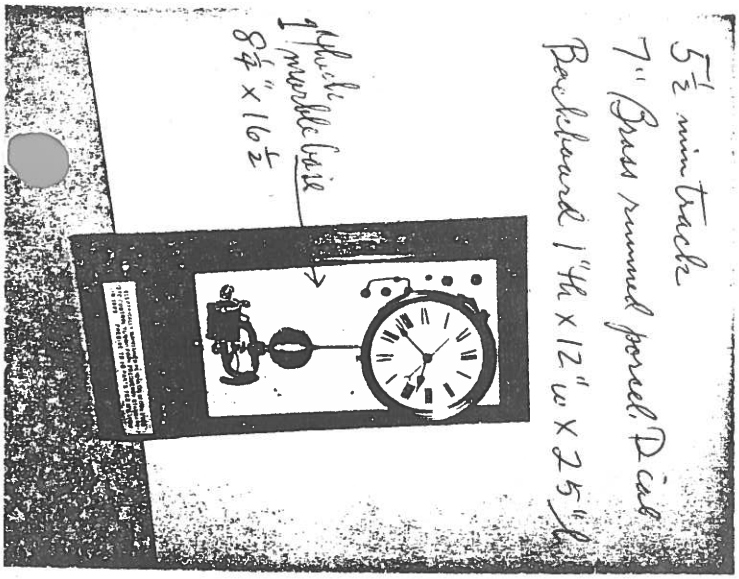
The smallest pallet ruby pin procurable should be used for the retention jewel pin.

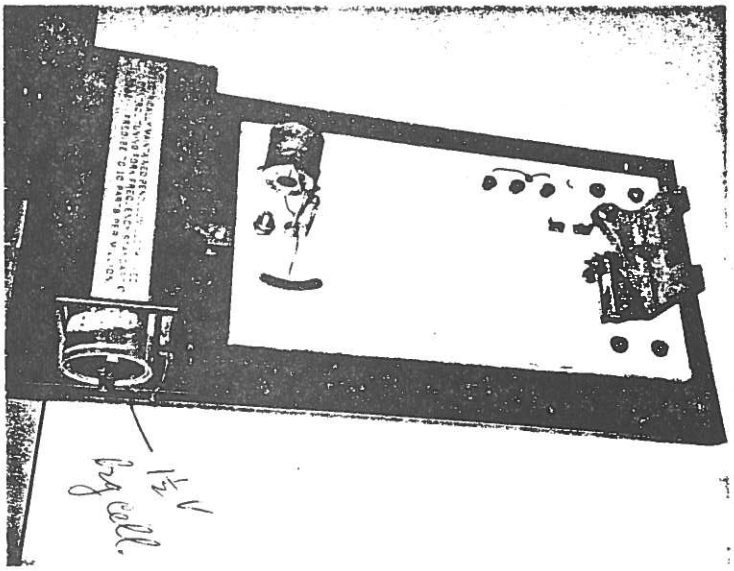
An 18 carat hard gold reduced to 0.002 in. in thickness, increasing to 0.005 in. at anchorage —10 mm. in length—should be used for the impulse detent unlocking spring.

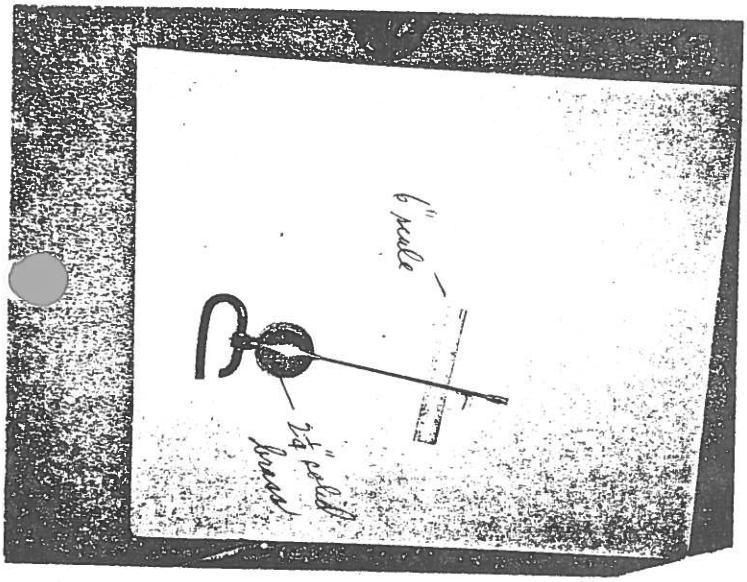
The engagement of the detent retention ruby pin with slot should be 0.02 in. The contacts should be preferably of platinum, but certain grades of tungsten can be used. The lower contact should be well rounded on the working face.

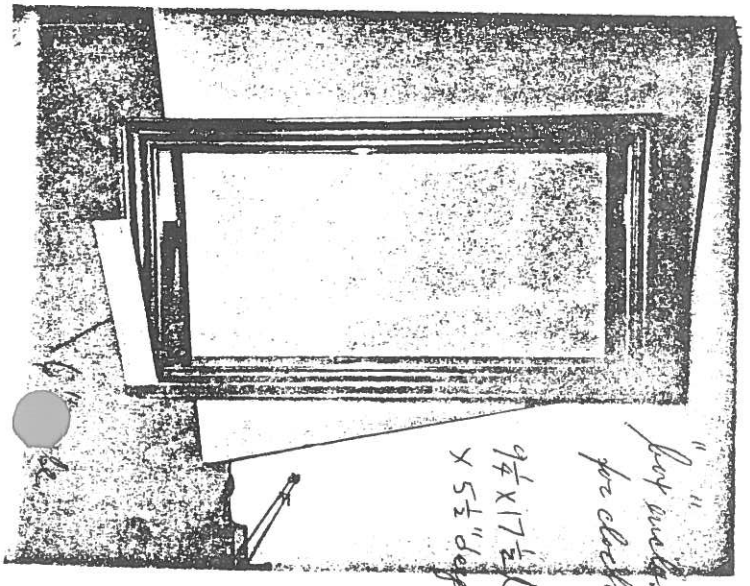
Both limiting stops are tipped with hard fibre, thus acting as a silencing medium and also as an insulator. A condensor is necessary of about 0.5 micro-farads capacity, connected across the contact terminals to by-pass the static charge at instant of break. There is just one other point before passing: due to exceptionally high loading of the bottom pivot a "flat back" diamond end stone is absolutely essential.

Owing to the difficulty in obtaining a clean snappy contact without impeding the balance after long periods of use, I propose publishing the whole of my researches in this field covering 25 years. These will include contacts as applied to heavy balances, medium balances and watch balances.









Brillié Master Clock used at the Bell Laboratories (NJ)
Dial marked: L.Leroy S C^ie Paris
7 Boul.^d de la Madeleine.
Specs.: 2¼" dia. solid brass ball pendulum bob; coil 1-3/4" dia. x 1-3/4"L; 5½" min. track, 7" brass bezeled porc. dial; 1" x 8¼' x 16½" marble base; 1" x 12" x 25" backboard; glass front box enclosure 9¼" x 17" x 5½".

submitted by: Al Stevens

Clock is in Bell Lab's. Museum

3

Directions

for the instalation and care of

Automatic Electric Clocks

Manufactured by

The American Clock Company

381-385 WABASH AVENUE,

Chicago, Ill., U. S. A.

INTRODUCTION.

Although our Clock is very simple and easy to understand, yet we trust that a description, setting forth the principles underlying its design, the plan of its operation, and covering all of the important details of its construction, will be highly advantageous to our patrons who handle and care for them.

We have sought to avoid all unnecessary detail, passing by with brief notice, that which is common to clocks in general, and have devoted the following pages principally to the special features pertaining to our Clock. We trust, however, that the instructions given are sufficiently comprehensive to enable any one of ordinary intelligence, by giving special attention to the descriptive matter herein contained, to handle the Clocks as easily as we do in our factory.

GENERAL DESCRIPTION.

Mechanically considered, aside from the actuating mechanism, our Clock is essentially the same as other high grade clocks; having a pendulum, a dead-beat anchor escapement, and a driving train of three wheels.

The motive power is supplied by the gravity of two weighted levers, mounted upon the center staff. These levers, together with the accompanying mechanism for operating them, constitute the special mechanical features of most importance in our Clock.

The electrical elements consist of a horse shoe magnet, a pivoted armature, an electric circuit, a device for making and breaking the said circuit, and a battery, usually of two cells.

Recognizing the fact that for accurate time keeping purposes, a clock should be uniformly supplied with very little more power than what is absolutely necessary to maintain vibration of the pendulum; we have mounted upon the outer end of each of the above named levers, a weight of small size. These weighted levers stand at an angle with each other. Both move slowly downward as the center staff of the clock rotates. When the upper lever reaches a horizon-

********** MART **********

NOTICE: ALL MART ANNOUNCEMENTS ARE PRINTED FREE! Send material to M. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467

FOR SALE: 30 to 40 electromechanical clocks; commercial electrical clocks and others. Call after 12 noon--George Zlobin, (212) 763-6124

FOR SALE: High quality electrical clocks. Send SASE for list or call: Dr.Scott R. Samuel,745 Linden Ave.,Los Altos, CA. 94022-(415) 941-6182

FOR SALE: JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY-1975-1980 ORIGINAL COPIES 50¢ a copy--$4 minimum!--Inquiries, SASE or send money payable to EHS. % C. Roth, 2 Circle Lane, Roslyn Heights, N.Y. 11577

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

WANTED: "Junker" early battery clocks, movements, parts, etc. Send details & $ wanted. ELECTRICAL CLOCK LITERATURE for possible reprinting in our Journal. M. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467

Electrical Horological Literature of any type. Hahl-Wenzel pneumatic clock face and weights. Will buy entire clock if necessary. M. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467

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FOR SALE: Approximately 75 rare and collectible electric clocks on hand at all times. Also, many parts, cases, movts. etc. L.O'Briant,Box 812, Raleigh, N.C. 27602. Phone (919) 851-1706--Home-night & weekends (919) 733-2995--7:30-4:30 EST

FOR SALE: High grade electrical clocks, Write for further information. J.E. Bosschieter, Zonneveldstraat 6, 2311 R.V. Leiden, Holland

cont'd. from Pg.1
the reprinting of the DIRECTIONS and the instalation and care of AUTOMATIC ELECTRIC CLOCKS Manufactured by THE AMERICAN CLOCK COMPANY which has been sent to us with thanks by our 2nd V.P., Leon O'Briant. This shall be continued in future Journals.

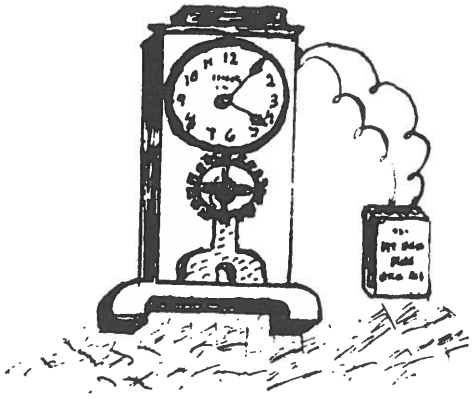
Enjoy this Issue!

Electromagnetically yours,

Martin C. Feldman,Editor

The
JOURNAL
OF THE
ELECTRICAL HOROLOGY SOCIETY
Chapter No 78

April, 1984
VOLUME X---ISSUE #2
Martin C. Feldman, Editor



Hello fellow enthusiasts:

This month we continue publishing the reprint of THE AMERICAN CLOCK COMPANY repair manual which shall be concluded in the June issue. Please note that the Index to Contents which is being printed in this issue should be placed after the title page.

The Smithsonian Institution in its American Museum section is presenting a special exhibit devoted to the "Standardization of Time in the U.S.." High grade clocks by Howard, Self-Winding Clock Company and others as well as information relating to this exhibit can be viewed. There are a few clocks which are running with one sending out a 1-second electrical impulse to a sounding device adding to the interest of this small exhibit. If anyone will be passing through Washington, D.C. and can stop at the Smithsonian, this would be worthwhile to see.

With some few exceptions the electrical clock market seems to have remained rather unremarkable. Repairs presently are more common than sales or trading. It appears that the current economic situation still dictates the lack of activity in the clock market as it does in other spheres as well.

Enjoy this Issue!

Electromagnetically yours,

Martin C. Feldman, FNAWCC

MEETING NOTICE PAGE 12

Ferd. T. Hasch
Dec. 12, 19. New York

INDEX TO CONTENTS.

tal position, the electric circuit is closed, and the lower lever is thrown upward, past the other one to the same angle above that it previously occupied below it. The relative position of the levers is reversed, but the angular difference between them is the same as before, and the circular arc through which the said lever passes downward, after a rise, is the same during each successive period of descent, both in position and extent of travel; and the amount of power delivered to the clock train by the gravity of the weighted levers is exactly the same for each of the above named periods during the entire life of the battery. So far as the motive power is concerned, the plan is, therefore, such as to produce a perfect rate of time keeping.

The mechanism for closing the electric circuit, operates to supply sufficient current to properly energize the magnets, so that the work of raising the lever is performed, and the said ascending lever, before it reaches the limit of its upward movement, opens the circuit and prevents any further expenditure of battery power. This automatic feature is of immense value, as it prevents waste, thus prolonging the life of the battery.

The construction of the clock is such as regards workmanship and material used, that the power applied by the weighted levers is transmitted through the train to the pendulum, with the least possible loss from friction, the escapement having jeweled pallets, and the train pivots being of hardened steel, highly polished.

The pendulum stick and the supporting springs are designed with special reference to convenience in attaching and removing the pendulum, as well as special adaptation for preventing lost motion between the parts so joined, the pendulum being free to assume a vertical position under all conditions. The pendulum is also provided with a graduated adjusting nut to facilitate regulation.

All parts are made interchangeable, so that in case of breakage, or injury to any of them, the same may be replaced by a new one.

DETAIL INFORMATION.

Pivots, Freedom Of.

Like most time keeping devices, it is absolutely necessary to have sufficient freedom in the train pivots, both of side and end shake, and no tightness in any of the moving parts.

The Cannon Pinion.

The tongue of the Cannon Pinion should have enough pressure against the center staff of the clock so that the friction between them is sufficient to enable the said pinion to safely operate the dial wheels, and carry the hands without any danger of slipping.

The Levers.

The two weighted levers should be perfectly free upon the center staff, and the supporting clicks, or pawls, should be perfectly free on the shoulder screws on which they are pivoted. The click springs should have tension enough to act quickly. These features are very important.

The Ratchets.

The seven equi-distant notches in each of the ratchets mounted on the center staff outside the levers, are placed opposite those of the other ratchet, so that the steel plate which is attached to the upper contact mechanism, and which extends over both ratchets, may drop down and permit the electric circuit to be closed.

The Armature.

The Armature, which is located above the magnets, should not be pivoted so low in the frame of the clock as to strike on the back edges (edges nearest the point of pivoting) of the magnet cores, when drawn down by the magnetism induced by the electric current; and must not be pivoted so high that the distance between the armature and magnet will materially lessen its attractive power when it first begins to act. The pivoting to the right, should bring the bottom face of the armature parallel with the top end faces of the magnet cores, when said armature is at its lowest limit.

The Connecting Link.

The projecting tongue of the armature has pivoted to it, a link, which projects upward and supports at its upper end, a cross pin. The link should not be tight in the slot of the armature tongue, but should fit closely on the sides, in order to keep the cross pin at the top of the link parallel with the center staff of the clock. This cross pin projects through the said link an equal distance on either side, each end respectively passing through the slot of the corresponding lever,

the total length of this pin being nearly equal to the distance between the ratchets. When the electric circuit is closed, and the magnets energized, the armature and link are drawn downward; the weighted end of one of the levers which runs the clock, being at this time, at the limit of its downward movement, the opposite, or slotted end, of said lever, is then at its highest point, and the downward pull in the slot by one end of the above described cross pin which enters it, will throw the weighted end of the said lever upward. The direct action of the magnets raises the lever nearly to the horizontal position, and the momentum acquired by the said lever carries it the remainder of the distance. See Diagram of Levers, Fig. 1.

In Fig. 1 the lever A is at the horizontal position at the time of closing the electric circuit. The lever B is at its lowest limit, and is thrown upward in the manner described above, to the position represented by the dotted lines B 1; the said momentum carrying it to the position represented by the dotted line B 2. By this arrangement of stopping the downward pull of the link pin when the ascending lever reaches the point B 1, all danger of disturbing the other lever A is avoided. The position B 1 is such that the top of the ascending lever weight is about even with the center of the other weight A. When the rotation of the center staff of the clock brings the notches of the ratchets, which are mounted upon it, to the proper position, the above described steel plate attached to the brass of the upper contact will drop down into them, and the above described piece of platinum attached to the long arm, will also drop down into the V of the lower contact, and close the electric circuit. The magnets will then be energized and the lower lever thrown upward. After it has risen about two-thirds of the distance, the cam-shaped hub of the said lever will lift the above described steel plate out of the lever notches, the upper and lower contact points being separated and the electric circuit broken at the same time.

The Magnets.

The magnets of the clock are provided with a shunt or short circuit connection of high resistance, between an outer coil of one spool and a similar coil on the opposite spool of the magnet. This reduces the sparking at the contact points when the circuit is broken. One of the terminal wires from the magnet is soldered into the binding post F, and the other one into the post G, as shown in Fig. 6.

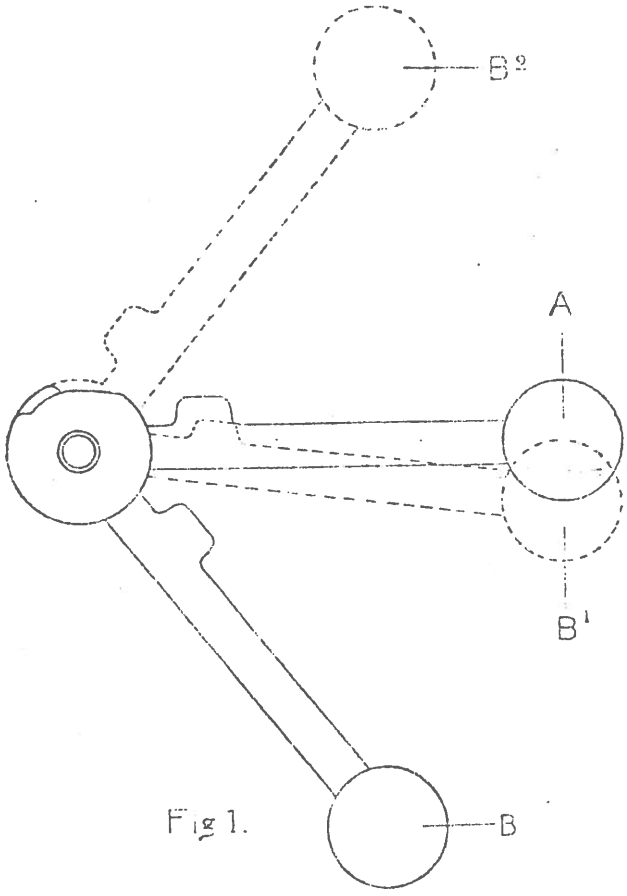


Fig 1.

The Contact.

The mechanism for making and breaking the electric circuit will in this description, be termed the contact, and consists of an upper and lower element. The upper contact has an electrical connection with the front frame of the clock, while the lower element is insulated therefrom, being mounted upon a strip of vulcanized fiber. Upon a long steel pin driven into the frame of the clock, the brass part of the upper contact is rotatably mounted. It has attached to it a hard steel plate, which extends over and rests upon the two ratchets. It has also a spring which presses it against the said ratchet; and has near the end of a projecting arm, a thin piece of platinum extending downward.

The lower contact element is fixed to its fiber support by a screw and two pins. The brass part of this consists of two pieces held together by screws. From each piece extending upward, are two steel springs tipped with platinum, shaped so that when they are together they form a V, which stands directly under and close to the platinum of the upper contact. Figures 2 and 3 are respectively a front and side view, on an enlarged scale, of a portion of the upper and lower contact.

Figures 4 and 5 are detailed views showing contact springs.

As will be seen by Fig. 2, the brass portion of the lower contact, is in two pieces, D and D 1. One of the platinum tipped springs is attached to the larger piece D, the other being attached to the smaller piece D 1, the said pieces being fastened together by screws. When the parts are together, as shown in Fig. 2, the platinum tips upon the springs press against each other, the tension on each spring being such that the V formed by the said tips is in line with the platinum of the upper contact; Fig. 2, showing their position when in the clock ready for operation, the circuit being open, the upper contact point and the lower V being on the dotted line EEEE. If one of the springs was broken off, the remaining spring would be relieved of its tension and extend over the line EEEE as shown in Fig. 4. If the other was broken off, then the remaining one would assume the position shown in Fig. 5.

The springs are set in separate pieces of brass so they may be taken apart for purposes of alignment and cleaning. It may be necessary, after a long period of time, to bend the springs toward each other so as to give them more tension. It requires very little,

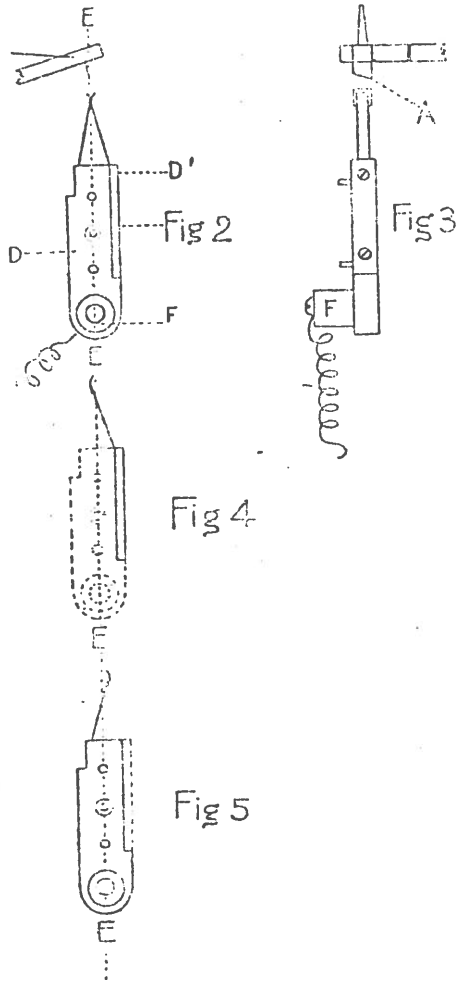


Fig 2

Fig 3

Fig 4

Fig 5

however, as a slight friction between the upper and lower platinum points, when the circuit is closed and opened, will suffice to keep the surfaces bright and clean.

Fig. 3. is a side view of the contact mechanism. The platinum of the upper contact is beveled, as shown, so that the point A is lowest and comes into engagement with the V of the lower contact first, when the electric circuit is closed; and is also last to separate from the lower V, when the circuit is broken. The purpose of this bevelled form is to facilitate the entry of the upper contact point into the lower V when the circuit closes; and to locate all the black oxide upon the extreme lower point of the upper contact, and upon the corresponding corner of the lower V, instead of having it distributed over the entire surface.

This oxide is caused by the spark which appears when the circuit is broken, and tends to hinder the free passage of the electric current. With our Clock, however, there is very little oxide formed and that is being continually rubbed off.

The long spring which presses the upper contact downward, should be polished bright where it bears against the pin. The pin should also be bright. The upper contact should be perfectly free upon its post, so that there can be no failure to drop promptly at the proper time. **Never permit any oil to get on the contact points**, as this will certainly make trouble. The platinum surfaces should be dry, clean and bright.

The Pendulum and Suspension Springs.

The pendulum is supported by two springs which are fastened to brass plates. The upper plate is clamped in the slot of the iron hanger which supports it. This plate should be in the bottom of the slot and screwed up firmly, as the clock can never be regulated to accurate time keeping if the spring plate is loose. In case the suspension springs, from accident or other cause, are bent—particularly when they receive a short kink—it is not advisable to try to straighten them; better replace them with new ones. The pendulum can be attached by passing the screw head on the upper end of the stick, through the V shaped opening in the lower brass plate of the suspension spring, using care that the parts are clean. See that the end of the crutch wire stands out straight and perpendicular from the clock frame, and that it is free in the pendulum slot.

The Clock in Beat.

If the clock is not in beat, bend the crutch wire over one of the banking pins a sufficient amount to correct the error; using care not to get the wire bowed out of shape, to the extent that it will strike either of the said banking pins when the pendulum vibrates with the running of the clock.

The Electrical Connections.

After a clock has been hung up upon the wall and levelled up ready to run, see that all the electrical connections are properly made. The ends of the wires should be polished bright with fine emery paper; the binding posts on the battery and on the clock where the wires are fastened, should also be made bright and clean, after which they should be screwed up firmly. A loose connection will expose the surface of the terminal wires, and of the binding posts, so they will in time, become oxidized and prevent the free passage of the electric current. If however, they are screwed up firmly, that portion of the metallic surface which receives the pressure will be protected from oxidation and always permit a free passage of the said current. **These points are vitally important and must not be overlooked.**

Fig. 6, page 10, shows the battery and the electric circuit. The ends G and H of the wires which form the circuit, are soldered into brass discs, the discs being screwed to the clock. This arrangement insures a better connection at the clock end of the circuit than would be attained by clamping the plain wires. In this case the flat face of the disc, which joins the clock, must be bright and clean. One of the wires leading from the clock should join with the carbon, or positive pole, of one of the battery cells. The other wire leading from the clock, should join with the zinc, or negative pole, of the other battery cell. The remaining carbon of one cell, should then be joined to the remaining zinc of the other cell, as shown in Fig. 6. **Never join two positive nor two negative poles together.**

Starting the Clock.

Before starting the clock, raise the lever weights so that one is above the other, a distance corresponding to the spacing of the notches in the ratchets on the center staff, as shown in Fig. 6. After the clock is in operation, observe the action of the electrical mechanism in throwing up the weighted levers. See that they rise

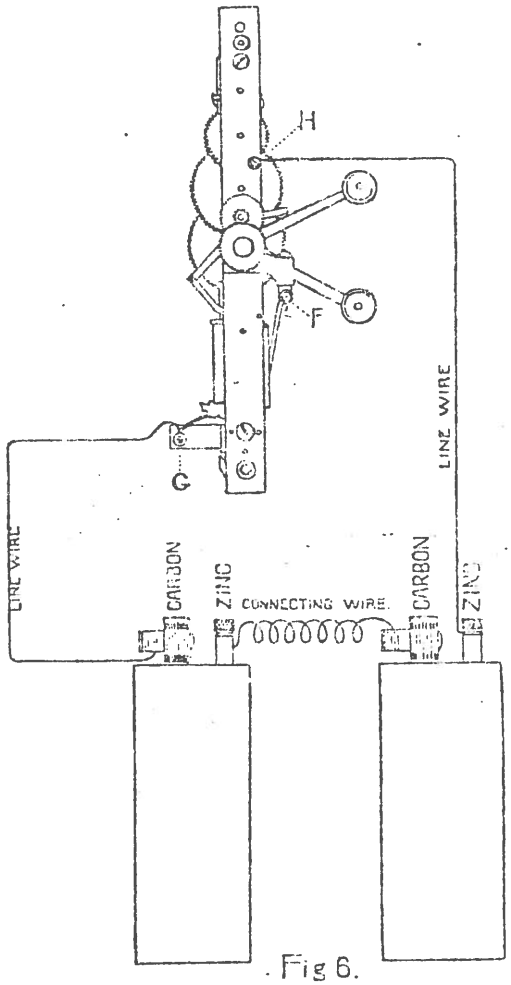

H
F
G
LINE WIRE
LINE WIRE
CARBON
ZINC
CONNECTING WIRE
CARBON
ZINC

Fig 6.

********** MART**********

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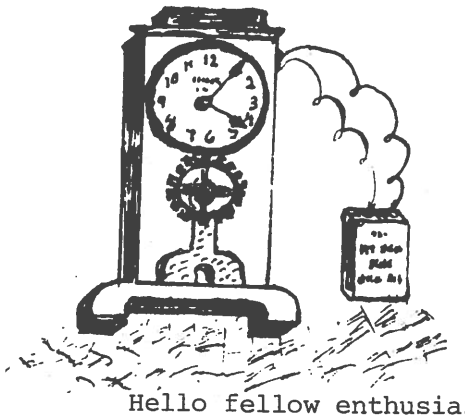
The
JOURNAL
OF THE
ELECTRICAL HOROLOGY SOCIETY
Chapter No 78

June, 1984
VOLUME X--ISSUE #3
Martin C. Feldman, Editor



Hello fellow enthusiasts:

We regret the delay in sending you the April, 1984 issue but problems at the printing end of production were unavoidable. However, hopefully this issue is reaching you close to its scheduled publication date.

We complete the reprinting of THE AMERICAN CLOCK COMPANY repair manual and follow it by another contribution from good friend and EHS 2nd V.P., Leon O'Briant. The NAWCC Museum sent Leon the October 13, 1908 electric clock patent of C. H. White. Leon's two clocks were made by the ELECTRO CLOCK CO., Baltimore, MD. and had escapements of 60 beats as well as 120 beats per minute. The factory reportedly was on Fleet Street in the Canton section of Baltimore and only was in production for a few years (?). The differences between the actual models and the patent are as follows: (1) The patent shows a bent flat metal verge whereas the model has a cut S.T. #2 type verge; the patent shows rectangular-shaped movement plates whereas both models have almost heart-shaped plates. To complicate the picture another movement has turned up with rectangular plates but also with a machine-cut verge. An interesting feature is the extreme taper of the coil pole pieces which mirror the curved moving armature designed to probably assure a more even distribution of magnetic force during the activation period of the electromagnetic assembly. From member and frequent contributor Al Stevens the wiring diagram for the Standard Electric Time Co., Master Clock system of 1/6/27 is included for your reference library.

The Society is in dire need of original articles or reprint material. We would also like to increase our membership and appreciate your spreading the word! All MART ads are FREE--please make use of this service. I would like to invite the Directors and the general membership to make suggestions for improvements, changes and/or direction you would like to see the EHS take. Please address your correspondence to me (address on Pg.12). Thank you.

Until August, enjoy this Issue!

Electromagnetically yours,

Martin C. Feldman, FNAWCC

promptly and with sufficient force. After one of them has risen stop the pendulum and see that the bumper strap is high enough, so that there is no danger of the lever wedging in under the strap and sticking there.

See also that it is not excessively high, as that would make the lever rebound too much. This bumper post, however, is set right when the clock leaves our factory, and seldom, if ever, needs re-adjusting.

Dialing the Clock.

For convenience in putting on the dial, especially to avoid dropping the screws, we suggest that the screws first be placed in the screw holes in the dial, hold dial in left hand, screw-driver in right hand with the blade pressed into the screw slot. Then raise dial until you can see the second hand staff, and center staff through their respective holes in the dial. You are thus enabled to get the position of dial approximately right, and can readily feel a screw point into the threaded hole in the clock frame. It may be well to put in one screw at a time, preferably the top one first, then hold the lower portion of the dial slightly away from the frame, and enter another screw sufficiently to catch the threads. Finally put in the last one, and screw them in to the limit. A clear idea of the above operation can be obtained from Fig. 7, page 12.

Mounting the Hands.

After the dial is on firmly, the hands can be mounted by placing second hand on the escape staff with the point at Fig. 12. Then put minute hand on the cannon pinion and turn the said pinion until the hand points to Fig. 12, then remove said minute hand temporarily and put on hour hand, pointing it also to Fig. 12, and press it tightly on the hour wheel socket. The minute hand may then be replaced as before and the nut screwed on finally. See that the second hand is sufficiently tight upon the staff. The socket may be closed with pair of pliers, if necessary. See also that the hour wheel socket has plenty of freedom in the hole and a little end shake. See that all three of the hands have sufficient room to pass each other without danger or interference, and that second hand clears the dial by a safe distance.

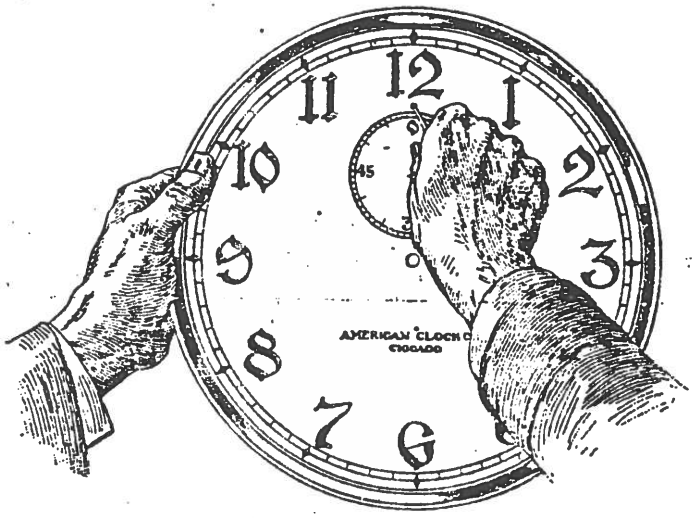


Fig. 7.

Location of the Clock.

In case the clock is to be installed in an upper story of a long narrow building, we suggest that whenever possible it be hung so as to face the broad side, instead of the narrow end, of the said building, as the vibration occasioned by storms will have much less effect upon it when so placed.

Cleaning and Oiling.

The clock should be taken apart, cleaned and oiled periodically; as often, under ordinary circumstances, as once in two years, although this must depend entirely, as with other clocks, upon the surrounding conditions. Some clocks would remain comparatively clean for a much longer period, while others would become dirty in a shorter time.

The lever bushings should be well oiled to avoid friction on the center staff when the magnets pull down the armature and link and throw up the lever.

In order to clean the levers, the front ratchet must be removed, after first driving out the taper pin, when the levers will slip off from the staff. Care must be used to replace the ratchets in the same position when putting the movement together again. The edges of the ratchets should receive a little oil, as well as the train pivots and the armature pivots. The pallets should be oiled very sparingly.

SPECIAL NOTICE.

Do not under any circumstances oil the contact points, nor permit any oil to reach them. Keep the oil off of the upper contact spring and the pin against which it bears. Do not oil the long pin or post on which the upper contact rocks. This bearing is intended to be clean and dry.

Broken Parts—How to Remedy.

In case any of the clock parts are broken, or seriously injured, we recommend that our patrons send to the factory for duplicates. When a pallet stone is broken, the pallet complete should, if pos-

sible, be sent to the factory. It will be more satisfactory if we get the pallet together with the staff and crutch wire, so that all of the parts can be matched by our standards. In case a part is ordered, state whether for a 60, 80, 100 or 140 beat movement. It is well also to give the serial number of the movement for which it is intended.

Stoppages—Their Causes.

If the clock stops and the lever weights are found together, the usual cause is exhaustion of the batteries. This is practically the only cause, unless something is wrong with the electric circuit, as previously described. If, when clock stops, said weights are found in proper position, as shown in Fig. 6, the fault lies, not in the battery nor electric circuit, but may be due to any of the following causes:

An injured escape wheel tooth, a broken pallet stone, interference of hands, lack of oil, etc., or any defect which would cause stoppage of clocks in general.

If a clock is located in a shaky building it may, during a severe storm, stop and possibly start again; or it may run continuously, but with an irregular rate. **Also an irregular rate will certainly result from the suspension spring being loose in the iron hanger, or from the crutch wire striking the banking pins, as has been previously described.**

Directions for Installing Wet Batteries.

1st. Dust out the glass jar thoroughly, then place therein the contents of the paper bag (Sal ammoniac).

2nd. Fill it to first water line with water, then stir until the solution is nearly dissolved.

3rd. Insert the carbon through slit in the cover, then attach the gonda to the carbon with the rubber bands around the top and bottom. Place the gonda and carbon in the solution, then insert the zinc.

4th. In filling and putting batteries in place be careful not to slop the solution upon the outside of the jar; also see that the cover is pressed down tightly to prevent the evaporation of the solution.

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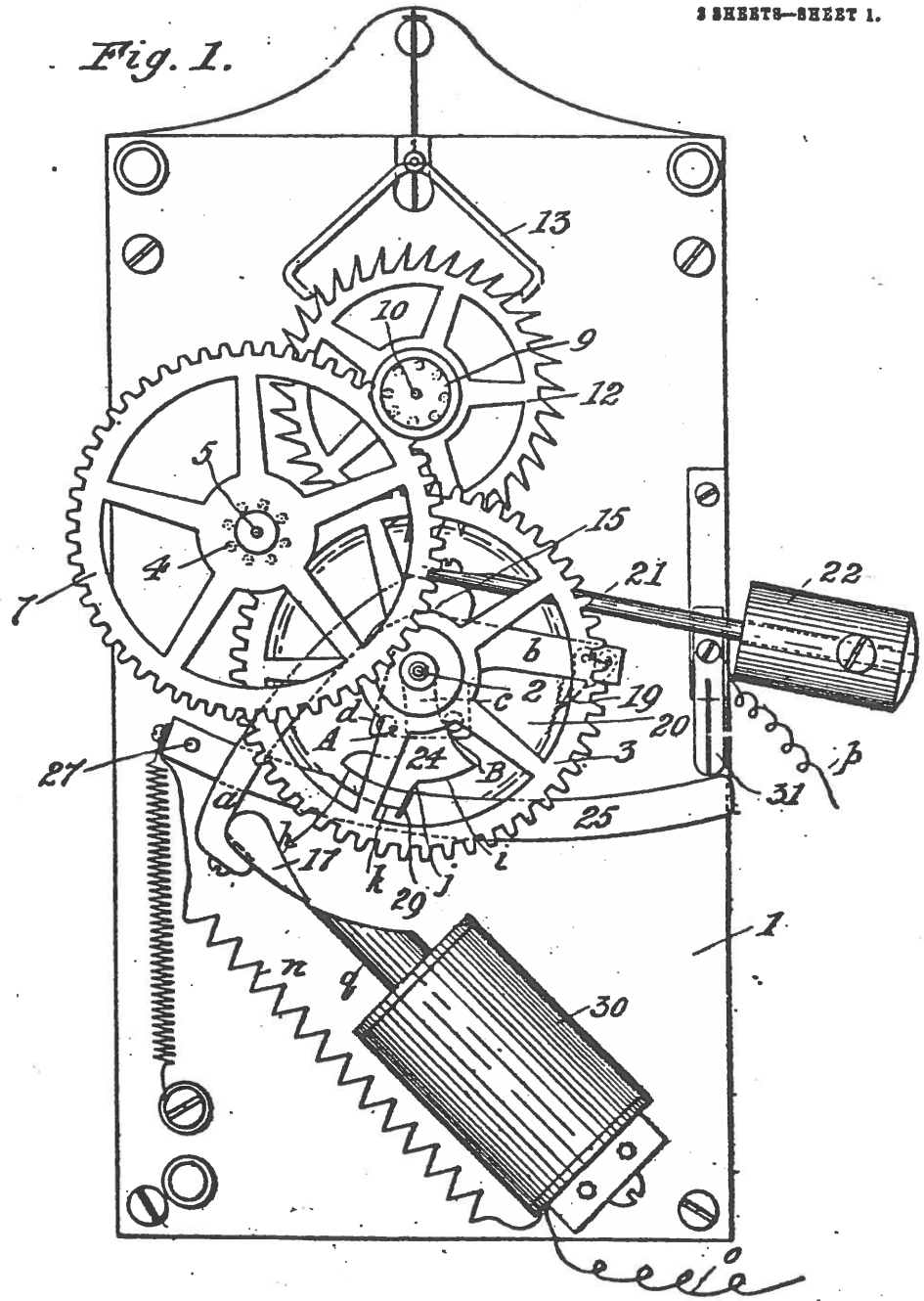
C. H. WHITE.
ELECTRIC CLOCK.
APPLICATION FILED APR. 24, 1907.

901,050. Patented Oct. 13, 1908.

3 SHEETS—SHEET 1.

Fig. 1.



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Charles H. White
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ATTORNEY.

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C. H. WHITE.

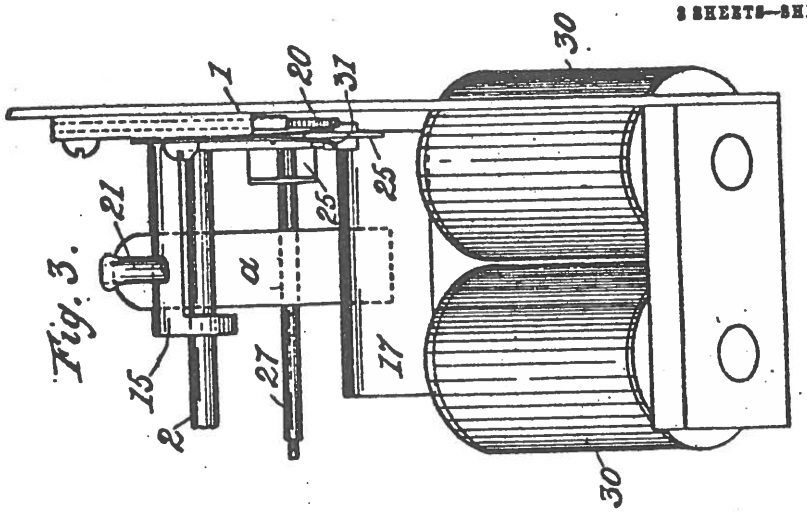
ELECTRIC CLOCK.

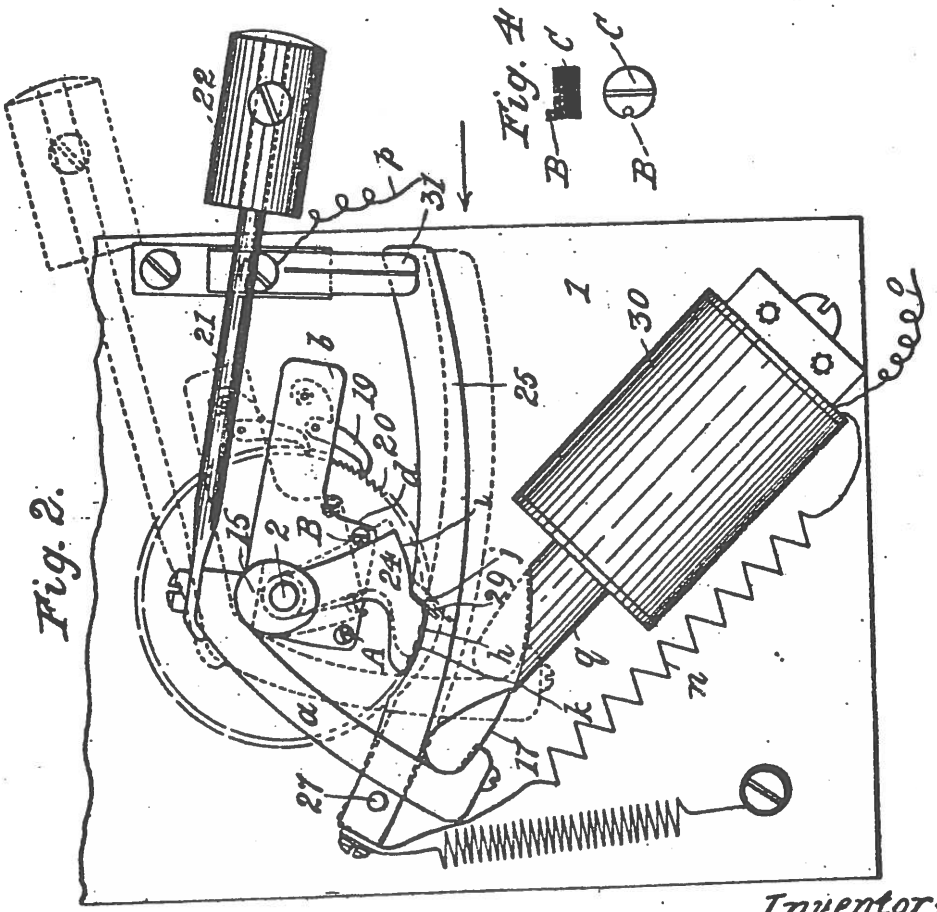
APPLICATION FILED APR. 24, 1907.

901,050.

Patented Oct. 13, 1908.

2 SHEETS—SHEET 2.





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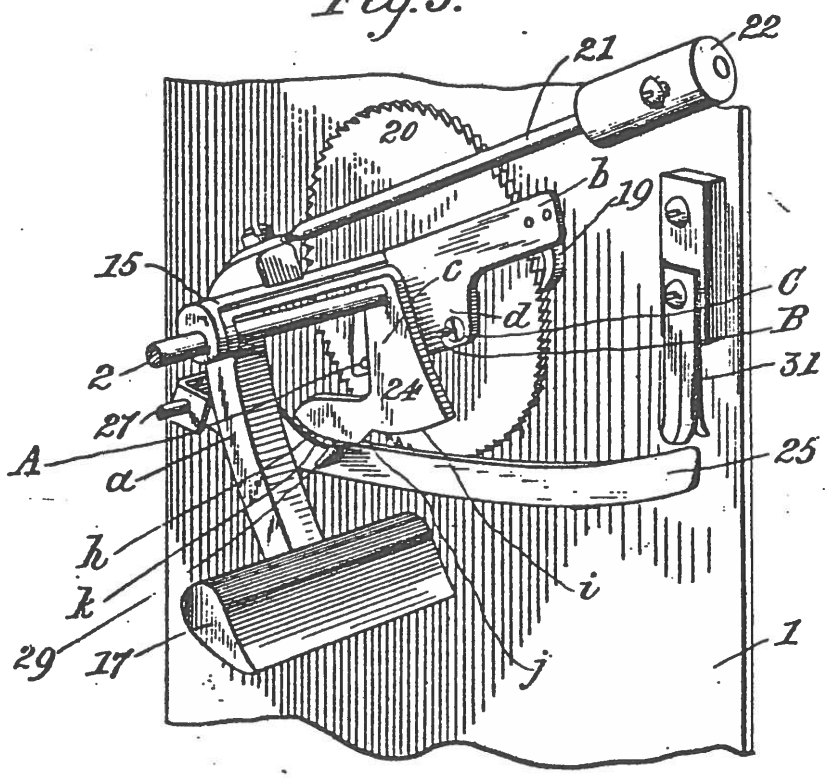
Inventor:
Charles H. White,
by Wm. H. T. Howard, Atty.

C. H. WHITE.
ELECTRIC CLOCK.
APPLICATION FILED APR. 24, 1907.

901,050. Patented Oct. 13, 1908.

3 SHEETS—SHEET 3.

Fig. 5.



Witnesses
Frank B. Wooden.
Alberta B. Richards

Inventor
Charles H. White,
By G. H. & W. J. Howard,
Attorney

-759-9

UNITED STATES PATENT OFFICE.

CHARLES H. WHITE, OF SPARROWS POINT, MARYLAND.

ELECTRIC CLOCK.

No. 901,050. Specification of Letters Patent. Patented Oct. 13, 1908.

Application filed April 24, 1907. Serial No. 369,928.

To all whom it may concern:

Be it known that I, CHARLES H. WHITE, of Sparrows Point, in the county of Baltimore and State of Maryland, have invented certain Improvements in Electric Clocks, of which the following is a specification.

This invention relates to certain improvements in that class of electric clocks in which the time movement is driven by a descending weighted lever, the said lever being raised at intervals by electro-magnets and an armature.

In the further description of the said invention which follows, reference is made to the accompanying drawings forming a part hereof, and in which,—

Figure 1 is a front view of such parts of the clock movement as are involved in the present invention. Fig. 2 is an enlarged front view of certain parts of the movement shown in Fig. 1. Fig. 3 is a view of certain parts of Fig. 2, looking in the direction indicated by the arrow. Fig. 4 represents two still enlarged views of an adjustable pin employed to communicate motion to a part of the clock movement, as hereinafter described. Fig. 5 is an enlarged perspective view of certain parts of the clock movement.

Referring now to the drawings, 1 is the back or rear plate of the clock movement, and 2 the minute arbor to which is fastened the first gear wheel 3 of the train of gearing comprised in the movement. The wheel 3 meshes with a pinion 4 on the arbor 5. The pins serving as teeth of the pinion 4 and those of another similar pinion hereinafter referred to, are shown dotted in Fig. 1. The arbor 5 carries the second gear wheel 7, and this wheel meshes with a pinion 9 on the escapement arbor 10. The escapement wheel is denoted by 12 and the anchor by 13.

All the parts of the clock movement thus far described, are common to clocks; and in order to avoid complication in the drawings, the remaining gearing which is embraced in a non-electric clock movement is omitted.

15 is a rocker placed loosely on the minute arbor, having a shank *a* to which an armature 17 is fastened. The said rocker is also provided with an arm *b* which carries a spring-held pawl 19 the point of which rests on the teeth of a ratchet wheel 20 fastened to the minute arbor 2.

21 is a rod shown as fastened to the rocker 15, having an adjustable weight 22 at its end, which as it descends, furnishes the power necessary to effect the action of the clock movement.

24 is a cam hung loosely on the minute arbor 2, with its active edge resting on a spring-held lever 25 fastened to a spindle 27 the pintles of which are loose in the clock plates only one of which is shown.

The shank *c* of the cam 24 is situated between the pins A and B projecting from the enlargement *d* of the arm *b*. These pins are formed on the face of screws C one of which is shown on an enlarged scale in Fig. 4; and they are placed eccentrically with respect to the axis of the screws, as is well shown in that figure. The pins are so spaced that the rocker 15 and its attachments will have considerable vibratory movement independent of the cam 24; and the object of placing the pins to one side of the axis of the screws, is to admit of the independent movement of the cam, being increased or diminished as required, the change in space between the pins being effected by turning the screws, as will be readily understood.

The active surface or edge of the cam is formed of two portions *h* and *i* which are concentric with the surface of the minute arbor 2, and these surfaces are connected by the practically straight tangential surface which forms a shoulder *j*; and the lever 25 is provided with a notch *k* in which the curved surface *h* of the cam will rest when the cam is in the position shown in Fig. 2.

29 is a plate of hard material such for instance as steel, which forms the abrupt edge of the notch *k* to reduce wear at that point, in the operation of the clock as hereinafter described.

30, 30 are electro-magnets in an electric circuit comprising wires *n*, *o*, *p*, the lever 25, and the insulated split contact plate 31. This circuit is open when the free end of the arm 25 is disconnected from the contact plate, as shown in Fig. 5 and by the dotted delineations of the said arm in Fig. 2. The battery whereby the magnets are energized is not shown.

By reference to Fig. 2 it will be seen that the ends of the cores *q* of the magnets are concentric with the minute arbor, consequently there is a common distance between the cores and the armature during the swinging or vibratory movement of the armature to which it is subjected in the operation of the clock.

It will be understood that the downward

movement of the weighted rod 21 effects the operation of the clock, the spring pawl 19 causing the rotation of the ratchet wheel 20 which is fast to the minute arbor 2. In Fig. 1 the various parts of the clock movement are shown in the positions which they occupy when the weighted rod 21 had nearly reached its lowest position and is about to become an inoperative device. In the further motion of the arm *b* of the rocker 15 consequent upon the fall of the weighted rod, the pin B which is in contact with the edge of the cam, carries its shoulder *j* into the slot *k* which as it enters allows the end of the lever 25 to make electric contact with the split plate 31. This contact of the lever 25 with the split plate 31 closes the electric circuit, and by the armature 17 being drawn down into the position shown by its dotted delineation in Fig. 2, the weighted rod 21 is instantly lifted to its highest position shown by the dotted lines in the same figure, the pawl clicking on the teeth of the ratchet wheel. This movement of the weighted rod as described is so rapidly performed, that the momentum of the weight causes that device to pass beyond a point it would reach by a gradual upward movement.

At the beginning of the upward movement of the weighted rod 21, the portion *h* of the cam 24 is fully within the slot *k*, and the contact of the lever 25 with the split plate 31, complete, as shown in full lines in Fig. 2; and as the pin A stands a proper distance from the edge of the shank *c* of the cam 24, the said weighted rod continues to ascend under the influence of the magnet, until the armature 17 is directly over or in alinement with the cores of the magnets as shown by the dotted lines in Fig. 2. The pin A then strikes the cam shank and the momentum of the weight 22 throws the shoulder *j* over the edge of the slot *k*, when the surface *h* will ride on the upper edge of the lever 25 which is forced from contact with the split plate 31 as shown by the dotted lines in Fig. 2 and in full lines in Fig. 5. The electric circuit now being open, the weighted lever descends from its elevated position shown in Fig. 5 and effects the operation of the clock, until it approaches its first position, when the pin B throws the cam to its original position shown in full lines in Fig. 2, and the weighted rod again ascends, and the operation described is repeated.

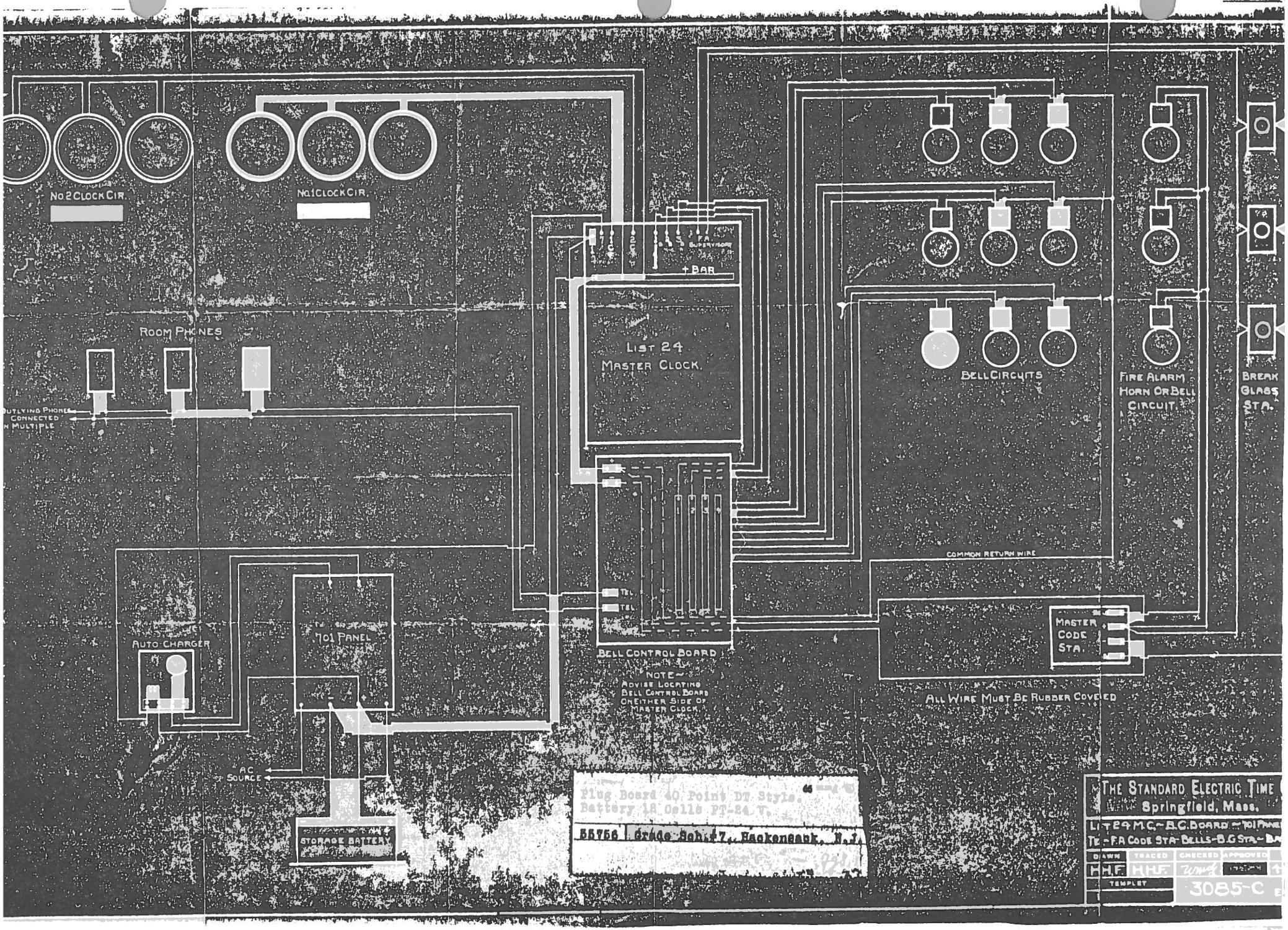
I claim as my invention:—

1. In an electric clock, the minute arbor thereof provided with a tight ratchet wheel, a rocker which is loose on the arbor having an extended weighted arm and carrying a pawl which engages with the teeth of the ratchet wheel together with a shank bearing an armature, a cam suspended loosely from the arbor, an independent spring-held lever having a notch therein to receive the cam, means to communicate motion from the rocker to the cam and thereby in the vibratory motion of the rocker, throw the cam into and out of the said notch, combined with a magnet and a contact plate for the notched lever, the said magnet notched lever and contact plate being in an electric circuit, substantially as specified.

2. In an electric clock, the minute arbor thereof provided with a tight ratchet wheel, a rocker which is loose on the arbor having an extended weighted arm and carrying a pawl which engages with the teeth of the ratchet wheel together with a shank bearing an armature, a cam suspended loosely from the arbor, an independent spring-held lever having a notch therein to receive the cam, spaced pins on the rocker to communicate motion from the rocker to the cam and thereby in the vibratory motion of the rocker, throw the cam into and out of the said notch, combined with a magnet and a contact plate for the notched lever, the said magnet notched lever and contact plate being in an electric circuit, substantially as specified.

CHARLES H. WHITE.

Witnesses:
THOMAS G. HULL,
WM. T. HOWARD.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Room Phones
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Bell Circuits
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All Wire Must Be Rubber Covered
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Plug Board 40 Point DT Style.
Battery 18 Cells PT-24 T.
55756 Grade Sch. 7, Hackensack, N.J.
The Standard Electric Time Co.
Springfield, Mass.
List 24 M.C.~ B.C. Board ~ 701 Panel
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The
JOURNAL
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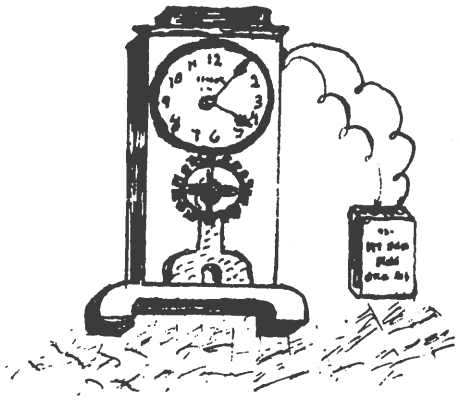
ELECTRICAL HOROLOGY SOCIETY
Chapter No 78



August, 1984
VOLUME X-- ISSUE #4
Martin C. Feldman, Editor

Hello fellow enthusiasts:

In this month's issue we are reprinting a patent of particular interest invented by Mr. R.J. Sheehy. The clock appears to have a high-quality type regulator face and a remontoire constant torque drive. In addition there is a separate mechanism for printing instantaneous time to a "fraction of a second". Whether this clock actually reached production is a mystery, however it is a complicated example of an early printing chronograph electrically wound.

The second main section of the enclosed issue is from the 1927 Sangamo Electric Company clock catalog. This section which today might be described by some as "company PR hype" has proven over the years to be as close to "truth in advertising" as many would desire. These clocks have run well, kept a good rate and have required little more than ordinary common sense care. Later Journals will feature some of the models produced by Sangamo.

Marty Swetsky, V.P.(EHS) has been quite active in organizing meetings of EHS members and non-members at Regionals. His original idea was to make the EHS available to all interested clock people and to give local EHS members a chance to meet each other and at least one member of the Board of Directors. These little mini-meets will have exhibits, question and answer periods and general swapping of views and perhaps a few electromagnets as well! Look for notices on the bulletin boards of any Regionals you attend to see whether an EHS MINI-MEET is scheduled. You won't be sorry.

Enjoy this issue.

Electromagnetically yours,
Martin C. Feldman, FNAWCC

3 Sheets—Sheet 1.

R. J. SHEEHY.

ELECTRIC-CLOCK.

No. 179,873. Patented July 18, 1876.

Fig. 1.

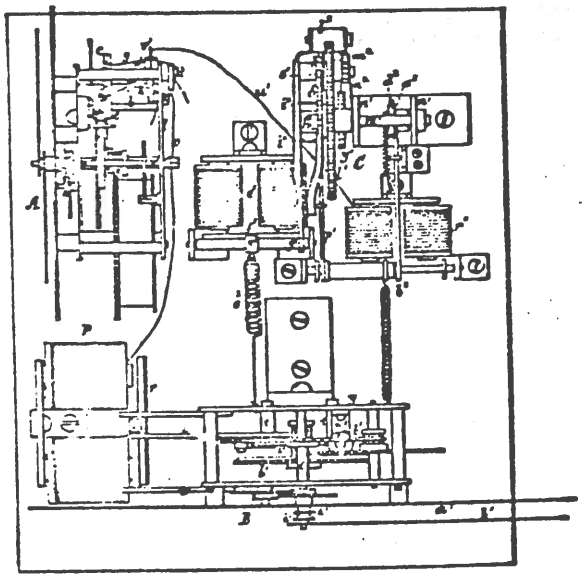
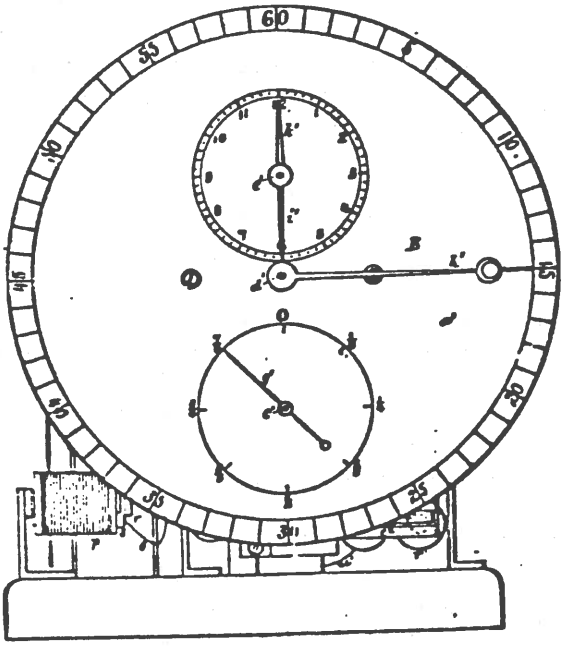


Fig. 2.



Witnesses.
J. W. Pipes.
L. W. Miller

Robert J. Sheehy
By his attorney
R. H. Eddy

3 Sheets—Sheet 2

R. J. SHEEHY.

ELECTRIC-CLOCK.

No. 179,873. Patented July 18, 1876.

Fig. 4.

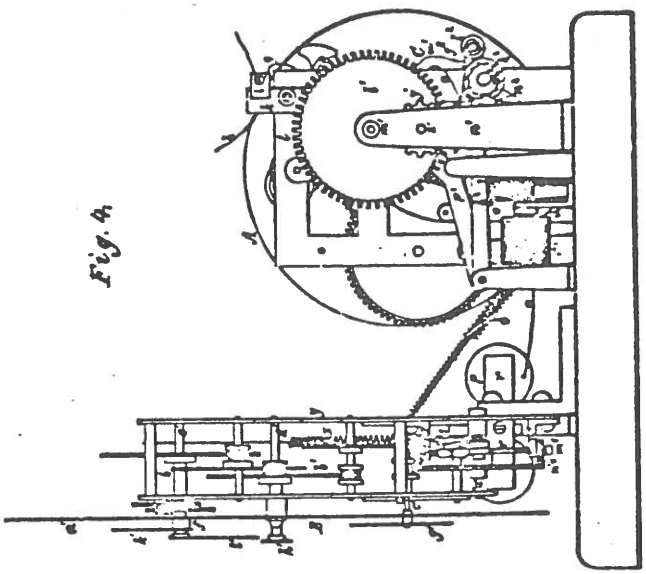
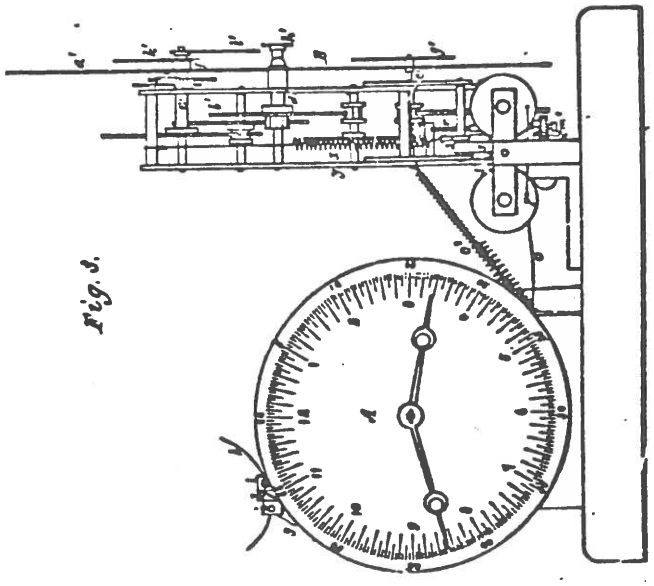


Fig. 5.



Witnesses.
L. W. Pitzer.
L. B. Wilbur

Robert J. Sheehy.
by his attorney.
R. H. Eddy

3 Sheets—Sheet 3.

R. J. SHEEHY.

ELECTRIC-CLOCK.

No. 179,873. Patented July 18, 1876.

Fig. 6.

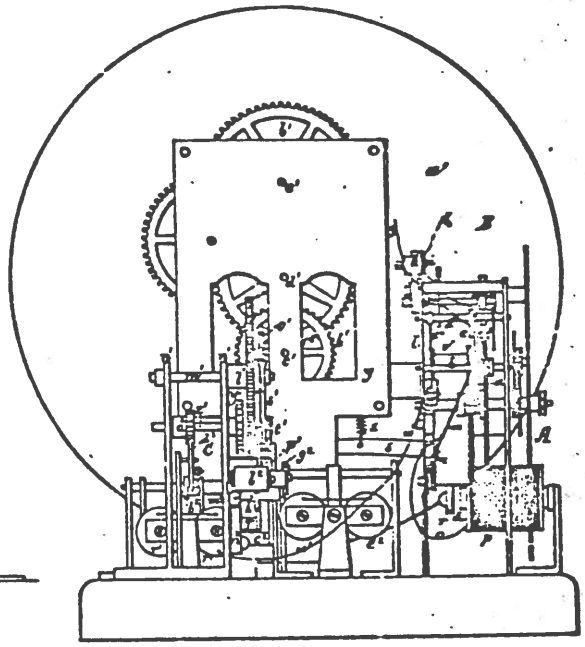


Fig. 2.

Fig. 3.

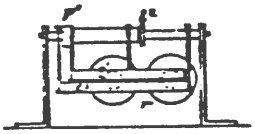


Fig. 7.

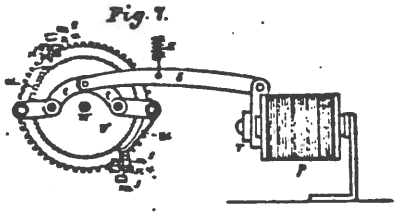


Fig. 6.

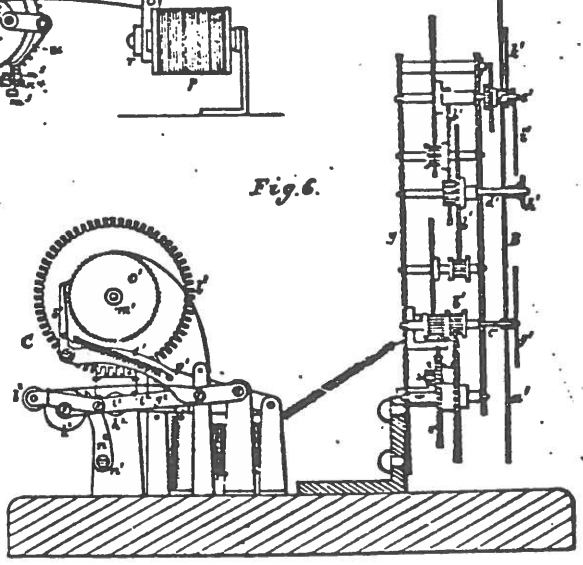
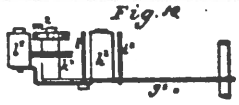


Fig. 8.



Witnesses:
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G. Gabrielle.

Robert J. Sheehy.
by his attorney
R. K. Ely

UNITED STATES PATENT OFFICE.

ROBERT J. SHEEHY, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN ELECTRIC CLOCKS.

Specification forming part of Letters Patent No. 179,873, dated July 18, 1876; application filed March 20, 1876.

To all whom it may concern:

Be it known that I, ROBERT J. SHEEHY, of Boston, in the county of Suffolk and State of Massachusetts, have made a new and useful invention having reference to Electric Clocks or Time-Pieces; and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a front elevation, Figs. 3 and 4 opposite side elevations, Fig. 5 a rear elevation, and Fig. 6 a longitudinal section, of an apparatus embodying my invention. Fig. 7 is a side view of the ratchet-wheel *r*, the two pawls *u u*, their carrying-levers *t t*, an armature-lever, *s*, armature *r*, and electro-magnet *p*, as employed in the auxiliary time-piece or indicator. Fig. 8 is a side elevation of the escapement-wheel and separate insulated pallets of the main clock, such figure showing the insulator of the wheel and its arbor.

By means hereinafter described, a secondary clock, or any number of such, put in electrical connection with a main clock, may be made to indicate fractions of seconds of time, and such may also be printed on a slip of paper, as occasion may require, especially in a horse or boat race.

In the said drawings, A denotes a clock for indicating time. In this clock, *a* is the escapement wheel, *b* its arbor, *c d* the escapement-pallets, and d^4 their arbor. The two pallets *c d*, made of metal, are separate from each other and fastened to a connection-piece or insulator, *e*, of ivory, glass, or vulcanite, this latter being fixed at its middle to the escapement-pallet arbor d^4. The escapement-wheel *a* is also electrically insulated from its arbor *b* by a disk, *f*, of vulcanite, fastened to both concentrically. From the two pallets *c d* separate circuit-wires *g h* are led to circuit-connections *i i*, fastened to a plate, *k*, of vulcanite, fixed to the clock-frame *l*. Touching the side of the escapement-wheel is a spring, *m*, projecting from a piece of vulcanite, *n*, fixed to the frame *l*. From this spring a circuit-wire, *o*, is led to an electro-magnet, *p*, constituting part of the auxiliary time-indicator B. An electric circuit or currents and battery being properly applied to the said magnet *p*, and the wires *g h o* of the pallets *c d* and spring *m*, it will be seen that at every beat of each pallet the circuit of the magnet will be closed in order for the magnet to attract and draw up to it its armature *r*, which is attached to the shorter arm of a bent lever, *s*. The longer arm of this lever *s*, at or near its free end, is pivoted to the inner arms of two other levers, *t t*. (See Fig. 7.) To the outer arms of the levers *t t* two pawls, *u u*, are jointed, they having between them, and serving to revolve, a ratchet-wheel, *r*, fixed upon the driving-arbor *w* of the auxiliary clock or time-indicator B. Furthermore, there is to the lever *s* a spring, *x*, which, fastened to the frame *y* of the auxiliary time-piece, serves to move the lever *s* in a direction opposite to that in which it is moved by the magnet.

By the conjoint operations of the spring and the magnet the lever can be moved so as to put in motion the auxiliary levers in a manner to cause their pawls to impart to the ratchet-wheel an intermittent rotary motion in one direction. Connected with the driving-arbor *w* and the frame *y* is a dial, a^1, and there is also connected with such arbor a train, b^1, of wheels for revolving four arbors, c^1 d^1 e^1 f^1, carrying hands g^1 h^1 i^1 k^1 for indicating upon the dial hours, minutes, seconds, and fractions of seconds, the dial being provided with suitable numbers, marks, and divisions, all as represented.

Now, if we suppose the auxiliary time-indicator B to be situated in one place, and the main clock A in another or distant one, we have the means of showing, by the indicator B, the time of the main clock and also the fractions of seconds, the main clock being supposed to indicate only hours and minutes.

In connection with the main and auxiliary clocks, or at the station of either, I employ an apparatus for printing on a strip of paper, at any instant of time, as may be desirable, the minute, second, and fraction of second indicated by the auxiliary clock, and expressive of that instant.

This printing apparatus and auxiliary clock are particularly useful for timing a heat of a race and permanently recording such. Besides, they may also be employed to advantage for various other useful purposes.

In the drawings, the printing apparatus is shown at C, and may be described as follows: l^1 is a type-wheel, having on its periphery a series of types for printing seconds and fractions thereof. This wheel is fixed on an arbor, m^1, supported in standards n^1 n^1, and provided with a ratchet-wheel o', all being arranged as shown. A lever, p', provided with an armature, q', and an electro-magnet, r', therefor, carries a pawl, s', to engage with the ratchet-wheel o'. A spring, t', arranged as shown, serves to pull the pawl against the periphery of the wheel o'.

The circuit-wire of the magnet r', shown at w', leads to a bent spring, v', projecting from a piece of vulcanite, w', fastened to the frame of the main clock. Directly over the free end of the spring v', and projected from the escapement pallet-arbor d^4, is a metallic arm, x', as shown. At each beat of each pallet the arm x' will be carried in contact with the spring, whereby the circuit will be closed, and the electro-magnet r' be made to attract and move the armature q' and lever p', thereby causing the type-wheel to be partially revolved.

Besides the type-wheel l^1 there is another type-wheel, y', for printing minutes. It is arranged with the wheel l^1 in the manner as shown, and fixed on a separate arbor, z', provided with a ratchet-wheel, a^2.

Another lever, b^2, fixed to another armature, c^2, (see Fig. 9, which is an inner end view of the magnet r' and its two armatures,) to be worked by the magnet r', carries a pawl, d^2, to actuate the ratchet-wheel a^2.

With the two printing-wheels l^1 y' I employ a mechanism for carrying a strip of paper, feeding it along, and forcing it up to such wheels at such instant as it may be desirable to obtain imprints of the time. This apparatus consists, first, of an electro-magnet, e^2, and its armature f^2. The said armature is attached to the shorter arm of a lever, g^2, provided with an elastic roller, h^2, and two prongs, i^2 i^2, arranged as shown, particularly in Fig. 10, which is a top view of the printing-lever and its adjuncts. Near its free end the lever carries a feed-wheel, k^2, and an elastic roller, l^2. The feed-wheel has a ratchet-wheel, m^2, fixed on its arbor, such wheel m^2 being to work against a pawl, n^2, pivoted to one of the standards n^1. The strip of paper to be printed is to be run up between the roller l^2 and the feed-wheel k^2, thence between the two prongs i^2 i^2 and the roller k^2.

A spring, o^2, fixed to the armature f^2, serves to draw it back from the magnet. The magnet being placed in a circuit separate from the others, will, whenever such circuit may be closed, attract and move the armature, and consequently cause the strip of paper to be printed by the type-wheels. During each downward motion of the printing-lever, its feed-wheel will be partially revolved, so as to feed the strip of paper along ready for another imprint.

In order to increase the efficiency of the magnet r' to cause it to attract to it the secondary armature c^2, which is held off by a force greater than that required to attract the fellow armature, I make use of a "resistance-coil" or an auxiliary battery in the circuit of the magnet.

In Figs. 3, 4, and 7, m^3 represents a screw, which screws down through a stationary projection, n^3, and directly over one of the pawls, u, for revolving the ratchet-wheel v upon the driving-arbor w of the auxiliary clock or time-indicator B. There is upon the screw m^3 a check-nut, n^4, which screws against the projection n^3, and holds firmly the screw m^3 from revolving. The said screw m^3 is to act as a stop to the pawl to prevent it from rising too high, so as to take more teeth of the ratchet than may be required. To each of the pawls u I use such a stop.

In the apparatus as hereinbefore explained, I claim as of my invention as follows:

1. In combination with a dial, a^1, and a train, b^1, substantially as described, (to indicate hours, minutes, seconds, and fractions of seconds,) the ratchet-wheel v, the two pawls u u, their carrying-levers t t, the armature-lever s, spring x, armature r, and electro-magnet p, all arranged substantially as set forth.

2. The combination of the ratchet-wheel, carrying levers t t, two pawls, u u, the armature-lever s, spring x, armature r, and electro-magnet p, all arranged essentially as specified.

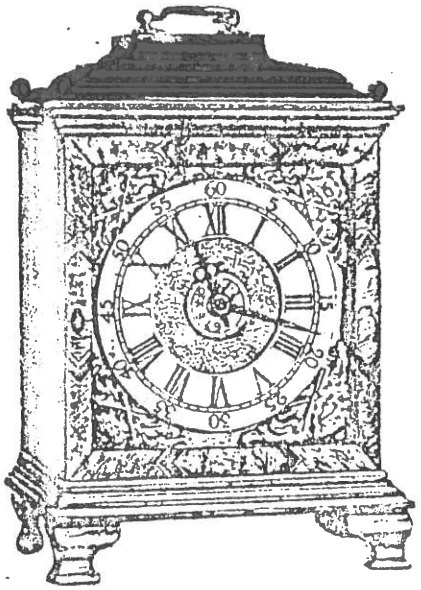
3. In the clock, the separate escapement-pallets c d, having separate circuit-wires g h, and connected with each other and their arbor d^4 by an insulator, e, affixed to the latter, the pallets in such case being electrically insulated from each other and the arbor.

4. The separate escapement-pallets c d, provided with separate circuit-wires g h, and connected with the escapement-arbor d^4 by the insulator e, as described, in combination with the escapement-wheel a, connected with its own arbor b by an insulator, f, and provided with the circuit-spring m and wire o, all as set forth.

5. The combination of the magnet r', its two armatures q' c^2, their two levers p' b^2, pawls s' d^2, ratchet-wheels o^1 a^2, two type-wheels l^1 y', and their arbors m^1 z', all arranged and applied essentially as set forth.

ROBERT J. SHEEHY.

Witnesses:
R. H. EDDY,
J. R. SNOW.



ELECTRICALLY WOUND

SANGAMO CLOCKS

FOR PROMPT SERVICE
ADDRESS INQUIRIES AND ORDERS TO

SCHIEFER ELECTRIC CO.
INCORPORATED
615 CITY BANK BLDG.
SYRACUSE, N. Y.

HIGH TENSION EQUIPMENT	ELECTRICAL INSTRUMENTS
OUTDOOR SUBSTATIONS	WATTHOUR METERS
OIL CIRCUIT BREAKERS	METER TESTING DEVICES
MOTORS AND GENERATORS	POTHEADS
OIL MOTOR STARTERS	DISTRIBUTION BOXES

Guarantee

THE SANGAMO CLOCK

Electrically Wound

[1]

ACCURACY
within 30 seconds a week.

[2]

CONTINUED OPERATION
through all current interruptions
up to 24 hours.

[3]

PARTS
warranted for *2 years.*

THE 3-POINT GUARANTEE

The facts of the Sangamo Clock's accuracy, performance and quality often strain belief. Therefore, this very definite and very remarkable guarantee is given with each and every clock.

THE HOW AND WHY OF THE ELECTRICALLY WOUND CLOCK

THE Sangamo Clock differs fundamentally from all preceding types of electric clocks.

It has no batteries, no contacts. It is not affected by current interruptions. It operates at any frequency. It is a complete, independent clock, usable wherever electric current goes, and more dependable even than your electric light.

The Sangamo clock movement consists of three main elements:

1 . . . A lever escapement, watch-type, full-jeweled (11 jewels).

2 . . . A clock gear-train, with chronometer-type gears, gold-plated.

3 . . . A small precision electric motor built into the movement.

The clock improves on common clock results in two principal ways:

1 . . . Winding is eliminated.

2 . . . Accuracy within 30 seconds a week is maintained and guaranteed.

Tests indeed show that Sangamo Clocks are generally more accurate and reliable than most watches. This is because:

1 . . . The electric motor keeps the mainspring at constant tension. This eliminates the fast-and-slow variations for which every hand-wound timepiece must be adjusted.

2 . . . Large, perfectly-formed chronometer-type gears insure minimum of friction.

3 . . . The 11 jewelled escapement is subject to less temperature variation.

4 . . . No adjustments are necessary for position.

The operation of the clock is as follows:

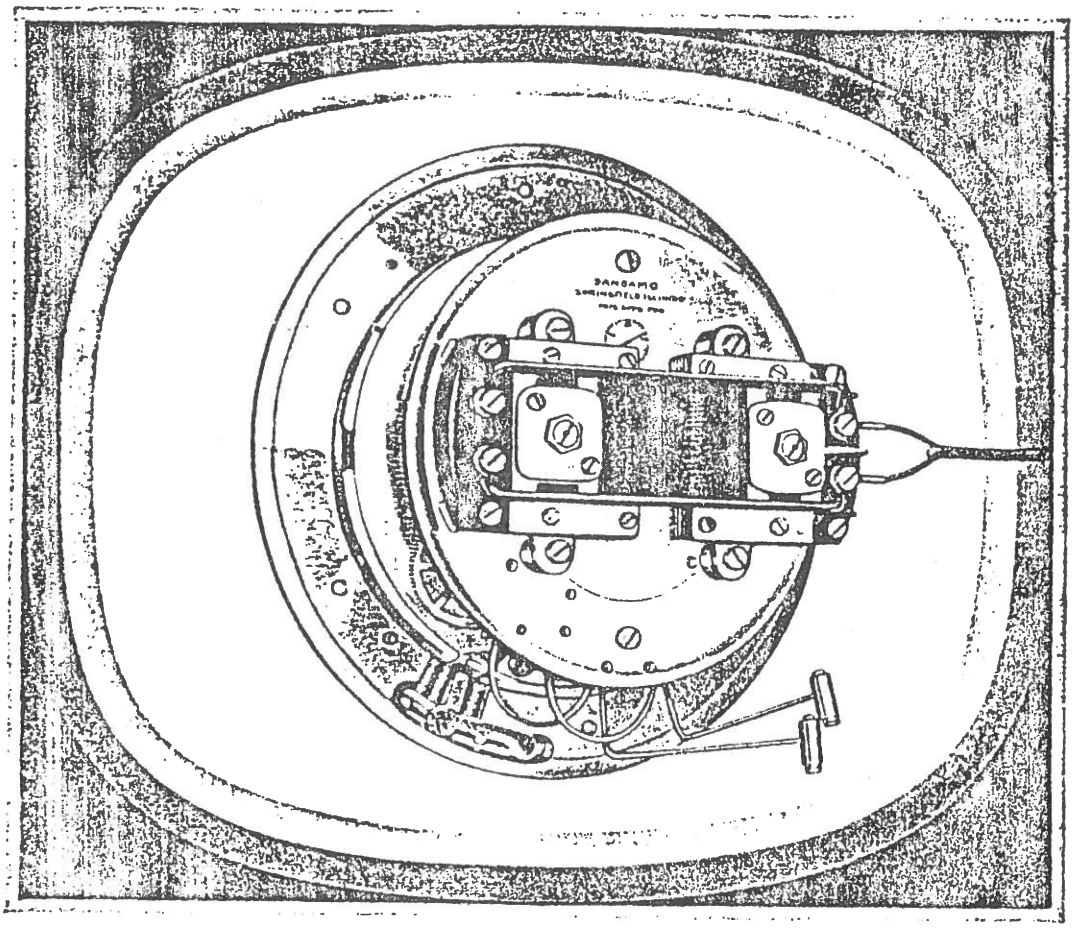
Setting-up . . . The clock can be placed anywhere. There is no need for levelling. In the back of the clock is an electric receptacle. Plug in the cord and connect it with any alternating current convenience outlet or light socket.

Starting . . . Simply switch on the current, and set the hands to the correct time. You will hear a faint purr inside the clock. That is the motor; it is winding the main spring. The motor runs about five minutes; the main spring is then wound to proper tension.

The escapement begins almost immediate operation. Its tick is a busy watch tick instead of a slow, measured pendulum tick.

Running . . . From the day you start it, the clock needs hardly any attention. Noiselessly, every few seconds, the motor creeps an infinitesimal bit, holding the main spring at the precisely proper tension.

Current interruptions do not affect the operation or the accuracy of the clock. The main spring has a reserve of 24 hours.



THE SANGAMO STRIKING CLOCK

Sangamo is also the first clock with electric strike! All Sangamo striking models mark the half-hours and the hours with a lovely, resonant strike.

The mechanism by which this is accomplished is positive, ingenious, and simple in the extreme. The illustration above shows the entire clock movement, from the back. Please note the two motors. One winds the main spring; the other operates the strike. In non-striking models, only one motor is used. These motors are practically the same as those used for the past five years in certain types of Sangamo meters. This view also shows how simple is the movement. It consists of three elements: (1) the small precision motors; (2) the full-jewelled (11 jewels) watch escapement (not visible); (3) the gear-train. The gears are chronometer-style, and gold-plated. Detailed diagrams and descriptions on pages 28 and 29.

The combination of this very fine piece of clock-making with the electric winding gives the Sangamo Clock its railroad accuracy, and enables the extraordinary three-point guarantee.

Current consumption . . . The motor uses 1¼ watts. One 50-watt lamp uses as much power as 40 of these motors. Current consumption is negligible, costing only about 50 cents a year.

Current required . . . The Sangamo Clock operates on any commercial alternating current circuit. The standard motor operates on 80 to 130 volts, 50 to 125 cycles, and is suitable for the great majority of installations throughout the world.

For 200 to 250 volts or for 25 to 42 cycles, motors with slightly different coils are substituted, and the performance is equally good.

Care . . . The Sangamo Clock, like every other timepiece, needs occasional oiling and cleaning. Because of its design and because of its sealed, dust-proof case, this operation need be performed only once in two years. The work should be done by a jeweler.

Workmanship and finish . . . The workmanship in Sangamo Clocks is equal to that in the finest watches. The plates are nickel-plated and beautifully finished, the pinions and staffs are cut from solid steel, hardened and polished to the finest finish, and all gears, accurately cut for minimum friction, are gold-plated. Blued steel cylinder-head screws are used to unite the various parts of the movement, including the motor, giving the same pleasing appearance as in the finest watches. It may be safely said that no other lever-escapement clock surpasses the Sangamo Clock in beauty of construction and finish.

Direct Current

The clock motor will not operate on direct current. For the convenience of jewelers in direct current districts, Sangamo has developed a small vibrating converter which may be used to wind clocks for display purposes. Where the operation of a considerable number of clocks is involved, a small rotary converter, full automatic design, may be installed.

The Motor

The motor which is built into the movement is not an experiment. It has been used in certain types of Sangamo meters for many years . . . and has definitely proven itself capable of service equal to hundreds of years of clock operation.

**********MART**********

NOTICE: ALL MART ANNOUNCEMENTS ARE PRINTED FREE! Send material to M. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467

FOR SALE: 30 to 40 electromechanical clocks; commercial electrical clocks and others. Call after 12 noon--George Zlobin, (212) 763-6124

FOR SALE: High quality electrical clocks. Send SASE for list or call: Dr. Scott R. Samuel, 745 Linden Ave.,Los Altos, CA 94022--(415) 941-6182

FOR SALE: JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY-1975-1980 ORIGINAL COPIES 50¢ a copy--$4 minimum!--Inquiries, SASE or send money payable to EHS. % C. Roth, 2 Circle Lane, Roslyn Heights, N.Y. 11577

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

WANTED: "Junker" early battery clocks, movements, parts, etc. Send details & $ wanted. ELECTRICAL CLOCK LITERATURE for possible reprinting in our Journal. M. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467

Electrical Horological Literature of any type. Hahl-Wenzel pneumatic clock face and weights. Will buy entire clock if necessary. M. Feldman, 620 Reiss Place-7e, Bronx, N.Y. 10467

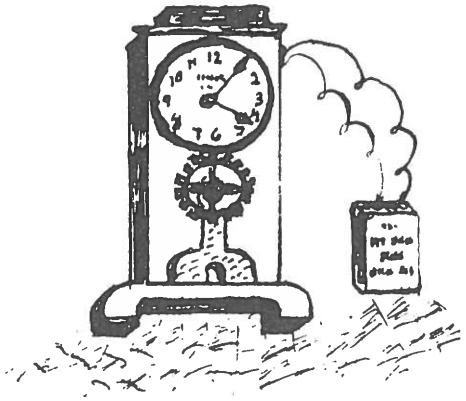
REPAIRS: ALL EARLY BATTERY CLOCKS including Pooles, Barrs, Tiffany Never-Winds, Eurekas, etc. SPECIALIZING IN BULLE CLOCK USING ORIGINAL PARTS. One month maximum time for all repairs. M. Feldman, 620 Reiss Place-7e, Bronx, N. Y. 10467

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

FOR SALE: Approximately 75 rare and collectible electric clocks on hand at all times. Also, many parts, cases, movts. etc. L.O'Briant, Box 812, Raleigh, N.C. 27602. Phone (919) 851-1706--Home--night & weekends (919) 733-2995--7:30-4:30 EST

The
JOURNAL
OF THE
ELECTRICAL HOROLOGY SOCIETY
Chapter No 78

October, 1984
VOLUME X--ISSUE #5
Martin C. Feldman, Editor



Hello fellow enthusiasts:

The Fall issue of our Journal continues with the reprint of the Sangamo clock manual of 1927. We feature the company's preamble which includes a short history of how these clocks came to be designed and produced. The models illustrated are rarely seen by the average collector and, most likely, not seen either by the electrical horological collector as well do to their scarcity.

There has been criticism from time to time of your Editor's policy in reprinting catalogs, manuals, early advertisements, set-up instructions, patents and the like. I really do not care to participate in this debate nor will I repeat the pros and cons regarding this topic. I hope to put the entire matter to rest by once and for all saying that what is printed in the JEHS is considered, in your Editor's best judgement, to be pertinent to our collective interests. I should be more than pleased to print original research, comments, anecdotes and other material submitted by members and non-members which pertain to our main interest.

Enjoy this issue.

Electromagnetically yours,

Martin C. Feldman,FNAWCC

MCF:ms

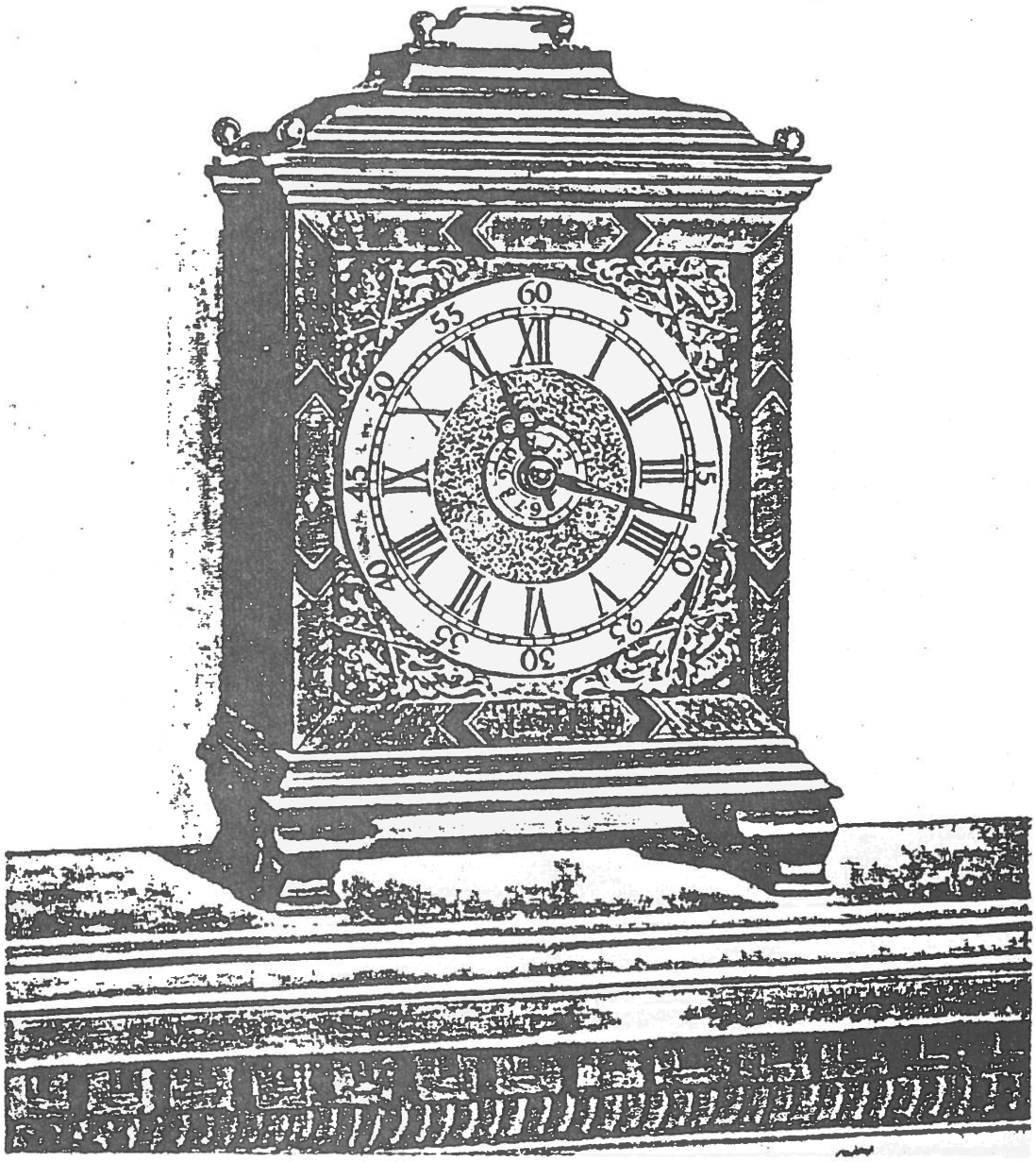
2.

SANGAMO CLOCKS

ELECTRICALLY WOUND

Their development. Their operation. The cases in which they have been designed.

THE SANGAMO ELECTRIC COMPANY, SPRINGFIELD, ILLINOIS



THE SANGAMO CLOCK

A timepiece . . . . . guaranteed accurate within 30 seconds a week . . . wound by electricity. A decorative piece . . . . . created in the best styles of famous clock-case makers. Ellsworth Model shown above. Reproduced by Erskine-Danforth from original in the Ellsworth Collection. 12" high, 8½" wide. Burled walnut, inlaid with holly and ebony.

4

THE COMING OF THE ELECTRICALLY WOUND CLOCK

CERTAIN problems fire the imagination of all scientists. Dotted all over the planet, in laboratories, speaking a dozen different tongues, experimenters go on for years, all trying to discover some one simple-seeming thing.

Now this one, now that one, gets a trifle nearer the goal. Some day, building up from the work of all, or brilliantly discarding everything, one swift mind bridges the final gap . . . and man has done at last what man never did before.

The problem of harnessing electricity to the measurement of time has been such a problem for three-quarters of a century.

Frenchman and German, Swiss and Austrian experimented, with long patience. The London Patent Museum alone is the tomb of more than a hundred failures.

Then, the problem took hold of the men in the laboratories of the Sangamo Electric Company.

"We ought to be able to do it, if anybody can," they argued, and with some reason. For, accuracy was their business. During more than a quarter of a century, the Sangamo Electric Company had been famous for its precision electric instruments.

Two years the Sangamo engineers studied the European attempts to harness electricity to the measurement of time, and ended by discarding them all.

It was decided that the most practical way to build an electrically operated clock was to apply electric power to a well made clock through the medium of a main spring and under the control of a lever-type escapement.

So, they designed and built test models in which the main spring was wound by a small precision motor and kept at practically constant tension. In the construction of these clocks, the highest grade workmanship was applied. In fact, men versed in clock construction have expressed their admiration for the workmanship, saying that they have rarely seen such uniformly high grade workmanship applied to a time-keeping mechanism.

The first models that satisfied the Sangamo engineers were set up in the homes of engineers, jewelers, clockmakers . . . to have their accuracy tested by men whose business was accuracy.

A year later, satisfied with reports of performance, the Sangamo Electric Company entered the Sangamo Electrically Wound Clock in the Sesqui-Centennial

Exposition . . . and walked off with a Grand Prix.

Then and only then did distribution of Sangamo Clocks begin in a broad way. The public, for the first time, was told of the clock's existence.

Never has a clock received such an enthusiastic welcome, and that from the most critical class of the community. Prominent horologists have acclaimed it as the greatest advance in timekeeping for generations. Laboratories that must possess accurate instruments of every kind have ordered it. Engineers, men with a passion for precision, have installed it in their offices and their homes. Leading jewelers have stocked it in their stores and purchased it personally.

And all this has come to pass in a few short years from the time that Sangamo engineers set to work to accomplish the dream of three-quarters of a century; an electrically-operated clock independent of all fallible hands.

6

SANGAMO

CLOCK DESIGNS

As developed by

Erskine-Danforth,

Gorham, and others,

in mantel, wall and

desk styles

THE SANGAMO ELECTRIC COMPANY, SPRINGFIELD, ILLINOIS

IN THE STYLE OF THE BEST EARLY MASTERS

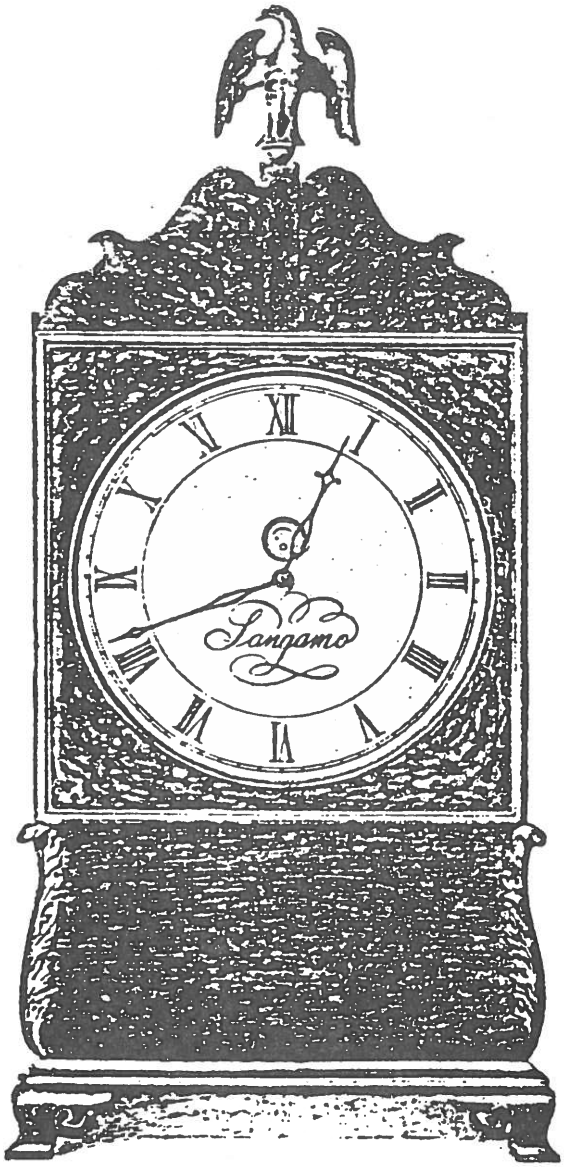
CLOCK-CASE making was at its height in the Golden Age of furniture. Sheraton and Chippendale, Heppelwhite and the Brothers Adam established in the eighteenth century an English tradition of cabinet-making that has never been surpassed. In harmony with them worked the best clockmakers of London Town.

About the middle of the eighteenth century the artisan class in England became discontented with the conditions under which they worked, and crossed the water. Some of the most skillful of the English clockmakers settled in Massachusetts and Connecticut. The three Willards of Roxbury were famous. David Wood's Old Salem Clock is a fine example of that time. Could you find an original today, collectors would cheerfully pay thousands of dollars for the case alone. Poets in mahogany, these early clock-case makers built fine and beautiful things that have stood the test of centuries. Nowhere else could Sangamo find better models for the cases in which to house the Sangamo Electrically Wound Clock.

Some of the most famous of these English and early American clock cases have been exactly reproduced. The actual cabinet making is done by the makers of Danersk Furniture, the Erskine-Danforth Corporation, whose New England workmen have for many years carried on the finest tradition of English and American furniture making. All the delicacy of detail in the originals is faithfully followed . . . the mouldings are slim, the backs of feet and overhanging ornaments are chamfered to give the proper thinness of outline, the joinery is done with all the care of old-time craftsmen. The grain of rare woods is used with decorative effect . . . burled walnut, full of silvery swirls like moire silk . . . crotch mahogany, rubbed to dusky richness . . . smooth surfaces lacquered dull black and ornamented with golden scrolls. The bronze designs similarly follow the best historic precedent, and are the creation of the Gorham Company.

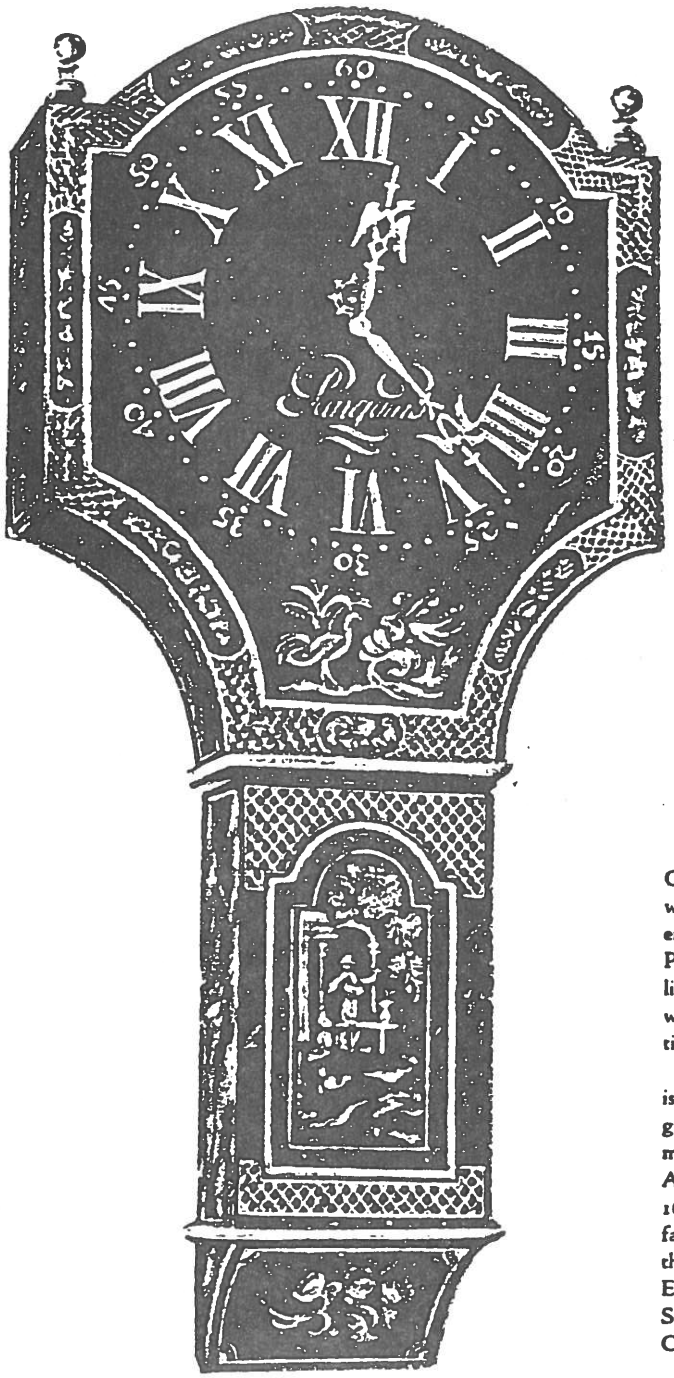
In addition to these historic pieces, Sangamo Clocks are offered in modern designs suitable for mantel, wall or table, for house or office. These also are based on the best traditions and trends in clock cases.

Throughout, thoroughness and beauty characterize the cases of the Sangamo Clocks, and they are ornaments, objects of art, for homes and executive offices.



Old Salem

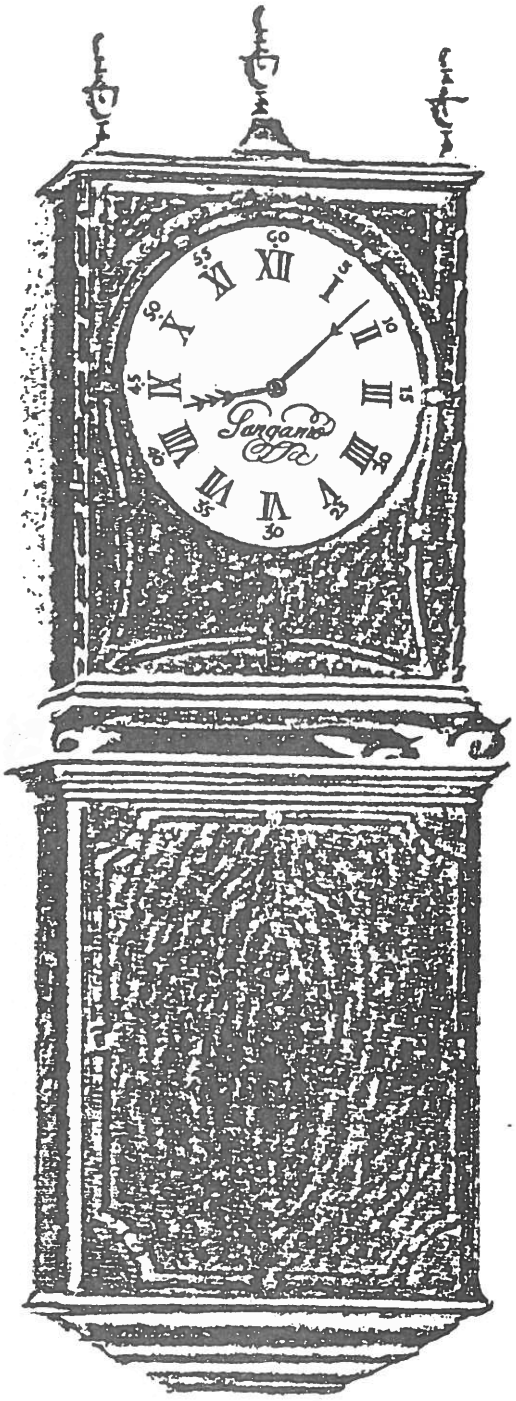
Could you find an original of this Old Salem clock case, collectors would pay thousands for it. Designed by Master David Wood of Newburyport. Reproduced for Sangamo by the Erskine-Danforth Corporation. This classic form of case adheres in its minutest details to the historic tradition of the clockmaker's art. Chippendale in character, with delicate low relief carvings on the base. Mahogany or walnut, 18" high x 9" wide.



Act of Parliament

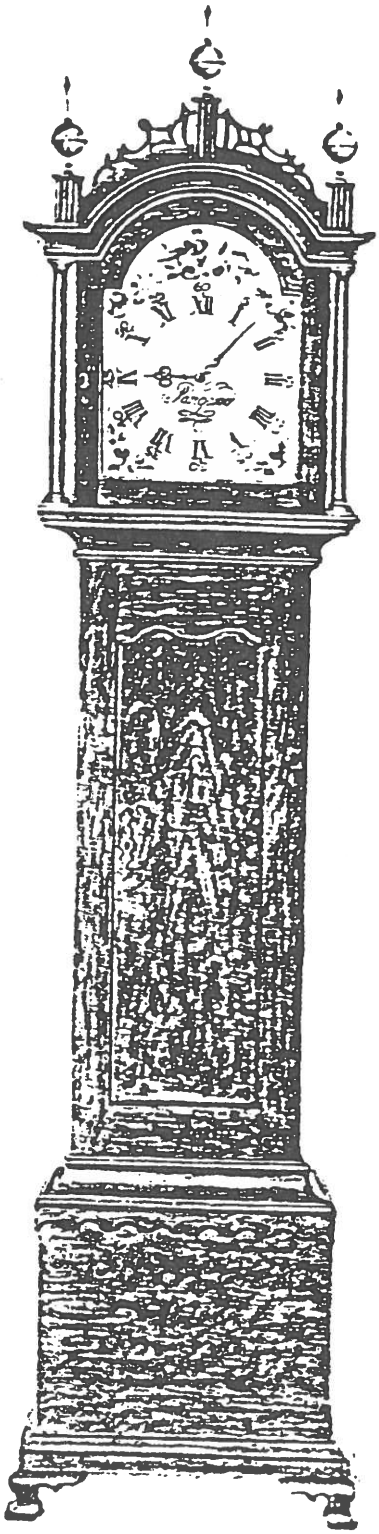
Clocks were a luxury of the rich when this clock was made by some eighteenth-century craftsman. So Parliament clapped the five-shilling tax on all clocks and watches, which gave this stately, dignified timepiece its name.

This Act of Parliament clock is lacquered on a rusty-black background, with gold raised ornament of singularly happy design. Approximately 36 inches high by 16½ inches wide. Reproduced faithfully from the original by the master cabinet-makers of the Erskine-Danforth Corporation for Sangamo Electrically Wound Clock.



Roxbury

Simon Willard, son of Benjamin and brother of Aaron, designed the original of this clock when he was a very young man in Roxbury, somewhere about 1790. In character it shows the originality and freedom of a young mind, the boldness and sureness of a master destined, even then, to become famous. A number of these clocks are still owned in the neighborhood of Boston, and treasured as priceless. The odd-shaped dial, sometimes known as the balloon dial, sometimes as the kidney dial, is particularly interesting. Precisely copied, in Cuban and San Domingo mahoganies. 30 inches high, 10 inches wide.



Grandfather Clock

Collectors differ about the original of this Grandfather clock. Some ascribe it to Nathan Edwards. Others hold that it is probably by the celebrated Willards . . . one of their earlier and more simple pieces. But they agree in considering it very fine in proportion, and in the skillful use of grains running crosswise around the base and lengthwise along the top. Copied exactly, in every detail of construction and ornament, in Cuban and San Domingo mahoganies. Cream enamel dial, delicately handpainted with birds and flowers. 85 inches high, 19 inches wide, 9½ inches deep.

******MART******

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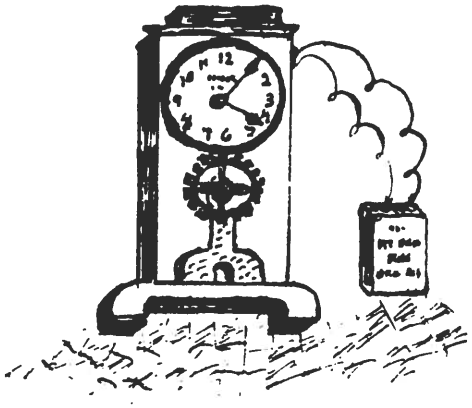
The JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY

Chapter No 78

December 1984
VOLUME X--ISSUE #6
Martin C. Feldman, Editor



Hello fellow enthusiasts:

This last issue of 1984 comes to you rather late and a few words of explanation certainly are in order. Basically, the writing, composition, typing of the Journal is done in one location by myself and my secretary while the printing, collating, envelope stuffing and mailing is done in another office by our Sec'y/Treasurer, Charlie Roth. This procedure has been working quite well for over ten years until recently when Charlie, because of other commitments, has found it difficult to keep to our bi-monthly schedule. As his considerable obligations probably will not lessen as time goes on he regrettably informed me that he would no longer be able to print and mail the Journal nor will he be able to coninue as Sec'y/ Treasurer of our Chapter. Charlie has done an outstanding job over the years despite many obstacles and other business affairs which he has had to deal with at the same time. I would like to thank Charlie at this time on behalf of the officers, membership and myself for the fine job he has done over the years and wish him all the best as a "regular" member. Marty Swetsky, our 1st V.P., has generously volunteered to assume the functions of the Sec'y/Treasurer and will be seeing to the printing and mailing of the Journal as well. Marty is a very enthusiastic electrical horologist, is a charter member of EHS and has vast experience with multiple mailings. Marty Swetsky's mailing address is, %EWC, 1910 Coney Island Avenue, Brooklyn,NY 11230.

This month we are printing original work by Joseph Singer, SWCC CLOCK HANDS. Also from Joe are the instructions for setting the Simplex R-83 Timer. While these clocks have not been commanding high prices they probably will become collectible and are of interest. We also continue printing the Sangamo Manual which we shall print in successive Journals until you have the entire 32-page copy.

Continued p.11

SELF WINDING CLOCK CO.

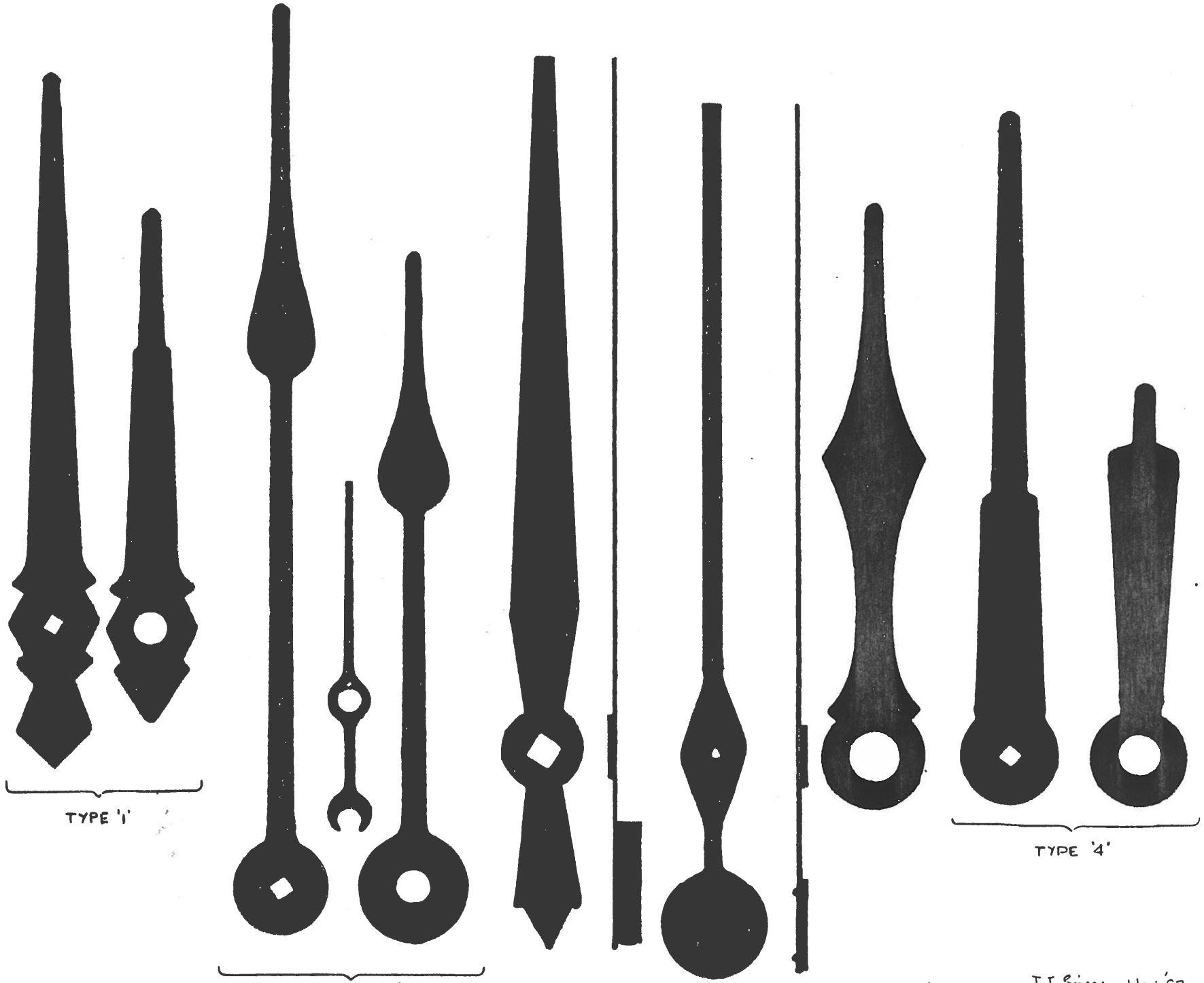
TOPIC

J. J. Singer 11-24-83

Clock Hands

On page 128 of the 1908 Self Winding Clock Company's catalog, thirteen styles of hands are shown. Examining later clocks, other styles of hand are found; these come in a variety of lengths to match dial diameters. The tabulation below and sketch shows some of these.

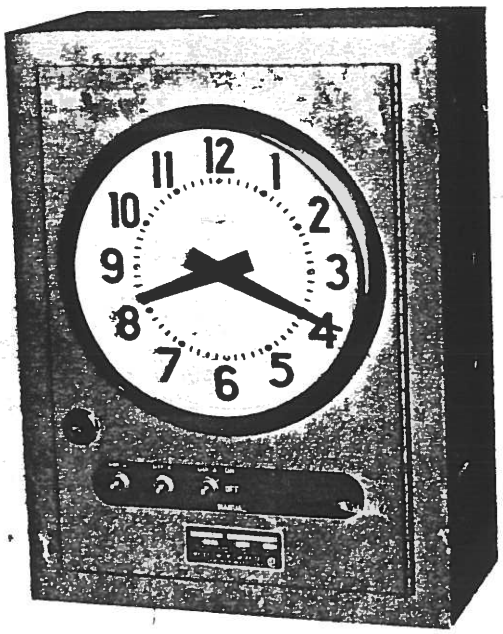
Type of Hand	Dial Diameter	Type of Clock
1	12"	27
2	14 1/2"	10
3	15"	37ss
4	15"	25, 37, 42, 43



J.T. Singer, Oct '83

Simplex STR

Customer's Instructions for Installing, Setting and Programming the R-73, R-83, R-731 and R-831 Program Units



R-83

Bulletin 278

Printed in U.S.A.

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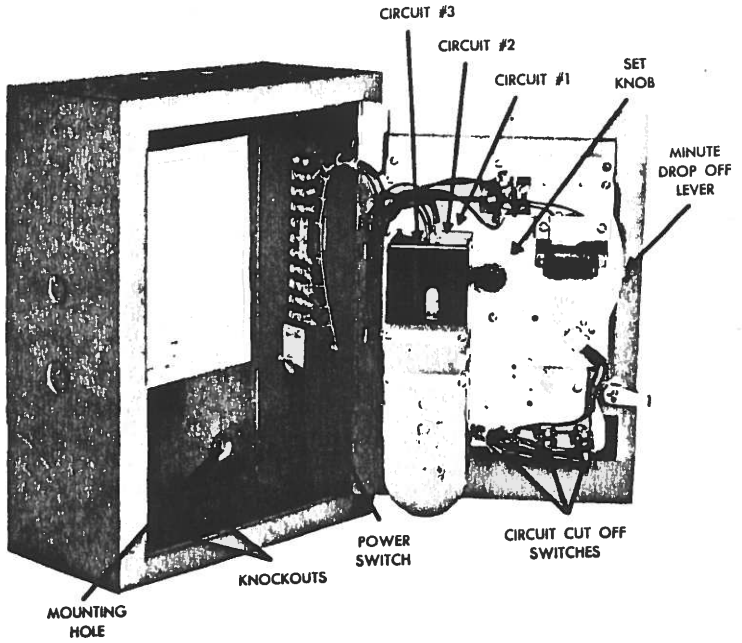
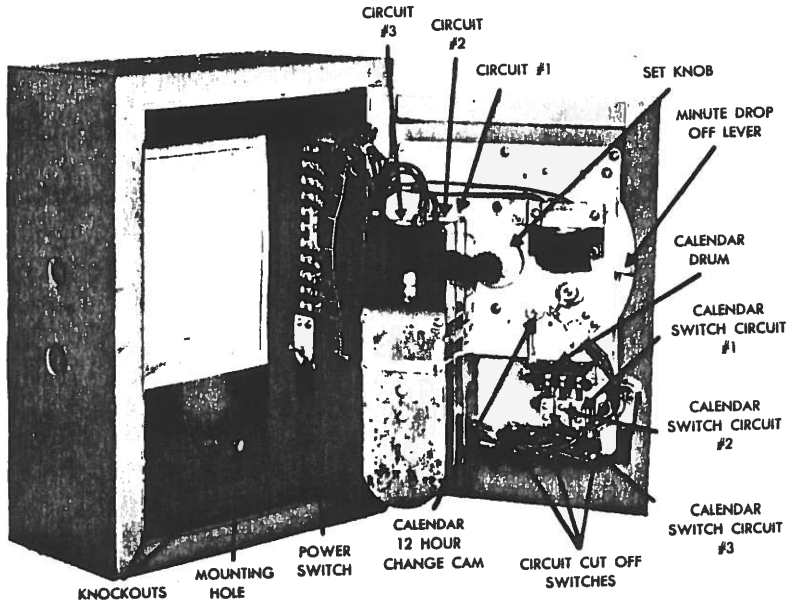


R-83
Figure 1



R-831
Figure 2

THE R-73, R-83, R-731 AND R-831 PROGRAM UNITS

GENERAL DESCRIPTION

The R-73, R-83, R-731 and R-831 are automatic, 3 circuit bead chain type program units. Each bead chain unit controls one circuit of audible signaling devices through the use of a continuous loop of 1440 beads (24 hour control). The R-73 flush mounted unit is not equipped with a calendar and is identical in operation to the R-83 surface mounted program. The R-731 flush mounted unit contains a calendar device and is identical in operation to the R-831 surface mounted unit. Descriptions of the calendar device apply to the R-731 and R-831 ONLY. Other descriptions pertain to all units.

All units are controlled by a 1 RPM 60 cycle synchronous rotor which advances the program face and bead chain units. Manual setting is required after a power interruption. Check "Setting Instructions". Switches for silencing programmed signals and for instantaneous signals controlling all three circuits are located on the door. Automatic signaling is accomplished through the use of a program clip secured to a bead of the continuous chain representing the desired hour and minute the signal is to take place.

At a desired signal time, an electrical circuit is completed through the bead chain unit actuator and duration contacts. The duration contact remains closed for a period of five seconds. Units without a calendar device require setting the silencing switch in the off position for such times as weekends or any period that bells are undesired. Program units with calendar devices are programmed for automatic silencing of undesired times. Check "Calendar Device."

SETTING PROCEDURES

All units are driven by a 1 RPM 60 cycle synchronous rotor. The indicating hands on the dial and the bead chain units are mechanically coupled making it possible to advance the indicating hands and bead chain units in synchronism through the downward and upward motion of the minute drop off lever. (Reference Figures 1 and 2). Rapid advancement of the units may be accomplished by holding the minute drop off lever in a downward position and rotating the set knob in a counter clockwise direction until the correct time has been reached. Release the drop off lever. (Reference Figures 1 and 2).

Note: Care must be taken in determining the correct 12 hour segment after a correction has been made. On units without a calendar this may be determined through the bead chain. Remove one of the bead chain unit covers (see Figure 3). As the unit is being corrected, a group of 3 blue colored beads will appear. This is known as the midnight reference point. The 12 hour segment is then determined from this point. For units with a calendar, see "Calendar Device."

METHOD OF PROGRAMMING

The desired schedule should be listed on a sheet of paper according to their respective circuits and in time sequence.

Remove power from the program unit by placing the power switch in the off position. (Reference Figures 1 and 2.)

Remove the bead unit covers. Establish the midnight reference point by advancing the program unit as outlined in "Setting Procedures" until the first blue bead is located under the actuator. (Reference Figures 3 and 4.) This is known as the midnight reference point. Each succeeding hour is recognized as a silver bead. All other beads of the chain are gold colored. These represent minutes. Advance the bead chain until the hour for the first desired signal time has been reached. The circuit number controlled by each bead chain unit is labeled in Figures 1 and 2. The bead chain should be held in the left hand as shown in Figure 3. Now that the desired hour has been located, count the number of beads from the established hour until the desired minute has been reached. EXAMPLE: A bell desired for 8:10 would require a count of 10 beads after the 8:00 o'clock bead has been established. Place a bead clip over the selected bead and secure the oversize bead to the chain with the bead pliers as shown in Figure 5.

Note: Close the bead pliers on the oversized beads in several places to insure proper roundness of the bead.

To remove clips from an undesired bell time, place the plier tips opposite the parting line on the clip and squeeze slowly. (See Figure 6.) Be certain that the plier tips ONLY engage the clip to be removed. Do not allow the pliers to slip or mark up adjoining beads.

After the complete schedule has been set, advance the unit a full 24 hours before placing it at the correct time. This procedure will allow the bead chain to make one complete revolution, insuring freedom from binds which may have been caused while setting a schedule. A second purpose is to check the schedule for proper time settings. As each large bead closes the actuator, check the time on the clock face of the unit and compare with the time desired on the schedule sheet. (See Figure 4.)

After the above procedure has been completed, replace the bead chain covers and place the power switch in the ON position.

CALENDAR DEVICE

The function of a calendar device is to silence any one or all circuits of the program unit automatically (see Figure 2). Units with a calendar require the completion of an electrical circuit through the bead chain unit, the duration cam and the calendar drum contacts before a signaling device may be actuated. A signaling device cannot be actuated should any one of the above contact points remain open.

The calendar drum advances one increment, every 12 hours. Careful attention must be paid to the correct 12 hour period. The calendar drum will indicate the period of the day. On the left hand side of the calendar drum, letters and dashes (M—T—W—T—F—S—SU—) indicate the 12 hour period in conjunction with the calendar switch. The 12 hour segment and day is determined by locating the dash or letter found directly to the left of the calendar switch top. The letter, representing the day, will indicate the hours from 6:00 A.M. to 6:00 P.M. and the dash following the letter will indicate hours from 6:00 P.M. to 6:00 A.M. To silence a circuit, merely install a 4-40 round head machine screw, supplied with the machine, in the calendar drum for the desired circuit at the proper period.

EXAMPLE: If it is desired to silence all bells from 6:00 P.M. Friday to 6:00 A.M. Monday, install screws in all holes of the second period (a dash) following the letter F (Friday) through the second period Sunday (a dash following the letters SU on the drum).

To reset the program drum, advance the unit to 6:00 o'clock according to instructions outlined in "Setting Procedures." The drum may now be set to the desired position. Once the drum has been set, advance the complete unit to the correct time. IMPORTANT: Be certain that the bead chain unit is on the correct 12 hour segment.

INSTALLATION INSTRUCTIONS

1. Locate a hanging screw in center of the selected location. Hang the program unit on the center screw and secure the program by installing screws in the lower right and left corners.
2. A rubber covered card is supplied with the program unit. If a direct connection through conduit is not required, simply plug in the rubber covered cord to the nearest 115V, 60 cycle outlet. Knockouts are provided on the bottom of the program unit case for 115V conduit and signal circuit connections.

   IMPORTANT: Before applying power to the unit, the following steps must be completed.
3. Remove scotch tape from bead unit cover. Then remove the bead unit cover (see Figure 3).
4. Remove fibre protectors from all bead units.
5. Each program unit is made to operate on 115V 60 cycle power and use the same source for signal device control, unless otherwise specified. For low voltage requirements check the wiring diagrams, Figures 7 and 8, for proper wiring connections.

MAINTENANCE

To obtain best results from this equipment, a periodic inspection by a Simplex Customer Engineer is recommended. Contact the nearest Simplex office for service or information.

Note: This booklet is valuable. It should be filed in a convenient place to insure easy access to the operation information necessary for continuous satisfactory operation of this equipment.

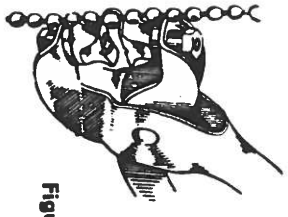


Figure 6

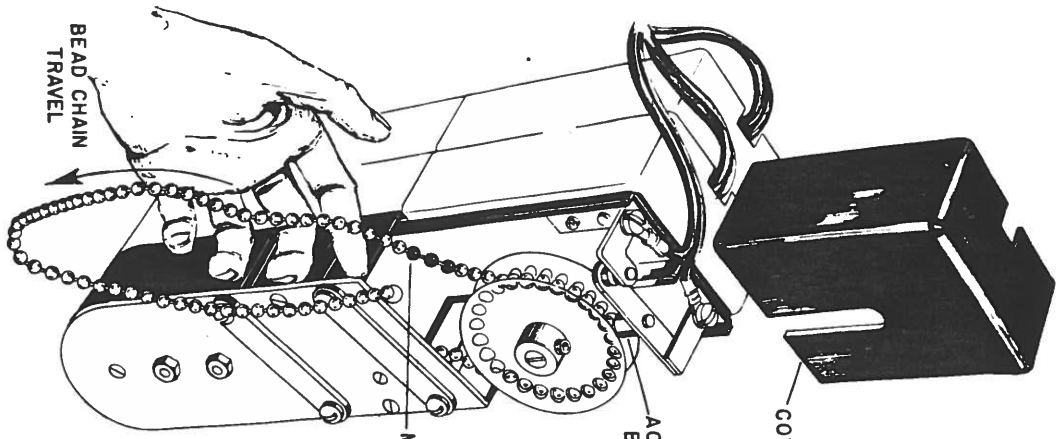


Figure 3

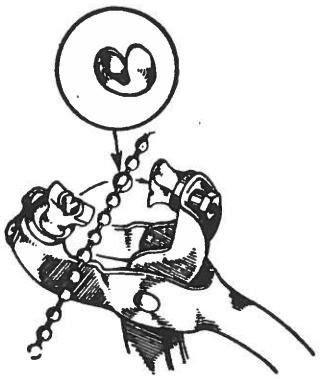


Figure 5

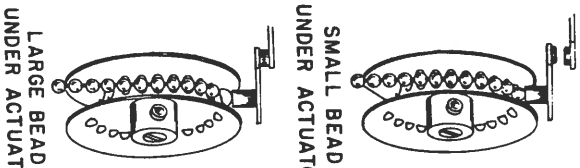


Figure 4

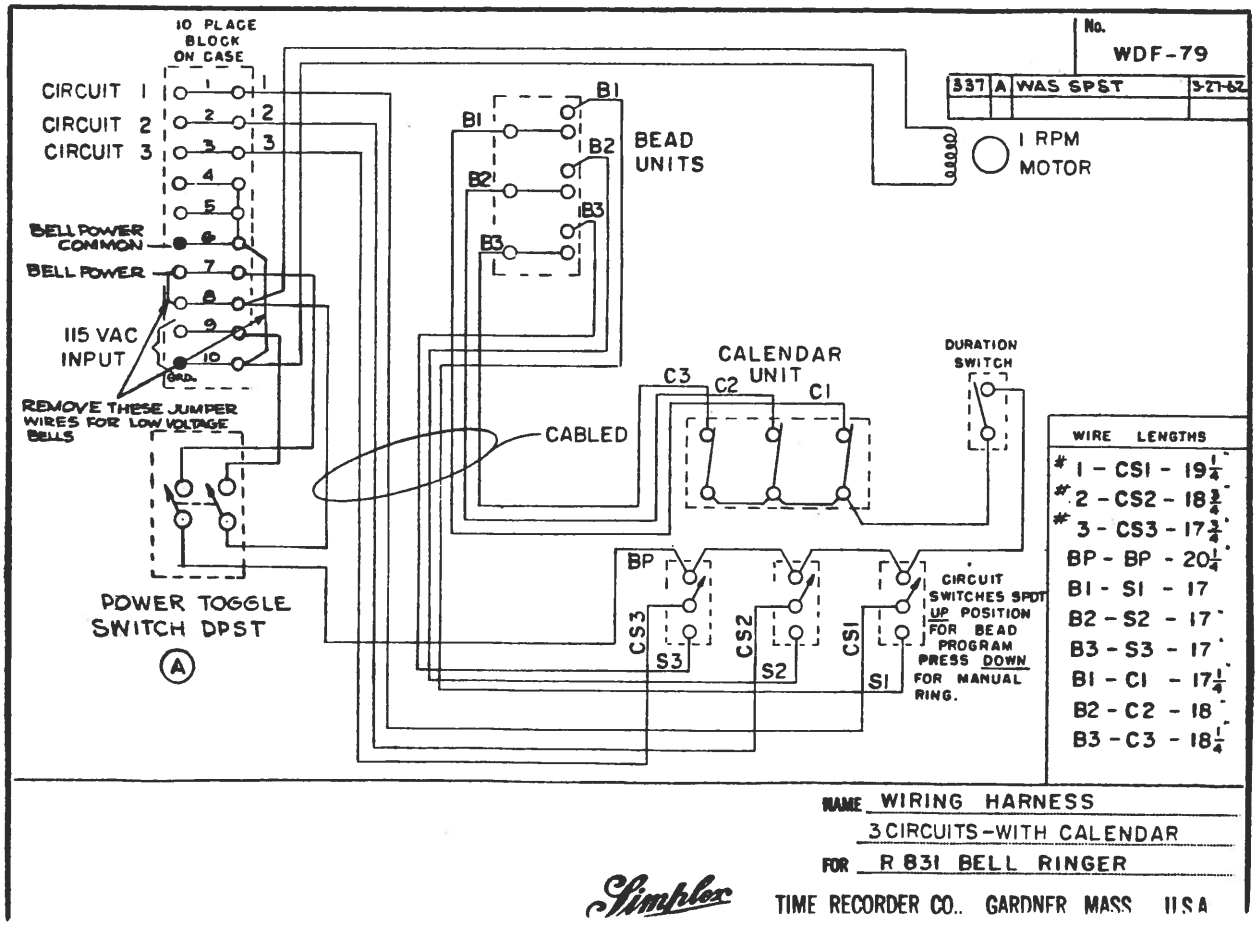
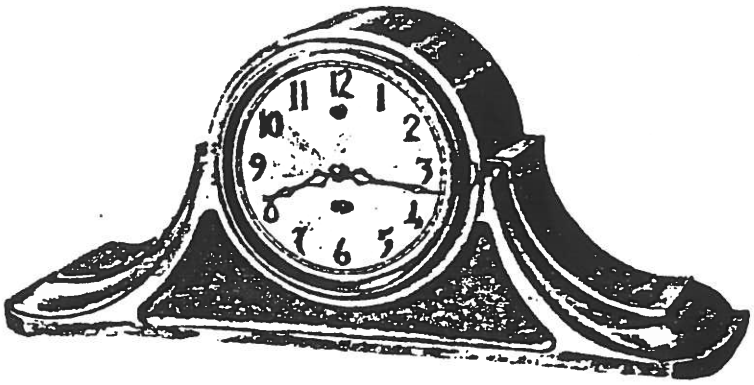


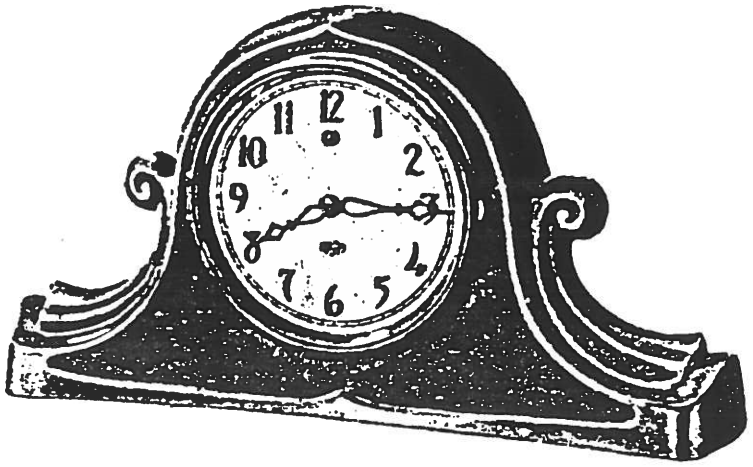
Figure 7



Style No. 5051

MANTEL CLOCK, SOLID CAST BRONZE

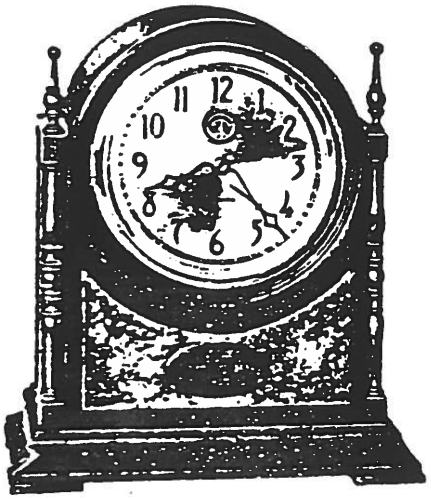
Finishes—same as 5050. Dial No. 32—5¼-inch. Raised gold letters on silver background. Gold hands. Height, 7⅝ inches; width, 17¼ inches; depth, 5 inches. Can be furnished with a two-tone hour and half hour strike if desired.



Style No. 5050

MANTEL CLOCK, SOLID CAST BRONZE

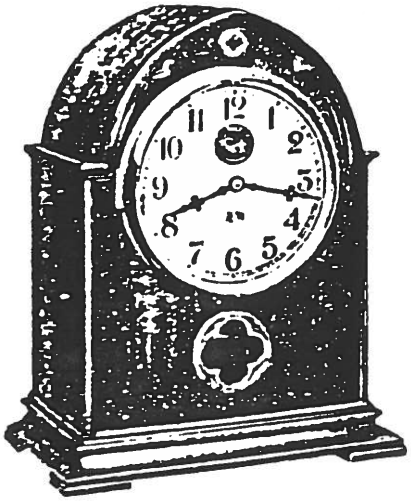
Supplied in Dark Plain Bronze, Olive Bronze, Copper Bronze, Verde Antique Bronze. Dial No. 33—5¼ inch. Raised bronzed figures on silver background. Bronze hands. Height, 8¼ inches; width, 15½ inches; depth, 3¾ inches. Can be furnished with a two-tone hour and half hour strike if desired.



Style No. 5009

MANTEL CLOCK, MAHOGANY, FRENCH GREY PANEL

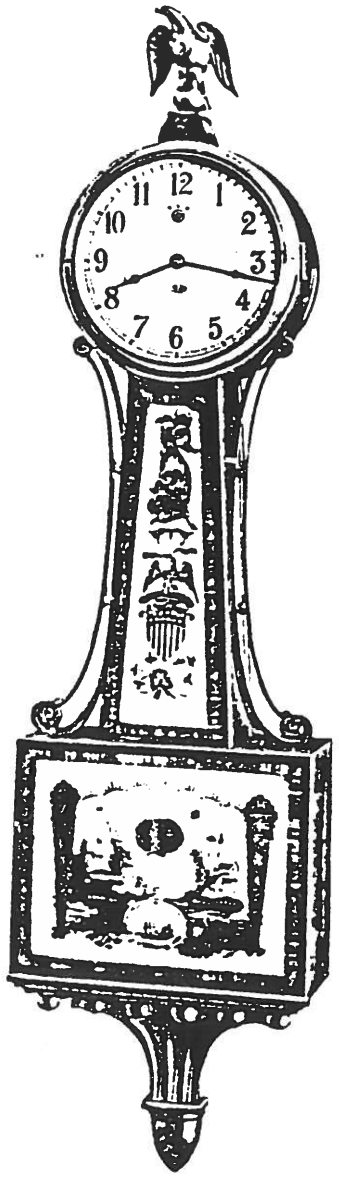
Dial No. 32—5¼-inch. Raised gold letters on silver background. Gold hands. Height, 11¾ inches; width. 10¼ inches; depth, 5¾ inches. Can be furnished with a two-tone hour and half hour strike if desired.



Style No. 5007

MANTEL CLOCK. UPRIGHT GOTHIC, MAHOGANY

Illustrated with Dial No. 13—5¼-inch. Height, 12¾ inches; width, 9¾ inches; depth, 5¾ inches. Can be furnished with a two-tone hour and half hour strike if desired.



Style No. 7042

SIMON WILLARD BANJO CLOCK

Furnished in various designs—all copies of original models. Dial No. 42—6½-inch. Height, 42 inches; width, 10½ inches; depth, 4¼ inches. Can be furnished with a two-tone hour and half hour strike if desired.

con't. from Pg.1

As we close this fiscal year we look forward to an exciting 1985 with many new articles, manuals, patents and other electrical horological material generally unavailable to the collector. It is once again time to send dues and despite anticipated higher costs we are keeping the Chapter dues down to $10. A tear-off Renewal Form is attached to this Journal. Please fill it out and mail it with your check while you have it in your hands as this will greatly facilitate our new Sec'y/Treasurer's job and will keep us going.

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Electromagnetically yours,

Martin C. Feldman, FNAWCC

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