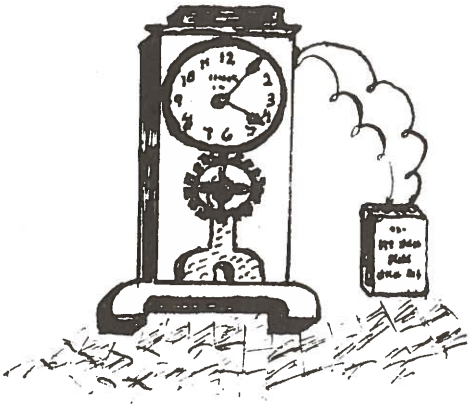
The JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY

Chapter No 78

November 29, 1975

VOLUME II---ISSUE #1

Martin C. Feldman, Editor



Hello fellow enthusiasts:

This issue marks the beginning of Volume II--#1 of six issues for the year 1976. Needless to say I am very pleased with the progress our Society has made and judging from some very kind letters received from the membership, you all seem to share in my pleasure. A letter from Mr. John Mies is reproduced in this issue for your information and I hope some of our Chapter members are winners. I have suggested to Mr. Mies that another category entitled: BEST RESTORATION be included in future award ceremonies.

On November 9th a meeting of members in the NY-NJ area was held at the home of Vice-President Alan Marx --- details to be found within this issue. This issue is primarily devoted to an excellent research effort made by member Ed Hanff regarding the Rempe Mfg. Co. movement he has restored and researched. Some of you may remember his fine work dealing with the Self-Winding Clock of Champagne, Illinois which was serialized in the early editions of our publication, the EHS Newsletter.

By the time you read this I hope to be home from the hospital after some surgery and recuperating. Thus, you will see the reason for the early date of this editorial.

Enjoy this issue!

Electromagnetically yours,

Martin C. Feldman FNAWCC

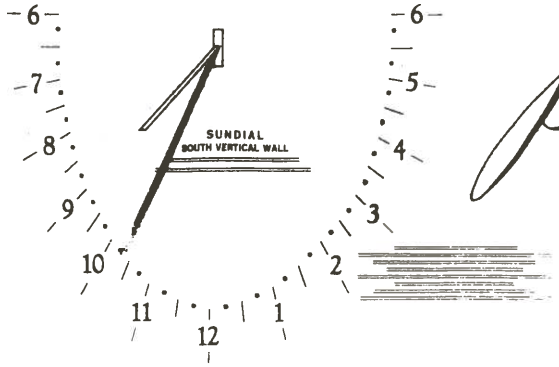
NY--NJ Meeting of the EHS.

On November 9, 1975 nine members of the EHS residing in the NY-NJ area met at the home of Vice President Alan Marx. We had a very interesting meeting and ironically 3 members who had what they thought was a one-of-a-kind clock were surprised to find that 3 out of 5 members who had arrived earlier brought this same model clock along with them! One was in working condition while two weren't but the surprise on the faces of the owners had to be seen to be appreciated.

A business meeting was held and once again the restoration of the Kennedy Electrical Clock which has been donated to the NAWCC Museum was discussed. The consensus of opinion was such that since we have a fairly large number of members of the EHS residing in this area, we might undertake the restoration of the clock only after seeing it. Your President was instructed to send a letter to National advising them of this decision. We know we shall have one problem which we may not be able to handle and that is the restoration of the wooden case. If there is any member who is capable of restoring a wooden case, please drop me a line and we shall take it from there.

A very fine buffet luncheon was prepared by Mrs. Marx for the member—guests and was enjoyed by all. A vote of thanks was heartily offered to the Marx' for opening their home to us and for their fine reception.

Members attending the above meeting--bottom row--L to R:
G.Zlobin, Pres.M.Feldman, B.McGuiness, G.Cohen.
top row--L to R:
G.Feinstein, P.D'Angelo, Vice-Pres, B.Levy, Vice-Pres. A.Marx, Sec.-Treas.C.Roth.



Paramount
MORTUARY
8026 ALONDRA BLVD. • PARAMOUNT, CALIFORNIA 90723
(213) 633-1164

JOHN A. MIES

MEDALLIONS TO BE AWARDED AT NAWCC NATIONAL CONVENTION-DISNEYLAND 1976

We would like to invite your membership to bring horological items made by themselves; clocks, watches, sun dials, or other time measuring devices, to the 1976 National Convention. There will be awarded medals in gold, silver and bronze of achievement for the most outstanding horological item in each of the following four categories:

(1) EXCELLENCE IN WORKMANSHIP

(2) MOST COMPLICATED

(3) MOST UNUSUAL

(4) BEST REPRODUCTION

The above awards will be presented at the banquet.

This is a "first" for NAWCC. These awards will give just recognition for the skills, talents and creativity among our membership.

Ample space, protection and care will be provided for the creations submitted which will be prominently displayed in the 1976 National Convention exhibit section.

We ask that you invite your membership to participate in this important competition.

Thank you for your cooperation.

Further information or questions may acquired from:

JOHN A. MIES
8026 ALONDRA BLVD.
PARAMOUNT, CALIFORNIA 90723
Phone-213-633-1164

AN INTERESTING SELF-WINDING CLOCK

By: Ed Hanff

At one of our local Chapter Marts a friend of mine offered for sale a very poor looking electric clock works of unknown parentage. I acquired the works but could find no identifying marks on it and there was no pendulum or case. I consulted several clock books and NAWCC Bulletins but found nothing resembling this clock. After submitting the photograph (s) and the description that follows to Marty Feldman, he found in his files the manufacturer's name—Rempe Mfg. Co., Danville, Pa. and patent dates: 7/21/03 (#734,366) and 8/25/03 (#737,019) issued to Henry Rempe.

Basically, the clock has a conventional gear train controlled by a pendulum and recoil escapement. The clock used a two-section pendulum rod of which only the upper section was available. This section is about four inches long with a T-shaped lower end to which a lower rod section hooks on. After rough calculations and experiment, the total pendulum length was found to be slightly over 14 inches to operate at 99 vibrations per minute. The power drive consists of an electromagnet energized by two 1.5 volt D cells. A light-weight armature has an extended lever arm which engages a similar arm to operate a ratchet wheel on the center arbor. This arm is attached to one end of a helical spring which supplies the operating power. Another extension from the armature controls the contacts. Each operating cycle is about six minutes.

Photo 1 is a front view of the works with the contacts closed and the magnet armature about to be closed. Photo 2 is a similar view with the contacts held open and the armature starting to rise. Photo 3 is a rear view showing the short upper section of the pendulum rod.

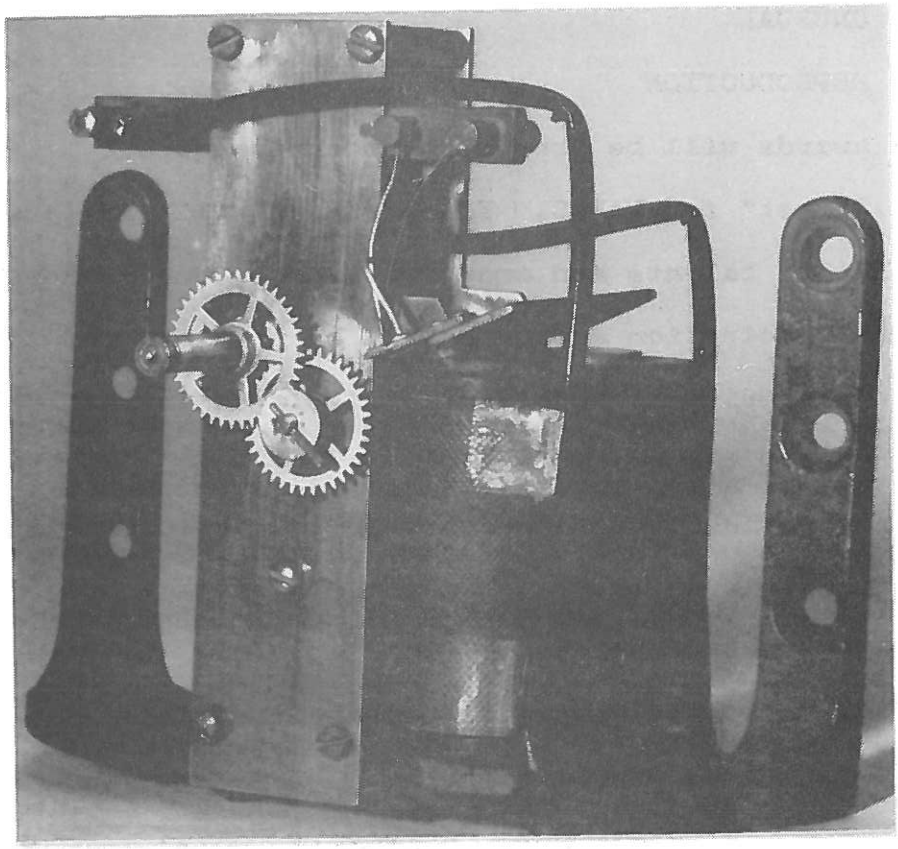


PHOTO 1.

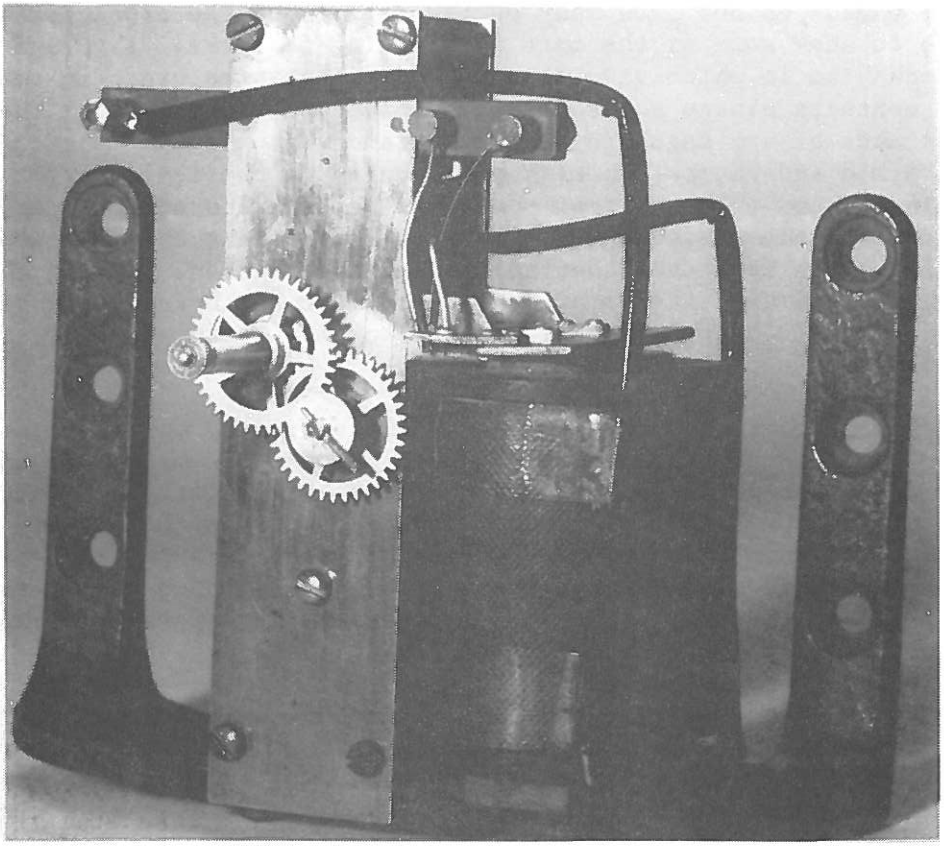


PHOTO 2.

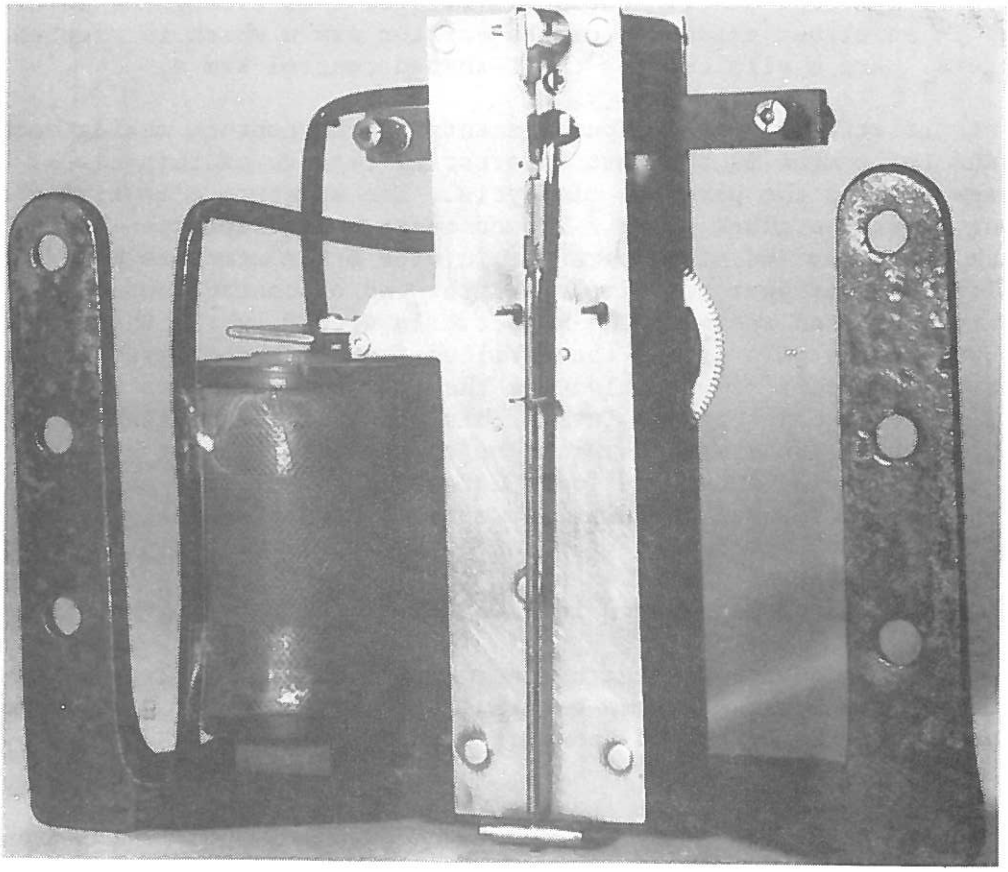


PHOTO 3.

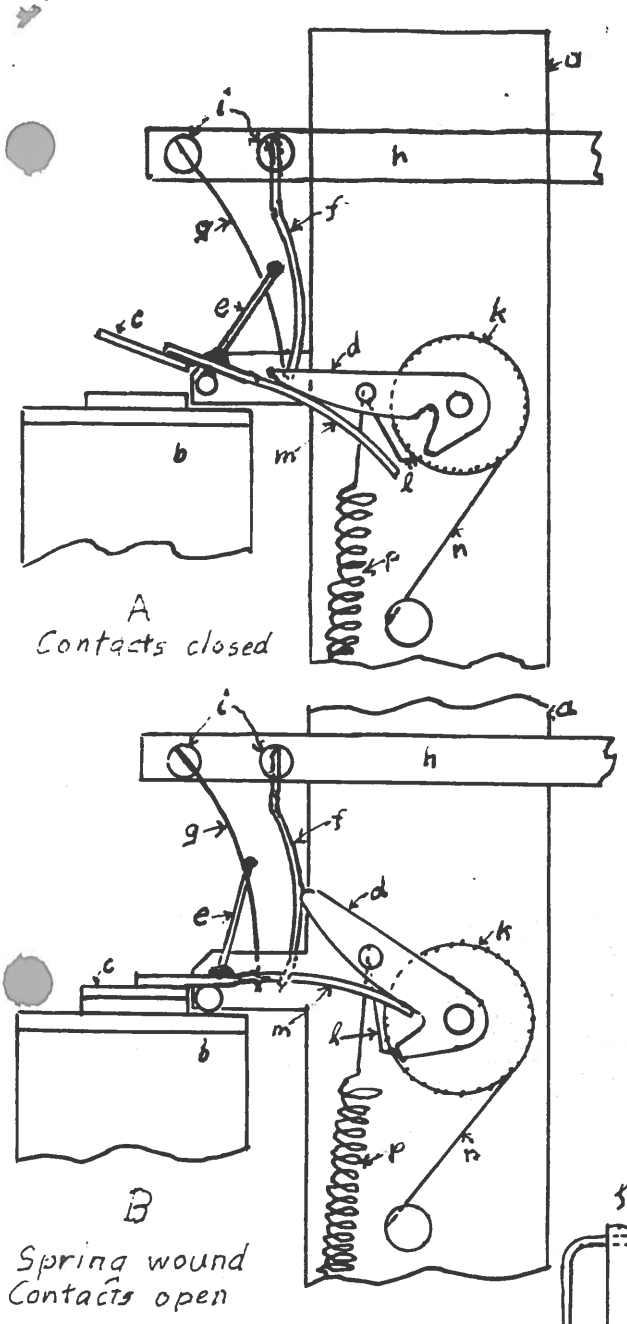
Since the photos do not show many of the details of the clock, drawings have been made to show some of the more interesting features. Figure 1 covers the winding mechanism in which view A shows the magnet armature c in open position with contacts closed and solenoid b about to be energized. The ratchet drive arm m is made of non-magnetic brass and is an extension of the armature c. The operating arm d and ratchet wheel k are mounted on the center arbor which carries the minute hand. The helical power spring p is hooked to a small stud on arm d. In view B the armature c has been pulled against the magnet pole piece and spring p has been stretched to its maximum tension. During this action the ratchet wheel k remains stationary, backward movement being prevented by holding pawl n, while the drive pawl l moves clockwise to engage the ratchet at a new position.

There are two important points to note in this winding operation. First; the two arms d and m have curved engaging surfaces of the same radius and the relation to their pivot points is such that a true rolling action results, thus eliminating sliding friction. Second; at the start of the closing cycle when the magnetic pull on the armature is weakest, the pressure point between d and m is closest to the armature pivot and farthest from the center arbor, thus applying greater leverage to arm d. As the armature approaches the pole piece these relations are reversed.

Figure 2 covers the action of the contact mechanism in four positions A, B, C and D, and for clarity, have been drawn at twice the scale of Figure 1. Both Figures 1 and 2 are drawn as viewed from the rear, hence appear in opposite relation to the photo views. The rigid contact support f is a brass wire about 1/32" in diameter with a small silver contact q at its lower end. The flexible contact support g is of phosphor bronze 1/8" wide with a mating silver contact q at the lower end where it covers only half of the width of the support. Section XX of view D shows the lower end of support g and also shows the gap t near the end. This gap t provides clearance for the trigger r to pass from one face of support g to the other. The small trigger r is triangular in cross section and is an offset extension of its carrier arm u which is riveted to the armature c. Arm u also carries the L-shaped control arm e.

The interrelation of the various elements of the contact making mechanism is unique and in my mind is the most interesting feature of this clock. In Figure 2 view A shows the parts in mid-cycle. The armature c is rising as the power spring keeps the clock going. The contacts q are kept open as the trigger r holds back the lower end of support g. In view B the armature has reached its upper limit and trigger r has released the end of contact support g, allowing contacts q to close and energize the magnet. In view C, while the armature is drawn down toward the pole piece, the bevelled face of the trigger maintains pressure on the contacts, thus prolonging the flow of current to the magnet to prevent too rapid disconnection. During this phase of the closing sequence the upper end of control arm e applies pressure on flexible support g tending to separate the contacts q. When the lower corner of the trigger passes into gap t the contacts snap open. View D shows the armature in fully closed position while control arm e keeps the contacts open by restraining the flexible support g. This restraint continues until the trigger r passes the gap t and engages the lower end of g as shown in view A.

The complete contact operating cycle requires only a small fraction of a second and the action described can be visualized only by moving the armature slowly by hand with the battery disconnected.

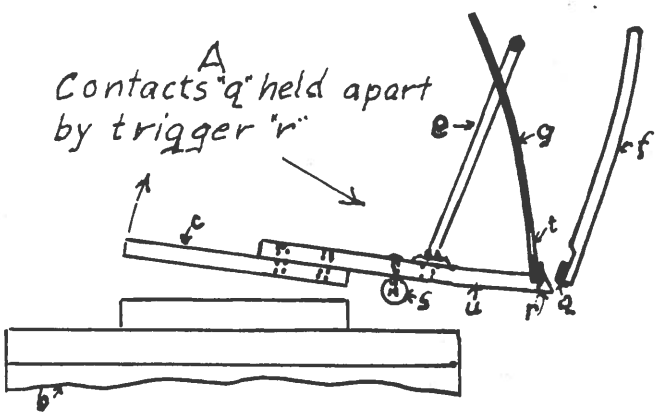


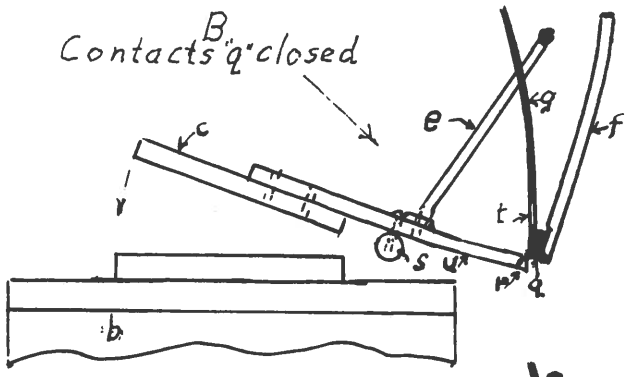
A
Contacts closed

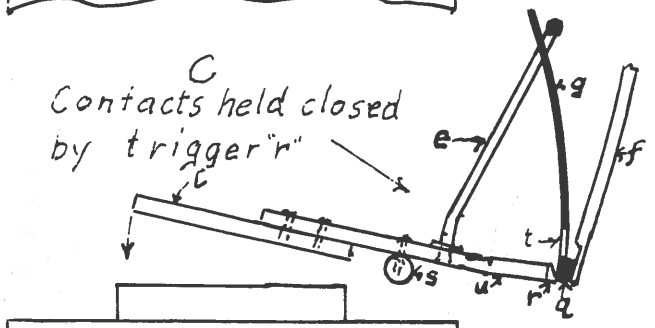
B
Spring wound
Contacts open

FIGURE 1 WINDING MECHANISM
Viewed from rear

0 1½" 1"
approximate scale







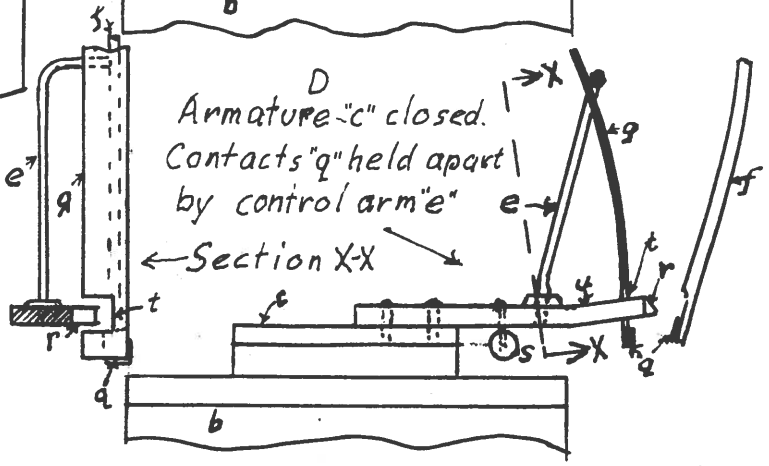


FIGURE 2. CONTACT OPERATION

0 ½" 1"
approximate scale

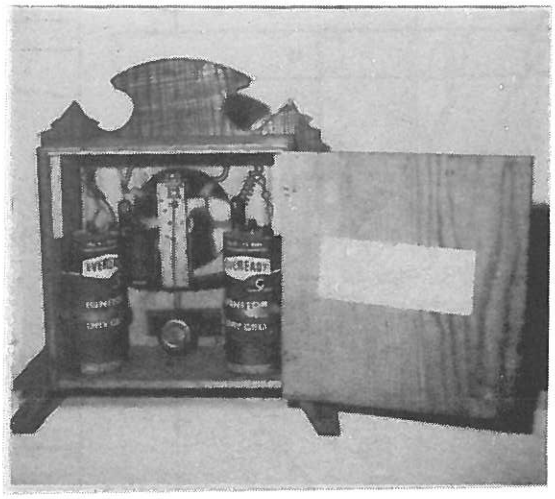
DETAILS OF SELF-WINDING CLOCK

E.A.H.

Parts shown in Fugures 1 and 2.

a Clock-work plate
b Solenoid
c Armature
d Operating arm
e Contact control arm
f Rigid contact support
g Flexible contact support
h Insulating contact base
i Contact support posts
k Ratchet wheel (on minute hand arbor)
l Ratchet drive pawl
m Ratchet drive arm
n Ratchet holding pawl
p Power spring
q Silver contacts
r Armature trigger
s Armature axle
t Open gap on flexible contact arm
u Trigger carrier arm

Front view



Rear view

Mantel Rempe Mfg. Co. Clock

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MART

FOR SALE: 1. Synchronome Master Clock, ca. 1935, in working order $550.00
2. Stromberg Elect. Master, restored, excellent. $450.00

WANTED: Unusual Electrical Clocks, (incl. Warren Mystery Battery Clock).
Also unusual foreign pieces.

A. Marx, 105 Bayeau Rd. New Rochelle, N.Y. 10804
914-632-5986

****

WANTED: Electrical horological literature---any type.
Hamilton-Sangamo clocks---write details.

REPAIRS: Made: All early electrical clocks--write details.
Martin C. Feldman, 1545 Rhinelander Ave. Bx. N.Y. 10461

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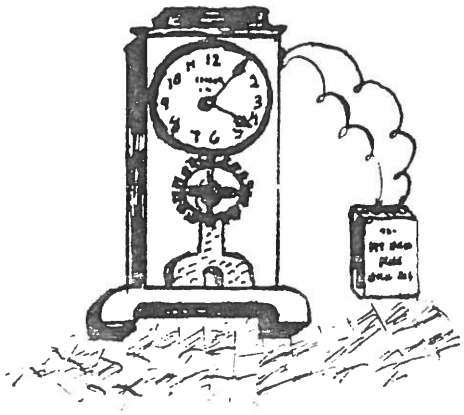

April 15, 1976
VOLUME II---Issue #2
Martin C. Feldman---Editor

Hello Fellow Enthusiasts:

This issue brings with it information of significant interest and importance. I have devoted this Journal to the printing of the Tiffany Never-Wind Clock patent in its entirety, and to the review of a new book entitled-LA BULLE-CLOCK, by Henry-Louis Belmont.

I have no original articles in my files for future issues of the Journal. So, once again, I ask our many talented members to submit articles for publication consideration. Original manuscripts, anecdotes, short stories, how-I-did-it articles, patent copies, and any other written material pertaining to electrical horology would be most appreciated by your Editor.

I thank you in advance and hope you enjoy this issue.

Electromagnetically yours,

Martin C. Feldman, FNAWCC
Editor and President--EHS

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IMPORTANT ANNOUNCEMENTS

On Sunday, May 23, 1976 Dr. and Mrs. Bruce Levy will be opening their home to members of the EHS for a Society Meeting. We encourage all members who are able to attend to write or call Dr. Levy for specific travel instructions and to let him know how many people to expect. Please bring your interesting electrical pieces for discussion. Swap, trade, and buy area will be provided! The Kennedy Clock which we are undertaking to restore will be brought to this meeting. Try and make this meeting---it should be most interesting and enjoyable.
Call: 516-935-2994 or write: Dr. B. Levy, 3 Saul Place, Plainview, N.Y.

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SPECIAL BOOK PRICE OFFER BY CLOCK TRADE ENTERPRISES FOR LA BULLE-CLOCK TO EHS MEMBERS ONLY.

Hard cover numbered edition: $14.00 PPD.
Plasticized soft-cover edition --$10.00 PPD.

Send checks payable to : Martin C. Feldman, 1545 Rhinelander Avenue, Bronx, New York 10461

ALL CHECKS MUST BE IN BY MAY 15, 1976 FOR THE SPECIAL OFFER. CHECKS RECEIVED LATER WILL BE RETURNED. DON'T MISS THE BOAT ON THIS ONE!!

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Those members interested in competing for the ACHIEVEMENT AWARDS to be given at the NAWCC NATIONAL CONVENTION this year must write immediately to John Mies for an entry blank and instructions. Send an SASE please. Write to: John Mies, 8026 Alondra Blvd., Paramount, California 90723.

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EHS Mart

More support and participation in the Mart of the EHS Journal is requested. This section is maintained for you so that you can buy, sell, or trade electrical horological items. Since our Journal reaches such a select group of enthusiasts with the same interests horologically, it stands to reason that the chances of a successful buy or sell are tremendously enhanced. The rates are $2(greenbacks please) for (4) type-written lines. SUPPORT AND PARTICIPATE IN THE MART. Send all Mart in-formation to Martin C. Feldman.

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Dr. George Feinstein will be in charge of the TECHNICAL QUESTION AND ANSWER section of future Journals. For the time being I will receive all questions for forwarding to Dr. Feinstein along with any assistance which I may be able to offer him. Please send in questions---we may have the answer to a question which has been troubling you for a long time! Certain questions and answers will be selected and sent to the BULLETIN ANSWER BOX for publication consideration as they may be of great general interest to the NAWCC membership at large.

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LAST CALL FOR 1976 DUES----PLEASE REMIT TODAY TO TREASURER CHARLES ROTH, 28 W. 25th Street, New York, New York 10010

BOOK REVIEW

LA BULLE-CLOCK by Henry L. Belmont, Millot & Cie, France, 1975,152 pages with illustrations. Price: (See special offer in ANNOUNCEMENT SECTION of Journal.)

Regular Price: Hardcover-$17.50, Softcover $12.50.

This book marks the first book published dealing exclusively with the Bulle Clock, and also, the first book specifically devoted to electrical horology in the past 30 years. Its importance does not primarily lie in the latter fact, but its being such an important, informative, and worthwhile piece of electrical horological literature.

LA BULLE-CLOCK is divided into five sections: 1-Biographies of Maurice Favre-Bulle and Marcel Moulin, the inventors of the clock; 2-Patents, research, development and manufacture of the Bulle Clock. This section is of particular interest to researchers as it shows patents of clocks which are quite different from the production model. Of course it includes the patents of the current collectible models. 3-Distribution and sales of the Bulle clock. This section again is of current interest as it includes a very excellent reprint of the 1931 catalogue showing 64 models with variations totaling 90 models. You are now able to identify the model in your collection with the aid of this section, or, you can seek a particular model by precise description. The old prices of the clocks have also been included--back in the days when a franc was a franc and a dollar was a dollar. The prices are in Fr. Francs. 4-Reprint of the 102 page Bulle clock repair manual (I know of only two original copies of this manual). The manual gives precise instructions for trouble-shooting sticky repair problems. It is, as is the entire book, written in French. But it is amply illustrated to be of value to the non-French readers. 5-Addenda. This last section is very interesting and useful to the electrical horological collector. In this section the very rare striking Bulle clock is shown. There are apparantly two models extant (what a prize if one of us could find one). From the manuscript it appears that this model was manufactured in a limited quantity and it is not a patent model or made up at the whim of some skillful collector. There are three articles in English from 1922 to 1974 (date span) as well as letters, photographs, and biography.

Even though this book is in French, the language used is very clear and does not resemble the French many of us suffered through in reading the prose and poetry in High School and College. For the non-French readers the illustrations and photographs are very clear. The printing is excellent and it appears no expense has been spared by the author to insure the highest legibility possible. This is an important electrical horological book and should find a place in every good horological library.

Martin C. Feldman, FNAWCC

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MART

Wanted Unusual Electrical Clocks (including Warren Mystery Battery Cl). Also unusual foreign pieces. A. Marx, 105 Bayeau Rd. New Rochelle,N.Y. 10804
914-632-5986

WANTED: Electrical Horological Literature--any type. Highest prices paid. Hamilton-Sangamo clocks---write details.

Repairs Made----All early electrical clocks-write details.
Martin C. Feldman, 1545 Rhinelander Ave. Bx., New York 10461

No. 754,397. PATENTED MAR. 8, 1904.

G. S. TIFFANY.

ELECTRIC CLOCK.

APPLICATION FILED NOV. 30, 1901.

NO MODEL.

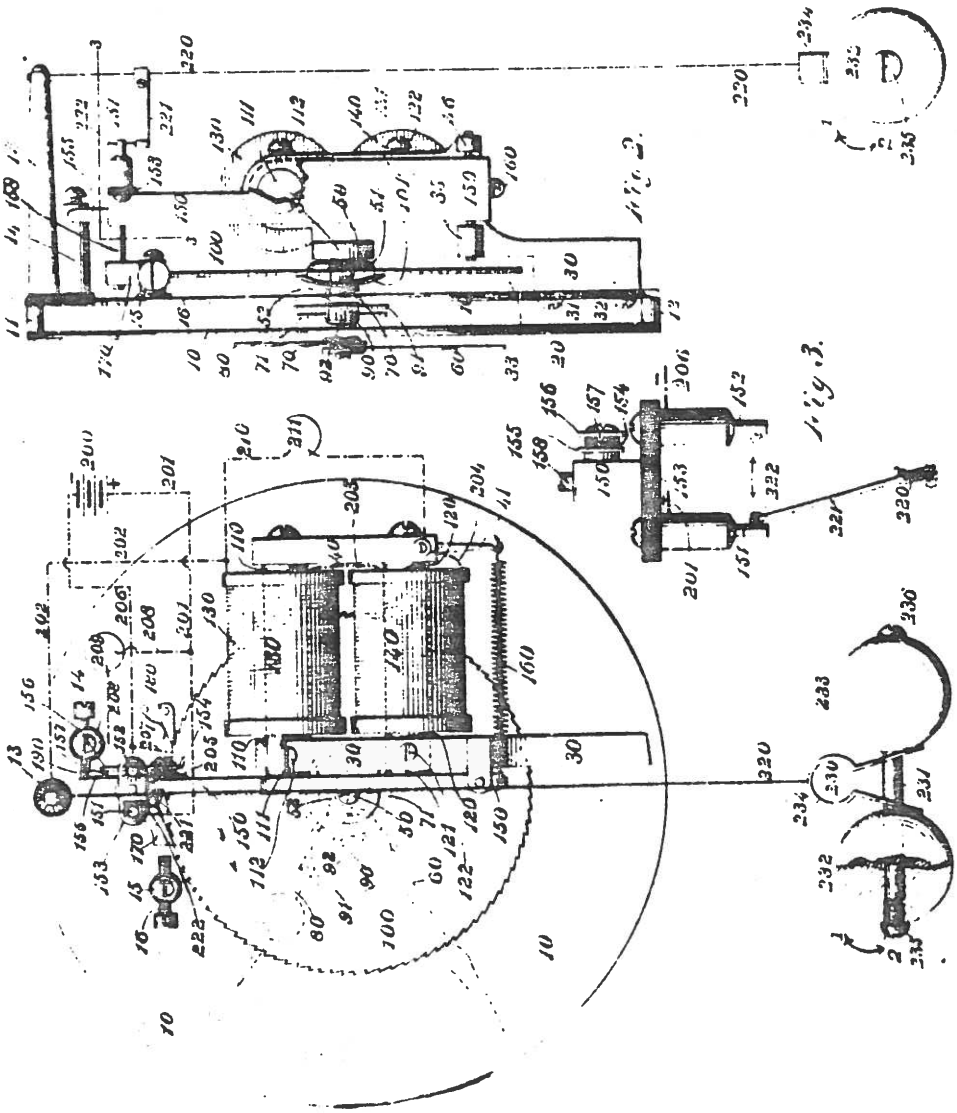

Fig. 1.

WITNESSES:

Harry King.

E. C. H. Clarkson

INVENTOR

Geo. S. Tiffany

BY: F. H. Sonas

ATTORNEY

No. 754,397. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

GEORGE S. TIFFANY, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO JAMES VAN INWAGEN, OF CHICAGO, ILLINOIS

ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 754,397, dated March 8, 1904

Application filed November 30, 1901. Serial No. 84,287. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. TIFFANY, a citizen of the United States of America, residing at Brooklyn, in the county of Kings in the State of New York, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification.

The object of this invention is to provide an electric clock which will keep time continuously for a long period—say a year, more or less—without requiring attention, except in case of accident, and with a very small current consumption. To this end the clock is made very simple and comprises the adaptation of a torsional pendulum to the control of an electromagnetic driving mechanism in such a manner as to leave the pendulum separate from the driving mechanism, whereby it is relieved of the work of mechanically actuating the parts of said mechanism and is free to rotate independently of the movement of the armature constituting a part of said mechanism. By this means the benefit of the long-period beats incident to the torsional pendulum is obtained without encumbering said pendulum with mechanism which will impair its regular and efficient action. The current consumption is minimized by the long-period beats, the current being used for an instant only near the middle of each beat to impulse the pendulum. The variation in frictional resistance of the driving mechanism due to changes of weather and changes in conditions of lubrication cannot be imparted to the pendulum and create irregularity thereof.

Figure 1 of the accompanying drawings represents a rear elevation of this clock, a few pieces being broken out to secure a better illustration. Fig. 2 represents a side elevation thereof looking from the right of Fig. 1, some parts being broken out. Fig. 3 represents, on an enlarged scale, a plan view of the armature with its contact-studs and the pendulum-rod with its contact-arm.

The same reference-numbers are used in all figures to designate the same parts.

The mechanism of this clock may be supported in a clock-frame of any suitable construction. In the form in which the invention is embodied in the accompanying drawings the frame comprises a back plate 10, having on its front face posts, as 11 and 12, near its periphery, and on its rear face at its top an elongated pendulum-post 13, insulated from the back plate, a shorter post 14 disposed near the pendulum-post and also insulated from the back plate, and a post 15 disposed below and on the other side of a vertical diametrical line passing through the pendulum-post. A clock-dial 20 is secured to the posts, as 11 and 12, in front of the back plate 10. This dial may be of any suitable construction.

A bracket 30, composed of non-magnetic material, is secured by means of screws 31 and 32 or otherwise to the lower portion of the back plate 10 on the rear face thereof. The bracket 30 extends upward and is recessed above its place of attachment, forming a space 33 between it and the back plate, and it has a laterally-projecting ear 34 opposite the center of the back plate 10 and two laterally-projecting ears 35 and 36 below the ear 34 and on a horizontal line with each other.

A central arbor 50 is supported in a bearing of the back plate 10 and at its inner extremity in a bearing of the ear 34 of the bracket 30. This arbor is provided with a fixed collar 51 near its inner end and with a pinion 52 between the back plate and the dial. A minute-hand 60 is secured to the outer end of the arbor in front of the dial 20. An hour-hand sleeve 70 surrounds the arbor 50 in the usual manner and extends through the dial 20, being provided at its outer end in front of said dial with an hour-hand 80 and at its inner end between the dial and back plate 10 with a gear-wheel 71.

An auxiliary arbor 90, supported in suitable bearings, is disposed between the back plate and the dial to one side of the central arbor 50. The auxiliary arbor is provided with a gear-wheel 91, which meshes with a pinion 52 of the central arbor and is also provided with a pinion 92, which meshes with the gear-wheel 71 of the sleeve 70, carrying the hour-hand. The motion of the arbor of

the minute-hand is communicated to the sleeve of the hour-hand by this or any suitable means.

A ratchet-wheel 100 is disposed on the central arbor 50 and extends into the recess 13 of the bracket 30 and is held against the collar 51 by a spring-clamp 101.

An electromagnet of any suitable construction is secured to the back plate at one side of the center thereof. In the form herein shown this magnet comprises cores 110 and 120, and spools or helices 130 and 140 are disposed thereon. The cores are supported at one end in the bracket 30 and are secured thereto by set-screws 112 and 122 and are connected at their other end by a yoke 40. The ends 111 and 121, which extend through the bracket 30, constitute the poles of the magnet. These cores are preferably composed of mild steel, so as to hold residual magnetism after the current is cut off.

An armature 150 is hinged to the ears 35 and 36 of the bracket 30 below the electromagnet and extends upward past the projecting pole ends of said magnet, with which it is adapted to form contact when the cores are magnetized. The armature is provided with means for drawing it away from the magnet. The means shown consists of a spring 160, connected at one end to an arm 41, depending from the bracket 40, and at the other end to the armature 150, below the pivot thereof, and this spring tends to swing the armature away from the magnet. A pawl 170 is pivoted on an arm 158 at the upper end of said armature and engages teeth of the ratchet-wheel 100. An adjusting-screw 16 engages post 15 and serves as a stop against which the pawl abuts on completing its stroke whereby the action of the spring 160 is controlled. A spring-check pawl 180 engages the ratchet-wheel 100 and serves to hold it in position during the retraction of the pawl 170.

The armature 150 is provided at or near its upper end with two electric contacts or contact-studs 151 and 152, disposed apart from each other on opposite sides of a vertical line passing through the center arbor. These studs are insulated from the armature and may be secured to the armature by means of a short cross-bar 153, composed of insulating material and disposed at the upper end thereof. The armature also carries a third contact 157, preferably attached to a plate 156, disposed on a stud 154, secured to and insulated from the armature 150. A spring 155 is also disposed on the stud 154 and in electrical connection with said armature, but insulated at its point of attachment from the plate 156. This spring rests normally against the contact 157 and serves to close the circuit through the plate 156. This spring extends beyond said plate and is adapted to engage at its outer end a contact 190, which is preferably adjustable on the insulated post 14. When the armature 150 is swung toward the magnet, the free end of the spring 155 engages the contact 190 of the energizing-circuit and is thereby separated from the contact 157 of the plate 156 of the releasing-circuit. The spring thus acts in connection with these parts as an automatic switch to shift the current from one circuit to the other, and the contact 190 thus serves as a circuit-breaker for the releasing-circuit.

A suitable electric source is disposed on or connected with the clock-case, for instance, a battery 200. A conductor 201 connects the positive pole thereof with the contact 151 on the armature, a conductor 202 connects the pendulum-post 13 with the helix 130 of the electromagnet, a conductor 203 connects the helix 130 with the helix 140, a conductor 204 connects the helix 140 with the heel 40, and conductor 205 connects the armature with the spring 155, a conductor 206 connects the contact 152 with the negative pole of the battery, a conductor 207 connects the plate 156 with conductor 206, and a conductor 208, provided with a resistance 209, connects the contact 190 with the positive conductor 201.

A shunt-circuit 210 is connected with the coils of the electromagnet and provided with a resistance-coil 211, which imparts to the shunt-circuit a considerably higher resistance than that of the magnet.

A compensating pendulum is preferably employed in connection with this clock. The pendulum shown comprises a torsional pendulum support or rod 220, suspended from the pendulum-post 13 and a pendulum-bob 230, whose arc of oscillation is horizontal, secured to the lower end of said rod. The pendulum-rod is composed of a flat elastic metallic strip or wire or strands of wire or other material adapted to receive and resist a torsional force. This pendulum-rod has means for completing an electric circuit through its main body or otherwise and is provided with a contact-arm 221, secured at one end to said rod and projecting at the other end between the contact-studs 151 and 152 of the armature. As the pendulum rod oscillates the arm 221 touches one or the other of said contacts, preferably by means of an upright stud 222, secured to the free end thereof.

The pendulum-bob 230 comprises a horizontal coupling-bar 231, weights 232 and 233 adjustable at opposite ends of said bar, and a spring-clip 234, suspended from the pendulum-rod and connected with said bar between said weights. The weights are preferably spherical in form and provided with diametrical holes, into which the opposite ends of the bar enter. These weights are preferably adjustable on the coupling-bar to regulate the torsional swing of the pendulum and to compensate for variations in the elasticity of the torsional support from changes of temperature. Any suitable means of adjustment may be employed. The means shown consist of screws

235 and 236, which engage screw-threaded holes in the ends of the bar and serve as stops for the weights. These screws render the coupling-bar extensible. The spring-clip 234 is preferably in the form of an expansible fork. The coupling-bar extends through holes in the legs of the fork, and the latter bear against the weights and hold them apart from each other in contact with the stops 235 and 236. The pendulum is regulated to increase the speed of its beats by adjusting the weights nearer together and to decrease the frequency of its oscillations by moving them farther apart. This adjustment is readily effected by means of said adjusting screws or stops. To avoid variations due to changes in temperature and to secure uniform action of the pendulum, the parts of the bob are so constructed as to compensate for such differences. The coupling-bar 231 is composed of a material which expands less for a given increase in temperature than the material of which the weights are composed. For instance, the coupling-bar may be composed of steel which has a comparatively low expansibility and the weights of an alloy of lead which has a comparatively high coefficient of expansion. An increase of temperature will cause an expansion of the coupling-bar and weights, and the expansion of the coupling-bar will tend to move the weights apart, and the greater expansion of the weights operating against the stops will tend to bring the weights nearer together. The relative dimensions and expansions of these elements, respectively, are such that as the coupling-bar expands outwardly the weights expand inwardly the required extent to maintain the normal relation between the weights. The parts of the pendulum may be so proportioned as to compensate for variations in the length or stiffness of the torsional wire due to variations in temperature.

The operation of the clock will now be described. Assuming the armature 150 to be away from the electromagnet 130 140 and the pendulum contact 221 touching the armature contact 151, the current takes the following course constituting the energizing-circuit: from the positive pole of the battery 200 to the contact 151 on the armature 150, thence through the contact-arm 221, thence through the torsional pendulum-rod 220, thence through the pendulum-post 13, thence through the conductor 202, thence through the coil 130, thence through the conductor 203, thence through the coil 140, thence through the conductor 204, thence through the yoke 40, thence through the magnet-cores 110 and 120, thence through the bracket 30, thence through the pivot of the armature, thence through the armature 150, thence through the contact-spring 155, thence through the contact-plate 156, thence through the conductor 206 to the positive pole of the battery. A small portion of the current will leak through the spark-coil 211, which is in a shunt around the magnet. The electromagnet being thus energized by the passage of the current through the coils 130 140 attracts the armature 150 and the latter swings into contact with the poles 111 and 121, dragging its pawl 170 over the teeth of the ratchet-wheel 100 and assuming the position shown in Fig. 1. In this movement of the armature the spring 155 engages the contact 190 and is thereby bent away from the contact 157, whereby the circuit is broken. The armature will, however, remain in contact with the magnet until the current is reversed, owing to the residual magnetism of the steel cores. This swinging of the armature toward the magnet imparts a torsional movement to the pendulum in the direction of the arrow-head 1, construed as in perspective, through the arm 221, attached to the pendulum-rod 220. This movement is not, however, imparted to the pendulum instantaneously. The pendulum being separate from the driving mechanism and independent of the movement of the armature, except to receive its impulses therefrom, the momentum imparted to it on the previous outward movement of the armature will cause it to continue its rotation in the direction of the arrow-head 2 against the flexibility of its contact-arm and the torsion of its rod for a substantial period in the same direction after the swinging of the armature. After the resistance of the rod and contact overcomes the momentum of the bob the rotation of the pendulum is reversed and the arm 221 is caused to swing away from the armature-contact 151 over against the armature-contact 152, and the circuit is then closed through the latter. The current then passes through the following course constituting the releasing-circuit—to wit, from the positive pole of the battery 200 through the conductor 201, thence through the conductor 208, including the resistance 209, to the contact 190 in the stud 14, thence through the spring 155 to the armature 150, thence through the bracket 30, thence through the cores 110 and 111 of the magnet, thence through the conductor 202, thence through the pendulum-post 13, thence through the pendulum-rod 220, thence through the arm 221 thereon, thence through the stud 156, thence through the conductor 206 to the negative pole of the battery. The course of the current through the magnet is thus reversed, and the polarity of the magnet thereby changed, whereby its residual magnetism is weakened or neutralized. The spring 160 then withdraws the armature 150 from the magnet and causes the pawl 170 to impart a step movement to the ratchet-wheel 100 and then come to a stop against the stud 16. The movement of the ratchet-wheel turns the hands of the clock the required distance for a single impulse. The outward spring of the armature separates the spring 155 from the contact 190, breaking the releasing-circuit and

permitting said spring to rest against the contact 157 on the plate 156 of the energizing-circuit preparatory to the re-formation of said energizing-circuit by the subsequent swing of the pendulum. This swinging of the armature toward the left imparts through the arm 221 on the pendulum-rod 220 a rotary impulse to the pendulum in the direction of the arrow-head 2, and after the torsional action of the pendulum has overcome the momentum of the previous impulse the arm 221 swings away from the stud 152 into contact with the stud 151, whereby the circuit is again restored in the direction before described and another impulse imparted to the pendulum in the direction of the arrow-head 1. This arrangement of contacts thus operates as a pole-changer with means for opening the battery-circuit after each reversal of the current and movement of the armature. The object of the resistance 209 is to weaken the current for releasing the armature, as a much weaker current is sufficient to neutralize the residual charge than that necessary for energizing the magnet for throwing up the armature. The resistance 211, which is in parallel with the magnet-coils, affords a path for the discharge-current of the magnet when the circuit of the battery and the magnet is opened, thus avoiding sparking at the contact.

It will be seen from the foregoing that for every swing of the pendulum there is a movement of the armature, and this movement of the armature will always give the pendulum an impulse tending to keep it in motion, and every alternate motion of the pendulum will propel the wheel of the clock the distance of one tooth. Consequently in order that the clock may keep accurate time it is merely necessary to adjust the beat of the pendulum to the number of teeth in said wheel. It will also be observed that the pendulum has no mechanical work to perform in controlling the clock, and consequently the frictional error is reduced to a minimum, being reduced practically to the resistance of the air.

I find that a pendulum having beats of five seconds each and a wheel having three hundred and sixty teeth, moving one tooth every ten seconds, will give good results in a small clock.

The mechanism may be varied in construction and arrangement without departing from the scope of this invention.

The battery-circuit being opened immediately after each effective action of the magnet and the torsional pendulum being permitted to oscillate in both directions of rotation after the circuit is reversed, whereby the intervals between the closings of the circuit are prolonged, it follows that the current consumption is very small. As a matter of fact it is scarcely measurable. As the pendulum is separate from the driving mechanism proper and acts merely as a contact device to control said mechanism, it is not retarded or made irregular in its action by the varying friction and irregularities of the mechanical devices constituting a part of said mechanism.

I claim as my invention

1. The combination of a clock-train, a torsional pendulum, and an electromagnetic clock-train-driving mechanism independent of said pendulum and comprising an armature separate from said pendulum, said pendulum being provided with an electric contact for controlling said electromagnetic driving mechanism and being free to rotate independently of the movement of said armature.

2. The combination of a clock-train, an electromagnetic clock-train-driving mechanism, and a torsional pendulum separate from said driving mechanism and comprising a torsional rod and a rotary bob suspended thereby and separate from the armature constituting a part of said mechanism, said rod being provided above said bob with a lateral projection serving as a circuit-closer for said electromagnetic driving mechanism.

3. The combination of a clock-train, a clock-train-driving mechanism therefor comprising an armature, an electromagnet for actuating said mechanism, alternate reversing electric circuits for energizing said magnet, and a regulating torsional pendulum independent of said driving mechanism and provided with an electric contact for controlling said circuits, said pendulum being free to rotate independently of the movement of said armature.

4. The combination of a clock-train, an electromagnet, an armature movable into contact with said magnet, mechanism operated by said armature for driving said clock-train, an electric circuit for energizing said magnet to attract said armature, an electric circuit for passing a reduced electric current through said magnet in a direction reverse to that of the energizing-circuit to eliminate residual magnetism, mechanical means for swinging said armature out of contact with said magnet, a pendulum, two contacts adapted to be engaged by said pendulum for closing the respective circuits at alternate beats of the pendulum, and a circuit-breaker adapted to instantly break the energizing-circuit on the closure of the armature against the magnet.

5. The combination of a clock-train, an electromagnet, an armature movable into contact with said magnet, mechanism operated by said armature for driving said clock-train, an electric circuit for energizing said magnet to attract said armature, an electric circuit for passing a reduced electric current through said magnet in a direction reverse to that of the energizing-circuit to eliminate residual magnetism, mechanical means for swinging said armature out of contact with said magnet, a pendulum provided with an electric contact, two contacts belonging respectively to said

cuits and engaged by said pendulum for closing either circuit, and automatic means adapted to instantly break the energizing-circuit on the closure of the armature against the magnet.

6. The combination of a clock-train, an electromagnet, an armature movable into contact with said magnet, mechanism operated by said armature for driving said clock-train, alternate reversing electric circuits, mechanical means for swinging said armature out of contact with said magnet, a torsional pendulum provided with an electric contact, two contacts mounted on said armature and adapted to be engaged by said pendulum for closing the respective circuits, a third contact also mounted on said armature and composed of separable parts respectively connectible with said circuits, and a device adapted to separate said parts to open one of said circuits immediately after the closing thereof and to form a connection with the other circuit preparatory to its being closed by the return of the pendulum.

7. The combination of a clock-train, an electromagnet, an armature movable into contact with said magnet, mechanism operated by said armature for driving said clock-train, an electric circuit for energizing said magnet to attract said armature, an electric circuit for passing a reduced electric current through said magnet in a direction reverse to that of the energizing-circuit to eliminate residual magnetism, mechanical means for swinging said armature out of contact with said magnet, a pendulum provided with an electric contact, two contacts mounted on said armature and adapted to be engaged by said pendulum for closing the respective circuits, a third contact also mounted on said armature and composed of separable parts respectively connectible with said circuits, and a device adapted to separate said parts for opening the energizing-circuit immediately after the closing thereof to form a connection with the releasing-circuit preparatory to its being closed by the return of the pendulum.

8. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, alternate reversing electric circuits for energizing said magnet, pole-changing contacts separate from the pendulum, and connecting with said circuits, respectively, and a regulating torsional pendulum provided with an electric contact adapted to operate in connection with said pole-changing contacts to open, close and reverse said circuits.

9. The combination of a clock-train, a torsional pendulum, an arm fixed to said pendulum and constituting an electric contact, an armature provided with two contacts between which said arm projects, means for moving said armature in one direction, an electromagnet for moving it in the opposite direction, intermediate devices between said armature and clock-train, and alternate electric circuits connected respectively with said armature-contacts and including the coils of said electromagnet.

10. The combination of a clock-train, a torsional pendulum, an arm fixed to said pendulum, an armature provided with two contacts between which said arm projects, means for moving said armature in one direction, an electromagnet for moving it in the opposite direction, means connected with said armature for actuating said clock-train, and alternate reversing electric circuits connected respectively with said armature-contacts and including the coils of said electromagnet.

11. The combination of a clock-train, a torsional pendulum, mechanism for actuating said train and imparting impulses to said pendulum, an electromagnet for operating said mechanism, electric circuits controlled by said pendulum for energizing said magnet, and a shunt-circuit connected with the magnet-coils and including a resistance

12. The combination of a central arbor carrying a minute-hand, a sleeve on said arbor carrying an hour-hand, a train between said arbor and sleeve, a large ratchet-wheel on said central arbor, a torsional pendulum, a contact-arm connected with said pendulum, an armature provided with two contacts between which said arm projects, means for moving said armature in one direction, an electromagnet for moving it in the opposite direction, a pawl connected with said armature for actuating said large ratchet-wheel, and electric connections adapted to close the circuit through the electromagnet by way of either of said armature-contacts.

13. The combination of a central arbor carrying a minute-hand, a sleeve on said arbor carrying an hour-hand, a train between said arbor and sleeve, a large ratchet-wheel on said central arbor, a torsional pendulum, a contact-arm connected with said pendulum, an armature provided with two contacts between which said arm projects, means for moving said armature in one direction, an electromagnet for moving it in the opposite direction, a pawl connected with said armature for actuating said large ratchet-wheel, a stop for said armature, and electric connections adapted to close the circuit through the electromagnet by way of either of said armature-contacts.

14. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, electric means for energizing said magnet, and a pendulum comprising a pendent torsional rod provided with a contact-arm, a horizontal coupling-bar suspended from said rod, and weights adjustable on said bar, the rod and weights being com-

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posed of metals having different expansibilities whereby the pendulum automatically adjusts itself to different temperatures.

15. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, electric means for energizing said magnet, and a pendulum comprising a pendent torsional rod provided with a contact-arm, a spring-clip attached to said rod, a horizontal coupling-bar supported by said spring-clip, and weights adjustable on said coupling-bar between said clip and stops.

16. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, electric means for energizing said magnet, and a pendulum comprising a pendent torsional rod provided with a contact-arm, a spring-clip attached to said rod, a horizontal coupling-bar supported by said spring-clip and provided with stops at its opposite ends, and weights adjustable on said coupling-bar between said clip and stops.

17. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, electric means for energizing said magnet, and a pendulum comprising a pendent torsional rod provided with a contact-arm, a spring-clip attached to said rod, a horizontal coupling-bar supported by said spring-clip, and provided with adjustable stops at its opposite ends, and weights adjustable on said coupling-bar between said clip and stops.

18. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, electric means for energizing said magnet, and a pendulum comprising a pendent torsional rod provided with a contact-arm, a spring-clip attached to said rod, a horizontal coupling-bar supported by said spring-clip and provided with adjustable stops, and weights adjustable on said coupling-bar between said clip and stops, the weights being more sensitive to changes of temperature than the bar, whereby the expansion or contraction of the bar is offset by the contraction or expansion of the weights, the expansion of the bar tending to separate the weights and the expansion of the weights causing them to approach each other and the contraction of each having the opposite effects respectively.

19. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, electric means for energizing said magnet, and a pendulum comprising a pendent torsional rod provided with a contact-arm, a spring-clip attached thereto, a horizontal bar supported by said spring-clip and provided with stops at its opposite ends, and weights adjustable on said coupling-bar between said clip and stops; the weights being more sensitive to the changes of temperature than the bar, whereby the expansion or contraction of the bar is offset by the contraction or expansion of the weights, the expansion of the bar tending to separate the weights and the expansion of the weights causing them to approach each other and the contraction of each having the opposite effects respectively.

20. The combination of a clock-train, an electromagnet, an armature movable into contact with said magnet, mechanism operated by said armature for driving said clock-train, an electric circuit for energizing said magnet to attract said armature, an electric circuit for passing a reduced electric current through said magnet in a direction reverse to that of the energizing-circuit to eliminate residual magnetism, mechanical means for swinging said armature out of contact with said magnet, a pendulum provided with an electric contact, two contacts belonging respectively to said circuits and engaged by said pendulum for closing either circuit, and automatic means adapted to instantly break either circuit after each movement of the armature.

21. In an electric clock, the combination a back plate, a bracket secured thereto, an electromagnet supported on said bracket, an armature hinged to said bracket and provided at its long end with contact-studs and with a pawl, a spring connected to the short end thereof, a central arbor, a ratchet-wheel attached to said arbor and engaged by said pawl, a torsional pendulum provided with a contact-arm engaged by said contact-studs of the armature in the oscillation thereof, and electric circuits connected with said studs.

22. In an electric clock, the combination of an electromagnet, an armature provided with a conductive plate, and with a conductive spring disposed adjacent to said plate and normally in contact therewith, a fixed contact with which said contact-spring engages on the movement of the armature in one direction, and electric connections forming alternate circuits passing through said spring and plate respectively.

23. In an electric clock, the combination of a back plate, a dial-plate, a recessed bracket secured to said back plate, a central arbor extending through said plates and having a bearing in said bracket, a minute-hand on said arbor in front of the dial-plate, an hour-hand sleeve surrounding said arbor, a train connecting said sleeve with said arbor, a ratchet-wheel disposed on said arbor back of said back plate, an electromagnet supported on said bracket, an armature hinged to said bracket adjacent to said electromagnet, a pawl on said armature engaging said ratchet-wheel, a pendulum engaged by said armature, and electric circuits controlled by said pendulum.

24. In an electric clock, the combination of a clock-train, a torsional pendulum, electromagnetic means for propelling the clock-train and maintaining motions of said pendulum, the circuits of said electromagnetic means being adapted to be alternately closed by the movement of said pendulum and opened independently of said pendulum.

25. The combination of a clock-train, a driving mechanism therefor, an electromagnet for actuating said mechanism, electric means for energizing said magnet, and a pendulum controlling said electric means and comprising a pendent torsional rod provided with a contact-arm, and means mounted on said driving mechanism and engaging said contact-arm for actuating said pendulum.

26. The combination of a clock-train, a torsional pendulum, an electromagnet, an armature for said magnet provided with means connecting directly with said clock-train for actuating it, and also provided with means for engaging said torsional pendulum for imparting impulses thereto, and an electric circuit controlled by said pendulum for energizing said magnet.

GEORGE S. TIFFANY.

Witnesses:
ISAAC O. HORTON,
THOMAS A. CONNOLLY.

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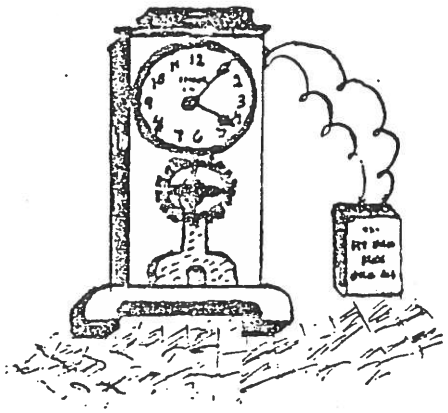
The
JOURNAL
OF THE
ELECTRICAL HOROLOGY
SOCIETY
Chapter No 78

May 28,1976

VOLUME 11---Issue #3

Martin C. Feldman,FNAWCC--Editor



Hello fellow enthusiasts:

Once again it is my pleasure to be writing this editorial for our Chapter. In Volume 11--Issue#1 the excellent article by Mr. Ed. Hanff in which he described the Rempe Electric Clock had to be printed without the benefit of the patent copy. In this issue some of the patent material is being reprinted so that you may if you wish, by putting the two sections of this article together, have a very complete and detailed description of this uniquely American early battery clock. A meeting of the N.Y./N.J. members of our Chapter was held at the home of Dr. and Mrs. Bruce Levy on May 23rd. and a report of this meeting by our new Recording Secretary, Mr. George Zlobin, is included. At that meeting we formerly accepted the restoration of a NAWCC Museum donation. This is not a local job alone and we wish to invite all those members who can do fine lathe turning, boring, and assorted other machine shop tasks to offer their services in this project. The clock is in very very poor condition and many parts will have to be made. All members participating in the restoration will be acknowledged by having their names inscribed on a brass plate to be placed with the clock in the National Museum upon completion of the work.

A new column,THE TIME MACHINE,by Dr. George Feinstein is first appearing in this issue. This column will be devoted, for the most part, to answering questions of a technical nature as Dr. Feinstein points out in his opening remarks. Please send your questions directly to him and always include and SASE. His address appears on his column page.

To those members who know of other members who have not been receiving their Journal from the EHS, would you please tell them that this is because they have not paid their dues. It is always possible to be reinstated as an active member, but we cannot guarantee that back issues of the Journal will automatically be available and sent to those members just because they have sent in their dues belatedly.

Lastly, we are including in this Journal an ELECTION BALLOT for the Officers of our Society. All the Officers presently serving have made themselves available for re-election. There is also space provided for a write-in candidate of your choice should you choose this option.

All ballots must be returned to me by July 20, 1976 for the tally. Hopefully in the next Journal I shall be in a position to publish the results.

Until the next issue have a healthy and happy summer. Enjoy this issue.

Electromagnetically yours,

Herb Feldman

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MART

FOR SALE: 1) Synchronome Master Clock, ca. 1935, in working order $550.00
2) Stromberg Elect. Master, restored, excellent $450.00

WANTED: Unusual Electrical Clocks, (incl. Warren Mystery Battery Clock). Also unusual foreign pieces.

A. Marx, 105 Bayeau Rd. New Rochelle,N.Y.10804
914-632-5986

* * * * * * * * * * * * * * *

WANTED: Electrical horological literature---any type.
Hamilton-Sangamo clocks---write details.

REPAIRS: Made: All early electrical clocks--write details.

FOR SALE: Early Hamilton-Sangamo synchronous motor. Lancet type case,running $30.00
Watchmaker's lathe and countershaft. Lathe by American $165.00
Martin C. Feldman,1545 Rhinelander Ave.Bx. N.Y.10461

WANTED: Literature concerning maintenance and repair for International Time Recording Co. Master Regulator Model No. 263. Also want same type of literature for Barr Mfg. Co. and historical data.
Irvin A. Pogue, 212 N. Wm. Dr.,Chillicothe, Ill. 61523

FOR SALE: Standard Electric Time Co. Master Clock with glass door, model AP ca.1925, double jar mercury pendulum, Oak 62" X 20", mint cond. $700.00 C.V.R. Bogert III (46998)

Cornelius V.R. Bogert III, 1651 Walnut Ave.
Oreland, Pa. 19075 (215) 885-5685

ELECTRIC TIME MACHINE

By: Dr. G. Feinstein
75-19 -195 St.Flushing,N.Y.11366

The purpose of this column is to aid the members of the Electrical Horology Society in developing and dispersing their knowledge of the technology and history of D,C. electric clocks.

To this end we will attempt to answer any significant questions on technical or historical aspects of D.C. electric clocks. Anyone expecting a reply to their question must enclose a self-addressed stamped envelope. Questions of appraisal of clocks will not be accepted.

Questions will be presented with the expectation that other members having knowledge pertinent to the question will help by sending in answers, corrections, clarifications and comments. Responsive replies with new information to these questions will then be published.

It is contemplated that, in addition to the above, to further the educational aims of this column, projects will be initiated to compile and publish information on various aspects of our adopted avocation. These projects will be successful only with the active participation of the membership.

Questions and Answers

(1) From: Harry Fox, 3241 N.Ashland Ave. Chicago, Ill. 60657

Q: I have a Flashlight Electric Alarm and Bank Clock by Darche Mfg. Co. Chicago. What size batteries do I need and where are they hooked up?
I also have a Standard Electric Time Master Clock which has been converted to electric. It was running for a week and stopped. Is there a fuse in this clock? The extension cord had a defective wall plug. I replaced the plug but it still doesn't run. What do I need to check it out? How do I connect the slave clocks and ring a bell?

A: Does anybody have information on the Flashlight Electric Alarm and Bank Clock, please help?
The Standard Electric Clock normally runs on 24 v. D.C.. Your statement that the clock was converted to electric I take to mean that in place of batteries a power supply composed of a transformer and rectifier has been provided. There are no fuses in these clocks. From your description I would first check to see that the power supply is providing the required voltage. Then check to see that the rewind contacts, the ones on the escape wheel and anchor, are clean and working properly. If it still doesn't run clean the entire movement. The terminals for slave clocks and bells are on top of the case.

(2) From: Albert F. Marshall, 70 Shadowood Rd. Fairfield, Conn. 06430

Q: I occasionally see ads in the Mart regarding "early electrics". Just what is considered to be an early electric?

A: There is no standard definition of "early electrics". My own feeling is that clocks made up to WWI and operating on D.C. can be considered as "early electrics". However, many interesting electric clocks were made after this date.

Lets see other member's ideas on the definition of "early electrics".

CHAPTER #78--ELECTRICAL HOROLOGY SOCIETY

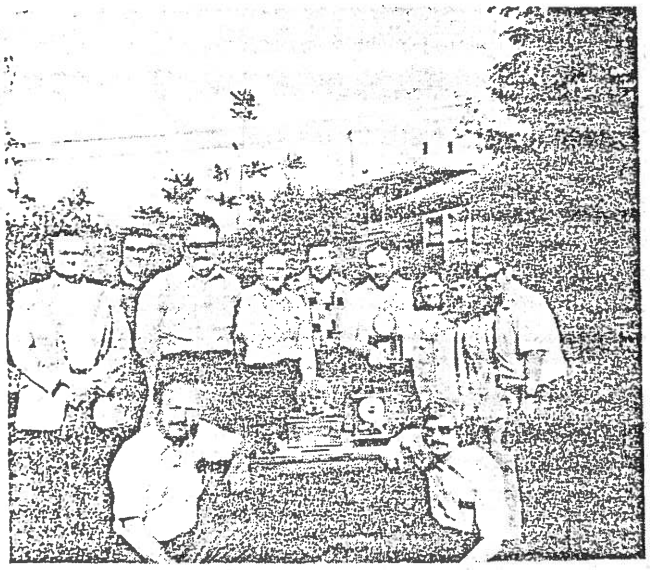
The Electrical Horology group last met on May 23rd at the charming home of Dr. and Mrs. Bruce Levy. The weather of the day was just what the Doctor ordered and the ten members from the N.Y.-N.J. area spent most of their time on the outside patio.

During the formal meeting, the much awaited S. A. Kennedy clock was unveiled and a lively session ensued as to what went where. This particular clock, having been constructed by Mr. Kennedy in 1867, is one of the early American-made battery operated clocks. The Kennedy Clock had been donated to the NAWCC Museum from a private collection and Chapter #78 has accepted the responsibility of restoration.

Several of the members brought some items for our Mart and ownership changed hands quickly.

Our members voted sincere thanks to Dr. & Mrs. Levy for their gracious hospitality and the abundant refreshments served. Dr. Levy demonstrated great dexterity with a spatula at the barbecue.

George Zlobin-Recording Secretary



Identification of members in the photo:

Kneeling L to R- G. Zlobin (Sec'ty), M. Feldman (Pres.)
Standing L to R- P. DeAngelo, R. Richman, Dr. G. Feinstein, R. McGuinness, C. Roth (Treas.), A. Mark; & friend (V.P.), Mrs. J. Mark, Mrs. M. Levy, Dr. B. Levy (V.P.).
Table: Assorted goodies. Case and mounting of Bulle clock (3rd from left) by Bob McGuinness.

OFFICIAL BALLOT

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**** ELLECTION OF ELECTRICAL HOROLOGY SOCIETY OFFICERS ****

INCUMBENT CANDIDATES	YES	NO	WRITE-IN CANDIDATE
Martin C. FELDMAN, FNAWCC (PRES.)	☐	☐	
Alan MARK (VICE PRES.)	☐	☐	
DR. Bruce LEVY (VICE PRES.)	☐	☐	
Charles ROTH (TREASURER)	☐	☐	
George ZLOBIN (Secretary)	☐	☐	

Ballot rules and explanations:

1) Vote either yes or no for each candidate. If a candidate is unacceptable and you wish to write-in a candidate of your choice, please do so in the space provided.
2) All candidates must be in good standing as members of the EHS.
3) All voters must be in good standing as members of the EHS.
4) The members elected will serve a term of two years.
5) Please have filled-in ballots returned to me by July 20, 1976.
   You need not put a return address on your ballot envelope as only members in good standing are receiving this ballot.
6) Send ballots to: Mr. Martin C. Feldman, 1545 Rhinelander Ave. Bronx,N.Y.10461

PLEASE VOTE AND THANK YOU

THE JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY NEEDS:

1: Original articles.
2: More Mart participation.
3: Technical questions.
4: New members (for the Society).

NEEDS YOU!

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No. 737,019. PATENTED AUG. 25, 1903.

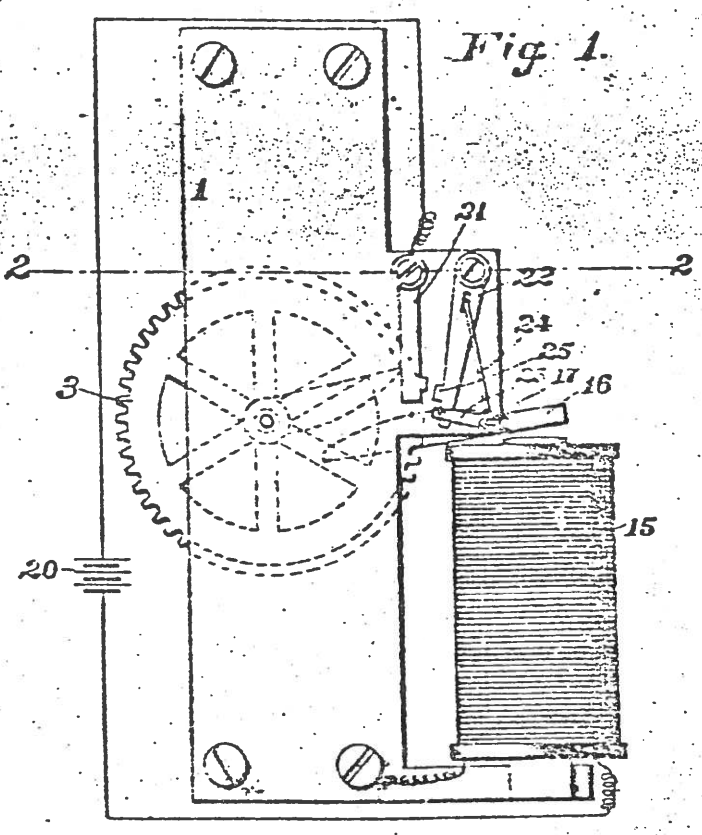
H. REMPE.

SELF WINDING ELECTRIC C[illegible]

APPLICATION FILED NOV. [illegible] 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



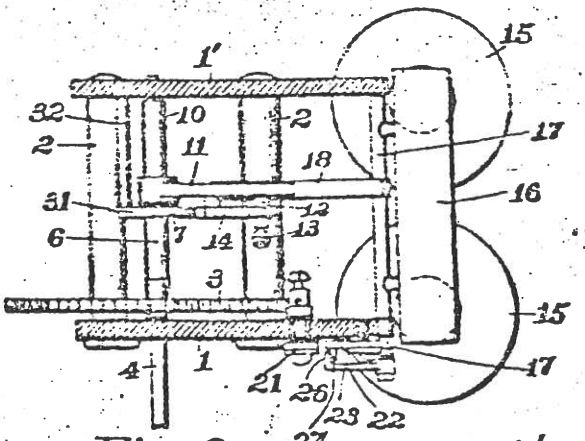


Fig. 2.

Witnesses
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By Watson E. Coleman
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-146-

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No. 737,019. PATENTED AUG. 25, 1903.

H. REMPE.

SELF WINDING ELECTRIC CLOCK.

APPLICATION FILED NOV. 12, 1903.

NO MODEL. 3 SHEETS—SHEET 2.

Fig. 4.

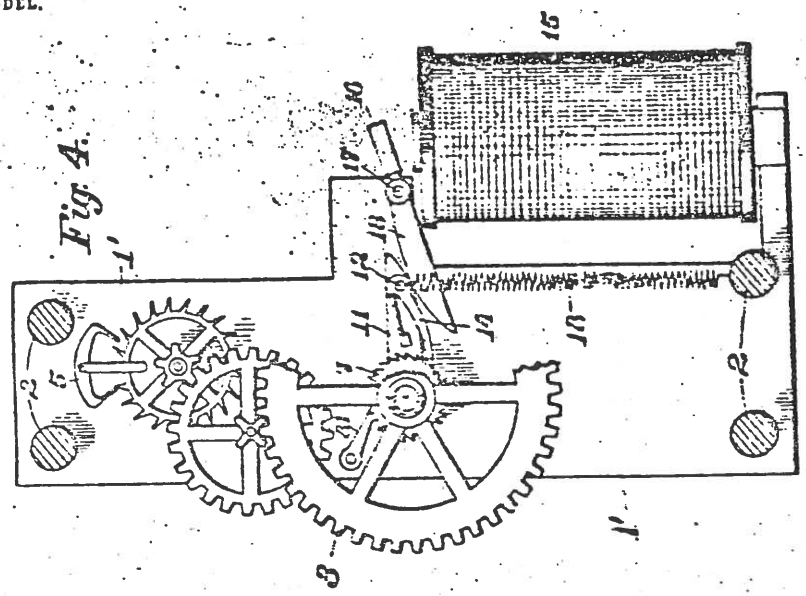
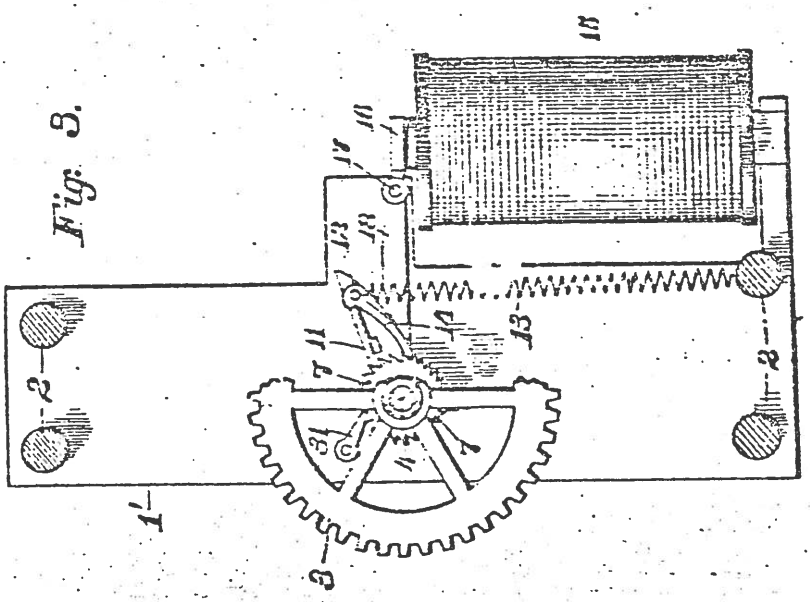


Fig. 5.



Witnesses
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C. H. Clement

Inventor
Henry Rempe
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No. 737,019. PATENTED AUG. 25, 1903.

H. REMPE.

SELF WINDING ELECTRIC CLOCK.

APPLICATION FILED NOV. 12, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 5.

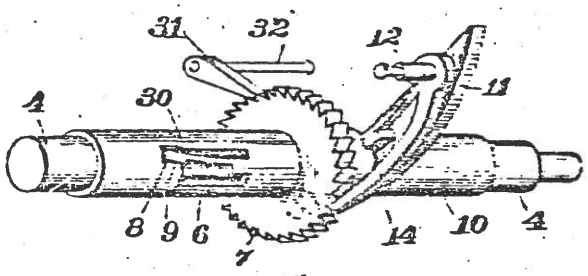


Fig. 6.

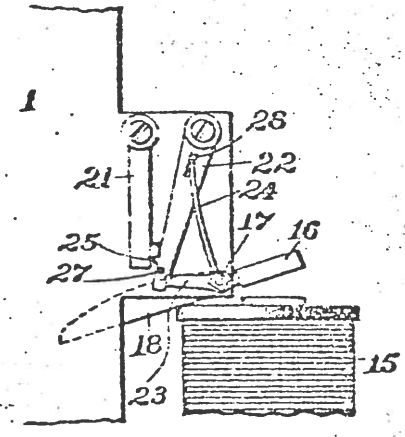
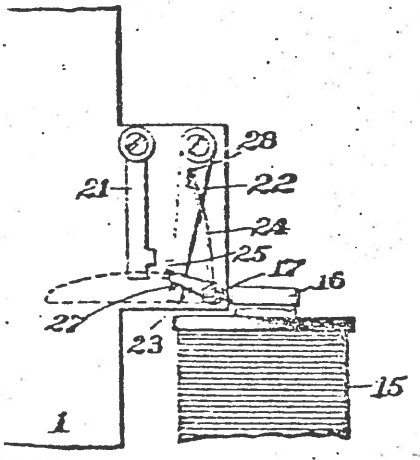


Fig. 7.



Witnesses
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C. F. Clemmer

Inventor
Henry Rempe
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No. 737,019. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

HENRY REMPE, OF DANVILLE, PENNSYLVANIA.

SELF-WINDING ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 737,019, dated August 25, 1903.

Application filed November 13, 1902. Serial No. 131,005. (No model.)

To all whom it may concern:

Be it known that I, HENRY REMPE, a citizen of the United States, residing at Danville, in the county of Montour and State of Pennsylvania, have invented certain new and useful Improvements in Winding Devices for Electric Clocks, of which the following is a specification.

This invention relates to improvements in clocks, and particularly to that class termed "self-winding," and will be described in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a clock-movement having my improvements applied thereto. Fig. 2 is a plan view, partly in section, on the line 2 2 of Fig. 1. Fig. 3 is an elevation, one of the side plates of the support or frame being removed, the parts being in the position occupied when the power or driving spring is extended. Fig. 4 is a similar view showing the position of the parts when the power-spring is relaxed. Figs. 5, 6, and 7 are detail views.

Referring to the drawings, 1 1' designate the side plates of the frame of a clock-movement, which plates are connected by suitable rods 2 and provide bearings for the several parts of the clock-movement. Between said plates is mounted the minute-wheel 3 of the clock-movement. This wheel is keyed or otherwise securely fastened to a shaft or arbor 4 and is connected to a train of gears controlled by an escapement device 5. On the shaft 4 is loosely mounted a sleeve 6, having a toothed wheel 7 secured thereto. In the hub of the wheel 3 is formed a notch 8, into which projects a spring-tongue 9 on the sleeve 6. This tongue is preferably of the form shown and is arranged within a slot in the sleeve 6, from which it projects into the notch 8 to connect the wheel 3 and said sleeve 6. A second sleeve 10 is mounted on and adapted to turn about shaft 4, it being arranged between the aforesaid sleeve 6 and the side frame-plate 1'. To this sleeve 10 is rigidly secured a radially-projecting arm having its lower edge or side curved, and from this cam-arm 11 projects laterally a stud or pin 12. To the outer end of this stud 12 is connected the upper end of a coiled spring 13, which is the driving or propelling spring for the mechanism. The lower end of said spring is secured to one of the cross bars or rods 2, that connect the sides of the supporting-frame. The stud or pin 12 also has connected thereto one end of a pawl 14, the other end of which engages the teeth on wheel 7 and turns the same and the wheel 3 as the cam-lever is rocked downwardly about the axis of shaft 4 by the action of spring 13.

On the supporting-frame are suitably mounted two electromagnets 15, the armature 16 of which is carried by a shaft 17, having bearings in the side plates 1 1'. To said shaft 17, within the path of movement of the cam 11, is secured a similarly-shaped but oppositely-arranged cam 18. As before described, the cam or lever 11 is connected to the toothed wheel 7 by the pawl 14, and said wheel is connected to the wheel 3 and through said wheel to the wheel engaged by the escapement device 5. The power-spring being under tension, or the parts occupying the relative positions shown in Fig. 3, it will be seen that at every actuation of the escapement device 5 the spring 13 will draw the free end of the cam-arm or lever 11 downwardly or cause the sleeve 10 supporting said arm to move about the shaft 4, and this movement will be communicated to the wheel 3 and said shaft 4 so that they will move to the same extent and in the same direction. As the wheel 3 and shaft 4 are thus turned the lower curved side of the arm 11 will contact with the curved or cam surface of the arm 18 and rock the shaft 17 to lift the armature 16 from the magnets, the circuit through the magnets being normally broken or interrupted during the downward movement of the arm 11. The movement of shaft 17 caused by the depression of the arm 18 serves to effect a closing of an electric circuit including the magnets 15, so that when the power-spring 13 has been relaxed to as great an extent as is desired the magnets will be automatically energized, the armature 16 attracted, and the levers or cams 11 18 rocked upwardly into the positions shown in Fig. 3, placing the power-spring 13 again under its maximum tension. The electrical connections and circuit-closing devices actuated by the shaft 17 will now be described.

Referring particularly to Figs. 1, 2, and 7,

it will be seen that one pole of an electric battery 20 is connected to a contact-plate 21, mounted on but insulated from the frame-plate 1. The other pole of the battery is connected to the magnets 15. A movable contact-arm 22 is pivotally mounted on the frame-plate 1 and is connected to an arm 23 on the shaft 17 by a flat or leaf spring 24, which acts to rock the arm 22 about its pivot to cause a contact point or lug 25 thereon to bear against a similar point or lug on the stationary contact 21. When the parts are in the positions indicated in Figs. 1 and 3, however, the arm 22 is held against the action of the spring 24 in such position that there is no contact between the lug 25 and plate 21. This is accomplished by providing the free end of the arm 23 with a lug 26, that extends into the path of a stud or pin 27 near the lower end of the movable contact-piece 22. As the cam 18 is forced downwardly by the cam 11 the arm 23 on the rock-shaft 17 is gradually depressed until the lug 26 thereon passes below the stud or pin 27, and the spring 24 instantly swings the movable contact-piece 22 into the position shown in Fig. 6 and closes the electric circuit. The magnets 15 are energized and the armature 16 drawn downward, raising the cams 18 11 and placing the power-spring 13 under tension, as before described. Immediately on the commencement of the downward movement of the armature 16 and the consequent upward movement of the arm 23 the spring 24 tends to draw the movable contact 22 away from the stationary contact; but such movement of the movable contact is prevented by the lug 26 on the arm 23 being then in rear of the stop or pin 27, as shown in Fig. 6. To prevent damage to the spring 24 under these conditions, it is not connected rigidly to the movable contact-piece 22, but has its upper end deflected slightly and extended into a slot 28, formed in said contact. The forward surface of the lug 26 is inclined, as shown in Fig. 6, and said lug is of such height that it insures a closing of the electric circuit until the cams 18 11 have been raised far enough to give the desired tension to the power-spring 13. When the parts 18 11 have been raised sufficiently, the arm 23 will be in such position that the stud or pin 27 is released by the lug 26, and the spring 24 instantly moves the adjustable contact 22 away from the stationary contact 21 and into the position shown in Fig. 7, breaking the electric circuit and de-energizing the magnets. As soon as the magnets are deenergized the weight of the cam 18 rocks the armature 16 away from the magnets and brings the lug 26 into position in front of the stud or pin 27 to prevent contact between the pieces 21 22 until the cam 18 is again depressed by the cam 11, as previously described.

It will be noticed that while the clock is being wound or the spring 13 is being placed under tension the propelling power is momentarily released or disconnected from the wheel 3, the pawl 14 simply sliding upwardly over the teeth of wheel 7. This would tend to give the clock-hands, which are connected with the shaft 4 in the ordinary manner, a sudden movement or vibration. To obviate this, I provide means for holding the wheels 7 and 3 and the shaft 4 stationary while the cams 18 11 are being raised. The pull of the spring 13 causes the spring-tongue 9 to bend slightly, so that it contacts with the shoulder 30 on the sleeve, and if the wheel 7 is held stationary, while the clock is being wound this tongue 9 will maintain the wheel 3 and shaft 4 in corresponding condition and take up any lost motion due to the fact that the propelling force is disconnected during the winding operation. To hold the wheel 7 stationary, I employ a dog or pawl 31, mounted on a shaft 32 and engaging said wheel in such a manner as to prevent any movement thereof in a direction opposite that in which it is moved by the pawl 14.

An important feature of the winding mechanism hereinbefore described is the manner in which the varying power of the armature is applied to the spring 13. When the winding commences, the armature is at the greatest distance from the magnets and can therefore exert a minimum pull or force on the spring. At this time, however, the point of contact between the cams 18 and 11 is relatively far from the axis of the shaft 4, and therefore the slight pull exerted by the armature is sufficient to start the upward movement of the cam 11 and begin the stretching of spring 13. As the point of contact between cams 11 and 18 is shifted toward shaft 4 the power or pull exerted by the armature increases, because it is constantly approaching the magnets, and therefore the extension of the spring 13 is gradually effected. The pull of said spring on the cam-arm 11 is also gradual and constant at all times. When the spring is fully extended, its pulling power is of course greatest; but at such time the line of force is relatively nearer the axis of the arm 11 than it is as the said arm swings downwardly. The shifting of the line of force effectually compensates for the difference in the strength of the pull exerted by the spring, so that the power applied to wheel 3 is constant at all positions of the arm 11. When the moving contact 22 is released and forced forward by spring 24, it makes a sliding contact with the stationary contact 21, and this sliding movement effectually cleans any dust from the contact-surfaces.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a clock, the combination with the clock-movement, of a spring adapted to drive said movement, an electric circuit including a stationary contact and a magnet, a movable contact for closing said circuit, as the tension of the power-spring is relaxed, means con-

nected with the armature for placing the spring under tension when the magnet is energized, means connected with the armature for moving the movable contact from the stationary contact, and means for preventing such movement of the movable contact until the spring has been placed under the desired tension.

2. In a clock, the combination with the clock-movement, of a spring adapted to drive said movement, an electric circuit including a magnet, a movable circuit-closer, means for normally maintaining said circuit-closer in inoperative position adapted to be withdrawn when the tension of the driving-spring is reduced to a predetermined extent, a spring connected to the circuit-closer for moving it into operative position when said locking means is withdrawn, means for automatically increasing the tension of the spring when the circuit is closed and the magnet is energized, and means connected with the armature for maintaining the circuit-closer in operative position until the spring has the desired tension.

3. In a clock, the combination with the clock-movement, of a spring adapted to drive said movement, an electric circuit including a magnet, a movable, spring-pressed, circuit-closer, a pivotally-mounted armature, an arm connected to said armature and normally engaging said circuit-closer to hold it in inoperative position, means for withdrawing said arm from engagement with the circuit-closer as the tension of the spring is relaxed, and means for increasing the tension of the spring when the magnet is energized, said arm being adapted to engage the circuit-closer and maintain it in operative position until the desired tension of the spring is attained.

4. In a clock, the combination with the clock-movement, of a shaft, a sleeve loosely fitted on the shaft and flexibly connected with a gear secured to the shaft and forming part of the clock-movement, a power-spring connected to a stationary post and to a second sleeve on said shaft, means for connecting said sleeves as the one connected to the spring is moved thereby, an electric circuit including a magnet, means actuated from one of said sleeves for closing said circuit, and means connected with the armature of the magnet for rocking said sleeve connected with the spring about its supporting-shaft to place the spring under tension when the magnet is energized.

5. In a clock the combination with a shaft, of a clock-movement having a wheel secured to the shaft, a sleeve loosely mounted on the shaft and having a flexible tongue projecting beyond one end thereof into engagement with the hub of said wheel of the clock-movement, a ratchet-wheel secured to said sleeve, a second sleeve on said shaft, adapted to engage the ratchet-wheel when moved in one direction, a power-spring connected to the second sleeve to turn both said sleeves in said direction and drive the clock-movement, means for automatically turning said second sleeve in the opposite direction, at the completion of a predetermined movement thereof, to maintain the power-spring under proper tension, and a pawl engaging the ratchet to hold the wheel connected thereto stationary during such backward movement of the winding-sleeve.

6. In a clock the combination with the clock-movement, of a shaft geared to said movement, an arm sleeved on said shaft and adapted to turn the same when moved in one direction, a power-spring for so moving said arm, an electric circuit including a magnet, a spring-pressed circuit-closer, a pivotally-mounted armature for the magnet, a stop connected with the armature and normally holding the circuit-closer in inoperative position, an arm connected with the armature and extending into the path of the arm connected to the power-spring and adapted to be actuated by said spring-arm, as the spring is relaxed, to withdraw the stop and release the circuit-closer, said armature-arm acting to move the spring-arm to increase the tension of the power-spring when the magnet is energized, and means for breaking the circuit when the spring has attained the desired tension.

7. In a clock, the combination of a clock-movement, a power device for driving said movement, an electric circuit including a magnet, means connected with the armature of the magnet for adjusting the power device to cause it to exert its maximum power, a spring-impelled circuit-closer, and a stop movable by the armature of the magnet and adapted to intermittently engage the circuit-closer to hold it in operative position when the power exerted by the power device is reduced to a predetermined amount and to hold said circuit-closer in inoperative position when said power device is adjusted to exert its maximum power.

8. In a clock, the combination of a clock-movement, a power device for driving said movement, an electric circuit including a magnet, means connected with the armature of the magnet for adjusting the power device to cause it to exert its maximum power, a pivotally-mounted circuit-closer, a spring connected to said closer and acting to move it about its pivot, and a stop movable by the armature of the magnet and adapted to engage said circuit-closer and hold it in inoperative position, with its actuating-spring under tension, until the power of the driving device is reduced to a predetermined extent, and to reengage said circuit-closer and hold it in operative position and its actuating-spring under tension until the driving device has been adjusted to exert its maximum power on the clock-movement.

9. In a clock, the combination of a clock-movement, a power device for driving said movement, an electric circuit including a magnet, a pivotally-mounted, spring-pressed, circuit-closer, two stops or engaging surfaces on

said circuit-closer, means connected with the armature for successively engaging said stops, and means connected with the armature for adjusting the driving device to cause it to exert its maximum power on the clock-movement, said circuit-closer being held in inoperative position until the power of the driving device is reduced to a predetermined amount and held in operative position until said driving device is adjusted to exert its maximum power.

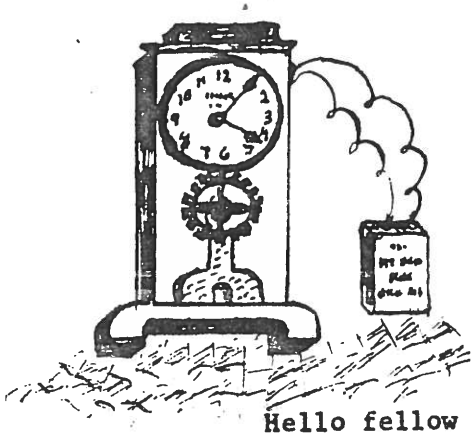
In testimony whereof I affix my signature in presence of two witnesses.

HENRY REMPE.

Witnesses:
G. WEIL,
M. G. YOUNGMAN.

The
JOURNAL
OF THE
ELECTRICAL HOROLOGY
SOCIETY
Chapter No 78

August 19, 1976
VOLUME II--ISSUE #4
Martin C. Feldman, Editor



Hello fellow enthusiasts:

During the summer months the amateur clock market is usually depressed and this holds as well for the electrical clock market. Nevertheless, research continues as usual and there has been some new material unearthed by your Editor. Select portions of this material will be forthcoming in the future editions of this Journal. If anyone has material which they wish to copy or to send to me for copying I shall be happy to receive same. All reasonable costs will be refunded and I request details from you if you are able to supply any type of written electrical horological literature. This material eventually will find a place in future Journals. While it is not the purpose of the JEHS to be a copying organ, I, nevertheless feel that there is much worthwhile information which is moderately to quite rare, and in almost 100% of the time unavailable to our electrical horological community. This material deserves to be disseminated for the good of our membership and to also put into practice one of our Charter aims. As always original research is most welcome and I cannot emphasize the fact strongly enough nor can I encourage you enough to please contribute to our Journal.

Approximately 10% of our membership responded by returning the Election Ballot for the election of our officers. They were re-elected unanimously and are as follows:

President/Editor--Martin C. Feldman,FNAWCC,
Vice-President--Alan Marx,
Vice-President--Dr. Bruce Levy,
Treasurer--Charles Roth,
Secretary--George Zlobin

The officers of the EHS wish to thank you for your continued support and we shall endeavor to work as we have in the past to the best of our abilities on your behalf.

Enjoy this issue!

Electromagnetically yours,
Martin C.Feldman,FNAWCC

LIST OF MAJOR ELECTRIC CLOCK LITERATURE AVAILABLE FROM THE FRANKLIN INSTITUTE LIBRARY, U.S.A.

These books may be obtainable through the Inter-Library Loan System. Some may be available through your local library branch and you should address all inquiries to them (local branches). --Ed.

American Clock Co.
Directions for the installation and care of automatic electric clocks. Chicago, n.d. 13p.

Arzberger (Fr)
Die electrische Uhr. Brunn, 1870 16p.
Ueber elektrische Uhren. Brunn, 1871. 8p.

Automatic Electric Clock Co.
The twentieth century demands accurate time. Chicago, 1901. 20p.

Bain (Alexander)
A short history of the electric clock. London, 1852. 31p.

Berner (Georges Albert)
L'horloger-electricien. 2. ed. Bienne, 1926. 204p.
Initiation de l'horloger a l'electricite et a ses applications. La Chaux-de-Fonds, 1910. 254p.

Brockling (Wilhelm)
Uber elektrische Uhren mit besondered Beziehung auf die Jones' schen. Uhren mit gleichschwingended Pendeln (sog. Sympathetische Pendeluhren). Hamburg, 1873. 12p.

Cuenod (M. H.)
Horloge electrique syst. R. Thury. Geneve, n.d. 6p.
Horloge electriquesyst. R. Thury pour commande d'instruments astronomiques et pour la distribution de l'heure. Geneve, 1884. 6p.

Decressain (P.)
L'horlogerie electrique a la Exposition universelle de 1900. Paris, 1903. 115p.

Eifert (A.)
Verkauf technischer und elektrischer Uhren und Uhrenanlagen einschliesslich der Turmuhren. Berlin, 1928. 70p.

Farrell (John M.)
Basic electricity as applied to horology. n.p., 1958. 9p.

Favag Electrical Works.
Catalog of electric clocks. Neuchatel, 1931. 12p.

Favarger (Albert Jules)
L'electricite et ses applications a la chronometrie. 2. ed. Geneve, 1892. 198p.
L'electricite et ses applications a la chronometrie. 3. ed. Neuchatel, 1924. 557p.

Fiedler (Ladislaus)
Die Zeittelegraphen und die electrischen Uhren vom praktischen Standpunket. Wien, 1890. 207p.

Finlaison (John)
Account of some remarkable applications of the electric fluid to the useful arts by Alexander Bain. London, 1843. 127p.

General Electric Co.
Warren master clock for maintaining constant average frequency. Schenectady, 1919. 3p.

Grainer (Jean)
Pendules electriques. Paris, 1935. 171p.

Guye (Rene P.)
Horlogerie electrique. Lausanne, 1948. 452p.

Hammond Clock Co.
Electric time. Chicago, 1931. 20p.

Hefner-Alteneck (Fr. Von)
Elektrischer Uhrenbetrieb. Berlin, 18--. 4p.

Hickman (Clarence Nicholas)
A portable spark chronograph. Philadelphia, 1931. 7p.

Hipp (M)
Notice relating to the electric clocks manufactured inNeuchatel. Neuchatel, 1876. 23p.

Hope-Jones (Frank)
Electric clocks. n.p. 1914. 16p.
Electric clocks. London, 1931. 261p.
Electric clocks and how to make them. London, 1949. 197p.
Electric impulse dials. n.p., 1914. 12p.
Electric timekeeping. London, 1940. 275p.
Electric timekeeping. 2nd ed. London, 1949. 279p.
The free pendulum. London, 1923. 11p.
Modern electric time service. London, 1910. 67p.

Jackson (J.)
The accuracy of Shortt free pendulum clocks, by J. Jackson and W. Bowyer. London, 1928. 8p.
The Shortt clocks at the Royal Observatory, Greenwich, by J. Jackson and W. Bowyer. London, 1928. 17p.

Kinostan
Electric clocks; principles, construction and working. London, 1920. 152p.

Langman (Henry R.)
Electrical horology, by H. R. Langman and A. Ball. 3rd ed. London, 1935. 200p.

Lecture on "Matsuda" electric horology. Tokyo, 1933. 1 vol.

Lehotsky (Ludwig)
Electrische Uhren und Signaleinrichtungen. Heidelberg, 1951. 184p.

The Magneta Co.
Description of the apparatus and working of the "Magneta" clock system. New York, 1908. 19p.
Illustrated catalogue of "Magneta" electric clocks. London, 1926, 16p.
System of electric clocks without batteries or contacts. New York, 1911. 32p.

Marrison (W.A.)
The crystal clock. New York, 1930. 11p.
The first electric clock. New York, 1940. 6p.

Mercer (T. and F.)
Marine octo electric British chronometer controlled clocks. St. Albans, 1937. 26p.

Merling (A.)
Die elektrischen Uhren ... Braunschseig, 1884. 323p.

Miller (H) Clock Co.
Herman Miller electric clocks. Grand Rapids, 1942. 1p.

Philpott (Stuart Fred)
Modern electric clocks. London, 1933. 212p.
Modern electric clocks. 4th ed. New York, 1949. 228p.

Pritchett (Henry Smith)
The Kansas City electric time ball. Kansas City, 1881. 4p.

Reithmann (Chr.)
Horloges normales electriques. Munich, 1867. 4p.

Revere Clock Co.
Revere electric clocks. Cincinnati, 1949. 24p.

Riefler (Clemens)
Illustrated catalogue of precision-pendulum clocks, nickel-steel compensation-pendulums and electric apparatus for time-service installations in observatories. Nesselwang, 19--. 36p.

Schneebeli (H.)
Elektrotechnik und elektrische Uhren. Dusseldorf, n.d. 95p

Seeley (E.B.) and Co.
Eco magnetic watchman's clock and Warner electric time system. Philadelphia, 18--. 16p.

Seth Thomas Clock Co.
Seth Thomas electric clocks. Catalog No. 790. Thomaston, 1931. 32p.

Siemens & Halski
Anleitung zur Projektierung und Ausfuhrung Weiner elektrischer Uhrenanlagen. Berlin, 1910. 40p.
Elektrische Uhr von Ziemens & Halske. Berlin, 1880. 4p.

Spellier (Louis H.)
Facts about Spellier's electric clock. Philadelphia, 1884. 3p.
A new system of electric clocks. Philadelphia, 1886. 24p.

Standard Electric Time Co.
Catalogue No. 33 standard electric time system. Springfield, 1915. 64p.
Catalogue No. 34 standard electric time system. Springfield, 1920. 11p.

Steuart (Alexander)
Alexander Bain. Edinburgh, 1941. 15p.

Synchronome Co. Ltd.
Electric clocks; descriptive pamphlet and price list. London, 1918. 16p.

Thiesen (Ferdinand)
Die elektrischen Einzeluhren. (Elektrische Uhren und Uhren fur technische Zwecke, Bd. 1.) Berlin, 1936. 146p.
Lehrgang uber die elektrischen Uhren. Bd. 1: Die elektrischen Einzeluhren. Ulm (Donau) 1950. 130p.
Die Synchronohren und ondere frequenzgesteuerte Uhren. (Elektrische Uhren und Uhren fur technische Zwecke, Bd. 2.) Berlin, 1936. 152p.

Tobler (Adolph)
Die elektrischen Uhren und die elektrische Feurwehr-Telegraphie. Wien, 1883. 194p.
L'horlogerie electrique. Ed. francaise, revue et augmentee par L. de Belfont de la Roguq. Paris, 1891. 152p.

Walti (A.)
Nouveautes en electro-chronometrie. Bienne, 1921. 24p.

Wagner (C. Theod.)
Katalog uber Normaluhren und elektrische Uhren nach Patent Grau. Wiesbaden, 1888. 51p.

Western Union Telegraph Co.
Self-winding synchronized clocks. New York, n.d. 2p.

White (Herbert G.)
Electric clocks. n.p. 1921. 4p.

Wise (S.J.)
Electric clocks for domestic and industrial purposes. London, 1948. 150p.

March, 1976

Compiled by F. G. A. Shenton,
Chairman, Electrical Horology Group
Antiquarian Horological Society.

FRANKLIN INSTITUTE BOOK LIST ADDITIONS

By: Dr. George Feinstein

Bahr (Joh. Karl)
Uber die einwirkung der Reibungs-Electricitat auf Pendel, Dresden,1870, 56p.

Bohmeyer (C.)
Anleitung zur Aufstellung und Behandlung elektrischer Uhren...Hanau, 1892, 101p.

Haraguchi (Chotaro)
Saishin denkidokei no chiskiki (latest information on electric clocks). Tokyo,1940 340p.

Schellen (Heinrich)
Elektrischen Zeittelegraphen oder die elektrischen Uhren. Braunschweig, 1870, 38p.

Schindler (Georg)
Elektrouhrentechnik. V.1 Ulm, 1957, 152p.

Self-Winding Clock Co.
Catalogne. New York, 1886, 33p.
Directions for installation and care of Self-Winding synchronizing clocks, Brooklyn, 1910, 32p.

Testorf (Friedrich)
Die Elektrizitat als Antriebscraft fur Zeitmessinstrumente, Halle, 1910, 205p.

Waltenhofen (Adalberl Carl Von)
Uber die electrische Uhr von G. Rebicek Prag, 1879, 6p.

Zacharias (Johannes)
Elektrotechnik fur Uhrmacher. Berlin, 1908, 310p.

The following books came in too late to be reviewed for this issue of the JEHS. However, they will be available for purchase by September 1976 from the Company listed below. They appear to be well done and are a worthwhile addition to the Electrical Horology library.

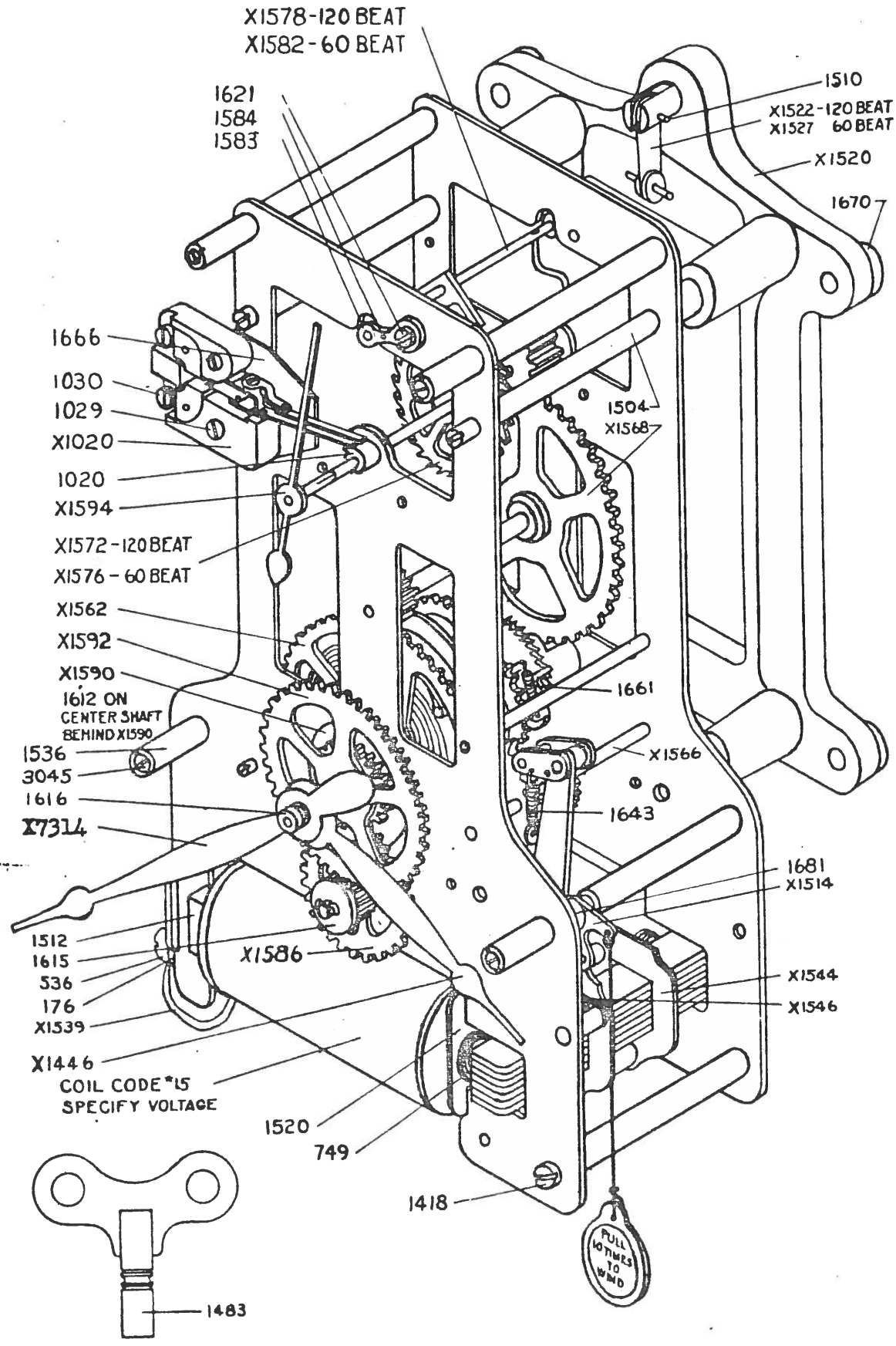
How to Make an Electric Clock
A reprint of the Barnard Way book on constructing a Hipp movement. . . . $3.00 *

Electric Clocks and Chimes
A series of Model Engineer articles on constructing various clocks, edited by Percival Marshall . . . . . $5.00 *

Caldwell Industries
4468 Zarahemla Drive,Salt Lake City,Utah 84117

**Prices approximate

60 or 120 BEAT
MASTER CLOCK MOVEMENT
NON-AUTOSET



ELECTRIC TIME MACHINE

By: Dr. G. Feinstein
75-19 - 195th Street
Flushing, N.Y. 11366

We would like to compile and publish a listing of electric clocks that have been manufactured, together with pertinent information about them, such as inventor, patent numbers and dates, place of manufacture, any unusual technical details, operating voltages, etc.

To be as complete as possible this project requires everyone's cooperation. Please send information on clocks in your possession or, on those that you have information.

This listing will commence with the next issue. Thank you very much.

QUESTIONS AND ANSWERS

(3) From: M. L. King, Route 1, Box 135B, Godley, Texas 76044

Q: Let us begin with Ques. No.2 "Early Electrics." First I think it is a misnomer. Really we are not concerned with "Electrics"; but rather batteries. I like that "operating on D.C." So--"Early D.C., or Batteries", wouldn't that be more to the point? Probably most of the clocks we will find, likely were made before WW I, so that is as good a cut off as one could wish for.

I am re-doing my shop and eventually want to have a wall about 6' long (both sides) for just electric clocks. I have 2-6V batteries (Willard) made of clear plastic with built in hydrometers. Will have 12 volts available which will run anything I have, and with a charger--will be in business.

I have a "Brillie Electrique", which is something like the Brillie pendulette shown in Fig. 12, Page 22-"Electrical Timekeeping", Hope-Jones. This one needs a pendulum (I have the suspension.) Any dimensions, material, etc.,etc. would be appreciated.

I recently acquired a battery clock. It is in a wood case, a burl veneer. It is marked Leon Hatot, Paris, France. The pendulum looks similar to that described in the Bulle Book, a small cobalt magnet and small coil. Not a Bulle, of course, but similar. Does my description help?

Have checked through my new Bulle Clock book and am still wondering about one of my Bulles. This is a larger type, not quite 1/2 second beat, but nearly so. The dial frame (of cast aluminum) has two lower extensions that support the magnet. "Modele BG" is cast in the aluminum. I fail to find this model listed, or pictured. All the illustrations show the magnet supported in the bottom of case. Could this be an earlier model than "A"?

A: Many of the clocks being collected were made after WW I, such as the Ato, Barr and Bulle.

You will need a divider network with your 12 volt batteries, since clocks were made for 1.5, 3, 4, 5, 6, 12, 24 volts and probably for other values as well.

The pendulum for your "Brillie Electrique" should be the same as shown in "Electrical Timekeeping." It generally consisted of a brass ball (approx. 2 3/8"

diameter) or sometimes a brass cylinder for the bob with a horseshoe magnet made of a round bar fixed below the bob. You can try advertising for it in the MART page of this Journal or in the National MART.

The clock you describe is an "ATO", it was invented by Leon Hatot, modern versions are still being made. It is similar in idea to the Bulle, except that the coils are fixed and the magnet is attached to the pendulum and moves, which is the reverse of the Bulle movement.

The aluminum "Modele BG" Bulle movement you describe was used in circular wall clocks, such as those shown on page 54 of the Bulle Clock Book.

(4) From: R. T. Walter, 218 Lakewood Dr., Sealbrook, Texas 77586

Q: I have acquired a Niagra Clock Corp.(Buffalo, N.Y.) wall clock. Seems intact but the pendulum is missing. From the instructions it appears to operate not unlike an anniversary clock, i.e. suspension wire/rotary motion etc. but I can't see enough from the pictures to be sure what to look for or attempt to construct.

Appreciate any help regarding acquisition or construction of the necessary item.

A: The clock movement you have is identical to the Cloister and Tiffany Never-Wind movements. There are two varieties of movements, one impulses on each swing and generally has a torsion pendulum made up of two brass balls (approx. 1 5/8" diameter) at the ends of a short, square adjustable bar. The second, more common type is impulsed on every other swing and generally has a torsion pendulum made up of two bullet shaped brass shells, filled with lead, (approx. 1 1/8" diameter x 1 3/8" high) at the ends of a fixed flat bar, or two brass balls (approx 1 1/2" diameter) on a short fixed bar. The timing adjustment on these is by changing the effective length of the torsion wire with a nut just above the pendulum.

You can try advertising for the pendulum in either the MART page of this Journal or in the National MART.

MART

WANTED: Stromberg Masters--Write details.
Joseph Bourell,4213 No.Milwaukee Ave.Chicago,Ill. 60641

FOR SALE: Barr with external battery box, original,GRO. $135.00
Small Tiffany Never-Wind (9 1/2" overall) excellent, all original, GRO. $135.00
Henry R. Cramer,1704 Hass Dr.South Bend, Ind. 46635

WANTED: Electrical Horological Literature--any type. Highest prices paid.
Hamilton-Sangamo clocks---write details.

Repairs Made---All early electrical clocks-write details.
Martin C. Feldman,1545 Rhinelander Ave.Bronx,N.Y.10461

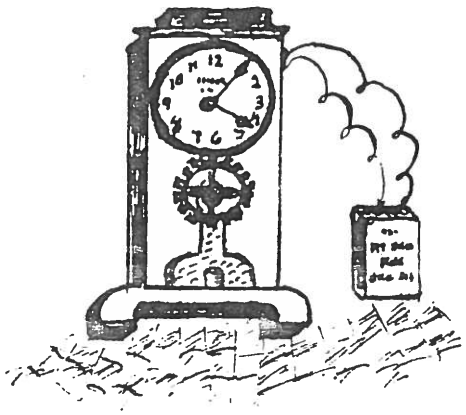
WANTED: Lower suspension assembly for Tiffany Never-Wind.
Any information on 110 v. A.C. German Eureka.
George Zlobin, 956 E. 79 St. Brooklyn,N.Y. 11236

WANTED: Unusual Electrical Clocks (including Warren Mystery Battery Cl.).
Also unusual foreign pieces.
A. Marx,105 Bayeau Rd.New Rochelle,N.Y. 10804

FOR SALE: Early Bulle Battery Clock about 16" square with an open dial. If interested let me know. I am asking $90.00 or would accept a trade for some good Ingersoll advertising material.
Steve Berger,854 Thornton Lane,Buffalo Grove,Ill. 60090

FOR SALE: SECONDARY CLOCKS - 90 Stromberg slaves, 11" and 14" dials, removed from an operating system. Sorry - as a lot or half-lot only --- you must pick up. $650 or best offer.
John McCall, 312-246-6342,
1527 W. 65th Place, LaGrange, Illinois, 60525

The
JOURNAL
OF THE
ELECTRICAL HOROLOGY SOCIETY
Chapter No 78



October 15, 1976
VOLUME 11--ISSUE # 5
Martin C. Feldman, Editor

Hello fellow enthusiasts:

In response to the overwhelming influx of mail not received asking me where Issue No.4 was, let me put everyone's mind at ease by stating that your last issue should have read, VOLUME 11--ISSUE #4 and not VOLUME 11--ISSUE #5. You may make the appropriate correction on your issue or keep it as a "collector's item". While this mistake may be of interest to philatelists when they find a stamp with some upside down printing, I do not think that our venerable Journal will ever fall into that category of value, but I have been wrong before!

This Journal brings to you an original article, Clock/Watch Tick Amplifier by John Bourquin who is one of our members living in this area of New York State. We also are continuing our policy of printing material from obsolete and rare books, manuals, etc.

It's that time of year when dues must be paid so that this Journal will continue to be printed and your Officers will be able to live the life of luxury to which they have never become accustomed. Let us make it easier for our Treasurer this year by paying on time. Thank you very much.

Enjoy this issue!

Electromagnetically yours,

Martin C. Feldman, FNAWCC

CLOCK/WATCH TICK AMPLIFIER

By: J. L. Bourquin

For various reasons (noisy environment, loss of hearing or simply a weak tick) those engaged in putting a pendulum-controlled clock in beat have occasionally desired a tick amplifier. The advent of modern Integrated Circuits, or "IC's" has made the construction of such a device in a small, portable package an easy undertaking. IC's are available that in a single 'chip', or DIP (for Dual Inline Package) will perform many functions that formerly required dozens or hundreds of electron tubes. In addition, the IC's do not require the higher voltage levels and bulky power supplies required to power electron-tube devices.

The class of IC's used in this application is known generally as Linear IC's and the particular subdivision of this class used in this device is that known as Amplifiers. It should be noted that there is another subdivision in the Linear IC class known as "Operational Amplifiers" but this type of device is not useful in the application to be described.

The particular IC used in this application is the LM-380 manufactured by National Semiconductor. This designation is used for two different IC's or 'chips" - one is an eight-pin version and the other is a fourteen-pin version. The tick amplifier uses the fourteen-pin version because of its' higher power dissipation (two watts) as compared to the 0.6 watt power dissipation of the eight-pin version. The LM-380 is widely available at prices ranging from $0.10 to $1.35 and it possesses the advantage of requiring very few external components to complete the tick amplifier. Another benefit accruing from the low parts count is that the tick amplifier is easy to construct and wire. A parts list is contained at the end of the text.

CONSTRUCTION

A small piece of brass or copper (1½" sq. X .30 th.) can serve as both a heat sink and a circuit board. A cutout is made along one edge to mount the combination volume control potemtiometer/on-off switch. Holes for the IC socket are drilled in accordance with the sketch. All DIP socket dimensions are based on a square grid composed of 0.10" X 0.10" squares. Two different sized holes are drilled in accordance with the sketch. Those for pins 3,4,5, 7,10,11 and 12 are just large enough to pass the socket pins through, as these pins will be soldered directly to the circuit board. The holes for pins 1,2, 6,8,9,13 and 14 are drilled as large as possible (without breaking into the adjacent hole) as they must not contact the heat sink/circuit board. Before mounting the socket to the board, cut a small rectangle (approx. 0.3" X 0.8") from a 3" X 5" file card and place it in position between the two rows of socket pins. The cardboard will prevent any undesired contact between the bottom of the pins and the circuit board. Pins 1,2,6,8,9,13 and 14 can also be prevented from contacting the plate by slipping a short (1/8") length of insulating sleeve over the socket pin and inside the heat sink/circuit board hole. This insulating sleeve can be obtained by stripping off the insulation from a piece of wire (#24 or #26) and cutting it into 1/8" pieces.

When doing any soldering to the socket pins, the LM 380 IC must not be in the socket; it is placed in the socket after all construction and soldering has been completed.

The circuit can be wired using very small (#30) insulated wire for all connections except those to the speaker; larger wire, say #24, should be used here. Other than that, the wiring is not critical.

With a little care and planning, the whole tick amplifier can be built into a box the size of a small, portable transistor 'shirtpocket' radio. In fact, the author used the case and speaker from such a radio which was no longer operable. The circuit board was located so that the thumbwheel operating the combination volume control/on-off switch protruded through the same opening in the case as did the original radio volume control/switch.

The one word of caution to be provided is this: do not substitute a microphone intended for voice use in place of the microphone specified. There are two reasons for this. The first is that we are dealing with weak signals (sounds) and if a voice microphone is used, the volume (gain) will have to be increased so much to make the tick audible that the speaker will feed back enough sound to the microphone so that the whole amplifying system will oscillate or 'howl'. The second reason against using a voice microphone is that it does not discriminate between wanted sounds (the ticks) and unwanted sounds (extraneous room noises). The contact microphone responds only to vibrations of the item to which it is clamped. In the vase of a clock, these vibrations will be caused primarily by the escape wheel teeth striking the pallet/verge faces. The contact microphone thus provides a high degree of discrimination against undesired sounds and the volume may be increased greatly (usually to the maximum) without any tendency for the amplifier to oscillate. The microphone as purchased comes equipped with a 'phone plug'. In order to minimize size, the author cut this plug off and substituted a smaller 'subminiature' plug. Obviously the microphone plug and its' mating jack must be the same size for compatibility.

OPERATION

Operation is simple. The slotted piece of metal projecting from the microphone case is clamped to whichever plate of the clock is available, back or front, and as close to the pallet/verge arbor pivot as possible. The microphone case must not touch anything - it must be free in space. Then the combination volume control potentiometer/ on-off switch is turned on and the volume adjusted to suit the user. The tick amplifier has been successfully used to amplify watch ticks by clamping the metal bar of the microphone to the watch case. In the case of a clock, one must obviously keep the microphone cable from interfering with the motion of the pendulum.

The user is cautioned to handle the microphone carefully as it is a very delicate component. In particular, the slotted metal bar protruding from the microphone case should be handled very carefully; it should not be moved or twisted by hand in any direction with respect to the case. To do so could break the delicate microphone crystal. Along this line, during and after clamping the slotted microphone input bar to the movement, no strain should be placed on the microphone cable; good practice is to provide a slack loop of six or seven inches of cable from the microphone and clamp the end of the loop farthest from the microphone somewhere to the clock movement or case. Then any strain on the microphone cable will be absorbed by the clamped cable and will not be transmitted to the microphone case, twisting it relative to the clamped, slotted, input bar.

To aid in its application, a few simple clamps and probes can be fabricated.

(All the material expressed in this manuscript are those of the author exclusively)- Ed.

PARTS LIST

QTY.	DESCRIPTION	
1	LM-380	0.10 to 1.35
1	14 pin DIP socket	.65
1	Heatsink/circuit board	.85
1	100K ohm potentiometer, switch and knob	1.50
1	500uF 35v electrolytic capacitor	.89
1	2" or 3" 8 ohm permanent magnet speaker	1.59
1	Harmonica (contact) microphone	2.70(A)
1	Microphone jack	.80(B)
1	Earphone (closed circuit) jack	.80(C)
1	8 ohm earphone	1.00(C)
2	9v transistor batteries	.58
2	9v transistor battery connectors	.20
Misc:	container, wire, solder (not acid core, rosin core only).	

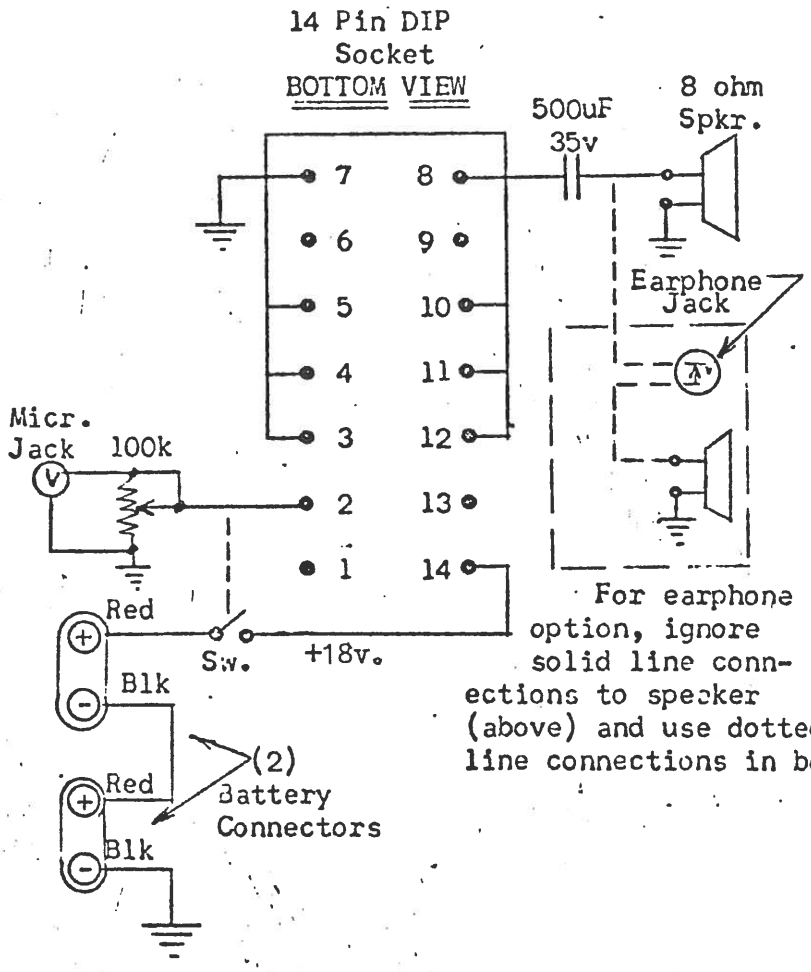
NOTES:

(A) Lafayette 99F45163
Radio Shack 33-115
Do not substitute an ordinary voice microphone; see text.

(B) The jack purchased must be the same size as the microphone plug used; see text.

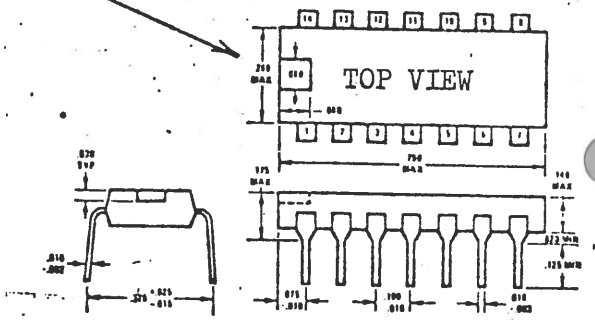
(C) The builder may desire the option of switching the output from the speaker to an earphone. If not, this part may be omitted.

SCHEMATIC

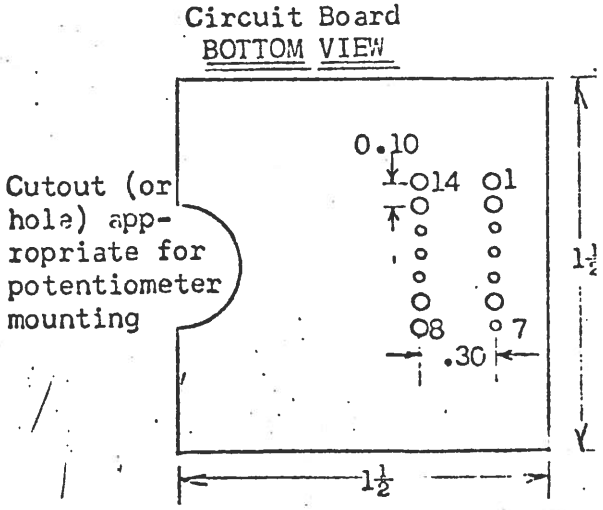


For earphone option, ignore solid line connections to speaker (above) and use dotted line connections in box.

End has dot, notch or corner cut to indicate pin no. 1 location



14 Pin Molded Dual-In-Line Package



Hole Size: See text

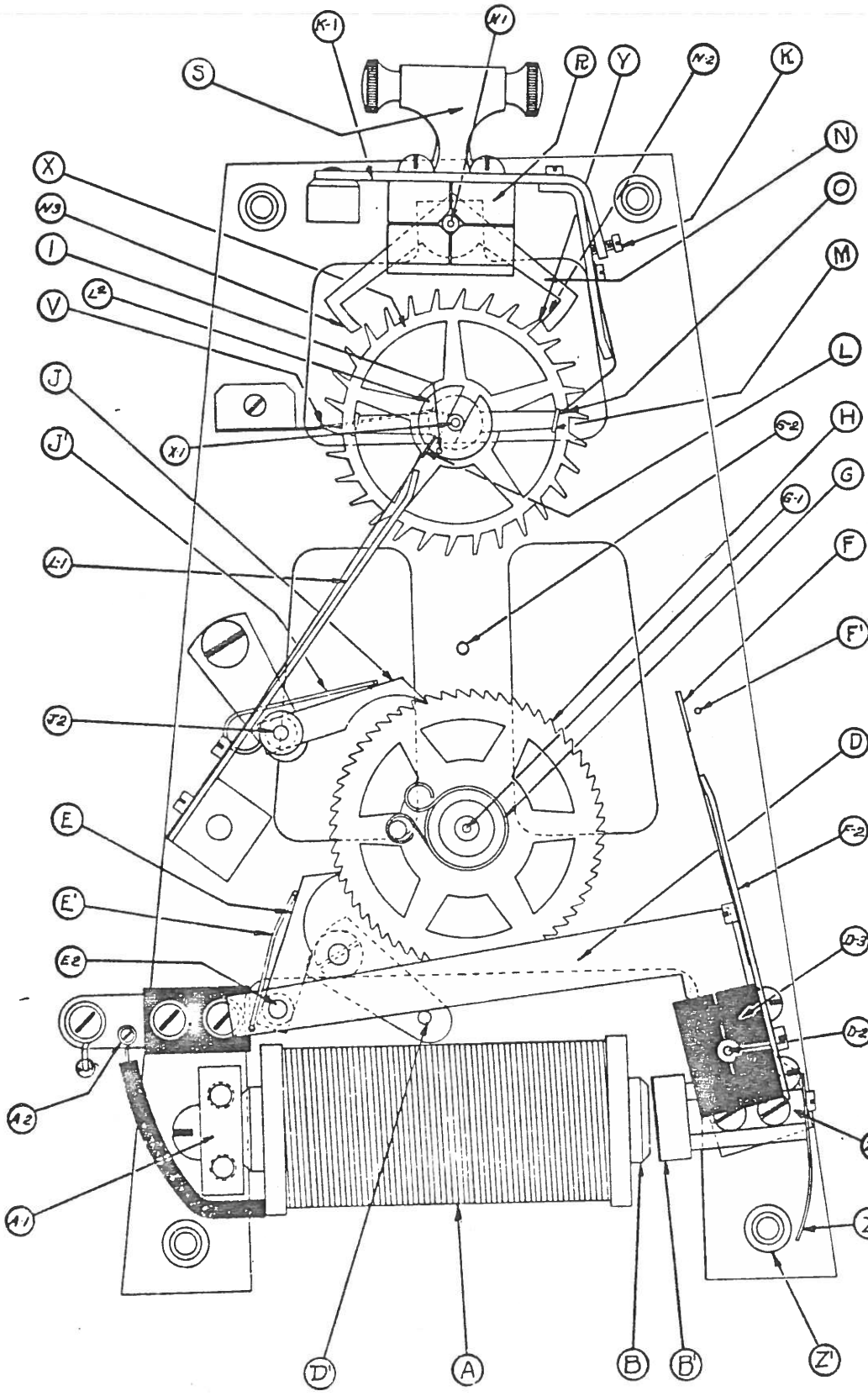
THE JOURNAL OF THE ELECTRICAL HOROLOGY SOCIETY NEEDS:

1: Original articles.
2: More Mart participation.
3: Technical questions.
4: New members (for the Society).

NEEDS YOU!

THE STANDARD ELECTRIC 60 BEAT MASTER CLOCK MOVEMENT

NUMBERS AND NAMES OF REGULATOR PARTS



6569-C

A Wire of Winding Magnet.
A-1 Magnet Bridge.
A-2 Magnet Connector
B Core of Winding Magnet.
B-1 Armature of Winding Magnet.
D Winding Lever.
D-1 Stop Pin for Winding Lever.
D-2 Winding Lever Staff.
D-3 Winding Lever Insulating Blocks.
E Winding Lever Pawl.
E-1 Winding Lever Pawl Spring.
E-2 Winding Lever Pawl Stud.
F Program Contact Point (flat iridium platinum)
F-1 Program Contact Point (round wire iridium platinum)
F-2 Program Contact Arm
G Main Spring.
G-1 Center Staff.
G-2 No. 3 Staff.
H Winding Ratchet Wheel
I Duration Contact (round wire iridium platinum).
J Retaining Pawl for Winding Ratchet Wheel.
J-1 Retaining Pawl Spring.
J-2 Retaining Pawl Stud
K Oscillating Contact Adjusting Screw.
K-1 Oscillating Contact Bracket.
L Duration Contact (flat iridium platinum contact).
L-1 Duration Contact Bracket.
L-2 Duration Contact Flange
M Rotary Circuit Closer Contact
N Verge
N-1 Verge Staff.
N-2 Verge Pallet (wiping surface).
N-3 Verge Pallet (wiping surface).
O Oscillating Circuit Closer Contact
R Circuit Closer Insulating Blocks.
S Beat Adjuster
V Contact Brush.
X Escape Wheel.
X-1 Escape Wheel Staff.
Y Escape Wheel Tooth.
Z Kick-Off Spring.
Z-1 Movement Post.
Z-2 Winding Armature Post.

LVL-mj

(See other side for #6568-C.)

*** 1977 E.H.S. DUES ***

PLEASE REMIT DUES OF $7.00 TO OUR

TREASURER - MR. CHARLES ROTH,

2 CIRCLE LANE, ROSLYN, N.Y. 11577

MART

WANTED: Help! Need pendulum for metal cased secondary Self Winding Clock. Would like wood rod, brass bob pendulum for replacement.
Al Engel, 1621 South Lincoln St.,Aberdeen,SD 57401

WANTED: Stromberg Masters--Write details.
Joseph Bourell,4213 No.Milwaukee Ave.Chicago,Ill.60641

WANTED: Electrical Horlological Literature---any type. Highest prices paid. Hamilton-Sangamo clocks---write details.

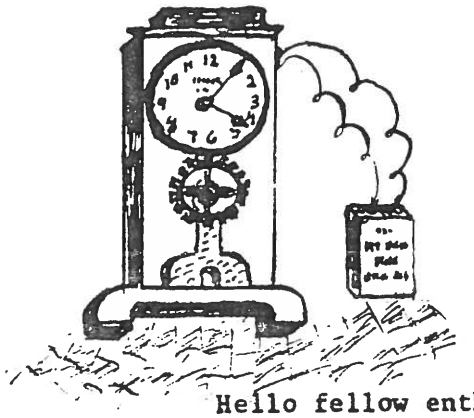
Repairs Made---All early electrical clocks-write details.
Martin C. Feldman,1545 Rhinelander Ave.Bronx, N.Y. 10461

WANTED: Unusual Electrical Clocks (including Warren Mystery Battery Cl.). Also unusual foreign pieces.
A. Marx,105 Bayeau Road,New Rochelle, N.Y. 10804

FOR SALE: Beautiful ATO in a Mahogany Case-All Glass Front 18½ high X 10 wide. Good Running Order $200

C. Roth, 2 Circle Lane, Roslyn,N.Y. 11577

The
JOURNAL
OF THE
ELECTRICAL HOROLOGY SOCIETY
Chapter No 78
November 15, 1976
VOLUME II--ISSUE #6
Martin C. Feldman, Editor



Hello fellow enthusiasts:

This issue marks the last Journal to be printed for Volume II. In the future starting with the February 1977 issue of the Journal, which will begin Volume III, all Journals will be printed during the odd-numbered months. Once again material for publication either in manuscript form or questions and the Mart must be submitted a month earlier in order to be published in the next Journal. Please send all your written material to me, 1545 Rhinelander Avenue, Bronx, N. Y. 10461.

This month our Journal is devoted to publishing an excellent article by Mr. H. R. Cramer, dealing with the Warren Battery Clock. While this article addresses itself to the repair and maintenance of the last model Warren Battery Clock, it nevertheless fills an important gap in the study and preservation of early electrical clocks. There were a few earlier models of the same clock with a direct drive between the pendulum and the movement which are also of considerable interest. For those wishing further information, i.e. patents, you may write to the U. S. Patent Office, Washington, D.C. enclosing 50¢ for each patent wanted along with the number of the patent. The patent information, as suggested by Mr. Cramer, will be very helpful. We shall try to publish patents for this particular clock in the future. We hope you will enjoy this article which is accompanied by superb photographs. The Warren clock remains as an excellent example of American ingenuity in combining electricity with horology. Since it is so rare, it is very collectible and prized by those lucky enough to own one!

Enjoy this issue!

Electromagnetically yours,

Martin C. Feldman, FNAWCC

WARREN BATTERY CLOCK

The Warren Battery (Mystery) Clock is a unique clock in that there is no mechanical connection between the pendulum and the movement. A pair of small horseshoe magnets carried in a horizontal plane on the pendulum rod propel a worm gear in almost continuous motion which in turn drives the clock. The clock is completely silent in operation and is a reasonably good time keeper when properly rated. It is a product of American ingenuity, apparently made in small quantities making it quite collectible.

This article is oriented toward the repair and adjustment of the Warren. Before starting repairs, it would be helpful to have copies of the Warren patents covering the clock. These are Patents #1,160,346 and #1,144,973. A thorough reading of the patent information will give a better understanding of the principle of operation.

Start with the Warren pendulum, as all else depends on the proper operation of the pendulum. First, check the operation of the mercury switch encased in the horizontal metal capsule on the pendulum rod. Do not attempt to remove the end caps, as one of the mercury switch leads is soldered to a cap. Turning the cap will twist the mercury switch lead and can lead to irrepairable switch damage. Check the switch action by standing the pendulum vertically with the bob resting on a flat surface. Insert an ohmmeter between the pendulum rod and the small round rod attached to the back of the pendulum.

By rocking the top of the pendulum (hook end) to the right or left of vertical, a reading will be obtained only as it passes through a vertical position. To the right or left of vertical, there will be no reading. A positive reading will indicate the switch to be good and assure that the small current carrying rod to the mercury switch is properly insulated from the pendulum rod. If there is no reading or a continuous reading, visually inspect the insulation points prior to attempting repair or removal of the mercury switch from the capsule.

The small rod attached to the back of the pendulum rod is flat and springy near the top. Current is fed to this rod by its contact with the suspension spring proper. A brass clip and hanger pin (for the pendulum) on the lower part of the suspension spring are insulated from the suspension spring. The suspension spring extends just a fraction of an inch below and behind this insulated brass hanger. The purpose is so the spring section of the small rod on the back of the main pendulum rod can make direct contact with the suspension spring only, and carry current to one side of the mercury switch. The suspension spring is grounded to the case of the clock, while the brass hanger is connected to the battery terminal via a coiled spring.

The coil can be checked by taking a resistance reading across the battery terminals on top of the tube and a reading of 60-65 ohms would be obtained. If no reading, there is a possibility of an open coil or a bad connection. Pursue the connection possibility first unless the coil appears to have been subjected to abuse. An open coil is not difficult to repair or replace, but is outside the scope of this article.

The Warren battery tube will accept only certain brands of standard "D" cells, and then sometimes only some batteries within those brands. Keep in mind if the battery swells after placed in the tube, there will be a removal problem. It is recommended a single "C" cell (the clock requires only 1-1/2 volts DC) be used, but the tube diameter will have to be reduced. A tube insert made of very thin cardboard can be made and slipped in the Warren tube. With careful work, a usable tube insert which will allow easy installation and removal of the "C" cell can be made. If the spring at the bottom of the tube is missing, use a spring from a flashlight for the battery base. Improvise to connect the positive battery terminal to the clock's top moveable terminal. Small diameter brass tube, cut to length and inserted between the two terminals will work well.

After the battery is installed the pendulum may be put on the suspension. Make sure the hook and the hanger pin are clean and polished for good contact and that the small rod contacts the suspension spring. Once started, the pendulum should continue to swing, and the open end of the "C" bob should swing well across the center of the coil. If the pendulum amplitude is so great that the centering indicator bumps the coil, remove the pendulum and look at the back side. The back has a single screw and there are slots in the pendulum. By turning the screw, the amplitude of the pendulum can be increased or reduced. This adjustment changes the angle of the mercury switch with respect to the pendulum rod. With the pendulum attached to the clock, a milliammeter in series with the battery will help indicate when the switch is closing. Keep in mind that the greatest amplitude possible is needed for proper operation of the clock. Adjusting the screw 1/8 to 1/4 turn should bring about the desired results. If you can't get sufficient amplitude, go to 3 volts DC until you can get the clock running, then go back and reclean all contact points.

The movement may then be mounted and it should run. If it doesn't, there may be one of several existing problems. First, friction must be at an absolute minimum, so the clock may need cleaning. Second, make sure the magnet tray carried by the pendulum is as close to the clock case as possible without rubbing the case. Also, if someone has tinkered with your clock, the horseshoe magnets may have been reversed or otherwise disturbed. It is best to refer to Patent #1,160,346 and use a compass to check the magnets for polarity. This clock will run backwards if the magnets have been reversed. The magnets may have lost their energy or polarity, and may have to be remagnetized.

If the clock is taken down for cleaning, you will find a small pot metal gear case which houses a worm gear, a fibre gear and a brass gear. The worm gear has a small magnetized arm at its lower end. This worm gear must turn freely as the case is turned in the hand. If it doesn't, it is necessary to remove it to clean the pivots. In some clocks, the upper pivot is contained in a tube which can be screwed out of the gear case. In others, the small brass cap at the bottom of the case must be removed. In either event, handle with care as the pivots are delicate and the worm is subject to breakage. The slightest misalignment of the lower cap, which houses a jeweled pivot will cause the worm gear to bind. Be sure to inspect the clock closely for alternatives before attempting to remove the worm gear.

Once running, all that remains is adjusting the clock for timekeeping. An adjusting screw extends upward from the base. This screw changes the distance between a small steel strip beneath the base of the clock, and the pendulum bob.

It should be noted that apparent modifications of this clock exist. Some Warrens have open movement plates with exposed gears, while others have the complete movement covered. Also, different gear cases are used on some clocks. Regardless of the different appearances, the principle remains the same.

H. R. Cramer
1704 Hass Drive
South Bend, Indiana 46635

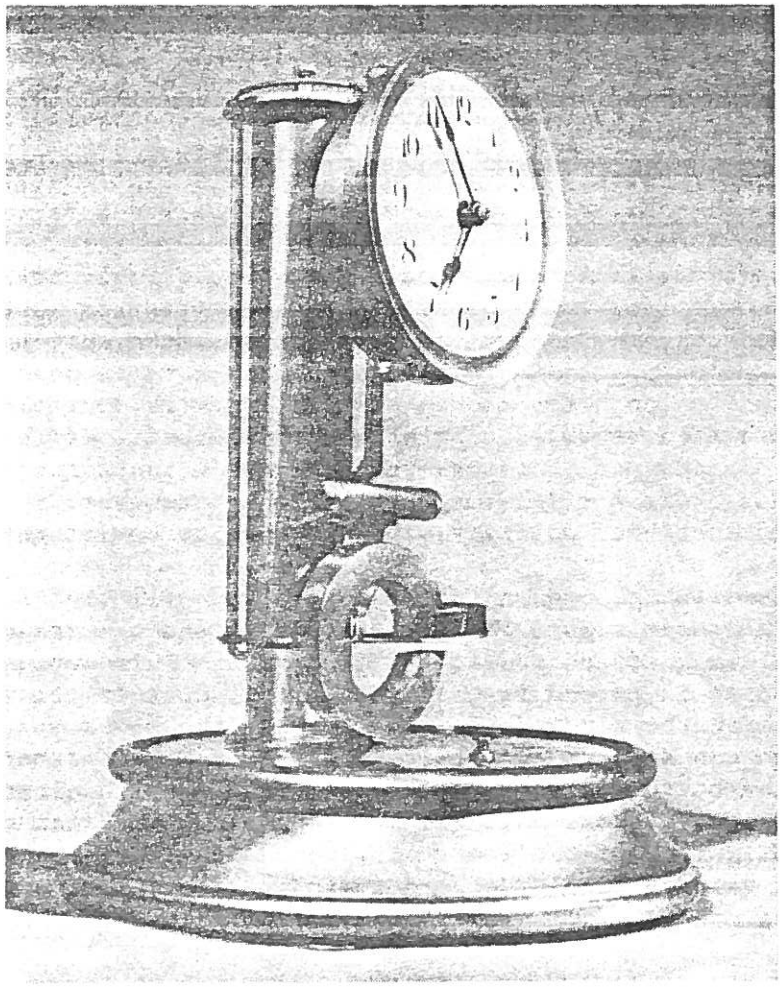
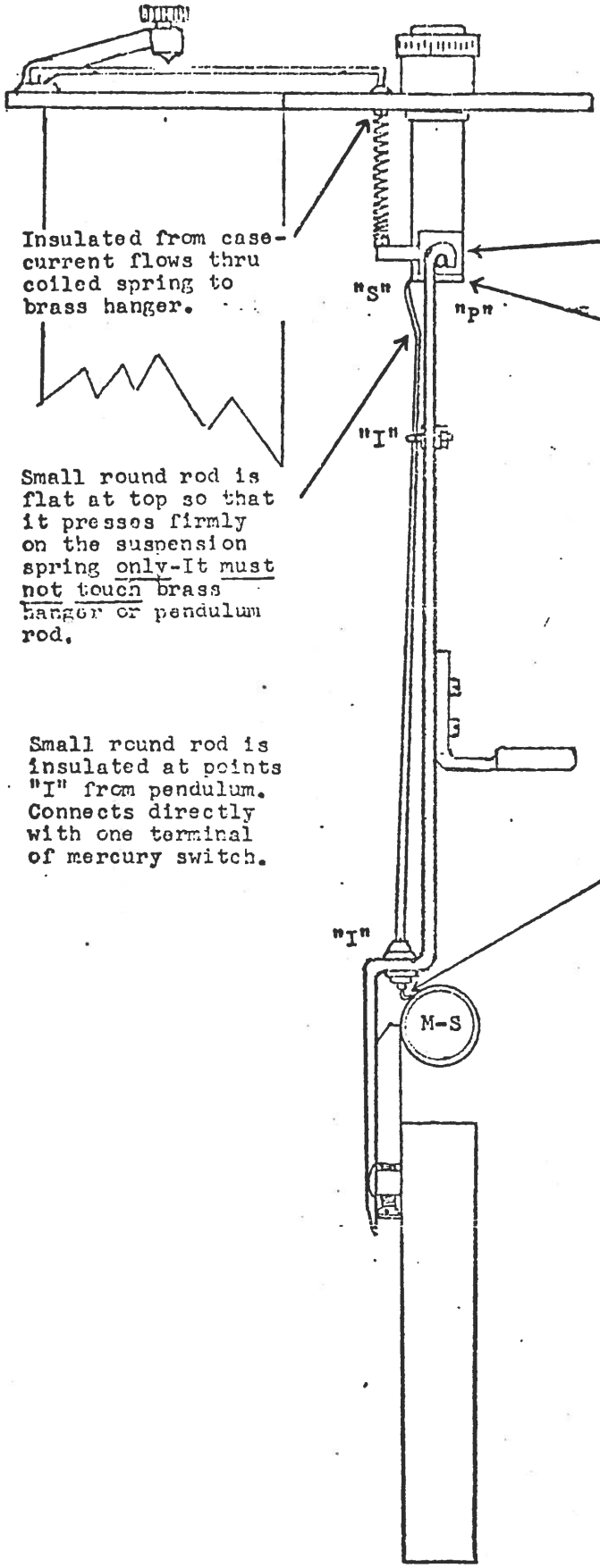


Fig.1-Warren Clock showing rear movement cover, Magnet Tray immediately beneath the movement and the capsule containing the mercury switch is just above the pendulum bob.

WARREN BATTERY CLOCK PENDULUM

(5)



Insulated from case-current flows thru coiled spring to brass hanger.

Brass end and pendulum hanger are insulated from suspension spring.

Suspension spring extends slightly beyond brass hanger so contact can be made with suspension spring only.

Small round rod is flat at top so that it presses firmly on the suspension spring only-It must not touch brass hanger or pendulum rod.

Small round rod is insulated at points "I" from pendulum. Connects directly with one terminal of mercury switch.

Wire connected to small round rod-goes thru capsule to one lead of the mercury switch. The other lead from the mercury switch is soldered to one of the end caps.

HRC

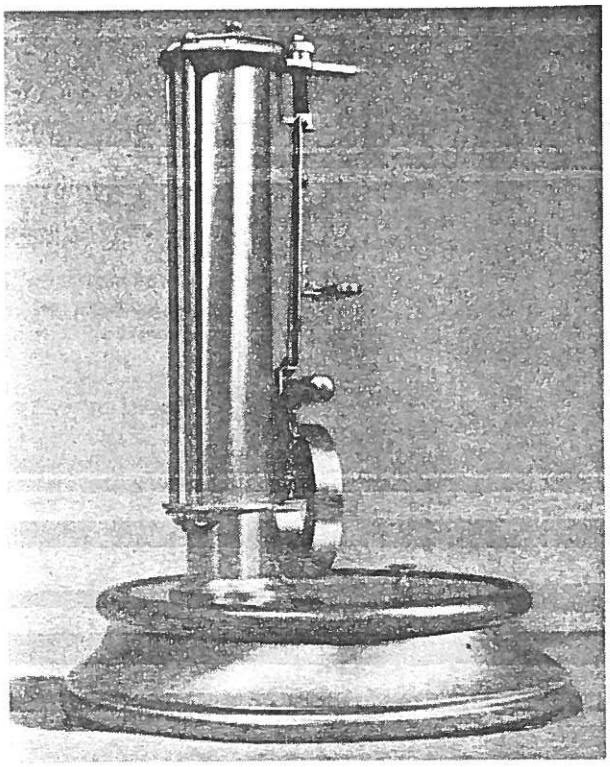


Fig.2- With the movement detached the battery tube, suspension and rear of pendulum bob are visible.

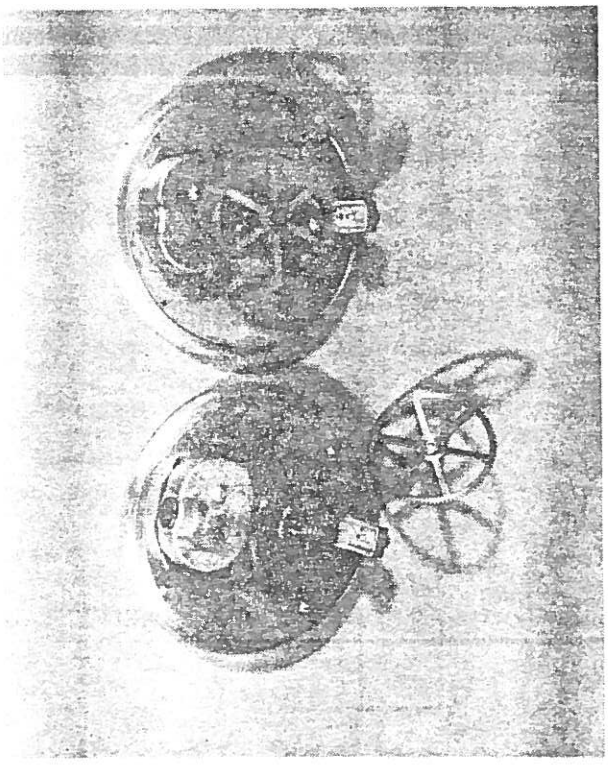


Fig.3- Two variations of Warren movements with the rear cover removed. The movement with the gear removed has a circular magnet attached to a stud that screws into the die cast gear case. (Numbers on movement, 185 and 302, are my identification numbers.)

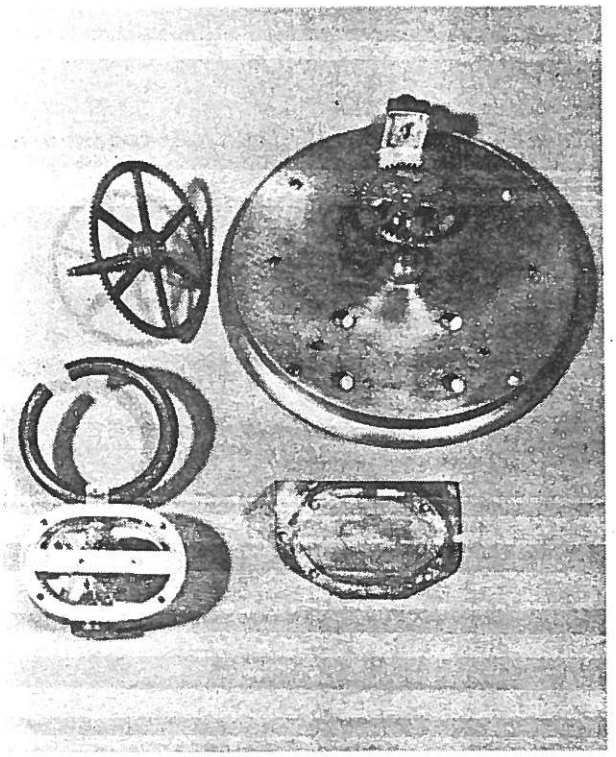


Fig.4- Movement with gear case removed.

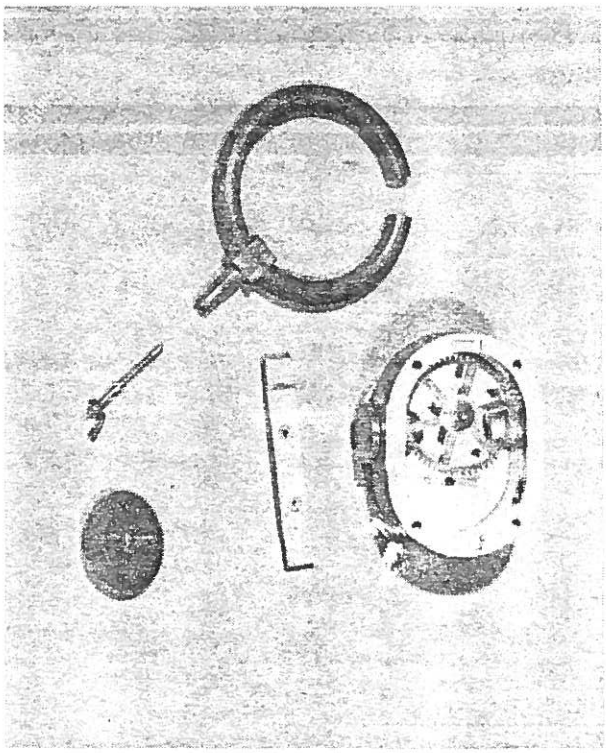


Fig.5- Gear case with parts removed. The stud to which the circular magnet is attached contains a jewel in which the upper pivot of the worm gear runs. The brass cap in the bottom of the case is also jeweled. The attachment at the bottom of the worm gear is a magnet and is propelled by the two horseshoe magnets carried on the pendulum rod.

MART

WANTED: Stromberg Masters--Write details.
Joseph Bourell, 4213 No. Milwaukee Ave. Chicago,Ill.60641

****

FOR SALE: Bar with external battery box, original,GRO. $135.00
Small Tiffany Never-Wind (9½" overall) excellent,
all original,GRO. $135.00
Henry R. Cramer, 1704 Hass Dr. South Bend,Ind. 46635

****

WANTED: Electrical Horological Literature---any type. Highest prices paid.
Hamilton-Sangamo clocks---write details.

Repairs Made---All early electrical clocks-write details.
Martin C. Feldman, 1545 Rhinelander Ave. Bronx,N.Y.10461

****

WANTED: Lower suspension assembly for Tiffany Never-Wind. Any information on
110 v. A.C. German Eureka.
George Zlobin, 956 E. 79 St. Brooklyn,N.Y.11236

****

WANTED: Unusual Electrical Clocks (including Warren Mystery Battery Cl.).
Also unusual foreign pieces.
A.Marx, 105 Bayeau Rd. New Rochelle,N.Y.10804

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PLEASE REMEMBER

1977 DUES SHOULD HAVE BEEN IN BY OCTOBER 30, 1976. IF YOU HAVE NOT ALREADY SENT IT IN, THEN PLEASE DO SO IMMEDIATELY. THANK YOU VERY MUCH.

SEND DUES TO: Mr. Charles Roth, 2 Circle Lane, Roslyn, N.Y. 11577