DIRECTIONS

for

INSTALLING and CARE OF

:Frick:

MASTER SECONDARY and PROGRAM

Clocks

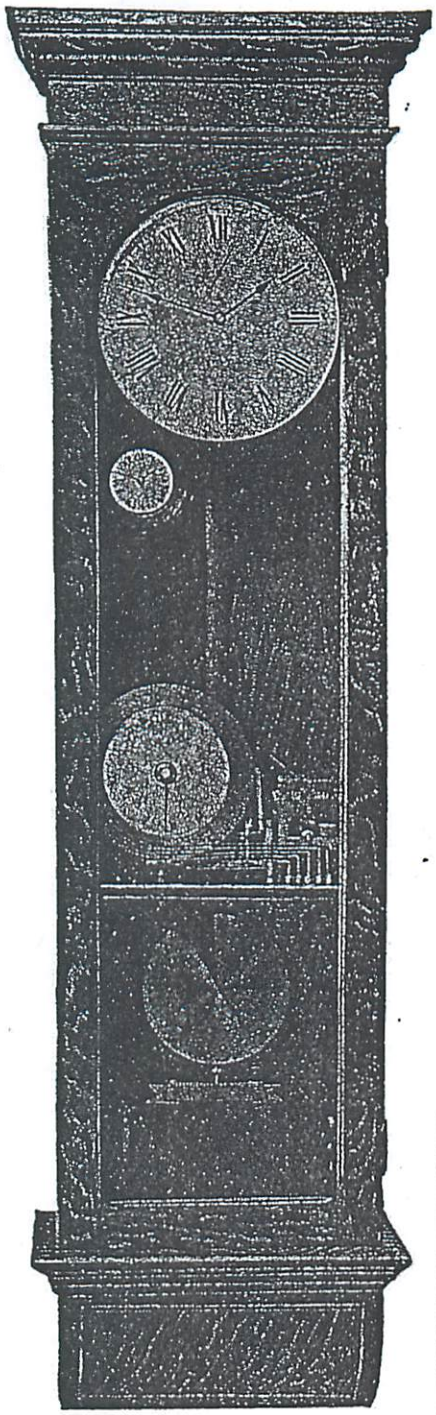
MANUFACTURED BY

FRED. FRICK CLOCK CO.

WAYNESBORO, PENNSYLVANIA, U. S. A.

Directions for Installing

AND CARE OF



Master Secondary

.. AND ..

Program Clocks

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Waynesboro, Franklin Co., Penna.

.... INDEX ....

Unpacking and Hanging Master and Program Clocks

1. When opening the packing box be very careful not to injure the clock in any way. The lid of the packing box and strips which secure the clock in the box are fastened with wood screws, so that the clock can be removed with a screw driver.

2. Hang the clock on the wall where it is to be located, by the hanger at top of case. Use a good strong wood screw on which to hang the clock, putting the screw securely in the wall, with an upward slant. The clock will then settle against the wall solidly. If the wall is brick it may be necessary to key it with a wooden wedge, into which to drive the screw. Do not hang the clock on a shaky partition, as it will not keep correct time if the wall or partition is not solid and free from vibration.

3. After the clock is hung on the wall as above, remove the wood clamp used to secure pendulum ball in transit, using care not to injure connecting wire 12 or any other part of the mechanism. Also carefully remove the strings and wires used to protect the various parts in transit.

4. Plumb clock by pendulum, the lower point of which must stand directly in front of the O on the scale back of it.

5. After plumbing case, secure its lower end to the wall with screws provided for this purpose. This is important to prevent lower end of case from moving and throwing clock out of beat.

Setting Batteries.

For winding battery use four cells No. 3 Samson battery in series as shown in Fig. 13, charging the cells in accordance with printed instructions on jars and following hints:

1. Be sure that the sal-ammoniac is thoroughly dissolved before placing elements in jars. This is important.

2. If possible use soft water for charging cells, and be careful not to splash solution on jar above paraffine.

3. Before putting elements in jars see that any of the solution which was splashed on or above paraffine is carefully wiped off.

4. Before connecting wires carefully clean clamping surfaces of binding screws b and f, Fig. 13. See that binding screws c and nuts g are drawn up. The connecting wires h, should not be smaller than No. 16 B. & S. gauge with good insulation. No. 14 or No. 12 wire where a large number of cells are connected in one battery should be used.

5. After having set up batteries as above connect the line wires securely under binding screws. Before connecting wires be careful to have them clean and bright.

6. The above instructions apply to all batteries in a general way.

Caring For and Renewing Batteries.

1. Batteries should not be allowed to entirely run down before recharging, for if entirely exhausted the carbon will be thoroughly polarized and may require renewing. When batteries have run too long without recharging the carbons will have a heavy coating of crystals, the solution will be discolored and have a strong odor of ammonia.

2. It should be made a rule to recharge all cells once a year. In schools and colleges this should be done a week or two before the opening of the fall term, which will insure the batteries running through the school year without interruption. Keep a record in the master clock showing when batteries were set up or renewed. Every two or three months examine the cells and see if solution has evaporated. Keep solution up to lower edge of paraffine, by adding water from time to time, if necessary.

3. Every system in which a number of cells of battery are used should be provided with a battery gauge by means of which the strength of every cell can be accurately measured at any time and trouble avoided. We will furnish this gauge for $5.00 net, delivered to purchaser by mdse. mail. By testing each cell occasionally with this gauge you can ascertain condition of entire battery and avoid interruptions in working of system.

4. After the close of the school term it is advisable to empty all cells, carefully rinsing them with clean water and if carbons are covered with crystals scrape off same carefully. It is also a good plan to soak the carbons in clean water for a day and then thoroughly dry them in the sun, after which store them in a clean dry place until cells are recharged before

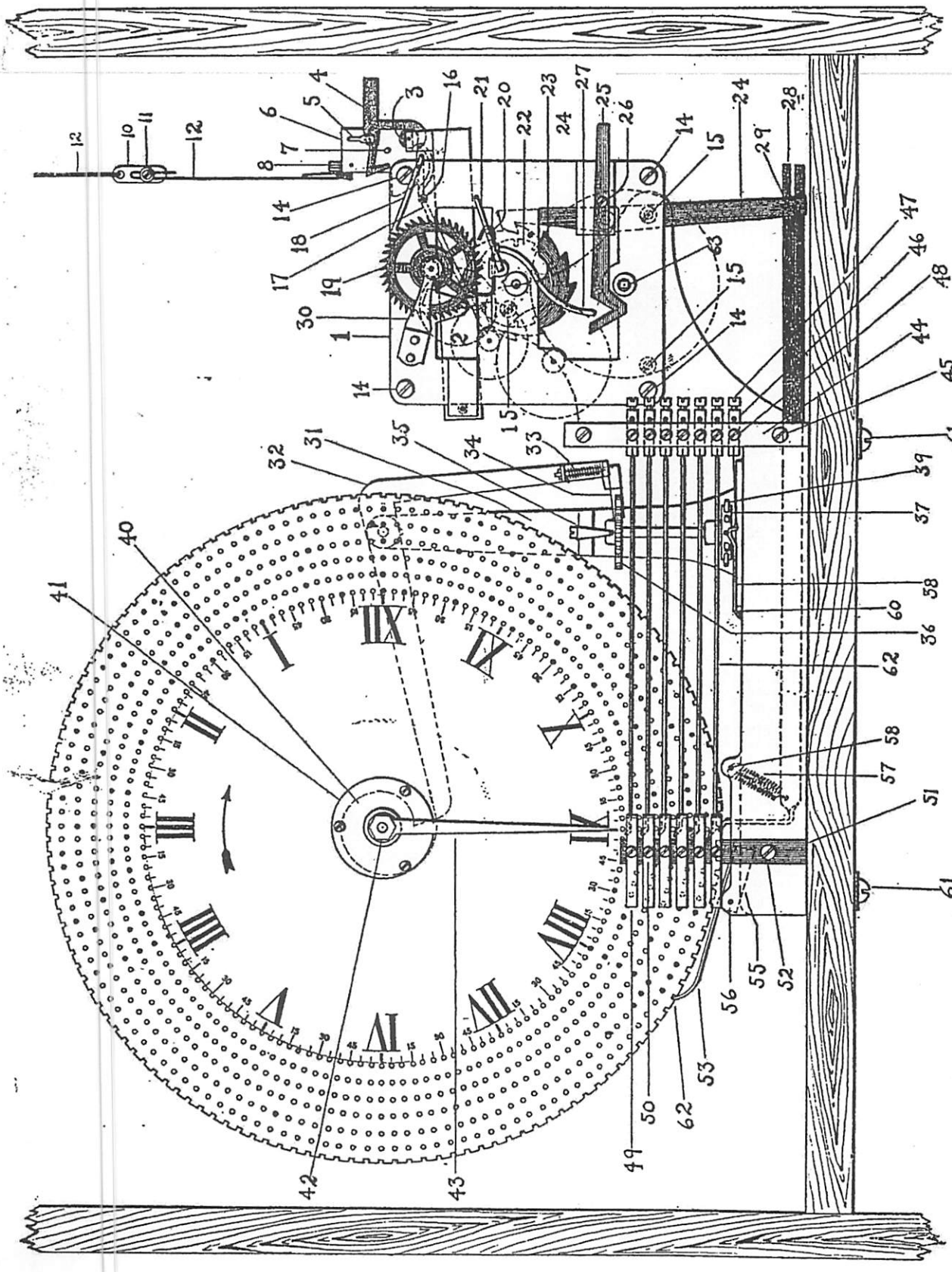

Fig. 1

opening of next term. If zincs are much eaten, put in new ones when recharging. Batteries can be recharged without soaking and drying carbons as above, but carbons will last longer if soaked out and thoroughly dried before recharging. Recharge batteries as instructed on page 3.

5. It is better to allow master clock to run throughout the year and consequently the winding battery must not be disconnected at close of school year, but all other clock and bell battery should be, unless the bells or clocks are needed during vacation for summer term, etc.

Connecting Wires.

1. To binding plates on top of master or program clock marked "winding battery" connect the winding circuit—the two wires running to winding battery.

2. Connect secondary clock circuit to binding plates marked "Secondary Clocks."

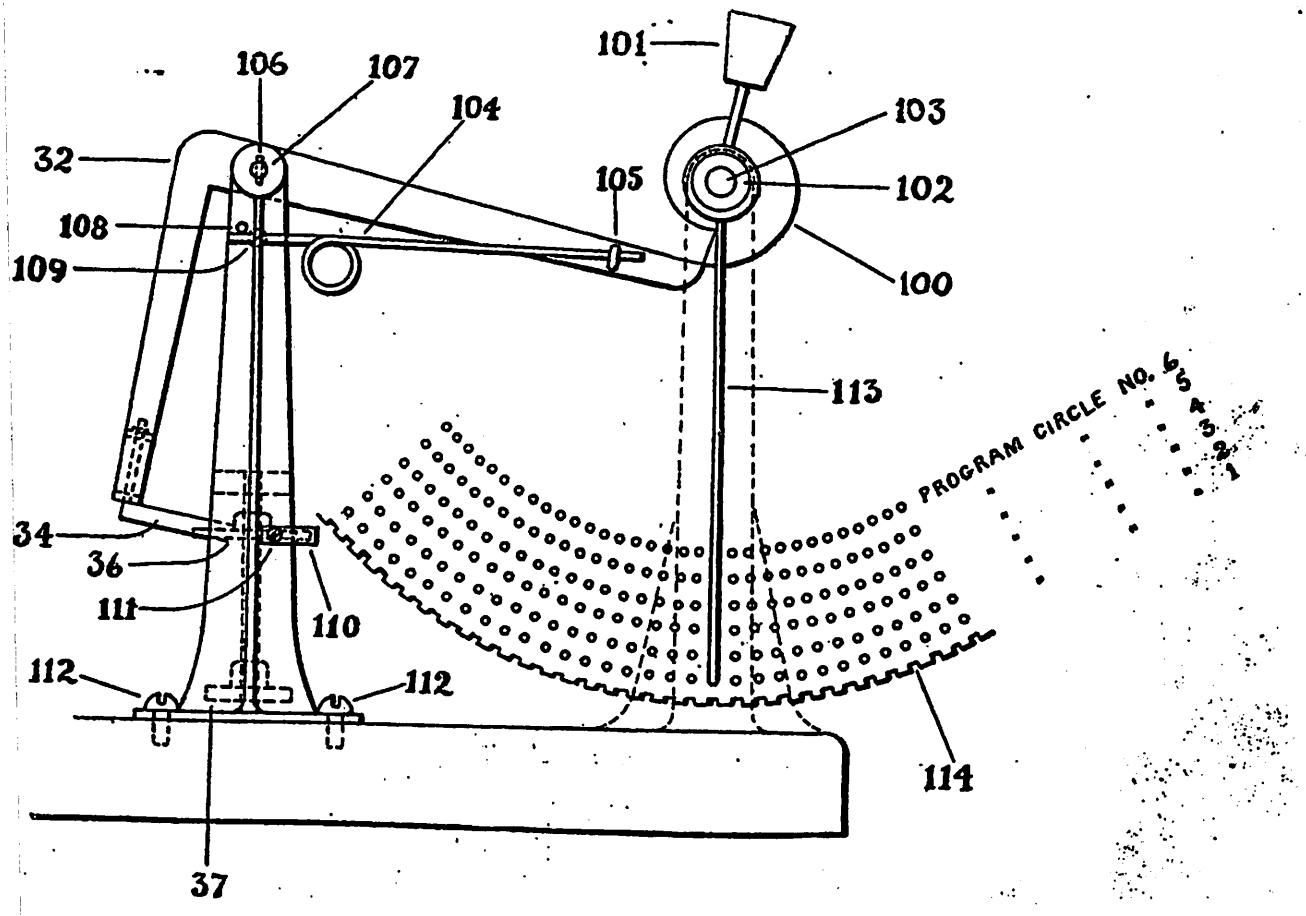

Fig. 2

3. Connect bell wires to binding plates marked "Bell Circuits", connecting bell battery wire to plate marked "Battery"; the wire operating bells on program No. 1. to plate No. 1; wire controlling bells on circuit No. 2 to plate No. 2 and so on. When but one bell circuit is used, but two bell binding plates on top of program clock are used and it does not matter to which plate battery wire is connected.

Referring to Fig. 11, 217 are Kartavert clamps which carry the vibrating contact arm 203, to which is fastened the brass spring 221, which carries at its outer end the platinum contact bar 210, which makes contact with the platinum contact bar 211 of revolving contact. The revolving contact is secured to escape arbor by screw 216. When contacts are in proper adjustment the contact points will not quite touch when pendulum has the least possible swing that will permit clock to run, but will make contact when swing of pendulum is increased one degree or less. The adjustment can be approxi-

mately made by turning vibrating and revolving contacts on their respective arbors and when adjustment is nearly right tighten up clamping screws 218 in vibrating contact and screw 216 in revolving contact, after which final adjustment can be made by means of adjusting screw 220. When making final adjustment turn on "Clock Switch" so that the secondaries will operate. This will enable you to tell exactly when contact is made, as it will operate pilot clock. The contact must not be made until a tooth of the escape wheel 173, Fig. 9, rests on the curved surface—locking surface—of pallet 172.

Setting and Regulating Master Clock.

1. Having set and connected batteries as per instructions, press "setting key" sixty (60) times, after which the clock will automatically wind itself once each minute, winding on the half minute. The "setting key" 207, Fig. 10, is located at left hand side of case, just below master clock dial. It is a good plan to press the "winding key" fifteen or twenty times, once each month or two, simply to make sure that the master is winding properly, and the battery is in working order. Should you press the "winding key" and not hear the winding armature click you will know winding battery is run down. Don't press "winding key" when second hand is at 60, as the secondary clocks are then operated and may be "scattered".

2. Set master clock by turning minute hand **forward slowly...Don't turn backward.**

3. The master clock is regulated in same manner as any ordinaryclock, by means of the adjusting nut under pendulum ball. To regulate pendulum, stop it when the second hand is one or two seconds past 60, then with left hand carefully support pendulum bob while with thumb and forefinger of right hand you turn adjustment nut, being careful not to twist pendulum. If the clock gains, lower pendulum bob; if it loses, raise it: Turning adjusting nut so that its front edge moves **from left to right,** raises pendulum bob and vice versa. One full turn of adjusting nut makes a difference of about ⅛ minute in twenty-four (24) hours. When variation is but a few seconds per day a small fraction of a turn of the nut will suffice.

4. Having adjusted pendulum set master clock hands to first minute **ahead of correct time** and wait until hands of master agree with correct time to the second, then start pendulum, being careful to avoid wabbling of pendulum, and be sure that it **swings to same point on the scale as before you stopped it.** The seconds beat pendulum should swing to 11 and the 80 beat to three. This is important where secondary clocks are operated, for if pendulum swings short the secondaries may be "scattered."

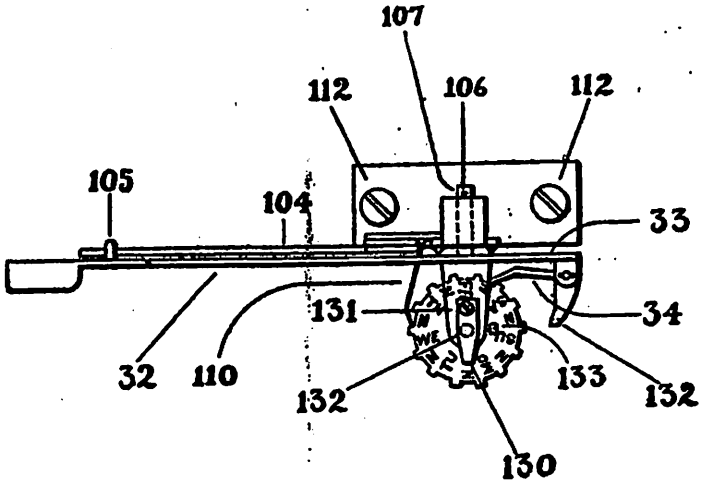

Fig. 3

To Hang and Connect Secondary Clocks.

1. Hang secondary clocks on screws driven securely into the wall in same manner as described for master clock, except that smaller screws may be used.

2. Connect wires to binding plates on top of cases, being sure that the wires are first clean and bright, and then securely held by binding screws. While it is not absolutely necessary that the secondaries hang plumb they should be carefully hung so as to look mechanical and neat.

To Set Secondary Clocks.

1. Open switch in master clock marked "clock switch", set pilot clock—the small clock just under left hand side of master clock dial—on time with master clock, by simply turning minute hand forward or backward, same as any ordinary clock.

2. Set all of the seconrady clocks to same time as pilot clock, by turning minute hand forward or backward same as ordinary clock, being careful to set minute hand on the minute dot.

3. Now return to master clock, close "clock switch" and press "setting key" a sufficient number of times to make pilot clock tally with master. Each time you press "setting key" pilot and secondary clocks are moved one minute ahead, but do not move "setting key" too fast or you may "scatter" the secondaries. "Setting key" sould be held down about a half second, which will give all of the secondaries time to operate. Should secondaries accidentally be set a minute or number of minutes ahead of master, simply open "clock switch" until master clock catches up with pilot clock.

4. Secondaries may also be set without operating "setting key" or opening "clock switch", by simply having your watch to agree with master to the second and then going to each secondary and setting same as any ordinary clock, bearing in mind that the secondaries move on the 60th second of each minute and that a few seconds before the close of each minute will seem to be about a minute slow.

5. Bear in mind that opening "clock switch" cuts out, or stops, the pilot clock and all secondaries, that each time you press down the "setting key" you move pilot and all secondary clocks one minute ahead.

6. After having started all clocks in accordance with above instructions, as a precaution, go to each secondary and see if it is on correct time, for owing to the fact that you have not had previous experience in handling these clocks you may have made a mistake. Before starting out to inspect clocks see that your watch is on time with master to the second.

7. For secondary clock circuit use either No. 16 or 14 B. & S. gauge damp proof office or weather proof wire. For concealed work No. 14 weather proof is the better. Carefully solder and tape all splices, and secure wires in place with either suitable cleats or knobs, but don't use staples, as wires may be injured in driving the staples.

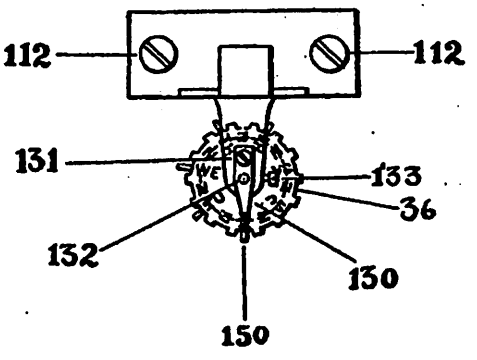

Fig. 4

Five Minute Interval Program Clock, Class A.

The five minute interval program clock gives signals on any or all periods divisible by five and is set as follows:

To Set the Periods in Five Minute Program Clock.

1. Each circle of holes in the program dial represents a program.

2. The outer or largest circle is No. 1, the next one No. 2 and so on. See Fig. 2.

3. Set program No. 1 in program circle No. 1, program No. 2 in program circle No. 2 and so on. For explanation of a program see catalogue page 7.

4. To set the periods turn the program dial in direction indicated by arrow on dial—never opposite way—by placing your fingers on upper edge

of dial and turning **from left to right** until the point at which contact pins are to be inserted stands at the **lower left hand side**, then with fingers of left hand carefully support edge of program dial while with pliers in right hand you press contacts securely home. It is important that the pins are pressed securely into the holes.

5. Now set program dial to the **last five minute period passed by master clock** by placing your fingers on **top edge** of dial and turning it **from left to right** until pointer stands at correct time. If you set the dial at 9.02 set to 9.00; if at 9.03 set to 9.05; if 9.32 set to 9.30 and so on.

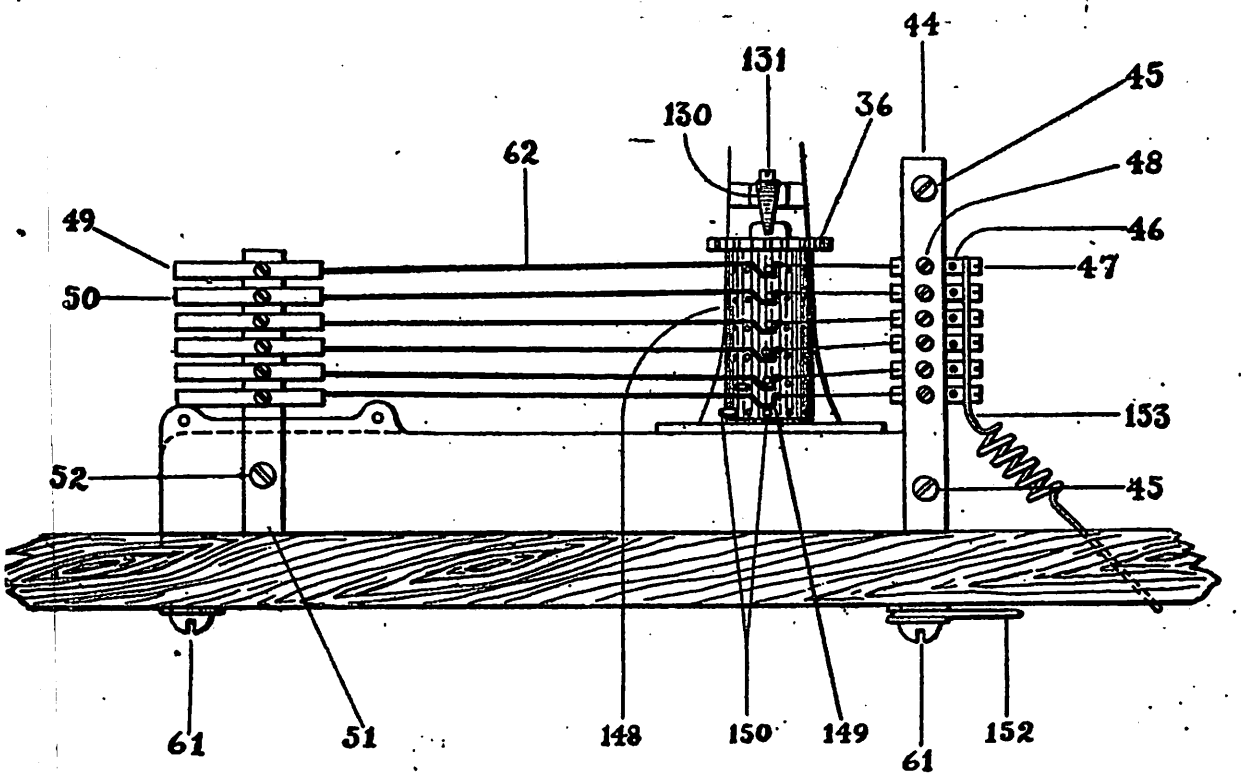

Fig. 5

The Automatic Cut-Out.

The automatic cut-out is used on Class A clock only and is shown in figures 1, 2 and 3, and is set as follows:

1. Place your finger against **front edge of indexed ratchet wheel and turn it from left to right** until the pointer 130 Fig. 3, stands at the index of the day or night on which you are setting it. If you set it between 6 a. m. and 6 p. m. Monday, set to "Mo"; if after 6 p. m. Monday set to the "N" following "Mo" and so on.

2. When setting the automatic cut-out be sure that the spring dog 110, Figs. 2 and 3, is just back of a tooth as shown in Fig. 3. This is important.

3. The automatic cut-out flange 37, Figs. 1 and 2, is provided with 14 holes, seven for the seven days of the week and seven for the seven nights. By inserting the switch pins in the holes of this flange by the index on ratchet wheel the bells can be automatically put in and out of service on any desired days of the week. To illustrate, if the bells are to be rung on Monday, Tuesday, Wednesday, Thursday and Friday, the pins must be inserted in five holes directly under "Mo", "Tu", "We", "Th" and "Fr".

4. Wind motor of program mechanism once each week, always winding it on same day of the week. To wind it apply winding key to winding arbor 63, Fig. 1.

Five Minute Automatic Calendar Switch.

This switch is used on class B clocks and differs from the Automatic Cut-Out in the substitution of the insulator drum 148, Fig. 5, for the metal switch flange 37, Figs. 1 and 2. It is set as follows:

1. Place your finger against front edge of indexed ratchet wheel 36, Figs. 4 and 5, and turn it from left to right until the pointer 130, Figs. 4 and 5, stands at the index of the day or night on which you are setting it. If you set it between 6.00 a. m. and 6.00 p. m., set to "Mo"; if after 6.00 p. m. Monday, set to the "N" following "Mo" and so on.

2. When setting the automatic calendar-switch be sure that the spring dog 110, Figs. 2 and 3 is just back of a tooth as shown in Fig. 3. This is important.

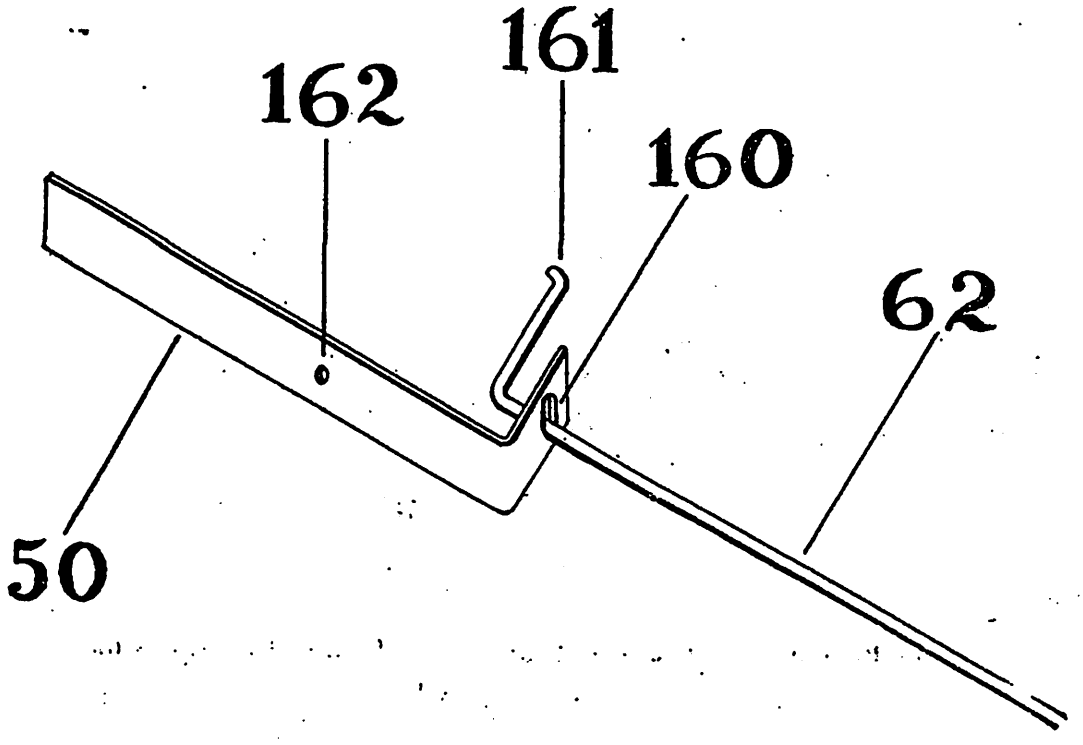

Fig. 6

3. By inserting the switch drum pins in the proper holes the different programs can be put in operation on any desired days or nights. Referring to Fig. 5 it will be noticed that for each commutator 62 there is provided a circle of 14 holes in switch drum 148. The lower commutator makes contact with contact pins in program circle No. 1—the largest circle, and if this program is to be in operation on say the five days of the week, Monday to Friday inclusive, simply place drum pins in the lower circle of holes in switch drum directly under "Mo", "Tu", "We", "Th", and "Fr. If program No. 2 is used on the five nights from Monday to Friday inclusive, place the drum pins in the next lower circle of holes in drum directly under the "Ns" following "Mo", "Tu", "We", "Th", and "Fr". If program No. 3 is to be in operation on Saturday simply place the switch pin in hole in third circle from bottom of drum directly under "Sa" and so on. Before inserting the drum pins turn drum as instructed above until the holes in which pins are to be placed stands in front, then press pins home, using great care not to bend or injure in any way the commutators. After having set the pins, set the switch as instructed above.

To Regulate Duration of Signals

The duration of signals is regulated by the flyers at the front and rear of motor movement. Three flyers are furnished with each clock. By using the two largest flyers the longest duration is secured; if the largest and smallest flyer is used a shorter duration is given; largest flyer only gives still a shorter ring and the smallest flyer the shortest duration, about 2 seconds. Care must be used when putting on and taking off flyers not to bend ends of the flyer shaft.

The escapement regulator shown in Fig. 1, consisting of escape wheel 19, verge 20, verge rod 27 and regulator 25 is no longer used, but will state for the benefit of users of the clocks having this adjustment, that raising outer end of regulator 25 gives a longer duration and lowering it gives shorter duration. Any duration between the limits can be secured. The duration of signals is regulated in same manner on both 5 and 2½ minute clocks.

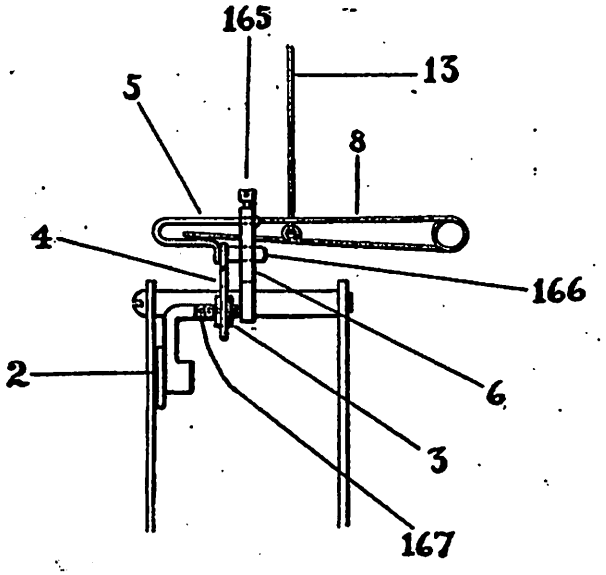

Fig. 7

To Set Periods and Program Dial of 2½ Minute Program Clock, Classes A and B.

The program dial revolves once each six hours, and in each circle there are 144 holes.

1. For each program two circles of holes are used, the outer circle of each pair being used for the A. M. and the inner for the P. M. signals.

2. The outer circle of figures on the program dial reads from 6.00 a. m. to noon and the inner from noon to 6.00 p. m.

3. To set the periods, place your finger on the upper edge of program dial and turn from **left to right**—never opposite way—until the point at which periods are to be set stands at **lower left hand side**, then with fingers of left hand support edge of dial while with plyers in right hand you press the contact pins securely home, inserting the pins by the figures on dial.

4. Now set the program dial to the **last 2½ minute period passed** by the master clock, by placing your fingers on **upper edge** of dial and turning it from **left to right**—never opposite way. If you set the program dial at 9.02, set it to 9.00; if you set it at 9.04, to 9.02½; if at 9.23, to 9.22½; if at 9.31, to 9.30 and so on.

To Set the 2½ Minute Automatic Calendar Switch.

The automatic calendar switch is the same as shown in Figs. 3 and 5, except that the hard rubber switch drum is larger in diameter and each circle

of holes has 28 holes instead of 14 as used on the five minute interval clock. It is set as follows:

1. Place finger on **Front edge of index ratchet wheel** which in the 2½ minute clock is at lower end of switch drum, 148, Fig. 5, instead of upper end, and turn from **left to right**, until the index of the day or evening on which you are setting it stands at the pointer. If you set it Monday between 6.00 a. m. and noon, set to "Mo", if between noon and 6.00 p. m. Monday set to the "PM" following this "Mo" and so on.

Hand Switches.

All program clocks are fitted with "hand switches" by means of which the bells or clocks can be switched off at any time. These switches are located at the lower end of the clock case. The switch for bells is marked "bell switch" and the one for clocks "clock switch." Sometimes it is desirable to cut out the regular programs for a while as is the case during examination periods, etc., in which case simply open "bell switch" and ring the bells by push botton during the time the regular signals are not wanted. During the vacation periods open "bell switch", in order to save battery and unnecessary ringing of the bells. The secondary clocks should also be cut out during vacation, by opening "clock switch." When school opens be sure that all switches are closed.

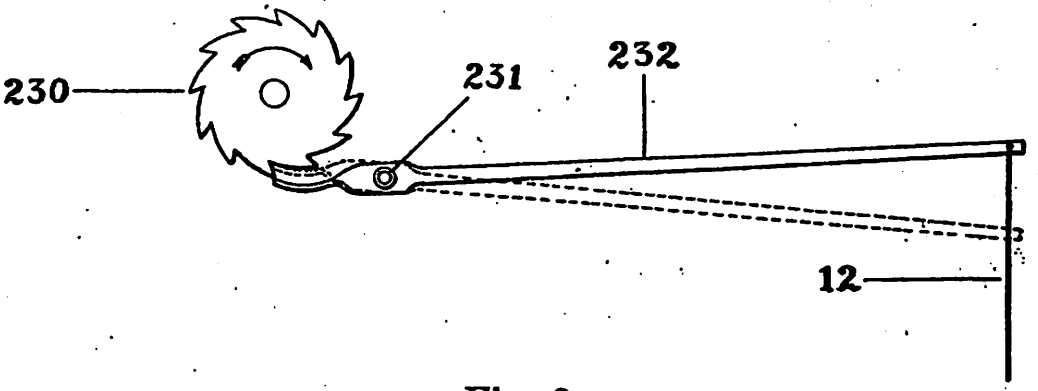

Fig. 8

Description of Master Clock

In the following description of master clock we will refer to Figs. 9, 10 and 11.

Once each minute a current is passed through the coils of the electro magnet 184 drawing armature 186 to poles of magnet, the armature 186 being fast to lever 197, which is mounted on shaft 188 and having at its upper end the pawl 193, imparts motion to winding ratchet wheel 175. The winding ratchet wheel 175 has sixty teeth and each time the current passes through the coils of magnets the driving spring 181 is wound one-sixtieth of a turn, the amount it unwinds in one minute. One end of winding spring 181 is hooked over the stud 182 on winding ratchet wheel 175, the other end being hooked over a similar stud in large gear wheel. The detent 176 carried on stud 179 is held in engagement with winding ratchet wheel 175 by means of spring 178. Winding pawl 193 is held in engagement with winding ratchet wheel 175 by the spring 191 which is secured to lever 197 by screw 192, which admits of adjusting tension on spring 191. Lever 197 is made in two parts, the lower part 189 being clamped to the upper part by clamping screw 190. This adjustment in connection with adjuster 196 permits of adjusting movement of pawl 193 so as to take one tooth of winding ratchet wheel 176 at each movement of armature 186. To make this adjustment loosen clamping screw 190, hold armature 186 against poles of maghet and move lever 197 until winding pawl 192 catches a tooth, then tighten clamping screw 190, loosen screw 195 and locate adjuster 196 so that winding pawl 193 moves back just one tooth. In brief, winding pawl 193 must be adjusted so as to take but one tooth of winding ratchet wheel 176 each time current is passed through coils of magnet.

Fig. 10 shows manner of connecting wires and battery. 200 is winding battery, the wires of which are connected to binding plates 201 on top of master clock; 207 is the "winding key" for winding driving spring 181, as per in-

structions on page 6. 180 is a small shunt of German silver wire, which practically eliminates sparking of clock contacts.

When self-winding master clocks are to operate secondary clocks they are fitted with two circuit closers as shown in Fig. 10, one operates the winding machanism and the other the secondaries. The secondary clock circuit closer operates when the second hand is at 60 and winding circuit closer when second hand is at 30. This circuit closer consists of a vibrating and a revolving contact.

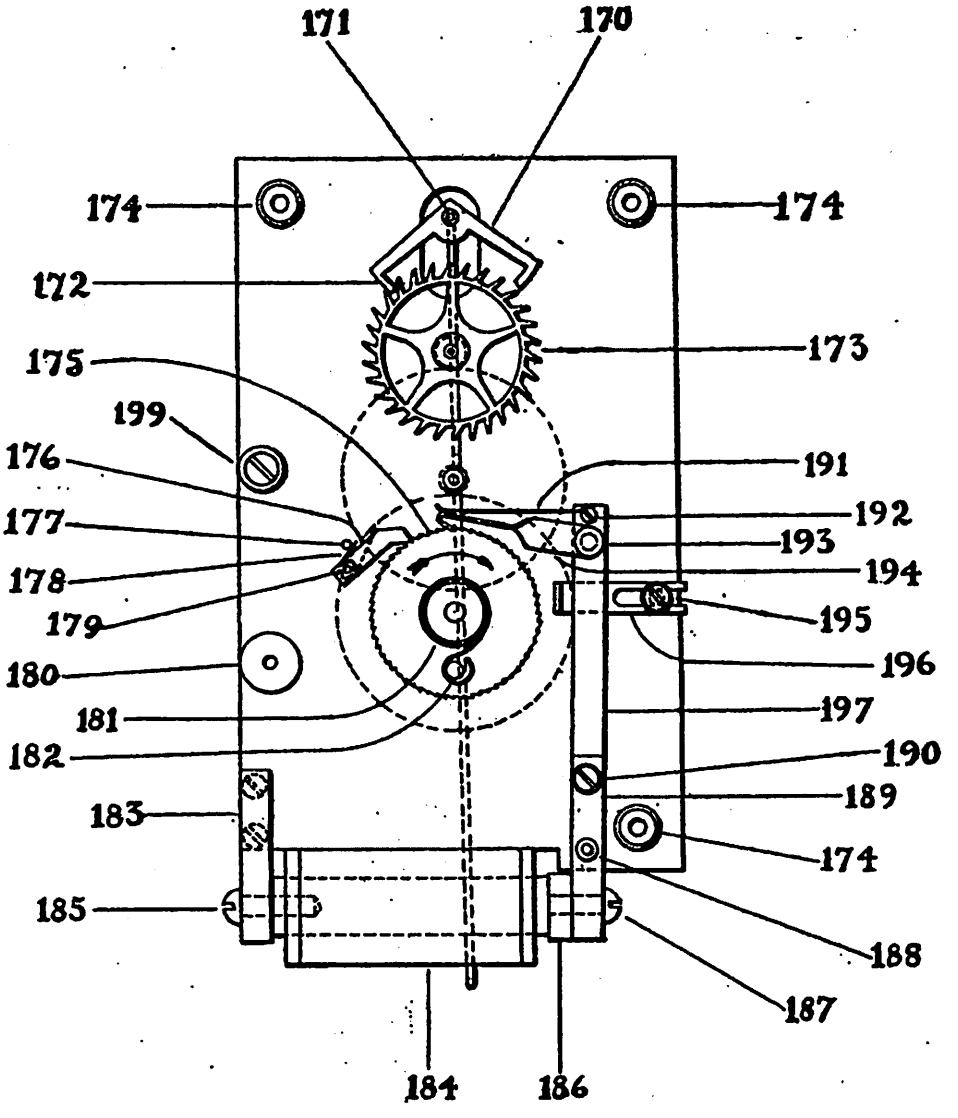

Fig. 9

The vibrating contact is clamped on pallet arbor 171, Fig. 9, and revolving contact on escape wheel arbor. Referring to Fig. 11, 217 are hard rubber clamps, which carry the vibrating contact arm 203 in the outer end of which is the contact screw 210, which makes contact with the platinum contact point 211 of revolving contact. Contact screw 211 is also tipped with platinum. The revolving contact is secured to escape wheel arbor by the screw 216. When contacts are in proper adjustment the contact points will not quite touch when pendulum has the least possible swing that will permit clock to run, but will make contact when swing of pendulum is increased one degree or less.

To be continued.

Continued from March, 2002 issue.

The adjustment can be approximately made by turning vibrating and revolving contacts on their respective arbors and when adjustment is nearly right tighten up clamping screws 218 in vibrating contact and screw 216 in revolving contact, after which final adjustment can be made with contact screw 210. When making final adjustment turn on "clock switch" so that the secondary will operate. This will enable you to tell exactly when contact is made, as it will operate pilot clock. The contact must not be made until a tooth of The escapement wheel 173, Fig. 9, rests on the curved surface—locking surface—of the pallet 172.

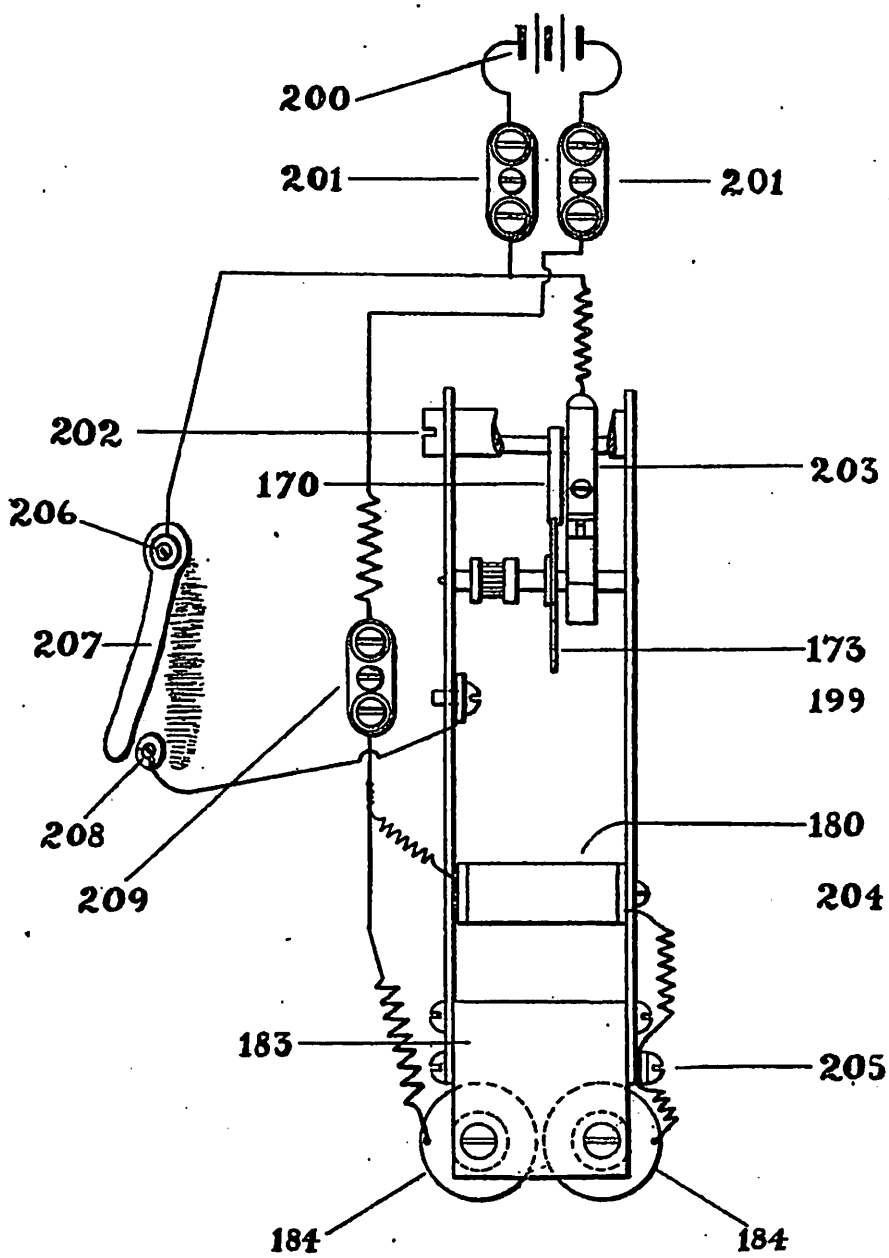

Fig. 10

Description of Secondary Clock.

The same movement is used for both pilot and secondary clocks. Therefore the same description applies to both.

Fig. 12 represents a secondary clock movement. Once each minute the master clock sends a current through the coils of secondary clock magnets 1 drawing armature 2 to poles 3, the armature being fast to lever 4 which is connected by link 5 to propelling plate 6 carrying propelling dog 7, moves counting wheel 8 one tooth each time the master clock closes the circuit. The counting wheel 8 has sixty teeth. Therefore at each movement it is moved one-sixtieth of a revolution or one minute. To lever 4 is fastened verge strip 9 carrying verge pallets 10 and 11, when armature 2 is drawn down to poles 3, lever 4 lifts verge strip 9 and disengages pallet 10 at the same time engaging pallet 11 which holds counting wheel 8 while propelling dog 7 is being moved back one tooth, when armature 2 is released lever 4 and propelling plate 6 drop back to their original position, by this movement propelling dog 7 moves counting wheel 8 forward one tooth while pallet 11 is disengaged and at the same time again engages pallet 10, thus allowing counting wheel 8 to move forward only one tooth and also preventing counting wheel from being turned backward. 12 is a back lash dog which holds the counting wheel firm while propelling dog is being moved back to the next tooth, thus preventing the hands of the clock from jumping while the circuit is being closed. The setting wheel 13, by which the clock is set, is held firmly in position by friction washer 14. Pole screws 15 hold magnets firm to base.

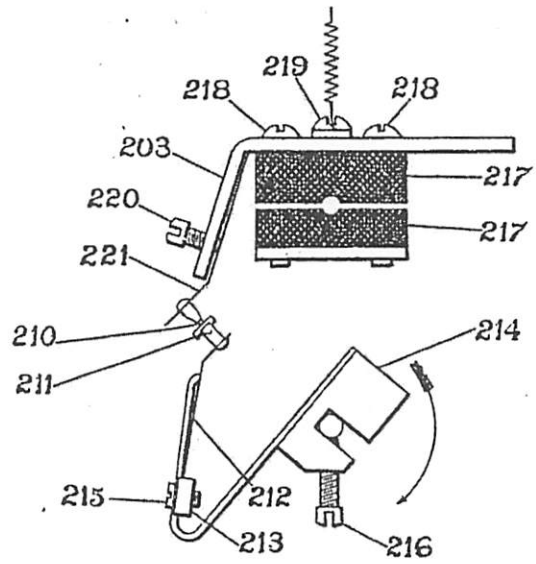

Fig. 11

Description of Program Mechanism.

The program machanism is connected to the master clock by the connecting wire 12, Figs. 1 and 8, which at its upper end is connected to the starting lever 232. Starting wheel 230, Fig. 8, is mounted on centre arbor of master clock and lifts starting lever 232 once each five minutes, allowing it to drop at the end of each five minute period. At its lower end connecting wire 12 is connected to starting spring 8, Figs. 1 and 7. When starting spring 232, Fig. 8, is raised to its highest position, starting spring 8 should be well above the inner end of starting dog 4, Figs. 1 and 7, and when starting spring drops it should strike in the corner of the L shaped bracket 6, Figs. 1 and 7. Starting spring should also have some tension against edge of bracket 6 so that it does not pass over starting dog 4, Figs. 1 and 7, without moving it. Starting spring 8 is held in bracket 6 by set screw 165, Fig. 7. By means of adjusting link 10 and clamping screw 11 length of connecting wire 12, Fig. 1. can be adjusted to give starting spring 8 proper lift. Each time starting

spring 8 sweeps down along edge of bracket 6 it strikes starting dog 4, which allows drop arm 2, Fig. 1, to fall, which in turn strikes outer end of counting arm 17, lifting inner end of counting arm 17 out of notch in counting wheel 22 and lifts arm 18 out of stop wheel 19, thus putting in motion the motor movement, including driving wheel 23, which causes rocker arm 24 to turn on its pivot and move propelling rod 28 forward. It will be noticed that propelling rod 28 projects up through a slot in base under program dial and engages the notches in periphery of dial, thus imparting motion to dial. When driving wheel 23 has moved one tooth, or space, the inner end of counting arm 17 drops into a notch in counting wheel 22, stop arm 18 drops into the path of a tooth of wheel 19 and movement comes to rest. Just an instant before movement comes to rest the head of rocker arm—its uper end—passes a tooth on driving wheel 23 and permits receding spring 57 to return propelling rod 28 to its starting position. It will be also noticed that while driving wheel 23 is moving rocker arm 24 it is lifting drop arm 2 to its starting position and that starting dog 4 drops in under roller 3 just before movement comes to rest. A lug on the inside of drop arm 2 rests on driving wheel 23. By this means drop arm 2 is lifted to its starting position. Starting dog 4, Figs. 1 and 7, is held on stud 166, Fig. 7, by guard 5. It is important that the guard rests on end of stud and does not bind dog 5. 53, Fig. 1, is the backlash dog, which must drop into a notch just as movement of dial is completed. If it does not, dial may be moved backward when propelling rod recedes.

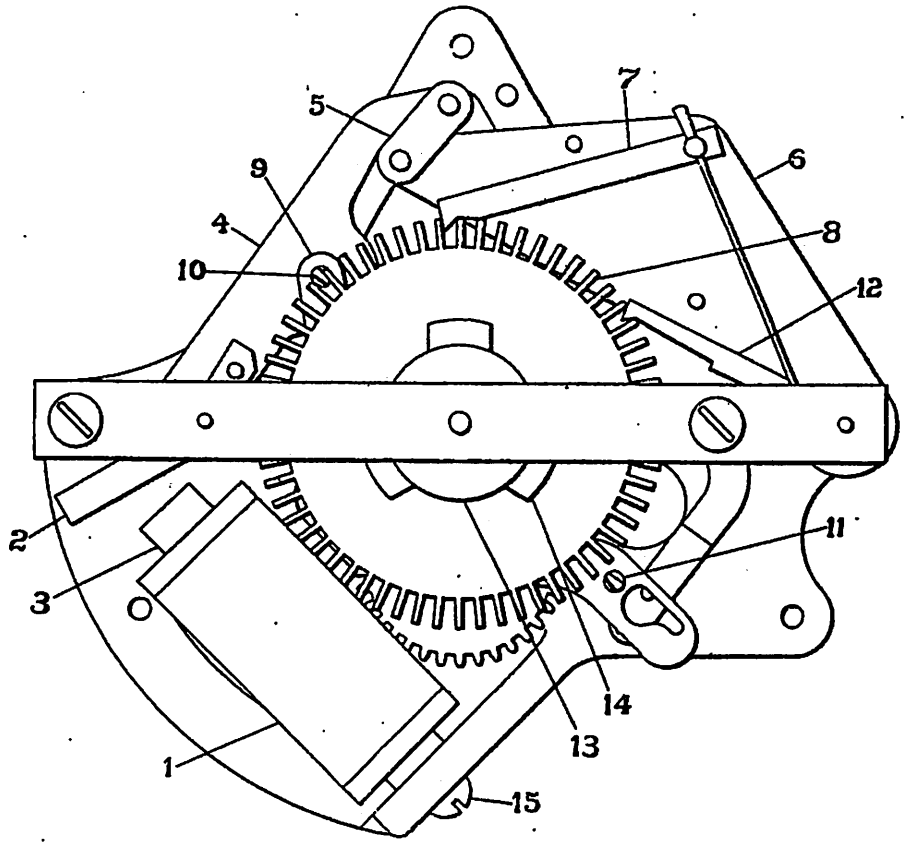

Fig. 12

Description of Commutators.

The commutators 62, Figs. 1, 5 and 6, make contact with contact pins in program dial. At one end they are held in the hard rubber column 44, Figs. 1 and 5, while the opposite ends are supported by adjusters 50, these adjusters being secured to the hard rubber post 51 by screws. On class A clocks, as shown in Fig. 1, all commutators muse rest against upper end of slot 160,

Fig. 6, under sufficient tension to make good contact with contact pins in dial, while on Class B. clocks, as shown in Fig. 5, only the commutators in actual service are held in upper part of slot 160 by pins 150 in switch drum 148, Fig. 5. It is plain that the commutators can be adjusted to make proper contact with pins in dial by means of the adjuster 50.

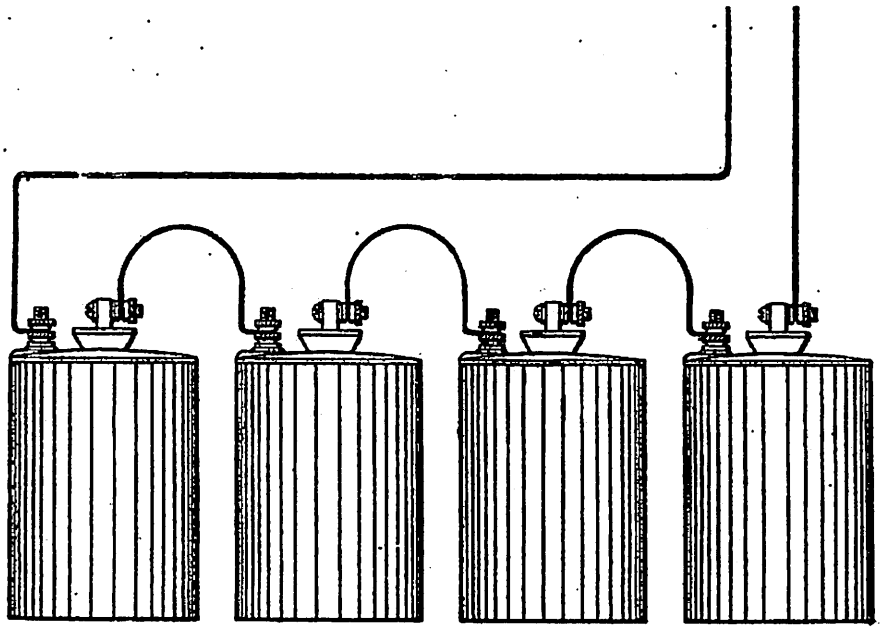

Fig. 13

Description of Automatic Cut-Out.

Aside from the insulator drum the automatic cut-out and calendar switch are the same.

The cam 100, Figs. 1 and 2, revolves once each twelve hours and operates switch arm 32, which carries at its lower end the pawl 34 which engages indexed ratchet wheel 36, Figs. 1, 2, 3, 4 and 5, turning ratchet 1-14th of a turn at each movement. Spring 104, Fig. 2, supplies the power to move switch arm 32. When switch arm 32 is released by cam 100 and pawl 34 turns indexed ratchet wheel one tooth the stop lug 132, Fig. 3, must move into path of a tooth of ratchet wheel 36 and prevent it from moving more than one tooth. The spring pawl 110 must also be in position shown in Fig. 3 on completion of movement.