SECTION 6
SELF-WINDING

The Self-Winding Clock Company of Brooklyn, New York, started production with their 3 pole rotary motor model "A" and model "C", in 1886. This repair data will cover these models before progressing to the model "F" which later became their standard for more than fifty years. Both early models had essentially similar mechanisms with the "A" using a solid plate arrangement, while the "C" employed a cut plate movement. The mechanical portions of the early movements were provided to Self-Winding by Seth Thomas, Howard, and H.C. Thompson, with Seth Thomas the dominant supplier. The electrical portion of the mechanism was added by Self-Winding, which included the motor and contacts.

The principal areas to cover in servicing this model are the adjustment of the contact fingers on the commutator, and the winding contact on the center arbor. The spring fingers make the connection to the electromagnets via the commutator as the rotating armature approaches each one, in turn. The contact is maintained until the next armature nears the electromagnet, when the next commutator contact becomes active. The three fingers must be adjusted for proper position against the six points of the commutator as shown in the accompanying diagram. The back-stop spring is adjusted so that a contact is touching a commutator point when the motor is in a stopped position, assuring a connection when the motor is to be restarted.

The winding contact is responsible for the hourly winding of the mainspring which makes one revolution, having lost one turn before the next winding. The circuit to the winding motor is completed by a pin on the center arbor which carries a loosely mounted cam lever around until it is in the upright position, where it contacts an insulated spring finger. The connection is maintained until the mainspring has completed one revolution when the pin moves the cam lever away via another lever, called the knock-away piece, breaking the circuit. The adjustment to insure adequate contact pressure involves the position of the insulated spring finger which should move downward approximately 1/16" when leaving the cam lever contact. Excessive pressure should be avoided as the added friction will act against the operation of the clock during winding.

Cleaning and lubrication is best accomplished by first letting down the mainspring by the removal of the pallet arbor cock. This is followed by removing the complete motor section as an entity, permitting disassembly of the mechanical portion for cleaning. The motor assembly is not taken apart, but is cleaned intact, by immersion in a suitable cleaning solution and brushing the liquid vigorously onto the bearings and commutator points. Lubrication of this mechanism including the motor bearings, is performed in the same manner as in any conventional clock. Harsh solvents that may attack the coil insulation should be avoided.

The commutator surfaces should be kept free of oil in order to maintain clean contact faces for the spring fingers. The mainspring should be set up in a half-wound position at final assembly with the objective of utilizing the center portion for the single turn needed between winding cycles. It is often noticed that the spring is kept fully wound, perhaps by improper instruction to the owner, which will not prevent the clock's operation, but may impair the reliability of time keeping.

The model "F" differs in its winding arrangement, eliminating the rotary motor which is replaced by a vibrating armature and a ratchet & pawl assembly which acts against the winding wheel. The winding is initiated by a cam on the center arbor, in similar fashion to the models just described, with the exception that the contacts are constructed of a pair of springs which are brought together by the cam. In this case the cam is not part of the electrical circuit, and doesn't carry any current. The obvious improvement by removing the rotating arbor from the circuit with its poor electrical connection to the frame of the clock insures a greater measure of reliability in establishing the rewinding process.

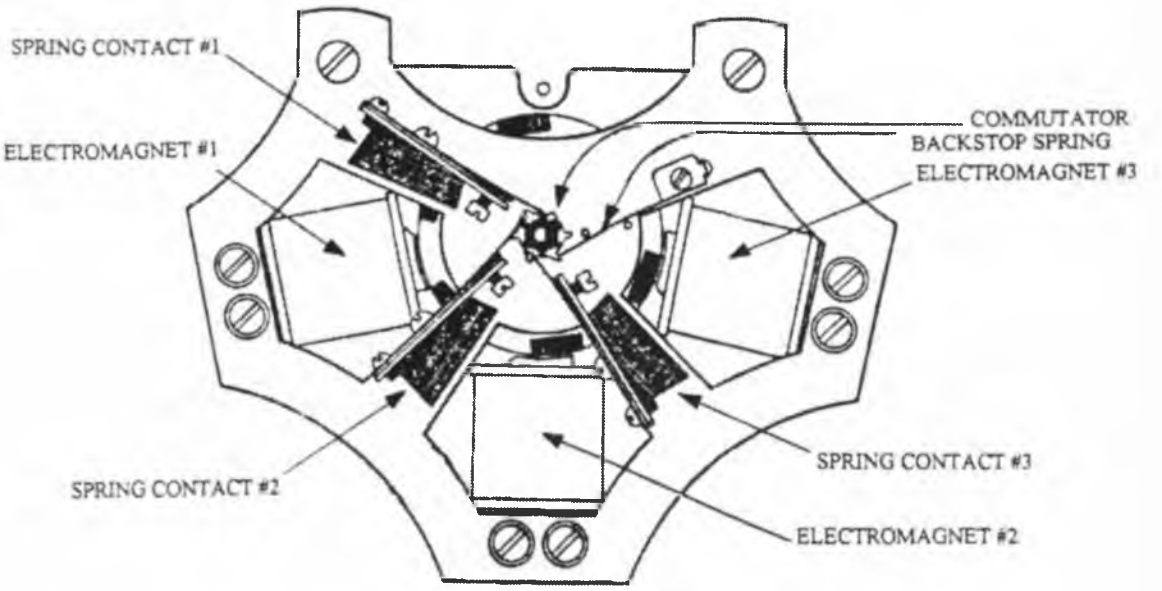
The hourly winding contact assembly should be adjusted so that the two spring contacts, until activated by the cam, or more properly, the contact piece, on the center arbor, are 1/16" apart. Their faces should be parallel to each other when they touch, and must be free of dirt and oil in order to insure a good electrical connection. The lower spring should be 1/32" away from the edge of the incline on the contact piece between winding intervals.

The armature rests against a banking spring, positioned with its edge in line with the edge of the magnet. In its activated state, it will rise to a position where it will contact the upper banking spring while its front edge will be 1/32" to 1/16" from the corner of the magnet core. A pair of spiral contact springs, one on the front plate and the other on the back, rest on contact pins at the approximate center of their contact surfaces. The springs are tensioned so that when temporarily pulled forward they will drop below the pins, and when released the space above will be 1/32" to 1/16". Both front and rear springs should be adjusted so that they are alike, which is accomplished by judicious bending with a pair of tweezers. The spiral springs are insulated from the clock plates, and care should be exercised when making adjustments to insure that their mountings are not compromised.

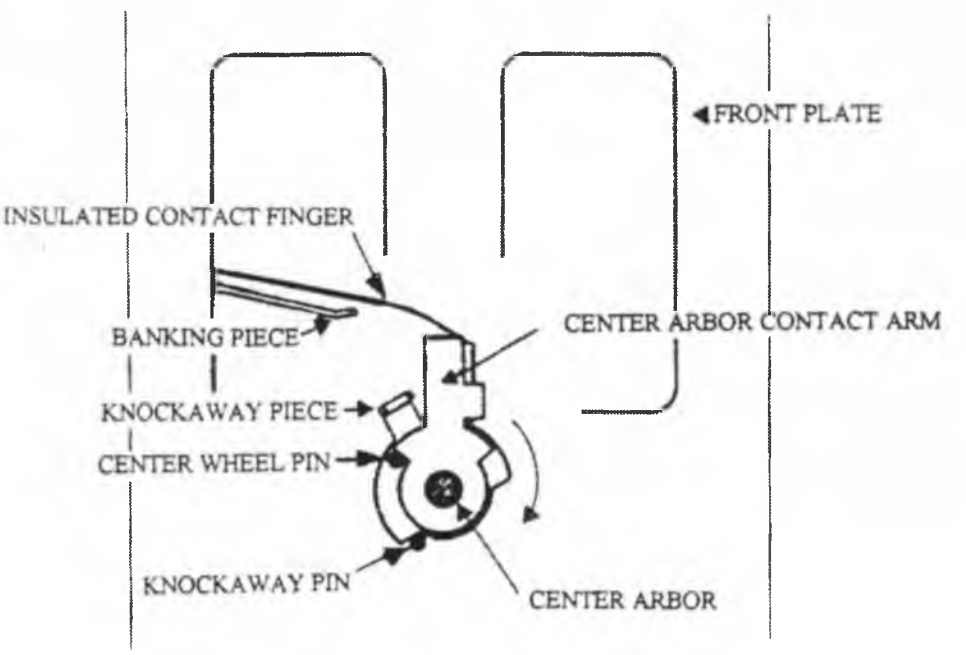
The mainspring is wound at hourly intervals by the oscillation of the armature which is fastened to a winding lever, carrying a pawl. The pawl drives a ratchet wheel with a pinion on its arbor engaging the winding wheel. If the movement is to be taken apart for any service, the front plate should be removed, and NOT the back plate. When reassembling, the mainspring is pre-tensioned with 1-1/2 to 2 turns from a completely unwound condition.

SELF WINDING STYLES A & C ROTARY-MOTOR MOVEMENTS

VIEW OF COMMUTATOR AND SPRING CONTACTS

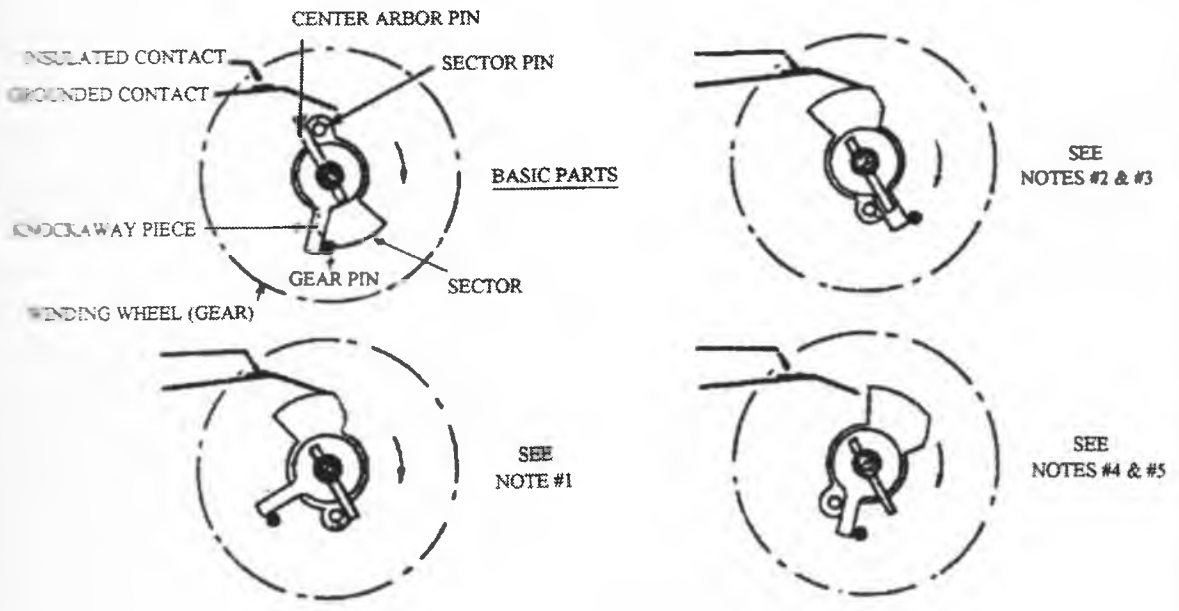


VIEW OF WINDING CONTACT ASSEMBLY



SELF WINDING TYPE F VIBRATOR-TYPE MOVEMENT

VIEW OF HOURLY WINDING CONTACT ASSEMBLY

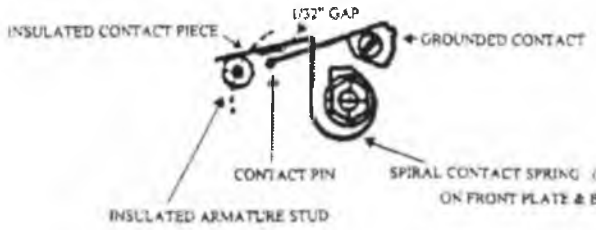


HOURLY WINDING, DESCRIPTION

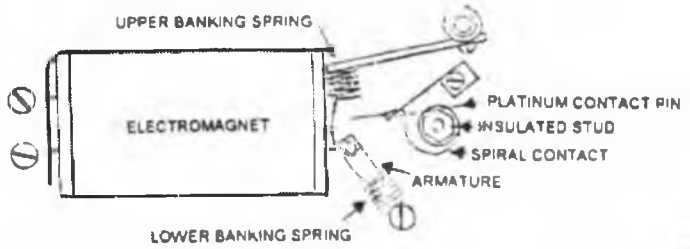
1. Center Arbor Pin engages Sector Pin and drives Sector to Contacts, closing circuit.
2. Winding Motor drives gear (on Mainspring Barrel).
3. Mainspring Barrel Wheel Pin engages Knockaway Piece.
4. Knockaway Piece reaches Sector Pin.
5. Sector Pin rotates Sector, opening winding circuit contacts.
6. Cycle is completed until the next engagement of Center Arbor Pin and Sector Pin, after one turn of the Mainspring Arbor, one hour later.

SELF WINDING TYPE F VIBRATOR-TYPE MOVEMENT

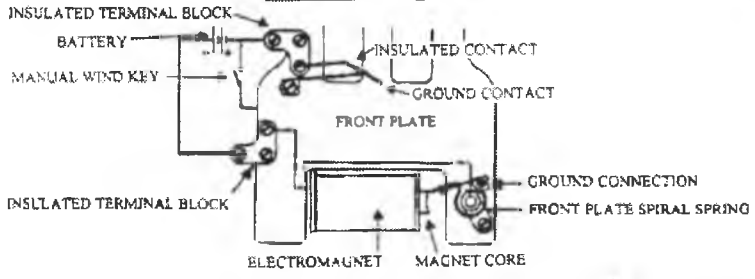
VIEW OF WINDING CIRCUIT CONTACTS



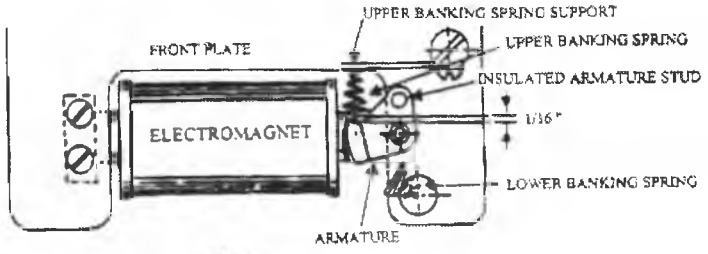
CHECK THAT SPIRAL SPRINGS ON FRONT AND BACK PLATES ARE ADJUSTED FOR SIMULTANEOUS MAKE AND BREAK CONTACT POSITIONS.



WINDING CIRCUIT



ELECTROMAGNET & ARMATURE



(SPIRAL SPRING IS NOT SHOWN IN THIS VIEW FOR CLARITY)