



*INSTALLING AND MAINTENANCE
INSTRUCTIONS for NO.3 and NO. 4
ALTERNATING CONVERTORS
Circa 1918*

Instructions for installing alternating convertors (pole changers) in this case for 110VAC 60cps house current to 90VAC 20cps ringing current. Very good tutorial on pole changers and ringing power supplies of the period.

Scanned from an original document furnished by Wayne Merit, Curator

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ALTERNATING CONVERTERS

Installing and Maintenance
Instructions

Bulletin No. 14

Kellogg Switchboard &
Supply Company

CHICAGO

Installing and Maintenance Instructions for No. 3 and 4 Alternating Converters

BULLETIN No. 14

60^w carbon 40^w mazda lamps to balance current supply

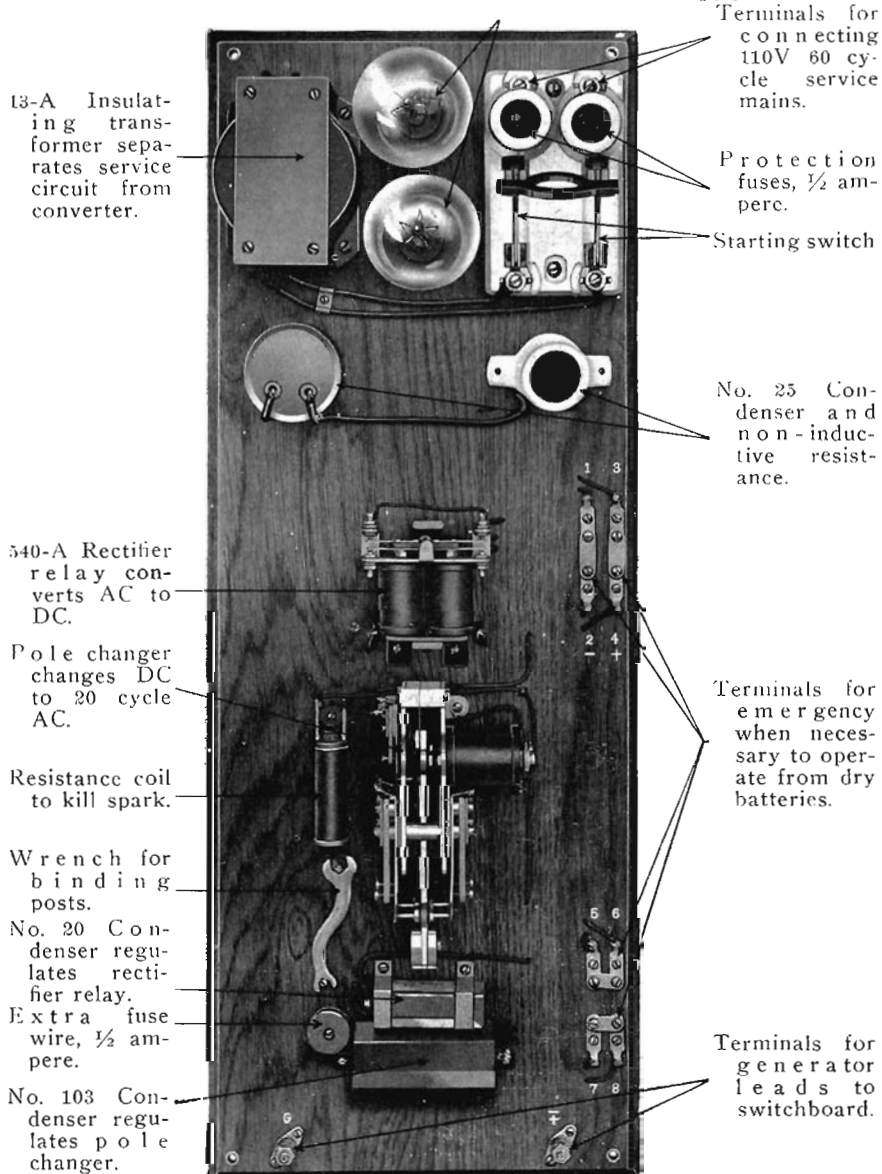


Fig. No. 9501

The No. 3 Alternating Converter operates directly from 110V 60 cycle electric light service mains and converts the 110 volt alternating current to direct current, which is in turn interrupted to obtain alternating current of practically 20 cycles per second for ringing telephone bells.

INSTALLATION

The converter is carefully packed and the pole changer armature is secured with temporary supporting blocks to prevent injury during shipment. These blocks should not be removed until after the converter is mounted.

To obtain best results the converter should be mounted on a wall which is as firm and free from vibration as possible and it is suggested when brick or concrete walls are encountered that the converter be mounted on a 2x4 secured with through bolts or expansion bolts as shown on figure No. 9503.

After the converter is leveled up and rigidly mounted, remove the supporting blocks which secure the armature. The contacts are properly adjusted before leaving the factory and if not injured in shipment, converter should be ready for operation just as soon as the 110 volt service mains are connected and the starting switch thrown on.

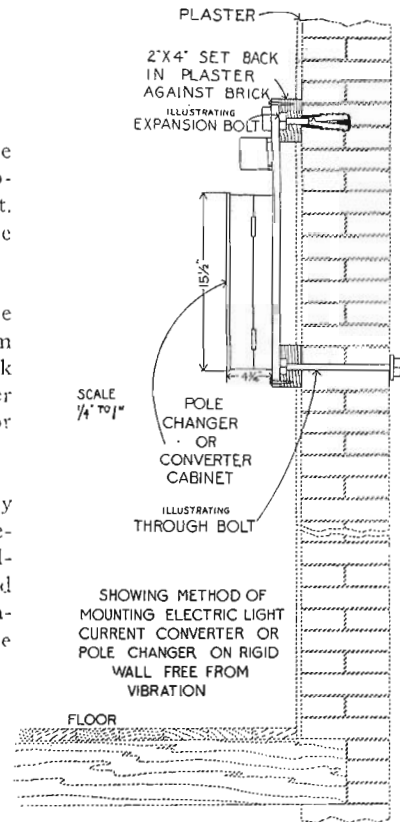


Fig. No. 9503

METHOD OF CONNECTING 110 VOLT, 60 CYCLE LEAD

From the switch marked "to AC power line" shown on figure No. 9504, circuit No. 20217, run No. 14 B and S gauge rubber covered braided copper wire and connect to the electric light mains at some convenient point, preferably at a fuse or outlet box. These wires should be run in conduit and placed in accordance with the requirements of the National Electric Code Standards.

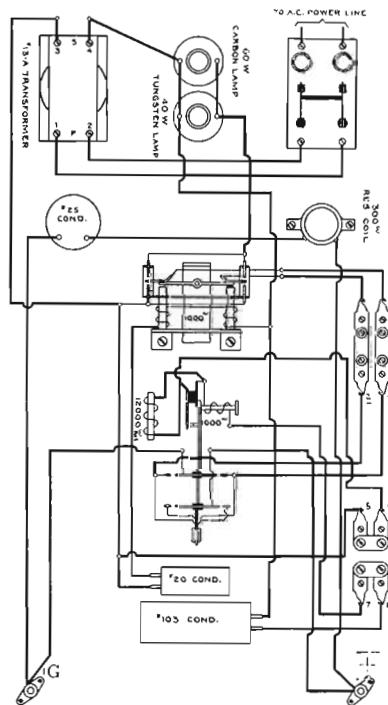


Fig. No. 9504

METHOD OF CONNECTING GENERATOR LEADS TO THE SWITCHBOARD

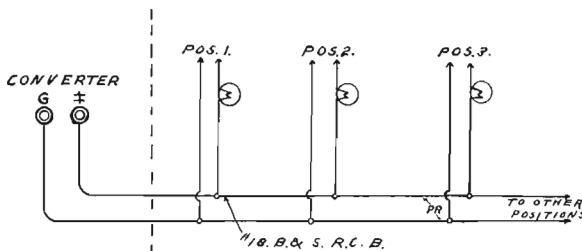


Fig. No. 9505

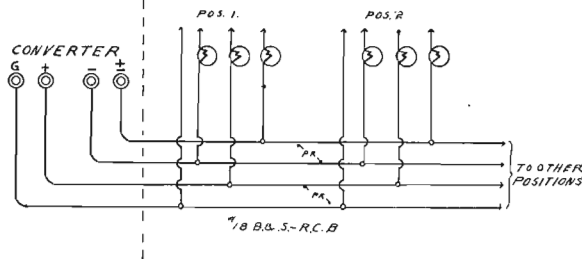


Fig. No. 9506

Generator leads to the switchboard should be No. 18 rubber covered twisted wire.

For straight line ringing a pair of No. 18 gauge wires is connected to the terminals marked \mp & G as shown on figure No. 9504 and carried to the switchboard, care being taken to keep these wires away from the transmitter battery, and order wires so as to avoid the possibility of generator noise in the operator's circuit. A 110 volt 15 watt Tungsten lamp is placed in series with the \mp side to each position as shown on figure No. 9505.

When a No. 4 pole changer is used for the old style positive and negative pulsating party line ringing, a second pair of No. 18 gauge wires are connected to terminals marked +, —, and 110 volt 15 watt Tungsten lamps placed in series with the leads to each position as shown on figure No. 9506. Circuit No. 20218.

EMERGENCY PROVISION

Where the 110 volt, 60 cycle electric light service is unreliable or subject to temporary shut down and it is desired to switch to dry battery operation, remove the straps from terminals 1 and 2, 3 and 4, 5 and 6 and 7 and 8.

Run 4 pairs of No. 18 braided, rubber covered, twisted wire to two double pole, double throw switches located adjacent to the converter one of which is designated "starting" and the other "ringing." Provide a suitable rack for two sets of dry batteries, 1 of 16 cells for operating the pole changer and one of 60 cells for ringing purposes. Wire the batteries and converter to the switches as shown in figures No. 9507.

When operating from dry cells, the main switch on the converter should be open.

The ringing battery should be wired through a 60 watt carbon and 40 watt mazda lamp connected in multiple as shown in Fig. No. 9507.

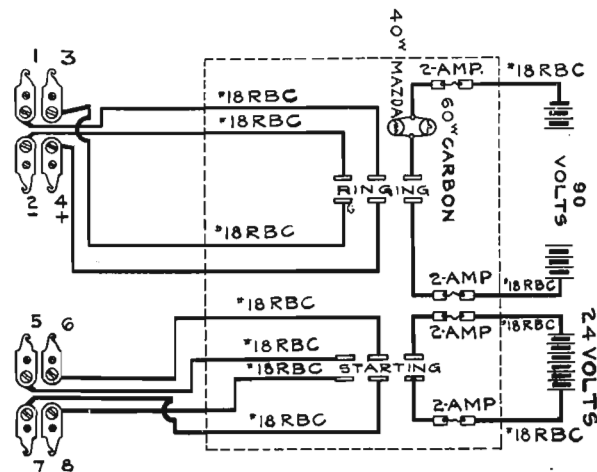


Fig. No. 9507

ADJUSTING CONTACTS

In making adjustments refer to figure No. 9508. The switch should be open to avoid short circuits.

When the converter is not in motion there is a clearance between the four pole changer springs 5, 6, 7 and 8 and the two generator contacts C and D while the operating contact No. 9 is normally made. The rectifier relay being polarized, springs A and B will make with contacts 1 and 4 while contacts 2 and 3 should have just a hairline opening between springs A and B. All the proper adjustments are made at the factory and by keeping the regular adjustments, very little trouble will be experienced.

Adjusting Rectifier Relay Contacts.

If the rectifier relay armature is held so that springs A and B are continually made with 1 and 4 or with 2 and 3, the secondary circuit will be closed so as to illuminate the carbon and tungsten lamps. These lamps act as a tell-tale for adjustments. With the switch off, turn the adjusting screws 1, 2, 3 and 4 away until springs A and B clear the contacts. Both springs and contacts should be cleaned and smoothed up if necessary. Turn back the contact screws until they just touch spring A and B, using the wrench to set lock-nut while the screw is being held in exact position by the screw-driver. When all the screws are locked, throw the starting switch. This should cause the carbon and tungsten lamps to illuminate. Hold the lock-nut of contact screw No. 1 and turn screw slightly away from spring A, leaving just a hairline opening. Then hold lock-nut of contact screw No. 4 and turn screw slightly away from spring B, leaving just a hairline opening. This should extinguish the lamps and start the rectifier in proper operation.

It is suggested that the bearing on the armature of the rectifier relay should be oiled occasionally.

Adjusting Vibrator Contacts.

The operating contact No. 9 should be adjusted with the switch out. Turn the adjusting screw No. 9 away until the spring clears the contact. Both spring and contact should be cleaned and smoothed up if necessary. Turn the screw No. 9 back until the spring just touches the contact and test starting the vibrator by again switching on the current. If the vibrator does not start, pull the switch and turn the screw $1/16$ of a turn. Now switch on the current and if the vibrator pulls over and sticks, turn away very slightly. This will allow making uniform adjustments that will always insure starting the pole changer when the switch is turned on.

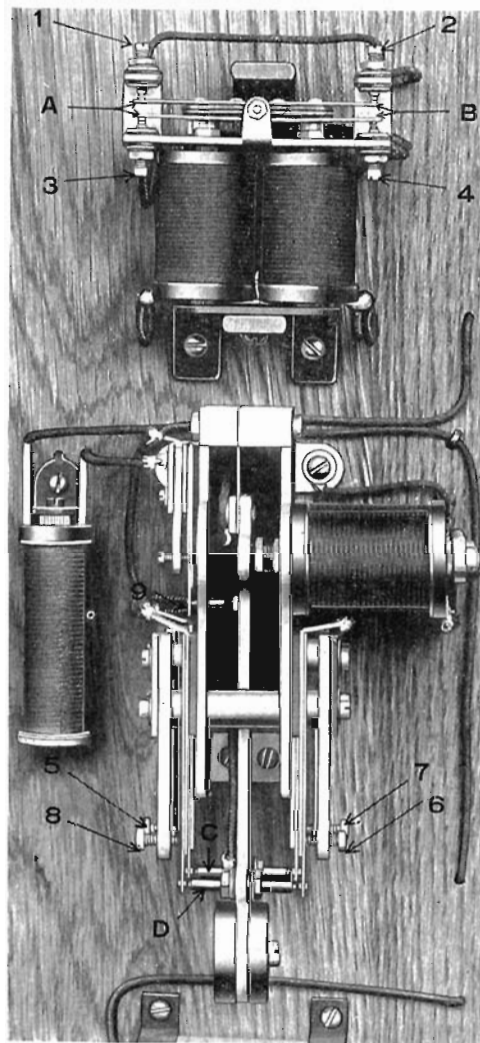


Fig. No. 9508

Adjusting Pole Changer Springs.

The four pole changer springs, 5, 6, 7 and 8 should be adjusted so that the generator contacts C and D meet simultaneously on springs 5 and 8 on the movement to the left, and simultaneously on springs 6 and 7 on the movement to the right.

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To adjust the left rear spring 5 and contact C, clean and smooth up if necessary. Turn screw No. 5 until the spring just touches contact C. Then turn the screw away $\frac{1}{2}$ turn. This will give the proper adjustment and clearance.

To adjust the left front spring No. 8 and contact D, clean and smooth up if necessary. Then turn screw No. 8 until the spring just touches the contact D. Now turn the screw away $\frac{1}{2}$ turn for adjustment and clearance.

Clean and smooth up the right front spring No. 6 and contact D. Then turn screw No. 6 until spring just touches generator contact D. Then turn screw away $\frac{1}{2}$ turn to obtain proper space between spring 6 and generator contact D. With the same procedure clean and smooth up the right rear spring No. 7 and contact C. Then turn screw 7 until the spring just touches the generator contact C. Now turn the screw away $\frac{1}{2}$ turn for the proper clearance.

The adjustment of $\frac{1}{2}$ turn for clearance between the generator contacts C and D and the pole changer springs can be varied to a $\frac{3}{4}$ turn if it is desired to vary to voltage of the ringing current according to the swing of vibrator as regulated by adjustment of vibrator contact No. 9.

MAINTENANCE

If both the rectifier relay and the pole changer vibrator do not operate when the switch is thrown, it is probable that the trouble is in a blown fuse at the converter or a poor connection on the service lead.

RECTIFIER RELAY DOES NOT OPERATE

If rectifier relay does not operate see that there are no defects in the connections shown on figure No. 9504, Circuit 20217.

See that the voltage of service lead is normal. (Oil armature bearing occasionally.)

Relay will operate on variations from 90 to 120 volts.

RECTIFIER RELAY CONTACTS SPARK HEAVILY

Sparking is probably due to dirty contacts. Put a short circuit on generator terminals \mp & G. This will do no harm and will serve to clean the contacts. As spark reduces, remove the short circuit.

If spark continues, inspect contacts for roughness and if necessary, clean.

See that contacts are properly adjusted.

CARBON AND TUNGSTEN LAMPS BURN CONTINUALLY.

Remove switchboard lead from generator terminal \mp to see if trouble is in converter.

If this extinguishes lamp look for trouble in generator lead in switchboard, such as pieces of solder, accumulations of dust between key springs, or broken down insulation in keys. (See Fig. No. 9513 showing illustration of Kellogg key.)

If lamps continue to burn adjust rectifier relay contacts, 1, 2, 3 and 4 as mentioned under Adjusting rectifier relay contacts.

VIBRATOR FAILS TO OPERATE

See that vibrator contact No. 9 makes properly.

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VIBRATOR PULLS OVER AND STICKS OR STRIKES POLE PIECES

See that vibrator contact No. 9 breaks and the vibrator armature does not touch pole piece.

Adjust springs 6 and 7 as mentioned under adjusting pole changer springs.

Test vibrator magnet windings for grounds on core.

See that 12,000 ohm resistance coil is not short circuited or defective.

VIBRATOR CONTACT SPARKS

Test 12,000 ohm resistance coil for open circuit.

See that adjustment of contact 9 is properly made.

VIBRATOR OPERATES; DOES NOT RING BELLS

See that voltage of service leads is normal.

See that generator contacts C and D are making proper contact with Pole changer springs 5 and 8, 6 and 7.

See that rectifier relay springs A and B make and break properly.

If ringing voltage is normal look for trouble in telephone with the old type adjustable ringers. If necessary replace with Kellogg non-adjustable ringer shown on page 10.

VIBRATOR OPERATES; RINGING CURRENT WEAK

See that voltage across converter terminals \mp & G is normal, 90 volts.

See that pole changer contacts are properly adjusted.

Look for partial short circuits in ringing leads such as **broken down insulation on keys.**

See that rectifier relay springs A and B make and break properly.

POLE CHANGER CONTACTS SPARK

Inspect contacts for roughness; clean if necessary.

See that adjustment is sufficient to make and break contact properly.

See that condenser and resistance bridged across generator contacts C and D are in good condition and the connections properly made.

RINGING NOISE ON LINE CIRCUITS

Ringling noise on line circuits is always more prevalent on grounded and common return lines and will occur with all kinds of ringing machines. This trouble can only be remedied by making all lines metallic with the proper transpositions. If lines are metallic and properly transposed, ringing noise may be due to unbalanced conditions such as high resistance connections, dusty carbons, tree leakage and wet cables.

NOISE IN OPERATOR'S CIRCUIT

See that contacts are all properly adjusted.

See that the generator wires leading from pole changer to switchboard are properly paired, and do not come in contact or run parallel with operators' transmitter battery wires or order wires.

See that the insulation in switchboard wiring is perfect.

Wet cables, poor insulation or separators between key springs, and generator wiring laced in with key cable, will cause noise.

There are some conditions where noise can not be prevented owing to the design of the circuits and construction of switchboard.

PIECE PARTS

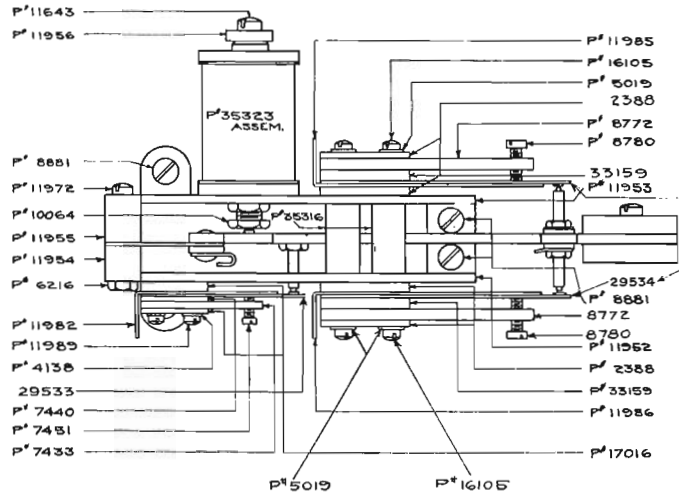


Fig. No. 9509—Vibrator

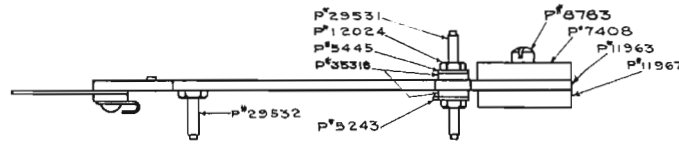


Fig. No. 9510—Armature

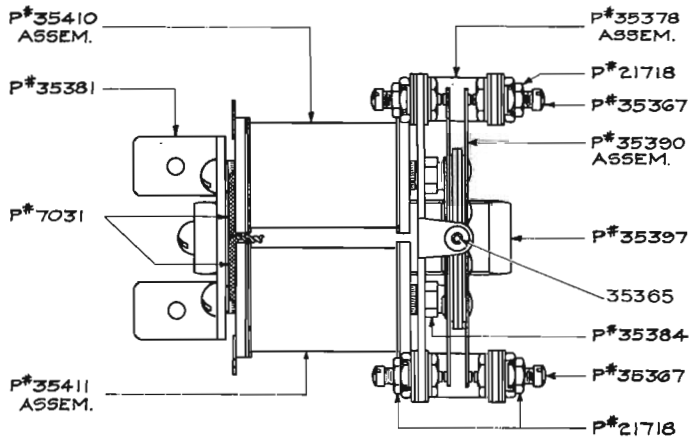
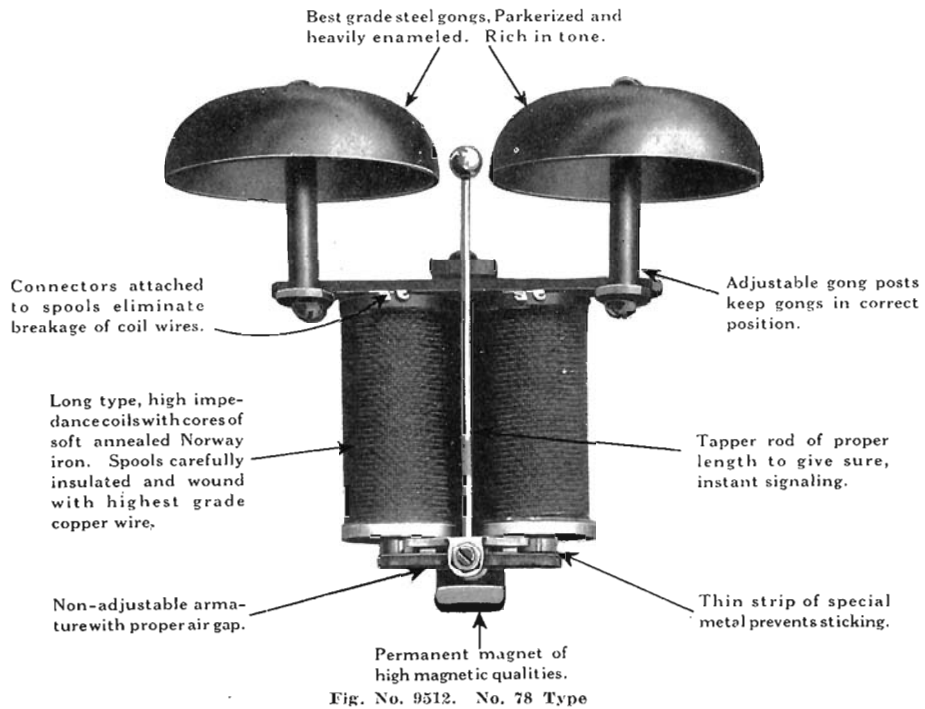


Fig. No. 9511—Relay

KELLOGG STANDARD RINGER



Kellogg non-adjustable ringers eliminate all ringer adjustments. They are positive in operation and respond to the slightest ringing current, producing a clear, yet pleasing signal. All metal parts are Parkerized, an absolute protection against rust.

KELLOGG STANDARD KEY

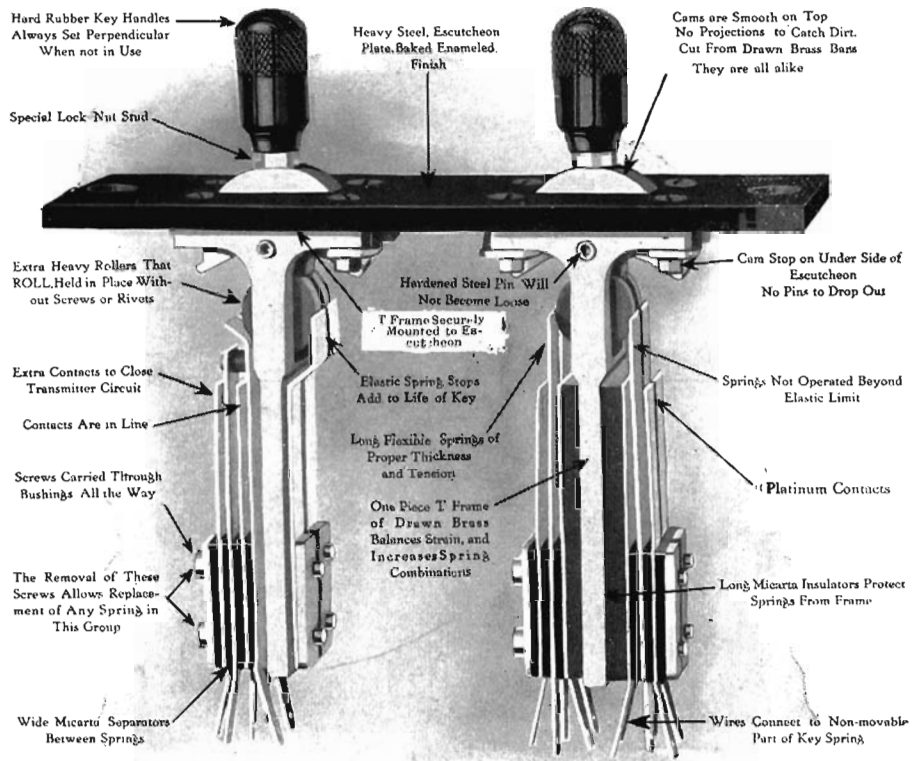
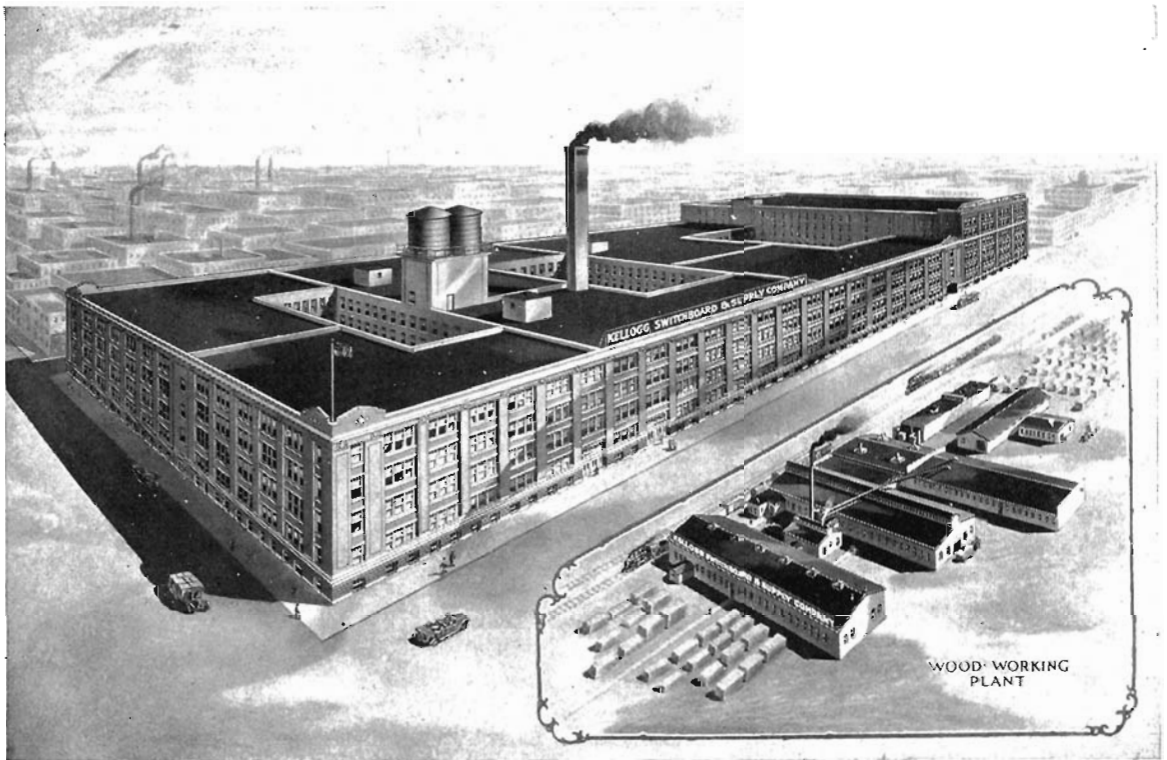


Fig. No. 9513, No. 1042 and 1031 Keys on 1013 Escutcheon

The Kellogg key will permit any combination of spring arrangements.

When ordering Kellogg keys to replace other makes send sample of escutcheon and give spring arrangement.



Kellogg Switchboard & Supply Company

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