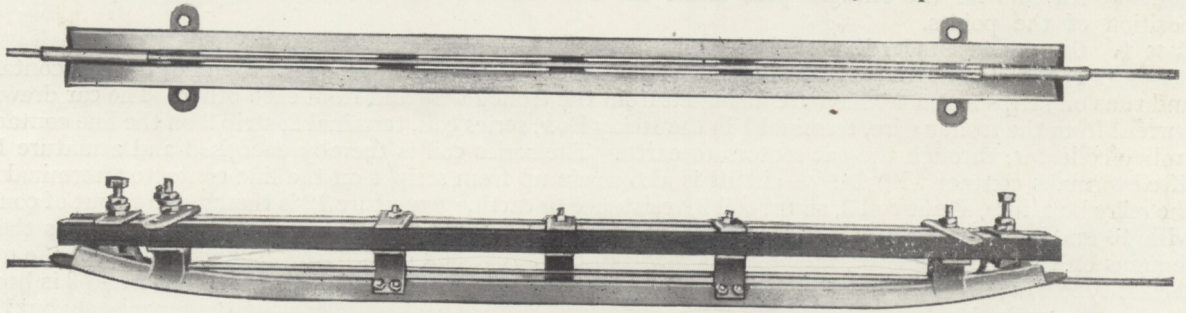


Collins Patent Automatic Point Turner

with Delayed Action Remote Control Relay Operation.



Contactor viewed from underneath and one side.

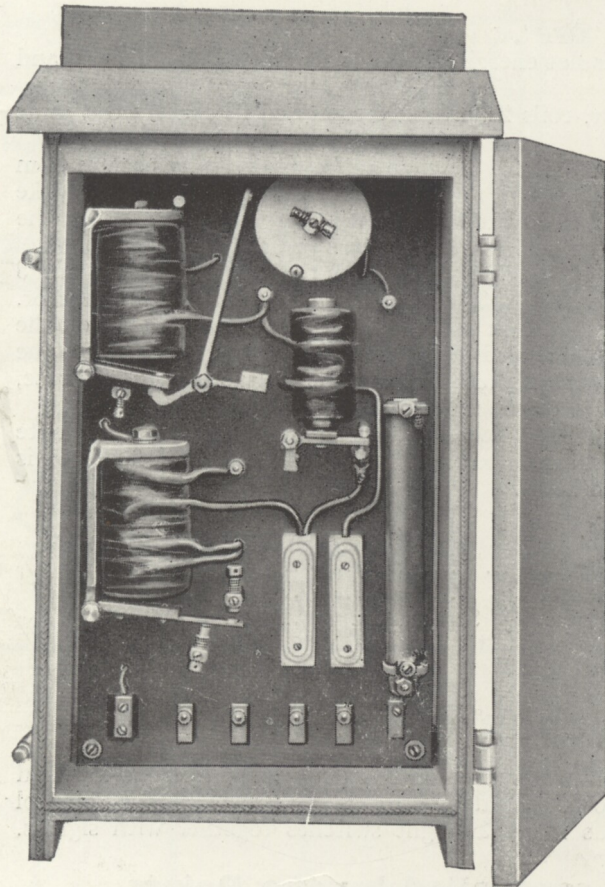
We believe that the delayed action remote control point controller described in these pages is distinctly in advance of any other point turner at present in use.

The complete apparatus for operating the Point Switch consists of:—

- 1 Simplified line contactor.
- 1 Relay box with delayed action remote control relays.
- 1 Watertight foolproof street box, type "Q," containing the operating mechanism.

The line contactor is shorter and lighter than those previously used.

The running strips are continuous and without spark gaps, and the trolley wheel runs from the trolley wire to the underside of the line contactor and back to the trolley wire without bumping.



Relay Box. Patent applied for.

The current broken on the line contactor is only 0.2 ampere.

There is no arcing on the line contactor.

Cars may remain with their trolley wheels on the line contactor continuously without causing damage to the street box coils.

With standard contactors the cars will turn the points while travelling at speeds up to 15 miles per hour. Higher speeds may be employed with special contactors.

If the motorman changes from current "off" to current "on" or vice versa while the trolley wheel is on the line contactor, there is no arcing at the series relay latch contacts.

The delayed action relay mechanism is sturdy, reliable and foolproof.

The type "Q" street box is an improved model of the type that has given satisfactory service since first introduced in 1911.

The current only passes through the street box coils for approximately 1 second. The points are turned as the trolley wheel leaves the line contactor.

The current taken by the car motors does not pass through the street box coils. The standard machine with street box coils taking $4\frac{1}{2}$ amps. at 500 volts will operate the heaviest double points with ease.

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METHOD OF OPERATION.

All cars for the curve pass under the line contactor with current "ON," irrespective of the position of the points.

All cars for the straight pass under the line contactor with current "OFF," irrespective of the position of the points.

Case 1. Car passing under line contactor with current "ON."

The trolley wheel (or bow or slipper) leaves the trolley wire at the entering end of the line contactor and runs on strips 2 and 4 which are insulated from the trolley wire and from each other. The car draws its current from the trolley wire, terminal 1 in the Relay Box, series coil, terminal 2, strip 2 on the line contactor, trolley collector, through the car motors to earth. The series coil is thereby energised and armature 13 is lifted to make contact with 14. A circuit is also made up from strip 4 on the line contactor, terminal 4 in the relay box, fuse, shunt coil 3, shunt coil 2, resistance to earth. Armature 12 is thereby lifted out of contact with 16 and armature 7 is lifted, allowing contact arm 8 to fall into contact with 11. So long as the car remains on the line contactor, no circuit is made to the street box coils. Now, shunt coil 3 is of the quick release type whereas coil 2 is designed for slow release so that when the circuit through coils 2 and 3 is broken by the trolley wheel leaving the line contactor, armature 12 drops back on to contact 16 immediately but there is a delay of about 1 second before armature 7 drops back and causes 8 to break with 11. During that time lag of 1 second, a circuit is made up from the trolley wire, terminal 1 in the relay box, fuse, contact 16, armature 12, arm 8, contact 11, blow-out coil 10, yoke 6, armature 13, contact 14, hold up coil, terminal 6, street box coil 6 and to earth. The point is thus operated for the curve.

After the time lag of 1 second, armature 7 of shunt coil 2 falls back and gives the left hand arm of 8 a hammer blow thus causing 8 to quickly break contact with 11 with an arc gap of over 3 in. The current to the street box coil is thus broken. The quickness of the break reduces the arc to a minimum and it is further damped by means of the blow out coil 10. Contact 8 finally comes to rest in the position indicated with its left arm held down by the weight of armature 7.

The hold up coil (wound on same core as the series coil) is provided to obviate all possibility of arcing between contacts 13 and 14. As the hold up coil is in series with street box coil 6, it will remain energised until the arc is broken at 11. It is also provided with delayed action (as coil 2) so that contact 13 does not break with 14 until about 1 second after the current has ceased to flow. There is thus no possibility of an arc between 13 and 14.

Case 2. Car passing under line contactor with current "OFF".

As the car is not drawing current, series coil 4 is not energised so that armature 7 is not lifted and contact 13 remains in contact with 24.

While the trolley wheel is on the line contactor, coils 2 and 3 are energised in exactly the same manner as described for Case 1.

When the trolley wheel leaves the line contactor, a circuit is made up for one second as before from the trolley wire, terminal 1, fuse, contact 16, armature 12, contact arm 8, contact 11, blow out coil 10, yoke 6, contact 13, contact 24, terminal 5, street box coil 5 and to earth. The point is thus operated for the straight. At the end of the 1 second lag, the arc is broken between 8 and 11 as in Case 1.

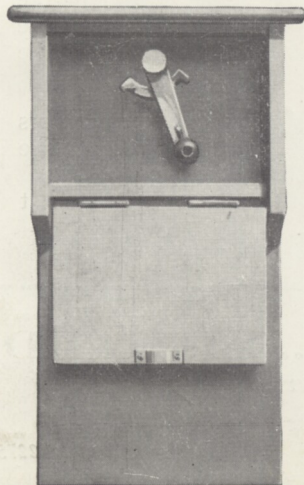
It should be noted that the only circuit broken on the line contactor is that through coils 2 and 3 and the series resistance cuts the current down to about 0.2 amps. There is thus no arc on the line contactor.

If the motorman changes from "current on" to "current off" or vice versa while actually on the line contactor, the point is not thrown and then reversed, and there is no arc at contact 13 as the circuit to the street box coils is not actually made until the trolley wheel has just left the line contactor. In this case, the point will be moved in accordance with the last action of the motorman.

It is obvious that the car can remain with its trolley wheel on the line contactor for an indefinite length of time without the slightest risk of burning out a street box coil as the circuit to the street box is broken at 16 until the trolley wheel has left the line contactor.

PRICES.

Delayed action remote control apparatus	£10 0 0
Delayed action remote control apparatus and line contactor	£15 0 0
Complete apparatus—relay box—line contactor and type "Q" Street Box.	£60 0 0



CURB CONTROL

Groups of points may be controlled by hand from boxes fixed on the curb or at any other suitable position. We have supplied control boxes to manipulate as many as eight switches together with signals.

Signals controlled by the Points.

Indicator contacts can be fitted to the plungers inside the street box, and by connecting signal lights to the indicator contacts the position of the points is shown by the signals.

These indicator contacts can also be used for operating traffic control lights.

Some of the advantages of the "Collins" Controller

1.—The street box is made water-tight by air and mercury seals and not by gaskets. The box may be submerged with the inner lid unfastened, but the air and mercury seals will prevent the water from entering the inner box. As the operating mechanism does not come into contact with water, mud or grit it is unaffected by frost and has a long life. Many machines are still in operation with their original fittings after 25 years service.

2.—In order to inspect the mechanism it is only necessary to unscrew 8 studs holding the inner lid in position. On lifting the inner lid the mechanism is freely exposed to view, and may be lifted bodily from the box.

3.—The point tongue may always be turned with an ordinary point iron.

4.—The street box coils are not in series with the car motors, and take only 4½ amperes.

5.—The point is not re-set in the original position after passage of the car, but remains set in last direction. This saves at least one-half the wear and tear as compared with a controller of the resetting type.

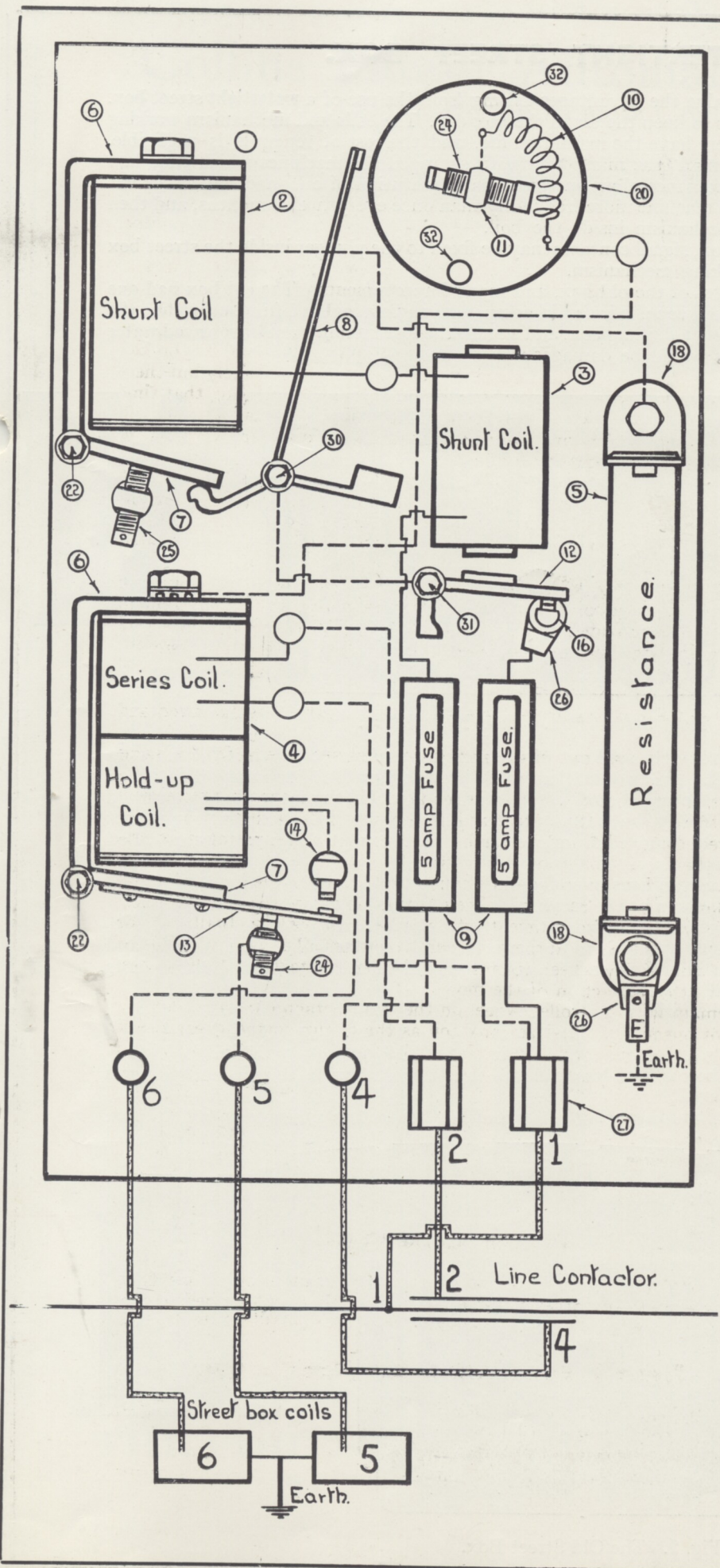
6.—The box only requires opening up once a year for oiling.

7.—The line contactor is smooth running and as only 0.2 ampere is broken on the line contactor there is no arcing.

8.—All parts are standardised and interchangeable.

9.—No adjustment ever required after controller is in operation.

10.—The apparatus is the simplest possible and consists of the fewest possible number of parts. Total weight complete is less than 8 cwt.



THE WATERTIGHT STREET BOX.

It is scarcely possible to over-value the advantages arising from the use of a **watertight** street box. The slight heat from the coils is sufficient to keep the air in the box dry. The coils and mechanism working in a dry, mudless and gritless atmosphere have the maximum life, and the cost of renewals is negligible.

The cost of maintenance is so small that many tramways scrapped the machines which they had previously in use, as the savings in maintenance alone justified the substitution of our machine. It is not desirable to open up the street box of this machine more frequently than once every twelve months, and then only for the purpose of greasing the mechanism inside the box.

Owing to the **watertight** street box, signal contacts may be fixed to the plunger inside the street box for operating light signals, and interlocking mechanism.

The new box has the best features of the old box, and many improvements. The old box had one serious disadvantage as it was necessary to keep the inner lid comparatively level when lifting, otherwise the mercury would be spilled out of the mercury stuffing box, and should the lost mercury not be replaced water would enter the street box and the coils would be damaged.

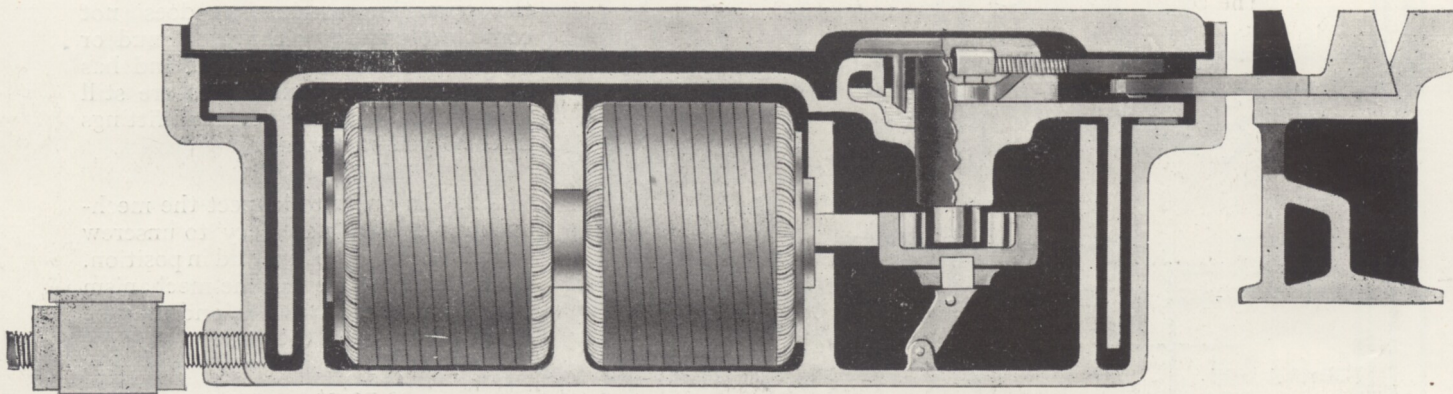


Fig. 1. The New Street Box. Pat. No. 381077.

It is now impossible for the mercury to spill out of the mercury stuffing box even if the inner lid should be turned completely upside down. An examination of the mercury stuffing box in the illustration will shew a cavity completely encircling the upper part of the stuffing box. If the lid is tilted or turned upside down the mercury pours into the cavity, but returns to its normal position as the inner lid resumes its level position. The mercury cannot be removed from the stuffing box except through holes provided for the purpose and sealed with plug caps.

The new box has the following advantages over the old box :—

It is very much stronger, and the area of the seating for the outer lid is twice as great.

The outer cast steel lid is stronger, and will withstand the heaviest road traffic.

The coils are stronger ; the toggle spring is more powerful, and the vertical shaft is shorter and stronger. The magnetic circuit has been improved and the controller will turn the heaviest double points with ease.

The dimensions of the boxes are as follows :—

	Length	Breadth	Depth.
New box type "Q"	32 in.	19¼ in.	11 in.
Old box	32 in.	19¼ in.	13 in.

It will be noticed that the new box is 2 in. less in depth than the old box. The coils and plungers of the old and new boxes are interchangeable.

The new box will operate with the same relay boxes and line contactors as used for the old box.

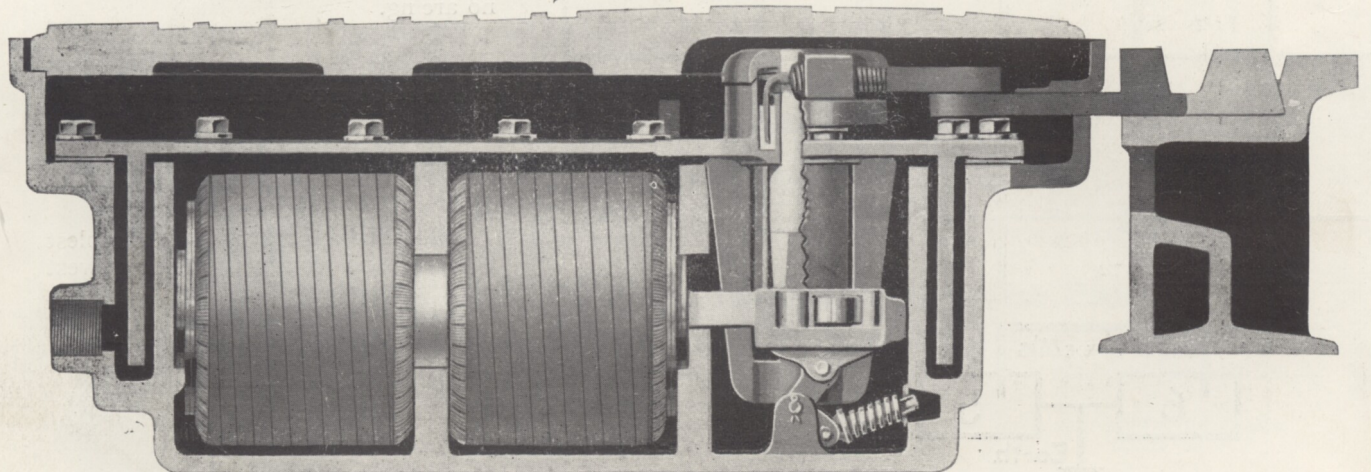


Fig. 2. The Old Street Box.