Sept. 16, 1924. 1,508,743

R. W. CARNAHAN

SIGNAL BOX

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Fig. 1.

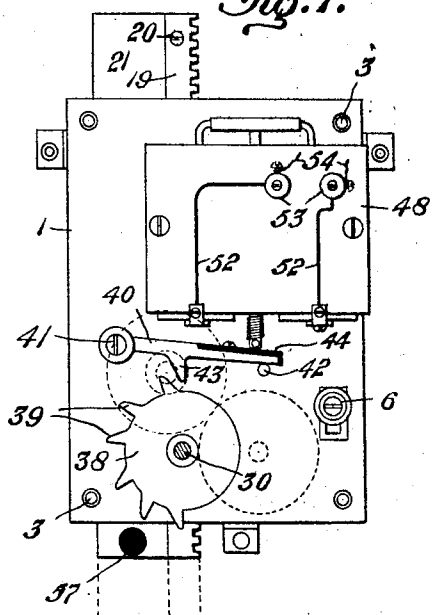


Fig. 2.

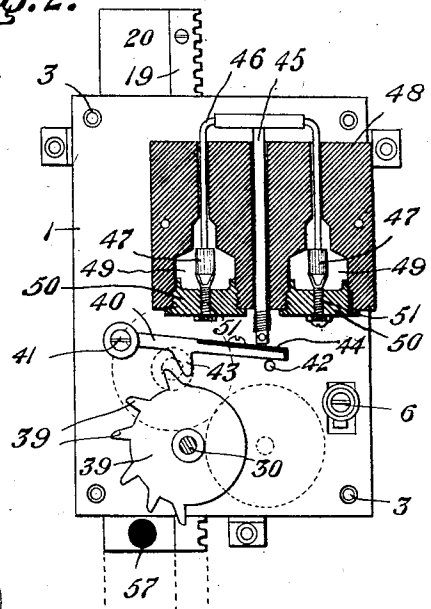
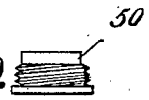


Fig. 20.



Fig. 19.



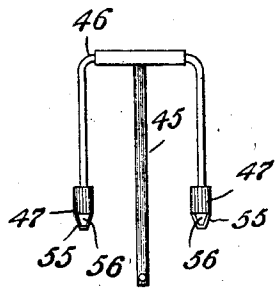


Fig. 18.

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Frease, Merkel, Sayrell & Bond

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R. W. CARNAHAN

SIGNAL BOX

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Fig. 3.

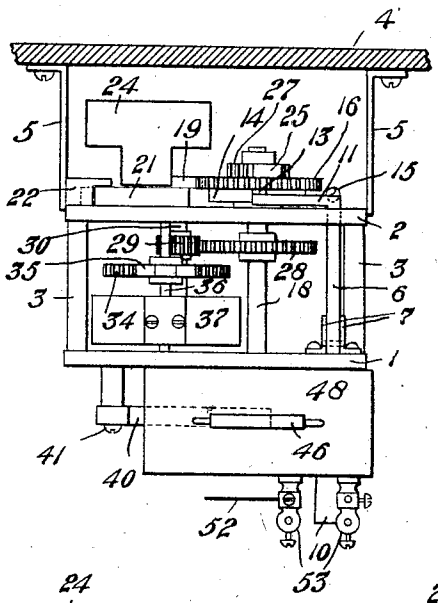
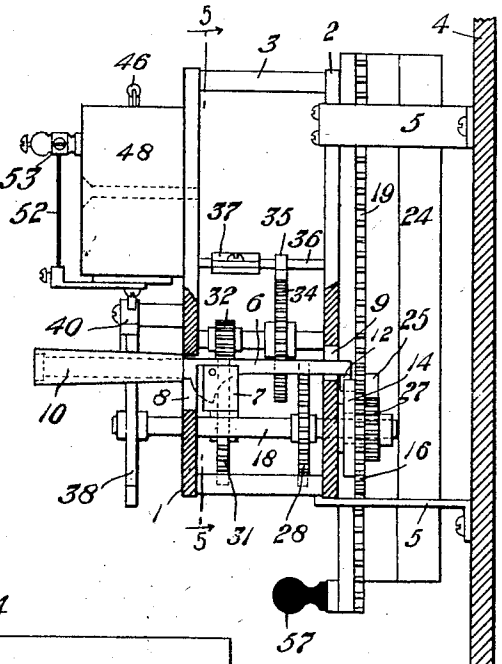


Fig. 4.



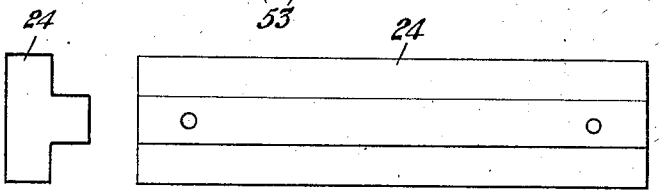


Fig. 9.

Fig. 10.

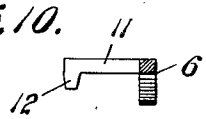


Fig. 13.

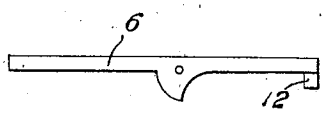


Fig. 11.

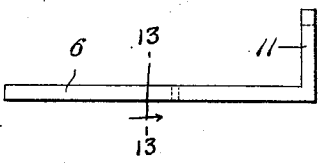


Fig. 12.

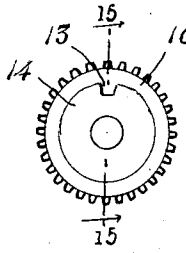


Fig. 14.

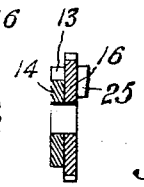


Fig. 15.



Fig. 17.

Fig. 16.

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R. W. CARNAHAN

SIGNAL BOX

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Fig. 5.

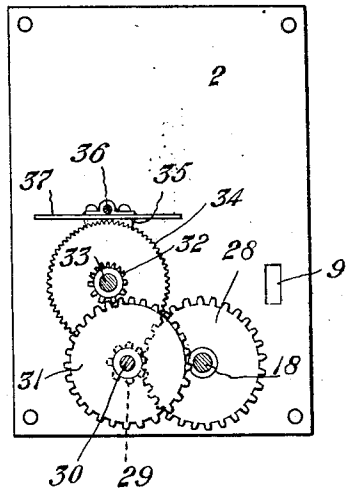
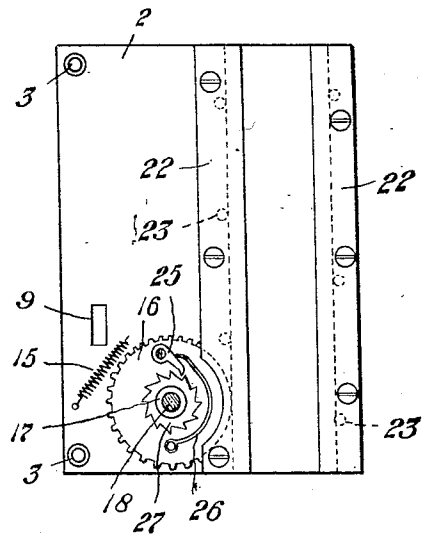


Fig. 6.



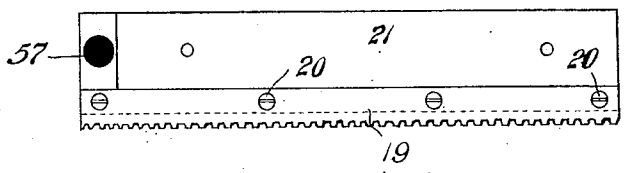


Fig. 7.

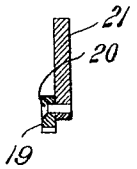


Fig. 8.

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Frease, Merkel, Sayrell & Bond

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Patented Sept. 16, 1924. 1,508,743

UNITED STATES PATENT OFFICE.

RALPH W. CARNAHAN, OF CANTON, OHIO, ASSIGNOR OF ONE-FOURTH TO ORPHA G. SIGLER, OF CLEVELAND, OHIO.

SIGNAL BOX.

Application filed April 15, 1919. Serial No. 290,175.

To all whom it may concern:

Be it known that I, RALPH W. CARNAHAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Signal Box, of which the following is a specification.

The invention relates to signal boxes, such as are used for fire alarms or the like for transmitting electric signals.

The object of the invention is to provide a signal box provided with automatic signal transmitting mechanism which does not depend upon a main spring for its operation.

A further object is the provision of a device of this character in which the motive power is supplied to the main drive gear by means of a sliding rack operated by means of a weight.

A further object is the provision of a make and break device, operated by the signal wheel, in which the contacts operate to make and break the circuit within mercury cups, the contact points being immersed in the mercury when the circuit is closed, preventing corrosion of said contact points.

A further object is the provision of the gearing in combination with the weighted rack so arranged that four complete transmissions of the signal or box number are given with one complete operation of the mechanism.

A still further object is to permit of signal boxes of the character mentioned in which complicated adjustments are eliminated, thus eliminating causes for failure to operate and to register accurately and to allow of their being manufactured economically and to be efficient and durable in operation and construction.

With these objects in view the invention consists in the novel construction and arrangement of parts, hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of construction may be made within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

The invention thus set forth in general terms is illustrated in the accompanying drawings forming part hereof, in which—

Figure 1 is a front view of the signal transmitting mechanism.

Fig. 2 is a view similar to Fig. 1, showing the make and break device in section.

Fig. 3 is a top plan view of the mechanism.

Fig. 4 is a side elevation with parts broken away for the purpose of illustration.

Fig. 5 is a section on line 5—5, Fig. 4, the operating lever being removed.

Fig. 6 is a rear elevation of the back plate of the signal transmitting mechanism.

Fig. 7 is an elevation of the sliding rack.

Fig. 8 is a transverse section through the same.

Fig. 9 is an elevation of the weight.

Fig. 10 is an end view of the same.

Fig. 11 is an elevation of the operating lever.

Fig. 12 is a plan view of the same.

Fig. 13 is a section on the line 13—13, Fig. 12.

Fig. 14 is an elevation of the cam and gear which is connected thereto.

Fig. 15 is a section on the line 15—15, Fig. 14.

Fig. 16 is an elevation of the bushing upon which the cam and gear illustrated in Figs. 14 and 15 are mounted.

Fig. 17, an end view of the same.

Fig. 18 is an elevation of the yoke which carries the movable contacts in the make and break mechanism.

Fig. 19 is an elevation of one of the mercury cups.

Fig. 20 is a plan view of the same.

A practical embodiment of the invention is disclosed in the accompanying drawings, forming a part of this specification in which similar numerals of reference indicate corresponding parts throughout the several views.

The front and rear plates 1 and 2 are connected together, preferably at their corners by means of the posts 3 and comprise the frame work within which the signal transmitting mechanism is suspended, the rear plate being connected to a suitable support 4 by means of brackets 5.

The operating lever 6 is pivoted to a pair of brackets 7 connected to the front plate 1 and extends through suitable slots 8 and 9 in the front and back plates respectively, a handle 10 being provided upon the forward

extremity of said lever which extends some considerable distance beyond the front plate 1. This lever is provided upon its inner extremity, which extends through the slot in the plate 2, with an angular portion 11 having a downwardly depending finger 12, which engages the notch 13 in the notched disk 14. This lever is balanced so that it will normally lie in position to have the finger 12 engage the notch in the notched disk, but as a further precaution a coil spring 15 is attached to the inner end of the lever and to the rear plate 2. The notched disk 14 is connected to the gear 16 by means of a hub or bushing 17 which is rotatably mounted upon the shaft 18, the notched disk 14 and gear 16 being thus arranged to rotate as one integral part upon the shaft 18.

The gear 16 meshes with the rack bar 19, said rack bar being connected as by the screws 20 to the plate 21, which is mounted for vertical reciprocation within the guides 22. For the purpose of allowing the plate 21 to slide readily within the guides 22, rollers 23 are located at intervals in said guides and arranged to contact with the edges of the plate. A weight 24 preferably of the form shown in Figs. 9 and 10 is connected to the rear face of the plate 21 and is the motive power which sets the mechanism into operation when the operating lever is rocked to release the finger 12 from the notch in the notched disk.

A pawl 25 is pivoted upon the rear face of the gear 16 and by means of a spring 26 is normally held in engagement with the ratchet 27, which is fixedly mounted upon the shaft 18. A gear 28 is mounted upon the shaft 18 between the forward and rear plates and engages a pinion 29 mounted upon the signal wheel shaft 30. A gear 31 is fixedly mounted upon the shaft 30 and meshes with a pinion 32 mounted upon the escapement shaft 33, said shaft carrying the escapement wheel 34 whose teeth cooperate with a suitable anchor 35 mounted upon the balance shaft 36, a pallet 37 being mounted upon said shaft. The shaft 30 extends through the front plate and has mounted thereon the signal wheel 38 on the circumferential surface of which are groups of projecting teeth 39 arranged in any desired combination to control the formation of the signal impulses.

The lever 40 is pivoted at 41 upon the front plate and normally rests upon the stop pin 42, the downwardly depending tooth 43 of said lever being arranged to be engaged by the groups of teeth upon the signal wheel to raise and lower the lever as will be later described. For the purpose of insulating the mechanism from the make and break device which is operated through the lever 40, a strip of hard rubber or other suitable insulating material 44 is attached to the upper surface of said lever near its free end which contacts with the vertical rod 45 of the yoke 46, which carries the movable contacts 47 of the make and break device. The rod 45 is slidably mounted through a suitable vertical aperture in the insulated housing 48 within which the make and break device is contained and the arms of the yoke 46 slide within suitable vertical passages in said housing, the movable contacts 47 upon said arms being located in the chambers 49 formed in said housing, cups 50 being threaded into the lower ends of said chambers and provided with the fixed contact points 51 to which the wires 52 are connected, said wires leading to suitable binding posts 53 to which the wires 54 are attached, said last named wires leading to the fire station or other point where the signal is to be given, it being of course understood that a suitable source of electrical power is located in this circuit.

Each of the cups 50 contains mercury and the movable contact members 47 are provided with the tips 55 formed of thin strips of suitable conducting material bent into the form shown in the drawings and connected at their extremities to the cylindrical portions 47 of the contact members, thus leaving the central openings 56 through the tips through which the mercury may flow when the movable contact members are in the normal position as shown in Fig. 2. In operating the mechanism, the handle 10 of the lever 6 is lowered, raising the finger 12 out of the notch in the notched disk 14. Immediately the weight attached to the sliding rack will cause the rack to slide downwardly in its guides, rotating the shaft 18 through the gear 16 and through the train of gears above described, rotating the signal wheel 38, the groups of teeth thereon engaging the tooth 43 upon the lever 40, raising and lowering said lever, which in turn raises and lowers the yoke carrying the movable contact points thus making and breaking the circuit at predetermined intervals and producing the proper signal at the fire station. The train of gears are so proportioned that at the time the sliding rack reaches the position shown in dotted lines shown in Figs. 1 and 2, at which time the notched disk 14 will have made one complete revolution and again reached the finger 12 of the operating lever, stopping the mechanism, the signal wheel 38 will have made four complete revolutions, ringing the number of the box in which it is located, once with each revolution. In order to reset the mechanism the insulated handle 57 upon the sliding plate 21 will be grasped and the plate is slid upwardly to the starting position. It should be noted that as the plate 21 is slid upwardly the rack thereon will cause

the gear 16 to rotate in a reverse direction, and as said gear is loosely mounted upon its shaft the pawl thereon will ride over the ratchet 27. As the plate 21 is moved into the raised or initial position the lever 10 must be raised sufficiently to remove the finger 12 in the notch of the notched disk 14 and as the plate 21 reaches its upward position the disk will have made one complete revolution and the finger 12 will again be seated in the notch therein.

I claim:

1. In a signal transmitter, a make and break device comprising a pair of mercury cups, fixed contact points within said cups, a vertically, slidable yoke extending into said cups, a contact upon each end of said yoke, an open tip upon each of said last named contacts arranged to engage the fixed contacts and to allow the mercury in the cups to flow through said tips, and means for vertically moving said yoke to move said tips into circuit make and break positions.

2. In a signal transmitter, a make and break device comprising a mercury cup, a fixed contact point within said cup, a movable contact point within said cup, an open tip upon said movable contact arranged to engage the fixed contact and to allow the mercury in the cup to flow through said open tip.

3. A signal transmitter comprising a pair of spaced plates, a make and break device upon the forward face of the front plate, a toothed signal wheel journaled in front of the front plate, a lever pivoted upon the front plate and having a tooth engaging the signal wheel, a vertically slidable rod engaging the lever and operatively connected to the make and break device, a chain of gears between the plates operatively connected to the signal wheel, a notched disk mounted upon the rear face of the rear plate, an operating lever pivoted intermediate the plates and having a tooth engaging the notched disk and a handle extending through a slot in the front plate, a gear wheel fixed to the notched disk and a weighted rack bar engaging said gear wheel.

In testimony that I claim the above, I have hereunto subscribed my name.

RALPH W. CARNAHAN.