Oct. 9, 1928. 1,687,183

B. C. SMITH ET AL

TRAFFIC SIGNAL

Filed June 17, 1925 2 Sheets-Sheet 1

Fig. 1.

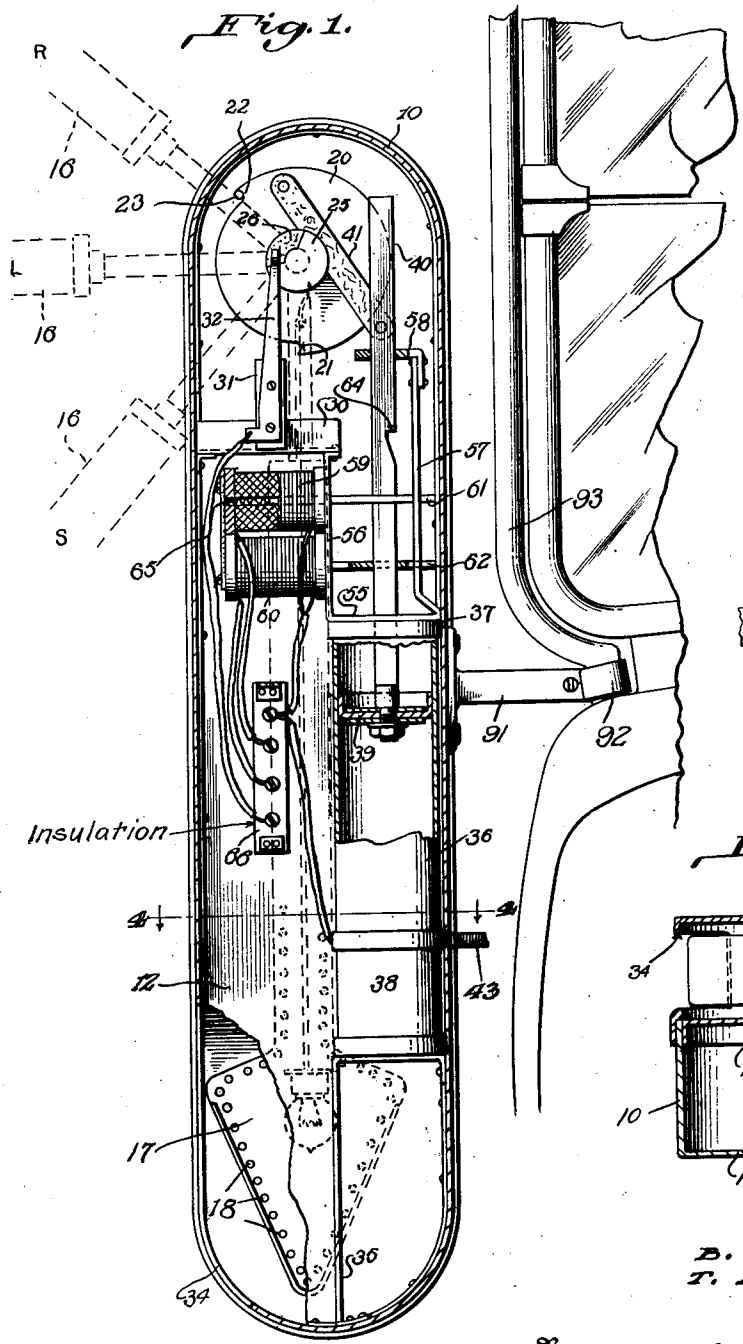


Fig. 5.

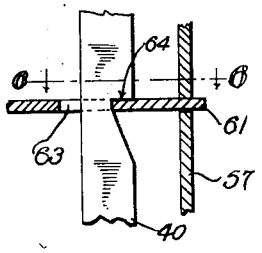


Fig. 6.

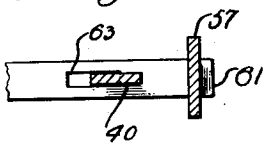
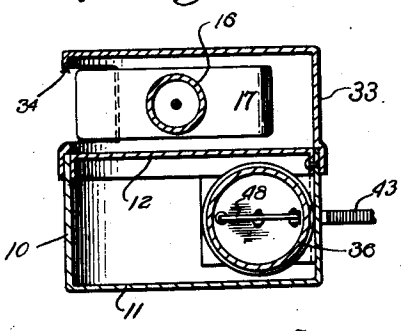


Fig. 4.



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Fig. 2.

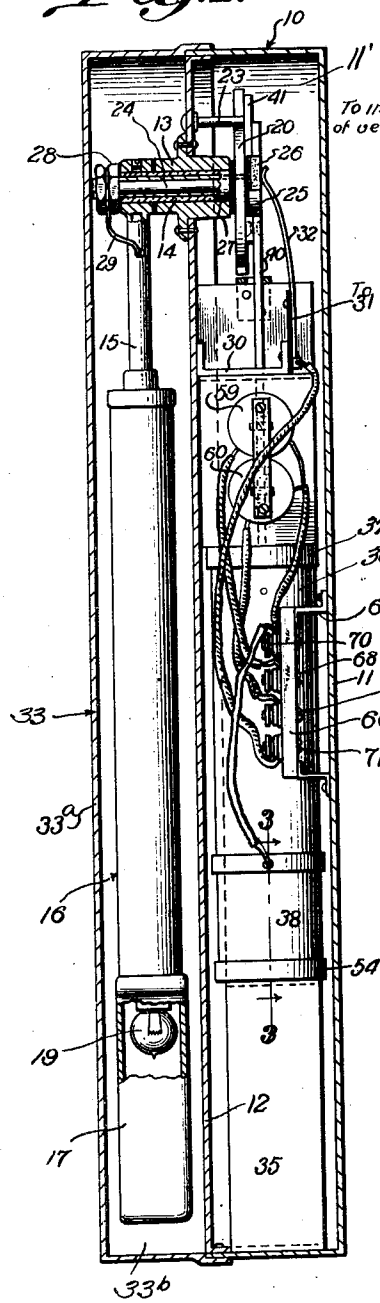


Fig. 3.

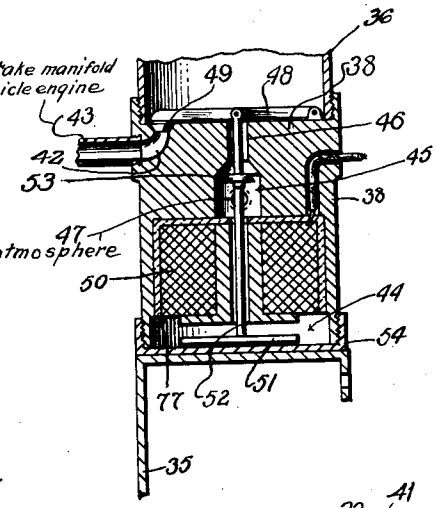
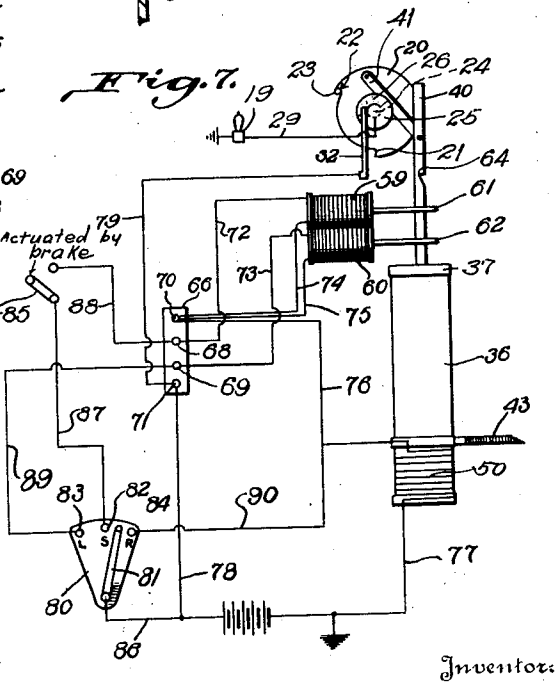


Fig. 7.



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UNITED STATES PATENT OFFICE.

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TRAFFIC SIGNAL.

Application filed June 17, 1925. Serial No. 37,735.

This invention relates to an improved traffic signal of the general character disclosed in our prior Patent, No. 1,531,719, for a like device issued March 31, 1925.

The invention seeks, among other objects, to provide a neat and efficient suction operated signal whereby a driver may readily signal an intention to turn to the right or left, or to stop.

The invention seeks, as a further object, to provide a signal embodying a signal arm movable to different positions for giving the different signals above indicated, and wherein movement of the arm will be controlled electrically.

A still further object, is to provide a signal wherein the electrical control mechanism for the signal arm may be set to select the position to which said arm will be swung for giving the desired signal.

And the invention seeks, as a still further object, to provide a signal wherein the movement of the signal arm under the control of the electrical control mechanism will be entirely automatic.

Other and less salient objects will appear as the description proceeds.

In the accompanying drawings:

Figure 1 is a vertical sectional view through our improved signal.

Figure 2 is a vertical sectional view taken at a right angle to Figure 1.

Figure 3 is a detail sectional view showing the lower head of the suction cylinder and particularly illustrating the suction and air valves.

Figure 4 is a transverse sectional view on the line 4—4 of Figure 1, looking in the direction indicated by the arrows.

Figures 5 and 6 are detail views showing a typical armature of the stop solenoids employed and illustrating the manner in which said armature is formed to engage the piston rod of the suction cylinder for limiting the rod in its movement.

Figure 7 is a diagrammatic view of the circuit connections employed.

In carrying the invention into effect, we employ a flat oblong casing 10 which is preferably rounded at its ends and is provided with an inner side wall 11, marginal walls 11′, and a removable outer side wall 12. Fixed to the outer side wall near the upper end of the casing is a bearing 13 journaling a tubular shaft 14 and fixed to said shaft is the inner tubular stem 15 of a hollow signal arm 16. The arm is enlarged at its free end to form an arrow-shaped head 17, the side walls of which are provided with openings as indicated at 18, and mounted within said head is a lamp 19. Fixed to the inner end of the shaft 14 is a disc 20 cut away at its periphery to form stop shoulders 21 and 22 and projecting from the wall 12 of the casing is a post 23 disposed for engagement by said shoulders. Extending through the shaft 14 is a rod 24 provided at its inner end with a flat head 25 and set into said head is an insulating sector 26. The rod and head are insulated from the shaft 14 and disc 20 by a bushing 27, and screwed on the outer end of the rod are nuts 28. Clamped at one end between said nuts is a wire 29 which is directed through a suitable opening in the stem 15 of the arm 16 and is connected at its opposite end to the socket of the lamp 19, one pole of which socket is electrically grounded to the arm. Abutting the side wall 12 of the casing 11 beneath the disc 20 is a channel shaped bracket plate 30 carrying an upstanding insulating plate 31, and fixed to said insulating plate is a spring contact 32 disposed to coact at its free end with the head 25 of the rod 24 for supplying current to the lamp 20. When the arm is swung downwardly to its normal vertical position, as shown in Figure 1, the free end of the contact rests on the insulating sector 26 so that the lamp is extinguished. Fitting upon the casing 10 is a hood or cover 33 for the arm 16. This hood includes an outer wall 33^a and marginal walls 33^b which fit about the marginal wall 11′ of the casing and, as best seen in Figure 4, the marginal wall of this cover is provided in its forward portion with a longitudinal slot 34 through which the arm may freely swing.

Secured within the lower portion of the casing 10 is a bracket 35 and mounted upon said bracket is a vertically disposed suction cylinder 36 closed at its upper end by a head 37 and at its lower end by an elongated head 38 resting on said bracket. Reciprocable in said cylinder is a piston 39 having a flat piston rod 40 slidable through the head 37 of the cylinder and connecting the upper end portion of said rod with the disc 20 is a preferably fiber link 41 notched at its adjacent edge to coact with the head 25 of the rod 24. Thus, when the piston is shifted

downwardly, the signal arm 16 will be swung upwardly by said link. As shown in detail in Figure 3, the head 38 of the cylinder is provided at one side thereof with a passage 42 and connected with said passage is a pipe 43 leading to the intake manifold of the vehicle engine or otherwise in communication with the intake suction of the vehicle engine.

At its lower end, the head 38 of the cylinder is cored out to form a chamber 44, at the upper end of which is a smaller axially disposed valve chamber 45 from which leads a passage 46 opening through the upper end of the head to communicate with the cylinder, and extending from the valve chamber 45 laterally through the head is an air passage 47 open to the atmosphere. Pivoted upon the upper end of the head is a lever 48 provided at its free end with a valve 49 normally seated in the inner end of the passage 42, closing said passage, and fixed in the chamber 38 of the head is a solenoid 50 having an armature 51, the stem 52 of which extends upwardly through the valve chamber 45 and passage 46 and is pivotally connected to the lever 48. Mounted on said stem is a valve 53 movable into the lower end of the passage 46 for closing said passage. As will be observed, the head 38 is screwed on the lower end of the cylinder 36 so that said head may be removed, and closing the chamber 44 of the head is a cap 54 screwed on the lower end of the head.

As will now be seen in view of the foregoing, when the solenoid 50 is energized and the armature 51 is shifted upwardly, the lever 48 will be swung upwardly for opening the valve 49 while the valve 53 will be shifted to closed position. Thus, the passage 46 will be closed to the atmosphere while engine suction will be admitted through the pipe 43 to the cylinder 36 for drawing the piston 39 downwardly and swinging the signal arm 16 upwardly. Conversely, upon the de-energization of the solenoid, the armature 51 will gravitate downwardly so that the valve 49 will be closed while the valve 53 will be opened to admit air to the lower end of the cylinder through the passage 47, valve chamber 45, and passage 46. Accordingly, the piston will be permitted to return upwardly within the cylinder so that the signal arm 16 will gravitate downwardly and return to its normal position within the cover 33.

Fixed to the head 37 of the cylinder 36 is a substantially U-shaped bracket 55 having an upstanding arm 56 secured at its upper end to the bracket plate 30, and a parallel arm 57 to the upper end of which is fixed a guide plate 58 slidably receiving the piston rod 40 therethrough. As shown in Figure 2, the opening in the guide plate which accommodates the piston rod is of a width to also freely receive the link 41. Fixed to the arm 56 of the bracket are stop solenoids 59 and 60 having flat armatures 61 and 62 slidable through the arms 56 and 57 of the bracket and provided, as shown in detail in Figures 5 and 6, with slots 63 freely accommodating the piston rod 40. Formed on the piston rod for selective engagement with said armatures is a shoulder 64 and mounted within the central openings of the solenoids are springs 65 pressing the armatures forwardly to inactive position. Thus, when the solenoid 59 is energized, the resultant pull on the armature 61 thereof will tend to retract said armature so that the forward end wall of the slot 63 in the armature will be held against the piston rod. Accordingly, as the piston 39 descends and the signal arm 16 is swung upwardly, the armature will, as shown in Figure 6, be shifted into engagement with the shoulder 64 of the piston rod for limiting the piston in its downward movement when, as shown in dotted lines at the left of Figure 1, the signal arm will be disposed in a downwardly inclined position for signaling an intention to stop. Similarly, when the solenoid 60 is energized, the armature 62 thereof will be subjected to retractive pull so that as the piston 39 descends, said armature will be shifted to engage the shoulder 64 of the piston rod for limiting the piston in its downward movement when the signal arm 16 will, as also shown in dotted lines at the left of Figure 1, be disposed in horizontal position for signaling an intention to turn to the left. The shoulder 21 is provided on the disc 20 to engage the post 23 for limiting the signal arm in upwardly inclined position, as further shown in dotted lines in Figure 1, and signaling an intention to turn to the right, while the shoulder 22 of the disc is disposed to engage said post for limiting the signal arm when swung downwardly into the cover 33 to normal position.

Mounted within the casing 10 is a junction strip 66 of suitable insulating material. This strip is supported by brackets 67 and mounted on said strip are binding posts 68, 69, 70 and 71. Circuit connections are made through these binding posts and in Figure 7 of the drawings, we have diagrammatically illustrated the circuit connections employed. Leading from the binding posts 68 and 69 to corresponding terminals of the solenoids 59 and 60 are circuit wires 72 and 73, and connecting the opposite corresponding terminals of said solenoids with the binding post 70 are wires 74 and 75. Leading from the binding post 70 to one terminal of the solenoid 50 is a wire 76 and, as shown in Figure 3 and diagrammatically illustrated in Figure 7, the other terminal of the solenoid 50 is electrically grounded or connected with the battery by a wire 77. Connected with the battery or other source of electrical en-

ergy upon the vehicle is a wire 78 attached to the binding post 71, and leading from said binding post is a wire 79 connected to the spring contact 32 so that current will be constantly supplied to said contact. In conjunction with the signal, we employ an appropriate switch 80 having a switch lever 81 and provided with terminals 82, 83 and 84 selectively engageable by said lever. We also employ an appropriate switch 85 which is actuated by the brake pedal of the vehicle. The lever 81 of the switch 80 is electrically connected with the vehicle battery by a wire 86 and leading from the terminal 82 of said switch to one terminal of the switch 85 is a wire 87. Leading from the other terminal of the latter switch to the binding post 68 is a wire 88. Leading from the terminal 83 of the switch 80 to the binding post 69 is a wire 89 and connecting the terminal 84 of said switch with the wire 76 is a wire 90. As shown, one side of the battery is electrically grounded in common with the grounded terminal of the solenoid 50.

Under normal circumstances, the lever 81 of the switch 80 will be disposed to engage the switch terminal 82 so that when the vehicle brake is applied and the switch 85 is closed, a circuit will be closed from the battery through the wire 86, the switch lever 81, the wire 87 and switch 85, thence through the wire 88 and wire 72, to the solenoid 59, thence through the wire 74 and the wire 76 to the solenoid 50, and thence through the wire 77 to ground or battery. Accordingly, as previously described, the solenoid 50 will be energized and the suction valve 49 opened while the air valve 53 will be closed. The piston 38 will, therefore, be shifted downwardly for swinging the signal arm 16 upwardly, as also previously described, while the solenoid 59 will be coincidently energized so that its armature 61 will be caused to engage the shoulder 64 of the piston rod 40, as also previously described, for limiting the piston in its downward movement and stopping the signal arm in downwardly inclined position for signaling an intention to stop. To signal an intention to turn to the left, the switch lever 81 is moved into engagement with the switch terminal 83. Current will then flow from the battery through the wire 86, the switch lever 81, and wire 89, thence through the wire 73 to the solenoid 60, thence through the wire 75, the wire 76 to the solenoid 50, and thence through the wire 77 to ground. Accordingly, the suction valve 49 will be opened and the air valve 53 closed so that the piston 39 will be caused to shift downwardly while the signal arm 16 will be limited in its upward swinging movement by the engagement of the armature 62 of the solenoid 60 with the shoulder 64 of the piston rod. Thus, the signal arm will be brought to horizontal position for giving the left turn signal. To signal an intention to turn to the right, the switch lever 81 is moved to engage the terminal 84 of the switch 80. Current will then flow from the battery through the wire 86 and switch lever 81, thence through the wires 90 and 76 to the solenoid 50, and thence through the wire 77 to ground. Accordingly, the valve 49 will be opened while the valve 53 will be closed, as before, so that the signal arm 16 will be swung up to upwardly inclined position and limited by the engagement of the shoulder 21 of the disc 20 with the post 23 for giving the right turn signal. Each time the arm is swung up, the insulating sector 26 of the head 25 of the rod 24 will be shifted from beneath the free end of the contact 32, when the contact will engage said head. Accordingly, current will then flow from the battery through the wires 78 and 79 to said contact, thence through the head 25 and rod 24 to the wire 29, and thence through the latter wire and through the lamp 19 to ground. Thus, the lamp will be energized coincident with the movement of the arm.

The signal may be mounted upon the vehicle in any appropriate location. In the present instance, we have shown the signal casing 10 as provided with a bracket 91 having a clamp 92 engaged with the left windshield post 93 of the vehicle. The signal will thus be supported in a conspicuous position at the adjacent side of the vehicle so that the signal may be readily seen both from the front and rear of the vehicle.

Having thus described the invention, what we claim is:

1. A traffic signal comprising a casing open at one side, a closure for the open side of said casing, a bearing secured to said closure adjacent its upper end and extending through the closure with a portion disposed within the casing and a portion projecting from the outer face of the closure, a hood fitted upon the side portion of the casing closed by said closure and projecting therefrom and formed with a side opening, a shaft rotatable in said bearing and projecting from the inner and outer ends thereof, a signal arm carried by the outer end portion of said shaft and extending radially therefrom and swung into and out of the hood through the side opening formed therein when the shaft is rotated, the weight of the signal arm normally retaining it within the hood, operating means in said casing connected with the inner end portion of said shaft to rotate the shaft and swing said signal arm out of the hood to a set position, and latch means in said casing to engage a portion of said operating means and releasably retain the arm in a set position.

2. A traffic signal comprising a casing open at one side, a closure for the open side

of said casing, a bearing secured to said closure adjacent its upper end and extending through the closure with a portion disposed within the casing and a portion projecting from the outer face of the closure, a hood fitted upon the side portion of the casing closed by said closure and projecting therefrom and formed with a side opening, a shaft rotatable in said bearing and projecting from the inner and outer ends thereof, a signal arm carried by the outer end portion of said shaft and extending radially therefrom and swung into and out of the hood through the side opening formed therein when the shaft is rotated, the weight of the signal arm normally retaining it within the hood, a disk secured upon the inner end portion of said shaft, a cylinder in said casing extending vertically therein, a piston in said cylinder having a rod extending through the upper end thereof, a link connecting the piston rod with said disk to impart rotary movement to said shaft and swing the signal arm upwardly out of said hood to a set position when the piston is moved in one direction, and a latch in said casing engageable with said piston rod to releasably retain the arm in a set position.

3. A traffic signal comprising a casing having an inner wall and marginal walls extending therefrom, an outer wall secured to said marginal walls to close the outer end of the casing, a hood having an outer wall and marginal walls extending therefrom and fitting about the marginal walls of said casing whereby the hood projects from the outer end of the casing, said hood having a portion of its marginal walls removed to provide a passage, a bearing carried by the outer wall of said casing and having a bore communicating with the interior of the casing, a shaft journaled in said bearing with its end portions projecting therefrom into the hood and casing, a signal arm connected with the outer end portion of said shaft and normally suspended therefrom within the hood, actuating means in said casing connected with the inner end portion of said shaft to impart rotary motion to the shaft and swing said signal arm outwardly through the passage in the marginal wall of the hood to a set position, and a latch to releasably retain the signal arm in a set position.

4. A traffic signal comprising a casing having an inner wall and marginal walls extending therefrom, an outer wall secured to said marginal walls to close the outer end of the casing, a hood having an outer wall and marginal walls extending therefrom and fitting about the marginal walls of said casing whereby the hood projects from the outer end of the casing, said hood having a portion of its marginal walls removed to provide a passage, a bearing carried by the outer wall of said casing and having a bore communicating with the interior of the casing, a shaft journaled in said bearing with its end portions projecting therefrom into the hood and casing, a signal arm connected with the outer end portion of said shaft and normally suspended therefrom within the hood, a disk secured upon the inner end portion of said shaft, a cylinder in said casing, a piston in said cylinder having a rod extending through one end of the cylinder, a link pivotally connected with the piston rod and said disk whereby rotary motion may be imparted to said shaft and the signal arm swung out of said hood to a set position when the piston is moved in one direction, and a latch engageable with said piston rod to releasably retain the signal arm in a set position.

5. A traffic signal comprising a vertical casing, a bearing carried by a side wall of said casing adjacent the upper end thereof and having a bore communicating with the casing, a shaft journaled in said bearing with one end projecting from the outer end of the bearing and its other end portion projecting from the inner end of the bearing and disposed within the casing, a signal arm carried by the outer end portion of said shaft and normally depending therefrom, a disk carried by the inner end portion of said casing, a link pivoted to said disk, a cylinder disposed vertically in said casing, a piston in said cylinder, a piston rod extending from said piston through the upper end of said cylinder and pivotally connected with said link, a latch for engaging said piston rod to releasably retain the signal arm in a set position, and means for controlling passage of fluid into and out of the cylinder.

6. A traffic signal comprising a vertical casing, a bearing carried by a side wall of said casing adjacent the upper end thereof and having a bore communicating with the casing, a shaft journaled in said bearing with one end projecting from the outer end of the bearing and its other end portion projecting from the inner end of the bearing and disposed within the casing, a signal arm carried by the outer end portion of said shaft and normally depending therefrom, a disk carried by the inner end portion of said casing, a link pivoted to said disk, a cylinder disposed vertically in said casing, a piston in said cylinder, a piston rod extending from said piston through the upper end of said cylinder and pivotally connected with said link, a latch for engaging said piston rod to releasably retain the signal arm in a set position, a valve body connected with the lower end of said cylinder and having a fluid inlet port and a fluid outlet port, an arm pivoted to said valve body with said cylinder and carrying a valve head to close the inlet port,

an electro-magnet carried by the lower end portion of said valve body, a stem connected to said arm and slidably passed through the outlet port and electro-magnet, an armature carried by said stem, and a valve head carried by said stem and moved into closing relation to the outlet port when the valve stem is moved upwardly by said magnet and the valve arm moved upwardly to open the inlet port.

In testimony whereof we affix our signatures.

BERT C. SMITH. [L. S.]
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