Nov. 21, 1939. H. R. TRUBSHAW 2,180,749

SEMAPHORE SIGNAL

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FIG. 1

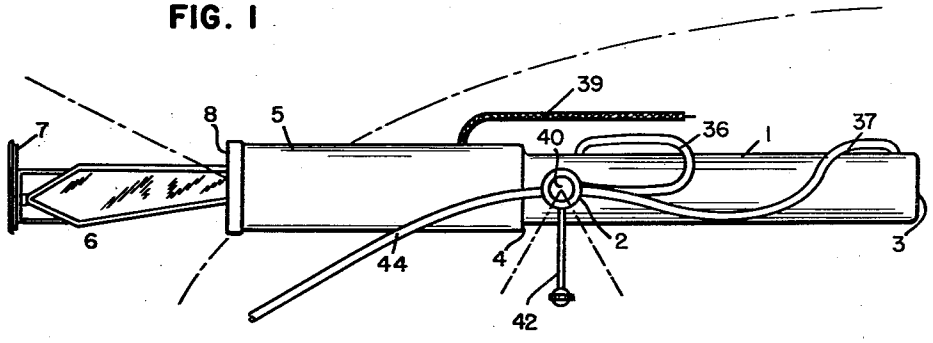


FIG. 6

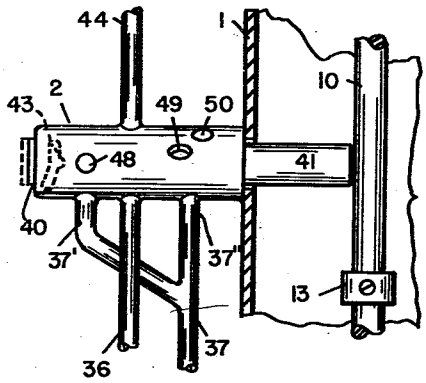
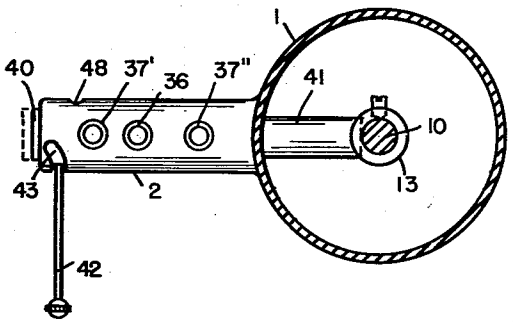


FIG. 7



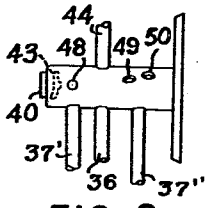


FIG. 8

FIG. 10.

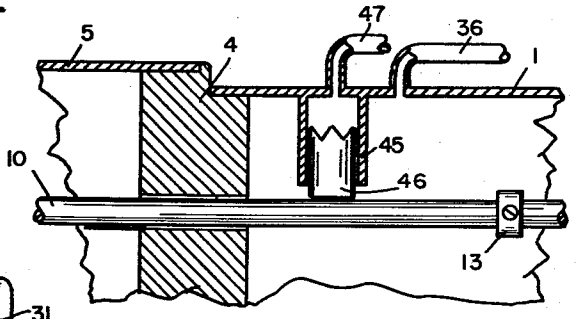
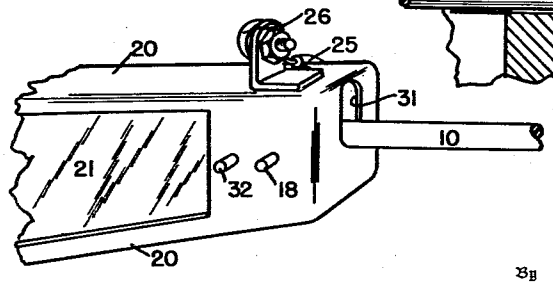


FIG. 9



Herbert R. Trubshaw
Inventor

By Herbert E. Smith

Attorney

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SEMAPHORE SIGNAL

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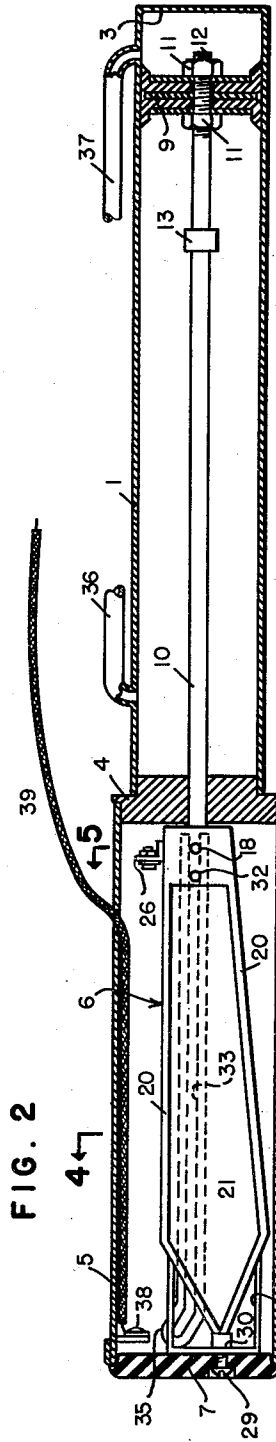


FIG. 2

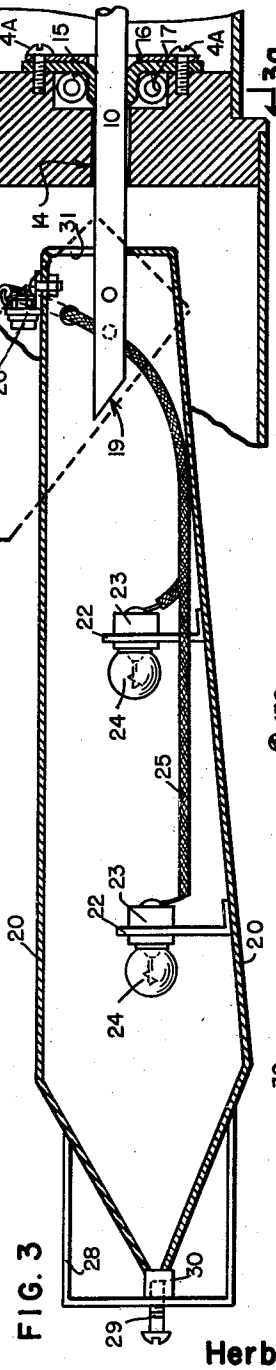


FIG. 3

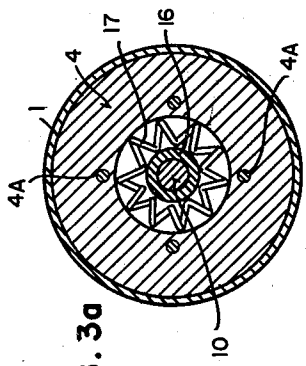


FIG. 3a

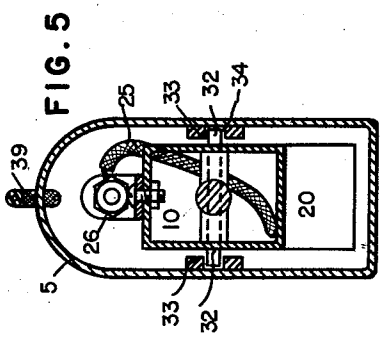


FIG. 5

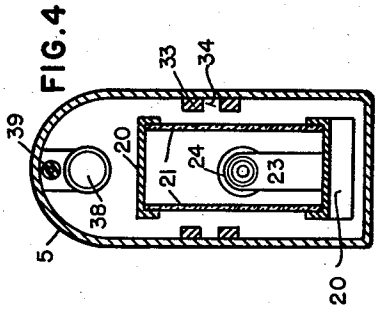


FIG. 4

Herbert R. Trubshaw Inventor

By Herbert E. Smith

Attorney

Patented Nov. 21, 1939 2,180,749

UNITED STATES PATENT OFFICE

2,180,749

SEMAPHORE SIGNAL

Herbert R. Trubshaw, Spokane, Wash.

Application September 6, 1938, Serial No. 228,490

6 Claims. (Cl. 116—39)

My invention relates to an improved semaphore signal with operating control means therefor.

This invention has for its main object the provision of a semaphore signal operated by a vacuum which may be simply and efficiently controlled manually.

It is another object of my invention to provide a semaphore which may be permanently attached within the top of a vehicle and which may also be attached to other exterior portions of the vehicle.

A further object of my invention has been the provision of a semaphore signal which may be extended horizontally to give one customary signal, or to be extended obliquely to give another signal, the choice of the signals displayed being controlled manually by the operator of a vehicle.

A still further object of my invention is the provision of a signal device operated by suction means available through the operation of an internal combustion engine or by other source of a suction supply.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is an elevational view of my signal apparatus,

Figure 2 is a longitudinal, vertical, sectional view of the semaphore signal device of my invention, detailing the general relation of parts,

Figure 3 is a vertical, sectional view through the semaphore signalling arm of my device,

Figure 3*a* is a vertical, cross sectional view taken on lines 3*a*—3*a* of Figure 3,

Figures 4 and 5 are vertical, cross sectional views taken on lines 4—4 and 5—5 respectively of Figure 2.

Figure 6 is a top plan view of the valve means used in connection with my signal,

Figure 7 is an elevational view, with portions in cross section for convenience of illustration,

Figure 8 is a perspective view of the inner end of the semaphore arm,

Figure 9 is a view detailing a modified form of my invention and Figure 10 illustrates the valve used in connection with this modified form.

As best seen in Figure 1 my signal apparatus consists of a vacuum cylinder 1 having attached thereto an operating valve 2. The cylinder head 3 closes one end of the cylinder 1 and a removable cylinder head 4 is provided to close the cylinder at the opposite end. A semaphore housing 5 is supported from the cylinder head 4 and a semaphore signal arm 6 is retained within the housing. A closure plate 7 of yieldable rubber is supported on the end of the semaphore and engages the open end 8 of the housing 5 to effectively seal the semaphore within the housing during such time as the device is inoperative.

Referring now to Figure 2, where in cross section the principal parts of the device are shown, within the vacuum cylinder 1 is provided a piston 9 secured to a piston rod 10 by means of nuts 11, 11 engaging a threaded end 12 of the piston rod. The piston rod 10 has secured thereto an adjustable collar 13. The cylinder head 4 provides a bearing surface 14 for the piston rod and a stuffing box or gland 15 which consists of a leather 16 maintained in close engagement around the rod 10 by means of the coil spring 17. The latter mechanism is attached to the head 4 by screws 4*a*. The semaphore 6 is pivotally supported upon the piston rod 10 by means of the pivot pin 18. The piston rod 10 is cut obliquely at 19 to provide a stop for the signal arm when it is swung in an upward oblique angle. The semaphore is constructed of a metal frame member 20 with transparent and colored side plates 21 secured therein. Upon socket support members 22 I provide lamp sockets 23 for the reception of light bulbs 24 used to illuminate the semaphore when a signal is given. The bulbs 24 are grounded in the usual manner.

A conductor wire 25 is attached to each of the sockets 23 and led to an L-shaped contact 26 supported upon and insulated from the rear upper surface of the semaphore. At the outer end of the semaphore and securely attached thereto is a U-shaped bracket 28 which carries a yieldable closure plate 7 firmly secured in place by means of a screw 29 threaded into a nut 30 formed as a part of the U-shaped bracket.

Referring now to Figure 3, the piston rod 10 is shown as entering the rear of the semaphore housing through an elongated slot 31 where it is retained by means of the pivot pin 18. A pair of guide stud pins 32 is provided and securely mounted upon the housing of the semaphore to travel in the slots 34 of the guides 33.

At its outer end the guide 33 and the slot 34 are upturned as at 35 for purposes that will later be described.

Suction lines 36 and 37 are provided at either end of the vacuum cylinder 1. An insulated contact 38 depends from the interior of the semaphore housing 5 and a conductor wire 39 is led

therefrom to a suitable source of electrical energy. As best seen in Figures 6 and 7 a ported valve **2** is shown provided with a valve core **40** rotatably and slidably supported within the valve casing. At its inner end the valve core **40** is provided with a valve stem **41**. A valve lever **42** is connected to the core and operates in a bayonet slot **43** in the casing **2**. The vacuum line **44** is run from the casing **2** to a suitable source of suction and the tube **36** also is led to and securely engages the casing **2**. The tube **37** branches into a Y adjacent the valve and the two arms **37'** and **37''** of the Y also engage and are supported from the casing **2**.

In Figure 9 a slightly modified form of my invention is disclosed, wherein I provide, within the cylinder **1**, an auxiliary vacuum cylinder **45** having an interior plug piston **46**. A suction line **47** is also shown communicating to the interior of the cylinder **45**. Suitable intake and exhaust ports **48**, **49**, and **50** are provided in the cylinder casing **2**.

Method of operation

The device of my invention is constructed so that it may be readily installed or built into that portion of an automobile body over the head of the driver. By suitable attaching clamps, not shown in the drawings, the device will fit between the ceiling of the vehicle and the outer curved surface and a certain portion of the housing **5** will extend outwardly. It is contemplated that in some instances the housing **5** and the closure plate **7** will be shaped so as to conform to the general contour of the body top.

When the device has been properly placed in a vehicle body a tube **44** is connected to a suitable source of suction as for example the manifold of an internal combustion engine. The conductor wire **39** is led to a convenient electrical outlet or to the storage battery of the vehicle. The valve lever **42** will extend downwardly through a slot or slit in the ceiling upholstery of the automobile, so that it will be readily accessible to the driver when he desires to make a signal by extending the semaphore outwardly in a horizontal position or upwardly at an oblique angle.

When it is desired to make the "left" signal the lever **42** is tripped to the left, as in Figure 1, at which time the suction line **44** is connected through ports in the valve to the suction line **36** at the left hand end of the cylinder. As the air in the cylinder is drawn outwardly through line **36** the piston is drawn to the left and through its connection by means of the piston rod **10** to the semaphore **6**, the semaphore slides outwardly on a horizontal plane. The guide pins **32** are engaged in the slotted guides **33** and a suitable bearing surface to carry the weight of the semaphore is thereby provided.

As the piston **9** and the piston rod **10** travel outwardly or to the left and approach the full stroke, the collar **13** abuts the valve stem **41** and the travel of the piston and the semaphore ceases. At approximately the same moment that the semaphore stops in its travel the contacts **26** and **38** engage each other and a circuit from a ground connection and through the light bulbs **24** is completed and the bulbs light, thus illuminating the semaphore and making it readily discernible to other drivers and to pedestrians.

To permit the piston **9** to travel to the left it is necessary that air be admitted to the right hand end of the cylinder and this is accomplished by allowing air to enter through the port **49** which is registered with the tube **37''** and this air travelling through the line **37** completely fills the cylinder so that no vacuum is created which would retard the piston. When the operator wishes to return the semaphore to its normal inoperative position the lever **42** is returned from the left oblique position to the normal vertical position shown in Figure 1. Suction from line **44** which is registered with line **37** through the ports of the valve now draws the air out of the right hand section of the cylinder and the piston **9** is urged to the right. To prevent a vacuum forming on the left hand end portion of the cylinder under these conditions the line **36** is registered with the port **49** and air from the outside is drawn into the cylinder.

At such time as the operator wishes to indicate a "right" signal, the valve lever **42** is swung to the right oblique position indicated by the dotted line in Figure 1. Under these circumstances the suction on line **44** operates in a similar manner as for the left hand turn through the registry of ports within the valve. However, because the bayonet slot **43** has one end upturned, the valve lever **42** not only swings to the right, but is also guided in the slot **43** so as to withdraw the core **40** and the valve stem **41** a short distance.

The movement of the valve stem **41** is sufficient to allow the collar **13** on the piston rod **10** to pass that point and the semaphore is urged a slight distance further outwardly. As for a left hand turn the contacts **26** and **38** engage and an electrical circuit is completed whereby the light bulb **24** will be lighted. The guide pins **32** travelling in the slotted guides **33** reach the upturned end **34** where they travel upwardly, the semaphore pivoting upon the pin **18**. Through the action of pins **32** and the slots **34** the semaphore is raised to the upper oblique angle indicated by a dotted line in Figure 1. As before, when it is desired to return the signal to its normal inoperative position the operator swings the valve lever **42** to the vertical position and suction returns the piston to the right, withdrawing the semaphore within the housing **5**. The closure plate **7** mounted upon the outer end of the semaphore arm is drawn into engagement with the open end of the housing **5** to effectively seal the semaphore within the housing from moisture, dirt, and the like.

Under some circumstances it is contemplated that the device be mounted upon the rear of a motor vehicle or of a trailer, as is used in heavy trucking operations. Remote control, therefore, would be imperative and Figure 9 illustrates the manner in which such remote control could be obtained.

Within the cylinder **1**, I have provided the auxiliary cylinder **45** and piston **46**. The valve **2** would normally be mounted somewhere adjacent the steering wheel or dashboard of the vehicle. The line **37''** is to be connected to line **37**, the line **36** communicates with the lefthand space in the cylinder **1**, and the line **37'** is to be connected to the line **47** and the cylinder **45**.

In this instance when a left hand signal is being given, the collar **13** engages the plug piston **46** and the semaphore is stopped in a horizontal manner as described in the preferred embodiment of my invention. When a right hand signal is to be given and the signal lever has been moved to the right oblique angle, suction on line **36** draws the piston to the left and suction on line **47** lifts the plug piston **46**, permitting the collar **13** to pass that point and for the guide pins **32**

to travel upwardly in the upturned end of the slotted guides 33.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a direction indicator having selective positions and including a vacuum cylinder, a slidable piston in the cylinder, a rod for said piston, and an illuminated indicating arm pivotally connected with said rod, the combination with manually operable valve means having vacuum connections with said cylinder, of a collar on said rod within the cylinder, stop means in the path of movement of said collar to limit movement of said rod whereby the arm may be slidably extended to one indicating position upon actuation of said valve means in one direction, and means operable upon actuation of said valve means in another direction for withdrawing said stop means from the path of movement of said collar whereby the arm may be swung on its pivot to another indicating position.

2. In a direction indicator having selective positions and including a vacuum cylinder, a slidable piston in the cylinder, a rod for said piston, and an illuminated indicating arm pivotally connected with said rod, the combination with manually operable valve means having vacuum connections with said cylinder, of an adjustable collar on said rod within the cylinder, stop means in the path of movement of said collar to limit the movement of said rod whereby the arm may be slidably extended to one indicating position upon actuation of said valve means in one direction, and means operable upon actuation of said valve means in another direction for withdrawing said stop means from the path of movement of said collar whereby the arm may be swung on its pivot to another indicating position.

3. In a direction indicator having selective positions and including a vacuum cylinder, a slidable piston in the cylinder, a rod for said piston, and an illuminated indicating arm pivotally connected with said rod, the combination with manually operable valve means having vacuum connections with said cylinder, of a collar on said rod within the cylinder, stop means under vacuum control in the path of movement of said collar to limit the movement of said rod whereby the arm may be slidably extended to one indicating position upon actuation of said valve means in one direction, and means operable upon actuation of said valve means in another direction for the withdrawal of said stop means from the path of movement of said collar whereby the arm may be swung on its pivot to another indicating position.

4. In a direction indicator having selective positions and including a vacuum cylinder, a slidable piston in the cylinder, a rod for the piston, and an illuminated indicating arm pivotally connected with said rod, the combination with manually operable valve means having vacuum connections with said cylinder, of a collar on said rod within the cylinder, stop means under manual control in the path of movement of said collar whereby the arm may be slidably extended upon actuation of said valve means in one direction to one indicating position, and means operable upon actuation of said valve means in another direction for withdrawing said stop means from the path of movement of said collar whereby the arm may be swung on its pivot to another indicating position.

5. In a direction indicator having selective positions and including a vacuum cylinder, a slidable piston in the cylinder, a rod for the piston, and an illuminated indicating arm pivotally connected with said rod, the combination with manually operable, cylindrical valve means having vacuum connections with said cylinder, of a collar on said rod within the cylinder, stop means including an extension lug on the valve in the path of movement of said collar adapted upon actuation of said valve means in one direction, to limit movement of said rod whereby the arm may be slidably extended to one indicating position, and means operable upon actuation of said valve means in another direction for withdrawing said lug from the path of movement of said collar whereby the arm may be swung on its pivot to another indicating position.

6. In a direction indicator having selective positions and including a vacuum cylinder, a slidable piston in the cylinder, a rod for the piston, and an illuminated indicating arm pivotally connected with said rod, the combination with manually operable valve means having vacuum connections with said cylinder, of a collar on said rod within the cylinder, an auxiliary vacuum chamber and a core therein, said core comprising a stop pin and located in the path of movement of said collar to limit movement of said rod whereby the arm may be slidably extended to one indicating position upon operation of said valve means in one direction, and means operable upon actuation of said valve means in another direction for applying differential pressure to said core whereby the stop pin will be withdrawn from the path of movement of said collar and the arm may be swung on its pivot to another indicating position.

HERBERT R. TRUBSHAW.