





# UNITED STATES PATENT OFFICE.

ASBURY G. WILSON, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO  
THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENN-  
SYLVANIA, A CORPORATION OF PENNSYLVANIA.

## RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 787,967, dated April 25, 1905.

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*To all whom it may concern:*

Be it known that I, ASBURY G. WILSON, a citizen of the United States, residing at Wil-  
kinsburg, in the county of Allegheny and State  
5 of Pennsylvania, have invented certain new  
and useful Improvements in Railway-Signals,  
of which the following is a specification.

This invention relates to apparatus for op-  
erating railway-signals, and particularly to  
10 that class of railway-signals in which the mo-  
tive power therefor is in the form of fluid-  
pressure. In railway-signals of this charac-  
ter the signal is moved in one direction by the  
fluid-pressure and in the other direction by  
15 gravity. The fluid-pressure apparatus usu-  
ally comprises a motor in the form of a cyl-  
inder and piston and valves for controlling  
the admission of the fluid to and its exhaust  
from the cylinder. The piston is usually con-  
20 nected to the counterweight of a semaphore-  
signal, and when heavy semaphore-castings  
are employed the return of the piston under  
the influence of the counterweight frequently  
subjects the apparatus to a severe shock, and  
25 the prevention of such shocks is the object of  
the present invention.

I will describe an apparatus for operating  
railway-signals embodying my invention and  
then point out the novel features thereof in  
30 claims.

In the accompanying drawings I have illus-  
trated so much of the operating mechanism  
of a railway-signal as is sufficient to illustrate  
the application thereto of my present inven-  
35 tion.

In such drawings, Figure 1 is a vertical sec-  
tion of part of a signal-operating apparatus.  
Figs. 2 and 3 are sectional views, on an en-  
larged scale, showing my present invention.  
40 Figs. 4 and 5 are respectively side and end  
views of a plug containing a check-valve.

Similar letters of reference designate corre-  
sponding parts in all of the figures.

By the term "fluid-pressure" I mean a liq-  
45 uid or gas under pressure, and preferably I  
employ a gas—as, for example, air or carbonic-  
acid gas—and under any pressure which is  
sufficient or more than sufficient to operate

the apparatus or mechanism for moving the  
signal. Where the pressure is above that re- 50  
quired, reducing-valves may be employed  
wherever desired.

Referring now to the drawings,  $d$  design-  
ates a piston, and  $d'$  a cylinder within which  
the piston moves. The piston, it is to be un- 55  
derstood, will be connected in any suitable  
manner to a semaphore-signal, (not shown,) it  
being deemed not necessary to illustrate the  
signal nor the connection of the piston there-  
to, it being well known to those skilled in the 60  
art that the piston  $d$  will be moved upwardly  
by the fluid-pressure and downwardly by  
gravity when the fluid-pressure is released.  
The fluid-pressure passes from a source of sup-  
ply (not shown) through a pipe  $e$  to a cham- 65  
ber containing a valve  $d^2$ , which is normally  
held in a closed position, but may be opened  
by an electric device  $D'$  in the manner de-  
scribed in United States Patent No. 745,309,  
granted November 24, 1903, to J. P. Coleman, 70  
and which need not be particularly described  
herein. When the electric device  $D'$  operates  
to open the valve  $d^2$ , it will also close the valve  
 $d^3$ , and thereby close the exhaust-passage  $e'$ .

It will be observed that the cylinder-head 75  
 $D$  is provided with a boss  $d^4$ , which is bored  
out and internally threaded to receive the ex-  
teriorly-threaded plug  $F$ , provided with a re-  
duced end portion  $f$  and a longitudinal pas-  
sage  $f'$ , which is made flaring at its outer end 80  
to receive the tapered portion  $g$  of the casing  
containing the valve  $d^2$ , such casing having  
also a passage  $g'$ , which communicates with  
the passage  $f'$  in the plug  $F$ . The reduced  
inner end of the plug  $F$  is tubular and pro- 85  
vided with a valve-seat  $f^2$ , upon which the  
loose freely-movable check-valve  $f^3$  is adapt-  
ed to seat. The stem  $f^4$  of the valve is of less  
diameter than the passage  $f'$ , into which it  
extends and serves to guide the valve. In 90  
order to limit the movement of the valve  $f^3$   
away from its seat, a pin  $f^5$  is secured in the  
reduced end of the plug. When the plug  $F$   
is in place, an annular chamber  $f^6$  is formed  
around the inner end of the plug and a pas- 95  
sage  $f^7$  is formed in the plug which leads from



the said chamber to the passage  $f'$  back of the valve, and this passage  $f'$  and the chamber  $f^6$  form a by-pass around the valve. From the chamber  $f^6$  a passage  $d^4$  leads to other passages  $d^5$  and  $d^6$ , the latter of which communicates with the interior of the cylinder  $d'$  below the piston  $d$ . The passage  $d^5$  will convey the fluid-pressure to a diaphragm  $h$ , the function of which is to control or actuate a locking mechanism, which it is unnecessary to describe herein.

The plug  $F$  is provided with a head  $f^8$ , and a packing-ring  $f^9$  is interposed between the head and the end of the boss  $d^9$ .

Such being a preferred embodiment of my invention its operation is as follows: When the electric device  $D'$  is energized to open the valve  $d^2$  and simultaneously close the valve  $d^3$ , the fluid-pressure will pass around the valve  $d^2$  into the passage  $g'$ , thence into the passage  $f'$  past the valve  $f^3$ , and also through the passage  $f^7$  into the annular chamber  $f^6$  through passages  $d^4$  and  $d^6$  to the cylinder  $d'$  below the piston  $d$ , and it will be observed by reference to Fig. 3 that the valve  $f$  does not offer any obstruction to the flow of fluid-pressure to the cylinder. When, however, the valve  $d^2$  is closed and the valve  $d^3$  is open and the piston  $d$  begins to descend under the influence of the heavy counterweight on the signal, the valve  $f^3$  will be forced to its seat, as in Fig. 2, and the only escape for the fluid-pressure will be through the passage  $f^7$ , which being restricted will retard the escape of such fluid-pressure, and thereby cause the latter to form a cushion below the piston, and thus prevent shocks to the apparatus.

For details of construction and the operation of the remainder of the apparatus illustrated reference may be had to United States Patent No. 745,309, hereinbefore referred to.

My invention is applicable to any and all forms of railway-signals employing a piston and cylinder to move the semaphore or other signal devices and fluid-pressure to cause a movement of the piston in the cylinder.

I claim—

1. In apparatus for operating railway-signals, the combination with a cylinder and a piston therein, of a conduit for conveying fluid-pressure from a source of supply to the cylinder below the piston, a check-valve in said conduit, and a by-pass from said conduit around the check-valve.

2. In apparatus for operating railway-signals, the combination with a cylinder and a piston therein, of a conduit for conveying

fluid-pressure from a source of supply to the cylinder below the piston, inlet and exhaust valves in said conduit, a check-valve in said conduit between the cylinder and the inlet and exhaust valves, and a by-pass from said conduit around the check-valve.

3. In apparatus for operating railway-signals, the combination with a cylinder and a piston therein, of a conduit for conveying fluid-pressure from a source of supply to the cylinder below the piston, electrically-controlled inlet and exhaust valves in said conduit, a freely-movable check-valve in the conduit between the cylinder and the inlet and exhaust valves, and a by-pass from said conduit around the check-valve.

4. In apparatus for operating railway-signals, the combination with a cylinder and a piston therein, of a plug fitted in the cylinder-head and having a tubular inner end portion provided with a valve-seat, a check-valve loosely supported within said tubular end portion, the said head having an annular chamber surrounding the inner end of the plug and a passage leading therefrom to the cylinder below the piston, and said plug having a longitudinal passage and a branch passage leading therefrom in rear of check-valve to said annular chamber, and means for conveying fluid-pressure to or from the central passage in the plug.

5. In apparatus for operating railway-signals, the combination with a cylinder and a piston therein, of a plug fitted in the cylinder-head and having a reduced, tubular, inner end portion provided with a valve-seat and a longitudinal passage leading from said valve-seat to the outer end of the plug, a check-valve loosely supported within the tubular end portion, means for limiting the opening movement of the valve, the cylinder-head having an annular chamber therein surrounding the inner end of the plug and a passage leading therefrom to the cylinder below the piston, and said plug having a passage leading from the said annular chamber to the said longitudinal passage in rear of the check-valve, and valve-controlled means for delivering fluid-pressure to and exhausting it from said longitudinal passage.

In testimony whereof I have signed my name to this specification in the presence of two subscribed witnesses.

ASBURY G. WILSON.

Witnesses:

M. D. HANLON,

W. L. McDANIEL.