

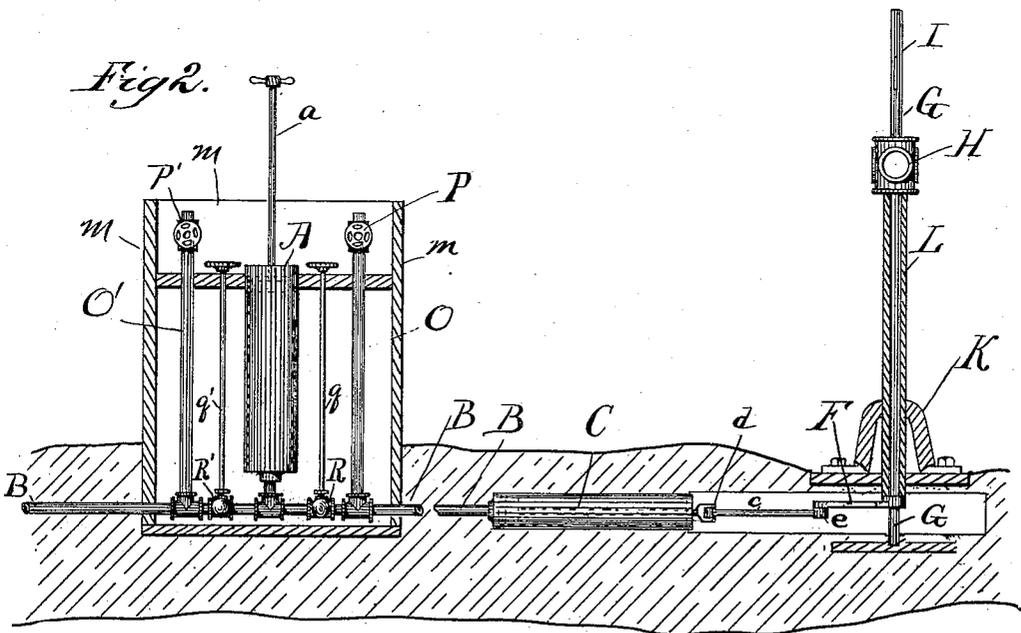
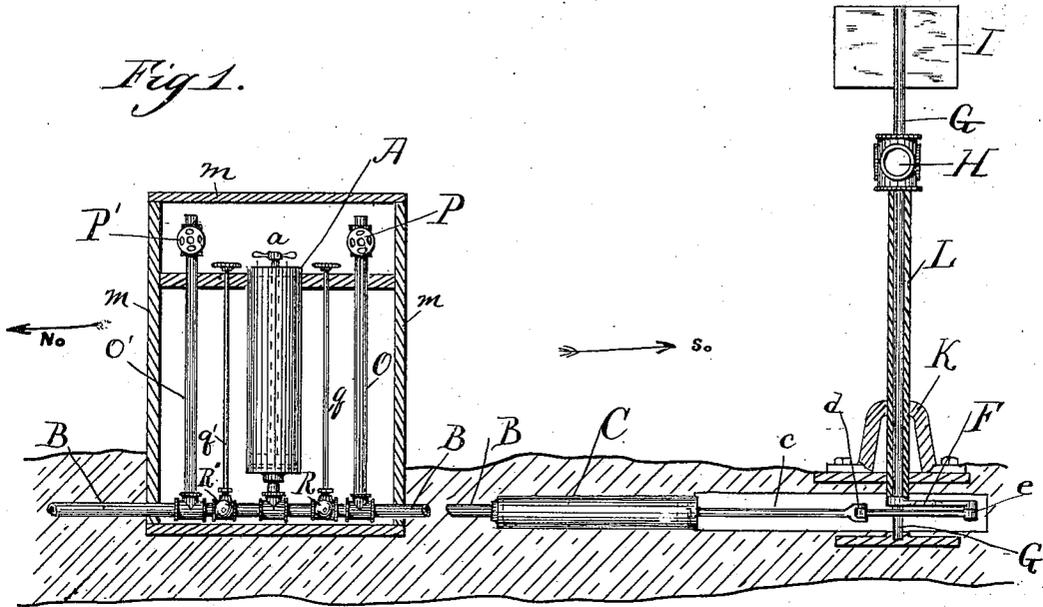
(No Model.)

M. B. MILLS & W. HANLEY.

SIGNAL.

No. 323,949.

Patented Aug. 11, 1885.



Witnesses:
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UNITED STATES PATENT OFFICE.

MORTIMER B. MILLS AND WILLIAM HANLEY, OF CHICAGO, ILLINOIS.

SIGNAL.

SPECIFICATION forming part of Letters Patent No. 323,949, dated August 11, 1885.

Application filed June 23, 1884. (No model.)

To all whom it may concern:

Be it known that we, MORTIMER B. MILLS and WILLIAM HANLEY, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Signals for Railway and other Purposes, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of our invention is to give signals at short and long distances by means of the mechanism and atmospheric air or other fluid, as herein specified and fully set forth.

In the drawings, Figure 1 shows piston *a* in cylinder A down, and piston *c* in cylinder C extended to its full limit outward and the signal I set. Fig. 2 shows piston *a* in cylinder A up and the piston *c* in cylinder C changed from its full limit outward to its full limit inward, and by such change shaft G, with signals thereon, moves over an arc of a circle about ninety degrees, reversing signal I, as shown in Fig. 1.

A is a cylinder open at one end, closely fitted with a piston and rod, *a*, and piston without valves, and the other end closed, except an orifice to admit of a small pipe-connection.

B is an air-tight pipe of small diameter, connecting at the bottom of cylinder A and leading to and connecting with the inner end of cylinder C. Said cylinder C, with piston *c*, is constructed practically air-tight and without valves, thus forming an air-tight compartment, filled with air or other fluid, and extending from cylinder A to cylinder C.

c is the piston-rod of cylinder C, and has a pivoted joint *d*, the upper end of which is pivotally connected with a crank, (or arm,) F, at right angles with an upright shaft, G, which crank F is firmly fastened to shaft G.

G is a shaft which moves upon a vertical pivot at its lower end.

H is a square lamp, with alternate colored faces and firmly secured to shaft G.

I is a painted disk firmly fastened to shaft G above the lamp H.

K is a brace to support and keep shaft G in position.

L is a tube to protect shaft G, in which tube shaft G moves freely.

m m m is a frame to inclose and cover the operating apparatus.

O and O' are pipes, with valves P and P' at their upper end, to admit air into cylinder A and pipe B, or to exclude air from cylinder A and pipe B, at the will of the operator.

q and *q'* are rods, with taps or valves R and R', attached to their lower ends to control the direction of signals.

When it is desired to have an apparatus constructed for signaling in opposite directions, Figs. 1 and 2 show such an apparatus complete, with the exception of duplicate cylinder C and piston *c*, shaft G, with signals H and I, and mechanism whereby said piston *c* and shaft G are connected.

When it is desired to have an apparatus for signaling in one direction only, the rods *q* and *q'*, with valves R and R', also the pipe O', with its valve P', can be dispensed with. The aforesaid cylinder C and piston-rod *c*, with pivoted joint *d*, together with crank F, are practically constructed not to admit of a greater rotatory motion of shaft G than ninety degrees of an arc of a circle by a forward and backward movement of piston in cylinder C, said cylinder C not exceeding half the dimensions of the aforesaid cylinder A.

The operation of our invention is as follows: The operator takes hold of the piston-rod *a* and raises the piston in cylinder A, which causes the air within pipe B and cylinder C to rush into cylinder A, producing a partial vacuum in pipe B and cylinder C, causing the piston in cylinder C to be pulled in an inward direction, effecting a corresponding movement of mechanism connecting signal-shaft G with the piston of cylinder C, and a consequent movement of shaft G and signals H and I on an arc of a circle about ninety degrees, resulting in change of signals, according to design. To change or reverse signal, the operator takes hold of piston-rod *a* in cylinder A while at its limit in an upward direction and pushes it downward, thus forcing the air in cylinder A and pipe B into cylinder C, which pushes the piston in cylinder C outward, producing corresponding motion of the mechanism connecting signal-shaft G and the signals thereon, causing said shaft G and the signals H and I to revolve about ninety degrees of an arc of a circle, resulting in a reversal of signal. In operating at long distances it might require more than one stroke of the piston in cylinder

A to effect a complete movement of cylinder C and signal-shaft G; hence by opening the valve P in pipe O, and raising or lowering the piston in cylinder A, additional force can be obtained and used in the direction required—
 5 to wit, if additional force is needed to pull the piston in cylinder C in an inward direction after the piston in cylinder A has been raised to its limit, open the valve P in pipe O, push
 10 down the piston in cylinder A, then immediately close the valve P and quickly raise the piston in cylinder A to its full limit, and repeat, if needed.

For the purpose of procuring additional force to push the piston in cylinder C in an outward direction after the piston in cylinder A has been pushed to its limit downward, open the valve P in pipe O, raise piston in cylinder A, and immediately close the valve P,
 15 then quickly push down the piston in cylinder A to its full limit, and so repeat until the desired effect is produced.

When it is desired to signal in opposite directions from the same operating-post, use the rods *q* and *q'*, to which is attached valves R and R'—to wit, to signal south close the valve R' attached to rod *q'*, and open the valve R attached to *q*, and to signal north close the valve R and open the valve R'. The operating-post can be placed in any building or place convenient to the operator, and constructed to inclose and place under lock and key the operating apparatus. Signals can be given with equal facility at right angles,
 25 around curves, with pipe above or under

ground. It is serviceable, proof against all kinds of weather and in all seasons of the year. Signals can be given from one operating-post in numerous directions by connecting cylinder A with the requisite mechanism, as hereinbefore fully described and set forth. 40

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The combination of a cylinder and piston at an operating-post, a pipe connecting with said cylinder and leading to a cylinder and piston of less dimensions, a pipe with a valve at its upper end, and at its lower end connected with the pipe communicating with the two cylinders, and mechanism, substantially as described, connecting the piston of small cylinder with a revolving shaft containing signals to operate a reciprocating to-and-fro movement by atmospheric or fluid pressure, all substantially in and for the purposes set forth. 45 50 55

2. The combination of cylinder A and piston *a*, pipe B, cylinder C, and piston *c*, jointed rod *d*, pivot *e*, crank F, shaft G, signals H and I, pipes O and O', valves P and P', rods *q* and *q'*, and valves R and R', all being constructed substantially as hereinbefore described, to operate signals in any direction, as substantially set forth. 60

In testimony whereof we affix our signatures in presence of two witnesses.

MORTIMER B. MILLS.
 WILLIAM HANLEY.

Witnesses:

JOHN H. COTES,
 E. R. STEINHILBER.