

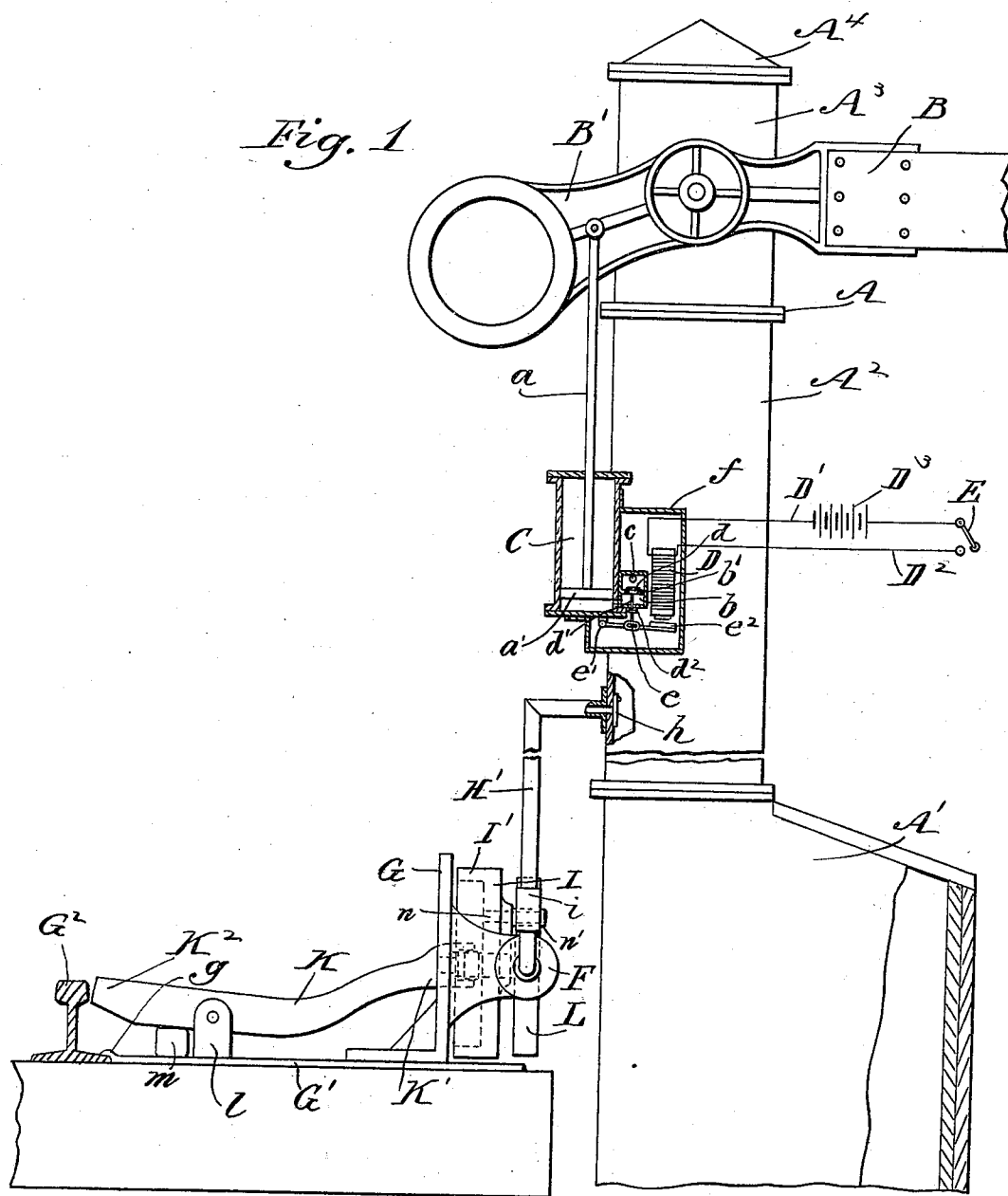
(No Model.)

2 Sheets—Sheet 1.

S. P. HULL & J. H. BOYLETT.
PNEUMATIC SIGNALING APPARATUS.

No. 556,577.

Patented Mar. 17, 1896.



WITNESSES:

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Samuel P. Hull
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

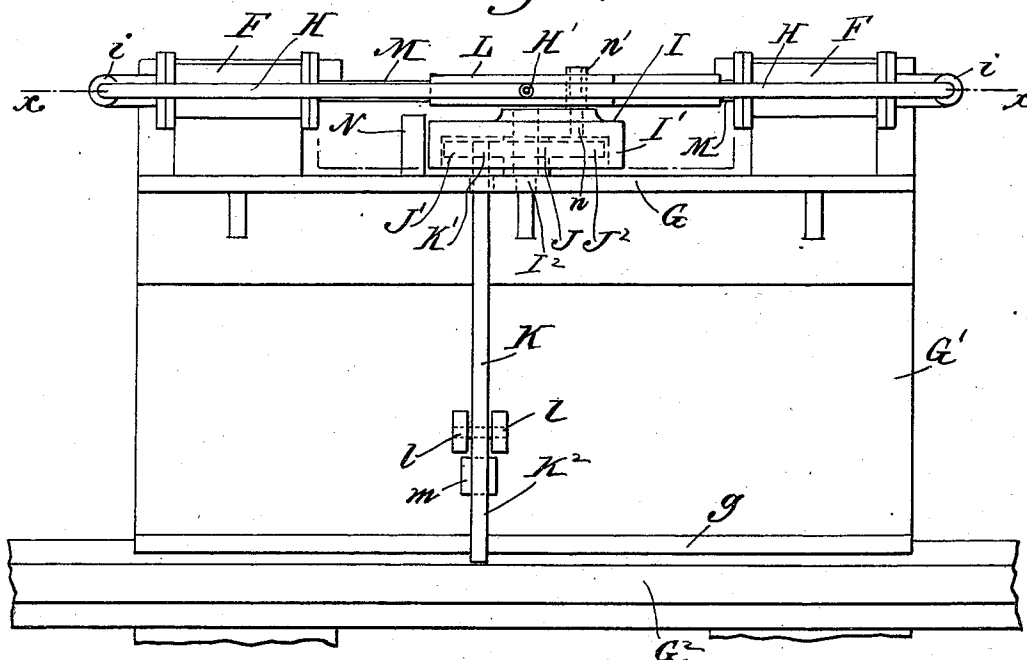
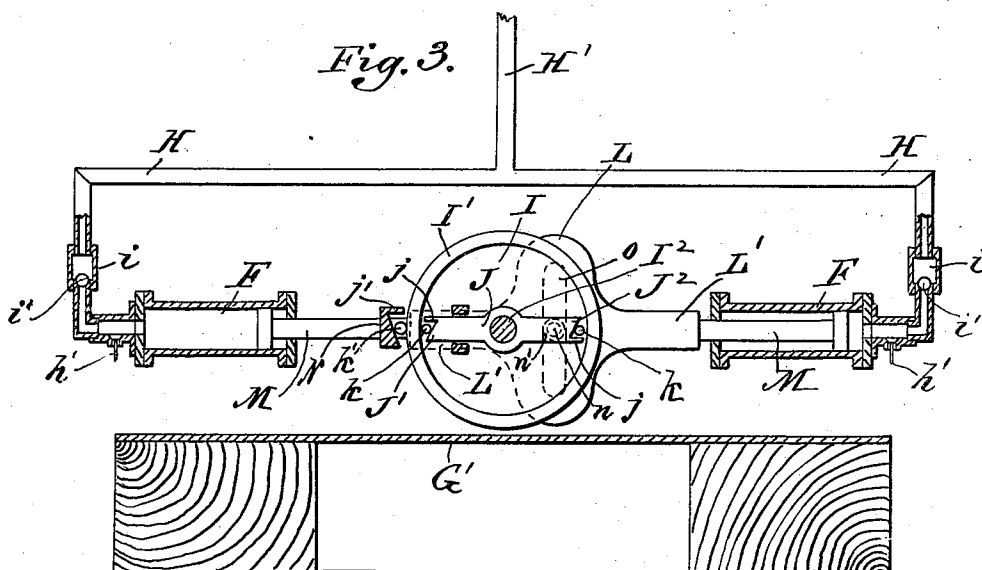


Fig. 3.



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UNITED STATES PATENT OFFICE.

SAMUEL P. HULL AND JAMES H. BOYLETT, OF POUGHKEEPSIE, NEW YORK.

PNEUMATIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 556,577, dated March 17, 1896.

Application filed January 9, 1895. Serial No. 534,353. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL P. HULL, a citizen of the United States, and JAMES H. BOYLETT, a subject of the Queen of Great Britain, and residents of Poughkeepsie, county of Dutchess, and State of New York, have invented certain new and useful Improvements in Pneumatic Signaling Apparatus, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which similar letters of reference indicate corresponding parts in all the figures.

This invention relates to pneumatic signaling apparatus for railroads, and has for its object to provide simple, cheap, readily-constructed, and perfectly-operating means for pumping air into a storing-chamber by the movement of passing trains and releasing a sufficient quantity of such air electrically from a central or other signaling station, whether near or distant, a further object of the invention being to provide such a signal-post as will comprise a storing-chamber for the air.

The invention consists in the novel construction and arrangement of parts whereby the above-mentioned and other desirable results are attained and hereinafter more fully described.

Referring to the drawings, Figure 1 is a side elevation of a device embodying our invention, with various parts thereof in section to more clearly illustrate the construction. Fig. 2 is a plan view of that portion thereof which is upon the track or ties. Fig. 3 is a longitudinal section upon the line *xx*, Fig. 2.

In the practice of our invention we construct the signal-post A of any suitable form and material, preferably of metal, and formed in four sections, comprising a support or embankment A', hollow and lined with concrete or asphalt to form a battery-well, above which is secured the second section, A², closed throughout to form an air-chamber.

The third section, A³, which is surmounted by a pinnacle A⁴, forms a support for the usual or any other approved semaphore B, which in our device is maintained normally at danger by securing or forming upon the rear end thereof a weighted arm or head B'. To this arm B' is pivoted a piston *a*, working in a

cylinder C secured to the side of the section A² immediately beneath, the head *a'* of said piston being depressed to the bottom thereof by the weight of said arm B'.

Communicating with the base of the cylinder C is a valve-chamber *b*, having at the top thereof an inlet *c* communicating with the interior of the section or air-chamber A², whereby the air within the same constantly fills the top of said valve-chamber *b*, which is divided horizontally by a partition *b'* centrally apertured and having a valve *d* therein, which said valve is normally closed and depressed by the pressure of the air entering through the inlet *c*. The stem *d'* of the valve *d* projects through the base of the valve-chamber *b* and is loosely pivoted therein, whereby when the valve is closed and the piston *a* is depressed in the cylinder by the weight of the semaphore-arm B' the air within said cylinder may be permitted to escape. Immediately beneath the base of the valve-chamber this stem *d'* has a valve *d*² mounted thereon, which tightly seals the junction of said stem with the base of the chamber when the valve *d* and the stem *d'* are raised.

Pivotaly secured to the lower end of the stem *d'* is a lever *e*, fulcrumed at one end in a shoulder *e'* upon the bottom of the cylinder C, the opposite or free end of the lever being provided with an armature *e*². Immediately above the armature-plate *e*² is mounted a magnet D, connecting by means of the conductors D' D² to a switch E, suitably located and under the control of the signal-operator or actuated by block-signaling apparatus, one of said conductors being intervened by a battery D³. The valve-chamber, magnet, and the various levers are inclosed by a casing or box *f*, secured to the side and the base of the cylinder C.

In order that the section A² may be constantly filled with air under comparatively heavy pressure, two pumping-cylinders F are supported upon a frame G secured or integrally formed upon a bed-plate G', which extends across two or more of the ties and is provided with a lip or shoulder *g* upon the end thereof, which bears against and clasps the base of the rail G² to securely hold the same. Angular pipes H lead from the rear of each cylinder F to a single pipe H', open-

ing into the base of the section A^2 and normally closed by a valve h . Near the junction of said pipes H with the cylinders F the same are provided with gravity-valves h' for the entrance of air, somewhat beyond which are valve-chambers i , the junction of which with the lower section of the pipe is closed by a ball-valve i' . Between said cylinders F is journaled in the frame G a wheel I , having a forwardly-ranging flange I' , within which is loosely mounted upon the shaft I^2 of said wheel a transverse bar J , extending across the said wheel almost in engagement with the flange I' at either side and having beveled ends J' J^2 , from the reduced sides of which project lugs or flanges j to form tapered recesses, in which are inserted metallic balls k , whereby, when the bar J is oscillated upon a vertical plane, the upward movement of the end J' and consequent downward movement of the end J^2 will cause the balls k to be wedged against the interior periphery of the flange I' of the wheel by reason of said ends being beveled, thereby partially rotating said wheel, and upon the downward movement of said end J' and upward movement of the end J^2 the action of said beveled ends will be reversed and the balls k bear inwardly against the lugs j , thereby not frictionally engaging said flange A' nor communicating the motion of the bar thereto. This oscillation of the bar J is effected by means of a lever K pivoted near its forward end in vertical bearings l secured or formed upon the bed-plate G , said lever having a forked end K' , which clasps the end J' of the bar J , the opposite end K^2 of said lever ranging slightly above the level of the rail G^2 adjacent thereto and being maintained in the elevated position by means of a rubber block m inserted beneath the same upon the bed-plate G immediately in front of the bearings l .

Upon the rear face of the wheel I is formed a projecting stud or pin n having a friction-roller n' thereon, which works in a vertical slot o , formed in a link L having horizontally-projecting ends L' which are secured to the outer ends of the piston-rods M of the cylinders F , whereby the rotation of the said wheel I reciprocates the said link L . To prevent reverse rotation of the wheel by any means, we secure or form upon the rear face of the frame G a projection or flange N , beveled vertically upon its inner face to taper upwardly toward a point, from which projects a lug j' to form a recess similar to that in the ends of the cross-bar J , in which is inserted a ball k' .

The operation of the device will be readily understood from the foregoing description taken in connection with the accompanying drawings.

As the various trains of the road pass the signal-post upon the rail G^2 the wheels thereof will strike the end K^2 of the lever K and depress the same against the rubber block m , thereby raising the forked end K' of said lever and with it the end J' of the cross-bar J ,

which thereby, through the agency of the balls k , which are wedged against the interior periphery of the wheel J , rotates the said wheel a fraction of a revolution to the right, as shown in the drawings, thereby carrying the link L a slight distance to the left, and this depression of the lever K being continued the wheel I is gradually rotated to revolve a plurality of times by the passage of each train of cars, thereby compressing air by means of the pumps F alternately and forcing the same through either of the pipes H and the branch H' into the air chamber or section A^2 of the signal-post, the valves h at the junction of said branch with the air-chamber and the ball-valves i' in the valve-chambers i of the pipes H preventing the return or escape thereof.

As the end K^2 of the lever K after each depression thereof is raised through the elasticity of the block m , the forked end K' thereof is depressed, causing the transverse bar J to reassume the horizontal position; but by reason of the direction of taper of the ends of said bar the balls k fail to frictionally engage the flange I' , and therefore do not reversely revolve the wheel I , any tendency of said wheel to so move being checked by the ball k' within the flange or projection N , which is caused to wedge between said flange and the exterior of the flange I' of the wheel upon the slightest reverse motion thereof.

The semaphore B being normally at "danger," or in the horizontal position, by reason of the weight of the arm B' , and it being desired to lower the same to permit the passage of a train, the switch E is actuated to close the circuit formed by the conductors D' D^2 and the magnet D , the operation of this switch being effected either by a signal-operator or by suitably including the same in the usual automatic block-signaling systems.

By the closing of the circuit the magnet D is energized and the armature e^2 upon the free end of the lever e thereby attracted, this action raising the valve d , while the valve d^2 closes connection of the valve-stem d' with the valve-chamber b . The compressed air within the chamber or section A^2 of the signal-post enters said valve-chamber through the inlet c , passing around the valve d and into the base of the cylinder c , forcing the piston-rod a upwardly and depressing the semaphore B .

When the switch E is opened in similar manner to that by which its closure is effected, the end of the lever carrying the contact-plate e^2 will be permitted to drop and the valve d will be closed by the pressure of the air through the inlet c , or where said valve is so arranged as to be unaffected by the pressure of said air when once open said lever e will fall of its own gravity. The weight of the arm B' of the semaphore then depresses the piston a to bring said semaphore into the normal position, the air in said cylinder escaping through the base of the valve-chamber b around the valve-stem d' .

The advantages resultant from the use of the invention will be manifest to all who are conversant with the general class of devices to which the same appertains.

5 We do not confine ourselves to the exact formation of parts or construction of details herein set forth and illustrated.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a pneumatic signaling apparatus, the combination of signal-post formed in sections, one of said sections forming an air-storing chamber, a semaphore pivotally secured upon the post, a weighted arm to hold said semaphore in a normally-raised position, a cylinder, a piston operating in said cylinder and having its upper end pivoted to the semaphore-arm and normally depressed, connections between the storing-chamber and the base of the cylinder normally closed, whereby air may be admitted to the cylinder to raise the piston and lower the semaphore, a magnet mounted adjacent to said connections and adapted to open the same when energized, connections between said magnet and a switch, a pump arranged adjacent to the signal-post and connected with the air-chamber, and a wheel adapted to be operated by the passage of trains to actuate the pump, substantially as described.

2. A pneumatic signaling apparatus comprising a signal-post, a semaphore pivoted thereto, an air-cylinder having a piston therein connecting to said semaphore to actuate the same, pumping-cylinders mounted adjacent to the track and communicating with the base of said cylinders, normally-closed connections to said cylinder-base, and means for opening the same, a slotted link connecting the pistons of the pumps or compressors, a wheel journaled adjacent to the track, having a stud thereon working in said link, whereby the revolution of said wheel reciprocates the piston, a lever pivoted adjacent to the rail and normally raised, whereby it is depressed by the passage of trains, the opposite end of said lever being connected to the wheel in such manner as to actuate the same when said lever is depressed, and means for preventing the reverse rotation of the wheel by the raising of said lever.

3. A pneumatic signaling apparatus comprising a signal-post constructed to form an air-storing chamber, a semaphore pivoted upon the face of said post, having a weighted arm at the rear thereof, whereby it is maintained normally raised, a cylinder mounted upon said post, a piston therein pivoted at the top to the semaphore-arm and thereby normally depressed, a valve-chamber communicating with the base of said cylinder and with the storing-chamber, a valve controlling the communication of said cylinder and air-chamber, a lever pivoted to the stem of said valve and normally depressed therewith, a magnet mounted adjacent to said le-

ver and adapted when energized to raise the same and open the valve, conductors leading from said magnet to a suitable switch, pumping devices secured adjacent to the track and communicating with the air-chamber, the pistons of said pumping devices being intervened by a slotted link, a wheel journaled adjacent to the track, having a stud thereon which works in the link to reciprocate said pistons by the revolution of said wheel, a transverse bar loosely mounted upon the shaft of said wheel, having beveled ends, friction-balls between said ends and the rim of the wheel to cause said wheel to revolve when said bar is moved in one direction, and to release said rim from engagement with said bar upon the opposite movement, and a lever pivoted adjacent to the rail, normally raised and adapted to be depressed by the passage of trains, the opposite end of said lever being forked and engaging the transverse bar of the pumping mechanism to actuate the same.

4. A pneumatic signaling apparatus comprising a signal-post formed of a plurality of sections secured together, the same consisting of a hollow base or receptacle, a hollow airtight storing-chamber secured to the same, and an upper section having a semaphore pivoted upon the face thereof, a weighted arm projecting inwardly from said semaphore, a cylinder mounted upon the air-chamber or central section of the post, a piston therein pivoted at the top to the semaphore-arm and thereby depressed, a valve-chamber communicating with the said cylinder at the base, and at the top with the storing-chamber, said chamber being centrally partitioned and having a valve therein, the stem of said valve being loosely mounted in the base of the valve-chamber to form an outlet and provided with an auxiliary valve to close said outlet when the cylinder-valve is opened, a lever pivoted to said valve-stem and normally depressed with the valve, having an armature upon the free end thereof, a magnet mounted adjacent to said lever and adapted when energized to open said valve, conductors leading from said magnet to a suitable switch, an inclosing case secured to the cylinder and surrounding the valve-chamber and magnet, a bed-plate secured upon the ties of the road and bearing against the rail thereof, a frame projecting upwardly from said bed-plate having pistons mounted thereon at either end, pipes leading from said pistons to a branch pipe opening into the storing-chamber, having a valve at its junction therewith, said pipes being normally closed by valves immediately beyond each cylinder, a link connecting the pistons of said cylinders together, having a vertical slot therein, a wheel journaled in said frame, having a stud upon the rear thereof, provided with a friction-roller which works in the slot of said link to reciprocate the piston by the revolution of the wheel, said wheel having a projecting annular flange, a transverse bar loosely mounted upon the shaft of said wheel

within said flange, and having beveled ends
bordered by lugs to form recesses, friction-
balls inserted in said recesses, whereby the
movement of the bar in one direction wedges
5 said balls against the flange of the wheel and
revolves the same, and whereby the reverse
movement of said bar fails to actuate the
wheel, a flange projecting from the frame ad-
jacent to said wheel, upwardly beveled or
10 tapered and having a friction-ball inserted
therein to prevent reverse rotation of said
wheel through any means, a lever pivoted
upon the frame, and a rubber block beneath
the forward end of the same to normally raise

said end above the level of the rail, whereby 15
the same is depressed by the passage of trains,
the opposite end of said lever being forked
and claspings the transverse bar to actuate the
same.

In testimony that we claim the foregoing as 20
our invention we have signed our names, in
presence of two witnesses, the 3d and 5th days
of January, 1895.

SAMUEL P. HULL.
JAMES H. BOYLETT.

Witnesses:

C. GERST,
PERCY T. GRIFFITH.