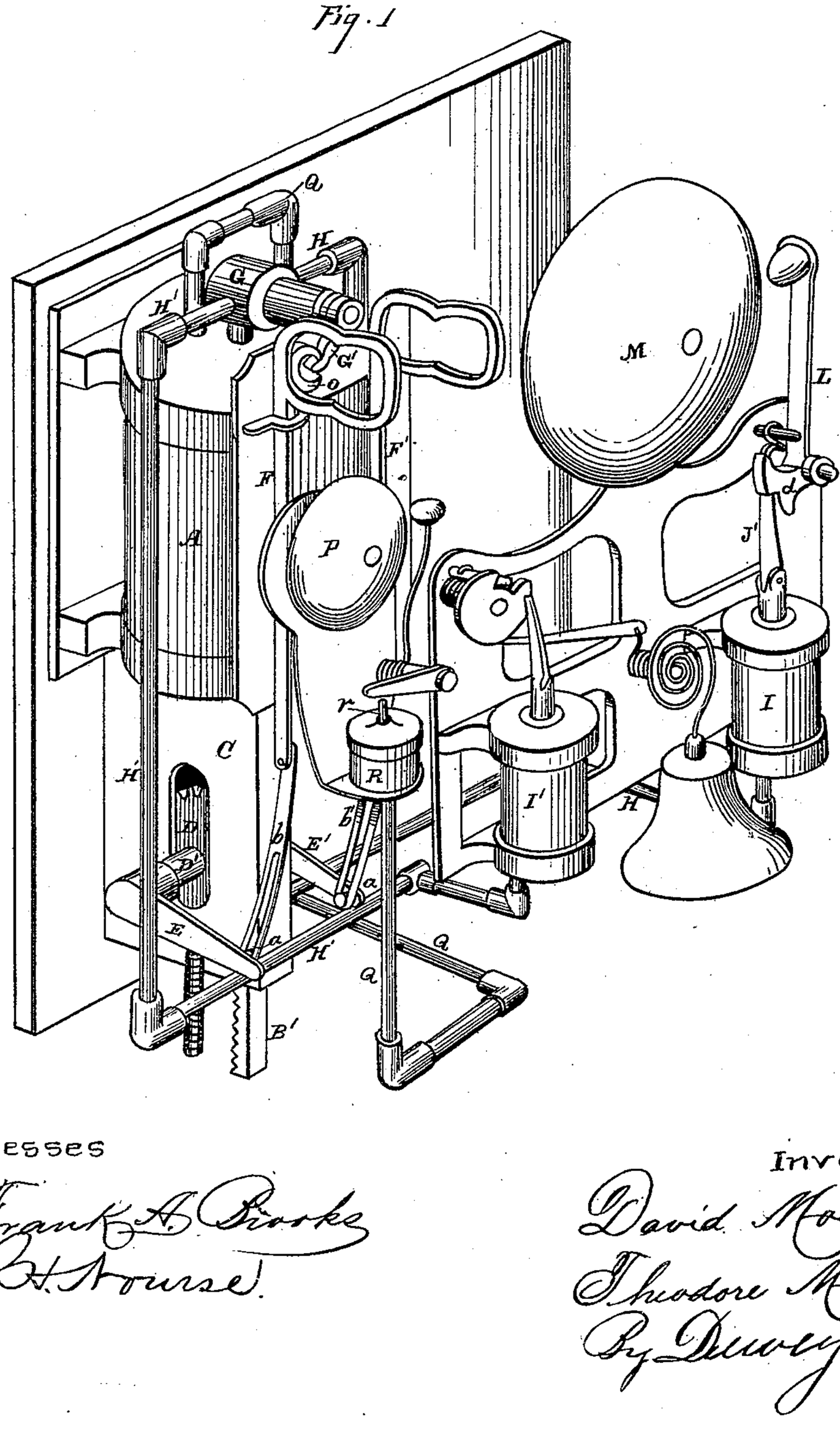
2 Sheets—Sheet 1.

D. & T. MORRIS.

Pneumatic Annunciator.

No. 228,267. **Patented June 1, 1880.**

Fig. 1



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2 Sheets—Sheet 2.

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Fig. 3.

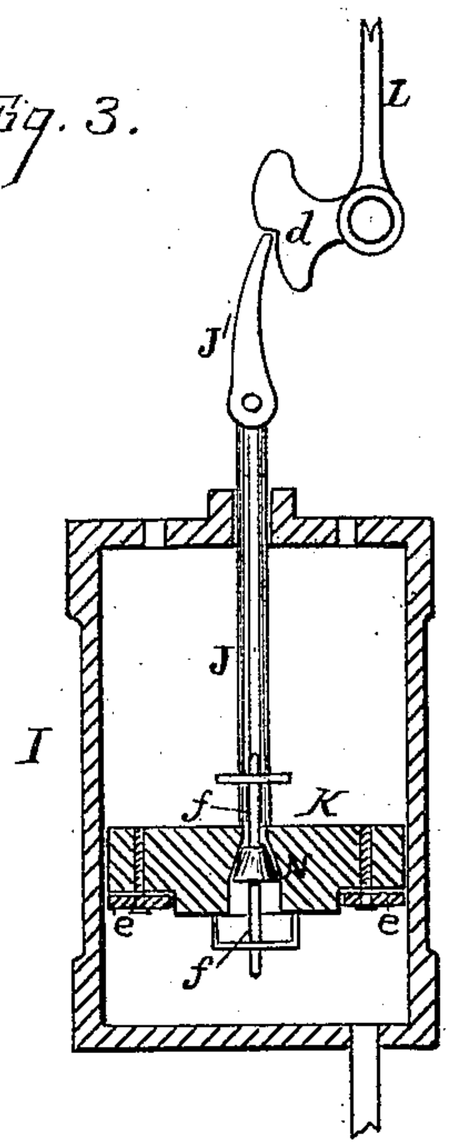
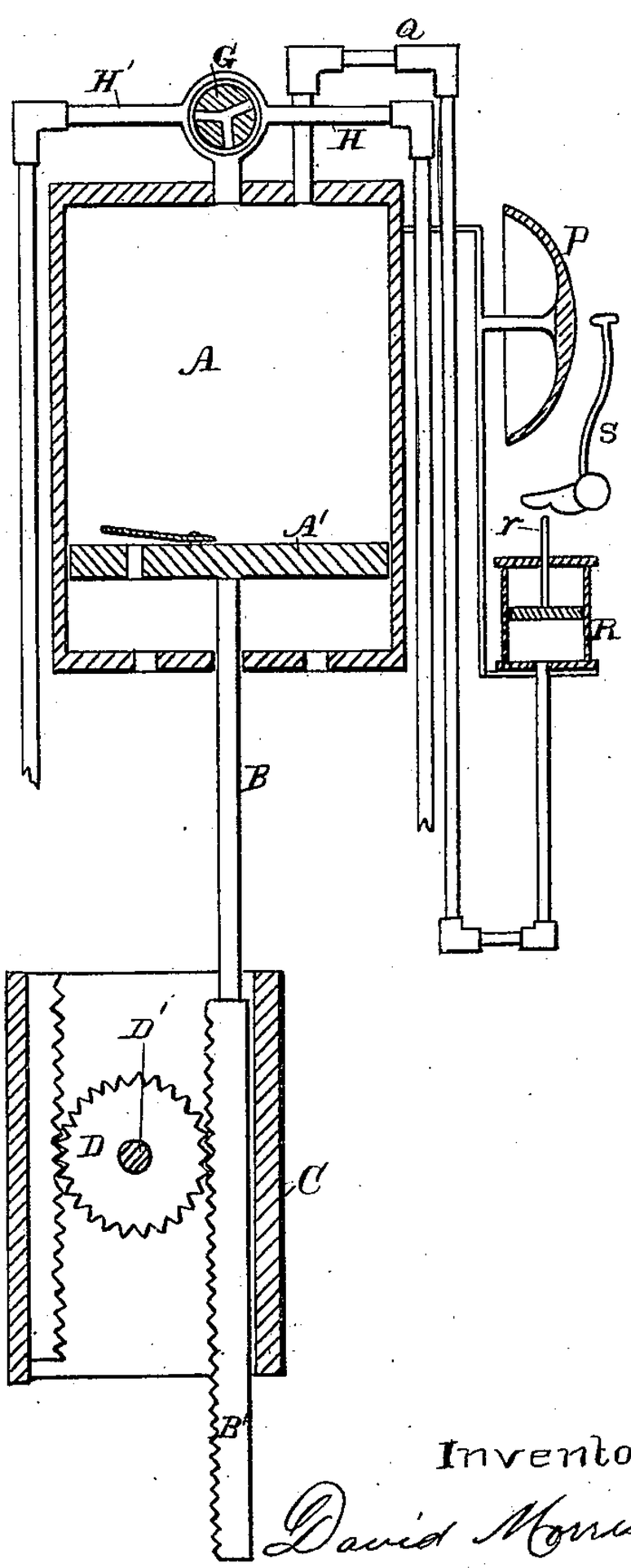


Fig. 2



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UNITED STATES PATENT OFFICE.

DAVID MORRIS AND THEODORE MORRIS, OF SAN FRANCISCO, CALIFORNIA.

PNEUMATIC ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 228,267, dated June 1, 1880.

Application filed December 1, 1879.

To all whom it may concern:

Be it known that we, DAVID MORRIS and THEODORE MORRIS, of the city and county of San Francisco, and State of California, have invented a Pneumatic Annunciator; and we hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to certain improvements in that class of devices known as "pneumatic annunciators;" and our improvements consist in certain details of construction, as hereinafter fully described, and specifically pointed out in the claims.

It further consists in attaching to the main compression-cylinder a peculiarly-operated check-bell or tell-tale, which is intended to indicate any leakage in the line of pipe, and consequent failure of the signal-bells to sound. This check-bell is used in combination with the gong or bell ringing cylinders in such a manner that it will ring when their bells ring, but will not do so when they fail to do so. Peculiarly-operating valves in the pistons of the bell-ringing cylinders control the action of the tell-tale bell in such a manner that when these pistons fail to move properly, so as to ring the bells and actuate the valves, the tell-tale bell will not ring, nor will it when there is any leakage in the line of pipe.

We have shown our device as arranged for steamboat purposes, where it is necessary for the pilot on the deck to signal by means of bells with the engineer in the engine-room below, and the tell-tale will indicate the action or non-action of the signal-bells in time to avoid accidents. The apparatus, however, is equally applicable for use in mines, hotels, public buildings, and dwelling-houses, or wherever it is desirable to communicate signals to a point more or less distant.

Figure 1 is a perspective view of our device. Fig. 2 is a section of the compressing-cylinder. Fig. 3 is a section of the operating-cylinder.

The air-compressing cylinder A is placed in any desirable position in the pilot-house, and has the usual piston A′ and piston-rod B. The lower end of this piston-rod has formed upon or attached to it a rack-bar, B′, this toothed or rack-bar portion passing down through a slotted case, C, as shown. Inside of this case is a cog-wheel, D, the teeth of which engage with the rack-bar on one side and with a stationary rack-bar bolted to the case revolving between the two bars, as shown. A shaft, D′, on which the cog-wheel is secured, extends through the slots in the case from each side, and on each end of this shaft is the crank E E′, as shown. On the ends of each of these arms or cranks are offsets or lugs *a a′*, arranged to slide in the longitudinal slots in the links *b b′*, which are jointed to the hand levers or pulls F F′. The cranks or arms E E′ are fixed on the ends of the shaft through the cog-wheel, and as soon as either of the hand-levers is raised and the cog-wheel is rotated the toothed piston-rod is forced up, the piston thus compressing the air in the cylinder. In case the lever or pull F is lifted the lug or offset *a* catches at the lower end of the slot in the link *b*, and the crank E is thus operated. The other crank, E′, however, moves up without disturbing the hand-lever F′, since the lug or offset *a′* slides in the slot in the link *b′* freely. This construction is necessary in order that independent bells may be rung by the same compressing-piston as desired, as hereinafter described. It will be evident, however, that a simple bar-lever may be connected with the arms or cranks and the piston-rod, instead of the form of cog-wheel and rack-bar which we have shown.

On top of the air-compressing cylinder is a valve-chamber, G, containing a three-way valve operated by a trip-bar, G′. This chamber communicates by a port with the air-cylinder, and also connects with two air-pipes, H H′.

When the two hand-levers are in their normal positions the valve allows the air to pass from the cylinder into the pipe H, the opening into the pipe H′ being closed. This pipe H runs from the pilot-house of the steamer, or point where the compressor is placed, to the engine-room or place where the gong is to be rung, and opens into the lower end of the operating-cylinder I, as shown. In this cylinder is the piston K and rod J, the upper end of the rod being provided with a peculiarly-shaped hinged spring-snap, J′. This engages with a shoulder on the arm *d* of the spring gong-lever L, so that as the piston is raised the snap pushes the gong-lever back, and as it is still further

raised the snap is disengaged from the shoulder by the peculiar shape of the arm itself, and the spring then throws the lever forward suddenly and strikes the gong M. As the piston falls back again the snap is thrown by its spring under the shoulder of the arm ready for its next action. The projection below the shoulder *d* forces the snap or spring-pawl out of the notch as the arm or disk is raised by the pawl.

Under the piston K is a leather or rubber washer, *e*, so as to make a tight joint. In the piston is a valve, N, having upwardly and downwardly extending spindle *f*. As the air comes in from below this valve is closed in its seat and no opening through the piston is left, the pressure of air keeping the valve in its seat. As the piston is raised to the top of the cylinder, however, the upper end of the spindle comes in contact with the top of the cylinder and the valve is opened, allowing the compressed air to escape. The pressure on both sides of the piston being thus equalized, the piston will drop back again, having performed its office, and the valve will be raised to its seat again by its lower spindle coming in contact with the bottom of the cylinder.

To operate what is known as the "jingle-bell," the hand lever or pull F is raised, which lifts the arm or crank E to compress the air in the cylinder. As this lever F is raised the lower short part of the jaw O on said lever lifts the trip-bar G′, thus operating the three-way valve to close the port into the pipe H and open that in the pipe H′, so that the air compressed may pass into said pipe H′ and into the independent cylinder I′, in which is the same arrangement of valves and piston as in the cylinder I, and the jingle-bell is therefore rung in the same manner, but by the independent lever F, as described.

In order to have a check on the movements of the gong and jingle-bell, so as to be sure and know whether they ring or not, the check-bell or tell-tale P is secured on a plate on the side of the compression-cylinder, or at a convenient point near by the hand-levers, so as to be readily heard by the pilot or person ringing the bells. A pipe, Q, runs from the top of this compression-cylinder to the bottom of a small cylinder, R, which has a common piston and a rod, *r*, so that when this rod *r* is raised by the piston it will operate the bell-crank S and strike the check-bell or tell-tale P.

When either of the hand-levers is raised for striking either the gong or the jingle-bell, the air is compressed in the main cylinder and its pressure is transmitted to the piston of the small cylinder R. As this piston is raised it forces the bell-crank back ready for it to be thrown forward by its spring; but unless the air-pressure under the piston is relieved this bell-crank hammer cannot strike forward. If the pressure is relieved gradually, the hammer returns slowly to its normal position and does not make any sound of the bell. If, however, the air-pressure under the piston is relieved quickly, the piston drops back and the spring may throw the hammer down and ring the bell. This tell-tale gong cannot therefore ring unless the pressure under it is relieved suddenly by the compressed air flowing out through one of the valves N in the cylinders I I′. The compressed air cannot pass out of the compressing-cylinder and pipes H H′ except through the valves N, and cannot pass through either of these valves unless one of their respective pistons rise high enough in the cylinder for the spindles to strike the top of said cylinders and open said valves. Of course, if there were any leakage in said pipes, no compression of the air could occur under the piston of the small cylinder R, and the piston would not be raised. If the leakage of air is only slight in the line of pipe, then, of course, the air would compress sufficiently to lift the piston so the spindle of the valves would come in contact with the head and open the port. In case the leakage, however, is great, then there can be no compression and none of the pistons will rise.

When the air is compressed the pistons must rise to the proper height, and either one of the bells, as the case may be, is necessarily rung. Should there be leakage in the line of pipe, or the bells not ring by the pistons not rising up by the want of compression of air, then the small tell-tale cannot ring, since there will be no pressure under its piston.

Even should there be pressure enough generated by the compression of air in the cylinder A to raise the pistons in either of the cylinders I I′ part way up, but not sufficient to ring the bell, then the check-bell would not ring either, since the valves in said cylinders I I′ would not open unless these spindles came in contact with the heads, and the pressure could not be relieved to allow the piston in the check-bell cylinder R to drop back, so as to admit of the lever striking the bell. The failure of the check-bell in the pilot-house to ring after either of the levers or hand-pulls are raised will then indicate not only a bursting of a pipe but a leakage as well, provided such leakage is sufficient to prevent the operation of the levers for ringing either gong or jingle-bell. Whenever this check-bell does ring, therefore, it is a signal to prove that the bell in the engine-room has rung, and when it fails to ring then the engine-bells have failed to ring, and the engineer can immediately be spoken to through the tubes.

The addition of this check-bell to this device is an important feature, since it affords an unfailing indicator to the action or non-action of the bells in the engine-room, which, from the nature of the case, are generally out of the hearing of the person giving the signal. The failure of these bells to ring by the breakage of connection is often attended with disastrous results.

It has frequently occurred that the wires leading from the pilot-house to the engine-room have broken at the moment of making

a landing at a wharf, and the pilot, having pulled the lever and supposed the bell to have rung, could not tell that the engineer had not received the signal to stop or reverse the engine until it was too late to prevent a violent collision with the wharf. With this check-bell all danger of any such accident is avoided, and if the check-bell does not ring when the hand-lever is lifted the pilot knows at once that the engineer has not received the signal. He can then communicate through the speaking-tube.

It is highly improbable, however, that any failure to transmit the signals will occur in this system, since there are no wires to break, the tubes are strong and durable, and the action of compressed air reliable and sure. This action is instantaneous in operation, and plenty of power is furnished to strike the largest bell.

It will be apparent that this system is applicable for operating annunciators in hotels, private dwellings, mines, and other places, as well as on board steamers. Small compressors may be placed in different rooms, each worked by any style of lever desirable for compressing the air necessary to communicate the power requisite for ringing the bell wherever it may be placed.

It is obvious that while we have only shown two separate bells operated by the single compression-cylinder, as many bells as may be desired may be rung by it by suitable arrangement of valves connected with the hand-levers, which shall direct the compressed air into various tubes or pipes. The same tell-tale will serve as a check or indicator for all the bells, its piston and cylinder having a separate and direct connection with the main compression-cylinder.

A colored card may be placed on the upper end of the arm that strikes the gong, and a shield be placed in front of it when the arm is standing with its hammer adjacent to the gong. Then as the arm is thrown back by the mechanism shown it will convey the colored card from behind the shield and bring it into view as a visual signal.

The mechanism can be arranged so that only a single bell will be rung, or a single gong struck, or a signal shown, or additional air-tubes may be added and the gongs, bells, and signals multiplied. Our drawings show two gongs struck at once by one pull, and also one of the gongs struck and a bell rung at once by the other pull.

In such places as mines and where it is desirable to communicate by words, the air-pipe may be utilized as a speaking-tube by placing suitable mouth-pieces and valves in it, thus obviating the necessity of telephonic communication.

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

1. In a pneumatic annunciator, an air-compressing cylinder, a distant cylinder and piston adapted to strike a gong or bell, and intermediate air-pipes, in combination with a second gong or bell operating cylinder and a gong or bell located near the air-compressor and adapted to repeat the signal to the sender, as and for the purposes set forth.

2. The air-compressing cylinder A, with its piston A′ and rod B, adapted to be operated directly by means of its hand pull or lever F F′, and having the conveying-pipes H H′, whereby the air is conveyed to a distant operating-cylinder to act upon its piston and rods, and thus strike the distant gong, in combination with the cylinder R, connected directly with the compression-cylinder, said cylinder R having the rod *r*, operating-lever S, and tell-tale gong P, and situated near the operator, whereby the action of striking the distant gong is signaled back to the operator, substantially as herein described.

3. The piston K and rod J, moving within the cylinder I and adapted to be raised by the action of a column of compressed air in the compression-cylinder, said piston being provided with an equalizing-valve, N, as shown, in combination with the cylinder R, also receiving air from the compression-cylinder, said valve being adapted to equalize the pressure of air within the cylinders and pipes after the stroke of the bell, and thus allowing the piston-rod to be depressed, and releasing the spring-hammer S, so as to strike the check-bell P, substantially as herein described.

4. The air-compressing cylinder A, with its piston A′ and rod B, adapted to be operated by the action of the hand-pull F F′, and having two or more conducting-pipes, H H′, leading to distant annunciators, in combination with the rotary valve or valves G, with the actuating-arm G′, adapted to be operated in unison with one of the hand-pulls, whereby the air is directed into any desired conducting-pipe and cut off from the others, substantially as herein described.

In witness whereof we have hereunto set our hands.

D. MORRIS.
THEODORE MORRIS.

Witnesses:
S. H. NOURSE,
FRANK A. BROOKS.