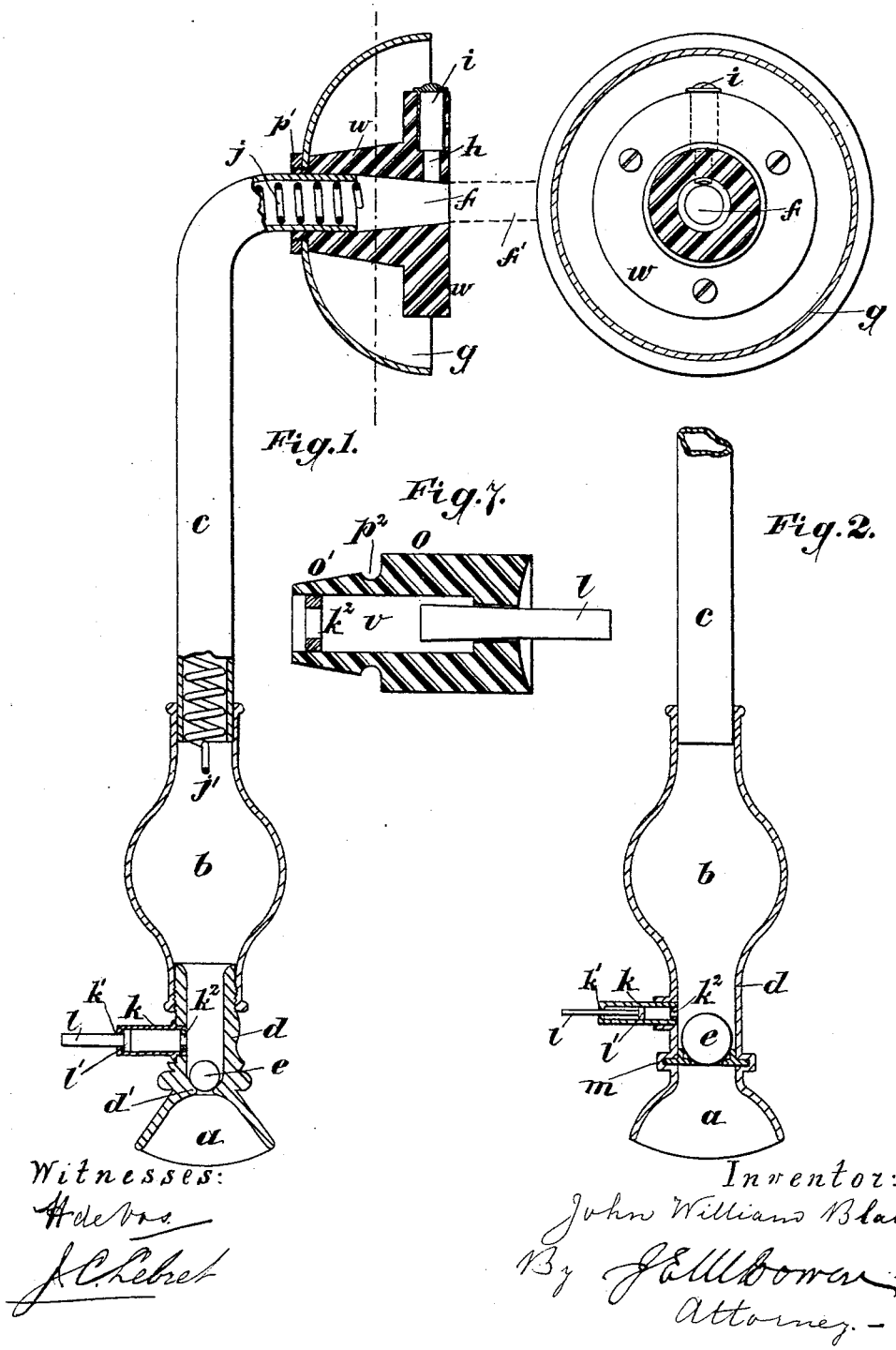
(No Model.) 2 Sheets—Sheet 1.

J. W. BLACK.

SPEAKING TUBE APPARATUS.

No. 493,059. Patented Mar. 7, 1893.



Witnesses:
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J. C. Hebert

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

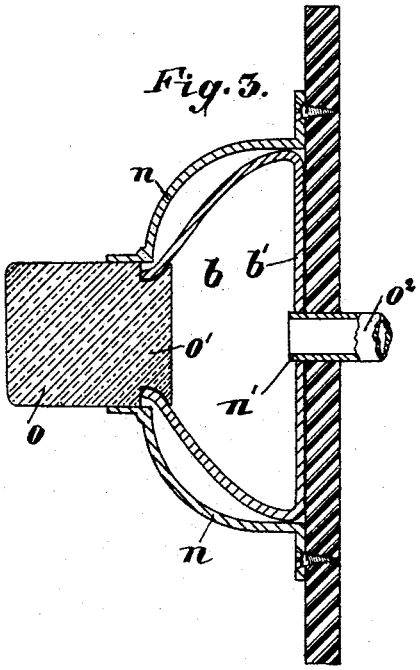


Fig. 4.

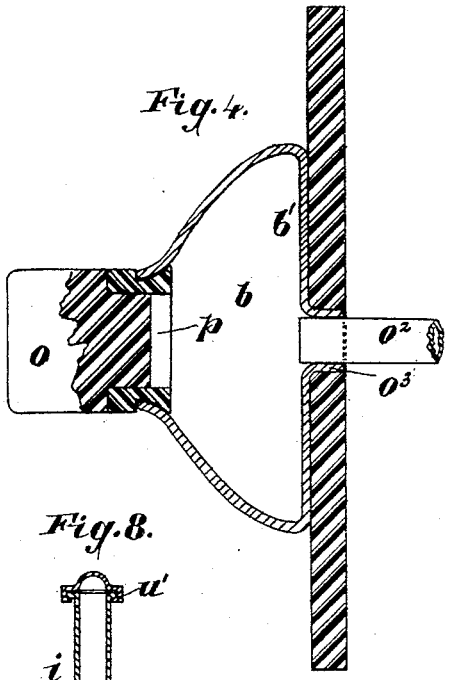


Fig. 8.

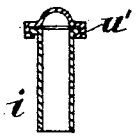


Fig. 5.

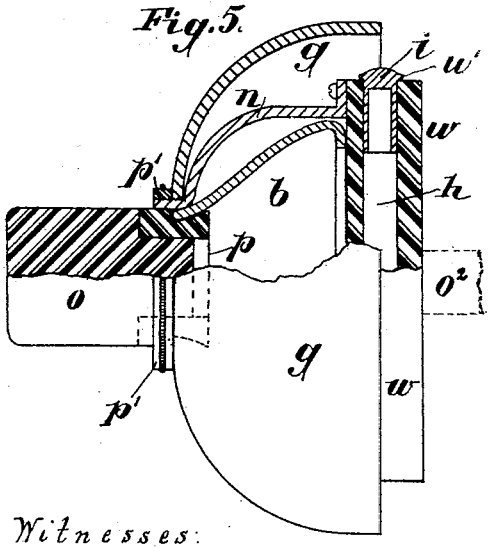
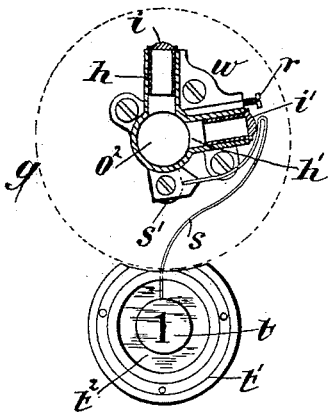


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN W. BLACK, OF GLASGOW, SCOTLAND.

SPEAKING-TUBE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 493,059, dated March 7, 1893.

Application filed April 28, 1891. Serial No. 390,823. (No model.) Patented in England April 11, 1891, No. 6,195.

To all whom it may concern:

Be it known that I, JOHN WILLIAM BLACK, a subject of the Queen of Great Britain, and a resident of the city of Glasgow, Lanarkshire, Scotland, have invented certain new and useful Improvements in Sound-Signaling and Speaking-Tube Apparatus, (for which I obtained Letters Patent in Great Britain, No. 6,195, dated April 11, 1891,) of which the following is a specification.

My invention which relates to an improved sound signaling and speaking tube apparatus has for its object to effect certain improvements hereinafter specified in both the sound signaling and the speaking tube parts of such apparatus.

A "Black" combined signaling and speaking tube apparatus consists of a mouth-piece attached by a collapsible chamber to each end of the speaking tube and a bell or gong is fixed either upon or sufficiently near to the speaking tube to be struck by means of a pneumatically actuated striker contained in a branch of or from the said speaking tube. The collapsible chamber hereinbefore mentioned being attached to a flexible tube, its natural tendency is to hang vertically downward and in this position the mouth-piece attached to it is closed by means of a hinged or equivalent valve which rests upon its seat. When it is desired to ring the bell at the farther end of the speaking tube, the collapsible vessel is compressed by hand. When the signal is made by compressing the collapsible vessel the action of the moving air causes the striker in the branch pipe farther from the speaker to be suddenly raised up therein and to strike the bell or gong at that end thus producing an audible signal which arouses the attention of the person with whom it is desired to communicate. Such person then, on taking hold of the mouthpiece at the farther end of the speaking tube and raising it to his ear, obtains, by virtue of the valve in each mouth-piece having fallen out of its seat, a free communication with the person who has made the audible signal, as in the case of an ordinary speaking tube.

The improvements constituting the present invention are hereinafter pointed out in the claims.

In order that my invention may be properly understood I have hereunto appended two explanatory sheets of drawings whereon:—

Figures 1 and 2 are views of a sound signaling and speaking tube apparatus in, respectively, part side elevation and transverse vertical section and in part front elevation and vertical section. In the view Fig. 2 a different construction of collapsible chamber *b* is shown from that of Fig. 1. Fig. 3 is a vertical section showing a form of chamber with accessory parts for sound signaling apparatus. Fig. 4 shows in vertical section a slightly different form of chamber, having a removable push knob. Fig. 5 shows in part section, a signaling gong and chamber with accessory parts. Fig. 6 is a part transverse vertical section of an indicating arrangement. Figs. 7 and 8 are sectional details.

On the drawings the same reference letters wherever repeated indicate similar or like parts.

Referring to the speaking tube apparatus Figs. 1 and 2, *a* is the mouth-piece and *b* the collapsible chamber, attached to the flexible wire-lined tube *c* at each end of the speaking tube. The chamber *b*, which is of rubber, is connected to the mouth-piece *a* by the elongated extension *d* in which the ball *e* is placed. The extension is narrowed at *d'* or has a rim or a ring *m* in it (as at Fig. 2) to serve as a seat for the ball *e*. The flexible tube *c* is cemented or otherwise secured into the central channel *f*, cut in the, preferably, wooden or metal socket *w*, which is secured to the wall or other part by screws or otherwise and upo which the bell or gong *g* is screwed. The channel *f* communicates by a pipe or tube *f'*, indicated in dotted lines, with the bell or gong *g* in another compartment or situation. In the socket *w* is a branch or channel *h* which may be of small diameter at its lower end as shown at Fig. 1. In the upper enlarged part of this channel works a light, preferably, metal striker or piston *i*, which, when the chamber *b* is collapsed or the tube *c* is blown through, is, by the air pressure forced to fly upward and strike the bell or gong *g* as the case may be. The tube *c* is preferably wire lined as shown at *j* and the lower end *j'* of the wire is bent across the tube to prevent the ball *e* passing up into or closing said tube. The tube *c* normally hangs vertically down-

ward, as shown so that the ball *e* rests on its seat and closes the mouth-piece *a*. When the mouth-piece is raised to or near to the level of the speaker's mouth the ball *e*, by gravity, runs down into the chamber *b* and the passage of the mouth-piece is thus cleared or opened.

When there is a number or series of call bells or gongs arranged in a station, kitchen, office, or other place, I fit an indicator, preferably, upon the extension *d* of the mouth-piece *a* and above the valve seat *d'*. The indicator I prefer to employ for this class of apparatus consists of a hollow tube or nipple *k* fitted into or made in one piece with the extension *d*. In the nipple *k* a rod or piston *l* is free to slide. The piston *l*, as shown, has a shoulder *l'* on it to prevent it coming out of the nipple which latter has also corresponding shoulders or stops *k'* and k^2. If the nipple *k* is screwed into the extension *d* the shoulder k^2 is preferably formed by a ring inserted and fixed into the nipple but when the nipple *k* is made in one piece with the extension, the shoulder *k'* is preferably formed by a cap or its equivalent.

In Fig. 2 the collapsible chamber *b*, is shown as made throughout of indiarubber. In this case the wooden mouth-piece *a* and extension *d* as shown in Fig. 1 are dispensed with, the mouth-piece *a* being molded in one piece with the collapsible chamber *b*. *m* is a preferably vulcanite ring which is sprung into place in the narrow neck of the chamber *b*. The ring *m* serves as a seat for the ball *e*. The indicator *k* may be molded with or fitted into the chamber *b* if so desired.

When it is desired to provide a bell or gong simply for the purpose of calling attention to any one part of a building or structure, and not for the purpose of verbally communicating through a speaking tube, such for instance as street door or kitchen bells, I construct such call bell in the manner represented at Fig. 3 of the annexed drawings. The figure shows a push button *o* for a street door bell. This push button communicates air pressure to a bell at any suitable part of a house. The collapsible chamber *b* is, as shown, preferably made somewhat in the form of a hollow cone or a hemi-sphere. The base *b'* of the cone or hemi-sphere may or may not be used as desired, I prefer to have a base *b'* however, as it prevents liability of air leakage around the rim (Fig. 5 shows a conic, partly conic or hemi-spherical chamber without the base *b'*). *n* is a metal guard corresponding in shape to the chamber *b*. The press button *o* has a recessed and expanding or trumpet shaped part *o'* on to which the tapered open end or apex of the chamber *b* fits tightly. The chamber has a hole *n'* in it which is pressed over the pipe o^2 which latter communicates with the kitchen calling station, or other part.

In Fig. 4 a collapsible chamber *b* is shown made of rubber throughout, and formed with a nipple o^3 which is pushed over the end of the pipe o^2 thus making a tight joint. The chamber is shown as fitted with a push knob made in two parts *o*, *p*. The ring shaped part *p*. fits into the opening at the apex of the chamber *b* and serves as a collar into which the narrow end of the knob *o* fits. This arrangement forms a simple speaking and signaling apparatus. When it is desired to speak through the tube o^2 the knob *o* is merely pulled out so that the person may speak into the chamber *b* and tube o^2. The knob *o* is pushed again into the collar *p* when the speaking has ceased. The chamber *b* will of course have a gong or bell over it similar to Fig. 5.

Fig. 5 shows a cheap form of call bell for a signaling and speaking tube which may be fitted, say at the kitchen end of the apparatus, instead of the form shown at Figs. 1 and 2. The gong *g* is forcibly struck by the hollow piston or striker *i* which is forced up the channel *h* by the sudden or jerked collapse of the conic or other chamber *b* at the opposite end of the apparatus. The metal guard *n* is fitted inside the gong *g*. *p'* is a screwed ferrule or ring for retaining the gong *g* in place. The wood socket *w*, is or may be secured by screws to the wall or other part. The conic chamber *b* is shown, in this view, without a base *b'* it being merely flanged and pressed tight against the wood *w*. The button *o* is similar in construction to that at Fig. 4.

Fig. 6 shows an indicating apparatus for kitchen or other bells. The metal socket *w* is made with two channels *h h'* and strikers *i i'*. The striker *i* is for striking the gong or bell *g* (shown dotted) while the striker *i'* is for striking a bent spring *s* attached, at *s'*, to the socket *w*. *r* is a small screw, or there may be a projection or stop provided in lieu of a screw, to prevent this striker *i'* striking the bell *g*. The lower end of the spring has preferably a small disk *t* on it with the number of the bell. The disk *t* is inclosed in a case *t'* with a glass front t^2. When the bell is rung the striker *i'* causes the spring *s* to vibrate and thus indicate to the attendant the bell that has been rung.

The pistons or strikers are in all cases preferably made as shown at Fig. 5 and in the detail view at Fig. 8 as the rim or flange *w'* prevents dust entering the channel *h* and clogging the piston and also enables the channel *h*, to be bored its full width throughout.

In cases where press buttons are used should it be required to have an indicator on the button such indicator is preferably made as shown in Fig. 7. The press button has a hole *v* in it of a larger diameter at its inner end. In this hole or channel is fitted a small bone or other indicator or piston *l* which is partly tapered, as shown, so as to prevent it being forced out of the button, or being drawn back by the suction when blown out. The inner end of the channel *v* is closed as before, by a ring k^2. The press button *o* may have a tapered end *o'* on it with a groove p^2 so as to

adapt it for insertion in or removal from the opening in the apex of the chamber *b* when the tube o^2 is used for speaking through. The rubber of the chamber *b* grips into the groove p^2 and thus retains the button *o* in place. The form of button shown at Fig 7 may be used in lieu of that at Figs. 4 and 5; or the latter may have indicating pistons *l*, in them like Fig. 7.

With the form of indicator *l* shown at Figs. 1 and 2 when a signal is made it is blown out but immediately the mouthpiece is lifted to reply it falls back into place as it works easy in the nipple *k*.

With the form of hollow conic or nearly conic chamber *b* shown at Figs. 3, 4 and 5 immediately the button *o* is pressed it collapses with a sudden jerk so as to give a sudden movement to the air in the tube o^2, and cause the piston *i* to give a decisive blow to the gong or bell at the other end. A spherical or like chamber would not effect this sudden movement.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pneumatic signaling or speaking tube apparatus, a collapsible rubber chamber *b* having its mouthpiece of soft rubber made in one piece therewith, in combination with a rim or valve seat inserted in said mouthpiece and held therein by engagement with the walls of the mouth-piece, and a valve working therein, substantially as and for the purposes set forth.

2. In a pneumatic or speaking tube apparatus, the combination with the tube, of the hollow conoidal collapsible compressing chamber, and a detachable two part push button inserted in said chamber and having the portion lying within the chamber expanded to bear against the inside face of the chamber, said collapsible chamber being adapted to be used as a speaking mouth piece when one part of said push button is detached, substantially as and for the purposes set forth.

3. A press button made in two parts *o*, *p*, the part *o* fitting removably into the part *p*, which latter is secured into the collapsible chamber, substantially as and for the purpose set forth.

4. In apparatus of the class set forth a press button (*o*) made hollow and having an indicator (*l*) working therein substantially as hereinbefore set forth with reference to Fig. 7 of the drawings annexed.

5. In a pneumatic signaling or speaking tube apparatus, the combination with the socket piece having the channel *h'*, of the piston fitting in said channel, the spring arranged with a portion in front of said chamber and piston to be struck and vibrated by said piston when projected and the index or disk connected with said spring, and actuated when the spring is struck by said piston substantially as and for the purposes set forth.

In witness whereof I have hereunto set my hand, at Glasgow, Scotland, this 26th day of March, 1891.

J. W. BLACK.

Witnesses:
HUGH FITZPATRICK,
DUNCAN DEWAR,
Both of Glasgow.