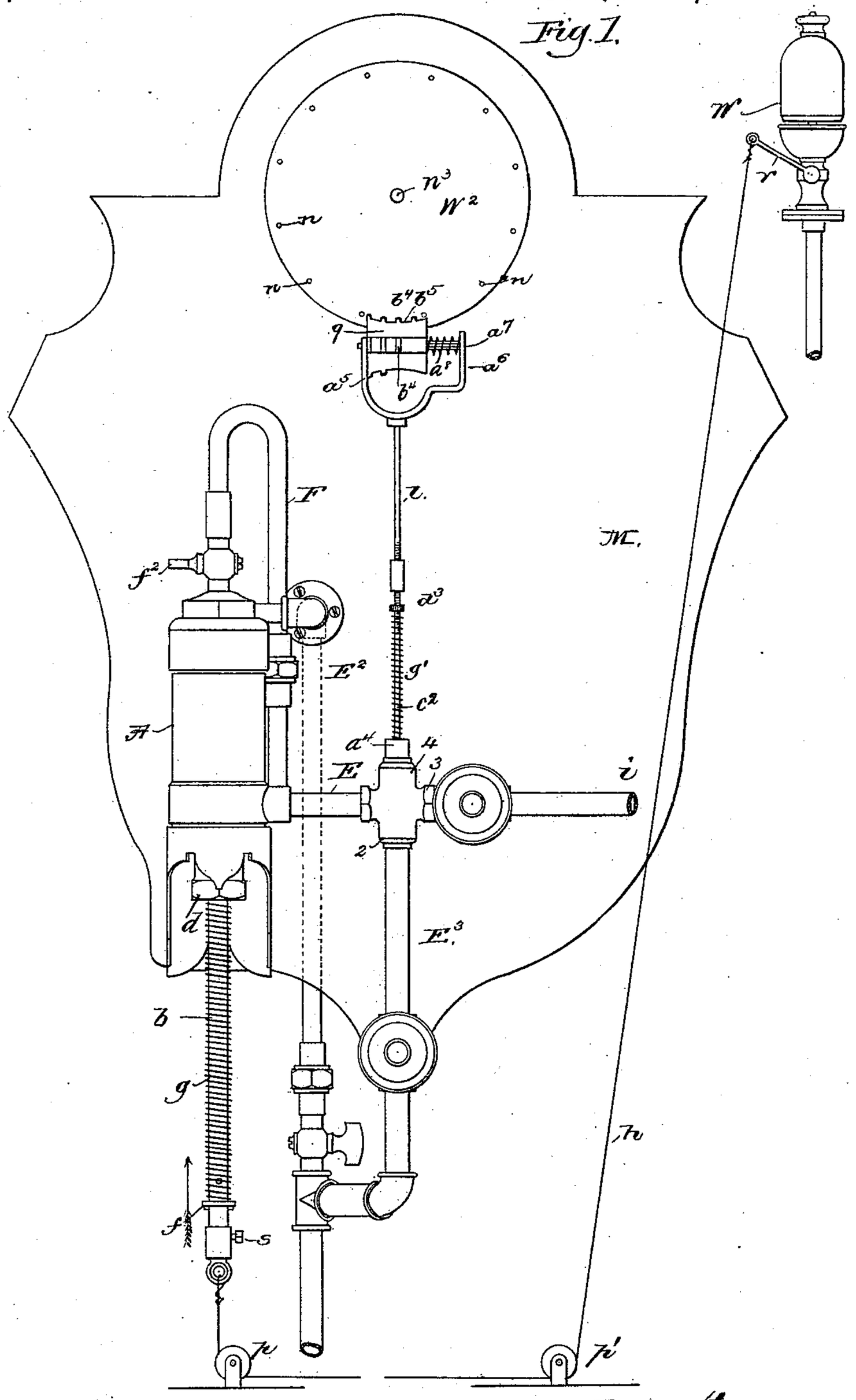
(No Model.) 2 Sheets—Sheet 1.

J. H. CROSBY.

AUTOMATIC SIGNAL APPARATUS.

No. 355,639. Patented Jan. 4, 1887.

Fig. 1.



Witnesses.
John F. b. Porcinkerk.
Fred L. Emery

Inventor.
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(No Model.) 2 Sheets—Sheet 2.

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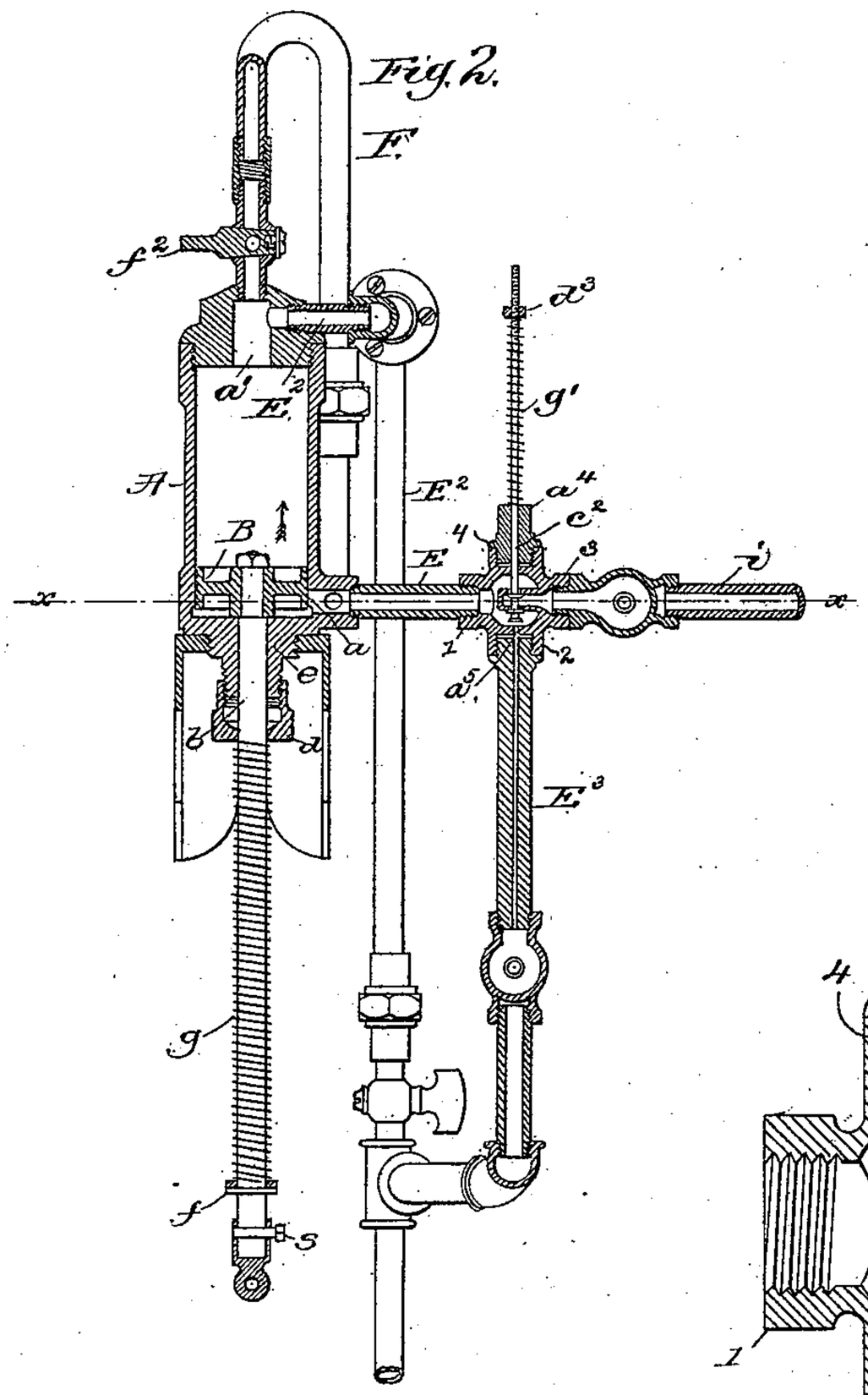


Fig. 2.

Fig. 3.

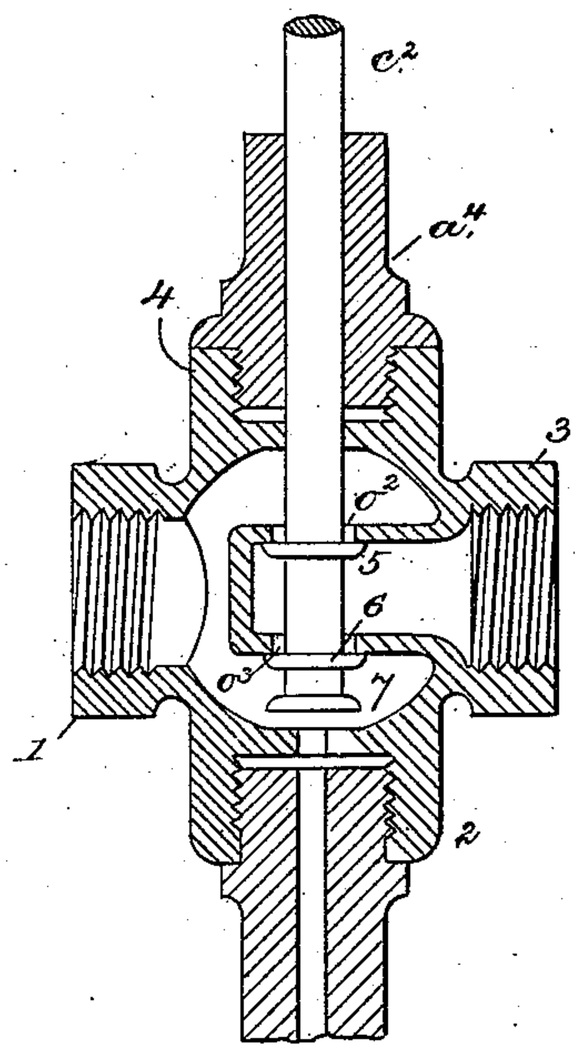
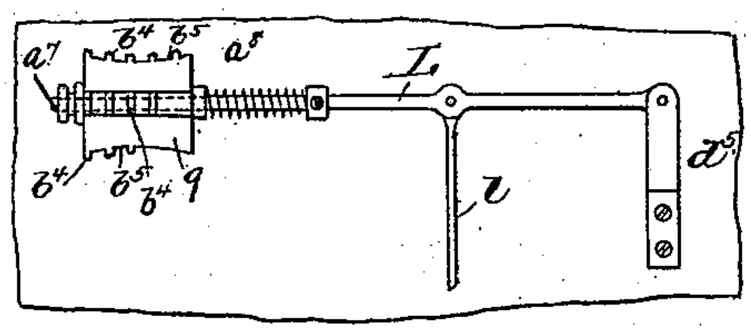


Fig. 4.



Witnesses.
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Inventor:
James H. Crosby.
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UNITED STATES PATENT OFFICE.

JAMES H. CROSBY, OF BOSTON, MASSACHUSETTS.

AUTOMATIC SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 355,639, dated January 4, 1887.

Application filed September 7, 1885. Serial No. 176,371. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. CROSBY, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Automatic Signal Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to that class of automatic signal apparatus wherein an audible signal, actuated by steam or air, is adapted to give a succession of intermittent blasts, the durations of which are automatically controlled by pins or projections on a disk or wheel rotated by a clock or similar motor co-operating with a code-cam, my invention having for its object to produce a simpler, more efficient, and cheaper signal apparatus than has been heretofore made.

My invention is especially designed and adapted to be used on board ships and along the sea-coast in times of fog; and it consists of a cylinder containing a piston, the rod of which is provided with a spring placed between the head of the cylinder and a collar secured on the said rod, the said spring acting to restore the piston-rod to its normal position after the steam or other fluid or medium has ceased to be admitted to the said cylinder, combined with an audible signal and a flexible connection between the said signal and the said piston-rod. The cylinder referred to is provided with the ordinary induction and eduction ports, and with an additional port communicating with the induction-pipe by a suitable pipe provided with a stop-cock, whereby, when desired, the steam or other fluid may be admitted to the top of the cylinder above the piston to form a cushion for the same.

My invention also consists of a valve-stem combined with valves to co-operate with seats in communication with the induction-pipe of the steam-cylinder, the said valve-stem being extended through a stuffing-box provided with a suitable packing, and being provided with a spring placed between the said stuffing-box and a collar on the said stem, the spring acting to maintain the valves of the valve-stem seated until unseated by a suitable motor, shown as a clock actuating a disk or wheel on the main shaft of a clock mechanism or time-train, said disk being provided with pins or projections that strike a code-cam supported by the said valve-stem, the said pins or projections depressing the valve-stem and unseating the valve when it is desired to admit steam to the cylinder, as will be hereinafter fully described.

My invention also consists in providing the valve-stem referred to with a code-cam, herein shown as a hub provided with wings, shaped to present elevations and depressions which are acted upon by pins or projections on a wheel rotated by a clock mechanism or time-train, the number of elevations on each wing and their lengths corresponding to the number of blasts and the duration of each blast which it is desired the audible signal shall give in a definite time, the depressions indicating intervals during which the audible signal is silent.

Figure 1 is a front elevation of my improved audible-signal apparatus, the same being secured to a bracket adapted to be affixed in any desired or usual place. Fig. 2 is a section of Fig. 1, showing the connection between the operating parts; Fig. 3, an enlarged sectional view of the operating-valves; and Fig. 4, a modification to be referred to.

Referring to the drawings, a steam-cylinder, A, made of usual material, is provided with ports *a* and *a'*, the former communicating with the induction-pipe E and the latter with the eduction-pipe E^2, and also with a pipe, F, connected at its lower or opposite end to the induction-pipe E, the pipe F having a stop-cock, f^2, to open and close the said pipe to admit steam above the piston, thereby forming a a cushion for the same.

The steam-cylinder referred to has a piston, B, whose rod *b* (see Fig. 2) moves in a sleeve, *e*, provided with suitable packing, and rendered air-tight by a nut, *d*, screwed to the said sleeve; and the said rod has a spring, *g*, wound upon it, one end of the spring bearing against the said nut, and the other end against a collar, *f*, fastened on the piston-rod, the said rod having secured to it a cap which is made adjustable on the said rod by means of the set-screw *s*.

The piston-rod referred to is connected in any convenient manner to the audible signal W, herein shown as a steam-whistle of usual construction, the said rod being herein shown

as connected by a flexible connection, *h*, passing under pulleys *p p'*, the valve of the said audible signal or whistle being opened when the piston-rod is moved up, or in the direction of the arrow, (see Fig. 2,) by steam or other motor—such as air—which enters the cylinder A through the port *a*, the said whistle-valve remaining open and emitting a blast until the piston and its rod are returned to their normal positions by the spring *g*.

I have provided the induction-pipe E with a fitting having four screw-threaded branches or arms, 1 2 3 4, the said fitting containing a valve-stem, c^2, provided, as herein shown, with three valves, 5 6 7, (see Fig. 3,) the valves 5 and 6 controlling the admission of steam to the cylinder A, to actuate the piston and sound the audible signal or whistle, the valve 7 serving as an exhaust.

The arm 1 is connected to the induction-pipe E, the arm 2 to an exhaust-pipe, E^3, communicating with the exhaust-pipe E^2, the arm 3 to a pipe, *i*, leading to the generator for steam or holder for compressed air, while the arm 4 has secured to it a stuffing-box, a^4, through which the valve-stem c^2 is extended, the said stem having on it a spring, *g'*, one end of which rests against the said stuffing-box, while the other end rests against a collar, d^3, secured on the said stem, the said spring acting to seat the valves 5 and 6 after each blast.

The extended valve-stem c^2 referred to, and as shown in Fig. 1, has a link, *l*, forked at its upper end, as at a^5 a^6, the said forks receiving a rod, a^7, that forms the center of motion or fulcrum for a code-cam, 9; but in Fig. 4 the said rod is shown as extended and secured to the bracket d^5, to serve as a stay for the link *l'*, which is shown in Fig. 4 as a straight link.

The code-cam 9 is herein shown as a hub provided with wings, herein shown as set at right angles to one another, and having elevations b^4 and depressions b^5, which are herein shown as acted upon by pins or projections *n* on a disk or wheel, W^2, mounted on the main shaft n^3 of a clock mechanism or time-train of ordinary construction, and by means of which a uniform rotary movement is imparted to the said disk or wheel.

The pins or projections *n* are distributed over the face of the disk or wheel W^2 at equal distances apart, so that when one pin is passing from engagement with the code-cam the pin following next in order will be brought into engagement with said code-cam, the said pins depressing the link *l* and valve-stem c^2 to open the valves 5 and 6 and admit steam into the steam-cylinder A through the ports o^2 o^3, pipe E, and port *a*, to move the piston B upward.

The elevations b^4 and depressions b^5 of the wings on the hub referred to are of such length and are so arranged with relation to each other that a series of long blasts of the signal may be alternated by a series of short intervals of silence—as, for example, the elevations may produce a blast of ten seconds, while the depressions would permit of a silence of only five seconds. Each wing of the hub may have a different number of elevations and depressions, thereby permitting the code of signals to be changed when desired.

The rod a^7, as herein shown, is encircled by a spring, a^8, one end of said spring bearing against one arm of the forked lever *l*, and the other end bearing against the end of the code-cam 9, said spring serving to steady the said code-cam when the latter is acted upon by the pins *n*.

The piston B in its upward stroke opens the valve of the audible signal or whistle W, by actuating the lever *r*, which is connected to the piston-rod *b* by the flexible connection *h*, as shown in Fig. 1.

Instead of the mechanism shown for unseating the valves 5 and 6, I may attach a straight link, *l'*, to the valve-stem c^2, the said link having secured to it a lever, L, as shown in Fig. 4, which lever is pivoted in a bracket, d^5, and which supports the code-cam 9 at its end remote from its fulcrum. This latter arrangement affords a greater power for unseating the valve.

In the operation of my improved audible signal the number of blasts per minute or for any other definite or standard time can be regulated by adjusting the code-cam, so that a wing having the requisite number of elevations or depressions or teeth or cams shall be placed in position to be engaged by the pins on the disk or wheel rotated by the clock mechanism or time-train, thereby causing the desired number of blasts to be given.

Any desired number of blasts can be given in a definite required time by regulating the number of elevations of the different wings, and the period of silence between each blast can be regulated by adjusting the distances between the successive elevations.

I do not desire to limit myself to any particular form of clock mechanism or time-train, as any of the well-known forms of time-motors may be used equally well.

I claim—

1. In a signal apparatus, a cylinder, a piston and piston-rod therein, and an audible signal in connection with said cylinder and piston-rod, and a valve-stem provided with a valve to control the admission of steam or other fluid into the said cylinder, as described, to actuate the said piston, combined with a code-cam, and means, substantially as described, to move the valve-stem through said code-cam, as and for the purpose set forth.

2. In a signal apparatus, a cylinder, a piston therein, a valve-stem and valves thereon to regulate the admission of steam or air into said cylinder to actuate the said piston, and an adjustable code-cam having a series of elevations and depressions to represent different code-signals, combined with means, substan-

tially as described, to act upon the said code-cam and actuate the said valve-stem, substantially as described.

3. In an automatic signal apparatus, an audible signal, a cylinder provided with a piston and piston-rod connected to said audible signal, and means, substantially as described, to restore the piston to its normal position after each sounding of the audible signal, combined with a valve-stem having valves communicating with said cylinder, and with means, substantially as described, to seat and unseat the said valves, as and for the purpose set forth.

4. In an automatic signal apparatus, an audible signal, a cylinder, its piston and piston-rod, and means, substantially as described, to restore the said piston to its normal position, combined with a valve-stem having a code-cam and valves on said valve-stem, and means, substantially as described, to unseat the said valves, and means, substantially as described, to seat the valves, as and for the purpose specified.

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

JAMES H. CROSBY.

Witnesses:

JAS. H. CHURCHILL,

G. W. GREGORY.