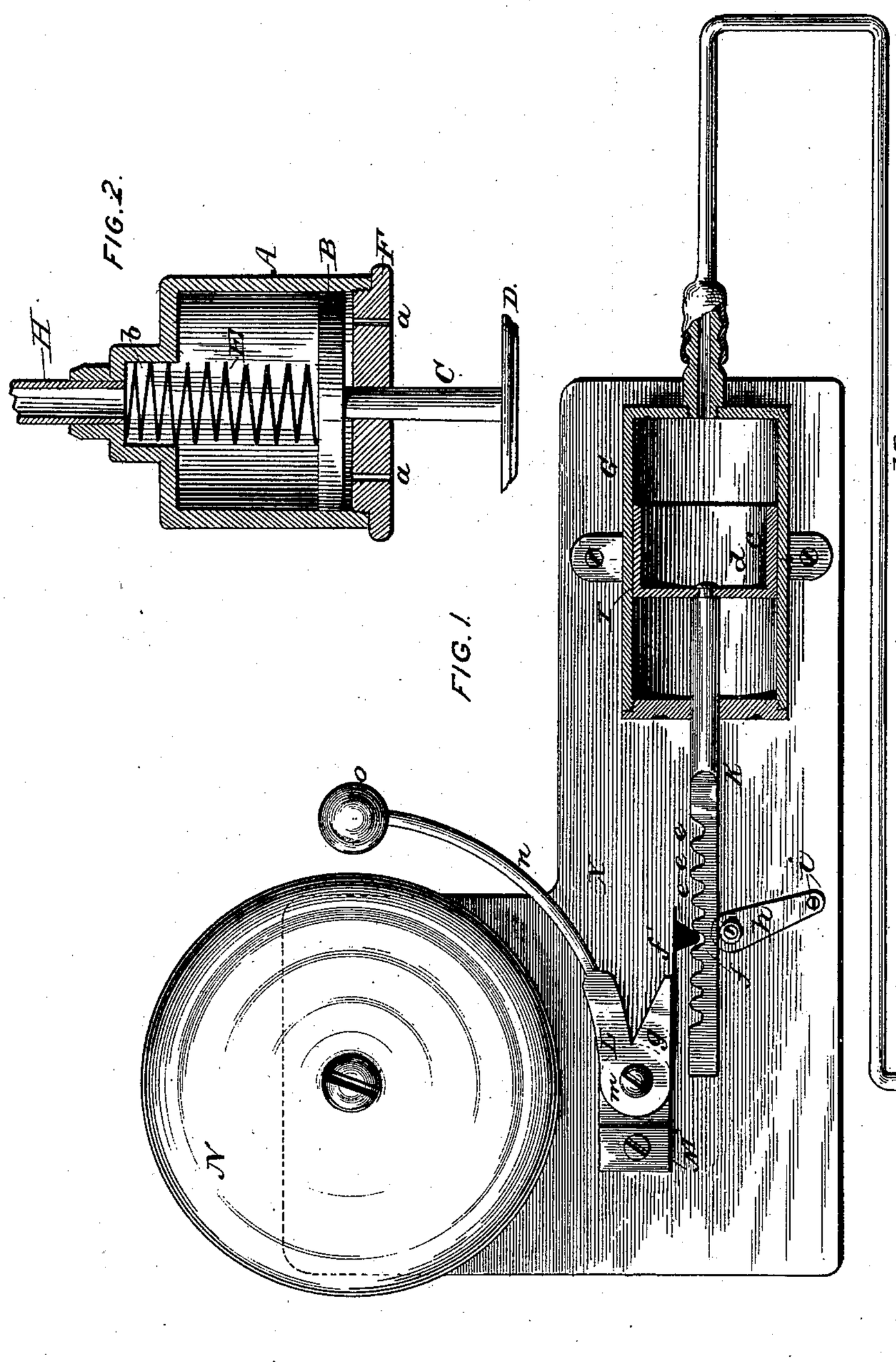
(No Model.)

J. A. MALONEY.

PNEUMATIC SIGNAL BELL.

No. 347,184. Patented Aug. 10, 1886.



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PNEUMATIC SIGNAL-BELL.

SPECIFICATION forming part of Letters Patent No. 347,184, dated August 10, 1886.

Application filed October 24, 1885. Serial No. 180,883. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. MALONEY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Pneumatic Signal-Bells; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention is to construct a signal-bell to be operated by compressed air to produce a continuous rattling sound such as is common to electric bells.

The invention consists in the constructions hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a front elevation partly in section; Fig. 2, a longitudinal section of the air-pump, and Fig. 3 a side view of the support for the piston-rod.

Reference being had to the drawings and the letters of reference marked thereon, A represents an air-pump provided with a piston, B, a rod, C, a disk or push-button, D, and a spring, E, for returning the piston to its normal position. The removable head F of the cylinder A is provided with small apertures *a a*, for relieving that end of the cylinder of air when the piston is being returned by the spring, and in the opposite head of the cylinder is formed a recess or pocket, *b*, which supports one end of the spring E.

G represents another cylinder interposed between the air-pump and the vibrating bell-hammer, and communicates with the former by means of a tube, H, which may be of any suitable material--such as metal or rubber—and conducts the air from the pump to the cylinder where it operates against the piston I which is cup-shaped and provided with a long bearing-surface formed by the annular flange *c* which projects at a right angle from the disk *d* of the piston. This extended bearing-surface of the piston enables me to dispense with packing around its periphery and forms a chamber within the walls of the piston to receive the impact of and retain the motor fluid during the outstroke of the piston. To the disk *d* of the piston I is secured a rod, K, which is provided with a series of teeth, *e*, forming a rack with which the projection *f* on the spring *f'* of the short arm *g* of the bifurcated vibrating lever L engages. The spring *f'* is secured to the arm *g* by brazing or in any other suitable manner well known to metal workers. The rod K is supported and held in position by means of an adjustable arm, *h*, which is pivotally secured upon a screw or pin, *i*, which enters the board X to which the apparatus is attached. From the arm *h* projects a stud, *k*, which is surrounded by a revolving sleeve, *l*, which is held in place by a screw, *l'*, and upon which the piston-rod rests. The sleeve forms an anti-friction bearing for the rod. To adjust the arm *h* and the stud *k* secured thereto, the screw *i* is slackened in its seat formed in the board X, and the arm moved until the sleeve *l* on the stud *k* bears against the under side of the rod K and sustains the weight thereof, when the screw *i* is again tightened and the arm *h* securely held in position. The vibrating lever L is fulcrumed at *m* upon a step, M, also secured to the board X, and the long curved arm *n* of the lever is provided with a hammer, *o*, for striking the bell N.

By the arm *n* being made to project out farther from the fulcrum than the arm *g* the gravity of the arm *n* and the hammer *o* keeps the projection *f* of the spring *f'* in constant contact with the rack formed on the rod K. It will also be observed that by placing the fulcrum of the vibratory lever on one side of both of its arms the gravity of the entire lever is brought into use to keep the short arm in constant contact with the rack.

The several parts being constructed substantially as described, the operation is as follows: The piston B of the air-pump being pushed in by the hand of the person desiring to give a signal, the air in the pump-cylinder is forced through the pipe H into the cylinder G, and forces the piston I outward, causing the rack on the rod K to engage with the spring *f'* and vibrate the lever L, thus causing the hammer *o* to strike the bell N a number of strokes in rapid succession, and producing a rattling sound in every respect like that com-

mon to electric signal-bells. The outstroke of the piston I compresses air between the disk *d* and the cylinder-head through which the rod passes. The instant the operator removes his hand or thumb from the push-button D the resiliency of the spring E returns the pump-piston to its normal position, and permits the air on the flanged side of the piston I in the cylinder G to expand, when the air compressed by the outstroke of said piston I will expand and return the piston, and cause the rack on the rod K to again engage with the spring *f'* and continue the striking of the bell. It will be observed that the bell is struck by both strokes of the piston I, that they are effected by compressed air acting upon each side of the piston, and that the strokes of the bell are continuous from the beginning of the outstroke to the end of the return-stroke.

I do not limit myself to the use of the spring-arm *f'* of the vibrating lever L, as the arm *g* may have a projection formed on it to engage with the teeth *e* on the rod K. By means of the arm *h*, stud *k*, and sleeve *l*, the rod K can be adjusted to a nicety, and kept in perfect line, while the sleeve forms an anti-friction bearing for it, thus rendering the operation of the piston I very sensitive and effectual.

I am aware of a bell having a lever, one arm of which strikes the bell and the other engages with a rack upon a window-sash, and is held in contact therewith by a spring.

Having thus fully described my invention, what I claim is—

1. The combination of a cylinder having a rod provided with a rack, an adjustable support for the rod, and a vibrating lever, substantially as described.

2. The combination of a cylinder having a rod provided with a rack, an adjustable support for the rod, carrying an anti-friction bearing, a vibrating lever, and a bell, substantially as described.

3. The combination of a cylinder having a close head, a piston provided with a rod projecting from one side of the head or disk, and with a cylindrical flange on the opposite side, whereby a chamber is formed within the walls of the piston to receive the impact of the motor fluid and retain the same, a vibrating lever, and a bell, substantially as described.

4. The combination, with a cylinder provided with a close head, of a piston and its rod having a rack thereon, a bifurcated vibrating lever, one arm of which engages with said rack and the other strikes the bell, and a fulcrum for said lever on one side of both arms, whereby the rack and one arm of the lever are held in constant working contact by the gravity of the lever, substantially as described.

5. In a pneumatic signal-bell, a lever, one arm of which carries a hammer and the other engages with a rack on a piston-rod, in combination with an air-pump and a cylinder having a close head through which the rod works, and interposed between the lever and the pump, the piston of which is operated in one direction by air compressed in said pump, and returned by the expansion of air between the piston and the close head in said cylinder, compressed by the outstroke of the piston, substantially as described.

6. The combination of a bell, a cylinder, and piston, the rod of which is provided with a rack, a vibrating lever having an arm engaging with the rack, a curved arm carrying a hammer, and a fulcrum on one side of both arms, whereby the weight of said lever will keep the short arm in constant contact with the rack, substantially as described.

7. The combination of a bell, a movable rack, a bifurcated lever having a short arm engaging with the rack, a long curved arm carrying a hammer, and a fulcrum on one side of both arms, whereby the short arm is kept in constant contact with the rack by gravity of the lever, substantially as described.

8. The combination of a bell, a rod and a rack, and a bifurcated vibrating lever fulcrumed on one side of both arms, the short arm provided with a spring having a projection formed thereon and engaging with the rack, substantially as described.

9. The combination of a bell, a horizontal cylinder having a rod provided with a series of teeth forming a rack, a support for said rod, and a bifurcated vibrating lever fulcrumed on one side of both arms, one arm of which carries a hammer and the other is in constant contact with the rack and effects a continuous ringing of the bell during both strokes of the piston, substantially as described.

10. The combination of a bell, a rod provided with a rack, and a bifurcated lever both arms of which project from one side of the fulcrum, the short arm engaging with the rack and the long one carrying a hammer and arranged to keep the former in working contact with the rack by the gravity of the lever, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES A. MALONEY.

Witnesses:
S. A. TERRY,
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