J. McLEISH.

Air-Compressing Apparatus for Air-Engines.

No. 133,713. Patented Dec. 10, 1872.

Fig. 1.

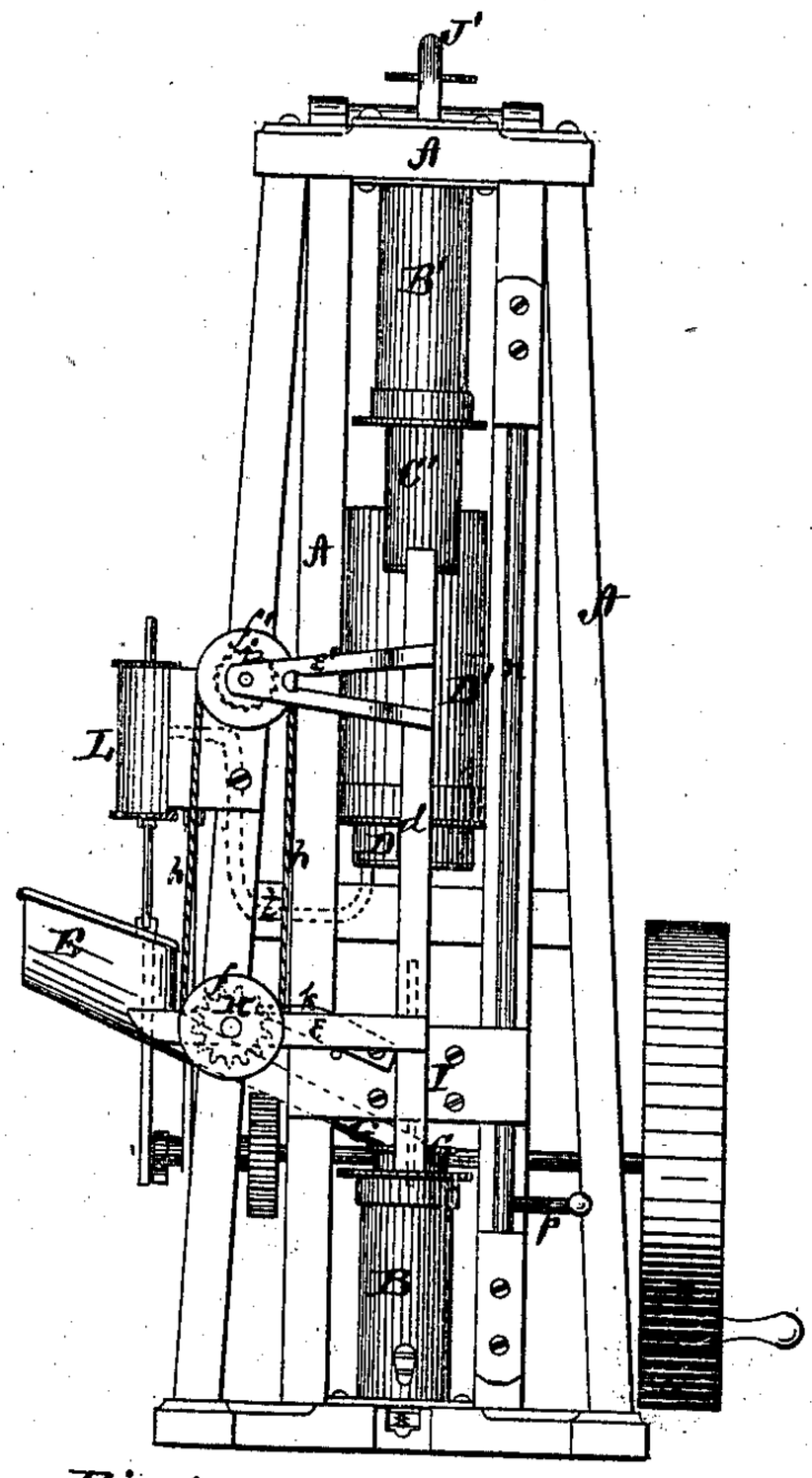


Fig. 2.

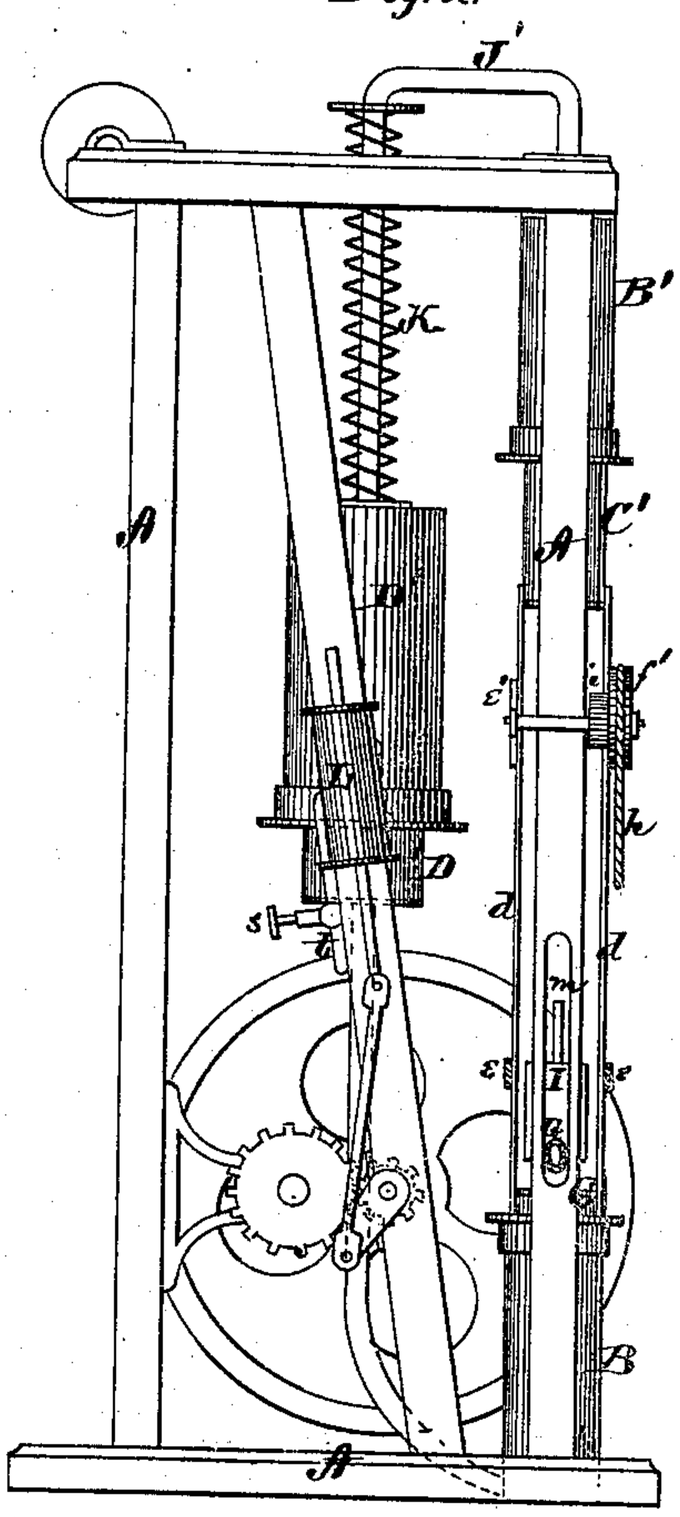


Fig. 3.

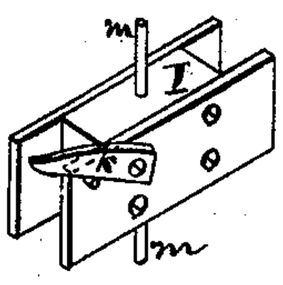
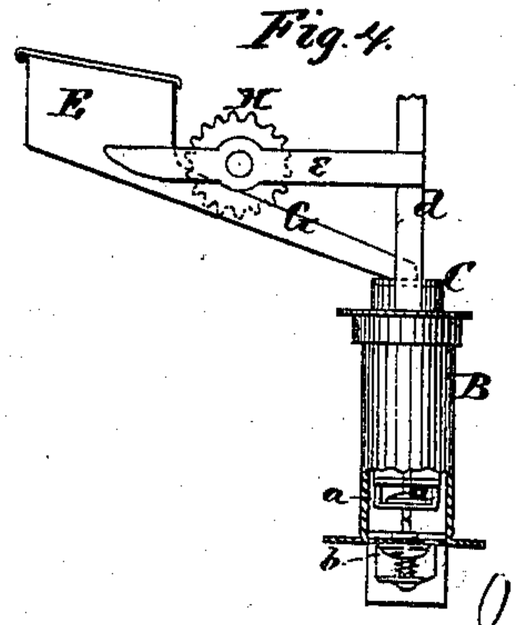


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN McLEISH, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN AIR-COMPRESSING APPARATUS FOR AIR-ENGINES.

Specification forming part of Letters Patent No. 133,713, dated December 10, 1872.

To all whom it may concern:

Be it known that I, JOHN McLEISH, of Philadelphia, in the county of Philadelphia and in the State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Compressing Air for Air-Engines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of my invention consists in the construction and arrangement of an apparatus for compressing air for air-engines, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a front view, and Fig. 2 a side view, of my machine. Figs. 3 and 4 are detached views of certain parts thereof.

A represents the frame of my machine, in which at the bottom is placed an air-pump, B. The piston C of this air-pump is in the shape of a cylinder, as shown, and in the bottom of the same is an upwardly-closing valve, *a*. In In the bottom of the air-pump B is a valve, *b*, held upward to its seat by a spring, as shown in Fig. 4. When the air is pumped or compressed in the air-pump this valve *b* opens and lets the air pass through a pipe, J, into the reservoir D. In the upper part of the frame A, directly above the pump B, is a similar pump, B′, placed in a reversed position, its cylinder-piston C′ entering at the lower end, and is by two bars or rods, *d d*, connected with the piston C of the lower pump B. From the upper pump B′ the air passes through a pipe, J′, into the reservoir D at the top. E represents a hopper, from which a conductor, G, leads to the top of the piston C, and firmly attached to it. In this conductor is placed a toothed wheel, H, the shaft of which has its bearings in arms *e e* connecting the hopper E with the bars *d d*. Upon one end of this shaft is a pulley, *f*, connected by a belt or cord, *h*, with a pulley, *f′*, placed upon the end of a shaft above, having its bearings in arms *e′* also extending from the bars *d*. Upon this shaft is placed a ratchet-wheel, *i*, which is operated by a pawl, *k*, pivoted to the weight I. This weight is on the front and back provided with plates projecting at the ends to form guides for conducting the weight up and down between two upright bars of the frame A, between which two bars the pumps are situated. From the center of the weight I, both on the upper and lower side, projects a pin, *m*, to enter openings in the two pistons C C′. In a groove in one of the upright bars above mentioned is placed a rod, *n*, pivoted eccentrically at its ends, and provided with a handle or lever, *p*, for turning it.

The weight I being raised as high as possible, the rod *n* is turned by its handle so as to wedge against the front plate on the weight, and thus hold the weight up. The hopper E is now filled with cartridges or pellets of any suitable construction, one of which is dropped into the air-pump B through the opening in the upper end of the piston C. The rod *n* is then turned so as to release the weight, when the same drops down upon the piston C, forcing the same into the air-pump B, compressing the air into the reservoir D. The compression of the air in the air-pump B creates sufficient heat to ignite and explode the pellet or cartridge previously placed therein, and the force of this explosion throws the weight upward until it strikes the lower end of the piston C′, forcing the same into the pump B′, compressing the air in the same into the reservoir D, when the weight falls down of its own accord, operating the pump B again. On its upward stroke the pawl *k* on the weight I comes in contact with and turns the ratchet-wheel *i* a certain distance, which movement, through the medium of the pulleys *f f′* and cord *h*, turns the toothed wheel H sufficiently to feed one pellet or cartridge down the conductor G and into the pump B, so that as the weight comes down the same compression and explosion and consequent lifting up of the weight occurs again. This movement of the weight up and down continues as long as there are pellets or cartridges in the hopper to be fed to the lower pump B, and thus continuing to compress the air by the pumps B and B′ into the reservoir D. This reservoir is made with a cap, D′, like a gas-receiver in gas-works, working up and down on the pipe J′, and with a spring, K, surrounding said pipe and press-

ing the cap down so as to equalize the pressure of the air in the reservoir. From the reservoir D the compressed air passes through a pipe, *t*, into an air-engine, L, to operate any desired machinery; the pipe *t* being provided with a stop-cock, *s*, for shutting off and letting on the air, and for regulating the amount passing into the engine.

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

1. The arrangement of two air-pumps, B B′, one placed above the other in an inverted position, and provided with cylindrical pistons C C′, respectively, which are connected by bars *d d*, all substantially as herein set forth.

2. The double-acting weight I, operating upon the pistons C C′ of the air-pumps B B′, substantially in the manner and for the purposes herein set forth.

3. In combination with the double-acting weight I, the eccentrically-pivoted rod *n*, provided with handle or lever *p*, substantially as and for the purposes herein set forth.

4. The combination, with the piston C of the air-pump B, of the hopper E, conductor G, and toothed wheel H for automatically feeding pellets or cartridges from the hopper into said air-pumps, substantially as and for the purposes herein set forth.

5. The arrangement of the toothed wheel H, pulleys *f f′*, cord *h*, and ratchet-wheel *i*, all operated during the upward movement of the double-acting weight I by means of the pawl *k* pivoted to said weight, substantially as herein set forth.

6. In an apparatus for compressing air, I claim a double-acting or reciprocating weight operating two air-pumps, when the movement of said weight in one direction is caused by the explosion of a pellet or cartridge, said explosion being the result of the compression of the air in one of the air-pumps, and the movement of the weight in the opposite direction is caused by its own gravity, substantially as herein set forth.

7. The arrangement of the air-pumps B B′, pipes J J, air-reservoir D with cap D′ and the spring K, all substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 11th day of May, 1872.

JOHN McLEISH.

Witnesses:

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C. L. EVERT.