2 Sheets—Sheet 1.

T. G. SPRINGER.

Air-Compressing Apparatus.

No. 211,662. Patented Dec. 17, 1878.

Fig. 1.

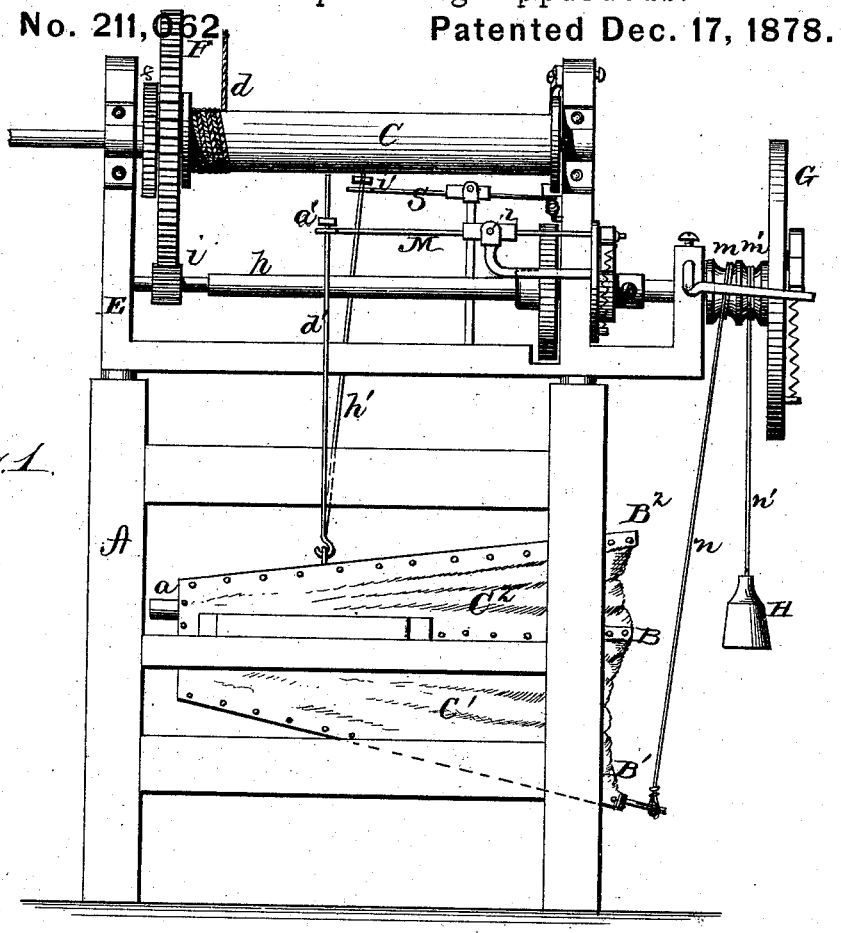
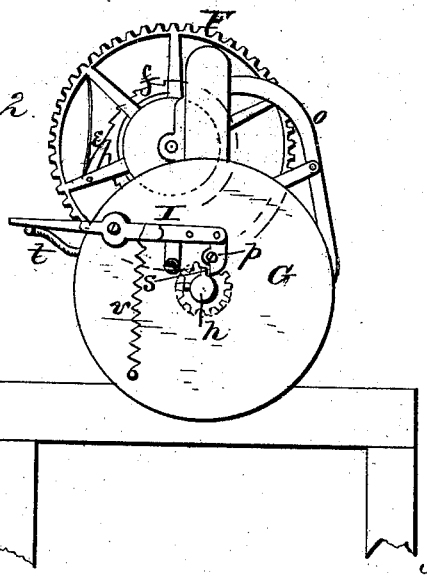


Fig. 2.



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2 Sheets—Sheet 2.

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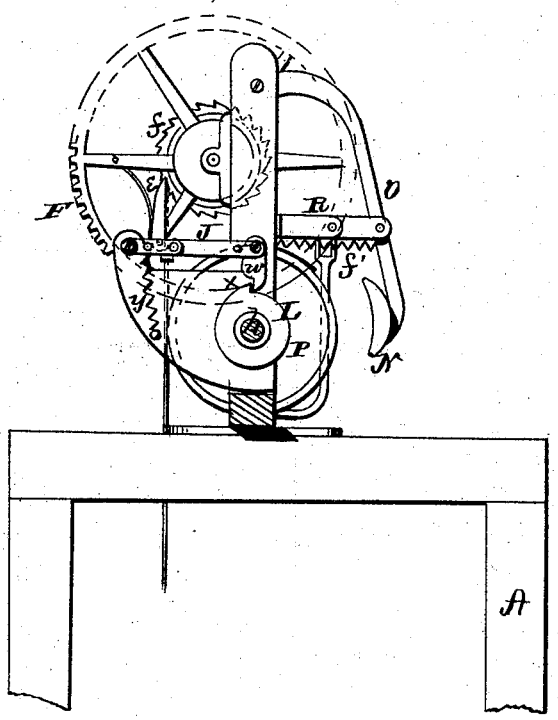
Air-Compressing Apparatus.

No. 211,062. Patented Dec. 17, 1878.

Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

THEODORE G. SPRINGER, OF NEW YORK, N. Y.

IMPROVEMENT IN AIR-COMPRESSING APPARATUS.

Specification forming part of Letters Patent No. **211,062**, dated December 17, 1878; application filed December 4, 1878.

To all whom it may concern:

Be it known that I, THEODORE G. SPRINGER, of New York, in the county of New York, and in the State of New York, have invented certain new and useful Improvements in Apparatus for Compressing Air; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, 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 pumping or forcing air through pipes for any purpose that the same may be desired, 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 drawings, in which—

Figure 1 is a front elevation of my machine. Fig. 2 is an end view of the same. Fig. 3 is a detailed view of the brake mechanism.

A represents a frame-work of any suitable construction, in which is a bellows divided by a central partition, B, into two compartments or chambers, C^1 and C^2. B^1 is the bottom board or plate of the bellows, and B^2 is the upper.

The partition B is provided with a valve, and the bottom board has a similar valve, both closing downward.

a is the outlet-pipe of the bellows, leading from the upper chamber, C^2. On top of the main frame A is a metal frame, E, containing a drum, C, around which is wound a wire or toher rope or cable, *d*. This rope or cable is to be carried over suitable pulleys, and have sufficient weight attached to it for keeping sufficient tension on the drum and rotate the same intermittingly, as hereinafter described.

On one of the journals of the drum is loosely placed a cog-wheel, F, connected to the drum by ratchet-wheel *f* and pawl *e*. The cog-wheel F gears with a pinion, *i*, on a shaft, *h*, running parallel with the drum. On one end of this shaft is placed loosely a large wheel or disk, G, the hub of which is formed or provided with two pulleys, *m m'*, forming part thereof or firmly connected to it. To the pulley *m* is attached a cord or chain, *n*, which connects with the bottom plate, B^1, of the bellows, while to the pulley *m'* is attached a cord or chain, *n'*, to which a weight, H, is attached, the two cords or chains being wound in opposite directions around their respective pulleys.

On the outside of the disk G is pivoted a toggle-lever or break-joint lever, I, which actuates a dog, *p*, to catch on a lug, *s*, upon the end of the shaft *h*, to stop the revolution of the disk.

t is an arm projecting from the metal frame E, to act as a stop for the toggle-lever I. *v* is a spring connected to the toggle-lever for holding the same rigid.

To a suitable arm projecting from the frame E is pivoted another toggle-lever, J, which actuates a dog, *w*, to catch against a lug, *x*, on a disk, L, secured upon the shaft *h*. *y* is the spring connected to this toggle-lever for holding the same rigid.

M is a rod, pivoted at *z*, and having one end projecting below and against the joint of the toggle-lever J, while in the other end of said rod is formed an eye, through which is passed a rod, *d'*. This rod, is at its lower end, connected to the top plate, B^2, of the bellows, while on the upper end is a nut, *a'*, which can be adjusted up and down, as required, to properly set the machine.

The operation of this part of my machine is as follows: The cord or cable *d* being wound up on the drum, and the machine at rest, the upper chamber, C^2, of the bellows is full of air, the end of the toggle-lever I rests on the arm *t*, and the dog *p* is held against the lug *s*. The dog *w* is also, by the toggle-lever J, held against the lug *x*. The lower plate, B^1, of the bellows is down, and the lower chamber, C^1, also full of air. Now, as the top plate, B^2, descends of its own weight, the air in the upper chamber, C^2, is discharged through the pipe *a* to the point desired. Before the air is entirely discharged from this chamber, the nut *a'* on the rod *d'* strikes the end of the pivoted rod M, and the other end of this rod breaks the joint in the toggle-lever J, so as to release the dog *w* from the lug *x*, which allows the weights to operate on the drum C, rotating the same. This, by

means of the gearing F *i*, gives one revolution to the shaft *h*. The shaft *h* carries with it the disk G, whereby the cord or chain *n* is wound up on its pulley *m*, thereby raising the bottom plate, B^1, of the bellows, so that the air in the lower chamber, C^1, will pass into the upper chamber, C^2. As the shaft *h* completes its revolution it is stopped by the dog *w* taking against the lug *x*, the toggle-lever J having by its spring *y* been thrown straight as soon as the top plate, B^2, is raised by the admission of the air from the lower to the upper chamber.

Just before the shaft *h* completes its revolution and is stopped, as above described, the end of the toggle-lever I strikes against the under side of the arm *t* and the joint therein is broken, which releases the dog *p* from the lug *s* on the end of the shaft *h*. As soon as the shaft *h* then stops, the lower plate, B^1, of the bellows drops down, causing the air to enter and fill the lower chamber, C^1. This movement of the said plate, by means of the cord *m*, returns the disk G to its former position, the spring *v* straightening the toggle-lever and holding the dog *p* against the lug *s*.

In case that from any cause the mechanism connected with the toggle-lever J should fail to work so as to stop the revolution of the shaft *h*, the machine would run down. To obviate this difficulty, I have provided a brake, N, attached to a pivoted lever, O. This brake is to be thrown against the periphery of a wheel, P, secured upon the shaft *h*. The brake is held away from the wheel by means of a toggle-lever, R, and under the joint of this lever projects one end of a pivoted rod, S, the other end of which has an eye for the passage of a rod, *h'*. The lower end of this rod is connected to the top plate, B^2, of the bellows, and the upper end has a nut, *i'*, screwed thereon. This nut should be so adjusted as not to come in contact with the rod S when the rod M is operated to break the joint in the toggle-lever J; but if this should fail to work, and as the plate B^2 of the bellows continues to descend, the nut *i'* strikes the rod S and pulls down the same, so that the other end thereof will break the joint in the toggle-lever R, and a spring, *f'*, throws the brake N against the wheel P. This at once slackens the motion, and the machine is stopped by a lug or projection, *m'*, on the wheel P coming in contact with the brake N.

In the operation of the machine the weight H is used simply as a counter-balance to prevent the too sudden dropping of the bottom plate, B^1, of the bellows.

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

1. In combination with a double bellows operated by weights, the loose disk G, placed upon the intermittingly-rotating shaft *h*, the toggle-lever I, with spring *v*, dog *p*, arm *t*, and lug *s* on the shaft, substantially as and for the purposes herein set forth.

2. The combination of the shaft *h*, disk L, with lug *x*, toggle-lever J, dog *w*, and spring *y*, substantially as and for the purposes herein set forth.

3. The pivoted rod M, rod *d'*, connected with the top plate of the double bellows, and the nut *a'* on the rod *d'*, in combination with the toggle-lever J and its attachments, substantially as and for the purposes herein set forth.

4. The combination of the shaft *h*, wheel P, with lug, the brake N, with lever O, toggle-lever R, spring *f'*, and the rod S, operated by the rod *h'* and nut *i'*, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 4th day of December, 1878.

T. G. SPRINGER.

Witnesses:
FRANK GALT,
C. L. EVERT.