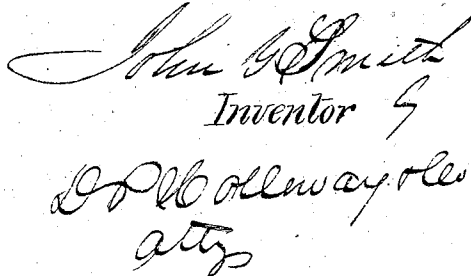


Air Ejectors.

Patented March 11, 1873.



Witnesses
H. Bradford
P. C. J. C. C.

UNITED STATES PATENT OFFICE.

JOHN Y. SMITH, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN AIR-EJECTORS.

Specification forming part of Letters Patent No. 136,779, dated March 11, 1873.

To all whom it may concern:

Be it known that I, JOHN Y. SMITH, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Air-Ejectors, &c., of which the following is a specification:

Figure 1 is an elevation of my improved ejector, showing the case of the same, the chamber for containing powder or fuse, a spring for holding the chamber in position, and a hammer for exploding caps. Fig. 2 is a longitudinal section, showing the parts above referred to, and the gas and air nozzles. Fig. 3 is a transverse section, showing the air-induction nozzle.

Corresponding letters refer to corresponding parts in the several figures.

This invention relates to that class of instruments which are used for the purpose of producing a vacuum in pipes and vessels, it being designed more particularly for use in connection with devices for applying brakes to railroad cars; and it consists in such an arrangement of its parts that the force of burning powder or of a fuse may be used for creating a vacuum in such pipes or vessels, and in the construction, combination, and arrangement of the parts of which it is composed, as will be more fully explained hereinafter.

In constructing ejectors of this type, I use a case or shell, A, which may be made of cast or of sheet metal, and of any length and diameter, according to circumstances, its body being cylindrical in form, as shown, while upon its outer end there may be formed a funnel, as shown, or this projection may be of any other form that will keep the wind or currents of air from blowing across the outer end of the discharge-nozzle. Upon the inner end of this case there is placed a collar, A', which closes its end with the exception of a small aperture, *a*, which is left open for a purpose soon to be described. Within the case A there is placed a gas-discharge nozzle, B, it being secured to the interior surface of the inner end thereof, and tapering gradually from that point to near the outer end of the cylindrical portion where it terminates. The outer end of this nozzle being smaller than the case leaves a space or chamber between the two, into which the air to be exhausted is drawn

through the pipe B' by the gas which passes through the nozzle B. Just outside or forward of the air-induction pipe B', and upon the inside of case A, there is placed a conical nozzle, C, the reduced aperture in the outer end of which is in a line with the outer end of the nozzle B, the object being to cause the jet of gas, as it passes through the instrument, to carry with it any air which there may be in the chamber D and the pipes and vessels connected with it, the conical nozzle C serving to contract the volume of gas and air, so as with aid of the pressure of the gas to give them the required velocity. To the rear end of case A there is attached a disk, E, which is placed eccentrically to the end of said case, and is allowed to turn upon a bolt, E', by which it is held in position with reference to said case; a flange which is also attached to the case aids in holding it, and serves as a case for it to revolve in. To the outer surface of the disk E there is attached a series of tubes, F, which are so placed that, when the disk is in the position shown in Fig. 2, one of them will register with the aperture *a* in the cap on the inner end of case A, and as the disk is revolved the next in succession will be brought into the same position, and so on until the whole series are brought to register with the apertures *a*, above referred to. Upon the outer ends of the tubes F there is placed a cap, which closes them while their inner ends are left open. Each one of these tubes near its inner end is supplied with an ordinary cap-nipple, or with other suitable means for holding a fulminate, which shall be made to ignite the powder or fuse which is placed in the tubes.

In order that the cap or fulminate may be exploded at any time that may be desired a hammer, G, is pivoted to the case A, and has a cord or rod attached to it, so that it may be drawn up and a spring, H, under its rear end be compressed so that when the cord or rod is released the hammer shall be forced down upon the cap or fulminate with sufficient force to explode the same, and thus ignite the material within the tube.

The object sought to be accomplished by this device will be obtained by using a slow-burning powder in the tubes; but a preferable material consists of a fuse, which may be made hollow and inserted into the tubes, it being so

composed as to burn with such a degree of rapidity as shall be found necessary, and for such a length of time as shall be necessary to exhaust the air from the pipes or vessels with which the ejector may be connected.

The operation of this device will be as follows: The instrument having been constructed substantially as shown and described, it is to be placed in any suitable position, and a connection made between its pipe B' and the pipes or vessels to be emptied, when, by turning the disk E, the tubes of which have previously been filled with the proper material so that the aperture in the front end of one of them shall register with the aperture *a* in the case, and then pulling upon the cord or rod attached to the hammer until it has been raised to the proper height, and then relinquishing the hold thereof, allowing it to be forced down upon the cap or fulminate, such cap or fulminate will be exploded, and the material in the tube will be ignited, the gas from which will pass through the aperture *a* into the nozzle B, and out through its contracted end with such rapidity as to exhaust the air from chamber D, when, as a matter of course, the air in the pipe B', and

any pipes or vessels with which it may be connected, will be exhausted, the commingled jets of air and gas passing out through the conical nozzle C.

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

1. An air-ejector, combining in its construction a case for holding the parts in position, and for forming the outer shell of a vacuum-chamber, a nozzle for the passage of the gas, and one for the passage of the mingled currents of air and gas, a chamber or chambers for containing the material to be burned, and suitable mechanism for exploding a cap or fulminate, the parts being arranged substantially as and for the purpose set forth.

2. The disk E and tubes F, when combined with the case of an air-ejector, substantially as and for the purpose set forth.

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

JOHN Y. SMITH.

Witnesses:

D. P. HOLLOWAY,
W. BRADFORD.