C. A. SUDLOW.

Air and Steam Injector.

No. 214,965. Patented April 29, 1879.

Fig. 1.

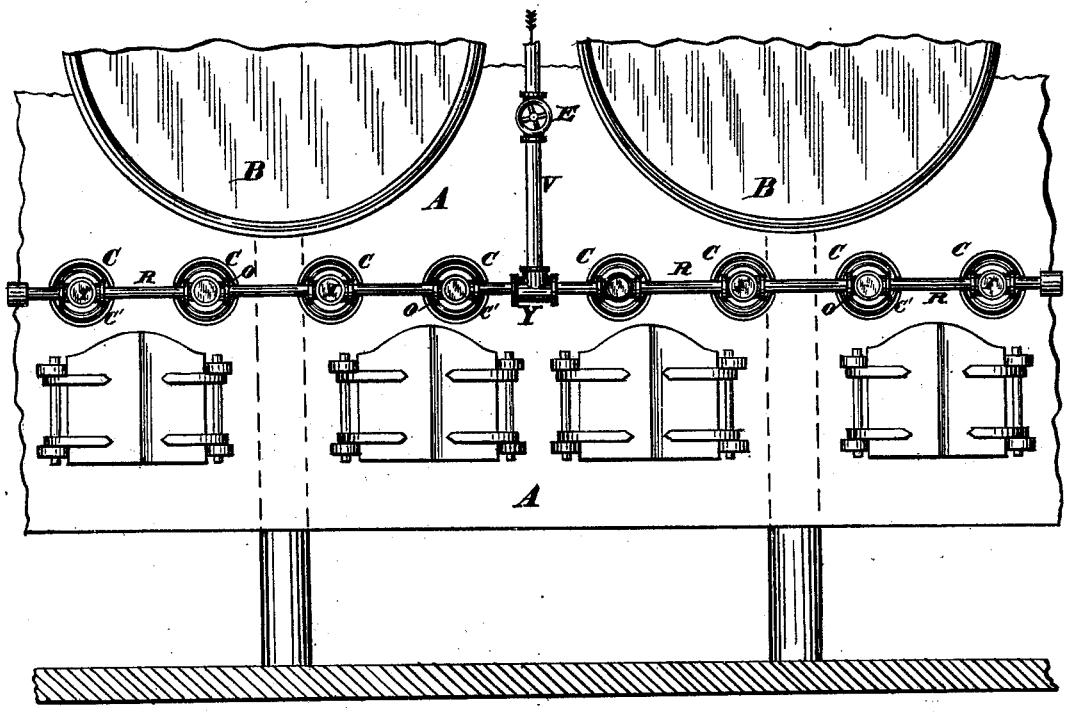


Fig. 2.

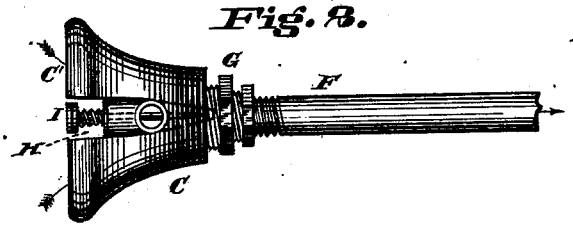


Fig. 3.

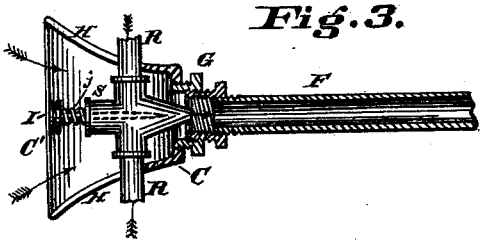
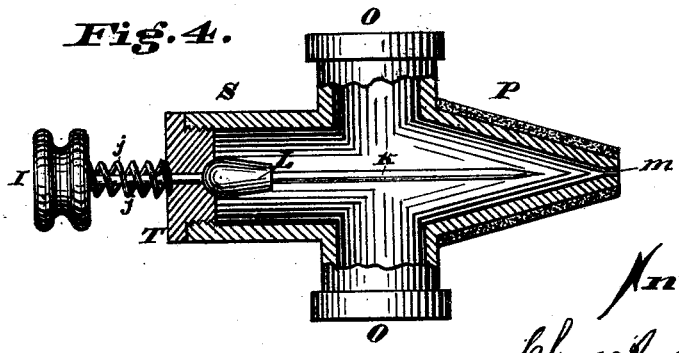


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES A. SUDLOW, OF CINCINNATI, OHIO, ASSIGNOR TO ROBERT L. DOUGLAS AND FERDINAND A. HART, OF SAME PLACE, ONE-THIRD TO EACH.

IMPROVEMENT IN AIR AND STEAM INJECTORS.

Specification forming part of Letters Patent No. **214,965**, dated April 29, 1879; application filed March 14, 1879.

To all whom it may concern:

Be it known that I, CHARLES A. SUDLOW, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in an Air and Steam Injector for Promoting Combustion in Furnaces, of which the following is a specification.

My invention relates to devices for injecting a mingled current of steam and air into furnaces to produce a more perfect combustion of the gases, and prevent waste of fuel.

It consists, first, of an open-mouthed pipe or receptacle for conducting air through injector-pipes into the furnace, the mouth or end of the pipe being slotted to support the steam-pipes and nozzle in their proper position within the air-pipe; second, in the combination, with the injector-nozzle, of a plunger-rod adapted to be projected into the orifice for the removal of deposits which clog up the nozzle, the plunger being adapted to be rapidly inserted and withdrawn.

Another feature of my invention consists in coating the surface of the nozzle with asbestus or other like material, to prevent the resonance of the metal caused by the escape of the steam.

The object of my invention is, first, to provide an easy mode of combining one or more injectors with the furnace in such a manner as to allow of their being readily removed; second, to provide a convenient and cheap mode of removing obstructions from the steam-orifice from the outside without disturbing the steam or air pipes; and, third, to lessen the cost of manufacture, and secure a device which can be kept continuously in operation.

Other features of my invention will be more fully described in the explanation of the accompanying drawings, in which—

Figure 1 shows a series of my injectors applied to a battery of boilers. Fig. 2 is a perspective view of a single injector. Fig. 3 is a central section, and Fig. 4 is an enlarged view, of the nozzle-pipe and clearing-plunger.

A represents a furnace-wall; B B, boilers; and C C C, a series of injectors connected together and supplying currents of air and steam to the furnace-chamber. C′ represents the outer end of the air-pipe, the mouth of which is preferably bell-shaped, so as to prevent drafts of wind from affecting the supply of air carried into the furnace-chamber. The thick round edges tend to prevent the vibration of the metal and avoid the whistling sound common in other devices.

H represents slots in the outer end of the air-pipe, of a sufficient size to admit the steam-pipe R, and they are placed centrally, so that when the pipes R rest in the slots, the nozzle P will be suspended centrally within the air-supply pipe C, as shown in Fig. 3. P represents the nozzle, preferably cast on and being a part of the pipe S.

O O represent a female screw-coupling, into which steam-pipes R R are screwed. When a single injector is used, only one coupling is employed. T represents a cap screwed into pipe S. K represents a plunger rod or needle passing through a cap, T. I is a knob rigidly attached to plunger K; *j*, a spring placed between cap T and knob I. The point of plunger K when retracted, as shown in Fig. 4, is opposite and in line with the orifice *m* in nozzle P.

Instead of spring *j*, the face of the valve L may be made of sufficient area, so that the pressure of the steam alone will retract the plunger-rod K, or a piston may be placed on rod K to accomplish this result.

L represents a valve fastened on plunger-rod K, and it has a seat in cap T, so as to prevent escape of steam. A packing-box may be used around the valve-stem, if desired.

The pipe and parts are preferably made of cast metal. The pipe S and valve L should be of brass, and the other parts may be made of iron. The nozzle P is represented as being covered with a thick coating of asbestus, gutta-percha, or other durable material. It is used to prevent oxidation and to deaden the sound caused by the escaping steam.

G represents a coupling for uniting the pipe F to the open pipe C′. A reducing coupling can be employed when a smaller size of pipe is employed. E is a valve, for regulating the amount of steam supplied to the pipes R R.

Y represents a T-coupling, for connecting pipes R R to steam-pipe V.

It is desirable to have the needle K operate quickly by a blow or pressure on knob I to drive the plunger through the orifice, and allow the spring to retract the same, after the manner of operating cocks.

A serious trouble in the use of injectors has been encountered from the rapidity of the clogging of the nozzle by deposits, carried in by currents of air or steam. My improvement allows all such obstructions to be quickly and easily removed without taking out any of the parts, or providing an opening into the interior of the injector. My mode of making the nozzle and pipe-coupling is also a very important feature, as it allows the ready removal of all the parts, and at the same time materially reduces the cost of manufacture and expense of repair. All the joints should be steam-tight.

It will be seen that a great advantage is derived from my method of making the nozzle and connecting it with the branch pipes of the series, so that the nozzles may be introduced and removed from the open end of the air-pipes in a series, and any single one removed from the pipes R R without disturbing the rest of the series. The nozzles also are supported in position by pipes R R resting in slot H, dispensing with screws, cheapening the cost of construction, and materially increasing the convenience of setting and removal.

What I claim is—

1. In combination with the furnace A, the slotted air-pipe C′, adapted to support the injector, nozzle, and steam-pipes in their relative positions, substantially as herein set forth.

2. The pipe S, having a nozzle, P, and a cap, T, constructed to receive the plunger K, in combination with the steam-pipe R, to which said pipe S is connected, the whole constructed to operate substantially as and for the purpose described.

3. The nozzle P, coated with asbestus or other like material, substantially as herein set forth.

4. The pipe and nozzle P, in combination with the plunger, constructed and arranged substantially as herein set forth.

In testimony whereof I have hereunto set my hand this 8th day of March, 1879.

CHAS. A. SUDLOW.

Witnesses:

E. E. WOOD,

R. L. DOUGLAS.