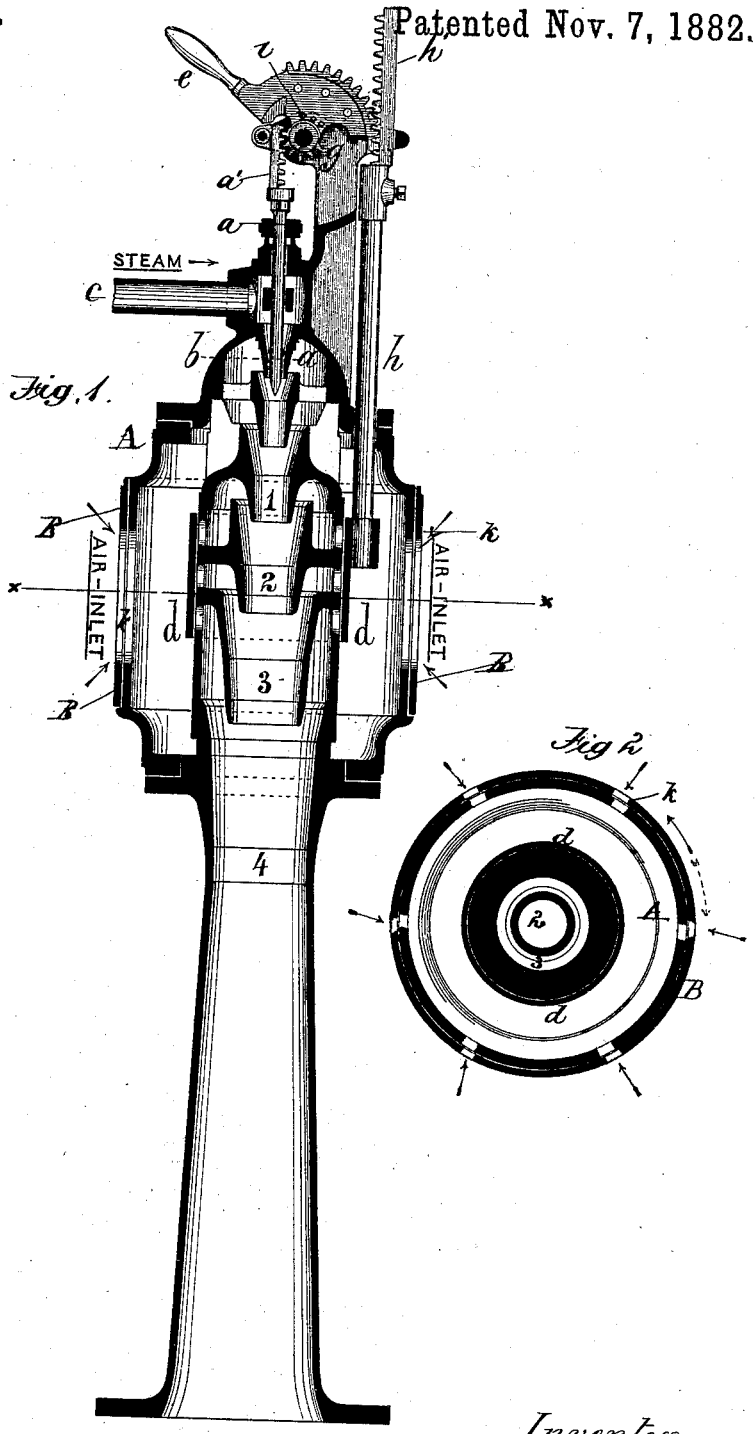
(Model.)

L. SCHUTTE.

STEAM JET INJECTOR AND EXHAUSTER.

No. 267,022. Patented Nov. 7, 1882.



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STEAM JET INJECTOR AND EXHAUSTER.

SPECIFICATION forming part of Letters Patent No. 267,022, dated November 7, 1882.

Application filed June 29, 1882. (Model.)

To all whom it may concern:

Be it known that I, LOUIS SCHUTTE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Steam Jet Injectors and Exhausters, of which the following is a specification.

My invention has special reference to the style of apparatus for which Letters Patent No. 142,856 were granted to Ernst Korting, September 16, 1873, wherein a series of nozzles are used in connection with several independent air-inlets and means for closing the same. These features being fully described in the patent, to which reference may be made therefor, it is deemed unnecessary to describe them in detail herein. In said original patent a spindle was provided in the steam-nozzle, to be adjusted and set by hand, according to the number of inlets open to obtain the corresponding "duty," or, in other words, to overcome a like counter-pressure, and use an amount of steam corresponding to the quantity of liquid or fluid to be delivered. This, although fully accomplishing the end in view, fails to indicate positively the required position, which can only be determined by auxiliary instruments, or by a certain knowledge and skill acquired by practical experience. To avoid this difficulty, I provide means whereby the relative position of the spindle and the inlet-controlling slides, with regard to the number of inlets open, is determined positively, and the adjustment effected by means of a single handle. To this end I provide a positive connection between the spindle and the rod or rods or other devices which control the inlet valves or slides. This connection may be formed by levers, gear-wheels, or any equivalent devices which will secure the proper movements in a positive manner.

Figure 1 represents a longitudinal central section of my improved injector; Fig. 2, a cross-section of the body portion on the line *x x*.

In all its leading features the apparatus is the same as in the original patent, referred to above, the nozzles, inlets, inlet-closing slide, and steam-controlling spindle having the usual form, arrangement, and mode of action.

Referring to the leading and usual parts of the apparatus, A represents the external or main body portion; *b*, the steam-inlet nozzle; *a*, the nozzle by which the admission of steam is controlled; and 1, 2, and 3, the series of inlet-nozzles, discharging one into another and increasing successively in diameter. The inlet-openings, by which air or other fluid to be moved is admitted into the body of the apparatus, are indicated at *k k*, being distributed at suitable distances apart in the outer walls of the body portion A.

B represents the external valve or ring, by which the admission of air through the openings *k* into the main body of the apparatus is controlled, as hereinafter more fully described.

The admission of the fluid into the nozzles 1, 2, and 3 is controlled by means of a surrounding sliding ring or valve, *d*, which will be hereinafter referred to.

On the outer end of the spindle *a*, I form or secure a rack-bar, *a'*, and to the outer end of the rod *n*, which operates the slide *d* for controlling the inlets, I form a second rack-bar, *h'*. On a common center I mount two sector-pinions, *f* and *g*, facing in opposite directions, the former engaging with the rack *h'* and the latter with the rack *a'* of the spindle. The two pinions are formed in one piece, or connected rigidly with each other, and are provided with an operating-lever, *e*, by which they may be moved simultaneously. The motion of the lever causes the pinions through the racks to move the spindle and the slide simultaneously in opposite directions, whereby the steam and air inlets are opened and closed in such manner that they always maintain the proper operative relations. It will be seen that the single lever serves not only to control the relative positions of the spindle and slide, but by operating them to adjust the apparatus for delivering at a greater or less speed.

As conditions sometimes arise under which a proportionately greater or smaller opening of the steam-nozzle will be demanded, an independent adjustment of the slide or spindle may be provided for in any suitable manner. A simple plan is that of constructing the pinions separately and uniting them by a bolt or pin, *i*, which may be passed through a slot or one of a series of holes in one of the parts, so that it will permit the pinions to be turned forward or backward, one in relation to the other, and again united rigidly.

In addition to the means of regulation above

described, it is also desirable to provide a separate means of controlling the quantity and temperature. I therefore provide a throttling mechanism at the point of admission for the fluid or liquid. This throttling mechanism may be of any appropriate form; but in the drawings it is represented in the form of a circular ring or slide, B, encircling the body of the apparatus, and perforated to correspond with the openings into the same, so that by giving it a rotary motion it may be caused to close or diminish the admission-openings into the apparatus.

Having thus described my invention, what I claim is—

1. In a jet apparatus for forcing fluids or liquids, a series of nozzles or separate inlets, an actuating-nozzle, a slide to close the inlets, a spindle to close the nozzle, and means, substantially as described, connecting said closing devices to cause their simultaneous movement.

2. In a jet-forcing apparatus embracing an actuating-nozzle and a series of inlet nozzles or openings, as described, a controlling device connected with and adapted to actuate both the devices for closing the actuating-nozzles and the inlet-openings.

3. In combination with the actuating-nozzle and the series of inlet-nozzles, the spindle and its rack, the slide and its rack, the two pinions, and the actuating handle or lever.

4. In a jet apparatus embracing the actuating-nozzle and a series of inlet nozzles or openings, separate means for closing the two, connected with a common operating device, and adjustable in relation to each other, substantially as described.

5. In a jet apparatus, the combination of an actuating-nozzle, a series of inlet nozzles or openings, as described, and means, substantially as described, whereby the flow of the fluid or liquid into the main body of the apparatus may be controlled in a positive manner.

6. In combination with the injector-body, the actuating-nozzle, its controlling device *a*, the series of inlet-nozzles 1 2, &c., and the regulating-valve B, applied to the body, substantially as described, to control the admission of air or other fluid thereto.

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