(No Model.)

H. N. WICKERSHAM & W. HUSTON.

EJECTOR.

No. 272,816. Patented Feb. 20, 1883.

Fig. 1.

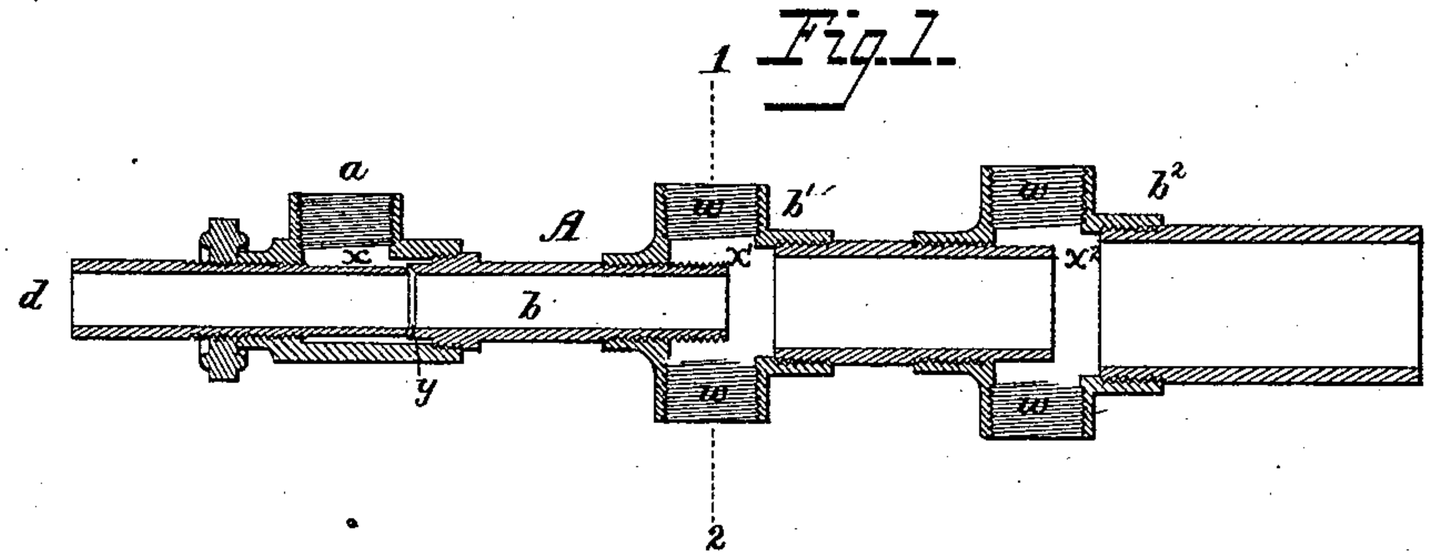


Fig. 2.

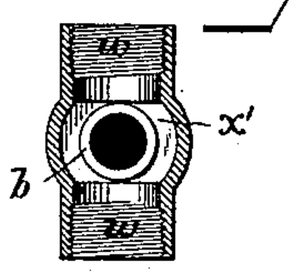
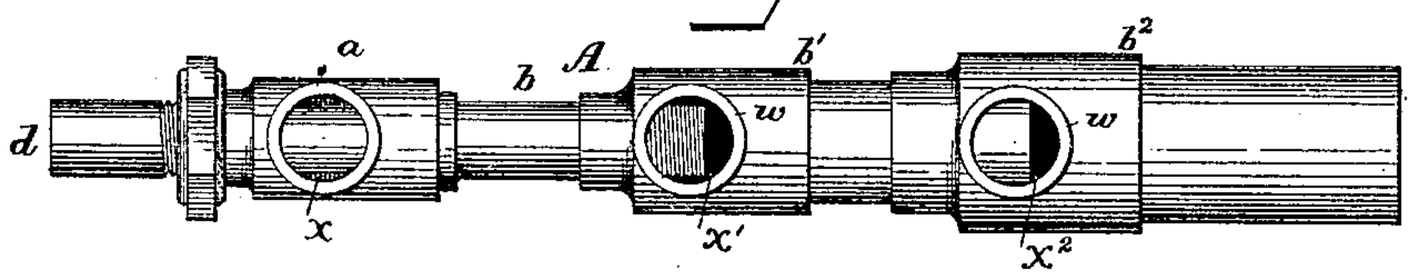


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY N. WICKERSHAM AND WILLIAM HUSTON, OF WILMINGTON, DEL.

EJECTOR.

SPECIFICATION forming part of Letters Patent No. 272,816, dated February 20, 1883.

Application filed June 7, 1882. (No model.)

To all whom it may concern:

Be it known that we, HENRY N. WICKERSHAM and WILLIAM HUSTON, citizens of the United States, and residents of Wilmington, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Ejectors, of which the following is a specification.

Our invention has for its object to set in motion columns or volumes of gas, or for purposes of ventilation to remove gases, creating drafts, or aiding combustion, or to move or set in circulation volumes of liquids, and this we accomplish by the means of appliances hereinafter fully set forth, and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section, illustrating our improved device. Fig. 2 is a cross-section on the line 1 2, Fig. 1; and Fig. 3 is an external view.

The device is of the nature of an ejector or injector.

A is a casing containing a chamber, *x*, to which the motor gas or fluid is admitted through a pipe, *a*, and from which it passes through a pipe, *b*, while a pipe, *d*, on a line with the pipe *b*, admits the fluid to be moved, the pipe *d* being adjustable longitudinally, or other means being employed whereby the passage *y* between the pipes *d* and *b* may be widened or narrowed to any required extent. The pipe *b* extends from the casing A through the end of another larger tubular casing or pipe, *b'*, and this pipe *b'* extends through the closed end of another larger pipe, b^2, and each pipe b' b^2 has lateral openings *w*, arranged at points nearly opposite the ends of the inner pipes.

Any suitable means may be employed for adjusting the pipes to regulate the extent to which each projects into the chamber of the next pipe, and valve devices may be used to regulate the extent of the openings *w*.

The apparatus is immersed in the fluid to be moved, either gaseous or liquid, and the motor fluid, gas, or liquid is admitted through the pipe *a* into the chamber *x*, and is throttled at the passage *y*, escaping into the pipe *b* at a greater velocity than it flows through the pipe *a*, and carrying with it into the pipe *b* a current of the fluid in which the apparatus is immersed. This current passing through and from the pipe *b* into the next chamber, *x'*, and centrally through the latter, causes the surrounding fluid to flow through the openings *w* into the chamber *x'*, and finally expels the same in a stream the diameter of the pipe *b'* into and through the chamber x^2, when a fresh volume of fluid, admitted through the openings *w*, gives increased volume to the stream, so that the volume issuing from the end tube is much larger than that admitted through the tube *a*.

It is important that each of the tubes *b b'*, &c., be of such length beyond the point where the injecting stream and indrawn fluid mingle, that the two shall thoroughly combine in a solid column. It is also important that the pipe *d* be open for the flow of the fluid to be moved, for the closing of the pipe *d* would at once reduce the volume of fluid ejected to that admitted through the pipe *a*.

It is not essential to immerse the apparatus in the fluid to be moved, as the same may be conducted to the apparatus through pipes communicating with the pipe *d* and openings *w w*. By this means we are able by the use of a small stream of steam or compressed air to move large volumes of air for heating, drying, cooling, ventilating, or other purposes. We can also by the same motor-fluids raise water or other liquids, or we can use water or other liquid for the motor fluid, although a gas under pressure is preferable.

We do not limit ourselves to the structure shown, as any device whereby the injecting fluid is caused to flow through chambers or tubes successively increasing in diameter, and each open for the admission of additional volumes of the fluid to be moved, may be employed.

We do not limit ourselves to any specific number of pipes *b b'*, &c., as any number that may prove advisable may be employed.

We claim—

1. The within-described mode of imparting motion to large volumes of fluids, the same consisting in directing a small stream of motor-fluid forward from a closed annular chamber formed around the nozzle, which admits the fluid to be moved from the rear of said chamber, and directing the stream so formed into a larger closed chamber and admitting an additional volume of the fluid to be moved to said

chamber, thereby forming and expelling a larger stream, substantially as set forth.

2. An apparatus for moving fluids, consisting of a closed casing, A, a pipe, *d*, for admitting the fluid to be moved, a pipe, *a*, for admitting the motor-fluid, an outlet-pipe, *b*, in line with the pipe *d*, communicating with a larger pipe, *b'*, with openings to admit additional quantities of the fluid to be moved, and a larger pipe, b^2, in line with and receiving the pipe *b'*, and having openings *w*, substantially as set forth.

3. The casing A, lateral motor-fluid pipe *a*, exit-pipe *b*, and adjustable pipe *d* in line with the pipe *b*, in combination with a larger casing or pipe, *b'*, having lateral openings, and with a pipe, b^2, in line with the pipe *b'*, all as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY N. WICKERSHAM.
WILLIAM HUSTON.

Witnesses:
JOSEPH W. VANDEGRIFT,
E. MORTIMER BYE.