

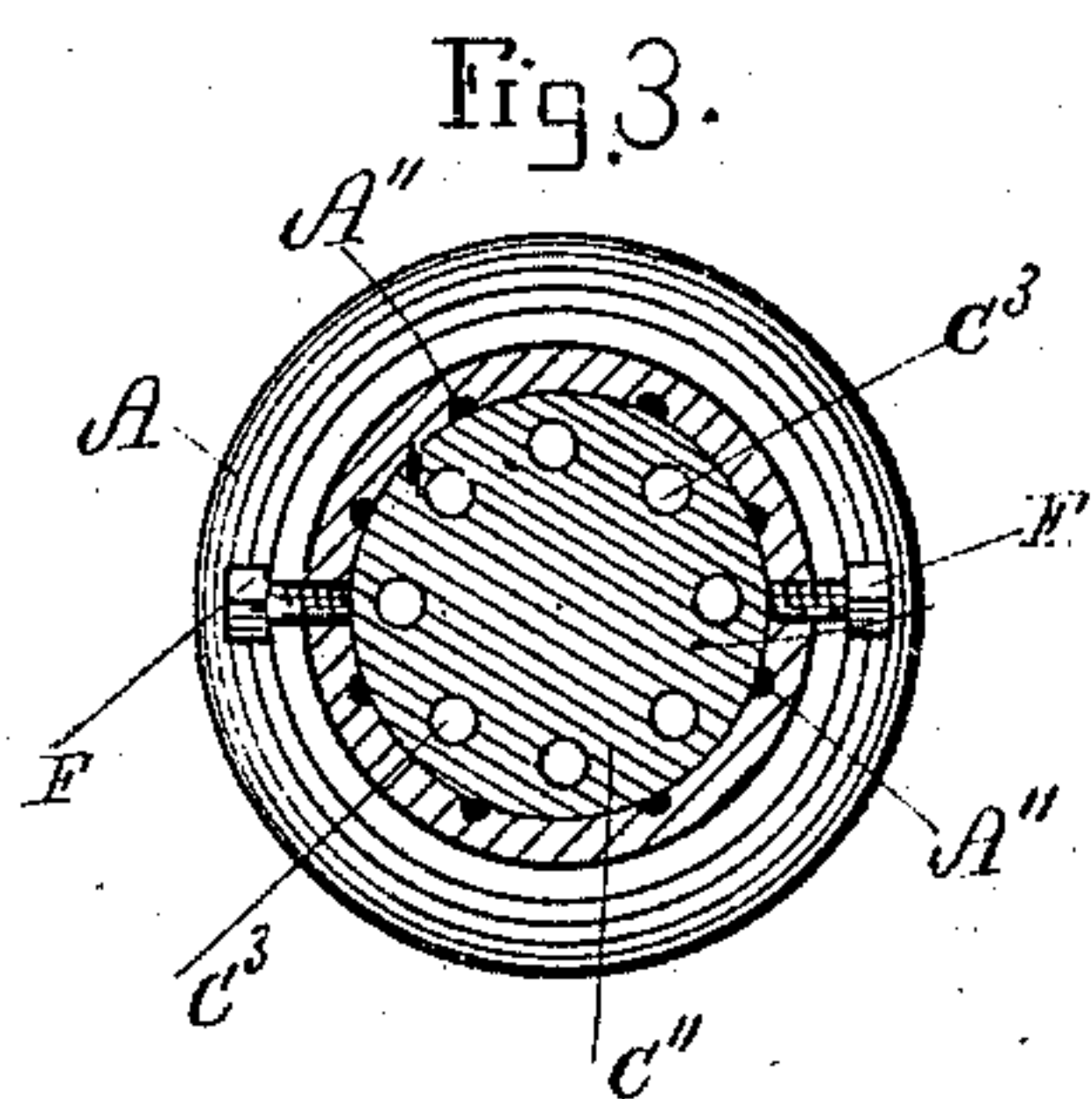
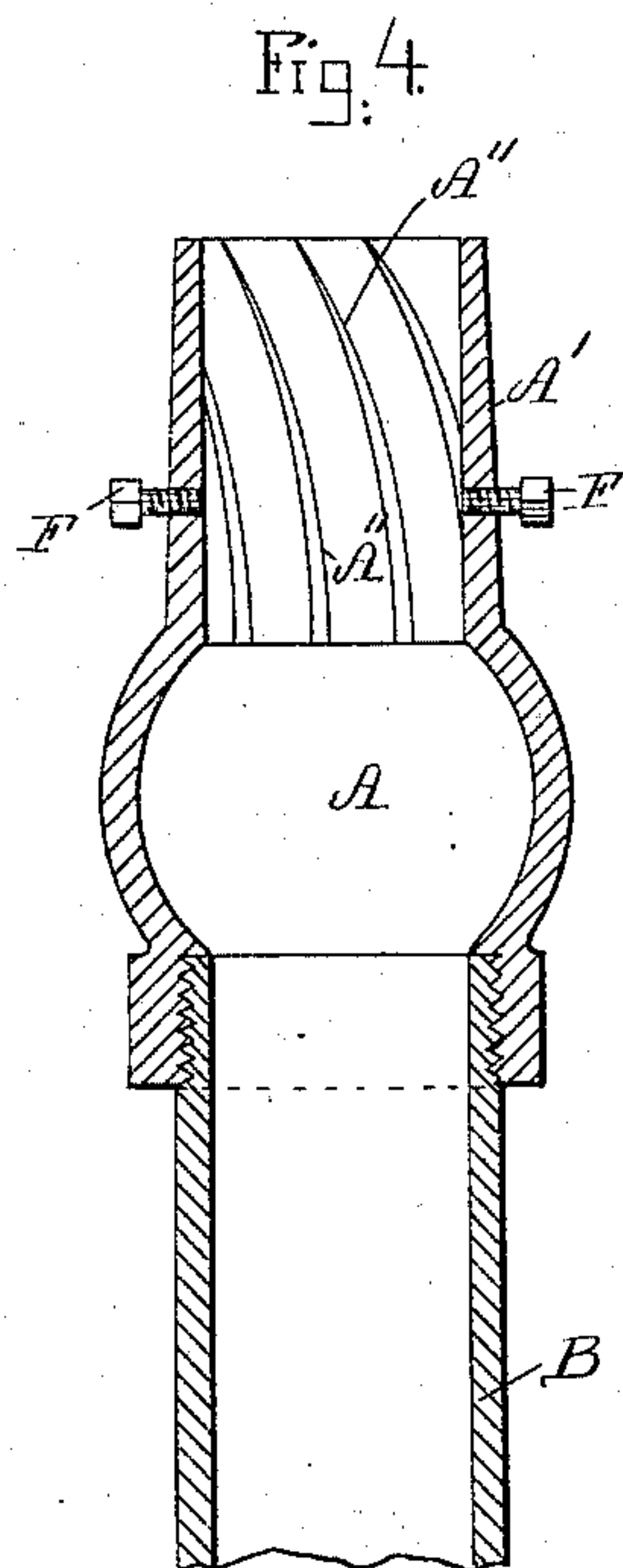
(No Model.)

G. W. LORD.  
AIR FORCING DEVICE.

No. 545,023.

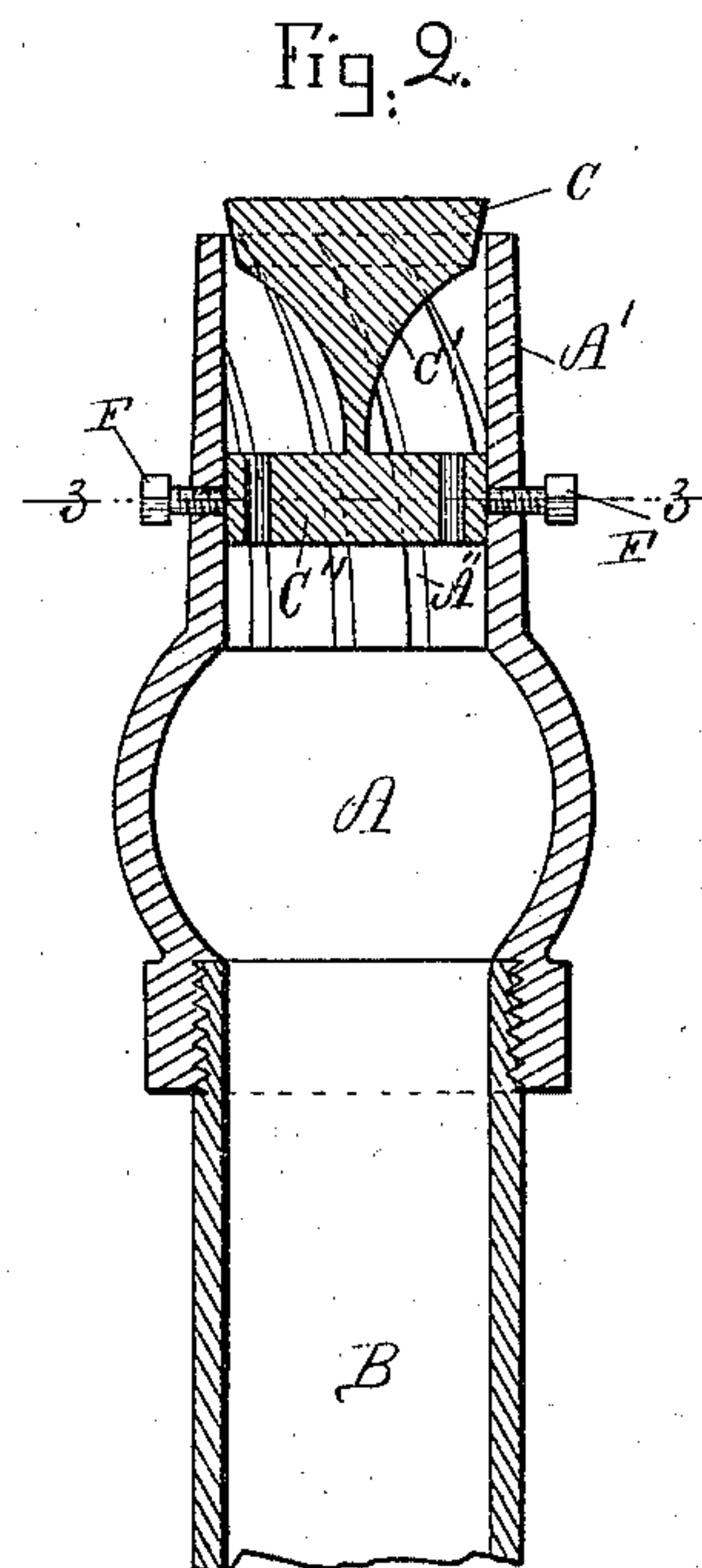
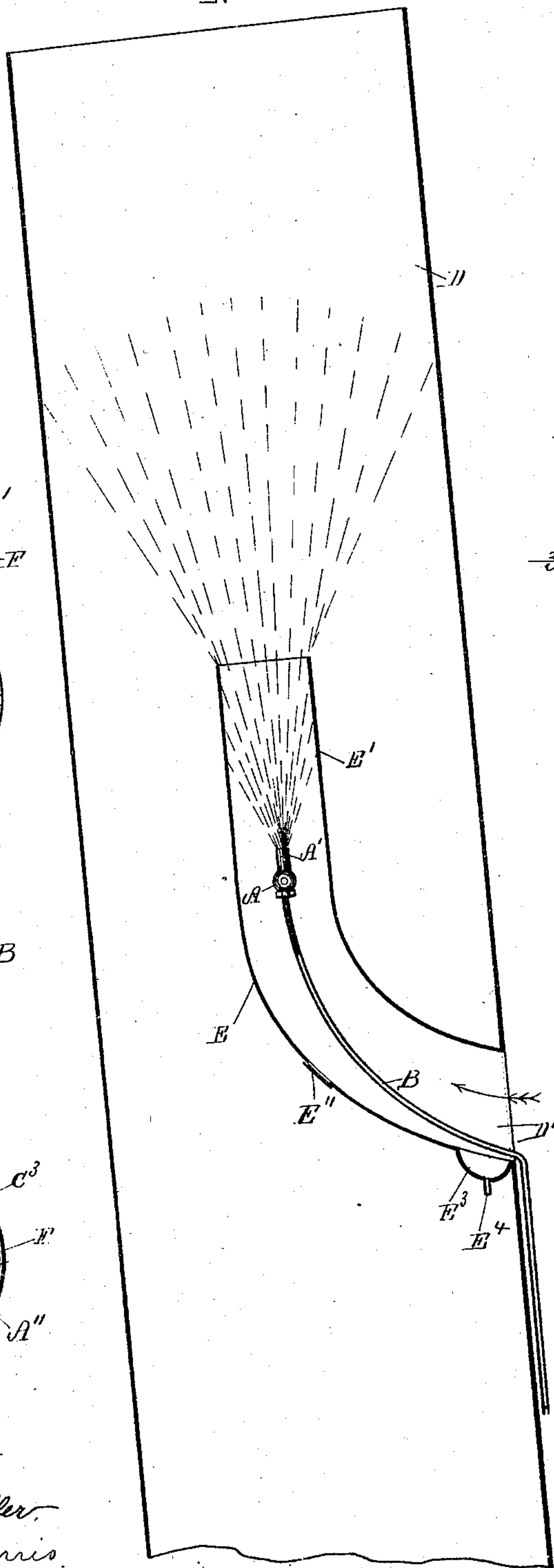
Patented Aug. 20, 1895.

Fig. 1.



Witnesses.

Lauritz W. Koller.  
Charles A. Harris.



Inventor.

George W. Lord

by *Wm. Andrew*  
att'y.



# UNITED STATES PATENT OFFICE.

GEORGE W. LORD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND FRANK M. WING AND LORENZO COWAN, OF SAME PLACE, AND WILLIAM A. SMITH, OF CHELSEA, MASSACHUSETTS.

## AIR-FORCING DEVICE.

SPECIFICATION forming part of Letters Patent No. 545,023, dated August 20, 1895.

Application filed November 30, 1894. Serial No. 530,322. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. LORD, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Air-Forcing Devices, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in air-forcing devices, and it is particularly well adapted for the purpose of producing and maintaining a forced draft in smokestacks or chimneys on steamboats, stationary or portable engines, &c., and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a central longitudinal section of a smokestack or chimney, showing my improved air-forcing device arranged therein. Fig. 2 represents a detail longitudinal section of the ejector which I use as a part of my improved air-forcing device. Fig. 3 represents a cross-section on the line 3-3 shown in Fig. 2; and Fig. 4 represents a central vertical section of the ejector, showing its adjustable plug as removed.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

A represents the shell of the ejector, provided at its upper end with an open cylindrical neck A', as shown in the drawings.

B is a steam-pipe leading from the steam-boiler or other source of steam-pressure to the ejector-shell A, as shown.

The interior of the ejector-neck A' is provided with a series of upwardly-tapering helical grooves A'' A'', the upper ends of which vanish at the upper edge of the neck A', as shown in Fig. 4. Within the upper end of the neck A' is arranged a vertically-adjustable and slightly-tapering plug C, having a downwardly-extending stem C', to the lower end of which is secured (or made in one piece with said stem) a disk C'', adjustably secured within the neck A' and fitting within the latter, as shown in Fig. 2, said disk being provided with a series of vertical perforations C<sup>3</sup>, (shown in Figs. 2 and 3,) through which the steam is conducted from the pipe B into the

upper portion of the neck A' and ejected through the narrow annular space between the exterior of the tapering plug C and interior of the upper edge of the neck A in the form of a thin conical sheet, which, as it is ejected, is caused to rotate by the agency of the tapering helical grooves A'', which impart to the steam a twisting motion as it is being forced upward through the said spirally-grooved neck A', by which the best results for producing the forced draft in the chimney or smokestack are obtained.

D in Fig. 1 represents the smokestack or chimney within which a forced draft is to be produced, and within said chimney is arranged for such purpose a curved air-supply pipe E, the upper end E' of which is open and made to project axially within the center of the said chimney, as shown in said Fig. 1. Preferably through the front portion of the smokestack D (if the latter is used on a steamboat) is made a perforation D', to the edge of which is secured the lower curved end of the air-supply pipe E, as shown in Fig. 1. The ejector A is arranged within the air-pipe E and connected to the steam-pressure source by means of the steam-pipe B, leading from said ejector through the curved lower portion of the pipe E and perforation D', thence outside of the smokestack to the steam-pressure source, as shown in Fig. 1. If so desired, an opening E'' may be made in the lower portion of the pipe E to draw the smoke in the smokestack from below the said pipe and force it up through the latter to aid in producing the forced draft; but in practice I prefer to admit the air through the front opening D' in the smokestack, as shown in Fig. 1.

The lower portion of the air-supply pipe E is provided with a cup-shaped depression E<sup>3</sup>, having a drip pipe or perforation E<sup>4</sup> at its bottom, for the purpose of arresting water of condensation in the pipe E and allowing it to drip inside the smokestack through the pipe or perforation E<sup>4</sup>, thus preventing such condensed water from running out through the opening D' and thus keeping the front exterior of the smokestack clean.

The invention, although especially designed as an air-forcing device within smokestacks



or chimneys, may to equal advantage be used in ash-pits without departing from the essence of my invention.

F F in Figs. 2 and 3 are regulating-screws 5 screwed through the wall of the neck A' against the periphery of the perforated disk C'' for the purpose of securing said disk and its plug C in the desired position within the neck A'. By loosening said screws the plug 10 C and its disk C<sup>3</sup> may be adjusted up or down within the neck A' for the purpose of regulating the position of said plug C within the neck A', according to the size of the exhaust-opening desired between the said plug and 15 upper end of the neck A', and the amount of steam that it is desired to force out through such opening.

The operation is as follows: Steam under pressure being admitted to the pipe B is 20 caused to escape through the annular space between the plug C and upper edge of the neck A' of the ejector. The escaping steam is ejected in a thin conical sheet, which, as it escapes, is caused to rotate by the impetus 25 given to the steam while passing by and in contact with the tapering spiral grooves A'' on the inside of the neck A', as described. The ejector being located within the air-supply pipe E causes the ejected steam to pass 30 upward through the pipe E and up through the smokestack, and in so doing a vacuum is formed in the pipe E below said ejector by which the outer air is drawn into the pipe E through the opening D' and forced out 35 through the upper end of the pipe E into the upper part of the smokestack, by which a powerful forced draft is produced within the smokestack, causing the products of the fire-box or furnace to be forced out of the smoke- 40 stack or chimney, thus causing a proper forced draft to be maintained in and through the smokestack or chimney.

What I wish to secure by Letters Patent and claim is—

1. The herein described air forcing device 45 consisting of a smokestack or chimney D having an air inlet D' and an upwardly curved air pipe E communicating with said opening and having a cup shaped trap or recess E<sup>3</sup> in its lower end and a discharge pipe or perfora- 50 tion E<sup>4</sup> thereon inside of the smoke stack combined with a steam ejector arranged within said pipe E and having a connecting pipe B leading to the source of steam pressure substantially as and for the purpose set forth. 55

2. In an air forcing device the herein described ejector consisting of a shell A connected to a steam pressure source and having an internally and spirally grooved neck combined with a vertically adjustable and taper- 60 ing plug C arranged within the upper end of the neck and having a perforated disk C'' adjustably secured within said neck substantially as and for the purpose set forth.

3. The herein described air forcing device 65 consisting of a smoke stack or chimney and a curved air pipe secured within the same and open at its lower end to the outer air combined with an ejector arranged within said air pipe and connected to a steam pressure 70 device and having an internally and spirally grooved neck, a tapering plug adjustably secured therein and having a perforated disk adjustably secured within said neck substantially as and for the purpose set forth. 75

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 24th day of November, A. D. 1894.

GEORGE W. LORD.

Witnesses:

ALBAN ANDRÉN,  
LAÜRITZ N. MÖLLER.