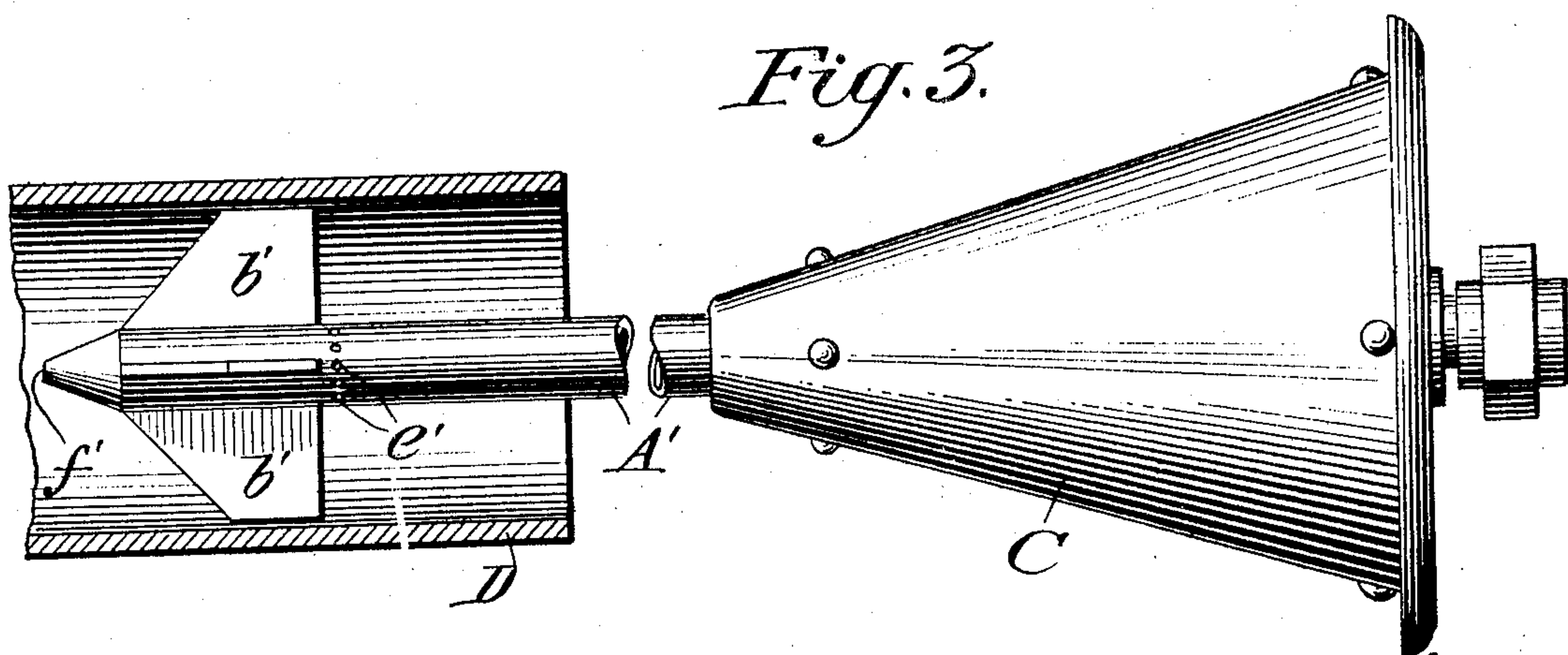
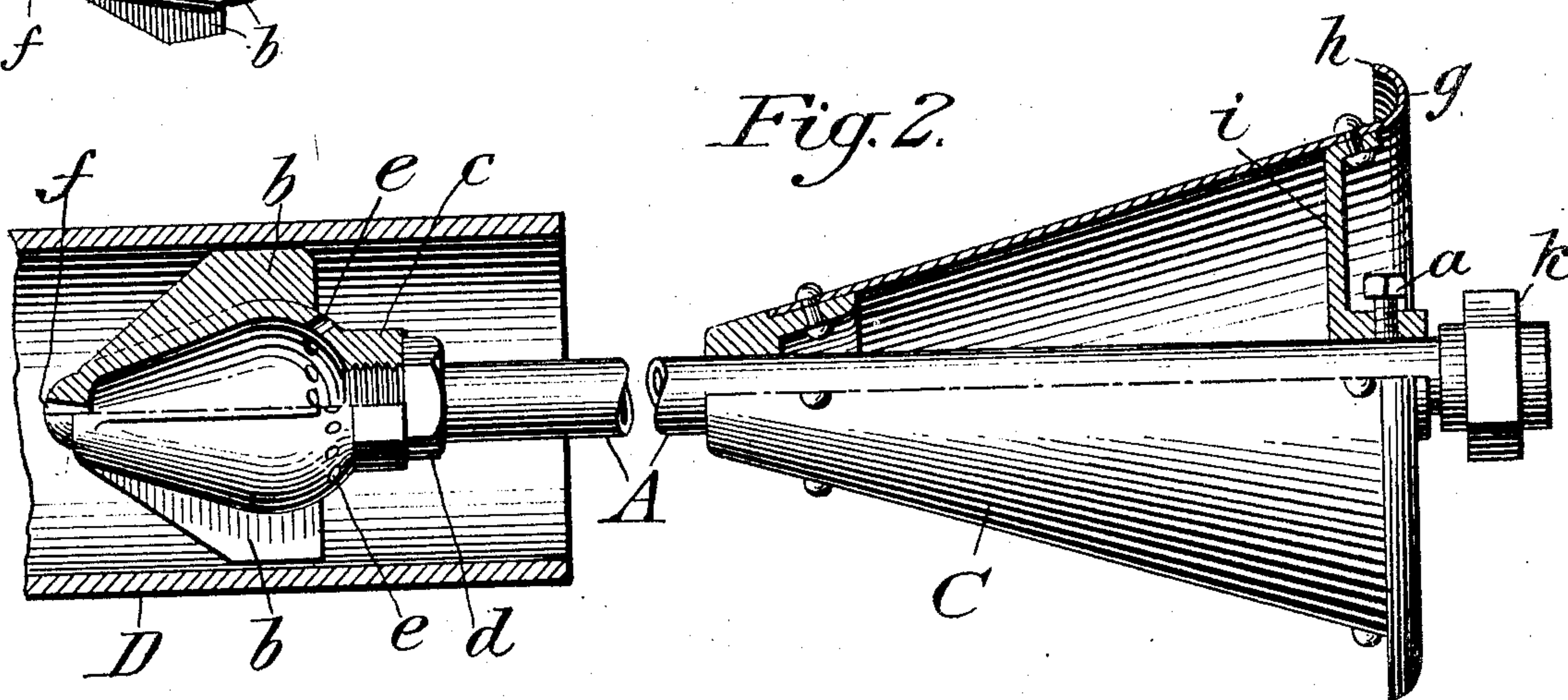
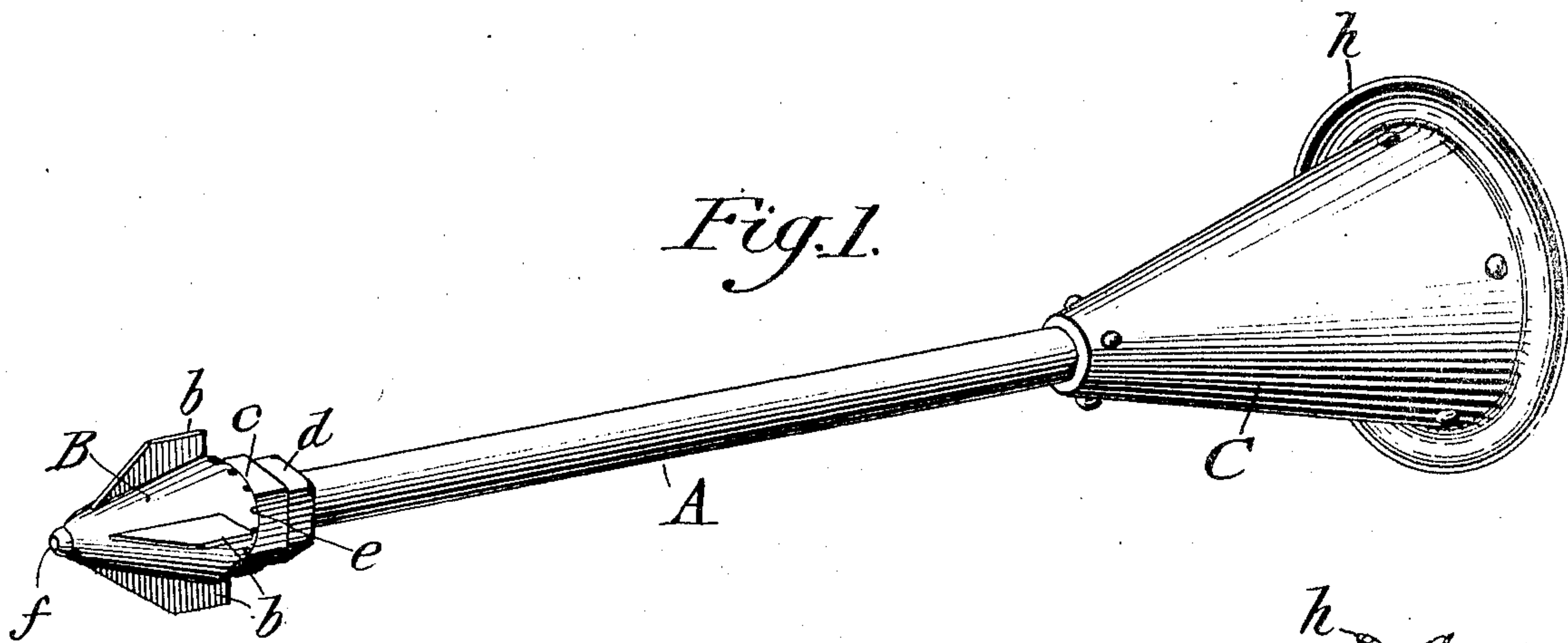


No. 822,706.

PATENTED JUNE 5, 1906.

W. P. WILSON.  
FLUE CLEANER.  
APPLICATION FILED DEC. 30, 1905.



Witnesses:

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# UNITED STATES PATENT OFFICE.

WILLIAM P. WILSON, OF TRENTON, NEW JERSEY.

## FLUE-CLEANER.

No. 822,706.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed December 30, 1905. Serial No. 293,898.

*To all whom it may concern:*

Be it known that I, WILLIAM P. WILSON, a citizen of the United States, residing at Trenton, in the county of Mercer, in the State of New Jersey, have invented certain new and useful Improvements in Flue-Cleaners, of which the following is a specification.

My invention relates especially to that class of flue-cleaners which operate to clean the flues of boilers principally or wholly by suction or exhaust; and the object of my invention is to provide an effective flue-cleaner of simple construction which may be readily used in boiler flues or tubes of various lengths and diameters.

In flue-cleaners of the class to which my invention belongs the principal desiderata are, first, means for procuring an effective suction or exhaust which will clear the flues of deposits of soot, ashes, &c., lodged therein, and, second, means of disposing of such deposits without interfering with their ready exit and complete ejection from the flues. Heretofore it has been common to construct such flue-cleaners in the form of a curved tube which when adjusted to the end of the flue to be cleaned formed substantially a curved prolongation of the flue, and means were provided for forcing through such curved tube outwardly a jet or jets of steam, thus inducing an exhaust within the flue; but such constructions are objectionable because the gases and products of combustion passing from the flue into such curved tube impact against the curved wall of the tube and are thereby so retarded in their exit therefrom as to prevent a sufficiently strong rush of gases through the flue to effectively clear it of the deposits of solid matter lodged therein. To make an exhaust flue-cleaner absolutely effective in its work, it is essential that a direct and not a tortuous passage be provided for the exit of the products of combustion from the flue. My invention provides such means in combination with means for disposing of the deposits after they are ejected from the flue in such manner as in no way to interfere with their exit from the flue.

In describing my invention I shall refer to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of my flue-cleaner. Fig. 2 is a view of my flue-cleaner partly in section and showing its position relative to a flue undergoing the process of

cleaning, and Fig. 3 is a view of a modified form of my flue-cleaner.

My flue-cleaner consists of a metal conduit A, upon one end of which I preferably fix the hollow metal head B, and a deflector C, which may be permanently fixed to the conduit near its end opposite the head B or may be arranged to slide longitudinally upon the conduit and made fast thereon at any desired point by means of the set-screw *a*. The head A has parallel longitudinal wings *b* formed upon it, preferably four in number and arranged in diametrical opposition to each other. At the base of the head B is a coupling extension *c*, formed integral with the head and internally threaded to take onto the end of the conduit A, which is also threaded at its end to receive such coupling extension. A lock-nut *d* may be also used to advantage in securing a firm connection between the head and conduit. In the base of said head are formed a number of small apertures *e*, which are arranged in a circle and open from the interior of the head outwardly. They may or may not be countersunk. These apertures have their axes on lines forming oblique angles with the plane of a cross-section of the head B, and said axes diverge from each other outwardly. In the front end of the head there is formed a countersunk aperture *f*, opening from the interior of the head outwardly and preferably having its axis coincident with the axis of the conduit and head. The deflector C is made of metal and is in the form of a truncated cone with a flanged base *g*. This base *g* has a return-curve at its outer edge *h*. The deflector is supported upon the conduit A by its wall at its smaller end and by a spider-frame *i* at its larger or rear end.

As stated before, the deflector may be permanently fixed upon the conduit near the rear end thereof, but preferably is arranged to be adjustably attached thereto by the set-screw *a*. At the end *k* of the conduit may be attached a flexible or other conduit, which in turn may be connected directly or indirectly with the boiler or a receiver for compressed air or the like, and by means of a cock in such conduit steam, compressed air, or the like may be admitted to the flue-cleaner and passed into the flue to be cleaned. These last-mentioned connections and appliance are not shown in the drawings, as they are well known to those conversant with the art.

While my invention is useful and operative



with either steam or compressed air as a cleaning agent, I prefer the use of steam and in describing its operation shall refer only to the use of steam, it being understood that compressed air and the like operate in substantially the same way.

My invention, then, operates as follows: Steam is first turned on and finds its way through the conduit A into the head B, from which it finds its exit through the apertures *e* and *f*, and any condensation remaining in the conduit or head from previous operation is quickly expelled therefrom. This accomplished, the head B is entered to the flue to be cleaned, such flue being indicated by D in Fig. 2, and is projected therein for about a foot or eighteen inches. The steam issuing from the aperture *f* dislodges the accumulation of ashes and soot in the flue immediately in advance of the head B, while the steam issuing from the apertures *e* impinges against the inner side of the flue and, clearing therefrom the accumulations of ashes and soot, rushes back along the outside of the conduit A and out of the flue. As the steam passing back from the head B is traveling in the same direction with the current of gases passing through the flue, it accelerates their motion by creating a partial vacuum in the flue beyond or back of the head B and draws them swiftly through the channels formed by the wings *b* and forces them out of the end of the flue, the force of the increased draft being sufficient to draw with the gases the deposits of solid matter accumulated throughout the entire length of the flue. The gases and solid matter ejected from the flue are forced against the conical face of the deflector C and deflected by it and its curved flange in a direction away from the flues of the boiler and their impetus so reduced as to enable the draft through the stack to seize them while in a state of suspension and carry them through the stack into the outer air, the deflector of course operating simultaneously to protect the person of the operator from said gases and solid matter.

Experience has demonstrated the fact that the accumulations of ashes and soot are formed principally in the front ends of the flues into which the flue-cleaner is projected and that the insertion of the head of the cleaner a foot or eighteen inches into the flues is amply sufficient to thoroughly clear the flues of all such deposits throughout their entire length.

In Fig. 3 I have illustrated a modification of my construction, wherein the head B is omitted. Therein the conduit A' is similar to the conduit A shown in Figs. 1 and 2 and is provided with wings *b'* to center it in the flue to be cleaned. Apertures *e'*, having their axes similarly disposed to the axes of the apertures *e* illustrated in Figs. 1 and 2, are formed in the conduit itself, while the

forward end of the conduit is closed save for the aperture *f'*, centrally located therein. This construction is operative in the same way as the construction first described, which, however, is my preferred construction. Either of said constructions is also operative without the aperture *f* or *f'* in the forward end of the head B or conduit A'; but my practical experience with such constructions has shown that it is preferable to include in the structure such forward aperture.

It will be observed that the deflector C is shown as standing or located at some distance from the mouth or open end of the flue into which the head of the cleaner is inserted. This is absolutely essential to the effective operation of the flue-cleaner, and the rearwardly-inclined face of the deflector is also very advantageous, if not absolutely essential. Were the deflector placed near the open end of the flue being cleared of ashes and soot, it would operate much as the curved tubes adjusted to the end of the flue, as above described in the former art, and would be equivalent in use to a tortuous passage for the exit of the products of combustion from the flue and would so reduce the exhaust as to seriously interfere with the cleaning process.

While the particular form of my deflector disclosed in this specification may be modified without changing its function or effect or withdrawing it from the scope of my invention, I have illustrated what I consider its best form for the purpose in view. Its form should in no event be so modified as to deflect the current of products of combustion back upon itself or in any way interfere with the free exit of the gases and solid matter from the flue being cleaned.

The flue-cleaner I have described is intended to be portable and to be used to clean the several flues of a boiler in the manner described by passing the head or forward end of the cleaner into each flue and turning on the steam or other cleansing agent in the manner described; but in practice I have found it very advantageous to place such a flue-cleaner permanently in connection with a boiler or one of a battery of boilers. By permanently placing such a flue-cleaner as that above described with its head inserted in the central tube or flue of the boiler and keeping a low head of steam turned on through the flue-cleaner not only is the flue into which the cleaner is inserted kept thoroughly clear of ashes and soot, but all the other flues of the boiler are beneficially affected; the increased draft caused by the exhaust set up in the central flue also operating to increase the draft of gases through the other flues of the boiler, thereby tending to keep them cleared of deposits of ashes and soot, which otherwise would accumulate in them much more rapidly. With a proper



exhaust thus effected in the central flue of a boiler or in one of a battery of boilers the accumulations of solid matter in all the flues are greatly minimized and have to be removed much less frequently than would otherwise be the case. Furthermore, the exhaust being used to draw the products of combustion through the flues in the direction in which they naturally pass serves to hold the heat to the rear end of the boiler, thus preventing contraction of the flues at their points of union with the crown-sheet and obviating the leakage consequent on such contraction.

Having thus described my invention, I claim—

1. In a flue-cleaner, a conduit for vapor, compressed air, or the like, having one or more apertures at or near one end thereof, said apertures being so placed and formed as to deflect the course of the current of vapor, compressed air, or the like passing through said conduit back along said conduit and through a flue into which it is inserted, in combination with a deflector so formed and located as to receive said current and any solid matter carried with it and so deflect the same as not to retard the exit of said current from said flue.

2. In a flue-cleaner, a conduit for vapor, compressed air, or the like, having an end or

head of greater diameter than said conduit, said head having one or more apertures at its rear end whereby the vapor, compressed air, or the like, passing through said conduit may be projected rearwardly along said conduit and within a flue within which said flue-cleaner is inserted, in combination with a deflector so formed and located as to receive said vapor, compressed air, or the like, and any solid matter carried with it and so deflect the same as not to retard the exit thereof from said flue.

3. In a flue-cleaner, the combination of a conduit having a head of greater diameter than the body of said conduit, said head having apertures opening rearwardly, and a conical deflector sustained on said conduit, substantially as described.

4. In a flue-cleaner, a conduit having a head of greater diameter than said conduit, said head having apertures opening rearwardly and an aperture opening forwardly, in combination with a conical deflector having a flanged edge, substantially as described.

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Witnesses:

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