

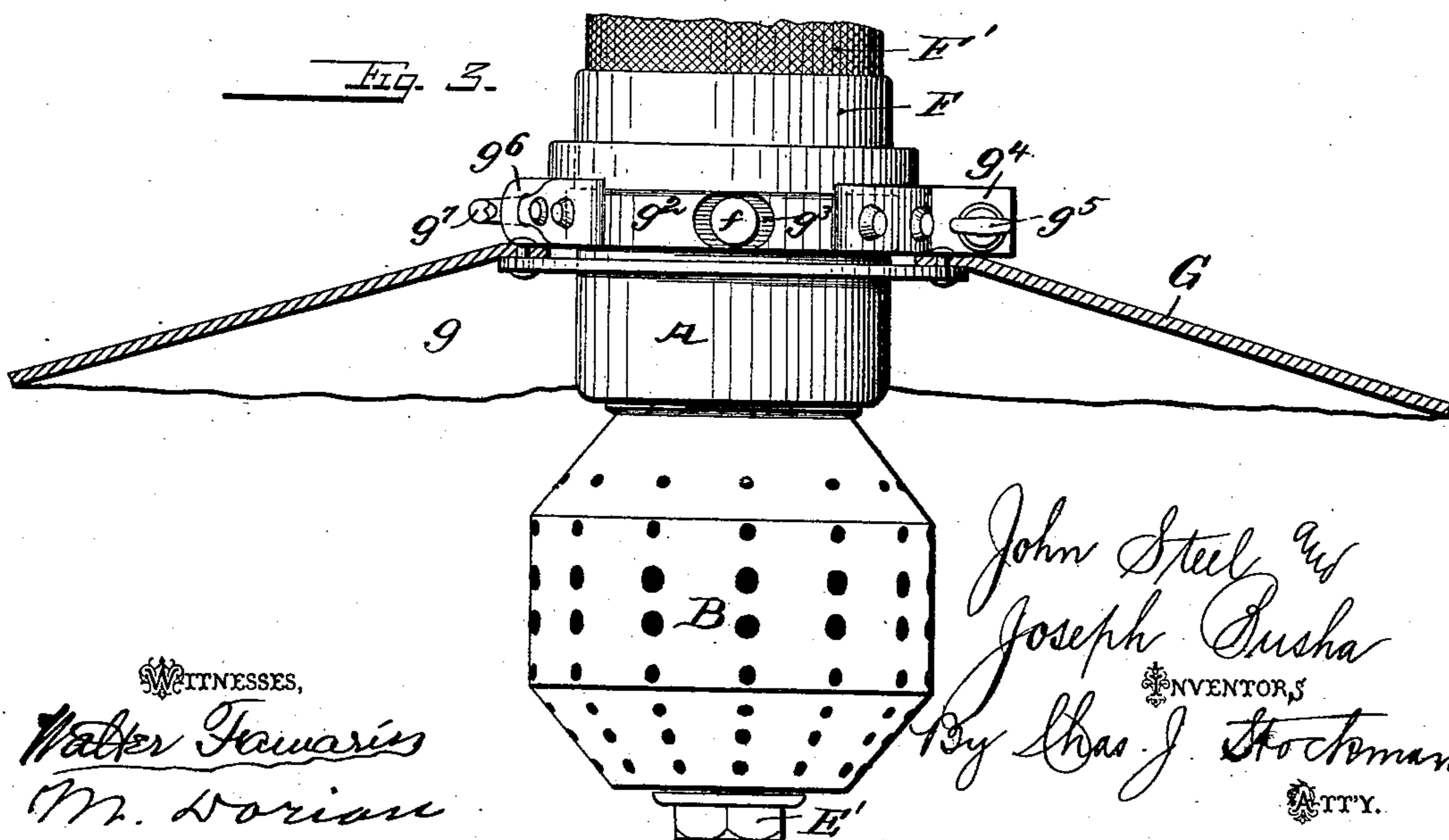
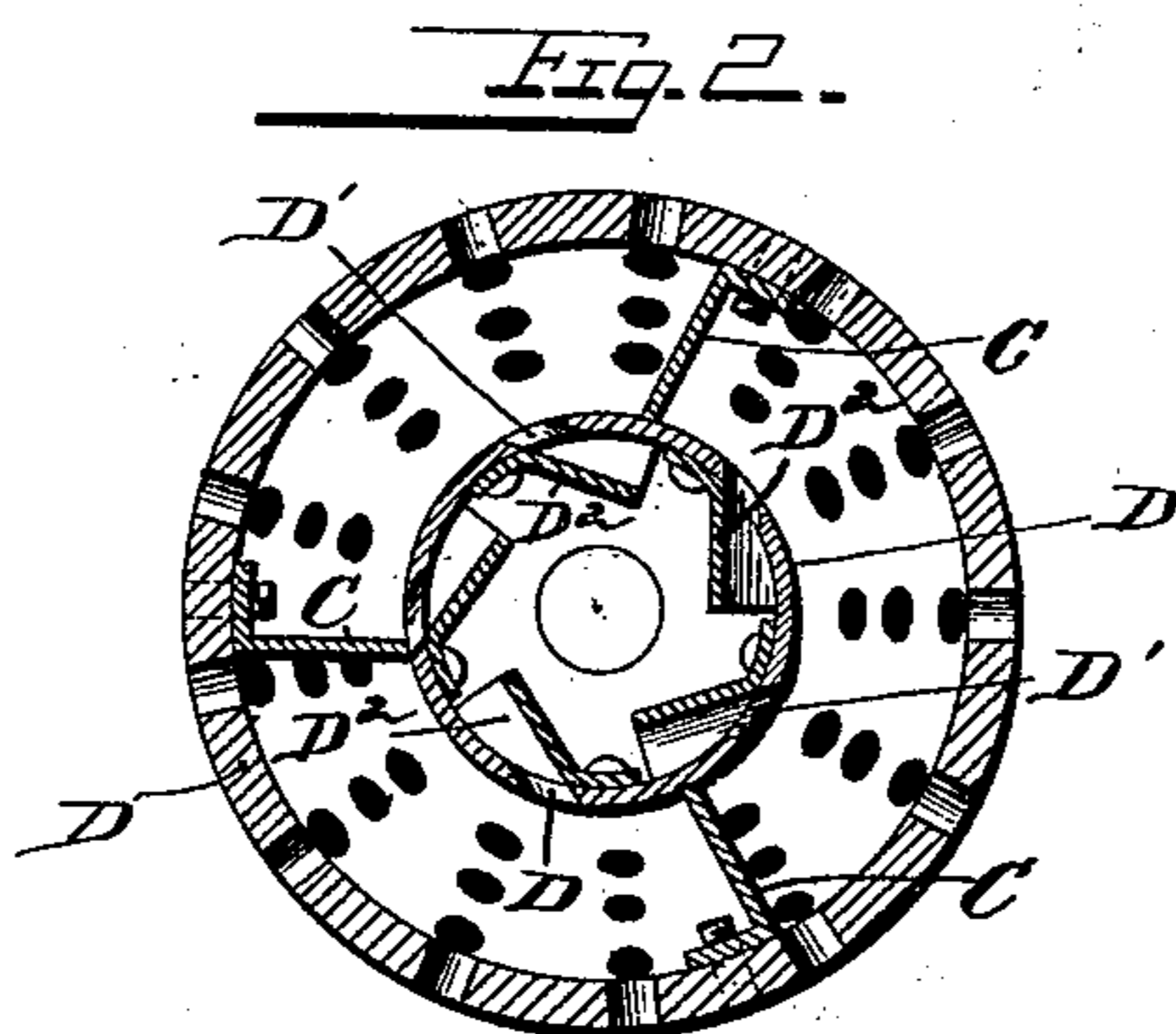
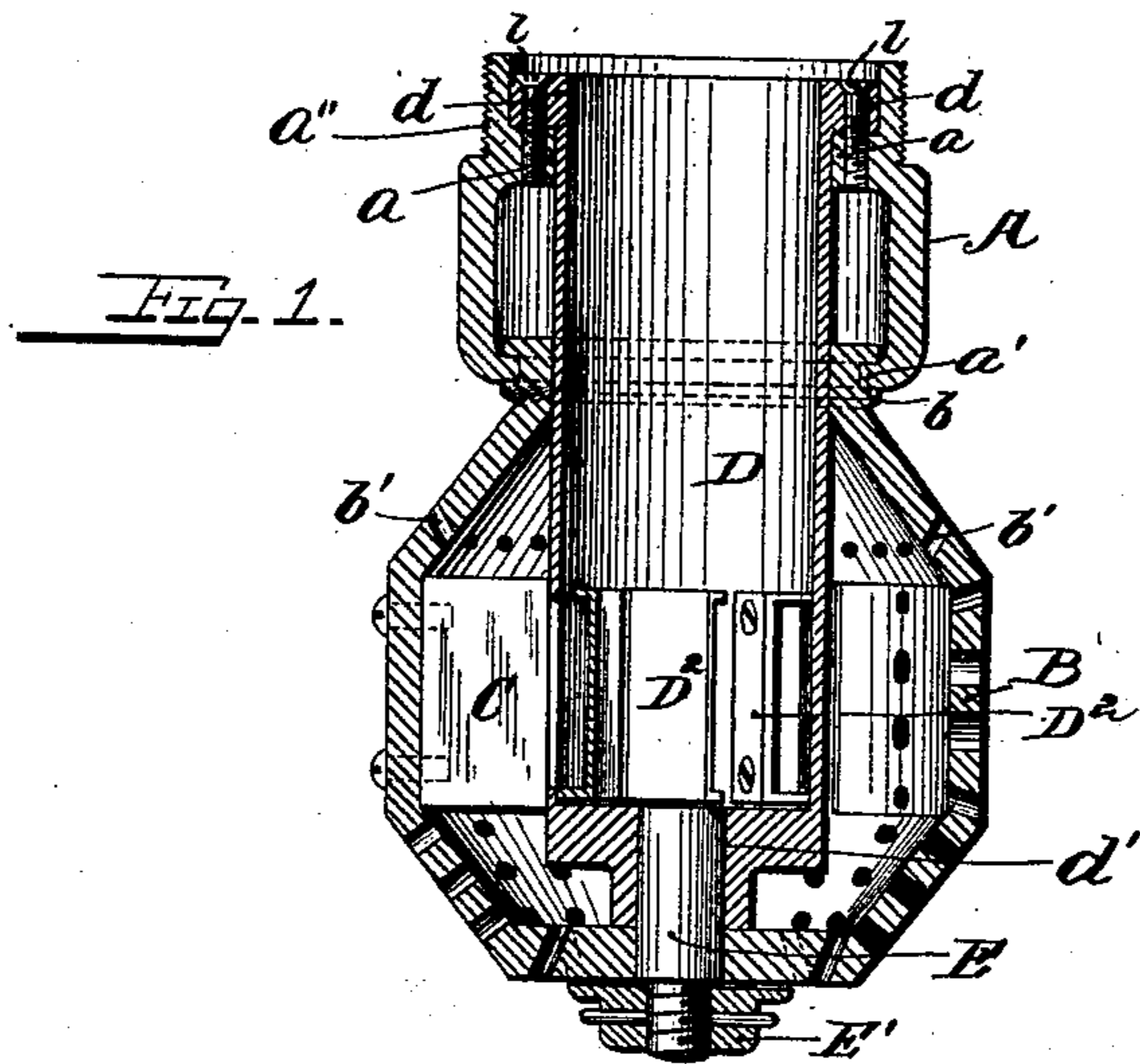
(No Model.)

2 Sheets—Sheet 1.

J. STEEL & J. BUSHA.  
SPRAYING NOZZLE.

No. 523,294.

Patented July 17, 1894.



WITNESSES,

Walter Foxwaris  
Mr. Lorian

John Steel and  
Joseph Buscha  
INVENTORS

By Chas. J. Stockman  
ATTY.

(No Model.)

2 Sheets—Sheet 2.

J. STEEL & J. BUSHA.  
SPRAYING NOZZLE.

No. 523,294.

Patented July 17, 1894.

FIG. 4.

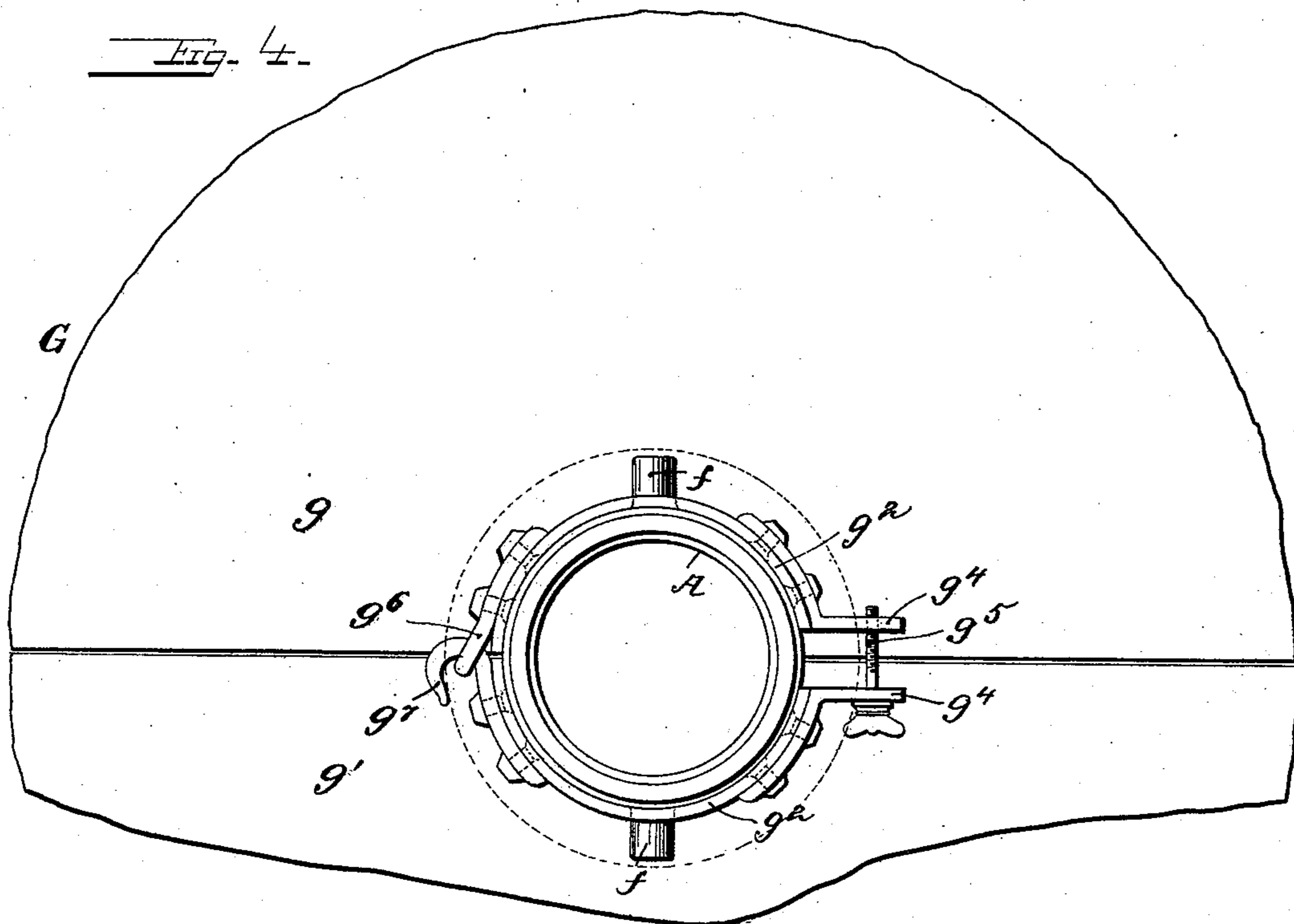
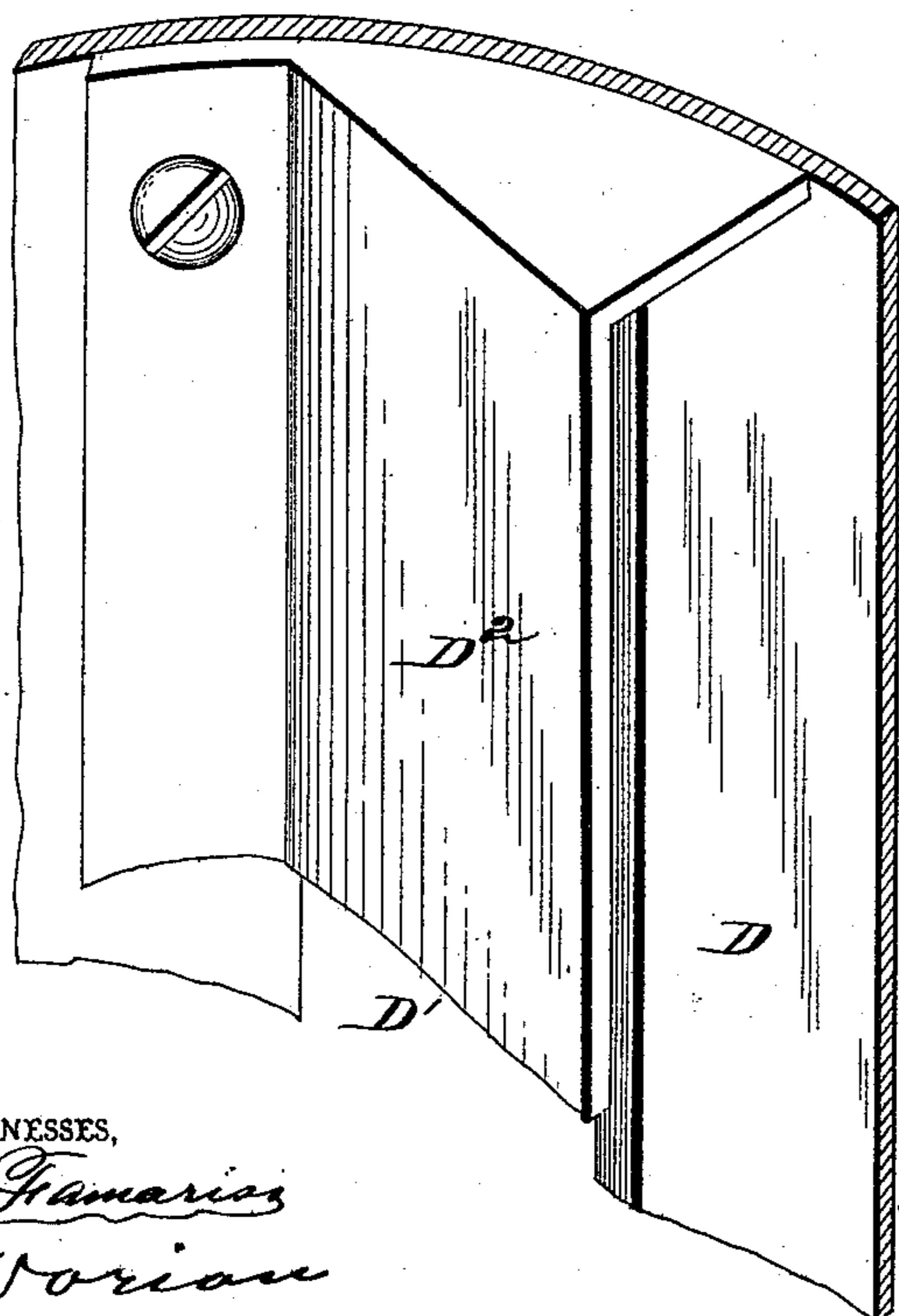


FIG. 5.



WITNESSES,  
Water & Fire Insurance  
Co. of New York

John Steel and  
Joseph Buscha  
INVENTORS  
By Charles Stockman  
ATTY.

# UNITED STATES PATENT OFFICE.

JOHN STEEL AND JOSEPH BUSH, OF PITTSBURG, PENNSYLVANIA.

## SPRAYING-NOZZLE.

SPECIFICATION forming part of Letters Patent No. 523,294, dated July 17, 1894.

Application filed August 30, 1893. Serial No. 484,383. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN STEEL and JOSEPH BUSH, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Spraying-Nozzles; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has relation to spraying nozzles, and it consists in certain peculiarities in the construction, arrangement and combination of the several parts thereof, substantially as hereinafter described and particularly pointed out in the subjoined claims.

One object of our invention is to so construct the nozzle that it will be capable of revolving with such rapidity as to throw water from it in solid sheets and over greater area than those now provided, and also of creating an air-current which will drive smoke away from it in a forward direction, thereby making it especially useful in fighting fire in cellars, and other closed rooms, where the smoke is so dense that firemen could not heretofore enter to fight the fire without subjecting themselves to the danger of suffocation.

Another object of our invention is to provide the nozzle with a simple means (capable of being quickly removed and replaced) which will protect the firemen from "back sprays," and, to a certain extent, from the smoke, when they are directing the streams of water, and which also, when the nozzle is let down into a room through an opening made in the ceiling for the purpose, will close the space around the nozzle, so as to leave no opening, which would create a draft and thereby feed the fire.

A further object of our invention is to so construct the device that the inside pipe is more readily accessible, when it is desired to remove it for inspection or repair, than in those heretofore constructed.

These objects are accomplished by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of our improved spraying-nozzle with the shield and

hose-coupling removed. Fig. 2 is a horizontal section, taken on the line 2—2 of Fig. 1. Fig. 3 is a side elevation of the device, with the coupling and shield in place. Fig. 4 is a plan view of the device, complete, with one side of the shield broken away. Fig. 5 is an enlarged detail representation of the inner tube.

The same letters of reference are used to designate the same parts in the several figures.

A designates the upper external part of our improved nozzle, having near its upper end an inwardly-extending offset or shoulder, *a*, and its extreme lower end extended inward, as shown at *a'*.

B designates the revoluble chamber, having its upper end formed with an annular recess, *b*, which receives the end, *a'*, of the stationary part, A, said revoluble chamber thus having at its upper end a swivel connection with the lower end of the part A. This revoluble chamber is made widest at its longitudinal center and presents frustums of cones both forward and rearward. Its sides are formed with series of perforations through which the water issues, said perforations being arranged to throw the water forward, rearward and outward at different angles, as clearly shown in the drawings. Bolted or otherwise suitably fastened to the inner wall of this revoluble chamber, at the longitudinal center, or widest part, of said chamber are three inwardly-extending wings, C, which are located equi-distant from each other.

D designates the inner tube of the nozzle. This tube is stationary and is secured to the part A in the manner hereinafter described. It is formed at points directly opposite the wings C with a series of lateral openings, *D'*, equal in length to said wings.

It is important, in order to accomplish the requirements fulfilled by our invention, that the part B be capable of revolving with maximum rapidity and without jerk caused by momentary complete or partial stoppages and starts while the pressure is on. To this end we provide a greater number of openings, *D'*, than there are wings, C, and secure within the tube a frame, *D<sup>2</sup>*, for each of said openings, each of said frames being closed at its

top and bottom and having its opposite sides arranged diagonally; said frames thereby forming diagonal passageways to the openings, D', and causing the water to be discharged diagonally from said inner tube. By closing the passageways at the top and bottom the water is caused more positively to issue diagonally from the tube than it would if the passages were left open at the top and bottom, as will be readily seen. As the wings, C, are located in the longitudinal center of the revoluble chamber the pressure is equalized at both top and bottom so that the chamber will revolve with maximum steadiness.

In practice we prefer to provide five passages or openings from the tube to three wings, whereby the side of each wing will be struck in succession by the water issuing diagonally from the inner tube and at no time, in the rotation of the revoluble chamber, B, will the wings be so located with respect to said openings that one or more of the former will not be struck by and receive the full force of the stream or streams issuing from one or more of the latter. Thus it will be seen that by the number, location and form of the passages and wings the full power of the direct pressure of water will be received by the wings and that such pressure is equal throughout the length of the revoluble chamber, whereby said revoluble chamber is capable of being revolved with maximum rapidity and without jerk. It will be further seen that as the part B is supported entirely, or almost so, by a swivel connection at its upper end with the stationary part, A, it may revolve with the greatest freedom as there is very little friction to overcome. Practical experience has demonstrated that in a nozzle constructed as above set forth the water will issue from it in solid sheets and with great force, thereby effectively covering a great area and, in addition thereto, creating an air current or a force which will dissipate the smoke in its immediate vicinity and force the same forward away from it to such an extent as to enable firemen, unprovided with firemen's respirators, to enter with it and fight fire in closed rooms, or in other places where the smoke is dense, without danger of being overcome by the heat or suffocated by the gases in the smoke.

The upper end of the inner tube, D, is formed with an outwardly-extending flange, d, which rests upon the offset, a, and is secured thereto by means of screws, l, while the lower end of said tube is closed and formed with an opening or recess, c', which receives the upper end of a post E. This post extends entirely through and beyond the bottom of the revoluble chamber, B, and its portion within the nozzle is round in cross-section, so as not to interfere with the free rotation of said part B, while its portion exterior thereto is externally-screw-threaded and is engaged by a nut E'. By thus securing the tube in place it can be quickly and

readily removed when it is desired to clean or to inspect it, simply by removing the screws, l, (the heads of which, as will be seen, are exposed when the device is not attached to a hose or pipe) and the nut E'. This is an important advantage as the passageways in said tube are liable to become clogged with the sediment of the water.

The nut, E', is not intended to serve as a support for the revoluble chamber, B, and consequently it is not located in close frictional contact therewith, so that there is no friction at the forward end of the nozzle to retard the movement of the revoluble chamber, but when the revoluble chamber is revolving at an extremely high speed—for example, under a pressure of from two hundred to two hundred and fifty pounds to the square inch—there may be, (notwithstanding that the pressure is equalized throughout the length of the revoluble chamber by the position of the wings, as above stated,) a tendency for such chamber to wobble, and to overcome this tendency we prefer to locate the nut sufficiently near to the bottom of the chamber whereby it, in connection with the post, E, and position of the wings will positively overcome all tendency of the chamber to wobble under any circumstances.

It will be observed that in addition to the usual forwardly and outwardly inclined openings in the revoluble chamber we provide said chamber with a series of rearwardly-inclined openings, b'. These openings are of prime importance because, when the nozzle is let down into a room where there is a fire which it is desired to extinguish the water issuing from such openings, b', will protect the hose by extinguishing fire upon the rafters, or woodwork, or other inflammable material surrounding the hose.

F designates a coupling collar, which is of the ordinary and well known construction, and, as usual, is attached to the hose F'. Into this coupling collar the upper end of the nozzle is screwed, the part A of the latter being formed with external screw-threads a'', for this purpose.

G designates a shield which projects considerably beyond the coupling-collar and has its main part inclined. This shield is made in two separate parts, or of two segments, g and g', each of which is formed with an upwardly-extending flange, g<sup>2</sup> surrounding the central spring which receives the coupling F said flange, having openings, g<sup>3</sup>, to receive the lugs, f, of said coupling collar F.

g<sup>4</sup> designates lugs which are secured to, or formed integral with the adjacent ends of the shield-segments, and one of which is formed with a threaded-perforation for the passage of a thumb-screw, g<sup>5</sup>, by means of which said ends of the shield-segments are drawn together and the shield clamped in position: and g<sup>6</sup> and g<sup>7</sup> respectively designate a link and a hook which are secured to the other ends of the respective shield-segments and

when engaged, the one with the other, form a loose pivotal connection of the shield-segments with each other at one side of the shield.

The shield, when thus constructed, can be readily and quickly attached to or removed from the coupling-collar, and when attached it will be held from displacement both by the clamping means at the free ends of the sections and by the engagement of the lugs of the coupling collar with the openings in the flanges of the shield. When thus secured in place it will protect the firemen from the water issuing from the uppermost rearwardly-inclined openings, *b'*, of the revoluble chamber when the firemen are directing the streams of water from the room in which the fire is located; and, in the event that the nozzle is let down into the room which contains the fire which it is desired to extinguish, through an opening made in the top of said room for this purpose, said shield will serve to close the portion of such opening surrounding the nozzle, which is important, as, especially in cases of fire, the opening has to be made so quickly as not to admit the exercise of nice calculation as to its size and shape, and if an opening is left uncovered a draft will be created which will feed the fire. This shield will also aid in protecting the firemen from smoke and heat.

Although we have described our invention as being a part of the firemen's hose, and therefore to be carried around by the firemen for use as occasion demands, it is, obviously, equally as well adapted for permanent connection with the stand-pipes of large buildings and may be located in any or all of the rooms of such buildings and serve as a part of the safety appliance thereof.

Having now described our invention, what we believe to be new, and desire to secure by Letters Patent, and what we therefore claim, is—

1. In a spraying nozzle, the combination of a revoluble perforated chamber, a plurality of wings secured to the inner wall of said perforated chamber, a stationary tube having a plurality of openings opposite said wings, and frames secured to the inner wall of said tube adjacent to said openings, said frames being arranged to form diagonal passageways to said openings and said passageways being closed at their tops and bottoms, substantially as described and for the purposes set forth.

2. In a spraying nozzle, the combination with a stationary part, A, having an inwardly-extending lower end, a stationary tube, secured to said part, A, and having openings near its lower end, and frames secured to the inner wall of said tube and arranged to form diagonal passageways to said openings, said passageways being open at their inner and outer sides but closed at their tops and bottoms, of a perforated revoluble chamber, having at its top a recess to receive the inwardly-extending end of said stationary part, A, said revoluble chamber being thereby suspended from said

stationary part by a swivel connection therewith, and wings, secured to the inner wall of said perforated revoluble chamber opposite said openings in the stationary tube, substantially as described and for the purposes set forth.

3. In a spraying nozzle, the combination of the stationary part, A, having an offset near its top, the revoluble chamber, connected with said stationary part, a stationary inner tube, having an inwardly-extending lug at its top, screws, extending through said lug in the tube and into the offset in said stationary part, A, a post, engaged with the bottom of said tube and extending entirely through and beyond the bottom of said revoluble chamber, the portion of said post exterior to said chamber being screw-threaded, and a nut, engaging the threaded portion of said post, substantially as described and for the purposes set forth.

4. In a spraying nozzle, the combination of the stationary part, A, the perforated revoluble chamber, supported entirely by said stationary part, wings, secured to the inner wall of said revoluble chamber opposite the longitudinal center thereof, an inner stationary tube, secured to said stationary part, A, and having openings opposite said wings, diagonal passageways to said openings, a post, having its inner end engaged with the lower closed end of said tube, and its outer end extending entirely through and beyond the bottom of said revoluble chamber, the portion of said post exterior to said chamber being screw-threaded, and a nut, engaging said threaded portion of the post, said nut being located adjacent to the bottom of said revoluble chamber but normally out of contact therewith, substantially as described, whereby the revoluble chamber may revolve at high speed without wobbling, as specified.

5. The combination with a spraying nozzle, having a revoluble perforated chamber, and a coupling collar having lugs, of a shield having a central opening to receive said coupling collar, said shield also having a flange formed with openings to receive said lugs and being made in sections pivoted together at one side of the shield and having lugs at the other side thereof, and a thumb screw, passing through said lugs and serving to clamp the shield around said coupling collar, substantially as described.

6. The combination with a hose nozzle, and its coupling collar having lugs, of a sectional shield, removably secured to said coupling collar and having a flange formed with openings to receive the lugs thereof, substantially as described.

7. The combination with a hose-nozzle, and a coupling collar, having lugs of a shield, having a flange formed with openings to receive said lugs the body part of said shield projecting outward beyond said collar, substantially as described and for the purposes set forth.

8. The herein-described shield, made in sec-

tions pivotally secured together at one side of the shield and having lugs at the opposite side thereof, said shield having its main part inclined and being formed with a central opening and provided with a flange for each of its sections, said flanges surrounding said central opening and having openings, and a clamping screw engaging said lugs, substantially as described.

10 9. The combination with a hose-nozzle, and a coupling collar having lugs, of a shield, having a flange formed with openings to receive the lugs of said coupling-collar, said shield having its main part inclined and projecting

15 considerably beyond said collar and being

made in sections pivotally secured to each other at one side of the shield, and a means at the opposite side of the shield for drawing the ends of the sections together and clamping the shield around the nozzle, substantially as described and for the purposes set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN STEEL.  
JOSEPH BUSH.

Witnesses:  
JAMES SHILLIDAY,  
GEO. G. THORNBURG.

It is hereby certified that in Letters Patent No. 523,294, granted July 17, 1894, upon the application of John Steel and Joseph Busha, of Pittsburg, Pennsylvania, for an improvement in "Spraying-Nozzles," errors appear in the printed specification requiring correction, as follows: In line 58, page 2, the reference letter "c<sup>1</sup>" should read *d<sup>1</sup>*; in line 122, same page, the word "spring" should read *opening*; the word *collar* should be inserted after the word "coupling" and a comma should be inserted after the reference letter "F," and in line 123, same page, the comma after the word "flange" should be stricken out; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 31st day of July, A. D. 1894.

[SEAL.]

W. H. SIMS,

*First Assistant Secretary of the Interior.*

Countersigned:

JOHN S. SEYMOUR,

*Commissioner of Patents.*