

No. 826,890.

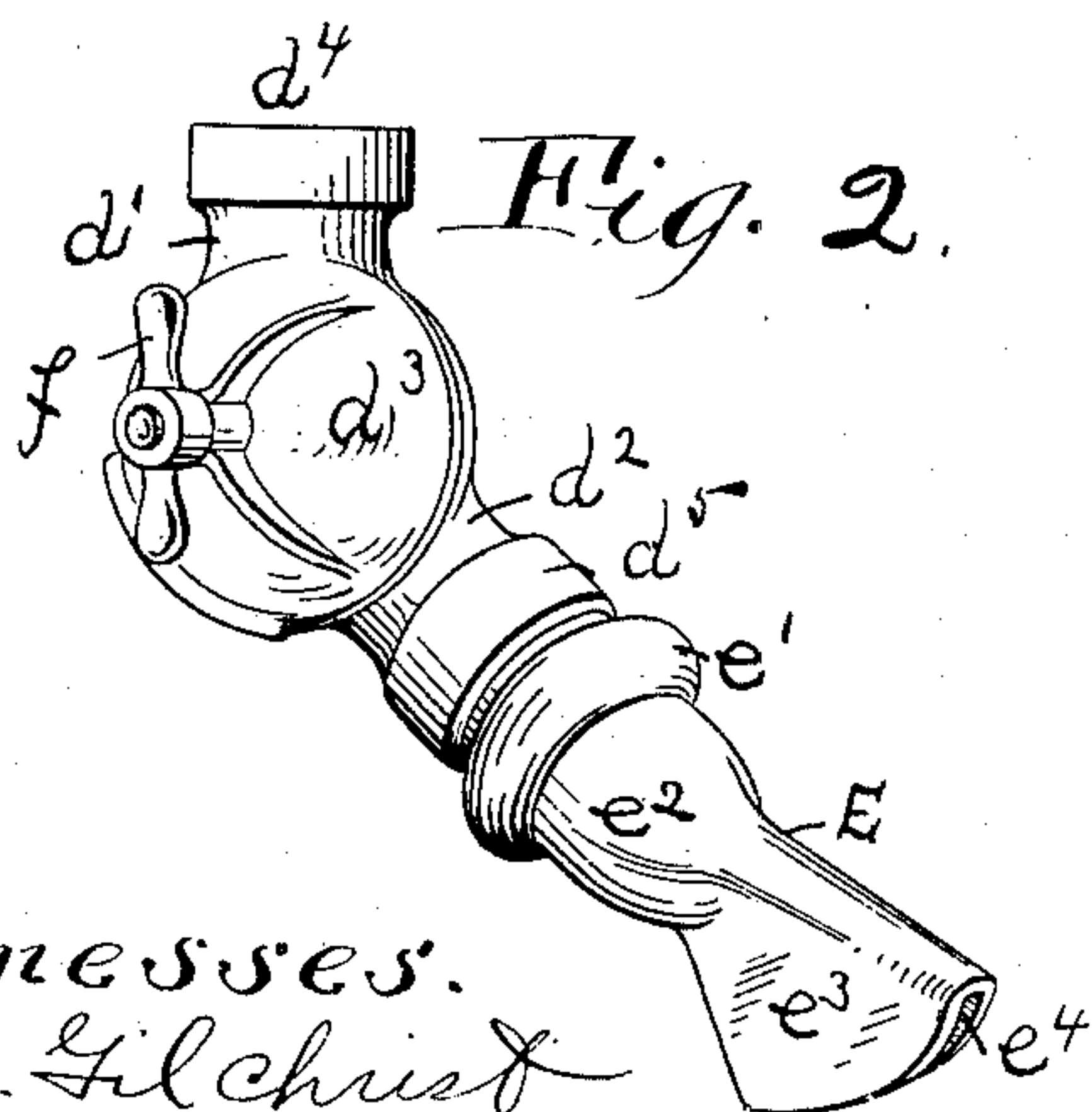
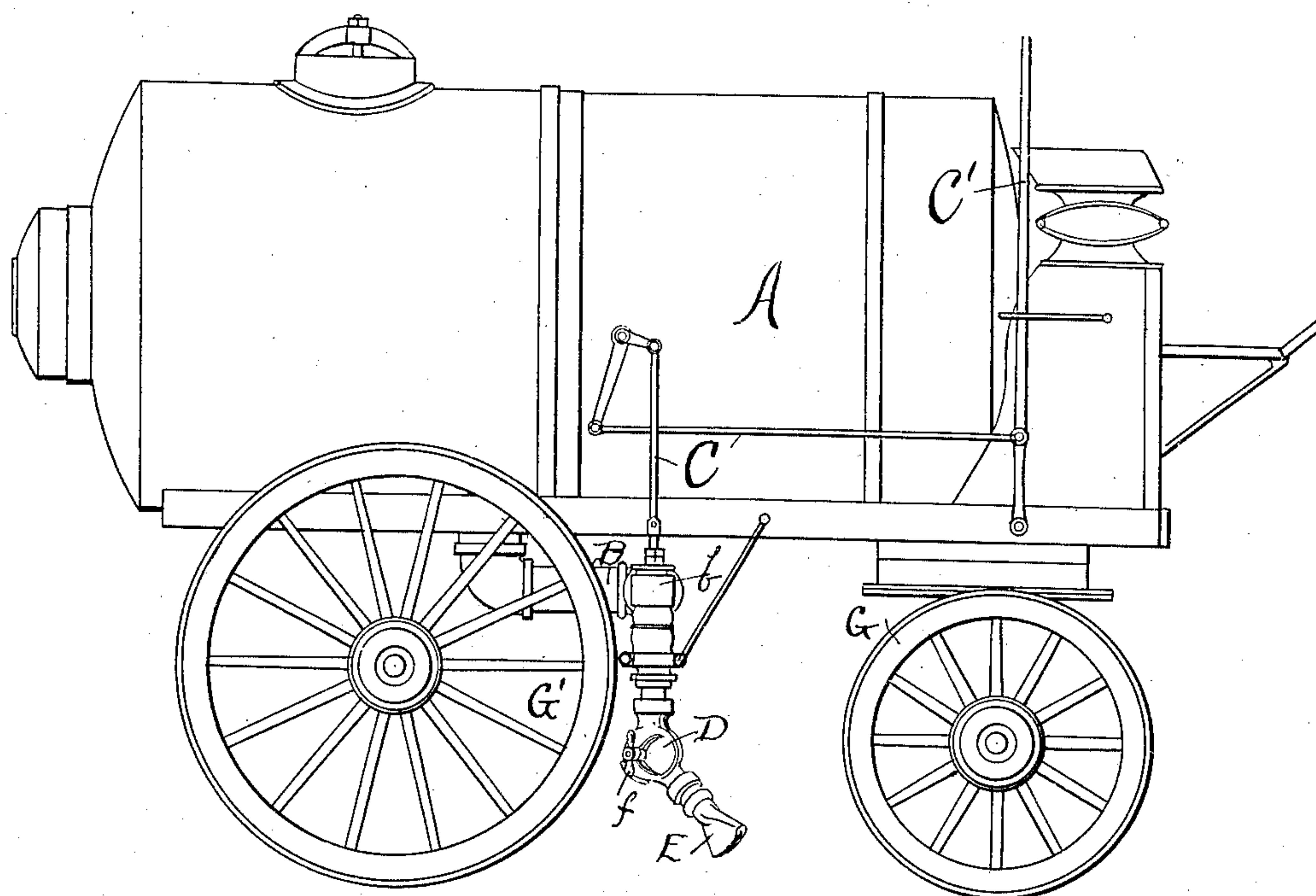
PATENTED JULY 24, 1906.

C. E. SCHAFER.
STREET FLUSHING APPARATUS.

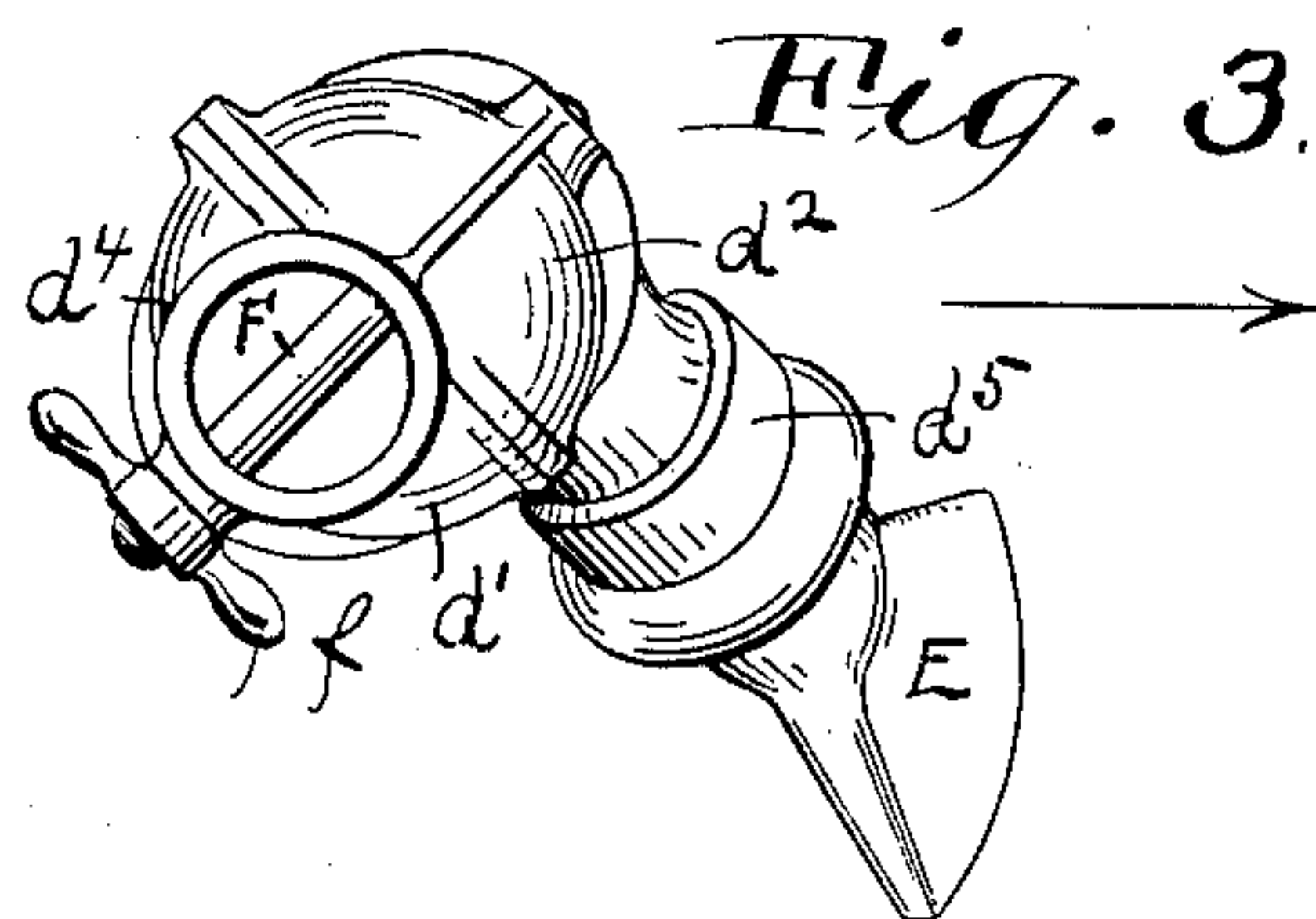
APPLICATION FILED AUG. 30, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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4 SHEETS—SHEET 2.

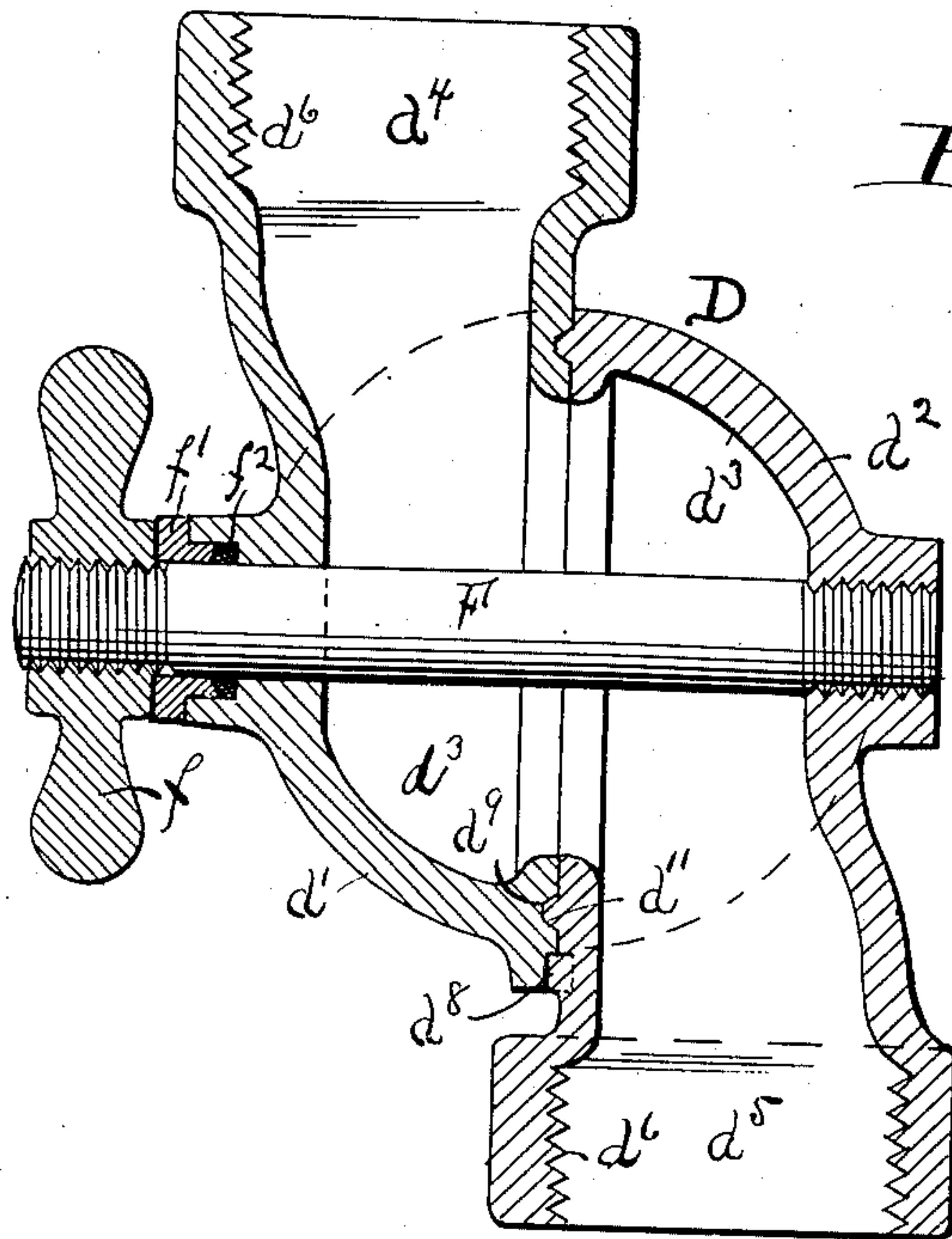


Fig. 4.

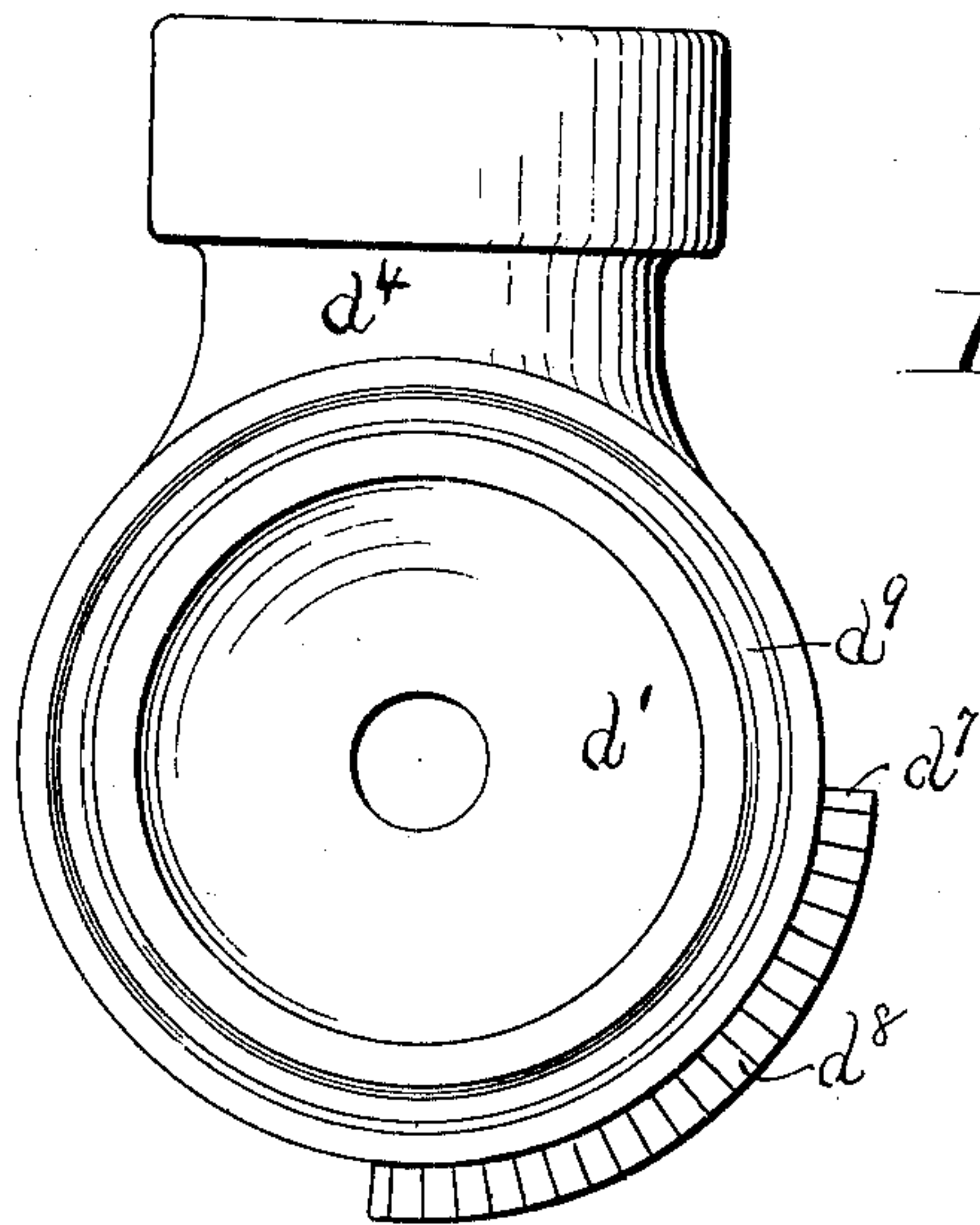


Fig. 5.

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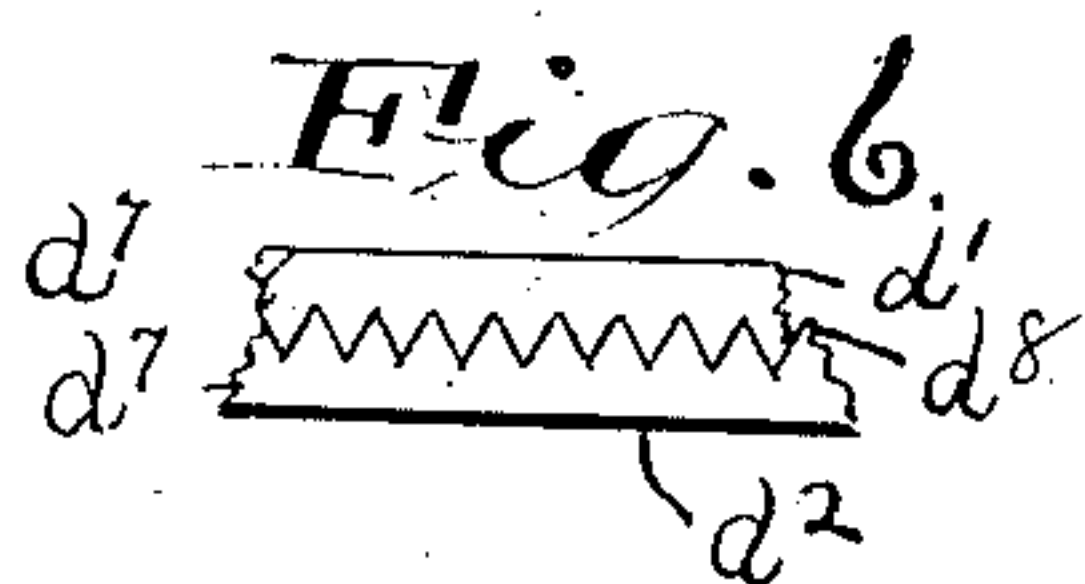


Fig. 6.

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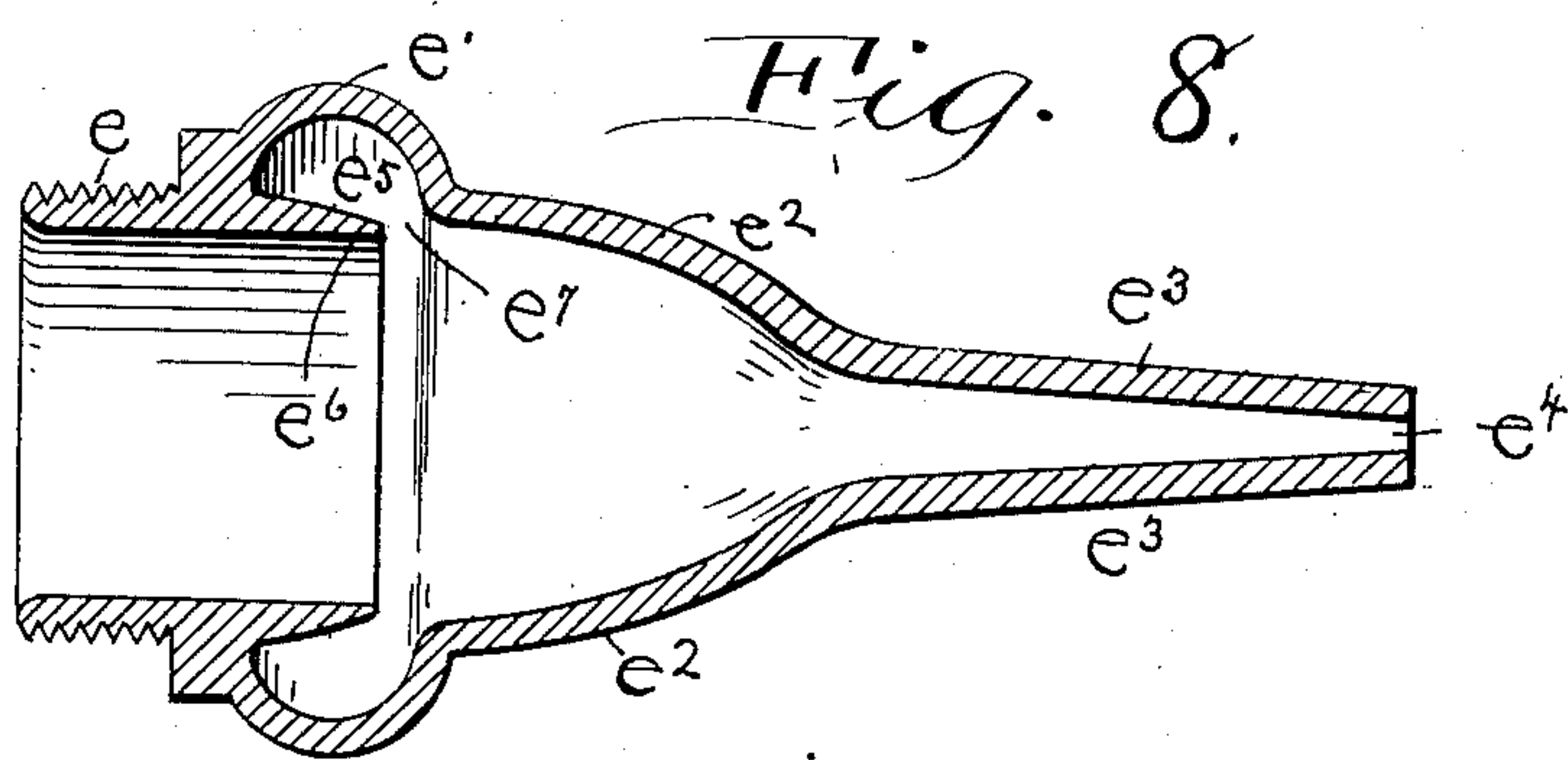
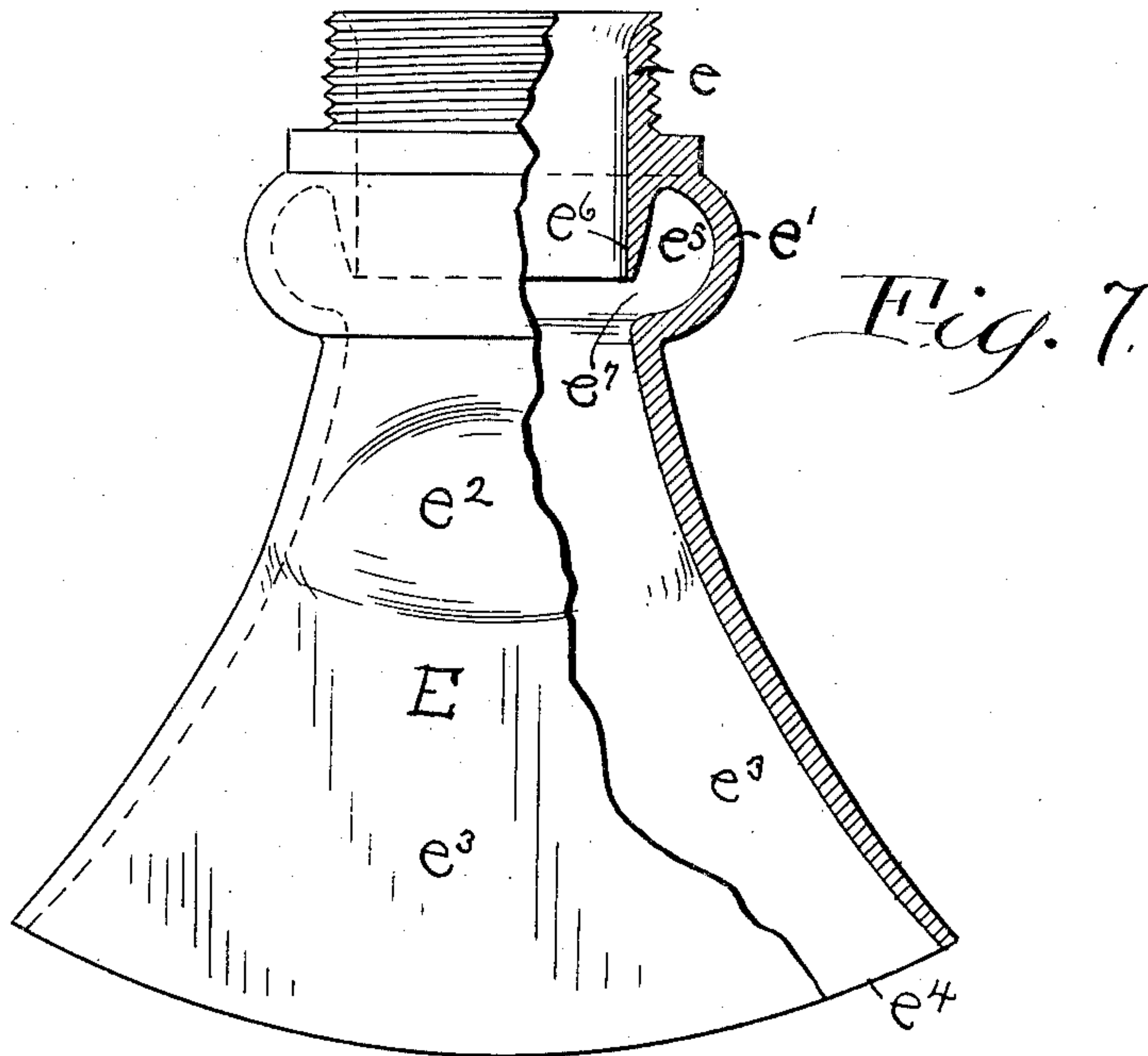
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 9

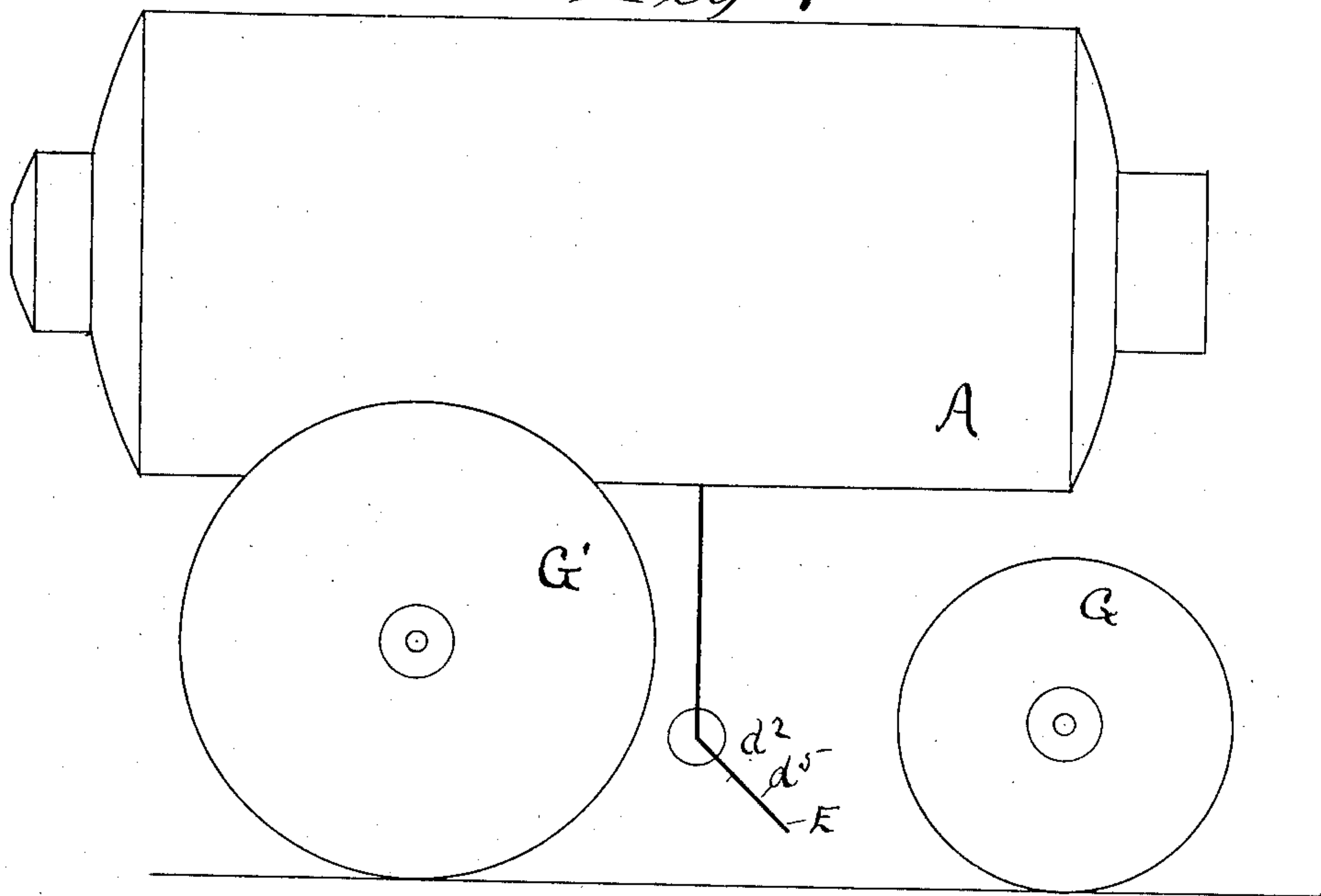


Fig. 10

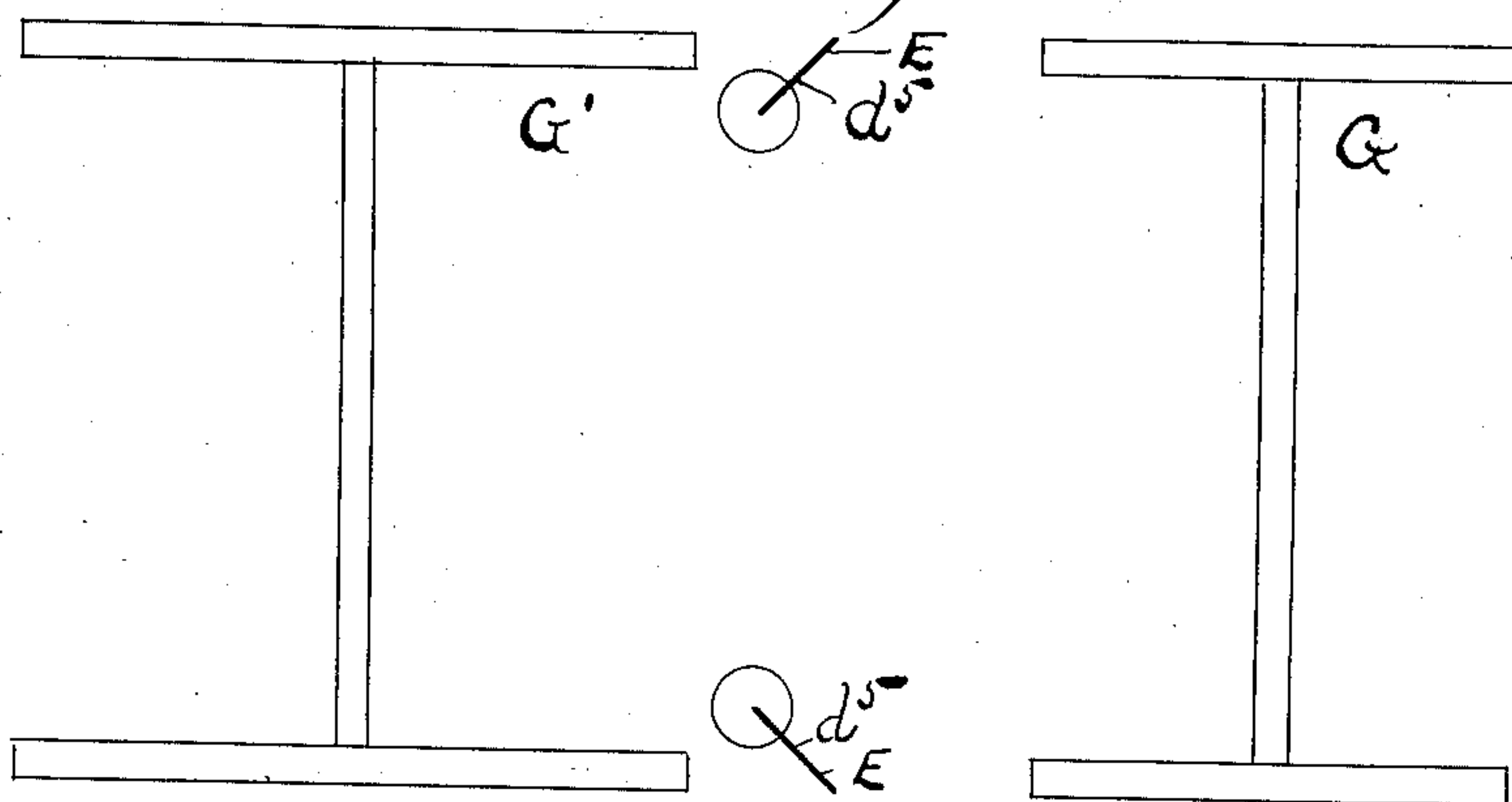
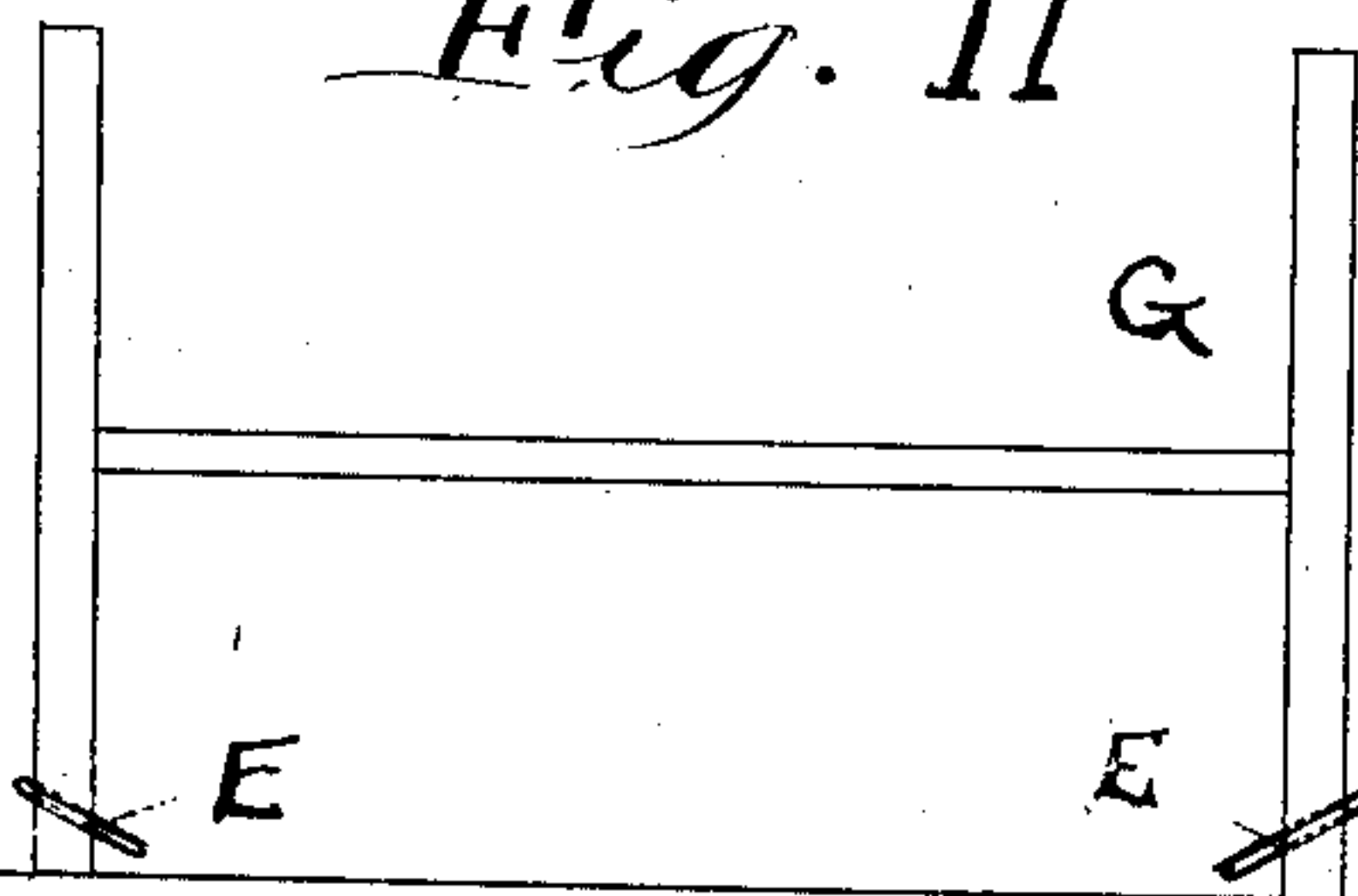


Fig. 11



Witnesses.
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UNITED STATES PATENT OFFICE.

CHRISTIAN E. SCHAFER, OF CLEVELAND, OHIO; ASSIGNOR OF ONE-HALF
TO DANIEL CONNELLY, OF CLEVELAND HEIGHTS, OHIO.

STREET-FLUSHING APPARATUS.

No. 826,890.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed August 30, 1905. Serial No. 276,388.

To all whom it may concern:

Be it known that I, CHRISTIAN E. SCHAFER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Street-Flushing Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

In modern street-cleaning flushing-wagons are employed which comprise a tank to contain water under pressure and nozzles to direct the water along the street pavement. In such wagons it has heretofore been customary to locate the nozzle close to the pavement and direct the water substantially horizontally along the pavement to force the dirt toward the curb in contradistinction to the old sprinkling-wagons, which let the water pass vertically onto the pavement. I have discovered that if the water be directed under the pressure against the pavement diagonally downward and outward it will clean the pavement most effectively; the downward force of the water digging the dirt out between the paving-stones, while the outward force carries it toward the gutter. Furthermore, I have found that if the stream of water strikes the pavement on edge the result is more efficient.

The apparatus which is the subject of this patent has been designed to accomplish this. It directs a flat stream of water diagonally downward, diagonally outward, and tipped diagonally on edge. The angles at which the stream strikes the pavement vary considerably with the nature of the pavement, wherefore means have been provided for adjusting angle of the discharge-pipe. These means are another feature of this invention. Furthermore, the nozzle may be adjusted so as to carry the stream in a direction such as will shove the dirt along at the curb toward and into the catch-basin.

The invention also includes a form of nozzle for the discharge-pipe which is so arranged as to contain within itself an air-chamber to insure a steady and even pressure on the discharging stream.

The drawings clearly illustrate the invention.

Figure 1 is a side elevation of the flushing apparatus. Fig. 2 is a side elevation of the nozzle itself, being taken from the same point

of view as Fig. 1. Fig. 3 is a plan of the nozzle, the arrow indicating the direction of travel of the vehicle. Fig. 4 is a vertical section through the joint in the discharge-pipe. Fig. 5 is a side elevation of one of the joint-sections. Fig. 6 is a fragmentary detailed view showing the interlocking edges of these sections. Fig. 7 is a view, partly broken away, of the nozzle itself. Fig. 8 is a longitudinal section of such nozzle. Figs. 9, 10, and 11 are diagrams to show how the nozzle stands at an angle in three directions. These views represent, respectively, a side elevation, a plan, and an end view of the apparatus.

Referring briefly to the wagon itself, A represents a tank adapted to contain water under pressure and mounted on a suitable frame and wheels G G'. A discharge-pipe B leads from this tank and has by means of an elbow a downward section *b*, in which is a valve operated by a system of links C, leading to a lever C' in convenient reach of the driver.

The lower end of the pipe-section *b* is continued downward by way of an angular discharge-pipe D. This comprises two sections *d'* and *d''* of similar construction and each having a substantially hemispherical casing *d'''*, from which leads a tubular extension *d''''* and *d'''''*, respectively. Each extension is enlarged at its end and has internal threads *d''''''*. The two halves of the casing are secured together by a bolt F, on which screws a hand-nut *f*, there being a gland *f'* and packing *f''* around the bolt between the casing *d'* and the nut.

The extension *d''''* of one half of the casing extends upward and screws onto the lower end of the pipe *b*. The corresponding extension *d'''''* of the other half of the casing extends diagonally downward and has screwed into it a nozzle E. This nozzle is made in the form shown and gradually flares from a cylindrical form at its screw-threaded end *e* to a narrow elongated slot *e'* at its outer end. The nozzle is screwed into the extension *d'''''* and tipped at an angle, the inner corner being lowermost, as clearly shown in Figs. 1, 2, and 11.

The casing *d''* *d'''*, extending diagonally downward, as shown in Figs. 1 and 9, and diagonally outward, as shown in Figs. 3 and 10, and the nozzle being itself at an angle, as shown in Figs. 1, 2, and 11, it will be seen

that the flat stream of water is given a course which is an angle in three directions—namely, it passes toward the front of the vehicle and diagonally outward, and its forward edge is
 5 nearest the pavement. This causes the stream of water to dig into the creases between the paving-stones and also gives it a greater effect in loosening dirt adhering to the pavement, for the stream has a plowing
 10 action as though a sharp edge of it got under the dirt and loosened it up for the rest of the stream to carry toward the curb.

In order to hold the casings d^2 at the proper angle to the casing d' and prevent slippage,
 15 I form on each of the casings a lip d^7 , which has a serrated edge d^8 . These serrations interlock, as shown in Fig. 6, whereby the bolt F and nut f are able to hold the parts securely against slipping. One of the members
 20 of the casing, as d' , has an annular groove d^9 in the face where it meets the other casing, and the other casing has a rib d'' , which enters this groove, as shown in Fig. 4. By this means leakage between the parts is pre-
 25 vented.

The angles which the extension d^2 d^5 and the nozzle E occupy vary considerably with the character of the pavement and the dirt to be removed. The angles shown in the dia-
 30 gram are illustrative of some frequently employed and show the discharge-pipe as inclining downwardly at about forty-five degrees and outwardly at about forty-five de-
 35 gree, while the nozzle itself is tipped downwardly at its inner corner at about thirty de-
 gree.

The importance of having the wide flat-mouthed nozzle tilted in all three directions with regard to the traveling tank arises from
 40 the fact that such a disposition of parts introduces an entirely new principle into the infant art of street-flushing. Heretofore there have been nozzles so disposed as to direct a sheet of water downwardly from the
 45 nozzle, so as to strike the pavement at a digging-angle. This has resulted in the removal of dirt from between the paving-blocks; but it has likewise resulted in the removal of the filler from between the blocks. Later inven-
 50 tors, realizing that this feature was a great deterrent to the use of street-flushing machines, sought to eliminate this particular difficulty and did so by abandoning the dig-
 55 ging-angle altogether, although the value of the digging action was well recognized in effecting the removal of the dirt. Nevertheless it was so abandoned, and nozzles were substituted which directed the sheet of water onto the pavement at an exceedingly acute angle,
 60 the mouth of the nozzle being practically parallel with the pavement. This arrangement gave a sweeping action and accomplished its purpose in so far as it saved the filler between the paving-blocks. For the purpose
 65 of securing this action it was necessary to

have the nozzle swung very near to the pavement, and certain improvements were adopted whereby the height of the nozzle from the pavement and the inclination of the same relative thereto could be adjusted according
 70 to the requirements of the particular work in hand. I, however, have discovered that the digging action of the flushing-stream can be utilized where it is directed in the line of
 75 travel of the machine without any injurious effect upon the street and find that the digging action which removes the filler results from the portion of the stream which is de-
 80 livered sidewise from the flushing-wagon—a fact not hitherto noticed by experts in this art. This condition arises from the fact that the blocks in the street are laid in transverse
 85 rows, a long narrow continuous strip of filler or packing material being of course interposed between the rows. The joints be-
 90 tween the short edges of the blocks parallel with the length of the street are, however, always staggered in the several rows, thus presenting very short lengths of filler mate-
 95 rial to an advancing stream. By reason of the pavement being constructed in this manner a sheet of water moving thereover and directed at a substantial angle thereto will
 100 have a digging or loosening effect upon the long continuous lines of filler transversely across the street, since these lines of filler have no backing or damming obstructions to
 105 check the wash. The digging effect upon the short staggered stretches of filler running lengthwise of the street is practically nothing
 110 and, as a matter of fact, the stream of water directed into these short stretches has the effect of packing the material against the block immediately in front and at the end
 115 thereof, and no opportunity for loosening up the material occurs. From these conditions I have been enabled to produce an exceedingly
 120 satisfactory arrangement by which a stream may be delivered from a traveling tank in such manner that the forwardly-directed por-
 125 tion of the stream has a digging action, while the portion of the stream delivered sidewise or broadside from the wagon is directed at such an angle that its digging effect upon the filler is negligible, but serves as a washing-stream
 130 to direct the loosened material into the gutter.

From the arrangement described it will be seen that my nozzle is so placed as to deliver the stream forward and downward at an
 120 angle to the pavement. It is to be observed, however, that owing to the fact that the inner corner of the nozzle is below the outer corner of the nozzle necessarily the angle at
 125 which the water coming from the inner corner will strike the pavement is greater and more of a digging-angle than that at which the water coming from the outer corner would strike the pavement. As a matter of
 130 fact, with the nozzle disposed as shown in

Figs. 1, 2, and 3 the water delivered from the inner lower portion of the nozzle will have a thorough scouring effect upon the pavement, and owing to the outward inclination of the jet the loosened material will be swept toward the side. This portion of the jet directed forwardly along the line of travel of the tank and of course parallel with the length of the street will have no effect upon the short strips of filling material between the edges of the paving-blocks, while the portion of the jet delivered from the outer corner of the nozzle, which strikes the pavement along the line more nearly transverse the street and more nearly parallel with the long stretches of filler between the several rows of blocks, will, owing to the fact that this corner of the nozzle-mouth is tilted upward, strike the pavement at a considerable distance from the nozzle and at an angle such that its digging effect will be negligible so far as the filler is concerned.

I am, so far as I am aware, the first person to have discovered the efficiency of this peculiar arrangement of a flat-mouthed nozzle as applied to a traveling tank.

In order to steady the discharging stream, there is provided in the nozzle, between the screw-threaded portion e and the flaring portion e^2 , an annular recess e^5 . The cylindrical portion of the nozzle continues within this recess, as shown at e^6 , the annular chamber being provided by the outer wall of the structure bowing outwardly, as shown at e' . In front of the cylindrical extension e^6 is an annular opening e^7 into the recess. The nozzle is gradually contracted from the annular bead e' by the rounded portions e^2 to the portions e^3 , which are flat and approach each other toward the long narrow orifice e^4 .

I claim—

1. In combination in a street-flushing apparatus, a traveling tank and a discharge-nozzle connected therewith, the mouth of the

nozzle being directed downward and forward and the outer corner of the nozzle disposed above the level of the inner corner in such manner that the water delivered from the outer corner will strike the pavement at a more acute angle than that at which the water from the inner corner will strike.

2. In combination in a street-flushing apparatus, a traveling tank and a nozzle connected therewith having a long contracted mouth, said mouth being directed downwardly and forwardly so as to deliver water at an angle to the pavement, the angle of delivery of the inner corner of the nozzle being greater than the angle of delivery of the outer corner with respect to the pavement.

3. In combination in a street-flushing apparatus, a traveling tank and a nozzle connected with said tank having a long contracted mouth, the inner edge of said mouth positioned to direct the water forwardly and downwardly and the outer edge of said mouth being positioned to direct the water forwardly, downwardly and outwardly, the angle of delivery of the outer edge being less with respect to the pavement than that of the inner edge.

4. A nozzle having at one end a cylindrical portion and at the other end a flaring flattened portion, the intermediate portion of the nozzle being formed with an outwardly-projecting annular bead adjacent to the cylindrical portion and a contracted portion connecting such bead with the flaring portion, the cylindrical portion continuing toward the exit-opening across a portion of the chamber provided within the annular portion.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHRISTIAN E. SCHAFER.

Witnesses:

ALBERT H. BATES,
W. L. MCGARREL.