

J. P. WALSH.
SAND BLASTING NOZZLE.
APPLICATION FILED SEPT. 1, 1909.

990,409.

Patented Apr. 25, 1911.

Fig. 1

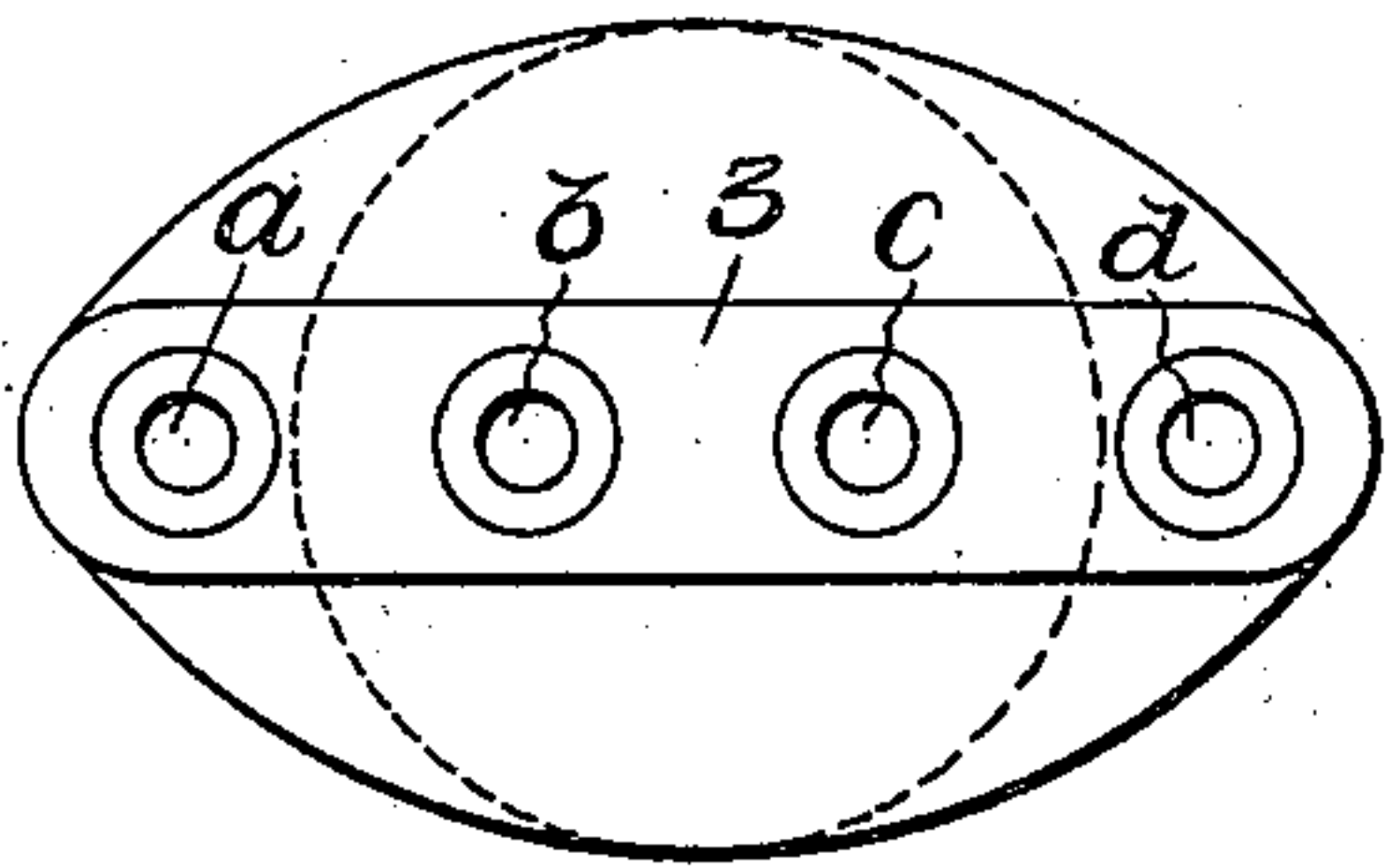


Fig. 2

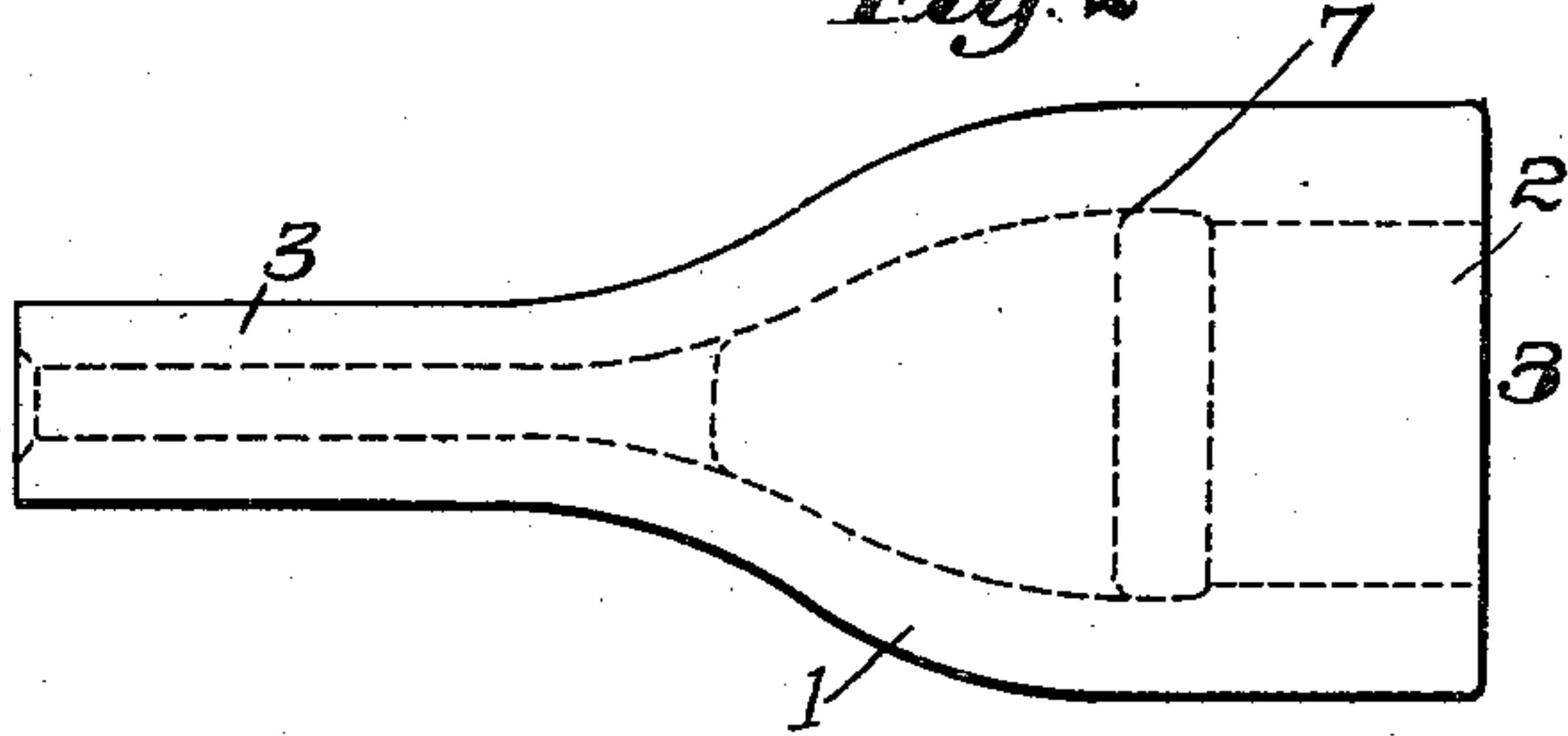


Fig. 3

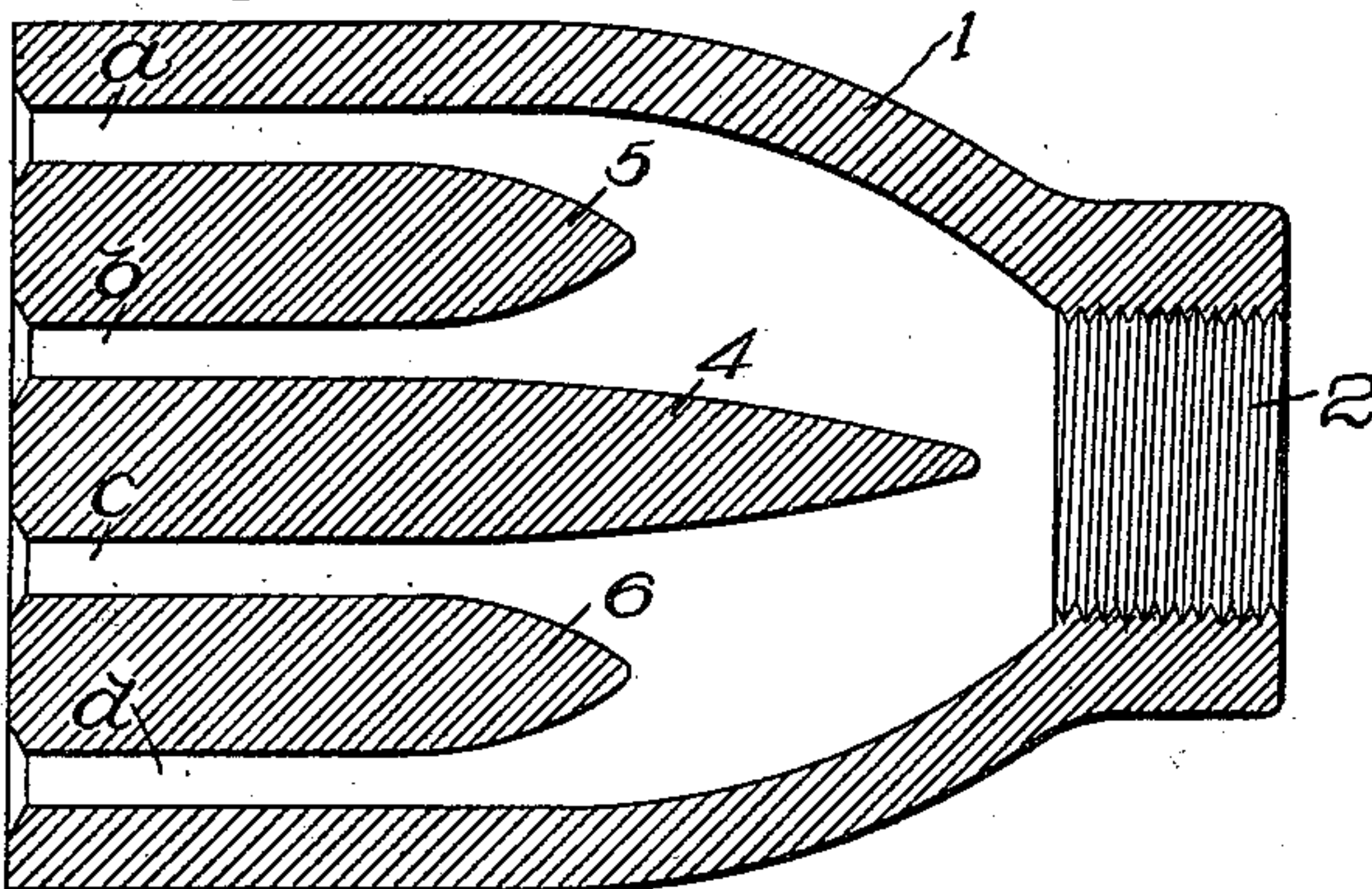


Fig. 6

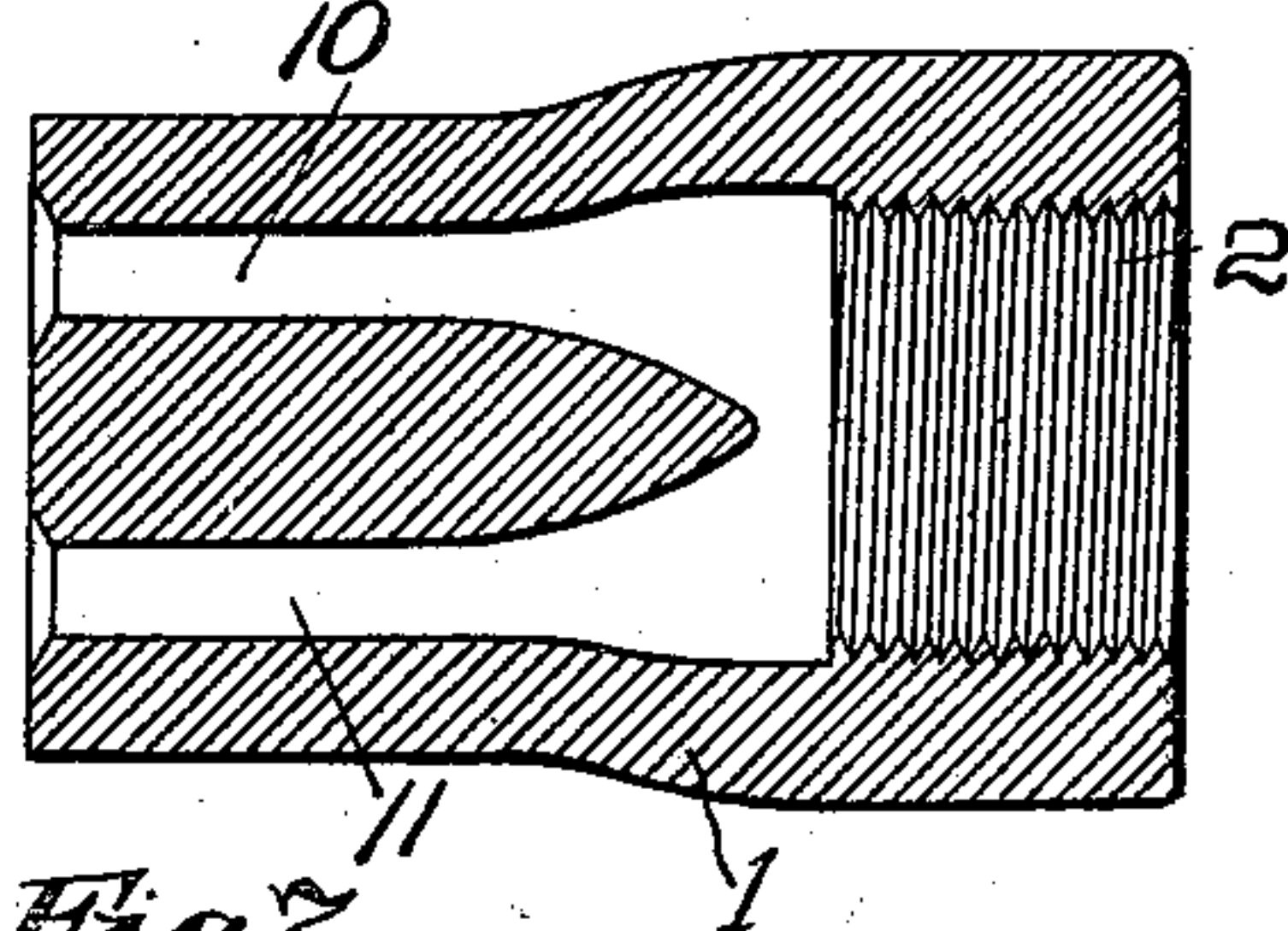


Fig. 7

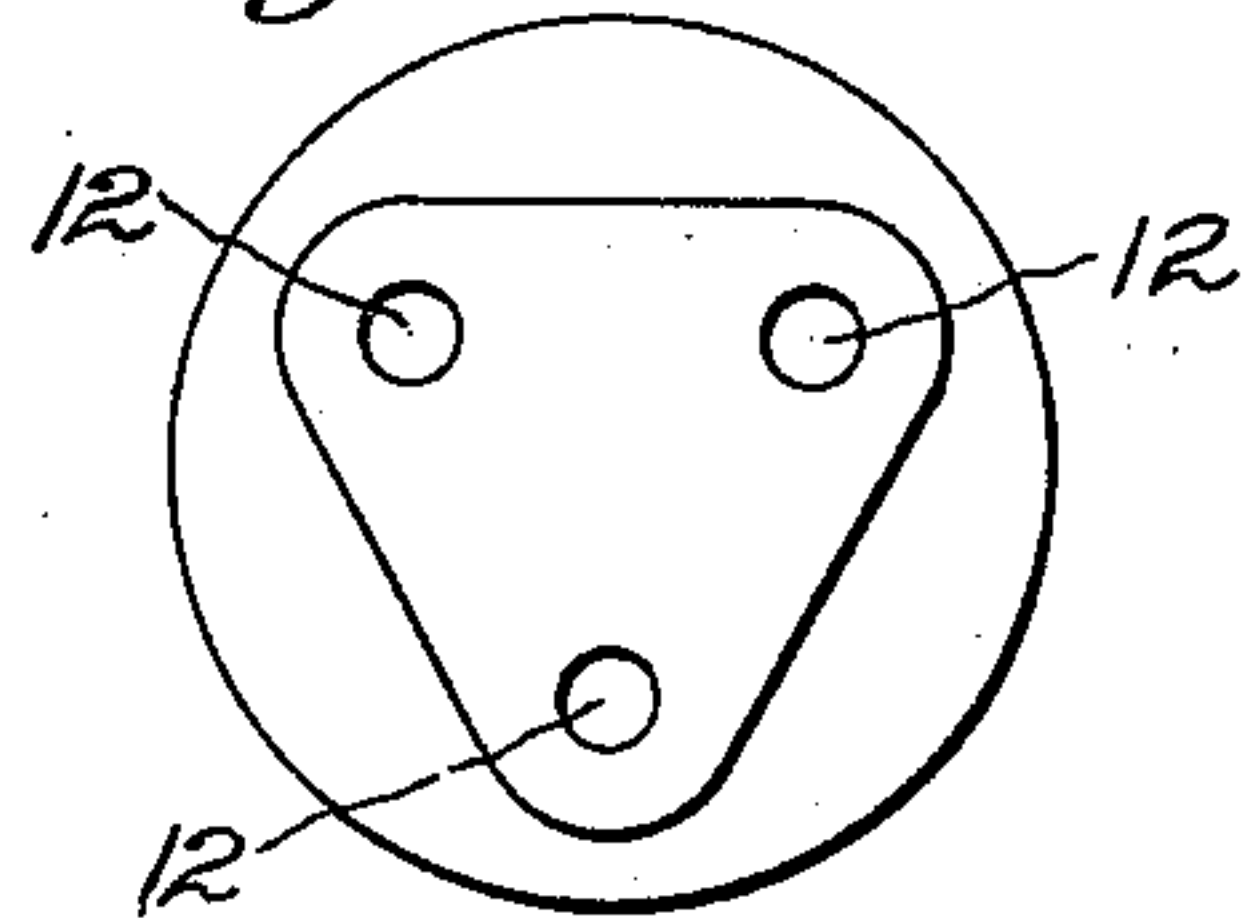


Fig. 4

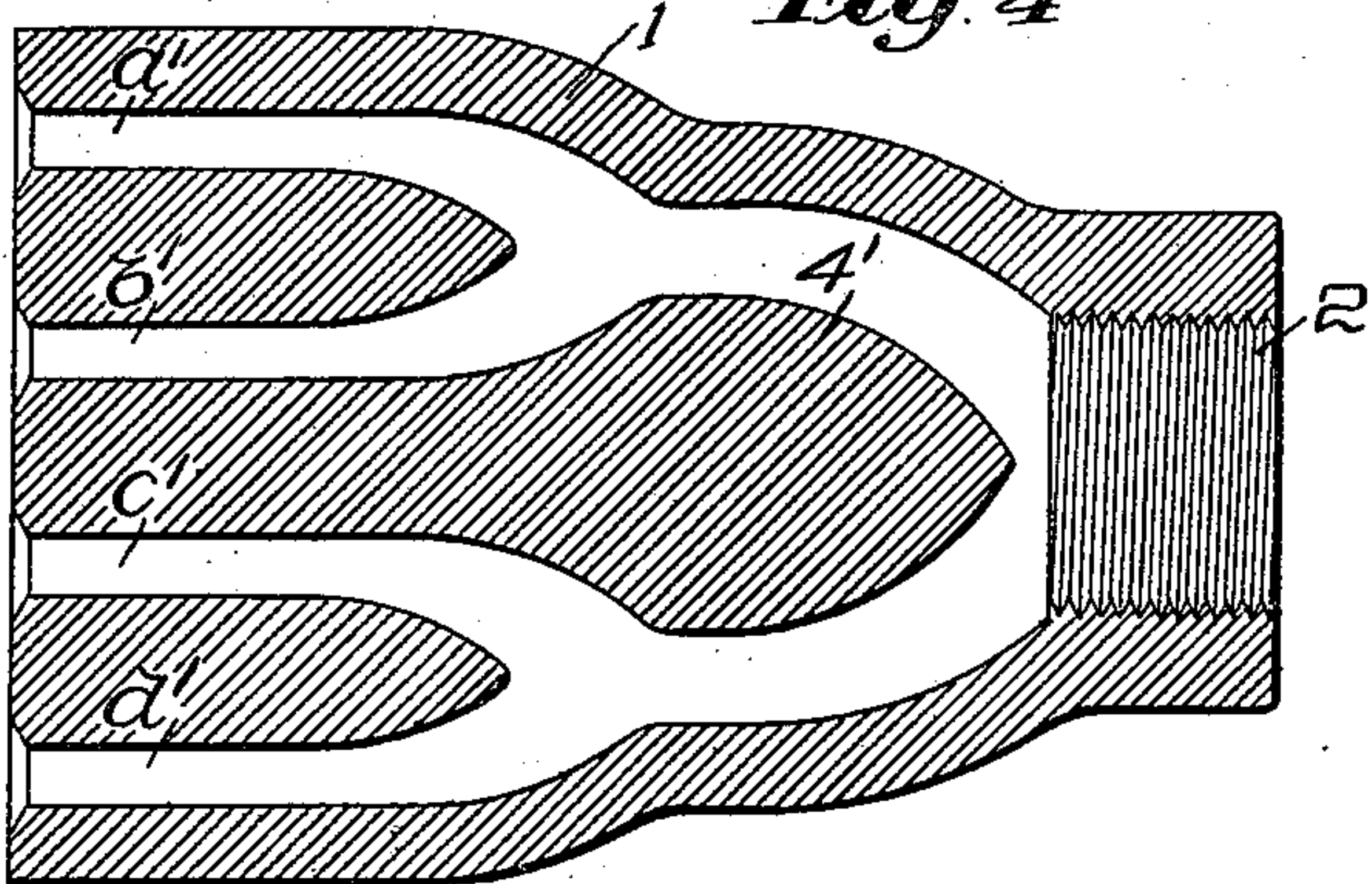


Fig. 8

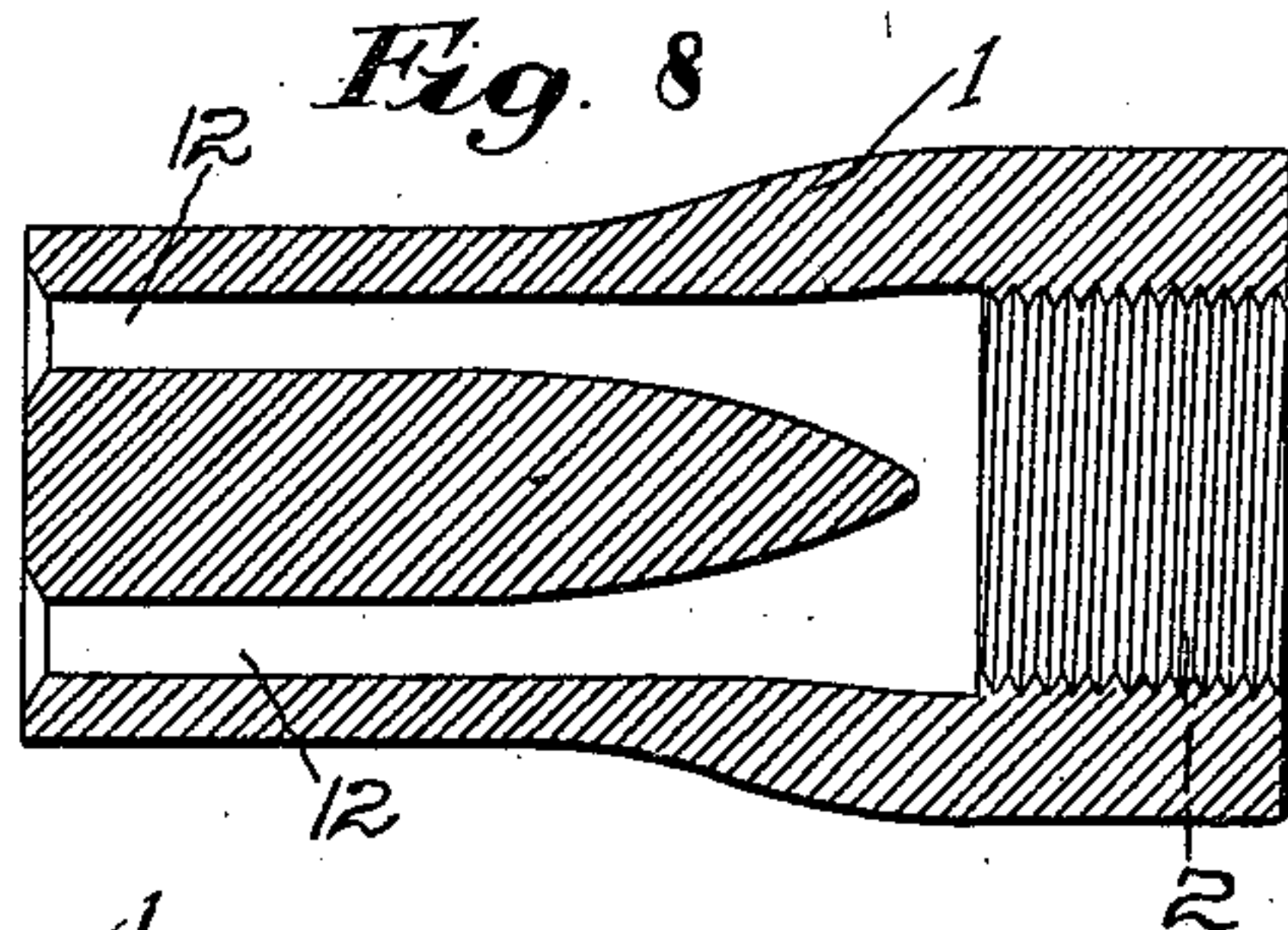
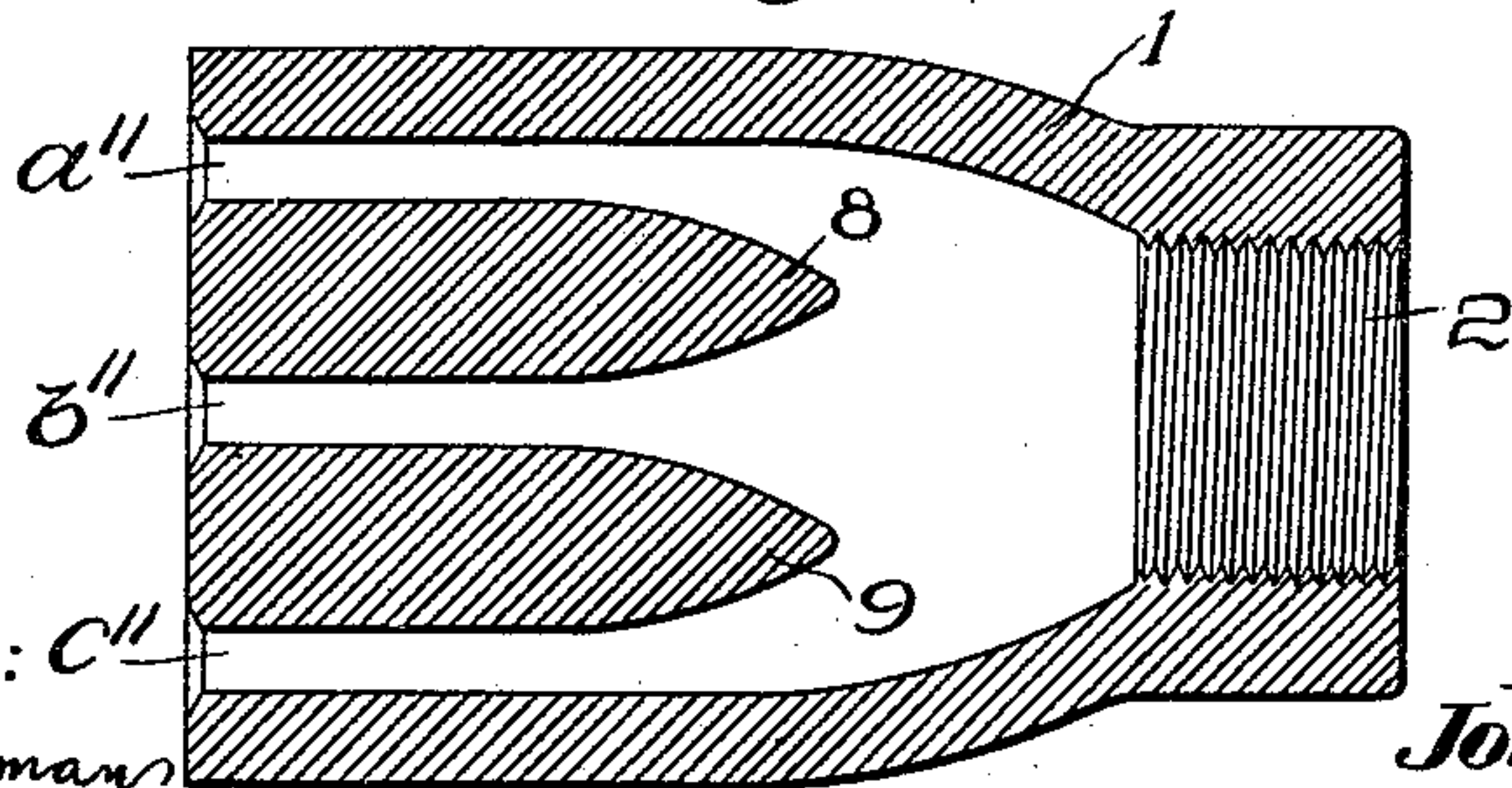


Fig. 5



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UNITED STATES PATENT OFFICE.

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SAND-BLASTING NOZZLE.

990,409.

Specification of Letters Patent.

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Application filed September 1, 1909. Serial No. 515,662.

To all whom it may concern:

Be it known that I, JOHN P. WALSH, a citizen of the United States, and a resident of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented an Improvement in Sand-Blasting Nozzles, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to sand blasting nozzles.

In order that the principles of the invention may be readily understood I have disclosed certain embodiments thereof in the accompanying drawings, wherein—

Figure 1 is a front end elevation of a sand blasting nozzle embodying my invention; Fig. 2 is a side elevation thereof; Fig. 3 is a vertical longitudinal section thereof; Figs. 4 and 5 are vertical longitudinal sectional views of modified forms of my invention; Fig. 6 is a longitudinal section of a further modified form of my invention; and Figs. 7 and 8 are respectively an end elevation and a longitudinal vertical section of still another form of my invention.

So far as I am aware, sand blasting nozzles heretofore constructed have been provided with but a single discharge opening, thus restricting the capacity of the device, as without movement of the nozzle only a very limited surface area can be treated, thus rendering the action of the device slow and arduous.

In the course of my experiments I have ascertained that by providing a sand blasting nozzle with a series of discharge openings so arranged as to discharge the sand against the surface to be cleaned in an unbroken sheet, I am enabled not only to treat or operate upon a larger surface area without movement of the nozzle, but that at the same time I can more effectively discharge the sand blast against the treated surface. I have also discovered that by providing a plurality of discharge openings I can greatly economize power and air.

Referring more particularly to the drawings and first to the form thereof shown in Figs. 1, 2 and 3, the nozzle body is represented at 1, it being of any suitable material, such, for example, as cast iron, steel, glass or rubber. One end of the nozzle is preferably threaded as indicated at 2, for

attachment to the usual hose which is in communication with the source of supply. Preferably the nozzle is provided with a narrow, elongated discharge end, as represented most clearly at 3 in Fig. 2. In said end I form a plurality of discharge openings, four being shown in Figs. 1 and 3. Said openings are preferably placed in alignment and sufficiently close together to effect the discharge of the sand in a sheet against the surface to be cleaned.

As illustrative of the principles of my invention, I may state that I have ascertained that a sand blasting nozzle having a single discharge hole three quarters of an inch in diameter and requiring the expenditure of between fifty and sixty horse power generating 522 cubic feet of air per minute at fifty pounds gage pressure will cut a swath less than two inches in width, whereas if I employ four discharge holes, each three sixteenths of an inch in diameter, and therefore aggregating in diameter three quarters of an inch, it is necessary to employ but 160 cubic feet of air per minute at fifty pounds gage pressure, the width of the resulting swath being between four and five inches. In other words, whereas 522 cubic feet of air per minute at fifty pounds gage pressure have been heretofore employed in the use of nozzles having a single discharge hole three-quarters of an inch in diameter and cutting a two inch swath, I may by the use of the same amount of air utilize more than three nozzles constructed in accordance with my invention and cutting swaths having the combined width of seventeen inches. These figures are given merely as illustrative of the results secured by the use of my invention, it being understood that for other sizes of openings, corresponding savings are made in air and pressure as well as in horse power. In other words, in the use of a single discharge hole of enlarged diameter there is a very material loss of air and pressure. There is a substantially proportionate loss of air and pressure in the use of single discharge openings of other diameters. Sand can be more effectively discharged through a small opening than through one of larger diameter, so far as comparative efficiency of the two openings is concerned, and aside from the relative volumes, but, owing to the small area that can be covered or cleaned by the use of a nozzle having a single small

opening, it has been customary heretofore, to employ a nozzle of larger diameter, with the result that more rapid but inferior work has been produced, even though a larger
 5 volume of sand has been discharged in a given unit of time. Moreover, in the use of a single discharge hole the result has been the production of mottled or non-uniform work, inasmuch as the area covered by the
 10 use of a nozzle having a single opening is restricted and the user, in order to treat the wall or other material as rapidly as possible, skips over portions thereof from time to time, between successive paths as he moves
 15 the nozzle over the work.

By the use of a nozzle having a single opening of, say three-sixteenths of an inch diameter, the width of surface that can be effectively treated thereby at any period of
 20 time is between one-half and three quarters of an inch, whereas by the use of four holes, aggregating the same diameter, and requiring, as previously stated, less power and air, the width of material effectively
 25 treated is increased to between four and five inches. By increasing the width of surface that may be treated at one time the workman can readily overlap the several swaths or paths of treatment, so as to pro-
 30 duce uniform work, without loss of efficiency or time. Moreover, in the use of a plurality of discharge holes I preferably employ means to divide and even in cases to subdivide the air and the sand, so that they are directed
 35 to the ultimate point of discharge without loss of efficiency and without pocketing. Moreover, the nozzle is preferably tapered toward the discharge openings, thereby concentrating the air blast and increasing its
 40 effectiveness.

In Fig. 3 I have shown four discharge openings *a b c d*, and have provided a main partition 4, preferably extending rearward closely adjacent the screw threads 2 and
 45 minor partitions 5, 6, by which the sand and air divided by the partition 4 are subdivided and directed to the several discharge holes *a b c* and *d*. It will be apparent that the interior of the nozzle is not provided with
 50 pockets or formations in which the sand can collect, but that the sand is directed at once to the several points of discharge and that the sand is discharged in an unbroken sheet against the work. As shown most clearly in
 55 Fig. 2, the nozzle is tapered from substantially the point 7 forwardly so that the air and sand are concentrated as stated. The several partitions 4, 5 and 6 terminate rearwardly, that is, toward the inlet end 2 in
 60 thin or fin like edges, so as to present substantially no obstruction to the on rush of the sand.

It is apparent that the nozzle and its partitions may be of any suitable shape. In
 65 Fig. 4 I have also shown four discharge

openings *a', b', c'* and *d'*, but have shown a slightly different form of partition 4'. Said partition 4' results in the more complete and rapid concentration of the sand and air.

In Fig. 5 I have shown the use of but three openings, *a'', b''* and *c''*, necessitating the use of but two partitions 8, 9. In Fig. 6 I have shown an exceedingly simple form of
 75 nozzle, involving the use of but two discharge openings 10, 11, necessitating the use of but a single partition.

For certain form of work, as for example in cleaning castings, I arrange the openings otherwise than in alinement, as for example
 80 in a triangular arrangement, as shown at 12, Figs. 7 and 8. The nozzle is provided with an inlet, and an outlet in free discharging relation to the inlet. The outlet, constituted by the forward portion of the nozzle, is provided with a series of discharging passages
 85 or openings, as illustrated, by the partition or partitions extending to the outlet and sufficiently toward the forward end of the nozzle to effect the purposes stated.

From the foregoing description it is clear that in the use of a sand blasting nozzle embodying my invention there is a saving not only of gage pressure but also of free air and
 95 that the resulting work is more uniform in character. Moreover, the surface under treatment can be far more rapidly cleaned.

Having thus described my invention, I desire it to be understood that although specific terms are employed they are used in a
 100 descriptive and generic sense, and not for purposes of limitation the scope of my invention being set forth in the following claims.

1. A sand blasting nozzle having one end
 105 formed as an air inlet for the combined admission of sand and the motive fluid and for attachment to a distributing hose, said nozzle having an outlet in free discharging relation to said inlet, and one or more longitudi-
 110 nally ranging partitions between said inlet and outlet and extending to and dividing the outlet into a series of discharge passages.

2. A sand blasting nozzle having a combined sand and motive fluid inlet and a plu-
 115 rality of discharge passages, the inner surface of said nozzle gradually merging from the inlet end into said plurality of discharge passages, and said passages being spaced from each other at said inlet end by a fin like
 120 edge or edges, whereby pocketing of the sand is prevented.

3. A sand blasting nozzle having a combined sand and motive fluid inlet and a plu-
 125 rality of discharge passages, said passages being separated by partitions whose inner ends terminate at different distances from the inlet end of the nozzle, whereby the sand and motive fluid are progressively divided.

4. A sand blasting nozzle having an end 130

formed as an air inlet for the combined admission of sand and a motive fluid and for attachment to a distributing hose, said nozzle having a central partition extending toward the outlet and having its inner edge directed toward the inlet, thereby equally to divide the stream of sand and motive fluid, and a partition upon each side of said central partition and also extending toward the

outlet and sub-dividing the said divided 10 main stream.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN P. WALSH.

Witnesses:

IRVING U. TOWNSEND,
MAY H. LOWRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
