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SPRAY NOZZLE AND ATTACHMENT

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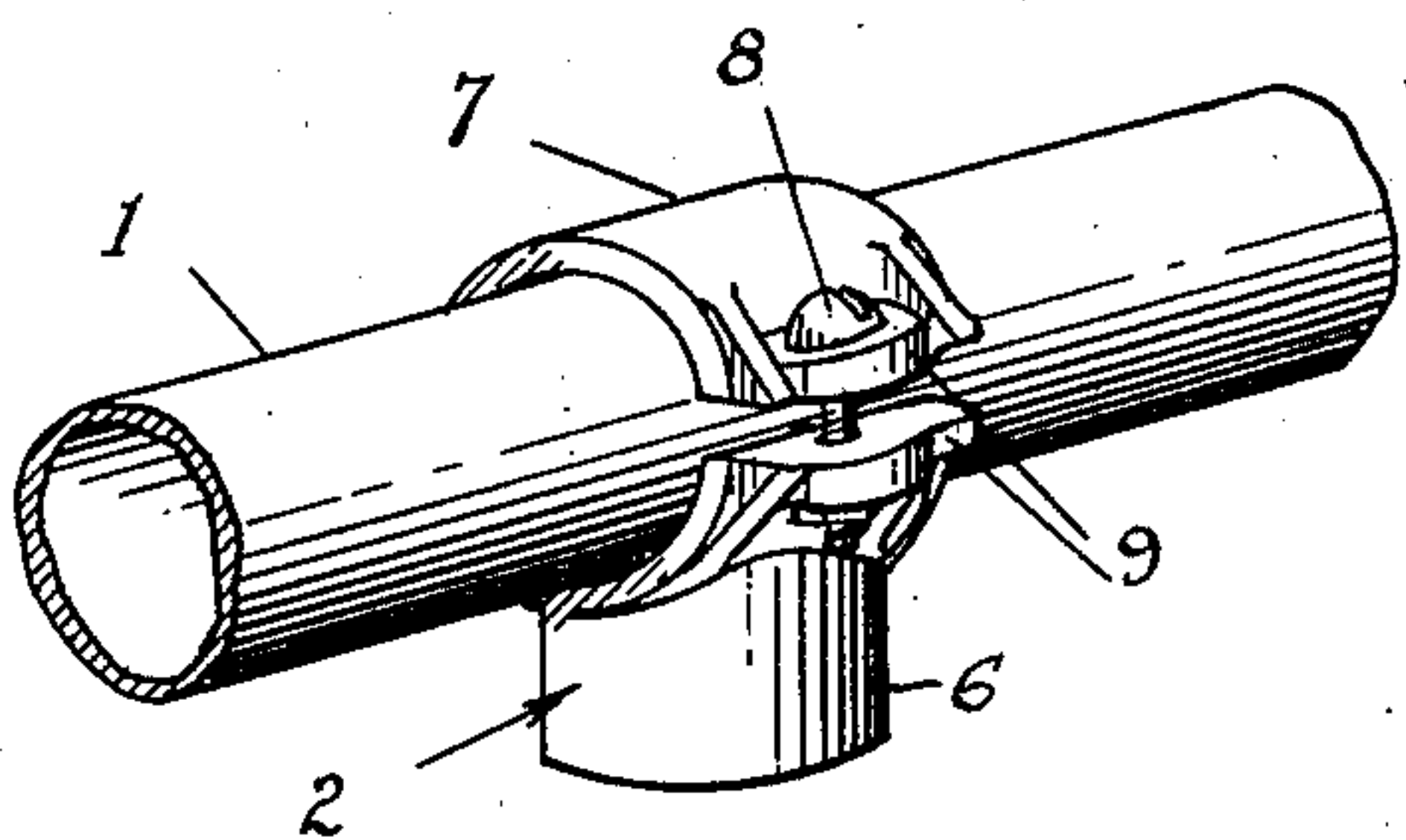


Fig. 1

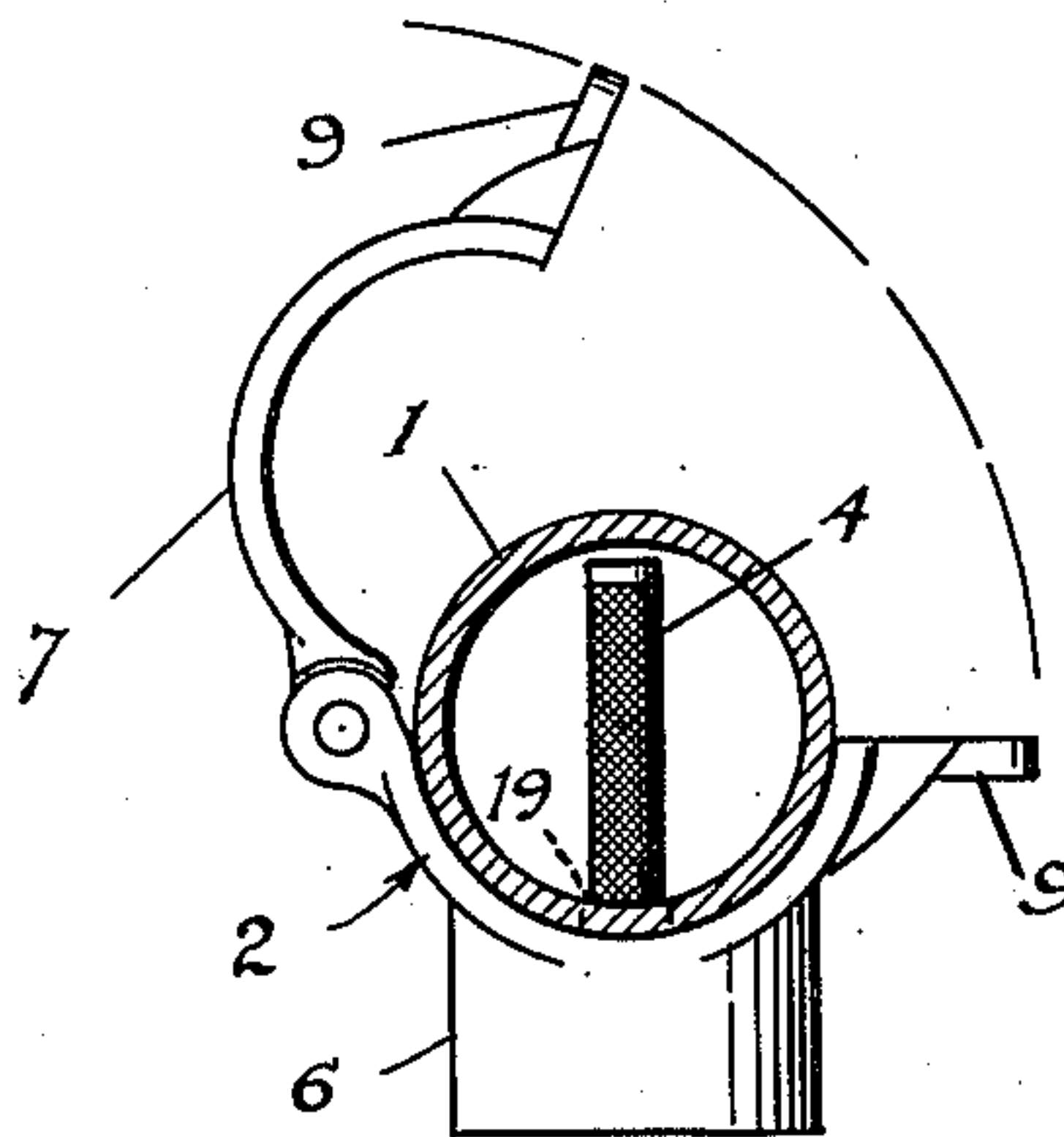


Fig. 2

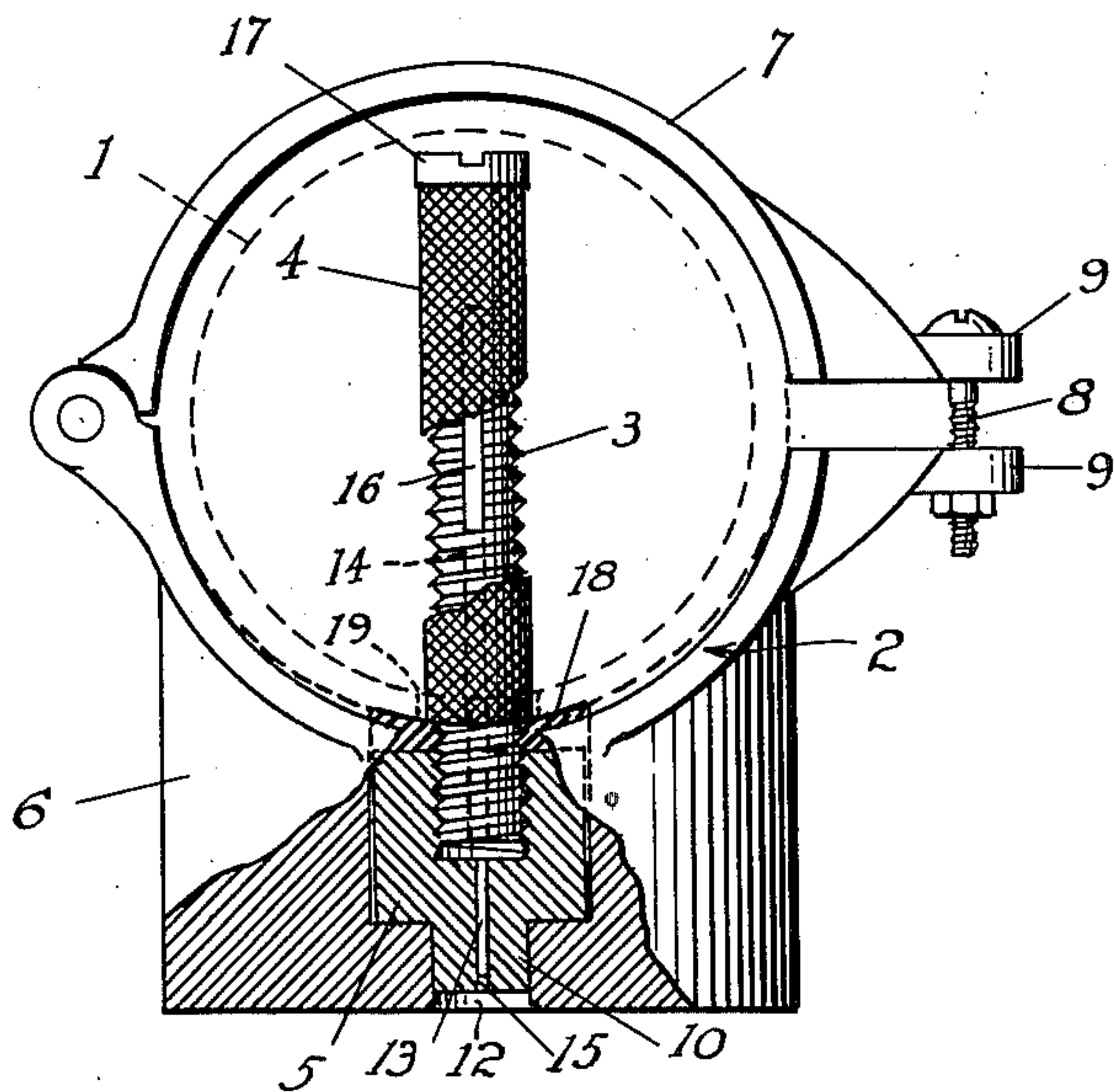


Fig. 3

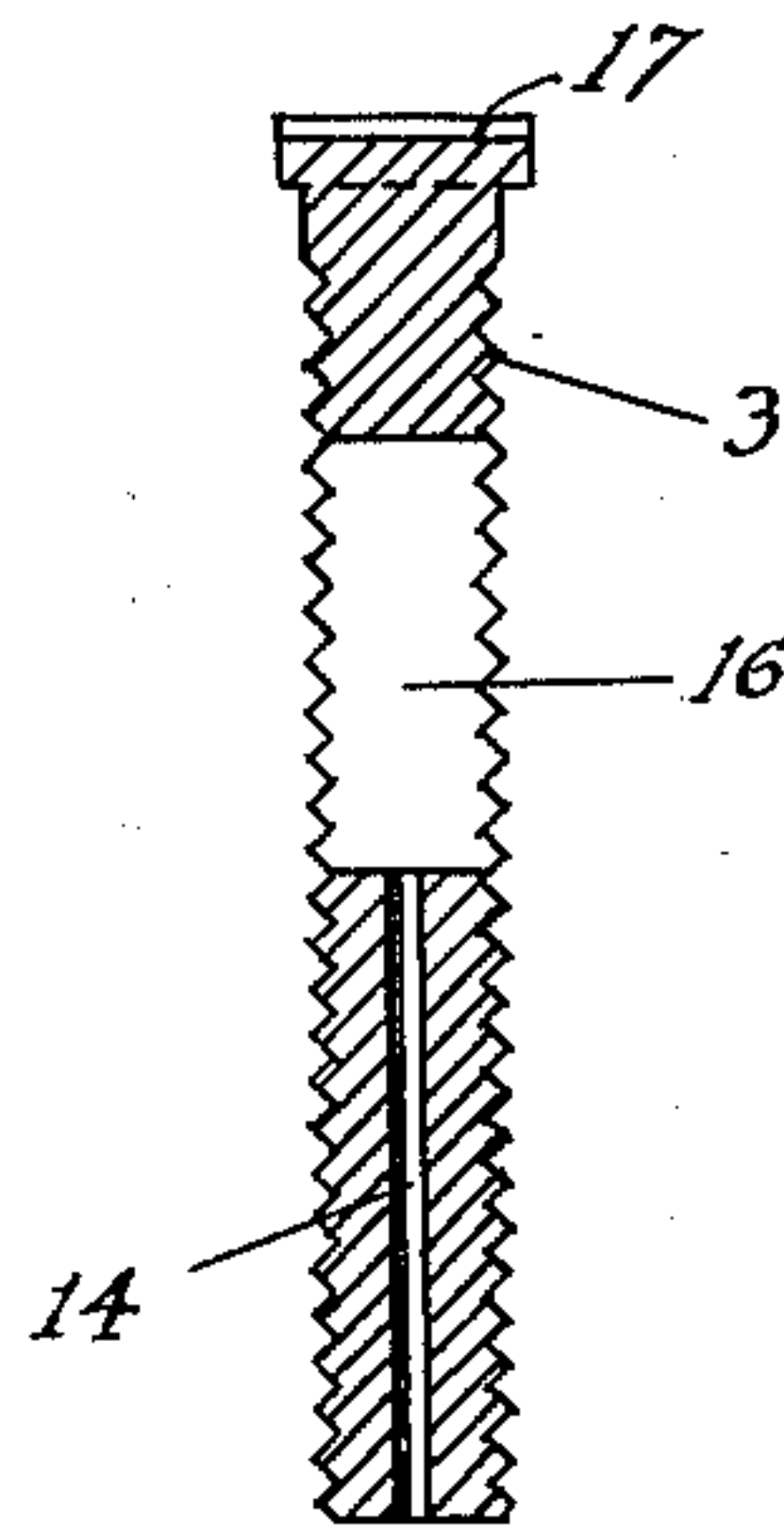


Fig. 4

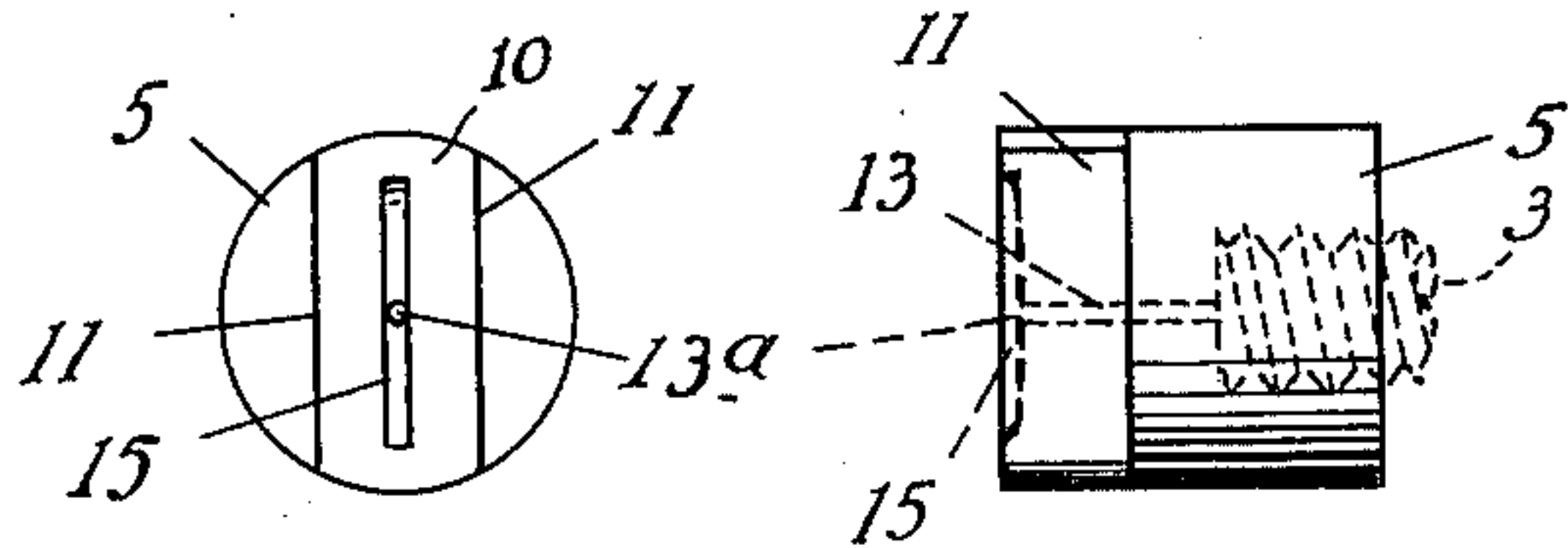


Fig. 5

Fig. 6

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SPRAY NOZZLE AND ATTACHMENT

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This invention relates to spray nozzles and their attachment to spray booms, and the object of the invention is to provide an efficient nozzle for use in agricultural spraying operations for crops, preferably as adaptable to transversely outspreading boom pipe members as found in conventional spraying apparatus.

The principal objection to conventional means of attaching the nozzles is that they are screwed into threaded holes along each boom pipe, the threads of which may so easily become stripped or worn. The advantage in my invention is that these nozzles herein described are not threaded for screwable attachment into the communication hole in the boom pipe, and consequently damage from breaking when inadvertently hitting the ground or rocks, and bending when roughly handled is easily remedied. The shortened neck of the nozzle is also a safeguard against damage as compared with conventional types of nozzles.

With this invented nozzle repairs and replacements are readily effected on the site by merely clamping and bolting a new nozzle if necessary to the boom pipe without having to dismantle the parts or replace the boom pipe entirely, or even having to ship the boom away for repairs, and consequently losing valuable time.

This invention discloses a very simple type of nozzle and without threads for engagement with the boom pipe, and it includes a screen through which the spraying liquid must pass prior to its emission through the spraying nozzle aperture. This screen with its mounting stem may be readily removed from the nozzle for cleaning, and may be replaced by screwably manipulating the threaded portion of the stem into the nozzle head if and when necessary. In my invented nozzle there is no boss necessary on the boom pipe to screwably retain the nozzle, as there is found in most conventional types or spray machines, the retention of these parts being in my invention a matter of simply clamping two parts together.

The spray orifice in this nozzle is very small, as regards the orifice itself, and the screen is of very fine mesh material to prevent choking the orifice, and the screen is kept in spaced relationship with the stem in the interior of the boom pipe by threads cut on the exterior face of the stem. Communication for the chemical liquid from the boom pipe through the nozzle head is through one or two longitudinal apertures slotted through the stem leading to the hollowed out passageway within the stem. This longitudinal

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passageway in the stem communicates directly with the nozzle spray orifice.

In this multiple spray device the nozzles are spaced at equal intervals along each boom pipe, and the nozzle orifices are preferably of such shape that the liquid is ejected therefrom in a fan shaped spray, although varying spray shapes and effects may readily be provided.

This is a low volume spray system nozzle, and it is essential that the boom pipes and apparatus are continually travelling when in operation, as effective spraying is dependent on a uniform coverage of the chemical over the ground. This uniformity of coverage is attained by assuring that the axis of the orifice slot in the nozzle head is longitudinally in parallel alignment with the axis of the boom pipe, and is thus set permanently in its relationship with the clamping parts.

The ejected fluid from the orifice of the longitudinal slot and holed type is spread downwardly in a fan shape, and nozzles are so spaced apart as to provide adequate coverage and yet assure that there is no overlapping of the fluid as it spreads from one nozzle and from the next adjacent nozzle. Any spaces left between spray streams or overlapping would tend to destroy the effectiveness of the chemical fluid, with possibility of destroying the twice sprayed area of the crop.

With these objects and advantages mentioned this invention consists in the novel features hereinafter described and claimed, and illustrated in the drawings accompanying this specification.

Fig. 1 is a view in perspective of the nozzle clamped on to the boom pipe.

Fig. 2 is an end view of the nozzle with hinged cap shown in open position, and with boom pipe in section.

Fig. 3 is an enlarged view of the nozzle with its screen, both partly mutilated.

Fig. 4 is a longitudinal sectional view of the screen stem.

Fig. 5 is a detail of stem holder and nozzle tip.

Fig. 6 is a side view of Fig. 5.

In the drawings the numeral 1 refers to a portion of a boom pipe as conventionally used in connection with farm spraying equipment, to which are attached spray nozzles as represented by 2 and in this invention there is a spray nozzle stem member 3 covered with a fine screen 4 for fitment inside the said boom pipe as part of the nozzle. There is a plurality of such nozzles along each boom pipe of the spraying apparatus.

In describing this nozzle there is a nozzle head

or stem holder 5 retained in a clamp member with a base portion 6 and a swingable clamping cap 7 together forming a pipe clamp, and having a screw bolt 8 drawing clamping lugs 9 together for tightening the device around the boom pipe. The stem holder 5 fits into the base 6 of the nozzle in an aperture therein and the spray tip 10 is a downward extension of an integral with this holder member. The tip is formed by parallel flattened faces 11 so flattened on the holder as to fit into the similarly shaped aperture 12 in the bottom of the base member 6, in order to secure the tip permanently aligned with regard to the axis of the boom pipe.

A hole running through the extension tip member, as seen at 13, extends up into the holder 5 for the passage of the spraying liquid from a hollowed passageway 14 longitudinally extending within the stem 3. A slot 15 is passaged transversely across the bottom face of the tip member 10 which is set longitudinally parallel with the axis of the boom pipe, and being milled out with a circular tool this slot forms an elliptically shaped aperture within the spray hole 13 on account of the arcuate shape so formed. Thus the spray is fan shaped in this particular case. Other shaped spray apertures may be used by merely inserting a different type of tip member and its uniformly shaped holder.

The stem 3 is exteriorly threaded for most of its length to provide a space between the screen covering and the stem surface, and it is screwably threaded into the top of the holder 5. A slot 16 is passaged transversely through the body of the stem to communicate with the said vertical passageway 14 of the stem. It is through these passageways that the spraying liquid passes from the boom to the spraying aperture 13, for ejection therefrom, through the end orifice 13a.

The fine cylindrical screen 4 fits closely over that portion of the stem within the boom pipe between a head 17 on the stem and a sealing gasket 18 inserted between the boom pipe and the holder 5. This gasket is compressed therefore when the screw bolt 8 is tightened to draw the lugs 9 together.

The stem 3 is inserted through a hole 19 in the underside of the boom pipe 1 with the clamping cap 7 open, and the clamp closed and screwed down. These clamps actually reinforce the boom pipes.

With the type of screen used with my nozzle there is no possibility of sediment becoming trapped as in older flat screen types. This vertical cylindrical screen insures against screen plugging, and is easily replaced by merely unclamping the unit.

What I claim and desire to secure by Letters Patent is:

1. A spray nozzle device as described for clamping to a spray boom pipe without being screwed thereto, comprising a hollowed stem closed and

headed at one end, and open at the opposite end, and insertable into the boom pipe through an aperture in the bottom wall thereof, and having a passageway communication between the interior of the stem and the inside of the boom pipe, a base portion as part of the nozzle device, an apertured stem holder insertable into said, base portion into which said stem is screwed and having a tip portion apertured for spraying liquid, a removable filter screen enclosing said stem, and a gasket between said holder and the boom pipe to render the device leak proof when clamped around said boom pipe.

2. In a spray nozzle device of the clamped on type for chemical spraying, a boom pipe for supplying the spray nozzles placed at equal intervals along said pipe, an exteriorly threaded hollowed stem for insertion through apertures into said pipe, a closure cap at the top of said stem, a screen enclosing said stem and distanced therefrom by its threads, a base portion as part of the nozzle device, an internally threaded stem holder within said base portion and apertured for its full depth, a portion of which aperture is to screwably receive said stem, a gasket to prevent leakage between clamped nozzle device and the boom pipe, a flat sided spray tip extending from said holder and apertured to communicate with the aperture in said holder to conduct the spray liquid from the boom pipe, to fit into a correspondingly flat sided bottom aperture in said base portion for the alignment of the sprays.

3. A spray nozzle comprising a pipe clamp with a base portion, a swingable cap hinged to said base portion, lugs on each said portion of the clamp for bolting together, a screen-covered hollowed stem for insertion into a spray boom pipe of a spray machine, an apertured stem holder threaded for the reception of said stem, communication passageways through said stem to conduct spray liquid from the boom pipe through the stem and its holder, an apertured spray tip integral with said holder, a slot in said tip in open communication with the spray aperture therein, and means to seal the pipe clamp against leakage.

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