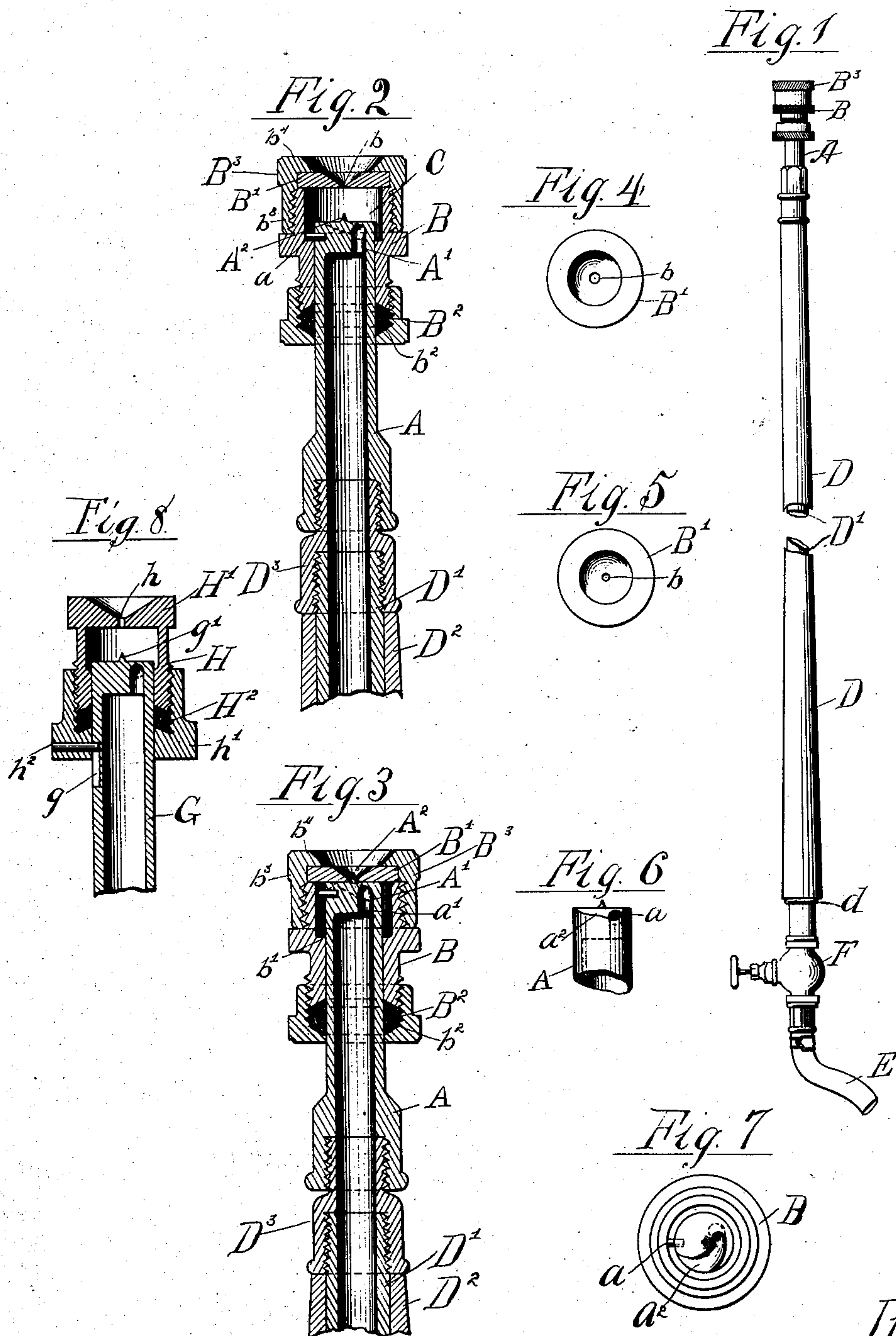


(No Model.)

J. & R. BEAN.
SPRAYING NOZZLE.

No. 604,873.

Patented May 31, 1898.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN BEAN, OF LOS GATOS, CALIFORNIA, AND ROSCOE BEAN, OF HUDSON, MICHIGAN.

SPRAYING-NOZZLE.

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To all whom it may concern:

Be it known that we, JOHN BEAN, of Los Gatos, Santa Clara county, California, and ROSCOE BEAN, of Hudson, Lenawee county, Michigan, have invented certain new and useful Improvements in Spraying-Nozzles; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in spraying-nozzles, and more particularly to that class of such nozzles used for spraying liquids containing a considerable amount of solid matter held in suspension therein—such, for example, as water containing an excess of paris-green or other poison beyond the point of saturation or in powdered form—and designed for the spraying of fruit-trees, &c., for the purpose of destroying the insects with which they may be affected.

The object of the invention is to provide an improved construction in devices of the character referred to; and it consists in the matters hereinafter set forth, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a general view of a spraying-nozzle embodying our invention in an elongated form suitable for spraying fruit-trees. Fig. 2 is a longitudinal sectional detail of the nozzle proper. Fig. 3 is a similar view showing the end of the nozzle depressed for the purpose of cleaning its spraying-orifice. Figs. 4 and 5 illustrate removable spray-plates with different sizes of spraying-orifices. Fig. 6 is a fragmentary detail of the upper end of the inner tube of the nozzle. Fig. 7 is a top plan view of the nozzle with the top cap and spray-plate removed. Fig. 8 is a sectional view of the end of the nozzle, showing a modified form thereof.

In said drawings, A designates the lower main portion or tube of the nozzle, and B a cylindric cap placed over the upper end of said tube and arranged to have a limited telescopic or longitudinal sliding movement thereon. The interior of the cap B when in its extended or uppermost position forms a

chamber C, with which the interior of the tube communicates through a passage A', formed in the otherwise solid top wall which closes the end of the tube at one side of the center thereof. Said chamber is closed at its upper end by a spray-plate B', which forms the top wall of the cap B and is perforated at its center by a minute orifice *b*, through which the liquid is discharged from the nozzle.

A² designates an upwardly-projecting spur or point located centrally upon the upper end of the tube A directly opposite the spray-orifice *b*. Said point is for the purpose of clearing the discharge-orifice *b* of the powdered substance carried by the water or other matter which may have accumulated therein, and is brought into action by simply depressing or forcing down the cap B over the tube A until the clearing-point enters the discharge-orifice, as shown in Fig. 3. This operation may be accomplished when the water-supply is turned off, but may obviously be equally well accomplished when it is turned on, if so desired, it being only necessary in the latter case to apply sufficient additional force to the cap, either by forcing the nozzle against a limb or projection or by means of a string or wire tied or fastened to the cap and of sufficient length to reach the operator, whereby the telescoping cap may be drawn down over the tube by merely pulling on the string or wire, to overcome the water-pressure within it, which pressure will obviously tend to maintain the cap in its outermost position. The cap is prevented from being forced off the tube by the water-pressure by means of a suitable stop, consisting in this instance of a lug or pin *a*, projecting from the upper end of the tube A within the cap and adapted to engage an upwardly-facing annular shoulder *b'* on the interior of the cap. When the water is turned on, the cap is at once forced outwardly until said stop-pin and shoulder are brought into contact and will be normally maintained in its outermost position so long as the flow continues.

The passage A' in the upper end of the tube A is arranged to discharge somewhat tangentially into the chamber C, so as to produce a whirling or rotary movement in the liquid within the chamber, and as a further

improvement is also arranged on an upward inclination, so as to give the jet issuing therefrom an upward as well as a tangential direction. As herein shown, the passage consists of a lower portion a' , which opens vertically upward from the interior of the tube A, at one side of the center thereof, and an upper spirally-shaped portion a^2 , opening laterally out of the lower portion a' and extending on an upward inclination to the exterior margin of the tube. Said upper portion a^2 of the passage is, moreover, herein shown as located so close to the upper face of the end of the tube A as to be uncovered or in open communication with the chamber C throughout the greater part of its length and as widened at its outer extremity, so as to provide a perfectly free discharge from the passage. The effect of the upward inclination of the tangential discharge-passage A' is to throw the liquid upward through the spray-orifice b with greater directness and force, thereby producing fuller and more powerful discharge from said orifice. The interior of the cap B is in this instance made somewhat larger in diameter in its upper portion or chamber C than the exterior diameter of the tube A, and the annular shoulder formed where its diameter is reduced to fit said tube constitutes the stop-shoulder b' , against which the stop-pin a strikes in limiting the upward movement of the cap on the tube. At its lower end the cap is shown as provided with a stuffing-box B^2 , having screw-threaded connection with the body of the box and within which any suitable packing b^2 may be compressed to prevent leakage between the cap and tube.

As a further improvement the spray-plate B' is herein shown as made separate from the rest of the cap, and consists of a circular plate or disk of somewhat larger diameter than the upper interior portion or chamber C of the cap and adapted to be securely held over the top of the chamber by means of a clamping-sleeve B^3 . The latter comprises a cylindric portion b^3 , fitting over the plate B' and the upper end of the cap and having screw-threaded engagement with the latter, and provided at its upper edge with an inwardly-projecting annular flange b^4 , between which and the body of the cap the plate B' is clamped. Interchangeable spray-plates having various sizes of discharge-orifice b may consequently be provided with each nozzle, and the form of the spray thus readily varied to afford a coarser or finer shower, as desired.

D designates a tubular extension or handle, upon the upper end of which the nozzle hereinbefore described is adapted to be secured when it is desired to sprinkle fruit-trees or other vegetation that rises to a considerable height above the ground. Said extension or handle comprises, as herein shown, a metallic inner tube or pipe D' of any desired length and a tubular outer covering D^2 , which may be conveniently formed of a bamboo pole with

the pith removed, or may be of some other light and stiff construction, and within which the inner tube D' is inserted. Such outer covering D^2 is in this instance secured upon the inner tube D' between an annular shoulder d at the lower end of the tube and a coupling-sleeve D^3 , which is interiorly threaded to fit corresponding exterior screw-threads on the upper end of the tube and is screwed down over the latter, so as to clamp the outer covering between it and the lower shoulder d . The upper end of the sleeve D^3 is exteriorly screw-threaded to fit within an interiorly-screw-threaded enlargement of the lower end of the tube A of the nozzle, and thus forms a coupling between the nozzle and handle.

The lower end of the tube D' is adapted for connection with a flexible hose E, leading from the liquid-reservoir or other source of water-supply, and any suitable globe or other valve or cock F may be inserted between the tube and hose for enabling the discharge through the nozzle to be regulated as desired.

In Fig. 8 we have shown a construction in the spraying-nozzle which embodies the principal features illustrated in the other figures of the drawings, but which has the advantage of being more simple in structure and more economical to make. In this instance G indicates the main portion or tube of the nozzle, which is identical in construction with the tube A of the other figures of the drawings, with the exception that in this case the stop-pin a is not secured in the tube G; but the latter is provided with a longitudinal slot g , which is engaged by a stop-pin h^2 in the cap H and the outer end of which forms a stop for limiting the outward movement of the said cap. Said cap H consists of a tubular part or body which immediately engages and slides upon the tube G and is provided with an integral outer or end wall H' , provided with a central spray-orifice h . At its lower end the cap is provided with a stuffing-box H^2 , formed by means of a ring or gland h' , the lower part of which fits the tube G and the upper part of which is adapted to receive the lower end of the cap H and is provided with interior screw-threads engaging exterior screw-threads on the lower part of the said cap. The pin h^2 is inserted through the ring h' and projects into the groove g , so as to limit the outward movement of the cap, and prevents the same from being detached from the tube. A central pin or projection g' on the end of the tube G serves as a clearing-point to keep open the discharge-orifice h in the same manner as hereinbefore described. The construction illustrated in Figs. 1 to 7 has the advantage of enabling the size of the spray-orifice to be changed by the insertion of plates B' , having orifices of different size, this being a feature which is not present in the construction illustrated in Fig. 8. The device illustrated in Fig. 8, however, is obviously much less expensive to construct,

having only two parts and one screw-joint. The arrangement of the limiting-stop in Fig. 8 is superior to that shown in Figs. 2 and 3; but such a stop-pin and groove may be used in the construction shown in Figs. 2 and 3 equally as well as in the construction shown in Fig. 8.

Some advantages derived from the use of a sliding cap in connection with the main tube of the spraying-nozzle may be obtained when the clearing point or projection on the main tube is omitted, it being obvious that when the cap is forcibly pressed backward on the tube the water within the chamber of the cap will be ejected with greatly-increased force from the spray-orifice, so that a clearing of the orifice may be produced even though no clearing-point be present. The use of a clearing-point is advantageous, however, and the same is hereinafter claimed in combination with other features of the invention.

As far as the production of a spray as distinguished from a solid jet or stream is concerned this result may be produced by the employment of a chamber exterior to the closed end of the main tube of the nozzle, when the hole leading through the closed end of the tube is larger than the spray-orifice or is placed out of alinement with the same, and a construction embracing such chamber is therefore herein claimed as part of our invention without restriction to the sliding feature of the cap, which latter is employed solely for the purpose of facilitating the clearing of the spray-orifice.

Obviously the several features of improvement involved in our invention as hereinbefore described may be employed with advantage separately and in other connections than those particularly referred to, although together contributing to superior results in the special structure and for the purposes especially set forth.

We claim as our invention—

1. A spraying-nozzle comprising a main tube provided at its upper discharge end with

an end wall, and a cylindric chamber exterior to the wall and having sliding telescopic connection with said main tube, and normally held at the extreme outward limit of its movement by the force of the outflowing liquid, said main tube having an eccentric discharge opening obliquely or spirally into said chamber, and a spray-orifice in the outer wall of the chamber out of line with said discharge-orifice, substantially as described.

2. A spraying-nozzle comprising a tube closed at its end except for a discharge-orifice therein and provided with a sliding telescopic cap having a spray-orifice out of line with the discharge-orifice, and a stop for limiting the outward movement of the cap under the force of the outflowing liquid, comprising an elongated recess parallel with the axis of the tube, and a stud carried by the cap and engaging said recess.

3. A spraying-nozzle comprising a main tube provided in its upper end with an eccentric outwardly-directed discharge-passage, a cap inclosing the end of the tube and having sliding telescopic connection therewith, a stop for limiting the outward movement of the cap under the pressure of the outflowing liquid, a central spray-orifice in the end wall of the cap, and a central clearing-point on the end of the tube opposite the spraying-orifice adapted to enter and clear said orifice when the cap is moved downwardly on the tube, substantially as described.

In testimony that we claim the foregoing as our invention we affix our signatures in presence of witnesses.

JOHN BEAN.
ROSCOE BEAN.

Witnesses to signature of John Bean:

B. H. NOBLE,
JOHN JOHNSON.

Witnesses to signature of Roscoe Bean:

BERT D. CHANDLER,
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