Aug. 10, 1943. W. H. ROSE 2,326,568

SPRAYER DEVICE

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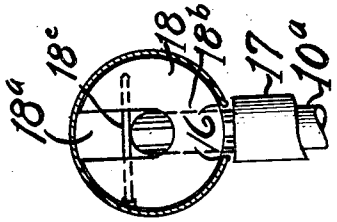


FIG.-1A

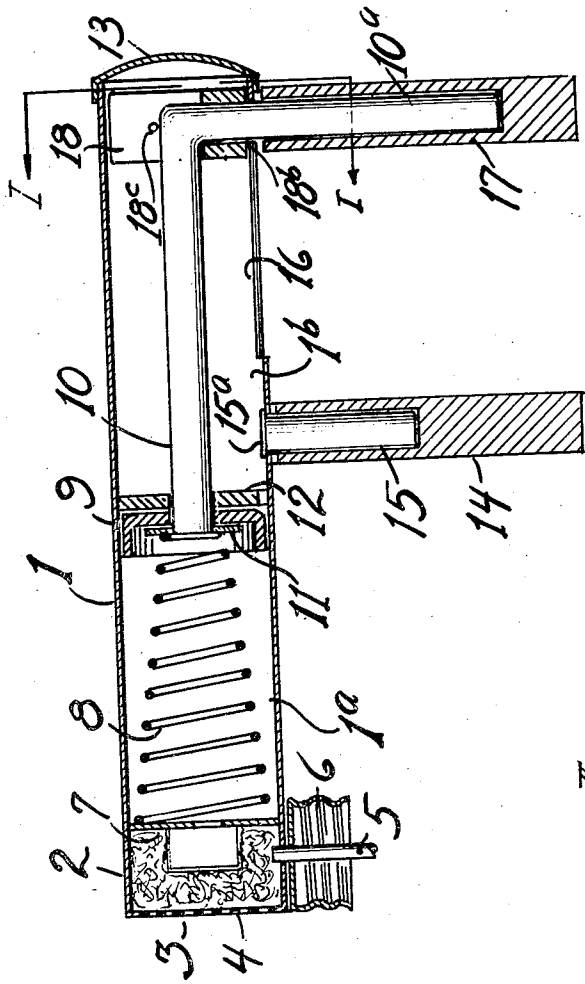


FIG.-1

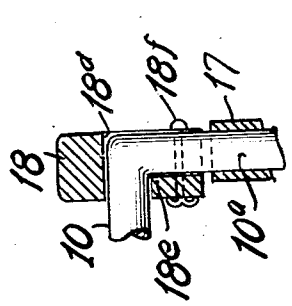


FIG.-2A

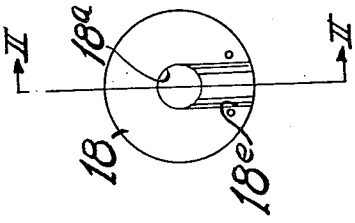


FIG.-2

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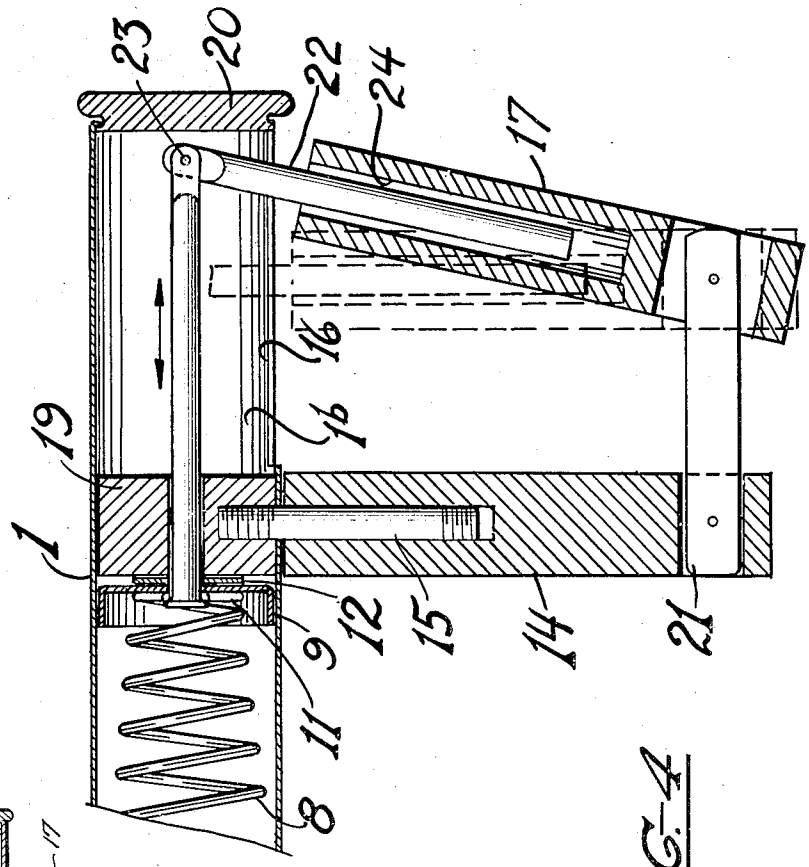


FIG. 4

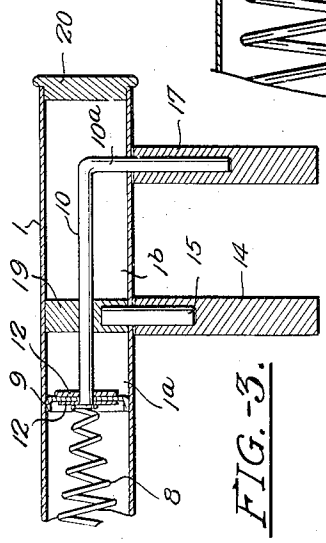


FIG. 3.

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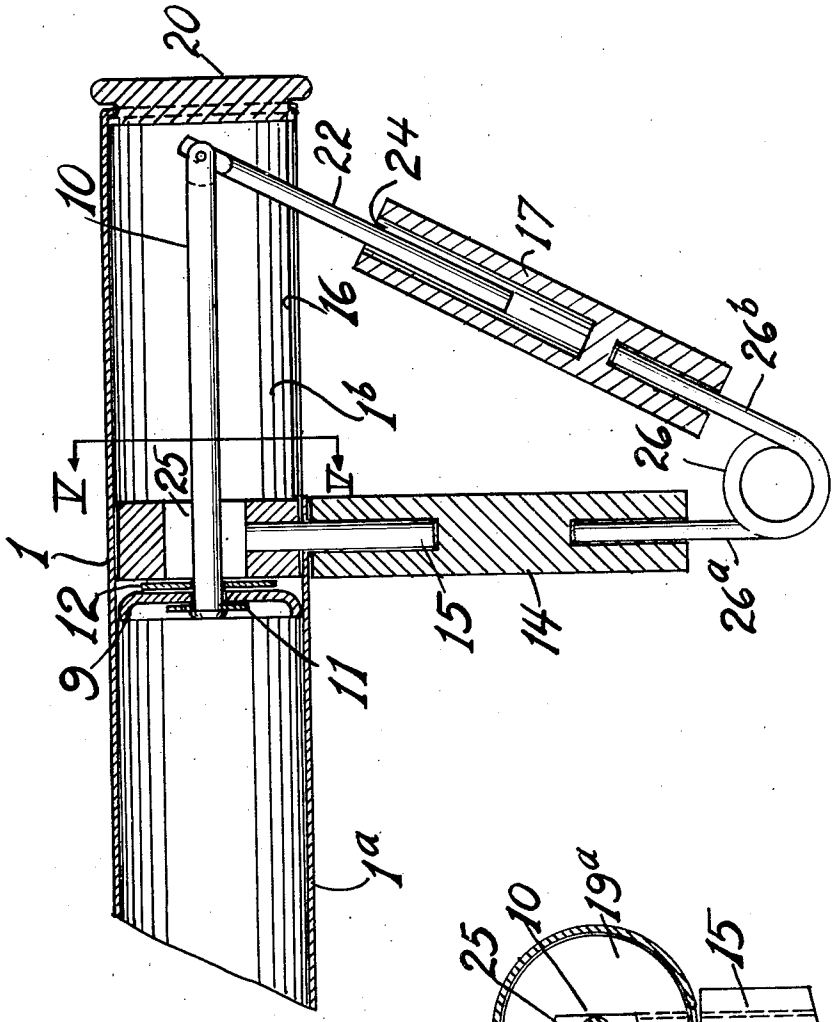


FIG.—5

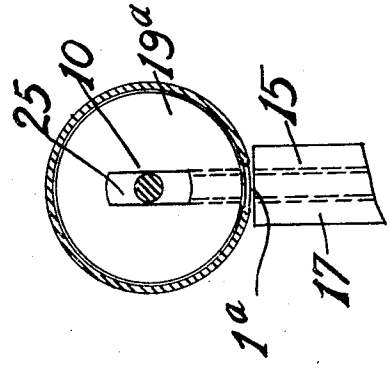


FIG.—5A

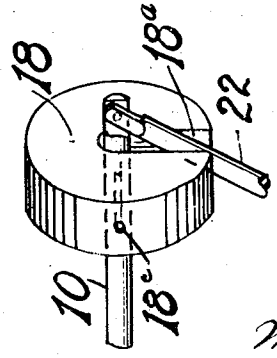


FIG.—6

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Patented Aug. 10, 1943

2,326,568

UNITED STATES PATENT OFFICE

2,326,568

SPRAYER DEVICE

William H. Rose, Jersey City, N. J., assignor to Stanco Incorporated

Application June 21, 1940, Serial No. 341,687

4 Claims. (Cl. 230—218)

The present invention relates to an apparatus for spraying liquids, such as household insecticides, and more particularly it relates to the construction of a device of such nature which may be operated with one hand. It is an object of the invention to provide a sprayer mechanism which while compact, and light in weight, will be a sturdy and efficient replacement for the more conventional spray-gun apparatus.

The invention and its objects may be fully understood from the following specification when it is read in conjunction with the accompanying drawings, in which

Fig. 1 is a vertical section longitudinally through a preferred form of the device,

Fig. 1A is a similar section taken along the line I—I of Fig. 1,

Fig. 2 is a plan view of an alternate guide plug construction,

Fig. 2A is a sectional view of the plug illustrated in Fig. 2, taken along the line II—II thereof,

Fig. 3 is a vertical section longitudinally through a portion of another form of spray pump,

Figs. 4 and 5 are similar views of alternate forms of construction,

Fig. 5A is a vertical sectional view along the line V—V of Fig. 5,

Fig. 6 is a sectional view showing an adaptation of a floating guide to the structure of Figs. 5 and 6.

With reference to the drawings, in which the same numerals are used to designate like parts, and with particular reference to Fig. 1, the numeral 1 designates a tubular spray pump barrel having a discharge end assembly. The assembly as illustrated, is composed of a discharge head 2 having one or more ports 3, an absorbent, non-fibrous filler element 4, and a fluid lift tube 5 opening into the head below the filler element. A means for attaching the pump barrel to a reservoir for liquid is provided by a screw cap member 6. An annular partition 7 separates the discharge head from the pump barrel maintaining the position of the filler element in the head, and serving as a stop member for one end of a compression spring 8 disposed in the pump barrel. The use of the indicated type of discharge head is particularly suited to the short stroke of the pump according to the present invention.

The barrel 1 is provided with the conventional leather-cup piston head or plunger cup 9 held on the rod 10 by means of retainer discs 11 and 12. It is a distinguishing feature of the structure according to the present invention, that the rod 10 is considerably shorter than that of the conventional sprayer, the rod being adapted to a stroke which may be less than four inches, or within the distance between the first thumb joint and second joint of the middle finger of an average human hand. Ordinarily the distance traveled by the plunger cup 9 within the barrel 1 will be between two and three inches, and may be even less. With this short stroke, the use of a spray discharge head according to the disclosure of the above mentioned application, is necessary for most satisfactory results. At its outer end, the spring 8 bears against the disc 11, maintaining the plunger assembly in a withdrawn position. The spring 8 is preferably of helical type, as shown, so that upon compression each flight will nest within another, permitting maximum travel of the plunger in the barrel.

In the preferred form illustrated, the barrel 1 is composed of a pressure section 1*a*, and a shield or guide section 1*b*. A cap 13 is provided at the outer end and may be snap or friction fitted thereto, or provided for any other means of fixed attachment. A stationary handle 14 is secured to the under side of the barrel at a point where, with the liquid reservoir attached, a feeling of substantial balance will be conveyed to an operator when the device is held in one hand. As shown, the handle 14 is secured to the barrel, at substantially the junction of the pressure and guide sections, by means of a metal shaft 15, to which the handle is friction fitted, extending through the wall of the barrel 1 and having an upset head 15*a*. Ordinarily the head 15*a* should be comparatively flat and smooth-edged to permit easy passage of the disc 12 thereover and the disc itself normally should be of such diameter as to facilitate such relationship. The shaft 15 may be soldered to the barrel, before attachment of the handle 14 is desired. Other means for securing the handle in fixed radial relation to the barrel may be substituted for the shaft 15.

The plunger rod 10 is L-shaped, having a dependent leg 10*a* extending downwardly through a slotted portion 16 in the guide section 1*b*. Preferably this slot should be provided with crimped edges as shown in Fig. 1A. The dependent leg of the rod 10 is provided with a friction fitted handle member 17, which with fixed handle 14 and a reservoir attached provide a means for maintaining the reservoir in a vertical position, with the pump barrel horizontal, on any flat surface.

To maintain the plunger rod 10 in substantially concentric relation with the pump barrel during operation of the spray-gun, a floating

guide plug 18 of wood or another material, such as a plastic, is provided in the portion 1b of the pump barrel. The plug 18 is generally cylindrical and of a thickness somewhat greater than the diameter of the plunger rod. A slotted portion 18a, having a width substantially equal to the diameter of the rod, is cut or formed in the guide plug. The slot extends radially into the plug body to a point beyond the center, terminating in a curved bottom wall, having a radius of curvature which is substantially equal to that of the rod 10. A cylindrical passage 18b, having a center line in common with the slotted portion 18a, extends through the plug 18, and is adapted to receive the dependent leg of rod 10. As shown in Fig. 1A, a pin 18c may be used to maintain the seating of the rod 10 in the guide slot 18a. On occasion, however, it may be found more convenient to omit the pin 18c, and depend upon cooperation between the handle 17 and plug 18 to prevent excessive radial movement of the rod 10. As may be seen from the drawings, the plug 18 is in substantially closely spaced relation to the inner barrel walls, preventing movement of the plug and rod together, and by providing a handle 17 which, as also shown, terminates in closely spaced relation to the outer barrel wall, the handle, acting as a stop member, will prevent movement of the rod portion 10a in the passage 18b. The edges of the plug 18 are preferably rounded or beveled as shown, to reduce friction with the barrel wall.

As shown in Figs. 2 and 2A, the guide plug 18 may be of other suitable construction. The plug illustrated has a central passage 18d, adapted to receive the outer end of the horizontal portion of rod 10, the dependent leg 10a fitting into a radial slot 18e, extending into the passage 18d. A wire clip or brad may be used to hold the leg 10a in place, and in this instance the clip 18f extends through suitable holes at each side of the slot, the ends being twisted together on the other side of the guide plug.

In Fig. 3, the guide plug 19 is disposed in fixed relation to the barrel 1 between the pressure and guide sections 1a and 1b, and at approximately the operating balance point for the complete assembly. In this instance, the pin or shaft 15 extends into the plug 19 also, the plug and handle engaging the barrel wall between them. The outer end of the barrel guide portion 1a is closed by an end closure 20, press fitted, or otherwise secured to the barrel.

The structure shown in Fig. 4 is an alternate form of one hand sprayer utilizing an internal compression spring 8 as in Figs. 1 and 3. As in Fig. 3, the guide plug 19 cooperates with a pin 15 and handle 17 to engage the barrel 1, providing a rigid gripping member for an operator. The operating mechanism of this type of spray-pump differs from those previously described, however, in that the operating handle 17 is pivotally secured to the gripping handle 14, at its lower end, by means of a link member 21, and the plunger rod 10, terminates in spaced relation to the end of the barrel 1, being connected to the handle 17 by means of a lever member 22 pivotally engaging the rod 10 as at 23, and extended downward through the slot 16 into free sliding relation within a receptacle bore 24 provided in the upper end of handle 17. The relationship between the lever 22 and bore 24 should be such that at the mid point of the handle arc, shown in dotted lines, there will be a clearance between the lower end of the lever and the bottom of the bore.

Another form of construction is illustrated in Fig. 5. In this form, the compression spring 8 is omitted in favor of a spring type linkage between the gripping handle 14 and the operating handle 17. Furthermore, a modified form of guide plug is utilized, which provides against binding of the plunger rod 10 due to any rocking motion which may be imparted to the rod during operation. As shown in this figure and in Fig. 5A, the guide plug 19a is provided with a central passage 25 which is generally rectangular in form, disposed vertically with relation to the pump barrel 11, the plug being secured in the assembly in the manner also illustrated in Figs. 3 and 4. As mentioned above, in this arrangement, the spring 8 has been omitted in favor of a spring element 26 having a leg 26a fixedly secured in the gripping handle 14, and a leg 26b fixedly secured in the operating handle 17. If desired, the leg 26a may be extended longitudinally through the handle 14 to replace the pin member 15. Except for the features mentioned, the construction of the sprayer according to Fig. 5 is similar to that shown and described in connection with Fig. 4.

Any of the forms shown in Figs. 3 to 5 inclusive, if desired, may be somewhat modified by omitting the guide section 1b of the barrel 1. In such a construction, the guide plug 19 should be as indicated in Fig. 5a, except that the barrel 1 should be secured to the circumference of the guide member as normally it would be secured to the closure member 20 of Figs. 3 to 5 inclusive.

The floating guide plug 18, illustrated in Figs. 1 and 1A or Figs.2 and 2A, may also be adapted to the lever linkage arrangement shown in Figs. 4 and 5, as is illustrated in Fig. 6, or in another convenient fashion. As illustrated, the plug 18 is provided with a slotted portion 18a as is the plug illustrated in Figs. 1 and 2. In this instance, however, the plug is disposed with the slot opening downward. The rod 10 is held in the slot as shown by means of a pin member 18c which in this instance is passed through the rod 10. The lever arm 22 is free to move within the slotted portion 18a.

The operation of the one hand sprayer is evident from the structure as illustrated and described. After attachment of the reservoir, the operator needs only to grasp the two handles in one hand, their spacing and size being predetermined by the average hand span, and pointing the discharge end at or in the direction of his spray target, flex his fingers and hand with a gripping action, the springs 8 or 26 effecting the return stroke. The device is distinguished by its compactness, ease of operation, and a simplicity adaptable to mass production and assembly methods.

Although the invention has been described in detail with reference to the accompanying drawings, it is not intended that any limitations shall be implied thereby. Obviously, considerable variations in structure are possible without departing from the inventive concept as set forth in the appended claims.

The invention claimed is:

1. A device of the character described, comprising a tubular pump barrel, a plunger and plunger rod reciprocally movable in said barrel, a barrel hand-grip member in fixed radial relation to the barrel, a plunger rod hand-grip member, having a receiver bore in its upper end, link

means connecting said barrel and plunger rod hand-grip members, the latter pivotally movable on said link substantially into abutment with the former, a rod link slidably disposed in said receiver bore, and at its upper end pivotally engaging the plunger rod, barrel guide means for said rod, and spring means, to retract the rod from a forward position, normally maintaining the respective hand-grip members in spaced relation.

2. A device of the character described, comprising a tubular pump barrel, a plunger and plunger rod reciprocally movable in said barrel, a barrel hand grip member in fixed radial relation to the barrel, a plunger hand grip member including, at its upper end, a pivotal connection to said plunger rod, link means connecting the barrel and plunger rod hand grip members, the link means comprising a rigid member fixed in relation to the barrel hand grip, and pivotally secured to the lower end of said plunger rod hand grip, the latter pivotally movable on said link means, substantially into abutment with the barrel hand grip member, to advance the plunger rod in the barrel, barrel guide means for said rod, and spring means to retract the rod, normally maintaining the respective hand grip members in spaced relation.

3. A device of the character described, comprising a tubular pump barrel, a plunger and plunger rod reciprocally movable in said barrel, a barrel hand grip member in fixed radial relation to the barrel, a plunger rod hand grip member including, at its upper end, a pivotal connection to said plunger rod, link means connecting the barrel and plunger rod hand grip members, the latter pivotally movable on said link means, substantially into abutment with the former, to advance the plunger rod in the barrel, barrel guide means for said rod, and spring means to retract the rod normally maintaining the respective hand grip members in spaced relation, the spring means comprising an angular spring member having divergent leg portions engaging the lower end portions of the respective hand grip members.

4. A spray gun adapted as a unit to be carried and actuated by a single hand of an operative which comprises, a compression cylinder having a discharge head for liquid, a reservor depending in fixed relation from the discharge end of the cylinder, a piston rod extending longitudinally in the cylinder, a supporting handle for the gun depending in fixed relation from an intermediate portion of the cylinder, a piston actuating handle depending from the piston rod, the reservoir supporting handle and piston actuating handle being in alignment along the longitudinal axis of the gun, the piston actuating handle being normally spaced from the supporting handle a distance to permit both handles to be held by one hand of the operative whereby when the hand is closed the piston is actuated, and a spring operative for normally forcing the piston rod against the pressure of the hand.

WILLIAM H. ROSE.