May 27, 1924. 1,495,772

M. J. BROWN

PUMP MEASURING DEVICE

Filed Sept. 19, 1921

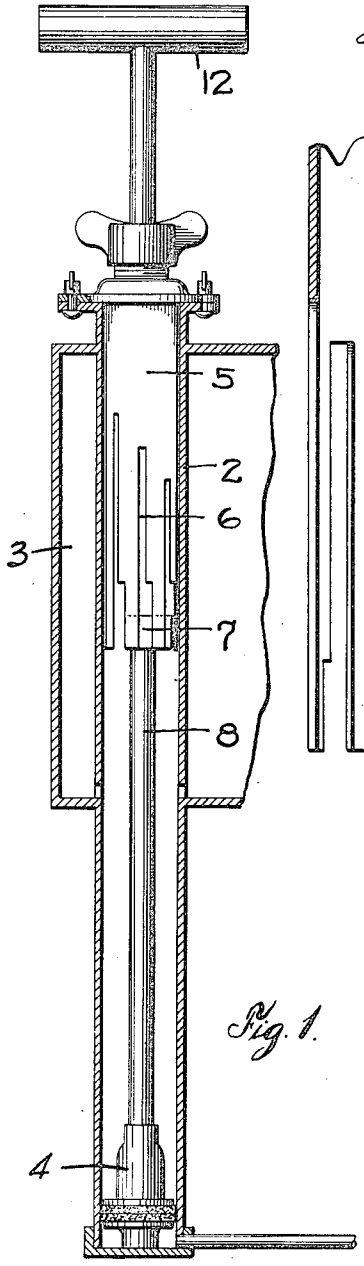


Fig. 1.

Fig. 2.

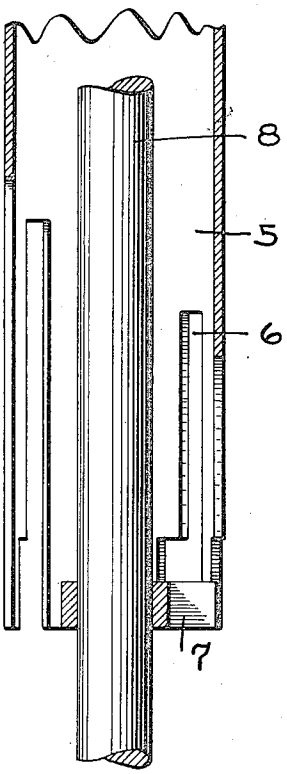
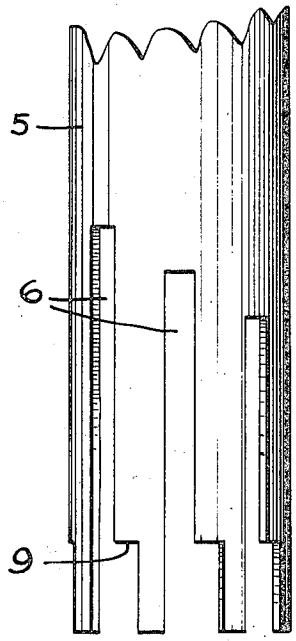


Fig. 3.



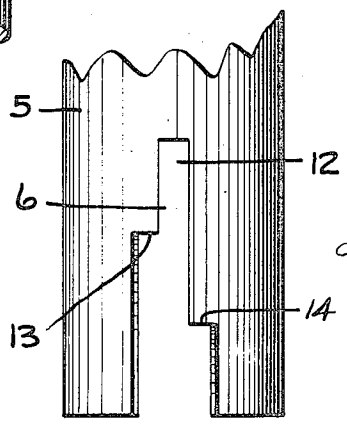


Fig. 4.

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Patented May 27, 1924. 1,495,772

UNITED STATES PATENT OFFICE.

MORTIMER J. BROWN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO THE PACIFIC R & H CHEMICAL CORPORATION, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

PUMP-MEASURING DEVICE.

Application filed September 19, 1921. Serial No. 501,554.

To all whom it may concern:

Be it known that I, MORTIMER J. BROWN, a citizen of the United States, and a resident of Los Angeles, county of Los Angeles, and State of California, have invented a certain new and useful Pump-Measuring Device, of which the following is a specification.

The invention relates to measuring pumps and particularly to means for limiting the stroke of the pump to certain predetermined lengths.

An object of the invention is to provide a simple, rugged means for limiting the stroke of a pump piston to variable predetermined lengths.

Another object of the invention is to provide means whereby the stroke of a pump piston may be readily changed from one fixed predetermined length to another.

A further object of the invention is to provide a means for limiting the stroke of a pump piston, which means may be supported and contained within the pump barrel.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline in full, that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown one form of device embodying my invention, but it is to be understood that I do not limit myself to such form, since the invention, as set forth in the claims, may be embodied in a plurality of forms.

Referring to said drawings:—

Figure 1 is a longitudinal section of a pump embodying my invention.

Fig. 2 is a longitudinal section on a larger scale of the stroke limiting device of my invention.

Fig. 3 is a side elevation of the stroke limiting device.

Fig. 4 is a side elevation of a modified form of stroke limiting device.

The device of my invention is particularly adapted for use in connection with apparatus employed in the fumigation of citrous and other fruit trees. In the fumigation of citrous trees, the tree is enclosed in an envelop and subjected to the action of a volatile fumigant such as hydrocyanic acid gas. Liquid hydrocyanic acid is largely used as the source of hydrocyanic acid gas and the function of the present device is to definitely measure the charges of liquid hydrocyanic acid used. Different charges of liquid are used in connection with the different trees, which are previously dimensioned for this purpose, and the apparatus must be capable of quickly delivering the definite charge required by the tree under treatment. As hydrocyanic acid fumigation is actually practiced, the fumigators use units of 10, 12, 14, 16, 18, 20 and 22 cubic centimeters of liquid hydrocyanic acid, the particular unit used depending upon several factors such as weather, tree and pest conditions, and since trees vary in size, the fumigator must be able to deliver any number of units at will. The device of my invention provides a simple, rugged means for accomplishing this result.

The measuring or piston stroke controlling device of my invention is used in connection with a pump barrel or cylinder 2 into which the liquid flows, preferably by gravity, from a superposed tank 3, and from which it is ejected on the downstroke of the piston 4. The piston shown is of the valvular type, which, on its upward stroke is pervious, permitting the flow of liquid therethrough and on its downward stroke is impervious, ejecting the liquid from the pump barrel. The piston is described and claimed in an application filed September 19, 1921, by M. J. Brown and C. J. Marvin Serial No. 501,578.

Means are provided for selectively limiting the stroke of the piston to certain predetermined lengths, and thereby accurately and definitely measuring the liquid discharged by the pump. In the present construction, the downstroke of the piston is limited by contact with the bottom of the pump barrel. The upstroke of the piston is limited and controlled by a regulating device arranged above or in the upper portion of the pump barrel. Depending into the pump barrel is a metallic skirt or open end cylinder 5 having one or more vertically disposed slots 6 therein, in one of which a dog 7 secured to the piston rod 8 is movable. When a plurality of slots 6 are provided, the slots are of different lengths, representing different volumes of discharge from the barrel. For instance, one slot may be of such length, that

with the dog in the slot and the piston reciprocated for the thus limited stroke, five units of 18 c. c. each are ejected. The next slot may be dimensioned to cause the ejection of five units of 20 c. c. each, and so on. Preferably each slot is a stepped or composite slot, having a shoulder 9 therein against which the dog abuts when the handle 12 on the piston rod is turned to bring the dog in engagement with that side of the slot from which the shoulder springs. This shoulder is preferably so positioned that it limits the movement of the piston to eject one unit of liquid. Assuming that the dog is positioned in a composite slot of a length on one side to cause the ejection of five units and on the other side to cause the ejection of one unit, and it is desired to discharge 18 units of liquid to fumigate a given tree, the fumigator then reciprocates the piston three times for the full length of the longer slot, twists the handle to move the dog against the short side of the slot and reciprocates the piston three times in that position. The dog is so positioned that it does not move out of the slot when the piston strikes the bottom of the pump barrel and consequently there is no liability of error on the part of the fumigator.

When the conditions under which the fumigation is to be done are such that the discharge of a different size of units per reciprocation of the piston will be advisable, the dog may be moved to another slot. This is accomplished by releasing the depending member at its upper end and raising it sufficiently to clear the dog, then turning the handle to bring the dog into alinement with the selected slot, and then lowering the depending member and securing it in position. The lower ends of the slots are preferably disposed in the same plane and the slots extend upwardly to different distances to provide the desired predetermined discharge.

In Fig. 4 I have shown a modified form of piston stroke controlling element in which a triple value slot is provided. The slot shown is provided with a central portion 12 representing five units, a portion on one side limited by the shoulder 13 representing three units and a shoulder 14 on the other side representing one unit. By twisting the handle, the fumigator is enabled to eject three units, five units or one unit of liquid for each reciprocation of the piston.

Other features of the invention shown or described, but not claimed herein, are claimed in another application filed by me simultaneously herewith.

I claim:

1. The combination with a pump barrel having a piston therein connected to a piston rod, of stationary means disposed in the pump barrel intermediate its ends and cooperating with the piston rod for limiting the stroke of the piston at the will of the operator to selected variable lengths.

2. The combination with a pump barrel having a piston therein connected to a piston rod, of an element in said barrel provided with longitudinal slots of different lengths and a dog engaging in one of said slots to limit the movement of said piston.

3. The combination with a pump barrel having a piston therein connected to a piston rod, of a skirt depending into said barrel provided with a plurality of longitudinal slots of different length and a dog engaging in one of said slots to limit the movement of said piston.

4. The combination with a pump barrel having a piston therein connected to a piston rod, of a skirt depending into said barrel and provided with a plurality of longitudinal slots opening at the bottom of the skirt and a dog on the piston rod engaging in one of said slots.

5. The combination with a pump barrel having a piston therein connected to a piston rod, of means disposed in said barrel for limiting the upward stroke of the piston comprising a skirt depending into said barrel and provided with a plurality of slots extending upwardly to different heights and a dog on the piston rod engaging in one of said slots.

6. In a pump for a poisonous volatile fumigant, the combination with a barrel, of a piston therein, an outlet adjacent one end of the barrel, means around said piston rod at the opposite end of the barrel to prevent leakage of the fumigant, and adjustable means fixed inside the barrel between its ends for limiting the travel of the piston to predetermined lengths.

7. The combination with a pump barrel having a piston therein connected to a piston rod, of means for limiting the stroke of the piston to variable selected lengths, comprising an element having a stepped longitudinal slot therein and a member engaging in said slot.

8. The combination with a pump barrel having a piston therein connected to a piston rod, of means for limiting the stroke of the piston to variable selected lengths, comprising a depending skirt having a plurality of stepped longitudinal slots therein and a dog engaging in one of said slots.

9. The combination with a pump barrel having a piston therein connected to a piston rod, of means for limiting the stroke of the piston to variable selected lengths, comprising an element having a longitudinal slot therein provided with shouders on its opposite sides and a member adapted to move in said slot and to engage either of said shoulders.

10. The combination with a pump barrel

having a piston therein connected to a piston rod, of means for limiting the stroke of the piston to variable selected lengths, comprising a skirt depending into said barrel and provided with a plurality of slots of different length opening on the lower edge of said skirt, a shoulder on the side wall of each slot and a dog secured to the piston rod and engaging in one of said slots and adapted to be moved to engage the upper end of the slot or the shoulder.

11. In a pump the combination with a barrel, of a piston therein for forcing a fluid from said pump, a piston rod, and means cooperating with said piston rod for selectively limiting the travel of said rod on rotation thereof, said means and barrel being relatively adjustable to change the limits of piston travel.

12. In a pump the combination with a barrel, of a piston therein, means for selectively limiting the movement of said piston which comprises a member having therein a plurality of longitudinal slots of different lengths all open at one end and closed at the other, a dog for engagement with said slots, means for limiting the movement of the dog to prevent its being moved out the open end of a slot, and means for adjusting said member to enable the dog to be moved out of the open end of the slot and into another slot.

13. In a pump the combination with a barrel, of a piston and piston rod therein, a depending skirt portion telescoping within the barrel, adjustably attached to the top thereof, extending well into the barrel and provided with a plurality of longitudinally spaced abutments located adjacent the lower and central portions of the skirt and adapted for co-operation with the piston rod to limit its travel.

14. In a pump the combination with a barrel, of a piston and piston rod therein, stop means inside the barrel provided with a plurality of longitudinally spaced abutments, said means and abutments being arranged to co-operate with the piston rod and permit a limited selection of piston travels on rotation of the piston rod, and to permit a larger selection of piston travels on adjustment of said means.

In testimony whereof, I have hereunto set my hand.

MORTIMER J. BROWN.