May 27, 1924. 1,495,773

M. J. BROWN ET AL

PUMP

Filed Sept. 19, 1921

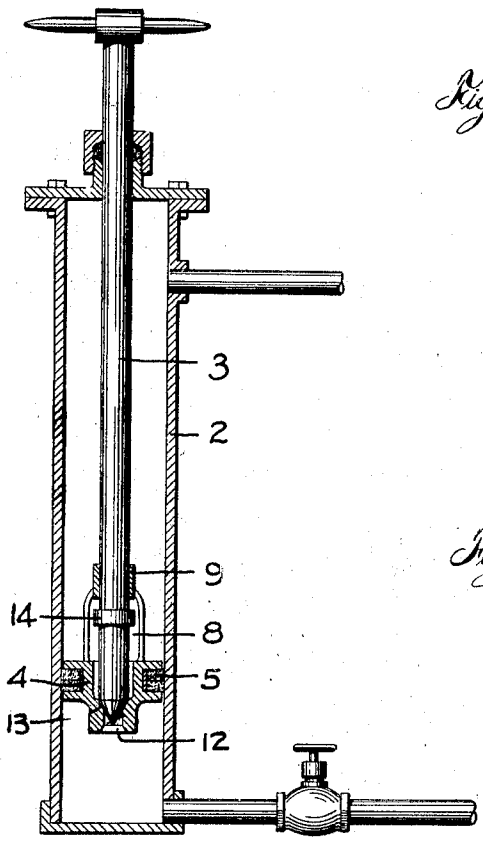


Fig. 1.

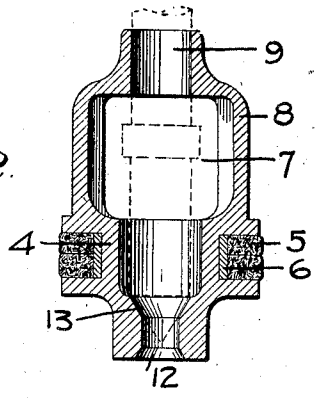


Fig. 2.

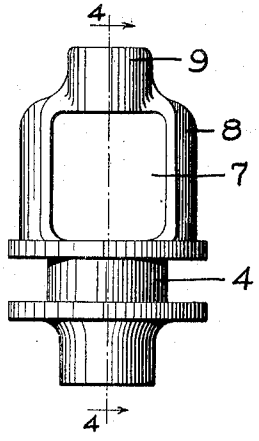


Fig. 3.

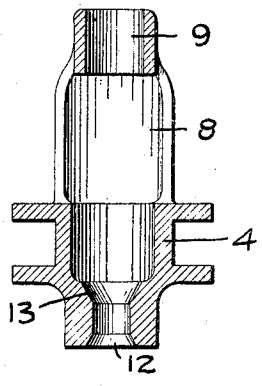


Fig. 4.

WITNESS
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UNITED STATES PATENT OFFICE.

MORTIMER J. BROWN AND CORNELIUS J. MARVIN, OF LOS ANGELES, CALIFORNIA, ASSIGNORS TO THE PACIFIC R & H CHEMICAL CORPORATION, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

PUMP.

Application filed September 19, 1921. Serial No. 501,578.

To all whom it may concern:

Be it known that we, MORTIMER J. BROWN and CORNELIUS J. MARVIN, citizens of the United States, and residents of Los Angeles, county of Los Angeles and State of California, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

The invention relates to pumps for measuring and ejecting charges of volatile liquids, such as liquid hydrocyanic acid, which is used as the source of gaseous hydrocyanic acid for fumigating fruit trees and relates particularly to the pump piston.

An object of the invention is to provide a piston that will not stick or bind in the pump cylinder.

Another object of the invention is to provide a valve in combination with the piston, the action of which will be positive even when operating with volatile liquids at their boiling points.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description, where we will outline in full, that form of the invention which we have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings we have shown one embodiment of our invention, but it is to be understood that we do not limit ourselves 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 vertical section of a pump cylinder showing the piston of our invention.

Fig. 2 is a vertical section on a larger scale of the piston, showing the valve in the closed position.

Fig. 3 is a side elevation of the piston.

Fig. 4 is a vertical section of the piston taken on the line 4—4, Fig. 3.

The pump of our invention is particularly adapted for use in connection with an apparatus for measuring and ejecting charges of liquid hydrocyanic acid for the fumigation of fruit trees, such, for instance, as is shown in the copending application of Mortimer J. Brown, Serial No. 501,553, filed September 19, 1921. In the fumigation of fruit trees it is essential to optimum results that definite predetermined charges of gaseous hydrocyanic acid be provided in the envelop surrounding the tree and the function of the pump is to definitely measure and eject the successive predetermined charges, the volume of which are varied by varying the stroke of the pump.

The present invention relates particularly to the pump piston which is reciprocable in the pump barrel 2 by the piston rod 3, which extends through a suitable packing gland at the top of the pump barrel. The piston comprises a hollow body 4, provided, intermediate its ends with a circumferential groove in which the piston packing 5 is disposed. The packing shown in the drawings comprises two superposed strands of graphited woven asbestos which projects sufficiently from the periphery of the piston to form a tight sliding fit for the single guiding surface cooperating with the pump barrel. Disposed in the groove, behind the packing, is an expanding ring 6, preferably made of phosphor bronze, which exerts an outward pressure on the packing, thus insuring a substantially leak-proof joint between the piston and the pump barrel wall, extending the greater part of the length of the piston.

Above the packing ring the body of the piston, which is of less diameter at that point than the pump barrel, is provided with one or more apertures 7, formed between the arms 8 which support the concentric piston rod guide bearing 9.

Below the packing ring, the piston is provided with an aperture 12, the upper portion of which constitutes a valve seat 13. The piston rod 3 extends through the guide bearing 9 and is formed or provided on its lower end with means to co-operate with the valve seat 13 to control the passage of liquid through the aperture 12. In the present instance, the rod is provided with a conical lower end which is adapted to snugly fit the valve seat. Within the body of the piston, the piston rod is provided with an abutment or collar 14, which, on the upstroke of the piston rod engages the under surface of the guide bearing and raises the piston. The piston rod thus has a limited freedom of movement with respect to the piston. On the upstroke of the rod, the force is applied to the piston above the piston and packing

ring and on the down-stroke of the piston rod, the force is applied to the piston below the piston and packing ring. With relation to the position of the packing ring, the piston is therefore pulled in both directions, so that it does not upset or bind in the barrel. On the downward movement of the piston rod, the aperture in the piston is positively closed before the piston is moved. The collar on the piston rod may be fitted with lugs, thus permitting the piston to be rotated by the piston rod, when such rotation is desirable.

Features disclosed, but not claimed in this application, are claimed in the co-pending application of Mortimer J. Brown, Serial No. 501,553, filed simultaneously herewith.

We claim:

1. In a pump, the combination with a cylinder, of a piston provided with a circumferential groove therein, packing in said groove projecting beyond the piston and providing a single guiding surface for the piston, a piston rod, said piston having reduced extensions on each end thereof, and means on the piston rod for transmitting thrust to the extension in advance of the packing, one of said means including a valve.

2. In a pump, the combination with a cylinder, of a piston provided with a circumferential groove therein, packing in said groove projectng beyond the piston and providing a guiding surface for the piston, said piston having reduced extensions at each end thereof, a piston rod extending through said piston, a collar on the piston rod for transmitting thrust to the extension above the packing, a valve seat in the extension below the packing, the lower end of said piston rod constituting a valve for said valve seat.

3. In a pump, the combination with a cylinder of a piston provided with a circumfertial groove therein, packing in said groove projecting beyond the piston and providing a guiding surface for the piston, said piston having reduced extensions at each end thereof, a piston rod slidable within said piston, the extension above the packing embracing and being slidable on said piston rod, a collar carried by the piston rod, a valve formed by the cooperation of the lower end of the piston rod with the extension below the packing, said collar and valve serving as a means to transmit the force from the piston rod to the piston at a short distance from the axis of the piston rod.

In testimony whereof, we have hereunto set our hands.

MORTIMER J. BROWN.
CORNELIUS J. MARVIN.