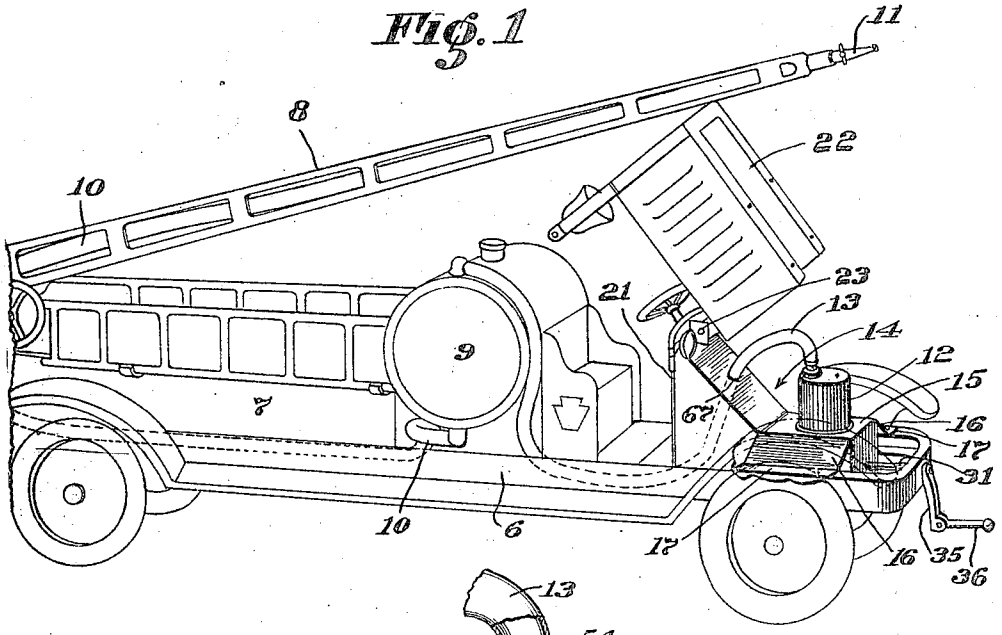
Aug. 7, 1928. 1,680,157

I. MARKS

PUMP

Filed March 26, 1927

Fig. 1



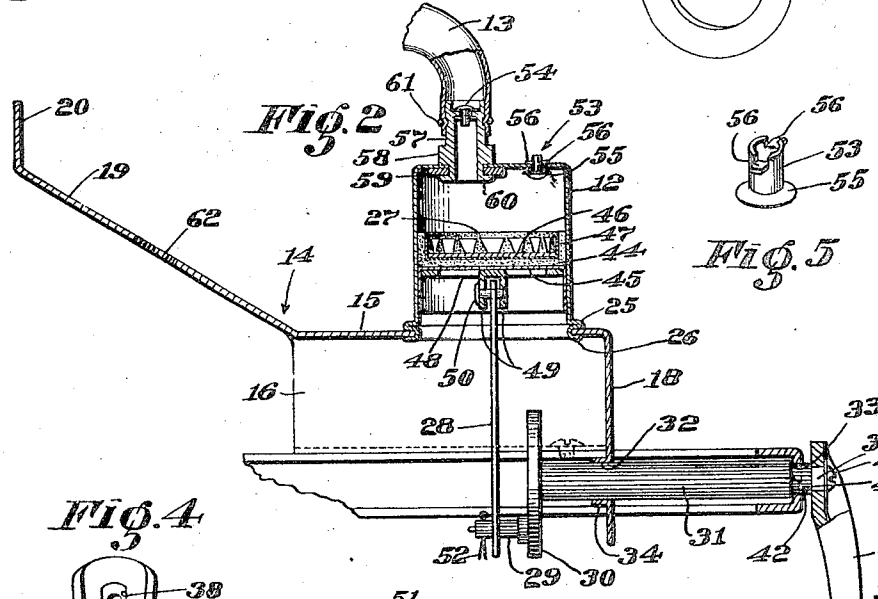


Fig. 2

Fig. 5

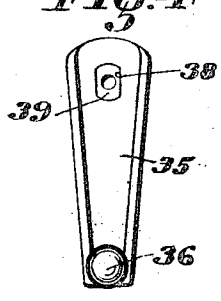


Fig. 4

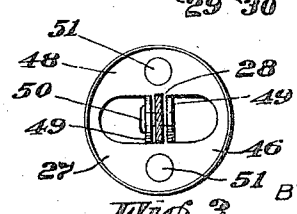


Fig. 3

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UNITED STATES PATENT OFFICE.

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PUMP.

Application filed March 26, 1927. Serial No. 178,764.

The present invention relates to improvements in pumps and is herein illustrated as embodied in an air pump particularly designed for use in toys such as fire apparatus, dump-body trucks and the like.

In the prior patent of the present inventor, No. 1,640,417 granted August 30, 1927 upon a copending application, there is disclosed a toy water-tower truck having a water supply tank, with which a hose is connected, and having also an air pump which is connected with the tank and is adapted to be operated to force a stream of water through the hose. One object of the present invention is to provide a pump of the type above referred to which is of simple construction and well adapted for economical quantity production, but which nevertheless is so made that it may be relied upon to operate effectively and not to get out of order under the hard usage given by children in operating the toys.

Another object of the invention is to provide an air pump adapted to toy trucks which is especially constructed and arranged to simulate certain characteristic features of the engine of motor trucks.

To the accomplishment of these objects, and such others as may hereinafter appear, the invention comprises the features of construction and combinations of parts hereinafter described and claimed.

The invention will be explained with reference to the accompanying drawings illustrating the preferred embodiment thereof, in which:

Figure 1 is a perspective view of a toy water tower truck equipped with a water tank and with an air pump constructed in accordance with the features of the present invention;

Fig. 2 is a vertical sectional view of the pump shown in Fig. 1;

Fig. 3 is a bottom plan view of the pump piston;

Fig. 4 is a detailed elevational view of the crank or handle for operating the pump; and

Fig. 5 is a detailed perspective view of the inlet valve.

Referring first to Fig. 1 of the drawings, the novel pump is shown, for illustrative purposes, as applied to a toy truck having a chassis 6, a body 7, a water tower 8, a water supply tank 9 and a hose 10 connecting the tank, at its bottom, with a nozzle 11 at the upper end of the tower 8.

The pump comprises a cylinder 12 which is connected by an air conduit or tube 13 with the top of the water tank 9. The pump cylinder 12 is supported in upright position upon a frame member 14 which is secured to the side frames of the chassis at the forward end thereof. The frame member 14 is so made as to simulate the crank case and associated portions of the body of the engine of a motor truck, while the pump cylinder itself is arranged to simulate the casting for the cylinders of the motor. To this end the pump cylinder 12 is secured to a horizontally disposed rectangular portion 15 of the frame member 14. The frame member further comprises two side pieces 16 which are bent downwardly at an angle to the portion 15 at the opposite sides thereof and have horizontal flanges 17 at their outer edges which are fastened to the opposite sides of the frame 6, a vertical front portion 18 and a rearward extension 19 which slopes upwardly with respect to the horizontal portion 15 and terminates in a vertical flange 20 adapted to be secured to the dashboard 21 of the truck. The pump cylinder and its supporting frame are adapted to be covered normally by means of an engine hood 22 which is pivoted at 23 to the dashboard 21.

The pump cylinder 12 consists of a cup of drawn sheet material (see Fig. 2) positioned bottom uppermost, said bottom constituting its head while the rim or open end of the cup projects downwardly through a circular aperture in the portion 15 of the supporting frame. As exterior annular bead or rib 25 formed integrally in the wall of the cup or cylinder 12 a short distance from its open end is adapted to engage the upper face of the supporting frame and determines the distance the cylinder may be projected through the aperture made to receive it. The lower edge of the cylinder wall is rolled or spun outwardly against the lower face of the supporting frame, as shown at 26, thus rigidly securing the pump cylinder in place without the use of fastening devices other than the integral bead 25 and rim 26 of the pump cylinder itself.

The pump is provided with a piston 27 having pivoted thereto a piston rod 28, which may conveniently be a flat bar, extending downwardly through the open lower end of

the pump cylinder connected at its lower end to a crank pin 29 carried by a disk 30 fixed to the inner end of a horizontal driving shaft 31. The shaft 31 extends through an aperture 32 in the front flange 18 of the frame 14 and through an aperture 33 in the front bar of the chassis frame. In forming the aperture 32 an annular rim or flange 34 is struck up thus providing a bearing of substantial length for the shaft 31.

A crank arm 35, having a folding handle 36 pivoted thereto at 37, is rigidly secured to the front end of the shaft 31 and thus simulates the hand crank of a motor truck engine. The hand crank provides natural appearing means for operating the pump. As shown in Fig. 4, the crank arm 35 is provided with a flat sided aperture 38 which receives the correspondingly shaped end 39 of the shaft 31. The crank arm 35 is held fast against a shoulder 40 on the shaft 31 by the head of a screw 41. Rearward displacement of the shaft 31 is prevented by engagement of the crank arm 35 with the chassis frame and forward displacement of the shaft is prevented by a shoulder 42 on the shaft which will engage the chassis frame. The above described construction of the pump cylinder and frame member 14 enables the pump and its operating mechanism to be self contained and capable of being assembled as a unit before attachment to the truck. The attachment may readily be effected by means of screws through the flanges 17 and 20 of the frame member, it being necessary merely to remove the crank arm 35 from the shaft 31 to enable the latter to be projected through the aperture 33 in the chassis frame.

The piston 27 (Figs. 2 and 3) comprises a leather disk 44 which is clamped between a metallic follower or piston head 45 and a metallic cap disk 46, the margin of the leather disk projecting beyond the cap disk and being turned upwardly for engagement with the inside of the cylinder wall so as to slide freely therein but to prevent air leakage past the piston. Accordingly a thin metallic spreader member or disk 47 is interposed between the leather disk and the upper cap disk 46, the margin of the spreader disk 47 being serrated or notched to provide a yielding or spring-like margin which is upturned to engage the inner wall of the the upturned margin of the leather disk. The leather is thus held closely against the cylinder wall. The follower 45 is in the form of a cup having a flat bottom wall which supports the body of the leather disk and a side wall fitted for sliding engagement within the cylinder. Beneath the bottom wall of the follower cup 45 is a second cap disk 48 having a pair of centrally located spaced ears 49 struck up thereon between which is pivoted, upon a pin 50, the upper end of the piston rod 28. As shown, all the above mentioned component parts of the piston 27 may be firmly held in assembled relation by two rivets 51. The lower end of the piston rod 28 is removably secured to the crank pin 29 by a split pin 52.

The pump cylinder is provided with an inlet valve 53 and an outlet valve 54. These valves are purposely of simple construction. Each valve comprises a movable member which may consist of an ordinary tubular rivet, the head of which constitutes a valve closure, while the shank of the rivet constitutes a valve stem. As shown the tubular shank of the rivet constituting the inlet valve 53 extends through, and is capable of free upward and downward movement in, a small aperture or inlet port in the cylinder head. A rubber washer 55 fitted over the shank of the rivet is adapted for air tight engagement with a valve seat formed by the under face of the cylinder head immediately surrounding the inlet port. As a convenient means for holding the tubular rivet valve within the aperture in the cylinder head a pair of lugs 56 (Fig. 5) are struck up from the free end of the rivet shank, these lugs being spaced far enough from the head of the rivet to permit such axial movement of the valve in the inlet port as is necessary for successful operation.

The closure of the outlet valve 54 may be made from a tubular rivet in the same way as the inlet valve. This rivet extends with its head uppermost through an outlet port consisting of an aperture formed in a transverse partition within the upper reduced portion of a nipple 57 that is carried by the head of the pump cylinder to provide a convenient means for connecting the air tube 13 with the pump. As shown, the lower end of the nipple 57 extends through an aperture in the cylinder head as far as permitted by an annular shoulder 58 on the nipple. The portion of the nipple projecting below the cylinder head is rolled over or spun at 60 against a rubber washer 59 to provide an air tight joint. The conduit 13 may be tightly secured to the nipple by a suitable band or wire 61.

The arrangement of the valves is such that upon the downward or intake stroke of the piston the inlet valve 53 will open and the outlet valve 54 will close, while upon the upward or pumping stroke of the piston the inlet valve will close and the outlet valve will open. An opening 62 is provided in the portion 19 of the frame member 14 through which the air tube may conveniently pass on its way to the water tank 9.

Besides simulating the general appearance of the motor and crank case of a motor truck, the above described pump is of unusually simple but nevertheless of a highly practicable and inexpensive construction. There is no machine work necessary upon

any of the parts of the pump including the cylinder, piston and valves, yet the joints and connections between the various component parts of the pump structure are strong and secure. The above mentioned characteristics of the pump make it particularly well adapted for use in toys of steel construction such as the water tower truck herein illustrated.

The nature and scope of the present invention having been indicated and its preferred embodiment having been specifically described, what is claimed as new, is:—

1. A pump unit designated for toy trucks and comprising, in combination, a pump cylinder, pump operating mechanism including a rotary shaft and a sheet metal frame having a cylinder supporting portion, downwardly and outwardly extending side walls flanged for attachment to a support, and a downwardly extending front wall for supporting said pump operating shaft.

2. In a pump construction, the combination with a sheet metal frame having a circular aperture therein, side walls with attaching flanges and an integral rearwardly and upwardly extending portion whereby the frame may be secured in position, and a pump cylinder projecting into said aperture and being permanently assembled and forming with the frame a unitary member.

3. A device of the class described having, in combination, a pump cylinder open at one end and closed at the other end, a piston in the cylinder, a frame member having portions adapted to be secured to the side frames of the chassis and to the dashboard of the truck and a top portion having an aperture to receive the open end of the pump cylinder, an outlet nipple secured in the closed end of the cylinder, an outlet valve in the nipple, an air tube connected with the nipple, an inlet valve in the closed end of the cylinder, a bearing in the frame member, a crank shaft journaled in the bearing, a hand crank at one end of the shaft, a crank disk carrying a crank pin at the other end of the shaft, and a piston rod connecting the crank pin with the piston.

4. In a pump the combination with a pump cylinder of a piston in said cylinder comprising a leather disk having an out-turned flange fitted to slide within said cylinder, a cup-shaped follower having a flat bottom wall for engaging and supporting the leather disk and a marginal flange turned away from the leather disk for sliding engagement within the cylinder, a cap plate in engagement with the bottom of the follower cup, a pair of spaced ears struck up from the cap plate, a disk in engagement with the outer side of said leather disk having out-turned spaced marginal ears engaging the inside of the out-turned flange of the leather disk, a second cap disk engaging the outer face of the spreader disk, and means securing said piston parts rigidly together, and a piston rod pivotally mounted between said ears.

5. A pump unit for toy trucks comprising, in combination, a one-piece frame of light sheet metal including a horizontally disposed cylinder-supporting portion merging at either side into downwardly bent side pieces, at its front end into a vertical wall and at its rear end into an upwardly bent extension terminating in a vertical flange, a cylinder carried by said supporting portion, and pump operating mechanism carried by said front vertical wall.

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