A. S. COMSTOCK.

AIR PUMP.

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903,543. Patented Nov. 10, 1908.

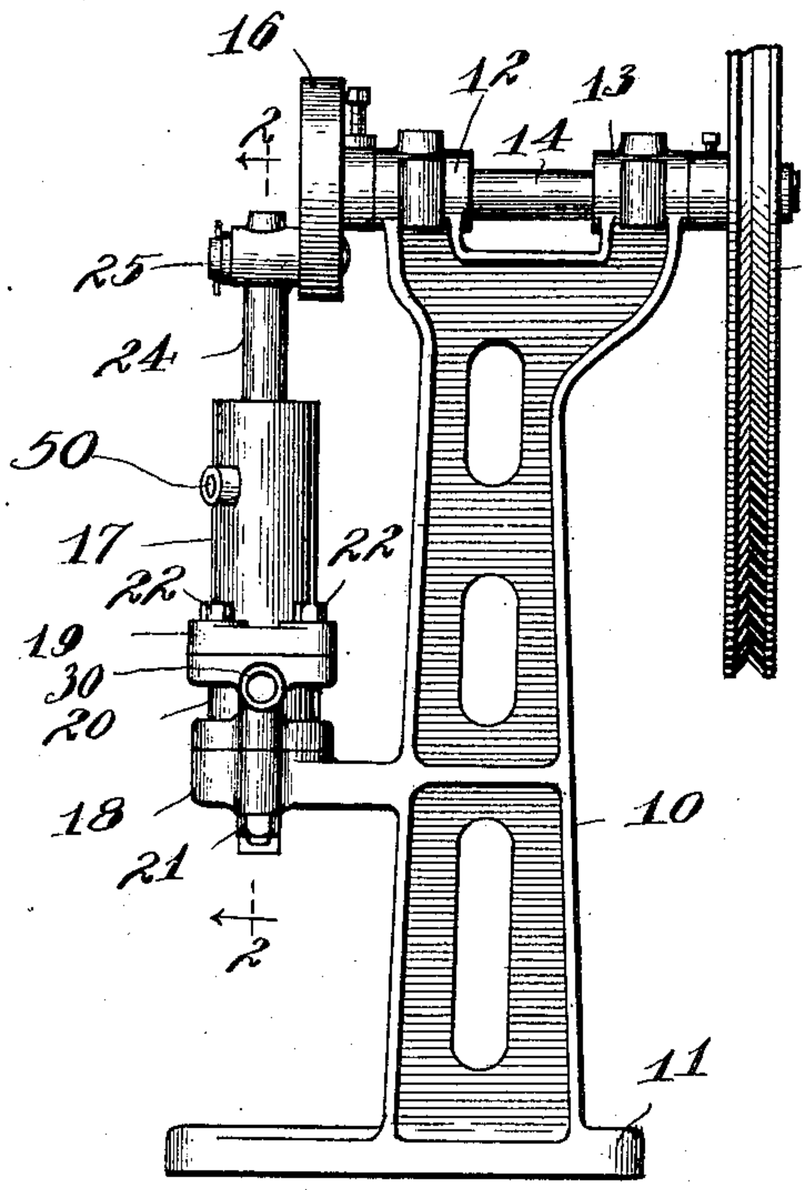


Fig. 1.

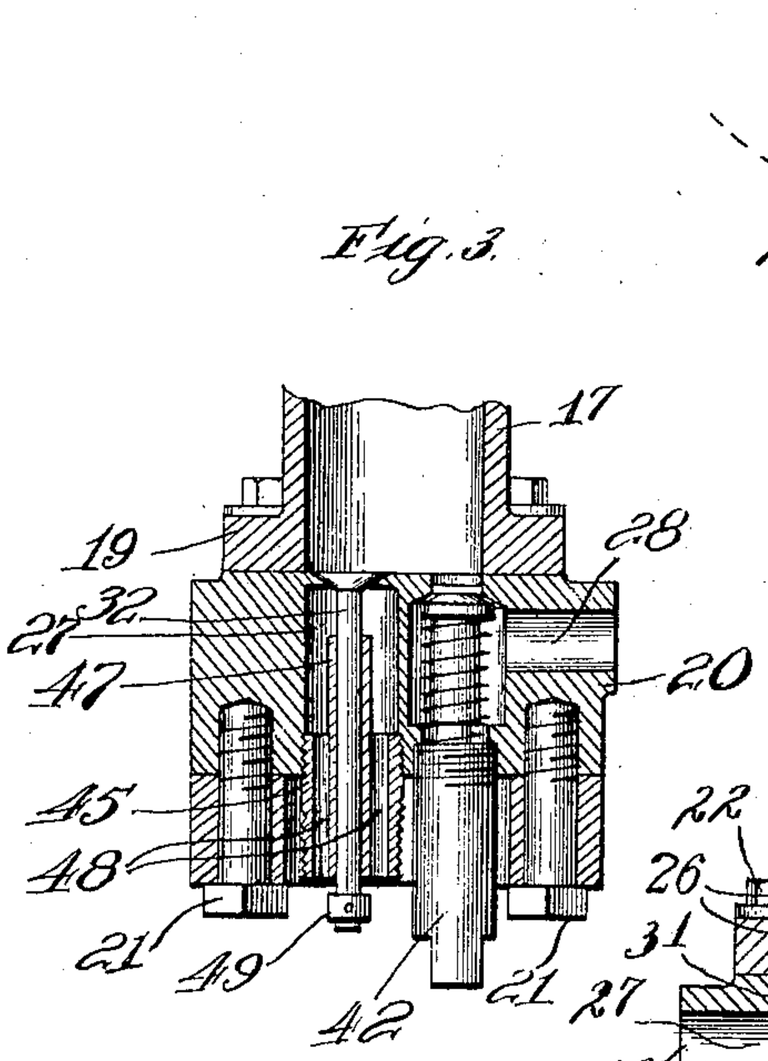


Fig. 3.

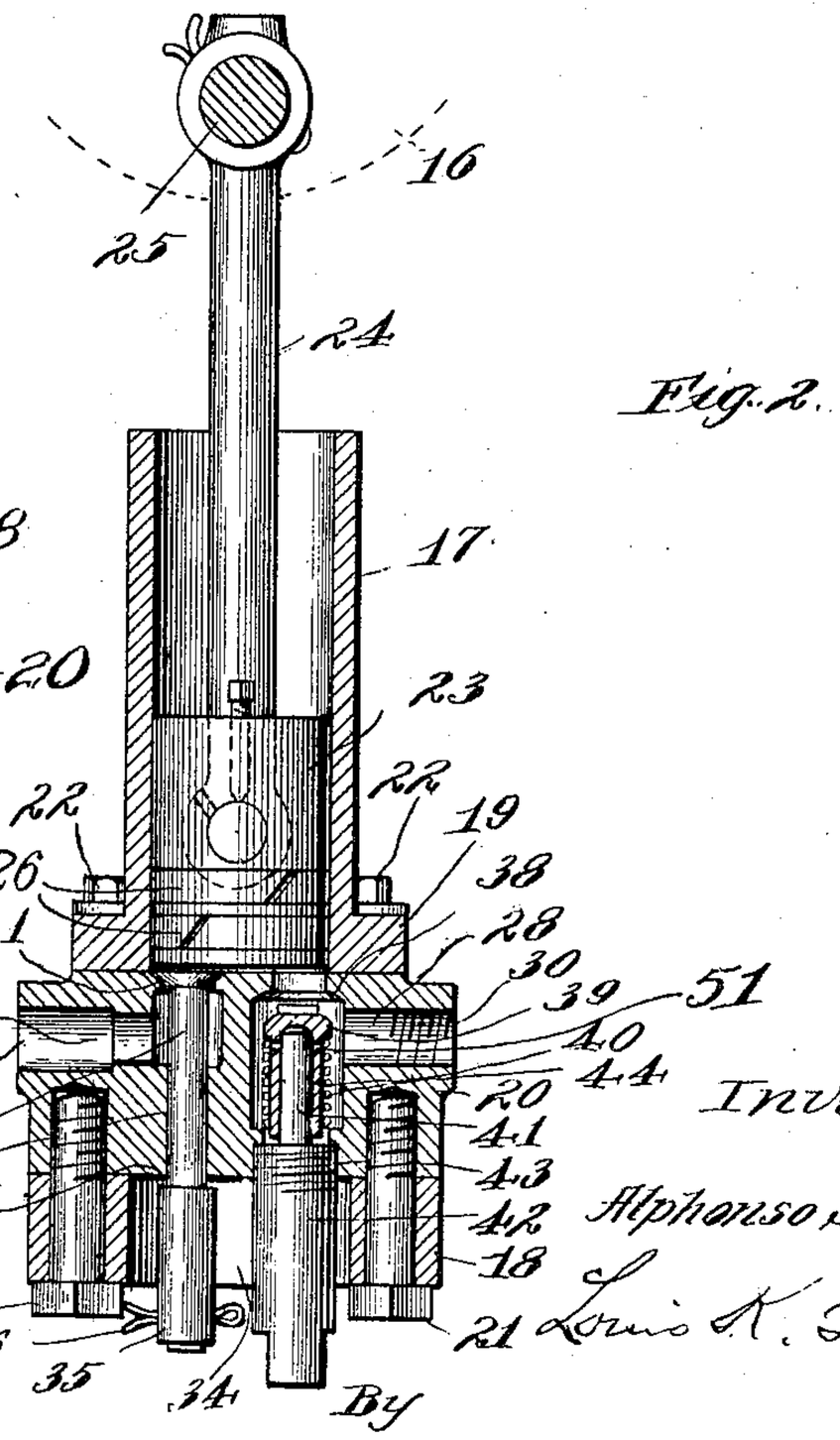


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## AIR-PUMP.

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Application filed January 23, 1908. Serial No. 412,271.

*To all whom it may concern:*

Be it known that I, ALPHONSO S. COMSTOCK, a citizen of the United States, and resident of Evanston, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to air pumps; and has for its object to simplify and improve the construction and operation of such devices.

The invention is exemplified in the construction to be hereinafter described, and which is illustrated in the accompanying drawings, wherein

Figure 1 is a front elevation of an air pump embodying the improvements provided by the invention; Fig. 2 is a detail sectional view of the same taken on the line 2—2 of Fig. 1; and Fig. 3 is similar to Fig. 2 but illustrates a slightly modified form of construction.

As shown in the drawings, a supporting frame 10 is provided having at its base a suitable supporting flange or floor plate 11. At the top of the standard bearings 12, 13, are provided for a driving shaft 14. Upon one end of the driving shaft a belt pulley 15 is mounted, and upon the other end of the shaft there is provided a crank disk 16.

A pumping cylinder 17 is provided. As shown this cylinder is vertically disposed below the crank disk 16, and is carried by a shelf or ledge 18, formed upon one side of the standard 10 intermediate its ends and adapted to permit of convenient access to the head end of the pump cylinder from below the shelf. Preferably the wall of the cylinder 17 takes the form of a simple tube having a flanged base 19, and what may be termed the cylinder head and valve chest of the pump are both comprised in an integral block 20, interposed between the shelf 18 and the flanged base 19 of the cylinder wall. The cylinder 17, block 20 and shelf 18 are rigidly united, as by means of screw-bolts 21, 22, which enter the block from the shelf and from the flanged base 19 of the cylinder wall, respectively.

A plunger 23 is mounted within the cylinder 17, and as shown is connected by a pitman 24 with a crank pin 25, formed upon the crank disk 16. The plunger 23 is caused to fit tightly within the cylinder by means of the usual packing rings 26 of spring metal.

Induction and eduction passages, designated 27 and 28, respectively, are provided for the pump in the block 20. Preferably each of such passages leads from the interior of the pump cylinder to a lateral opening, as 29, 30, in the block 20, the wall of the passage 28, as shown, being threaded adjacent the opening 30 for the attachment of suitable connections for leading away the fluid compressed by the pump.

A seat 31 for an inwardly-opening valve 32 is provided in the passage 27. Preferably this valve-seat is formed directly in the wall of the passage without the interposition of bushings heretofore employed, and it is desirably located at the mouth of the passage within the chamber of the pump cylinder for the purpose of reducing the clearance space of the pump. As shown the stem of the valve 32 extends through an aperture 33 in the block 20, in front of the valve-seat 31, and through an opening 34 in the shelf 18 to a point below the shelf, where it is exposed and may be grasped by the hand to rotate the valve on its seat from time to time to assist in the removal of dirt from below the valve, which would otherwise prevent its closing.

As shown a tubular grip-piece 35 incloses the outer end of the valve stem and is secured thereto as by means of a cotter pin 36. This grip-piece conveniently serves to limit the movement of the valve by engaging the block 20 at the mouth 37 of the aperture 33, when the valve is raised. The aperture 33 serves as a guide or bearing for the valve-stem, which slides freely therein, the closing of the valve being effected, as shown, by gravity.

A seat 38 for an outwardly-opening valve is provided in the eduction passage 28. This valve-seat is preferably also formed directly in the wall of the passage without the interposition of a bushing, and is desirably located adjacent the inner end of the passage for the purpose of reducing the clearance space of the pump. A spring-closed valve 39 coöperates with the valve-seat 38. As shown this valve has a socket 40 formed upon its back for receiving a pintle 41, which enters the passage 28 from below the valve and serves as a guide therefor. Preferably the pintle 41 is formed upon the inner end of a screw-plug 42, which normally serves as

a closure for an aperture 43 which leads into the passage 28 from the lower face of the block 20, and through which the valve 39 may be removed when the screw-plug is withdrawn. The head of the screw-plug 42 is made of sufficient length to be conveniently accessible from the under side of the shelf 18, the opening 34 provided in the shelf for receiving the stem of the valve 32 being preferably of sufficient size to also receive this plug and to permit of free access to both. A closing spring 44 reacts between the face of the screw-plug 42 and the under side of the valve 39.

As shown in Figs. 1 and 2 of the drawings, and as so far described, the pump provided by the invention is adapted for the compression of air for any purpose, as for example the inflation of vehicle tires. The device may, however, be readily adapted for use as an exhaust pump. To this end means may be provided for preventing leakage about the stem of the induction valve 32, as shown in Fig. 3 of the drawings. In this form of construction there is preferably no lateral opening for the passage 27, and a nipple 45 enters the passage from below, preferably through the opening 34 provided in the shelf 18. The outer end of this nipple is most conveniently threaded to provide means for attaching connections, not shown, leading from the part to be exhausted. The inner end of the nipple provides a guide, as indicated at 47, for the stem of the valve 32, the end of the nipple about the valve stem being, however, freely perforated, as indicated at 48, to permit of the passage of air from the interior of the nipple to the chamber of the pump cylinder. In this form of construction the movement of the valve 32 is limited by means of a collar 49, mounted upon the lower end of the valve-stem for engaging the inner end of the nipple 45 when the valve is raised.

The lubrication of the pump will be preferably effected through an aperture 50 in the wall of the pump cylinder, and by means of the improved form of construction shown, any excess of lubricant provided will find its way out of the pump cylinder through the passages 27, 28, without interfering with the operation of the valves therein.

As shown, apertures, as 51, are formed in the socket 40 provided upon the back of the valve 39 adjacent its base, to prevent air or oil becoming entrapped in the socket in front of the pintle 41 and thereby interfering with the operation of the valve. By mounting the pump cylinder in the upright position shown, however, lubricant will be unlikely to accumulate upon the valves, as it will flow by gravity down the stem of the valve 32, or the wall of the socket 40 provided upon the back of the valve 39.

Inasmuch as seats for the valves are formed directly upon the walls of the passages 27, 28, provided in the block 20, which also serves as the cylinder head, valves may be employed which are proportionately much larger than if bushings or separate valve casings were employed. The passage of fluid into and out of the pump is, therefore, facilitated and the pump may be operated effectually with but little expenditure of power.

I claim as my invention—

1. In an air pump, in combination, a supporting standard, a crank shaft journaled at the top of the standard, a shelf formed on the side of the standard and integral therewith, a compression cylinder carried by the shelf and removable therefrom, an integral cylinder head and valve chest interposed between the shelf and the cylinder and having a laterally opening eduction passage communicating with the interior of the cylinder, a valve controlling the passage removable from below the shelf, a plunger within the cylinder and connection between the plunger and a crank of the shaft.

2. In an air pump, in combination, a supporting standard, a crank shaft journaled at the top of the standard, a shelf formed on the side of the standard and integral therewith, a compression cylinder carried by the shelf and removable therefrom, an integral cylinder head and valve chest interposed between the shelf and the cylinder and having laterally-opening induction and eduction passages communicating with the interior of the cylinder, a valve controlling each of the passages the stem of the induction valve being exposed below the shelf, a plunger within the cylinder and connection between the plunger and a crank of the shaft.

3. In an air pump in combination, a supporting standard, a crank shaft journaled at the top of the standard, a shelf formed on the side of the standard and integral therewith, a compression cylinder carried by the shelf and removable therefrom, an integral cylinder head and valve chest interposed between the shelf and the cylinder and having laterally-opening induction and eduction passages communicating with the interior of the cylinder, a valve controlling each of the passages, the eduction valve being removable from below the shelf and the stem of the induction valve being exposed below the shelf, a plunger within the cylinder and connection between the plunger and a crank of the shaft.

4. In an air pump, in combination, a supporting standard, a crank shaft journaled at the top of the standard, a shelf projecting laterally from the standard intermediate of its ends, a compression cylinder car-

ried by the shelf and removable from the standard independently of the shelf, an integral cylinder head and valve chest interposed between the shelf and the cylinder and having a laterally-opening eduction passage communicating with the interior of the cylinder, a valve controlling the passage removable from below the shelf, a plunger within the cylinder, and connection between the plunger and a crank of the shaft.

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