

W. A. COOK.
AIR PUMP.
APPLICATION FILED MAR. 25, 1910.

977,274.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.

Fig. 1

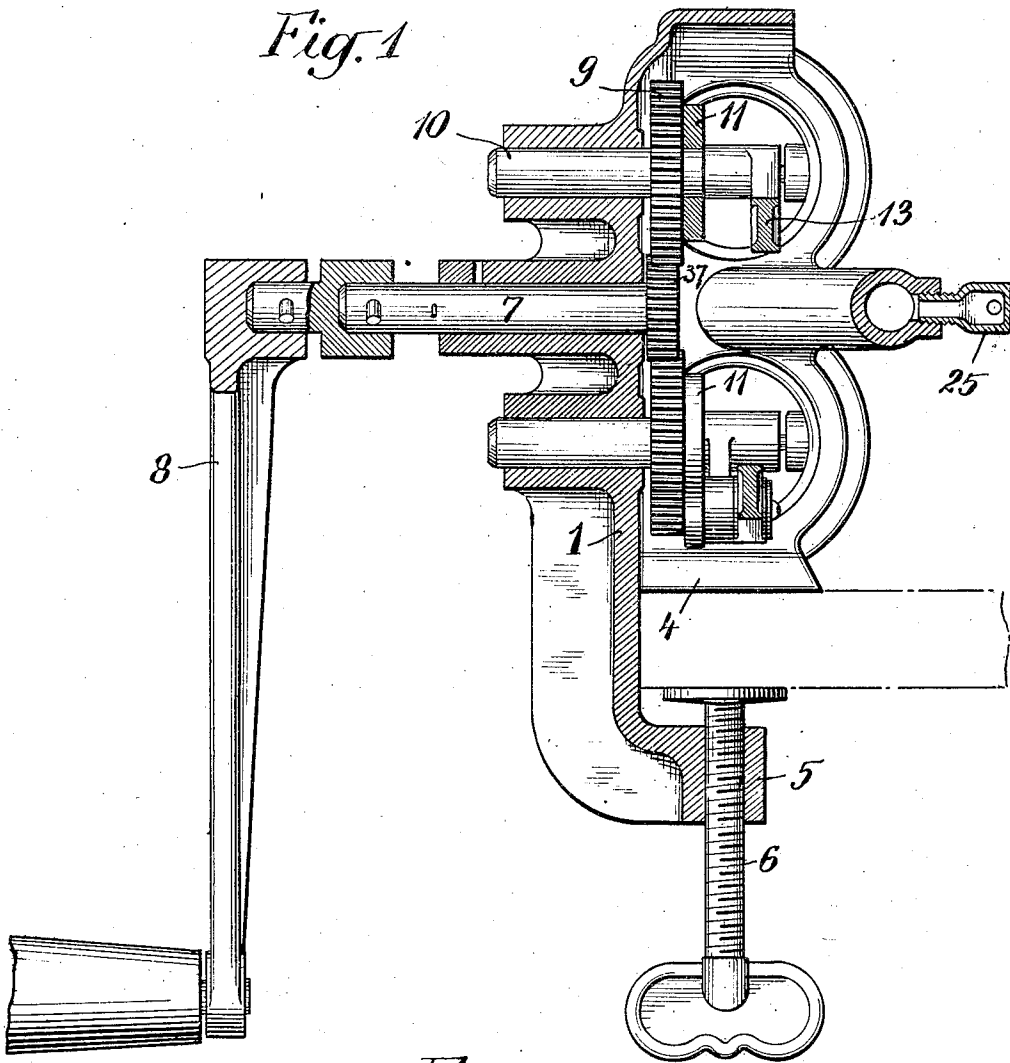
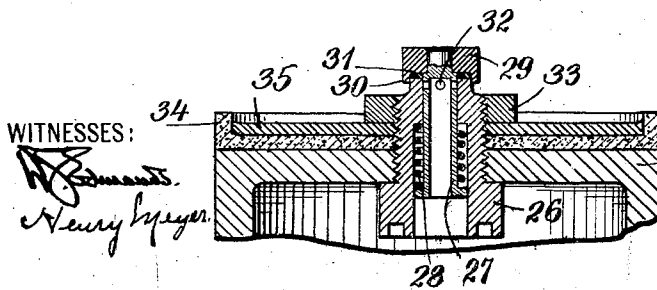


Fig. 5



WITNESSES:

H. Edwards
Henry Byrnes

INVENTOR

William A. Cook

BY

J. P. Edwards

ATTORNEY

W. A. COOK.
AIR PUMP.
APPLICATION FILED MAR. 25, 1910.

977,274.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 2.

Fig. 2,

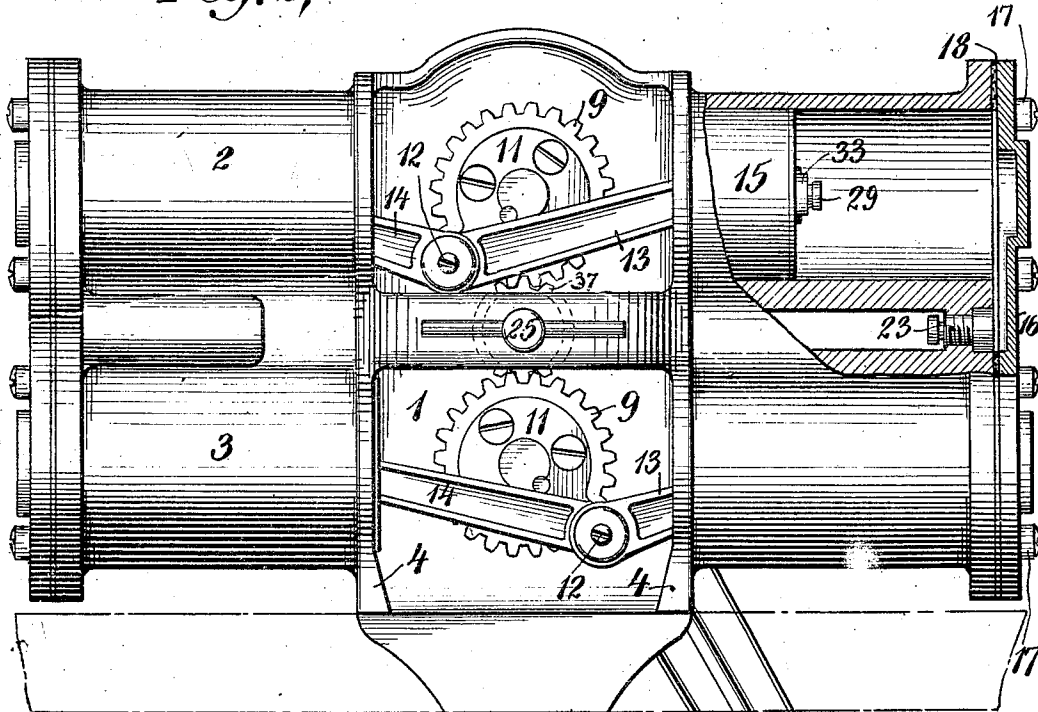


Fig. 3,

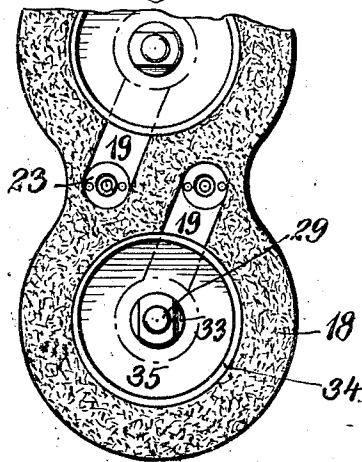
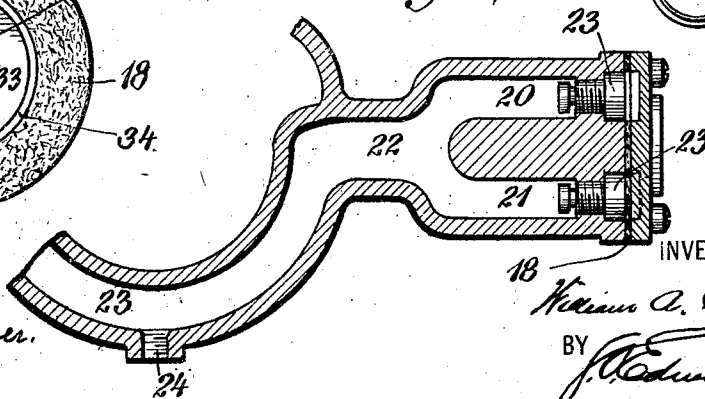


Fig. 4,



WITNESSES:

Henry Meyer.

INVENTOR

William A. Cook

BY

J. H. Edwards

ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM A. COOK, OF NEW YORK, N. Y.

AIR-PUMP.

977,274.

Specification of Letters Patent.

Patented Nov. 29, 1910.

Application filed March 25, 1910. Serial No. 551,427.

To all whom it may concern:

Be it known that I, WILLIAM A. COOK, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification.

This invention is directed to the provision of an improved form of air pump adapted particularly for use on automobiles for inflating the tires thereof.

The object of the invention is to provide an improved form of air pump which is portable and can be readily attached to and detached from a suitable support, as for instance, the step of an automobile, which possesses great strength so that it is well able to withstand rough usage in connection with automobiles, which is simple in construction and can therefore be manufactured at low cost, which is efficient and reliable in operation and in which the air passages are so formed that joints therein which might become loose and leak, are eliminated and that ample protection is provided to guard them against severe blows. These several objects are attained in a pump the frame of which is a single casting consisting of a vertically disposed wall and cylinders integral therewith and on opposite sides thereof, these cylinders being disposed in axial alinement. Any suitable number of pairs of cylinders may be employed though preferably four such cylinders are used, these being arranged two at either side of the vertical wall, and one on each side in axial alinement with one on the opposite side. Pistons reciprocate in these cylinders actuated by a handle journaled centrally with respect to the cylinders in the central vertical plate, and suitable valves admit air to the cylinders for compression and permit the escape of the air when properly compressed. The passages for conveying compressed air from the cylinders to the means for carrying the air to the devices in which it is to be used are formed directly in the casting constituting the frame of the pump so that there are no joints in these passages which might become loose and leak, and the passages are thoroughly protected against severe blows such as a portable, detachable pump to be carried by an automobile would undoubtedly receive. The valves are arranged in these passages for precluding the return of the compressed air to the cylinders

and these valves, as well as the valves controlling the inlet of air to the cylinders, are so constructed that the use of ample lubricating oil in the cylinders will not so affect the parts thereof as to result in incomplete closing thereof. The air-inlet valves are mounted one upon each of the pistons and are automatically opened by suction during the return stroke of the piston.

I have illustrated the preferred embodiment of my invention in the accompanying drawings in which—

Figure 1 is a central vertical section of a pump embodying my invention, Fig. 2 is a side view of the same broken away and sectioned in part, Fig. 3 is an end view of a portion of the pump having the end plate removed therefrom, Fig. 4 is a detail view in horizontal section showing the air passages and Fig. 5 is a sectional detail view through one end of one of the pistons.

Referring to these drawings, the frame of the pump consists of a central vertical wall 1 and cylinders 2 and 3 formed integral with the central wall 1, these cylinders being arranged in pairs, one on either side of the wall 1, and the cylinders of each pair in axial alinement. In the present instance I have shown a four cylinder pump, and this is the form which I prefer to employ, there being two cylinders on each side of plate 1, each in axial alinement with one on the other side. The frame of the pump, therefore, consists of a single casting having all the cylinders formed directly therein, and moreover, the air passages leading from these cylinders are formed directly in this casting. Also, the casting supports the operating mechanism for the pump and is shaped to provide means for detachably securing the pump to a support. Near the bottom of the central plate 1, legs 4 are formed therein, having horizontally disposed bottom surfaces. At one side of these legs the plate 1 is extended downwardly to form an arm 5 in which is a threaded opening to receive a screw-clamp 6 which may be screwed up in this opening in arm 5 to grip a suitable support, as for instance the step of an automobile, between its upper end and the legs 4. At the center of the central wall 1, that wall is formed to provide a bearing for an operating shaft 7 to the outer end of which a detachable handle 8 may be applied. To the inner end of this shaft is secured a pinion 37 meshing with two gears 9 each

carried by a short shaft 10 mounted for rotation in a bearing formed in the central plate 1, one of these shafts 10 being directly above and the other directly below the shaft 7. Secured to each shaft 10 or to the gear 9 thereon is a disk 11 carrying an eccentrically disposed crank-pin 12. Each crank-pin 12 has two connecting rods 13 and 14 pivotally connected thereto, these connecting rods extending in opposite directions from the crank-pin and having their distant ends connected to pistons 15 reciprocating in axially aligned cylinders 2 and 3.

The outer ends of the cylinders 2 and 3 at the outer ends of the pump are closed by a plate 16 secured in position by a plurality of screws 17, a gasket 18 being preferably provided between each plate 16 and the ends of the cylinders. Plate 16 and the gasket 18 have shallow grooves 19 formed therein, as best shown in Fig. 3, each adapted to connect a cylinder with an air passage adapted to carry compressed air from that cylinder. These air passages are formed within the casting constituting the frame of the pump, preferably in the spaces between the two cylinders at each end of the pump. Fig. 4 of the drawings shows a central horizontal section through the center of one end of the pump and it will be seen that two passages 20 and 21 are provided within the casting, these passages being joined at 22. In each passage 20 and 21 is a valve 23 controlling communication between the passage 20 and 21 and the corresponding passage provided by a groove 19 and leading to a cylinder. The construction shown in Fig. 4 is duplicated at the other side of the pump and the two passages 22 at opposite sides of the central wall 1 are connected by a tubular passageway 23 formed by an integral part of the casting constituting the frame of the pump, this tubular passageway 23 in addition to conveying air forming a brace for the frame at the side of the pump opposite that at which the wall 1 lies. It will be seen that the cylinders 2 and 3 are all disposed upon one side of the plane of the central plate 1; the tubular member 23 extends from the cylinders 2 and 3 at one edge of plate 1 to the cylinders at the other edge at the side of those cylinders opposite plate 1; it therefore strengthens the construction very materially. In the tubular passage way 23 is a lateral opening 24 to receive a connecting device 25 preferably provided with two branches, as shown in Fig. 2, for connection to a pressure-gage and to the tire of an automobile.

The air inlet valves are carried by the pistons and are preferably of the same construction as the outlet valves 23 located in the passageways 20 and 21. This construction is shown in Fig. 5, which illustrates in section one end of one of the pistons 15.

The valve consists of a plug 26 threaded so that it may be screwed into position by screwing it into a threaded opening, and this plug has an opening therethrough to receive a tubular member 27 adapted to move back and forth in this opening. A spring 28 bears at one end against a shoulder formed in the opening in plug 26 and at the other end against a shoulder formed upon the tubular member 27 to normally hold member 27 in the position in which it is shown. To the end of tubular member 27 is secured a bonnet 29 having an overhanging circumferential lip 30 which, when the member 27 is in the position shown, closely incloses the end of the plug 26. Between the lip 30 and the body of the tubular member 27 is a washer 31 of rubber or similar suitable material, and immediately below this washer, radial openings 32 are formed in the wall of the tubular member 27. It will be seen that the inlet valve shown in Fig. 5 will be opened in response to the suction within the cylinder against the tension of spring 28, this suction moving tubular member 27 until openings 32 are carried beyond the end of plug 26. Spring 28 will then move member 27 to the position shown in which the washer 31 carried by member 27 engages the end of plug 26, so as to effectually guard against the escape of air from the cylinder through the inlet valve. Furthermore, the lip 31 closely incloses the end of plug 26 and thus prevents contact of the oil, which must be used in the cylinder, with the rubber washer 31, which oil will cause the rubber to deteriorate so that it would soon be rendered useless. In the case of the inlet valve shown in Fig. 5, a nut 33 may be screwed upon the threaded end of plug 26 and may be employed for holding in position a gasket 34 by means of a metallic washer 35.

I have found in practice that a pump thus constructed is reliable and efficient in operation and is of a construction possessing great strength and at the same time its simplicity permits of manufacture at low cost. The pump is well adapted for use in connection with automobiles, since it occupies but little space, can readily be attached to the step for use and detached for storage in the tool box and is of such a rugged construction that there is little danger of its getting out of order, this latter characteristic resulting particularly from the formation of the air passages directly in the casting of the frame of the pump. The strength, ruggedness, simplicity and reliability of the pump are largely due to the employment of the frame construction herein shown, consisting of the central plate carrying the operating mechanism and formed to facilitate attachment of the pump to a support and cylinders formed integral with this cen-

tral plate in axially-alined pairs with the air passages leading therefrom also formed in the casting, each at the side of its respective cylinder.

5 Having now described my invention, what I claim as new and desire to secure by Letters Patent is as follows:—

1. A pump having a frame formed of a single casting and consisting of a central wall and four cylinders integral therewith and located two at either side of said wall and in axial alinement with the two on the other side, attaching means formed on said central wall for removably securing the pump to a support, passages for air formed directly in said casting and each leading from a cylinder, the several passages being joined together within said casting, a shaft journaled in said central wall, a pinion carried thereby, two gears meshing with said pinion and mounted for rotation on said central wall, a crank secured to each gear, pistons in said cylinders, the axially alined pistons being connected to the same crank, and a connection to the single air passage in the casting leading to all said cylinders for carrying air therefrom, substantially as set forth.

2. A pump having a frame formed of a single casting and consisting of a central

wall and four cylinders integral therewith and located on one side of the plane of said wall and two at either of the lateral edges of said wall, the cylinders at one of the lateral edges being in axial alinement with those at the other edge, attaching means formed on said central wall for removably securing the pump to a support, passages for air formed in said casting and each leading from a cylinder, the passages for the cylinders at one edge of said wall being joined to those at the other edge by a single tubular member formed integral with said casting and lying at the side of said cylinders opposite said wall, a shaft journaled in said wall, a pinion carried by said shaft, two gears meshing with said pinion and mounted for rotation on said wall, a crank secured to each gear, pistons in said cylinders, connecting rods connecting each crank to two pistons in axial alinement, and a connection to said tubular member for carrying air therefrom, substantially as set forth.

This specification signed and witnessed this 23rd day of March, 1910.

WM. A. COOK.

Witnesses:

W. C. McCURDY,
HARRY A. LEVINE.