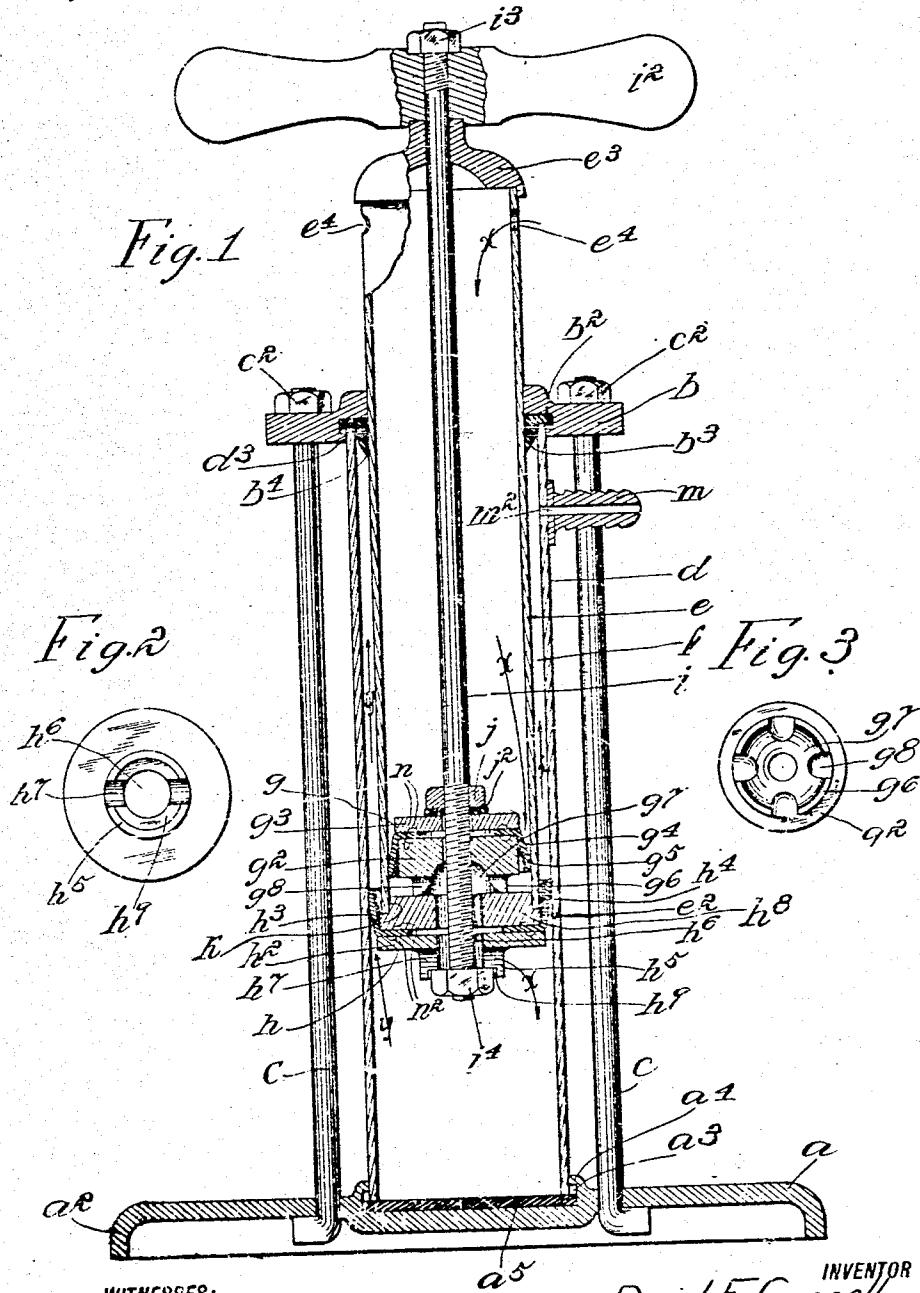


D. F. CORNELL.
AIR PUMP.
APPLICATION FILED MAY 25, 1909.

955,321.

Patented Apr. 19, 1910.



WITNESSES:
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UNITED STATES PATENT OFFICE.

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AIR-PUMP.

955,321.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, DAVID F. CORNELL, a citizen of the United States, and residing at Rochester, in the county of Olmsted and State of Minnesota, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to air pumps, air compressors and like devices; and the object thereof is to provide an improved device of this class which is simple in construction and operation and which may be easily manipulated by hand for the purpose of inflating pneumatic tires, or for compressing air in any suitable receptacle or receiver for any desired purpose, and by means of which any desired pressure of air up to say three hundred pounds may be quickly produced.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a sectional side view of my improved air pump, Fig. 2 a bottom view of one part of a plunger head which I employ, and;—Fig. 3 a similar view of another part of said plunger head.

In the practice of my invention, I provide a strong substantial frame comprising a base plate or member *a* and a top plate or member *b*, said plates or members being connected by vertically arranged rods *c* so as to form a strong substantial frame.

The bottom plate or member *a*, in the form of construction shown, is provided with a depending flange or rim *a*², and the central portion thereof is thickened and provided with a circular chamber *a*³ having an inwardly directed top flange *a*⁴, and placed in the chamber *a*³ is a packing *a*⁵ of rubber or any other suitable material. The central portion of the top plate or member *b* is also thickened and formed therein is a chamber *b*² which opens downwardly and around which is an inwardly directed annular flange or rim *b*³, and placed in the chamber *b*² is a packing gasket *b*³ of rubber or any suitable material having a depending rim portion *b*⁴ the outer walls of which are

tapered outwardly and the inner walls of which are cylindrical in form.

Secured between the top and bottom plates or members *a* and *b* is a tubular casing *d* the top and bottom ends of which enter the chambers *b*² and *a*³ in the top and bottom plates or members *b* and *a* and press on the packings *b*³ and *a*⁵, and the rods *c* of the main frame are provided at their upper ends with nuts *c*² by which the top and bottom plates or members *b* and *a* may be securely drawn together, and this as will be understood, forms a perfectly air tight joint for the upper and lower ends of the tubular casing *d*.

Passing centrally and downwardly through the top plate or member *b* and packing *b*³ is a plunger tube *e* of less diameter than the tubular casing *d* and fitting concentrically therein so as to form an annular space or chamber *f* between said tubular casing and said plunger tube, and the tube *e* forms a plunger the lower end of which is provided with a head *e*² by which it is closed and comprising a top member *g* and bottom member *h*, and the upper end of the tube *e* is closed by a cap *e*³ and provided below said cap with air ports or passages *e*⁴, and passing downwardly and centrally through the cap *e*³ of the tube *e* and through said tube and the head *e*² of the plunger is a rod *i* provided at its upper end with a handle *i*² and nut *i*³, and at its lower end with a nut *i*⁴, and by means of the rod *i* and the nuts *i*³ and *i*⁴ the parts *e*, *e*², *e*³ and *i*² are securely bound together and form a complete plunger, the top portion of which consists of the handle *i*².

The top part *g* of the plunger head *e*² is of smaller transverse dimensions than the bottom part *h* of said plunger head and is also of less dimensions than the tube *e*, and said top part consists of a bottom portion *g*² and a top portion *g*³ between which is placed a flexible valve disk or gasket *g*⁴ having a downwardly directed skirt or valve member *g*⁵ which presses on the inner wall of the tube *e*.

The top part *g* of the plunger head *e*², or the bottom portion *g*² thereof, is provided with a central depending boss *g*⁶ in which is formed a central conical recess *g*⁷ in the side walls of which are radial ports or passages *g*⁸, all as clearly shown in Figs. 1 and 3.

The bottom part h of the plunger head e^2 consists of a top portion h^1 and a bottom portion h^2 , and the said bottom part h of the plunger head e^2 is of less transverse dimensions than the tubular casing d , and placed between the top and bottom portions thereof is a flexible packing gasket h^3 provided with an upwardly directed skirt or valve member h^4 adapted to bear on the inner walls of the tubular casing d .

The bottom portion h^2 of the bottom part h of the plunger head e^2 is provided centrally with a downwardly directed boss h^5 , and said bottom part h of said plunger head e^2 is provided with a large central vertical port or passage h^6 through which the rod i passes, and the boss h^5 is provided with an internal rabbet groove or recess h^9 in which the nut i^1 fits, and the central port or passage h^6 through the bottom part h^2 of the plunger head e^2 is much larger in transverse dimensions than the rod i , and the boss h^5 is provided with side ports or passages h^7 , all as clearly shown in Figs. 1 and 2.

Placed on the rod i above the plunger head e^2 is a nut j between which and the plunger head e^2 or the top part thereof is placed a packing gasket j^2 , and the separate parts of the plunger head e^2 are not connected in any way except by the rod i and the nuts i^1 and j , and the bottom part h of the plunger head e^2 , or the top portion thereof is provided with an annular groove k in which the lower end of the tube e fits. The top of the top portion of the bottom part h of the plunger head is inclosed by the lower end of the tube e and the walls thereof are tapered or conical, and the tube e in assembling the parts is compressed on said conical or tapered walls, and this forms a perfectly tight joint between said tube and the bottom part of the plunger head.

In assembling these parts of my improved pump, the parts of the plunger head e^2 are mounted on the rod i in the order shown in Fig. 1 beginning with the nut j . The rod i is then inserted into the lower end of the tube e , the top plate or member b and the packing b^2 are then placed on the tube e ; or said tube is passed therethrough, and the tube e is inserted into the casing d , after which the parts a and b are connected or the top plate or member b is secured on the rods c , and after this operation the cap e^3 is placed on the tube e and the handle f^2 on the rod i , and by means of the nut i^1 the tube e , the plunger head e^2 thereof and the cap e^3 and handle f^2 will be securely bound together and the device will be ready for use.

The top part of the tubular casing d is provided at one side with a nozzle m with which a flexible hose or similar device may be connected for the purpose of conveying air under pressure to a pneumatic tire to be

inflated or to any other receptacle designed to contain air under pressure for any purpose, and this nozzle m communicates with the annular chamber f at m^2 and at a predetermined point below the top of said chamber.

The operation will be readily understood from the foregoing description when taken in connection with the accompanying drawing and the following statement thereof. In the upward movement of the plunger, the air passes downwardly through the tube e and through the plunger head into a chamber in the lower end of the tubular casing d as indicated by the arrows x . In this operation, the air passes around the flexible valve g^5 inwardly through the ports or passages g^8 and down through the central port or passage h^6 in the bottom portion of the plunger head and out around the nut i^1 through the radial or lateral ports or passages h^7 . In this operation, as will be understood, air is compressed in the annular chamber f by means of the valve h^4 on the bottom part of the plunger head, and this air passes out through the nozzle m . In the downward movement of the plunger, the air in the bottom part of the tubular casing d passes up into the annular chamber f as indicated by the arrows y , and this air under pressure also passes out through the nozzle m , and in this way air under pressure passes out through the nozzle m at both the upward and downward movements of the plunger.

It will be observed that the skirt valve g^5 around the top part of the plunger head has no movement in the tube e but remains in the same position at all times, but yields to permit the air to pass around the bottom thereof in the operation described.

The separate parts of the top portion g of the plunger head are provided in their adjacent faces with annular grooves n , and the separate parts of the bottom portion h of the plunger head are provided in their adjacent faces with annular grooves n^2 , and when the said parts are bound together, the packing disks placed therebetween expand in these grooves and this makes an air tight connection between said parts.

My improved pump is exceedingly simple in construction and operation, and there are no screw threads used in connection with the tube e or casing d , and by simply taking off the top plate or member b all the main parts of the device may be detached or disconnected at once for cleaning and other purposes, and by taking off the nut i^1 the separate parts of the plunger head may be disconnected at once for cleaning or other purposes.

The bottom plate or member a of the head proper is made wider in order that the operator may place his feet thereon so as to firmly hold the pump in the operation thereof.

My invention is not limited to the exact details of construction herein shown and described, and various changes therein and modifications thereof may be made, within
 5 the scope of the appended claims without departing from the spirit of my invention or sacrificing its advantages.

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

1. An air pump comprising a tubular casing and a plunger passing vertically through and movable in the top portion thereof, said plunger comprising a tube provided at its
 15 lower end with a head and at its upper end with a handle, said head and handle being connected by a rod passing therethrough and through said tube, said tube forming in connection with said casing an annular
 20 chamber provided at its upper end with a discharge nozzle, and said head being composed of separate top and bottom portions, the top portion being fitted concentrically in said tube and the bottom portion being fitted
 25 concentrically in said casing, the top portion being less in transverse dimensions than said tube and being provided with a flexible valve and the bottom portion being less in transverse dimensions than said casing and being
 30 provided with a flexible valve, and the parts of said head being also provided with ports or passages which communicate with the bottom portion of said casing.

2. In an air pump or compressor, the combination of top and bottom plates or members connected by vertically arranged rods, said top and bottom plates or members being provided in their adjacent faces with chambers in which are placed packings, and a tubular
 40 casing the ends of which fit in said chambers and bear on said packings, and a plunger device passing downwardly through the top plate or member into said tubular casing, and comprising a tube having air inlets at
 45 the top and a plunger head at the bottom, a rod passing downwardly through said tube and through the plunger head and provided at its upper end with a handle and by means of which the separate parts of the plunger
 50 head are connected, said plunger head consisting of top and bottom parts, one of which is concentric in the lower end of said tube and provided with a downwardly directed skirt valve which fits the walls thereof, and
 55 the other of which is fitted to the lower end of said tube and is provided with a skirt valve directed upwardly and which fits the inner walls of said tubular casing, said plunger head or the separate parts thereof
 60 being provided with ports or passages whereby when the plunger device moves upwardly air will pass downwardly around the top portion of the plunger head and through
 65 ports or passages in the bottom part thereof and through the bottom portion of the

plunger head into a chamber in the lower end of said tubular casing and up around the bottom portion of the plunger head into the annular chamber, and when said plunger device moves downwardly the air in the bottom of the tubular casing will pass upwardly around the bottom portion of the plunger head into said annular chamber.

3. In an air pump, a tubular casing, a plunger movable therein and through the top portion thereof and comprising a tube provided at its lower end with a plunger head and at its upper end with a handle, said tube forming in connection with said casing an annular chamber, and the handle and plunger head being connected by a rod passing vertically therethrough and through said tube, and said tube being also provided at its upper end with air inlets, and the plunger head comprising top and bottom
 85 portions, said top portion being of less diameter than said tube and fitted concentrically therein and the bottom portion being fitted on the lower end of said tube, said top and bottom portions of the plunger head being
 90 composed of separate top and bottom parts, and the top part being provided with a downwardly directed skirt valve which fits in said tube, and the bottom part with an upwardly directed skirt valve which fits in said
 95 casing, and said top and bottom parts of said plunger head being also provided with air ports or passages and being bound together by nuts on said rod.

4. The combination in an air pump of a tubular casing and a plunger passing vertically through and movable in the top portion thereof, said plunger comprising a tube provided at its lower end with a head and at its upper end with a handle, said head and handle being held together by a rod passing vertically therethrough and through said tube, said tube forming in connection with said casing an annular chamber provided near its upper end with a discharge nozzle, and said head being composed of separate top and bottom portions held together by
 110 nuts on said rod, the top portion fitting concentrically in said tube and the bottom portion fitting concentrically in said tubular casing, the top portion being provided with a depending skirt valve, and said bottom portion with an upwardly directed skirt valve, and the parts of the plunger head being also provided with ports or passages
 120 which communicate with the bottom portion of said tubular casing.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this
 21st day of May 1909.

DAVID F. CORNELL.

Witnesses:

GEO. W. GRANGER,
 J. M. HANSON.