Jan. 9, 1923.

1,441,829.

C. D. BRANDT.

AIR PUMP.

FILED APR. 15, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

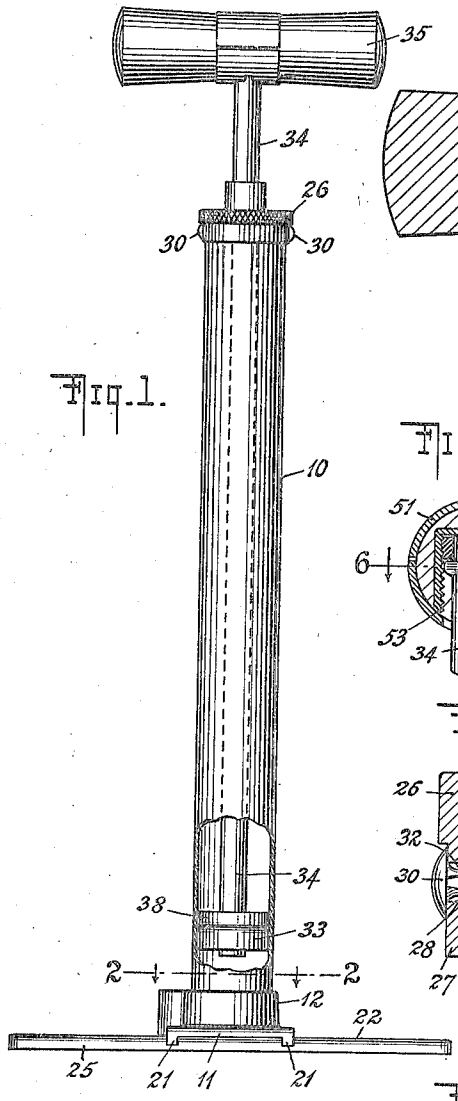


Fig. 3.

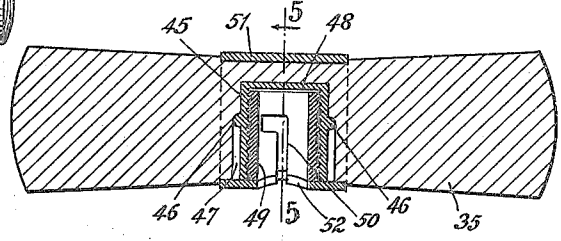


Fig. 4.

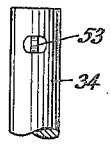


Fig. 5.

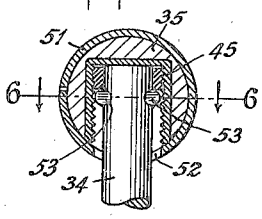


Fig. 6.

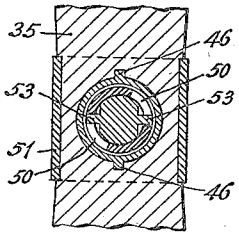


Fig. 7.

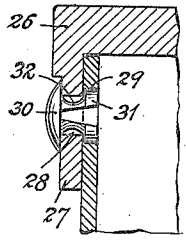


Fig. 8.

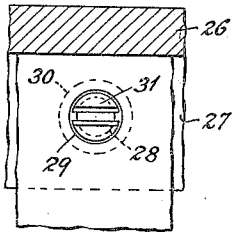
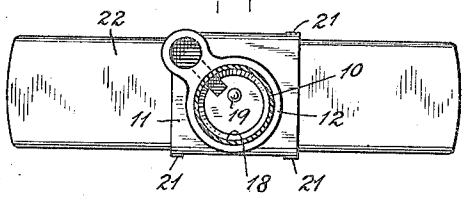


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 9.

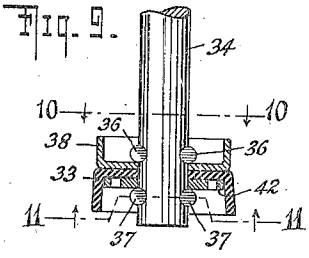


Fig. 10.

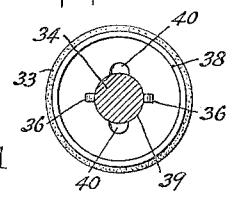


Fig. 11.

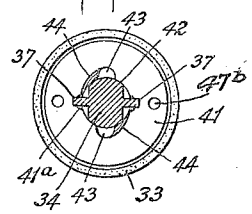


Fig. 12.

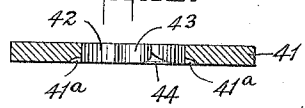


Fig. 13.

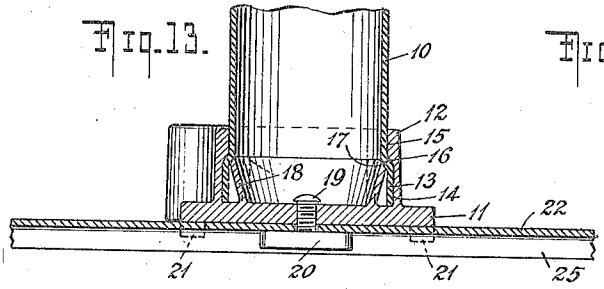


Fig. 14.

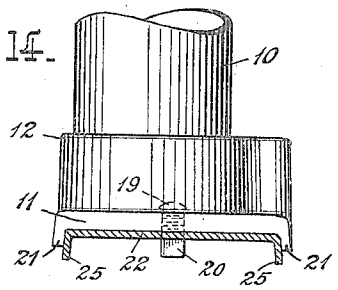


Fig. 15.

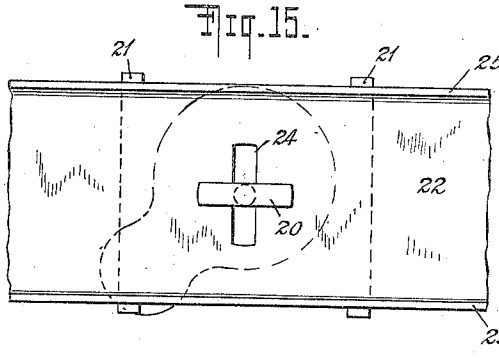


Fig. 16.

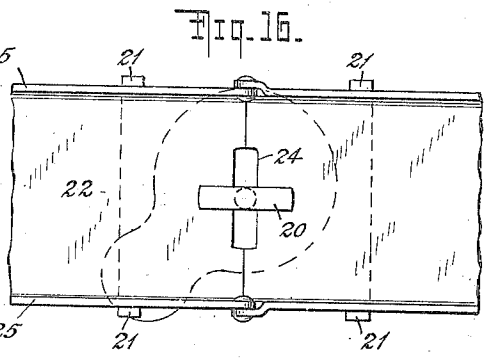
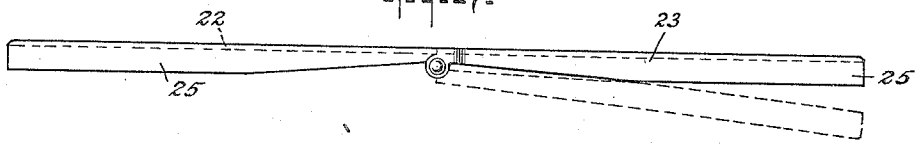


Fig. 17.



WITNESSES

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Patented Jan. 9, 1923. 1,441,829

UNITED STATES PATENT OFFICE.

CHARLES D. BRANDT, OF NEW YORK, N. Y.

AIR PUMP.

Application filed April 15, 1920. Serial No. 374,097.

To all whom it may concern:

Be it known that I, CHARLES D. BRANDT, a citizen of the United States, and resident of Richmond Hill, borough and county of Queens, city and State of New York, have invented certain new and useful Improvements in Air Pumps, of which the following is a specification.

My invention relates to air pumps and more particularly to that type thereof which is manually operated and is used primarily for inflating pneumatic tires. The object of my invention is to provide a novel construction whereby the general serviceability and efficiency of the pump is increased and whereby its cost of production and maintenance is reduced to a minimum. My invention will be fully described hereinafter and the features of novelty will be pointed out in the appended claims.

In the accompanying drawings, which show an example of my invention without defining its limits, Fig. 1 is an elevation of a pump embodying my invention; Fig. 2 is a cross section thereof on the line 2—2 of Fig. 1; Fig. 3 is a detail sectional view of the handle construction; Fig. 4 is a detail view of the piston rod; Fig. 5 is a section on the line 5—5 of Fig. 3; Fig. 6 is a similar view on the line 6—6 of Fig. 5; Figs. 7 and 8 are detail sections illustrating the cap fastening; Fig. 9 is a sectional elevation of the plunger; Figs. 10 and 11 are sectional views on the lines 10—10 and 11—11 respectively of Fig. 9; Fig. 12 is a detail section of the locking washer; and Figs. 13, 14, 15, 16 and 17 are detail views illustrating the stirrup construction.

As shown in the illustrated example the pump comprises the customary cylinder or barrel 10 of any suitable length and diameter and the base 11 to which one end of said cylinder is attached. The means whereby the cylinder and base are connected represents one of the novel features of the invention. By reference to Fig. 13 it will be seen that the one end of the cylinder 10 projects into a tubular neck 12 of the base 11 and is formed with an enlargement 13 which fits within a complemental recess 14 comprising a continuation of the axial bore 15 of said neck 12. With this arrangement co-operating shoulders 16 and 17 are provided respectively in the neck 12 and on the cylinder 10 and by engagement which each other prevent a separation of the cylinder and base in an axial direction. In order to positively lock said cylinder and base together against relative rotation or other relative movement, the base is formed with an internal annular flange 18 which flares outwardly and engages the cylinder 10 beneath the shoulder 17 as shown in Fig. 13.

The base 11 with its tubular neck 12, bore 15, continuing recess 14 and internal annular flange 18 which in its initial condition occupies an upright position as shown by dotted lines in Fig. 13, may be produced in any convenient manner as by casting, it being understood that the diameter of the bore 15 is such as to snugly fit about the cylinder 10 when the latter is connected with the base 11.

The cylinder 10 in its original condition may be of approximately even diameter throughout and is combined with the base 11 by inserting its one end into the bore 15 until it engages the end face thereof. In this position the cylinder 10 projects between the recess 14 and the flange 18; by means of suitable mechanism this end of the cylinder 10 is expanded until the shoulder 17 is forced into firm surface engagement with the shoulder 16. After this has been done the flange 18 is expanded, by means of a suitable tool, until its periphery is located beneath the shoulder 17 and in firm, rigid engagement therewith, it being understood that the parts are proportioned and located so as to secure this result.

With this arrangement, which is very simple and economical to produce, the cylinder 10 and base 11 are rigidly and securely fastened together against relative movement in all directions including rotation.

The invention includes further a novel means whereby the stirrup may be conveniently connected with the base so as to be readily detached therefrom.

In the illustrated example which has been chosen for descriptive purposes, this means comprises a locking member 19 which is rotatably mounted upon the base 11 and extends therefrom as shown in Fig. 13 and which is formed with a preferably elongated head 20. The base 11 is further formed with lugs 21 located in spaced pairs at the corners of the base if the latter is of rectangular form and being correspondingly arranged if the base is of other configuration. The stirrup may comprise a rigid metallic member 22 as shown in Figs. 13 and 15 or it may

comprise members 23 hinged together as shown in Figs. 16 and 17. In the latter case, which constitutes a folding stirrup, the hinge thereof is located within the confines of the base 11 when connected therewith; the purpose of this will appear more fully hereinafter.

In any case the members 22 and 23 are provided with preferably elongated slots 24 having a width and length to permit the passage therethrough of the head 20 when the latter is in registry with said slots and to prevent its withdrawal when said head is turned through an arc of 45° so as to extend transversely across said slots. The stirrup in the forms illustrated includes depending longitudinal flanges 25 which engage the lugs 21 and prevent rotation of the stirrup relatively to the base about the major axis of the pump; it will be understood that these flanges 25 are not absolutely necessary and that the width of the stirrup is always such that it fits nicely between the lugs 21.

To connect the stirrup with the base, the head 20 of the locking member 19 is passed through the slot 24 and then turned through an arc of forty-five degrees so as to extend transversely to the slot. The parts are so arranged and proportioned that the head 20, when turned as described, will bear against the stirrup and thus by pressing it against the base rigidly secure it in position; the lugs 21 prevent rotation of the stirrup about the axis of the pump. To detach the stirrup it is simply necessary to turn the head 20 until it registers with the slot 24 whereupon the stirrup may be readily removed. With the arrangement described the pump and stirrup may be easily disconnected to facilitate carrying in a tool receptacle and may be quickly connected when the pump is desired for use. If the hinged stirrup is used it is connected and disconnected in the same way as described but preferably occupies a position at right angles to that of the solid stirrup when connected with said base. In this form the members 23 may be folded up when the stirrup is detached from the base 11 if for any reason this is desired. By having the hinge located within the confines of the base 11 the latter forms a stop whereby pivotal movement on the hinge is prevented when the pump piston is actuated, particularly in an upward direction.

At the end opposite to that at which the base 11 is located the cylinder 10 is provided with the customary cap 26 having the usual axial opening for the passage of the piston rod. In the present instance this cap instead of being screw-threaded upon the cylinder 10 as is usually the case is connected therewith in a novel manner. As shown in the illustrated example the cap 26 is formed with an annular flange 27 which fits over the cylinder 10 and is provided with one or more apertures 28, two located at diametrically opposite points being preferred. These apertures are arranged to register with similar apertures 29 formed at appropriate points in the cylinder 10 and accommodate fastening devices in the form of studs having heads 30 and shanks 31 split in a lengthwise direction and provided with notches 32; the members comprising the split shank 31 are resilient and normally tend to spread apart as shown in Fig. 7. The studs are inserted into the apertures 28 and 29 by pressing the shank members together; said members spreading apart because of their inherent resiliency as soon as the notches 32 register with the flange 27 and thus preventing said studs from being unintentionally withdrawn from said apertures. It will be understood that the shanks 31 are of such length as not to project inwardly beyond the inner surface of the cylinder 10 and that the notches 32 are located so as to snap over the peripheral surface of the apertures 28 when the heads 30 are in engagement with the outer surface of the flange 27. With this arrangement the cap 26 is positively locked upon the cylinder 10 against unintentional removal in a simple and efficient manner; to remove the cap the members of the shanks 31 are brought together against their resiliency, for instance, by exerting an outward pull upon the heads 30 sufficient to disconnect the notches 32 from the flange 27.

In addition to the parts so far described the pump includes the customary packing cup or the like 33 carried by the stem or piston rod 34 which projects through the cap 26 and at its outer end is provided with an operating handle 35. In the present invention both the packing cup or the like 33 and handle 35 are connected with the piston rod 34 in a novel and efficient manner.

As shown in the drawings the piston rod or stem 34 is provided with projections 36 and 37 which are located in co-operating pairs spaced from each other in the direction of the axis of said stem 34 as shown in Fig. 9. In the preferred form these projections 36 and 37 comprise integral parts of the stem formed by upsetting the metal thereof by means of a suitable tool. The arrangement includes further a metallic dished member 38 having a central opening 39 and recesses 40 located preferably at diametrically opposite points of said opening for the accommodation of said projections 37. In assembling the parts this member 38 is placed upon the stem 34 in proper position with the recesses 40 in registry with the projections 37 and moved lengthwise of said stem: as soon as said member 38 passes beyond said projections 37 it may be given a quarter turn to bring the recesses 40 out of registry with the projections 36. The lengthwise movement is then continued until said member finally

rests upon said projections 36 as shown in Fig. 9. The packing cup or the like 33 which comprises a cup shaped member of leather or similar material having an axial opening is next placed upon the stem 34 in proper position and forced beyond the projections 37 into engagement with the member 38. The device whereby the member 38 and packing cup or the like 33 are locked in position comprises a metal washer 41 having an axial opening 42 and diametrically opposite recesses 43 and being provided with sloping portions 44 which extend from the recesses 43 along the periphery of the axial opening 42. This washer 41 is placed upon the stem 34 by passing the recesses 43 over the projections 37 and is moved into engagement with the bottom of the plunger 33 so as to lie within the same as shown in Fig. 9. In this position the lower ends of the sloping portions 44 lie slightly below the projections 37 so that, when the washer 41 is given a quarter turn said projections ride along said sloping portions and come to rest upon the surface of said washer. As this happens a wedging action is exerted upon the projections 37 which securely clamps the packing cup or the like 33 between the member 38 and the washer 41 and firmly fixes all three elements between the projections 36 and 37; in this way the packing cup or the like 33 is fastened securely upon the stem 34 without screw-threading any of the parts in the customary manner and without requiring the use of any screws or other extraneous fastening devices.

Any suitable means may be provided for preventing unintentional rotation of the washer 41 whereby its efficiency as a locking medium might be interfered with. For instance, the washer 41 may be provided with depressions 41[a] located preferably at diametrically opposite points between the recesses 43 and arranged to receive the projections 37 when the washer has been turned to its locking position. If desired the depressions may be duplicated upon both faces of the washer 41 to receive both pairs of projections 37 and 36 although one set of depressions will generally be found sufficient for the intended purpose. In any case the co-operation of the depressions and the projections will prevent unintentional rotation of said washer 41 from its locking position. Recesses 41[b] may be provided for the accommodation of a suitable tool for facilitating the manipulation of said washer.

In the illustrated example the handle 35 which may be constructed of wood or other suitable material and of conventional size and shape is provided with a transverse opening into which a metal socket member 45 is fitted and held by friction and by means of projections 46 which extend into grooves 47 formed in said handle and also prevent rotation of the latter relatively to said socket member 45. The latter is constructed with an end wall 48 and is internally screw-threaded for the reception of an externally screw-threaded tubular bushing 49 provided at diametrically opposite points with bayonet slots 50 which are open at one end as shown in Fig. 3. A sleeve 51 is fitted upon the handle 35 and, by concealing the member 45, grooves 47 and bushing 49 serves to give a finish to the construction, said sleeve 50 having an opening 52 of substantially the same diameter as and in registry with the bore of the bushing 49 as illustrated in Fig. 3. The stem 34 is provided with lugs 53 located preferably at diametrically opposite points and preferably formed by upsetting the metal of which the stem is constructed.

To connect the handle with the stem the latter is inserted through the opening 51 and projected into the bushing 49 with the lugs 53 in registry with and moving lengthwise of the slots 50 until the end face of the stem 34 contacts with the end wall 48. The stem and handle are then rotated relatively to each other in a direction to move the lugs 53 into the transverse portions of said bayonet slots 50. The parts are so proportioned that as this occurs, the lugs 53 will bear against the lower walls of the transverse portions of the bayonet slots 50 and will force the end face of the stem 34 against the end wall 48 under pressure so that a wedging action is exerted between said lower walls of the slots 50 and the end wall 48 of the socket member 45. In this way not only the handle itself is firmly locked upon the stem 34 but the bushing 49, in addition, is securely fixed in the member 45 against relative rotation and unintentional displacement. The handle may be readily detached by a reverse movement to bring the lugs from the transverse portions of the slots 50 into the longitudinal portions thereof; in this position of the parts the stem may be readily withdrawn from the bushing and thus separated from the handle.

The pump with the novel features herein enumerated and described represents an organization of maximum efficiency and simplicity in which all parts may be economically produced and assembled. The disassembling of the pumps may also be accomplished without appreciable effort whereby the packing of the pump in a tool kit or otherwise is facilitated.

Various changes in the specific form shown and described may be made within the scope of the claims without departing from the spirit of my invention.

I claim:

1. The combination of an end member, a tubular member extending into the same, co-operating shoulders on said members whereby a separation thereof in an axial direction

is prevented and means comprising an integral portion of said end member whereby an internal pressure is exerted upon said shoulders to clamp them together.

2. In an air pump, the combination of a base, a neck projecting from said base and provided with an axial bore, an annular shoulder forming a continuation of said bore, a pump cylinder fitted within said bore, an annular shoulder forming a continuation of said cylinder and fitted against the annular shoulder of said neck and an annular flange comprising an integral part of said base and extending beneath and in engagement with the annular shoulder of said cylinder to clamp same against the shoulder of said neck.

3. In an air pump, the combination of a base, a pump cylinder carried thereby, a stirrup member comprising two sections hinged together and provided with a slot in registry with the hinged connection, said stirrup member extending transversely beneath and beyond said base and a locking member rotatably mounted on said base and arranged to project through and transversely across said slot to detachably lock said stirrup member on said base.

4. In an air pump, the combination of a base, a pump cylinder carried thereby, a stirrup member provided with a slot and extending transversely beneath and beyond said base and a locking member rotatably mounted on said base and arranged to project through and transversely across said slot to detachably lock said stirrup member on said base.

5. In an air pump, the combination of a base, depending flanges extending along opposite edges thereof, a pump cylinder carried by said base, a stirrup member located beneath said base and between the flanges thereof, said stirrup member being provided with an elongated slot, a locking member rotatably mounted on said base and an elongated head arranged to pass through said slot and transversely across the same in surface engagement with said stirrup member to detachably lock same upon said base.

In testimony whereof I have hereunto set my hand.

CHARLES D. BRANDT.