June 26, 1928. 1,675,238

W. C. WALKER

PISTON RESIZER

Filed Nov. 9, 1926

Fig. 1

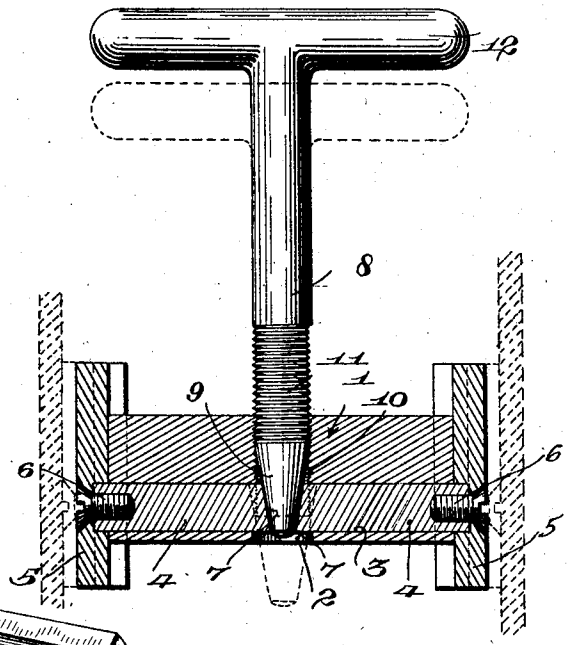
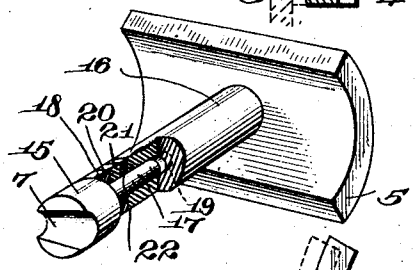


Fig 3



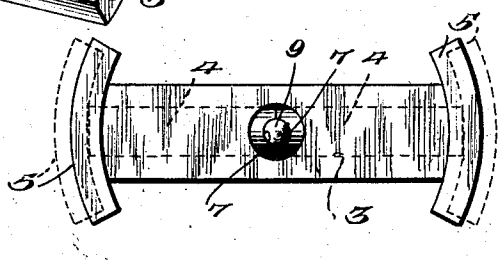
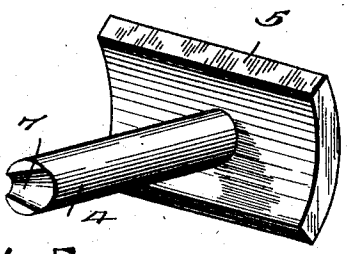


Fig. 2

Fig 4.



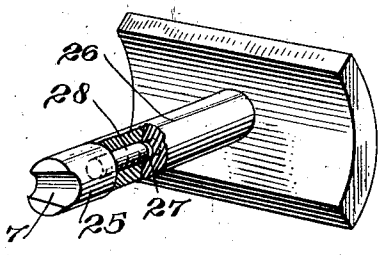


Fig. 5

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UNITED STATES PATENT OFFICE.

WILLIAM CLARENCE WALKER, OF TULSA, OKLAHOMA.

PISTON RESIZER.

Application filed November 9, 1926. Serial No. 147,367

My invention relates to devices for resizing pistons of the split skirt type of construction beyond their original sizes, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of the invention is the provision of a resizer which can be conveniently and easily operated to resize a piston of the type referred to as desired within a considerable range of expansion.

A further object of the invention is the provision of a piston resizer that is simple in construction, reliable in use, not likely to get out of order easily and thoroughly practical commercially.

A still further object of the invention is the provision of a novel method of treating an expanded piston to assure accuracy of size of the piston when it has set to a predetermined extent.

Other objects and advantages of the invention will be apparent from the following description, considered in conjunction with the accompanying drawings, forming a part of this application, in which:—

Figure 1 is a view of the improved piston resizer partly in side elevation and partly in vertical section, showing the contracted position of the device in full lines and showing in dotted lines an expanded position of the device,

Figure 2 is a bottom plan view of the structure exhibited in Figure 1, the full lines indicating the contracted position of the device and the dotted lines indicating an expanded position of the device,

Figure 3 is a perspective view of one form of resizer arm and head which may be used in the improved resizer,

Figures 4 and 5 are perspective views of modified forms of resizer arms and heads which may be used in the improved resizer, portions of the modified forms of the resizer arms being broken away and other portions being shown in section.

Referring now to the drawings, it will be observed that the improved resizer has a body 1 which may be formed of any suitable metal, such as steel, and may be of block form as shown. The body 1 is adapted to be disposed transversely in the bore of the hollow body of a conventional piston (not shown) and the body 1 is provided with a transverse bore 2, the center line of which preferably is coincident with the transverse median line of the body 1. The body 1 also is formed with a longitudinal bore 3 which intersects the bore 2 and which may extend longitudinally of the body 1 nearer to one face of the body than to the opposite face of the body as clearly shown in Figure 1. The opposite end portions of the bore 3 constitute guide passages for longitudinally slidable arms 4 which are of sufficient length to abut each other in the bore 2 when the outer ends of the resizer arms 4 are substantially flush with the end walls of the body 1 as shown in Figure 2. Resizer heads 5, each of which preferably is a segment of a cylinder and has its outer face curved convexly in one plane to conform to the curvature of the inner wall of a piston with which the device is to be used, are secured to the outer ends of the arms 4 by screws 6. The screws 6 have their heads countersunk in the outer faces of the resizer heads 5. When the inner faces of the resizer heads 5 are concavely curved to be parallel with the outer faces of the resizer heads as shown in the drawings, the end walls of the body 1 preferably will be convexly curved also to conform to the curvature of the inner faces of the resizer heads.

The inner ends of the arms 4 have transversely extending grooves 7, each of said grooves decreasing in width and depth regularly from one end of the groove to its opposite end.

An expanding needle 8 has a tapering end portion 9, the taper of which conforms to the taper of the grooves 7. The wall of the bore 2 is provided with screw threads at 10 which extend through the relatively thick portion of the body 1 from one side of the bore 3 to the remote face of the body 1 and which are adapted for engagement with screw threads 11. The screw threads 11 are formed on the expanding needle 8 at the inner end of the tapering portion 9 of the expanding needle. The outer end of the expanding needle is provided with a cross handle member 12.

The resizer arms are secured to the resizer heads 5 so that the larger ends of the grooves 7 will be next to the extremity of the tapering portion 9 of the expanding needle and will partially receive the tapering end portion 9 of the expanding needle when the resizer arms are in their retracted positions as shown by the full lines in Figure 1. The device then is in its contracted position and may be inserted to a desirable

position in a piston that is to be expanded. The expanding needle 8 then is screwed into the body 1 to advance the tapering portion 9 between the grooves 7 from the position shown by the full lines in Figure 1 toward the dotted line position of Figure 1. It is obvious that the contact of the tapering end portion 9 of the expanding needle with the tapering walls of the grooves 7 will bias the resizer arms outward in the guide passages and that the resizer heads will be urged against the wall of the piston to effect expansion of the piston body as desired. The initial expansion of the piston by means of the device should be approximately three times the permanent expansion that is desired. That is, if the piston body is to be expanded 1/5000th of an inch permanently, the expansion needle 8 should be screwed into the body until the piston body has been expanded 3/5000″. Cylinder oil then is sprayed onto the piston and the piston then is held in proximity to the flame from a torch, the piston being turned slowly and regularly until all portions of the piston body have been subjected to the action of heat from the torch flame and until the cylinder oil on the piston has dried. The piston with the resizer therein is taken away from the flame and is dipped into a cold solution of water and salt. The piston and the resizer are left in the cooling solution until they have cooled, after which they are removed and the resizer is permitted to contract by manipulating the expanding needle 8 as required to permit the resizer arms 4 to move inward in the guide passages of the resizer body and when the piston body has set, the desired degree of expansion will have been obtained.

Each of the resizer arms of the device may be a one-piece rod-like member as shown in Figures 1 to 3 inclusive or may be a longitudinally extensible and contractile member as shown in each of Figures 3 and 4. The form of resizer arms shown in Figure 3 comprises an inner end section 15 which has the groove 7 formed in its inner end face, and an outer end section 16 that is secured to the associated resizer head 5. The section 15 includes a reduced axial extension 17 at the outer end of the section 15 and a shoulder 18 thus is produced at the juncture of the section 15 and its extension 17. The extension 17 is adapted to fit slidably, although rather tightly, in an axial socket 19 in the adjacent end portion of the section 16. One or more spacer washers may be disposed on the extension 17 between the shoulder 18 and the adjacent end of the section 16 and the effective length of the expander arm shown in Figure 3 may be varied by varying the number or the size of the spacing washers that are placed on the extension 17 at a given time. For example, I show in Figure 3 these washers respectively indicated at 20, 21 and 22. The thicknesses of these washers vary and are known, the thickness of the washer 22 being one-half the thickness of the washer 21 and the washer 21 in turn being one-half the thickness of the washer 20. The effective length of the resizer arm shown in Figure 3 thus may be varied accurately and within a considerable range of adjustment by selection of the proper spacing washer or washers for a desirable adjustment or adjustments.

The form of resizer arm shown in Figure 4 has the inner end section 25 and an outer end section 26, the section 25 having a groove 7 in its inner end and the section 26 being secured to the associated resizer head 5. The section 26 has an axial socket 27 in its inner end and the section 25 is provided with an axial extension 28 which is in threaded engagement with the wall of the socket 27, whereby the sections 25 and 26 can be turned relatively to each other to vary the effective length of the resizer arms within a considerable range as desired.

Obviously, the invention is susceptible of embodiment in forms other than those which are illustrated in the accompanying drawings and I therefore consider as my own all such modifications and adaptations thereof as fairly fall within the scope of the appended claims.

I claim:—

1. A piston resizer comprising a body having a longitudinal bore and a transverse bore intersecting each other intermediate the ends of said body, said body being adapted to be disposed transversely within the bore of a piston that is to be resized, a pair of movable resizer members having heads at the ends of said body and having arms extending slidably in the end portions of said longitudinal bore of the body, said arms projecting into said transverse bore of the body when the arms are in their retracted positions, and an expanding needle adjustably engaged with the wall of the transverse bore of the body and having an end portion extending between the inner ends of said resizer arms for urging said resizer arms outward when said expanding needle is turned in one direction while in engagement with the wall of the transverse bore of the body.

2. A piston resizer comprising a body having a longitudinal bore and a transverse bore intersecting each other, said body being adapted to be disposed transversely within the bore of a piston that is to be resized, movable resizer members having head portions at the ends of said body and having arms extending through the end portions of the longitudinal bore of the body into the transverse bore of the body, an expanding needle having a portion in threaded en-

gagement with the wall of the transverse bore of the body and having a tapering end portion extending between the inner ends of said resizer arms, said resizer arms having tapering transverse grooves in their inner ends for engaging with the tapering end portion of said expanding needle.

3. A piston resizer comprising a body having a longitudinal bore and a transverse bore intersecting each other, said body being adapted to be disposed transversely within the bore of a piston that is to be resized, movable resizer members having head portions at the ends of said body and having arms extending through the end portions of the longitudinal bore of the body into the transverse bore of the body, an expanding needle having a portion in threaded engagement with the wall of the transverse bore of the body and having a tapering end portion extending between the inner ends of said resizer arms, said resizer arms having tapering transverse grooves in their inner ends for engaging with the tapering end portion of said expanding needle, said grooves in the inner ends of said expansion arms decreasing in width and depth in conformity with the taper of the end portion of said expanding needle.

4. A piston resizer comprising a body having a longitudinal bore and a transverse bore intersecting each other, said body being adapted to be disposed transversely within the bore of a piston that is to be resized, movable resizer members having head portions at the ends of said body and having arms extending through the end portions of the longitudinal bore of the body into the transverse bore of the body, an expanding needle having a portion in threaded engagement with the wall of the transverse bore of the body and having a tapering end portion extending between the inner ends of said resizer arms, said expansion heads having their outer faces curved convexly to conform to the curvature of the inner wall of the cylinder that is to be expanded, the inner faces of said expansion heads and the outer end faces of said body being complementarily curved.

5. A piston resizer comprising a body having a bore, resizer members comprising heads at the opposite ends of said bore and arms slidable in the opposite end portions of said bore, means adjustably engageable with the body for urging said resizer arms outward in the end portions of said bore equally when the arms are at the limits of their inward movements in the end portions of said bore, each of said arms being longitudinally extensible and contractile.

6. A piston resizer comprising a body having a bore, resizer members comprising heads at the opposite ends of said bore and arms slidable in the opposite end portions of said bore, means adjustably engageable with the body for urging said resizer arms outward in the end portions of said bore equally when the arms are at the limits of their inward movements in the end portions of said bore, each of said arms comprising a pair of aligned sections, one of said sections having an axial socket in its inner end and the other section having an axial extension at its outer end fitting slidably in said socket, and a plurality of spacing washers of different sizes adapted to be used selectively or at the same time on said axial extensions of one of the sections of said resizer arm and between said sections of said resizer arm.

7. A piston resizer comprising a body having a bore, resizer members comprising heads at the opposite ends of said bore and arms slidable in the opposite end portions of said bore, means adjustably engageable with the body for urging said resizer arms outward in the end portions of said bore equally when the arms are at the limits of their inward movements in the end portions of said bore, each of said arms comprising a pair of aligned sections, one of said sections having an axial socket in its inner end and the other section having an axial extension at its outer end fitting slidably in said socket, and a plurality of spacing washers of different sizes adapted to be used selectively or at the same time on said axial extension of one of the sections of said resizer arm and between said sections of said resizer arm, the wall of said axial socket and said axial extension having co-operating screw threads.

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