H. GLASER.

PISTON.

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1,417,514. Patented May 30, 1922.

Fig. 2

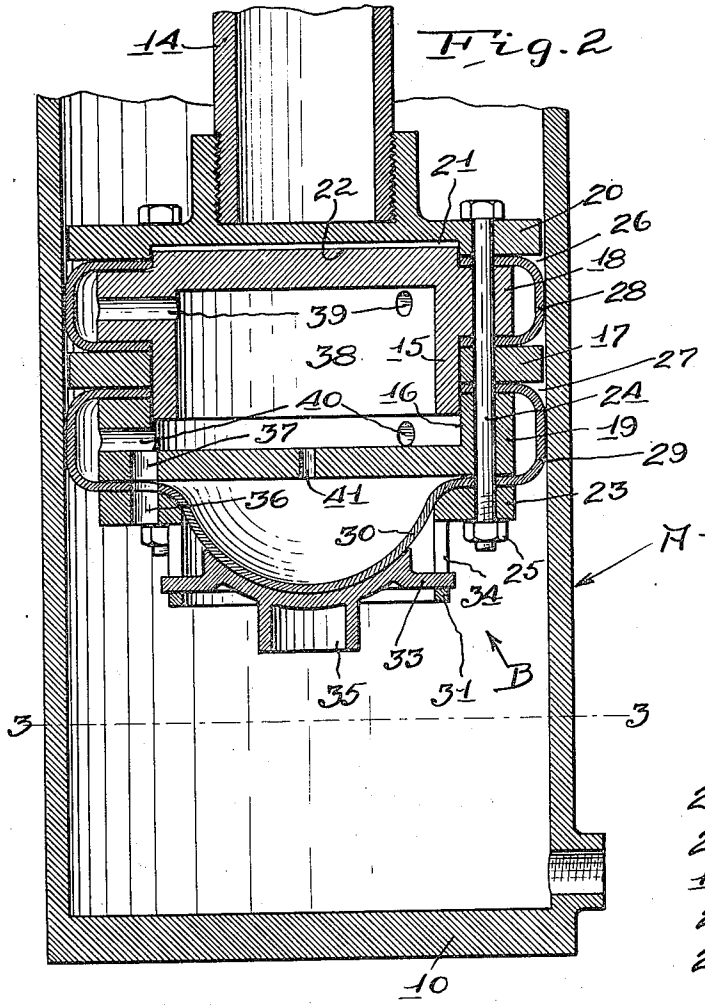


Fig. 1

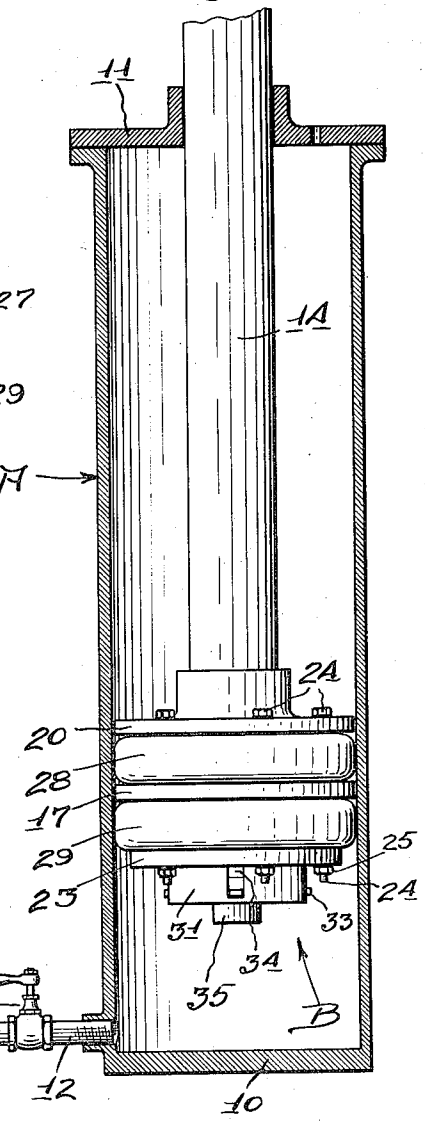
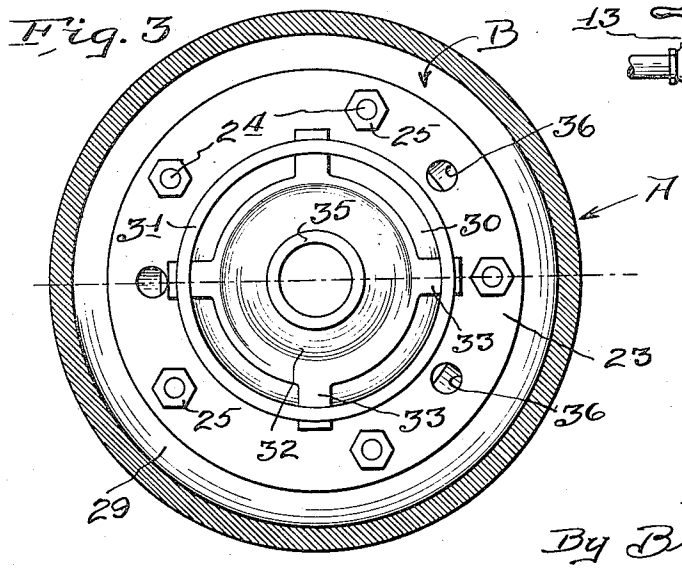


Fig. 3



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PISTON.

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Application filed April 30, 1921. Serial No. 465,654.

To all whom it may concern:

Be it known that I, HUGO GLASER, a citizen of the United States, residing in St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improvement in Pistons, of which the following is a specification.

My invention relates to improvements in pistons.

Its object is to provide a pressure tight piston for use in the cylinders of structures employed particularly, though not exclusively, for hoisting purposes.

A further object is to provide a durable piston adapted to be propelled in a cylinder by the pressure of air or other operating fluid, said piston being supplied with packing rings adapted to be inflated or expanded against the cylinder walls by pressure of the operating fluid.

Another object is to supply a composite piston, including members telescopically joined to form a unitary structure, resilient bands gripped at their margins between said members and forming circumferentially expanding rings, the interior of said rings communicating with the interior of the cylinder through the body of the piston, and adapted to be pressed against the cylinder wall by the piston actuating medium.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings, Fig. 1 illustrates an embodiment of my invention. This view shows a cylinder and a piston therein, the former being in section and the latter in elevation: Fig. 2 is a similar view in detail, the piston as well as the cylinder being illustrated in section, and Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

Referring to the drawings, I have used the reference letter A to indicate a cylinder and B to designate the piston therein. The cylinder A may have ends 10 and 11, and a conduit 12 to direct a propelling medium into the cylinder. This conduit may also serve as an outlet for said medium and may be fitted with a valve 13 of ordinary construction for closing the conduit, directing the propelling medium into the cylinder or permitting the escape of said medium from the cylinder. The piston B may have a plunger rod 14 attached thereto and passing through one end of the cylinder for transmitting the movement of the piston to associated mechanism. However, for some uses contemplated, no plunger rod need be employed.

My improved piston is composite in form and includes two open ended sections 15 and 16 telescopically joined and forming a hollow body portion, as shown in Fig. 2. A spacer ring 17, encircling the upper body section 15, lies between annular shoulders 18 and 19 on said sections 15 and 16, respectively. A top plate 20, having a circular depression 21 in its lower side, fits over the reduced upper end 22 of the body section 15 and a binder ring 23 at the bottom of the piston structure completes the body of the piston. Aligned openings in the shoulders 18 and 19 of the body sections 15 and 16, the top plate 20, spacer ring 17 and binder ring 23 receive bolts 24, which are supplied with nuts 25 for clamping the members of the piston together. The diameters of the top plate 20 and spacer ring 17 are identical and slightly less than that of the bore of the cylinder A. The diameters of the annular shoulders 18 and 19 of the body sections 15 and 16 are considerably less than that of the top plate 20 and spacer ring 17, which relative proportions provide circumferential recesses 26 and 27 in the piston. In the recess 26, I place a pneumatic packing ring 28. This ring comprises a band of resilient material, preferably elastic, the upper margin of said band being turned inward and gripped between the top plate 20 and shoulder 18 of the body section 15, while the lower margin thereof is turned inward and gripped between said shoulder 18 and the upper side of the spacer ring 17. The packing ring 29 for the lower recess 27 is formed by the margin of a bag 30 suspended beneath the piston section 16 and gripped, as shown,

between said section 16 and the binder ring 23 and between the shoulder 19 on said section and the lower side of the spacer ring 17. The gripped portions of the packing rings 28 and 29 are perforated to receive the bolts 24. These portions, however, need not extend inward far enough to require perforations for said bolts, but the arrangement shown provides for greater ease in assembling. The bag 30 hangs within a depending annular flange 31 formed integrally with the binder ring 23. A cage 32, fitted with radial arms 33 slidable in vertical slots 34 in said flange, has a depending bumper 35 thereon for reasons soon to appear.

Openings 36 in the binder ring 23 communicate with openings 37 in the bottom of piston section 16, which openings 37 lead to the central chamber 38 formed within the piston sections 15 and 16. Ports 39, passing radially through the shoulder 18 of the piston section 15, lead to the packing ring 28 embracing said shoulder, while ports 40, passing radially through the shoulder 19 of the piston sections 16, lead to the packing ring 29 embracing said shoulder 19. An opening 41 in the bottom of the piston section 16 affords communication between the bag 30 and said chamber 38. Compressed air, or other propelling medium, entering the cylinder A passes through the openings 36 and 37 into the chamber 38 and from said chamber into the rings 28 and 29 and bag 30. Said rings, under pressure of a propelling medium, are inflated or expanded against the wall of the cylinder, thus supplying a tight fit between piston and cylinder. The introduction of a propelling medium to the cylinder drives the piston upward. Arresting the inflow of said medium results in suspending the piston within the cylinder, while releasing the medium from the cylinder is attended by the fall of said piston. As the piston is lowered by gravity against the receding medium within the cylinder, the bag 30 remains inflated under pressure equal to that within the cylinder. The engagement of the bumper 25 with the bottom 11 of the cylinder A causes the cage 32 to compress said bag 30 near the end of the fall of said piston. The compression of this bag increases the pressure beneath the piston, thus retarding the speed thereof and causing it to settle slowly to position wherein the radial arms 33 of the cage 32 engage the binder ring 23 and arrest the further lowering of the piston.

It will be noted that my piston may be employed in hydraulically operated structures as well as in pneumatically operated devices and that its use, though preferably intended for hoists, is not necessarily confined to that particular type of structure.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

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

1. The combination with a cylinder, of a piston adapted to be propelled in said cylinder by the pressure of a fluid medium, an inflatable packing ring encircling the body of the piston and a compressible buffer bag beneath said body, said ring and bag being in communication with the bore of the cylinder and adapted to be inflated by the propelling medium therein.

2. The combination with a cylinder, of a piston therefor adapted to be lifted in said cylinder by air pressure, a compressible bag depending beneath the body of the piston, said bag being in communication, through a restricted opening, with the bore of the cylinder and adapted to be inflated by the air pressure, said bag serving to cushion the blow of the piston against the bottom of the cylinder.

3. The combination with a cylinder, of a piston therefor adapted to be lifted in said cylinder by air pressure, depending guides on the bottom of the body of the piston, a compressible bag depending from the piston, said bag being in communication with the bore of the cylinder, a cage beneath the bag slidably supported in said guides, and a bumper on the cage adapted to strike the bottom of the cylinder, said bag, when compressed by relative movement between said cage and body of said piston, being adapted to retard the fall of the latter.

4. The combination with a cylinder, of a piston therefor adapted to be lifted in said cylinder by air pressure, the body of said piston including two telescopically joined sections having annular shoulders thereon, a top plate upon the upper section, a spacer ring between the shoulders of said sections and a binder ring beneath the lower section, clamping bolts joining said body members, and upper and lower packing rings, the upper and lower margins of the former being turned inward and gripped respectively between the top plate and shoulder of the upper body section and between said shoulder and the spacer ring, the upper and lower margins of the lower packing ring being gripped, respectively, between the spacer ring and shoulder of the lower piston section and between said shoulder and binder ring, said packing rings being in communication with the bore of the cylinder and adapted to be inflated by the pressure of air therein.

5. The combination with a cylinder, of a piston therefor adapted to be lifted in said cylinder by the pressure of a fluid medium, the body of the piston including a body sec-

tion formed with an annular shoulder thereon, a top plate on said section and a ring beneath said section, a resilient packing ring encircling the body section, the upper and lower margins thereof being interposed respectively between said top plate and shoulder and between said shoulder and ring, clamping means joining the piston members, said packing ring being in communication with the bore of the cylinder and adapted to be expanded against the cylinder wall by pressure of the fluid medium therein.

In testimony whereof, I have signed my name to this specification.

HUGO GLASER.