No. 831,603. PATENTED SEPT. 25, 1906.

N. C. DAVIS.

PACKING.

APPLICATION FILED SEPT. 29, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

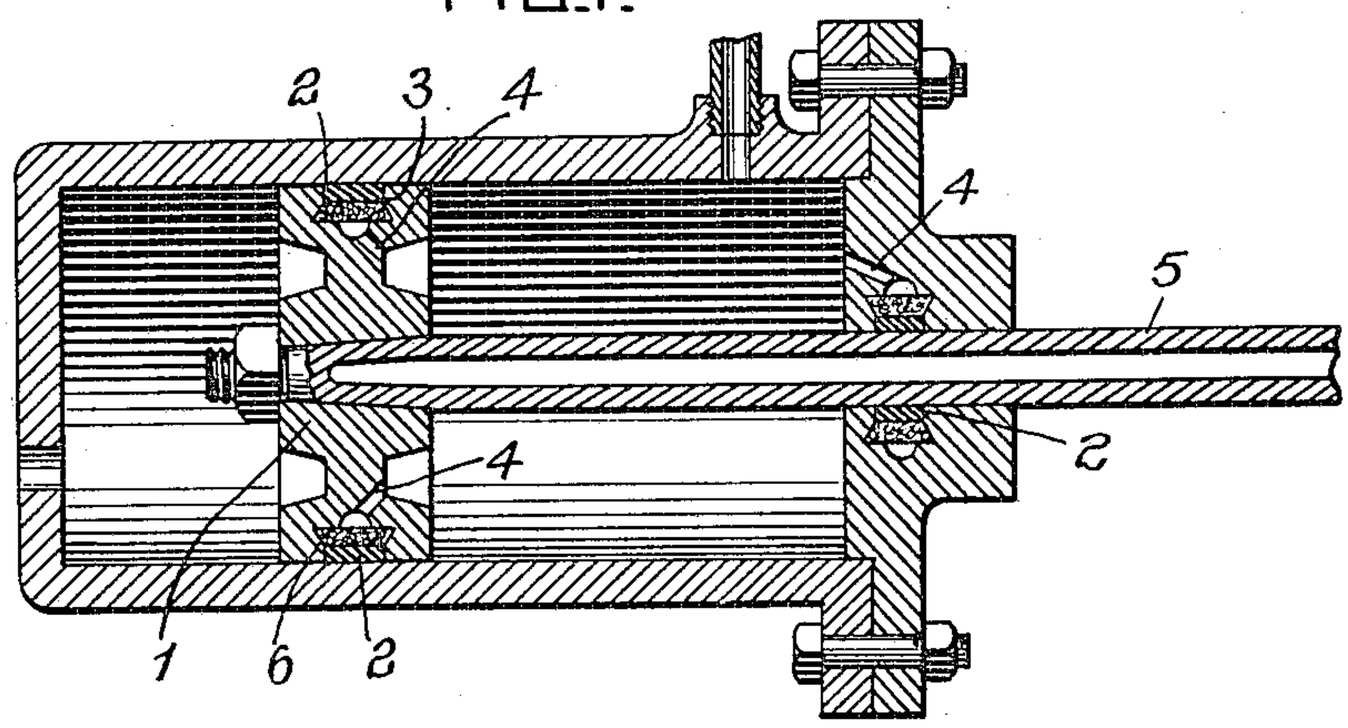


FIG. 2.

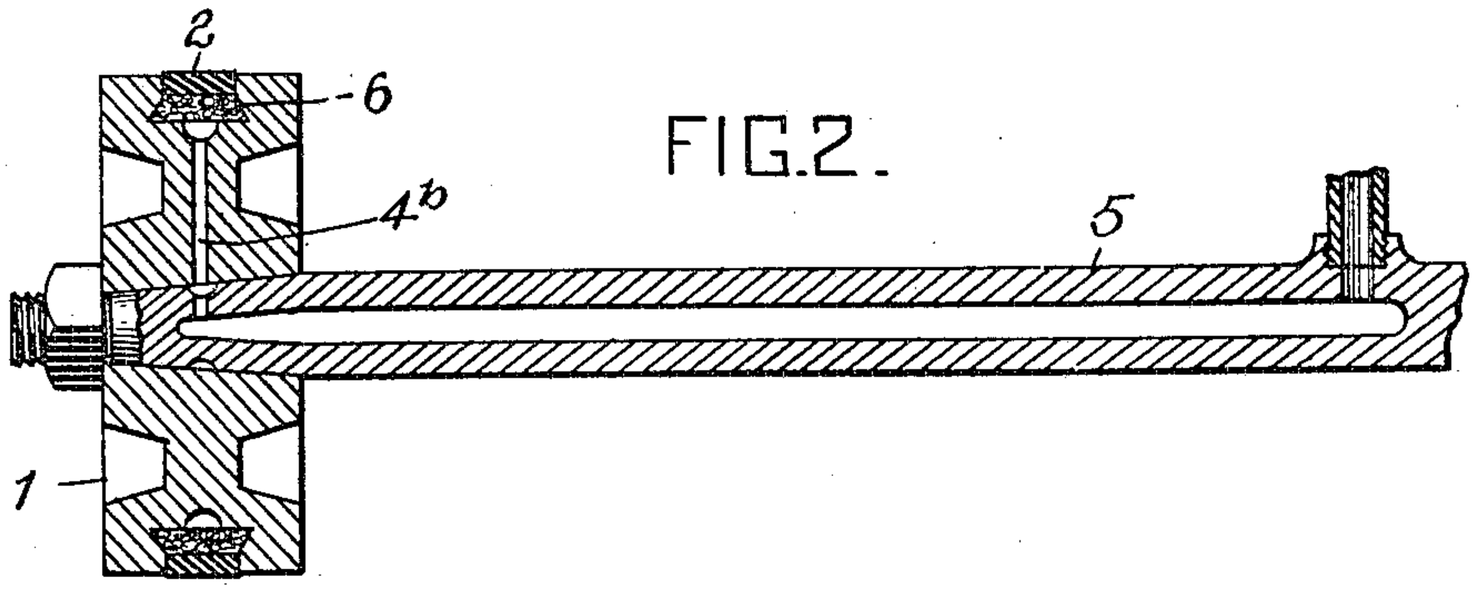
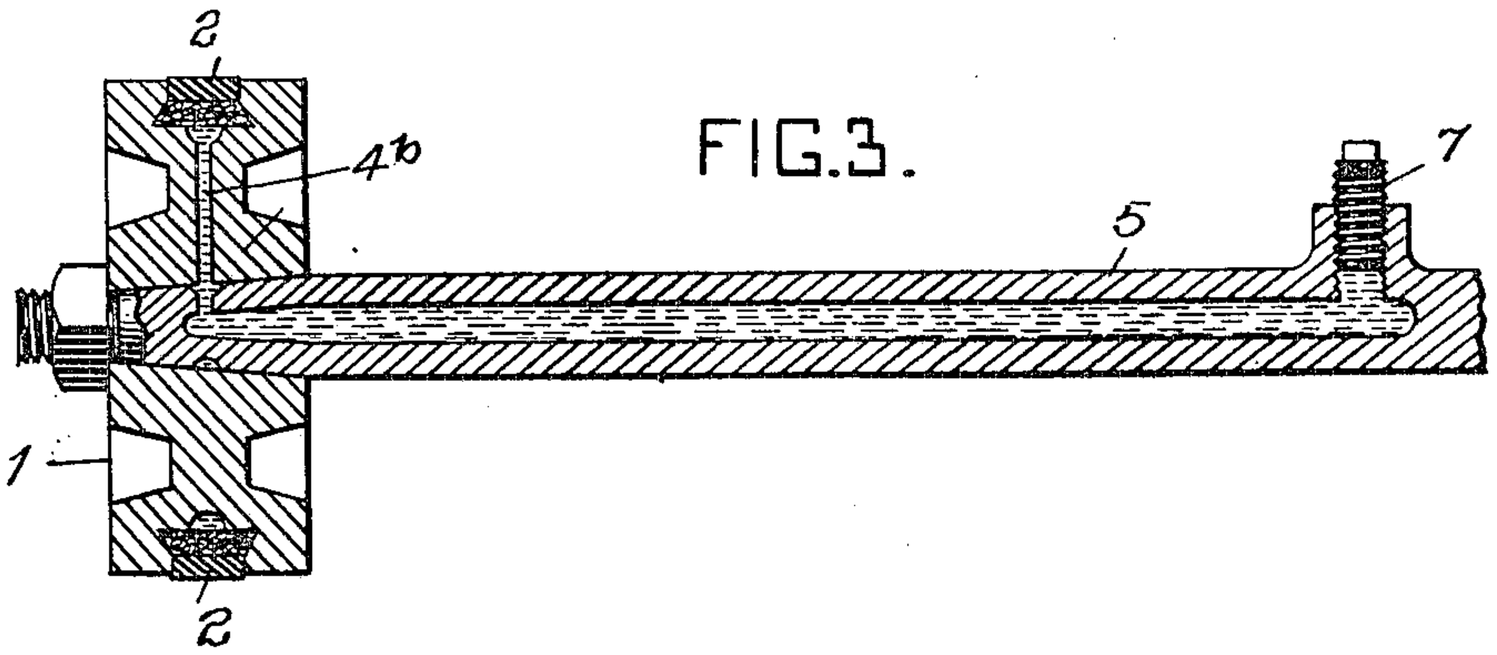


FIG. 3.



WITNESSES:
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Carl Sidle

INVENTOR
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by Christy & Christy, Atty's

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2 SHEETS—SHEET 2.

FIG. 4.

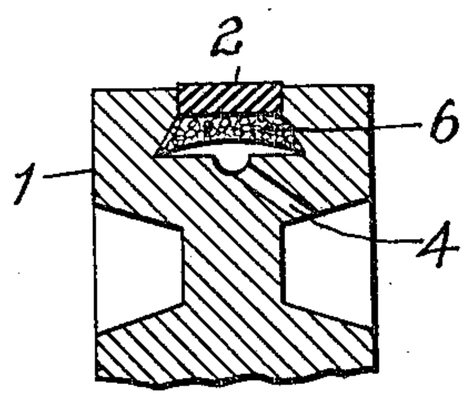


FIG. 5.

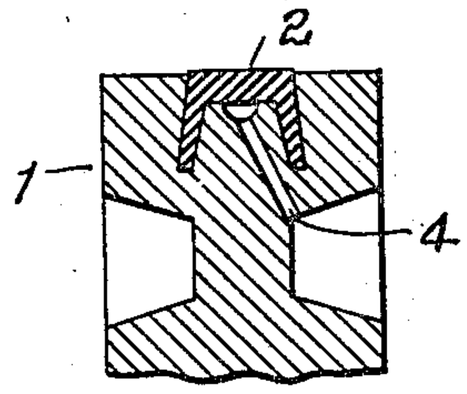


FIG. 6.

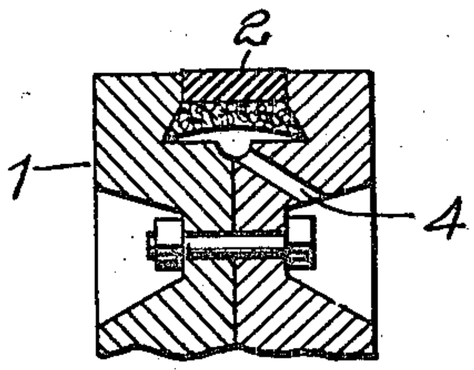


FIG. 7.

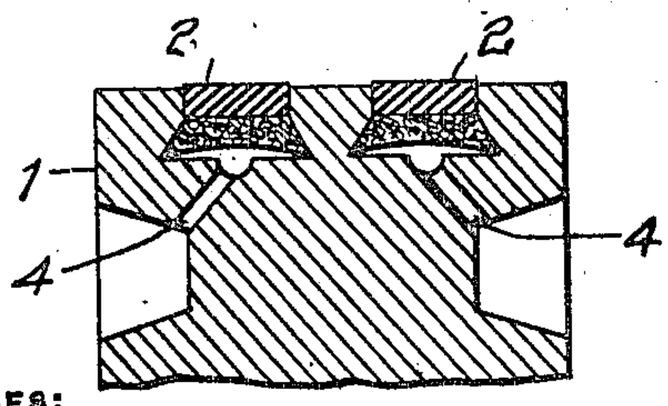


FIG. 8.

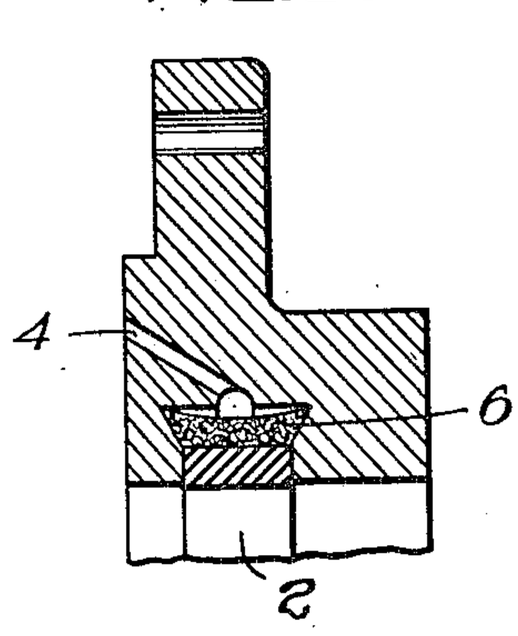


FIG. 9.

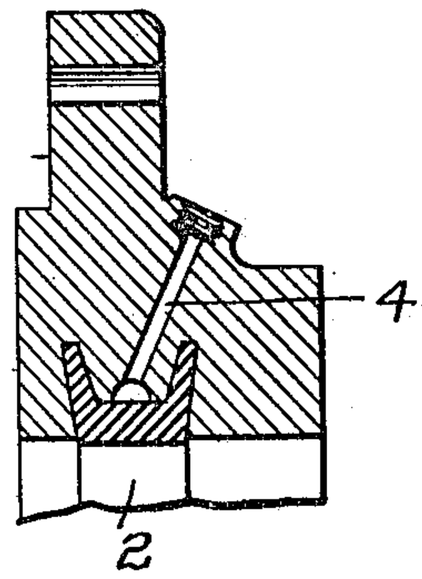
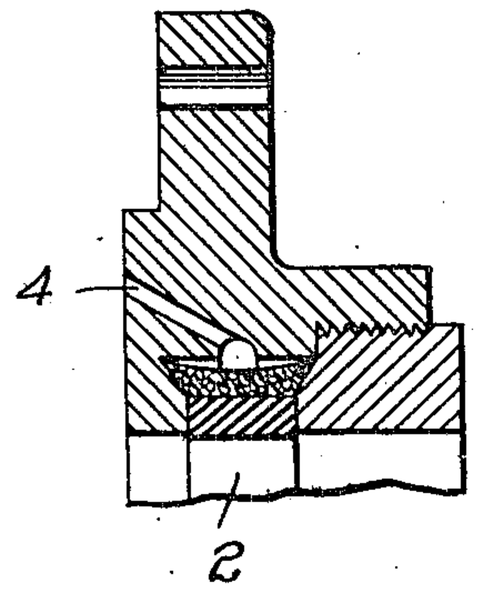


FIG. 10.



WITNESSES:
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UNITED STATES PATENT OFFICE.

NORMAN C. DAVIS, OF EDGEWORTH, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO CHARLES W. DAVIS, OF EDGEWORTH, PENNSYLVANIA.

PACKING.

No. 831,603. Specification of Letters Patent. Patented Sept. 25, 1906.

Application filed September 29, 1905. Serial No. 280,603.

To all whom it may concern:

Be it known that I, NORMAN C. DAVIS, a citizen of the United States, residing at Edgeworth, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Packing, of which improvements the following is a specification.

The invention described herein relates to certain improvements in means for packing pistons and piston-rods for fluid-pressure mechanisms—such as steam-engines, hydraulic valves, rams, pumps, &c.—and has for its object the arrangement of a solid ring in one of the surfaces—*i. e.*, either the piston or the cylinder or piston-rod or in the wall of the guide-opening through which it passes—and expanding such ring by fluid-pressure to contact with the opposite surface.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional view of a hydraulic cylinder, showing the piston and piston-rod packed in accordance with my invention. Fig. 2 illustrates a construction whereby fluid-pressure other than that employed for operating the piston, operated by the piston, or controlled by the valve is employed for causing such movement of the packing-ring as is desired. Fig. 3 is a view similar to Fig. 2, illustrating a modification. Figs. 4, 5, and 6 are sectional detail views illustrating different embodiments of the invention. Fig. 7 shows a construction of piston for a hydraulic valve or double-acting engine. Figs. 8, 9, and 10 are sectional detail views illustrating the manner of adapting my invention to the packing of piston-rods or pistons, the packing being arranged in the walls of the chamber surrounding the moving member.

In the practice of my invention as illustrated in Fig. 1 a groove 3 is cut in the periphery of the piston 1 and a solid metal ring 2 (and by the term "solid" is meant a continuous ring as distinguished from a split ring) is arranged in such groove. A port or passage 4 extends from the inner surface of the ring or from the groove in which the ring is arranged to such a point as will permit the flow of fluid-pressure in the cylinder through the port, so as by its pressure to expand the ring sufficiently to cause it to bear with the desired pressure against the surface of the cylinder. It will be understood that in case of double-acting engines, whether steam, gas, or hydraulic, where the pressure on opposite sides of the piston varies it is preferred to employ two packing-rings, the ports or passages 4 extending from the groove to the opposite ends of the piston in such manner that one or the other of the rings will be always subjected to sufficient pressure to obtain the desired packing action. In lieu of employing the fluid operating the piston, operated by the piston, or in the case of hydraulic valves controlled by the piston for producing the desired variation of the ring fluid-pressure from an independent source may be employed, as shown in Fig. 2, where the piston-rod 5 is made hollow or has a passage therethrough and connects with a port 4^b in the piston leading to the groove or grooves containing the ring. Where the ring is arranged in the piston, the action of fluid-pressure thereon will cause an expansion of the ring, whereas when the ring is arranged in the wall of the cylinder or in the rod-guiding portion of the cylinder-head and surrounds the piston or piston-rod the fluid-pressure, whether that employed for actuating the piston or from an independent source, produces a compression of the ring, causing it to firmly hug the piston or piston-rod. In this construction the fluid-pressure operating on the ring may be that used in the cylinder or from an independent source, as shown in Fig. 9.

The ring is made of a metal or alloy, preferably elastic, and can be either cast in position in the groove or otherwise placed therein. As, for example, the ring may be split and opened sufficient to slip onto the piston and after being adjusted in position the ends united to form a continuous ring. Where the piston is made in sections, as shown in Fig. 6, the ring may be placed in position before the sections are secured together. Where the ring is square or oblong or of such shape in cross-section that lateral expansion cannot be produced, it is preferred to provide a packing 6 of a more or less tenacious material back of the ring, such packing being adapted to be expanded and form a tight joint with the walls of the groove. If the ring is cast into the groove, this packing should be of such character that it will not be injured by heat. As shown in Fig. 5, the ring may be

made with thin lips along its inner edges, which will be forced outwardly against the walls of the groove by the fluid-pressure, thereby forming a tight joint with such walls to prevent the escape of fluid.

Heretofore fluid-pressure has been employed to expand or set out packing, such as leather cups, which are inapplicable for use in connection with high pressures, and with split rings, of which a large number must be used in order to prevent the leakage of fluid along the split or line of section. I employ a solid ring, which by expansion or contraction under this fluid-pressure will form a tight joint between the relatively movable surfaces, and in some cases—such, for example, where the construction shown in Fig. 5 is employed—will be self-packing. When a packing such as asbestos or leather is employed in connection with the metal ring, it is so located as not to be subject to any wear or deterioration.

As shown in Fig. 3, the dimensions of the ring may be adjusted by mechanical means operating for convenience through a column of fluid. As therein shown, the passages are filled with a liquid to which pressure is applied by a threaded plug 7. While this plug may be arranged at any desired point, it is preferred to so locate it, as in the piston, where it is readily accessible.

I claim herein as my invention—

1. A packing for fluid-pressure mechanisms having in combination a continuous metal ring carried by one of the parts or members to be packed, and fluid-pressure means for changing the peripheral dimensions of the ring and thereby causing it to yieldingly bear against the other part or member to be packed.

2. A packing for fluid-pressure mechanisms having in combination a continuous elastic metal ring carried by one of the parts or members to be packed, and means for changing the peripheral dimensions of the ring and thereby causing it to yieldingly bear against the other part or member to be packed.

In testimony whereof I have hereunto set my hand.

NORMAN C. DAVIS.

Witnesses:

CHARLES BARNETT,

HERBERT BRADLEY.