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Patented Apr. 24, 1900.

T. G. SAXTON & R. E. McCUEN.
PISTON ROD AND VALVE STEM PACKING.

(Application filed Aug. 28, 1899.)

(No Model.)

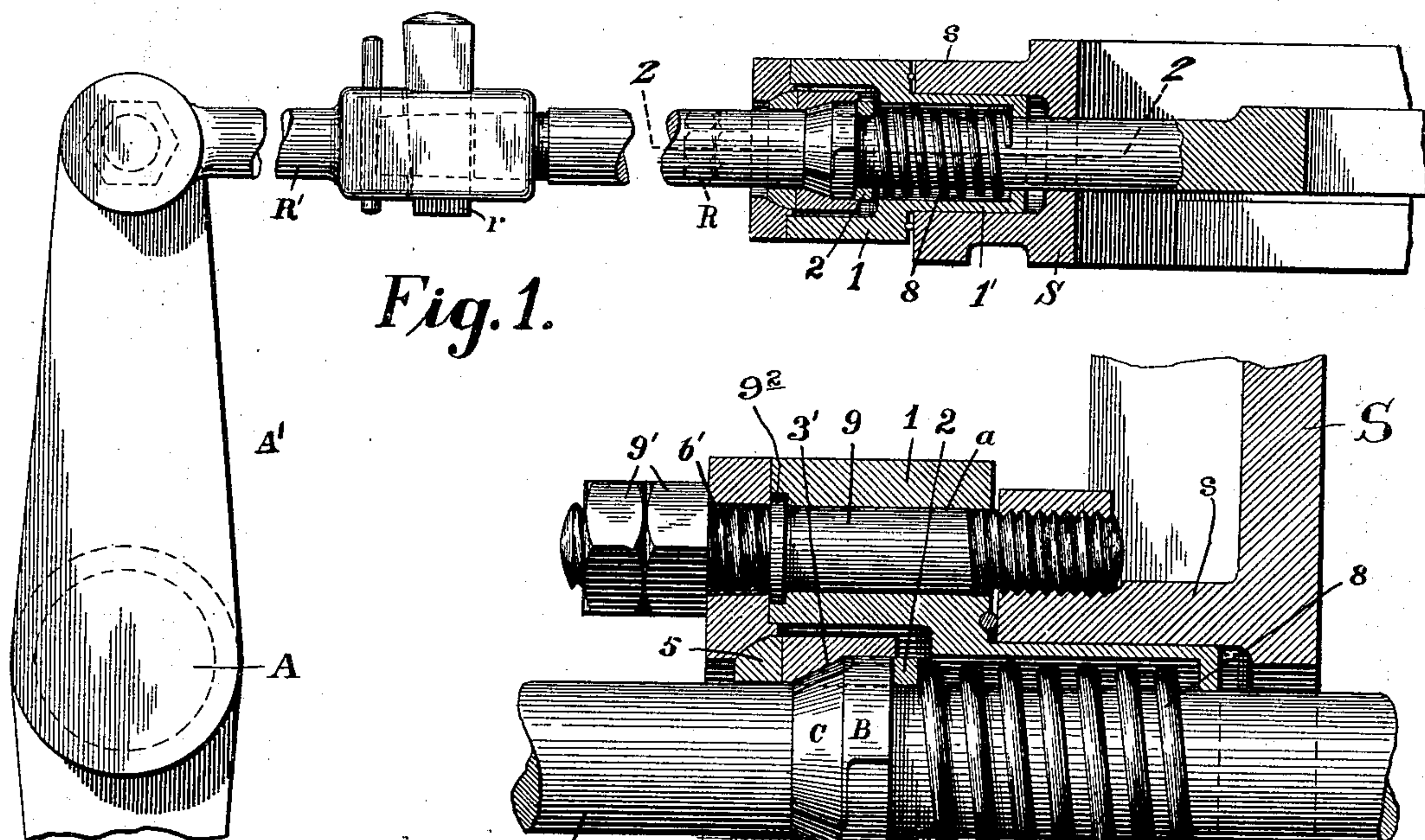


Fig. 1.

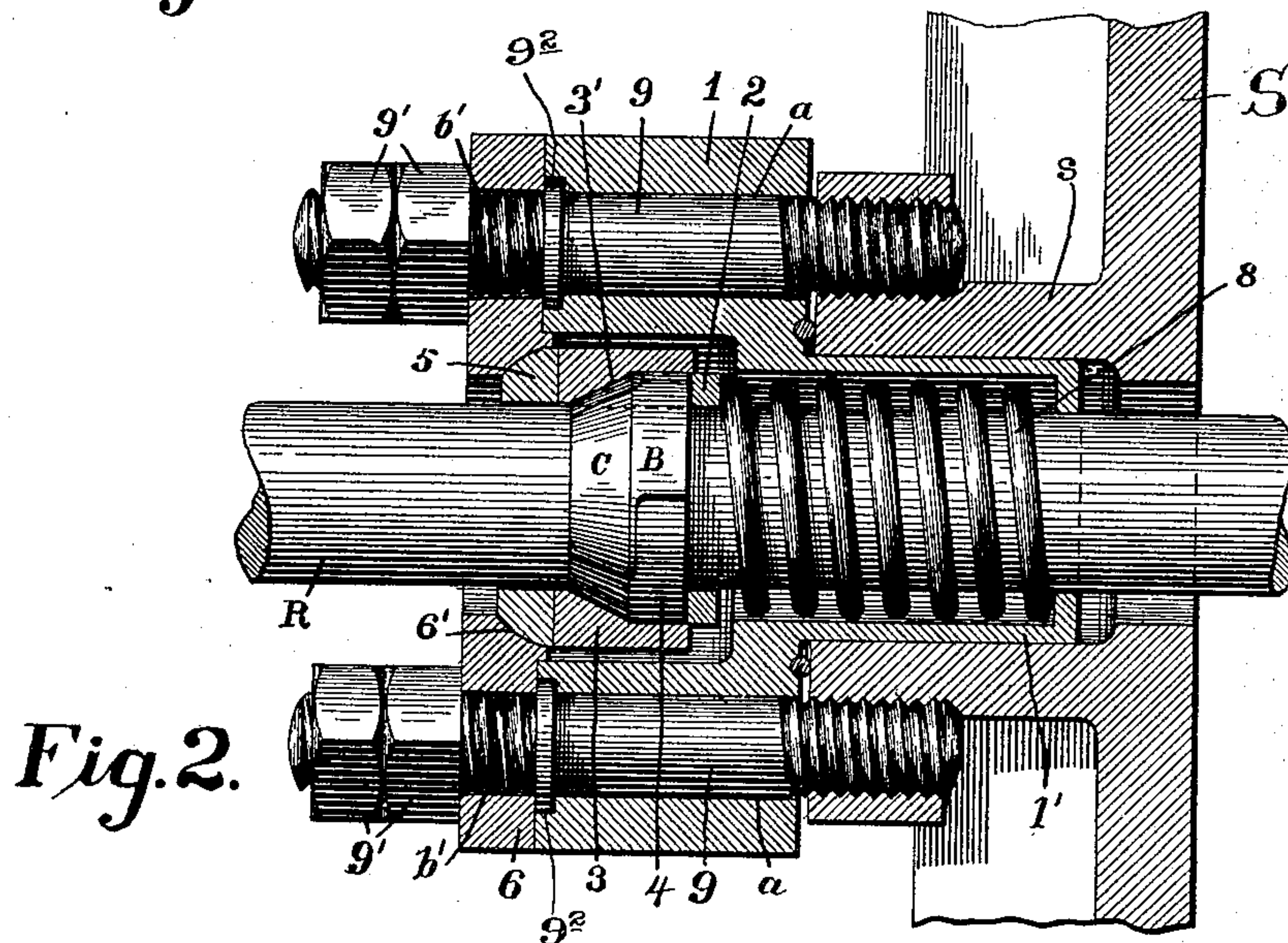


Fig. 2.

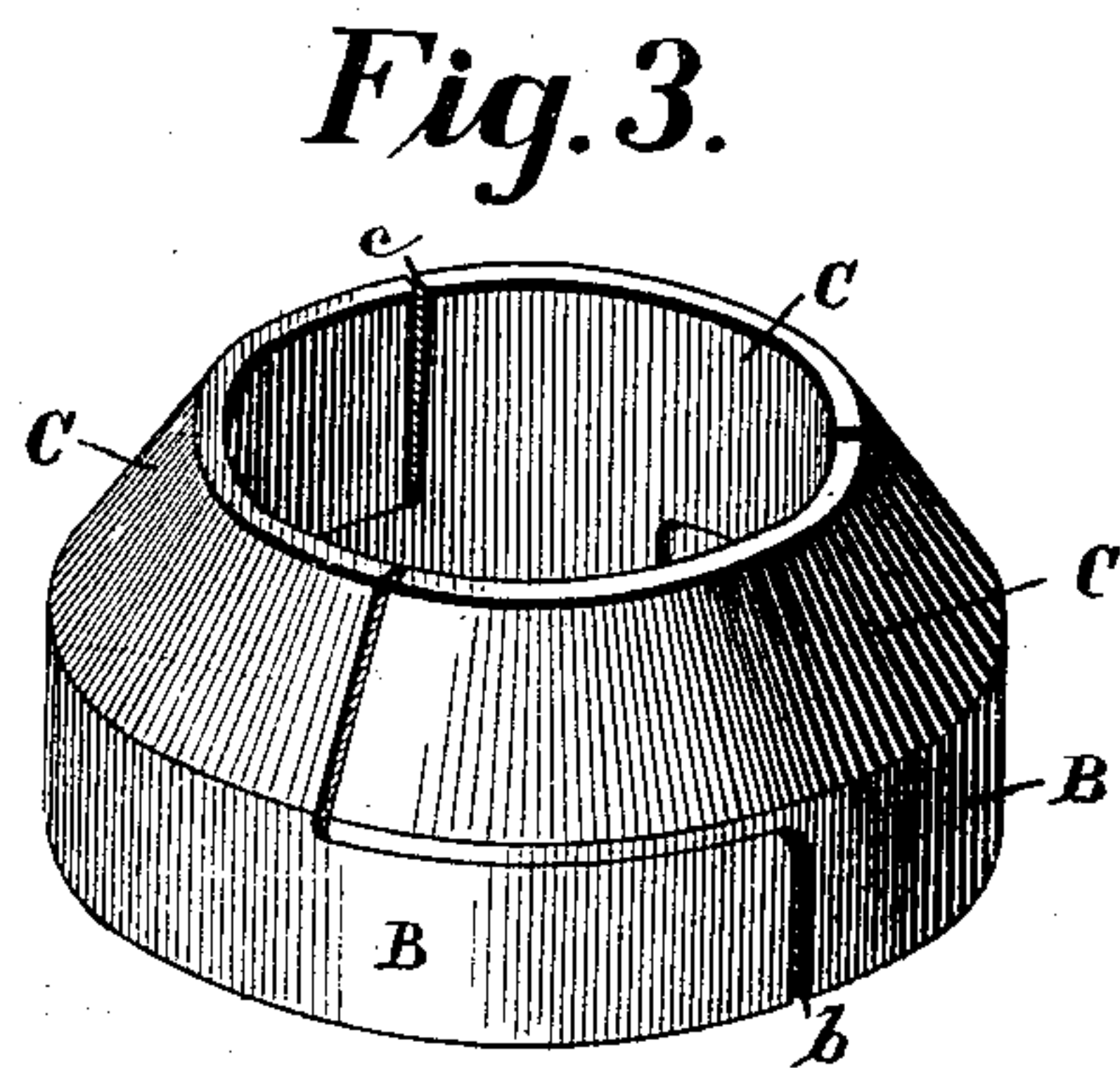


Fig. 3.

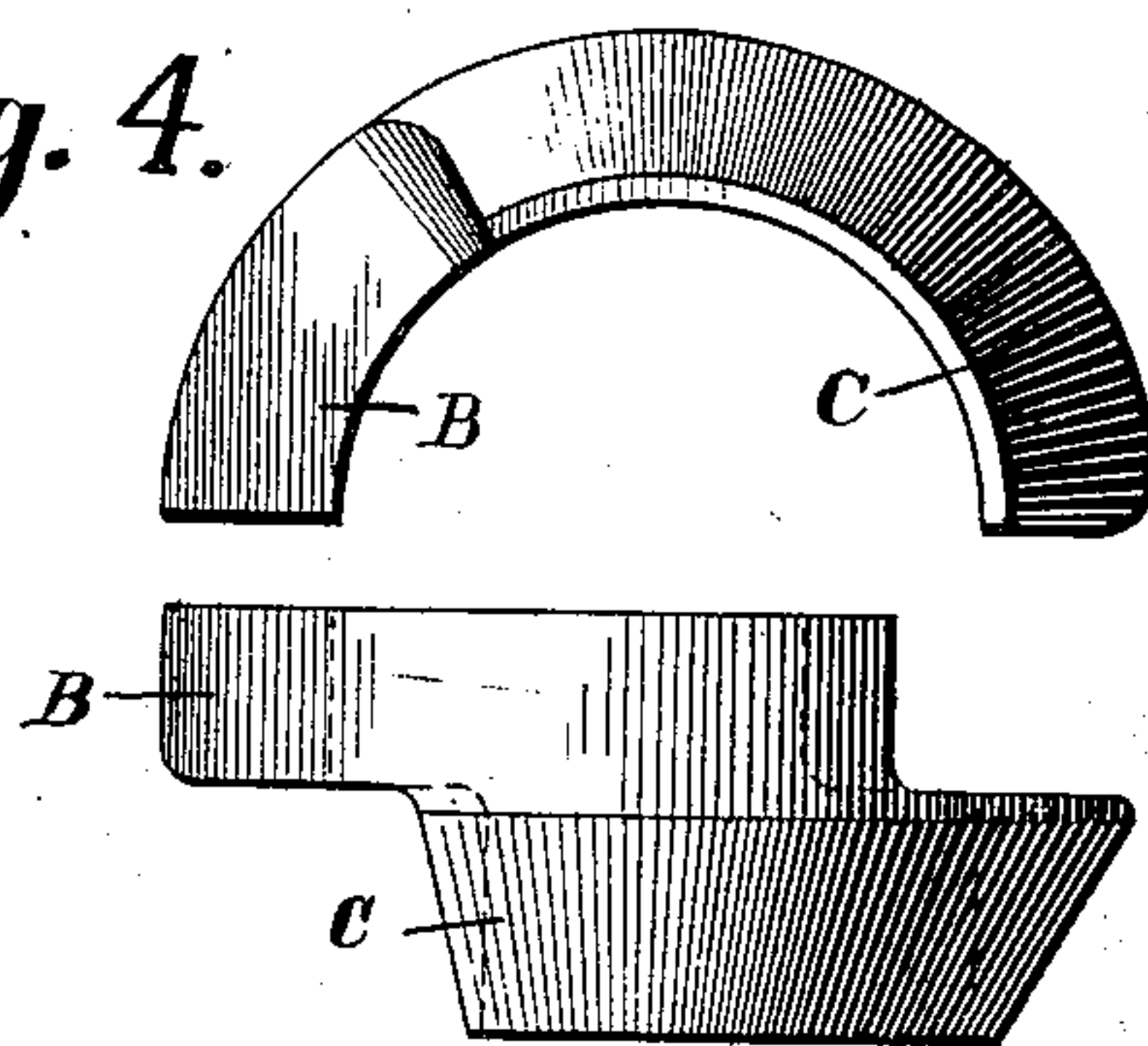


Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS G. SAXTON AND ROBERT E. MCCUEN, OF LEXINGTON, KENTUCKY;
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PISTON-ROD AND VALVE-STEM PACKING.

SPECIFICATION forming part of Letters Patent No. 647,991, dated April 24, 1900.

Application filed August 28, 1899. Serial No. 728,759. (No model.)

To all whom it may concern:

Be it known that we, THOMAS G. SAXTON and ROBERT E. MCCUEN, citizens of the United States, residing at Lexington, in the county of Fayette and State of Kentucky, have invented certain new and useful Improvements in Piston-Rod and Valve-Stem Packing; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is an improvement in metallic packing especially designed for packing the valve-rods and piston-rods of steam-engines; and its object is to provide an easily-applied hard packing which will maintain a steam-tight sliding joint under all conditions of service, be self-compensating for wear, and can be applied and renewed when necessary without "drawing" the piston-rod or valve-stem in order to do so.

The invention therefore consists in the novel and improved construction of the packing-ring and in the construction and combination of parts whereby said packing-ring is kept in position within the stuffing-box.

In the accompanying drawings the invention is illustrated as applied to the slide-valve of a steam-engine, and therein—

Figure 1 represents a detail side view of the valve-operating devices, showing the packing in vertical section. Fig. 2 is an enlarged horizontal section on line 2 2, Fig. 1. Fig. 3 is an enlarged view of the packing-ring detached, and Fig. 4 is a detail view of a section of the packing-ring.

S designates a steam chest or cylinder, and R a piston-rod or valve-stem which passes through a stuffing-box s on the cylinder and the gland 1, attached to the stuffing-box. The valve-stem R is connected to a valve-rod R' by a socket-joint and taper pin r in the usual manner, and this rod R' is connected to an arm A' on the rock-shaft A, as usual.

Heretofore where a hard packing has been employed it has been generally necessary to draw the piston-rod or valve-stem—that is, in applying the hard packing it has been necessary to disconnect the valve-rod from the rock-arm, then to disconnect this rod from the stem

proper, then to remove the gland-follower and withdraw the worn packing by slipping the same out of the gland and off the packing-rod, and then replace the new packing by sliding the same on the rod into the gland, then replace the gland-follower, and then connect the stem to the rod and the rod to the rock-arm, this operation of course consuming a great deal of time and involving much trouble. When such "hard" packing is to be applied to a piston-rod, it has been generally necessary to disconnect the piston-rod from the cross-head and draw the rod, which also involves a great deal of trouble and waste of time. Of course where "soft" packings are used it is unnecessary to disconnect the parts in this manner, as the soft packing can be wrapped around the rod or stem and thus easily removed and quickly replaced; but soft packings have to be renewed so often that it is more desirable to employ the hard packing, notwithstanding the extra amount of time involved in placing or renewing the same.

By our present invention we avoid the necessity of drawing the piston-rods or valve-stem and provide an improved construction of parts by which our packing can be applied as readily as a soft packing, but will possess the advantages of durability of hard packing and of self-compensation for wear.

The parts already described are old and well known, and the following is a description of the elements of our invention.

1 designates a gland which is attached to the stuffing-box s by means of the bolts 9 9, which pass through openings a in the ears of the gland and are screwed into suitably interiorly threaded openings in the stuffing-box s, each of said bolts having a rib or annular shoulder 9² intermediate its ends, which abuts the outer face of the gland proper, 1, being preferably seated in a recess in the outer wall of said gland, so as to confine the latter to the stuffing-box when the gland-follower or cover-piece 6 is removed, the latter being secured on the same bolts by means of the nuts 9', screwed onto the outer screw-threaded ends of said bolts. The gland is provided with a cylindrical extension 1', which fits closely within the stuffing-box, and through the box and gland passes the valve-stem or piston-

rod R, as usual. The inner end of the gland is contracted, so as to fit closely around the stem, as shown, and within the gland, and interposed between the contracted end thereof and a spring-follower 2 on the stem is a coiled spring 8. The follower 2 is a plain ring which fits easily on the stem and is adapted to slide within a packing-cup 3, also easily fitted on the stem, said packing-cup having its bore cylindric next the follower 2, but contracted to form a conical surface or bearing 3' at the end opposite the follower. Within this packing-cup and interposed between the conical surface 3' and the follower 2 is fitted a packing-ring 4, which may be formed of any suitable material or composition to make a hard and durable packing, the particular chemical or mechanical elements of which it is composed not forming part of the present invention. This packing-ring 4 is composed of a number, preferably three, of similar sections, each section having a segmental or parti-cylindric portion B, which is of uniform width and thickness and is about one hundred and twenty degrees in extent. At one edge of this portion B and formed integral therewith is another segmental portion C, which is also about one hundred and twenty degrees in extent, but is tapered exteriorly, as shown, so as to fit in the tapered bearing 3' of the packing-cup 3. The part C, however, extends from about midway of the part B to and projects beyond one end thereof, as shown in Fig. 4, so that the distance between the farthest-removed extremities of the parts B and C is about one hundred and eighty degrees. Each section of the packing-ring therefore forms a half-circle or extends half-way around the stem or rod against which the said section closely fits. When the sections of the ring are put together, as shown in Fig. 3, the portions C and B of the adjoining sections overlap. The meeting ends *b* of the parts B of adjoining sections are parallel and so are the meeting ends *c* of the parts C, but the meeting ends *c* and *b* of the sections of the packing-ring are not intended to come into close contact, but instead are slightly separated when the sections are put together, so as to permit the packing-ring to adjust itself closely around the stem and contract as the ring is forced outward into the packing-cup. The opposite edges of the parts B and C of opposite sections, however, are adapted to fit closely together and are held closely together by the pressure of the spring 8 against the base of the packing-ring, which spring through follower 2 tends to force the packing-ring 4 into packing-cup 3, as shown. This pressure is increased when the steam is turned into the valve-chamber.

The packing-cup is secured in position within the gland by means of the gland-follower plate 6, which is provided with eyes *b'*, by which it is strung on the bolts 9, that secure the gland to the stuffing-box, the ends of these bolts being threaded and the locking

and jam nuts 9' 9' being tapped thereon. The gland-follower is conically recessed on its inner face around the piston-rod, as shown at 6', and within this recess is placed the vibrating ring 5, which is tapered on its outer surface and abuts against the packing-cup, as shown. By this construction a close fit is maintained between the inner surface of the ring 4 and the piston rod or stem R and between the outer surface of the ring 4 and the walls of packing-cup 3, and at the same time there are no joints left open through which steam or water can leak, as the longitudinal splits in the ring between the meeting ends *b* of the parts B and the meeting ends *c* of the parts C are so far displaced that leakage is impossible.

It will be observed that our packing-ring as shown is formed in three similar sections, yet each has a bearing on or makes contact with half the circumference of the rod or stem and also bears against or makes contact with half the interior circumference of the packing-cup. This makes the packing very effective in preserving tight joints.

Each section of the packing-ring extends one full half-circle around the rod or stem, as described, and it also extends substantially the entire length of the packing-cup, and when the ring is placed in the packing-cup each section thereof interlocks with the others and assists in retaining them in position.

In our invention when it is desired to renew a packing it is only necessary to loosen the nuts 9' 9', slip the gland-follower off the bolts 9, and then draw out the packing-cup, remove and renew the packing therein, return the parts to place, and secure the gland-follower by the nuts, as before.

Having thus described our invention, what we therefore claim as new is—

1. A packing-ring comprising a plurality of sections each of which consists of a straight or uniform segmental portion, and a single tapered or conical portion, said portions being united circumferentially for a suitable distance each beginning at a point between the ends of the other, and the projecting tapered portion of one section overlying the projecting straight portion of the other, substantially as described.

2. A packing-ring comprising a plurality of sections each of which consists of a straight or uniform segmental portion, and a single tapered or conical portion, said portions being united circumferentially, each beginning at a point substantially intermediate the ends of the other, and the projecting tapered portion of one section overlying the projecting straight portion of the other, each of said portions being less than a half-circle in extent, and each section of the ring being a full half-circle in extent, substantially as described.

3. The combination with the stuffing-box, the gland, and the rod, of the plurality of ring-sections fitting around the rod, each sec-

tion comprising a uniform segmental portion and a tapered segmental portion, the two being united circumferentially, each beginning at a point between the ends of the other, and the parts overlapping each other, as described, a spring within the gland and surrounding the rod, the packing-cup, and the ring in said cup, substantially as set forth.

4. The combination of the stuffing-box, the gland secured thereto, the spring within said gland, the packing-cup within said gland having a conical bearing-surface, a sectional packing-ring in said box composed of three sections each having a segmental cylindric portion B, and a segmental tapered portion C, the parts C of the sections overlapping the parts B, and the gland-follower fastened to the gland and confining the parts therein, substantially as described.

5. The combination of the stuffing-box, the gland secured thereto having a cylindrical portion fitted within the stuffing-box, the spring within the gland, a spring-follower on the stem or rod within said gland, the packing-cup within said gland having a conical bearing-surface, a sectional packing-ring in said cup composed of three sections each having a parti-cylindric or segmental portion B, and a parti-cylindric or segmental tapered portion C, the parts B and C of adjoining sections overlapping; the conical vibrating ring on the rod exterior to the packing-cup, and

the gland-follower fastened to the gland and confining the parts therein, for the purpose and substantially as described.

6. As a means for applying and renewing metallic packing for piston-rods and the like without "drawing" the piston-rod, the gland having a cylindrical portion adapted to form a chamber for the packing encircling said rod, a gland-follower or cover for the outer open end of said chamber, and fastening-bolts for said parts passed through openings therein and having their inner ends tapped into the steam chest or cylinder and nuts screwed on their outer ends; said bolts having ribs or shoulders thereon at the point between said gland and gland-follower so as to permit the removal of the gland-follower to afford access to the packing without removing or disturbing the gland, in combination with suitable metallic packing-rings surrounding the rod within said chamber and a spring in said chamber for compressing the packing and holding the outer ring in contact with the inner face of said gland-follower, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

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Witnesses:

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