(No Model.)

4 Sheets—Sheet 1.

F. J. COLE.

METALLIC ROD PACKING.

No. 526,381. Patented Sept. 25, 1894.

Fig. 2

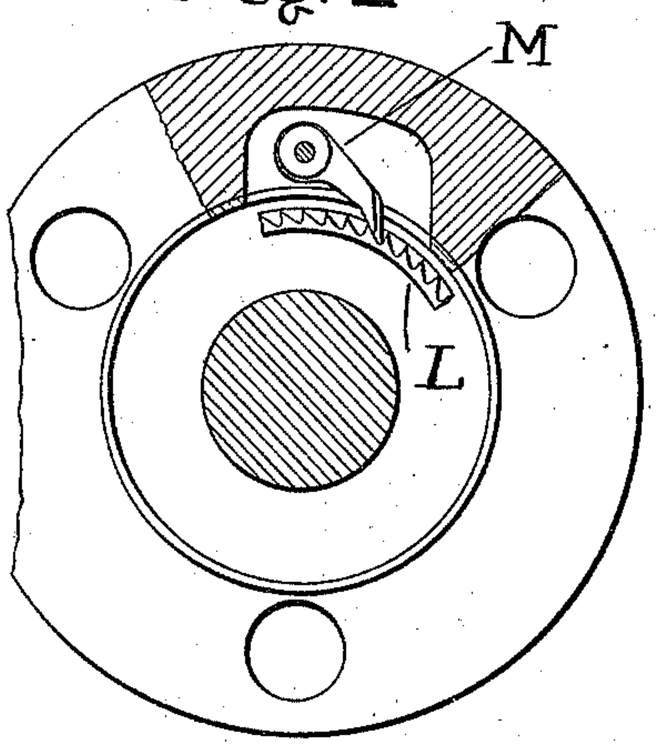


Fig 1

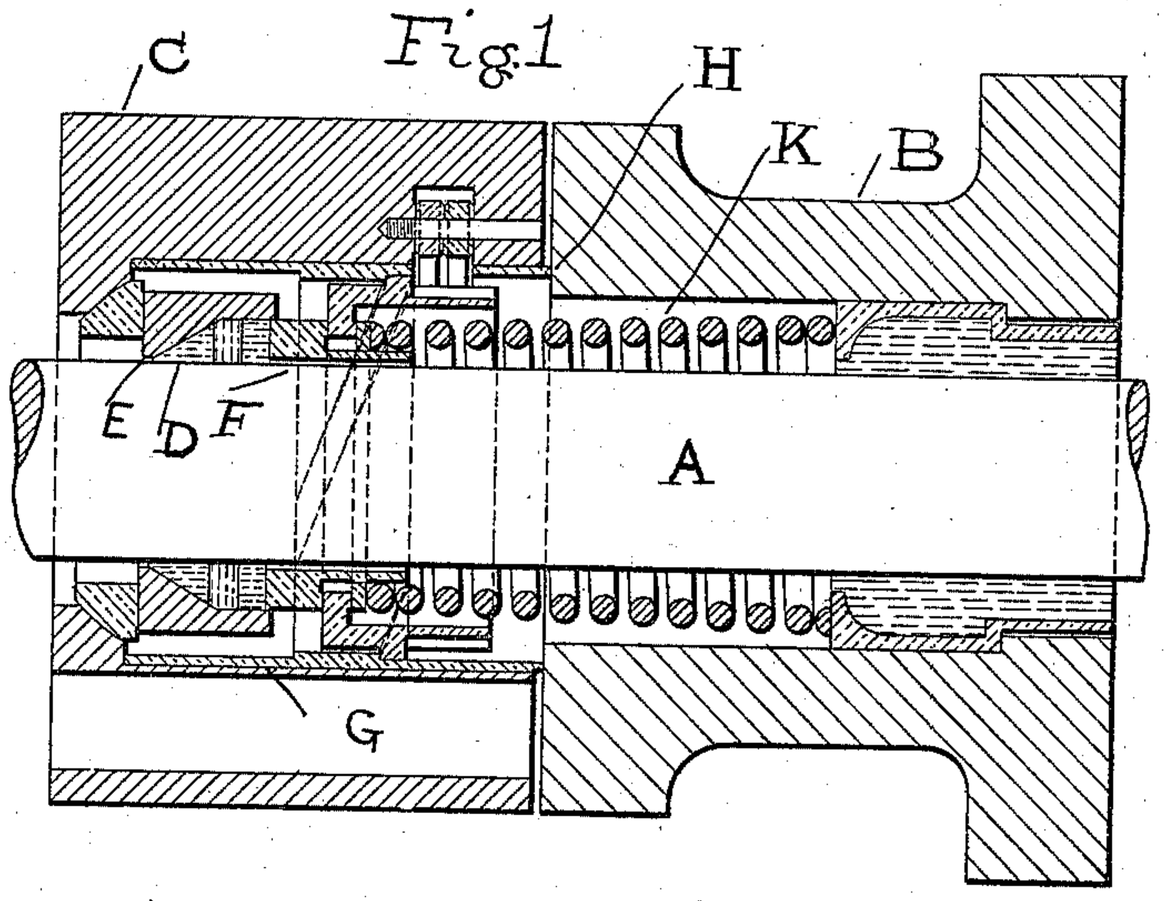


Fig 4

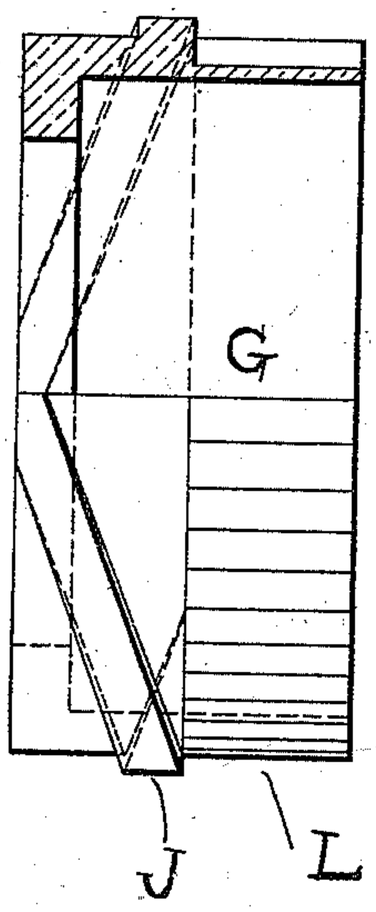
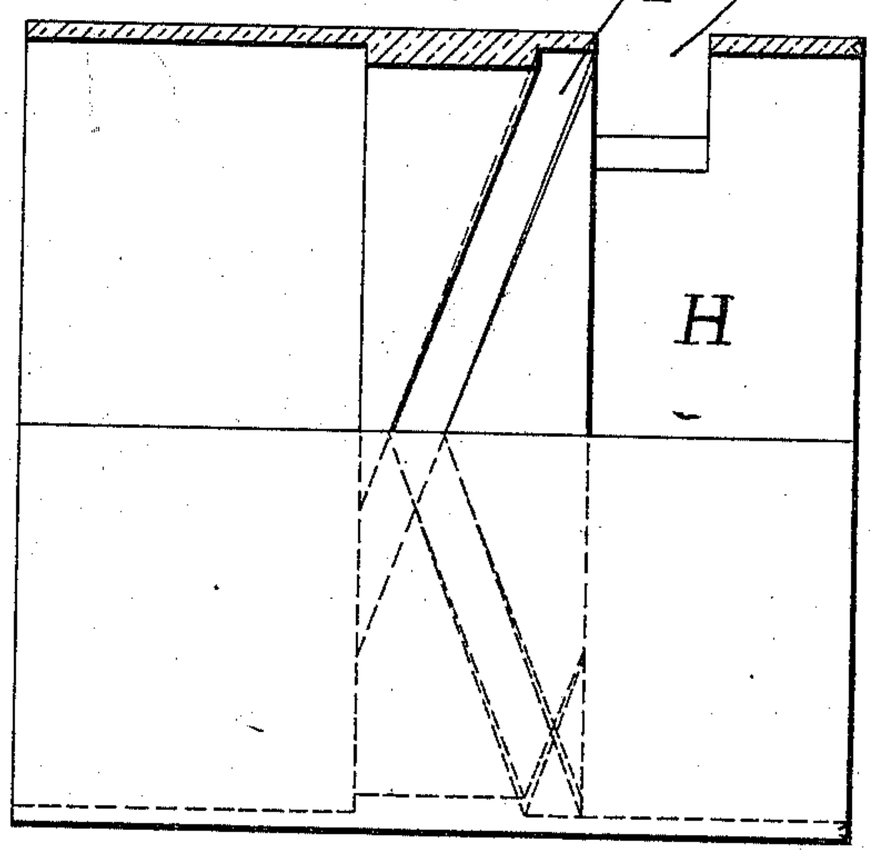


Fig. 3



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(No Model.)

4 Sheets—Sheet 2.

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METALLIC ROD PACKING.

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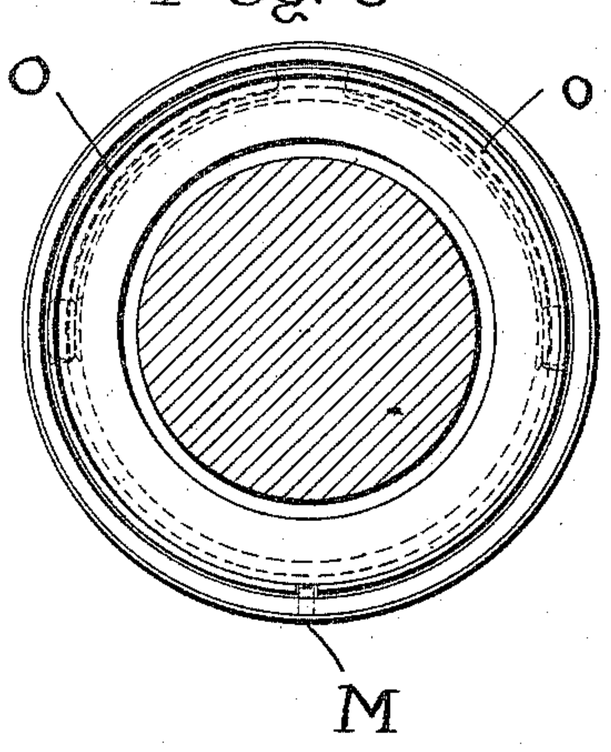
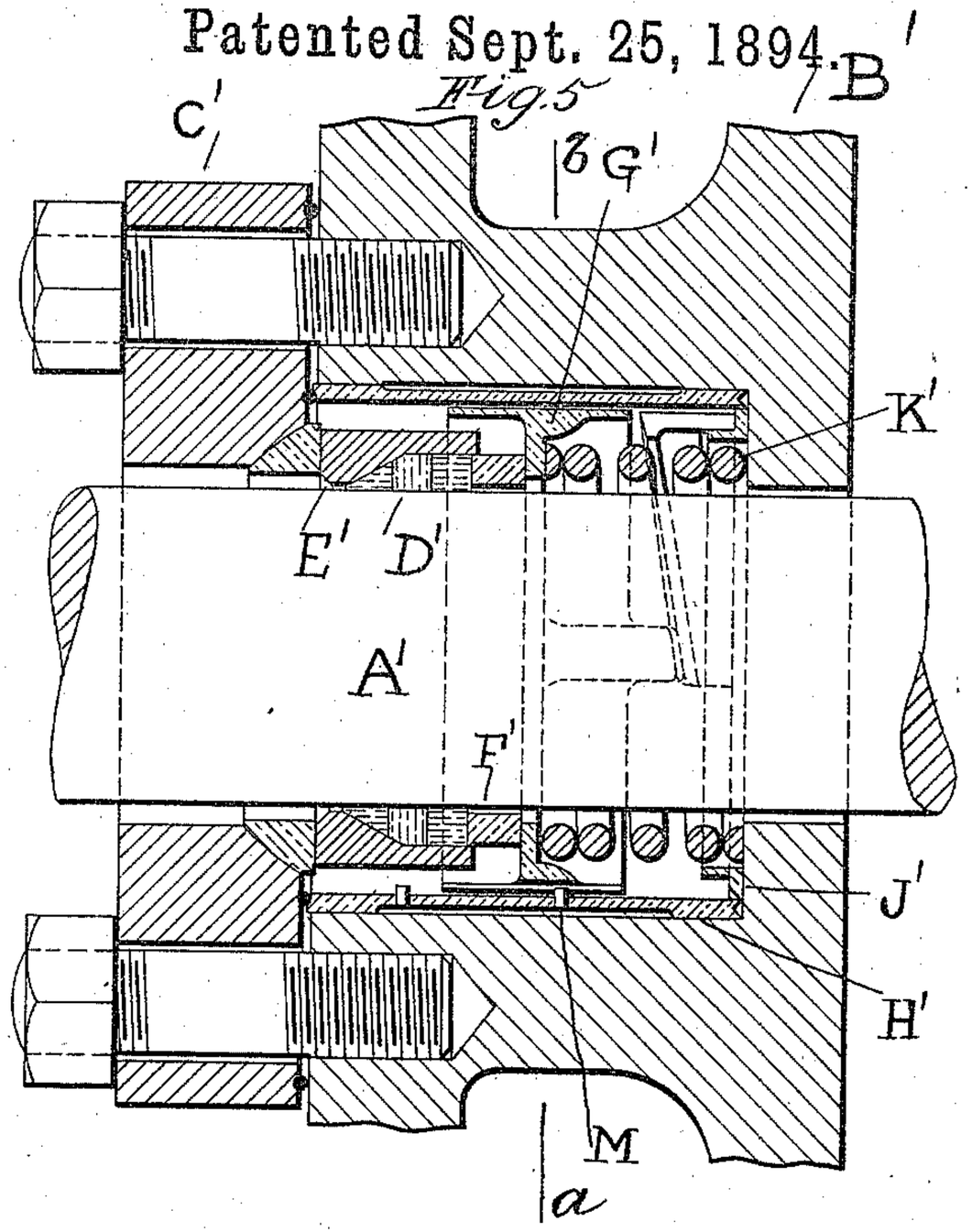
Fig. 6





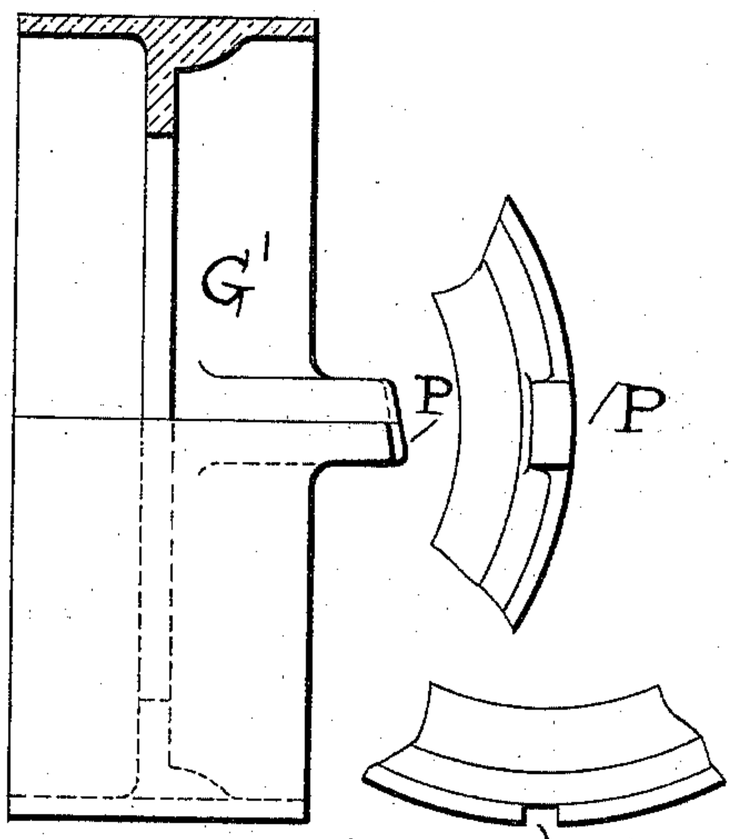


Fig. 7

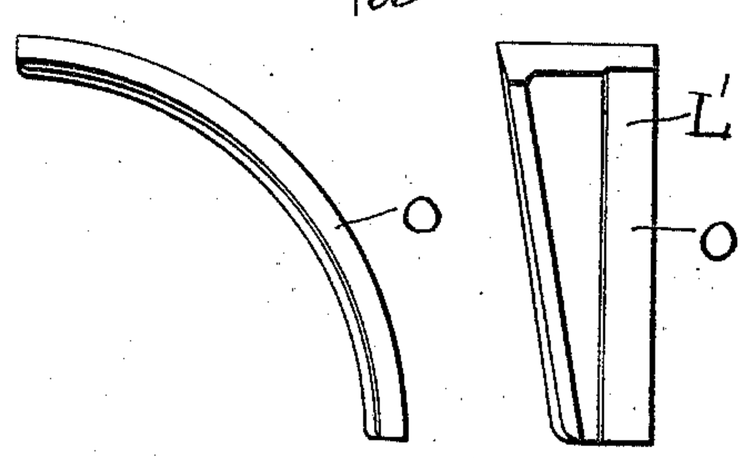


Fig. 8

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4 Sheets—Sheet 3.

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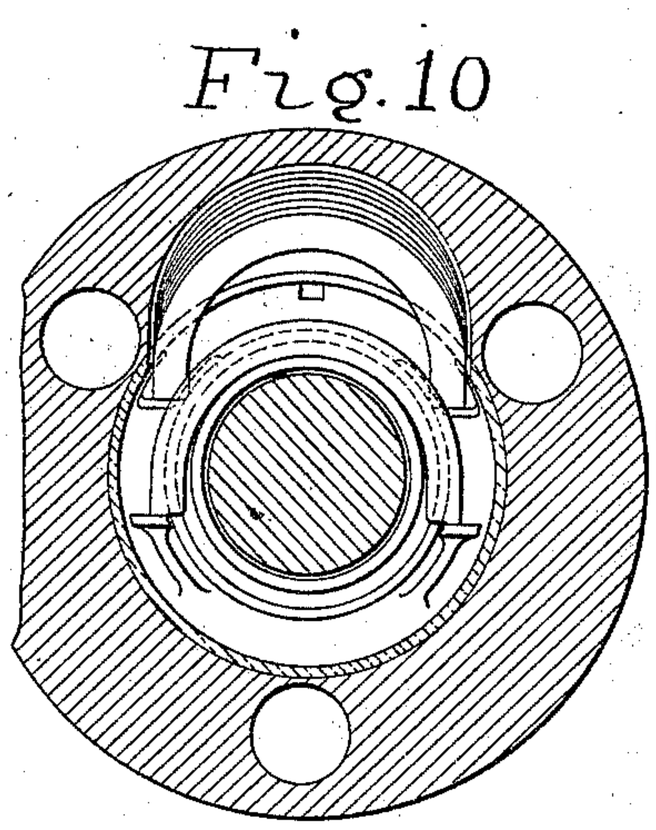
METALLIC ROD PACKING.

No. 526,381. Patented Sept. 25, 1894.

Fig. 10



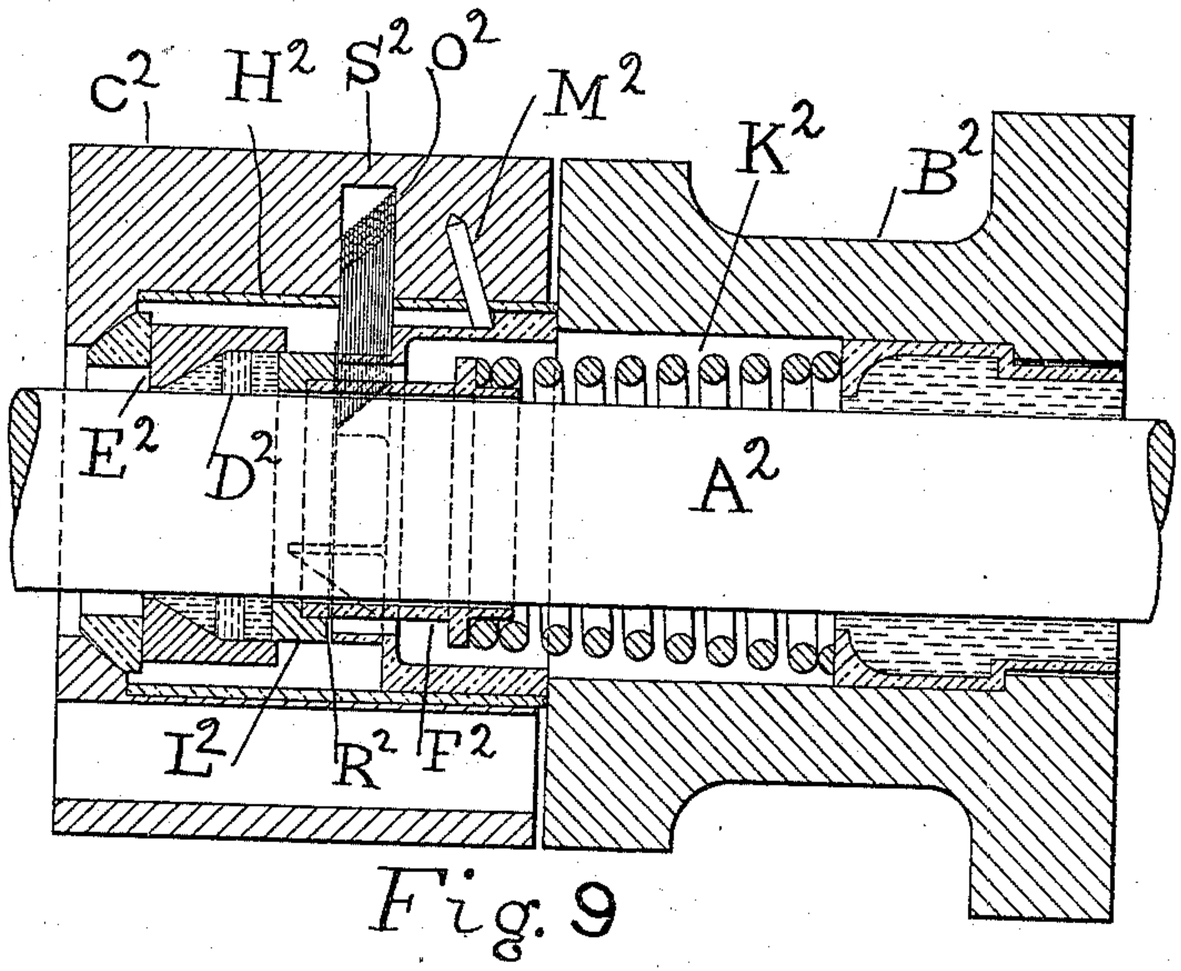


Fig. 9

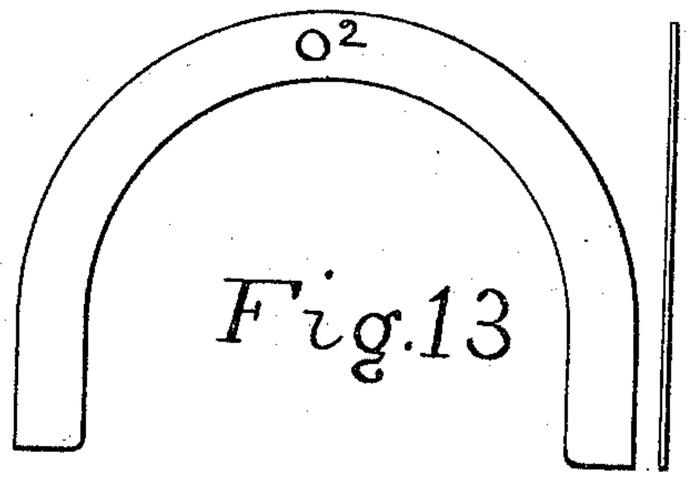


Fig. 13

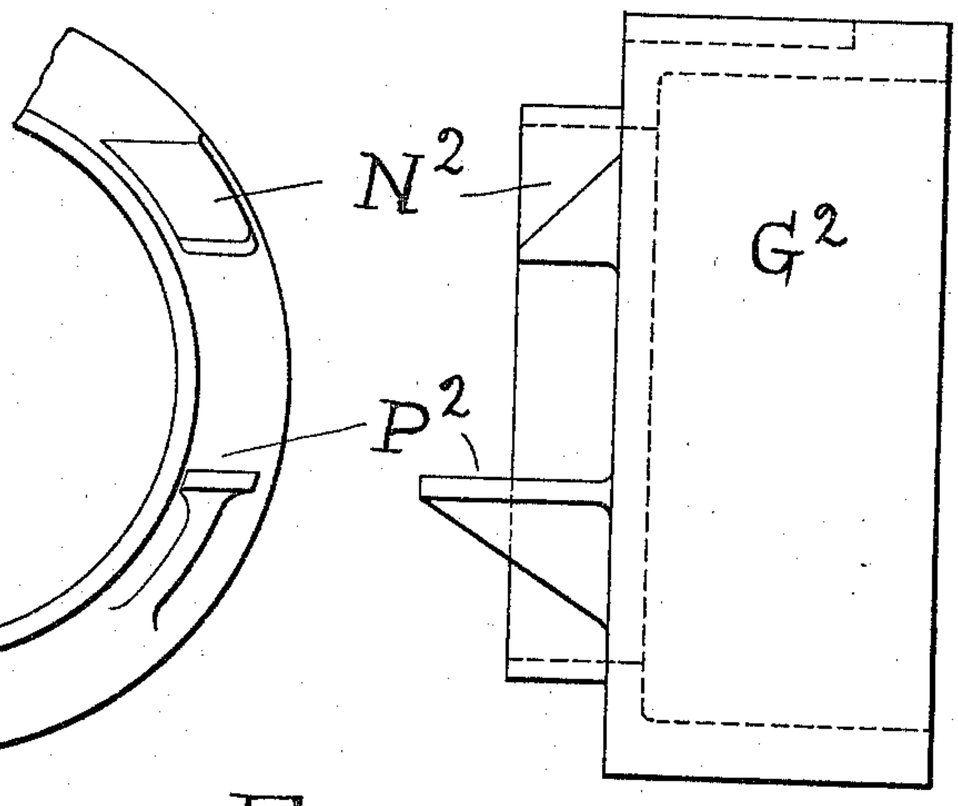


Fig. 11

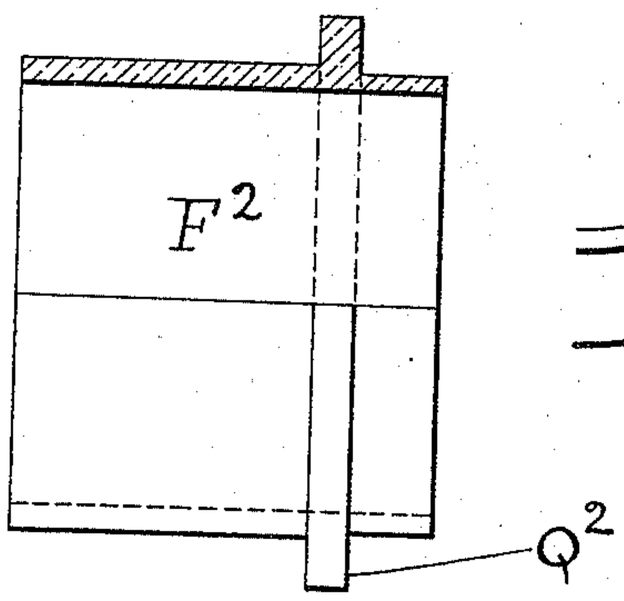


Fig. 12

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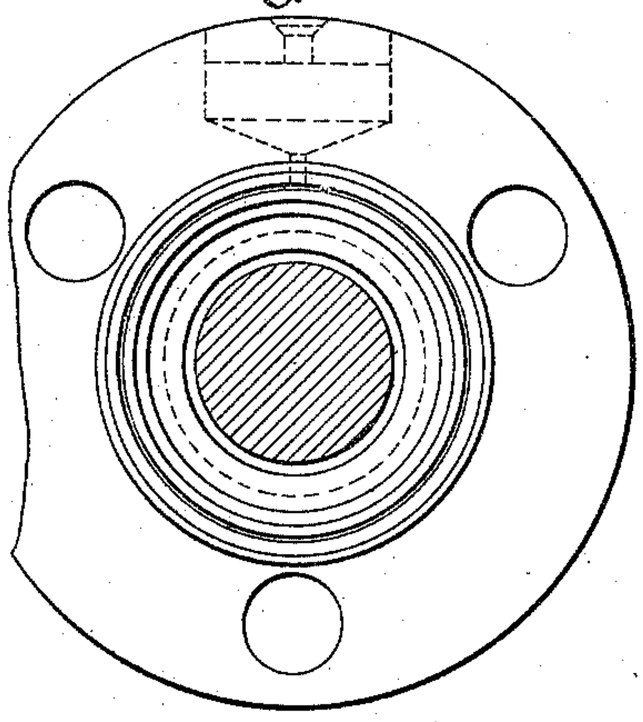
METALLIC ROD PACKING.

No. 526,381. Patented Sept. 25, 1894.

Fig. 15



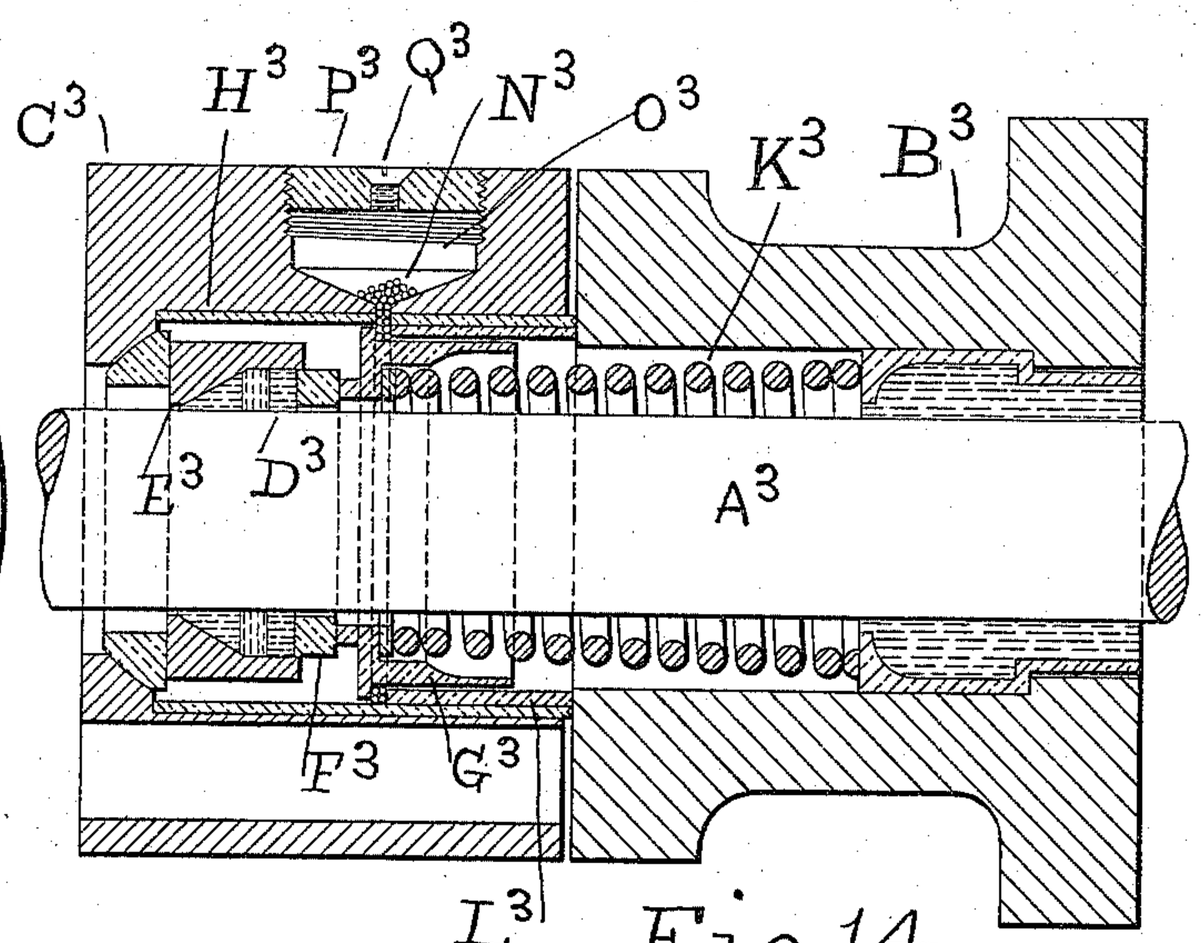


Fig. 14

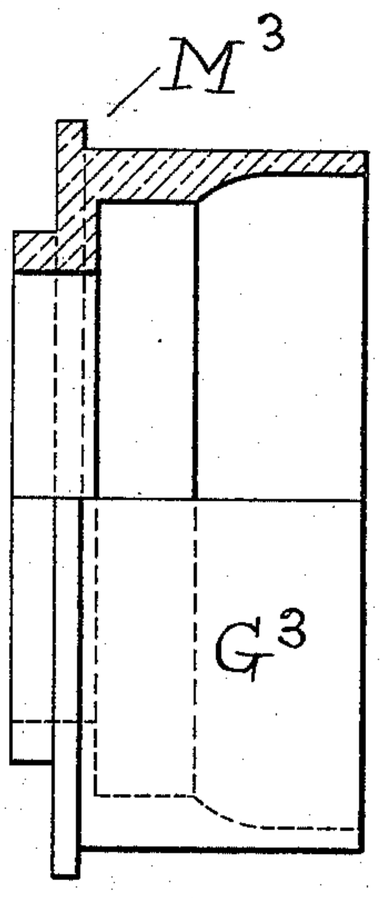


Fig. 16

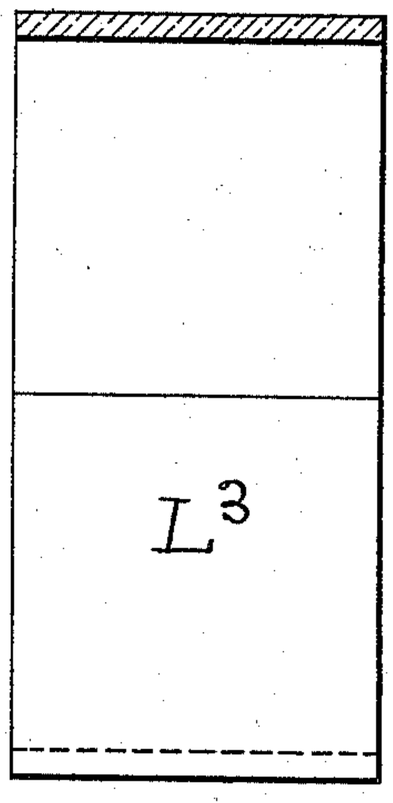


Fig. 17

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UNITED STATES PATENT OFFICE.

FRANCIS JOHN COLE, OF BALTIMORE, MARYLAND.

METALLIC ROD-PACKING.

SPECIFICATION forming part of Letters Patent No. 526,381, dated September 25, 1894.

Application filed May 21, 1894. Serial No. 511,991. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS JOHN COLE, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented a new and useful Improvement in Metallic Rod-Packing, of which the following is a specification.

This improvement relates to metallic rod packing, constructed substantially as the usual forms now in use, in which the metallic rings are pressed against the surface of the rod, by being forced into a conical, or other shaped cup, having a tapering form, by means of a spring acting in the direction of the axis of the rod. It is well known that with this form of packing the rings frequently bind so tightly on the rod, due to roughness or slight irregularities in same, or by reason of a lack of oil, or by being too tightly forced against the surface by the action of the spring, that instead of the rod sliding through them, the rings are carried back by the motion of the rod until the spring is entirely compressed, when it suddenly flies back to its original position, often causing the breakage of some of the parts, and nearly always resulting in unduly jamming the rings in the conical cup. In order to partially overcome this it is customary to use an undue amount of spring pressure and increase its strength far in excess of what would be normally needed to keep the rings in sufficient contact with the rod to make a steam tight joint. No provision has hitherto been made in this form of packing to automatically restrict this motion, and the object of this invention is to provide an abutment or stop which is automatically forced forward by the action of the spring, and blocked in its advanced position so that the metallic rings cannot be pushed out of position by the action of the rod.

Figure 1 shows a sectional elevation of the rod, packing, &c.; Fig. 2, an end view of same, showing a partial section of the ratchet and pawl; Fig. 3, a detail of main inside casing, the upper part in section, showing the screw thread; Fig. 4, the movable abutment or stop, the upper part of which is shown in section, with the external thread which engages on the inside of Fig. 3, and the ratchet part of which is shown in Fig. 2. In the arrangement, Figs. 1 to 4, the abutment or stop is provided with a very coarse thread, the pitch of which is sufficiently steep, so that the pressure of the spring will cause it to revolve as it advances, caused by the rings gradually wearing on being forced into the conical vibrating cup; and it is automatically locked in its advanced position by the pawls engaging in the ratchet teeth, which prevents it being forced in the opposite direction. Fig. 5 shows a sectional view of another means of producing this result, by means of inclined planes, bent to arcs of a circle conforming to the radius of the inside casing, which fall down by gravity and automatically secure the abutment or stop in its advanced position. Fig. 6 represents a sectional end view of same, taken on the line *a*—*b*. Fig. 7 shows the movable abutment or stop in a complete sectional elevation, and fragmentary details of other portions of same; Fig. 8, an elevation and side view of the inclined planes. Fig. 9 shows the same result produced by means of a number of horse shoe washers, stamped out of thin metal, which are grouped in the upper part of case and automatically fall down, by reason of their weight, when the packing rings are gradually worn. Fig. 10 is a sectional end view of same, showing one of the washers dropped down and partially surrounding the rod and the rest grouped in the upper part of case. Fig. 11 shows the elevation and portion of end view of the abutment, which in this case is stationary; Fig. 12, an elevation, with upper part in section, of the spring follower; Fig. 13, an elevation and end view of the thin horse shoe washers. Fig. 14 represents a sectional elevation of metallic packing and rod, in which the abutment is automatically pushed forward by means of the spring and prevented from returning by means of small cylindrical balls or shot, which naturally fall down from the receptacle in which they are stored, and fill up the annular space, as the rings are pushed forward by reason of wear. Fig. 15 is an end view of same; Fig. 16, an elevation of the movable part of the abutment, the upper part being shown in section; Fig. 17, an elevation and partial section of the stationary part of abutment, which in this case is in the form of a plain, thin, cylindrical ring.

Referring again to Fig. 1, A is the rod around which the packing is arranged and which it is desired to render steam tight; B, the portion of the steam chest or cylinder head forming the stuffing box, through which the rod has a reciprocating motion; C, the packing case; D, the rings, and E the vibrating cup containing the same. F is the spring follower, which presses the rings into the cup E; G, the movable abutment; H, the casing forming the inner part of the case C, and provided with a very coarse internal screw thread I, in which the external thread J, shown on Fig. 4, works. K is the spring which forces the metallic rings forward into the vibrating cup E. L is the ratchet teeth formed on the outside and rear portion of the movable abutment G. M is two or more pawls which engage in the teeth L. N is a slot, cut in the inside bushing H, through which the pawls M move.

It will be readily seen that as the abutment G is forced forward by reason of the spring, and the wear of the metallic rings, it revolves by reason of the screw threads J and I, and is automatically prevented from returning by the pawls M engaging in the ratchet teeth L.

In Fig. 5, A′ represents the rod; B′, the steam chest or cylinder head; C′, the packing case; D′, the lead rings; E′, the vibrating cup; F′, the spring follower; G′, the movable abutment; H′, the inside casing; K′, the spring; J′, a ring with a lip formed on a smaller diameter, which holds up the inclined plane, shown in Fig. 8, and engages in the groove L′. M M are steady pins in case H′ which keep the movable abutment in a vertical position. These engage in the slot N′, shown in Fig. 7. When the packing is put in place, the wedges O O are placed in the back and in the upper portion of the inside casing ring H′, and are held in position by means of the ring J′, with its lip. The wedges bear against the projection P on the ring G′ and gradually settle down as the abutment is forced forward by means of the spring and the wear of the metallic rings.

In Fig. 9, A^2 represents the rod; B^2, the steam chest or cylinder head; C^2, the packing case; D^2, the metallic packing rings; E^2, the vibrating cup containing said rings; F^2, the spring follower; G^2, the abutment, which in this case is stationary; H^2, the inside casing; K^2, the spring; L^2, a ring, one end of which is in contact with the spring follower F^2 and the other with the metallic packing rings D^2. M^2 is a steady pin to keep the stationary abutment G^2 in a vertical position. N^2 is an inclined surface on the stationary abutment G^2, whose object it is to keep the thin metallic packing washers, shown in Fig. 13, marked O^2, always in the forward part of the case, next to the ring L^2 and the stationary abutment G^2. P^2 is a lug or projection on the stationary abutment G^2, on which the horse shoe washers rest, after they fall down in their lowest position, and prevents them from dropping to the lower part of the case. Q^2 is an annular ring formed around the spring follower F^2, for a projection or bearing for the spring K^2. The operation of this modified form is, that as the rings D^2 are forced forward in the vibrating cup E^2, by the pressure of the spring and by reason of their wearing, the space R^2 between the stationary abutment G^2 and the ring L^2 is gradually increased until it exceeds the thickness of one of the washers. The thin horse shoe washer O^2, traveling down on the inclined plane N^2, is always kept in contact with this opening R^2, and drops down in position whenever the thickness exceeds the thickness of the said washer. The slot S^2 in packing case C^2, is made wide enough to contain a sufficient number of washers, whose total thickness is equal to the total amount of wear allowable on the metallic packing rings.

In Fig. 14, A^3 is the rod; B^3, the steam chest or cylinder head; C^3, the packing case; D^3, the metallic packing rings; E^3, the vibrating cup containing the same; F^3, the spring follower; G^3, the movable abutment; H^3, the inside casing; K^3, the spring; L^3, the stationary abutment, fitting tightly on the inside of the casing H^3; M^3, an annular ring or projection formed on the movable abutment G^3, the space between it and the stationary abutment L^3 forming an annular space into which the shot, N^3, falls. O^3 is a receptacle or chamber for the shot and is sufficiently large to equal an area as large as the annular space into which the shot falls when the rings are worn down until they require renewing. P^3 is a cap for the shot chamber O^3; Q^3, a small screw which can be removed and affords a ready means for filling the chamber without removing the main cap P^3.

The movable abutment G^3 is made an easy sliding fit, without undue looseness, so that it can be readily moved forward by sliding in the stationary abutment L^3, and it is automatically prevented from returning, as the spring forces it forward, by the resistance of the shot. It has been found by experiment that the small shot will fall in readily and will afford sufficient resistance against being forced back into its original chamber.

I claim—

1. The combination of a metallic packing for rods, a packing chamber, a rod reciprocating therein, a helical spring surrounding said rod, and an abutment provided with means for automatically increasing its effective length, by interposing substantial solid or unyielding substances on one of its ends to prevent the axial movement of the packing rings in a reverse direction to the elongation of the spring.

2. The combination of a metallic packing for rods, a packing chamber, a rod reciprocating therein, a helical spring surrounding said rod, and an abutment which advances as the metallic packing rings become worn, provided with means for automatically se-

curing it in its advanced position, to prevent the axial movement of said rings.

3. The combination of a metallic packing for rods, a packing chamber, a rod reciprocating therein, a helical spring surrounding said rod, and an abutment which is advanced by means of said spring, and prevented from returning by means of inclined planes or wedges, located wholly or in part within the packing chamber, which fall down by reason of their weight and prevent a backward or axial movement of the metallic packing rings.

4. The combination of a metallic packing for rods, a packing chamber, a rod reciprocating therein, a helical spring surrounding said rod, an abutment which is advanced by means of said spring, and the projection "P" on the abutment, the abutment being prevented from returning by means of inclined planes or wedges, located wholly or in part within the packing chamber, which fall down by reason of their weight and prevent a backward or axial movement of the metallic packing rings.

5. The combination of a metallic packing for rods, a packing chamber, a rod reciprocating therein, a helical spring surrounding said rod, an abutment which is advanced by means of said spring, the projection "P" on the abutment, and the guide ring "J," the abutment being prevented from returning by means of inclined planes or wedges, located wholly or in part within the packing chamber, which fall down by reason of their weight and prevent a backward or axial movement of the metallic packing rings.

FRANCIS JOHN COLE.

Witnesses:
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EDWARD G. ROST.