

(No Model.)

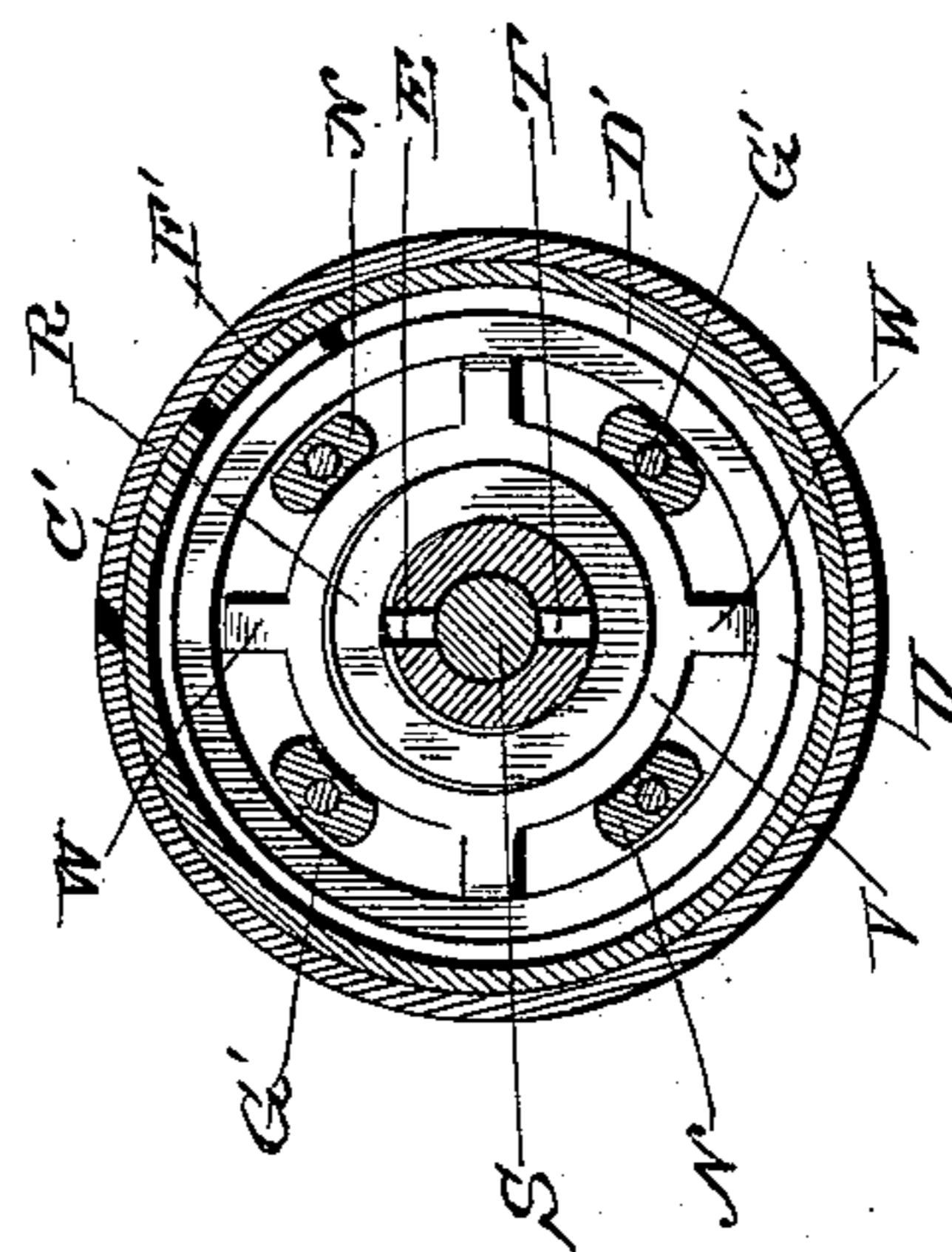
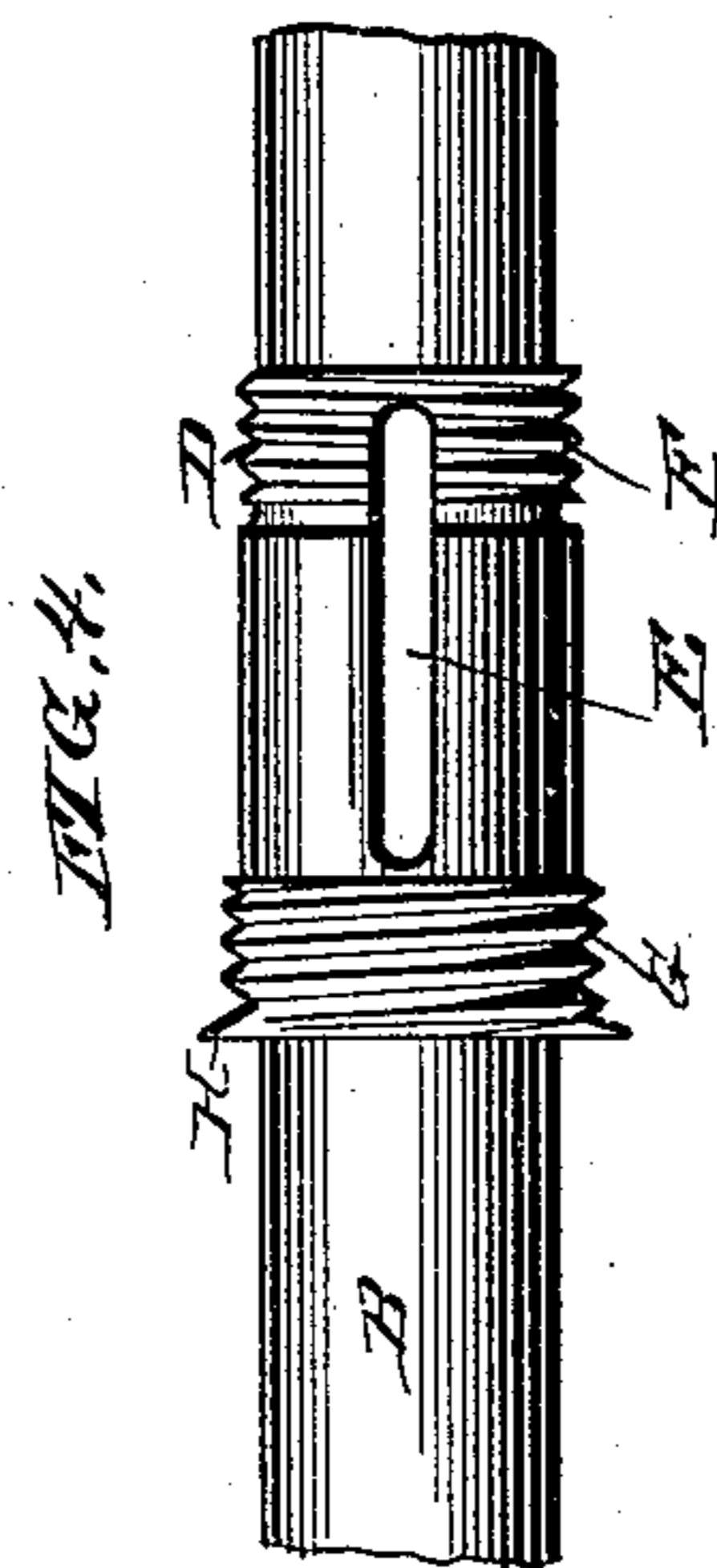
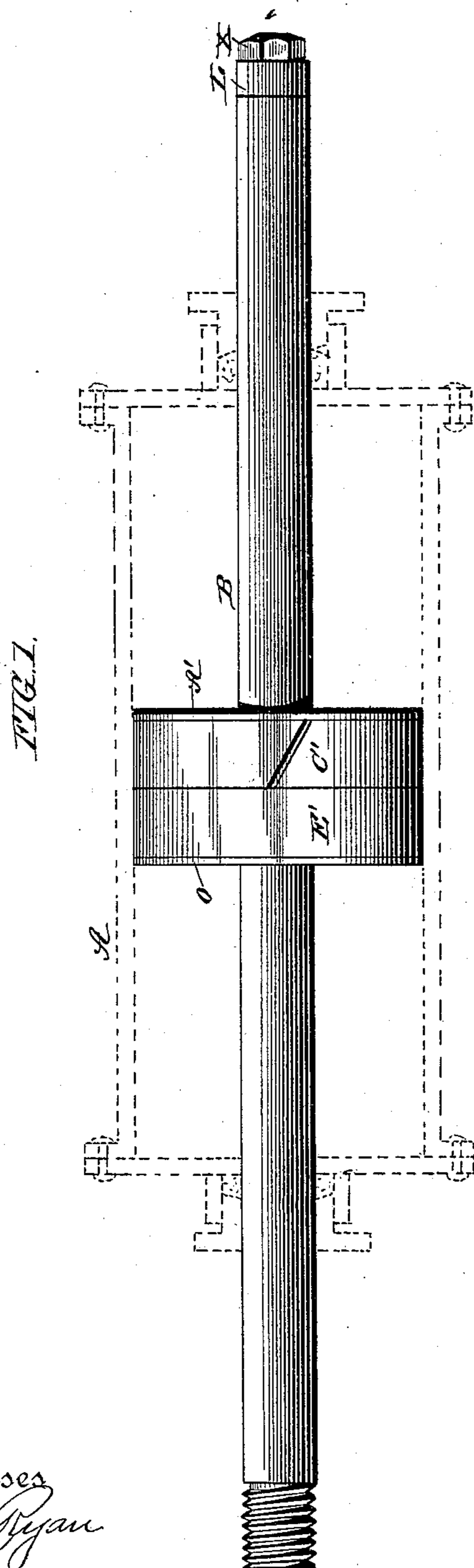
2 Sheets—Sheet 1.

S. IDE.

PISTON PACKING.

No. 361,521.

Patented Apr. 19, 1887.



Witnesses
Jos. A. Ryan
J. W. Gannon

Inventor
Samuel Ide
By his Attorneys
C. K. Shaw & Co.

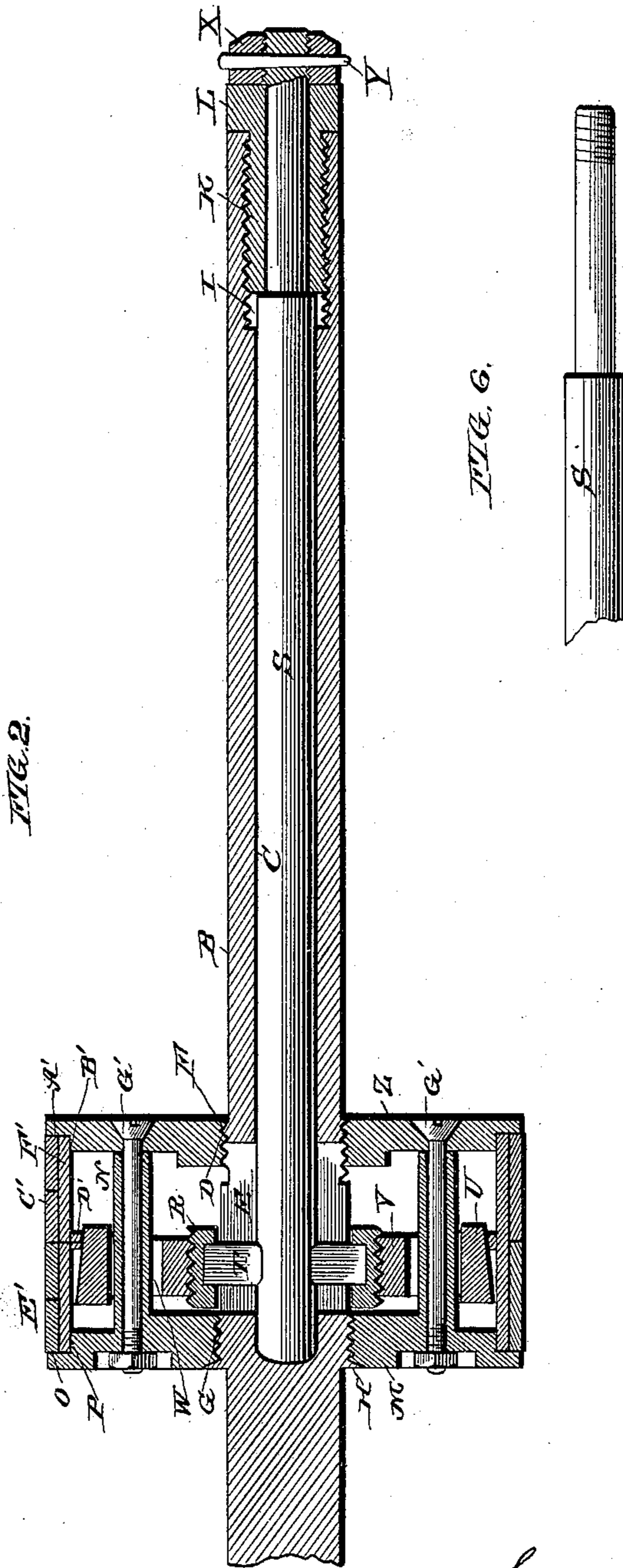
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UNITED STATES PATENT OFFICE.

SAMUEL IDE, OF MEDINA, NEW YORK.

PISTON-PACKING.

SPECIFICATION forming part of Letters Patent No. 361,521, dated April 19, 1887.

Application filed January 22, 1887. Serial No. 225,163. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL IDE, a citizen of the United States, residing at Medina, in the county of Orleans and State of New York, have invented a new and useful Improvement in Pistons and Piston-Packings, of which the following is a specification.

My invention relates to an improvement in pistons and piston-packings for steam-engines; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a piston embodying my improvements, showing the same arranged in a steam-cylinder, the latter being indicated in dotted lines. Fig. 2 is a vertical longitudinal sectional view of the piston, taken through a portion of the piston-rod. Fig. 3 is a transverse sectional view taken on the line $x x$ of Fig. 2 and looking in the direction indicated by the arrow in said figure. Fig. 4 is a detail view of the central portion of the piston-rod. Fig. 5 is a detail view of the collar R. Fig. 6 is a view in detail of one end of the rod S.

A represents the cylinder of a steam-engine, and B represents the piston-rod, which extends through both heads of the steam-cylinder, the said heads being provided with the usual packing-boxes, the glands of which entirely support the piston-rod. The latter is provided with a longitudinal bore, C, which extends from its rear end to about the central portion of the piston-rod. The central portion of the piston-rod is provided with an enlarged shoulder, D, which is of suitable length, and through the said shoulder and communicating with the inner end of the bore C is made a longitudinal opening, E. The rear end of the shoulder is provided with left-hand screw-threads F, and the front end of the shoulder is provided with right-hand screw-threads G, the extreme front end of the shoulder having an enlarged flange, H, for the purpose to be hereinafter set forth. The portion of the shoulder which intervenes between the threads F and G is plane. The rear end of the bore C of the piston-rod is enlarged to form a cavity, I, which is screw-threaded, and is adapted to receive a threaded adjusting-sleeve, K. The latter is provided at its outer end with an enlarged head, L, the

diameter of which is just equal to the diameter of the piston-rod, so that the said head will offer no obstruction to the insertion of the piston-rod through the packing-box in the rear head of the steam-cylinder.

M represents a piston-head, which is provided at its center with a threaded opening that is adapted to be screwed upon the threads F of the shoulder D. From the rear side of the said piston-head project arms N, which are of suitable length, and are arranged in a circle drawn from the center of the piston-head. The latter is provided at its perimeter with a projecting flange, O, thereby forming an annular shoulder, P, on the rear side of the piston-head.

R represents a sleeve-nut, which is cylindrical in shape, and is provided with a central plane longitudinal opening, which is adapted to fit upon the plane portion of the shoulder D, and thereby the said sleeve-nut is adapted to slide upon the said shoulder. The periphery of the sleeve-nut is provided with a left-hand screw-thread.

S represents an adjusting-rod, which fits in the bore of the cylinder and extends outwardly through the adjusting sleeve-nut K. The inner end of the said adjusting-rod is secured to the sleeve-nut R by means of a key T, which extends through a transverse opening made in the said sleeve-nut, through the opening E of the piston-rod, and also through an opening made at the rear end of the adjusting-rod.

U represents a circular spider, the face of which forms the frustum of a cone. The said spider is provided with a central hub, V, which is provided with a left-hand interior thread, and is thereby adapted to receive the left-hand threaded sleeve-nut R. From the said hub projects a number of radial arms W, which correspond in number with the arms N, that project from the rear side of the piston-head, the said arms N being passed through the openings which are formed in the spider between the arms W.

By reference to Fig. 2 it will be understood that the sleeve-nut R must be screwed into the spider at the same time that the piston-head is screwed onto the thread G.

The rear end of the adjusting-rod S is slightly reduced in diameter, and is provided with a left-hand screw-thread, on which is secured a

nut, X. This nut is prevented from turning on the rear threaded end of the adjusting-screw-after it has been screwed home by a pin or key, Y, which is inserted in a transverse opening made in the nut and in a similar opening made in the rear end of the adjusting-rod.

From the foregoing it will be understood that when the adjusting sleeve-nut is turned so as to cause the same to move outwardly in the rear end of the piston-rod the adjusting-rod S will be caused to move rearwardly with the said sleeve-nut, and thus cause the sleeve-nut R to also move rearwardly, and as the spider is secured to the said sleeve-nut R, it is obvious that the said spider will be also caused to move rearwardly. When the adjusting-nut K is screwed forwardly, the spider will move toward the piston-head M.

Z represents the rear piston-head, which is provided with a central threaded opening, which is adapted to be screwed upon the left-hand thread F of the piston-rod. The perimeter of the said piston-head Z is provided with a projecting annular flange, A', and thereby an annular shoulder, B', is formed in front of the said flange.

The heads M and Z of the piston are of exactly the same diameter, and the diameter of the said heads should be a very little less than the diameter of the bore of the cylinder, so that the flanges on the said heads will be just out of contact with the sides of the bore of the cylinder, and thereby the piston will have its weight supported entirely by the glands in the packing-boxes at the ends of the cylinder.

C' represents an annular spreading-ring which is made of brass or other suitable metal or alloy, and is provided with a diagonal slot, which entirely traverses one side of the said ring, thereby opening the same. On the inner side of the ring, at the center thereof, is formed an annular inwardly-projecting flange, D'. This ring C' is adapted to fit on the annular shoulders on the opposing sides of the piston-head, and the cone-shaped face of the spider U has its smaller end normally engaged with the inner side of the annular flange D' of the ring.

E' F' represent a pair of annular open rings, which are also made of brass or other suitable metal or alloy, and have diagonal kerfs or slits extending across one side. The interior diameter of these rings E' and F' corresponds to the exterior diameter of the ring C', and they are fitted thereon, the width of each ring E' and F' being just equal to one-half the width of the ring C', and thereby the said rings E' and F' entirely cover the face of the ring C'. The exterior diameter of the rings E' and F' is normally slightly in excess of the diameter of the piston-heads, and thereby the said rings E' and F' are adapted to just fit the bore of the cylinder, so as to effect a steam-tight packing therein, and to bear against the bore of the cylinder with such a slight pressure as to offer but very little friction when the piston is reciprocated.

The rear piston-head, Z, bears against the rear end of the arms N of the piston-head M, and is provided with countersunk openings which align with openings that extend longitudinally through the said arms N and through the piston-head M. Screw-bolts G' fit in the said openings and clamp the piston-heads together, as shown. As the piston-head M has a right-hand threaded opening and as the piston-head Z has a left-hand threaded opening, whereby they are attached to the piston-rod, it will be readily understood that when the piston-heads are clamped together neither of them can be turned on the piston-rod and become unscrewed therefrom. The function of the flange H at the front side of the screw-threads G is to cause the piston-head M to stop when it comes in contact with the said flange when the said piston-head is being screwed upon the piston-rod.

The operation of my invention is as follows: The packing-rings C', E', and F' are inert, non-resilient, and have no tendency to expand in the bore of the cylinder. When the packing-rings become worn and it is necessary to expand them in order to effect a steam-tight joint between the piston and the cylinder, this may be readily done by turning the adjusting sleeve-nut K so as to cause the same to be partly unscrewed from the threaded cavity in the rear end of the piston-rod, thus causing the spider to move rearwardly, and as the face of the said spider is cone-shaped, as before described, it will be readily seen that it will expand the interior packing-ring, C', and the exterior rings, E' and F', will be also expanded thereby, and thus caused to fit snugly in the bore of the cylinder. Care should be exercised in expanding the packing-rings to prevent the latter from being expanded too much, and thus caused to offer needless frictional resistance to the reciprocation of the piston. It is only necessary to expand the said rings to such an extent as to cause them to just come in contact with the bore of the cylinder at all sides in order to effect a steam-tight packing, and thus the said packing-rings offer but a minimum frictional resistance, when properly set, to the operation of the piston.

As the piston-rod passes through packing-boxes at both ends of the cylinder, the weight of the piston is entirely borne by the piston-rod, and consequently the piston does not bear more heavily upon the lower side of the cylinder than at other points, and thus the packing-rings do not become worn on their lower sides to a greater degree than at other points of their circumference.

Having thus described my invention, I claim—

1. The combination of the piston-rod having the longitudinal bore, the piston-heads rigid on the rod, the cone-shaped spider arranged between the said heads and movable on the piston-rod, the adjusting-rod in the bore of the piston and connected to the spider

to move the latter, and the expansible packing-rings fitting between the piston-heads and bearing on the cone-shaped periphery of the spider, substantially as described.

5 2. The combination of a hollow piston-rod having a transverse opening, E, communicating with the longitudinal bore thereof, an endwise-movable adjusting-rod fitted in the bore of the piston-rod, a sliding sleeve fitted
10 on the piston-rod over the opening therein, a key fitted in the opening of the piston-rod and connecting the sliding sleeve and adjusting-rod, the cone-shaped spider carried by the sliding sleeve, and the expansible packing-
15 rings riding on the periphery of the spider, substantially as described, for the purpose set forth.

3. The combination of a hollow piston-rod, an endwise-movable adjusting-rod fitted in the
20 bore of the piston-rod, a cone-shaped spider sliding on the piston and connected to the adjusting-rod, a threaded adjusting-sleeve working in a threaded portion at the outer end of the longitudinal bore of the piston-rod,
25 a binding-nut fitted on and keyed to the outer end of the adjusting-rod, which is extended through the adjusting-sleeve, and the expansible packing-rings riding on the periphery of the spider, as and for the purpose described.

30 4. The combination of a piston-rod having the right and left hand threaded portions, with an intermediate plane portion, the pis-

ton-heads rigid on the threaded portions of the piston-rod and connected by a series of spaced arms, which are fixed to the heads, a sliding
35 spider fitted on the plane portion of the piston-rod between the rigid heads and having the openings through which the connecting-arms of the heads are passed, and the expansible packing-rings bearing on the periphery
40 of the spider, substantially as described, for the purpose set forth.

5. The combination of a piston-rod having the longitudinal bore, the heads fixed on the piston-rod, an endwise-movable adjusting-rod
45 fitted in the longitudinal bore of the piston-rod, a sliding spider fitted between the rigid piston-heads and connected to the adjusting-rod to move therewith, the periphery of the spider being in the form of a truncated cone,
50 and the expansible packing-rings bearing at all points equally upon a portion of the cone-shaped periphery of the spider, whereby the said rings are expanded or contracted equally
55 in all directions, as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

SAMUEL IDE.

Witnesses:

WM. H. WILMARTH,
FRANK CARPENTER.