

No. 885,652.

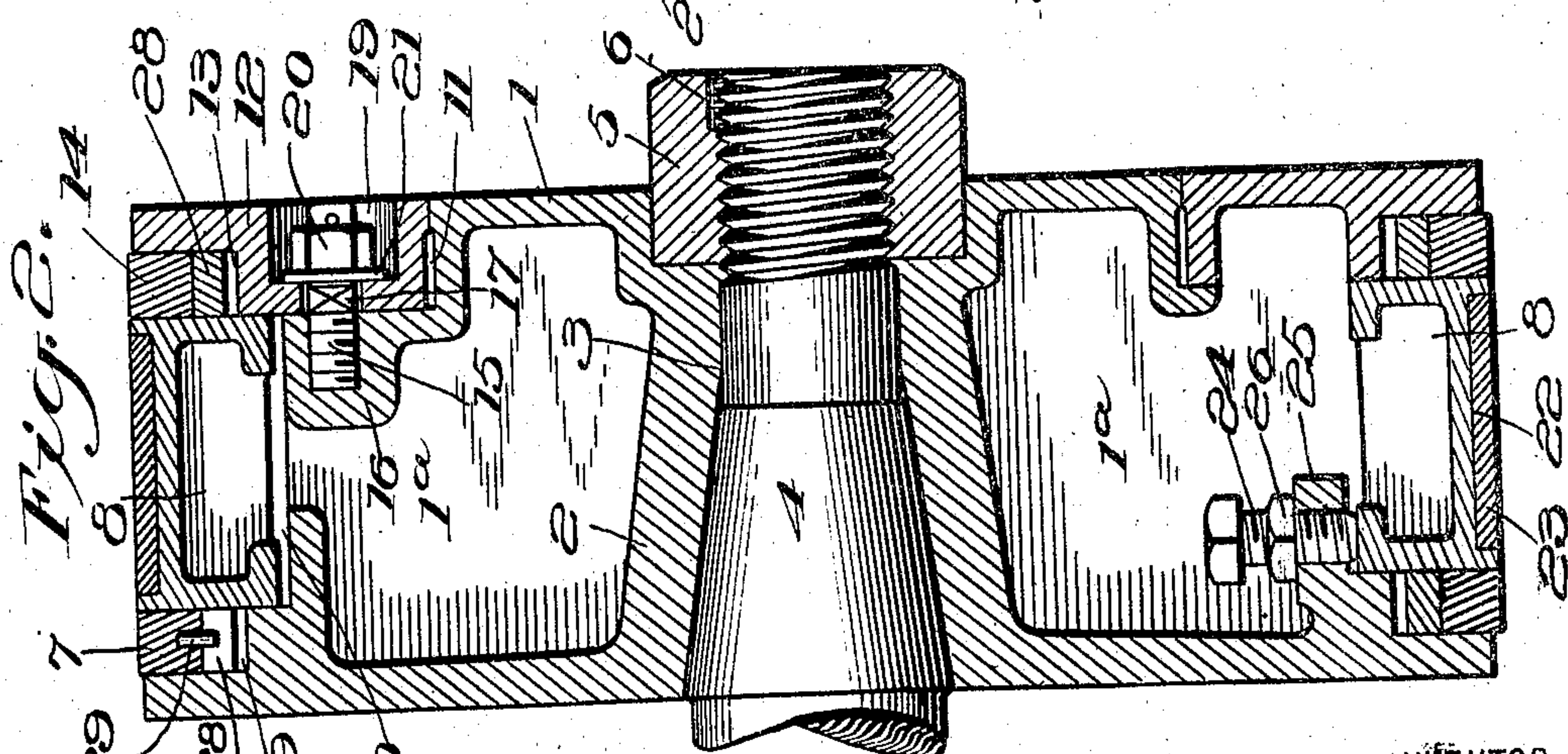
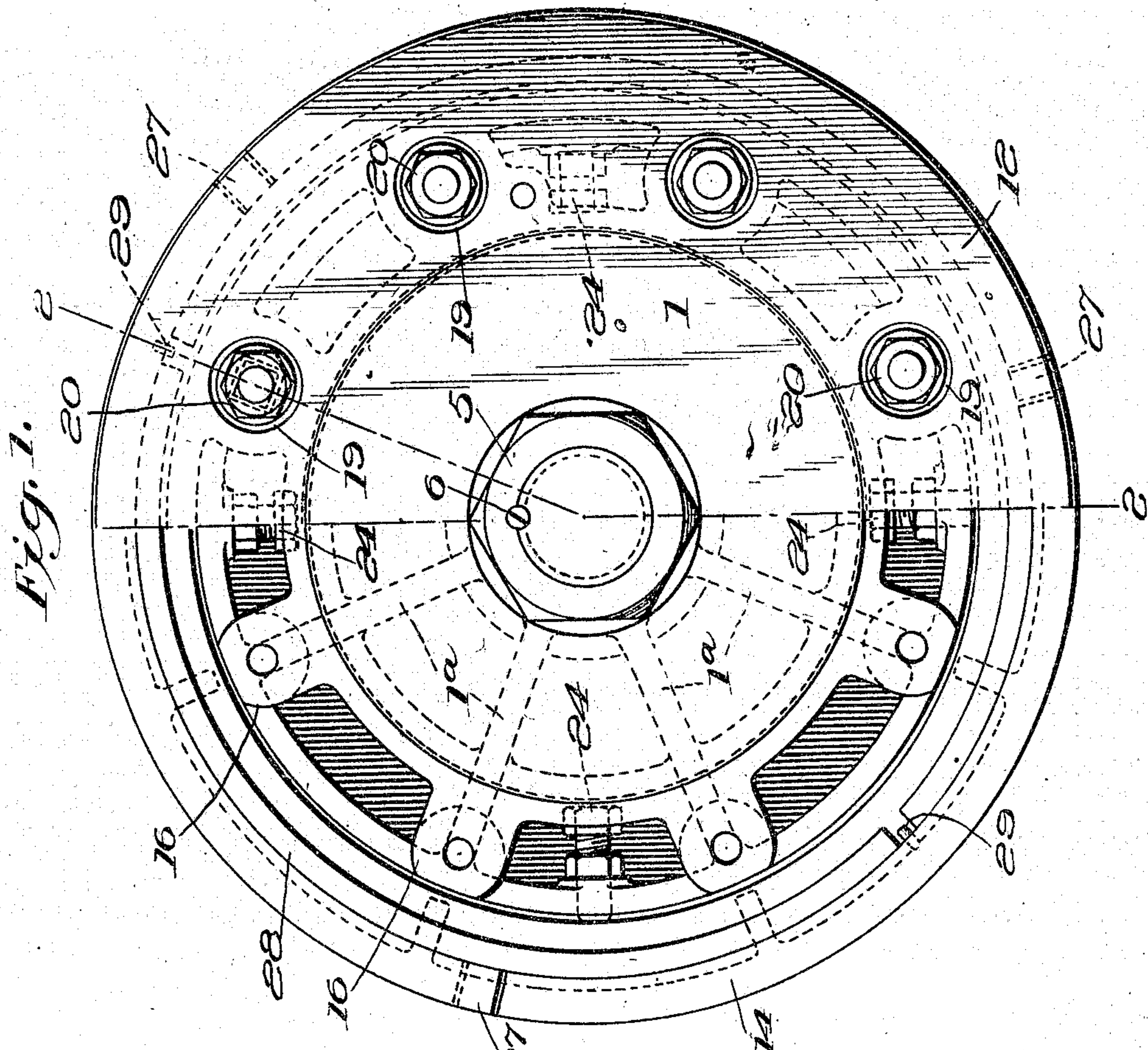
PATENTED APR. 21, 1908.

J. A. SCOTT.

PACKING FOR PISTONS.

APPLICATION FILED MAY 25, 1906.

3 SHEETS—SHEET 1



WITNESSES

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Allan H. Goose.
J R Richards

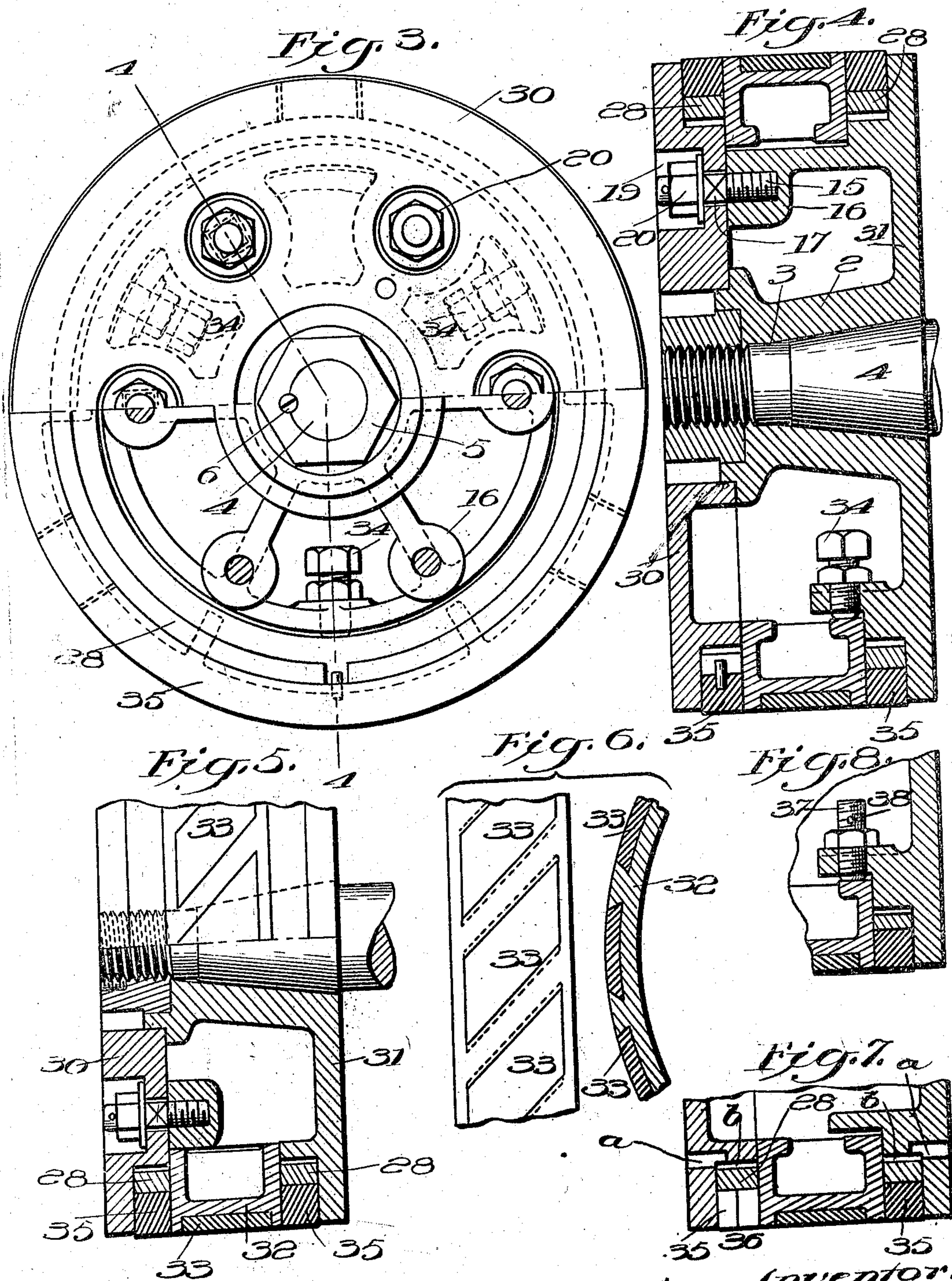
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3 SHEETS—SHEET 2.



Witnesses:
Allan F. Wood.
J. R. Richards.

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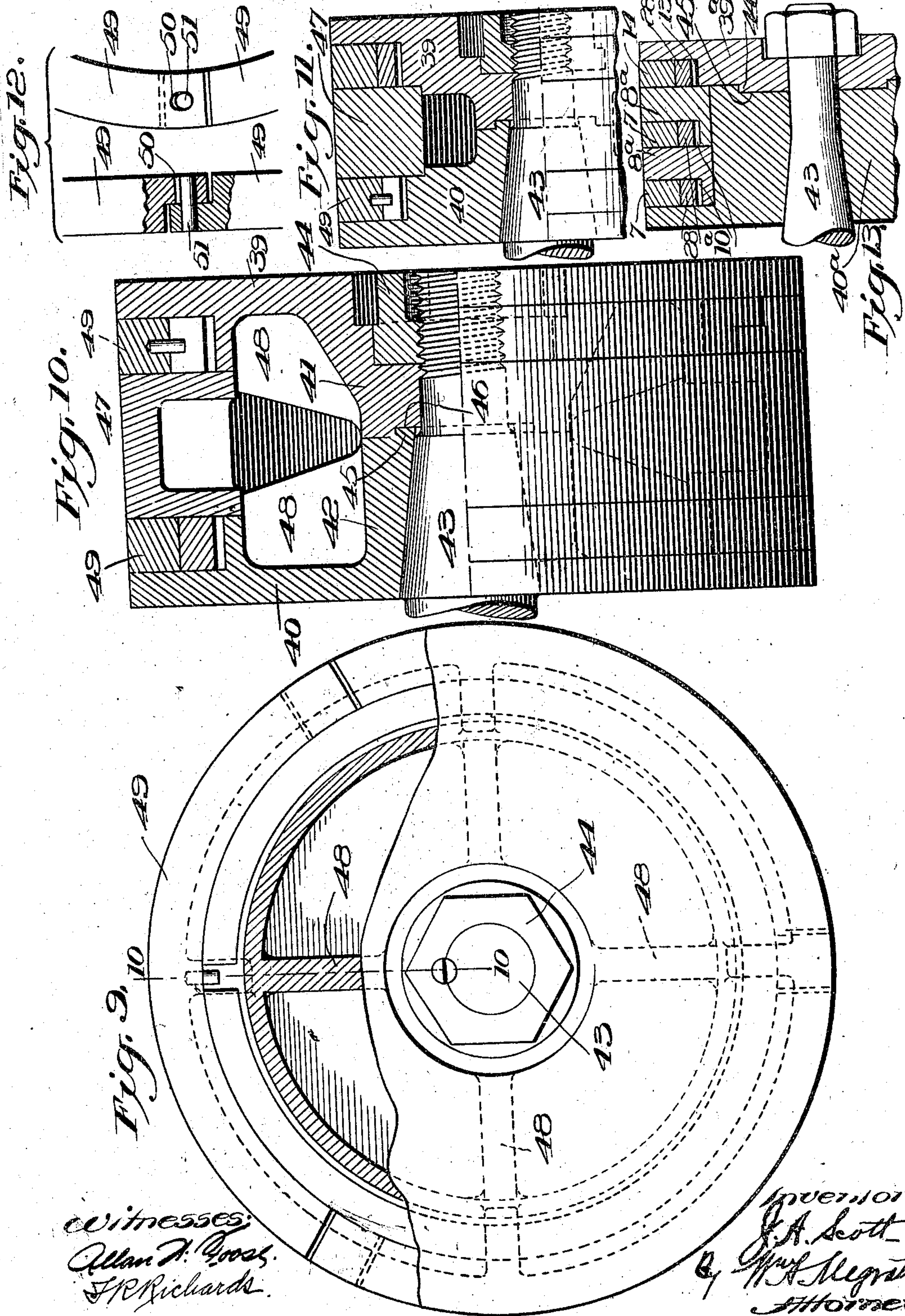
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PACKING FOR PISTONS.

APPLICATION FILED MAY 26, 1906.

3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOSEPH ALVAH SCOTT, OF NEW YORK, N. Y., ASSIGNOR TO COCKBURN BARROW & MACHINE COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PACKING FOR PISTONS.

No. 885,652.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed May 25, 1906. Serial No. 318,651.

To all whom it may concern:

Be it known that I, JOSEPH ALVAH SCOTT, a citizen of the United States, and a resident of the city and State of New York, have invented certain new and useful Improvements in Packings for Pistons, of which the following is a specification.

My invention relates to packings for pistons comprising annular packing and wearing or centering rings, and to the manner of and means for mounting the rings upon the piston body so that said rings may be held securely in place while being permitted to expand freely against the side of the cylinder.

It also relates to means for securing the rings so that they may be easily and quickly assembled on the piston and removed therefrom when desired.

My invention will be best understood from the description of the several embodiments thereof which have been selected for illustration. These embodiments are shown in the accompanying drawings in which the same reference characters refer to the same parts in the different views.

Referring to the drawings, Figure 1 is a plan view of a preferred form of my invention, part being removed to more clearly show the construction. Fig. 2 is a sectional view of the complete device on the line 2—2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, of a modified form of the invention. Fig. 4 is a sectional view of the complete device on the line 4—4 of Fig. 3. Fig. 5 is a sectional view of a modification. Figs. 6 and 7 are views of details of the construction shown in Fig. 3. Fig. 8 is a view of a modified form of centering screw for the continuous packing ring. Fig. 9 is a view similar to Fig. 1 of another modification of the invention. Fig. 10 is a view, partly in transverse section as the line 10—10, of Fig. 9. Fig. 11 is a view similar to Fig. 10 of another modification, and Fig. 12 is a detail view of the expansible connection between the segments of the segmental packing rings. Fig. 13 is a sectional view showing the use of a plurality of packing rings and centering rings especially adapted for use in high pressure cylinders.

In the embodiment of my invention shown in Figs. 1 and 2, the piston comprises a hollow casting 1 having a central hub 2 bored at 3 to receive the end of the piston rod 4, said rod being tapered to have a driving fit in the similarly tapered opening 3 of the pis-

ton. The rod 4 is threaded to receive a nut 5, by which the piston and rod are secured together and the nut is preferably locked in position by a threaded key 6. To strengthen the casting 1 and to provide further support for the packing rings, ribs 1^a radiate from the hub 2 to the perimeter of the casting.

To receive the packing rings 7 and wearing or centering ring 8, respectively, the perimeter of the piston is provided with the annular recesses 9 and 10, and one face of the piston, preferably the rear or top, as here shown, is further recessed at 11 to receive an annular holding ring or follower plate 12, which itself has an annular recess 13 to receive another packing ring 14. Said ring 12 serves to secure the packing rings upon the perimeter of the piston, while, at the same time it permits free expansion of said rings against the sides of the cylinder.

The ring or plate 12 is secured to the piston casting 1 by means of stud bolts 15 which are screwed into lugs 16 upon the ribs 1^a, said bolts being squared at 17 to enter similar apertures 18 in the bottom of the bolt receiving recesses 19 in said holding rings 12. The squared portions 17 of the stud bolts 15 prevent them from rotating when the clamping nuts 20 are screwed down over their upper ends upon the washers 21 at the bottom of the recesses 19. This squared portion of the stud bolts may, however, be dispensed with, but other means of locking may be provided; for instance, headed bolts could be used with locking plates placed in recesses 19.

The packing rings 7, centering ring 8 and packing rings 14, as before described, are arranged in the annular recesses 9, 10, and 13 respectively of the piston casting 1. The centering ring 8 is continuous or solid, and consists of a circular casting having a groove 22 in its perimeter to receive a band or plates 23 in metal which constitute the wearing material proper. The ring 8 is of somewhat larger diameter than the recess 10, and to keep the ring properly centered with respect to the piston casting 1, I provide adjusting screws 24, mounted in lugs 25 on the piston casting, which screws bear against the inner face of said ring. When the ring is properly adjusted the screws are locked in position by lock nuts 26. The packing rings 7 and 14 are alike and comprise segments having overlapping ends 27, Fig. 1. A split spring band 28 is interposed between the segments of the

rings 7 and 14 and the bottom of the recesses 9 and 13, whereby said segments are uniformly expanded outwardly and against the interior wall of the cylinder.

5 For most effective action it is necessary that the ends of the spring bands 28 be staggered with respect to the joints of the segmental rings 7 and 14, and to this end one of said segments is provided with a pin 29 which
10 projects between the ends of the ring 28.

In the modifications shown in Figs. 3 to 7 inclusive, and which is intended for pistons of comparatively small diameter, the annular plate 30 which corresponds to the holding
15 ring 12 of Figs. 1 and 2, is of a width to extend substantially from the perimeter to the hub of the piston casting 31, Fig. 5. In this construction the central centering ring 32 is of substantially the same construction as
20 heretofore described but the wearing material is in the form of plates 33 whose sides are arranged diagonally to the circumference so that one end of the plate overlaps longitudinally the plane of the opposite end of the ad-
25 jacent plate, thus forming in effect a continuous wearing surface circumferentially of the ring. In this construction these adjusting screws 34 are spaced 120 degrees apart to hold the ring in proper position and to ad-
30 just it centrally, as above described. The packing rings in this construction are of the same construction and arrangement as the rings 7 and 14 in Figs. 1 and 2.

In Fig. 7 is clearly shown at 36 an end view
35 of the overlapping end of one of the segments of the rings 35.

In Fig. 8 is illustrated a modified form of adjusting screw 37, having an aperture 38 which may receive a suitable key by which
40 said screw may be adjusted.

In the modification shown in Figs. 9 to 11 inclusive, the piston body comprises two complementary castings 39 and 40, having
45 hubs 41 and 42 respectively which are bored to receive the piston rod 43. The nut 44 by which the piston and rod are secured together, serves at the same time to secure together the castings 39 and 40, so that the piston may be held assembled by a single nut.
50 The castings 39 and 40 are held in alignment independently of the rod 43 by means of an annular rim 45 on one of them which fits into an annular recess 46 in the other, adjacent the rod receiving bore. In this construction
55 the adjusting screws for the central packing ring 47 are dispensed with and the latter is fitted directly upon the outer extremities of the radiating ribs 48 of the castings 39 and 40. In Fig. 11 this central ring is shown as
60 solid in cross-section.

In Fig. 12 means are shown for limiting the outer expansion of the packing rings 49, which comprises a slot 50 in the overlapping end of one of the ring segments, arranged to
65 receive a pin 51 secured to the adjacent end

of the next segment. When the parts are in the position shown in this figure, further expansion of this ring is impossible. This construction serves, moreover, to hold the segments together when the piston is re-
70 moved from the cylinder. The remaining elements of this construction shown in Figs. 9 to 11 are similar to the corresponding parts heretofore described and hence need not be further set forth.

In Fig. 13 I have shown a construction in which a plurality of packing rings and wear-
75 ing or centering rings are used. This construction is especially adapted to high pressure cylinders. Such a construction reduces
80 the liability of leakage between the two sides of the piston. Leakage between any one of the rings and walls of the cylinder will be stopped by the following rings. In this construction the centering rings 8^a are provided
85 with recesses 10^a into which is fitted the packing rings 7 and the split spring bands 28. In this construction, one of the two complementary castings 39^a and 40^a are shown
90 slotted as in Fig. 11, but one, 40^a being much thicker than the other 39^a. These two complementary castings are also pro-
95 vided with the annular rim 44 and recess 45.

In Fig. 7 of the drawing I have provided the walls or main body of the piston with
100 openings or holes *a* which communicate with the recess or space *b* behind the annular split ring 28. This permits variation of pressure and forces the packing rings to bear against the cylinder wall in accordance with
105 the pressure in the cylinder on the respective sides of the piston. While I have shown this construction only in Fig. 7, it is to be understood that it can be applied to the constructions shown in any of the figures of the
110 drawing. As many changes could be made in the above construction and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, I intend that all
115 matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. I desire it also to be understood that the language used in the following
120 claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

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

1. A piston comprising a body portion, having its perimeter annularly recessed, a
125 plurality of segmental packing rings and a wearing or centering ring arranged in said recess, annular holding means removably secured to said body portion to hold said rings
130 securely upon said piston, while permitting

free radial movement of said packing rings, and means for radially adjusting said wearing ring.

2. A piston comprising a body portion, 5 having its perimeter annularly recessed and provided with a recessed holding means removably secured thereto, and packing means in the recesses of the body and holding means comprising a plurality of segmental expansible packing rings, a wearing or centering ring, 10 and means for radially adjusting the wearing or centering ring.

3. A piston comprising a body portion having its perimeter annularly recessed, and 15 packing means in the recess, said packing means including an expansible packing ring, a wearing or centering ring provided externally with a separately-formed wearing element arranged approximately in the plane of 20 the outer surface of the expansible ring, and means for adjusting the wearing or centering ring.

4. A piston comprising a body portion, having its perimeter annularly recessed, a 25 plurality of segmental packing rings and a plurality of wearing rings arranged in said recess, and annular holding means removably secured to said body portion to hold said rings securely upon said piston, while 30 permitting free radial movement of said rings.

5. A piston comprising a body portion having its perimeter annularly recessed, a 35 plurality of spring expansible segmental packing rings and a non-expansible wearing or centering ring arranged in said recess, means to adjust said non-expansible ring radially with respect to said piston, and an annular ring to hold said rings upon said piston.

40 6. In a piston packing, a plurality of segmental packing rings, a wearing or centering ring, an annular holding ring to secure said rings in position, means for securing said holding rings in position, comprising bolts, 45 each having a threaded portion to enter cor-

responding threaded bores in said piston, a squared portion to enter similarly shaped apertures in said ring, and a threaded portion to receive a securing nut.

7. A piston comprising a body portion, 50 having annular recesses in its perimeter, packing means in said recesses comprising segmental rings, split-spring rings interposed between said segmental rings and said piston, and means to maintain the joints of said 55 segmental rings and the ends of said split rings in staggered relation.

8. A piston packing ring, comprising segmental spring expansible sections, and means comprising a pin and slot connection to limit 60 the extent of expansion of said section.

9. A piston comprising a body portion, consisting of a casting having a hub and oppositely disposed face plates, ribs radiating from the hub to the perimeter of said casting, 65 an annular recess in said perimeter, a plurality of segmental packing rings, and a plurality of wearing or centering rings in said recess.

10. A packing for a piston, comprising a 70 segmental ring, the segments of which have overlapping ends, and means connecting said ends arranged to permit and to limit expansion and contraction of said ring.

11. A piston comprising a body portion, 75 having an annular recess in the circumference thereof, a centering ring arranged in said recess, a packing ring also in said recess, and a spring band behind the packing ring, there being a space between said spring band 80 and the body of the piston, and the body of the piston having an opening therein which communicates with said space.

In witness whereof I have hereunto set my hand at the city, county and State of New 85 York, this eighteenth day of May, 1906.

JOSEPH ALVAH SCOTT.

In presence of—

T. R. RICHARDS,
JOHN J. RANAGAN.