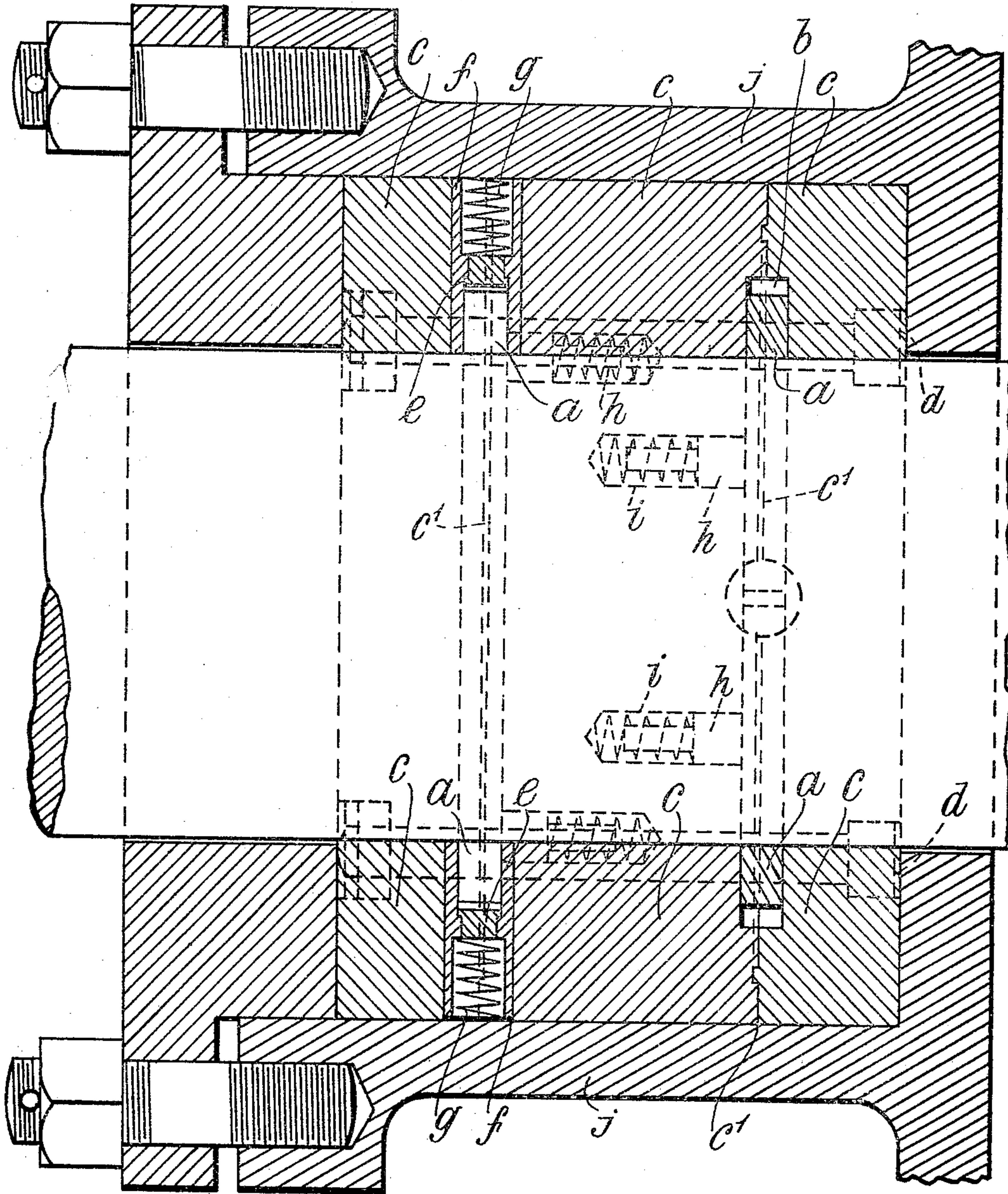


R. ALLEN.  
METALLIC PACKING FOR STUFFING BOXES, &c.  
APPLICATION FILED JULY 28, 1908.

943,642.

Patented Dec. 21, 1909.  
8 SHEETS—SHEET 1.

*Fig. 1.*



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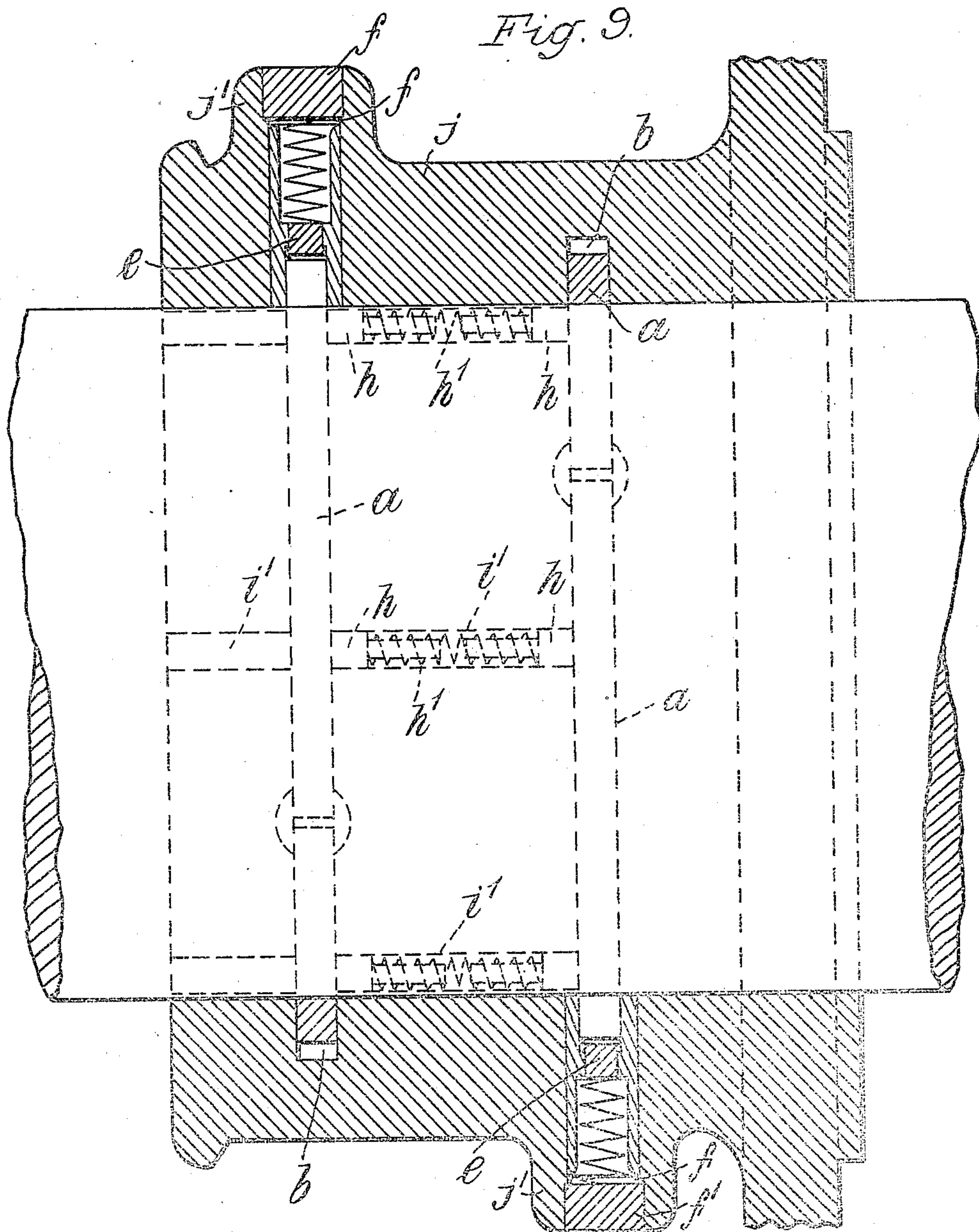
METALLIC PACKING FOR STUFFING BOXES, &c.

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2 SHEETS—SHEET 3.

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METALLIC PACKING FOR STUFFING BOXES, &c.

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This technical drawing illustrates a mechanical assembly in cross-section. The central component is a large, rectangular chamber or housing, shown in a perspective view. It features a central vertical passage or channel. Inside this chamber, there are two sets of internal components, each consisting of a rectangular block (labeled 'i') and a smaller, cylindrical component (labeled 'h'). These components are positioned symmetrically on either side of the central passage. The chamber is mounted on a base, which is shown in cross-section. The base has a central vertical support structure (labeled 'a') and two side supports (labeled 'k'). The side supports are connected to a horizontal bar (labeled 'k') that spans the width of the chamber. The base is secured by two large, cylindrical bolts or screws, one on each side. The drawing includes various labels and dimensions: 'i' and 'h' for the internal components, 'a' for the central support, 'k' for the side supports and connecting bar, 'c' for the top and bottom flanges, 'c²' for the central vertical passage, 'c³' for the side flanges, and 'c⁴' for the top and bottom flanges. The drawing is a detailed technical illustration, likely for a patent or engineering document.

Edw. D. Spring.  
W. P. Barker

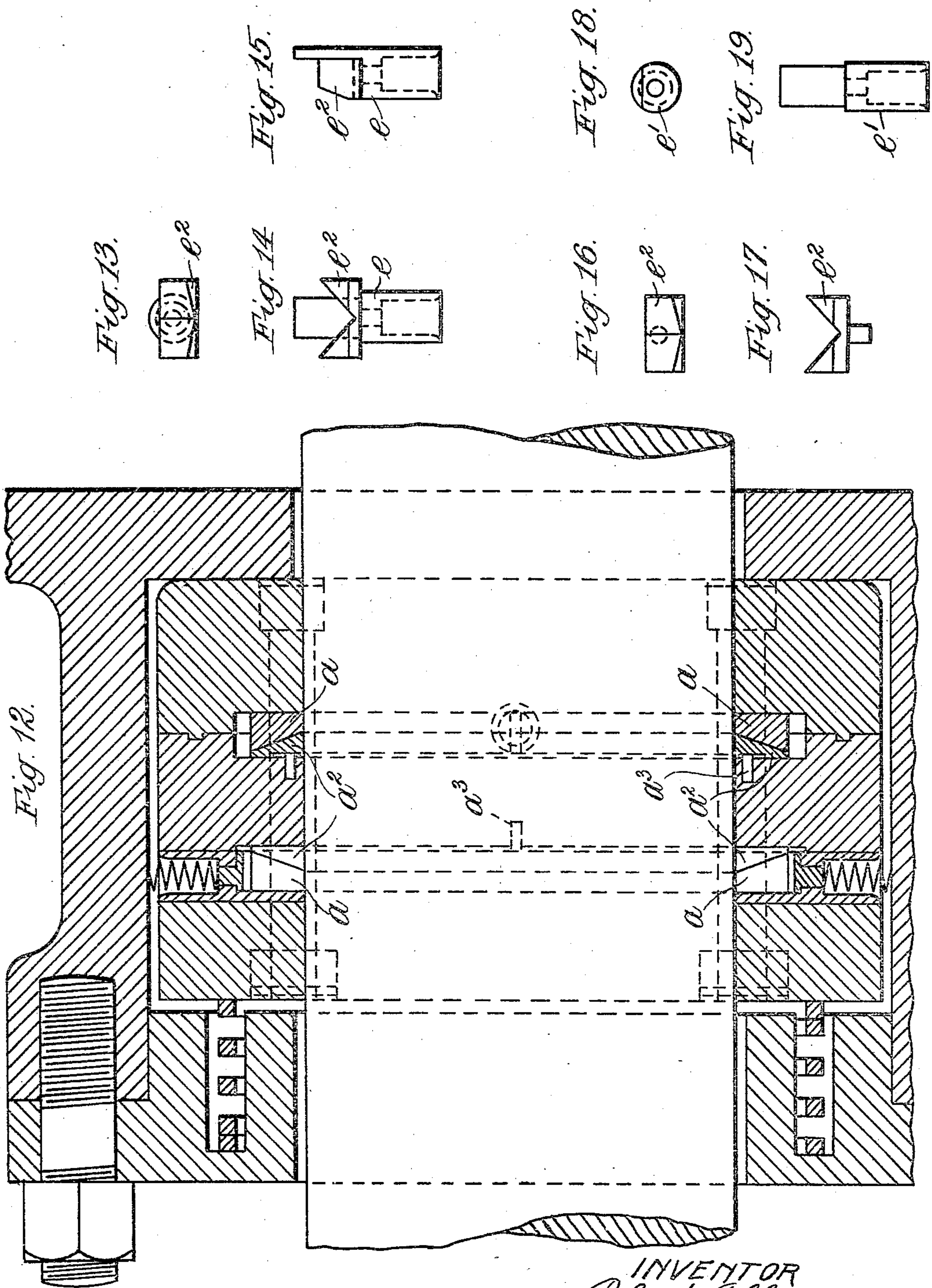
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943,642.

Patented Dec. 21, 1909.  
8 SHEETS—SHEET 6.



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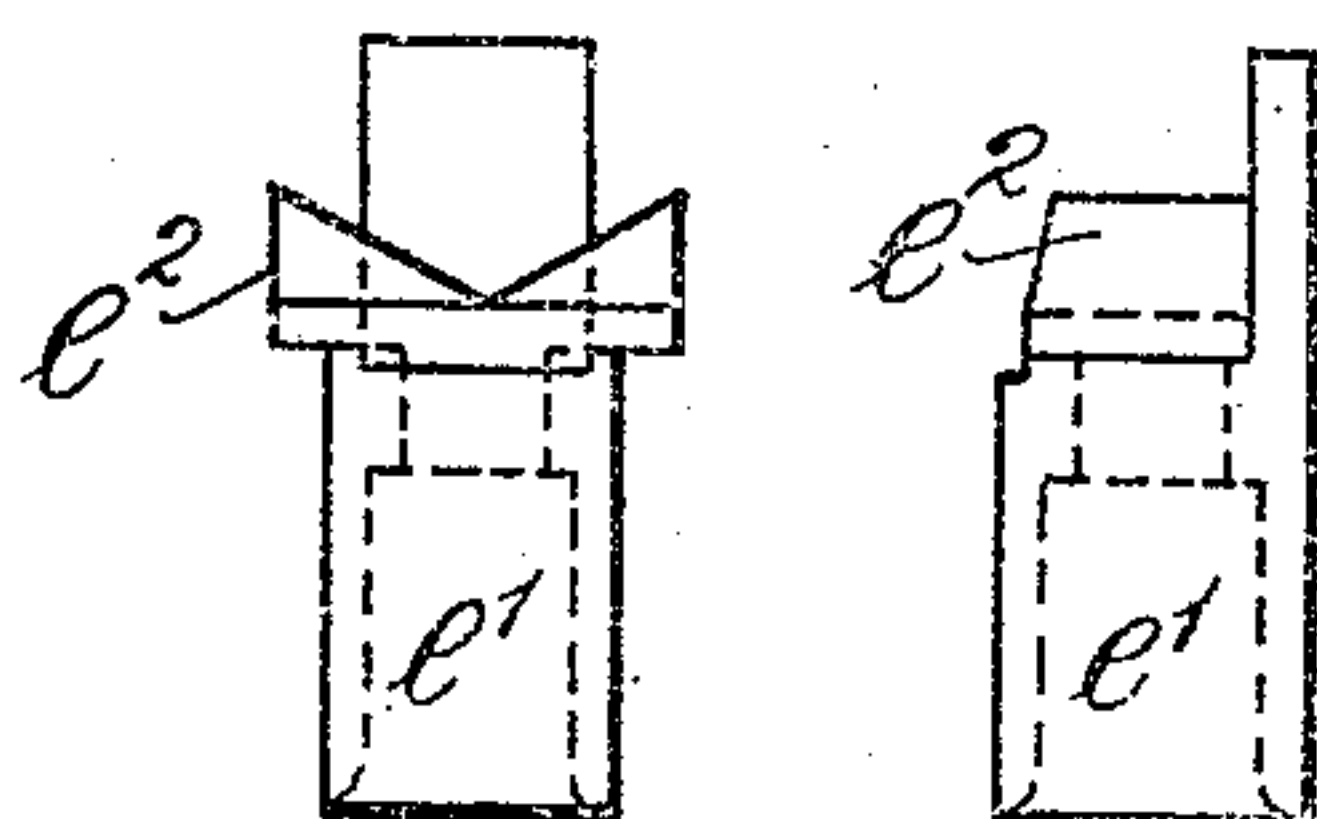
METALLIC PACKING FOR STUFFING BOXES, &c.

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Patented Dec. 21, 1909.

8 SHEETS—SHEET 7.

Fig. 21.



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Patented Dec. 21, 1909.

8 SHEETS—SHEET 8.

Fig. 23.

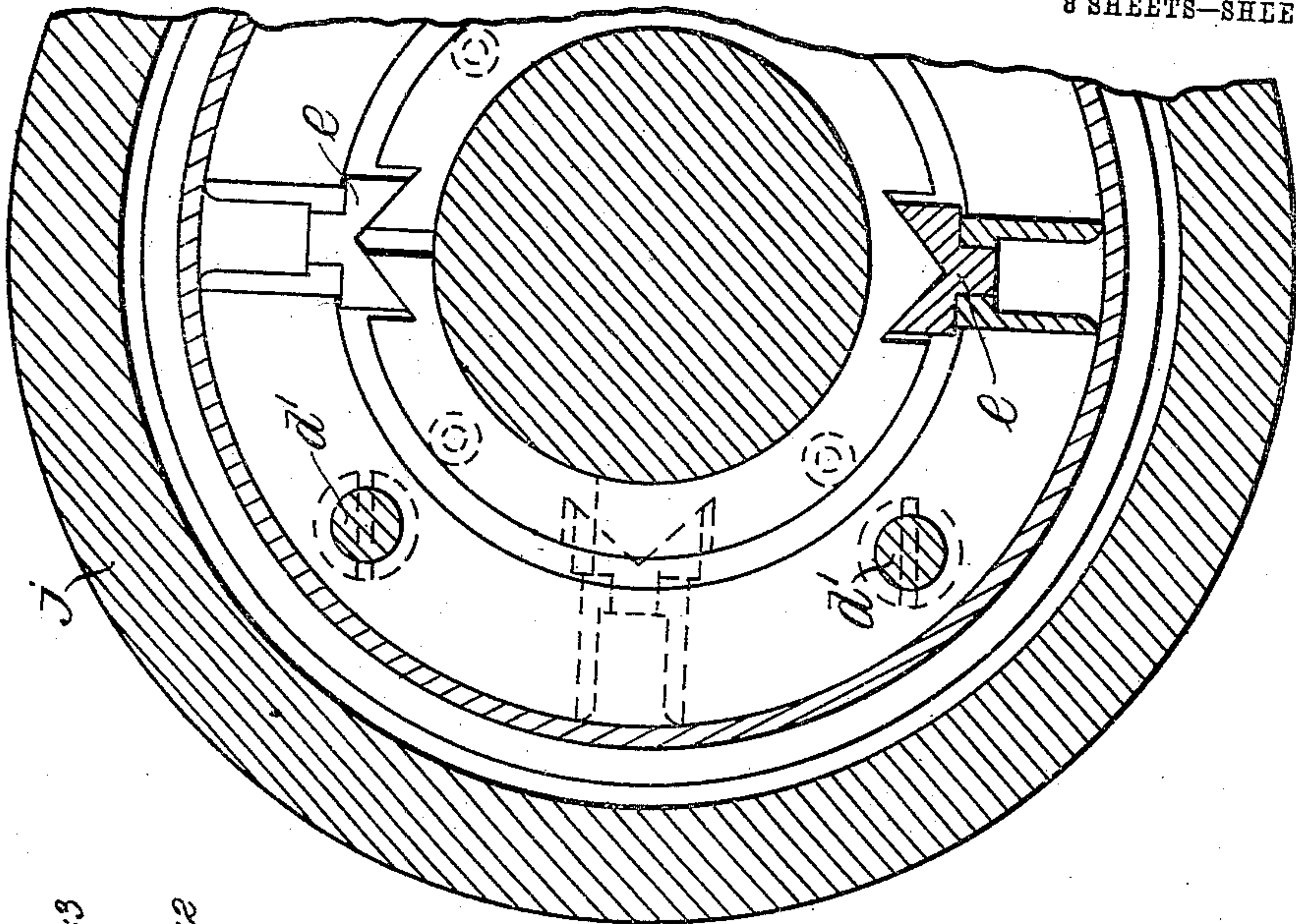
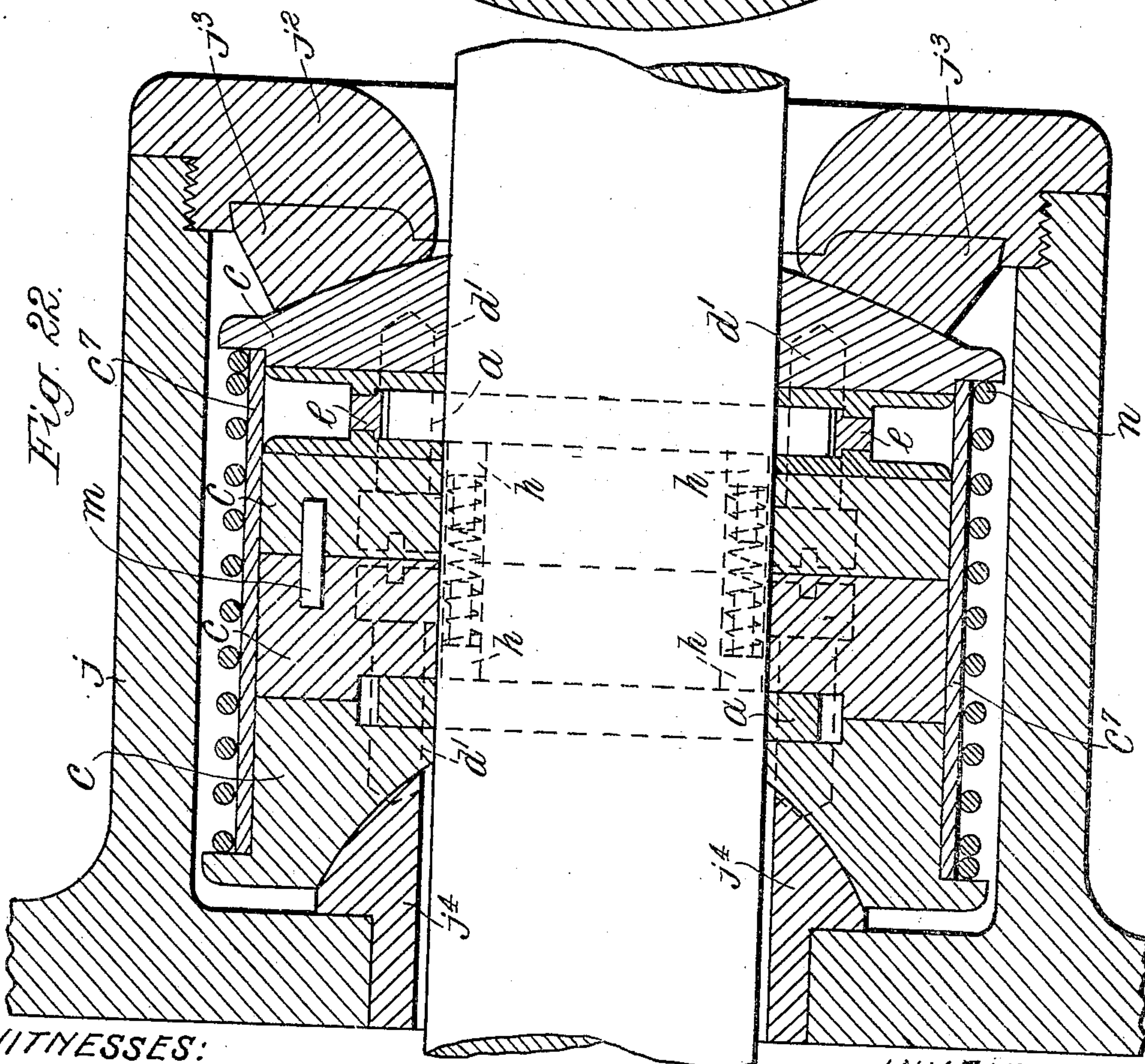


Fig. 22.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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METALLIC PACKING FOR STUFFING-BOXES, &c.

943,642.

Specification of Letters Patent.

Patented Dec. 21, 1909.

Application filed July 28, 1908. Serial No. 445,820.

*To all whom it may concern:*

Be it known that I, ROBERT ALLEN, a subject of the King of Great Britain and Ireland, residing at "Oakdene," Kidmore Road, Caversham, Oxfordshire, England, have invented certain new and useful Improvements in Metallic Packings for Stuffing-Boxes and the Like, of which the following is a specification.

10 This invention for improvements in metallic packings relates more particularly to packings for the glands of piston and like rods wherein metal rings formed in two or more parts or segments are forced inward upon or drawn against the piston rod by radial wedge blocks acting upon wedge like projections on the ends of the segments and has for its object to provide a joint of this type around a moving piston rod that shall be perfectly steam or air tight and that at the same time will avoid undue friction.

According to this invention the packing rings are held in annular seatings cut in external metal fixing rings or sleeves and closed around the piston or rod by means of chokes or wedges located in radial pockets in the fixing rings or sleeves and so constructed as to cover the joints between the ring segments on either side of the wedging surfaces. Means are also provided for forcing the rings laterally against the pressure or vacuum sides of their grooves.

35 The invention is hereinafter fully described with reference to the accompanying drawings in which—

Figure 1 is a longitudinal section of a stuffing box and gland provided with packing constructed according to this invention, 40 Fig. 2 is a transverse section of the same, Figs. 3 to 5 are elevations at right angles and plan respectively of a wedge block or choke employed in the improved packing, Figs. 6 to 8 are detail views of the two parts constituting the wedge block, Figs. 9 and 45 10 are similar views to Figs. 1 and 2 showing a modified construction specially applicable for packing large rods. Fig. 11 is a longitudinal section of a stuffing box and gland showing a method of mounting the packing therein so as to allow a certain amount of self adjustment. Fig. 12 is a similar view to Fig. 11 showing a modified form of packing, Fig. 13 is a plan and Figs. 50 14 and 15 are elevations at right angles of a

wedge block or choke employed with the packing illustrated in Fig. 12, Figs. 16 to 19 are detail views of the two parts constituting the wedge block. Fig. 20 is a similar view to Fig. 11 showing a further slightly modified arrangement of the packing, Fig. 21 illustrates the wedge or choke used therewith and Figs. 22 and 23 are longitudinal section and transverse section respectively of a further modified arrangement of the improved packing. 65

Referring to Figs. 1 to 2 two or more packing rings *a* which are preferably formed of phosphor bronze cast iron or some other soft but tough metal, are seated in annular grooves *b* cut in metal fixing rings or sleeves *c* which are arranged in the stuffing box *j*. The fixing rings or sleeves *c* are spigoted together at their meeting edges or joints *c'* and clamped in position by the bolts *d*. Any convenient number of sleeves may be employed but where there are two packing rings as shown three sleeves are used and the recesses or grooves *b* for the packing rings to work in are cut at the joints *c'* in the sleeves that is half in each piece, so that the packing rings may be readily removed or replaced when the sleeves are released. Each of the packing rings *a* is formed in two or more parts or segments and drawn together around the piston rod by wedges or chokes *e* working in radial pockets *f* in the annular seating *b* the chokes being forced inward by springs *g* bearing against the inside of the stuffing box. As shown in Figs. 3 to 8 each choke comprises a hollow sleeve part *e'* of more or less cylindrical form which incloses the spring *g* and a double wedge *e<sup>2</sup>* adapted to engage with inclined surfaces *a'* formed by notching the piston ring segments near the ends. The chokes *e* are provided with segmental extensions *e<sup>3</sup>* on either side of the ring and wedging surfaces which seal the joint made by the two segments of the rings. In order to facilitate manufacture and to allow more play to the inclined surfaces, the chokes are as shown constructed in two pieces in which case the wedge piece *e<sup>2</sup>* is fitted separately to the sleeve part *e'* by means of a spigot *e<sup>4</sup>* on the one part taking into a hole *e<sup>5</sup>* in the other part. It will be obvious however that the chokes may be made in one piece. In some cases the sleeve *e'* may be replaced by a solid shank and the spring *g* coiled around 110



the shank. The ends of the packing rings  $a$  are each notched or formed with an inwardly inclined bevel surface  $a'$  so that when the ends of the two segments are brought nearly  
 5 together, they engage with the two inclined surfaces of the wedges or chokes  $e$  which under the tension of the spring tends to draw the ends together so closing the two segments of the rings around the piston rod.  
 10 In order to prevent any escape of steam or air around the packing rings  $a$  and to prevent their being moved by the working of the piston rod spring pressed plugs or plungers  $h$  are arranged in holes  $i$  drilled  
 15 in the side faces of the fixing sleeves  $c$  to press on the packing rings  $a$  and keep them tightly up against the pressure or vacuum side of the grooves also up against the lip or joint seal or cover.  
 20 In a simpler form of this invention Figs. 9 and 10 especially suitable for large rods where the diameter is such that the segments of the packing rings  $a$  can be easily inserted into internal grooves without trouble, the  
 25 fixing sleeves or rings are dispensed with, the packing rings  $a$  being inserted directly into an annular box or sleeve  $j$  adapted to be bolted to the cylinder cover, or cast in one piece therewith. The internal grooves  $b$  for  
 30 the rings are cut in the casting at any suitable point and the chokes or wedge pieces  $e$  are arranged in bosses  $j'$  cast on the outside. The holes or pockets  $f$  for the chokes  $e$  are drilled from the outside and provided with  
 35 a screw plug or cap  $f'$ . Spring plugs  $h$  are also employed as previously described for holding the packing rings against the sides of the grooves but in this case they are inserted into holes  $i'$  drilled concentric with  
 40 the piston rod in the body or ring; the open ends of the holes being subsequently filled, or plugged with screws or the like. Each hole  $i'$  serves to hold two plungers  $h$  in position, a central spring  $h'$  serving to keep  
 45 them pressed in opposite directions against the adjacent sides of the two packing rings  $a$ . The packing rings  $a$  may be formed in any number of pieces, the ends being in each case left with a slight gap between so as to  
 50 allow of their being closed up to compensate for wear.

In the form of the invention shown in Fig. 11 a clearance space  $c^2$  is left between the fixing rings or sleeves  $c$  and the stuffing box,  
 55 also similar spaces  $c^3$  between the rod and the box  $j$  and the rod and gland to enable the packing to adjust itself to any slight deviation of the rod from its true alinement. The joint between the sleeves  $c$  and box  $j$   
 60 is in this case rendered tight by truing up the end face  $c^4$  of the end ring  $c$  to fit against a similar face on the end of the stuffing box, and providing a spring  $k$  at the opposite end of the stuffing box which bears  
 65 against the adjacent sleeve  $c$  and keeps the

face  $c^4$  tight against the end of the stuffing box. As shown the spring  $k$  is located in a groove  $k'$  in the gland.

In the packing shown in Figs. 12 to 19 which as shown is mounted in a similar man-  
 70 ner to that illustrated in Fig. 11 but may, of course be differently applied if desired, the packing rings are each composed of two bevel rings  $a$   $a^2$  each divided into two or  
 75 more segments. The segments are drawn tight against the rod which they pack by double wedges or chokes  $e$  acting on the segments of the ring  $a$  and beveled at one side of the wedge part  $e^2$  to correspond with the  
 80 section of the ring  $a$ . The narrower ring  $a^2$  serves to force the wider ring  $a$  against the side of the groove thus insuring a tight joint and replacing the side expansion plungers  $h$ . In this type of packing the rings  
 85 may be arranged closer together so that it is applicable to high speed engines where the length of the stuffing box is somewhat restricted. In order to prevent the rings  $a^2$  from turning in the groove, pins  $a^3$  are  
 90 tapped into the sides of the grooves next to the rings and engage in slots in the rings.

Figs. 20 and 21 illustrate a form of the invention in which three packing rings  $a$   $a^2$   $a$  are placed in each groove  $b$  formed in the sleeves  $c$ , the two outer rings  $a$  being  
 95 beveled on their inner faces only, while the inner ring  $a^2$  is beveled on both faces and thus has the form of a wedge in cross section. The rings  $a$  and the ring  $a^2$  are divided into a suitable number of segments,  
 100 the outer rings  $a$  being acted upon by chokes or wedges  $e$  to draw them inward, while the inner ring  $a^2$  acts as a wedge to force the outer rings tightly against the sides of their groove. A pin  $a^3$  engages a hole in  
 105 the ring  $a^2$  and prevents the same from turning. The wedges  $e$  are shaped to engage the outer rings  $a$  only. As before described clearance spaces  $c^2$   $c^3$  are left to enable  
 110 the packing to adjust itself to the rod when necessary, a tight joint being made at  $a^4$  and kept tight by spring plungers  $c^6$  or by a single spring as hereinbefore described acting upon the sleeves  $c$ . One or more pack-  
 115 ing rings  $l$  of any suitable form may also be placed between the sleeves  $c$  and the stuffing box to further insure a tight joint between the box and sleeves.

Figs. 22 and 23 illustrate a further method of mounting the packing whereby it is able  
 120 to readily adjust itself to a rod or shaft when the latter becomes slightly out of line, the stuffing box or casing  $j$  has a cover or gland  $j^2$  preferably provided on its inner  
 125 face with a lining  $j^3$  of Babbitt or other softer metal, and is fitted with a neck bush  $j^4$  at its opposite end, the lining and neck bush being curved as shown the curves being struck from the same center. Four packing  
 130 ring sleeves  $c$  and an outer sleeve  $c^7$  are



mounted between the liner  $j^3$  and neck bush  $j^4$  the end sleeves  $c$  being made concave or convex as required to fit the bush  $j^4$  and liner  $j^3$  and work freely between them. The sleeve  $c^7$  serves to keep the sleeves  $c$  in axial alinement; but may if desired be dispensed with and replaced by the groove and spigot arrangement hereinbefore described or by other suitable means. As shown the sleeves  $c$  are held together in pairs by the stud bolts  $d'$  the middle joint being left free to expand and take up wear between the ends of the bushing and the ends of the casing or box  $j$  but connected by a dowel pin  $n$  for keeping groups of sleeves in the same relative position. A spring  $n$  is mounted on the sleeve  $c^7$  to insure a tight joint at all times between the end sleeves  $c$  and the parts  $j^3$ ,  $j^4$ . In some cases the force of the springs acting on the plungers  $h$  is sufficient for this purpose and the spring  $n$  is omitted.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A metallic packing for piston rods and the like comprising a sleeve having an internal annular groove and radial pockets in the sleeve communicating with the groove at their inner ends, a packing ring seated in the groove, and composed of segments having notches forming inclines near the ends of the segments, wedges seated in the radial pockets and adapted to engage the inclined surfaces formed by the notches in the ends of the segments and springs arranged to force the wedges or chokes inward.

2. A metallic packing for piston rods and the like comprising a sleeve having an internal annular groove, and radial pockets in the sleeve communicating with the groove at their inner ends, a packing ring seated in the groove, and composed of segments having notches forming inclines near the ends of the segments, wedges seated in the

radial pockets adapted to engage the inclined surfaces formed by the notches in the ends of the segments, extensions on the sides of the wedges arranged to cover and effectually close the joints between the segments, and springs arranged to force the wedges or chokes inward.

3. In a metallic packing for piston rods and the like, the combination with a sleeve provided with an internal seating groove, of a segmental packing ring located in the seating groove, radially disposed wedges adapted to engage the contiguous ends of the segments to contract the packing ring, and means for forcing the packing ring against one side of the seating groove.

4. In a metallic packing for piston rods and the like, the combination with a sleeve provided with an internal seating groove, of a segmental packing ring located in the seating groove, radially disposed wedges adapted to engage the contiguous ends of the segments to contract the packing ring, and laterally disposed spring plungers arranged to maintain the packing ring against one side of the seating groove.

5. In a metallic packing for piston rods comprising a sleeve formed of several parts, said parts having a tongue and groove connection and also having grooves at their meeting faces, forming an interior annular groove, a packing ring seated in the groove, the meeting faces of the several portions of the sleeve having radial grooves therein forming pockets communicating with the annular groove, wedges seated in the pockets and engaging the packing ring to force the same against the piston.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ROBERT ALLEN.

Witnesses:

T. L. RAND,  
R. WILLIAMS.