

No. 786,976.

PATENTED APR. 11, 1905.

W. H. LAW.
METALLIC PACKING.
APPLICATION FILED JUNE 21, 1904.

Fig. 1.

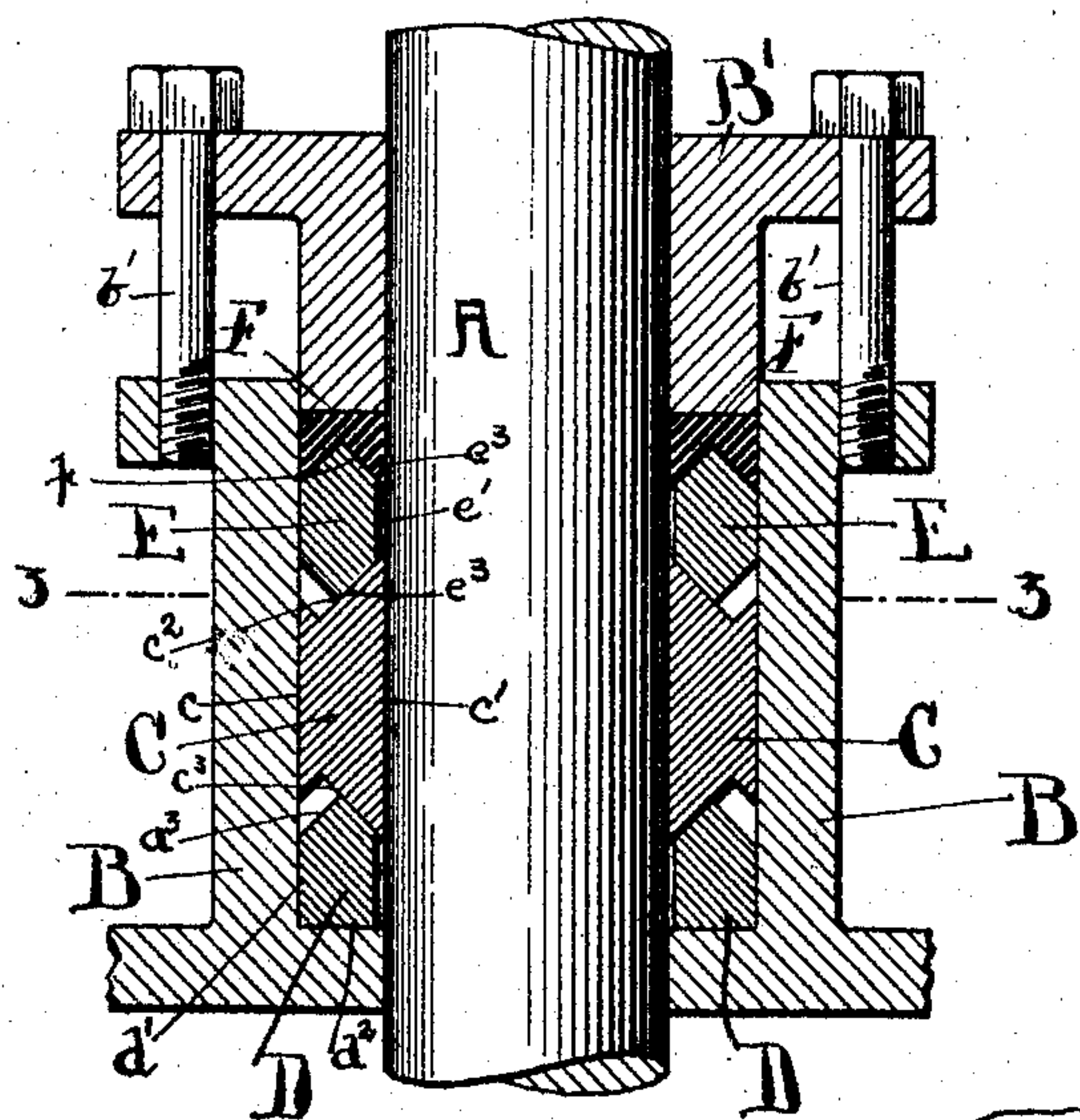


Fig. 2.

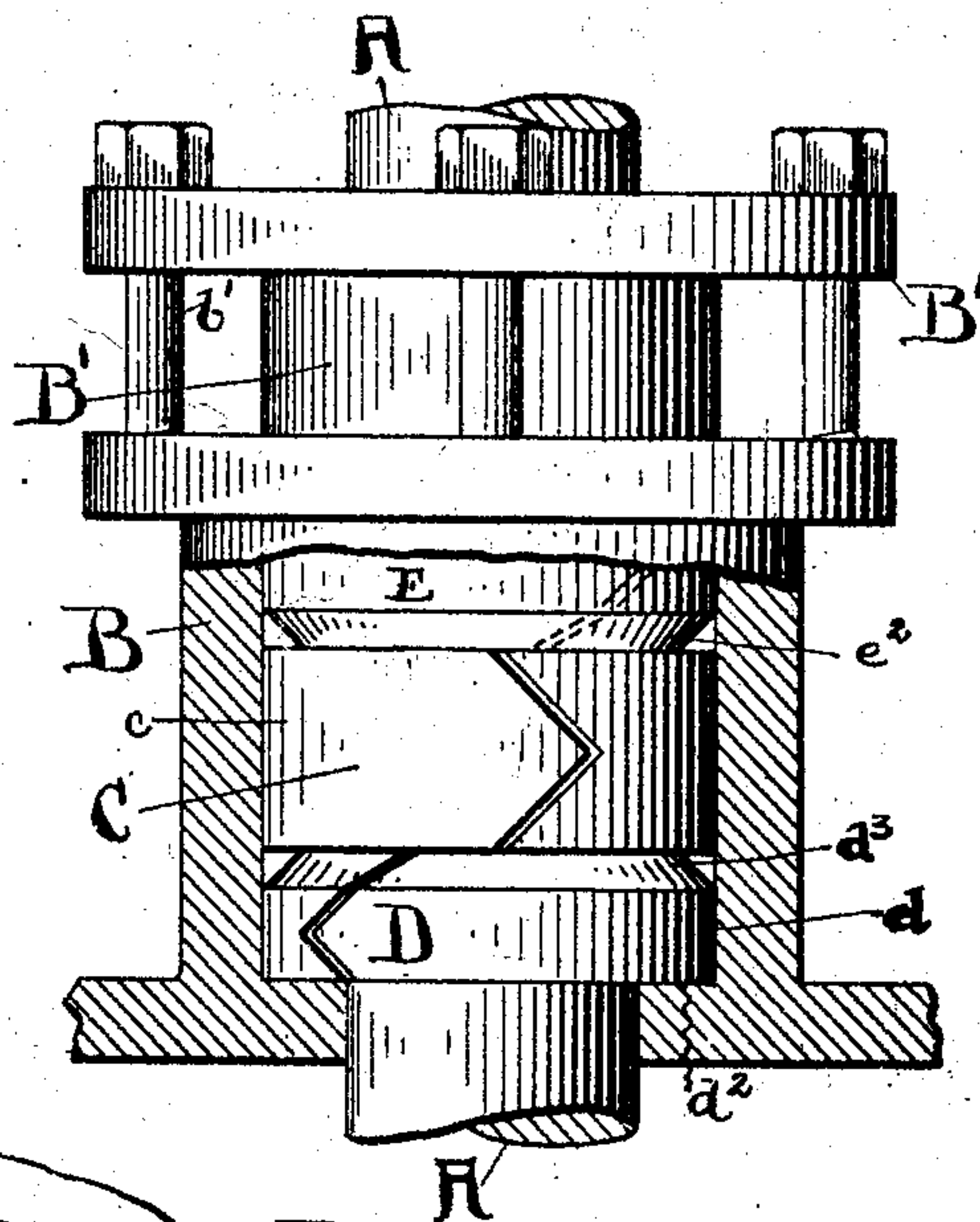


Fig. 3.

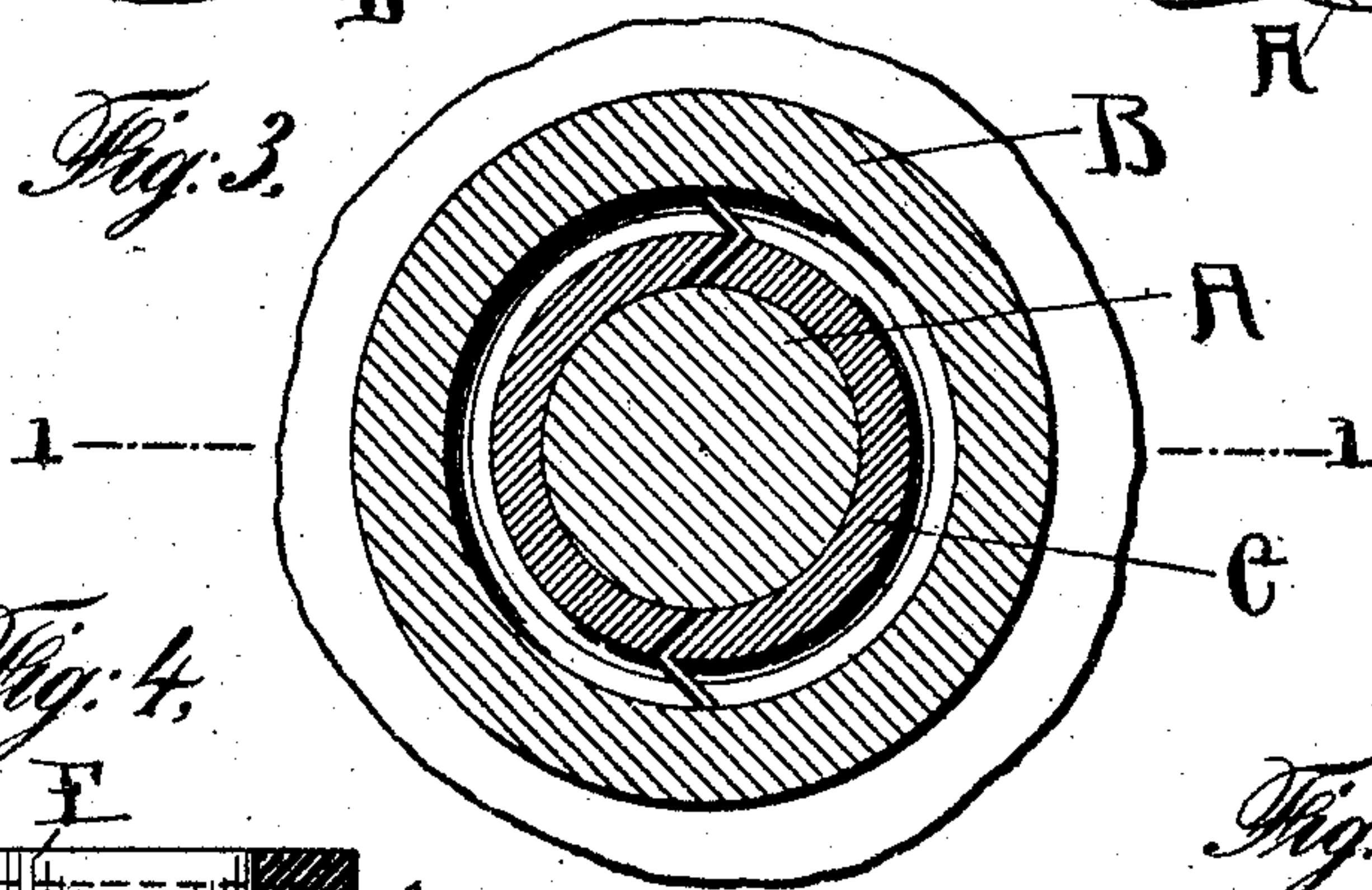


Fig. 5.

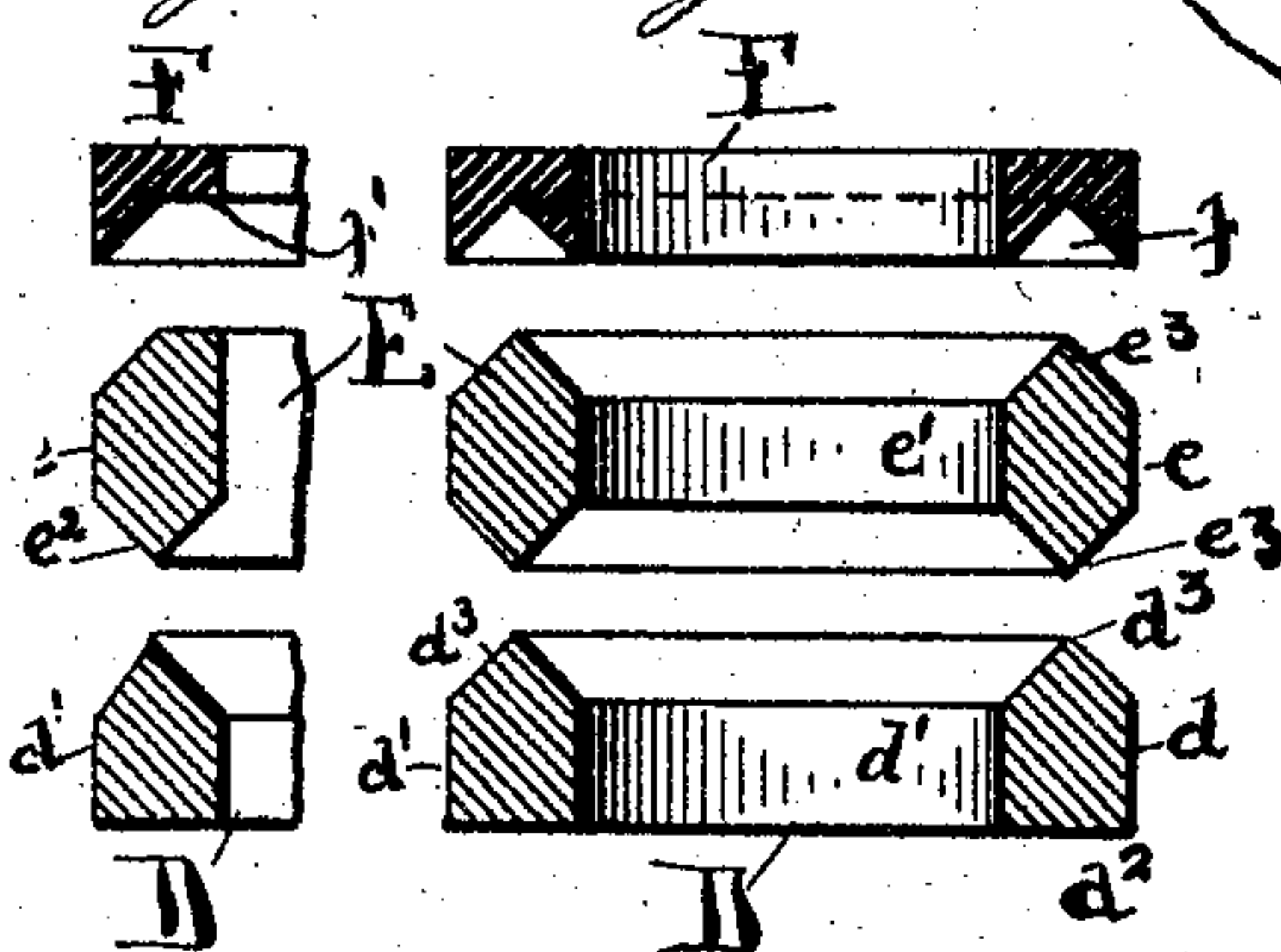


Fig. 4.

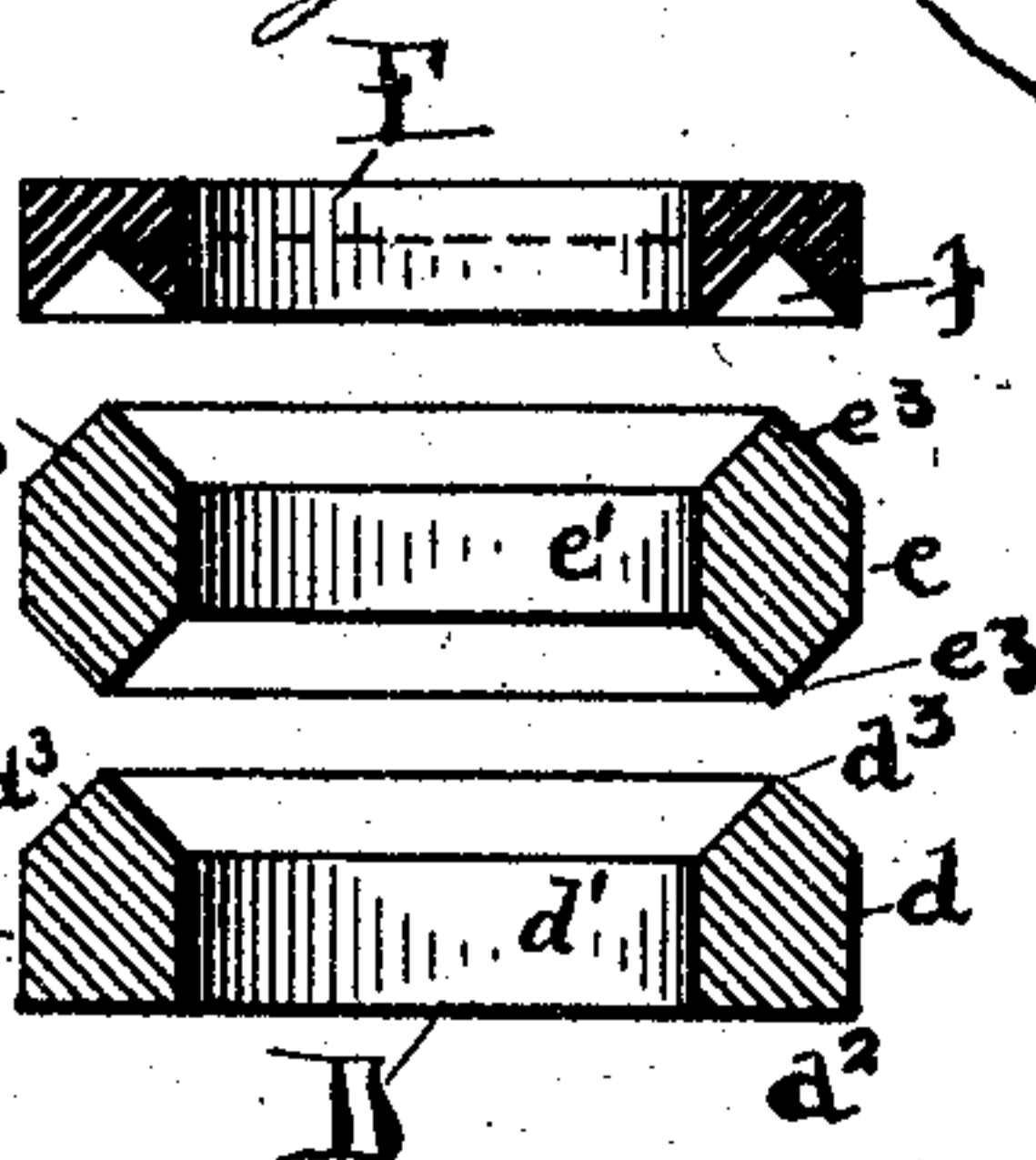


Fig. 6.

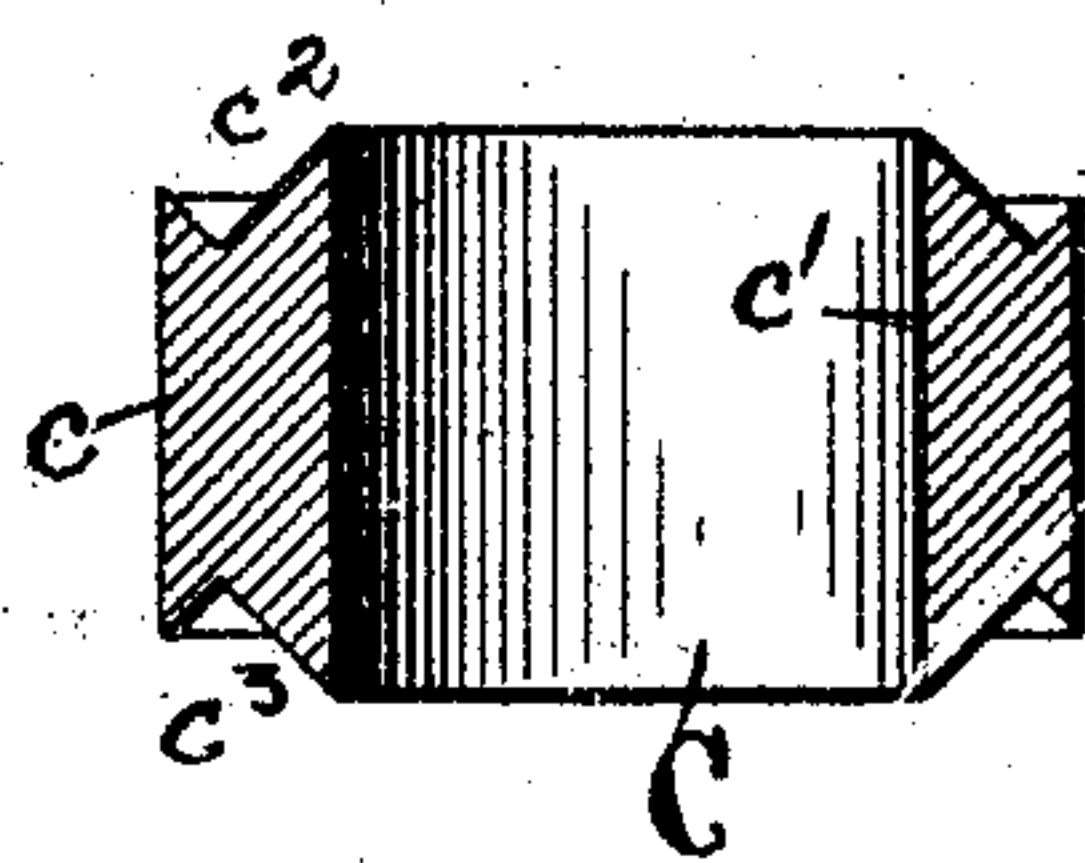
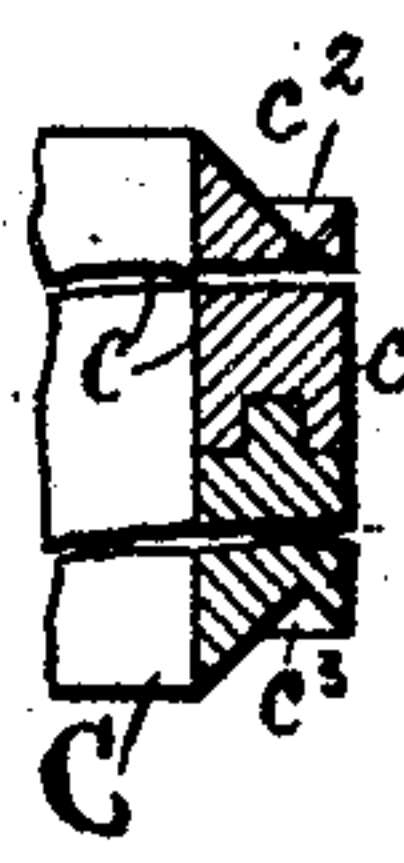


Fig. 7.



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UNITED STATES PATENT OFFICE.

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METALLIC PACKING.

SPECIFICATION forming part of Letters Patent No. 786,976, dated April 11, 1905.

Application filed June 21, 1904. Serial No. 213,463.

To all whom it may concern:

Be it known that I, WILLIAM H. LAW, a citizen of the United States, residing in the borough of Brooklyn, city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Metallic Packing, of which the following is a specification, reference being had to the accompanying drawings, wherein—

Figure 1 is a longitudinal section of a stuffing-box and packing-rings on the line 1 1 of Fig. 3. Fig. 2 is an elevation of a stuffing-box and rings, one side of the box being broken away. Fig. 3 is a cross-section of Fig. 1 on the line 3 3 of Fig. 1. Fig. 4 is a transverse section of the end rings or sections of packing and of the fibrous packing used at the extreme end. Fig. 5 is a section of the same rings to show a slight modification in form. Fig. 6 is a transverse section of the main or middle packing-ring, and Fig. 7 is a section of one side of a like ring modified in construction for use under certain circumstances.

My invention relates to packing for stuffing-boxes and the like, and more particularly to metallic packing, this invention being an improvement on a similar metallic packing described and claimed in a patent granted to me on the 12th of October, 1897, No. 591,670.

Heretofore the main disadvantages of metallic packings adapted to wedge inwardly and outwardly against the operating rod or shaft and stuffing-box, respectively, have been that the bearing-face of the shaft-bearing or central ring is relatively small and also that the shaft bears and moves against the edges of a number of rings or sections. To obviate this, I provide a packing of a simple construction which shall give a great amount of continuous bearing-surface to the shaft, which under compression shall expand and fill any irregularities in the wall of the stuffing-box, which shall be easily adjusted to take up wear, and in which the friction on the rod is confined to a definite unbroken or continuous portion thereof, thus preventing "shouldering" the rod at various intervals.

The invention consists in certain novel features of construction to be hereinafter set forth, and more definitely stated in the claims.

In the drawings, where like letters indicate like parts, A designates a length of piston rod or shaft, and B a stuffing-box surrounding the same and provided with a gland B' of the ordinary construction and adapted to be forced down into the bore of the stuffing-box by bolts b'.

C is the main or middle packing-ring, having an exterior face *c*, interior face *c'*, and the upper and lower grooved or channeled edges *c² c³*. These channels or grooves are V-shaped or wedge-shaped in cross-section, the sides of the channel being of unequal length and the longest of said sides being nearest the piston or interior face *c'* and forming a wedging-face. The wedging-face of both edges of the central or shaft-bearing ring are thus inclined from the point of contact with the shaft convergently toward each other and not divergently from each toward the stuffing-box. It is necessary that they should have this inclination of the wedge-faces in order that they may force the ring toward the shaft; but heretofore this expanding action has been obtained by making the end rings with V-shaped channels and the central ring with a wedge-like edge. In consequence the shaft-bearing face of the central section was of relatively small area. By reversing this, however, and making the channels in the central ring I increase its bearing area, while accomplishing the expanding action required.

Above and below the main packing-ring C and fitting into the V-shaped channels thereof are the end rings D E. Both of these end rings have exterior and interior faces *d d' e e'*, which bear, respectively, against the rod A and the walls of the stuffing-box, the interior faces thus forming wedge-faces acting against the wedge-faces of the central ring to force it inward. The ring D has an upper wedge-shaped edge *d³* and the ring E a lower wedge-shaped edge *e²*, which are adapted to enter the V-shaped channels *c² c³*, as shown clearly in Fig. 1. The sides of these wedge-shaped edges *d³ e³*, which correspond to the

facing sides of the channels c^2 c^3 , are of different length from the channel sides, whereby the apices of the channels and of the wedge-shaped edges of the end rings when the rings
 5 are in position are out of alinement, as clearly shown in Fig. 1. By this means when the end rings are forced toward the middle ring the middle ring is wedged in against the rod A, and the end rings corre-
 10 spondingly forced out against the wall of the stuffing-box.

The lower edge d^2 of the ring D is flat to rest upon the bottom of the box A, and the upper edge e^3 of the ring E is shaped to con-
 15 form to the lower face of a fibrous packing or ring F, which is interposed between the gland B' and the ring E. In Figs. 1 and 4 I show the ring E as having a wedge-shaped upper edge, which approximates a V-shaped
 20 channel f' in the lower edge or face of the ring F, the apices of both angular edges alining. This conformation of the meeting edges of rings E and F, I design for use in pumps or similar apparatus, or where the pressure of
 25 air, water, or ammonia is to be resisted when it is desired to expand the fibrous ring in both directions. For steam-packing the upper edge of ring E has a flat face f'' and a downwardly-inclined face, as shown in Fig.
 30 5, the recess in the lower edge of the fibrous ring F being shaped to correspond, having an inner flat face and an outer downwardly-inclined face. By this means the fibrous packing is expanded outwardly against the wall
 35 of the stuffing-box, but not against the rod A, thus preventing the leakage of steam out through the gland-joint, but permitting the inner part of the fibrous packing-ring to absorb and retain the steam, which thus acts as
 40 a lubricant to the rod.

The rings C, D, and E are each split at one or more places in their circumferences, as is common in rings of this character. When
 45 the rings are in position in the stuffing-box, these joints are set out of register with each other; but by means of these joints and the annular spaces left between and around the rings the condensed steam and lubricant used is distributed around the circumference
 50 of the rings and prevents the heating of the rings or the rod moving therein. It will be seen that by my construction, even when the ring C is worn down so that the annular spaces between the rings through "setting
 55 up," are smaller, yet the ring C being forced outward leaves a space between it and the stuffing-box, thus preventing communication between the rings being broken or interfered with and providing for the perfect
 60 distribution of steam and lubricant.

In Fig. 7 I show a modification of the central ring C as used for an ammonia stuffing-box. When used for ammonia, the box B is
 65 twice as long but of the same diameter as for water, and for convenience in handling I

make the ring in two parts tongued and grooved together.

In operation when the gland B' is set downward the central ring C, with its broad bearing-face c' , is forced into snug contact with
 70 the rod or shaft by the wedging action of the upper and lower end rings D E, and this same wedging action forces the said end rings snugly against the wall of the stuffing-box. This gives in practice a sliding bearing on
 75 only one of the rings—the middle one, E, which, because of its channeled edges has a large and unbroken area of bearing-surface, as before stated—and this prevents the unequal
 80 wearing incident to the use of a number of rings no two of which are of exactly the same hardness. Thus, too, the bearing-surface for the rod or shaft is continuous and unbroken, whereby any tendency to shouldering the rod is avoided.
 85

The fibrous packing-ring serves to wipe and keep clean the piston-rod A as it passes out of the box, and when expanded by the wedging action of ring E it is forced out against
 90 the wall of the box and fills and closes any pits or irregularities therein. Though I have shown this fibrous packing in the form of a ring, I may use it loose, it being compressed into shape between the gland and the end
 95 ring.

The rings C D E are intended to be made of any appropriate metal or composition suitable to the work to be done.

A packing of metal rings made as above described is easily put in place without the services of an expert workman. It requires no
 100 attention save the occasional renewal of the fibrous layer. The friction on the rod is reduced to a minimum. The rod is not scored or cut, and the packing stands a very high
 105 pressure.

I have used the terms "upper" and "lower" as designating the position of the end rings and of the fibrous packing; but it will be understood that the phrase is purely relative to
 110 the stuffing-box in the position shown in the drawings.

Though I have shown what I believe to be the preferable form of my invention, I do not wish to be limited to the exact number of
 115 rings shown nor to the exact arrangement of wedging-faces, as these details may be varied within certain limits without departing from the spirit of my invention.

Having described my invention, what I
 120 claim is—

1. A packing for stuffing-boxes comprising split rings or sections fitting one with the other, the said rings having adjacent, oppositely-disposed, wedge-faces so adapted that
 125 when the rings or sections are forced toward each other one of the rings will be forced inward against the rod passing through the stuffing-box, and others of the rings forced out against the wall of the stuffing-box, and
 130

thesaid rings being in contact with each other at their inner circumferences, but separated from each other at their outer circumferences, to form outer, annular lubricant-passages, substantially as described.

2. A packing for stuffing-boxes comprising a central ring having a bearing-face for contact with the piston-rod, and end rings having bearing-faces for contact with the stuffing-box wall, the said central ring having upper and lower wedge-faces inclined convergently toward each other from the bearing-faces thereof in a direction toward the stuffing-box wall, and the said end rings having edges fitting thereto so adapted that when the rings are forced toward each other the central ring will be forced toward the said rod and the outer rings outward toward the wall of the box, substantially as described.

3. A packing for stuffing-boxes comprising a central ring having a bearing-face for contact with the rod passing therethrough, and end rings having bearing-faces for contact with the stuffing-box wall, the adjacent edges of said rings having reverse wedge-faces, the upper and lower wedge-faces of the central ring being inclined convergently toward each other from the bearing-faces thereof, in the direction of the stuffing-box wall, substantially as described.

4. A packing for stuffing-boxes comprising a middle ring or section having two sides and two edges each of the edges having two oppositely-inclined wedge-faces converging toward each other from the bearing-face of the ring, in the direction of the stuffing-box wall; and two end sections or rings having each two sides and an edge having oppositely-inclined faces disposed for engagement with the inclined faces of the edges of the middle ring; the apices of the inclined edge faces of the end rings being out of alinement with the apices of the inclined edge faces of the middle section, substantially as described.

5. A packing for stuffing-boxes comprising a middle ring or section having two sides and two edges each of the edges having a V-shaped channel therein whose side toward the interior circumference of the ring is longer than the other and forms a wedge-face inclined convergently toward the corresponding wedge-face on the other edge of the ring; and two end rings or sections having each two sides and two wedge-shaped edges for engaging

ing with the channels of the middle ring; the apices of the wedge-shaped edges of the end rings being out of alinement with the apices of the V-shaped channel of the middle ring, substantially as described.

6. A packing for stuffing-boxes comprising a middle split ring or section having two sides and two edges, each of the edges having a V-shaped channel therein one of whose sides is longer than the others; and two end split rings or sections having each two sides and two wedge-shaped edges for engaging with the channels of the middle split ring; the apices of the wedge-shaped edges of the end ring being out of alinement with the apices of the V-shaped channels of the middle ring, whereby a lubricant distribution and cooling passage is formed between and on the outer circumference of each ring and from one ring to another, substantially as described.

7. In a stuffing-box, the combination with a middle split ring having wedge-faces inclined convergently toward the box, and two end split rings having wedge-faces oppositely inclined to the adjacent edge faces of the middle ring and whose apices are out of alinement with the apices of the wedge-faces of the said middle ring; of a fibrous packing-ring having an outwardly-inclined edge face, one of the said end rings being separated from each other on their outer circumferences having an inclined edge face adapted to bear against the edge face of the fibrous packing and expand the same against the wall of the stuffing-box, substantially as described.

8. The combination in a stuffing-box, of a middle split ring, a lower split ring adapted to wedge the middle ring inward away from the wall of the stuffing-box and to be thereby wedged out against said wall; an upper split ring adapted to wedge the middle ring inward and to be itself thereby wedged outward against the said wall; said split rings being separated from each other on their outer circumferences, and each thereby having communication with its adjacent ring; and a fibrous packing-ring above the said upper end ring, adapted to be expanded outwardly and inwardly by forcing it down upon the said upper ring, substantially as described.

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Witnesses:

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