

(No Model.)

2 Sheets—Sheet 1.

C. F. CHURCHILL.  
METALLIC ROD PACKING.

No. 493,978.

Patented Mar. 21, 1893.

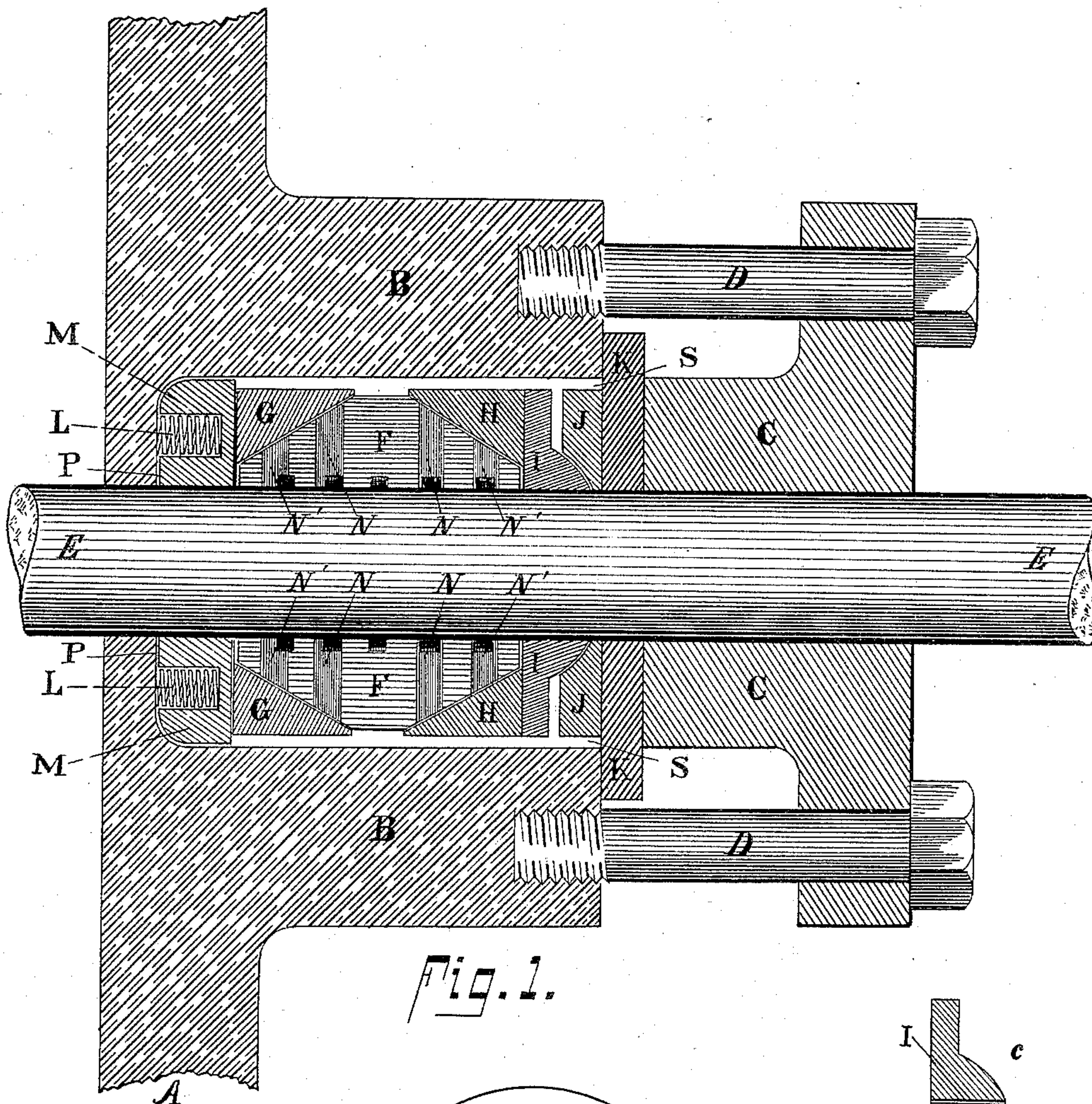


Fig. 1.

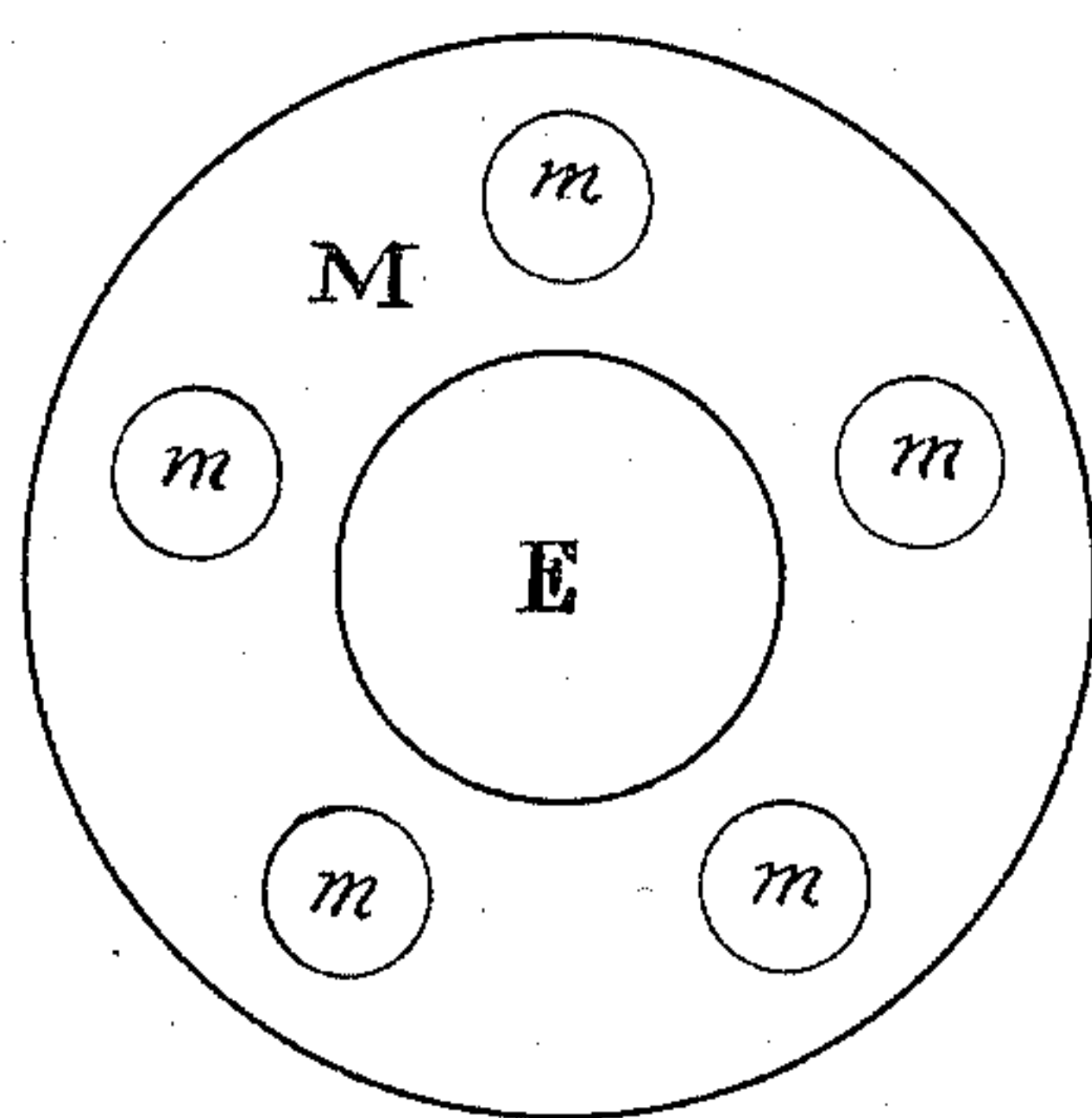


Fig. 2.

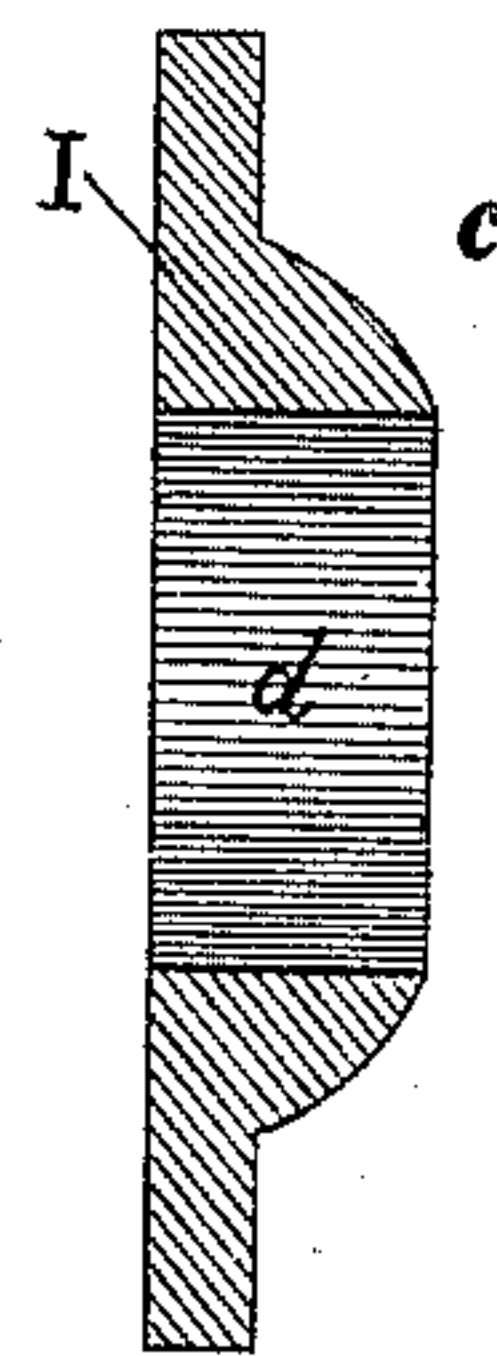


Fig. 3.

WITNESSES:

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Geo. H. Calvert

INVENTOR.

Charles F. Churchill  
BY *A. H. French*

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(No Model.)

2 Sheets—Sheet 2.

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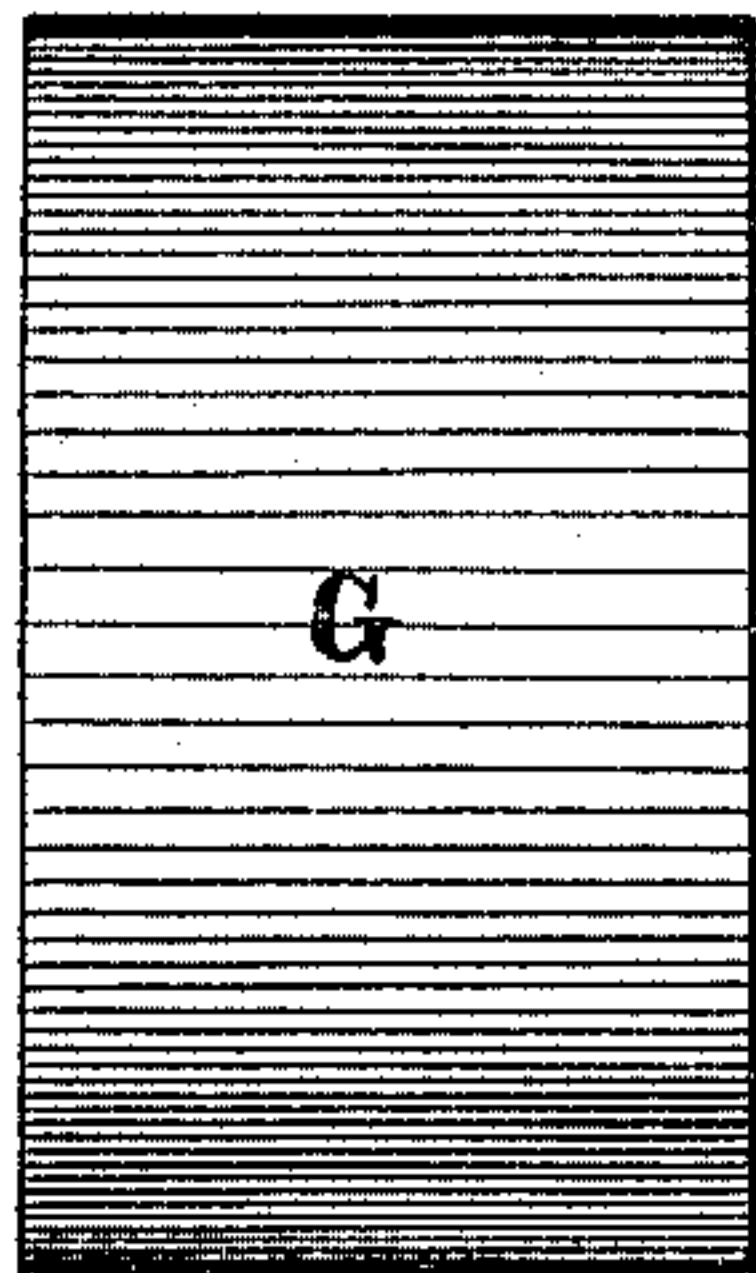


Fig. 7.

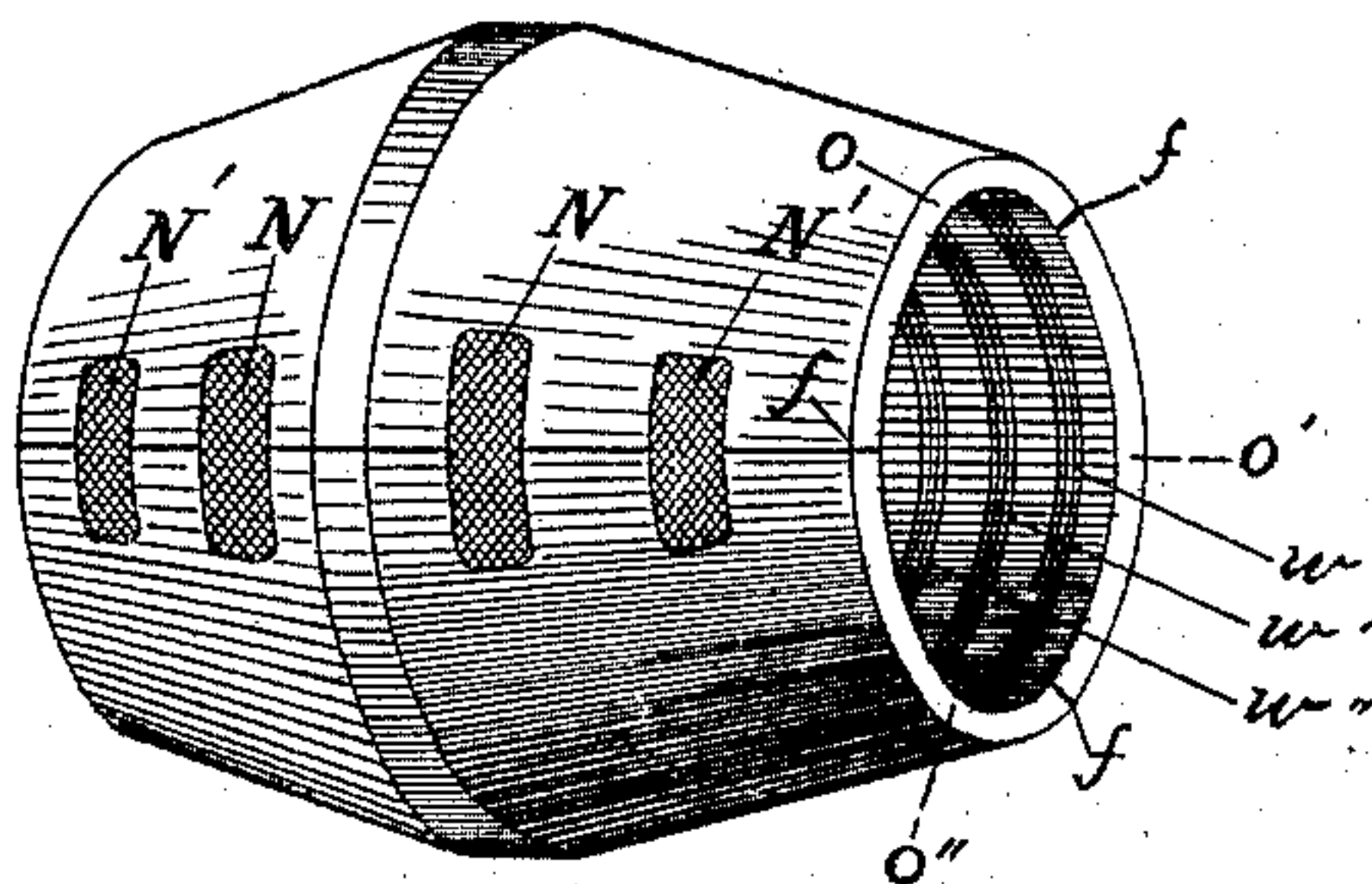


Fig. 4.

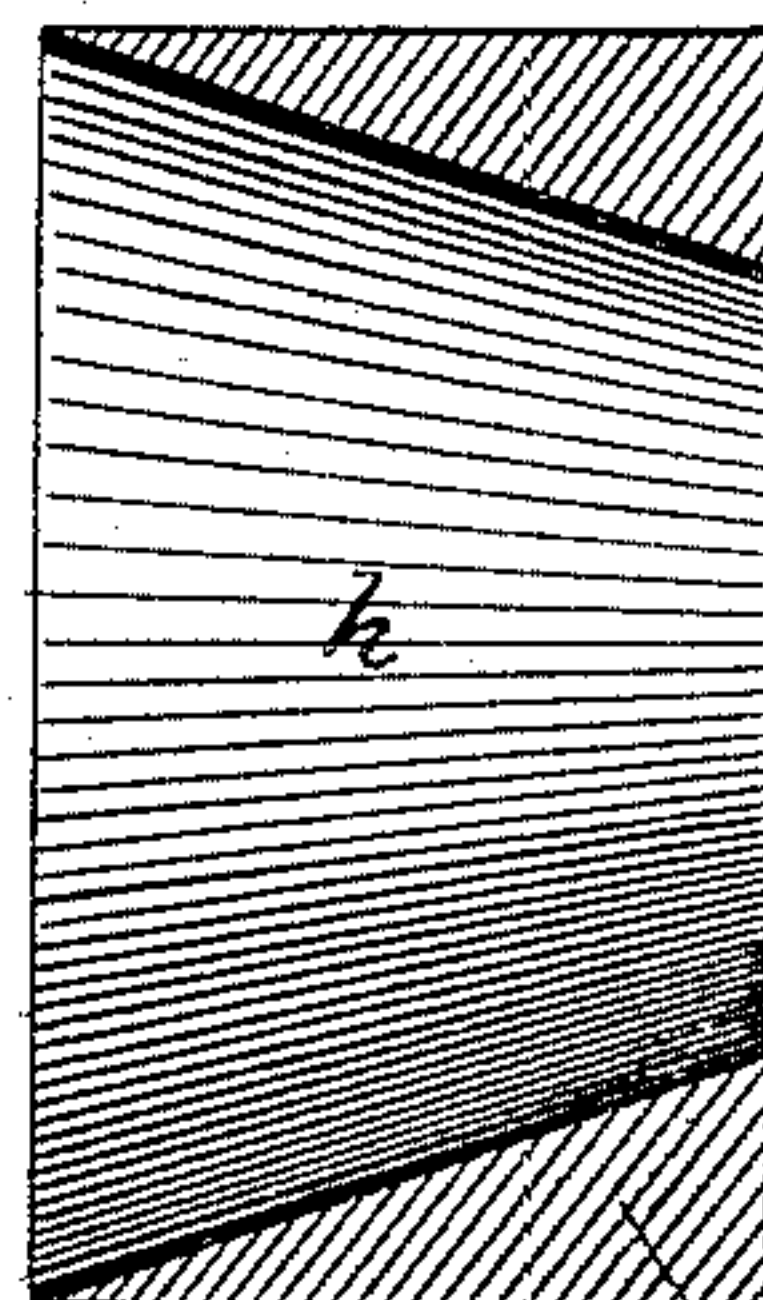


Fig. 8.

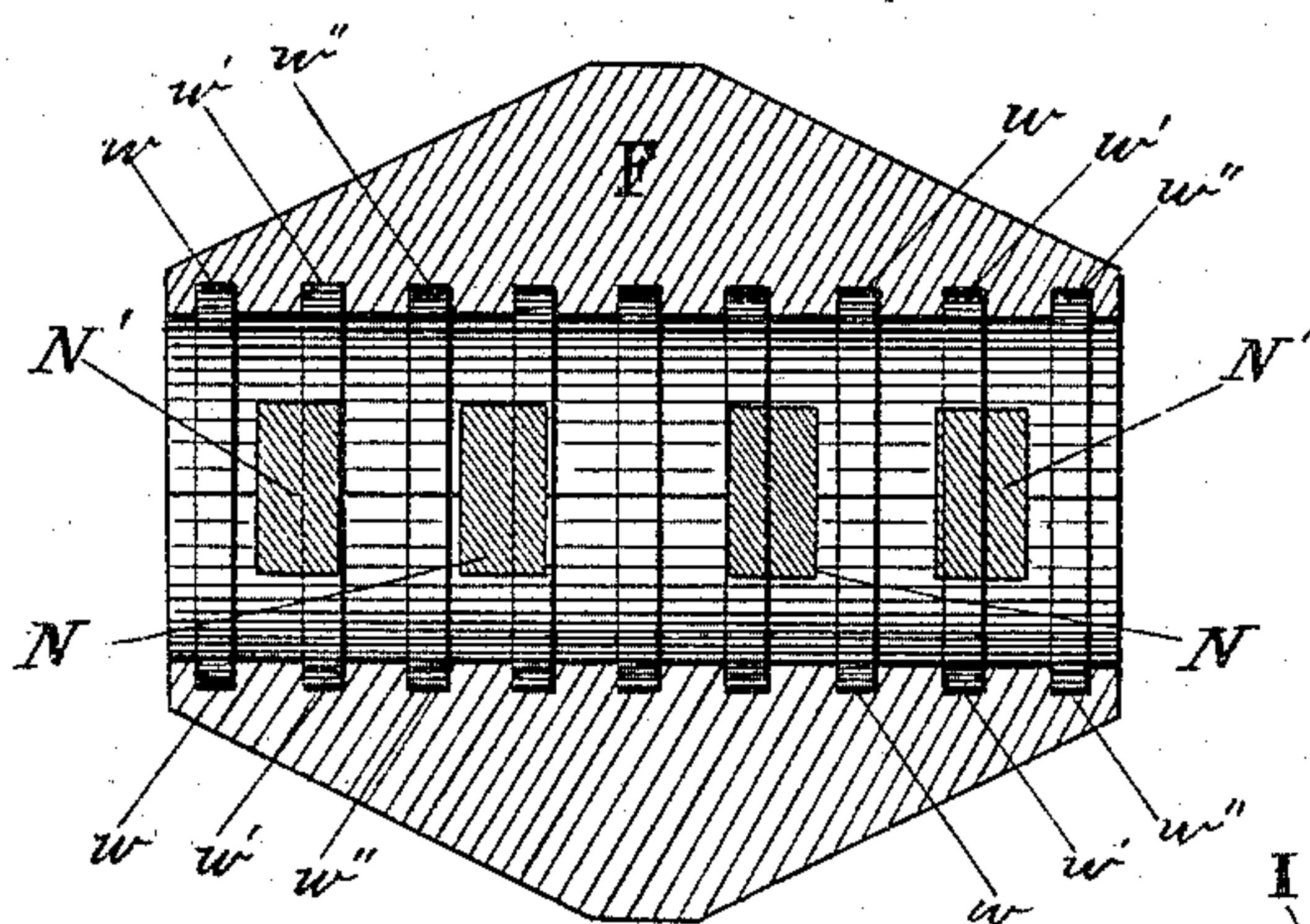


Fig. 5.

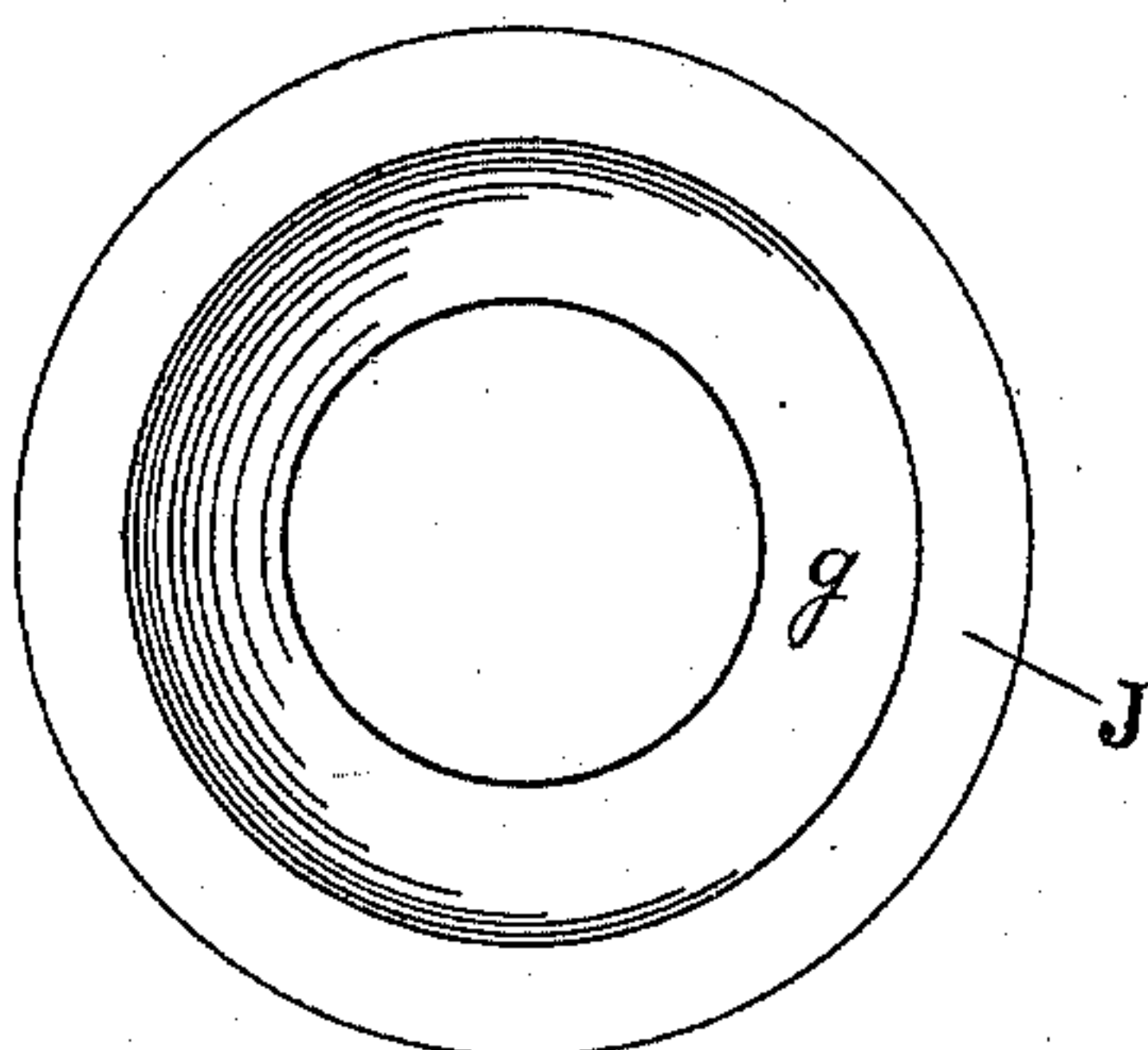


Fig. 9.

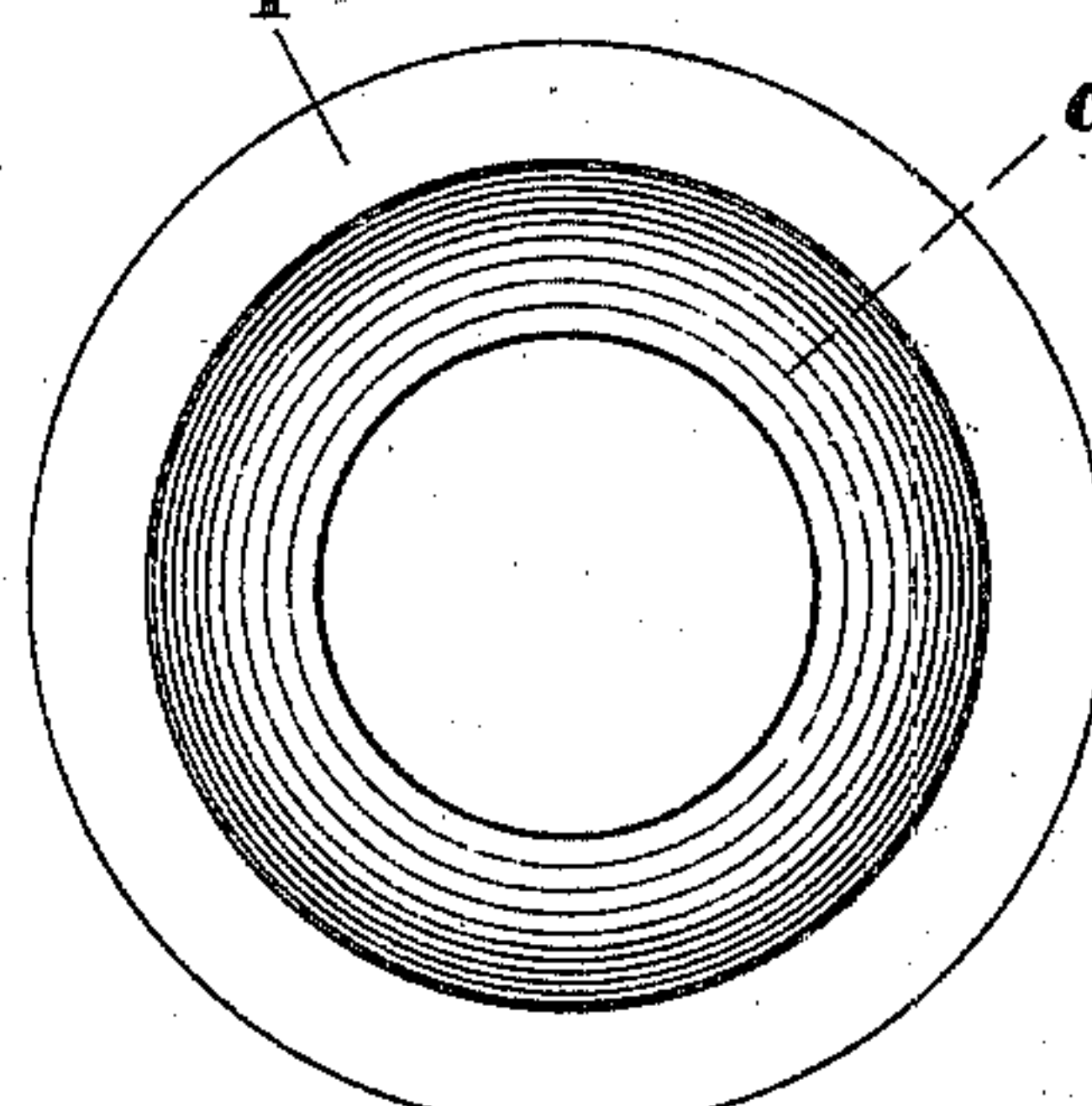


Fig. 10.

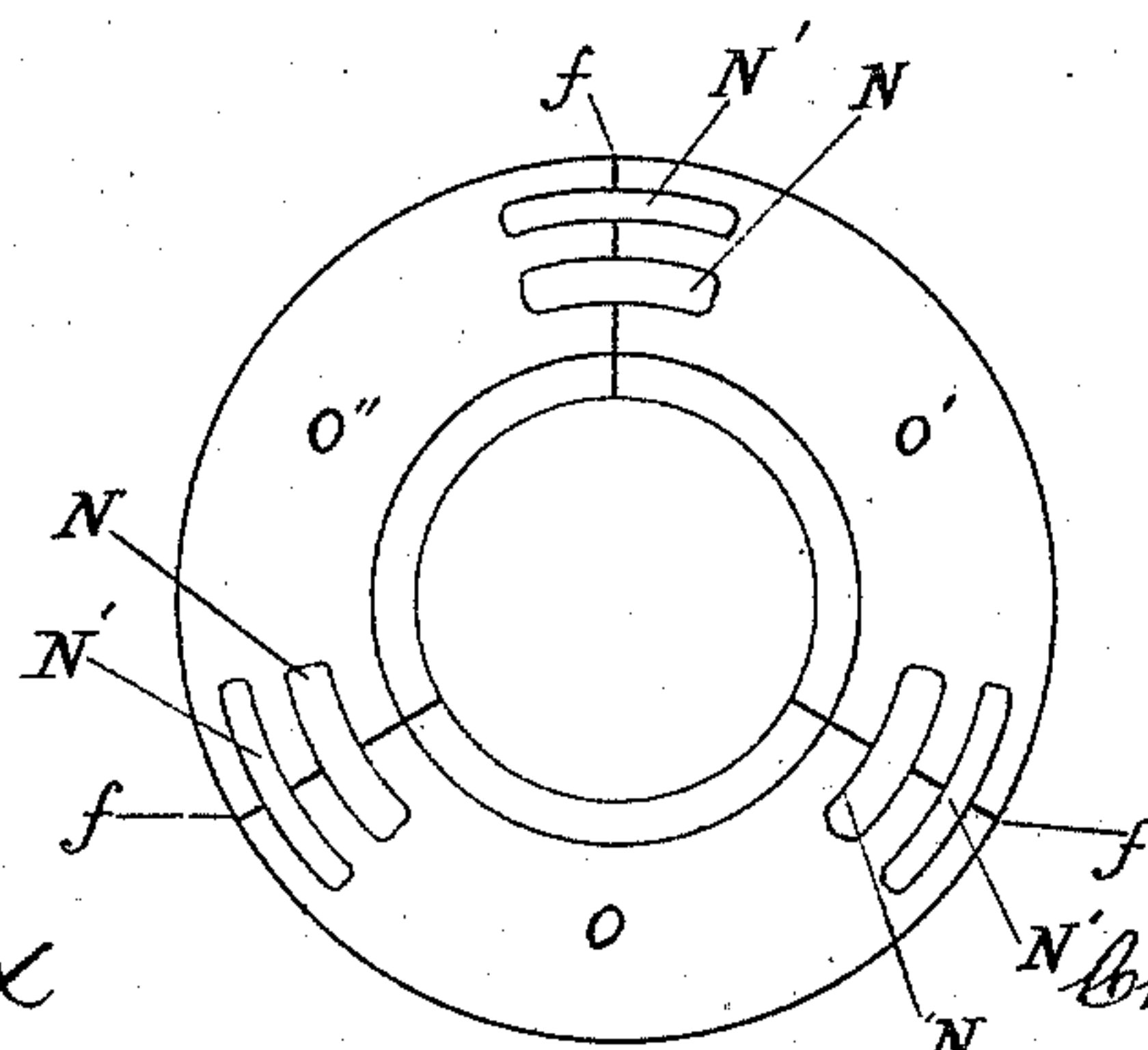


Fig. 6.

WITNESSES:

Henry A. Hancock  
Geo. H. Colver

INVENTOR

Charles F. Churchill  
BY  
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# UNITED STATES PATENT OFFICE.

CHARLES F. CHURCHILL, OF MELROSE, MASSACHUSETTS.

## METALLIC ROD-PACKING.

SPECIFICATION forming part of Letters Patent No. 493,978, dated March 21, 1893.

Application filed October 4, 1892. Serial No. 447,815. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. CHURCHILL, of Melrose, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Metallic Piston-Rod Packing, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of rod-packing for the piston-rod or valve-stem of steam-engines in which are employed segmental or divided metallic packing-rings encircling the rod or stem and adapted to be forced by the steam-pressure firmly together about the rod or stem, to make a steam-tight connection therewith, and also at the same time to admit of lateral or vibratory motion; and my invention consists in the novel construction and combination of parts hereinafter described and claimed.

In the drawings Figure 1 is a side elevation, principally in section, of a part of a cylinder-head, stuffing-box, and piston-rod, showing my improved packing applied thereto. Fig. 2 is a view of the inner face of a metallic ring, M, at the inner end or bottom of the stuffing-box. Fig. 3 is a longitudinal, vertical section of a ring or washer, I, at the opposite end of the box. Fig. 4 is a perspective view of the interior segmental packing-ring, F. Fig. 5 is a central longitudinal section of the packing-ring F, in a plane at about a right-angle to that of Fig. 1, showing the concave bearing surface of said ring upon the piston-rod, extending through it, and adjacent parts. Fig. 6 is an elevation of one end of the composite packing-ring F. Fig. 7 is a view of the outer cylindrical surface of one of the inclosing rings, G, H, which are alike. Fig. 8 is a sectional view of one of said rings G, H, showing its converging, concave inner surface. Fig. 9 is an inner face view of a ring or washer, J, showing a concave recess, *g*. Fig. 10 is an outer face view of the ring or washer, I, showing a convex projection, or boss, *c*.

The stuffing-box B, through which the piston-rod E reciprocates, is mounted on the cylinder-head A, and is closed by the plate K and gland C, secured to it by the bolts D, D, all in the usual manner.

The elongated metallic packing-ring F, (Figs. 1, 4, 5, 6,) is divided on longitudinal

lines *f, f, f*, into three segmental portions *o, o', o''*, whose inner concave surfaces are adapted to bear upon the rod. When in working position the ends of this segmental packing-ring are approximately cone-shaped, tapering from the central portion each way toward the ends.

G and H are duplicate outer packing-rings which are adapted to partly inclose between them the composite ring F, being interiorly tapered or beveled to conform to the tapering ends of said inner ring.

M is a heavy cylindrical ring placed contiguous to the bottom or inner end of the stuffing-box, having its flat outer face seated against the inner face of the ring G, and its rounded inner face recessed with numerous equidistantly located, circular chambers *m, m*, (Fig. 2,) for receiving spiral springs L, L, which bear against the bottom of the box. By the action of said springs a slight space P is provided for the passage of steam between the ring M and the bottom of the box. Said rings are also arranged and adapted to maintain a uniform tension on the face of the ring M, to keep the packing in position when the steam pressure is reduced or has ceased; as well as in cases where the rod, box, &c., are set vertically or inclined.

I is a ring seated in the opposite end of the box, its flat inner face against the outer face of the inclosing ring H, and having on the central portion of its outer face a circular convex projection, or boss, *c*, (Fig. 10). Next to the ring I is a ring J, having its outer face flat and bearing against the plate K, and its inner face provided with a concave circular recess *g*, (Fig. 9,) adapted to receive a part of the boss *c*, and form therewith a rocking bearing or ball-and-socket joint. All the above described rings are mounted centrally to the path of the rod, and all their surfaces, where they bear against each other or the rod, are ground to form steam-tight joints. The central opening in the rings M, G, H, I, J, for the passage of the piston-rod, is made slightly larger than the diameter of the rod, to admit a small quantity of steam and allow slight lateral vibration of the rod. A steam-space S is left between the circumference of the rings and the inner wall of the stuffing-box. When the engine is in operation steam from



the cylinder follows along the rod and enters the stuffing-box, filling the spaces P and S and forcing the rings G and H, inclosing the segmental ring F, toward each other, thus closing the joints *f, f, f*, and causing the ring F to grip the rod closely and make a steam-tight joint. The adjustment of the convex boss *c*, formed on the ring I, in the concave recess of the ring J permits a lateral rocking movement of the combined rings M, G, F, H, I, when the same are under steam-pressure, without disturbing joints or allowing steam to escape.

To prevent the passage of steam along the division lines *f, f, f*, between the segments *o, o', o''*, I provide a series of metallic bars or keys, N, N', preferably of brass and rectangular in cross-section, which are inserted in slots of like shape formed in the adjacent edges of the segments *o, o', o''*, across the joints *f, f, f*, and extending radially through the ring F from its outer to its inner surface. Fig. 1 shows a lateral section of said keys, Fig. 4 an outer end view, and Fig. 5 their inner ends, next to the piston-rod. These keys serve the double purpose of intercepting the steam and keying the segments *o, o', o''*, together, preventing longitudinal displacement. When the steam-pressure is reduced or stopped the tension upon the rings relaxes proportionately, and the rod passes freely through the packing without friction. The parts being self-adjusting, the construction described effects the important double result of a steam-tight joint when the work to be done requires it, and releases from friction and wear of parts at other times.

In constructing my improved packing I also

provide grooves or channels *w, w', w''*, &c., Figs. 1, 4 and 5, formed in and encircling the bearing surface on the piston-rod of the inner segmental packing-ring F. These are distributed along the said bearing surface, parallel to each other, and may if desired, as shown in Fig. 1, be cut through the inner ends of the keys N, N'. Said grooves serve as receptacles for storing the surplus lubricating material and elements set free by attrition.

I am aware that it is not new to employ in rod-packing segmental, metallic packing-rings having externally coniform or tapering ends inclosed in chambers having internally coniform or converging surfaces fitting the inner ring, and I do not claim broadly such construction; but

I do claim as my invention—

A rod-packing for stuffing-boxes, &c., consisting of an inner, expansible, segmental packing-ring F provided with radial keys N, N', closing the joints between its segments, its exterior surface tapering from the center toward its ends, and inclosed between outer compressing rings G, H, in combination with a ring or washer I bearing against the ring H and having outwardly a convex, circular boss *c*, adapted to engage with a concave socket *g*, in a ring J, seated against the gland, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 12th day of September, A. D. 1892.

CHARLES F. CHURCHILL.

Witnesses:

THOS. J. KENNY,  
A. H. SPENCER.