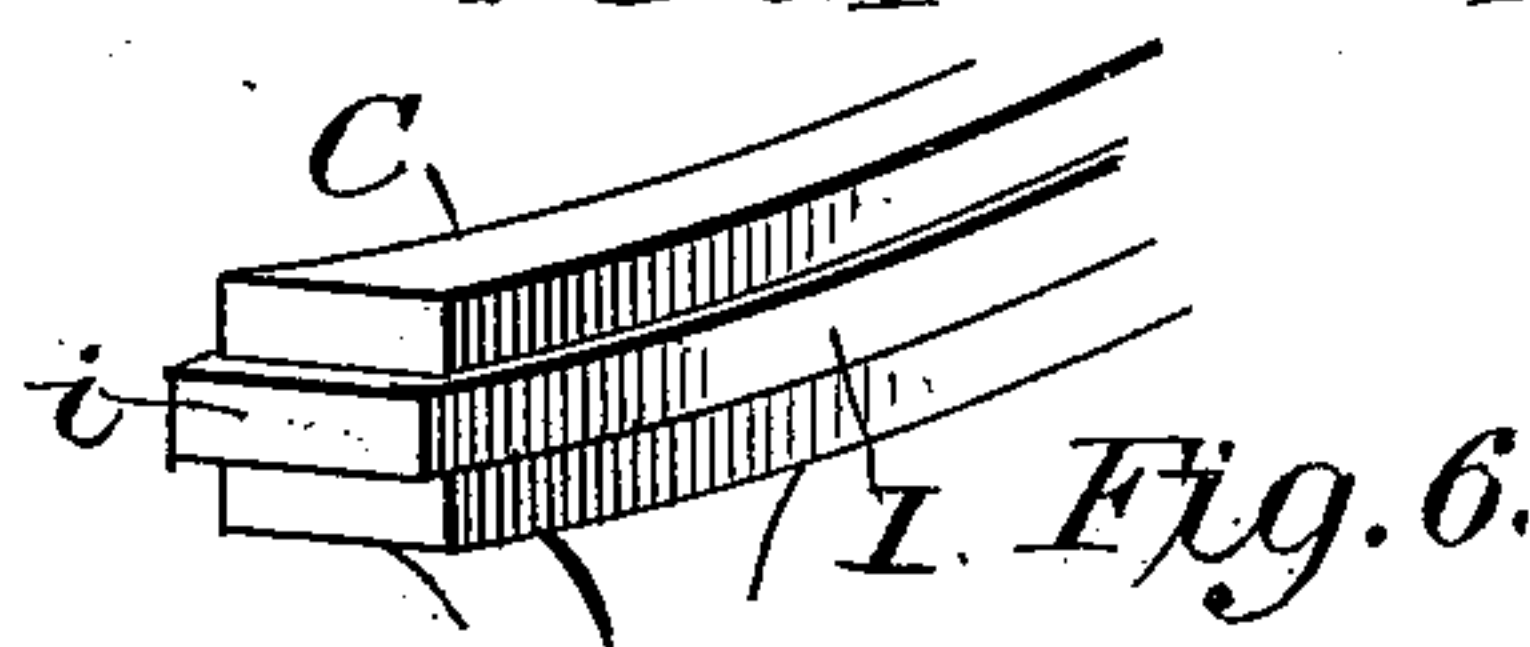
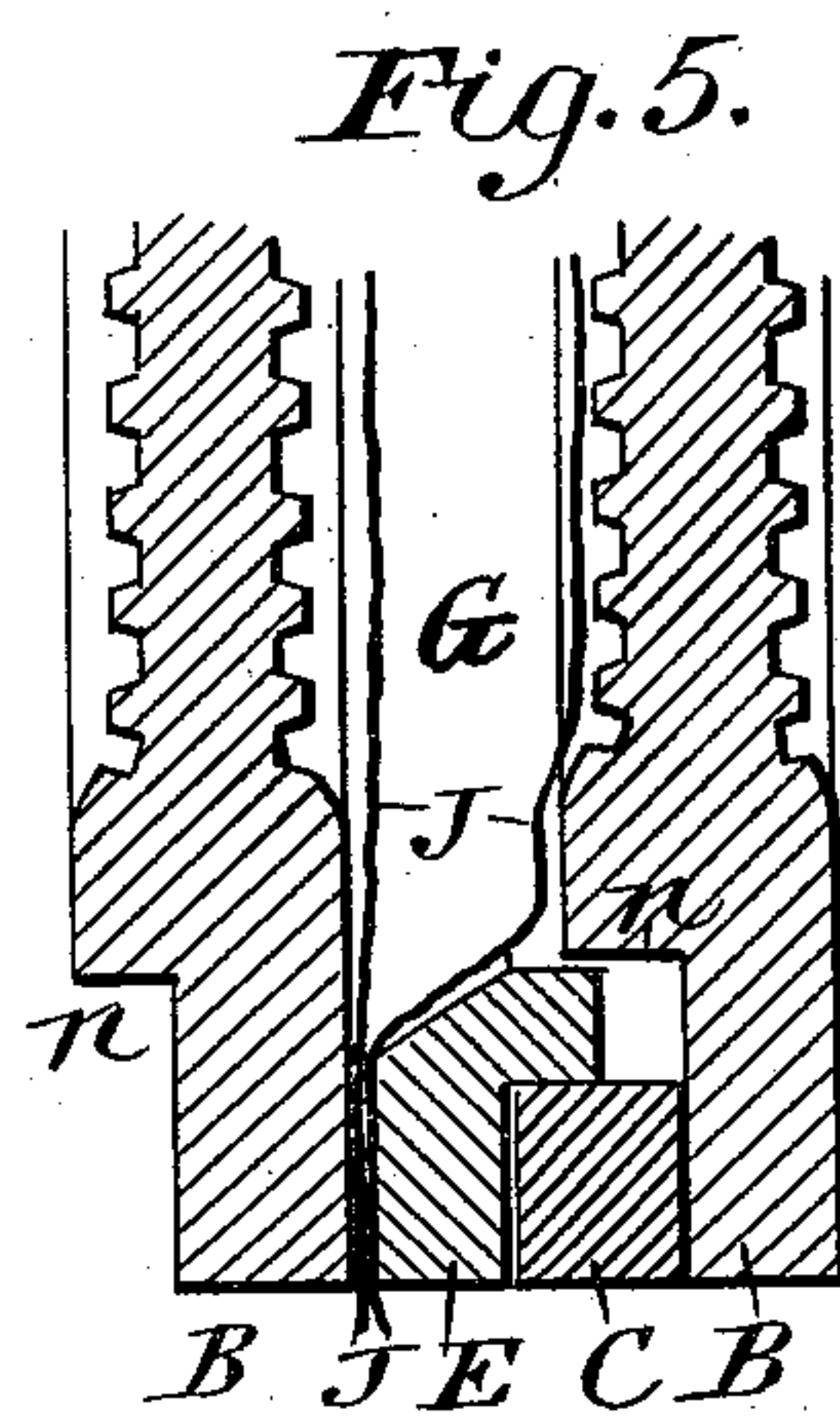
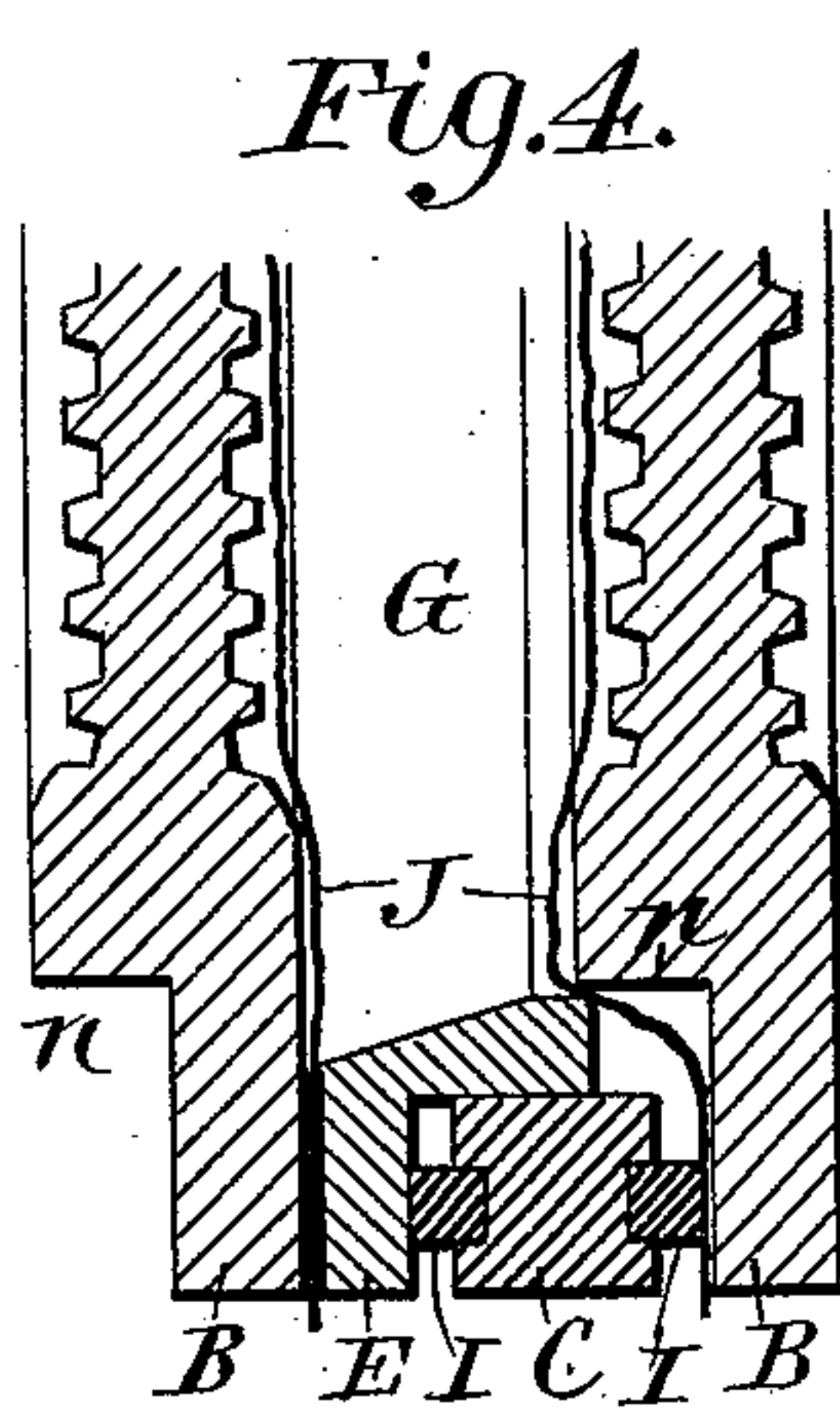
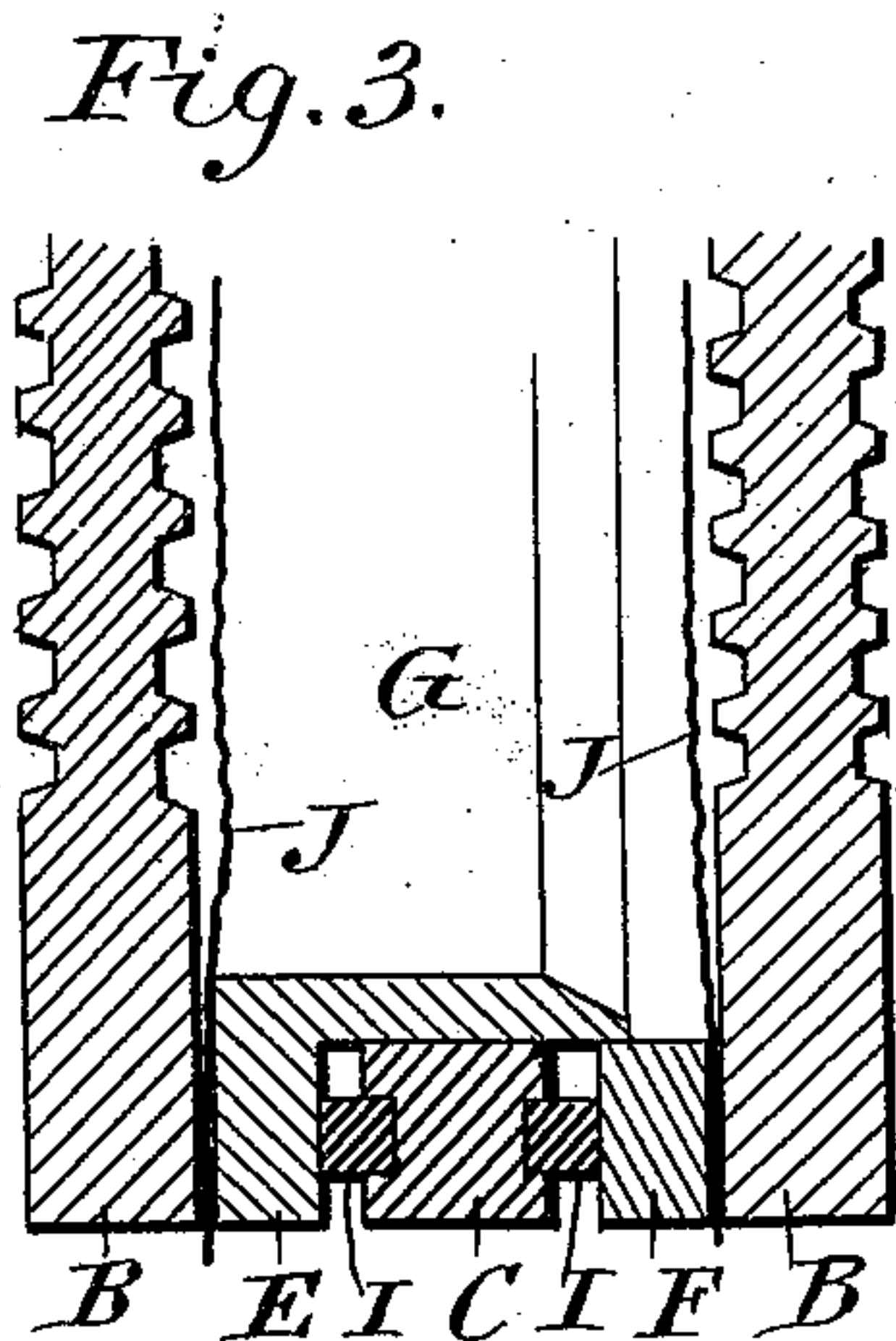
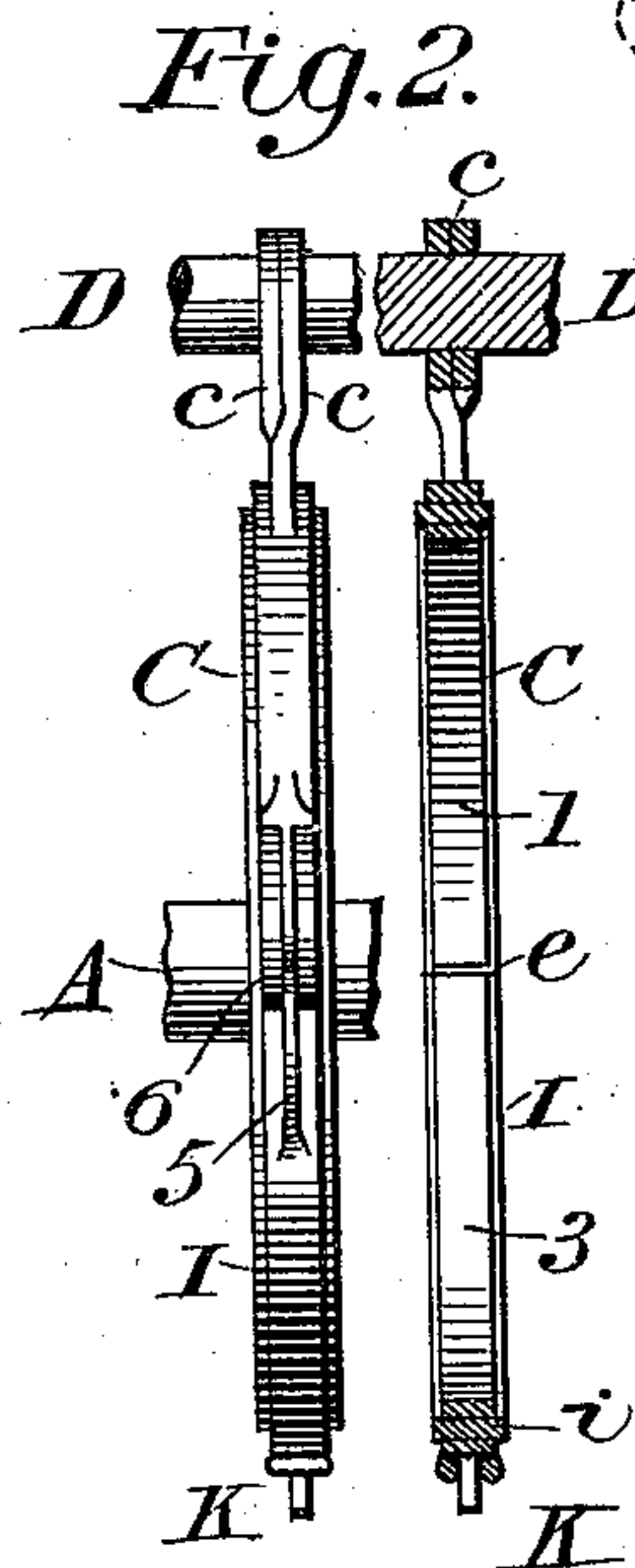
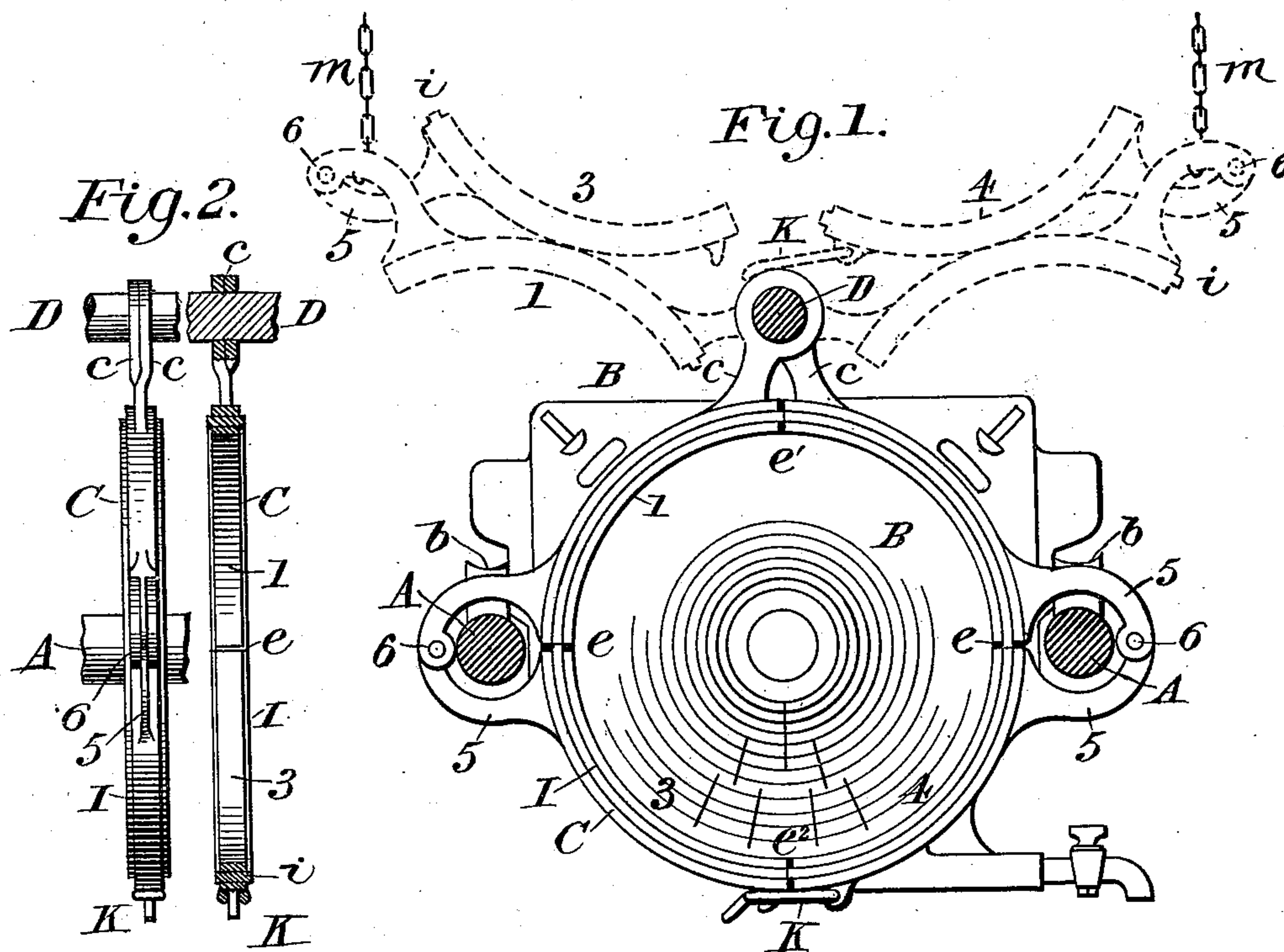


O. P. BUSHNELL.
FILTER PRESS.

Patented Nov. 19, 1895.



Witnesses:

Charles Bacon
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UNITED STATES PATENT OFFICE.

OSCAR P. BUSHNELL, OF MOUNT GILEAD, OHIO.

FILTER-PRESS.

SPECIFICATION forming part of Letters Patent No. 549,896, dated November 19, 1895.

Application filed February 9, 1895. Serial No. 537,762. (No model.)

To all whom it may concern:

Be it known that I, OSCAR P. BUSHNELL, a citizen of the United States, residing at Mount Gilead, in the county of Morrow and State of Ohio, have invented a new and useful Improvement in Filter-Presses, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This invention pertains to that class of filter-presses in which a series of plates with intervening chambers and filter-cloths are employed, the plates being supported at their sides by rollers that run upon the horizontal press-rods and adapted to be forced together in series by pressure appliances arranged in well-known manner.

My present improvement more especially relates to the construction and manner of combining the distance-rings with the pressure-plates, the object of the invention being to provide a compound distance-ring formed in two or three ring-sections separable from each other and from the plates.

Another object is to provide in a filter-press a ring for use between the plates, made in a series of segments hinged together and also hinged to a support-rod in a manner that will permit of the ring being unclapsed and its segments swung or moved out of the way of the plates when desired.

Another object is to provide a distance-ring formed with a plurality of ring-sections, one or more of which are made in segments or sections hinged together and adapted to be released and swung out of the way without disturbing the other ring-sections and plates; also, to afford a hinging connection for the segments that will not interfere with the press-rods; also, to provide a segmental sectional ring having packings connected with the segments.

I attain these objects by the mechanism illustrated in the drawings, wherein—

Figure 1 is a view showing the face of the distance-ring and pressure-plate of a filter-press, the press-rods and ring-supporting rod being shown in section and the position of the ring-segments when swung up out of the way being indicated by dotted lines. Fig. 2

shows a side view and section of the jointed ring. Figs. 3, 4, and 5 are section views through one side of the plates and rings, showing, on a somewhat larger scale, the form and manner of combining the rings and plates; and Fig. 6 is a perspective view showing the end of one of the ring-segments.

In referring to parts, A A indicate the press-rods along the sides of the press, and B the presser-plates, of the usual well-known construction and arrangement.

C indicates my jointed ring-section, and D a supplemental rod longitudinally arranged along the top of the press above the plates B with its ends sustained upon the end frames in any suitable manner and serving as a hinging center and support for the jointed rings.

E indicates a male ring-section, and F a female ring-section, which (one or both, as in any case desired) are employed, together with the jointed section C, to form the compound distance-ring adapted for use between the adjacent plates for giving a greater or less width to the intervening press-chambers G and facilitating contraction of said chambers by removal of the jointed ring-sections as the press is operated.

I indicates yielding or semielastic packing on the side faces of the ring-segments, and J the filter-cloths, which latter may be of the usual kind.

The ring E, in accordance with my invention, is made in a series of segments 1, 2, 3, and 4. The segments 1 and 2 are provided with hinging ears *c c*, that embrace the rod D, forming a hinge and support for the ring, and each of the segments is provided with an outwardly-curved hinging ear 5, that extends partly around the press-rod A, such ears being connected in pairs by hinging pivots 6 at the outer sides of said press-rods, the joint between the adjacent segments being at the inner side of the rods, as at *e* and *e'*. The ring is preferably made with four segments, the two lower segments being joined across the bottom joint *e*² by a clasp or detachable connection K, which can be readily secured and unfastened, as occasion requires. The side faces of the segments have the packing I attached thereto, preferably by grooves formed in the segments, and at one end of

each of the segments there is a packing *i*, that gives a tight closure against the opposite surface when the ends of the segments are brought together in position corresponding to the face-rim of the plates. By releasing the clasp K the several segments can be swung up, as indicated in dotted lines, Fig. 1, out of the way of the plates, and there sustained by suitable suspending devices *m*, affording the operator convenient access for managing the filtering appliances. The hinging ears *h*, being extended around the rods A, permit of the removal and readjustment of the segmental ring without interfering with the press-rods, and when elevated leave said press-rods unobstructed for the travel of the plate-supporting rollers *b* thereon.

In Fig. 3 I have shown the jointed ring C as employed with a male ring-section E telescoping with a female ring-section F in combination with the plates B, the three parts forming a compound distance-ring that gives a wide chamber G. In Fig. 4 the mechanism is shown with a single male ring-section combined with the jointed ring and telescoping with an offset *n* formed on the plate, giving a medium chamber G. In Fig. 5 a similar arrangement of ring-sections is shown, but adapted for taking the filter-cloths both at one side of the distance-ring, and the jointed ring-section as made without packings on its side faces. Either of these modifications can be used according to the particular class of material upon which the press is to be used, the structure and hinging of the segmental ring being in each case substantially as shown in Fig. 1.

In the operation of the press, when the bulk of the material contained within the chamber G has been partially reduced by the pressure, the segmental ring can be unclaspd, removed from its position, and swung up out of the way, and the space thus afforded permits the further reduction of the chamber by the pressure, the segments being entirely out of the way, so as not to impede the action of the other parts.

What I claim as my invention, herein to be secured by Letters Patent, is—

1. In a filter-press, the combination with the press-rods, and pressing-plates having lateral projections movably mounted on said press-rods, substantially as described, of the supplemental rod arranged along the press above and adjacent to said plates, and the distance rings composed of separable ring-sections hinged and supported on said supplemental rod, independent of the press-rods, as set forth.

2. The ring for filter-presses formed of a number of segments adjacently hinged together, and a support-rod having said ring supported thereon independent of the press-

rod, whereby said segments are adapted for adjustment to the circle of the plates, or to be swung up out of the way, as set forth.

3. A ring for filter presses, having its circular body composed of separable jointed segments, the upper segments having hinging ears adapted for embracing a rod, the supporting rod forming the pivot for the hinge and upholding the segments, and the lower segments connected to the upper segments with hinging ears that are adapted to extend around the exterior of the press-rods, for the purpose set forth.

4. In combination with the plates and press-rods in a filter press, of a top-supporting-bar, a distance-ring comprising a plurality of ring-sections, one ring formed in four segments hinged together in pairs, the two upper segments hinged upon said support rod; and the lower segments hinged to the upper segments at their sides by hinging ears that extend around the press-rods without attachment thereto, and a clasp detachably connecting the adjacent ends of the lower segments.

5. A ring for filter presses, comprising a series of segments hinged together, and having a clasp for closing the ring, said segments provided with packing strips on their side faces and packing at the ends of the adjacent segments, as set forth.

6. The combination with the plates in a filter-press, of the compound distance-ring composed of a plurality of ring-sections disposed between the pairs of adjacent plates, one of which ring-sections is made in a series of segments having their ends hinged together and adapted for removal of said ring by swinging its segment out of range from between the other ring sections and plates, thereby permitting further closure of the press, substantially as set forth.

7. The combination with the press-rods, the plates supported to move on said press-rods and the filter-cloths facing said plates; of the supplemental support-rod, the distance-ring composed of the male ring-section, and the jointed ring-section, said jointed ring-section formed of a series of segments, the upper segments hinged upon said support-rod, their free ends hinged to the adjoining segments by hinging joints disposed at the outer side of the press-rods, and a releasable connection joining the opposite ends of said ring-segments, substantially as and for the purposes set forth.

Witness my hand this 2d day of February, A. D. 1895.

OSCAR P. BUSHNELL.

Witnesses:

IRA FITTS,
J. W. SMITH.