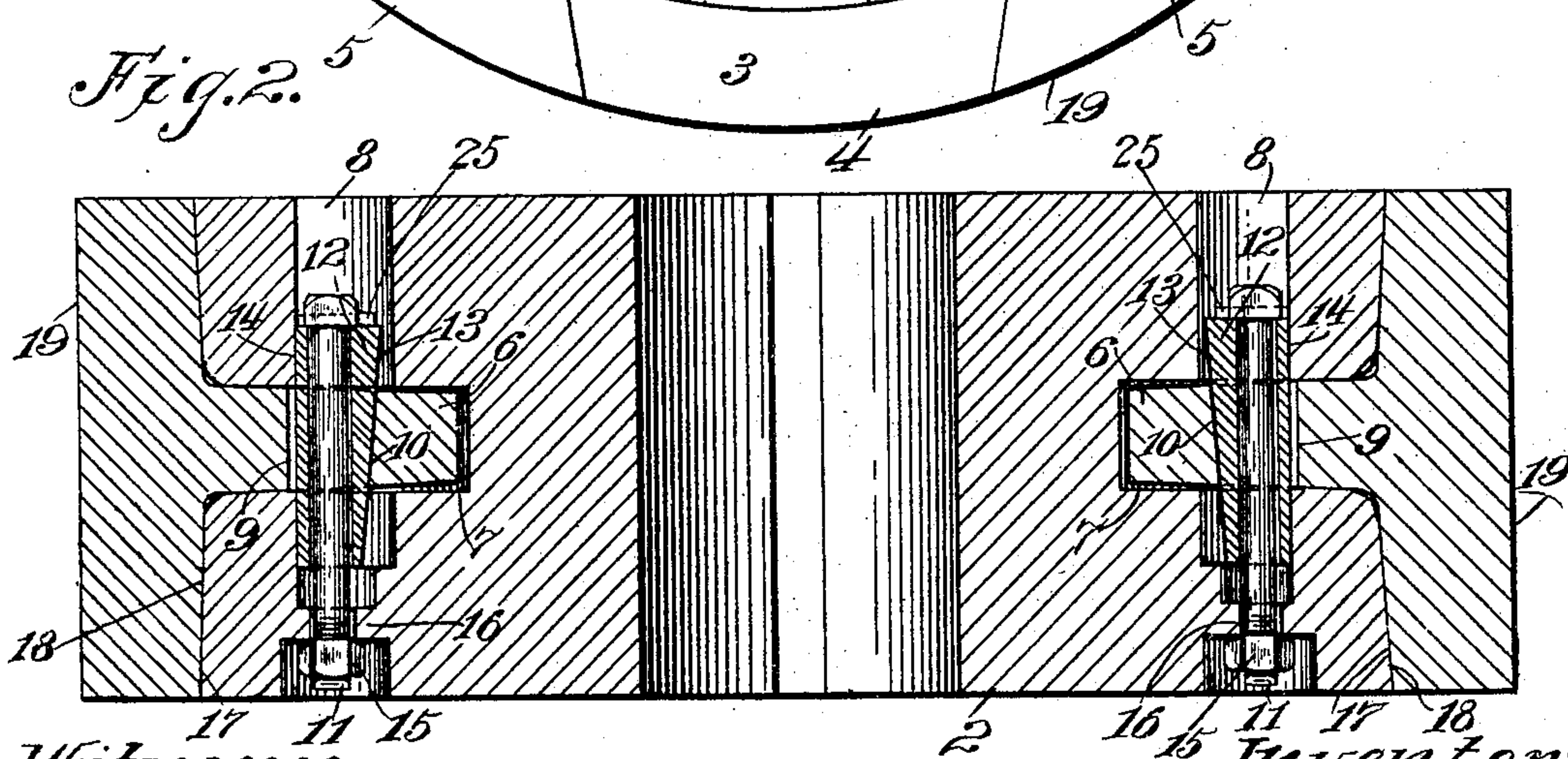
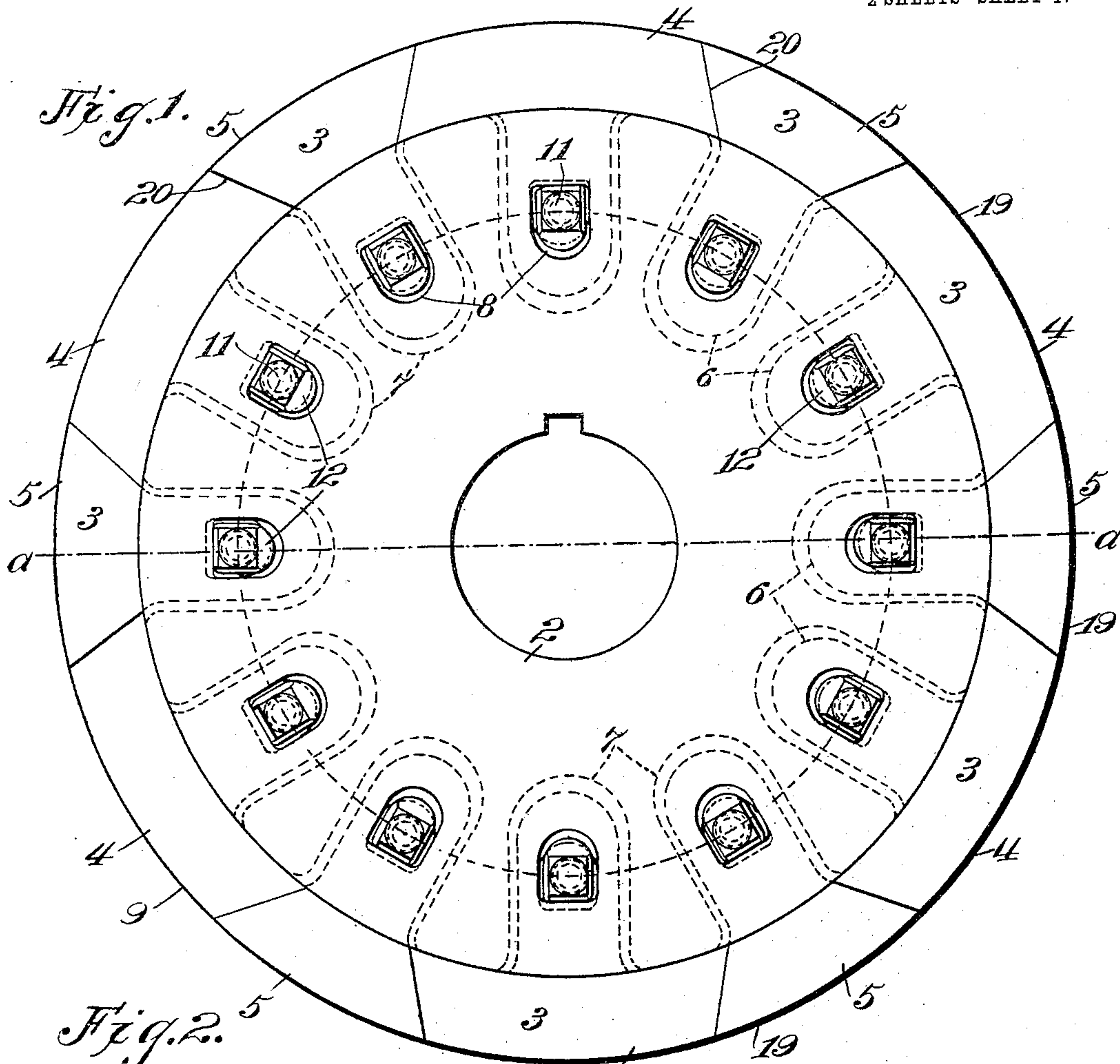


W. BRINTON.
CRUSHING ROLL.

APPLICATION FILED DEC. 24, 1903.

2 SHEETS—SHEET 1.



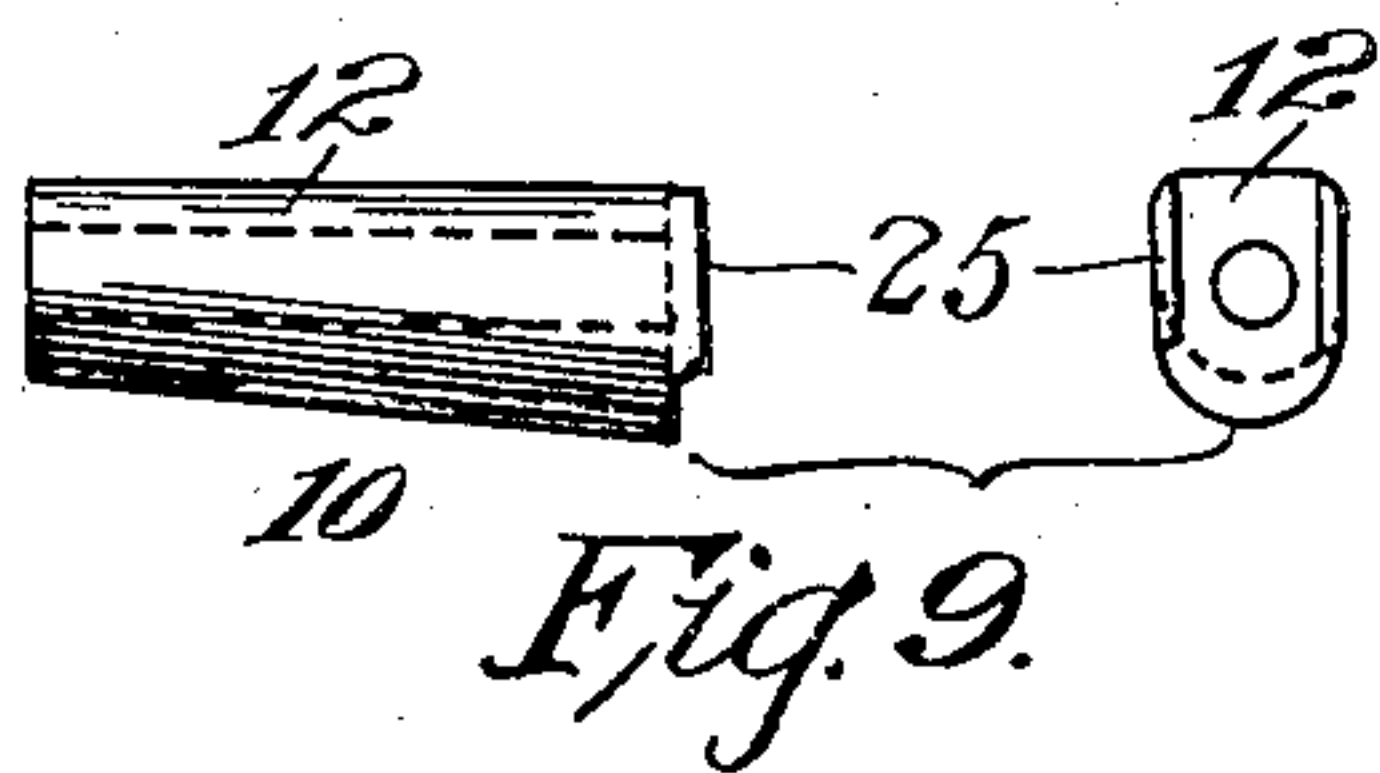
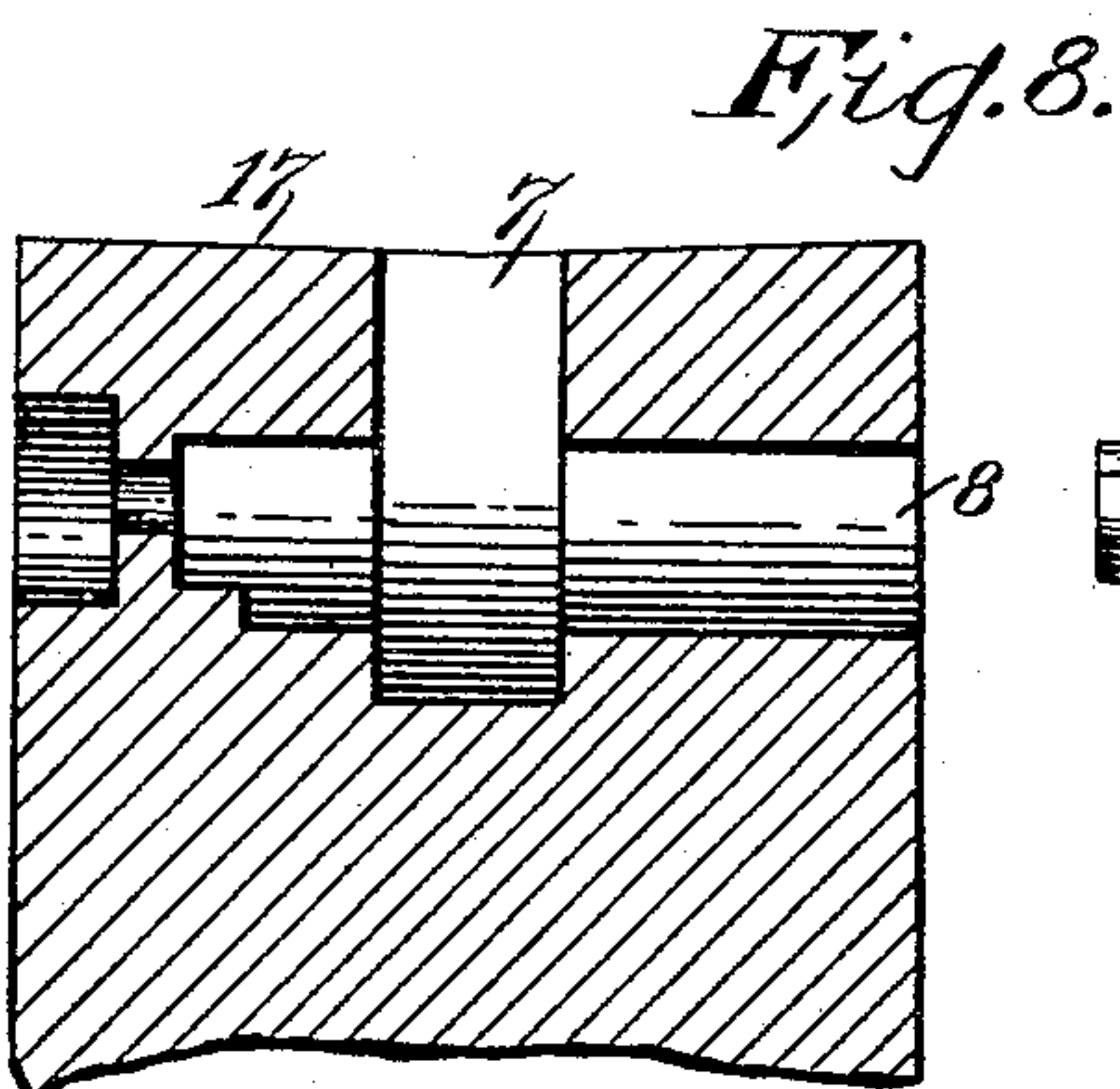
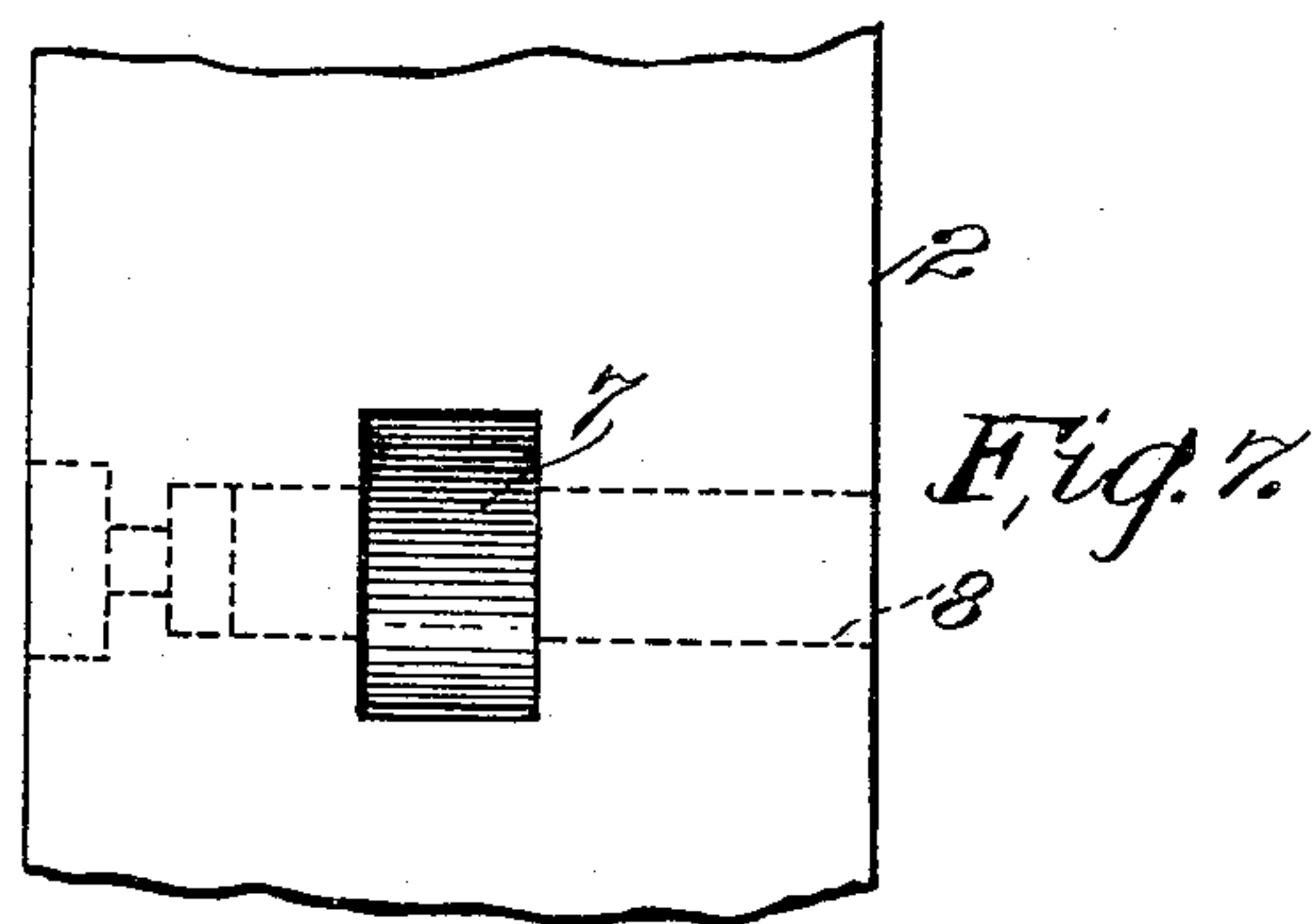
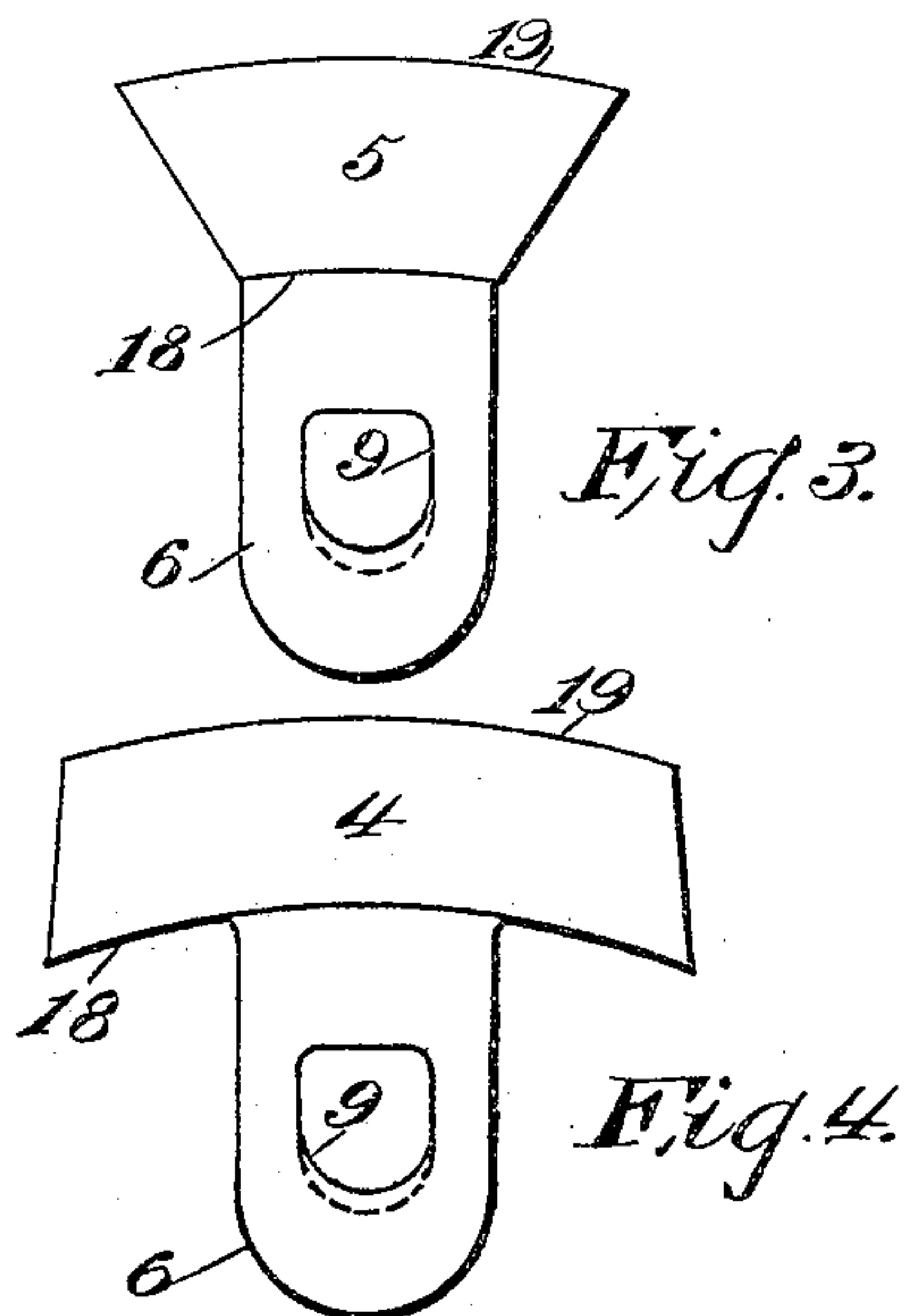
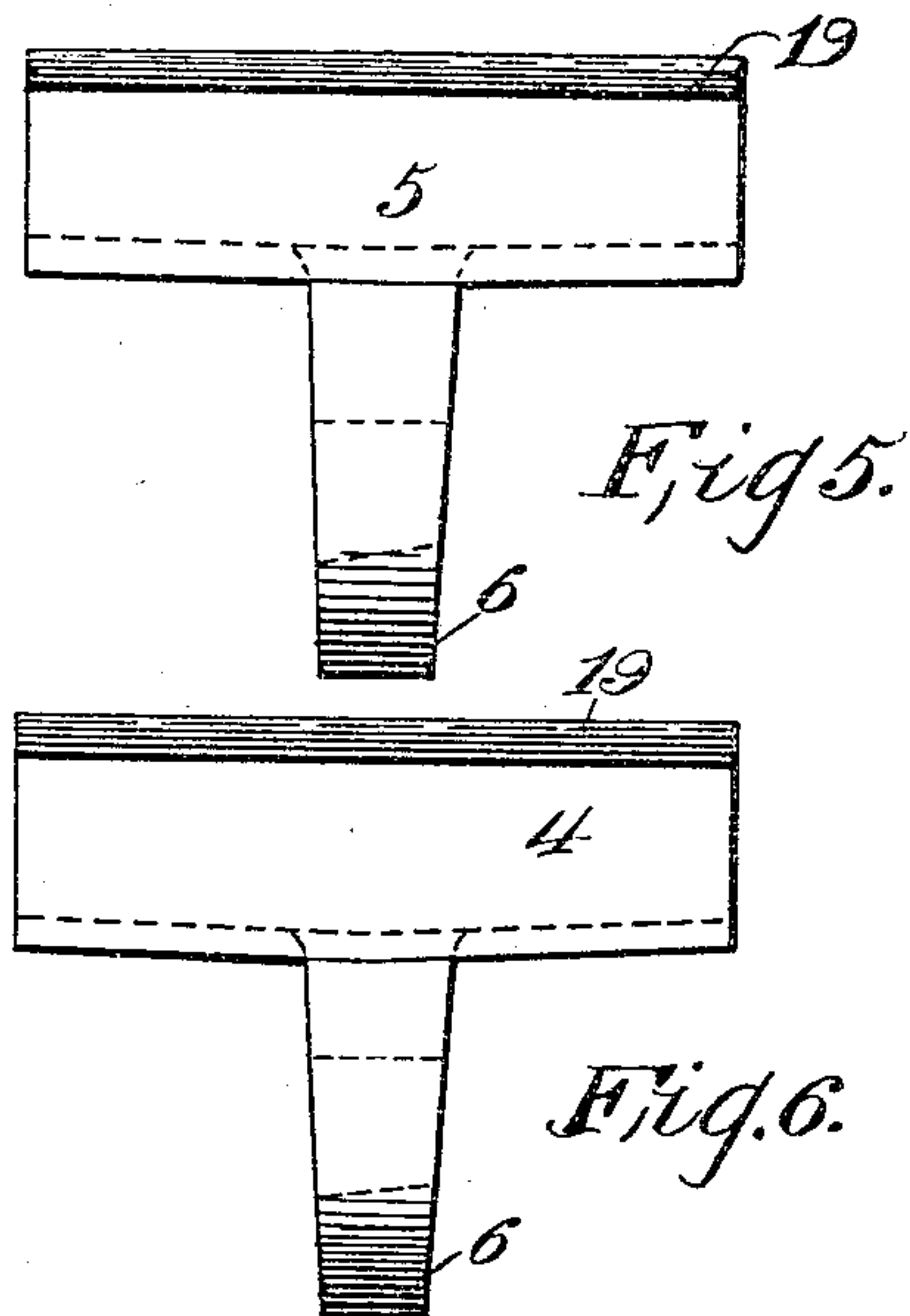
Witnesses:
Robert Addt
C. A. Jarvis.

Inventor:
Walter Brinton,
By his Attorney
F. H. Richards.

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CRUSHING ROLL.

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2 SHEETS—SHEET 2.



Witnesses:
Robert A. Adt
C. A. Jarvis.

Inventor:
Walter Brinton,
By his Attorney,
F. H. Richards.

UNITED STATES PATENT OFFICE.

WALTER BRINTON, OF HIGHBRIDGE, NEW JERSEY, ASSIGNOR TO TAYLOR
IRON AND STEEL COMPANY, A CORPORATION OF NEW JERSEY.

CRUSHING-ROLL.

No. 795,331.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed December 24, 1903. Serial No. 186,483.

To all whom it may concern:

Be it known that I, WALTER BRINTON, a citizen of the United States, residing in Highbridge, in the county of Hunterdon and State of New Jersey, have invented certain new and useful Improvements in Crushing-Rolls, of which the following is a specification.

This invention relates to crushing-rolls for ore, brick-clay, sand-mixing mills, &c., the object of the invention being to provide an improved crushing-roll comprising a core or hub and a separable peripheral working face or shell made up of independent and separable segments or shoes secured to the core or hub.

A further object of the invention is the provision of a crushing-roll comprising a core provided with a plurality of segmental shoes, said core and shoes having a construction tending to prevent sidewise displacement of the shoes and the organization being such that a part of said shoes act as locking means or keys to maintain another part thereof rigidly in position.

In the drawings accompanying and forming a part of this specification, Figure 1 is an end view of this improved crushing-roll. Fig. 2 is a longitudinal sectional view taken in line *a a*, Fig. 1. Figs. 3 and 4 are edge or end views of the wedge and thrust shoes, respectively. Figs. 5 and 6 are transverse side views, respectively, of the shoes shown in Figs. 3 and 4; and Figs. 7, 8, and 9 are detail views showing a part of the core and the means for rigidly securing the shoes in position.

Similar characters of reference indicate like parts throughout the various figures of the drawings.

It is desirable in practice that the wearing-face of the roll or other device to which the present improvement is applicable should be of greater wear-resisting quality than the other part of the device. For this purpose the roll has been usually made up of a core and an integral separable shell. This, however, necessitates the removal of the entire roll from the mill in order to replace the shell when it has become worn or for any other reason it is unfit for use. It is also desirable that this shell be made of manganese steel, since when this is properly toughened by heat treatment it has a superior wear-resisting quality, which renders it particularly well adapted for use as a crushing-roll; but owing to the peculiar characteristics of this metal the casting must be substantially uniform or otherwise internal strains will be set up within the mass during

such heat treatment. There are, therefore, certain disadvantages not easily overcome in making the roll-shell as an integral structure of manganese steel, so that the provision of such a shell is expensive.

It is one of the objects of the present invention to provide a crushing-roll so constructed that its core or hub is provided with a peripheral working face of manganese steel made up of a series of separable elements each of which can be independently heat-treated in a uniform manner.

The present improvement comprises in the preferred form shown a core or hub 2, having a circular periphery, although the form of the periphery depends upon the form given to the inner surfaces of the shoes hereinafter referred to, and a plurality of segmental shoes or members 3, rigidly secured to the core. In the structure shown twelve of these shoes are provided, part of which will be herein designated the "thrust" members or shoes 4 and the other part the "wedge" members or shoes 5, for the reason that the latter assist in maintaining the former in position. Each of the shoes is provided with an inwardly-projecting portion or lug 6, extending into a pocket or recess 7, extending from the periphery of the core toward the axis thereof. Extending transversely through or into the core and transversely of the radial pockets or openings is a series of openings 8, one for each recess 7, for the reception of securing means for the shoes. The lug of each shoe, the construction and mode of assemblage being such that one lug for each shoe is sufficient, has a transversely-extending opening 9, the innermost wall 10 of which is inclined or beveled, and which openings 9 register with the transverse openings 8 of the core. The securing means in the present instance comprise tapered or wedge-shaped hollow keys 12, one for each shoe, the beveled or tapered surfaces 13 thereof coöperating with the beveled or inclined surfaces 10 of the lugs to wedge the shoes firmly to their seats by reaction against the faces 14 of the key-seats. For maintaining each of these tapered keys in position a bolt 11 is provided, which projects through the tapered key and has its head fitting into a squared countersunk portion 25 in the key to prevent the turning of such bolt. The opposite end of the bolt carries a nut 15, engaging a retaining-wall 16 of the core formed for this purpose, and which wall is

sufficiently strong to receive the strain of the nut. By turning the nut the key will be drawn forward to rigidly secure the nut firmly in engagement with its core. To prevent sidewise slipping of the shoes, the peripheral surface of the core is curved, being shown concaved transversely, while the inner surfaces 18 of the shoes are formed with a co-acting or registering surface or curvature shown convex, such concaved portions 17 forming seats for the shoes. This formation might in some structures be reversed, the concaved seats being carried by the wearing members. Each of the wedge-shoes is formed with a segmental outer wearing-surface 19, the thrust-shoes 4 having similar inner surfaces. The shoes are formed with inclined or beveled joint ends 20, the inclination of the thrust-shoes 4 being from the inner sides thereof, while the inclination of the wedge-shoes 5 is from the outer sides thereof, so that the wedge-shoes assist in securing the thrust-shoes in position on the core and locking them against displacement, owing to the lap-joints formed. This formation of the joint also prevents movement and consequent end wear of the shoes.

In assembling the shoes two of the shoes 4 may be first located in position and then bolted, then an intermediate shoe 5 placed in position and bolted, after which other shoes alternately placed in position. All the pockets or recesses and the lugs of the shoes are shown of a similar formation, so that the assemblage may commence at any point around the perimeter of the roll. In practice should one or more of these shoes become worn to a greater extent than the others or unfit for use it can be readily removed without the necessity of taking the roll out of the mill, thereby saving a great deal of time and resultant expense, or should the entire wearing-surface become worn or unfit for use it can be replaced without taking the roll out of the mill by replacing the several shoes, one at a time, while the roll is in place.

By this organization an improved roll is provided having a complete peripheral wear-resisting face formed of separable members, the mode of securing such peripheral face in position being such that it is as durable for crushing or grinding as though it were a complete solid ring, since the parts are interlocked with each other by the lap-joint and with the core by the hollow or concaved seats and by the securing means. It will be obvious that while this same principle may be applicable to other devices than crushing-rolls it is particularly well adapted for this purpose.

Having thus described my invention, I claim—

1. A crushing-roll comprising a core or hub having a series of pockets extending inwardly from the periphery thereof, such periphery

having a concaved formation transversely thereof, a plurality of segmentally-formed shoes each having a transverse convex inner face fitting into the concaved seats of the core, and an inwardly-extending lug, and means for securing such shoes individually to the core, said shoes having beveled coacting end faces, certain of said shoes being formed as wedges and others as thrust members such wedges assisting to maintain the thrust members in position.

2. A crushing-roll comprising a core or hub having a transverse concaved peripheral surface, and a plurality of radially-extending pockets or recesses intersected by a plurality of transversely-extending openings one for each pocket or recess, and a plurality of segmentally-formed lap-jointed shoes having transverse inner faces fitting the concaved face of the core and also having inwardly-extending lugs located in said pockets or recesses and provided with transversely-extending openings registering with the transverse openings of the core, and means located in said transverse openings for maintaining the shoes in position.

3. In a crushing-roll the combination with a core provided with a series of cored radial pockets and with a transverse opening intersecting each of said pockets, of a plurality of convexed inner-surfaced shoes or segments having beveled ends and one-half of which segments are adapted to overlap the others forming joints, said segments having cored lugs, hollow tapering keys passing through said transverse openings and through said lugs for maintaining said segments in position, and a bolt passing through each of said keys for tightening the said keys and thereby the segments.

4. A crushing-roll comprising a core or hub having a plurality of radially-extending pockets or recesses intersected by a plurality of transversely-extending openings one for each pocket or recess, and a plurality of segmentally-formed shoes having inwardly-extending lugs located in said pockets or recesses and provided with transversely-extending openings registering with the transverse openings of the core, and means located in said transverse openings for maintaining the shoes in position, said means comprising hollow tapered keys, the inclined faces thereof coöperating with inclined faces of the lugs and also having flat-sided countersinks at the larger ends, and bolts passing through said hollow keys for maintaining them in position and having flat-sided heads occupying said countersinks.

5. In a crusher-roll, the combination with a core chambered at intervals about its perimeter, of a number of segmental shoes mounted thereon and each having a lug, said lugs respectively entering alternate chambers and secured to the core each by a single means of

attachment the ends of the said shoe-segments approaching the chambers intermediate the chambers in which the lugs of said shoes are entered, and shoe-segments shorter than the former shoe-segments interposed therebetween and each having a projection entering one of the said intermediate chambers and secured to the core by a single means of attachment, the ends of said latter shoe-segments overlapping the former radially of an unchambered portion of the perimeter of the core.

6. In a crushing-roll the combination with a core, of a series of segmental shoes each secured to the core and spaced apart and having end faces inclined to the radius of the core, and segmental shoes occupying the spaces

between said former shoes and each secured to the core, and having end faces inclined to the radius of the core and abutting the said faces upon said former shoes.

7. A crusher-roll embodying a core and a shell or tire thereon composed of comparatively long segmental shoes each secured by its central portion to the core and alternating with a series of comparatively short segmental shoes each secured to the core and overlapping the ends of the former shoes whereby substantially uniform rigidity is had in the several portions of the entire shell or tire.

WALTER BRINTON.

Witnesses:

JACOB STRUBLE,

A. F. MURRAY.