

No. 709,642.

Patented Sept. 23, 1902.

V. W. MASON, JR.  
GRINDING OR CRUSHING HEAD OR ROLL.

(Application filed Dec. 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.

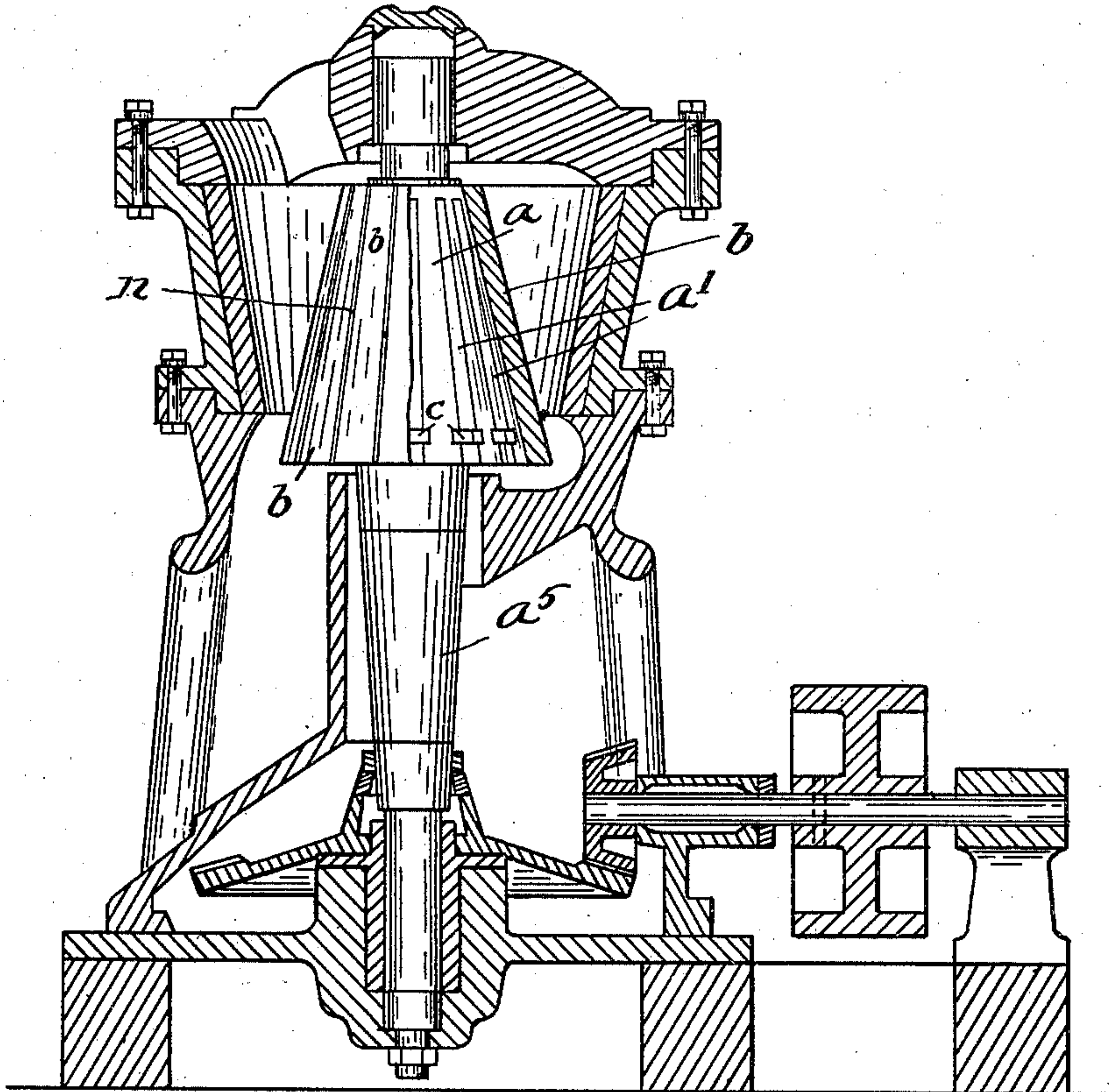


Fig. 1.

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Fig. 2.

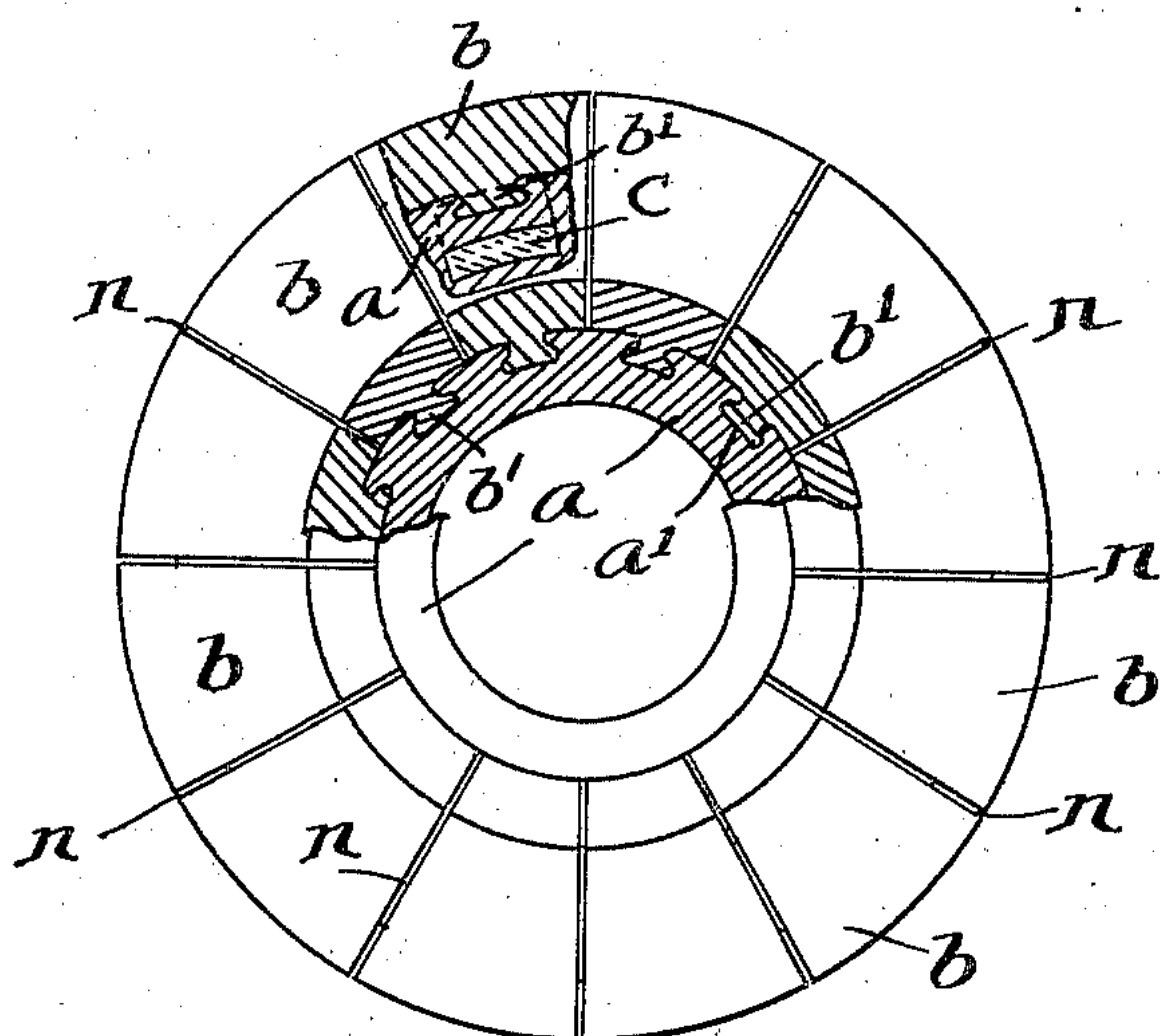


Fig. 3.

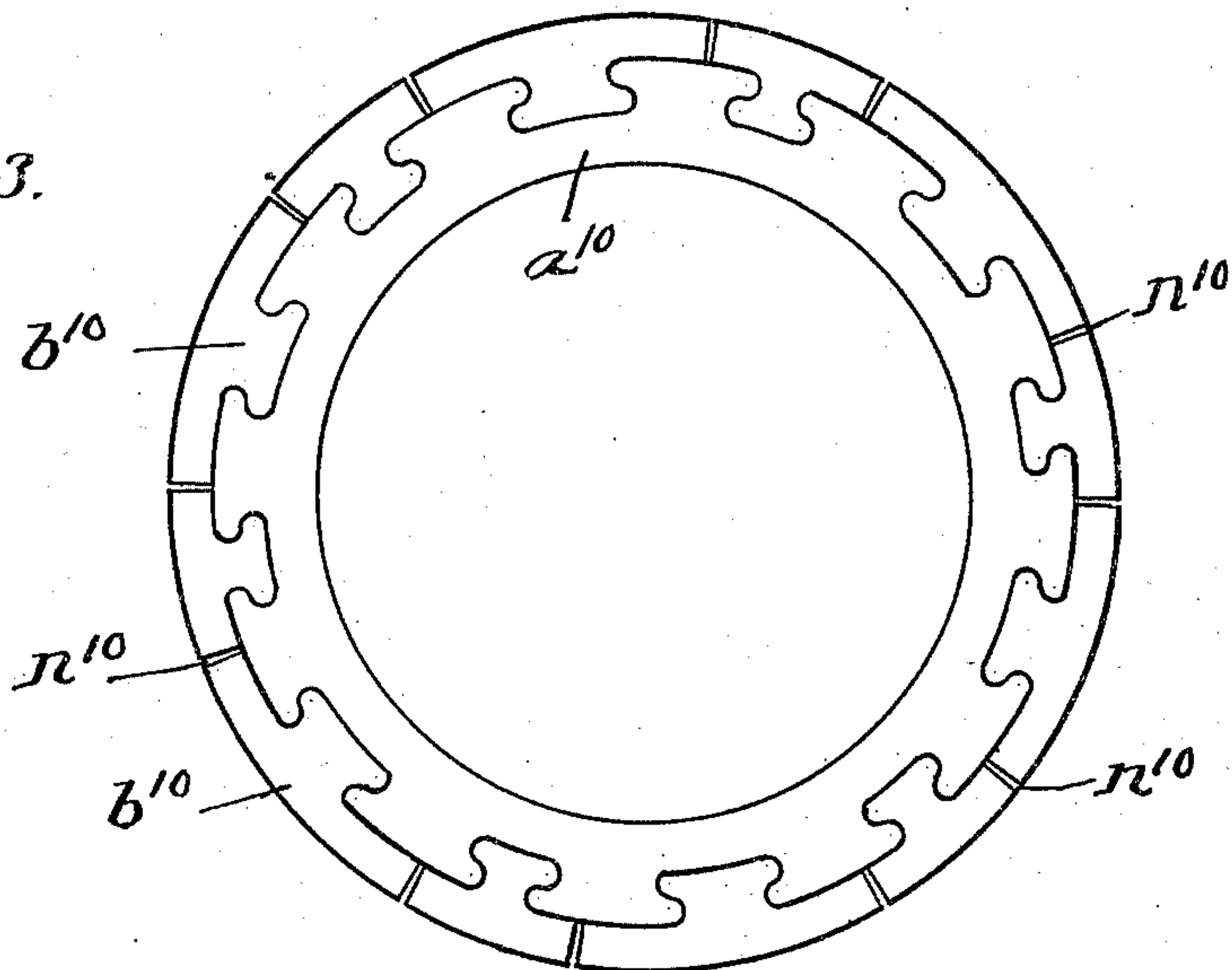
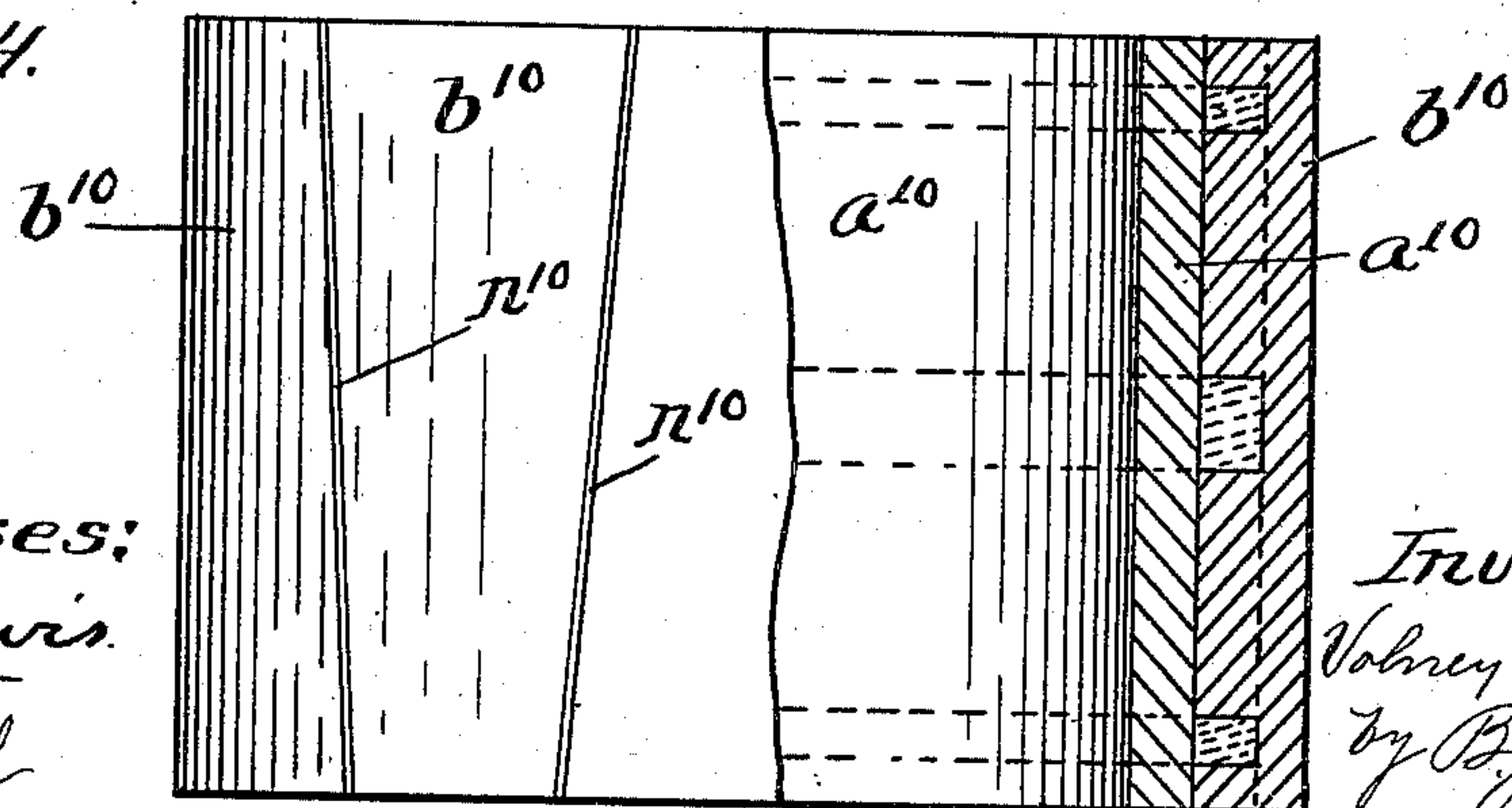


Fig. 4.



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# UNITED STATES PATENT OFFICE.

VOLNEY W. MASON, JR., OF NEW YORK, N. Y.

## GRINDING OR CRUSHING HEAD OR ROLL.

SPECIFICATION forming part of Letters Patent No. 709,642, dated September 23, 1902.

Application filed December 27, 1901. Serial No. 87,458. (No model.)

*To all whom it may concern:*

Be it known that I, VOLNEY W. MASON, Jr., of New York, county of New York, and State of New York, have invented an Improvement in Grinding or Crushing Heads or Rolls, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In the manufacture of grinding or crushing heads for gyratory crushers and also in the manufacture of grinding or crushing rolls it is very desirable to provide an external wearing or acting face of manganese-steel, owing to the peculiar characteristics of this material especially adapting it for this particular use—that is to say, said metal is hard and tough, yet ductile.

In my application for Letters Patent, Serial No. 56,358, a grinding or crushing head for a gyratory crusher is shown comprising a core having thereon a number of external segments, and in my application for Letters Patent, Serial No. 57,606, a grinding or crushing roll is shown comprising a core having thereon a number of external segments. In each of these instances the external segments are shown as abutting together, and in the manufacture of these devices I find that when the segments abut together the tendency is for that portion thereof between the dovetailed ribs of any two adjacent segments to buckle when subjected to the severe duty to which the devices are ordinarily put, and this result is objectionable. This is due to the peculiar qualities possessed by manganese-steel, whereby it flows and soon becomes materially distorted—that is to say, the segments soon widen. To a number of incidental causes may be attributed the flowing of the manganese-steel and consequent distortion or widening of the segments; but the more important are expansion and repeated peening action.

This invention has for its object to improve the construction of a grinding or crushing head or roll, whereby a number of external segments of manganese-steel may be supported on a core and the difficulties above enumerated obviated.

The invention consists, essentially, in a grinding or crushing head or roll composed of a core and a number of hard tough unma-

chinable yet ductile external segments capable of distortion secured thereto and disposed relatively to each other to provide narrow spaces between them. These spaces are wide enough to provide for the flow of the metal or distortion due to expansion, repeated peening action, and other causes, yet narrow enough to prevent the adjacent sides from breaking down. As an illustration, on a head, say, twenty-six inches in diameter and having six external segments the width of the spaces will be approximately three-sixteenths of an inch.

Figure 1 shows in side elevation and partial section a grinding or crushing head embodying this invention in connection with a sufficient portion of a gyratory crusher to illustrate my invention. Fig. 2 is a plan view and partial section of the grinding or crushing head. Fig. 3 is an end view and partial section of a grinding or crushing roll embodying this invention, and Fig. 4 is a longitudinal vertical section of the same.

Referring to Figs. 1 and 2, wherein a grinding or crushing head of a gyratory crusher is shown similar in general construction to that shown in my said application Serial No. 56,358, *a* represents a core which is conical and hollow and is mounted on a spindle or shaft *a*<sup>5</sup>, and said core is formed with a number of dovetailed grooves *a*'. *b* represents one of the external segments, of which there may be any desired number, but corresponding to the number of grooves in the core. Each segment *b* has formed or provided on its inner side or face a dovetailed rib *b*' of a shape corresponding to the shape of the groove *a*' in the core, and each segment *b* will preferably be secured or locked to the core *a* by transversely-disposed keys *c*, as in my said application. The segments *b* will be made of manganese-steel, being therefore hard and tough, yet ductile, and consequently capable of distortion by expansion, repeated peening action, and other causes incidental to the severe use to which they are put. To provide for distortion of these segments, they are made of a width and so disposed relative to each other as to provide narrow spaces *n* between them. These spaces *n* are only wide enough to provide for distortion of the segments, and consequently are very narrow to



obviate the adjacent sides breaking down. The spaces  $n$  are made radial to the axis of the head, although this is not material.

Referring to Figs. 3 and 4, a grinding or crushing roll similar in general construction to that shown in my application Serial No. 57,606 is shown, yet so far as my present invention is concerned it is immaterial whether the grinding or crushing device be made conical or cylindrical.  $a^{10}$  represents a core which is formed or provided with dovetailed grooves, and  $b^{10}$  the segments thereon, formed or provided with dovetailed ribs on their inner sides or faces, and said segments will be locked to the core by the transverse keys or by any other suitable means. The segments  $b^{10}$ , like the segments  $b$ , are made of manganese-steel, and to provide for distortion thereof narrow spaces  $n^{10}$  will be provided between them. These spaces  $n^{10}$  will also be radial to the axis of the roll.

In operation as the segments distort by expansion, repeated peening action, or other cause they will gradually widen and work more or less into the narrow spaces until finally said spaces are actually closed up and will not buckle between the dovetailed ribs of any two of the adjacent segments. The narrow spaces will first be closed at the outside, and as the segments gradually widen they will finally become entirely closed, but not until the segments have been used for a long time, and it is intended that they shall be renewed by the time said spaces become entirely closed up.

I claim—

1. A grinding or crushing head or roll composed of a core, and a number of hard, tough yet ductile unmachinable external segments,

capable of distortion, secured thereto and disposed relatively to each other to provide very narrow spaces between them, substantially as described.

2. A grinding or crushing head or roll composed of a core formed or provided with dovetailed grooves and a number of hard, tough yet ductile unmachinable external segments, capable of distortion, formed or provided with dovetailed ribs which enter said grooves, said segments being disposed relatively to each other to provide very narrow spaces between them, substantially as described.

3. A grinding or crushing head or roll composed of a core formed or provided with dovetailed grooves a number of hard, tough yet ductile unmachinable external segments, capable of distortion, formed or provided with dovetailed ribs which enter said grooves, and means for locking said segments to the core, said segments being disposed relatively to each other to provide very narrow spaces between them, substantially as described.

4. A grinding or crushing head composed of a core, a number of distortionable segments secured thereto and disposed relatively to each other with narrow spaces between them, wide enough to provide for distortion of the segments, yet narrow enough to prevent breaking down their adjacent sides, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

VOLNEY W. MASON, JR.

Witnesses:

B. J. NOYES,  
H. B. DAVIS.