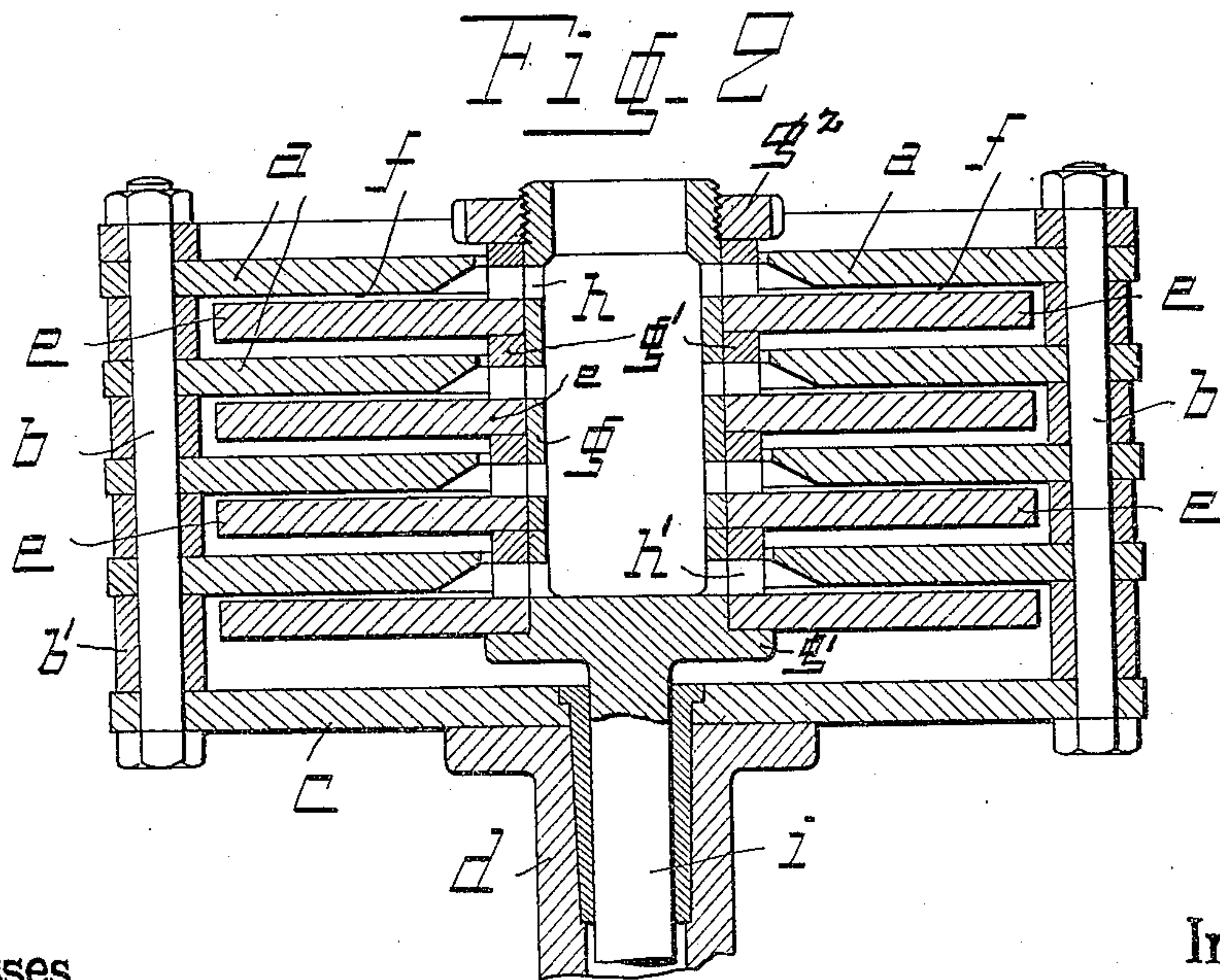
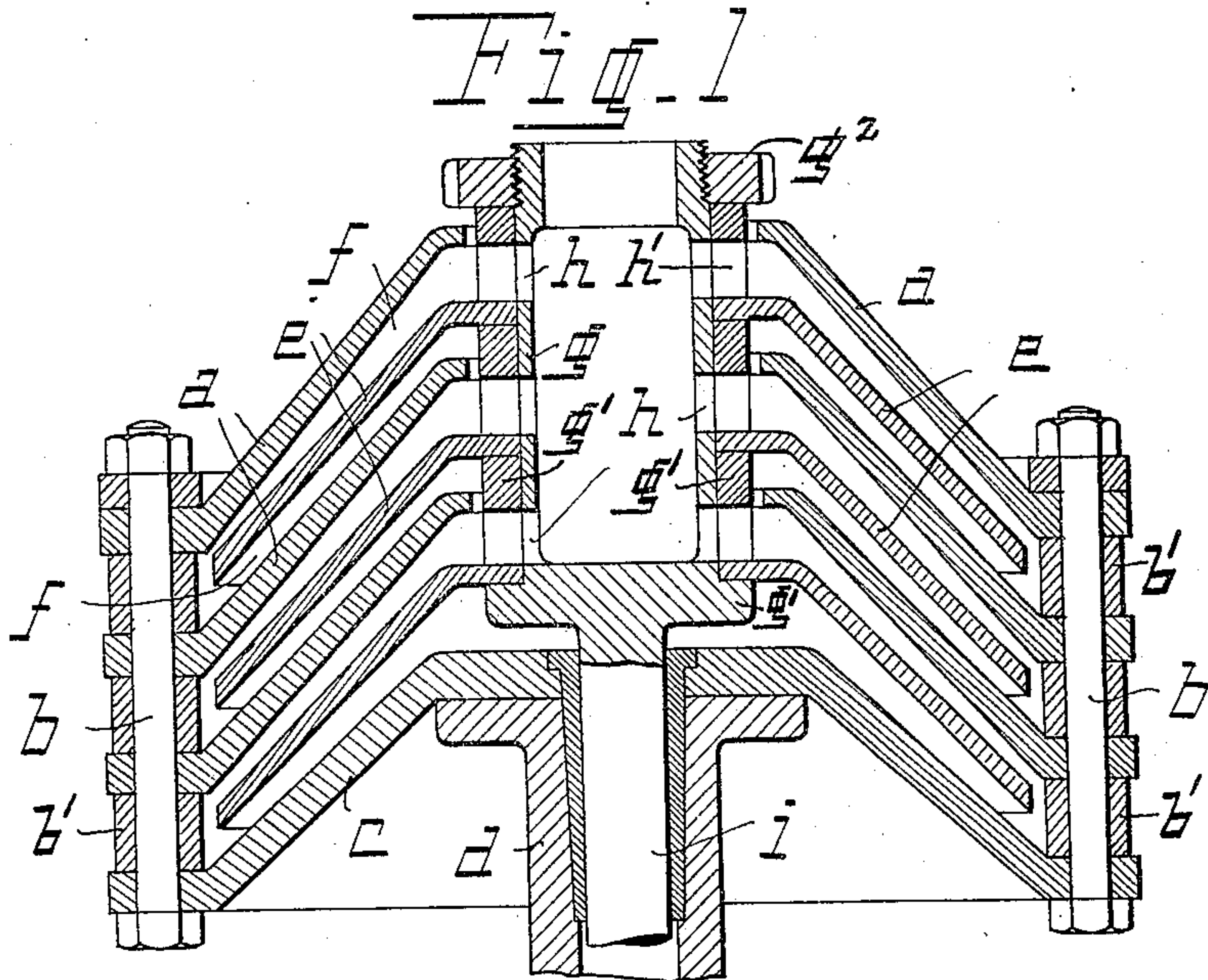


A. J. ERICSSON.
MACHINE FOR GRINDING SOLID BODIES.
APPLICATION FILED JAN. 6, 1908.

938,466.

Patented Nov. 2, 1909.
3 SHEETS—SHEET 1.



Witnesses.

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Fig. 3.

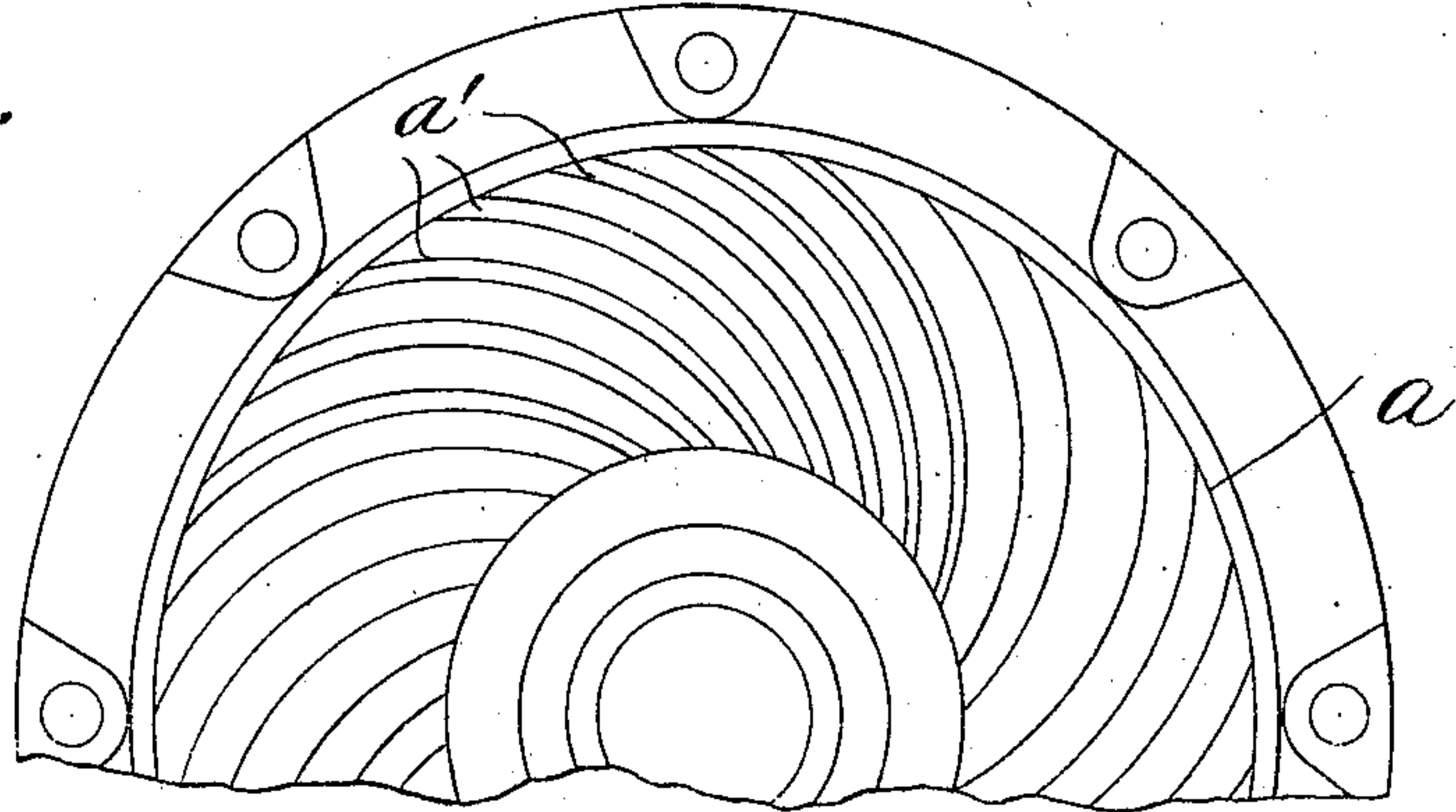


Fig. 4.

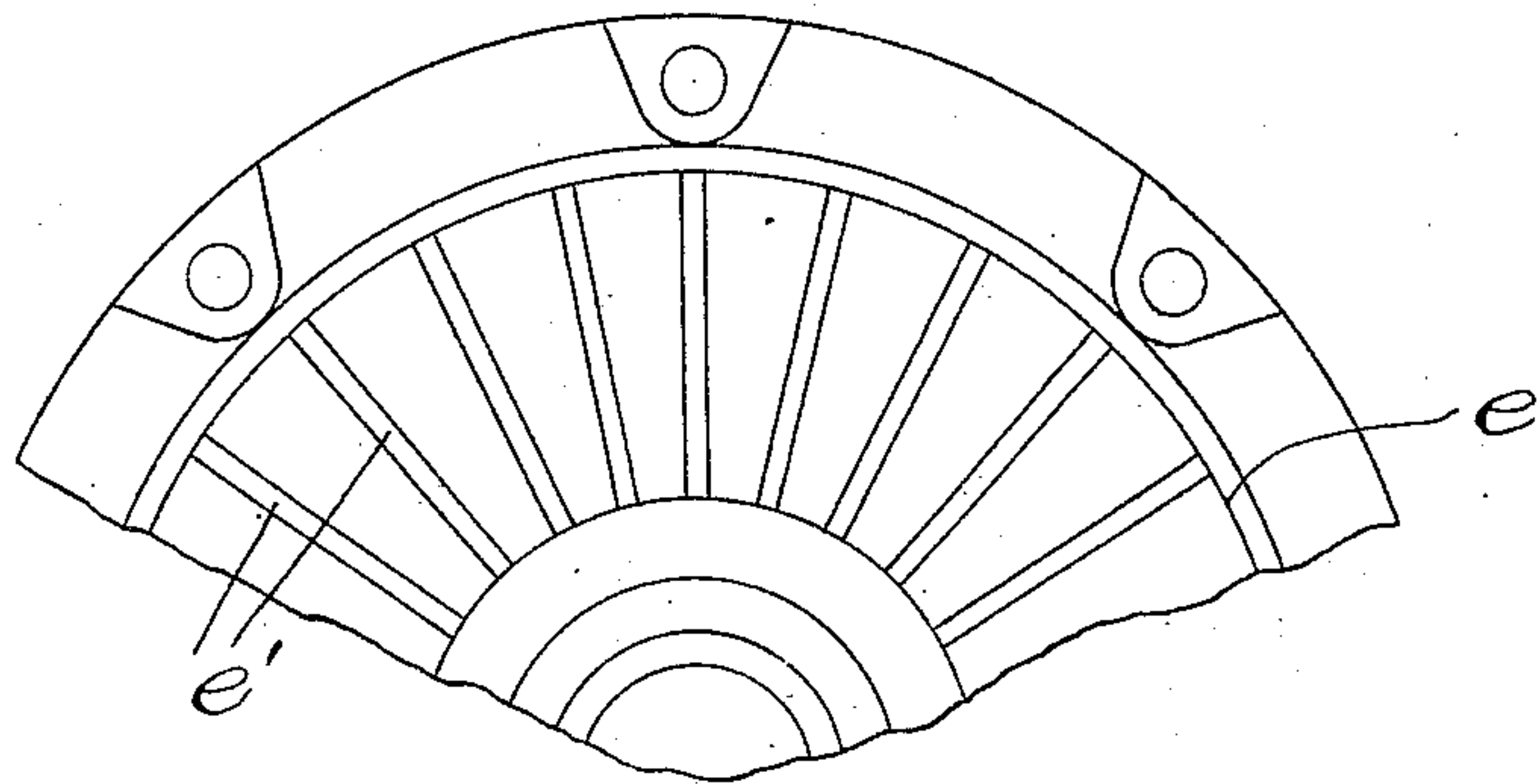
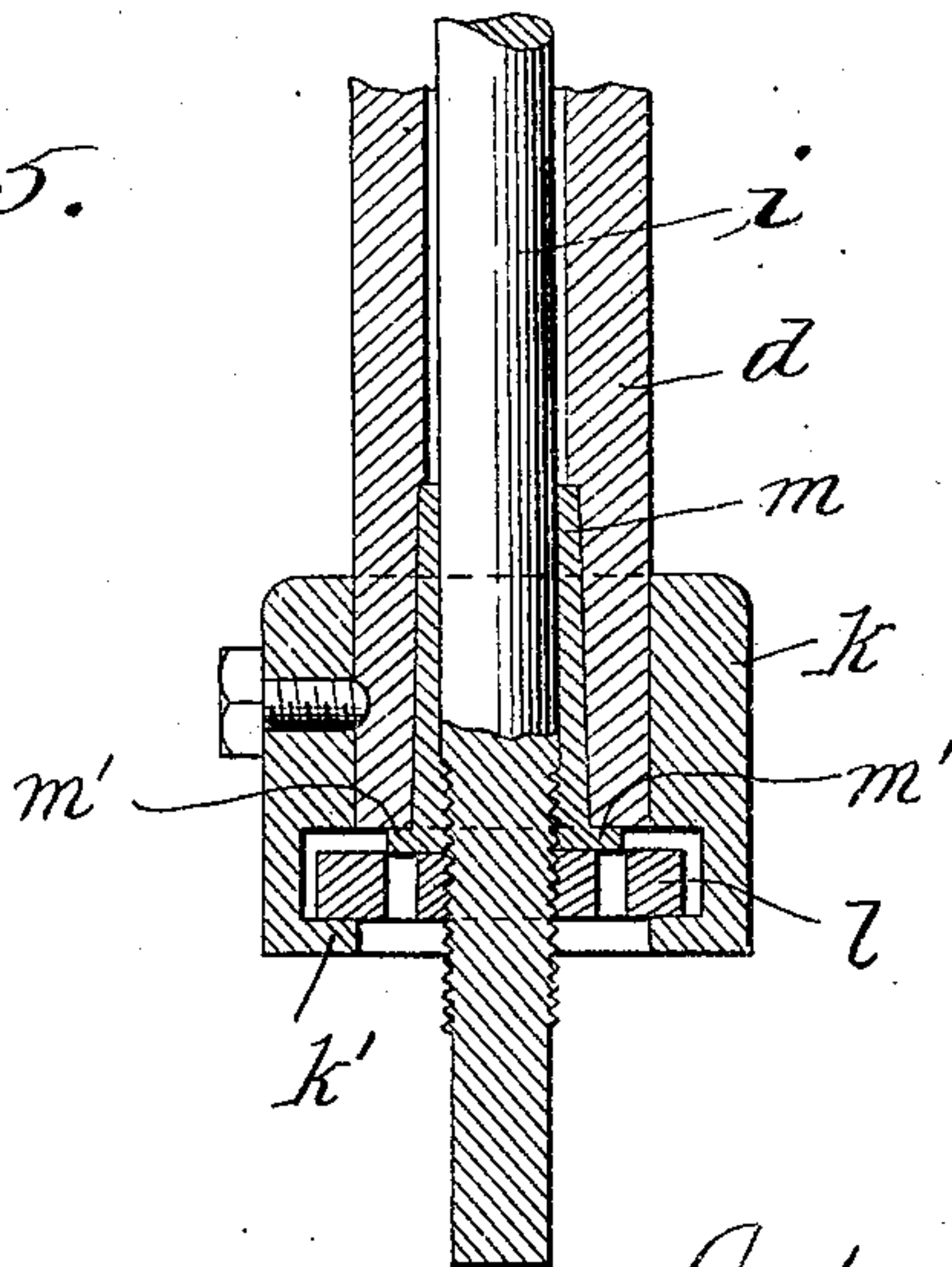


Fig. 5.



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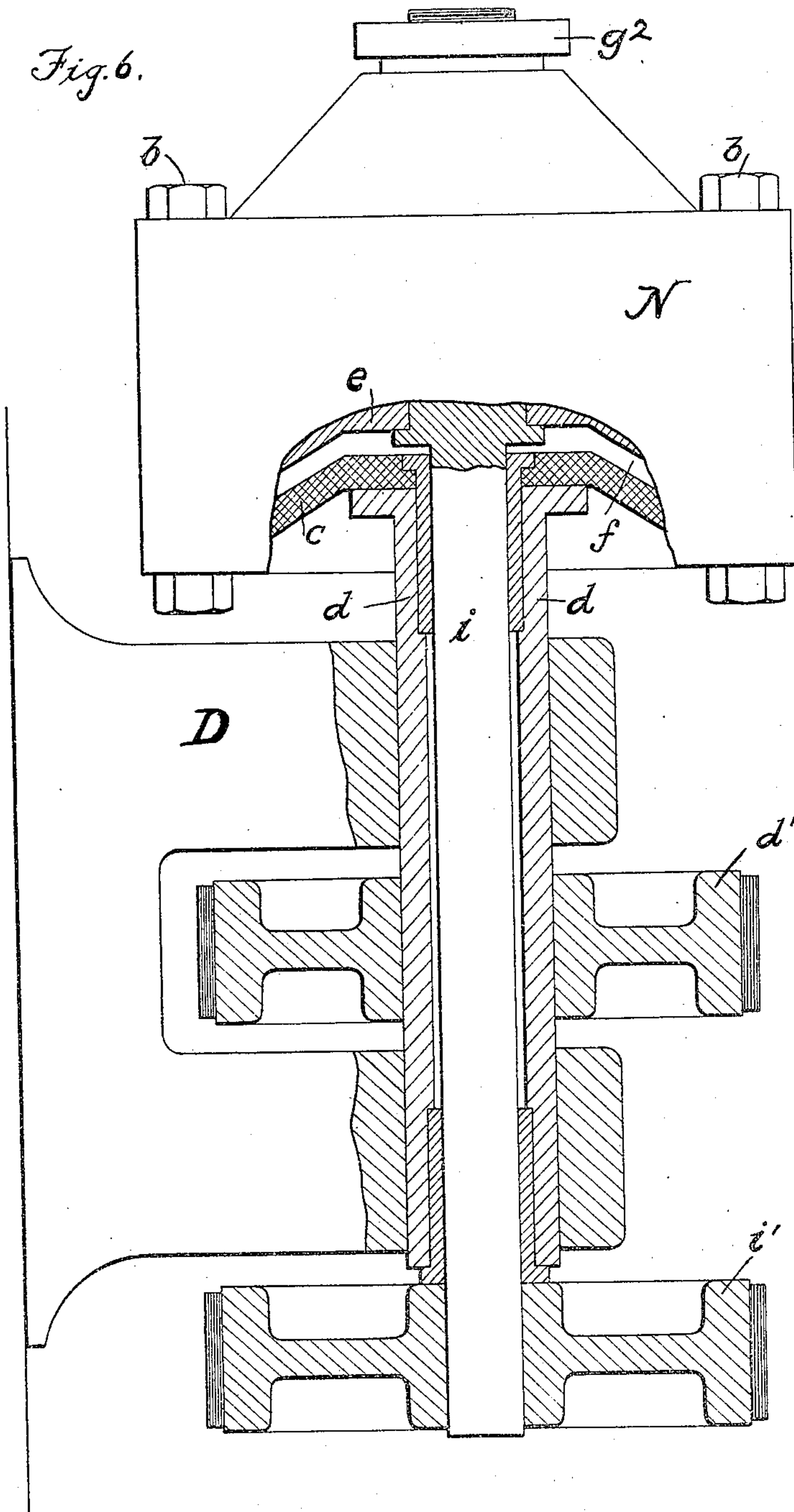
Anders Johan Ericsson
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ANDERS JOHAN ERICSSON, OF STOCKSUND, SWEDEN.

MACHINE FOR GRINDING SOLID BODIES.

938,466.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed January 6, 1908. Serial No. 409,545.

To all whom it may concern:

Be it known that I, ANDERS JOHAN ERICSSON, of Stocksund, Sweden, a subject of the King of Sweden, have invented certain new and useful Improvements in Machines for Grinding Solid Bodies; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In powdering apparatus two round bodies of stone, steel or other material have been almost exclusively employed, the one body remaining stationary while the other rotates. If a high effectivity of such machine be desired, increase of the diameter has been exclusively resorted to. It is, however, manifestly incorrect to increase the effectivity in this manner, as the speed between the grinding surfaces becomes quite different at the periphery and toward the center. In order to obtain a good grinding result a certain relative speed of the grinding surfaces is necessary. Whether large or small stones are used, the most advantageous grinding effect is only obtained at a certain distance from the center, and both at greater and less distances from the center the grinding effect is less advantageous.

This invention has for its object to evade this drawback, and instead of two large stones or plates a plurality of smaller ones is used, which are placed over each other, whereby corresponding plates of each pair are mutually connected into one series and the other ones to another series. The one series is put in rotation, and the other may also be rotated or may remain stationary. Each alternate space between the plates communicates with a receptacle wherein the material to be ground is introduced and from whence it spreads simultaneously to said spaces. The other spaces are of such width as to permit a relative adjustment of the plates. By this arrangement it is made possible to increase the capacity of grinding-machines to an essential degree without having the grinding take place under more disadvantageous conditions than when the capacity is smaller. Another advantage is

that the machine is more compact and less bulky in form.

Another advantage in this invention is that the grains or larger particles which are crushed immediately on being introduced between the grinding surfaces may be rapidly removed out of the machine, for preventing doughy formations, in that the series of stationary plates may be made to rotate, as well as the rotating plates though with somewhat different speeds, whereby the material between the two grinding surfaces is, by means of the influence of centrifugal power, quickly removed from the machine. Such a proceeding gives another advantage, namely, that the feeding of the material to be crushed or powdered is done by the influence of centrifugal power, whereby no special external pressure need be supplied for effecting this feeding. The same condition exists with the material already powdered or crushed, which leaves the machine in consequence of the outward pressure caused by the centrifugal power.

The invention is illustrated in the annexed drawing, in which—

Figure 1 is a vertical section of a machine provided with a plurality of conical plates; Fig. 2 is a similar view of a modification; Fig. 3 is a partial plan view of one of the plates; Fig. 4 a like view of a modification, and Fig. 5 is a detail view of the adjusting means. Fig. 6 is an elevation, partly in section, of the machine and means for mounting and driving the shafts.

In the drawings *a* designates one series of plates, which by means of bolts *b* or the like are assembled and connected with a bottom plate *c* connected to a shaft *d*, which latter may either be stationary or rotary. Said plates are spaced apart by means of rings *b'* provided with holes for the bolts *b* and mounted between the outer edges of the plates *a*. Said rings are further provided with openings through which the material is thrown out from the spaces between the plates. *e* designates the other series of plates extending into each chamber, which together with the plates *a* form the grinding chambers *f*. The plates *e* are carried by a central part suitably in the form of a perforated tube *g*, and said plates are spaced apart and joined together at their inner edges by means of rings *g'* resting on the inner

edges of the plates, the rings being pressed down upon said edges by a nut g^2 which is screwed onto the perforated tube g' as shown in Fig. 1. The material to be ground is introduced into the perforated tube g and passes out through holes h in the tube g and through corresponding holes h' in the rings g' to the chambers f between the plates a and e . The ground material passes from the chambers f through the holes in rings b' over the outer edges of the plates a . If desired a casing N shown in Fig. 6, may be placed around the grinding plates and is preferably secured thereto by means of the bolts b passing through an inwardly projecting flange formed on the upper edge of the casing. The casing is distanced from the outer edges of the plates a to form an annular space between it and said plates. The ground material thrown out through the holes in rings b' by centrifugal force will strike against the casing and be directed downward. The tube g is connected to the shaft i situated inside the shaft d , which latter may be suitably journaled in a bracket as D . Either of the shafts d and i may be put in rotation by gears d' and i' respectively keyed to said shafts as shown in Fig. 6, or both shafts can rotate, though with different speed. In the latter case an outward directed centrifugal power arises, which aids both the feeding of the material to be powdered or crushed and the removal of the already crushed material. The plates a and e are preferably, though not necessarily, provided with spiral grooves, such as indicated by a' , Fig. 3, or with radial grooves, as e' , Fig. 4. Any suitable means may be provided for moving the shafts longitudinally for the purpose of adjusting the plates to increase or diminish the space between them for producing a coarser or finer material. A suitable adjusting means is shown in Fig. 5, which consists of a collar k fixed on the end of the hollow shaft d , said collar having an end flange k' forming a bearing for a supporting nut l for the inner shaft i . Surrounding the latter is a conical bearing sleeve m having a flange m' projecting under the end of the shaft d and serving as a lock for the nut l . The inner shaft i is screw-threaded and works in nut l , and by holding the nut stationary by means of a suitable tool the shaft i may be raised or lowered the desired degree, whereupon the sleeve m is locked to the shaft d by screwing the nut l against the flange m' . The screw threads are formed so that the rota-

tion of either shaft with relation to the other will have a tendency to tighten the nut against the flange m' .

I claim—

1. A device for grinding or crushing solid material consisting of a central perforated tube forming a containing and distributing chamber, a series of superposed plates surrounding the latter, the inner edge of the bottom plate of said series resting on a flange formed on said tube, spacing rings interposed between the inner edges of the remaining plates of said series, a nut adjustable on the upper end of the tube to clamp the rings and plates to said flange, a second series of plates entering the spaces formed between the first series of plates, spacing members interposed between the outer edges of said second series of plates, bolts connecting the latter to the spacing members, a support for the second series, the last named series of plates forming with the first named series on one side a series of grinding or crushing spaces for the material and means for imparting a relative rotation to said plates.

2. A device for grinding or crushing solid material consisting of a central perforated tube forming a containing and distributing chamber, a series of superposed plates surrounding the latter, the inner edge of the bottom plate of said series resting on a flange formed on said tube, spacing rings interposed between the inner edges of the remaining plates of said series, a nut adjustable on the upper end of the tube to clamp the rings and plates to said flange, a second series of plates entering the spaces formed between the first series of plates, spacing members interposed between the outer edges of said second series of plates, bolts connecting the latter to the spacing members, a shaft supporting the second series, the last named series of plates forming with the first named series on one side a series of grinding or crushing spaces for the material, said spaces communicating with the perforated tube, means for imparting a relative rotation to said plates and means to adjust said plates relative to each other.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

ANDERS JOHAN ERICSSON.

Witnesses:

GUSTAF ALSON,
HJALMAR ZETURSTROM.