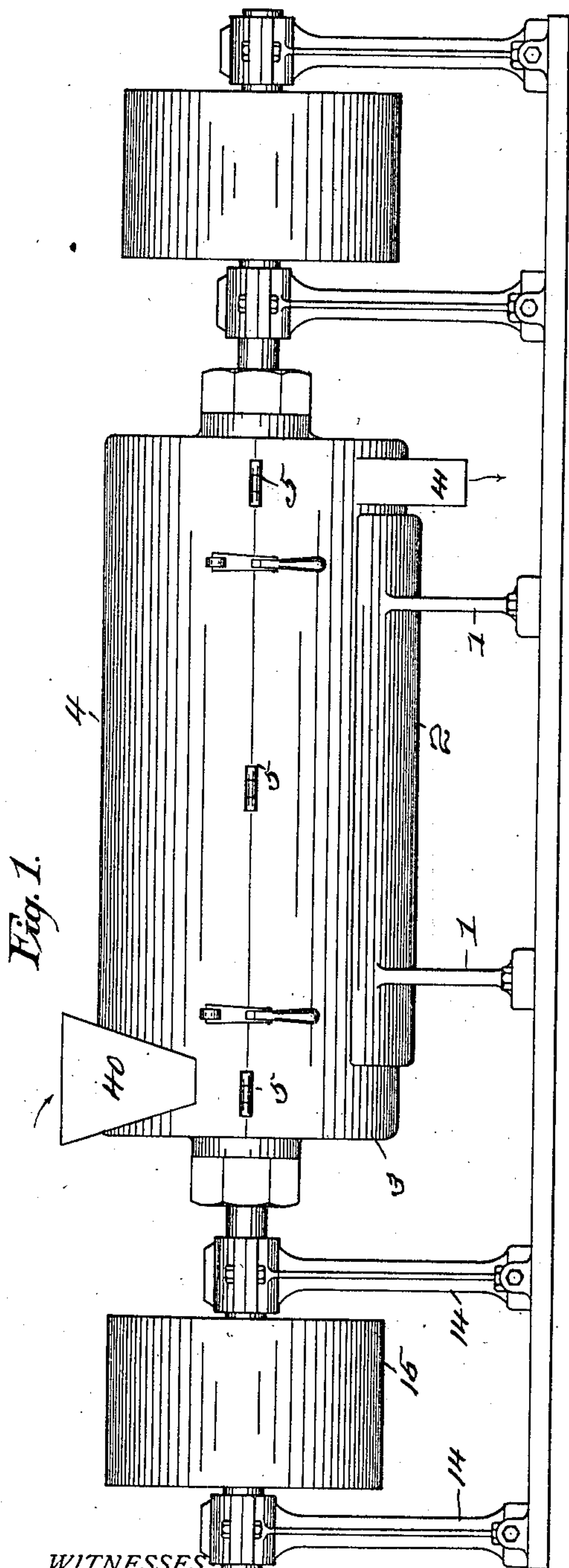


No. 812,122.

PATENTED FEB. 6, 1906.

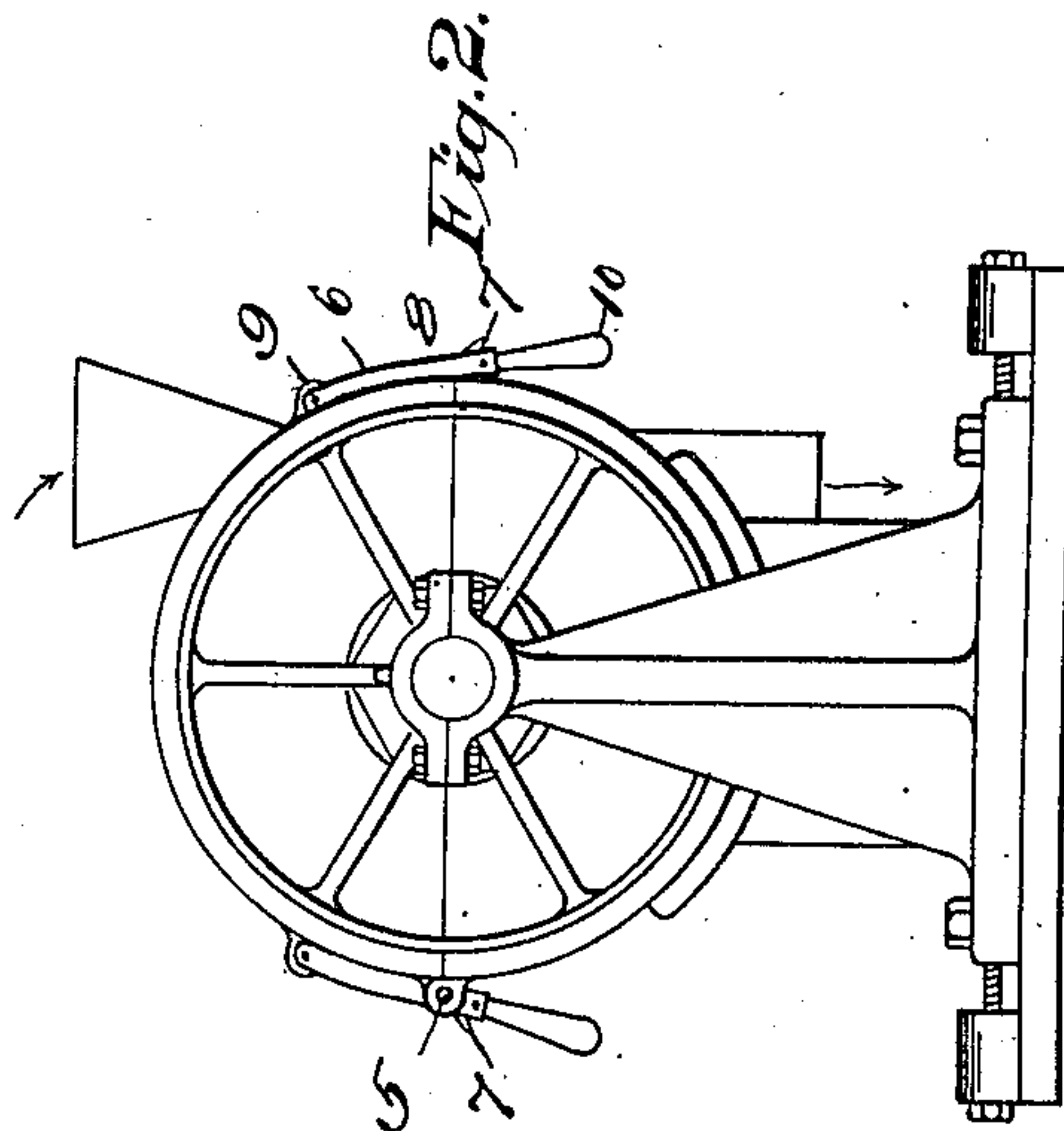
R. D. FASSETT.  
GRINDING MACHINE.  
APPLICATION FILED DEC. 3, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

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2 SHEETS—SHEET 2.

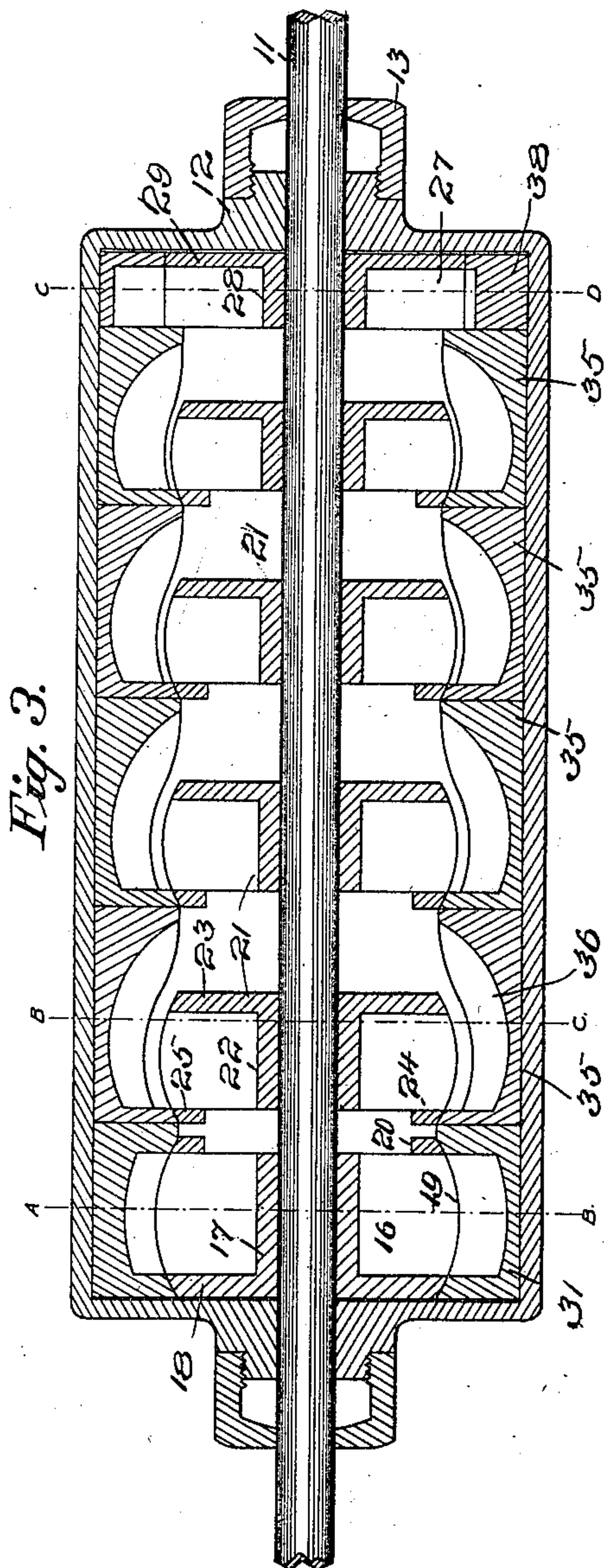


Fig. 3.

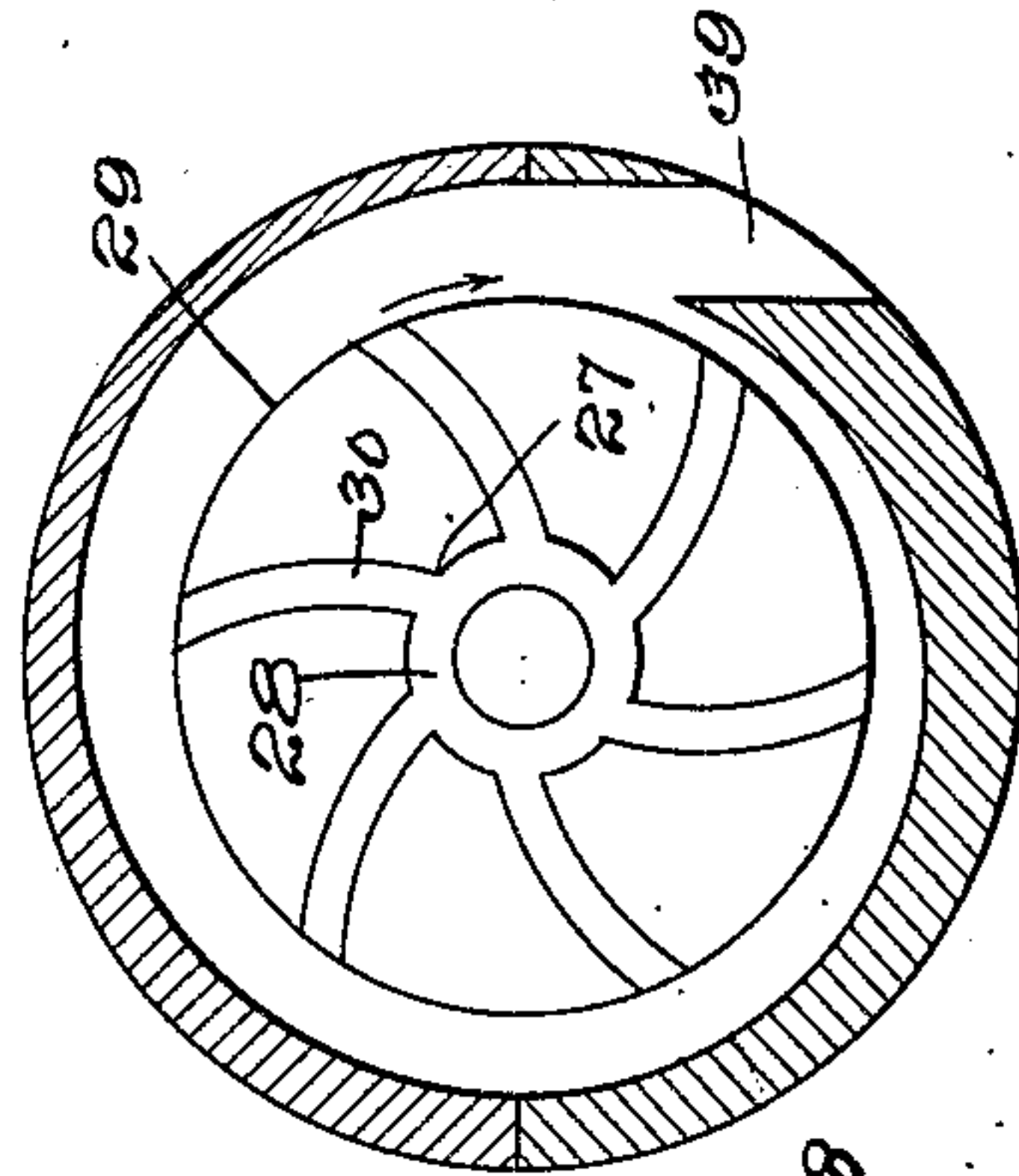


Fig. 6.

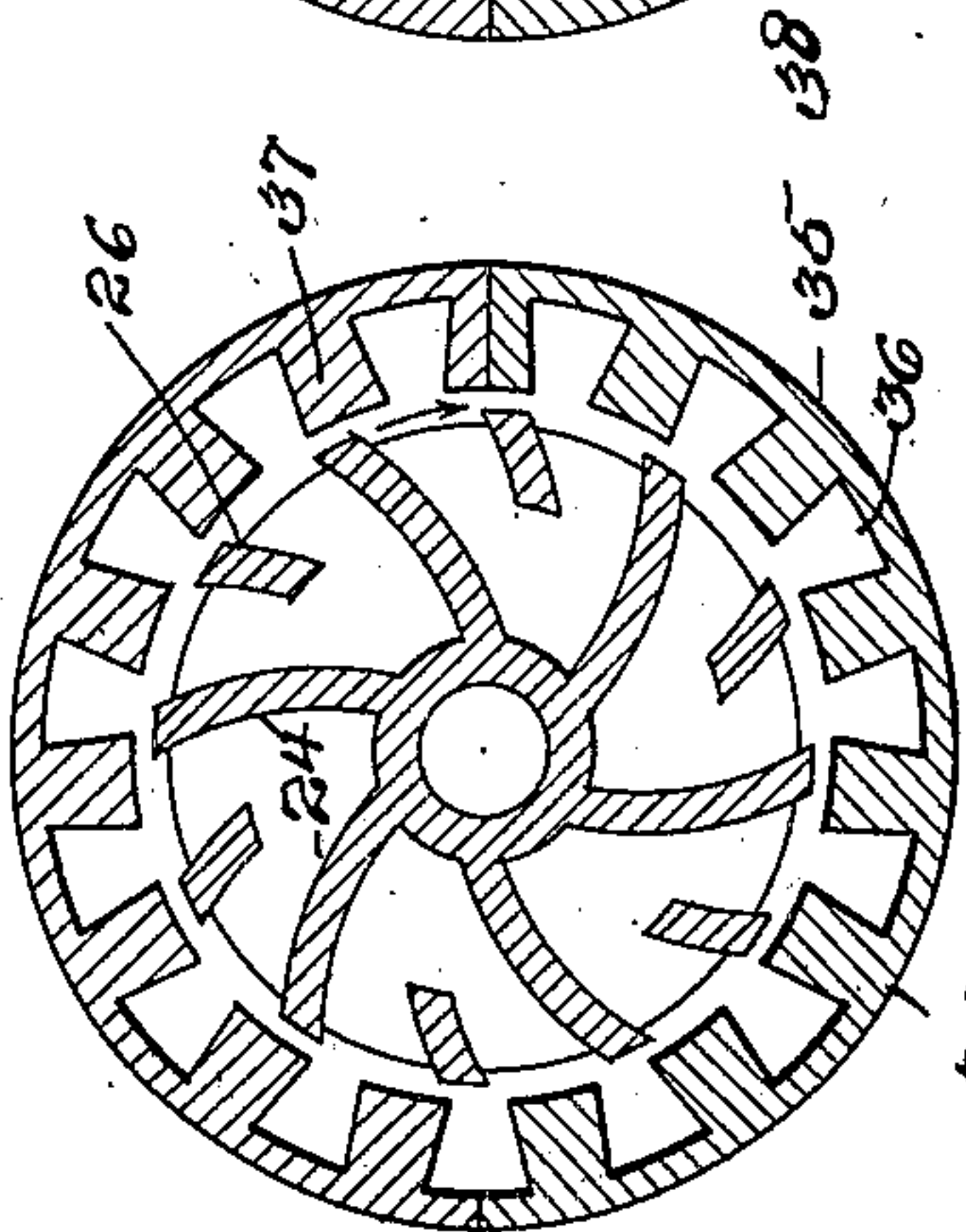


Fig. 5.

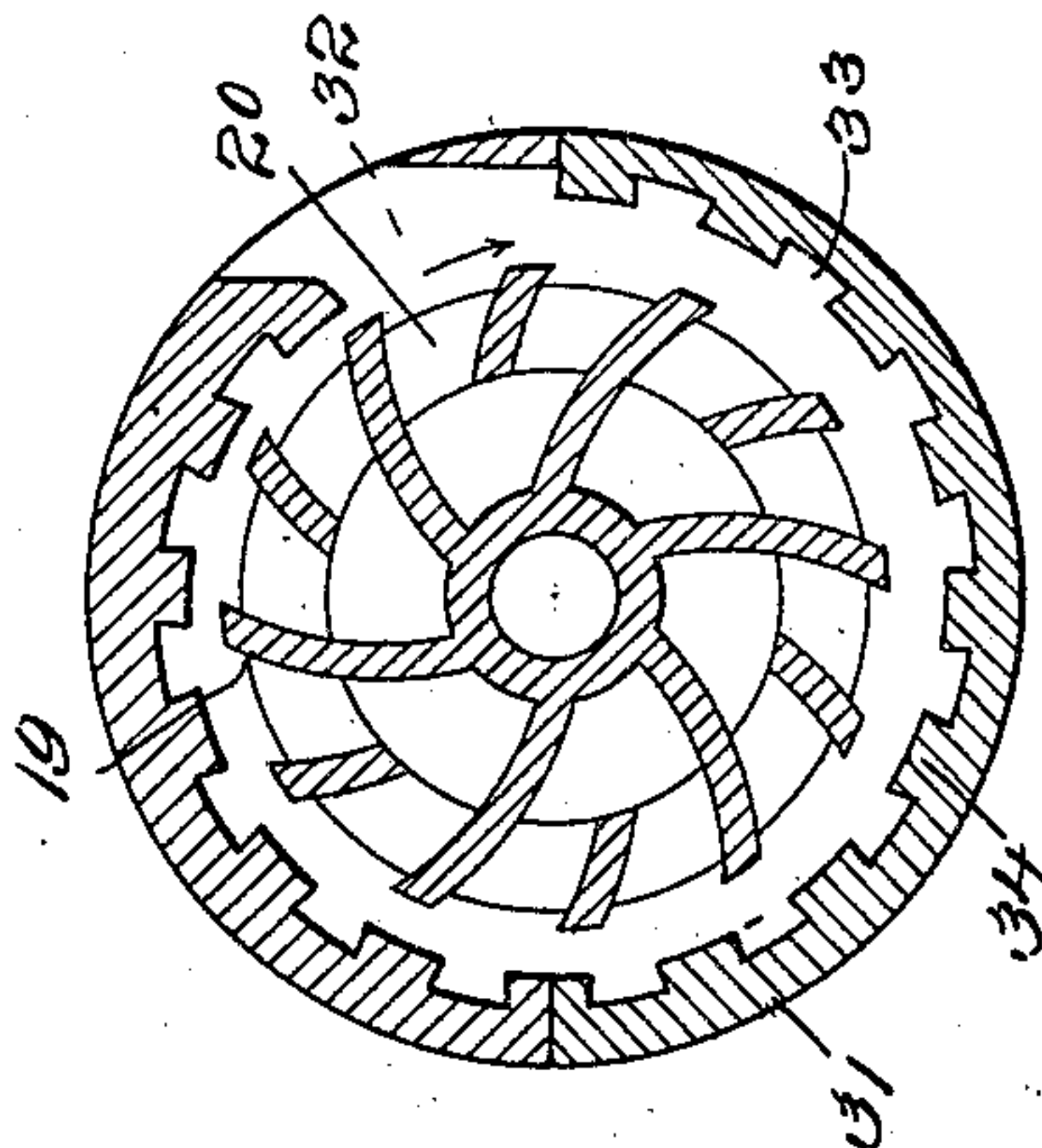


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## GRINDING-MACHINE.

No. 812,122.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed December 3, 1904. Serial No. 235,374.

*To all whom it may concern:*

Be it known that I, RILEY D. FASSETT, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Grinding-Machines; 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.

My invention relates to grinding-machines, and more particularly to a machine of this character which is adapted for grinding mica.

The object of the invention is to provide a simple, durable, and compact machine having a series of grinding devices which are so constructed and proportioned as to subject the material fed to the machine to successive grinding operations, each of which reduces the size of the particles.

A further object is to provide a casing of novel construction containing a series of detachable boxes having grinding-surfaces each of which is formed of a series of ribs of peculiar form.

With the above and other objects in view the invention consists in certain other novel features and combinations of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of the complete machine. Fig. 2 is an end elevation thereof. Fig. 3 is a central horizontal section through the casing and the grinding mechanism contained therein. Fig. 4 is a section on line A B, Fig. 3. Fig. 5 is a section on line B C, Fig. 3; and Fig. 6 is a section on line C D, Fig. 3.

Referring to the figures by numerals of reference, 1 1 are standards which support a base 2, on which is fixedly mounted the casing of my improved grinder. This casing comprises a lower section 3 and an upper section 4, each of which is preferably semicylindrical in form. The two sections are secured together along one side by means of hinges 5, and lever-locks 6 are pivoted to opposite portions of the upper section 4 of the casing and engage lugs 7 on the lower section 3. These levers are employed for the purpose of drawing the two casing-sections tightly together and locking them in such position. The levers may be constructed in any preferred manner; but each is preferably formed of a

link 8, which is pivoted at one end to an ear 9 on section 4 and has a cam 10 pivoted in the other end of the link. This cam will engage the lower surface of its lug 7 and when turned in one direction will bear against the lug and draw the two sections of the casing tightly together.

A shaft 11 is rotatably mounted within the ends of the casing and the portions of the sections 3 and 4 which immediately surround the shaft project laterally to form bosses 12, which are externally screw-threaded and which are adapted to be engaged by caps 13. These caps serve to further bind the two sections of the casing together. A shaft is journaled in standards 14 and is provided with a desired number of pulleys 15, whereby rotary motion may be transmitted to the shaft from a suitable source of power by means of a belt. (Not shown.)

Keyed or otherwise secured to the shaft 11 is a grinding-wheel 16, comprising a hub 17 and an end disk 18. Extending from the hub are curved blades 19, which are secured to or formed with the disk 18 at one end. The opposite edges of the blades 19 are connected by a ring 20, which serves, in addition to the disk 18, to keep the blades properly spaced apart at all times during the operation of the grinding-machine. Disk 18 is positioned against the inlet end of the casing of the machine. A series of similar grinding-wheels or beaters 21 is located on the shaft, and each of these wheels is also formed of a hub 22, a disk 23, and a series of curved blades 24, the edges of said blades which are farthest removed from the disks 23 being connected and braced by rings 25. The grinding-wheels 21 are arranged in a position the reverse to that of wheel 16, and their blades 24 are also curved in a direction opposite to the blades 19. Moreover, each grinding-wheel 21 has an intermediate blade 26 located between the outer edges of every two blades 24, and these intermediate blades are secured to the disks 23 and rings 25 and are held firmly in position thereby. A fan 27 is secured to and rotates with shaft 11 and is formed of a hub 28, a disk 29, and curved blades 30. The disk 29 adjoins the inlet end of the casing, and blades 30 are curved in a direction opposite to the blades of the first grinding-wheel 16. It will of course be understood that all of the grinding-wheels and



the fan move in the same direction and at the same speed.

Each grinding-wheel of the machine is surrounded by a box of novel construction. These boxes form separate grinding-compartments, and each of them consists of two sections which are fitted within the respective sections 3 and 4 of the casing and are held firmly in position when the casing is closed. The box 31, which incloses wheel 16, has an inlet 32. The inner face of ring 31 is eccentric to the center of said ring and has a series of pockets 33 formed therein, the walls of said pockets converging, so as to form substantially dovetail grooves. Ribs 34 are formed between the pockets by the converging walls thereof and form a grinding-surface over which the material which is fed to the machine is adapted to be drawn by the blades 19. As hereinbefore stated, the inner surface of box 31 is eccentrically arranged, it being at a constantly-varying distance from the grinding-wheel and having its inlet 32 where the said surface is farthest from the wheel. Each of the grinding-wheels or beaters 21 is inclosed by a box 35, which is considerably wider than the wheel surrounded by it. Each box 35 has peripheral pockets 36 formed therein. Each pocket is of a varying depth which diminishes from the center of the pocket toward the outlet end thereof. The walls of the pockets 36 are inclined inwardly toward each other, as clearly shown in Fig. 5, and produce ribs 37, which constitute the grinding-face of the box. The working edges of these ribs are curved to conform with the corresponding edges of the blades of the grinding-wheel. All of the boxes 35 are practically the same, with the exception of the ribs thereof, which increase in size, so that the ribs in the box adjoining box 31 are farther removed from their grinding-wheel than are the ribs in the end box 35 of the series. Box 38 incloses the fan 27 and is interposed between the end box 35 and the outlet end of the casing. The inner surface of box 38 is eccentric to the center of the fan, and the distance of said surface from the fan gradually increases from the lower side of an outlet 39 around the fan to the opposite side of said outlet. A hopper 40 is arranged above the inlet 32 and on section 4 of the casing, and an outlet-spout 41 extends from outlet 39.

When the material to be ground is placed within the hopper 40, it will fall by gravity through the inlet 32 and into the largest portion of the passage formed between wheel 16 and the inner surface of box 31. It will be engaged by the curved blades 19 and carried around the wheel 16 and drawn to the center thereof. It will then be discharged into the adjoining box 35, where the blades 24 of the grinding-wheel in said box will throw the material by centrifugal force against the ribs 37

and partially grind it. The material is then subjected to further grinding by being forced into the next box 35, where it is acted upon by the wheel 21 therein, and as the distance between this wheel and the ribs 37 surrounding it is less than that between the first wheel 21 and its surrounding ribs it will be seen that the material will be ground to a greater degree of fineness. This operation is continued as the material passes from the inlet to the outlet end of the machine, and after it has been reduced to a desired condition it is forced from the end box 35 into the box inclosing the fan 27. This fan throws the material through the outlet 39 and spout 41.

It will be noticed that the ends of the blades 19 and 24 are curved and that the ribs are also curved to correspond therewith. A waved passage is thus formed from one end to the other of the casing by the ribs of the boxes, and the machine is therefore rendered very effective in breaking up flat scaly substances which would naturally slip over a flat surface without being reduced in size.

By constructing the machine in the manner herein described wear and tear upon the box are reduced to the minimum, because the process of grinding is gradual and none of the parts are subjected to any undue strain. The casing can be readily opened by removing the caps 13 from the bosses 12 and by unlocking the upper section 4. After the opening of the casing one or more of the box-sections can be detached and replaced, and access may also be readily had to the grinding-wheels for the purpose of cleaning or repairing them.

In the foregoing description I have shown the preferred form of my invention; but I do not limit myself thereto, as I am aware that modifications may be made therein without departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination with a series of rotatable beaters, of a series of stationary boxes surrounding said beaters and forming grinding-compartments, the internal diameters of said boxes diminishing from one end toward the other of said series, the external diameter of all of said boxes being equal, and each box having a series of pockets therein formed by integral ribs therebetween.

2. In a machine of the character described, the combination with a series of rotatable beaters, of a series of stationary boxes surrounding said beaters and forming grinding-compartments, the internal diameters of said boxes diminishing from one end toward the other of said series, and each of said boxes



having a series of pockets therein, each pocket being of varying depth.

3. In a machine of the character described, the combination with a series of rotatable  
5 beaters, of a series of stationary boxes surrounding said beaters and forming grinding-compartments, the internal diameters of said boxes diminishing from one end toward the other of said series, and each box having a series of peripheral pockets therein forming ribs  
10 therebetween, each pocket having converging walls and being of varying depth.

4. In a machine of the character described, the combination with a series of beaters each  
15 comprising similarly-curved blades having irregular ends; of a series of stationary boxes surrounding the beaters and forming communicating grinding-compartments of different diameters, each box conforming in contour to the ends of the blades and having  
20 pockets therein.

5. In a machine of the character described, the combination with a series of rotatable beaters each comprising a hub, similarly-  
25 curved blades extending therefrom and having irregular ends, and means for connecting the blades at opposite edges; of a series of stationary boxes surrounding the beaters and forming grinding-compartments of different  
30 diameters, the inner surface of each box conforming in contour to the ends of the blades therein and having pockets forming ribs therebetween.

6. In a machine of the character described, the combination with a casing, of a series of  
35 rotatable beaters therein, each comprising a hub, similarly-curved blades extending therefrom and having irregular ends, and bracing means connecting the opposite edges of the  
40 blades, sectional boxes within the casing and surrounding the beaters, said boxes forming grinding-compartments and each box having an irregular working face conforming in contour to the ends of the blades.

7. In a machine of the character described, the combination with a casing comprising  
45 sections movably connected; of a series of rotatable beaters within the casing and each comprising a hub, similarly-curved blades, and bracing means connecting the edges of  
50 the blades, sectional boxes within the casing and surrounding the beaters, said boxes forming grinding-compartments of different diameters and having irregular inner faces  
55 conforming to the contour of the ends of the blades.

8. In a machine of the character described, the combination with a casing having an inlet and an outlet, of a series of rotatable  
60 beaters within the casing, and each comprising a hub, similarly-curved blades and strengthening devices connecting the edges of blades, means rotatable with the beaters for forcing material into engagement there-  
65 with, a discharge device within the casing

having blades curved in a direction opposite to the blades of the beaters and a series of sectional boxes within the casing and surrounding the rotatable devices therein.

9. In a machine of the character described, 70 the combination with a sectional casing, and means for securing the same in closed position; of a series of beaters rotatably mounted within the casing and each comprising a hub; similarly-curved blades having irregular 75 working ends and bracing means connecting the blades, a series of sectional boxes within the casing and surrounding the beaters, said boxes having irregular working faces conforming in contour to the ends of the blades 80 therein, means for forcing material into the boxes at one end and having blades curved in a direction opposite to those of the beaters, and a discharge device rotatably mounted within the casing. 85

10. In a machine of the character described, the combination with a sectional casing having an inlet and an outlet, and means for securing the same in closed position, of a shaft rotatably mounted in the casing, a series of rotatable beaters secured upon the shaft and each comprising a hub, blades having irregular working ends and bracing devices connecting the blades, a series of sectional boxes within the casing and surrounding 95 the beaters, each of said boxes having an irregular working face conforming in contour to the ends of the blades, rotatable means adjacent the inlet for forcing material into the boxes, and a rotatable discharge device adjacent the outlet. 100

11. In a machine of the character described, the combination with a casing having an inlet and an outlet; of a rotatable shaft within the casing, a series of sectional 105 boxes within the casing and forming grinding-compartments of different diameters, each of said boxes having an irregular working face, and end boxes within the casing and adjacent the inlet and outlet, each of said end boxes 110 having an eccentric working face, a rotatable device within the inlet-box for forcing material into the adjoining boxes, a rotatable discharge device in the outlet-box, and a series of rotatable grinding devices in the grinding- 115 compartments.

12. In a machine of the character described, the combination with a casing having an inlet and an outlet, a box within the casing and adjacent the inlet, said box having an eccentric working face, a rotatable 120 feeding device within said box for drawing material through the inlet, said device comprising a hub and curved blades extending therefrom, a series of rotatable beaters within the casing each comprising a hub and similar blades curved in a direction opposite to those on the feeding device, sectional boxes within the casing and surrounding the beaters, said boxes being of different internal di- 130



ameters and having irregular working faces and rotatable means for discharging material through the outlet.

5 13. In a machine of the character described, the combination with a series of rotatable beaters having blades with curved ends; of a series of stationary ribs surrounding each of said beaters to form a grinding-chamber, said ribs conforming in contour to  
10 the ends of the blades and forming a continuous passage with waved walls.

14. In a machine of the character described, the combination with a series of rotatable beaters, having blades with curved  
15 ends; of a series of stationary ribs surrounding each of said beaters and conforming in contour to the ends of the blades, the series of ribs forming a passage having waved walls.

15. In a machine of the character described, the combination with a rotatable  
20 beater; of a stationary box surrounding the beater having ribs, said ribs forming pockets in the inner surface of said box, said pockets having overhanging walls.

25 16. In a machine of the character described, the combination with a series of rotatable beaters having blades with curved ends, of a series of stationary boxes surrounding the beaters, said boxes being of different  
30 internal diameters and forming a continuous passage diminishing in diameter from one end to the other thereof, and ribs integral with the inner surfaces of the boxes, and conforming in contour with the ends of the blades,

said ribs forming pockets therebetween of 35 varying depths, said pockets having overhanging walls.

17. In a mechanism of the class described, the combination of a sectional casing, each  
40 section of said casing provided with a semicylindrical end portion, caps positioned upon the semicylindrical end portions of said sections, and grinding means positioned within said casing.

18. In a mechanism of the class described, 45 the combination with a casing, of a rotatable beater positioned within said casing, said beater comprising a hub, similarly-curved blades extending from said hub, spacing means engaging said blades, and an interme- 50 diate short blade carried by said spacing means and positioned between each two of said similarly-curved blades.

19. In a mechanism of the class described, the combination with a casing, of a rotatable 55 beater positioned within said casing, said beater comprising a hub provided with similarly-curved blades, spacing means engaging one side of each of said blades, and an intermediate blade positioned between each two 60 of said similarly-curved blades and engaging said spacing means.

In testimony whereof I affix my signature in presence of two witnesses.

RILEY D. FASSETT.

Witnesses:

C. E. SMEDLEY,  
CARLE WHITEHEAD.