No. 688,362. Patented Dec. 10, 1901.

J. S. TARR.

COFFEE MILL.

(Application filed Oct. 11, 1898.)

(No Model.) 2 Sheets—Sheet 1.

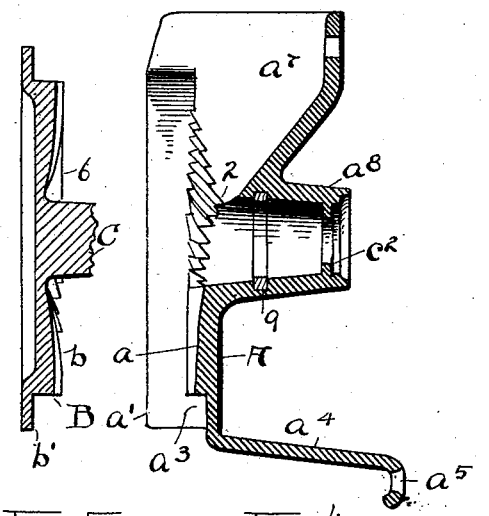



Fig. 5. Fig. 4.

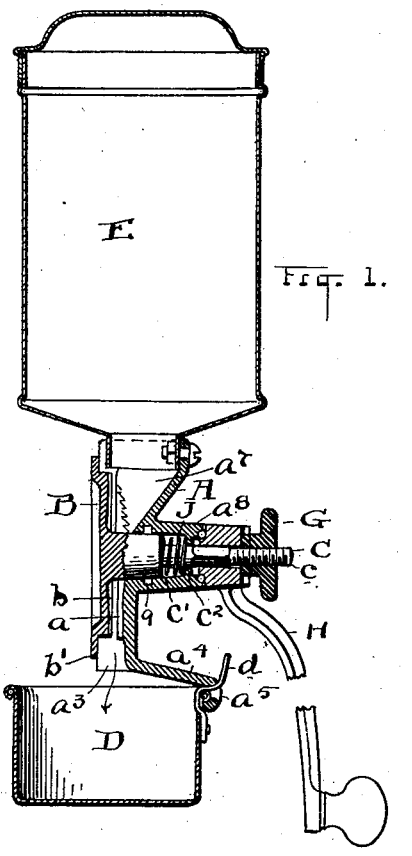
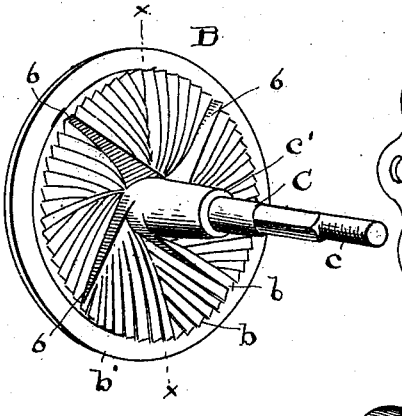



Fig. 1.

Fig. 2.

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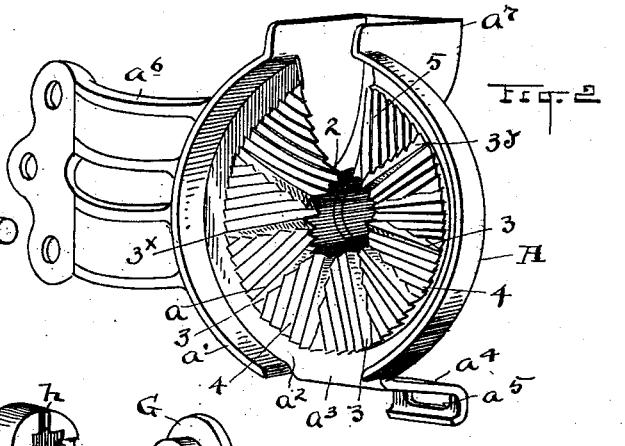


Fig. 3

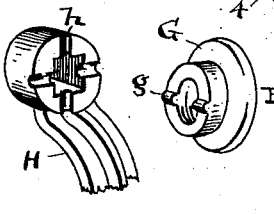





Fig. 7.

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Fig. 8.

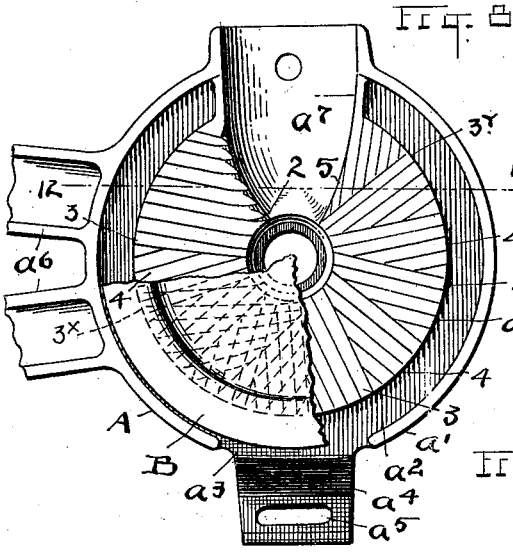



Fig. 9.

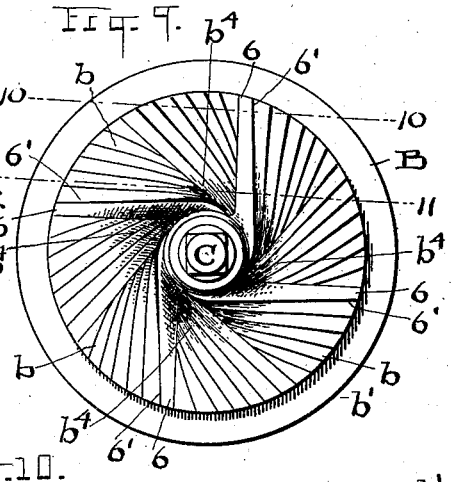



Fig. 10.


Fig. 11.

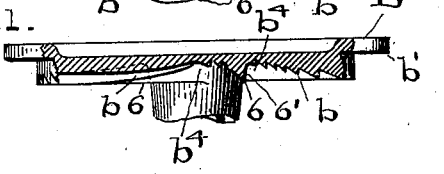



Fig. 12.

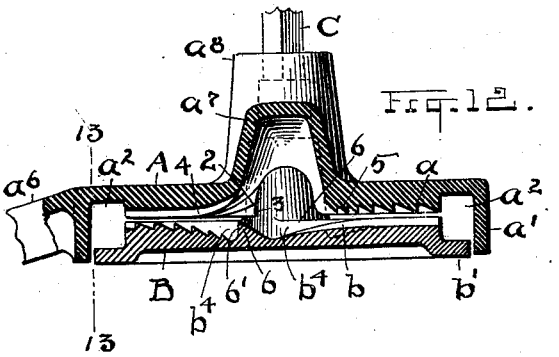
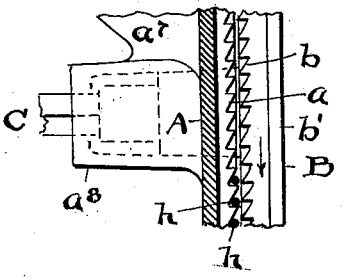



Fig. 13.

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# UNITED STATES PATENT OFFICE.

JOSEPH S. TARR, OF CLEVELAND, OHIO.

## COFFEE-MILL.

SPECIFICATION forming part of Letters Patent No. 688,362, dated December 10, 1901.

Application filed October 11, 1898. Serial No. 693,229. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH S. TARR, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Coffee-Mills; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to coffee-mills; and the invention consists in a mill made wholly in two parts, substantially as shown and described, and particularly pointed out in the claim.

In the accompanying drawings, Figure 1 is a vertical central sectional elevation of the mill on the line of its axis. Fig. 2 is a perspective front elevation of the stationary member or section of the mill, and Fig. 3 is a perspective front elevation of the rotatable member. Fig. 4 is a cross-section of the stationary member alone on the same line as Fig. 1, but enlarged; and Fig. 5 is a cross-section of the revolving member on line $x$ $x$, Fig. 3. Figs. 6 and 7 are details of the handle and lock-nut, respectively. Fig. 8 is a plain inside elevation of the stationary member shown in perspective, Fig. 2. Fig. 9 is a plain inside elevation of the rotatable member. Figs. 10 and 11 are cross-sections on lines 10 and 11, respectively, Fig. 9. Fig. 12 is a cross-section on line 12 12, Fig. 8. Fig. 13 is an edge elevation of the two members as they are seen when operating together and on line 13 13, Fig. 12. A view anywhere on their periphery is the same except at the feed-inlet.

First of all I have had in mind cheapness or economy in the initial cost of the mill, so that it might enter the market in competition with other mills which likewise have had this advantage in view and are put upon the market at low prices. To this end, as well as to its advantageous operation, the mill is constructed wholly in two main parts—the stationary part or member A and the rotatable part or member B. These parts, furthermore, are so fashioned as to be easily cast complete and operative in the form and with all the details as here shown, so that when they come from the foundry they are ready to be assembled and put into use. Thus it will be seen that the working faces of both parts A and B are disk shape in outline, and part B is nothing more than a grinding-disk, with a crushing-face $b$ and a depressed peripheral flange $b'$, as hereinafter fully described. This part has the shaft C cast integral with its centers.

The part A comprises all the casing there is in the machine, consisting of the peripheral angular flange $a'$, which projects beyond the plane of the disk and which in a full-sized domestic machine need not be over half an inch or less in depth and adapted to receive the peripheral flange $b'$ of section B within its peripheral angular flange $a'$ and with such close fitting that there will be no leakage of the ground coffee and yet perfect freedom of operation. A serrated or milled face $a$ on part A matches the face $b$ and stands out slightly from the back of said part A and has its edge a sufficient distance from the flange $a'$ to leave a channel $a^2$, the bottom of which is depressed relatively to the plane of the grinding-disk, into which the ground coffee is thrown and whence it gravitates to the outlet $a^3$ in the bottom of the mill and discharges into cup D. A short arm $a^4$ on section A has a transverse slot $a^5$ in its downwardly-turned extremity to receive and hold the handle $d$ of the cup D, as plainly seen in Fig. 1.

It may be observed here that this mill is designed to be fastened to a wall or some fixed support, and to this end is provided with an integral bracket $a^6$ at one side of section A, perforated for fastening-screws. This brings the grinding-faces $a$ and $b$ into a vertical plane.

Another feature of the stationary member A is the relatively small feed-receptacle $a^7$, cast upon its side and top and having an open side extending into the face of the grinding-surface $a$ down to the center thereof relatively about as seen in the perspective view, Fig. 2. The coffee is contained in the canister E, temporarily secured in the top edge of receptacle $a^7$, and in practice may be filled and covered over and serve as a reservoir for use from day to day until it is exhausted.

An extended tubular bearing or hub $a^8$ projects centrally from the back of section A, and the shaft or spindle C of section B passes

through the same from the opposite side and is provided with a threaded extremity *c*, on which is engaged a nut G. The handle H engages an angular portion on the shank of the shaft C to rotate the member B, and sleeved on the shaft inwardly from the handle is a spiral spring J. This spring bears at one end against a shoulder *c'* on the shaft and at the other end against an internal flange or shoulder $c^2$ on the hub. Then to hold the two grinding members in the desired relation and to adjust the relationship for finer or coarser grinding I employ the adjusting-nut G on the outer extremity of shaft or spindle C. This nut draws against the resistance or tension of spring J, so that I can make an exceedingly fine adjustment and bring the two grinding-surfaces practically together and yet keep them out of immediate contact by reason of the reverse pressure of the spring, and thus not only prevent wear upon the faces, but also insure easy rotation. Then again I am enabled through this locking engagement to secure the nut fixedly in any adjusted position, where it will remain without danger of loosening until purposely changed. This engagement is made by rounded lugs *g* on the nut dropping into grooves or depressions *h* on the corresponding surface of handle H, and the tension of spring J is always sufficient to keep these parts together when the handle is rotated for use, while the spring also yields sufficiently to allow the nut to be turned by hand in either direction as adjustment may be required. The lugs *g* and depressions *h* might be reversed on the nut and handle and serve the same purpose.

Now having reference particularly to the grinding-surfaces of the members A and B it will be seen that the surface *a* of part A has its lowest point at 2, where the several ribs at that side which terminate in the entrance from feed-chamber $a^7$ run down on a slight curvature to the said edge and from which edge there is a slight spiral development and rise in the smaller ribs successively until reaching the level of the last set of serrations or ribs bounding the opposite edge 5 of the inlet, which are all on the same level. The cracking-ribs 3 all radiate from about the center of the disk and are on the same plane their entire length from rib $3^x$ to rib $3^y$, while the minor ribs 4, between main ribs 3, are on the same plane therewith in their outer upper edges, but gradually rise from their inner ends after passing the rib $3^x$ to the rib $3^y$, so that at last they become practically on the same plane at both ends. This preserves the spiral rise in the ribs above referred to and which is chiefly noticeable about the center of part A, where the whole grain feeds in from the receptacle and is first encountered in its unbroken state. However, though the small ribs 4 gradually rise to the elevation of the cracking-ribs 3 they also, in fact, deepen somewhat in cross-section, so that the channels between them are deeper at the periphery of the grinding-surface than at the center of the mill. In other words, the said channels deepen from the center outward. It will also be noticed that the initial action, wherein the grain is cracked and broken, comes directly about the center of the disk, where the hard work is most easily done. The larger pieces then naturally follow the semiradial channels, where room has been made to receive them, while the centrifugal action and leads of the mill carry these gradually-broken pieces outward to be further broken or sheared before they are discharged at the periphery, where the product is cast off evenly ground into the channel $a^2$; but the action is not really one of grinding, but rather of shearing or cracking, because there are no grinding-surfaces in the mill. The deeper channels toward the periphery prevent grinding or flowing of the grain, and the set of the opposite ribs is such as to give to both large and small a shearing action and a granulated product.

The member B has a grinding-surface *b*, designed to coöperate in the most advantageous manner with surface *a*. In this surface *b* there is perfect uniformity of edge elevation throughout the several main or cracking ribs 6, being on the same plane, while the minor ribs between them are arranged in groups running one half substantially parallel to the ribs 6 and the other half at an inclination thereto, and all the minor ribs having a gradually lower end elevation as they approach the center or shaft C, and also a gradual deepening as they approach the periphery. This affords additional room for the larger pieces of grain to work along around the center in the gradually-closing spiral space before described, while the tangential arrangement of the large breaking-ribs 6 cross the radial breaking-ribs 3 in part A with a shearing action, and thus further reduce and minimize the possible resistance. A like shearing action also obtains in all the minor ribs. The hard work, therefore, is all done at the easiest place, (about the shaft C,) while the fine shearing or breaking of the particles occurs farther away toward the periphery. This also insures evenness of product, which is very desirable, and especially does it avoid reducing a portion of the coffee to a powder while other portions are in small pieces. The grinding is uniform and all alike, according to adjustment, and there is no powdered or floured coffee in the product.

During the operation of grinding and supplemented by the tension of spring J there is of course considerable friction liable to develop at the point of contact between the handle H and the extremity of hub $a^8$, against the end of which it bears, and hence to relieve this friction and make the movement easy and noiseless I introduce a series of anti-friction-balls into this space, the hub and handle-head being constructed to receive and con-

fine them. The chamber also serves to carry a suitable lubricant, and packing 9 keeps the mill clear of the oil.

It will be noticed that the cutting-teeth in Fig. 9 on the disk B have three distinct peculiarities—*i. e.*, first, all of them are arranged at a tangent in respect to the center, four of them (designated by 6) having a straight cutting and carrying edge 6′, while the others, *b*, have a curved edge, which extends from the depression or hollow space $b^4$ or inner end of said teeth to a point where they rise flush with edge 6′, near the outer end; second, looking at view Fig. 9 the teeth *b*, as seen in plan, are wider at their outer than at their inner ends, and, third, looking at view Fig. 11 these same teeth *b* are also of greater depth at their outer ends than at the inner ends or beginning-point, the two views just described showing clearly a gradually increasing cross-section of these teeth from the center to the periphery. The object of having the teeth constructed in this manner is to provide a breaking edge for the coffee near the center of the disk B, and after each coffee-bean has been broken into small enough particles they can be easily discharged without a continuation of grinding, thus avoiding pulverizing the ground particles. The effect of this novel construction is seen in edge elevation, Fig. 13, where cracked particles *h* are lying in the substantially V-shaped covers or spaces, from which they are dislodged not by further cracking, but by crowding from the center of the mill. Hence they clear into the channel $a^2$ and are thus discharged from the mill. There is therefore no such thing here as a finer grinding-surface as the periphery of the mill is approached; but the grinding or cracking of the coffee all occurs before more than about two-thirds cross the cracking-surfaces outward. Over the outer third there is travel and discharge, but no other action and no crowding the particles across the ribs to make them finer. All the teeth have a straight front edge and an inclined back, and in grinding the square edges of B run against or toward the square edges in A, Fig. 13, and the tangential arrangement in one as compared with the other makes a shearing cut and a throwing discharge.

What I claim is—

The combination of a stationary grinding member formed with an extended tubular bearing, grinding-disk, and a peripheral angular flange constituting a channel with a bottom depressed relatively to the plane of the grinding-disk and a cylindrical outer wall which projects beyond the plane of the disk, and a rotary member having a spindle mounted in the bearing of the stationary member, a grinding-disk, and a relatively-depressed peripheral flange inclosed within the cylindrical wall of the stationary disk and completing the inclosure or channel formed thereby, substantially as described.

Witness my hand to the foregoing specification this 7th day of October, 1898.

JOSEPH S. TARR.

Witnesses:
R. B. MOSER,
H. E. MUDRA.