A. L. BAUSMAN.

GRINDING MACHINE.

APPLICATION FILED JULY 21, 1910.

1,079,465.

Patented Nov. 25, 1913.

3 SHEETS—SHEET 1.

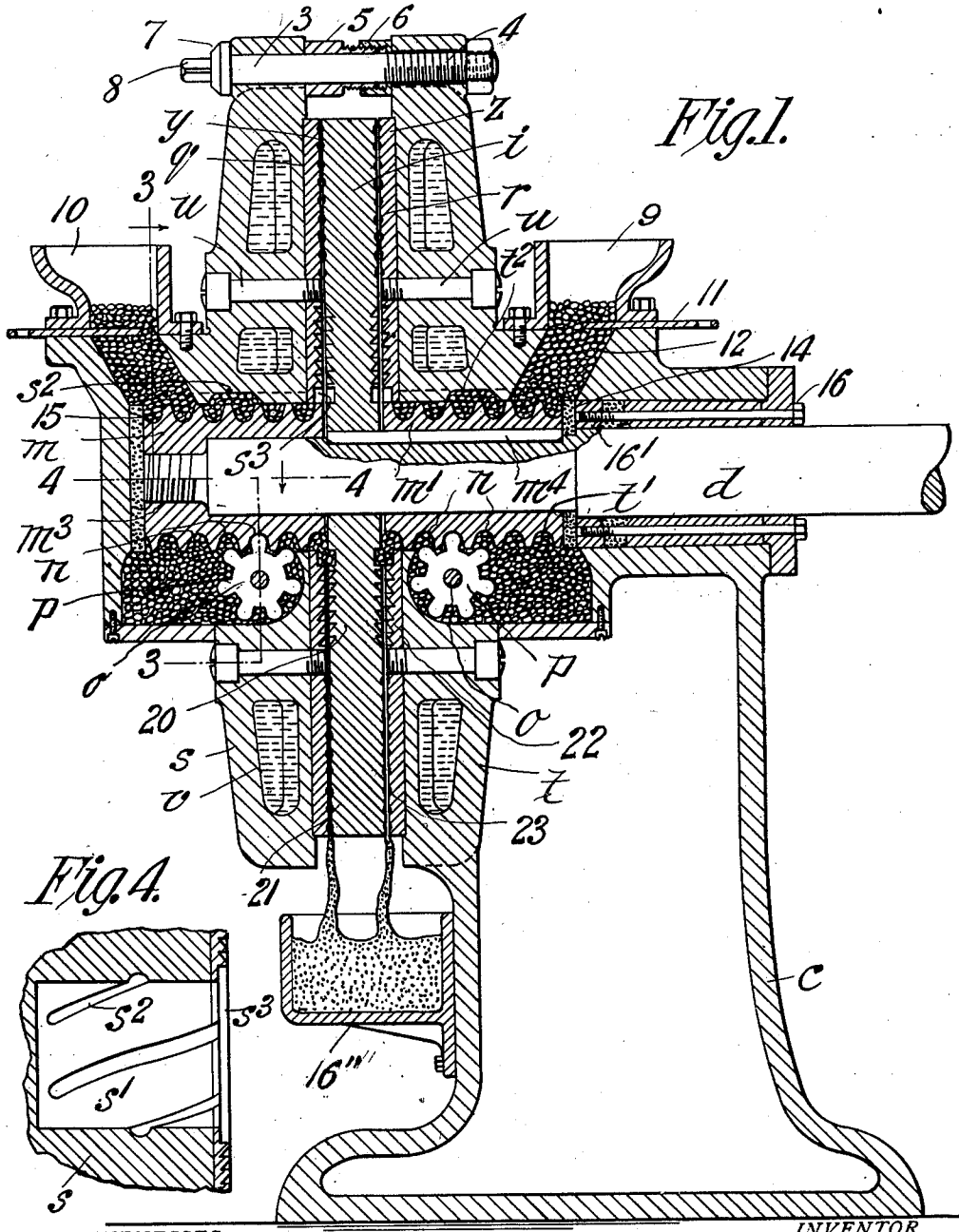


Fig. 1.

Fig. 4.

WITNESSES:

H. L. Sprague

Harry W. Bowen

INVENTOR,

Alonzo L. Bausman

BY

Chapin & Co

ATTORNEY.

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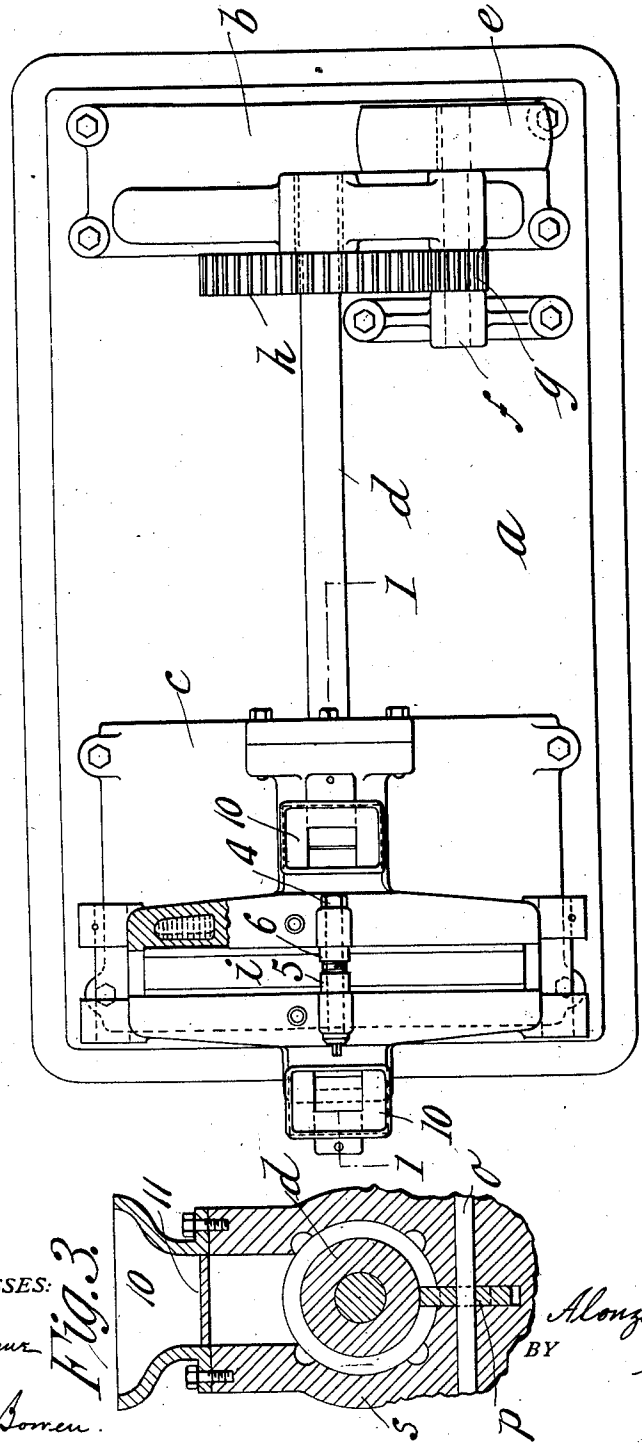


Fig. 2.

Fig. 3.

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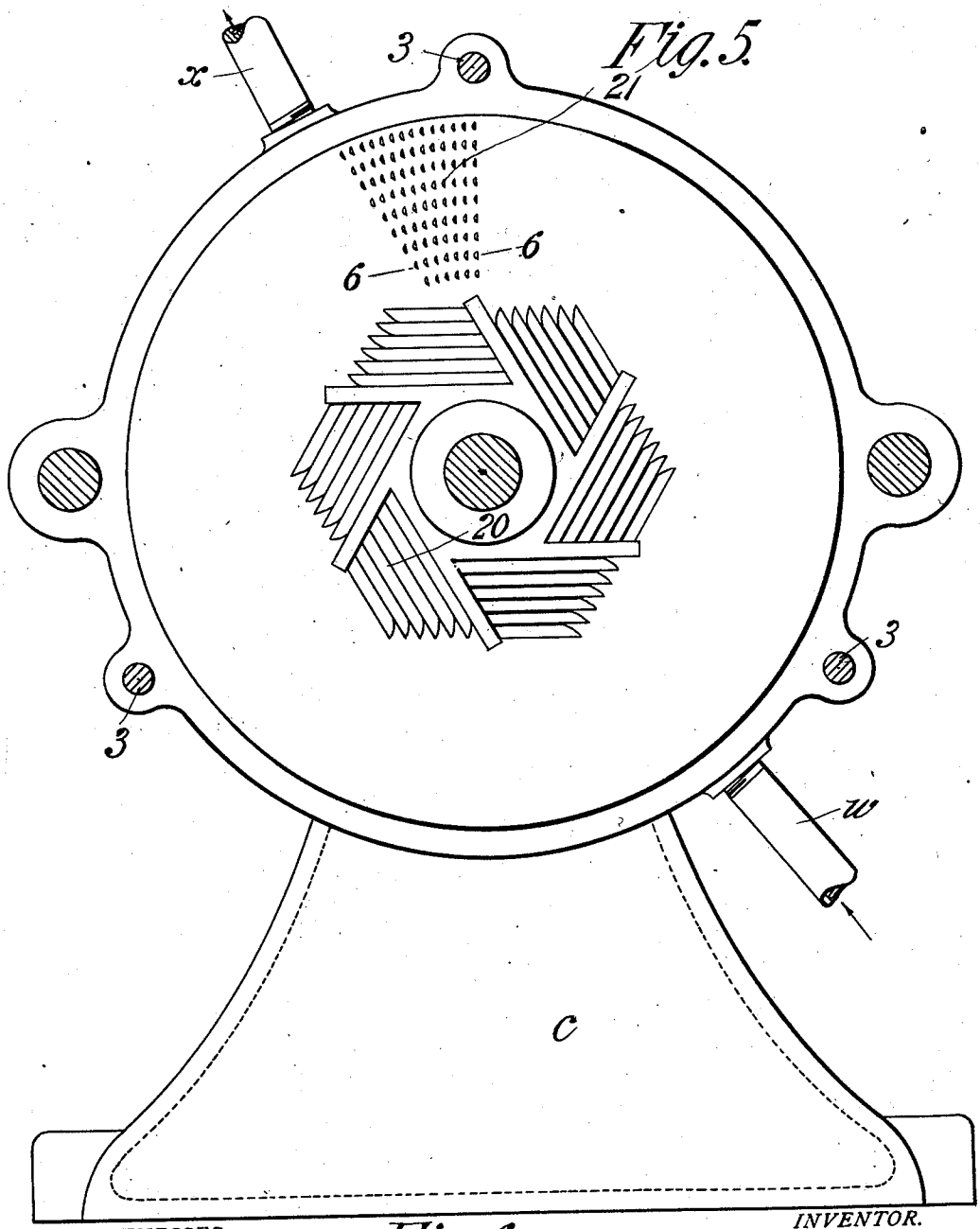
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3 SHEETS—SHEET 3.

Fig. 5.

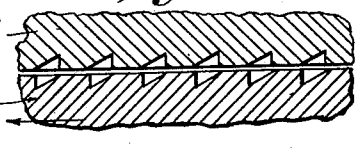


WITNESSES:

H. L. Sprague

Harry M. Bowen

Fig. 6.



INVENTOR.

Alonzo L. Bausman

BY

Chapin & Co.

ATTORNEY.

UNITED STATES PATENT OFFICE.

ALONZO LINTON BAUSMAN, OF CHICOPEE, MASSACHUSETTS.

GRINDING-MACHINE.

1,079,465. Specification of Letters Patent. Patented Nov. 25, 1913.

Application filed July 21, 1910. Serial No. 573,124.

To all whom it may concern:

Be it known that I, ALONZO LINTON BAUSMAN, a citizen of the United States of America, residing at Chicopee, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Grinding-Machines, of which the following is a specification.

This invention relates to improvements in grinding mills and is particularly adapted and designed for grinding cocoa beans.

The object of the invention is in providing means for rapidly and thoroughly grinding or disintegrating the cocoa bean so that the particles will be of uniform size and yet at the same time prevent the cocoa butter from being separated from the solid matter of the bean.

The invention consists broadly in providing a disk or bur element, the opposite sides of which are roughened and so mounted as to rotate between oppositely disposed fixed disks or burs and with means for feeding the bean simultaneously to the opposite sides of the grinding disk, as described and claimed.

A further object of the invention consists in providing a gate element which will permit the beans to be forced or pushed into the grinding space between the disks and at the same time prevent the pressure, due to the grinding operation, from forcing the beans back into the receptacle or hopper.

A further object of the invention is to provide means for accurately spacing the fixed grinding disks or burs from the rotatable bur, which consists preferably of a spacing adjustment and spacing sleeves.

In the drawings forming part of this application,—Figure 1 is a vertical, longitudinal, sectional view on the line 1—1 of Fig. 2 showing the manner in which the fixed grinding disks are adjusted toward and from the rotatable disk; also indicating the gate construction which permits the beans to be forced into the grinding space and at the same time prevent their escape from this space. Fig. 2 is a plan view of the machine showing the means by which the main shaft is rotated, also the hoppers for receiving the material to be ground, and a top view of one of the micrometer adjustments. Fig. 3 is a transverse sectional view on the line 3—3, Fig. 1, showing the worm construction, the hopper, and the shaft in cross section. Fig. 4 is a sectional plan view on the line 4—4, of Fig. 1 showing the grooves through which the beans are forced into the grinding chamber. Fig. 5 is a view of the rotatable grinding plate showing its roughened surface and the drive-shaft in cross section. Fig. 6 is a detail sectional view on the line 6—6, Fig. 5 showing the relation of one of the fixed and the movable grinding plate or disk.

Referring to the drawings, *a* designates the base portion of the machine that is provided at its opposite ends with shaft-supporting standards *b* and *c*, the shaft being indicated at *d*. The driving-pulley is indicated at *e* which operates the shaft *f* on which the pinion *g* is secured. This pinion meshes with a large gear *h* that is secured to the shaft *d*. On the opposite end of this shaft is keyed the grinding disk or bur *i* by means of the key m^4. Secured to the outer end of the shaft *d* by means of the threads m^3 is a cylindrical element *m*, which is provided with spiral shaped grooves *n*. This cylindrical element rotates in the opening of the head pieces of the machine. Located transversely to the axis of the shaft *d* is a short shaft *o* and on this shaft is secured a worm gear *p* which engages the spiral groove or threads *n* of the cylindrical element *m*. The wheel, or worm-gear *p* serves the purpose not only of feeding the beans forward but prevents their return from the grinding spaces between the fixed and rotatable grinding members.

q and *r* designate grinding plates that are provided with roughened surfaces and are located on opposite sides of the rotatable disk or plate *i*. These plates are secured to the casting or cooling chambers *s* and *t* by means of the bolts *u*.

v designates the cored out portion of the chambers *s* and *t* into which cooling water is permitted to pass by means of the pipes *w* and *x*, as shown in Fig. 5. The members *s* and *t* have openings s^1 and t^1 (see Fig. 4) which are provided with grooves s^2 and t^2 and in which is located the cylindrical rotatable members *m* and m^1 respectively.

In order to accurately adjust the chambers *s* and *t* from the rotatable plate *i*, whereby the grinding spaces *y* and *z* may be the same, I provide bolt members 3 threaded at one end, as shown at 4; and located between the chambers *s* and *t* is a sleeve 5 that threads into another sleeve 6. These two threaded sleeves comprise a spacing element which, after being accurately adjusted, is placed on the bolts 3 and

clamped between the members s and t by means of the nuts 4.

The hoppers for receiving the cocoa beans which are to be ground are shown at 9 and 10 and are provided with a sliding gate 11 past which the beans flow to an opening 12 in the cooling chambers s and t. These openings communicate with the grooves or channels n in the rotatable members m and m^1 which are secured to the shaft d by means of the threads m^3 and key m^4. Packing rings 14 and 15 are located at opposite ends of the cylindrical elements m and m^1, and bolts 16 are provided for adjusting the packing rings 16^1 so as to provide a tight joint at the end of the part m^1 and about the shaft d.

The operation of the grinding mill is as follows: Assuming the shaft d to be rotated and the hoppers 9 and 10 supplied with beans which fall downward through the opening 12 into the spiral shaped grooves n of the cylindrical elements m and m^1, the rotation of these parts in the openings s^1 and t^1 of the chambers s and t causes the worm gear p to be rotated by means of the grooves n, the effect of which is to feed the beans forward in opposite directions through the openings s^3 at the center of the fixed members q and r which openings communicate with the opposite grinding sides of the rotatable member i. The worm-gears p serve the double effect of feeding the beans forward and at the same time preventing their escape by the outward pressure during the grinding operations. The spiral grooves s^2, t^2 in the members s and t communicate with the outlets s^3 so that when the cylindrical members m and m^1 are rotated their spiral grooves n will cause the beans to be moved or pushed forward into the grinding spaces surrounding the disk i above the shaft d.

Fig. 1 shows the material after being ground escaping into the receptacle $16''$ from the opposite sides of the disk i.

In order to vary the fineness of the ground product, the operator, by adjusting the sleeves 5 and 6, can accurately adjust the spaces y and z. The roughened sides of the disk i are indicated by 20 and 21 and that of the fixed disks at 22 and 23.

What I claim, is:—

1. In a grinding machine, the combination with a rotatable bur or plate member, a shaft for supporting said member, a sleeve provided with grooves thereon which communicate with a hopper for receiving the material to be ground, a worm-gear operable from the grooved sleeve for forcing the material into contact with the bur and for preventing its return movement during the grinding operation.

2. In a grinding machine, the combination with the shaft thereof, a rotatable grinding disk, a pair of fixed grinding disks oppositely disposed to the first mentioned disk and having openings through their centers, and means including a grooved sleeve and worm-gear driven from the shaft for simultaneously forcing the material to be ground through the openings and into engagement with the said disks.

3. In a grinding machine, the combination with a rotatable shaft, a pair of grooved cylindrical members carried thereby and secured thereto, a worm-gear engaging said grooves, a rotatable grinding disk carried by the shaft for effecting the grinding, fixed grinding disks oppositely disposed to the grinding disk, said gears being designed to force the material into engagement with the rotatable grinding disk, and means for axially adjusting the position of the said fixed disks whereby the spaces on the opposite sides of the grinding disk are adjusted.

4. A grinding machine of the class described comprising a pair of fixed grinding members, a rotatable grinding member located therebetween, means, including a toothed wheel and a rotatable feed member, for forcing the material to be ground into the grinding spaces on the opposite sides of the grinding members, and for preventing its escape.

5. A grinding machine comprising a pair of coacting members, a rotatable bur member therebetween, a shaft, the fixed members having spiral grooves leading to the rotatable bur member, cylindrical members having spiral grooves secured to the shaft, a toothed feed wheel operable from the grooved cylindrical members for forcing the material to be ground toward the rotatable bur member, and means for adjusting the fixed members toward and from the rotatable bur member, as described.

6. A grinding machine comprising in combination a rotatable shaft, a grinding member mounted thereon, two fixed grinding members between which the first mentioned grinding member rotates, said fixed members having holes through which the material to be ground is fed to the grinding members, sleeves mounted on said shaft and extending through said holes to feed the material, and members coöperating with said sleeves to prevent the material from being forced back when once fed to said grinding members.

ALONZO LINTON BAUSMAN.

Witnesses:
K. I. Clemons,
Harry W. Bowen.