

(No Model.)

2 Sheets—Sheet 1.

F. WEGMANN.
HULLING OR GRINDING MACHINE.

No. 405,810.

Patented June 25, 1889.

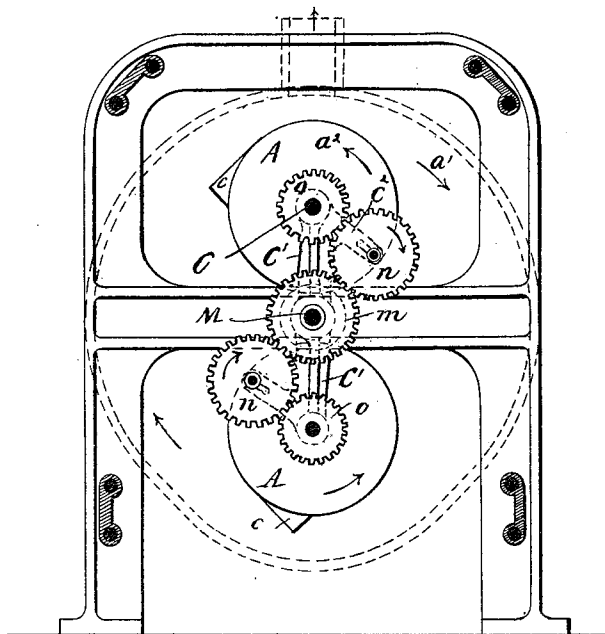


Fig. 1.

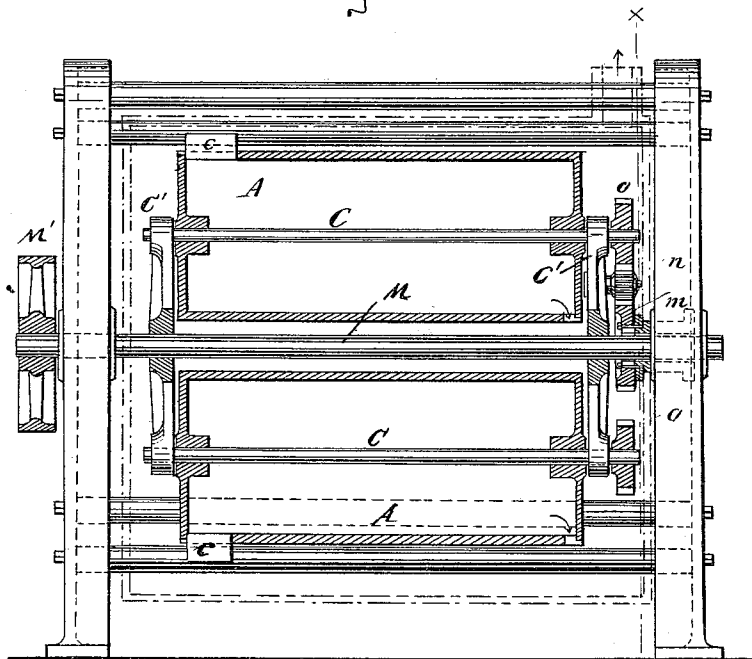


Fig. 2.

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(No Model.)

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Fig. 3

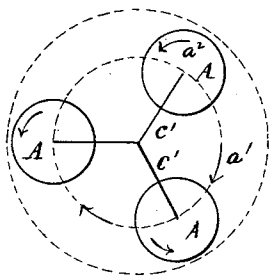


Fig. 4

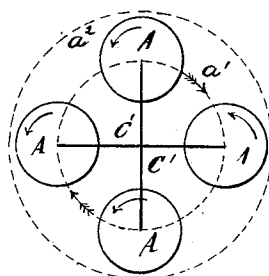


Fig. 5

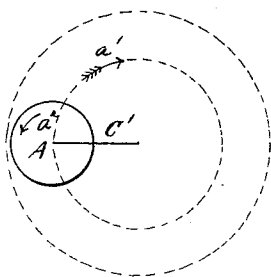


Fig. 6

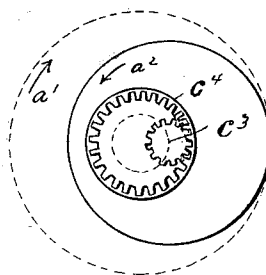
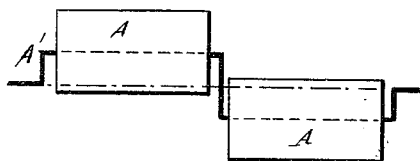


Fig. 7



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UNITED STATES PATENT OFFICE.

FRIEDRICH WEGMANN, OF ZURICH, SWITZERLAND.

HULLING OR GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 405,810, dated June 25, 1889.

Application filed August 18, 1887. Serial No. 247,259. (No model.) Patented in Germany July 20, 1887, No. 44,396; in France July 25, 1887, No. 184,981; in Belgium July 26, 1887, No. 78,347; in England July 27, 1887, No. 10,456; in Italy September 20, 1887, No. 22,105; in Spain November 20, 1887, No. 11,744, and in Austria-Hungary June 2, 1888, No. 18,622 and No. 38,755.

To all whom it may concern:

Be it known that I, FRIEDRICH WEGMANN, a subject of the Republic of Switzerland, residing at the city of Zurich, in the Republic of Switzerland, have invented certain new and useful Improvements in Machines for Hulling or Grinding Grain, (for which Letters Patent were granted to me in Germany, No. 44,396, dated July 20, 1887; in France, No. 184,981, dated July 25, 1887; in Belgium, No. 78,347, dated July 26, 1887; in England, No. 10,456, dated July 27, 1887; in Italy, No. 22,105, dated September 20, 1887; in Spain, No. 11,744, dated November 20, 1887; in Austria-Hungary, No. 18,622 and No. 38,755, dated June 2, 1888,) of which the following is a specification.

The hulling of grain—that is, the removing of the exterior shell or cuticle in order to expose the kernel—has to this day been a difficult operation which required much time, while the resulting product was irregular and by no means perfect, and the operation was attended by a considerable loss of meal. If, for the purpose of hulling, the grain be rolled over the inner surfaces of horizontal drums and at the same time exposed to the rubbing action of the grains against each other, the hull or cuticle is removed uniformly, but only to a slight degree—that is to say, the hulling is not perfect, and the kernel is not fully exposed and separated from the hull. Owing to the small specific gravity of grain, the individual grains cannot exert a sufficient pressure on each other in order to produce the necessary energetic friction required for rubbing or wearing off the hull entirely. Bodies of a greater specific gravity than grain can be operated in this manner very satisfactorily. By increasing the speed of rotation of the drum the grains have a tendency, in proportion to the speed of rotation, to adhere with greater pressure to the inner surface of the drum, and as the pressure against the inner surface of the drum and against each other increases their motion in relation to each other decreases, and thus the rubbing of the grains against each other and against the side of the drum ceases. The

grain is thus held in a comparatively compact mass under the action of the centrifugal force, and the individual grains have no movement in relation to each other.

The object of my invention is to operate upon the grain in such a manner that it is subjected to the action of great centrifugal force, and at the same time the berries are rubbed against each other and against the sides of the drum, so as to cause the gradual wearing off of the hulls, whereby the grain is hulled in the most perfect manner. This I accomplish by placing the grain in drums which are rotated on their own axes and at the same time rotated in the reverse direction on an axis eccentric to the axes of the drums.

The invention consists of the construction and combination of parts and details, as will be fully described and set forth hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a cross-sectional elevation of my improved apparatus for hulling and grinding grains on the line *x x*, Fig. 2. Fig. 2 is a longitudinal vertical sectional view of the same on the line *y y*, Fig. 1. Figs. 3, 4, and 5 are diagrammatic end views of different constructions of the machine. Fig. 6 is an end view of one cylinder of a machine of modified construction. Fig. 7 is a diagrammatic side view of the construction shown in Fig. 6.

Similar letters of reference indicate corresponding parts.

The drums *A* are rigidly mounted on the shafts *C*, which are journaled in the arms *C'*, said arms being mounted rigidly on the shaft *M*, which is journaled in a suitable frame and provided at one end with the belt-pulley *M'*. A fixed cog-wheel *m* surrounds the shaft *M* at one end in such manner that the shaft can rotate without rotating the said cog-wheel, and with said cog-wheel *m* two cog-wheels *n* engage, which are pivoted on arms or lugs *C²* on the arms *C'*, said cog-wheels *n* or planetary wheels engaging with the cog-wheels *o*, fixed on projecting ends of the shafts *C*.

As shown in Fig. 3, three drums *A* are provided. In Fig. 4 four drums are shown. In

Fig. 5 one drum is mounted in the manner just described.

If desired, the drums may be mounted end to end, as shown in Fig. 7, in which case the drums A are mounted loosely on a double crank-shaft A' on the end of each of which a cog-wheel C³ is fixed, which engages with the internally-toothed cog-wheel C⁴, surrounding the journal of the shaft A' and fixed to the frame.

In all constructions the drums are rotated on the shaft M, or the journals of the shaft A', as the centers in the direction of the arrow a', and at the same time each drum is rotated by cog-wheels or planetary wheels in the inverse direction—that is, in the direction of the arrow a²—the drums thus having two movements—a rotary movement on a shaft eccentric to their axes, which movement is in one direction, and at the same time they have a rotative movement in the opposite direction on their own axes.

The grain, according to the speed employed, is pressed with greater or less pressure against that part of the inner surface of the drum which is farthest from the eccentric or main shaft M, and under the action of the rotation of the drums on their own axes the grain is subjected to continual displacement on the inner surface of the sides of the cylinder, causing the grains to rub against each other and the inner surface of the drum, whereby the hulls are worn off and the grain hulled.

It is evident that the pressure of the grains against each other and against the sides of the drum varies with the speed of rotation, as does also the rubbing action of the grains on each other.

The grains can be shelled completely, so that they are ready for being ground into meal, or by continuing the operation may be completely reduced to meal. To reduce the grain to meal, parts of the interior surface of the cylinders must be lined with a rough or abrading material—such as porcelain, earthenware, emery, stone, punched, corrugated, or slitted metal—or sharp-edged projections must be provided on the inner sides of the cylinders.

In the same manner as grain is treated other materials may be shelled, polished, rounded off, and finished—for instance, shot, needles, beads, buttons, &c.

The operation may be carried on dry or with the addition of water. The drums may be

mounted vertically or horizontally. A casing (shown in dotted lines in Figs. 1 and 2) surrounds the drums.

In application Serial No. 275,216, filed May 29, 1888, I have claimed the method of grinding, decorticating, and polishing grain and other articles for the carrying out of which method the different forms of apparatus herein described are adapted.

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

1. The combination of a rotary main shaft, a drum or drums mounted eccentrically to said shaft, so as to revolve around the same, and transmitting mechanism between the main shaft and the drum or drums, whereby the drum or drums are rotated on their own axes in a direction opposite to their revolving motion around the main shaft, substantially as set forth.

2. The combination of a rotary main shaft, a drum or drums mounted eccentrically to said shaft, so as to revolve around the same, and planetary gearing for rotating the drum or drums axially in opposite direction to their revolving motion around the main shaft, substantially as herein shown and described.

3. The combination of a supporting-frame, a rotary main shaft journaled in the same, a drum or drums mounted eccentrically to said shaft, so as to revolve around the same, a stationary gear-wheel mounted on the frame, and planetary gear-wheels meshing with said stationary gear-wheel for imparting rotary motion to the drum or drums axially in a direction opposite to their revolving motion around the main shaft, substantially as herein shown and described.

4. The combination, with a supporting-frame, of a rotary main shaft journaled in the same, arms fixed on said shaft, drums journaled on the arms, a stationary gear-wheel mounted on the frame, a cog-wheel on each drum-shaft, and intermediate cog-wheels journaled in the arms and meshing with the stationary gear-wheel and the cog-wheels on the drum-shafts, substantially as herein shown and described.

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

FRIEDRICH WEGMANN.

Witnesses:

ROBERT STOLZ,

WILLIAM SCHNEIDER.