(No Model.) 2 Sheets—Sheet 1.

A. FRYER.

MACHINE FOR GRINDING.

No. 483,249. Patented Sept. 27, 1892.

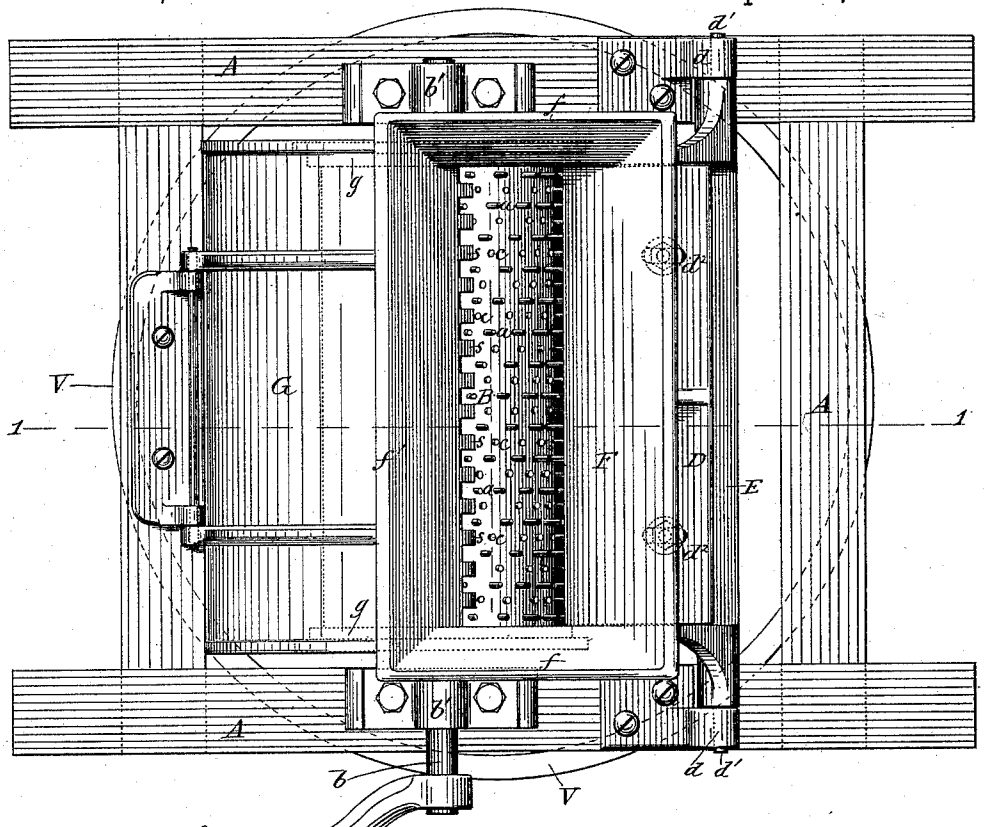


Fig. 1.

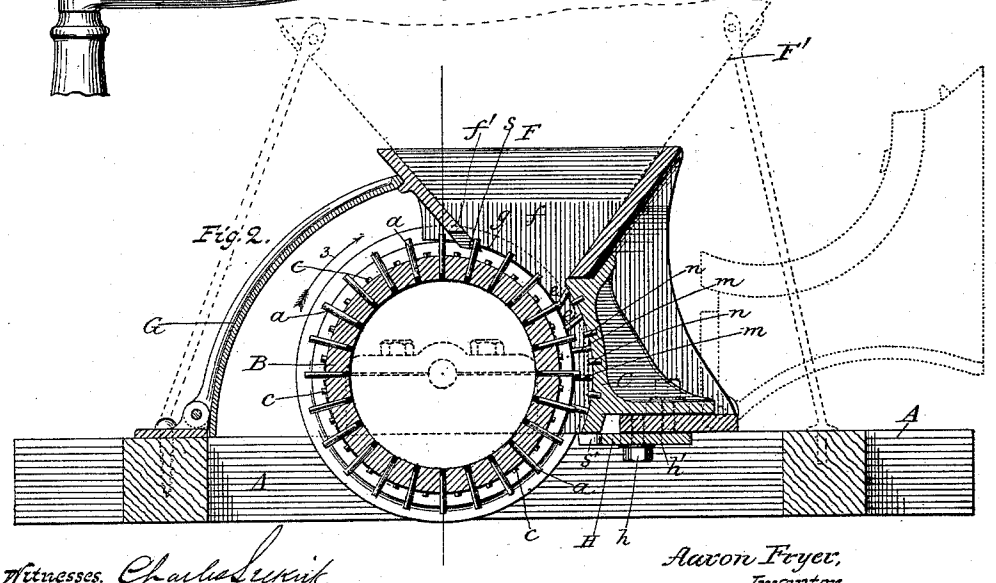


Fig. 2.

Witnesses. Charles Selkirk
A. Selkirk Jr.

Aaron Fryer,
Inventor.
by his Attorney
Alex. Selkirk

(No Model.) 2 Sheets—Sheet 2.

A. FRYER.

MACHINE FOR GRINDING.

No. 483,249. Patented Sept. 27, 1892.

Fig. 3.

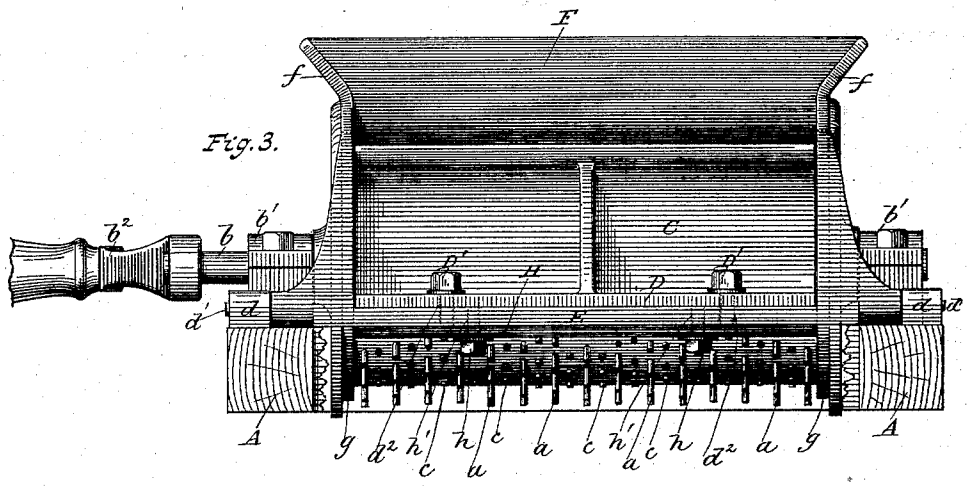
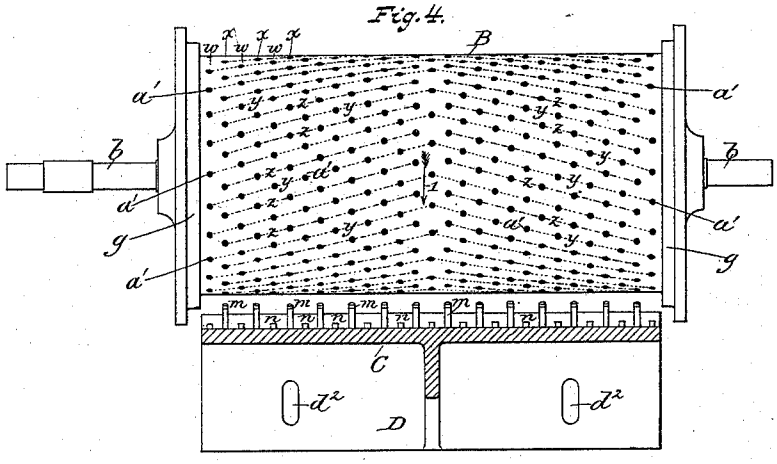


Fig. 4.



Witnesses: Charles Seward
A. Selkirk Jr.

Aaron Fryer,
Inventor.
by his Attorney
Alex. Selkirk

UNITED STATES PATENT OFFICE.

AARON FRYER, OF BATH, NEW YORK.

MACHINE FOR GRINDING.

SPECIFICATION forming part of Letters Patent No. 483,249, dated September 27, 1892.

Application filed October 10, 1890. Serial No. 367,753. (No model.)

To all whom it may concern:

Be it known that I, AARON FRYER, a citizen of the United States, residing at Bath, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Machines for Grinding Fruits, of which the following is a specification.

My invention relates to machines for grinding or minimizing fruits preparatory to pressing out their juices; and it consists in the combinations of devices and elements hereinafter particularly described, and specifically set forth in the claims.

The objects of my invention are, primarily, to provide with a grinding-cylinder and concave means by which fruits of different kinds and sizes—such as grapes, berries, currants, &c., or larger fruits of different kinds—can be rapidly operated with, so as to effectually break their outer skins and also the pulps or sacks containing the juices, and also to so remove the seeds from their original situations in the fruits as to afford ready opportunity for the escape of the juices from the tissues of the same; secondarily, to provide particular combinations of devices or elements by which the improvements in this invention may be embodied in fruit-grinding machines for operating with fruits of different kinds and sizes. I attain these objects by the means illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view from above of a machine embodying the improvements in my invention. Fig. 2 is a sectional view of the same, taken at line 1 in Fig. 1. Fig. 3 is an outside view of the same, taken from its concave side; and Fig. 4 is a plan view of the cylinder and illustrates the peculiar features of arrangements of the tooth-holes for the teeth.

The same letters of reference refer to similar parts throughout the several views.

In the drawings, A is a suitable frame, which can be made of wood or metal and with any size and form that will adapt it to receive the working parts of the machine and serve as a support of said parts over a suitable tub or other vessel V below, as illustrated in Fig. 1.

B is the cylinder, the body of which may be made of wood, metal, or other material and with a size as to diameter and length as may be preferred or be suitable for operations with particular kinds of fruits or as the capacity of the machine may require. This cylinder is mounted on a suitable shaft b, supported from the frame by bearings b' b', and may be revolved by any suitable power through any known suitable mechanism. For operation by hand I prefer to use the hand-crank b^2. This cylinder B is provided with two classes of teeth a a and c c, the former being the primary teeth and having a greater length than the latter, which are the secondary teeth. The primary teeth a a I prefer to make with a length of from three-eighths to one-half an inch, while the secondary teeth c c are preferably about one-eighth of an inch in projection. The length of said teeth may, however, be varied accordingly as the kind and condition of the fruit to be operated with may require. These two classes of teeth are arranged in regular parallel rows running in direction of the line of movement of the cylinder, and each row of primary teeth a a alternates with a row of secondary teeth c c, as shown. These two classes of teeth are also arranged in parallel rows, running slightly in diagonal lines of direction from the middle of length of the cylinder toward the opposite ends of the same, so as to be in lines which are substantially reversed diagonal lines of direction, and the said two classes of teeth in these reversed diagonal rows alternate, as shown.

In Fig. 4 I have illustrated the cylinder B as having its shell pierced to receive in its body these two classes of teeth. The omission in said figure of the teeth is to avoid confusion of lines in the same, and in referring to the rows of tooth-holes in said Fig. 4 for these two classes of teeth the directions and the alternations of the said rows of primary and seconary teeth will be readily understood.

The tooth-holes a' a', Fig. 4, for the primary teeth a a are shown to be in one direction, as on lines w w, running parallel with each other and in direction of the line of rotation of the said cylinder. (Indicated by arrow 1 in said Fig. 4.) The tooth-holes c' c' for the secondary teeth c c are shown also to be in the same direction in lines of rows x x, running parallel with each other and also with those of the primary-tooth holes, alternating with the same. These tooth-holes a' a' and c' c' are also shown in Fig. 4 to be set in regular parallel lines and in reversed diagonal direction and nearly transversely to the direction of

the rows *w* and *x* above described. The reversed diagonal rows of tooth-holes *a'a'*, receiving the primary teeth *a a*, are indicated in Fig. 4 by dotted lines marked *y y*, while the reversed diagonal rows of tooth-holes *c' c'*, receiving the secondary teeth *c c*, are indicated by broken dotted lines marked *z*. When the respective teeth are in place in the cylinder, the primary teeth *a* in holes *a'* are therefore parallel and in rows *y y*, which are extended from the middle of length of the cylinder B in reversed diagonal directions to the respective opposite ends of the same, and, while running toward the ends of the cylinder, they are run slightly forwardly in direction of the line of motion of the cylinder, as in direction of arrow 2 in Fig. 4. The secondary teeth *c* in holes *c'* are therefore also in rows *z*, which are parallel with each other and with rows *y* of the primary teeth *a* and run in similar reversed diagonal directions from the middle of length of said cylinder toward the outer ends of the same. These teeth *a* and *c* in their respective reversed diagonal directions of rows *y* and *z* alternate, as shown. The prominent advantage arising from these reversed diagonally-arranged rows *y* and *z* of the said teeth will be hereinafter described.

C is the concave, which may be made of metal, wood, or other suitable material. This concave is situated forward of cylinder B, so that when the latter is revolved in direction of arrow 1 in Fig. 4 its teeth will be carried forwardly in direction of arrow 3, Fig. 2, toward the teeth of said concave. The teeth of this concave for coaction with the teeth of the cylinder are of three classes or kinds. One of these three classes of teeth consists of the downwardly-inclined teeth *e e*, which are the feeding-teeth of the concave and tend to readily deliver the fruit in front of the primary teeth *a a* of the cylinder and against the ends of the secondary teeth *c c* of the same. These inclined feeding-teeth *e e* are preferably arranged in two horizontal rows at the upper portion of the concave, and the teeth *e* in the uppermost row are preferably made with a greater angle of incline than those in the row below, as illustrated in Fig. 2. The second class of teeth consists of the checking-teeth *m*, which are about of the same length as the primary teeth *a* of the cylinder and about radial in reference to the center of the circle on which the concave is made. These teeth tend to hold the fruit from passing too freely downwardly and hold the same in situation against the ends of the secondary teeth *c* of the cylinder for receiving the bites of said secondary teeth as they are successively carried against the fruit. The third class of these concave teeth consists of the short teeth *n*, which are about of the same length as the secondary teeth *c* of the cylinder. These three classes of teeth are arranged in one direction in horizontal parallel rows and in the transverse direction in vertical parallel rows, with the short teeth *n n* in both their horizontal and vertical rows alternating with those teeth of the other classes in their respective horizontal and vertical rows.

Another peculiar feature in this machine is that the primary teeth *a a* of the cylinder in their respective rows *w* are directly opposite to the short teeth *n* in their respective vertical rows in the concave, while the secondary teeth *c c* of the cylinder in their respective rows *x* are directly opposite the long inclined teeth *e* and radial teeth *m* in their respective vertical rows in said concave.

The concave C may be secured by any suitable means in place with its coacting cylinder B and at a short distance therefrom, so that the primary teeth *a* of the latter will move between the inclined teeth *e* and the radial checking-teeth *m* of the former and directly in front of the short teeth *n* of said concave, with the secondary teeth of the cylinder running opposite to the longest teeth *e* and *m* of the concave. Yet I prefer to secure said concave in a jointed manner to said frame, so that it may at will be turned away from said cylinder, as indicated by dotted lines in Fig. 2, and back to the same. This hinging can be effected by use of eyes *d* and pins *d'*, the former secured to the frame and the latter to the concave, as illustrated in Figs. 1 and 3, or the reverse. This concave C is also made adjustable in a horizontal direction in relation to the cylinder B, so that the teeth of one may be readily set nearer to or farther off from those of the other, as the kind and condition of the fruit may require. This adjustability can be effected by different means. Yet I prefer to use with slotted limb or flange D set-bolts D', working in slots d^2 in said limb or flange and into plain holes in the plate E, by which the concave is hinged to the frame by the hinge-eyes *d d*. This slotted limb or flange D, though shown to be integral with the body of the concave, may be made of a separate piece and secured to said body of the concave.

F is a hopper, which is preferably secured to the concave C, so as to be moved with it when the latter is turned to position of dotted lines in Fig. 2. This hopper has its ends *f f* extended downwardly, with their lower edge portions made concave, so as to ride on the annular seat *g*, provided with the head ends of the cylinder, as shown. This hopper is also preferably secured to the piece E, by which the concave is supported from the frame of the machine, and it is made to be seated wholly forward of the axis of said cylinder, with its rear side piece *f'* forward past a line drawn vertically through the said axis, so that the fruit will be delivered on the forwardly and downwardly inclined convex surface of the cylinder B.

G is a guard-piece, which is preferably hinged to the frame A rearward of the cylinder B and at a short distance from the rear upper quarter of said cylinder, as shown in

Fig. 2. This guard-piece G operates to prevent the juices from the fruit being thrown upwardly out of the lower and rear side of the cylinder when it is rapidly revolved. The free end of this guard-piece is suitably supported from contact with the cylinder B, and preferably by a projection from the rear side piece of the hopper.

The rear side piece f' of the hopper F is provided at its lower marginal edge with a series of tongues s s, in number corresponding with the rows of secondary teeth c. These tongues are projected downwardly on an incline between the rows of primary teeth a of the cylinder and to near the tops of the secondary teeth c.

H is a check-plate secured at the lower edge of the concave C, so as to be adjustable in a horizontal direction in reference to the toothed side of said concave. This check-plate is provided with a series of tongues s' s', corresponding in number with the rows of secondary teeth c, and, like the tongues s s of the rear side piece f' of hopper F, they are placed opposite to said rows of teeth c of the cylinder. A suitable set screw or screws h, working in the slots h' made in said piece H and working in screw-threaded holes in piece E, can be employed to render the check-plate adjustable.

A second hopper F′ (indicated by dotted lines in Fig. 2) can be used in connection with the hopper F for delivering fruit (supplied in large quantities thereto, as by a shovel or basket) in a gradual and uniform manner to the latter. This second hopper can be supported by suitable standards from the frame, with its delivery end discharging into the open receiving end of hopper F, as illustrated by dotted lines in Fig. 2.

By the arrangement of the teeth a and c of the cylinder B in reversed parallel diagonal rows, as described, when the said cylinder is revolved toward the concave the fruit will be prevented from accumulating at the head portions of the same.

Though the several kinds of teeth above described are shown to be cylindrical, yet in some cases, as in machines for operating with apples or pears, the teeth can be of square or rectangular form in their cross-area.

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

1. The combination, with a revolving cylinder having the primary teeth a a, running in rows in direction of the line of rotation of the cylinder and alternating with the parallel rows of the secondary teeth c c described, of a concave provided with the checking-teeth m m, arranged in vertical rows, which are opposite the rows of the said secondary teeth c c of said cylinder, and alternating vertical rows of the short teeth n n, arranged so as to be opposite the rows of the primary teeth a a of the cylinder, and the series of feeding-teeth e above the plane of the teeth m and n, inclined forwardly and downwardly and projected between the rows of primary teeth a a of the cylinder and directly opposite the secondary teeth of the same, substantially as and for the purposes set forth.

2. The combination, with a concave having the long checking-teeth m, arranged in vertical rows, and the short teeth n, in similar rows and alternating with those of teeth m, of a coacting cylinder of uniform diameter and having the primary teeth a a, arranged in rows parallel with the line of rotation of said cylinder, and the secondary teeth c, arranged in rows alternating with those of teeth a, teeth a a of the cylinder being opposite teeth n n of the concave and teeth c c opposite teeth m m, and a hopper which is located relatively forward of a line drawn vertically through the axis of the cylinder and having its end pieces f extended downwardly and seated on the annular seats g, provided in the peripheries of the head ends of the cylinder, substantially as and for the purposes set forth.

3. The combination, with a cylinder which is of uniform diameter and having primary teeth a a in a series of rows arranged parallel with the line of rotation of the cylinder and the series of secondary teeth c c, arranged in rows alternating with those of teeth a a, of the adjustable concave provided with the series of checking-teeth m m, arranged in vertical rows opposite the rows of the said secondary teeth, and with the series of short teeth n n in rows alternating with those of teeth m m and opposite to the rows of teeth a a, and a hopper provided with the notched piece f' and connected with said concave and in situation forward of a vertical line drawn through the axis of said cylinder, plate E, secured to the said hopper, flange D, connected with the said concave and provided with slots, and the set-bolts D′, substantially as and for the purposes set forth.

4. The combination, with the revolving cylinder B, provided with teeth a a and c c, above described, of a concave provided with coacting teeth m m and n n and e e and hinged to the frame, so as to be turned at will up toward said cylinder or back from the same, and a hopper which is so connected with said concave as to be moved with the same in either direction, substantially as and for the purposes set forth.

5. The combination, with the revolving cylinder B, provided with teeth a a and c c, above described, and a concave provided with coacting teeth, of the guard-piece G, hinged to the frame and arranged over the rear upper quarter of the said cylinder and extending to the rear side of the hopper, substantially as and for the purposes set forth.

AARON FRYER.

Witnesses:
ALEX. SELKIRK, Jr.,
CHARLES SELKIRK.