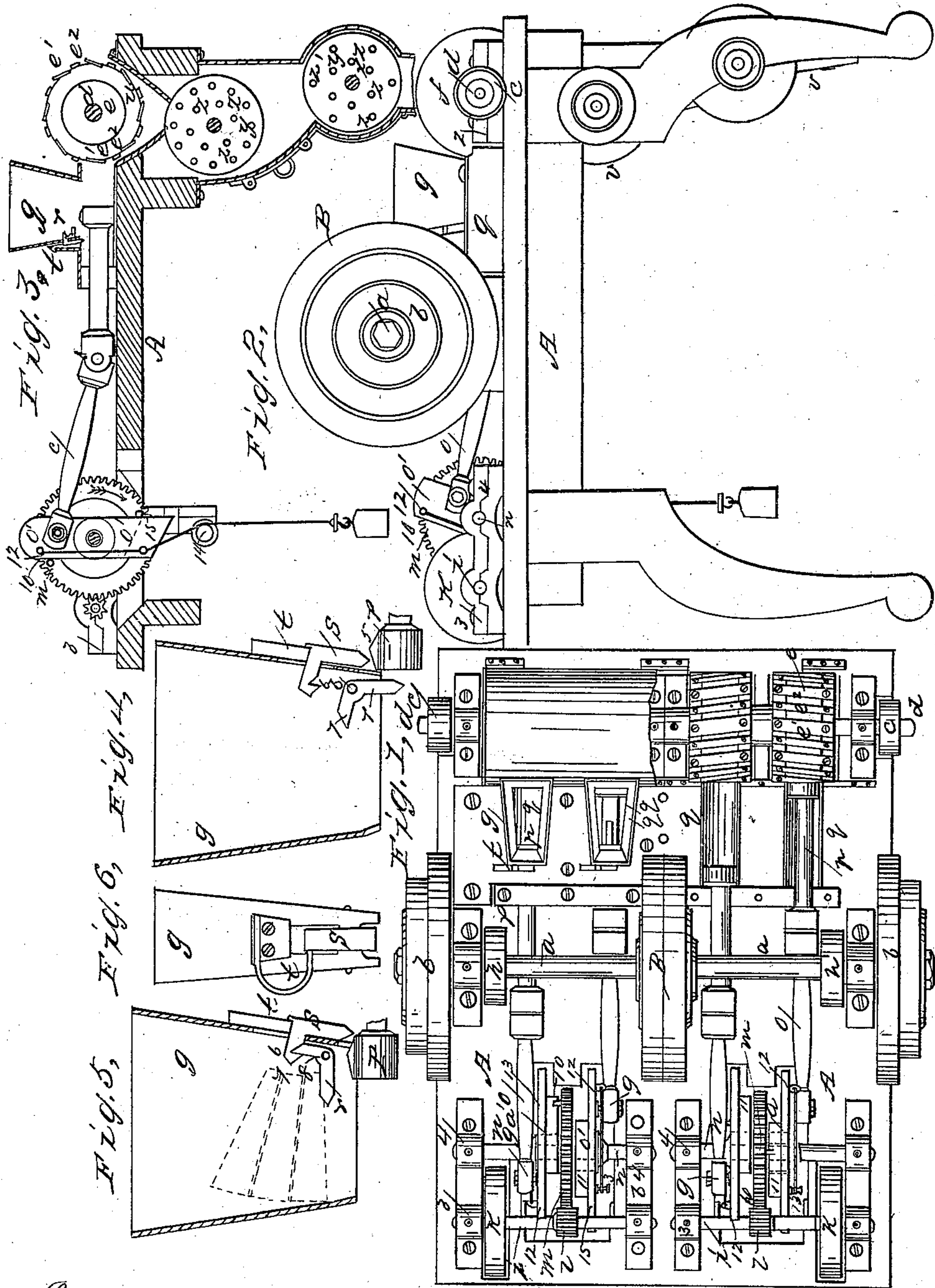


F. EBELING.

Sugar Mill.

No. 24,204.

Patented May 31, 1859.



James W. Small  
Thomas C. Harold

F. Ebeling





# UNITED STATES PATENT OFFICE.

FREDERICK EBELING, OF NEW YORK, N. Y.

## MACHINERY FOR CRUSHING AND MIXING SUGAR.

Specification of Letters Patent No. 24,204, dated May 31, 1859.

*To all whom it may concern:*

Be it known that I, FREDERICK EBELING, of the city, county, and State of New York, have invented and made certain new and useful Improvements in Machinery for Crushing and Mixing Sugars; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a plan. Fig. 2 is a side elevation and Fig. 3 is a vertical section, showing my improved crushing and mixing apparatus.

Similar marks of reference denote the same parts.

In the manufacture of sugar a revolving disk fitted with knives has been used to reduce the "loaves" to form the "crushed sugar." In this instance the weight of the loaf alone keeps it onto the knives, hence the reduction by such knives becomes less as the loaves are cut away.

My said invention consists in a peculiar construction and arrangement of devices by which the sugar is forced, by a uniform motion, onto, and against revolving knives, in such a manner that the crushing of the sugar is much more rapid, and uniform, and at the same time the loaves of sugar only require to be placed in a hopper, and are automatically taken therefrom, ground and mixed in the desired manner.

In the drawings A, is the frame of the machine; B, is a drum receiving motion from competent power to rotate the main shaft *a*, and other parts. The shaft *a*, is in journal boxes 1, 1, and fitted with pulleys or drums *b*, *b*, from which crossed bands pass to the pulleys *c*, *c*, on the shaft *d*, *d*. These shafts *d*, *d*, revolve in boxes 2, 2, and carry the cutting heads *e*, *e*, which are formed with two circular heads carrying the ends of cutting knives *e'*, and also intermediate mouth pieces *e''* that prevent too deep a cut on the loaf of sugar. Thus each cutting head is an open cylinder out of which the sugar as it is "crushed" or cut off from the loaf is at liberty to be thrown by centrifugal force into a hopper *u*, hereafter referred to; *f* is a cover over said cutting heads.

The sugar loaves are placed in the hop-

pers *g* *g* and each one forced up successively to the cutting heads by the means next described. *i*, is a shaft set in bearings 3, 3, and rotated with rather a slow motion by belts from the pulleys *h*, *h*, to the pulleys *k*, *k*. *l*, *l* are pinions, revolving the wheels *m*, *m*, that are on cross shafts *n*, *n*, in bearings 4, 4; *n'*, *n'*, are cranks and *o*, *o*, pitmen to the reciprocating plungers *p*, *p*, that press onto the bottom sugar loaf (in the part *q*, of the hopper) and force the same against the cutter heads (*e*,) by which the sugar is cut up or crushed. In this manner of operating each loaf is pressed to the cutter head with an uniformity of power and speed that renders the operation more perfect, uniform and expeditious. In order to hold up the next loaf of sugar in the hopper and prevent the same becoming jammed as the plunger returns I use the support *r*, and latch *s*, so fitted that the projection 5, on the plunger *p*, turns the support *r*, up to latch the same, as it goes forward from the position seen in Fig. 4, when the latch *s*, holding the support *r*, in position as seen in Fig. 5, sustains the sugar loaves in the hopper; but when the projection 5, lifts the latch *s*, (against the spring *t*,) the parts 6 and 7 separate and another loaf is dropped into trough *q* ready to be pushed up as seen in Fig. 4.

The crushed or cut sugar passes into the hoppers *u* and *v*, in the latter of which are revolving mixers *y* and *y'*, set and revolved rapidly on shafts *w* and *x*. These mixers are formed of heads with slats *z* between them as seen in Fig. 7, so as to mix and commingle the sugar thoroughly as it passes through the same. I have shown in the drawing four hoppers (*g*), if the same kinds of loaf sugar is supplied to each, but one product is the result; if however two or more different quantities are supplied to said hoppers the product will be a sugar of that color which results from mixing thoroughly the different kinds. If the machine is required to crush two different qualities simultaneously, a vertical division in the hoppers (*u*, *v*,) will keep the sugars separate, and they can be delivered by different spouts.

In Sheet 2 of the drawing I have shown the same parts, as in Sheet 1, and they act for the same purpose, but I have shown a device for saving time in returning the plun-



gers  $p$ , for in Sheet 1 it will be seen that the plungers moving back only as slowly as the loaf of sugar was fed in, much time was lost. The modification in Sheet 2, is simply to  
 5 bring these plungers back suddenly, and allow for performing twice the work, the parts moving at the same speed in other respects.

The pitmen  $o, o$ , instead of being connected to the cranks  $n'$ , have their crank pins set in sliding bars  $o'$ . Each of these bars is provided with an inclined end, 15, and allowed to slide lengthwise across the shaft  $n$ , by the hole through which said shaft passes  
 15 being elongated.

10 10 are pins in the wheel  $m$ , acting against a projecting part 11 to rotate the said bars  $o'$  and move the plungers  $p$ . However when the inclined end 15, takes the  
 20 shaft  $i$ , an endwise motion is given said bar  $o'$ , that slides 11, off of the pin 10 when the weight  $o^2$  draws back the plungers by acting through the cord and stops 12 and 13, to the former of which the end of the cord is attached, and when drawn back the next pin  
 25 10, immediately commences to press the parts forward again.

What I claim as my invention and desire to secure by Letters Patent is—

1. The reciprocating plunger  $p$ , acting on 30 the sugar loaf in combination with the revolving cutter head  $e$ , in the manner and for the purposes substantially as specified.

2. I claim the support  $r$ , and latch  $s$ , actuated as set forth, and acting to drop one 35 loaf of sugar at a time from the hopper, so as to be pressed forward by the plunger  $p$ , as set forth.

3. I claim the sliding bar  $o'$ , fitted with the incline 15, in combination with the pins 40 10, on the wheel  $m$ , and the weight  $o^2$ , or its equivalent for drawing back the plungers  $p, p$ , in the manner and for the purposes specified.

4. I claim the revolving mixers  $y, y'$ , constructed with slats  $z, z$ , between the heads in 45 the manner and for the purposes set forth.

In witness whereof I have hereunto set my signature this twenty ninth day of April 1859.

F. EBELING.

Witnesses:

LEMUEL W. SERRELL,  
 THOMAS G. HAROLD.