(No Model.)

R. MORRELL.

ROLLER GRINDING MILL.

No. 283,639. Patented Aug. 21, 1883.

Fig. 1.

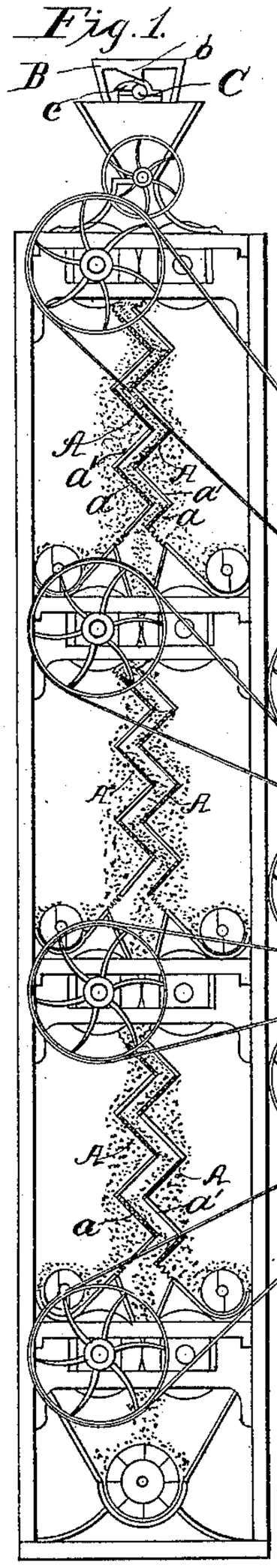


Fig. 5.

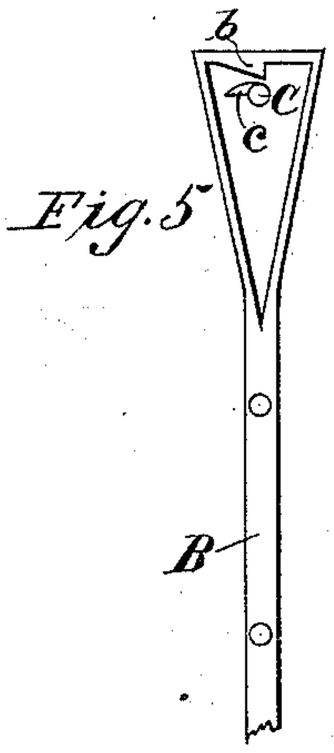


Fig. 2.

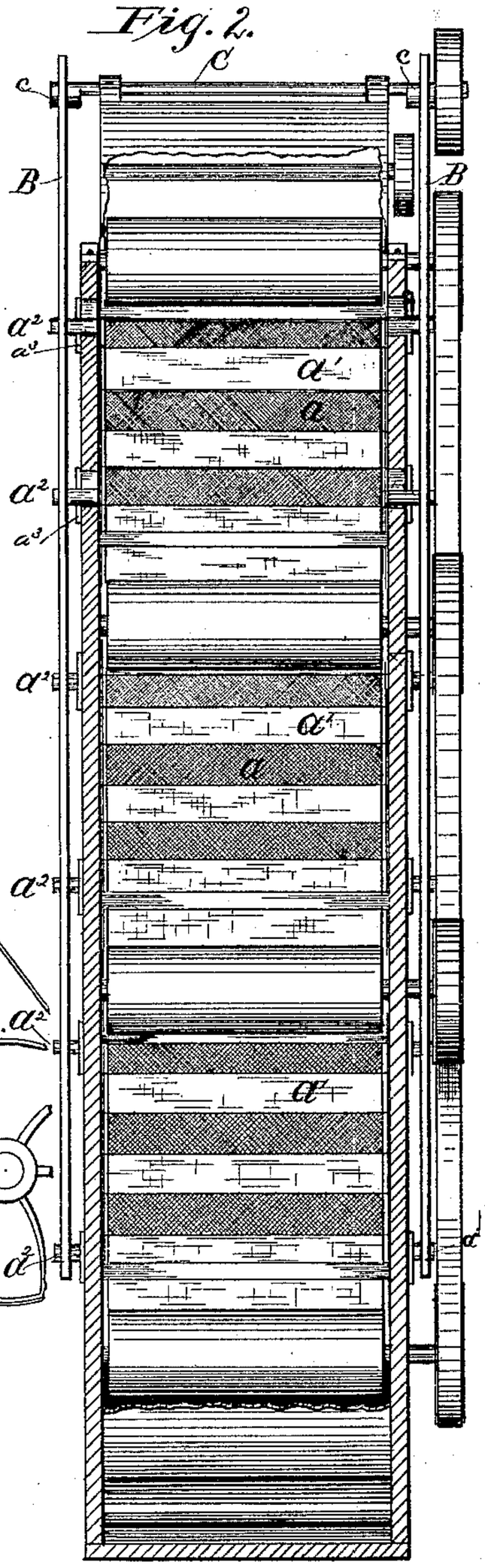


Fig. 3.

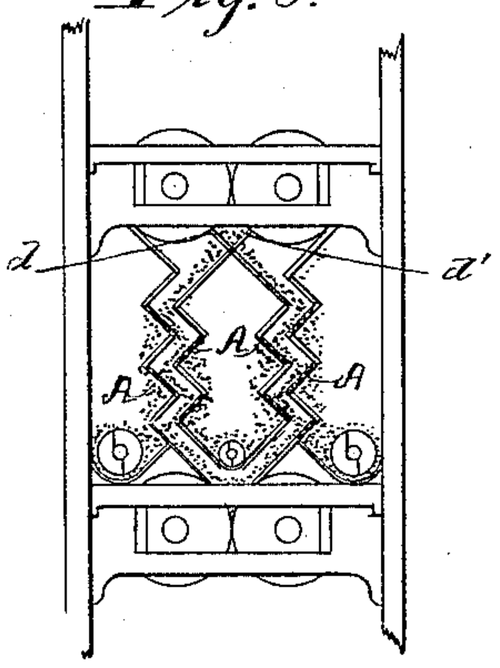
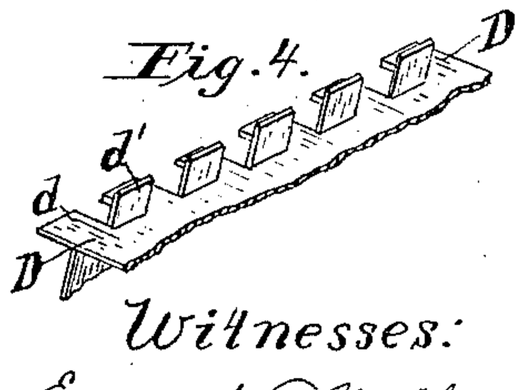


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT MORRELL, OF MONTCLAIR, NEW JERSEY.

ROLLER GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 283,639, dated August 21, 1883.

Application filed August, 23 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MORRELL, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Roller Grinding-Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to roller grinding-mills which are constructed with upright screens of zigzag form, down which the chop from the grinding-rollers falls by its own gravity, and through which the finer flour and middlings sift during such descent. As heretofore constructed the screens are apt to become clogged, and the mill has to be made of considerable height to obtain the requisite amount of screening action.

My invention consists in the combination, with such mills, of certain novel features, which will be fully described in the ensuing specification, and particularly pointed out in the claims at the close thereof.

In order that the several features of my invention may be clearly understood, I have illustrated in the annexed drawings, and will proceed to describe, the best forms thereof at present known to me.

Figure 1 is a vertical sectional end elevation of a roller grinding-mill embodying my invention. Fig. 2 is a vertical sectional side elevation of the same. Fig. 3 illustrates the combination of two parallel sets of zigzag screens arranged side by side. Fig. 4 is a perspective view of the divider for dividing the chop into two streams, and Fig. 5 a detail view of the screen-operating devices.

The same letters of reference indicate identical parts in all the figures.

The chest, feed devices, grinding-rollers, and the gearing for driving the moving parts thereof may all be of the ordinary construction shown in the drawings, which will, without further description, enable any one skilled in the art of building roller grinding-mills to construct such parts. The chop from the uppermost pair of rollers falls by gravity down a zigzag screen, A, through the screening portions of which the fine flour and middlings sift, while the coarser portions pass to the next lower pair of rollers for further reduction. From this pair of rollers the chop descends a second zigzag screen for a second separation from it of fine flour and middlings. Thus the chop is subjected to successive separations and reductions, falling, after the last reduction, onto a conveyer for discharging it from the mill onto any suitable receptacle for proper subsequent treatment. The screens must be fully as long as the grinding-rollers. Each zigzag screen A is composed of two zigzag sides, the respective panels, *a*, of which are open frames covered with suitable screening-cloth, while the panels *a'* thereof are made solid—either of thin wood or any other preferred light material. The interior sides of all the panels should be made smooth, and without projections of any sort, so as not to obstruct the free flow of the chop. The exterior sides of the panels *a'* should also be made smooth, and without projections, in order to facilitate the descent of the siftings which fall upon them through the screening-panels *a*. The panels are set at such inclinations that the chop will readily flow down by its own gravity. This downward flow of the chop is greatly aided by its successive falls from screening-panel to screening-panel through a free space, whereby it recovers momentum lost by friction on the screens. If the zigzag screen is to be reciprocated up and down as a whole, as in the example illustrated, in that case its two sides are rigidly secured together. I prefer to place the mechanism for reciprocating the screen outside of the chest. To this end the screen is provided, in this instance, with arms a^2 a^2, near the top and bottom, at each end, which project through vertical slots in the end of the chest. The arms fit, not tightly but snugly, in the vertical slots, which serve as guides to steady the screen in its reciprocation.

Covers a^3 may be secured to the arms a^2 to cover the slots in the chest, especially in case the mill is to be aspirated. To the projecting parts of the arms a vertical bar, B, is secured at each end of the chest, constructed with a yoke at the top encircling a rotating shaft, C, which is provided with cams *c c* to operate on inclines *b b* on the respective bars, B B, in such

a manner as to successively lift and drop the screen to jar it. Shaft C is shown as mounted in bearings on top of the hopper. It should be turned slowly if operated automatically, and may in that case be driven by belt-gearing from the counter-shaft of the mill. Where a vertical series of screens A are used, as shown in Fig. 1, the bars B B are extended downward, and are connected to and operate the lower screens simultaneously with and in like manner as the upper screen. The siftings from the screens are caught in troughs, and are removed by conveyers, as shown, or they may be directed by cant-boards into side trunks on the chest, to be conveyed away by appropriate means.

In order to reduce the height of the mill, where that is desirable or required, I employ two sets of zigzag screens, as shown in Fig. 3, between each two pairs of grinding-rollers. They can be connected together and simultaneously reciprocated, the same as the single screens. One half of the chop is directed to one screen and the other half to the other screen by a divider, D, constructed with narrow leaves *d* and *d'*, diverging in opposite directions, as best seen in Fig. 4. These leaves should be made quite narrow, in order that the streamlets of chop may readily unite after passing them and spread in thin films over the whole length of the respective screens. Even if nothing were gained in the height of the mill, the use of two parallel zigzag screens has the advantage over the use of a single screen in that by them a more thorough separation can be effected because the chop passes over them in thinner films. The siftings between the two sets of screen, may be caught in a trough and conducted away by a conveyer, as shown. The two streams reunite at the bottom of the screens and pass to the next pair of rollers.

Although I do not deem it necessary, it is obvious that each side of a screen may be separately and alternately reciprocated and jarred.

In some cases I propose to use brushes to brush the screens from time to time. To that end I secure the back of a brush (in length equal to that of the screen to be operated on) at each end to an endless band or chain, and provide the brush with a stud at each end, entering a fixed zigzag track or groove corresponding to the zigzag contour of the screen, so that by moving the brush by the endless chain it will pass down the screen, following its contour. Two brushes will be required for each screen, one for each side.

I do not confine myself to the details of construction, as they may be greatly varied, nor to the described special mechanism for reciprocating the screen up and down.

Having thus described my invention, what I claim is—

1. The combination, substantially as before set forth, of a pair of grinding-rollers and a zigzag screen vertically reciprocated and jarred.

2. The combination, substantially as before set forth, of a pair of grinding-rollers and two parallel zigzag screens.

3. The combination, substantially as before set forth, of a pair of grinding-rollers and two parallel zigzag screens vertically reciprocated and jarred.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT MORRELL.

Witnesses:
C. A. NEALE,
EWD. F. WALKER.