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SUGAR CANE CRUSHING MILL.

APPLICATION FILED APR. 6, 1910.

1,010,164.

Patented Nov. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

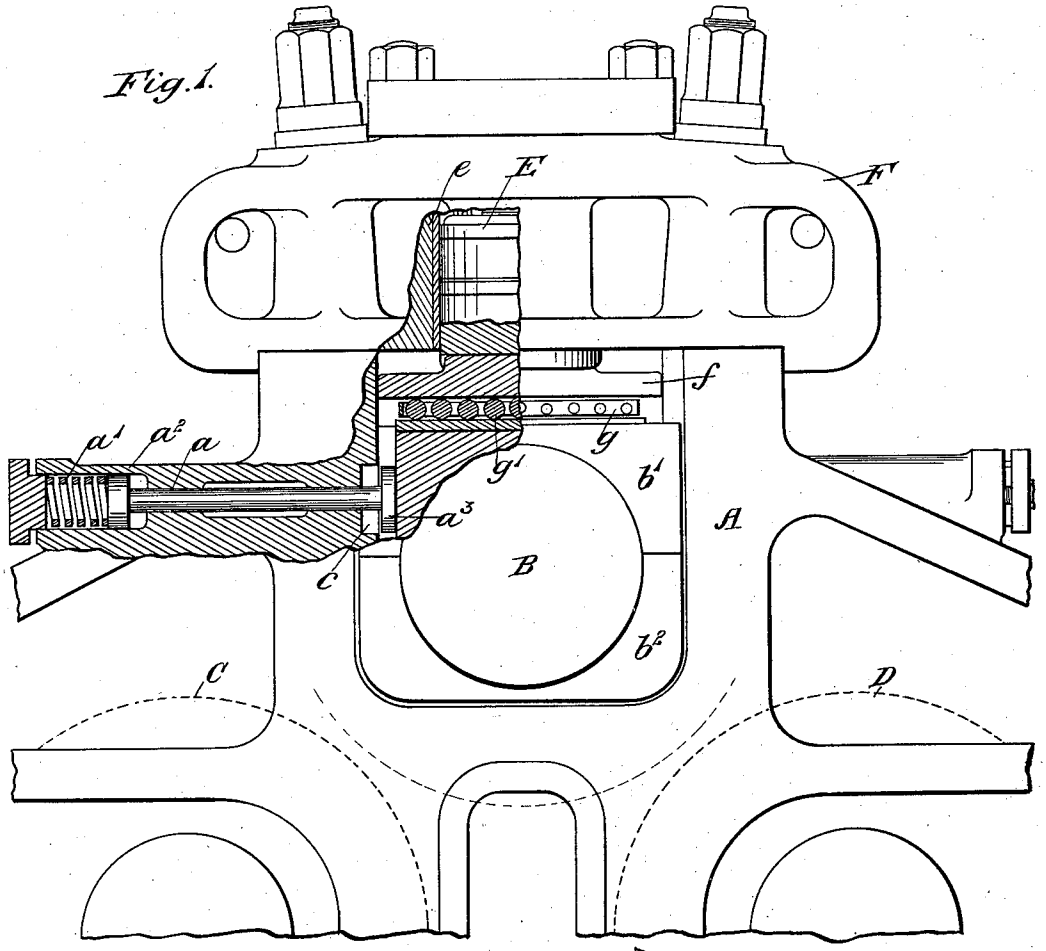


Fig. 2.

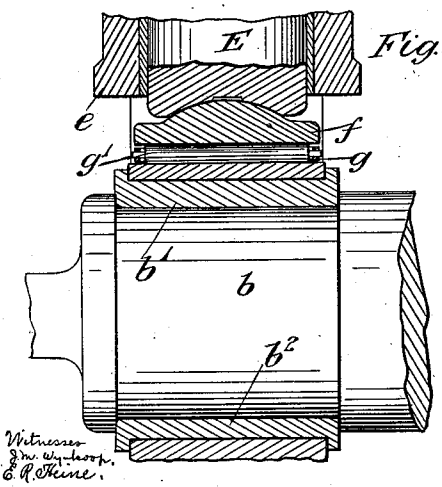
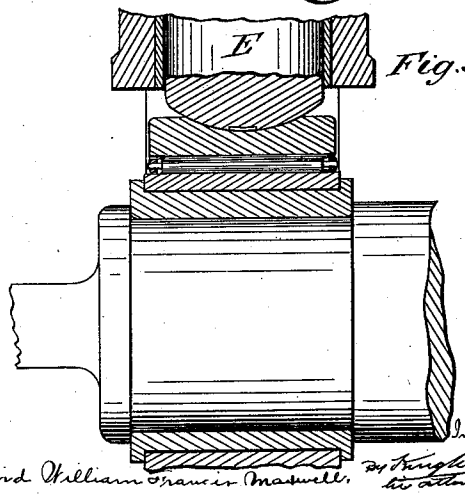


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

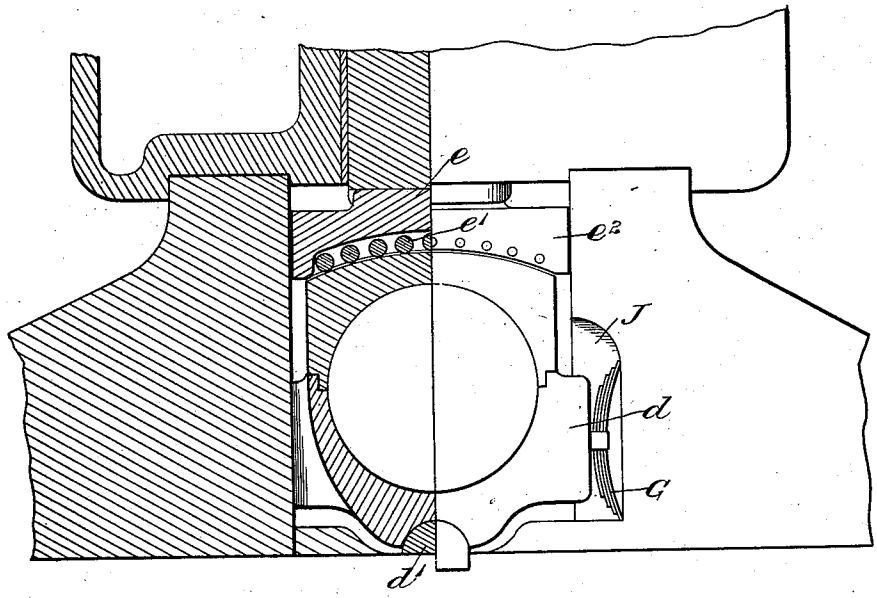
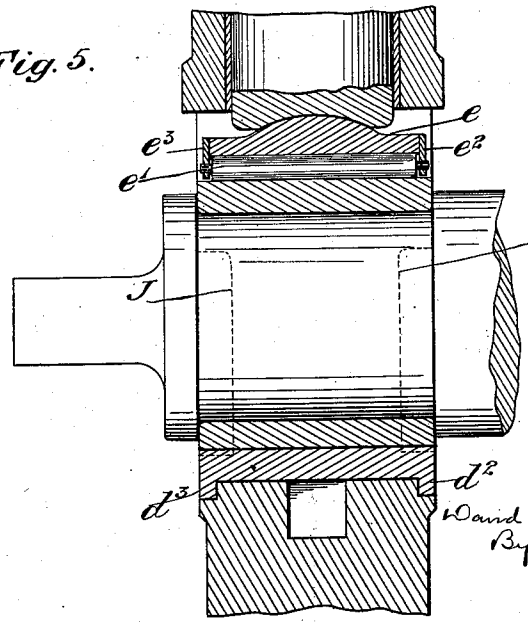


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SUGAR-CANE-CRUSHING MILL.

1,010,164. Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed April 6, 1910. Serial No. 553,682.

To all whom it may concern:

Be it known that I, DAVID WILLIAM FRANCIS MAXWELL, a citizen of the United Kingdom of Great Britain and Ireland, and resident at 77 Lawrie Park road, Sydenham, England, engineer, have invented certain new and useful Improvements in or Relating to Sugar-Cane-Crushing Mills, of which the following is a specification.

This invention relates to improvements in sugar cane crushing mills and has for its object to provide the top roller thereof of a series of three rollers with a floating or moving action whereby a better extraction of juice is obtained from the cane and also so that the bagasse is in better condition after passing from the rollers, and a more regular running of the mill is secured. Also by reason of the application of hydraulic or other fluid pressure to the top roller, any hard "foreign" substance is allowed to pass without danger to the mill and in the case of over-heavy feeding the mill is allowed to run freely, regularly and without damage.

Although the top roller is shown in the drawings as controlled by a ram so as to permit the lifting thereof at the required time, I may use the usual fixed top cover held down by bolts in the manner commonly adopted in sugar mills.

Figure 1 shows a side elevation of the upper portion of a rolling mill housing—with a series of three rollers; only a portion of the bottom rollers being shown and with the housing broken away to show the interior of the mechanism constituting my improvements. Fig. 2 a section at right angles to Fig. 1, showing the journal of the top roller and the parts for allowing the movement thereof. Fig. 3 a slight modification of the arrangement shown in Fig. 2. Fig. 4 a sectional elevation of the upper portion of a rolling mill housing and showing a slightly different means for effecting the movement of the top roller. In this view one half is shown in section; the other in elevation. Fig. 5 a view at right angles to Fig. 4.

Referring to Figs. 1 and 2, A shows one side of the housing frame carrying the rollers B, C, and D. B is the top roller which is moved horizontally; the journals of the rollers being carried by the top and bottom brasses b^1, b^2, in turn carried by the housing A, the brasses b^1, b^2, along with the top roller being capable of side movement which is controlled by plungers and spring dash pots such as a and a^1 within the cylinder a^2 preferably formed along with the housing. The ram a may be provided with the head a^3 which bears against the side of the brass b^1, as shown in the broken elevation at the left hand side of Fig. 1. The right hand side of the housing is also provided with a cylinder having a similar arrangement of plunger as that of the left hand side, that is to say that there is a plunger similar to a with head a^3 bearing against the opposite side of the brass b^1. I may provide in the inside of the housing a recess c to accommodate the head a^3 of the ram a and so as to allow the brasses and top roller to have the proper traverse. To allow of the vertical movement of the top roller B when any hard substance passes through the mill and without damaging it, I may provide the fluid pressure ram such as E working within the cylinder e formed in each housing cap such as F; the ram E exerting a pressure on the block f which in turn communicates the pressure to the brasses b^1, b^2 at each end of the necks of the top roller.

I may prefer to form the end of the ram convex as shown in Fig. 2 or concave as shown in Fig. 3; the blocks such as f being of a shape to correspond with the ends of the rams. By so forming the ends of the ram and the blocks the top roller can lift at either end without any damage to the mill.

To allow the top roller B and brasses b^1, b^2 to move horizontally, while the pressure from the ram E is being transmitted to the necks of the roller, I may provide the arrangement shown, consisting of the frame g carrying the rollers g^1—one such frame and roller for each end—the rollers of the frame bearing on the top brass b^1 and in order to prevent the wearing of the top brass by the rollers g^1 I may interpose a chilled metal or steel plate between the top of the brass and the underside of the roller.

The block f—at each end—may be constructed of chilled metal or steel so as to prevent the under face being easily worn by the action of the rollers g^1.

If desired, I may interpose between the underside of the brass b^2 and the bed formed

in the housing for the brasses, rollers to assist the movement of the brasses and top roller.

Referring now to the modification Figs. 4 and 5, the housing cap and hydraulic ram arrangement may be similar to Fig. 1 and I may employ a block such as e under which are rollers e^1 carried by side plates such as e^2, e^3 (Fig. 5) secured to the inside and outside of the block e and the top of the block may be of a convex or concave form and with the bottom of the ram of a corresponding shape.

In the case of the modification Figs. 4 and 5 the brasses b are carried on the half round cotter d^1 supported on the housing frame and kept in position by the flanges d^2, d^3. The bottom of the brass d is recessed to correspond with the cotter d^1 and the arrangement is such that the top roller and neck brasses rock on the pivot cotter d^1 so as to be capable of moving horizontally and to control this movement and prevent shock, I may provide at each side of the brasses d, a coach spring such as G which may be carried by the said brass d. The coach springs are accommodated at each side of the brass (that is to say preferably four coach springs for each brass) in pockets J, J^1 at each side of the housing, as shown.

Although I have shown a coach spring for controlling the top roller but yet allowing a floating action thereof I may employ other suitable springs for this purpose, such as volute springs carried in pockets of the housing at each side of the brasses for the necks of the rollers.

In the case of the modifications Figs. 4 and 5, the application of the rollers to the underside of the brasses that is to say interposed between the underside of the brasses and bedding of the housing, are not applicable to the modification.

Claims.

1. In a cane crushing mill, a frame, two main rollers in the frame, a third roller disposed above the main roller, means for permitting slight lateral and vertical movement to the third roller.

2. In a cane crushing mill, a frame, two main rollers horizontally disposed in said frame, a pair of oppositely disposed journal boxes slidable in their respective seats above the main roller, a third roller mounted in said boxes with the main rollers, spring actuated means for permitting slight horizontal sliding movement to the journal boxes, fluid pressure means for controlling slight upward displacements thereof to allow the mill to run freely in case of over feeding.

3. In a cane crushing mill, a frame, a plurality of main rollers horizontally disposed in said frame, a pair of oppositely disposed journal boxes slidably disposed in their respective seats above the main rollers, a third roller mounted in said boxes with the main rollers, a plurality of horizontally disposed dash pots in said frame in the horizontal plane of the journal boxes, spring actuated plungers in said dash pots adapted to bear against the sides of said journal boxes to permit slight lateral horizontal displacement of said roller, means for permitting slight vertical displacement to said roller to allow the mill to run freely in case of over feeding.

4. In a cane crushing mill, a frame, a plurality of main rollers horizontally disposed in said frame, a pair of journal boxes slidable in their respective seats oppositely disposed in the respective ends of the frame, a third roller mounted in said boxes with the main rollers, a plurality of vertically disposed dash pots in said frame in the vertical plane of the journal boxes, fluid pressure actuated plungers in said dash pots adapted to bear against the upper faces of said journal boxes to permit slight vertical displacements of said roller, means for permitting slight horizontal displacement of said roller to allow the mill to run freely in case of over feeding.

5. In a cane crushing mill, a frame, a plurality of main rollers horizontally disposed in said frame, a pair of journal boxes slidable in their respective seats, oppositely disposed in the respective ends of the frame, a third roller mounted in said boxes with the main rollers, roller bearings on the upper faces of the respective journal boxes, rollers in said roller bearings, disposed at an angle to the axis of the third roller, means for permitting slight lateral horizontal displacement of said third roller, other means for permitting slight vertical displacement of said roller to allow the mill to run freely in case of over feeding.

6. In a cane crushing mill, a frame, a plurality of main rollers horizontally disposed in said frame, a pair of journal boxes slidable in their respective seats, oppositely disposed in the respective ends of said frame, a third roller mounted in said boxes with the main rollers, a semi-cylindrical channel centrally and longitudinally of the base of said journal boxes, a semi-cylindrical rib formed with the frame and adapted to fit said channel, leaf springs seated in the frame and adapted to bear against the journal boxes, to permit slight rocking displacements of said boxes and allow the mill to run freely in case of over-feeding.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."