A. F. EWART & S. TERRY.

SUGAR CANE MILL.

APPLICATION FILED NOV. 14, 1916.

1,284,627.

Patented Nov. 12, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

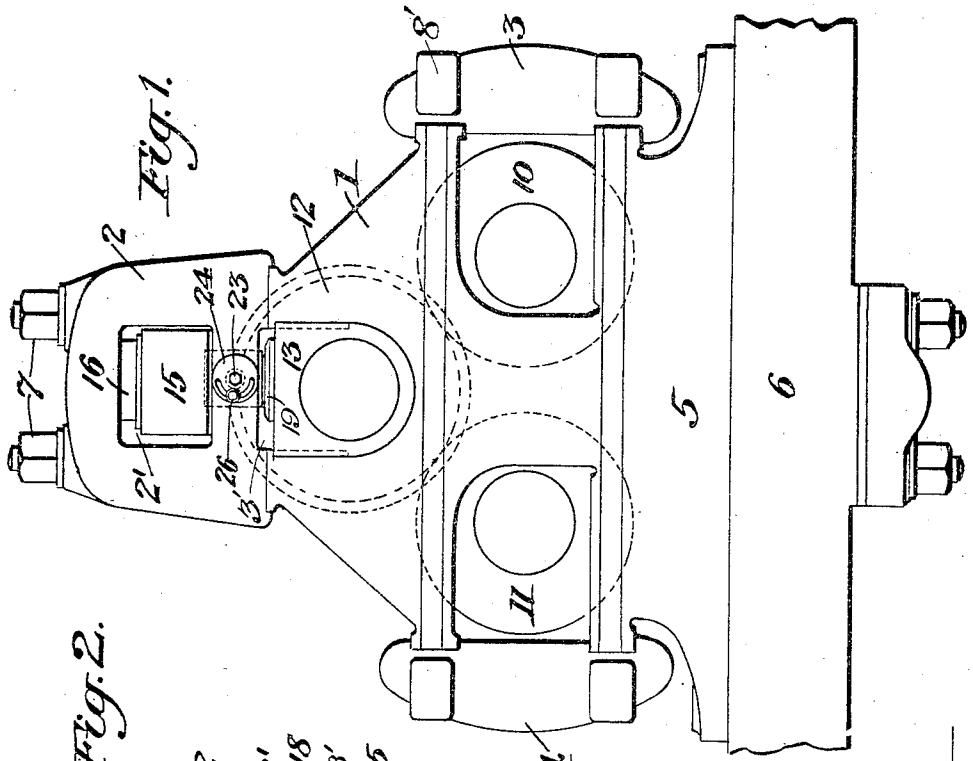
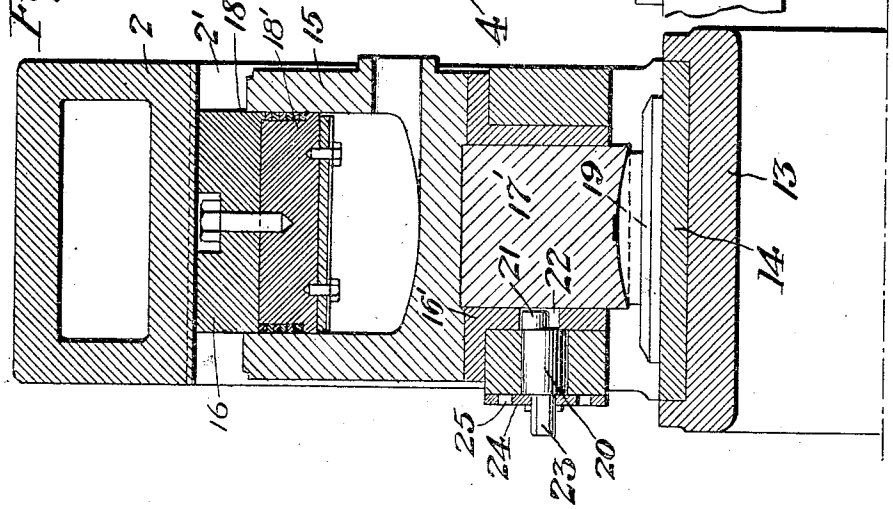


Fig. 2.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 3.

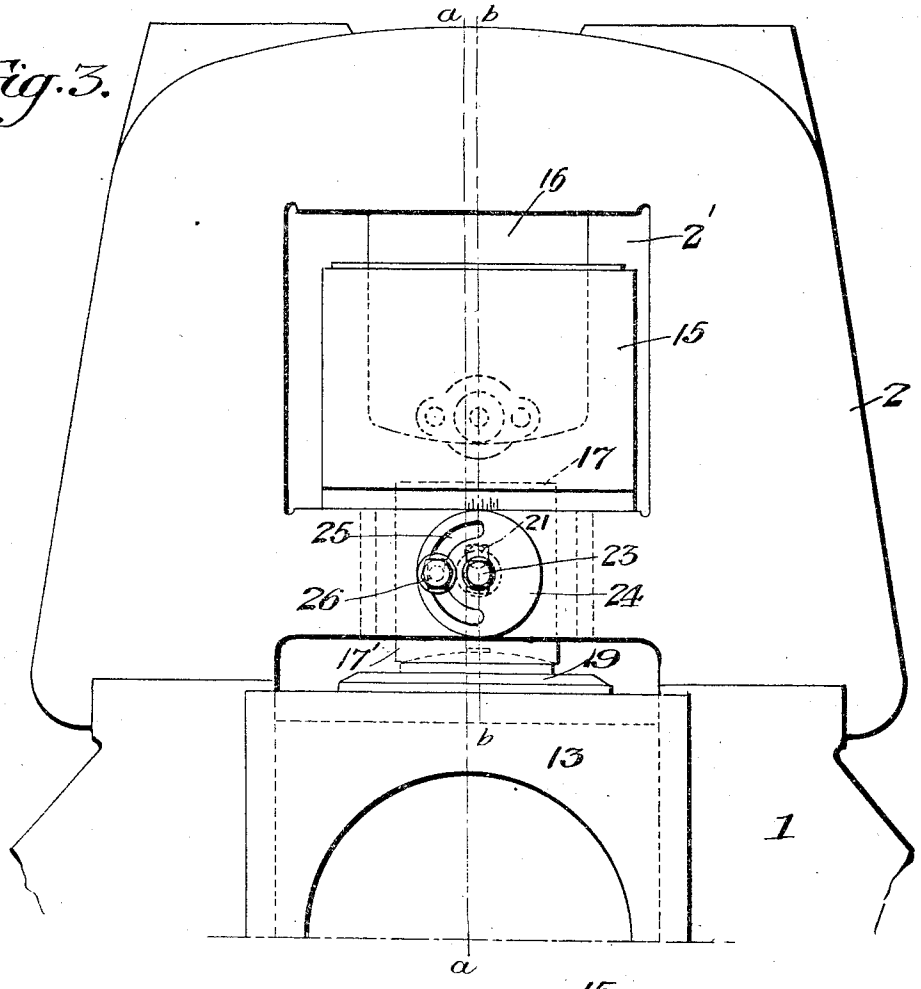
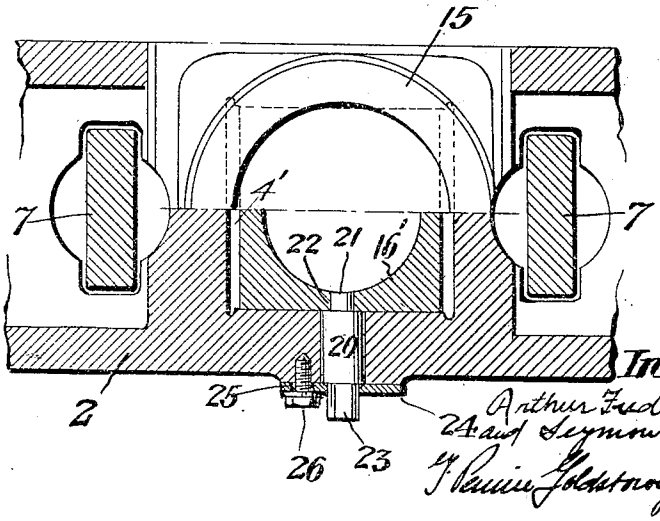


Fig. 4.



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UNITED STATES PATENT OFFICE.

ARTHUR FREDRICK EWART AND SEYMOUR TERRY, OF HONOLULU, TERRITORY OF HAWAII.

SUGAR-CANE MILL.

1,284,627. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed November 14, 1916. Serial No. 131,231.

To all whom it may concern:

Be it known that we, ARTHUR FREDRICK EWART and SEYMOUR TERRY, citizens of the United States, residing at Honolulu, county of Honolulu and Territory of Hawaii, have invented certain new and useful Improvements in Sugar-Cane Mills; and we 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 sugar-cane mills having three crushing rolls mounted in triangular relation, and particularly to the means for applying hydraulic pressure to the bearing of one of said rolls. In mills of the above type, owing to the fact that the discharge roll is set closer to the top roll than the feed roll is to the top roll, a greater resultant pressure acts on a line drawn through the centers of the top roll and the discharge roll than on a line drawn through the centers of the top roll and the feed roll. This uneven pressure causes the top roll bearing to tip and bind in the pocket of the housing in which it is mounted. Various means have been provided to overcome this binding tendency, but none of these means have been commercially successful. The first step taken to relieve the strain on the housing of the mill was to insert a timber under the mill bed, through which timber, the king bolts, which held the parts of the housing together, passed, which bolts also passed through the housing bed. The theory was that the timber would compress under the abnormal strains and the king bolts would take the tensile strain caused by the top roll shaft tending to lift, and would thus relieve any strain on the housing itself. Later the hydraulic jack was provided and this jack was located in the place formerly occupied by the timber, as this was the most convenient place on the existing style of mills. The objection to this was that the mill as a whole was not of sufficient strength, as the top cap was not rigid with the housing. The next step led to the provision of a top cap which included the hydraulic jack. This arrangement permitted the top cap to be rigid with the housing, but necessitated the reconstruction of the housing. It was necessary to remove the cap to replace the packing in the hydraulic jack, and this, it was found, took too much time to be commercially successful. An attempt was made to overcome the binding tendency of the bearing by the formation of an inclined housing. With the use of the rigid top cap, a hydraulic jack appeared, which jack was adjustable on the top cap and about the center of the roll as a pivot. It was found to be difficult to adjust the jack on the cap in this arrangement, however.

It is an object of the present invention to provide a cap which is rigid with the housing and an adjustable hydraulic jack which will exert pressure on the roll bearing at various points, so as to overcome the binding tendency between the bearing and the housing, and thus permit the bearing to rise and fall without difficulty.

It is a further object of the invention to provide a cap and jack which may be readily applied to the mills of the type that are at present commercially used, without necessitating the reconstruction of the housings.

It is a still further object of the invention to so mount the jack within the cap that the cap may be rigidly mounted on the housing and yet the jack may be readily removed therefrom when desired, without necessitating the removal or loosening of the cap.

A still further object of the invention resides in the provision of a jack and cap which are so constructed and arranged that the jack may be readily adjusted between the cap and the bearing without any considerable difficulty and securely held in its adjusted position.

While the drawing illustrates the jack as disposed between the top cap and the top roll, it is evident and should be understood that the cap may be applied to either the front or rear sides of the housing and the jack interposed between the cap so arranged and either the feed or discharge roll bearing.

In the drawing:—

Figure 1 is an elevation of a sugar-cane mill showing the cap applied to the top of the housing and the jack interposed between the cap and the bearing of the top roll;

Fig. 2 is a vertical sectional view with parts thereof broken away to show the construction of the ram;

Fig. 3 is an enlarged elevational view of the upper portion of the housing, the cap, jack and roll bearing, construction lines

being shown on this figure to indicate the movement of the jack so that it will apply pressure to the bearing to the sides of the center thereof; and

Fig. 4 is a horizontal sectional view.

In the drawing, the ordinary type of housing 1 is illustrated, which includes side caps 3 and 4, a base 5, and is secured to a bed 6. Mounted on the upper end of the housing 1 is a top cap 2 which is constructed in accordance with the present invention and which is provided with a recess 2′. This top cap is secured to the housing by stay bolts 7 which pass completely through the cap, the housing, its base, and the bed-piece 6. A recess 3′ is formed at the lower end of the cap and communicates with the recess 2′ by means of an opening 4′, which latter is substantially rectangular in form. Mounted in the housing 1, in the usual manner, are the front and rear rolls 10 and 11 and the top roll 12. This top roll is supported in the usual bearing 13 and includes upper and lower brasses. This bearing is movable vertically within the housing, as is necessary in mills of this type. If no means were provided for applying pressure to the upper brass of this bearing at various points, with relation to the center of the roll, the uneven pressure exerted between the discharge roll and the feed roll would cause the bearing to bind upon the housing, and thus it would not move freely and would subject the housing to undue strain. To overcome this objection, the invention provides means for applying pressure to the bearing 13 at various points with relation to the center of the roll. This means includes a hydraulic jack comprising a cylinder 15 and a ram 16, in the lower portion of which cylinder, a socket 17 is formed. This ram comprises a body portion 18, a head 18′, between which head and body portion, suitable packing material is arranged, as illustrated in Fig. 2 of the drawing. The upper end of the ram 16 bears against the adjacent face of the cap 2 and the diameter of the cylinder 15 is less than the width of the recess 2′, so that the cylinder and ram may be moved laterally within the recess, the cylinder resting and movable upon a housing 16′, which latter extends downwardly through the opening 4′ and is movable laterally therein, being of less width than the opening. Extending through the housing 16′ is a follower 17′ which extends into the recess 17 in the cylinder 15 and rests upon a suitable base 19, which base is movable laterally upon a plate 14 which is carried by the upper brass of the bearing 13 and is attached to the follower by means of a socket connection, as illustrated in dotted lines in Fig. 2. It will be seen with this arrangement of the jack that when the ram is relieved of hydraulic pressure, it may be moved into the cylinder 15, at which time, the cylinder and ram may be lifted from the follower 17′ and removed from the head. If desired, the follower may also be removed from the housing 16′ and the base 19 removed from the plate 14, so that the entire jack may easily be removed from the cap without necessitating the loosening of the latter.

In order that the adjustment of the jack laterally of the recess 2′ may be effected, and in order that it may be held in its various adjusted positions, the invention provides a pin 20 which is rotatably mounted within the head 2 and is provided on its inner end with an eccentric lug 21. This lug extends into a vertical elongated slot 22 which is formed in the housing 16′. The outer end of the pin 20 is provided with a wrench hold 23, so that when the pin 20 is turned, the movement of the eccentric lug 21 within the slot 22 will cause the housing 16′ to move laterally. This housing will carry with it, the jack, that is to say, the cylinder 15 and the ram 16, and also the base 19. Mounted rigidly on the wrench hold 23 is a disk 24 which is provided with an arcuate slot 25. Extending through this slot and in threaded engagement with the head 2 is a screw bolt 26 which has a washer interposed between its head and the disk 24. When this bolt is tightened, it will bind the disk against the head 2, and since this disk is rigid with the pin 20, the latter will be held in any particular position and will, in turn, hold the jack in its adjusted position. It will thus be seen that the jack may be adjusted laterally to exert pressure in direct line with the center of the top roll, or to either one side or the other thereof. In Fig. 3, of the drawing, the line which extends through the center of the roll is indicated by *a*—*a*, while the center line of the jack is indicated by the line *b*—*b*, the jack exerting pressure to one side of the center of the roll. The extent of the adjustment of the jack may be determined by a suitable indicator, such as illustrated in Fig. 3 of the drawing.

What we claim is:—

1. In a sugar cane mill, feed and discharge rolls, and a pressure roll mounted in a movable bearing, a hydraulic jack arranged to apply force to the pressure roll bearing, and means for adjusting the jack, bodily, with respect to the aforementioned bearing.

2. In a sugar cane mill, feed and discharge rolls and a pressure roll movable to and away from the aforementioned rolls, and a jack adjustable to exert pressure on the pressure roll at various lateral locations with respect to the longitudinal axis of pressure roll.

3. In a sugar cane mill, a housing, a cap

thereon, feed and discharge rolls and a pressure roll mounted in a bodily movable bearing, a jack mounted in said cap to apply force to the bearing of the adjacent roll and means active only when the jack is under pressure to prevent its removal from the cap.

4. In a sugar cane mill, a casing, three rolls arranged in triangular relation in said casing, one of said rolls being bodily movable, a cap on the casing, a jack mounted in the cap and arranged to apply force to the bearing of the movable roll, and means for adjusting the jack relative to the bearing and within the cap.

5. In a sugar-cane mill having three rolls disposed in triangular relation within a housing, a cap fixed to the housing and having a recess therein, a jack including a cylinder and a ram located in said recess, a base resting upon the bearing of the adjacent roll, a follower extending between the base and the cylinder, said jack, base and follower being removable from the cap and adjustable laterally with relation to the bearing.

In testimony whereof we affix our signatures.

ARTHUR FREDRICK EWART.
SEYMOUR TERRY.

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