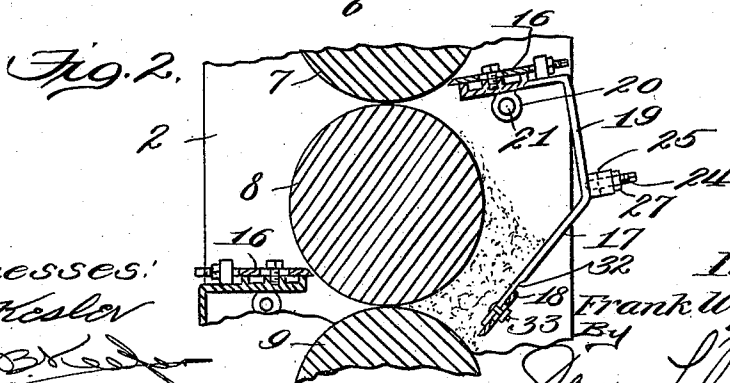


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2 SHEETS—SHEET 1.



E. H. Kessler

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Frank Wolfenden

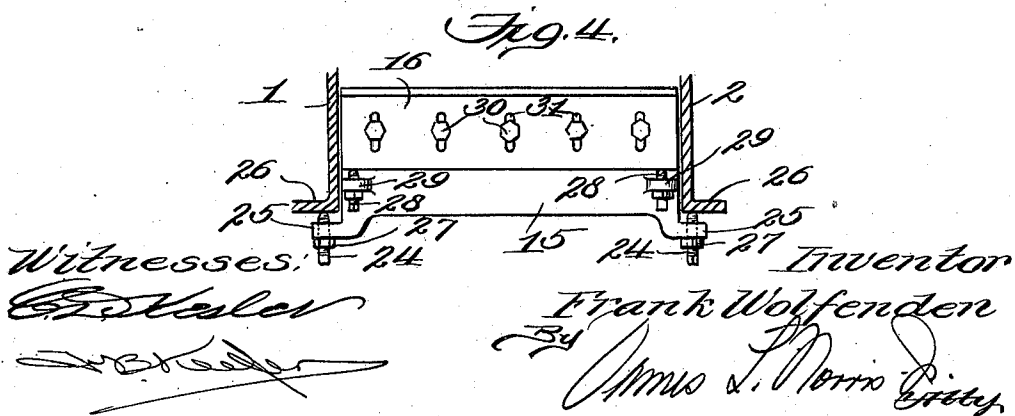
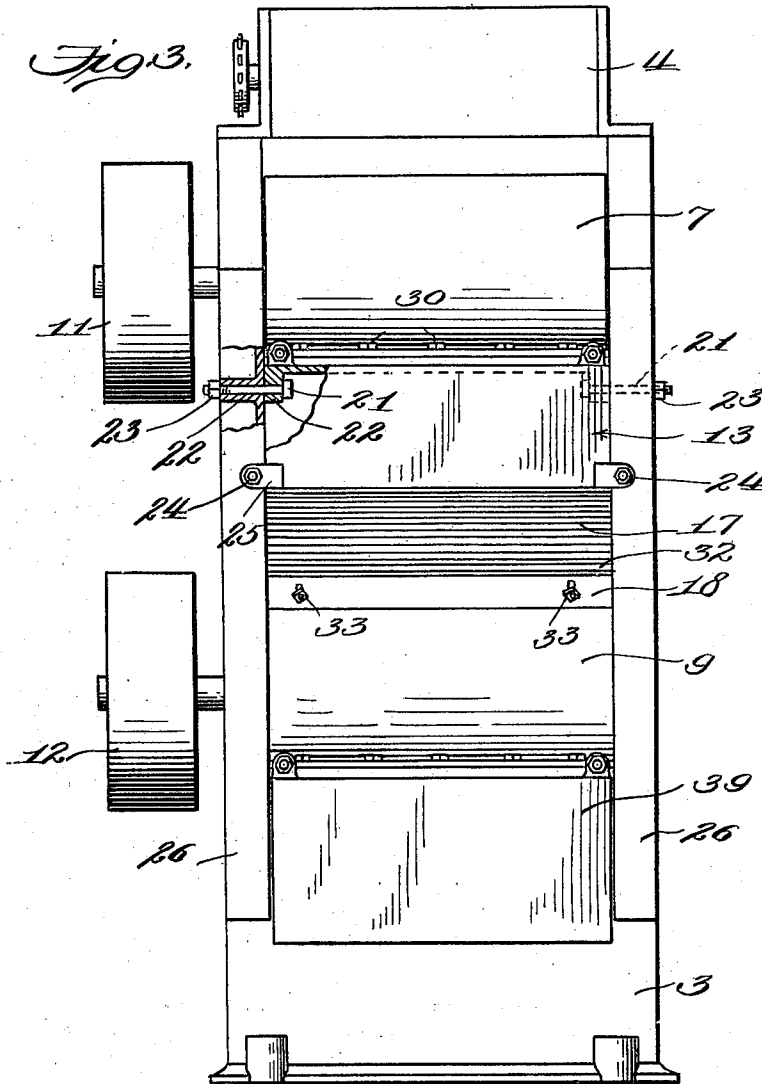
James L. Norris, Esq.

F. WOLFENDEN.
 ROLLER CRUSHING MILL.
 APPLICATION FILED MAY 6, 1910.

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Patented Dec. 6, 1910.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

FRANK WOLFENDEN, OF WEST POINT, MISSISSIPPI.

ROLLER CRUSHING-MILL.

977,918.

Specification of Letters Patent.

Patented Dec. 6, 1910.

Application filed May 6, 1910. Serial No. 559,791.

To all whom it may concern:

Be it known that I, FRANK WOLFENDEN, a citizen of the United States, residing at West Point, in the county of Clay and State of Mississippi, have invented new and useful Improvements in Roller Crushing-Mills, of which the following is a specification.

This invention relates to improvements in roller crushing mills, and more especially in mills for crushing the meats or kernels of cotton seeds. The best known constructions of such mills include as essential elements a series of superposed rolls with which are associated series of scrapers and guides, the latter devices being employed for diverting the material in the proper direction from one roll to another and for preventing its escape under ordinary circumstances, while the first-named devices serve to clean the crushing surfaces of the rolls. These mills are, however, generally open to one or the other of two main objections:—the tendency of the rolls to become choked by the accumulation of the gummy crushed material therebetween, and the escape of lint and dust from the housing wherein the rolls are mounted. Attempts have been made to obviate both of the defects specified, the first defect by providing a swinging or rocking mounting for the scrapers, and the second defect by providing a substantially dust-proof housing which completely incloses the rolls. In the first instance, the scrapers fail to prevent the lint and dust from flying out of the housing, and in the second instance the existence of a choke is not indicated until the driving belts are actually thrown off.

The present invention seeks to overcome both objectionable features by providing a combined scraper and diverting board which is so constructed and arranged that one operating portion thereof coacts with the adjacent roll, while the other operating portion coacts simultaneously with a lower roll of the series, the mounting of this device being such as to preclude the escape of the lint and dust, while, when a choke occurs, both of said operating portions will be shifted bodily away from the corresponding rolls, whereby the strain is relieved and the throwing of the belts prevented.

The invention further comprehends the provision of means associated with the compound device afore-mentioned for regulat-

ing the extent to which the weight thereof is allowed to rest upon the rolls.

A structural embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a vertical sectional view, with parts in elevation, of the improved mill, showing the combined scrapers and diverting boards. Fig. 2 is a fragmental sectional view showing the position of one of said boards when a choke takes place. Fig. 3 is a front elevation, with parts in section, of Fig. 1. Fig. 4 is a detail view showing the means for effecting the adjustment of one of the boards.

The mill shown in said drawings comprises as essential elements a housing, a series of crushing rolls mounted in superposed relation therein, and a series of combined scrapers and diverting boards. The first of these elements is constituted primarily by parallel vertical sides 1 and 2 connected by bottom pieces 3, and by a top casing or hopper 4 wherein there is located a suitable feed device, (not shown), operated in any preferred manner, as, for instance, by a chain and sprocket connection with the source of power. The two bottom pieces are shown as formed with inner sides 5 which are inclined toward each other and constitute, together with the adjacent portions of the housing sides, a discharge hopper 6. The crushing rolls are, in the main, of conventional type. Four are shown in the present construction, numbered 7, 8, 9 and 10, the uppermost roll 7 being located directly beneath the feed hopper 4, while the lowermost roll 10 projects into the discharge hopper 6. The several rolls are frictionally engaged, as is customary, the two "live" rolls 7 and 9 having their shafts or spindles provided with driving pulleys 11 and 12 connected with the source of power.

In operating mills of the type shown and described, provision is usually made for passing the material through the rolls in a tortuous path, this being ordinarily effected by means of diverting or guide boards. Owing, moreover, to the gummy nature of the material, when crushed, it also becomes necessary to utilize scrapers, to strip the material from the rolls, since it would otherwise be continuously carried around with said rolls and eventually choke the same. Finally, since the effective edges of both the

diverting boards and scrapers actually contact with the peripheries of the rolls, provision must be made for compensating for the resultant wear. Above all, it is the object of this invention to attain these desiderata in conjunction with the production of combined scrapers and diverting boards so constructed and arranged as to automatically operate, when choking occurs, and, at the same time, to prevent the lint and dust from flying out of the housing. This is effected primarily by means of the main scraper-diverting boards 13 and 14, each of which is in the form of a three-sized body comprising a horizontal bearing portion 15 for the scraper blade 16, an inclined portion 17 which constitutes the diverting board proper and carries a blade 18, and a vertical portion 19 connecting the outer edges of the aforesaid portions 15 and 17 and arranged at right angles to the former. These three portions are preferably of integral construction. Each device, as a whole, is pivotally mounted in such a manner as to insure, by reason of its own weight, the contact of the working edges of the blades 16 and 18 against the proper rolls. To this end the upper portion 15 thereof is provided with depending eyes 20 through which are loosely passed headed bolts 21, the stems of these bolts extending through sleeves 22, provided upon the housing sides 1 and 2, and carrying tightening nuts 23 upon their projecting threaded terminals. The lower portion 17 of each device extends beneath the upper portion 15 thereof, as shown, and the weight of the device will, therefore, maintain it normally in the operative position above described. Means are provided, however, for controlling the gravital action, as originally stated, by regulating the pressure with which said blades are caused to bear against the rolls; such means may be advantageously comprised by set screws 24 inserted through laterally-projecting apertured lugs 25 formed upon the outer face of the connecting portion 19 of each device, said screws having their terminals arranged to bear against the laterally flanged edges 26 of sides 1 and 2, and carrying tightening nuts 27 by means whereof they may be retained in adjusted position.

The scraper blades 16 are suitably mounted on supports provided upon the upper portions 15 of the boards 13 and 14, and they are advanced toward the adjacent rolls, to take up wear, in any preferred manner, as, for instance, by set screws 28 working in apertured lugs 29 formed upon said portions 15; they are retained in adjusted position by means of additional set screws 30 which extend through transverse slots 31 cut in said blades. (See Fig. 4.) The blades 18 carried by the diverting portions 17 of the boards are mounted in seats 32 in

the lower ends of the latter, and are maintained against displacement, after having been adjusted, through the medium of set screws 33 or the like, in the same manner as the scraper blades.

The arrangement of the two main boards 13 and 14 is illustrated in Fig. 1, from which it will be seen that the upper, or front, board 13 has its blades 16 and 18 cooperating, respectively, with the first and third rolls 7 and 9, while those of the lower or rear board 14 engage the second and fourth rolls 8 and 10. In conjunction with said main boards, there are provided top and bottom supplemental boards 34 and 35. The former of these is bowed or curved, and acts solely as a guide for the material between the top pair of rolls 7 and 8. It is pivotally mounted in the housing at its upper edge as at 36, above roll 7, around which latter it extends part way; at its lower edge it carries an adjustable blade 37 similar in all respects to the blades 18. The lower board 35 is L-shaped, and comprises horizontal and vertical portions 38 and 39, the first-named portion carrying a scraper blade 40 which is adjustable in the same manner as blades 16 and is designed to engage the third roll 9. This board has a pivotal mounting 41 for its horizontal portion 38, which is the same as that of the main boards. The vertical portion 39 of said board extends past the adjacent bottom board 3.

The operation of the mill is substantially as follows: The meat or kernels of the seeds are fed into hopper 4, whence they fall onto the top roll 7, and are crushed between the latter and the second roll 8, being guided or diverted between said rolls by the supplemental board 34. On passing through these rolls, the crushed material is next guided to the nip of rolls 8 and 9 by the diverting member 17 of the upper main board 13, and is again crushed. The re-crushed material is then given a final crushing between rolls 9 and 10, to which it is directed by the guide member of the lower main board 14, and subsequently falls into the discharge hopper 6, through which it passes onto any suitable support located therebeneath. During the several crushing operations, the surfaces of the rolls are maintained in a clean state by the various scrapers.

By reason of the fact that the main boards are pivotally hung, as above described, it will be apparent that if sufficient material accumulates at the nips of either the rolls 8 and 9, or of the latter roll and the roll 10, to cause choking to take place under ordinary circumstances, the packing of such material against the diverting member of either board will force the same to swing outwardly away from the adjacent roll, while at the same time the scraper member will be shifted out of engagement with its roll, into

the position shown in Fig. 2. This movement of the diverting member of the board will reduce the pressure of the material against the rolls, since the throat or passage in which the material is disposed is thus enlarged, thereby relieving the strain upon the rolls and preventing the belts from being thrown. The supplemental board 34 is also capable of swinging movement similar to that just described, and under much the same circumstances. It will also be apparent that since the several boards extend completely across the housing and are held by gravity against the proper rolls, so as to completely close the feed passages leading thereto, all danger of the lint or dust flying out of the housing is overcome. Consequently, the mill is susceptible of perfect operation under the trying circumstances, *i. e.*, when the stock is in a moist condition, and choking is most apt to occur, and also when it is extremely dry and the throw-off of dust and lint reaches the maximum. Finally, it will be observed that the extent to which the weight of the main boards is permitted to rest directly upon the rolls may be varied at will, and that the several blades, both of said main boards and of the supplemental boards, may be adjusted, when necessary, to compensate for the wear thereon.

I claim as my invention:

1. In a mill of the type specified, the combination, with a series of superposed crushing rolls, and a housing wherein the same are mounted; of a board provided with separate scraper and diverting portions arranged for coaction with certain of said rolls, said board being pivotally mounted in said hous-

ing for movement away from said rolls under the pressure of the crushed material.

2. In a mill of the type specified, the combination, with a series of superposed crushing rolls, and a housing wherein said rolls are mounted; of a gravity-operated combined scraper and diverting board pivoted in said housing for coaction with certain of said rolls and for movement away from the same under the pressure of the crushed material.

3. In a mill of the type specified, the combination, with a series of superposed crushing rolls, and a housing wherein the same are mounted; of a board arranged within said housing having a pivotally mounted upper portion coacting with one of said rolls, and a lower diverting portion coacting with another of said rolls, said lower portion extending beneath and past the pivotal point of the first-named portion, whereby both portions are normally held in operative position.

4. A combined scraper and diverting board for roller crushing mills comprising a horizontal upper portion provided with depending pivot-receiving members, an inclined lower portion extending beneath the first-named portion and past said members, and an intermediate vertical portion connecting the outer edges of said upper and lower portions.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK WOLFENDEN.

Witnesses:

S. A. SCOTT,
RUSH MOORE.