M. F. WILLIAMS & E. H. FRICKEY.

FEEDING MECHANISM FOR DISINTEGRATING MACHINES.

APPLICATION FILED AUG. 21, 1908.

1,004,126. Patented Sept. 26, 1911.

3 SHEETS—SHEET 1.

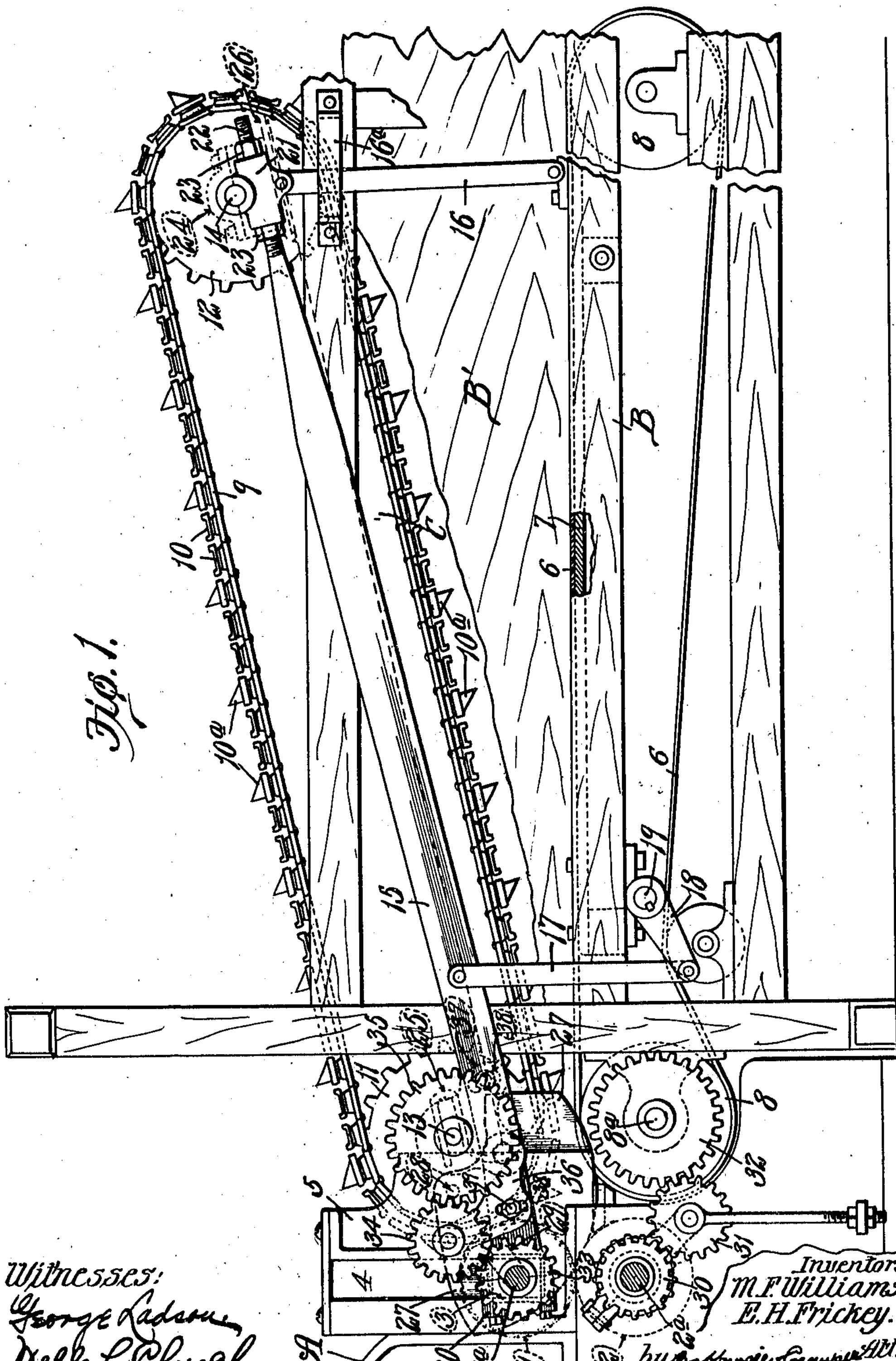

Fig. 1.

Witnesses:
George Ladson
Wells L. Church

Inventors:
M.F. Williams.
E.H. Frickey.
by Bakewell & Cornwall Att'ys.

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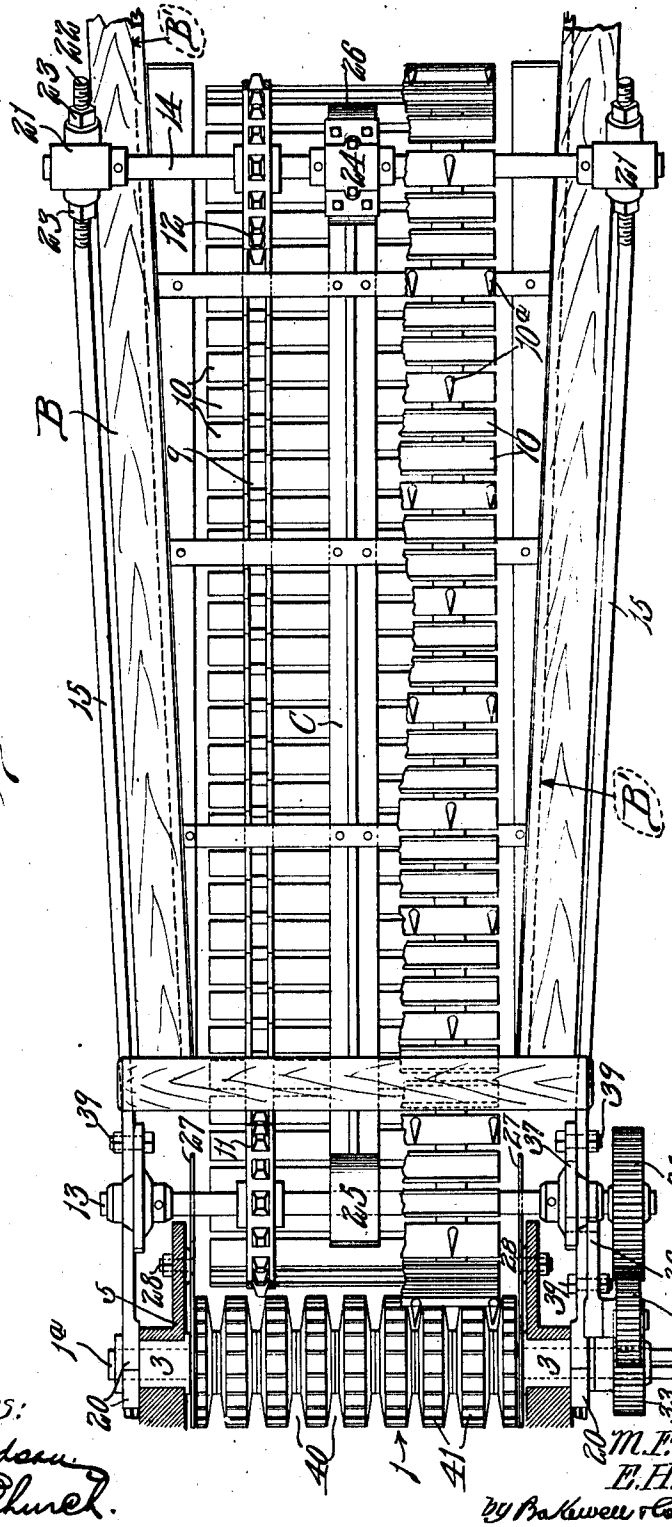
3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
George Gibson
Nellie L. Chuck.

Inventors:
M. F. Williams.
E. H. Frickey.
By Bakewell & Cornwall Attys.

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3 SHEETS—SHEET 3.

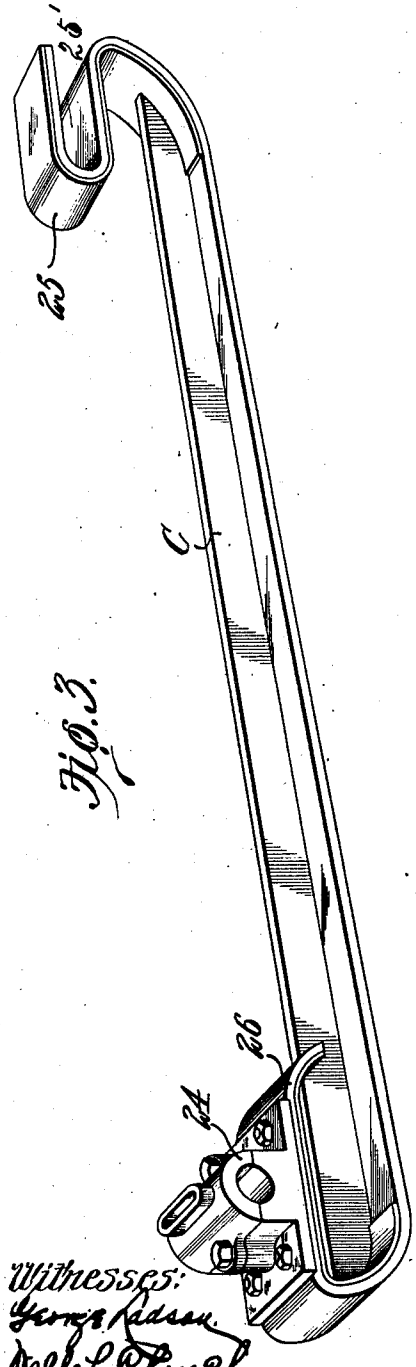

Fig. 3.

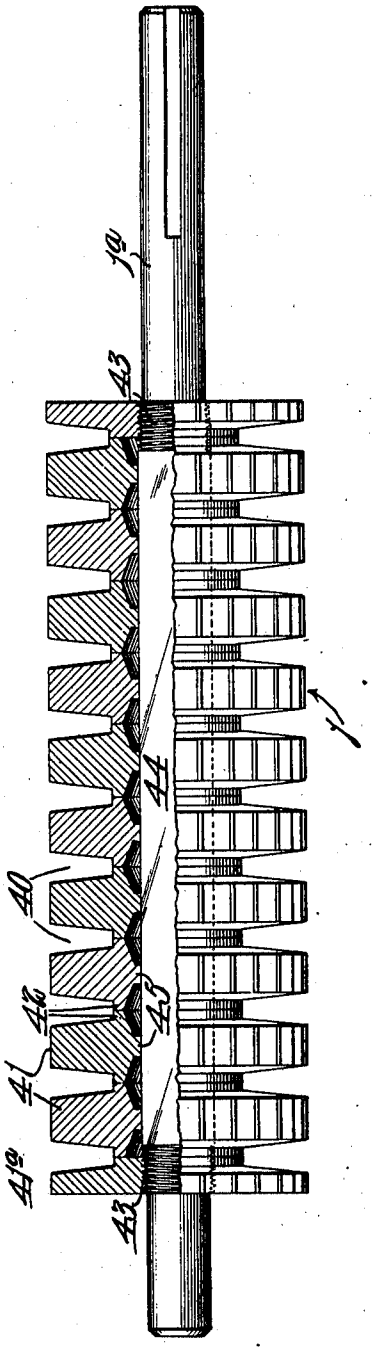

Fig. 4.

Witnesses:
George Gibson.
Nellie L. Chuel.

Inventors:
M. F. Williams.
E. H. Frickey.
by Bakewell & Cornwall Attys.

UNITED STATES PATENT OFFICE.

MILTON F. WILLIAMS AND EDWARD H. FRICKEY, OF ST. LOUIS, MISSOURI, ASSIGNORS TO WILLIAMS PATENT CRUSHER & PULVERIZER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

FEEDING MECHANISM FOR DISINTEGRATING-MACHINES.

1,004,126. Specification of Letters Patent. Patented Sept. 26, 1911.

Application filed August 21, 1908. Serial No. 449,751.

To all whom it may concern:

Be it known that we, MILTON F. WILLIAMS and EDWARD H. FRICKEY, both citizens of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Feeding Mechanism for Disintegrating-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a feeding mechanism constructed in accordance with our invention; Fig. 2 is a top plan view of said mechanism, a portion of the upper conveyer being broken away to more clearly illustrate parts of the mechanism; Fig. 3 is a perspective view of the member that forms a rigid track for the slats on the underneath side of the upper conveyer; and Fig. 4 is an enlarged detail view, partly in section, of the upper feed roll.

This invention relates to feeding mechanisms such as are used for feeding material to shredding machines or machines that cut and disintegrate material.

One object of our invention is to provide a feeding mechanism of simple construction that comprises a pair of endless conveyers, the upper one of which is inclined relatively to the lower conveyer and mounted on a pivoted or rockable support.

Another object of our invention is to provide a feeding mechanism comprising a pair of feed rolls arranged adjacent the mouth of a shredding or disintegrating machine, a pair of conveyers for feeding material to said rolls, and a rockable or pivotally mounted support carrying the upper conveyer and also the upper roll of the pair of feed rolls arranged adjacent the mouth of said machine.

Another object is to provide a feeding mechanism comprising a pair of feeding rolls arranged adjacent the mouth of a disintegrating machine, the upper roll being carried by bearings that are vertically movable in slots formed in the side walls of a casing, and plates that are adapted to move automatically into position to close the lower portions of said slots when the upper roll is separated from the lower roll. And still another object is to provide a feeding mechanism comprising a pair of flexible endless conveyers and a reinforcing means for preventing the upper conveyer from yielding when it comes in contact with a hard lump or piece of material.

Other objects of our invention are to provide a sectional feeding roll and an endless conveyer of novel construction.

Referring to the drawings which illustrate the preferred form of our invention, A designates a portion of the casing of a shredding or disintegrating machine, and 1 and 2, respectively, designate upper and lower feed rolls that are arranged adjacent the mouth of said machine for feeding material into same. The lower feed roll 2 is connected to a shaft 2^a that is mounted in stationary bearings but the shaft 1^a to which the upper feed roll is connected is mounted in boxes or bearings 3 that are vertically movable in slots 4 formed in the side walls of a casing or stationary housing 5 so that the upper roll can move away from the lower roll to accommodate batches or pieces of material of different size and thus prevent the machine from becoming choked.

A stationary frame-work B is located adjacent the disintegrating machine for carrying a pair of superimposed endless conveyers that feed the material to the feed rolls 1 and 2. The lower conveyer consists of a belt 6 that passes over a track 7 and pulleys 8 carried by said frame-work B, and the upper conveyer consists of sprocket chains 9 provided with transversely extending slats or bars 10. The chains 9 of the upper conveyer pass over sprocket wheels 11 and 12, and the shafts 13 and 14, respectively, to which said sprocket wheels are connected, are carried by a movable support comprising inclined bars 15 arranged outside of the stationary frame-work B and connected to pairs of rock arms 16 and 17. The rock arms 16 which support the upper ends of the inclined bars 15 are pivotally connected at their lower ends to the stationary frame B, as shown in Fig. 1, and the rock arms 17 that are pivoted to the lower ends of said inclined bars 15 are pivotally connected to arms 18 on a rock shaft 19 which is journaled in bearings on the stationary frame B, the parts 17, 18 and 19 constituting an equalizing mechanism which insures paral-

lelism between the vertically movable and immovable parts of the device. The frame B is provided with guides 16ª through which the arms 16 pass. These guides permit inward movement of the bars 15 and their carried parts to accommodate the vertical movement of the lower ends of said bars which are connected to the shaft 1ª and guided in the slots or ways 4. The inclined bars 15 are provided at their lower ends with split bearings 20 through which the shaft 1ª of the upper feed roll 1 passes so that said roll is carried by the movable support for the upper conveyer and consequently will move vertically with said support when a large piece or batch of material forces the upper conveyer away from the lower conveyer, as hereinafter described. Preferably, the bearings 21 for the shaft 14 of the upper conveyer are adjustably mounted on the inclined bars 15 so that said shaft can be moved toward or away from the shaft 13 to adjust the tension of chains 9 of the upper conveyer. In the construction herein shown the bearings 21 are mounted on the upper ends of bars 15. The screw threaded portion 22 of the bars have jam nuts 23 which lock bearing 21 in position, but it will, of course, be obvious that other means than that herein shown could be used for regulating the tension of conveyer chains 9 without departing from the spirit of our invention.

To prevent the flexible upper conveyer from yielding when it engages the material on the lower conveyer we have arranged a track member C in such a position that it will form a back-support for the lower series of slats. The member C, see Fig. 3, is provided at its upper end with a split bearing 24 through which the shaft 14 of the upper conveyer passes, as shown in dotted lines in Fig. 1, and at the lower end of the member C is a re-bent portion 25 through which the shaft 13 of the upper conveyer passes. The member C is thus carried by the shafts of the upper conveyer and is so arranged that it forms a track under which the lower series of slats of the upper conveyer travel so that it will be impossible for said series to yield or give when in contact with a hard or rigid piece of material being fed to the disintegrating machine without lifting the inner ends of bars 15 and their carried parts. The track member C can be formed in various ways but we prefer to form it from a piece of T-iron having its vertical leg sheared off and its horizontal flange bent around, and then re-bent, as shown in Fig. 3, to form a bearing 25 for shaft 13. The flange at the other end of the T-iron is bent over to form a support for the split bearing 24 through which the shaft 14 passes. By providing the member C with re-bent portion 25 an elongated slot or bearing 25′ is produced which permits said member to be arranged in position easily and also provides for the movement of the shaft 14 relatively to the shaft 13 to adjust the tension of the sprocket chains 9 of the upper conveyer.

We do not claim broadly the track member as described above, as it forms the subject of a divisional application filed on October 1, 1910, Serial No. 584,929.

As previously stated, the casing 5 in which the upper feed roll 1 is arranged is provided in its side walls with vertical slots 4 in which the shaft bearings for said roll are mounted and in view of the fact that said upper roll is at times separated from the lower roll 2, some of the material which passes between said rolls would clog in said slots and thus choke the machine if means were not provided for closing said slots when the upper feed roll moves away from the lower roll. The means which we have herein shown for preventing material from entering the slots 4 consists of a pair of plates 27 arranged on the inside faces of the side walls of the casing 5 and pivotally connected thereto at 28, as shown in broken lines in Fig. 1, and in full lines in Fig. 2. The plates 27 normally close the lower ends of the slots 4 and are provided with elongated slots 29, as shown in broken lines in Fig. 1, through which the shaft 1ª of the upper feed roll 1 passes. Consequently, when said upper feed roll moves vertically the plates 27 will swing on their pivots and thus keep the slots 4 closed so that the material which is passing between the feed rolls cannot enter said slots.

The slot guard above described is not broadly claimed in this application as it forms the subject of a divisional application filed October 1, 1910, Serial No. 584,928.

The endless conveyers can be driven in various ways but we prefer to drive the lower conveyer from the lower feed roll 2 and the upper conveyer from the upper feed roll 1. The shaft 2ª of the lower feed roll is driven by a belt, not shown, and suitable gears, not shown, are provided for transmitting the movement of shaft 2ª to the shaft 1ª of the upper feed roll 1. The shaft 2ª of the lower feed roll is provided with a gear 30, as shown in Fig. 1, that meshes with a gear 31 which meshes with a gear 32 connected to the shaft 8ª which carries one of the pulleys of the lower conveyer. The shaft 1ª of the upper feed roll is provided with a gear 33 that meshes with a gear 34 which meshes with a gear 35 connected to the shaft 13 of the upper conveyer, said intermediate gear 34 being carried by a bearing 36 on one of the bars 15 of the support for the upper conveyer so that it will always remain in mesh with the gears 33 and 35. The bearing 36 for the gear 34 is preferably so constructed that it can be adjusted to

cause the gears to mesh accurately, and the shaft 13 of the upper conveyer is also mounted in adjustable bearings 37 for a similar purpose, each of said bearings being pivotally connected to the side bar 15 and the bearing 36 being provided with an elongated slot 38 through which a clamping bolt 39 passes, as shown in Fig. 1. Another object of providing adjustable bearings for the shaft 13 of the upper conveyer is to enable said conveyer to be adjusted toward and away from the upper roll 1 and thus maintain the same space between said roll and conveyer after the parts have become worn.

Every third slat of the upper conveyer is provided with pointed projections or teeth 10^a which bite into the material that is being fed to the feeding rolls. The upper feed roll 1 is toothed or serrated so that it will get a firm hold on the material, and said roll is preferably provided with grooves 40 that provide a clearance for the projections 10^a on the upper conveyer and thus permit said conveyer to be arranged very close to the periphery of the upper feed roll. Another advantage of providing the upper feed roll with grooves 40 through which the projections 10^a on the upper conveyer travel, is that the side walls of said grooves will wipe off the material tending to adhere to the projections 10^a when said projections pass through the grooves. The upper feed roll could, of course, consist of a single member provided with circumferentially disposed grooves but we prefer to form said roll from a number of sections 41 mounted on an angular middle portion of the supporting shaft 1^a, as shown in Fig. 4. Each of the sections 41 consists of a tapered disk having a toothed periphery and provided with a hub 42 which projects laterally from each side of the disk, the laterally projecting portions of the hubs of adjacent disks constituting means for spacing the sections apart so as to form the grooves 40. The end sections 41^a are provided with screw-threaded openings through which screw-threaded portions 43 on the supporting shaft 1^a pass. The portion 44 of the supporting shaft 1^a that lies between the two screw threaded portions 43 is preferably non-circular in cross section, preferably square, and the hubs of the intermediate disks 41 are provided with narrow webs 45 having openings that conform to the cross sectional shape of the intermediate portion 44 of said shaft. The non-circular portion 44 of the shaft prevents the intermediate sections from turning or rotating thereon, and when the end sections 41^a are screwed up on the threaded portions of the shaft the sections will be firmly clamped together and thus produce practically a solid roll.

As shown in Fig. 1 the stationary frame B is provided with side pieces B′ that form a trough through which the material passes as it is being fed to the feed rolls. This trough B′ is preferably of greatest width at its outer end where the material is introduced so that if the material is loose it will be compacted slightly before it reaches the feed rolls.

The material that is to be disintegrated is placed in the outer end of the trough on the lower conveyer which carries it toward the feeding rolls and when it arrives adjacent the inner end of said conveyer the upper conveyer will grip it and force it positively between the feed rolls. As the material travels between the conveyers it will tend to raise the lower end of the upper conveyer, and when the lower end of said conveyer moves upwardly its supporting frame will swing on the rock arms 16, and at the same time the rock arms 17 will swing on their pivots 19 and thus act as equalizing links and keep the bars 15 parallel. The upper feed roll will, of course, move upwardly when the lower end of the upper conveyer rises in view of the fact that said upper roll is carried by the same frame which supports the upper conveyer, so that the feed rolls 1 and 2 will be spaced apart just far enough to receive the batch of material that leaves the conveyers. When the lower end of the upper conveyer rises the movable support which carries said conveyer will shift longitudinally by means of the rock arms 16 and 17 swinging on their bearings due to the fact that the shaft for the upper feed roll travels in fixed guides 4.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A feeding mechanism of the character described, comprising a stationary frame, a lower conveyer and a lower feed roll, an upper conveyer and an upper feed roll, bars that form a support for the shafts of the upper conveyer and the shaft of said upper feed roll, rock arms pivotally connected to said stationary frame and also pivotally connected to said bars, a rock shaft, arms carried thereby and links pivotally connected to said arms and to the lower ends of the bars.

2. A feeding mechanism of the character described comprising a stationary frame, an endless conveyer arranged for operation therein, a rockable frame supported above the stationary frame, and having side portions with screw threaded ends, a pair of shafts arranged for rotation on said rockable frame, adjustable bearings for one of said shafts mounted on said screw threaded ends, wheels mounted on said shafts, continuous bands operating on said wheels, and transversely disposed bars carried by the said bands.

3. A feeding mechanism of the character described, comprising a stationary frame, an endless conveyer arranged for operation therein, a rockable frame supported above the stationary frame, a pair of shafts arranged for rotation on said rockable frame, adjustable bearings for one of said shafts, sprocket wheels mounted on said shafts, sprocket chains operating on said sprocket wheels, transversely disposed bars carried by said sprocket chains, and a longitudinally disposed track member arranged inside the upper conveyer and having means thereon adapted to engage said shafts to be supported thereby preventing the lower portion of the upper conveyer from moving upward.

4. In a feeding mechanism of the character described, a stationary frame, an endless conveyer arranged for operation therein, a rockable frame arranged above the stationary frame and supported thereby, a pair of shafts journaled in the rockable frame, an endless conveyer mounted on said shafts, a longitudinally disposed track member arranged between the pair of shafts, a bearing on said member through which one of the shafts passes, there being a slot formed in the opposite end of said member, which slot receives the remaining shaft.

5. A feeding mechanism of the character described, comprising a lower conveyer, a rockable frame having shafts rotatably mounted therein, an upper conveyer mounted on said shafts, a feed roll having a gear mounted thereon, a gear mounted on one of the shafts of the upper conveyer, a gear intermeshing with both of said gears, and means for adjusting the position of the intermeshing gear, and also the gear mounted on the conveyer shaft.

6. A feeding mechanism of the character described, comprising a stationary frame, an endless conveyer mounted thereon, a rockable frame having an endless conveyer mounted thereon, one end of said rockable frame having a projection slidably mounted in a fixed guide way, and an equalizing mechanism coöperating with said rockable frame.

7. A feeding mechanism of the character described, comprising a stationary frame, an endless conveyer arranged for operation therein, a feed roll adjacent one end of the conveyer, and means for operating the feed roll from the conveyer operating means, a rockable frame having an endless conveyer mounted thereon and a feed roll journaled in one end and means for operating the feed roll from the conveyer operating means.

8. A feeding mechanism of the character described, comprising a stationary frame, an endless conveyer arranged for operation therein, a feed roll adjacent one end of the conveyer, and means for operating the feed roll from the conveyer operating means, a rockable frame having an endless conveyer mounted thereon and a feed roll journaled in one end, means for operating the feed roll from the conveyer operating means, and an equalizing mechanism coöperating with said rockable frame.

9. A feeding mechanism of the character described, comprising a lower conveyer, a fixed and slotted guide way, a rockable frame having a projection at one end engaging said fixed guide way, a conveyer mounted thereon and a guard member attached to the frame adapted to close the slot in the guide way as the rockable frame is moved.

10. A feeding mechanism of the character described comprising a lower conveyer, a fixed guide way, a rockable frame having a projection at one end engaging said fixed guide way, a conveyer mounted thereon, a guard member attached to the frame adapted to close the slot in the guide way as the rockable frame is moved, and an equalizing mechanism for rocking the frame.

11. A feeding mechanism of the character described, comprising a lower conveyer, a rockable frame having an endless conveyer thereon, and a feed roll mounted in one end of the frame, and means for automatically [illegible]sitioning the rockable frame, and thereby the upper conveyer and feed roll relative to the lower conveyer.

12. In a feeding mechanism of the character described, a stationary frame, an endless conveyer arranged for operation therein, a rockable frame arranged above the stationary frame, and supported thereby, a pair of shafts journaled in the rockable frame, means on the shafts for operating an endless conveyer, and a longitudinally disposed track member arranged between the pair of shafts, comprised of an angle iron with the web at both ends bent, and having bearings therein for each of the shafts.

13. A feeding mechanism of the character described, a rockable frame having an endless conveyer mounted thereon, parallel links pivotally connected to each end of the frame, said links being freely movable during the operation of the mechanism for supporting the frame.

14. A feeding mechanism of the character described, comprising a rockable frame, an endless conveyer mounted thereon, a support, a link connecting one end of the rockable frame with the support, a rock arm mounted on said support, and a link connecting the opposite end of the frame with the rock arm, said links being freely movable during the operation of the mechanism.

15. In a device of the character described, an oscillatory frame, transversely disposed shafts journaled for rotation in the ends of said frame, rotating wheels mounted on said shafts, a continuous conveyer operated by

said wheels, and a track member having its ends mounted upon and supported by the frame, extending between the wheels and positioned to engage and act as a support for the lower portion of the conveyer.

16. In a device of the character described, a pair of shafts, wheels mounted on each shaft, a continuous conveyer operating on said wheels, a track member comprising a structural form bent at one end to provide a bearing for one of the shafts, and a bearing fixed on the opposite end of said track member for receiving the other shaft, and which track member is positioned to engage and act as a support for the lower part of the conveyer.

17. In a device of the character described, rotating wheels mounted on shafts, a continuous conveyer operated thereby, a track member comprising a T-iron with one flange cut away at both ends, and the other bent to form a bearing for one of said shafts, said latter flange acting also as a support for the conveyer.

18. In a device of the character described, rotating wheels mounted on shafts, a continuous conveyer operated by said wheels, a track member comprising a T-iron having one of its flanges bent at one end to form an elongated slot, and a bearing attached to the other bent end to form a journal for the other shaft, said flange intermediate the bearings forming a support for the continuous conveyer.

In testimony whereof, we hereunto affix our signatures, in the presence of two witnesses, this 8th day of August, 1908.

MILTON F. WILLIAMS.
EDWARD H. FRICKEY.

Witnesses:
WELLS L. CHURCH,
GEORGE BAKEWELL.