

June 18, 1929.

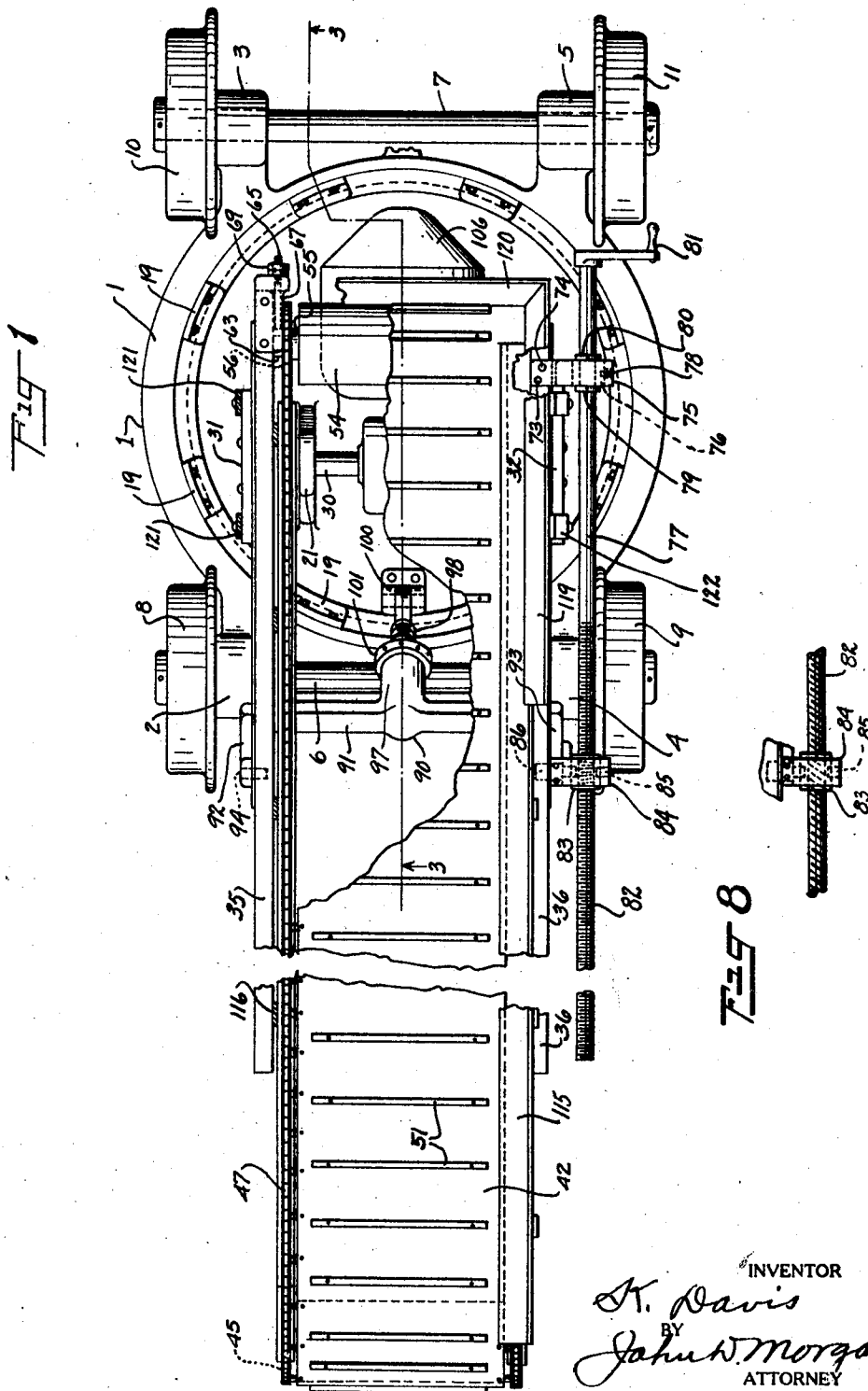
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1,717,876

MACHINE FOR CONVEYING AND STOWING LOOSE MATERIALS

Filed April 2, 1924

3 Sheets-Sheet 1



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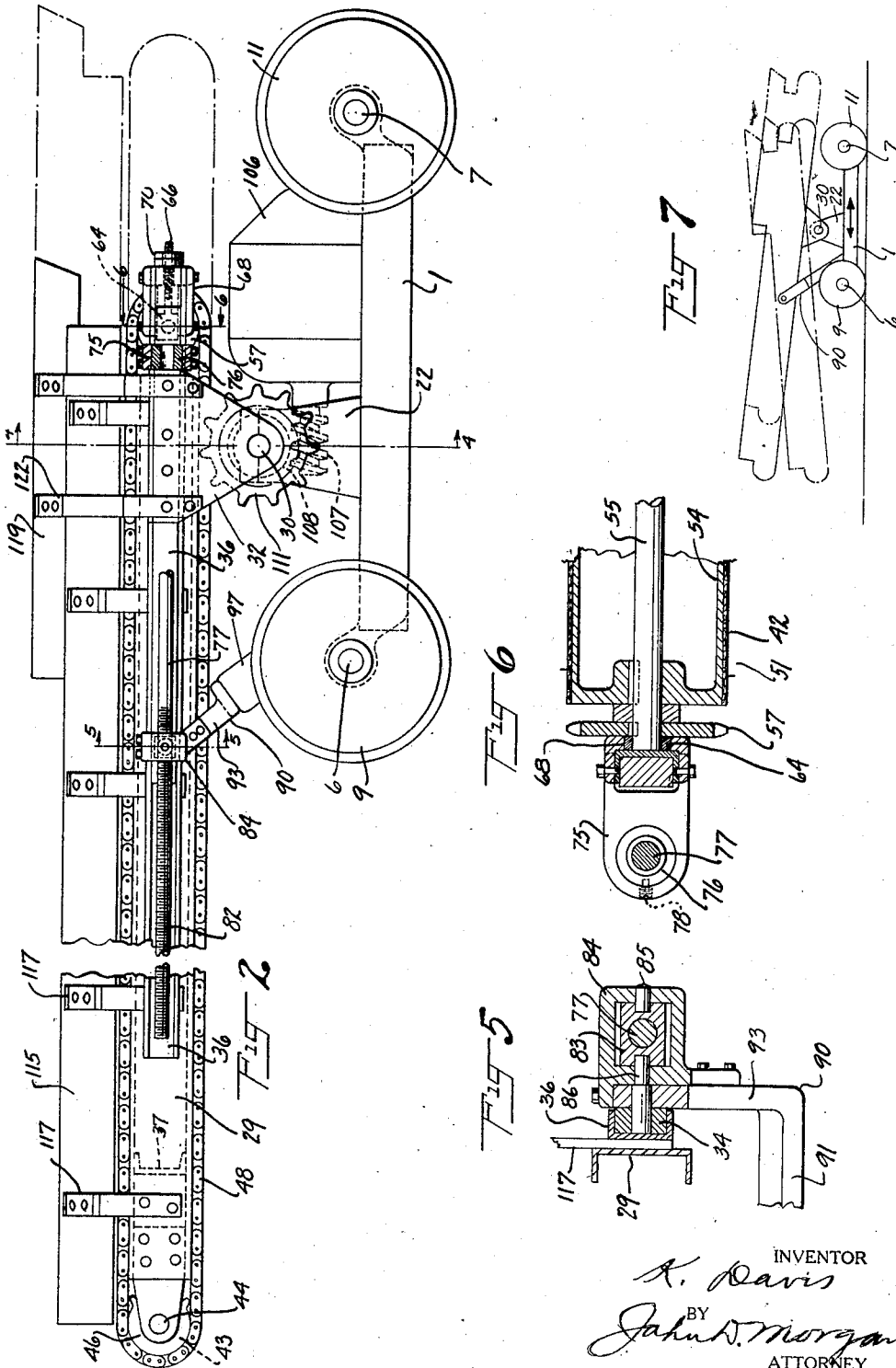
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Fig 3

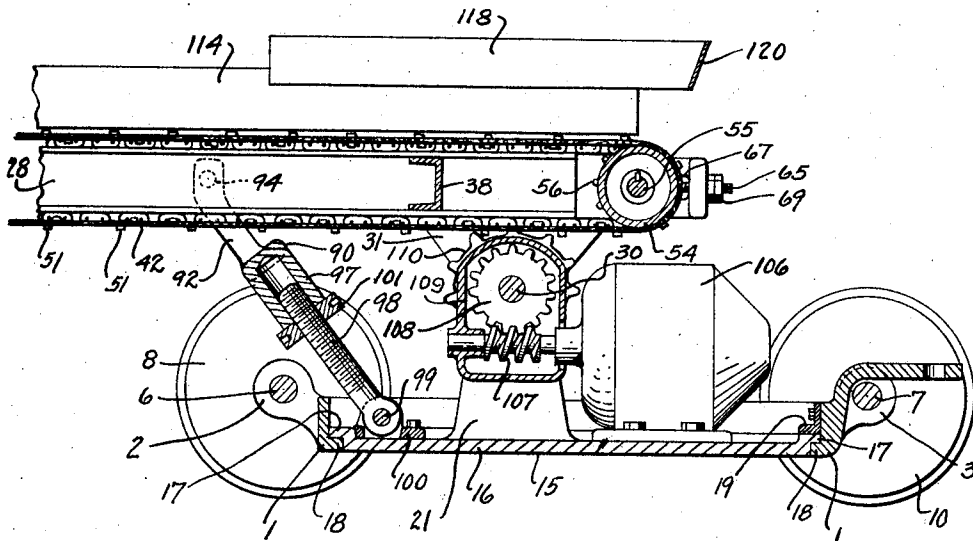
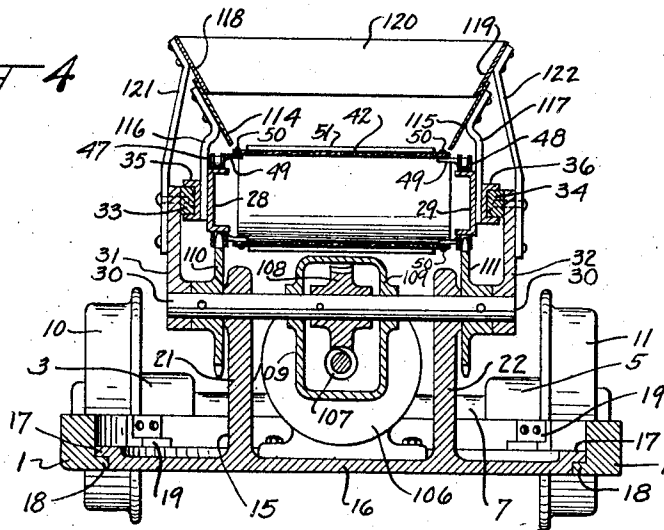


Fig 4



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UNITED STATES PATENT OFFICE.

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MACHINE FOR CONVEYING AND STOWING LOOSE MATERIALS.

Application filed April 2, 1924. Serial No. 703,653.

The invention relates to a novel mechanism for conveying and piling or stowing loose material, and more especially for so conveying and stowing loose material over a relatively large area and for a considerable height.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:—

Fig. 1 is a top plan, with parts broken away, of a machine embodying the invention;

Fig. 2 is a side elevation corresponding to Fig. 1;

Fig. 3 is a central, vertical, longitudinal section taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a transverse, vertical section, taken substantially on line 4—4 of Fig. 2;

Fig. 5 is a fragmentary, detail section, taken on line 5—5 of Fig. 2;

Fig. 6 is a fragmentary, detail section, taken on line 6—6 of Fig. 2;

Fig. 7 is a diagrammatic side elevation of the machine; and

Fig. 8 is a fragmentary detail showing the long lead screw-thread for feeding back the conveyor.

The invention is directed to providing a material conveying and stowing mechanism adapted, from a particular stand or station, to convey the material and to discharge it over a relatively large area, considered in two substantially transverse directions, and for considerable heights over or upon such area. The mechanism is also preferably equipped with track wheels or other suitable traveling means, so that its stand or station may be changed as the work progresses.

One purpose for which the machine of my

invention is adapted is the "gobbing" of shot-down rock in a coal-mine entry. That is, the entry is driven of full width and then the top rock is shot down for a portion only of such width to afford head room in the entry, and the shot-down rock is stowed in, and walled up to fill the remainder or low portion of the entry width. In this use thereof, the machine stands on the track in the high part of the entry and fills the rock into the "gob" and may be traveled along the track as required, as the conveying and stowing of the rock in the "gob" proceeds along the entry.

The machine, in the present preferred embodiment, comprises a base and a pedestal mounted thereon to rotate about a vertical axis, thereby being capacitated to discharge the material over a relatively large area. A carrier for an endless conveyor is mounted, near its rear end, on the pedestal to swing about a horizontal axis, and means are provided for variably inclining it vertically about its axis, thereby discharging and stowing the conveyed material at different heights, as it fills up from the floor.

The endless conveyor is also movable to and fro, longitudinally of itself, on its carrier, thereby being further capacitated to discharge the material at various distances from the machine, and giving a wide discharge range transversely to its range about its vertical axis. These combined capacities give a very wide scope in discharging and in stowing, or piling or walling the material from a given station of the machine.

Driving means for the conveyor are provided which permit of the various positionings of the conveyor, including the variable positioning thereof to and fro longitudinally of itself.

It will be understood that the foregoing general description and also the following detail description are exemplary and explanatory, but are not restrictive of the invention.

Referring now to the embodiment of the invention illustrated by way of example in the accompanying drawings, a base or general frame 1 is provided of annular form, and having four apertured, outwardly-extending projections 2, 3, 4 and 5, whereby the machine is supported upon two axles 6 and 7. Axle 6 is provided with wheels 8 and 9,

flanged to run upon a trackway, and axle 7 has similar flanged wheels 10 and 11. It will be understood that any other known or suitable traveling means may be provided for the machine if desired.

Mounted upon the base 1 to have rotation relatively thereto about a vertical axis is a pedestal 15. This pedestal comprises a horizontally-disposed bottom plate or turntable 16 of circular form, supported upon bed 1, and having sliding rotational movement thereon. For this purpose the plate 16 has at its outer edge a shouldered and outwardly-extending circular flange 17, which rests slidingly upon an inwardly extending annular flange 18, extending inwardly from the inner surface of the base 1, the plate 16 also fitting slidingly within the flange 18.

The outer edge of the flange 17 also fits against the inner vertical annular wall of the base 1. Retaining lugs 19 are fastened to the inner vertical wall of the base 1, and extend over the top surface of the flange 17, to hold the pedestal, the conveyor and the other mechanism supported thereby in position while permitting the pedestal to rotate about its own vertical axis by flange 17 sliding on flange 18. The pedestal 15 comprises two upwardly-extending pillars 21 and 22, preferably integral with the base plate 16.

In the embodied form of the invention, the supporting means for the conveyor and the driving means therefor are combined in a single mechanism. As so embodied, a horizontal shaft 30 is journaled in the upper part of the pillars 21 and 22, and extends outwardly therefrom at either side. The support or carrier for the conveyor is pivotally mounted on shaft 30 so as to be vertically inclinably positionable thereon, and this pivotal support is preferably arranged at or near one end of the conveyor carriage. As so embodied, frame plates 31 and 32 are pivotally mounted at either side upon the ends of the shaft 30 and extend upwardly therefrom. Plates 31 and 32 at their upper ends have fixed thereto horizontally-disposed guideways 33 and 34, which extend out forwardly from the plates 31 and 32.

The conveyor proper is supported upon these guideways 33 and 34 and is slidable therealong longitudinally of itself to vary the point of discharge of the conveyed material relatively to the position of the machine. The embodied form of conveyor is an endless belt, which is connected to and driven by sprocket chains. The frame for the conveyor comprises longitudinally-extending, inwardly-channeled side frames 28 and 29, which are connected together by transversely extending cross-frames 37 and 38 at or near either end of the conveyor. Fixed to the outsides of side frames 28 and

29, respectively, are outwardly-channeled plates 35 and 36, which are supported upon and are slidable along the guideways 33 and 34 as best appears from Fig. 4.

At the forward end of the conveyor there is provided guiding and supporting means for the endless belt 42, comprising a roller 43, mounted on a shaft 44. Also mounted on shaft 44, at either side of the roller, are sprocket wheels 45 and 46, over which run, respectively, endless sprocket chains 47 and 48, which extend longitudinally at either side of the endless belt and constitute part of the driving means therefor. At the opposite end of the endless belt 42 there is likewise provided a supporting and guiding roller 54, supported on a shaft 55, this shaft carrying also at either side thereof sprocket wheels 56 and 57 for the two sprocket chains 47 and 48.

The belt, as embodied, is attached to the driving sprocket chains by means of attachment links 49 formed in the chain, and extending beneath the belt 42, and being fixed thereto by suitable means, such as rivets 50. The belt may be provided on its outer, or material-carrying, face with transversely disposed cleats 51.

To provide for adjusting the tension of the belt or for varying the length thereof, the shaft 55, together with its roller and sprocket wheels, is made longitudinally positionable relatively to the conveyor frame. For this purpose, the shaft 55 is journaled at either end, respectively, in a pair of journal blocks 63 and 64, slidably carried in guideways 67 and 68, fixed to the conveyor frame at either side. Fixed to and extending rearwardly from the members 63 and 64 are two screw-threaded rods 65 and 66, provided, respectively, with nuts 69 and 70. This mechanism it will be understood may be adjusted to govern the tension of the conveyor belt and the sprocket chain by positioning the roller 54 and the sprocket wheels 56 and 57.

In the embodied form of means for variably positioning the conveyor longitudinally of itself and relatively to the machine (Figs. 1, 2 and 6), there is provided a lug or bracket 75, projecting outwardly from, and fixed to, the channel plate 36 by bolts 73 and 74 (Figs. 1, 2 and 6). Lug 75 is horizontally apertured, and a bushing 76 is carried in the aperture, a longitudinally extending rod 77 being journaled in the bushing. The bushing is held in position by a binding screw 78. Rod 77 is provided with collars 79 and 80, fixed thereto at either side of the bracket 75, to prevent longitudinal movement of the rod while permitting rotation thereof. At its rear end, rod 77 is provided with a crank handle 81.

The forward end of rod 77 is provided with a screw-thread 82 (Figs. 1, 2 and 5).

The screw-thread 82 passes through and engages with an internal screw-thread in a block 83, carried in a supporting bracket 84, carried upon the conveyor carrier. Block 5 83 is held against longitudinal displacement, while permitted to have pivotal movement, to allow for the changes in vertical inclination of the conveyor. For this purpose it is pivotally carried on pins 85 and 86, extending 10 thereinto at either side. The pin 86 is sufficiently long that it extends also into the supporting guide 34.

It will be clear that as the crank handle 81 is turned, rod 77 will travel longitudinally 15 relatively to the block 83, and by reason of the collars 79 and 80 engaging lug 75, the conveyor and its frame, to which the bracket 75 is attached, will be slid along the guides 33 and 34 in one direction or the other. It 20 will be understood that a similar positioning means may be provided on the other side of the machine, if desired, or that some other known or suitable form of positioning means may be employed so far as concerns many 25 features of the invention.

The embodied form of means for vertically and inclinably positioning the conveyor (during which movement it pivots about the shaft 30) comprises a yoke 90, 30 substantially U-shaped, having a horizontal reach or portion 91 extending transversely beneath the conveyor, and having arms 92 and 93, integral with and extending upwardly from the part 91, at either side of 35 the conveyor support. The upwardly-extending arm 92 at its upper end is pivotally connected to, and constitutes a support for, the guide 33 of the conveyor carrier. The upwardly-extending arm 93 of the yoke at 40 the other side of the conveyor, at its upper end, pivotally supports the pin 86, which is fixed in the slide 34.

The yoke 90 at its central portion has a downwardly-extending member 97 which is 45 interiorly longitudinally apertured to receive loosely a screw-threaded rod 98. Rod 98 is pivotally supported on a pin 99, carried in a supporting bracket 100, which is mounted on the base 16 of the pedestal. A nut 101 50 is screw-threaded on the screw 98, and as it is screwed upwardly, it raises the conveyor angularly about shaft 30 and when it is screwed downwardly it permits the conveyor to drop angularly about that shaft.

Means are provided for driving the conveyor in any of its various positions, and as embodied, a motor 106 is mounted upon the bottom plate 16 of the pedestal. The motor shaft is provided with a worm 107, 60 which meshes with a worm-wheel 108, fixed on shaft 30. The worm and worm-wheel are preferably inclosed within a housing 109 supported on the shaft 30. Fixed to the shaft 30, at either side, are two sprocket 65 wheels 110 and 111, which sprocket wheels

mesh with the lower reaches of the sprocket chains 47 and 48, to drive the conveyor in all positions.

Suitable material-directing and guiding devices are provided, and for this purpose 70 inclined sides 114 and 115 extend along either side of the conveyor, and are conveniently carried by standards 116 and 117 fixed to and extending upwardly from the side frame members 28 and 29. There are 75 preferably provided also further material guiding members at the usual point of loading, and as embodied, these comprise inwardly and downwardly inclined boards or plates 118 and 119, located above the guides 80 114 and 115 at this point and there is also provided preferably a cross guide plate 120. This structure is carried on supports 121 and 122, fixed to and extending upwardly from the plates 31 and 32 of the conveyor car- 85 riage.

In Fig. 7 is a diagrammatic showing, indicating in a general way the various co-operating positionings of the mechanism, as will be clear from inspection of the figure 90 and without further explanation.

The manner of operation and the positioning of the mechanism will be clear from the preceding description. It will be understood that during the beginning of the conveying 95 and stowing operation, the material is loaded onto the conveyor at or near its rear end, and the conveyor being downwardly inclined will deliver the material at or near the floor level. The conveyor while running may be 100 swung horizontally about its vertical axis, and thus will deliver the material over a relatively large floor area.

At the same time, by turning the crank handle 81 the point of delivery of the material from the front of the conveyor can be 105 moved to and from the position or stand of the machine, and thus a large area can be covered in the transverse direction. As the delivered material fills up over the entire 110 area, or in successive parts thereof, the nut 101 may be turned, and the discharge end of the conveyor will be kept at the desired distance above the delivered material, and will act to stow it uniformly and compactly up 115 to the desired height.

In connection with the practical operation of the machine, the thread of the screw rod 82, which longitudinally feeds the conveyor, is preferably a long lead pitch thread (Fig. 120 8), say for example about one thread per inch. It will be understood, however, so far as concerns most features of the invention, this screw-thread may be of any form, suitable or desired. 125

The use of the long pitch screw thread constitutes an embodied form of means for automatically feeding back the conveyor longitudinally of itself as the material is stowed or packed at the delivery end thereof. 130

With the long lead pitch screw, light pressure on the conveyor would not move it, but when the delivered material is packed against the delivery end of the conveyor, it will continue to pack in and increase the pressure on the end of the conveyor, thereby automatically moving the conveyor back without turning the screw by hand.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. A machine for conveying and stowing loose materials including in combination a conveyor and means for moving the conveyor longitudinally of itself, said means including a long lead screw shaft being automatically operable by the back pressure on the conveyor of the material delivered by the conveyor.
2. A machine for conveying and stowing loose materials, comprising in combination a base, an endless conveyor mounted on the base, means for variably positioning the conveyor with respect to the base, said means normally holding the conveyor in a definite position, but permitting the reactive back pressure of the piled up material against the conveyor to push the conveyor bodily backwardly from the pile, and means for driving the conveyor.
3. A machine for conveying and stowing loose materials, comprising in combination a base, a turntable on the base, a conveyor pivotally mounted on the turntable, means for variably positioning the conveyor about its pivot, mechanism for moving the conveyor longitudinally for variably positioning it with respect to the base, said mechanism normally holding the conveyor in a definite position, but permitting the reactive back pressure of the piled up material against the end of the conveyor to push the conveyor bodily backwardly from the pile, and means for driving the conveyor.
4. A machine for conveying and stowing loose materials, comprising in combination a base, a turntable on the base, an endless conveyor pivotally mounted on the turntable,

means for variably positioning the conveyor about its pivot, mechanism for moving the conveyor longitudinally of itself for variably positioning it with respect to the turntable and base, said mechanism including a threaded shaft, having a relatively high pitch, which acts normally to hold the conveyor in a definite position, but which yields under the reactive back pressure of the piled up material against the end of the conveyor to allow such back pressure to push the conveyor bodily backward from the pile, and means for driving the conveyor.

5. A machine for conveying and stowing loose materials, comprising in combination a base, a turntable on the base, a pair of supporting pillars extending upwardly from the turntable, a shaft journaled in said pillars, a conveyor frame pivotally mounted on said shaft, an endless belt conveyor carried by said conveyor frame, sprocket means carried by said shaft for driving the conveyor belt, and a motor on the turntable for driving said shaft.

6. A machine for conveying and stowing loose materials including in combination a portable base, a turntable on the base, a shaft supported by the turntable, a conveyor frame pivotally mounted on the shaft for vertical angular movement, an endless belt conveyor carried by the frame, sprocket wheels on the shaft adapted to engage the treads of the conveyor belt to drive the belt, and a motor on the turntable for driving the shaft.

7. A machine for conveying and stowing loose materials including in combination a portable base, a turntable on the base, a shaft supported by the turntable, a conveyor frame pivotally mounted on the shaft for vertical angular movement, an endless belt conveyor carried by the frame, sprocket wheels on the shaft adapted to engage the treads of the conveyor belt to drive the belt, and a motor on the turntable for driving the shaft, means for giving the conveyor frame a movement of translation with respect to the base, and means for regulating the tension of the conveyor belt.

In testimony whereof, I have signed my name to this specification.

KENNETH DAVIS.