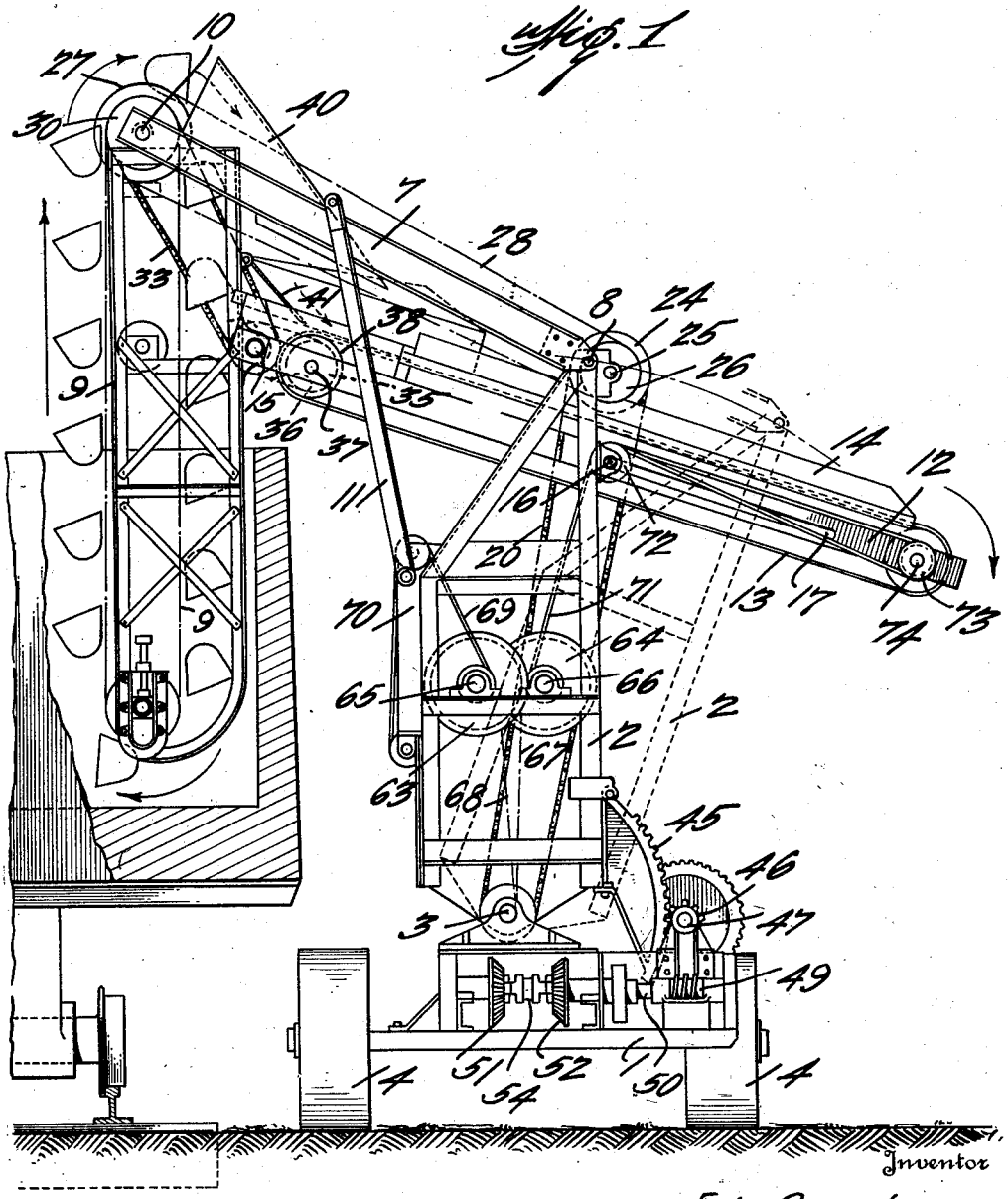
Dec. 2, 1930. E. L. BRADT 1,783,823

UNLOADING MACHINE

Filed Aug. 12, 1929 4 Sheets-Sheet 1

Fig. 1.



Inventor

E. L. Bradt.

By Lee B. Stinson

Attorney

Dec. 2, 1930. E. L. BRADT 1,783,823

UNLOADING MACHINE

Filed Aug. 12, 1929 4 Sheets-Sheet 2

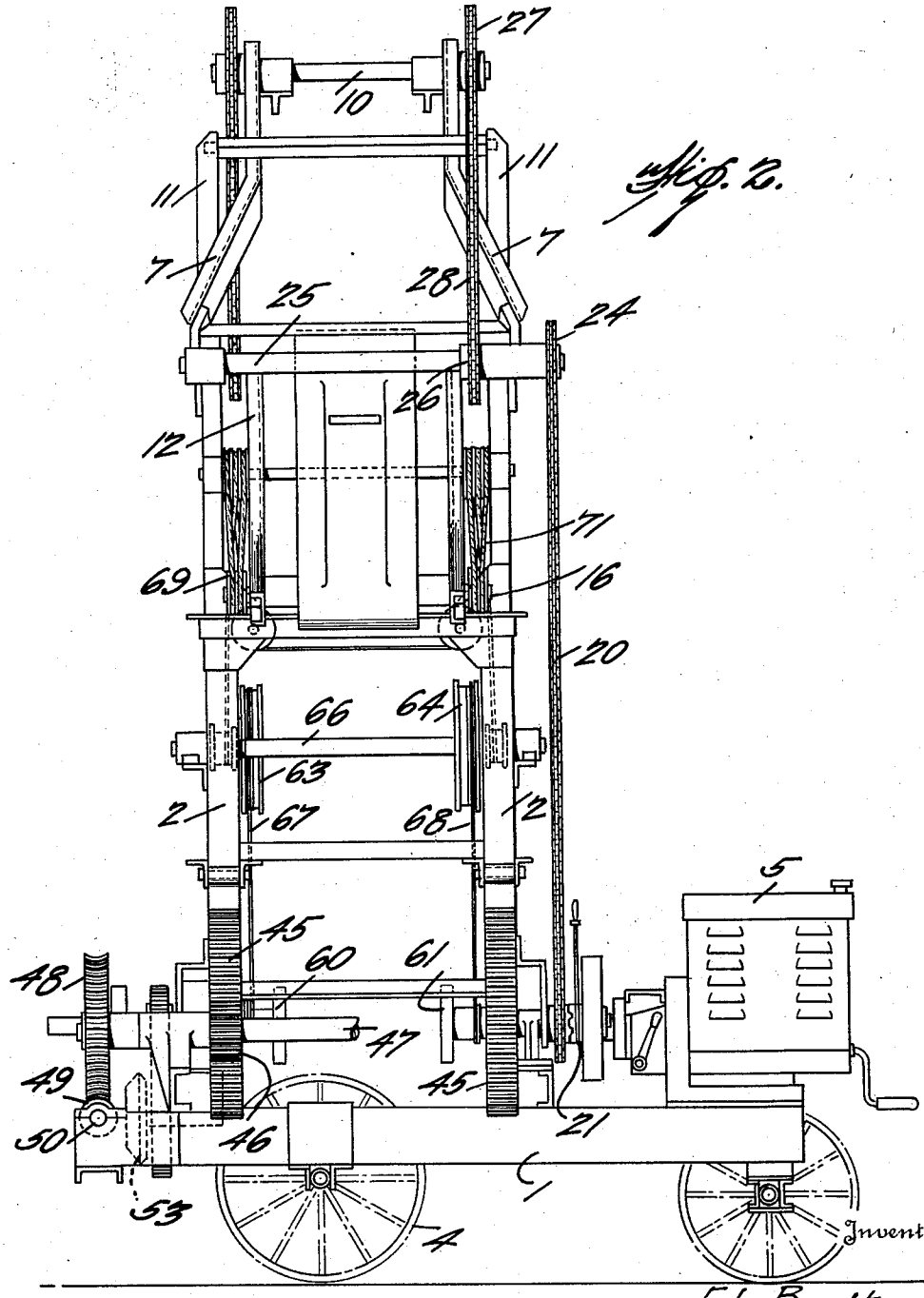


Fig. 2.

Inventor

E. L. Bradt.

By Lee B. Kennon.

Attorney

Dec. 2, 1930. E. L. BRADT 1,783,823

UNLOADING MACHINE

Filed Aug. 12, 1929 4 Sheets-Sheet 3

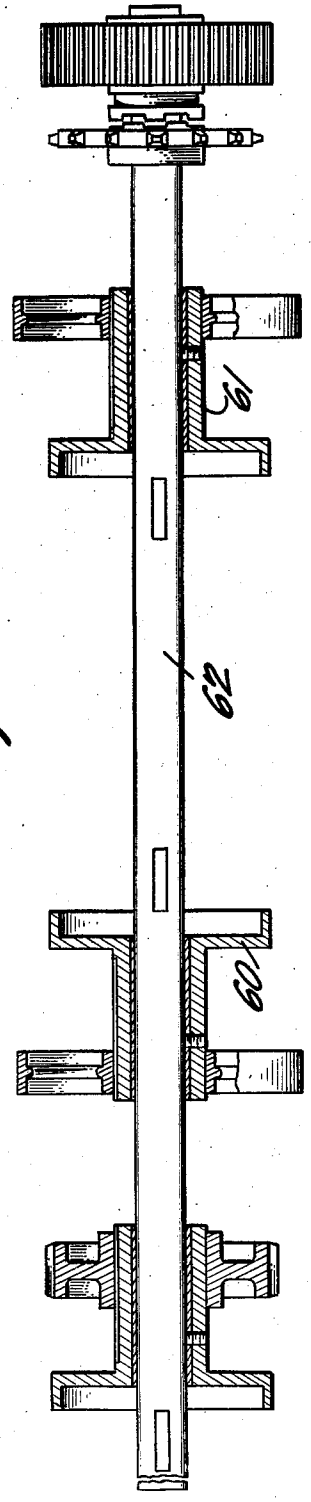


Fig. 3.

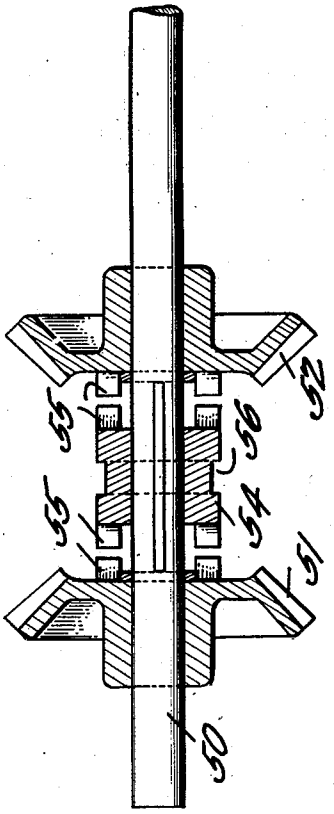


Fig. 4.

Inventor

E. L. Bradt.

By Lee B. Stearns.

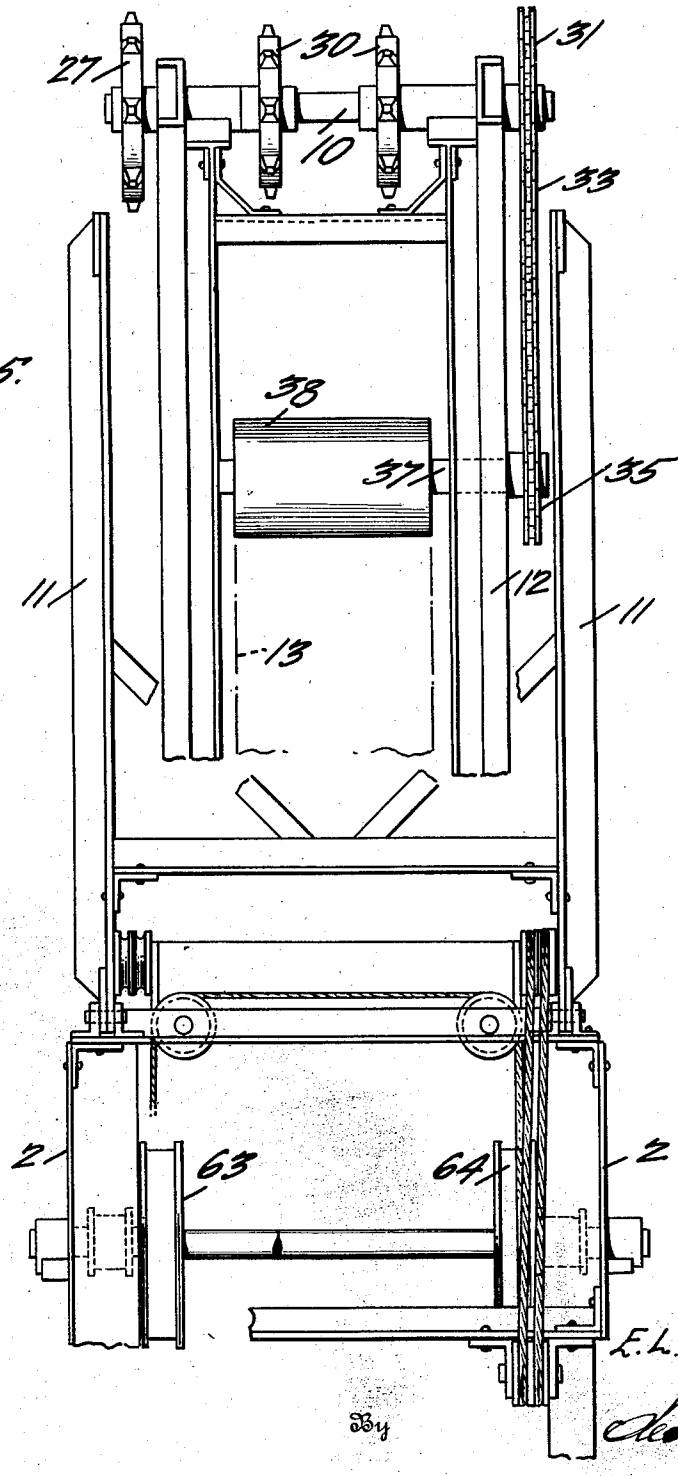
Attorneu

Dec. 2, 1930. E. L. BRADT 1,783,823

UNLOADING MACHINE

Filed Aug. 12, 1929 4 Sheets-Sheet 4

Fig. 5.



Inventor
E. L. Bradt.
By
Attorney

Patented Dec. 2, 1930

1,783,823

UNITED STATES PATENT OFFICE

EDWARD L. BRADT, OF SHREVEPORT, LOUISIANA, ASSIGNOR TO ARMBRUSTER, INC., OF SHREVEPORT, LOUISIANA, A CORPORATION OF LOUISIANA

UNLOADING MACHINE

Application filed August 12, 1929. Serial No. 385,183.

My invention relates to material-handling apparatus adapted for unloading gravel, coal or the like, or for transferring the same from one car or truck to another or from a storage pile to a car or truck.

The objects of the invention are to improve and simplify the construction of apparatus of this character and to provide a flexible apparatus that is easily handled and is efficient in operation.

In apparatus of this character embodying adjustable conveyor elements, the means usually provided for adjusting the respective elements in relation to the car or pile containing the material to be handled is relatively complicated. It is ordinarily necessary both to elevate the material and to transfer it from one side of the machine to the other where the receiving car or truck is located. In order to be flexible enough to meet the requirements of actual service, the elevating conveyor must be adapted to be raised and lowered at will and also adapted to pick up material from points at different distances from one side of the machine while continuously discharging the material into a stationary receiving car at the opposite side.

In order to meet these requirements which are of considerable practical importance, the machine embodying the present invention comprises a tilting mast structure supporting a substantially horizontal boom which in turn supports a depending endless bucket conveyor or similar elevating means. The tilting mast structure is pivoted at or near its lower end to the main frame of the machine. The boom is likewise pivoted to the mast structure and the elevating conveyor is adapted to be swung back and forth about its pivot upon the boom. The tilting of the mast upon the main frame and the swinging of the conveyor varies the reach of the latter whereas the raising and lowering of the boom permits the necessary vertical adjustment of the conveyor. The positions of the several elements just described are preferably controlled mechanically by the source of power utilized for driving the conveyor.

In accordance with a further feature of the invention, the angularity of the conveyor is controlled by a movable element or frame extending between the conveyor and the mast structure, which frame further supports a conveyor, for example of the belt type, for transferring the material raised by the elevating conveyor to the opposite side of the machine where the receiving car or truck is located.

Other objects and advantages of my invention will appear from the following detailed description of the embodiment thereof shown on the accompanying drawings, in which

Fig. 1 is a rear elevational view of the complete machine as employed in unloading a railway car;

Fig. 2 is a side elevational view of the machine shown in Fig. 1;

Figs. 3 and 4 are detail views of certain of the driving elements of the machine; and

Fig. 5 is a detail view of a portion of the belt conveyor and adjacent parts of the machine shown in Figs. 1 and 2 but drawn to an enlarged scale.

Referring particularly to Figs. 1 and 2, the complete machine embodies a main frame 1 upon which a tilting mast structure 2 is pivotally supported at the point 3. The frame 1 may be supported upon wheels 4 and carries an internal combustion engine 5 at the forward end thereof. The engine 5 is adapted to drive the conveyor elements of the machine and also mechanically control the relative adjustment of the component parts thereof. The engine is preferably arranged to drive the wheels 4 but inasmuch as such driving means is common in machine of this character, is not shown in detail.

A frame 7 constituting a boom is pivotally secured to the upper end of the tilting mast 2 at the point 8. An elevating conveyor 9, of the bucket type for example, is suspended from the outer end of the boom 7. The bucket conveyor may be of any known construction and may be angularly adjusted about the shaft 10 journalled in the boom 7 and constituting a pivot for the conveyor. The elevation of the boom 7 is controlled by a movable

supporting strut 11 extending between the boom and the mast structure 2.

A second conveyor frame 12 is provided for transferring the material elevated by the bucket conveyor 9 to the opposite side of the machine where the receiving car or truck is located. The conveyor frame 12 supports a continuously-driven belt 13 for this purpose. The conveyor frame 12 is further provided with guiding means 14 adjacent the belt 13 for preventing spilling of the material.

A shaft 15 is mounted on the elevating conveyor frame and provides a pivotal connection between the frames 9 and 12. A second shaft 16 is mounted in suitable brackets upon the tilting mast 2 and is adapted to support the rear end of the belt conveyor frame 12. As shown, the frame 12 is slotted as indicated at 17 to embrace the shaft 16, suitable anti-friction rollers being interposed between the frame and the shaft.

In operation, the elevating conveyor and the belt conveyor are continuously driven by the engine 5 through the chain 20. A suitable clutch 21 may be interposed between the engine 5 and the driving chain 20.

The chain 20 drives a second sprocket 24 supported upon a shaft 25 which is journalled in the upper end of the mast. A third sprocket 26 mounted upon the shaft 25 is driven by the sprocket 24 and is adapted to drive another sprocket 27 on the outer end of the boom 7 through the chain 28. The sprocket 27 is mounted upon the shaft 10 already described. Driving sprockets 30 for the bucket conveyor 9 are also mounted upon the shaft 10 as shown in Fig. 5.

A sprocket 31 upon the opposite end of the shaft 10 from the sprocket 27 is adapted to drive a sprocket 32 upon the shaft 15 through the driving chain 33. The sprocket 32 is a double sprocket and serves to drive a sprocket 35 through a driving chain 36. The sprocket 35 is secured to a shaft 37 which supports a driving pulley 38 for the belt conveyor 13 as shown in Fig. 5. It will be noted that the pivotal points of the respective sprockets 27, 31 and 32 correspond to the pivotal connections between the boom and the elevating conveyor and between the two conveyor frames whereby relative movement of the elevating conveyor with respect to the boom or relative movement of the two conveyor frames do not affect the driving connections to the respective conveyors.

While the detailed arrangement of the conveyors and the driving connections therefor may be modified without departing from the scope of the invention, the general arrangement of the two cooperating conveyors and their correlation to each other are important features of the invention. The tilting of the mast structure 2 raises and lowers the end of the bucket elevator 9 and the angular position of the bucket elevator 9 about the pivot point 10 may be adjusted by lateral movement of the cooperating conveyor frame 12 which engages the former at the point 15. Further vertical adjustment of the bucket elevator is provided for by raising and lowering the boom 7. It is therefore possible to adjust the position of the lower end of the bucket conveyor 9 both horizontally and vertically over a wide range without affecting the driving connections to the respective conveyors or the cooperative relation of said conveyors. The apparatus is flexible in operation and adapted to meet the various requirements of practical service while at the same time the ruggedness and simplicity of the construction is apparent.

Suitable means, such as aprons or guide members 40 and 41, may be provided to prevent spilling of the material as it is dumped from the elevating conveyor to the belt conveyor.

In accordance with a further feature of the invention, means is provided for mechanically adjusting the elevating conveyor 9 with reference to the body of material being handled by the agency of the engine 5. Two segmental gears 45 are rigidly secured to opposite sides of the lower end of the tilting mast structure 2 and are adapted to mesh with pinions 46 upon a shaft 47 journalled in the frame 1. A worm gear 48 is mounted upon the outer end of shaft 47, as shown in Fig. 2, and is adapted to engage a worm 49 upon a shaft 50 also journalled in the frame. As shown in Figs. 1 and 4, two bevel gears 51 and 52 are mounted upon the shaft 50. These gears are not keyed to the shaft but are adapted to rotate freely thereon. Both of the gears engage a driving gear 53 connected to the driving engine 5.

A clutch member 54 slidably mounted upon the shaft 50 but keyed thereto is adapted to provide a driving connection between either of the gears 51 or 52 and the shaft 50. The clutch member 54 and the gears 51 and 52 are provided with engaging portions 55 for this purpose. The adjustment of the clutch member 54 may be effected in any desired manner, as by means of the usual collar mounted in the peripheral groove 56 of the clutch member. It will be noted that the gearing is adapted to reduce the driving speed in order that gradual and accurate control of the tilting mast may be effected.

The control of the raising and lowering of the boom 7 and the swinging of the bucket conveyor 9 is effected by winches and cables driven by the engine 5 through suitable clutch mechanism. Two cable winches or drums 60 and 61 are loosely journalled upon a shaft 62, as shown in Figs. 2 and 3. The shaft 62 is driven by the engine 5 through ordinary reversing gear and when control is desired the cable drums are clutched to the shaft to be rotated thereby. Two cable

drums 63 and 64 are journalled upon shafts 65 and 66, each of these cable drums embodying large and small drum surfaces. From the larger portions of the drums, cables 67 and 68 extend to the drums 60 and 61. A cable 69 extends from the smaller portion of the drum 63 and is secured to a frame member 70 which is adapted to slide vertically upon the mast structure 2 and thereby raise and lower the supporting strut 11 and the boom 7 connected thereto. In a similar manner a cable 71 extends from the smaller portion of the drum 64 around the pulleys 72 and 73 upon the mast and belt conveyor frame respectively in such a manner as to control the lateral movement of the belt conveyor frame and the angular position of the depending bucket conveyor 9. The pulley 72 is freely rotatable upon the shaft 16 and the pulley 73 is freely rotatable upon a shaft 74, which also supports the outer end of the belt conveyor 13. It will be noted that the relative diameters of the cable drums are such as to reduce the speed ratio so that gradual and accurate adjustment of the elements of the machine may be readily effected. The detailed construction of the cable drums, clutches and pulleys may be variously modified and since suitable forms of such elements are known, the same are not shown in detail.

Various modifications of the apparatus shown and described above will occur to those skilled in the art and I do not desire that the scope of the invention be limited except as limitations may be contained in the appended claims.

I claim:

1. In an unloading machine, a vertically disposed mast structure pivotally supported for tilting movement transversely of its support, a boom element hinged at one end to the mast, a depending endless conveyor suspended from the outer end of the boom, a strut supporting arm for the boom, said arm being connected to the boom intermediate its ends and having a vertically sliding connection with the mast to adjust the elevation of said conveyor, and additional means for adjusting the angular dependent position of the conveyor relative to the vertical mast.

2. In a machine of the character described, a main frame, a vertically disposed mast structure pivotally supported thereon for tilting movement in a vertical plane, a boom element hinged at one end to the mast, a depending endless conveyor suspended from the boom, adjustable supporting means for the boom to raise and lower the endless conveyor and means including an arm extending between the conveyor and the mast for varying the angular dependent position of the former.

3. In a machine of the character described, a main frame, a vertically disposed mast structure pivotally supported thereon for tilting movement in a vertical plane, a boom element hinged at one end to the mast, a depending endless conveyor suspended from the boom, means for swinging the boom to raise and lower the conveyor and means cooperating with the mast structure to adjust the angularity of the endless conveyor, said last-named means embodying a second conveyor element cooperating with the first-mentioned conveyor.

4. In a machine of the character described, a main frame, a vertically disposed mast structure pivotally supported thereon for tilting movement in a vertical plane, a boom element hinged at one end to the mast, a depending endless conveyor suspended from the boom and means including an arm extending between the conveyor and the mast for varying the angular dependent position of the former, said means also including a power-driven cable connected to said arm.

5. In a machine of the character described, a main frame, a vertically disposed mast structure pivotally supported thereon for tilting movement in a vertical plane, a boom element hinged at one end to the mast to swing in a vertical plane, a supporting strut member for said boom, said strut member being pivoted thereto at one end and slidably engaging the mast structure at the other end, means including a power-driven cable for raising and lowering the strut member and boom and a depending endless conveyor suspended from the boom.

6. In a machine of the character described, a main frame, an engine mounted thereon, a vertically disposed mast structure pivotally supported on said frame for tilting movement in a vertical plane, a boom element hinged at one end to the mast to swing in a vertical plane, a depending endless conveyor pivotally suspended from the boom, a second conveyor cooperating with the first-mentioned conveyor and extending to the opposite side of the machine therefrom, means including said engine for driving said conveyors, said means being operable with the elements of the machine occupying different relative positions, and means for raising and lowering said boom, tilting the mast structure and moving the second conveyor frame to swing the first-mentioned conveyor about its pivotal point on the boom.

7. In a machine of the character described, a main frame, a vertically disposed mast structure pivotally supported thereon for tilting movement in a vertical plane, a boom element hinged at one end to the mast to swing in a vertical plane, a depending endless conveyor pivotally suspended from the boom at its upper end, a second endless conveyor mounted transversely of the machine and pivotally engaging the first conveyor at a point intermediate the ends thereof and driving means for said conveyors, said driv-

ing means embodying rotatable elements concentric with the pivotal support of the mast upon the main frame, the pivoted support of the first-mentioned conveyor on the boom and the pivotal connection between the two conveyors.

8. In a machine of the character described, a main frame, a depending endless conveyor for elevating material supported thereon, said conveyor being pivoted at its upper end for swinging movement in a vertical plane, a second co-operating endless conveyor mounted on the frame for transverse movement relative thereto and engaging the first-mentioned conveyor and means including said second conveyor for adjusting the lateral position of the first-mentioned conveyor while maintaining both conveyors in co-operative material-transferring relation.

9. In a machine of the character described, a main frame, a vertically disposed mast structure supported thereon, a depending endless conveyor suspended from the upper end of said mast structure for swinging movement in a vertical plane, a second endless conveyor extending across the main frame and engaging the first-mentioned conveyor in co-operative material-transferring relation therewith, and means extending between the mast structure and the first-mentioned conveyor for adjusting the lateral position of the latter with respect to the main frame and mast structure.

EDWARD L. BRADT.