

April 8, 1924.

L. V. FRALEY

1,489,752

CONVEYER

Original Filed Nov. 18, 1919

2 Sheets-Sheet 1

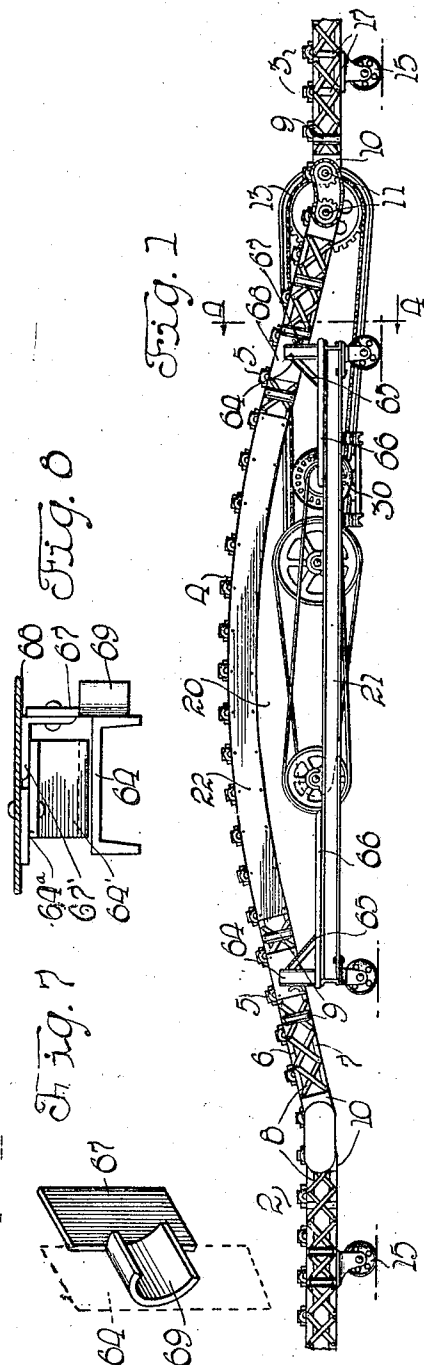


Fig. 1

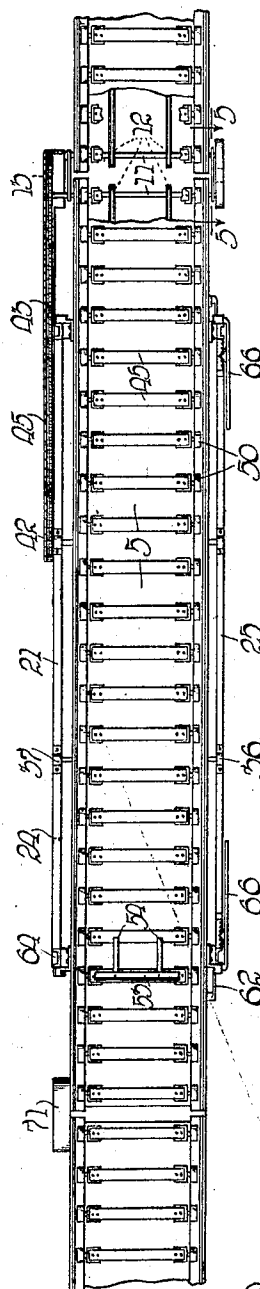


Fig. 2

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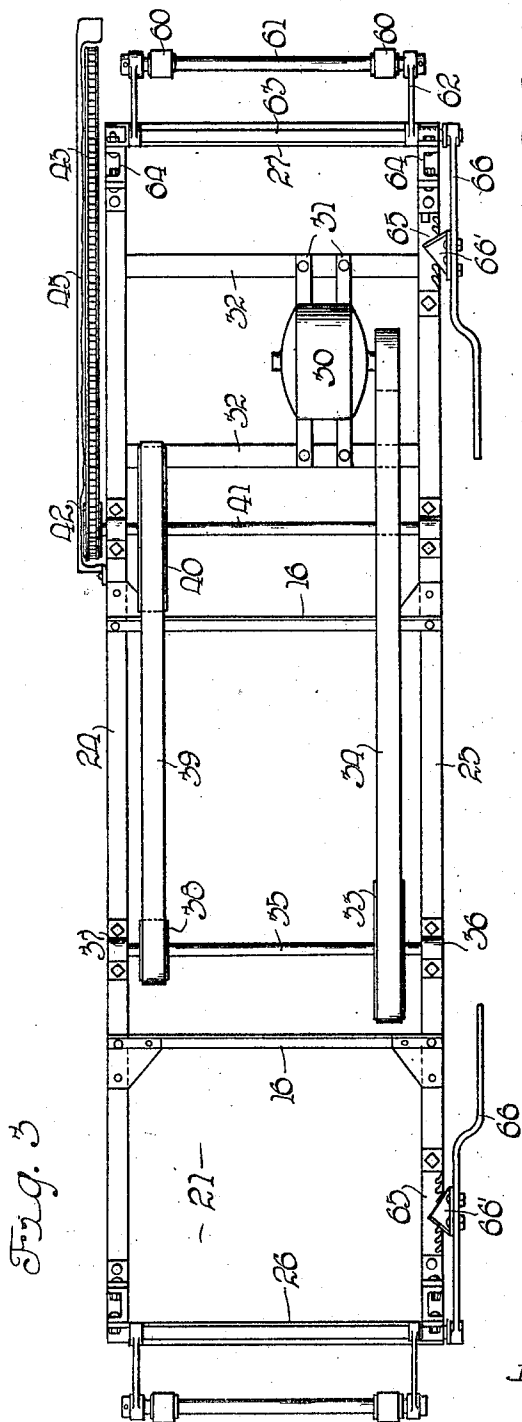
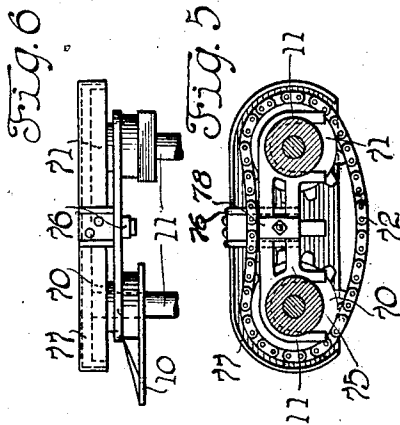
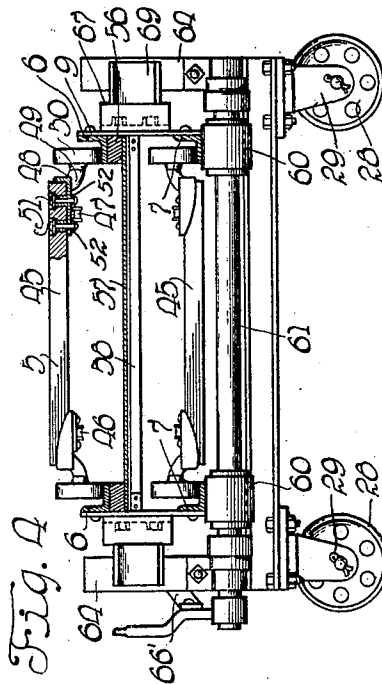
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Original Filed Nov. 18, 1919 2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

LAWRENCE V. FRALEY, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO STANDARD CONVEYOR COMPANY, OF NORTH ST. PAUL, MINNESOTA, A CORPORATION OF MINNESOTA.

CONVEYER.

Application filed November 18, 1919, Serial No. 338,905. Renewed April 16, 1923.

To all whom it may concern:

Be it known that I, LAWRENCE V. FRALEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Conveyers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to improvements in conveying machinery and particularly to that type of conveying machinery wherein the conveyer comprises a plurality of sections having one or more independent sections carrying the power means for driving the apron or carrier of the conveyer.

While in the particular embodiment which I shall describe later the traveling surface is adapted to convey what I term commodities, namely, boxes, bales, bundles, etc., it is to be understood that a belt may be employed for handling loose material or articles of kind.

Where a fairly long carry is required, more than one source of power driving mechanism has been found necessary to drive the sectional carrier or apron. Various forms of construction have been provided to carry this driving mechanism, for instance, superposed structures over the run-web supported upon the main frame of the conveyer. It is often desirable to convey bulky articles or commodities like bales of cotton, hay, or the like, or large crates having dimensions greater than the overhead or sidewise dimensions of the run. Another disadvantage of the superposed structure is that the center of gravity is high and vibration of the frame is far more pronounced. If the driving mechanism is not well mounted or the structure itself is not rigid, the carrying strain would tend under certain circumstances to unbalance the power section or subject it to excessive strains and undesirable vibration.

According to my invention I provide a power frame with a low center of gravity having the power and driving elements on the lower frame just above the floor, and I run the conveyer arm over the power frame. Hence the power frame imposes no overhead or lateral limitations on the carrier of the conveyer.

The conveyer arm is made rigid and curves

or crowns over the power frame. The arm is so mounted that either end may be elevated for a proper run of the articles or material upon the adjacent sections, whether in a straight line or at an angle.

The ends of the conveyer arm are connected if desired to adjacent sections having no power frames and the carriers on said adjacent sections are driven through suitable couplings from the motor or engine on the power frame. The couplings permit the connected ends to be raised or lowered with respect to each other without disturbing the driving relation.

In order to acquaint those skilled in the art with the manner of constructing and practicing my invention, I shall now describe in connection with the accompanying drawings, one embodiment of the invention.

Figure 1 is a fragmentary side elevational view of a machine embodying my invention; Figure 2 is a top plan view of the machine embodying my invention as shown in Figure 1;

Figure 3 is a plan view of the carriage bearing the power mechanism;

Figure 4 is an enlarged cross sectional view taken on the line 4-4 of Figure 1;

Figure 5 is an enlarged fragmentary sectional view taken on the line 5-5 of Figure 2, illustrating the driving connection between the power sections and adjacent sections which permits the power section to be raised or lowered with respect to the adjacent sections without interfering with the driving of the conveyer;

Figure 6 is a plan view of the casing housing this connection;

Figure 7 is a perspective view of the member guiding the conveyer arm upon the sub-frame; and

Figure 8 is a top plan view showing the mounting of the member guiding the conveyer arm upon the sub-frame.

As shown in Figures 1 and 2 the conveyer comprises the sectional arm members 2 and 3 and the power sectional arm member 4 having thereon the traveling surface or apron 5 for conveying the objects or commodities for which the carrier is designed. These sections 2, 3 and 4 consist preferably of the upper guiding angles 6 and the lower guiding angles 7 which angles are connected by diagonal braces or lattice work 8, and

vertical struts or braces 9. At their respective ends the angle bars 6 and 7 are connected by plates 10 which are riveted to the vertical sides of the angle bars. The plates 10 have projecting therethrough and journaled therein the shafts 11, which shafts 11 carry the sprocket wheels 12 for each of the chains of the carrier or apron 5 and also the sprocket gear 13 which transmits the driving power from the power section 4 to the adjacent sections.

The sections 2 and 3 are provided with suitable casters 15, the bases of which are secured by means of bolts to the lateral extending flanges of the vertical struts 17 which struts are fastened to the upper and lower guiding angles 6 and 7 respectively as are the vertical struts 9.

The section 4 which carries the driving mechanism for driving the conveyer comprises the carriage 20 having a sub-frame 21 supporting an adjustable conveyer arm 22, which arm 22 is in general similar in construction to the sections 2 and 3. I have found that where the web run or traveling surface is relatively long better results and a greater working efficiency can be attained from the conveyer by the insertion of more than one of these power sections, the number depending upon the conditions under which the conveyer works.

The substructure 21 of the carriage 20 comprises two longitudinal channel irons 24 and 25 and the two end members 26 and 27 which make up the supporting frame of this carriage. This frame is carried by the wheels 28 which are mounted on and carried by the brackets 29 pivoted to upper bases which are fastened by means of bolts to the cross members 26 and 27.

In order to make the frame more rigid and avoid lateral distortion thereof caused by the vibration of driving mechanism, the angle iron members 16 are provided intermediate the end of the frame and are secured as by rivets to the channel irons 24 and 25. Although I have shown a motor driving the machine embodying my invention, it is to be understood that any suitable source of driving power may be employed, I have employed an engine instead of a motor in some instances.

The motor 30 is mounted upon the frame of the carriage 20 by means of a motor frame formed of two angle irons 31, suitably secured to the cross channel members 32. The channel members 32 are bolted to the bottom side of the longitudinal channel irons 24 and 25, so as to allow as much head room as possible for the motor without unnecessarily increasing the height of the power section 4.

The motor 30 is connected to the carrier of the power section 4 through a speed reducing power connection comprising the counter shafts 35 and 41 and the driving

sprocket 42 and chain 43. The motor pulley is belted to the large belt pulley 33 through the belt 34. The pulley 33 is keyed to the shaft 35 which shaft is journaled in the boxes 36 and 37 mounted on the side frames 24 and 25. The counter shaft is connected to the second counter shaft 41 by means of the belt 39 trained over the small pulley 38 keyed on the counter shaft 35 and the large pulley 40 keyed upon the second counter shaft 41. This shaft 41 is also journaled on the side frames 24 and 25. One end of the shaft extends beyond the side frame 24 and has a sprocket pinion 42 mounted thereupon. The sprocket pinion 42 is connected by the chain 43 to the sprocket 13 on the shaft 11 at the adjacent end of the conveyer arm of the power section 4. This shaft 11 has the sprocket wheels 12 meshing with the chains forming the web or carrier to drive the carrier or traveling surface of the conveyer. I have provided the housing 45 for the sprocket chains 43 and the sprocket wheels 42 and 13. This housing is mounted at one end on the shaft 11 and might be fastened by a bendable strap to the top side of the frame member 24 or as shown in Figure 3 pivoted to the lateral side of the frame member 24. This permits the conveyer arm to be moved with respect to the base without injury to or strain on the gear case or housing 45. The power means employed to drive the conveyer embodying my invention is compactly and rigidly mounted upon a structure which has a low center of gravity, and its arrangement permits the traveling surface of the conveyer to travel over instead of under the structure carrying the driving mechanism.

As hereinbefore pointed out the conveyer arm of the power section 4 comprises the upper and lower guiding angles 6 and 7 on which the carrier or apron 5 travels. The apron 5 comprises a series of slats 45 which are connected by two endless chains 46 and 47, which chains run over suitable sprockets at the ends of the conveyer arm. The slats 45 have malleable or cast iron gudgeons 48 at their ends and these gudgeons are provided with axles 49 for the rollers 50. Rivets 51 pass through the slats 45, the gudgeons 48 and the wings 52 which are formed on certain links of the chains 46 and 47.

In the form shown the surface of the slats 45 is raised slightly above the edge of the rollers 50, so that a commodity being borne on the slats 45 will not rub against the rollers even though it overhangs the end of the slats and possibly the sides of the conveyer structure. At given intervals of the traveling surface or apron I provide cleats 53 (although only one has been illustrated) which will prevent slipping of commodities on the apron. As is more clearly shown in Figure 2 the cleats comprise the angle bar

53 which is placed with one wing thereof parallel to the face of the slats and the other face vertical thereto. Small pieces of flat bar iron 54 are placed between the horizontal wing of the angle bar 53 and the top of the slat to which the cleat is fastened and extend to the rear of the adjacent slats. Suitable bolts pass through the lower wing of the angle bar 53 and through the bars 54 to hold the bars and the angle iron firmly in fixed relation to the slat on which the cleat is mounted. The rear ends of the bar 54 are not fastened to the adjacent slat, but merely rest thereon so that in passing around the sprockets carrying the apron chains 46 and 47 at the end of each respective section, sufficient lost motion is permitted to prevent the flat bar iron 54 from being bound or cramped. It can be seen that the resistance of a commodity carrying against the vertical leg of the bar 53 tends to turn the carrying slat about its axis. In this form of device the bars 54 resting upon the adjacent slats take up this tendency to turn and hold the slats in proper position.

The traveling surface of bed of the section 4 is formed slightly curved, which curve permits an easy travel for the commodity being borne. This curve is of such a degree that the center of gravity of the traveling bed is not higher than necessary in order to clear the motor and its driving connection.

The angle irons 6 and 7 are suitably fastened together at the sides by straps of bar iron forming the lattice work 8 as best shown in Figure 1. The upper and lower angle irons are also connected by struts 9, which struts have projecting lugs or studs 56 extending inwardly, as shown in Figure 4. A sheet metal floor or bottom 57 is mounted upon the transverse angle irons 58 and is secured to the horizontal flanges of the same to form a smooth continuous bottom for the conveyer arm.

I have provided means whereby each end of the arm 4 may be tilted upwardly or downwardly in the plane of the traveling surface. Where the commodity is to pass from one section to another it is advisable to have the delivery end of the first section higher than the advance or receiving end of the succeeding section so that the two surfaces may be made to approach a condition of overlapping, gravity aiding in transferring the commodity from one to the other. The means for adjusting the ends of the section 4 with respect to the adjacent sections comprises rollers 60 mounted upon rod 61, which rollers are rotatably mounted so that they will be free to turn as they ride along the bottom of the conveyer arm or frame. The rod 61 is mounted in the outer ends of the arms 62, which are in turn keyed upon the rocking shaft 63.

The rocking shaft 63 is carried in bear-

ings which are mounted upon the vertical guiding posts forming part of the carriage frame. An operating lever 66 is keyed on the outer end of the rocking shaft 63 for moving the end of the conveyer shaft up or down. The lever 66 has a pawl or catch in the form of an angular plate 66' adapted to engage the dentate edge of the angle bar 65. The teeth are secured so that they will prevent accidental disengagement of the pawl from the teeth. At each end of this section 4 one of these means is provided so that either end of the section may be lowered or raised. Referring to Figures 7 and 8, guiding members or blocks 67 are mounted upon angle irons 67' which angle irons 67' are carried by the plates 68. The plates 68 are mounted on the side angles 6 and 7. In order to keep the adjustable conveyer arm 22 spaced from the posts 64, the members 64' are provided and secured as by rivets or the like to the plate 68. The members 64' are of a U-shape, having vertical projecting flanges 64^a through which flanges the rivets pass and between which flanges and the plate 68 the angle irons 67' are guided. The guiding members 67 have the integral arcuate portions 69 which ride upon the uprights 64. The section 4 is carried upon the rollers 60 and guided by the arcuate portions 69 of the guiding member 67, all of which form a novel adjustable support for the same. This section is permitted by said mounting to move in a plane vertical to the run of the web and is guided from slipping forward or backward on the carriage by the guiding members 69.

The power is transmitted from the power section 4 to the adjacent sections through sprockets 70 and 71, mounted upon the shafts 11, by the chains 72. The shafts 11 are spaced from each other by removable coupling members 75 which hold the shafts at all times at a proper distance from each other regardless of which end is higher or lower. Thus the chain will always be under the proper tension. The coupling member 75 comprises a central frame or spacing member and two forks which are adapted to drop over the adjacent bearings or sprockets or the like to space the shafts. When the conveyer is to be moved the sections may be uncoupled by raising the connectors 75 and then taking the chains 72 off of the sprockets. Spacing couplings 75 may be employed at each side to hold the adjacent sections in alignment. The spacing coupling 75 is provided as shown in Figure 5 with a gear cover 77 secured by a clamp 76 and an arm 78 to the central part of the spacing connection 75. The gear housing or cover 77 also prevents the dislocation of the connector or coupling 75 on the hubs of the sprocket wheels 70-71. The hubs may be provided with peripheral grooves to receive

the forked ends of the connector or coupling member.

It is not intended that the invention be limited to the precise forms of the conveyer shown and described, as the invention is broader than the particular embodiment which has been shown.

Other arrangements of the driving mechanism might be provided, depending entirely upon the conditions under which the conveyer is operated.

I claim:

1. In combination with a conveying machine having a traveling carrier for carrying commodities, a unitary sub-frame, power means mounted upon the sub-frame beneath the carrier and adapted to drive the carrier, said carrier having opposite ends in substantially the plane of the sub-frame and an intermediate portion clearing the power means on the sub-frame.

2. In a conveying machine comprising a plurality of sections and having independent carriers therefor, a power frame, one of said sections adapted to travel over said frame, said frame having driving means for said machine, said mentioned section traveling over said frame substantially out of the horizontal run of the other said sections.

3. In a conveying machine, an adjustable conveyer arm having a carrier traveling thereon, a frame carrying the driving mechanism for said carrier, said conveyer arm being of substantially curved configuration and having means whereby it is adapted to be movably supported by said frame above said driving mechanism.

4. In a conveying machine, a plurality of rigid, sectional arm members forming a continuous conveyer, carriers for each member, a frame having power means thereupon for driving said carriers, the carrier of one of said sectional arm members traveling over said frame and having operative connection with said driving means, and means operatively connecting said carrier with the carriers of the other members.

5. In combination, a frame, power means mounted upon said frame, a carrier traveling over said frame, said carrier comprising a plurality of slats having a common connection and adapted to ride on a trackway, said trackway comprising a conveyer arm having pivotal support upon said frame.

6. In combination, a supporting frame, a conveyer arm suspended end to end over said frame, a carrier comprising a plurality of apron slats mounted on the arm, said frame having mounted thereon power means for driving the carrier, said arm comprising a second frame having a guide-way for guiding the travel of said apron slats, said arm being pivotally mounted and carried by said first frame, and means at the ends of said frame for controlling the position of

said arm each end of said arm adapted to be adjusted relative to the frame by said means.

7. In combination, a conveyer arm comprising one of a plurality of sections of a conveying machine, a carrier on said arm comprising a traveling surface forming part of the continuous traveling surface of said machine, a power frame having mounted thereon power mechanism for driving said traveling surface, said carrier traveling directly over said power frame whereby said carrier and power means lie in a common plane, said frame comprising frame members for forming a supporting structure, arm adjusting means on said frame having control means therefor, guide members for guiding said arm upon said frame, and means for transmitting power from said traveling surface to another traveling carrier on an adjacent section of said machine.

8. In combination, a conveyer comprising a plurality of conveyer sections, separate shafts in the respective ends of said sections, carriers trained over these shafts, said shafts of the adjacent sections having operative connection with each other, a frame carrying power means for driving said carriers, one of said sections being pivotally supported on said frame, means for adjusting one end of said mentioned section to any desired position, and connecting means independent of said shafts for permitting said adjustment between driving connections of said adjacent sections.

9. In combination, a conveyer arm, a carrier on said arm, said carrier comprising a series of slats having rollers at their ends, said slats being connected together by chains, a frame adapted to support said conveyer arm, said frame comprising longitudinal and transverse frame members, driving means mounted upon said members, uprights on said members, lifting means adjacent said uprights, said lifting means engaging said arm at either end thereof so that either end is tiltable with the apposite end serving as the pivot, and guide members guided by said uprights to prevent shifting of the arm in a longitudinal direction while in tilted position.

10. In combination, a conveyer arm, a carrier on said arm, a frame adapted to support said conveyer arm, arm raising means on said frame having a control lever therefor, guide members mounted upon the conveyer arm, said arm adapted to be carried by said guide members and said raising means solely.

11. In combination, a movable power frame, power means supported on said frame, speed reducing means also mounted on the frame, a conveyer arm arched over said power means and said speed reducing means, a carrier member mounted on said

arm, power means connecting said speed reducing means with the carrier for driving the same, and means at each end of the frame for pivotally supporting the conveyer arm.

12. In combination, a supporting power frame having a driving member thereupon, speed reducing mechanism connected to said driving member and mounted on said frame, a rigid conveyer arm arched over said driving means and supported at the ends of the frame, said conveyer arm having a traveling carrier, a driving connection between the carrier and the speed reduction mechanism, and means associated with the frame for raising either end of the arm.

13. In combination, a power frame, a driving member thereupon, a speed reducing mechanism connected to the driving member, a wheel driven by the speed reducing mechanism and journaled on the frame, a conveyer arm arched over the power frame in suspended relation so as to be adjustably mounted at the end, a traveling carrier on the arm, a wheel at one end of the arm for driving the carrier, and a flexible driving connection between said wheels.

14. In combination, a power frame, a driving member thereupon, a speed reducing mechanism connected to the driving member, a wheel driven by the speed reducing mechanism and journaled on the frame, a conveyer arm arched over the power frame, a traveling carrier on the arm, a wheel at one end of the arm for driving the carrier, a flexible driving connection between said wheels, and means for raising and lowering the ends of the arm with respect to the frame.

15. In combination, a rectangular frame of greater length than width, driving mechanism mounted on said frame, speed reduction mechanism connected to the driving means, upright posts at the corners of the frame, a rigid conveyer arm arched over the driving means and guided between said upright posts, said arm having a traveling carrier, a flexible driving member between the speed reducing mechanism and the carrier, and means at each end of the frame for adjusting the vertical height of the adjacent end of the arm.

16. In combination, an oblong power frame having vertical guiding posts at each corner, driving and speed reducing mechanism mounted on the frame comprising a transverse axle having a driving wheel external to the frame, a rigid conveyer arm arched over said driving and speed reducing means and guided between said posts, said arm having a traveling conveyer, a shaft at one end of the arm having driving means for the carrier and a wheel lying

substantially in the plane of said first named wheel, and a flexible driving member trained over said wheels.

17. In combination, an oblong power frame having vertical guiding posts at each corner, driving and speed reducing mechanism mounted on the frame comprising a transverse axle having a driving wheel external to the frame, a rigid conveyer arm arched over said driving and speed reducing means and guided between said posts, said arm having a traveling conveyer, a shaft at one end of the arm having driving means for the carrier, a wheel lying substantially in the plane of said first named wheel, a flexible driving member trained over said wheels, and means for raising each end of the arm independently, said means being mounted on the frame.

18. In combination, a rectangular power frame having driving means and speed reducing means thereupon, a rigid conveyer arm arched over said driving and speed reducing means and supported on said frame, said arm having its ends extending beyond the frame, a traveling carrier mounted on the arm, driving means connecting the speed reducing means and said carrier, means for preventing endwise displacement of the arm with respect to the frame, and means on the frame for raising either end of the arm.

19. In combination, a power frame having driving means thereupon, a conveyer arm arched over said driving means and supported at each end only of the frame.

20. In a conveyer, a plurality of sections including a power section, said power section comprising a frame having a driving means thereupon and a conveyer arm arched over said frame and supported at the ends only of the frame, connecting means between the power section and the adjacent sections and being independent of the structure of either of these sections.

21. In a conveyer, means for conveying material in substantially a straight line, said means comprising a plurality of sections, each of said sections having a traveling surface, one of said sections comprising a power frame having driving means thereupon connected to the traveling surface of said section, said section having an arm arched over the driving means and being adapted to convey materials from one adjacent section to the opposite adjacent section.

22. In a conveyer, means for conveying material in substantially a straight line, said means comprising a plurality of sections, each of said sections having a traveling surface, one of said sections comprising a power frame having driving means thereupon connected to the traveling surface of said section, said section having an arm arched over the driving means and being adapted to convey materials from one adjacent section to

the opposite adjacent section, and means independent of the sections for driving the traveling webs of the adjacent sections from the driving means of the power section.

23. In a conveyer, a substantially horizontal conveyer arm having a traveling surface, an arched conveyer arm adjacent said horizontal conveyer arm, a power frame under the arch of said latter arm, driving means on said power frame, said arched arm being supported adjacent the ends of the power frame, and having one end thereof extending into receiving or discharging position with respect to the horizontal conveyer arm.

24. In a conveyer, a substantially horizontal conveyer arm having a traveling surface, an arched conveyer arm adjacent said horizontal conveyer arm, a power frame under the arch of said latter arm, driving means on said power frame, said arched arm being supported adjacent the ends of the power frame, and having one end thereof extending into receiving or discharging position with respect to the horizontal conveyer arm, said arms each having traveling surfaces, and driving connections between them driven by the driving means on the power frame.

25. In combination, a power frame, driving means mounted on said frame, a conveyer arm arched over said driving means, and adjustable means on the frame for supporting the ends of the arm independently.

26. In combination, a power frame having a motor thereon, driving means mounted on said frame, a conveyer arm arched over said driving means and supported by said frame, and a traveling surface mounted on said arm and connected to said driving means.

27. In combination, a power frame, driving means mounted on said frame connected with the source of power, a conveyer arm arched over said driving means, a traveling surface mounted on said arm and connected to said driving means, guiding means on the power frame for preventing longitudinal or endwise shifting of the arm with respect to the frame.

28. In combination, a power frame, driv-

ing means mounted on said frame connected with the source of power, a conveyer arm arched over said driving means, a traveling surface mounted on said arm and connected to said driving means, guiding means on the power frame for preventing longitudinal or endwise shifting of the arm with respect to the frame, and means on the power frame for adjustably supporting the ends of the arm.

29. In combination, a conveyer arm having a traveling carrier, a power frame, driving means on the frame connected with the source of power for driving the carrier, said arm being arched over the frame and supported on the ends of the frame, and adjusting means at one end of the frame for raising or lowering the adjacent end of the arm.

30. In a conveyer, a substantially horizontal power frame, driving means on said power frame, vertical guiding posts on one end of the power frame, a conveyer arm pivoted at the other end of the power frame, and being guided between said posts, a raising arm pivoted on the frame at its lower end and having its upper end engage the lower surface of the conveyer arm, means for swinging said raising arm pivotally about its lower end to raise or lower the adjacent end of the conveyer arm.

31. In combination, a conveying machine comprising sectional arm members, a substantially horizontal power frame having driving means thereupon, guiding means at one end of the frame for guiding the adjacent end of a sectional arm member, a second sectional arm member pivoted at the other end of the frame and guided by said guiding means, a traveling surface on said second sectional arm member, driving connections on the end of the sectional arm member adjacent said guiding means, said driving means being connected to the driving means on the power frame, and means adjacent the guiding means for raising and lowering the adjacent ends of the arm.

In witness whereof, I hereunto subscribe my name this 15 day of November, A. D. 1919.

LAWRENCE V. FRALEY.