

Jan. 29, 1935.

J. L. WENTZ

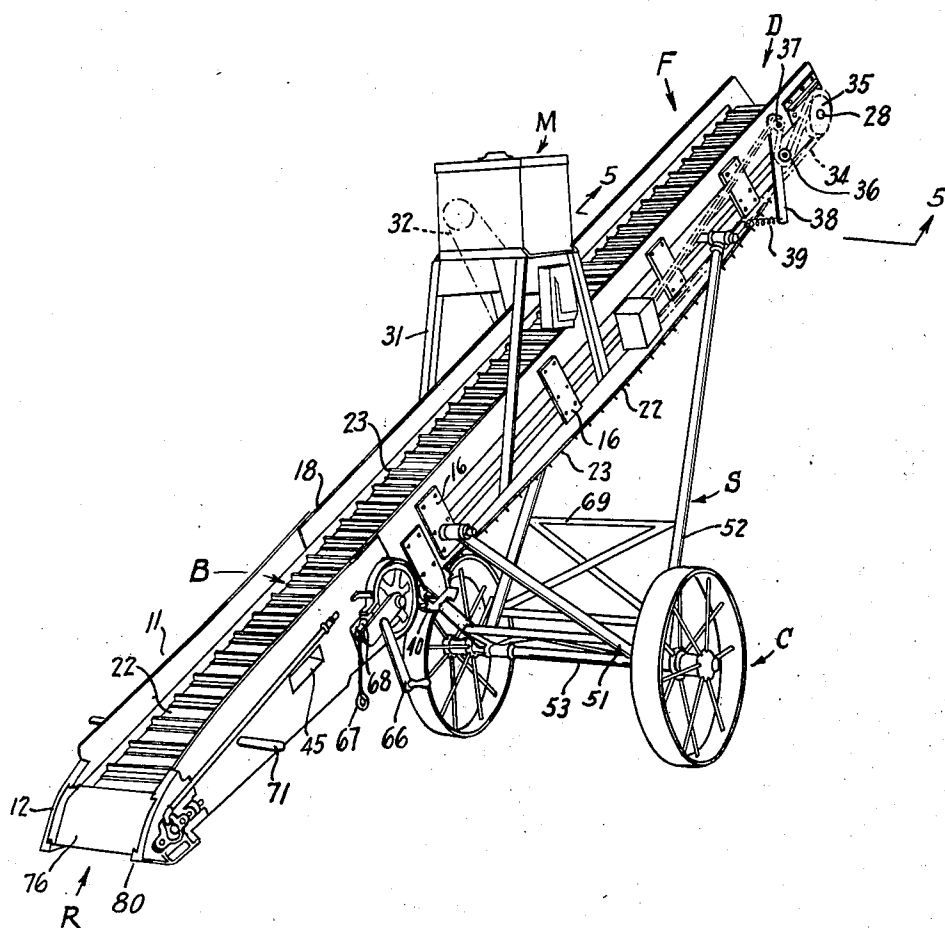
1,989,537

CONVEYER

Filed July 25, 1929

4 Sheets-Sheet 1

FIG. 1



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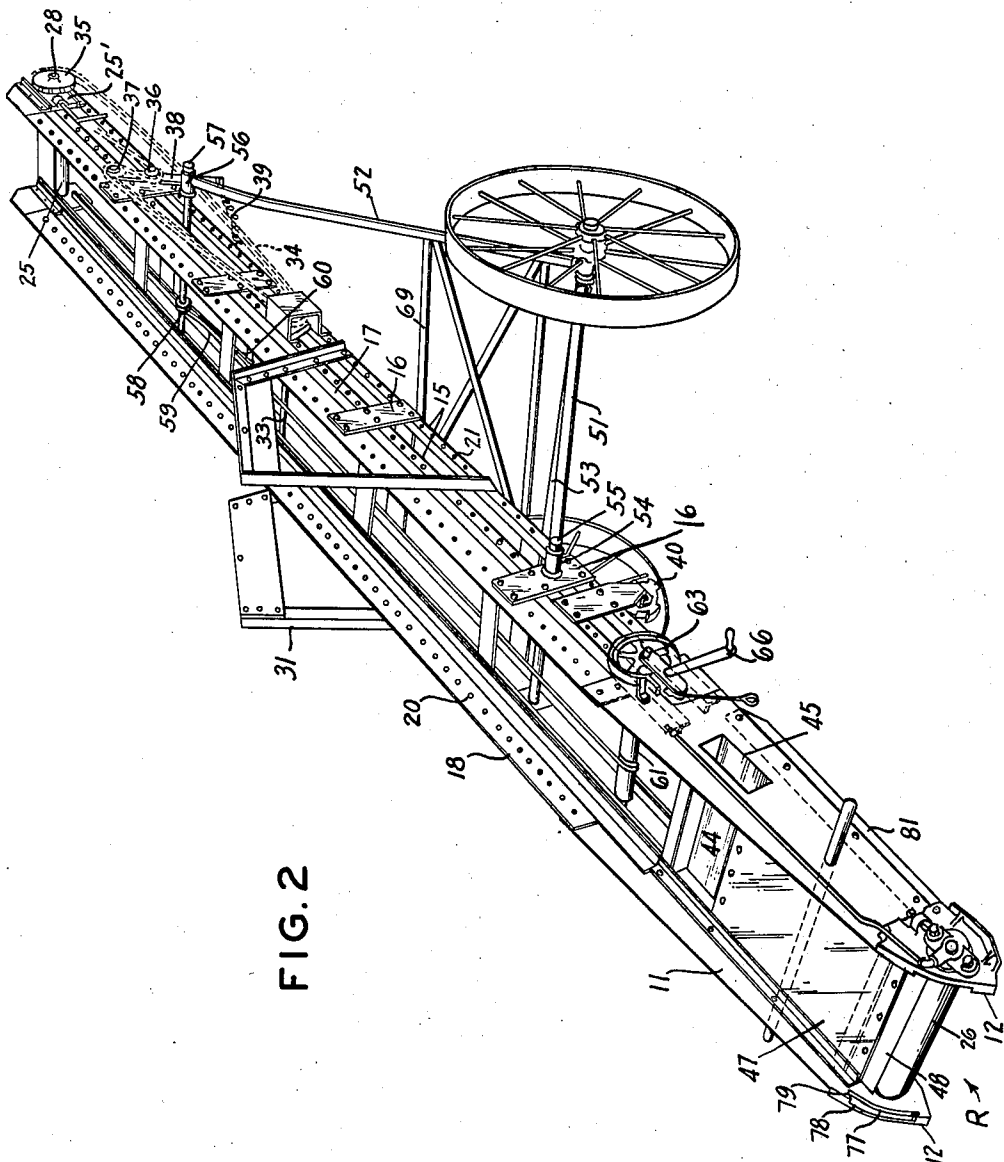
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CONVEYER

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4 Sheets-Sheet 2



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CONVEYER

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4 Sheets-Sheet 3

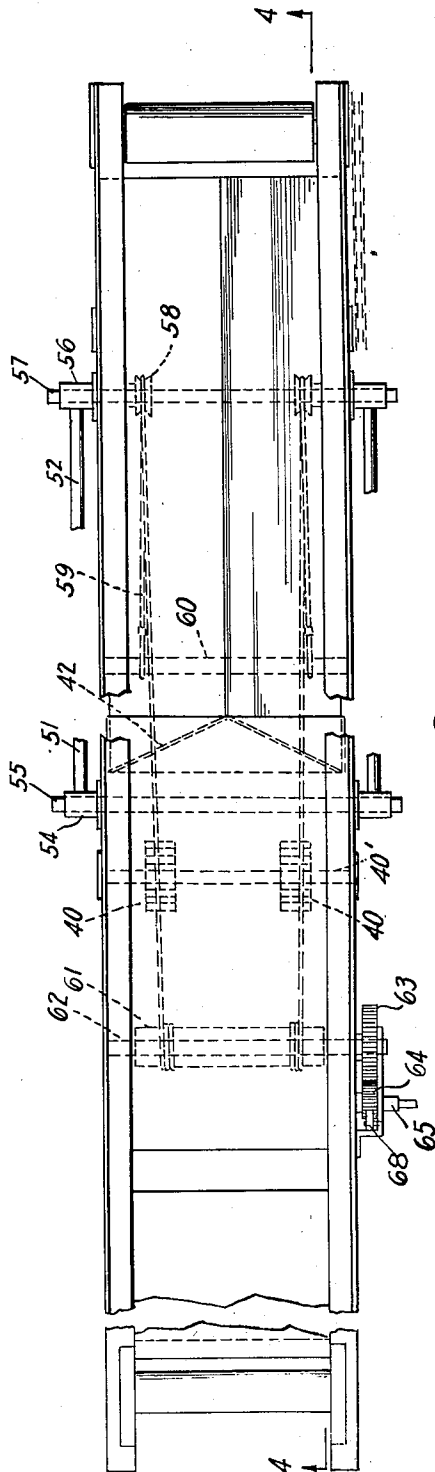


FIG. 3

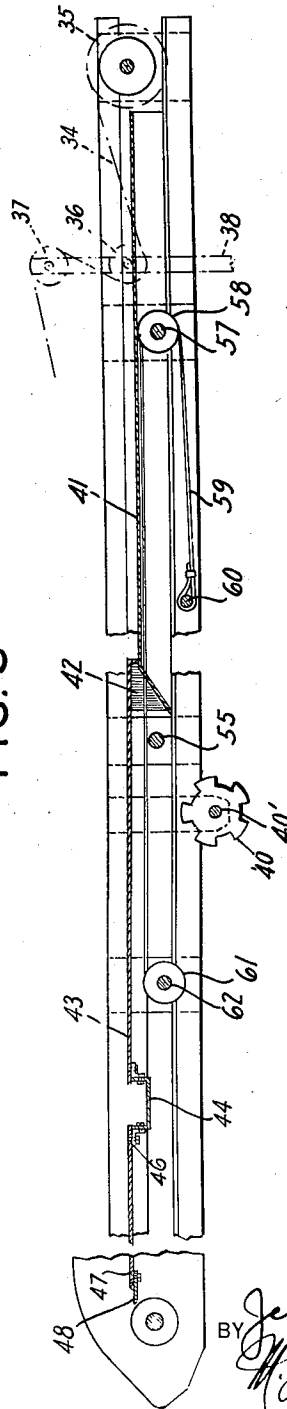


FIG. 4

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CONVEYER

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FIG. 6

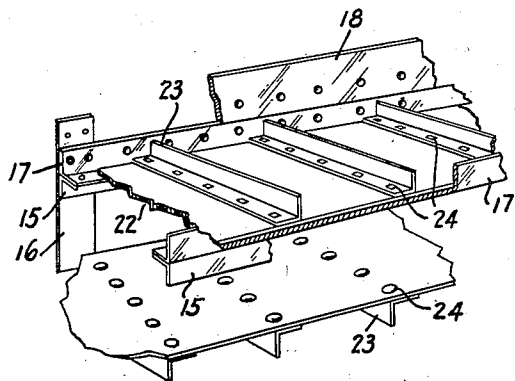


FIG. 7

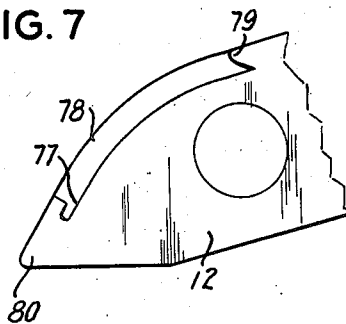


FIG. 5

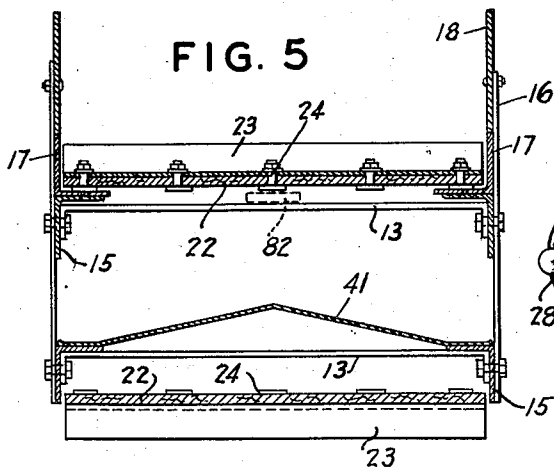


FIG. 8

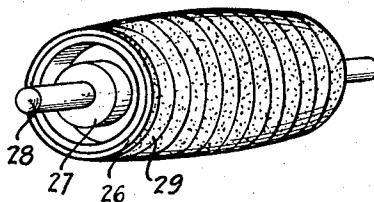
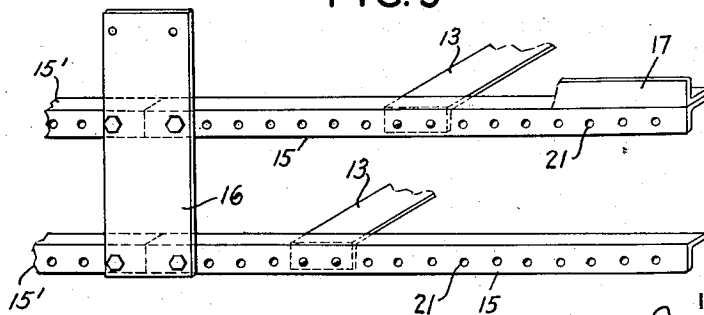


FIG. 9



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UNITED STATES PATENT OFFICE

1,989,537

CONVEYER

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Application July 25, 1929, Serial No. 380,935

4 Claims. (Cl. 198—233)

This invention relates to material conveyers that are readily and easily portable by an operator, and more particularly to that type provided with means for the operator to raise and lower the discharge end of the conveyer.

It is one object of my invention to provide a conveyer frame made up with a plurality of holes spaced equi-distant along the frame, to facilitate mounting the various construction and operating elements of the conveyer in proper position along the frame in accordance with the size and type of conveyers.

It is another object of my invention to provide a belt conveyer in which all supporting rollers intermediate the end rollers are eliminated from the construction.

It is a further object of my invention to provide a construction of belt for a conveyer in which the flights thereof act as reinforcements to prevent the belt from sagging. The flights also extend to the outer edges of the belt so as to protect the same from wear therealong.

It is a still further object of my invention to provide a belt for a conveyer of the above type with metallic reinforcements under the belt so as to protect the same from wear on its under surface, and to reduce friction as the belt is operated.

It is a still further object of this invention to provide a belt conveyer of the above type in which the flights of the belt and the sides of the frame cooperate to minimize leakage of materials past the edges of the flights and of the belt, thus increasing the efficiency of the conveyer.

In conveyers of this type it is desirable to have the center of gravity of the assembled conveyer substantially in vertical alignment with the axle of the supporting wheels so as to balance the conveyer when the lower end thereof is raised, thus making for ready portability thereof from place to place. In some instances the power plants are located above or below the conveyer frame, in some instances the position of the conveyer frame varies with respect to the supporting frame, and in some instances chutes and discharge guides and screen attachments are secured to the discharge end of the machine all or any of which, and others known to those skilled in the art, affect the location of the center of gravity of the machines. It is an additional object of my invention to provide an arrangement whereby the supporting frame and the conveyer frame may be adjusted relatively to each other to compensate for such variations in the location of the center of gravity and thus preserve the balance of the conveyer.

Other and further objects of my invention will become apparent from the following specification, taken in conjunction with the accompanying drawings, including various structural features such as the screening of the return portion of the belt from material which may seep around the edges of the belt and over the sides of the conveyer frame, the construction of end roller, and the general assembly and arrangement of parts making to an efficient and useful apparatus.

In the accompanying drawings, in which are illustrated one of the various possible embodiments of this invention,

Figure 1 is a perspective view of an assembled conveyer omitting, however, the holes provided along the frame for mounting the various elements;

Fig. 2 is a perspective view of the conveyer omitting the belt and various other parts to facilitate the illustration;

Fig. 3 is a plan view of the conveyer, with portions broken away and parts removed to facilitate the illustration of the arrangement of the height adjusting mechanism;

Fig. 4 is a vertical section on the line 4—4 of Fig. 3, and with parts broken away and the supporting frame omitted;

Fig. 5 is a detail sectional view, on the line 5—5 of Fig. 1, the relationship of parts being slightly exaggerated to facilitate illustration;

Fig. 6 is a detail perspective view of a portion of the conveyer belt, illustrating the arrangement of the flights thereon;

Fig. 7 is a detail side elevation of the end casting showing the arrangement of mounting slot;

Fig. 8 is a perspective view of a drive roller as constructed for use in connection with the belt of said conveyer; and

Fig. 9 is a perspective view of a portion of the frame of the conveyer, illustrating a method of assembling said frame from a plurality of sections.

In the embodiment of the invention shown on the drawings, the conveyer consists of a main frame F mounted upon a supporting frame S and having carrier or traction wheels C. The frame F, which is in normally inclined position, carries motor M, which drives the endless belt B to convey material from the lower or receiving end R to the upper or discharge end D of the conveyer. Suitable height adjusting means is also provided.

The main frame F comprises a pair of angle iron sections 15 spaced apart vertically by plates

16 extending along each side of the conveyer from the discharge end D to adjacent the receiving end R. The respective sections 15 are joined to supporting plates 11 which extend to the end R, as indicated in Figs. 1 and 2, where there are secured mounting castings 12. The sides are retained in spaced relation by a plurality of suitable flat plates extending between opposite angle sections 15 and bolted thereto.

In the type of conveyer described herein there is secured to each of the upper frame members 15 a second set of angle iron members 17, with the flat surfaces projecting inwardly, the positioning being well shown in Fig. 5. The trough of the conveyer in which the belt B rides is formed by the upwardly extending plates 18 which may rest upon the edge of members 17 and are secured in place by being bolted to the plates 11 and also to the spacers 16. The angle irons 17 constitute a support or trackway for the conveyer belt B at the base of the trough as will be explained hereafter.

From Figs. 2 and 9 it will be noted that the vertical portions of the frame members 15 are provided with a plurality of holes 21 spaced equi-distant throughout the length of the members. In the conveyers as marketed the holes 21 are spaced apart three inches, but of course any other spacing may be adopted. The holes are provided for the primary purpose of greatly facilitating the mounting of the various elements of the conveyer along the frame at whatever point might prove most desirable and efficient, depending upon the characteristics and service of the conveyer as well as the length and size thereof. A second purpose of the holes 21 is lightening the weight of the frame without decreasing the strength and rigidity. As shown in Fig. 2 the plates 18 may also be provided with a plurality of equi-distant holes 20 corresponding to the holes 21 and for the same purposes.

My conveyer is provided with a new and improved construction of endless belt, shown more in detail in Figs. 5 and 6, which increases the efficiency of the machine and also permits of numerous economies in the construction thereof.

The body of the belt 22 is composed of fabric, rubber or other flexible material, and has secured thereto in definite spaced relation a plurality of flights 23 shown as constructed of angle iron sections, but which may be constructed of other materials. The flights extend across the full width of the belt 22 with the flat horizontal part thereof resting upon the flat surface of the belt and there secured to the belt by a plurality of bolts 24 located across the same. As will be noted from Figs. 5 and 6, the bolts are of a particular construction, being provided with enlarged flattened heads which extend slightly below the under surface of the belt, Fig. 6 illustrating particularly the distribution of the heads along the under surface of the belt, which is seen in the lower part of that figure. The retaining nuts for the bolts 24 are applied to the upper ends of the bolts above the horizontal surface of the flight. The vertical portion of the flight is the advancing edge thereof.

When the belt is positioned upon the frame, the upper reach thereof rests upon the inwardly projecting horizontal portions of members 17 and extends around the upper or drive roller 25 and the lower roller 26, the ends of the belt being appropriately joined together to form an endless carrier. The roller 25 is journaled in a pair of bearing blocks 25' adjustably mounted

on each side of the frame F. Roller 26 is journaled in bearings in end castings 12.

A detail of the drive roller is shown in Fig. 8. It comprises tubular sleeve member 26 at opposite ends of which are mounted the hub carrying members 27 adapted to receive the shaft 28. The tubular member is provided with an auxiliary surface coating or covering 29 of suitable roughening, and composition to withstand the ravages of varying weather conditions, such as brake lining material, so as to efficiently grip the surface of the belt 22 in moving the same. The finished roller is bowed outwardly so as to maintain the belt properly centered when moving it.

The drive for the roller 25 is obtained from a motor or gasoline engine, or other source of power whose housing M is shown in Fig. 1 as mounted upon the trestle 31 above the frame F, the trestle being bolted to the frame in proper position as will be hereinafter explained. The drive is by sprocket and chain 32 to the transverse shaft 33 and by appropriate gearing and chain 34 to sprocket 35 mounted upon the shaft 28 of the roller 25. If desired there may be two chains 34 and sprockets 35 on opposite sides of the conveyer. The chain 34 passes over and around pulleys 36 and 37 that are mounted upon lever 38 that is pivoted to the frame and has connected to the depending end thereof a spring 39. The spring in turn is fastened to the frame to continually exert a pull upon the lever 38 in proper direction to take up the slack in the chain to place the same under tension continually.

A pair of idler rollers 40 are mounted in the frame upon the shaft 40' in position to support the return portion of the belt 22 extending from the roller 25 to the roller 26. The roller 40 is appropriately grooved as indicated in Fig. 4, to receive and pass the downwardly protruding flights of the belt.

Referring now to Fig. 5, it will be noted that where the upper reach of the belt rests upon the angle members 17, it is the flattened heads of the bolts 24 that engage the horizontal portions of the angles 17 and thus support the belt so as to permit it to slide along the members 17 without undue wear upon the under surface of the belt. The flattened heads likewise offer less friction to the sliding of the belt than the surface of the belt would offer. It will also be noted that the outer edges of the flights 23 have a very small clearance from the upright portion of the angles 17, which prevents materials, particularly the finer materials such as sand and gravel, from drifting around the edges of the flights back toward the lower or receiving end of the machine. This arrangement also minimizes the wear upon the edge of the belt where it may contact with the vertical portion of the members 17, the wear being taken up by the edges of the flights 23.

I have discovered that by imparting a sufficient rigidity to the flexible belt 22 I can eliminate from the machine entirely all supporting rollers for the belt which have heretofore been found necessary intermediate the end rollers 25 and 26. This rigidity is secured in my conveyer by spacing the flights relatively much closer together than has heretofore been the usual and customary practice in this industry. At the same time the flights cannot be spaced too close together because then the efficiency of the conveying function of the machine is seriously interfered with. I have determined that the most efficient spacing of the flights for these purposes to be not less than three inches nor more than ten inches

apart, and the flights are so arranged upon the belt of the conveyer of this application. The close spacing of the flights 23 prevents the belt from transverse sagging between flights and between its edges even when the conveyer is loaded with material.

My arrangement of the flights upon the belt also accomplishes another useful function in that the belt is held rigid or taut along its edges so that seepage of materials around the outer edges and beneath the belt is very greatly reduced.

The seepage materials would fall from the horizontal edges of the members 17 on to the under surface of the return portion of the belt 22 as would also dirt from other sources. To prevent this I shield the return portion of the belt. A portion of the shield is formed by a metallic hood 41 which is secured between the lower frame members 15 and thus extends over the width of the belt. From Fig. 5 it will be noted that the shield is peaked in the center and slopes downwardly towards its edges, the edges terminating adjacent the opening between the upper and lower frame members 15. The purpose of this slope is to deflect materials and dirt to the outside of the machine and thus dispose of it by gravity.

Since the conveyer normally stands in an inclined position such materials as fall upon the shield 41 will also fall toward the lower end of the machine. To prevent this, I provide a vertically disposed deflecting member 42 at the end of the hood 41 and fitting the contour of the same, as shown in Figs. 3 and 4. Deflector 42 is likewise peaked at its center and tapers outwardly to the sides of the frame 15 to insure the ejection of the material and dirt from the machine before it has opportunity to reach the lower roll 26.

The remainder of the return portion of the belt is protected by a sheet steel plate 43 which is flat and likewise overlies the width of the belt and the vertical deflector 42. The plate 43 is positioned between the horizontal portions of the trackway 17 and level therewith so that the upper reach of the belt rests upon the plate 43 as well as the trackway 17 at this point. The lower end of plate 43 terminates at the upper edge of a box 44 which is suspended between the side frames and communicates with openings 45 in the plates 11. Thus any material that may seep around the edges of the belt 22 as it moves over the plate 43 will be discharged out the sides of the machine and will not reach the under surface of the return portion of the belt. Box 44 is mounted upon a pair of angle iron bars 46.

A supporting plate 47 extends from the support for the lower edge of the box 44 and terminates adjacent the surface of the roll 26. Plate 47 is mounted in the frame so as to be level with the horizontal portions of the trackway 17 and thus the belt rests upon the plate and trackway as it passes this portion of the frame. In this position the plate 47 serves to take up the shock and force of the material being dumped or thrown upon the belt for carrying to the discharge end of the conveyer.

As some materials or dirt may nevertheless reach the under surface of the belt and particularly the roller 26, I arrange a scraper to remove any materials and accretions from the surface of the roller. Fixed to the lower end of the plate 47 and practically engaging the surface of the roller 26 is a scraper blade 48, the edge next the roller being sharpened to better perform the re-

moval function. The loosened materials will be fed along plate 47 into the box 44 and discharged from the sides of the conveyer.

The adjustment of the height of the discharge end D of the conveyer is accomplished substantially as described in my United States Letters Patent No. 1,589,495, issued June 22, 1926, and therefore will be only briefly referred to herein, there being, however, a difference in the arrangement of the cables.

The conveyer frame is mounted upon the supporting frame S which comprises two pairs of supporting arms 51 and 52 arranged in V-formation with the apex thereof mounted upon an axle 53 carrying traction wheels C. The free ends of arms 51 are received in sockets 54 that are pivotally mounted upon transverse shaft 55. Shaft 55 passes between the vertically spaced frame members 15 and is journaled at each side of the frame in one of the spacer plates 16. The free ends of arms 52 are received in socket members 56 that are pivotally mounted upon transverse shaft 57 which extends between the upper and lower frame members 15 and is slidable along the lower member.

The shaft 57 carries a pair of pulleys 58 around which pass ropes or cables 59 that are secured to a shaft 60, fixed in the frame, pass around the pulleys 58 and thence to a drum 61 which is located near the lower end of the machine and beyond the shaft 55. The shaft 62 of the drum 61 has a spur gear 63 thereon. A pinion 64, mounted on stub shaft 65, meshes with the spur gear to rotate the same by means of the crank handle 66. A release 67 is provided for a detent 68 which engages the pinion 64 to retain the drum in its adjusted position. When the drum is rotated to wind the ropes thereupon the arms of the V-shaped supporting frame will be drawn closer together and since the arms 51 are maintained fixed, the arms 52 will slide along the frame to raise the discharge end. The opposite action occurs when the ropes are unwound from the drum 61. It will be noted from the arrangements of cables herein that a multiplication of forces is obtained so that the operation of the raising and lowering device is accomplished easier than in my Patent No. 1,589,495.

Appropriate cross bracing 69 is provided between the respective pairs of members 51 and 52 and when desired the motor for driving the belt may be located on the supporting frame S.

I also provide an adjustment to compensate for changes in the location of the center of gravity of my improved conveyer. The location of the center of gravity varies with the size of the conveyer, the size and location of the electric motor or driving engine, or on the addition of the various screens or chutes at the discharge end of the conveyer. However, when the conveyer is to be moved from place to place, it is very desirable to have the center of gravity of the whole machine disposed substantially in line with or over the axle 53, thus nicely balancing the machine and making it easy for one person to move the machine. This position is attained by lifting the lower end of the conveyer by means of the handles 71, one of which is shown in Figs. 1 and 2, thus tilting the conveyer about the axle of the traction wheels. The handles 71 may be the opposite protruding ends of a bar mounted in the conveyer frame.

In order that this change of location in the center of gravity may be compensated for I mount the arms 51 so that the wheels may be moved back and forth beneath the conveyer frame in accordance with whatever compensation may be

necessary. One embodiment of this adjustment is shown in Fig. 2. Since shaft 55 is mounted in a pair of the spacer plates 16, and these are adjustable along the conveyer frame at will, it is apparent that if the plates 16 carrying the shaft 55 are moved along the frame, the wheels will move forwardly or backwardly to the desired position whereupon the plates are bolted in their new positions, thus locking the arms 51 in the adjusted position. While I have shown this form of adjustment, it will be understood that other compensating arrangements might be provided.

When the conveyer is assembled, the lower end is provided with a cover plate 76 for the conveyer belt where it passes around the lower roll 26. The plate 76 is mounted in slots 77 in the castings 12, entrance to which is had through the cut-away portion 78 above each slot. The cut-away portion is shorter than the slot 77 and at the upper end tapers into the slot so as to form the nose 79 (Figs. 2 and 7). In inserting the plate it is sprung slightly so as to pass the nose. As in some uses it may be desirable to leave off the plate 76, it is easily removed by forcing it past the nose 79. It will be noted that the plate 76 and castings 12 terminate in a pointed nose 80, the purpose of which is to aid the feeding of loose material to the conveyer, particularly from a pile of such material. The plate 76 also aids in this feeding action.

As the return reach of the belt leaves the rollers 40, it is important to insure centering the same as it reaches the roller 26. For this purpose I secure to the inside of each of the plates 11 a guide rail 81 which substantially spans the distance between rollers 40 and 26.

It may be desirable to construct the conveyer frame from a number of sections of standardized length, so that different length conveyers can be made up readily and economically from the standpoint of manufacturing cost. With my improved construction this can be easily accomplished as shown in Fig. 9. Frame members 15 are shown as having continuation sections 15' abutting thereto and secured in place by one of the plates 16 which, in this instance, overlaps the joint of sections 15, 15'. Then by the addition of spacer plates 13 between sections 15', the rigidity of the frame is maintained.

In summary of the operation and features of the above described conveyer: it has a normally inclined position shown in Fig. 1 with the lower end as the receiving or feeding end, and the upper end as the discharge or delivery end. The discharge end is raised and lowered by turning the crank 66 which brings the arms 51 and 52 closer together or further apart as the case may be. The frame is provided with a plurality of equi-distant holes which receive the bolts for mounting the various appurtenances of the conveyer therealong as may be desired. A compensation for the change in location of the center of gravity is effected by moving the plates 16 carrying arms 51 along the conveyer frame. The conveyer has only two rollers for supporting the upper reach of the conveyer belt, located respectively at opposite ends of the machines, the belt being supported intermediate the two rollers upon the tracks 17 located at the sides of the frame. The belt, although made of flexible material, is rendered sufficiently rigid by extending the flights across the width of the belt, and spacing the same so as to prevent sagging of the belt, while at the same time preserving its efficiency. The belt is kept from contact with the metallic parts of

the frame by providing enlarged flat heads for the bolts securing the flights in position, which heads ride upon the tracks 17, and also by the edges of the flights which extend to the edge of the belt and thus engage the sides of the frame in the event of any side play of the belt.

It may be pointed out that in the case of very wide belts, a central track 82, as shown in dot and dash lines in Fig. 5 may be provided, the track being so located that one of the bolt heads 24 rides thereon. However, such an additional track is seldom necessary.

Certain of the features of the mechanism hereinafore set forth are more particularly described and claimed in my copending application Ser. No. 451,608, filed May 12, 1930.

Modifications may be made in the location and arrangement of parts within the spirit and scope of my invention, but such modifications are intended to be covered by the appended claims.

I claim:

1. A conveyer for loose materials comprising a main frame having upright side members, a pair of rollers mounted on opposite ends of said frame, a flexible endless fabric belt encircling said rollers and extending therebetween and also between said side members, a plurality of rigid flights extending substantially the full width of said belt and secured thereto, trackway supports for said belt extending longitudinally between said rollers and cooperating with the flights to constitute the principal support for the belt between said rollers, and means to prevent sagging of the belt between said supports, the flights cooperating with the side members to prevent seepage of material around the side edges of the belt, and a motor operatively connected to drive said belt.

2. In a conveyer, a boom having a receiving end and a discharge end, the receiving end being formed with side walls, an angle iron secured to each of said side walls below the top thereof, a supporting plate secured between said angle irons and extending a substantial distance along the boom, a roller mounted near the receiving end beyond said plate, a plate for covering said roller and overlapping one end of the supporting plate but spaced therefrom, said cover plate also extending substantially to the end of the boom, upper and lower supporting members secured to said side walls and extending substantially to the discharge end of the boom, angle irons carried by said upper supporting members so that one portion of each angle iron projects inwardly to form trackways at each side of the boom, said angle irons being positioned so as to be in alignment with the angle irons holding the supporting plate whereby trackways are provided from the receiving to the discharge end of the boom, trough plates mounted above the trackways and extending as continuations of said side walls to the discharge end of the boom, means for holding the upper and lower members spaced apart and for securing the trough plates in position, means for holding the continuations of the side walls spaced apart laterally, a driving roller mounted at the discharge end, a fabric belt encircling said rollers and passing below the cover plate and above the supporting plate, rigid means carried by said belt for cooperating with the trackways to support the belt, a frame upon which the boom is supported, the frame and boom being adjustable relatively to each other to raise and lower the discharge end at will, means for adjusting the frame and boom

relatively to each other and locking the same in adjusted position, a motor mounted upon said boom and operatively connected to said driving roller, and wheels carried by the frame and upon which said conveyer is portable from place to place at will.

3. In a conveyer for loose materials, a boom having a receiving end and a discharge end, the receiving end being formed with side walls and a supporting plate secured to each of said side walls below the top thereof and extending a substantial distance along the boom, a roller mounted near the receiving end beyond said plate, a cover for said roller overlapping one end of the supporting plate but spaced therefrom, said cover also extending substantially to the end of the boom, upper and lower supporting members secured to said side walls and extending substantially to the discharge end of the boom and having inwardly projecting portions, inwardly projecting trackways carried by said upper supporting members, said trackways being positioned so as to be continuations from the surface of the supporting plate, trough plates mounted upon and extending above the trackways and extending as continuations of said side walls to the discharge end of the boom, means for holding the upper and lower members spaced apart and for securing the trough plates in position, means for holding the continuations of the side walls spaced apart laterally, a driving roller mounted at the discharge end, a fabric belt encircling said rollers and passing below the cover plate and above the supporting plate and trackways and below the lower supporting members, rigid means carried by said belt for cooperating with the trackways as the principal support for the upper reach of the belt, a shield extending from the upper end of the supporting plate substantially to the discharge end of the boom and secured to the lower supporting members, a frame upon which the boom is supported, the frame and boom being adjustable relatively to each other to raise and lower the discharge end at will, means for adjusting the frame and boom relatively to each other and locking the same in adjusted position, a motor mounted upon said boom and operatively connected to said driving roller, and wheels carried by the frame and upon

which said conveyer is portable from place to place at will.

4. In a conveyer for loose materials, a boom having a receiving end and a discharge end, the receiving end being formed with side walls and a supporting plate secured to each of said side walls below the top thereof and extending a substantial distance along the boom, a roller mounted near the receiving end beyond said plate, a cover plate for said roller overlapping one end of the supporting plate but spaced therefrom, said cover plate extending substantially to the end of the boom, continuations of said side walls comprising sectioned upper and lower supporting members secured to said side walls and end to end to the discharge end of the boom and having inwardly projecting portions, inwardly projecting trackways carried by said upper supporting members, said trackways being positioned so as to be continuations from the surface of the supporting plate, sectioned trough plates mounted upon and extending above the trackways to the discharge end of the boom, plates for holding the upper and lower members spaced apart and for securing the trough plates in position, some of the plates joining together the ends of said sectioned members and plates, means for holding the continuations of the side walls spaced apart laterally, a driving roller mounted at the discharge end, a fabric belt encircling said rollers and passing below the cover plate and above the supporting plate and trackways, rigid means carried by said belt for cooperating with the trackways as the principal support for the upper reach of the belt, a frame upon which the boom is supported and including struts that may be secured to the boom at various distances from the receiving end, the frame and boom being adjustable relatively to each other to raise and lower the discharge end at will, means for adjusting the frame and boom relatively to each other and locking the same in adjusted position, a motor mounted upon said boom and operatively connected to said driving roller, and wheels carried by the frame and upon which said conveyer is portable from place to place at will.

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