June 15, 1926.

1,589,091

H. H. BARBER

PORTABLE CONVEYER

Filed Nov. 4, 1918

3 Sheets-Sheet 1

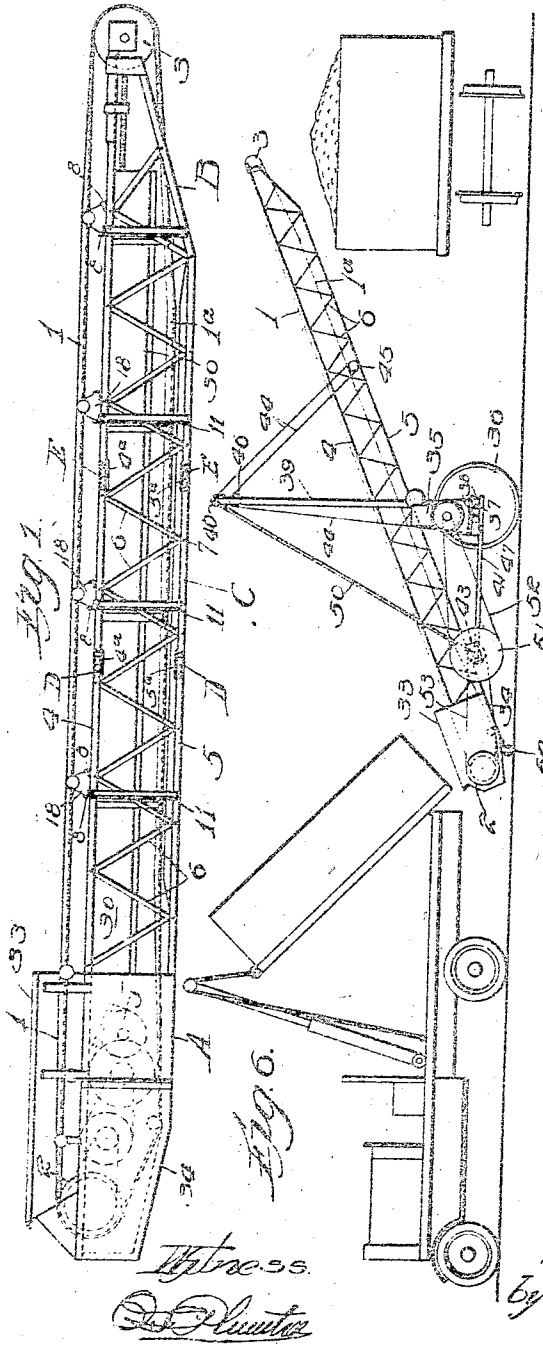


Fig. 1.

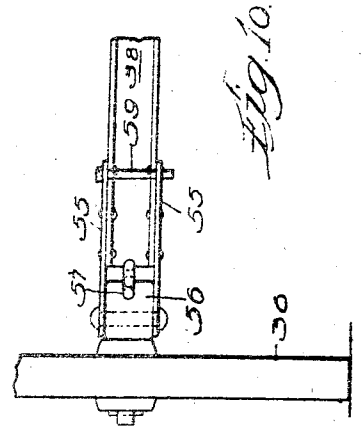


Fig. 10.

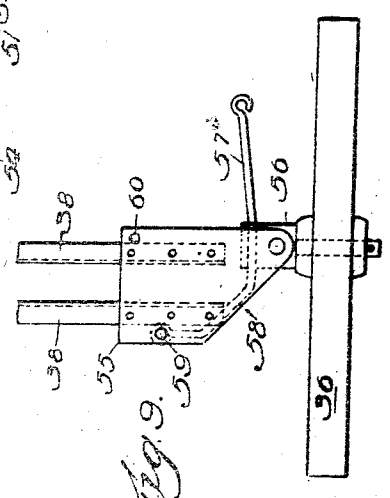


Fig. 9.

Fig. 6.

Witnesses.

Inventor.
Harry H. Barber,
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H. N. BARBER

PORTABLE CONVEYER

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3 Sheets-Sheet 2

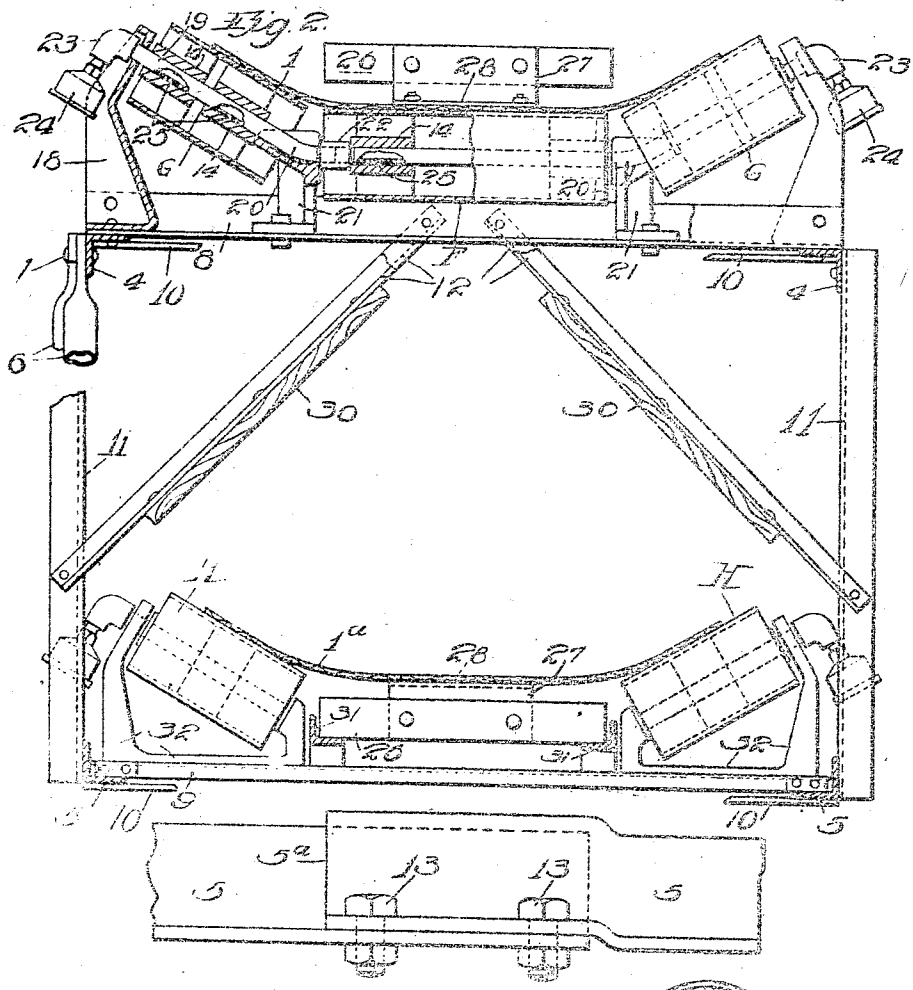


Fig. 2.

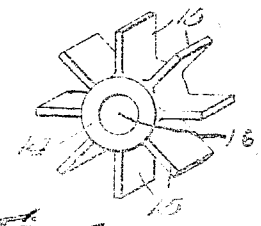


Fig. 4.

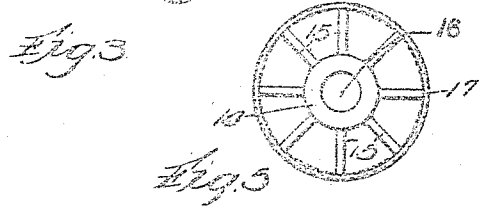


Fig. 3

Fig. 5.

Witness:

Inventor:
Harry N. Barber;
by Burton & Burton
his Attys.

June 15, 1926.

1,589,691

H. H. BARBER

PORTABLE CONVEYER

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3 Sheets-Sheet 3

Fig. 7.

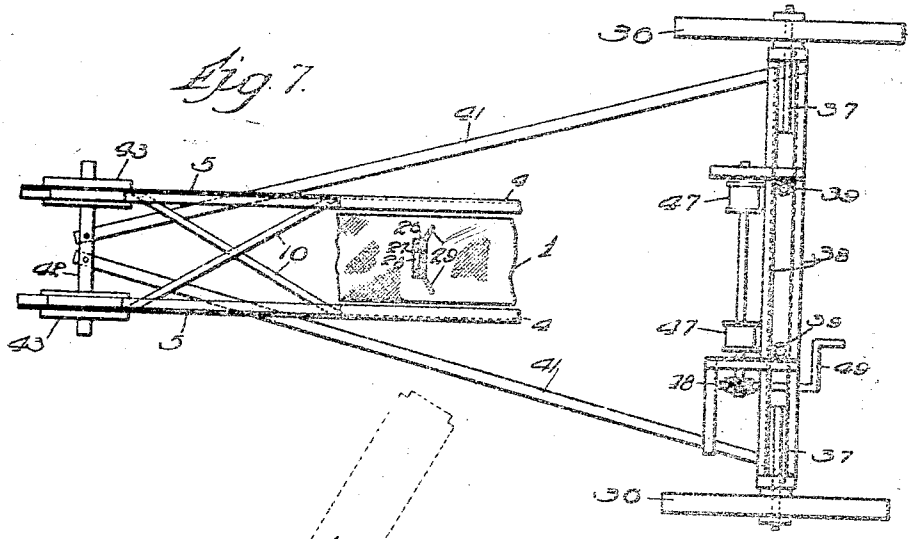
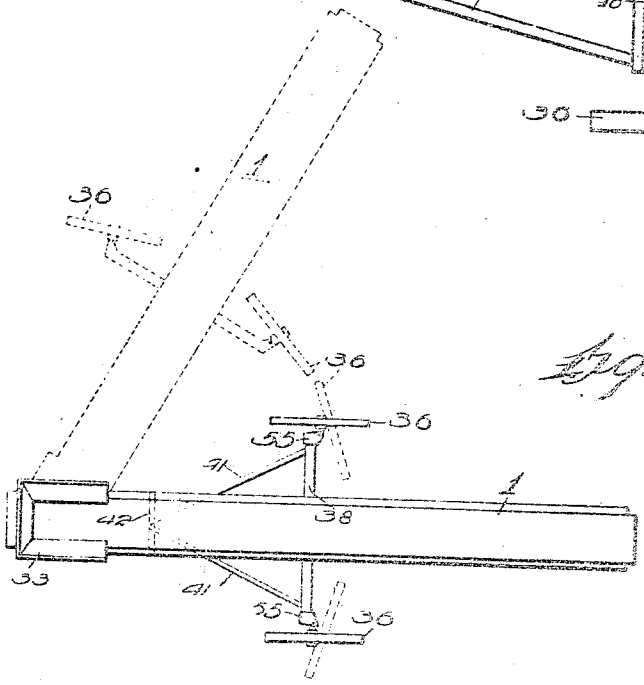


Fig. 8.



Witness:

Inventor:
Harry H. Barber;

by Burke & Burke
his Attys.

Patented June 15, 1926. 1,589,091

UNITED STATES PATENT OFFICE.

HARRY H. BARBER, OF AURORA, ILLINOIS, ASSIGNOR TO BARBER-GREENE COMPANY, OF AURORA, ILLINOIS, A CORPORATION OF ILLINOIS.

REISSUED

PORTABLE CONVEYER.

Application filed November 4, 1916. Serial No. 260,934.

This invention relates to a conveyer designed to be mounted and operated as a portable unit, and adapted to a wide variety of uses. It consists of the various details of construction and the combinations thereof which are hereinafter described and illustrated in the drawings, as indicated by the claims.

In the drawings:

Figure 1 is a side elevation of a conveyer unit embodying this invention.

Figure 2 is a transverse section on a larger scale showing details of the conveyer frame and also of the conveyer belt and rollers on which it is mounted for travel.

Figure 3 is a detail plan view showing the form of joint by which the frame sections are detachably connected.

Figure 4 is a perspective view of a hub or spider used in constructing the belt rollers.

Figure 5 is an end elevation of a completed roller showing the spider inserted in the tubular rim.

Figure 6 is a diagrammatic side elevation illustrating the mode of use of the type of conveyer to which this invention relates, and including a carriage in the form of a portable tower from which the conveyer frame may be adjustably supported at various angles to bring its discharge or delivery end at exactly the right height.

Figure 7 is a detail plan view, partly in section, to illustrate certain features of the tower shown in Figure 6.

Figure 8 illustrates a modified form of carriage for a tower or other support for a portable conveyer of this type.

Figure 9 is a detail plan view showing the wheel mounting of the carriage shown in Figure 8.

Figure 10 is a detail elevation of the part illustrated in Figure 9.

The conveyer illustrated in the drawings consists briefly of a frame provided at its opposite ends with head and tail pulleys respectively and with a conveyer belt arranged to run over said pulleys, together with suitable gearing for applying power to drive the belt. The frame may be mounted either horizontally for merely transferring material from one point to another in horizontal direction or, as is more frequently the case, may be supported obliquely so that the conveyer belt will elevate material from the receiving end to the discharge end. A typical use is illustrated in Figure 6 in which bulk material is either dumped or shoveled from a truck into the receiving hopper of the conveyer from which it is carried on the conveyer belt to the upper and discharge end for delivery into a freight car.

Referring first to Figure 1, the conveyer belt is shown at 1 with its upper ply arranged to run off from a head pulley or driving drum, 2, and over a tail pulley, 3, at the opposite end of the frame. The frame consists of two parallel side members formed as steel trusses whose upper chord, 4, and lower chord, 5, may be formed by standard steel angle bars and connected together by lacing composed of short sections of pipe or tubing, 6, whose extreme ends are flattened and secured to the vertically extending parts of the angles, 4 and 5, as by rivets, 7, indicated in Figures 1 and 2. This construction makes a very stiff, and at the same time a very light form of truss which may be rapidly and economically assembled. These side frames or trusses are transversely connected at suitable intervals by cross members such as the angle bars, 8 and 9, seen in Figure 2, and crossed pairs of diagonals, 10, in both the upper and lower panels of the cross frame will secure the latter against collapse. In addition to the diagonal lacing members, 6, the side frames are provided with vertical angle bars, 11, arranged in the same vertical planes as the cross bars, 8, so that diagonal braces, 12, may be connected to these members for reinforcing the box like frame thus formed for the conveyer.

Preferably these conveyer frames are made up of standard units, and Figure 1 illustrates an assembly of the three different units comprising a standard drive end, A, in which the head pulley, 2, is carried, a standard discharge end, B, by which the tail pulley, 3 is carried, and a standard intermediate section, C, which is the portion of the frame shown between the joints, D and E, at which it is connected with the drive section, A, and discharge section, B, respectively. To simplify the assembly of these sections, the end portions, 4^a and 5^a, of the longitudinal angle members, are offset at one end of each standard section to the extent indicated in Figure 3, so that they may lap within the end portions of the corre-

sponding members, 4 and 5, of the next section and can be connected or spliced thereto by fastening bolts, 13. This permits as many intermediate sections, C, to be inserted between a pair of end sections, A and B, as may be needed to produce a conveyer of the desired length. It will be obvious that to reduce the number of joints as shown at D and E, to a minimum, the standard sections, C, may be manufactured in a series of different lengths, such lengths being preferably multiples of the minimum length of such intermediate sections.

The belt 1, is supported on carrier rollers which are made up of elements illustrated in Figures 4 and 5. A cast spider comprising a hub portion, 14, with radiating arms, 15, is first bored out approximately at the axis of its hub. Through the bore, 16, there is then inserted a carefully centered mandrel which is mounted on centers in a grinding machine, whereupon the ends of the radial arms, 15, are ground off just enough to make the spider a tight drive fit for pipe or tubing, 17, which is to serve as the rim or tire of the roller. The spider is then forced or driven longitudinally into a section of this tubing, 17, to the desired position, as indicated in Figure 5; owing to the elasticity of the tubular wall, 17, it may thus be stretched into an approximately polygonal form as indicated by the dotted line in Figure 5, but on account of the multiplicity of the radial arms, 15, the final form of the roller will be nearly enough cylindrical to serve all practical purposes. Figure 2 shows rollers of this type mounted on the conveyer frame. At its opposite ends the cross-member, 8, supports two brackets, 18, in which are secured the ends of a bent tubular axle, 19, for the rollers, the bends, 20, of said axle being lodged in upwardly-open cradle brackets, 21, also carried on the member, 8. Preferably the tubular axle, 19, is formed of standard pipe, and to facilitate its assembly it is made in two sections joined by a coupling, 22, so that before the two sections are coupled together, the middle roller, F, and one of the end rollers, G, can be entered on the longer section of the axle from opposite ends thereof, while the other roller, G, can be slid onto the short axle section from its outer end. The two sections are then secured together by the coupling, 22, and lodged in the cradle bracket, 21, whereupon the end brackets, 18, may be engaged with the end portions of the axle, 19, and the elbows, 23, applied thereto with their grease cups, 24, as shown in Figure 2. Small apertures, 25, in the tubular axle, 19, are positioned to register with the hub portions, 14, of the spiders in the rollers, F and G, for feeding to the bearing surfaces the lubricant supplied through grease cups, 24. This construction permits a large supply of lubricant to be carried in the hollow journal or axle, 19, thus minimizing trouble from inadequate lubrication.

To enable the belt, 1, to hold a load of material, particularly bulk material, even when operating at a relatively steep incline, it is provided with flights, 26, which are shown as bars of flat stock extending crosswise of the belt through the middle portion of its width but not to its extreme edges, each bar, 26, being supported by an angle member, 27, whose width transversely of the belt is much less than that of the bar itself, so that the securement of its foot portion, 28, to the belt will not seriously interfere with the troughing thereof which is effected by the inclined rollers, G, shown in Figure 2. Preferably as indicated in Figure 7, the end portions, 29, of the bar, 26, may be slightly bent with respect to the middle portion which is secured to the supporting angle, 27, such bending being in the direction of travel of the belt, 1, and thus tending to center the load of bulk material on the belt and prevent spillage from the edges of the belt. Within the box-like conveyer frame there are mounted the obliquely-disposed boards, 30, secured to the diagonal braces, 12, and serving as shields to protect the lower ply of the belt by shedding any spillage which may occur over the edges of the upper ply.

At the lower or return ply of the belt, 1, indicated at 1^a, on Figure 2, the flights, 26, are of course inverted and suspended from the lower surface of the belt. Guide rails formed of inwardly-facing angle bars, 31, are arranged to accommodate the flight bars, 26, between them, and to prevent undue dragging of the bars upon these rails, the extreme lateral portions of the belt beyond the end of the bars, 26, are supported upon obliquely-disposed rollers, H, which are substantially similar in construction to the rolls, G, which serve for troughing the upper ply of the belt, 1. However, there being no middle roller corresponding to the upper rollers, F, the rolls, H, are shown as supported each upon an individual axle carried in a bracket, 32, lodged upon the cross-member, 9, of the frame.

When electric power is available for driving a conveyer of this type, it may be equipped with an electric motor which is preferably mounted at the receiving end of the frame, adjacent the drive pulley, 2, and below the receiving hopper, 33; such a motor is indicated at J in Figure 1 in dotted line, and a suitable gearing connecting the motor to the pulley, 2, is likewise indicated, such assembly of motor and gearing being enclosed for protection from dust or injury by means of suitable steel plates, 34, forming a housing under the receiving hopper, 33, at this end of the frame. With a motor of this type the power is applied to the conveyer

merely by an electric cable leading to a source of electrical energy, and the conveyer can be readily adjusted to any desired position of operation without interfering in any way with the power connection. Where electric power is not available and the conveyer is mounted on a carriage such as shown in Figure 6, a small gasoline engine may be supported on the carriage itself, as indicated at 35. This carriage which is shown more in detail in Figure 7 consists of a pair of wheels, 36, whose stub axles, 37, are secured between transverse frame bars, 38, in which there are also mounted the vertical posts, 39, connected at their upper ends by a suitable cross member, 40, to form a tower. From the transverse frame members, 38, horizontal braces, 41, extend rearwardly to a cross-beam, 42, which is pivotally engaged in blocks, 43, rigidly attached to the conveyer frame, of which only a fragment is shown in Figure 7. By this means the conveyer frame is pivotally connected to the carriage frame only at the axis of the cross-beam, 42. From the top of the tower composed of the uprights, 39, and cross member, 40, flexible cables, 44, are shown extending around pulleys, 45, suitably located on the conveyer frame for minimizing the strain thereon; from the pulleys, 45, the cables, 44, pass around other pulleys, 46, and down to the drums, 47, supported on the carriage frame and constituting a windlass which may be operated through a worm gear, 48, and crank, 49, for raising or lowering the delivery end of the conveyer frame. Oblique tie rods, 50, reaching from the top of the tower to the blocks, 43, serve to reinforce the carriage frame. Throughout the raising or lowering adjustment of the conveyer frame with respect to the carriage frame, the axis of the cross-beam, 42, will not change its relation to the carriage frame, hence a counter-shaft carrying a belt wheel, 51, may be journalled at this axis and power transmitted through said counter-shaft by means of a belt, 52, from the engine, 35, and a second belt, 53, to the drive pulley, 2, of the conveyer, and the relation of these driving elements will remain undisturbed throughout the adjustment of position of the conveyer frame, and the belt, 1, thereon. By furnishing the receiving end of the conveyer frame with a caster wheel, 54, the entire assemblage can be readily moved about for use at any desired place.

In using a conveyer of this type to handle bulk material such as sand, gravel or coal which is to be received at one point and distributed in a pile or piles, it is frequently convenient to be able to keep the receiving end of the conveyer at such receiving point and gradually shift the delivery end. For this purpose a modification of the carriage shown in Figure 6 is shown in Figures 9 and 10, as consisting in mounting the wheels, 36, on very short stub axles vertically swiveled as between plates, 55, carried at the end of the frame members, 38; the block, 56, from which the stub axle projects is provided with two arms, 57 and 58, respectively, each terminating in an eye. For ordinary travel of the carriage in direction longitudinal with respect to the conveyer frame, the wheels will be locked at a position shown in full line in Figure 8, by the insertion of a locking pin, 59, in apertures in the plate, 55, and engaging the eye of the arm, 58, as indicated in Figure 9, but for adjusting the wheels to extend transversely of the carriage, as indicated in dotted lines in Figure 8, the arms, 57, may be swung against the frame members, 38, so as to permit insertion of the locking pin, 59, through apertures, 60, in the plate, 55, to engage the eyes at the end of arms, 57. This permits the wheel, 36, to travel in an arc about a center located under the receiving hopper, 33, as to such a position of the conveyer as is indicated in dotted outline in Figure 8, for distributing the material delivered by it into a semicircular pile or into a series of adjacent piles. It will be obvious that such adjustment of the conveyer involves the expenditure of considerably less effort than if it must be wheeled back and forth longitudinally for shifting the position of its discharge end.

I claim:

1. In a portable conveyer comprising a longitudinally extending frame composed of trusses and upper and lower transverse members connecting the upper and lower chords of the trusses, respectively, head and tail pulleys carried by the frame at its opposite ends, an endless conveyer belt on said pulleys, the upper ply running over the upper transverse members and the lower ply returning between said upper and lower transverse members, diagonal transverse braces extending downwardly from the upper transverse members, and shields carried by said braces over the lower ply of the belt.

2. A portable conveyer comprising in combination a longitudinally extending frame with head and tail pulleys at its opposite ends supporting an endless conveyer belt, a carriage consisting of a transverse frame with laterally spaced uprights and axles with carrying wheels at the ends of the transverse frame, the conveyer frame being inclined between said uprights with its lower end resting on the ground; suitable tackle supported by the uprights and connected to the conveyer frame for raising and lowering the latter, a cross beam secured to the conveyer frame at a distance upward from its lower end and braces attached to said cross beam diverging therefrom and secured to the extreme ends of the transverse frame.

3. A portable conveyer comprising in com-

bination a longitudinally extending frame with head and tail pulleys at its opposite ends supporting an endless conveyer belt, a carriage comprising a transverse member and laterally spaced uprights with axles and carrying wheels at the ends of the transverse member, suitable tackle supported by the uprights and serving to suspend the conveyer frame between them with its receiving end resting on the ground and bracing means extending in approximately horizontal direction from the transverse frame member to pivotal connection with the conveyer frame intermediate its receiving end and said transverse member.

4. In the combination defined in claim 3, oblique braces extending from the upper portions of the uprights substantially to the pivotal axis at which the horizontal braces are attached to the conveyer frame.

5. In the structure defined in claim 2, said cross-beam being pivotally attached to the conveyer frame.

6. In the structure defined in claim 2, the cross-beam extending beyond the frame, and a stepped pulley journaled thereon; a power device mounted on the carriage, power-transmitting means from the power device to one of the steps of said pulley, and another power-transmitting means from another step of the stepped pulley to the head pulley at the power-receiving end of the conveyer.

7. In the structure defined in claim 2, the axles of the carrying wheels being swivelled to the transverse frame on a vertically pivoted block; a pair of plates overhanging the end of the transverse frame, supporting means for pivoting the block, a pair of arms projecting from the block, each arm terminating in an eye, and a locking pin for engaging the said eye, arranged to lock one of the arms to the said overhanging plates, thereby securing the carrying wheels in planes parallel to each other, or in a plane parallel to the transverse frame.

8. The combination of a transversely flexible conveyer belt, troughing rollers engaging and upbending its marginal portions and flights transversely mounted on the belt secured only to the middle portion thereof with their laterally extending portions spaced away from the belt surface.

9. The combination of a transversely flexible conveyer belt, troughing rollers engaging and upbending its marginal portions and flights transversely mounted on the belt secured only to the middle portion thereof, the lateral extent of said flights stopping short of the extreme marginal portions of the belt.

10. The combination of a transversely flexible conveyer belt, troughing rollers engaging and upbending its marginal portions and flights transversely mounted on the belt each comprising a bar spaced from the belt surface and a foot member supporting said bar and secured only to the middle portion of the belt.

11. The combination of a transversely flexible conveyer belt, troughing rollers engaging and up-bending its marginal portions and flights transversely mounted on the belt secured only to the middle portion thereof, guiding means for the return ply of the belt comprising obliquely disposed rollers supporting the marginal portions of the belt and a pair of longitudinal guide rails of angle section opening inwardly and opposite each other for engaging opposite ends of the flights on the belt.

In testimony whereof, I have hereunto set my hand at Aurora, Illinois, this first day of November, 1918.

HARRY H. BARBER.