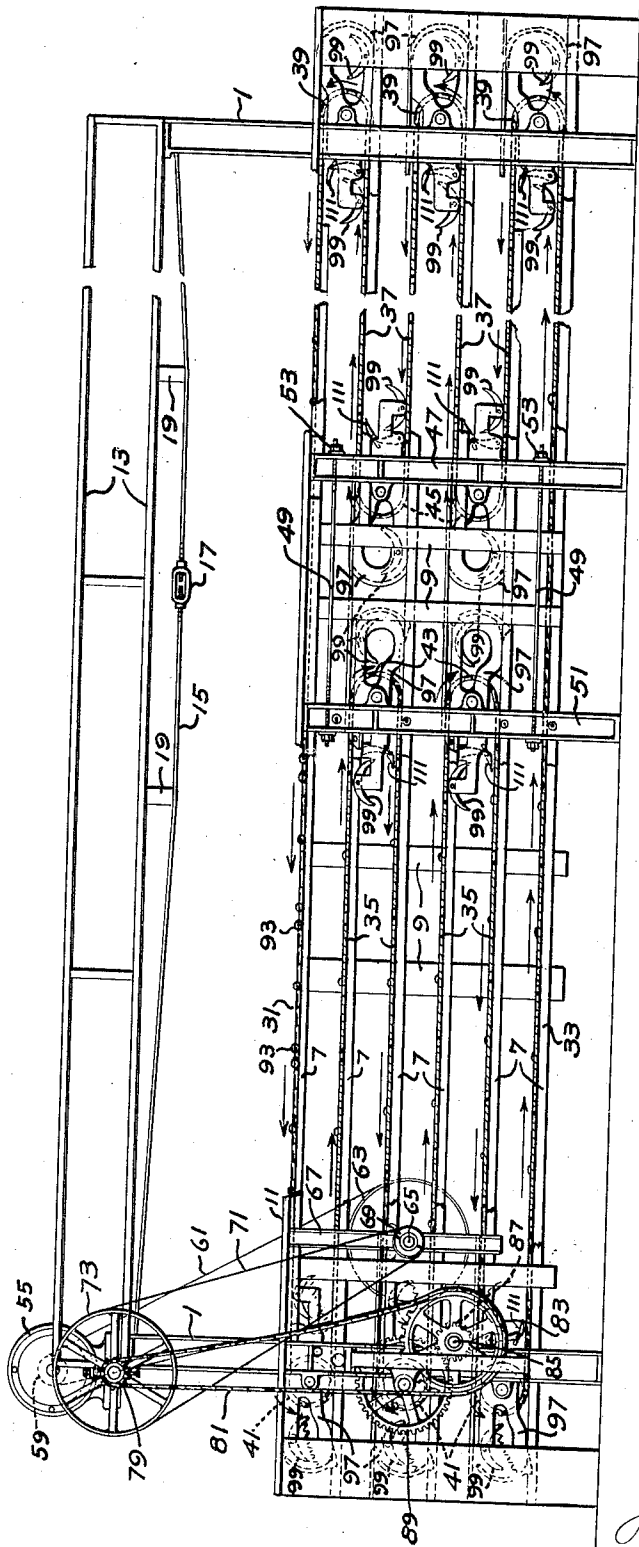


1,321,520.

J. W. GREER.  
CONVEYER.  
APPLICATION FILED NOV. 21, 1918.

Patented Nov. 11, 1919.  
3 SHEETS—SHEET 1.

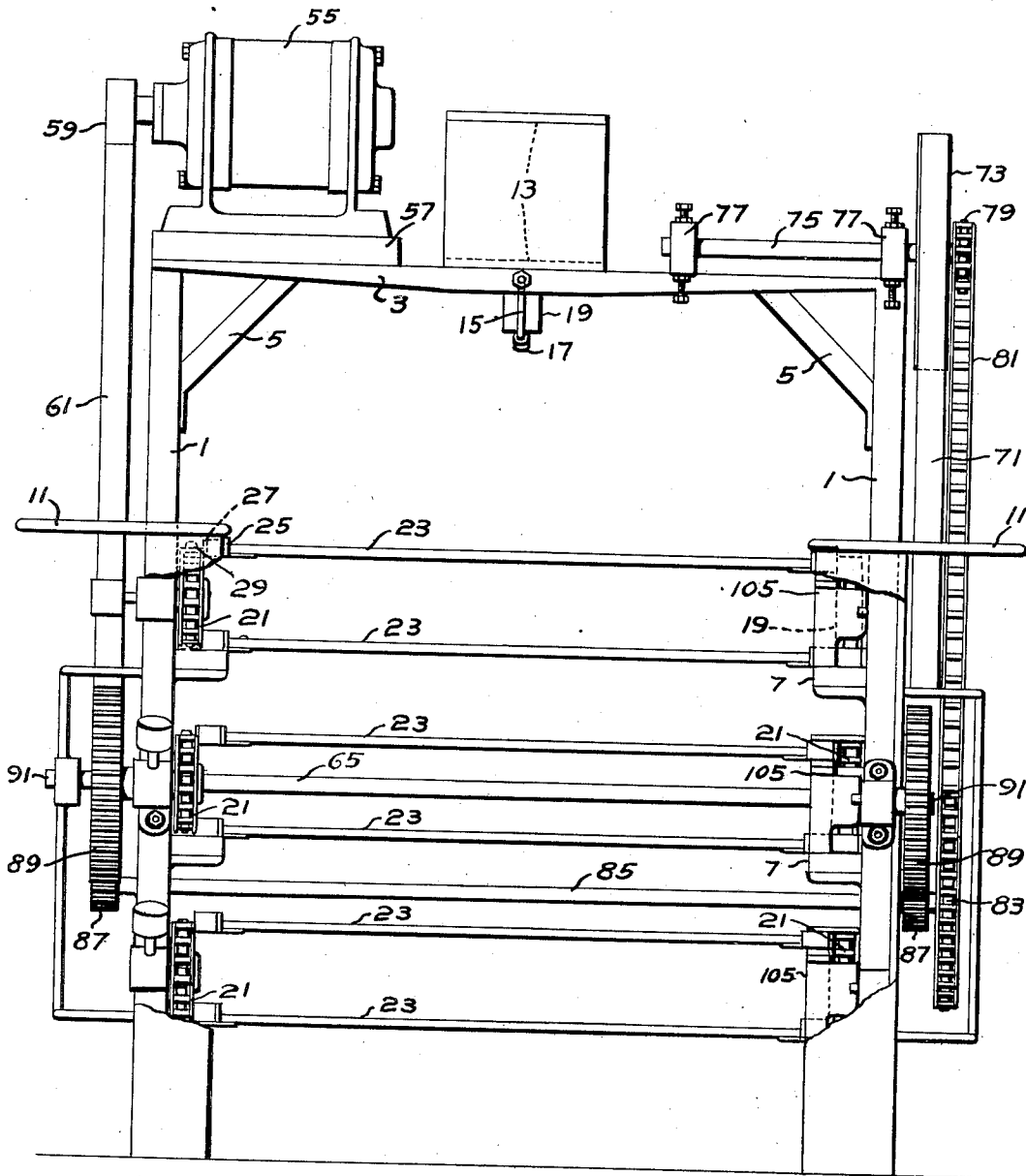


*Fig. 1*

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**Fig. 2**

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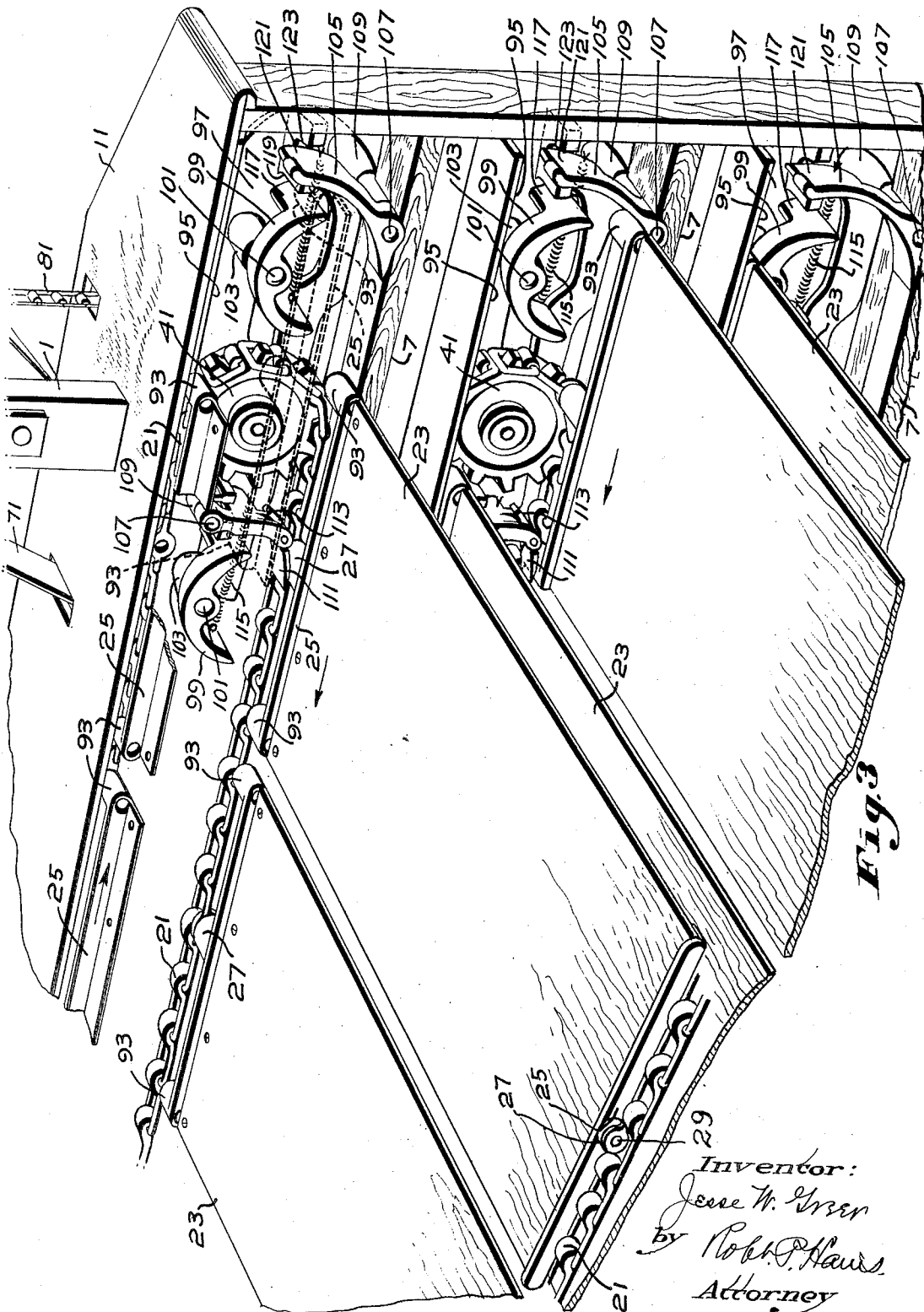
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# UNITED STATES PATENT OFFICE.

JESSE W. GREER, OF CAMBRIDGE, MASSACHUSETTS.

CONVEYER.

1,321,520.

Specification of Letters Patent.

Patented Nov. 11, 1919.

Application filed November 21, 1918. Serial No. 263,603.

*To all whom it may concern:*

Be it known that I, JESSE W. GREER, a citizen of the United States, residing at Cambridge, county of Middlesex, and State of Massachusetts, have invented an Improvement in Conveyers, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described relates to conveyer apparatus and more particularly to apparatus for conveying confectionery from a receiving station to a discharge station with sufficient travel between said stations to allow the confectionery time to dry or harden.

It is desirable that the articles shall be conveyed a considerable distance in a minimum space. An object of the invention, therefore, is to provide a conveyer which will have upper and lower runs, a series of intermediate runs to lower the articles from the upper to the lower run, and a series of intermediate runs to elevate the articles from the lower to the upper run.

The conveyer is provided with plates or carriers pivotally connected to the conveyer, which should be maintained substantially horizontal throughout their travel in order that they may not dump the articles therefrom. Another object of the invention is to provide simple and efficient means for automatically maintaining the plates or carriers substantially horizontal when transferring from upper to lower runs and from lower to upper runs.

It is important that the conveyer shall have proper tension throughout the runs thereof. Another object of the invention is to provide simple, easily operated adjusting means whereby the tension of the runs may be varied as desired.

With the aforesaid and other objects in view, the character of the invention will be best understood from the following description of one good form thereof shown in the accompanying drawings, wherein:—

Figure 1 is a side elevation of one good form of apparatus embodying the invention, parts being broken away to show parts beyond the same;

Fig. 2 is an end elevation of the apparatus shown in Fig. 1; and

Fig. 3 is a perspective view of an end portion of the apparatus.

Referring to the drawings, the apparatus shown therein as one good form of the invention, comprises a frame of any appropriate construction, in the present instance, comprising end posts 1 connected at their tops by transverse bars 3 strengthened by diagonal braces 5 secured to said bars. At opposite sides of the frame are two series of longitudinal bars 7 provided with vertical stiffening members 9 at appropriate intervals. Tables 11 may be mounted at opposite sides of the frame and extend longitudinally thereof to support the articles to be loaded on and taken from the conveyer. A pair of shelves 13 may rest upon the upper transverse bars 3, referred to, and extend longitudinally of the frame. To contribute to the support of the shelves and strengthen the frame, a stringer rod 15 may be provided having two sections with their outer ends secured to the upper transverse bars 3, and their inner ends connected by a turn buckle 17. Struts 19 may be interposed between the stringer rod and the lower shelf 13. These shelves may conveniently serve to receive supplies used in packaging the confectionery removed from the conveyer.

The conveyer may be of any suitable construction for the purposes set forth, and in the present instance, comprises sprocket chains 21 at opposite sides of the frame, and plates or carriers 23 of wood or other suitable material, each having at opposed ends thereof, angle bars 25 provided with bosses 27 conveniently formed integral with said angle bars and adapted to receive studs 29 projecting inward from links of the sprocket chains, said bosses and studs serving as means for pivotally connecting the carriers with the sprocket chains.

An operative or operatives may stand at receiving and discharging stations intermediate the ends of the frame to load the confectionery onto the plates or carriers of the conveyer and to remove the same therefrom. The conveyer should have sufficient travel between said stations to allow the confectionery time to dry or harden. To accomplish this, it is necessary to provide a conveyer of considerable length, but it is desirable that the conveyer shall occupy as little space as possible. For these purposes the conveyer, in the present instance, is provided with means for guiding the same in upper and lower runs 31 and 33, a series of

intermediate runs 35 for lowering the carriers from the upper run to the lower run, and a series of intermediate runs 37 for elevating the carriers from the lower run to the upper run.

The guiding means for giving the conveyer the path of travel through the runs described, in the present instance, comprises sprocket wheels 39 mounted at one end of the frame, sprocket wheels 41 mounted at the opposite end of the frame, a pair of intermediate sprocket wheels 43, and a pair of intermediate sprocket wheels 45.

Suitable means may be provided for furnishing the required tension to the conveyer. To accomplish this, in the present instance, the sprocket wheels 45 are carried by upright bars 47 at opposite sides of the apparatus, connected by adjusting rods 49 with fixed upright bars 51 supporting the intermediate sprocket wheels 43 referred to. The construction is such that nuts 53 on the rods may be adjusted to move the bars 47 relatively to the bars 51 to give the conveyer the tension required.

Suitable means may be provided for driving the conveyer. To accomplish this, in the present instance, an electric motor 55 is mounted on a base 57 resting on one of the upper transverse bars 3, referred to. A pulley 59 on the armature shaft of the motor is connected by a belt 61 with a large pulley 63 fast on a shaft 65 journaled in bearings in upright frame members 67. A small pulley 69 fast on the shaft 65 is connected by a belt 71 with a large pulley 73 fast on a short countershaft 75 (Fig. 2) journaled in bearings 77 mounted on the upper transverse bar carrying the motor. A sprocket wheel 79 fast on the countershaft 75 is connected by a sprocket chain 81 with a large sprocket wheel 83 fast on a shaft 85 journaled in suitable bearings carried by the frame of the apparatus. Pinions 87 fast on the shaft 85 mesh with large gears 89 fast on stub shafts 91 journaled in suitable bearings carried by the frame, and said shafts 91 also carry one of the sprocket wheels of each of the sprocket chains. The transmission described provides a desirable speed reduction between the electric motor and the sprocket chains of the conveyer.

Suitable means are provided for maintaining the plates or carriers substantially horizontal during their travel between the ends of each of the runs of the path of the conveyer. To accomplish this, in the present instance, each of the plates or carriers is provided with a pair of elements conveniently in the form of bosses 93 projecting from the angle bar 25 at one end of the carrier and disposed at opposite sides of the pivot boss 27 on such angle bar. These bosses or elements 93 are adapted to engage suitable horizontal tracks or guides extend-

ing longitudinally of the machine. In the present instance, the bosses 93 may engage a metal strip 95 (Fig. 3) secured to the under surface of one of the longitudinal tables 11, referred to, during the travel of the carrier through its upper run, and said bosses may engage the surfaces of tracks formed on the longitudinal bars 33 and 35 during the travel of the carrier through its lower and intermediate runs. It will be understood that the two point engagement of elements at opposite sides of the pivot point of the carrier with the tracks, will serve to maintain the carriers substantially horizontal throughout their travel through said runs.

Next will be described devices for maintaining the carriers substantially horizontal during their transfer from one run to another. Since these devices are or may be similar in their general construction, a description of one will suffice for all.

Each of these devices, in the present instance of the invention, comprises a plate 97 suitably secured to the frame of the apparatus and carrying a pair of curved guides adapted to be simultaneously engaged by the pair of bosses 93 on the carrier. These curved guides may be of suitable construction for the purpose, and in the present instance, comprise crescent shaped members 99 fulcrumed intermediate their ends on pins 101 suitably secured in bosses 103 projecting inward from the plate 97. Coöperating with these crescent shaped members are curved arms 105 fulcrumed on pins 107 secured in bosses 109 projecting inward from the plate 97. The inner arm 105 may have a finger 111 pivotally connected thereto free to rock in one direction, and having a spur 113 to engage the arm and limit the extent of rocking movement of the finger in the opposite direction.

The crescent shaped members and the curved arms are normally spaced a distance corresponding to the diameters of the bosses 93 on the carrier to allow said bosses to pass therebetween. One of the crescent members and arms is located a suitable distance from the other crescent member and arm to correspond with the spacing of the bosses 93, in order that the latter may simultaneously pass through the spaces between the crescent members and arms. The construction is such that in the course of the travel of a carrier, the bosses 93 will automatically enter between the crescent members and arms during the transfer from one run to another and be guided thereby so as to maintain the carrier substantially horizontal throughout the transfer. After the transfer as the carrier continues to travel, one of the bosses 93 will move away from the finger 111, referred to, after being guided thereby, and the other boss 93 will approach and pass back of said finger, the latter being

susceptible of sufficient rocking movement with respect to its arm to allow such passage of the boss.

To prevent cramping of the bosses as they pass between the crescent members and arms and to compensate for any irregularities in the construction, it is desirable that the crescent members and arms shall be susceptible of limited yielding movements. To accomplish this, in the present instance, each crescent member may be connected with the arm cooperating therewith by a coil spring 115. This spring will urge the crescent member and arm toward one another. The movement of the crescent member may be limited by engagement of a lug 117 thereon with a stop 119 projecting inward from the plate 97, and the movement of the arm 105 may be limited by engagement of a lug 121 thereon with a wall of a notch 123 in said stop. Thus, the movements of the crescent member and arm are limited in one direction, but they are free to spread apart against the resistance of the coil spring 115 to allow ready passage of the boss between them.

The transfer devices for the lowering runs of the conveyer are positioned reversely to the transfer devices for the elevating runs of the conveyer, as will be noted in Fig. 1.

The plates 97 may also serve as convenient means for supporting the sprocket wheels of the conveyer, and the plates 97 for the transfer devices adjacent the sprocket wheels 45 referred to, may be secured to the upright bars 47 to share in the adjustment of said sprocket wheels for giving the conveyer its appropriate tension and to avoid disturbing the proper relation of the sprocket wheels 45 with respect to the transferring devices.

In operation, the operator at the receiving station may place the confectionery or other articles on the plates or carriers traveling through the upper run of the conveyer toward the left of Fig. 1. The carriers are progressively conducted thence through the intermediate runs of the conveyer at the left of Fig. 1 to the lower run of the conveyer. They are conducted through the lower run toward the right of Fig. 1, and conducted thence through the intermediate runs of the conveyer back to the upper run of the latter to the discharge station, where the operative may remove the confectionery or articles from the plates or carriers and pack the same in cartons or otherwise dispose thereof. The plates or carriers will automatically be maintained substantially horizontal during their travel throughout all of the runs and during their transfer from one run to the other without any attention on the part of the operative.

It will be understood that the invention is not limited to the specific embodiment shown,

but that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What is claimed is:—

1. An apparatus of the character described, comprising, in combination, an endless conveyer, means to guide said conveyer in upper and lower runs, a series of carriers pivotally connected to said conveyer, means to maintain said carriers substantially horizontal when traveling between the ends of each run, curved transfer guides at the ends of said runs, one member whereof is yieldingly supported and elements on the carriers cooperating with said guides to maintain said carriers substantially horizontal when transferring from one run to another.

2. An apparatus of the character described, comprising, in combination, an endless conveyer, means to guide said conveyer in upper and lower runs, a series of carriers pivotally connected to said conveyer, means to maintain said carriers substantially horizontal when traveling between the ends of each run, a pair of transfer guides at each end of each run, one of the members of each pair being supported for movement relative to the other member of the pair, and a pair of elements on each carrier for engagement with said guides to maintain the carriers substantially horizontal when transferring from one run to another.

3. An apparatus of the character described, comprising, in combination, an endless conveyer, means to guide said conveyer in upper and lower runs, a series of carriers pivotally connected to said conveyer, means to maintain said carriers substantially horizontal when traveling between the ends of each run, a pair of transfer guides at each end of upper and lower runs, one of the members being mounted for swinging movement relative to the other member of the pair, and a pair of elements at opposite sides of the point of pivotal connection of the carrier with the conveyer cooperating with said guides to maintain the carrier substantially horizontal when transferring from one run to another.

4. An apparatus of the character described, comprising, in combination, a conveyer comprising a pair of sprocket chains, sprocket wheels for guiding said sprocket chains in upper and lower runs, and means to maintain the carriers substantially horizontal when transferring from one run to another including a pair of guides adjacent one of the sprocket chains, the members of each pair being mounted for relative movement on the passage of an element between them, and a pair of elements on each carrier adapted simultaneously to pass along said guides.

5. An apparatus of the character described, comprising, in combination, an end-

less conveyer having carriers pivotally connected thereto at intervals, means to guide said conveyer in upper and lower runs, a pair of yielding guides, and a pair of elements on each carrier adapted to pass along said yielding guides as the carrier transfers from one run to another to maintain the carrier substantially horizontal.

6. An apparatus of the character described, comprising, in combination, an endless conveyer having carriers pivotally connected thereto at intervals, means to guide said conveyer in upper and lower runs, and means to maintain said carriers substantially horizontal when transferring from one run to another including a pair of pivotally mounted guides, and a pair of elements on the carrier adapted to pass along said guides.

7. An apparatus of the character described, comprising, in combination, a frame, an endless conveyer comprising sprocket chains at opposite sides of said frame, sprocket wheels for guiding said chains in upper and lower runs, carriers pivotally connected to said chains, a pair of elements projecting from an end of each carrier, tracks extending longitudinally of the frame and cooperating with said elements to maintain the carriers substantially horizontal in their travel between the ends of each run, and a pair of relatively movable guides cooperating with said elements to maintain the carriers substantially horizontal when transferring from one run to another.

8. An apparatus of the character described, comprising, in combination, an endless conveyer, means to guide said conveyer in upper and lower runs, and intermediate runs, driving means for said conveyer, a series of carriers pivotally connected to the conveyer, and pairs of guides at the ends of said runs yieldingly mounted to cooperate with parts of the carriers to maintain the latter substantially horizontal in transferring from one run to another.

9. In a candy drying machine, the combination of an endless conveyer carrying trays for supporting confections, a frame having two portions, one a lowering and the other an elevating portion, a series of sprocket wheels at each end of the lowering portion about which the conveyer passes in a plurality of alternating upper and lower runs, a series of separate sprocket wheels at the ends of the elevating portion about which the conveyer passes in a plurality of upper and lower runs, a pair of guides adjacent the sprocket wheels in both the lowering and elevating portions of the frame for maintaining the trays horizontal, and means for simultaneously adjusting all the sprocket wheels at an end of one of said frame portions to take up lost motion and maintain the conveyer in proper relation to its related parts.

10. In a candy drying machine, the combination of an endless conveyer carrying trays for supporting confections, a frame having two portions, one a lowering and the other an elevating portion, a series of sprocket wheels at each end of the lowering portion about which the conveyer passes in a plurality of alternating upper and lower runs, a series of separate sprocket wheels at the ends of the elevating portion about which the conveyer passes in a plurality of upper and lower runs, a pair of guides adjacent the sprocket wheels in both the lowering and elevating portions of the frame for maintaining the trays horizontal, and means for simultaneously adjusting all the sprocket wheels and the tray guides associated with said sprocket wheels at an end of one of said frame portions to take up lost motion and maintain the conveyer in proper relation to its related parts.

11. An apparatus of the character described, comprising, in combination, an endless conveyer, means to guide said conveyer in upper and lower runs, a series of carriers pivotally connected to said conveyer, a pair of elements at an end of each of said carriers, a support, two pairs of spaced members mounted on said support, each pair comprising a pivotally mounted crescent member and a curved arm for receiving said elements on the carriers.

12. In a machine of the class described, the combination of a frame, an endless conveyer, a series of trays pivotally mounted on the conveyer, a series of sprockets about which the conveyer passes in upper and lower runs, a series of guides adjacent the sprockets for maintaining the trays in horizontal position as they pass from one run to the other, an upright support movably mounted on the frame and carrying one series of sprockets and their associated guides, and means for adjusting the upright support to simultaneously move the series of sprockets and guides relatively to the frame.

13. An apparatus of the character described, comprising, in combination, an endless conveyer, a series of carriers pivotally connected to said conveyer at intervals, means to guide said conveyer in upper and lower runs, a pair of elements at an end of each of said carriers, a pair of curved guides cooperating with said elements to maintain said carrier substantially horizontal in transferring from one run to another, and spring means cooperating with said pair of guides that they may yield relatively to permit free passage of said elements along the same.

14. In a candy drying machine, the combination of a frame, a conveyer carrying trays for supporting confections, a series of sprockets about which the conveyer passes to form a series of upper and lower

runs, a table extending longitudinally of the frame at the side of the exposed upper run of the conveyer for supporting confections to be placed upon the trays while  
5 in horizontal position at the upper run of the conveyer, upwardly extending posts, an overhead frame supported by the posts a distance sufficient to permit the attend-

ant at the longitudinally extending table to place confections on or take them off the 10 trays, and receiving supports for confections carried by the overhead frame.

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

JESSE W. GREER.