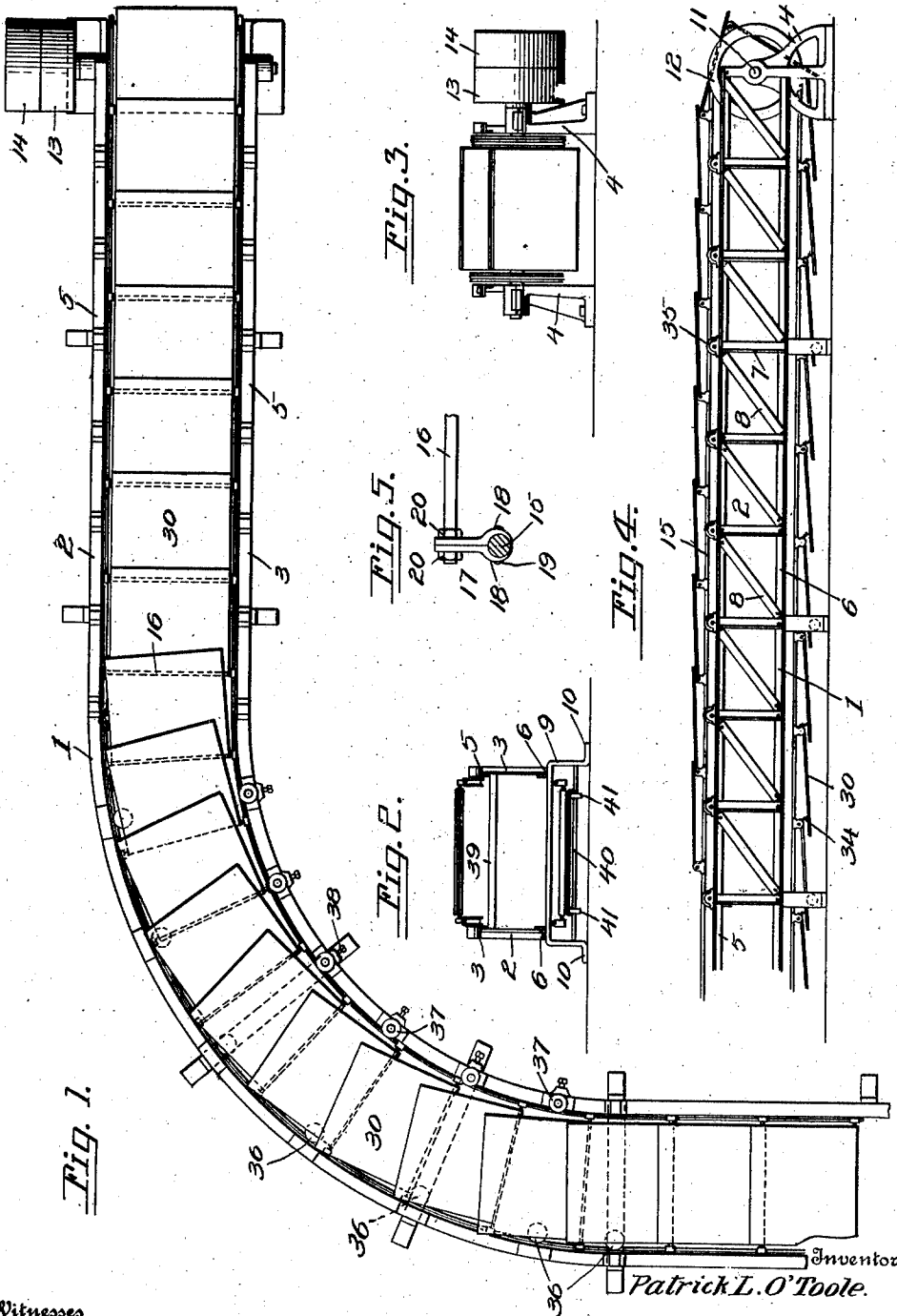


P. L. O'TOOLE.
CONVEYER AND ELEVATOR.
APPLICATION FILED OCT. 9, 1908.

967,424.

Patented Aug. 16, 1910.

3 SHEETS—SHEET 1.



Witnesses

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3 SHEETS—SHEET 2.

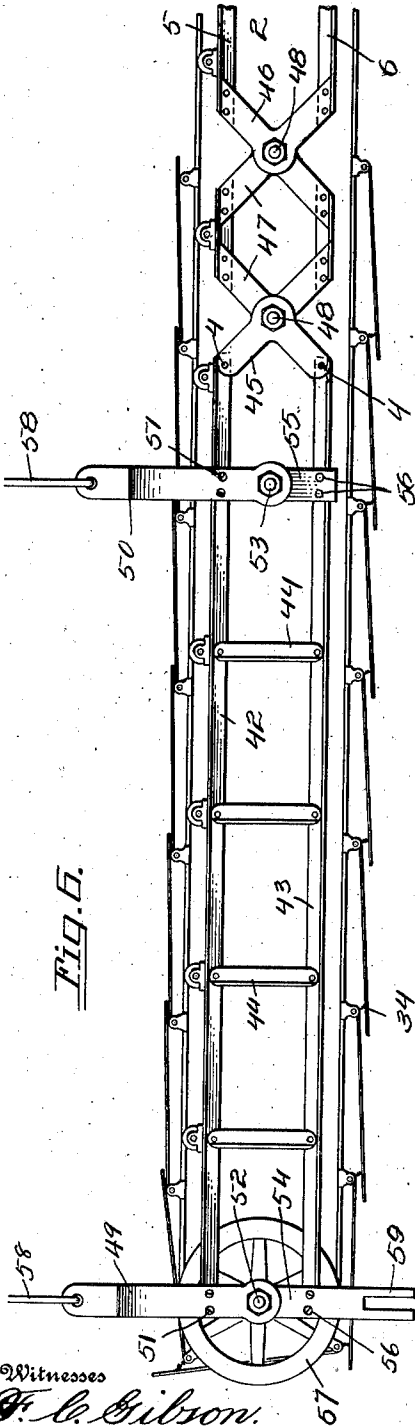


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.

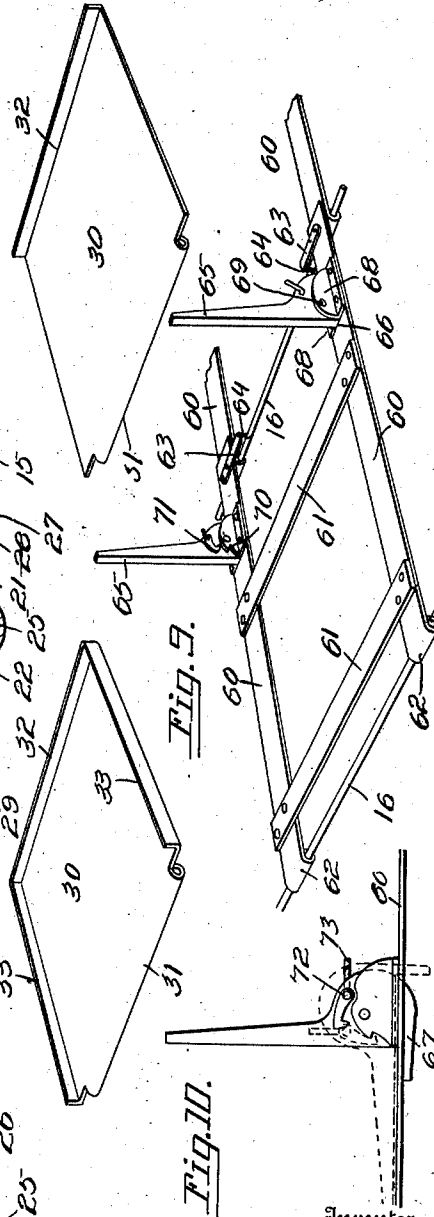


Fig. 10.

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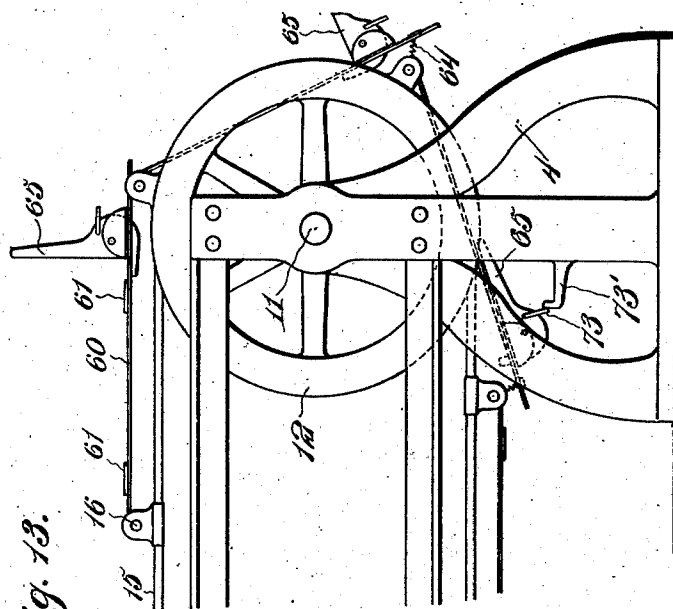


Fig. 13.

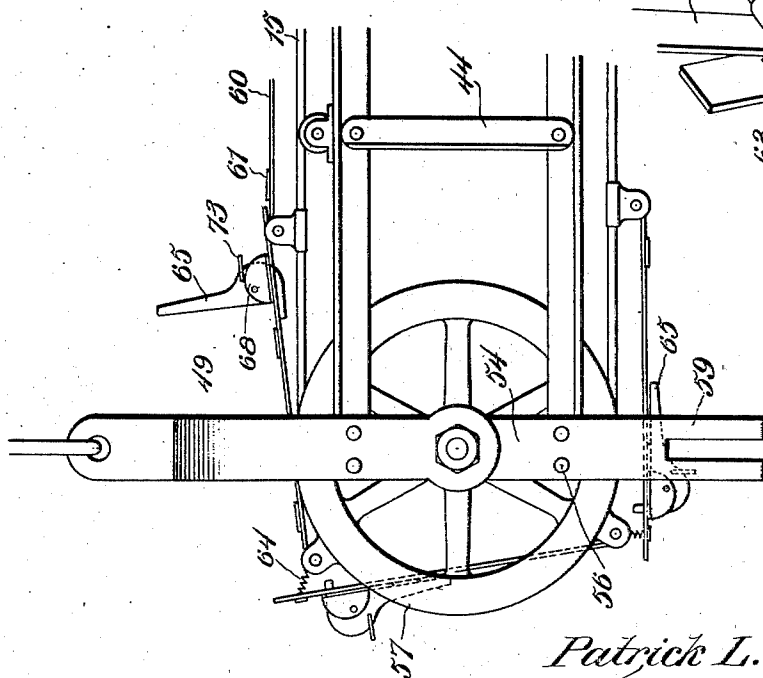
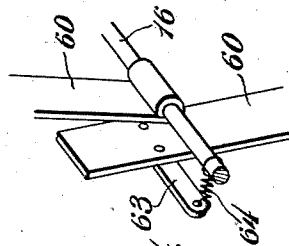


Fig. 14.



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CONVEYER AND ELEVATOR.

967,424.

Specification of Letters Patent.

Patented Aug. 16, 1910.

Application filed October 9, 1908. Serial No. 456,937.

To all whom it may concern:

Be it known that I, PATRICK L. O'TOOLE, a citizen of the United States, residing at Edwardsville, in the county of Madison and State of Illinois, have invented new and useful Improvements in Conveyers and Elevators, of which the following is a specification.

This invention relates to elevators and conveyers for elevating and conveying various kinds of articles or materials.

The object of the invention is to provide a machine of this character which is simple of construction, durable and efficient in use, and adapted to convey or elevate a maximum number of articles or amount of material in a given period of time.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a top plan view of a conveyer embodying my invention. Fig. 2 is a vertical cross section of the same. Fig. 3 is an end elevation. Fig. 4 is a fragmentary side elevation. Fig. 5 is a detail view showing the manner in which the cross rods of the conveyer are secured to the cables thereof. Fig. 6 is a side elevation of the delivery portion of a conveyer adapted for delivering brick to kilns and other special uses. Fig. 7 is a perspective view of one of the carrier plates. Fig. 8 is a similar view of another form of the same. Fig. 9 is a perspective view of a section of a conveyer belt adapted for conveying and elevating bags, boxes and the like. Fig. 10 is a detail of features shown in Fig. 9. Figs. 11 and 12 are side elevational and sectional views of the coupling means for connecting the ends of the conveyer cables. Fig. 13 is a fragmentary side elevation of the frame of conveyer partially shown in Fig. 9. Fig. 14 is a detail view of the flexible connection shown in Figs. 9 and 13 for limiting the pivotal movement of a conveyer section.

Referring to the drawings, 1 designates the frame of the conveyer or elevator, which comprises parallel sides 2 and 3, supported at the receiving end of the frame or at both the receiving and delivery ends upon brackets or standards 4. Each frame side is preferably formed of elements of angle iron or steel and, as shown, comprises upper and

lower angle rails 5 and 6 connected at suitable intervals by standards or uprights 7 and inclined braces or struts 8. Intermediate of the ends of the frame the sides 2 and 3 are supported upon inverted U-shaped brackets 9 extending transversely across the same and upon which the lower rails 6 are laid and secured, the downturned ends of the brackets being provided with supporting feet 10 through which suitable fastenings may be passed to secure the same to the floor or supporting foundation. The brackets 4 are also perforated for the passage of suitable fastenings, and each set of brackets at the receiving and delivery ends is formed or provided with bearings for a shaft 11. The shaft 11 at the receiving end only is shown, and on this shaft is mounted a pair of grooved wheels or pulleys 12 arranged in spaced relation, as shown. The shaft is extended at one end and also carries fast and loose pulleys 13 and 14 for the reception of a driving belt from any suitable source of power. Ordinary spur or other gearing may, however, be employed in lieu of a belt and pulley drive.

The arrangement of the pulleys 12 upon the shafts at the opposite ends of the conveyer frame may be identical when the apparatus is a stationary one and arranged for conveying materials horizontally on the surface, but the mode of mounting the pulleys at the delivery end may vary as circumstances may require and according to the specific use to which the apparatus is to be put.

An endless conveyer is arranged to travel upon the frame and around the grooved pulleys 12 at the opposite ends thereof. This conveyer comprises a pair of spaced cables 15 connected at intervals for movement in unison by transverse rods 16. The rods 16 are terminally threaded and secured to the respective cables by sectional clips or couplings 17, provided with semicircular portions 18 to grip the cable and secured thereto and to each other by rivets or suitable fastenings 19, the arms of said clips being apertured for the passage of the threaded ends of the rods, which are secured thereto by inner and outer clamping nuts 20.

In practice, the ends of each cable are preferably connected by a type of coupling such as shown in Figs. 11 and 12. This coupling consists of male and female members 21 and 22, the former provided with a

socket 23 opening through one side and the end thereof, the end opening being contracted, as at 24, and the latter having a head 25 to fit within said socket and a contracted neck 26 to fit within said contracted opening 24, thus allowing the coupling members to be connected and disconnected by a relative lateral or sidewise movement while interlocking them against disconnection under longitudinal strain, so that the ends of the cable while under normal tension will be held securely in engagement with each other. The outer end of each coupling member is formed with a socket 27 for the reception of the end of the cable, and is provided in said socket with a longitudinal partition 28 to separate and spread the strands of the cable into engagement with the side walls of the socket. This construction allows the confined strands of the cable to be secured in the socket by a fastening rivet 29 and to also be brazed or soldered therein or welded to the coupling member to form a strong and practically homogeneous structure. The ends of the cable are thus strongly and durably secured by the couplings and connected by the latter in such manner as to permit of the ready assemblage and disassemblage of the parts of the belt in erecting, taking down and repairing the conveyer, and also permits the cables to be lengthened by the addition of cable sections having similar couplings, so that the apparatus may be made as long or as short as desired.

Pivottally mounted upon the belt is a continuous series of rectangular supporting plates or leaves 30 on which the articles or substances to be conveyed or elevated are placed. These plates or leaves are preferably made of sheet metal, each having its forward edge rolled to form a hinging bead 31 which pivottally engages one of the rods 16. Where the conveyer is employed to elevate or carry loose materials, each supporting plate may be provided with a rear flange 32 and side flanges 33, giving it the form of a pan to retain the material therein. Where crackers or other materials of like character are to be transported and elevated, as in the use of the apparatus for baking and transporting crackers, cakes and the like, the rear flange 32 alone may be employed to prevent displacement of the articles while being elevated by the conveyer. The pans have a length greater than the distance between the rods 16, so that they will have an overlapping arrangement, the rear edge of each pan or plate lapping over upon the pivoted edge of the succeeding pan or plate, thus forming a practically continuous supporting surface along the upper run or working stretch of the conveyer. The rear end of each supporting plate is coupled to the pivoted end of the succeeding supporting

plate by a chain, spring or other suitable flexible connection 34, which serves to support and prevent the plate from dropping downward when reversed or forming a part of the lower run or return stretch of the conveyer.

In order to properly support and guide the conveyer belt, guide pulleys or rollers 35 are arranged at intervals along the upper side rails of the frame sides 2 and 3 and are journaled upon suitable spindles or stub shafts. The upper stretches of the cables run upon these pulleys and are thus supported to prevent deflection of the working stretch of the belt. Where the conveyer is provided at any point with a turn or curve, as shown in Fig. 1, horizontally instead of vertically arranged guide pulleys 36 and 37 are arranged at the opposite sides of the curved portions, one set of pulleys acting against the inner side of one of the cables and the other set against the outer side of the opposite cable to guide said cables around the curve and prevent deflection of said cables, as well as to relieve the same of undue strain. The bearings of the set of pulleys 37 may be provided with adjusting screws 38 by which they may be adjusted to bear with greater or less force against the adjacent cable. Where the curve is a reverse one from that shown and the adjustable pulleys are arranged along the short radius of the curve, the pulleys are arranged to bear against the outer surface of the adjacent cable as shown. When the curve is in the reverse direction the sets of pulleys may be reversed in arrangement, as will be readily understood. As the supporting plates or pans pass around the guide pulleys 12 at the delivery end, the material carried thereon is dumped therefrom by gravity and the plates dropped down slightly to the degree permitted by the flexible supporting connections 34.

The frame sides 2 and 3 may be connected at intervals by transverse braces 39 and the sides of the individual brackets 9 may be similarly connected by braces 40, which latter may carry rollers 41 to permit the carrier plates on the return stretch of the belt to run easily over the same, as will be seen by reference to Fig. 4.

It will be understood that the delivery portion of the apparatus may incline upwardly or downwardly to elevate or lower the goods or material being transported to any desired height above or below the surface, and that the apparatus may be employed for ordinary elevating and conveying purposes or for feeding crackers or cakes through a baking oven or other substances to be dried through a drying kiln or the like, the invention not being limited to any particular use of the apparatus. The construction of the frame of angle iron or steel en-

ables long or short frames to be readily and conveniently constructed, and the mode of connection of the cables also enables the length of the belt to be regulated accordingly. The frame structure is further such as to secure maximum strength and rigidity with economy, and the construction and arrangement of the carrier plates or pans adapts the conveyer for transporting a large amount of articles of materials from one point to another within a given period of time.

In Fig. 6 is shown a modified construction of the delivery section or end of the conveyer frame which is designed to be coupled in a pivotal manner to the main portion of the frame and to extend wholly within a brick kiln for the purpose of conveying green bricks thereto to be stacked therein and dried or burned. In practice, this modified form of delivery section is connected with the curved portion of the main frame, which terminates near the door of the kiln, thus arranging the conveyer for the proper delivery of the bricks. In the form shown the said delivery section comprises spaced side frames, each of which is formed of upper and lower bars or rails 42 and 43 connected by pivoted braces or links 44 between their ends and at their rear ends by a V-bracket 45, while, for use in connection with this type of delivery section, the terminal ends of the bars or rails of the main frame sections are connected by a V-bracket 46. The bars 42 and 43 are pivotally connected with the arms of the bracket 45, as at 45^a, to permit the delivery frame section to fold in the manner hereinafter described, and each side of the delivery frame section is connected with the adjacent side of the main frame by a substantially diamond-shaped coupling 47, forming an intermediate articulating section whose front and rear points are coupled to the vertex portions of the brackets 45 and 46 by pivot bolts 48. Hanger bars 49 and 50 are secured by screws or bolts 51 to the front and rear ends of the upper rail 42 at each side and are respectively connected by bolts 52 and 53 with short bracket plates 54 and 55 fastened by bolts or screws 56 to the corresponding portions of the adjacent lower rail 43, whereby the sides of the frame are held from pivotal movement and folding or collapsing in use. On the pivot bolt 52, which like the pivot bolt 53 preferably extends across the frame and connects the hangers and bracket plates at the opposite sides, may be mounted the grooved guide pulleys 57 around which the cables of the endless carrier pass at the delivery terminal. To the upper ends of the respective hangers are connected hoisting ropes or cables 58 by which the delivery sections may be supported from above. As the bricks conveyed into the kiln by the carrier are de-

posited, they are stacked beneath and adjacent to the delivery section of the conveyer and as the height of the stack increases such section of the conveyer may be elevated correspondingly by manipulation of the cables 58, said section swinging on its pivotal connections 48. After use the delivery section may be disconnected from the main section and withdrawn through the top of the kiln, if the kiln is of the updraft type, or may be folded in compact form for removal if the kiln is of the downdraft type. To collapse the delivery frame section the bolts 52 and 53 are removed, as are also the securing screws 51, whereupon the sides of the delivery frame section will fold on their coupling links, as will be readily understood. The brackets 54 may be provided with forked extensions 59 to adapt the free end of the delivery section to be supported in an inclined position upon the side or end of a railway car, suitable portion of a vessel or like vehicle for use in loading the same.

In Figs. 9 and 10 I have shown a construction of pivoted goods supporting members for the endless conveyer which are employed in place of the plates or leaves in transporting boxes, barrels, poles and other long, heavy and bulky articles. Each of these members comprises a pair of parallel longitudinal metallic strips 60 connected by transverse braces 61 and bent at their forward ends to form hinging beads or eyes 62 to engage one of the cross rods of the carrier. Each supporting member is also of greater length than the distance between the rod to which it is pivoted and the following rod so that the rear ends of the strips 60 thereof will overlap and rest upon the forward ends of the strips of the supporting member in rear thereof, by which said supporting members are sustained and braced while on the working run of the carrier. As each supporting member passes beyond the delivery end of the frame, it swings forward to dump the load. To limit this forward swinging movement and to prevent the supporting member from dropping downward when reversed and arranged on the return stretch of the carrier, the rear ends of the strips 60 are provided with inwardly extending arms 63 coupled by a spring, chain or like flexible connection 64 to the pivot rod 16 of the supporting member in rear thereof.

Mounted upon the rear ends of the strips 60 are goods supporting arms 65, each of which has its lower end projecting downwardly through a longitudinal slot 66 in the strip and provided with a bracing extension 67 which is adapted to bear against the underside of the strip to support the arm when the latter is in an upright or operative position. Angular bracket plates 68 are secured to each strip on opposite sides of the

arm and carry a pin or bolt 69 on which the arm is pivotally mounted. The inner bracket plate has a segmental upper edge notched at its forward end to form a shoulder 70 which is adapted to be engaged by a pawl 71 on the arm to lock said arm in a position folded down upon the strip, as shown in dotted lines in Fig. 10. The pawl is mounted upon one end of a stub shaft 72 journaled on the arm and provided at its opposite or outer end with a crank 73. As each supporting member passes from the working to the return stretch of the chain, the arms drop by gravity from an upright supporting position down upon the strips 60 and the pawls drop by gravity into the notches 70 of the bracket plates and support the arms in folded position while they remain a part of the return stretch.

20 In practice, suitable trip devices are arranged on or adjacent to the brackets 4 at the receiving ends of the conveyer frame, so that as the supporting members pass upwardly around the pulleys 12 the crank 73 will be engaged by said trip device and the pawls retracted to enable the arms as they move upward to pass to a vertical supporting position by gravity.

Having thus fully described the invention, what is claimed as new is:—

1. A conveyer comprising a frame embodying side sections, each section comprising upper and lower longitudinal rails and bracing connections between said rails, inverted U-shaped brackets arranged at intervals below the side sections and supporting the lower rails, guide pulleys at the front and rear ends of the conveyer frame, a carrier having endless cables running over said pulleys, intermediate supporting pulleys on the upper rails for the working portions of the cables, pivoted supporting members carried by the cables, rods carried by the brackets, and supporting rollers on said rods over which the supporting members on the return stretch of the carrier are adapted to pass.

2. An endless conveyer comprising a frame embodying side portions, each consisting of upper and lower longitudinal rails and bracing connections between them, transverse braces connecting the upper portions of said side portions of the frame, inverted U-shaped brackets arranged beneath said frame portions and on which the lower rails thereof are carried, guide pulleys at the receiving and delivery ends of the frame, an endless conveyer passing around said pulleys and provided with pivoted goods supporting members having a limited pivotal motion, and means supported by the brackets to assist in supporting the goods supporting members on the return stretch of the conveyer.

3. A conveyer comprising a frame having a main section, a delivery section pivotally connected with the main section and embodying folding side portions, hangers detachably connected with the side portions and holding them in normal position, guide pulleys upon the main and delivery sections, and an endless flexible conveyer passing around said pulleys and provided with goods supporting members.

4. A conveyer embodying an endless carrier provided with a series of pivoted goods supporting sections each having slots, supporting arms pivotally mounted on each section above the slots, means for automatically depressing the arms, locking mechanism for holding the arms in depressed position, stops on the arms projecting downward through the slots to engage the underside of the goods supporting section when the arms are upright, and automatic means for releasing said locking mechanism and turning the arms to an upright position.

In testimony whereof I affix my signature in presence of two witnesses.

PATRICK L. O'TOOLE.

Witnesses:

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JOHN HOLLAREN.