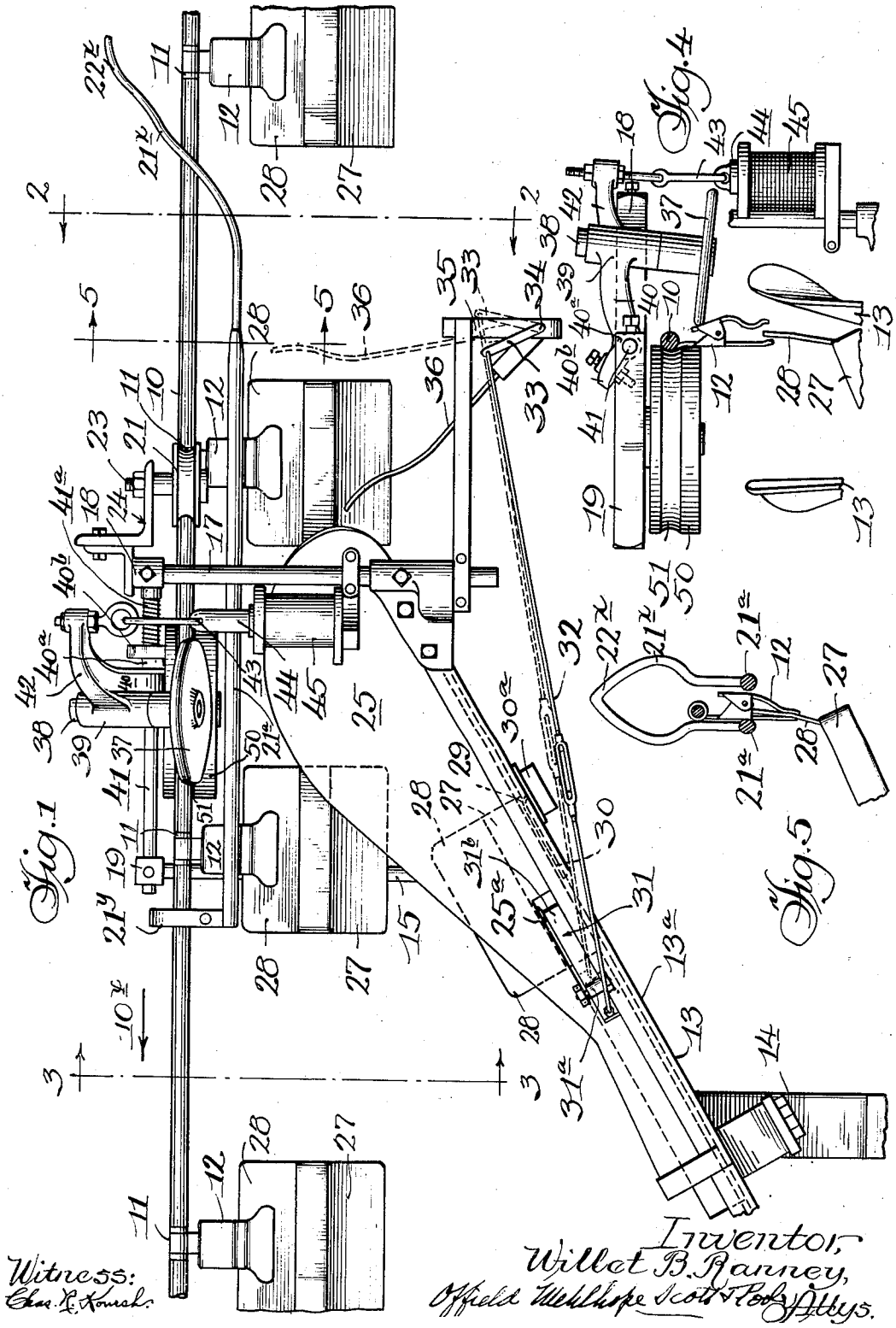
Sept. 26, 1939. W. B. RANNEY 2,173,952

CABLE CONVEYING AND DISTRIBUTING MEANS

Filed Feb. 11, 1938 2 Sheets-Sheet 1



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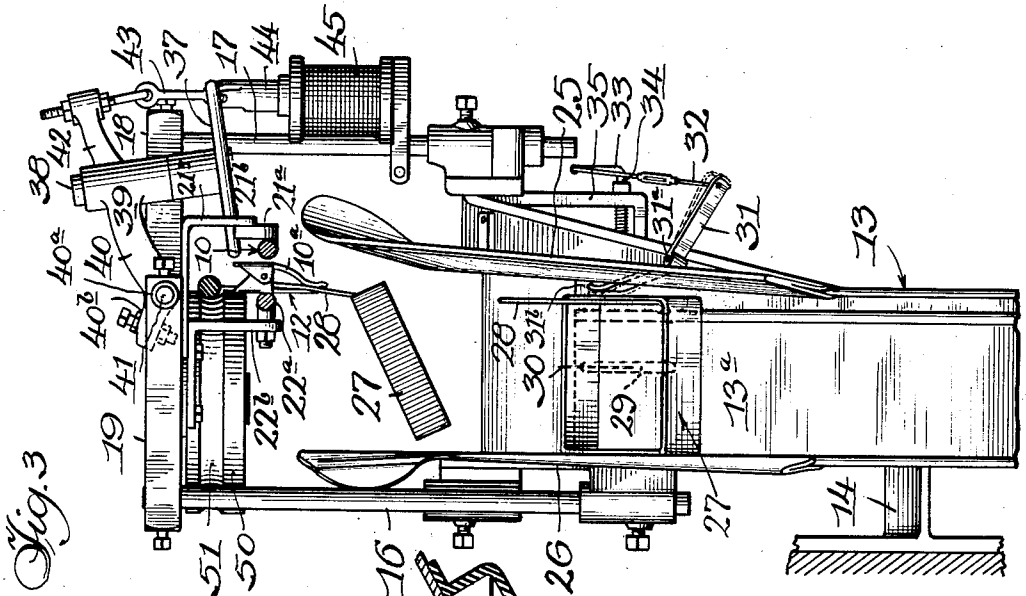


Fig. 3

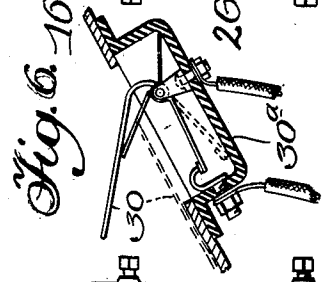


Fig. 6

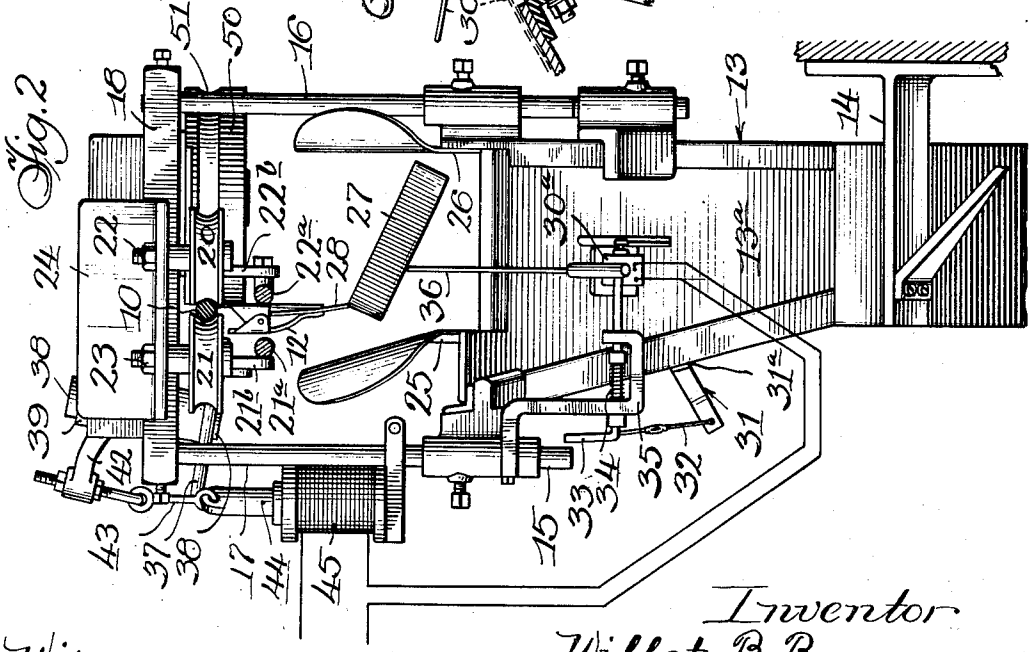


Fig. 2

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CABLE CONVEYING AND DISTRIBUTING MEANS

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Application February 11, 1938, Serial No. 190,106

9 Claims. (Cl. 198—180)

This invention relates to improvements in cable conveying and distributing means, and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The invention as illustrated herein is adapted for association with a plurality of boxing machines for packing articles of merchandise and is designed to distribute boxes to the several boxing machines as and when required. The machine comprises a conveyor cable with a succession of spaced, spring controlled clips suspended therefrom for holding the boxes, and automatic trip mechanisms severally associated with delivery chutes, adapted to release the boxes from said clips and deliver them to said chutes as and when required to maintain an ample supply for the boxing machines.

The object of the invention is to produce a novel and efficient machine wherein the trip mechanism associated with each chute will be inoperative as long as said chute is full and/or no boxes are required to supply the box machine to which said chute delivers.

A further object of the invention is to provide in a machine of the kind means associated with said trip mechanism to prevent operation of the actuation device for said trip mechanism, usually an electro-magnet or solenoid, when a clip or clips carrying no boxes, passes said trip mechanism.

These and other objects and advantages of the invention will appear more fully as I proceed with my specification.

In the drawings:

Fig. 1 is a view representing a side elevation of the improved cable-conveying and distributing means.

Fig. 2 is a view representing a vertical section through Fig. 1 in a plane indicated by the line 2—2 of Fig. 1.

Fig. 3 is a view representing a vertical section through Fig. 1 in a plane indicated by the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary view of the means for releasing the clip from the lid of a box, including the solenoid by which it is actuated.

Fig. 5 is a view representing a vertical section through Fig. 1 in a plane indicated by the line 5—5 of Fig. 1.

Fig. 6 is a sectional detail view of a switch box and switch to be referred to more particularly later.

Referring now to that embodiment of the invention illustrated in the drawings: 10 indicates a cable conveyor of any suitable kind provided at regular intervals with bearing spools 11 from which are freely suspended spring-controlled clips 12. 13 indicates a downwardly inclined chute of familiar construction rigidly attached to and supported by a frame member 14 located in near relation to a boxing machine which is to be supplied with boxes to be packed. A framework comprised of upright posts 15, 16 and 17, and horizontal top cross bars 18 and 19, is rigidly fixed to and supported at the upper end of the chute 13, as shown clearly in Figs. 2 and 3.

The cable 10 is supported and guided by means of sheaves 20, 21 between which said cable is engaged. The sheaves are mounted on spindles 22, 23 secured to the horizontal flange of an angle bar 24 fixed to the top frame member 18. The chute 13 is flared outwardly towards its upper end and is there provided with diverging walls or wings 25, 26 formed to guide a box delivered at the top of the chute into the chute as shown in Figs. 2 and 3. The cable-supporting sheaves 20, 21 are so disposed with reference to the flanges 25, 26 of the chute that a box 27 with its hinged flap or fly 28 gripped and suspended from a clip 12, will pass between the wings 25 and 26 of the chute when said box comes above the receiving end of said chute.

To obviate swinging of the clip with its suspended box as it approaches the delivery point, parallel guide rods 21^a, 22^a are fixed to frame members 21^b, 22^b suitably suspended from the top frame bar 18. Said rods project a considerable distance alongside the cable in advance of the delivery point and toward their ends rise above the cable as indicated at 21^x in Fig. 1. The rods are joined at their ends to form a peaked yoke 22^x above the cable, as shown in Fig. 5, in such manner as to engage and guide a swinging clip into the space between them. They are also extended in the other direction beyond the delivery point where they are rigidly connected together by a yoke 21^y which passes up and over the cable.

The bottom wall 13^a of the chute 13 near its upper end is provided with a slot 29 through which projects a switch arm 30. 31 indicates a bell crank lever mounted at one side of the chute as indicated at 31^a, and having an arm 31^b projecting into the chute through a slot 25^a in the wing 25. Said bell crank lever 31 is connected by a rod 32 to a crank arm 33 on a horizontal, spring actuated, rock shaft 34. The crank arm is mounted in a hanger 35 depending from and fixed to the upright frame member 17.

36 indicates a trip-arm located in advance of the chute 13 and extending into the path of the

boxes suspended from the cable 10, which travels in the direction of the arrow 10^x as shown in Fig. 1. Said trip-arm is fixed to the rock shaft 34 which is prolonged beyond the hanger 35 for the purpose. The trip-arm 36 and the connected members, including the rod 32 and bell crank arm 31^b, normally stand in the position indicated in dotted lines in Fig. 1.

37 indicates a clip-releasing member which (as shown) is in the form of a disc. Said disc is fixed to a stud 38 rotatively supported in a sleeve 39 in any suitable manner. Said sleeve has a laterally extending arm 40 which has a bearing member 40^a at its end (see Fig. 1) rotatively mounted on a fixed shaft 41 supported at its ends by the top cross bars 18, 19. The arm 40 has an angular extension 40^b providing a stop to limit the upward swing of the arm 40 by engagement with a frame member, against which it is normally held by coil spring 41^a interposed between the fixed shaft 41 and the bearing member 40^a of the arm 40.

A second laterally extending arm 42 fixed to said sleeve 39 is connected by linkage 43 to the core 44 of a solenoid 45 mounted on the upright frame member 17. The periphery of the clip-releasing disc 37 approaches on one side the vertical plane of the cable 10, but is so disposed with reference thereto that in the normal position of the arm 40 the clips 12 may pass freely by said disc 37.

Diametrically opposite to the disc 37 is a cylindrical drum 50 rotatively mounted in any convenient manner on the frame members 18, 19 in a horizontal plane. It has a peripheral groove 51 in which the cable 10 is engaged. The periphery of the drum below the plane of the groove 51 is directly opposed to the periphery of the disc 37,—being separated therefrom normally by just sufficient space to permit the free passage of the clips 12, as shown in Figs. 2 and 3. Upon energization of the field of the solenoid 45, however, the core 44 will be pulled downwardly, thus pulling the arm 40 and the sleeve 39 downwardly about the shaft 41 as a pivot and shifting the disc 37 into nearer spaced relation to the drum 50. Then when a clip 12 is carried through this reduced space between the drum and the disc, the upper ends of the clip members are squeezed together. The lower, gripping ends of said arms are thus forced apart, to release the flap or fly 28 of the box 27 as shown in Fig. 4. Thereupon the box drops into the top end of the chute and slides down the same.

The field of the solenoid 45 is connected by suitable wiring (not shown) to a switch box 30^a containing a normally closed switch which is adapted to be opened when the switch arm 30 is swung downwardly towards the bottom of the chute by a box sliding down the chute 13.

The operation of the machine is as follows: The normal position of the trip-arm 36 of the bell crank lever arm 31 is that shown in dotted lines in Fig. 1, with the arm 31^b engaged against the side of the last box dropped into the chute and holding down the switch arm 30. In this position of the parts, the field of the solenoid is not energized and the clip-releasing disc 37 is in the position shown in Fig. 3, with the maximum space between it and the drum 50. When an empty clip comes along, it will not strike the trip-arm 36, since said arm operates in a plane at one side of the path of the clip, as shown in Fig. 2. When, however, a loaded clip comes along, the box suspended from the clip will strike the trip-arm 36 as shown in Fig. 2, and will swing it from the position shown in dotted lines in Fig. 1 to the position shown in full lines therein, and swing the bell crank arm 31^b from the position shown in dotted lines in Fig. 3, where it is engaged with the last previously delivered box, to the position shown in full lines, thus releasing said box and permitting it to move downwardly through the chute. This releases the switch arm 30, which springs up and closes the electric circuit to the field of the solenoid 45, producing a downward swing of the disc 37 to approach the drum 50 and reduce the space between the disc and the drum. This occurs just before the cable 10 brings the loaded clip 12 with the box 27, which actuated the trip-arm 36 as just described, to the point of delivery. As the clip is squeezed through said space by the further travel of the cable, its grip on the flap or fly of the box is released and the box drops to the chute. As it slides down the chute the box engages and depresses the switch arm 30 and is arrested in its downward movement by the bell crank arm 31^b.

The chute finally becomes filled with boxes, with the last delivered box holding down the switch arm 30, and retained in position not only by engagement with the bell crank arm 31^b, but also because it is supported in that position by the stack of boxes below it in the chute. With the chute thus filled with boxes, when a box strikes the trip-arm 36 and moves it from the position shown in dotted lines to that shown in full lines in Fig. 1, thereby swinging the bell crank arm 31^b from its engagement with the last delivered box at the top of the stack, this actuation of the trip-arm will be ineffective since the switch arm 30 is held down by the last delivered box which is temporarily held in place by the boxes in the stack below it, and the control circuit is thereby held open. This ineffective operation of the trip-arm by successive boxes conveyed by the cable 10 will continue until the box next below the one last delivered drops below its supporting engagement with said last box delivered. Then when a box conveyed by the cable 10 strikes the trip-arm 36, the operation first described will ensue, that is to say, the last box delivered to the chute is released by the bell crank arm 31^b, the switch arm 30 is released and springs to upright position, closing the circuit to the field of the solenoid 45; the disc 37 is swung towards the drum 50 to narrow the space between them; and the clip carrying the box which actuated the trip-arm 36 is squeezed through the confined space between the disc 37 and the drum 50, releasing the box 27 and dropping it into the chute along which said box slides to swing down the switch arm 30, and is arrested in that position by bell crank arm 31^b.

It will be obvious from the foregoing description that the solenoid by means of which the disc 37 is operated to open the clips, is energized only when the boxing machine associated with any chute is calling for boxes, and that such energization in each case is but momentary. Obviously the life of the solenoid is greatly prolonged in an apparatus operating as hereinbefore described.

As the sheaves 21 and 20 provide the support for the cable 10, and as said cable must be held efficiently in its path, it is necessary that the bottom flanges of said sheaves shall project radially to engage as much as possible the bottom of the cable as shown in Fig. 2. This brings them close together, with a quite narrow space be-

tween. Therefore, the neck which supports the clip 12 must be long enough to be the only part of the clip required to pass between said flanges, as clearly shown in Fig. 2.

While in describing the invention I have referred to boxes as illustrative of the article to be conveyed and distributed, it is to be understood that this term is used generically both in the specification and in the claims as covering any article to which the conveying and distributing apparatus may be adapted.

In describing the invention, I have referred to several details of mechanical construction and arrangement. But it is to be understood that the invention is not to be limited thereto, except as may be pointed out in the appended claims.

I claim as my invention:

1. A conveying and distributing mechanism for boxes, comprising a cable conveyor, a plurality of spaced spring-controlled clips suspended from said conveyor for gripping said boxes, a plurality of delivery chutes below said conveyor each having a receiving end at a predetermined point in the path of said conveyor, means adjacent said receiving end of the chute for arresting a box delivered thereto, trip mechanism in the path of the boxes carried by said clips for releasing said box-arresting means, normally inactive box-releasing devices adapted to engage said clips as they pass said predetermined point, and means including an arm in said chute in the path of the boxes delivered thereto for actuating said box-releasing devices after said box-arresting trip mechanism has released the box previously arrested thereby.

2. A conveying and distributing device for boxes, comprising a cable conveyor, a plurality of spaced spring-controlled clips suspended from said conveyor for gripping said boxes, a delivery chute below said conveyor having a receiving end at a predetermined point in the path of said conveyor, means adjacent to said receiving end for arresting a box delivered thereto, trip mechanism in the path of the boxes carried by said conveyor for momentarily releasing said box-arresting means, relatively movable devices in the path of said clips above said receiving end of said chute normally spaced to permit passage of said clips, means for relatively moving said devices to bring them to position to be engaged by said clips to release said boxes in the travel of said conveyor, and an arm in said chute in the path of the boxes delivered thereto operable to actuate said movable devices to release a box carried by a clip after an arrested box in said chute is released by said trip mechanism.

3. A conveying and distributing device for boxes, comprising a cable conveyor, a plurality of spaced spring-controlled clips suspended from said conveyor for gripping said boxes, a delivery chute below said conveyor having a receiving end at a predetermined point in the path of said conveyor, means adjacent to said receiving end for arresting a box delivered thereto, trip mechanism in the path of the boxes carried by said conveyor for momentarily releasing said box-arresting means, relatively movable devices in the path of said clips above said receiving end of said chute normally spaced to permit passage of said clips, means for relatively moving said devices to bring them to position to be engaged by said clips to release said boxes in the travel of said conveyor, said means including an electro-magnetic device, a normally closed switch in circuit with said electro-magnetic device, and a switch arm in said chute operable to open said switch when engaged by a box retained by said arresting means.

4. A conveying and distributing device for boxes, comprising a cable conveyor, a plurality of spaced spring-controlled clips suspended from said conveyor adapted to grip said boxes, a delivery chute having a receiving end at a predetermined point below said conveyor, means near the top of said chute for arresting a box delivered thereto, trip mechanism in the path of said boxes adapted to release said box-arresting means, compression members in the path of said clips above said delivery point, means for moving said compression members nearer together, including an electro-magnetic device, a normally closed switch in circuit with said electro-magnetic device, and an arm connected with the said switch member located in the neighborhood of said arresting means adapted to be operated to open said switch by the box retained by said arresting means.

5. In combination, a cable conveyor, a plurality of spaced spring-controlled clips suspended from said conveyor, a downwardly inclined delivery chute having a receiving end located below said conveyor, anti-friction means disposed at the point of delivery above said chute normally spaced to permit free passage of said clips, electro-magnetic means associated with one of said members adapted to reduce the space between them, a normally open switch in circuit with said electro-magnetic means, a switch arm in the path of a device delivered to said chute, a trip-arm located in advance of the chute in a path of the device carried by said clips but outside of the path of the clips themselves, a lever arm normally projecting into said chute adapted to arrest such device near the top of said chute, and means including a yielding member adapted to retain said trip-arm and said lever arm in normal position.

6. In combination, a conveyor cable, a succession of spaced, spring-controlled clips suspended therefrom for holding boxes, a downwardly inclined chute having a receiving end located below said conveyor at a predetermined point, compression members disposed at said point of delivery above said chute normally spaced to permit free passage of said clips, means for reducing the space between said compression members including electro-magnetic means, a normally closed switch in circuit with said electro-magnetic means, a switch arm near the top of said chute in the path of a box delivered thereto, an arm projecting into said chute adapted to arrest a box in a position to hold down said switch arm, and a spring-controlled trip member for releasing said box-engaging arm, said trip-arm being in the path of said boxes but outside the path of said clips.

7. In combination, a cable conveyor, a plurality of spaced spring-controlled clips suspended from said conveyor, a delivery chute having a receiving end below said conveyor, means near the top of said chute for arresting a box delivered thereto, trip mechanism in the path of said suspended boxes adapted to release said arrested box, means for disengaging said clips from the boxes suspended therefrom at a predetermined point in the path of said conveyor, an electro-magnetic device for actuating said releasing means, a normally closed switch in circuit with said electro-magnetic device, and a switch arm located in said chute in the neighborhood of said arresting means adapted to hold said switch in

open position, said switch arm being actuated by the box retained by said arresting means.

8. In combination, a cable conveyor, a plurality of spaced spring-controlled clips suspended from said conveyor, a delivery chute having a receiving end below said conveyor, means near the top of said chute for arresting a box delivered thereto, trip mechanism in the path of said suspended boxes adapted to release said arrested box, means for disengaging said clips from the boxes suspended therefrom at a predetermined point in the path of said conveyor, and means associated in timed relation with the release of said arrested box for actuating the said means for disengaging said clips from the boxes suspended therefrom.

9. In a conveying and distributing mechanism for boxes, a cable conveyor, a plurality of spaced, spring-controlled clips suspended from said conveyor for gripping said boxes, a plurality of delivery chutes below said conveyor, each having a receiving end at a predetermined point in the path of said conveyor, spaced guide rods for engagement with said clips, said guide rods being located below said cable and extending parallel thereto in the neighborhood of each delivery chute, the two guide rods projecting in advance of the associated delivery chute and there rising above and being joined to form a peaked yoke located above said cable.

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