

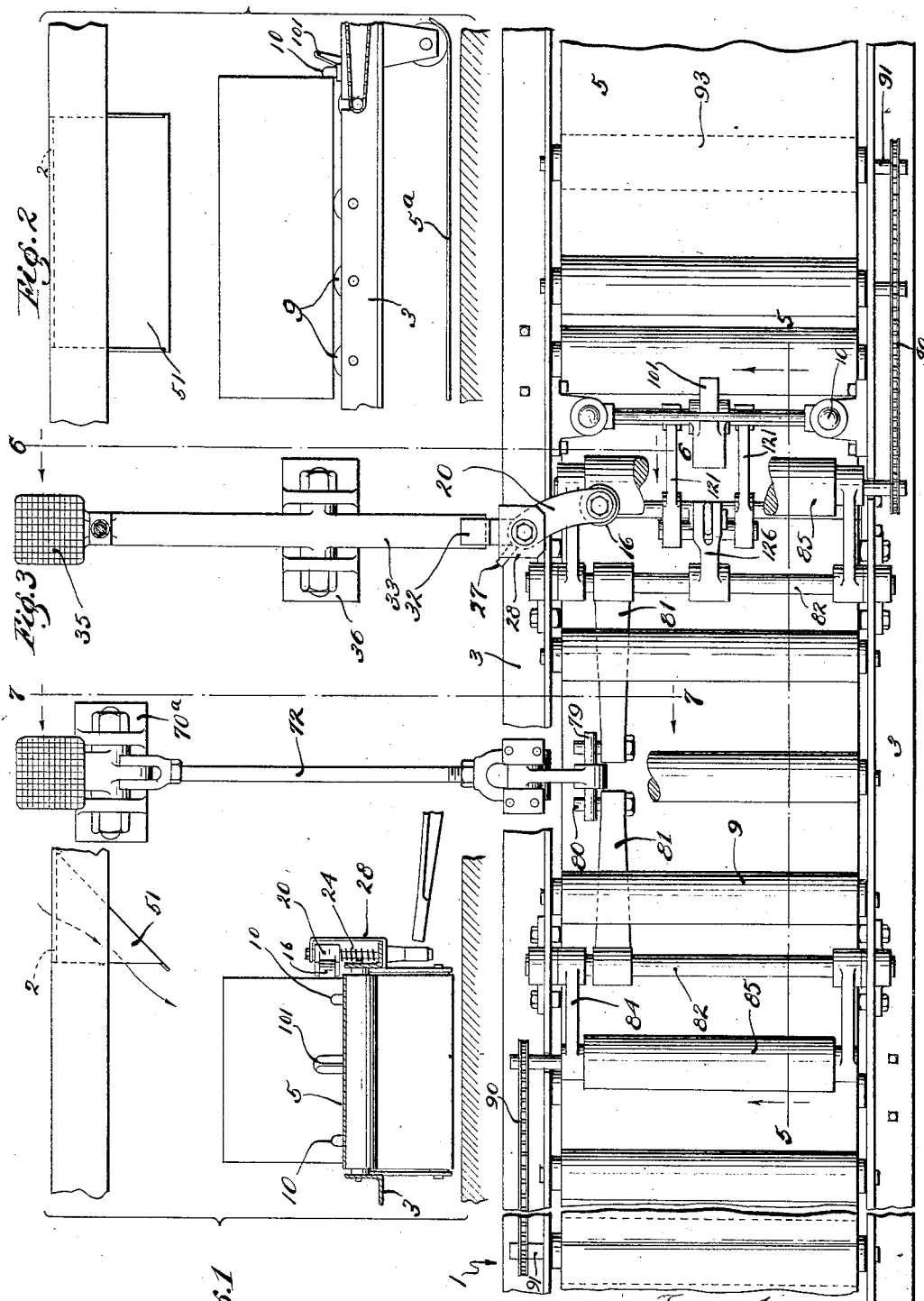
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C. S. JENNINGS ET AL

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LOADING MECHANISM FOR CONVEYERS

Filed March 14, 1929 3 Sheets-Sheet 1



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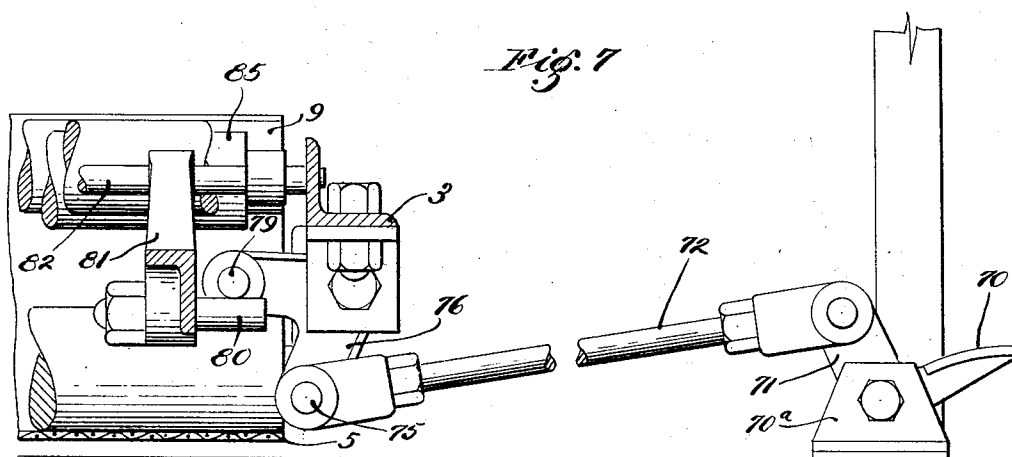
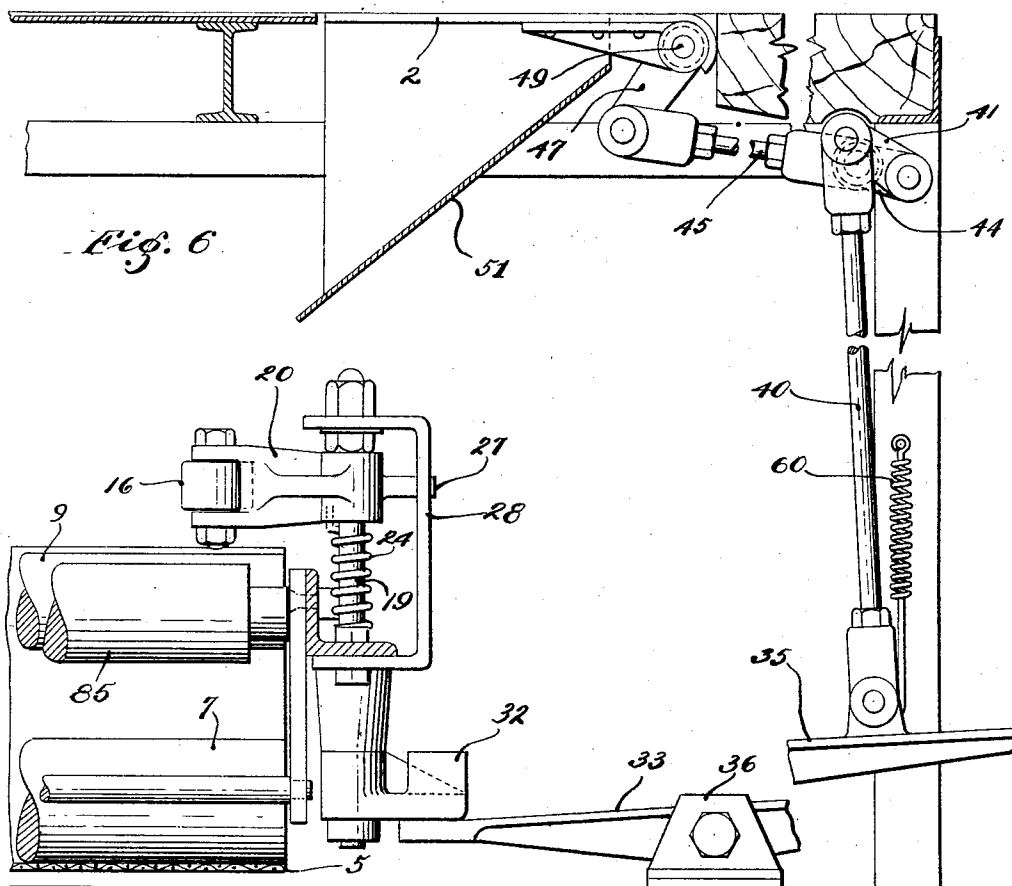
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UNITED STATES PATENT OFFICE

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LOADING MECHANISM FOR CONVEYERS

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This invention relates to a conveyer apparatus, and more particularly to means to permit and facilitate the loading of articles into a carrier or the like which is supported on a horizontally moving conveyer.

The present invention provides means for automatically stopping and positioning an empty carrier box in a load receiving or dwell station, for example beneath overhead load delivery means, including for example a valve, trapdoor, or the equivalent, hereinafter referred to generally as a movable closure, as well as means to permit the release of articles from the closure only when a carrier box is properly positioned below the same and thereafter to permit starting means to be brought into engagement with the carrier to cause it to continue upon its path along the main conveyer. Thus, for example, an elongate conveyer belt may have a depressed portion in the region of the loading station with a plurality of freely rotatable rolls disposed above this depressed portion of the belt to receive carrier boxes, and with a stop arranged to cause such boxes to halt in an article receiving position below the loading means. A control member is arranged to be engaged and moved by a carrier in this load receiving position thereby unlocking the movable closure, so that the latter may be opened at will to deliver material into the carrier, as for example by the operation of a suitable actuating element by a workman. Another control element, similarly actuated, may remove the stops from the path of the carrier and concomitantly raise driving means into engagement with the same to push it onto the main conveyer belt, this control means being arranged to permit the subsequent automatic return of the stops to their normal positions so that a succeeding carrier may be properly positioned in the load receiving station.

In the accompanying drawings:

Fig. 1 is a transverse section of the loading

station, somewhat diagrammatic in character, showing the general arrangement of a conveyer section adjoining and below an unloading factor;

Fig. 2 is a side elevation of the same;

Fig. 3 is a top plan view of this portion of the conveyer mechanism with a portion of the control means that is associated with the same, parts being broken away for clarity in illustration;

Fig. 4 is a side elevational view of this portion of the conveyer assembly;

Fig. 5 is an enlarged sectional view on line 5—5 of Fig. 3;

Fig. 6 is a vertical section designated by line 6—6 of Fig. 3; and

Fig. 7 is a section designated by line 7—7 of Fig. 3.

In the accompanying drawings, which exemplify one concrete embodiment of this invention, a conveyer, designated in general by the numeral 1, extends below and preferably somewhat at one side of an overhead material or article releasing means 2, such as a trapdoor, valve, or the like. As shown more particularly in Fig. 4, the main conveyer 1 may comprise side rails 3 supporting rollers 4 upon which an elongate continuous belt 5 is mounted. A portion 5^a of the latter is depressed beneath the plane of the main run of the belt to provide a loading station, suitable idler rolls 7 mounted upon depending brackets 8 engaging the upper surface of the belt run for this purpose, as shown. Aligned with the main run of the belt are a plurality of freely rotatable article supporting rolls 9 which are mounted upon the side rails 3 of conveyer 1. Due to the momentum of a carrier box transported upon the conveyer belt 5, the former will pass onto the rolls 9 when it arrives at the loading station. In order to ensure the proper positioning of such a carrier box in relation to the overhead article releasing means, we provide one or more, preferably two, stops 10 which comprise verti-

cally moving plungers mounted in cylindrical brackets 12 secured to the side rails 3 of the conveyer. Springs 14 within the cylindrical brackets normally urge the stop plungers upwardly into the path of approaching carrier boxes.

A locking arm 20 normally projects outwardly over the rolls, adjoining the stops 10, with an anti-friction roller 16 at its outer end to engage an on-coming carrier box. This arm is pivotally mounted so that engagement with a box will swing it outwardly from the position shown in Fig. 1. A spring 24 yieldably holds the arm 20 in the path of articles upon the conveyer and a projection 27 carried thereby is engageable with the supporting bracket 28 to limit movement of the arm 20 in one direction. The end of arm 20 is keyed to a vertical shaft 19 which is adapted to turn in the legs of bracket 28 and the lower end of which carries a crank 32; the latter, in the normal position of arm 20, engages the upper face of a lever 33 carrying a pedal 35 and which is pivotally mounted upon a bracket 36. Thus the crank 32 locks the pedal against depression while the arm 20 is projecting into the path of carrier boxes upon the conveyer, while movement of the arm 20 out of this position releases the pedal from engagement with crank 32 and permits the latter to be actuated. The outer end of the pedal lever is pivotally connected to an upwardly extending link 40, the upper end of which is articulated to a crank 41 that is connected to a second crank 44, the latter being joined to a link 45 that in turn is pivotally connected to an arm 47 projecting from a shaft 49 upon which the trapdoor 2 is mounted.

An inclined chute 51 is adapted to receive material or articles from the opened trapdoor 2 and to direct it or them into a carrier resting on rolls 9 and engaging the stops 10. The chute also limits the downward movement of the trapdoor. A spring 60 normally urges the outer end of the pedal 35 upwardly and holds the door closed.

A second pedal 70 pivotally supported by a bracket 70^a may be conveniently disposed beside pedal 35 and is provided with a crank 71 to which one end of a link 72 is connected. The opposite end of link 72 is connected by a pin 75 with one arm of a bell crank 76. The other arm of bell crank 76 carries a substantially horizontally disposed pin 79, the ends of which engage outstanding studs 80 upon the ends of swinging arms 81; these arms are fixed to shafts 82, (Fig. 3) the ends of which are rotatably mounted upon the side rails 3 of the conveyer mechanism. Adjoining the rails 3 at each side of the conveyer are the arms 84 (Fig. 3) fixed to each shaft 82 and supporting the axles of rollers 85 therebetween. Thus, as shown more particularly in Fig. 5, there are two such rollers 85 which

are horizontally spaced from each other and disposed in a normal retracted position below the level of the tops of rolls 9, and which are substantially vertically movable in response to the movement of arms 84. Suitable driving means such as chains 90 connect sprockets carried respectively by the axles of these rollers and the axles 91 of drive and supporting rolls 4 that frictionally engage and support the continuously moving main belt.

A transverse shaft 100 is rotatably mounted in the lower ends of plungers 10 and carries a lever arm 101. The upper end of arm 101 extends into the path of carrier cars or containers which have advanced slightly beyond the stops 10 so that cars released from engagement with the latter may swing the arms and turn shaft 100. A latch element 117 is carried by arm 101, said latch element having a cam-like lower portion 119 and normally being engageable with a transverse bar 120 which connects two parallel arms 121 that are pivotally mounted upon a bracket 123 which extends downwardly below the conveyer frame. The ends of these arms are connected to a link 125 that pivotally engages a crank arm 126 mounted upon the adjoining shaft 82, so that rotation of the latter causes vertical movement of the link and the swinging of arms 121 to pull the plungers 10 downwardly out of their position in engagement with the carrier box.

The operation is as follows: Empty boxes or carriers are delivered by the main conveyer belt 5 onto the freely rotatable rolls 9 and, due to the momentum imparted thereto by the main belt, move into engagement with stops 10 and are properly positioned thereby to receive articles from the load releasing door 2. As the carrier box approaches this load receiving position it engages the roller 16 at the end of locking arm 20 and swings the latter outwardly so that the crank 32 is released from engagement with the actuating pedal 35. Thereupon the latter may be depressed at the will of the operator against the action of spring 60 to open the trapdoor and to permit material or articles to drop from the same into the carrier box. It is evident that the pedal and consequently the trapdoor is locked against such movement, except when a carrier box has arrived in proper article receiving position.

In order to permit onward movement of the carrier box after it has received articles from the load releasing means, the pedal 70 may be actuated, operating through link 72 and crank 76 to swing arms 81 downwardly, thus turning shafts 82 and lifting the rolls 85 upwardly into engagement with the lower surfaces of the box, it being understood that normally these rolls are positioned somewhat below the rolls 9. Since rollers 85 are constantly driven by chains 90, movement is imparted to the container box, the stops 10

being depressed through link 125, arms 121, and latch 117 to permit such a movement of the container box. It is thus evident that the filled container may again pass onto the main run of belt 5 and may continue upon its path.

When the front portion of the container box passes over the depressed stop elements 10, it engages the swinging lever 101, swinging latch 117 out of engagement with the transverse bar 120. The springs 14 immediately urge the plungers 10 toward their normal positions so that they instantly snap back into operative positions as soon as the bottom of the container has passed over them. Thus another container closely following the first container will be properly stopped by these plunger elements, even should the operator not accurately time the controlling of the rolls 85 by the depression of pedal 70. As soon as the latter is released the bar 120 engages the cam-like lower surface of the latch 117 so that the bar 120 snaps back into its normal engagement with this latch.

We claim:

1. Apparatus of the class described comprising in combination a substantially horizontally disposed conveyer, including freely rotatable rolls in one section of the same defining a load-receiving station, load delivery means including a closure above this station, said closure being movable from normal load-retaining to a load-discharging position and linkage for moving the closure to load-discharging position and means for locking the linkage against movement including an element engageable by a carrier in load-receiving position upon the rolls to permit movement of the linkage and the closure, a movable stop in said conveyer section to temporarily detain a carrier in load-receiving position, and means for removing the stop from its normal position to permit the carrier to continue on its path.

2. Apparatus of the class described comprising in combination means defining a path along which carriers move, said path comprising a section constituting a loading station at which carriers come to rest, load-delivering means including a closure above this station, said closure being movable from normal load-retaining to a load-discharging position and connections for moving the closure to load-discharging position, means for locking the connections against movement including an element engageable by a carrier at the loading station to permit movement of the connections and the closure, and a driven roller normally positioned below the path of the carriers but movable upwardly to a position where it engages a carrier to cause the latter to move out of the loading station and resume its journey.

3. Apparatus of the class described comprising in combination a substantially horizontally disposed conveyer for moving car-

riers, freely rotatable rolls in one section of the same constituting a load-receiving station and a stop for detaining a carrier in the station, load-delivery means including a closure above this section, said closure being movable from normal load-retaining to a load-discharging position and linkage for moving the closure to load-discharging position, means for locking the linkage against movement including an element engageable by a carrier in load-receiving position at the station to permit movement of the linkage and the closure, a mechanically driven roller normally positioned below the rolls but movable upwardly to a position where it engages a carrier resting on said rolls to cause the carrier to move out of the station, and linkage to effect the concomitant upward movement of said roller and the removal of the stop from its normal position.

4. Apparatus of the class described comprising in combination a substantially horizontally movable conveyer for carriers, load delivery means including a closure above the conveyer, said closure being movable from normal load-retaining to a load-discharging position, detaining means normally operable to cause a carrier upon the conveyer to stop in load-receiving position beneath the closure, means for moving the closure to load-discharging position, and means independent of the load-delivery means for rendering the detaining means inoperable whereby the carrier may continue upon its path.

5. Apparatus of the class described comprising in combination a substantially horizontally movable conveyer for carriers, load delivery means including a closure above the conveyer, said closure being movable from normal load-retaining to a load-discharging position, detaining means normally operable to cause a carrier upon the conveyer to stop in load-receiving position beneath the closure, means for moving the closure to load-discharging position, means for rendering the detaining means inoperable whereby the container is free to continue upon its path, and a driving factor associated with said last named means and movable into engagement with a carrier in load-receiving position to cause the carrier to resume its journey.

6. Apparatus of the class described comprising means defining a predetermined path along which carriers may move, a section of said path constituting a dwell station at which carriers may come to rest, detaining means to cause the stopping of a carrier at said station, a positively driven element normally out of contact with the carriers at the dwell station and selectively movable into engagement with such a carrier to start the same and push it from the station, and means for rendering such detaining means inoperable and for moving said element into engagement with the carrier.

7. Apparatus of the class described comprising a substantially horizontally movable conveyer having interposed in its length a section constituting a dwell station, a stop associated therewith to cause the stopping of a carrier at said station, and a positively driven element selectively movable into engagement with such a carrier to start the same and push it from the dwell station, said stop being movable out of its carrier engaging position when the driven element is moved into its carrier engaging section.

8. Apparatus of the class described comprising a conveyer having interposed in its length a section constituting a dwell station, and a stop associated therewith to cause the stopping of a carrier at said station, and a positively driven element selectively movable into engagement with such a carrier to start the same and cause it to advance out of the dwell station, said stop being movable out of its carrier engaging position when the driven element is moved into its carrier engaging section, and means automatically urging the stop back toward its normal position immediately after the advancing carrier has cleared the stop, irrespective of the position of the driven element.

9. Apparatus of the class described comprising a conveyer having interposed in its length a dwell station comprising a plurality of freely rotatable article-supporting rolls, a movable stop normally positioned in the path of articles at said station, and a driven roll normally positioned below the other rolls but movable into a position to engage an article supported upon the latter to advance the same out of the station, said stop being movable out of article engaging position concomitantly with the movement of the driven roll into article advancing position.

10. Apparatus of the class described comprising a horizontally movable conveyer having interposed in its length a dwell station including a plurality of freely rotatable article supporting rolls, side rails supporting the same, shafts supported by the rails, swinging arms upon the shafts, positively driven rollers carried by the arms, said rollers being normally positioned below said article supporting rolls and being movable by the swinging of the arms into a position substantially on a level with the supporting rolls thereby to engage an article supported on the rolls, and selectively operable means to swing the arms and lift the driven rollers.

11. Apparatus of the class described comprising a conveyer, freely rotatable rolls in one section thereof defining a load receiving station upon which rolls the carrier is supported during the loading operation, means checking the carrier at the loading position, a roller normally positioned below the rolls, and means for releasing the checking means

and for raising the roller, thereby causing the carrier to move from the loading position.

12. Apparatus of the class described comprising, in combination, a substantially horizontally disposed conveyer over which carriers are transported and including a section of freely rotatable rolls which constitute a load receiving station, load delivery means above such station including a closure movable from a normal load-retaining position to a load-discharging position and connections for moving the closure to a load discharging position including a pivotally mounted pedal, and means for locking the connections against movement including an element which normally prevents movement of said pedal and a second element engageable by a carrier in the load-receiving station for shifting said first element out of contact with said pedal and thereby permitting said pedal to be depressed to actuate the connections and closure.

13. Conveyer mechanism comprising a conveyer over which articles are transported, means normally operative to check the travel of each article upon its arrival at a station, means for rendering said checking means inoperative and driving means normally out of the path of travel of the articles, which driving means are advanced into the path of travel of the articles by the means for rendering the checking means inoperative to engage the checked article and set it in motion past the checking means.

14. Conveyer mechanism comprising a conveyer over which articles are transported, means normally operative to check the travel of each article upon its arrival at a station, means for rendering said checking means inoperative, driving means normally out of the path of travel of the articles which driving means are advanced into the path of travel of the articles by the means for rendering the checking means inoperative to engage the checked article and set it in motion past the checking means, and means engaged by the article passing the checking means for counteracting said rendering means to permit the checking means to resume its operative position as soon as the article has passed the checking means.

15. Conveyer mechanism comprising a conveyer over which articles are transported, stops normally operative to check the travel of each article upon its arrival at a station, operator controlled means for rendering said stops inoperative and a positively driven roller normally out of the path of travel of the articles which roller is advanced into the path of travel of the articles by the operator controlled means to engage the checked article and set it in motion past the then inoperative stops.

16. Conveyer mechanism comprising a conveyer over which articles are transported,

- stops normally operative to check the travel of each article upon its arrival at a station, operator controlled means for rendering said stops inoperative, a positively driven roller normally out of the path of travel of the articles which roller is advanced into the path of travel of the articles by the operator controlled means to engage the checked article and set it in motion past the then inoperative stops, and a trip engaged by the article as it passes the stops for counteracting the operator controlled means to permit the stops to resume their operative position as soon as the article has passed the stops. 70
17. Conveyer mechanism comprising a conveyer over which articles are transported, stops normally and yieldably held in the path of travel of the articles to check the travel of each article upon its arrival at a station, operator controlled means for retracting said stops and holding them retracted, and a positively driven roller normally out of the path of travel of the articles, which roller is advanced by the operator controlled means into contact with the article checked by the stops to set it in motion as soon as the stops are retracted. 80
18. Conveyer mechanism comprising a conveyer over which articles are transported, stops normally and yieldably held in the path of travel of the articles to check the travel of each article upon its arrival at a station, operator controlled means for retracting said stops and holding them retracted, a positively driven roller normally out of the path of travel of the articles, which roller is advanced by the operator controlled means into contact with the article checked by the stops to set it in motion as soon as the stops are retracted, and a trip engaged by the article as it passes the stops for counteracting the operator controlled means to permit the stops to resume their operative position as soon as the article has passed the stops. 85
19. Conveyer mechanism comprising a conveyer over which articles are transported, a stop by which the travel of each article is checked upon its arrival at a station and a spring by which the stop is held in operative position, pedal controlled means for retracting said stop against the urge of said spring, and a positively driven roller normally out of the path of travel of the articles which roller is advanced by the pedal controlled means into contact with the article checked by the stop to set it in motion as soon as the stop is retracted. 90
20. Conveyer mechanism comprising a conveyer over which articles are transported, a stop by which the travel of each article is checked upon its arrival at a station and a spring by which the stop is held in operative position, pedal controlled means for retracting said stop against the urge of said spring, a positively driven roller normally out of the path of travel of the articles which roller is advanced by the pedal controlled means into contact with the article checked by the stop to set it in motion as soon as the stop is retracted. 100
- path of travel of the articles which roller is advanced by the pedal controlled means into contact with the article checked by the stop to set it in motion as soon as the stop is retracted, and a trip engaged by the article advanced by the roller for counteracting the pedal controlled means to permit the spring to return the stop to its operative position as soon as the article has passed the stop. 105
- Signed by us at Syracuse, New York, this 12th day of March, 1929. 75
- CHESTER S. JENNINGS.
LAVONT C. ALLEN.