Dec. 31, 1929. R. AMORY 1,741,752

SPACING MECHANISM FOR CONVEYER SYSTEMS

Filed March 22, 1922

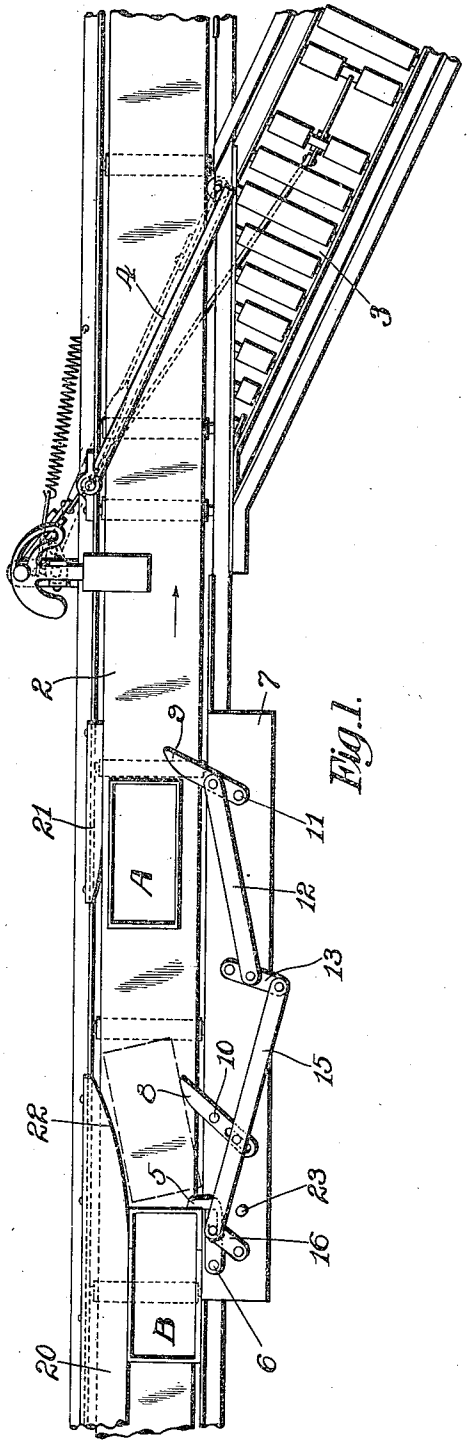

Fig. 1.

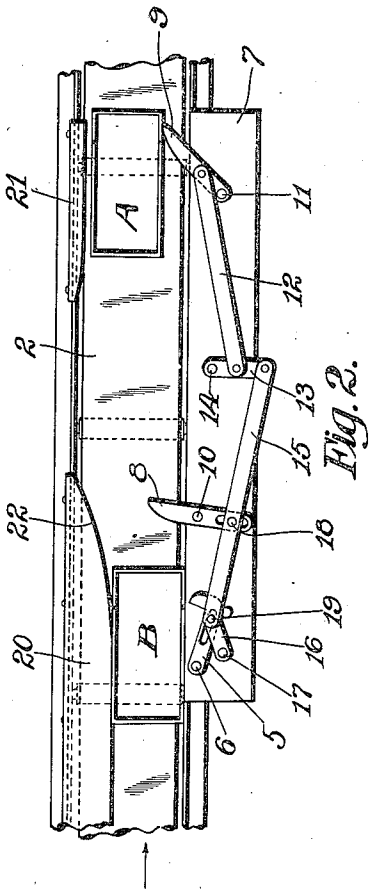

Fig. 2.

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Patented Dec. 31, 1929 1,741,752

UNITED STATES PATENT OFFICE

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SPACING MECHANISM FOR CONVEYER SYSTEMS

Application filed March 22, 1922. Serial No. 545,703.

This invention relates to conveyer systems and is especially concerned with systems of the type in which automatic mechanism is employed to switch or divert the carriers or articles being conveyed in a predetermined manner. Frequently it is necessary to provide such a system with a mechanism for spacing the carriers along the conveyer by certain minimum intervals in order to prevent the bunching of the carriers at the switching points and also to enable the switching operation to be performed accurately. It is also desirable under other conditions to have the carriers spaced along the conveyer by at least a certain predetermined distance. The present invention is especially concerned with mechanisms for performing this spacing operation, and it aims to devise a mechanism of this character which will be simple in construction, reliable in operation, and will require a minimum of care and attention. It is also an object of the invention to devise a spacing mechanism which will be operated by the carriers themselves.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

Referring now to the drawings,

Figure 1 is a plan view of a conveyer equipped with a spacing mechanism embodying the invention in the form at present preferred; and

Fig. 2 is a plan view of the mechanism shown in Fig. 1, but showing the parts in a different relationship.

The apparatus shown comprises a conveyer belt 2 which is supported and driven in the usual manner. A roller conveyer 3 diverges from the belt 2, and a switch arm 4 is provided to divert carriers on to the roller conveyer under certain circumstances which need not be described here. The carriers in this instance consist of boxes, two of which are shown at A and B.

The spacing mechanism shown comprises a stop 5, in the form of a hook-shaped arm or lever, which is pivoted at 6 on a supporting plate 7 mounted at one side of the conveyer belt 2. Two levers 8 and 9 are pivoted at 10 and 11, respectively, on the plate 7, the lever 9 being located considerably in advance of the lever 8, with reference to the direction of travel of the belt, and both being in advance of the stop 5. A link 12 connects the lever 9 with a short bar 13 pivoted on the plate 7 at 14, and another link 15 connects the bar 13 with an arm 16 pivoted on the plate 7 at 17. A pin 18 secured in the link 15 projects downwardly into a slot in the lever 8. The pin 19, which pivotally connects the link 15 with the arm 16, also is extended downwardly into a slot formed in the stop 5.

The operation of the apparatus is as follows:

The stop 5 normally is in a withdrawn or inoperative position, as shown in Fig. 2,— that is, a position out of the path of travel of the carriers and where it consequently is inoperative to arrest their movement. If a carrier is now conveyed past the stop by the belt 2, it will strike the lever 8, and the movement of the lever so produced will be transmitted to the stop 5 swinging it against the carrier. As soon as the carrier has moved past the stop the free end of the stop will be projected into the path of travel of the next carrier, as shown in Fig. 1, and will therefore arrest the movement of the latter carrier. In Fig. 1 the foremost carrier A has just moved past the lever 8 and has actuated this lever to set the stop 5 so that it has caught the carrier B following immediately behind A. The carrier A next strikes the lever 9 and swings it in a clockwise direction, thus acting through the connections with the stop 5 to withdraw the stop and allow the carrier B to move forward with the belt 2. This results, therefore, in spacing the carriers A and B apart on the belt by a distance at least equal to that between the stop 5 and the lever 9.

The forward carrier A moves out of contact with the lever 9 before the carrier B moves out of engagement with the lever 8, and consequently the latter carrier re-sets the stop again to arrest the movement of another

carrier which may be immediately behind B. If there is no carrier following B for a space equal to the distance between the stop 5 and the lever 9, then the stop will be withdrawn again by the carrier B striking the lever 9 so that the parts will be left in the positions in which they are shown in Fig. 2, with the stop inoperative to arrest the movement of the next carrier that comes along. It will be seen, therefore, that each carrier, after moving past the stop, sets the stop in position to catch a carrier following immediately behind, and after it has travelled a predetermined distance it then withdraws the stop again and leaves it in its withdrawn or inoperative position.

In order to ensure the proper engagement of the stop with the carriers, a guide plate 20 is supported rigidly at the opposite side of the belt from the stop where it will deflect each carrier into position to be engaged by the stop. A similar but smaller guide plate 21 is mounted opposite the lever 9 and acts to force the carriers against this lever with sufficient firmness to ensure the proper movement of the lever. The plate 20 is cut away at its forward edge, as shown at 22, so that as the forward end of a carrier strikes the lever 8 it will be swung slightly across the belt 2, as indicated in dotted lines in Fig. 1, and its rearward corner adjacent to the stop will, therefore, be swung away from the forward end of the carrier immediately behind it so as not to interfere with the inward movement of the stop 5 into proper position to arrest the latter carrier. The tendency of carriers, such as those shown, to follow each other in an unbroken line with the forward end of one carrier bearing against the rearward end of another has proved very troublesome; but by swinging each carrier laterally on the belt immediately after it has passed the stop, as shown in Fig. 1, this difficulty is avoided since the swinging movement breaks the joint between successive carriers and permits the stop to be entered laterally between the carriers, as above described. A pin 23 is positioned to engage the stop 5 and limit its withdrawing movement.

It will now be appreciated that this invention provides a very simple form of spacing mechanism which is operated solely through the movement of the carriers, which is entirely automatic in its action, and is so simple in construction that it is almost impossible for it to get out of order. It therefore requires practically no care or attention.

While I have herein shown and described the best embodiment of my invention which I have so far devised, it will readily be appreciated that this embodiment may be modified in many particulars without departing from the spirit or scope of this invention.

Having thus described my invention, what I desire to claim as new is:

1. In a conveyer system, the combination of a substantially horizontal conveyer for transporting a series of carriers, a stop for arresting the movement of said carriers, carrier actuated means operable by a moving carrier, and positive connections for transmitting movement of the carrier actuated means to the stop for moving the stop into and out of its carrier arresting position.

2. In a conveyer system, the combination with a conveyer for transporting a series of carriers, of a stop for said carriers normally inoperative to arrest the movement of the carriers, a device actuable by a moving carrier for rendering said stop operative, said device retreating from the carrier path in setting the stop member into operative position, a resetting device in the carrier path, and positive connections from said resetting device to the stop and to the actuator device, engagement of a carrier with the resetting device simultaneously restoring the stop and the actuator device to normal position.

3. In a conveyer system, the combination with a belt conveyer for transporting a series of carriers along a substantially rectilinear path, of mechanism for spacing the carriers apart along said conveyer comprising a stop movable laterally into and out of the path of the carriers, means engageable by the advancing end of a carrier for deflecting the trailing end of the carrier laterally at a point adjacent to said stop to facilitate lateral movement of the stop into operative position between said carrier and a following carrier and for moving said stop into operative position, and carrier actuated means for positively restoring the stop to normal inoperative position.

4. In a conveyer system, the combination of a conveyer for transporting a series of carriers, a stop for said carriers normally inoperative to arrest the movement of a carrier, and stop controlling means, including spaced parts in the path of movement of a carrier after it has passed said stop, for moving said stop into position to arrest the movement of another carrier closely following the first carrier, and for subsequently positively withdrawing said stop, said controlling means including positive connections for transmitting movement from said parts to the stop.

5. In a conveyer system the combination of a conveyer for transporting a series of carriers, a stop for said carriers, two levers arranged one in advance of the other and both beyond said stop in position to be struck successively by a carrier after it has traveled past the stop, and positive connecting means between said levers and said stop arranged positively to actuate said stop, the actuation of the first lever by a carrier moving the stop into its operative position, and contact of the carrier with the second lever positively withdrawing the stop again.

6. In a conveyer system, the combination of a conveyer for transporting a series of carriers, a stop for said carriers, two levers mounted with their ends in position to be struck successively by a carrier when it has moved predetermined distances past said stop, and positive link connections between said levers and stop, the engagement of the carrier with the first lever setting the stop and the engagement of the carrier with the second lever positively withdrawing the stop.

7. In a conveyer system, the combination with a conveyer for transporting a series of carriers, of mechanism for spacing the carriers apart along said conveyer comprising a stop automatically movable into and out of engagement with the carriers on said conveyer, an actuator device arranged to be struck and moved by a carrier, and connections between said actuator device and said stop so constructed and arranged that movement of the actuator device moves said stop into the path of a second carrier following the first carrier, said actuator device being operative to swing a carrier engaged thereby laterally into a position such as to facilitate entry of the stop between said carrier and a following carrier.

8. In a conveyer system, the combination of a substantially horizontal conveyer for transporting a series of carriers, a stop for said carriers, two levers arranged one in advance of the other and both mounted beyond said stop in the direction of movement of the carriers and in position to be struck successively by a carrier after it has traveled past the stop, positive means for transmitting movement of said levers to the stop, the actuation of the first of said levers by a carrier moving the stop into operative position and contact of the carrier with the second lever positively withdrawing the stop again.

9. In a conveyer system, guide means defining a substantially horizontal path along which carriers move with the same end of a carrier always in advance, a stop for arresting the movement of the carrier, and means actuated by the kinetic energy of a moving carrier for advancing the stop into carrier arresting position and for removing it from such positon.

10. In a conveyer system, guide means defining a path along which carriers move with the same end of a carrier always in advance, a stop movable into and out of the carrier path, an actuator and a resetter arranged one in advance of the other and in position to be engaged successively by a carrier after it has traveled past the stop, and means connecting the actuator and resetter with the stop, the connecting means being so constructed and arranged that engagement of a carrier with the actuator advances the stop into the carrier path, and engagement of the carrier with the resetter retracts the stop and advances the actuator.

11. In a conveyer system means providing a substantially rectilinear guideway defining a path along which carriers move with the same end of the carrier always in advance, a stop movable into and out of said path, said stop being out of said path when no carriers are moving along the latter, an actuator engageable by a carrier after it has passed the stop and movable by the carrier to advance the stop into the path whereby to arrest a subsequent carrier, and a resetter device engageable by a carrier after it has passed the actuator and movable by the carrier positively to retract the stop from the carrier path.

12. In a conveyer system, guide means defining a path along which carriers move with the same end of a carrier always in advance, a stop lever, an actuator lever, and a resetter lever, all disposed adjacent to said path, and link and lever connections uniting said stop, actuator, and resetter levers, the connections being so arranged that engagement of a carrier with the actuator lever moves the stop lever and the resetter lever toward the carrier path, and engagement of a carrier with the resetter lever moves the stop away from and the actuator lever toward the carrier path.

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