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SAFETY DEVICE FOR TRAY CONVEYERS AND THE LIKE.

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1,277,100. Patented Aug. 27, 1918.

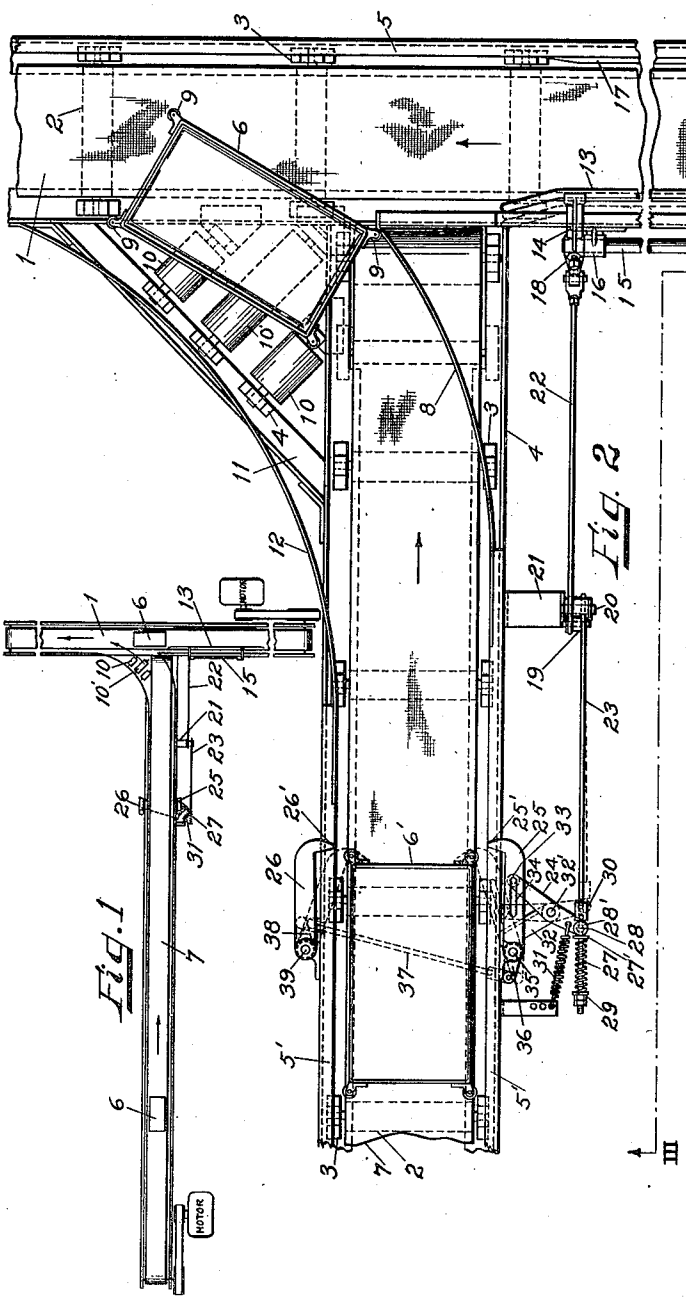


Fig. 1

Fig. 2

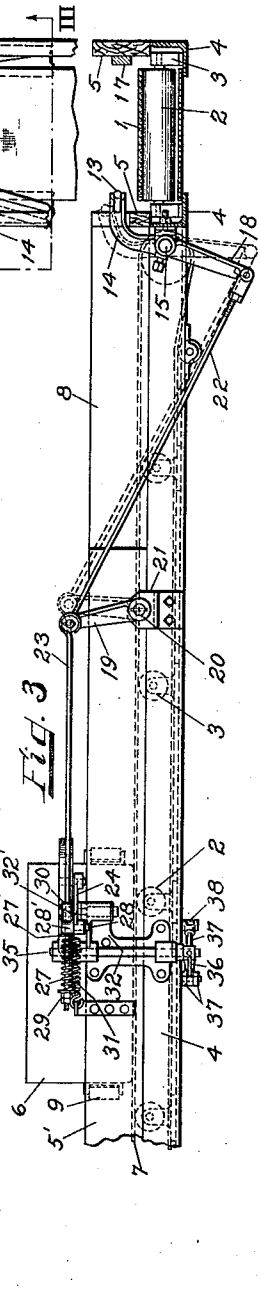


Fig. 3

Witnesses.

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SAFETY DEVICE FOR TRAY-CONVEYERS AND THE LIKE.

1,277,100. Specification of Letters Patent. Patented Aug. 27, 1918.

Application filed June 11, 1915. Serial No. 33,474.

To all whom it may concern:

Be it known that I, WILLARD ADNA MARCY, a citizen of the United States, residing at Newton Upper Falls, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Safety Devices for Tray-Conveyers and the like, of which the following is a specification.

This invention relates to tray or article conveyers and more especially to a safety stop for such devices.

It has for one of its objects the provision of novel means to prevent the collision of trays or the like at a point in a tray or article conveyer, where a branch line joins the main line.

The preferred construction hereinafter given by way of exemplification provides that the trays on the main line will have the right of way.

These and other objects, such for example as the provision of means for insuring the proper delivery of trays from a branch line to the main line of a conveyer, will be hereinafter referred to and the novel combination of means and elements whereby said objects may be attained will be more particularly pointed out in the claims appended hereto.

In the accompanying drawing, which forms a part hereof, and in which like reference characters designate like parts throughout the several views, I have exemplified a preferred construction; but as I am aware of various changes and modifications which may be made herein without departing from the spirit of the invention, I desire to be limited only by the scope of said claims.

In the drawing:

Figure 1 is a somewhat diagrammatic plan view of a tray conveyer comprising a main and a branch line.

Fig. 2 is a fragmentary plan view showing portions of the main and branch lines of said conveyer together with the tray guiding means and safety stop provided in connection with these portions.

Fig. 3 is a section of the device shown in Fig. 2, taken on the lines III—III of Fig. 2.

The preferred belt conveyer preferably comprises a main line belt 1, suitably supported upon rollers 2, the shafts or trunnions of which are journaled in brackets 3, carried by side supports 4, upon which are preferably mounted side boards 5 which laterally guide the trays 6 and hold them in place upon the belt, when being conveyed by the latter.

Leading into the main line is a branch or auxiliary belt conveyer, the belt of which has been designated 7. This belt also rides upon rollers 2, provided with brackets 3, supports 4, and side boards 5′.

The belts 1 and 7 are preferably continuously driven by suitable motors or gearing so that their tray-carrying surfaces move in the direction of the arrows indicated thereupon.

As best shown in Fig. 2, a tray being delivered from the branch line to the main belt is caused to gently swerve around by means of a deflector 8 which is adapted to engage the lateral guiding and anti-friction rollers 9 upon the sides of the trays which would impinge against the deflector 8, were these rollers not provided. The deflector 8 forms in effect a continuation of the inner or adjacent side board 5′, as viewed in Fig. 2; and this deflector preferably stops short of the belt 1, so as not to interfere with passing trays traveling along the main line. In the angle between the main and the branch lines, opposite the deflector 8, I provide rollers 10, 10′, which may be of different lengths as shown, but which preferably have their axes of rotation located at about 45° to the line of travel of the main belt, if the auxiliary belt 7 is perpendicular to the latter. These rollers may also have their shafts or trunnions journaled in brackets 4, the outer brackets being carried by a suitable support or strut 11.

There is comparatively little tendency for a tray to be displaced outwardly, longitudinally of these rollers 10; but to provide against such a contingency, I preferably provide a curved guide-strip 12, which may extend from the upper or outer side board 5′ around to the adjacent side board 5 of the main conveyer.

The trays are of such size and the rollers 10, 10′, are so disposed with respect to the

belts 1 and 7, that trays being delivered from the auxiliary belt to the main line, continue to be thrust forward by the belt 7 until they are in driving engagement with the belt 1; the rollers 10, 10′, supporting the outer side of a tray during this operation.

Were it not for the provision of the means now to be described, it would obviously be possible for a tray traversing the main line to collide with one being delivered from the auxiliary belt; which would probably jam the system, and which would almost certainly prevent the further progress of either of the trays so colliding.

To render such action impossible, collision preventing means are employed, which preferably give the right of way to the tray upon the main line. To this end, a rod 13, the ends of which are bent or turned laterally with respect to the belt 1, is mounted in substantial parallelism with this belt, at one side thereof. This rod is mounted upon rocker arms 14, carried by a rock-shaft 15, journaled in brackets 16, attached to the left-hand support 4, as viewed in Fig. 3; so that as a tray 6 passes said rod, the latter will be driven to the left. To insure a proper actuation of said rod by the tray, I prefer to provide a pressure strip 17, which may be mounted upon the inner side of the opposite side board 5 and which preferably has the extremities thereof beveled, as shown in Fig. 2, so as to cause the rollers 9 of the passing tray to ride thereupon. Every tray passing along the main line will hence deflect the rod 13; thereby rocking the shaft 15 and swinging a lever arm 18 thereof counter-clockwise, as viewed in Fig. 3, into the position in which it is shown in dotted lines in said figure.

This movement of the arm 18 rocks an arm 19, mounted at 20 upon a bracket 21, carried by a side support 4; there being a link-connection 22 between the arms 18 and 19. A similar connection 23 between the arm 19 and the outer end of a lever 24, causes the latter to rotate counter-clockwise, as viewed in Fig. 2, when the arm 19 is swung toward the main conveyer in the manner above described.

I prefer to provide a yielding connection between this link 23 and said lever 24, to prevent possible breakage of any parts of the apparatus or injury to a tray, should one of these latter chance to be directly opposite the hooks 25′—26′ of the stop members 25—26, which are operated by the lever 24 in the manner hereinafter described.

The preferred yielding connection, aforesaid, comprises a spring 27, disposed around the rear extremity of the rod 23; the latter extending through the head 28′ of a somewhat bolt-like member 28, the stem of which is journaled in the outer end of the lever 24. The inner end of the spring 27 bears against a washer 27′ on the rod 23, and presses this washer up against the head 28′. Suitable nuts 29 are provided upon the outer extremity of the link or rod 23, for retaining the spring in place and giving it proper tension.

Upon the opposite side of the head 27′ is a sleeve or collar 30, preferably pinned fast to the rod 23.

The lever 24 is normally held in the position in which it is shown in Fig. 2 by means of a spring 31; and said lever may be pivoted at 32′ upon a bracket 32, attached to the adjacent side support and side board 5′.

The inner end of the lever 24 carries a pin 33 which rides in a slot 34 in the member 25, above referred to. By reason of this connection when the lever 24 is rotated counter-clockwise in the manner above described, said member 25 is correspondingly rotated counter-clockwise until its hook 25′ is disposed in the path of any tray which may be *en route* theretoward along the branch line.

The member 25 is preferably mounted upon a vertical shaft 35, journaled in suitable bearings in the bracket 32, so as to turn with this shaft. At the lower end of the shaft 35 is an arm 36, which is connected by a suitable link or rod 37 with an arm 38, of the same length as the arm 36, but extending in an opposite direction, and fast to a vertical shaft 39, upon the opposite side of the branch conveyer.

The upper extremity of this shaft 39 carries the stop member 26 which, as stated, is provided with a hook 26′ and which may be in all respects similar to the member 25, except for the fact that no slot 34 need be provided therein.

Obviously when the member 25 is moved into its dotted line position, shown in Fig. 2, the shaft 35 will be rotated counter-clockwise and thereby, through the instrumentality of the arm 36, the link 37 will be caused to rotate the arm 38 and the shaft 39 clockwise, to swing the member 26 into its operative position, in which its hook 26′ is adapted to co-act with the hook 25′ to prevent the advance of the tray 6′, shown in dotted lines upon the branch or auxiliary conveyer, toward the main line conveyer, until said hooks have been withdrawn.

As soon as the tray traversing the main line, clears the rod 13, the spring 31 will be free to act and the lever 24 will thereby be rotated clockwise, causing the members 25 and 26 to swing to their outer positions, while the links 23 and 22 are moved to the right, as shown in Fig. 2, to restore said rod 13 to its normal position in the path of any succeeding tray which may be traveling upon the main belt 1.

The hooks 25′ and 26′ are located at a sufficient distance from the main conveyer

and the rod 13 is sufficiently extended to insure against any possible collision between any tray traveling along the branch line, which may have passed these hooks, and any tray *en route* along the main line.

The operation of the device is briefly as follows:

Trays *en route* along the main line will of course be carried by the belt 1 and as each of these trays pass the rod 13, it will press against the strip 17 or its rollers 9 will make contact with this strip, while its rollers 9 upon the opposite side of the tray will thrust aside the rod 13 and will thereby cause the hooks 25′, 26′ to be swung into the path of any carrier traversing the branch line, which may be approaching the stop or safety device. These hooks will engage the forward end of this tray and will of course prevent its further advance toward the main line belt until said hooks have been withdrawn.

Since the belt 7 is continuously driven, of course said belt, which frictionally engages the tray by the action of gravity upon said tray, will slidingly engage the bottom of the tray when the latter is held by the hooks; but since this slippage is usually but momentary, no material wear of the engaged parts will result.

If a tray on the branch line has passed the hooks 26′ before the latter are operatively disposed by a tray passing along the main line, such tray on the branch line will be carried along by the belt 7 until its rollers 9 engage the deflector 8, whereupon said tray will be propelled gently over the rollers 10, 10′, until it is safely in place upon the main line belt in advance of any carrier upon the main line which may not have reached the rod 13 in time sufficient to stop the tray upon the branch line. No collision can hence occur even in this case.

Should a tray traveling along the branch line happen to have its sides directly opposite the hooks or jaws 25′, 26′ at the instant that these parts are moved into their operative position, no harm will result; since in such case the spring 27 will yield and if this spring be sufficiently stiff, the jaws or hooks will simply be caused to frictionally engage the sides of the tray with sufficient force to prevent its further onward movement until said jaws or hooks are withdrawn. The provision of a yielding connection in the stop-mechanism is obviously therefore of value.

As the trays traveling along the main line clear the rod 13, the spring 31 restores the parts of the safety device to their normal positions in the manner above described.

While I have shown and prefer to use three rollers 10, 10′, in the angle between the main and branch conveyers, I do not wish to be limited to such number; but it is advisable, when such a roller is used, to dispose the axis of rotation thereof in the plane of said angle and obliquely between the respective sides of the latter.

Having thus described my invention what I claim is:—

1. In combination, conveying apparatus comprising a main line and a branch line leading thereinto, continuously moving means for conveying articles along said lines, article moving parts of said means traveling along with said articles, means for emplacing an article *en route* along said branch line, upon said main line, and mechanism operable by articles traveling along said main line, for resisting the action of the branch line article-moving parts upon any article *en route* along said branch line which would collide with said articles traveling along said main line were said article on the branch line free to continue its advance toward and be delivered to said main line, said mechanism having means to invariably give the articles traveling along the main line the right of way over any article traveling along the branch line, the latter, alone, being held as aforesaid.

2. A tray conveyer comprising a main line and a branch line, trays adapted to be conveyed along said main and branch lines, means for changing the direction of movement of a tray traveling along the branch line, as the main line is approached, to adapt said tray for movement along said main line, means under the control of trays traveling along the main line for preventing collisions between trays traveling along said branch line and trays traveling along said main line, and means to propel said trays along both of said lines by the frictional engagement between said trays and said means due to the action of gravity upon said trays.

3. In a tray conveyer, the combination of a main line with a branch line, each of said lines having a belt upon which trays to be conveyed along said line repose, trays to travel along said lines, rollers, disposed in the angle between said conveyers which said trays traverse when being delivered from said branch line to said main line, a deflector to co-act with said rollers, for causing trays passing from the branch line, to move into the main line end foremost, said deflector being out of the path of all trays traveling along the main line, and means to prevent collisions at said rollers between trays traveling along said branch line and trays traveling along said main line.

4. In a tray conveyer, the combination of trays having friction rollers upon the sides thereof, a main line belt conveyer upon which said trays are adapted to travel, a branch line conveyer adapted to deliver trays to said main line conveyer, deflecting means to engage one or more of said rollers, for changing the direction of movement of

a tray being delivered from said branch line to said main line conveyer, and collision preventing means, having an operating part adapted for engagement with a roller of a tray traveling along one of said conveyers and means, movable by an actuation of said part into the path of a tray traveling along the other of said conveyers, for impeding the progress of said last mentioned tray, so long as said first mentioned tray is in engagement with said actuating part.

5. In combination, a conveyer, trays adapted to be conveyed by said conveyer, a pair of oppositely movable jaws adapted for movement into and out of the path of a tray when the latter is being conveyed by said conveyer, a second tray conveyer disposed at an angle to that first mentioned, means to effect the delivery of a tray from said first mentioned conveyer to said second mentioned conveyer, and means, controlled by a tray traveling along said second mentioned conveyer, for causing said jaws to occupy their operative position in the path of a tray traveling along said first mentioned conveyer.

6. In combination, a belt conveyer, trays adapted to be conveyed by said conveyer, a pair of jaws adapted for movement into and out of the path of a tray when the latter is being conveyed by said conveyer, a second belt, tray conveyer disposed at an angle to that first mentioned, means to effect the delivery of a tray from said first mentioned conveyer to said second mentioned conveyer, and means, controlled by a tray traveling along said second mentioned conveyer, for causing said jaws to occupy their operative position in the path of a tray traveling along said first mentioned conveyer.

7. A tray conveyer comprising a main line and a branch line, trays adapted to be conveyed along said main and branch lines, a deflector for changing the direction of movement of a tray traveling along the branch line, as the main line is approached, to adapt said tray for movement along said main line, rollers on said trays to engage said deflector when the latter is to change the direction of tray movement, as aforesaid, means for preventing collisions between trays traveling along said branch line and trays traveling along said main line, said collision preventing means having provisions for normally giving the right of way over the trays on the branch line to the trays on the main line and including an actuating part controlled by the rollers of the trays traveling along the main line, and means to propel said trays along at least one of said lines by the frictional engagement between said trays and said propelling means due to the action of gravity upon said trays.

8. A tray conveyer comprising a main line and a branch line, trays adapted to be conveyed along said main and branch lines, a deflector for changing the direction of movement of a tray traveling along the branch line, as the main line is approached, to adapt said tray for movement along said main line, means for preventing collisions between trays traveling along said branch line and trays traveling along said main line, said collision preventing means having provisions for normally giving the right of way over the trays on the branch line to the trays on the main line, and means to propel said trays along at least one of said lines by the frictional engagement between said trays and said propelling means due to the action of gravity upon said trays.

9. In conveying apparatus, the combination of two belt conveyers disposed substantially at an angle to each other, a roller disposed in the angle between said conveyers, the axis of rotation of said roller lying in the plane of said angle obliquely between the respective sides of said angle, a deflector extending resistingly over but one of said conveyers, a tray adapted to be carried by the belts of said conveyers, said deflector adapted to deflect said tray onto said roller as said tray is about to be delivered from one of said conveyers to the other, said tray being of sufficient length to permit each said conveyers to simultaneously engage opposite ends of the tray, whereby the latter when emplaced unpon said roller is thrust forwardly thereover by one of the belts and is pulled along over said roller by the other of said belts.

10. In tray conveying apparatus, the combination of a main belt conveyer and a branch belt conveyer disposed at an angle to each other, the main conveyer being prolonged past the adjacent end of the branch conveyer to carry trays past said end, a roller disposed in the angle between said conveyers, the axis of rotation of said roller lying in the plane of said angle obliquely between the respective sides of said angle, a deflector extending only over the branch conveyer to leave the course of the main line conveyer clear, a tray adapted to be carried by the belts of said conveyers, said deflector adapted to deflect said tray onto said roller as said tray is about to be delivered from the branch conveyer to the main conveyer, said tray being of sufficient length to permit each of said conveyers to simultaneously engage opposite ends of the tray, whereby the latter when emplaced upon said roller is thrust forwardly thereover by the belt of the branch conveyer and is pulled along over said roller by the belt of the main conveyer.

11. The combination of a main line tray conveyer with a unidirectional branch line tray conveyer, a continuously driven belt

which supports and carries along thereon the trays to be conveyed by the main line conveyer, a separate continuously driven tray-supporting belt for the branch line conveyer, and means operable by trays carried by the belt of the main line conveyer only, for stopping the progress of a tray *en route* along said branch line conveyer and about to be delivered therefrom to the main line conveyer, whenever and only at such time as a collision between said last mentioned tray and a tray upon the main line conveyer, is possible.

In testimony whereof I have affixed my signature, in the presence of two witnesses.

WILLARD ADNA MARCY.

Witnesses:
WILLIAM HARRIS,
CHARLES O. LAURIN.