July 2, 1946. A. A. TUNLEY 2,403,249

CONVEYER MECHANISM

Filed May 9, 1944 3 Sheets-Sheet 1

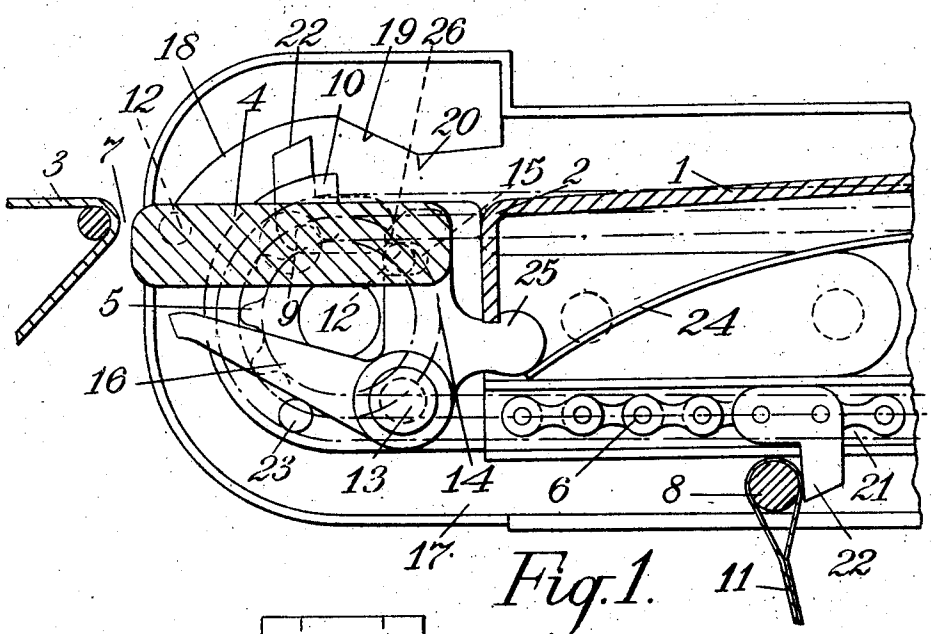


Fig. 1.

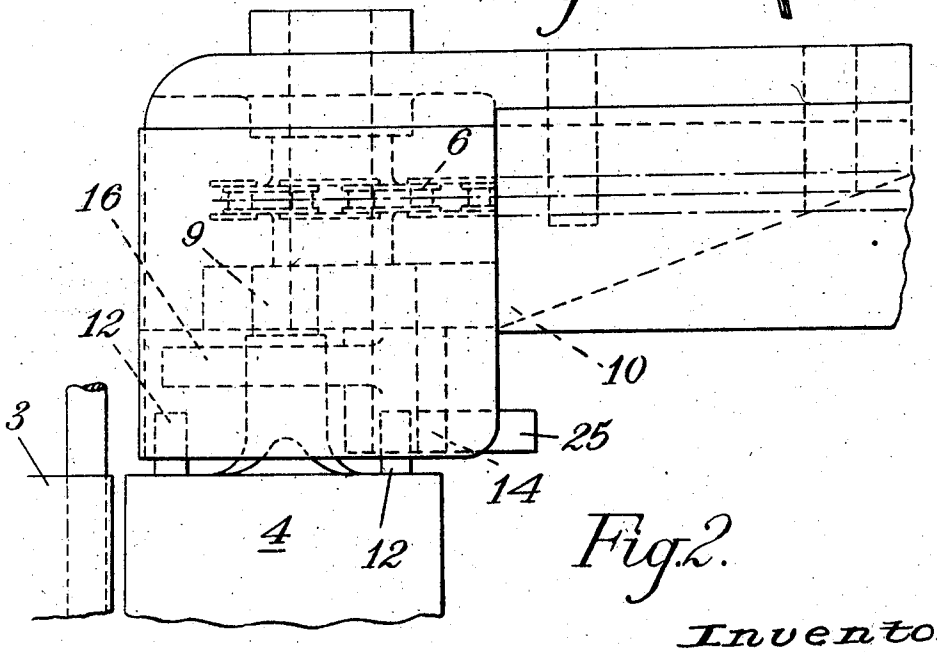


Fig. 2.

Inventor
A. A. Tunley
By Glascock Downing Seibold
Attys.

July 2, 1946. A. A. TUNLEY 2,403,249

CONVEYER MECHANISM

Filed May 9, 1944 3 Sheets-Sheet 2

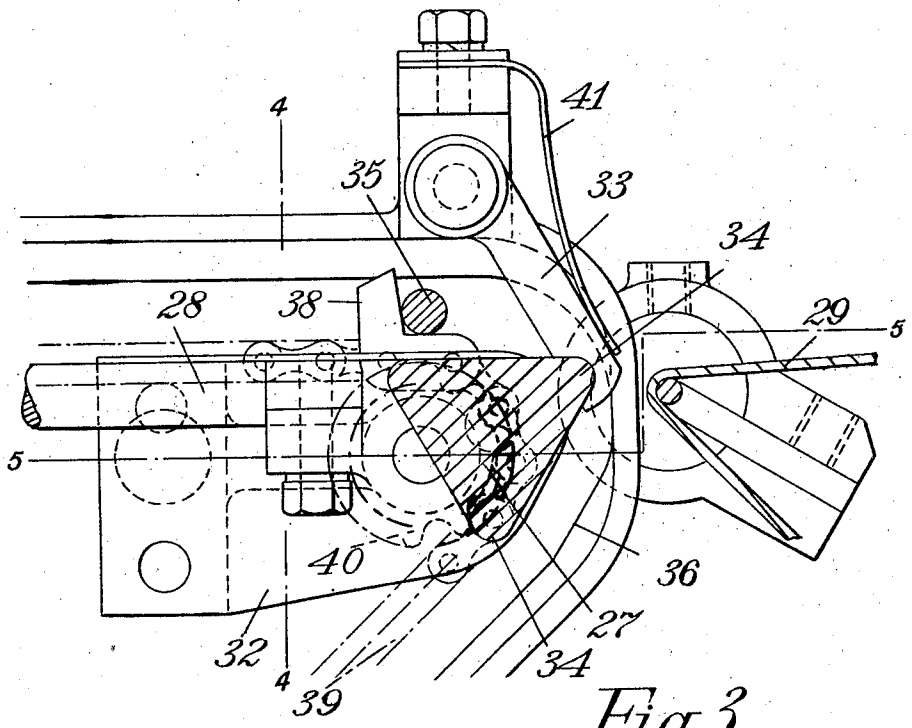


Fig. 3.

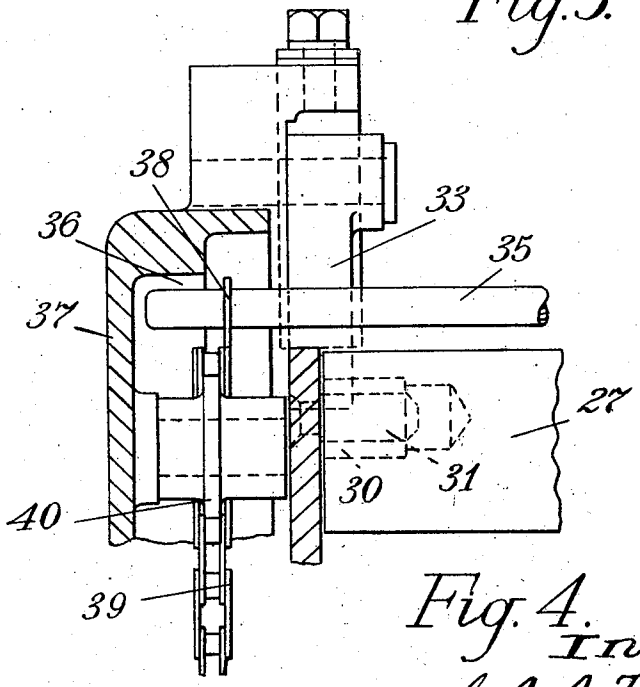


Fig. 4.

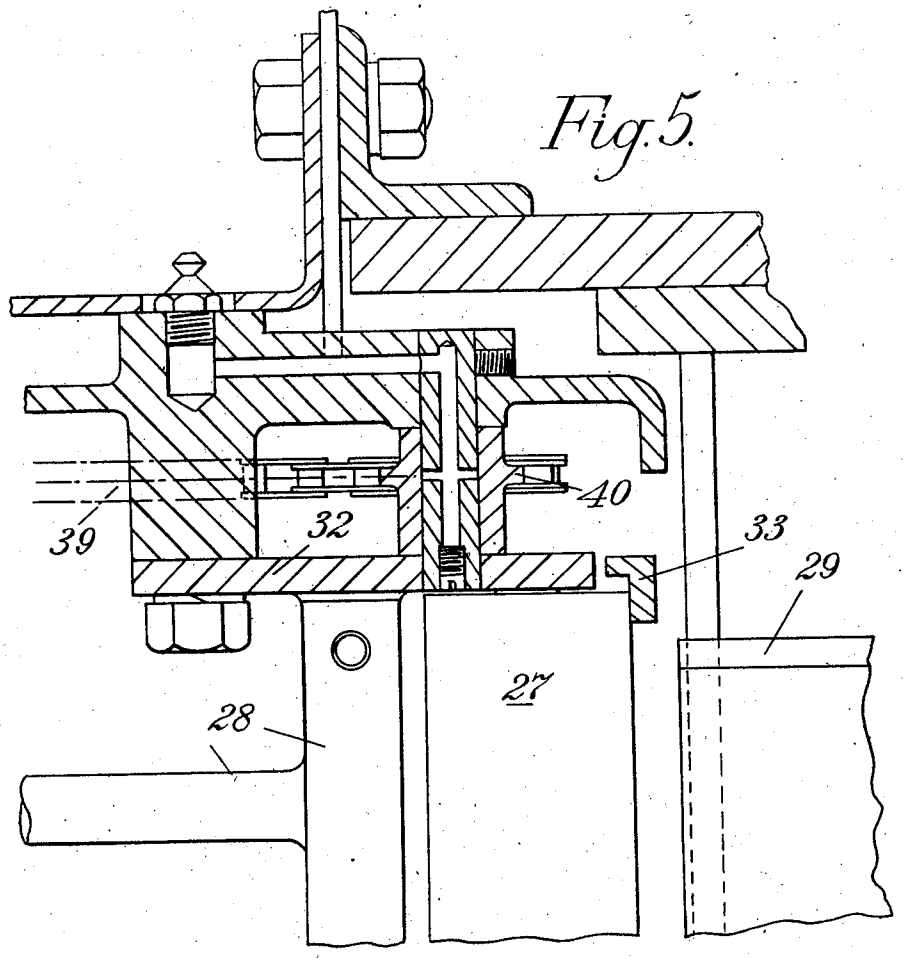
Inventor
A. A. Tunley
By Glascock Downing & Seebold
Attys.

July 2, 1946. A. A. TUNLEY 2,403,249

CONVEYER MECHANISM

Filed May 9, 1944 3 Sheets-Sheet 3

Fig. 5.



Inventor
A. A. Tunley
By Glascock Downing & Seibold
Attys

Patented July 2, 1946 2,403,249

UNITED STATES PATENT OFFICE

2,403,249

CONVEYER MECHANISM

Allan Ashmead Tunley, Peterborough, England, assignor to Baker Perkins Limited, Peterborough, England

Application May 9, 1944, Serial No. 534,775
In Great Britain May 10, 1943

8 Claims. (Cl. 198—20)

1

This invention relates to endless band conveyers of canvas, wire mesh or other flexible material, or of a flexible nature, or comprising chains carrying or driving plaques or aprons, and is concerned with mechanism of the type comprising displaceable means for closing the gap between the adjacent ends of conveyers in series to facilitate the transfer of goods from one conveyer to another and for opening the gap periodically to permit an obstruction to pass between the conveyer ends.

The invention may be applied in connection with a plaque conveyer, such as employed in the chocolate industry, wherein the plaques have traction rods which project on either side of the conveyer and which have to be passed through the gap between adjacent conveyers when the goods carried on the plaques are stripped therefrom and transferred to the adjoining conveyer and when they are drawn to the upper side of the conveyer to receive goods from another conveyer such as an enrober conveyer.

The invention may also be used in conjunction with a conveyer which has cross battens or partitions or ribs for positioning the goods or preventing their sliding upon an inclined conveyer.

The plaque traction rods and the cross battens or ribs mentioned above may be conveniently referred to as the "obstructions."

The invention has for its object the provision of improved and simplified displacement means for opening and closing the gap between the adjacent ends of conveyers operating in series, which have the advantage of being more or less silent in operation and avoid the employment of reciprocating parts with their attendant disadvantages.

The invention consists in the provision of displaceable gap closing and opening means in the form of a rotary bridge piece of a shape in cross-section such that in one rotational position it presents a surface which serves to bridge the gap between the conveyers, while in another rotational position the gap is opened to permit the passage of an obstruction from one lap to the other of the conveyer.

The invention further comprises a rotary bridge piece of the above character wherein the rotation of the bridge piece is effected by the action of the obstruction itself.

According to an alternative arrangement, mechanical means are provided to impart periodic rotation to the bridge piece in synchronism with the arrival of obstructions at the junction between the adjacent conveyers.

2

The bridge piece may be in the form of a transverse bar or member of triangular, square, or an elongated rectangular cross-section, each member having its rotational axis located to pass through or near the centre of gravity thereof.

Locking means are preferably provided for temporarily holding the members in the bridging position, such locking means being conveniently in the form of sears or latches having lever arms or parts which lie in the path of the obstructions so that the arrival of an obstruction automatically unlocks the bridge piece and subsequently, according to the preferred mode, causes its rotation to allow the obstruction to pass.

In the accompanying drawings:

Figures 1 and 2 are elevation and plan respectively of the invention as applied to the feed end of a plaque conveying plant as described in U. S. Patent specification Serial Number 463,554, filed October 27, 1942.

Figures 3, 4 and 5 show the application of the invention in a modified form to the discharge end of a matching apparatus as described in U. S. Patent No. 2,363,211, Figure 3 being a side elevation, Figure 4 being a sectional elevation on line 4—4 of Figure 3, and Figure 5 being a sectional plan partly on line 5—5 of Figure 3.

In carrying the invention into effect according to one convenient mode as applied to a plaque conveying plant for receiving chocolate coated goods from an enrober and subsequently stripping the goods from the plaques and transferring them to a packing or other conveyer, as described for example in U. S. Patent specification Serial Number 463,554, filed October 27, 1942, in which flexible plaques are drawn over a table 1 at the feeding end of the conveyer path the end 2 of the plaque supporting table 1 adjacent to the end of the enrober wire conveyer 3 has a rotary bridge piece 4 positioned adjacent the terminal chain or guide wheels 5 of the plaque conveying chains 6. The bridge piece 4 is adapted to be rotated for opening the gap 7 to permit the passage of the traction rods 8 of the plaques between the table 1 and the conveyer 3 and also for introducing a bridging surface or support for substantially closing the gap while the goods are being transferred from the enrober conveyer 3 to the plaques as they are drawn upwardly over the bridge piece and onto the table 1.

The bridge piece 4 comprises a bar of elongated rectangular form in cross section disposed transversely of the conveyer path and provided with trunnions 9 mounted in bearings 10 so that it is rotatable about an axis located substantially to

pass through the centre of gravity of the bridge piece. The rectangular bridge piece 4 acts somewhat after the fashion of a two-winged revolving door and when it is lying horizontally the gap between the conveyer 3 and the table 1 is substantially closed and the upper surface of the bridge piece serves as an extension of the table 1 over which the plaques pass when travelling at the upper side of the conveyer path. The corners of the rectangular bridge piece 4 are radiussed so that the plaques may be conveniently bent and drawn thereover in passing from the lower lap on to the table 1 associated with the upper lap of the conveyer.

When the bridge piece 4 is rotated it passes to a vertical position in which the gap between the conveyers is opened, thereby permitting the traction chains 6 to draw the plaque traction rod 8 upwardly through the gap. The continued rotation of the bridge piece 4 turns the opposite face of the elongated rectangle into a position in which it lies horizontally in extension of the plaque table 1 to take the place of the bridge surface which has just vacated this position. As the chains 6 continue to drive the plaque rod 8 forward the flexible body 11 of the plaque is drawn over the radiussed corner of the bridge piece 4 and as it emerges on to the face of the bridge piece it is progressively fed with goods from the enrober conveyer 3.

On the ends of the bridge piece 4 at each side of the trunnions 9 and slightly off the centre line of the rectangle, locking pins 12 project, the locking pins at each end being adapted to be alternately engaged by a locking sear 13 so that whenever the bridge piece 4 occupies a horizontal position it is locked against displacement. Each locking sear comprises a bell-crank lever one arm 14 which has a recess 15 or detent adapted to engage the locking pins 12 in turn while the other arm 16 is in the form of a finger extending across the path travelled by the projecting ends of the plaque traction rods 8, the arrangement being such that when the plaque traction rods arrive beneath the fingers 16 their ends contact therewith and oscillate the sears 13, causing their recesses or detents 15 to disengage the locking pins 12, thus freeing the bridge piece 4 for rotation. As the upward movement of the plaque traction rod 8 continues they abut against the underside of the bridge piece 4 and turn it about its pivots 9 so that it is reversed while the plaque traction rods are drawn on to the plaque table at the upper side of the conveyer. A stop 23 is provided for limiting the movement of the sears in the locking position by engagement of the finger 16 therewith. The sears are returned to and held in the locking position by springs 24 engaging a short arm 25 on the sears. When the bridge piece is turned over and arrives at the horizontal position the appropriate locking pin 12 engages an inclined surface 26 on the arm 14 of the sear to move it aside after which it snaps into the locking position by the spring.

The plaque rods 8 are guided in their travel in grooves 17 in the side frames of the machine, which grooves terminate in a cam path 18 surrounding the terminal wheels 5. The cam path is provided with a downwardly inclined part 19 providing a hump 20 to ensure the bridge piece 4 being moved by the plaque rods 8 to the horizontal locking position.

The chains 6 which are driven from sprockets (not shown) travel in guideways 21 and are provided with spaced dogs 22 adapted to engage and drive the plaque rods 8.

A similar bridging arrangement may be provided for the discharge end of the plaque conveyer in the position in which the plaques are usually drawn over a displaceable knife edge to strip the goods for transfer to a packing conveyer or other receiving conveyer. Alternatively the bridge piece may take the form of a transverse bar which in cross section is an equilateral triangle, the angles or corners of which are radiussed to facilitate the smooth bending and stripping of the plaque.

Thus referring to Figures 3, 4 and 5 which illustrate the triangular shaped bridging piece applied to a batch forming machine as disclosed in U. S. Patent No. 2,363,211 comprising flexible plaques conveyed over a table by side chains, the triangular bridging bar 27 is located between the discharge end of the plaque supporting table 28 and the receiving conveyer 29. The triangular bar is provided with bushed recesses 30 to receive stub shafts 31 supported on bearing plates 32 and has locking means in the form of a pivoted depending catch 33 adapted to engage the rounded corners 34 of the triangular member in turn and be disengaged when the ends of the plaque traction rods 35 contact therewith in their path of travel. The plaque rods 35 are guided around the discharge end by the guiding surface or groove 36 in the side frame 37 of the machine and are driven by dogs 38 on traction chains 39 which pass around terminal wheels 40.

According to this form it will be appreciated that the facets of the triangular bar 27 in turn are rotated by engagement of the plaque rods 35 into positions in which they function as extensions of the plaque table 28 at the discharge end of the conveyer. It will be appreciated that as the rotational axis is at the centre of the triangular form the bar 27 will be turned into a position in which the difference between the lesser radius normal to a facet and the radius to the corners of the bar provides a clearance through which the traction rod 35 of a plaque can pass from the upper lap to the lower lap of the conveyer, while during the progress of the rod the bridge piece 27 continues to turn and presents a fresh facet to the horizontal position where it is locked by the latches 33. The latches are held in their locking position by springs 41.

The sequence of operations is similar to that already described in reference to the rectangular bridge piece, namely as a plaque traction rod 35 arrives at the discharge position its ends knock aside the locking latches 33, freeing the bridge piece 27, and in further progress the ends of the traction rod bear upon the nose of the bridge piece adjacent to the receiving conveyer 29 and cause the bridge piece to turn about its axis, in which operation the gap opens and permits the traction rod to pass downwardly to the lower lap of the conveyer. In turning, the next following nose or radiussed corner of the triangular piece 27 is turned into the position occupied by the nose which has just been depressed, and the bridge piece is locked in this position, while the body of the plaque is drawn over the nose to strip the goods from the plaque as they are transferred to the receiving conveyer 29. It will be appreciated that a triangular bridge piece may be used at the feed end of the machine if desired.

In applying the invention to battened or ribbed conveyers, the battens or ribs are extended upon either side of the conveyer so that they occupy

positions similar to the ends of the plaque traction rods described above and are adapted to operate in the same manner upon the latches and bridge pieces to cause the unlocking and rotation of the bridge pieces.

I claim:

1. Conveyer mechanism comprising endless conveyers arranged in series and having adjacent fixed terminal points separated by a space, through which a plaque bar is adapted to pass, means for closing and opening said space, comprising a bridge piece mounted in said space for rotation about a stationary axis, the cross sectional shape of said bridge piece being such that in one position it presents a surface which bridges said space, while when rotated to another position sufficient opening is provided to permit said plaque bar to pass through said space, and means for successively rotating the bridge piece to said positions.

2. Conveyer mechanism comprising endless conveyers arranged in series and having adjacent fixed terminal points separated by a space, through which a plaque bar is adapted to pass, as claimed in claim 1, wherein the bridge piece has a surface lying in the path of the plaque bar, with which the plaque bar is adapted to engage, whereby rotation of the bridge piece to open the gap is effected by pressure of the plaque bar against said surface.

3. Conveyer mechanism comprising endless conveyers arranged in series and having adjacent fixed terminal points separated by a space, through which a plaque bar is adapted to pass, as claimed in claim 1, wherein the bridge piece comprises a bar having a rectangular cross sectional shape presenting long and short surfaces for closing and opening the gap respectively.

4. Conveyer mechanism comprising endless conveyers arranged in series and having adjacent fixed terminal points separated by a space, through which a plaque bar is adapted to pass, as claimed in claim 1, wherein the bridge piece comprises a bar having cross sectional shape comprising an equilateral triangle, the closing of the gap being effected when a face lies uppermost and horizontal.

5. Conveyer mechanism comprising endless conveyers arranged in series and having adjacent fixed terminal points separated by a space, through which a plaque bar is adapted to pass,

as claimed in claim 1, wherein means are provided for locking the bridge piece in the gap closing position.

6. Conveyer mechanism comprising endless conveyers arranged in series and having adjacent fixed terminal points separated by a space, through which a plaque bar is adapted to pass, as claimed in claim 1, wherein the bridge piece comprises a bar of rectangular cross section, pins projecting from one end of the bar on both sides of the axis of rotation, a pivotally mounted sear adapted to successively engage the pins when the bar is in the bridging position, said sear being spring pressed and having an arm lying in the path of the plaque bar which is adapted to pass through the gap, the arrangement being such that the plaque bar in its travel engages with said arm to unlock the sear and then engages the bar to rotate it to open the gap.

7. Conveyer mechanism comprising endless conveyers arranged in series and having adjacent fixed terminal points separated by a space, through which a plaque bar is adapted to pass, as claimed in claim 1, wherein the bridge piece comprises a bar of triangular cross section, locking means for said bar comprising a pivoted latch adapted to engage an apex of said triangle when the bar is in the bridging position, said latch being spring pressed and lying in the path of the plaque bar which is adapted to pass through the gap, the arrangement being such that the plaque bar in its travel engages the latch to remove it from its locking position and then engages the bar to rotate it to open the gap.

8. Conveyer mechanism comprising an endless conveyer having a terminal point, a receiving means adjacent said terminal point but spaced therefrom, said conveyer having transverse plaque bars adapted to travel around said terminal point and through the space, means for opening and closing said space comprising a rotatably mounted transverse bridging bar located in said space, means having cam grooves located at the sides of said conveyer adjacent the terminal point, and into which grooves the ends of the plaque bar are adapted to project, said grooves being shaped to cause the plaque bars to contact with the bridging bar to rotate it to the bridging position subsequent to the rotation of the bridging bar by the plaque bar to open the space.

ALLAN ASHMEAD TUNLEY.