

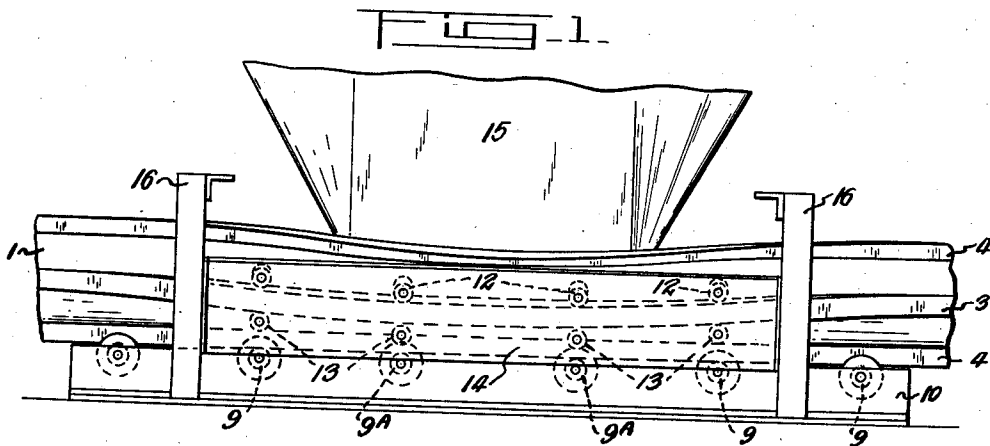
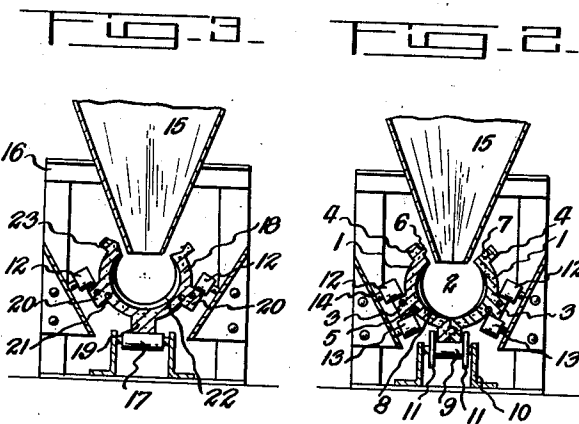
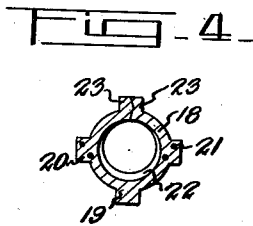
May 7, 1940.

H. S. JOHNS

2,199,935

TUBULAR BELT CONVEYER

Filed Sept. 8, 1939



Inventor
Henry S. Johns

by

Charles E. Bruce

Atty

UNITED STATES PATENT OFFICE

2,199,935

TUBULAR BELT CONVEYER

Henry Stinson Johns, Cleveland, Ohio, assignor
to Bancroft Holdings Limited, Hamilton, Ontario,
Canada, a joint-stock company of
Ontario, Canada

Application September 8, 1939, Serial No. 293,873

8 Claims. (Cl. 198—57)

My invention relates to improvements in tubular belt conveyers of the type shown in my United States Patents No. 2,013,242, September 3, 1935; No. 2,061,838, November 24, 1936; and No. 2,108,488, February 15, 1938. In my Patent No. 2,108,488, I disclose an apparatus for opening my conveying tube for the reception and discharge of material.

The object of my present invention is to provide a simple apparatus for retaining the tube in its open position, particularly for the reception of material, although the same apparatus could be used for retaining the tube open for the discharge of material.

As will be seen upon reference to my previous patents, my conveying tube is provided with four external ribs extending therealong and a further object of my invention is to provide means engaging the sides of several of the ribs to retain the tube in a split open position.

With the foregoing and other objects in view as shall hereinafter appear, my invention consists of an apparatus constructed and arranged all as hereinafter more particularly described and illustrated in the accompanying drawing, in which:

Figure 1 is a side elevational view of a feeding apparatus constructed in accordance with my invention.

Figure 2 is a vertical cross-sectional view through the apparatus.

Figure 3 is a similar view to Figure 2, showing a unitary tubular belt passing through a modified construction of my feeding apparatus, and,

Figure 4 is a cross-sectional view through a unitary tubular belt showing it in the normal closed material carrying position.

Like characters of reference indicate corresponding parts in the different views of the drawing.

As disclosed in my United States Patent No. 2,013,242, September 3, 1935, my conveyer tube can be either in the form of a pair of trough-shaped belts which run together to constitute the material carrying tube, or may be in the form of a unitary tubular belt having a slit extending along one side through which material is received or discharged when the belt is opened. In my United States Patent No. 2,108,488, February 15, 1938, I show my conveyer tube, formed either of the two trough-shaped belts or of the unitary tube, split open for the reception or discharge of material through the exertion of roller pressure against the side of the belt opposite to the open slit.

Figure 1 is a side elevational view of a material feeding apparatus through which my tube is passed. With this apparatus, as illustrated in Figures 1 and 2, the pair of trough-shaped belts forming the tube run side by side in the same manner as disclosed in my United States Patent No. 2,108,488. The tube comprises two trough-shaped belts 1 of substantially semi-circular trough form which enclose and form a material carrying bore 2. Each belt is formed with a centrally positioned longitudinal rib 3 and a pair of edge flanges 4 wherein the complementary flanges of the two belts form another pair of ribs of the same dimensions as the ribs 3. The belts are made of rubber and are retained against longitudinal stretching by chains 5 embedded in the ribs 3. The abutting faces of the flanges 4 are preferably formed with interlocking tongues and grooves 6 and 7. To retain material against slipping in the tube, particularly in vertical rises, the belts may be formed with spaced apart ribs 8 which substantially follow the curvature of the inner faces of the tubes.

My apparatus comprises a plurality of rollers 9 journaled between a pair of spaced apart angle members 10 running along the bottom of my apparatus and upon which the lower flanges 4 of the tubular belt ride. The rollers may be formed with side flanges 11 to retain the belt flanges 4 from splitting apart. The central rollers 9A, if so desired, can be positioned at a higher elevation than the outer rollers 9 so the bottom of the belt is arched upwardly to assist in splitting it open, following my invention as disclosed in my United States Patent No. 2,108,488.

To retain the belts in the split open position as illustrated in Figure 2, my apparatus consists of a plurality of pairs of rollers 12 and 13 which are freely journaled upon side plates 14 extending along the side of my apparatus. The top rollers 12 engage the top faces of the ribs 3 and the rollers 13 engage the bottom faces of the ribs 3. The rollers 12 are so positioned that when the ribs 3 on the belts are adjusted underneath the rollers, the rollers, through pressing against the top faces of the ribs, retain the belts in the split open position. The lower rollers 13 are spaced apart from the upper rollers 12 a distance substantially equal to the thickness of the ribs 3 and thus help to retain the belt in its adjusted position as it passes through my feeding apparatus. The apparatus contains a plurality of pairs of rollers 12 and 13 which are suitably positioned upon the plates 14, as illustrated in Figure 1. The feed hopper 15 forms part of the feeding ap-

paratus and is suitably supported to direct material into the split open belts. The ends of the side plates 14 are suitably supported upon end frames 16 positioned on either side of the feed hopper 15.

In Figure 3 I show a slight modification of my apparatus wherein I only provide the rollers 12 to engage the upper faces of the belt ribs, and in place of the flanged rollers 9, furnish similarly positioned rollers 17 which are not formed with flanges. The rest of the construction in this modification is similar to the construction shown in Figure 2. The apparatus shown in Figure 3 contains a unitary tubular rubber belt 18 in place of a tube made up of two trough belts, as illustrated in Figure 2. This belt 18 has its lower rib 19 riding upon the rollers 17 and the upper faces of its ribs 20 engaged by the rollers 12. The ribs 20 also contain embedded chains 21. This unitary belt can also be formed with a plurality of spaced apart material retaining flight ribs 22 which substantially follow the curvature of the inner face of the tube. In Figure 4 I show a unitary tubular belt in the normal closed material carrying position wherein the V-shaped faces of the flanges 23 interengage.

When my tubular conveyor is in operation, the embedded chains in the sides of the tube are substantially taut and it will therefore be appreciated, when the tube is adjusted underneath the feeding hopper 15, with the upper faces of its side ribs engaging the rollers 12, and the lower rib engaging either the rollers 9 or 17, that with the various rollers being properly positioned, the belt will be opened along its upper slit in passing through my hopper, as illustrated in Figures 2 and 3. Before the tube enters the material feeding apparatus it is closed, as illustrated in Figure 4 and also as described in my United States Patents Nos. 2,013,242 and 2,108,488, and when it passes out of such apparatus it again resumes the closed position. As the split open portion of the belt in my feeding apparatus is somewhat in the shape of an elongated lozenge, as shown in Figure 3 of my United States Patent No. 2,108,488, the tube entering portion of the feeding hopper is also made of the same shape.

Although I have shown sets of rollers for engaging the ribs of the tube for splitting the tube open, it is to be understood that I can use stationary members slidably engaging the ribs instead of the rollers, without departing from the spirit of my invention, and that furthermore I can make such changes and alterations as I may from time to time deem necessary without departing from the spirit of my invention as set forth in the appended claims.

What I claim as my invention is:

1. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on the outer face of the tube and spaced away from the slit, and members bearing against the sides of the ribs to open the slitted elastic tube from its pre-formed tubular shape for the reception or discharge of material.

2. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on

the outer face of the tube and spaced away from the slit, a member engaging the side of the tube opposite the slitted side of the tube, and members exerting a pressure against the sides of the ribs adjacent to the slitted side of the tube to open the slitted elastic tube from its pre-formed tubular shape for the reception or discharge of material.

3. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on the outer face of the tube and spaced away from the slit, a roller engaging the side of the tube opposite the slitted side of the tube, and members exerting a pressure against the sides of the ribs adjacent the slitted side of the tube to open the slitted elastic tube from its pre-formed tubular shape for the reception or discharge of material.

4. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on the outer face of the tube and spaced away from the slit, a member engaging the side of the tube opposite the slitted side of the tube, and rollers engaging and exerting a pressure against the sides of the ribs adjacent the slitted side of the tube to open the slitted elastic tube from its pre-formed tubular shape for the reception or discharge of material.

5. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on the outer face of the tube and spaced away from the slit, a roller engaging the side of the tube opposite the slitted side of the tube, and rollers engaging and exerting a pressure against the sides of the ribs adjacent the slitted side of the tube to open the slitted elastic tube from its pre-formed tubular shape for the reception or discharge of material.

6. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on the outer face of the tube and spaced away from the slit, and a plurality of rollers engaging the sides of each rib, the rollers being so positioned that the slitted elastic tube in passing between the rollers with its ribs in engagement therewith is opened from its pre-formed tubular shape for the reception or discharge of material.

7. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on the outer face of the tube and spaced away from the slit, means embedded in the ribs to retain the belt against stretch, rollers engaging the side of the tube opposite the slitted side of the tube, and a plurality of rollers engaging the side of each rib adjacent the slitted side of the tube,

the rib engaging rollers being so positioned that the slitted elastic tube in passing between said rollers with its ribs in engagement therewith is opened from its pre-formed tubular shape for the reception or discharge of material.

8. In a conveying mechanism, a moving pre-formed tube having the elastic characteristics of rubber and formed with a material carrying bore and having a longitudinally extending slit-like opening through the wall thereof, a pair of ribs positioned substantially opposite one another on the outer face of the tube and spaced away from the slit, means embedded in the ribs to retain

the belt against stretch, a set of spaced apart rollers forming an arch in relation to the path of travel of the tube and engaging the side of the tube opposite the slitted side of the tube, and sets of rollers, each set of rollers engaging the side of each rib adjacent the slitted side of the tube, the rib engaging sets of rollers being so positioned that the slitted elastic tube in passing between said rollers with its ribs in engagement therewith is opened from its pre-formed tubular shape for the reception or discharge of material.

HENRY STINSON JOHNS.