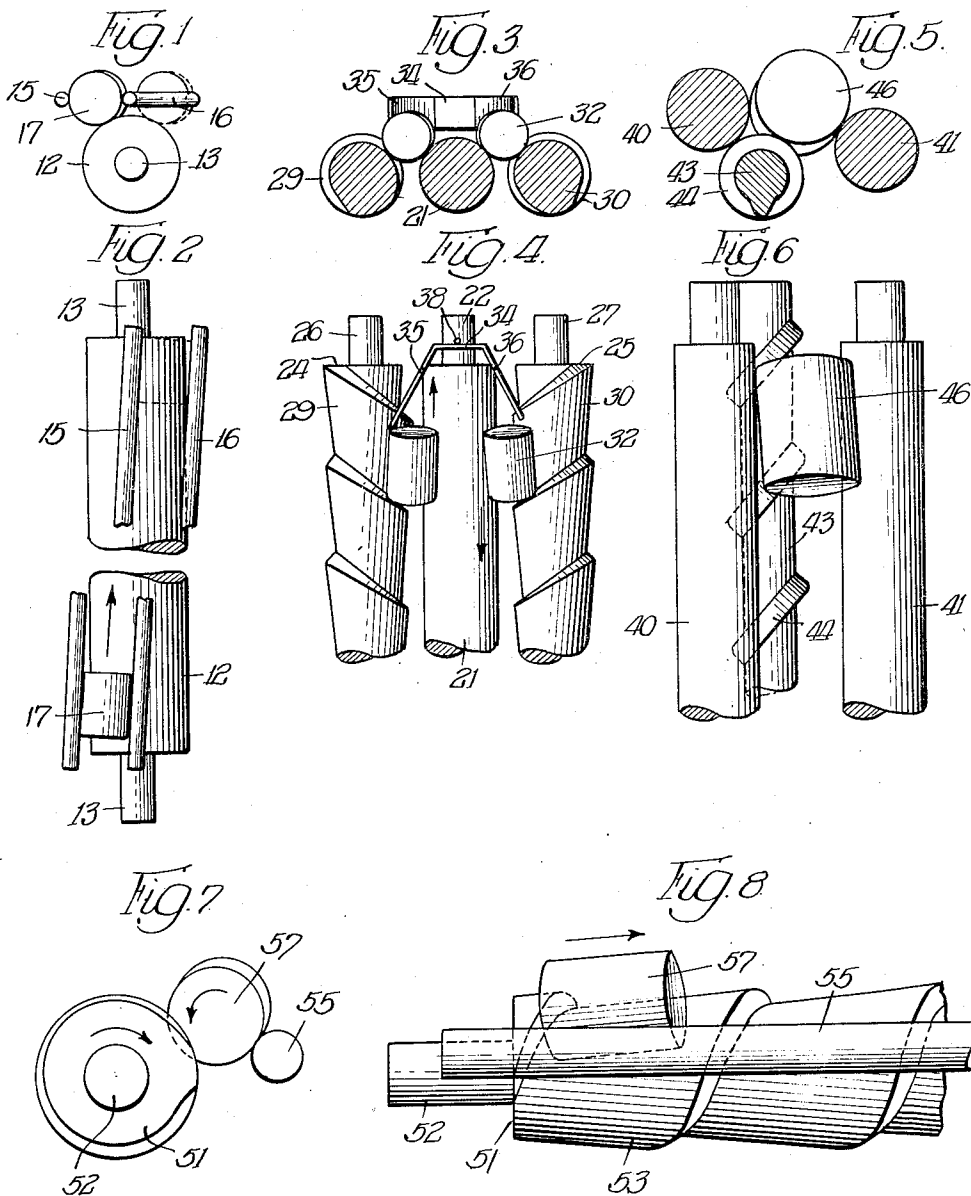


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O. GROSVENOR
CONVEYER APPARATUS
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INVENTOR.

Oliver Grosvenor,

BY

Wilkinson, Hickey, Byron & Hance
attys.

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CONVEYER APPARATUS

Oliver Grosvenor, Morrison, III, assignor to Libby,
McNeill & Libby, Chicago, Ill., a corporation of
Maine

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This invention relates to a new and improved conveyor apparatus, and more particularly to a roll type conveyor for rotating and moving longitudinally units or articles which are generally cylindrical in form.

Various types of roll conveyors have been used heretofore for handling all types of units or articles. In general, such conveyors comprise cylindrical rollers to impart rotation to the units and other means such as chains, screw forms or other mechanical means for moving the unit along its axis. In some cases the rolls are inclined and the units move longitudinally under the influence of gravity. All such means and methods result in frictional loss, since the units are given a sliding motion along the roll surfaces.

According to the present invention, the unit is positioned and maintained with its axis at an angle to the axis of the roll and the rolling contact with the surface causes it to progress longitudinally as well as rotate about its own axis. The unit, which is generally cylindrical in form, does not move longitudinally in the line of its own axis, but at an angle thereto. This movement serves to greatly minimize sliding friction.

While the unit or generally cylindrical object being conveyed is undergoing rotation and translation or longitudinal movement, any desired treatment may be applied to it. It may be heated or cooled, dried or sprayed with a protective coating. The rotating movement may be utilized in the use of the conveyor to mix and agitate the contents of the unit. This agitation is of great value where it is desired to heat or cool the contents, as it accelerates the transfer of heat between the container, its contents and the surrounding medium. It is an important advantage also of the present invention that this agitation takes the form of a smooth, even flow or circulation and does not comprise a shaking or churning effect which would tend to cause foaming or other undesirable results.

It will be apparent that the entire conveyor apparatus may be enclosed in a chamber or an autoclave with provisions for the entrance and exit of units being conveyed through substantially fluid tight valves so that any preferred process can be carried out at, above or below atmospheric pressure. Such forms of apparatus are well known and require no detailed description. Objects of wood, glass, metal, plastic or other suitable material may be treated and, in the case of containers, those of metal, glass, plastic or any other suitable composition may be conveyed.

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It is an object of the present invention to provide a new and improved roll conveyor.

It is a further object to provide a conveyor of this character in which the objects being conveyed are both rotated and moved longitudinally of the conveyor.

It is an additional object to provide a roll conveyor so constructed as to minimize sliding friction in the longitudinal movement of the objects being conveyed.

It is also an object to provide a conveyor which is simple in design and rugged in construction, whereby it is adapted for commercial production and use.

Other and further objects will appear as the description proceeds.

I have shown certain preferred embodiments of my invention in the accompanying drawings, in which—

Figure 1 is an end elevation of an apparatus comprising a single roll and a pair of fixed guides; Figure 2 is a plan view, partially broken away, of the construction of Figure 1;

Figure 3 is an end view of a modified form of construction comprising rolls having helicoidal surfaces with a cylindrical roll located therebetween;

Figure 4 is a fragmentary plan view of the construction of Figure 3;

Figure 5 is a vertical section through a construction including two cylindrical rolls and an intermediate driving roll having a helicoidal projection thereon;

Figure 6 is a fragmentary plan view of the construction of Figure 5;

Figure 7 is an end view of a construction involving one roll with a helicoidal surface and an adjacent guide bar; and

Figure 8 is a fragmentary side elevation of the construction of Figure 7.

Referring first to the form of construction shown in Figures 1 and 2, the cylindrical roll 12 is supported on stub axles 13 and the parallel guide bars 15 and 16 are located above the roll. As clearly shown in Figure 2, the guide bars extend at an angle to the axis of the roll 12. These bars 15 and 16 are parallel and cause the unit 17, which is being conveyed, to be held at an angle to the surface of roll 12. This causes the object to be given both rotary and a longitudinal movement while minimizing the friction between the surface of roll 12 and the unit during this movement.

The form of construction shown in Figures 3 and 4 includes a central cylindrical roll 21 car-

ried on stub shaft 22. Located on each side of the roll 21 are the rolls 24 and 25 carried on stub shafts 26 and 27. The axes of all of the rolls are parallel and, as shown in Figure 4, the rolls 24 and 25 are provided with helicoidal surfaces, the major portions of which, as shown at 29 and 30, are of greater axial length than the length of the units 32 adapted to be translated or moved longitudinally by the conveyor system. The pivoted member 34 with the long arm 35 and short arm 36 serves to transfer the units 32 from one side to the other of the central cylindrical roll 21. The unit 32 engaging the sloping longer leg 35 rides up and over the top of the roll 21, dropping down against the shorter leg 36. This causes the member 34 to swing in the counter-clockwise direction about its pivot 38. This movement brings the longer leg 35 in a position to prevent further forward movement of the next unit and the consequent jamming of the transfer point. As soon as the member 32 has cleared the short leg 36, the transfer member swings back by gravity to its normal position, as shown in Figure 4, and a succeeding unit 32 may be similarly transferred. It will be noted that the helicoidal surfaces of rolls 24 and 25 are oppositely inclined so that the second movement is in the reverse directions, as shown by the arrows in Figure 4.

The construction of Figures 5 and 6 includes the cylindrical rolls 40 and 41 and the intermediate roll 43 having the helicoidal projection 44. The units 46 conveyed by the rolls are tilted by the helicoidal projection 44 on roll 43 so as to minimize the surface contact between the unit 46 and the rolls 40 and 41. This inclines the unit 46 at an angle to its axis of forward movement and carries it forward at a speed dependent upon the pitch of the helicoidal surface 44 and the speed of rotation of the roll 43. As shown, the pitch of the surface 44 is greater than the length of the unit 46 being moved, and ordinarily this relationship is preferable.

The form of construction shown in Figures 7 and 8 includes the helicoidal roll 51 carried on stub shafts 52, the roll having a helicoidal surface 53 in general similar to the surfaces of the rolls 24 and 25 of Figures 3 and 4. The guide bar 55 is fixedly supported adjacent and parallel to the roll 51. The spacing is such as to support the unit 57 being conveyed at a point above the horizontal plane of the axis of the roll 51. As clearly shown in the drawings, the axis of the unit 57 is non-parallel to the axis of the roll 51, and the unit moves longitudinally with a minimum of friction between the unit and the surface on which it rolls.

While certain preferred embodiments of the invention have been shown, these are to be understood to be illustrative only, as it is capable of further modification to meet differing conditions and requirements. I contemplate such modifica-

tions as come within the spirit and scope of the appended claims.

I claim:

1. A conveyor comprising a rotatable roll and means spaced from said roll for guiding a cylindrical unit to be conveyed in frictional contact with the roll and at an acute angle to the axis of rotation of the roll, said guiding means comprising a pair of spaced guides located above the roll, said guides having parallel axes making an acute angle with the axis of the roll, the unit to be conveyed fitting between the guides and resting on the roll.

2. A conveyor comprising a rotatable cylindrical roll, and parallel guide means spaced from and above the roll, the axes of the guide means making an acute angle with the axis of the roll, said guide means being spaced to guide cylindrical units resting on the roll and to maintain said units with their axes making an acute angle with the axis of the roll while restricting only lateral movement of the units.

3. A conveyor comprising a substantially horizontal rotatable cylindrical roll and non-rotatable guide means spaced from said roll and having a fixed guide surface making an acute angle with the axis of the roll, said roll being adapted to support a unit resting thereon and engaging the guide surface whereby the friction due to gravity causes the unit to be rotated and moved linearly of the roll in contact with the guide surface.

4. A conveyor comprising a substantially horizontal rotatable cylindrical roll, and fixed cylindrical guide means spaced from and above the axis of the roll, the axis of the guide means making an acute angle with the axis of the roll, the spacing of roll and guide surfaces being such that a cylindrical object resting on the roll and guided by the guide means has the major portion of its weight carried by the roll whereby the friction due to gravity causes the object to be rotated and moved linearly of the roll in contact with the guide means.

OLIVER GROSVENOR.

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