

Feb. 4, 1941.

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2,230,653

TRAVERSE MOTION FOR WINDING MACHINES

Filed Aug. 11, 1939

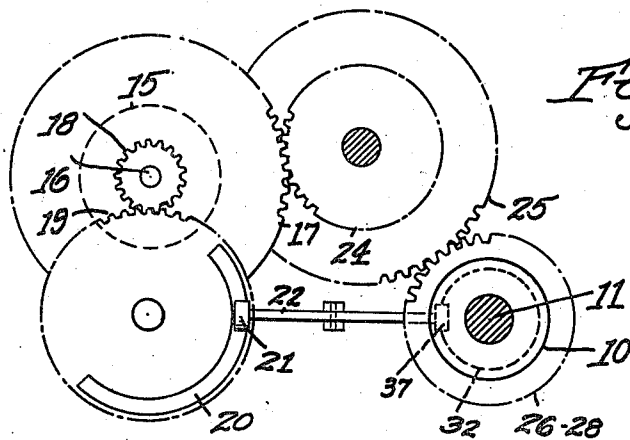


Fig. 1

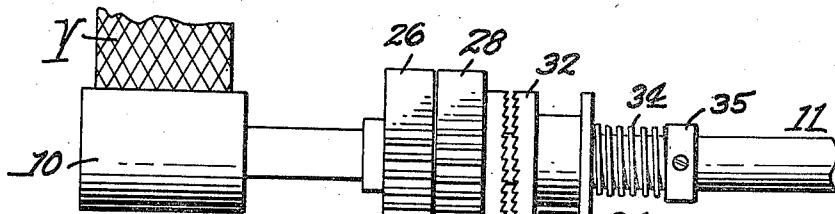


Fig. 2

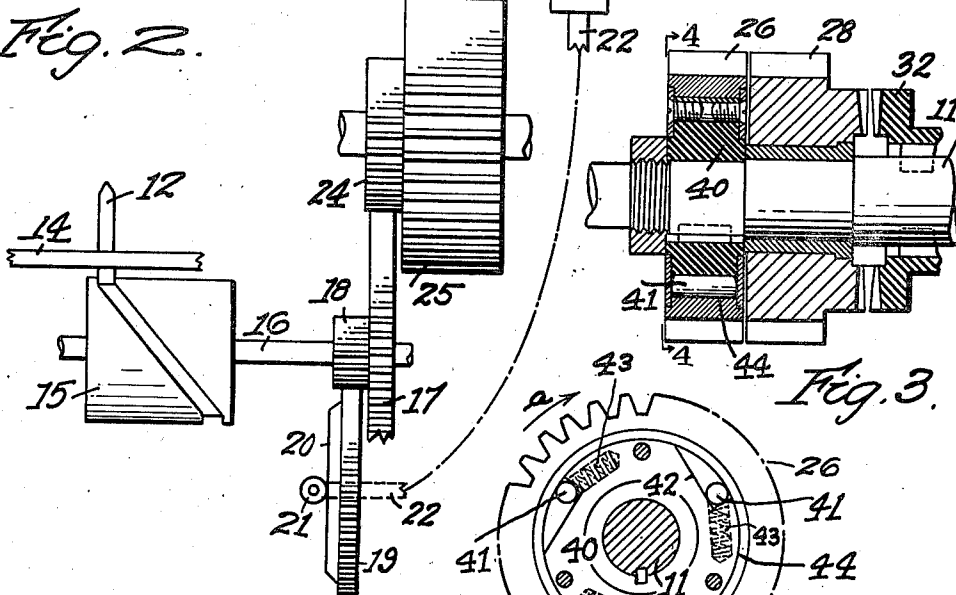


Fig. 3

Fig. 4

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2,230,653

TRAVERSE MOTION FOR WINDING
MACHINES

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Application August 11, 1939, Serial No. 289,621

3 Claims. (Cl. 242—43)

This invention relates particularly to apparatus for moving the traverse guide in a machine for cross-winding yarn packages, such as cheeses. An unvarying traverse motion has not been found satisfactory in such machines, as the yarn crossings and reversals are not so distributed as to provide a firm and satisfactory package. In particular, the reversals at the ends of the package are often successively superposed, producing hard spots, with intervening soft spots, and interfering seriously with subsequent unwinding operations.

It has been proposed to avoid such difficulties by introducing a belt-and-cone drive for the traverse cam, so that the traverse speed may be progressively varied. It has also been proposed to provide a supplemental accelerating and retarding motion between the yarn guide and the traverse guide. While these arrangements varied the relative traverse motion, they were also costly and complicated.

It is the general object of my invention to provide improved and simplified means for varying the ratio of movement between a traverse guide and a winding roll.

A further object is to provide means for moving the traverse guide at two different and definite rates, and for automatically shifting from one rate to the other at predetermined intervals.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawing, in which

Fig. 1 is an end elevation of my improved traverse motion;

Fig. 2 is a diagrammatic side elevation of the parts shown in Fig. 1;

Fig. 3 is an enlarged sectional side elevation of certain parts shown in Fig. 2; and

Fig. 4 is a sectional view, taken along the line 4—4 in Fig. 3.

Referring to the drawing, I have shown a driven winding roll 10 mounted on a driving shaft 11 and by which a yarn package Y is supported and rotated. The yarn is traversed by a guide 12 on a traverse rod 14, which in turn is reciprocated by a rotated cam 15 on a traverse cam shaft 16. The shaft 16 is provided with a gear 17 and pinion 18.

The pinion 18 meshes with a large gear 19 which is thus rotated at a much slower speed than the traverse cam 15. A segmental cam 20 is mounted on the side of the gear 19 and is en-

gaged by a cam roll 21 in one end of a cam lever 22.

The gear 17 engages a smaller gear 24 rotatable with a wide-faced gear 25, which in turn meshes with two driving gears 26 and 28. These gears are mounted on the driving shaft 11, which shaft is continuously rotated from any suitable source of power.

The gear 26 is connected to the shaft 11 by an over-running clutch shown in detail in Figs. 3 and 4, and the gear 28 is loose on the shaft 11 but may be engaged by a clutch collar 32 keyed to the shaft 11 but slidable thereon. A spring 34 is interposed between the clutch collar 32 and a collar 35 fixed to the driving shaft 11 and tends to move the clutch collar 32 to engaging position.

A roll 37 is mounted on the opposite end of the lever 22 from the roll 21 previously described, and this roll 37 projects into the groove of the clutch collar 32. The connection is such that the clutch will be disengaged when the roll 21 is moved by the cam segment 20 and will be engaged by the spring 34 when the roll 21 is free of the cam segment 20.

The gears 26 and 28, while of approximately the same size, are provided with different numbers of teeth. In the preferred construction, the gear 26 will have one less tooth than the gear 28.

The over-running clutch may comprise a driver 40 (Fig. 4) keyed to the shaft 11, and on which the gear 26 is freely rotatable. Rolls 41 are supported on cam faces 42, and springs 43 tend to push the rolls into engagement with an internal surface 44 of the gear 26. As the driver 40 rotates in the direction of the arrow a, the rolls engage and drive the gear 26, but if the gear 26 is rotated faster than the driver 40, the rolls are automatically disengaged. This clutch structure is commercial and forms no part of my invention per se.

The operation of my improved traverse motion will be readily apparent. When the clutch collar 32 is disengaged, the traverse motion will be driven through the over-running clutch and the smaller gear 26 at a definite rate of speed.

When the clutch 32 is engaged, the traverse motion will be driven at a slightly faster rate by the larger gear 28. As the gear 26 has one less tooth than the gear 28, the gear 26 will then be rotated by the gear 25 at a slightly faster speed than the driving shaft 11, and this faster motion will be permitted by the over-running clutch which allows the gear to slip forward freely rela-

tive to the shaft 11 but does not allow relative rearward movement.

Consequently the traverse guide will be moved at two slightly different but definite speeds, and the apparatus will shift automatically from one speed to the other at predetermined time intervals. The gears 26 and 28 may be in mesh for equal periods or one gear may drive for a longer or shorter period relative to the other gear, the relative timing depending on the length of the segmental cam 20.

I have thus provided a very simple and reliable means for automatically varying the traverse rate during cross-winding in such manner that the described defects in yarn packages will be effectively avoided.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a traverse motion for a winding machine, a winding roll, a thread guide, a traverse cam for said thread guide, means to rotate said winding roll at constant speed, and means to rotate said traverse cam at different selected speeds, said latter means comprising a driving shaft, a first gear loose on said shaft, a clutch on said shaft for said first gear, a second gear loose on said shaft, said gears being of the same size but with different numbers of teeth, a clutch on said shaft for said second gear, automatic means to connect one or the other of said gears to said shaft at predetermined intervals of operation, and a wide-faced gear continuously meshing with said first and second gears and connected to rotate said traverse cam at a speed determined by the selective driving connection of said shaft to said gears.

2. In a traverse motion for a winding machine, a winding roll, a thread guide, a traverse cam for said thread guide, means to rotate said winding roll at constant speed, and means to rotate said traverse cam at different selected speeds, said latter means comprising a driving shaft, a first gear loose on said shaft, an over-running clutch on said shaft for said first gear, a second gear loose on said shaft, said first and second gears being of the same size but said second gear having an additional tooth, a clutch on said shaft for said second gear, automatic means to engage and disengage said clutch at predetermined intervals of operation, and a gear continuously meshing with both said first gear and said second gear and connected to rotate said traverse cam.

3. In a traverse motion for a winding machine, a winding roll, a thread guide, a traverse cam for said thread guide, means to rotate said winding roll at constant speed, and means to rotate said traverse cam at different selected speeds, said latter means comprising a driving shaft, a first gear loose on said shaft, an over-running clutch on said shaft for said first gear, a second gear loose on said shaft, said first and second gears being of substantially the same size but said second gear having an additional tooth, a clutch on said shaft for said second gear, automatic means to engage and disengage said clutch at predetermined intervals of operation, and a gear member having gear portions rotating together, with one portion continuously meshing with said first gear and the other portion continuously meshing with said second gear, and said gear member being connected to rotate said traverse cam.

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