June 9, 1942. J. A. NEUMAIR 2,285,939

WEB FEEDING MECHANISM

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Fig. 1.

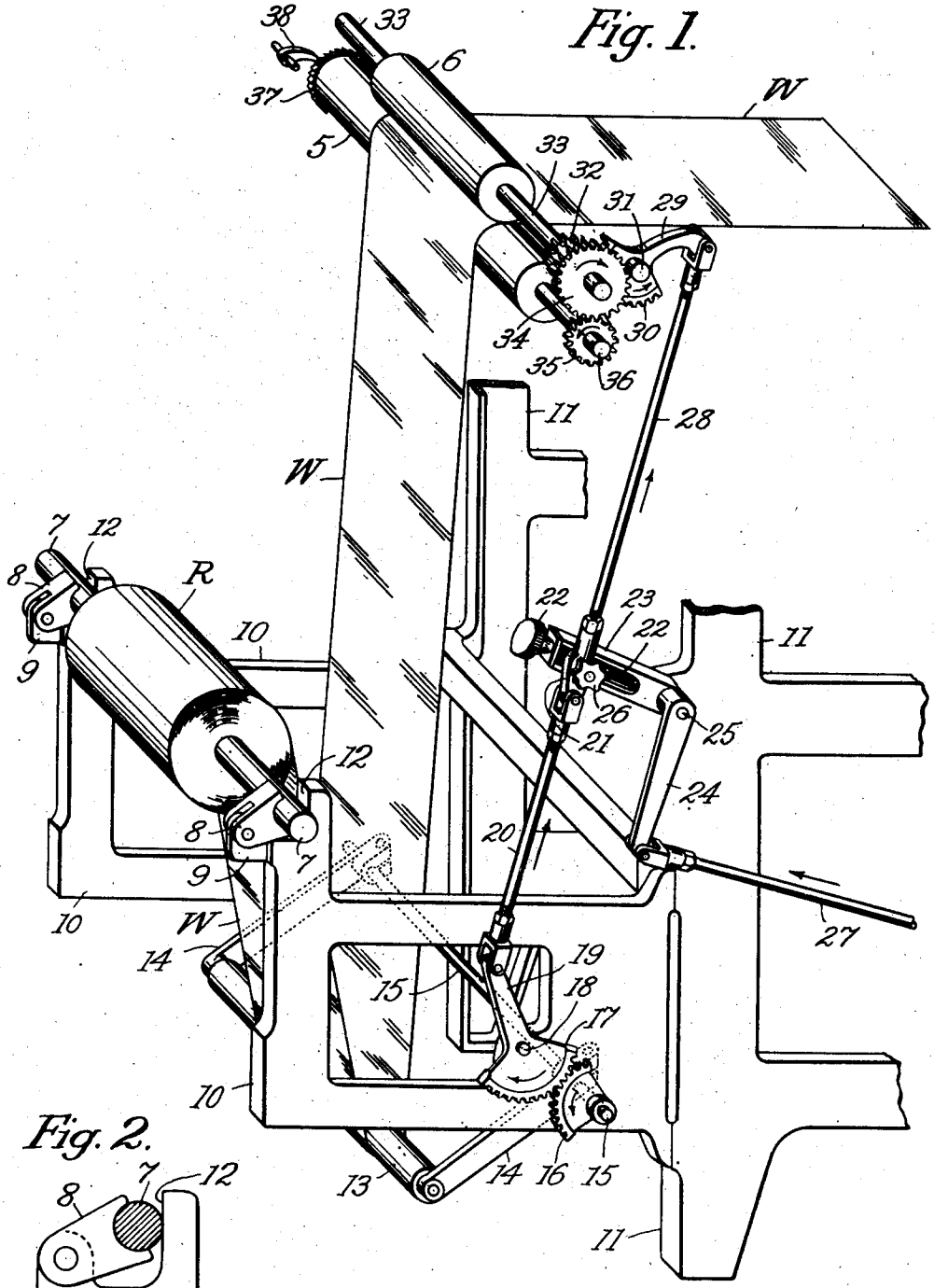


Fig. 2.

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WEB FEEDING MECHANISM

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8 Claims. (Cl. 242—75)

This invention relates to web feeding and is of special utility when carried into effect by mechanism intended to be embodied in a wrapping machine, although it is to be understood that the present invention may be utilized in any field for which it is adapted by the nature of the improvements disclosed herein. The invention also has particular reference to an improved braking device for tensioning material drawn from a roll.

In high-speed wrapping machines of conventional construction, only a comparatively small portion of each machine cycle is available for the feeding of the web ordinarily when the web-feeding mechanism derives its advancement from a forwardly moving element of the machine, and hence the web-advancement is very rapid during this web-feeding portion of the machine cycle, with the result that the momentum of the supply roll, upon stoppage of the web pull, exerted by a feed-roll couple usually, causes more or less slackness in the stretch of web between the supply roll and the web pulling members.

At the moment of taking up this slack, in the subsequent operation of the machine, the web is apt to be subjected to a sudden jerk which frequently results in breakage of the web, and as a pull or jerk of this character may occur in each machine cycle, such breakages constitute a prolific source of expense, both in the time occupied in manual repairs, and in loss of profitable use of the machine while the repair is being effected.

An object of the present invention is to avoid this unfavorable condition, by diminishing the momentum of the supply-roll to such an extent as to eliminate practically the production of slackness in the web.

The invention consists further in the provision of means adapted to take advantage of the above relatively low momentum of the supply roll by avoiding any overrun of the same when the web-pulling motion is interrupted, the means provided comprising a pair of brake shoes so disposed in an inclined upright position relatively to a co-operating upright stationary surface that the shaft of the supply roll is biased frictionally against the upright stationary surface with a braking action that is at its maximum when the roll is full and heavy, but diminishes as the web on the roll is expended and its weight decreases.

Another object is to provide a braking device which will support a member carrying a roll of material and which will automatically apply a braking action on said member proportional to the weight of the roll being carried by said member. A further object is to utilize a toggle action for causing a frictional drag to be applied to a roll feeding device.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the present invention progresses.

In the accompanying drawing, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawing, in which:

Fig. 1 is a view in perspective of the web feed end of a wrapping machine in the construction of which the present invention is embodied; and

Fig. 2 is a fragmentary detail view in vertical sectional elevation, upon an enlarged scale, looking toward the end of the shaft 7 in Fig. 1 and showing the action of a compensating brake shoe for supporting the web supply roll, in accordance with one feature of the invention.

Referring to the drawing, the part designated by the reference character R is a supply roll of wrapping material from which the web W is to be fed to the machine by the feed rollers 5, 6. An arbor 7, on which the roll R is placed, is supported in a pair of brake shoes 8 pivoted to swing on lugs 9 of a bracket 10 attached to the frame 11 of the wrapping machine. The brake shoes 8 are so dimensioned as to bias the arbor 7 toward and against vertical surfaces 12 provided on the bracket 10 so that the weight of the roll exerts maximum pressure of the arbor against the vertical surfaces 12 when the roll is full, exerting less and less pressure against these surfaces as the web is used up in the operation of the machine.

Since the momentum of a moving body is in direct proportion to its weight, it will be seen that with this arrangement the braking action is at all times proportional to the momentum which it is to overcome, resulting in uniform braking action during the entire life of the roll.

The web W from the roll R, before it passes between the feed rolls 5 and 6, is carried around a roller 13 attached by arms 14 to a shaft 15 turnable in bearings of the bracket 10. To the shaft 15 is affixed a gear segment 16 meshing with a segment 17 turning on a stud 18 in bracket 10 and having an arm 19 by which it is attached to a rod 20. The latter connects the arm 19 with a slide or block 21 adjustable on a hand operated screw shaft 22 mounted in the slotted arm 23 of a bell-crank lever 24 turning on a stud 25 in frame 11. Upon adjustment, the slide 21 may be locked in position by a thumb-nut 26.

The bell crank 24, 23 is actuated by a cam-

controlled rod 27 and operates the feed rollers 5 and 6, the slide 21 being connected by a rod 28 to the arm 29 of a gear segment 30 turning on a stud 31 in frame 11 and meshing with a gear 32 on shaft 33 of feed roller 6. A gear 34 on shaft 33 meshes with a gear 35 on shaft 36 of feed roller 5 thereby driving the latter. The gear 32 is mounted on shaft 33 through a one-way clutch (not shown) and the shaft 36 is provided with a ratchet wheel 37 engaged by a stationary pawl 38, so that the rollers 5, 6 can turn only in the forward direction, feeding the web W intermittently on the out-stroke of operating rod 27 (i. e., the stroke opposite to the arrows).

On the back stroke of rod 27, shown by arrows, the arms 14 on shaft 15 swing the roller 13 away from the supply roll R, thereby pulling a length of web from the same. Since, in a high-speed wrapping machine, the portion of the cycle available for the back stroke is much greater than that available for the forward stroke, the cyclic withdrawal of web sections from the roll R can by this arrangement be spread over a much longer period and thus the rotation speed of the supply roll proportionally decreased, resulting in a reduction of its momentum to but a small fraction of its former amount.

The arms 19 and 29 are so dimensioned as to produce equal linear travel of the web W on rollers 5 and 13 for any angular movement of arm 23, hence an adjustment of slide 21 automatically takes care of both of these rollers and no further manipulation is required when setting up the machine for a given length of web feed.

The invention above described may be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many concrete embodiments of the same. The invention, therefore, is not to be restricted to the precise details of the precise details of the structure shown and described.

What is claimed is:

1. A brake device for tensioning wrapping material drawn from a roll comprising, a rotatable shaft supporting said roll for rotation therewith, opposed fixed and pivoted bearing means gripping and supporting between them said shaft, said pivoted bearing means having a curved shaft engaging portion, a pivot for said pivoted means, said pivot and pivoted bearing means being so constructed and arranged that the weight of the shaft thereon tends to urge the shaft engaging portion of said pivoted means toward said fixed means to exert a frictional drag on said shaft which varies with the weight of the roll.

2. A brake device for tensioning material drawn from a roll mounted on a shaft comprising, spaced opposed shaft receiving members, one of said members being constructed and arranged to fit the curvature of the shaft to have a substantially toggle action with the other of said members to produce a relative movement of said members toward each other as a result of the weight of the shaft to cause a frictional braking effect on the roll supporting shaft varying automatically with the weight of the roll supported on said shaft.

3. A brake device for tensioning material drawn from a roll mounted on a shaft comprising, spaced opposed shaft receiving members including, a shaft supporting member engaging one part of said shaft, and a pivoted toggle member having a curved portion engaging another part of said shaft, said shaft being arranged to bias said toggle member into braking engagement with said shaft supporting member to cause a frictional braking effect on the roll supporting shaft varying automatically with the weight of the roll supported on said shaft.

4. Web supporting and tensioning mechanism comprising a shaft supporting a roll of continuous web material, bearing means provided at one end of said shaft for supporting said shaft, said bearing means including a backing element; a shaft supporting element opposed to said backing element; means supporting said supporting element for movement to wedge said shaft against said backing element as a result of the weight of the roll of web material to apply a braking force to said shaft which varies in amount with the weight of the roll supported, said supporting and backing elements constituting the sole support for one end of said shaft.

5. Web supporting and tensioning mechanism comprising a shaft for supporting a roll of continuous web material, bearing means provided at either end of said shaft for supporting said shaft, said bearing means comprising opposed relatively movable members, one of said members being constructed and arranged to cramp said shaft against the other opposed member under the downward pull of gravity on said roll and shaft to apply a braking force on said shaft while supporting said shaft, and said opposed force applying members constituting the sole support for said shaft.

6. Web supporting and tensioning mechanism comprising a shaft supporting a roll of continuous web material, bearing means provided at either end of said shaft, said bearing means comprising opposed relatively movable members, said members being constructed and arranged to engage and support said shaft exclusively, and also apply thereto a fractional braking force proportional in amount to the weight of the roll supported.

7. A brake device for tensioning material drawn from a roll comprising a rotatable shaft supporting said roll for rotation therewith, a fixed bearing member having a substantially vertical shaft engaging surface, a movable bearing member having a shaft engaging surface opposed to the shaft engaging surface of said fixed bearing member to grip the shaft directly between said surfaces, said shaft engaging surfaces of said fixed and movable bearing members constituting the sole supporting means for one end of said shaft, a pivot for said movable bearing member constructed and arranged to allow said movable bearing member to bias said shaft against said fixed vertical bearing member to apply a braking force directly to the shaft in an amount proportional to the weight of the roll supported.

8. A brake device for tensioning wrapping material drawn from a roll comprising, a rotatable shaft supporting said roll for rotation therewith, a fixed substantially vertical bearing member having a shaft engaging surface, a pivoted bearing member having a curved shaft engaging surface for supporting said shaft and biasing the same against said fixed vertical bearing member for line contact therewith to apply a braking force on said shaft proportional to the weight of the roll supported.

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