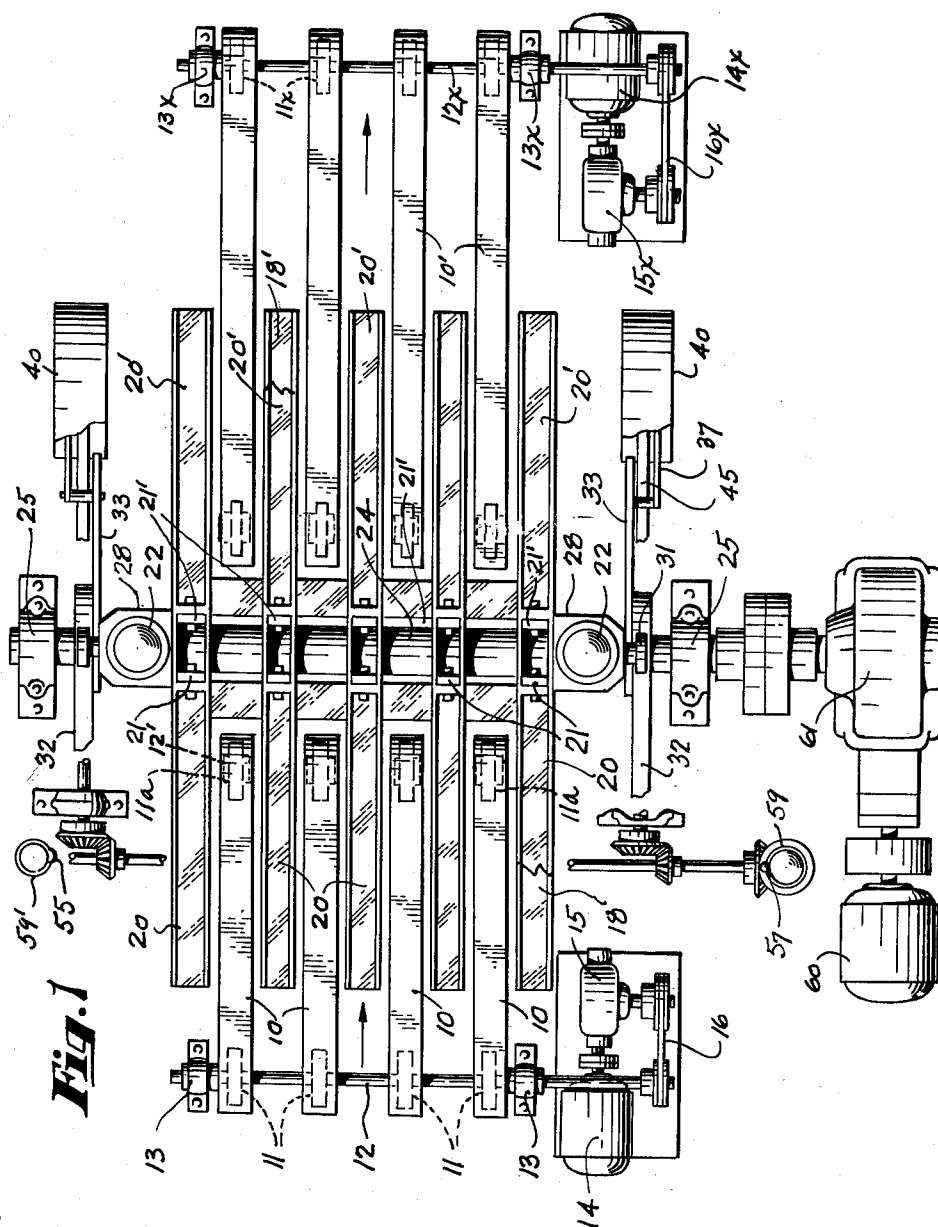


Filed May 22, 1961

ROLL-OVER MACHINE

3 Sheets-Sheet 1



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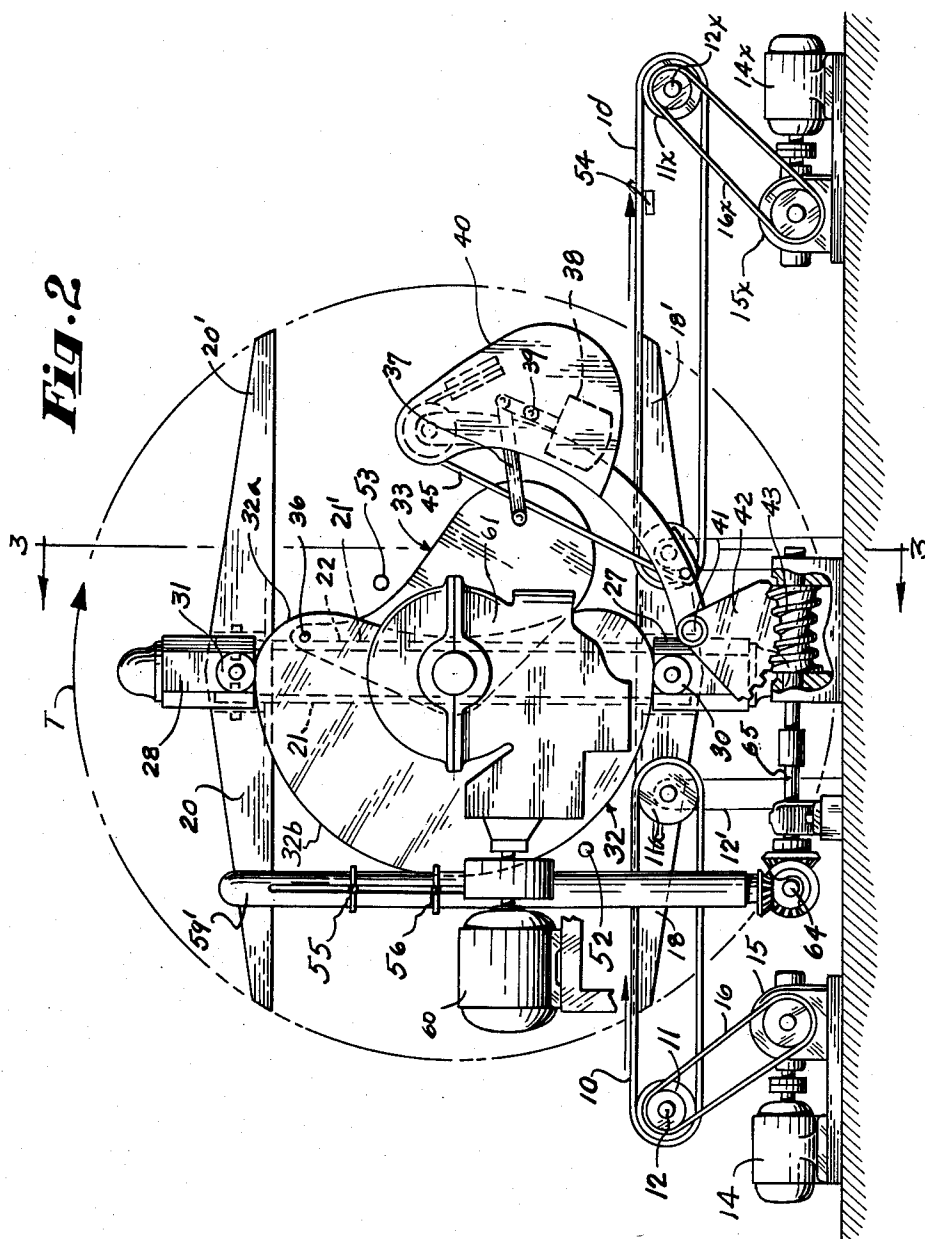
March 12, 1963

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ROLL-OVER MACHINE

3,080,984

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3 Sheets-Sheet 2



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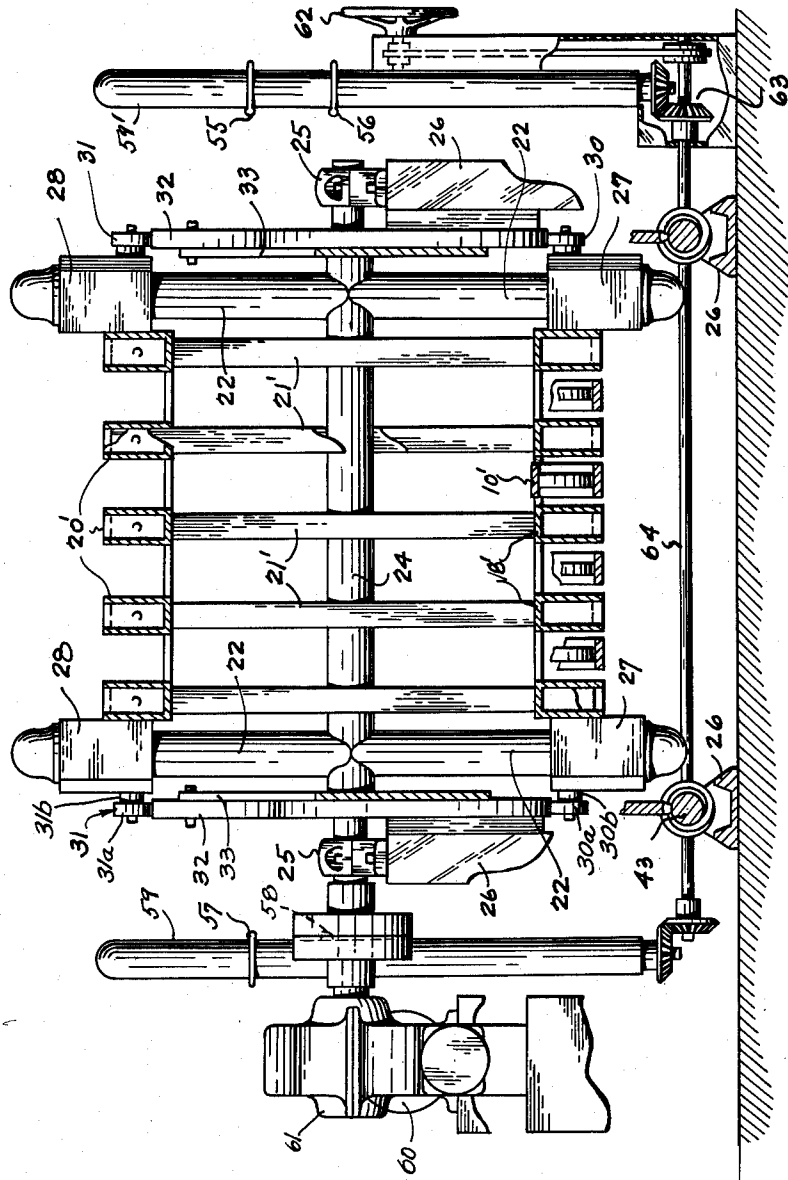
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Fig. 3



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ROLL-OVER MACHINE

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10 Claims. (Cl. 214—1)

This invention relates to what will herein be designated a "bale roll-over mechanism."

Explanatory to the invention, it will here be noted that when wrapping and binding stacks or bales of sheet material such as paper, pulp, cellulose, etc., or any other material without inner consistency, such as for example, wool and tow, it is of importance during the compressing and lashing or binding of the bale, to be able to roll the bale over or invert it before it is lashed or strapped in order to facilitate the placing of the usual protecting or stiffening sheets of wrapping material on the side faces of the bale under preparation.

The present invention relates particularly to an apparatus whereby such rolling-over of the stack may be effected in a simple manner while at the same time holding it secure.

It is the principal object of this invention to provide a stack roll-over apparatus having a stack receiving space, defined by parallel, top and bottom limiting faces extending in the direction of introduction of the stack and a stop face positioned transversely of the direction of stack introduction and at right angles to said parallel limiting faces; at least one of the latter faces being adapted to perform a stack compressing displacement in a direction at right angles to the plane of said face during a roll-over movement of the space as a whole about an axis extending at a right angle to the direction of introduction of the bales, to the effect that not only is the bale rolled over, but at the same time, is subjected to such compressing pressure that no movement of the stack as a whole is possible relative to the space nor is there any relative movement of the constituting elements of the stack or bale.

For the purpose of obtaining just the desired compression of the bale during the rolling-over operation, it is a further object of this invention to provide certain novel stationary guides for governing the movement of the movable limiting face during the rolling-over of the space as a whole; these guides being adjustable to suit different bale sizes and different bale material, and the guides may also comprise a resilient portion or part adapted to damp the compression during such portions of the roll-over movement, if so desired.

It is also an object of this invention to so arrange the apparatus that the movable limiting face may perform its movement under the force of rolling over, or it may be subjected to such external force, for instance by means of a spring, that the space between the pair of limiting faces will be reduced to a minimum.

In accomplishing the above and various other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

FIG. 1 is a plan, or top view of the "stack roll-over" mechanism of the present invention.

FIG. 2 is a side view of the machine.

FIG. 3 is a vertical cross-section taken on line 3—3 in FIG. 2.

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Referring more in detail to the drawings:

The present apparatus comprises a supply conveyor composed of a plurality of parallel, coextensive link belts 10, operated at their outer ends about sprocket wheels 1 of equal diameter fixed on a horizontal drive shaft 12 that is shown in FIG. 1 to be rotatably mounted in supporting bearings 13—13 at opposite sides of the conveyor and at their inner ends operate about similar sprocket wheels 11a mounted on individual supports 12' that may be fixed to the machine supporting surface. Shaft 12 is shown in FIG. 1 to be driven by an electric motor 1 operating through speed reduction gearing, designated 15, and a sprocket chain belt 16 connecting the gear and the shaft.

The several conveyor belts 10 are so spaced as to operate individually between spaced parallel fingers 18 which as shown in FIG. 2, form the lower limiting face of the space in the apparatus into which the stacks are to be introduced by the conveyor.

At a distance spaced from and above the fingers 18 and parallel thereto, as seen in FIG. 2, is a second set of fingers 20; these being so disposed as to form the top or second limiting face of the stack receiving space; the fingers 18 and 20 being in opposed relationship at bottom and top sides of the receiving space.

The belts 10 terminate at their inner ends close to a set of vertical battens 21 which form the inner end stop face of the receiving space and which are mounted as presently explained. The lower and upper sets of face defining fingers 18 and 20 are supported by and between vertical posts or standards 22—22 located at opposite sides of the machine, as well shown in FIG. 1 and which posts comprise upper and lower portions that are fixed in axial alignment perpendicularly to a horizontal cross-shaft 24 that extends at its ends beyond the posts 22—22 and is revolvably contained in supporting bearings 25—25 on a supporting frame structure 26. It is noted in FIG. 3 that the two posts 22—22 extend equally above and below the cross-shaft 24, and it is further to be understood, by reference to FIGS. 2 and 3, that the battens are fixed to the cross-shaft 24 at right angles to the fingers and extend the full distance between the fingers 18 and 20.

The unit formed by the fingers 18 and that unit formed by the fingers 20 are, respectively, mounted by sleeves 27 and 28 that are slidably fitted about opposite end portions of the posts 22—22.

The two units, as comprised by the fingers 18 and battens 21, are adapted to be rolled-over as a whole about cross-shaft 24 to a position in which the space defined between the fingers and by the battens as shown at the left hand side in FIG. 2, reverts to the position shown at the right of the cross-shaft in FIG. 1, and consequently constitute the discharge space of the apparatus into which discharge space conveyor belts 10' extend in the same manner as the belts 10 as shown in FIG. 1.

It is shown in FIG. 1 that the conveyor belts 10' operate at their outer ends about sprocket wheels 11x fixed on cross-shaft 12x rotatably mounted in supporting bearings 13x—13x and driven by an electric motor 14x through speed reduction gearing 15x and sprocket chain belt 16x.

Obviously, the machine may be constructed one side that is, as in the manner of that side first described at the left of cross-shaft 24 in FIG. 2, but it is most com-

venient both from the standpoint of counter-balancing and a rational, economic operation, to construct the apparatus as herein illustrated having battens 21 and 21' at opposite sides of cross-shaft 24 and oppositely related pairs of fingers 18—20 and 18'—20' extending, respectively, in opposite directions from the posts so as to form a pair of spaces, of which that at the left of center in FIG. 1 always constitutes the receiving charge space and that space at the right of center constitutes the discharge space. In this manner, the apparatus is perfectly balanced and may operate at a double rate.

The two sleeves 27 and 28 which mount the finger units on the posts 22—22 have stepped guide rolls 30 and 31 mounted thereon to cooperate on the stationary guide surfaces 32 and 33 at opposite sides of the machine. The rolls 30 and 31 include the larger part 30a and 31a, respectively, and the portions of smaller or reduced diameter 30b and 31b, respectively. These surfaces may be as shown in FIG. 2 wherein the right hand portion 32a and 33 constitutes the paths followed by the roll 31 and consequently controls movements of the fingers 20 and 20' during a turning movement by the cross-shaft 24 in the direction of the arrow T in FIG. 2, that is, during compression and roll-over of a bale, whereas the left hand portion 32b constitutes the path followed by roll 30, the discharge fingers being moved upwardly to the position for the purpose of providing full charge space.

The guide member 33 is formed into a generally pear-shaped circumference and it is hinged at 36 at its top end portion and is connected, in its lower end portion through a link 37 to a weight 38 which is hinged at 39 in the shell 40. The shell 40 comprises one arm of a bell crank type lever pivoted at 41 with its other arm 42 constituting a toothed segment engaged with a worm 43 for the purpose of effecting adjustment of the angular position of the shell. By a rocking movement of the shell 40, the positions of the guide 33 may be adjusted through link 37. The member 40 supports a tensioned, resilient member 45 which is extended close to one side thereof to the effect that the roll 31 when following the path 33 will strike softly against the resilient member 45 and thereby be damped in its further movement downward along the path 33. The tensioning of the member 45 may be adjusted in any suitable manner to make the movement of roll 31 and thereby the finger unit 20—20' suits the bale size and bale material under treatment.

In operation of the apparatus, bales are, in turn, introduced into the charge space between fingers 18 and 20 and battens 21 by means of conveyor belts 10, whereupon the shaft 24 is started, for instance under the control of a photo-electric cell 52, so that the portion 31a of roll 31 is moved downwardly along the top right hand portion of the guide 32a and the portion 31b of roll 31 follows along the guide 33, during which movement the bales are initially caused to engage the battens 21 and thereby be perfectly straightened, whereupon the sleeves 28—28 and fingers 20 secured thereto slide downwardly on the posts 22—22 so that the fingers 20 clamp the bale firmly against the fingers 18, to the effect that the constituents of the bale, for instance sheets, can not be displaced relatively to each other. When the roll 31 strikes against the resilient member 45, the movement is dampened by the unit constituted by the fingers 20 so that the compression and clamping of the bale is made slightly elastic during the continued movement until the fingers arrive in the position shown occupied by the fingers 18' in FIG. 1, during which movement the roll 30 has performed a movement along the path 32b and thereby released the bale, which is immediately caught by the discharge conveyor 10'. At the same time, a fresh bale is introduced in the charge space which is now formed to the left in FIG. 1 between the fingers 18' and 20' which are now occupying the position shown as occupied by fingers 18 and 20. Thereupon the cycle of operation is repeated as described.

For the purposes of safeguarding the apparatus and the performance of automatic operation, the apparatus may be equipped with photo-electric control means. As mentioned, a photo-electric cell 52 may be arranged in association with the charge space, for the purpose of starting the operation when a bale is in position in the charge space. A further photo-electric cell 53 may be associated with the discharge space, for the purpose of preventing starting of the operation as long as a bale is still in the discharge space, and/or a safety switch 54 may be arranged which switch must be passed by the bale prior to the initiation of operation.

For the purpose of adjusting the apparatus to accommodate bales of different height, there is provided photo-electric cells 55 and 56 and light sources 57 and 58, respectively, and arranged in posts 59 and 59' at opposite sides of the entering space. Such cells are so connected that the light impinging on cell 55 will be interrupted by an entering bale, whereas the light impinging on cell 56 is to be uninterrupted if the apparatus is to operate at all.

The cells 55 and 56 together with the light sources 57 and 58 are vertically adjustable along graduated scales on their supporting posts 59 and 59' by means of a hand wheel 62 shown in FIG. 3 to be applied to an adjusting mechanism designated generally by numeral 63 which operates through shafts 64, see FIG. 3, and shafts 65, see FIG. 2, to effect adjustment of the resilient tensioning members 45 mounting the worms 43, as shown in FIG. 2.

While it has been previously stated that the roll-over operation may be powered by any suitable means, it has herein been shown that shaft 24 has a driving connection at one end with an electric motor 60 through a reduction gearing shown at 61. It is further to be observed by reference to FIG. 1 that the parts 32—33—40 are duplicated at opposite sides of the machine.

What I claim as new is:

1. A bale roll-over mechanism comprising a supporting frame, a horizontally disposed, rotatable cross-shaft mounted for rotation on said frame, a pair of laterally spaced posts mounted on said cross-shaft medially of the ends thereof, two sleeves slidably mounted on each post, one above and one below said cross-shaft, a plurality of laterally spaced bale supporting and clamping fingers secured to and between the pair of sleeves above and the pair of sleeves below said cross-shaft, a bale engaging means secured to said cross-shaft at right angle to said fingers, stationary guide means mounted adjacent at least one of said posts, follower means secured to both of the sleeves on the post adjacent said guide means, said follower means being engageable with said guide means to control the relative position of said sleeves on said posts and power means for rotating said cross-shaft and posts whereby a bale positioned between said fingers is clamped by the fingers incident to the rotation of the fingers and sliding toward one another of the sleeves on the posts.

2. A roll-over mechanism according to claim 1 wherein said stationary guide means is adjustably mounted for establishing the extent of movement of said sleeves.

3. A roll-over mechanism according to claim 1 wherein said stationary guide means includes resilient portions for varying the application of the bale clamping force in the passing of the follower means thereover.

4. A roll-over mechanism as in claim 3 including adjusting means for altering the resiliency of said resilient portions.

5. A roll-over mechanism as in claim 1 including fingers projecting in the same plane on diametrically opposed sides of the sleeves.

6. A roll-over mechanism as in claim 1 including means for causing the power means to be actuated incident to the movement of a bale on to said bale supporting fingers.

7. A roll-over mechanism as in claim 1 wherein said guide means is substantially circular on a major portion of its edge and is irregularly shaped on the remaining edge portion.

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8. A roll-over mechanism as in claim 1 wherein said guide means includes two pieces one of which is pivotably joined to the other and means is provided to limit the movement of the pivotably mounted piece.

9. A roll-over mechanism as in claim 1 wherein all sleeves are freely slidable on said posts toward the ends of posts and the guide means and guide followers limit the movement of said sleeves toward said cross-shaft.

10. A roll-over mechanism as in claim 1 wherein stationary guide means are provided adjacent each of said

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posts and follower means are provided on each of said sleeves.

References Cited in the file of this patent

UNITED STATES PATENTS

2,293,192	Campbell -----	Aug. 18, 1942
2,772,766	Kellam -----	Dec. 4, 1956
2,851,147	Hageline et al. -----	Sept. 9, 1958
2,865,516	Hedderich -----	Dec. 23, 1958
2,984,364	Lamb -----	May 16, 1961