

Nov. 19, 1968

J. E. CORNWALL
STACKING DEVICES

3,411,773

Filed May 25, 1966

4 Sheets-Sheet 1

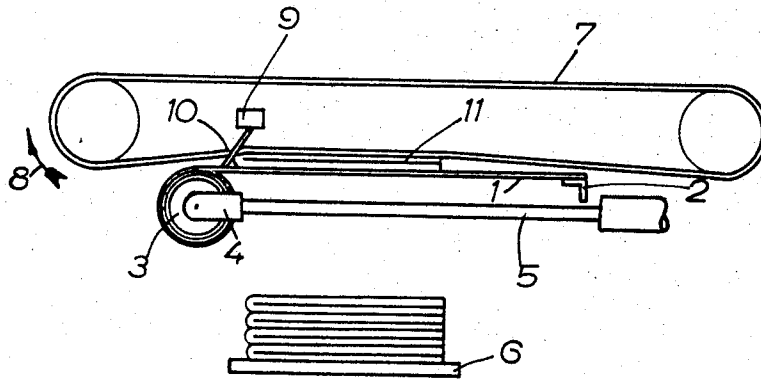


FIG. 1.

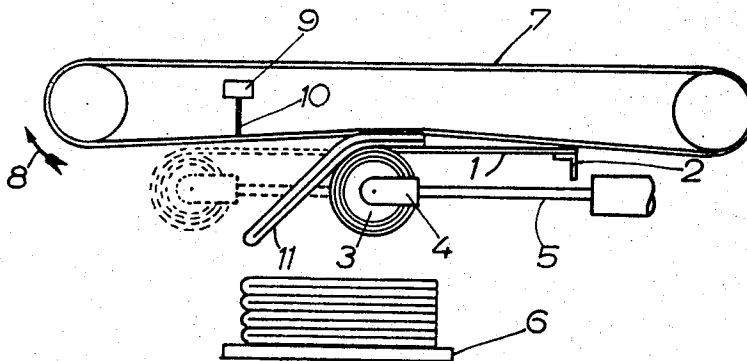


FIG. 2.

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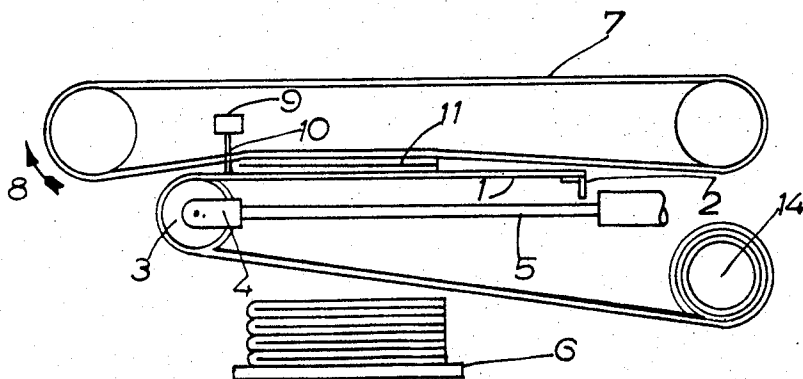


FIG. 3.

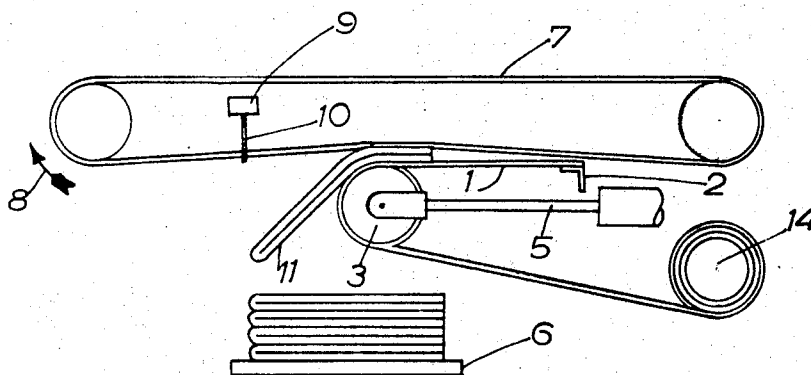


FIG. 4.

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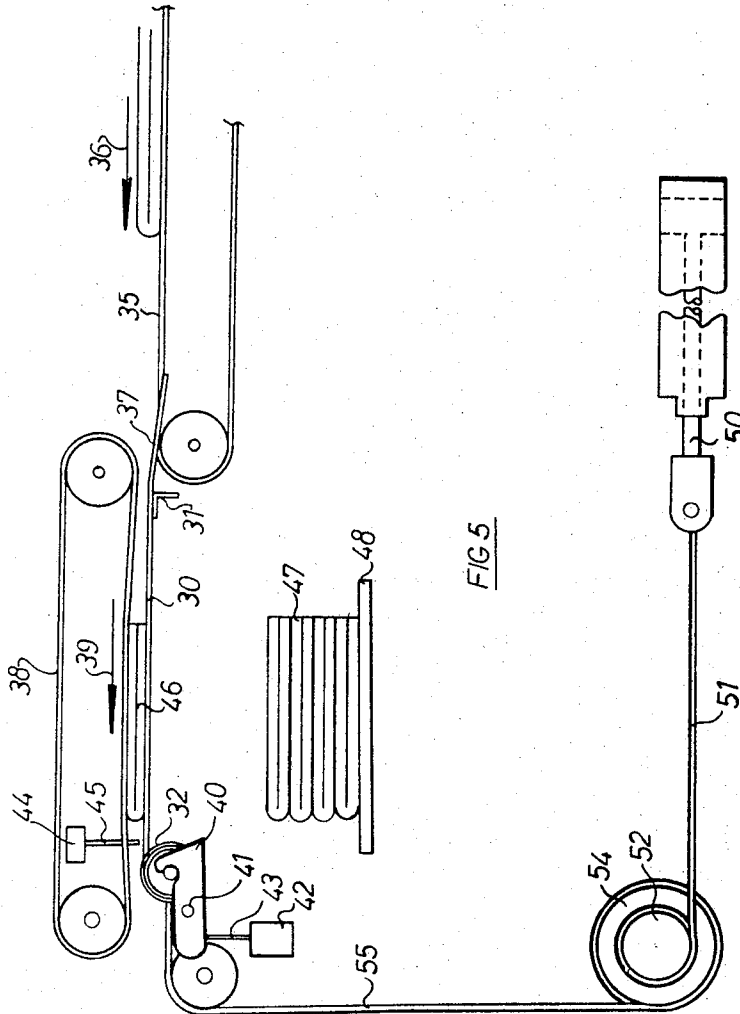
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4 Sheets-Sheet 3



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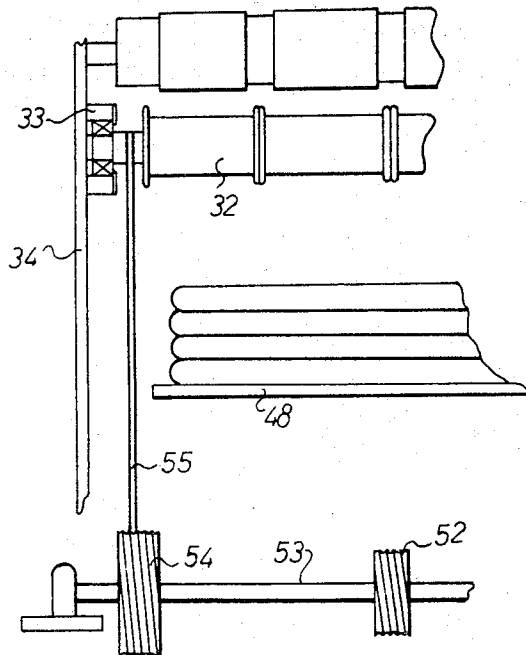


FIG 6

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STACKING DEVICES

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9 Claims. (Cl. 271-73)

ABSTRACT OF THE DISCLOSURE

Articles are advanced serially to a staking station along a lengthening and shortening run of article supporting flexible material which is self coillable on a roller, the forward end of the run being arcuate and being advanced at a lower speed and withdrawn at a higher speed to and from a terminal position above a stacking station. On retraction the article supporting run rolls away from the article to render the article unsupported without sliding between the article and the run.

The present invention relates to staking devices and is especially applicable to the stacking of articles of laundry. The object of the present invention is to provide a simple and inexpensive but effective and reliable stacking device in which a supporting means on which an article is supported while traversing to a position above a stacking station can be withdrawn from the article to render it unsupported without sliding thereof relatively to the article during the withdrawal.

According to the present invention a stacking device comprises a length of article supporting flexible material which is fixed at one end and at its other end is coiled upon a roller, said supporting material and said roller being arranged for self coiling of the material on the roller, means for advancing and retracting the forward end of a lengthening and shortening run of said material in one direction to and in the opposite direction from a terminal position above a stacking station while the article supporting material is respectively uncoiled from and allowed to self coil itself on said roller, said forward end of said run being arcuate and the lengthening and shortening of the run resulting from traversing of said material into and out of said run around the arcuate forward end thereof during the uncoiling and self coiling of the material from and on said roller and means for traversing an article along said run in a direction from the fixed end thereof towards said terminal position.

In one arrangement of the invention self coiling of the supporting material on the roller is achieved by loading of the roller for rotation in the direction for coiling the supporting material thereon. In another arrangement of the invention the supporting material comprises a plurality of noncumulative force spring strips capable of coiling themselves on the roller.

The supporting run may be advanced to and retracted from its terminal position by a piston and its retraction may be controlled by sensing means such as a feeler or photoelectric cell which senses the movement of an article supported on the run as it approaches the terminal position.

The present invention enables an article to be swiftly rendered unsupported by rolling of the article supporting material away from the underside of the article. This enables sliding between the article and its support to be avoided and thus enables the incidence of friction to be avoided in the retraction of the support from the article to be stacked.

The invention is further described by way of example

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with reference to the accompanying diagrammatic drawings in which:

FIGS. 1 and 2 illustrate one form of construction of the invention;

FIGS. 3 and 4 illustrate an alternative form of construction;

FIG. 5 is a side view and FIG. 6 is a fragmentary end view illustrating a further form of construction developed from that of FIG. 1.

In the form of construction illustrated in FIGS. 1 and 2 an article supporting run 1 comprises a number of parallel transversely spaced strips of flexible material fixed at one end to an angle bar 2 and coiled at the other end around a roller 3 mounted in a fork 4 at the end of a piston rod 5. Roller 3 is thus movable to the left and to the right relatively to a stacking station which comprises a platform 6. The supporting run 1 is arranged beneath an endless conveyor 7 which traverses in the direction indicated by arrow 8 and which comprises a number of parallel transversely spaced strips of flexible material having a frictional outer surface enabling the conveyor 7 to propel articles along the run 1.

The retraction of the roller 3 to the right is controlled by a switch 9 operated by a feeler 10 which extends into the path of and is engaged by an article 11 supported by the supporting run 1. Actuation of the switch 9 causes the piston rod 5 and the roller 3 to be withdrawn to the right as illustrated in FIG. 2. Continued movement of the roller 3 to the right beyond the position shown in FIG. 2 renders the article completely unsupported, enabling it to be discharged to the stack on platform 6. The speed of movement of the roller 3 from right to left may be equal to the speed of movement of the conveyor 7 but movement of the roller 3 in the opposite direction to render the article unsupported should be relatively rapid. The roller 3 is supported at opposite ends by guides (not shown) along which it slides.

Roller 3 is loaded for rotation in the counter clockwise direction to enable it rapidly to coil the supporting run 1 thereon when the roller is retracted to the right. Alternatively the supporting run 1 may comprise a plurality of coiled non-cumulative force spring strips which, being self-coiling, would render it unnecessary for the roller 3 to be loaded for counter clockwise rotation.

In the arrangement illustrated in FIG. 3 an article 11 is supported by a length of flexible material 1 fixed at one end to an angle bar 2. The material 1 extends to the left from the bar 2 as an upper run then passes around roller 3 and then extends to the right as a lower run to a roller 14 which is loaded for counter clockwise rotation. Roller 3 is mounted in a fork 4 at the end of piston rod 5 and is supported at opposite ends by guides (not shown) along which it slides. Movement of roller 3 to the left extends and advances the upper run of the supporting material to the left and movement of the roller 3 to the right results in retraction of the upper run as illustrated in FIG. 4.

Any suitable form of conveyor means or driving means may be provided for moving articles along the upper run to the left as viewed in the drawings and such means may be of a reciprocating character instead of unidirectional as in FIGS. 1 and 2.

In the form of construction diagrammatically illustrated in FIGS. 5 and 6 a supporting run 30 is secured at its righthand end to an angle bar 31 and at its left hand end is coiled on a roller 32. The run 30 comprises a number of parallel transverse spaced self-coiled metal strips of downwardly concave crosssection. The roller 32 is supported and guided at opposite ends in opposed horizontal guides 33 of which one is shown in FIG. 6, the guides being supported by the framework 34 of the machine.

Articles to be stacked are fed to the supporting run 30 by an endless conveyor 35 whose upper run moves constantly in the direction of the arrow 36. The conveyor 35 comprises a number of parallel transversely spaced conveyor strips or tapes. Fingers 37 extend from angle bar 31 downwardly into the spaces between the parallel strips of which the conveyor 35 is comprised. Articles to be stacked are traversed along the supporting run 30 by a traversing conveyor 38 whose lower run moves in the direction of the arrow 39. Conveyor 38 comprises a number of parallel transversely spaced conveyor strips having a frictional outer surface.

Since the parallel strips of which the run 30 is comprised are self-coiling they tend to coil themselves on roller 32 and thus to draw roller 32 to the right. In FIG. 5 roller 32 is shown in its left hand terminal position above the stacking station and is held in this position by a pair of latches 40 which are pivoted at 41. The angular position of each latch 40 is controlled by a solenoid 42 which can raise an armature 43 to release the latch 40 from engagement with the roller 32.

The solenoids 42 are energised to release the latches 40 by a switch 44 operated by a feeler 45 which is engaged by an article 46 to be stacked as it reaches an appropriate position for discharge to a stack 47 supported on a stacking platform 48. On release of the latches 40 the roller 32 moves quickly to the right to allow article 46 to be discharged.

A reciprocable piston rod 50 is attached to a cable 51 which is connected to the periphery of a pulley 52 fixed on a rotatable shaft 53. Two larger pulleys 54, of which only one is shown in FIG. 6, are secured to shaft 53 and are connected by cables 55 to opposite ends of roller 32. After roller 32 has moved to the right to discharge the article 46 to the stack 47 it is again drawn to the left to its terminal position as shown in FIG. 5 by movement of the piston rod 50 to the right, the piston rod 50 having previously been drawn to the left by movement of roller 32 to the right.

A valve controlling the supply of a pressure fluid for moving the piston rod 50 to the right is controlled by switch 44 through a timing device. Thus the roller 32 is returned to its terminal position shown in FIG. 5 after a predetermined interval of time following the release of the latches 40.

The stacking platform 48 is adjustable in height and means (not shown) are provided for causing it to be progressively lowered in ratio to the stacking of articles thereon.

The invention is particularly applicable to the stacking of laundry pieces which have passed through a folding machine and which may vary in width, length, thickness, weight and texture but the invention is nevertheless applicable to the stacking of other materials for example cartons or paper or cardboard sheets.

I claim:

1. A stacking device comprising a length of article supporting flexible material which is fixed at one end and at its other end is coiled upon a roller, said supporting material and said roller being arranged for self coiling of the material on the roller, means for advancing and retracting the forward end of a lengthening and shortening run of said material in one direction to and in the opposite direction from a terminal position above a stacking station while the article supporting material is respectively uncoiled from and allowed to self coil itself on said roller, said forward end of said run arcuate and the lengthening and shortening of the run resulting from traversing of said material into and out of said run around the arcuate forward end thereof during the uncoiling and self coiling of the material from and on

said roller and means for traversing an article along said run in a direction from the fixed end thereof towards said terminal position.

2. A stacking device according to claim 1 comprising sensing means capable of sensing the movement of an article supported on said run as the article approaches said terminal position, commencement of movement of said forward end of said run away from said terminal position being controlled by said sensing means.

3. A stacking device according to claim 1 comprising a length of article supporting flexible material which is fixed at one end and which at its other end is wound upon a roller, and means for moving said roller in one direction and then retracting it in the opposite direction away from said terminal position.

4. A stacking device according to claim 3 in which said roller is held at its terminal position by a latch whose release is controlled by sensing means sensing the approach towards the terminal position of an article supported on said run.

5. A stacking device according to claim 1 in which said roller is loaded for rotation in the direction for coiling of said article supporting material thereon.

6. A stacking device according to claim 1 in which said article supporting material comprises at least two parallel transversely spaced self coiling metal strips.

7. A stacking device according to claim 1 comprising a stacking platform, an article supporting run formed of a plurality of parallel transversely spaced self coiling metal strips fixed at one end, a roller on which said run is coiled at its other end, parallel guides supporting said roller and enabling it to traverse towards and away from said terminal position to cause said run to uncoil from and to recoil upon the roller, a piston, cables connecting the piston to said roller and enabling the piston to draw said roller to said terminal position, a latch adapted to engage the roller to hold it in its terminal position and a sensing device controlling the release of the latch and sensitive to the movement of an article supported on said run as it approaches said terminal position.

8. A stacking device according to claim 7 comprising means for causing the platform to descend progressively in ratio to the stacking of articles thereon.

9. A stacking device comprising a length of article supporting flexible material fixed at one end and extending in one direction as an article supporting upper run from said fixed end to a first roller and then passing around the roller and extending in the opposite direction as a lower run to a second roller on which it is coiled, said supporting material and said second roller being arranged for self coiling of the material on the second roller, means for moving said first roller relatively to a stacking station away from and towards said fixed end to extend and retract the article supporting upper run whereby to enable an article supported by the upper run to be rendered unsupported by retraction of the upper run, the end of the lower run being uncoiled and coiled on said second roller as the upper run is extended and retracted and means for traversing an article along said upper run in a direction from the fixed end thereof towards said terminal position.

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