

[54] **STRAP DISPENSING APPARATUS**

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[58] **Field of Search** 242/75.4, 85, 86, 86.8,
242/105, 106, 78.6, 78.7, 99

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[57] **ABSTRACT**

Apparatus for dispensing package strapping from a mill wound coil includes a reel for rotatably supporting the coil and a guide or aligner for directing the traversed windings of the coil toward the center line of the reel at a point well in advance of the point where the strapping actually leaves the reel. This prevents a sharp pull on the strapping from causing a winding at the edge of the coil to slip from the edge and possibly jam between the coil and a flange of the reel. The disclosed arrangement also enables the use of a simple guide for controlling rather precisely the path of the strapping as it leaves the apparatus even though on the coil the strapping windings may be traversed over a distance of several inches.

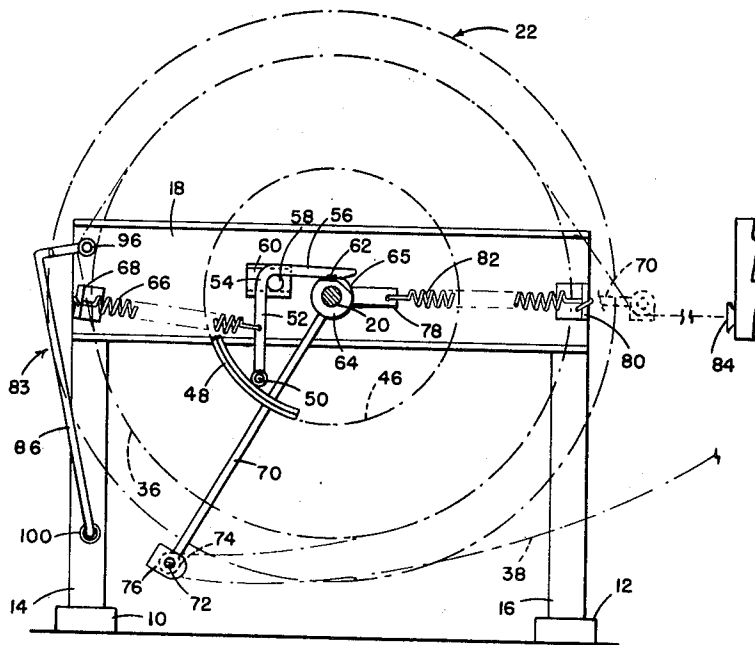
7 Claims, 5 Drawing Figures

[56] **References Cited**
UNITED STATES PATENTS

2,506,354	5/1950	Green.....	242/105
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FOREIGN PATENTS OR APPLICATIONS

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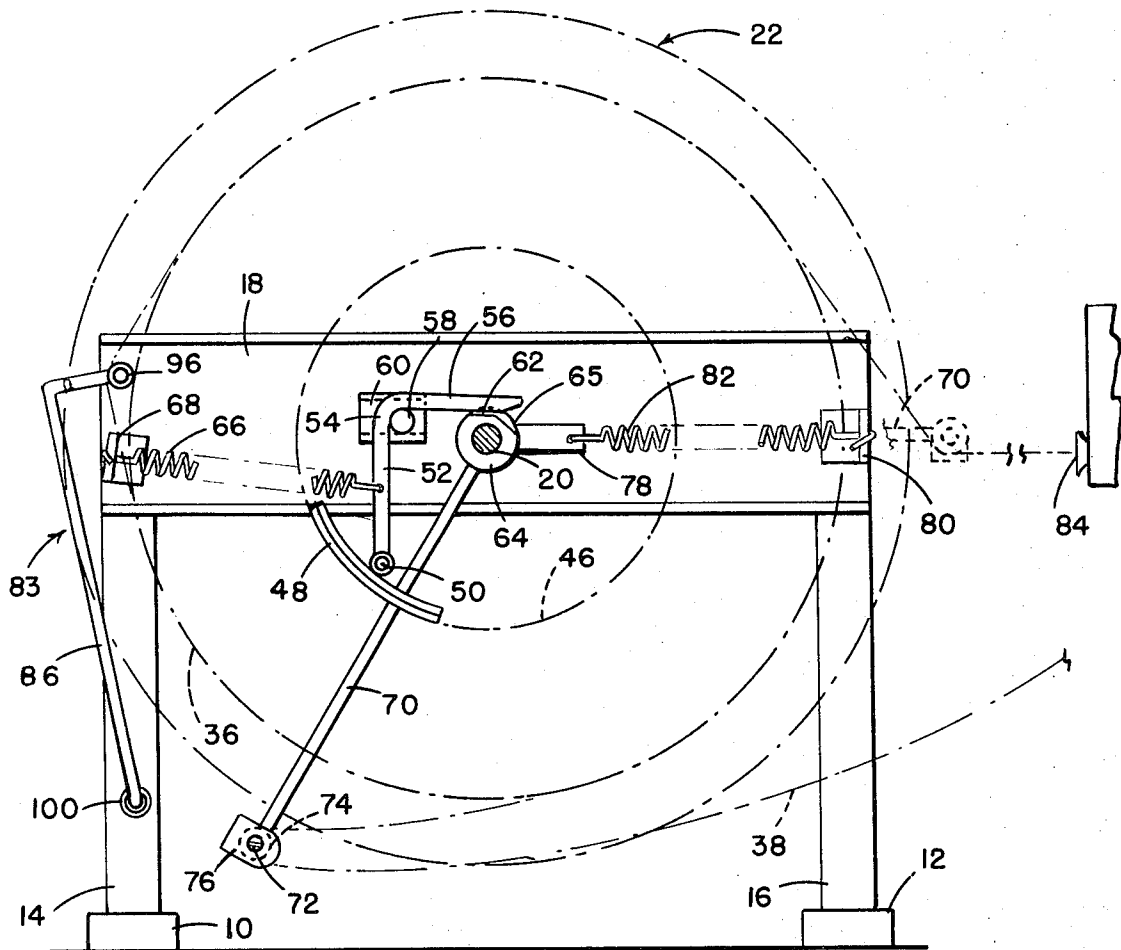


Fig. 1

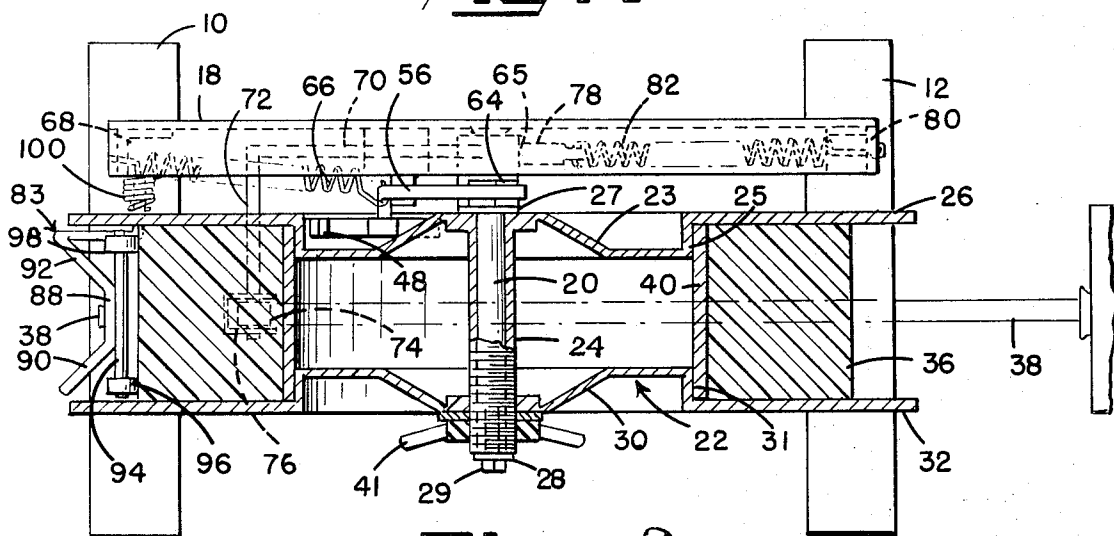


Fig. 2

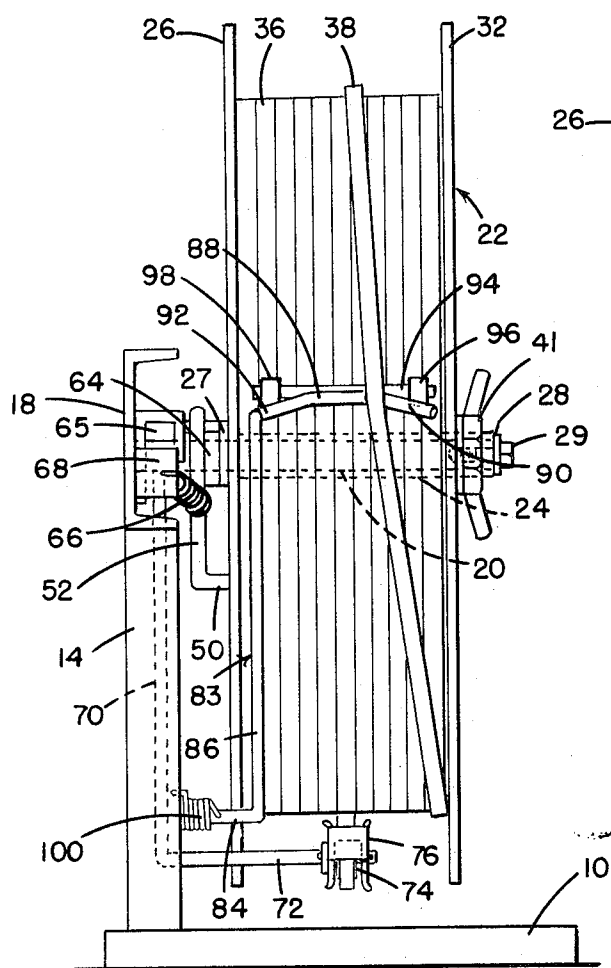


Fig. 3

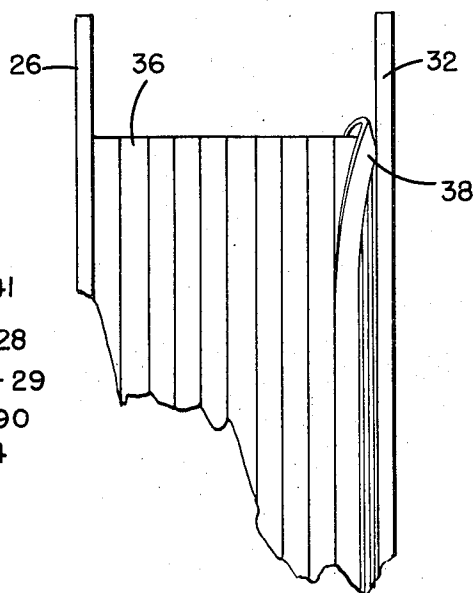


Fig. 4

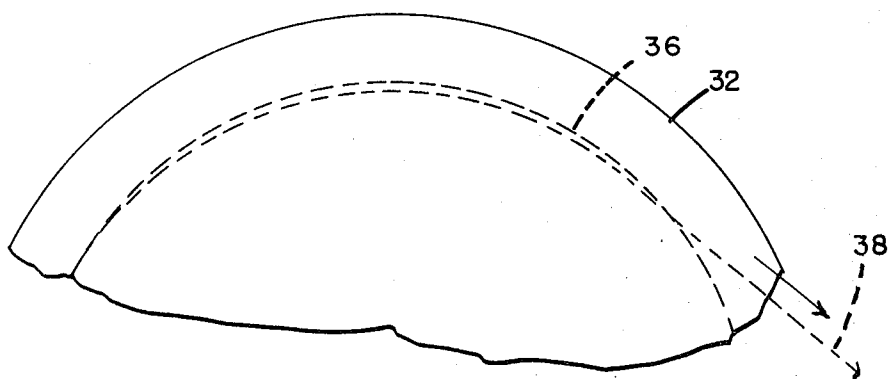


Fig. 5

STRAP DISPENSING APPARATUS

This invention relates to apparatus for dispensing package strapping material from a mill wound coil and more particularly to a dispenser which prevents malfunction when the strapping is jerked or pulled sharply from an imperfectly formed coil. The invention further relates to a strap dispenser of simple construction which rather precisely aligns the strap as it leaves the apparatus even when, on the coil, the strap windings traverse across the coil over a distance of several inches.

Strapping, such as steel strapping or plastic strapping, used for binding packages and the like is itself packaged in a variety of forms. One common form of strapping package is known as a mill wound coil where the strapping is wound on a core considerably longer than the width of the strap and is traversed back and forth across the core during winding. With plastic strapping, the mill wound coil can as a practical matter, be substantially wider than with steel strapping since the plastic is so much lighter and it is feasible to have a much greater length of plastic strapping in a coil and still have a manageable weight. In use, the coil is normally mounted on a rotatable reel having flanges abutting the sides of the coil and the strapping is pulled from the reel as needed. One such reel is shown in U.S. Pat. No. 2,777,647 to Fullerton et al.

There have been certain difficulties in using wide mill wound coils. One of the difficulties is brought about by the fact that the side edges of the coil are not smooth, this condition being caused by non-uniformity in traversing the strap during winding and/or by the fact that the angle of the traverse naturally brings about axial displacement of the edge of the strapping as it proceeds circumferentially about the previous windings. Since the edges of the coil are not smooth, the flanges of the reel do not fit snugly against the strapping at all points and it sometimes happens that a strong jerk on the strapping will cause one of the edge windings to be pulled down between the edge of the coil and the adjacent flange of the reel and interfere with further withdrawal of the strapping. Another problem with the wide mill wound coil arises when it is used for supplying an automatic strapping machine and this involves guiding the strapping without twisting it from where it traverses across the width of the coil to what is normally a rather restricted entrance into the strapping machine.

It is an object of this invention to provide an improved strap dispensing apparatus capable of dispensing strapping from a relatively wide mill wound coil without substantial danger of malfunction.

A further object of the invention is to provide a strap dispensing apparatus wherein the strapping is withdrawn from the apparatus along a fixed alignment even though the supply is a relatively wide mill wound coil across which the strapping traverses.

Other objects, features and advantages of the invention will become apparent as the description of a preferred embodiment thereof proceeds:

Referring now to the drawings:

FIG. 1 is a side elevational view of the apparatus;

FIG. 2 is a plan view of the apparatus with certain portions being shown in section;

FIG. 3 is an end elevational view;

FIG. 4 is a fragmentary view showing a dispensing malfunction; and

FIG. 5 is another fragmentary view illustrating the malfunction.

The apparatus comprises a support formed of a pair of base members 10 and 12 to which are secured respectively uprights 14 and 16 welded or otherwise secured to the upper ends of which is a channel member 18. Suitably secured to channel 18 and extending horizontally therefrom is a shaft or spindle 20 which rotatably supports a reel generally indicated at 22. Reel 22 comprises a circular member 23 having a threaded sleeve 24 extending in alignment with a central opening therein. Member 23 is provided with a coil supporting cylindrical shoulder 25 and a flange portion 26. The sleeve 24 of member 23 is rotatably mounted on spindle 20, being retained thereon between a suitable stop 27 provided on the spindle and a washer 28 held against the free end of the spindle by a bolt 29 threaded into the end of the spindle. The reel also comprises a second circular member 30 provided with a coil supporting cylindrical shoulder 31 and a flange portion 32 and having a central opening adapted to slip onto sleeve 24 when the reel is assembled. Reel 22 is adapted to carry a mill wound coil 36 of strapping 38. The coil is wound on a cardboard core 40 which fits around the shoulders 25 and 31 while flanges 26 and 32 embrace the sides of the coil. Reel members 23 and 30 are held assembled with the coil squeezed between the reel flanges by a wing nut 41 screwed onto the threaded sleeve 24.

Reel member 23 is provided with a brake drum 46 cooperating with which is a brake shoe 48. As best seen in FIG. 1, the brake shoe is pivotally mounted on a bent end portion 50 of an arm 52 of a bell crank 54. The bell crank includes a second arm 56 and stub shaft 58, the latter being rotatably mounted in a suitable bearing 60 secured to channel member 18. The arm 56 of the bell crank overlies a low segment 62 of a cam 64 formed on a hub 65 rotatably mounted on the spindle 20. A spring 66 extending between arm 52 of the bell crank and an anchor 68 secured to channel member 18 normally holds brake shoe 48 in braking engagement with brake drum 46.

Secured to or formed integrally with cam 64 or the hub 65 is an arm 70 which extends radially to a point beyond flange 26 of the reel and then bends to provide an end portion 72 overlying the periphery of the reel. A roller 74 is rotatably mounted on end portion 72 and a guard 76 in the form of a U-shaped member is mounted on end portion 72 so that the arms of the U lie close to the sides of the roller. The tip end of end portion 72 is flattened and extends through a rectangular slot in the outer arm of guard 76 whereby the guard is made non-rotatable with respect to arm 70. Roller 74 and guard 76 constitute a guide for strap 38 as the strap leaves the dispenser and in any suitable manner the guide is retained on the end portion 76 of arm 70 in substantial alignment with the centerline of the reel as shown in FIGS. 2 and 3.

Secured to or formed integrally with cam hub 65 is a short arm 78 extending between which and an anchor 80 secured to channel member 18 is a tension spring 82. Spring 82 normally holds the hub 65 and the parts associated therewith in the position shown in FIG. 1 with the strap guide 74, 76 located beneath the lower segment of reel 22 and with the low segment 62 of cam 64 aligned with bell crank arm 56. The strap 38 is laced through the strap guide as shown, with the end thereof

either extending into an entrance guide 84 of an automatic strapping machine or being free for grasping by a human operator. The effective strengths of springs 66 and 82 are such that a pull on the strap first causes strap to be removed from the dispenser due to swinging of strap guide carrier arm 70 from the full line position shown in FIG. 1 to a point somewhat before the dotted line position, the brake shoe 48 holding the reel from rotation during this initial movement of arm 70. As arm 70 approaches the dotted line position, but well before it reaches such position, it causes cam 64 to be rotated to an extent to bring a high segment thereof into engagement with arm 56 of the bell crank 54 to thereby rock the bell crank counterclockwise as viewed in FIG. 1 and release brake shoe 48 from braking engagement with brake drum 46. Due to the inertia of the reel carrying the coil of strap, further high speed withdrawal causes arm 70 to swing into approximately the dotted line position before the reel starts to rotate, even though the brake is released well before that time. As the reel builds up momentum whereby strap is easily withdrawn from the coil, spring 82 begins to return the guide carrier arm 70 toward the full line position and even after the arm has moved far enough to cause cam 64 to permit brake shoe 48 to re-engage drum 46, the momentum will cause the reel to continue to rotate sufficiently to supply enough strap to permit arm 70 to return all the way to the full line position without withdrawing strap from wherever it is being used.

A sudden pull on the strap, such as is normal when an automatic strapping machine begins a cycle of operation and is frequent when a human operator starts to apply strapping to a package, results in a considerable inward radial component of force at the point where the strap leaves the coil before inertia of the reel and coil is overcome and the reel starts to turn. Referring to FIGS. 4 and 5, the strap at the point where it leaves the coil is shown as being at an edge of the coil, that is, at one extreme of its traverse across the coil. When a sudden jerk is applied to the strap at this time, the radial inward component of force can sometimes cause the strap at the point where it leaves the coil to be pulled down and jammed between the edge of the coil and the flange 32 of the reel, this being especially apt to happen when the edge of the coil is not smooth so that the flange will fit snugly against the edge. This condition is best shown diagrammatically in FIG. 5 and it will be understood that such a condition will interfere with free rotation of the reel. Furthermore, if the strapping slips between the edge of the coil and the reel flange, the strapping is apt to be folded and split longitudinally and splitting of the strap adversely affects its use with automatic strapping machinery. The present invention provides a way of avoiding this by causing the strap to always be located at least approximately on the center line of the reel and coil at the point where it leaves the coil, as will now be described.

The invention includes a strap aligner, best shown in FIG. 3, which comprises a member generally indicated at 83 having a portion 84 rotatably mounted in upright 14 and extending parallel to spindle 20 and a portion 86 extending at right angles to portion 84. Secured to or formed integrally with portion 86 is a strap engaging member 88 which extends substantially from edge to edge across the periphery of the coil 36. Member 88 has portions 90 and 92 sloping inwardly toward the central portion of the periphery of the coil from areas

overlying outer peripheral portions of the coil. Secured, as by welding, to the member 88 is a rod 94 having rotatably mounted thereon a pair of rollers 96 and 98. A torsion spring 100 surrounds portion 84 of member 83 and is connected at one end to said member and at the other to upright 14. Spring 100 urges member 83 in the direction to engage rollers 96 and 98 against the periphery of coil 36.

At a point well ahead of where the strap is engaged with guide 74, 76 it leaves the main body of the coil and passes over member 88 of the strap aligner. Beyond member 88 the strap returns to the coil and forms a part of a substantial portion of the circumference of the coil before finally leaving the coil to engage guide 74, 76. As best illustrated in FIG. 3, if the strap at the point where it leaves the coil on its approach to member 88 is taken from an edge winding of the coil it will engage one of the sloping ends of said member and be guided thereby toward the center line of the coil. Thus, from whatever lateral part of the coil the strap is initially removed it returns to the coil near the center line thereof after passing over the member 88 of the aligner so that as the strap finally leaves the coil on the way to the guide 74, 76 it always leaves substantially from the center line of the coil. Therefore, the aligner assures that the radial inward component of force applied to the strap at the point where it finally departs from the coil will not cause the strap to become jammed between an edge of the coil and one of the flanges of the reel. When a sudden strong pull is applied to the strap the force of the pull is substantially dissipated within a relatively short extension of the strap about the coil. By locating the strap aligner well in advance of the strap guide, very little force is applied to the strap at the point where it leaves the coil on the way to the aligner so that there is substantially no chance of the strap being jammed between the edge of the coil and the flange of the reel at this point. If it is expected that a hard enough pull is to be encountered so that a substantial force will be transmitted to the point shown in the drawing where the strap leaves the coil on the way to the aligner, then the strap may be directed over the aligner 360° in advance of the position shown.

Having thus described a preferred form of the invention, what is claimed is:

1. Strap dispensing apparatus comprising a support, a reel rotatably mounted on a shaft carried by said support, said reel being adapted to carry a mill wound coil of strapping, a strap guide adapted to be engaged by strapping being withdrawn from a mill wound coil of strapping carried by said reel, said strap guide being substantially aligned with the center line of said reel, and a strap aligner adapted to press against the periphery of a coil of strapping carried by the reel at a point located a substantial distance about the periphery of the coil ahead of said strap guide, said strap aligner being constructed and arranged to direct strapping from the sides of the periphery of the coil toward the center line of the coil, this relationship between said aligner and said guide causing the strapping to be wrapped a substantial distance about the center line of the coil before engaging said guide.

2. The apparatus set forth in claim 1 wherein said aligner comprises a strap engaging member extending substantially from edge to edge across the periphery of a mill wound coil of strapping carried by said reel, said member having portions sloping inwardly toward the

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central portion of the periphery of the coil from areas overlying outer peripheral portions of the coil.

3. The apparatus set forth in claim 2 wherein said aligner comprises an arm pivotally mounted on said support, and spring means urging said aligner in a direction to engage the periphery of a mill wound coil of strapping carried by said reel.

4. The apparatus set forth in claim 3 wherein said aligner comprises rotatable means adapted to engage and rotate over the periphery of the coil carried by the reel, said rotatable means serving to substantially eliminate friction between the aligner and the coil.

5. The apparatus set forth in claim 1 wherein said reel comprises flanges adapted to embrace the edges of a mill wound coil of strapping.

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6. The apparatus set forth in claim 1 comprising brake means for impeding rotation of said reel, means normally applying said brake, brake release means for releasing said brake, said brake release means comprising a swingably mounted arm to which is attached said strap guide, means normally resiliently holding said arm in a position wherein said brake release means is ineffective to release said brake means, said arm being swingable through a predetermined arc upon withdrawal of strapping from said apparatus to a position where said brake release means releases said brake.

7. The apparatus set forth in claim 6 wherein said brake means comprises a brake drum on said reel and a brake shoe mounted on said support.

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