March 14, 1967 E. C. RUTTY 3,309,039

DISPENSING REEL

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FIG. 1

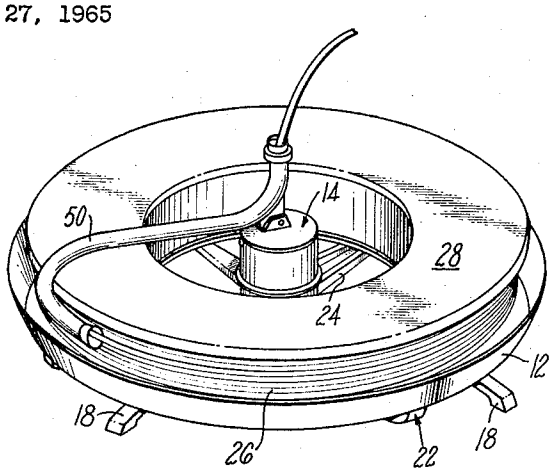
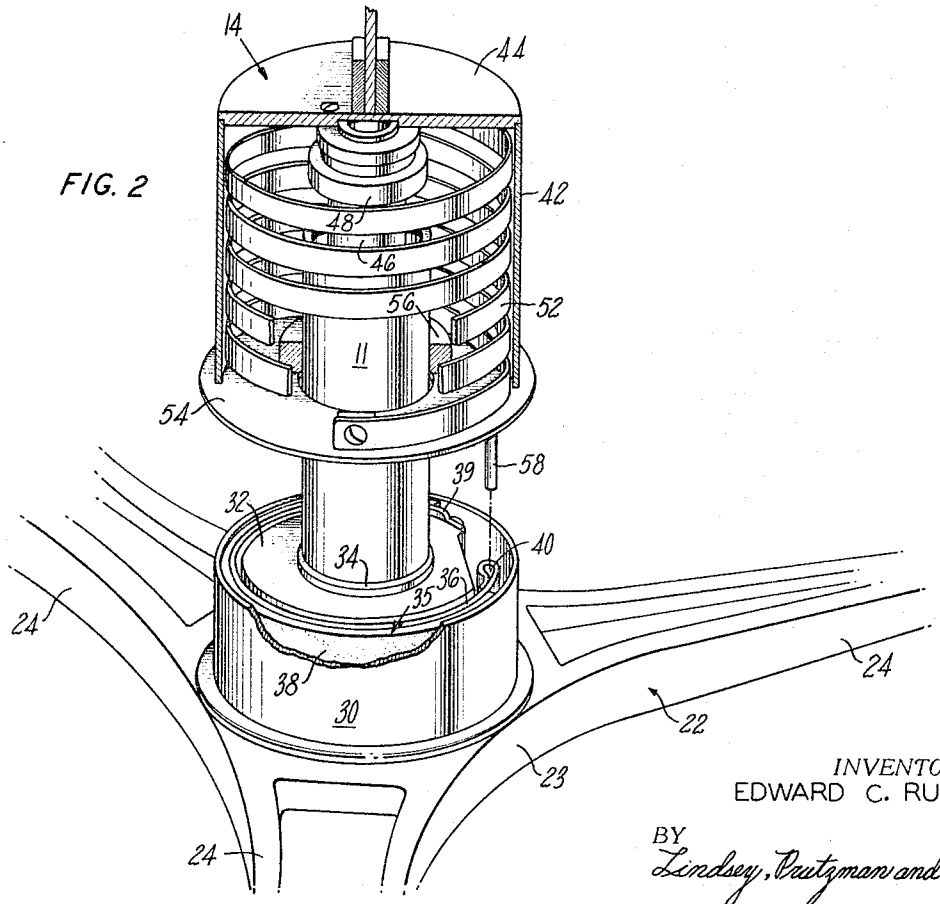


FIG. 2



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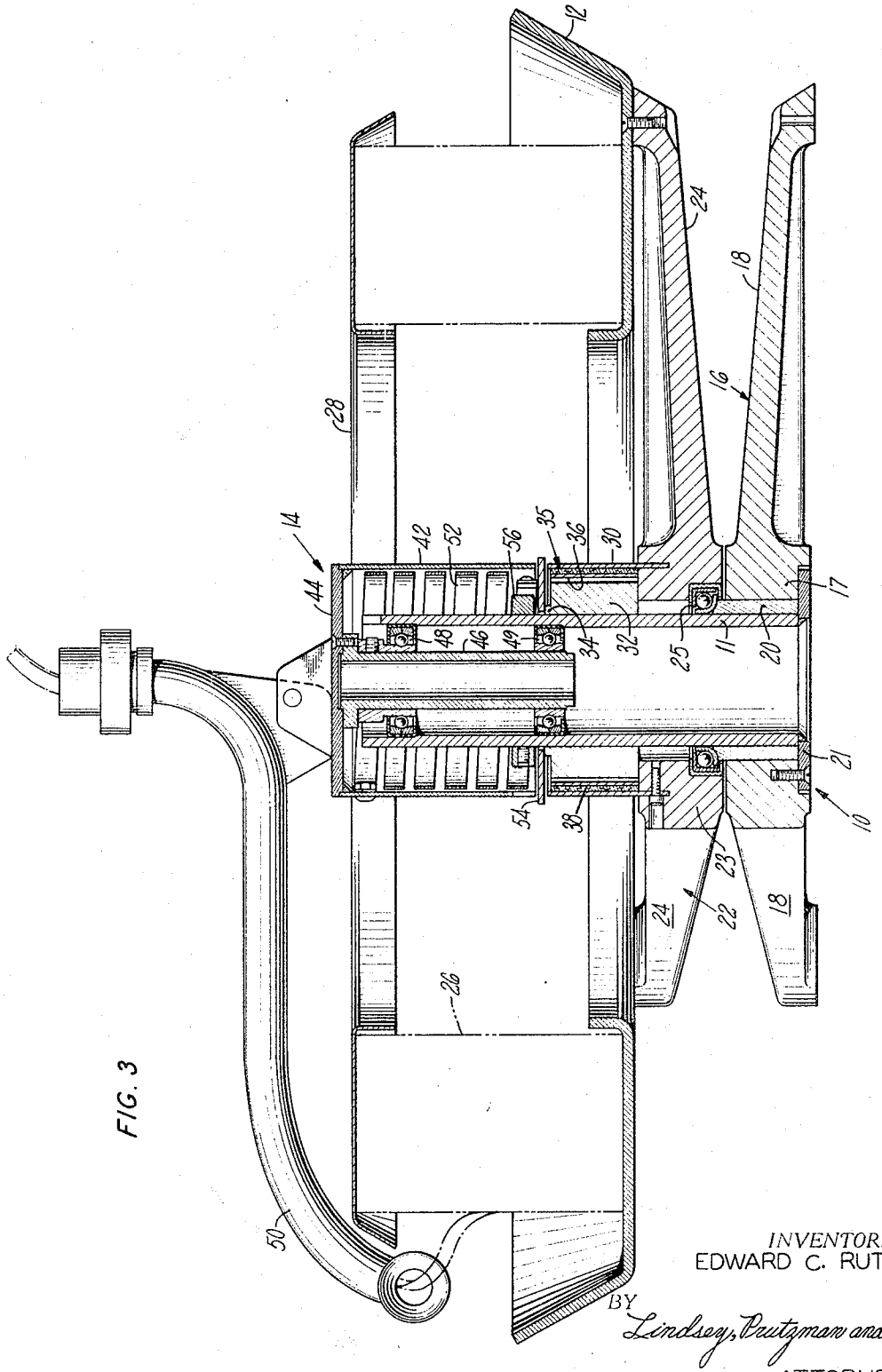


FIG. 3

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DISPENSING REEL

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11 Claims. (Cl. 242—128)

This invention relates to coil stock handling equipment and particularly concerns dispensing reels for paying-out strapping, wire or similar coil stock.

A principal object of the invention is to provide an improved dispensing reel for paying-out coil stock substantially free from twisting.

Another object of the invention is to provide a dispensing reel which is adapted for automatically adjusting the rotational speed of the coil stock in response to changes in the rate at which the coil stock is being used.

A further object of the invention is to provide a dispensing reel which is particularly suited for paying out coil stock to equipment having irregular or intermittent stock requirements and which is adapted to pay-out the coil stock at variable rates without stock over-running or excessive stock tension.

Another object of the invention is to provide an improved dispensing reel of the type described which is capable of effecting smooth but rapid acceleration and deceleration of the coil stock and thereby assure reliable unreeling of the coil stock and continuous, uninterrupted operation of the dispensing reel.

Another object of the invention is to provide a dispensing reel which is useful for paying-out nonmetallic strapping.

A further object of the invention is to provide an improved dispensing reel having superior efficiency and reliability of operation and which offers the advantages of mechanical simplicity, low cost manufacture and assembly, and long reliable essentially maintenance-free operation.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth, and the scope of the application of which will be indicated in the appended claims.

In the drawings:

FIG. 1 is an isometric view, partly broken away, showing a preferred embodiment of a dispensing reel constructed in accordance with the invention and a coil of nonmetallic strapping installed thereon;

FIG. 2 is an enlarged partly exploded isometric view, partly broken away and partly in section, of the dispensing reel; and

FIG. 3 is an enlarged elevation view, partly broken away and partly in section, showing the dispensing reel in full lines and the coil of nonmetallic strapping in broken lines.

Referring now to the drawings in detail, a preferred embodiment of the dipensing reel of the invention is illustrated comprising a stationary base assembly **10** having an upright hollow shaft or center post **11** providing a common axis of rotation for an annular basket **12** and a control drum or head **14**.

The base assembly **10** includes a main support **16** having a central hub **17** and three equally spaced elongated legs **18** which extend radially outwardly from the hub **17** to provide a rigid support for the dispensing reel. As seen in FIG. 3, the upright center post **11** of the base assembly **10** is rigidly secured within the hub **17** by a collar **20** and a base plate **21**. A basket support **22** which is substantially identical in construction to the main support **16** is similarly provided with a central hub **23** and three basket-support legs **24**. The basket support **22** is rotatably supported on the center post **11** directly above the main support **16** in oppositely facing relation thereto by a main bearing assembly **25** seated upon the collar **20**. The bottom of the basket **12** is secured to the basket support **22** at the outer ends of its legs and opens upwardly for supporting a coil **26** of stock, for example wire, metallic or nonmetallic strapping, or other coiled stock which is to be paid-out in accordance with the stock demands of associated equipment, not shown.

The hub of the basket support **22** also serves to anchor a cylindrical brake drum **30** which extends upwardly from the hub **23** in coaxial relationship with an inwardly spaced collar **32** secured about the center post **11** and having a reduced upper neck portion **34** which projects slightly above the upper axial end of the brake drum **30**.

A brake shoe **35**, shown comprising a generally cylindrical resilient band **36** extending substantially about the collar **32** and a brake lining **38** bonded to the outer surface of the resilient band **36**, is provided for controlling the basket rotation. The end **39** of the brake shoe band **36** is fixed to the collar **32** and the opposite looped end **40** of the band **36** is mounted for limited angular movement for withdrawing the brake shoe **35** from its normal position in engagement with the inner surface of the brake drum **30** and thereby reduce or eliminate the rotational restraint on the basket **12** and the basket-supported coil of stock.

The control head **14** includes a cylindrical drum or casing **42** which encloses the upper end of the center post **11** and an integrally attached cover disk **44**. A depending coaxial tube **46** fixed to the cover disk **44** projects into the cylindrical center post **11** and is rotatably supported in the post by suitable anti-friction bearings **48**, **49** for rotatably supporting the control head **14** on the center post **11**.

A guide arm or supply tube **50** is pivotally mounted on the cover disk **44** of the control head **14** for paying-out stock from the dispenser. The supply tube **50** is shown in the drawings in its lower pivotal or normal operating position with its inner exit end substantially coaxial with the control head **14** and its outer entrance end adjacent the outer periphery of the coil **26** and extending circumferentially thereof. When the supply tube **50** is in this operating position, the stock may be smoothly and easily drawn from the coil **26** into the entrance end of the supply tube **50** and then radially inwardly from the coil and axially upwardly from the basket **12** and out the exit end of the supply tube **50** for paying-out the stock.

In order to maintain the stock substantially free from twisting while it is being dispensed and to provide for smooth and even withdrawal of the stock from the dispensing reel, a flat helical torsion spring **52** is provided in accordance with the invention for limiting the rotational movement of the control head **14**. The control head in turn is adapted to coact with the brake mechanism of the basket **12** to provide for continuously controlling the basket rotation in accordance with the race of withdrawal of the stock.

The upper end of the torsion spring **52** is secured to the inside surface of the drum **42** and the lower end of the torsion spring **52** is secured to an annular plate **54** rotatably mounted on the center post **11** and retained against substantial axial movement between the neck portion **34** of the collar **32** and a ring **56** secured to the center post. The coils of the torsion spring **52** are thereby retained within the hollow control head **14** so that the cylindrical center post **11** and the cylindrical drum **42** provide inner and outer coaxial drums which coact with the flat torsion

spring 52 to limit the angular displacement of the supply tube 50 in opposite angular directions respectively from its inactive angular position shown in the drawings. The flat torsion spring 52 also serves to operate the brake mechanism for the basket 12 and for this reason the brake shoe 35 is operatively connected for operation by the torsion spring 52 by a depending pin 58 fixed to the annular plate 54 and received in the looped free end 40 of the brake shoe 35. The torsion spring 52 is thereby adapted to withdraw the brake shoe 35 from the brake drum 30 in accordance with the angular position of the supply tube 50 inasmuch as the torsional bias on the supply tube 50 created by the torsion spring 52 is equal to the torsional bias on the brake shoe 35 which tends to withdraw the brake shoe from the brake drum 30.

To summarize the operation of the dispensing reel, the supply tube 50 may be pivoted upwardly from its normal operating position to facilitate loading a coil of stock in the basket 12. The supply tube 50 is then lowered to its normal operating position and the free end of stock is fed through the supply tube 50 to associated equipment, e.g., having its own stock feeding mechanism. With the supply tube 50 in its inactive or starting position shown in the drawings, the brake shoe 35 remains engaged with the brake drum 30 to restrain the basket 12 against rotation and the torsion spring 52 assumes its natural or unstressed condition having preferably a small clearance between its coils and the inside surface of the drum 42 of the control head 14 as seen in FIG. 3.

As the stock is initially paid-out from the dispensing reel, torque is applied through the stock to rotate the supply tube 50 and the control head 14, in the counterclockwise direction as viewed in FIG. 1. As the supply tube 50 rotates, the torsion spring 52 contracts inwardly toward the center post 11 and simultaneously generates an increasing bias tending to withdraw the brake shoe 35 from the drum 30. The angular displacement of the supply tube 50 from its starting position is limited by the number of turns available before the torsion spring 52 is fully contracted into engagement with the center post 11, thereby to minimize stock twisting while permitting the supply tube 50 to rotate sufficiently to assist in paying-out the stock during the acceleration of the basket 12.

In the specific embodiment, the supply tube 50 rotates approximately three revolutions before the torsion spring 52 is fully contracted to stop the rotation of the supply tube. During the relatively short time that the control head 14 and the supply tube 50 are being rotated counterclockwise as seen in FIG. 1, by the torque applied by the initial withdrawal of the stock, the basket 12 is freed to be gradually accelerated in a clockwise direction by the tension in the stock being pulled through the supply tube 50. As the stock is fed from the supply tube 50, it will be given a full twist for each full turn of the supply tube. The twisting of the stock will be effectively minimized to a maximum of approximately three full twists before the supply tube 50 is stopped by the contraction of the torsion spring 52 which functions as a helical brake member upon engaging the center post 11. It will be noted that the stock will be untwisted when the supply tube 50 returns in the clockwise direction to its starting position.

Thus, the basket 12 and the basket-supported coil 26 are smoothly accelerated to rotate at an operating speed proportional to the rate of withdrawal of the stock such that the latter is essentially free of any substantial twisting despite its resiliency and high speed of withdrawal.

When the desired length of strapping is nearly paid-out, the tension on the stock is reduced and the control head 14 and supply tube 50 are returned in a clockwise direction under the torsional bias of the torsion spring 52. This causes the brake shoe 35 to move radially outwardly to engage the brake drum 30. Since the supply tube 50, the basket 12 and the coil 26 are now rotating in the same angular direction, the dispensing reel provides a controlled braking action without danger of overrun, and this braking action effected on the basket 12 and coil 26 is reversely related to the angular displacement of the supply tube 50 from its starting position shown in the drawings. While the brake mechanism is checking the rotational movement of the basket 12, the torsion spring 52 continuously expands until it engages the drum 42 of the control head 14 to positively stop the control head 14 and the supply tube 50 against further clockwise rotation. The basket 12 and its coil 26 are smoothly and quickly brought to a halt and the control head 14 and the supply tube 50 are simultaneously returned to their original starting position, thereby to untwist the stock and to condition the dispensing reel for the next operation.

By virtue of the described structure, the dispensing reel of the invention is particularly suited to automatically adjust its rotational speed in response to variations in the rate at which the stock is being used in the course of a dispensing operation, as well as during the termination of each cycle. The described dispensing reel provides continuous protection against over-run and twisting of the stock thereby to reduce costs normally incurred due to damaged stock and lost operating time. Finally, the present invention is exceptionally simple to operate, economical to manufacture and consists of a minimum number of parts which provide long reliable service and are virtually free of maintenance requirements.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above described will become readily aparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claims.

I claim:

1. A stock dispensing reel comprising a base, a basket rotatably mounted on the base for supporting a coil of stock for rotation in one angular direction for paying-out the stock from the coil, a stock guide mounted on the base for feeding the stock generally radially inwardly from the coil and axially from the reel, the stock guide being rotatably mounted on the base coaxially with the rotatable basket for assisting in paying-out the stock from the coil, and control means for limiting the angular displacement of the stock guide in the opposite angular direction from a starting angular position thereof while stock is being payed out, control means permitting sufficient rotation of the stock guide in said opposite angular direction to assist in paying-out stock during acceleration of the basket while precluding rotation of the stock guide beyond a predetermined angular displacement from said starting position thereby to maintain the stock guide substantially stationary to minimize twisting of the stock while it is being payed out.

2. The stock dispensing reel of claim 1 wherein the control means includes a torsion spring which biases the stock guide against angular displacement in said opposite angular direction to apply torque through the stock to the basket for accelerating the basket in said one angular direction.

3. The stock dispensing reel of claim 1 wherein the control means includes a brake for restraining the rotation of the basket in said one angular direction, and a brake operator connected to the brake for effecting control of the rotational restraint on the basket in accordance with the angular position of the stock guide relative to its starting position.

4. The stock dispensing reel of claim 1 wherein the control means comprises a pair of coaxial drums respectively secured to the base and the stock guide, and a helical brake member mounted between the coaxial drums having one end connected to the rotatable stock guide for alternately contracting and expanding the helical brake member into engagement with the drums, in turn, in accordance with the angular displacement of the stock guide to limit the same.

5. The stock dispensing reel of claim 4 wherein the helical brake member is a torsion spring which biases the stock guide against angular displacement in said opposite angular direction to apply torque through the stock to the basket for accelerating the basket in said one angular direction.

6. A stock dispensing reel comprising a base, a basket rotatably mounted on the base for supporting a coil of stock for rotation in one angular direction for paying-out the stock from the coil, a stock guide mounted on the base for feeding the stock generally radially inwardly from the coil and axially from the reel, the stock guide being rotatably mounted on the base coaxially with the rotatable basket for assisting in paying-out the stock from the coil, and control means establishing a rotary limit precluding rotation of the stock guide in the opposite angular direction beyond a predetermined angular displacement from a stationary starting position thereof while stock is being payed out, and for restraining the rotation of the basket in said one angular direction in reverse relationship with the angular displacement of the stock guide in said opposite angular direction from its stationary starting position.

7. The stock dispensing reel of claim 6 further including an upright center post fixed to the base, and a basket support secured to the basket and supported on the center post for rotation.

8. The stock dispensing reel of claim 7 wherein the control means includes a drum fixed to the stock guide and rotatably mounted on the center post in radially outwardly spaced relation thereto, and a helical brake member mounted between the center post and the drum.

9. The stock dispensing reel of claim 8 wherein the control means further includes a brake drum secured to the basket support, a brake shoe fixed to the center post and biased into engagement with the brake drum for restraining the basket against rotation, and wherein the

helical brake member is a torsion spring coiled between the center post and the drum, the torsion spring being connected between the drum and the brake shoe for biasing the stock guide against rotation in said opposite angular direction and for biasing the brake shoe out of engagement with the brake drum in relation to the angular displacement of the stock guide in said opposite angular direction from its starting position.

10. The stock dispensing reel of claim 8 wherein the stock guide is an elongated supply tube having entrance and exit ends and being secured intermediate its ends to the drum, the supply tube being directed generally radially outwardly from the drum to the entrance end and being directed generally axially from the drum to the exit end thereby to feed stock generally radially inwardly from the coil and axially from the reel.

11. The stock dispensing reel of claim 1 wherein the control means includes a drum supported for rotation on the base, and wherein the stock guide is an elongated supply tube mounted intermediate its ends on the drum and having an entrance end positioned adjacent the outer periphery of the coil in radially outwardly spaced relation thereto, the supply tube extending from its entrance end circumferentially of the outer periphery of the coil and being directed generally radially inwardly therefrom to the drum and being directed generally axially from the drum to an exit end of the supply tube for paying-out stock generally radially inwardly from the outer periphery of the coil and axially from the reel.

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