Sept. 11, 1956 R. F. HERR 2,762,576

COLLAPSIBLE REEL

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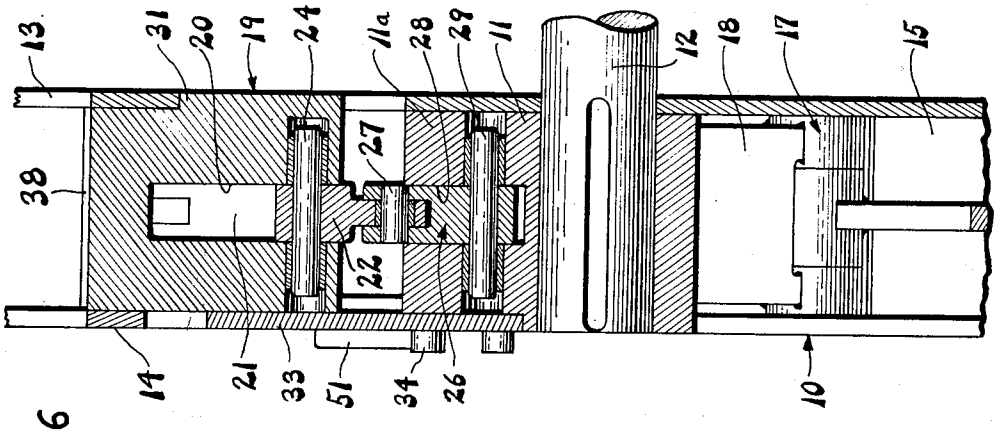


Fig. 6

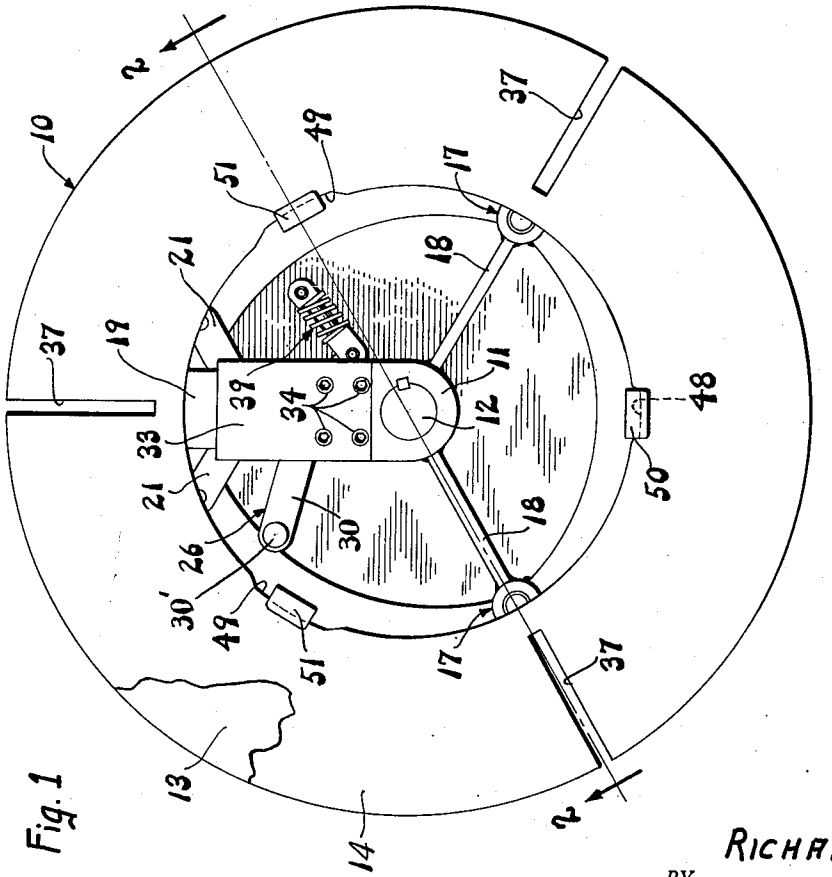


Fig. 1

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COLLAPSIBLE REEL

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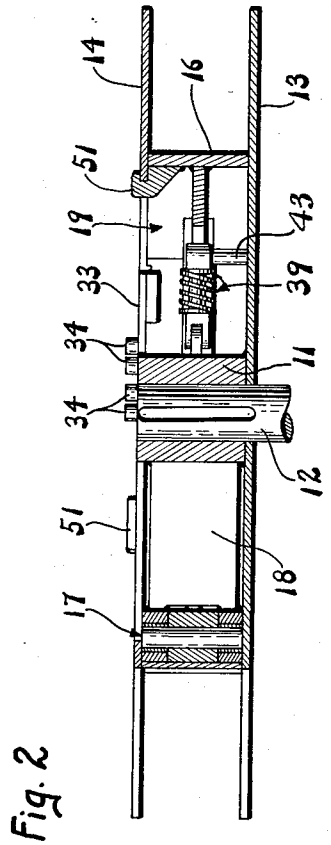


Fig. 2

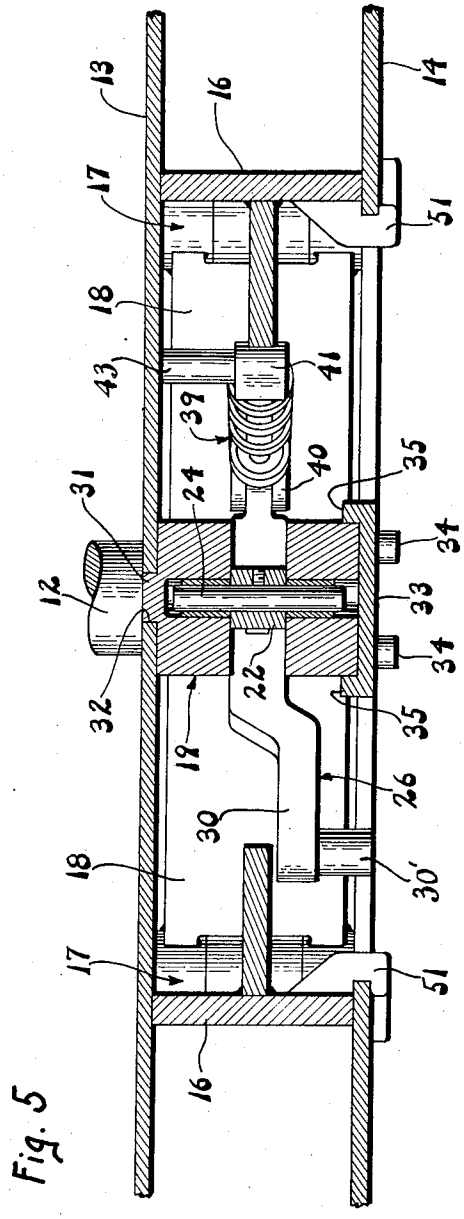


Fig. 5

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COLLAPSIBLE REEL

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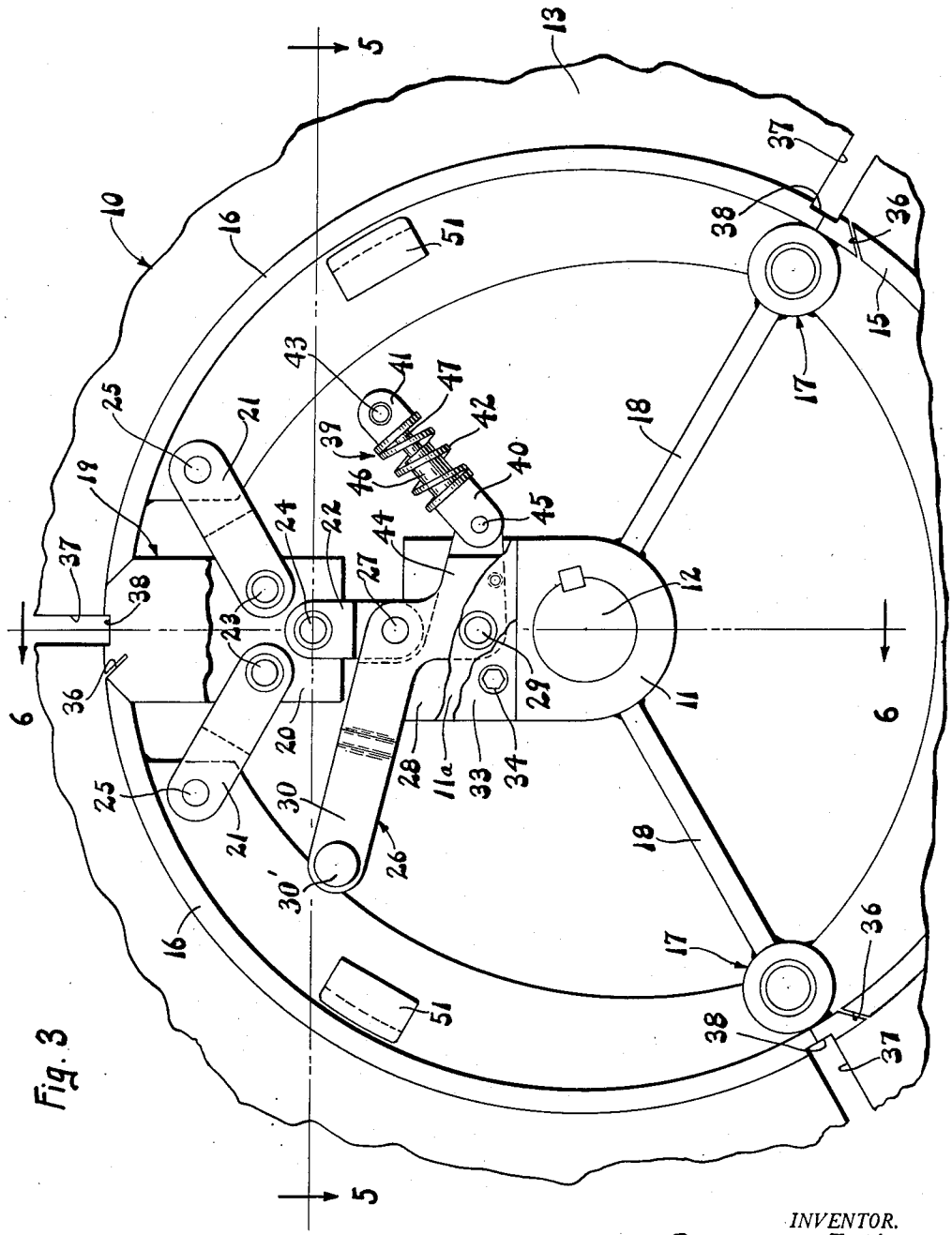


Fig. 3

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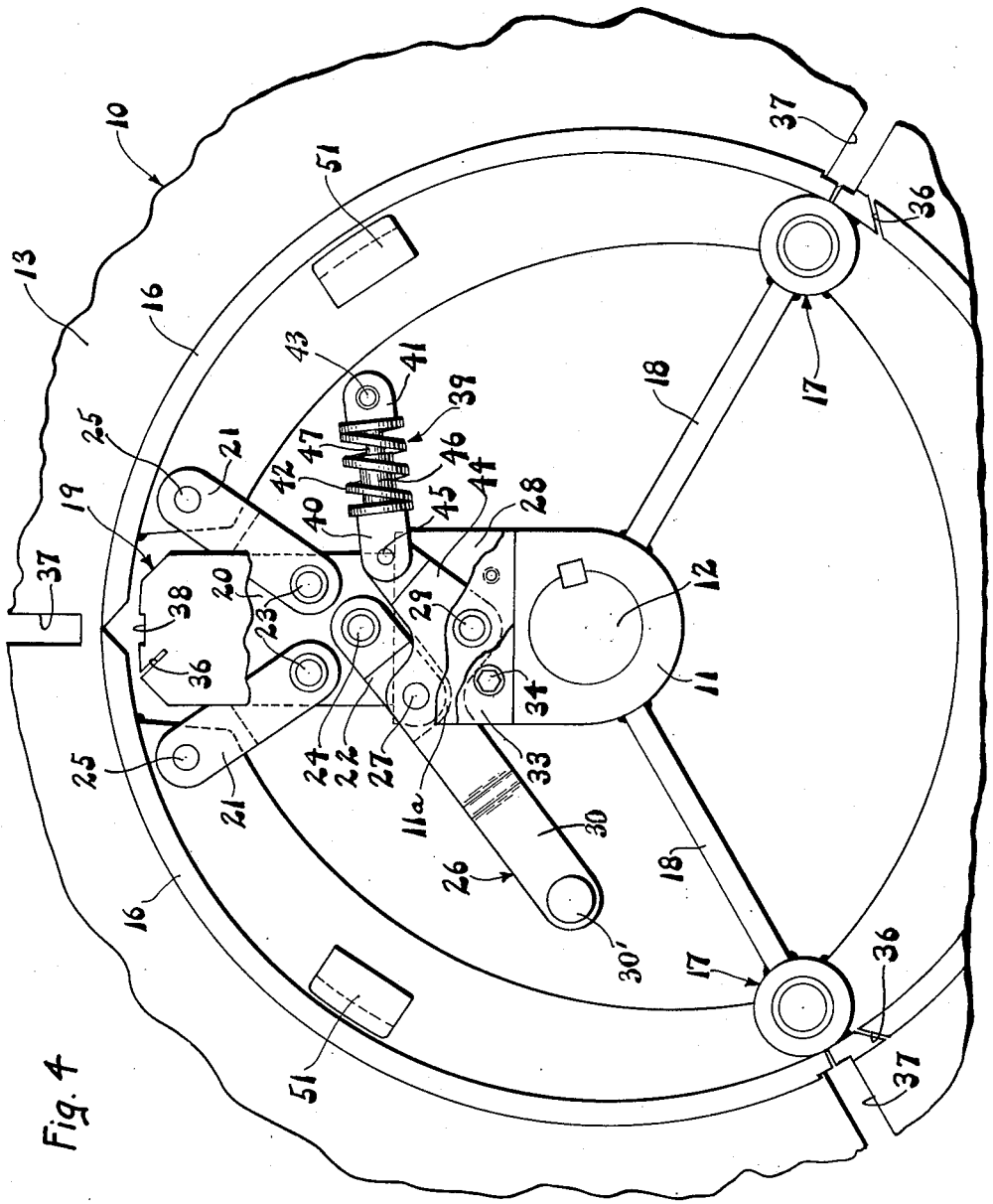


Fig. 4

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2,762,576

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2,762,576

COLLAPSIBLE REEL

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Application August 1, 1952, Serial No. 302,209

6 Claims. (Cl. 242—72)

My invention relates to reel apparatus, more particularly to apparatus adapted for use in reeling strip material, and the principal object of my invention is to provide new and improved apparatus of the class described.

The increasing use of coiled strip material by modern industry has resulted in an increasing demand for a cheaper, more fool-proof, and more efficient reel than has been provided by the prior art and my invention provides a reel having these qualities.

My improved reel is similar to certain prior art construction in that it is formed of a plurality of arcuate segments which are shiftable relative to one another so as to expand or contract the reel. However, my improved reel is simpler in construction and cheaper to manufacture than prior art reels; it is free of small fragile parts and is therefore more rugged in service and less susceptible to breakdown; and my improved reel may be easily expanded and contracted by a single motion thus reducing shut-down time between reeling operations.

These and other advantages will become apparent from a study of the following detailed description and from the drawings appended thereto.

In the drawings accompanying this specification and forming a part of this application there is shown, for purpose of illustration, an embodiment which my invention may assume, and in these drawings:

Figure 1 is an end elevational view of an embodiment of my improved reel apparatus,

Figure 2 is a sectional view generally corresponding to the line 2—2 of Figure 1,

Figure 3 is an enlarged view similar to Figure 1, certain parts being removed or broken away to show internal construction,

Figure 4 is a view similar to Figure 3 but showing certain parts in another position,

Figure 5 is a sectional view generally corresponding to the line 5—5 of Figure 3, and

Figure 6 is a sectional view generally corresponding to the line 6—6 of Figure 3.

While my invention is particularly suited for coiling purposes, that is, receiving strip material and forming it into a coil, it will be apparent that it may also be used to support a coil during uncoiling operations. Additionally, while reference is made herein to strip material, it is to be understood that my invention is equally well adapted for use with wire and like material.

As best shown in Figures 1 and 2, my invention comprises an expansible-contractable reel **10** having a hub **11** which is adapted to be secured to a shaft **12**. The hub **11** is provided with a transversely extending portion **11***a* for a purpose later to be disclosed. Although not shown in the drawings because it forms no part of this invention, means for rotatably supporting the shaft **12** may be provided, and in the event my invention is used for coiling purposes, the shaft **12** may be driven by any means found suitable.

As clearly shown in Figure 2, the hub **11** is welded

or otherwise secured to a back plate **13** which is adapted to prevent rearward displacement of a coil wound upon the reel. The back plate **13** additionally provides support for mechanism later to be described. A front or face plate **14**, similar to back plate **13**, is provided for the reel **10** and this plate prevents unintentional forward displacement of a coil. However, the face plate **14** differs from the back plate **13** in that it may be removed from the reel to permit a finished coil to be withdrawn therefrom.

Referring particularly to Figure 3, the embodiment chosen to illustrate my invention provides a plurality of arcuate segments which, in the position of parts shown in Figure 3, provide a generally annular, unbroken, drum-like core upon which the strip material may be wound. The segments are presently shown to be three in number and are shown to comprise a stationary segment **15** and movable segments **16**.

The stationary segment **15** is adapted to be welded or otherwise secured to the back plate **13**, and opposite ends of the segment **15** provide pivots **17** to which are attached respective segments **16**. Members **18** extend radially from the hub **11** and these members brace the segment **15** and transmit the load carried thereby to the hub.

As previously mentioned, the movable segments **16** are pivotally secured to respective ends of the stationary segment **15**, and as shown in Figures 3 and 4, the free ends of the members **16** are adjacent to each other and are shiftable about their respective pivots toward and away from the axis of the reel. In the present embodiment, and in the disposition of parts shown in Figure 3, the free ends of the segments **16** are spaced apart by a body or wedge member **19** which fills the gap between the segments **16** and maintains the drum-like continuity of the segments.

The wedge member **19** is slotted at **20** to provide spaced-apart legs between which are disposed links **21** and **22**. Each link **21** has one end thereof pivoted to member **19** by means of a respective pin **23**, and the link **22** has one end thereof pivoted to member **19** by means of a pin **24**. Each link **21** has its free end pivotally secured to a respective segment **16** at **25** as shown, and the link **22** has its free end pivotally secured to a bell-crank **26** by means of a pin **27**.

The aforementioned portion **11***a* of hub **11** is slotted at **28** to receive the bell-crank **26**, and the bell-crank is pivotally secured within the slot **28** by means of a pin **29**. The bell-crank **26** is provided with an off-set handle portion **30** by means of which expansion and contraction of my reel apparatus may be effected. In the present embodiment, the handle portion **30** is completely contained within the reel so as to preclude injury to the operator in the event he carelessly contacts the rapidly rotating reel.

The wedge member **19** is shiftable toward and away from the axis of the reel in a manner soon to be disclosed, the wedge member being held to such shifting movement by means of a tongue **31** formed thereon which is slideable in a groove **32** formed in the back plate **13** (see Figures 5 and 6).

As shown in Figures 4 and 6, the portion **11***a* of the hub **11** is recessed for a plate **33**, and the plate is presently secured to the hub **11** by cap screws **34** which pass through apertures in the plate and are threadably secured in the hub. The plate **33** is provided with spaced-apart, laterally extending flanges **35** (see Figure 5) which provide ways between which the wedge member **19** is slideable.

As best shown in Figure 1, the face plate **14** is of ring-like configuration and is formed with spaced-apart notches **48**, **49** in its inner periphery. These notches are respec-

tively engageable with hook-like lugs **50, 51** each providing a groove and each secured by welding or the like to segments **15, 16** as shown (see especially Figures 2 and 5). As clearly shown in Figures 1, 2 and 5, the face plate **14**, in the expanded position of the reel, will be securely locked thereto by means of its engagement with the lugs **50, 51**.

In the present embodiment, slots **36** are provided, as shown, in the segment **15** and in the wedge member **19** for receiving the starting end of the strip material which is to be wound upon the reel. It will be obvious, however, that any suitable means may be employed to secure the starting end of the strip to the reel.

Slots **37** extend inwardly from the outer peripheries of the back plate **13** and the face plate **14**, and shallow slots **38**, corresponding with the slots **37**, are formed in the segments **15, 16** and in the wedge member **19**. The slots **37, 38** are provided so that bands or tie strips may be wound about a completed coil before it is removed from the reel in order to securely hold it together after its removal therefrom.

Means are provided to hold the reel mechanism in expanded relation as shown in Figure 3 or contracted relation as shown in Figure 4, such means presently comprising a spring actuated toggle mechanism generally indicated by the numeral **39**. The mechanism **39** comprises a pair of members **40, 41** spring-pressed apart by means of a spring **42**. The member **41** is pivotally carried by a stud **43** anchored in the back plate **13** (see Figures 2 and 4), and the member **40** is adapted to be pivotally secured to an arm **44** of the bell-crank **26** by means of a pin **45**. The member **40** is provided with a tubular extension **46**, and the member **41** is provided with a rod-like extension **47** which is slideable within the extension **46**. As will be apparent, the extensions **46, 47** provide for telescoping interengagement between the members **40, 41**.

Operation of my reel apparatus will now be described, it being recalled that the face plate **14** has been removed in Figures 3 and 4 in the interest of clarity: The reel **10** is shown in its expanded position in Figure 3 and in such position it is ready to receive the strip material that is to be coiled. The starting end of the strip material may be inserted in any one of the slots **36** and the reel may then be rotated so as to wind the strip material thereon.

Reel rotation may be stopped when a coil of sufficient size has been formed thereon and, if desired, the coil may be banded through the slots **37, 38** to hold the coil together. Removal of the completed coil from the reel may now be effected by shifting the handle portion **30** of bell-crank **26** from the position shown in Figure 3 to the position shown in Figure 4. Movement of the bell-crank **26** will cause the wedge member **19** to slide along its ways to the position shown in Figure 4, such movement of the wedge member pulling on the links **21** and thus causing respective segments **16** to shift about their respective pivots to the position shown in Figure 4.

As will be clear, movement of the segments **16** to the position shown in Figure 4 will collapse the drum-like core upon which the coil is wound and will effect disengagement of the lugs **51** from the face plate **14** and thus permit removal of the face plate from the drum and subsequent removal of the completed coil from the reel.

After removal of a completed coil, the reel may again be prepared for winding by placing the face plate **14** over the lugs **50, 51** so that it hangs upon at least one of the lugs and then shifting the bell-crank **26** from the position shown in Figure 4 to the position shown in Figure 3. This will restore the parts to the position shown in Figure 3 wherein the reel is expanded and the face plate **14** is securely held in place against the reel by means of the lugs **50, 51**.

The spring actuated toggle mechanism **39** is employed primarily to hold the reel in either expanded or contracted relation; however, this mechanism does assist in shifting the reel to its extreme positions of expansion and contraction.

Clearly, since both expansion and contraction of my reel is effected in a postive manner instead of depending upon gravity, springs, or the weight of the coil, there is less likelihood of the mechanism jamming because of an accumulation of dirt, metal particles or the like. Furthermore, and since my construction eliminates the heavily loaded sliding surfaces employed in many prior art devices, my reel apparatus is easily operated even under the most severe operating conditions.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, wihout departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described, hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. A reel for strip material comprising an expansible-contractable drum having a stationary segment, a hub portion fixedly secured to said stationary segment, and two movable segments, each movable segment having one end thereof pivotally secured to said stationary segment and the free ends of said movable segments being adjacent to each other and being shiftable toward and away from the drum axis, body means shiftable toward and away from the drum axis, link means pivotally connecting respective free ends of said movable segments to said body means, and link means in part pivoted to said body means and in part pivoted to said hub portion and shiftable to effect movement of said body means and consequent movement by said movable segments thereby effecting expansion and contraction of said drum.

2. A reel for strip material comprising an expansible-contractable drum having a stationary segment, a hub portion fixedly secured to said stationary segment, and two movable segments, each movable segment having one end thereof pivotally secured to said stationary segment and the free ends of said movable segments being adjacent to each other and being shiftable toward and away from the drum axis, body means shiftable toward and away from the drum axis, link means pivotally connecting respective free ends of said movable segments to said body means, a bell-crank lever pivotably secured to said hub portion and having one leg linked to said body means and being shiftable about its pivot to effect movement of said body means and consequent movement of said movable segments to expand and contract said drum, and spring-actuated toggle means in part provided by the other leg of said bell-crank lever for yieldably holding said drum in expanded or contracted relation.

3. A reel for tenuous material, comprising a drum split longitudinally whereby it may be radially expanded and contracted respectively to a larger and smaller diameter and including means forming a groove, and a face plate having an aperture and extending radially beyond said drum, the aperture defining marginal surface of said face plate being seated in said groove with surfaces defining said groove engaging opposed sides of said face plate to hold the latter against movement axially of said drum in either direction, said aperture defining marginal surface being released from seating engagement within said groove by contraction of said drum to provide for removal of said face plate from said drum.

4. A reel for tenuous material, comprising a drum split longitudinally whereby it may be radially expanded and contracted respectively to a larger and smaller diameter and having axially extending means forming a hook construction, and a face plate having an aperture and extending radially beyond said drum, the peripheral surface of said face plate aperture having notch means

and said hook construction being seated in said notch means to lock said face plate to rotation with said drum, said hook construction also having portions engaging opposed sides of said face plate to restrain the latter against movement axially of said drum, said hook construction being released from engagement with said face plate by contraction of said drum whereby said face plate may be removed from the latter.

5. A reel for tenuous material, comprising a drum split longitudinally for radial expansion and contraction respectively to a larger and smaller diameter and including means forming a groove adjacent to one end of said drum, a pair of face plates normal to and abutting opposite ends of said drum and each having a surface extending radially beyond said drum whereby the entire width of said drum from one end to the other may be utilized for the support of tenuous material, one of said face plates having an aperture and the defining marginal surface of such aperture being seated in said groove and engaged on opposite sides by surfaces defining said groove to hold said one face plate against movement axially of said drum in either direction, said aperture defining marginal surface being released from seating engagement within said groove by contraction of said drum to provide for removal of said one face plate from said drum and thereby open access to one end of said drum for selectively removing and replacing material.

6. A reel for tenuous material, comprising a rotatable drum split longitudinally for radial expansion and contraction respectively to a larger and smaller diameter, said drum having at least three axially extending hook members each opening in a radially outward direction, and a face plate having an aperture and extending radially beyond the drum, spaced portions of the aperture defining marginal surface of said face plate being seated in respective hook members with surfaces defining the latter engaging opposed sides of said face plate to hold the latter against movement axially of said drum in either direction, said aperture defining marginal surface portions being released from seating engagement within said hook members by contraction of said drum, and said hook members being spaced-apart peripherally of said drum whereby a portion of said aperture defining marginal surface hangs within at least one of said hook members when said drum is contracted.

References Cited in the file of this patent

UNITED STATES PATENTS

1,820,693	Dreisbach	Aug. 25, 1931
1,905,178	Kohler	Apr. 25, 1933
2,116,057	Yoder	May 3, 1938
2,366,081	Wood	Dec. 26, 1944
2,535,693	Murray	Dec. 26, 1950