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Schulz

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[54] **DEREELING APPARATUS**

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[52] **U.S. Cl.** **242/128,** 242/75.45, 242/156.2

[51] **Int. Cl.** **B65h 49/00**

[58] **Field of Search** 242/128, 156, 156.2, 75, 242/45

[56] **References Cited**

UNITED STATES PATENTS

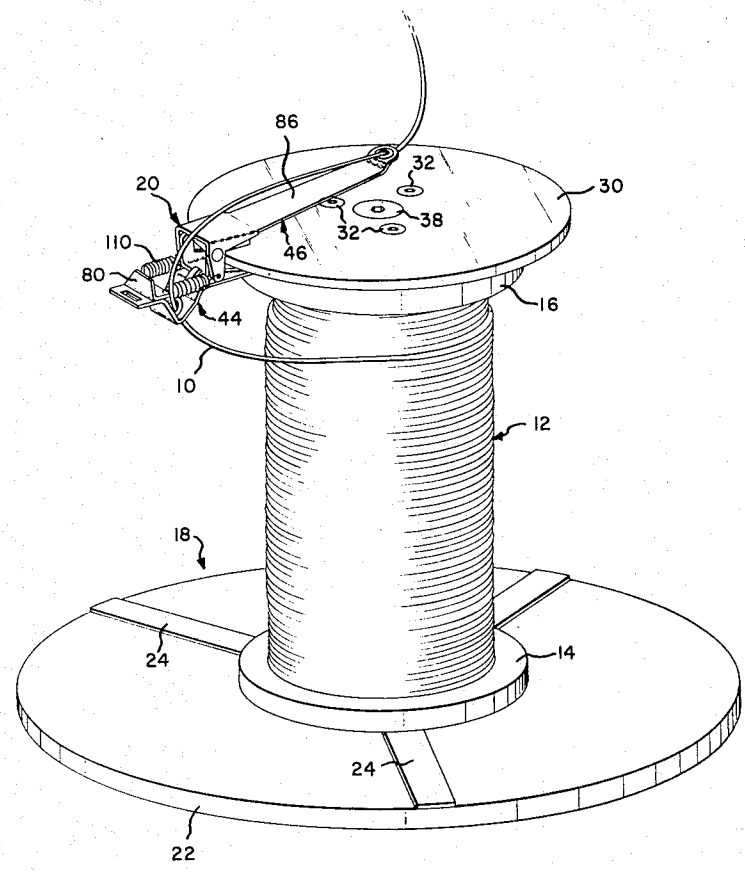
2,643,075	6/1953	Moore	242/128
3,618,873	9/1971	Fons et al.	242/128
3,638,877	2/1972	Clark et al.	242/128
3,669,370	6/1972	Mason	242/75.45

Primary Examiner—Leonard D. Christian

[57] **ABSTRACT**

An apparatus is described for dereeling filamentary material, such as wire, cording and the like, from a stationary spool or reel on a demand basis. The material wound on spool is dereeled from the spool substantially axially thereof. The dereeling apparatus includes a base for non-rotatively supporting the spool and a spinner assembly for feeding the material off the end of the spool. The spinner assembly is similar to a disc brake with a disc fixed to the spool support and an arm assembly rotatively mounted with respect to the disc to brakingly engage the disc when there is no demand for wire.

9 Claims, 5 Drawing Figures



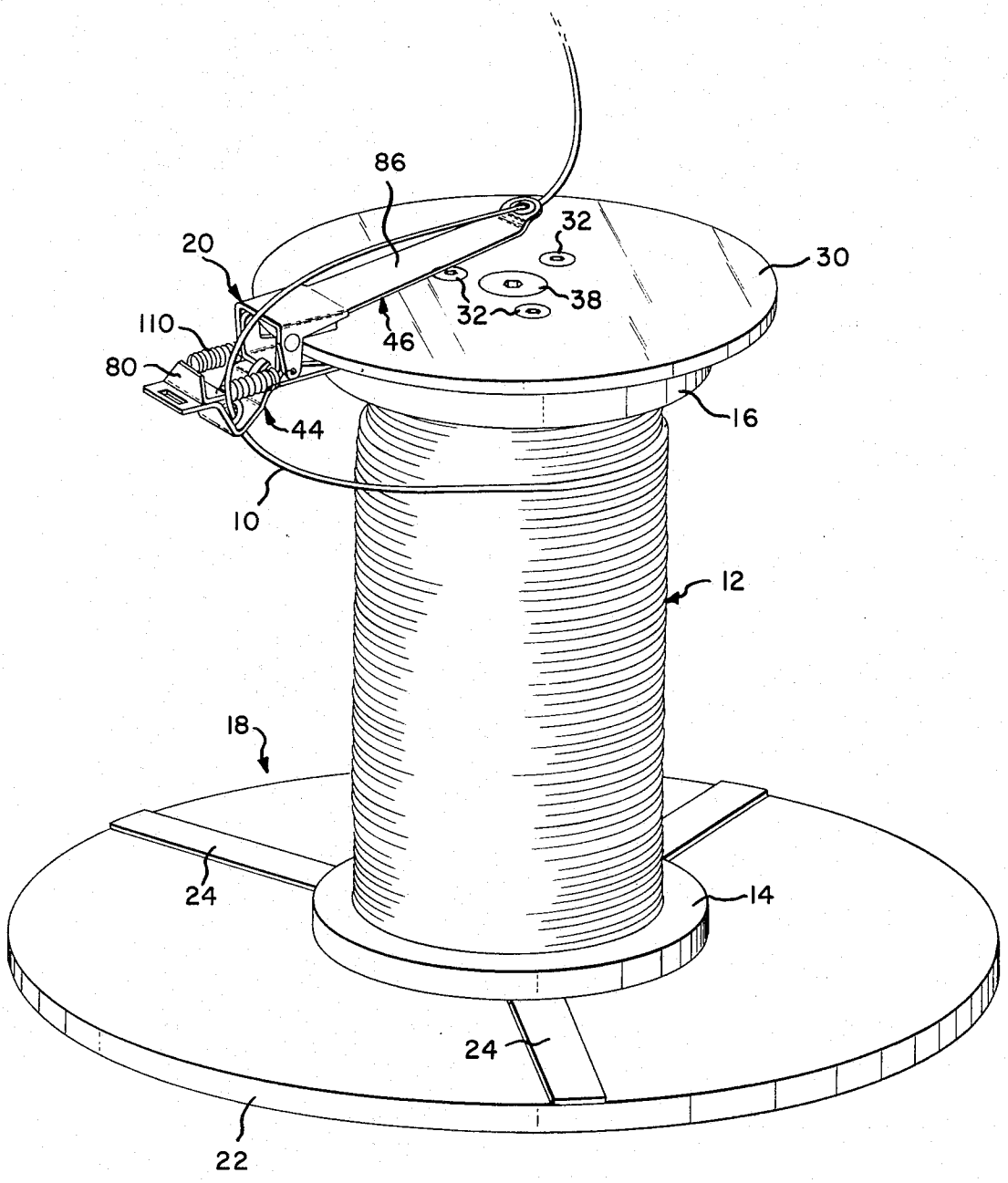


Fig. 1

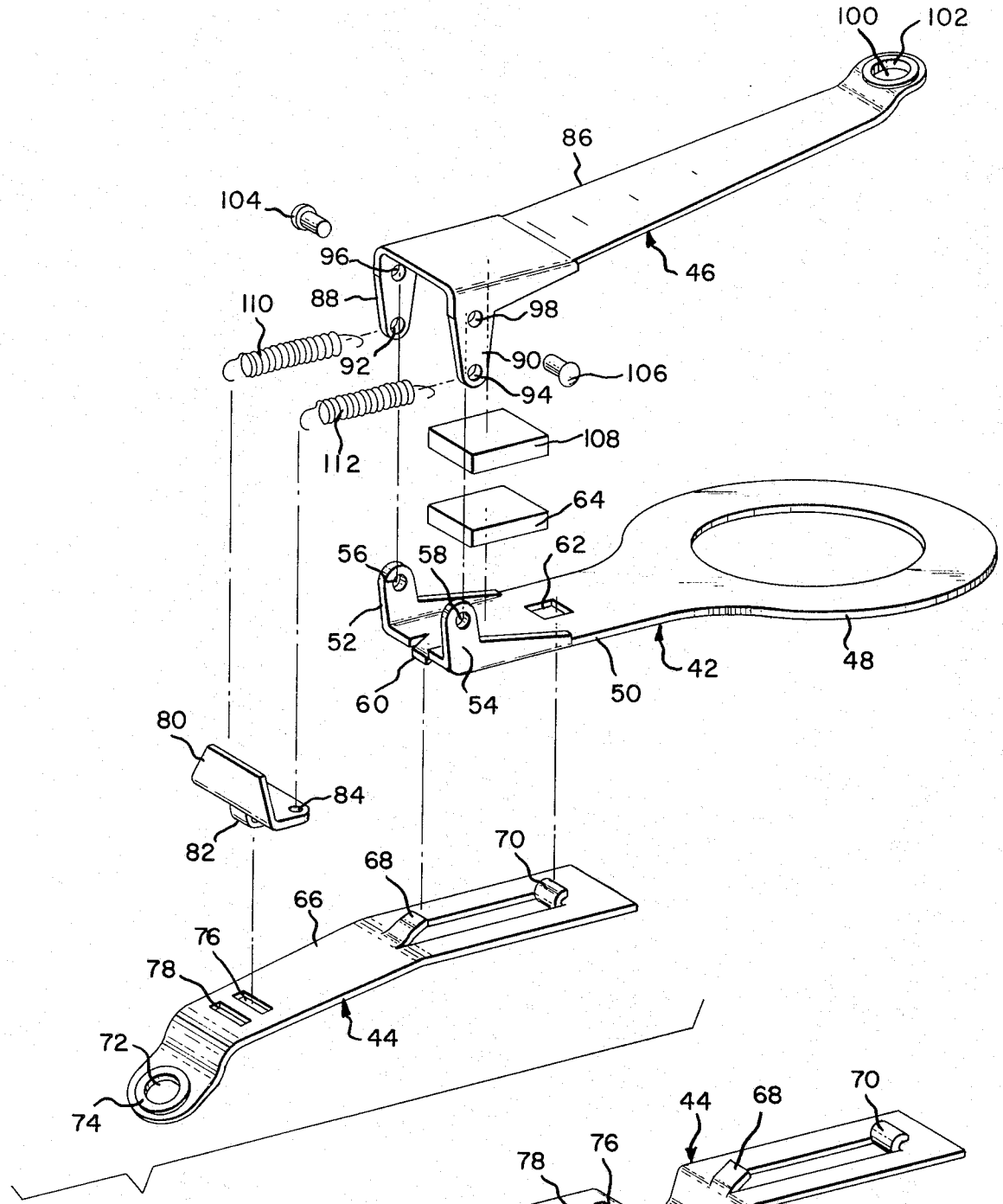

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Fig. 2

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Fig. 3

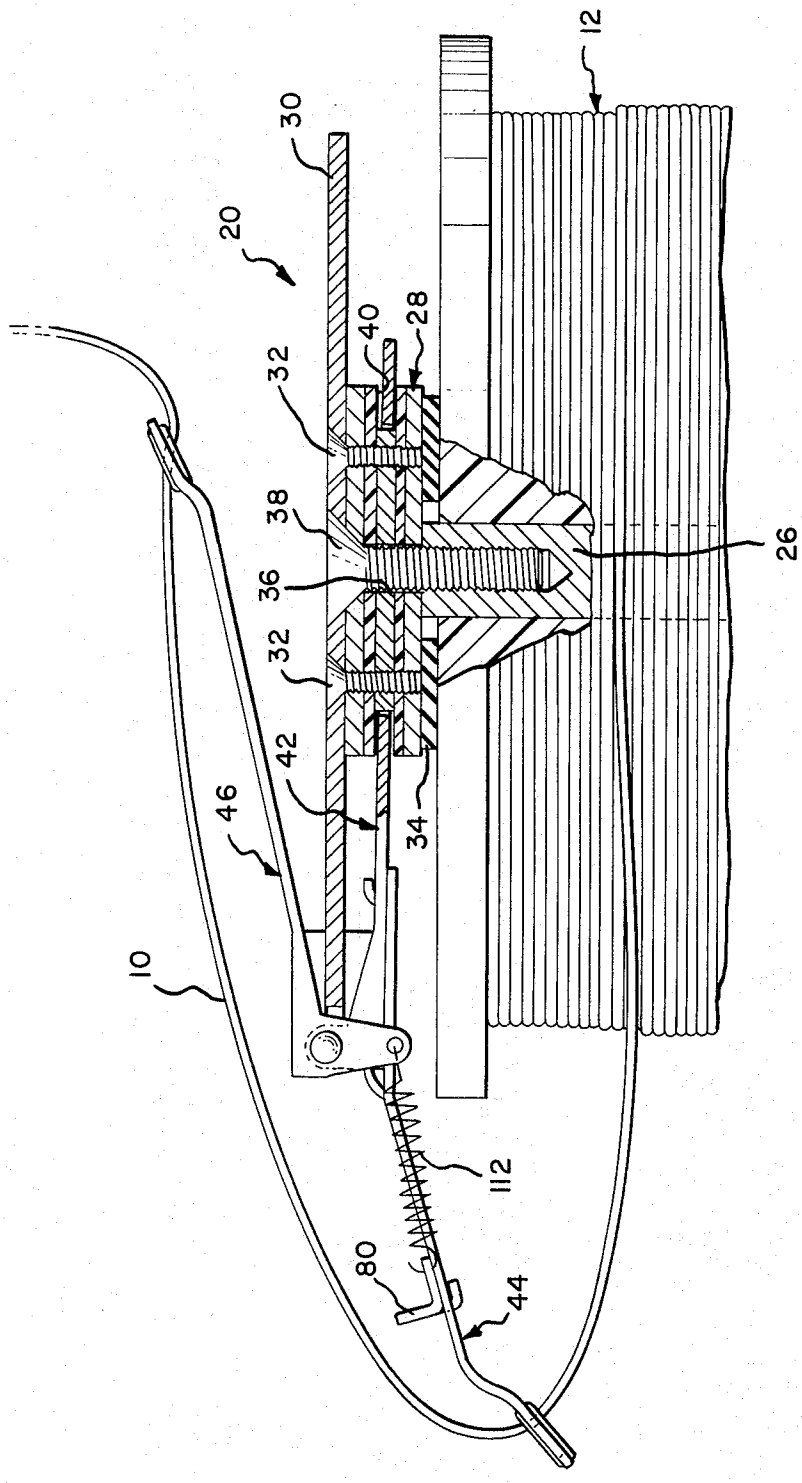

FIG. 4

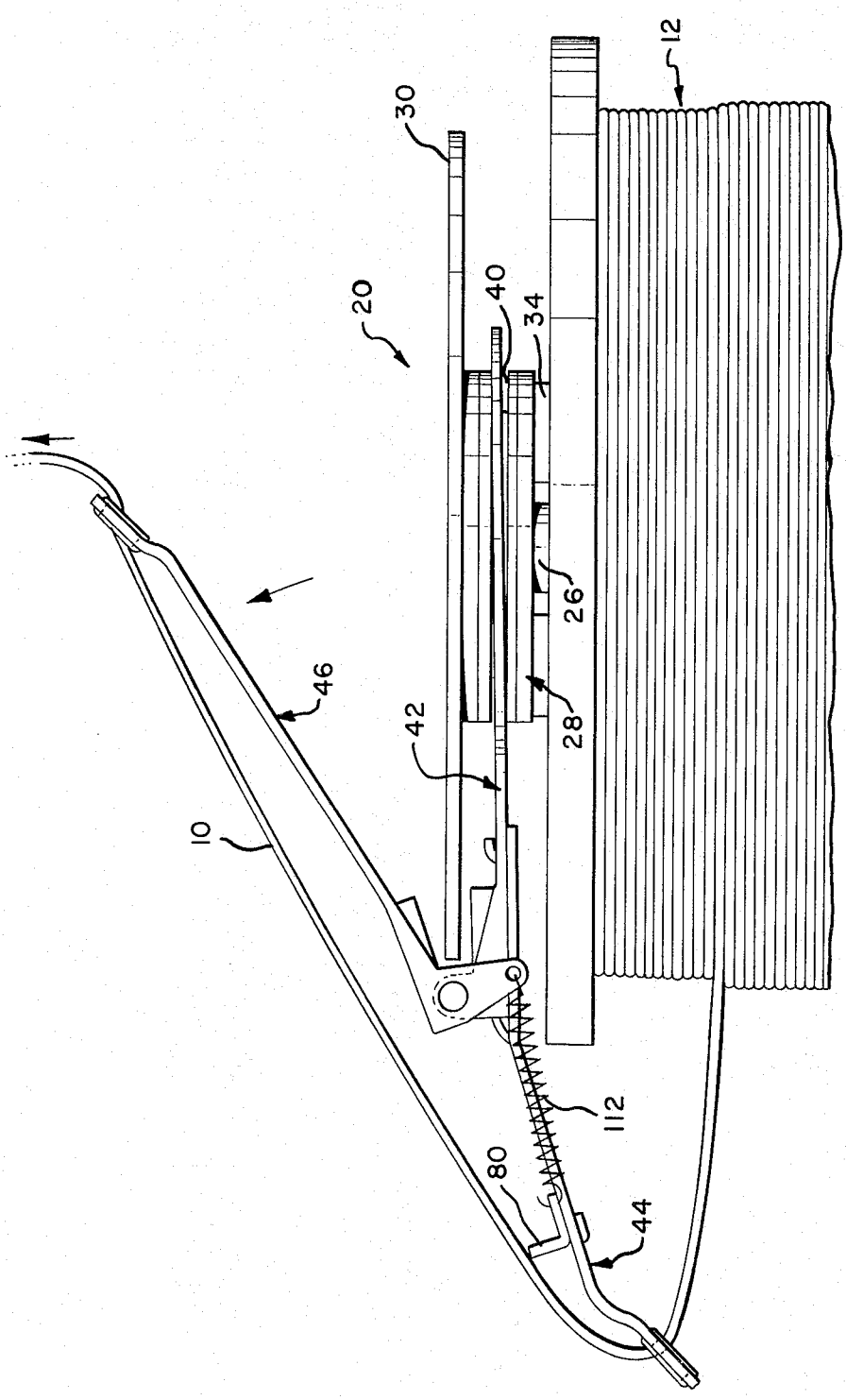

FIG. 5

DEREELING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to an apparatus for handling filamentary material, such as wire and the like, and in particular for dereeling wire from spools, reels or drums only upon demand.

The Prior Art

An inherent problem in removing filamentary material, such as wire or cording, from a spool, reel or the like is to have the material removed only upon demand and not allow continued dereeling during periods when there is no demand. This is frequently rather difficult because many dereeling devices support the reel for free rotation and, because of the momentum which builds in the rotating reel, the reel may continue to spin long after the demand for wire has been satisfied. This continued rotation will, of course, result in the undesirable unreeling and pile-up of wire off the reel with possible tangling. The obvious answer to overcome this situation is to have a braking means acting on the reel. Unfortunately, many of the known braking devices are so constructed that they add substantially to the weight of the reel thereby increasing the mass which must be overcome in order to remove the material reel and subsequently stop the reel. Also, many brakes act as tensioning devices thereby increasing the force required for dereeling operations. This obviously is an unsatisfactory solution where the filamentary material or wire is of light gauge and of relatively low tensile strength.

U.S. Pat. No. 1,401,123; 1,418,706; 1,908,073; and No. **2,906,472** all disclose dereeling devices in which the spool is rotatably supported to remove the wire radially therefrom in a single direction. The arrangements disclosed in the above noted patents have somewhat limited versatility in that they cannot be used interchangeably with different size reels and with different types of material. For example, the device disclosed in patent **2,906,472** clearly is suitable for large heavy cables, hoses, and the like while the device, disclosed in patent **1,418,076** would be for lighter materials. Both of these devices would require substantial structural changes in order to accommodate other materials or spool sizes.

U.S. Pat. No. **223,133**; **3,618,873** and **3,638,877** all disclose dereeling devices which have a spinner arrangement rotating about a fixed spool. Each of these devices includes a braking assembly which stops the spinner when there is no demand. However, each of these devices places a substantial amount of tension on the filamentary material being removed from the spool. This has the obvious disadvantage of possibly breaking or stretching the filamentary material being removed from the spool.

SUMMARY OF THE INVENTION

The present invention concerns an apparatus for dereeling filamentary material, such as wire or the like wound on a spool, upon demand only and includes a spindle assembly for non-rotatively supporting the spool, and a spinner assembly mounted on the free end of the spindle. The spinner assembly is similar to a disc brake and includes a disc fixedly mounted on a free end of the spindle in parallel spaced relation to one end of the spool and an orbiting caliper freely rotably mounted on the spindle and adapted to selectively engage said disc to stop the spinner assembly to prevent dereeling of the filamentary material during periods of no demand. The orbiting caliper includes a stand-off arm for guiding the filamentary material about the end of the reel and a pivotally mounted feed arm for releasing the disc only upon demand for the filamentary material.

It is therefore an object of the present invention to produce dereeling apparatus which will allow a free running supply of filamentary material wound upon a spool only on a demand basis.

It is another object of the present invention to produce dereeling device which will accommodate cycling of automatic lead making machines while preventing continued dereeling of filamentary material from a spool, and subsequent snarling of the unwound material, when demand for the material ceases.

It is yet another object of the present invention to produce an apparatus for dereeling filamentary material from a spool in which the apparatus has less mass to overcome and less tension applied to the filamentary material to thus prevent stretching and/or breaking of fine gauged filamentary material as it is dereeled.

It is a further object of the present invention to produce a dereeling device which will accommodate a wide range of filamentary material and reel sizes and which device can be used in substantially any orientation.

It is a still further object of the present invention to teach a filamentary material dereeling apparatus which can be readily and economically produced.

The means for accomplishing the foregoing and other objects and advantages of the present invention, which will become apparent to those skilled in the art, are described in detail in the following specification taken with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the subject dereeler applied to a small reel of light gauge wire;

FIG. **2** is an exploded perspective view of the spinner assembly of the present invention;

FIG. **3** is a perspective view of an alternate stand-off arm of the spinner assembly;

FIG. **4** is a partial side elevation, partially in section, showing the subject spinner assembly with the brake engaged; and

FIG. **5** is a partial side elevation, similar to FIG. **4**, showing the subject spinner assembly when there is demand for wire and the brake is disengaged.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The subject despooler is intended for use in removing filamentary material, such as wire **10**, from conventional spools **12** having parallel spaced end walls **14**, 16. The despooler is comprised of two major components, namely the support **18** and the disc brake or spinner assembly **20**. The support assembly **18** includes a weighted base plate **22** having a plurality of friction pads **24** mounted thereon. A central spindle **26** projects axially from the base plate **22** and preferably is of a type which is adjustable in length by any of well known means. For example, the spindle **22** can be made up of a plurality of separate sections which are threadedly attachable in order to accommodate reels of different axial dimensions.

The spinner assembly **20** includes a hub portion **28** on one end of which a disc **30** is fixedly secured by known means, such as screws **32.** The opposite end of hub **28** has a plurality of friction pads **34** which engage the end wall **16** spool **12.** An axial bore **36** is provided in the disc and hub for fastening the spinner assembly **20** on the spindle **26** by means of bolt **38.** The hub portion **28** also includes an annular slot or recess **40** and for this purpose can be formed by a laminar stack of bearing and spacer elements (as shown) or by a unitary member. The orbiting caliper portion of the spinner assembly, see FIG. **2,** includes spinner arm **42,** standoff arm **44** and caliper arm **46.** The spinner arm **42** includes an enlarged annular portion **48** and an arm **50** extending radially from one side of the annular portion. The annular portion **48** is adapted to be received in slot **40** of the hub **28.** On either side of the free end of the arm **50** there are upstanding flanges **52, 54** each having a bore **56, 58** adjacent the free end thereof. A downwardly projecting tab **60** is formed at the free end of arm **50,** centrally of flanges **52, 54,** and an opening **62** is formed in the arm **50** spaced back from tab **60.** A brake pad **64** is fixedly mounted on the arm **50** between the flanges **52, 54** and between tab **60** and opening **62.**

The stand-off arm **44** comes in different lengths to accommodate spools of different diameters. A stand-off arm for small spools is shown in FIGS. **1** and **3** and a stand-off arm for larger spools is shown in FIGS. **2,** 4 and **5.** The stand-off arm **44** is an elongated member **66** having spaced tabs **68** and **70** toward one end thereof and adapted to engage, respectively, with tab **60** and opening **62** of spinner arm **42.** The length of the stand-off from tab **68** to the free end is determined by the size of the spool which is to be unwound. The longer stand-off arms have a bore **72** near the free end surrounded by bearing material **74,** such as nylon. The free end of the longer stand-off arm can also be bent downwardly in a curved or stepped fashion to provide clearance for the filamentary material over the edge of the spool. Spaced inwardly of the free end of the longer stand-off arm, there are first and second slots **76** and **78.** A spring retainer member **80** is adapted to engage in one of the slots by a tab **82.** This member also includes a pair of spaced spring receiving bores **84.**

An alternate short stand-off arm is shown in FIGS. **1** and **3.** This arm is similar to the longer stand-off arm **44** but is intended for use with reels of small diameters. The bore **72** in the shorter stand-off arm is positioned between the spring retaining slots **76, 78** and the mounting tabs **68, 70** instead of at the free end of the arm. The portion of the shorter stand-off arm having the bore is bent downwardly to provide clearance over the end of the reel.

The caliper arm **46** is an elongated member **86** having, at one end, a pair of parallel, spaced depending flanges **88, 90** each having a spring retaining opening **92, 94** near the free end of the flange and a pivot opening **96, 98** adjacent the main portion of the arm. The opposite free end of the caliper arm includes an opening **100** surrounded by bearing material **102,** such as nylon. Caliper arm **46** is mounted on spinner arm **42** by rivets **104, 106** or the like fixed through bores **56, 96** and **58, 98,** respectively. A brake pad **108** is fixed to caliper arm **46** in opposition to the brake pad **64** on the spinner arm. Spring members **110** and **112** have one end, respectively, engaged with openings **92, 94** of the caliper arm and their other ends engaged with bores **84** of the spring retainer **80,** which is engaged in an appropriate slot of the stand-off arm **44.**

The subject dereeling device is operated as follows: a reel **12** of wire **10** is placed over an appropriate length spindle **26** which is fixedly mounted on the weighted base **22.** The spinner assembly **20** is attached to the spindle **26** using a flat headed bolt **38.** The reel is non-rotatively supported in the device by the engagement of friction pads **24, 34** with the opposite ends of the reel. A stand-off arm **44** of appropriate length is attached to the spinner assembly by engaging tabs **68, 70** with tab **60** and opening **62,** respectively. The spring catch **80** is engaged in one of two slots **76, 78** on the stand-off arm, **44** depending upon the wire size and desired tensioning. The inntermost slot **76** will provide less tension and less braking effect and therefore would be used for a light wire while the outer slot **78** would provide greater tension and braking and would be used for heavier wire. The position of the two spring catch slots differs on each stand-off arm. The longer the stand-off arm, the further out the holes are placed to provide more spring tension and hence greater breaking to compensate for the added mass of the orbiting stand-off arm. The springs **110** and **112** are attached between the spring catch **80** and the respective bores **92, 94** in caliper arm **46.** Wire **10** is fed from the spool or reel through the bore **72** in the stand-off arm **44** and through the bore **100** of the caliper arm **46** as shown in FIGS. **1, 4** and **5.** When tension is placed on the wire, stand-off arm **44** is pulled downwardly, to some extent, and the caliper arm **46** is rotated counter-clockwise, as shown in the FIGURES, thus releasing the brake and permitting the spinner assembly to rotate about the fixed disc **30** and stationary spool **12.** As soon as tension on the wire is relaxed, the caliper arm **46** is biased in a clockwise direction by the springs **110, 112** to bring the brake pads **64, 108** into engagement with disc **30** thus stopping the unspooling of the wire. Additionally, when the draw of the wire begins, the raising of the caliper arm and hence the reduction of the acuity of the wire angle (formed from the stand-off through the caliper arm and up through the wire draw mechanism) acts as a shock absorber permitting the rotating parts to accelerate to speed without placing undue stretching stresses on the wire.

The present invention may be subject to many modifications and changes without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as being illustrative and not restrictive of the scope of the invention.

What is claimed is:

1. A device for dereeling filamentary material from a stationary spool, said device comprising:

a base assembly including a weighted base plate, a spindle projecting centrally of said base plate, and at least one friction pad fixed to said base plate, and

a spinner assembly adapted to be mounted on the free end of said spindle, said spinner assembly including a disc fixedly mounted on and normal to said spindle, and an orbital caliper assembly adapted to coact with said disc, said caliper assembly comprising a first rotor arm rotatably mounted on said spindle, a second standoff arm mounted on a free end of said first arm, and a third caliper arm pivotally attached to said free end of said first arm,

each said first and said third arm having a bore in the free end thereof and brake pads fixed to adjacent surfaces thereof to act on opposing surfaces of said disc, whereby tensioning of the filamentary material fed successively through the bores of said stand-off arm and said caliper arm disengages said brake pads from said disc allowing rotation of said spinner assembly.

2. A device according to claim **1** further comprising spring means fastened between said second and third arms to normally bias said brake pads into engagement with said disc.

3. A device according to claim **2** further comprising at least two slots formed in said second stand-off arm and spring retaining means adapted to be secured to said springs and selectively engaged in said slots whereby the tensioning of said springs can be adjusted to accommodate filamentary material of different tensile strengths.

4. A device according to claim **1** wherein said second stand-off arm is detachably mounted on said rotor arm whereby said stand-off arm can be readily replaced with similar stand-off arms of different dimensions to accommodate spools of various diameters.

5. A device according to claim **1** wherein the free end of said stand-off arm is profiled to extend downwardly over the edge of a spool mounted in said device.

6. A device according to claim **1** wherein said disc includes an axial hub, friction pad means on the free end of said hub adapted to engage one end of a reel mounted in said device whereby said reel is non-rotatably secured in the device.

7. A device according to claim **1** wherein said spindle is adjustable in length to accommodate spools of different axial dimension.

8. A device according to claim **7** wherein said spindle comprises a plurality of separate portions threadedly attachable into a single unit.

9. An improved apparatus for removing filamentary material, such as wire, from spools, reels, drums and the like, said apparatus comprising a base including an axial spindle adapted to receive a spool thereon in non-rotatable fashion, a spinner assembly adapted to be mounted on the free end of said spindle, said assembly including a disc fixedly mounted on said spindle and an orbiting caliper brake mounted for rotation about said spindle and adapted to engage said fixed disc, first and second stand-off arms having bores adjacent the free ends thereof through which the material from said spool sequentially passes and when tensioned causes said arms to release said disc allowing the rotation of said assembly and dereeling of said material.

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