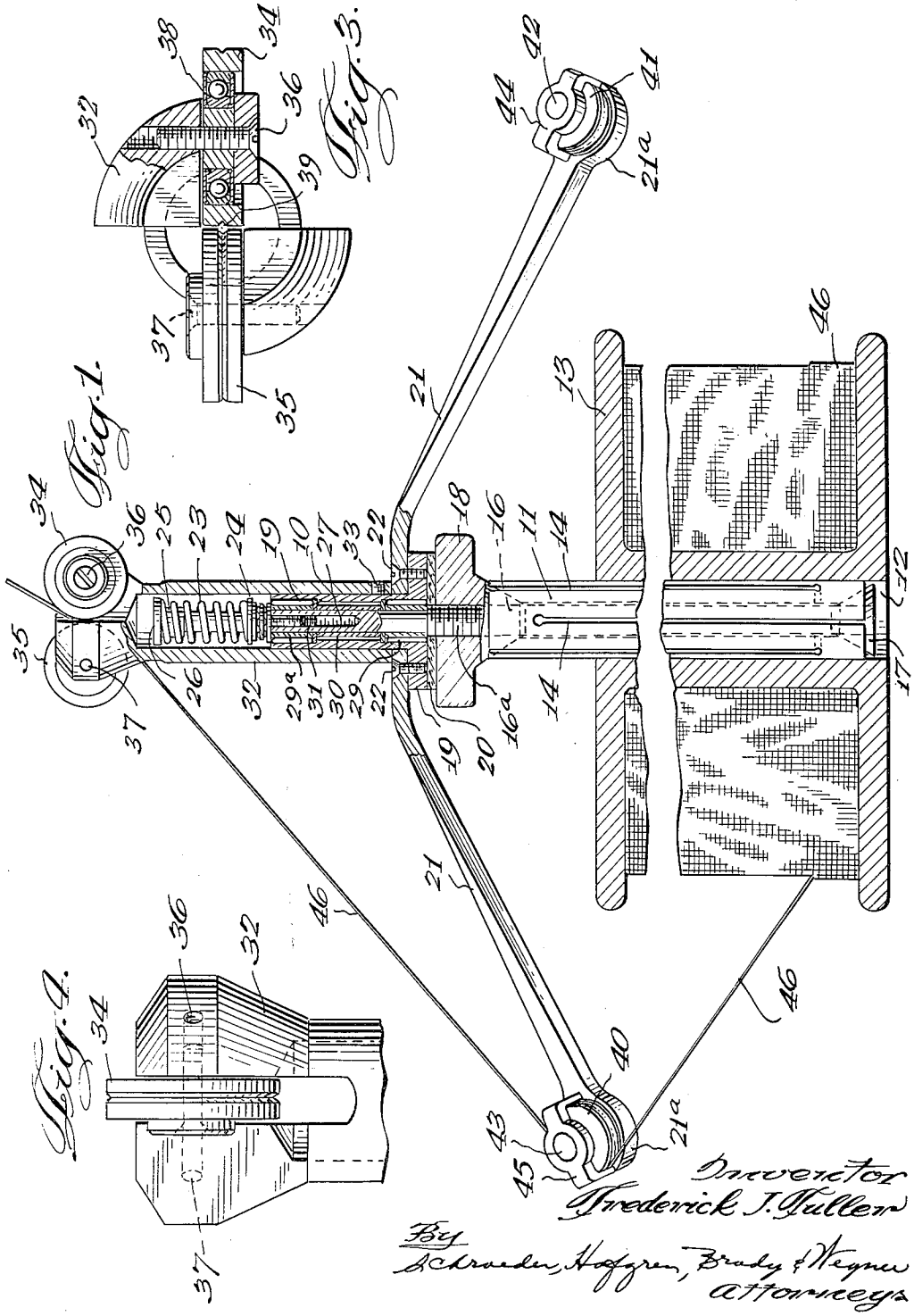
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UNWINDING DEVICE

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UNWINDING DEVICE

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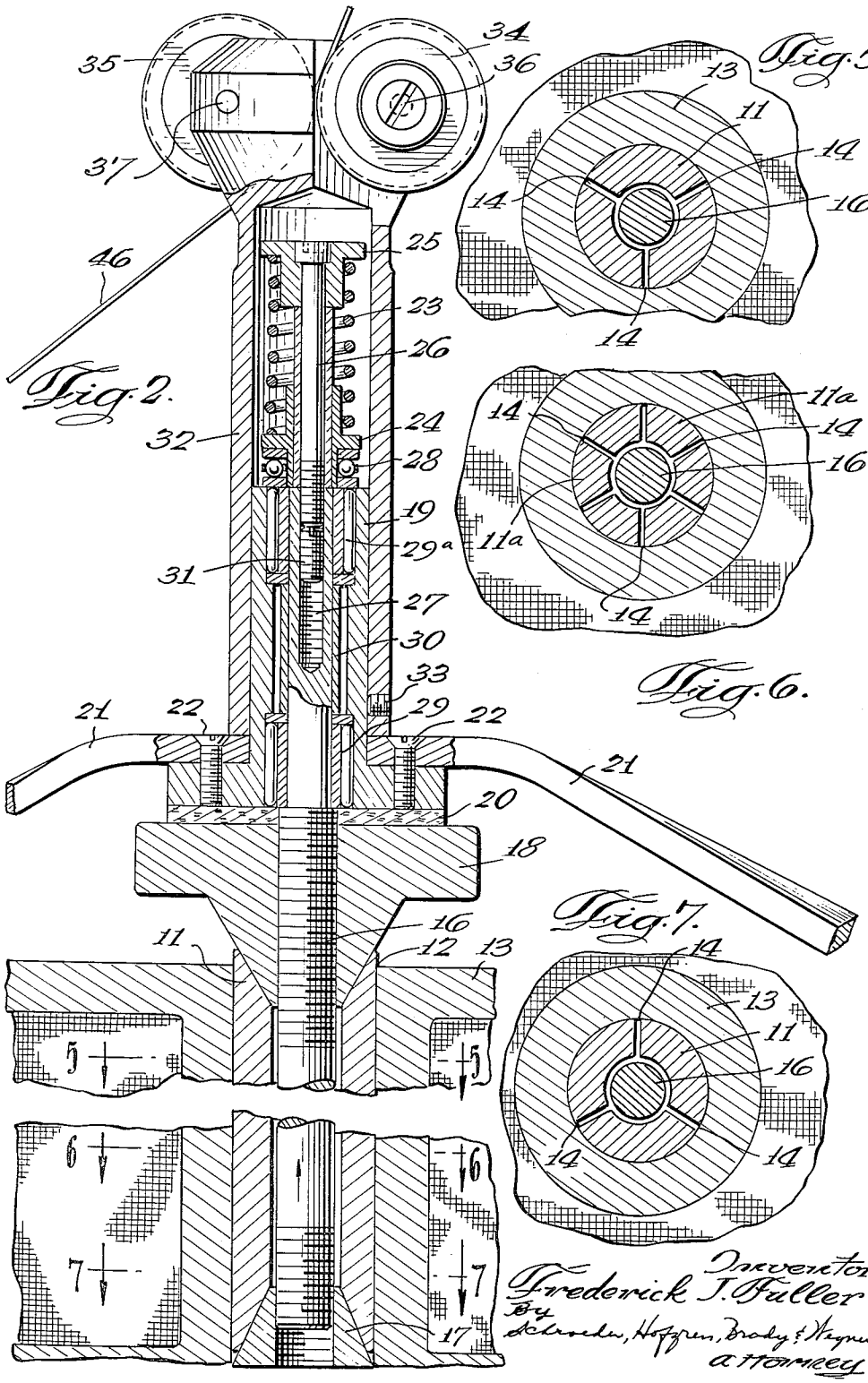


Fig. 2.

Fig. 5.

Fig. 6.

Fig. 7.

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UNWINDING DEVICE

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4 Claims. (Cl. 242—128)

This invention relates to an unwinding device and more particularly to a device for controlling the unwinding of an elongated flexible member such as wire from a coil thereof.

It is one feature of this invention to provide a device for controlling the unwinding of a coil of an elongated flexible member such as spooled wire and the like, which comprises an expandable base for removably attaching the device in an operative relationship to the coil such as in the center of the coil, a rotatable member supported for rotation on the base member which includes a plurality of flexible member guide means, such as pulleys located in spaced relationship with the base member for guiding the flexible member off the coil as the rotatable member rotates about the coil and a means such as a brake cooperating with the rotatable member and the base member for yieldingly retarding the rotation of the rotatable member.

Many modern high-speed machines need a continuous supply of an elongated flexible member or strip such as wire. Such a machine is described in my copending application, Serial Number 615,695, filed October 12, 1956. Normally, the wire is supplied in coils which include a hollow centered spool on which the wire has been wound. In removing the wire from such a spool, the wire often becomes snarled and tangled due to its normal tendency to regain a straight position or its tendency to continue unwinding when the pull on the wire has been lessened or stopped.

The wire unwinding device of this invention overcomes this tendency to snarl. Thus the device provides a controlled unwinding of the wire and because of its brake means will prevent the wire from continuously unwinding when the pull on the wire has been lessened or stopped.

It is therefore an advantage of this invention to provide a device which will control the unwinding of spooled or coiled wire and the like. It is a further advantage of this invention that it will prevent the wire from continuing to unwind when the pull on the wire has been lessened or stopped.

Further objects and advantages of this invention will become apparent from the drawings and the following description.

Of the drawings:

FIG. 1 is a front elevational view partially broken away in section of an embodiment of the invention;

FIG. 2 is an enlarged front elevational view of the device shown in FIG. 1 partially broken away in section;

FIG. 3 is an enlarged top plan view of the device shown in FIG. 1 partially broken away in section;

FIG. 4 is an enlarged end elevational view of the top of the device shown in FIG. 1;

FIG. 5 is a transverse sectional view taken along the line 5—5 of FIG. 2;

FIG. 6 is a transverse sectional view taken along the line 6—6 of FIG. 2; and

FIG. 7 is a transverse sectional view taken along the line 7—7 of FIG. 2.

The unwinding device **10** of this invention includes a hollow cylindrical base **11** which is arranged to be inserted in the center portion **12** of a wire spool **13**. The base **11** is designed so as to be expandable thus rigidly but removably attaching the device **10** in the spool **13**.

The expandable feature of the base **11** is provided by means of a plurality of sections **11***a* separated by slits **14** which extend in a vertical direction, but which are shorter than the base **11**. Thus as is shown in FIG. 5, three of the slits **14** begin at the top of the base **11** and as is shown in FIG. **7**, three different slits begin at the bottom of the base **11**. The result of this arrangement of slits is shown in FIG. 6 wherein there are six slit portions or segments **11***a* in the cylindrical base **11**.

A shaft **16** extends upward through the center portion of the base **11** and has a conically shaped member **17** attached to its lower end as by welding or the like. A portion of the shaft **16***a* is threaded so that a conically shaped nut **18** may be moved up and down. As the conically shaped nut **18** is moved down the shaft **16**, it forces the base onto the conically shaped member **17**. This causes the slit segments **11***a* in the base **11** to be displaced in an outward direction thus rigidly positioning the base **11** in the spool **13**.

A hollow cylindrical brake member **19** is arranged for rotation about the shaft **16** on a cork brake lining **20** which abuts against the top of the conically shaped nut **18**. A pair of arms **21** are also arranged for rotation about the shaft **16** and are held rigid to the brake **20** by the metal screws **22**.

The brake **19** is urged toward the top of the conically shaped nut **18** by the spring **23** which is positioned between the thrust collar **24** and the cap collar **25**. The spring **23** is compressed by the socket head cap screw **26** which is screwed into the threaded aperture **27** in the upper portion of the shaft **16**. A ball thrust bearing **28** is interposed between the thrust collar **24** and the top of the brake **19**. Thus the spring force is transmitted from the spring **23** through the thrust collar **24** and ball thrust bearing **28** to the top of the brake **19** while allowing the brake **19** to rotate about the shaft **16**. A set of needle bearings **29***a* and **29** which are spaced by the spacer **30** are provided to properly position the brake **19** for rotation on the shaft **16**.

A socket set screw **31** is provided in the threaded aperture **27** and may be moved up and down within the aperture to predetermine the position of the socket head cap screw **26** in the aperture. Thus it is possible to predetermine the amount of spring tension desired and further to lock the socket head cap screw **26** in the desired position regardless of vibration due to rotation of the brake **19**.

An elongated hollow member **32** is rigidly but removably positioned over the brake **19** by means of the set screw **33**. Thus it is possible to remove the elongated hollow member **32** simply by loosening the set screw **33** and lifting up on the member.

A pair of freely rotatable pulleys **34** and **35** are mounted for rotation in substantially the same plane at the top of the hollow elongated member **32** by means of the metal screws **36** and **37**. A bearing is also provided for each pulley as is shown in FIG. 3 at **38**. Since the pulleys **34** and **35** are mounted in the same plane and in relatively close juxtaposition they define a small aperture **39**.

The arms **21** are bent in a downward direction so that the ends of the arms **21***a* are located in a position roughly equivalent to the top of the spool **13**. The end of the arms **21***a* are also twisted through an angle of about 60° and present canted surfaces both of which face the same direction. A pair of pulleys **40** and **41** are positioned for free rotation at the ends of the arms **21** on the canted surface by means of the metal screws **42** and **43** along with a pair of pulley guides **44** and **45**.

In operating the unwinding device of this invention, the base **11** is inserted in the hollow center **12** of the spool **13** and the conically shaped nut **18** is screwed down

on the base 11 thus rigidly positioning the base 11 in the center 12 of the spool 13. The set screw 33 is then loosened and the hollow elongated member 32 is removed. Assuming that the spring tension is not satisfactory the socket head cap screw 26 is unscrewed and the spring 23, thrust collar 24 and bearing 28 are removed. The socket set screw 31 is then adjusted in the threaded aperture 27 to give the desired spring tension and the spring 23, thrust collar 24, bearing 28 and socket head cap screw 26 are replaced. The elongated hollow member 32 is next replaced on the brake 19 and the set screw 33 is retightened. The wire unwinding device 10 is now ready for operation.

The wire 46 which is wound on the spool 13 is threaded around either the pulley 40 or the pulley 41 depending upon which direction the wire is wound upon the spool. Using the pulley 40, as is shown in FIG. 1, the wire is dipped under the pulley guide 45 and led up to and under the pulley 35 so that it passes through the small aperture 39 between the pulleys 34 and 35 from whence it may be fed to any desired machine (not shown). As the machine uses the wire 46, it will exert a pull on it tending to unwind it from the spool 13. This force will be transmitted through the wire to the arm 21 and will cause the arm 21 as well as the brake 19 and the elongated hollow member 32 to rotate in the direction of the pull. It is only necessary for the machine to apply enough pull to overcome the spring tensioned brake to remove the wire from the spool 13.

Because of the presence of the spring tensioned brake 19, however, a relatively constant pull will be exerted between the pulley 40 and the spool 13 thus removing the wire in a smooth continuous motion which prevents any snarling. Further, if the pull on the wire 46 should be lessened or stopped an according decrease in rotation speed or stopping of the rotation will result. Because of this, the wire is prevented from uncoiling when the pull decreases or stops.

Having thus described my invention as related to the embodiments shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. A device for controlling the unwinding of a coil of an elongated flexible member comprising: a base member for removably attaching said device in an operative relationship to said coil, a rotatable member supported for rotation by said base member, said rotatable member carrying flexible member guide means spaced from said base member for guiding said flexible member off said coil as said rotatable member rotates about said coil, and means cooperating with said rotatable member and said base member for yieldingly retarding the rotation of said rotatable member including a passage in said rotatable member, locking means arranged to be raised or lowered in said passage, resilient force applying means arranged to abut against said base member and a spring tension determining member normally received in said passage and bearing against said locking means.

2. A device for controlling the unwinding of a coil of an elongated flexible member comprising: an expandable base member arranged to be inserted in the center portion of said coil for removably attaching said device in an operative relationship to said coil, an elongated shaft positioned in said base member and extending upwardly therefrom, an elongated hollow rotatable member supported for rotation on said shaft, a pulley carried on the upper portion of said rotatable member, an arm carried on said rotatable member, said arm extending transversely from said rotatable member, a pulley carried on the end portion of said arm and arranged to cooperate with said pulley for guiding said flexible member off said coil as said rotatable member rotates about said coil, a resiliently urged brake on said rotatable member arranged to abut against said base member for yieldingly retarding the rotation of said rotatable member, and means on said shaft for urging said brake toward said base member with a predetermined resilient force including a threaded passage in the upper portion of said shaft, a set screw arranged to be raised or lowered in said passage, a compressible helical spring arranged to abut against said brake and a spring tension determining pin arranged to be threadedly received in said passage and to be locked against said set screw.

3. A device for controlling the unwinding of a coil of an elongated flexible member comprising: an expandable cylindrical base member arranged to be inserted in the center portion of said coil for removably attaching said device in an operative relationship to said coil, an elongated shaft positioned in said base member and extending upwardly therefrom, an elongated hollow rotatable member supported for rotation on said shaft, a pair of cooperating pulleys carried on the upper portion of said rotatable member, a pair of arms carried on said rotatable member, each of said arms extending transversely from said rotatable member in a direction substantially opposite to each other and each being twisted through an angle of about 60° in substantially the same direction, a pulley carried on the end portion of each of said arms and arranged to cooperate with said pair of pulleys for guiding said flexible member off said coil as said rotatable member rotates about said coil, a resiliently urged brake on said rotatable member arranged to abut against said base member for yieldingly retarding the rotation of said rotatable member, and means on said shaft for urging said brake toward said base member with a predetermined resilient force.

4. A device for controlling the unwinding of a coil of an elongated flexible member comprising: an expandable cylindrical base member arranged to be inserted in the center portion of said coil for removably attaching said device in an operative relationship to said coil, an elongated shaft positioned in said base member and extending upwardly therefrom, an elongated hollow rotatable member supported for rotation on said shaft, a pair of cooperating pulleys carried on the upper portion of said rotatable member, a pair of arms carried on said rotatable member, each of said arms extending transversely from said rotatable member in a direction substantially opposite to each other and each being twisted through an angle of about 60° in substantially the same direction, a pulley carried on the end portion of each of said arms and arranged to cooperate with said pair of pulleys for guiding said flexible member off said coil as said rotatable member rotates about said coil, a resiliently urged brake on said rotatable member arranged to abut against said base member for yieldingly retarding the rotation of said rotatable member, and means on said shaft for urging said brake toward said base member with a predetermined resilient force including a threaded passage in the upper portion of said shaft, a set screw arranged to be raised or lowered in said passage, a compressible helical spring arranged to abut against said brake and a spring tension determining pin arranged to be threadedly received in said passage and to be locked against said set screw.

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