Oct. 30, 1951 R. P. PERRY ET AL 2,573,598

SPOOL

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FIG. 1.

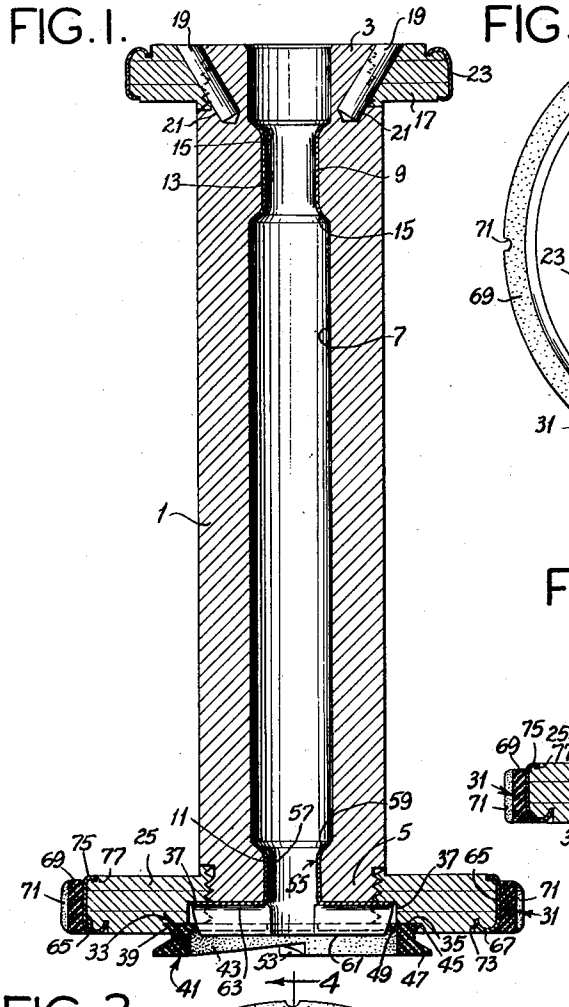


FIG. 2.

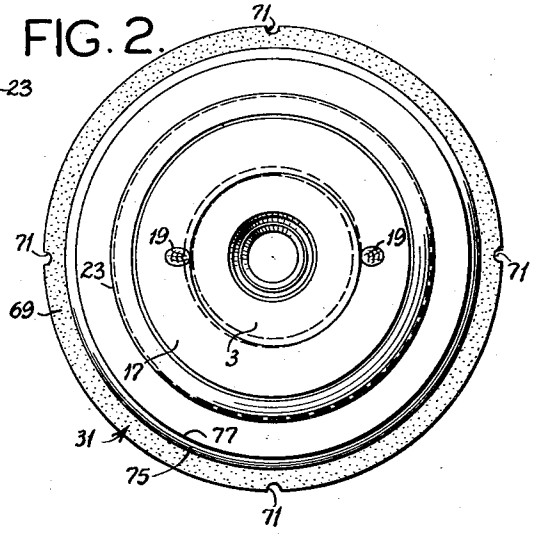


FIG. 4.

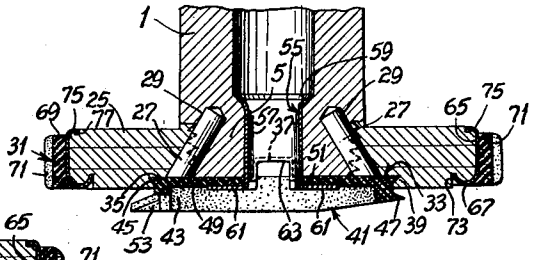


FIG. 5.

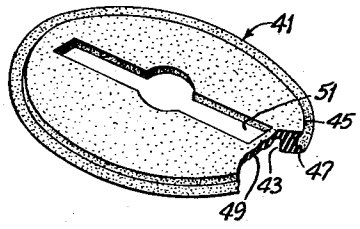
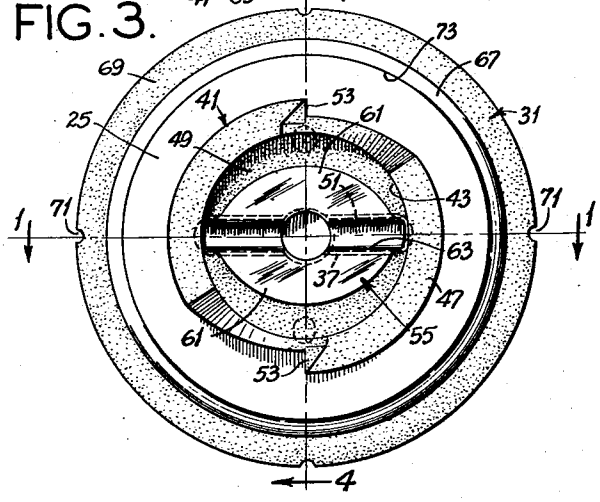


FIG. 3.



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UNITED STATES PATENT OFFICE

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SPOOL

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8 Claims. (Cl. 242—125)

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This invention relates to spools and more particularly to wooden spools such as are used on the spindles of twisting apparatus.

Wooden spools of the class described usually consist of a wooden barrel having wooden heads at both ends, with a metal drive bushing at the lower end of the spool for receiving the usual driving member on a twister spindle. One of the features of this invention is the provision of a yarn tail retainer for such a spool mounted on the lower end of the spool which is adapted to withstand the severe usage to which such spools are subjected and which is readily assembled with the spool proper. In general, a tail retainer of this invention is made of rubber or the like and has a yarn-receiving tubular barrel, a web across one end of the barrel, and a yarn-retaining head at the other end of the barrel. The tail retainer is mounted with its web bearing against the end of the spool coaxial with the spool barrel. A metal drive bushing is fixed in the end of the spool barrel, the bushing having a tube extending through an opening in the web of the tail retainer and a flange within the tail retainer barrel bearing against the web to hold the tail retainer on the spool. Another feature of the invention is the provision of a shield for the periphery of the lower head of the spool which is adapted not only to protect the lower head from damage but also to prevent the loop of yarn which extends over the rim of the lower head from the tail retainer to the barrel of the spool from precessing around the head during the operation of winding the yarn on the spool. In general, a shield of this invention comprises a metal collar fitted on the periphery of the head and having a ring of rubber or the like molded on its outer periphery. Other features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a transverse section through a spool of this invention, taken on line 1—1 of Fig. 3;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 is a bottom plan view of Fig. 1;

Fig. 4 is a fragmentary section taken on line 4—4 of Fig. 3; and,

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Fig. 5 is a perspective view of a tail retainer per se of this invention, with parts broken away and shown in section.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

Referring to the drawing, a spool of this invention is shown to comprise a tubular cylindrical wooden barrel 1 having reduced-diameter externally threaded end portions, the upper end portion being designated 3 and the lower end portion being designated 5. The bore of the barrel is designated 7. This has a reduced-diameter section 9 adjacent the upper end of the barrel and a reduced-diameter section 11 at the lower end of the barrel. A bushing 13 is fixed in the reduced-diameter bore section 9, its ends being spun over the ends of the section 9 as indicated at 15.

An annular wooden head 17 is threaded on the upper end 3 of the barrel. This is held against turning relative to the barrel by dowels 19 driven into and glued in holes 21 bored at an angle through the head into the barrel. The head 17 is provided with a metal shield 23 encircling its rim. An annular wooden head 25, is threaded on the lower end 5 of the barrel. This is held against turning relative to the barrel by dowels 27 (Fig. 4) driven into and glued in holes 29 bored at an angle through the head into the barrel. The head 25 is provided with a special shield 31, this being one of the features of the invention and to be more particularly described later. As shown, both the upper spool head 17 and the lower spool head 25 are of laminated wood construction. Each is shown to consist of three wooden plies glued together. The upper spool head 17 may, as shown, be of smaller diameter than the lower spool head 25 to facilitate over-end take-off of the yarn in unwinding.

After the lower head 25 has been fixed to the barrel, it is counterbored to form a circular recess 33 coaxial with the barrel 1. This operation cuts away part of the lower end of the barrel so that the flat inner end 35 of the recess 33 is flush with the flat lower end of the barrel 1. A diametrical groove 37 is then milled in the inner end of the recess and across the lower end of the barrel. This groove, as shown, is of rectangular cross section. Also, the recess 33 is conically undercut at its periphery, as indicated at 39.

A tail retainer of this invention, generally designated 41, is fixed to the bottom of the lower head 25 for receiving a number of turns of yarn at the start of winding on the spool to provide

a tail of yarn which can be unwound from the tail retainer and knotted to the leading end of the yarn wound on a second spool, for continuous unwinding. The tail retainer is molded as a one-piece body of elastomeric material, i.e., rubber or the like, preferably an oil-resistant synthetic rubber such as neoprene (chloroprene rubber), in the form of a flat bobbin having a short tubular cylindrical barrel **43**, an upper conical head **45** of such form and diameter as to fit in the conically undercut perimeter **39** of the recess **33**, and a lower conical head **47** which may be of greater diameter than the head **45**. At the upper end of the barrel **43**, the tail retainer is formed with a flat web **49** having a diametrical slot **51** corresponding in outline to the outline of the groove **37** milled in the inner end of the recess **33** and across the lower end of the barrel of the spool. The lower head **47** of the tail retainer is formed on its bottom with yarn-catching teeth **53** for starting the winding of yarn on the tail retainer.

The webbed end of the tail retainer is fitted in the recess **33** with the web **49** bearing against the inner end of the recess and with the slot **51** aligned with the groove **37**, and is held in place by a metal drive bushing **55**. This consists of a metal tube **57** fitted in the reduced-diameter bore section **11** with its upper end spun over on the upper end of section **11** as indicated at **59**. Integral with the lower end of the tube **57** is an outwardly extending flange **61** formed with a downwardly open diametrical channel **63** which is continuous across the tube. Flange **61** is of such size as to fit within the tail retainer barrel **43** underneath and bearing tightly against the bottom of the web **49**. The channel **63** fits in the slot **51** of the web and in the groove **37** and opens downward to receive the usual driving member on a spindle of a twisting frame.

Assembly of the tail retainer **41** with the spool is readily accomplished simply by fitting the upper end of the retainer in the recess **33** with slot **51** aligned with groove **37**, driving in the bushing **55** until the flange **61** bears against the web **49**, and then spinning over the upper end of the drive bushing tube **57** at **59**. The tail retainer, being molded of rubber or the like, is adapted to withstand the severe usage to which twister spools of this type are usually subjected without appreciable damage due to its resilience. Also, if made of oil-resistant synthetic rubber, it is resistant to deterioration which might otherwise be caused by oil spattering on the retainer from the twister frame.

The shield **31** for the lower head **25** of the spool comprises a sheet metal collar **65** of such diameter as to fit tightly on the head and pre-formed with an inwardly directed lower end flange **67** of channel shape in cross section. A ring **69** of elastomeric material, i.e., rubber or the like, preferably an oil-resistant synthetic rubber such as neoprene (chloroprene rubber), is molded on the outside of the collar. The rubber ring **69** is formed with axial yarn-catching grooves **71** spaced at equal intervals around its periphery. These may be molded or milled in the ring. As shown, there are four such grooves, spaced at 90° intervals. The flange **67** of the collar **65** fits in an annular groove **73** formed in the lower face of the head **25** adjacent its periphery. The collar has a portion **75** which projects from within the rubber ring **69** and which is spun over on a step **77** formed at the periphery of the upper face of the head **25**.

In winding yarn on a spool, a number of turns of yarn are first wound on the tail retainer; then the yarn is jumped over the rim of the lower head **25** and wound on the barrel **1** of the spool proper. This forms a loop of yarn leading over rim of the lower head from the tail retainer to the spool barrel. As shown, the diameter of the tail retainer barrel **43** is somewhat larger than the diameter of the spool barrel **1**, though this relationship is not critical. It is evident that because of the varying number of turns of yarn first wound on the tail retainer barrel **43**, the diameter of the tail retainer barrel cannot be established so that the pitch diameter acting on the last turn of yarn on the tail retainer will equal the diameter of the spool barrel **1**. It can be shown by an analysis of the forces acting on the loop of yarn leading over the rim of the lower head from the tail retainer to the spool barrel that this loop will tend to precess about the lower head in such a manner as to unwind more yarn from the larger pitch diameter barrel than from the smaller pitch diameter barrel. Such precession would elongate the loop so that it would no longer fit snugly over the lower head **25** and so that it would be in danger of being fouled by other spools, or by parts of the machinery. Precessing of the yarn, however, is eliminated by the provision of the grooved rubber ring on the periphery of the lower head. When the yarn is jumped from the tail retainer to the spool barrel, the loop of yarn may catch in one of the grooves in the rubber ring and thereby be prevented from precessing. If the loop does not so catch in jumping from the tail retainer to the spool barrel, and if it then precesses about the head, the precession would be arrested by the loop's catching in one of the grooves. The grooves in the rubber ring may not be essential where the coefficient of friction between the yarn and the rubber ring is sufficiently high to prevent precessing. It is therefore contemplated that under suitable circumstances, the rubber ring may be formed without grooves, and with a completely smooth periphery. Thus, the rubber ring prevents precessing, and at the same time protects the lower head **25** of the spool from damage. Being made of oil-resistant synthetic rubber, it is resistant to deterioration which would otherwise be caused by oil spattering on the lower head from the twister frame.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. A spool comprising a tubular wooden barrel having a wooden head at one end, and a tail retainer formed of elastomeric material having a yarn-receiving barrel, a web across one end of the tail retainer barrel and a yarn-retaining head at its other end, said tail retainer being mounted with its web bearing against said end of the spool coaxial with the spool barrel and being held in place by a metal drive bushing comprising a tube fixed in the end of the spool barrel and extending through an opening in the web and having a flange within the tail retainer barrel bearing against the web.

2. A spool comprising a tubular wooden barrel having a wooden head at one end, a tail retainer

of elastomeric material having a yarn-receiving barrel with a web across one end of the barrel and a yarn-retaining head at its other end, said tail retainer being mounted with its webbed end in a recess in said end of the spool coaxial with the spool barrel, with the web bearing against the inner end of the recess and being held in place by a metal drive bushing comprising a tube fixed in the end of the spool barrel and extending through an opening in the web and having a flange within the tail retainer barrel bearing against the web.

3. A spool comprising a tubular wooden barrel, a wooden head at one end of the barrel, a tail retainer of elastomeric material having a yarn-receiving barrel with a web across one end of the barrel and a yarn-retaining head at its other end, said tail retainer being mounted with its webbed end in a recess in said end of the spool coaxial with the spool barrel, with the web bearing against the inner end of the recess and being held in place by a metal drive bushing comprising a tube fixed in the end of the spool barrel having a flange within the tail retainer barrel bearing against the web, the flange being formed with a downwardly opening diametrical channel adapted to receive a driving member on a twister spindle, the channel and the tube extending through a slot in the web and the channel being received in a groove in the spool at the inner end of the recess.

4. A spool comprising a tubular wooden barrel, a wooden head at one end of the barrel, a tail retainer of elastomeric material having a yarn-receiving barrel with a web across one end of the barrel and a yarn-retaining head at its other end, said tail retainer being mounted with its webbed end in a recess in said end of the spool coaxial with the spool barrel with the web bearing against the inner end of the recess and being held in place by a metal drive bushing comprising a tube fixed in the end of the spool barrel having a flange within the tail retainer barrel bearing against the web, the flange being formed with a downwardly opening diametrical channel adapted to receive a driving member on a twister spindle, the channel and the tube extending through a slot in the web and the channel being received in a groove in the spool at the inner end of the recess, the recess being conically undercut at its periphery and the tail retainer having a conical head at its webbed end fitting in the conically undercut periphery of the recess.

5. A spool comprising a wooden barrel having a wooden head at one end, a tail retainer on said end of the spool, and a shield on said head comprising a metal collar fixed on the periphery of the head and having a ring of elastomeric material molded on its outer periphery, said elastomeric ring being formed with grooves spaced at intervals around its periphery.

6. A tail retainer for use on a spool to receive a number of turns of yarn at the start of winding on the spool consisting of a body molded of elastomeric material in the form of a flat bobbin having a relatively short tubular cylindrical barrel, a head at one end of the barrel, and a web across the other end of the barrel, the web having an opening adapted to receive a drive bushing for holding the tail retainer on a spool.

7. A tail retainer for use on a spool to receive a number of turns of yarn at the start of winding on the spool consisting of a body molded of elastomeric material in the form of a flat bobbin having a relatively short tubular cylindrical barrel, a head at one end of the barrel, and a web across the other end of the barrel, the web having a diametrical slot adapted to receive a drive bushing for holding the tail retainer on a spool, the head being formed with at least one yarn-catching tooth for starting the winding of yarn on the tail retainer.

8. A tail retainer for use on a spool to receive a number of turns of yarn at the start of winding on the spool consisting of a body molded of oil-resistant synthetic rubber in the form of a flat bobbin having a relatively short tubular cylindrical barrel, heads at the ends of the barrel, and a web across one end of the barrel, the web having a diametrical slot adapted to receive the channel and tube of a drive bushing for holding the tail retainer on a spool, the head at the other end of the barrel being formed with yarn-catching teeth for starting the winding of yarn on the tail retainer.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
368,675	Leonard	Aug. 23, 1887
1,852,243	Hubbard	Apr. 5, 1932
2,048,995	Clinton	July 28, 1936

FOREIGN PATENTS

Number	Country	Date
690,147	France	June 10, 1930