

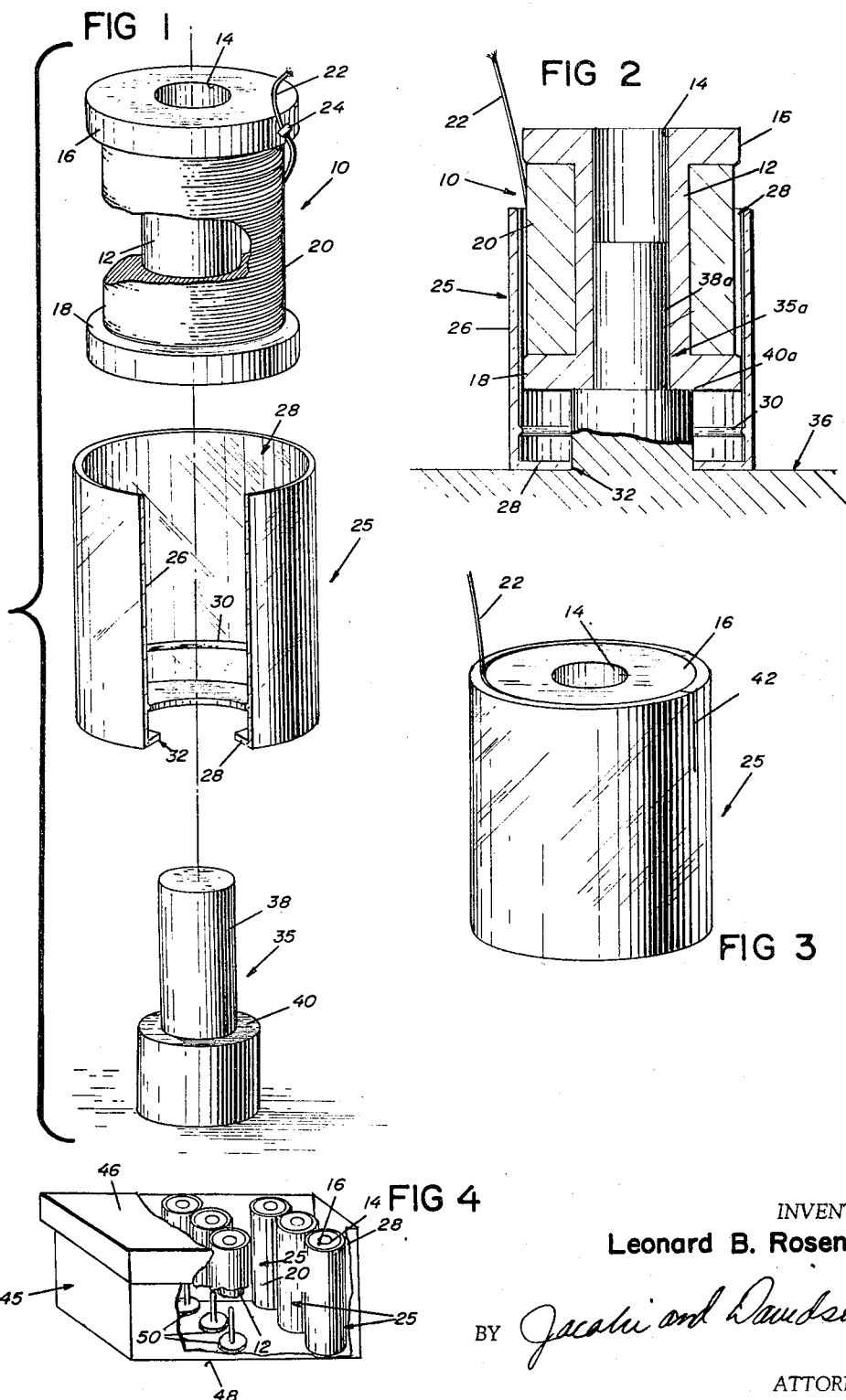
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CONTAINER FOR SPOOLS OF SHOCK-SENSITIVE ELONGATED MATERIAL

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CONTAINER FOR SPOOLS OF SHOCK-SENSITIVE ELONGATED MATERIAL

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This invention relates to a container for spools of convolutely wound material and relates more particularly to protective receptacles for shipping and handling of materials which are particularly sensitive to shocks incurred during the procedures.

Various materials of the type described, such as thread, yarn, wire, rope and the like, are conventionally wound upon the central core portion of a spool or reel having outwardly extending upper and lower flange members at the extremities of the core portion adapted to preclude undesirable loss of the material from the spool. Such spools ordinarily have a central bore for rotatably mounting the same on the spindle of a processing apparatus in conjunction with which the elongated material is to be utilized. Certain of these materials are particularly sensitive to the shocks frequently encountered during ordinary shipping or handling of the reels. For example, the wire utilized in the primary and secondary windings of a transformer in normally covered with a relatively thin, and sometimes quite brittle, coating of insulating material such as plastic or shellac. Similarly, the wire materials conventionally used in armature and field windings of electric motors and in the coils of inductors for tuned circuits, particularly for elements of relatively high quality, is also rather easily damaged. For this reason, reels of such material are presently overwrapped with paper and tape and inserted into a corrugated box by the manufacturer before shipping the same to a customer. It will be obvious that such a procedure is extremely time consuming and relatively expensive. Further, once the spool is removed from the shipping container and the paper and tape covering stripped from their protective relationship with respect to the wire, great care must be taken with subsequent handling of the spool. In some instances, when only a portion of the material on a spool is utilized, rewinding of the same becomes necessary if protection against damage during storage is to be precluded.

Thus, it becomes obvious that there is a great need for a simple protective shipping and handling container for use with spools of such delicate elongated material. It is therefore a primary object of the instant invention to provide such a container.

Considering the foregoing, an important objective of this invention is the provision of a receptacle into which a spool of easily damaged material can be quickly inserted for shipping, storage or handling the same, and from which the spool may be readily removed for subsequent use of the wound material. In this regard, a significant object of the instant invention is the provision of a container of the type described having a gripping means adapted to resiliently engage a portion of the spool with a continuous protective wall extending between the flange members of the reel in spaced, overlying relationship to the material therewithin. Thus, any shocks received during handling of the container will be transferred directly to the spool through its flange members rather than causing any damage to the delicate elongated material carried thereby.

A preferred feature of the instant invention is the provision of a container of the type described wherein, in addition to gripping means inside the lower end portion of the same for resiliently engaging the lower flange of a spool received thereby, the inside of the upper end por-

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tion of the container is dimensioned to frictionally engage the upper flange of the spool when the end of the elongated material is tapered thereto for easy access as is conventional with such elements.

Yet another important feature of this invention is the provision of such a protective container and an ejector means for use therewith which will automatically release the container from its gripping relationship with the spool whereby the spool may be removed for subsequent use of the elongated material carried thereby, or whereby the elongated material may be directly unwound from the spool during use without completely removing the spool from the container.

It is to be understood that although the instant invention is particularly useful for protecting shock-sensitive materials, and, for that reason, the instant specification is generally described with relation thereto, the construction of the container of this invention is equally applicable to use with spools of other, more sturdy elongated materials such as rope, thread, yarn or the like.

Other and further objects reside in the combination of elements, arrangement of parts and features of construction.

Still other objects will in part be obvious and in part be pointed out as the description of the invention proceeds and as shown in the accompanying drawings wherein:

FIGURE 1 is an exploded perspective view of a spool of convolutely wound elongated material, a preferred form of container therefor according to the instant invention, and a separate ejector means for use in releasing the spool from the container, parts being broken away for illustrative clarity;

FIGURE 2 is a vertical cross-sectional view through a spool and container according to this invention showing the spool partially ejected from the container by an ejector means integral with a piece of processing machinery;

FIGURE 3 is a perspective view of a modified form of protective container according to this invention having a spool of elongated material therewithin, and

FIGURE 4 is a perspective view, to a smaller scale, of a shipping box for use with a plurality of protective containers in accordance with this invention, parts being broken away for illustrative clarity.

Like reference characters refer to like parts throughout the several views of the drawings.

Referring now to the drawings in general and more particularly to FIGURE 1, a conventional spool or reel is designated generally by the reference numeral 10 and comprises basically a central core portion 12 having an elongated bore 14 therethrough, with upper and lower flange members 16, 18 extending outwardly from the core portion 12 at the extremities of the same. An elongated material 20 is generally convolutely wound thereon with the exterior layer of the same extending from the core portion 12 a distance less than the peripheral edges of the flange members 16, 18. The end portion 22 of the elongated material 20 is normally secured to the upper flange 16 as by tape 24 to facilitate access to the same.

The protective container of the instant invention is designated generally by the reference numeral 25 and comprises basically an elongated, continuous, hollow wall means 26 which is at least substantially as long as the reel 10 whereby it will extend between the upper and lower flange members 16, 18 when the reel is inserted therein. The upper end of the wall means 26 is open as shown at 28 for reception of the reel 10 during packaging and is preferably dimensioned to frictionally grip the upper flange member 16 of the reel 10 when the end portion 22 of the elongated material 20 is taped thereto.

The lower end portion of the wall means 26 is at least partially closed to preclude passage of the reel 10 there-

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through, an inwardly directed offset portion 28 being shown for this purpose.

A gripping means in the form of an inwardly directed flexible bead 30 is carried by the interior of the wall means 26 and is spaced from the offset portion 28 a distance substantially equal to the height of the lower flange member 18 of the reel 10 whereby the lower flange member is resiliently wedged between the flexible bead 30 and the offset portion 28 when the reel 10 is fully inserted into the container 25. It is to be understood that this flexible element may be in the form of a plurality of spaced fingers (not shown) or even a single finger rather than the continuous bead illustrated in the drawings. Further, although the flexible element 30 is shown as integral with the wall means 26, which is possible if the wall means is formed of a flexible plastic material such as polyethylene or the like, it is to be understood that if the remainder of the container 25 is formed of a substantially rigid material such as high-impact polystyrene or corrugated cardboard, the flexible element may be secured in any conventional manner to the interior of the wall means 26.

The offset element 28 at the bottom end of the container 25 preferably defines an opening 32 for reception of the spindle portion of an ejector means which is illustratively shown at 35 as a separate element in FIGURE 1. In the embodiment of FIGURE 2 the ejector means 35a is an integral portion of the processing machinery with which the elongated material is to be utilized, a portion of such machinery being identified generally by the reference numeral 36. In either event, the ejector means includes a central spindle element 38 or 38a dimensioned for reception in the bore 14 of the spool 10 and an offset ledge portion 40 or 40a smaller than the opening 32 of the container 25, but larger than the bore 14 of the spool 10.

The use and operation of the instant inventive device will now be readily understood. The spool 10 of convolutely wound elongated material 20, with or without the end 22 of the same taped to the upper flange member 16 is inserted into the open upper end 28 of the container 25, pressure being applied against the top of the spool 10 to force the lower flange member 18 past the flexible element 30 whereby it will be wedged between the flexible element and the offset portion 28 of the container to preclude accidental disengagement between the container and the spool. In this closed position the continuous wall means 26 extends between the upper and lower flanges 16, 18, respectively, in spaced protective, overlying relationship to the exterior layer of the wound elongated material 20. Thus, as explained hereinabove, any shock encountered by the container during shipment or handling will be transmitted to the spool 10 through the flanges 16, 18 rather than damaging the material 20.

Release of the spool 10 may be readily accomplished by merely placing the container having the spool therein over the spindle element 38 or 38a of the ejector means until the lower end of the spool is engaged by the ledge portion 40 or 40a whereby further downward pressure on the container 25 will press the spool 10 upwardly until the lower flange member 18 of the same is disengaged from the flexible element 30. At this point, the spool 10 can be completely removed from the container 25, if desired, or, the material 20 may be unwound from the spool with the container loosely circumscribing the same as shown in FIGURE 2. Then, the container may be readily reengaged in protective relationship with the spool during any down-time of the machinery 36 or if a partially full spool is to be removed for storage purposes.

In FIGURE 3 a slightly modified embodiment of the container shown in FIGURE 1 is illustrated wherein a slit portion 42 extends partially downward from the open upper end of the same to provide the upper end with sufficient flexibility to preclude undue binding of the flange members of the spool during insertion into, or removal from, the container.

As mentioned previously, the container of the instant

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invention may be made of a variety of materials including various plastics, corrugated cardboard, pressed fibrous materials and the like. If desired, the container may be transparent in order to facilitate viewing the material wound thereon to determine when the spool is substantially depleted, particularly if the container is to be retained in loose, circumscribing relation during use of the material as shown in FIGURE 2.

Referring now to FIGURE 4, a shipping box for use with the protective containers of the instant invention is designated generally by the reference numeral 45 and may include a cover 46, if desired. The inside of the bottom 48 of the shipping box 45 has a plurality of spindles 50 secured thereto in any conventional manner and so arranged as to each receive thereover a spool 10 of material 20 within its protective container 25. The spindles 50 are dimensioned to be received in the elongated bore 14 of the core portions 12 of the reels 10. The shipping box 45 may be made of any desired material such as corrugated cardboard, fiber board, plastic or the like and the spindles 50 may be either integral with the bottom 48, adhesively secured or otherwise held in fixed relation therewith for reception of the containers 25.

Such an arrangement provides further protection for the material 20 during shipping or storing of the same and facilitates handling by the ultimate user. The container 25 may be packed in the shipping box 45 with their upper ends disposed downwardly over the spindles 50 as shown in FIGURE 4 in order that the operator may merely lift the same from the shipping box, reverse the containers and place them over the spindle of the ejector means for use. On depletion of a reel of material, the operator can then merely reinsert the spool over the spindles in the empty shipping box with the protective containers disposed thereover to facilitate return of the entire package to the manufacturer of the elongated material for reuse. Thus, not only is the elongated material 20 protected from shock by the container 25 as well as by its relatively stable position within the shipping box 45, but the spools 10, the containers 25 and the shipping box 45 are all re-usable, with the former elements being returned in the shipping box for subsequent processing whereby they will be free from the normal damage encountered by prior art techniques of merely piling numerous spools on top of each other in a shipping carton for return to the manufacturer of the elongated material. Since such spools cost about 60 cents a piece and are frequently damaged beyond use by conventional handling techniques, the overall assembly of the instant invention produces substantial saving in this regard alone.

Thus, it will now be seen that there is herein provided an improved protective container, particularly adapted for use with spools of delicate or shock-sensitive elongated materials, which satisfies all of the objectives of the instant invention, and others, including many advantages of great practical utility and commercial importance.

Since many embodiments may be made of the instant inventive concept, and since many modifications may be made of the embodiments hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense. Accordingly,

What is claimed is:

1. In combination, a reel having a longitudinally extending central core and upper and lower flange members carried by said core at the extremities of said core, said flange members extending at least substantially perpendicularly to said core, each of said flange members having a peripheral portion spaced from said core, said peripheral portions of said upper and lower flange members being substantially aligned, an elongated filamentary material wound on said core with the exterior layer of said material extending a distance less than said peripheral portions of said flange members from said core, a container receiving said reel and including an elongated,

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continuous, tubular side wall with an open upper end, said side wall being at least substantially as long as the height of said reel and extending between said peripheral portions of said flange members in spaced, protective, overlying relationship to said elongated material, the interior of said side wall corresponding in configuration to the shape of said peripheral portions of said flange members and slightly exceeding the dimensions of said flange members to define a space between the interior of said side wall and said peripheral portions of said flange members, an inwardly directed bottom element carried by the lower end of said side wall to at least partially close the same to thereby permit passage of said reel through said open upper end of said side wall while precluding passage of said reel through said lower end of said side wall, an inwardly directed flexible element carried by the interior of said side wall and spaced from said bottom element a distance substantially equal to the height of said lower flange member of said reel whereby said lower flange member is resiliently wedged between said flexible element and said bottom element, said space between said peripheral portion of said upper flange member of said reel and the interior of said side wall of said container being smaller than the thickness of said elongated material whereby the end portion of said elongated material is frictionally gripped when disposed therebetween.

2. The combination defined in claim 1 wherein said flange members of said reel are substantially circular in cross-section and said side wall of said container is substantially cylindrical.

3. The combination defined in claim 1 wherein said reel includes a central bore extending at least partially through said lower flange member, said combination further including an ejector means having a spindle element for reception in said bore and an offset ledge portion

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larger than said spindle element and smaller than said lower flange member of said reel, said bottom element of said container defining an opening smaller than said lower flange of said reel to preclude passage of said reel therethrough and larger than said ledge portion of said ejector means to permit passage of said ledge portion therethrough for engaging said lower flange member of said reel to press said reel free from gripping relationship with said container.

4. The combination defined in claim 1 wherein said core of said reel includes an elongated central bore extending through said upper and lower flange members, said combination further including a shipping box having a plurality of spindles dimensioned for reception in said bores of a corresponding plurality of said reels, said spindles being spaced from each other and from the side walls of said shipping box sufficiently to preclude contact by said containers with each other and with said shipping box.

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