Jan. 4, 1966 J. COCKER III 3,227,395

YARN PACKAGE ADAPTER

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FIG. 1

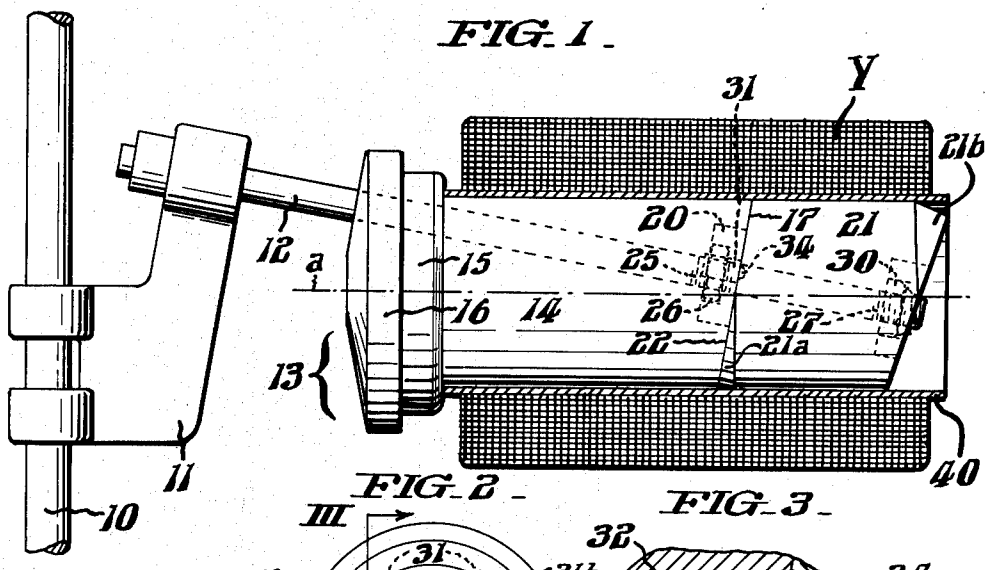


FIG. 2

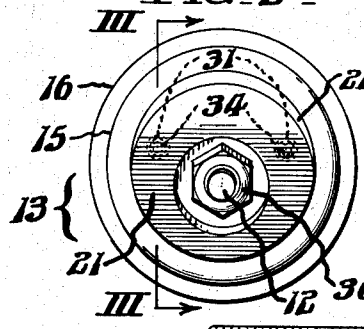


FIG. 3

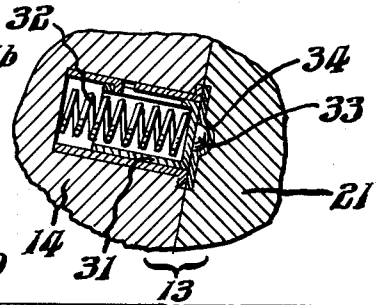
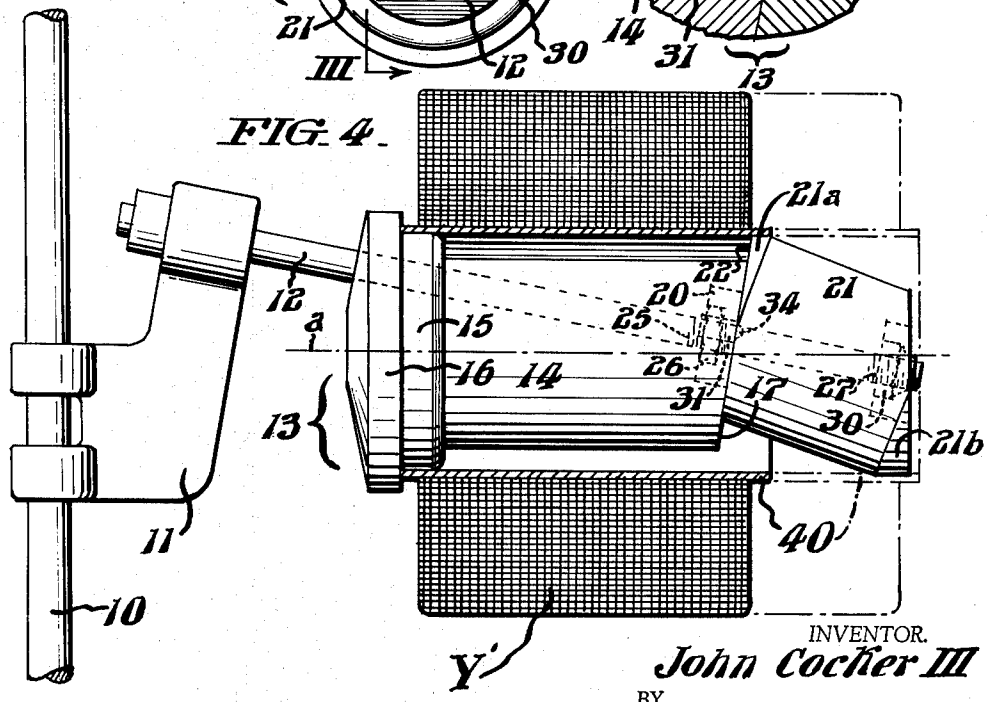


FIG. 4



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FIG. 5

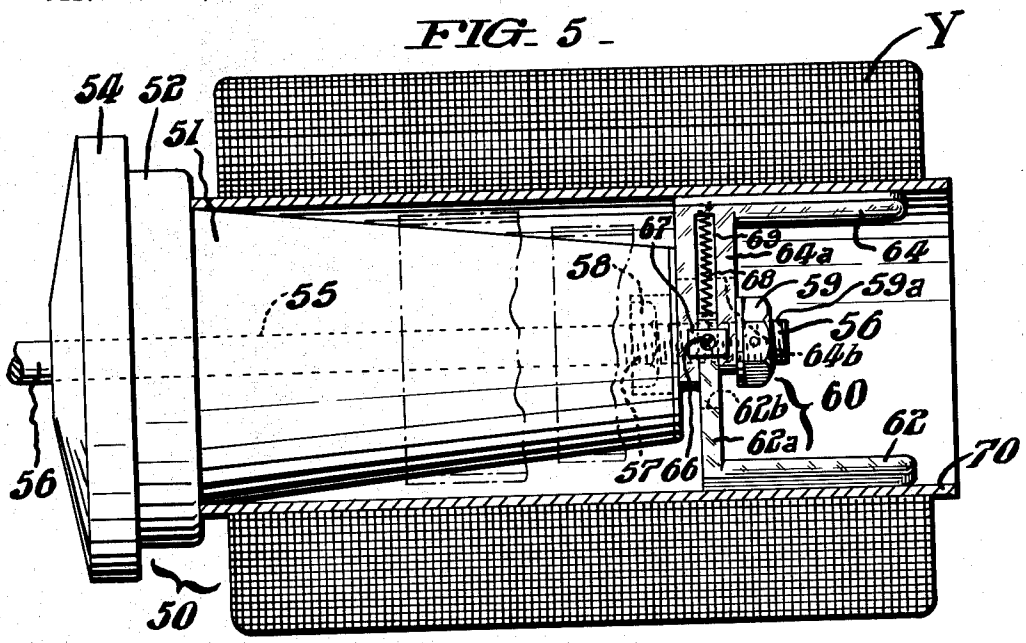


FIG. 6

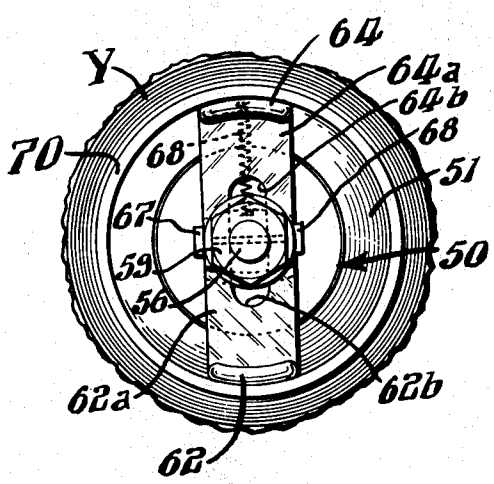
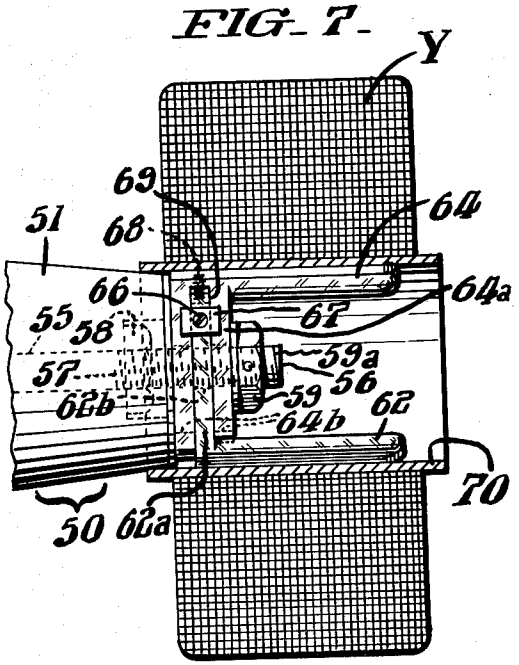


FIG. 7



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FIG. 8

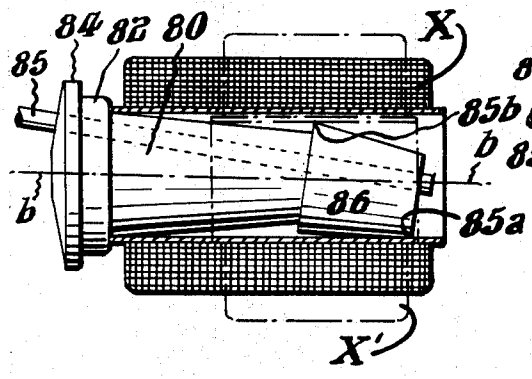


FIG. 9

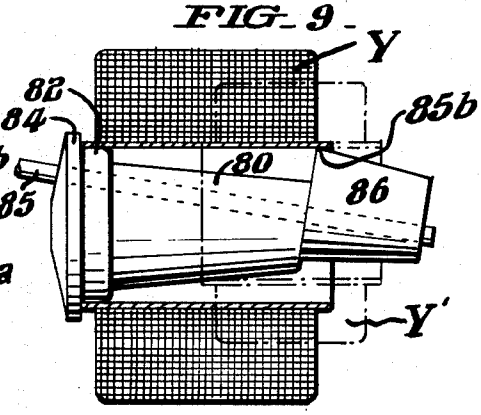


FIG. 10

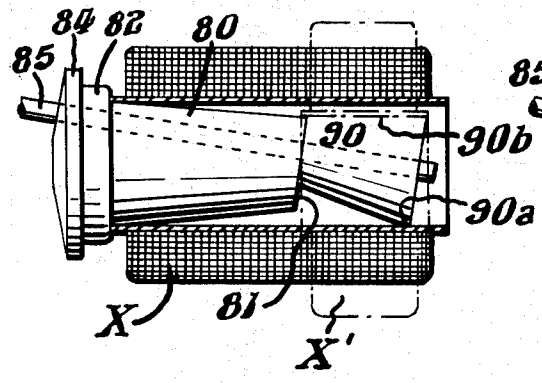


FIG. 11

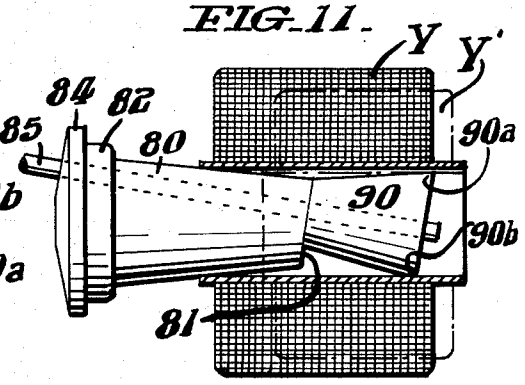


FIG. 12

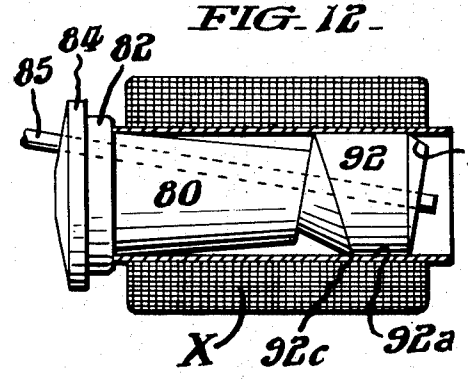
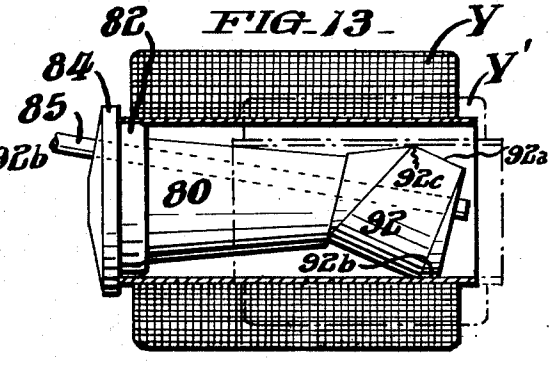


FIG. 13



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3,227,395

YARN PACKAGE ADAPTER

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Filed Feb. 8, 1963, Ser. No. 257,168
16 Claims. (Cl. 242—129.5)

This invention relates to a holder for textile yarn packages which is particularly advantageous because of its ability to accommodate itself to yarn packages of varying diameters and lengths. Holders of the type described herein are particularly adapted for use in creels wherein large numbers of yarn packages are supported in a spaced geometric relationship to one another, for providing a multiplicty of ends of yarn.

Conventional yarn holders for creels are cylindrical pieces of wood or the like, centrally bored out, which can be slipped over rods of corresponding diameter and secured in place by means of a nut threaded onto the end of the rod. Such yarn holders are necessarily of a single diameter and of a fixed length and are not well adapted to hold yarn packages of different diameters or of significantly different lengths. Thus, it has been conventional in the art to provide yarn package holders in many different sizes and lengths, and to change these holders in order to accommodate different packages of corresponding sizes. This in turn has required the textile mills to maintain large inventories of yarn package holders, to provide storage space for those not in use, and to provide an index or referencing system for promptly locating the sizes required.

It is an object of this invention to overcome the disadvantages referred to above, by providing a yarn package holder which is adaptable to various yarn sizes. A further object is to provide an adjustable or adaptable yarn package holder which can be adjusted without removing it from the creel. Other objects and advantages of this invention will further become apparent hereinafter.

Referring now to the drawings, FIG. 1 is a view in side elevation, showing the yarn package in section, illustrating a specific embodiment of this invention.

FIG. 2 is an end view of the yarn package adapter appearing in FIG. 1.

FIG. 3 is a greatly enlarged view of a stop means incorporated into the yarn package adapter, taken along the line indicated by the arrows III—III in FIG. 2.

FIG. 4 is a view in side elevation, partly in section, similar to FIG. 1, showing the yarn package adapter in an adjusted position.

FIG. 5 is a view in side elevation, partly in section, similar to FIG. 4 showing another embodiment of the yarn package adapter of this invention.

FIG. 6 is an end view of the adapter appearing in FIG. 5.

FIG. 7 is a partial view in side elevation of the adapter of FIGS. 5 and 6 in which the adapter accommodates a small diameter package.

FIGS. 8 through 13 are views in side elevation, with the yarn package appearing in section, showing other embodiments of the adapter of this invention.

Turning now to one specific form of the invention selected for illustration in FIG. 1 of the drawings, the number **10** designates a generally vertical support which is a fixed portion of the creel, to which an angle iron **11** is vertically adjustably affixed. The upper portion of the angle iron **11** carries an elongated rod **12**, which supports the embodiment of the yarn package adapter comprehensively designated by the number **13**.

The yarn package adapter **13** has a generally cylindrical body portion **14** having a longitudinal axis designated by the letter *a*. At one end, the adapter **13** has a cylindrical shoulder **15** of larger diameter than that of body portion **14**, and a further and still larger cylindrical shoulder portion **16**.

At its other end, the body portion **14** is provided with a flat, angularly arranged end face **17** having a substantially centrally located indentation **20**.

The number **21** designates a gentrally cylindrical extension portion which has an end face **22** which is immediately adjacent to the end face **17**, and which is arranged at the same angle with respect to the axis *a*.

As will be observed, the body portion **14** and the extension portion **21** are provided with co-extensive bores, arranged at an acute angle to the axis *a*, through which the rod **12** extends. The rod **12** is provided with an intermediate threaded portion **25**, which together with a nut **26**, secures the body portion **14** to the rod. At its end, the rod **12** is provided with another threaded portion **27** which, together with a nut **30**, secures the end portion **21** in position on the rod **12** and immediately adjacent to the body portion **14**.

As is shown in particular detail in FIGS. 2 and 3, the body portion **14** has an indentation accommodating a plunger **31** which is urged by a compression spring **32** toward the extension portion **21**. The plunger **31** carries a ball **33** which is adapted to be received in a socket **34** carried by the extension portion **21**. This structure provides a spring-urged stop means located and effective between the adjacent end faces of the body portion and the extension portion to establish and maintain a plurality of predetermined rotated positions of the extension portion relative to the body portion.

It will be observed that FIG. 1 shows a yarn package Y which is as long as the sum of the body portion plus the extension portion, but which has a bore with a diameter approximately equal to the diameter of the body portion and of the extension portion.

Referring now to FIG. 4, it will be observed that the yarn package Y′ has a bore of larger diameter than that of yarn package Y, and that the yarn package cylinder **40** is engageable upon the enlarged shoulder **15**. Further, it will be observed that the end portion **21** is shown in a rotated position as compared to the position shown in FIG. 1, and because of the fact that the extension portion is rotated about an axis which is arranged at an acute angle to the axis *a*, an edge portion **21***a* of the extension portion **21** extends outwardly beyond the periphery of the body portion **14**, providing an effective diameter equal to the diameter of the shoulder portion **15**, thus providing a support for the package Y′ of such diameter.

It will be appreciated further that, having reference to the dot-dash lines appearing in FIG. 4, the yarn package Y′ may be of greater length than the length shown in solid lines, in which event the additional end portion **21***b* of the extension portion **21** also engages and supports the yarn package cylinder **40**.

Although this end portion **21***b* has been shown as specially shaped to provide a cylindrical surface to engage internally the cylindrical bore surface of yarn package cylinder **40**, this end portion may be shaped in any desired manner, including an outward extension to co-operate with the larger shoulder **16** to accommodate an even larger package.

It will be appreciated that it is unnecessary to remove the body portion or the extension portion from the creel when changing from one size package to another. In most cases it is sufficient simply to rotate the extension portion, which is automatically maintained in the desired position by the spring-urged stop members. On other occasions, if desired, the extension portion 21 may

simply be removed and replaced, utilizing the nut **30**, and various sizes and shapes of the extension portion **21** may be provided.

Referring now to FIGS. 5 through 7 of the drawings, another embodiment of this invention is shown in three views. In FIG. 5, the modified adapter **50** consists of a cone shaped body portion **51** having at its larger end two cylindrical shoulders **52**, **54** of progressively greater diameter and an expanding diameter extension **60** mounted at the smaller end. An elongated rod **56** extends through a bore **55** in the adapter **50** along its longitudinal axis and has a thread portion **57** with a nut **58** to hold the body portion in position. The rod **56** also extends through an extension **60** and a nut **59**, mounted on a second threaded portion **59***a*, holds the extension against the body portion **51**.

The extension **60**, as also shown in FIGS. 6 and 7, comprises two L-shaped arms **62**, **64** which are outwardly spring biased to press against the surfaces of the bore of the yarn package cylinder **70**. The vertical portions **62***a*, **64***a*, of the extension arms, as shown in FIG. 6, have elliptical holes **62***b*, **64***b* which allow the arms **62**, **64** to move vertically in relation to the centrally positioned rod **56**. Screws **66** together with small plates **67**, **68**, positioned on opposing sides of the two arms **62**, **64**, guide the arms as they slide outward (FIG. 5) and inward (FIG. 7). A spring **68** presses against the top edge of arm **62**, as shown in FIGS. 5 and 6, and against the top edge of a groove **69** formed in the arm **64** thereby urging the arms outwardly.

When a yarn package Y having a cylinder **70** of relatively large diameter is placed on the adapter **50**, as illustrated in FIG. 5, the package slides along the tapered surfaces of the conical body portion **51** to that point where the body portion fits tightly within the cylinder thereby supporting the yarn package at one end. The extension **60** then expands until the arms **62**, **64** are pressing against the inner surfaces of the cylinder thereby supporting the yarn package firmly at the other end. If the yarn package and cylinder are even larger, the cylinder can be fitted on one of the shoulders **52**, **54**, and the extension **60** will expand correspondingly.

If the yarn package has a small inner diameter, as shown in FIG. 7, the package fits only a short distance up the conical body portion and the expanding legs hold the package firmly at the other end. By means of this embodiment of the adapter of this invention, an infinite number of package and cylinder sizes, within the limits of the extension action, can be accommodated without having to substitute a new adapter.

Another embodiment of the adapter of this invention is shown in FIGURES 8 through 13. In all of these views, the adapter comprises a conical body portion **80** having two cylindrical shoulders **82**, **84** and an extension portion, designated **86** in FIG. 8, with a rod **85** positioned within co-extensive bores in both portions. The supporting rod is positioned at an acute angle to the axis *b* of both portions. The extension portion is held against the small end of the body portion **80** by a nut, not shown but similar to that of FIG. 1, and a spring urged stop means, as shown supra in FIG. 3, positions the extension portion in the desired position relative to the body portion **80**. Throughout the description this embodiment of which three modifications are shown in FIGS. 8, 10 and 12, the parts identified by numbers in FIG. 1, which are substantially duplicated in all modifications, are referred to by the same number.

Considering FIGS. 8 and 9, which show the extension portion **86** having a conical shape of slightly larger diameter than the adjacent part of the body portion **80**, when a medium diameter package X is placed on the adapter, the extension **86** is positioned relative to the rod **85** so that its effective outside diameter at point **85***a* is only large enough to grip the bore of the yarn package X. A package X', shown in dot-dash lines, having a smaller diameter is also accommodated on the conical body portion and by the extension at point **85***b*.

In FIG. 9, a larger diameter package Y rests upon and around the shoulder **82**, and the rotated extension **86** at point **85***b*, supports the other end of the yarn package. The smaller diameter package Y', shown in dot-dash lines, is supported by the body portion at one end and the extension at point **85***b*.

In FIGS. 10 and 11, the extension **90** is conical in shape but can be described as inverted on the rod **85** so that the smaller end of the extension **90** is adjacent the small end **81** of the body portion **80**. As such, the extension easily accommodates the long package X at point **90***a* while a somewhat smaller diameter and shorter package X' is held by the almost horizontal top surface **90***b* of the extension. In FIG. 11, the extension **90** has been rotated 180 degrees from that shown in FIG. 10, so that point **90***b* grips the package Y together with the conical surface of the body portion and point **90***a* grips a somewhat smaller package Y'.

In FIGS. 12 and 13, the extension **92** has a compound shape which is a more extreme form than that shown in FIG. 1. In FIG. 12, together with the conical body portion **80**, the relatively large surfaces **92***a* of the extension is in contact with the surface of a medium size package X. In FIG. 13, a larger diameter package Y is held on the adapter by fitting around the shoulder **82** and supported by a surface **92***b* of the extension. A package Y', shown in dot-dash lines, of smaller diameter is held on the conical surface and on a point **92***c* of the extension.

In the shown modifications of this embodiment of the adapter of this invention, only a few of the potential combinations of effective gripping surfaces provided by the conical body portion and the multi-shaped extension portion are illustrated. It should be understood that the length and effective diameter of these parts can be varied so as to accommodate a large range of yarn packages.

Although this invention has been shown and described with reference to specific forms thereof, it will be appreciated that many variations and changes may be made without departing from the scope of this invention. For example, parts may be reversed, equivalents may be substituted, and certain features of the invention may be used independently of other features all without departing from the spirit and scope of this invention as defined in the appended claims.

Having described my invention, I claim:

1. A yarn package adapter for holding yarn packages of different sizes comprising in combination an elongated circular body portion having a plurality of concentric shoulder portions at one end, each of said portions forming a smooth annular supporting surface of constant diameter, the elongated axis of the body portion being coincident with the centers of the shoulder portions, and an extension portion independent of the body portion and attached to the body portion at the other end, said extension portion having an effective surface of variable diameter as measured from the elongated axis of the body portion.

2. The adapter as defined in claim **1** wherein a supporting rod extends through both the body portion and the extension portion allowing said portions to pivot thereon.

3. The adapter as defined in claim **2** wherein the body and extension portions are substantially cylindrical in shape.

4. The adapter as defined in claim **2** wherein the body and extension portions are substantially conical in shape.

5. The adapter as defined in claim **2** wherein the extension portion is provided with spring biased extending arms whereby the effective diameter of said portion can vary.

6. A yarn package adapter for holding yarn packages of different sizes comprising in combination a head mem-

ber having a plurality of concentric generally cylindrical shoulder portions, an elongated cylindrical body portion having an elongated axis coincident with the centers of said shoulder portions, an extension portion having a generally cylindrical periphery coaxial with and corresponding in diameter to said body portion, and means supporting said extension portion for turning movement about an axis arranged at an acute angle to that of said body portion.

7. The adapter as defined in claim **6** wherein the body and extension portions have a generally conical periphery.

8. The adapter as defined in claim **7** wherein stop means is provided whereby the extension portion can be positioned relative to the body portion around the common axis.

9. A yarn package adapter for holding yarn packages of different sizes comprising in combination a generally conical body portion having at one end a plurality of concentric generally cylindrical shoulder portions, the elongate axis of the body portion coincident with the centers of the shoulder portions, an extension portion having a generally conical periphery coaxial with and larger in diameter than the adjacent conical part of the body portion, and means supporting said extension portion for turning movement about an axis arranged at an acute angle to that of said body portion.

10. The adapter as defined in claim **9** wherein the extension portion is mounted upon said supporting means so that the larger end of the extension portion is abutting the smaller end of the body portion.

11. The adapter as defined in claim **9** wherein the extension portion is mounted on the supporting means so that the smaller end of the extension portion is abutting the smaller end of the body portion.

12. The adapter as defined in claim **11** wherein is provided spring urged stop means located and effective between said adjacent end faces of the body and extension portions so as to establish and maintain a plurality of predetermined rotated positions of said extension portion relative to said body portion.

13. A yarn package adapter for holding yarn packages of different sizes comprising in combination an elongated

conical body portion and an extension portion abutting the body portion, said portions mounted on a supporting bolt extending through the elongated axis of both por-
L-shaped arms mounted for sliding motion on the sup-
L-shaped arms mounting for sliding motion on the supporting bolt, means for allowing the arms to slide in the same plane with one another whereby the effective diameter of the extension portion varies in relation to the size of the yarn package mounted on the adapter.

14. The adapter as defined in claim **12** wherein a plurality of concentric shoulder portions are mounted on the body portion at the end opposite that of the attached extension portion.

15. A yarn package adapter for holding yarn packages of different sizes comprising a head member having a plurality of concentric generally cylindrical shoulder portions, and an elongated generally cylindrical body portion having an elongated axis coincident with the centers of said shoulder portions, said body portion having a flat end face arranged at an acute angle to said axis, an extension portion having a generally cylindrical periphery coaxial with and corresponding in diameter to said body portion, said extension portion having an angular end face arranged immediately adjacent to said end face of said body portion and arranged at substantially the same acute angle relative to said axis, means supporting said extension portion for turning movement about an axis which is substantially perpendicular to said angular end face, and spring-urged stop means located and effective between said adjacent end faces to establish and maintain a plurality of predetermined rotated positions of said extension portion relative to said body portion.

16. The adapter as defined in claim **15** wherein the extension portion has a periphery comprising cylindrical and conical shaped surfaces.

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