Dec. 7, 1965 L. B. WEBB 3,221,612

METHOD OF MAKING REELS

Original Filed March 11, 1963 2 Sheets-Sheet 1

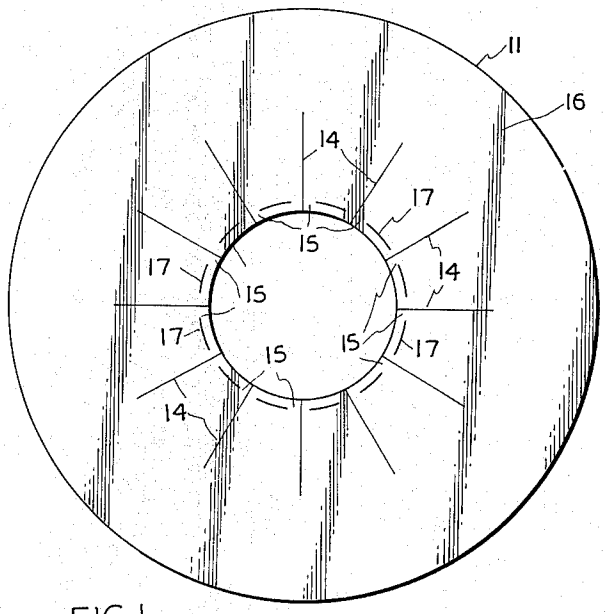


FIG.1

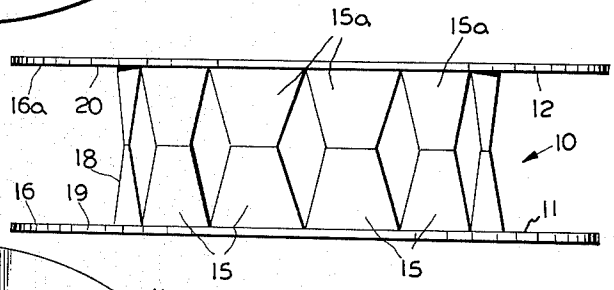


FIG.2

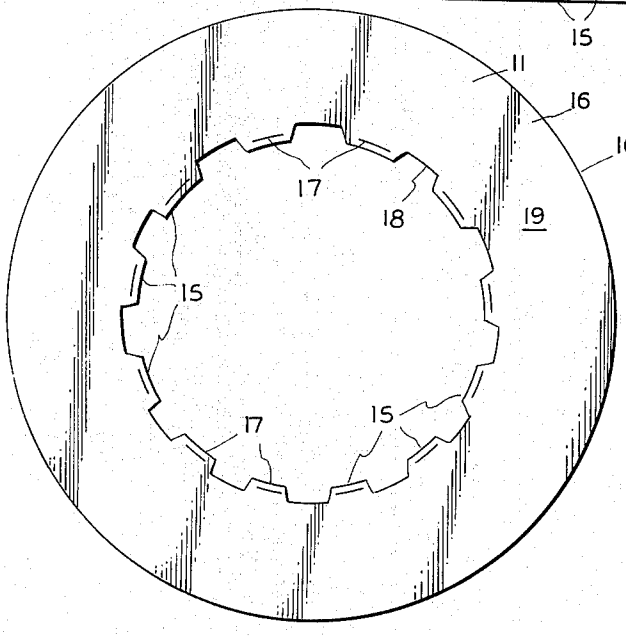


FIG.3

INVENTOR
LEWIS B. WEBB
BY Robert D. Sommer
AGENT

Dec. 7, 1965 L. B. WEBB 3,221,612

METHOD OF MAKING REELS

Original Filed March 11, 1963 2 Sheets-Sheet 2

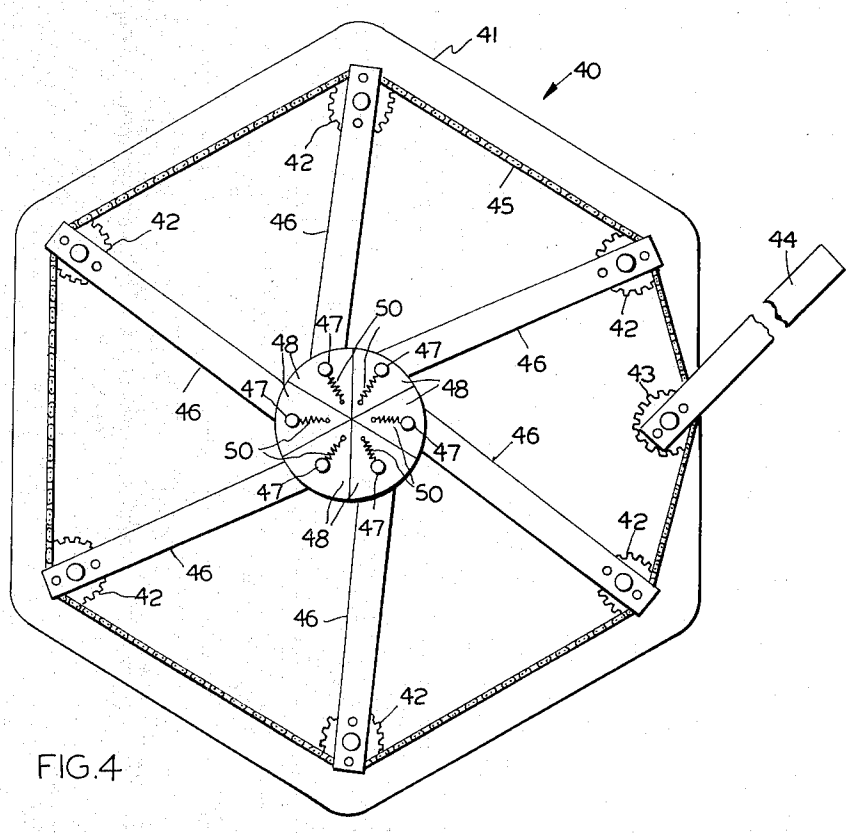


FIG.4

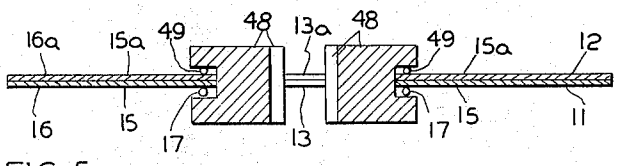


FIG.5

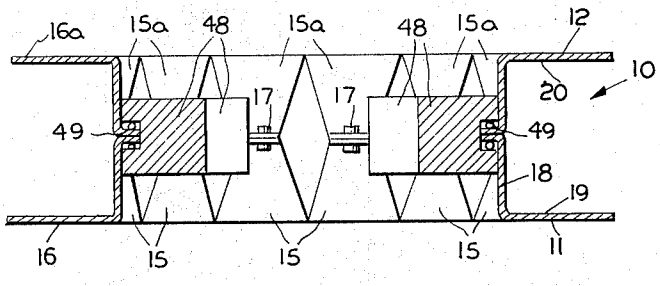


FIG.6

INVENTOR
LEWIS B. WEBB

BY Robert D. Sommer
AGENT

United States Patent Office

3,221,612
Patented Dec. 7, 1965

1

3,221,612

METHOD OF MAKING REELS

Lewis Benton Webb, Mount Airy, N.C., assignor to Essex Wire Corporation, Fort Wayne, Ind., a corporation of Michigan

Original application Mar. 11, 1963, Ser. No. 264,291. Divided and this application Feb. 23, 1965, Ser. No. 440,055

3 Claims. (Cl. 93—1)

This application is a division of my copending application, Serial No. 264,291, filed March 11, 1963.

This invention relates to reels and to a method for making reels. More particularly, this invention is concerned with improved reels or spools of the type upon which is wound wire, cordage, fabric and similar strand material, and to a method of making such reels or spools.

Reels or spools of the type to which this invention is directed generally comprise a cylindrical or tubular body having heads on each end of greater diameter than the body. Some such reels have in recent years been formed of corrugated paperboard and like foldable sheet material to reduce the cost and weight of the reel. Such previous constructions using corrugated paperboard were, in general, somewhat time-consuming and expensive to assemble, and not entirely satisfactory in use. Furthermore, the parts of such previous constructions could not be fully assembled in a flat condition, and thus the assembled reels required considerable storage space at the place of their use.

Accordingly, it is an object of this invention to provide a new and improved reel formed from foldable sheet material such as corrugated paperboard and a novel and simple method of constructing such a reel which avoids certain of the difficulties experienced with previous reels.

Another object of this invention is to provide an inexpensive and durable reel constructed of a pair of identically shaped parts of foldable sheet material such as corrugated paperboard which parts may be united while in flat form and subsequently shaped to final form at the place of use in a convenient manner.

A further object of this invention is to provide a new and improved method of forming a reel of the foregoing character which is easily and economically accomplished.

These and related objects and advantages of this invention will be apparent from the following description and the accompanying drawings in which:

FIGURE 1 is a plan view of one of two identical blanks showing the one blank after being united to the other blank but before being shaped to final form;

FIGURE 2 is a plan view of a completed reel shaped from the two blanks;

FIGURE 3 is an end elevational view of the completed reel;

FIGURE 4 is a plan view of the apparatus which is used in shaping the reel according to the present invention;

FIGURE 5 is a diagrammatic view of those parts of the apparatus which shape the reel from the united pair of blanks, the united pair of blanks being shown in section and in position on the apparatus prior to the shaping operation; and

FIGURE 6 is a view similar to FIGURE 5, but showing the apparatus parts and the reel upon completion of the shaping operation.

2

Referring now to the drawings and particularly to FIGURES 1, 2 and 3, it will be observed that the reel **10** of the present invention is constructed of two identical disk-like blanks **11** and **12** formed of suitable foldable form-retaining sheet material such as corrugated paperboard. As the blanks **11** and **12** are identical to each other, a specific description will be made only of the parts of the blank **11**. The parts of the blank **12** identical to the parts of the blank **11** are given the corresponding reference numeral with the suffix "A."

The blank **11** is of annular form preferably having a circular outer periphery and a circular inner periphery which defines the opening **13**. At its inner peripheral portion, the blank **11** has a series of equally spaced, open-ended radial slits **14** of equal length extending from the opening **13**. Such slits **13** define a series of uniform tabs **15** which are connected to the outer peripheral portion **16** of the blank **11** only at their outer ends. The blanks **11** and **12** may be cut from suitable sheet material with conventional, well-known equipment.

In assembling the reel **10**, the two blanks **11** and **12** are placed in opposing relation with the slits **14** of the blank **11** in registry with the corresponding slits of the blank **12** as shown in FIGURE 1. The blanks **11** and **12** are then united by inserting fastening devices **17** such as metal staples through the aligned pair of tabs **15** and **15A** near their inner ends. As the blanks are secured together in superposed relation while in flat condition, the fastening devices **17** may be applied simultaneously to all of the tabs. For instance, fastening devices such as staples may be applied simultaneously by means of an array of conventional staple-driving heads with a common anvil operated by a single power actuator. Other well known metal stitching apparatus for applying staples formed from a continuous length of wire may also be used in a similar manner. Thus, it will be seen that the blanks **11** and **12** may be united in a fast and economical manner, and when so united, may be shipped and stored in a flat condition occupying a minimum of space.

Although the united pair of blanks **11** and **12** described above may be shaped to reel form in various ways, this operation in accordance with this invention is preferably effected by applying radial outwardly-directed forces to the inner peripheral edges of the blanks defined by the openings **13** and **13A**. It has been discovered that the application of uniform outwardly-directed forces to the inner peripheral edges of the blanks while maintaining the inner ends of the tabs **15** and **15A** in a common plane causes the tabs to bend at their outer edges and along lines adjacent the united inner edges, thus causing the outer peripheral portions **16** and **16A** to separate. After the tabs **15** and **15A** have been bent to the positions illustrated in FIGURES 2 and 3, the blanks **11** and **12** have been shaped to final reel form with the tabs **15** and **15A** defining a cylindrical or tubular body portion **18** and the peripheral portions **16** and **16A**, respectively, defining head portions **19** and **20** of greater diameter than the body portion **18**. After the reel **10** has been so shaped, it may be placed directly upon a winding mandrel and wire or other flexible material is wound upon the body portion **18**. Ordinarily, the material wound upon the reel **10** is adequate to hold the reel in its desired form. However, if

desired, a strip of corrugated paperboard or other material may be wound upon the bent tabs **15** and **15A** and secured thereon to maintain the head portions **19** and **20** separated and to strengthen the reel **10**. This would also provide a smooth liner surface upon which the flexible material may be wound. It should be noted that such a liner ordinarily would not be required because the staple fasteners **17** have no portion present on the winding surfaces of the reel **10**.

Referring now particularly to FIGURES 4, 5 and 6, there is shown an expanding apparatus **40** by means of which the above-described shaping operation may be performed. The expanding apparatus **40** has a frame plate **41** which is adapted to be secured in a vertical position to any suitable support. A plurality (here six) of driven sprocket wheels **42** are rotatably mounted on the plate **41** in a uniformly spaced and circular arrangement. Also rotatably mounted on the plate **41** intermediate two of the sprocket wheels **42** is a driving sprocket wheel **43** to which is attached one end of a manually operable lever **44**. The sprocket wheel **43** is connected by a sprocket chain **45** with each of the sprocket wheels **42** whereby operation of the lever **44** may impart a simultaneous rotary motion in either direction to the sprocket wheels **42**. Fixed to each of the sprocket wheels **42** and movable therewith is one end of an arm **46**. The other end of the arm **46** is fitted with a post **47** extending in a direction away from the plate **41** and rotatably supporting a disk segment **48** at its free end at a suitable distance from the arm **46**. The disk segments **48** are conveniently formed from a circular metal disk having a diameter somewhat less than that of the openings **13** and **13A** and having a shallow groove **49** in its peripheral surface of a width slightly greater than the combined thickness of the united reel blanks **11** and **12**. The arms **46** are arranged to be angularly displaced inwardly to positions where the disk segments **48** abut each other in a circular arrangement as shown in FIGURE 4. It is desirable that a spring **50** be connected between each post **47** and its respective segment **48** to urge the segment **48** to the position relative its respective arm **46** shown in FIGURE 4.

In use of the expanding apparatus **40**, the disk segments **48** are initially moved inwardly to their contracted positions in adjacent relationship as shown in FIGURES 4 and 5. The flat united blanks **11** and **12** are then placed upon the contracted disk segments **48** with the disk segments projecting through the openings **13** and **13A**. With the blanks **11** and **12** so disposed, the lever **44** is actuated to move the segments **48** outwardly while at the same time the inner peripheries of the blanks **11** and **12** are guided into the groove **49** of the disk segments **48** as shown in FIGURE 5. Upon further movement of the lever **44** to shift the segments **48** outwardly, the segments **48** exert radially outward forces against the inner ends of the tabs **15** and **15A** which force apart the outer peripheral portions **16** and **16A**, respectively, of the blanks **11** and **12** as the tabs **15** and **15A** bend at their outer ends and at lines adjacent the inner end portions supported by the portions of the groove **49** of the segments **48**. As the movement of the lever **44** is continued, the disk segments **48** move outwardly further to the positions shown in FIGURE 6 where the blanks **11** and **12** have been shaped to final reel form. It will be noted that although the segments **48** move away from each other during the shaping operation, the inner ends of the tabs **15** and **15A** remain in flat-wise engaging relation with each other supported within the respective portions of the groove **49** because the segments **48** are free to turn on the posts **47**. Thus, the inner ends of the tabs **15** and **15A** are held in a common plane while being subjected to the radial outwardly directed shaping forces of the segments **48**.

After the reel **10** has been shaped as described above, the lever **44** may be actuated in a reverse direction to return the segments **48** to their contracted positions, thus releasing the shaped reel **10** for use. The segments **48** which had been rotated from their initial positions during the shaping operation are returned to their initial positions by the springs **50**. The expanding apparatus **40** is then ready to repeat the shaping operation with another pair of united blanks **11** and **12**.

It will be observed that the reel of the present invention may be formed from inexpensive foldable material such as corrugated paperboard with a minimum use of material since the body portion **18** is formed from a portion of the blanks **11** and **12** which would otherwise be discarded. While a reel of substantial strength is thus provided using only a minimum of material, additional strength may be obtained if desired by merely wrapping an additional strip of flexible material about the body portion **18**. However, it will be noted that such a strip is not needed for liner purposes as in prior constructions of paperboard reels because no staples or other fasteners are present on the winding surfaces of the reel which might scratch or otherwise damage the goods wound upon the reel. By the method of assembling the reel described, the reel blanks can be easily and economically united while in flat condition and then shipped and stored in such condition, yet be easily shaped to reel form at the place of use with inexpensive and compact apparatus.

Although only a single embodiment of the improved reel and a single example of the method of constructing the reel have been illustrated and described herein, it will be understood that many modifications and variations of the present invention may be made without departing from the scope of the appended claims.

What is claimed is:

1. A method of shaping a reel from a pair of superposed, flat, substantially identical, sheet-like blanks each having a central opening and inner and outer peripheral portions, the inner peripheral portions of each blank having equally-spaced, open-ended radial slits defining a series of tabs integrally joined at their outer edges to said outer peripheral portion, said blanks being united solely by fastening means securing the inner end portions of the tabs of one blank to the inner end portions of the tabs of the other blank, said method comprising the steps of:

(a) supporting the inner peripheral edges of the blanks in a common plane so that the tabs are free to bend along lines adjacent to said supported inner peripheral edges; and

(b) simultaneously applying radial outwardly-directed forces to the inner peripheral edges of the united blanks to cause the tabs to bend at their outer edges and at lines adjacent to said supported inner peripheral edges as said outer peripheral portions of the blanks are forced apart.

2. A method of constructing a reel from two flat substantially identical sheet-like blanks each having a central opening and inner and outer peripheral portions, the inner peripheral portion of each blank having equally-spaced, open-ended radial slits defining a series of tabs integrally joined at their outer edges to said outer peripheral portions, said method comprising the steps of:

(a) superposing the two flat blanks in opposing relation;

(b) applying fastening means solely to the inner end portions of the tabs of the blanks to unite the blanks;

(c) supporting the united inner end portions of the tabs of the blanks in a common plane; and

(d) while so supporting the blanks, simultaneously applying a substantially uniform radial outwardly-directed force against the inner edge of each of the tabs to force apart the outer peripheral portions of said blanks as said tabs bend at their outer edges and at lines adjacent to their supported end portions.

3. A method of constructing a reel from foldable form-retaining sheet-like material comprising the steps of:

(a) cutting out two substantially identical annular flat blanks each having a central opening and inner and outer peripheral portions;

(b) cutting a series of equally-spaced, open-ended slits in the inner peripheral portion of each blank to form a series of uniform tabs integrally joined at their outer edges to said outer peripheral portion;

(c) superposing the flat blanks in opposing relation;

(d) securing the inner end portions of the tabs of one blank to the corresponding inner end portions of the tabs of the opposing blank;

(e) supporting the secured end portions of the tabs of of the blanks in a common plane so that said tabs are free to bend along lines adjacent to said supported end portions; and

(f) while so supporting the blanks, simultaneously applying radial outwardly-directed forces to the inner edges of the tabs to force apart the outer peripheral portions of said blanks as said tabs bend at their outer edges and at lines adjacent to their supported end portions.

No references cited.

FRANK E. BAILEY, *Primary Examiner.*