Nov. 8, 1966 S. L. EIFRID 3,284,022

COLLAPSIBLE REELS

Filed Nov. 26, 1963 4 Sheets-Sheet 1

Fig. 1.

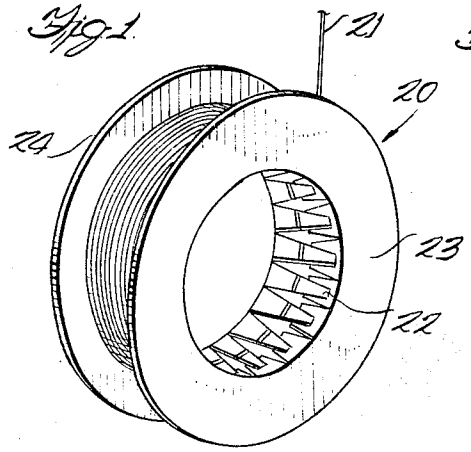


Fig. 2.

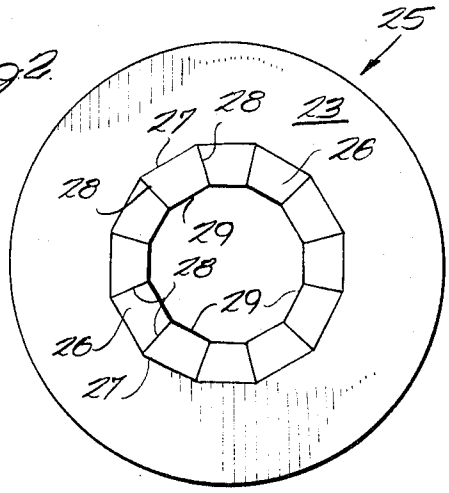


Fig. 3.

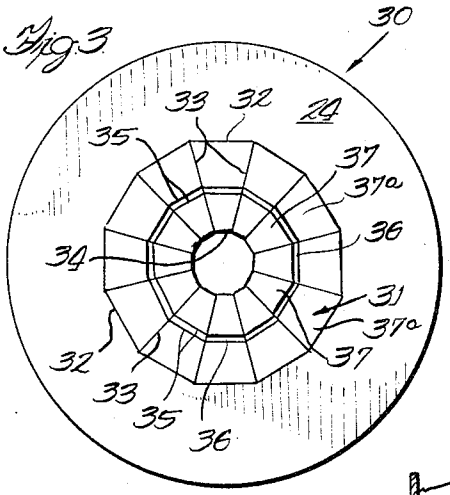


Fig. 4.

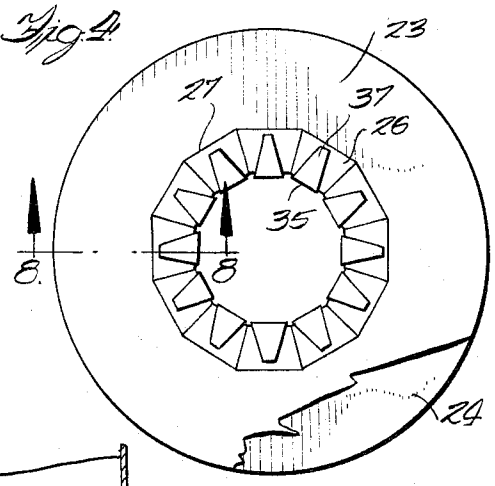


Fig. 5.

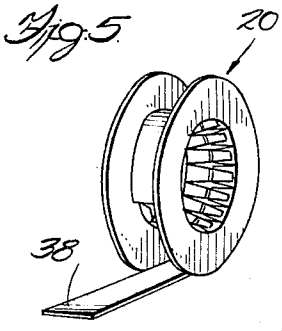


Fig. 6.

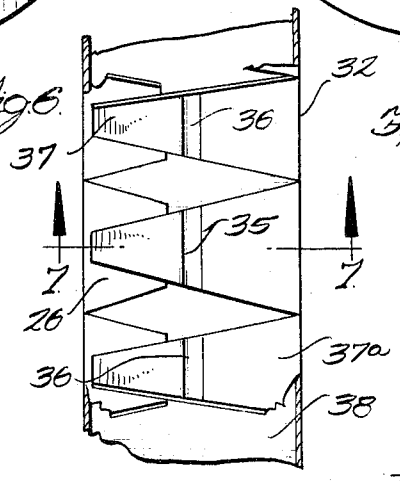


Fig. 7.

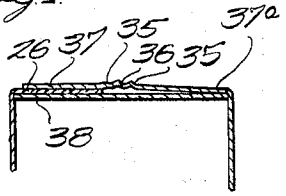


Fig. 8.



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Nov. 8, 1966 S. L. EIFRID 3,284,022

COLLAPSIBLE REELS

Filed Nov. 26, 1963 4 Sheets-Sheet 2

Fig. 9

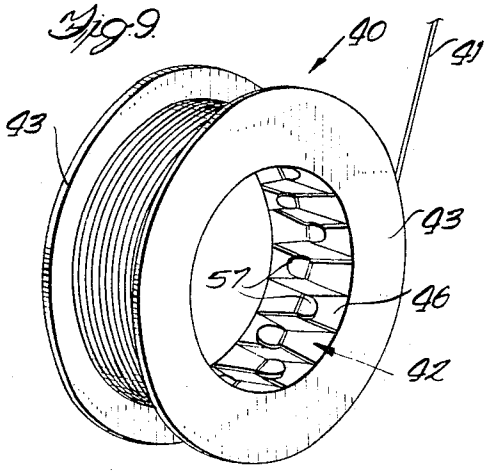


Fig. 10

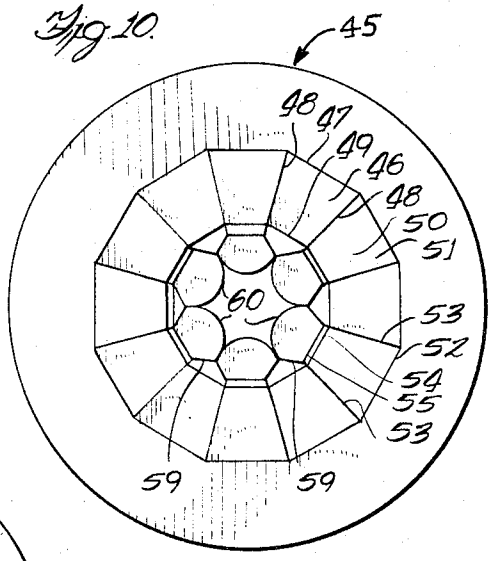


Fig. 11

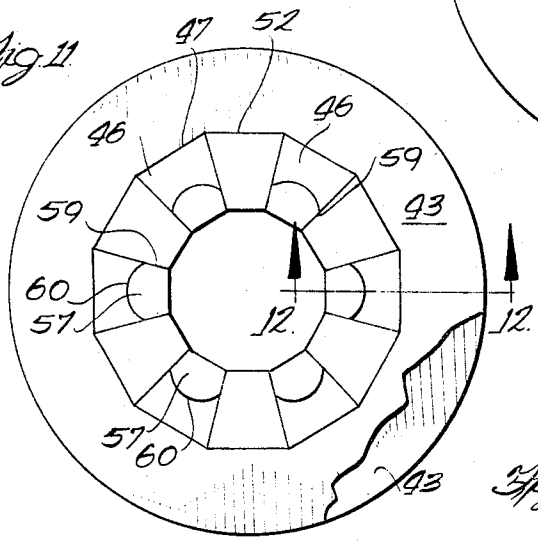


Fig. 12

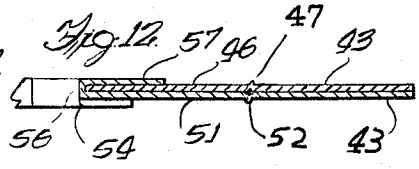


Fig. 13

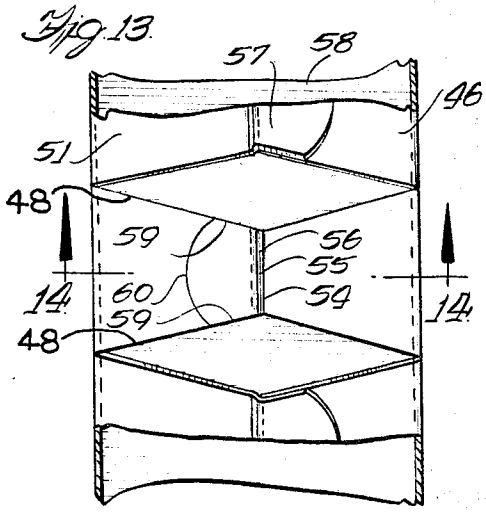
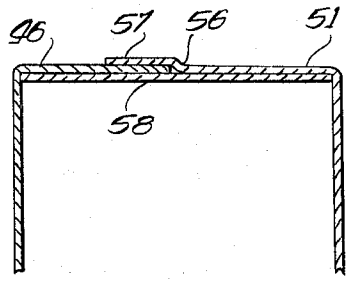


Fig. 14



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Nov. 8, 1966 S. L. EIFRID 3,284,022

COLLAPSIBLE REELS

Filed Nov. 26, 1963 4 Sheets-Sheet 3

Fig. 15.

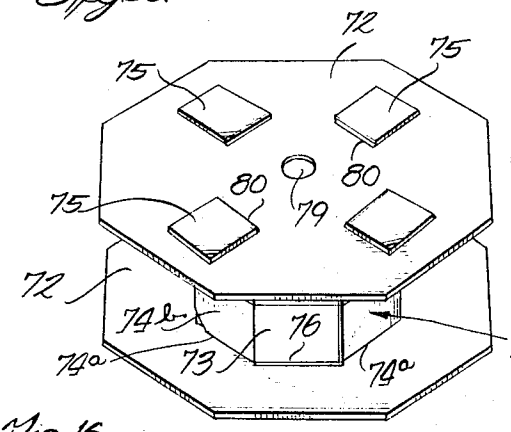


Fig. 16.

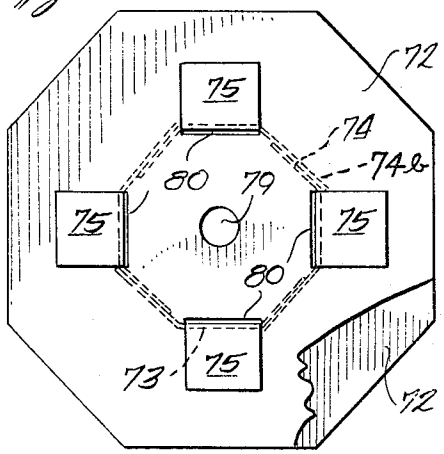


Fig. 17.

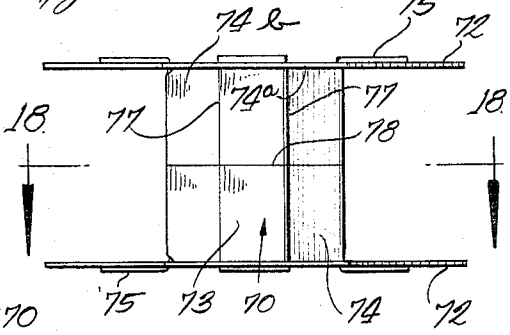


Fig. 19.

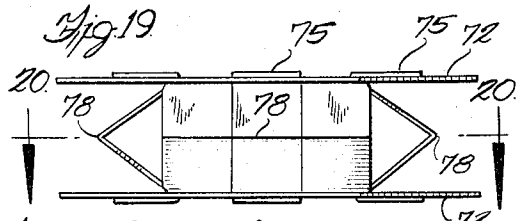


Fig. 21.

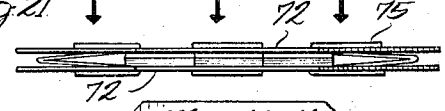


Fig. 20.

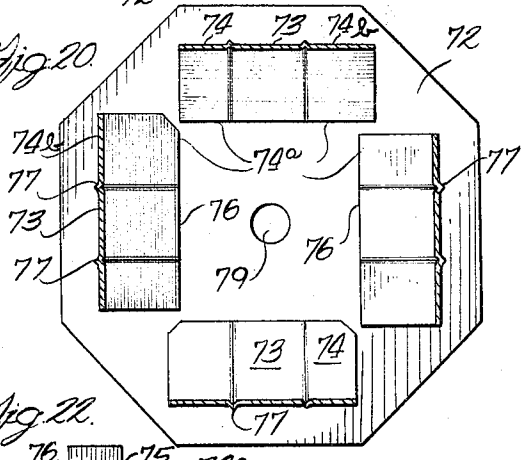


Fig. 18.

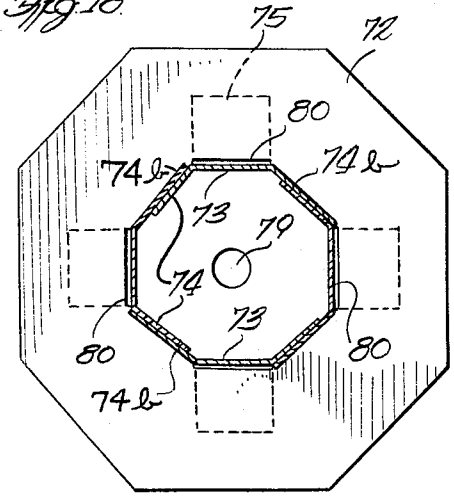
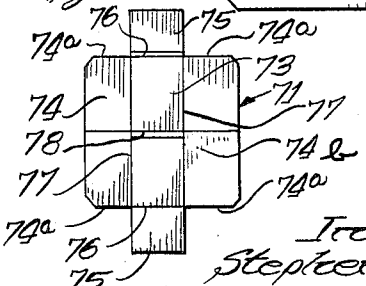


Fig. 22.



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Nov. 8, 1966 S. L. EIFRID 3,284,022

COLLAPSIBLE REELS

Filed Nov. 26, 1963 4 Sheets-Sheet 4

Fig. 23.

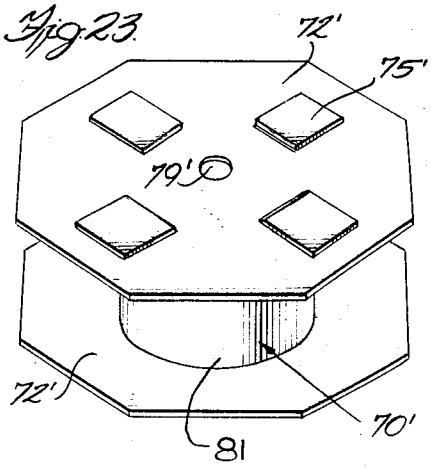


Fig. 24.

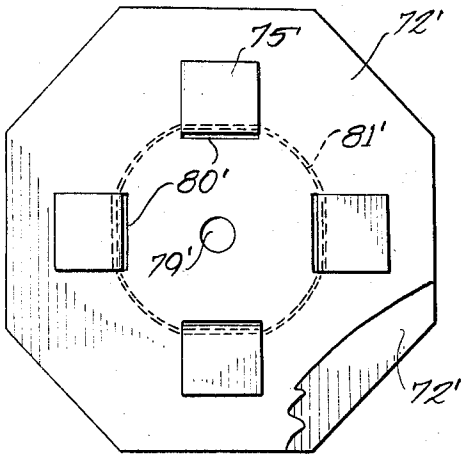


Fig. 26.

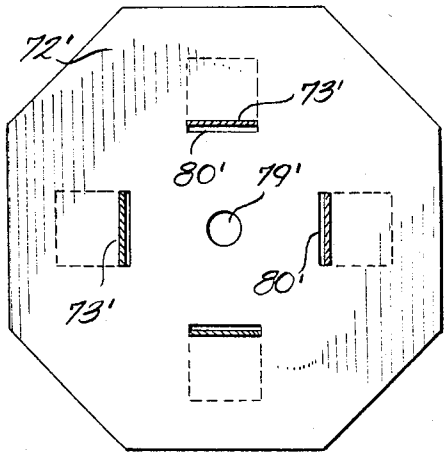


Fig. 25.

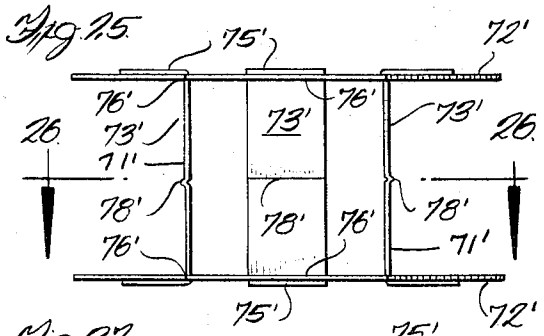


Fig. 27.

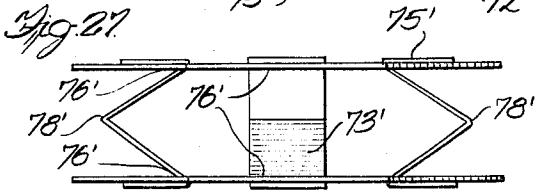


Fig. 29.

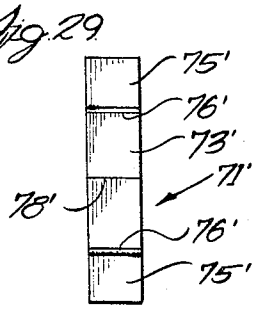
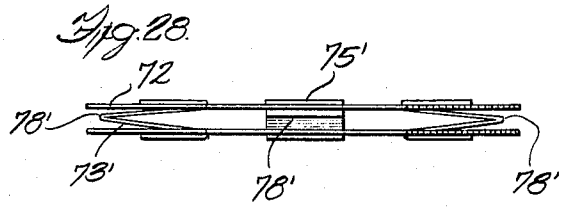


Fig. 28.



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United States Patent Office 3,284,022 Patented Nov. 8, 1966

3,284,022

COLLAPSIBLE REELS

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Filed Nov. 26, 1963, Ser. No. 326,056
12 Claims. (Cl. 242—118.8)

This invention relates generally to reels for holding wire, rope or similar materials and more particularly to such a reel formed of paperboard or corrugated cardboard and having end flanges projecting radially and outwardly from a central core or hub.

The primary object of the invention is to provide a novel reel of the above character which is made up of inexpensive and easily formed parts, which occupies little space while being shipped in an unassembled condition, and which may be prepared to receive materials quickly and with little effort by the ultimate user.

Another object of this invention is to construct the core in a novel manner enabling the reel to be assembled partially by the manufacturer and shipped to the user in that condition thereby reducing the time and labor required by the user in completing the assembly of the reel.

A more detailed object is to provide a core which is formed from individual members attached to the end flanges and which can be folded flat without detaching the core members from the flanges.

Another more detailed object is to form the individual core members as overlapping parts radiating from and integral with the respective flanges and folded in a novel manner enabling the reel to be partially assembled and shipped flat in this condition.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a perspective view of a preferred form of an assembled reel embodying the novel features of the present invention;

FIG. 2 is an elevational view of a blank for one part of the preferred form of reel;

FIG. 3 is an elevational view of a blank for another part of the preferred form of the reel;

FIG. 4 is an elevational view of a partially assembled reel folded flat;

FIG. 5 is a perspective view of a reel showing a reinforcing strip wound around the core of the reel;

FIG. 6 is an enlarged fragmentary elevational view of the core of the preferred form of the reel;

FIG. 7 is a fragmentary cross-sectional view taken along line 7—7 of FIGURE 6;

FIG. 8 is a fragmentary cross-sectional view taken along the line 8—8 of FIG. 4;

FIG. 9 is a perspective view of a modified form of an assembled reel;

FIG. 10 is an elevational view of a blank from which the modified reel is formed;

FIG. 11 is an elevational view of the modified reel partially assembled and folded flat;

FIG. 12 is a cross-sectional view taken along line 12—12 of FIG. 11;

FIG. 13 is an enlarged fragmentary elevational view of the core of the modified reel;

FIG. 14 is a cross-sectional view taken along line 14—14 of FIG. 13;

FIG. 15 is a perspective view of another modified form of an assembled reel;

FIG. 16 is a top plan view of the reel of FIG. 15;

FIG. 17 is a side elevational view of the reel of FIG. 15;

FIG. 18 is a cross-sectional view taken along line 18—18 of FIG. 17;

FIG. 19 is a side elevational view of the reel in a partially collapsed position;

FIG. 20 is a cross-sectional view taken along line 20—20 of FIG. 19;

FIG. 21 is a side elevational view of the reel in a collapsed position;

FIG. 22 is a plan view of a blank for one of the parts which form the core of the reel;

FIG. 23 is a perspective view of a third modified form of an assembled reel;

FIG. 24 is a top plan view of the reel of FIG. 23;

FIG. 25 is a side elevational view of the reel in a partially assembled condition;

FIG. 26 is a cross-sectional view taken along line 26—26 of FIG. 25;

FIG. 27 is a side elevational view of the reel in a partially collapsed position;

FIG. 28 is a side elevational view of the reel in a collapsed position; and

FIG. 29 is a plan view of a blank for one of the parts which forms the core of the reel.

The invention is shown in the drawings for purposes of illustration embodied in a reel **20** which is especially adapted for storing and dispensing wire **21** or other similar materials. In general, a reel of this type has a hollow hub or core **22** around which the wire is wound and flat end walls or flanges **23** and **24** which extend radially and outwardly from the ends of the core to prevent slippage of the wire off the ends of the core.

In accordance with the present invention, the reel parts are constructed in a novel manner so that they may be partially assembled and shipped in a flattened condition by the manufacturer and completely assembled quickly and easily by the user without the inconvenience of glue, staples or other securing devices. To this end, the core **22** is formed from a series of separated flat strips of cardboard which are positioned around the axis of the reel and connected at opposite ends to the flanges. These flat strips are constructed so that they can be folded between the flanges along their lines of juncture with the flanges and along lines in a plane midway between the flanges. The core is easily folded because these flat strips have only a single thickness along their lines of folding.

In the forms of the invention shown in FIGS. 1 to 8 and FIGS. 9 to 14, respectively, the separate core strips are a series of elongated fingers **26** and **31** formed integral at one end with the flanges **23** and **24** and extending inwardly therefrom into overlapping relation with each other between the flanges where they are secured together. Heretofore, reels of this type have been assembled from flat pieces of a suitable material such as corrugated carboard cut in the shape of annular rings forming the flanges with the fingers **26** and **31** extending radially and inwardly from the inner peripheries of the rings. To join the rings in spaced relationship to form the reel, the fingers of each ring were bent at right angles to the plane of the ring and attached as by glue or staples to overlapping parts of the similarly bent fingers of the other ring. This resulted in a relatively rigid reel having a hollow core with flat end flanges. Ordinarily, the two pieces of cardboard were shipped to the user flat and disconnected from each other so that, in order to assemble a reel, the user was required to fold the fingers of each piece out of the plane of each ring and secure them in overlapping relation with the fingers of the other ring.

In the partial assembly of the reel shown in FIGS. 1 to 8, the fingers **26** and **31** first are bent toward each other from their rings **23** and **24** and are secured together in overlapping relation by the manufacturer to form the

strips connecting the rings. Then, the strips are folded transversely both at their junctures with the rings and intermediate their ends in a central plane disposed between and parallel to the rings. The reel is shipped to the user in this flattened patrially assembled condition and, when it is to be used, the rings or flanges are pulled apart by the user to spaced positions in which the overlapping fingers are unfolded. The flanges are retained in such spaced positions and the reel assembly is completed by winding a strip **38** of reinforcing material around the outer sides of the overlapping fingers to form a tube extending between the flanges **23** and **24**.

In order to facilitate the folding of the overlapping fingers **26** and **31** while still achieving a rigid core **22** in the finally assembled reel, there is only a single thickness of material along any line of folding. For this purpose, at least one of each pair of overlapping fingers is shorter than the other and extends from its ring or flange **23** or **24** to a line short of the central plane in which the fingers are folded. The other fingers of the pairs then extend beyond the central plane but short of the opposite flange. The folding is facilitated further by scoring the fiingers along the desired lines of folding both at the juncture between each finger and its integral ring and in or adjacent the central plane. In the preferred construction of FIGS. 1 to 8, all of the short fingers **26** are formed on the same ring **23** and the longer fingers **31** all are formed on the other ring **24** in order to simplify the securing of the fingers together.

Referring to FIGS. 1 to 8, the shorter fiingers **26** are arranged in an annular series around the inner periphery of their integral supporting ring **23** and are formed with the ring as a part of a flat bank **25** (FIG. 2). These fingers are joined to the ring along score lines **27** which define their bases, are separated from each other by radial cut lines **28** and terminate in straight lines **29** which define the tips of the fingers. In the partial assembly of the reel, the fingers **26** are bent along their base score lines **27** to extend at right angles to the plane of the ring **23**.

The other piece or blank **30** of corrugated paper which has the same inner and outer diameters as the flange **23** forms the annular end wall or flange **24** of the reel. This blank includes the longer fingers **31** which are arranged in a series around the inner periphery of the flange. These longer fingers are joined integrally to the inner periphery of the ring **24** by score lines **32** which define the bases of the fingers. Radial lines **33** define the sides of the fingers, and cut lines **34** which are parallel to the base lines define the tips of the fingers.

The longer fingers **31** are foldable along the base score lines **32** to project at right angles to the plane of the ring **24**. These fingers also have pairs of score lines **35** positioned intermediate the base score lines **32** and the tips **34** and extending parallel to each other and to the base score lines. The intermediate score lines **35** divide the fingers **31** into tip portions **37**, base portions **37***a* and intermediate portions **36**; the intermediate portions being located between the score lines **35**. These intermediate score lines are disposed adjacent the central plane between the flanges and are spaced from the base score lines **32** of the fingers so that the length or height of a base portion **37***a* of a finger **31** is slightly greater than the length or height of a finger **26** of the ring **23**. The tip portion **37** is formed with a height less than that of a finger **26**.

This construction of the fingers **26** and **31** facilitates partial assembly of the reel with the core in a folded or flattened condition. The reel is easily and accurately assembled by placing the blank **25** concentrically on top of the blank **30** with the shorter fingers **26** of the top blank **25** aligned with the longer fingers **31** of the bottom blank **30**. With the blanks positioned in this manner, their inner and outer perimeters will be aligned and the longer fingers extend radially and inwardly beyond the tips **29** of the shorter fingers. Since the base portion **37***a* of each longer finger is slightly longer than each shorter finger, the score lines **35** of the longer fingers are also positioned inwardly of the tips **29** of the shorter fingers. Thus, each longer finger can be folded along the lines **35** into the shape of a U (FIG. 8) with its tip portion **37** reversely folded against the shorter finger and its intermediate portion **36** forming the base of the U and being positioned adjacent the end edge **29** of the shorter finger. Since the tip portions **37** of the longer fingers are not as long as the shorter fingers, they will not overlap the base score lines **27** of the shorter fingers when reversely folded and thus there will only be a single thickness of material along any line of folding of the core.

The tip portions **37** of the longer fingers **31** are secured to the shorter fingers **26** in a suitable manner as by adhesive applied either to the shorter fingers or to the longer tip portions. After such application, the tip portions are pressed into contact with the shorter fingers to adhere in the manner shown in FIGURE 4. When the adhesive has set, the reel is ready for shipment or use.

The user who receives a reel in this flattened or folded condition can easily prepare it for the reception of wire simply by moving the flanges **23** and **24** apart and wrapping the strip **38** of corrugated paper around the core. Movement of the flanges away from each other will cause all of the fingers **26** and **31** to bend along their lines of juncture with their respective flanges and the longer fingers **31** to unbend along the intermediate score lines **35** until the fingers are fully extended at right angles to the end walls. In this position, the fingers **26** and **31** form the hollow hub or core for the reel as shown in FIGURE 1. When the reel is in its fully extended position, as shown in FIGS. 1 and 5, the flanges **23** and **24** will be spaced apart a distance equal to approximately twice the height of a base portion **37***a* of finger **31**. Thus, the length of the core can be regulated simply by controlling the length or height of the base portion of the finger **31**.

The strip **38** of corrugated paperboard which is wound around the exterior of the fingers between the flanges **23** and **24** forms a tube which prevents the reel from returning to its collapsed state and also strengthens the reel. The strip preferably is at least as long as the circumference of the inner peripheries of the rings at the bases of the fingers so that it will wrap around the core at least once. Also, the strip has a width equal to the length of the core so that it will act as a spacer to engage the inner sides of the flanges **23** and **24** to maintain the flanges in spaced relation with the fingers in their fully extended position. If desired, adhesive may be applied to two overlapping end portions of the reinforcing strip to hold it in position around the core, but this usually will not be necessary because the pressure exerted by the end flanges will normally hold the strip in place until the wire **21** or other material is wound around the reel.

Instead of forming all of the shorter fingers on one blank, each blank may have both long and short fingers so that the two blanks are of the same construction. Such a modified form of reel **40** is shown in FIGURES 9 through 14 of the drawings. In this modified form, each of the blanks **45** is in the shape of an annular ring or flange **43** having a series of fingers **46** and **50** positioned completely around the inner periphery of the ring and extending radially and inwardly from this periphery. As indicated above, each ring has two sizes of fingers which are arranged in a series around the ring with adjacent fingers of different sizes and alternate fingers of the same size. The shorter fingers **46** are connected to the annular ring **43** along score lines **47** which also define the bases of the fingers. The sides of these fingers are defined by cut lines **48** which extend radially of the annular ring **43**. The inward edges or tips of these fingers are defined by cut lines **49** which are parallel to the base fold lines **47** of the fingers.

The longer fingers 50 are divided into three portions. The first or base portions 51 are attached to the annular ring 43 by score lines 52 which form the bases of the fingers. Cut lines 53, extending radially of the ring, define the sides of the fingers and score lines 54, which parallel the base score lines 52, define the inward edges of the first portions. The score lines 54 are spaced the same distance from the inner perimeter of the annular ring as the tip lines 49 of the shorter fingers 46. Thus, the first portions 51 of the longer fingers are the same size and shape as the short fingers 46. Additional score lines 55 are located radially inwardly of and generally parallel to the first score lines 54 to define second or connecting portions 56 of the fingers 50. These connecting portions join the first portions 51 to the third or tip portions 57 of these fingers. The tip portions 57 are located radially and inwardly of the portions 51 and 56. The score lines 54 and 55 are spaced a sufficient distance apart to permit the connecting portions 56 to extend across the ends of the shorter fingers when the tip portions 57 are reversely folded over the shorter fingers 46, as shown in FIGURE 12. The tip portions of the longer fingers have diverging sides 59 which extend from the score lines 55 to intersect the diverging sides of the adjacent longer fingers as shown in FIGURE 10. These diverging sides also align with the sides 48 of the shorter fingers 46 when the tip portions 57 overlap the shorter fingers, as shown in FIGURE 13. The radially and inwardly extending ends of the tip portions of the longer fingers are defined by convex curvilinear cut lines 60 which extend between the sides 59.

The modified form of the reel is also intended to be assembled by the manufacturer and shipped to the user in the flattened condition. In such assembly, one blank 45 is placed on top of another blank 45 with the flanges 43 arranged concentrically and the longer fingers 50 of one ring aligned with the shorter fingers 46 of the opposite ring. When the fingers of the rings are aligned in this manner, the tip portions 57 and the connecting portions 56 of the longer fingers will be positioned radially inwardly of the tips of the shorter fingers so that the longer fingers can be reversely folded over and fastened to the shorter fingers in the same manner as previously described for the other construction. To facilitate such folding, the longer fingers of the top ring are temporarily bent away from the bottom ring so that the longer fingers of the bottom ring can be folded over the shorter fingers of the top ring. With the longer fingers of the bottom ring thus folded out of the way, the longer fingers of the top ring can be reversely folded over the shorter fingers of the bottom ring.

Since the base portions 51 of the longer fingers have the same length as the shorter fingers 46, the intermediate portions 56 of these longer fingers will fit across the ends 49 of the shorter fingers, as shown in FIG. 12, and allow the tip portions 57 of the longer fingers to overlap and lie against the shorter fingers where they are secured together as by a suitable adhesive. The final assembly of the modified reel is the same as in the case of the preferred construction of FIGS. 1 to 8.

Instead of being formed from fingers integral with and projecting into overlapping relation from the flanges, the core strips may be individual, elongated parts spanning and secured at opposite ends to the reel flanges in a suitable manner as by adhesive. This construction is shown in two other modifications of FIGS. 15 to 22 and FIGS. 23 to 28, respectively. Referring to FIGS. 15 to 22, there are four such strips 71 angularly spaced equal distances around the core. Each strip includes a central portion 73 which is of elongated rectangular shape with end tabs 75. These extend through openings 80 in the end flanges 72 of the reel and lie flat against and are secured to the outer sides of the flanges.

To permit collapse of the partially assembled reel with the modified strips 71, the strips are foldable both along

their lines of juncture 76 with the end flanges 72 and along lines 78 lying in a medium plane between the end flanges. When the flanges are pushed together, the strips will bend along the median lines and along the junction lines and each strip will fold over itself between the end flanges, as shown in FIG. 19. The reel is shipped and stored in the completely flattened condition shown in FIG. 21.

The flattened reel of the modification of FIG. 21 is made ready for use by moving the end flanges 72 apart until the strips 71 are fully extended to form the framework of the reel core. To prevent the strips from folding and to reinforce the core, a strip 81 of the reinforcing material is wound around the core framework to form the outer wall or skin of the core.

Instead of constructing the core with an inner framework of connecting strips and an outer reinforcing skin as described above, the connected strips 71 may be modified so that they form a rigid core without a reinforcing strip 81. To accomplish this purpose, side flaps 74, are attached to the center portion of each strip and are foldable out of the planes of the center portions 73 to form stiffeners to prevent folding of the strips. These flaps, when folded out of the planes of their center portion, may be utilized to form walls of a core of polygonal cross section. While only a single flap attached to each strip would be necessary for this purpose, it has been found desirable to provide a flap on each side of the center portion of the strip so that the flaps of alternate strips can be overlapped to make the core stronger. The core is also made more resistant to collapse if at least one of the flaps on each strip is made wide enough to contact the center portion of the adjacent strip when this flap is folded.

A typical strip adaptable for this purpose is shown in FIG. 22. The wider flap 74*b* has the same width as the center portion 73 so that it will contact the center portion of an adjacent strip when folded, while the other flap 74 is narrower than the center portion. The flaps are connected to the center portion of the strip by score lines 77 and are foldable along these lines. When the flaps 74 and 74*b* are bent along the score lines 77 and out of the planes of the center portions with the narrow flaps overlapped on their outer sides by the wider flaps of adjacent strips, they form a core of octagonal cross section, as shown in FIG. 18. When the side flaps are thus bent out of the planes of the center portions of the strips, the end edges 74*a* engage the flanges 72 and prevent folding of the strips along the median fold lines 78 and end fold lines 76. If desired, the overlapping flaps can be affixed to each other by adhesive or fasteners, such as staples, to form a permanent core. However, the pressure of the flanges will normally hold the flaps in place until the wire or other material is wound around the core.

The modified core of FIGS. 15 to 22 can be collapse simply by bending the flaps 74 and 74*b* back into the plane of their center portion 73 and then pushing the end flanges 77 together. To enable the flaps to fold easily when positioned in the plane of the center portion, the median score lines 78 of the center portions are continued through the side flaps. When the flanges are pushed together, the strips will fold along the median score lines and along the score lines 76 at the lines of juncture of the strips with the flanges and will fold over themselves between the end flanges. When the reel is in the folded condition of FIG. 21, it is ready for storage or shipment.

A reel constructed of strips without side flaps is shown in FIGS. 23 to 29 and the parts of this reel which are similar to those of the previously described reel bear the same number with a prime mark. This reel is assembled and used in the same manner as the modified form of FIGS. 15 to 22 heretofore described but with the addition of an elongated reinforcing strip 81 wound around the score strips 71 to hold the flanges 72 apart and complete the core of the reel.

I claim:

1. A reel having a tubular core and annular ring shaped flanges extending radially and outwardly from each end of the core, the core being formed from fingers of longer and shorter lengths extending from the inner peripheries of the annular rings, the longer fingers of each ring being connected to the shorter fingers of the other ring in an overlapping manner and the shorter fingers extending less than one-half the distance between the flanges, and all of said fingers being foldable along lines of connection of the fingers with their respective flanges and the longer fingers having fold lines in a median plane between the flanges to allow with flanges to be moved together as the fingers of both lengths bend along said lines of connection.

2. A cardboard reel adapted to be assembled in a folded condition, said reel comprising first and second annular rings having a plurality of fingers arranged in a series around their inner peripheries and extending radially and inwardly therefrom with the fingers of one ring longer than and aligned with the fingers of the other ring when the rings are placed on top of one another concentrically, the tip portions of the longer fingers overlayying and being attached to the shorter fingers to connect the rings and all of said fingers being bendable along their respective lines of connection with the rings to extend at right angles to the rings and form a hollow core for said reel as said rings are moved away from each other, and said longer fingers having fold lines in a median plane between said rings to permit movement of the rings toward each other.

3. A collapsible paperboard reel adapted to be assembled in a collapsed or flattened condition, said reel comprising a pair of flat annular rings of the same inner and outer diameters, a plurality of fingers connected to and extending radially and inwardly from the inner periphery of each ring and having alternately longer and shorter lengths around said periphery, said longer fingers being divided into first portions attached to the associated ring and having lengths at least as great as the lengths of the shorter fingers, outer end portions, and intermediate portions connecting the first portions and the outer ed portions, said outer end portions of said fingers of each ring being aligned with, overlapping and secured to said shorter fingers of the other ring and said intermediate portions of the longer fingers being extended across the outer ends of the shorter fingers when the rings are against each other in concentric faces to face relationship, said longer fingers having fold lines in a median plane between said rings to permit movement of the rings toward each other.

4. A reel comprising two flat annular rings spaced apart along a common axis, a plurality of fingers secured to the inner periphery of each ring and extending therefrom toward the opposite ring in parallel with said axis, half of said fingers being no longer than one-half the distance between said rings and the remaining fingers being longer than one-half the distance between the rings and secured in overlapping relation to the shorter fingers of the opposite ring to form a hollow core connecting said rings, each of said fingers being foldable along a line of junction of the finger with its associated ring and each longer finger having a fold line along the intersection of the longer fingers and a median plane between the rings to permit said rings to be moved along said axis into contact with each other.

5. A reel comprisig a hollow core, two flat flanges projecting radially and outwardly from the core which can be collapsed to permit the flanges to be moved toward each other, said flanges including openings therein, said core having a plurality of flat strips extending through said openings and secured at opposite ends to said flanges along straight fold lines and disconnected from each other throughout their lengths between the flanges, and each of said strips having intermediate fold lines between their ends in a plane equidistant from the flanges to permit collapse of the core, and a spacer and reinforcing strip wound around the outer side of said core and engaging the inner sides of said end walls to maintain the end walls in spaced relation and thereby prevent collapse of the core, the width of said strip being equal to the unfolded lengths of said flat strips between said straight fold lines.

6. A reel formed of cardboard having end walls spaced along a common axis, a plurality of flat elongated panels attached to and extending between said end walls and spaced around said common axis, said panels being foldable along lines adjoining said end walls and in a median plane between the end walls to permit the panels to fold over themselves and between the end walls as the end walls are moved together, at least one flap attached to each panel and foldable along an edge of the panel extending between the end walls with the flap positioned in the plane of and extending laterally of the panel, each of said flaps being foldable along said edge and out of the plane of its panel to form a stiffener which resists folding of its panel along said median plane.

7. A reel of the type described in claim 6 in which said flaps extend laterally of said panels throughout the length of the panels between the end walls and have edges which engage the end walls to prevent bending of the panels when the flaps are folded out of the planes of their respective panels.

8. A reel of the type described in claim 7 in which each flap extends a sufficient distance laterally of its panel to engage the adjacent panel to form a core of polygonal cross section when the flaps are bent out of the planes of their respective panels and toward the common axis.

9. A reel of the type described in claim 6 in which a flap is attached to each edge of each panel extending between the end walls of the reel and the flap on one of the edges of a panel is wider than the flap on the opposite edge with each of the wider flaps extending a sufficient distance laterally of its panel to engage an adjacent panel when bent out of the plane of its panel and each of the narrower panels extending an insufficient distance laterally of its panel to engage an adjacent panel when bent out of the plane of its panel, the core of said reel being formed by folding the wide flap of each panel over the narrower flap of an adjoining panel to form a tubular core of polygonal cross section.

10. The combination of claim 1 in which a flat spacer strip is removably wound around the outside of said fingers and engages the inner sides of said flanges to hold the flanges in spaced relation with the fingers unfolded.

11. The combination of claim 2 in which a flat spacer strip is removably wound around the outside of said fingers and engages the inner sides of said rings to hold the rings in spaced relation with the fingers unfolded.

12. The combination of claim 4 in which a flat spacer strip is removably wound around the outside of said fingers and engages the inner sides of said rings to hold the rings in spacer relation with the fingers unfolded.

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