Aug. 27, 1963 S. L. EIFRID 3,101,846

REEL ASSEMBLY

Filed June 2, 1961 3 Sheets-Sheet 1

Fig. 1

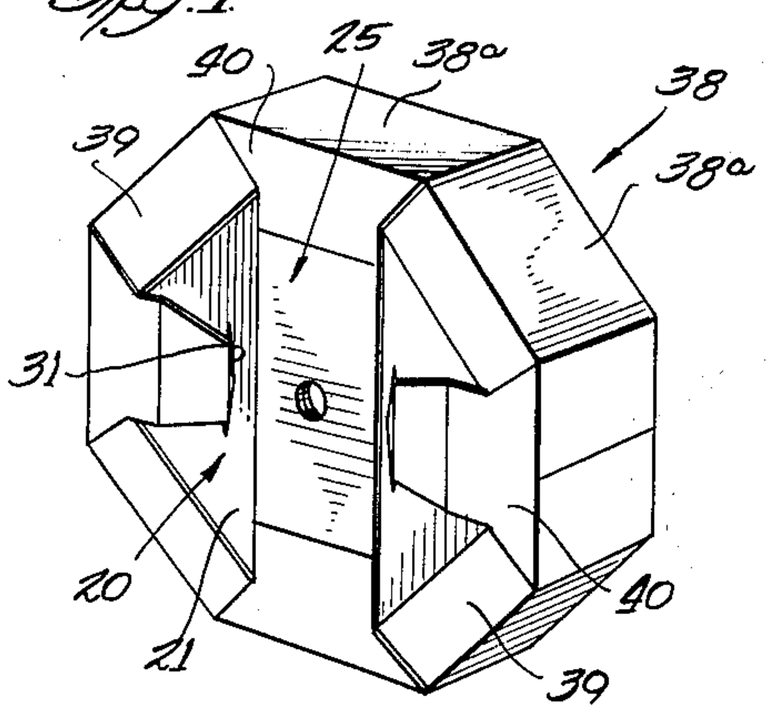


Fig. 2

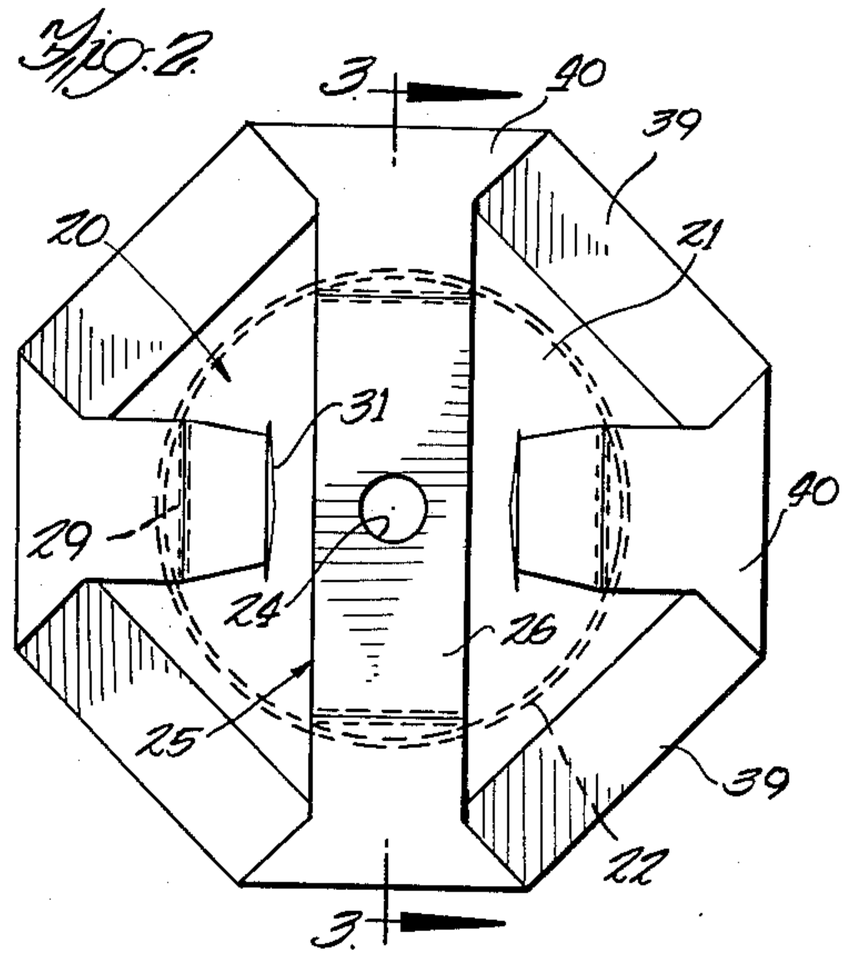


Fig. 3

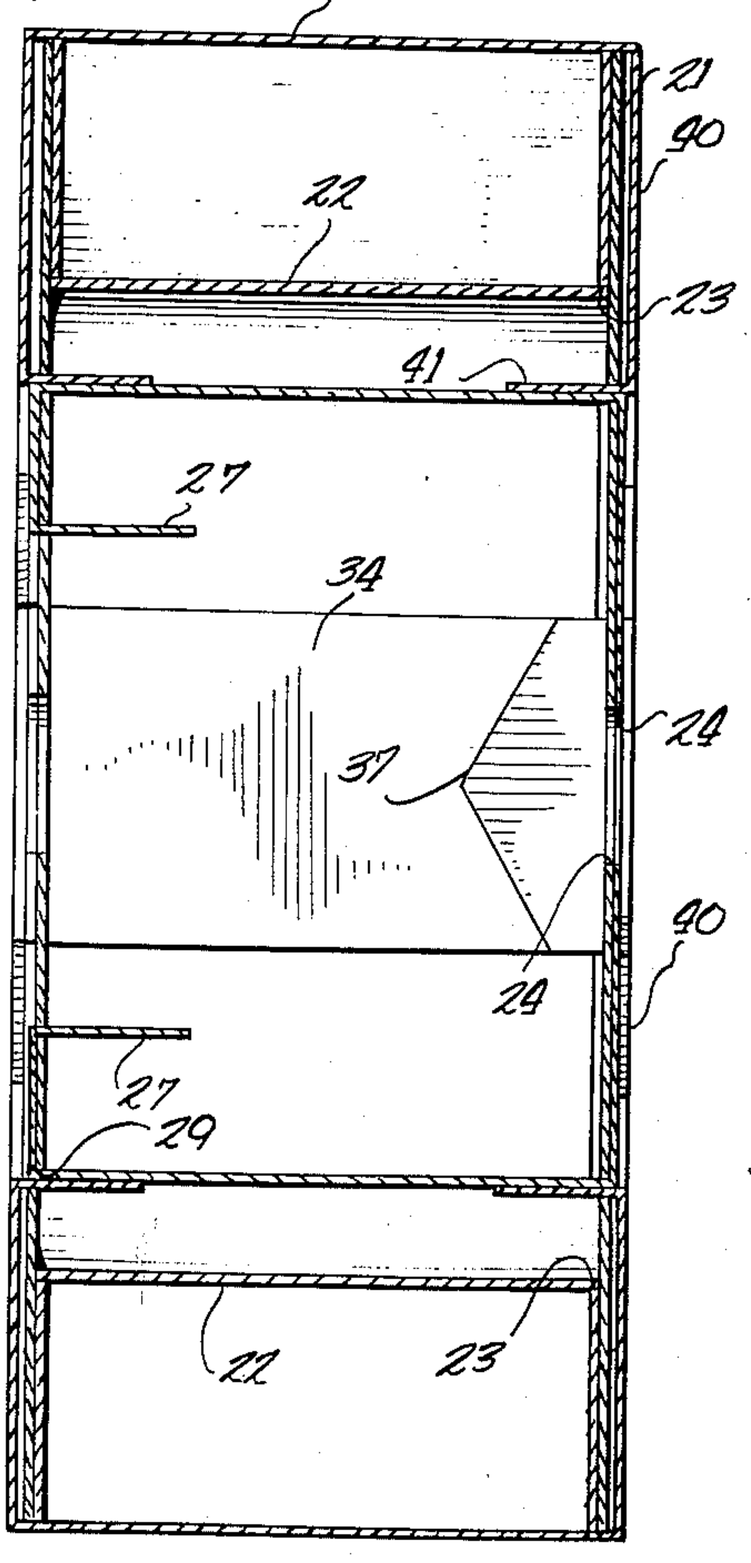


Fig. 4

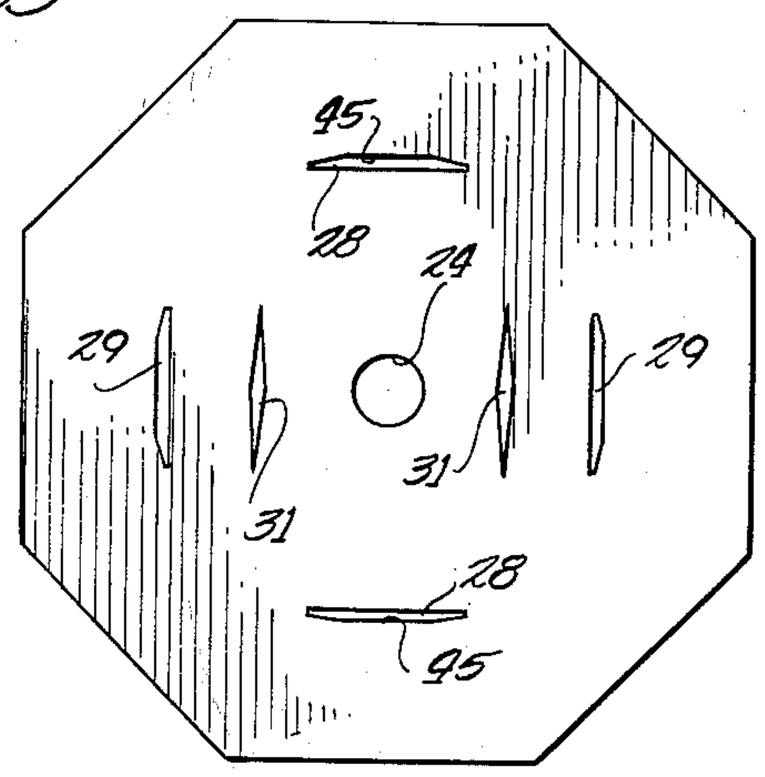
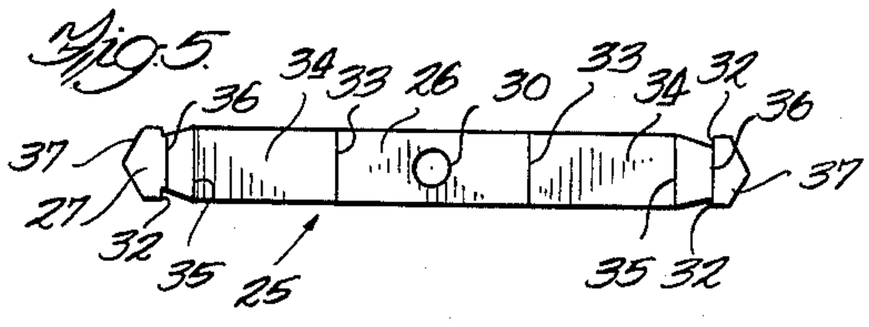


Fig. 5



Inventor
Stephen L. Eifrid

By Donald L. Welsh
Attorney

Aug. 27, 1963

S. L. EIFRID

REEL ASSEMBLY

3,101,846

Filed June 2, 1961

3 Sheets-Sheet 2

Fig. 6.

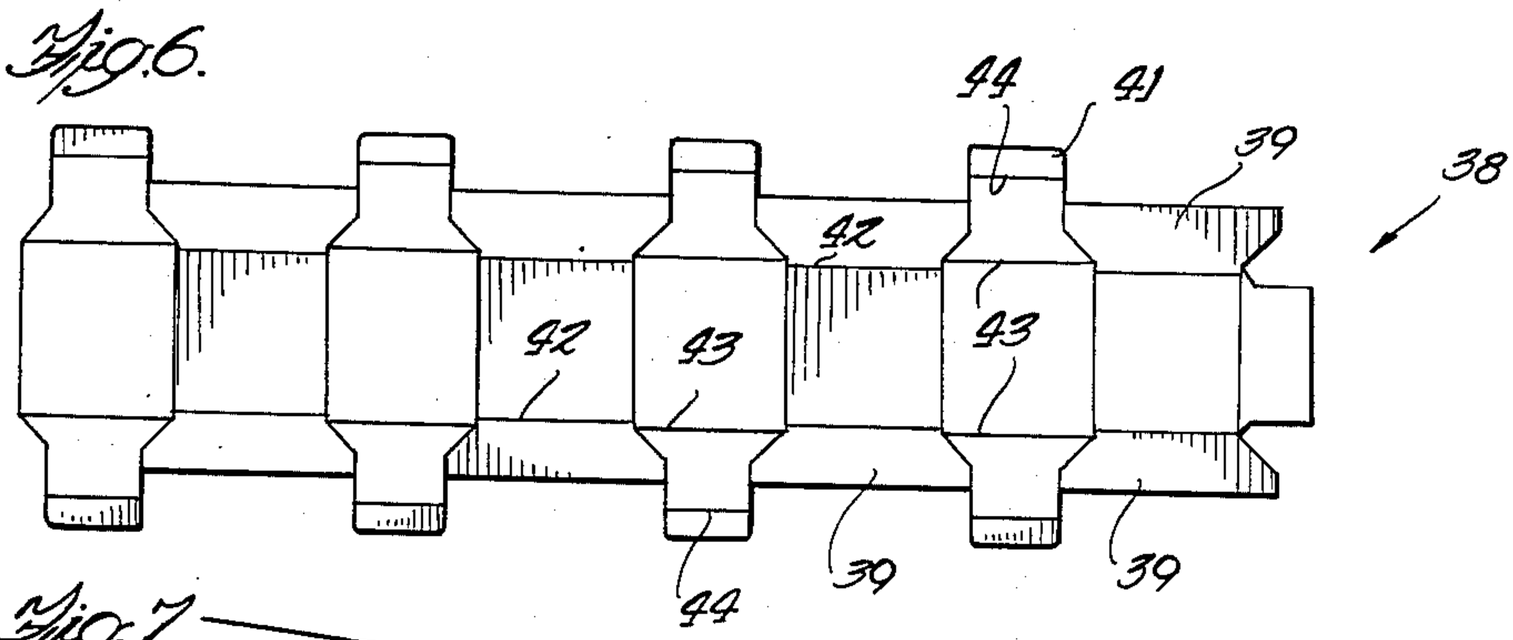


Fig. 7.

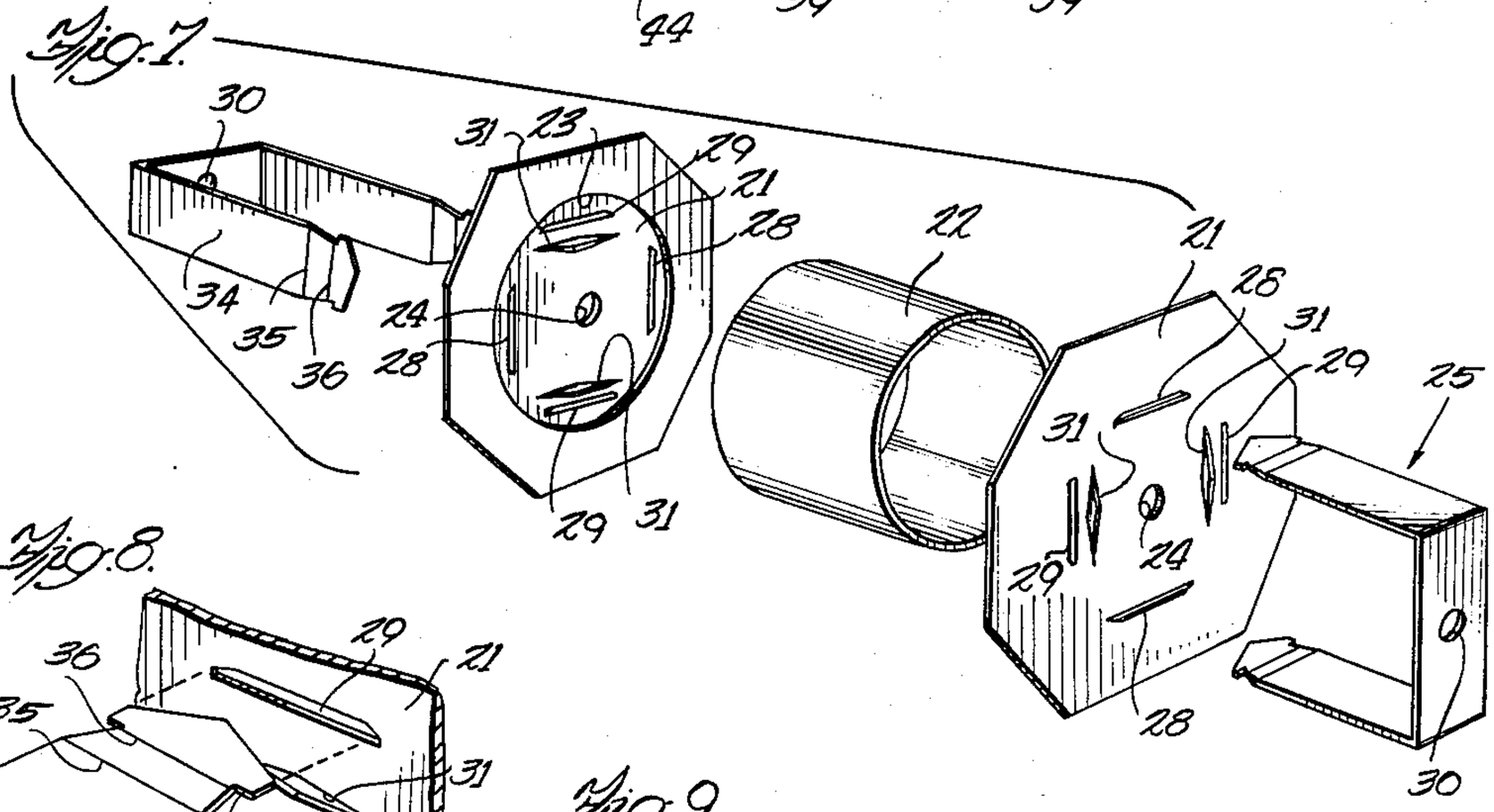


Fig. 8.

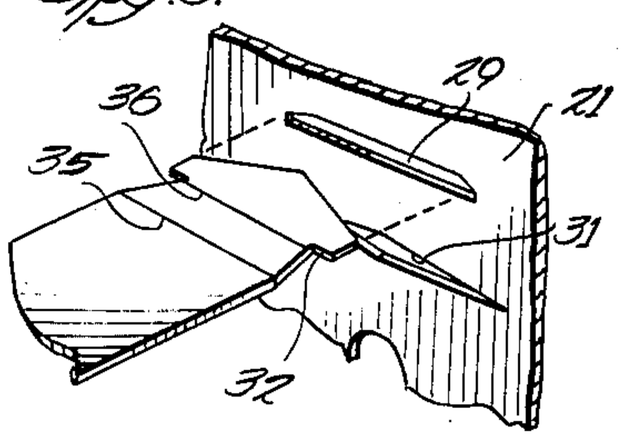


Fig. 9.

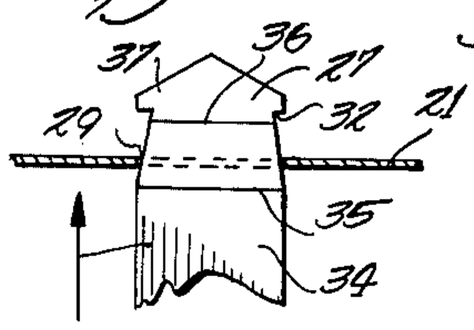


Fig. 10.

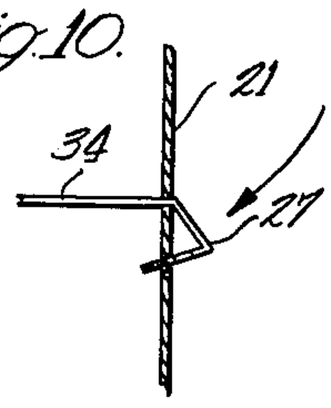


Fig. 11.

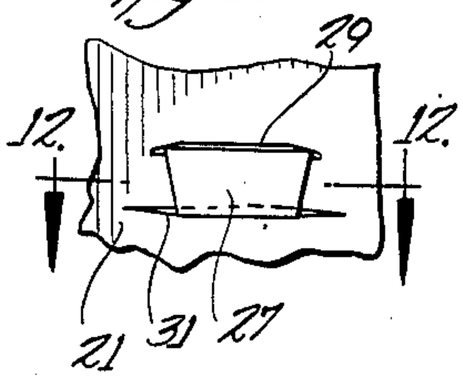


Fig. 12.

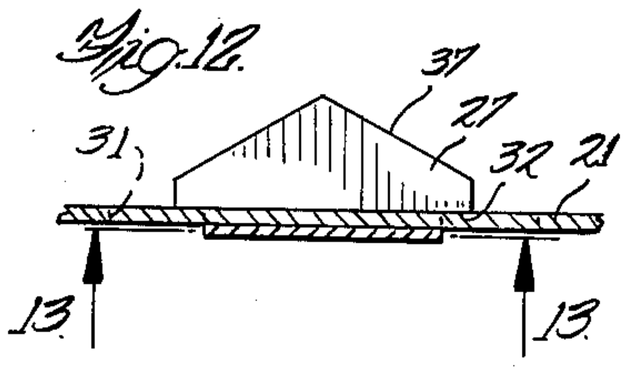
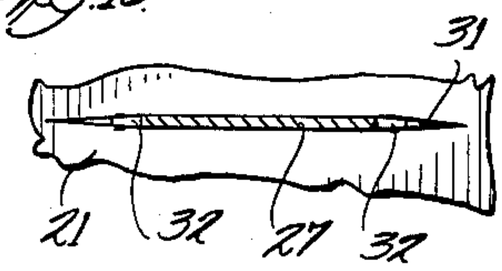


Fig. 13.



Inventor
Stephen L. Eifrid
By Donald L. Welch
Attorney

Aug. 27, 1963

S. L. EIFRID

REEL ASSEMBLY

3,101,846

Filed June 2, 1961

3 Sheets-Sheet 3

Fig. 14.

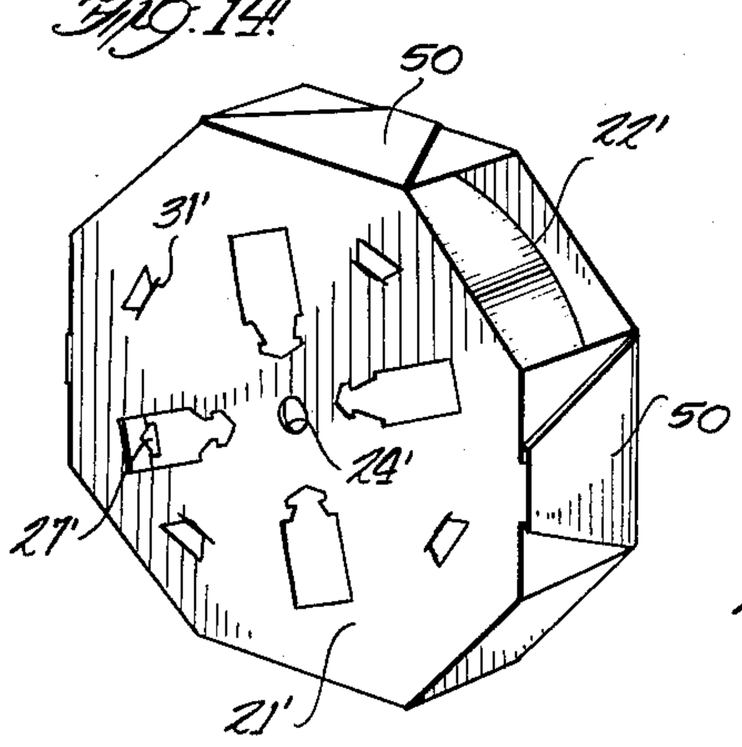


Fig. 15.

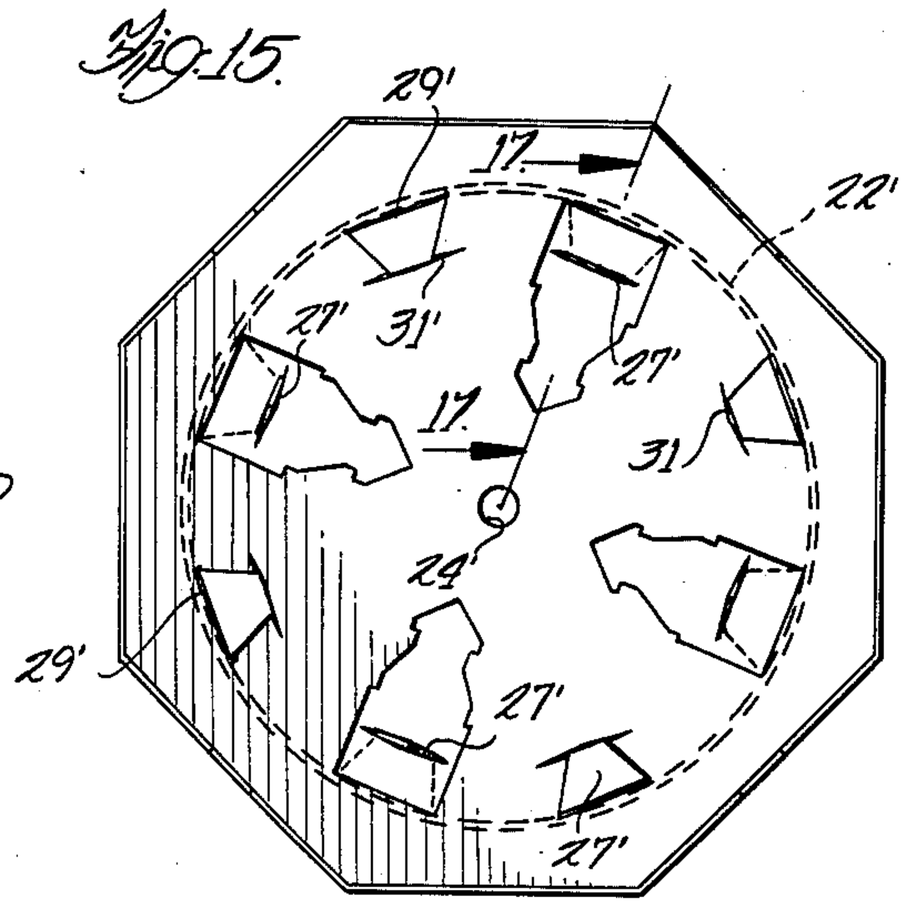


Fig. 16.

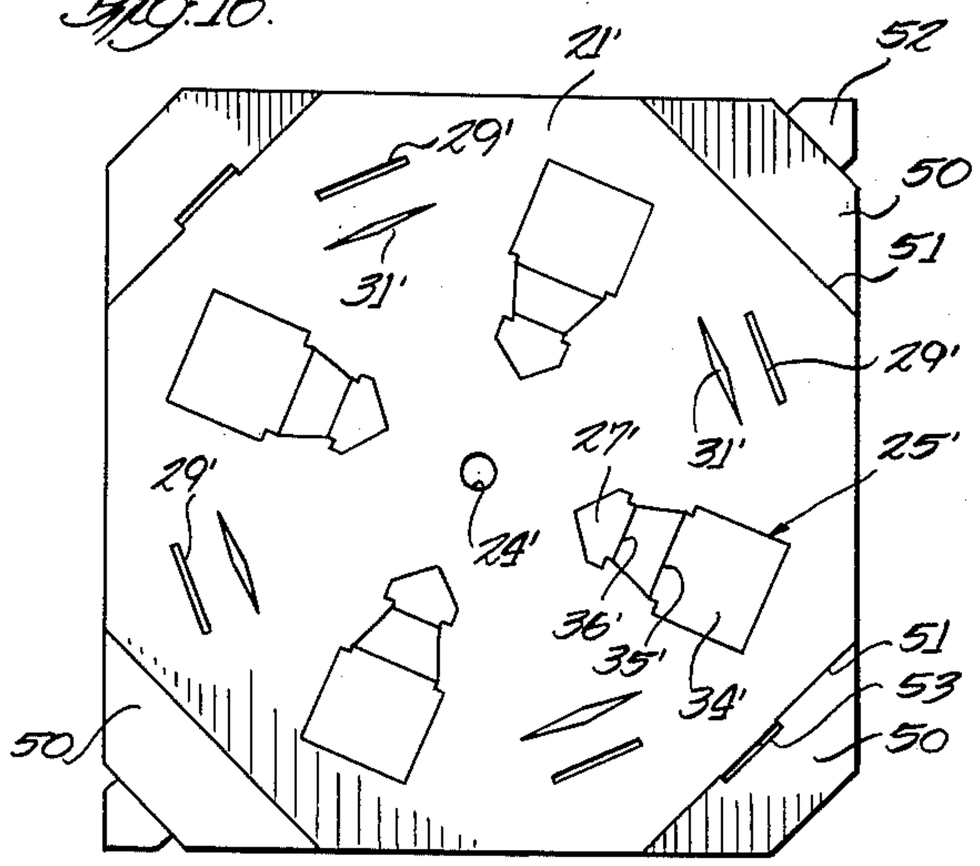


Fig. 17.

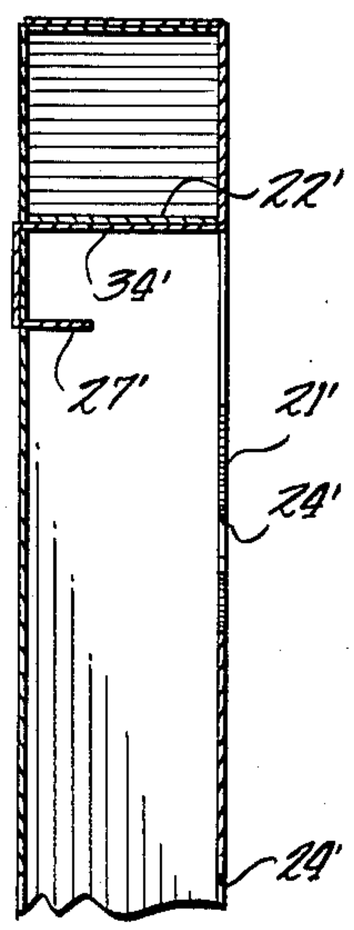
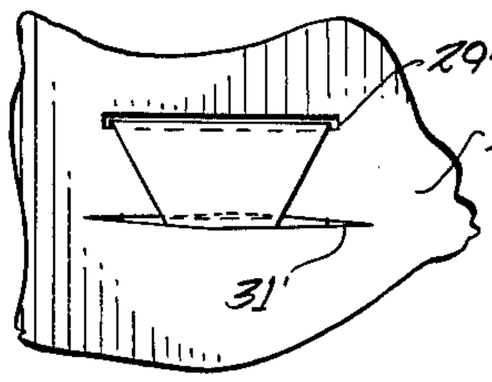


Fig. 18.



Inventor
Stephen L. Eifrid

By Donald L. Welch
Attorney

United States Patent Office

3,101,846

Patented Aug. 27, 1963

3,101,846
REEL ASSEMBLY

Stephen L. Eifrid, 641 61st Place, La Grange, Ill.

Filed June 2, 1961, Ser. No. 114,491
10 Claims. (Cl. 206—59)

This invention relates to reels formed of corrugated cardboard or similar material and comprising generally flat parallel heads secured against opposite ends of a tubular core member and projecting radially and outwardly beyond the core to form flanges, the heads also having alined center holes to receive a shaft for rotatably supporting the reel.

One object of the present invention is to secure the heads of a reel of the above character against the core in a novel manner reinforcing the portions of the heads around the peripheries of the center holes and strengthening the core against inward collapse.

Another object is to provide a cover for the reel and connect the same to the heads in a novel manner to strengthen the flanges and also reinforce the core against inward collapse.

Still another object is to provide novel connectors for locking the heads in assembled relation against the core without the necessity of adhesive or fastening apparatus such as staples.

A more detailed object is to project fastening devices through slots located in the heads in a novel manner to engage and reinforce the inner periphery of the core.

FIG. 1 is a perspective view of a reel assembly embodying the novel features of the present invention and including a cover.

FIG. 2 is an end view of the reel and cover.

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2.

FIG. 4 is a plan view of one reel head.

FIG. 5 is a plan view of one of the connector strips.

FIG. 6 is a layout view of the cover.

FIG. 7 is an exploded perspective view of a modified reel assembly without the cover.

FIG. 8 is a fragmentary perspective view of one head and connector strip of the modified reel.

FIGS. 9 and 10 are fragmentary sectional views through one head showing progressive steps in assembly of a connecting strip to the head.

FIG. 11 is a fragmentary end view of the modified reel showing the connector strip in finally assembled position.

FIG. 12 is a fragmentary sectional view taken on the line 12—12 of FIG. 11.

FIG. 13 is a fragmentary sectional view taken along the line 13—13 of FIG. 12.

FIG. 14 is a perspective view of another modification.

FIG. 15 is an end view of the second modification.

FIG. 16 is a layout view of one head of the second modification.

FIG. 17 is a fragmentary sectional view taken on the line 17—17 of FIG. 15, and

FIG. 18 is a fragmentary enlarged end view of the second modification.

The invention is shown in drawings for purpose of illustration embodied in a reel 20 comprising generally two flat heads 21 of stiff material such as corrugated cardboard abutting and secured against opposite ends of a tubular core 22. The core is smaller than the heads which project radially and outwardly beyond it to form flanges. While the core may be of polygonal cross section, it is a cylinder in the present instance. The heads also may be of different peripheral contours and herein are regular polygons with eight sides. To provide peripheral support for the core, its ends are received in recesses 23 formed in the inner sides of the heads and of a shape complementary to the outer periphery of the

core. Herein, each head is formed of two layers of cardboard, the inner which are glued together and one of which is cut out of its center to provide a circular hole for the recess 23. A smaller center hole 24 coaxial in the recess is cut in the other or outer layer to receive a shaft (not shown) to support the reel for turning about this alined axes of the heads and core.

In one of its aspects, the present invention contemplates securing the heads 21 against opposite ends of the core 22 in a novel manner to reinforce the heads around the periphery of the center hole 24 and also strengthen the heads against lateral collapse. This is accomplished by the provision of elongated connector strips 25 each having a flat center portion 26 lying against the outer side of one head and an end portion 27 secured to the other head after being projected through the core and alined slots 28 and 29 in the two heads.

One pair of angularly spaced parallel slots 28 cut in one head 21 on opposite sides of the center hole 24 receive the end portions 27 of one strip 25 at the ends of the central portion 26 of the strip. A second pair of slots 29 angularly spaced from the first pair receive the end portions 27 of the other strip extending through the core 22 from the other head. A hole 30 of the same size as the center holes 24 of the heads is cut in the center portion of each strip to register with the closest hole of the head lying against the center portion of the strip.

To avoid the use of adhesive or fastening devices such as staples, the invention also contemplates a novel construction of the heads 21 and connector strips 25 for locking the end portions 27 to the heads. For this purpose, a third pair of parallel slots 31 are cut in each head in parallel with and radially spaced from the second pair 29. These slots are correlated in size and shape with the end portions of the strip to receive those portions and lock them to the heads after they are inserted in the slots. The third slots thus are tapered to progressively decreasing widths of their ends and are of a length equal approximately to the maximum width of the end portions. The latter are recessed along their edges inwardly of such maximum width to form inwardly facing shoulders 32 which engage the inner sides of the heads after the end portions are bent laterally to lie along the outer side of the head and then are bent reversely and inwardly to project through the third slots as shown in FIG. 12.

Referring to FIG. 5 which is a plan view of a connector strip 25 before bending, it will be seen that the flat center portion 26 terminates at its ends in score lines 33 which are spaced the same distance as the slots 28 of the first pair. Intermediate portions 34 adjacent the end of the center portion are the parts which extend through the core 22 and their outer ends terminate in score lines 35 parallel to the lines 33 at their inner ends and spaced apart a distance equal approximately to the spacing of the heads. The end portions 27 are joined to the intermediate portions at the latter score lines 35 and themselves are divided into two parts by score lines 36.

The inner sections of the end portions 27 of the strips between the two score lines 35 and 36 lie along the outer sides of the heads 21 and the outer sections project through the third or tapered slots 31. The outer section includes the shoulders 32 and the outer score lines 36 are spaced inwardly from the shoulders a short distance equal approximately to the thickness of the outer layer of the head, the outer section constituting a locking tab. To facilitate entry of the outer ends of the strip into the tapered slots 31, they preferably are tapered to a point as indicated at 37. The end portions then have the appearance of arrowheads. When the arrowheads have been projected through the tapered slots 31 until the shoulders pass to the inner side of the heads as shown in

FIG. 12, the edges of each slot at their ends close behind the shoulders as shown in FIG. 13 to lock the tab securely on the inner side of the head.

The slotted heads 21 are advantageous in facilitating attachment of a cover 38 to the reel without adhesive or fastening devices. The cover comprises a plurality of flat panels 38*a* adapted to span the flanges of the heads and arranged end to end to extend around the circumferences of the heads. The panels correspond in number and length to the flat peripheral edges of the heads so that one panel lies along and is coextensive with each pair of parallel edges. To provide lateral reinforcement for the flanges, lateral extensions or strips 39 and 40 extend integrally from opposite sides of the panels and lie against the outer sides of the flanges.

Alternating connector or fastener strips 40 project beyond the intervening reinforcing strips 39 to provide tabs 41 which extend into the outermost slots 28 and 29 on the heads 21 to fasten the cover to the heads. Herein, the reinforcing strips are wider than the fastening strips to underlie the latter when the cover is assembled around the reel. This is permitted by beveling the ends of the reinforcing strips and offsetting the inner edges 42 of the reinforcing strips inwardly from the inner edges 43 on the fastener strips, each of the latter tapering from its inner edges to a narrower width throughout most of its length. The tabs 41 on the fastener strips are connected thereto along score lines 44.

In accordance with another aspect of the present invention, the portions of connector or fastener strips extending into the outermost slots 28 and 29 are utilized to reinforce the core 22 against collapse radially and inwardly due to the pressure of material wrapped around the core. This is accomplished by correlating the locations of these slots and the inner periphery of the core so that the portions of strips projecting into the slots engage or tie closely adjacent the core periphery. The outermost edge portions 45 of the slots thus are closely adjacent or register with the inner periphery of the core when the parts are assembled.

With core 22 of cylindrical shape like that shown in the present instance, the desired registry of the outer edge portions 45 of the slots 28 and 29 is obtained by bevels at the ends of these edges so that the end portions of the slots are tapered as shown in FIG. 4. Where, as in the preferred construction of FIGS. 1 through 6, the tabs 41 on the cover connector strips 40 extend into the outermost slots 28 and 29, the slots are wide enough to receive both those tabs and the intermediate portions 26 of the connector strips 25, the cover tabs then being the parts which engage and reinforce the inner periphery of the core along the outer edges 45 of these slots. It will be apparent that the slots 28 and 29 are spaced from the defining edge of the recess 23 in each head by a distance equal approximately to the thickness of the core.

Assuming the parts of the reel and cover have been formed as described above and are separated from each other, they are assembled first by projecting the end portions 27 and intermediate portions 34 of each connector strip 25 inwardly through the first pair of slots 28 on the respective heads 21 to bring the center portion 26 of the connector strips against the outer sides of the heads and also, to bring the holes 30 of these strips into registry with the center holes 24 of the head. Then, the heads are moved into parallel relation against opposite ends of the core by telescoping the end and intermediate portions of the connector strips through the core when the heads are offset angularly 90 degrees from each other so that these portions of the strips of the different heads are disposed in perpendicular planes.

In the movement of the heads 21 toward each other, the end portions 27 of the connector strips 25 advance through the slots 29 of the second pair on each head as shown in FIGS. 8 and 9. This movement is completed when the heads abut the ends of the core 22 with such ends located in the recesses 23. The inner score line 35

of each end portion 27 of each connector strip then should lie in the plane of the outermost side of the adjacent head so that the outer section of the end portion may be bent reversely along the outer score line 36 and inserted into the inner tapered slot 31 as shown in FIG. 10. This insertion continues until the shoulders move to the inner side of the head as shown in FIGS. 12 and 13. During such insertion, the side edge portions of the outer section of the strip are compressed slightly between the tapered end edges of the slot, the compressed portions expanding after the shoulders move beyond the slot edges far enough to abut the inner side of the head as shown in FIG. 13.

When all of the end portions 27 of the strips 25 have been bent reversely and inserted far enough into the tapered slots 31 that the shoulders 32 lock against the inner sides of the heads 21, the assembly of the reel is complete and the heads are held securely against the opposite ends of the core. The central portions 26 of the connector strips 25 lie against the outer sides of the heads and the parts of such portions defining the edges of the holes 30 reinforce the central parts of the heads around their center holes 24.

To assemble the cover 38 to the reel, the cover is extended around the periphery of the reel heads 21 with the panels 38*a* lying against their respective pairs of parallel edges of the reel heads. Then, the reinforcing strips 39 are bent inwardly along their score lines 42 to lie against the outer sides of the heads. This is followed by first bending the tabs 41 inwardly with respect to the remainder of the fastening strips 40 and then bending the latter inwardly. During this final bending movement, the tabs 41 are inserted into the outer slots 28 and 29 far enough to bring the remainder of the strips into overlapping relation with the reinforcing strips and the outer sides of the heads. Such folding and tucking should begin with the connector strips at a first end of the cover and progress along the cover to the other end where a longitudinally projecting flap is left to tuck beneath the panel 38*a* at the first end. The tabs 41 lie between the core and the parts of the separate connector strips 25 within the slots 28 and 29 and actually engage the inner periphery of the core to reinforce the same against collapse radially and inwardly.

In cases where it is not desired to use a cover as in the modification shown in FIGS. 7 through 13, the outer slots 28 and 29 are made thinner and equal approximately the thickness of the separate connector strips 25 in those slots so as to be filled substantially by the strips. The outer edges of such slot however are in substantial registry at their ends with the inner periphery of the core so that the strips 25 provide the same radial support of the core as when the slots receive both the tabs 41 from the cover connector strips 40 and the portions of the individual connector strips 25.

In the constructions described thus far, the connector strips have been formed as parts separate from the heads 21. In a simplified modification shown in FIGS. 14 through 18, the connector strips are formed integral with the heads, the parts of this modification which corresponds to the parts previously described having similar but primed reference characters. As in the preferred and modified constructions of FIGS. 1 through 13, each modified connector strip 25′ is formed with an intermediate portion 34′ spanning the space between the heads 21′ and an end portion 27′ extending first through outer slots 29′, then laterally across the outer side of the opposite head and inwardly through an inner tapered slot 31′. Instead of being connected to a central portion as the connector strips of the preferred construction, each intermediate portion 34′ is cut out of its associated head while remaining integrally connected along its outer edge to the head.

Although each connector strip 25′ in this instance extends inwardly from its outer edge of connection with

the head 21' to the point spaced from the center hole 24' of the head, it will be understood that the inner ends of the strips for each head may converge at the center thereby leaving a larger opening than the center hole. Also, different numbers of connector strips may be cut from each head but, herein, there are four such strips and a corresponding number of outer slots 29' and tapered slots 31' to accommodate the respective end portions 27'. Unlike the earlier described constructions, each head of the second modification comprises only a single layer of cardboard. As in the case of the earlier constructions however, the outer slots 29' are located adjacent the inner periphery of the core 22'. The outer connected edge of each strip 25' is located in the same relation so that the strips themselves position the core 22' in a central location with regards to the heads as well as reinforce the core against inward collapse.

If desired, to provide a partial cover in the second modification, flaps 50 may be connected along score lines 51 to alternate ones of the corners of each head 21'. Alternate ones of these flaps, in addition, are formed with tabs 52 and the intervening flaps are slotted as indicated at 53 along end score lines 51 to receive the tabs of the flaps of the other heads.

In the assembly of the parts of the reel of the second modification, first the connector strips of each head are bent laterally from one side of the head and projected through the core and into the outer slots 29' of the other head by advancing the heads toward each other when they are angularly offset to aline the outer slot of each head with a connector strip of the other head. To enable the cover tabs 52 to be alined with the slots 53 at the same time, the connector strips and slots are offset angularly so that opposed connector strips are alined along diagonals of the heads rather than along lines perpendicular to the flat sides. Once the end portions of the connector strips have been projected through the outer slots 29' on the heads, these end portions are bent laterally and then reversely for insertion into the inner tapered slots 31'. As in the preferred construction, the end portions are inserted far enough that the shoulders engage the inner sides of the heads to lock the strips to the heads. Finally the cover flaps 50 are bent inwardly and the cover tabs 52 are inserted in the slots 53.

Due to the location of the inner edge of each connector strip and the outer slot 29' adjacent to inner periphery of the core 22' of the second modification, the intermediate portion 34' of the strip extends along the inner periphery of the core 22' to reinforce the same against inward collapse and locate the core in a central position with regard to both heads. Also, the heads are secured against the ends of the core without adhesive or fastening devices such as staples due to the tapered character of the inner slots 31' and the formation of the end portions 27' of the connector strips with rearwardly facing shoulders. The strips being formed as integral parts of the heads, the second modification not only is easy to assemble, but also may be constructed at low cost.

I claim as my invention:

1. A reel having, in combination, two generally flat heads spanned by a hollow tubular core member and each having first and second pairs of parallel elongated slots angularly spaced around a central axis of the heads and extending circumferentially with respect to such axis, the slots of each pair being disposed on diametrically opposite sides of the axis, a third pair of elongated slots extending parallel to and spaced inwardly from the slots of said first pair on each head, means on each head defining a hole centered on said axis and adapted to receive a shaft to support the reel for rotation about the axis, and two flat elongated fastening members each having a flat central portion extending between said second pair of slots on one of said heads and across said axis and lying against the outer side of the head and end portions extending first through said core member and said first pair of slots in the

other head, then laterally along the outer side of the other head, and finally reversely and inwardly through said third pair of slots on the other head to secure the heads and core in assembled relation and to reinforce each head around said hole therein, means on said central portion of each fastening member defining a hole registering with the center hole of the adjacent head, and a cover having angularly spaced connector strips extending radially and inwardly from the peripheries of said heads at angularly spaced points and terminating in tabs bent laterally and inwardly and extending into said slots of said first and second pairs between the outer edges of the slots and the parts of said fastening members in the slots.

2. A reel having, in combination, two generally flat heads spanned by a hollow tubular core member and each having first and second pairs of parallel elongated slots angularly spaced around a central axis of the heads and extending circumferentially with respect to such axis, the slots of each pair being disposed on diametrically opposite sides of the axis, a third pair of elongated slots extending parallel to and spaced inwardly from the slots of said first pair of each head, means on each head defining a hole centered on said axis and adapted to receive a shaft to support the reel for rotation about the axis, and two flat elongated fastening members each having a flat central portion extending between said second pair of slots on one of said heads and across said axis and lying against the outer side of the head and end portions extending first through said core member and said first pair of slots in the other head, then laterally along the outer side of the other head, and finally reversely and inwardly through said third pair of slots on the other head to secure the heads and core in assembled relation and to reinforce each head around said hole therein, and means on said central portion of each fastening member defining a hole registering with the center hole of the adjacent head.

3. A reel having in combination two generally flat heads spanned by a hollow tubular core member and each having first and second pairs of parallel elongated slots angularly spaced around a central axis of the heads and extending circumferentially with respect to such axis, the slots of each pair being disposed on diametrically opposite sides of the axis, means on each head defining a hole centered on said axis and adapted to reecive a shaft to support the reel for rotation about the axis, and two flat elongated fastening members each having a flat central portion extending between said second pair of slots on one of said heads and across said axis and lying against the outer side of the head and end portions extending first through said core member and said first pair of slots in the other head and then laterally along the outer side of the other head, means securing said end portions of each member to said other head to secure the heads and core in assembled relation, said central portion of each of said members reinforcing the adjacent head around said hole therein, and means on said central portion of each fastening member defining a hole registering with the center hole of the adjacent head.

4. A reel having, in combination, two generally flat heads spanned by a hollow tubular core member and each having a set of parallel elongated slots angularly spaced around a common central axis of the heads and core and extending circumferentially with respect to such axis, elongated fastening members each extending from one of said heads and through said core and one of said slots in the other head and secured to the other head, and a cover extending circumferentially around and spanning the peripheries of said heads and having fastening strips extending radially and inwardly from the peripheries of said heads against their outer sides at angularly spaced points and terminating in tabs bent laterally and into said slots between edges of the slots and the parts of the fastening members in the slots.

5. The combination of claim 4 in which the outer edges of said slots lie closely adjacent the inner periphery

of said core and said cover tabs engage such periphery to reinforce the same against inward collapse.

6. A reel having, in combination, two generally flat heads spanned by a hollow tubular core member and each having a first set of elongated slots angularly spaced around a common central axis of the core and the heads and extending circumferentially with respect to such axis, a second set of elongated slots extending parallel to and spaced inwardly from the slots of said first set on each head, the end portions of said second slots being tapered outwardly, and a plurality of flat elongated fastening members each extending from one of said heads first through said core member and one of said first set of slots in the other head, and finally reversely and inwardly through the adjacent parallel slot of said second set on the other head to dispose the end portion of the member between the heads and secure the heads and core in assembled relation, said end portion of each fastening member having shoulders facing outwardly against the inner side of the adjacent head at the tapered ends of the associated second slot and engaging the inner side of the head to lock the fastening member to the head.

7. The combination of claim 6 in which said fastening members are formed integral with and bent from said heads.

8. A reel having in combination two generally flat heads and spanned by a hollow tubular core member and each having a first pair of parallel elongated slots extending circumferentially with respect to a central axis of the head and disposed on diametrically opposite sides of the axis, the slots of one head being offset angularly with respect to the slots of the other head around said axis, a second pair of elongated slots extending parallel to and spaced radially from said slots of said first pair on each head, a plurality of elongated connector members one for each of said slots of said first pairs and each having an

intermediate portion extending from one of said heads to the other within said core and an end portion extending first outwardly beyond the core and through one of said slots of said first pair in the other head, then radially along the outer side of the other head, and finally inwardly through the adjacent one of said slots of said second pair in the other head so that each of said end portions of said connector members is secured to said other head to hold the heads assembled against said core.

9. The combination of claim 8 in which said connector members are formed integral with and are bent from said heads.

10. A reel having, in combination, two generally flat heads spanned by and secured against a hollow tubular core member and each having a set of elongated slots angularly spaced and extending circumferentially around a common center axis of the heads and core and lying within the inner peripheries of said core, a cover extending circumferentially around and spanning the outer peripheries of said heads, and a plurality of flat elongated connector strips connected to opposite edges of said cover and extending radially and inwardly from said peripheries of said heads along the outer sides of the heads and then laterally and inwardly into said slots to attach the cover to the heads.

References Cited in the file of this patent

UNITED STATES PATENTS

2,369,958	Fox	Feb. 20, 1945
2,724,538	Schweich	Nov. 22, 1955
2,812,854	Fletcher	Nov. 12, 1957

FOREIGN PATENTS

352,256	Great Britain	July 9, 1931
584,780	Canada	Oct. 6, 1959