Dec. 25, 1956 C. J. TELLEN 2,775,411

REEL CONSTRUCTION

Filed Dec. 21, 1953 2 Sheets-Sheet 1

Fig. 1

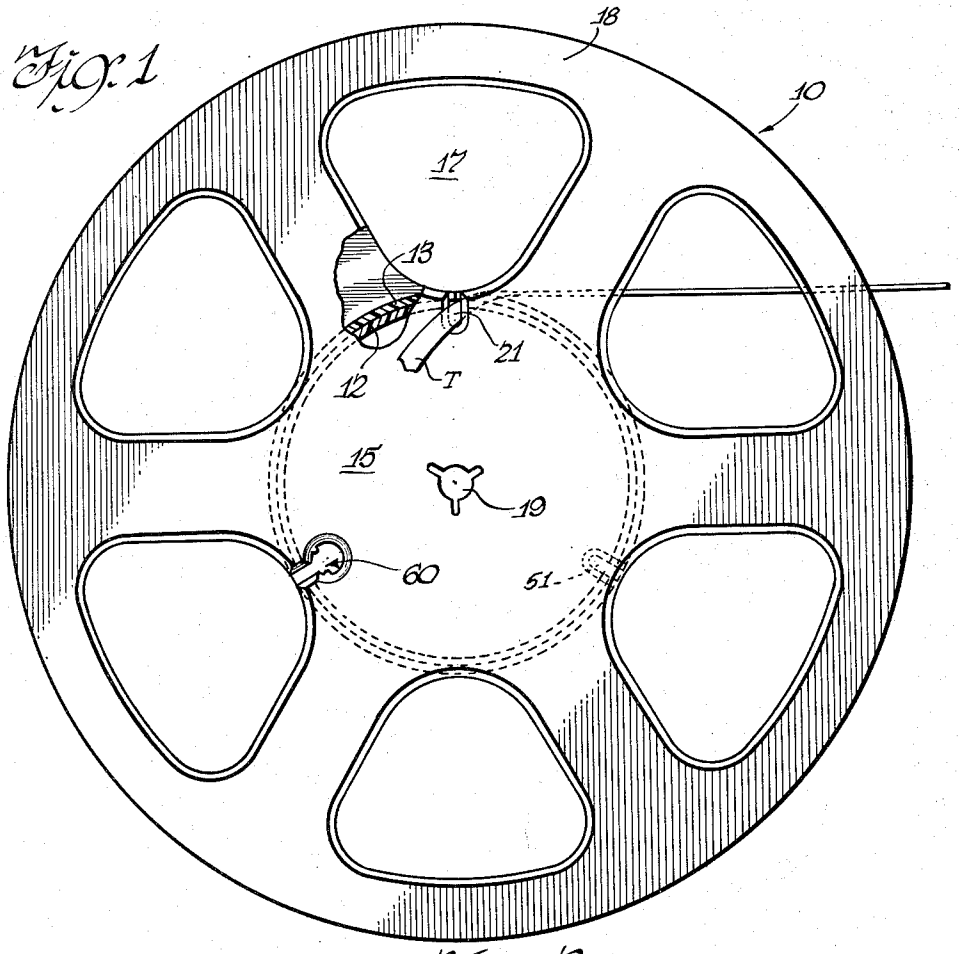
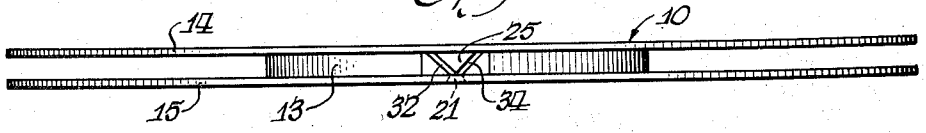


Fig. 2



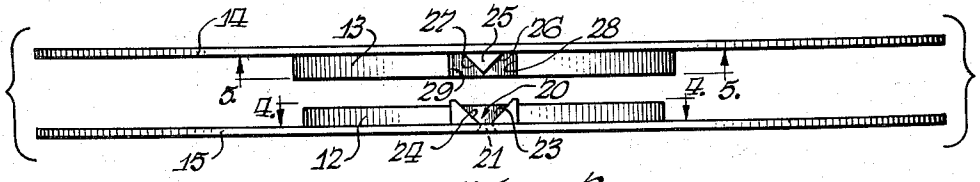


Fig. 3

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REEL CONSTRUCTION

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Fig. 4

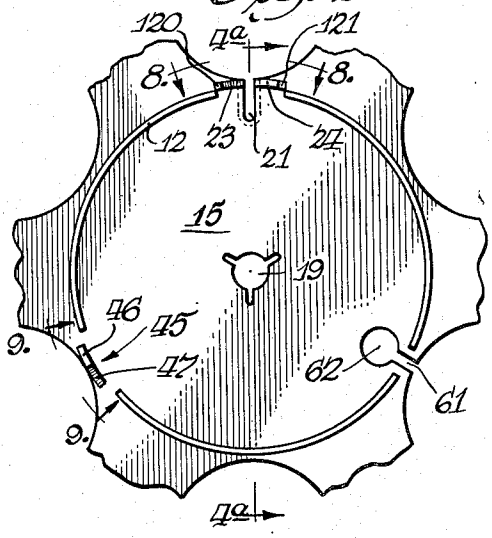


Fig. 5

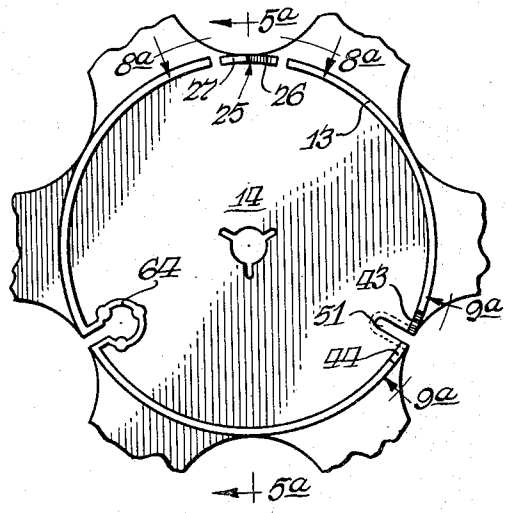


Fig. 4a

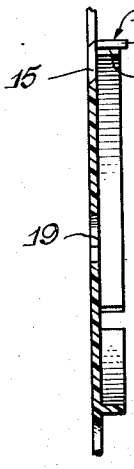


Fig. 5a

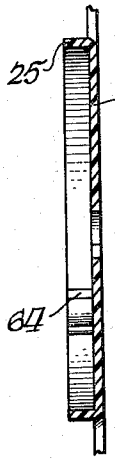


Fig. 6

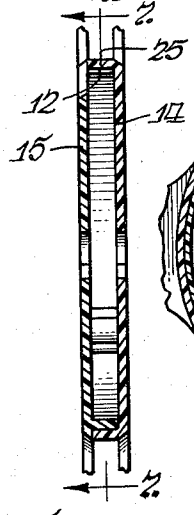


Fig. 7

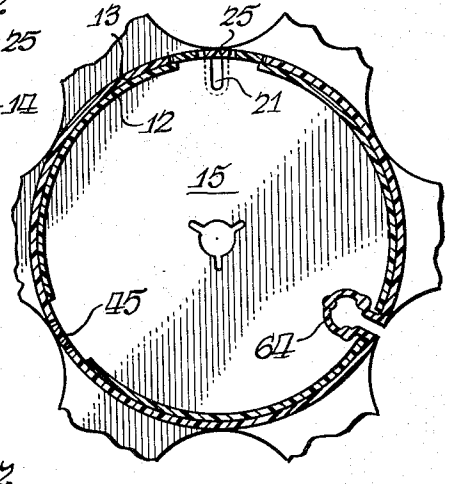


Fig. 9

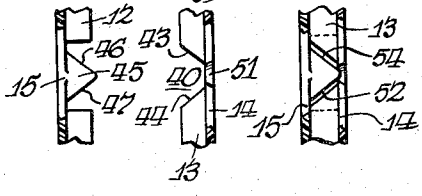


Fig. 9a

Fig. 9b

Fig. 8



Fig. 8a

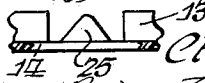
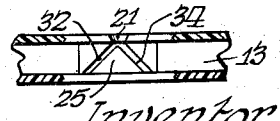


Fig. 8b



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2,775,411

REEL CONSTRUCTION

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Application December 21, 1953, Serial No. 399,392

7 Claims. (Cl. 242—70)

This invention relates generally to a reel construction, and more particularly to improvements in the construction of reel of the type disclosed in copending Hultgren application Serial No. 399,391, abandoned in favor of continuation in part application, Serial No. 416,105, now Patent No. 2,766,947, having a common assignee with the present invention, wherein novel means are provided for facilitating the reel winding thereon of continuous tape or ribbon-like materials.

It is a primary object of the present invention to provide improvements in the construction of reels having means for initiating reel winding of tape or ribbon-like materials, whereby the starting end of the material may be securely held throughout the first full revolutions of the reel.

It is another object of the present invention to provide improvements in the construction of reels of the type having means for initiating reel winding, wherein said means are operable to afford access from either face side of the reel and in either direction of rotation thereof.

In reel construction of the type disclosed in the aforesaid co-pending application, conventional methods of fabrication and assembly, employing two cooperating, telescoping hub portions suitably notched and cut-away to provide a V-shape opening terminating in a radial slot in a face flange of the reel have not been fully satisfactory. Such methods have resulted in surface discontinuities and offsets at the area of formation of the V-shape opening. Where the periphery of the reel hub is not a substantially uniformly curved surface due to such discontinuities and offsets, the resultant tape winding thereon will have highly undesirable bends and bulges. Such deformations are particularly objectionable when the reel is being used for purposes of magnetic tape recording, because they substantially impair the fidelity of reproduction in that the deformations result in sound distortions in the recording. It is a further object of the present invention, therefore, to provide a reel construction comprising two telescoping hub members having cooperating cut-away and projection portions offset in a novel manner to provide a V-shape slotted opening extending through a substantially uniformly curved peripheral hub surface.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my reel construction invention whereby the objects contemplated are obtained as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, wherein:

Figure 1 is a side elevational view, partly broken away, showing a reel constructed in accordance with the present invention.

Figure 2 is a top view of the reel taken as indicated at line 2—2 on Figure 1.

Figure 3 is an exploded top view of the reel of Figure 1, showing the telescoping concentric hubs forming the reel assembly in separated relation to each other.

Figure 4 is a fragmentary view in side elevation, taken at line 4—4 of Figure 3, showing one of the hub elements of the reel assembly of Figure 1.

Figure 5 is another fragmentary view in side elevation, taken at line 5—5 of Figure 3, showing the other of the hub elements of the reel assembly of Figure 1.

Figures 4*a* and 5*a* are cross-sectional views taken along the lines 4*a*—4*a* and 5*a*—5*a*, respectively of Figures 4 and 5.

Figure 6 is an assembly view of the reel hub portions, shown in Figures 4*a* and 5*a*, in mating engagement.

Figure 7 is a cross-sectional view along line 7—7 of Figure 6.

Figures 8 and 8*a* are fragmentary cross-sectional views taken along the lines 8—8 of Figure 4 and 8*a*—8*a* of Figure 5, respectively, showing the cooperating projection and cut-away of one pair of slots and cooperating projection of the hub portions of Figures 4 and 5.

Figure 8*b* is an assembly view of the reel hub portions, shown in Figures 8 and 8*a*, in mating engagement.

Figures 9 and 9*a* are fragmentary cross-sectional views taken along the lines 9—9 of Figure 4 and 9*a*—9*a* of Figure 5, respectively, showing the other pair of slots and cooperating projection of the hub portions of Figures 4 and 5.

Figure 9*b* is an assembly view of the reel hub portions, shown in Figures 9 and 9*a*, in mating engagement.

In Figures 1 and 2 of the drawing I have illustrated a reel assembly, indicated generally at 10, constructed in accordance with the present invention. The reel comprises two cylindrical hubs 12 and 13 cooperatively engaged in telescoping relation to form a concentric cylinder assembly having coinciding longitudinal axes. As shown by the cut-away portion of Figure 1, the hub 12 is slightly smaller in diameter than the hub 13 so as to permit concentric positioning of the small diameter hub within the large diameter hub. The hub 12 is provided at one end thereof with a substantially circular face flange 15. The hub 13 is provided with a similar face flange 14. The plane surfaces of the face flanges 14 and 15 are substantially at right angles to the longitudinal axes of the respective hubs 13 and 12. In this manner, the face flanges 14 and 15 are positioned in spaced, parallel relation with the hubs 12 and 13 assembled in concentric telecsoping engagement, as best seen in Figures 1 and 2.

The hubs and flanges of the reel construction of the present invention are preferably, but not necessarily, made of a suitable low-cost non-metallic material, such as plastic. The hubs and their attached face flanges, are each preferably molded as separate, integral units having a hub and flange, which units may be secured together in any desired manner, and when suitable plastic materials are employed a solvent or adhesive may be applied between the inner surface of the large diameter hub 13 and the outer surface of the small diameter hub 12 to effect a secure and permanent bond therebetween.

Each of the face flanges 14 and 15 is provided with a pattern of cutout portions, as at 17, to form a ribbed flange of conventional spoked configuration, having a continuous peripheral rim 18.

As best seen in Figures 4 to 7 of the drawing, I have provided a novel arrangement of cooperating elements to form a V-shape slotted opening, while maintaining a substantially uniformly curved peripheral hub surface adjacent the edges thereof. The large diameter hub 13 is provided with a V-shape projection 25 having inclined edges 26 and 27 arranged at an angle of substantially 45° with respect to the plane of the face flange 14. The V-shape projection 25 is formed by notches or cut-away portions in the peripheral surface of the hub 13. These cut-away portions are bounded by the inclined

edges 26 and 27, and by the straight side edges 28 and 29 which are arranged substantially normal to the plane of the face flange 14, and peripherally spaced a slight distance from the base of projection 25. As is best shown in Figure 5, the projection 25 lies within the same curved surface as the hub periphery. The small diameter hub 12 is provided with radially outwardly offset portions 120 and 121, which form a V-shape notch 20. The notch 20 terminates at its apex in a radial slot 21 extending inwardly, preferably from the lowermost edge of the cutout 17 in face flange 15, toward the central bore 19 of the reel assembly. The inclined edges 23 and 24 of the cut-away forming offsets 120 and 121 of notch 20 are at an angle of substantially 45° with respect to the plane of the face flange 15.

As best shown by Figures 6 and 7, telescoping assembly of the respective hub elements of the reel serves to bring the inclined edges 23 and 24 of the radially offset notch 20 of hub 12 and the inclined edges 26 and 27 of the V-shape projection 25 into cooperative relation whereby the adjacent inclined edges are in directly opposed relation. In this manner the cut-away forming offsets 120 and 121 of the small diameter hub and the projection of the large diameter hub lie within the same uniformly curved peripheral surface when the two hubs are concentrically positioned, thereby providing a V-shape opening through the continuously uniform outer surface of the reel hub. This opening comprises slots 32 and 34, which intersect and terminate at the radial slot 21 in the flange 15.

The slots 32 and 34 extend transversely between the face flanges 14 and 15. Each of the slots transects an angle of about 45° with respect to the longitudinal axes of the concentric hubs, thereby forming an included angle of about 90° therebetween.

In this manner it will be apparent that the assembled reel construction is provided with a novel V-shape opening comprising a pair of slots which intersect and terminate at the apex thereof in a radial slot extending through the surface of one of the reel flanges. As illustrated in Figure 1, this construction provides a slotted means for threading the starting end of a continuous ribbon of tape or the like, indicated at T, through the outer periphery of the reel hub and outwardly against one of the side or face flanges thereof. An operator may, either manually or by some other suitable holding means, fix the starting end of the tape to be wound on the reel against the surface of the face flange without in any way interfering with the peripheral surface of the hub. The tape may be thus readily held, without in any way obstructing or contacting the tape to be wound on the hub, while several initial revolutions of the reel are completed, thereby permitting a simple, efficient, and reliable initiation of winding of the tape on the reel.

In Figure 1 of the drawing I have shown the manner in which a length of tape or the like, T, passes between the face flanges 14 and 15 of the reel, extends through the slot 34, bends at an angle of 45°, and passes out the slot 21, where the end thereof may be readily held securely as the reel is rotated in a counter-clockwise direction.

By providing a pair of slots, so as to form V-shape openings, the material to be wound on the reel may be introduced from either direction so as to permit the novel slot of the present invention to be employed for initiating reel winding in either rotative direction. In certain applications, as heretofore indicated, the reel is first rotated in one direction and then reversed for rotation in the other direction. Normally, the reel has one of its face flanges resting upon or against a turntable, thereby permitting access to only the exposed face flange. Accordingly, therefore, I provide two pairs or sets of V-shape openings in the reel hub. Preferably, the two sets are peripherally displaced about the circumference of the hub a suitable distance, as indicated approximately 120° apart. In this manner the slots of the present invention may be employed to initiate the winding operation from either exposed face flange of the reel.

In Figures 8 and 8*a*, I have illustrated the notch 20 and projection 25, respectively, of the upper slot assembly of Figures 4 and 5. In Figure 8*b*, I have indicated the manner in which the notch and projection elements of my novel construction cooperate to form the V-shape opening, comprising slots 32 and 34, extending through the continuously uniform outer surface of the reel hub, when the two hub elements are positioned in concentric engagement, one within the other.

In Figures 9 and 9*a*, I have illustrated a notch 40 and a projection 45, respectively, of the lower slot assembly of Figures 4 and 5. In this assembly, the cooperative relation between notch and projection is the reverse of that illustrated by elements 20 and 25. Here, the V-shape notch 40 is formed by a cut-away portion of the large diameter hub 13, and the projection 45 is formed by a radially outwardly offset V-shape element of the small diameter hub 12. The cut-away or notch 40 is provided with inclined edges 43 and 44, arranged at an angle of about 45° for cooperation with the edges 46 and 47 of offset projection 45, which are also inclined at an angle of about 45°. The notch 40 terminates at its apex in a radial slot 51 in flange 14. In this manner, positioning of the two hub elements in concentric engagement, one within the other, serves to bring the notch and projection elements in cooperative relation to form the V-shape opening, comprising slots 52 and 54, extending through the continuously uniform outer surface of the reel hub.

When the reels embodying the present type are initially assembled and tape or other narrow ribbon of material is wound thereon by the manufacturer, it is desirable that the means for inserting the tape into the reel to start the winding operation be arranged so as to permit several adjacent reels to be wound at the same time. For this purpose, I additionally provide an opening 60 which extends transversely between the reel face flanges and inwardly through the reel hub. Each of the face flanges 14 and 15 and their corresponding hubs are formed with a radial slot 61, which in the face flanges terminates in an axial bore 62. Either or both of the face flanges may be provided with a perimeter flange 64, herein shown for purposes of illustration as surrounding the slot 61 and bore 62 or face flange 14, normal thereto, so as to provide a base means cooperating with the reel face flanges to define the opening 60 when the reel hub elements are concentrically positioned.

The opening 60 permits a number of reels to be positioned in adjacent relation on a single rotating shaft, extending through the central axial bores 19 thereof, for simultaneous winding. The starting ends of the respective tapes to be wound are inserted through the openings 60 of each of the reels, and held in fixed position against the perimeter of the hub by means of a wedge-bar extending through the aligned openings of all of the reels. In this manner the winding of a number of reels simultaneously upon a single shaft may be readily and simply initiated without interference between respective reels.

Changes may be made in the construction and arrangement of the parts of my reel construction without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical improvements which may be reasonably included within their scope.

I claim:

1. A reel comprising two hollow cylindrical hubs, one of said hubs having a diameter larger than that of the other of said hubs and said hubs being telescoped into closely adjacent concentric relation with each other, each of said hub portions having a face flange at one end thereof, said face flanges being positioned at op-

posite ends of said concentric hubs at right angles to the longitudinal axes thereof and in parallel relation to each other, the inner small diameter hub having an offset portion extending radially outwardly therefrom and registering with a cut-away portion of the outer large diameter hub, said offset and cut-away portions cooperating to provide a substantially uniform outer peripheral hub surface for said outer large diameter hub, portions of said offset and said cut-away being spaced relative to each other to form an inclined slot extending through both of said hubs, transversely between said face flanges.

2. A reel comprising two hollow cylindrical hubs, one of said hubs having a diameter larger than that of the other of said hubs and said hubs being telescoped into closely adjacent concentric relation with each other, each of said hub portions having a face flange at one end thereof, said face flanges being positioned at opposite ends of said concentric hubs at right angles to the longitudinal axes thereof and in parallel relation to each other, the inner small diameter hub having an offset portion extending radially outwardly therefrom and registering with a cut-away portion of the outer larger diameter hub, said offset and cut-away portions cooperating to provide a substantially uniform outer peripheral hub surface for said outer large diameter hub, portions of said offset and said cut-away being spaced relative to each other to form an inclined slot extending through both of said hubs, transversely between said face flanges, at an angle of about 45° with respect to the longitudinal axis of said hubs and terminating at one end in a radial slot extending through one of said face flanges.

3. A reel comprising two hollow cylindrical hubs, one of said hubs having a diameter larger than that of the other of said hubs and said hubs being telescoped into closely adjacent concentric relation with each other, each of said hub portions having a face flange at one end thereof, said face flanges being positioned at opposite ends of said concentric hubs at right angles to the longitudinal axes thereof and in parallel relation to each other, the inner small diameter hub having an offset portion extending radially outwardly therefrom and registering with a cut-away portion of the outer large diameter hub, said offset and cut-away portions cooperating to provide a substantially uniform outer peripheral hub surface, portions of said offset and said cut-away being spaced relative to each other to form a pair of inclined slots extending through both of said hubs, transversely between said face flanges, each of said slots transecting an angle of about 45° with respect to the longitudinal axes of said hub and having an included angle of about 90° therebetween, said slots intersecting at the apex of said included angle and terminating in a radial slot extending through the surface of one of said face flanges.

4. A reel comprising two hollow cylindrical hubs, one of said hubs having a diameter larger than that of the other of said hubs and said hubs being telescoped into closely adjacent concentric relation with each other, each of said hub portions having a face flange at one end thereof, said face flanges being positioned at opposite ends of said concentric hubs at right angles to the longitudinal axes thereof and in parallel relation to each other, the inner small diameter hub having an offset portion of V-shape cooperating with a cut-away portion of V-shape in the outer large diameter hub to form a pair of inclined slots extending through both of said hubs, said offset and cut-away portions cooperating to provide a substantially uniform outer peripheral hub surface transversely between said face flanges, each of said slots transecting an angle of about 45° with respect to the longitudinal axes of said hubs and having an included angle of about 90° therebetween, said slots intersecting at the apex of said included angle and terminating in a radial slot extending through the surface of one of said face flanges.

5. A reel comprising two hollow cylindrical hubs, one of said hubs having a diameter larger than that of the other of said hubs and said hubs being telescoped into closely adjacent concentric relation with each other, each of said hub portions having a face flange at one end thereof, said face flanges being positioned at opposite ends of said concentric hubs at right angles to the longitudinal axes thereof and in parallel relation to each other, the inner small diameter hub having an offset portion formed with a V-shaped cut-away, said offset portion registering with a cut-away portion in the outer large diameter hub, said latter cut-away portion forming a portion of V-shape aligned with the V-shaped cut-away of said offset portion to form a pair of inclined slots extending through both of said hubs, said offset and cut-away portions cooperating to provide a substantially uniform outer peripheral hub surface transversely between said face flanges, each of said slots transecting an angle of about 45° with respect to the longitudinal axes of said hubs and having an included angle of about 90° therebetween, said slots intersecting at the apex of said included angle and terminating in a radial slot extending through the surface of one of said face flanges.

6. A reel comprising two hollow cylindrical hubs, one of said hubs having a diameter larger than that of the other of said hubs and said hubs being telescoped into closely adjacent concentric relation with each other, each of said hub portions having a face flange at one end thereof, said face flanges being positioned at opposite ends of said concentric hubs at right angles to the longitudinal axes thereof and in parallel relation to each other, the inner small diameter hub having an offset portion extending radially outwardly therefrom and registering with a cut-away portion of the outer large diameter hub, said offset and cut-away portions cooperating to provide a substantially uniform outer peripheral hub surface for said outer large diameter hub, portions of said offset and said cut-away being spaced relative to each other to form a slot extending through both of said hubs, transversely between said face flanges.

7. A reel comprising two hollow cylindrical hubs, one of said hubs having a diameter larger than that of the other of said hubs and said hubs being telescoped into closely adjacent concentric relation with each other, each of said hub portions having a face flange at one end thereof, said face flanges being positioned at opposite ends of said concentric hubs at right angles to the longitudinal axes thereof and in parallel relation to each other, the inner small diameter hub having an offset portion extending radially outwardly therefrom and registering with a cut-away portion of the outer large diameter hub, said offset and cut-away portions cooperating to provide a substantially uniform outer peripheral hub surface for said outer large diameter hub, portions of said offset and said cut-away being spaced relative to each other to form a pair of immediately adjacent slots extending through both of said hubs, transversely between said face flanges.

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