Nov. 29, 1966 M. GOLDBERG 3,288,392

FILM REEL

Filed Nov. 27, 1964

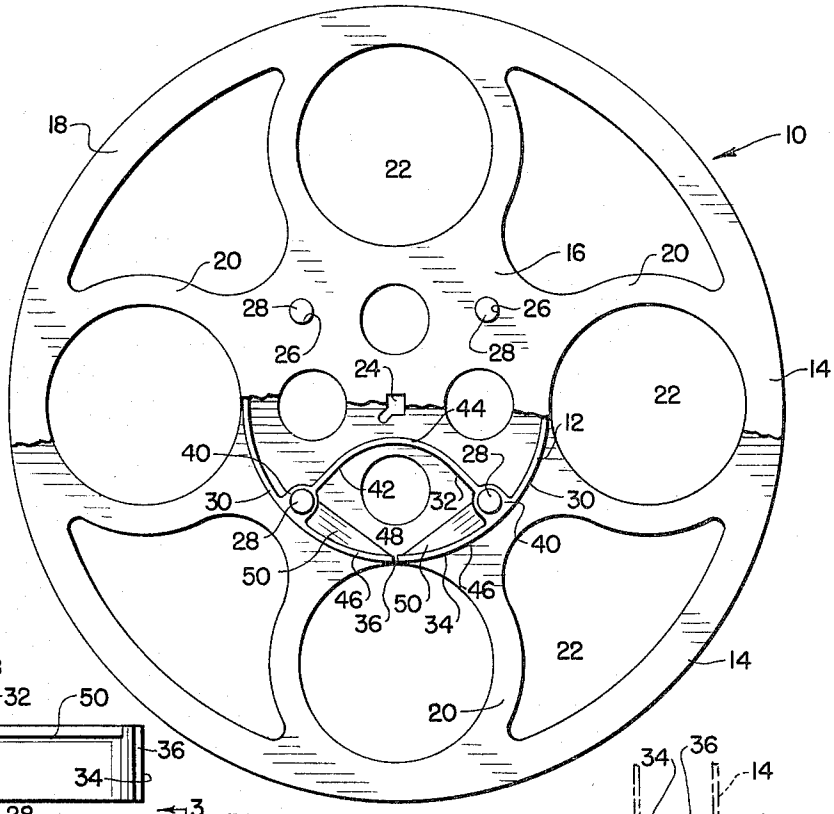


FIG. 1

FIG. 4

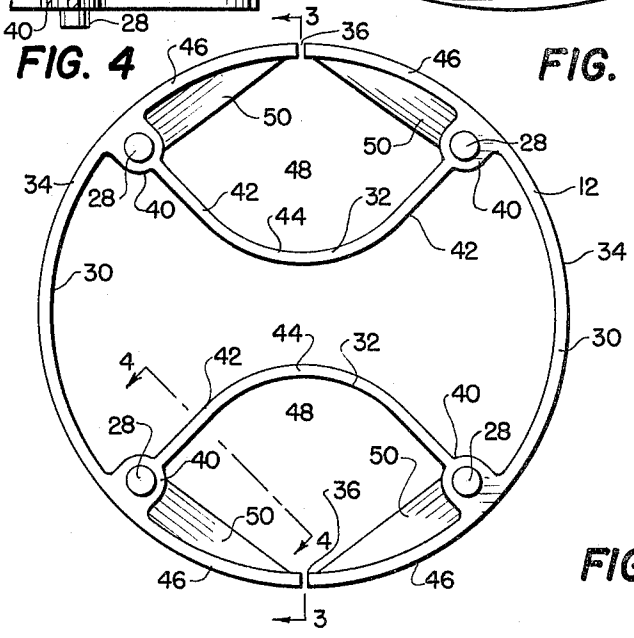


FIG. 2

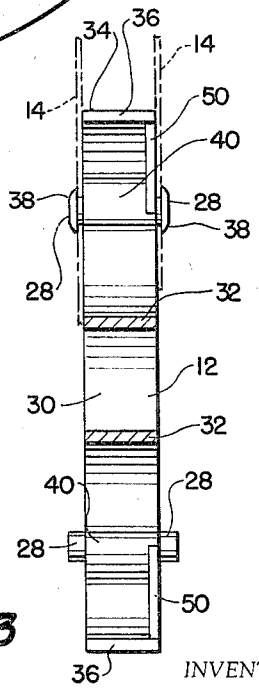


FIG. 3

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FILM REEL

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This invention relates to tape or film storage reels and, more specifically, to improved flange-supporting hubs therefor.

Film and tape storage reels universally comprise some sort of cylindrical hub containing means for fastening a leader thereto that holds a pair of film-coil retaining flanges in fixed spaced relation to one another. In its simplest form, the leader-fastening means comprises nothing more than a slot in the hub adapted to pass the leader end into the interior thereof. Oftentimes, a pair of diametrically-opposed leader slots are provided in the hub so that no more than a half-turn of the reel will bring a slot into position to receive the leader end.

In the past, the practice has been to form the hub of two strips of metal slightly wider than the film or tape to be wound thereon. These strips each have bendable tabs projecting from the side margins thereof that fit into registering slots on the flanges once the strips are formed into a semi-circular configuration. The adjacent ends of the semi-circular hub-forming strips are left spaced apart slightly to produce the leader-fastening slots.

Unfortunately, the above-described construction has proven to be unsatisfactory from several standpoints. To begin with, the core-forming semi-circular strips are difficult to hold in position while the flanges are being mounted thereon. Secondly, the resulting reel structure is not particularly strong and any relative rotational movement between the flanges will oftentimes loosen the bendable tabs to the point where the unit is no longer useful as a film or tape-storage reel. Should a tab break off, the entire reel must be discarded in most instances because one of its flanges will be loose. Also, flange alignment problems result when the tabs are bent over. Even an angular shift of a degree or two in the flanges relative to the hub near the center of the reel becomes quite noticeable at the periphery thereof. While such a shift does not affect the function of the reel, it is unpleasant aesthetically and makes the unit look like it is poorly made.

Ideally, the reel core or hub should be of one-piece construction so as to provide the necessary support for the flanges. A solid core, however, is too heavy and does not provide the hollow interior necessary to receive the leader end. The core should also be rigid and adapted to resist relative angular forces exerted on the flanges as well as those forces tending to separate same. At least one, and preferably two leader slots must be provided in the periphery of the core opening into pockets of substantial size on the interior thereof that can accept at least an inch or so of leader. Upstanding lugs or fasteners on the faces of the core can be used in registering apertures in the flanges to facilitate both alignment and assembly.

It has now been found in accordance with the teaching of the instant invention that these and other objectives can be attained through the use of a hub-forming core having two arcuate semi-circular sections joined together in opposed, spaced end-to-end relation by a pair of incurved bridge-forming ribs that span the gaps between the ends and connect at points spaced therefrom. These ribs are integral and connect with the arcuate sections at points on the core periphery spaced apart angularly approximately 90° thus providing pockets of substantial size beneath both of the leader slots defined between the spaced ends. Additional structural support and rigidity for the "cantilevered" ends of the arcuate sections is provided by

integral reinforcing webs extending from said ends around to the points of rib attachment. Integral lugs project from both faces of the core located at the points where the ribs join the arcuate sections. These lugs pass through corresponding apertures in the flanges and cooperate therewith to align same. If the core is cast from a malleable material, the projecting lug ends can be spread to form integral rivet-type fasteners that have no tendency to shift said flanges angularly relative to one another.

It is, therefore the principal object of the present invention to provide a novel and improved hub-forming core for film and tape-storage reels.

A second objective is the provision of a device of the character above-noted that is of one-piece construction yet preserves all of the advantages of the two-part unit while eliminating its many shortcomings.

Another object of the invention is to provide a reel core that is reinforced to resist angular deflection of the flanges relative to one another.

Still another objective of the invention herein disclosed and claimed is the provision of a reel core carrying integral flange-mounting and aligning studs.

Additional objects of the invention are to provide a storage-reel structure that is simple, inexpensive, rugged, easy to assemble, versatile, lightweight and decorative.

Other objects will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows, and in which:

FIGURE 1 is a side elevation of a film or tape storage reel having portions of one flange broken away to expose the hub-forming core;

FIGURE 2 is an enlarged side elevation of the core alone;

FIGURE 3 is a diametrical section taken along line 3—3 of FIGURE 2; and,

FIGURE 4 is a fragmentary section taken along line 4—4 of FIGURE 2.

Referring now to the drawing for a detailed description of the present invention, reference numeral **10** has been employed to designate the film or tape storage reel in its entirety and it will be seen to include a hub-forming core **12** enclosed on both sides by circular latticed flanges **14**. The flanges **14** are conventional and comprise circular sheet metal stampings cut out to provide a central hub-covering portion **16** connected to a peripheral rim portion **18** by a plurality of ribbon-like webs **20**. The openings **22** left between the webs provide access to the core to facilitate threading of the film or tape leader, not shown. The webs **20** and rim **18**, of course, confine the coils of film or tape wound on the hub.

The hub-covering portion **16** includes a central opening **24** shaped to form a driving connection with the spindle of a moving picture projector in the particular form illustrated, however, the spindle openings in a tape reel are quite often circular and other provision is made for the driving connection.

Each of the flanges also includes a plurality of apertures **26** in the hub-covering central position **16** thereof positioned and adapted to pass the stud-type fasteners **28** projecting from opposite faces of the core **12**. These fasteners will be described in greater detail presently although it is worthy of note that they lie equidistant from the spindle-opening **24** and are equiangularly spaced from one another.

Next, the hub-forming core **12** will be seen to be a unitary casting preferably fabricated from some rigid but malleable metal. This hub includes a pair of semi-circular arcuate bands or straps **30** fastened together by a pair of incurved bridge-forming ribs **32** which maintain said straps in opposed, spaced end-to-end relation. The combined external surfaces **34** of the arcuate bands cooperate to define a smooth cylindrical film-supporting hub inter-

rupted only by the diametrically-positioned leader slots **36**. It is, of course, important that cylindrical surface **34** include no projecting portions that would hold the film or tape away from the hub.

The width of the hub or core **12** apart from studs **28** is just slightly greater than the width of the film or tape to be wound thereon so that it will wind freely between the flanges without bending yet maintain the coils in registering layers. Nothing projects beyond the sides of the reel except the upset heads **38** (FIGURE 3) of the studs and these are so shallow as to present no problem. It should, perhaps, be mentioned in this connection that any substantial projection on the sides of the reel will render them unuseable on many projectors and tape decks because the reels oftentimes run very close to the instrument panels or film-reel supporting arms thereof.

The bridge-forming ribs **32** connect to the arcuate portions **30** of the core at points spaced well away from the leader slots **36** where integral bosses **40** are provided. In the preferred form illustrated herein, the bosses **40** are displaced angularly 45° on either side of each leader slot **36** thus providing four bosses in all spaced 90° from one another. The studs **28** project from these bosses in both directions with their axes lying in spaced parallel relation to the axis of reel rotation and equidistant therefrom.

As shown, the bosses lie inside the hub and point generally toward the center thereof. The incurved ribs **32** include an inwardly-extending radial section **42** that merges short of the hub-center with curved connecting section **44**. Thus, the bridge-forming ribs have the center of the core open to pass the reels mounting spindle and also cooperate with the cantilevered portions **46** of the arcuate sections **30** that extend between the bosses **40** and the leader slots **36** to define a rather sizable leader pocket **48** inside the hub. Thus, a substantial length of the leader end can be passed into pocket **48** in the core.

The prime function of the bridge-forming webs **32** is, of course, to make a unitary structure out of the two half-sections of the core. In addition, they provide additional strength for the unit and greatly facilitate mounting of the flanges, the latter being merely mounted on the studs preparatory to upsetting same. Furthermore, exact alignment of the flanges is assured.

There remains a weak point in the structure just described, namely the cantilevered ends **46** of the arcuate hub sections which are supported at only one end and, therefore, are the most vulnerable to breakage. Considerable strain may be placed on these ends when the leader is tensioned and additional reinforcement thereof is desirable. This is provided by integral webs **50** that extend from the bosses **40** to the near edge of the leader slots **36** on the inside of the cantilevered portions **46**. These webs provide the much-needed reinforcement for these cantilevered hub ends; yet, they do not interfere appreciably with the pockets **48** that receive the leader end. To lessen the possibility of the webs catching on the leader end and preventing same from threading properly, the webs **50** are preferably all located on one side of the hub as shown most clearly in FIGURES 3 and 4 rather than centrally.

The remaining feature of the core that requires additional explanation are studs **28**. As previously mentioned, if the core is fabricated from some malleable metal, the studs **28** can be upset once the flanges are in place thereon thus providing integral fasteners rather than mere positioning lugs which must be supplemented by some other type of loose fastener. All eight studs can, of course, be upset simultaneously greatly decreasing the assembly time. Each stud is backed up by one of the bosses **40** so that there is no danger of damaging the core while fastening the flanges thereto.

Having thus described the several useful and novel features of the film and tape storage reel core of the present invention, it will be seen that the many worthwhile objectives for which it was developed have been achieved. Although but a single specific embodiment of the invention has been illustrated and described herein, I realize that certain changes and modifications therein may well occur to those skilled in the art within the broad teaching hereof; hence, it is my intention that the scope of protection afforded hereby shall be limited only insofar as said limitations are expressly set forth in the appended claims.

What is claimed is:

1. A hub-forming core for film and tape storage reels of the type having a pair of disk-shaped flanges fastened to opposite faces of said core in fixed spaced relation to define a continuous annular film or tape coil retaining groove therebetween which comprises: a pair of rigid arcuate semi-circular straps of a width corresponding to the width of the tape or film to be wound thereon arranged in coplanar opposed end-to-end spaced relation producing a smooth cylindrical hub interrupted at diametrically-opposed points by transverse leader slots defined between the spaced ends thereof, a pair of non-intersecting bridge-forming ribs interconnecting the arcuate hub producing straps at points spaced on opposite sides of the leader slots to form a leader-end pocket therebeneath, and means for fastening the reel flanges to the core located on both faces of the latter at the juncture of the ribs and straps.

2. The hub-forming reel core as set forth in claim **1** in which: the bridge-forming ribs comprise rigid incurved bands spaced on opposite sides of the hub center.

3. The hub-forming reel core as set forth in claim **1** in which: each bridge-forming rib connects with the semi-circular straps at points spaced angularly on opposite sides of one of the leader slots approximately 45°.

4. The hub-forming reel core as set forth in claim **1** which includes: integral bosses formed at the juncture between the ribs and straps, and integral reinforcing webs located within the leader-end pockets extending between the bosses and the near edge of the adjacent leader slot in supporting relation to the cantilevered strap ends.

5. The hub-forming reel core as set forth in claim **1** in which: the flange-fastening means comprise integral studs.

6. The hub-forming reel core as set forth in claim **1** in which: the flange fastening means comprise integral studs, said studs together with the bridge-forming ribs and semi-circular straps comprise a unitary malleable casting, and said studs are adapted to be upset in rivet-like fashion for purposes of attaching the flanges to the core.

7. The hub-forming reel core as set forth in claim **4** in which: the flange-fastening means comprise integral studs projecting from opposite sides of each boss.

8. The hub-forming reel core as set forth in in claim **4** in which: the bridge-forming ribs, semi-circular straps, bosses, reinforcing webs and flange-fastening means comprise a unitary malleable casting.

9. The hub-forming reel core as set forth in claim **8** in which: the flange-fastening means comprises integral studs projecting from opposite sides of each boss and adapted to be upset in rivet-like fashion for purposes of attaching the flanges to the core.

References Cited by the Examiner

UNITED STATES PATENTS

1,009,673	11/1911	Lang	242—74
1,429,692	9/1922	Passavanti	242—74
3,132,822	5/1964	Arthur	242—74 X

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