

Sept. 16, 1969

G. E. BRADT

3,467,339

TAPE REEL WITH RELEASABLE CLOSURE MEANS

Filed Oct. 27, 1966

3 Sheets-Sheet 1

Fig. 1.

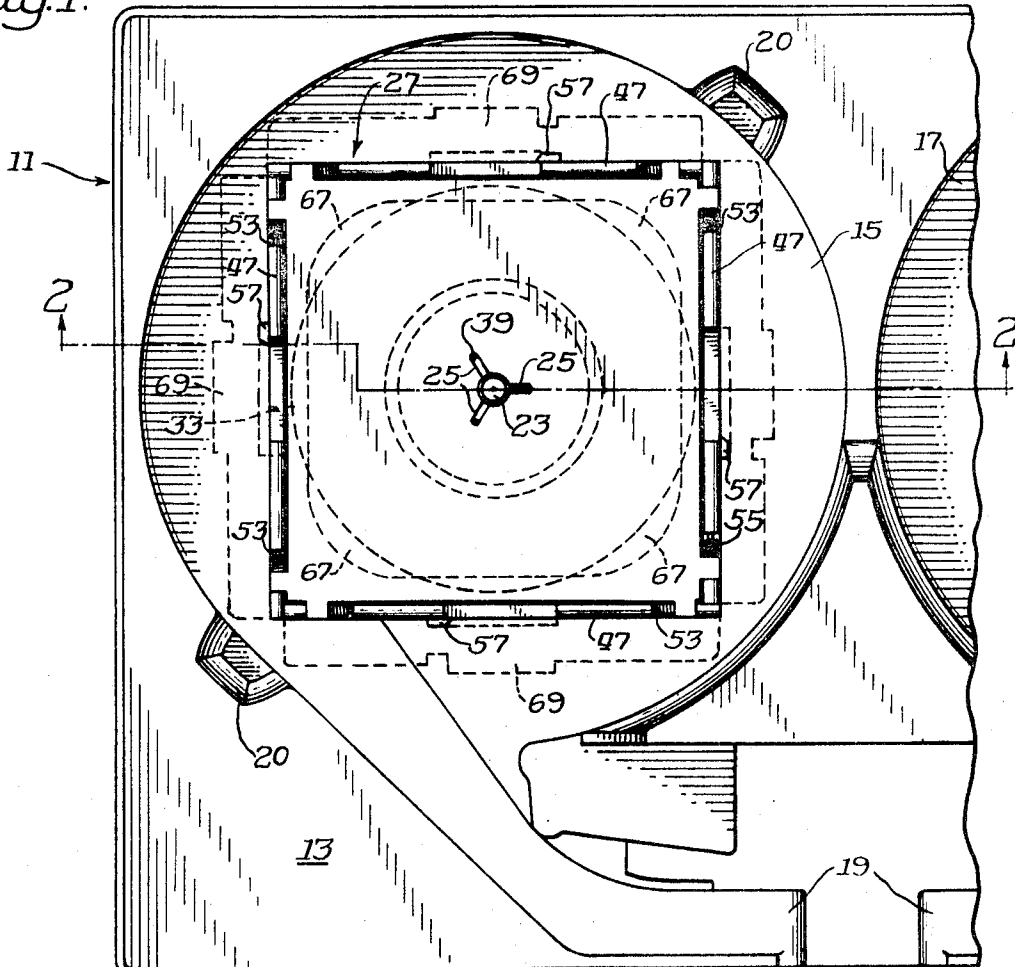
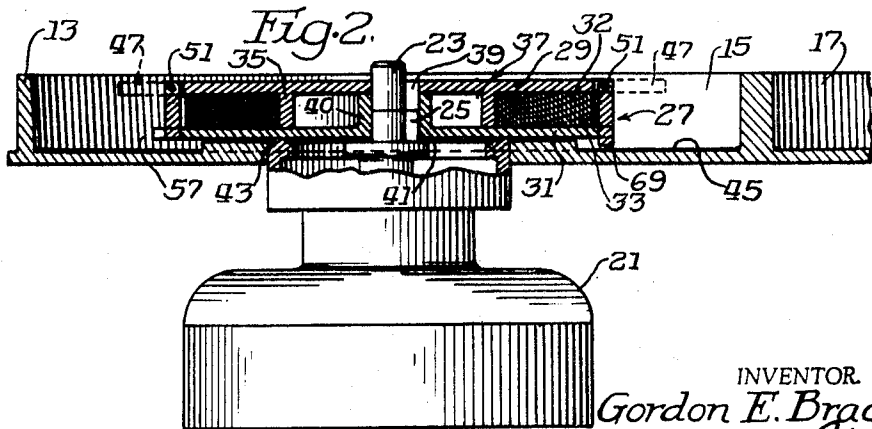


Fig. 2.



INVENTOR  
Gordon E. Bradt  
BY *William F. Runk*  
*John E. Kelley*  
Attys

**Sept. 16, 1969**

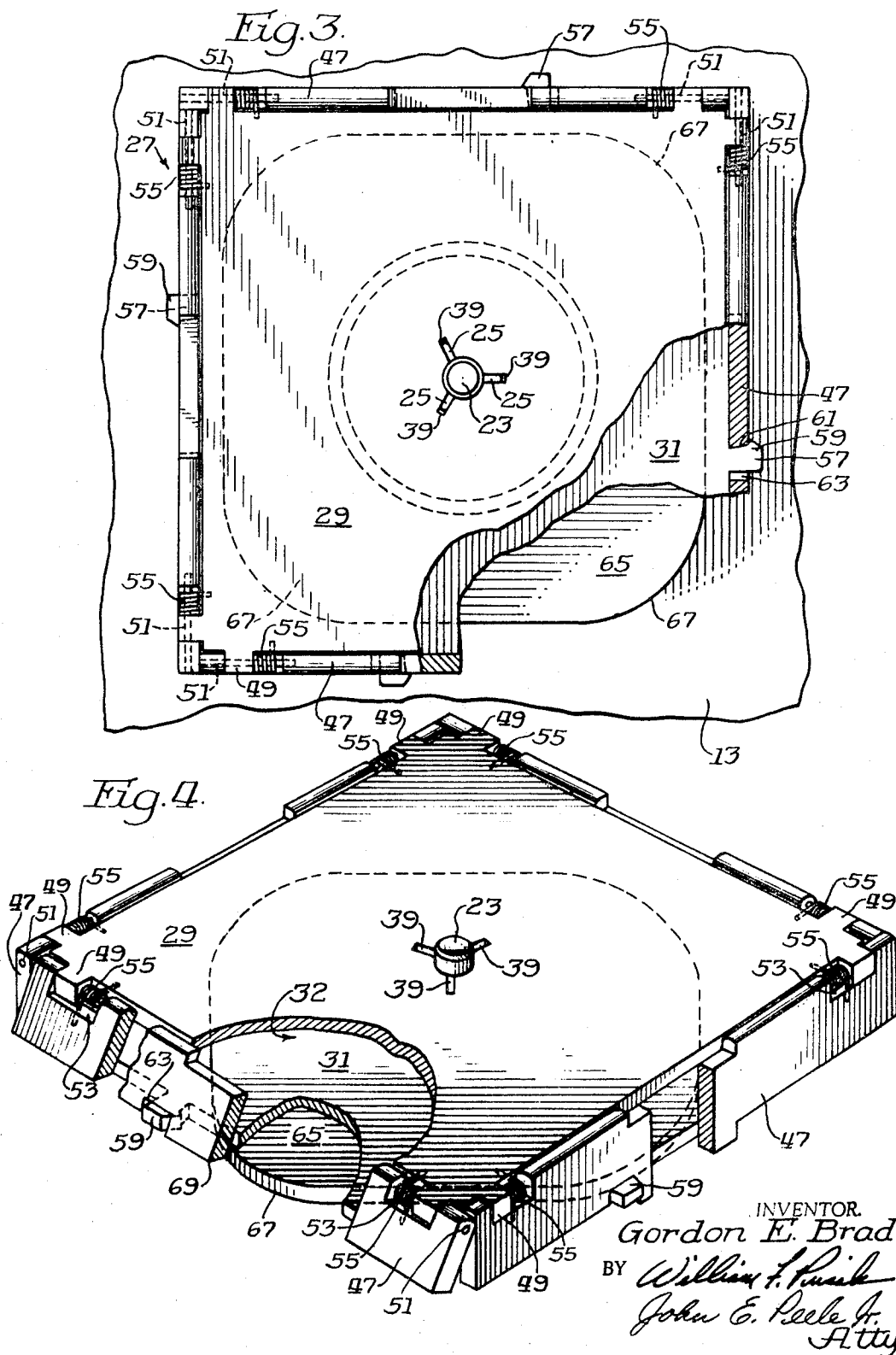
**G. E. BRADT**

**3,467,339**

TAPE REEL WITH RELEASABLE CLOSURE MEANS

Filed Oct. 27, 1966

3 Sheets-Sheet 2



**Sept. 16, 1969**

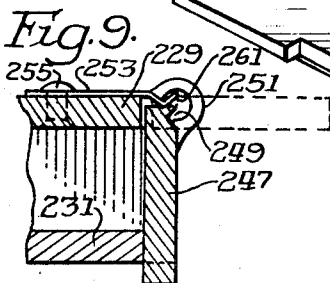
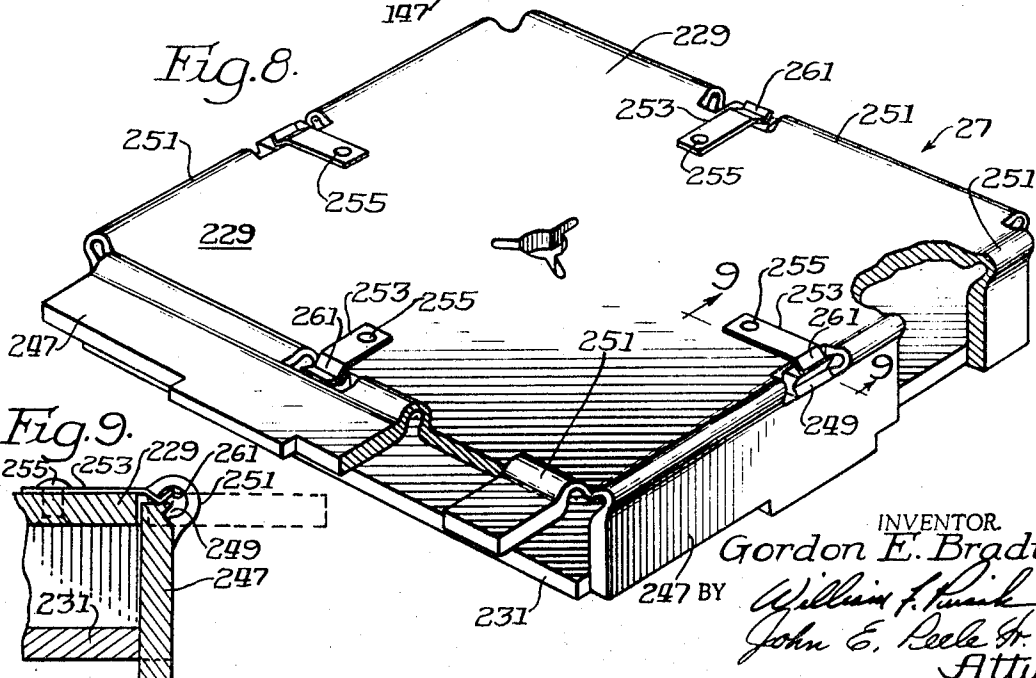
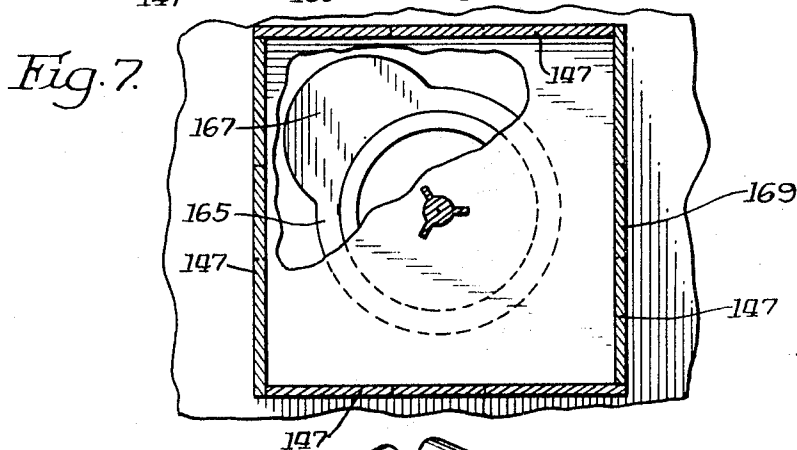
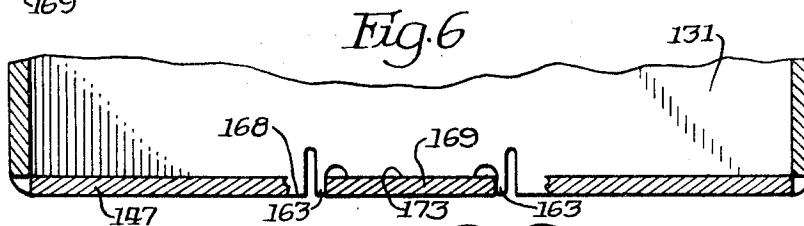
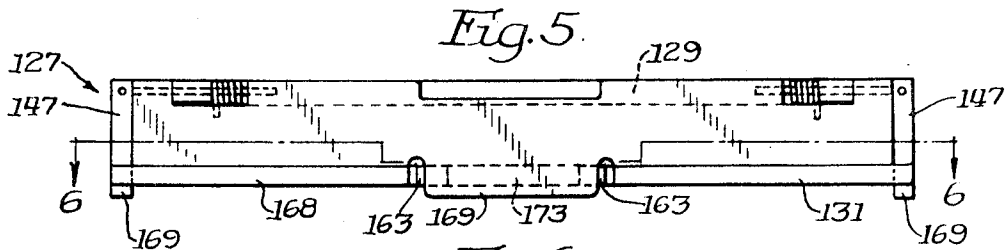
**G. E. BRADT**

**3,467,339**

TAPE REEL WITH RELEASABLE CLOSURE MEANS

Filed Oct. 27, 1966

3 Sheets-Sheet 3



INVENTOR.

*Gordon E. Bradt*

Y *William F. Kuak*  
*John E. Reele Jr.*  
*Attys*

1

3,467,339

## TAPE REEL WITH RELEASABLE CLOSURE MEANS

Gordon E. Bradt, Wilmette, Ill., assignor to Bell & Howell  
Company, Chicago, Ill., a corporation of Illinois  
Filed Oct. 27, 1966, Ser. No. 590,072  
Int. Cl. G11b 15/32; B65h 75/18; B65d 85/04  
U.S. Cl. 242—197

9 Claims

### ABSTRACT OF THE DISCLOSURE

A rotatable reel structure usable on a web handling machine and having flanges on which flaps are movable between an open operative position and a closed storage position in both of which positions they are releasably retained. An opener device on the machine cooperates with and moves the flaps to the open position when the web on the reel structure is to be handled by the machine.

The present invention relates to a reel assembly of the class having wide flanges and adapted for handling elongated webs of the type which are adapted for repeated use rather than consumption. Particularly, the invention relates to a self-storing reel structure which may be used for take-up and supply of a web, for example, a record tape. However, the invention is not limited to such use, notwithstanding its description herein such environment.

The customary round profile of conventional reels of the indicated class necessitates employment of an additional structure to facilitate reel storage. Conventionally, a container conforming somewhat to reel configuration but having a peripheral flat is used. The flat facilitates economical storage by enabling a reel to stand erect on a shelf, while the container itself serves to provide a relatively dust-free reel environment.

Need is caused by conventional storage means for a plurality of manual operations between successive uses of a reel which is stored after each use. Although attempts heretofore have been made to devise means for minimizing reel handling between uses, no prior self-storing reel which also provides a dust-free environment during storage can be considered labor-free in terms of its need for web and reel conditioning for and following use.

In accordance with the present invention and as an object thereof, there is provided an improved self-storing reel construction.

It is a further object of the present invention that the self-storing reel construction comprise a novel combination flanged spool for a web and a closure.

Another object of the invention is the provision of a reel structure having parallel spaced-apart reel flanges defining a web chamber and closure means associated with said flanges and adapted to cover and uncover the web chamber, whereby a therein wound web may be selectively made available for use and enclosed in a relatively dust-free environment when not in use.

A still further object of the invention is the provision of fastening means for releasably securing closure means in chamber-closed condition, and release means adapted for manual and automatic operation for opening closure means.

The foregoing and other objects, features and advantages of the present invention will become more apparent upon consideration of the following description when considered in conjunction with the accompanying drawings wherein the same reference character or numeral refers to like or corresponding parts throughout the several views.

On the drawings:

FIG. 1 is a top plan view of a portion of a record tape

2

player, having thereon arranged in operative condition a web reel embodying one form of the present invention, parts being in dashed line for the purpose of illustration.

FIG. 2 is a planar projection composite of views taken substantially on the vertical planes designated by the line 2—2 of FIG. 1 and looking in the direction of the arrows.

FIG. 3 is a plan view of the reel, enlarged from FIG. 1, parts being broken away for the purpose of illustration.

FIG. 4 is a perspective view of the reel, rotated from the position of FIG. 3 to a closure-unlatching condition.

FIG. 5 is a side elevational view of a modified form of the reel.

FIG. 6 is a planar projection of a sectional composite of an end portion of a modified reel when viewed along the horizontal planes designated by the line 6—6 of FIG. 5 and looking in the direction of the arrows.

FIG. 7 is a plan view of the modified form, parts being broken away for the purpose of illustrating a further modification of the closure-unlatching mechanism.

FIG. 8 is a perspective view of a further modification of the reel.

FIG. 9 is a horizontal sectional view taken substantially on line 9—9 of FIG. 8 and looking in the direction of the arrows.

Referring now more particularly to FIGS. 1 and 2, there is seen a portion of a web handling device herein illustrated as a record tape player generally designated 11. The record tape player comprises an upper deck 13 having a pair of horizontally disposed adjoined upwardly opening wells 15 and 17, only a portion of the latter being seen. While the wells 15 and 17 may serve in reversible capacity, herein, the well 15 provides a supply chamber while the well 17 provides a take-up chamber. Communicatively connected with each of wells 15 and 17 is a channel 19 which is fashioned in the deck 13 to guide a record tape from one well 15 to the other well 17 past an indicia-sensing head (not shown) which may be of conventional construction. Deck 13 may be recessed to provide finger holes 20 which communicatively connect with the wells 15 and 17 to facilitate reel manipulation.

A housing of a spindle drive assembly 21 (FIG. 2) is mounted below the deck 13. A vertical spindle 23 which is rotationally driven by said drive assembly projects upwardly from the latter into the center of the chamber 15. A plurality of vertical radially extending keys or splines 25 are co-rotationally carried with said spindle.

A reel generally designated 27 and herein being a web supply member is rotationally arranged in the well 15. Said reel comprises parallel upper and lower reel flanges 29 and 31. They are shown as being of rectilinear profile, preferably square. Between the flanges arranged substantially parallel with one another, a web chamber 32 is proportioned to accommodate the width of a web 33 (FIG. 2) which has been coiled in a customary manner about the reel hub 37.

In the present embodiment, flange 29 is fashioned with an integral thereto normal outer hub annulus 35 which serves as a spacer against an end of which flange 31 is secured by any suitable means, such as cement. Flange 29 has a central opening (which is obscured by the spindle 23 in FIGS. 1, 3 and 4) from which radiate a plurality of recesses 39 (FIG. 3) which are adapted for engagement therein of the upper end portions of the keys or splines 25.

Flange 31 of the present embodiment is fashioned with an integral normal inner hub annulus 40 (FIG. 2) concentric with the outer hub annulus 35 and to the end of which the flange 29 is rigidly secured by any suitable means, such as cement. Inner hub annulus 40 provides an axial passage for the spindle 23. Said inner hub annulus has a plurality of pockets or recesses 41 (only one of which is shown in FIG. 2) which are herein disposed in

vertical alignment and partial registration with the recesses 39. The recesses or pockets 41 are proportioned for snug reception of the keys or splines 25, whereby the reel 27 is mounted in driving relationship with said spindle.

An annular anti-friction reel bearing support 43 (FIG. 2) which projects concentrically with spindle 23 slightly outwardly from the floor 45 of the recess 15 provides a seat on which the flange 31 engages when said reel is disposed in operative position. In the present embodiment, support 43 is shown as an upward projection in the well 15 from the housing of the spindle drive assembly 21.

A closure in the form of a flap 47 is hingedly or pivotally connected to each side of the reel flange 29. For that purpose, a mounting or journalling lug 49 (FIG. 4) which may be of integral fabrication with flange 29 projects outwardly from the end portion of each side of said flange. Each lug 49 serves as a mount for a hinge pin 51. The opposite end portions of each flap 47 have a pair of recesses 53, respectively, in the upper or inner flap side to receive the lugs 49 from a corresponding side of flange 29.

Each recess 53 is proportioned to accommodate a biasing spring 55 which is disposed adjacent an associated lug 49 and coiled about a corresponding hinge pin extension. The opposite ends of each spring 55 engage, respectively, an associated flange 29 and an adjoining flap 47, the springs 55 being coiled and arranged to bias the flaps to open condition. The association or arrangement of the flaps and the reel flange 29 is such that under spring biasing action when the flaps are completely open, as illustrated in the dashed lines in FIGS. 1 and 2, said flaps will be disposed coplanar with said last flange and thereby permit web removal from chamber 32 as the reel is spindle-rotated in a playing direction.

Fully closed position of the flaps 47 is indicated in solid line, and fully open position of said flaps is indicated in dashed lines, in FIGS. 1 and 2. A partially open condition of one of the flaps is illustrated in FIG. 4. The flaps are arranged in overlapping end-to-end relationship with each flap extending normally to a pair of adjoining flaps. Moreover, the flaps are arranged in a general rectilinear association, substantially defining a square in the present embodiment when closed, with one end of each flap overlapping an adjoining end of one adjacent flap in a manner such that each flap has one overlapping end and one overlapped end. Furthermore, the flaps are proportioned in a manner such that what is considered the height of each flap is adequate to substantially completely close or cover the web chamber 32, as illustrated in solid line in FIG. 2. Obviously, more or less than the disclosed four flaps can be used, if desired.

An interlockable latch 57 which may be integral with flange 31 projects outwardly from a medial part of each flange side. Each latch has a slightly enlarged or undercut head 59. (FIGS. 3 and 4), whereby a slight snap trough 61 is formed between latch head 59 and its flange 31. Extending inwardly from what may be considered the lower or outer side of each flap 47 is a recess 63 (FIG. 3) which is disposed for snapping interlocking reception of a corresponding latch head as such flap is swung or moved from open to closed position. When the reel is conditioned as in FIG. 3 and in the solid line positions of FIGS. 1 and 2, flaps 47 are disposed normally to reel flanges 29 and 31, and said reel serves as its own container maintaining the web dust free and preventing the web from unreeling. The reel may be thusly stored without an additional container.

Said reel may be proportioned for use on a conventional record tape player of the type normally accepting circular profiled reels. In such event prior to record play, the flaps will require manual unlatching by snapping them over the latch heads 59, all interlocking parts preferably being fabricated to yield easily. More sophisticatedly, the record player 11 may be modified to automatically unlatch the flaps.

In the embodiment illustrated in FIGS. 1-4, inclusive, automatic unlatching of flaps is accomplished by elevating the floor 45 about the spindle 23 to form a flat or plate 65 which is spaced slightly below the play position of reel flange 31. The annular reel bearing support 43 serves to slightly space the reel from said flat or plate 65. The plate or flat 65 is proportioned to provide a plurality (four in FIG. 1) of latch trips which are shown as cam or throw projections or surfaces 67 which will be overhung by the reel when it assumes certain angular aspects, as in FIGS. 1 and 2. Cam surfaces 67 will extend slightly beyond the periphery of flange 31 when the reel assumes other aspects, as in FIG. 4. An integral boss 69, which is considered as projecting downwardly or outwardly from each flap, is proportioned to hang below said flat or plate 65 when such flap is closed. Each boss is proportioned for engagement with an adjacent cam surface 67 upon rotation of the reel. The cam surfaces are proportioned to apply outward pressure of unlatching magnitude on the closed flaps when engaged by rotating bosses 69, as illustrated in FIG. 4.

It is not necessary, however, to provide four cam surfaces 67 in order to open chamber 32. In the modified form of FIG. 7, the plate 165 (which corresponds to plate 65) is fashioned to provide only a single throw or cam projection 167. The latter is adapted to unlock all of the flaps successively as the reel 27 rotates to carry each flap past a single flap-unlocking station.

Referring now to the modification in FIGS. 5 and 6, it is seen that a reel generally designated 127 comprises what is considered an upper flange 129 and a lower flange 131, said flanges being parallel and spaced apart vertically or axially. Spring-biased flaps 147 are hingedly connected to flange 129 in a manner which is shown as being the same as that for the connection of the flaps 47 to the flange 29. Flaps 147, however, are releasably secured in container-forming association by different means than are used to secure flaps 47. In the modified form, each side of the lower flange 131 is cut away to provide a pair of spaced apart resilient fingers 163 extending to the edge of flange 131. A recessed flat 173 extends between each pair of fingers. An integral projection 169 extends from each flange 147 and is proportioned and arranged for frictional and releasable engagement between each pair of resilient fingers 163. The disposition of each flat 173 is such that when its associated projection 169 is fully engaged in its recess, in the manner illustrated in FIG. 6, to close the reel chamber, flaps 147 will be disposed normal to the flanges 129 and 131.

As illustrated in FIG. 5, each part or boss 169 is seen to be adapted for engagement by a latch trip or cam surface 167 to disengage the flaps 147 from retained position.

In the further modified reel form shown in FIGS. 8 and 9, a flap 247 is fabricated integrally with each of the sides of the upper reel flange 229 to which said flaps are hinged by means of marginal lines of thinned material 251. The character of the material is such that the flaps 247 are biased toward the plane of the flange 229. The thinned material facilitates bending of the flaps to condition them normally to the reel flanges 229 and 231 to closed position by manipulation from the dashed line to the solid line position of FIG. 9.

To insure retention of the flaps 247 in a co-planar attitude, a medial part of the inner edge portion of each thereof is fashioned with a groove 249. A leaf or band spring 253 is associated with each flap 247 and has one end portion suitably connected by a fastener, such as a rivet 255, to the reel 229. An outer end portion 261 of each of said leaf springs is fashioned as a V-shaped detent which overhangs an associated flap when the same is in closed position. Each detent 261 is proportioned for snap fit into or friction retention in an associated groove 249 to hold its flap at open attitude in co-planar association with reel flange 229. Each groove 249 and its associated detent is constructed so that upon application of suitable

manual pressure its flap will spring the detent 261 to permit closing of the reel to container condition.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A rotatable reel structure adapted as a take-up and supply member for a web and the like and comprising:

first and second axially spaced apart flanges;

extendable flap means associated with said flanges for repeatable movement between an open position substantially co-planar with one of said flanges and a closed position in substantially normal disposition to said flanges to cover the space between said flanges; biasing means arranged to urge said flap means toward open position; and

means associated with said flap means and said flanges for releasably retaining said flap means in closed position.

2. A reel structure as defined in claim 1 in which said flap means comprise a plurality of closure members, said means for releasably retaining said closure members in closed position comprising an interlocking mechanism associated with one of said flanges.

3. A reel structure as defined in claim 1 in which said flap means is hingedly connected to one of said flanges, said biasing means including spring means arranged adjacent said flap means to impress an extending torque to open said flap means.

4. A reel structure as defined in claim 1 in which said flap means comprises a plurality of closure members and includes means for cooperation with spring means associated with one of said flanges for releasable retention of said closure members in open condition.

5. A reel structure as defined in claim 1 and further characterized in that said means for urging said flap means toward open position is a resilient strip fashioned integrally with one of said flanges.

6. A reel structure as defined in claim 2 further characterized by lug means arranged for co-rotation with said reel structure and adapted for engagement to release said interlock mechanism.

7. A web handling device for management of a web reel having a pair of axially spaced apart flanges, flap means associated with said flanges for movement between an open position substantially co-planar with one of said flanges and a closed position, said web handling device comprising support means defining a rotational axis for said reel and throw means arranged adjacent said reel to unlock interlocking means and condition said flap means for opening.

8. A web handling device as defined in claim 7 in which said support means defines a bearing surface adapted for rotational support of the other of said flanges in overhanging association, said throw means disposed beyond said bearing surface adjacent said last mentioned flange for engagement by said interlocking means as said reel rotates.

9. A reel structure as defined in claim 1 in which the flap means comprise a plurality of flat regular closure members which define a parallel-sided container when closed.

#### References Cited

#### UNITED STATES PATENTS

1,531,305	3/1925	Nye	-----	242-71.1	X
1,691,995	11/1928	Saulter.			

GEORGE F. MAUTZ, Primary Examiner

U.S. Cl. X.R.

206-52