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Goldstein

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[54] **COLLAPSIBLE REEL**

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[52] **U.S. Cl.**..... **242/115,** 242/118.8, 242/125.1

[51] **Int. Cl.**..... **B65h 75/22,** B65h 75/28

[58] **Field of Search**..... 242/118.8, 118.7, 115, 242/118.4, 118, 125.1, 100; 206/52 R

[56] **References Cited**

UNITED STATES PATENTS

84,919	12/1868	Valentine et al.	242/100
335,749	2/1886	Fries	242/118.8
1,324,172	12/1919	Rau	242/118.7
2,413,966	1/1947	Greisman	242/118.7
3,138,345	6/1964	Luber	242/125.1
3,284,022	11/1966	Eifrid	242/118.8
3,307,802	3/1967	David	242/118.8

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[57] **ABSTRACT**

A collapsible light weight reel having good load-supporting properties comprising a pair of flanges and a core, the latter including two axially spaced parallel members each with a central panel, coextensive side panels pivotally secured thereto along axial fold lines and tabs pivotally secured to the ends of the central panel along transverse fold lines, the tabs extending through appropriate openings in the flanges and being secured thereto whereby the reel can be collapsed to a substantially flat inoperative position and erected to an operative position by a parallelogram action. The confronting side panels of the two core members are overlapped in the fully erect position and the abutment of the ends of these side panels against the inner faces of the flanges rigidifies the structure.

9 Claims, 9 Drawing Figures

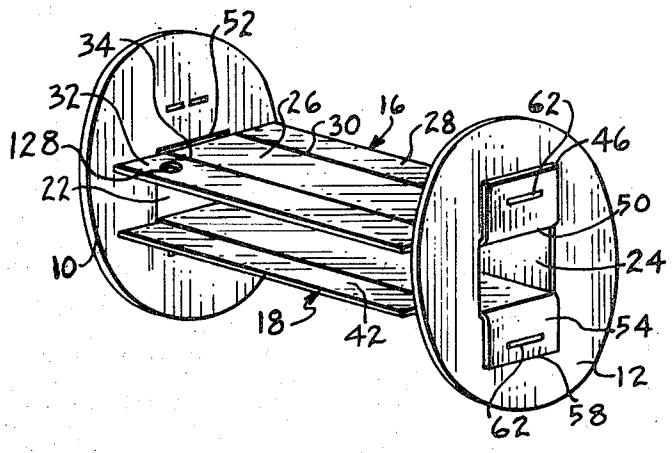


FIG. 1.

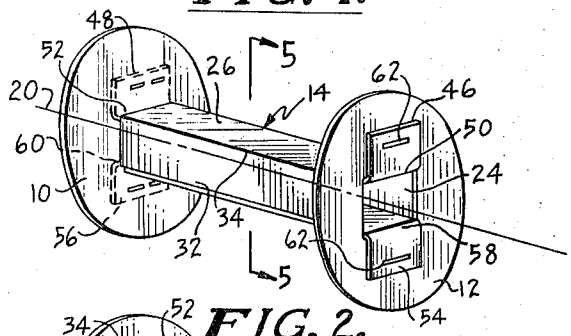


FIG. 2.

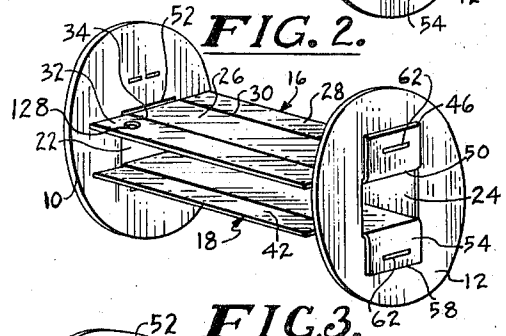
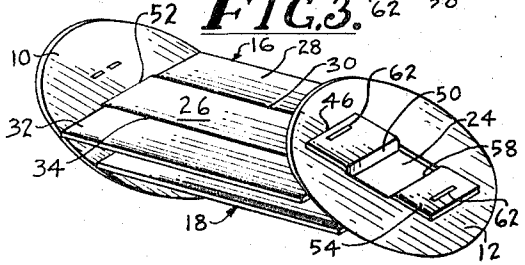


FIG. 3.



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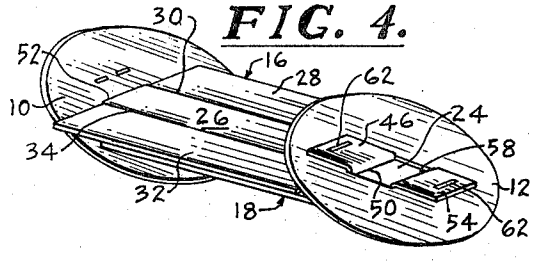
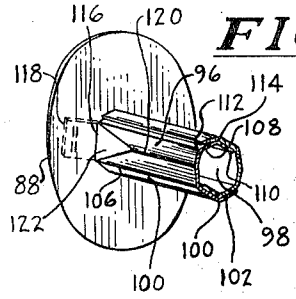


FIG. 9.



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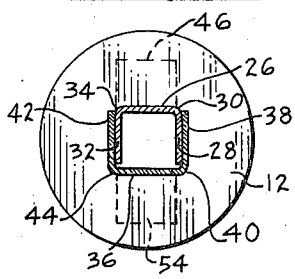

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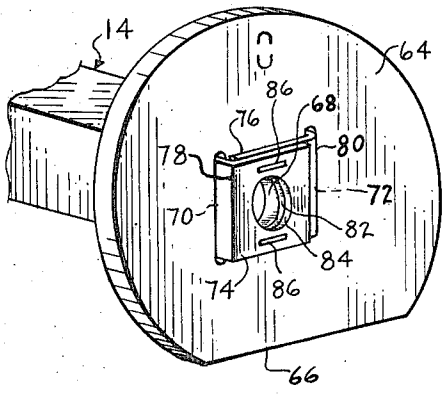


FIG. 7.

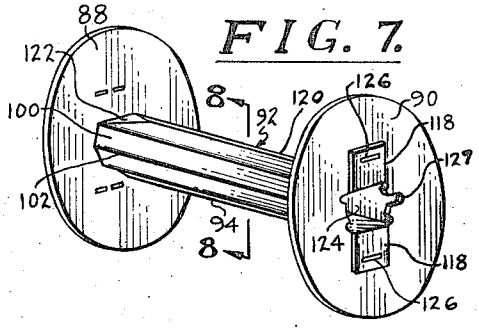
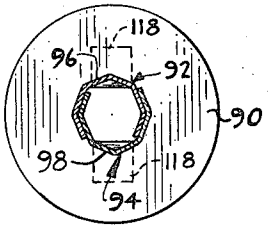


FIG. 8.



COLLAPSIBLE REEL

This invention relates to collapsible reels for retaining flexible material such as plastic or rubber hose, extrusions, packings, cable, tape, ribbon, rope and the like.

The primary object of the invention is to provide a reel capable of being manufactured economically of light weight materials such as coated or uncoated paperboard and plastics and so constructed that the reel can be readily and easily collapsed to an inoperative flat position for space-saving in storage and transportation and readily and easily erected to an operative, sturdy, effective load-supporting position for reeling flexible material.

Another object of the invention is to provide a collapsible reel having spaced flanges and a core comprised of a pair of spaced members on opposite sides of the axis which extends through the flanges, each member having a central panel which is pivotally secured at its ends to the flanges around transverse score lines and side panels which are pivotally secured to the central panel along axial fold lines, so that the reel can be collapsed in parallelogram fashion to a substantially flat position and can be erected to a load-supporting position by having the side panels of one member overlap the confronting side panels of the other member.

Another object of the invention is to provide a collapsible reel of the character described including means to easily effect the attachment of one end of the hose or other flexible material thereto to facilitate the reeling operation. To provide a hole into which to thread the hose or flexible material to facilitate reeling in one of the flat members of the present invention is less difficult than to provide such a hole in a conventional tubular core of a reel.

Another object of the invention is to provide a collapsible reel of the character described in which the flanges are provided with non-circular holes for the receipt of a non-circular shaft to eliminate slippage in the reeling operation.

Another object of the invention is to provide a collapsible reel of the character described in which the central panels of each member are secured to the flanges by means which reinforce the shaft-receiving openings of the flange.

Yet another object is to provide a collapsible reel of the character described in which there are a plurality of side panels secured by axial score lines to the central panel so that in the erected form the core has a substantially rounded contour required for certain applications.

These and other objects of the invention will become more apparent as the following descriptions proceeds in conjunction with the accompany drawings, wherein:

FIG. 1 is a perspective view of a reel embodying the instant invention shown in its fully erected form;

FIG. 2 is a perspective view showing the first stage in collapsing the reel;

FIG. 3 is a view similar to FIG. 2 showing an intermediate collapsing stage;

FIG. 4 is a view similar to FIG. 2 showing the final collapsed stage;

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 1;

FIG. 6 is a fragmentary perspective view looking at the flange of a modified form of the invention;

FIG. 7 is a perspective view similar to FIG. 1 of yet another form of the invention;

FIG. 8 is a sectional view taken on the line 8—8 of FIG. 7; and

FIG. 9 is a fragmentary perspective view of the form of the invention shown in FIGS. 7 and 8.

Specific reference is now made to the drawings in which similar reference characters are used for corresponding elements throughout.

Referring first to FIGS. 1–5, the collapsible reel may be made of paper stock, plastic and the like light weight but rigid material, and comprises a pair of flanges 10 and 12 pivotally interconnected by a core 14 extending axially between the flanges. The preferred shape of the flange is circular although modified shapes may be employed as will appear hereinafter.

The core comprises a pair of members 16 and 18 which extend generally parallel to each other and are spaced equally from the axis 20 extending between the flanges and through the non-circular openings 22 and 24 provided centrally in the flanges.

The member 16 includes a central panel 26, a first coextensive side panel 28 pivotally secured to one axially extending edge of the central panel by a fold or score line 30 and a second coextensive side panel 32 pivotally secured to the opposite axially extending edge of central panel 26 by a fold or score line 34. Similarly, the other member 18, see FIG. 5, includes a central member 36 having a first coextensive side panel 38 pivotally secured to one axially extending edge of the central panel by a fold or score line 40 and a second coextensive side panel 42 pivotally secured to the other axially extending edge of the central panel by a fold or score line 44.

The central panel 26 of the member 16 includes end tabs 46 and 48 which are pivotally secured to the ends of the central panel by transverse fold or score lines 50 and 52. Similarly, the central panel 36 of the member 18 includes end tabs 54 and 56 which are pivotally secured to the ends of the central panel by transverse fold or score lines 58 and 60.

In assembly, the end tabs 46, 48, 54 and 56 are passed through the flange holes 22 and 24 and bent back against the outer faces of the flanges there to be secured by staples 62 or other securing means such as rivets, adhesive and the like. In use, the reel can be completely collapsed as shown in FIG. 4 wherein the core member 16 lies flat against the core member 18, the flange 10 lies flat beneath the core member 18 and the other flange 12 lies flat over the core member 16. To unfold the reel, the flanges are grasped in the opposite hands and both are rotated clockwise to the erect position about the transverse fold lines 50, 52, 58 and 60 of the end tabs 46, 48, 54 and 56 thereby producing a parallelogram action as shown in FIGS. 2 and 3. When the fully erect position of FIG. 2 is obtained, the confronting side panels 28 and 38 are infolded around the axially extending fold lines 30 and 40 respectively and overlapped, and similarly the side panels 32 and 42 are infolded around the axially extending fold lines 34 and 44 and overlapped, as seen in FIGS. 1 and 5. Thus, a core of substantially square cross-section is formed with one set of free edges of the side panels 28, 32 and 38, 40 abutting the inner face of the flange 10 and the opposite set of free edges of the side panels 28, 32 and

38, 40 abutting the inner face of the other flange 12 to thereby hold the reel in a sturdy erect position ready for use.

In the form of the invention shown in FIG. 6, the flanges 64 are circular except for a lower chordal edge 66 to support the reel in an erect position on a table top so as to enable the reeled articles to be displayed with appropriate advertising on the outer faces of the flanges. Instead of a non-circular opening to receive a reel shaft, a circular opening 68 is provided with vertical slots 70 and 72 on both sides thereof. The tabs 74 and 76 which are pivoted along transverse fold lines 78 and 80 to the opposite ends of the central panels of the core member pass through the slots 70 and 72 and overlap each other and the tabs are provided with central circular openings 82 and 84 which register with the opening 68 in the flange to thereby reinforce the opening. The overlapped end tabs are then secured by staples 86 or equivalent means to each other and the flange. If desired, this reinforcing construction can be employed with non-circular openings as well.

In the form of the invention shown in FIGS. 7–9, the flanges 88 and 90 are pivotally interconnected by a core member which when set up in its erect form has a generally circular contour. To accomplish this, the two members 92 and 94 equivalent to the two members 16 and 18 previously described have central panels 96 and 98 and several coextensive side panels foldably secured to each other and to the axial edges of the central panels. Thus, for the central panel 96 there are panels 100, 102 connected by axially extending fold lines 104 and 106 to one side of the panel 96 and panels 108 and 110 connected by axially extending fold lines 112 and 114 to the other side of the central panel. The other central panel 98 is of the same construction as is evident from the drawings.

Secured by a transverse fold or score line 116, see FIG. 9, to each end of each central panel 96 and 98 is an end tab 118. In order, however, to obtain the rounded contour of the core member, the central panel itself contains an axially extending score or fold line 120 which joins the apex of a flat triangular portion 122, which is the portion that is foldably secured to the end tab 118.

In assembly and use, the end tabs 118 are extended through holes 124 in the flanges, this time of a somewhat different configuration than the circular or square holes previously described. The tabs are bent back against the outer faces of the flanges and there secured by appropriate staples 126 or equivalent means. To proceed from the fully collapsed to the fully erect position of the reel, the same operation is used as that previously shown and described except that because of the plurality of axially extending fold lines 100, 106 and 120 for each core member 92 and 94 in excess of three, and preferably five, the overlapping of the side panels of one core member with those of the other core member produces an assembled core member whose outer contour is generally circular, that is the assembled core member is generally cylindrical. If desired, a reinforcing tape (not shown) can be secured coextensively with each core member.

It will also be noted that each flange 88 and 90 is equipped with a small opening 127 which communicates with the larger shaft-receiving opening 124, through which smaller opening, one end of the hose, ribbon or similar flexible material, can be threaded to facilitate the reeling of the material on the core. Such a small opening can, of course, be included in the structures of FIG. 1–6 as well. Also, a threading opening 128 can be provided in one of the side panels 28 or 32 of the core member itself adjacent one flange. The end of the hose, ribbon or similar flexible member can be threaded into the opening 128 before the panels are overlapped to provide the erected operative structure shown in FIGS. 1 and 5, the provision of such an opening 128 in a flat panel being much more easily effected than in a conventional tubular reel core.

While preferred embodiments of the invention have here been shown and described, it will be understood that minor variations may be made without departing from the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A collapsible light weight reel including a pair of flanges having a central aperture through each flange and a core member comprising a pair of generally parallel members spaced on opposite sides of a reel axis extending between the flanges, each parallel member including a central panel, side panels coextensive therewith, means pivotally securing said side panels to the opposite side edges of said central panel for pivotal movement about the reel axis, tabs, means pivotally securing said tabs to the opposite end edges of said central panel only for movement about axes transverse to that of the reel axis, said tabs extending through said apertures of said flanges and means securing said tabs to said flanges so that by parallelogram folding action said reel can be moved from a collapsed position in which said parallel members overlap with one flange underlying and the other flange overlying said overlapped parallel members to a fully erect position in which the end edges of said side panels abut the inner faces of said flanges and said side panels of one parallel member overlap the confronting side panels of the other parallel member, said overlapped side panels being unsecured to each other.

2. The reel of claim 1 wherein said means pivotally securing said side panels to the opposite side edges of said central panel includes axially extending fold lines.

3. The reel of claim 1 wherein said means pivotally securing said tabs to the opposite end edges of said central panel includes transverse fold lines.

4. The reel of claim 2 wherein said means pivotally securing said tabs to the opposite end edges of said central panel includes transverse fold lines.

5. The reel of claim 4 wherein said apertures in said flanges are non-circular and are adapted to nonslippingly receive a non-circular shaft therethrough.

6. The reel of claim 4 and an opening in said flange communicative with said flange aperture and of lesser dimensions for the threading of a flexible member therethrough to initiate the reeling.

7. The reel of claim 4 wherein said central panel includes a further axially extending fold line centrally thereof and flat substantially triangular portions at its ends, the bases of said triangular portions being the transverse fold lines connecting said tabs to said central panel and said further axially extending fold line centrally thereof terminating at the apexes of said triangular portions whereby when the reel is fully erected, the contour of said core will be substantially circular.

8. The reel of claim 7 and at least two sets of side panels on opposite sides of and coextensive with said central panel, each set of side panels having one panel which is secured to the side edge of said central panel by an axially extending fold line and the other panel being secured to said one side panel by an axially extending fold line to thereby provide at least five axially extending fold lines so that when the reel is fully erected, the contour of said core will be substantially circular.

9. A collapsible light weight reel including a pair of flanges having a central aperture through each flange and a core member comprising a pair of generally parallel members spaced on opposite sides of a reel axis extending between the flanges, each parallel member including a central panel, side panels coextensive therewith, means pivotally securing said side panels to the opposite side edges of said central panel for pivotal movement about the reel axis, tabs, means pivotally securing said tabs to the opposite end edges of said central panel for movement about axes transverse to that of the reel axis, slots on both sides of said flange apertures, said tabs extending through said slots and overlapping each other, means securing said overlapped tabs to each other and to said flange, said tabs having apertures therein of the same general contour of said flange apertures and registering with them to thereby reinforce them, so that by parallelogram folding action said reel can be moved from a collapsed position in which said parallel members overlap with one flange underlying and the other flange overlying said overlapped parallel members to a fully erect position in which the end edges of said side panels abut the inner faces of said flanges and said side panels of one parallel member overlap the confronting side panels of the other parallel member.

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