July 20, 1965 H. J. BIEDINGER 3,195,708

ONE PIECE RIBBON SPOOL HAVING AN INTEGRALLY MOLDED REVERSING TRIP

Filed July 29, 1963 2 Sheets-Sheet 1

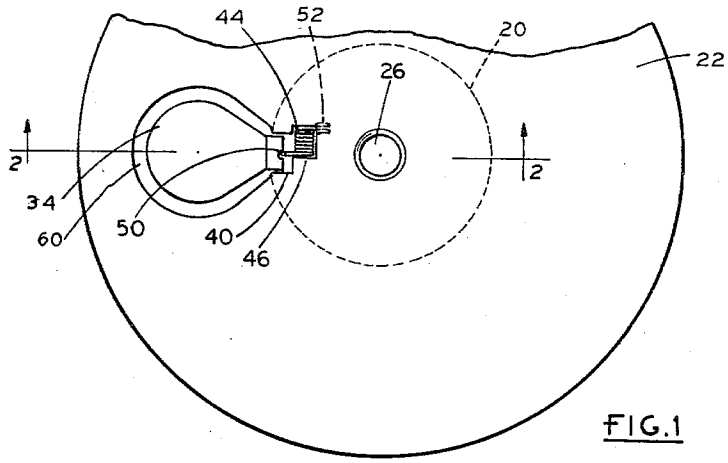



FIG. 1

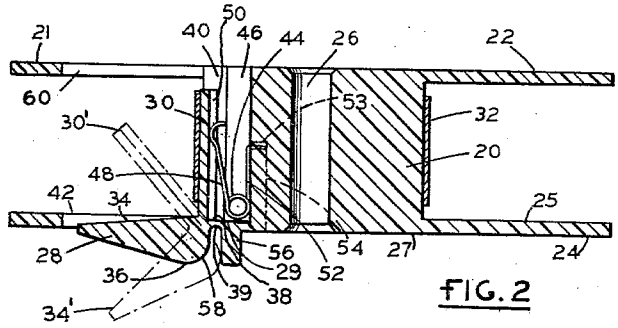



FIG. 2

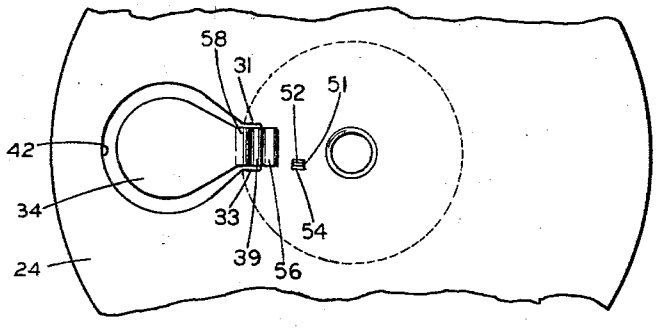



FIG. 3

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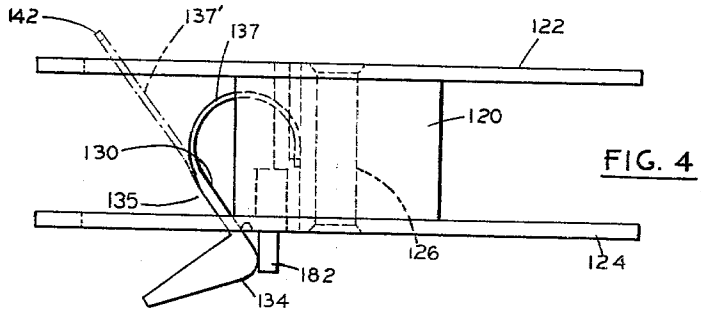



FIG. 4

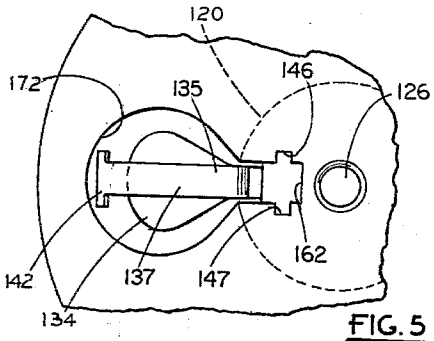



FIG. 5

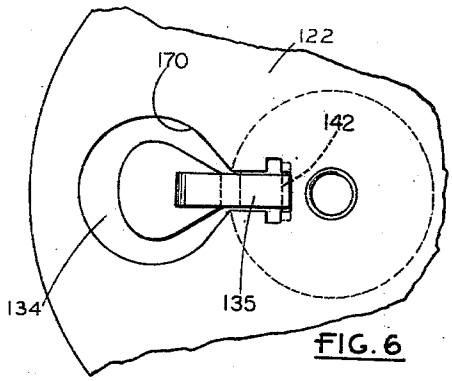



FIG. 6

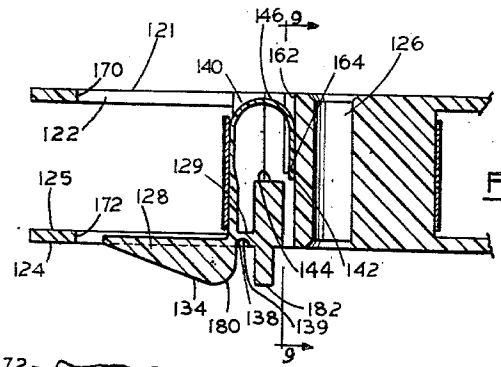



FIG. 7

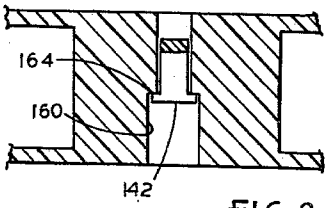



FIG. 9

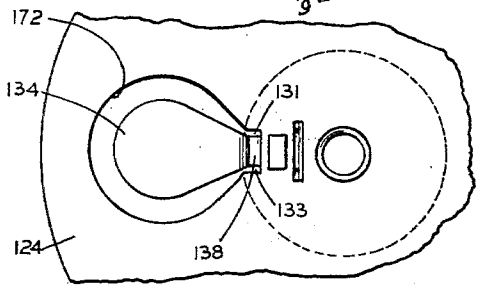



FIG. 8

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3,195,708

# ONE PIECE RIBBON SPOOL HAVING AN INTEGRALLY MOLDED REVERSING TRIP

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4 Claims. (Cl. 197—175)

This invention relates to inked ribbon spools for typewriters and the like, and more particularly to a one piece molded spool including a reversing trip molded integral with the spool.

It has been the practice to form typewriter ribbon spools from sheet metal stampings and to provide the same with a pivoted spool reversing trip that is rendered active as the last convolution of ribbon is unwound from the spool. Such trips have been formed as a separate element and pivoted in ears struck from the sheet metal of one of the side flanges of the spool. With the advent of forming such spools by plastic molding process, the provision of a trip and forming pivots therefor has presented a problem. In Biedinger 2,961,084 and 2,961,083, molded plastic spools having trunnion sockets for a separate metal trip element are shown.

The forming of the trip element, and its assemblage are each items of cost.

The present invention is directed to a molded spool and reversing trip, wherein the trip is an integral part of the spool and molded simultaneously with the spool, and wherein the pivoted movement of the trip between its active and inactive positions is accommodated through the use of a thin membrane of the plastic that is flexible, and acts as a hinge. The spool thus provided requires no assembly of the trip, or the separate operation of forming a trip. The single operation of molding the spool forms the trip.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings wherein like reference characters indicate like parts:

FIGURE 1 is a fragmentary view of a spool taken from one side;

FIGURE 2 is a sectional view taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a fragmentary view of the spool taken from the other side;

FIGURE 4 is an elevational view of a modified form of spool and trip;

FIGURE 5 is a fragmentary view of one side flange of the reel as molded;

FIGURE 6 is a view similar to FIGURE 5, with the strap or ribbon arm folded and locked in position;

FIGURE 7 is a fragmentary sectional view through the spool showing the ribbon convolutions holding the trip inactive;

FIGURE 8 is a fragmentary view of the other side flange of the reel; and

FIGURE 9 is a sectional view taken on the line 9—9 of FIGURE 7.

Referring to the drawings, FIGURES 1 to 3 there is shown a ribbon spool molded in one piece of plastic, such as polypropylene, the spool having a hub or drum 20, flanges 22 and 24, and hub spindle aperture 26. A groove or recess 40 extending parallel with the axis of the spool is formed inwardly from the exterior surface 21 of the



flange 22, and extends to the plane of the inside surface 25 of the flange 24, as at 29. Spaced slits 31 and 33 at the sides of the groove extend through to the outside surface 27 of the flange 24. The slits define a membrane hinge portion 38, which is molded integral with the spool and trip which is normally L-shaped 28. The trip comprises a pad 34 adapted to lie in the recess 42 in the flange 24, the recess 42 extending to and joining with the slits 31 and 33. The heel portion of the trip, where the pad 34 and arm 30 join, may be thickened as at 58, and the outside wall 27, may have a projection 56, adapted to engage the thickened heel to prevent angular movement of the trip 28, beyond its operative position indicated by the dotted lines at 34'. The membrane hinge portion as at 38 may be thinned to a thickness of about fifteen thousandths of an inch as by a chordal recess 39, whereby the thin membrane will freely flex with little resiliency.

It will be understood that one or more convolutions of ribbon 32 will hold the arm 30 in the recess 40, and hold the pad within the recess 40. Such spools are generally mounted on a vertical axis, as indicated in FIGURE 2, so that the weight of the pad 34 would tend to move the trip to the position indicated at 34' upon the unwinding of the last convolution of the ribbon. The membrane hinge 38 may also have slight resiliency to bias the trip to take the position shown at 34' in FIGURE 2. However the thickness of the membrane may be made so thin as to offer practically no resiliency, with practically no resistance to flexure, and the nature of the plastic may be such as to be so light that the pad will have little weight. In order to assure operation of the trip, a biasing spring 44 may be provided beneath the arm 30. For this purpose a second rectangular sectioned recess 46 is formed inwardly from surface 21, such recess extending to a depth corresponding to the depth of recess 40, and being disposed radially inward of recess 40, and offset with respect to recess 40, as shown in FIGURE 1. A second recess 54 may be formed inwardly from the outside surface 27 to a depth as indicated at 53, such recess being disposed radially inward of recess 46 and offset toward one end thereof, as also indicated in FIGURE 1.

The underside of the arm 30 may be provided with a lengthwise groove 50, to receive the arm 48 of the coil spring 44, and the other end 52 of the coil spring may have an inbent end 51 seated in the end 53 of the recess 54. It will be seen that such a spring may be readily slid into the recess 46, and assembled beneath the arm 30, and held in place by the inbent end 51 when once placed in position. The coils of the spring will positively bias the trip 28 to take the position indicated at 34' whenever the last convolution of the ribbon is being unwound from the drum. The spring will offer little resistance to the ribbon returning the arm into the recess 40, as shown in FIGURE 2, when rewind commences.

It can be seen that the spool thus described may be readily molded in a single operation. The window 60 formed in the flange 22 which extends radially outward from the groove 40, will afford entry for the necessary mold projections or punches to enter the spool.

Referring to the modification shown in FIGURES 4 to 9, wherein a biasing of the trip is effected by a resilient integral extension of the ribbon arm, the spool comprises a drum 120, with a center aperture 126, and drum flanges 122 and 124. Extending inwardly from the surface 121 of the side flange 122 is a recess 140, extending parallel to the drum axis. Such recess extends to a depth coplanar with the inside surface 125 of the flange 124 as at 129. Slits 131 and 133 extend inwardly from the surface 127 of flange 124 to join with the sides of the recess 140 to form a hinge membrane portion 138, which may be made thin by a chordal recess 139.

The trip **128** which is normally L shaped has a pad **134**, and an arm **130** extending at substantially right angles thereto, at a heel portion, which may be thickened as at **180**. The heel is joined integrally with the membrane hinge portion **138**.

The arm **130** is formed with sufficient cross section as at **135** so as to be relatively stiff, and continues with an end portion **137** of thinner section, adapted to take advantage of the resiliency in the plastic of which the spool is molded. Such end portion terminates with a T as at **142**.

The recess **140** is of increased width to receive the T end **142** of the end portion **137**, intermediate of its depth, the increased width being obtained by the opposed grooves **146** and **147**, which terminate as at **144**. A rectangular sectioned recess formed inwardly from the surface **127** is aligned with the bottom **162** of the recess **140**, and offset inwardly of the grooves **146** and **147** and extends inwardly beyond the terminal surface **144**, by a distance corresponding to the cross section of the T end **142**. It will be seen that the construction is such as to permit the resilient end **137** of the arm to be looped as shown in FIGURE 4, and the T end **142** slid down the grooves **146** and **147** until the T end **142** snaps into the recess **160**, where it is held by the end shoulders **164**.

It will be understood that the resiliency of the end portion of **137** will be sufficiently light so as to readily yield to the winding of a convolution of ribbon **132**, to cause the trip and its arm **130** to take the position shown in FIGURE 7. At the same time the resiliency of the looped portion **137** will be such that upon the unwinding of the end convolution of the ribbon, the trip will take the position shown in FIGURE 4. The thickened heel **180** is adapted to engage the projection **182** to limit its movement.

As in the previous form shown in FIGURES 1 to 3, the membrane hinge portion **138** may be thinned to ten to fifteen thousandths of an inch to provide a hinge having relatively free movement. At the same time the length of the arm **137** and the sectional dimension thereof will be such as to utilize the small amount of resiliency in the plastic employed, to bias the trip to the position shown in FIGURE 4 upon the unwinding of the last convolution of the ribbon. The resiliency is such as to immediately yield to the ribbon on rewind, taking the position shown in FIGURE 7. While polypropylene has been proposed for use in forming the spool, any plastic having the requisite characteristics may be employed. As before, the flange **122** may have a recess **170** to permit the use of mold forms necessary to effect molding in a single operation, molding being preferably effected with the pad **134** in the position shown in FIGURE 7, and with the arm **137** extending parallel with the spool axis.

It will be understood that the drum of the spool will be provided with means for securing a ribbon end to the drum by an integral molded lock of the type described in the copending application of Kuckhoff and Biedinger, filed on or about July 1, 1963, under Serial Number 291,849, or an adapter with a barb applied in the manner shown in Biedinger and Kuckhoff Patent #3,065,838, or by any other suitable means.

While two forms of the invention, have been referred to, it will be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without department from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

**1.** A one piece inked ribbon spool of pliable resilient plastic having a cylindrical drum, and an integral side flange with a planar inside face, a groove in the surface of said drum extending parallel to the spool axis and extending to the inside plane of said side flange, said groove having spaced side slits extending to the outside surface of the flange defining a hinge membrane portion lying in the plane of said side flange, an aperture in the side flange extending radially outwardly from the groove and said slits, an L shaped reverse trip having an arm adapted to lie in said groove beneath a convolution or more of ribbon wound on the drum and a radially outwardly extending pad adapted to lie in said aperture and disposed at right angles to said arm and joining said arm in a knee, said knee being integrally joined to the spool radially inward of said arm by the membrane portion formed between said slits.

**2.** A one piece inked ribbon spool of pliable resilient plastic having a cylindrical drum, and an integral side flange with a planar inside face, a groove in the surface of said drum extending parallel to the spool axis and extending to the inside plane of said side flange, said groove having spaced side slits extending to the outside surface of the flange defining a hinge membrane portion lying in the plane of said side flange, an aperture in the side flange extending radially outwardly from the groove and said slits, an L shaped reverse trip having an arm adapted to lie in said groove beneath a convolution or more of ribbon wound on the drum and a radially outwardly extending pad adapted to lie in said aperture and disposed at right angles to said arm and joining said arm in a knee, said knee being integrally joined to the spool radially inward of said arm by the membrane portion formed between said slits, said membrane portion having a thin section extending chordally across said membrane portion inwardly of the drum periphery, whereby to increase the flexibility of said membrane portion.

**3.** A one piece inked ribbon spool of pliable resilient plastic having a cylindrical drum, and an integral side flange with a planar inside face, a groove in the surface of said drum extending parallel to the spool axis and extending to the inside plane of said side flange, said groove having spaced side slits extending to the outside surface of the flange defining a hinge membrane portion lying in the plane of said side flange, an aperture in the side flange extending radially outwardly from the groove and said slits, an L shaped reverse trip having an arm adapted to lie in said groove beneath a convolution or more of ribbon wound on the drum and a radially outwardly extending pad adapted to lie in said aperture and disposed at right angles to said arm and joining said arm in a knee, said knee being integrally joined to the spool radially inward of said arm by the membrane portion formed between said slits, said membrane portion having a thin section extending chordally across said membrane portion inwardly of the drum periphery, whereby to increase the flexibility of said membrane portion, and resilient means disposed within said groove beneath said arm for urging said arm radially out of said groove when not held therein by a ribbon convolution, whereby to swing the pad of said trip out of and beyond the plane of said side surface of said flange.

**4.** A one piece inked ribbon spool of pliable resilient plastic having the characteristics of polypropylene, said spool having a cylindrical drum, and an integral side flange with a planar inside face, a groove in the surface of said drum extending parallel to the axis of the drum and to the inside plane of said side flange, said groove having spaced side slits extending to the outside surface of the flange and hub defining a hinge membrane portion, an aperture in the side flange extending radially outwardly from the groove and said slits, an L shaped reverse trip having an arm adapted to lie in said groove beneath a convolution or more of ribbon wound on the drum and a radially outwardly extending pad adapted to lie in said aperture and disposed at right angles to said arm and joining said arm in a knee being integrally joined to the spool by the membrane portion formed between said slits, said membrane portion having a thin

section extending chordally across said membrane inwardly of the drum periphery, whereby to increase the flexibility of said membrane, and resilient means for biasing said arm for movement radially out of said groove when not held by a ribbon convolution, whereby to swing the pad of said trip out of and beyond the plane of said side surface of said flange, said knee having a portion projecting beyond the side surface of said flange, and a projection from the outside surface disposed radially inward of said projecting portion and adapted to be engaged by said projecting portion to limit angular movement of said trip.




**References Cited by the Examiner**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,304,498 | 12/92 | Hart | 197—175 |
| 2,961,083 | 11/60 | Biedinger | 197—175 |
| 2,961,084 | 11/60 | Biedinger | 197—175 |
| 2,967,601 | 1/61 | Landgraf et al. | 197—175 |
| 3,009,169 | 11/61 | Bodner | 16—150 X |
| 3,019,486 | 2/62 | Stinson. | |
| 3,043,354 | 7/62 | Fitzgerald | 16—150 X |


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