Oct. 4, 1949. C. A. CHRISTOFF 2,483,528

RIBBON SPOOL

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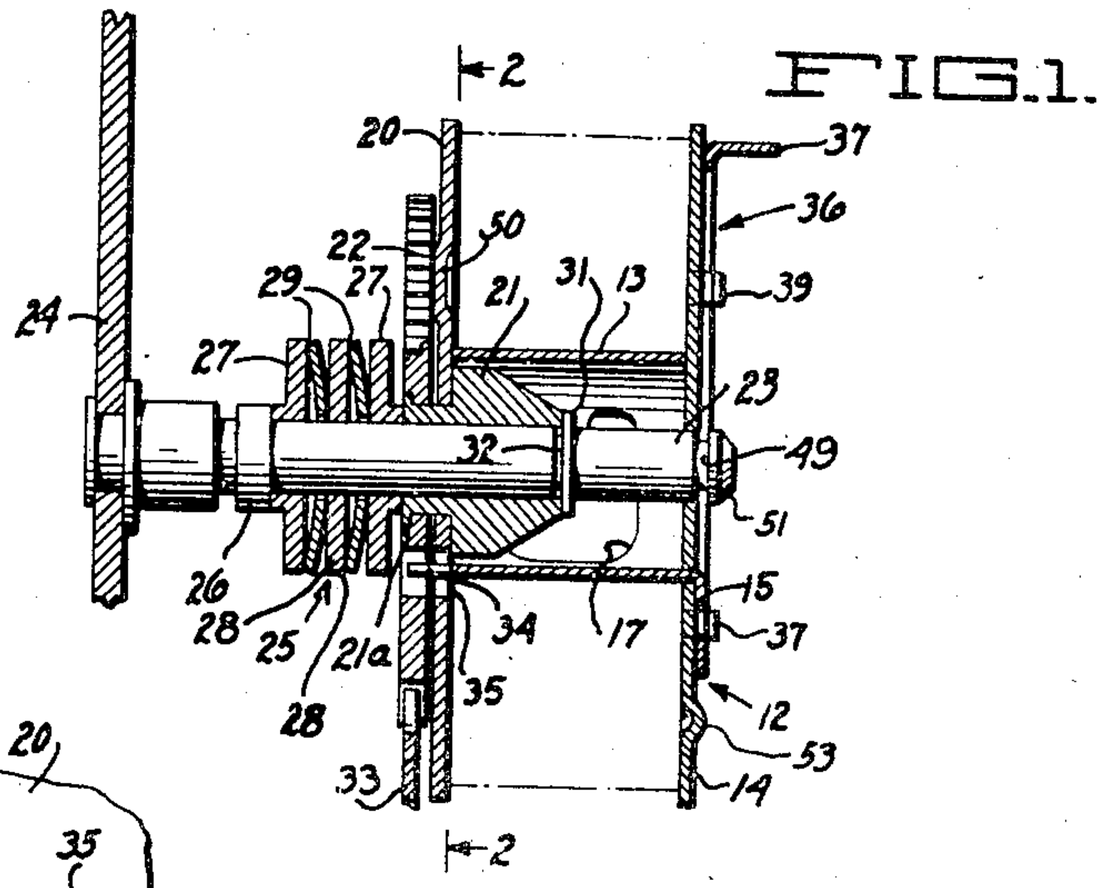

FIG. 1.

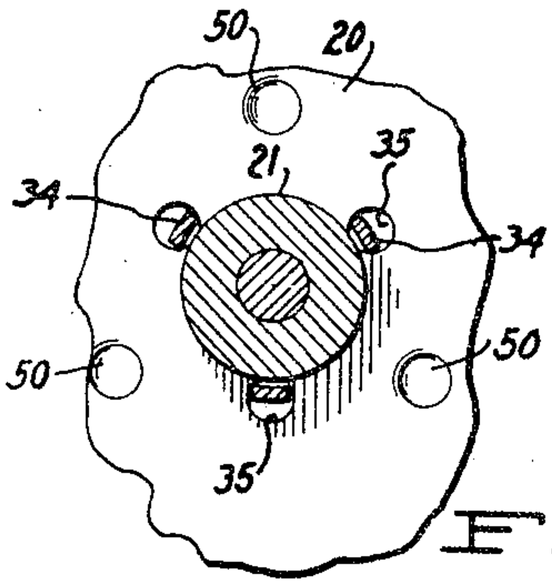

FIG. 2.

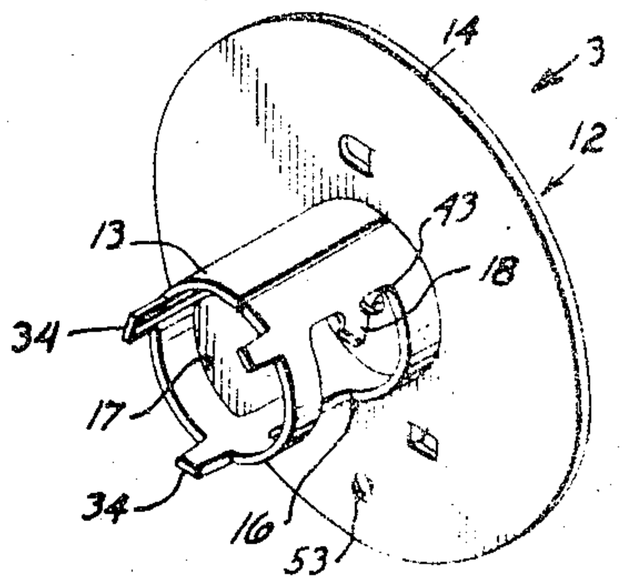

FIG. 4.

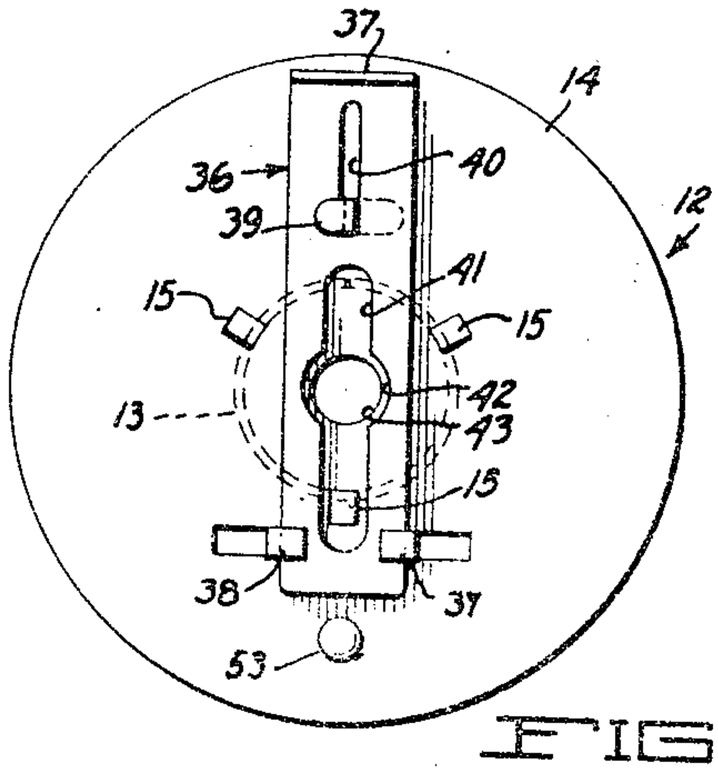

FIG. 3.

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RIBBON SPOOL

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6 Claims. (Cl. 242—70)

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This invention relates to ribbon storing devices for type printing ribbons, such as used in adding machines, calculating machines, typewriters, etc., and has particular reference to spool assemblies for such ribbon.

One object of the present invention is to reduce the number of parts comprising a replaceable ribbon spool.

Another object is to provide an improved supporting and rotating device for a ribbon spool.

Another object is to facilitate mounting of a ribbon spool on the machine.

A further object is to provide a ribbon spool which is economical to manufacture in large quantities.

As is well known, the printing ribbons used on adding machines, typewriters, etc., are generally passed between two storage spools. One spool is normally rotated to take up the ribbon as it passes off of the other spool, and when the latter is practically empty the process is reversed to drive said latter spool. Such ribbons must be replaced from time to time whenever the ribbon material becomes worn or whenever the charge of ink on the ribbon becomes depleted.

In order to facilitate handling and replacing of the ribbon, the latter is generally supplied in wound condition upon one such spool. Therefore, in view of the relatively frequent replacement of the ribbon, it is desirable that ribbon spools be of economical manufacture and be readily replaceable in the machine.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawing, wherein;

Fig. 1 is a sectional view through a ribbon spool assembly embodying the present invention.

Fig. 2 is a fragmentary transverse sectional view of the ribbon spool assembly and is taken along the line of 2—2 of Fig. 1.

Fig. 3 is an end view of the replaceable ribbon spool and is taken in the direction of the arrow 3 in Fig. 4.

Fig. 4 is a perspective view of the replaceable ribbon spool.

Referring to the drawing, only one of a pair of ribbon spools and their mountings, as applied to an adding machine or the like, is shown. The ribbon drive and reversing mechanism is also omitted for the sake of brevity since such mechanisms are well known in the art and are not necessary for an understanding of the present invention.

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The ribbon spool, generally indicated at 12 (see Fig. 4 in particular), comprises a barrel 13 of sheet metal formed into a cylindrical shape to constitute the core of a ribbon wound thereon. The barrel is integrally secured to a single circular flange or disc 14, also of sheet metal, by a set of three equally spaced ears 15 (Figs. 1 and 3) extending from the barrel 13 and through openings in the flange, being bent over the outer surface of the latter to integrally unite the barrel thereto.

The barrel has a pair of openings 16 and 17 therein, into which extend spears, one of which is shown at 18, formed of the material of the barrel. The ribbon to be wound upon the spool is impaled on one or the other of the spears and is then wound in a coil over the barrel, the flange 14 aligning the coil longitudinally.

The spool 12, when assembled on the machine, coacts with a second flange 20 permanently mounted on the machine. Referring to Fig. 1, the flange 20 is integrally mounted on a hub 21 to which is also integrally fastened a gear 22. The latter is spaced from the flange 20 by a set of three equi-spaced dents 50, and all three elements are held in intimate contact with each other by a flange 21*a* formed on the hub 21 and pressing against the gear 22. The latter assembly of elements 20, 21 and 22 is rotatably mounted on a stationary support spindle 23 extending from and suitably secured to a stationary side frame 24 of the machine.

Means are provided for applying a constant frictional drag to the spool assembly to apply a tension to the ribbon when the latter is drawn from the instant spool and to prevent spinning or overrunning of the latter. For this purpose, a friction clutch or drag device, generally indicated at 25, is inserted between the hub 21 and a shoulder 26 on the spindle 23. The drag device comprises a pair of collars 27, a washer 28 inserted therebetween, and a pair of bowed spring elements 29, each inserted between one of the collars 27 and the washer 28, thereby urging the right hand collar 27 outward along the spindle 23 and into frictional engagement with the hub 21. The hub 21 thus presses against a clip 31 fitted in a groove 32 formed in the spindle which thereby retains the flange assembly, including elements 20, 21 and 22, from removal from the shaft. Thus, a continual drag is applied to the flange assembly, and the gear 22 is maintained in a position in mesh with a drive gear, partly shown at 33, forming part of the drive mechanism for the spool assembly.

Describing now the means for establishing a driving connection between the flange assembly and the spool 12, it will be noted on reference to Fig. 4 that the barrel 13 of the replaceable spool has a set of three equi-spaced projections 34 extending therefrom. These projections are adapted to be inserted in three apertures 35 extending coextensively through both the flange 20 and the gear 22, thus constituting a driving connection between the flange and the spool.

It will be further noted that the hub 21 is of slightly smaller diameter than the inside of the barrel 13 so that the apertures 35 form the locating means for holding the barrel 13 concentric with the spindle 23 as well as forming the driving connection therefor when the spool is mounted in place. The projections 34 taper slightly toward their outer ends so that they may be easily fitted into the apertures 35 but when the spool is pressed inward on the spindle 23 the projections will fit snugly in the apertures. Thus, the spool 12 will be maintained in rigid relation to the flange 20 and will be accurately centered on the spindle.

Means are provided for removably securing the spool 12 in operative relation on the spindle 23. For this purpose, a slide 36 having a tab 37 formed thereon is slidably mounted on the outer surface of the spool flange 14. The slide is retained against the outer face of the flange 14 by a set of three tabs 37, 38 and 39 extending from the latter. The tab 39 extends through the slot 40 in the slide and limits the extent of travel of the latter. A second slot 41 is formed in the slide and an enlarged opening 42 therein is adapted to register with a bearing aperture 43 formed in the flange.

When the spool is fitted over the shaft 23, the conical surface 31 of the hub 21 guides the barrel 13 into substantial coaxial alignment with the spindle 23, whereupon the projections 34 may be easily guided into their apertures 35. At the same time a conical head 51 on the end of the spindle 23 guides the bearing aperture 43 of the spool onto the spindle. When the spool is in place the slide 36 will be aligned with a groove 49 on the spindle so that the slide may be pressed downward from its position shown in Fig. 3 to cause the restricted portion of the slot 41 to embrace the groove and thus lock the spool in place while allowing the same to rotate.

A rounded projection 53 extends outward from the flange 14 and is located in the path of the slide 36 when the latter is pressed downward to locking position. Since the slide must spring outward slightly when passing over the projection as it moves to its lowermost locking position the slide will be yieldably retained in said position.

Although I have described my invention in detail in its preferred embodiment and therefore have utilized certain specific terms and language herein, it is to be understood that the present disclosure is illustrative rather than restrictive, and that changes and modifications may be made without departing from the spirit or scope of the claims appended hereto.

Having thus described my invention, what I desire to secure by United States Letters Patent is:

1. A ribbon spool assembly comprising the combination of a supporting shaft, a ribbon side flange mounted on said shaft, means for transmitting rotation to said flange, a replaceable ribbon spool comprising a ribbon barrel and a side flange integral with one end thereof; said last mentioned side flange having a bearing portion

rotatably mounted on said shaft, said barrel having tapered projections extending axially from the opposite end thereof and converging from said opposite end, said projections being adapted to fit in circular apertures in said first mentioned flange to transmit rotation therebetween and to support said opposite end of said barrel, and means for removably maintaining said spool in coacting relation with said first mentioned flange.

2. A ribbon spool assembly comprising the combination of a shaft, a ribbon side flange rotatably carried by said shaft, means for transmitting rotation to said flange, a replaceable ribbon spool comprising a ribbon barrel and a side flange integral with one end thereof, said barrel having tapered projections extending axially from the opposite end thereof and converging from said opposite end, said projections being adapted to fit in circular apertures in said first mentioned flange to transmit rotation therebetween and to support said opposite end of said barrel, means on said shaft forming a conical surface for guiding said opposite end of said barrel toward concentric alignment with said first mentioned flange upon assembly of said spool on said shaft, said second mentioned side flange having a bearing portion adapted to journal on said shaft, and means for removably maintaining said spool in coacting relation with said first mentioned flange.

3. A ribbon spool assembly comprising the combination of a supporting shaft, a ribbon side flange rotatably supported by said shaft, means for transmitting rotation to said flange, a friction device operatively associated with said flange to exert a drag thereon during rotation thereof, a replaceable ribbon spool comprising a ribbon barrel and a side flange integral with one end of said barrel, said barrel having projections extending longitudinally from the opposite end thereof and adapted to fit in apertures in said first mentioned flange to transmit rotation therebetween and to support said opposite end of said barrel, said second mentioned flange having a bearing portion journalled on said shaft to support said one end of said barrel, and a retainer device for removably retaining said barrel on said shaft in coacting relation with said first mentioned flange.

4. A ribbon spool assembly comprising the combination of a supporting shaft, a ribbon side flange member rotatably mounted on said shaft, means on said shaft retaining said flange member against axial movement in one direction, a drag device frictionally engaging said flange member, means yieldably urging said friction device against said flange member in said direction whereby to exert a drag thereon during rotation thereof, a replaceable ribbon spool comprising a ribbon barrel and a side flange integral with one end of said barrel, said barrel having projections extending longitudinally from the opposite end thereof and adapted to fit in apertures in said first mentioned flange to transmit rotation therebetween, said side flange having a bearing portion journalled on said shaft to support said one end of said barrel, means on said shaft forming a conical surface for guiding said opposite end of said barrel toward concentric alignment with said first mentioned flange upon assembly of said spool on said shaft, and a retainer device for removably retaining said barrel on said shaft in coacting relation with said first mentioned flange.

5. A ribbon spool of the type adapted to be rotatably mounted on a shaft comprising a cylindrical barrel of sheet material, a side flange integral at one face thereof with said barrel, said

flange having a bearing portion arranged concentric with said barrel and adapted to journal on said shaft, said barrel having tapered projections extending axially upon the opposite end thereof and converging from said end, and a retaining device movably mounted on the opposite face of said flange and adapted to engage said shaft to retain said ribbon spool thereon.

6. A ribbon spool assembly comprising the combination of a stationary supporting shaft, a ribbon side flange member rotatably mounted on said shaft, means for rotating said flange, means on said shaft retaining said flange member against axial movement in one direction, a friction device surrounding said shaft, spring means urging said friction element in said mentioned direction against said flange member whereby to exert a drag thereon during rotation thereof, a replaceable ribbon spool comprising a ribbon barrel and a side flange integral with one end of said barrel; said barrel having an inside diameter greater than the diameter of said shaft and having projections extending axially from the opposite end thereof and adapted to fit in apertures in said first mentioned flange to transmit rotation therebetween, said second flange having a bearing portion journalled on said shaft to support said one end of said barrel, means on said shaft forming a conical surface for guiding said

opposite end of said barrel toward concentric alignment with said first mentioned flange upon assembly of said spool on said shaft, and a retaining device for removably retaining said barrel on said shaft in coacting relation with said first mentioned flange.

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