July 24, 1962 W. D. LANDGRAF 3,045,800

UNIVERSAL TYPEWRITER SPOOL

Filed July 1, 1960 2 Sheets-Sheet 1

FIG. 1

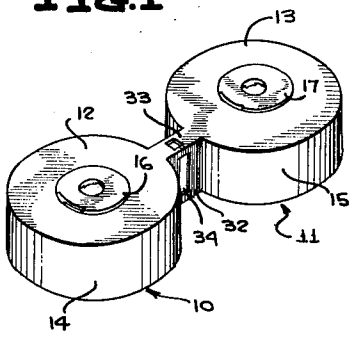

FIG. 2

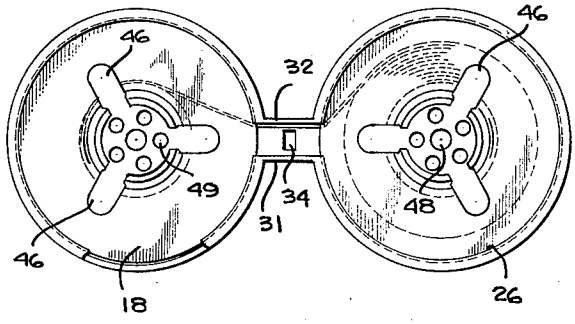

FIG. 3

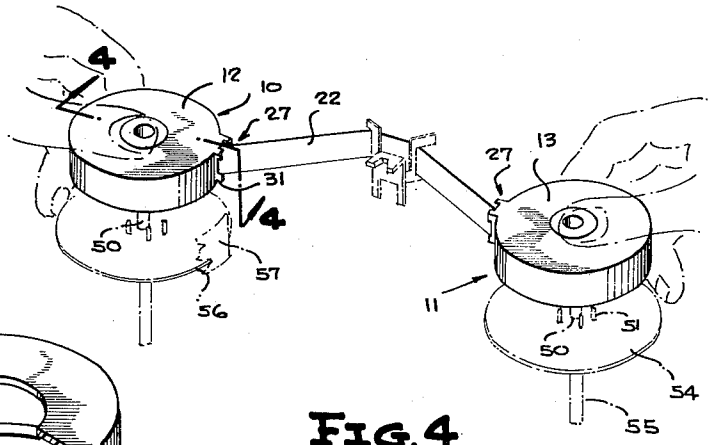

FIG. 4

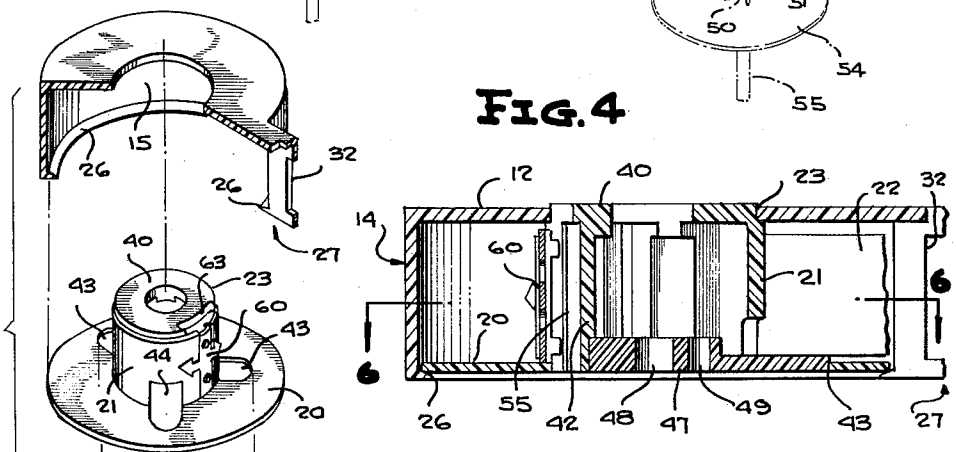

FIG. 5

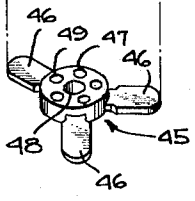

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FIG. 6

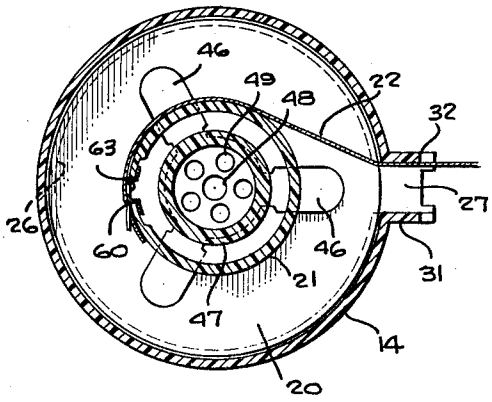


FIG. 7

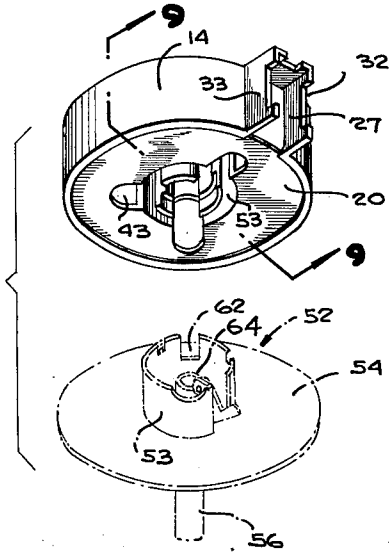


FIG. 8

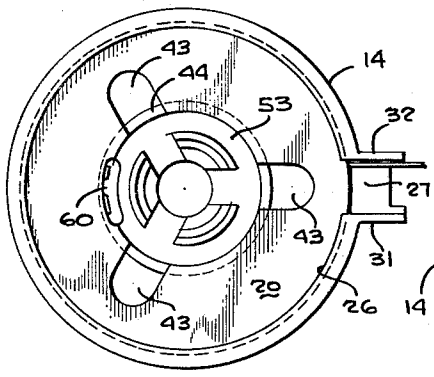
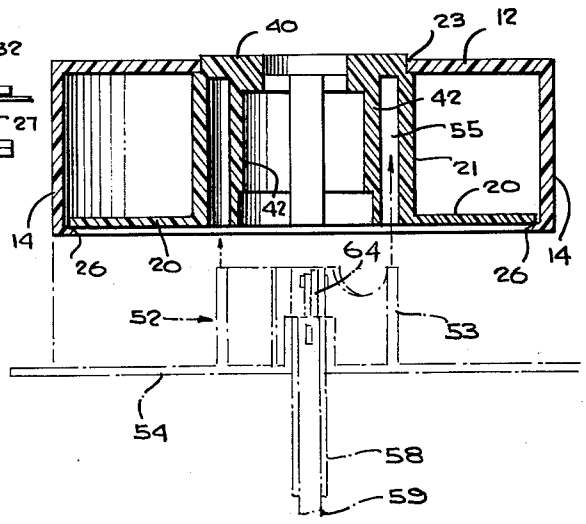


FIG. 9



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United States Patent Office 3,045,800 Patented July 24, 1962

3,045,800

UNIVERSAL TYPEWRITER SPOOL

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Filed July 1, 1960, Ser. No. 40,249
13 Claims. (Cl. 197—151)

This application is a continuation-in-part of my application, Serial Number 30,562, filed May 20, 1960 now Patent 3,008,561, issued November 14, 1961, for Typewriter Spools.

The present invention relates generally to cartridges for inked printing ribbons and more particularly to improved packaging devices and spools for inked printing ribbons of the kind employed in typewriters, and the like, having spools capable of adaptation to a wide variety of typewriters.

It is presently known to package typewriter ribbons in pairs of completely closed containers, which are joined when sold and which are separated prior to installation on the typewriters. The ribbons are mounted on spools joined to the containers, and extend from one to another of the containers through slots provided therein. The advantages of the described construction are (1) that the fingers of the installers do not become covered with ink, during installation of a ribbon on a typewriter, because the fingers cannot come in contact with the main body of the ribbon, (2) that prolonged storage of the ribbons in substantially closed containers results in a minimum of ink dryness, and (3) that drying out of the ribbon while in the typewriter is minimized.

In the heretofore known form of typewriter ribbon cartridge, receptacles have been provided, which are supplied with cover plates, and the latter have been joined by a frangible element, so that the cover elements function as separable connectors for the receptacles.

In accordance with the present invention, a simplified and more effective form of typewriter ribbon cartridge is provided. Two containers are utilized, in the form of cylindrical cups, the bases of which are each provided with a small central circular aperture. The cups themselves are provided with axial slots for ribbon egress and an interconnecting bridge joins the slots. The bridge can be severed when the cartridge is to be installed, as by means of scissors or other sharp instruments. The bridge includes two walls, between which the ribbon passes in proceeding from one cup to the other via the slots, to maximize protection of the fingers against soiling with ink from the ribbon.

Typewriter spools are also provided, each of which has an extended disc-shaped flange acting as a cover plate for a cup and which also each includes a stub or shoulder of reduced diameter extending from the main body of the spool into rotating engagement with a circular aperture in the cup base. The rim of each cup is provided with an inwardly extending circular lip, of slightly smaller diameter than the flange diameter. The spool may be assembled to the cup by pressing insertion of the spool, the stub then engaging the small circular aperture in the cup base, and the flange edges being pressed past the cup rim and resiliently engaging the under side of the latter. This operation is feasible, although the inner diameter of the cup is nearly equal to the flange diameter, because the radial slot in each cup imparts resilience to its circumferential wall, permitting it to spread, while the flanges and the cup bases themselves have some inherent resilience. This resilience holds the flange rim snugly against the lip without imparting significant frictional resistance to rotation of the spool within the cup.

Spools according to the present invention are capable of universal use in a wide variety of typewriters. To this

end the hub of the spool is hollow, except for the provision of three axially extending arcuate elements, extending parallel to but spaced from the inner hub wall, and spacedly distributed at equal angles about the circumference of a circle. In one type of typewriter, a vertically extending hollow metallic cylinder, which houses ribbon control mechanism of conventional character per se, and which acts as a ribbon actuator, can extend within the space between the inner wall of the hub and the axial elements. Inwardly projecting lugs integral with the cylinder engage the edges of the axial elements to prevent relative rotation of the hollow metallic cylinder and the spool.

The spool flange includes three equi-angularly disposed radially extending recesses, which communicate with the hollow hub. Into these recesses may be fitted a three pronged adapter, the prongs of which are equi-angularly disposed and extend radially outwardly of a central disc which fits within the circle defined by the aforementioned axial elements. The adapter is thus secure against both rotation and radial movement in any direction. In the central disc of the adapter are provided one central aperture and five smaller apertures distributed symmetrically about the central apertures. These apertures can engage prongs of a ribbon spool actuation of certain typewriters.

The ribbon spool, taken both with and without its adapter, is thus suitable for use in most commonly commercially sold typewriters.

Structures according to the present invention can be fabricated of three molded elements: (1) the two joined cup, (2) the spools, which are duplicates, and (3) the adapters for the spools, which are duplicates. The device is therefore economical of fabrication, while the spool elements perform multiple functions, i.e. they include cover plates for the cups, spools for the ribbons, driven elements, and fittings to hold the adapters.

It is, accordingly, a broad object of the present invention to provide a novel double cartridge for an inked ribbon.

It is another object of the invention to provide a novel cartridge system for inked ribbons, wherein each cartridge is composed of basic elements, i.e. a cup element and a spool element, the latter including a unitary construction having a flange acting as a cover plate, a ribbon hub, and an adapter.

It is another object of the invention to provide a system of inked ribbon cartridges, each composed of a cup and a spool, the cups being joined by a bridge, the walls of which are designed to be placed into ribbon wells of a variety of typewriters without having to change the shape of said wells.

It is another object of the invention to provide a novel two piece ribbon cartridge, including a cup having an inwardly protruding rim and a spool having a flange acting as a cover for the cup and engaging the under side of the rim at the flange edge, wherein provision is made for engaging the spool with a variety of ribbon drive mechanisms.

It is another object of the present invention to provide a novel ribbon spool, having provision for retaining an adapter, whereby the spool may be adapted to engage the actuating mechanisms of typewriters of substantially all commercial types, some by virtue of the adapter configuration and others by virtue of the configuration of the hub of the spool, exclusive of the adapter.

The above and still further objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of one specific embodiment thereof, especially when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a view in perspective of a typewriter ribbon double cartridge, according to the invention;

FIGURE 2 is a plan view as seen from the under side, of a cartridge according to the invention;

FIGURE 3 is a view in perspective of a double cartridge according to FIGURE 1 in process of being mounted on a typewriter;

FIGURE 4 is a view in section taken on line 4—4 of FIGURE 3;

FIGURE 5 is an exploded view in perspective of a single cartridge, according to the invention;

FIGURE 6 is a view in section taken on line 6—6 of FIGURE 4;

FIGURE 7 is an exploded view of a cartridge in relation to a spool drive mechanism;

FIGURE 8 is a view in plan of a single cartridge; and

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

Referring now to the drawings, the reference numeral **10** denotes one cup and the reference numeral **11** another cup of a twin cup ribbon cartridge. The cups **10** and **11** each includes a base, these being identified by the numerals **12** and **13**, and further the cups include cylindrical walls **14**, **15** and axially located circular openings **16** and **17**, in the bases respectively. Substantially identical spool elements **18** are provided for the cups **10** and **11**, so that a description of one will suffice for both.

The spool elements **18** include disc-shaped flanges **20** acting as cover plates for the cups **10** and **11**. The flanges **20** have slightly smaller diameters than the inner diameters of the cylindrical walls **14**, **15**, and hence fit snugly but rotationally therein. Extending centrally from each flange is a hub **21**, on which may be wound a ribbon **22**. To secure the ribbon **22** to the hubs **21**, suitable fastening device **60** are secured to the hubs **21**. Each of the hubs is provided at its end with a stub or shoulder of reduced diameter, **23**, which fits within the axial openings, as **16**, **17**, the latter providing a bearing surface for the stub or shoulder **23**, both in respect to rotary and end bearing, since the main body of the hub **21** is of slightly greater diameter than the diameters of the openings **16**, **17**.

The rims of cups **10** and **11** are each provided with an inwardly extending lip **26** of internal diameter slightly smaller than the diameter of the flanges **20**. The height of the spool plus the thickness of the flange, making allowance for the height of the shoulder **23**, is such that the upper edge of the flange **20** can be forced under the lip **26**, and thereafter rotate within the cylindrical walls, as **15**, **16**, without vertical or lateral play. Opposed axial slots **27** are provided in the cylindrical walls **14** and **15** of the cups **10**, **11**, to permit movement of a ribbon into and out of the cups. The slots **27** have the added effect of imparting resilience to the cylindrical walls **14**, **15**, permitting some spread when the flanges **20** are forced into place, and this resilience in turn maintains a close fit of the flanges **20** within the cups. In a vertical sense the bases **12**, **13** of the cups have sufficient resilience to maintain contact of the edges of the flanges **20** against the under side of rims **26**. The thickness of the shoulder **23** is approximately adequate to equal the thickness of the base **12** of the cup **10**.

The cups **10** and **11** are joined by two parallel webs **31**, **32**, joined by a base **33**, to form a bridge between the cups, and also to provide a shield for that portion of the ribbon **22** which extends between the cups, via openings **27**. Openings **34** are provided in webs **31**, **32**, and base **33**, to permit observation of the ribbon, as to establish color or type, and also to facilitate cutting of the bridge.

The cartridge pairs are sold in bridged or joined relation. When the purchaser desires to install the ribbon in a typewriter, the bridge is cut, as by scissors or other sharp instruments, at the windows **34**, and the cups **10**, **11**, separated. The cups are installed in the typewriter with with the bases **12**, **13** upwardly, and the cover plates **20** are provided with devices, hereinafter described, which can engage driving mechanism of a typewriter. Such mechanism rotates as the typewriter is operated to type,

and rotates the cover plates or flanges **20**, and thereby the spools **21**, in usual fashion. The spools including flanges **20** cannot wobble, during rotation, because they are provided with bearing surfaces at the shoulders **23** and also at the edges of flanges **20**, where the latter fit snugly laterally against the inner surfaces of walls **14** or **15**, and uppwardly against the under side of lip **26**.

Extending upwardly from the base **40** of the hub **21**, and internally of the wall of the hub, are three arcuate elements **42**, which are distributed at equal angles co-axially of the wall of the hub **21** but are spaced radially therefrom. The heights of the axial arcuate elements **42** are such that they extend to the outer surface of the flange **20** at their outer edges. The flange itself is provided with radial openings **43**, three in number, and spaced equiangularly about the flange, and symmetrically with respect to the axis thereof. The openings **43** communicate with slots **44** in the wall of the hub **21**, and extend about half way down into the hub.

An adapter **45** is provided, as a element separate from the flange **20** and hub **21**, and comprises three radially extending elements **46**, extending from a central disc **47**. The disc **47** is provided with a central opening **48**, surrounding which are located five openings **49**, (for example only), at equal angles and on a circle concentric with the central opening **48**. The central disc **47** is slightly thicker than the radial extensions **46**, but on one side the extensions **46** and the disc **47** are co-planar or have a co-planar surface, this being the outer surface when the adapter is applied to the flange **20**. When so applied the extensions **46** fit the openings **43**, while the central disc **47** fits the opening formed by the three axial arcuate elements **42**, the spacing between adjacent pairs of these permitting passage of the extensions **46**.

Extending downwardly from flange-like base **54** is a cylindrical sleeve **58**, within which rides a reciprocable rod **59**, the latter serving to actuate a ribbon feed control **64**, located within cylinder **53**, and which is part of a typewriter and not of the present invention, and therefore is not further described.

In operation the cylinder **53** fits into the opening **55**. The cylinder **53** is provided with an inwardly extending lug **62**, which in conjunction with a further lug **63**, locks into the spaces between arcuate elements **42**, and prevents rotary play of the spool with respect to the cylinder **53**. Rotation of sleeve **58**, in response to typing operation of a typewriter, then results in rotation of the spool.

When the adapter **45** is applied to the flange **20**, it provides a coupling element to a driving mechanism having a central pin **50** for engaging opening **48**, and one further pin, as **51**, which engages one of the openings **47**, so that each hub and flange can be rotated with respect to its cup. On the other hand, when the adapter **45** is removed, exposing the arcuate axially extending elements **42**, and the opening between these and the outer wall of the hub **21**, provision exists for coupling the hub **21** with a drive element **52**, such as is illustrated in FIGURE 9 of the accompanying drawings and which includes a metallic cylinder **53**, extending upwardly from a flange-like base **54** of greater diameter than the cylinder **53**. The cylinder **53** extends into the space **55** between the hub **21** and the elements **42**.

A typewriter ribbon well **56** is shown in FIGURE 3, in fragmentary fashion, to indicate that the web **31** which forms part of each cup, as **11**, **12** bears against the edge of well **56**, after the cup and enclosed ribbon have been installed in a typewriter. Thereby the cup, as **12** is held against rotation, the edge **57** of well **56** operating as a stop, but rotation of flange **20** within the cup **12** is not impeded.

While I have described and illustrated one specific embodiment of the present invention, it will become apparent that variations of the specific details of construction may be resorted to without departing from the true spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. A ribbon cartridge, comprising a pair of cups, a bridge joining said cups, each of said cups including a base wall and a cylindrical wall extending from and integral with said base wall, said cylindrical walls of said cups including opposing axial slots for ingress and egress of a ribbon, a spool for each of said cups, each of said spools including a flange acting as a cover for said cup, and means for securing said spools and flanges rotationally with respect to said cups, said bridge including at least two walls between which said ribbon extends in passing between said axial slots, and adapters arranged to be secured to said flanges, said flanges including recesses mated with said adapters.

2. A ribbon cartridge adapted for use with a drive shaft having a radially extending arm, comprising a pair of joined cups, each of said cups including a base wall and a cylindrical wall extending from and integral with said base wall, said cylindrical walls of said cups each including an axial slot, a spool for each of said cups, each of said spools having a flange acting as a cover for a cup, means for securing said spools and flanges rotationally with respect to said cups, said spools including a plurality of arcuate axially extending elements located interiorly thereof, said arcuate elements all falling on arcs of the same circle and being circumferentially separated, said elements being spaced so that said arm extends between an adjacent pair of them.

3. A ribbon cartridge, comprising a pair of joined cups, each of said cups including a base wall and a cylindrical wall extending from and integral with said base wall, said cylindrical walls of said cups each including an axial slot, a spool for each of said cups, each of said spools having a flange acting as a cover for a cup, means for securing said spools and flanges rotationally with respect to said cups, said spools including a plurality of arcuate axially extending elements located interiorly thereof, said arcuate elements all falling on arcs of the same circle and being circumferentially separated and a multi-pronged adapter having prongs mating with slots in said flange and a central disc located between said arcuate elements.

4. A spool for a typewriter ribbon, said spool including a hollow hub, a flange coaxial with and integral with said hub, said flange including a plurality of spaced apertures, said hub having internally thereof a plurality of elements adapted to engage a first type of ribbon driver, and an adapter having arms engageable with said hub and the apertures of said flange, in irrotational relation to said flange, said adapter being arranged to engage a second type of ribbon driver different from said first type of ribbon driver.

5. The spool of claim 4 wherein said apertures extend radially of said flange and divide said flange into equal areas.

6. The spool of claim 4 wherein said plurality of elements comprises a plurality of arcuate, axially extending elements located interiorly of said spool, all of said arcuate elements falling on arcs of the same circle and being circumferentially separated.

7. The combination according to claim 6 wherein is further provided a multi-pronged adapter having prongs mating with slots in said flange and a central disc located between said arcuate elements.

8. A ribbon cartridge comprising a pair of cups having parallel axes, a bridge joining said cups, each of said cups including a base wall and a cylindrical wall extending from and integral with said base wall, said cylindrical walls including opposed axial slots for ingress and egress of said ribbon, a spool rotatable within each of said cups, each of said spools including a flange acting as a cover for its cup, said bridge extending in a plane parallel to the axes of said cups, said bridge being severable to leave a protuberance on each cup arranged to prevent predetermined rotations of said cups with respect to the wells of inked printing machines when installed therein, and adapters arranged to be secured to said flanges, said flanges including recesses mated with said adapters.

9. A universal ribbon cartridge adapted for use with a drive shaft having a radially extending arm, comprising a pair of cups, a severable bridge joining said cups, a spool installed in each of said cups and rotatable freely with respect thereto, said cups being arranged for installation in the wells of an inked printing machine after severance of said bridge, the severed remainders of said bridge on each side of the line of severance remaining secured to said cups as protuberances and being arranged to hold said cups against rotation with respect to said wells, said spools including a plurality of arcuate, axially extending elements located interiorly thereof, said arcuate elements elements all falling on arcs of the same circle and being circumferentially separated, said elements being spaced so that said arm extends between an adjacent pair of them.

10. The combination of claim 9 wherein said cups and said bridge before severance constitute a unitary molded structure.

11. An adapter for ribbon spools carried by rotatable driving elements, comprising a cylinder having an axially extending wall, means on said cylinder for securing said cylinder to said driving elements and a plurality of radially extending arms secured to said wall and adapted to fit into slots on a flange of said spools.

12. The adapter of claim 11 wherein said arms are equispaced about the central axis of said cylinder.

13. The adapter of claim 11 wherein said cylinder includes a disc secured to and extending at right angles to said wall, said disc including a plurality of apertures adapted to engage the driving element.

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