Feb. 4, 1969 J. R. FULD 3,425,531

RIBBON SUPPLY UNIT

Filed Dec. 1, 1965

FIG. 1.

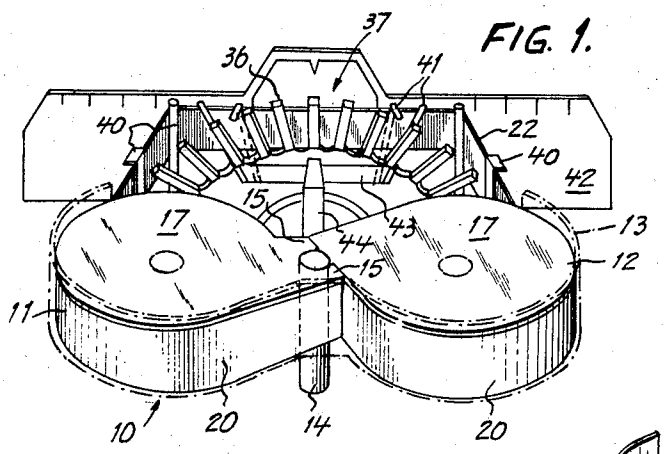


FIG. 3.

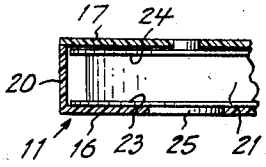


FIG. 4.

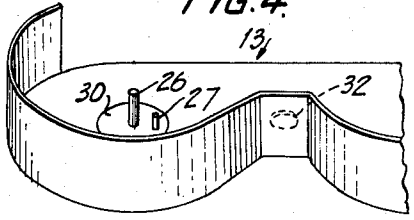


FIG. 2.

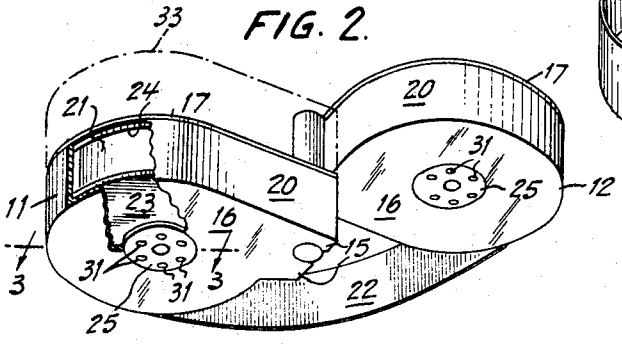
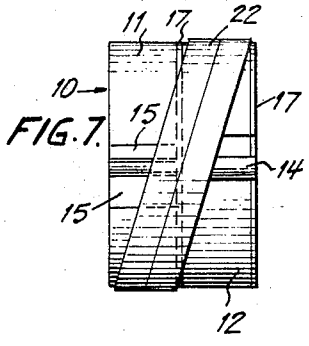


FIG. 7.



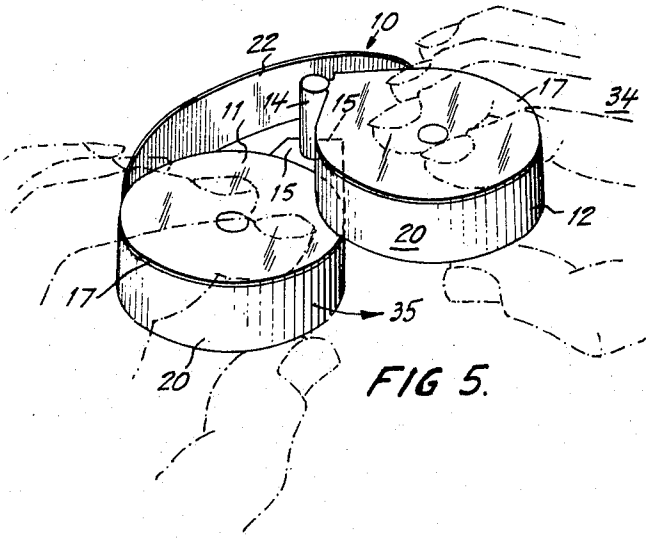


FIG 5.

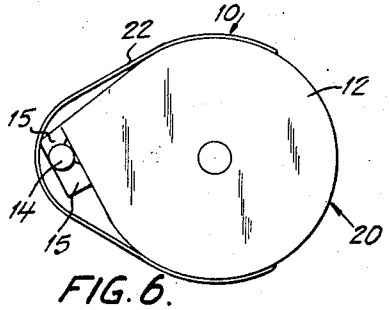


FIG. 6.

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RIBBON SUPPLY UNIT

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Int. Cl. B41j *31/12;* G11b *15/32;* G03b *1/04*

ABSTRACT OF THE DISCLOSURE

A ribbon supply unit comprising a pair of containers interconnected by unique adjusting means. The adjusting means includes a socket and rod disposed on respective containers arranged to permit the containers to be adjusted to a first position in which they are juxtaposed in the same plane or to a second position in which they are superposed one upon the other.

The present invention relates in general to a ribbon supply unit and more particularly to a cartridge assembly for office machine ribbons or the like.

Throughout the many diverse industries of today, there is widespread application of supply units having as a principal function the provision of a similar web or ribbon like material. Generally, the ribbon supply unit is ancillary equipment for providing ribbon which carries or transfers information upon demand. The ribbon may have archival value and be stored indefinitely for repeated use, such as a strip of film or recording tape. On the other hand, the nature of the ribbon supplied may be such that it is expendable, e.g., a fabric or carbon ribbon for an office machine. Regardless of application and the particular type of ribbon that is involved, in many instances it is desirable to keep at a minimum the necessity of operator handling of the ribbon during insertion into its associated working environment and/or during removal therefrom. For example, in the case of inked typewriter ribbon, handling by an operator causes transfer of the ink to the operator's fingers and the possibility arises of subsequent unsightly smudges appearing on finished worksheets during manipulation thereof. When film strips are concerned, inadvertent handling can result in detrimental marks, such as a marred surface or fingerprints, which appear as images during projection of the information carried by the strip.

Another facit of many modern day machines which employ ribbon supply units, is the trend toward economically manufactured one-time ribbon supply containers. Further, in many printing machines using inked ribbon for a transfer medium it has been found to be desirable to go one step further and discard the entire ribbon supply unit upon depletion of the ribbon transfer capacity, rather than repeatedly inserting a fresh ribbon and/or container into the unit. This throwaway feature obviates ribbon handling by the operator, and eliminates a time consuming rethreading step. For exemplary purposes, the following description is directed to an inked ribbon supply unit of this type adapted to transfer images at a printing station. However, the prevalent problems and their associated solutions are not confined to that specific type of unit.

It is therefore an object of this invention to provide a novel ribbon supply unit.

Another object is to provide an economical ribbon supply unit adapted to facilitate and simplify the manipulation thereof while minimizing contact with the ribbon during insertion of the unit into associated apparatus.

A further object is to provide a unitary cartridge assembly for typewriter ribbon or the like wherein communication of the ribbon between egress and ingress apertures

is not interrupted during manipulation of the cartridge from an operative to an inoperative condition and vice versa.

Still another object is to provide a ribbon supply unit wherein the ribbon may be disposed in operative relationship with associated apparatus without necessitating handling of the ribbon and wherein the ribbon supply unit further lends itself to operation as either an integral container having supply and take-up chambers or two separate containers with independently operative supply and take-up chambers.

According to the present invention a ribbon supply unit is provided having a pair of interconnected containers adapted to permit ribbon to pass from one container to the other. More specifically, in one embodiment, each container defines an enclosed chamber, one formed to receive a supply spool for typewriter ribbon, or the like, and the other to receive a take-up spool. The containers are provided with apertures through which communication of the ribbon between the chambers is effected. Where reference herein is made to supply and take-up spools, it should be understood that they may be complementary to the extent that is common in the art, i.e., when the ribbon is expended in one direction the function of the spools is interchanged.

A principal feature of the unit is the unique adjusting means interrelated with both containers for alternatively arranging the chambers in a fixed operative position and a stacked nonoperative position. In the operative position, the containers are juxtaposed with their apertures arranged for egress and ingress of the ribbon in a manner convenient for cooperation with associated printing apparatus. Alternatively, by simple manipulation of the containers the unit is readily disposed in its inoperative condition. In this position the containers (and necessarily the spools) are superposed in a compact arrangement without disrupting the communication of the ribbon between the chambers.

The particular adjusting means, explained in detail hereinafter, is characterized by cooperating hinge members including a rod affixed to and extending from one container for registration with a suitable socket in the other container. During manipulation from the operative to the inoperative condition it is necessary to first translate one container relative to the other container in the direction of the rod axis to an interjacent position, and then to effect relative rotation about the rod axis. The interjacent position is such that the containers are free to rotate to a superposed position yielding a compact unit for packaging or storage in a box or carton. This relative positioning of the containers is referred to as the inoperative condition of the unit. It will become evident that the above explained manipulations will not require the operator to come in contact with the portion of exposed ribbon due to the novel structure of subject supply unit. It should also be noted that when the containers are connected to effect the operative condition of the unit, depending upon the particular use involved, a minimum or no handling of the ribbon is necessary. For example, referring to the mentioned embodiment, when inserting the unit into a typewriter the ribbon may first be located between the guide arms of a top-feed vibrator by manipulation of the containers connected in the operative position. To complete the insertion, the operator merely aligns and seats the unit, through aid of integral locating means, in a mounting assembly on the typewriter. The ribbon is then taughtened by rotating the take-up spool as required.

The foregoing and other objects, features and advantages of the invention will appear more fully hereinafter from a consideration of the detailed description which follows, in conjunction with the accompanying sheet of

drawing wherein one principal embodiment of the invention is illustrated by way of example.

In the drawing wherein like reference characters refer to like parts throughout the several views:

FIG. 1 is a top perspective view showing applicant's novel supply unit with the containers in operative position and disposed adjacent typical associated printing apparatus which is shown diagrammatically;

FIG. 2 is a bottom perspective view of applicant's novel supply unit with the containers disposed in an interjacent position, and showing a supply spool through a cutaway portion of one container;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a perspective view showing a portion of an associated mounting platform and drive pin assembly;

FIG. 5 is a diagrammatic illustration in perspective of the device during manipulation of the containers of subject unit from its operative to its inoperative condition;

FIG. 6 is a plan view of the subject supply unit with the containers in their nonoperative position; and

FIG. 7 is an elevational view from the left side of the unit as shown in FIG. 6.

Referring now to the drawing for a detailed description of the present invention, and more specifically to FIG. 1, the subject supply unit is shown being utilized for supplying typewriter ribbon to a printing station. A more detailed description of the diagrammatically illustrated printing apparatus is set forth in the below explanation of operation. The apparatus shown relates to a single element type printing machine. The nature of a single element type machine is such that the subject supply unit is especially adapted for use therewith by virtue of its unitary structure facilitating harmonious motion with the printing apparatus with respect to the information receiving media. Thus, a single element machine is best suited to illustrate the functional environment of subject supply unit.

For the purpose of describing the assembly illustrated by the drawing, reference numeral **10** generally designates a preferred embodiment of subject ribbon supply unit. The assembly **10** further comprises a pair of substantially flat containers **11** and **12**, a mounting platform **13** (shown in phantom outline in FIG. 1) for receiving the containers **11, 12**, and intermediate connection means integral with the containers **11, 12** for interconnecting the containers **11, 12**. More specifically, the connection means comprise, a rod **14** extending from container **12** and a pair of shoulders **15** defining a socket in container **11** for receiving the rod **14**. Further, the containers **11, 12** each include a base **16**, a similarly shaped top **17**, and a continuous side wall **20**, extending between the adjacent outer edges of top **17** and base **16** to form the cylindrically shaped containers **11, 12** shown.

Now referring to FIG. 2, the cutaway portion shows a conventional typewriter ribbon spool **21** encased in container **11** for storing ribbon **22**. The spool **21** includes a ribbon receiving barrel (not shown) disposed between a pair of disc shaped opposing end flanges **23** and **24**. A similar spool **21** is encased in container **12** to provide the complementary function for the ribbon **22** which communicates between the containers **11, 12** through appropriate apertures (not shown). One spool **21** issues the ribbon **22**, while its counterpart takes up the issued ribbon **22** depending upon the ribbon disposition, therefore, each particular spool **21** functions alternatively as a supply and take-up spool. The spools **21** are also provided with an end disc **25** attached to the surface of end flange **23**. Registration between the discs **25** and appropriate apertures in the bases **16** of the associated containers **11, 12** effectively provides an appropriate axial journal for each spool **21** in its respective container **11, 12**, thereby making spool rotation possible. The sectional view of FIG. 3 shows the relationship of spool **21** and the inner walls of container **11** to illustrate that there is sufficient clearance therebetween to permit rotation of spool **21** with a minimal clearance, whereby end disc **25** is retained in journalled relationship with the aperture in base **16**.

The actual construction of the subject unit **10** can be by any convenient method. The containers **11** and **12**, for example, can be construed of unitary plastic formed around the spools **21** to yield a transparent nonaccessible unit **10**, or conversely the containers **11, 12** can be construed to render access to the chambers for replacement of the spools **21**. The latter type includes a removable top cap member frictionally interfitting in a recessed portion of the side walls. Although the top cap is not a prerequisite it is desirable in that it keeps the stored ribbon **22** clean. A type similar to this is illustrated in the drawing.

The mounting platform **13**, shown in phantom in FIG. 1, is partially shown in FIG. 4, along with a pin drive arrangement for driving the supply and take-up spools **21** within containers **11** and **12**, respectively. The pin drive arrangement comprises a mounting shaft **26**, and a drive pin **27** integral with driven disc **30**. Each spool **21** when mounted on the platform **13**, registers at its hub with mounting shaft **26** and guides the driven pin **27** for registration with any one of the spaced receiving apertures **31** in disc **25**. The driven discs **30** are coupled to drive means (not shown) adapted to drive the take-up spool **21** and the supply spool **21** in a synchronized manner in accordance with the demand for ribbon **22** at a printing station and the disposition of the exhausted web. In those instances where the issued ribbon **22** is reused, the take-up spool **21** and the supply spool **21** provide the above mentioned converse function and the direction of drive is reversed. In other instances only the take-up spool **21** is driven while the supply spool **21** is idled with sufficient frictional drag to provide ribbon tension.

Again referring to FIG. 1, the rod **14** is shown in relationship with container **11** as it performs its integral connecting function. It should also be mentioned in passing that rod **14** facilitates location of unit **10** during alignment with platform **13**. To this end, aperture **32** (see FIG. 4) is provided in platform **13** to cooperate with the rod **14**. Shoulders **15** extending from and integral with container **11** define a socket for cooperation with rod **14**. The end surfaces of shoulders **15** are adapted to engage container **12**, as shown, to prevent relative rotation between the containers **11** and **12**, when disposed in the illustrated operative position. Engagement between rod **14** and the socket in container **11** is of a frictional nature and effected by providing a rod and socket having relatively smooth surfaces and equally dimensioned diameters. Translation of container **11** from the phantom position **33** shown in FIG. 2 (which corresponds to the operative position of FIG. 1) to the interjacent position shown by the solid lines of FIG. 2 is accomplished simply by urging one container with respect to the other with a minimum amount of force in the direction of the rod axis.

It can now be appreciated that, in view of the FIG. 2 arrangement, an operator merely needs to apply a moment about the rod axis (see FIG. 5) to rotate the containers **11, 12** to the nonoperative superposed position shown in FIGS. 6 and 7. For exemplary purposes, the fingers of an operator's hands are illustrated in phantom outline at FIG. 5. By retaining container **12** between the fingers **34** of his right hand the rod **14** is fixed enabling rotation in a counterclockwise direction of container **11** thereabout, see direction arrow **35**. The snug cooperation of rod **14** and the socket formed by shoulders **15** prevents the containers **11, 12** from becoming disengaged during rotation or subsequent nonoperative superposed disposition. Ribbon **22** remains clear during this manipulation and free to take the position adjacent the containers **11, 12** shown in FIG. 6, where the containers **11, 12** are shown superpositioned with the spools **21** coaxial and side walls **20** coplanar.

The end elevational view of the nonoperative position of the unit **10** shown in FIG. 7, shows ribbon **22** disposed

diagonally between container **11** and container **12**. Thus, a minimum amount of space is required during nonuse and the ribbon **22** remains in a flat untwisted condition ready for immediate use when the unit **10** is adjusted to its operative condition. It should be noted that the interconnection arrangement lends itself to the obvious reverse steps when adjustment from nonoperative to operative position is desired. Further, if the situation presents itself, it is also obvious that the containers **11**, **12** can be conveniently separated for independent mounting by disengaging the rod **14** from the socket.

In operation, subject unit **10** may be adapted for use with any apparatus in which a ribbon **22** is employed for carrying or transferring information. One application is shown at FIG. 1 wherein the ribbon **22** is employed as a transfer media for a single element type printing mechanism. The printing mechanism is shown in diagrammatic form in that the particular type of such apparatus is not a part of subject invention. A print wheel is provided having a plurality of print slugs **36** interconnected in a radial array. The wheel is positioned in spaced relationship adjacent ribbon **22** as it is guided through a print station **37**, aided by guide rods **40** and arms **41**, mounted near aligning scale **42**. Arms **41** may be interconnected via cross member **43** to provide functional elements of a conventional vibrator, although a vibrator is not essential in all single element printing mechanisms. Print wheel hammer **44** completes the printing elements shown. Usually, to effect printing the hammer **44** successively drives rotatively selected slugs **36** against a copy material, such as paper, supported in the print station on a platen (not shown). The wheel and hammer assembly traverses parallel to the axis of the platen, along with the entire ribbon supply assembly and associated guide means, during such print operation.

Many advantages of the present invention have been explicitly and implicitly set forth in the above description, e.g., the simple and economical construction of the unit **10**, and the widely diversified use to which the ribbon supply unit **10** may be employed. It should again be emphasized that operator handling of the ribbon **22** is eliminated, or at least kept to a bare minimum, depending on the particular application. To this end, no threading of the ribbon **22** is required with respect to the containers **11**, **12** after or before the unit **10** is manipulated to its operative position. The ribbon **22** remains untwisted and continuously in communication between the container chambers even when in the superposed nonoperative position. Further, the nonoperative position is such that a minimum amount of space is required which enhances shipping and storage.

A still further advantage is the adaptability of the unit **10** to facilitate and simplify aligning and insertion thereof as a singular unit into operative position in associated apparatus. But, on the other hand, the subject supply unit **10** does not preclude use as a divisible assembly, by disengaging the containers **11**, **12** for mounting as two separate units, with the space-saving, nonoperative position still featured. For example, printing machines having a plurality of print elements in many instances have spool or container mounting means disposed in opposition on the machine frame. The positioning of such mounting means requires separate ribbon containers.

What is claimed is:

1. A cartridge assembly for typewriter ribbon comprising:

a supply spool for storing inked typewriter ribbon,

a take-up spool for receiving the typewriter ribbon after it has passed through a printing station,

a pair of containers,

each of said containers comprising base and top members of substantially circular configuration and continuous side walls forming a chamber for storing one of said spools, each of said side walls having an aperture formed therein to provide egress of the ribbon from the supply spool and ingress of the ribbon to the take-up spool,

a cylindrical rod rigidly disposed on the side wall of one of said containers with its axis parallel to the axis of said one container, said rod being approximately equal in length to the combined width of said containers,

an elongated socket for receiving said rod in frictional engagement and disposed in the side wall of the other of said containers and extending between said base and top members of said other container to permit said containers to be relatively movable from a nonoperative position in which said containers are superposed one upon the other to the operative position in which said containers are juxtaposed in the same plane, shoulder means formed on said other container engaging said one container to prevent relative rotation about said rod when said pair of containers are in said operative position, and

mounting means adjacent the work station for receiving said containers when in said operative position, said mounting means having an opening for receiving the extension of said rod, said mounting means including means for rotating said take-up spool to cause passage of the ribbon through the printing station.

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U.S. Cl. X.R.

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