

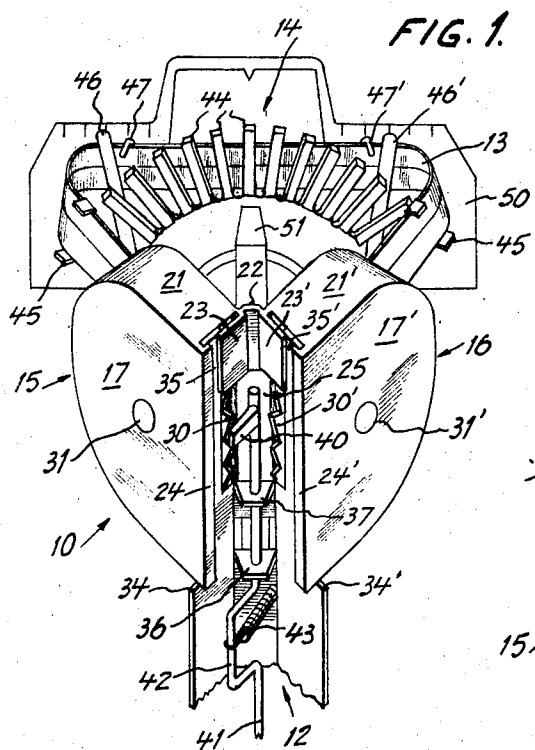
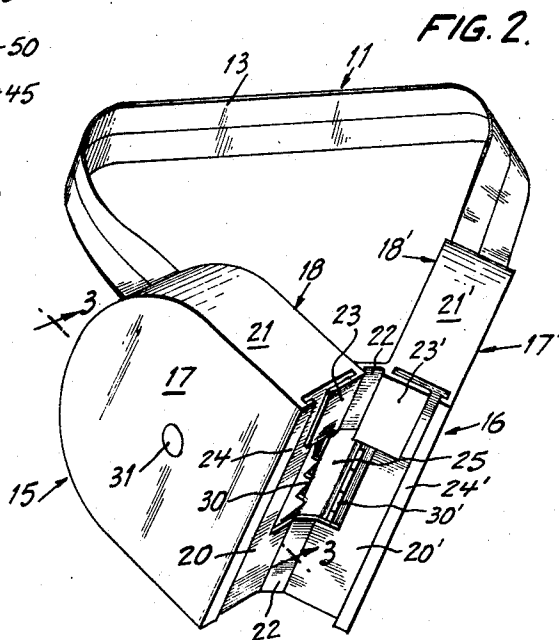
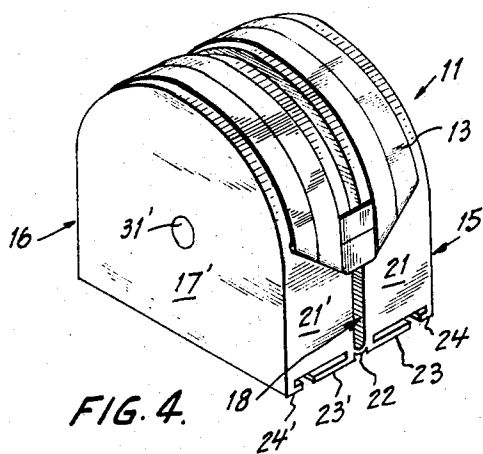
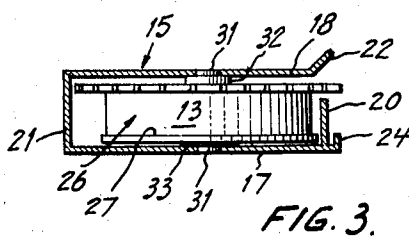
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RIBBON SUPPLY ASSEMBLY

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## RIBBON SUPPLY ASSEMBLY

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1 Claim

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### ABSTRACT OF THE DISCLOSURE

A ribbon supply unit having a pair of containers for storing a continuous web. The containers are permanently connected by hinge means biased normally to hold the containers one folded down upon the other. Even though so connected the containers may be mounted against the bias on a support means disposing the containers in oblique intersecting planes to provide an expanse of web to a work station with ratchet wheel and pawl means uniquely disposed for taking up ribbon from either of the containers to the other.

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

Throughout the many diverse industries of today, there is wide spread application of similar supply units having as a principal function the provision of a 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 work-sheets 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 facet of many modern day machines which employ ribbon supply units, is the trend toward economically manufactured one-time ribbon supply and take-up spools. 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 new spools and/or a fresh ribbon into the unit. This throw-away feature obviates ribbon handling by the operator, and eliminates spool rethreading. 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 such 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 manipu-

lation thereof while minimizing contact with the ribbon during insertion of the unit into associated apparatus.

A further object is to provide a unitary cartridge for office machine ribbons or the like wherein communication of the ribbon between a pair of apertured containers 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 assembly wherein the ribbon may be disposed in operative relationship with associated apparatus without necessitating handling of the ribbon and wherein the assembly when in such operative relationship is adapted to coact with the associated apparatus to provide incremental ribbon feed.

Yet another object is to provide a ribbon supply assembly wherein the ribbon is disposed in a unitary cartridge and is selectively fed in either direction through an associated work station by a simple feed mechanism.

According to the present invention a ribbon supply unit is provided having a pair of interconnected containers adapted to permit ribbon to pass from a chamber in one container to a similar chamber in the other container. More specifically, in one embodiment, each container is D-shaped in cross section and defines an enclosed chamber, one of which is adapted to receive a supply spool for typewriter ribbon, or the like, and the other of which is adapted 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 are 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. When the unit is resting in an operative condition the containers are connected such that they are retained together in a superposed position. Resilient connection means are provided to interconnect a portion of the adjacent straight edges of the containers. By manipulation of the unit, the ribbon may be disposed for operation with the containers urged to oblique intersecting planes. This manipulation is effected by rotating the containers about an imaginary axis intermediate the interconnected straight edge portions.

The present invention further contemplates an assembly which includes a unit as described above interrelated with a unique ribbon advancing mechanism. The unit which is in the nature of a cartridge is constructed to accommodate mounting means to mount the containers adjacent a work station with the axes of the spools disposed obliquely with respect to each other. During operation the ribbon is intermittently advanced from one spool to the other through the work station. The advancing mechanism comprises a series of peripheral ratchet teeth extending from one flange of each spool. The teeth extend through apertures in their respective containers for cooperation with a reciprocally driven pawl member. The pawl is mounted on an oscillatory rod which may be rocked selectively to either of two operative positions corresponding to drive in alternative ribbon directions. Operative engagement with the ratchet teeth of either associated spool effects rotation thereof to advance the ribbon through the work station in the selected direction.

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 an embodi-

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ment of applicant's unique ribbon supply assembly with the novel cartridge disposed in operative position adjacent typical associated printing apparatus, which is shown diagrammatically;

FIG. 2 is a top perspective view from the left of applicant's novel ribbon supply unit with the containers disposed for operation in oblique intersecting planes;

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

FIG. 4 is a perspective view of applicant's novel supply unit resting in its inoperative condition with the containers connected in their superposed nonoperative position.

Referring now to the drawing for a detailed description of the present invention, and more specifically to FIG. 1, the subject ribbon supply assembly 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 ribbon supply assembly, and more specifically the unique supply unit in combination with the mounting and ribbon advancing means, is especially adapted for use therewith. For example, the unitary cartridge structure of the interconnected containers facilitates harmonious translation with the printing apparatus with respect to the information receiving media. Secondly, the simplicity of the interrelated mounting and ribbon advancing mechanisms adapt the assembly to diverse mechanical traveling drives with associated single element machines without necessitating complex intermediate linkages. Thus, a single element machine is best suited to illustrate the functional environment of subject ribbon supply assembly.

For the purpose of describing the assembly illustrated at FIG. 1 of the drawing, reference numeral 10 generally designates a preferred embodiment of subject ribbon supply assembly, comprising a ribbon supply unit 11 (see FIGS. 2 and 4), a mounting bracket 12, and a ribbon advancing mechanism interrelated generally and assigned no numeral designation to avoid confusion.

Supply unit 11 is shown in FIG. 2 in the position it assumes during operation when mounted on bracket 12 (shown only in FIG. 1) and adapted to provide ribbon, generally designated by reference numeral 13, to an adjacent work station 14. The unit 11 comprises a pair of containers 15 and 16 in the nature of a cartridge for storing ribbon 13. The containers 15, 16 have similar D-shaped configurations. Each container defines a chamber having outer endwalls 17, 17' opposing inner endwalls 18, 18' and a continuous sidewall including flat portions 20, 20' and arcuate portions 21, 21'. The arcuate portions 21, 21' of the sidewalls are provided with appropriate apertures (not shown) to accommodate egress and ingress of ribbon 13. Interconnecting means in the form of web 22 extend between the adjacent edges of the corresponding flat wall portions 20, 20' to retain the containers 15, 16 in a unitary cartridge arrangement. Each container is further provided with a pair of flanges 23, 23' and 24, 24' extending along the outer edges of the flat portions 20, 20' of the respective container sidewalls. The flanges 23, 23', 24, 24' are partially disposed in opposition and receiving channels are thus formed to accommodate bracket 12 (see FIG. 1), as discussed in further detail hereinafter. It should be noted that primed reference numerals are used when referring to elements relating to container 16 that corresponds to like elements of container 15 having non-primed reference numerals of the same order.

Now referring to FIG. 4, containers 15 and 16 are shown at rest in the inoperative condition of the unit. The containers 15, 16 are disposed in a superposed position by virtue of the characteristics of web 22 which is of a resilient nature and biased to flex the containers 15, 16 to the relationship shown. In such nonoperative position the ribbon 13 remains in communication between the con-

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tainer chambers and may be disposed in any convenient position with respect to the corresponding sidewalls. A typical position is shown wherein the ribbon 13 is snugly draped to cover approximately one half of the arcuate portions of the sidewalls, for the purpose of leaving a sufficiently long bight in the ribbon 13 to enable ready access for installation purposes. It should be noted that the characteristics of the interconnecting web 22 necessitate a retaining force when the unit 11 is disposed in the position shown in FIG. 2, otherwise the containers 15, 16 will tend to automatically assume their nonoperative position, referred to as the inoperative condition of the unit 11. Although the unit 11 is shown having continuously formed containers 15, 16 with integral web 22 extending therebetween, it is obvious that many alternative constructions exist, e.g., containers having a removable endwall in the nature of a cap. Also, even though in many instances the integral web 22 is preferable, in other instances it could merely comprise a mechanical hinge with or without biasing.

The storage unit, 11 as viewed in FIG. 2, shows flat wall portions 20, 20' juxtaposed on opposite sides of web 22 and coextensive therewith. Regardless of whether the containers 15, 16 are in the operative or nonoperative position, the flat wall portions 20, 20' and the web 22 form a substantially continuous surface, interrupted by extending flanges 23, 23' and an aperture 25. The flanges 23, 23' oppose a corresponding portion of flanges 24, 24' to provide a pair of channels extending from the aperture 25 to the end of the flat wall portions 20, 20'. Although a single aperture 25 is shown, it is evident from the description that follows that a pair of slots would also suffice.

The function of aperture 25 is to permit access to the chambers defined by containers 15 and 16. This access is necessary to effect the operation of the ribbon advance mechanism which includes a modified ribbon spool in each container. The modifications are best described by reference to FIG. 3, which shows a section along line 3—3 of container 15 (see FIG. 2) to illustrate the enclosed ribbon supply spool 26. A similar spool is disposed in container 16. Ribbon 13 is received by a spool barrel (not shown) disposed axially between a pair of end flange members 27 and 30. The spools are mounted in the container chambers by shafts 31, 31' axially extending from the hub of each spool, which shafts are journaled in accommodating apertures in the associated containers endwalls 17, 18. With respect to spool 26 appropriate bushings 32 and 33 are coaxially disposed on shaft 31 to provide a bearing surface and spacing between the end flanges 27, 30 and the inner surface of the endwalls 17 and 18. End flange 30 extends beyond the periphery of end flange 27, and is serrated as shown. Now referring to FIG. 2, the serrated edge of end flange 30 is shown extending through aperture 25 with ratchet teeth facing upwardly. Container 16 and the spool journaled for rotation therein are arranged as a mirror image of the spool 26 and container 15 and thus the ratchet teeth shown extending from spool end flange 30' are also facing upwardly as shown in FIG. 2. In FIG. 1, the ratchet teeth also appear, by virtue of a slot in bracket 12 corresponding in width to the width of aperture 25.

Again referring to FIG. 1, bracket 12 includes extending shoulder portions 34, 34' upon which containers 15 and 16 are limited respectively when the bracket 12 is received by flanges 23, 23' and 24, 24'. More specifically, the bracket 12 is substantially U-shaped in cross section and formed for contiguous superposed relationship with the side-walls portions 20, 20' and web 22 when they are disposed in a similar U-shaped configuration by urging the containers 15, 16 against the web bias to the operative position. The bracket 12 includes tab members 35 and 35' which cooperate with the channels formed by opposing flanges 23, 23' and 24, 24' (see FIG. 1). When the containers 15, 16 rest against shoulders 34, 34' the ends of tabs 35, 35' are flush with the surface of arcuate sidewall

portions 21, 21' and the slot in bracket 12 registers with aperture 25. Bracket 12 is also provided with projecting tabs 36 and 37 associated with the ribbon advancing mechanism described below.

Although flanges 23, 23' serve to securely hold tab members 35 and 35', respectively, in the position shown in FIG. 1, in some applications of subject supply unit 11 the flanges 23, 23' are not essential. The omission of flanges 23, 23' does not alter the overall relationship of bracket 12 and its function with respect to unit 11, in such instances. It should be noted however, that without these flanges 23, 23' closer tolerances are required to effect snug interengagement between bracket 12 and unit 11.

The ribbon advancing mechanism shown in FIG. 1 includes a pawl 40 extending from a shaft 41 which is mounted in tabs 36 and 37 and driven in a reciprocal manner by drive means not shown. The pawl 40 is adapted to selectively cooperate with the ratchet teeth extending from either of the spool end flanges 30 or 30'. Selective engagement is effected by rocking the shaft 41 radially at bight 42 by shifting spring 43 to either of two predetermined limit positions. The means (not shown) for physically shifting the spring 43 comprise any conventional two positional lever arm. The details of this lever arm, the reciprocating drive means for shaft 41, and the mounting of bracket 12 do not form a part of the present invention and thus are not described in further detail; however, it should be noted that their cooperation with the subject assembly must conform with the necessary adjacency of the work station.

It can now be appreciated that subject assembly may be adapted for operation with any apparatus in which a ribbon is employed for carrying or transferring information. One application is shown at FIG. 1 wherein the ribbon 13 is employed as a transfer media for a single element type printing machine, referred to hereinabove as a suitable utilization. The mechanism is shown in diagrammatic form to illustrate such utilization; however, the particular type of apparatus is not a part of subject invention. A print wheel is provided having a plurality of print slugs 44 interconnected in a radial array. The wheel is positioned in spaced relationship adjacent ribbon 13 as it is guided through work station 14, aided by guides 45, and paired arms 46, 46' and 47, 47' the latter of which are mounted adjacent an aligning scale 50. Arms 46, 46' and 47, 47' may be interconnected via an appropriate cross member (not shown) to provide functional elements of a conventional vibrator, although a vibrator is not essential in all single element printing machines. Print wheel hammer 51 completes the printing mechanism elements shown. Usually, to effect printing the hammer 51 successively drives rotatively selected slug 44 against the ribbon 13 and a copy material, such as paper, supported at the work station 14 on a platen (not shown). The wheel and hammer assembly, during print operation, traverses parallel to the axis of the platen, along with the entire ribbon supply assembly, associated mounting means, and intermediate drive linkages such as those required for implementing the reciprocal drive and rocking functions. During printing, issuance of the ribbon is effected by the ratchet and pawl mechanism which incrementally rotates the selected spool in synchronization with the hammer actuation.

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, and the widely diversified use to which the ribbon supply assembly may be employed. It should be reemphasized that operator handling of the ribbon is eliminated, or at least kept to a bare minimum, depending on the particular application. To this end, no threading of the ribbon is required with respect to the containers after

or before the unit is manipulated to its operative position. The ribbon remains 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 assembly to facilitate simple alignment of the supply unit into an operative position adjacent an associated work station. The interrelated elements of the ribbon advancing mechanism are readily actuable and the simple bracket mounting means therewith may be stationary or translatable depending on the desired application.

What is claimed is:

1. A unit for supplying ribbon to a work station, comprising in combination:

a pair of substantially flat containers storing a single ribbon,

each of said containers comprising a pair of D-shaped base portions and a continuous side wall forming a chamber,

each of said side walls including an aperture facing the work station through which said ribbon passes,

a biased hinge comprising a resilient web integral with one of the straight edges of each of said side walls normally biasing said containers together with a base portion of one container substantially parallel with a base portion of the other container,

support means,

bracket means disposed on each of the straight portions of said side walls for connection to said support means to secure said containers in a juxtaposed operative position in which the containers are disposed in oblique intersecting planes with the diverging side facing the work station to supply an expanse of ribbon thereto,

a spool rotatably mounted in each of said chambers for storing ribbon,

each of the straight portions of said side walls having an opening formed therein,

a ratchet wheel rigidly mounted on each spool and having ratchet teeth on the periphery thereof passing through said opening in the straight portion of its associated side wall, and

pawl means mounted on said support means for articulating with the ratchet teeth of a selected one of said ratchet wheels for taking up ribbon from a selected one of said containers to the other.

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