United States Patent

[11] 3,603,283

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[21] Appl. No. **869,672**
[22] Filed **Oct. 27, 1969**
[45] Patented **Sept. 7, 1971**

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[54] **RIBBON-INKING MACHINE**
6 Claims, 11 Drawing Figs.

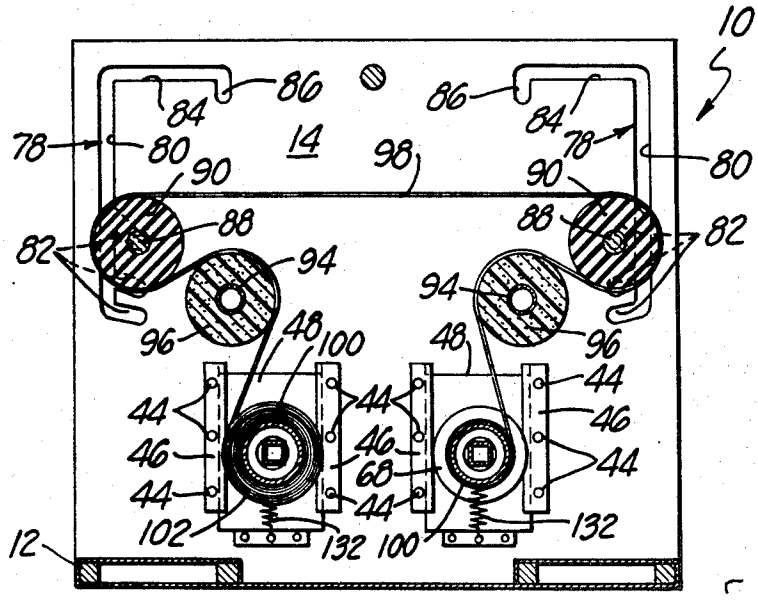
[52] **U.S. Cl.** **118/6,**
118/224, 118/235, 118/246, 118/266
[51] **Int. Cl.** **B05c 11/12,**
B05c 1/10
[50] **Field of Search** 197/171;
101/332, 336; 118/6, 246, 223, 224, 235, 266, 260

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ABSTRACT: A ribbon-inking machine is disclosed for use in re-inking ribbons employed in various types of computers, accounting machines, printing machines and the like. The machine includes two winding rollers, each of which is also capable of serving as a supply roller, at least one inking roller, and control means for controlling the operation of the winding rollers. In use a roll of ribbon is located on one of the winding rollers and attached to the other of the winding rollers so as to extend past the inking roller or rollers used. As the machine operates the ribbon is wound from one of the winding rollers to the other and then back again, a number of times dependent upon the setting of the control means.



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SHEET 1 OF 3

FIG. 1.

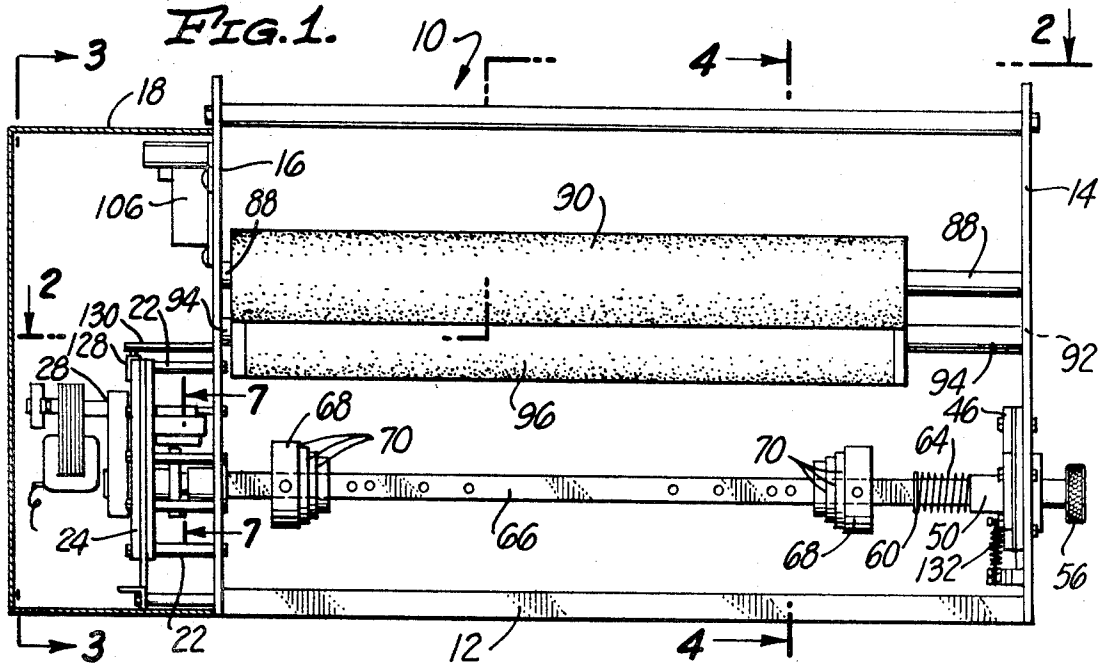


FIG. 2.

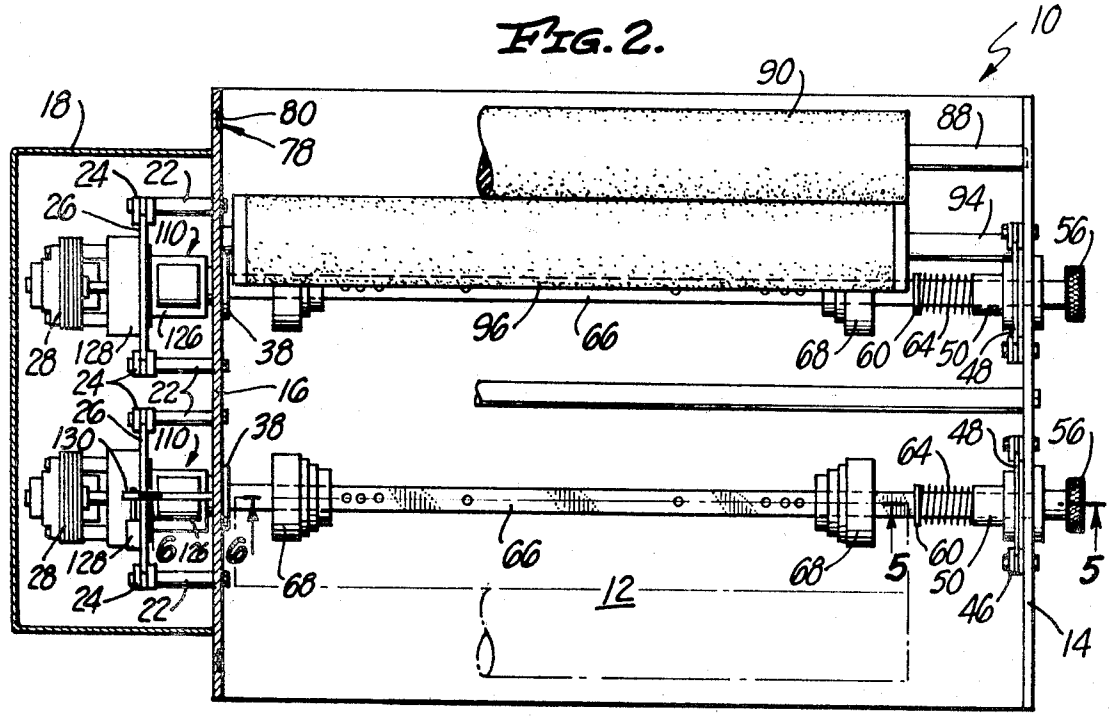
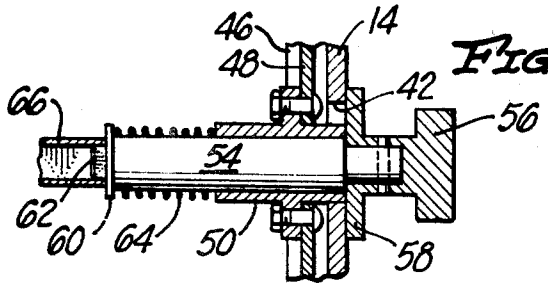


FIG. 5.



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FIG. 3.

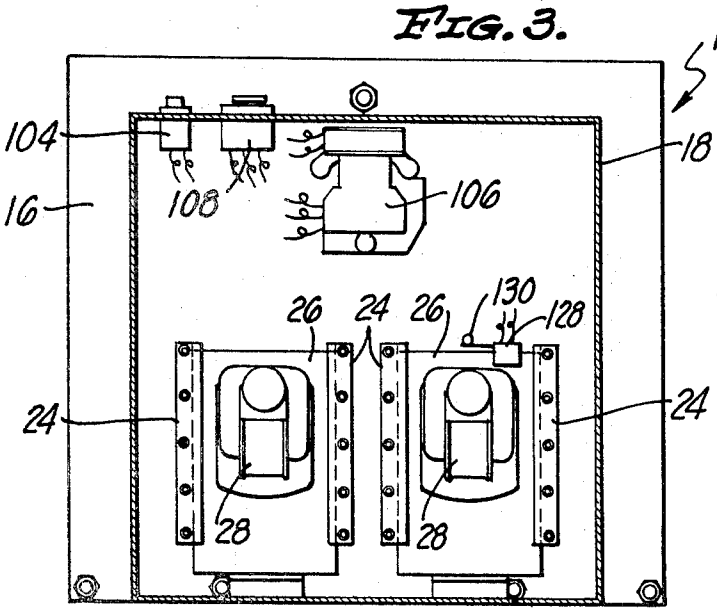


FIG. 8.

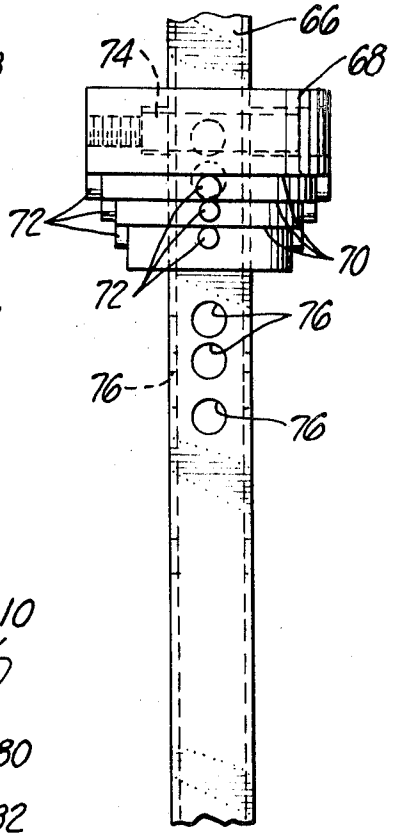


FIG. 4.

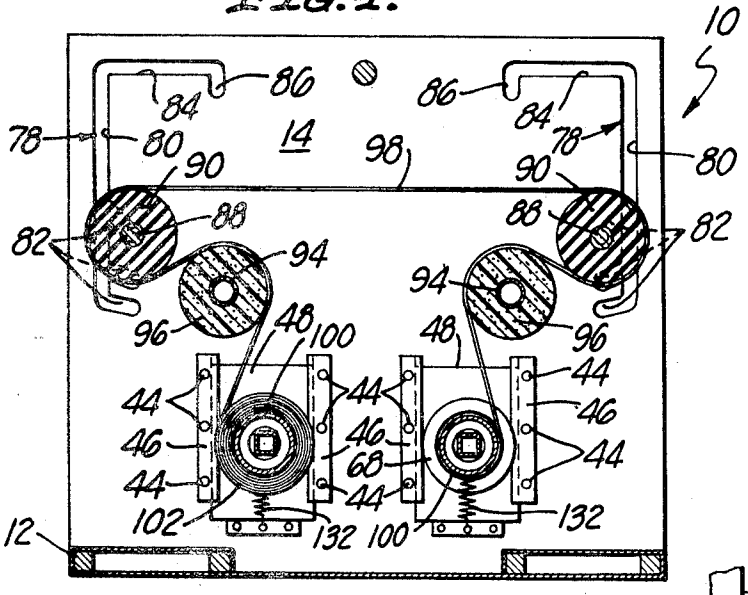


FIG. 6.

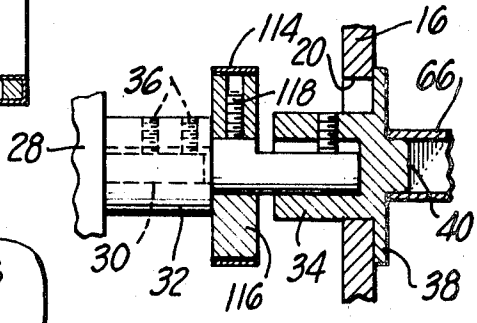
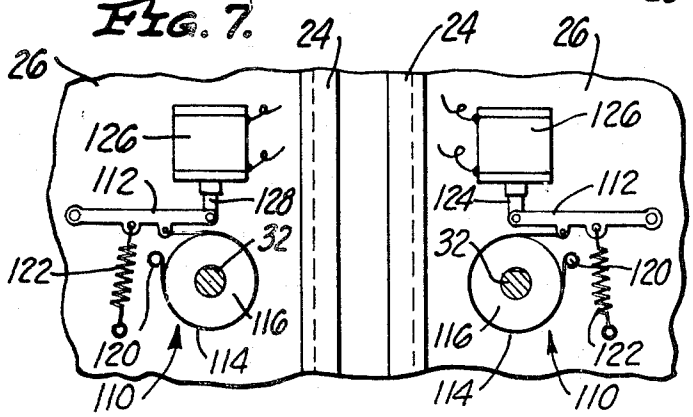


FIG. 7.



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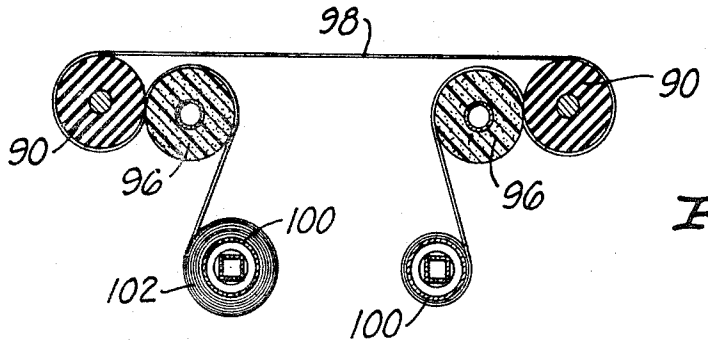


FIG. 9.

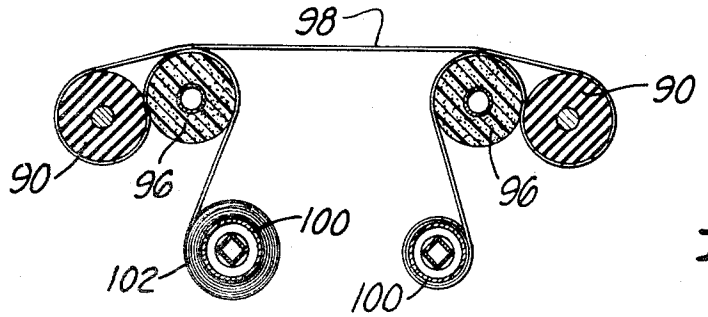


FIG. 10.

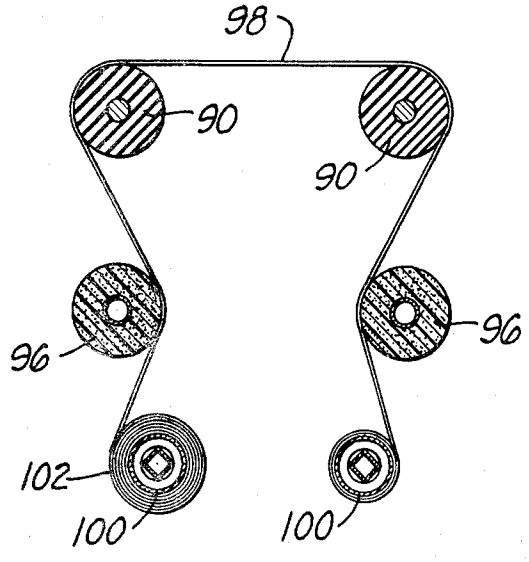


FIG. 11.

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RIBBON-INKING MACHINE

CROSS-REFERENCES TO RELATED APPLICATION

This application incorporates by reference the entire disclosure of the copending Frank R. Anderson and Albert J. Castro application serial number 672,687 entitled "Ink Applying Devices" filed Oct. 2, 1967, now abandoned.

BACKGROUND OF THE INVENTION

In conventional types of addressing, computing and calculating machines inked ribbons are used in order to provide a visual indicia signifying or embodying the output of the machine. In the past such ribbons have been constructed so as to utilize cotton or similar fabrics impregnating with ink so that such ink is held until pressure is applied to the ribbon so as to cause the ink to be transferred. At the present time such ribbons are frequently constructed using a fabric of synthetic material such as nylon. As any such ribbon is used in time the ink supply within it will become exhausted.

It has been conventional to discard inked ribbons from which the ink has been exhausted. Since in many cases the basic fabric of a ribbon is still sound when the ink from such a ribbon is exhausted this is considered to constitute an unnecessary waste. This policy has been followed because in the past there has been a dearth of any satisfactory procedure for re-inking a used ribbon of the type indicated so that the ribbon after such re-inking possessed adequate physical characteristics for satisfactory use.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a new and improved way of satisfactorily re-inking ribbons of the type indicated. Other objects of this invention are to provide a new and improved method and apparatus for re-inking ribbons which were originally inked but from which ink has been removed. Further objectives of the invention are to provide a method of the type described which is relatively simple to carry out, which may be easily and conveniently practiced and which is effective. Still further objectives of the invention are to provide ribbon inking machines which can be constructed at a comparatively nominal cost, which perform satisfactorily in re-inking ribbons, which are capable of giving prolonged, reliable performance and which may be easily and conveniently used.

In accordance with this invention these and various related objectives of the invention are achieved by winding a ribbon being inked back and forth between two different winding rollers operated so that first one of these winding rollers serves as a winding roller while the other serves as a supply roller and then vice versa. As a ribbon is wound back and forth in this manner it passes in contact with at least one and preferably a plurality of inking rollers, each of which is capable of supplying ink to the ribbon being re-inked.

BRIEF DESCRIPTION OF THE DRAWING

Further details of the present invention as well as the manner in which the invention achieves its objectives will be apparent from a careful consideration of the remainder of this specification and the accompanying drawings in which:

FIG. 1 is a side-elevational view, partially in section, of a presently preferred embodiment of a ribbon inking machine of this invention;

FIG. 2 is a partial cross-sectional view taken at line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 1;

FIG. 4 is a cross-sectional view taken at line 4—4 of FIG. 1;

FIG. 5 is a partial cross-sectional view taken at line 5—5 of FIG. 2;

FIG. 6 is a partial cross-sectional view taken at line 6—6 of FIG. 2;

FIG. 7 is a partial cross-sectional view taken at line 7—7 of FIG. 1;

FIG. 8 is an enlarged elevational view of part of a collar and shaft employed as a part of a winding roller in the machine illustrated in the preceding figures;

FIG. 9 is a diagrammatic view illustrating one manner of use of the machine illustrated in the preceding figures;

FIG. 10 is a diagrammatic view illustrating another manner of use of a machine illustrated in the preceding figures;

FIG. 11 is a diagrammatic view illustrating another manner of use of a machine illustrated in the preceding figures.

The purpose of the accompanying drawings is to clearly illustrate for explanatory purposes the nature of the presently preferred embodiment or form of a machine of this invention. Various changes may be made in the particular machine illustrated through the use of routine engineering skill without departing from the essential character of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing there is shown a ribbon inking machine **10** of this invention which includes a generally flat baseplate **12** supporting upstanding parallel walls **14** and **16**. These walls **14** and **16** have opposed surfaces facing one another. The surface of the wall **16** remote from the wall **14** is preferably enclosed by a conventional housing **18**. The wall **16** is provided with vertically extending bearing slots **20**. On each side of each of the slots **20** a plurality of support posts **22** extend into the interior of the housing **18**. These posts **22** carry sliding bearings **24** which face one another so as to support a mounting plate **26** adjacent to each of the slots **20**.

These mounting plates **26** carry reversible motors **28** having shafts **30** extending therefrom generally towards the wall **16**. The shafts **30** are connected to couplings **32** to bushings **34** by means of conventional set screws **36**. Each of the bushings **34** extends through one of the slots **20** and carries a collar **38** limiting its motion with respect to the wall **16** by engaging this wall **16**. Each of the bushings **34** also include a nonround stud **40** extending therefrom generally towards the wall **14**.

In the wall **14** directly opposite each of the slots **20** there is located a slot **42**. Conventional fasteners **44** mount sliding bearings **46** along each of the sides of each of the slots **42**. It will be noted that these bearings **46** extend vertically. The bearings **46** carry mounting plates **48** corresponding to the mounting plates **26**. These mounting plates **48** carry bearings **50** which rotatably and slidably support plungers **54**. Each of the plungers **54** includes a handle **56** designed to facilitate its being moved linearly, a flange **58** designed to limit movement by abutting against the wall **14**, a terminal flange **60** and a terminal nonround stud **62**. The studs **40** and **62** preferably are of the same dimension. The flange **60** is intended to provide a bearing surface for an end of a coil spring **64** held under compression on each of the plungers **54** against a bearing **50**.

This structure is designed so that nonround shafts **66** may be mounted so as to extend generally between the walls **14** and **16** by pulling the handles **56** so as to increase from normal the spacing between the studs **40** and **62**. When a shaft **66** is positioned as shown, it will rotate in accordance with the operation of a motor **28**.

Each of the shafts **66** preferably carries two shaft collars **68**. These shaft collars are provided with stepped shoulders **70** which face the stepped shoulders **70** on the other shaft collar **68** on the same shaft **66**. Each of the shoulders **70** on each collar **68** preferably includes a pin **72** which is adapted to physically engage an end of a cylindrical ribbon core located on such a shoulder during the use of the machine **10** so as to cause such a core to rotate with a shaft **66**. A core as indicated herein is subsequently described. The collars **68** —are adapted to be secured in various desired "standard" positions on the shafts **66** by means of other pins **74** fitting through these collars and through holes **76** in the shafts **66**. The pins **74** may be threaded into the collar **68** as indicated in FIG. **9** of the drawing so as to prevent undesired movement.

The walls **14** and **16** carry positioning slots **78** on their opposed surfaces. These slots **78** have vertically extending sections **80**. Adjacent to the bottoms of these sections **80** there

are located downwardly extending terminal extensions **82**. The upper ends of the sections **80** are connected to horizontally extending sections **84** each of which terminates in another downwardly extending extension **86**. The structure of the slots **78** is designed so that shafts **88** extending from upper inking rollers **90** may be supported in any of the extensions **82** or **86** so that these rollers **90** will rotate thus in effect the extensions **82** and **86** act as bearings. The shafts **88** may be conveniently moved between the extensions **86** and **82** by being slid along the remainder of these extensions. The walls **14** and **16** also preferably carry aligned openings **92** serving as bearings for shafts **94** on other, lower inking rollers **96**.

These rollers **90** and **96** are preferably of identical dimension. The rollers **96** are of such a nature as to be capable of applying ink to a ribbon **98** being re-inked in accordance with the invention. Highly suitable rollers for this purpose are disclosed and claimed in the copending Anderson et al. application Ser. No. 672,687 entitled "Ink Applying Device" filed Oct. 2, 1967. In the interest of brevity the construction of such rollers is not described in detail herein and the entire disclosure of the copending application is incorporated herein by reference.

The ribbon **98** shown in FIG. **4** is supported upon a core **100** which is in turn mounted upon shoulders **70** on collars **68** on one of the shafts **66**. In the manner of the use of the invention indicated in FIG. **4** of the drawing the ribbon **98** extends from a winding **102** around this core **100** over one of the rollers **90** to the other roller **90**. It passes around and under this other roller **90** and thence over the other roller **96** to another core **100**. In the condition of the machine **10** illustrated in FIG. **4** the ribbon **98** has just been placed in the machine **10** on a core **100**.

At this time a setting switch **104** on a conventional stepping switch control structure **106** is set to an amount corresponding to the desired amount to which the ribbon **98** is to be inked. Then a conventional on-off switch **108** forming a part of the control **106** is turned on. This will supply current to the motor **28** which is connected so as to rotate the core **100** which does not contain the winding **102** as shown at the right in FIG. **4**. The operation of this motor **28** will cause this ribbon **98** to be wound upon this particular core **100**. As the ribbon is wound in this manner it will travel between the rollers **90** and **96** so that ink will be applied to it by contact with these rollers.

As this occurs a braking action increasing the tension on the ribbon is achieved through the use of pony brakes **110** as shown in FIG. **7** of the drawing. Each of these brakes **110** includes a lever arm **112** pivotally mounted on a plate **26**. The lever arms **112** are connected to braking straps **114** which extend around braking discs **116** secured to the couplings **32** by set screws **118**. The ends of the straps **114** remote from the levers **112** are secured to the plates **26** by means of support pins **120**. The levers **112** are biased into normal nonbraking positions by means of coil springs **122** connecting them to the plates **26**.

These levers **112** are also pivotally connected to the actuators **124** from solenoids **126** mounted on the plates **26**. These solenoids **126** are connected through the control **106** so that the solenoid remote from a particular motor **28** being operated is actuated so as to operate the brake **110**. In other words when one motor **28** is operating the parts rotated by operation of the other motor **28** are braked through operation of a solenoid **126** and the brake **110** attached to it so as to increase the tension on the ribbon **98**.

After the ribbon **98** has been wound completely upon a core **100** in the manner described the tension on the ribbon will pull up upon the core **100** from which the ribbon **98** has been removed. This will tend to move the entire assembly of parts associated upon the now empty core **100** upwardly so that a microswitch **128** mounted upon the upwardly moving plate **26** will be actuated by contact with the pin **130** projecting from the wall **16**. Such upward motion will be opposed by a spring **132** connecting a mounting plate **48** corresponding to the upwardly moving plate **26** to the wall **14**. In effect the springs **132** as used tend to equalize weights so as to prevent "cocking" during such upward movement.

Upon a particular microswitch **128** being actuated in this manner the control **106** will cause reversal of the operation so as to operate the other motor **28** and the other brake **110** in such a manner to cause rewinding of the ribbon **98** upon the core **100** where it was previously located. The ribbon **98** will pass back and forth in this manner a number of times depending upon the initial setting of the switch **104**, receiving ink from the rollers **90** and **96** each time.

In order to vary the ink applied to a roller **98** it is possible to relocate the rollers **90** in any of the extensions **82** and **86** in the slots **78** and to pass the ribbon **98** over around these rollers **96** and the rollers **90**. Various configurations designed to vary the ink application are shown in FIG. **9**, **10**, and **11** of the drawing. When the machine **10** is used in the manners indicated in FIG. **4**, **9**, **10** and **11** of the drawing it should be born in mind that the amount of ink applied will be proportional to the degree or amount of contact between the ribbon **98** and the rollers **90** and **96**.

We claim:

1. A ribbon-inking mechanism which comprises:

movable mounting means for mounting two winding rollers,

a winding roller rotatably held by each of said mounting means,

a ribbon to be inked extending between said winding rollers and at least partially wound on one of said winding rollers,

motor means for turning said winding rollers so that said ribbon can be wound from one of said winding rollers on to the other and vice versa;

switch means mounted adjacent to each of said mounting means for controlling the operation of said motor means so that when said ribbon is wound on one of said winding rollers, the tension on said ribbon causes movement of the mounting means for the other of said rollers, actuating said switch means so as to cause actuation of said motor means in order to no longer wind said ribbon on said one of said winding rollers and to cause said ribbon to be wound on the other of said winding rollers;

means for rotatable mounting an inking roller so that it is contacted by said ribbon as said ribbon passes between said winding rollers;

an inking roller for applying ink located on said means for rotatably mounting an inking roller so that a ribbon passing between said winding rollers passes around said inking roller, said inking roller being capable of applying ink to said ribbon in an amount proportional to the contact with said ribbon,

said means for mounting an inking roller being constructed so that said inking roller may be located in a plurality of different positions, the amount of contact of said ribbon with said inking roller being different in said different positions.

2. A ribbon-inking mechanism as claimed in claim **1** wherein:

said means for rotatable mounting an inking roller comprises slot means, said slot means having a plurality of extensions, said inking rollers being capable of being fitted within different of said extensions so as to be located in said different positions.

3. A ribbon-inking mechanism as claimed in claim **1** including:

means for mounting a second inking roller so that it is contacted by said ribbon passing between said winding rollers,

a second inking roller for applying ink located on said means for mounting said second inking roller so that said ribbon passing between said winding rollers passes around both of said inking rollers, said second inking roller being capable of applying ink to said ribbon in an amount proportional to the contact with said ribbon,

the amount of contact between said ribbon and both of said inking rollers being variable in accordance with the position of said first mentioned inking roller.

4. A ribbon-inking mechanism as claimed in claim 3 wherein:

said first-mentioned means for rotatably mounting an inking roller comprises slot means, said slot means having a plurality of extensions, said first mentioned inking roller being capable of being fitted within different of said extensions so as to be located in said different positions.

5. A ribbon-inking mechanism which comprises:

mounting means for mounting two winding rollers;

a winding roller rotatably held by each of said mounting means;

a ribbon to be inked extending between said winding rollers and at least partially wound on one of said winding rollers;

motor means for turning said winding rollers so that a ribbon can be wound from one of said winding rollers on to the other and vice versa;

control means responsive to tension on said ribbon for reversing the direction of ribbon travel between said winding unit so that when said ribbon becomes wound on one of said winding rollers, the direction of ribbon travel

reverses to wind said ribbon on the other of said winding rollers;

two separate means for rotatably mounting an inking roller;

an inking roller for applying ink to said ribbon located on each of said means for rotatably mounting an inking roller so that said ribbon passes in contact with and around both of said inking rollers, said inking rollers being capable of applying ink to said ribbon in an amount proportional to the contact with said ribbon,

one of said means for mounting being constructed so that the inking roller held thereby may be located in a plurality of different positions, said positions being such that the amount of contact of said ribbon with said inking rollers is different in said different positions.

6. A ribbon-inking mechanism as claimed in claim 5 wherein:

said one of said means for rotatably mounting an inking roller comprises slot means, said slot means having a plurality of extensions, said inking roller held by said one of said means for rotatably mounting being capable of being fitted within different of said extensions so as to be located in said different positions.