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2,102,216

SUPPLYING INK TO INK TRANSFER MEMBERS

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Fig. 1.

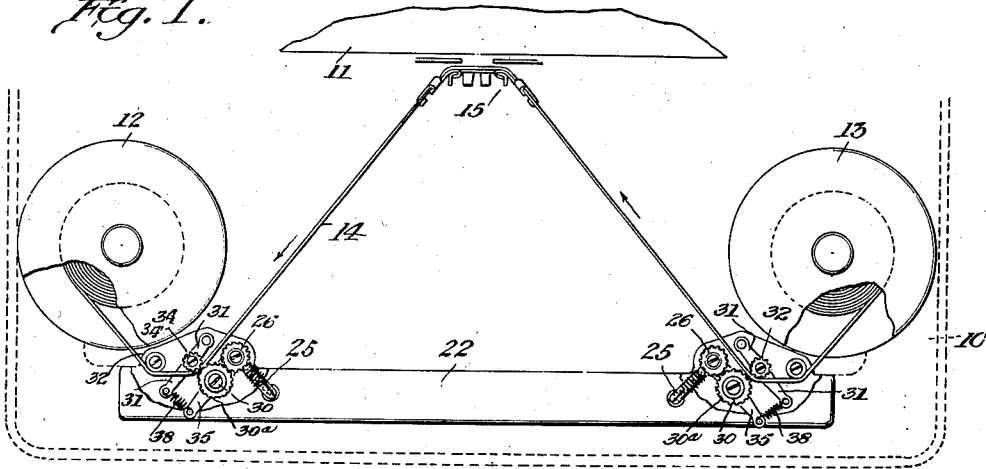
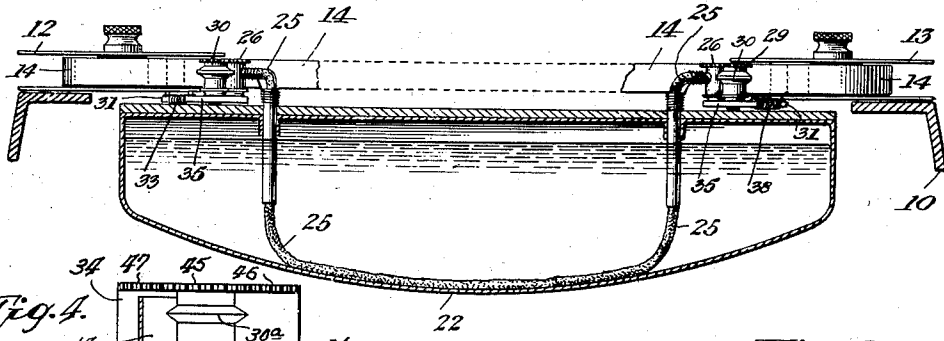
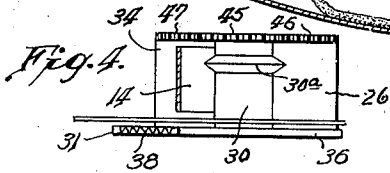
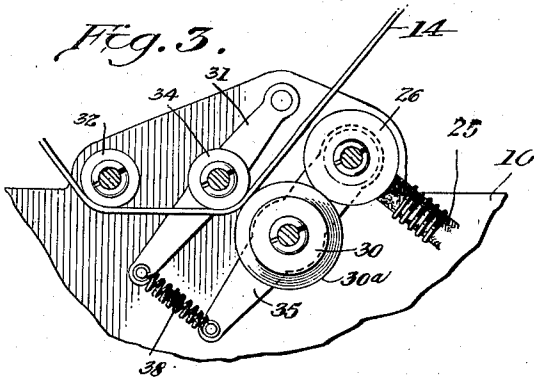


Fig. 2



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UNITED STATES PATENT OFFICE

2,102,216

SUPPLYING INK TO INK TRANSFER MEMBERS

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Original application September 19, 1932, Serial No. 633,874, now Patent No. 2,074,970, dated March 23, 1937. Divided and this application November 13, 1936, Serial No. 110,711

11 Claims. (Cl. 197-171)

This invention relates to typing devices and printing mechanisms and machines, and particularly to single ribbon machines and to means for supplying ink to the absorbent and non-absorbent members of such devices, mechanisms and machines while in operation.

This application is a division of my application Serial No. 633,874 filed on the 19th day of September, 1932, and upon which Letters Patent 2,074,970 issued March 23, 1937.

One of the main objects of this invention is to provide an improved inking means for inking a writing ribbon which may be of the quality and thinness of long fibre silk described in my copending application Serial No. 567,111 filed on the 5th of October, 1931.

An object of this invention is to provide a writing ribbon of unusual thinness and of greatly increased length which does not interwind with an ink supply ribbon.

Another object is to provide improved inking means and an improved writing ribbon for use in cash registers and other machines employing type in making impressions on a writing surface and in which the type press against the writing ribbon and are not struck or hammered against it, and in which several type press together simultaneously; and the life of said writing ribbon may be for a number of years, and throughout its life the writing done will be of substantially uniform weight of ink and of excellent color.

Another object is to provide an improved inking device and means which contacts directly with the writing ribbon and which is of improved design making for precision and accuracy; and it is also of advantage in supplying ink to a multi-color ribbon.

Another object is to provide an improved ink reservoir which employs but one wick, the ends of which contact with the inking devices lying on opposite sides of the typing machine.

Other objects of the invention will be apparent from the following description and claims:

In the accompanying drawing:

Fig. 1 is a plan view of a portion of a typing machine having applied thereto inking means embodying this invention.

Fig. 2 is a sectional elevation thereof.

Fig. 3 is a fragmentary plan view, on an enlarged scale, of one of the inking devices.

Fig. 4 is an enlarged detail view in side elevation illustrating the arrangement of the gearing for the inking devices.

This invention may be applied to typewriters,

cash registers, adding machines or typing mechanisms of any kind using a ribbon. The term "ink" as hereinafter used is intended to designate any material of which marks or characters can be made on paper or other writing surface or other material which is being typed, or printed.

The accompanying drawing illustrates by way of example one embodiment of my invention, showing the same applied to a typewriting machine, but it will be understood that my invention may be incorporated in other embodiments of modifications without departing from the scope of the same.

The typing machine illustrated has a frame 10 and a platen 11 which carries the paper or other writing material upon which the writing is done. 12 and 13 represent the ribbon spools upon which a writing ribbon 14 may be wound and unwound during the use of the machine, the ribbon spool actuating mechanism not being shown. The ribbon in passing from one spool to the other passes through the usual ribbon guide or vibrator 15 which moves the ribbon into and out of writing position for striking by the type. Any other means for transferring ink from the ribbon to a writing surface may be employed. The ribbon may be used where the type contact its face but do not strike it.

In accordance with my improved method of supplying ink to a writing ribbon, I provide a wick which may extend into an ink reservoir and which may supply ink to a rotary inking member which is in direct or indirect contact with the thin edge portion of a rotatable member. For purposes of illustration a stationary wick is shown so arranged as to feed ink from said stationary wick to an inking roller of suitable metal which in turn inks the thin edge portion of a rotatable member.

The apparatus for use in carrying out this method of inking a writing ribbon which is in contact with the thin edge portions of the rotatable members may include two inking devices or mechanisms fastened to any convenient part of the frame 10 of the typing machine in any suitable manner, by screws or other suitable means; the two inking mechanisms may be directly opposite each other and located as shown in Fig. 1. In Fig. 1, I use one wick 25 with its ends in contact with rollers or inking members 26 which in turn contact with rotary disks 30, the thin edges of which are 30a.

22 represents a reservoir of ink which may be supported on the frame 10 of the typing ma-

chine in any suitable manner, for example from the top plate of the typing machine, and ink is conducted from said reservoir 22 by the capillary action of wick 25, which is preferably in a single piece, the opposite ends of which extend upwardly through the top wall of the reservoir and into a position to contact with said rollers or inking members 26 which are mounted to rotate in contact with said wick 25. Ink deposited on these rollers 26 is applied to rotary disks 30 by rolling contact of said disks with said rollers 26, and disks 30 also contact with the writing ribbon 14, so that ink is transferred from edges 30a of the disks 30 to said ribbon 14. In order to provide a positive rolling contact between the writing ribbon 14 and each disk 30, a backing roller or pulley 34 is provided to cooperate with each disk and to engage the face of the ribbon opposite that engaged by said disk. In the construction shown, the backing roller or pulley 34 is mounted to rotate freely about an upright pivot secured to a bracket or swinging arm 31 pivotally mounted at one end on a fixed part of the machine, for example, the top plate or edge of the typewriter frame, and having a spring 38 secured to the other end thereof. The spring 38 also engages a second bracket or arm 35 attached to the frame of the machine concentric with the axis of the inking roller 26, and the shaft of the disk 30 is secured to the bracket or arm 35. Consequently, the tension spring 38 draws the brackets or arms 31 and 35 and yieldingly presses the backing roller or pulley 34 towards the disk 30 so that opposite faces of the ribbon 14 are contacted firmly yet yieldingly and ink is fed from the edge 30a to the face of the writing ribbon when the machine is in use. 32 represents a guide or idler roll over which the ribbon passes to and from each adjacent spool as the ribbon winds or unwinds. The wick 25 extends down to the very bottom of the ink reservoir 22, which reservoir may be located at any desired position, and may be of any desired construction. For purposes of illustration said reservoir is fastened to the top plate of the machine in any suitable manner, by screws or otherwise. This type of construction utilizes the reservoir 22 as a portion of the machine itself and by means of the one stationary wick, substantially the entire ink supply in such reservoir 22 can be efficiently utilized. The reservoir is preferably built large enough to supply as much ink as may be required, when using pica type (or smaller type) and a forty-two yard length of writing ribbon, in a machine which has type which strike against the ribbon in the normal operation of the same; or, if desired, I may utilize in place of the stationary wick, a reservoir similar to reservoir 22 but into which rotary wicks extend, these wicks being of cylindrical form as illustrated in my Patent 2,074,969 issued March 23, 1937 on a copending application filed January 26, 1932. In the present instance, the pivot of the disk member 30 carries a gear 45 which meshes with a second gear 46 secured to the roller 26 which contacts with the wick 25. These gears are preferably of such size that the peripheral portions of the roller 26 and of the disk 30 will be caused to move at the same peripheral speeds by the said gears. Preferably, though not necessarily, the pulley 34 (or backing roller) which presses the writing ribbon 14 against the thin edge (30a) of the rotary disk 30, is also provided with a gear meshing with the gear of said rotary disk member 30, so that when the writing ribbon 14 is moved lengthwise

between the said pulley 34 and the said thin edge 30a of disk 30, the frictional contact of said ribbon with said pulley 34 and said thin edge portion 30a will cause rotation of the various rotary members.

Wherever bold writing is required and a substantial feed of ink in the form of a line or lines, containing a substantially uniform amount of ink, it is advantageous to utilize the two groups of inking apparatus feeding ink from the ends of a wick directly to the two inking rollers 26 which in turn ink the edges 30a of disks 30.

It is possible to use only one inking means such as described. Preferably such thickness of disk's edge portion (30a) is selected as will supply to the writing ribbon only enough ink to replace that which is removed during the operation of the machine as the ribbon travels from one spool past the impact point to the other spool.

As a general rule (although there may arise an exception to same) it is best to supply a line of ink to the writing ribbon which shall not be as wide as the height of the type faces used in the typing machine employing the ribbon. I prefer to use a thin ink. If the disks 30 have edge portions that are serrated or notched, they may be thicker than when disks such as illustrated herein are employed. The kind of ink used has some bearing upon the disks used and upon the thickness of the edge portions.

In the operation of the device described and illustrated, ink will pass by capillary action from the reservoir 22 to the upper ends of the wick 25 and films of ink will be deposited on the inking rollers 26. As the ribbon 14 passes in either direction between the disk's edge 30a and pulley (or backing roller) 34, rotary motion will be imparted to the disk 30, and this rotation of the disk 30 may be imparted in any suitable manner to roller 26, for example, by frictional contact. During the contact of thin edge 30a of disk 30 with the roller 26, a film of ink will be deposited on the edge of the said disk, which, during further rotation, will be deposited upon a face of the writing ribbon 14. Since only minute quantities of ink are usually transferred in this manner for the usual typewriting machine, it will be obvious that the supply of ink in the reservoir 22 will be sufficient for a long period. Furthermore, with my improved inking mechanism, herein described, it will be obvious that when the typing machine is not in operation, the edge portion 30a of disk 30 will transfer no ink and ink is only supplied during the use of the machine for writing, and when the ribbon is moving from one spool to the other spool. Because of the constant supply during writing of quantities of ink to the ribbon which are approximately equal to the ink removed from the ribbon by the type during operation, it is obvious that the ink storage capacity of the ribbon may be very slight indeed and a ribbon may be selected such as described in my copending application Serial No. 567,111. It may prove advantageous to utilize a writing ribbon as thin as .002 of an inch because it is possible to wind twice as much of this thin ribbon upon the spool as of ordinary commercial inked ribbon. If this .002 of an inch ribbon is of long fibre silk, very closely woven and is produced by calendering a much thicker ribbon (.004 of an inch or .004½ of an inch) it is possible to have a very strong, exceedingly durable ribbon. Where the typing machine used is one where the type contact with the said writing ribbon's surface by pressure instead of by

cutting impact and blows, it is possible to utilize such a ribbon for a period of some years. By using a large ink reservoir, it is possible to carry enough ink to last for at least two years in a busy office. However, it is an easy and very simple matter to refill the reservoir.

I prefer to use as my writing ribbon a fabric that is composed of long fibre silk of the highest possible thread count and then calendered and compacted and pressed down as much as possible without weakening the fabric's ability to withstand the blows of the type; said ribbon may be woven edge or cut edge. If cut edge, the edges should be secured well for very long, arduous wear.

It will also be understood that a number of disks may be employed for placing a plurality of lines on any desired portions of a face of the writing ribbon 14. By utilizing my invention in inking the upper portion of a multicolor ribbon, one can thereby utilize the multicolor ribbon for as long a period as one may use one edge portion of a solid color ribbon.

A thin ribbon such as described may also be produced by using wide cloth woven very closely on a skip-weave basis, that is woven so that the warp or filling threads skip or pass over two or more adjacent threads of the other type on one side of the member whereby the skipping threads may be more closely drawn together to provide more threads in a given space than in a plain or basket weave. Another way of expressing this is as follows: A weave of fabric comprising a set of warp threads and a set of weft threads so woven that one set of the threads lies mostly on one surface of said fabric; or, one set of threads is more exposed on one surface than on the opposite surface. I may employ a skip weave fabric ribbon having a long fibre silk warp and a linen filling and use a ribbon that is not more than .004 of an inch thick. In accordance with this invention, a writing ribbon no longer needs to act as an ink reservoir in the ordinary sense. It is unnecessary for the writing ribbon to carry more than a temporary supply of ink and the type need never strike into a lot of ink.

It will, of course, be understood that the devices and apparatus and equipment described herein may be used on any typing or printing machines or mechanisms employing type and a transfer member, whether said member is in the form of a ribbon or sheet or other form. The writing ribbon may be of thin silk, tightly woven and compacted and pressed down and calendered so that the resulting ribbon is two and one-half thousandths of an inch in thickness or thereabouts. Such a ribbon takes very little space in the spool and has a smooth, glossy surface and is free from the usual hills and valleys of the usual typewriter ribbons, as fully described in said application Serial No. 567,111 filed October 5, 1931. The ordinary ribbon such as is used in commercial typewriters generally is understood to be approximately .005 of an inch in thickness and it usually is medium inked or heavily inked so that it acts as a reservoir of ink. Such commercial ribbons may cost 75¢ each or more at retail and wherever a typist is using such a ribbon, this new invention will mean a very substantial saving of money, time and labor. The labor of frequent replacement of ribbons is saved. A typist using a noiseless or silent typewriter equipped with the present invention (or any typewriter where the type press and do not strike the face of the writing ribbon) should not replace the

writing ribbon oftener than once in five years, if the set-up herein described is employed.

The periphery or edge portions 30a of disks 30 may be .004 of an inch thick to .006 or .008 of an inch thick depending upon the thinness of the ink employed and the size of the type used and the character of the typing machine employed also. The disks 30 may be arranged on their axes at any desired height, so that ink may be applied to the upper or lower or any intermediate part of the face of the writing ribbon 14. Several disks may be used on one axis.

It is advantageous in certain typing mechanisms to supply ink from both inking devices in order to insure a plentiful inking of the ribbon throughout that portion which is struck by the type or marked by the type in writing, while in other mechanisms it may be advantageous to use only one inking device and locate it near the vibrator or impact point of the type. For certain types of mechanisms it may be advisable to use disks having edges as thin as .002 of an inch. The thickness of the edge of the disk depends upon various factors and upon whether heavy, medium or light printing is desirable.

It is to be understood that the construction and designs hereinabove described and illustrated by the drawing annexed are for purposes of illustration only and that variations may be made in details, in sizes and styles and designs of parts without in any degree departing from the scope and the spirit of my inventions. In general language the present inventions show new ways of utilizing improved inking means without in any degree adversely affecting the operation of the machine and at the same time enabling the typist to carry a much longer writing ribbon and to carry it on a spool or spools to itself with all the advantages which accrue thereby, including a vastly increased amount of writing that substantially matches from first to last of the life of the ribbon's fabric. I do not limit myself as to the kind of materials used in the writing ribbon, or in the rotary members or in the wicks or other members and I do not limit myself as to the sizes of the rotary members or as to the shape or design of the rotary disks or inking wheels or inking members. I do not limit myself as to the width or thickness or length of the writing ribbon. I do not limit myself as to the shape or size of the reservoir or reservoirs used. I prefer the type of reservoir illustrated in the drawing. The intermediate member between the end of the wick and the inking disk may be of any suitable material. It may have a substantially impervious surface upon which the ink is placed. It is understood that the rotary members herein described are substantially non-ink-absorbent.

I claim as my invention:

1. Device for supplying ink to a writing ribbon in a typewriter as said ribbon travels back and forth during intermittent operation of said typewriter, to maintain an approximately uniform supply of ink in said ribbon at the typing position, comprising two rotary inking members, adjacent each other which are substantially non-ink-absorptive, and a pulley which contacts with said ribbon opposite that face of said ribbon which contacts a rotary inking member; an ink reservoir, whose ink supply lies below said pulley; said ink being placed on a face of said writing ribbon by a rotary inking member in predetermined amounts, accurately gauged; at least two of said rotary members, of said device for supplying ink, being connected by gears.

2. In a typing machine, a ribbon inking device for maintaining an approximately uniform supply of ink in a writing ribbon at the typing position during intermittent operation of said machine, wherein a thin-edged, non-ink-absorptive rotary inking member is supplied with ink from a reservoir by an ink supplying means including an upstanding, non-ink-absorptive rotary member located near said thin-edged member; and wherein said thin-edged member is opposed to a pulley between which and said thin-edged member said writing ribbon is fed endwise, characterized in that the pulley is supported above the reservoir to rotate about an upstanding axis which is fixedly related to said reservoir; and said thin-edged member is supported above said reservoir to rotate about an upstanding axis and to move horizontally relative to said reservoir, and said upstanding, non-ink-absorptive rotary member carrying ink for transfer to the thin edge portion of said thin-edged rotary inking member; the latter member occupying a position on the same side of said writing ribbon as the said upstanding, non-ink-absorptive rotary member.

3. In a typing machine, means for supplying ink to the ribbon thereof comprising a pulley and an inking wheel, the latter having a thin peripheral portion, means yieldingly urging the pulley and the inking wheel toward each other in such manner that their peripheral portions contact opposite faces of said ribbon, an inking roller having an impervious surface and mounted to rotate on a vertical axis at a position adjacent said inking wheel, and means for feeding ink from an ink reservoir to said inking roller, the periphery of said inking roller being in engagement with the thin peripheral edge of said inking wheel so that the ink supplied to the inking roller is transferred to the thin periphery of the inking wheel and by the latter transferred to the upper half portion of the writing ribbon, whereby approximately uniform writing is maintained during intermittent operation of said machine.

4. In a mechanism equipped with a writing ribbon, means for supplying ink to said ribbon comprising a pulley and a rotatable ink wheel mounted on a vertical axis and lying on opposite sides of said ribbon and being yieldably urged toward each other, whereby they are both rotated by movement of said ribbon, a rotary non-ink-absorptive member, means for supplying ink from an ink reservoir to said non-ink-absorptive member, the latter member having its periphery in engagement with the peripheral edge of said inking wheel so as to transfer ink to a face of said writing ribbon during intermittent operation of the machine to maintain a substantially uniform quantity of ink in said ribbon at the typing position, and driving gearing connecting said pulley, inking wheel and non-ink-absorptive rotary member, said inking wheel lying in an approximately horizontal position, above and outside of the ink supply.

5. In a printing machine equipped with a writing ribbon, means for supplying ink to the upper half portion of said ribbon, comprising two sets of members each consisting of a pulley and a rotatable inking wheel mounted on vertical axes, and both of which contact with said ribbon, two upstanding non-ink absorptive rotary inking members each lying adjacent an inking wheel, and gearing connecting each pulley to the inking wheel of its set.

6. In a mechanism equipped with a writing

ribbon, means for supplying ink to said ribbon comprising a pulley and a rotatable ink wheel mounted on vertical axes and lying on opposite sides of said ribbon and being yieldably urged toward each other, whereby they are both rotated by movement of said ribbon, a rotary non-ink-absorptive member, means for supplying ink from an ink reservoir to said non-ink absorptive member, the latter having its periphery in engagement with the peripheral edge of said inking wheel so as to transfer ink to a face of said writing ribbon during intermittent operation of the machine to maintain a substantially uniform quantity of ink in said ribbon at the typing position, and driving gearing connecting said pulley, inking wheel and non-ink-absorptive rotary member, said inking wheel and said non-ink-absorptive rotative member lying in approximately horizontal positions, above and outside of the ink supply.

7. In a printing machine equipped with a writing ribbon, means for maintaining an approximately uniform quantity of ink in said ribbon comprising a pulley and an inking wheel lying on opposite sides of said ribbon, means for yieldably urging said pulley and said inking wheel toward each other, an ink reservoir located in a plane below said pulley and said inking wheel, a rotary non-ink-absorptive member also supported on a vertical axis in a plane above said reservoir and having its periphery in contact with the peripheral edge of the inking wheel, and an ink feeding member extending from the reservoir to said non-ink-absorptive rotary member and contacting with the periphery thereof, the peripheral engagement of the non-ink-absorptive member and the inking wheel, and the contact of the inking wheel with the ribbon being such that ink from said reservoir is supplied to the surface of said non-ink-absorptive rotary member for transfer to the periphery of the inking wheel in approximately correct amounts for replacing the ink used from said ribbon during intermittent operation of the machine.

8. A ribbon inking device of the character described comprising a pulley and an ink transfer wheel adapted to be supported on opposite sides of a writing ribbon, an ink reservoir, an upstanding non-ink-absorptive rotary member mounted on a vertical axis, means for supplying ink from the reservoir to the periphery of said non-ink-absorptive rotary member, the latter having its periphery in engagement with the peripheral edge of said ink transfer wheel, for transfer to that portion of the writing ribbon which is marked by the type in writing so as to maintain an approximately uniform quantity of ink in said writing ribbon at the typing position during intermittent use of a typing machine, said ink transfer wheel being mounted on a vertical axis and lying in an approximately horizontal position.

9. In a typing machine, the combination of a writing ribbon, an ink reservoir, a stationary wick, an inking means including a substantially non-absorptive ink roller adjacent to and engaging each end of said wick, and thin edged inking wheels which contact with a face of said ribbon at two different positions, to place ink thereon; said thin edged inking wheels also having their peripheral edges in contact with said inking rollers, said rotary members being gear connected.

10. In a typing machine equipped with a writing ribbon, the combination of means for reinking said ribbon during intermittent operation of said mechanism, including a pulley and an ink

transfer wheel lying on opposite sides of said writing ribbon; gears connecting said pulley and said wheel, and means, including an upstanding non-ink-absorptive rotary inking member which is rotatable on a vertical axis at a position near said wheel and which carries ink on its surface for delivery to the peripheral edge of said wheel, so as to supply ink from a reservoir to the upper half portion of said writing ribbon throughout substantially that lengthwise portion which is marked by the type in the operation of writing with said mechanism; said ink transfer wheel being rotatable in an approximately horizontal position on a vertical axis.

11. In a typing machine, the combination with a writing ribbon inked for neat impressions, of means for reinking said ribbon during intermittent operation of said typing machine, said means

including rotary means, and a thin edged inking wheel lying on one side of said ribbon in said machine, and a pulley lying opposite said inking wheel and contacting with the other side of said ribbon; an ink reservoir, an upright, substantially non-ink-absorptive rotary inking member mounted to rotate on a vertical axis and lying near said inking wheel and supplying ink from said reservoir in suitable quantities to the peripheral edge of the inking wheel to renew the ink supply in said ribbon, thereby maintaining substantially uniform impressions from said ribbon during the life of its fabric; at least two of the rotary members of the inking means being connected by gears, the ink in said reservoir lying below said inking wheel.

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