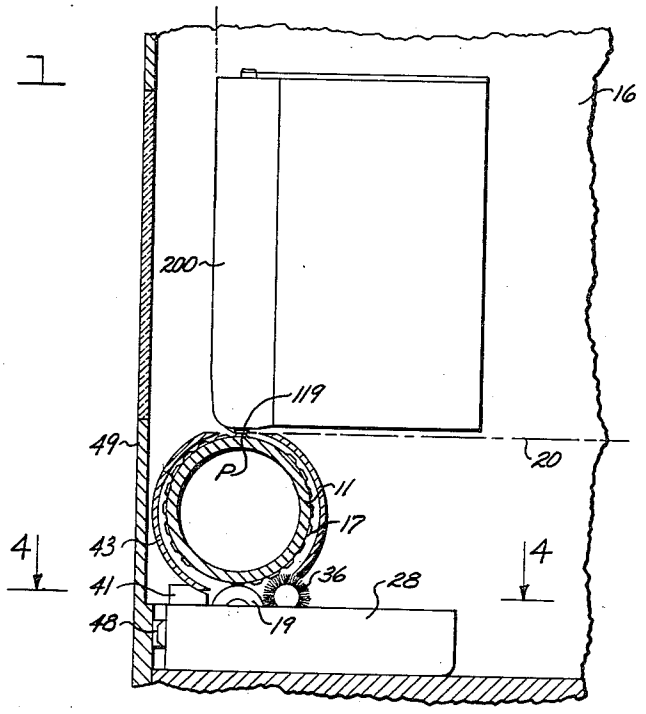
July 10, 1962 C. A. CHRISTOFF 3,043,214

INKING DEVICE

Filed April 11, 1960 2 Sheets-Sheet 1

FIG. 1



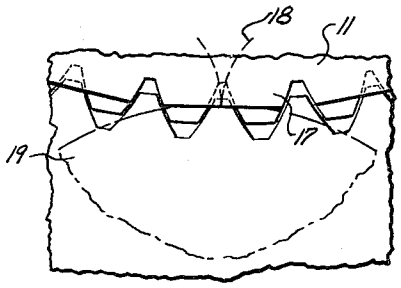
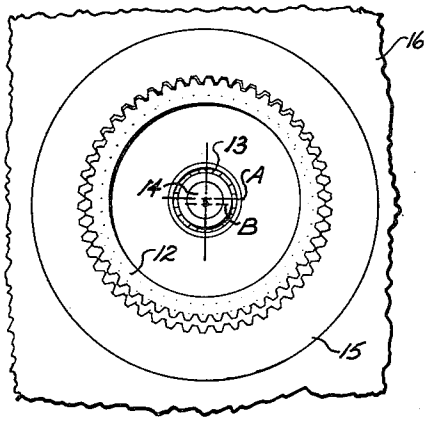


FIG. 3

FIG. 2



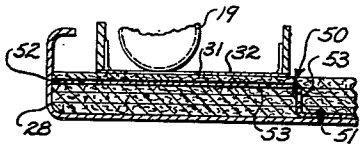


FIG. 4

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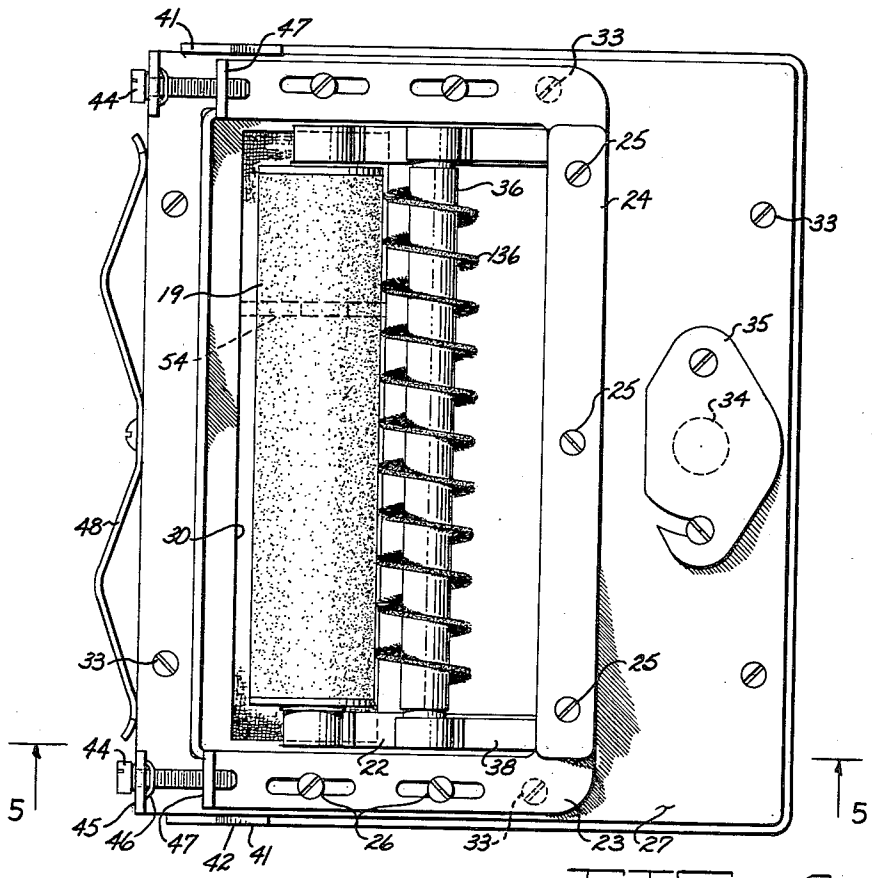


FIG. 4

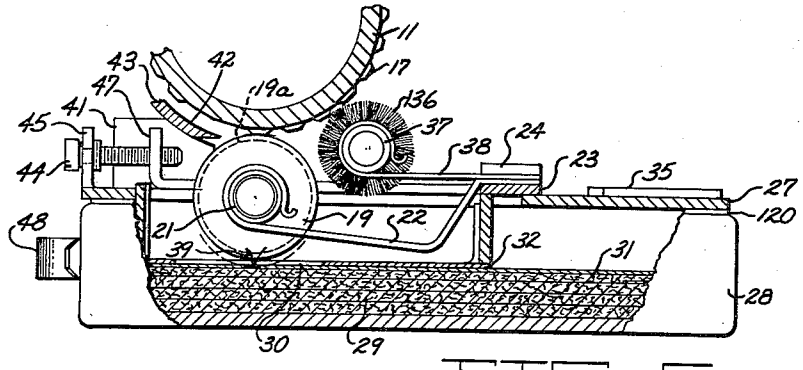


FIG. 5

United States Patent Office 3,043,214 Patented July 10, 1962

3,043,214

INKING DEVICE

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Filed Apr. 11, 1960, Ser. No. 21,370
6 Claims. (Cl. 101—97)

This invention relates to printing devices and has particular reference to improvements for applying ink to the type characters of a high speed continuously rotating type drum.

One means for transferring a type character to a record medium or strip requires the placing of an ink transfer ribbon between the type characters and the record strip, but this means of transfer requires the addition of means for properly guiding and advancing the ribbon, and with a high speed printer in constant use, the wear on the ribbon would require frequent changes.

A second means for transferring type characters to a record strip comprises an ink well for applying ink to an intermediate means, which being in contact with said drum coats the characters with ink in preparation for a print operation. This inking means becomes unsatisfactory when the printer is used in devices subject to rocking or other unstable motion as found on airplanes, boats, missiles, etc., due to the splashing of the ink and the uneven distribution of the ink to the intermediate means.

A third means, of which the present invention is an improvement, comprises an ink supply pad having direct contact with the type drum or an intermediate member such as an ink transfer roller. Although this means of ink supply is generally satisfactory in most environments, the constant friction between the pad and the drum or between the pad and the intermediate member will quickly deteriorate the pad and also, in time, the adjacent member.

One object of the present invention is to provide an inking pad arrangement for a rotary drum type printer which will allow the printer to be mounted in a vehicle or the like which is subject to rocking or unstable motion, without slopping of the ink and without varying the distribution of the ink on the type drum.

Another object is to eliminate the frictional engagement between the pad and the intermediate roller of a printer of the foregoing type, thereby greatly increasing the life of the ink pad.

Another object is to provide a means for removing excess ink from the drum thereby eliminating accumulation of ink deposits around the type characters and uneven printing.

These and further objects and advantages of the invention will be more readily understood when the following description is read in connection with the accompanying drawings, in which:

FIG. 1 is a longitudinal sectional view of a high speed printer embodying the present invention.

FIG. 2 is an enlarged sectional view illustrating some of the mechanical means for driving the type drum.

FIG. 3 is an enlarged fragmentary sectional view illustrating the relationship between the internal gear, the external gear and the type characters.

FIG. 4 is a plan view of the inking device and is taken substantially along the line 4—4 of FIG. 1.

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4.

FIG. 6 is a fragmentary sectional view showing a modified form of the invention.

The particular printer illustrated in connection with the present invention is disclosed and claimed in the patents to E. O. Witt et al., Patent No. 2,915,968, issued on December 15, 1959, and the C. A. Christoff et al., Patent

No. 2,910,936, issued on November 3, 1959. Therefore, for the sake of brevity, only those portions of the printer which embody the present invention or cooperate therewith will be illustrated and described herein. It is to be understood, however, that the invention could be equally well applied to other types of rotary drum printers.

Describing first the printer, the latter comprises a hollow drum 11, FIGS. 1 and 2, having affixed at its extreme ends external gears 12 (only one shown). Said drum also comprises a plurality of adjacent circumferentially extending rows of type characters spaced therearound, which may be more easily seen in the aforementioned Patent No. 2,915,968.

The drum 11 and gears 12 are supported by ball bearings 13 on eccentric members 14 (only one shown). Therefore, the drum 11 and gears 12 are concentric to the axis formed by the intersection of the vertical center line and the line A, which is the axis of the eccentric member 14, but are eccentric to the axis formed by the intersection of the vertical center line and the line B, which is the axis of the printer drive shaft (not shown).

A pair of internal gears 15 (only one shown) are mounted in printer support frames 16 concentrically of the printer drive shaft axis "B," and in line with the external gears 12 so as to mesh with the same.

The ratio between the teeth of the gears 12 and 15 is such that as the eccentric members rotate the eccentric axis "A" about the axis "B," the external gear will be retracted a specific amount equal to one type character space on the drum.

The motion of the drum as above described is commonly called a hypocycloidal motion whereby a point or a character 17 (FIG. 3) will approach the print point "P" (FIG. 1) through a hypocycloidal curve as indicated at 18. It will be seen that as a type character reaches the cusp of its outward travel, it will be moving substantially radially outward. If, at this time, a platen 119 is positioned inwardly toward the drum 11, by means not shown, a printing contact with the paper 20 will occur.

The paper is suitably guided from a supply roll (not shown), past the drum 11 and upwardly along the side of a guide block 200 for the various platens.

To supply ink to the type characters 17 of the drum 11 there is provided a transfer roller 19, FIGS. 4 and 5, which is rotatably supported at opposite ends through bushings 21 by leaf springs 22. Each spring 22 is rigidly secured between an adjustment frame 23 and a hold down bar 24 through screws 25, whereby said spring will hold said roller in constant engagement with the drum 11. The adjustment frame 23 is slidably mounted through screw and slot combinations 26, on a cover plate 27. The cover plate and a gasket 120 are secured to an ink supply container 28 by screws 33.

The container 28 is provided with ink absorbing packing 29 of some suitable material such as felt and a top pad 31 of the same material but covered with a screen-like layer of nylon or similar material to prevent tufting of the pad due to the engagement of the roller 19.

The packing 29 and 31 is held in position by a frame plate 32 which is integral with the adjustment frame 23, said plate having an opening 30 through which the roller 19 contacts the pad 31. The plate 32 acts similar to a pressure plate on the packing in that as the roller 19 disengages the pads, the relief of pressure on the pads will hasten the return of ink to the point of pick up.

The ink supply for the packing is entered through an opening 34 in the cover plate 27, said opening having a cover plate 35 to prevent dust and dirt from falling through the opening onto the ink pad.

For cleaning the drum 11 of any exces ink accumulated thereon, there is provided in constant engagement

with said drum, a helically arranged roll **136** of radially extending bristles mounted on a roller **36** which is supported at opposite ends through bushings **37** by leaf springs **38**. Each leaf spring is rigidly secured between the adjustment frame **23** and the hold down bar **24**, similar to springs **22**.

The functioning of the ink transfer roller **19** is that as the drum **11** reaches its lower position in its hypocycloidal movement, it will have depressed said roller into contact with the pad **31**, as shown at **39** of FIG. 5, thereby eliminating practically all of the frictional engagement between the roller and the pad. This engagement is only momentary and as the drum continues it moves upward allowing the transfer roller to retract out of engagement with the pad **31**.

As the print drum continues around past the print point P the bristled roller **36**, which is held in frictional rolling engagement with surface of the drum, will wipe the excess ink from the drum **11**. That is, since the bristles are helically arranged and extend radially from the roller, the ink will be wiped laterally across the drum, dropping off at the end onto the pad **31**. The bristles are preferably formed of a flexible material such as nylon plastic or the like.

The roller **36** is a necessity in this type of printer, in that ink is applied to all of the type characters on the drum but only one character out of each row is used during a print cycle. Thus, if the drum is not cleaned, the characters that are not used would soon build up an accumulation of ink so great, that upon a print they would transfer an unintelligible blot of ink onto the paper. Also, the bristles **136** are effective to enter and remove ink from the spaces within the type characters thereby preventing accumulation of ink at such points.

The top plate **27** (FIGS. 4 and 5) has two upwardly extending edges **41** whose curved edges **42** rest against a shrouding **43** (FIG. 1) on the printer, whose construction may be more clearly seen in the aforementioned Patent No. 2,910,936.

After the inking unit has been placed in position as shown in FIG. 1, final adjustment may be made by turning a pair of adjustment screws **44**. The screws **44** are loosely mounted in upwardly extending ears **45** of the top plate **27** and are held thereby clip springs **46**. The screws are then threaded into upwardly extending ears **47** of the adjustment plate **23**, so that by turning the screws **44** the plate will, through the screw and slot combinations **26**, move the rollers **19** and **36** back and forth for final adjustment.

That is, the plate **23** is preferably adjusted so that the transfer roller **19** is caused by the drum **11** to lightly touch the top surface of the pad **31** when the roller is at the lowermost point of its movement. Any excessive pressure by the roller **19** against the pad would cause an excess transfer of ink and undue wear of the pad. However, such adjustment serves as a means to control the amount of ink transfer. That is, as the pressure of the roller against the pad is increased a heavier inking will result.

For best results, it has been found desirable to wrap the roller **19** with a layer **19***a* of felt or rubber to facilitate transfer of ink.

A leaf spring **48** mounted on the front of the container **28** is provided so that when a door **49** of the printer is closed it will apply pressure against the spring to thereby hold the edges **42** against the shrouding.

Normaly, the ink pads **29** and **31** have sufficient resiliency to continually maintain the upper surface of the former in line with the under surface of the plate **32** as ink is depleted from the pads. However, the construction shown in FIG. 6 could be resorted to in the event the ink pads tend to lose their resiliency or sag. Here, a resilient leaf spring **50** is attached by a screw **51** to the floor of the container **28**. The spring is formed with an upper level **52** which extends under the upper pad **31** to yieldably hold the latter against the under surface of the plate **32**. Holes **53** are formed in the spring to permit transfer of ink therethrough from one pad to another.

If desired, the roller **19** and the ink transfer layer **19***a* thereon may be split longitudially into two or more separated sections, as indicated by the dot-dash lines **54** (FIG. 4) to cooperate with similarly separated ink pads, enabling differently colored inks or different types of ink, such as magnetic ink and standard printing ink, to be applied to the different roller sections. In this case, the container **28** and the ink supply pads therein would likewise be split and separated into correspondingly aligned sections. In addition, the bristles **136** of the roller **36** would also preferably be split and separated in line with the separations of the two sections of the roller **19** or the ink transfer layer **19***a* in order to prevent lateral transfer of ink between such sections.

Although the invention is described in detail and therefore certain specific terms and languages are used herein, it is to be understood that the present disclosure is illustrative rather than restrictive and that changes and modifications may be made without departing from the spirit or scope of the invention as set forth in the claims appended hereto.

Having thus described the invention, what is desired to be secured by United States Letters Patent is:

1. In a printing device including a printing drum having a plurality of type characters therearound, means for moving said drum about its center, means for effecting an impression of a selected one of said type characters against a record medium, and means for applying a coating of ink over said type characters, a roller for removing accumulated ink from said type characters, said roller comprising a helical row of flexible radially extending bristles, and yieldable means rotatably supporting said roller in engagement with said drum whereby said drum engages said bristles to rotate said roller.

2. In a printing device including a printing drum having a plurality of type characters therearound, means for moving said drum about its center, means for effecting an impression of a selected one of said type characters against a record medium, and means for applying a coating of ink over said type characters, a roller comprising a helically arranged row of radially extending bristles, means supporting said roller for rotation about an axis parallel to the axis of said drum, and means for yieldably pressing said roller into frictional engagement with said drum whereby said drum engages said bristles to rotate said roller to cause said bristles to remove accumulated ink laterally from said type drum during rotation of said roller by said drum.

3. In a printing device including a printing drum having a plurality of different type characters therearound, means for oscillating the center of said drum while rotating said drum about said center, means for effecting an impression of a selected one of said type characters against a record medium, and means for continuously applying a film of ink over said type characters, a roller, said roller comprising a helical row of radially extending bristles, bearings on opposite ends of said roller supporting said roller for rotation about an axis substantially parallel to the axis of said drum, and means for independently urging said bearings toward said drum whereby to cause said drum to rotate said roller, said bristles being effective to remove accumulated ink from said type characters upon rotation of said roller.

4. In a printing device including a printing drum having a plurality of different type characters therearound, means for oscillating the center of said drum while rotating said drum about said center, and means effecting an impression of a selected one of said type characters against a record medium at a predetermined point in said oscillation, an inking device for said drum comprising an ink transferring roller, means supporting said roller in rolling engagement with said drum, a container, an inking

pad in said container, and means supporting said container in juxtaposition with said roller whereby said roller engages said inking pad during oscillation of said drum away from said record medium and disengages said inking pad during oscillation of said drum toward said record medium.

5. In a printing device including a printing drum having a plurality of different type characters spaced thereabout, means for guiding a record medium in juxtaposition with said drum, means for moving the center of said drum in an orbital path toward and away from said record medium while rotating said drum about said center to cause said type characters to move at a rate such that a new type character is presented to said record medium during each orbital movement of said drum center, and means for impressing a selected type character against said record medium, an inking device for said drum comprising an ink transferring roller, means yieldably supporting said roller in rolling engagement with said drum, an ink absorbent body, and means supporting said body in juxtaposition with said roller whereby said roller engages said body during movement of said drum toward said record medium and disengages said body during movement of said drum away from said record medium.

6. In a printing device including a printing drum having a plurality of type characters therearound, means for guiding a record medium in juxtaposition with said drum, means for oscillating the center of said drum toward and away from said record medium while rotating said drum about said center, and means for selectively effecting an impression of one of said type characters against a record medium at a predetermined point in said oscillation; an inking device for said drum comprising an ink transferring roller, spring means supporting said roller in continuous engagement with said drum, a cleaning roller comprising a helical arranged wiping device, spring means supportnig said cleaning roller in continuous engagement with said drum, an ink reservoir, an ink storing medium in said reservoir, and means supporting said ink reservoir in juxtaposition with said transfer roller whereby said transfer roller engages said ink storing medium during oscillation of said drum toward said medium and disengages said medium during oscillation of said drum away from said storing medium, said oscillation of said drum acts to rotate said cleaning roller to remove accumulative ink laterally from said type drum.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 13,400	McCoy	Apr. 9, 1912
1,126,732	Drake	Feb. 2, 1915
1,826,801	Littleford	Oct. 13, 1931
2,265,856	Reed et al.	Dec. 9, 1941
2,714,365	Rowlands	Aug. 2, 1955

FOREIGN PATENTS

1,905	Great Britain	of 1855