

Nov. 3, 1959

C. A. CHRISTOFF ET AL

2,910,936

PRINTER MECHANISM

Filed Jan. 19, 1959

3 Sheets-Sheet 1

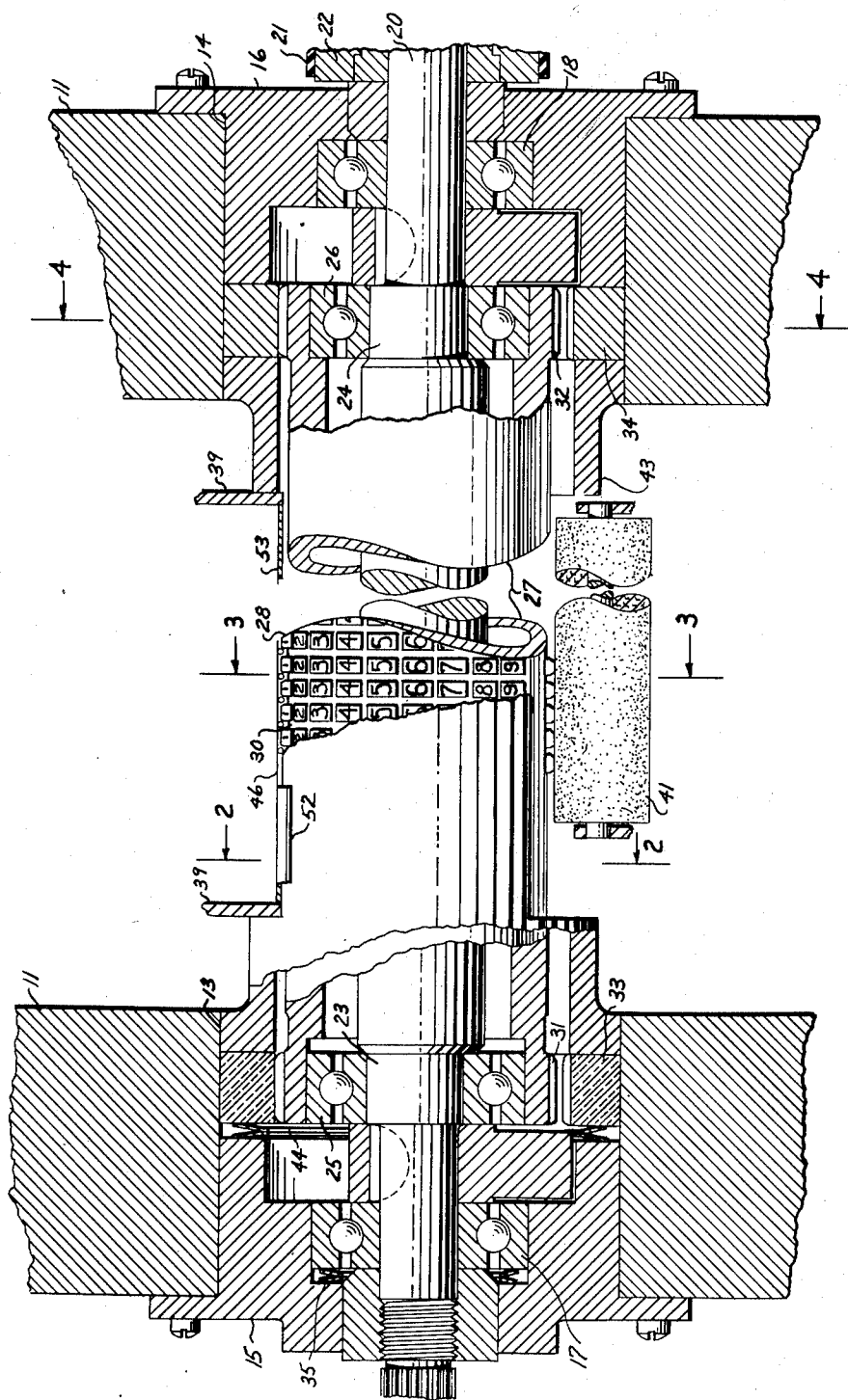


FIG. 1

Nov. 3, 1959

C. A. CHRISTOFF ET AL

2,910,936

PRINTER MECHANISM

Filed Jan. 19, 1959

3 Sheets-Sheet 2

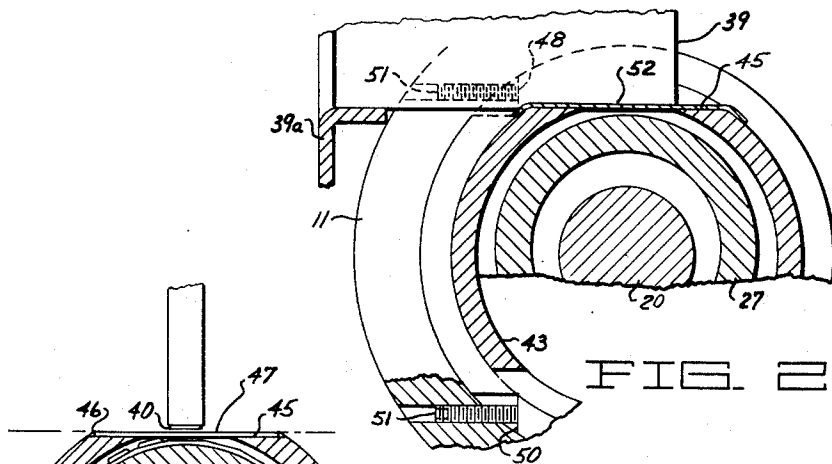


FIG. 2

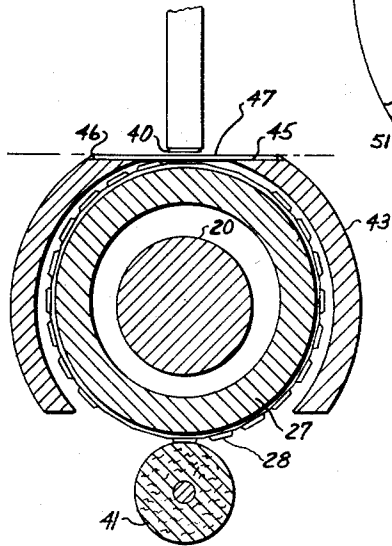


FIG. 3

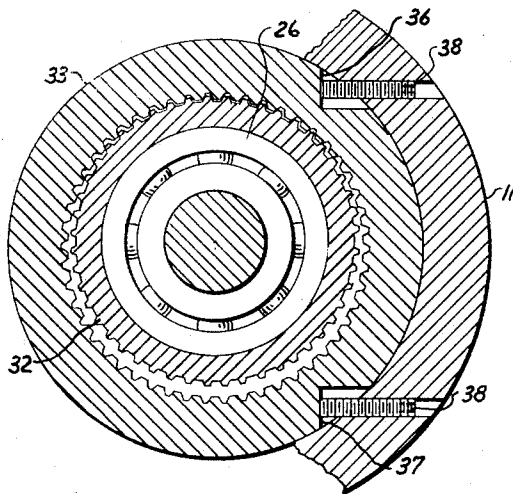


FIG. 4

Nov. 3, 1959

C. A. CHRISTOFF ET AL

2,910,936

PRINTER MECHANISM

Filed Jan. 19, 1959

3 Sheets-Sheet 3

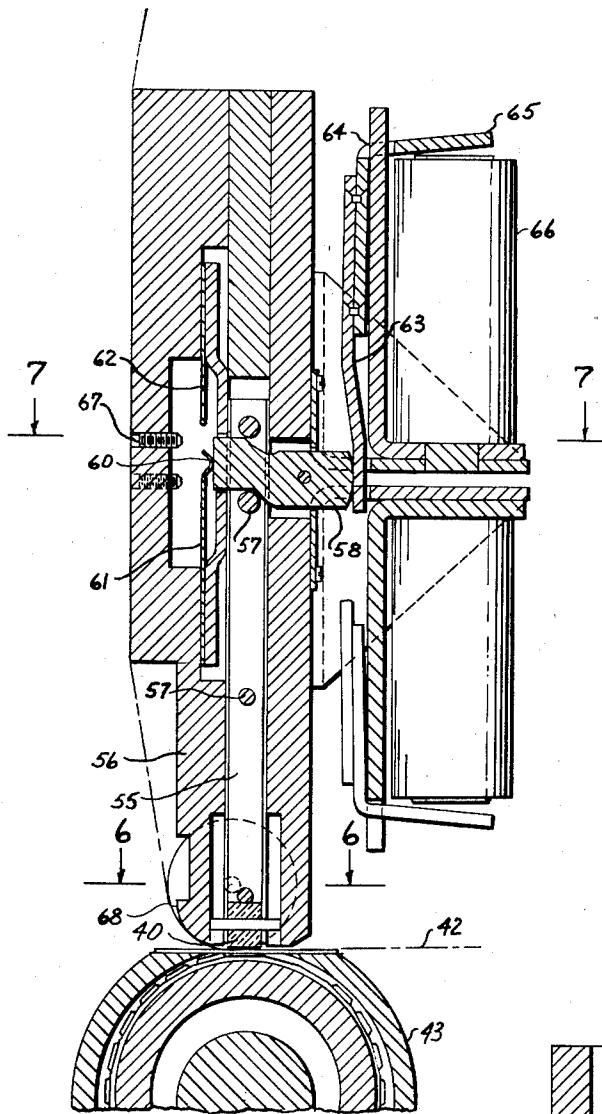


FIG. 5

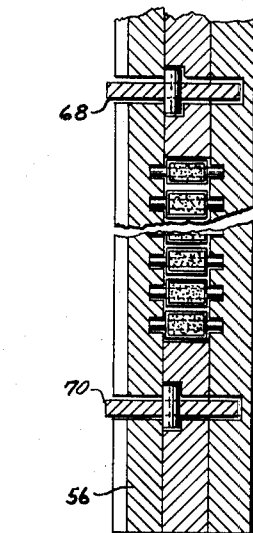


FIG. 6

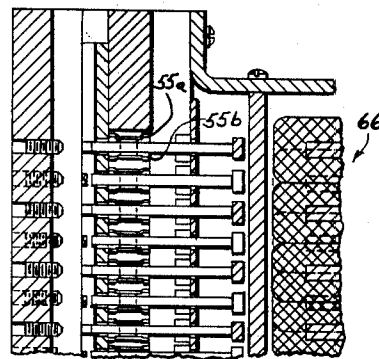


FIG. 7

1

2,910,936

PRINTER MECHANISM

Chris A. Christoff, San Gabriel, and Elwin O. Witt, Sierra Madre, Calif., assignors to Clary Corporation, San Gabriel, Calif., a corporation of California

Application January 19, 1959, Serial No. 787,543

5 Claims. (Cl. 101-93)

This invention relates to printing mechanism for line printing selective characters and has particular reference to printers of the type shown in the co-pending application of E. O. Witt and C. A. Christoff, Serial No. 770,719, filed October 30, 1958, wherein a printing drum having a plurality of rows of type characters therearound is moved past a printing station and wherein a plurality of hammers or platens aligned with the different rows of type characters are advanced at different times to obtain an imprint of selected ones of the type characters.

Although such printing mechanism works satisfactorily, it has been found that when a certain hammer or platen is advanced in one row to effect an imprint of a type character on a paper strip located between the printing drum and the platen, an unwanted phantom or ghost imprint is usually obtained in adjacent rows on opposite sides of such row due to the inherent stiffness of the paper.

It therefore becomes a principal object of the present invention to eliminate the above difficulty.

Another object is to provide a dust and dirt shield for a printing drum of the above type, which shield is also effective to prevent printing of unwanted phantom images of type characters adjacent a type character being printed, at any one time.

Another object is to facilitate adjustment of a type drum of the above type relative to a printing station.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a front view, partly in section, of a printer embodying a preferred form of the present invention.

Fig. 2 is a transverse sectional view, with parts broken away, and is taken along the line 2-2 of Fig. 1.

Fig. 3 is a transverse sectional view taken along the line 3-3 of Fig. 1.

Fig. 4 is a transverse sectional view, with parts broken away, taken along the line 4-4 of Fig. 1.

Fig. 5 is a transverse sectional view through the platen actuating mechanism.

Fig. 6 is a sectional plan view taken along the line 6-6 of Fig. 5.

Fig. 7 is a sectional plan view taken along the line 7-7 of Fig. 5.

The printing mechanism disclosed herein is basically similar to that disclosed and claimed in the aforementioned co-pending application of Witt and Christoff. Reference may be had to said application for details not specifically disclosed herein.

Referring to the drawings, the printer comprises a base frame 11 having a pair of coaxially extending bores 13 and 14 extending therethrough. Bearing caps 15 and 16 are suitably secured in the bores and support ball bearings 17 and 18, respectively, which in turn rotatably support the opposite ends of a drive shaft 20. The latter is continuously driven by a motor (not shown) through

2

a belt 21 movable over a pulley 22 which is suitably secured to the shaft 20.

Eccentric portions 23 and 24 formed on the shaft 20 support ball bearings 25 and 26, respectively, on which is rotatably mounted a hollow printing drum 27. The latter has a plurality of rows of type characters 28 extending therearound. The various rows are spaced from each other forming grooves 30 therebetween.

External gears 31 and 32 are formed on the printing drum coaxially thereof and at opposite ends thereof. These gears mesh with the teeth of internal gears 33 and 34, respectively, freely mounted in the bores 13 and 14. The latter gears are preferably formed of plastic material.

Spring washers 35 are mounted between the cap member 15 and the outer race of the bearing 17 to properly locate the printing drum in longitudinal position against the cap member 16 and to preload the bearings 17 and 18.

The gears 33 and 34 are adjustable through a limited angular range relative to each other, and for this purpose, each has a pair of shoulders like those indicated at 36 and 37 (Fig. 4) engageable by adjusting screws 38 threaded through the frame portion 11. By retracting one screw and advancing another, the angular position of the internal gear and consequently of the type characters relative to cooperating hammers or platens may be adjusted. Also, by adjusting one gear relative to the other, any back lash in the internal, external gearing may be removed.

An ink-impregnated roller 41 of felt or other porous material is rotatably supported in contact with the type characters 28 by suitable spring means (not shown) whereby to continuously transfer a film of ink onto the outer edges of the various type characters.

As described in said co-pending patent application, the printing drum 27 is divided into a number of type character spaces therearound and the number of external teeth on gears 31 and 32 is preferably equal to such number or an equal integral multiple thereof, whereas the internal gears 33 and 34 contain the same number of teeth plus one or plus one such multiple number of teeth so that upon each complete rotation of the shaft 20 and consequent orbital movement of the printing drum 27 about the center of the shaft, the drum will creep from one type character space to the next relative to a printing station established by the individual platens 40.

The various type characters are each substantially aligned with the pitch diameters of the external gears 31 and 32. Accordingly, as the type drum center moves in an orbit about the centers of the coaxial internal gears 33 and 34, a part of each type character lying in a plane extending through the pitch circles of the gears 31 and 32 will describe a hypocycloidal curve so that as each type character reaches the apex of its outward travel, it will be moving substantially radially outward. If at this time a printing platen 40 had been positioned inwardly toward the type drum against a strip of paper 42, a printing contact will occur.

According to the present invention, a cylindrical shield 43 surrounds the printer drum and is fitted at its ends in the bores 13 and 14, being held in proper longitudinal position by spring washers 44 extending between the end cap 15 and the internal gear 33 which in turn abuts the left-hand end of the shield.

The shield 43 has a slot 45 (Figs. 2 and 3) formed therealong, the edges 46 of said slot extending substantially tangential with the periphery of the printing drum, but slightly thereabove when the drum is closest to the platens 40 in its orbit. Paper guide bars 47 are embedded in the edges 46 of the shield on opposite sides

of the slot 45. Such guide bars pass through the grooves 30 between the different rows of type characters and their outer surfaces extend in the plane of the edge 46 so as to lie just outside of a plane passing through the outer edges of adjacent type characters when such characters are at the outermost point in their travel. Preferably, such space between the plane of the edge 46 and the plane passing through the outer edges of the type characters is on the order of .005 inch.

The shield 43 is adjustable angularly whereby to change the plane of the guide bars and surfaces 46 relative to the planes of the forward surfaces of the platens 40. For this purpose, shoulders 48 and 50 (Fig. 2) are formed on the shield. These shoulders are engageable by adjusting screws 51 threaded in the frame element 11.

Thin metal guides 52 and 53 (Figs. 1 and 2) are suitably secured in cut-out sections in the shield 43 at opposite ends of the slot 45, their upper surfaces extending in the plane of the surfaces 46. Such guides guide the leading edge of a paper strip over the slot 45 and also prevent dirt or dust from falling through the slot onto the printing drum.

The paper, while passing over the shield 43, is edge guided by walls 39 extending from a plate 39a located at one side of the shield.

The various platens 40, which are formed of plastic or other similar relatively soft resilient material, are located in side-by-side relation in line with respective ones of the rows of type characters and are fixed in slides 55 (Figs. 5, 6 and 7) which are guided for longitudinal movement in slots formed in a guide block 56.

In order to lighten the slides to permit relatively high speed of operation, they are each formed of two spaced sides rails 55a and 55b, separated by pins 57.

Cam bars 58 extend between the side rails of the slides 55 and have camming surfaces thereon cooperable with the upper pair of pins 57 to raise and lower the platens. Normally, the cam bars are held inwardly as shown in Fig. 5, whereby to maintain their respective platens 40 raised out of cooperative relation with the printing drum, by prongs 60 of leaf springs 61 and 62 suitably secured to the guide block 56. The inner ends of the cam bars engage arms 63 pivotally supported at 64 and provided with tabs 65 forming armatures cooperable with electromagnets 66.

Energization of a magnet 66 will rock its associated armature, thereby causing its cam bar 58 to lower a respective slide 55 and its platen 40 into cooperative relation with an associated row of type characters on the printing drum.

It will be noted, particularly on reference to Figs. 5 and 7, that the magnets 66 are located in staggered relation, alternate magnets being located in an upper group and the other magnets being located in a lower group.

Adjusting screws 67 are threaded in the guide block 56 to limit outward movement of the cam bars 58 to thus adjust the positioning of the platens 40 relative to the printing drum.

Guide rollers 68 and 70 are rotatably mounted in slots formed in the lower end of the guide block 56 and serve to guide the paper 42 from a horizontal path, past the slot 45 in the shield 43, and upwardly along the vertical face of the guide block. Suitable means, not shown, are provided to intermittently advance the paper.

Since the paper is held slightly above the outer edges of the type characters by the guide bars 46, depression of one of the platens 40 to depress an aligned area of the paper in position to receive an imprint from a selected type character, will not result in phantom printing in areas aligned with adjacent rows of type characters.

Although we have described our invention in detail in its preferred embodiment and have therefore used certain specific terms and language 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 claims appended hereto. For example, one of the sets of adjusting screws 37 and 38 for one of the internal gears 33 and 34 may be omitted so that the respective gear will merely float angularly in its bore. In fact, such gear may be omitted if desired. Also, one of these gears may be integrally attached to the shield 43 to thereby move angularly with the same during adjustment. Further, in some cases, certain of the guide bars 47 may be omitted without causing phantom printing. For example, in such cases guide bars would be needed only between every second or third rows of type characters.

Having thus described the invention, what we desire to secure by United States Letters Patent is:

1. A printing mechanism comprising a rotatable printing drum having a plurality of circumferentially extending rows of type characters thereon, means for guiding a flexible record medium past said rows of type characters, a plurality of printing elements aligned with respective ones of said rows of type characters for obtaining an impression of a selected type character on said record medium, a plurality of elongated guides, each located between two adjacent ones of said rows of type characters, and means for selectively actuating said printing elements, said guides having guide surfaces arranged outside the outer peripheries of said type characters whereby to prevent phantom printing of type characters in rows adjacent a row in which a printing element is actuated.

2. A printing mechanism comprising a rotatable printing drum having a plurality of circumferentially extending rows of type characters thereon, means for guiding a paper strip past said rows of type characters, a shield substantially surrounding said printing drum, said shield having an elongated slot therein, a plurality of printing elements aligned with respective ones of said rows of type characters for obtaining impressions of selected type characters on said strip, means for selectively actuating said printing elements through said slot, and a plurality of elongated guides extending across said slot, each of said guides being located between two adjacent ones of said rows of type characters, said guides having guide surfaces arranged slightly outside the outer peripheries of said type characters whereby to prevent phantom printing of type characters in rows adjacent a row in which a said printing element is actuated.

3. A printing mechanism comprising a rotatable printing drum having a plurality of circumferentially extending rows of type characters thereon, means for rotating said printing drum past a printing station, means for guiding a flexible record strip past said printing station, a shield substantially surrounding said printing drum, said shield having an elongated slot extending axially thereof and aligned with said printing station, a plurality of printing elements aligned with respective ones of said rows of type characters for obtaining impressions of selected type characters on said strip, means for selectively actuating said printing elements through said slot, and a plurality of guide bars extending across said slot and anchored to said shield on opposite sides of said slot, each of said guide bars being located between two adjacent ones of said rows of type characters, said guide bars having guide surfaces arranged outside the outer surfaces of said type characters whereby to prevent phantom printing of type characters in rows adjacent a row in which a printing element is actuated.

4. A printing mechanism comprising a rotatable printing drum having a plurality of circumferentially extending rows of type characters thereon, means for guiding a record strip past said rows of type characters, a shield substantially surrounding said printing drum, said shield having an elongated slot therein, a plurality of printing elements aligned with respective ones of said rows of type characters for obtaining impressions of selected type characters on said strip, means for selectively actuating said printing elements through said slots, a plurality of

5

elongated guides extending across said slots, each of said guides being located between two adjacent ones of said rows of type characters, said guides having guide surfaces arranged outside the outer surfaces of said type characters whereby to prevent phantom printing of type characters in rows adjacent a row in which a printing element is actuated, and means for adjusting said shield about the axis of said drum.

5. A printing mechanism comprising a printing drum having a plurality of circumferentially extending rows of type characters thereon and circumferentially extending grooves intermediate said rows; means for moving said drum at least substantially about the axis thereof and past a printing station, a shield substantially covering said printing drum, said shield having elongated slots extending axially thereof and aligned with said printing station, means for feeding a flexible record strip past said

6

printing station, a plurality of printing elements aligned with respective ones of said rows of type characters for obtaining impressions of selected type characters on said strip, means for selectively actuating said printing elements through said slots and toward said type characters, and a plurality of guide bars extending across said slot and integral with said shield on opposite sides of said slot for guiding said strip past said printing station, said guide bars extending through respective ones of said grooves and substantially tangentially of the periphery of said printing drum, said guide bars having guide surfaces arranged slightly outside the outer surfaces of said type characters whereby to prevent phantom printing of type characters in rows adjacent a row in which a printing element is actuated.

No references cited.