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TRAVELING CYLINDER PRINTING DEVICE

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2 Sheets-Sheet 1

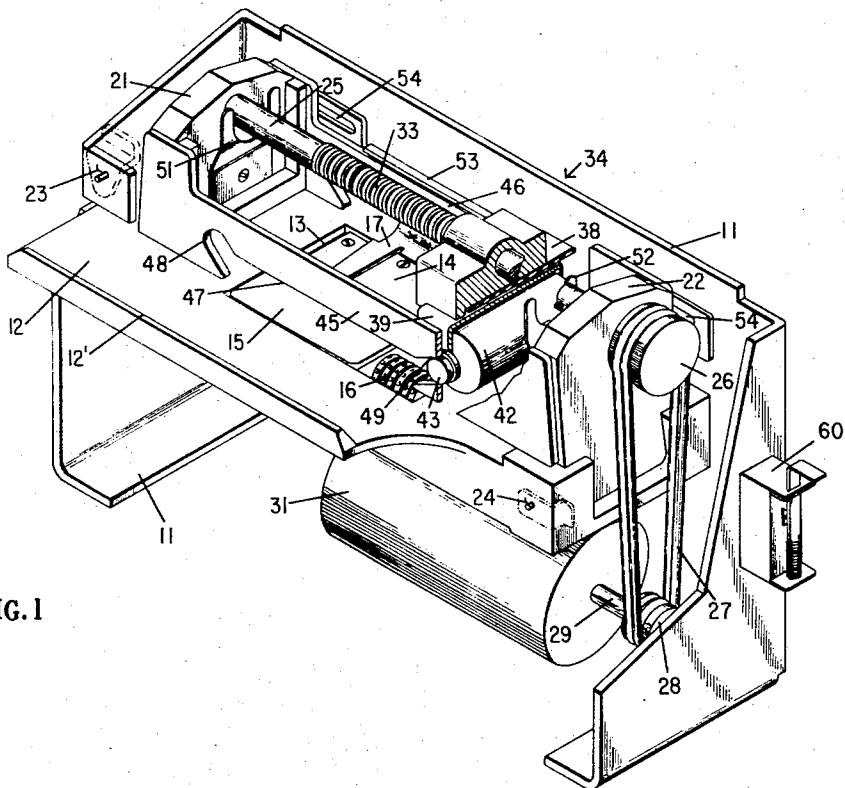


FIG. 1

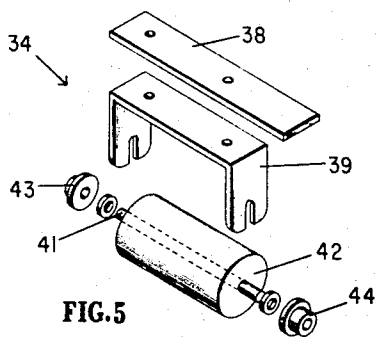


FIG. 5

ROTATED 90°

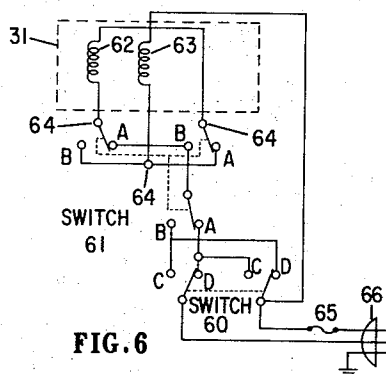


FIG. 6

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TRAVELING CYLINDER PRINTING DEVICE
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6 Claims. (Cl. 101-269)

ABSTRACT OF THE DISCLOSURE

An apparatus in an electrical printing machine for recording data on a document with a printing plate having raised indicia located at a printing station. A roller platen for effecting the imprint is carried by a carriage having a threaded female portion to receive a threaded shaft for relative movement therebetween, as the shaft is rotated by electrical apparatus. The shaft is so threaded to at least engage the carriage in screw-like fashion while the carriage traverses the printing station, and a resilient member is arranged at an unthreaded area at the end of the shaft to bias the carriage back so its female threaded portion will abut the threaded part of the shaft allowing the carriage to engage the threaded shaft for being driven back over the printing station.

The present invention relates to a printing device and, more particularly an improved electrical printing device for recording data on business documents or the like by means of printing plates of a kind suitable for use as identification cards and adapted to be readily carried by individuals.

In utilizing an electrical motor in combination with a threaded shaft to drive a platen assembly for imprinting business documents with portable printing plates of the type described above, it is by all means desirable to avoid binding which might occur by overdriving the platen assembly on the shaft as a consequence of a switch defect or a difference in printing pressures experienced by the platen assembly with each imprinting operation. The binding might result from the platen assembly abutting an end wall or some other obstruction in which case a threaded insert within the platen assembly would tend to bind with the threaded shaft whereby not only might the threads be gradually worn down and defaced to negatively effect subsequent imprint quality but also an initial large amount of torque, not provided by the drive motor, may be required to offset the binding in driving the platen assembly in the reverse direction.

Briefly, it is the general purpose of the instant invention to provide an improved electrical printing device which avoids the hazard of binding and which also provides for utilization of bidirectional imprinting. To attain this, the present invention contemplates a roller platen rotatably mounted on a carriage assembly which is motor-driven via a partly threaded shaft to traverse the printing bed to impress the business documents against the printing plates for accomplishing an imprint. The shaft is only partially threaded but at least at an area substantially coextensive with the printing field while resilient means are provided at the termination of the threaded portions of the shaft to bias the carriage assembly back toward the threaded portion to abut the same when driven therefrom. Further provisions enable the device to reverse the motor drive for a subsequent operation after each printing function has occurred. By utilizing the above-noted features, an electrical imprinting device of maximum efficiency and compactness is achieved.

The objects of this invention are to provide an electrical printing device which is simple and economical in

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construction, which produces uniform printing, which operates conveniently and with little effort, and which is durable and reliable in use.

Another object of the present invention is the provision of a simple and economical bidirectional electrical printing device.

A further object is to provide an electrical printing device which utilizes a threaded shaft to drive a platen assembly yet avoids binding.

Yet another object of the present invention is the provision of a bidirectional electrical printing device which utilizes a threaded shaft to drive a platen assembly yet eliminates the hazard of binding.

For the purpose of illustration, a typical embodiment of the invention is shown in the accompanying drawings in which:

FIGURE 1 is an isometric view of the printing device.

FIGURE 2 shows a top view of the printing machine.

FIGURE 3 illustrates a side elevation of the apparatus shown in FIGURE 1 with the frame member 11 removed.

FIGURE 4 is a section of the device taken on the line 4-4 of FIGURE 2.

FIGURE 5 illustrates an exploded view of the platen assembly 34.

FIGURE 6 represents a schematic diagram of the electrical circuitry employed in the present invention.

As shown in FIGURES 1 and 2 of the drawings, the printing device comprises a frame member 11 which may be cast or molded of metal or a suitable hard plastic composition, together with a base 12 secured midway of the frame member 11 by screws or any other suitable means. Base 12 is recessed at 13 wherein there is placed seat 14 for supporting a portable printing plate bearing raised characters thereon, and directly adjacent the seat within recess 13 is what many commonly refer to as a dealer plate 15 usually bearing the name and address of the recording agency or the like. In addition, printing wheels 16 may similarly be mounted within recess 13 adjacent the seat 14, these printing wheels bearing numeral characters on their periphery and being individually rotatable to provide an indication of the date. On either side of seat 14, and also illustrated in FIGURE 4, is part of a resilient guide member 17 to provide for properly positioning the portable printing plate on the seat. Guide member 17 also extends in accurate fashion toward frame member 11 so that the printing plate is directed to the bed plate when received through a horizontal opening 18 (see FIGURE 4) in frame member 11. Substantially at the same plane with the surface of seat 14 is a support member 19 which protrudes from yet is integral with frame member 11 as shown in FIGURE 2. For convenience, we shall designate the area denoted by seat 14, dealer plate 15, and/or printing wheels 16, as the printing field.

At the ends of the printing device are upstanding blocks 21 and 22 adapted to be connected to base 12 by locking pins 23 and 24 respectively, which extend through mating apertures in the base and the upstanding blocks. A shaft 25 is rotatably mounted through a pair of bushings fitted in the upstanding blocks 21, 22 as illustrated in FIGURES 1 and 4, the shaft protruding through upstanding block 22 and fixedly secured to a pulley 26 about which is wound a pair of belts 27, the belts further being wound about a second pulley 28 driven by the output shaft of a reversible motor 31. Mounted to the bottom of base 12 by screws or other suitable means is a holder 32 employed to support the motor 31 which is attached thereto.

Rotatable shaft 25 is threaded at 33 substantially coextensive with the length of the printing field as is generally defined by the area containing or to contain printing plates utilized for imprinting purposes. Mounted about shaft 25 for axial movement relative thereto across the

printing field is a platen assembly 34 comprising a carriage 35, and an insert 36 within the carriage which insert is threaded to be compatible with the threaded portion 33 of shaft 25. To maintain threaded insert 36 fixed for preventing rotation with threaded shaft 25 and preventing horizontal movement within the carriage 35, a disk 37 is fastened by adhesive or other means to the threaded insert 36 and also to the carriage 35. Attached to the grooved underside of carriage 35 are an extension piece 38 and a bracket 39, the bracket having a pair of downwardly extending open slotted arms, as disclosed in FIGURE 5, adapted to receive a shaft 41.

Mounted on shaft 41 for movement across the printing area is a platen roller 42 which may be of the dry or ink impregnated type such as that disclosed in Gilbert Patent No. 2,620,730. The roller is arranged to press a business document or the like, against the indicia on the printing plates and printing wheels. When an inked roller as described in the Gilbert patent is employed, ink impressions appear on the upper face of the paper placed opposite the printing plate, while when a non-inked roller is used, a sheet of carbon paper laid over the paper to be imprinted may be used, and with either type of roller, carbon paper may be interleaved between multiple sheets of paper to be printed.

Secured to each end of shaft 41 outwardly of the slotted arms on bracket 39, to form end trunnions, are flanged cap rolls 43 and 44 which may be made of suitable wear-resistant material such as nylon. These cap rolls 43 and 44 are respectively engaged by guide or cam members 45 and 46 attached to each side of upstanding blocks 21 and 22. The guide members are provided with a depressed cammed surface 47 together with upwardly inclined cammed surfaces 48 and 49 at each end thereof. When the roller is properly seated against guide members 45 and 46, flanges 43 and 44 are respectively engaged by the edges of the guide members thus preventing endwise movement of shaft 41 and maintaining the roller properly positioned between the slotted arms of bracket 39.

At each end of the printing device and in line with the path traversed by the platen assembly 34, there is shown in FIGURES 1, 2 and 4 one of a pair of leaf springs 51 and 52 biased toward the platen assembly and fastened to mutual upstanding blocks 21 and 22. As the platen assembly is driven by the threaded portion of shaft 25, it will eventually ride off the thread 33 yet simultaneously by engagement with one of the leaf springs 51 or 52, it will be biased toward thread 33 for engagement with the same, so that when rotation of shaft 25 is reversed relative to the last direction of rotation by the shaft, the platen assembly will be received by the threaded portion 33 to again be driven across the printing field.

At one side of the printing device lying between the platen assembly and frame member 11 there is illustrated in FIGURE 3 a bar 53 slideable relative to flat head pins 54 fastened to guide 46 through elongated slots 54 located in the bar. The bar 53 is cut away at 55 allowing extension piece 38 to protrude from the carriage 35 to slightly beyond the bar 53 as shown in FIGURES 1 and 2, however at each end of the cut away 55 there is provided a shoulder lying in the path traveled by extension piece 38 adapted to be engaged and moved thereby when platen assembly 34 is impelled to traverse the printing field. As shown in FIGURE 3, fixedly attached to one side of the slideable bar 53 is a downwardly extending arm 56 with an actuating roller 57 secured to its end. Seated in rocking fashion within base 12 is a pivotal arm 58 slightly extending above the top of the base for engagement with the actuating roller as shown in FIGURE 3. Pivotal arm 58 is connected to a pair of push rods 59 which in turn are tied to a rocker switch 61 for use in conjunction with a push button switch 60, shown in FIGURE 1 to be mounted on frame 11, the utilization of which will hereinafter be described in detail.

A schematic diagram of the electrical circuitry in the

preferred embodiment is shown in FIGURE 6, wherein the motor 31 comprising an armature 62 and a field 63, is tied to three of output points 64 which are connected by way of rocker switch 61 to a push button switch 60 thence via a fuse 65 to a plug 66 adapted to be inserted in a conventional power source outlet. While the rocker switch 61 is rocked in the A position as illustrated, and the push button switch 60 is in the C position, the armature 62 and field 63 will be shorted out, therefore the motor 31 will not operate. When push button switch 60 has been actuated, the switch arms will be pressed into the D position as shown thus completing a circuit to supply current for operating the motor to drive the shaft 25 in a first direction of rotation until the rocker switch 61 is actuated by actuator roller 57 at which point in time armature 62 and field 63 are again shorted out to stop the motor operation and simultaneously instantly reversing the current flow in armature 62 to provide dynamic breaking.

The above-disclosed apparatus operates as follows: Subsequent to inserting a printing plate on seat 14 through opening 18, a business document is interposed into the device through the slot below the guide member 45 and onto the tray defined by rim 12' and the raised inner ridges of base 12 to overlie the printing plate, dealer plate 15 and printing wheels 16; then the operator will depress push button 60 to its D contact position to energize the reversible motor 31 driving the shaft 25 in a first rotating direction as actuating roller is already in its A contact position as illustrated. The platen assembly 34 as shown in solid lines in FIGURE 3 will, due to the force exerted by biased spring 52, be brought into engagement with the threaded portion 33 of the shaft to be driven in the X direction, at which time by movement of cap rolls 43 the shaft 41 and thereby platen 42 are guided from inclined cams 49 to depressed central cam 47 for transferring an imprint on the business document from the printing plate, dealer plate 15 and printing wheels 16, by transmitting pressure to the platen 42 from cam 47 via cap rolls 43 and shaft 41.

As the platen assembly is driven to approach one end of the device as shown by the broken lines, it will contact the biased spring 51 and continue to urge the same toward upstanding block 21 until the platen assembly is driven off the threaded portion 33, while simultaneously extension bar 38 will engage the shoulder of bar 53 to slidably push the bar in the X direction advancing actuating roller 57 to rock the pivotal arm 58 and thereby rocker switch 61 into the B contact position for deactuating the motor 31. At the same time the circuit is set up to provide for current flow when the push button switch 60 is depressed during a subsequent imprint cycle to assume its C contact position.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that numerous modifications or alterations may be made therein without departing from the spirit and the scope of the invention, it is desired therefore, that only such limitations be placed on the invention as are imposed by the prior art and as set forth in the appended claims.

What is claimed is:

1. Apparatus for printing business forms and the like comprising a base member adapted to support a printing means, a partially threaded shaft mounted to lie parallel to said base member and upwardly spaced in relation with said printing means support area, a carriage having a threaded female portion to receive the threaded part of said shaft for movement relative thereto, a roller platen, means for mounting said roller platen on said carriage for movement therewith, automatic means for rotating said shaft, said shaft being threaded so at least to engage the carriage assembly in screw-like fashion while the carriage traverses the area to be occupied by the printing means, resilient means for biasing said carriage assembly

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back so its female threaded portion will abut the threaded part of the shaft when driven therefrom.

2. In apparatus for printing business documents and the like, the combination recited in claim 1 including cam means for urging the roller platen downwardly at the beginning of each imprint operation and upwardly at the end of each imprint operation.

3. In apparatus for printing business documents and the like, the combination recited in claim 2 wherein the threaded shaft is driven in a single direction during each imprint operation, and means are provided to reverse the rotation of the shaft driven by the automatic means opposite to the last direction of rotation during each successive imprint operation.

4. Apparatus for printing business forms and the like comprising a base member adapted to support a printing means, a partially threaded shaft mounted to lie parallel to said base member and upwardly spaced in relation with said printing means support area, a carriage having a threaded female portion to receive the threaded part of said shaft for movement relative thereto, a roller platen, means for mounting said roller platen on said carriage for movement therewith, a reversible motor for rotating said shaft, said shaft being threaded so at least to engage the carriage assembly in screw-like fashion substantially opposite the area to be occupied by the printing means, resilient means for biasing said carriage assembly back so its threaded female portion will abut the threaded part of the shaft when driven therefrom, a first switch for actuating said reversible motor to drive the carriage for an imprint operation in a single direction, a second switch, means for tripping said second switch at the end of the imprint operation for deactivating said reversible motor and adapting the reversible motor to drive the carriage in a direction opposite to the last direction of travel when the first switch is next operated.

5. In apparatus for printing business documents and the like, the combination recited in claim 4 including cam means for urging the roller platen downwardly at

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the beginning of each imprint operation and upwardly at the end of each imprint operation.

6. Apparatus for printing business forms and the like comprising a base member adapted to support a printing means, a partially threaded shaft mounted to lie parallel to said base member and upwardly spaced in relation with said printing means support area, a carriage having a threaded female portion to receive the threaded part of said shaft for movement relative thereto, a roller platen, means for mounting said roller platen on said carriage for movement therewith, a reversible motor for rotating said shaft, said shaft being threaded so at least to engage the carriage assembly in screw-like fashion substantially opposite the area to be occupied by the printing means, resilient means for biasing said carriage assembly back so its threaded female portion will abut the threaded part of the shaft when driven therefrom, a hand-operated switch for actuating said reversible motor to drive the carriage for an imprint operation in a single direction, a second switch, means provided on said carriage assembly to initiate the tripping of said second switch when driven at the end of an imprint operation for deactivating said reversible motor and adapting the reversible motor to drive the carriage in a direction opposite to the last direction of travel when the hand-operated switch is next actuated, and cam means for urging the roller platen downwardly at the beginning of each imprint operation and upwardly at the end of each imprint operation.

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