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Rott

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[54] **PRINT HEAD CARRIAGE MECHANISM FOR IMPACTLESS PRINTER**

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[52] **U.S. Cl.** **197/66**, 197/127, 178/42, 226/120, 226/157

[51] **Int. Cl.** **B41J 19/70**

[58] **Field of Search**...197/1 R, 127 R, 127 A, 133 R, 197/133 F, 60, 66, 82; 178/42; 226/120, 134, 157

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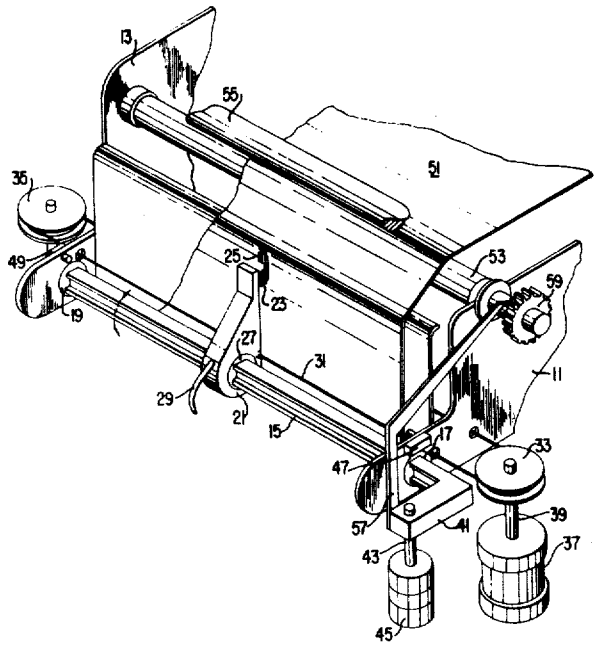
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[57] **ABSTRACT**

A carriage assembly for an impactless printer having a printing head mounted for reciprocal movement across the paper to be printed. A cable is attached at either end and passes around a drive pulley at one side of the printer and an idler pulley at the other side. A bi-directional motor drives the pulley. A solenoid rotates the mounting means for the head so as to move the stylii into and out of contact with the paper.

3 Claims, 2 Drawing Figures



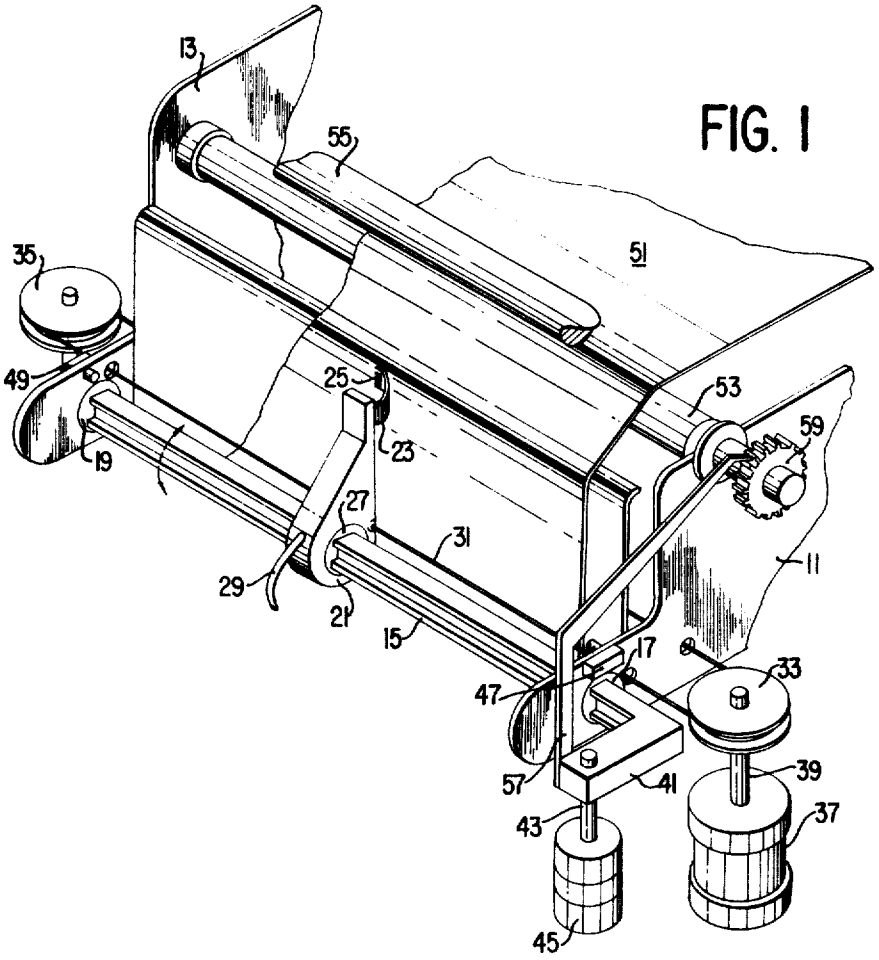


FIG. 1

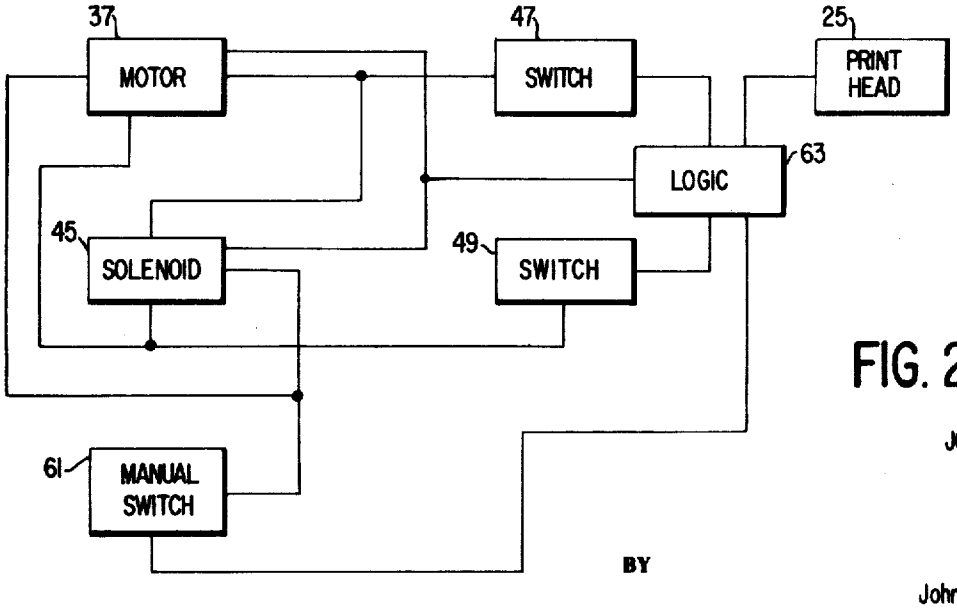


FIG. 2

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PRINT HEAD CARRIAGE MECHANISM FOR IMPACTLESS PRINTER

The present invention relates generally to impactless printers and more particularly to a carriage control mechanism for controlling the movement of the print head in such a printer.

Impactless printers are well-known today and in at least limited use for various types of telegraphy operations and the like. These printers use a particular type of paper wherein either an electrostatic charge or head causes an imperforation in the paper so as to cause the paper to show the mark made thereon. The paper is fed through the printer in accordance with the type of printing head or heads which are to be used. In some instances a plurality of printing heads are arranged horizontally across the printing mechanism so that the paper may pass transversely thereof. Each head is then provided with signals to cause the particular character to be printed.

Other printers employ a plurality of moving heads which move transversely across the paper and have signals supplied thereto by some means of commutation so as to print the characters on the paper. One specific type of printing device is disclosed in co-pending application Ser. No. 11,077 entitled PRINTING HEAD MECHANISM. In that device a printing head used with an impactless printer reciprocates across the face of the paper to be printed. The head is biased toward the left hand side of the paper by a spring. A continuous belt is driven between the head and the paper below the printing stylii and means are associated with the belt so as to drive the head in a scan manner across the paper against the bias of the spring. At the conclusion of one line of printing, the head is released from the influence of the belt and returns to the left hand side of the paper.

The present invention eliminates the use of a continuous belt and spring and, in effect, substitutes therefor a bi-directional motor for transverse movement of the printing head and a solenoid for selectively controlling the position of the head relative to the paper to be printed.

Accordingly, it is an object of the present invention to provide a carriage mechanism using a single motor means for driving the printing head transversely across the paper to be printed.

It is a further object of this invention to provide a mounting means and solenoid control for controlling the position of the head relative to the paper to be printed.

Yet another object of this invention is to provide a combination motor means and solenoid means whereby a scan by the printing head may be provided across the entire paper, or the head may be selectively stopped at any position on the paper and returned to the starting scan position.

These and other objects of the invention will become obvious from the description when taken in conjunction with the drawings wherein

FIG. 1 is a perspective view of the head and controlling mechanism for the present invention; and

FIG. 2 is a block diagram of the control mechanism used in conjunction with Fig. 1.

Broadly speaking, the present invention relates to an impactless printer having a carriage assembly which

comprises support means rotatably mounted on the housing of the printer substantially parallel to the plane of the paper to be printed. A printing head, including stylii, is slidably mounted on the support means. A cable is attached to either side of said printing head and passes about pulley means which are in turn controlled by a driving means so as to move the head in a scan across the paper while printing and to return the head to the start position when not printing.

The illustrative drawings are simplified in order to render the specific invention more obvious. The details of the housing of the printer and of the specific electrical circuitry controls are not shown in detail since they are not part of the present invention.

Turning now more specifically to the drawings, side frames **11** and **13** of the basic printing housing have an I-beam shaft **15** mounted therebetween. The shaft is mounted in bearings **17** and **19** which are rotatable within the side frames **11** and **13**.

A printing head **21** including a flexible member **23** and stylii **25** is mounted on a bearing **27** which in turn is slidable along the I-beam shaft **15**. The electrical signals are supplied through the head to the stylii **25** by means of a multiple conductor cable **29** connected to control logic circuitry (not shown).

A cable **31** is connected to either side of the printing head **21**. The cable passes around drive pulley **33** at one side of the printer through apertures in side frames **11** and **13** and around idler pulley **35** at the other side of the printer.

Drive pulley **33** is driven by a bi-directional motor **37** through shaft **39**.

I-beam shaft **15** terminates in an arm **41** extending substantially at right angles therefrom. A shaft **43** is connected to the outer end of the arm and is moved in response to actuation of the solenoid **45**. Actuation and deactuation of solenoid **45** causes a raising and lowering of the outer end of arm **41** and, thus, rotates the I-beam shaft **15** which carries the printing head **21**. Thus, stylii **25** are maintained in contact with paper **51** during the scan cycle and are removed from contact with the paper during the return cycle.

Switches **47** and **49** are mounted on side frames **11** and **13** at opposite ends of the printing device so that the printing head movement will actuate each switch when coming in contact therewith.

In order to coordinate movement of the paper **51** with the movement of the head **21**, a ratchet lever **57** may be secured to the outer end of arm **41**. As illustrated, the arm is of an L-type configuration so as to extend upwardly into contact with ratchet **59**. Ratchet **59** controls the movement of a roller **53** associated with idler roller **55** through which the paper **51** passes. Accordingly, each time the head **41** is rotated by the solenoid **45** so that stylii **25** contact the paper **51**, the ratchet **59** will be advanced one step causing the paper also to advance a fixed, predetermined amount.

While the control circuitry is not part of the present invention, there is a broad showing in FIG. **2** of such circuitry so as to give a better understanding of operation of the mechanism itself.

Motor **37** is coupled to both switches **47** and **49** whereby actuation of switch **47** will cause the bi-directional motor to rotate in a direction so as to return print head **21** to return it to the start position. When

head 21 closes switch 49, motor 37 is stopped and the logic is placed in control of the motor for another scan. Switches 47 and 49 also control the operation of solenoid 45. Actuation of switch 47 cause the solenoid to draw shaft 43 downward and, thus, rotate the head 21 out of contact with the paper. When the head is then returned to the other end of the carriage by means of motor 37 and cable 31, the actuation of the switch 49 by the head deactivates solenoid and shaft 43 returns to the position shown, thus rotating the head so that the stylii are again in contact with the paper. A manual switch 61 is also connected to the motor and the solenoid. The switch is not shown in FIG. 1 since it may be located anywhere on the printing mechanism itself.

As indicated in the above-mentioned application, the signals to multiconductor cable 29 and thus to the stylii 25, appear from a type of logic system. Such logic is not part of this invention and various types of control signal devices may be used in conjunction with the present carriage. It is to be understood that such logic or control systems may also send a return signal to the motor and solenoid at any time during the scan cycle. As indicated in FIG. 2, the logic 63 is also coupled to the switches 47, 49 and 61 and has an output to the printing head 25.

As can be seen, the present invention provides a simple and yet reliable carriage control mechanism for use with various types of printing heads.

The description and drawings are illustrative only since particular components of the device might be replaced with equivalent components. Accordingly, the invention is to be limited only by the scope of the following claims.

I claim:

1. In an impactless printer, a carriage assembly comprising

support means rotatably mounted on said printer substantially parallel to the plane of the paper to be printed,

a printing head including a stylii slidably mounted on said support means,

cable means attached at either side to said printing head,

means mounted on said printer and connected to said cable means for driving said cable means in either direction so as to scan said head across said paper,

an arm attached to and extending angularly from said support means,

a solenoid mounted on said printer and coupled to said arm,

means for actuating said solenoid so as to rotate said support means so that said stylii can be moved into and out of contact with said paper,

a lever secured to said arm,

a ratchet associated with and rotated by said lever upon actuation of said solenoid, and

paper advancing means connected to said ratchet.

2. The printer of claim 1 further comprising

control means mounted on said printer and coupled to said means for driving said cable for reversing the direction of said means for driving said cable.

3. The printer of claim 2 wherein said control means comprises

a switch mounted on said printer and actuated by said printing head.

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