

[54] PRINT TYPE CARRIER

[72] Inventors: John E. Drejza; Michael A. Hendel, both of Endwell, N.Y.; William F. Morgan, Saratoga, Calif.

[73] Assignee: International Business Machines Corporation, Armonk, N.Y.

[22] Filed: Apr. 29, 1969

[21] Appl. No.: 820,206

[52] U.S. Cl.101/111, 101/93 C

[51] Int. Cl.B41j 1/20

[58] Field of Search101/93, 93 C, 96, 109, 111, 101/368, 383

2,936,704	5/1960	Hense	101/93
3,041,964	7/1962	Simpson et al.	101/111
3,041,965	7/1962	Sasaki	101/111
3,142,249	7/1964	Sasaki	101/111
3,216,348	11/1965	Oldenburg et al.	101/93
3,379,125	4/1968	Antonucci	101/93
3,379,126	4/1968	Staller et al.	101/111
3,402,657	9/1968	Potter et al.	101/93
3,416,442	12/1968	Brown et al.	101/93

Primary Examiner—William B. Penn
Attorney—Hanifin and Jancin and Francis V. Viola

[57] ABSTRACT

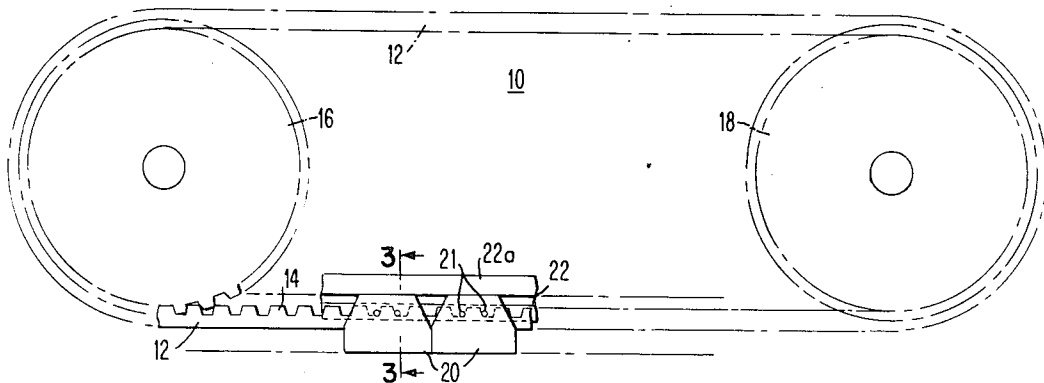
A type carrier comprises a flexible, toothed timing belt having U-shaped type carrier members which are attached to the belt by pins through the legs of each member on either side of a belt tooth and which have flexible supports secured thereto each with a type character at the free end.

2 Claims, 4 Drawing Figures

[56] References Cited

UNITED STATES PATENTS

3,224,336	12/1965	Cunningham	101/93
2,267,661	12/1941	Meyers	101/111



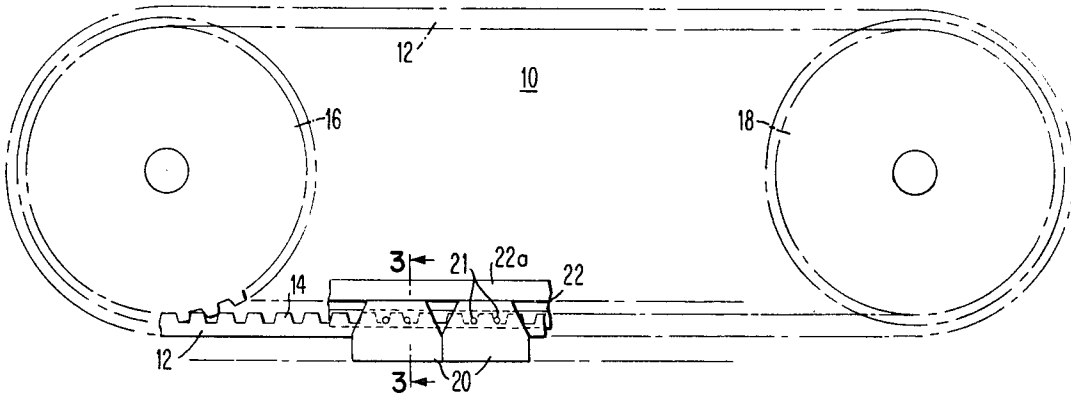


FIG. 1

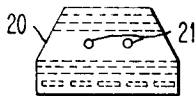


FIG. 2

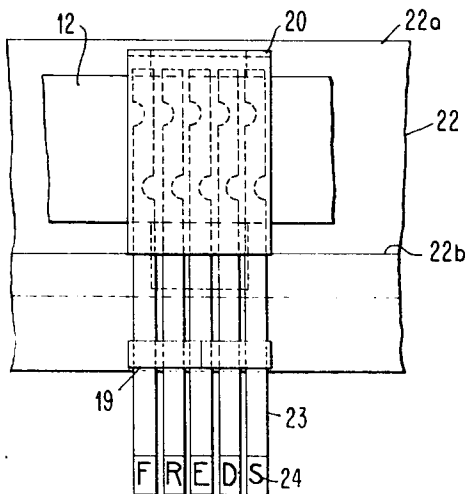


FIG. 4

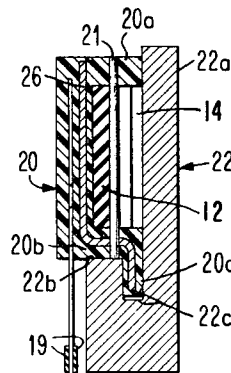
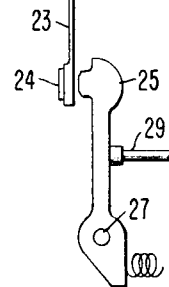


FIG. 3



INVENTORS

JOHN E. DREJZA
MICHAEL A. HENKEL
WILLIAM F. MORGAN

BY *Francis V. Giolma*
ATTORNEY

PRINT TYPE CARRIER

CROSS-REFERENCE TO RELATED APPLICATIONS

This invention is related to the invention of copending application Ser. No. 820,163, filed Apr. 29, 1969, (Docket GE968037) of Fritz Hilpert and Guenter H. Schacht, assigned to the assignee of the present invention.

FIELD OF INVENTION

This invention relates to type carriers for high-speed line printers and it has reference in particular to a flexible timing belt type carrier for a printer.

DESCRIPTION OF PRIOR ART

Heretofore type carriers for printers have comprised a plurality of type carrying slugs secured to a continuous metal band, a train of type carrying slugs sliding on a guide rail, or have consisted of C-shaped clips secured to the teeth of a toothed belt.

SUMMARY OF INVENTION

Generally stated, it is an object of this invention to provide a new and novel type carrier for a printer.

More specifically, it is an object of this invention to provide for securing a plurality of U-shaped type carrier members to a toothed timing belt in a type carrier for a printer.

Another object of this invention is to provide for securing to a flexible, toothed timing belt a plurality of type carrier members having a width slightly greater than an integral multiple of the tooth pitch of the belt in its free state.

Yet another object of the invention is to provide for placing a toothed timing belt in a predetermined state of tension and then securing thereto a plurality of U-shaped type carrier members having a width equal to or slightly greater than the tooth pitch or an integral multiple of the tooth pitch in its stressed condition.

It is also an object of the invention to provide for molding a flexible type carrier support in a U-shaped type carrier member which is secured to a toothed timing belt by means of pins on either side of a belt tooth.

Yet another object of the invention is to have the width of each of a plurality of U-shaped type carrier members secured to a toothed timing belt slightly greater than an integral multiple of the tooth pitch, so that the carriers themselves determine the exact pitch length of the belt.

In a preferred embodiment of the invention a toothed timing belt is placed on a pair of spaced-apart toothed drive pulleys, and the distance between the pulleys is increased to place the belt in a predetermined state of tension. Type carrier members comprising U-shaped clips having depending flexible type carrying fingers are positioned about the belt and are secured thereto by means of pins which pass through the ends of the clips on either side of a belt tooth to accurately position the clips.

DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 is a schematic plan view showing a type carrier embodying the invention in one of its forms.

FIG. 2 is an enlarged plan view of one of the type carrier members shown in FIG. 1.

FIG. 3 is an enlarged cross-sectional view in elevation along the line 3-3 of FIG. 1, showing a print hammer associated therewith and

FIG. 4 is a partial enlarged front elevational view of the type carrier of FIG. 1.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIG. 1 it will be seen that a type carrier 10 may comprise generally a flexible, toothed timing belt 12 having a plurality of uniformly spaced teeth 14 along the inner surface and arranged to be mounted on a pair of spaced-apart toothed

pulleys 16 and 18. A plurality of type carrier members 20 are secured to the belt for presenting type characters to a plurality of print hammers in FIG. 3 along a straight portion of the belt path comprising the print line. Along the print line the type carrier members 20 are aligned by means of a type carrier guide 22 which extends the length of the print line.

Referring particularly to FIGS. 1-3 it will be seen that the type carrier members 20 comprise generally a U-shaped clip which is positioned about the belt 12 with the two legs projecting rearwardly on opposite sides of the belt 12 defining a uniform open space therebetween which has substantially the same width as the belt. The carrier member is secured to the belt by means of pins 21 which are either positioned in previously drilled spaced-apart holes in the upper and lower legs 20a and 20b of the type carrier members or are pressed through the upper end of lower legs in any well-known manner. The pins 21 are so spaced that they are positioned immediately adjacent to, and in intimate contact with, the opposite sides of a tooth 14 so as to accurately locate the type carrier member relative to a tooth. As shown, each of the type carrier members 20 has a plurality of flexible spring fingers 23 secured thereto having raised type characters 24 on the free end formed by swaging or coining or formed separately and secured thereon. The fingers 23 may be secured to the carrier member 20 in any suitable manner being, for example, molded therein when the carrier members 20 are formed. The carrier members 20 may be formed in any suitable manner being, for example, molded from a plastic material such as NYLATRON GS* (*Registered Trademark of Polymer Corp., Reading, Pa.) is a molybdenum sulphide filled type 66 nylon material made by the Polymer Corporation.

If desired, a metallic reinforcing member 26 may be molded with the body member to provide added strength and dimensional stability. To damp out oscillations of the fingers a damping member 19 is secured across the several fingers of each type carrier. A piece of self-adhesive nylon wrapping tape has been used successfully for this purpose. The tape may be positioned on one side of the fingers or may be wrapped around both sides of the group of fingers on each type carrier, as shown.

As shown in FIG. 3, the type carrier member 20 has a depending flange 20c which is positioned in a groove 22c in the type carrier guide 22. The guide 22 may comprise a substantially J-shaped support extending along the print line and having a relatively long upstanding rear leg 22a which acts as a platen to support the carrier members 20 against the rotating moment caused by the impact of print hammers on the type carrying fingers 23, and provided with a relatively short front leg portion 22b on which the type carrier member 20 rides, and which defines the groove 22c in which the depending flange 20c of the carrier member 20 is positioned. The fingers 23 may be impacted against a document by means of print hammers 25 positioned along the print line, the hammers 25 being, for example, mounted on pivots 27 and actuated by push rods 29.

The type carrier members 20 are secured to the toothed timing belt 12 while the belt is stretched under a predetermined tension which is greater than the tension during operation. The width of the carrier members 20 is designed so that in the example shown the width is slightly more than three times the tooth pitch of the belt. The carrier members 20 are mounted on the belt when it is stretched and is in a predetermined stressed condition, so that when the force producing said predetermined tension is removed, the belt contracts and the type carrier members 20 are forced into contact with each other by the belt, and the sum of the lengths of the type carrier members actually determines the pitch or length of the belt. In the operating condition there will exist some tension in the belt, but less than said predetermined tension. With a neoprene compound belt having a continuous fiberglass tension member, molded therein with a belt width of 0.50 inches and a tooth pitch of 0.25 inches, a 21 pound force results in an elongation of the belt to a pitch length of approximately 39.5

inches. This is compared with a relaxed length of 39.429 inches and a relaxed tooth pitch of approximately 0.2495 inches.

With the arrangement thus described the type carrier members 20 are accurately positioned on the belt 12 by means of the pins 21, which engage opposite sides of a tooth, and are maintained in substantial contact with each other as they pass along the straight portion of their travel opposite the print line. The carrier guide member 22 accurately locates the type carrier members as they pass by the print line, permitting accurate positioning of the type characters 24 in the different print positions in which they are struck by the print hammers which may, as shown, be suitably mounted on pivots 27 and actuated by means of push rods 29.

While the type carrier shown and described is arranged for front printing, the present invention is not limited to this arrangement, and instead of mounting the type characters 24 on the carrier members 20 by means of spring fingers 23, the type characters 24 may instead be formed separately and mounted on the body of the type carrier 20, being cemented thereto or secured in any other suitable manner as for use in a back printer. Indeed, the type characters 24 may be molded integrally with the carrier members 20, in which instance it may be more desirable to use a ceramic member instead of the molded plastic, or the carrier member may be manufactured by means of any well-known powdered metal process or the like. In addition, while the timing belt is shown having teeth on the inside only, it is also possible to use teeth or spaced ribs on the outside which could mate with corresponding grooves on the inside of the type carrier members, if desired.

While the invention has been particularly shown and described with reference to a preferred embodiment thereof it

will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. In a printer for moving a plurality of type characters along a print line,

a type carrier comprising a flexible toothed timing belt having a plurality of equally spaced teeth on the inside, said timing belt having a predetermined length in the relaxed state and being stretched to a greater length under a predetermined tension force,

a plurality of U-shaped type carrier members having said type characters thereon and having spaced apart legs positioned on the belt with said legs extending inwardly on opposite sides of the belt, said type carrier members each having a length such that the total length of all said type carrier members is greater than the unstretched length of said belt but is substantially equal to the stretched length of said belt under said predetermined tension force so that said type carrier members are forced against each other by said belt when said predetermined tension force is removed and said belt contracts until said type carrier members determine the length of said belt, and

securing means comprising a pair of pins one on each side of a tooth said pins being closely positioned against said tooth and passing through said spaced-apart legs.

2. The invention as defined in claim 1 characterized by each of said type carrier members having a plurality of flat spring type character bearing fingers secured thereto, said fingers being connected intermediate their ends by damping means.

* * * * *

35

40

45

50

55

60

65

70

75