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[31]		P 17 74 268.6

[54] **TYPE CARRIER TOOTHED BELT**
2 Claims, 3 Drawing Figs.

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[51]	Int. Cl.....	B41j 1/20
[50]	Field of Search.....	101/93 C, 111, 105, 378, 390

[56]

References Cited

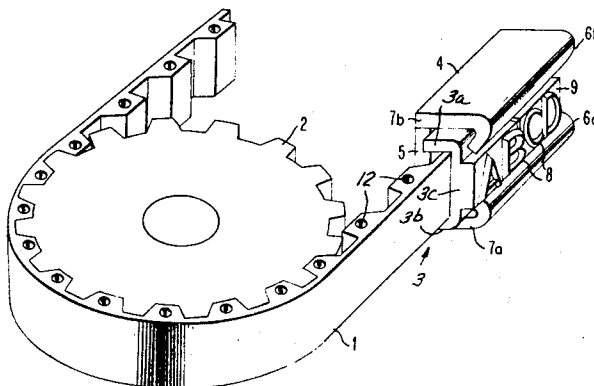
UNITED STATES PATENTS

3,041,964	7/1962	Simpson et al.....	101/111
3,142,249	7/1964	Sasaki	101/111
3,224,366	12/1965	Cunningham	101/93
3,379,125	4/1968	Antonucci.....	101/93
3,379,126	4/1968	Staller	101/111

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ABSTRACT: On each tooth of the belt one type carrier is pivotally mounted by means of one pin each. The type carrier, which preferably accommodates two type characters, is U-shaped, embracing the belt with a certain amount of play. The play, which exists both in a vertical direction and in the direction of firing of the print hammers, permits an accurate alignment of each type carrier in the guide provided in the printer station.



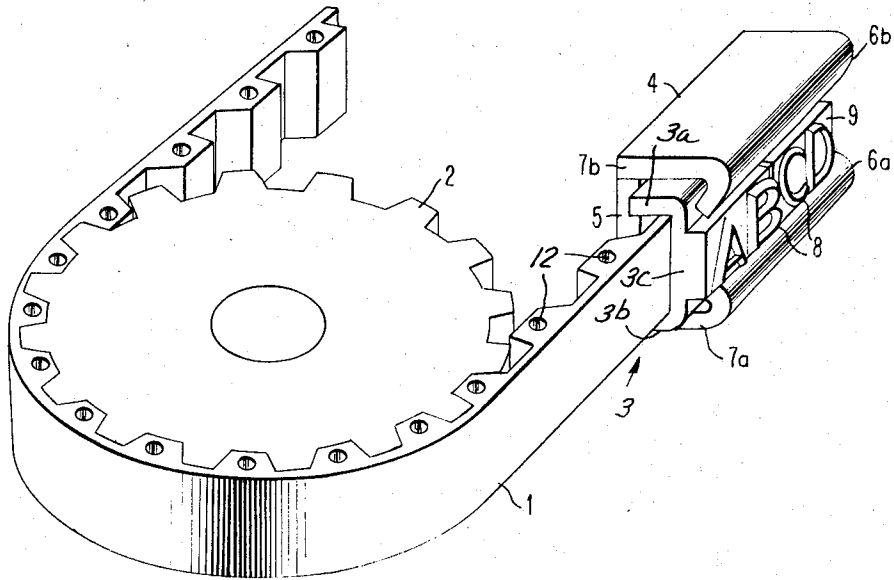


FIG. 1

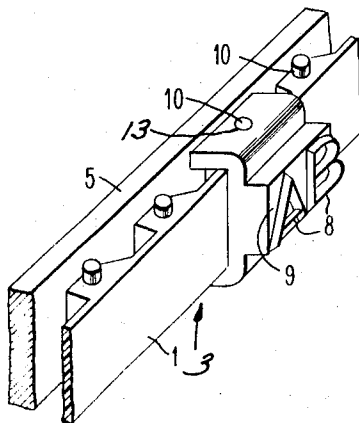


FIG. 2

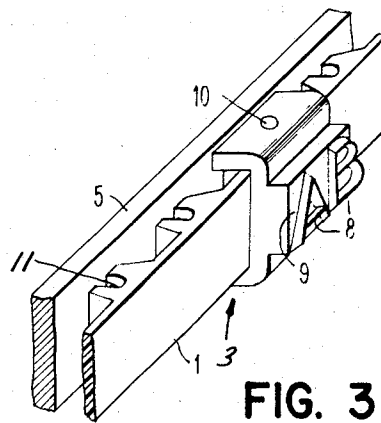


FIG. 3

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TYPE CARRIER TOOTHED BELT

The invention relates to an endless belt provided with teeth on its inside and on the outside of which are arranged with equal centerline spacing exchangeable, essentially U-shaped movable type carriers.

DESCRIPTION OF PRIOR ART

DAS 1 222 299 (German published Pat. application No. 1,222,299) relates to a type carrier tape on which exchangeable types are arranged with various spacings. The types are mounted so that of each type two feet pointing towards the back are passed through openings in the tape, the feet on the back of the tape being provided with holes accommodating the ends of spring wire clamps. This design of the type carrier and its arrangement on the tape do not permit an alignment of the types in the printer station which is essential in the interest of a high-quality image. The arrangement of the type on the carrier tape is intricate insofar as a spring clamp has to be inserted in two holes arranged at a distance from each other.

Austrian Pat. No. 211 078 refers to a printing arrangement comprising a type tape on which are arranged type plates. These type plates in their longitudinal centers are attached to the type tape by a pin of each type plate passing the type tape vertically in relation to its circumference and by a spreader ring, preventing an axial displacement of the bolt, engaging a recess of the pin. This kind of arrangement of the type plates on the type tape, although ensuring that the plates upon passing the two transfer wheels are caused to assume a spread tangential position, does not allow an alignment of the individual type plates in relation to the type tape in the printer station. With the help of the U-shaped cross section of the type tape, the type plates, assuming a tangential position upon passing the type guide or transfer wheels, are returned to the plane of the type tape without being twisted in relation to the longitudinal extension of the latter. The two parallel limbs of the U shape form as it were an edge reinforcement which detrimentally affects the movement of the tape over the transfer or guide wheels, since greater bending forces are encountered or rather the edge reinforcements cause the tape to vibrate at high operational speeds. This renders highly uncertain a safe return of the individual tape plates to the groove formed by the U-shaped cross section of the type tape.

SUMMARY OF INVENTION

Therefore, it is the object of the invention to provide a type carrier belt eliminating the disadvantages of known type tapes and by means of which the individual type carriers are positively transferred and aligned both parallel in relation to the printing plane and vertically in relation to the printing line, at the same time ensuring that the individual carriers are readily exchangeable. This problem is solved in accordance with the invention in that each U-shaped type carrier surrounds the toothed belt with a certain amount of play and in that the two parallel limbs of the U-shaped type carrier accommodate a bolt or pin protruding through a tooth of the toothed belt vertically in relation to the tooth profile. A type carrier toothed belt designed in accordance with the invention upon passing the transfer or guide wheels permits its type carriers to move freely without detrimental tensions leading to undesirable vibrations being produced in the toothed belt.

Further features of the invention may be seen from the claims.

DESCRIPTION OF DRAWING

Details of the invention are hereafter described by means of embodiments shown in the following drawings:

FIG. 1 part of a type carrier toothed belt with part of the type carrier guide arranged in the printer station;

FIG. 2 embodiment of the type carrier attachment to the type carrier toothed belt;

FIG. 3 another embodiment of the type carrier attachment to the type carrier toothed belt.

DESCRIPTION OF PREFERRED EMBODIMENT

The endless type carrier toothed belt 1 having a plurality of teeth about its inner periphery and having a relatively smooth outer periphery; is led over two toothed transfer wheels 2 (FIG. 1 showing only one wheel). The type carriers 3 (FIG. 1 showing only two type carriers) are pivoted with the same centerline spacing to the type carrier toothed belt. Within the printer station, that means opposite the print hammers (not shown) is arranged the type carrier guide 4. The latter consists of a C-shaped channel with the backwall 5 aligning the individual type carriers 3 in conjunction with the lips 6a, 6b of the two side bars 7a, 7b, which are firmly linked with the backwall 5. The lips 6a, 6b are so spaced from the backwall 5 that they engage the type carriers 3 in a manner that the individual type carriers 3 are restrained against moving laterally away from the wall 5 of the guide channel 4, and the type characters 8 are arranged in a common plane extending parallel in relation to the record carrier (not shown). Bars 7a, 7b are spaced apart so they align the type carriers 3 to prevent motion thereof vertically in relation to the printing line so that within the printing area all type characters 8 are arranged essentially on one common line. The individual type carriers 3 are essentially U shaped, each having spaced-apart upper and lower limbs 3a, 3b, open at one end and connected at the other end by a center limb or bight portion 3c, and surrounding the type carrier toothed belt 1 on three sides. The lips 6a, 6b engage the carriers 3 at the junction of the limbs 3a, 3b and the center limb or bight portion 3c of the U-shaped type carrier 3 has an inner face and an outer face which comprises the raised area 9 on which are disposed the type characters 8. The two limbs or arms 3a, 3b of the type carrier 3 are spaced apart further than the width of the belt 1 to allow play therebetween. For example, for a belt width on the order of 0.240 inch a distance between the limbs of about 0.250 to 0.255 inch will suffice. Each type carrier 3 preferably carries two type characters 8. In order to enable the alignment of the type carriers 3 by means of the type carrier guide 4 as described without subjecting the type carrier belt 1 to any loads, play is provided between all faces of the U-shaped type carrier 3 and the adjoining faces of the type carrier toothed belt 1.

FIGS. 2 and 3 show the pivotal connection of the individual type carriers 3 to the type carrier toothed belt 1. For the sake of ready discernibility both figures only show the backwall 5 of the type carrier guide 4. It is a feature common to the embodiments of FIGS. 2 and 3 that each type carrier 3 is pivotally connected by means of a bolt or pin 10 extending vertically in relation to the tooth profile through one tooth each of the type carrier toothed belt 1. Each tooth of the type carrier toothed belt 1 supports one bolt 10. These bolts or pins 10, as shown in FIG. 2, are pressed into holes or openings 12 of the type carrier toothed belt 1, pivotally accommodating one type carrier 3 each by means of the parts protruding on either side from the type carrier toothed belt 1. A sliding fit is provided between the bolt and the receiving holes 13 for the latter in the type carrier 3. The holes 13 are preferably further from the inner face of the bight than the openings 12 are from the outer periphery of the belt 1. A difference on the order of 0.010 to 0.015 inch has proved satisfactory. It is also possible for the bolt 10 to be pressed into the parallel limbs of each type carrier 3 and a sliding fit to be provided between the bolts 10 and the receiving holes or openings 12 in the type carrier toothed belt 1.

Instead of providing a through hole for each tooth of the type carrier toothed belt 1, it is also possible to arrange the opening to be an open groove 11 (FIG. 3) on each tooth. In addition to obviating the need for the bolt 10 to be accurately positioned in the type carrier 3 (embodiment 2), grooves are more readily manufacturable than through holes. During alignment of each type carrier 3 in the type carrier guide, the embodiment of FIG. 2 only permits pivoting each type carrier

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3 around its bolt or pin 10 if, as described, no external forces are to be exerted on the type carrier toothed belt 1 during alignment. Consequently, in the embodiment of FIG. 2 the spacing of the hole receiving bolt 10 in relation to the plane of the type character 8 is to be kept more accurately than in the embodiment of FIG. 3, since the latter, through the grooves 11 in the type carrier toothed belt 1 during the alignment of the type carrier 3 in the type carrier guide 4, in addition to the pivotal movement of the type carrier 3 permits a slight vertical shift of the latter in relation to the type character plane.

The individual type carriers 3 are thus pivoted to the type carrier toothed belt 1, so that in spite of the positive connection, alignment takes place in the printer station or in other words upon arrival of each type carrier 3 in the type carrier guide 4. This alignment is effected automatically in two coordinates, no forces causing the type carrier toothed belt 1 to be bent or tensioned occurring during alignment. Therefore, an accurate positioning of the type carrier toothed belt 1 in relation to the printer station is not so critical, since the individual type carriers 3 are accurately aligned when passing the printer station. No forces are exerted on the type carrier toothed belt 1 during alignment. This results in addition to high-quality printing images and high operational speeds of the type carrier toothed belt 1, in the latter operating free from vibrations.

While the invention has been particularly shown and described with reference to preferred embodiments 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 in combination with a toothed drive wheel having a plurality of teeth,
 - a flexible belt positioned about said wheel having a relatively smooth outer periphery and a plurality of teeth about its inner periphery with openings through said teeth, said

teeth being disposed to mesh with said teeth on said drive wheel,

- a plurality of substantially U-shaped type carriers each having a pair of substantially parallel limbs spaced apart a distance greater than the width of said belt positioned on opposite sides of said belt to extend inwardly about said belt and provide limited vertical movement of said carrier in the direction of the width of said belt and a bight portion connecting said limbs at one end and having an inner face and an outer face with a character on said outer face, said limbs having aligned holes therein spaced from the inner face of said bight portion a distance greater than the distance of the tooth opening from the outer periphery of said belt to provide a clearance between said inner face and said outer periphery.

C-shaped channel guide means positioned along a portion of said belt to receive said type carrier, said guide means having spaced-apart side bars and lip portions engaging said type carriers at the junction of said limbs and said bight portions to prevent vertical and lateral motion of said type carriers in said guide means, and

- a pin positioned in said aligned holes and having a sliding fit in one of said tooth openings to provide limited vertical and rotational movement of said type carrier relative to said belt when said type carrier is outside said guide means.

2. The invention as defined in claim 1 characterized by said opening in said belt tooth being a groove extending through the width of the belt and open at the tip of said tooth, with the inner end of said slot being closer to the outer periphery of said belt than the distance of said aligned openings in the limbs of said type carrier from the inner surface of said bight portion joining said limbs.

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