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Offermann

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[45] **Jan. 14, 1975**

[54] **FEEDING DEVICE FOR TAPE-TYPE RECORD CARRIERS**

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[21] Appl. No.: **471,135**

Related U.S. Application Data

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[52] **U.S. Cl.** ..... **74/229,** 74/231 C

[51] **Int. Cl.** **F16h 7/02,** F16g 1/28

[58] **Field of Search** 74/229, 231

[56] **References Cited**

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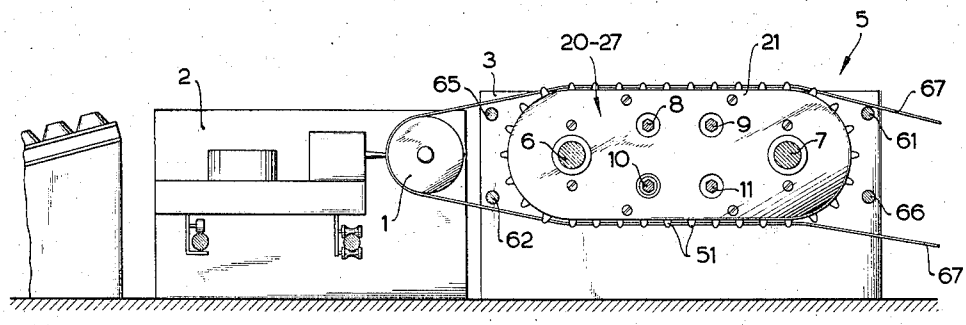
Primary Examiner—Leonard H. Gerin

Attorney, Agent, or Firm—McGlew and Tuttle

[57] **ABSTRACT**

Pairs of externally spiked gear belts are trained over geared guide rollers and each is mounted in a respective housing in which they are freely rotatable. A frame, having substantially the width of a business machine, has a number of profiled shafts extending thereacross in spaced parallel relation. The housings are mounted in the frame for lateral displacement in the frame. The profiled shafts preferably are driven by respective variable speed reversible electric motors. Each unit, comprising a pair of gear belts and the associated guide rollers, is connected to a respective profiled shaft either directly or through the medium of a gear on the profiled shaft. In another embodiment of the invention, the externally spiked gear belts are replaced by externally spiked annular discs rotatable on internal housings which are stationary on the profiled shafts which, in turn, extend through each of the housings. The annular discs have internal gear teeth and each disc has associated therewith, in driving relation, a pinion secured on a respective profiled shaft.

15 Claims, 9 Drawing Figures



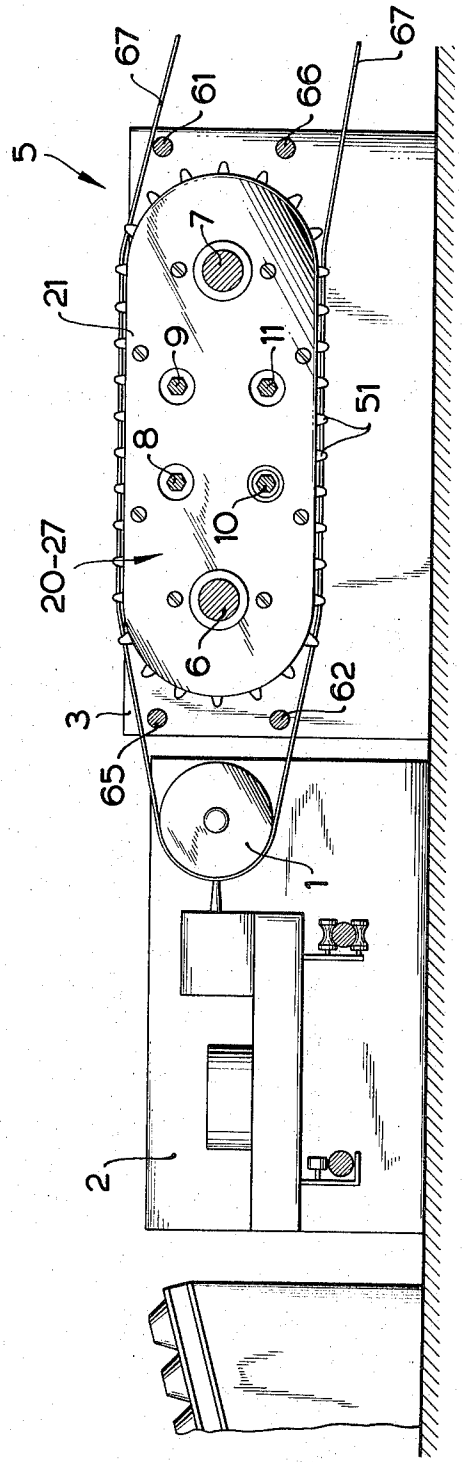


FIG.1

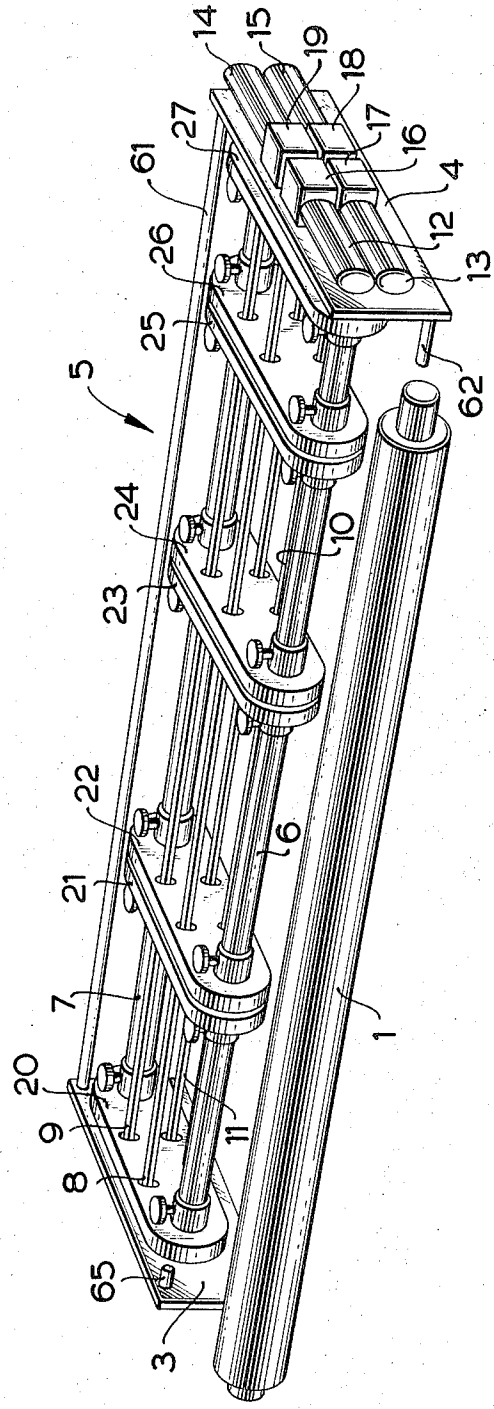

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FIG. 2

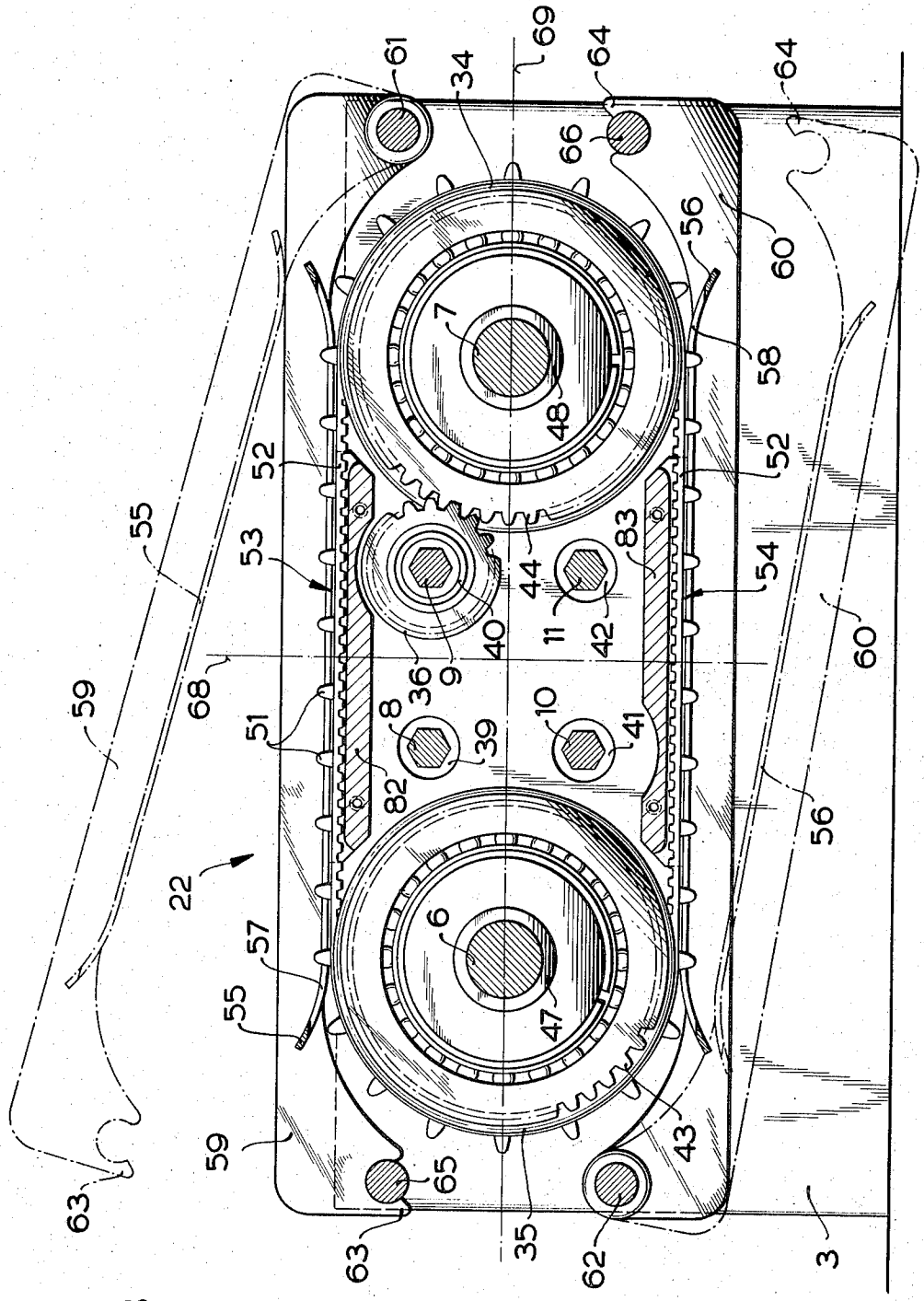
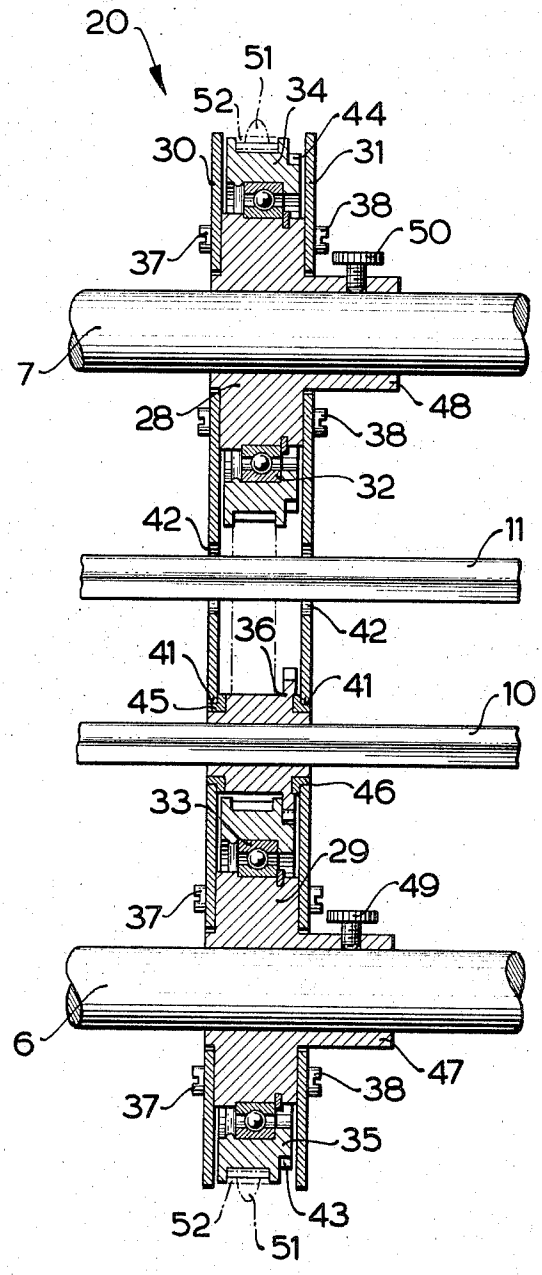

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FIG.3

FIG. 4


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48
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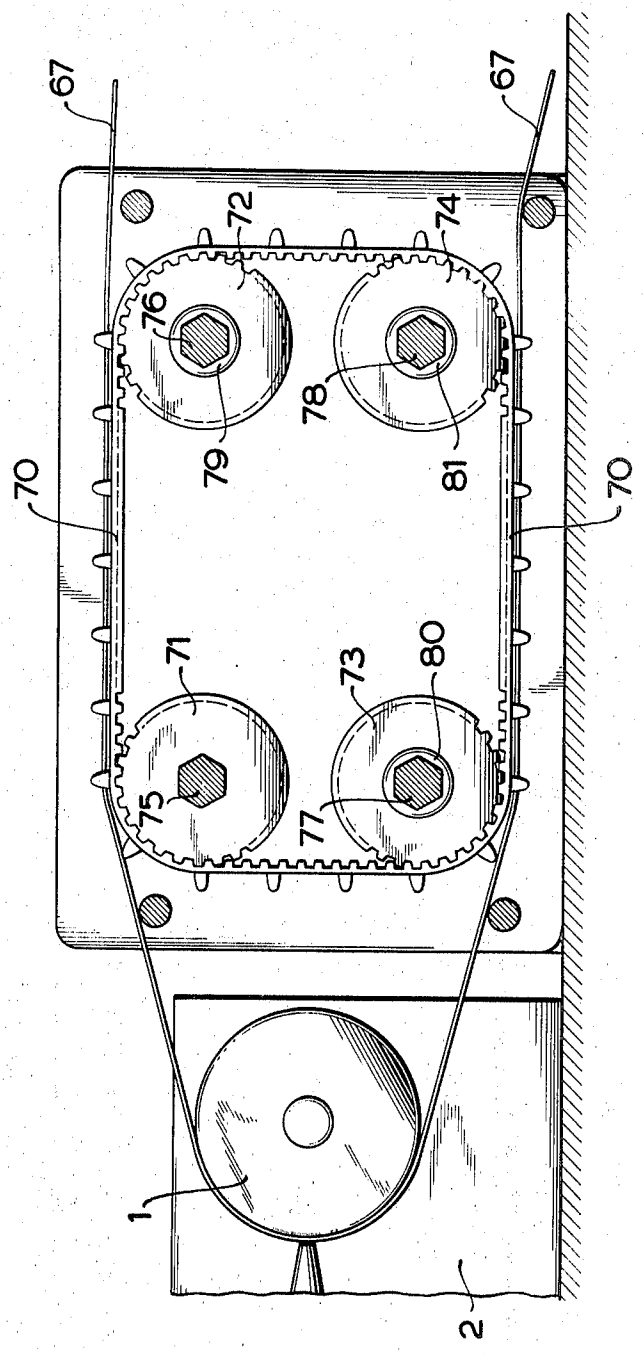


FIG.5

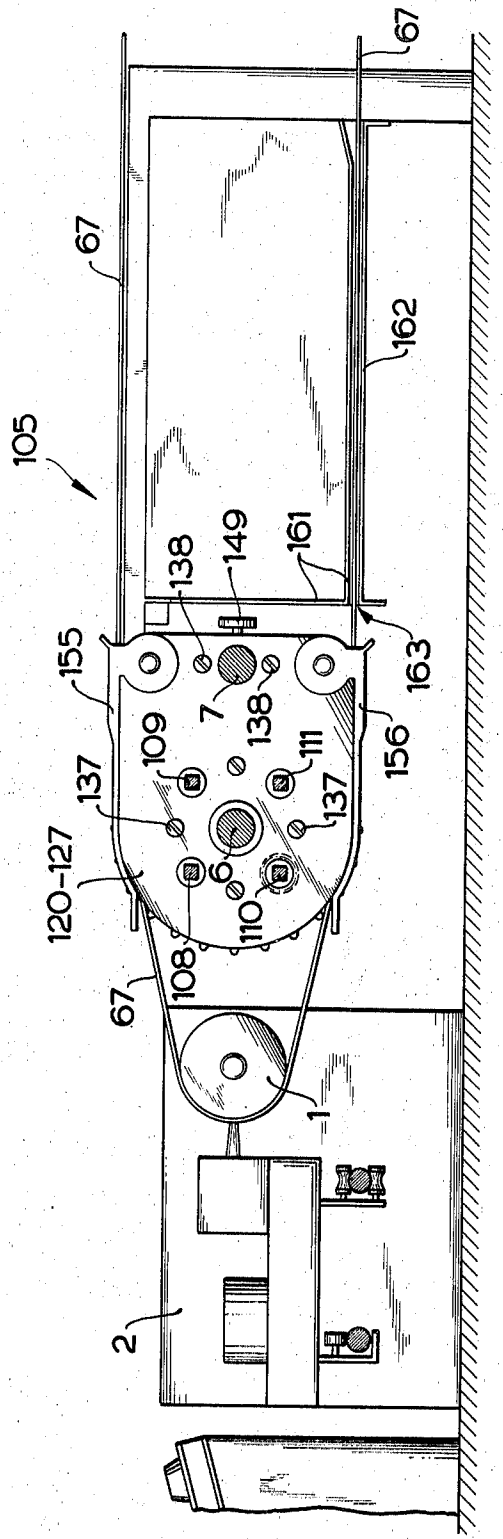

67
67
162
105
138
149
161
155
163
7
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109
111
156
137
137
120-127
6
110
108
67
1
2

FIG.6

FIG. 7

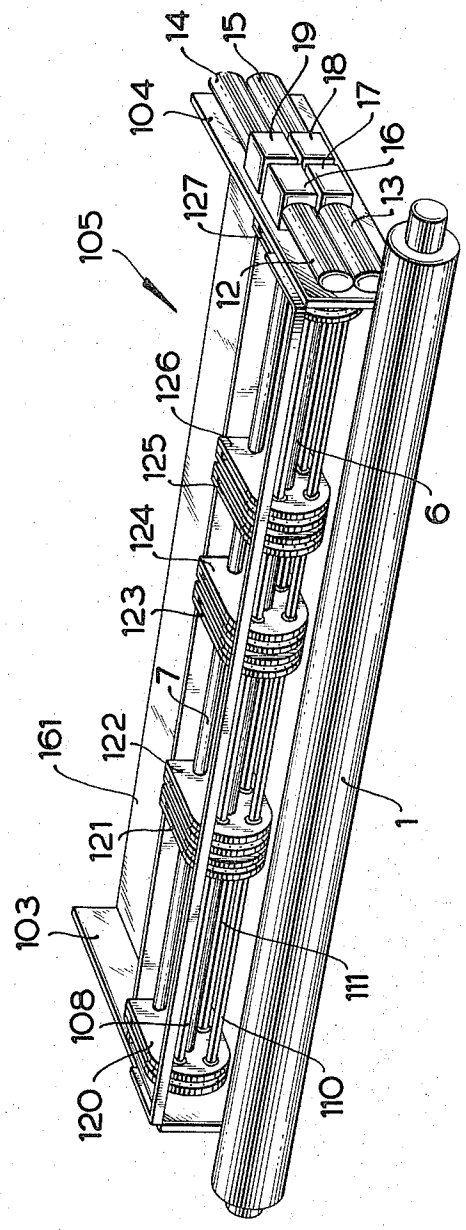

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104
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123
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161
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120
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111
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1

FIG.8

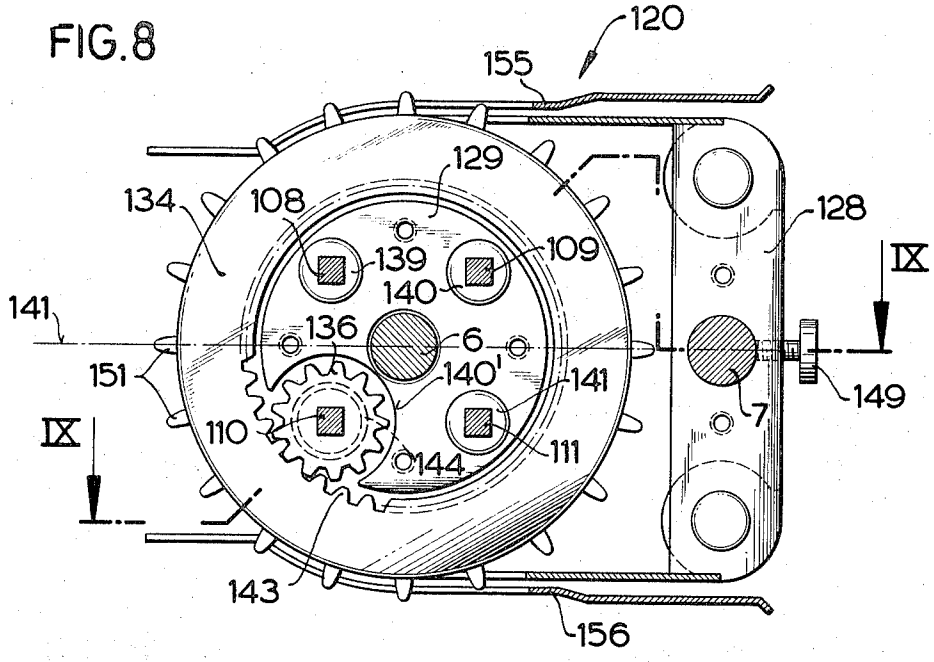
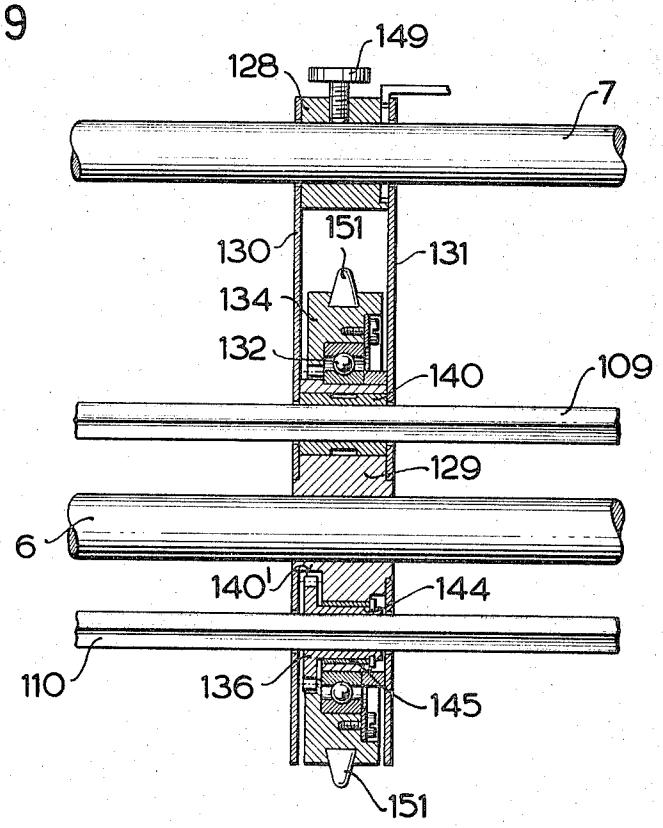

120
155
129
134
108
128
139
109
IX
140
141
136
6
151
140'
141
149
7
110
111
144
IX
143
156

FIG.9


149
128
7
151
130
131
134
132
140
109
129
6
140'
144
110
136
145
151

FEEDING DEVICE FOR TAPE-TYPE RECORD CARRIERS

This is a continuation, in-part of application Ser. No. 376,289 July 5, 1973.

FIELD AND BACKGROUND OF THE INVENTION

This invention relates to feeding devices for tape-type record carriers perforated at their lateral edges and, more particularly, to a novel and improved such feeding device by which several record carriers may be selectively driven at the same speed and in the same direction, at different speeds, or in different directions.

The invention is particularly directed to a feeding device for tape-type record carriers, perforated at the lateral edges, of the type including skiked belt driving means arranged in pairs with the driving means of each pair being spaced laterally a distance equal to the tape perforations, in a frame which preferably extends over the width of a printing mechanism of a bookkeeping machine, date processing machine, and the like. Each driving means includes a gear belt pulley and a guide roller, on which there rotates a gear belt provided externally with spikes, the gear belt pulley and the guide roller being mounted for rotation in a housing which is axially displaceable on axles of the frame, and which housings have, at least in the range of one section of the gear belt, a liftable tape guide bar.

Such feeding devices are already known, and serve for the intermittent drive of endless forms which are printed in printing mechanisms of data processing machines, for example. In numerous bookkeeping operation, it is necessary successively to print several forms guided, over the entire width of the printing mechanism, side-by-side over the printing roll, such forms including journals, invoices, bank bills, addresses, etc. All the forms are fed in the form of tapes provided with tear-off perforations. The linear feeding steps, that is, the driving paths of the individual tapes, can differ from each other. In addition, it happens that certain forms must be moved backward by a certain amount at the end of a bookkeeping operation so that a numerical value resulting, for example, in the last entry line can be printed on a line at the upper edge of the form.

In the known feeding devices, each frame is equipped with only a single motor-driven profiled shaft, and with two spiked belt driving means mounted thereon and spaced axially the distance between the perforations. The gear belt pulleys of the two belt driving means are mounted for displacement axially of the shaft, but are non-rotatable with respect to the shaft as the profile shaft extends through correspondingly profiled axial openings in the pulleys. In order to maintain the paper tape with its perforations in engagement with the exterior spikes on that section of the toothed belt designed to transport the tape, guide bars are provided and can be swung to the side or upwardly or downwardly, and these are lifted from the gear belt for threading the respective form tape.

Because the spiked belt driving means for threading the respective form tapes must be freely accessible, at least from one side, it is necessary, in the known feeding devices, to arrange the driving means, as far as they are associated with different form tapes, not only laterally along the printing line but also transversely thereto staggered one behind the other and in different horizontal planes. On the one hand, this requires a very voluminous construction and, on the other hand, it requires an expenditure for frames which is a multiple of the number of form tapes to be fed separately. Moreover, additional paper guides must be provided between the feeding devices, staggered to the rear, and the platens about which the form tapes must be conducted. These paper guides represent not only increased costs but also make the threading of the form tapes much more difficult.

A great disadvantage in known devices is that, due to the staggered arrangement, not all form tapes can be brought into engagement with both the upper and the lower section of the associated spiked belts, so that the number of possible running paths of the form tapes is limited to a minimum. This means a limitation of the possible applications of known feeding devices. An essential is that the form tapes, which can be brought into engagement with only one section of the spiked belt, can be fed exclusively in only one direction, and backward feed is impossible. This is a disadvantage which further limits the applicability of the known feeding devices.

SUMMARY OF THE INVENTION

The objective of the present invention is to provide a feeding device, of the above mentioned type, which avoids the mentioned disadvantages and where, in particular, the threading of the form tapes is considerably facilitated, with the feeding device permitting a space-saving design and tape feed in both the forward and backward directions.

In accordance with one embodiment of the invention, this objective is attained by equipping a single frame with several separately driven profiled shafts and with several spiked belt driving means, arranged side-by-side axially of the profiled shafts, with gear belt pulleys rotating freely in the respective housings, the gear belt pulleys of each pair of spiked belt driving means being operatively connected either directly or through gears with a respective profiled shaft.

The main advantage of this embodiment of the invention device is that all the pairs of spiked belt driving means are arranged in the same plane in parallel with each other and side-by-side, which makes possible a compact construction and which substantially facilitates threading of the individual form tapes. All form tapes can be brought simultaneously into engagement with the upper and lower sections of the externally spiked belts, which permits both a forward and a backward feed. In addition, the total expenditure for parts is substantially lower than in known feeding devices.

As a further feature of the invention, it is provided that each spiked belt driving means has, in the same housing, at least two gear belt pulleys carrying the externally spiked gear belt, each of which is associated with one or more profiled shafts arranged at the same radial distance therefrom. It is thus possible to use the same parts for all the spiked belt driving means, and to provide them in pairs with gear wheels arranged on the same profiled shaft and which are in engagement with one of the gear belt pulleys. For this purpose, the gear belt pulleys are provided with spur gear rims. As many pairs of spiked belt driving means can be provided as there are profiled shafts.

Another advantageous feature of the present invention is that the gear belt pulleys are mounted rotatably on guide bushes arranged non-rotatably in the housing, these guide bushes being arranged for axial displace-

ment on a guide axle of the frame. This results in a small volume of the individual spiked belt driving means and in favorable arrangements of the profiled shafts, which has a favorable effect, particularly as far as space is concerned, and which also permits a simply assembly. The guide bushes also insure a good guidance of the individual driving means, so that the latter can be adjusted easily and precisely to the given lateral spacing of the perforations of the respective form tape.

The profiled shafts are arranged preferably between the guide axles so that they extend through the housings of all the driving means arranged side-by-side in the frame, axially displaceable gears being arranged in the housing of each driving pair on the profiled shaft of the latter, these gears meshing with a gear rim of a respective gear belt pulley. Due to this favorable space arrangement, it is possible to arrange, in a narrow space, profiled shafts coupled selectively with one or the other gear belt pulleys.

In order to be able to push pairs of feeding devices not required in a certain bookkeeping operation out of the range of the working pairs of feeding devices and into a position in which they do not interfere with the operation of the working feeding devices, it is advisable to make the frame wider than the maximum width of the associated printing mechanism by at least twice the width of a single driving means.

In another embodiment of the invention, the spiked belt driving means have a number of gear belt pulleys corresponding to the number of profiled shafts about which the gear belt rotates, the coaxial gear belt pulleys of a pair of spiked belt driving means being arranged non-rotatably on one profiled shaft, while the other gear belt pulleys are mounted rotatably on the other profiled shafts. This embodiment requires a larger construction, but it has the advantage that it requires no gear connections between the individual belt pulleys and the profiled shafts.

In both mentioned embodiments of the invention, the guide bars extending in the feeding direction along both runs of the gear belts are slotted to engage over the spikes so as to maintain the respective form tapes in engagement for both forward and rearward movement. In order to be able to arrange the adjacent spiked belt driving means as close as possible side-by-side, the guide bars are mounted pivotally on axles extending over the entire width of the frame, and are guided in an axial direction on the respective housings.

The individual profiled shafts are driven separately by variable speed reversible driving motors, so that they can be driven in either direction of rotation. Although it would be readily possible to drive the individual profiled shafts separately from a common driving motor, through respective electromagnetic clutches, the provision of several profiled shafts with individually associated driving motors has the advantage of an exact slip-free step drive.

In a further embodiment of the invention, the externally spiked gear belts are replaced by externally spiked annular internal gears rotatably mounted on housings, in the interior thereof, having the profiled shafts extending therethrough and being adjustable longitudinally of the profile shafts. In this embodiment of the invention, each profiled shaft has fixed thereto a pair of pinions which mesh with a respective pair of external spiked internal gears. The externally spiked internal gears have a sufficiently large diameter to provide a relatively large peripheral area of engagement with the tape-type record carriers.

An object of the present invention is to provide an improved feeding device for tape-type record carriers perforated at their lateral edges.

Another object of the invention is to provide such a feeding device in which the threading of the form tapes is considerably facilitated.

A further object of the invention is to provide such a feeding device with a space saving design and in which the tapes can be fed both forwardly and backwardly.

For an understanding of the principles of the invention, reference is made to the following description of typical embodiments thereof as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a somewhat schematic side elevation view, partly in section, illustrating the arrangement of a feeding device, embodying the invention, behind a printing mechanism;

FIG. **2** is a perspective view of a feeding device embodying the invention;

FIG. **3** is a vertical longitudinal sectional view through a spiked belt driving means of the feeding device embodying the invention;

FIG. **4** is a horizontal sectional view corresponding to FIG. **3** and taken on the line A-A of FIG. **3**;

FIG. **5** is a somewhat schematic side elevation view, partly in section, of another embodiment of a feeding device in accordance with the invention;

FIG. **6** is a view, similar to FIG. **1**, illustrating a further embodiment of the invention;

FIG. **7** is a perspective view of the feeding device shown in FIG. **6**;

FIG. **8** is a side elevation view, partly in section, of the externally spiked disc or annular gear driving mechanism of the embodiment of the invention shown in FIGS. **6** and **7**; and

FIG. **9** is a sectional view taken along the line IX-IX of FIG. **8**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the embodiment of the invention shown in FIGS. **1** to **4**, and as best seen in FIG. **1**, a pair of guide axles **6** and **7** is arranged, at the level of the platen **1** of a printing mechanism **2**, in a frame **5** consisting of two plates **3** and **4** and which guide axles connect plates **3** and **4** with each other. Between the two guide axles, there are arranged hexagonal profiled shafts **8, 9, 10** and **11** which are rotatably mounted in plates **3** and **4** of frame **5**. The profiled shafts **8, 9, 10** and **11** are driven by respective reversible variable speed electric motors **12, 13, 14** and **15**, through miter or bevel gears **16, 17, 18** and **19**, the motors being arranged on the outside of the plate **4**, as best seen in FIG. **2**, and being program controlled.

Profiled shafts **8** and **10** have the same radial spacing from the axis of guide axle **6**, and profiled shafts **9** and **11** have the same radial spacing from the axis of guide axle **7**. Between the two plates **3** and **4**, as best seen in FIG. **2**, there are arranged, in pairs, a total of eight spiked belt driving means **20–27**, which are all designed identically and all of which have the same parts.

The construction of the spiked belt driving means 20–27 can be best seen in FIGS. 3 and 4. Each driving means comprises two bushes 28 and 29 mounted for displacement on respective guide axles 6 and 7, two housing plates 30, 31, two gear belt pulleys 34 and 35 mounted rotatably, by means of respective ball bearings 32 and 33, on the respective guide bushes 28 and 29 between plates 30, 31, as well as a gear 36 mounted non-rotatably on one of the profiled shafts. Plates 30 and 31 are secured by means of screws 37, 38 on the axial end faces of bearing bushes 28 and 29, and have aligned bores 39, 40, 41 and 42 through which extend the profiled shafts 8, 9, 10 and 11. Both gear belt pulleys 34 and 35 are provided, on one end face, with a respective spur gear rim 43, 44 with which a gear 36 is in engagement depending on which of the profiled shafts 8–11 it is secured.

In the pair of spiked belt driving means 20, 21, gear or pinion 36 is arranged, as shown in FIG. 4, on profiled shaft 10. Gear 36 has an axial bore profiled to correspond to the cross-section of the profiled shafts 8 through 11, so that gear 36 is fixed to rotate with the respective shaft 8-11 on which it is arranged. Each gear 36 is mounted rotatably by means of two bearings discs 45 and 46 in a respective one of the aligned bores 39–42 in plates 30 and 31, and is displaceable axially of the respective profiled shaft. The two bushes 28 and 29 are provided with respective hubs 47 and 48 into which are threaded adjusting screws 49 and 50, by means of which the individual spiked belt driving means can be locked in the desired axial position on guide axles 6 and 7.

In FIG. 3, which is a cross-section through the spiked belt driving means 22, gear 36 is mounted on profiled shaft 9 and is in engagement with the gear rim 44 of gear belt pulley 34, as is also the case with the associated spiked belt driving means 23. In the spiked belt driving means 24 and 25, gear 36 rotates with profiled shaft 8, and in the two spiked belt driving means 26 and 27, gear 36 rotates with profiled shaft 11.

A gear belt 52 having its outer surface provided with spikes 51, which represents the feed element proper and which bears rotatingly on gear belt pulleys 34 and 35, is driven through gear wheel 36 and gear belt pulley 34 or 35 through one of the profiled shafts 8 through 11.

In order to keep the perforations of the respective form tape 67 in engagement with the upper and lower runs 53 and 54 of the gear belt, respective guide bars 55 and 56 are arranged closely adjacent these runs. Guide bars 55 and 56 have respective longitudinal slots 57 and 58 along which the spikes 51 of the gear belt run without hindrance. The guide bars are secured on respective swingable levers 39 and 60, one of which can be swung upwardly about a stationary axle 61 and the other of which is pivotal downwardly about a stationary axle 62.

The two swing levers 59 and 60 are identical in design, and each has, at its free end, a respective fork 63 and 64 by means of which it can be locked, in the respective guiding position of guide bars 55 and 56, on axles 65 and 66, respectively. Swing levers 59 and 60 are mounted on axles 61 and 62 for conjoint axial displacement with the individual spiked belt driving means 20–27. Axles 61, 62, 65 and 66 are, in turn, secured in plates 3 and 4 to extend parallel to guide axles 6 and 7, and are so arranged that they have a common tangent with the gear belt pulleys 34 and 35 and with platen 1, so that they serve simultaneously as a paper guide in the space between gear belt pulleys 34 or 35, facing platen 1, and the platen.

The symmetrical arrangement of spiked belt driving means 20–27 and of frame 5 with its axles 61, 62, 64 and 65, its guide axle 6 and 7 and its profiled shafts 8, 9, 10 and 11, both with respect to a vertical center axis 68 and a horizontal center axis 69 has, at the same time, the advantage that the individual spiked belted driving means can be inserted into frame 5 mirror-inverted both with respect to vertical axis 68 and with respect to horizontal axis 69, so that gears 36 can be inserted in the preliminary assembly into the respective bores 39, 40, 41 or 42 of plates 30 and 31. For supporting the upper and lower runs 53 and 54, respectively, of belt 52, respective supporting bars 82 and 83 are arranged between plates 30 and 31, forming the housing, and are secured thereon by means of screws.

The embodiment of the invention shown in FIG. 5 differs from the embodiment shown in FIGS. 1 through 4 particularly in that each gear 70 runs over four gear belt pulleys 71, 72, 73 and 74 which are mounted directly on the respective profiled shafts 75, 76, 77 and 78 arranged at the corners of an imaginary rectangle, of which only gear belt pulley 71 is secured to rotate with a profiled shaft 75. Only gear belt pulley 71 has an axial bore profiled to correspond to the cross-sectional profile of shafts 75 through 78. The other gear belt pulleys 72, 73 and 74 are mounted rotatably on bushes 79, 80 and 81 which are non-rotatably mounted on shafts 76, 77 and 78, respectively, but are displaceable axially of the respective profiled shafts.

In this embodiment of the invention, the spur gear rims of gear belt pulleys 34 and 35, as well as gear 36 and guide axles 6 and 7, are eliminated. All other parts of the embodiment shown in FIGS. 1 through 4 can be present in a similar manner. In order to prevent axial displacement of the individual spiked belt driving means designed as shown in FIG. 5, and also cooperating in pairs, bushes 79, 80 and 81 can be similar to guide bushes 28 and 29 in that they have hubs into which there can be threaded adjusting screws and the like. For the sake of simplicity, these parts have not been shown in FIG. 5.

As is particularly apparent from FIGS. 1 and 5, the feeding device embodying the invention occupies only a relatively little space behind the platen 1, in such a way that it does not hinder the additional equipment of printing mechanism 2, particularly above and below platen 1, with automatic account inserting devices, and permits, in general, a space-saving construction both in the horizontal and in the vertical directions.

As will be clear from the embodiment of the invention shown in FIGS. 6 through 9, the underlying construction principle of the invention can be applied readily to driving means or driving mechanisms which, instead of using externally spiked geared belts 52 with pins or spikes 51, utilize externally spiked discs and wherein the individual profiled shafts are arranged inside the circular periphery of the spiked discs and are in engagement with internal gearings of the respective spiked discs through the means of gears or pinions arranged in pairs.

The individual spiked pulleys must be mounted rotatably on an inner housing arranged concentrically thereto, and which is traversed by all existing profiled

shafts, similar to the housing shown in the embodiment of FIGS. 1 through 4. With a corresponding large diameter of spiked pulleys, a satisfactory degree of engagement and covering can be attained so that a sufficient number of spikes are simultaneously engaged with perforations of the respective form tape.

Such an embodiment of the invention is illustrated in FIGS. 6 through 9, in which the spiked discs are formed by annular internal gears 134 having circumferentially spaced external spikes or pins 151 on their external peripheries. The individual profile shafts 108 through 111 extend through the interior of gears 134 and are connected to respective pairs of gears 134 through the medium of respective pairs of external gears or pinions 136 meshing with the internal gearings 143 of the pairs of annular gears 134. Each annular internal gear 134 is mounted for rotation on a respective concentric internal housing 129 through which housings all of the profile shafts 108 through 111 extend in the same manner as shown and described with respect to the embodiment of the invention shown in FIGS. 1 through 4.

The arrangement of the spiked disc driving mechanisms 120, 121, 122, 123, 124, 125, 126 and 127 of FIGS. 6 and 7 correspond substantially to that of the embodiment of the invention shown in FIGS. 1 and 2. For this reason, the same reference numerals have been used, in FIGS. 6 and 7, for parts corresponding to those shown in FIGS. 1 and 2. However, it will be noted that the supporting structure 105, in FIGS. 6 and 7, differs somewhat from that shown in FIGS. 1 and 2. In particular, side plates 103 and 104, in which guide shafts 6 and 7 as well as profile shafts 108, 109, 110 and 111 are mounted, are connected to each other on the rear side by an angle sheet 161 which, along with the guide sheet 162 located in slightly spaced relation therebeneath, forms a lower guide channel 163 for the tape-type record carrier to be conveyed. Electric motors 12 through 15, with their respective miter or bevel gears 16 through 19, separately driving each profile shaft 108 through 111 are again mounted on the exterior of plate 104.

The construction of the driving mechanisms 120 through 127 is best seen in FIGS. 8 and 9. In the same manner as the belt driving mechanisms 20 through 27 of the embodiment of the invention shown in FIGS. 1 through 4, the driving mechanisms 120 through 127 are mounted on the two guide shafts 6 and 7 for axial displacement therealong, and are secured in axially adjusted position by means of set screws 149. Guide shaft 7 extends through respective vertical frame webs 128 each of which has secured, to opposite sides thereof, plates 131 and 130, by means of screws which have not been shown. Guide shaft 6 carries the cylindrical internal housings 129, mounted thereon for axial displacement, and the outer periphery of each internal housing 129 rotatably mounts a respective annular internal gear 134 provided with the external spikes 151, each gear 134 being mounted on the associated cylindrical internal housing 129 through the medium of an anti-friction bearing 132.

Each internal housing 129 is formed with cylindrical bores each coaxial with the axes of a respective profile shaft 108, 109, 110 and 111. Three of the four cylindrical bores in each housing 129 are provided with guide bushings 139, 140, or 141 having profile bores matching the respective profile shafts for receiving the latter.

In a manner analogous to the embodiment of FIGS. 1 through 4, each driving mechanism 120 through 127 includes an external gear or pinion 136 rotatably mounted, by means of a respective bearing bush 145, in that cylindrical bore of the associated internal housing 129 not provided with a guide bushing 139, 140 or 141. The hub 144 of gear or pinion 136 has a profile bore for receiving the respective profile shaft. In the driving mechanism particularly illustrated in FIGS. 8 and 9, gear 136 is mounted on profile shaft 110 and meshes with the internal gear teeth 143 of annular internal gear 134 so that, upon rotation of profile shaft 120, gear 134 is turned correspondingly.

To receive the associated gear or pinion 136, the respective internal housings 129 of each driving mechanism 120 through 127 is provided, at the appropriate angular location thereon, with a quasi-circular recess 140 which is concentric with a cylindrical bore through the internal housing 129. Aside from this recess 140, the entire driving mechanism 120 through 127 is designed symmetrically relative to the horizontal central axis constituted by guide shaft 6.

During mounting of the four driving mechanism 120 – 121, 122 – 123, 124 – 125 and 126 – 127, care should be taken that the recesses 140 of the respective pair of internal housings 129 be associated with a respective profile shaft, with each profile shaft being different for each driving mechanism. This care should be taken if all of the driving mechanism pairs are to be drivable separately. It is, of course, also possible to drive two or more driving mechanism pairs conjointly by the same profile shaft.

To keep the perforations of the respective tape-type record 67 in engagement with pins 151 both on the upper side and on the lower side of the externally spiked annular gears 134, the embodiment of the invention shown in FIGS. 6 through 9 also provides, in a manner analogous to the arrangement shown in FIG. 3, slotted guide strips 155 and 156 which are resiliently biased against the peripheries of the associated pair of externally spiked annular gears 134, and guide strips 155 and 156 are hinged to frame web 128.

The use and the mode of operation of the embodiment of the invention shown in FIGS. 6 through 9 is substantially the same as that in the embodiment shown in FIGS. 1 through 4 and in FIG. 5. However, the embodiment of the invention shown in FIGS. 6 through 9 is more advantageous than those shown in FIGS. 1 through 4 and FIG. 5, insofar as it requires no driving gears for geared belts and no geared belts having external spikes are necessary, so that the device can be produced, in general, with a smaller number of component parts and with a lower space requirement.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. In a feeding device for tape-type record carriers, perforated at their lateral edges, of the type having spiked rotatable driving elements, arranged in pairs, with the driving elements of each pair having a lateral spacing equal to that of carrier perforations, in a frame having a width preferably at least equal to that of the printing mechanism of a bookkeeping machine, data processing machine and the like, and which feeding de-

vice has a driving means driven by a profiled shaft and mounted in a housing which is displaceable axially along axles of the frame and which has at least one liftable record carrier guide bar: the improvement comprising, in combination, a single said frame having several said profiled shafts rotatably mounted therein in spaced parallel relation; respective externally spiked rotatable driving elements mounted freely rotatably in respective housings which are arranged in pairs in said frame for lateral displacement in said frame; and means connecting the rotatable driving elements of each pair to the same respective profiled shaft for driving of the associated pair of rotatable driving elements by said respective profiled shaft.

2. In a feeding device for tape-type record carriers, the improvement claimed in claim 1, in which said spiked rotatable driving elements are spike belts; said feeding device having a gear belt driving means driven by a profiled shaft and a gear belt guide roller over which is trained a gear belt having spikes on its outer surface engageable with the perforations, each gear belt, trained about the associated guide rollers, being mounted in one of said housings and each housing having, at least in the range of one run of the associated gear belt, a liftable record carrier guide bar; said externally spiked rotatable driving elements comprising gear belts with associated gear belt guide rollers mounted freely rotatable in respective housings; said connecting means connecting a guide roller of each belt of a pair to the same respective profile shaft for driving of the associated pair of belts by said respective profile shaft.

3. in a feeding device for tape-type record carriers, the improvement claimed in claim 2, in which said last named means comprises a pair of gears secured to the respective profiled shaft and each engageable with a respective guide roller of the pair of belts.

4. In a feeding device for tape-type record carriers, the improvement claimed in claim 2, in which each pair of guide rollers is directly connected non-rotatably to said respective profiled shaft.

5. In a feeding device for tape-type record carriers, the improvement claimed in claim 4, in which each spiked gear belt in a housing is trained over at least two gear belt guide pulleys; each gear belt guide pulley being selectively cooperable with a selected one of plural profiled shafts all spaced the same radial distance from the respective guide pulley.

6. In a feeding device for tape-type record carriers, the improvement claimed in claim 5, in which said gear belt guide pulleys are mounted rotatably on respective guide bushes each secured non-rotatably to a guide axle extending through the associated housing; said bushes being displaceable axially of the guide axle.

7. In a feeding device for tape-type record carriers, the improvement claimed in claim 6, in which there are a pair of spaced guide axles; said profiled shafts being arranged between said guide axles; said guide axles and said profiled shafts extending through all of said housings in said frame; a respective gear in each housing; the two gears of each pair of associated housings being non-rotatably mounted on the same profiled shaft; said gears being axially displaceable on the associated profiled shaft; each gear being in engagement with a respective spur gear rim secured to a gear belt guide pulley in the associated housing.

8. In a feeding device for tape-type record carriers, the improvement claimed in claim 2, in which the width of said frame exceeds the width of said printing mechanism by an amount equal to twice the width of the housing of each spiked belt driving means.

9. In a feeding device for tape-type record carriers, the improvement claimed in claim 2, in which each externally spiked gear belt is trained about a number of gear belt guide pulleys equal to the number of gear belt pairs in said frame; each gear belt drive pulley of a respective gear belt being mounted on a respective profiled shaft; one pair of coaxial gear belt guide pulleys of a respective associated pair of gear belts being arranged non-rotatably on the associated profiled shaft, while the other gear belt guide pulleys of the respective gear belt are mounted rotatably on the other profiled shafts.

10. In a feeding device for tape-type record carriers, the improvement claimed in claim 2, including respective guide bars in each housing adjacent the respective runs of the associated gear belt and extending in the direction of movement of the associated gear belt, each guide bar being formed with a slot for uninterrupted movement of the spikes of the associate gear belt therealong; said guide bars maintaining the record carriers engaged with the spikes of the gear belt; and means mounting said guide bars for swinging out of operative relation with the associated runs of the gear belt.

11. In a feeding device for tape-type record carriers, the improvement claimed in claim 10, including axles pivotally mounting said guide bars and extending throughout the width of the frame; each pair of guide bars being displaceable axially of the pivot axles with the associated housing.

12. In a feeding device for tape-type record carriers, the improvement claimed in claim 2, in which said driving means comprises respective variable speed reversible motors driving each profiled shaft.

13. In a feeding device for tape-type record carriers, the improvement claimed in claim 1, in which said spiked rotatable driving elements comprise annular internal gears, having spikes on their external surfaces, rotatably mounted in respective housings; each said housing including a second internal housing coaxial with the associated annular internal gear and rotatably mounting the associated annular internal gear; each internal second housing being mounted on said axles of said frame and having said axles extending therethrough, for axial displacement of each internal second housing along said axles; each internal second housing being formed with respective openings receiving all of said profiled shafts extending parallel to said frame axles; and external gears, each respective to one internal second housing mounted in one of the openings through the associated internal second housing and connected to a respective profiled shaft extending through the last-mentioned opening, each external gear meshing with the associated annular internal gear for driving thereof upon rotation of the associated profile shaft.

14. In a feeding device for tape-type record carriers, the improvement claimed in claim 3, in which there are four profiled shafts and four pairs of said first-mentioned housings; and three guide bushings rotatably mounted in those three openings of each housing not having the associated external gear mounted therein, each guide bushing having a respective profile shaft extending non-rotatably therethrough.

15. In a feeding device for tape-type record carriers, the improvement claimed in claim 14, in which each internal second housing is closed laterally by a pair of plates; each pair of plates having interposed therebetween a frame web apertured to receive a second of said frame axles extending thereto and guided for axial displacement along said second frame axle.

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