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CARTRIDGE FOR A TYPING RIBBON

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(56) Prior Art Documents
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(57) Claim

1. A cartridge for a typing ribbon for typewriters comprising a container , having a bottom wall ; a supply reel which is rotatable in the container ; and a device for tensioning and braking the ribbon , comprising a flange on a lower portion of the supply reel provided with peripheral notches , a stop element engageable selectively with the notches and fixed on a stop member movable in the container between an engagement position in which the stop element locks the supply reel and a disengagement position in which the stop element is disengaged from the notches , a ribbon tensioning lever pivoted in the container and a lost-motion coupling between the tensioning lever and the stop member to move the stop member from the engagement position to the disengagement position after an idle travel movement of the tensioning lever alone , or combined movement of the tensioning lever and the stop member , wherein said tensioning lever is pivoted on a fulcrum in the container , is tensioned by a spring and has an end portion carrying a guide element for the ribbon which is unwound from the supply reel ; characterized in that

the stop member comprises a small stop lever pivotable on a fulcrum in the container adjacent to the notches , in which the spring is also connected with the stop lever to act as a resilient connection between the tensioning lever and the stop lever ;

the tensioning lever has a bearing surface which is confined in a region of said container included between said flange and said bottom wall , wherein the said spring is also confined

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in the said region and wherein the fulcrum on which is pivoted said tensioning lever is positioned adjacent to the axis of rotation of said supply reel ; and

the lost-motion coupling comprises a bearing portion of the small stop lever and said bearing surface of the tensioning lever , in which under rest condition the bearing portion is disengaged from the bearing surface thereby to define the idle travel movement of the tensioning lever , and in which the bearing portion and the bearing surface are capable of coming into engagement in the region of said container included between the said flange and the said bottom wall .

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Complete Specification for the invention entitled:

"CARTRIDGE FOR A TYPING RIBBON"

The following statement is a full description of this invention, including the best method of performing it known to us:-

8591A/bm

TITLE:

CARTRIDGE FOR A TYPING RIBBON

BACKGROUND OF THE INVENTION

(1) FIELD OF THE INVENTION

The present invention relates to a cartridge for a typing ribbon and concerns more particularly a cartridge in which the supply reel has a flange provided with peripheral notches and having a ribbon tensioning lever and stop element engaging with the notches.

(2) DESCRIPTION OF THE PRIOR ART

US-A 4 810 839 discloses a cartridge for a typing ribbon comprising a container or casing for accommodating a supply reel having a flange provided on the outside edge with a series of perpheral notches and a tensioning and stop device comprising a tensioning lever which is pivoted on a pin on the container. The tensioning lever comprises at one end a pin, the lower part of which is co-operable with the series of peripheral notches on the flange of the supply reel while the upper part thereof guides and tensions the typing ribbon by the action of a spring which is applied to the other end of the lever and which is capable of holding the pin in engagement with the space between the series of notches, with the ribbon stationary, and which gives rise to a movement for engagement and disengagement as between the pin and the notches during the feed movement of the ribbon to hold it in a condition of tension in use thereof. The tensioning and stop device is sufficiently operational for typing ribbons which are fairly rigid and robust.

On the other hand, since the lever is reasonably long, it is robust but heavy and, for optimum operation, the spring must also provide a fairly high level of tension for tensioning the ribbon. That device is therefore not suited for ribbons which have very thin deformable supports which are required when large amounts of ribbon are to be used in the cartridge.

SUMMARY OF THE INVENTION

According to the present invention there is provided a cartridge for a typing ribbon for typewriters comprising a container having a bottom wall; a supply reel which is rotatable in the container; and a device for tensioning and braking the ribbon comprising a flange on a lower portion of the supply reel provided with peripheral notches, a stop element engageable selectively with the notches and fixed on a stop member movable in the container between an engagement position in which the stop element locks the supply reel and a disengagement position in which the stop element is disengaged from the notches, a ribbon tensioning lever pivoted in the container and a lost-motion coupling between the tensioning lever and the stop member to move the stop member from the engagement position to the disengagement position after an idle travel movement of the tensioning lever alone or combined movement of the tensioning lever and the stop member, wherein said tensioning lever is pivoted on a fulcrum in the container, is tensioned by a spring and has an end portion carrying a guide element for the ribbon which is unwound from the supply reel; characterized in that

the stop member comprises a small stop lever pivotable on a fulcrum in the container adjacent to the notches, in which the spring is also connected with the stop lever to act as a resilient connection between the tensioning lever and the stop lever;

the tensioning lever has a bearing surface which is confined in a region of said container included between said flange and said bottom wall, wherein the said spring

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is also confined in the said region and wherein the fulcrum on which is pivoted said tensioning lever is positioned adjacent to the axis of rotation of said supply reel; and

the lost-motion coupling comprises a bearing portion of the small stop lever and said bearing surface of the tensioning lever, in which under rest condition the bearing portion is disengaged from the bearing surface thereby to define the idle travel movement of the tensioning lever, and in which the bearing portion and the bearing surface are capable of coming into engagement in the region of said container included between the said flange and the said bottom wall.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features of the invention will be clear from the following description, which sets forth a preferred embodiment of the invention, which is given by way of non-limiting example, with reference to the accompanying drawings in which:

Figure 1 is a plan view of part of a cartridge according to the invention,

Figure 2 is a plan view of a cartridge, shown in Fig.1, illustrating some features thereof,

Figure 3 is a plan view of a first alternative embodiment of the cartridge shown in Figure 1, illustrating some features thereof,

Figure 4 is a side view of the Figure 2 cartridge, showing some features thereof,

Figure 5 is a side view of part of the Figure 3 cartridge, showing features thereof, in an operating position,

Figure 6 is a side view of part of the cartridge shown in Figure 1,

Figure 7 is a front view of part of the Figure 5 cartridge showing some features thereof, on an enlarged scale,

Figure 8 is a plan view of part of the Figure 5 cartridge, seen from below, showing some features thereof,

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Figure 9 is a side view of part of the Figure 3 cartridge, showing some features thereof, on an enlarged scale,

Figure 10 is a diagrammatic view in section of details from Figure 9,

Figure 11 is a view in section of other features from Figure 9,

Figure 12 is a logic diagram of the electronic control system for the cartridge according to the invention,

Figure 13 is a plan view of part of a second alternative embodiment of the cartridge shown in Figure 1,

Figure 14 is a plan view of part of the Figure 13 cartridge, showing further features thereof, seen from below, and

Figure 15 is a side view of some features from Figure 13, on an enlarged scale,

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figures 1, 4, 5 and 6, a cartridge for a typing ribbon is generally indicated by reference numeral 11 and comprises a container 12 for accommodating a typing ribbon 13, 13a which may be of single-strike, correctable or non-correctable, carbon type, with a support of polyethylene, and of multi -strike type with a support of nylon, as indicated at 13b, and of inked type 13c with a fabric support.

A cartridge for a correction ribbon is generally indicated by 14 and can accommodate a correction ribbon 16 which may be of the lift-off cancellation type which is suited to the typing ribbon of correctable type, and of the cover-up correction type which is suitable for the typing ribbon of the non-correctable type of the various types of polyethylene, nylon or fabric. The correction cartridge 14 can be removably fixed to the lower part of the container 12 by engagement means indicated generally at 17. Coupling means which are generally indicated at 18 prevent the engagement means 17 from working when the ribbons are not compatible with each other. Fixing means which are generally indicated at 19 removably fix the container 12 on a support 21 of the typewriter either individually or in conjunction with the correction cartridge 14. The engagement means 17, the coupling means 18, the fixing means 19 and the correction cartridge 14 have been described and illustrated in diagrammatic and highly simplified form in order not to complicate the description and drawings, but they are substantially similar to those described in Italian patent application No 67132-A/88 filed on 22nd February 1988 in the name of the present applicants and which is therefore incorporated into this description.

The cartridge 11 (see Figure 1) is mounted on a typewriter, for example an electronic typewriter, comprising a conventional platen roller 22, a character-carrying disc 23 and a striker 24. The roller 22, the disc 23 and the striker 24 are known per se and have been described and illustrated in diagrammatic and highly simplified form in order not to complicate the description and drawings. The cartridge 11

comprises the container 12 of plastics material having a bottom 26 and two rear walls 27 and 28 for rearwardly defining a space 29 for accommodating the character-carrying disc 23 and the striker 24, which are disposed in front of the platen roller 22 which defines a point of typing 31 (see Figure 5). The container 12 (see Figure 1) is closed upwardly by a substantially flat cover 32 and is defined by a front wall 33 and side walls 34 and 36. The container 12 comprises two arms 37 and 38 which project from the rear walls 27 and 28 and have two openings 39 and 41 respectively to permit the typing ribbon 13 to pass therethrough. The bottom 26 is provided with a step 40 which is parallel to the wall 33 and equidistant between the ends of the arms and the wall 33, which defines with the cover 32 a volume of a thickness which is slightly greater than the height of the ribbon at the arms 37 and 38 and a volume which is much greater in the region between the step 40 and the wall 33.

The container 12 (see Figures 1 and 2) is capable of accommodating a supply reel for the ribbon 13a, 13b, as indicated generally at 42, which in the lower part has a flange 43 provided on the outside edge with a compact tooth arrangement 44 which is uniformly distributed over the whole of its outside edge, and a tubular portion 46 which is fixed with respect to and integral with the flange 43, being rotatable on a pin 47 on the bottom 26. The tubular portion 46 comprises a hub 48 which projects downwardly beyond the flange 43 and which is normally supported on a shoulder 49 on the bottom 26, concentric to the pin 47, in the region of increased thickness of the container 12.

A tensioning and stop device comprises a lost-motion mechanism which is generally indicated by 51 and which comprises a stop lever 52 and a tensioning lever 53. The stop lever 52 is pivoted on a pin 54 on the bottom 26 adjacent to and outside the flange 43 and comprises a first arm 56 provided at the end with a bearing peg 57 and a second arm 58 provided at the end with a wedge-shaped stop element 59 capable of engaging without play into the spaces defined by the teeth 44 on the

flange 43. The tensioning lever 53 is pivoted on a pin 61 on the bottom 26 adjacent to the pin 47 and comprises a first arm 62 having a side surface co-operable with the peg 57 on the stop lever 52 and being provided at the end with a guide pin 63 for engaging and guiding the typing ribbon 13a and 13b with a tensioning and loop take-up function.

The lever 53 further comprises a limb 64 which projects downwardly and which is opposite to the pin 63, being accommodated in a space 66 in the bottom 26 in order in use to actuate a signalling lever 67 of the machine such as to signal the end of the ribbon 13 which is wound on the supply reel 42. The tensioning lever 53 comprises a second arm 68 which is normally supported on a projecting guide 69 on the bottom 26 to guide the tensioning lever 53 during the rotary movement thereof. The projecting guide 69 is in the form of a sector of a circle and terminates with a shoulder 71 for arresting the second arm 68 after the signalling lever 67 has been actuated. The lever 53 with its pin 63 and the arm 56 of the lever 52 with its peg 57 are confined between the bottom 26 and the flange 43 in the volume of the container 12 which is of greater thickness.

The stop lever 52 and the tensioning lever 53 which are already of small dimensions are produced using materials which are of very low specific weights and they are thus of very limited inertia. A spring 72 is disposed between the second arm 58 of the stop lever 52 and the second arm 68 of the tensioning lever 53 in order to urge the arm 62 in an anticlockwise direction towards an end-of-travel position against the wall 36 and to urge the lever 52 in a clockwise direction for engagement of the wedge-shaped member 59 with the teeth 44.

The above-defined structure makes it readily possible to use ribbons 13a of small thickness, about 8 microns, in comparison with the normal value of about 14 microns, and large amounts of ribbon which are wound on the reel with substantial variations in respect of the reel from the full reel condition to the empty reel condition. In particular

the spring 72 produces a low, predetermined tension which does not cause the ribbon 13a to stretch, while optimising tensioning of the typing ribbon 13 and engagement of the wedge-shaped element 59 with the spaces between the teeth 44.

The stop lever 52 is of plastics material and the tensioning lever 53 is of zamak.

Both when the cartridge 11 has been removed from the machine and when it is fitted to the machine and the typing ribbon 13a, 13b is not caused to advance, as in quick tabulating movements, the tensioning and stop device 51 is in the position shown in Figures 1 and 2. The wedge-shaped element 59 is engaged without play in a space between the teeth 44 and the first arm 62 of the tensioning lever 53 is slightly spaced from the pin 57 on the stop lever 52 and permits an idle tensioning travel movement of the lever 53. The typing ribbon 13a, 13b which is unwound from the reel 42 is guided around the roller 73 and engages and is guided around the pin 63 of the tensioning lever 53 and subsequently issues from the opening 41 to extend parallel to the platen roller 22.

As the ribbon 13 is caused to advance, as described hereinafter, in anticipation of or after printing of a character, the tension in the ribbon 13 causes rotation in the clockwise direction of the tensioning lever 53 which after a short travel movement engages by means of its first arm 62 against the peg 57 in a zone which is aligned between the pins 54 and 61, and causes rotary movement in the anticlockwise direction of the stop lever 52 against the force of the spring 72. By rotating in the anticlockwise direction, the stop lever 52 disengages the wedge-shaped element 59 from the teeth 44. The supply reel 42 can thus rotate in the anticlockwise direction and permits the ribbon 13 to be unwound from the supply reel 42. Even when the typing ribbon 13 is moved with a continuous movement, the tension of the spring 72 causes the levers 52 and 53 to perform an intermittent movement in the anticlockwise direction and in the clockwise direction, over short distances, to keep the ribbon 13 tensioned in front of the point of

the point of typing, with a feed movement with a strictly constant stepping motion. As the ribbon 13 ceases to advance, the tension of the spring 72 removes from the reel 42 that amount of ribbon which is sufficient to move the tensioning and stop device 51 into the rest condition, with the wedge-shaped element 59 engaged into a space between the teeth 44 and with the ribbon 13 properly tensioned. To improve the movement of the ribbon 13a, 13b, the ribbon additionally bears against rollers 60 which are supported rotatably by the arms 37 and 38 adjacent the openings 39 and 41.

When the ribbon 13 has been completely unwound from the supply reel 42, the tension in the ribbon, the end of which is fixed to the hub 46, causes the tensioning lever 53 to rotate in a clockwise direction into an over-travel position in which the limb 64 engages the signalling lever 67, causing it to rotate until it actuates a switch 76 (see Figure 12), thereby signalling an end-of-ribbon condition to an electronic control unit 77 of the machine. The electronic control unit 77 then causes the motor 78 to stop, and thus terminates the unidirectional feed movement of the typing ribbon 13.

The container 12 (see Figures 1, 2, 3 and 5) is also capable of accommodating a receiving reel which is generally indicated at 81 and which is rotatable on a pin 82 on a support lever 83. The lever 83 has a sleeve portion at 84 rotatable on a pin 86 on the bottom 26 and on a peg 87 on the cover 32, which is coaxial with the pin 86, in the region of the container 12 which is of greater height. The lever 83 comprises a first arm 89 from which the pin 82 projects and a second arm 91 which is disposed at approximately 90° from the first arm 89. The lever 83 is supported and guided by means of the two arms 89 and 91 on two corresponding guide ribs 92 and 93 which are in the shape of sectors of a circle and which project from the bottom 26, for translatory movement parallel to the bottom 26, as the turns of the ribbon 13 which are wound on to the receiving reel 81 increase, against the action of resilient means 94.

The resilient means 94 comprise a wire spring having a series of turns which are concentric with the sleeve 84 and which terminate with two arms 96 and 97 which are respectively arranged to engage a shoulder 98 on the container 12 and a shoulder 99 on the lever 83, to hold the lever 83 always in a condition of being rotated in the clockwise direction, with the receiving reel 81 engaged with a wheel 101 having straight teeth, of a feed roller assembly as indicated at 102.

The feed roller 102 comprises a small notched wheel 103 which partially projects from the cover 32 for manual feed movement of the ribbon 13, the toothed wheel 101 capable of co-operating with the ribbon 13a which is wound on to the receiving reel 81 in order to wind the ribbon 13 thereonto, a wheel 104 with sawtooth-shaped teeth, capable of co-operating resiliently with a stop element 106 fixed on the bottom 26 to prevent reverse motion of the roller 102, and a coupling arrangement 107 (see Figure 9) which can be coupled to a drive shaft or spindle 108 (see Figure 5). The drive shaft 108, the coupling arrangement 107 and the support 21 are described and illustrated in diagrammatic and highly simplified form in order not to complicate the description and drawings, but they are substantially similar to those described in US patent No 4 637 744 which is therefore incorporated into this description. The drive shaft 108 is driven in rotation by constant increments by the motor 78 (see Figure 12) which in turn is controlled by the electronic control unit 77 of the machine and causes unidirectional feed movement of the ribbon 13.

The container 12 (see Figures 1, 2, 3 and 5) comprises a protective rib 109 which projects inwardly of the bottom 26 and which is positioned adjacent to the periphery of the flange 43, and its upper edge is in the same plane as the upper surface of the arm 89 and the lower edge of the turns of the ribbon 13 which are wound on the receiving reel 81. Therefore, as the turns of the ribbon 13 which is wound on the receiving reel 81 increase, said turns are supported against the upper edge 111 of the rib 109, thus avoiding any contact with the teeth 44 of the supply reel 42.

The typing ribbon 13a, 13b (Figure 1) is unwound from the supply reel 42, guided around the roller 73, engages with and is guided around the pin 63 on the tensioning lever 53, issues from the opening 41 and, guided by the rollers 60, is disposed parallel to the platen roller 22. The ribbon 13a, 13b then re-enters through the opening 39, is guided firstly around the fixed pin 112 and then around a roller 113 which is rotatable on a pin 114 and is then engaged with and wound on to the receiving reel 81. In the alternative embodiment shown in Figures 3 and 9, the ribbon which re-enters the cartridge through the opening 39 is guided around a roller 116 which is rotatable on a pin 117 and then around two fixed pins 118 and 119. From there the ribbon is passed forwardly to the roller 101 by way of a column portion 121, a rib 122, a second fixed column portion 123 and a roller 124 which is rotatable on a pin 126 and is thus re-wound on to the receiving reel 81. In Figure 3 the dash-dotted line indicates an alternative path of movement of the ribbon 13, in comparison with those described above.

In the above-described cartridges 11 (see Figures 1, 2 and 3) which use a single-strike typing ribbon 13a of erasable or correctable type and of single-strike non-erasable type, with a polyethylene support, the unidirectional feed movement of the ribbon 13 is produced by means of direct coupling of the roller assembly 102 to the drive shaft 108. The rotational increments of the shaft 108 produce a movement of the ribbon 13 after printing of the characters, which is a little greater than the width of the character. Since however the multi-strike ribbon 13b permits a plurality of characters to be struck on the same part of the ribbon, the feed movement roller assembly which is suited for the multi-strike ribbon with a nylon support as generally indicated at 102' in Figures 9, 10 and 11 is of a structure which is different from that for the single-strike ribbon and besides the notched wheel 103 and the coupling arrangement 107 which are synchronous with the shaft 108, further comprises a speed reducing mechanism which is generally indicated at 131 for substantially

reducing the turns of the toothed wheels 101 and 104 relative to the turns of the drive shaft 108 and the coupling arrangement 107.

In the assembly 102', the notched wheel 103 comprises a hub 132 having an internal seat 133. The wheel 101 with the straight teeth and the wheel 104 with the sawtooth-shaped teeth are fixed on a sleeve 134 which is rotatable on the hub 132 and comprises two pin portions 136 which project downwardly and in opposite relationship to the wheel 103. The coupling arrangement 107 is received internally of a tubular portion 137 which comprises a cylindrical flange 138 and a shaft portion 139 projecting from the flange 138 and having a first toothed portion so as to define a pinion 140 and a second cylindrical portion 141 which is capable of being press-fitted into the internal seat 133 in the hub 132. The reducing mechanism 131 comprises two toothed wheels 142 which are rotatable on the pin portions 136 and which are always in mesh with the pinion 140. A seat 143 in the bottom 26 of the container 12 comprises a toothed ring 144 which is always engaged with the toothed wheels 142 which are rotatable on the pin portions 136 and which are thus accommodatd between the upper part of the cylindrical flange 138 and the lower part of the sleeve 134. The seat 143 comprises two cylindrical, coaxial openings 146 and 147 which are provided below the toothed ring 144, for respectively accommodating the cylindrical flange 138 and the tubular portion 137 to guide the roller assembly 102'.

The reducing mechanism 131 constitutes an epicyclic gear train in which the pinion 140 constitutes the sun gear, the toothed wheels 142 constitutes the planet gears, and the toothed ring 144 constitutes the ring gear, the mechanism being capable of reducing the turns of the toothed wheel 101 with respect to the turns of the drive shaft 108 in dependence on the transmission ratio between the number of teeth on the pinion 140 and the number of teeth on the toothed ring 144. In order to optimise use of the multi-strike typing ribbon 13b, the ratio between the turns of the drive shaft 108 and the turns of the toothed wheel 101

is 4.8:1, that is to say the drive shaft 108 performs 4.8 revolutions while the toothed wheel 101 performs one revolution. That is acheived with a pinion 140 having 8-10 teeth, which makes it possible to have a toothed roller assembly 102' of dimensions which are no greater than those of the roller assembly 102. As already referred to and described above, by varying the transmission ratio the value of the ratio 4.8:1 is also varied. In addition as is clearly visible from the drawings the reducing mechanism 131 does not interfere with the path of movement of the ribbon 13b, or with the ribbon 13b which is being wound on to the receiving reel 81 again.

In order further to simplify the above-described cartridge, all the containers 12 provide the seat 143 having the toothed ring 144. At the time of assembly containers 12 which are intended to accommodate typing ribbons 13a of correctable and non-correctable type, of polyethylene, are assembled with the roller 102 while containers 12 which are intended to accommodate typing ribbons 13b of multi-strike non-correctable type of nylon are assembled with the roller 102' having the reducing arrangement 131.

The cartridge 11 may be removably fixed to the support 21 (see Figure 4) by the fixing means 19 or by means of a travel-amplifying arrangement as indicated generally at 156 (see Figures 1,2,5,7,8 and 13).

Two lugs 157 project from the front wall 33 of the container 12 and capable of engaging in respective hook portions 158 on the support 21. The arrangement 156 is disposed on an intermediate wall 159 between the arms 37 and 38 and comprises an upper element 161 capable of being manually engaged for actuation purposes, being provided at its end with two flexible lateral blade portions 162 and 163 which connect the upper element 161, by means of two lower edges 164 and 166, to a lower part of the intermediate wall 159. An intermediate projection 167 on the upper element 161 engages a resilient blade portion 168 which is

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positioned between the flexible side blade portions 162 and 163. The resilient blade portion 168 has its upper end integral with an upwardly projecting edge 169 of the intermediate wall 159 and the lower end 171 in the form of a hook configuration for engagement with a fixed shoulder 172 on the support 21. With a small movement of the upper element 161, the travel-amplifying arrangement 156 produces a corresponding large movement of the hook portion 171, thus making it easier to fit the container 12 to and remove it from the support 21.

Figures 13, 14 and 15 concern a cartridge 11a which can accommodate an inked typing ribbon 13c of the fabric type. The cartridge 11a has portions for interfacing with the typewriter which are the same as those of the cartridge 11 described hereinbefore and which are denoted by the same reference numerals. The container 12 comprises a magazine 181 of constant height for accommodating the inked ribbon 13c which is of the closed loop type disposed in randomly distributed turns.

A feed roller 182 is rotatable in the container 12 and comprises a shaft portion 183 which can be coupled by way of the coupling arrangement 107 to the drive shaft 108, and the notched wheel 103, and a toothed wheel 187 which is fixed on the shaft portion 183 and a sleeve 184 which is freely rotatable about the shaft portion 183.

A feed wheel 189 comprises at its ends two hubs 191 and 192 which are rotatable on pins 196 and 197 of the container 12, a toothed ring 198 engaged with the toothed wheel 187, and two elastic rings 199 mounted on two grooved flanges 200 and 201 for the feed movement of the ribbon 13c. The flange 201 is provided in its lower part with a radial tooth arrangement 204. A resilient blade portion 206 provided by the bottom 26 has a tooth 207 for engaging the tooth arrangement 204 to prevent reverse rotary movements of the wheel 189.

A pressure wheel 208 which is substantially identical to the first wheel 189 is slidable by means of the hubs 191 and 192 in guides 209 on the cover 32 and the bottom 26, and a fixed separator 202 of the

container 12 and a movable separator 210 are arranged to disengage the inked ribbon 13c from the rings 199. A blade spring 211 co-operates with the movable separator 210 to hold the pressure wheel 208 in constant contact with the feed wheel 189 in such a way that the ribbon 13 remains pinched between the rings 199.

The inked ribbon 13c issues from the magazine 181, is guided around three fixed pins 212, co-operating with a tensioning spring 213, and issues from the opening 41. It passes in front of the platen roller 22 (see Figure 1), returns into the cartridge through the opening 39 (see Figures 13 and 15), is guided around a rotatable roller 214 and around the sleeve 184 and then, remaining in contact with the rings 199, is re-introduced into the magazine 181 by means of the wheels 189 and 208.

It will be appreciated that modifications and improvements may be made in the cartridges 11 for the typing ribbon 13, both in regard to the form and the arrangement of the various elements and parts, without thereby departing from the scope of the present invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A cartridge for a typing ribbon for typewriters comprising a container, having a bottom wall; a supply reel which is rotatable in the container; and a device for tensioning and braking the ribbon comprising a flange on a lower portion of the supply reel provided with peripheral notches, a stop element engageable selectively with the notches and fixed on a stop member movable in the container between an engagement position in which the stop element locks the supply reel and a disengagement position in which the stop element is disengaged from the notches, a ribbon tensioning lever pivoted in the container and a lost-motion coupling between the tensioning lever and the stop member to move the stop member from the engagement position to the disengagement position after an idle travel movement of the tensioning lever alone or combined movement of the tensioning lever and the stop member, wherein said tensioning lever is pivoted on a fulcrum in the container, is tensioned by a spring and has an end portion carrying a guide element for the ribbon which is unwound from the supply reel; characterized in that

the stop member comprises a small stop lever pivotable on a fulcrum in the container adjacent to the notches, in which the spring is also connected with the stop lever to act as a resilient connection between the tensioning lever and the stop lever;

the tensioning lever has a bearing surface which is confined in a region of said container included between said flange and said bottom wall, wherein the said spring is also confined in the said region and wherein the fulcrum on which is pivoted said tensioning lever is positioned adjacent to the axis of rotation of said supply reel; and

the lost-motion coupling comprises a bearing portion of the small stop lever and said bearing surface of the tensioning lever, in which under rest condition the bearing portion is disengaged from the bearing surface thereby to define the idle travel movement of the tensioning lever, and in which the bearing portion and the bearing surface are capable of coming into engagement in the region of said container included between the said flange and the said bottom wall.

2. A cartridge according to claim 1, characterized in that said bearing portion engages said bearing surface in a zone substantially aligned between the fulcrum of the small stop lever and the fulcrum of the tensioning lever.

3. A cartridge according to claim 1, characterized in that the stop lever comprises a pair of arms of which one arm carries

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the stop element and the other arm carries a peg portion which constitutes the bearing portion, in which the tensioning lever comprises the bearing surface to free end of which is fixed the ribbon guide element with a take-up function during the unidirectional feed movement of the ribbon , and in which the single spring is fixed between a projection on the stop lever and a projection on the tensioning lever .

4. A cartridge according to claim 3, characterized in that the tensioning lever comprises a bearing element which cooperates with a signalling lever of the machine to signal the end of the ribbon which is wound on the supply reel in an over-travel condition of the tensioning lever .

5. A cartridge according to claim 4, characterized in that said bearing element comprises a limb which projects from the bearing surface but on the opposite side with respect to the ribbon guide element and in which the limb is accomodated in a space in the bottom of the container to actuate the signalling lever in the over-travel condition of the tensioning lever .

6. A cartridge according to claim 5, characterized in that said tensioning lever comprises a second arm to which the single spring is connected and by means of which the tensioning lever bears against and is guided on a guide projecting from the bottom of the container .

7. A cartridge according to claim 6, characterized in that the guide is in the form of a sector of a circle and terminates with a shoulder which engages the second arm for arresting the tensioning lever after the signalling lever has been actuated.

8. A cartridge according to any of the preceding claims, characterized in that the tensioning lever and the stop lever are pivoted on corresponding pin portions projecting from the bottom of the container , and wherein the tensioning lever and stop lever are of small dimensions, are produced using materials of low specific weight respectively zinc and aluminium alloy and plastic material and are thus of very limited inertia.

9. A cartridge for a typing ribbon for typewriters comprising a drive shaft for the unidirectional feed movement of the ribbon according to claim 1, wherein the container comprises a receiving reel for the ribbon , a roller which can be coupled to the drive shaft for the feed movement of the ribbon and has a toothed wheel projecting upwardly from the container for the unidirectional feed movement of the ribbon , a support lever which is pivotable in the container and on which the receiving reel is rotatable, and resilient means which act on the support lever to hold the most outward turns of ribbon which is wound on to the receiving reel in engagement with the toothed wheel , characterized in that the support lever comprises a first arm having a pin portion on which the receiving reel is rotatable and a second arm disposed at about 90° with respect to the first arm

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, in which the support lever by means of at least one of the two arms is supported on and guided by a corresponding guide rib means which project from the bottom of the container , and in which said two arms are movable with a traslatory movement parallel to the bottom against the force of the resilient means and without impediment as the turns of the ribbon which is wound on the receiving reel increase.

10. A cartridge according to claim 9, characterized in that both arms are guided by a guide rib projecting from the bottom of the container .

11. A cartridge according to claim 9 or 10, characterized in that the support lever comprises a sleeve to which the said two arms are fixed and having a central hole for being pivotally mounted in its lower part on a pin portion projecting from the bottom of the container and in its upper part of a peg portion projecting from the cover of the container, the pin portion and peg portion being coaxial.

12. A cartridge according to claim 11, characterized in that the resilient means comprise a spring having a series of concentric turns pivotally disposed on the sleeve and two arms which are capable of respectively engaging a shoulder on the container and a shoulder on the lever for holding the support lever in a constantly rotated position with the receiving reel urged towards the toothed wheel .

13. A cartridge according to claim 1 and claim 9, characterized in that the receiving reel is devoid of flanges and the container comprises a protective rib means adjacent to the notches of the flange of the supply reel , in which the upper edge of the protective rib means is in the same plane as the upper part of the first arm of the support lever for guiding the turns of the ribbon which is wound on the receiving reel and preventing any contact of those turns with the notches , and in which the second arm is guided by the corresponding guide rib means and is confined between the flange and the guide rib means .

14. A cartridge for a multi-strike typing ribbon for typewriters of the type having a single drive shaft for the unidirectional feed movement of the ribbon according to claim 1, in which the container comprises a receiving reel for the ribbon rotatable and displaceable within the container , a roller capable of being coupled to the drive shaft for the unidirectional feed movement of the ribbon , a toothed wheel carried by the roller and resilient means urging the receiving reel in such a way that the outward turns of the ribbon are in the engagement with the toothed wheel , characterized by a wheel having sawtooth-shaped teeth and connected by rotary movement to said toothed wheel and cooperable with a stop element supported resiliently by the container to prevent rotary movement of the roller in the opposite direction to the direction of unidirectional feed movement of

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the ribbon .

15. A cartridge for a multi-strike typing ribbon for typewriters comprising a drive shaft for the unidirectional feed movement of the ribbon according to claim 1, in which a drive roller assembly comprises a coupling member which is rotatable on the container and can be coupled to the drive shaft to be rotated incrementally by the drive shaft , and a drive roller provided with a toothed wheel which can be coupled to the ribbon for the feed movement thereof, characterized by an epicyclic transmission arrangement comprising: as the sun gear a pinion disposed in an intermediate portion of a driven shaft of the coupling member ;

as the ring gear a toothed ring having internal teeth provided on the bottom of the container ; and

as the planet gear two toothed rollers which are rotable on corresponding pin portions carried by the drive roller , and in which the drive roller is rotatable about another terminal portion of the driven shaft .

16. A cartridge according to claim 15, characterized in that the said drive roller assembly comprises a wheel with notches projecting at the top from the container for manual feed movement of the ribbon , and in which the drive roller carries a wheel with sawtooth-shaped teeth for cooperating with a resilient stop element of the container to prevent reverse motion of the drive roller .

17. A cartridge according to claim 16, characterized in that the notched wheel comprises a shaft portion having an internal seat , in which the drive roller comprises a sleeve on which the toothed wheel and the wheel with sawtooth-shaped teeth are fixed, said sleeve is rotatable on the said shaft portion and carries the said pin portions , and in which the coupling member comprises as coupling member a tubolar portion which in its upper part comprises a cylindrical flange , the pinion and a cylindrical portion projecting from the pinion engaging a press fit in the internal seat of the shaft portion .

18. A cartridge according to claim 17, characterized in that the said two toothed rollers are rotatable between the upper part of the cylindrical flange and a lower surface of the sleeve , and in which the bottom comprises two cylindrical coaxial seats provided below the toothed ring for rotatably supporting the cylindrical flange and the tubolar portion .

19. A cartridge for a typing ribbon for typewriters of the type having a support according to claim 1, in which the cartridge is positioned on the support and the container comprises two projecting arms for positioning an external portion of the ribbon parallel to a platen roller , and engagement means for removably fixing the container on the support , characterized by travel-amplification arrangement which is disposed on an intermediate wall of the container between said two arms

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and comprises a flexible limb projecting downwardly from an upper edge of the container and having a hook for engaging a corresponding fixed hook on the support , and in which the travel-amplification arrangement for controlling the flexible limb comprises two flexible blade portions which project upwardly from a lower part of the intermediate wall at the sides and rearward of said flexible limb and are provided in turn with an upper projection capable of being manually engaged to flex said two blade portions and an intermediate projection adjacent to the upper projection and for engaging the flexible limb in a region adjacent to the upper edge to flex the flexible limb frontwardly in response to a frontwardly flexing of the said flexible limb .

Dated this 12th day of December 1991.

ING. C. OLIVETTI & C. S.p.A.
By their Patent Attorneys
GRIFFITH HACK & CO.

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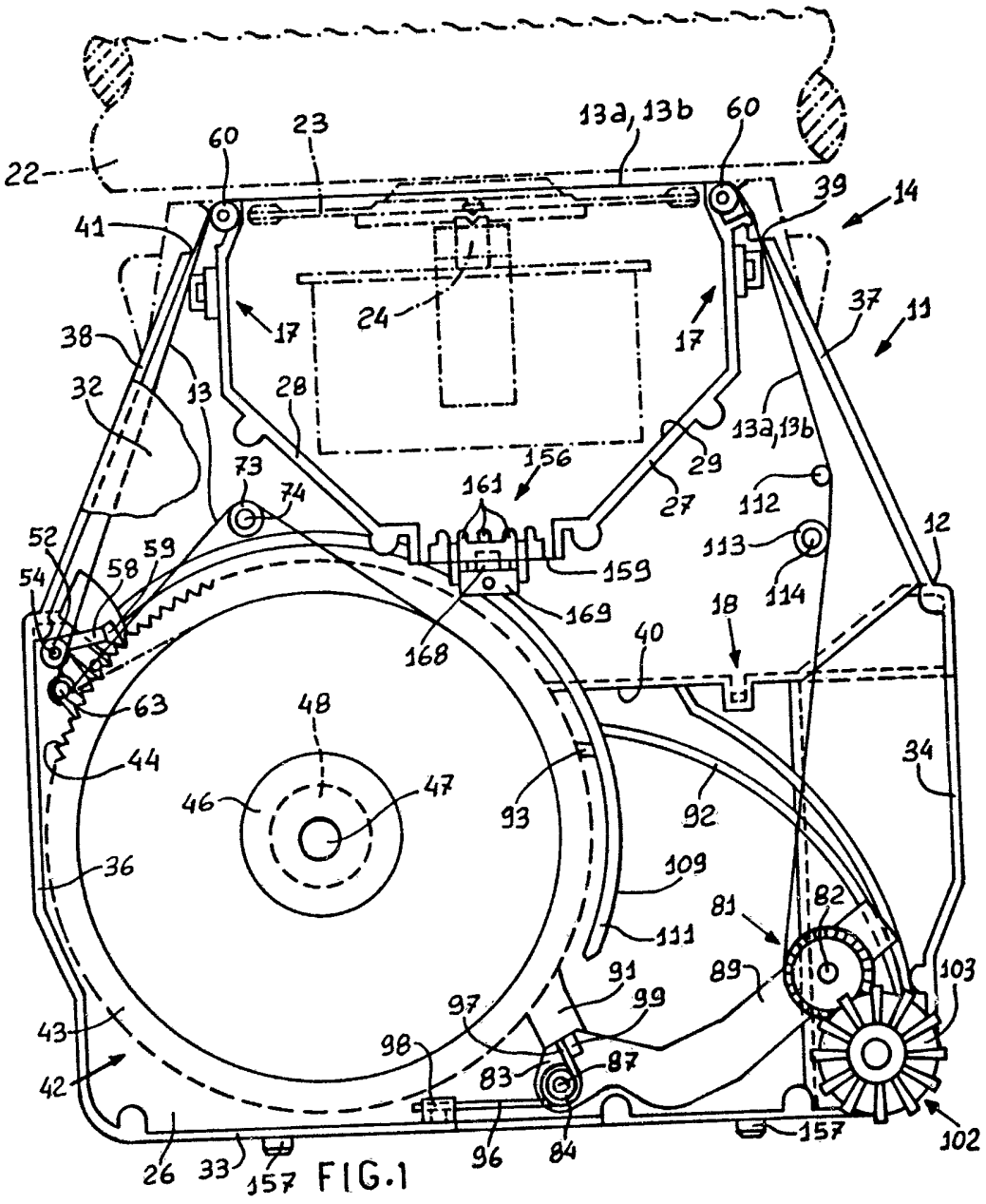
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FIG.1

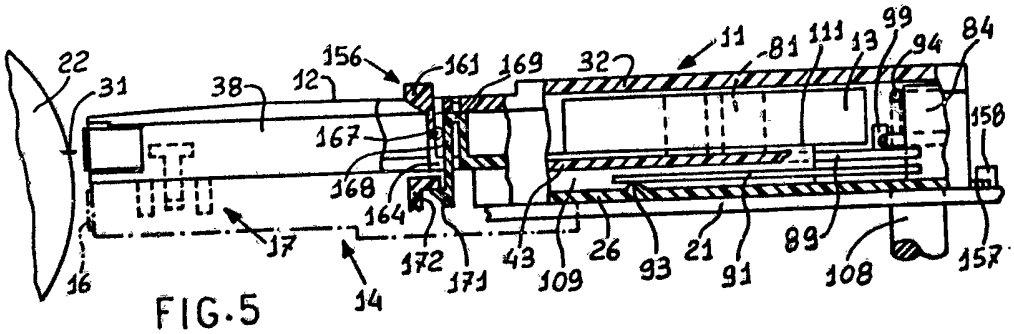
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FIG.5

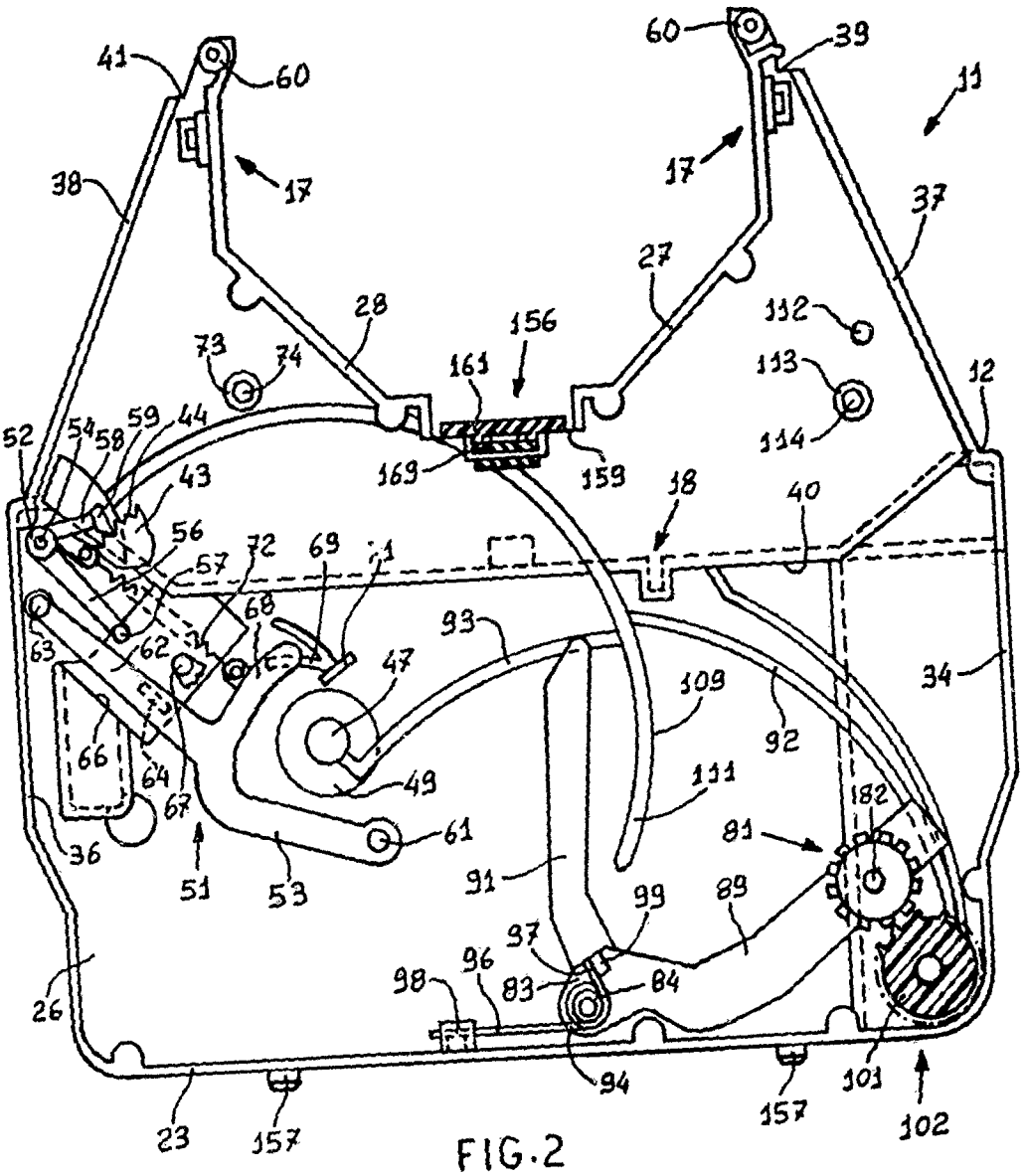
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FIG.2

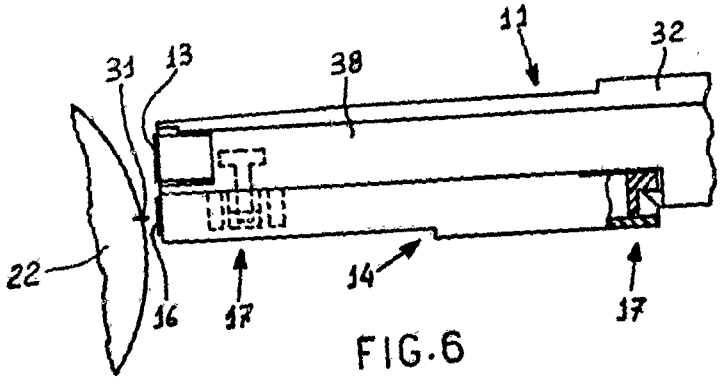
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FIG.6

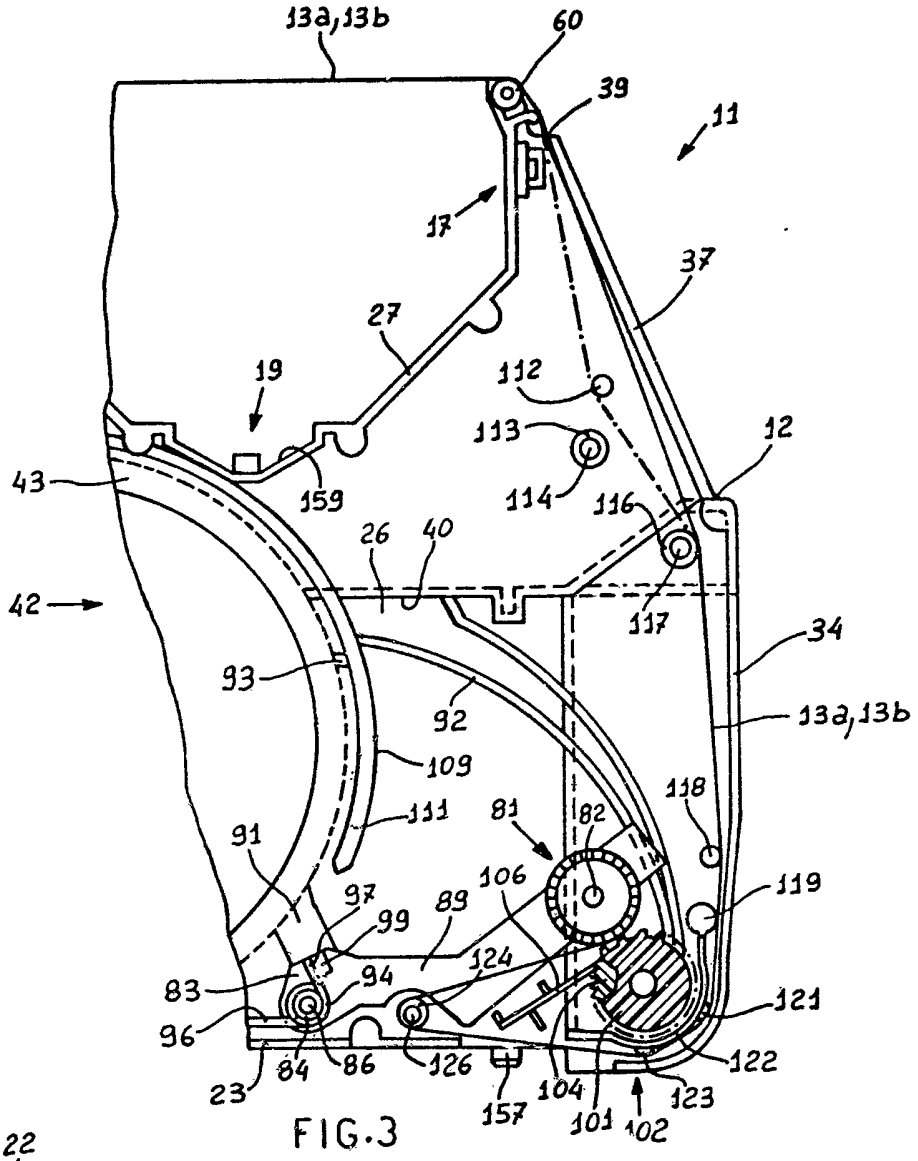
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FIG.3

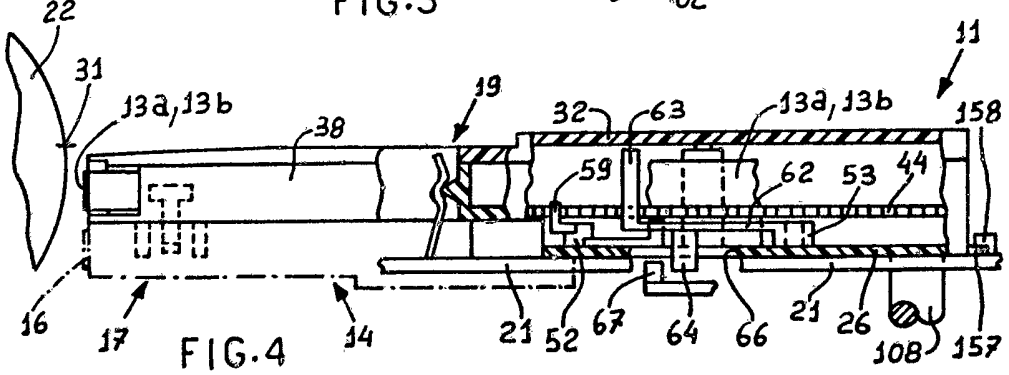
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FIG.4

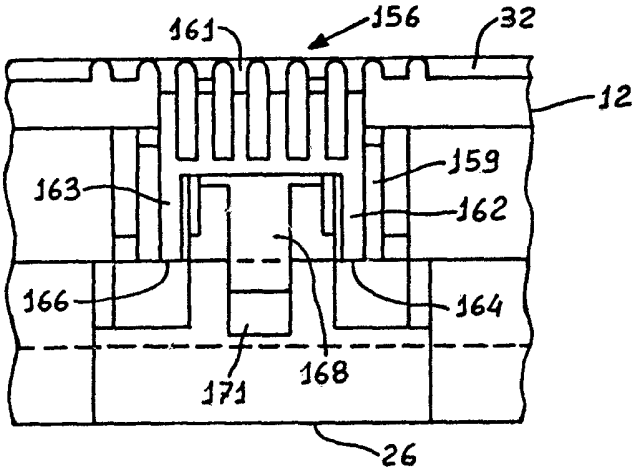

FIG.7

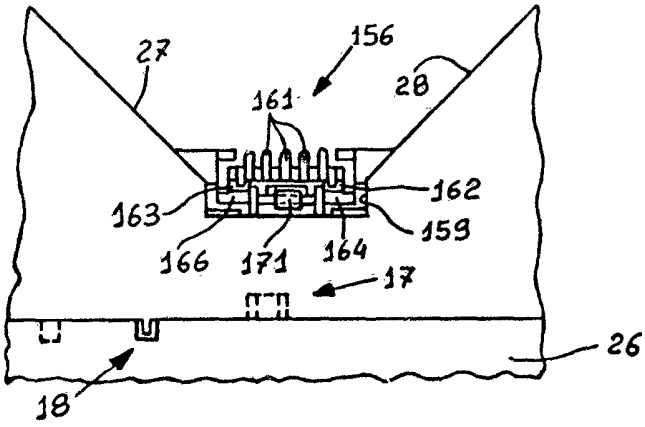

FIG.8

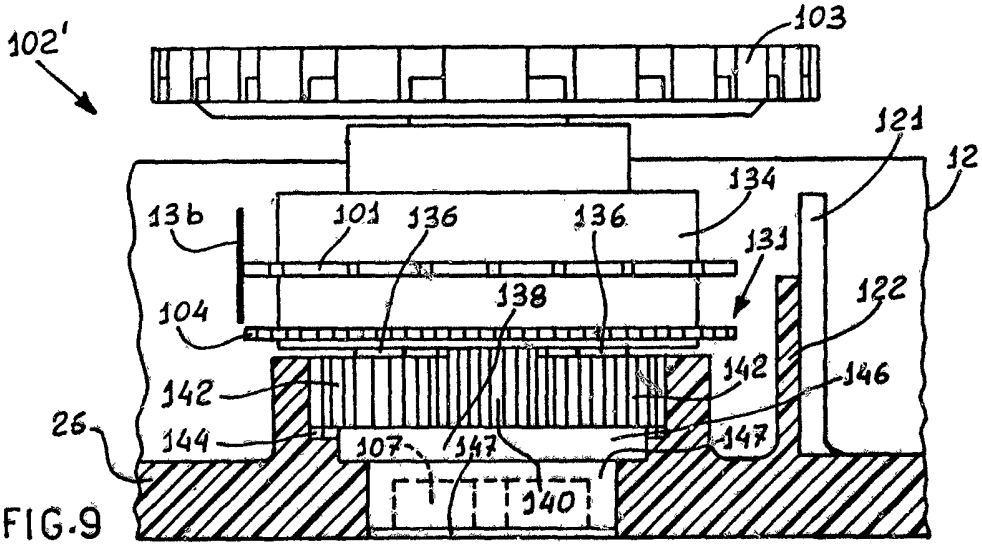

FIG.9

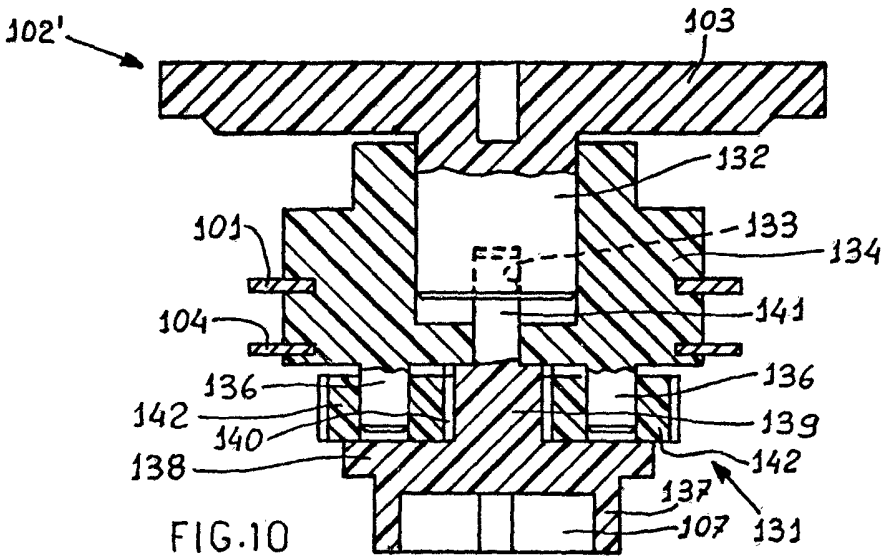

FIG.10

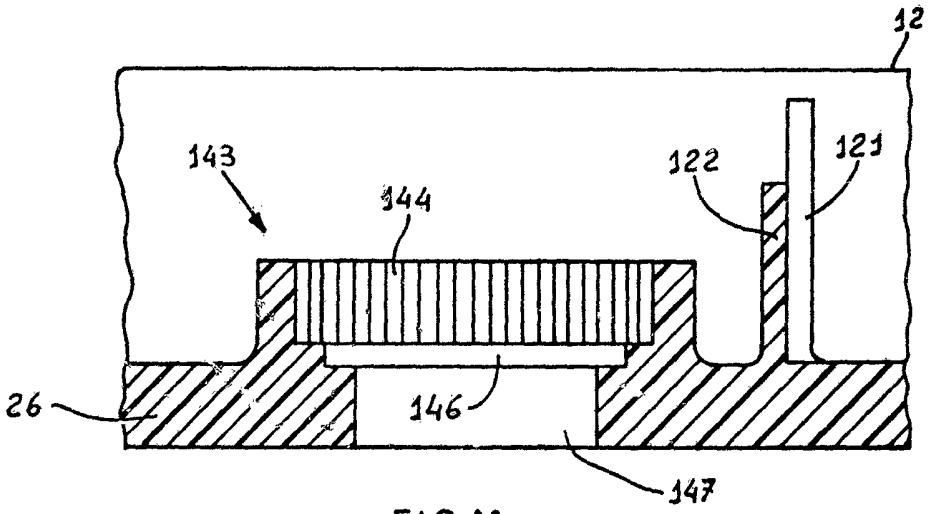

FIG.11

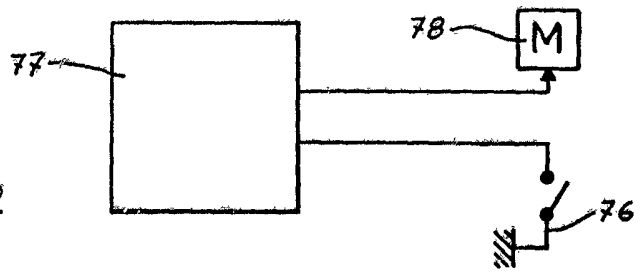

FIG.12

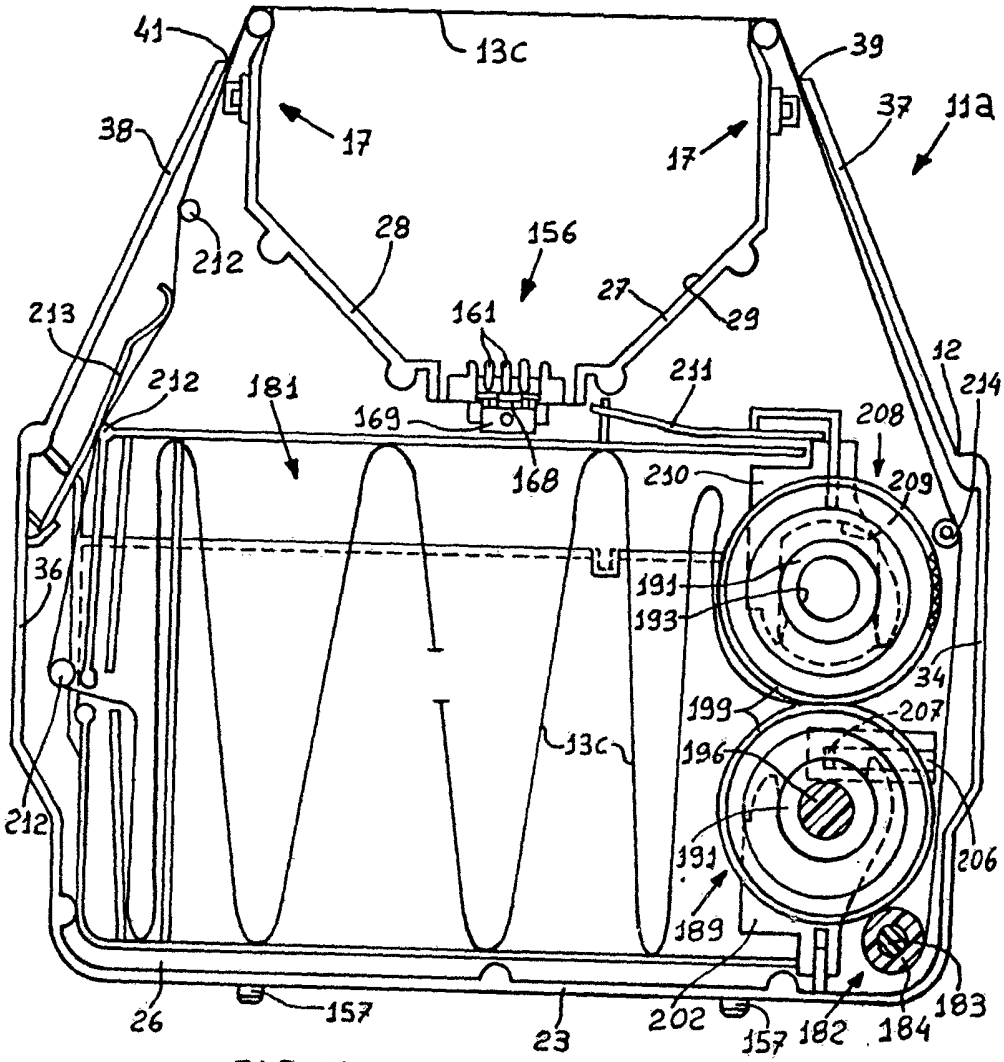

FIG.13

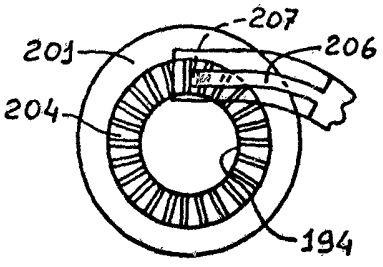

FIG.14

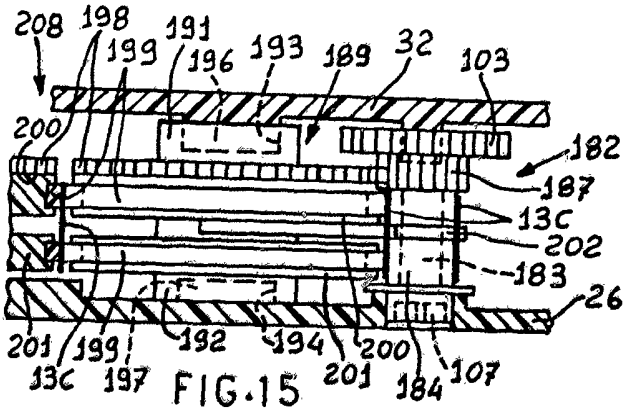

FIG.15