United States Patent [19]

Sams

[11] **3,890,188**

[45] **June 17, 1975**

[54] **LABEL DISPENSING AND APPLYING APPARATUS**

[76] Inventor: **Bernard Sams,** 22 Avondale Ave., No. 12, London, England

[22] Filed: **Aug. 23, 1972**

[21] Appl. No.: **283,212**

[30] **Foreign Application Priority Data**

Aug. 25, 1971 United Kingdom 39850/71
Jan. 29, 1972 United Kingdom 4305/72

[52] **U.S. Cl.** **156/384;** 101/291; 101/293; 101/328; 156/277; 156/584

[51] **Int. Cl.** **B65h 5/28**

[58] **Field of Search** ..... 156/277, 384, 385, 541, 156/584, DIG. 46, DIG. 48, DIG. 49; 101/288, 291, 292, 293, 327, 328

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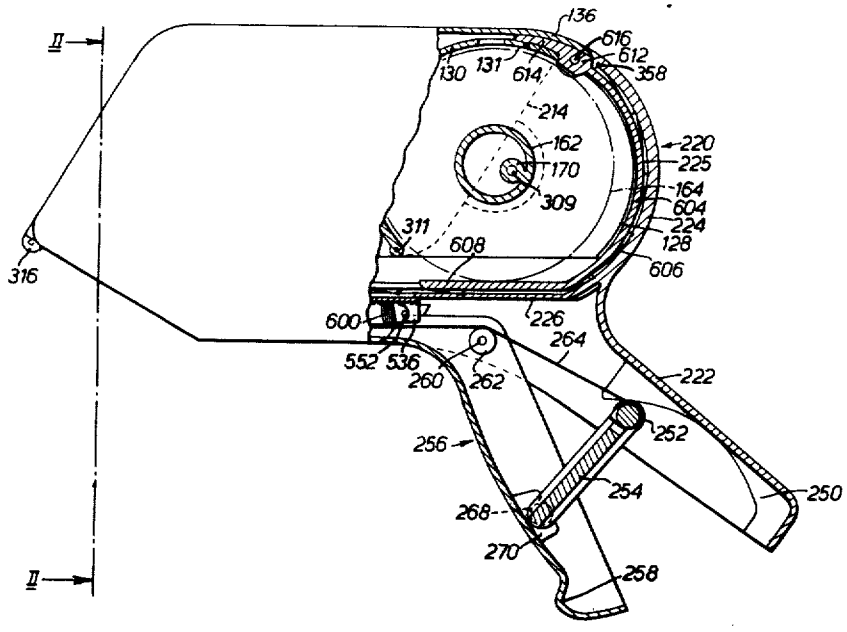
Primary Examiner—Caleb Weston
Attorney, Agent, or Firm—McGlew and Tuttle

[57] **ABSTRACT**

Four self-adhesive label applicators each capable of printing, with one or two impressions, a label and dispensing that label in the same operational cycle, are intended for hand actuation, but can be power operated. In each embodiment, a web of labels is drawn from a reel in steps corresponding to one label by a feed slide which is in the form of an elongate member having barbs which engage notches of the web downstream of a location at which individual labels are detached from the web by passage over an edge and bending of the web through approximately 180°. Each label, before being dispensed, is printed by operative type facets of at least one print head assembly. The latter include a number of print bands which can be adjusted from externally of the applicator casing by a single knob which selects the band for adjustment and also adjusts the selected band to the required character. The dispensed labels are applied to an article by a semi-circular pad arranged adjacent the dispensing edge. Each of the applicators is operated by a trigger-like member and the applicators as a whole have the appearance of a pistol.

22 Claims, 62 Drawing Figures



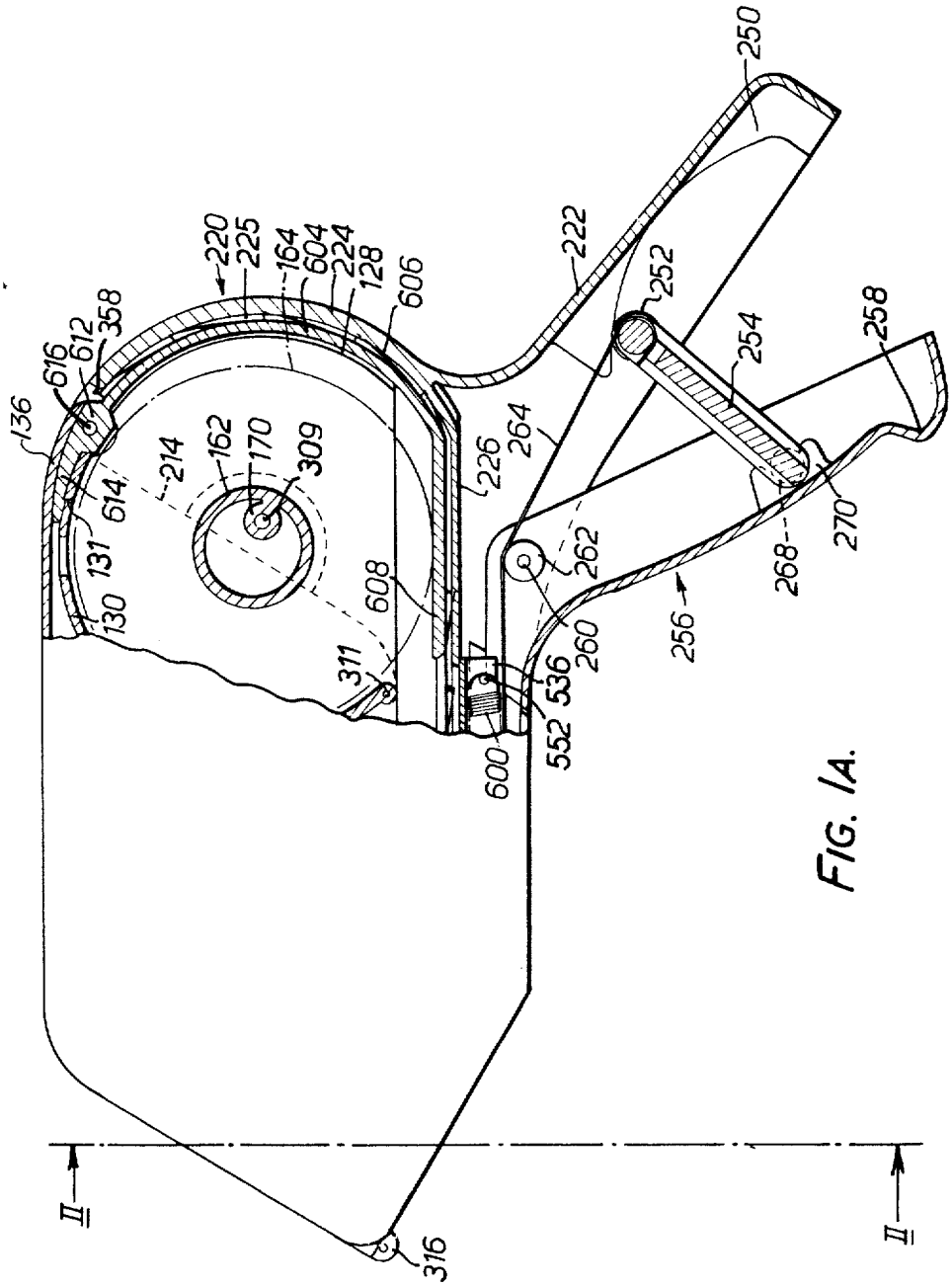

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FIG. 1A.

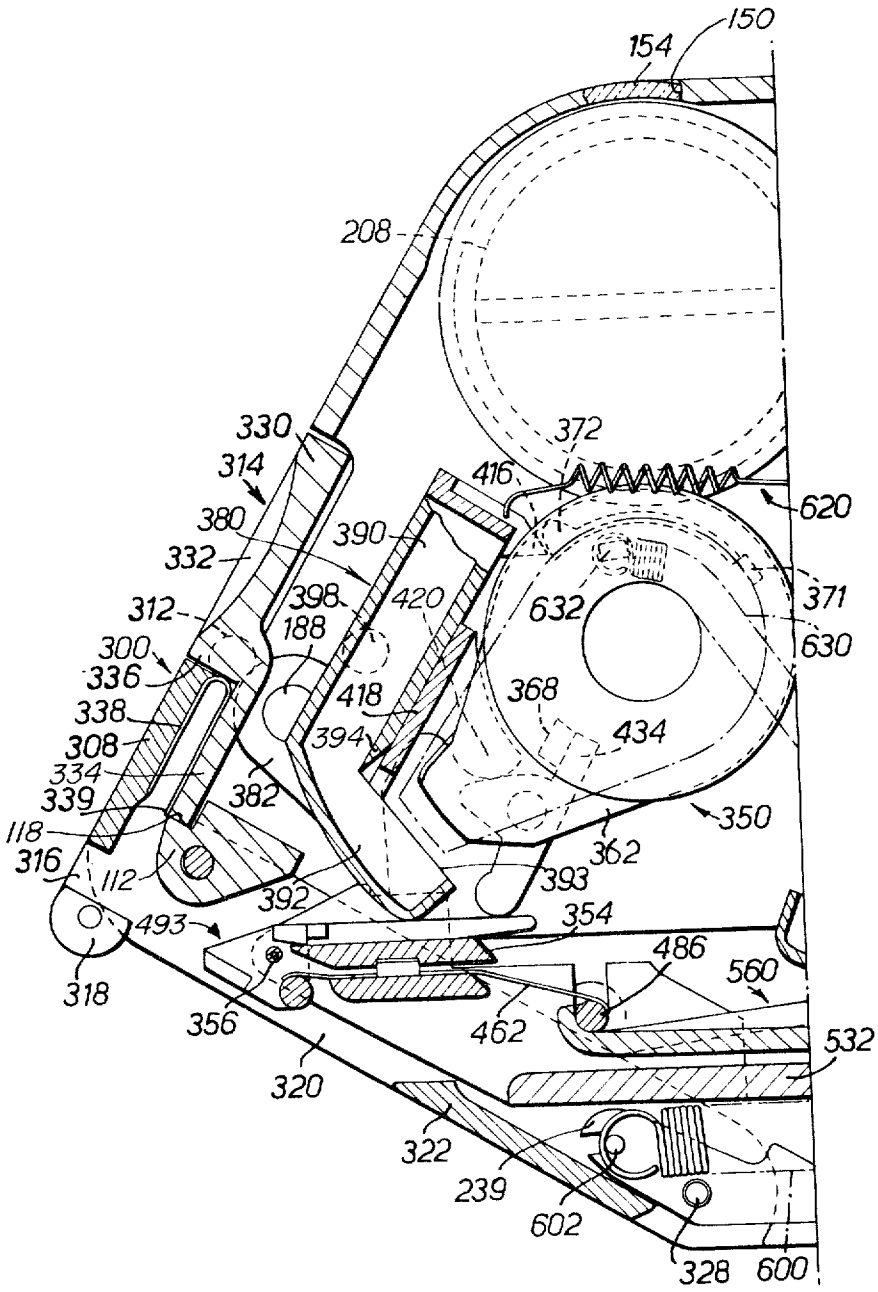
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FIG. 1AA.

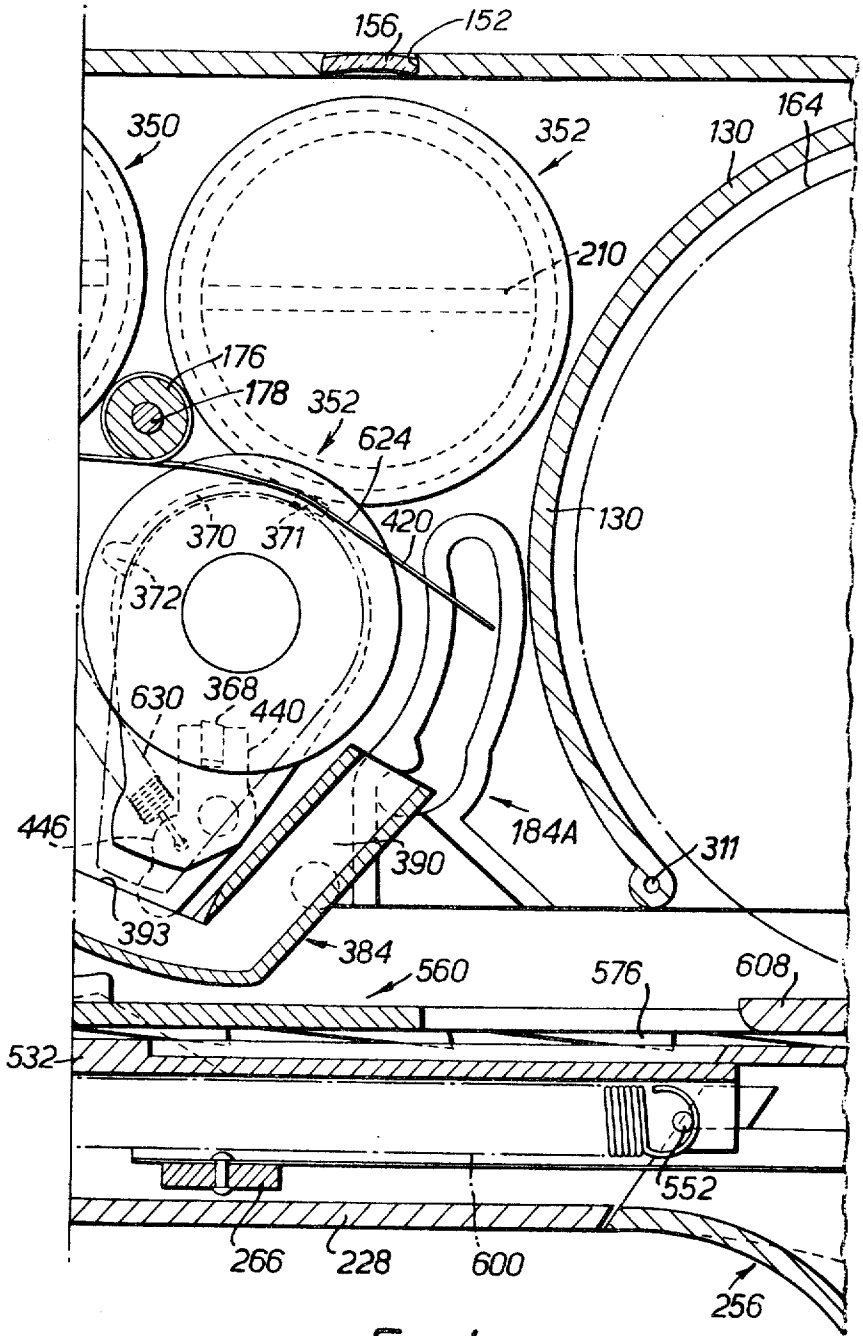
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FIG. 1AB.

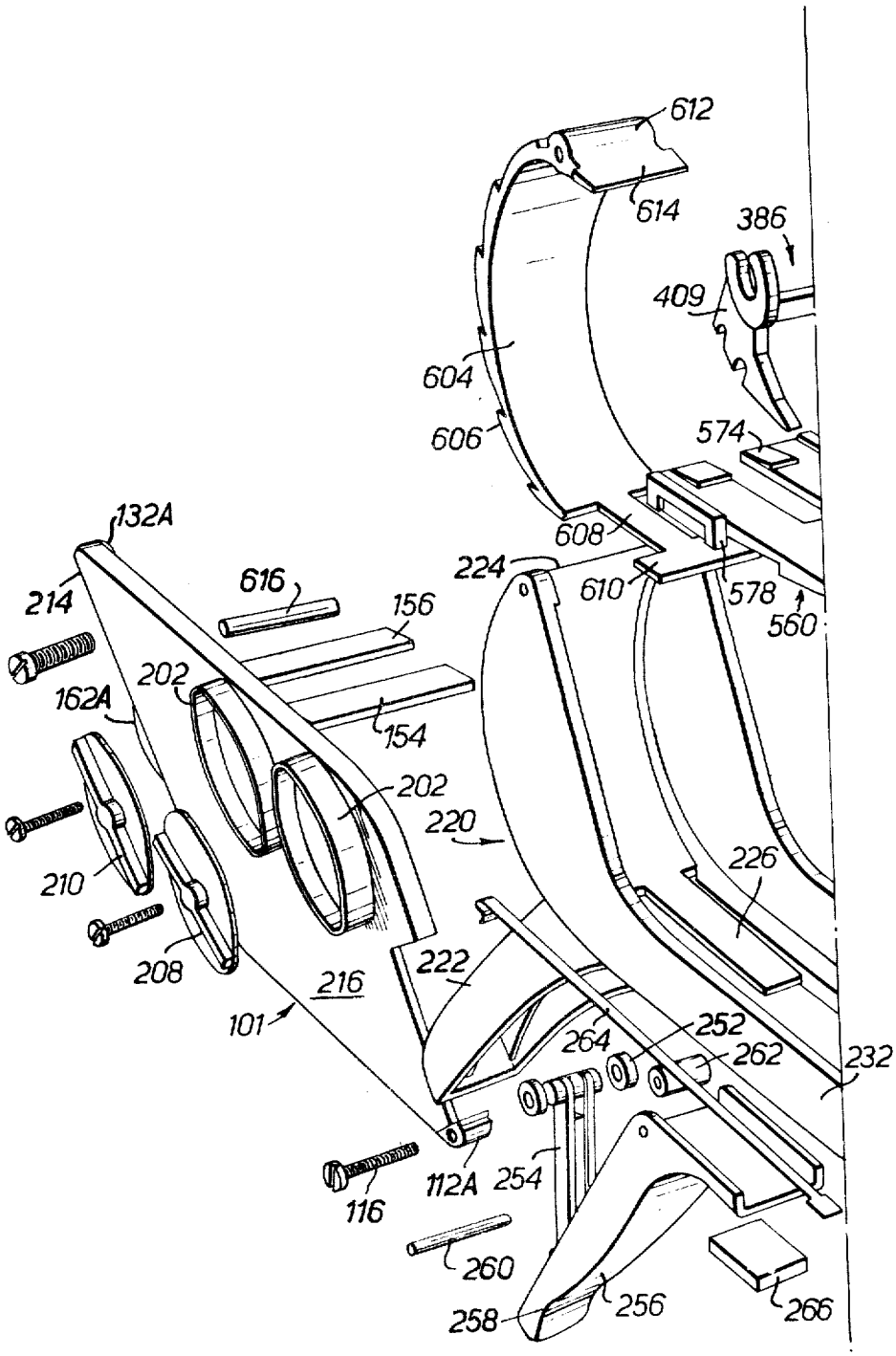
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FIG. 1BA.

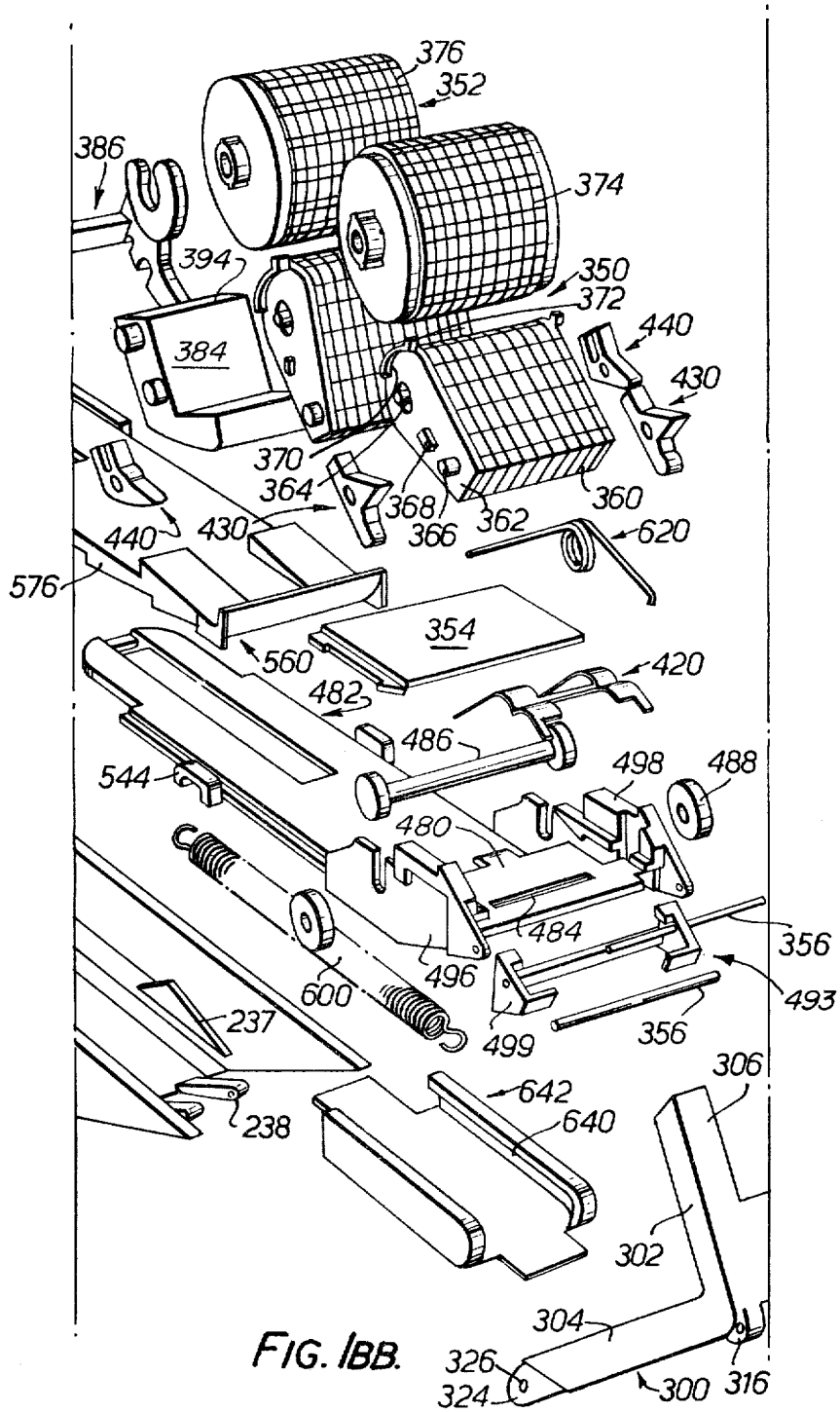
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FIG. 1BB.

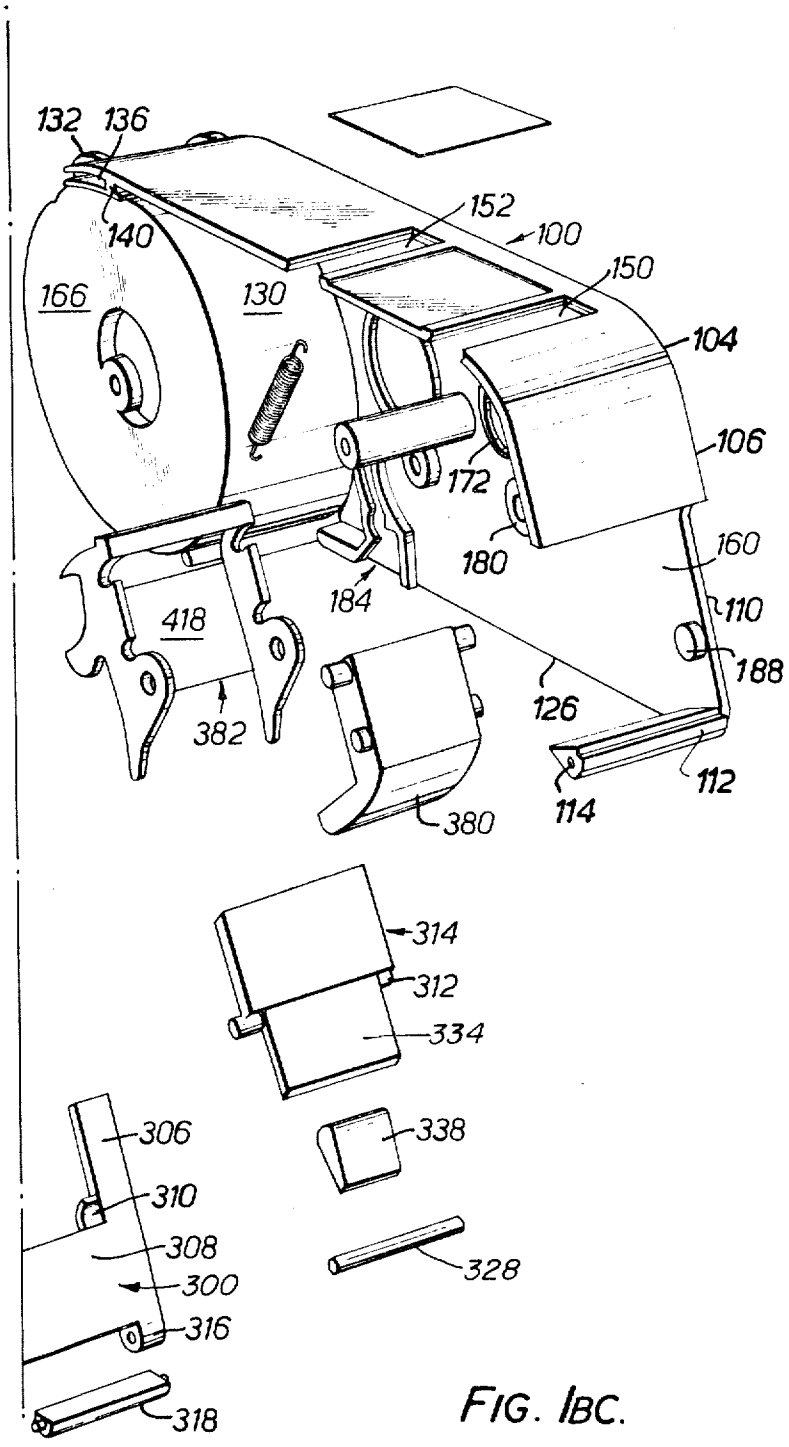
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FIG. 1BC.

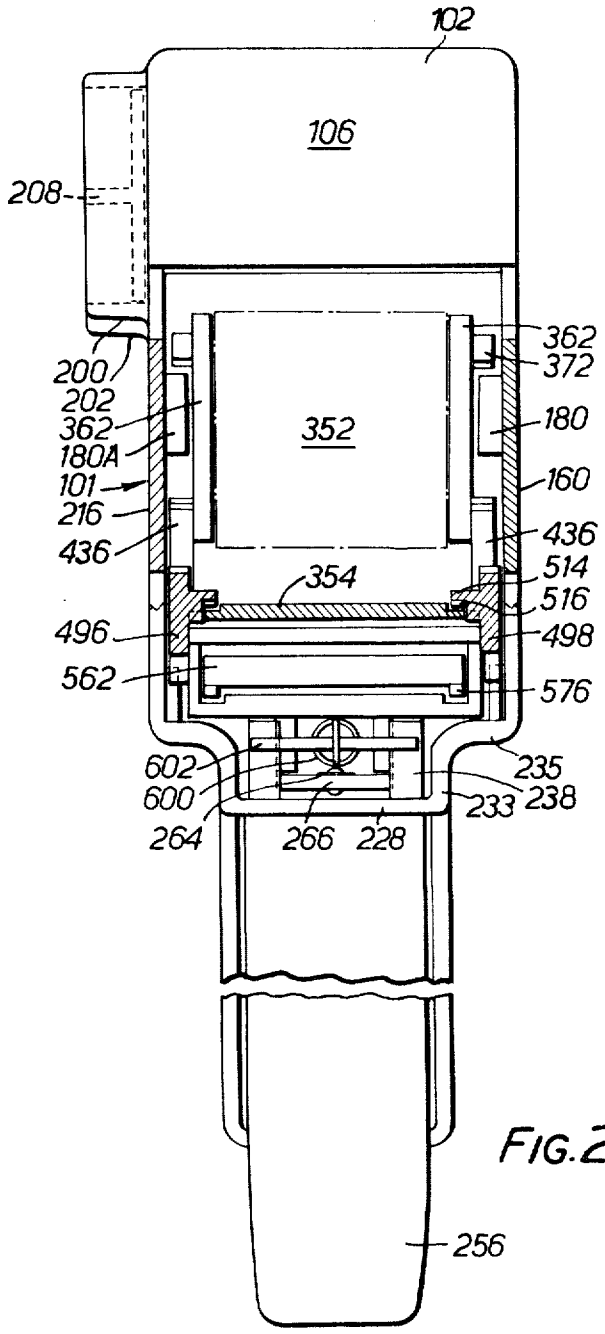
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FIG. 2.

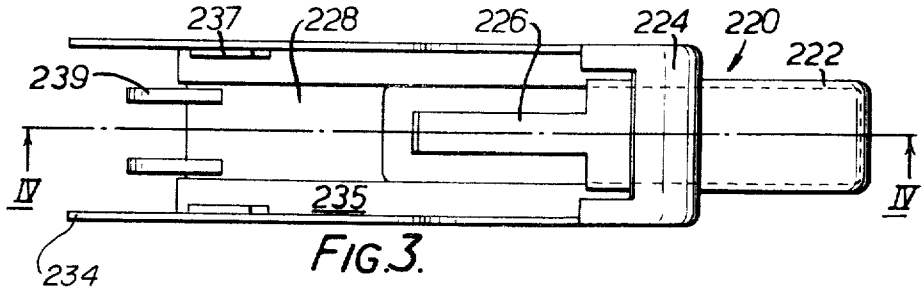
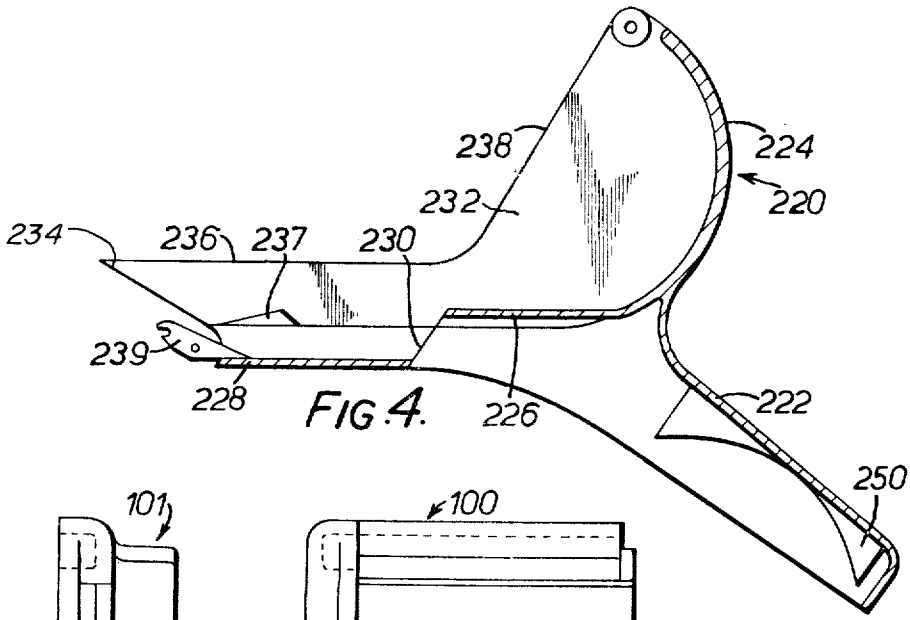


FIG. 3.



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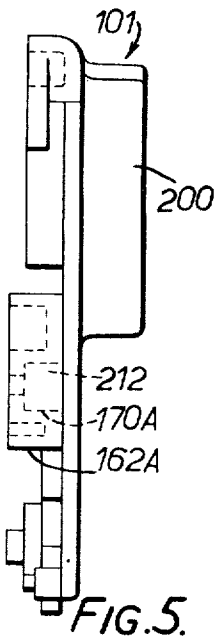

FIG. 5.

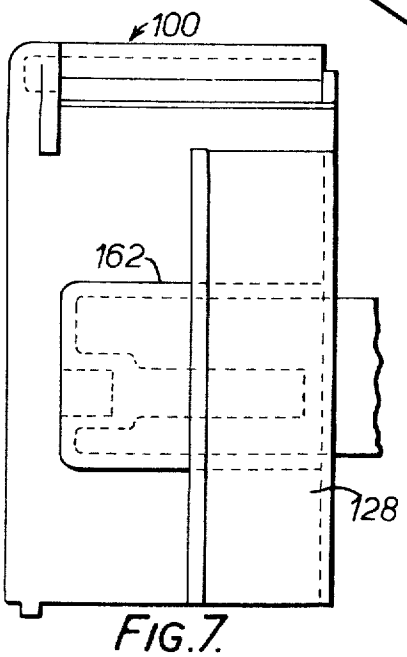

FIG. 7.

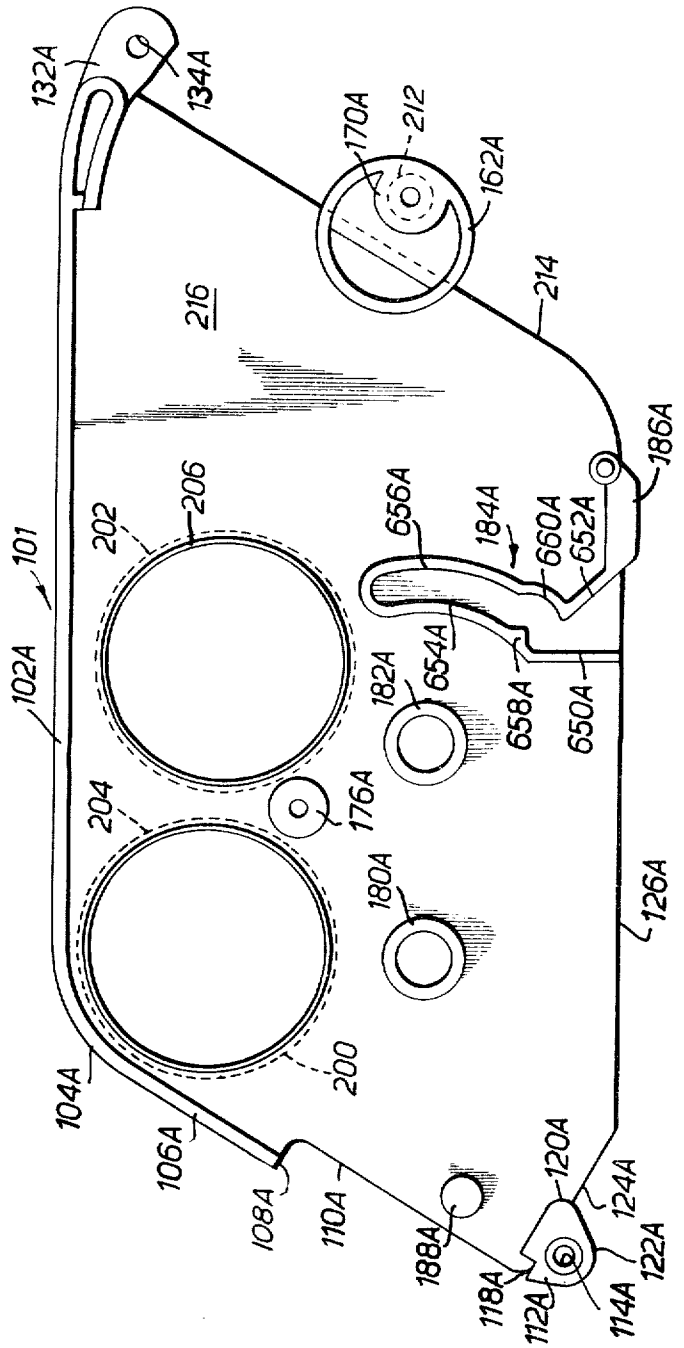
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FIG. 6.

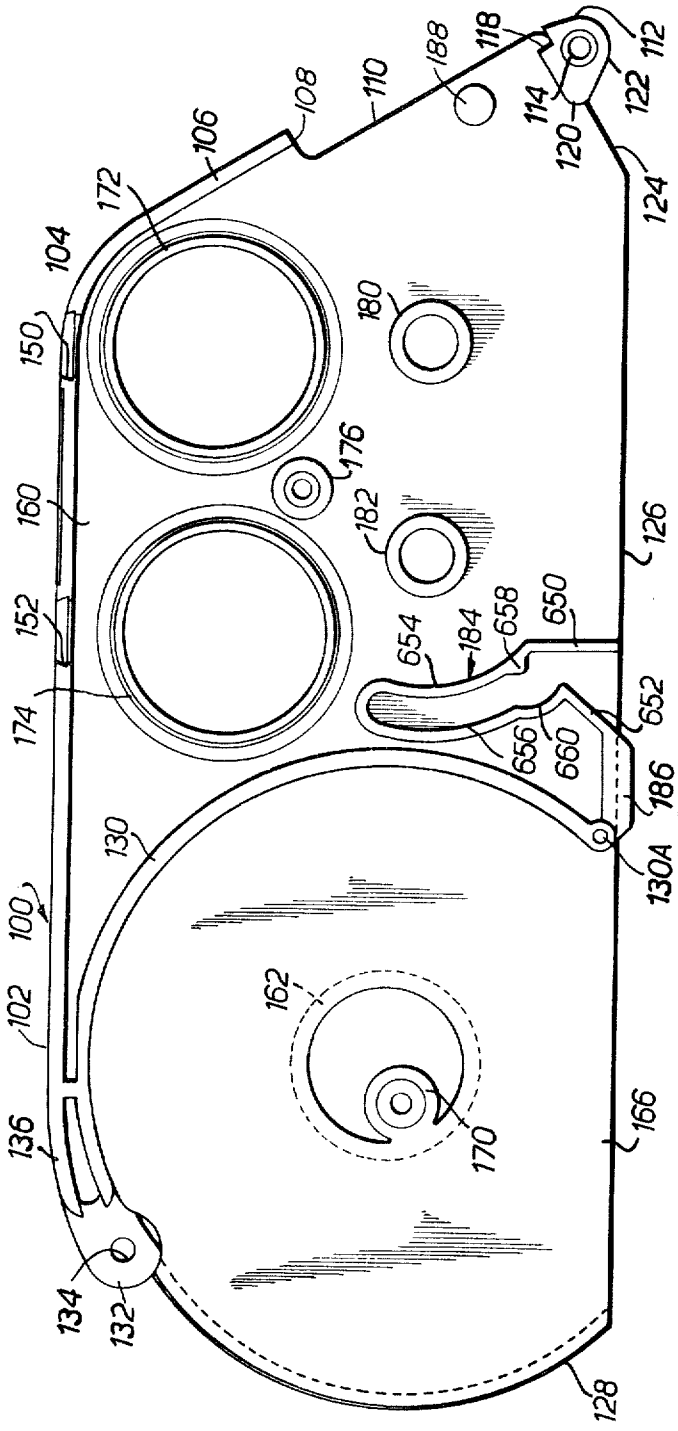
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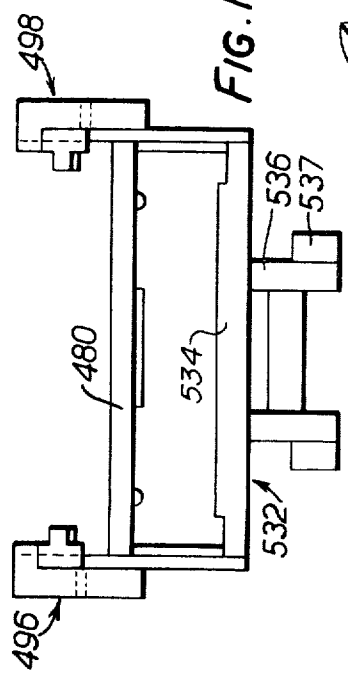
FIG. 8.



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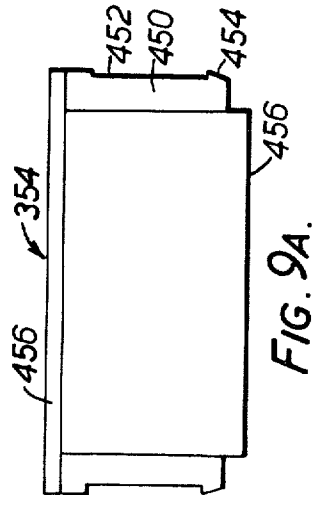


FIG. 9A.

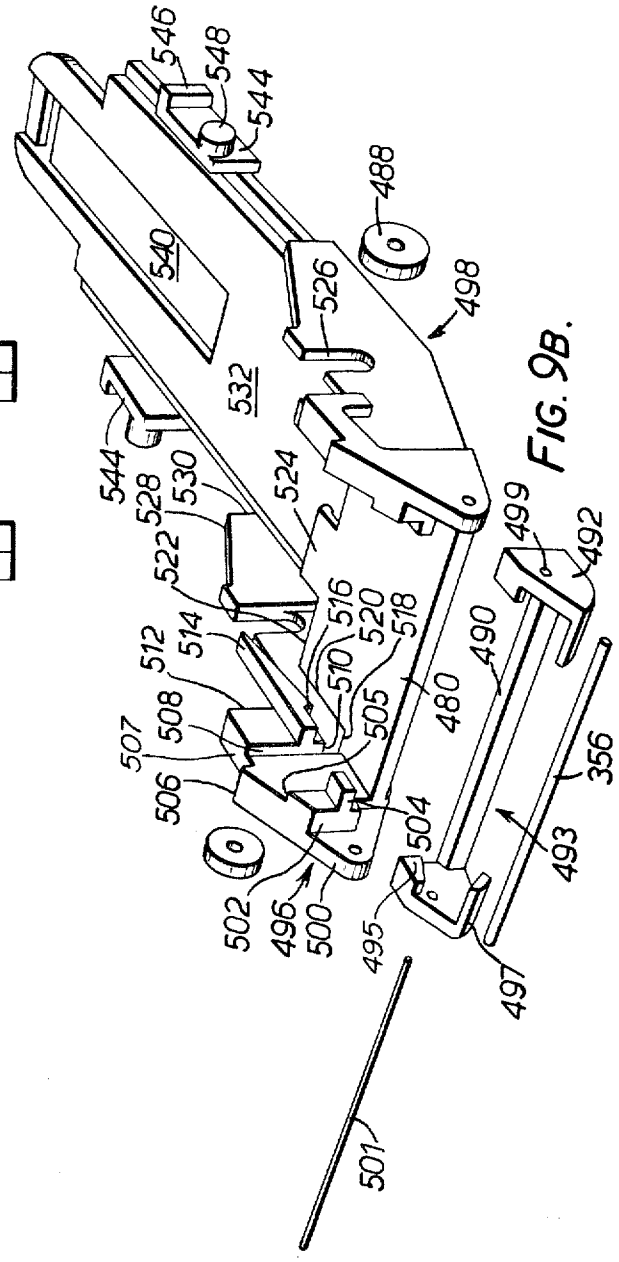
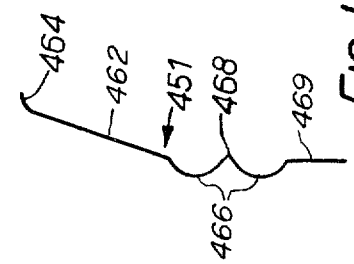


FIG. 9B.



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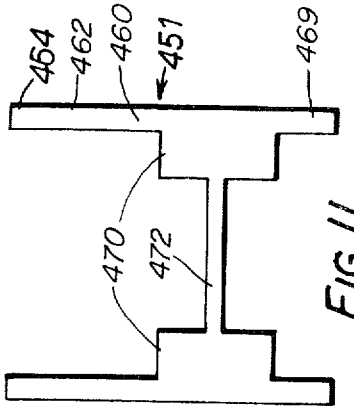

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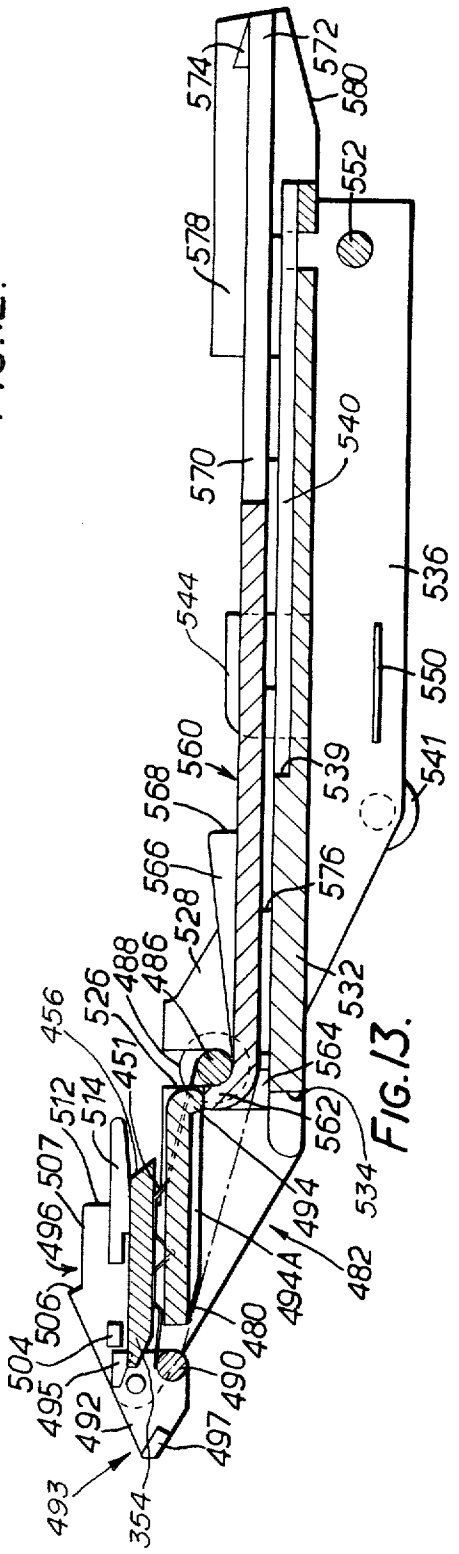

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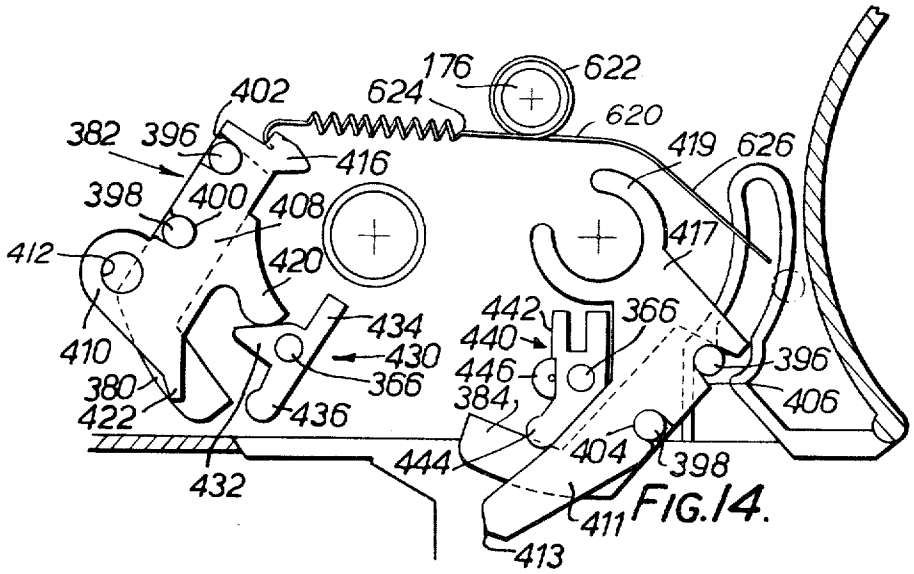

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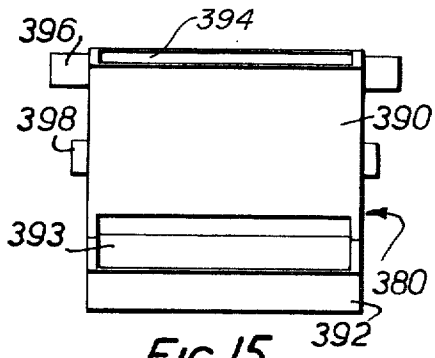

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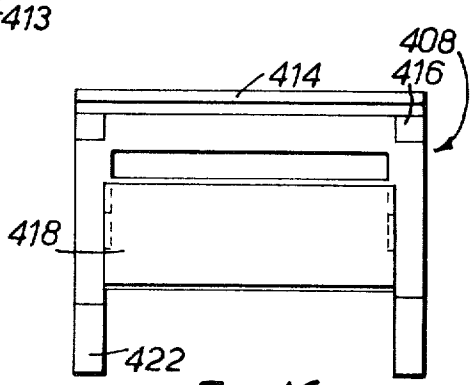

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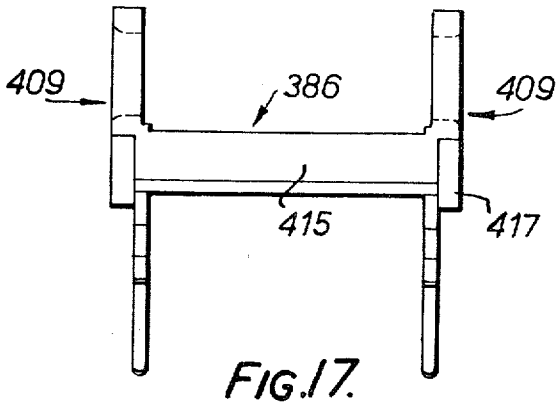

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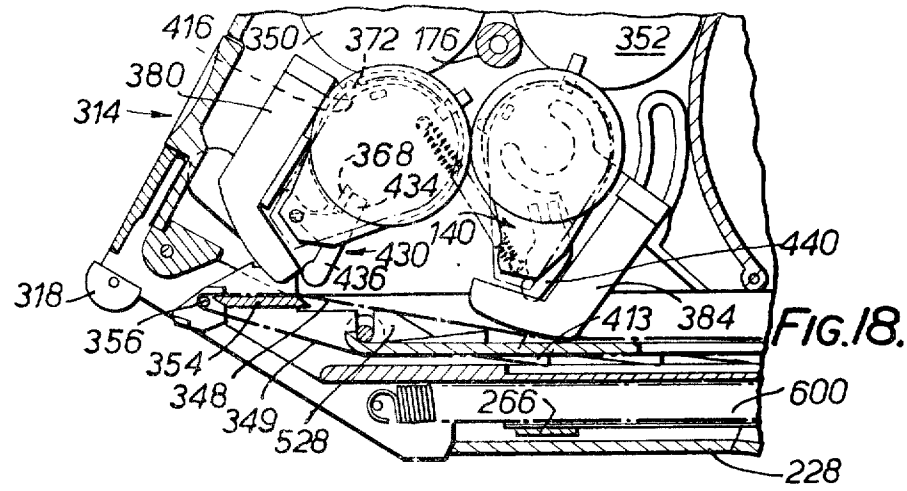

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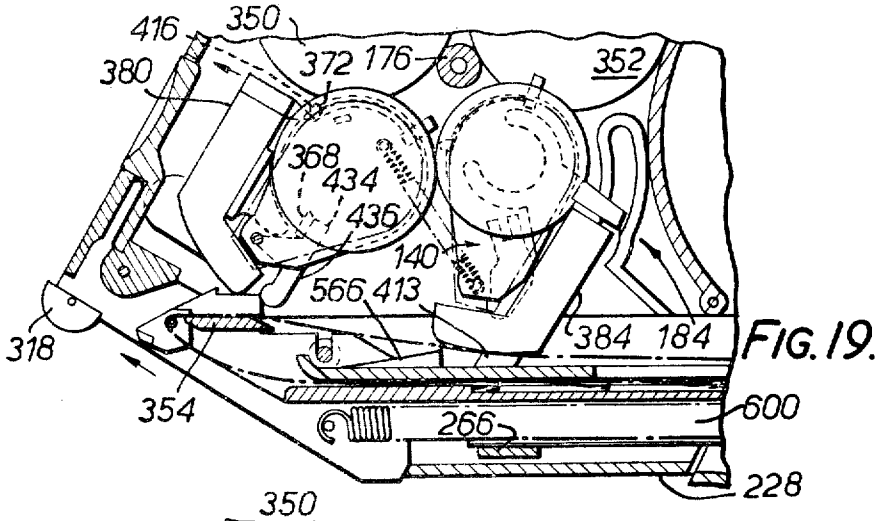

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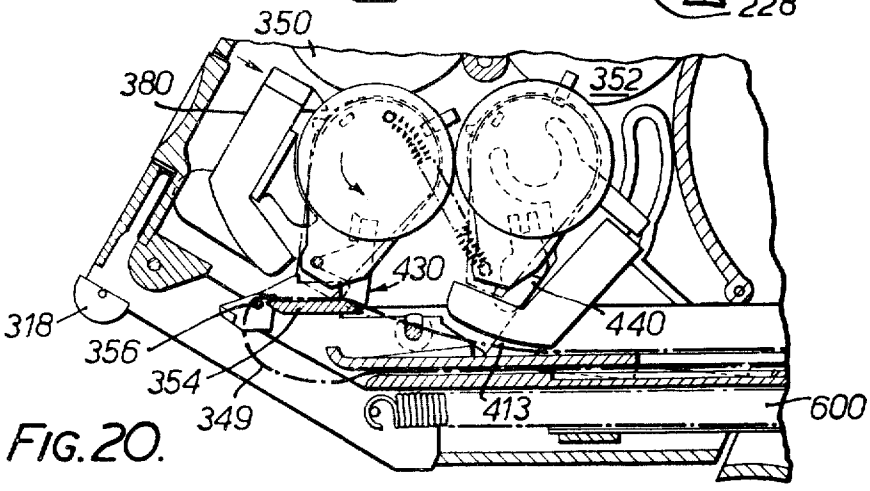

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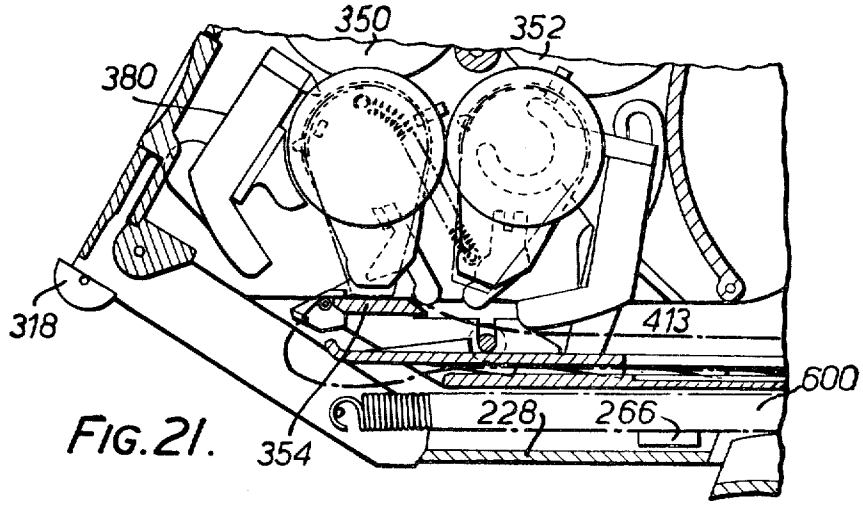

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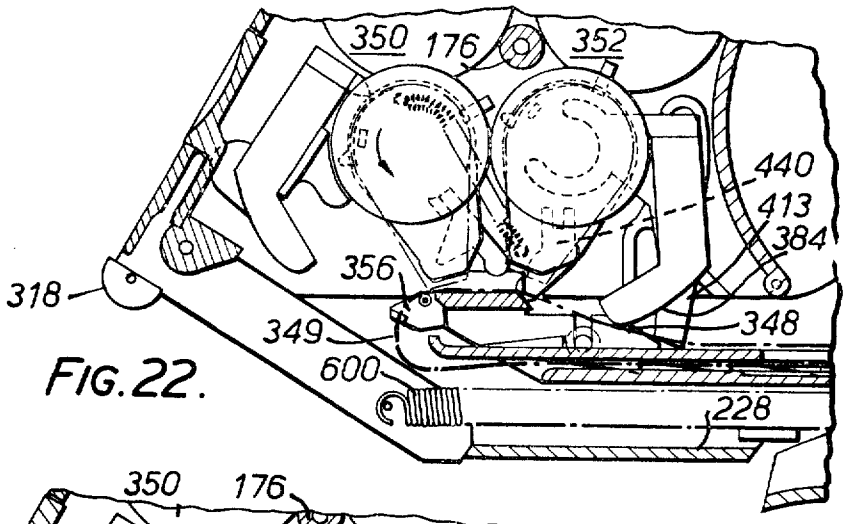

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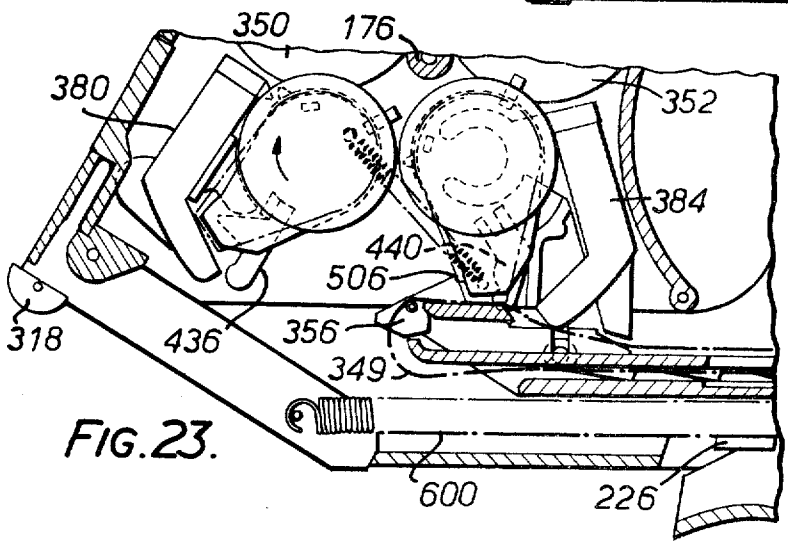

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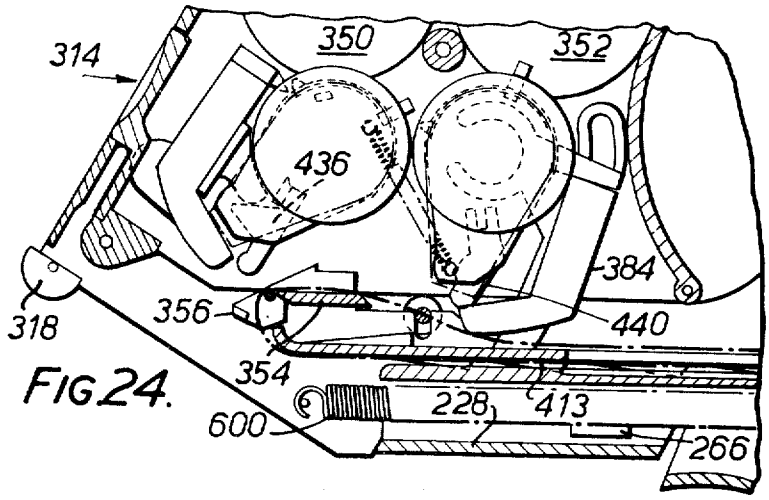

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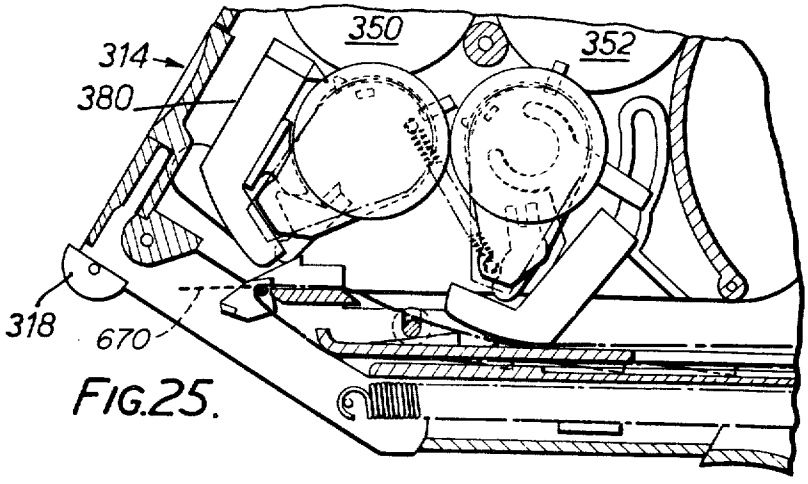

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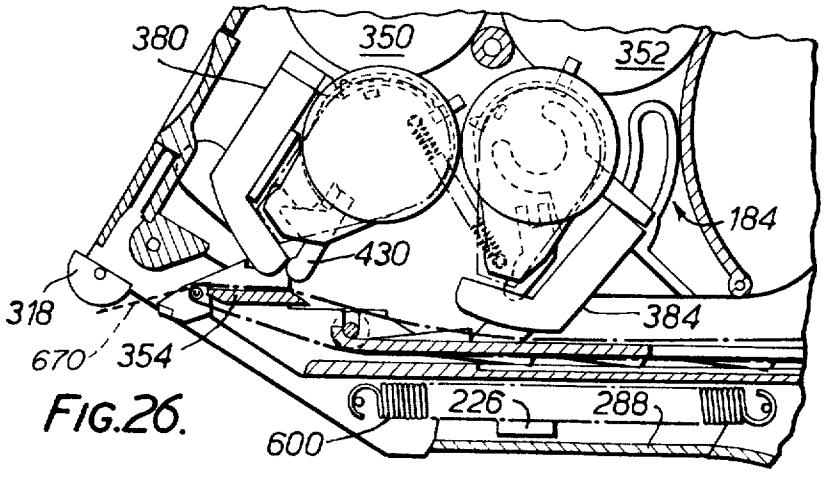

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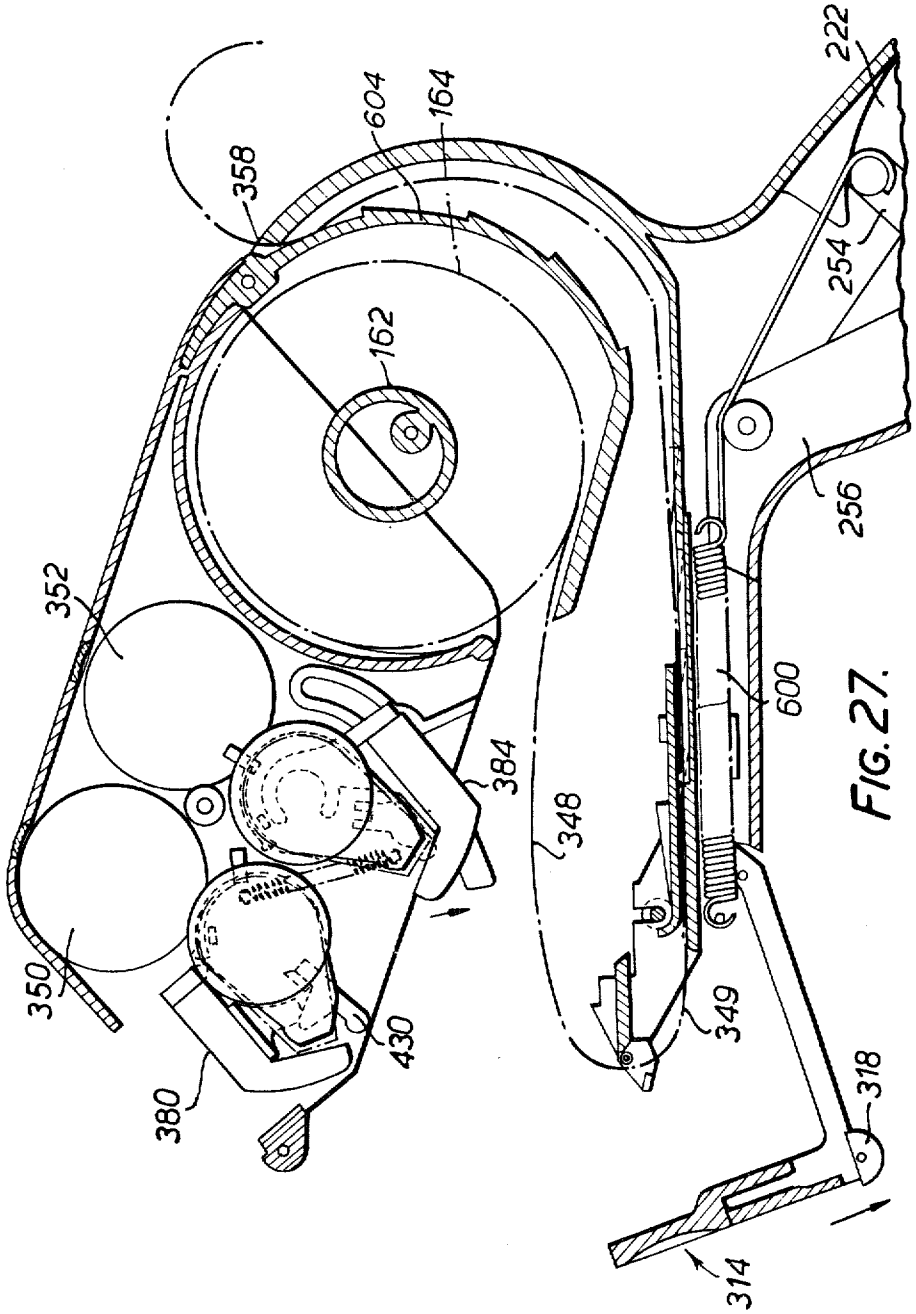
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FIG. 27.

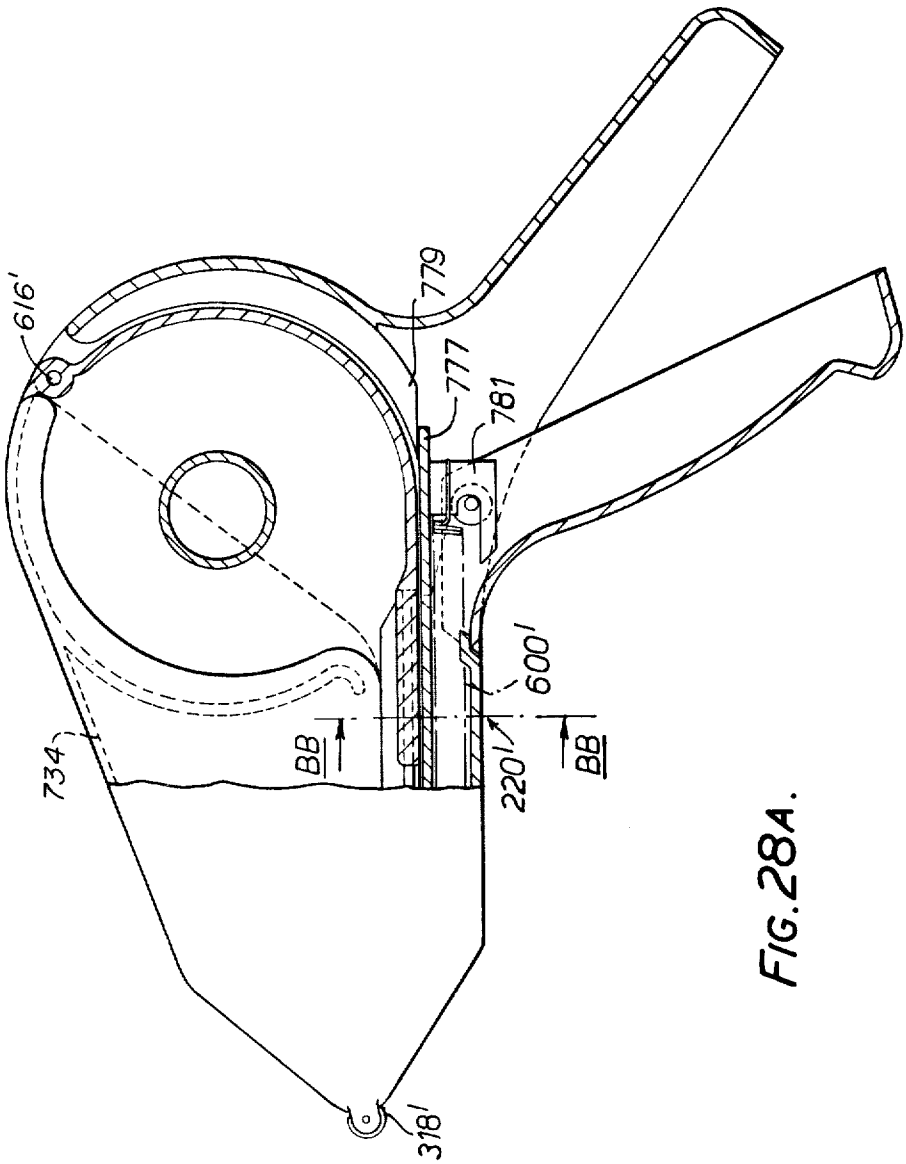
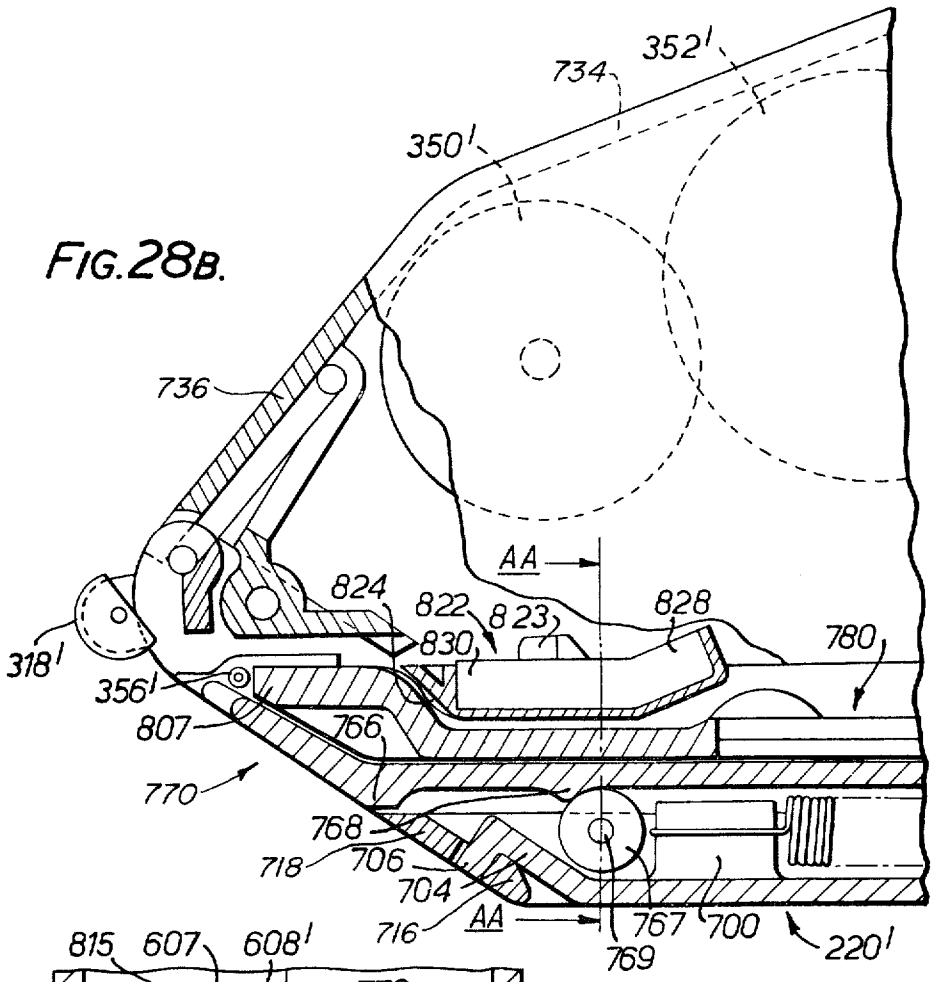


FIG. 28A.

FIG. 28B.



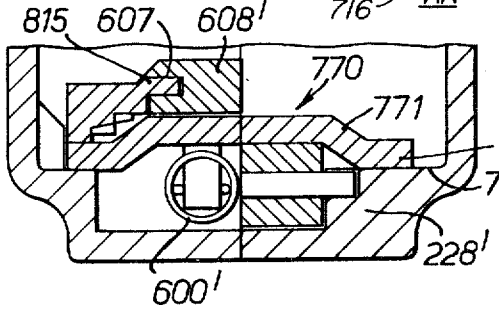
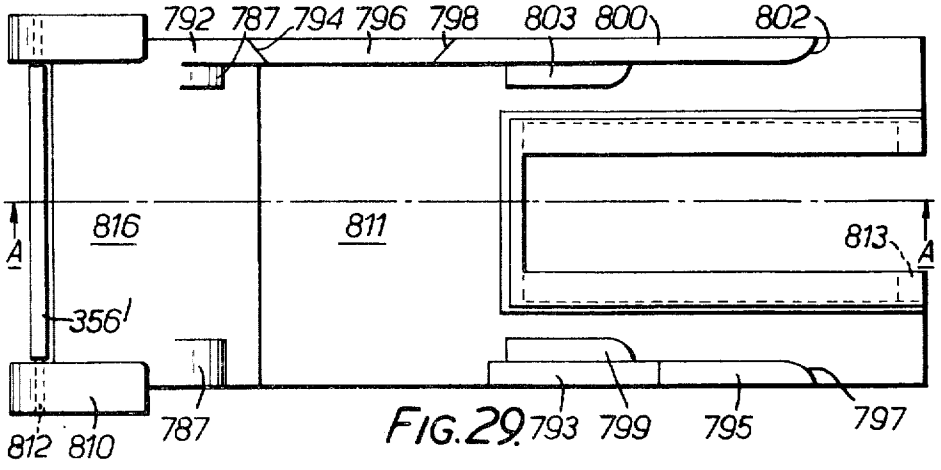


FIG. 28C.



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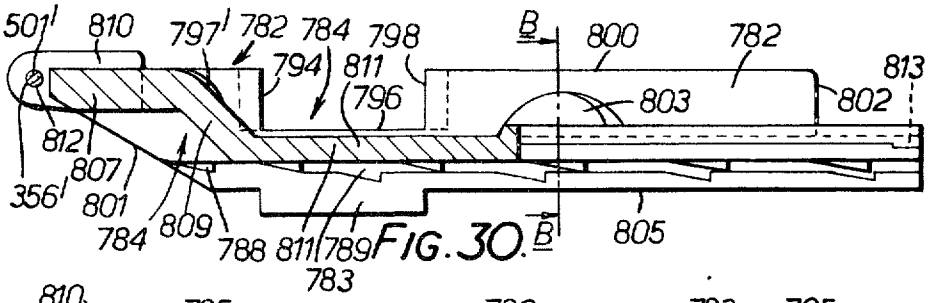

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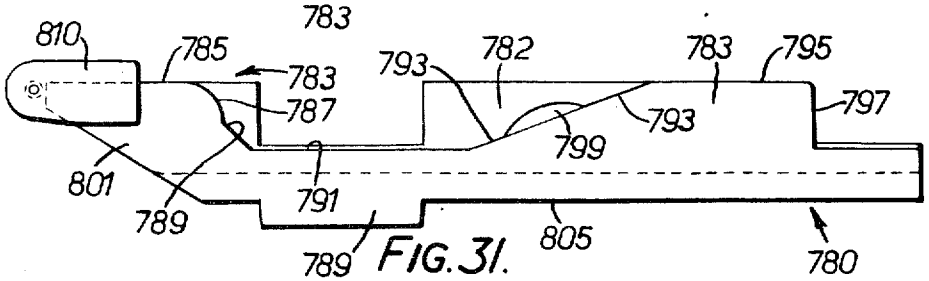

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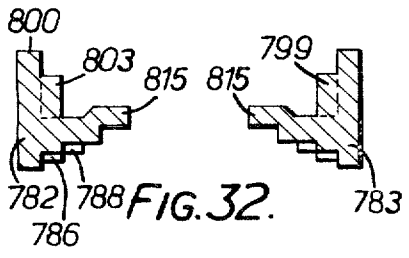

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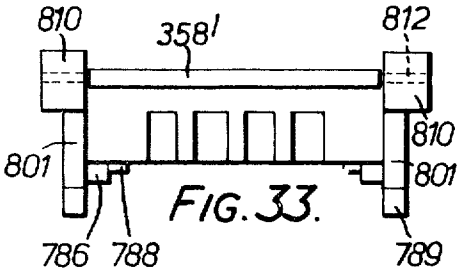

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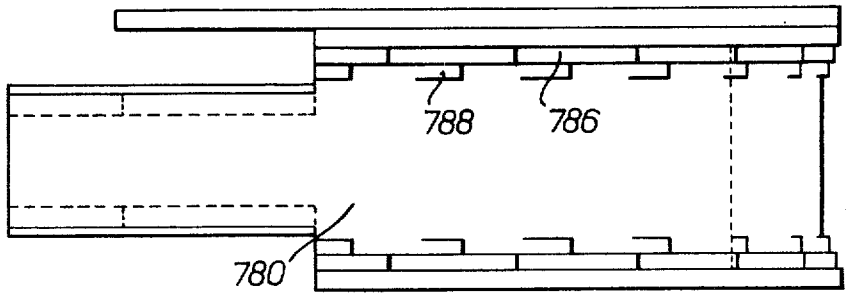


FIG. 34.

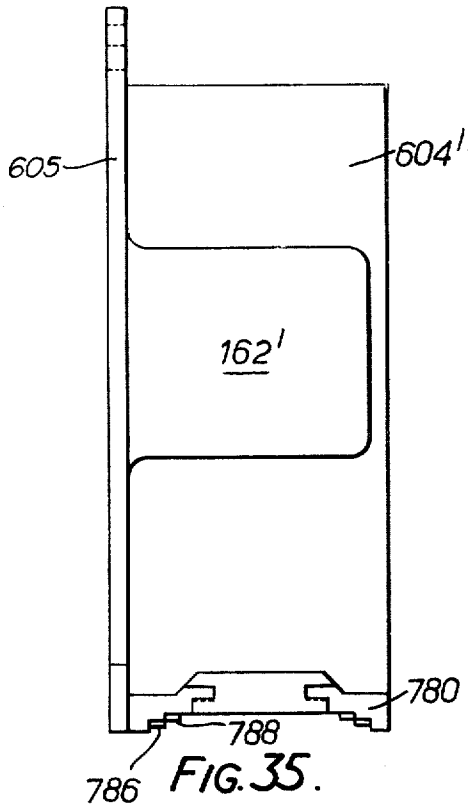


FIG. 35.

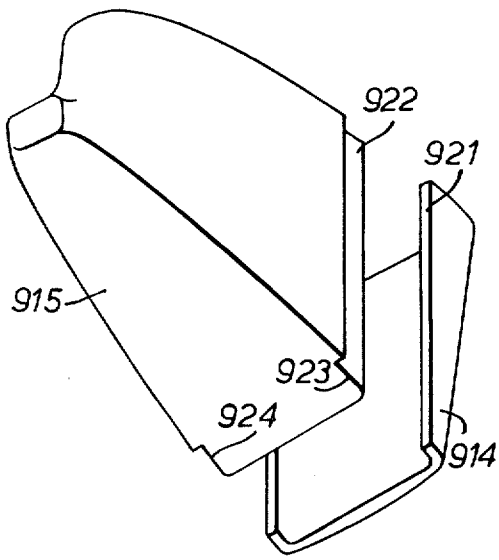
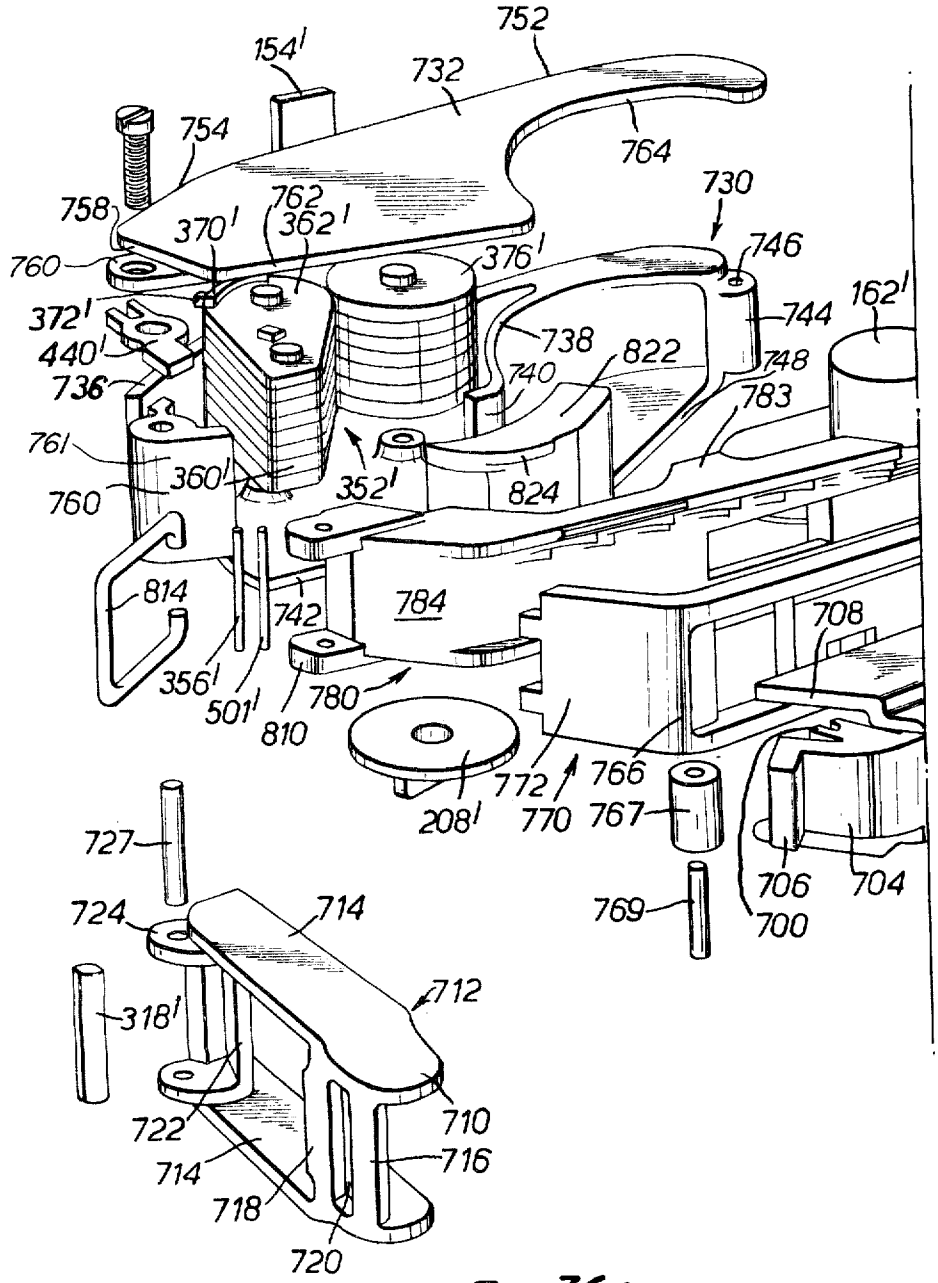


FIG. 47.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746
760
376'
162'
372'
744
738
822
440'
748
740
736
783
761
360'
352'
824
760
814
742
784
708
356'
501'
780
810
772
766
208'
770
767
727
706
704
724
714
769
700
712
318'
710
722
716
714
718
720

FIG. 36A.

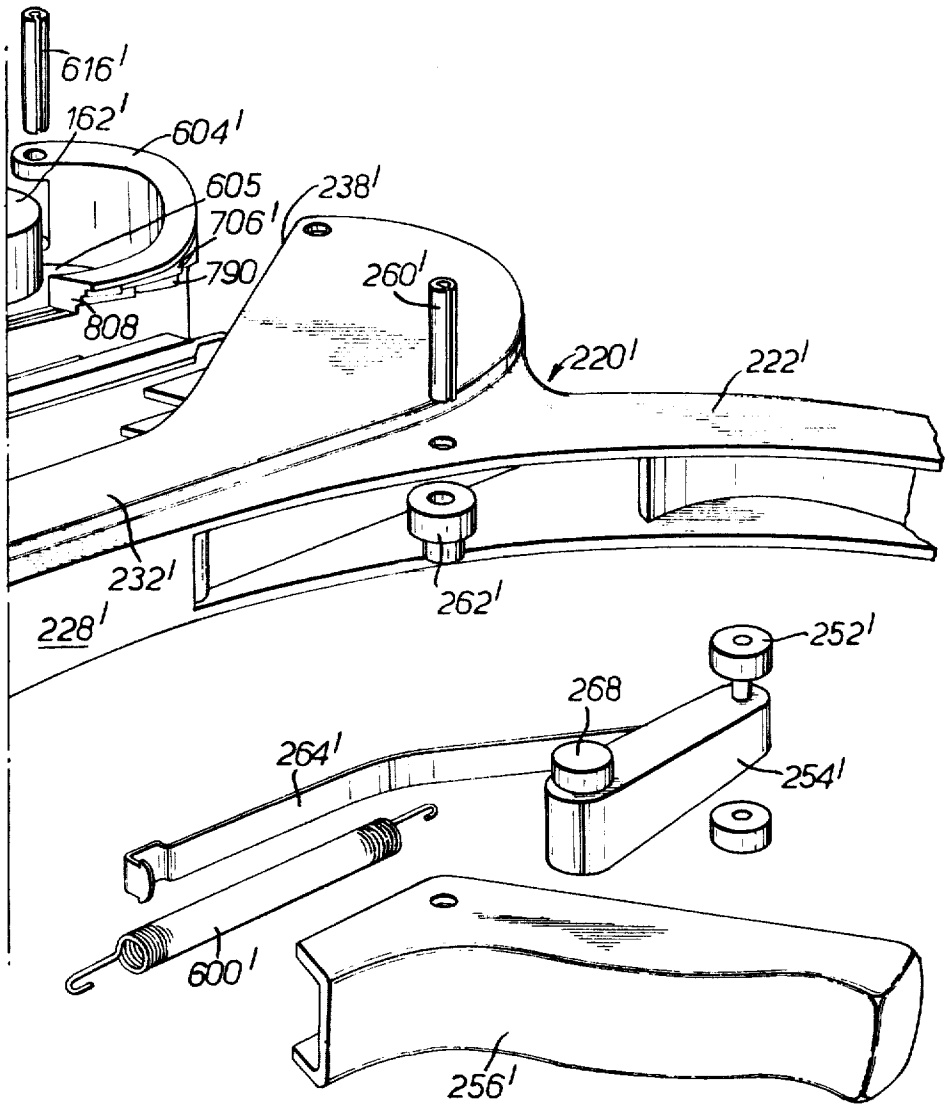
616'
162'
604'
605
238'
706'
790
260'
808
220'
222'
232'
262'
228'
252'
268
264'
254'
600'
256'

FIG. 36B.

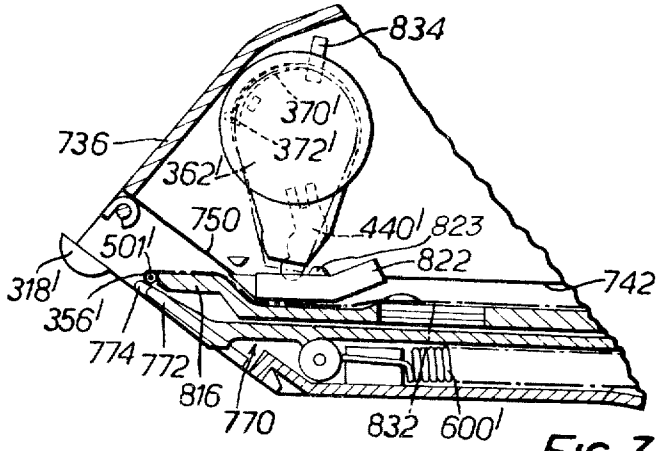

FIG 37.

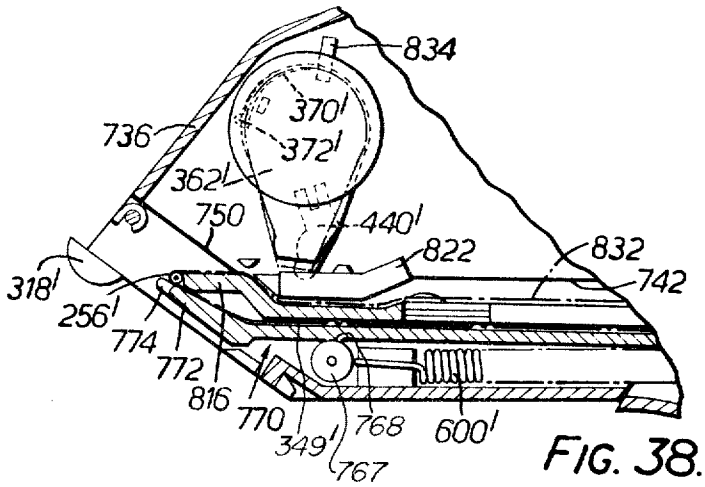

FIG. 38.

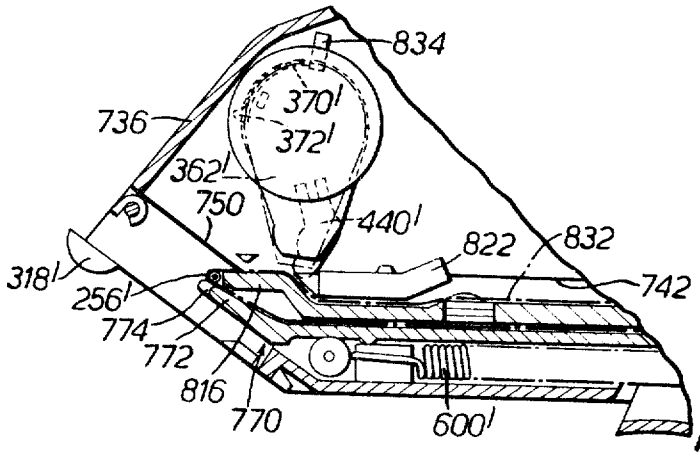

FIG. 39.

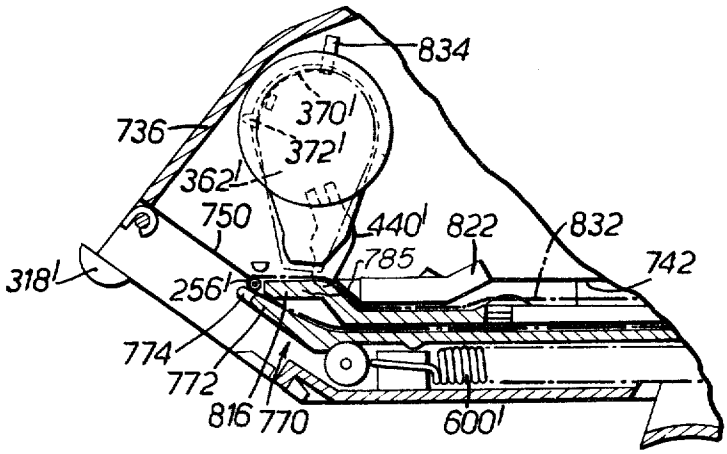

FIG. 40.

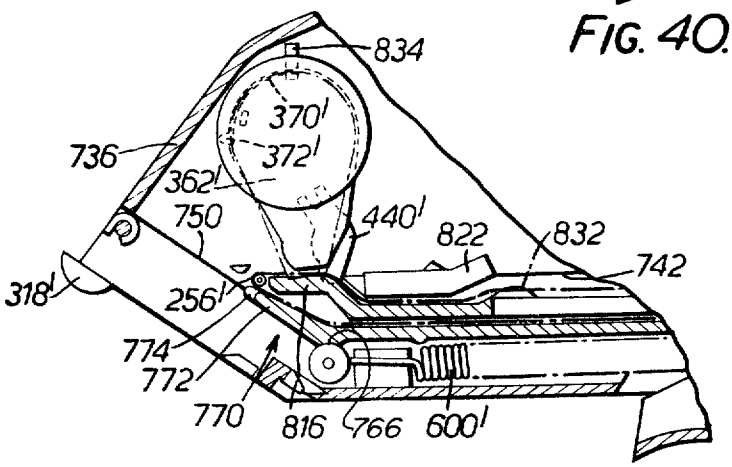

FIG. 41.

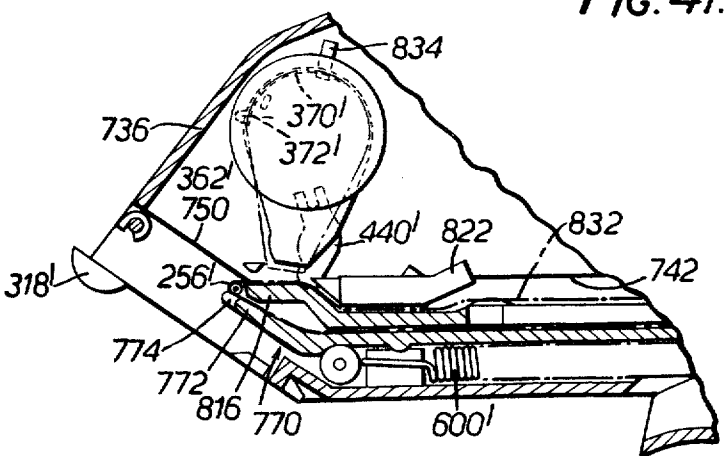

FIG. 42.

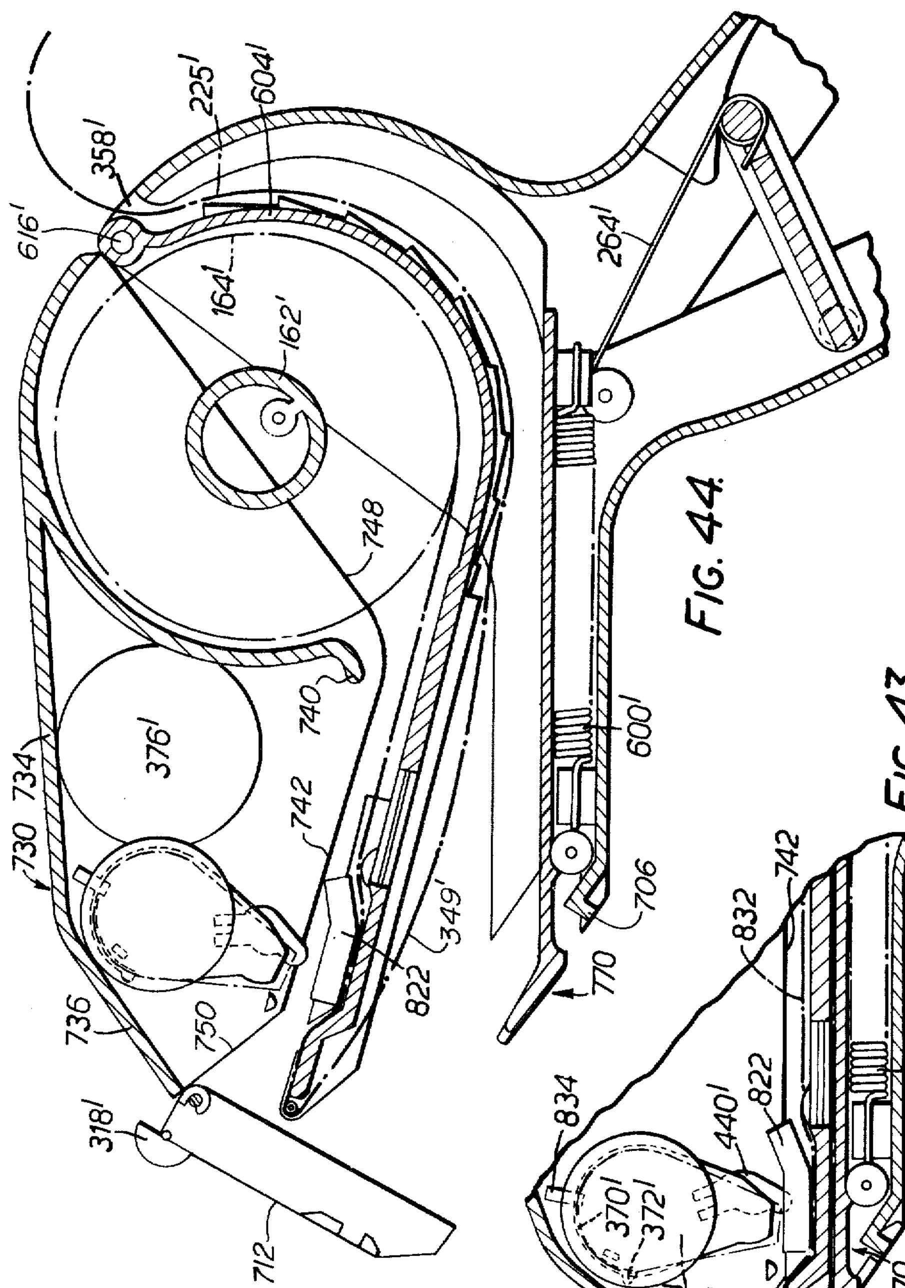
358'
225'
604'
616'
164'
162'
264'
748
740
376'
742
730
734
600'
706
349'
822
770
736
750
318'
712

FIG. 44

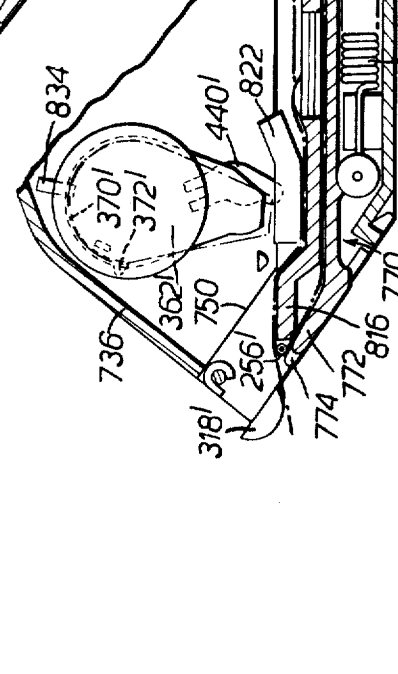
832
742
834
822
440'
370'
372'
600'
362
750
736
256'
816
770
772
774
318'

FIG. 43

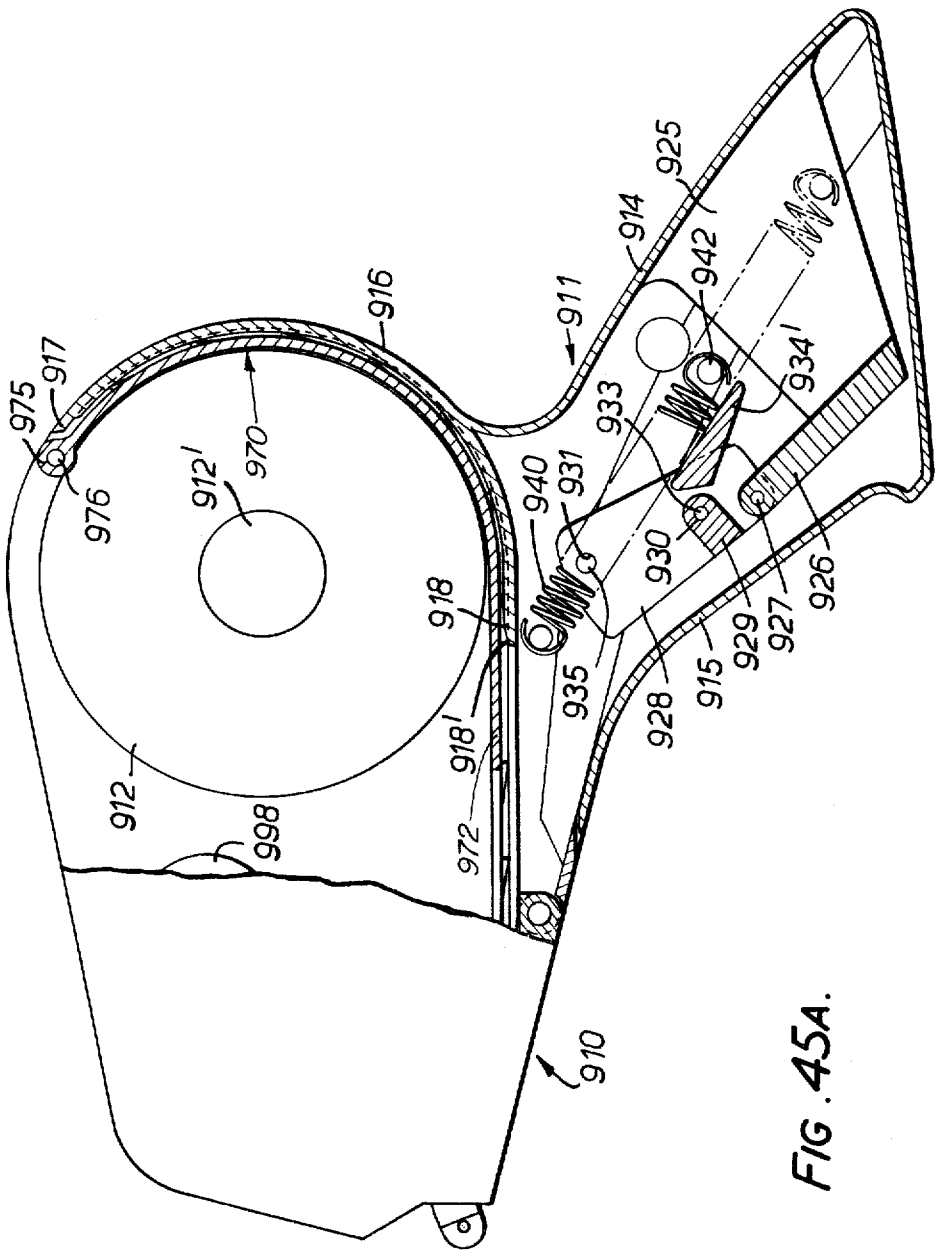
975
917
976
912'
970
916
911
914
925
942
933
934'
940
931
930
926
927
929
915
928
935
918
918'
912
998
972
910

FIG. 45A.

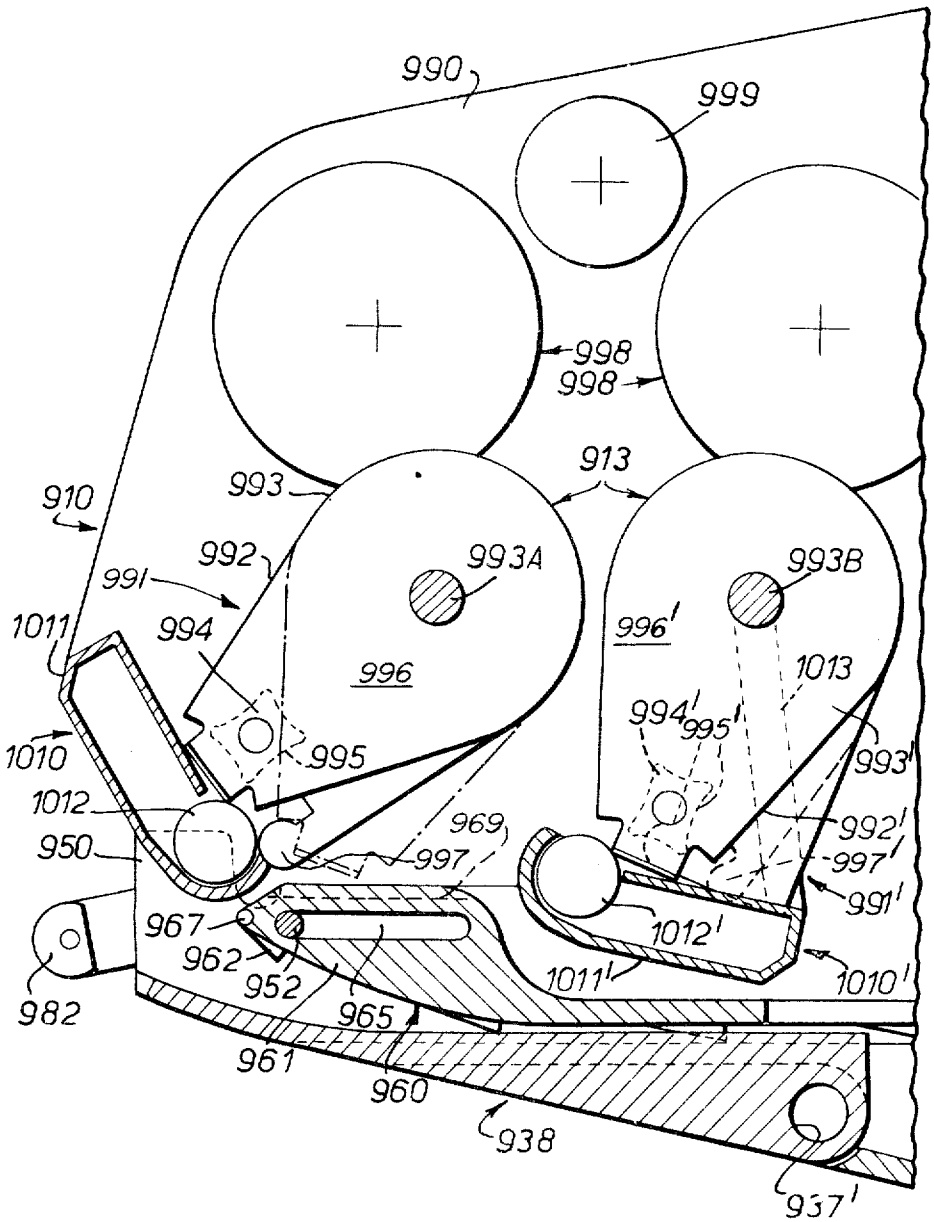
990
999
998
998
913
910
993
992
991
1011
994
993A
996
995
1010
1012
950
969
997
967
962
952
982
965
961
960
938
937'
993B
996'
1013
994'
995'
993'
992'
997'
991'
1012'
1011'
1010'

FIG. 45B.

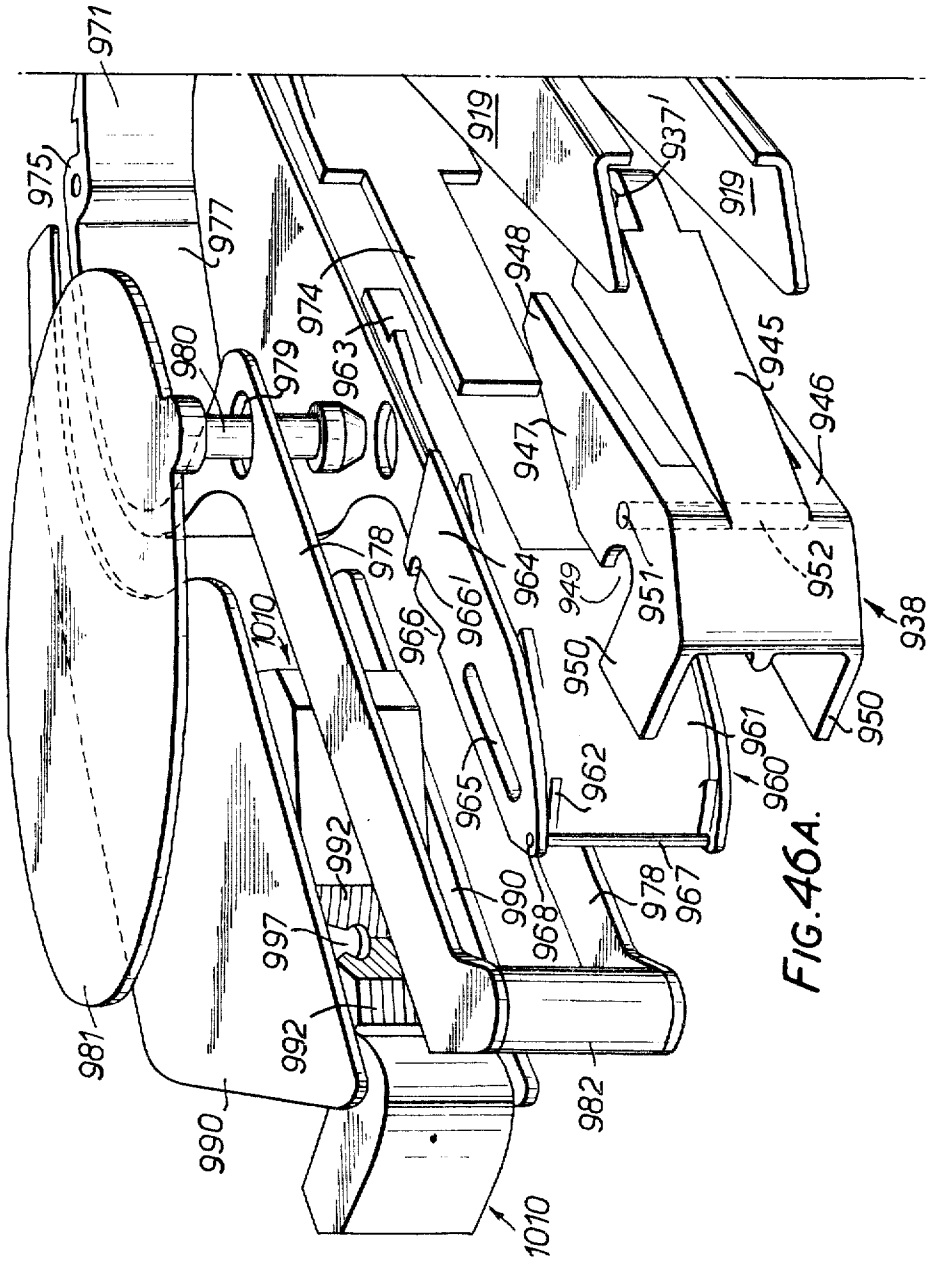
971
975
977
919
937
919
948
974
980
979
963
945
946
947
978
964
949
951
952
938
1010
966
966
950
950
961
962
960
965
992
990
968
978
967
997
992
981
990
982
1010

FIG. 46A.

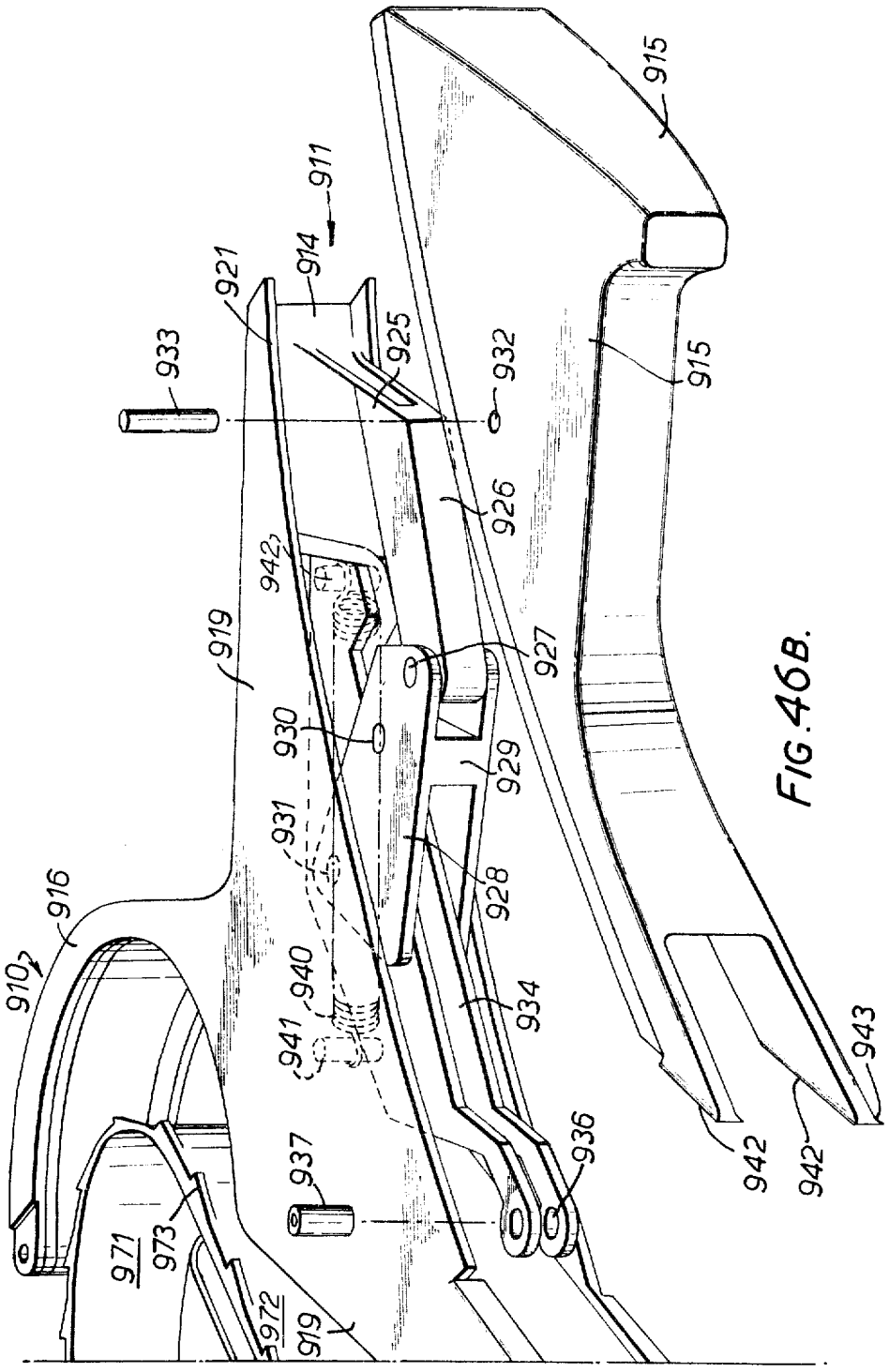
915
911
914
921
933
925
932
915
926
942
919
927
930
929
931
928
916
910
940
934
941
943
936
937
942
942
971
973
972
919

FIG. 46B.

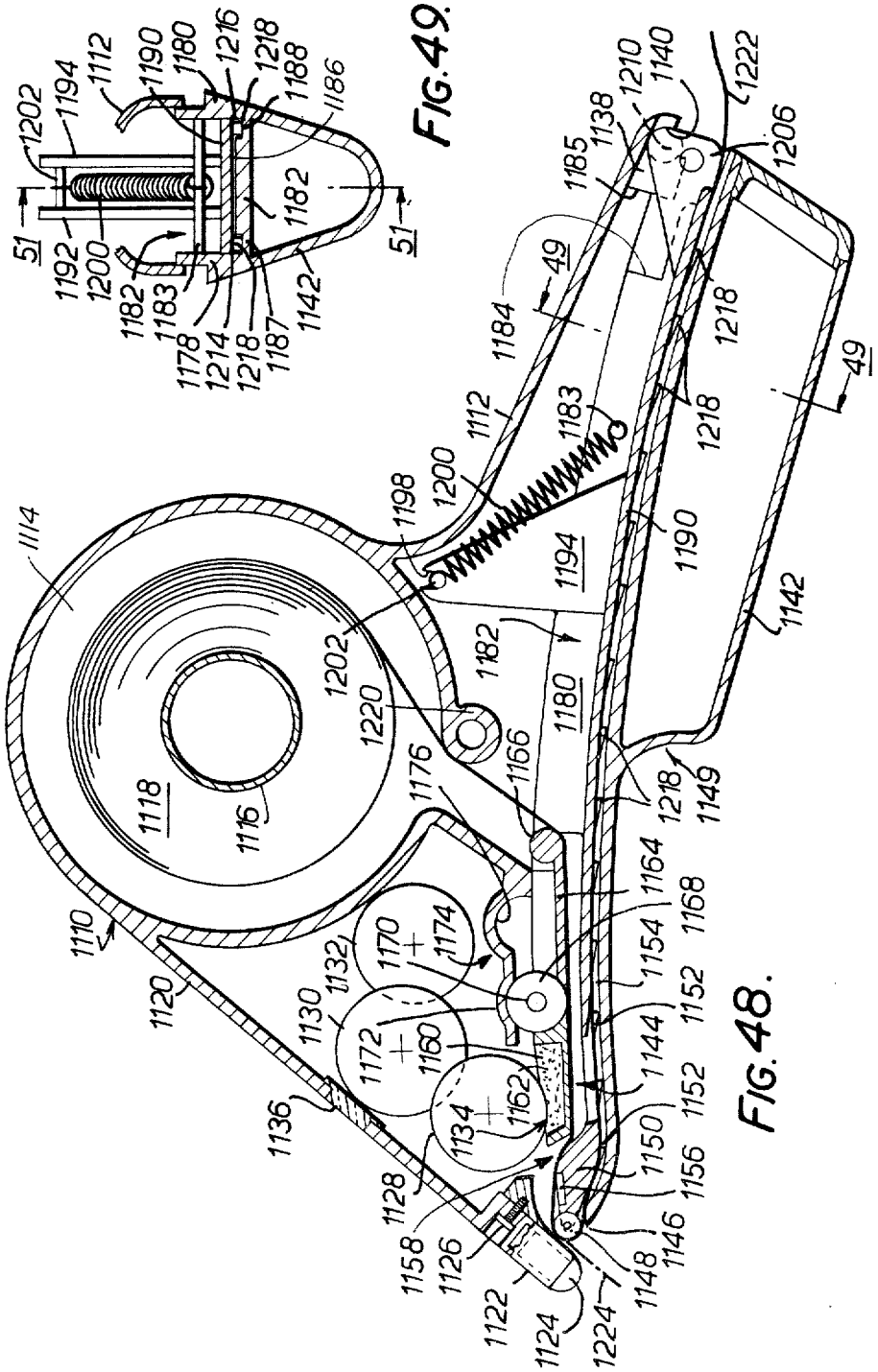
1202
1194
1112
1190
1180
1216
1218
1188
1186
51
1192
1200
1182
1183
1178
1214
1218
1187
1142
1182
51
1185
1138
1210
1140
1222
1206
49
1184
1218
49
1112
1183
1218
1198
1200
1190
1114
1194
1142
1202
1182
1220
1180
1166
1176
1218
1149
1118
1116
1164
1154
1168
1110
1170
1174
1132
1120
1130
1172
1160
1144
1152
1162
1134
1150
1152
1136
1156
1128
1146
1158
1126
1148
1122
1124
1224

FIG. 49.

FIG. 48.

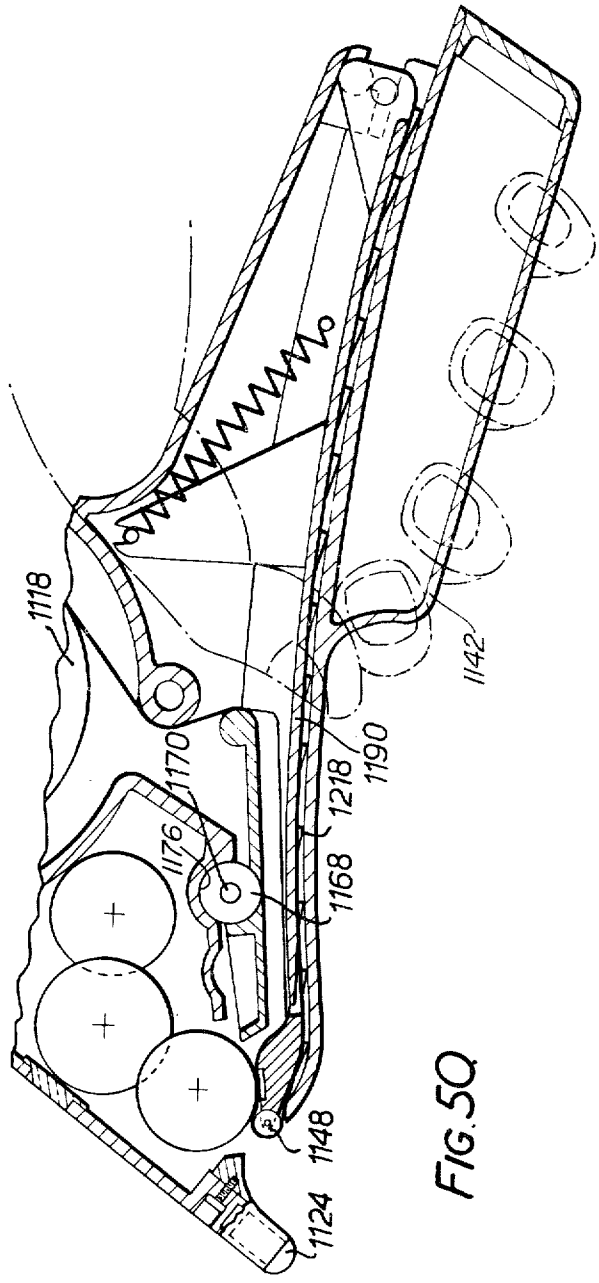
1118
1170
1176
1168
1218
1190
1142
1148
1124

FIG. 50

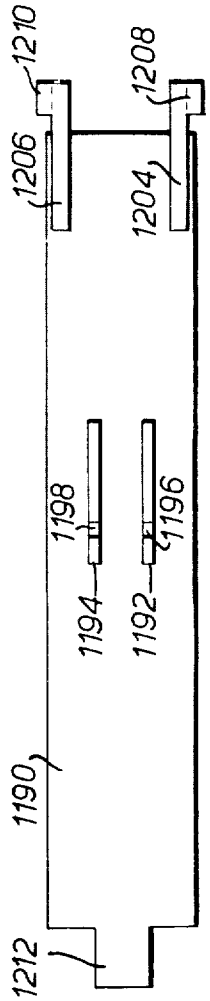
1210
1208
1206
1204
1198
1196
1194
1192
1190
1212

FIG. 51

LABEL DISPENSING AND APPLYING APPARATUS

FIELD AND BACKGROUND OF THE INVENTION

This invention relates to self-adhesive label printing and applying devices, and also to devices which serve only to dispense and apply self-adhesive labels.

Such devices may serve to print and apply self-adhesive labels to articles, for example price and code labels applied to packets to be placed on sale in a retain shop. In simplified versions, the devices may serve simply to carry a supply of pre-printed labels and to dispense and apply them to articles. The devices may be hand held or otherwise and for the sake of simplicity will be termed hereinafter "applicators."

SUMMARY OF THE INVENTION

According to the present invention there is provided a label applicator comprising a casing, means for carrying a stock of self-adhesive labels supported on a backing strip having regularly spaced engagement means along its length, a dispensing member carried by the casing and arranged to detach and dispense successive labels from the backing strip, a member having on a face thereof a series of barbs with the same spacing as the engagement means, and means for actuating the barbed member to engage successive series of the engagement means of the backing strip thereby to advance the labels for each operational cycle from the stock by one label length to the dispensing member.

Further according to the present invention there is provided a label applicator comprising a casing, means for carrying a reel of self-adhesive labels supported on a backing strip having regularly spaced notches along its length, printing means housed within the casing for printing successive labels, a dispensing edge member carried by the casing and arranged to detach successive printed labels from the backing strips by passage of the latter over the edge thereof, a feed mechanism including a member movable within the casing and arranged to engage successive series of the notches by barbs on a face thereof, the barbs having a spacing equal to the spacing of the notches, and means common to the printing means and the barbed member for actuating the printing means to print a label about to be dispensed and for actuating the barbed member to move the backing strip by one label and to detach the label at the dispensing edge member, the arrangement being such that the dispensed label is that one which has been printed by the same operational cycle.

Still further according to the present invention there is provided a label applicator comprising at least one print head assembly, means for dispensing printed labels and actuating means operative to print and to dispense a given label in the same operational cycle.

Yet further according to the present invention there is provided an applicator for self-adhesive labels mounted on a backing strip having a continuous series of regularly spaced notches along both longitudinal edges, the applicator comprising a casing, a print head assembly pivotally mounted in the casing, ink pad means for inking operative type facets of the print head assembly, a label-support printing platen movable substantially rectilinearly past the operative type facets, a label feed slide rigid with the platen and supporting the ink pad means, a platen carrier, a label dispensing member adjacent the platen actuating means of the platen carrier and the print head assembly, the actuating means comprising a pivotal trigger, a flexible elongate member connecting the trigger to the platen carrier, a return spring connecting the casing to the carrier, and means on the platen carrier for urging the ink pad and the platen towards the operative type facets, the feed slide comprising at least one series of regularly spaced barbs adapted to engage the backing strip during a first stroke of the slide and a barbed member fixed to the casing and adapted to engage and hold the backing strip during the second, return stroke of the feed slide, the return stroke serving to draw the label printed during the first stroke over the dispensing member and to draw a fresh label from the supply on to the platen.

BRIEF DESCRIPTION OF THE DRAWINGS

Four embodiments of applicators in accordance with the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

FIG. **1A** is a side elevation view, partly in section, of a first applicator embodying the invention;

FIGS. **1AA** and **1AB** are together a longitudinal section of a forward portion of the first embodiment;

FIGS. **1BA**, **1BB** and **1BC** are together an exploded view of the first embodiment;

FIG. **2** is a section on the line II—II of FIG. **1A** with certain parts omitted;

FIG. **3** is a plan view of a unitary member including a fixed handle and certain portions of the casing of the applicator;

FIG. **4** is a section on the line IV—IV of FIG. **3**;

FIG. **5** is an end elevation of one part of a side casing;

FIG. **6** is a side elevation of the side casing of FIG. **5** viewed from the interior;

FIG. **7** is an end elevation of a second part of the side casing;

FIG. **8** is a side elevation of the side casing of FIG. **7** viewed from the interior;

FIG. **9A** is a plan view of a platen;

FIG. **9B** is a perspective view of a carrier for the platen of FIG. **9A**;

FIG. **10** is a front elevation of the platen carrier;

FIG. **11** is a plan view of a spring which, when in situ, lies between the platen carrier and the platen;

FIG. **12** is a side elevation of the spring;

FIG. **13** is a longitudinal central section of the assembly formed by the parts of FIGS. **8** to **12**;

FIG. **14** is a side elevation illustrating the relationship between certain parts (ink pads) of the applicator;

FIG. **15** is a front elevation of an ink pad;

FIG. **16** is a front elevation of an ink pad carrier for use with the ink pad of a front one of two print head assemblies;

FIG. **17** is a front elevation of an ink pad carrier for use with the ink pad of a rear one of two print head assemblies;

FIGS. **18** to **26** are fragmentary diagrammatic outline side views illustrating the operation of the first embodiment;

FIG. **27** is an outline side view illustrating access to the working parts of the applicator;

FIG. **28A** is a side elevation, partly in section, of a second embodiment which includes only a single print head assembly;

FIG. **28B** is a fragmentary side elevation, to an enlarged scale illustrating working parts of the second embodiment;

FIG. 28C is a fragmentary cross-section on the line AA—AA (right-hand half) of FIG. 28B and BB—BB (left-hand half) of FIG. 28A;

FIG. 29 is a plan view of a feed slide of the second embodiment;

FIG. 30 is a longitudinal section of the feed slide of FIG. 29 on the line A—A of FIG. 29;

FIG. 31 is a side elevation of the feed slide;

FIG. 32 is a section on the line B—B of FIG. 30;

FIG. 33 is an end elevation of the feed slide;

FIG. 34 is an inverted plan view of a part which forms one part of the casing of the second embodiment and a part of the feed mechanism;

FIG. 35 is an end view of the part shown in FIG. 34;

FIGS. 36A and 36B are together a perspective exploded view of the second embodiment;

FIG. 37 is a diagrammatic outline of the second embodiment showing the working parts thereof in a rest position;

FIGS. 38 to 41 are outlines showing the working parts in positions when the platen has been drawn rearwardly through 3mm. 9mm. 15mm. and 19mm. (maximum) travel, respectively;

FIG. 42 is an outline showing the working parts in positions when the platen has been partially moved to its forward position and a label is being dispensed;

FIG. 43 is an outline at the instant of label dispensing;

FIG. 44 is an outline showing the second embodiment in its open configuration;

FIG. 45A is a side elevation, partly in section, of a third embodiment having two print head assemblies, and FIG 45B is a section of the unsectioned parts of FIG. 45A, to an enlarged scale;

FIGS. 46A and 46B are together an exploded perspective view of the applicator of FIG. 45;

FIG. 47 is an exploded perspective view of a part of a handle and trigger portion of the applicator of FIGS. 45 and 46;

FIG. 48 is a longitudinal section of a fourth embodiment in its rest position, on the line 48—48 of FIG. 49 with certain parts omitted;

FIG. 49 is a section on the line 49—49 of FIG. 48;

FIG. 50 is a view corresponding to FIG. 48 with the working parts adjacent their rearmost positions and a label about to be dispensed being printed, and showing how the applicator can be held in the hand; and

FIG. 51 is a top plan view of a tongue member used in dispensing means of the fourth embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, all embodiments of the applicator are intended for use with a band or web of self-adhesive labels having accurately regularly-spaced indents or notches along the whole of the length of the backing strip. Other bands, however, can also be used. The notches or indents may be provided either at both longitudinal edges of the backing strip, or centrally, or, possibly, at one longitudinal edge only. It should be emphasized that the exact form of the web of labels is not critical provided that some form of accurately, regularly spaced indents, notches or other engagement means is provided which can be positively engaged by a part or parts of the mechanism of the applicator. All applicators hereinafter described serve to print data, such as prices and stock coding, on each label immediately prior to applying the label onto an article, the backing strip on which the labels are mounted being deflected away from the labels immediately adjacent to the point of application to an article, and the spent backing strip being discharged at a point remote from the point of application of the labels.

The applicators herein described can be substantially modified, and simplified by omitting the print head or print heads, thus serving simply to dispense and apply pre-printed labels.

The applicator of the first embodiment has the facility of applying two separate impressions to each label and these impressions may, if so desired, be in different colors. As will be apparent from the description given hereinafter the printing operation, for any given operational cycle, takes place on the same label as that dispensed during that cycle. This feature avoids label wastage when the print-out is changed.

Broadly, the first embodiment comprises a casing housing the working parts, and actuating means including a trigger arranged by a pivotal squeeze action to operate all the working parts in order to print and dispense successive labels and to feed the next label. The main working parts are a label feed mechanism, two print head assemblies, two inking assemblies, a member which serves to detach and dispense successive printed lables from the web and a pad or other application member adjacent to the detaching device which serves actually to apply the labels to articles.

The casing comprises two main portions **100, 101** which, as can be seen from FIGS. **5, 6, 7** and **8,** serve substantially to enclose the working parts laterally and peripherally along the upper (as shown) edge only of the applicator. The main portion **100** (FIG. **8**) has an outline in side elevation including a generally rectilinear upper edge **102** which terminates at the front of the applicator in a curved edge **104** which itself continues in a rectilinear edge **106** inclined to the upper edge **102** at an angle of approximately 60°. As can be seen from FIGS. **1BC** and **7** the edges **102, 104** and **106** have substantial transverse dimensions and thus constitute transverse wall portions. The outline, continuing beyond the edge **106,** is stepped inwardly at **108** and continues, parallel to the portion **106,** as a rectilinear edge **110.** This edge **110** does not have a corresponding transverse wall portion although, at its end remote from the step **108,** it carries a rod-like transverse member **112** (FIG. **1BC**) which has a countersunk bore **114** for a locating dowel **116** (FIG. **1BA**). The member **112** is of generally rounded section, but one corner, **118** (FIG. **8**), is notched and not rounded as the other two. It receives an edge portion of a catch release button **314** (FIG. **1AA**) of the casing described hereinafter. The notched corner **118** lies at the end of the portion **110** and that rounded corner **120,** lying inwardly of the other rounded corner **122,** lies adjacent a further, short, rectilinear edge **124** which joins a lower edge **126** extending substantially parallel to the edge **102.** The edges **110** and **124** are substantially at right angles to one another. The edge **126** extends through the length of the upper edge **102** and terminates at an arcuate edge **128** which again has transverse thickness and thus constitutes a further transverse wall portion. The arcuate edge **128** effectively continues as an internal arcuate wall **130** which extends back to the edge **126** (FIG. **1BC**). The wall corresponding to the edge **128** extends only part way across the width of the applicator as is apparent from FIG. **7.** The end of the wall **130** ad-

jacent the edge **126** terminates in an elongate, hollow, boss **130A** as is apparent from FIG. **8** and this serves to receive a locating dowel. A boss **132** with an aperture **134** extends beyond the end of a short arcuate portion **136** itself forming a continuation of the upper edge **102** and also beyond the end of the wall **130.** As seen in FIG. 1A, the portion **136** and the end portion of the wall **130** receive an end portion of an internal part of the applicator to be described in detail hereinafter. A transverse step **131** in the end portion of the wall **130** serves to lock the end portion of the internal part in engagement. The wall **130** does not intersect the portion **136** and is spaced therefrom by a transverse projecting **140** of the wall corresponding to the edge **102.**

The upper wall corresponding to the edge **102** has two transverse slots **150, 152** of dove-tail cross-section and each serves to carry an elongate magnifying or plain lens **154, 156** (FIGS. 1AA, 1AB), respectively, of complementary cross-section to the slots to faciliate reading the characters at any given time visible on the read-out of the respective print head assemblies in their locked position (for example, as fully described in nicholson application Ser. No. 378,031, filed July 10, 1973). In a modification these slots **150, 152** and lenses **154, 156** may be angled so that the characters may be more conveniently read when the operator is viewing the characters from a position rearwards of the applicator.

The space lying between the edges **102, 104, 106,** 108, 124, 126 and the wall **130** outlining the casing main portion **100** is occupied by a side wall **160** and this carries a number of internal projections serving to support working parts. A hollow boss **162** is substantially concentric with the wall **130** and serves to carry a reel of labels **164** (chain lines in FIGS. **18** to **27**). The space lying between the edge portion **128** and the wall **130** is spanned by a further side wall **166** at the opposite side to the side wall **160** and the hollow boss **162** extends from this side wall **166** substantially across to the inner plane of the wall **160.** The side wall **160** does not extend between the edge **128** and the wall **130,** to enable access to the reel. A further transverse boss **170** extends eccentrically within the hollow boss **162** but concentrically with the edge **128** and continues to a plane just short of the inner plane of the side wall **166.**

The purpose of the boss **170** is to accommodate a screw holding the parts **100, 101** together. The side wall **160** is integral with two large diameter annular locating spigots **172, 174** which serve to support, when the applicator is assembled, the assembly of read-out wheels of the front and rear print label assemblies. These spigots **172, 174** lie adjacent the respective read-out slots **150** and **152.** A hollow, elongate, sleeve **176** of smaller diameter lies between the two spigots **172** and **174** and this serves to accommodate a fixing screw **178** (FIG. 1AB) and a dowel (not shown). Two smaller diameter spigots **180, 182** serve as pivot carriers for the front and rear print head assemblies **350, 352** (FIGS. 1AA, 1AB) and a cam track **184** extends from the lower edge portion **126** to a position adjacent the spigot **174.** Details of the cam track will be given hereinafter. Finally, the side wall portion **100** includes a projection **186,** depending below the edge portion **126** and extending forwardly of the boss **130A,** and a solid spigot **188** adjacent the edge portion **110.** The projection **186** serves with a complementary part **186A** of the portion **101** to locate the two portions relative to a further casing part **220.** The spigot **188,** in conjunction with a corresponding spigot of the casing portion **101** serves pivotally to support an ink carrier hereinafter described.

The side wall portion **101** (FIG. **6**) of the casing has a number of features common with those of the casing portion **100** and parts serving corresponding functions will be given the suffix "A" and will not be further described. The main differences between the portions **100** and **101** are that the transverse wall portions of the casing portion **101** are of only comparatively small extent measured transversely and the internal spigots **172** and **174** have complementary external annular bosses **200, 202** and apertures **204, 206** which accommodate adjusting knobs **208, 210** (FIGS, 1AA, 1AB and 1BA) of the front and rear print head assemblies **350, 352.** The boss **162A** again carries an internal eccentric boss **170A,** and this has a countersunk bore **212** (FIG. **5**) arranged to receive a head and part of the shank of a fixing screw (not shown). The boss **162A** is disposed at and spans laterally one edge **214** of the casing portion **101** which extends substantially from the projection **186A** to the boss **132A.** The transverse extent of the boss **162A** is slightly greater than that of the casing portion **101** as a whole, so that when assembled with the portion **100** it engages in a recess in the latter aligned with the boss **162.** The side wall **216** itself is therefore not defined by the same outline as of the wall portion **160,** but most of the edges are complementary.

A further part **220** of the casing which is integral with the fixed part **222** of the handle is illustrated in FIGS. **3** and **4** as well as in FIGS. 1A and 1B. As will be apparent from FIG. 1A, one peripheral wall portion **224** of the casing part **220** is arcuate in longitudinal section and is concentric with the eccentric bosses **170, 170A** but is spaced from the outer surface of the wall defined by the edge **128.** This space defines, in part, a channel **225** for spent backing strip and will be referred to again hereinafter.

Adjacent a junction with the inner end of the fixed handle part **222** which extends outwardly and rearwardly from the casing as a whole, a rectilinear tongue **226** extends from the end of the arcuate part **224** parallel to the upper edge **102** but, as will be apparent from FIG. **4,** the part **224** is not in tangential relationship with the wall **226.** A further rectilinear wall **228** lies parallel with the tongue **226** but is spaced therefrom both in a lateral and longitudinal sense so that a gap **230** is formed between adjacent edges of these walls. As will be apparent from FIGS. **1B** and **3,** the tongue **226** has a width less than the width of the casing part **220** as a whole, while the wall **228** extends across a greater proportion of the width and is integral at its longitudinal edges with side cheeks **232** through the intermediary of a riser **233** and longitudinally extending horizontal steps **235** as shown in FIG. **2.** Each of the side cheeks **232** extends from adjacent the upper edge (as shown in FIG. **4**) of the part **224** to a tip **234** lying forward of the front edge of the wall **228.** Each horizontal step **235** is integral with a ramp **237** and this also lies alongside and is integral with the corresponding cheek **232.** One part **236** of the free edge of each cheek is rectilinear and lies parallel to the wall **228** and another part **238** is inclined thereto by the same angle as the edge **214** of the casing portion **101.** The two edges are joined by a smooth curve and edges **236** and **238** are complementary to and form a good fit with the edges **126A** and **214** (FIG. **6**) when assembled. The

wall **228** carries two inclined projections **239** symmetrically arranged about the longitudinal center line, which extend effectively beyond the forward edge of the wall **228** and have a purpose described in detail hereinafter. The forward edge of each cheek is inclined at an angle of approximately 30° to the wall **228** and the center line of each projection **239** is at approximately the same angle.

The fixed handle **222** is of channel section and is closed at the extremity remote from the tongue **226.** Two integral cam tracks **250** (only one shown) are provided internally of and integral with each side limb of the channel and these tracks cooperate with rollers **252** (FIG. 1A) provided on a link **254** of a movable trigger **256.**

The movable trigger **256** is of channel section and the external surface is suitably shaped to accommodate a user's fingers. A transverse indent or recess **258** is provided adjacent the free end to assist the gripping action. The trigger **256** (FIGS. 1A and 1BA) is pivoted by a pin **260** in the fixed handle **222** and this pin also carries a roller **262** which acts as a guide for an elongate flexible strip **264** or other member connected between that end of the link **254** carrying the rollers **252** and a retainer member **266** (FIG. 1AB) connecting the flexible member with the working mechanism of the applicator. In a modification, the flexible strip takes the form of a continuous band. The end of the link **254** remote from the rollers **252** carries two lateral, opposed, circular section pegs **268** which snap into a corresponding pair of open socket members **270** which are integral with opposite side limbs of the channel-section trigger member **256.** The rest position of the trigger is shown in full lines in FIG. 1A.

The casing is completed by a catch member **300** illustrated in FIGS. 1AA, 1BB and 1BC. This member is formed essentially of two integral portions **302, 304** disposed mutually at right angles to one another and the member serves the purpose of closing the gap between the wall **228** and the wall **106.** from portion **302** is formed by two opposed angle sections **306** spanned over a part of their lengths by a brige **308.** At the junction between the free parts of the angles the te bridge **308** two semi-annular seats **310** are provided which serve partially to support pins **312** integral with a catch button **314** (see FIGS. 1AA and 1BC). At the end of the bridge **308** remote from the seats **310** two opposed lugs **316** are provided which together support a pressure pad **318** of semi-cylindrical shape which serves as the application member. The preferred pad comprises foam natural or synthetic rubber or a foam synthetic resin coated by adhered glass balls. The lugs **316** lie at the corner of the member **300** and the angles continue in the portion **304** defining an opening **320** through which labels are dispensed. Below the opening a further bridge **322** is provided and this continues into a space lying between two lugs **324** forming continuations of the angles but spaced apart by a smaller distance. Each lug **324** has an aperture **326** carrying a pivot pin **328** of the catch member **300.**

The catch member **300** can be released and pivoted from the position shown in FIG. 1AA by the catch release button **314** which comprises a rectangular portion **330** with a part-spherical finger recess **332** on its external face and an inwardly off-set rectangular portion **334** interconnected by a thickened portion **336** which carries the two lateral integral pins **312** partially supported in the part-annular seats **310** of the catch member **300.** As shown in FIG. 1AA the catch release button **314** is retained in the seats **310** by the action of a U-shaped spring **338** engaged between the bridge **308** and the portion **334** of the catch button. Two shallow opposed transverse ridges **339** on the bridge **308** and portions **334** serve to retain the spring in position. The rectangular portion **330** has two ridges (not shown) on its side edges which prevent the spring from forcing the catch release button outwardly beyond the plane of the outer face of the bridge **308.**

The assembled parts are held together by screws **116,** (FIG. 1BA) **178** (FIG. 1AB) **309** (FIG. 1A) and **311,** (FIGS. 1A and 1AB) the corresponding apertures being countersunk to avoid the screw heads and the nuts interrupting the smooth outline of the casing.

The working parts of the applicator will now be described in the sequence in which the parts operate on the web of labels as the web **348** (FIGS. **18–26**) is withdrawn from the reel **164** (FIG. **27**) mounted rotatably on the bosses **162, 162A.** The web passes from the reel beneath the rearward print head assembly **352,** beneath the forward print head assembly **350** over and in contact with the upper surface of the label and backing strip support platen **354** and around a dispense edge roller **356** or other member which serves to detach and dispense the individual labels from the backing strip because of the relatively greater stiffness of the label in comparison with the backing strip. The labels then pass out through the opening **320** and are applied by the pad **318.** The spent backing strip **349** then encounters the feed mechanism which draws the web through the applicator and finally passes out through the channel **225** and an opening **358** (FIGS. 1A and **27**).

The individual working parts will now be described in detail, although the print head assemblies **350** and **352** will be described only in outline because a full description is given in co-pending application Ser. No. 378,031. However it must be emphasized that other print head assemblies could be employed. Each print head assembly **350, 352** (FIG. 1BB) includes a plurality of flexible print bands **360** mounted between end plates **362.** Each end plate has a shift **364** enabling the print band assembly to be pivotally mounted in the bosses **180, 180A** and **182, 182A** of the respective side walls **160, 216** of the casing. Each end plate **362** also carries a circular projection **366** adjacent the end thereof remote from the shaft **354** and a rectangular projection **368.** As will appear hereinafter these projections serve a control purpose. Each end plate **362** also includes an arcuate flange **370** centered on the shaft **364** and a radial lug **372** at one end of the arcuate flange, both these parts serving to control the locking of the front print head assembly, in a manner to be described hereinafter. The side wall **160** carries stops **371,** shown in broken lines in FIGS. 1AA and 1AB, which serve as stops for the print head assemblies by engaging, at the desired respective ends of their pivotal movement, the respective ends remote from the lugs **372,** of the flanges **370.** The lugs **372** serve no purpose for the rear assembly and are incorporated merely for the sake of uniformity and interchangeability.

Each print head assembly **350, 352** (FIG. 1BB) has a respective set of read-out wheels **374, 376** assembled on a shaft assembly (not shown) and mounted between flanges. The read-out wheel assemblies **374, 376** are coupled to respective knobs **208, 210** and, as described

in our co-pending application Ser. No. 378,031, rotary motion of each knob selects a particular character of a given print band and read-out wheel while axial inwards motion of the knob enables the selected band and read-out wheel to be changed. The selected characters are read through the lenses **154, 156** only when the print head assemblies are locked in their rest position.

The front print head assembly **350** cooperates with a front ink pad holder **380** (FIG. 1BC) mounted in an ink pad carrier **382,** while a rear ink pad holder **384** and carrier **386** cooperates with the rear print head assembly **352.** The ink pad holders **380** and **384** (FIGS. 1AA, **14** and **14**) are identical and only one will be described in detail. Each comprises a reservoir portion **390** of elongate shape and rectangular cross-section, open at one end and communicating at the other end with a dish portion **392** which is open at one face **393** to enable contact of absorbent inking material with the type facets of the bands, the open face lying at approximately 100° to the reservoir portion **390.** The edge **394** of the reservoir portion is chamfered. Both portions are filled with a conventional ink absorbent material (not shown). Externally the reservoir portion **390** has two opposed lugs **396** of circular section at the ends of the side walls remote from the dish portion **392.** A further pair of opposed circular section lugs **398** is provided approximately half-way along the side walls. The lugs **398** are shorter than the lugs **396.**

As is apparent from FIG. **14,** the front ink pad holder **380** is clipped into its carrier **382** by the lugs **398,** the corresponding slots **400** in the carrier being of re-entrant form, while the lugs **396** merely rest in U-shaped slots **402.** The rear ink pad **384** is clipped by the lugs **398** into re-entrant slots **404** and the lugs **396** merely rest in U-shaped slots **406** of the carrier **386.**

The front carrier **382** shown in FIGS. **1BC** and **14** comprises a pair of side member **408** each with the slots **400, 402** in one edge and an upstanding lug **410** with an aperture **412** adjacent the slot **400.** A transverse bar **414** interconnects the two side members **408** at the ends thereof remote from the lugs **410** and this bar carries at opposite ends teeth **416** arranged to engage the lug **372** (FIG. **1BB**) on the assoicated end plate of the print band assembly. A further connection **418** is provided between the side members **408** in the form of a plate connected at the edges opposite to the slots **400,** 402 and a detent **420** extends away from each lateral edge of the connection **418.** The ink pad holder **380** is held in fixed relationship with its carrier by contact with the connection **418.** At the end remote from the bar **414** each side member has a narrow tapering extension **422** extending from the longitudinal edge remote from the lug **410** and inclined to that edge. As will be apparent from FIG. **1AA,** in one position the teeth **416** engage one face of the lugs **372** of the forward print head assembly, while the detent **420** engages one face of a control member **430** (FIG. **14**) of the front print head assembly. That edge of the bar **414** facing towards the chamfered end edge **394** of the ink pad reservoir is of complementary shape to provide a seal.

The two control members **430** (one at each side) each include three arms **432, 434** and **436** each of differing shape and serving different purposes. The arm **432** is generally triangular with one side arranged to engage a convex face of the detent **420** in the locked position of the print head assembly. The arm **434** is generally rectangular and one side face is arranged to engage one of the projections **368** of the end plate as shown in FIGS. **14** and **1AA,** in the locked configuration. The arm **436** has a part-circular tip and serves to rotate the heads as will appear hereinafter. Each member **430** is pivotally mounted on a pin **366** of the respective end plate of the print head assembly.

The carrier **386** (FIGS. **14** and **17**) of the rear print head assembly comprises a pair of side members **409** having the slots **404, 406** along one longitudinal edge. A lower portion (FIG. **14**) **411** is slightly inclined to the upper portion and generally tapers to a tip **413.** The ends remote from the tip **413** are interconnected by a bridge **415** and each side member is connected integrally with an arm **417** which is thicker than the side member and tapers towards the pivot axis of the corresponding print head assembly. Each arm **417** terminates in a slotted ring **491** which, when assembled on the corresponding print head, serves to pivot the carrier. The slots in rings **419** assist initial assembly.

A corresponding control member **440** of the rear print head assembly **352** comprises a bifurcated arm **442,** an arm **444** with a part-circular tip and a semi-circular lug **446.** Each control member is mounted by pin **366** on the corresponding plate plae **362** and, it will be noted that the two arms are inclined to one another at an angle of approximately 145°. The lug **446** is thinner than the remainder of the member **440.**

The web **348** next encounters the platen **354** which is shown in detail in FIG. **9A** as a plan view. The platen **354** takes the form of a generally rectangular plate having a pair of opposed edge portions **450** of reduced thickness. Each edge portion has a shallow recess **452** extending along a major proportion of its length, and one corner of each edge portion is chamfered to form a tooth **454.** The transverse edges **456** of the platen are chamfered as can be seen from FIG. **13.** The edge portions serve to retain the platen in its carrier and the recesses **452** fit against inner faces of the carrier to be described hereinafter.

The platen **354** is directly supported by a spring **451** as illustrated in FIGS. **11,12** and **13.** The spring comprises two elongate side strips **460** each having a relatively long straight limb **462** with a short arcuate tip portion **464,** an intermediate double arcuate portion **466,** the two parts joining at a cusp section portion **468,** and a relatively short straight limb **469.** Each portion **466** is continued inwardly by extensions **470** and these extensions are interconnected by a narrow bridge portion **472** forming a continuation of the cusp section portion **468.**

The platen spring **451** rests on a bridge member **480** (FIG. **13**) of a platen carrier **482** with the cusp section portion **468** engaged in a transverse groove **484** (FIG. **1BB**) of the bridge member, the curved tip **464** resting on a shaft or other transverse member **486** interconnecting two rollers **488.** The shorter limb **469** rests on a transverse spindle **490** which also serves to interconnect two side members **492** of a platen tooth member **493** (FIG. **9B**). The bridge member **480** has a ridge **494** (FIG. **13**) of semi-circular section at the rear edge and lies between two side cheeks **496. 498** (FIG. **1BB**) of identical outline and having similar functional parts. The ridge **494** continues forwardly as two fins **494A** only one shown.

The platen tooth member **493,** primarily illustrated in FIGS **9B** and **13** will now be described. Each side mem-

ber **492** has an inwardly-directed tooth **495** vertically above the spindle **490.** In cross-section each tooth **495** is generally rectangular but has a slight taper in a forward direction. As is apparent from FIG. **9B** each side member **492** has the shape of a highly irregular hexagon with two parallel, but unequal, horizonal sides (as shown), a rear vertical side and two sides extending forwardly from the parallel sides and meeting a second, very short vertical side, which effectively constitues the forwardmost point of the platen carrier. Two opposed inwardly extending teeth **497** lie immediately to the rear of these short vertical sides. Apertures **499** accommodate opposite ends of a slender rod **501** which carries the label detaching roller **356** and also serves pivotally to support the member in noses **500** of the platen carrier.

The cheek **496** of the platen carrier (identical to cheek **498**) includes one of the rounded noses **500** and, moving rearwardly, a vertically-extending step **502** is encountered which provides an abutment to limit pivotal motion for the rear vertical edge of one of the side members **492** of the platen tooth member **493.** A rectangular section projection **504** extends inwardly from the step **502** for a short distance and acts to restrain the forward edge of the platen **354** from rising excessively under the action of the platen spring. Rearwardly of the projecting **504** a shallower vertically-extending step **505** is provided while the upper edge of the cheek is inclined upwardly and has an upper tooth **506.** Rearwardly of this tooth **506** the edge **507** continues parallel to the plane of the bridge **480** and increases in breadth at a further vertically-extending step **508.** The step **508** does not, however, extend to the upper surface of the bridge **480** and a lip **510** is formed which extends to a rear vertical edge **512.** The edge **512** extends downwardly substantially to the level of the upper plane of the bridge **480** at approximately mid-length thereof. A prong **514** extends rearwardly and inwardly from the step **508** and is of elongate, generally wedge-like form with the taper rearwards. Adjacent the front edge of the prong, a lower step **516** and corresponding recess are provided.

The upper surface of the prong **514** lies parallel to the upper plane of the bridge member **480.** However, the bridge member itself is cut away immediately below the steps **508** and the prongs **514** to form transverse edges **518** (only one shown) and longitudinal edges **520** as will be apparent from FIG. **9B.** The bridge member **480** has further steps **522** so that the rearmost edge including the ridge **494** is formed effectively only on a central tongue **524.** This ridge **494** is transversely aligned with the forward end of U-shaped slots **526** formed in the cheeks **496** and **498,** these slots being adapted to receive the shaft **486** (FIG. **13**) of the pair of rollers **488.** Each slot **526** extends to approximately one half of the local depth of the cheek and rearwardly of the slot the upper wall of the cheek is inclined downwardly at **528** and the cheek terminates rearwardly in a vertical edge **530.**

A further bridge member **532** has its forward edge **534** vertical below the rear edge of the ridge **494** and this bridge member **532** continues rearwardly. At a line substantially vertically below the front edge of the inclined portion **528** of the cheek **496** the leading edges of two dependent flanges **536** meet the under surface of the bridge member **532.** These flanges extend rearwardly from the leading edges as downwardly inclined ramps to the maximum depth of the flanges at approximately one quarter of their lengths where they continue with a lower edge parallel to planes of the bridge member **532.** As can be seen in FIG. **10,** the flanges **536** lie inwardly of the longitudinal edges of the bridge member **532** and, at the intersection of the inclined leading edge there and the lower edge are two outwardly facing spigots **537.** At a line just rearward of the spigots **537** the bridge member has a step **539** which extends transversely over a central portion of its width and rearwardly of the step there is a shallow longitudinal slot **540.** The spigots **537** carry at each exposed end portion a roller **541** (FIG. **13**) which rolls along the interior surface of a track member **642** (FIG. **1BB**). At approximately mid-length of the lower beidge member **532** two upstanding projections **544** are provided, one being at each longitudinal edge, and each having a vertically-extending ridge **546** at the rearward end and a circular section peg **548** at the upper forward corner. A slot **550** is provided in each flangs **536** and these receive end portions of the member **266** (FIGS. **18, 19** and **21**). A pin **552** extends between rearward end portions of the flanges. The pin **552** extends only part way across the bridge member corresponding to the transverse dimension of the slot **540** but is symmetrical about the centre line. The end portion of the bridge member **532** remote from the bridge **480** is semi-circular in plan view.

As is apparent from FIG. **13,** the platen carrier **482** also supports a part of the web feed mechanism, and this part takes the form of an elongate generally plane barbed member or feed slide **560** constituting a part of a lost motion drive. Considering its component parts from front to rear it includes an upturned lip **562** of arcuate cross-section which, as shown in FIG, **13,** abuts the ridge **494** of the tongue **524** with its upper edge. At each end the lip **562** is integral with a thin vertical web **564** which extends downwardly and lies in contact with the upper surface of the bridge member **532.** A pair of ramps **566** is provided on the upper surface of the member **560** and these extend rear-wardly from a line adjacent the rear face of the lip **562.** The ramps are disposed symmetrically of the centre line and terminate rearwardly at abutments **568.** The lengths of the ramps correspond substantially to the free or lost motion of the platen before the feed mechanism is activated. At the end portion remote from the lip **562** the member **560** is bifurcated, with the inner longitudinal edges **570** of the parts **572** chamfered at an angle of approximately 20° to the vertical. Adjacent the rear edge, each part **572** has a tooth **574** and these taper towards the trailing edge. The lower surface of the member **560** is provided with two series of barbs **576** one disposed along each longitudinal edge, the barbs being regularly and accurately spaced longitudinally by a distance equal to the spaces between the notches of the web. Transversely the barbs have substantially the width of the depth of the notches in the web. The steps of the barbs are inclined at an angle of approximately 90° to the lower surface of the member **560.** The outer longitudinal edge of the parts **572** carries at the ends remote from the lip **562,** a generally rectangular side plate **578** which extends both above and below the part **572,** the lower and vertical rear edges forming abutments being fore-shortened by an inclined edge **580.**

In the assembled condition illustrated in FIG. **13.** the member **560** lies parallel to the bridge member **532** and the rearward vertical edge of each projection **544** is ar-

ranged, under certain conditions of operation, to abut the forward vertical edge of the corresponding side plate **578.**

The platen carrier **532** is connected to the casing part **220** by an elongate helical spring **600,** (FIGS. 1A, 1AA and 1AB) which is engaged over the pin **552** and the other end of which is engaged over a pin **602** which spans the projections **239** carried on the wall **228.** The spring **600** lies between the two flanges **536.** The retainer member **266** is secured to and spans the lower edges of the flanges **536.**

The web feed mechanism also comprises an arcuate section member **604** (FIGS. 1BA and 27) arranged to nest between the arcuate part **224** of the casing and the arcuate edge wall **128** thereby defining the channel **225** in conjunction with the part **224.** The wall, although it extends only half way across the applicator, provides sufficient support for the member **604.** The outer surface is provided with two series of barbs **606,** one series being disposed at and adjacent each of the outer longitudinal edges, these barbs being identical in configuration to and longitudinally forming a continuation of the barbs of the member **560.** The end of the member **604** adjacent the member **560** is integral with a tongue **608** (FIG. 1BA) and a terminal cross-piece **610.** The rear edges of the tongue are arranged to engage the teeth **574** to limit forward motion of the feed slide. The tongue **608** is aligned with the member **560** and, as will be apparent, neither tongue nor cross-piece carries any barbs. The end of the arcuate section member **604** remote from the tongue **608** is integral with a boss **612** of hollow cylindrical form, and a further, tapering tongue **614** extends beyond the boss and, when assembled, as shown in FIG. 1A, the tongue **614** engages between the bifurcated end portions of the casing part **102.** The boss accommodates a pin **616** about which the casing parts hinge when opened (see FIG. 27).

A number of small, auxiliary parts will now be briefly mentioned. Referring to FIG. **14,** a leaf spring **620** includes an intermediate single coil **622** wrapped around the sleeve **176** and two limbs **624, 626** extending outwardly from the coil. A portion of the limb **624** is formed as a helical spring. The extremity **628** of the limb **624** is hooked and engages in a recess behind the tooth carrying part of the carrier **382** while the other limb is curved and its extremity engages in a side wall of the casing.

A helical spring **630** (FIGS. 1AA and 1AB) is anchored at one end in the aperture of the lug **446** of the control member **440** and is anchored at the other end on a projection **632** provided on one end plate **362** of the forward print head assembly **350.** As shown in FIG. 1AA the spring is partially wrapped around a rotatable bush mounted on the spigot **180** and as the print head swings rearwardly the wrapping action is increased (see FIGS. **18** to **26**).

The rollers **541** are constrained vertically by side channels **640** provided on a member **642** (FIG. 1BB only).

The operation of the applicator will now be described primarily with reference to the sequence of FIGS. **18** to **27,** but reference will also be necessary to certain details which are apparent only from FIGS. **1** to **17.**

In FIG. **18** all the working parts are in their respective rest positions and a reel **164** of self-adhesive labels has been loaded into the applicator. The two print head assemblies **350, 352** are locked in position, the front assembly being held stationary by engagement of the teeth **416** of the carrier **382** against one face of the lugs **372** (one each side) under the action of the spring **620** while the arms **434** of the control members **430** abut the projections **368** of the end plates **362.** Simultaneously, the detents **420** abut the upper surfaces of the arms **432** of the control members **430,** and the flanges **370** abut the stops **371,** the arms **436** being spaced from the edges **512.** The control members are thus effectively rigid with the print head assembly and the detents **420** and lugs **372** positively prevent pivot motion of the print head assembly **350** in both senses. The extensions **422** of the carrier **382** are spaced slightly from the teeth **506** of the cheeks **496, 498.** The rear print head assembly **352** is similarly locked by engagement of the ends of the flanges **370** remote from the lugs **372** against stops **371** in conjunction with the action of the tension spring **630.** When a fresh label is brought up to the platen **354** at the end of the previous cycle, the web is guided by the under surfaces of the prongs **514** and the vertical edges **516** engage the rear edges of the web notches of the fresh label to prevent return of web. Because of the tension on the spent backing strip the platen tooth member **493** is biased in an anti-clockwise sense (FIG. **26**) and the label instantly on the platen is locked thereon by the teeth **495.**

Squeezing the trigger **256** has the almost immediate (approximately 2 millimetres of motion necessary) action of unlocking the front print head assembly, the trigger motion being transmitted through the flexible strip **264,** and the platen carrier, to the platen **354** and other working parts. The extensions **422,** already in contact with the teeth **506,** are immediately displaced rearwardly thus casusing the ink pad carrier to pivot, disengaging the teeth **416** from the lugs **372** and the operative face **393** of the ink pad contacts the type facets. The extensions **422** then clear the teeth **506** and come to reset on lands (not shown) so that the teeth **416** clear the lugs **372** and the operative face of the ink pad clears the operative type face. The rounded arms **436** are engaged by the vertical edges **512** of the side walls **496, 498** and the motion (as indicated in FIG. **19**) which results, represents the commencement of the swing of the operative type facets to the printing position. The platen tooth member **493,** which is pivotally carried by the nose pieces **500** of the platen carrier, engages, with the wider ends of the teeth **495** thereof, forward notches of the web of the fresh label on the platen as a result of the slight clockwise motion of the tooth member following slackening of the tension on the spent backing strip. The lower edges **516** of the prongs **514** already being in engagement with rear notches of the web, the label is firmly held on the platen ready for the two printing operations. The rear print head assembly **350** remains locked and the spent backing strip **349** downstream of the platen **354** is slightly slack.

The squeezes action continues and is, indeed, progressive throughout the whole operation as the spring **600** becomes tensioned and at a platen movement of 5.5 mm. (FIG. **20**), the control members **430** have further pivoted the print head **350** under the action of the edges **512.** The tips of the extensions **422** of the carrier **382** have overridden the teeth **506** and engage the land (not shown) so that the carrier pivots slightly clockwise and the teeth **416** engage the arcuate flange **370.** The operative print facets are thus moving towards the label on the platen **354** which, of course, also continues to

move rearwardly. The feed release rollers **488** are moving up their respective ramps **237** and the shaft **486** simultaneously moves up ramp **566.** The shaft is also constrained to move within the vertical slots **526** in the carrier **482,** the slide **560** remaining stationary. The spent backing strip **349** downstream of the platen has developed substantial slack. At the same time the platen carrier engages the rear ink pad holder carrier at the tips **413** thereof with the vertical edge **530** and the rear inking pad operative face **393** is moved against the operative type facets of the rear print head assembly by the action of the cam tracks **184, 184A** now to be described in detail. The rear print head assembly remains stationary in the FIG. **20** configuration.

As will be apparent from FIGS. **6** and **8,** the cam tracks **184, 184A** comprise a vertical rectilinear section **650** with an opposed inclined section **652.** The divergence provided by these two sections is necessary only to facilitate assembly. Upwardly, beyond the sections **650, 652,** there are two arcuate sections **654, 656** of complementary shape, the radii of which are centered on the axis of the spigot **182.** At the junction between the rectilinear and arcuate sections there is a pip **658** at the one side and a recess **660** at the other side. These cooperate to provide a slight movement of the ink pad towards the operative print facets thereby to ink the latter. Once the inking has been effected, the face **393** of the ink pad moves away from the print facets and the pegs **396** move smoothly up the arcuate sections and the ink pad carrier moves correspondingly. The rear platen carrier and ink pad holder carrier have travelled as shown in FIG. **21** so that the pegs **396** are near the upper ends of the arcuate sections **654, 656** of the cam tracks, the tips **413** of the ink pad holder carrier remaining engaged with the platen carrier edges **530,** 528.

As seen in FIG. **21,** after the platen **354** has moved 21.5 mm. the label is about to be printed (0.75 mm. of travel before printing) as a result of tangential relative movement between the inked operative print facet of the front print head assembly **350** and the platen **354.** In the meanwhile, the feed slide release rollers **488** have reached the peaks of their respective ramps **237,** the shaft **486** has reached the peak of the ramp **566** and has dropped over the edges **568** and, as motion rearwardly continues, the feed slide **560,** which has been ineffective over a first portion of the operation cycle, is entrained to move rearwardly with the platen carrier by contact of the rear abutment edges **546** of the carrier with the forward abutment edges of the plates **578.**

The front print head assembly continues its rearward swint, and the return springs **600** and **630** continue to be progressively stressed and stretched to store energy for return movements. The feed slide **560** engages the spent backing strip with the barbs **576** as it moves rearwardly, the strip already in the channel **225** overriding the barbs **606** thereof. The feed slide is restrained from tilting by the fins **494A** remaining in contact with the tip **562.**

After 35 mm. of travel, as shown in FIG. **22,** the forward print head has completed the printing action and the arms **436** of the control members trail on the top edges **507** of the side cheeks **496, 498.** At this point, the vertical edges **512** contact the arms **444** of the respective rear control members **440** while the ink pad holder carrier pegs **396** have substantially reached the upper ends of the cam tracks.

Continued rearward motion causes the control members the swing the rear print head assembly to that in the configuration of FIG. **23** the label has just been printed for a second time (possibly in a different color) and the operative print facets of the print head assembly **352** remain in contact with the label even in the overcenter position as shown. At the same time the forward print assembly **350** is released so that it returns to its original position and re-locks automatically. At the FIG. **23** configuration, the platen has reached its maximum rearward travel of 47.5 mm., the tips **413** of rear ink pad holder carrier **386** coming into contact with a stop (not shown) on casing portions **100, 101.**

Releasing takes place automatically by the teeth **416** riding over lugs **372.** In the meanwhile the feed slide **560** has moved the spent backing strip web rearwardly so that the fixed barbs **606** are overriden by 7 mm., the spent backing strip having been moved rearwardly by a total of 26 mm. (i.e. 7 mm. more than the label pitch). The spring **600** has reached maximum extension.

It will be appreciated that, by virture of the construction of the print head assemblies, the read-out wheels **374** swing as the print bands swing and thus no indication of the instantaneous print-out is given at the lenses **154, 156.**

On initially releasing the trigger **256,** under the action of the spring **600,** the platen carrier commences its return motion and the feed slide is entrained by the rollers **488** and shaft **486,** while the spent strip is partially drawn back to engage on the fixed barbs **606** of the channel **225.** Over a short initial portion of the return motion, the label remains in contact with the print facets of the rear print assembly **352.** The feed slide rollers **488** mount, after a total of 21.5 mm. release travel, inclined rear faces of the ramps **237** (FIGS. **1BB** and **4**) so that the shaft **486** is released from engagement with abutments **568** of the ramps **566** and the feed slide is no longer driven forwardly. The forwards motion of the slide is only 26 mm. and is limited by contact with the teeth **574** of the cross-member **610.** The rear ink pad holder carrier is at the same time rotated clockwise by contact of the tips **413** of its carrier with the pegs **548** of the projections **544** of the platen carrier. These operations are illustrated in FIG.. **24.**

After the feed slide has stopped, the rollers **488** continue to move down ramps **237** and **566** as shown in FIG. **25,** the rear ink pad carrier continues to swing forwardly and the type facets are again inked as the pegs **396** of the carrier pass over the pips **658, 658A** of the cam tracks. The spent backing strip remains locked on the fixed and movable barbs. When the noses **500** encounter the arms **436** of the control members **430,** the front ink pad holder carried is rotated slightly anticlockwise through inter-action of the arms **432** and the detent **420** thus causing the ink pad to ink the operative facets ready for the next printing operation.

The teeth **495** are caused to disengage from the label which has just been printed by the tension now applied to the spent backing strip (FIG. **25**). The dispensed label is indicated immediately after detachment by the roller **356,** in broken lines at **670** in FIG. **25.** A fresh length of web is simultaneously drawn from the reel as the platen carrier continues to move forward.

Finally at the end of the cycle, illustrated in FIG. **26,** the label **670** is fully dispensed and is applied by means of the pad **318** onto an article, the passage out of the

applicator of the label being guided by the teeth **497** of the platen tooth member **493.** The arm **436** has dropped rearwardly over the edge **512** of the platen carrier, thereby allowing the teeth **416** of the front ink pad holder carrier to engage the lugs **372.** By the end of the cycle a full length of web equivalent to one label has been drawn from the reel **164** and guided on to the platen by the prongs **514.**

If it is desired to gain access to the interior of the casing it is only necessary to press the catch release member **314** at the recess **332** and the lower edge of the portion **334** will disengage from the step in the transverse member **112** so that the casing parts **100, 101** can pivot upwards about the pin **616** which passes through the aperture **134, 134A** in bosses **132, 132A** (FIGS. **6** and **8**) thus exposing some of the working parts of the applicator. The open position is illustrated in FIG. **27.**

A second embodiment will now be described with reference to FIGS. **28** to **43.** The principle of construction remains the same as in the first embodiment but substantial simplification results from the omission of one complete print head assembly. To avoid undue repetition similar, but not necessarily dimensionally identical, parts have been given the same reference as in FIG. **1** but with the addition of a prime. Such parts will not be further described.

As is apparent from FIGS. **28A** and **28B**, the casing portion **220'** corresponds generally to the casing portion **220** of the first embodiment. It differs, however, in that two springs **600'** (only one shown) are provided and thus the arrangement for securing the springs **600'** includes a pair of forked peg members **700** (FIG. **28B**) over which one end of each spring **600'** is hooked. The forward end of this casing portion **220'** includes an upwardly inclined lip **704** with a transverse downwardly-facing ridge **706** at its extremity. The lip **704** and ridge **706** lie beyond the forward edges **708** of the cheeks **232'** (FIGS. **36A** and **36B**) of the casing portion **220'** and the lip **704** spans only a proportion of the total distance between the cheeks **232'** (FIG. **36B**) so that end portions of a front catch **712** can engage over the lip **704.**

The catch **712** (FIG. **36A**) includes a pair of side cheeks **714,** which are spaced further apart than end portions **710** thereof adjacent the lip **704.** The end portions **710** are spaced by a member **716** adjacent their extremities and also by a transverse member **718** lying substantially at the junction of end portions **710** and the main parts of the cheeks **714.** The space **720** between these transverse portions **720** receives the ridge **706** of the lip **704** when the applicator is in its assembled and closed condition. The other ends of the cheeks **714** are spanned by a bridge member **722** including two apertured lugs **724** lying inwardly of, but not spaced from, the inner faces of the cheeks **714.** These lugs serve to support the label applicator member **318'.**

The casing is completed by a portion **730** and a side wall **732.** The casing portion **730** includes an upper wall **734** (FIGS. **28A, 28B** and **44**) which is inclined forwardly towards the plane of the wall **228'** of the casing portion **220'.** Adjacent the front of the applicator, this upper wall has an increased slope at a portion **736.** The portion **730** also includes an internal transverse wall **738** (FIG. **36A**) which extends arcuately from a line approximately one third of the distance from the rear edge of the transverse wall to the front of the applicator. This internal wall **738** has a lip **740** at the edge remote from the wall **734** and lying closely adjacent a lower edge **742** of this casing portion. The rear edge of the casing portion **730** carrier a transverse boss **744** (FIG. **36A** only) having a transverse aperture **746** and an edge **748** extends from the boss **744** in an inclined direction substantially through the axis of the boss **162'** to meet the lower edge **742** adjacent the lip **740.** The forward end of the edge **742** meets an inclined edge **750** (FIGS. **37–43**) which extends to the front edge of the wall portion **736.** These edges **734, 736, 748, 742** and **750,** as best seen in FIG. **44,** define boundaries of the side wall portion **730.**

The side wall **732** has an upper edge **752, 754** corresponding to the edges **734, 736** of the casting portion **730.** A front inclined edge **758** corresponds to the edge **750** and has, inwardly of its outer face, an eye **760** used for the purpose of securing the casing portions together. A lower edge **762** corresponds to the edge **742** of the portion **730** and a concave edge **764** conforms substantially with the arcuate shape of the wall portion **738.** Both the side wall **732** and the wall portion **730** have projections which receive shafts of the print head assembly.

The eye **760** (FIG. **28B**) forms a part of a member which extends transversely of the casing and includes a flange **761** extending rearwardly from the eye **760** which is chamfered at its rear edge.

In this embodiment, the boss **162'** is carried by a side wall **605** (FIG. **35**) also forming a part **604'** of the feed mechanism pivotal about the pin **616'** (FIG. **36B**). The tongue **608'** (FIG. **28C**) has, in this embodiment, grooves **607** along its longitudinal edges.

In this embodiment, the platen carrier comprises an elongate member **770** (FIG. **36A**) with an upturned inclined end portion **772,** the end portion **772** carrying two projections **774** (FIGS. **37–39**) at its free edge.

The platen carrier **770** (FIG. **28C**) has a cross-section over its length, apart from the end portion **772,** of shallow channel section with downwardly-inclined sides **771** (FIG. **28C**) horizontal flanges **773** which are suitable on longitudinal steps **775** of the wall portion **228'** of the casing. A rear end portion **777** (FIG. **28A**) is guided by three members **779** integral with the casing portion **220'.** Each spring **600'** is mounted on a peg **781** extending downwardly from the central portion of the carrier **770.** Cam surfaces **776, 768** (FIG. **28B**) on the underside of the central portion serve respectively, in co-operation with a roller **767** carried by a pin **769,** to impart an upwards movement to the carrier to effect printing of a label and inking of the operative print facets.

A feed slide **780** (FIGS. **29–33**) corresponds in its function to the feed slide **560** of the first embodiment but differs substantially in detail. It includes two side walls **782, 783** and a transverse wall **784,** the side wall **782** extending below the level of the transverse wall **784** and inwardly thereof two series of barbs **786, 788** (FIG. **34**) are provided. The outer series of barbs **786** has a larger pitch than the inner series of barbs **788.** The pitch of the outer barbs **786** corresponds with the pitch of the barbs **706'** of the member **604'** (FIG. **36B**), and the member **604'** also carries an inner series of barbs **790** corresponding in pitch to the barbs **788.**

The upper edge (FIGS. **29** and **30**) of the side wall **782** includes a forward portion **792** which extends parallel to the casing wall **228'** and progressing rearwardly

the edge **792** meets a vertical edge **794** which is chamfered vertically with the chamfered edge facing outwardly and which in turn intersects an edge **796** at a lower level also extending parallel to the wall **228'** of the casing portion **220'**. The edge **796** terminates in a further chamfered edge **798** which, at the upper end meets a further edge **800** parallel to the plane of the wall **228'** and lies at a level corresponding to that of the edge **792**. The edge **800** terminates rearwardly in a radiussed vertical edge **802** and, just to the rear of the edge **798**, an inwardly extending part-circular projection **803** is provided and this is radiused at its rearward edge. The edge **802** is arranged to abut, at the end of the stroke of the feed slide a corresponding vertical edge **808** (FIG. **36A**) of the member **604'**. The vertical edges **802, 808** thus act as stops. An ear **810** having an aperture **812** which serves to receive the spindle **501'** of the dispense edge roller **356'** is carried on each of the side walls **782, 783.**

The upper edge (FIG. **31**) of the side wall **783** differs from that of the side wall **782** and from front to rear has a forward rectilinear edge **785** running parallel with the wall **228'**, a short convex edge **787** extending downwardly from the rear end of edge **785**, and a rectilinear inclined edge **789** which meets a rectilinear edge **791** extending parallel to and slightly below the edge **785.** The edge **791** has a lengthwise extent somewhat greater than edge **796** of the side wall **782** and at its rearward end intersects an upwardly inclined edge **793** which terminates at an edge **795** aligned with edge **785.** The edge **795** terminates rearwardly in a vertical radiused edge **797.** Inwardly of the edge **793** a semi-circular projection **799** is provided which corresponds to and lies directly opposite the projection **803.** The projections **799** and **803** serve as guides for narrower webs of labels as they are unwound from the reel, i.e. those engaged by barbs **790.**

The lower edges of both side walls **782** and **783** are similar and each includes a downwardly-inclined forward portion **801** and a lower edge **805** interrupted by opposed downwardly-extending tongues **789.**

The transverse wall **784** (see FIG. **30**) includes a forward portion **807**, which acts as the printing platen in this embodiment, a downwardly inclined portion **809** and further portion **811** lying parallel to the portion **807.** The wall **784** terminates in a bifurcated portion **813**, the inner longitudinal edges of which are formed with guide ridges **815** (FIG. **32**) adapted to engage in corresponding grooves **607** of the tongue **608'** of the part **604'** (FIG. **28C**).

Return action of the print head assembly **362'** is effected by a helical tension spring connected to an end plate of the print band assembly and an internal projection (not shown) of the side wall of the casing.

An ink pad holder **822** has shallow ridges **824** (only one shown in FIG. **28B**) on its under surface, which act as guides for the label web **832**, and an upstanding projection **823.** The holder **822** is supported on the side wall **782** by a projection (not shown) of dove tail section which engages on the chamfered edges **794, 798** of that wall. Because of the arrangement of this embodiment, it is not necessary to have a separate ink pad carrier but, as in the first embodiment, each ink pad holder includes a reservoir portion **828** and an operative portion **830** with an exposed face.

As in the first embodiment, the individual labels are detached from the backing strip by a roller **356'** carried on a pin **501'**. After passage around the roller **356'** the spent backing strip passes below the feed slide **780** and, according to the pitch of the notches in the web engages, when appropriate, either the series of barbs **786** or **788.** Again, as in the first embodiment the spent backing strip leaves the applicator via a channel **225'** (FIG. **44**) leading to the discharge opening **358'**.

As shown in FIG. **37**, the applicator is in a rest position with the operative face of the ink pad **822** opposite to but spaced from the operative print facets of the print band assembly and a label ready to be printed is disposed on the platen **816.** The print head assembly is locked in position by the projection **823** on the ink pad holder **822** which co-operates with the control member **440'** (FIG. **36A**) and a projection **834** on the inside of the casing (broken line in FIGS. **37** to **43**) to hold the assembly in the configuration of FIG. **37.** The projection **834** co-operates with that end of the arcuate flange **370'** remote from the lug **372'**. The lug **372'** serves no purpose in this embodiment.

Squeezing the trigger **256'** causes tension to be applied to the flexible strip member **264'** and the platen carrier **770** is drawn rearwardly against the action of the springs **600'**. At a position 3 mm. from the rest position (FIG. **38**) the cam **768** engages the roller **767** and, as the cam traverses the roller, the platen carrier rises about 1.5 mm. forcing the ink pad into contact with the operative type facet of the print band assembly. In this embodiment there is no platen tooth member so that the spent backing strip does not go slack downstream of the platen, but the web carrying labels is fed to the platen effectively through a labyrinth formed by the various guides and slack developes in the first turn or two on the reel.

As shown in FIG. **39**, the operative print facets have, after a rearward motion of approximately 9 mm., cleared the operative face of the ink pad and are now approaching the label. A control edge **785** of the platen carrier (FIG. **31**) then rotates the control member **440'** (only one provided in this embodiment) through a small angle in an anti-clockwise sense and the cam **766** raises the platen carrier and platen into contact with the operative print facets, the relative motion being tangential. Throughout the rearward movement described up to this position the spent backing strip is fed back by the barb series **786** or **788** and overrides the fixed barbs in the channel **225'**.

In the last part of the arcuate movement of the print head assembly, up to a maximum pull of 19 mm. (FIG. **41**) the label is moved in relation to the operative type facets and the necessary printing action is completed. The print head assembly swings through only a small angle during this printing action and in the meanwhile feed of the web through the channel **225'** has been completed and, as shown in FIG. **42** immediately the trigger is released the spent backing strip moves forwards slightly and engages in the fixed barbs **606'** or **790** in the channel **225'** so that the feed of fresh web can take place as the label which has just been printed is moved forward over the dispensing roller **356'** (FIG. **43**). The web notches then override the barbs **786** or **788** of the feed slide.

In the meanwhile the roller **767** has come off the cam **766** thus allowing the platen **816** itself to fall, the control member **440'** is moved forwardly and the print head assembly under the action of the helical spring (not shown) returns to its forward position and the

print facets are reinked as the cam **768** passes over the roller **767.** As in the first embodiment, the pad **318'** is used to apply the self-adhesive label to the article in question.

In a modification, the operational part of the control member **440'** is made integral with the corresponding end plate of the print head assembly.

The second embodiment enables a label to be printed only once and dispensed in the same operational cycle, but has the advantage that it can accommodate, without modification, at least two label sizes.

FIG. **44** illustrates the manner in which the applicator of the second embodiment can be opened up. The two main casing portions being pivoted by the pin **616'**. Release is effected by unclipping the catch **712** from the ridge **706.**

In an unillustrated modification of the second embodiment, ink from the ink pad or other ink reservoir is transferred to the operative ink facets by means of an offset member of hard rubber or other suitable material, instead of direct inking by the pad itself. This member is carried by and moves with the platen carrier. In operation the offset member is inked when the printing action is occurring, that is at the rearwardmost position of the platen carrier, the member being raised to the reservoir dispensing face by the cam **766.** Since the offset member can be very thin, the sharp change in direction of the label web can be avoided as it passes out from beneath the ink pad holder of the second embodiment.

Referring now to the third embodiment illustrated in FIGS. **45A–47** it will be apparent that the casing of the applicator comprises a body portion **910** and a handle and trigger portion **911** which bear a resemblance resemblence to the corresponding parts of the first and second embodiments. However, because these and other corresponding parts are generally of different construction to those of the first and second embodiments, different reference numerals have been assigned. The body portion **910** has a width sufficient to incorporate a reel of unused self-adhesive labels **912** mounted on a boss **912'** and also to accommodate print band assemblies **913** hereinafter to be described in greater detail. Such assemblies may also be as described in co-pending application Ser. No. 378,031 . The handle and trigger portion **911** bears, externally, a general resemblance to the handle and trigger portion of a pistol (as do those of the first and second embodiments) and is shaped to ensure ease of handling by operators and, indeed, the applicator may be housed, when not in active use, in a holster mounted on a belt worn by an operator.

The handle and trigger portion **911** is made up of two parts, consisting of a rearward part **914** integral with a part **916** of the main casing portion **910** and a trigger part **915.** As shown in FIGS. **45A, 46A, 46B** and **47,** the part **914** includes an elongate dependent channel-section member which so tapers over its length that the shallowest portion thereof is remote from the main portion. The part **916** is of very shallow channel cross-section and is arcuate in longitudinal section as is apparent from FIG. **45A.** The tip **917** of the part **916** remote from the trigger portion is of rectangular cross-section and tapers to a sharp edge for tearing the spent backing strip at a discharge opening, as required. At the other end of the arcuate section, the base of the channel extends rectilinearly to an edge **918** while the shallow limbs of the channel extend away from the base to form cheeks **919** (FIG. **46B**). These cheeks extend beyond the edge **918** and are cut back obliquely at their end portions. The edge **918** is chamfered as indicated at **918'** in FIG. **45A.** It will be noted from FIG. **46B** that the cheeks **919** are spaced apart further than the opposite limbs of the channel section member **914** which forms part of the handle, this increased dimension being necessary to accommodate the thickness of the reel **912.**

The other or forward part **915** of the handle and trigger portion **911** is movable relatively to the part **914** and, as will be apparent from FIG. **47,** the two parts overlap along respective contiguous curved edges **921** and **922,** and these edges have generally complementary shapes in the longitudinal sense. The required relative movement (which is substantially of a sliding nature) between the parts **914** and **915** can take place without a gap appearing between them, because the opposite walls of the part **915** are provided with inward steps **923, 924** (FIG. **47**), the tread of the steps being spaced by a distance corresponding substantially to the spacing between the internal faces of the limbs of the channel-section member of the part **914.**

A projection **925** (FIG. **46B**) extends from the inner surface of the base of the channel section member of the part **914** and is preferably bifurcated for lightness and reduction of the amount of material necessary. The projection **925** carries an extension **926** extending approximately parallel to the base of the channel. The main part of the projection **925** does not extend normally from the base, but is so inclined that its rearward face lies substantially parallel to the end face of the trigger part **915.** At the free end the extension **926** has an aperture which receives a pivot pin **927.** The pivot pin **927** also carries two spaced plates **928** interconnected by a transverse web or webs **929** (only one shown) and each plate is of generally irregular quadrilateral form. Each plate **928** has a second aperture **930** and a third aperture **931.** The second apertures **930** are, when the applicator is assembled, aligned with apertures **932** in the limbs of the channel-section trigger part **915.** These apertures **930** receive a pivot pin **933** so that the trigger part **915** is effectively pivotally connected to the part **914** through the intermediary of the plates **928.** The third apertures **931** of the plates **928** serve to connect the plates to a further plate assembly **934** by means of a pivot pin **935** (FIG. **45A**). The plates **934** are of elongate form and are, like the plates **928,** interconnected by one or more transverse webs **934'** (FIG. **45A**). The ends of the plates **934** remote from the pin **935** each have an aperture **936** which together serve with the aid of a pin **937** to pivot the plates **934** to an aperture **937'** of a feed slide and platen carrier **938,** to be described in detail hereinafter.

The part **914** (FIG. **46B**) of the handle also carries within it an elongate helical spring **940** supported at one end by a peg **941** rigid with the part **914** of the handle and is also supported by a peg **942** rigid with and extending between the plates **934.** The spring **940** thus exerts a force biassing the two parts **914** and **915** towards one another.

The trigger part **915** of the handle portion is bifurcated at the end thereof adjacent the body portion to enable the passage of the carrier **938.** In other words the base of the channel is omitted while the limbs remain. As will be seen in FIG. **46B** the extremities **942**

extend parallel to the underfaces of the cheeks **919** and are radiused at **943** along the edges.

As best shown in FIG. **46A**, the feed slide and platen carrier **938** comprise a hollow wedge-shaped portion **945**, rigid, at the shallower end thereof, with a transverse member **946** which carries along its edges, flanges **947** each of which includes a truncated wedge shape portion **948**, a U-shaped notch **949** and an upstanding projection **950**. Each of the flanges **947** has an aperture **951** and together these apertures carry a transversely-extending pin **952** (broken lines).

The carrier **938** carries, between its flanges **947** and the upstanding projection **950**, one part of a feed slide **960** which serves to engage and draw on the adhesive-label web at a position downstream of the position of application and this feed slide includes a part **961** of arcuate longitudinal section carrying a series of equally spaced barbs **962** at each of two longitudinal edges. The part **961** has integral therewith a pair of laterally spaced rearward extensions **963** also carrying similarly regularly spaced barbs **962** along their outer edges. The spacing between the barbs of both series corresponding exactly with the spacing between the notches of the adhesive-label band. Two side plates **964** are included in this feed slide and each side plate **964** has an elongate slot **965**, and notches **966'** the purpose of which will appear hereinafter. Opposite end portions of the pin **952** of the carrier **938**, engage in the slots **965** thus pivotally securing the two parts together and permitting limited relative axial motion, and also limited pivotal motion. It will, however, be immediately apparent that the degree of pivotal movement is strictly limited. A pin **967** of small diameter extends between projecting end portions **968** of the two side plates **964**, and serves as a device for detaching labels from the backing strips. The pin **967** could be replaced by an extension of the platen **969** defining and edge at the same position as the pin. The side plates **964** are secured together by a transverse bridge piece **969** (FIG. **45B**) which piece serves as the platen for the label to be printed by the operative type facets.

Gripping of the exhausted backing strip is also performed by a further member **970** (FIGS. **45A** and **46A**), forming part of the web feed mechanism (one part **971**) of which is of arcuate section and nests within the arcuate part **916**. A further part **972** of this member **970** is in the form of a rectilinear plate and both parts **971** and **972** have series of barbs **973** along their longitudinal edges. The spacing corresponds exactly with the spacing of the notches of the spent backing strip. A narrow tongue **974** engages in the space formed between the two lateral extensions **963** of the backing strip gripping member **960**. The member **970** has, beyond the part thereof which has barbs **973** along its edges, a thickened transverse boss **975** (FIG. **45A**) having an aperture for the reception of a pin **976** by mans of which the member **970** is pivoted to the extremity of the arcuate part **916**. Both the barbs series **962** and **973** are formed so that the generally upright riser of the barb is inclined forwardly, that is in the direction of travel of the backing strip, so that, in effect the riser overhangs the tread of the barb. The join between riser and tread is radiused.

A further arcuate part **977** (FIG. **46A**) of the member **970** has no barbs at its edges and forms merely a part of a housing for the unused reel **912** of labels. Another end portion of the member **970** takes the form of two elongate parallel arms **978** which are spaced laterally and have sufficient depth to allow the formation of an aperture **979** which receives a pin **980** rigid with a swingable, circular cover **981** of the reel casing. The ends of the arms **978** remote from these apertures are interconnected by a transverse pad **982** similar to the pads **318, 318'** of the first and second embodiments.

The casing further comprises two side walls **990** and an outer peripheral member (not shown) joining these side plates.

Two print heads **991, 991'** (FIG. **45B**) are housed and supported within the side walls **990** and each head comprises a plurality of bands **992, 992'** which bands are guided around separately rotatable individual adjusting wheels **993, 993'** which are spaced from elongate rotatable members **994, 994'** each having flat or concave faces **995, 995'** extending in a direction parallel to a tangent to the wheels **993, 993'** so that when correctly orientated each character of the respective print band **992, 992'** has an adequate flat or slightly concave support surface. Each of these rotatable members **994, 994'** is mounted co-axially with a plate **996**, 996' carrying a projection **997, 997'** which serves a purpose to be described hereinafter. Each wheel **993**, 993' and the corresponding rotatable member **994**, 994' is pivotal about a respective spindle **993A**, **993B** extending between the side plates **990**.

Each print head comprises means for adjusting the bands to give a selected print impression as required. As indicated in outline only in FIG. **45B**, the adjustment means comprises a toothed wheel **998** associated with a respective one of the wheels **993, 993'** and a jockey wheel **999** movable over an arcuate path to engage selectively one or the other of the wheels **998**. The jockey wheel **999** is mounted on a spindle (not shown) which carries knob of the casing an adjusting knobn (likewise not shown). Each wheel **998** is fast for rotation with a display or read-out wheel (not shown) which shows, through a transparent window of the casing, the characters selected for printing similarly to the slots and lens of the first embodiment.

A respective linking assembly **1010, 1010'** is provided for each print head **991, 991'** one such inking assembly **1010** being fixedly mounted between the side plates **990** of the housing of the print mechanism. Each assembly includes a respective ink reservoir **1011**, 1011' and a respective roller **1012, 1012'** rotatably mounted so that a part thereof lies in an elongate transverse aperture thereof. The other inking assembly is carried on an arm **1013** pivotal about the axis of rotation of the wheel **993'**. The inking assembly **1010'** only carries, for a purpose to be described hereinafter, a pair of side plates, not shown.

To load the applicator, the reel **912** consisting of a backing strip and self-adhesive labels applied to one face thereof is mounted in the body portion for rotation on the boss **912'** by pivoting the cover **981** and the pin **980**. With the label side uppermost the strip passes below the operative facets of the bands of both print heads **991, 991'**, the right-hand head **991'** (as shown in FIG. **45B**) being encountered first. At the extremity of the platen **969**, the band is deflected around the pin **967** (or edge) which serves to peel off the labels from the backing strip. The pad **982** serves to guide the detached labels and apply them to an article being labelled.

After the labels have become detached from the backing strip, the strip passes beneath the platen **969** where it engages the barbs **962** of the part **960** and is guided along a channel formed between the part **960** on the one hand and the carrier **938** on the other. The channel continues between the member **970** and the arcuate part **916** of the fixed portion of the handle. Forward motion of the strip is effected by engagement of the barbs **962** with the notches of the strips and labels. The barbs **973** serve only to retain the spent strip when it is not being fed forward. The spent backing strip is finally discharged from the applicator through a gap between the free end of the part **916** and the boss **975** of the part **971.** For convenience the edge **917** is made sharp enough to cut the spent strip as required.

The action of squeezing the trigger part **915** causes the pair of plates **928** to entrain the pair of plates **934** through the pivot pin **931** and in turn the pivot pin **937** at the ends of the plates **934** causes the platen carrier **938** to move rearwardly with a rectilinear motion. The path of movement of the trigger part **915** towards the fixed handle part **914** is actually arcuate in nature because the parts are interconnected through the pivot pins **927** and **930,** the projection **925** and the plates **928.** It will, of course, be apparent that the mechanical advantage of the trigger part **915** depends on the spacing of the pivot pins **927, 930** and **931.** The upstanding projection **950** (FIG. **45B**) of the carrier **938** initially engages the projection **997** which is fast for pivotal movement with the print head **991** and this causes the operative print of the ofthe bands **992** to be wiped over the roller **1012** and, subsequently, as the pivotal movement continues when the imaginary radial line passing through the centre of the operative print facets is approximately 22° from the vertical at the 22° position of the print facets the platen **969** is entrained by engagement of the pin **952** with the end of the slot **965** remote from the pin **967.** The operative print facets and the platen **969** thus move with the same velocity throughout the print operation. The wheels **993** move through an angle of approximately 30° from the retracted position as shown in FIG. **45B** with the operative facets opposite the reservoir **1011** to the position in which printing is initiated, and printing terminates when the wheels **993** have moved through a total of approximately 76°. The actual printing takes place over a range of movement of the imaginary line of approximately 15° before the vertical to 15° after the vertical.

When the print head has travelled to a position in which the imaginary line is 22° after the vertical, the operative facets have ceased contact with the label. The projection **997** then moves along the upper flat edge of the projection **950** and after disengagement the print head, under the action of a light spring, drops downwards behind the moving platen **969.** Simultaneously, pegs (not shown) depending from and rigid with the second inking assembly **1010'** engage the notches **966'** (FIG. **46A**) in the side plates **964** and the inking assembly **1010'** swings on an arc so that the roller **1012'** inks the operative facets of the print head **991'**. Just as the roller **1012'** disengages from the print facets, one side of the projection **997'** of the print assembly **991'** is engaged by the upstanding projection **950** and thus entrains the operative facets of the print bands to move over a label at that instant carried on the platen **969** and moving at the same speed. Entrainment of the print assembly **991'** by the swinging motion of the inking assembly **1010'** is prevented by side plates and, which engage the surface of the platen **969** positively to prevent such entrainment. However, when the upstanding projection **950** strikes the projection **997'**, the notches **966** in the side plates of the platen member allow the print head assembly **997'** to swing through a small angle by engagement of one of the side plates in the notches **966.** This engagement ensures that the platen **969** is retained together with the print head **991'**.

The print operation by the print head assembly **991'** involves a total angular travel of the assembly of approximately 27°, the distance travelled by the assembly rearwardly beyond the vertical position being only of the order of 5°.

As the trigger part is moved rearwardly a degree of slack is generated in the label band and because of the stiffness of the latter, any surplus is accommodated by a slight slackening of the outer turn or turns of the reel, the slack being accommodated in the space between the outer turn of the reel and the part **916.** Release of the trigger results in the spring **940** returning the trigger part **915** and the stationary handle portion to their initial relative positions as shown in FIG. **45A.**

The notches **966'** in the side plates **964** return the inking assembly **1010'** to the forward position, as this reverse motion takes place, the corners of the projections **950** which were inoperative during the rearwards motion of the trigger part **915** serving to restore, to the initial or forward position, the print head **991.** As the forward movement continues, the print assembly **991'** is also returned to its initial position. Continued forward motion results in the projection **997** becoming engaged so that the print head **991** is returned to the position shown in FIG. **45B.**

The motions of the platen described also serve to index the band forward. The rearwards movement of the platen, initiated when the pin **952** engages the right-hand end of the slots **965,** and with the barbs **962** thereof engaged in the notches of the backing strip pushes the backing paper over the rear fixed barbs **973.** The spent backing strip disengages from the barbs **973** of the fixed part **970** and a corresponding length of strip is discharged from the gap between the part **916** and the boss **975.** As soon as the spring-energized return motion is initiated the notches of the backing strip engage the barbs **973.** The label to be applied is thus drawn around the pin **967** by the forward motion of the platen **969** and draws a length of band from the reel equal to the length of one label and, because of the sharp angle through which the backing strip is thereby turned over the pin, the label becomes detached. The carrier **938** moves further forward and assists the pad **982** in guiding the detached label during the actual dispensing operation. A fresh label is simultaneously drawn on to the platen **969.** The cycle of drawing forward and printing is repeated each time the trigger is squeezed and, as will be apparent from the foregoing description, the label is printed twice during each cycle, the label actually applied having been printed during the immediate cycle.

Briefly, the actual applying of a label is as follows.

The pad **982** is positioned on or immediately adjacent the article to be labelled and, as a printed label is discharged from the backing strip at the pin **967** by releasing the trigger part **915,** the applicator is drawn rearwardly with a wiping motion.

The applicator of the fourth embodiment, shown in FIGS. **48** to **51**, a casing **1110** having a handle portion **1112**, a label reel store portion **1114** with a central boss **1116** on which a reel **1118** is mounted for rotation, and a detachable printing assembly **1120**. A label application device **1122** carries a pad **1124** and is fastened to the casing **1110** by a self-tapping screw **1126**.

The assembly **1120** comprises print wheels **1128** entrained with corresponding read-out wheels **1130** and setting wheels **1132**. The wheels **1132** may be selectively rotated by means (not shown) accessible from outside the casing **1110** to select operative type facets as, for example, disclosed in co-pending application Ser. No. 378,031. When the selected characters on the print wheels **1128** are in the print position **1134**, corresponding characters on the display wheels **1130** are visible from outside the body **1110** through a window **1136** as in the first embodiment.

The surface of the handle portion **1112** is contoured so that the applicator can be manually held in the manner shown in FIG. **50**, i.e. with this surface in the palm of the hand. Adjacent its rear end, the handle portion is provided with a pair of depending members **1138** each having a partly-open circular aperture **1140** therein.

A label dispensing and feed mechanism, which is reciprocably slidably movable with respect to the casing **1110**, comprises a trigger **1142** and an inking and guide assembly **1144** incorporating a feed slide which is pivoted on the front end of the trigger **1142** by a spindle **1146** which also mounts a label-detaching roller **1148**. The trigger **1142** is also desirably contoured as shown so that the user can conveniently place his index finger in the curved portion **1149** and his other fingers where indicated in broken lines in FIG. **50**. As the action of the machine is light, the user may choose to use his index finger only.

The assembly **1144** includes a nose portion **1150** mounting the spindle **1146** and having two pairs of barbs **1152** at the longitudinal edges of the undersurface thereof. The portion **1150** has a lower trailing part having a central slot **1154** therein, on either side of which slot a respective one of the rearmost pair of barbs **1152** is mounted. A printing platen **1156** is mounted on the upper surface of the nose portion **1150**.

The remainder of the assembly **1144** is spaced from the nose portion **1150** to form a channel **1158** and is provided with a recess **1160** containing an ink pad **1162** and with a trailing extension **1164** having a circular section end portion **1166**. Between the ink pad **1162** and the portion **1166** a roller **1168** is rotatably mounted on a pin **1170**.

In the rest position of the applicator as shown in FIG. **48**, the operative facets **1134** of the print wheels **1128** are in engagement with the ink pad **1162** and the roller **1168** is seated in a notch **1172** in a portion **1174** of the casing **1110**. In the position of FIG. **50** in which the trigger **1142** is at its rearmost position, the print wheels **1128** lie opposite the platen **1156** and the roller **1168** is seated in a second, deeper notch **1176** in the portion **1174**.

The trigger **1142** has two side walls **1178, 1180** which define a channel **1182** which is arcuate longitudinally and of a generally rectangular cross-section. A transverse pin **1183** is mounted at each end in a respective one of the walls **1178, 1180**. Rear portions of the walls **1178, 1180** are cut away to define abutment surfaces **1184**. These surfaces abut, when in the rearmost position, the surfaces **1185** of the depending members **1138** of the handle portion, and meeting of the surfaces **1184** and **1185** limits the movement of the trigger **1142** with respect to the casing **1110**. A central portion **1186** of the bottom surface of the channel **1182** is raised to define two smaller, similar channels **1187, 1188** adjacent its edges. A tongue member **1190** (FIG. **51**) having, a width slightly less than that of the channel **1182** and of the same arcuate configuration, is an easy sliding fit in the channel **1182**.

The tongue member **1190** is in the form of an arcuate strip and has a pair of flanges **1192, 1194** arranged symmetrically on the upper surface thereof, each such flange **1192, 1194** having a respective U-shaped slot **1196, 1198** in the free edge thereof. A helical spring **1200** has one end attached to a pin **1202** fitted between the two slots **1196, 1198** and the other end attached to the pin **1183** extending across the channel **1182** on the upper surface of the trigger **1142**. The spring **1200** serves to bias the trigger **1142** against reciprocal movement from the position shown in FIG. **48** to that shown in FIG. **50**. It also urges the trigger **1142** and the tongue **1190** together so as to keep the backing strip locked therebetween.

The tongue **1190** has two other, triangular, flanges **1204, 1206** upstanding from the upper surface thereof and carrying respective circular pegs **1208, 1210** on their outer surfaces which are supported in the apertures **1140** in the members **1138** of the handle portion **1112**, whereby the tongue **1190** is free to pivot to a limited extent with respect to the casing **1110**.

The leading edge of the tongue **1190** has a portion **1212** (FIG. **51**) of reduced width which fits into the slot **1154** in the lower trailing part of the nose portion **1150** of the inking and guide assembly **1144** when the trigger **1142** is drawn back as shown in FIG. **50**.

The configuration of the undersurface of the tongue **1190** can best be seen from FIG. **49**. It is generally flat but has depending flanges **1214, 1216** which seat, respectively, in the channels **1187, 1188** in the floor of the channel **1182** in the trigger **1142**. The tongue **1190** has, adjacent to the flanges **1214, 1216**, a series of equally spaced barbs **1218**. The barbs **1218** are similar to barbs **1152** on the inking and guide assembly **1144** and the barbs of each series are mutually spaced by the same distance.

The web is led from the reel **1118**, with the label side uppermost, around a guide portion **1220** of the casing **1110**, around the portion **1166** of the assembly **1144**, along the lower surface of the trailing extension **1164** of the assembly **1144** and the part of the assembly mounting the roller **1168** and the ink pad **1162** up through the channel **1158** and around the roller **1148** where labels are detached. The backing strip only is then fed below the nose portion **1150** of the assembly, between such nose portion and the trigger **1142**, and then along the floor of the channel **1182** in the trigger **1142** below the tongue **1190**. The spent backing strip is discharged at **1222**.

In operation, initially the applicator is in the configuration shown in FIG. **48** where the barb series **1152** and **1218** engage the backing strip. The operator then moves his fingers rearwardly with respect to his palm causing the trigger to move rearwardly with respect to the casing **1110** towards the configuration of FIG. **50**.

As the barb series **1152** is engaged with the trailing edges of respective pairs of notches in the backing strip, the backing strip is entrained by this rearward movement, so that there is no movement of the strip with respect to the dispensing roller **1148.** The backing strip slides past the barbs **1218** which are angled in the correct direction for this to happen. The barbs **1218** stay in substantially the same position with the rearwards movement as the tongue **1190** only pivots slightly with respect to the casing **1110.**

As the trigger **1142** moves rearwardly, the roller **1168** disengages from the notch **1172** and moves along the flat surface between the notches **1172** and **1176.** The resultant slight anti-clockwise pivotal movement of the trigger **1142** and the tongue **1190** is accommodated by the pivoting of the tongue. The ink pad **1162** is moved out of engagement with the print wheels **1128.**

The rearward movement continues until stopped by contact of the surfaces **1184, 1185.** This occurs when the roller **1168** is engaged in the notch **1176,** as shown in FIG. **50.** The notch **1176** has a depth such that, as the roller **1168** engages therein, the print wheels **1128** are urged into contact with the label on the platen **1156,** located just in advance of the dispensing roller **1148,** and sandwiched therebetween. The label **1224** which is about to be dispensed thus has the selected characters printed thereon.

To dispense this label, the grip is relaxed so that the spring **1200** returns the trigger **1142** towards the configuration of FIG. **48.** Owing to the reversed movement, the barb series **1218** lock the backing strip with respect to the tongue **1190** and therefore, as the strip cannot move backwards, the label web is pulled around the dispensing roller **1148** as the roller is urged back against the web. The spent backing strip will slide over the barb series **1152** during this movement, as they are moving, with respect to the backing strip, in the correct direction for this to happen.

In the configuration of FIG. **50,** the label **1224** may have its trailing edge still adhering to the backing strip, or the trailing edge may be secured solely to the leading edge of the next label on the strip by the self-adhesive layers of the two adjoining labels.

The stroke of the trigger **1142** (and the corresponding member of the first three embodiments) is chosen so that the web advances by one label length. The barb series **1152** and **1218** (and the corresponding series of the first three embodiments) are so arranged that the web registers with the print wheels and the dispensing roller. This being so, the extremely positive drive provided by the barb series **1152** locking the web, and the barb series **1218** (and the corresponding series of the first three embodiments) thereafter feeding it by a precise amount, obviate the disadvantages of creeping registration loss experienced by some previously proposed machines.

To apply the just-dispensed label to an article, the lower, self-adhesive side of the label is wiped on to the surface of the article and, in the same action, it is pressed into contact with the surface by the applicator pad **1124.**

To load the applicator with a fresh reel, a removable side piece (not shown) is detached to allow access to the label reel store portion **1114.** An end of the reel is then fed through by hand until it emerges adjacent to the label detaching roller **1148.** The free end is then fed underneath the nose portion **1150** of the inking and guide assembly until it engages with the barbs. Loading can then be completed by a few reciprocating operations of the trigger.

Dispensing means other than the roller **1148** can be employed, for example a pin, fixedly or rotatably mounted in the nose portion **1150,** as also can a fixed dispensing edge. Further the label application pad can be replaced by a plain or grooved edge or a transversely arranged series of longitudinally-extending fixed fingers.

With the exception of the springs and certain parts of the print head assemblies, the applicators hereinbefore described are manufactured from synthetic resin of appropriate strength.

I claim:

1. In a label applicator capable of successively printing and dispensing labels carried by a web having regularly spaced engagement means along its length, at least one print head assembly including a plurality of selectively adjustable print facets, means pivotally mounting the print head assembly, means operable to detach a printed label from the web, means operative to pivot the print head assembly to bring the operative print facets thereof into tangential contact with a label on the web while the label is moving at the same linear speed as the instantaneous linear speed of the operative print facets, and means operable to advance the web through the applicator to the detaching means including an elongated slidable member having regularly spaced means for engaging positively a plurality of the engagement means of the web, and further regularly spaced means operable to engage positively a plurality of the engagement means of the web, said further regularly spaced means being fixed relative to the applicator as a whole and serving, in cooperation with the first-mentioned engaging means, to advance a printed said label to and beyond the detaching means at an end portion of a given operational cycle, said means operative to pivot said print head assembly and said means operable to advance the web through the applicator being effective to print a given label and deliver it to the detaching means in the same operational cycle of the applicator.

2. An applicator for self-adhesive labels mounted on a backing strip having a continuous series of regularly spaced notches along both longitudinal edges, said applicator comprising a casing, a print head assembly pivotally mounted in the casing, ink pad means for inking operative type facets of the print head assembly, a label support printing platen movable substantially rectilinearly past the operative type facets as the latter move at the same instantaneous linear speed whereby to print a said label, a label feed slide rigid with the platen and supporting the ink pad means, a platen carrier, and a label dispensing member adjacent the platen, actuating means of the platen carrier and the print head assembly, said actuating means comprising a pivotal trigger, a flexible elongated member connecting the trigger to the platen carrier, a return spring connecting the casing to the carrier, and means on the platen carrier for urging the ink pad and the platen towards operative type facets of the print head assembly, said feed slide comprising at least one series of regularly spaced barbs adapted to engage the backing strip during a first stroke of the slide and a barbed member fixed to the casing and adapted to engage and hold the backing strip during the second, return stroke of the feed slide, said sec-

ond stroke serving to draw the label printed during the first stroke over the dispensing member and to draw a fresh label from the supply onto the platen.

3. In a label applicator, a casing, means for carrying a stock of self-adhesive labels supported on a backing strip having regularly spaced engagement means along its length, a dispensing member carried by the casing and arranged to detach and dispense successive said labels from the backing strip as the latter is drawn around the member, a rectilinear member including a series of barbs with the same longitudinal spacing as the engagement means, means for actuating the rectilinear barbed member to engage successive said engagement means of the backing strip and to move longitudinally thereby to advance the labels for each operational cycle from the stock by one label length to the dispensing member, and pivotally mounted printing means operable by said actuating means to print, while pivoting with an instantaneous linear peripheral speed equal to the linear speed of a label to be printed, during any one operational cyclce of the actuating means, the same label as that dispensed by the dispensing member during that cycle, the actuating means serving to move the label being printed at the same linear speed as the instantaneous linear peripheral speed of the printing means during the production of the print impression.

4. An applicator according to claim 3, wherein the printing means comprises

two print head assemblies operable to make two separate print impressions on a given label,

both said print head assemblies being operable during one operational cycle of the actuating means to print the same label as that dispensed by the dispensing member during that cycle.

5. An applicator according to claim 3, wherein the barbs of the barbed member are arranged as two series to accommodate webs carrying different sized labels.

6. In a label applicator, a casing, means for carrying a reel of self-adhesive labels supported on a backing strip having regularly spaced notches along its length, pivotal printing means housed within the casing for printing successive labels as the labels move with the same linear speed as the instantaneous linear speed of the printing means while the print impression is being formed, a dispensing edge member carried by the casing and arranged to detach successive printed labels from the backing strip by passage of the latter over the edge thereof, a feed mechanism including an elongated barbed member movable within the casing and arranged to engage successive series of the notches by barbs on a face thereof, said barbs having a spacing equal to the spacing of the notches, barbed means defining a further plurality of barbs having the same spacing as the barbs of the said barbed member, said barbed means being fixed in relation to the casing, and means common to the pivotal printing means and the elongated barbed member for actuating the barbed member to move the backing strip by one label and to detach the said label at the dispensing edge member by movement of the barbed member and dispensing edge member while the notches of the backing strip are engaged on said fixed barbed means, the arrangement being such that the dispensed label is that one which has been printed by the same operational cycle of the actuating means which has actuated the feed mechanism to dispense that label.

7. An applicator according to claim 6, comprising a pad of sponge rubber and a plurality of glass balls adhered to the pad, the assembly of balls and pad serving to apply labels to an article.

8. An applicator according to claim 6, comprising an ink pad movable with respect to the printing means, an ink-pad carrier,

a roller of the ink pad carrier, and

a part of the casing having a notch engageable by the carrier to bring the ink pad into contact with the print means, as the actuating means are operated.

9. An applicator according to claim 8, comprising a label-support platen, said part of the casing having a deeper notch enabling a label on the platen to move into contact with operative type facets of the printing means.

10. An applicator according to claim 6, comprising a label support platen movable by the actuating means linearly and radially with respect to the print means at a print station,

said printing means being pivotal so that during printing the operative type facets move tangentially with respect to a label on the platen.

11. An applicator according to claim 10, wherein the label-support and printing platen is integral with the barbed member.

12. An applicator according to claim 6, wherein the printing means comprises two pivotal print head assemblies operable successively on the same label as that dispensed during a given operational cycle.

13. An applicator according to claim 12 comprising means for locking each print head assembly in a predetermined orientation when the actuating means is inoperative.

14. An applicator according to claim 13, wherein each print head assembly comprises

an ink pad and

a carrier for the pad, and wherein the locking means comprises

at least one abutment on one of the print head assemblies and

at least one tooth on a said ink pad carrier of the corresponding print head assembly,

initial actuation of the actuating means serving to disengage the abutment and the tooth to release the corresponding print head assembly.

15. An applicator according to claim 14 further comprising

a control member of said one print head assembly,

a projection of said one print head assembly in engagement with the control member, and

a detent of said ink pad carrier, said control member also being in engagement with the detent when in the locked position.

16. An applicator according to claim 12, wherein each print head assembly includes

an ink pad holder supported for limited pivotal movement and

a carrier, each carrier being itself pivotally mounted on a pivot axis of the corresponding print head assembly and being operable by the actuating means to swing the ink pad into and out of operative contact with the operative facets of the corresponding print head assembly.

17. An applicator according to claim 16, wherein the casing carries

means defining cam tracks,

and wherein one said print head assembly carries pegs,

said pegs being engaged in respective said cam tracks, said cam tracks being arranged to bring the ink pad into operative contact with the operative print facets of that print head assembly.

18. An applicator according to claim **12,** wherein said actuating means comprises

a lost-motion drive whereby the elongate barbed member is inoperative to move the backing strip over a first portion of the operational cycle of the actuating means.

19. An applicator according to claim **18,** wherein the lost-motion drive comprises

a rectilinearly-movable member,

an abutment on said member of the drive, and

an abutment on the barbed member, said abutments being spaced by an amount substantially equal to one half of the advance required for the backing strip to index one label to the print position.

20. An applicator according to claim **19,** wherein the lost-motion drive further comprises

a transverse member carried by slots in said member of the drive,

a further abutment on the barbed member, and

a ramp rigid with the casing,

said transverse member and further abutment being operative to move the barbed member only during a first portion of a return movement of the latter, the further abutment being rendered inoperative by said ramp which serves to lift the transverse member out of the slots at the end of a first portion of the return movement.

21. An applicator according to claim **19,** comprising

a platen serving to support, for printing, a said label and a corresponding portion of the backing strip, and

a platen tooth member operative to lock said label on the platen substantially immediately the actuating means are operated at the commencement of the operating cycle.

22. An applicator according to claim **21,** wherein the platen tooth member is pivoted on said one member of the lost-motion drive which serves to carry the platen, the locking action being effected by pivoting the platen tooth member to engage teeth thereof on corresponding engagement means of the backing strip.

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