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(54) **PUNCHING MACHINE AND DEVICE FOR POSITIONING THE STACK OF SHEETS**
STANZMASCHINE UND VORRICHTUNG ZUM POSITIONIEREN DES BLATTSTAPELS
PERFORATRICE ET APPAREIL DE POSITIONNEMENT DE PILES DE FEUILLES

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(73) Proprietor: **Acco UK Limited**
Aylesbury, Buckinghamshire HP19 3DT (GB)

(72) Inventors:
• **BUMPSTEED, Austin**
Worcester WR3 7JU (GB)

• **MEAD, David**
Malvern, Worcestershire WR14 3NT (GB)

(74) Representative: **Lally, William**
FORRESTER & BOEHMERT
Pettenkoferstrasse 20-22
80336 München (DE)

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Description

Description of Invention

[0001] This invention is concerned with improvements relating to punching machines, particularly of the kind (hereinafter referred to as being of the kind specified) utilised to punch a plurality of holes through an edge margin of one or more sheets of material (hereinafter referred to for convenience as a stack of paper), to enable a plurality of sheets to be bound together, such as by the use of a wire-ring or comb-binding operation, or to enable the sheets to be mounted in a ring binder, or the like.

[0002] Difficulty is encountered in punching machines of the kind specified, in the provision of location means in the determination or maintenance of a spacing between the edge of the stack, and the array of punched holes, particularly where it is desirable that said spacing is adjustable.

[0003] In conventional punching machines of the kind specified, the location means may be provided by a plate located in the punching slot or aperture, on which the stack of paper rests, and said plate may be adjustable in the height-wise direction, to vary the spacing of the array of punched holes from the edge of the stack. However, in use small pieces of paper derived from the punching operation (conventionally termed and referred to hereinafter as "clippings") may drop into the punching slot. For example, where the punching slot is defined by guide and die plates, whilst the majority of clippings are forced through the apertures in the die plate to fall into a receptacle for their collection and subsequent disposal, a number of clippings may remain adhered to the front faces of the punches, and become detached therefrom as the punches are retracted through the apertures in the guide plate, falling into the punching slot. Thus when a subsequent stack of paper is placed in the punching slot, the spacing may be influenced by the clippings. Over a period of time, this may cause an unacceptable variation from the desired spacing.

[0004] It is one of the various objects of this invention, to reduce the problems set out in the last preceding paragraph.

[0005] According to this invention there is provided a punching machine comprising

- a) a punching slot into which a stack of material to be edge-punched may be located;
- b) a punching device comprising a plurality of punching members moveable through the punching slot to punch holes in the stack; and
- c) location means to locate the edge of the stack and hence the spacing between the edge of the stack and the array of punched holes;

characterised in that the punching slot locates the stack of material in a generally vertical orientation, and

the location means comprises a plurality of support members extending in the punching slot to support the stack at spaced intervals.

[0006] In this manner any clippings which may enter the punching slot will drop between said support members and will not affect the spacing in subsequent punching operations.

[0007] Said support members may be fixed, or may be adjustable, and where the stack is supported in vertical or generally upright orientation, are preferably of a cross-section to reduce the tendency for clippings to lie thereon, eg. are of generally curved cross-section.

[0008] Preferably the width of the support members is smaller than the width of the punch members, and said support members may be fixed or adjustable.

[0009] Additionally in machines of the kind specified, there is a requirement for different numbers and different types of holes to be punched in the edge margin of a stack of sheets of paper.

[0010] In the first type of punching operation a first plurality of holes are punched in the edge margin of a stack of sheets of paper, typically nineteen or twenty-one holes, typically rectangular in profile, which may be used in a comb or wire binder, or thirty-two or thirty-four holes for a wire binding operation.

[0011] In a second type of punching operation a second plurality of holes are punched in the edge margin of the stack, typically three or four holes, which may be used with a ring binder.

[0012] It is a requirement of modern punching machines that they be as versatile as possible, allowing different types of edge punching operation to be carried out with a minimum of reorganisation, and it is another of the various objects of this invention to provide a punching machine which is both easy to use and versatile in its operation.

[0013] Thus, preferably the machine comprises two punching devices each arranged to provide a different plurality of holes in the edge margin of the stack, said location means being provided by the punching members of one of the punching devices.

[0014] Preferably the machine comprises selector means moveable between a first condition in which an operating device of the machine moves the first punching device, and a second condition in which the operating device moves the second punching device, the machine comprising a single slot into which one or more sheets of material may be located during an edge punching operation, into which punch members of each of the punching devices moves in the operation of the machine.

[0015] Conveniently when one of the punching devices is in operation, the punching members of the other punching device provide said location means of the machine.

[0016] Preferably additional location means is provided for the stack of material, when the second punching device is in operation, and preferably said additional lo-

cation means is adjustable.

[0017] Thus, when the selector means is in its second condition and the second punching device is selected for operation, the material to be edge punched may be entered into the punching slot into engagement with the second location means, and when the selector means is in a first condition and the first punching device is selected for operation, the location means is provided by the punching members of said first punching device.

[0018] Preferably means is provided automatically to adjust the depth to which material is entered into the slot, according to the condition of the selector means.

[0019] Preferably the two punching devices operate in spaced planes, and said automatic means is such as to restrict the distance to which sheet material is inserted into the punching slot, in accordance with the condition of the selector means.

[0020] Preferably the first punching device is mounted for movement in a first plane, and the second punching device is mounted for movement in a second plane parallel to the first plane, and the machine comprises operating means operative to move the punching device in their respective planes between inoperative and operative positions.

[0021] Preferably the selector means comprises a locking member operative, when the operating means is operative to move the first punching device to its advanced position, to retain the second punching device in its retracted position.

[0022] Preferably the locking member is also operative, when the operating means is operative to move the second punching device to its advanced position, to retain the first punching device in its advanced position.

[0023] There will now be given a detailed description, to be read with reference to the accompanying drawings, of an edge punching machine which has been selected for the purposes of illustrating the invention by way of example.

[0024] In the accompanying drawings:

FIGURE 1 is a perspective view of the machine which is a preferred embodiment of this invention; FIGURE 2 is a perspective view on an enlarged scale, binding mechanism of the machine having been removed for the purposes of clarity; FIGURE 3 is a perspective view of an operating member of the machine; FIGURE 4 is a perspective view of a first punching device of the machine; FIGURE 5 is a perspective view of a second punching device of the machine; FIGURE 6 is a perspective view of a selector member of the machine, showing a locking means thereof; FIGURE 7 is a perspective view of part of the machine, binding mechanism thereof having been removed for the purposes of clarity, showing the selector means in an intermediate condition, and the

drive means in an advanced position;

FIGURE 8 is a view corresponding to Figure 7, with selector means in a first condition;

FIGURE 9 is a view corresponding to Figure 8, selector means thereof having been moved from said first condition towards a second condition into said intermediate condition;

FIGURE 10 is a view corresponding to Figure 9, the drive means having been moved to a retracted position, the selector means having been moved fully into its second condition;

FIGURE 11 is a view corresponding to Figure 10 showing the drive means having been moved to its advanced position;

FIGURE 12 is a view corresponding to Figure 10 showing the selector means having been moved towards its first condition;

FIGURE 13 is a perspective view showing an adjustable stop mechanism of the machine;

FIGURE 14 is a perspective view showing a die plate assembly of the machine;

FIGURE 15 is an exploded view of the die plate assembly, showing guide means thereof; and

FIGURES 16 and 17 are views corresponding to Figures 14 and 15, showing a modified edge punching machine which is illustrative of certain aspects of this invention.

[0025] The machine which is the preferred embodiment of this invention is for the binding of a stack of sheets of material such as paper, comprising a punching section 20, adapted to punch a plurality of binding apertures or holes in the edge margin of a stack of sheets of paper, and a binding section 100, comprising comb binding means 142, by which a stack of paper having a perforated edge margin may be mounted on a plastic binding comb, and wire binding means 104 by which a stack of sheets may be mounted on a conventional wire comb.

[0026] The machine also comprises drive means for the punching section 20, comprising a drive handle 22, and drive means for the binding section, comprising a drive handle 23, constituting operating means of the machine.

[0027] The binding section is generally conventional, and does not form part of the present invention, and no further description will be given. For details of the construction and operation of conventional binding means, reference may be made to the specification of one of our European patents 0647186, 0613423, 0638022, 0689497, or of other prior art known to the man skilled in the art.

[0028] The punching section 20 comprises punching mechanism 24, mounted on a floor plate 18 of the machine.

[0029] At a forward part of the machine, a die plate assembly is provided comprising three substantially vertical plates, consisting of a first guide plate 32, a second

guide or stripper plate 34, and a die plate 36, see also Figure 14 and 15. The stripper plate 34 and die plate 30 define a generally vertically-oriented material punching slot 38, into which, for example, a stack of sheets of paper may be entered, preparatory to carrying out an edge punching operation on said stack (see also Figure 4). In the preferred embodiment, the plates are inclined rearwardly at 5° to the vertical, to assist in the support of the material to be edge-punched.

[0030] The three plates 32, 34 and 36 are secured together by bolts (not shown) which pass through holes 36h in the die plate 36, through holes 146h in a spacer plate 146, which defines the width of the material punching slot, through holes 34h in the stripper plate 34, through apertures 125h in a spacer member 125 between the stripper plate 34 and the guide plate 32, and through bores 32h in the guide plate 32. The spacer member 146 comprises two flanges extending mutually at right angles, namely flange 146a which in use extends generally horizontally, and flange 146b, which in use extends generally vertically, and which is toothed in construction, the holes 146h extending through teeth of the flange 146b.

[0031] In this way, the spacer member 146 not only defines the desired separation between plates 34 and 36, but also provides an extensive surface, provided by the faces of the teeth, providing extensive face-to-face engagement with the stripper plate 36. In addition this construction provides apertures 146c in the base of the spacer member, through which punchings may fall.

[0032] Between the guide plate 32 and the stripper plate 34 a guide member 148 is provided (best shown in Figures 1 and 15) providing a slot 149 into which a side edge of the stripper plate 34 may be located, and simultaneously providing an edge guide 147 for paper inserted into the material punching slot 38.

[0033] The punching mechanism comprises a base assembly 60 comprising two support blocks 58a, 58b from each of which a pair of spaced guide pins 62, 64 respectively extend. Mounted on the base plate are an operating member 70, (Figure 3) a first punching device afforded by a punching plate 80 (Figure 4), and a second punching device afforded by a punching plate 90 (Figure 5). Said three components are provided on opposite sides thereof with two elongate guide slots 63, 65 through which the guide pins 62, 64 extend, whereby the three components may move relative to the base plate 60 in the longitudinal direction, limited by engagement of the guide pins 62, 64 in the elongate guide slots 63, 65.

[0034] Preferably the side edges of the three plates, namely the operating member 70 and the two punching plates 80 and 90 are slidable in channels provided by an outer casing (not shown) to ensure rectilinear movement of the plates during operation of the machine.

[0035] Mounted for sliding movement over the top-most plate, ie. the second punching plate 90, is a selector member 100 (Figure 6) having three selector pins

102a, 102b, 102c which extend downwardly through guide apertures 92a, 92b, 92c in the second punching plate 90, through guide apertures 82a, 82b, 82c in the first punching plate 80, and into three transverse guide slots 72a, 72b, 72c in the operating member 70, whereby the selector member 100 may move relative to the assembly in the transverse direction limited by engagement of the three selector pins 102 in the guide slots 72 of the operating member.

[0036] The selector member 100 is provided with a short cross-bar 105, and provided in the underside thereof is a guide slot 106, and carried by the selector member is a locking member 108 having a head portion 110 and a locking pin 112 which locking pin extends from the guide slot 106 of the selector member, passing through respective control apertures 96, 86 and 76 of the second punching plate, the first punching plate and the operating member respectively, into a transverse guide slot (not shown) provided in a guide block 66 mounted on the base plate. In this manner the locking member 108 is retained stationary in the longitudinal direction, whilst movement thereof with the selector member 100 in the transverse direction is permitted.

[0037] The drive means of the machine comprises a transverse axle 28 (see Figure 2), from each side of which a connecting rod 26a, 26b respectively extends, each having at a forward end portion thereof an aperture 28a, 28b respectively which is engaged over an L-shaped engagement formation 78a, 78b, on each side of the operating member 70, (see also Figure 7).

[0038] The connecting members 26 extend to eccentrics 24a, 24b mounted on the axle 28, the drive handle 22 extending from the eccentric 24a. By movement of the handle 22, the axle 28, and hence the eccentrics 24a and 24b may be rotated, causing the connecting members 26a, 26b, and hence the operating member 70, to advance and retract.

[0039] The first punching plate 80 is provided with a first plurality of punching members 81, to provide a first plurality of apertures adjacent to a side edge of a stack of material such as paper. Typically said first plurality may be 21, although if desired means may be carried by the first punching plate to increase or decrease the number of punch members which are operative. Said means is well known in the art, and will not hereinafter be described, although said means comprises latches 24, shown in Figure 2, which may be depressed to take out of operation certain of the punching members 81 of the first punching device.

[0040] Whilst in the preferred embodiment, the punching members 81 are secured to the plate 80, if desired they may be formed integrally with the plate 80.

[0041] The second punching plate 90 carries a second plurality of punching members 91, typically 4.

[0042] With the punching assembly in a fully retracted position, and with the selector member 100 in a first condition (shown in the right hand position, in Figure 2 of the drawings) the punch members of the two punching

devices are located in guide apertures 32x in the guide plate 32. The selector pins 102a, 102b, 102c pass through the slots 72 of the selector member and engage in a narrow transverse slot-like portion 83a of each of the guide apertures 82a, 82b and 82c of the first punching plate, and thus as the operating member 70 advances, through the action of the selector pins 102 it carries with it the first punch plate, causing the punch members of the first punching plate to move into apertures 34a in the stripper plate 34, into and through the material punching slot 38, and through any material therein, and through exit apertures 36a in the die plate 36. The selector pins 102a, 102b and 102c at this stage pass through an unimpeded portion 93a of the guide apertures 92a, 92b and 92c of the second punch plate, and thus the second punch plate is not acted upon by the selector pins as the operating member advances.

[0043] The locking pin 112 passes through a transverse slot-like portion 96a of the control aperture 96. Since the locking pin is prevented from moving in the longitudinal direction by engagement within the transverse guide slot 66 of the base plate, the second punch plate is prevented from moving from its retracted position. Conversely, the locking pin 112 passes through an unrestricted portion 86a of the control aperture 86, permitted the first punch plate to move freely, (see Figure 8).

[0044] During this movement of the operating member the selector member moves longitudinally with the operating member whilst locking member 108 remains stationary, with the locking pin moving relatively within the guide slot 106 of the selector member.

[0045] Thus a stack of material to be provided in its edge margin with a first plurality of apertures may be placed in the material slot in engagement with adjustable support members, described in detail hereinafter, and with the control member in its first position, the operating member 70 may be caused to advance to cause the punch members of the first punch plate to move into the slot 38 and through the stack of material therein.

[0046] With the selector member 100 retained in its first position, this operation may be repeated as necessary.

[0047] When it is desired to carry out a punching operation utilising the second punch plate, with the assembly in its advanced position the selector member 100 is moved from its first position to an intermediate condition, in the direction of the arrow A in Figure 9, into a position in which the locking pin 112 moves into the transverse slot 86b, preventing longitudinal movement of the first punch plate 80. Thus on retraction of the operating member 70, the selector pins 102a, 102b, 102c are now located outside the transverse slot-like portions 83a of the guide apertures 82a, 82b, 82c in the first punch plate. As the operating member is retracted, the selector pins engage inclined cam surfaces 84 of said guide apertures 82 to move the selector member into a second position. As this happens the locking pin 112 is carried

across the portion 86b of the control aperture 86 thereof, whilst the selector pins 102 are carried into engagement with transverse slot-like portions 93b of the guide apertures 92a, 92b and 92c of the second punch plate 90, (see Figure 10).

[0048] Thus with the selector means in its second position, the second punch plate 90 may be moved longitudinally by the operating member whilst the first punch plate is retained in its advanced position. The punch members 91 thus move forwardly from the position in which they are located in the guide apertures 32x, and through apertures 34x in the stripper plate 34, through the material punching slot 38, and into apertures 36x in the die plate 36. Thus a stack of material to be provided in its edge margin with a second plurality of apertures (eg. four) may be placed in the material punching slot 38, resting on the punch members 81, the punch members thereby providing location means in the form of a stop for the stack of material, allowing apertures to be placed in a stack of material located in the slot 38 at a specific distance from the edge, Figure 11.

[0049] This operation may be repeated as desired, and at an appropriate time, with the assembly in its retracted position, the selector member may be moved to its first position.

[0050] When it is desired to actuate the first punch plate, with the operating member in an advanced position, the operating member may be moved from its second position to towards its first position into an intermediate position, said intermediate position being determined by engagement of the locking pin 112 with a side wall 96c of the control aperture 96, in which position the selector pins 102 are located once more within the transverse slot-like sections 83a of the apertures 82, Figure 12.

[0051] Thus on retractive movement of the operating member, both the first and second punch plates are simultaneously retracted. As the operating member moves into its fully retracted position, an inclined cam surface 86c of the control aperture 86 engages the locking pin 112, moving the locking pin to the right, as shown in the drawings, into location within the transverse recess 96a of the control aperture 96, as the selector member moves fully into its first position.

[0052] Thus as the operating member is once more moved longitudinally from its retracted to its advanced position, the second punch plate is retained in its retracted position by engagement of the locking pin 112 within the portion 96a of the slot 96, the first punch plate being moved to its advanced position by engagement of the selector pins 102 within the portions 83a of the apertures 82.

[0053] Insofar as the stack of paper, when the second punching device is being operated, rests on the punch members of the first punching device, should any "clippings" be drawn back through the apertures 36b of the die plate 36, they will fall between adjacent punch members 81, and hence will not influence the spacing of the

holes provided by the punch members 91, from the edge of the stack of material.

[0054] However, the die plate assembly also comprises further location means to locate the edge of the stack of paper, when the first punching device is in operation, in the provision of an array of holes along the side edge of the stack of paper for a comb binding or wire binding operation.

[0055] Said further location means comprises a guide member 150 mounted in an elongate and transversely-extending channel 152 defined by a front face of the stripper plate 36 and a face plate 154 secured to the floor 18 of the machine. The guide member 150 is provided with four support members 156 extending in a direction longitudinally of the machine, which are located in respective angled slots 155 of the die plate 36, and similar angles slots 157 of the stripper plate 34, said members 150 passing between teeth 146b of the plate 146.

[0056] Thus by movement of the guide member 150 longitudinally (ie. in a direction transversely of the machine) from right to left in Figure 15, the guide pins 156 will lower, whilst movement of the guide member in the opposite direction causes the pins to rise.

[0057] In this manner the height-wise location of stack of paper to be edged punched in the material punching slot 38 may be determined by sideways movement of the guide member 150.

[0058] Conveniently a protrusion (not shown) on the inner side of the guide member 150 may be engaged with an array of vertical channels 159 provided on the front face of the die plate 36, to provide a step-wise location of the guide member 150.

[0059] As will be seen from Figure 15, the guide member 150 is provided with downwardly-open apertures 151, through which punchings provided in the operation of the machine may fall to a receiving chamber in the interior of the machine.

[0060] The modified machine illustrated in Figures 16 and 17, and reference to the preferred embodiment hereinbefore described should be made for details of construction and operation not hereinafter described in detail.

[0061] In particular the machine shown in Figures 16 and 17 is suitable for use in performing a single type of edge punching margin, specifically for a comb or wire-binding operation, having a relatively large number of holes perforated adjacent to an edge margin of the stack of paper, typically fifteen, eighteen, twenty-one or thirty-four. Specifically, the machine illustrated in Figures 16 and 17 is not provided with the capability of alternatively providing a second, alternative array of apertures in the edge margin of a stack of material.

[0062] In the modified machine, in which similar numerals have been utilised to indicate parts similar to those of the preferred embodiment, rather than the guide member 150 being located forwardly of the die plate 36, the location means comprises a guide member

120 which is located between the stripper plate 34 and the guide plate 32, specifically having support members 126 which project forwardly of the machine. Specifically, the guide member 120 is mounted in an elongate and transversely-extending channel 122 of a spacer block 124 located between the guide plate 32 and the stripper plate 34. The guide member 120 is provided with a plurality, specifically in the preferred embodiment four, support members 126 of circular cross-section extending in a direction longitudinally of the machine, and which are located in respective slots 35 of the stripper plate 34, and 37 of the die plate 36.

[0063] Thus by movement of the guide member 120 longitudinally (ie. in a direction transverse of the machine) from right to left in Figure 15, the support pins 126 will lower, whilst movement of the guide member in the opposite direction causes the pins to raise. Engagement of a small protrusion or pip 121 extending rearwardly of the guide member 120 in one or other of an array of vertical channels 123, the guide member may be located in specific transverse positions, relating to specific distances between the upper side of the pins 126 and the apertures through which the punches 81 travel.

[0064] The pins 126 allow clippings drawn backwardly into the material punching aperture to fall through, and hence interference in the desired spacing in a subsequent punching operation is not caused.

[0065] Additionally, in the modified machine rather than the serrated spacer member 146 of the preferred embodiment, washers 146a are utilised, being mounted on the bolts (not shown) by which the die plate, stripper plate and guide plate are retained in position, said washers 146a providing similarly a convenient space between the die plate and the stripper plate, between which punchings may fall on retraction of the punch members through the apertures of the stripper plate 34.

[0066] In the present specification "comprise" means "includes or consists of" and "comprising" means "including or consisting of".

Claims

1. A punching machine comprising:

- a) a punching slot (38) into which a stack of material to be edge punched may be located;
- b) a punching device (80, 90) comprising a plurality of punching members (81, 91) moveable through the punching slot (38) to punch holes in the stack; and
- c) location means (156, 126, 81) to locate the edge of the stack and hence the spacing between the edge of the stack and the array of punched holes;

characterised in that the punching slot lo-

cates the stack of material in a generally vertical orientation, and the location means comprises a plurality of support members (156, 126, 81) extending into the punching slot (38) to support the stack at spaced intervals.

2. A machine according to claim 1 wherein support members (156, 126) are of a cross-section to reduce the tendency for clippings to lie thereon.

3. A machine according to claim 2 wherein said support members (156, 126) are of a generally curved cross-section.

4. A machine according to claim 3 wherein the width of the support members is smaller than the width of the punch members.

5. A machine according to any preceding claim wherein said support members (156, 126, 81) are fixed or adjustable.

6. A machine according to any preceding claim comprising two punching devices (80, 90), each arranged to provide a different plurality of holes in the edge margin of the stack, said location means being provided by the punching members (81) of one of the punching devices (80).

7. A machine according to claim 6 comprising selector means (100) moveable between a first condition in which an operating device (22) of the machine moves the first punching device (80), and a second condition in which the operating device (22) moves the second punching device (90), the machine comprising a single punching slot (38) into which one or more sheets of material may be located during an edge punching operation, into which punch members (81, 91) of each of the punching devices move in the operation of the machine.

8. A machine according to claim 7 further **characterised in that** when one punching device (90) is in operation, the punching members (81) of the other punching device (80) provide said location means of the machine.

9. A machine according to claim 8 comprising additional location means (156) for the stack of material, when the other punching device (90) is in operation.

10. A machine according to claim 9 wherein said second location means (156) is adjustable.

11. A machine according to any preceding claim further comprising means (150, 155, 156, 120, 126, 35) automatically to adjust the depth to which material is entered into the slot (38).

12. A machine according to claim 11 wherein the two punching devices (80, 90) operate in spaced planes, and said automatic means is such as to restrict the distance to which sheet material is inserted into the punching aperture (38), in accordance with the condition of the selector means (100).

13. A machine according to any of claims 7 to 12 in which the first punching device (80) is mounted for movement in a first plane;

the second punching device (90) is mounted for movement in a second plane parallel to the first plane and the machine further comprises operating means (22) operative to move the punching devices in their respective planes between inoperative positions and operative positions.

14. A machine according claim 13 wherein the selector means (100) comprises a locking member (108) operative, when the operating means (22) is operative to move the first punching device (80) to its advanced position, to retain the second punching device (90) in its retracted position.

15. A machine according to claim 14 wherein the locking member (108) is also operative, when the operating means (22) is operative to move the second punching device (90) to its advanced position, to retain the first punching device (80) in its advanced position.

Patentansprüche

1. Lochungsvorrichtung, mit:

a) einem Lochungsschlitz (38), in den ein Stapel eines am Rand zu lochenden Materials angeordnet werden kann;

b) einem Lochungsgerät (80, 90), das eine Anzahl von Lochungsteilen (81, 91) aufweist, die durch den Lochungsschlitz (38) bewegbar sind, um Löcher in den Stapel zu lochen;

c) einem Lokalisierungsmittel (156, 126, 81), um den Rand des Stapels örtlich festzulegen und somit den Abstand zwischen dem Rand des Stapels und dem Feld von gelochten Löchern;

dadurch gekennzeichnet, daß der Lochungsschlitz den Stapel des Materials in einer im wesentlichen vertikalen Orientierung anordnet, und daß das Lokalisierungsmittel eine Anzahl von Stützteilen (156, 126, 81) aufweist, die sich in den Lochungsschlitz (38) erstrecken, um den Stapel an beabstandeten Intervallen abzustützen.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** die Stützteile (156, 126) einen Querschnitt aufweisen, um die Neigung von Papierschnitzeln, auf diesen liegenzubleiben, zu reduzieren. 5
3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, daß** die Stützteile (156, 126) im wesentlichen einen gekrümmten Querschnitt aufweisen. 10
4. Vorrichtung nach Anspruch 3, **dadurch gekennzeichnet, daß** die Breite der Stützteile kleiner ist als die Breite der Lochungsteile.
5. Vorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** die Stützteile (156, 126, 81) feststehend oder einstellbar sind. 15
6. Vorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** sie zwei Lochungsgeräte (80, 90) aufweist, die jeweils dafür eingerichtet sind, eine unterschiedliche Anzahl von Löchern in dem Randbereich des Stapels herzustellen, wobei das Lokalisierungsmittel durch die Lochungsteile (81) von einem der Lochungsgeräte (80) gebildet wird. 20 25
7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, daß** sie ein Auswahlmittel (100) aufweist, das zwischen einem ersten Zustand, in dem ein Betätigungsgerät (22) der Vorrichtung das erste Lochungsgerät (80) bewegt, und einem zweiten Zustand, in dem das Betätigungsgerät (22) das zweite Lochungsgerät (90) bewegt, bewegbar ist, wobei die Vorrichtung einen einzelnen Lochungsschlitz (38) aufweist, in den ein oder mehrere Materialbögen während eines Randlochungsvorgangs angeordnet werden können, und in dem sich Lochungsteile (81, 91) einer jeden der Lochungsvorrichtungen beim Betrieb der Vorrichtung bewegen. 30 35 40
8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet, daß** dann, wenn eines der Lochungsgeräte (90) im Betrieb ist, die Lochungsteile (81) der anderen Lochungsvorrichtung (80) das genannte Lokalisierungsmittel der Vorrichtung bilden. 45
9. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, daß** ein zusätzliches Lokalisierungsmittel (156) für den Materialstapel vorgesehen ist, wenn sich das andere Lochungsgerät (90) in Betrieb befindet. 50
10. Vorrichtung nach Anspruch 9, **dadurch gekennzeichnet, daß** das zweite Lokalisierungsmittel (156) einstellbar ist. 55
11. Vorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** ein Mittel (150, 155, 156, 120, 126, 35) vorgesehen ist, um die Tiefe, bis zu der das Material in den Schlitz (38) eingeschoben wird, automatisch einzustellen.
12. Vorrichtung nach Anspruch 11, **dadurch gekennzeichnet, daß** die beiden Lochungsgeräte (80, 90) in voneinander beabstandeten Ebenen arbeiten, wobei das genannte automatische Mittel so ist, daß der Abstand, bis zu dem das Blattmaterial in die Lochungsöffnung (38) eingeschoben wird, begrenzt wird, entsprechend dem Zustand des Auswahlmittels (100).
13. Vorrichtung nach einem der Ansprüche 7 bis 12, **dadurch gekennzeichnet, daß** das erste Lochungsgerät (80) zur Bewegung in einer ersten Ebene angebracht ist; und daß das zweite Lochungsgerät (90) zur Bewegung in einer zweiten Ebene parallel zu der ersten Ebene angebracht ist, wobei die Vorrichtung ein Betätigungsmittel (22) aufweist, das so wirkt, um die Lochungsgeräte in ihren entsprechenden Ebenen zwischen Ruhe- und Betriebsstellungen zu bewegen.
14. Vorrichtung nach Anspruch 13, **dadurch gekennzeichnet, daß** das Auswahlmittel (100) ein Verriegelungsteil (108) umfaßt, das wirksam ist, wenn das Betätigungsmittel (22) wirkt, um das erste Lochungsgerät (80) in seine vorgeschobene Stellung zu bewegen, um das zweite Lochungsgerät (90) in seiner zurückgezogenen Stellung zu halten.
15. Vorrichtung nach Anspruch 14, **dadurch gekennzeichnet, daß** das Verriegelungsteil (108) ebenfalls wirksam ist, wenn das Betätigungsmittel (22) wirkt, um das zweite Lochungsgerät (90) in seine vorgeschobene Stellung zu bewegen, um das erste Lochungsgerät (80) in seiner vorgeschobenen Position zu halten.

Revendications

1. Machine à perforer comprenant :

- a) une rainure de perforation (38) dans laquelle peut être positionnée une pile de matériau dont les bords doivent être perforés ;
- b) un dispositif de perforation (80, 90) comprenant une pluralité d'éléments de perforation (81, 91) déplaçables à travers la rainure de perforation (38) pour perforer des trous dans la pile ; et
- c) un moyen de positionnement (156, 126, 81) pour positionner le bord de la pile et par conséquent l'espacement entre le bord de la pile et

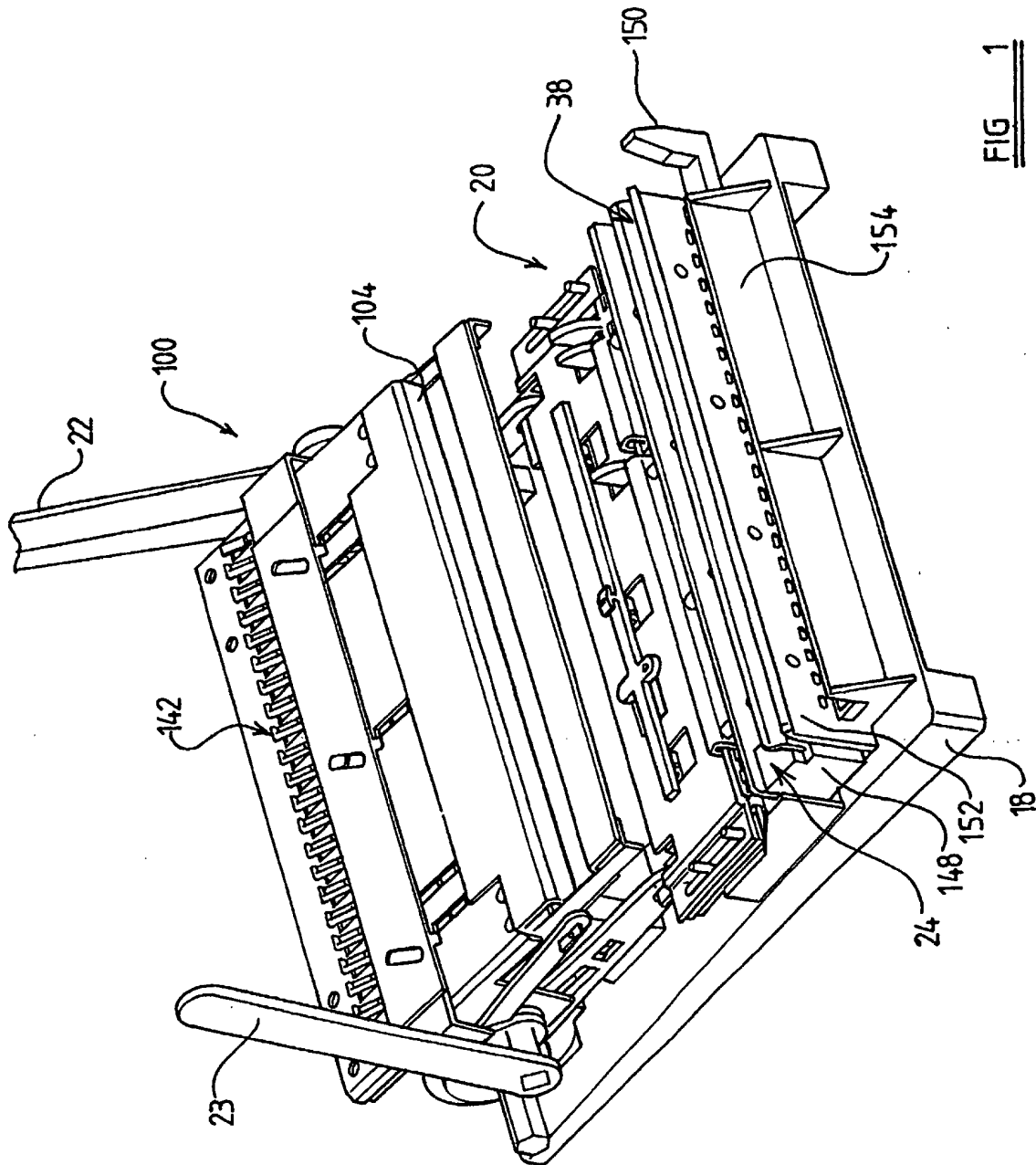
l'alignement des trous perforés ;

caractérisée en ce que la rainure de perforation positionne la pile de matériau selon une orientation globalement verticale, et le moyen de positionnement comprend une pluralité d'éléments de support (156, 126, 81) s'étendant dans la rainure de perforation (38) pour supporter la pile a des intervalles espacés.

2. Machine selon la revendication 1, dans laquelle les éléments de support (156, 126) présentent une section transversale permettant de réduire la tendance pour les rognures à s'étendre sur ceux-ci.
3. Machine selon la revendication 2, dans laquelle lesdits éléments de support (156, 126) présentent une section transversale globalement courbe.
4. Machine selon la revendication 3, dans laquelle la largeur des éléments de support est plus petite que la largeur des éléments de perforation.
5. Machine selon l'une quelconque des revendications précédentes, dans laquelle lesdits éléments de support (156, 126, 81) sont fixer ou ajuscables.
6. Machine selon l'une quelconque des revendications précédentes, comprenant deux dispositifs de perforation (80, 90), chacun agencé pour fournir une pluralité différente de trous dans la marge de bordure de la pile, ledit moyen de positionnement étant fourni par les éléments de perforation (81) de l'un des dispositifs de perforation (80).
7. Machine selon la revendication 6, comprenant un moyen de sélection (100) déplaçable entre une première condition dans laquelle un dispositif de fonctionnement (22) de la machine déplace le premier dispositif de perforation (80), et une seconde condition dans laquelle le dispositif de fonctionnement (22) déplace le second dispositif de perforation (90), la machine comprenant une rainure de perforation unique (38) dans laquelle une ou plusieurs feuilles de matériau peuvent être positionnées au cours d'une opération de perforation de bordure, dans laquelle les éléments de perforation de chacun des dispositifs de perforation (81, 91) se déplacent lors du fonctionnement de la machine.
8. Machine selon la revendication 7, **caractérisée en outre en ce que** lorsque l'un des dispositifs de perforation (90) est en fonctionnement, les éléments de perforation (81) de l'autre dispositif de perforation fournissent ledit moyen de positionnement de la machine.
9. Machine selon la revendication 8, comprenant un

moyen de positionnement supplémentaire (156) pour la pile de matériau, lorsque le second dispositif de perforation (90) est en fonctionnement.

- 5 10. Machine selon la revendication 9, dans laquelle ledit second moyen de positionnement (156) est ajustable .
- 10 11. Machine selon l'une quelconque des revendications précédentes, comprenant en outre un moyen (150, 155, 156, 120, 126, 35) pour ajuster automatiquement la profondeur à laquelle le matériau pénètre dans la rainure (38).
- 15 12. Machine selon la revendication 11, dans laquelle les deux dispositifs de perforation (80, 90) fonctionnent dans des plans espacés, et ledit moyen automatique est tel qu'il restreint la distance à laquelle la feuille de matériau est insérée dans l'ouverture de perforation (38), en fonction de la condition du moyen de sélection (100).
- 20 13. Machine selon l'une quelconque des revendications 7 à 12, dans laquelle le premier dispositif de perforation (80) est monté pour se déplacer dans un premier plan ;
le second dispositif de perforation (90) est monté pour se déplacer dans un second plan parallèle au premier plan, et la machine comprend en outre un moyen de fonctionnement (22) qui fonctionne pour déplacer les dispositifs de perforation dans leurs plans respectifs entre des positions de fonctionnement et des positions de non fonctionnement.
- 30 14. Machine selon la revendication 13, dans laquelle le moyen de sélection (100) comprend un élément de verrouillage (108) de fonctionnement, pour déplacer, lorsque le moyen de fonctionnement (22) fonctionne, le premier dispositif de perforation (80) dans sa position avancée, et pour retenir le second dispositif de perforation (90) dans sa position rétractée.
- 35 15. Machine selon la revendication 14, dans laquelle l'élément de verrouillage (108) est également en fonctionnement, pour déplacer, lorsque le moyen de fonctionnement (22) fonctionne pour déplacer le second dispositif de perforation (90) dans sa position avancée, et pour retenir le premier dispositif de perforation (80) dans sa position avancée.
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- 50
- 55



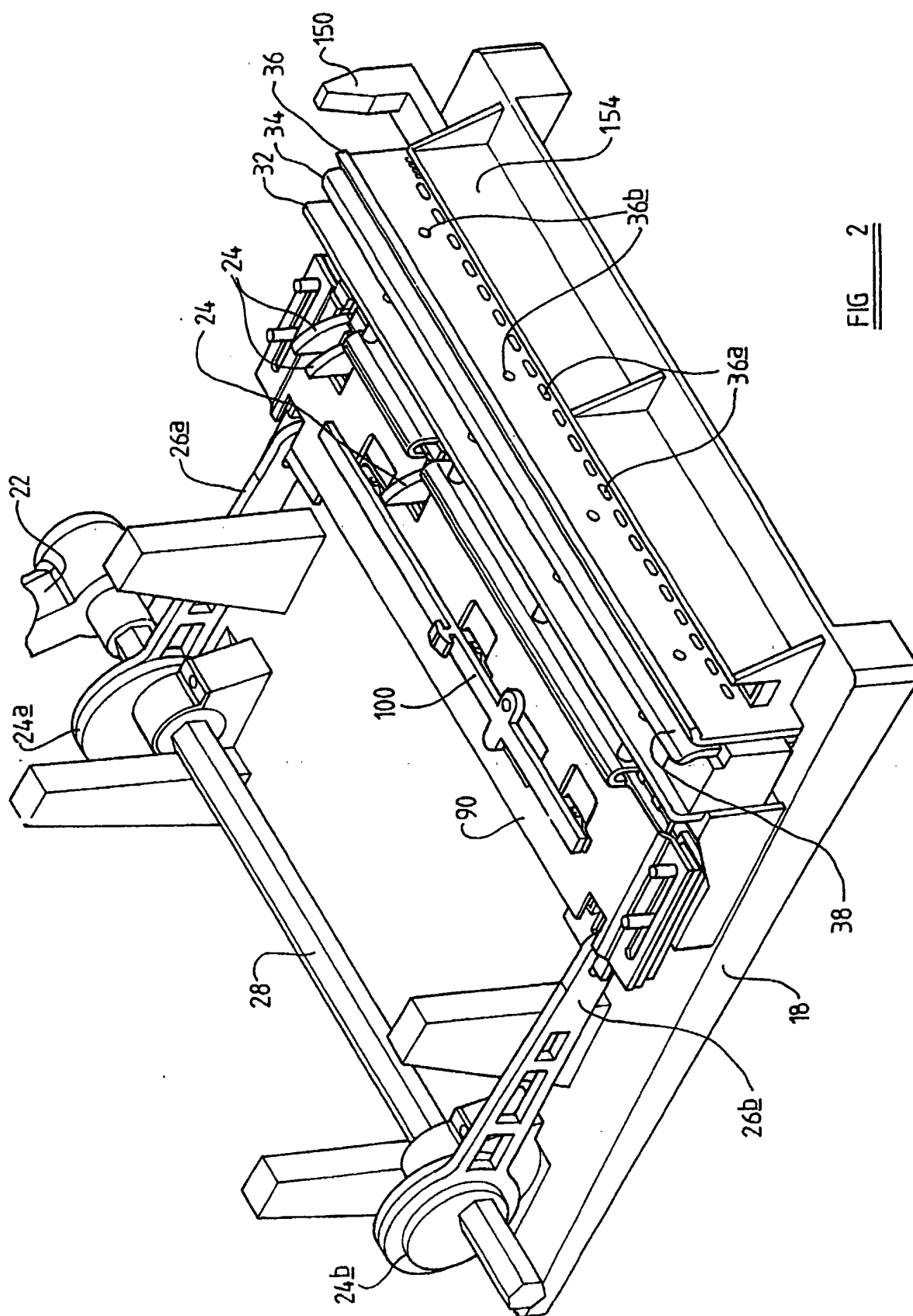


FIG. 2

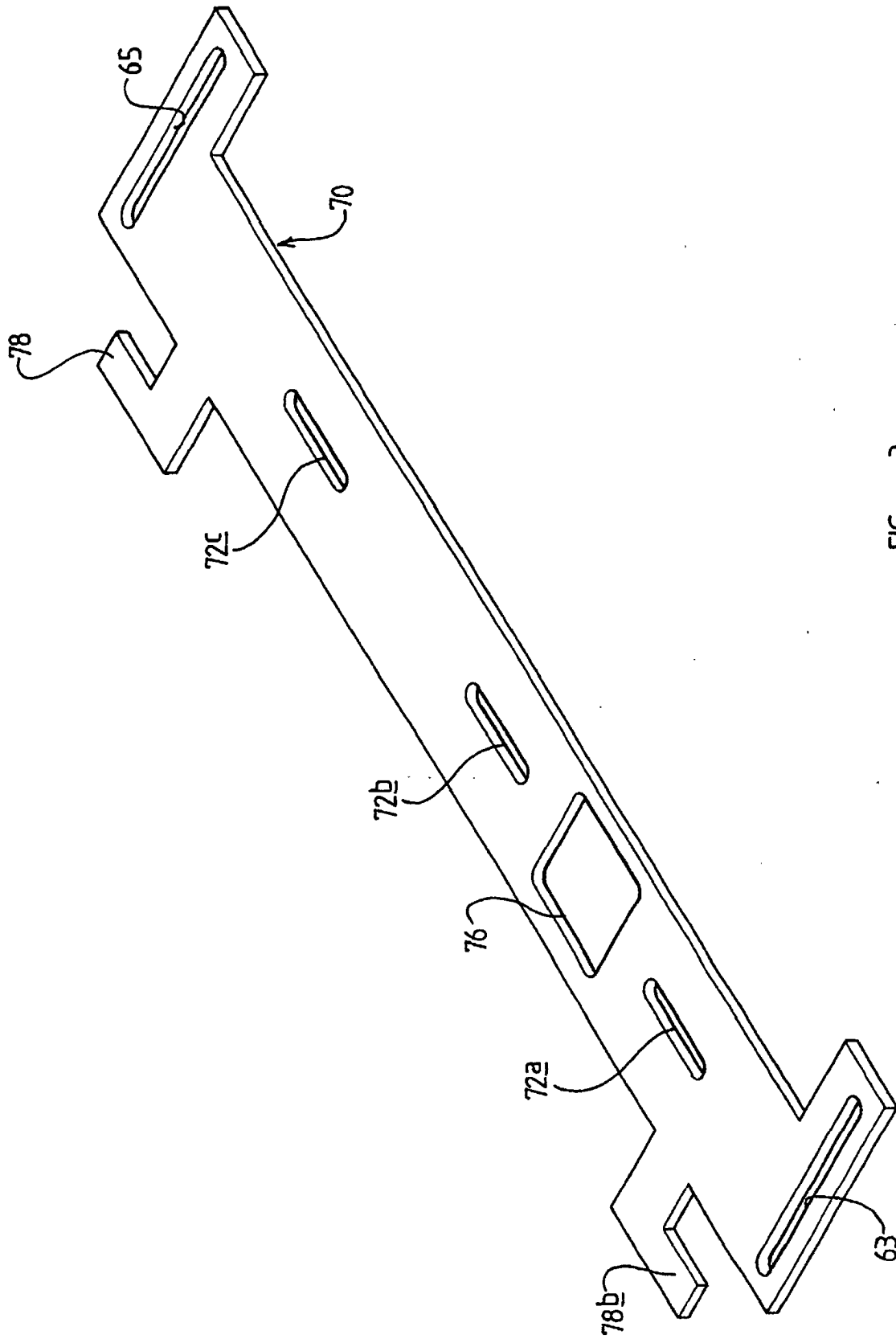


FIG 3

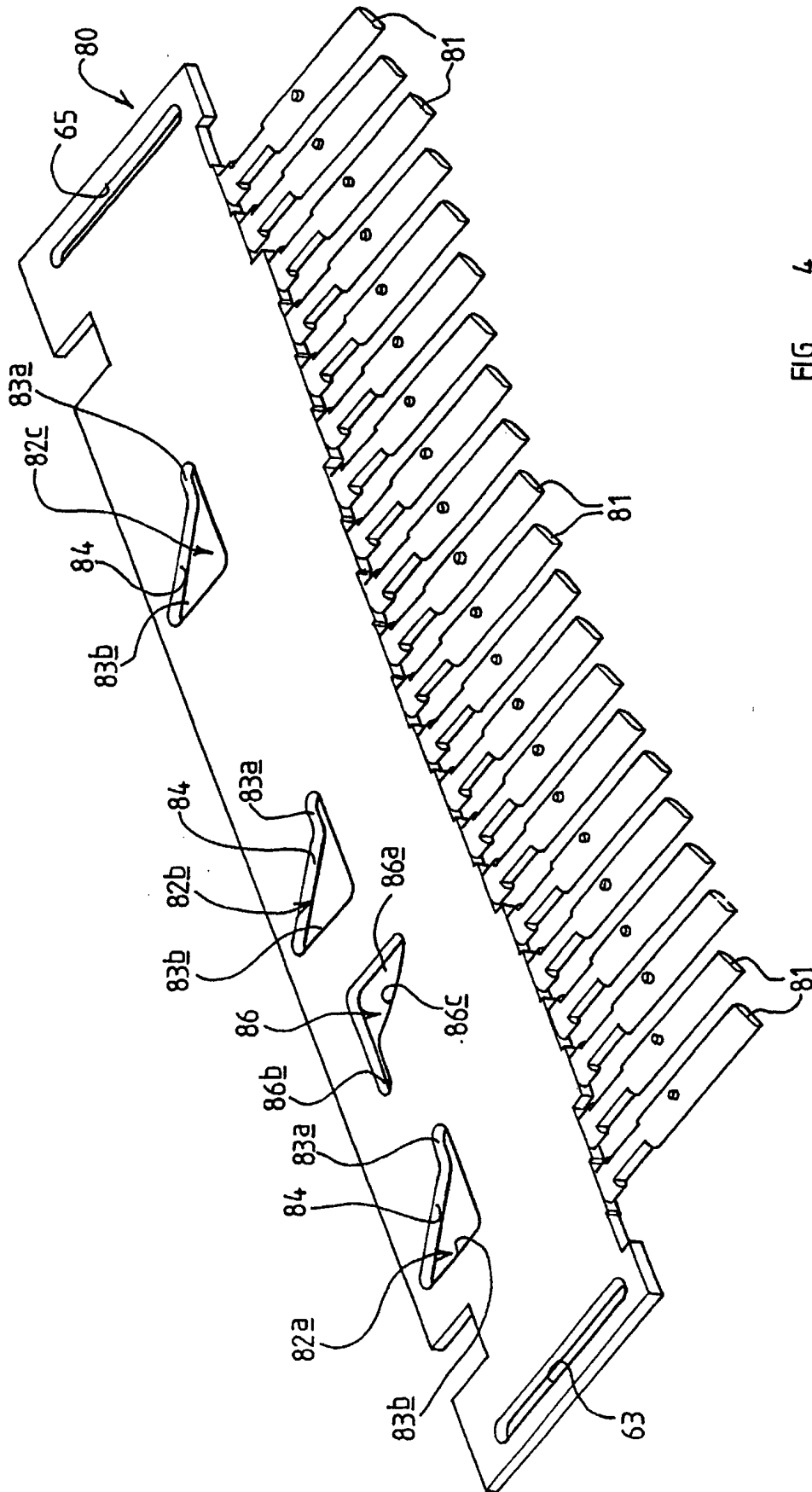


FIG 4

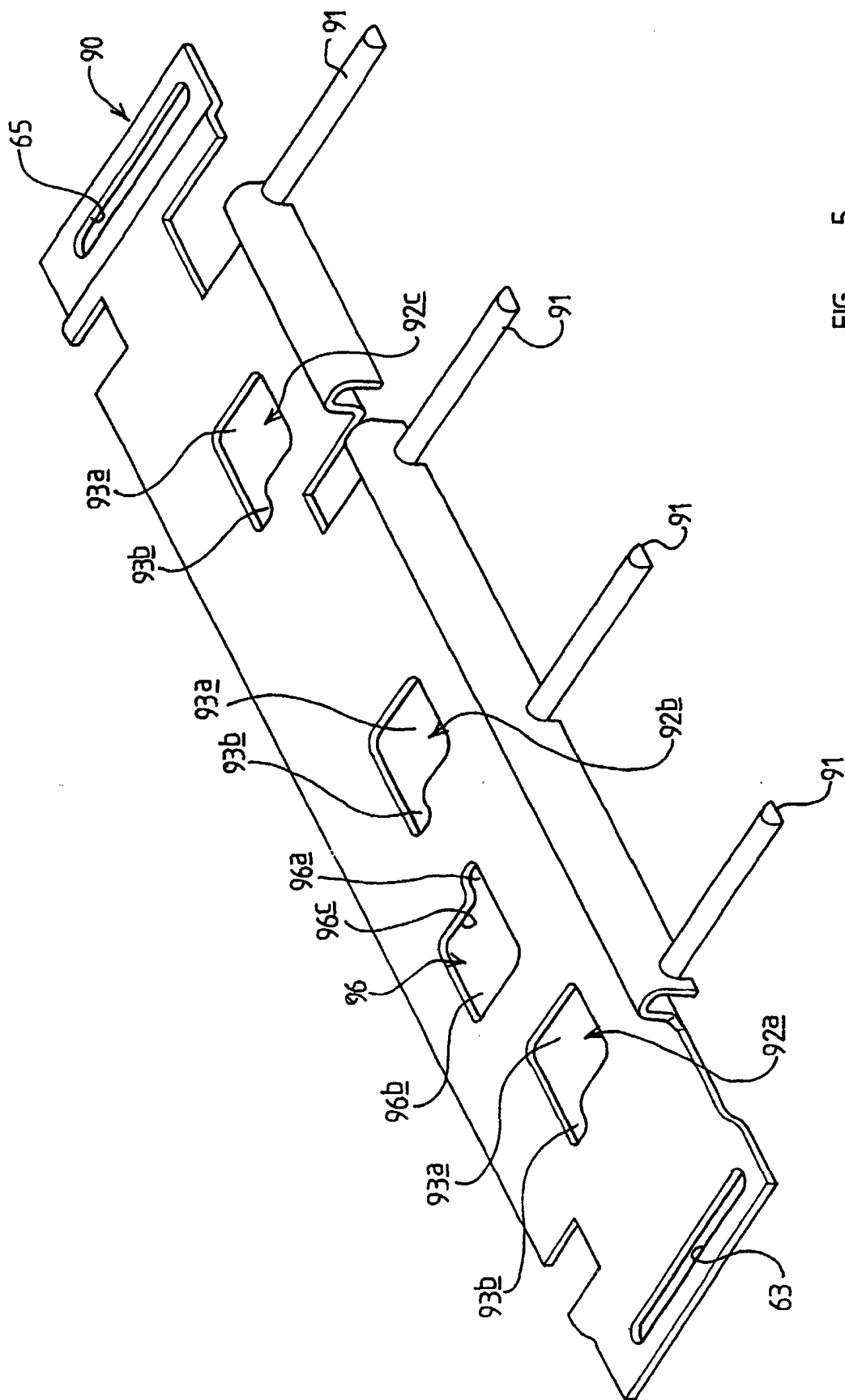
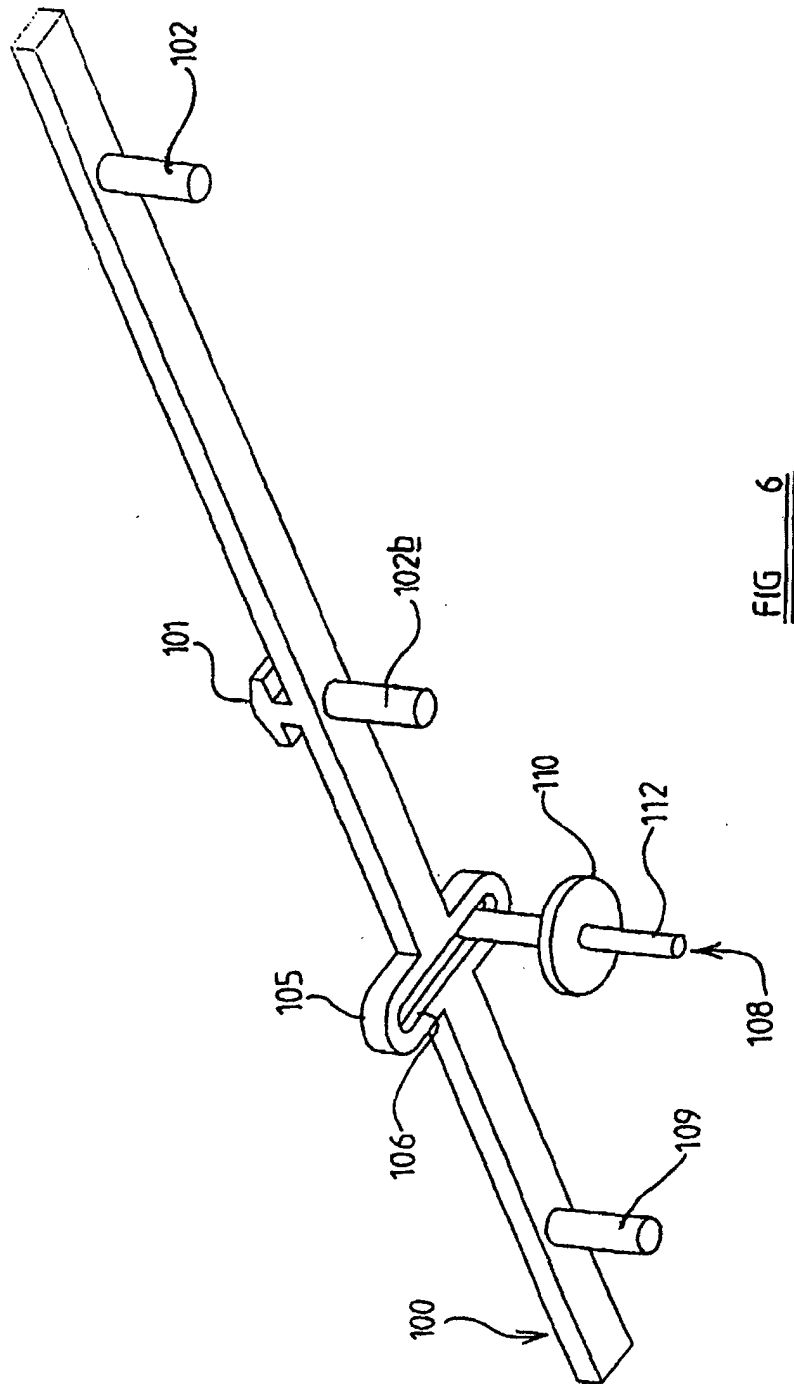


FIG 5



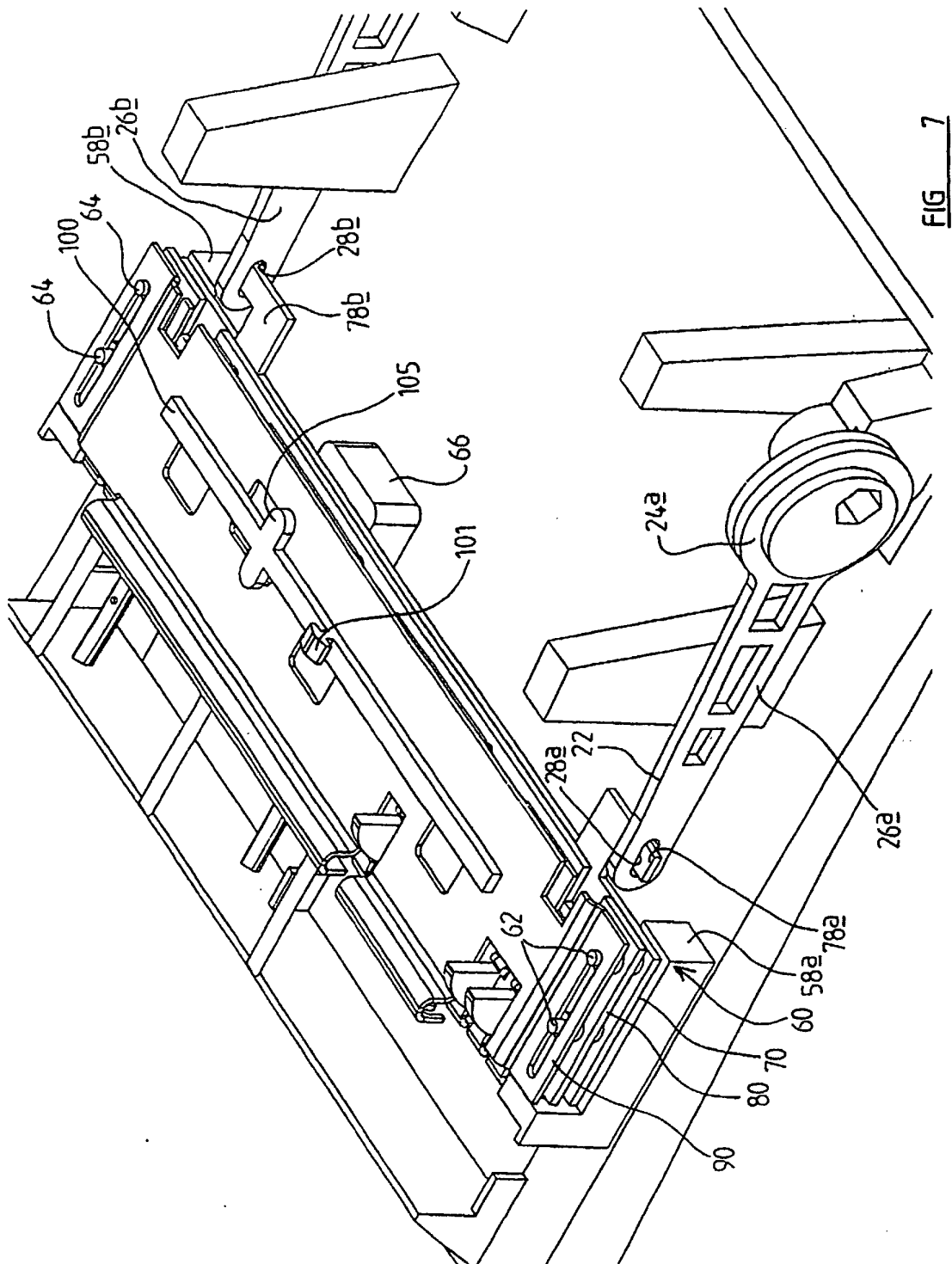
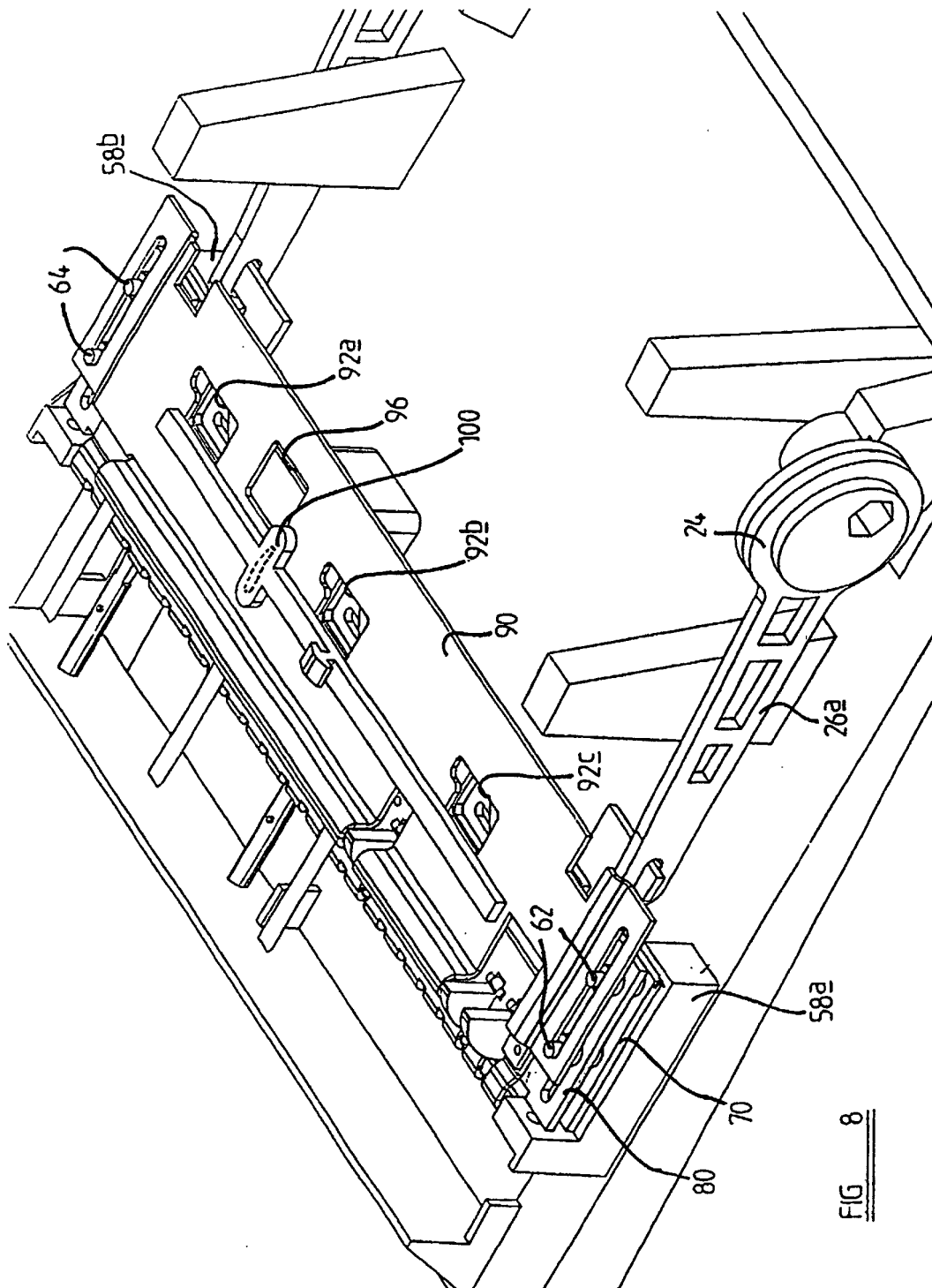
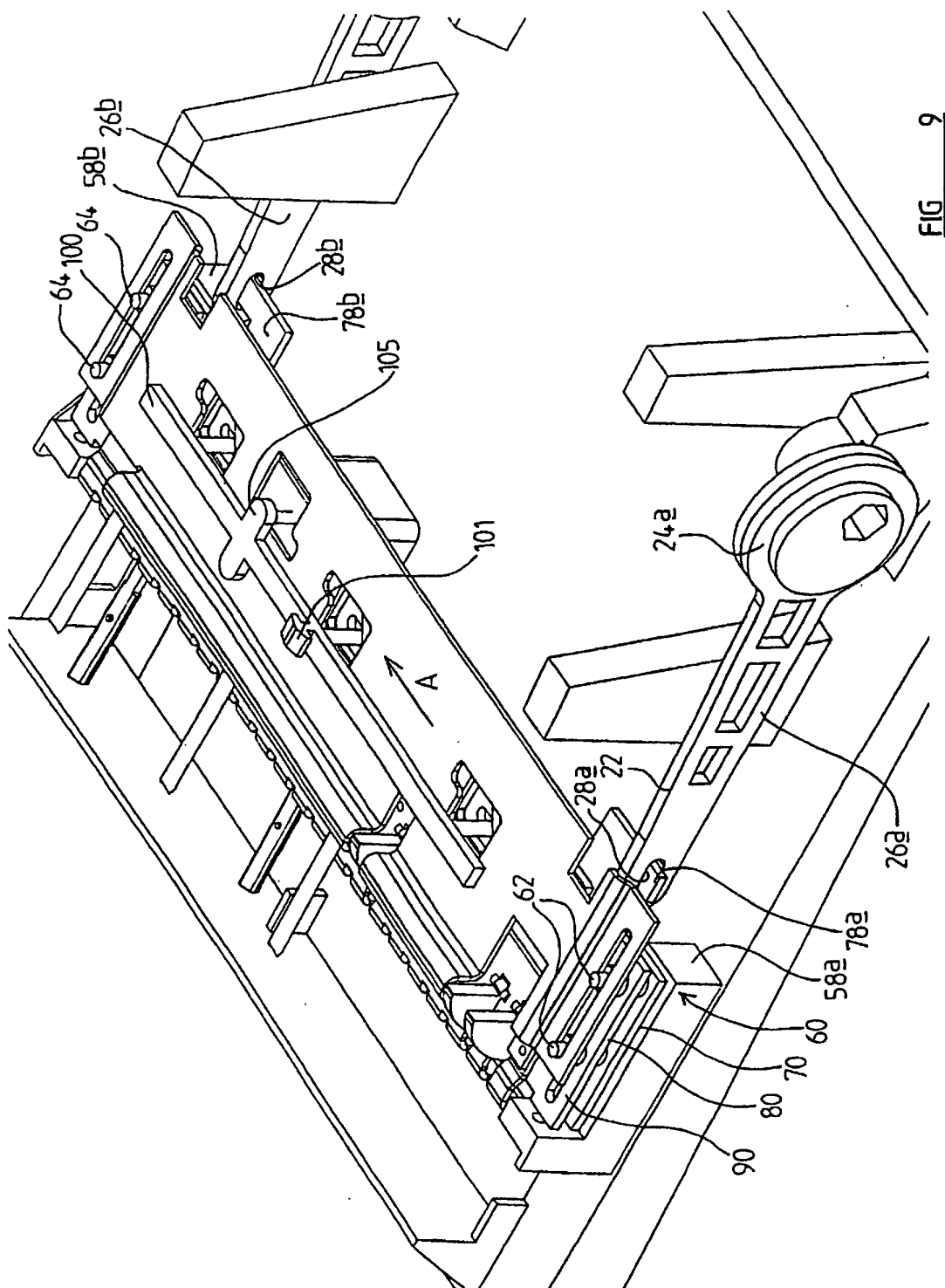
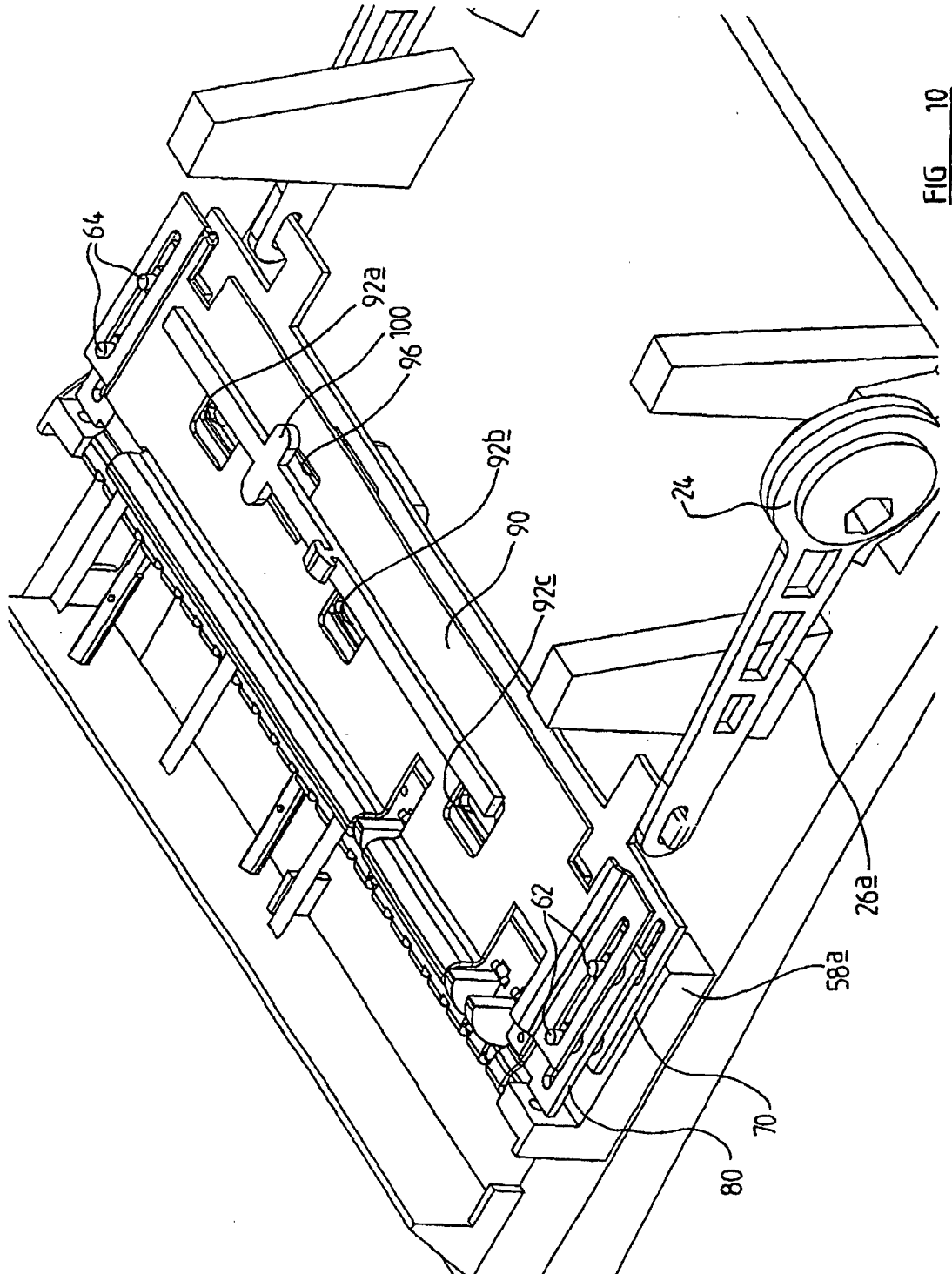
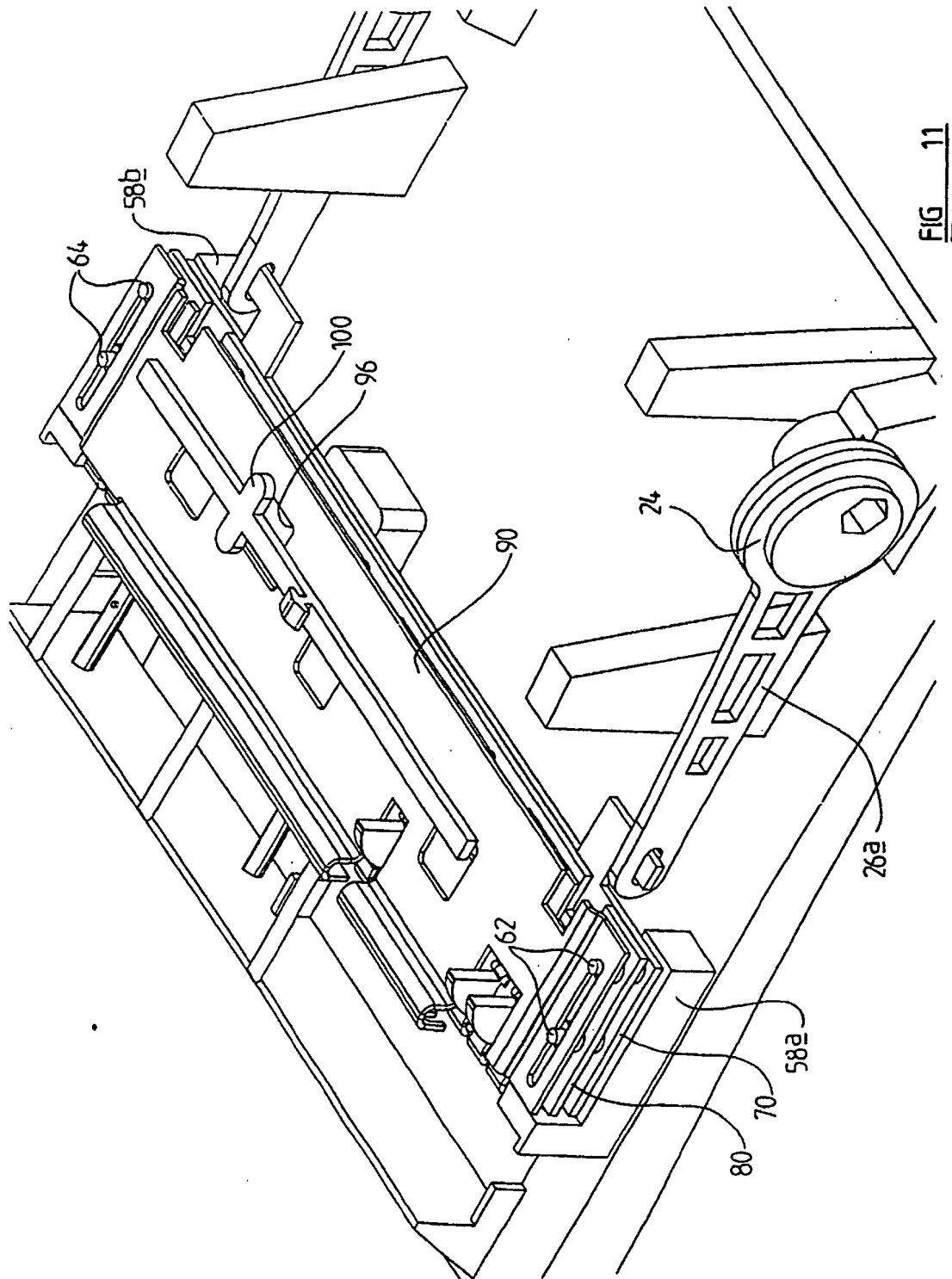


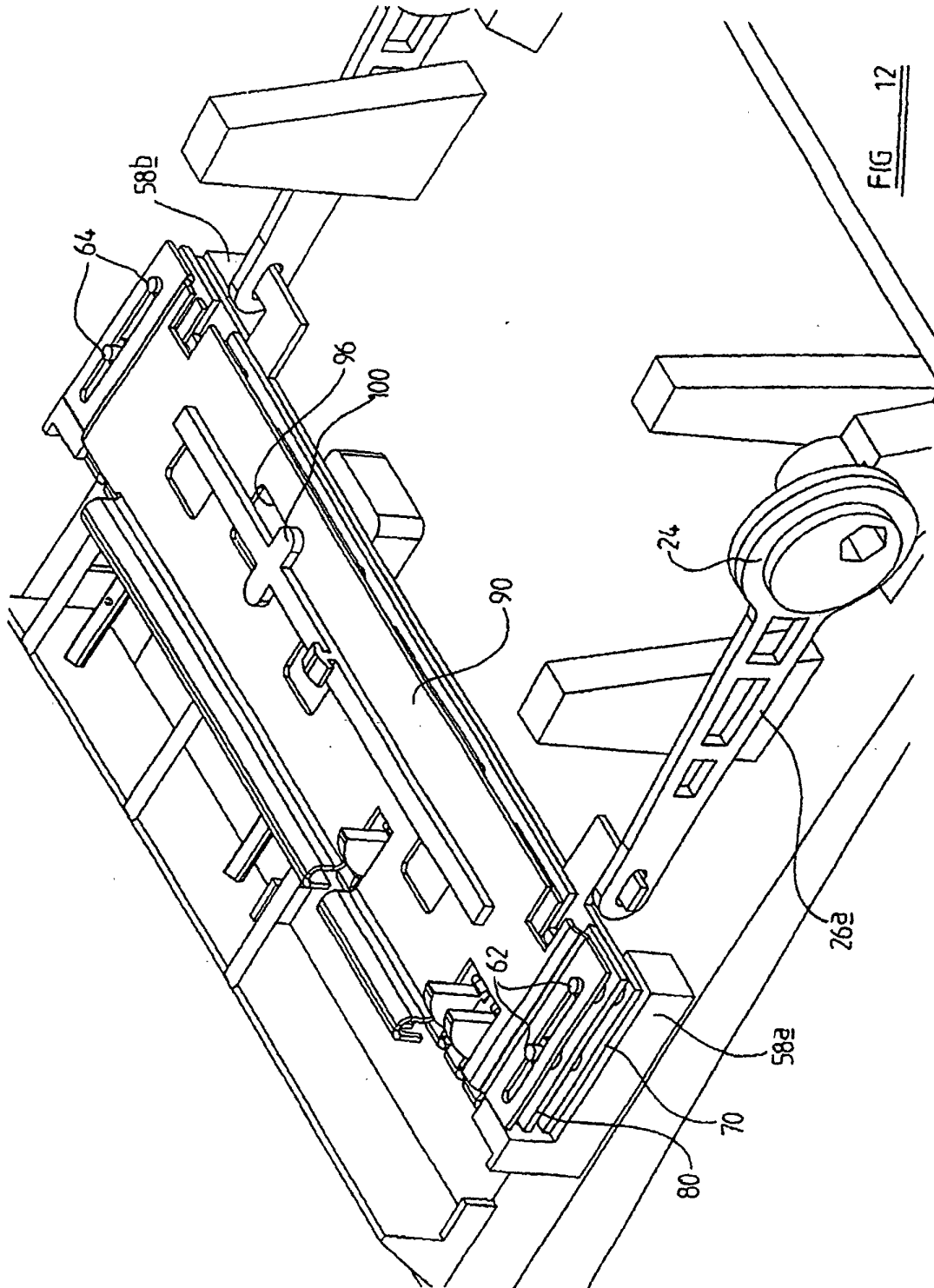
FIG 7











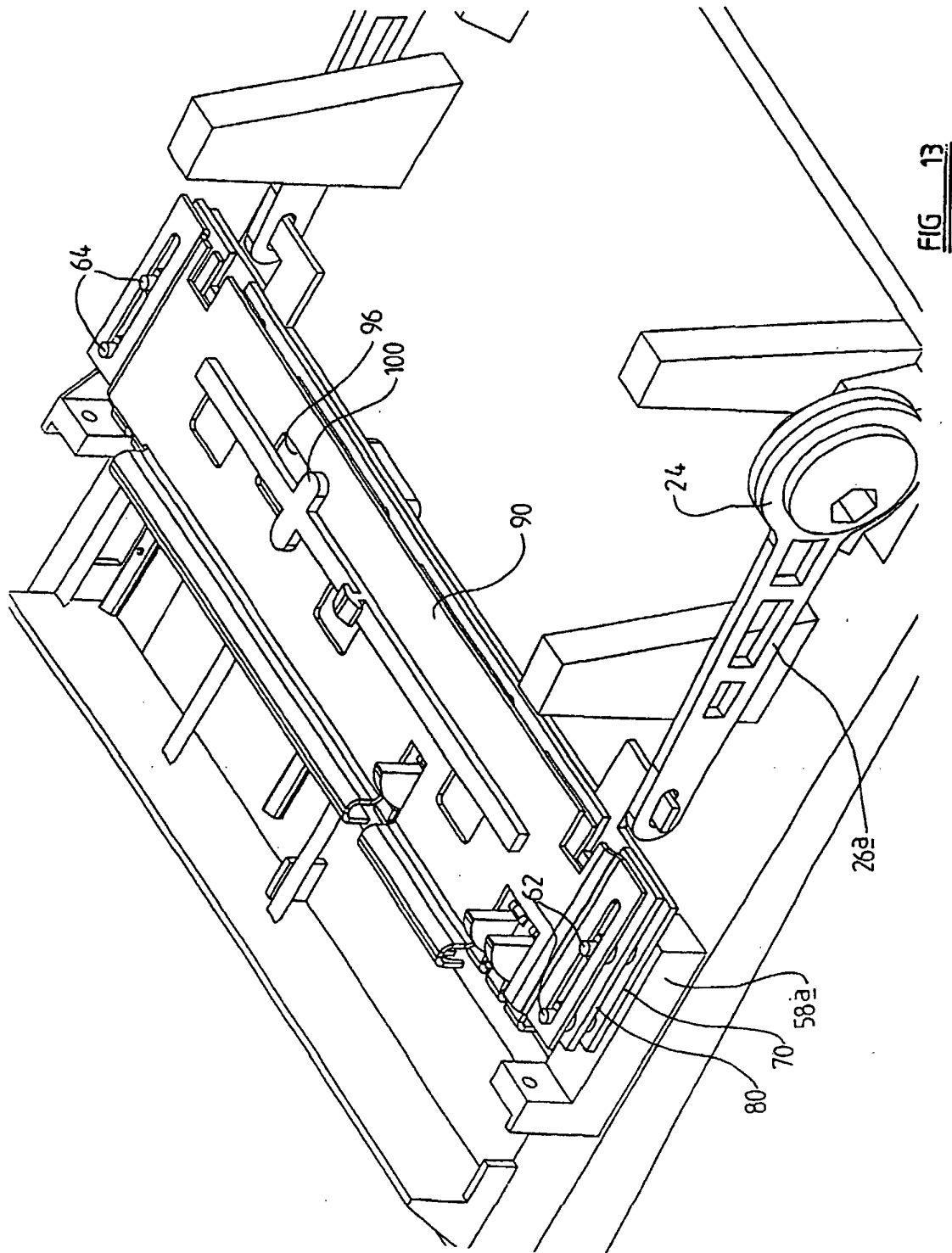
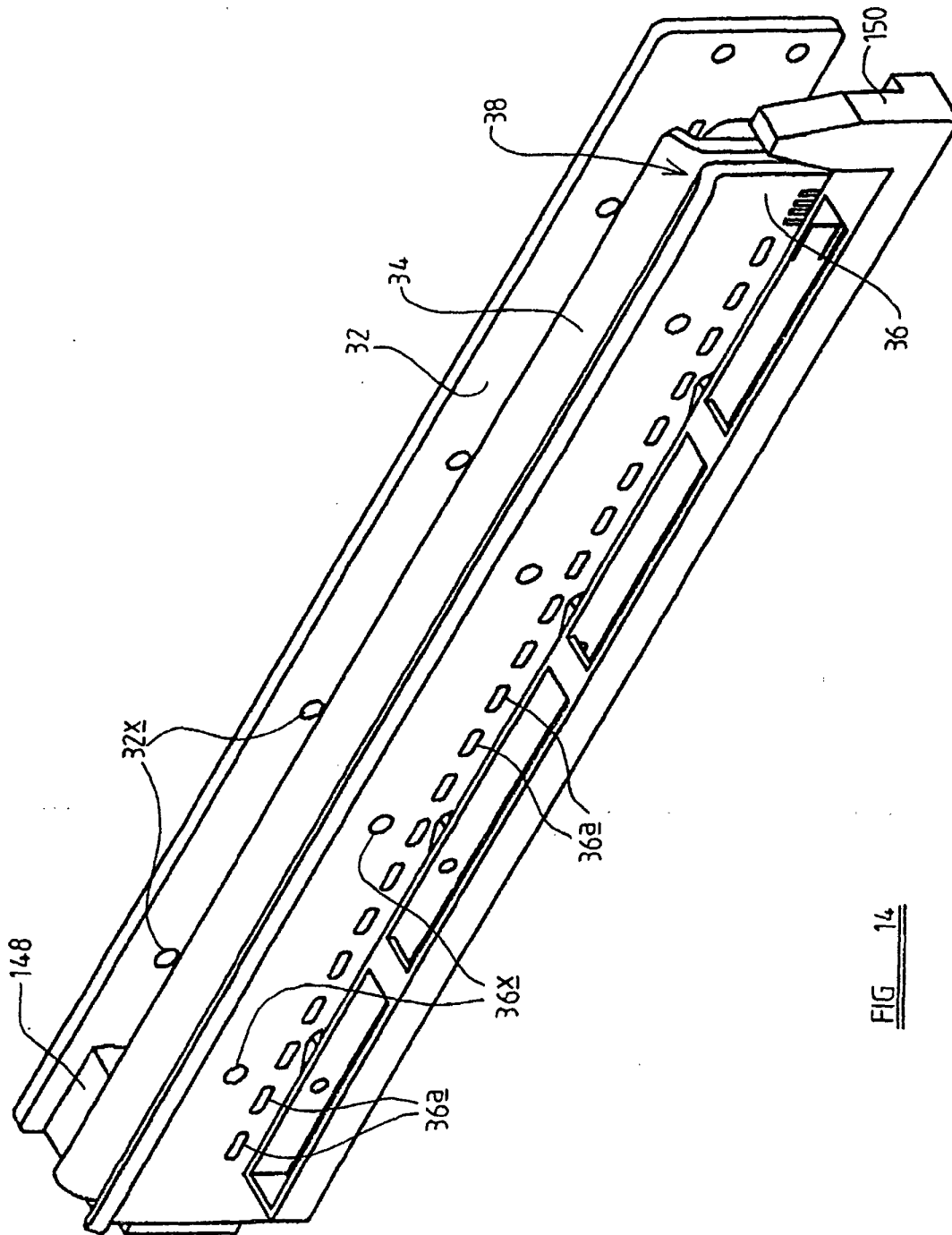
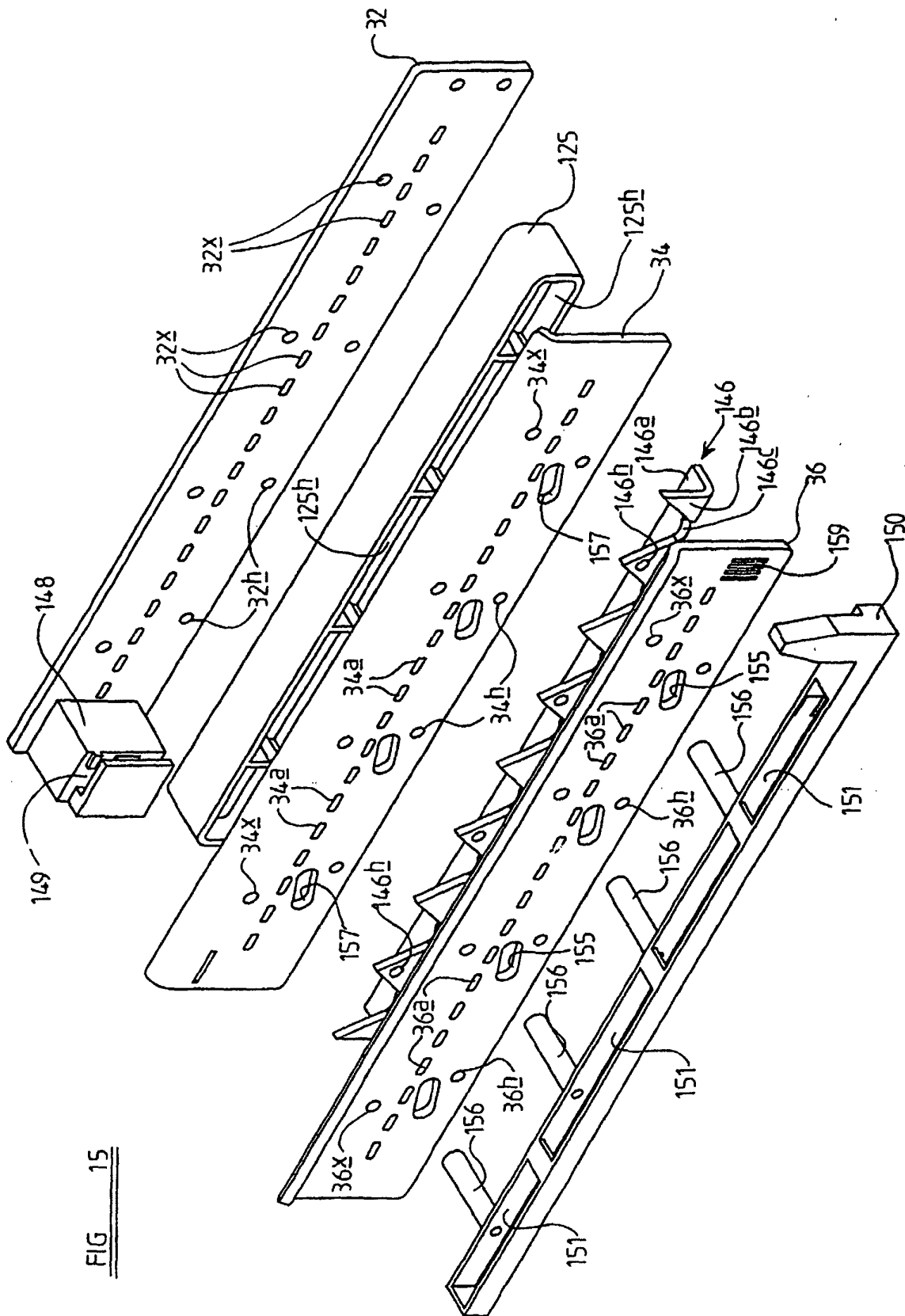


FIG. 13





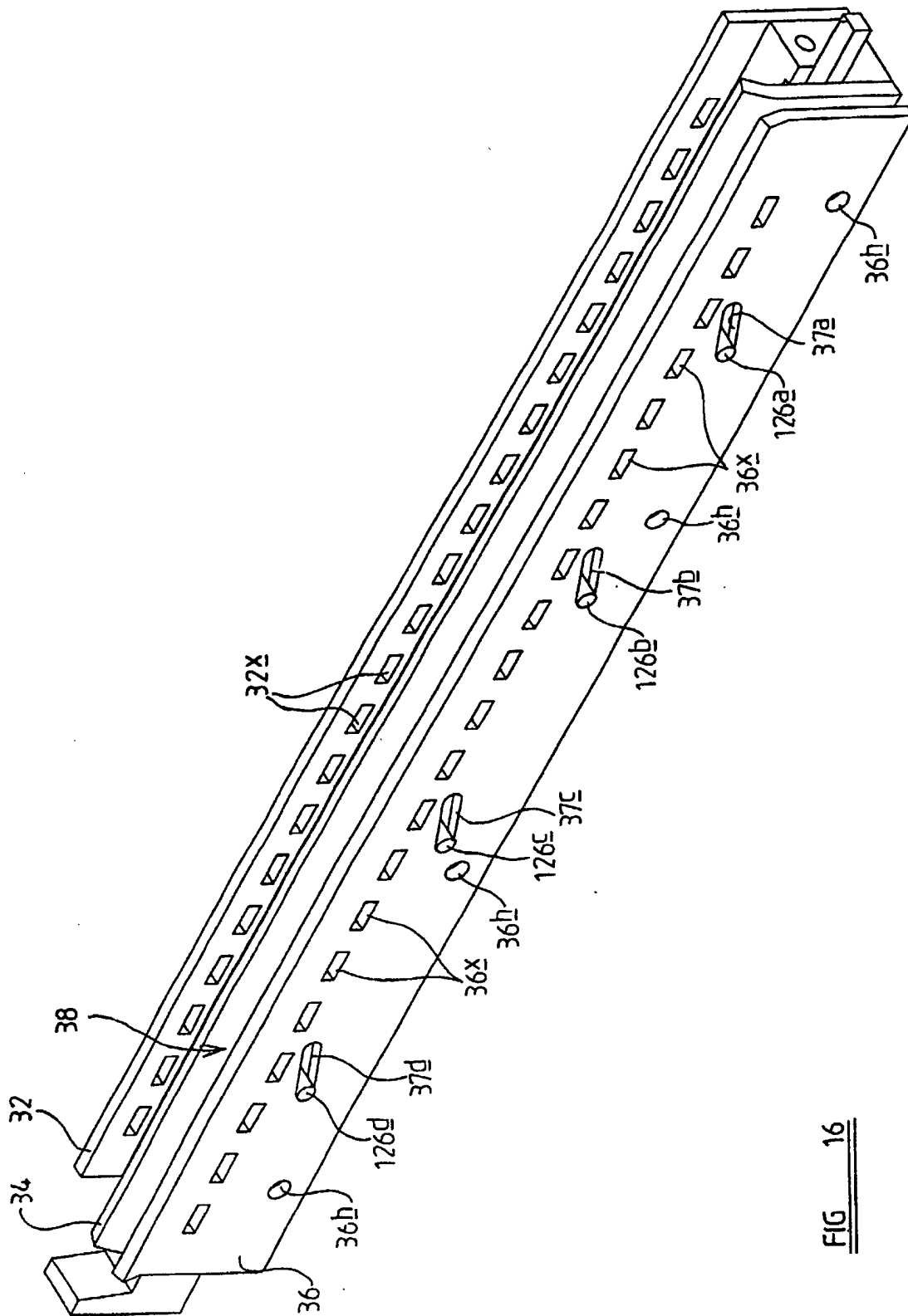


FIG 16

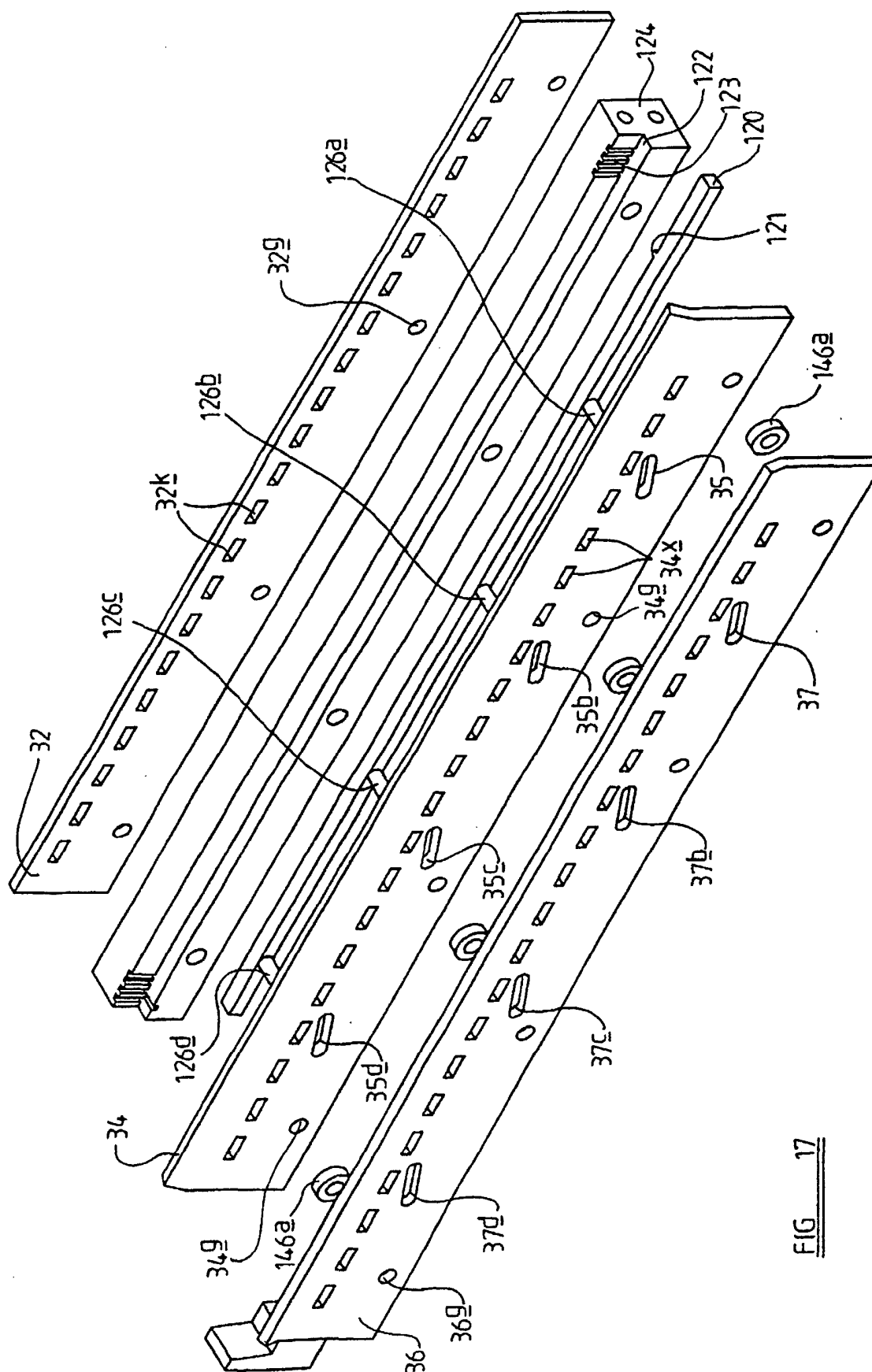


FIG 17