



(22) Date de dépôt/Filing Date: 1992/03/17
(41) Mise à la disp. pub./Open to Public Insp.: 1992/11/03
(45) Date de délivrance/Issue Date: 2005/06/07
(62) Demande originale/Original Application: 2 063 196
(30) Priorité/Priority: 1991/05/02 (670,963) US

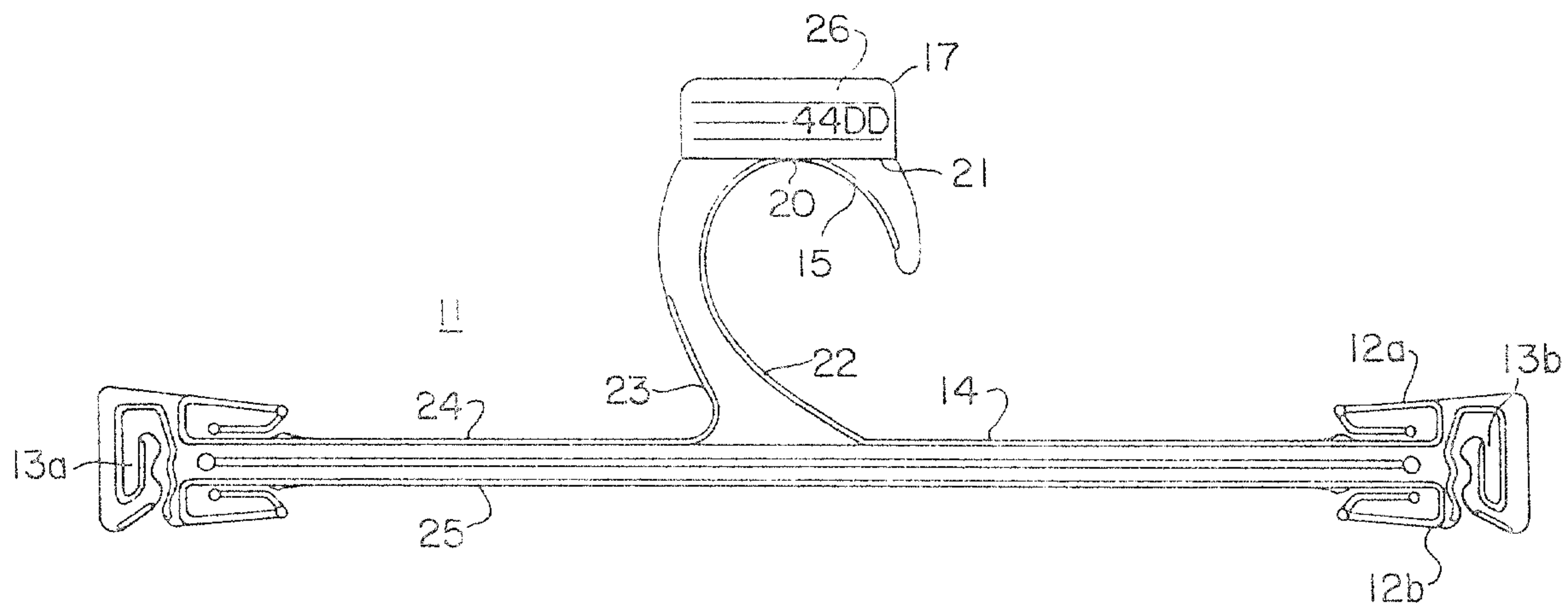
(51) Cl.Int.⁷/Int.Cl.⁷ B65C 7/00, A47G 25/14, A47F 5/00,
G09F 3/00

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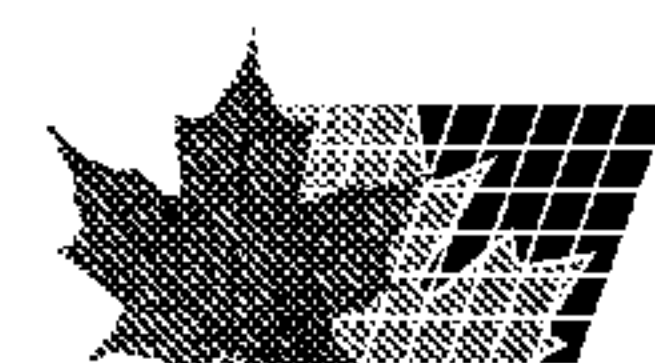
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(54) Titre : SYSTEME AUTOMATISE DE REPERAGE DE CROCHETS PAR INDICE CODE
(54) Title: AUTOMATED SYSTEM FOR SIZING HANGERS WITH AN INDICATING MEANS



(57) Abrégé/Abstract:

The specification discloses an automatic means for assembly of hangers and indexing caps at the time clothing is hung from the hangers, the means comprising means for receiving a bundle of stacked caps; means for receiving a separate plurality of stacked hangers; reciprocal means for simultaneously dispensing one of the caps and securing the caps to one of the hangers to define an indexed hanger wherein an index defined by the secured cap is correlated to a specific characteristic of a garment hung thereon.



ABSTRACT

The specification discloses an automatic means for assembly of hangers and indexing caps at the time clothing is hung from the hangers, the means comprising means for receiving a bundle of stacked caps; means for receiving a separate plurality of stacked hangers; reciprocal means for simultaneously dispensing one of the caps and securing the caps to one of the hangers to define an indexed hanger wherein an index defined by the secured cap is correlated to a specific characteristic of a garment hung thereon.

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AUTOMATED SYSTEM FOR SIZING HANGERS
WITH AN INDICATING MEANS

This application is a Divisional application of allowed Canadian application serial number 2,063,196, filed on March 17, 1992 and allowed on July 27, 2001.

The present invention is applicable to the field of garment hangers from which clothing or other articles of apparel are suspended. In particular, it includes a method, means and system for manufacturing and distributing the indicating means to a plurality of locations for attachment to said hangers, and a method and means for automatically affixing an indicating means to the hanger which identifies some attribute of the garment suspended therefrom.

It is known to affix an indicating means to a particular size from a plurality of like garments arranged adjacent thereto on a display rack. Consumer taste and fashion have dictated a desire for mass produced, but well fitted garments. For example, men's suits, commonly sold by chest measurement are now available for short, regular, tall, and extra tall proportions for a given size, thereby providing four different "attributes" for a given garment size, i.e., 42S, 42R, 42T, 42XT respectively.

The manufacturers of women's garment, particularly those who manufacture bra and panty sets, have also experienced a comparable increase in the number of attributes allocated to

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1 a given garment, in addition to its size. For example, a bra
with a chest size of 36 may be available in five different
cup sizes (A-DD) and for certain types of lingerie, may be
matched with one or more corresponding panty sizes.

5 For this reason, the trade has developed a variety
of indexing means to further sub-divide garments by their
appropriate attributes, all of which are today manually
affixed.

10 For example, U.S. Patent 4,322,902 discloses an
indicator for garment hangers, which is currently assigned to
the assignee of the present application, and which further
discloses a first indicator which may be snapped over the
wire hook of a hanger, and a second indicator, disclosed in
Figures 3-6 which may be attached to either a wire hanger, or
a plastic hanger as illustrated in Figures 4 and 6.

15 U.S. Patent 4,137,661 discloses an "identification
procedure for suspended articles of clothing and carrier for
application of the procedure." In this patent, the marking
of data with respect to size, quality, color, manufacturing
data, delivery, pattern or price is affixed to a label member
20 5 and removably secured to the hanger.

25 U.S. Patent 3,024,953 discloses a rectangular
plastic guard which is adapted to be secured to the wire hook
of a clothes hanger, and which extends upwardly therefrom to
assist in preventing the clothes hangers from becoming
entangled with one another.

30 U.S. Patent 1,099,261 discloses a clothes hanger
particularly adapted for hanging sets of furs, with a metal
rectangular plate 10 which receives an index card describing
the furs suspended therefrom.

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U.S. Patent 4,115,940 discloses a garment hanger
1 with a size indicator in which the indicia or carry tab is
visible when the garment is hung on the hanger.

Design Patent 302,214 discloses a garment hanger
in three embodiments, two of which disclose indexing indicia.
5 Design Patent 302,214 is also assigned to the assignee of the
present invention.

Design Patent 244,197 discloses an ornamental
design for size indicator for a garment hanger that is
intended for attachment to a garment hanger. Each of these
10 devices is manually affixed, and further, may include
additional steps of printing, writing, or otherwise creating
the desired indicia to be attached to the hanger.

15 The present invention is an automatic system for
sizing hangers with an indicating means that is directly
related to some attribute of the garment suspended from the
hanger. The indicating means is automatically attached to
the hanger at the time the garment is hung or suspended from
20 the hanger. The invention further includes a method, means
and system for manufacturing the indicating means, and then
distributing them to a plurality of locations around the
world for attachment to the garment hangers at the time the
garments are suspended therefrom.

25 The present invention provides a colorful, easy to
read, visual display of one or more attributes of the garment
which could be easily discerned by the customer when a
plurality of like garments are suspended from a display rack.
The sizing indicator is attached above the hook of the hanger
30 to be easily visible above the hangers, even when a plurality

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of like garments are suspended adjacent one another on a longitudinal rail. By imprinting the size in an Arabic numeral, i.e., 44, and a garment attribute in a color, it is possible for the customer to select the desired garment quickly and easily. When plural garments are involved, such as a bra and panty set, the bra size can be imprinted on one side of the indexing means, while the panty size can be printed on the opposing side of the indexing means.

Also disclosed is a system for producing a plurality of hangers, each of which has an index coded cap which is related to a specific characteristic of the garment hung from the hanger wherein the individual hangers are produced at a plurality of locations, and the index coded caps are produced at a central location. This system is particularly adapted to the manner in which garments are currently manufactured, distributed and sold in international trade. Large national retailers of clothing generally contract with a plurality of clothing manufacturers to produce uniform standardized clothing which is essentially identical from batch to batch, even though manufactured by different entities. These plurality of manufacturers in turn produce the clothing at their own plants, or in many cases sub-contract the production of the garments to far eastern manufacturers based in Hong Kong, Taiwan, Singapore and South Korea.

It is desirable to maintain a consistent appearance for the indexing features of the hanger. It is also desirable to locally produce the hanger at the remote manufacturing location to avoid the shipping costs associated with the bulk shipment of millions of hangers from the United States to far eastern locations. Therefore, the present

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invention is particularly suited to the production of uniform
1 indexing caps in the United States, and the shipment of those
caps to a plurality of garment manufacturing locations,
wherein the caps may be automatically attached to the garment
hangers, at the time the garment hanger is dispensed for
5 securing the clothing thereto. The use of such a hanger
facilitates the "rack ready" production of clothing articles
wherein the clothing articles are manufactured and suspended
from hangers in the far east, together with the retail
store's price tag, and mounted in intermodal containers for
10 shipment to the United States whereupon the "rack ready"
clothing may be transferred from the intermodal container to
the display rack in the retail store without any additional
labor input.

To facilitate this system, the present invention
15 also includes a means for aligning and stacking the index
coded caps in a predetermined relationship to one another, so
that the caps may be loaded in a machine for automatically
affixing the index coded caps to the garment hanger. The
present invention also includes means for transporting the
20 stacked cap and a bundle which maintains said predetermined
relationship to the plurality of locations for which the
stacked caps are to be attached to the hangers. Finally, the
present invention includes automatic means for sequentially
affixing the index coded caps to the garment hangers at each
25 of the plurality of locations wherein the index coded caps
are secured to the hanger automatically at the time the
garment is hung from the hanger.

The present invention also includes a mechanized
means for manufacturing a bundle of stacked indexing caps for
30 subsequent attachment to a plurality of hangers wherein

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the individual index coded caps are injection molded in a
1 plurality of colored batches. The mechanized means further
includes a centrifugal means for aligning the caps from each
batch in a predetermined stacked relationship to one another,
and a means for binding the caps into a bundle for transport
5 to a plurality of remote locations.

The present invention also includes a garment
hanger having an indexing cap for identifying at least one
characteristic of the garment hanging therefrom wherein the
garment hanger includes a hook adapted to engage a rod or
10 other supporting means, and an upstanding flange extending
from the hook for receiving one of a plurality of different
indexing caps, said flange extending and projecting above the
top contour of the hook. The hanger of the present invention
also includes a snap fit engagement means defined by the
15 upstanding flange, and a generally planar and stackable
indexing cap having a recess formed therein for receiving the
flange of the hanger therewithin. The indexing cap also
defines a through opening which facilitates stacking the
indexing cap in a bundle of stacked caps during transport,
20 and which receives the snap fit engagement means when the
indexing cap is attached to the hanger.

The present invention also includes an automatic
means for assembly of the indexing coded cap and the hanger
at the time the clothing is hung from the hanger. This
25 means includes a magazine for receiving a bundle of stacked
caps, a separate magazine for receiving a plurality of
stacked hangers, and a reciprocal means for simultaneously
dispensing one of the index caps from the magazine and
securing said cap to the hanger at the time the hanger is
30 presented to the operator for attaching the clothing thereto.

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In one embodiment of the present invention, there is provided an automatic means for assembly of hangers and indexing caps at the time clothing is hung from the hangers, the means comprising means for receiving a bundle of stacked caps; means for receiving a separate plurality of stacked hangers; reciprocal means for simultaneously dispensing one of the caps and securing the caps to one of the hangers to define an indexed hanger wherein an index defined by the secured cap is correlated to a specific characteristic of a garment hung thereon.

Desirably, the hanger and the index cap to be secured are positioned in a common plane, the means for receiving a bundle of stacked caps and the means for receiving a plurality of hangers is a magazine, respectively.

It is also preferably for the above embodiment of the present invention, that the reciprocal means includes a plate defining a first cutout which defines the size and shape of the index cap and second cutout which is arcuate and extends from the first cutout to a leading edge of the plate, the first and second cutouts aligning the index cap and hanger prior to engagement, the reciprocal means reciprocates along a common plane with the cap and the hanger to remove a cap from the magazine and thereafter secure the cap to the hanger as the hanger and cap are dispensed from the hanger magazine.

In another embodiment of the present invention, there is also provided a manual means for assembly of hangers and indexing caps at the time clothing is hung from the hangers the means of the indexing caps being secured in a stacked bundle of caps by a plastic ribbon and a releasable clamp, the manual means comprising means for receiving a bundle of stacked caps; means for removing the releasable clamp; alignment means for

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aligning the hanger with the cap to assist an operator in inserting the hanger into the indexing cap.

It is desirable in the above embodiment of the present invention that the means for receiving a bundle of stacked caps is a magazine and the means for removing the releasable clamp disengages a plastic barb.

Further, it is preferable the magazine defines an opening at its bottom end whereby after a hanger has been inserted into the recess of a cap the cap may be removed from the magazine by withdrawing the hanger.

In another embodiment of the present invention there is provided a manual means for assembly of hangers and indexing caps at the time clothing is hung from the hangers, each of the hangers having a hook member and each of the indexing caps defining a recess for receiving a portion of the hook member of one of the hangers, each of the indexing caps further defining an aperture through which a plastic ribbon is inserted to hold the indexing caps in a stack, a releasable clamp being attached to the plastic ribbon at one end of the stack to secure the indexing caps in a stacked bundle, the manual means comprising means for receiving a bundle of stacked caps; means for removing the releasable clamp from the plastic ribbon; and alignment means for aligning one of the hangers with one of the indexing caps to assist an operator in inserting the portion of the hook member of one of the hangers into the recess of one of the indexing caps.

It is preferably in the above embodiment that the means for receiving a bundle of stacked caps is a magazine.

Further, it is preferable of the above that the magazine

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defines an opening at its bottom end whereby after the portion of the hook member of one of the hangers has been inserted into the recess of one of the indexing caps, the one of the indexing caps is removed from the magazine by withdrawing the one of the hangers from the alignment means.

Additionally, the releasable clamp is a plastic barb and the means for removing the releasable clamp disengages the plastic barb from the plastic ribbon, wherein the releasable clamp is a plastic barb slidably engaged at one end of the plastic ribbon and the means for removing the releasable clamp disengages the plastic barb from the plastic ribbon.

Moreover, the means for removing the releasable clamp is a reciprocating fork.

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In the accompanying drawings:

1 Figure 1 is a plan view of one side of a bra and panty garment hanger having an index coded cap relating to an attribute of a bra to be suspended therefrom;

5 Figure 2 is an exploded view of the opposite side of the bra and panty hanger illustrated in Figure 1 with the index coded cap separated from the hanger and displaying an attribute of a panty to be suspended therefrom;

10 Figure 3 illustrates a cross-section of the index coded cap taken along section line 3-3' of Figure 2;

 Figure 4 represents a corresponding cross section of the hanger taken along section line 3-3' of Figure 2;

 Figure 5 illustrates an end-view of the indexing cap illustrated in Figure 1;

15 Figure 6 illustrates a top view of the indexing cap and hook illustrated in Figure 1;

 Figure 7 is an isometric view of a mechanized means for producing a bundle of stacked index caps in accordance with the present invention;

20 Figure 8 is a top view of a means for aligning and stacking said index and coded caps;

 Figure 9 is a diagrammatic view taking along cord section 9-9' of Figure 8;

25 Figure 10a is a diagrammatic view of an air jet separator means taken along section line 10-10' in Figure 9;

 Figure 10b is a diagrammatic illustration of an air jet separator means also taken along section line 10-10' in Figure 9;

30 Figure 11 is a cross-sectional view taken along section line 11-11' of Figure 8;

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1 Figure 12 is a partially cross-sectioned isometric
view of an index coded cap manufactured in accordance with
the present invention;

5 Figure 13 is partially cross-section planar view
of the stacking means of the present invention;

 Figure 14 is a top plan view of the magazine of
the present invention;

10 Figure 15 is a plan view of a bundle of stacked
index coded caps prepared in accordance with the present
invention;

 Figure 15a is an alternate embodiment of a portion
of the invention illustrated in Figure 15;

15 Figure 16 is an isometric plan view illustrating
the means for assembling the index and coded caps and hangers
at the time the hangers are dispensed;

 Figure 17 is a top plan view of the means for
assembling illustrated in Figure 16, illustrating a second
operating position in dotted lines;

20 Figure 18 is an isometric plan view of a manual
means for assembling index coded caps and hangers;

 Figure 19 is a top plan view of a portion of the
invention illustrated in Figure 18;

 Figure 20 is a side plan view of the element
illustrated in Figure 19.

25 Figures 1-6 illustrate a garment hanger and the
index coded cap of the present invention. While the
invention will be described and illustrated with respect to a
single bra and panty hanger, it is understood that the
invention is equally applicable to other types of garment
30 hangers. As illustrated in Figures 1 and 2, the garment
hanger is a bra and panty hanger having bra hanger strap
clips 12a-12b and panty hanger clips 13a, 13b arranged at

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either end of central support 14. The hanger presents a
1 first side in Figure 1, and the opposite side in Figure 2,
with the index cap positioned for attachment in Figure 2.

Hanger 11 also includes a hook member 15 having an
upstanding flange 16 (illustrated in Figure 2) for receiving
5 one of a plurality of different indexing caps, one of which
is illustrated at 17 in Figures 1-6. The flange 16 projects
above the top contour of hook 15. A snap fit engagement
means 18 is defined on the upstanding flange 16 as
illustrated in Figure 2. The index coded cap 17 is generally
10 planar and stackable and has a recess 19 formed therein
(illustrated in Figure 3) for receiving the upstanding flange
16 therewithin. The indexing cap 17 defines a through
opening 20 (illustrated in Figures 1-3 and 12) which receives
the snap fit engagement means 18 when the index cap is fitted
15 to the upstanding flange. This through opening is also used
to form a bundle of stacked caps as will be hereinafter later
described with respect to Figures 13-15. The hook member
further defines a horizontal flange 21 which cooperates with
the snap fit engagement means 18, and a first 16a and second
20 16b edge of flange 11 to engage the recess 19 defined within
the index cap in a wedging manner. Edges 16a and 16b extend
upwardly and inwardly in an angular fashion to assist in
centering the cap for engagement of the snap fit engagement
means 18. Hook member 15 also includes an inner flange 22
25 which extends from the tip 15a of the hook to the
intermediate frame member 14 to strengthen the hook and to
provide a larger load bearing surface when the hanger engages
a rod or other supporting means during use. Hook member 15
also includes a second reinforcing rib 23 which extends
30 upwardly from control support member 14 to strengthen the

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hook and to resist twisting or flexure of the hook 15 when
1 the garment hanger is in use. Flanges 22, 23 join with
similarly defined upper flange 24, defined by central support
member 14. Central support member 14 includes upper and lower
flanges 24, 25 and a center medial flange 26 which serves to
5 stiffen the hanger.

By choosing a relatively resilient plastic
material for the hanger 11, and a relatively stiff plastic
material for the cap, the snap fit engagement can be made
relatively permanent, since once the index coded cap is
10 secured by snap fit engagement barbs 18, it is necessary to
bend or flex the side walls 17a, 17b beyond barbs 18 before
the cap can be removed. The stiffness of the plastic
material used to form the cap thereby determines the degree
of difficulty one encounters in removing the cap. Further,
15 the fit and cooperation of the flat edge 17c of the cap and
the horizontal flange 21 makes it difficult to insert a screw
driver, or other means, with which to pry the side walls
apart for removal of the cap.

As illustrated in Figures 1-6, the index cap
20 includes several indexing features. The cap is color coded
to denote a specific attribute of the garment suspended from
the hanger. In addition, the indexing cap 17 carries on one
side the legend 44DD as illustrated at 26 to denote a bra
size suspended from the hanger. On the opposite side of the
25 cap, as illustrated at 27 in Figure 2, a panty size "6" is
indicated for a hypothetical bra and panty set. In this
instance, the color coding could relate to a certain grade
and quality of garment, a certain style of garment, or to
visually reinforce one of the printed indicia such as cup
30 size or panty size. This color attribute would assist the

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1 purchaser in selecting the appropriate garment for his or her intended use.

5 The index cap 17 is planar, having a first and second planar side 17a, 17b which facilitate stacking of the caps for shipment as a bundle of stacked caps. The bottom portion of the cap 17c defines a flat edge, while the top edge of the garment 17d is rounded. The flat configuration 17c and rounded configuration 17d assist the sorting and stacking mechanism in automatically aligning and stacking the caps in a predetermined manner as will be hereinafter
10 illustrated and described with respect to Figures 8-11.

15 As illustrated in Figure 6, the top of the indexing cap 17d is unadorned in the preferred embodiment and is somewhat wider than the internal flange 15a and 15b. It should be noted that as illustrated in Figure 6, flanges 22 and 23 are not visible, and that horizontal flange 21 is substantially the same length as the indexing cap 17, and therefore not visible in Figure 6.

20 The garment hanger illustrated in Figures 1 and 2 also includes a center strengthening rib 26. The use of ribs 22-26 allow the central web of the hanger to be reduced in thickness and weight, thereby reducing the material cost for the hanger and the shipping cost during transit from the various remote manufacturing facilities to the United States. In the preferred embodiment, the hanger is formed of Styrene
25 which provides a clear, virtually transparent hanger for maximum display of bras and panties suspended therefrom. Alternately, the hanger could be formed from K Resin, H.I. Styrene and Polypropylene or other suitable thermoplastics.

30 Figure 7 is an isometric view of a mechanized means for manufacturing a bundle of stacked indexing caps

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1 (illustrated in Figure 15). The means includes an injection
molding machine 30 having a supply of pelletized thermo-
plastic through an air conveyor system 31 and a pair of
opposing mold cavities, generally indicated at 32. In one
5 embodiment of the invention, the injection molding machine is
manufactured by various supplies around the world. In
operation, the mold cavities 32 are first filled with thermo-
plastic at elevated temperatures and pressure to form
multiple index coded caps in a single cycle. The number of
10 index coded caps formed during each cycle is a function of
the capacity of the injection molding machine and the mold
configuration. As the injection mold 32 is separated, the
index coded caps, and molding sprues fall from the cavities
onto conveyor belt 33 which travels beneath the injection
15 molding machine. The index coded caps and molding sprues are
then discharged into an open hopper 34 of a sprue separator
35 which discharges the index caps through an upper opening
onto intermediate conveyor 36 and the molding sprues into a
waste collection box 37. The accumulated sprues may then be
20 shredded and re-introduced into the product stream at 31 as
desired.

The sprue separator 35 is a device, manu-
factured by Alliance Equipment Co. of Starling, Mass.
and uses counter rotating brushes to direct the index
25 coded caps through the upper opening 38 onto conveyor 36.
The caps deposited on conveyor 36 are then transferred to
a second conveyor 39 for transport to an aligning and
stacking machine generally indicated at 40. While belt
conveyors are illustrated in Figure 7, it should be
30 understood that air conveyors or other suitable means for
transport of the index coded caps could be used to move
the caps from the injection molding location to the

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aligning and stacking station. The aligning and stacking
1 machine includes a central hopper 41 equipped with a shut-off
valve and vibrating magnet to assist in controlling the flow
of caps from the injection molding machine 30, to the
aligning and stacking machine 40. As the index coded caps
5 are discharged from hopper 41, they are deposited into a
circular chamber generally indicated in Figure 7 at 42 which
aligns the caps in a serial fashion as will be hereinafter
further illustrated and described with respect to Figures
8-11. The index coded caps are randomly oriented during all
10 stages of the transport from the injection molding machine 30
to the circular chamber 42. The aligning means provides a
serial stream of index caps which exit the circular chamber
42 along conveyor 43 in sequential serial alignment with all
caps aligned in the same direction and orientation. The
15 output of conveyor 43 feeds a stacking mechanism 44 which
creates a bundle of stacked caps from the serial sequential
stream arriving from conveyor 43, as will be further
illustrated and described with respect to Figures 13-15.
When 100 caps or any other desired number, have been stacked
20 in a stacking mechanism 44, a plastic ribbon is inserted
through the opening 20 defined in the index coded caps to
create a bundle of stacked caps, which are then lifted from
the magazine for transport to a plurality of garment assembly
locations. The use of a central location for injection
25 molding machine 30, assures that the respective batches of
index coded caps are all of the same color and appearance.
The different colors of plastic may be maintained in separate
silos (not shown) in Figure 7) and directed to the injection
molding machine 30 through an air conveyor system as
30 illustrated at 31. When a first batch of caps is completed,

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the mold cavities 32 are changed to prepare molds with the
1 new indicia, and the air conveyor system will draw a
different colored plastic from a separate silo. The rest of
the mechanized system remains essentially unchanged, thereby
providing quick, convenient and rapid ability to produce a
5 plurality of different batches of stacked index coded caps.

As illustrated in Figure 8, the aligning and
stacking mechanism 40 includes a circular chamber 42 having a
stationary inner circular wall 45 and a rotating circular
bowl 46. As the stacked caps are dropped into the circular
10 chamber by hopper 41, they are rotated in a counter-clockwise
direction by the rotating bowl 46, and the centrifugal force
generated by the rotating bowl. The inverted and downwardly
beveled slope of the bowl, illustrated in Figure 9, forces
the jumble of stacked caps outwardly against stationary outer
15 wall 45. A ramp 47 extends from the rotating bowl 46
upwardly to an annular band 48 which extends around the inner
lower portion of side wall 45. As the jumble of stacked caps
encounters ramp 47, the centrifugal force drives selected
caps upwardly along the ramp, with a preference for those
20 that are aligned along the circumferential path defined by
the annular band 48. The aligned caps are driven upwardly
along ramp 47 by other caps from the rear and are held
against the annular band 48 by the centrifugal force exerted
by more inwardly directed caps in the jumbled pile of caps.
25 A transition plate 50 is positioned parallel to the upper
edge of annular band 48 to assist the caps in making the
radial transition from the radius defined by ramp 47 to the
radius defined by annular band 48. A separator plate 51 is
adjacent to ramp 47 and begins with the entry point of ramp
30 57, but continues upwardly past the elevation of the upper

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shelf defined by annular band 48, and extends inwardly to
1 contact annular band 48 as ramp 47 tapers off underneath.
The separator plate 51 is much thinner than ramp 47, while
ramp 47 and annular band 48 are both the approximate width of
one of these stacked caps. As the stacked caps emerge from
5 the separator plate 51 along the top of annular band 48, they
encounter first and second air jets 52, 53. The motive force
for the caps is a push from the rear generated by the jumble
of stacked caps advancing upwardly along ramp 47. As
illustrated in Figure 10b, air jet 52 is directed downwardly
10 across the upper outer periphery of the advancing row of
index coded caps 17. The curved lower portion 17d creates
instability on the part of the cap if the cap is oriented
upside-down. Air jet 52 strikes the inner recess 19 and
drives the stacked cap off the wall in the direction of arrow
15 A. On the other hand, a properly aligned cap will advance
under the air jet as illustrated in Figure 10a, and the
rounded top portion 17b thereby reduces the impact area from
jet 52. A second air jet 53 is provided to displace all caps
from the annular band 48 in the event the conveyor mechanism
20 43 and stacker mechanism 44 are full. The air jet 53 is
activated when light from photo diode 54 is no longer
received by photo resistor 55 as indicated in Figure 8
because the column of stacked caps has completely filled the
conveyor 43 and stacking mechanism 44. As the row of aligned
25 caps passes air jet 53, it encounters guides 56, 57 which
maintain the caps in an aligned relationship as they are fed
in the conveyor means 43. In addition to the centrifugal
force generated by rotating bowl 46, additional air jets may
be provided as indicated at 58 and 59 to create an inner
30 vortex of air which swirls around the inner wall 45 of the

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chamber. A second air jet 59 is directed somewhat inwardly
1 to assist the caps in the transition from ramp 47 to annular
band 48. While it would be possible to combine ramp 47 and
ramp 48 in a single unitary structure, it has been found less
expensive to use a singular annular band 48, and a short ramp
5 47 which is fitted therewith.

The remaining jumble of stacked caps is swept in a
circular manner against annular band 48 by rotating bowl 46,
and the centrifugal force generated by the circular movement
of the caps. When the jumble of caps has accumulated to a
10 predetermined height, the jumble strikes a feeler probe 60
illustrated in Figure 11. The feeler probe 60 is suspended
from gantry 61 which spans both the inner wall 45 and outer
wall 62 of the circular chamber 42. When deflected by the
jumble of stacked caps, a micro switch (not shown) attached
15 to feeler probe 60 actuates a shut-off valve in hopper 41 to
stop the flow of index caps until the jumble is reduced to
the predetermined level. As the feeler probe 60 returns to
its normal position, the outlet valve on hopper 41 is opened,
and an electromagnet is energized which vibrates the hopper
20 41 to assist in releasing supply of caps into the circular
chamber 42.

The alignment mechanism also includes a twisted
guide 65 which receives the row of stacked caps in a vertical
alignment as defined by guides 56, 57 and annular band 48
25 (illustrated in Figure 9) and rotates them 90° to a flat
horizontal position as illustrated in Figure 8. The lower
portion of guide 65 is cut away to receive a conveyor belt 43
which is powered by motor 44 to assist in driving the caps to
the stacking mechanism 44. The driving force which
30 transports the caps through the twisted portion of guide 65

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is generated by the jumble of stacked caps circulating on
1 rotating bowl 46 and is transmitted end to end through each
of the caps aligned in serial fashion along the top shelf of
annular band 48.

As illustrated in Figure 13, the conveyor means 43
5 includes an endless belt 66 which is tensioned by idler
roller 67 and driven by motor means 44 (illustrated in Figure
8). As illustrated in Figure 13, two caps, 17 and 17' are
shown exiting guide means 65. The first cap 17 is driven
inwardly by the conveyor means until it strikes the outer
10 wall of magazine 70. A fiberoptic photodiode-
photoresistor mechanism indicated at 71 senses the arrival of
the new cap 17, a control means (not shown) actuates
pneumatic motor 72 which drives plunger 73 and platform 74
upwardly, thereby elevating the cap 17 to the position
15 illustrated by cap 17'' in Figure 13. As the cap is elevated
upwardly, a pair of beveled dogs 75 and 76 are displaced
outwardly by means of their beveled edge, (one of which is
illustrated at 77 in Figure 13), until the cap has passed
beyond the upper face of the dogs. As soon as cap 17 is in
20 position, spring means 78, 79 urge the dogs 75 and 76
inwardly, thereby suspending cap 17 in the new position
illustrated by cap 17'' in Figure 13. While the plunger 73
is in an extended position, a skirt 80 prevents the entry of
any additional cap, such as cap 17', until the plunger has
25 retracted to the position illustrated in Figure 13. The
operation of pneumatic motor 72 is controlled by a timer,
actuated by fiberoptics 71 connected to a photoresistor-
photodiode arrangement, and by fiberoptic arrangement 82
which is arranged at the top of the stacking arrangement to
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1 generate an interrupt signal for the control means when the magazine 70 is fully loaded.

Magazine 70 is defined by a pair of complementary U-shaped channels 70a, 70b as illustrated in Figure 14. A weighting mechanism 83 is dimensioned to travel within the guides 70a, 70b and exert a downward force on the stacked caps as the stacking mechanism 72 is operating. The weighting means 83 is connected to a vertical rod 84 by means of offset arm 85 which maintains the weight 83 in alignment, and provides for the easy removal of the weight when the magazine 70 is filled. In addition, a friction guide 86 is mounted on weight 83, and contains a thumbscrew 87 which can exert a vertical drag on weight 83, which drag acts to offset the force of pneumatic cylinder 72. It has been found in practice, that the force and speed of pneumatic cylinder 72, when coupled with the light weight of the index cap 17, will cause the index caps to flip in magazine 70, unless restrained by a weight such as that indicated at 83.

When the magazine is filled, the stacked caps, one of which is illustrated at 17''' will interrupt a light beam emitted by a photodiode in fiberoptic array 82, and will generate an interrupt signal for the control means which controls pneumatic cylinder 72. At that time, the operator can remove the weight 83 and swing it around its axis on guide 84, and insert a plastic strand 90 through the aligned through holes 20 defined by the stack of aligned caps. The plastic band 90 is rectangular in cross-section as illustrated in Figure 15a, and matches the rectangular configuration of through hole 20 defined in each of the stacked caps, to thereby maintain the caps in their initial alignment during transport. The plastic strand 90 may

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1 include one-way barbs 92, 93 as illustrated in Figure 15a, or
a round plastic ball 94 as illustrated in Figure 15. Ball
means 94 defines a circular inner opening which receives the
rectangular cross-section of strand 90 in a binding
engagement. The binding engagement may be further enhanced
5 by serrations 95 formed on the outer surface of the lower
portion of plastic strand 90.

As illustrated in Figure 12, the index caps 17
include first 17a and second 17b generally planar side walls
which facilitate their stacking as a bundle of stacked caps
10 as illustrated in Figure 15. The through hole 20 defined in
both side wall 17a, 17b, is configured to match the
rectangular configuration of the plastic strand 90
illustrated in 15a. The index cap may include a variety of
indicia such as "44DD" illustrated at 17e and various design
15 ornamentation as indicated at 17f. As can be seen from
Figure 12 and Figure 3, the inner cavity 19 is tapered to
snugly engage the upstanding flange 16 defined by the hook 15
of hanger 11.

20 With respect to the rate of supply of the index
coded caps to the stacking mechanism illustrated in Figure
13, it should be noted that the bowl speed of rotating floor
46, the vibration of hopper means 41, the speed of conveyor
means 43, and the repetition rate of pneumatic motor 72 are
all independently controllable to ensure maximum throughput
25 of the device.

Figures 16 and 17 illustrate an automatic means
for assembly of hangers and indexing caps at the time the
clothing is hung from the hangers. The device is a modified
Hangermatic 589 manufactured by Trim-Master, 4860 North 5th
30 Street Highway, Temple, Pennsylvania 19560.

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The original Hangermatic machine includes a pair
1 of magazine towers 101 and 102 which are dimensioned to
contain a vertical stack of hangers therebetween. The
hangers rest on a platen member 104 and are selectively
engaged by a reciprocating plate 105 which selectively
5 engages the lower most hanger and urges it outwardly to stop
means 106 and 107 when actuated. As it reaches the stop
means, it displaces the outer platen 106 as illustrated in
Figure 17, which opens a pneumatic bleed port mounted in the
face of platen 104. As long as the outer platen 106 is in
10 its extended position, the pneumatic motor means remains
stationary. When the operator has fitted a garment to the
extended hanger and removes the hanger, the outer platen 106,
which is spring loaded, returns to the inner platen 104,
thereby sealing the pneumatic bleed port, and activating a
15 control means (not shown) for pneumatic motor 103 to return
reciprocating plate 105 to its original position. When set
to fully automatic operation, the pneumatic motor 103 will
immediately begin a return stroke for plate 105 which will
pick up another hanger from magazines 101, 102, and advance
20 it outwardly against eccentric stops 106 and 107.

In the present invention, a third magazine 108 has
been added which receives the bundle of stacked caps
illustrated in Figure 15, and the configuration of
reciprocating plate 105 has been altered to provide a cut-out
25 105a which conforms to the exterior dimension of the index
coded cap 17. Immediately adjacent cut-out 105a, are
alignment cams 109. The ends of 111a, 111b of reciprocating
plate 105 have also been altered to provide a spring loaded
tip for engagement of the hanger 11. In addition, the
30 magazines 101 and 102 are now independently adjustable by

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means of bracket 110 and support 112 to configure the
1 Hangermatic machine to a wide variety of hanger
configurations. Each of the magazines 101, 102 and 108 have
cut-outs 101a, 102a which allow the hangers and index caps to
be withdrawn from the magazines as plate means 105
5 reciprocates forwardly as illustrated in Figure 16.
Stand-off legs 113-115 are used to elevate the Hangermatic
above the employee work bench, to assist the operator in
draping the article of clothing about the hanger before the
hanger is withdrawn from the Hangermatic machine.
10 Alternately, the individual legs can be altered in length to
provide a slanted configuration which will facilitate hanging
clothes therefrom.

As illustrated in Figure 17, the Hangermatic
machine is loaded with a bundle of stacked caps indicated at
15 117 which are loaded into magazine 108. Magazine 108 is
suspended above the reciprocating plate 105 and platen 104 by
↓ brackets 116, 117. Prior to engagement with the hanger 11
the spring loaded tips 111a, 111b of reciprocating plate 105
are fully distended. As plate 105 moves forward, or
20 downwardly as illustrated in Figure 17, it first engages an
index cap from the stack of caps 117 within recess 105a. The
↙ alignment surface 109 centers the hook 15 within
reciprocating plate 105 so that the index cap is properly
aligned with the upstanding flange 16 during attachment. As
25 indicated earlier, the upwardly and inwardly directed edges
16a, 16b of flange 16 also assist in centering the index cap
as it is attached to hook 15. Plate 105 is dimensioned such
that the index cap is seated on hook 15 by the impact of
plate 105 as the floating spring loaded tips 111a, 111b
30 engage the center portion of hanger 11. The hanger is then

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driven forwardly, or downwardly as illustrated in Figure 17
1 out of the magazines 101, 102 to the position illustrated by
the dotted lines in Figure 17. As illustrated in Figure 17,
the hanger engages pivoted eccentric stops 106a, 106b and
displaces the end portion of platen 104 outwardly as
5 illustrated in Figure 17. The spring loaded tips 111a and
111b compensate for irregularities in hanger molding, and
reduce the impact of the reciprocating plate 105 on the
central portion 14 of the hanger. This substantially
eliminates the broken and shattered hangers normally
10 encountered in this type of device. As the pneumatic
cylinder 103 drives plate 104, the spring loaded tips 111a,
111b are compressed, and the spring loaded platen 107 is
extended, thereby opening the pneumatic bleed line positioned
between platen 104, and platen 107. As illustrated in Figure
15 17, the hanger is now presented to the operator with the
clips 12a-12c suspended above the work space, and free from
any immediately adjacent encumbrances, so that the operator
may quickly and easily attach a bra strap thereto. As the
article of clothing is attached to the hanger, it is lifted
20 free of the spring loaded tips 111a, 111b of platen 105,
which allows platen 107 to close, thereby actuating the
control mechanism for the Hangermatic machine, to return
reciprocating plate 105 back to its original starting
position as illustrated in Figure 17. If set on automatic,
25 as soon as the plate 105 has reciprocated to its fully
retracted position, it is reciprocated forward to
automatically dispense another index coded cap and hanger.

Figure 18 illustrates a manual means for affixing
the index caps to hanger 11. As illustrated in Figure 18, a
30 stationary platen 125 is fitted with guide means 126, 127

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which are secured to platen 125 by screws and elongated slots
1 128 which enable the means to be adjusted for a variety of
hanger hook sizes. A bucket means 129 suspends an index cap
magazine 130 above platen 125, the approximate distance of
the width of one index coded cap. Immediately under magazine
5 130 is an opening 131 which is aligned with the through hole
20 defined in the index cap. Immediately below the opening
131 is a reciprocating fork 132 which has both horizontal and
vertical fork tines as illustrated in Figures 19 and 20.

In operation, a bundle of stacked caps, such as
10 that illustrated in Figure 15, is dropped into the magazine
130, such that the serrated end 95 and ball closure means 94
extend through opening 131. Reciprocating fork 132 is then
driven inwardly in the direction illustrated by arrow B in
Figure 18 to engage ball means 94 as illustrated in Figures
15 19 and 20. As illustrated in Figure 19, the strap 90 is
frictionally engaged within ball 94. As soon as the ball is
engaged by the fork means 132, the strap 90 is withdrawn from
the top of the magazine, and the operator is then free to
insert a hanger such that the hook of the hanger engages the
20 lowermost index coded cap in the magazine 130. In operation,
the operator lies the hanger flat on platen 125, and
reciprocates it inwardly in the direction of arrow A until
the hanger hook has firmly seated within the index coded cap.
The hanger and cap are then withdrawn from the stack, and
25 another index coded cap is present for attachment. Legs
133-135 are provided to position platen 125 at a comfortable
working height for the operator.

As will be understood from the foregoing, the
present invention includes a system for producing a plurality
30 of hangers having index coded caps which are automatically

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1 affixed to the hanger at a plurality of remote locations.

The index coded caps may be mass produced in a mechanized means and method of injection molding, aligning, stacking and binding of the caps into a stack bundle for shipment. When
5 the bundle of stacked caps has arrived at its end destination, it is inserted into a magazine 108 or 130 and the caps are subsequently attached to a locally produced hanger.

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WE CLAIM:

1. A automatic means for assembly of hangers and indexing caps at the time clothing is hung from said hangers, said means comprising:
means for receiving a bundle of stacked caps;
means for receiving a separate plurality of stacked hangers;
reciprocal means for simultaneously dispensing one of said caps and securing said caps to one of said hangers to define an indexed hanger wherein an index defined by the secured cap is correlated to a specific characteristic of a garment hung thereon.
2. An automatic means for assembly of hangers as claimed in claim 1 wherein said hanger and said index cap to be secured are positioned in a common plane.
3. An automatic means as claimed in claim 1 or 2, wherein said means for receiving a bundle of stacked caps is a magazine.
4. An automatic means as claimed in any one of claims 1 to 3, wherein said means for receiving a plurality of hangers is a magazine.
5. An automatic means as claimed in any one of claims 1 to 4, wherein said reciprocal means includes a plate defining a first cutout which defines the size and shape of said index cap and second cutout which is arcuate and extends from said first cutout to a leading edge of said plate,
said first and second cutouts aligning said index cap and hanger prior to engagement.

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6. An automatic means as claimed in any one of claims 1 to 4, wherein said reciprocal means reciprocates along a common plane with said cap and said hanger to remove a cap from said magazine and thereafter secure said cap to said hanger as the hanger and cap are dispensed from said hanger magazine.
7. A manual means for assembly of hangers and indexing caps at the time clothing is hung from said hangers, each of said indexing caps defining an aperture through which a plastic ribbon is inserted to hold said indexing caps in a stack, said means for assembly and said indexing caps being secured in a stacked bundle of caps by said plastic ribbon and a releasable clamp, said manual means comprising:
 - means for receiving a bundle of stacked caps;
 - means for removing said releasable clamp from said plastic ribbon; and
 - alignment means for aligning said hanger with said cap to assist an operator in inserting a hook member of said hangers into said indexing cap.
8. A manual means for assembly as claimed in claim 7, wherein said means for receiving a bundle of stacked caps is a magazine.
9. A manual means for assembly as claimed in claim 7 or 8, wherein said means for removing said releasable clamp disengages a plastic bar.
10. A manual means for assembly as claimed in any one of claims 7 to 9, wherein each of said hangers have a hook member and each of said indexing caps define a recess for receiving said hook member of one of said hangers, and wherein said magazine defines an opening at its bottom end whereby after a hook member of said hanger has been inserted into the recess of one of said indexing caps, said one of said indexing caps may be removed from said magazine by withdrawing said hanger.
11. A manual means for assembly of hangers and indexing caps at the time clothing is hung from said hangers, each of

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said hangers having a hook member and each of said indexing caps defining a recess for receiving a portion of said hook member of one of said hangers, each of said indexing caps further defining an aperture through which a plastic ribbon is inserted to hold said indexing caps in a stack, a releasable clamp being attached to the plastic ribbon at one end of said stack to secure said indexing caps in a stacked bundle, said manual means comprising:

means for receiving a bundle of stacked caps;

means for removing said releasable clamp from said plastic ribbon; and

alignment means for aligning one of said hangers with one of said indexing caps to assist an operator in inserting said portion of said hook member of one of said hangers into said recess of one of said indexing caps.

12. The manual means for assembly as claimed in claim 11 wherein said means for receiving a bundle of stacked caps is a magazine.
13. The manual means for assembly as claimed in claim 12 wherein said magazine defines an opening at its bottom end whereby after said portion of said hook member of one of said hangers has been inserted into the recess of one of said indexing caps, said one of said indexing caps is removed from said magazine by withdrawing said one of said hangers from said alignment means.
14. The manual means for assembly as claimed in any one of claims 11 to 13 wherein said releasable clamp is a plastic barb and said means for removing said releasable clamp disengages said plastic barb from said plastic ribbon.

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15. The manual means for assembly as claimed in any one of claims 11 to 14 wherein said means for removing said releasable clamp is a reciprocating fork.
16. The manual means for assembly as claimed in claim 11, 12 or 13, wherein said releasable clamp is a plastic barb slidably engaged at one end of said plastic ribbon and said means for removing said releasable clamp disengages said plastic barb from said plastic ribbon.

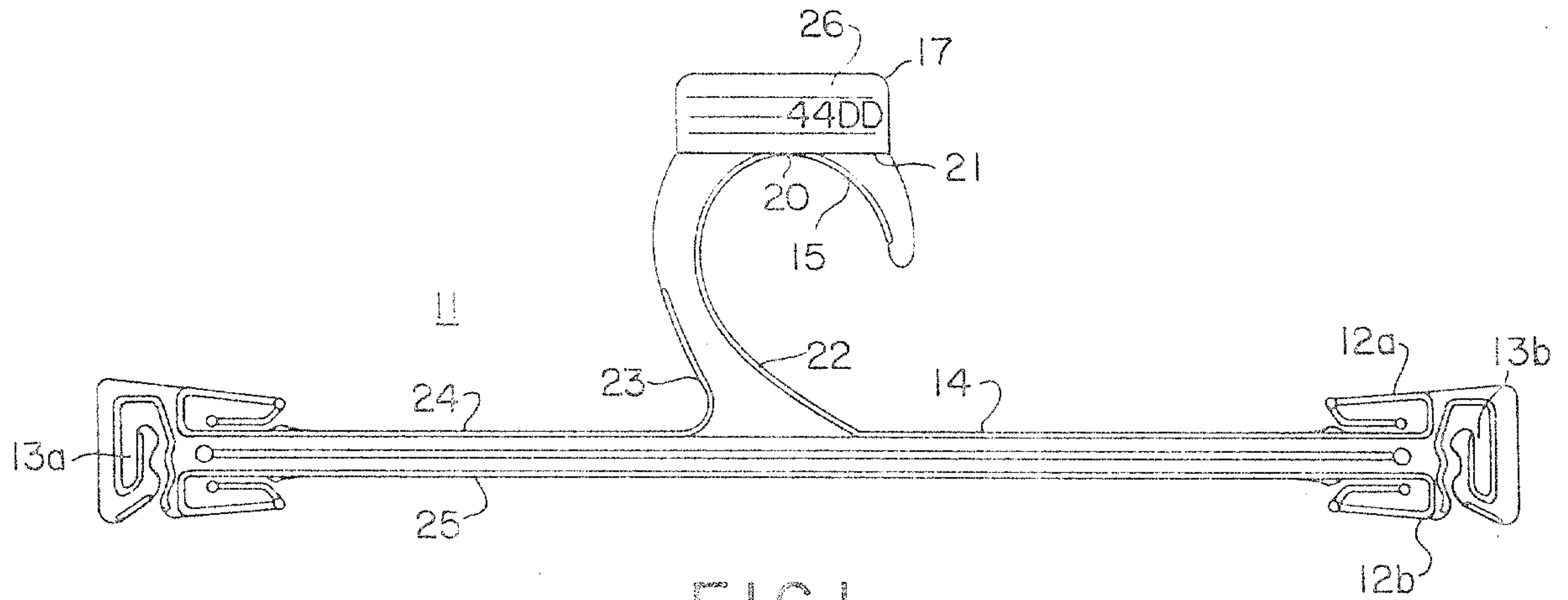


FIG. 1

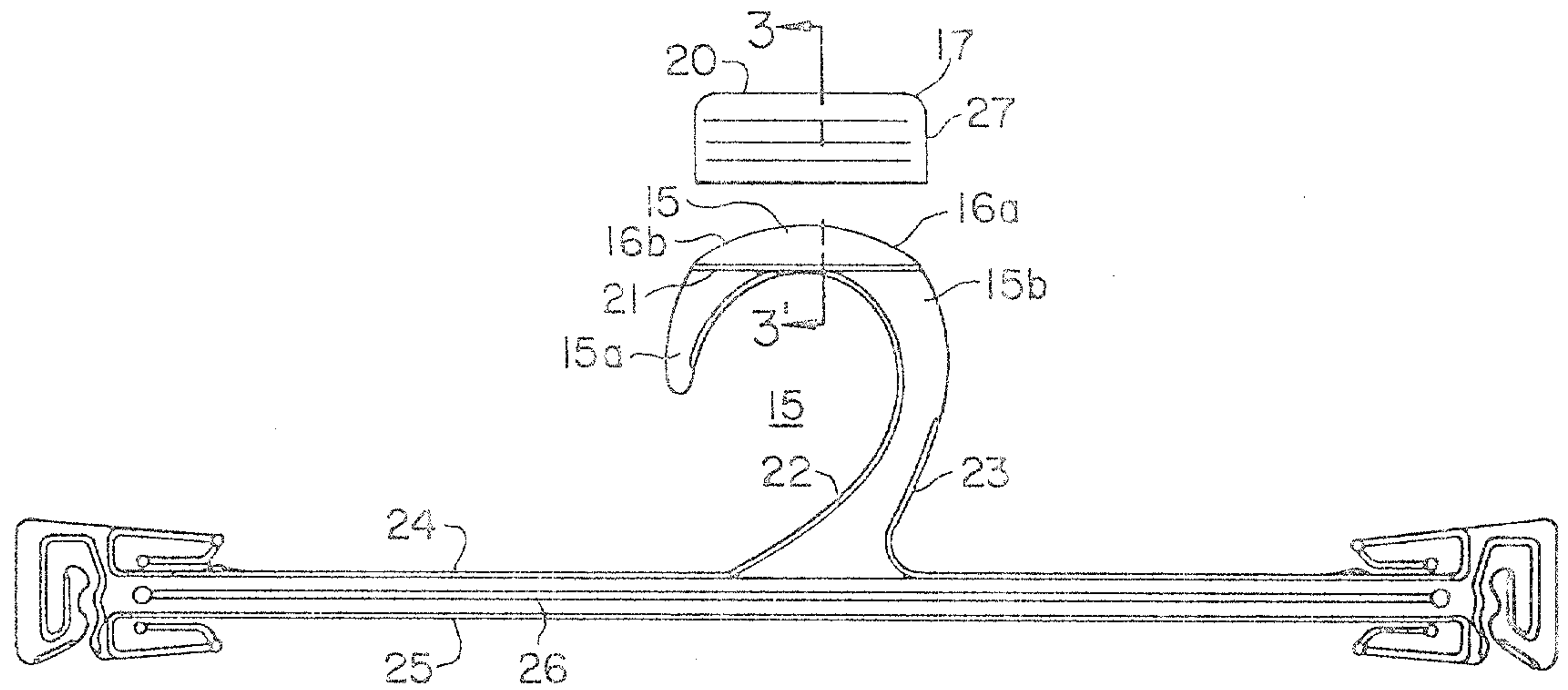


FIG. 2

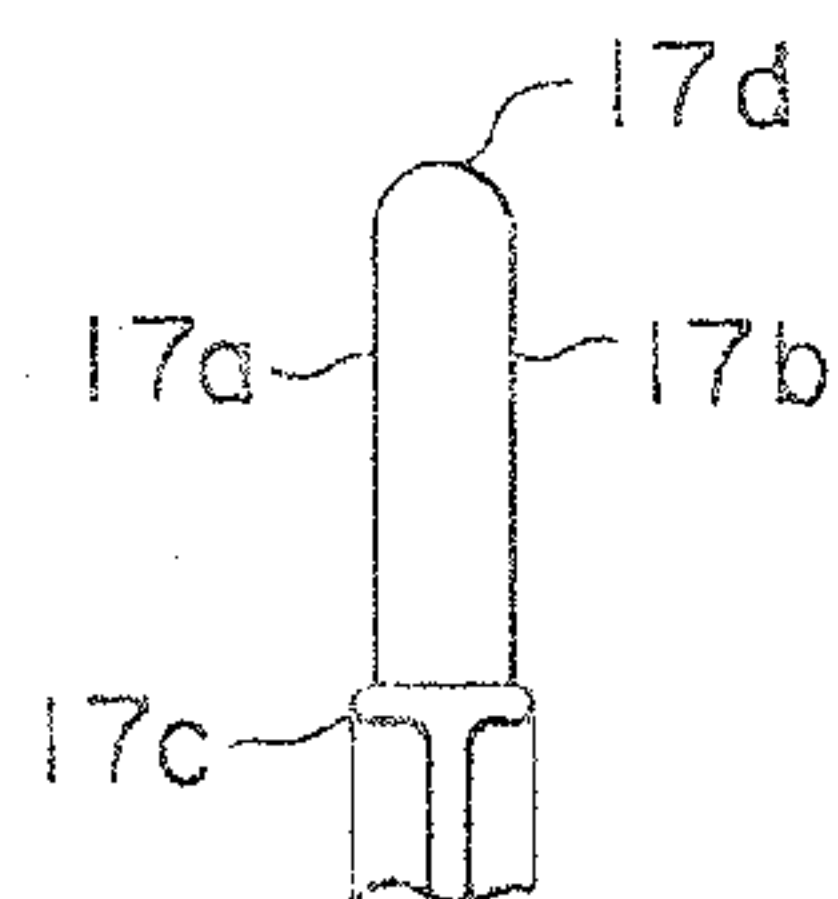
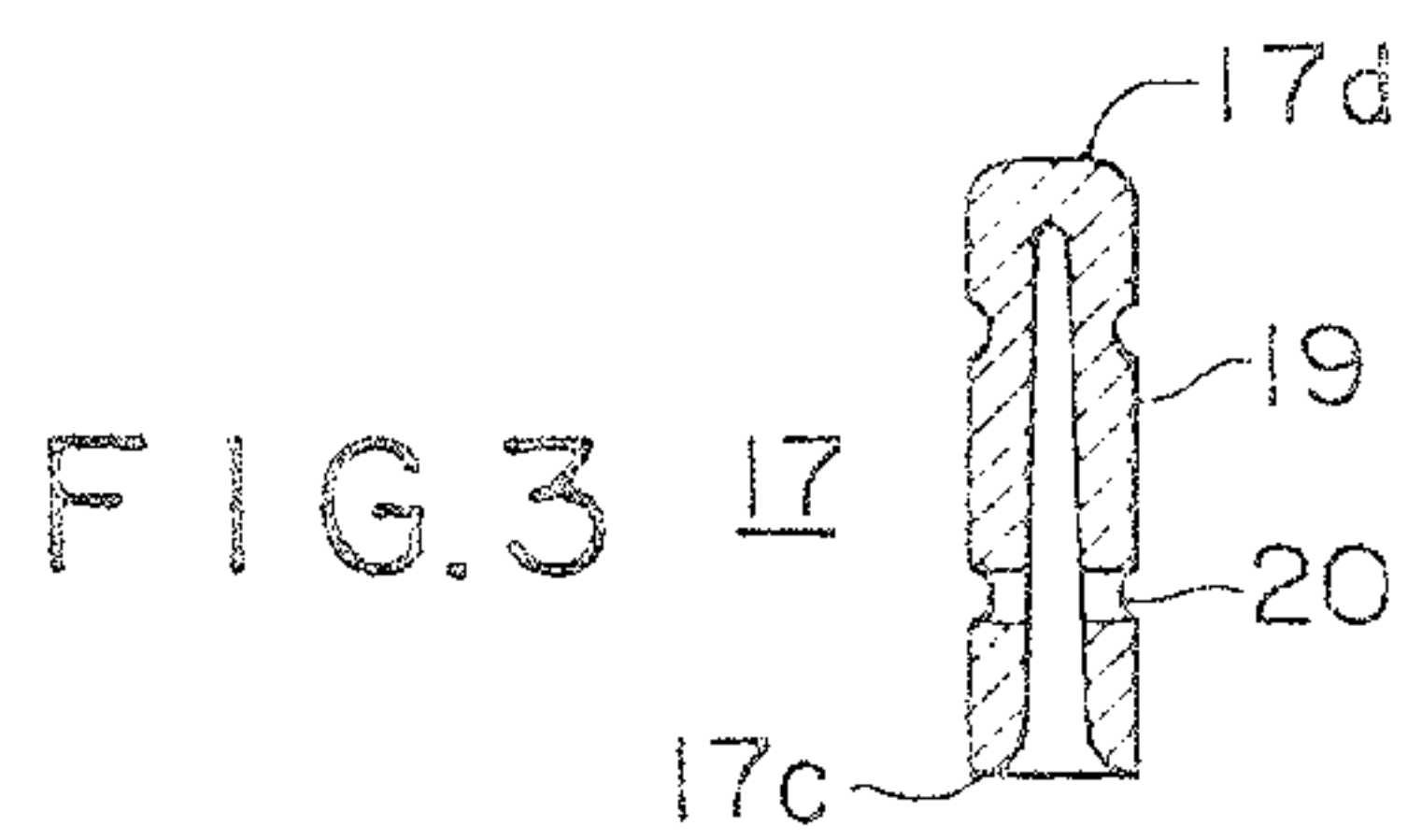


FIG. 5

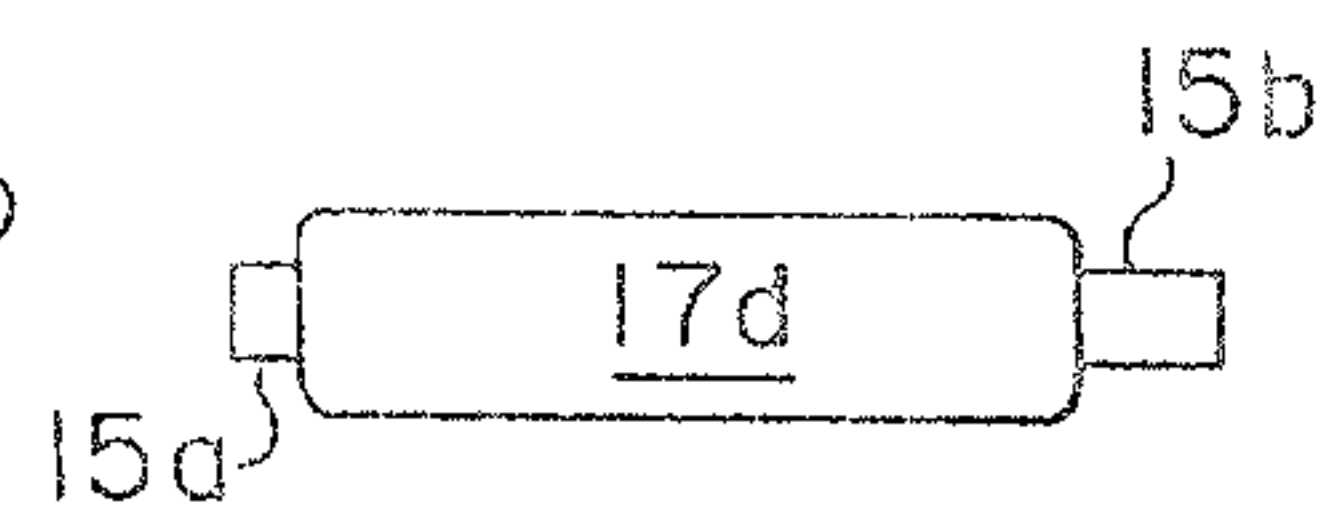


FIG. 6

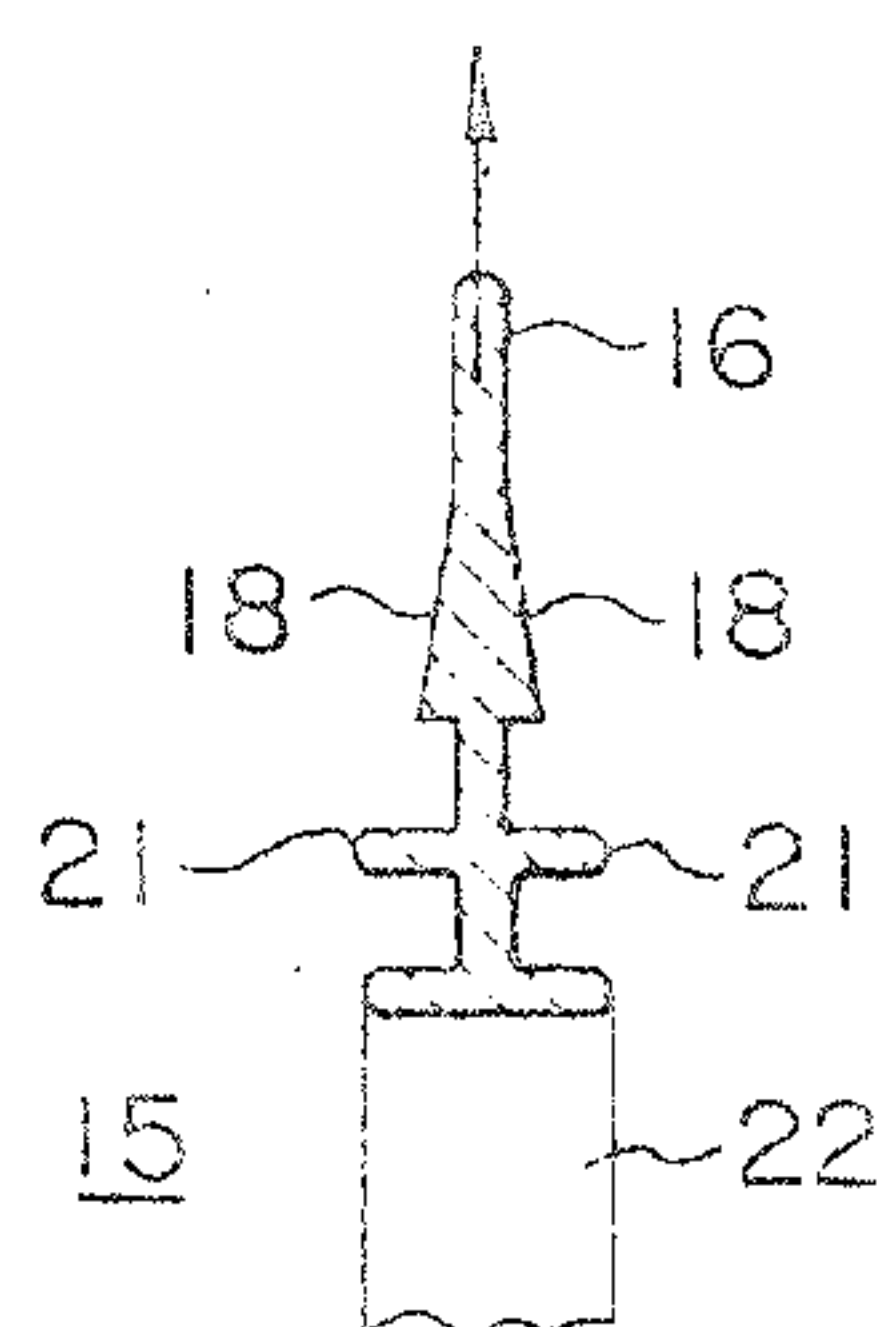


FIG. 4

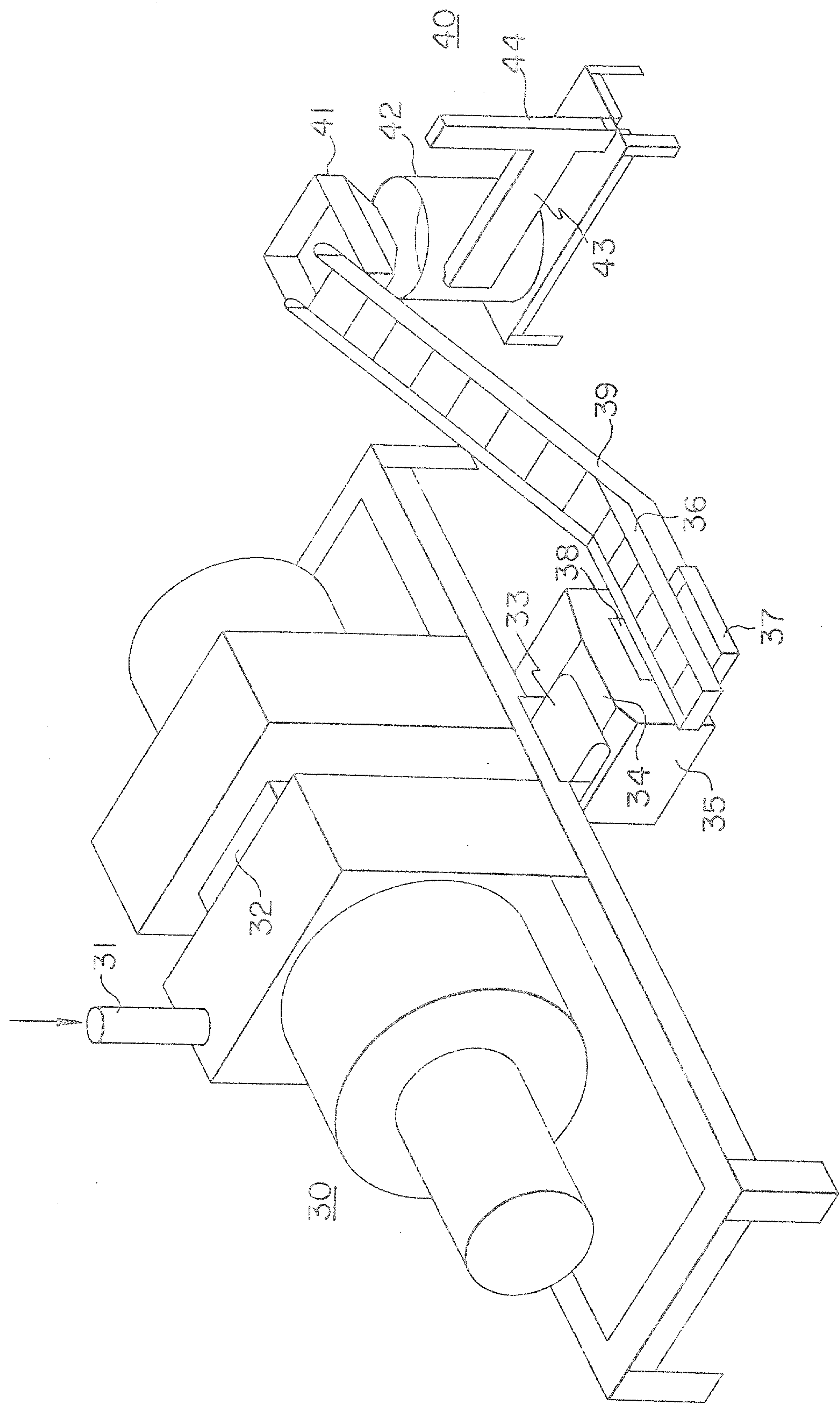


FIG. 7

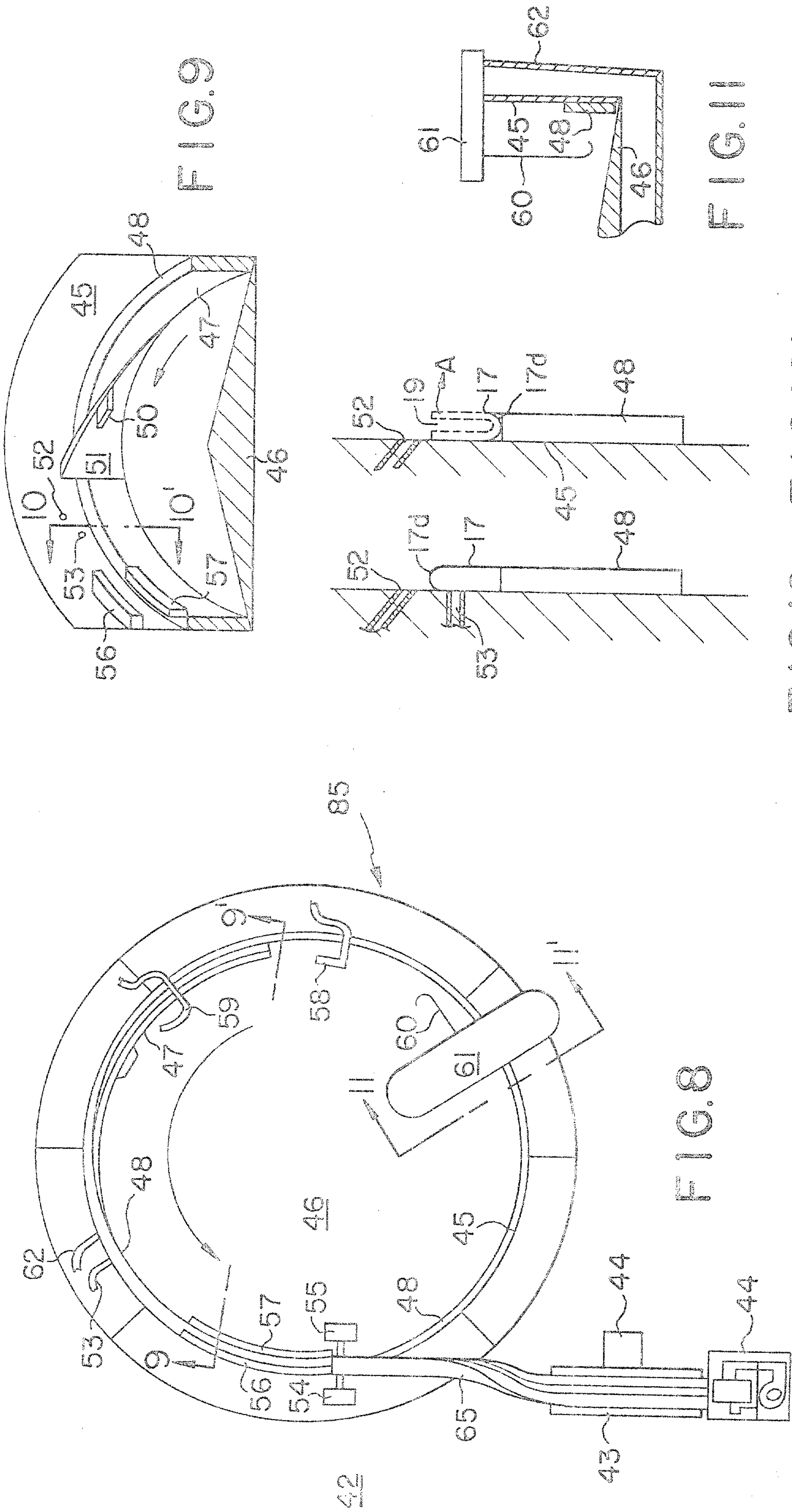


FIG.10a FIG.10b

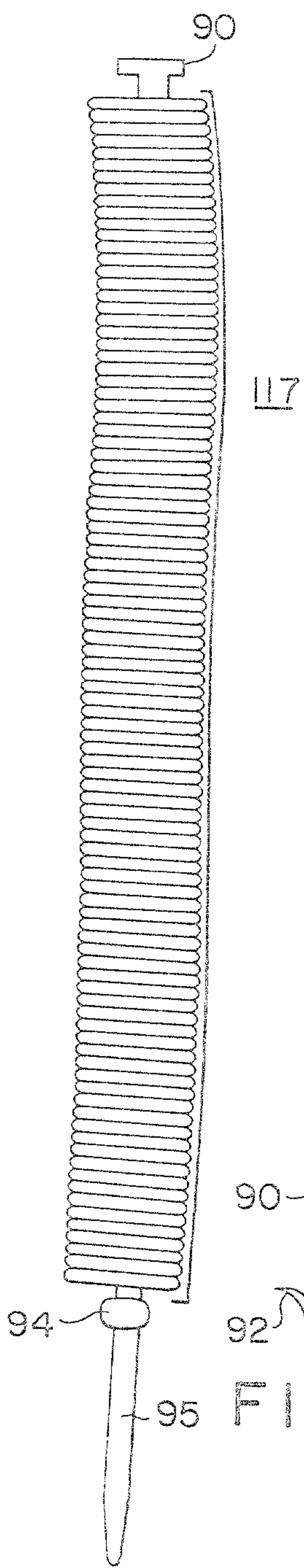


FIG. 15

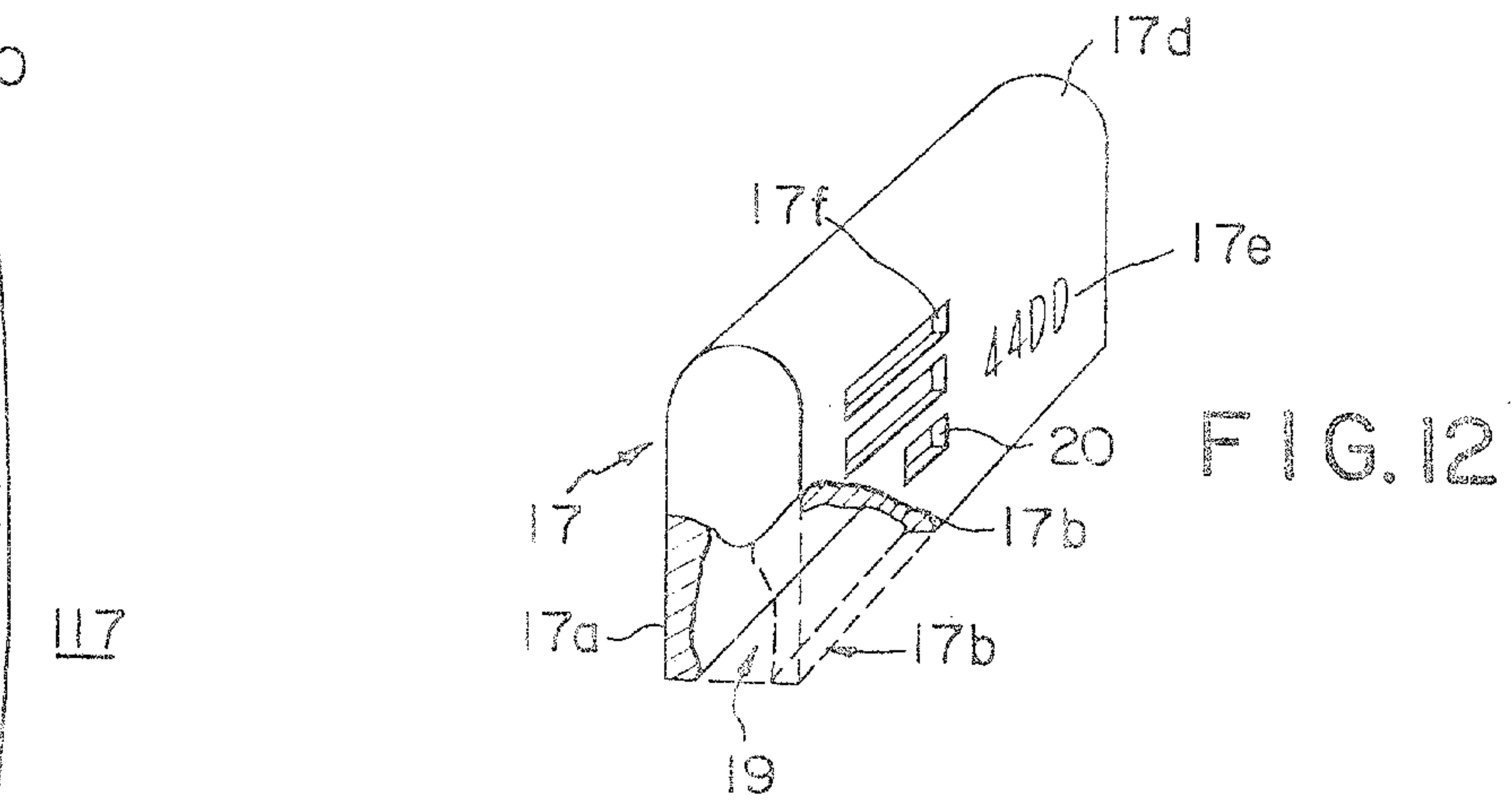


FIG. 12

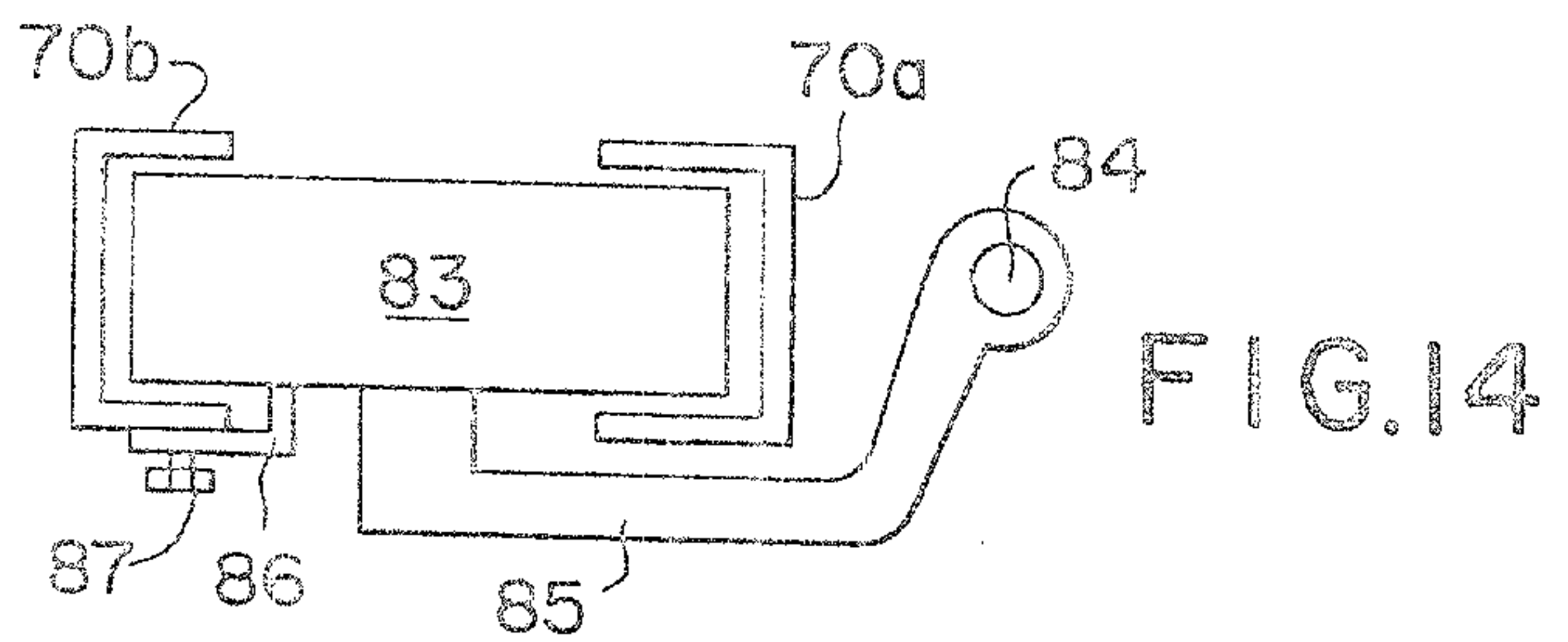


FIG. 14

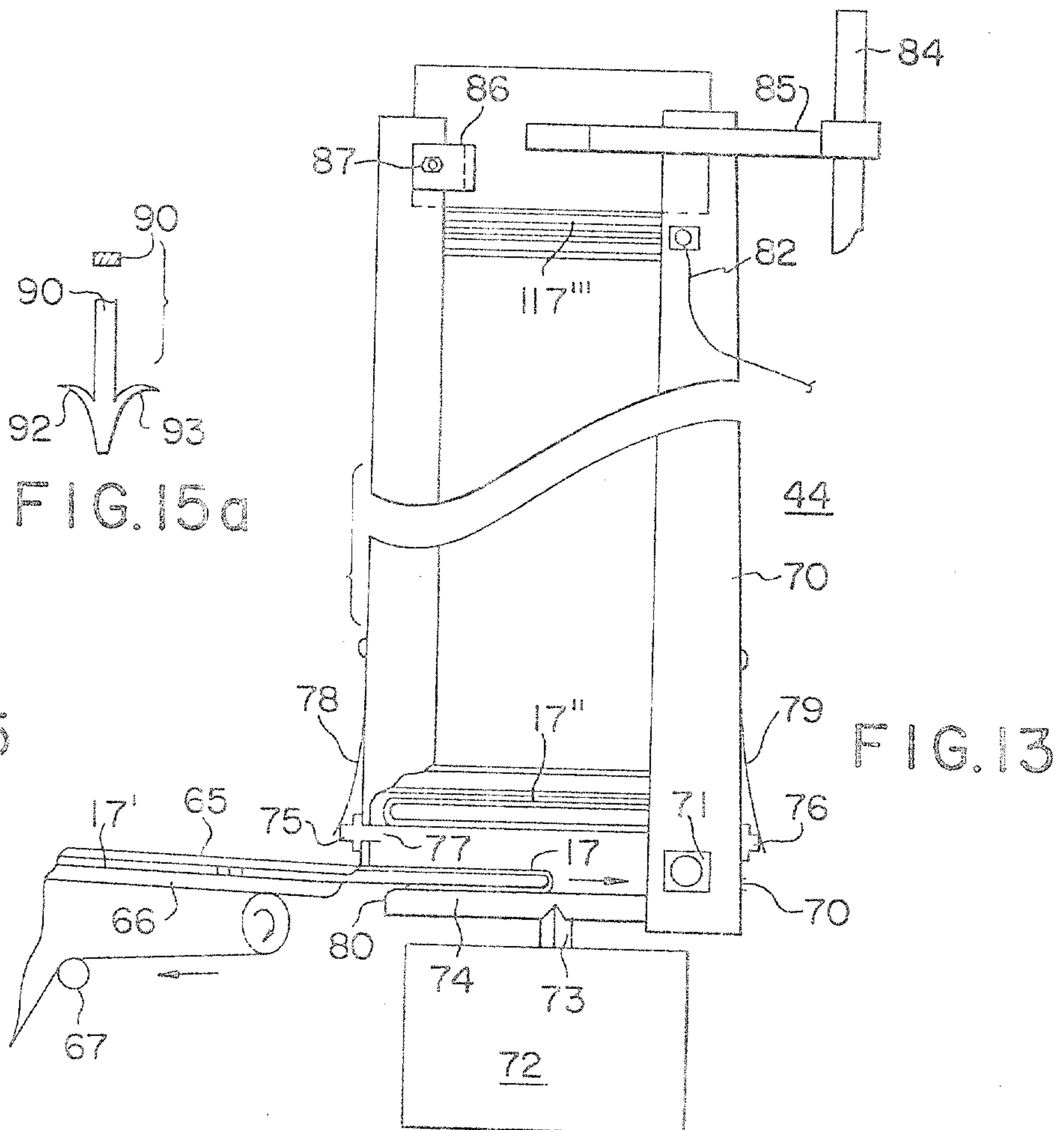


FIG. 13

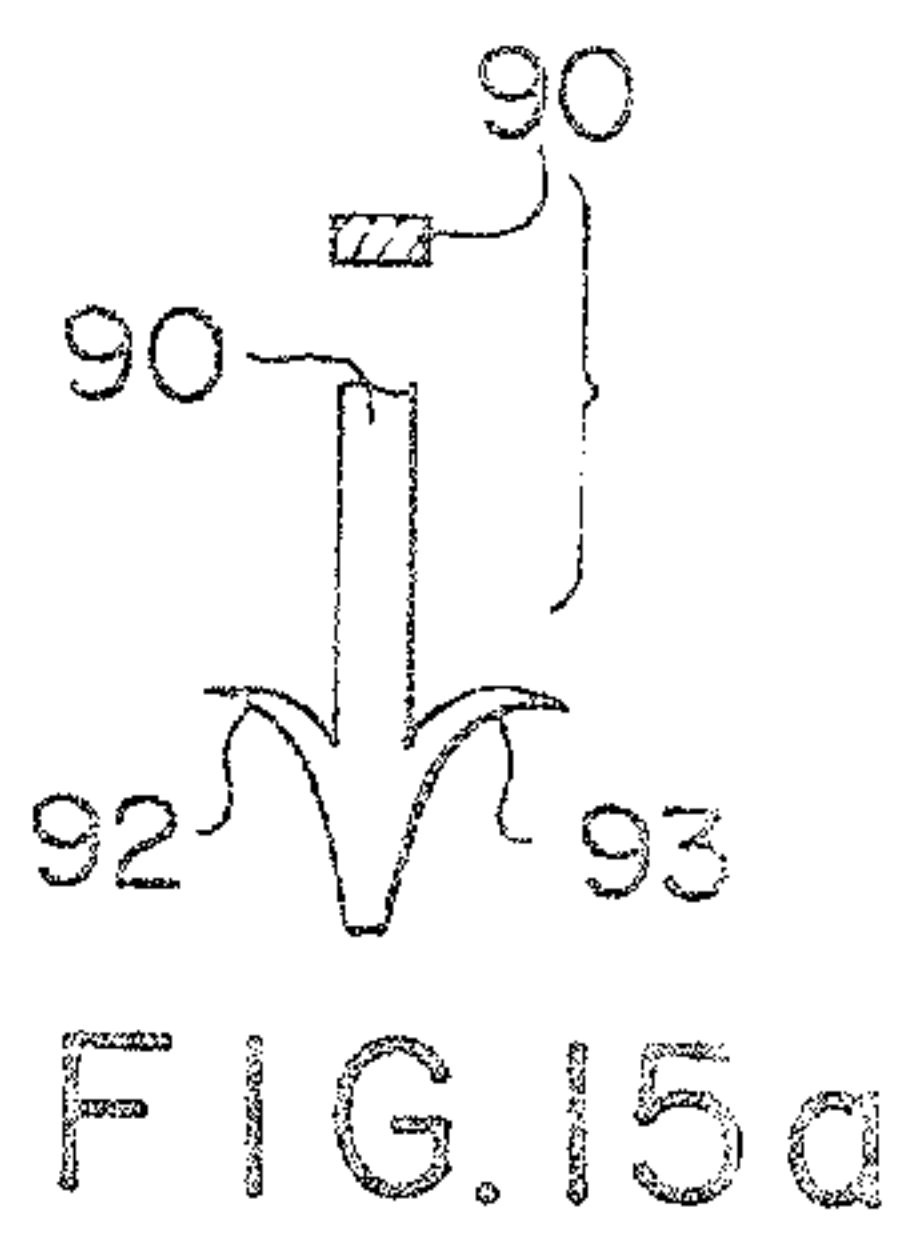


FIG. 15a

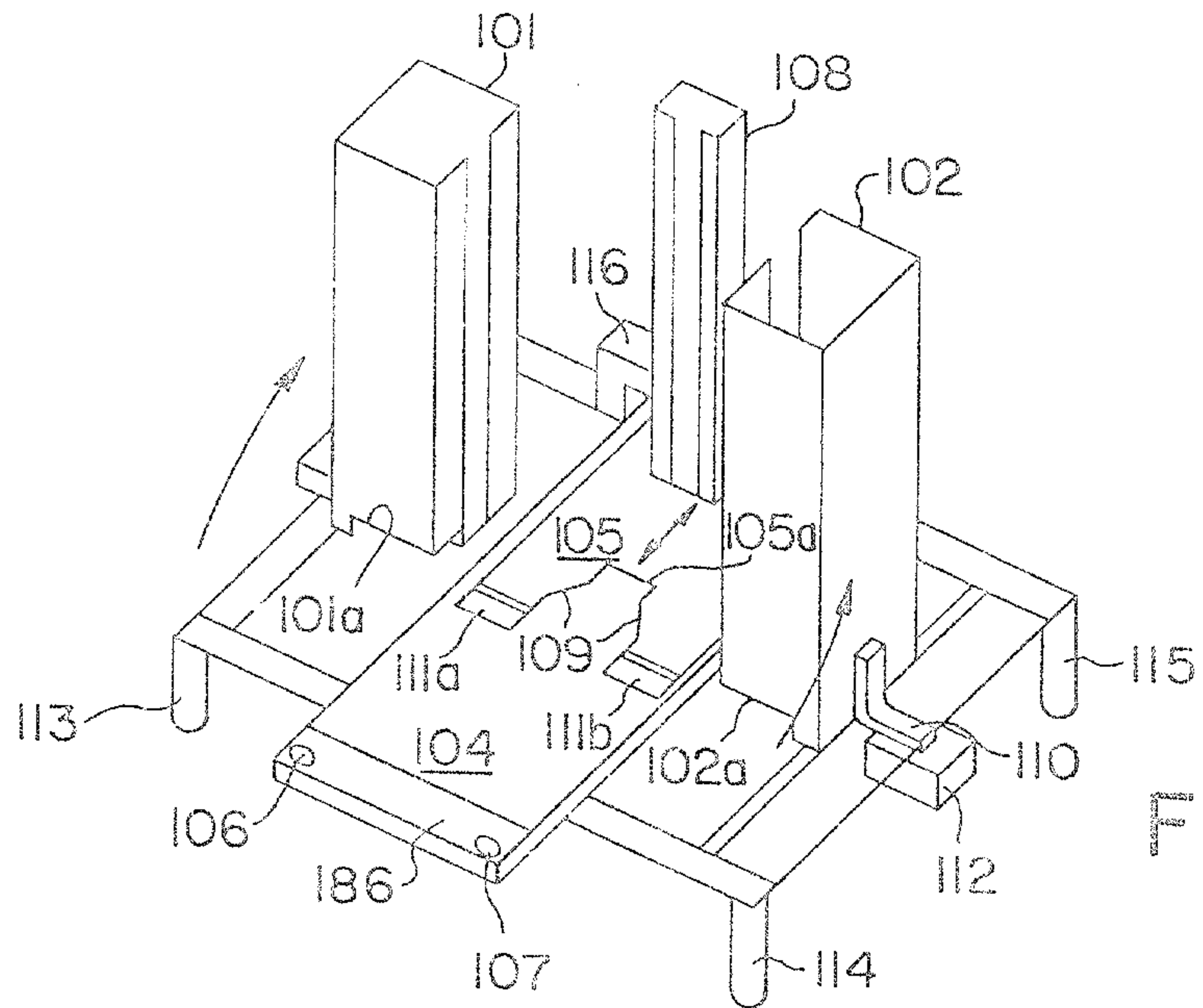


FIG. 16

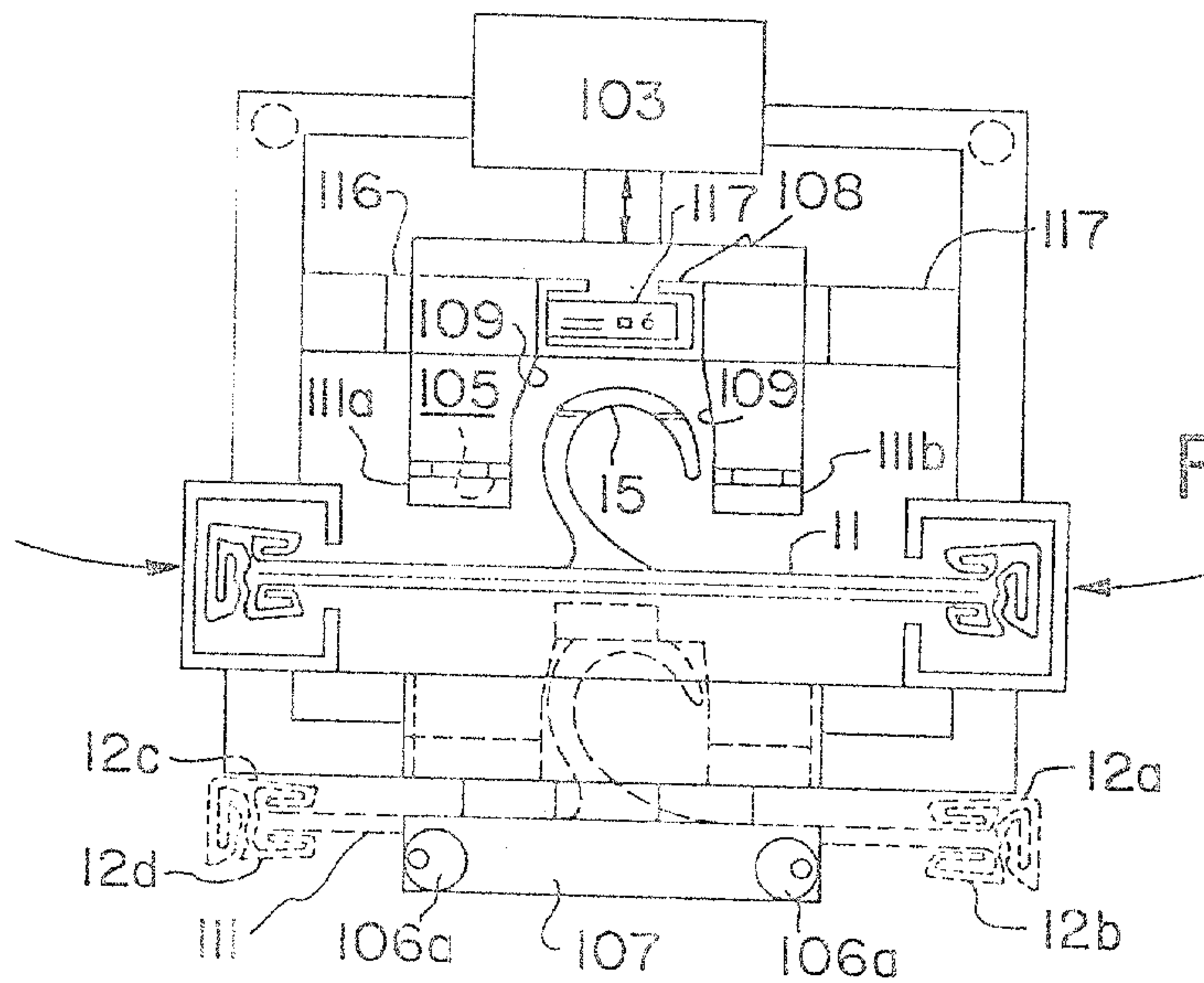


FIG. 17

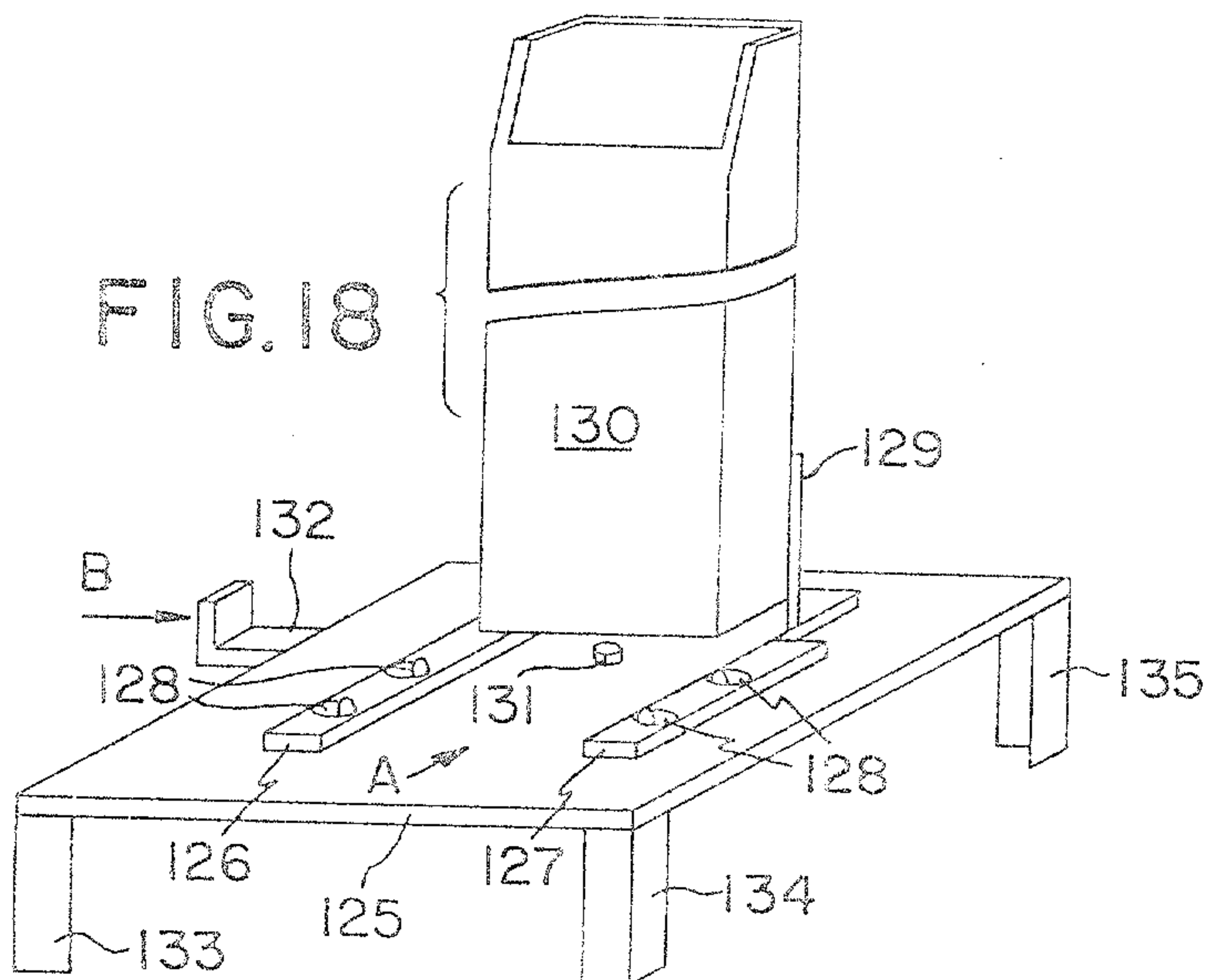


FIG. 18

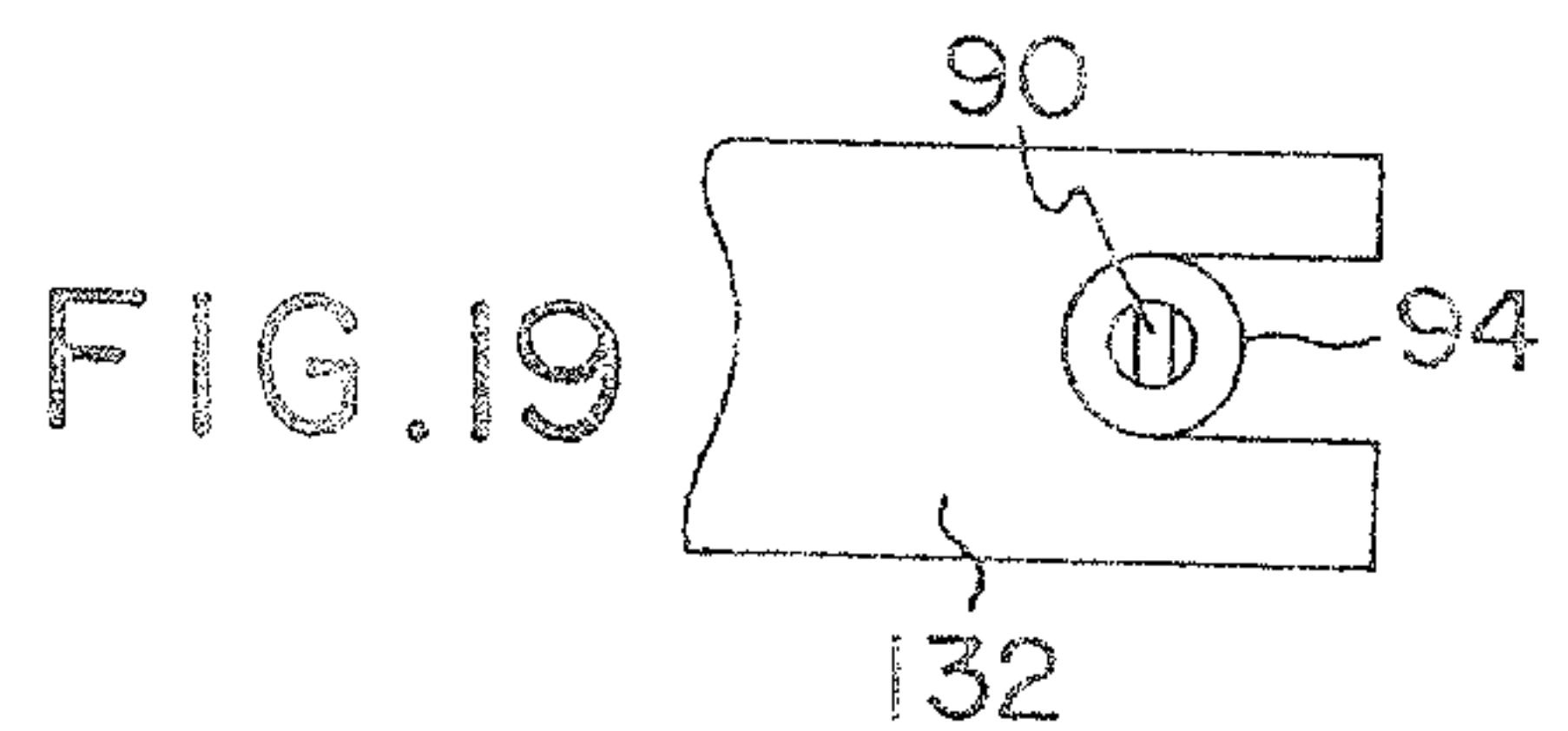


FIG. 19

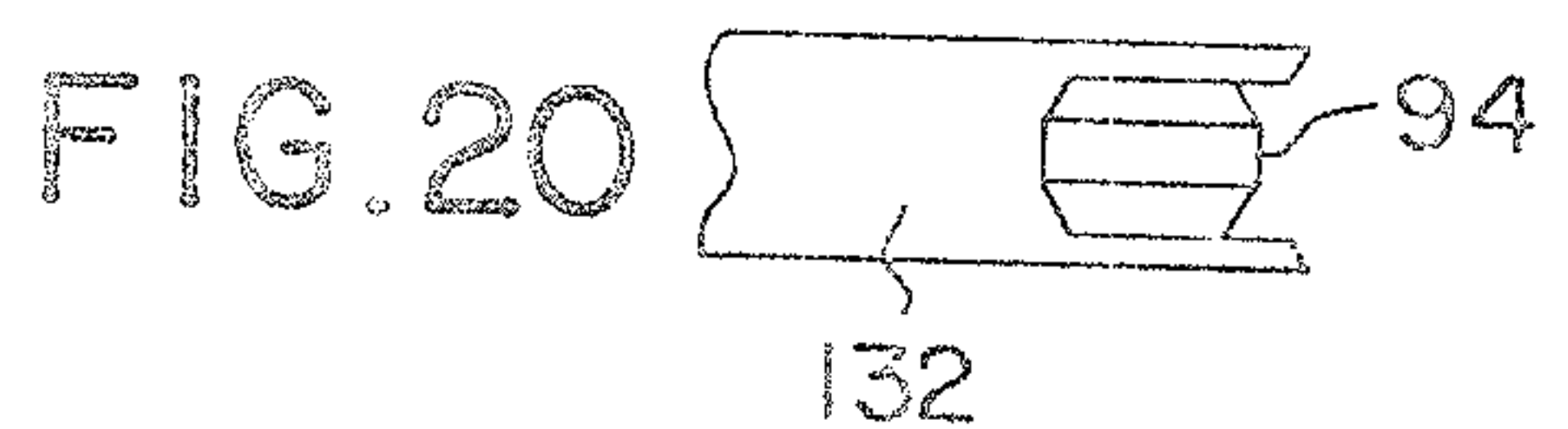


FIG. 20

