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(72) SULLIVAN, THOMAS J., III, US
(71) SULLIVAN, THOMAS J., III, US

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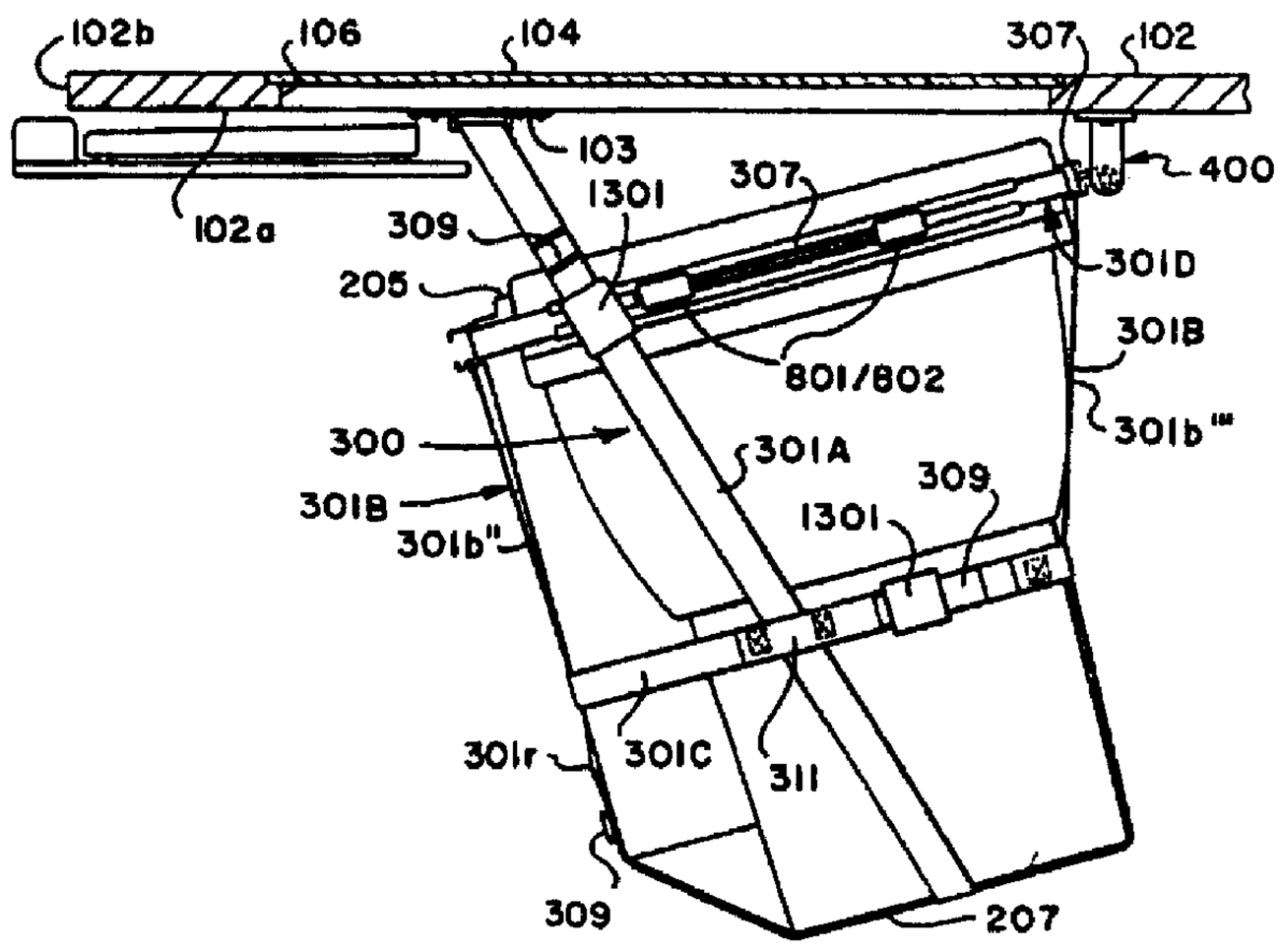
(54) **SYSTEME DE SUSPENSION POUR ECRAN**
(54) **MONITOR SUSPENSION SYSTEM**



(57) Cette invention se rapporte à un système de suspension servant à suspendre un écran d'ordinateur ou un écran vidéo (201) sous une surface de travail (102) et comprenant à cet effet un harnais souple (300) constitué par plusieurs courroies qui passent sur le dessus, sur l'arrière et sur le dessous de l'écran (201), pour que celui-ci vienne se loger dans le harnais (300). Un système de courroie de retenue réglable (301d) est relié à l'écran (201) au niveau de son extrémité proximale et comporte un système de pivot (400) servant à fixer l'écran (201) à un étrier (307) comprenant une tige à pivot (402) sur la face inférieure de la surface de travail

(57) A suspension system for suspending a computer or video monitor (201) beneath a work surface (102) includes a flexible harness (300) formed of plural straps which extend around the top, back and bottom of a monitor (201) to cradle the monitor in the harness (300). An adjustable gripping strap assembly (301d) is connected to the monitor (201) at its proximal end and includes a pivot assembly (400) for securing the monitor (201) to a bracket (307) including a pivot rod (402) on the underside of the work surface (102). The pivot assembly bracket (307) may be laterally adjustable to adjust the horizontal position of the monitor (201).

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(102). L'étrier (307) du système à pivot peut être réglable latéralement, pour permettre le réglage de la position horizontale de l'écran (201). Des courroies de suspension latérale (301a et 301b) du harnais (300) peuvent être reliées à un support fixe sur la face intérieure de la surface de travail (102) ou à des bras de réglage d'angle allongés opposés (434), lesquels sont montés pivotants sur la face inférieure de la surface de travail (102) et sont réglables par rapport à des étriers de support crantés et espacés (436). Des moniteurs à écrans plats ou peu profonds (201f) peuvent être soutenus par une version raccourcie du harnais en question ou par un élément de support en forme de cuvette peu profonde (601).

Lateral suspension straps (301a and 301b) of the harness (300) may be connected to a fixed support on the underside of the work surface (102) or to opposed elongated angle adjustment arms (434) which are pivotally mounted on the underside of the work surface (102) and are adjustable with respect to spaced apart notched support brackets (436). Low profile or flat screen monitors (201f) may be supported by a shortened version of the harness or by a shallow pan shaped support member (601).

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(71)(72) Applicant and Inventor: SULLIVAN, Thomas, J., III [US/US]; 330 North Swarthmore Avenue, Swarthmore, PA 19081 (US).

(74) Agent: MARTIN, Michael, E.; Akin, Gump, Strauss, Hauer & Feld, L.L.P., P.O. Box 688, Dallas, TX 75313–0688 (US).

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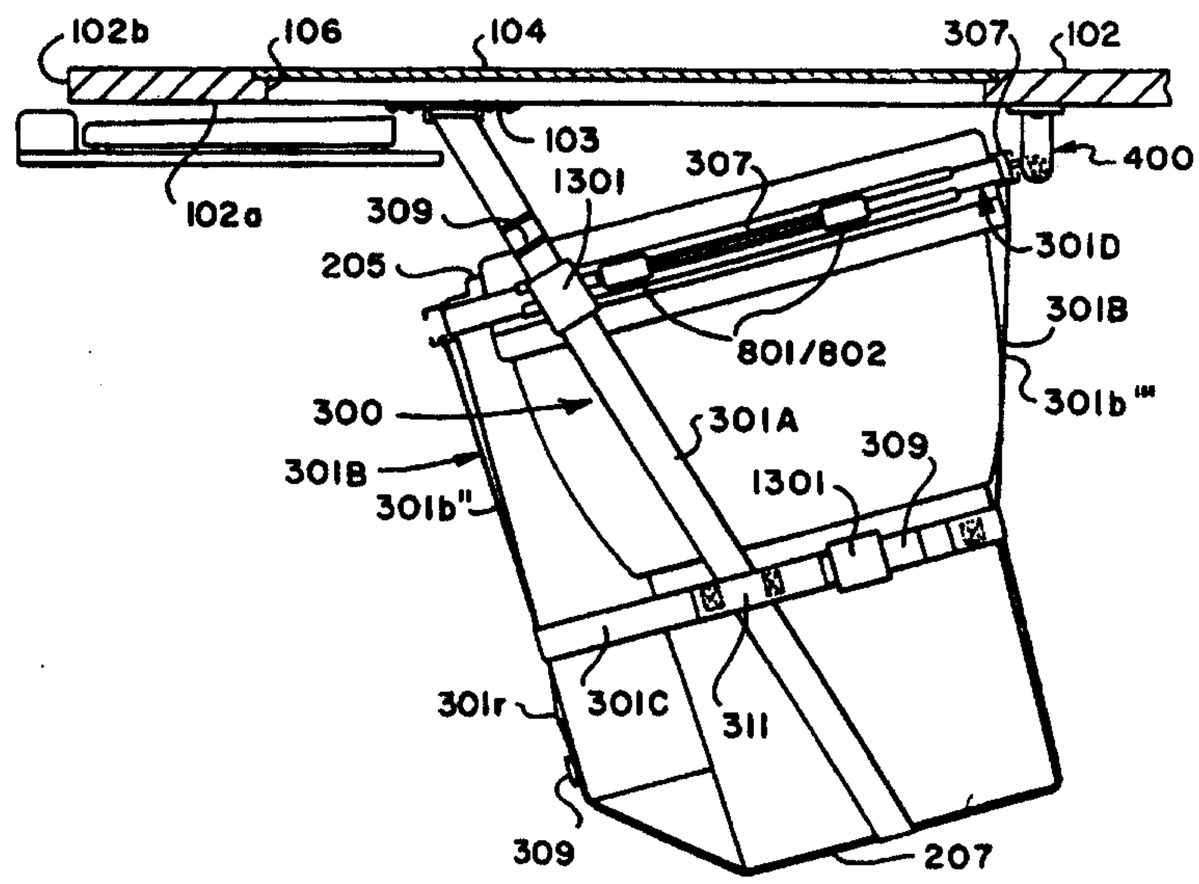


(57) Abstract

A suspension system for suspending a computer or video monitor (201) beneath a work surface (102) includes a flexible harness (300) formed of plural straps which extend around the top, back and bottom of a monitor (201) to cradle the monitor in the harness (300). An adjustable gripping strap assembly (301d) is connected to the monitor (201) at its proximal end and includes a pivot assembly (400) for securing the monitor (201) to a bracket (307) including a pivot rod (402) on the underside of the work surface (102). The pivot assembly bracket (307) may be laterally adjustable to adjust the horizontal position of the monitor (201). Lateral suspension straps (301a and 301b) of the harness (300) may be connected to a fixed support on the underside of the work surface (102) or to opposed elongated angle adjustment arms (434) which are pivotally mounted on the underside of the work surface (102) and are adjustable with respect to spaced apart notched support brackets (436). Low profile or flat screen monitors (201f) may be supported by a shortened version of the harness or by a shallow pan shaped support member (601).

*(Referred to in PCT Gazette No. 44/1999, Section II)

MONITOR SUSPENSION SYSTEM

Field of the Invention

The present invention relates to apparatus for adjustably suspending a computer monitor or other video monitor under a work surface.

Description of the Related Art

Computer display monitors and other video display monitors (hereinafter ''monitors'') are an increasingly ubiquitous part of the workplace. Such monitors are typically mounted on a user's desk or similar work surface. This arrangement, however, not only wastes precious workspace, but also suffers from a variety of ergonomic disadvantages. For example, many users find that it is uncomfortable to view a monitor in an upright vertical position on their desk for extended periods. Also, it is awkward for a user to attempt to simultaneously view both the monitor and papers or other materials arrayed on the work surface if the monitor is placed in the standard vertical arrangement on top of the work surface.

Methods and apparatuses for positioning and supporting a monitor underneath a work surface (which may then be viewed by a user, for example, through a piece of non-reflective glass placed over a hole in the work surface) are known. However, such known methods and apparatuses tend to be both bulky and relatively inflexible. In particular, prior art monitor support systems tend to take up an inordinate amount of space underneath the work surface. Moreover, once a monitor is placed in such known systems, it is difficult to adjust the positioning of the monitor to accommodate the changing preferences of one or more users.

For example, one particularly vexatious problem in adjusting the position of a video or computer monitor is experienced by users who wear multiple vision correction lenses, such as bifocals or trifocals. Persons wearing multiple vision correction lenses require or desire that

the monitor be frequently adjusted to accommodate the distance and angle of the monitor screen in relation to the operator's work position. Accordingly, a relatively wide range of angular adjustment is desired as well as generally horizontal position adjustment, that is closer to or further away from the operator in a generally horizontal direction. Still further, known monitor support systems are usually not able to accommodate diverse sizes, shapes and types of monitors including cathode ray tube (CRT) and liquid crystal, for example.

Summary of the Invention

The present invention is directed to a computer or so-called video monitor suspension device or system comprising: (1) means for cradling a monitor; and (2) means for coupling the monitor cradling means to structure including a work surface, wherein the monitor cradling means is adjustable so that the distance and angle between the monitor and the work surface and the user's preferred work position can be adjusted.

The present invention is also directed to a monitor suspension device comprising: (1) at least one monitor support strap adapted to engage the distal end of a monitor, wherein the opposite ends of the strap are adapted to be coupled to a work surface directly and wherein the length of the strap is adjustable, (2) a hinge adapted to pivotally couple a monitor to a work surface, or an arrangement wherein the strap may be secured to angle adjustment mechanism and (3) mechanism for adjusting the horizontal position of the monitor relative to the work surface.

The present invention is also directed to a method for suspending a monitor comprising the steps of: (1) cradling a monitor in an adjustable assembly; (2) pivotally coupling the monitor cradling assembly to a work surface; and (3) adjusting the assembly so that the assembly suspends the

monitor at a desired angle between the monitor and the work surface.

Accordingly, the present invention offers numerous advantages over the known art. Among other things, the present invention provides unobtrusive, adjustable, relatively inexpensive methods and apparatuses for suspending a monitor under a work surface.

Brief Description of the Drawings

Figure 1 is a side elevation view of a monitor suspension system in accordance with one preferred embodiment of the present invention;

Figure 2 is a perspective view of a harness assembly in accordance with a preferred embodiment of the present invention installed on a typical monitor;

Figure 3 is a perspective view of a harness assembly in accordance with a preferred embodiment of the present invention;

Figure 4 is a detail side elevation view of a pivot assembly or coupling portion of the monitor suspension system in accordance with a preferred embodiment of the present invention;

Figure 5A is a front elevation view of the pivot assembly of Figure 4;

Figure 5B is a section view taken along line 5B-5B of Figure 5A;

Figure 6A is a front elevation view of a pivot hook member for connection to the pivot assembly of Figure 4;

Figure 6B is a section view taken along line 6B-6B of Figure 6A;

Figure 7A is a plan view of the pivot assembly of Figure 4;

Figure 7B is a perspective view of a portion of the pivot assembly of Figure 4;

Figure 8 is a side elevation of a channel bracket with a strap tightening screw clamp assembly for the monitor suspension system in accordance with a preferred embodiment of the present invention;

Figure 9 is a perspective view of a channel bracket portion of a monitor suspension system in accordance with a preferred embodiment of the present invention;

Figures 10A and 10B are perspective and side views, respectively, of a portion of the channel bracket and clamp assembly shown in Figure 8;

Figure 11 is a detail perspective view of a slip joint for the monitor suspension system in accordance with a preferred embodiment of the present invention.

Figures 12A, 12B, 12C and 12D are perspective, end, plan and side elevation views, respectively, of a front support assembly portion of a monitor suspension system in accordance with a preferred embodiment of the present invention;

Figures 13A, 13B and 13C are perspective, side elevation and plan views, respectively, of a safety clamp portion of a monitor suspension system in accordance with a preferred embodiment of the present invention;

Figure 14 is a detail cut-away perspective view of a portion of the channel bracket shown in Figure 4;

Figures 15A and 15B are side elevation views of monitor suspension systems in accordance with first and second alternate embodiments of the present invention;

Figure 16 is a side elevation of a monitor suspension system in accordance with a third alternate embodiment of the present invention;

Figure 17 is a detail perspective view of an angle adjustment arm and support bracket in accordance with the embodiment of Figure 16;

Figure 18 is a detail view taken generally from the section line 18-18 of Figure 16;

Figure 19 is a plan view taken generally from the section line 19-19 of Figure 16; and

Figure 20 is a detail view taken generally from the section line 20-20 of Figure 19.

Detailed Description of the Preferred Embodiments

The present invention is directed to improved methods and apparatuses for suspending monitors from work surfaces. As a result, reference is made throughout to monitors and various parts of monitors in connection with a complete description of the invention. In particular, as shown in Figures 1 and 2, reference is made herein to the following parts of a typical monitor 201: screen 203, proximal end 205, distal end 207, top 209, bottom 211, and sides 213. A monitor, including the monitor 201, is not, however, part of the invention.

A monitor suspension system in accordance with the present invention comprises means for cradling a monitor and means for coupling a monitor to a conventional generally horizontal desk top or the like structure comprising a work surface 102.

The monitor cradling means preferably comprises a harness including straps or other adjustable elements sufficient to support the weight of a monitor. As shown in Figures 1, 15A and 15B, the monitor cradling means is adapted to receive and securely hold a wide variety of monitor sizes and shapes. For example, Figure 1 shows the monitor cradling means supporting a large CRT monitor 201, whereas Figures 15A and 15B show monitor cradling means supporting a flat panel LCD monitor 201f. The monitor cradling means is adapted to be removably and pivotally coupled to the underside of a work surface.

In a preferred embodiment, as shown in Figures 1 and 3, the monitor cradling means comprises a harness 300 including plurality of monitor support straps 301a, 301b and 301c adapted to securely engage a monitor 201. The monitor cradling harness 300 preferably comprises at least one lateral monitor support strap 301a, at least two vertical monitor support straps 301b, one circumferential girdle support strap 301c and a monitor gripping strap assembly 301d. The support straps may be made from any of the materials, preferably synthetic, typically used for cordage (round or flat) so long as such material has sufficient strength and durability to support the weight of a monitor for extended periods. Suitable materials include, without limitation, nylon, Mylar, rayon, glass rope and the like. All of the straps preferably have suitable conventional safety clamp assemblies 1301 (as shown in Figures 1 and 13A through 13C) or other suitable devices to secure strap ends and prevent an accidental strap release.

The lateral monitor support strap 301a is adapted to be removably coupled at its opposite ends, respectively, to spaced apart front support assemblies 103, one shown in Figures 1 and 12A. Each front support assembly 103 includes a mounting plate 103a and a fixed shackle member 103b secured thereto. Each assembly 103 is adapted to be mounted on the underside 102a of work surface 102 (as shown in Figure 1) or to opposed sides of vertical support members, not shown, for work surface 102. Work surface 102 includes a front edge 102b and generally rectangular opening 106 therein and preferably covered by a transparent member 104, Figure 1. The lateral monitor support strap 301a has a conventional adjustable buckle and/or clamp assembly 309 on one or both ends to enable a user to train the strap ends through shackle members 103b, as shown, and adjust the length of the monitor strap 301a. The center of

the lateral monitor support strap 301a engages the distal end 207 of monitor 201. The lateral monitor support strap 301a also passes through slip joints 311 in the circumferential monitor support strap 301c (as shown in Figures 1 and 11), which serve to secure the lateral support strap 301a in place and prevent slippage of the monitor 201.

The vertical monitor support straps 301b are adapted to wrap around the distal end 207 of monitor 201 perpendicular to the lateral monitor support strap 301a. The ends of the vertical monitor support straps 301b are coupled to the monitor gripping strap assembly 301d. Preferably, the ends of the vertical support straps 301b are coupled to opposed channel brackets 307 which are secured to and form part of the monitor gripping strap assembly 301d. The vertical monitor support straps 301b also have adjustment buckles 309 or other suitable strap length adjustment devices between the ends of the straps to enable a user to adjust the length of the straps 301b to accommodate different sizes of monitors. The vertical monitor support straps 301b may each be stitched or otherwise coupled to the lateral monitor support strap 301a at the points where the straps intersect. As shown by example in Figures 4 and 14, loops 301b' are formed at the ends of the vertical support straps 301b and are passed through slots 307a in the sides of each opposed channel bracket 307 and secured with a hitch pin 317 that is preferably at least 1 inch longer than the slot in the channel bracket 307. Straps 301b preferably include strap segments 301b'' and 301b''' connected to each other at rings 301r and buckles 309, see Figure 1.

The circumferential monitor support strap 301c is oriented in a plane perpendicular to the lateral and vertical monitor straps 301a and 301b and, when the monitor 201 is in place, parallel to the plane of the monitor screen, the

circumferential monitor support strap 301c is positioned and adapted to engage the monitor near the distal end 207, preferably at a point about one-third of the distance between the distal and proximal ends 207 and 205 of the monitor. The circumferential monitor support strap 301c may be stitched or otherwise coupled to the vertical monitor support straps 301b at the points where the straps intersect. The circumferential monitor support strap 301c has an adjustment buckle 309 or other suitable strap length adjustment device to enable a user to adjust the length of the straps 301c to accommodate different sizes of monitors.

The monitor gripping strap assembly 301d is oriented perpendicular to the lateral and vertical monitor straps 301a and 301b and, when the monitor 201 is in place, strap assembly 301d extends generally parallel to the plane of the monitor screen 203. The monitor gripping strap assembly 301d is positioned and adapted to engage the proximal end 205 of the monitor 201 and includes means for securely engaging the proximal end of monitor. In a preferred embodiment of strap assembly 301d, as shown in Figure 3, a plurality of channel shaped bracket members 307 are secured to a gripping strap 301d', respectively, wherein the strap is trained through a channel formed by the brackets, respectively. Each of the channel brackets 307 preferably includes a non-slip backing 901 thereon (as shown in Figure 9) which engages a surface of proximal end 205 of monitor 201 when the monitor gripping strap 301d is tightened. The non-slip backing 901 may comprise hook and loop fasteners, rubberized backing, or the like. One or more of the channel brackets 307 may include a tensioning screw clamp assembly 800 (as shown in Figure 8). As shown in Figures 8, 10A and 10B, the tensioning screw clamp assembly 800 comprises two sliding members 801 and 802 slidably disposed on a bracket 307 and each suitably connected to respective op-

posite ends of a strap 301d', and to a tightening screw 803. The tightening screw 803 couples the members 801 and 802 and may be used to increase or decrease the distance between the members 801 and 802 thereby adjusting the tension in the gripping strap 301d'. The opposite ends of gripping strap 301d' are each preferably coupled to the members 801 and 802 by being clamped between upper and lower clamp plates 801a, 801b, 802a and 802b (Figure 8) of the bracket members 801 and 802, respectively. Thus, the screw clamp assemblies 800 may be used to tighten the monitor gripping strap assembly 301d to a point where the strap assembly securely engages the proximal end of a monitor.

When installed at a work surface 102, the monitor cradling harness 300 is pivotally coupled to the underside of the work surface. Any hinge like assembly may be used to pivotally couple the monitor cradling means to a work surface as long as the assembly is sufficient to support the weight of a monitor and permits the monitor cradling means to pivot relative to the work surface. In a preferred embodiment, as shown in Figures 4, 5A, 5B, 6A, 6B, 7A and 7B, means for pivotally coupling a monitor 201 to work surface 102 comprises a pivot assembly 400 comprising spaced apart fixed members 401 supporting a pivot rod 402 therebetween. Members 401 are secured to a base plate 403 adapted to be secured to work surface underside 102a. The pivot assembly 400 further includes an elongated plate 404 having spaced apart hooks 405 attached thereto and engageable with rod 402. Plate 404 is suitably retained between reentrant flanges 307f of bracket 307, Figure 4. Alternatively, the pivot hooks 405 may be mounted on the gripping strap assembly 301d or the monitor itself. The pivot assembly 400 removably and pivotally couples the monitor 201 to the work surface 102.

A monitor suspension system in accordance with the present invention is preferably installed and operated as follows. The front support assemblies 103 and the fixed members 401 of the pivot assembly 400 are secured to the underside 102a of a work surface 102 or to side support members, not shown, of work surface 102. The monitor cradling harness 300 comprising the lateral, vertical and circumferential monitor support straps and the gripping strap assembly are preferably pre-assembled with all of the straps preferably adjusted to be slightly longer than their anticipated final arrangement. A monitor 201 is then placed in the harness 300 with the distal end 207 of the monitor towards the circumferential strap 301c and the proximal end 205 towards the monitor gripping strap assembly 301d. The monitor gripping strap 301d' is then tightened with the tightening screw 803 of the tightening screw clamp assembly 800. Once the gripping strap 301d' is secured, the vertical and circumferential support straps 301b and 301c may be tightened by adjusting the straps at their respective buckles 309. The straps are then secured by their respective clamp assemblies 1301. The harness 300 may then be coupled to the work surface 102 by engaging the pivot hooks 405 to the pivot rod 402 secured to the fixed members 401 of the pivot hook assembly. The ends of the lateral strap member 301a may then be passed through the shackle members of the hanger front support assemblies 103 and the effective length of lateral support strap 301a may be shortened by pulling the strap ends through the buckles 309 until the monitor 201 is drawn up into the desired orientation beneath the work surface 102. The orientation of the monitor 201 (i.e., the angle between the monitor and work surface) may be changed at any time by lengthening or shortening the lateral support strap 301a. Clamp assem-

blies 1301 are secured to the strap ends once the strap 301a is suitably adjusted.

The present invention may be embodied in other forms without departing from the spirit or essential attributes of the invention. For example, the monitor cradling assembly may consist of only a single lateral support strap in which case the pivot hook may be coupled to the monitor with adhesives, screws, hook and loop fasteners or any other fastener capable of supporting the weight of the monitor. Alternatively the monitor cradling means may comprise more than one lateral support strap and/or any number of vertical support straps and or any number of circumferential support straps. The fixed member of the pivot assembly may be a bracket that may be suspended from an edge of the work surface as long as the bracket is sufficient to support the weight of a monitor. Alternative mechanisms may be suitable for tightening the gripping strap on the monitor such as any standard adjustable strap buckle so long as the gripping strap may be tightened sufficiently to hold the strap assembly in place when suspended from a work surface.

By way of further example, Figures 15A and 15B show how the present invention may be used with flat panel LCD monitors. As shown in Figure 15A, the monitor cradling means may comprise harness 300a including a lateral monitor support strap 301a', a monitor gripping strap assembly 301d engaging the side of the monitor, and one or more vertical monitor support straps 301b' extending underneath the monitor from the gripping strap assembly 301d. Alternatively, because of the small size and light weight of LCD monitors, the monitor cradling means may comprise a shallow rectangular tray 601 (as shown in Figure 15B) supporting the bottom of the monitor and extending at least partially around the sides of the monitor. The tray 601 may be made of any ma-

terial so long as it has sufficient strength and durability to support the weight of the monitor for extended periods, and is preferably made from materials such as lightweight wood or synthetic components such as plastics, polyethylene, etc. The tray 601 may be pivotally coupled to a work surface with any hinge like assembly, including a pivot rod 402 engaged by a suitable hook member 405' connected to the tray 601, as long as the assembly is sufficient to support the weight of the monitor and permits the monitor cradling means to pivot relative to the work surface.

As shown in Figure 15B, spaced apart depending support arms 410, one shown, are pivotally connected to the underside 102a of work surface 102 by suitable pivot brackets 412, one shown in Figure 15B. Each of the arms 410 is adapted to be secured to the tray 601 by suitable clamp means including a thumb screw 413 connected to the tray and extending within a slot 411, for example, whereby the angle of the monitor screen for the monitor 201f may be adjusted relative to the work surface 102.

Referring now to Figure 16, a side elevation of a third alternate embodiment of the present invention is illustrated. The monitor suspension system shown in Figure 16 is generally designated by the numeral 430 and is adapted to be used in conjunction with a monitor 201 in substantially the same manner as the embodiments previously described herein. As shown in Figure 16, the monitor suspension system 430 is adapted to be suspended beneath a work surface 102 and is also adapted to be horizontally adjustable relative to the work surface including the opening 106 formed therein. The suspension system 430 is also adapted to more easily adjust the angle between the plane of monitor screen 203 and the work surface.

The monitor suspension system 430 comprises a harness 432 including two spaced apart vertical monitor support

straps 301b, one shown in Figure 16, a circumferential monitor support strap 301c including a clamp 1301 and a modified lateral support strap 301a''. The harness 432 of the system 430 also comprises the monitor gripping strap assembly 301d including the plural channel brackets 307 in the same arrangement as the embodiment of Figures 1 through 3 of the present invention. One of the channel brackets 307 is adapted to support one or more hooks 405 engageable with a pivot rod 402, again in substantially the same manner as the embodiment of Figures 1 through 3. However, the pivot rod 402 is supported for horizontal adjustment relative to the work surface 102 as will be explained in further detail herein.

Opposite ends of the lateral strap 301a'' are suitably connected to opposed elongated angle adjustment arms 434, one shown in Figure 16. Strap 301a'' may be provided with buckles 309, one shown, for forming a loop 301k at each end of the strap and for adjusting strap length. Arms 434 pass through the aforementioned loops at the strap ends and are secured at one end, respectively, to spaced apart pivot brackets 436, one shown in Figure 16. Arms 434 also extend through respective spaced apart angle adjustment brackets 438, one shown in Figure 16. The pivot brackets 436 are suitably secured to underside 102a of work surface 102. As shown in Figure 17, by way of example, each angle adjustment bracket 438 includes a laterally extending support flange 439 adapted to be secured to the underside 102a of the work surface 102 adjacent the rectangular opening 106 by suitable fasteners, not shown. Each bracket 438 includes an elongated slot 440 with spaced apart laterally disposed notches 442 formed therein for receiving a portion of the angle adjustment arm 434, as illustrated in Figure 17. A distal handle portion 435 of angle adjustment arm 434 may be grasped to move the arm into and out of a se-

lected one of the slots 442 to adjust the angle of the face of screen 203 of monitor 201 with respect to the work surface 102.

Referring briefly to Figure 18, each of the angle adjustment arms 434 is mounted on a support bracket 436 suitably secured to the underside of the work surface 102 by suitable fasteners. Each of the arms 434 is secured to its associated support bracket 436 by a pivot pin 437 comprising a conventional machine screw and nut assembly, for example.

Referring now also to Figures 19 and 20, the pivot rod 402 which is supported at its opposite ends by members 401 mounted on base plate 403' is retained in supported relationship under the work surface 102 by spaced apart support plates 452, Figure 19. Each of the support plates 52 is supported in a standoff position, as shown in Figure 20, from the underside 102a of the work surface 102 by a suitable somewhat C-shaped spacer 454 to provide a slot 456, one shown in Figure 20, for receiving the opposite ends, respectively, of the base plate 403. Elongated slots 453 are provided, as shown in Figure 19, in the respective plates 452 for receiving the shank portion of a thumbscrew 460 threadedly engaged with the support plate 403 and providing for lateral adjustment of the pivot rod 402 in a generally horizontal direction along the underside 102a of the work surface 102. The lengths of the angle adjustment arms 434 are sufficient to allow substantial lateral or horizontal movement of the harness 432 and the monitor supported thereby without the handle ends 435 of the arms leaving the slots 440 or without interference between the brackets 438 and the lateral support strap 301a''. Accordingly, the embodiment of the suspension system illustrated in conjunction with Figures 16 through 20 provides for a more convenient and wider range of adjustment of the posi-

tion of the monitor 201 with respect to the work surface 102 and, of course, the operator's preferred work position with respect to the work surface 102.

It will be understood by persons skilled in the art that various other changes in the details, materials, and arrangements of the parts which have been described and illustrated in order to explain the nature of this invention may be made by those skilled in the art without departing from the principle and scope of the invention expressed in the following claims.

Claims

What is claimed is:

1. A monitor suspension device comprising:

(1) means for cradling a monitor; and

(2) means for pivotally coupling the monitor cradling means to a work surface,

wherein the monitor cradling means is adjustable so that the distance and angle between the monitor and the work surface can be adjusted.

2. The device of Claim 1, wherein:

the monitor cradling means comprises a plurality of straps arranged to securely hold a monitor.

3. The device of Claim 2, wherein:

at least one of the straps is adapted to engage the distal end of a monitor, the ends of said one strap are adapted to be coupled to a work surface and the length of said one strap is adjustable.

4. The device of Claim 3, wherein:

the pivotal coupling means comprises a hinge wherein a first member of the hinge is coupled to the monitor gripping strap and the second member of the hinge is adapted to be coupled to a work surface.

5. The device of Claim 1, wherein:

the monitor cradling means comprises a tray adapted to support said monitor.

6. The device of Claim 5 including:

spaced apart depending arms connected to said tray and said work surface and operable to adjust the angle between a screen of said monitor and said work surface.

7. A monitor suspension device comprising:

(1) at least one monitor support strap adapted to engage the distal end of a monitor, wherein the ends of said strap are adapted to be coupled to a work surface and the length of said strap is adjustable; and

(2) a pivot hinge adapted to pivotally couple said monitor to a work surface.

8. The device of Claim 7, further comprising:

a monitor support strap adapted to circumferentially engage the proximal end of a monitor, and wherein, the pivot hinge comprises a first member and a second member and the first member is coupled to the monitor support strap adapted to circumferentially engage the proximal end of a monitor.

9. A method for suspending a monitor comprising the steps of:

(1) cradling a monitor in an adjustable assembly;

(2) pivotally coupling the monitor cradling assembly to a work surface; and

(3) adjusting the assembly so that the assembly suspends the monitor at a desired angle between the monitor and the work surface.

10. A monitor suspension system for suspending a computer or video monitor beneath a work surface for viewing said monitor through an opening in said work surface comprising:

a harness for supporting a video monitor whereby a screen of said monitor may be viewed through said opening in said work surface;

a coupling engaged with said harness for allowing said harness to pivot with respect to said work surface to change the angle of said screen with respect to said work surface; and

support means for said harness connected thereto at a point spaced from said coupling for supporting said monitor by said harness at a predetermined angle with respect to said work surface.

11. The suspension system set forth in Claim 10 wherein:

said coupling includes at least one support bracket laterally adjustable with respect to an underside of said work surface for adjusting the horizontal position of said harness with respect to said opening.

12. The suspension system set forth in Claim 11 wherein:

said coupling includes an elongated pivot rod connected to spaced apart support brackets, said support brackets being supported by spaced apart support plates for lateral adjustment with respect to said support plates to adjust the horizontal position of said harness and said monitor.

13. The suspension system set forth in Claim 12 wherein:

said support plates are supported on said underside of said work surface.

14. The suspension system set forth in Claim 12 wherein:

said support brackets include means for securing said support brackets in selected predetermined positions with respect to said support plates.

15. The suspension system set forth in Claim 10 wherein:

said support means includes spaced apart support brackets, each of said support brackets being operable to support an elongated arm supported for movement with respect to said work surface and connected to said harness, said arms being operable to be placed in predetermined positions on and supported by said support brackets, respectively.

16. The suspension system set forth in Claim 15 wherein:

said support brackets include spaced apart arm receiving notches formed therein for receiving said arms in selected positions to place the screen of said monitor at a predetermined angle with respect to said work surface.

17. The suspension system set forth in Claim 10 wherein:

said harness includes a strap assembly adapted to forcibly grip a portion of said monitor, said strap assembly including a circumferential gripping strap and a tightening clamp assembly secured to said gripping strap for adjusting a gripping force applied to said monitor.

18. The suspension system set forth in Claim 17 wherein:

said strap assembly includes a plurality of substantially rigid members engageable with opposed surfaces of said monitor, said gripping strap being engaged with said rigid members.

19. The suspension system set forth in Claim 18 wherein:

said clamp assembly is attached to one of said rigid members of said strap assembly.

20. The suspension system set forth in Claim 18 wherein:

said coupling is attached to one of said rigid members of said strap assembly.

21. The suspension system set forth in Claim 18 wherein:

said rigid members of said strap assembly comprise elongated channel shaped members adapted for receiving said gripping strap in a channel thereof, respectively.

22. The suspension system set forth in Claim 10 wherein:

said harness comprises a gripping strap assembly adapted to extend circumferentially around said monitor and be in gripping engagement therewith;

at least one vertical strap assembly connected at one end to said gripping strap assembly, extending around a distal end of said monitor and connected at its opposite end to said gripping strap assembly; and

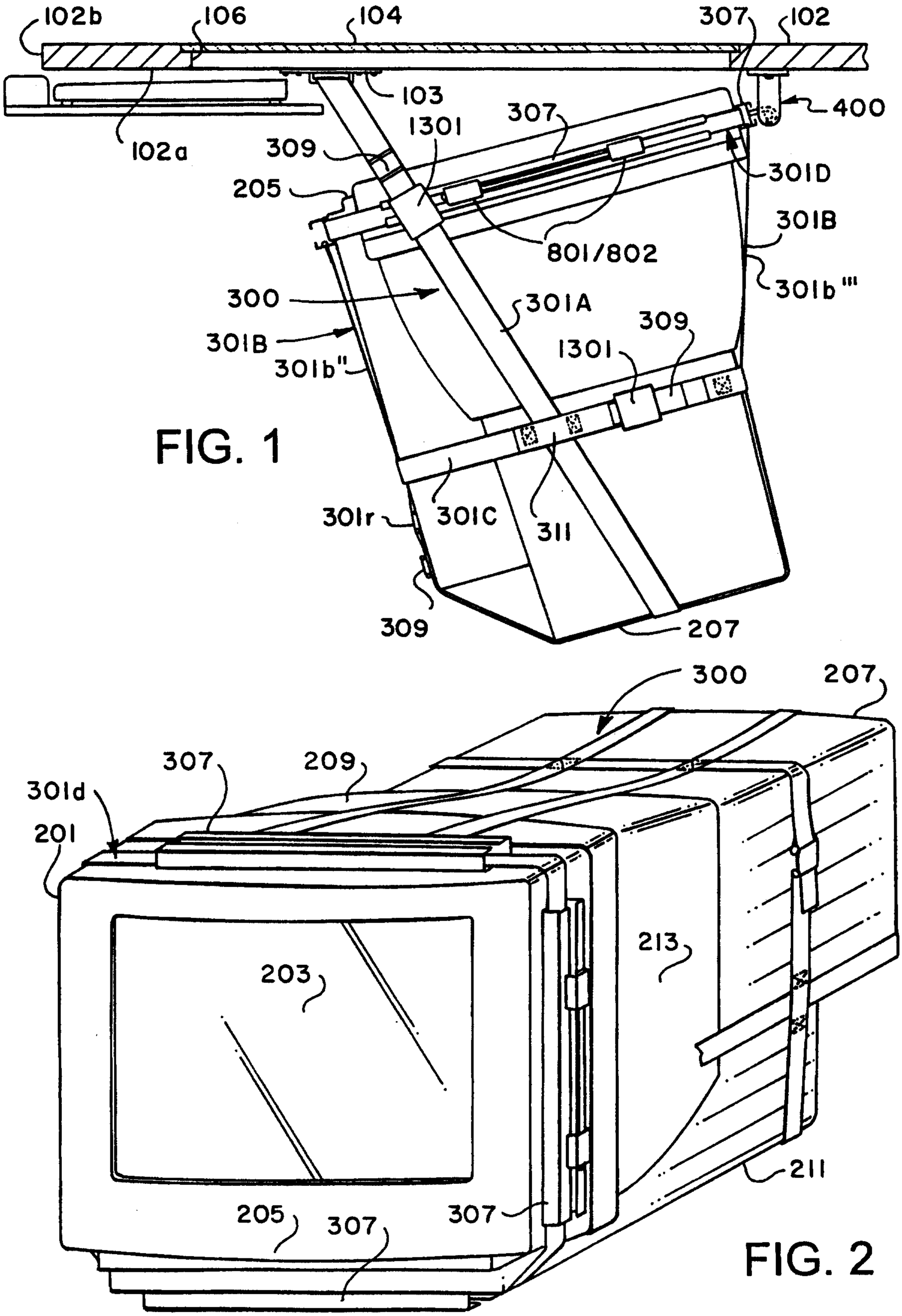
at least one lateral strap assembly engageable with said monitor and connected at its opposite ends to means for supporting said lateral strap assembly at said opposite ends and to provide for angular adjustment of a screen of said monitor with respect to said work surface.

23. The suspension system set forth in Claim 22 wherein:

said lateral strap assembly is connected at its opposite ends to respective strap support assemblies and said lateral strap assembly is provided with at least one adjustment means for adjusting the effective length of said lateral strap assembly to adjust the angle of said screen with respect to said work surface.

24. The suspension system set forth in Claim 22 including:

at least one circumferential support strap spaced from said gripping strap assembly and extending around said monitor between a proximal end and a distal end of said monitor.


102b
106
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102
103
400
102a
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1301
307
205
301D
301B
801/802
301b'''
300
301A
309
301B
1301
301b''
301r
301C
311
309
207

FIG. 1

300
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301d
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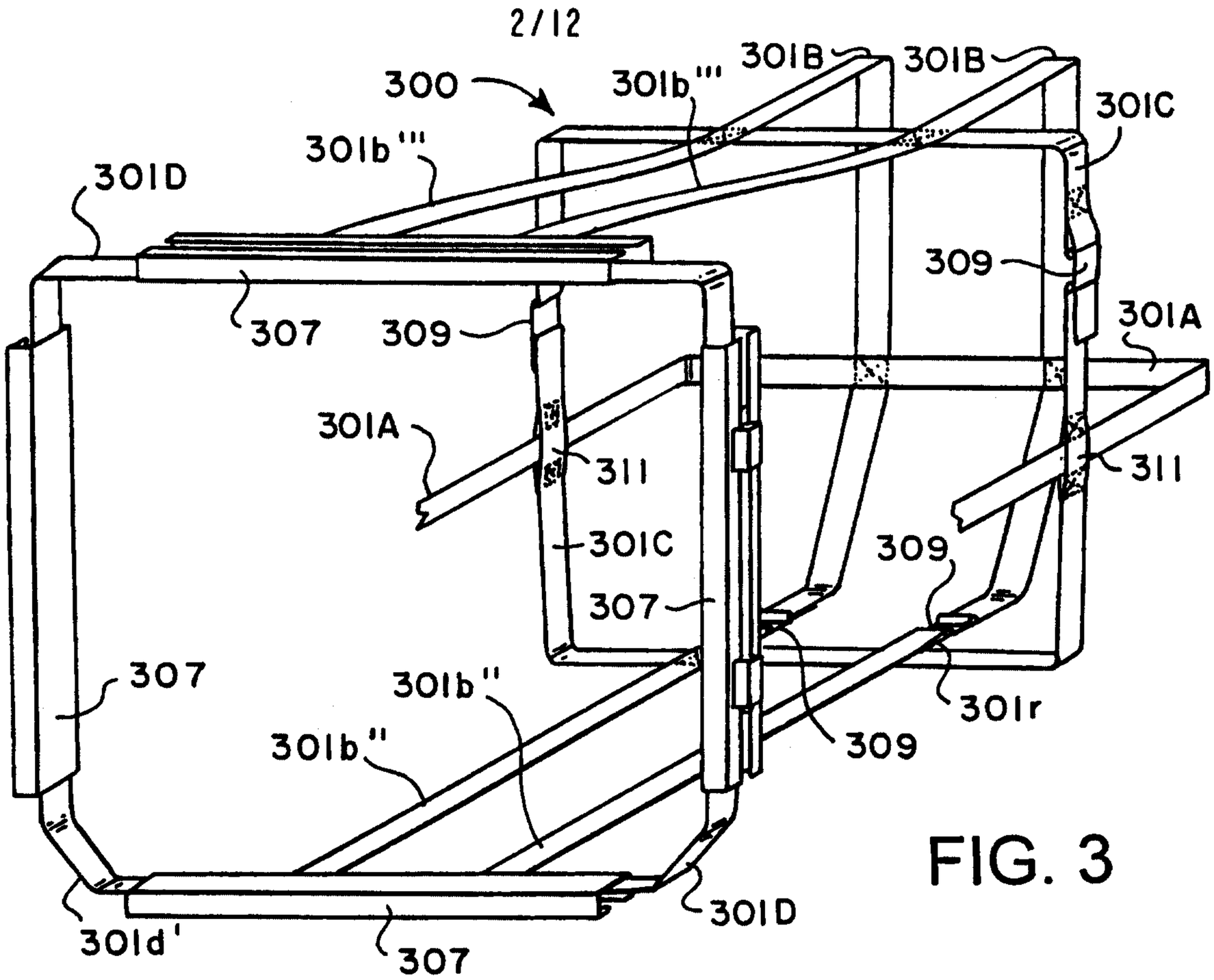
307
211

FIG. 2


300
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301B
301C
301b'''
301b'''
301D
309
301A
307
309
301A
311
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301C
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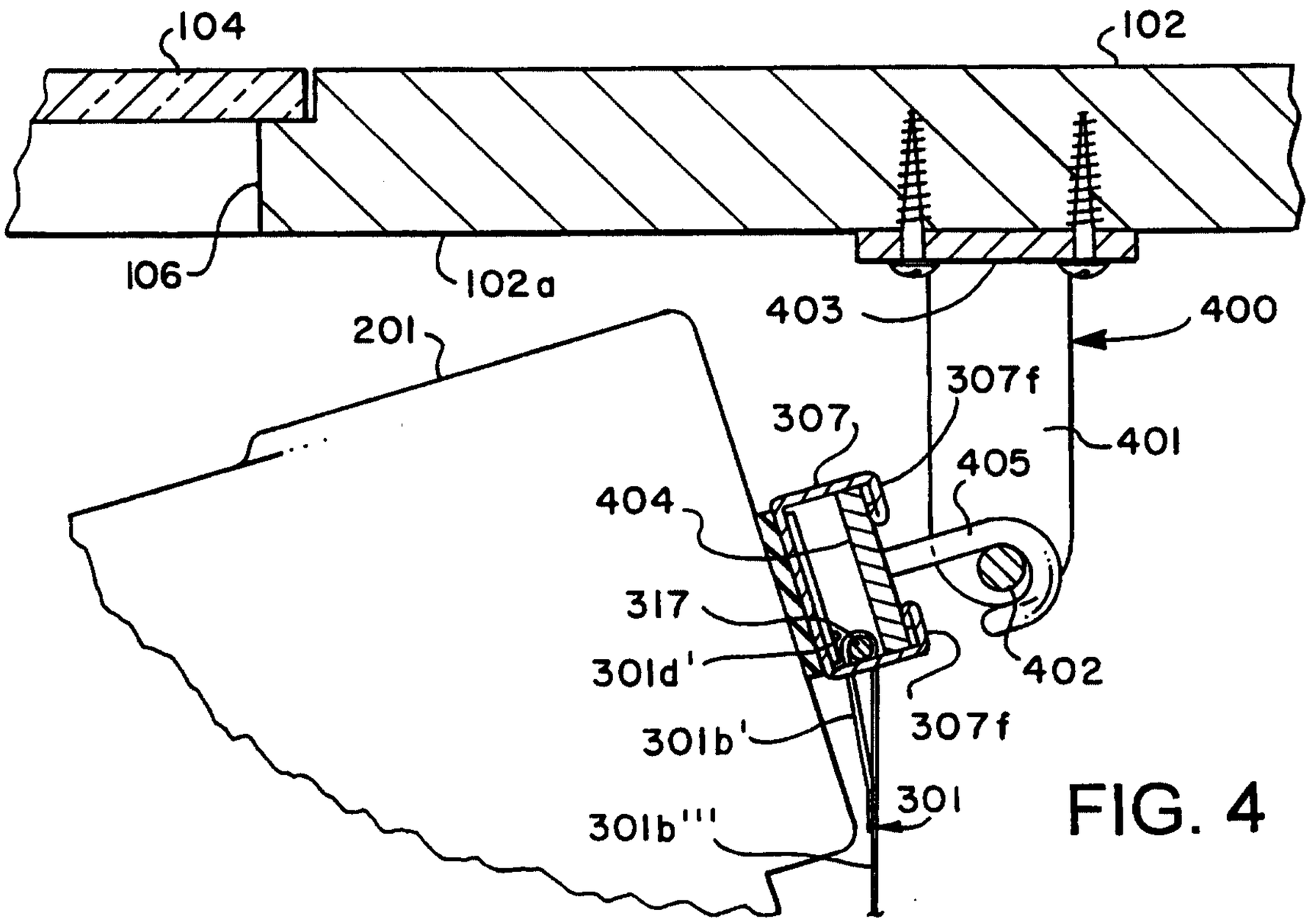
307
307
301b''
301b''
309
301r
307
301D
301d'
307

FIG. 3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317
402
301d'
307f
301b'
301
301b'''

FIG. 4

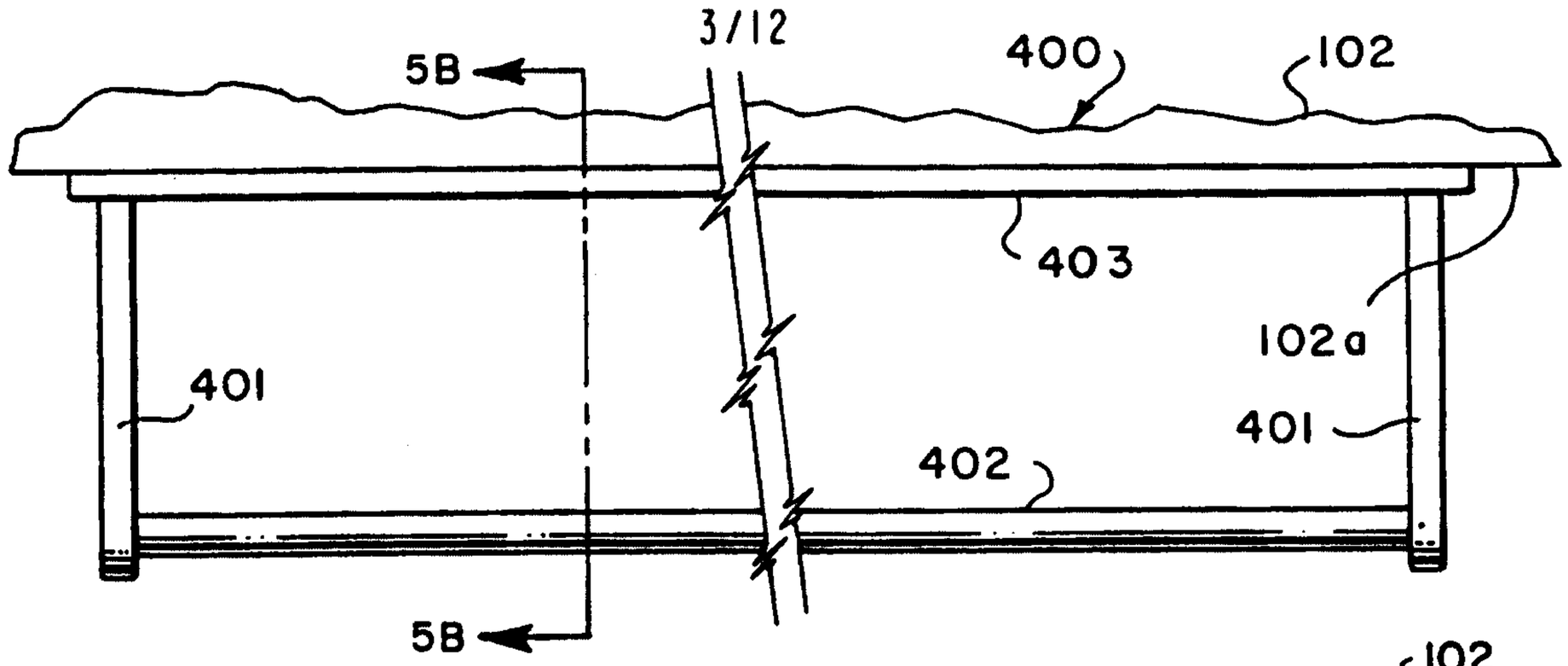

FIG. 5A

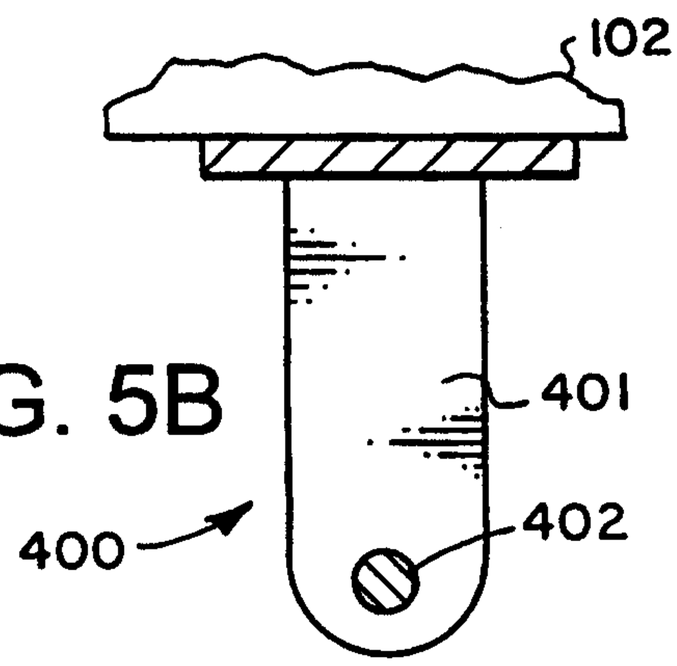

FIG. 5B

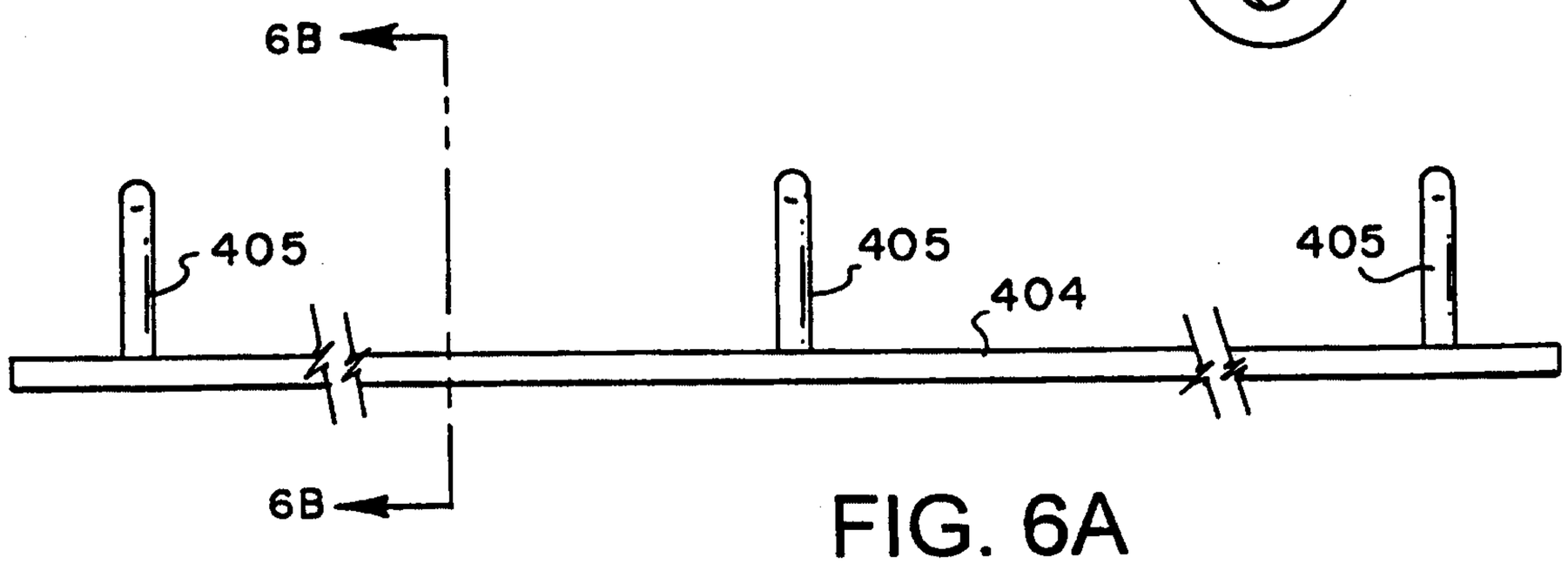

FIG. 6A

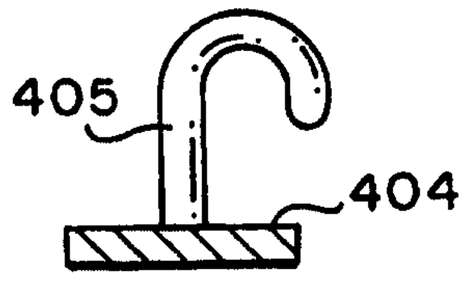

FIG. 6B

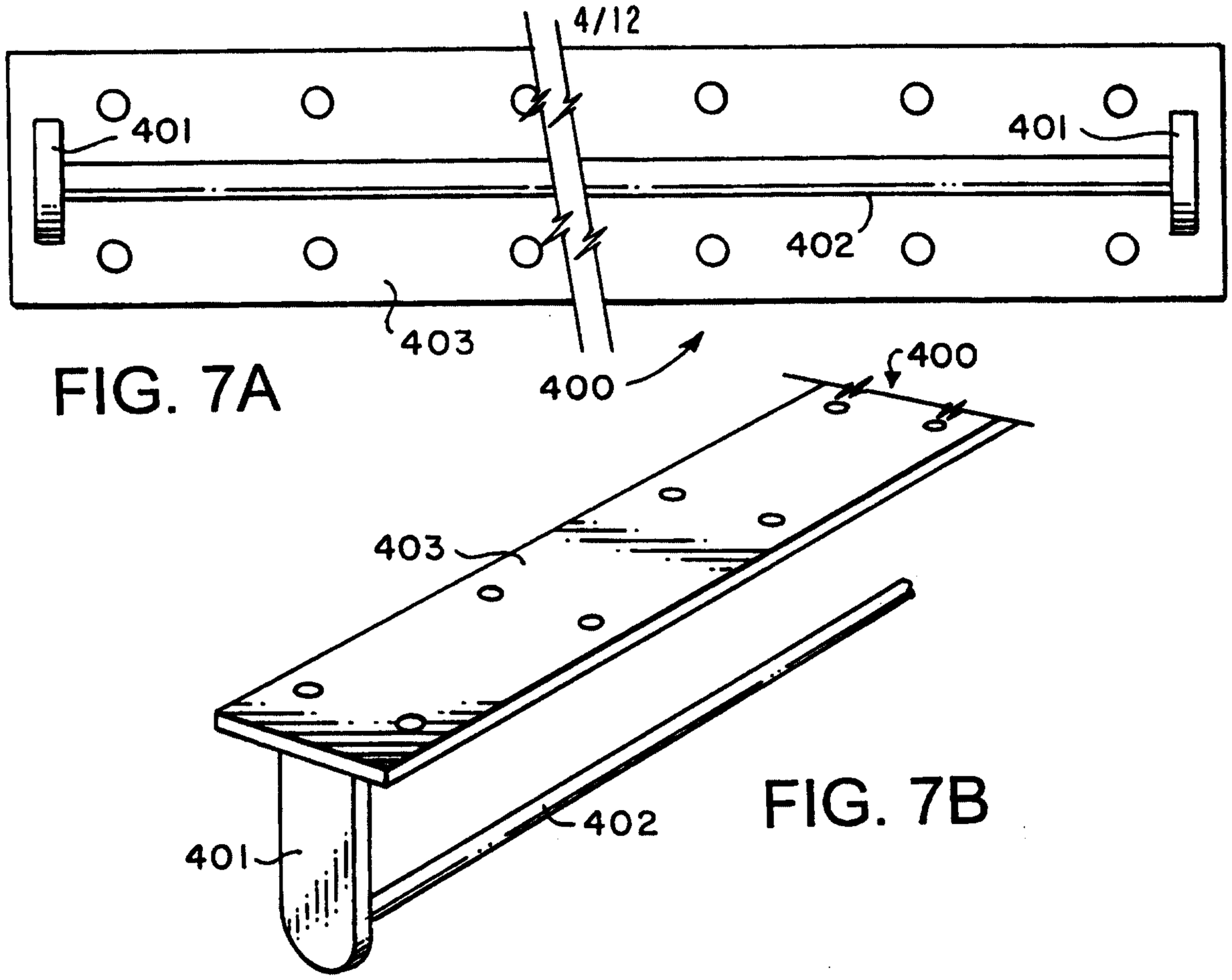

FIG. 7A

FIG. 7B

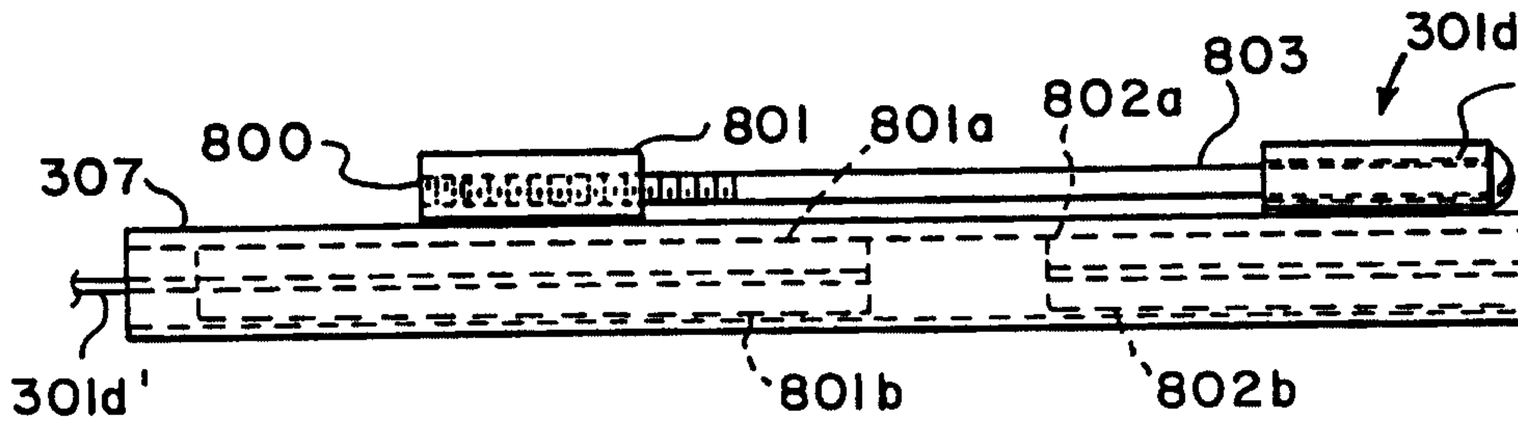

FIG. 8

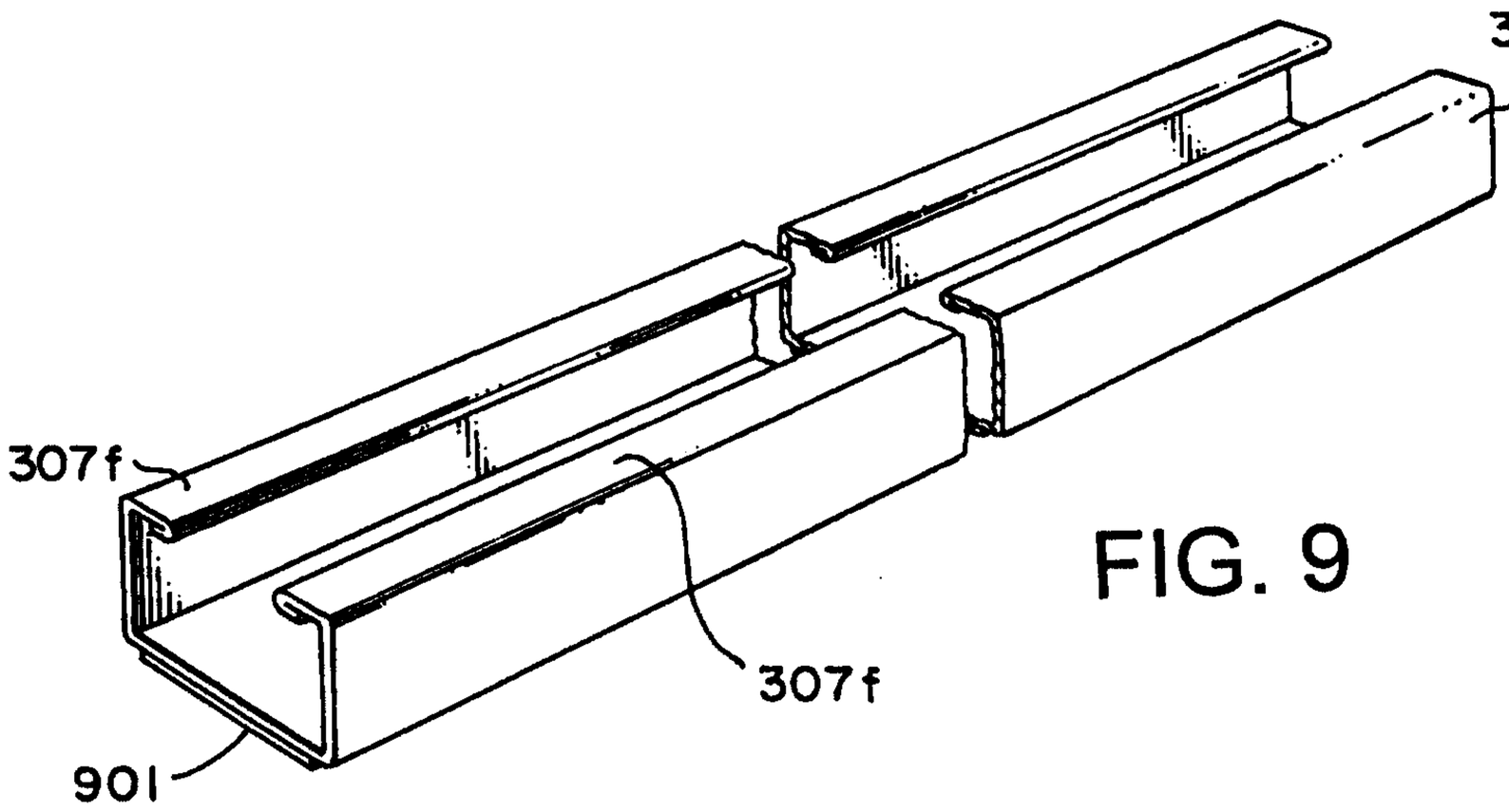

FIG. 9

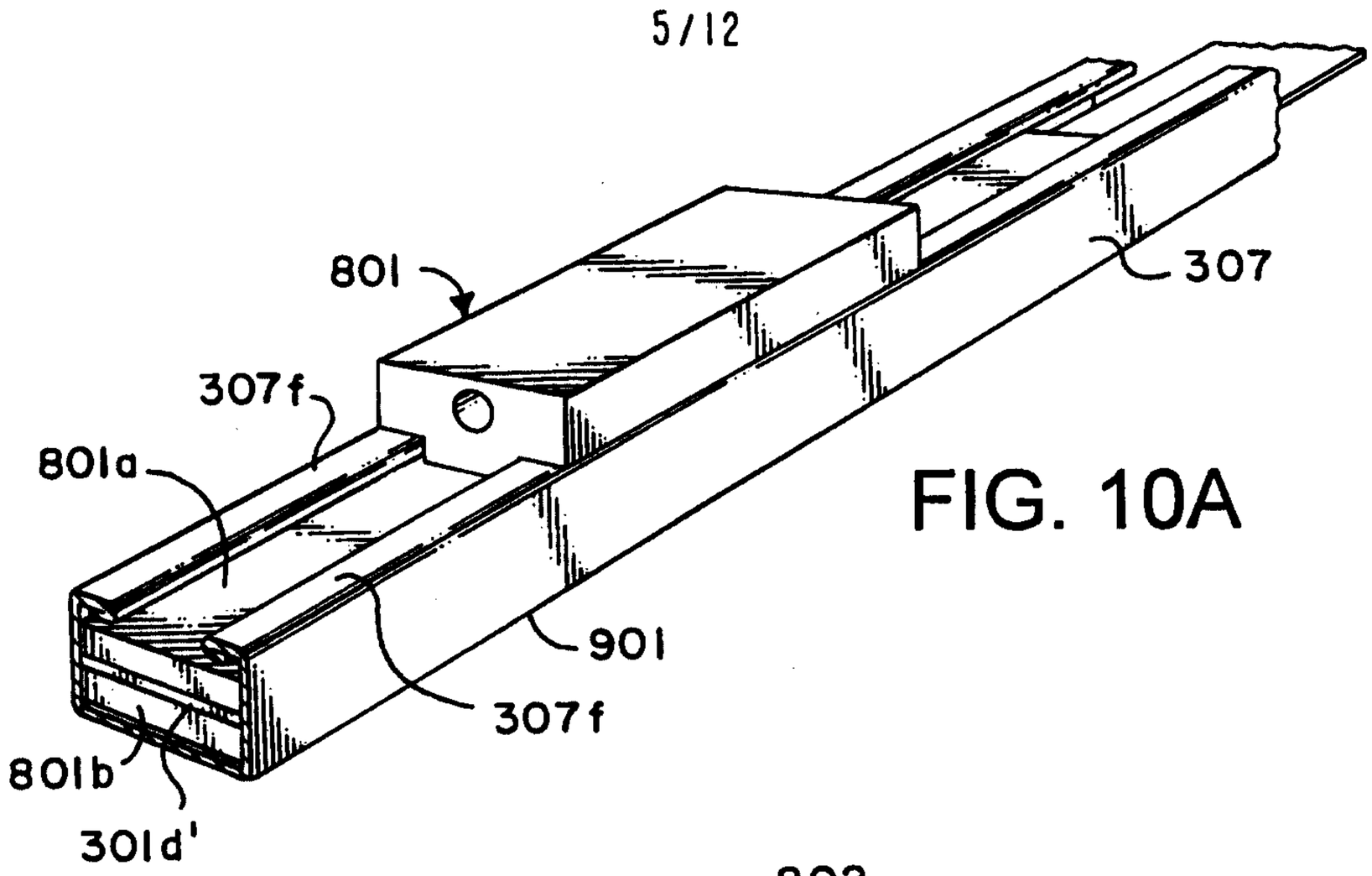

FIG. 10A

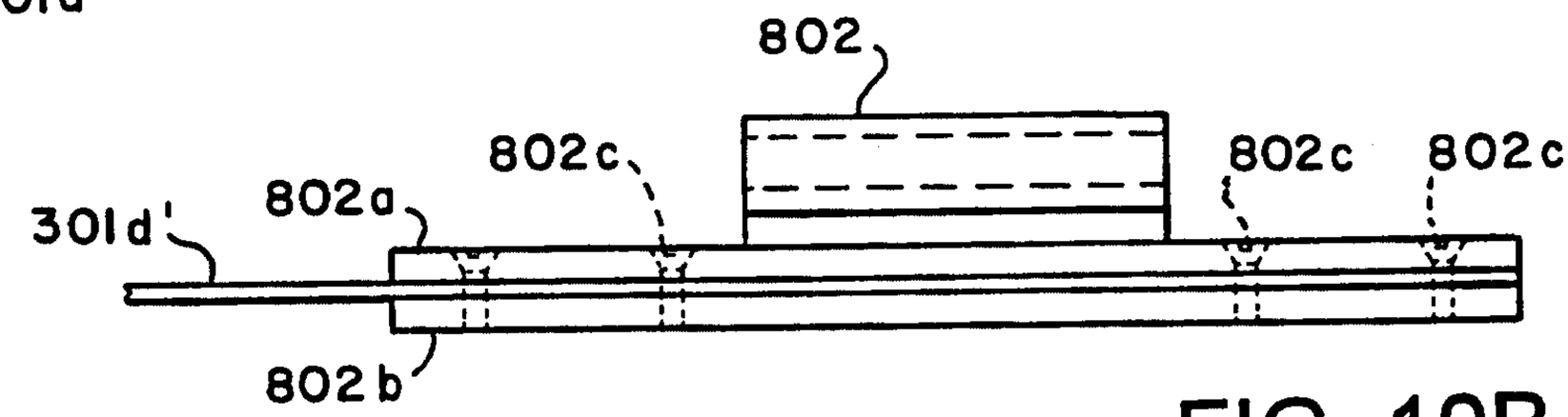

FIG. 10B

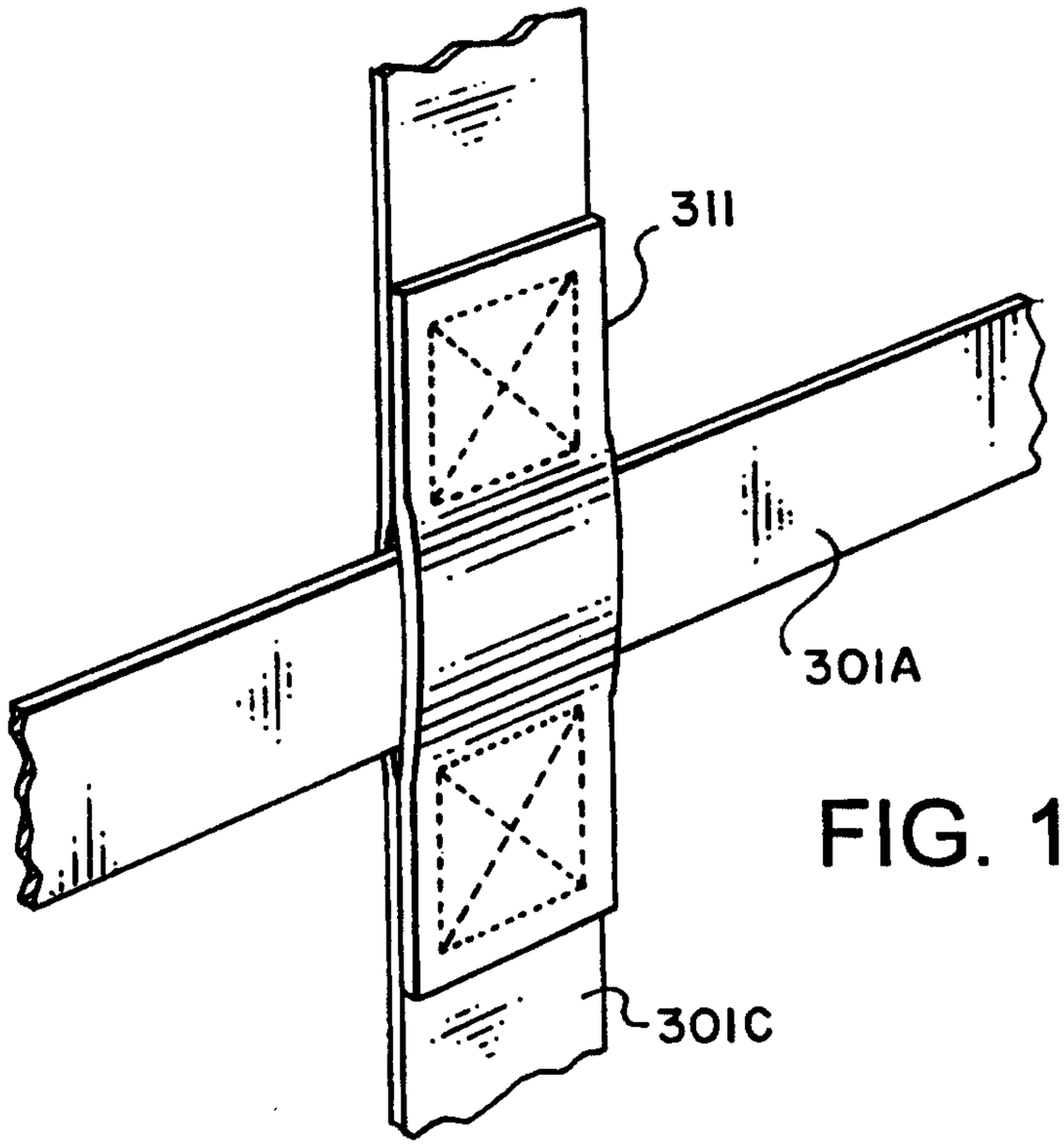

FIG. 11

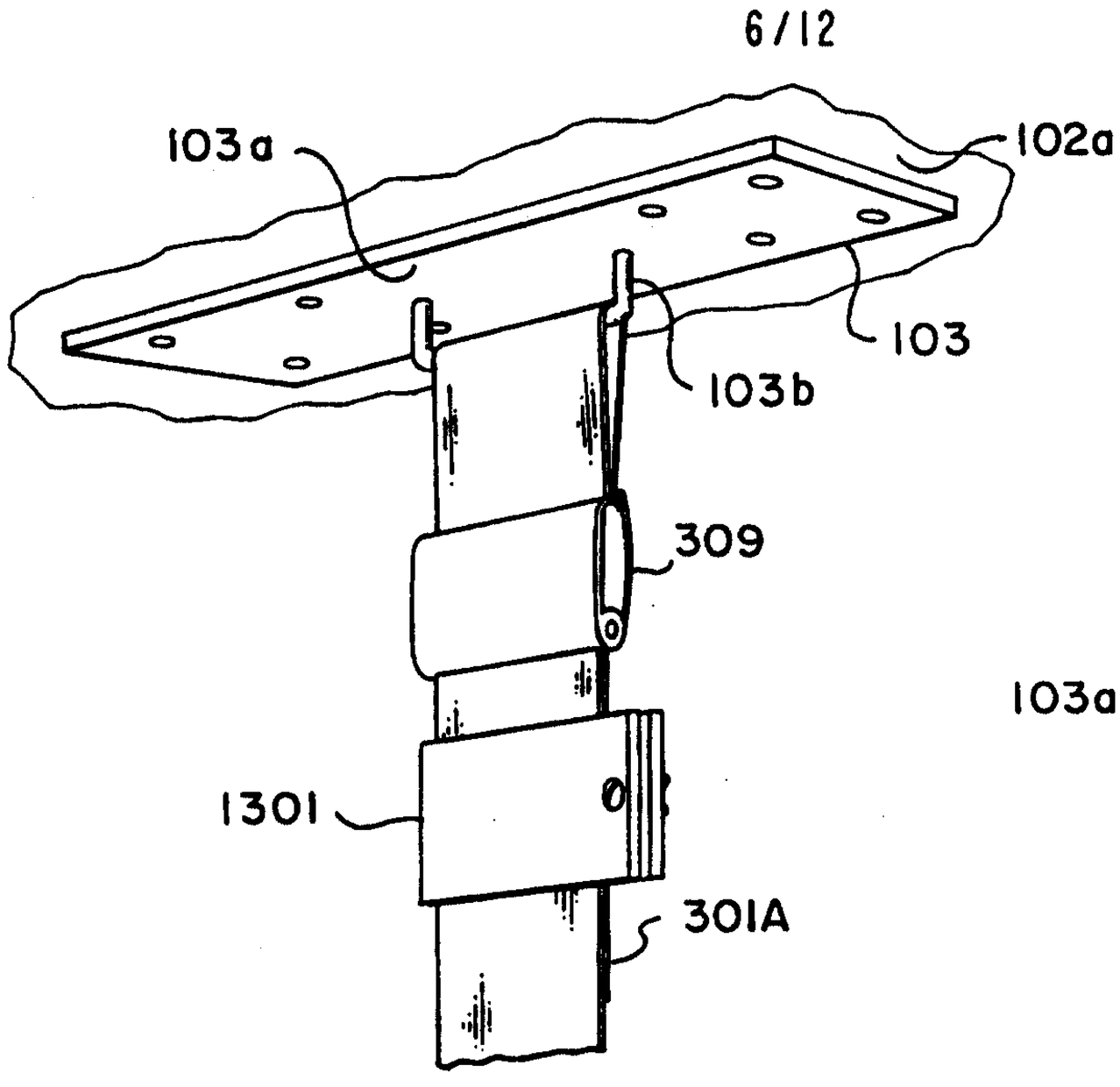

FIG. 12A

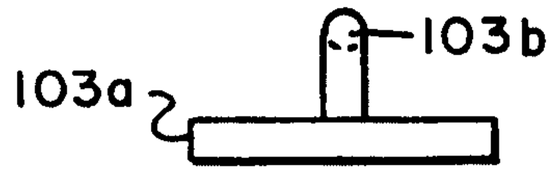

FIG. 12B

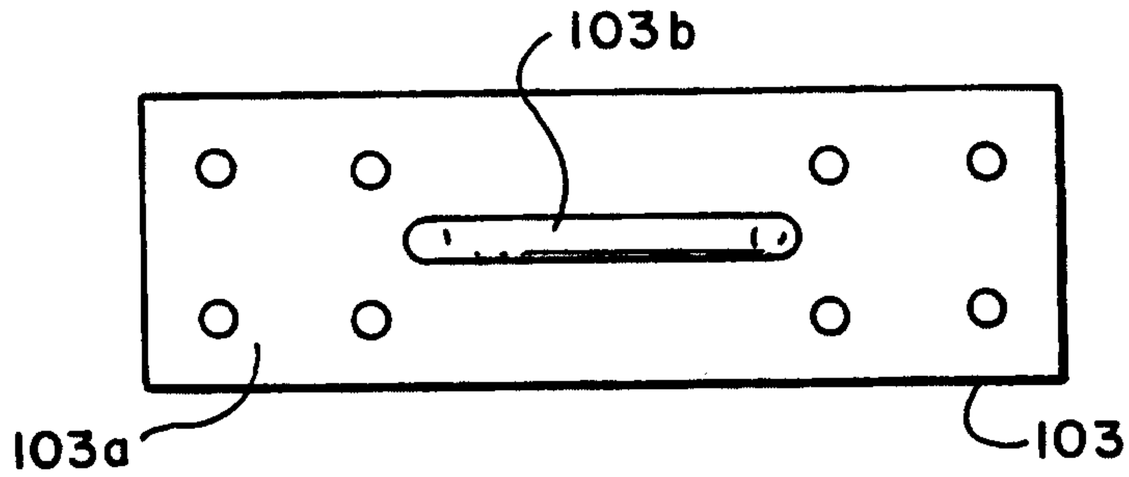

FIG. 12C

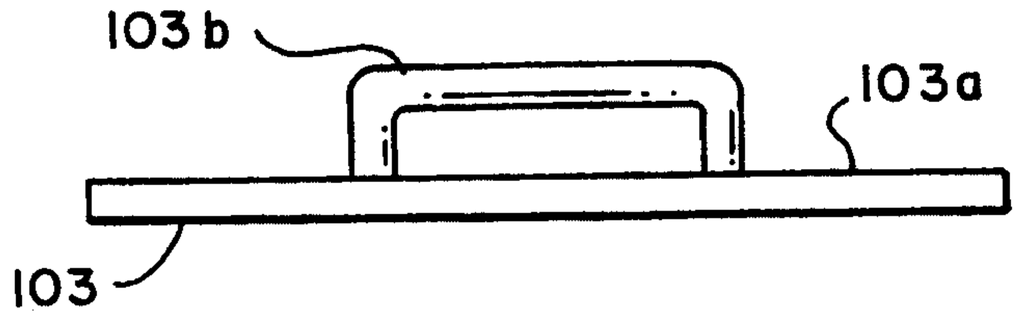

FIG. 12D

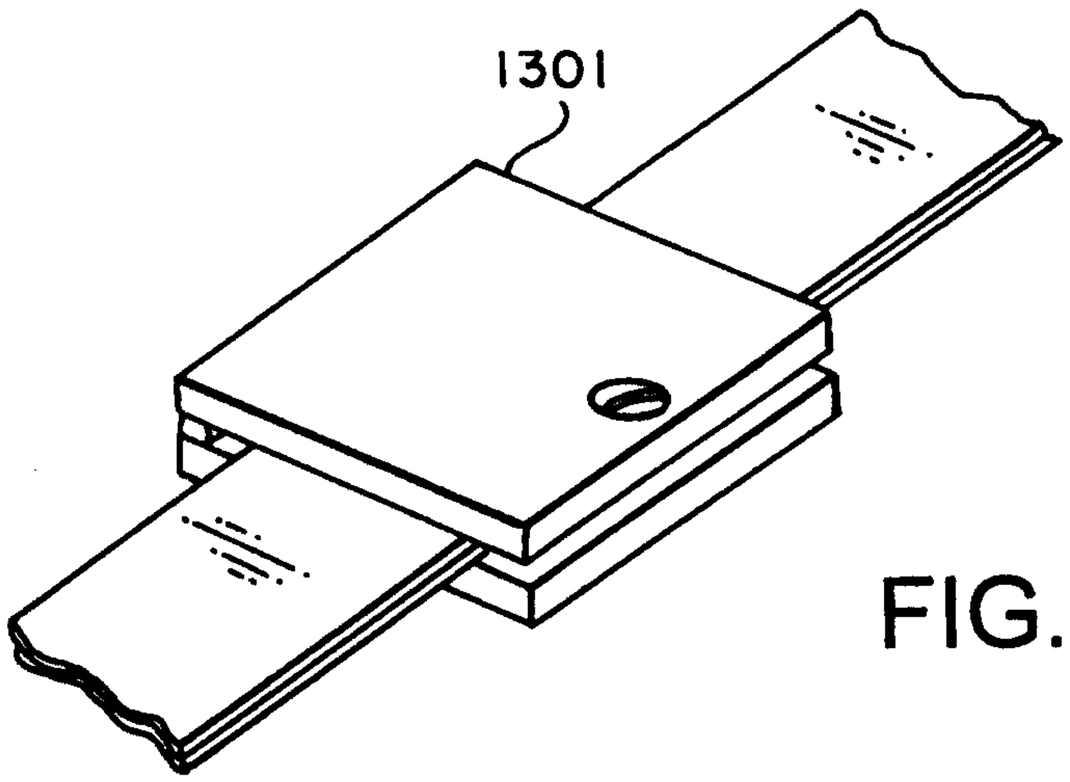

FIG. 13A

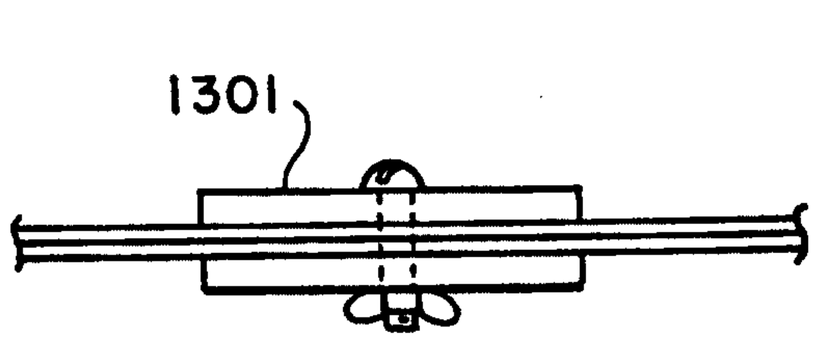

FIG. 13B

FIG. 13C

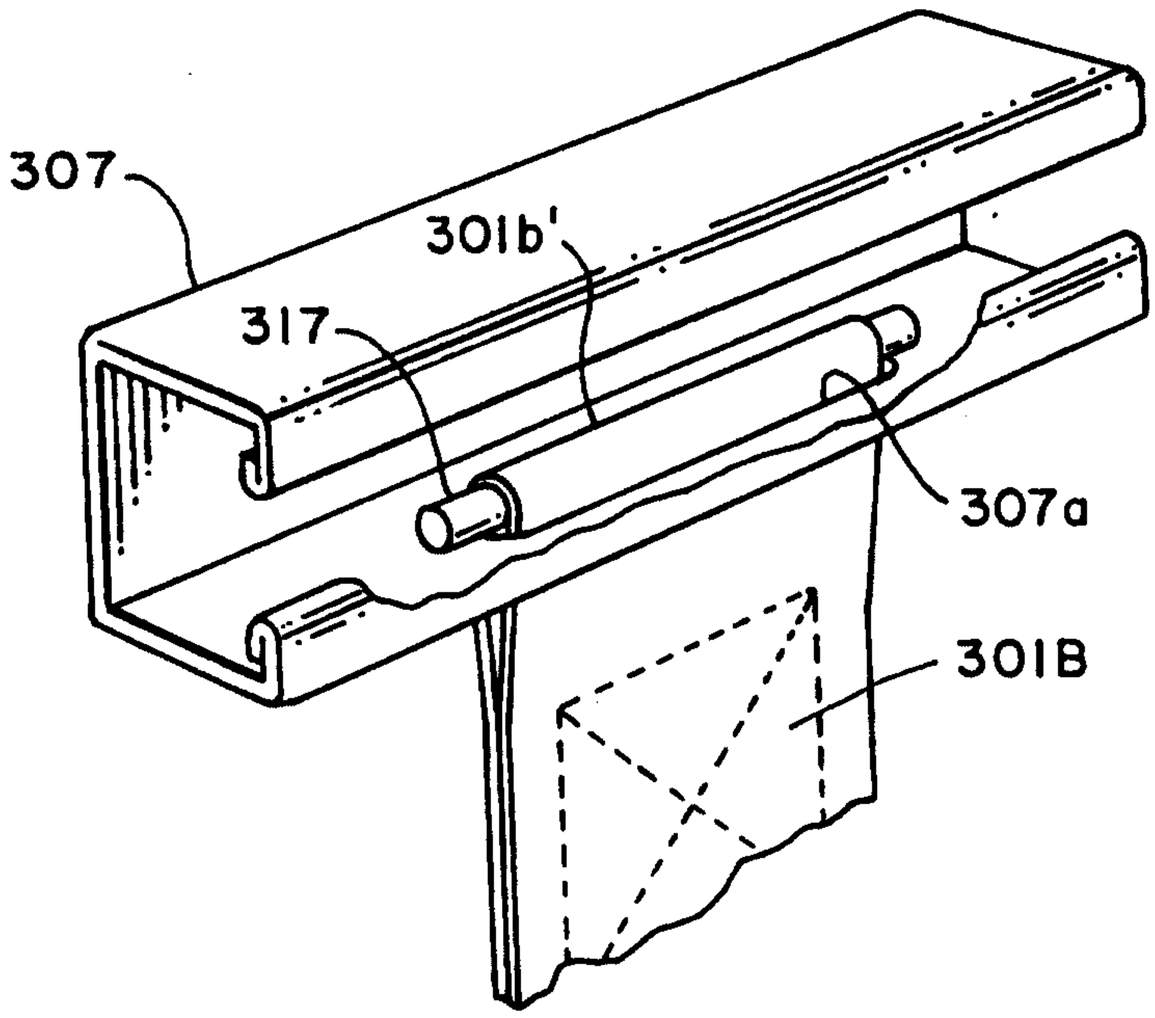

FIG. 14

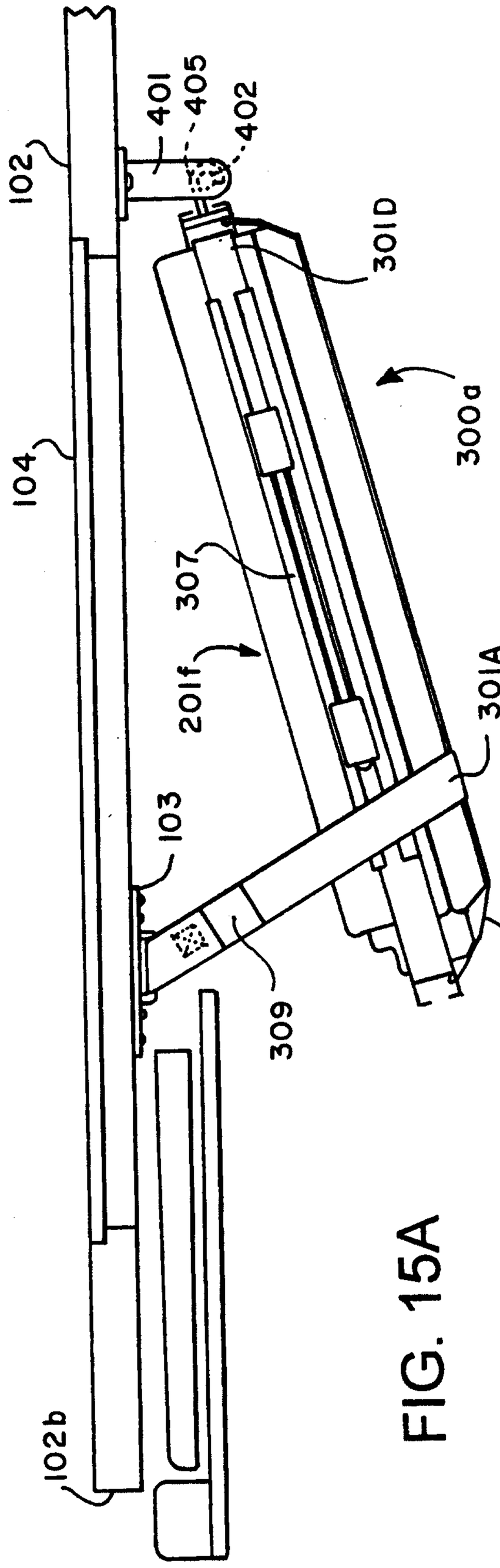

FIG. 15A

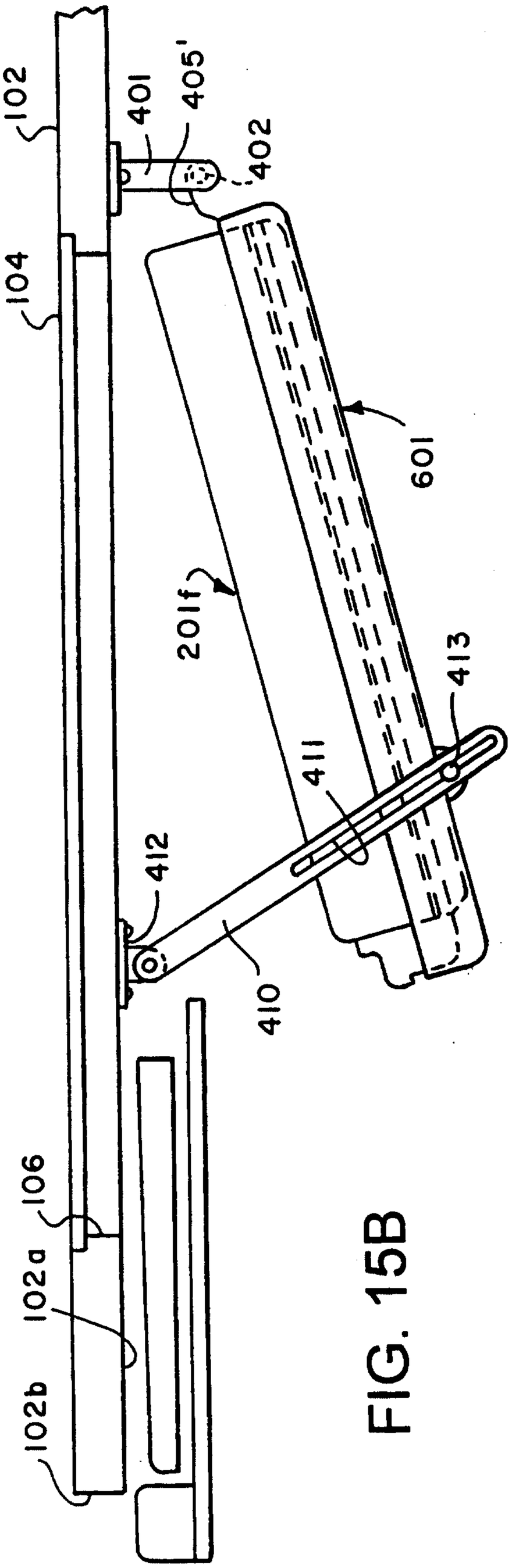

FIG. 15B

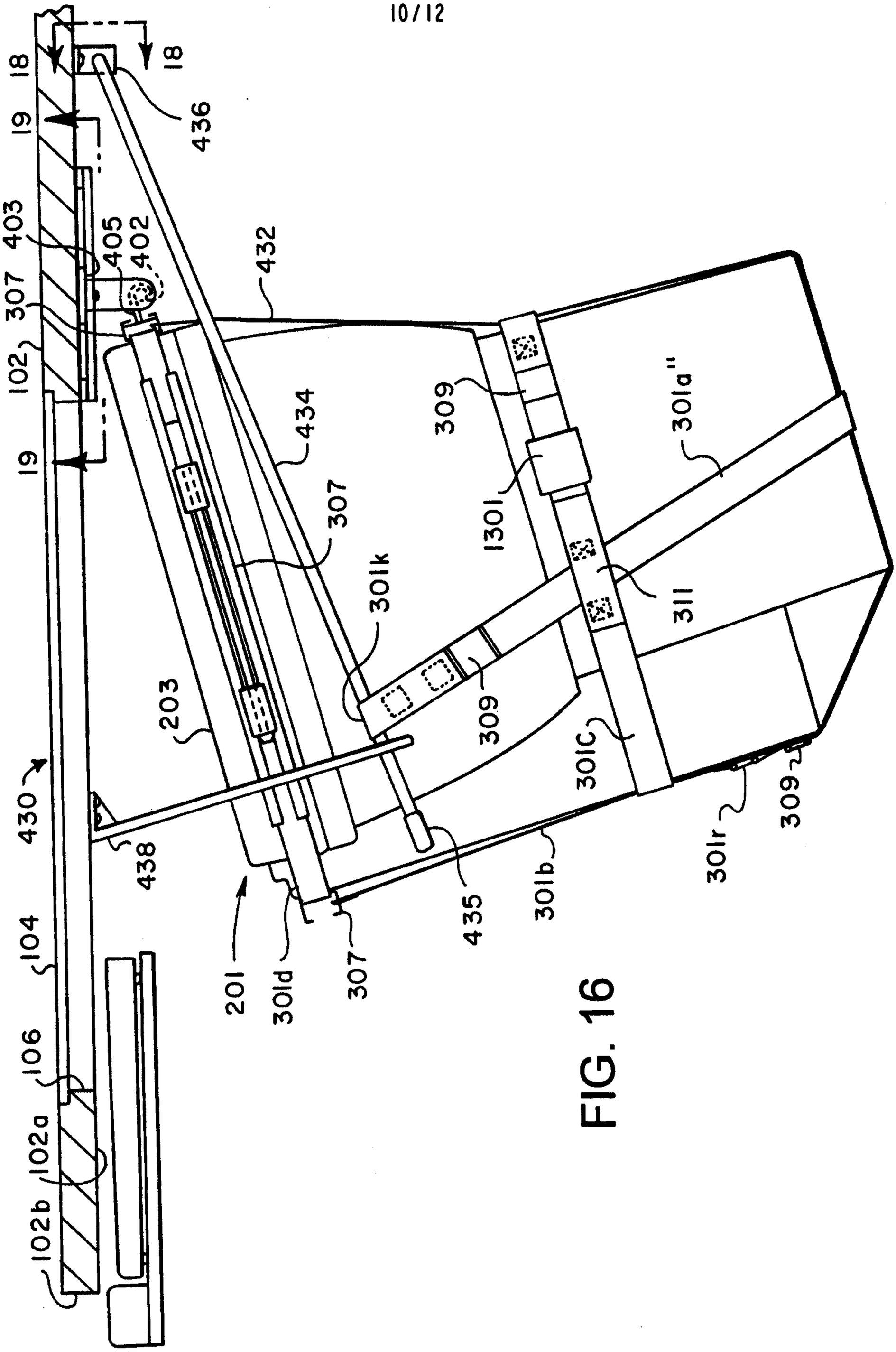
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FIG. 16

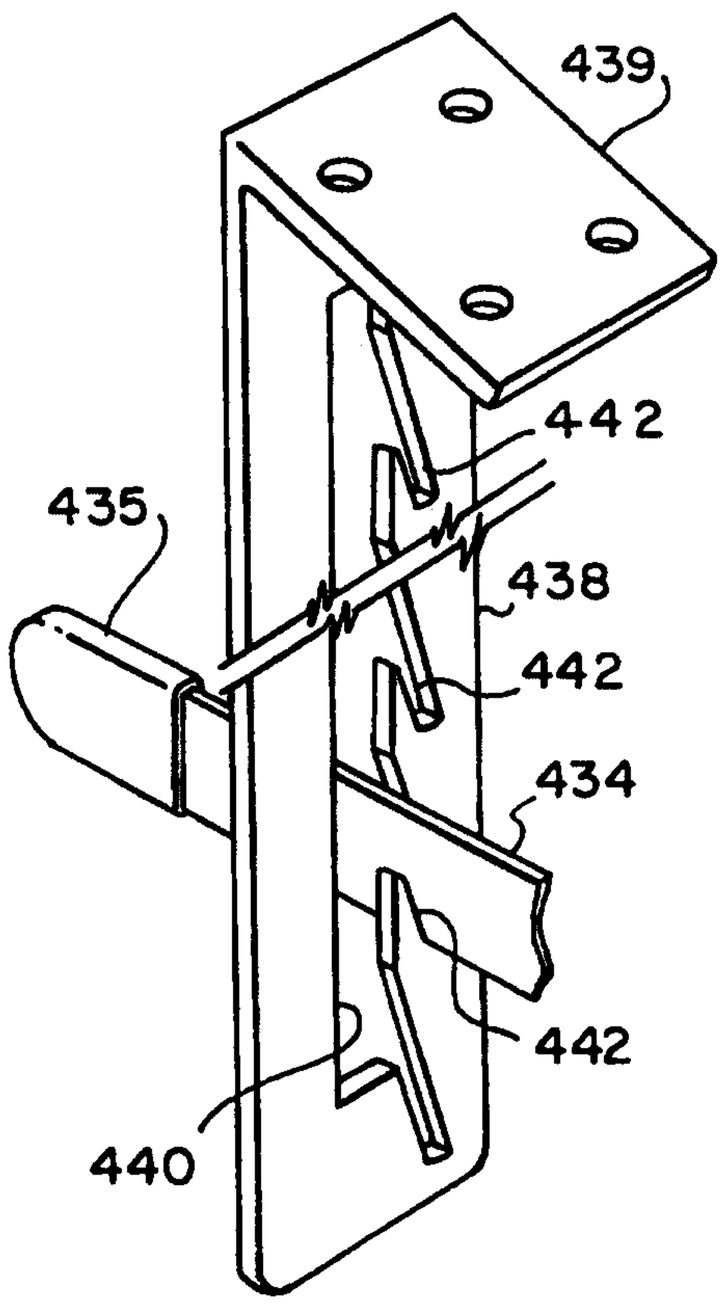

FIG. 17

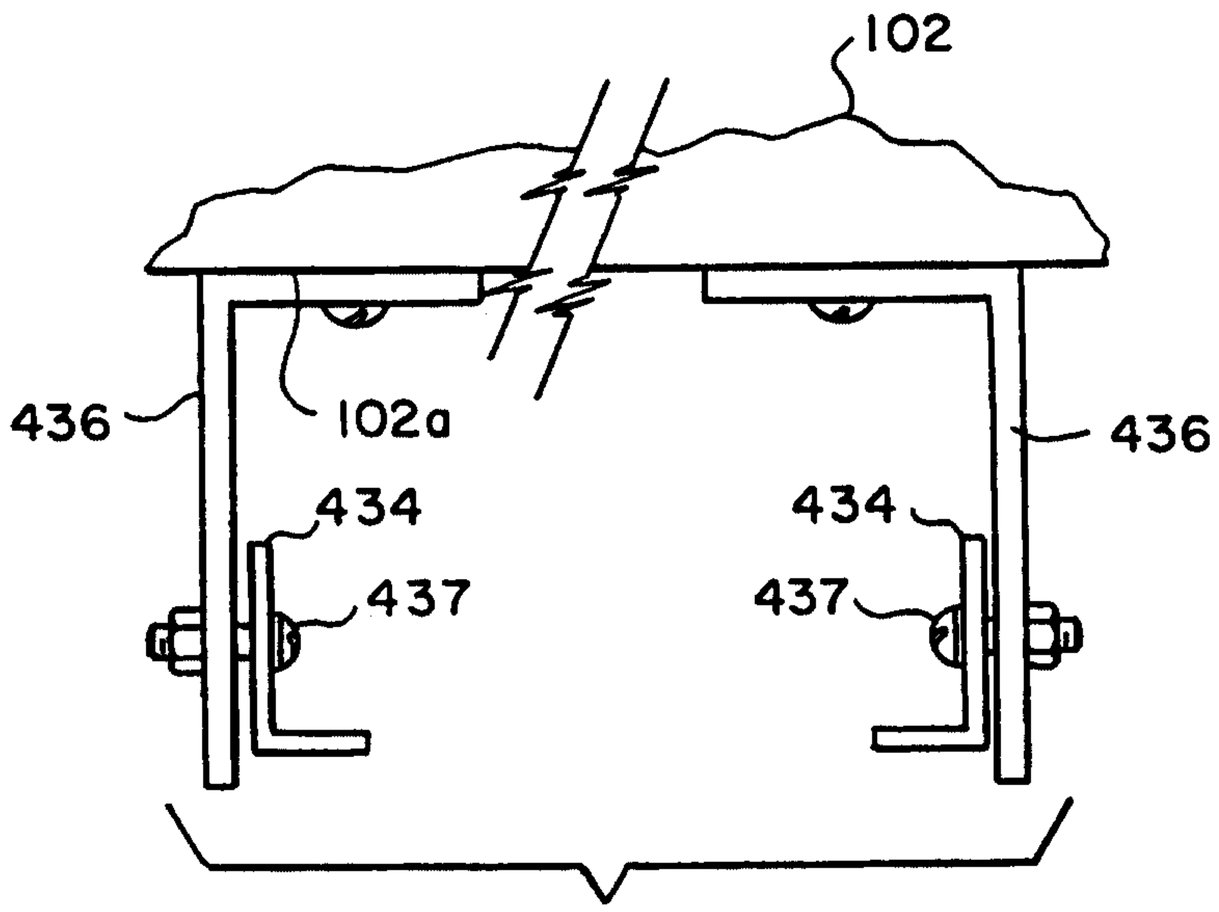

FIG. 18

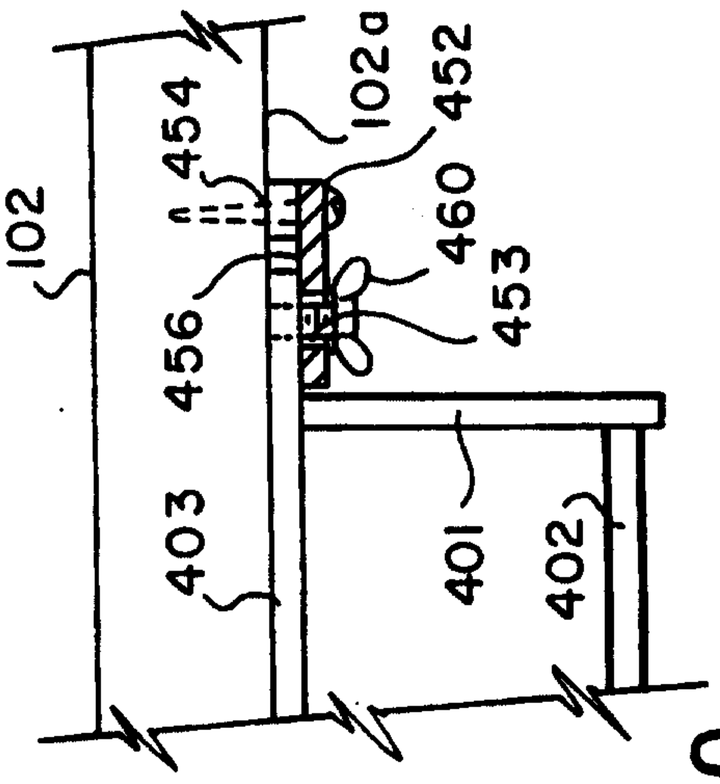
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FIG. 20

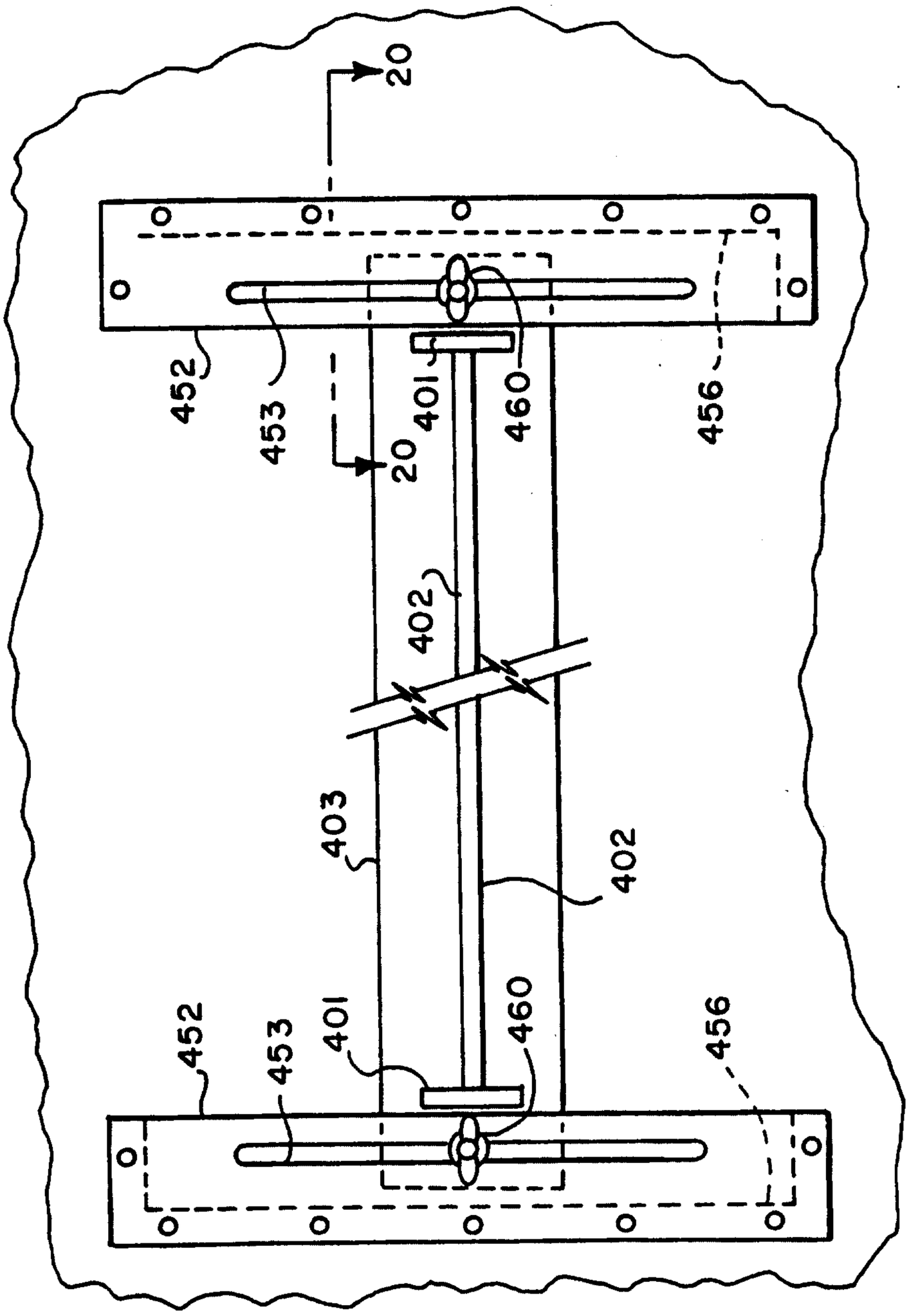
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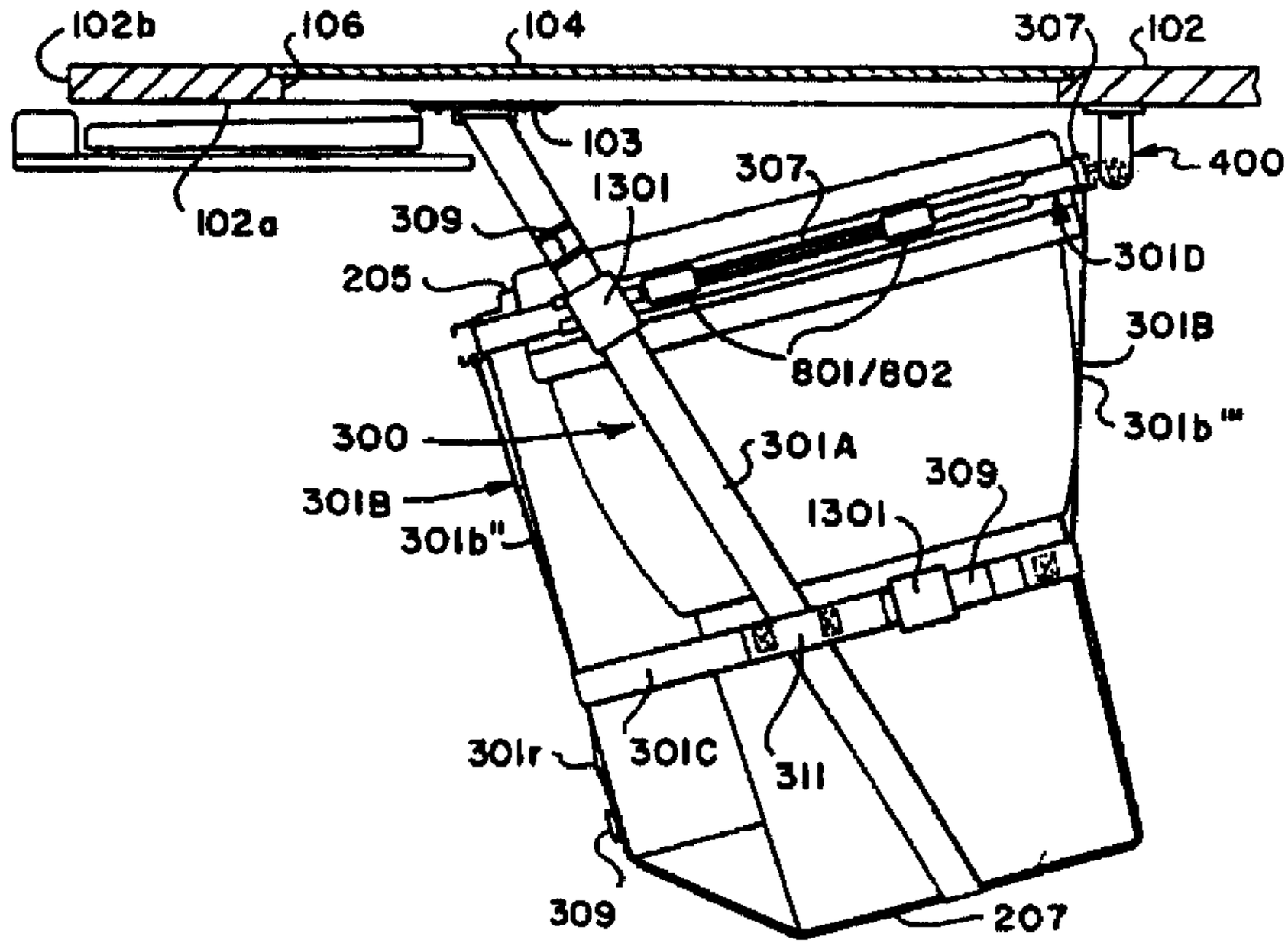
FIG. 19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