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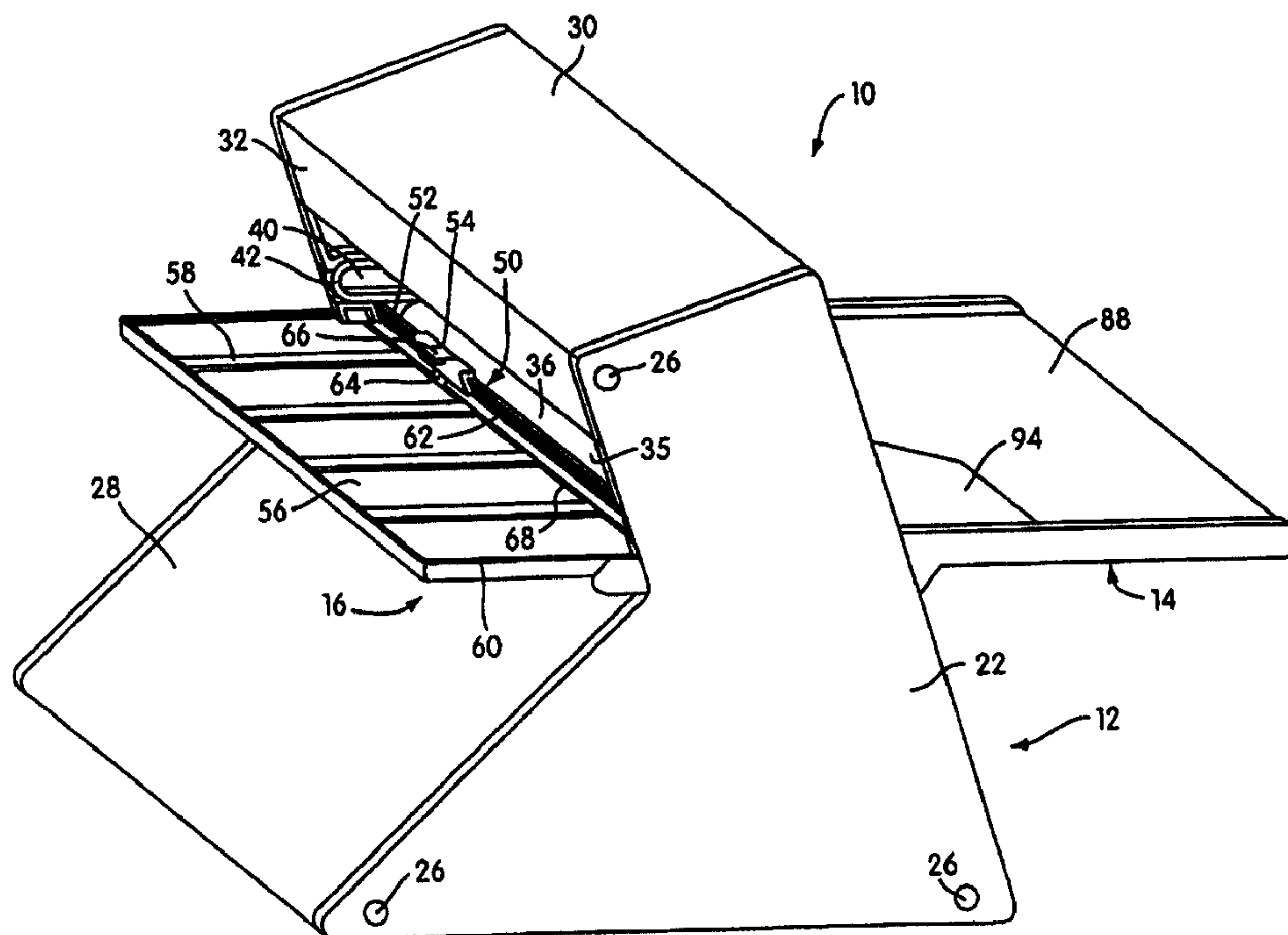
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(54) **MACHINE A PLASTIFIER ET A TRANSFERT PAR ADHESIF
MUNI D'UN PLATEAU DE SORTIE**

(54) **LAMINATING AND ADHESIVE TRANSFER APPARATUS WITH
AN EXIT TRAY**



(57) L'invention concerne une machine à plastifier et à transfert par adhésif qui s'utilise avec une paire de rouleaux d'alimentation amovibles servant à acheminer une matière de base devant être déroulée. La machine (10) comprend un cadre conçu et arrangé pour accueillir des rouleaux d'alimentation amovibles. Une paire de cylindres presseurs rotatifs est montée sur le cadre (12) et délimitent une zone de contact flanquée d'un côté alimentation et d'un côté déchargement. Un mécanisme d'actionnement est conçu et arrangé de manière à influencer sur la rotation des cylindres presseurs. Le cadre (12) est conçu et arrangé de sorte que, lorsque les rouleaux

(57) The present invention relates to a laminating and adhesive transfer apparatus (10) or use with a pair of removable feed rolls. The removable feed rolls carrying a supply of stock material to be unwound. The apparatus comprises a frame (12) constructed and arranged to removably mount the feed rolls. A pair of nip rollers are rotatably mounted to the frame. The nip rollers define a nip area therebetween with a feed side and a discharge side. An actuating mechanism is constructed and arranged to affect nip roller rotation. The frame (12) is constructed and arranged such that, when the feed rolls are removably mounted thereto, a master can be inserted



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d'alimentation y sont montés de manière amovible, une bande-mère puisse être insérée entre les rouleaux d'alimentation. La matière de base est ensuite déroulée depuis chaque rouleau d'alimentation de manière à se déposer sur des côtés opposés de la bande-mère pour que cette dernière et la matière de base puissent ensuite alimenter ensemble le côté alimentation des cylindres presseurs. Les cylindres presseurs sont conçus et arrangés pour exercer sur la bande-mère et la matière de base en cours d'insertion dans le côté alimentation des cylindres presseurs une pression résultant de la rotation des cylindres presseurs, de manière à réaliser un processus de contrecollage ou de transfert par adhésif avec la bande-mère et la matière de base, lesquelles sont ensuite déchargées vers l'extérieur par le côté déchargement. Un plateau de déchargement (16) présente une surface support du substrat positionnée et configurée pour recevoir et soutenir la bande-mère et la matière de base en cours de déchargement depuis les cylindres presseurs, de manière sensiblement plane, pour empêcher ainsi la flexion de la bande-mère et la matière de base traitées.

between the feed rolls, the stock materials can then be unwound from each of feed rolls so as to be disposed on opposing sides of the master, and the master and the stock materials can thereafter be fed together into the feed side of the nip rollers. The nip rollers are constructed and arranged to apply pressure to the master and stock materials being fed into the feed side of the nip rollers as a result of the nip roller rotation so as to perform a laminating or adhesive transfer process to the master and stock materials and subsequently discharge the processed master and stock materials outwardly from the discharge side. An exit tray (16) provides a substrate supporting surface positioned and configured to receive and support the processed master and stock materials being discharged from the nip rollers in a substantially flat relation to thereby prevent downward bending of the processed master and stock materials.



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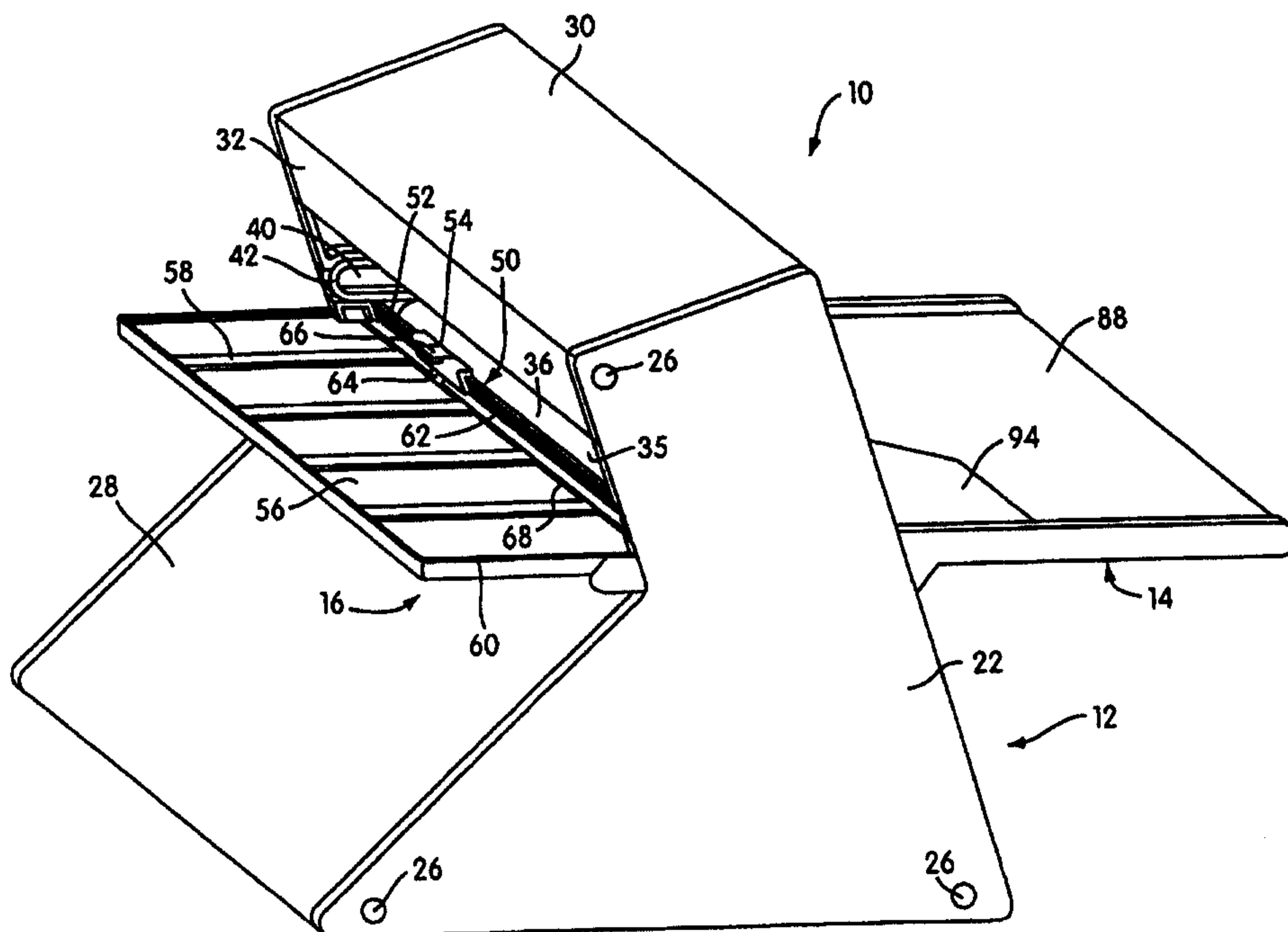
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(21) International Application Number: PCT/US98/23237 (22) International Filing Date: 6 November 1998 (06.11.98) (30) Priority Data: 60/064,629 7 November 1997 (07.11.97) US (71) Applicant: XYRON, INC. [US/US]; 14698 North 78th Way, Scottsdale, AZ 85269 (US). (72) Inventor: PAQUE, Michael, W.; 4905 E. Ranco Tierra Drive, Cave Creek, AZ 85331 (US). (74) Agents: LIPPITT, Raymond, F. et al.; Pillsbury Madison & Sutro, LLP, 1100 New York Avenue, N.W., Washington, DC 20005 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>	

(54) Title: LAMINATING AND ADHESIVE TRANSFER APPARATUS WITH AN EXIT TRAY

(57) Abstract

The present invention relates to a laminating and adhesive transfer apparatus (10) or use with a pair of removable feed rolls. The removable feed rolls carrying a supply of stock material to be unwound. The apparatus comprises a frame (12) constructed and arranged to removably mount the feed rolls. A pair of nip rollers are rotatably mounted to the frame. The nip rollers define a nip area therebetween with a feed side and a discharge side. An actuating mechanism is constructed and arranged to affect nip roller rotation. The frame (12) is constructed and arranged such that, when the feed rolls are removably mounted thereto, a master can be inserted between the feed rolls, the stock materials can then be unwound from each of feed rolls so as to be disposed

on opposing sides of the master, and the master and the stock materials can thereafter be fed together into the feed side of the nip rollers. The nip rollers are constructed and arranged to apply pressure to the master and stock materials being fed into the feed side of the nip rollers as a result of the nip roller rotation so as to perform a laminating or adhesive transfer process to the master and stock materials and subsequently discharge the processed master and stock materials outwardly from the discharge side. An exit tray (16) provides a substrate supporting surface positioned and configured to receive and support the processed master and stock materials being discharged from the nip rollers in a substantially flat relation to thereby prevent downward bending of the processed master and stock materials.



LAMINATING AND ADHESIVE TRANSFER APPARATUS
WITH AN EXIT TRAY

5 The present invention relates to laminating and adhesive transfer apparatuses.

10 It is a common practice to protect documents and other items such as business cards by laminating them in clear plastic coverings. It is also a common practice to make articles such as stickers and labels by a process of adhesive transfer. U.S. Patents Nos. 5,584,962 and 5,580,417 are directed to devices which are capable of performing both laminating and adhesive transfer operations.

15 The laminating or adhesive transfer operation performed by these devices, however, may result in a bending of the finished product because the product is allowed to fall downward as it is discharged from the device. Also, the finished product may be susceptible to curling caused by differences in shrinkage which occur in the manufacturing of substrate layers used to produce the final product. Thus, it can be seen that there is a need for a laminating and adhesive transfer apparatus which supports the finished product of a laminating or adhesive transfer operation in a generally horizontal orientation to prevent such curling or bending.

20 It is therefore an object of the present invention to meet the above-mentioned need. In order to achieve this object, there is provided a laminating and adhesive transfer apparatus for use with a pair of removable feed rolls. The removable feed rolls carrying a supply of stock material to be unwound. The apparatus comprises a frame constructed and arranged to removably mount the feed rolls. A pair of nip rollers are rotatably mounted to the frame. The nip rollers define a nip area therebetween with a feed side and a discharge side. An actuating mechanism is constructed and arranged to affect nip roller rotation. The frame is constructed and arranged such that, when the feed rolls are removably mounted thereto, a master can be inserted between the feed rolls, the stock materials can then be unwound from each of feed rolls so as to be disposed on opposing sides of the master, and the master

and the stock materials can thereafter be fed together into the feed side of the nip rollers. The nip rollers are constructed and arranged to apply pressure to the master and stock materials being fed into the feed side of the nip rollers so as to perform a laminating or adhesive transfer process to the master and stock materials and subsequently discharge the processed master and stock materials outwardly from the discharge side. An exit tray provides a substrate supporting surface positioned and configured to receive and support the processed master and stock materials being discharged from the nip rollers in a substantially flat relation to thereby prevent downward bending of the processed master and stock materials.

It is also advantageous to sever the master and stock materials being discharged from the rollers. To this end, the present invention further provides a cutting assembly disposed on the discharge side of the nip rollers. The cutting assembly is positioned and configured to cut transversely through the processed master and stock materials being supported in substantially flat relation on the exit tray so as to separate a portion of the processed master and stock materials from the portion being discharged from the nip rollers. Preferably, the cutting assembly comprises a blade mounted for transverse cutting movement in a transverse direction of the tray and the tray comprises a groove formed in the substrate supporting surface and extending in the transverse direction. The blade is mounted such that a portion thereof extends into the groove and below the supporting surface, thereby enabling the blade to cut through an entire thickness of the processed master and stock materials during the transverse cutting movement.

Another aspect of the present invention relates to a cutting assembly for severing the finished product. In the apparatuses of the '417 and '962 patents, the cutting blade is mounted on a pivoting arm. Manual movement pivots the arm to move the blade into engagement with an anvil. Although this arrangement does provide a cutting function, when the blade becomes dull it may not cut effectively through the entire product thickness, thus requiring second or third cutting movements.

It is therefore an object of the present invention to provide a laminating and adhesive transfer apparatus with a cutting assembly configured to ensure that the entire thickness of the finished product is cut in one cutting stroke. In order to achieve this object, the present invention provides a laminating and adhesive transfer apparatus for use with a pair of removable feed rolls. The removable feed rolls carry a supply of stock material to be unwound. The apparatus comprises a frame constructed and arranged to removably mount the feed rolls. A pair of nip rollers are rotatably mounted to the frame. The nip rollers define a nip area therebetween with a feed side and a discharge side. An actuating mechanism is constructed and arranged to affect nip roller rotation. The frame is constructed and arranged such that, when the feed rolls are removably mounted thereto, a master can be inserted between the feed rolls, the stock materials can then be unwound from each of the feed rolls so as to be disposed on opposing sides of the master, and the master and the stock materials can thereafter be fed together into the feed side of the nip rollers. The nip rollers are constructed and arranged to apply pressure to the master and the stock materials being fed into the feed side of the nip rollers so as to perform a laminating or adhesive transfer process to the master and stock materials and subsequently discharge the processed master and stock materials outwardly from the discharge side. A substrate supporting surface is positioned and configured to receive and support a portion of the processed master and stock materials being discharged from the nip rollers. A cutting assembly is disposed on the discharge side of the nip rollers. The cutting assembly is constructed and arranged to be moved in a transverse direction so as to cut through the processed master and stock materials being supported on the surface. The cutting assembly has a blade with a portion thereof extending downwardly below the supporting surface. The downward extent of the blade portion enables the blade to cut through an entire thickness of the processed master and stock materials during the aforesaid transverse cutting movement.

Other objects, advantages, and features will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

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BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a laminating and adhesive transfer apparatus embodying the principles of the present invention.

10 Figure 2 is a front plan view of the laminating and adhesive transfer apparatus shown in Figure 1.

Figure 3 is a sectional view along line 3-3 of Figure 2.

Figure 4 is a top plan view of an exit tray assembly used in conjunction with a laminating and adhesive transfer apparatus embodying the principles of the present invention.

15 Figure 5 is a profile view of the exit tray assembly shown in Figure 4.

Figure 6 is a profile view of a supply cartridge used in conjunction with a laminating and adhesive transfer apparatus embodying the principles of the present invention.

20 Figure 7 is a profile view of a laminating and adhesive transfer apparatus embodying the principles of the present invention with a supply cartridge for supplying a roll of substrate material mounted therein and having a transparent side wall to illustrate the interior of the apparatus.

Figure 8 is a sectional view along line 8-8 of Figure 2.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Figure 1 illustrates a laminating and adhesive transfer apparatus, generally indicated at 10, embodying the principles of the present invention.
30 The apparatus 10 comprises a frame assembly, generally indicated at 12, a feed tray assembly, generally indicated at 14, and an exit tray assembly, generally indicated at 16. As best shown in Figures 3 and 7, the laminating

and adhesive transfer apparatus 10 also includes a set of nip rollers, generally indicated at 18, designed to engage each other in a rolling relation and feed layers of substrate or film through the laminating and adhesive transfer apparatus 10 and exert pressure on the layers.

5 The frame assembly 12 includes a metal base plate 20, as best shown in Figures 3 and 7, and a pair of generally vertical side walls 22 made of plastic which are disposed parallel to one another and extend upward in a generally vertical direction. The generally vertical side walls 22 are connected to one another by three steel rods 24 as best shown in Figure 3. The steel rods extend
10 transversely across the laminating and adhesive transfer apparatus 10 and are fixed to each of the side walls by screws 26 which are inserted through apertures in the side walls 22 corresponding to the location of the steel rods 24.

The frame assembly 12 also includes a plastic back cover 28. The back
15 cover 28 extends transversely across the laminating and adhesive transfer apparatus 10 between the vertical side walls 22 and extends upwardly and inwardly from the left edge of the base plate 20 as viewed in Figure 3. A top cover 30 constructed of plastic extends transversely between the side walls 22 extends across the length of the top edges of the side walls 22. A portion 32 of
20 the top cover 30 also extends downwardly and inwardly from the left side of the top edges of the side walls 22 as viewed in Figure 3.

The front side of the laminating and adhesive transfer apparatus 10 has an opening 33 configured so that it may receive a cartridge containing a supply roll of adhesive web material or laminate film and a feed tray
25 assembly 14, each of which shall be discussed below. As shown in Fig. 1, the rear side of the laminating and adhesive transfer apparatus 10 also has a discharge opening 35 between the downwardly and inwardly extending portion 32 of the top cover 30 and the upper edge of the back cover 28.

On the interior of each side wall 22 is an upwardly facing U-shaped nip
30 roller receiving slot 34 as best seen in Figure 8. The U-shaped slot 34 is designed to rotatably receive axles 75, 77 of an upper roller 36 and a lower roller 38 which extend transversely between the side frame walls 22 and

comprise the set of rollers 18. The upper and lower rollers 36, 38 are disposed one above another with their respective axles 75, 77 retained in the U-shaped slot 34.

5 Spring slots 40 defined by inwardly projecting ribs on each of the side walls 22, as best shown in Figure 3, extend inwardly from the discharge opening 35 in the rear side of the apparatus 10. Each spring slot 40 extends inwardly to the U-shaped slot 34. A U-shaped spring 42 is snugly fit into each spring slot 40 such that the legs of the U-shaped spring 42 extend away from the discharge opening 35 in the rear of the apparatus 10 and across the top of the upwardly facing U-shaped slot 34. By extending across the top of the U-shaped slots 34, each U-shaped spring 42 contacts the uppermost portions of the axles 75 of the upper roller 36, as best shown in Fig. 8, and applies pressure thereto, thereby retaining the set of rollers 18 in the upwardly facing U-shaped slots 34.

15 An upwardly facing generally rectangular slot 44 as shown in Fig. 3 extends downwardly from the spring slot 40 at a position immediately inward from the discharge opening 35 on each of the side walls 22. An exit tray assembly 16 as shown in Figures 4 and 5 has a set of mounting tabs 46 extending outwardly therefrom adjacent a tapered forward edge 48. The mounting tabs 46 are configured to be received in the generally rectangular exit tray receiving slot 44 on each side wall 22. A cutting assembly 50 includes a steel cutter bar 52 and a slidable blade mounting structure 54 slidably mounted on the cutter bar 52. The cutter bar 52 is also configured to be received in the generally rectangular slot 44. The generally rectangular slot 25 44 opens upwardly to the spring slot 40 such that when the U-shaped spring 42 is mounted in the spring slot 40 of each side wall 22 the bottom leg of the U-shaped spring 42 contacts the cutter bar 52, thereby retaining and mounting the cutting assembly 50 and the exit tray assembly 16 in the laminating and adhesive transfer apparatus 10.

30 The exit tray assembly 16 is constructed of plastic and has a generally rectangular substrate supporting surface 56 with a plurality of generally parallel ridges 58 thereon extending longitudinally away from the nip rollers.

A lip 60 having the same height as the aforementioned ridges 58 extends around the periphery of the exit tray assembly 16 on three sides. The supporting surface 56 of the exit tray assembly 16 is textured. The tapered forward edge 48 of the exit tray assembly 16 extends inwardly into the discharge opening 35 and is disposed immediately adjacent the discharge side of the nip area defined at the point where the upper and lower rollers 36, 38 meet.

The exit tray assembly 16 is configured to receive a finished product of a laminating or adhesive transfer operation performed by the apparatus 10. As the finished product is fed through the set of rollers 18, the exit tray assembly 16 receives and supports the finished product in a generally horizontal orientation. The ridges 58 support the finished product slightly above the surface 56. By supporting the finished product in a generally horizontal orientation, the exit tray assembly 16 enhances the laminating or adhesive transfer process by preventing the finished product from falling downward and bending or curling due to a shrinkage differential which occurs in the manufacturing of the substrate layers used to make the finished product. By eliminating bending or curling of the finished product, the exit tray assembly 16, in conjunction with the laminating and adhesive transfer apparatus 10, provides a straighter and flatter finished product which is generally more desirable than a bent or curled finished product.

As can be seen from this description, the use of the exit tray assembly 16 is not limited to the particular laminating and adhesive transfer apparatus 10 described herein. It can be seen that an exit tray assembly 16 embodying the principles of the present invention may be used with other laminating and adhesive transfer devices such as those disclosed in U.S. Patents Nos. 5,584,962 and 5,580,417, both of which are hereby incorporated into the present application by reference.

As shown in Figures 1 and 2, the cutter bar 52 extends transversely between the side walls 22. A groove 62, best seen in Figs. 1 and 2, extends along the length of the cutter bar 52 and is configured to engage the slidable blade mounting structure 54. A blade 64 extends downwardly from the blade

mounting structure 54. A tab (not shown) extends inwardly from the blade mounting structure 54 and is inserted through a hole (not shown) formed at the top of the blade 64 and is slidably engaged in the groove 62. The slidable blade mounting structure 54 has a front side, a back side, and a top side which are formed together continuously and open downwardly to fit over the upper edge of the cutter bar 52 as shown in Fig. 1 with the aforementioned tab slidably engaged in the groove 62. A tab 66 extends outwardly from the slidable blade mounting structure 54 to facilitate operation of the cutting assembly 50. Thus, the slidable blade mounting structure 54 can be slid transversely with respect to the apparatus 10 along the length of the cutter bar 52 between the side walls 22.

As best shown in Figs. 1, 3, 5, and 7, a groove 68 is formed on the exit tray assembly 16 immediately to the rear of the forward tapered edge 48. The groove 68 extends transversely across the surface 56 of the exit tray assembly 16. The groove 68 is configured such that the blade 64 of the cutting assembly 50 extends downward and a portion thereof is received in the groove 68. The cutting assembly 50, in conjunction with the groove 68 on the exit tray assembly 16, enhances cutting of the finished product by enabling the blade 64 to cut through the entire finished product by configuring the cutter assembly 50 such that the blade 64 extends downward into the groove 68 and extends below the upper surface 56 of the exit tray assembly 16. Additionally, by supporting the finished product in a generally horizontal orientation, the exit tray assembly 16 also enhances cutting of the finished product by insuring that the severed edge of the product is straight rather than angled, as it would be if the product were allowed to curl or bend.

Referring to Fig. 3, the upper and lower rollers 36, 38 each include an elongated steel shaft 70, 72 and a rubber outer cover 74, 76 extending the length of the shaft 70, 72. As best shown in Fig. 7, each shaft 70, 72 has axles 75, 77 extending axially with respect to the shaft 70, 72 from opposite ends. Bushings 71, 73 fit on the ends of the axles 75, 77. These bushings 71, 73 are configured to be snugly fit in the upwardly facing U-shaped slot 34, thereby

allowing the set of rollers 18 to be rotatably mounted in the upwardly facing U-shaped slot 34 as discussed above.

As is best seen in Figures 2 and 7, the laminating and adhesive transfer apparatus 10 also includes a crank handle 78. The crank handle has a shaft 80 which extends inwardly through side wall 22 to the interior of the apparatus 10 and is disposed within the upwardly facing U-shaped slot 34. Although not shown, the end of the shaft 80 disposed within the upwardly facing U-shaped slot 34 is threaded. The axle 77 of the lower roller 38 has a threaded bore (not shown) which is configured to receive the threaded end of the shaft 80 of the crank handle 78, thereby operatively connecting the crank handle 78 to the lower roller 38.

The axle 77 of the lower roller 38 opposite the crank handle 78 is knurled such that a set of axially extending grooves (not shown) are disposed about the circumference of the axle 77 immediately adjacent the aforementioned bushing 73. The knurled portion of the axle 77 is configured to fixedly receive a pinion gear 81 thereon. Likewise, the axle 75 of the upper roller 36 is knurled such that a set of axially extending grooves (not shown) are disposed about the circumference of the axle 75 immediately adjacent the aforementioned bushing 71. A pinion gear 82 is fixedly mounted upon the knurled portion of the axle 75 of the upper roller 36. The pinion gear 81 of the lower roller 38 and the pinion gear 82 of the upper roller 36 are constructed and arranged to engage one another such that manually operating the crank handle 78 rotates both the upper and lower rollers 36, 38. The rollers 36, 38 rotate in opposite directions with respect to one another thereby allowing layers of substrate or film to be fed into the nip area of the rollers 36, 38 and fed through the rollers 36, 38 as the crank handle 78 is turned. It is also contemplated that the set of rollers 18 may be driven by an electric motor or other similar powered actuating means rather than by manual operation of the crank handle 78.

The feed tray assembly 14 has a planar upper surface 88 and projections 90 extending outwardly from each side. The outwardly extending projections 90 are removably insertable in slots 92 formed on the forward

edge of the side walls 22. The feed tray assembly 14 also has a wiper bar 94 which extends transversely across the planar upper surface 88 of the feed tray assembly 14. The wiper bar 94 is pivotally mounted to the sides of the feed tray assembly 14 by projections 96 which are removably inserted into slots 98
5 formed in the side walls of the feed tray assembly 14. As a master is fed into the nip area of the set of rollers 18, the wiper bar 94 lightly engages the master as it passes between the wiper bar 94 and the upper planar surface 88 of the feed tray assembly 14. The wiper bar 94 serves several functions and cleans, smoothes, and guides the master as it enters the nip area between the rollers
10 36, 38. A particularly important function of the wiper bar 94 is to tension the master and keep it flat and aligned with the laminate or adhesive webs resulting in better alignment, especially when feeding the masters intermittently.

It is contemplated that in the present invention, various substrates may
15 be provided to the user in a self contained, ready-to-use cartridge 100 which allows the user simply to select and insert the appropriate cartridge. As indicated above, the apparatus of the present invention can be used for multiple purposes including both adhesive transfer and lamination. The cartridge is generally indicated at 100 and includes a frame having opposite
20 side walls 102, a top wall 106, a bottom wall 108, and a front wall 110 having a substantial rectangular opening 112. As shown in Fig. 6, the cartridge 100 includes an upper feed roll 116 and lower feed roll 118 each containing a roll of film or other flexible substrate material. The upper and lower feed rolls 116, 118 may be pretensioned by the means disclosed in U.S. Patent 5,580,417.

25 Thus, it will be seen that inserting a supply of suitable feed substrate is easily accomplished. The user simply selects the appropriate cartridge 100 and positions the cartridge 100 in the opening 33 of the front side of the apparatus 10. The cartridge 100 has outwardly extending projections 120 on each side wall 102 which are slidably received in a set of inwardly projecting
30 guiding ribs 122 on each of the side walls 22 of the apparatus 10. The side walls 102 of the cartridge 100 contact circular projections 124, 126 which extend inwardly from each of the side walls 22. As can be seen from Figure 7,

the inwardly extending circular projections 124, 126 and the guiding ribs 122 support the cartridge 100 inside the laminating and adhesive transfer apparatus 10.

As shown in Fig. 7, the feed tray assembly 14 is inserted in a generally horizontal position extending through the opening 112 formed in the front wall 110 of the cartridge 100 with the projections 90 removably inserted in the slots 92 on the side walls 22. The master is aligned on the upper surface 88 of the feed tray assembly 14 with the leading free edge of the master positioned between the inner surfaces of the materials supplied by the lower feed roll 118 and the upper feed roll 116 of the cartridge 100. The master, the feed materials supplied by the upper supply feed roll 116, and the materials supplied by the lower feed roll 118 are fed into the nip area of the set of rollers 18. The operator then actuates the machine by operating the crank handle 78 which rotates the lower roller 36 and the upper roller 38 as discussed above. The master is smoothed, guided, and wiped clean as it passes between the wiper bar 94 and the upper surface 88 of the feed tray assembly 14. The master proceeds between the set of rollers 18 and the finished product is fed to the tapered forward edge 48 of the exit tray assembly 16. The exit tray assembly 16 supports the finished product in a generally horizontal orientation to preventing curling and bending of the finished product as discussed above. When it is desired to cut the finished product, the blade mounting structure 54 may be slid transversely across the cutter bar 52 such that the blade 64 is moved transversely within the groove 68 and cuts through the entire thickness of the finished product in one pass.

By way of example, the lower feed roller 118 may comprise a flexible film with an adhesive coating. The upper feed roller 116 comprises a supply of film which has an affinity for adhesive. The upper and lower films are fed between the set of rollers 18. The feed tray assembly 14 is placed in position and a pre-printed master such as a master containing labels repetitively printed on a sheet can be fed via the feed tray assembly 14 to the nip area of the set of rollers 18 between the upper planar surface 88 and the wiper bar 94. Adhesive will be transferred from the bottom film to the labels with the

excessive adhesive being picked up by the top film. The labels are now provided with an adhesive and are attached to the lower film and may be severed from one another by the cutter assembly 50 at the discharge opening 35. The labels may then be peeled from the film substrate when desired.

5 While the principles of the invention have been made clear in the illustrative embodiments set forth above, it will be obvious to those skilled in the art to make various modifications to the structure, arrangement, proportion, elements, materials, and components used in the practice of the invention.

10 Any U.S. Patents or patent applications mentioned herein above and not specifically incorporated by reference are hereby incorporated into the present application by reference.

15 It should be noted that the use of claim language in the "means for performing a specified function" format of 35 U.S.C. §112, paragraph 6, has been omitted from the appended claims. This is to make clear that the applicant does not intend the appended claims to be interpreted under §112, paragraph 6, so as to be limited solely to the structures disclosed in the specification or their structural equivalents.

WHAT IS CLAIMED IS:

1. A laminating and adhesive transfer apparatus for use with a pair of removable feed rolls, the removable feed rolls carrying a supply of stock material to be unwound, at least one of the stock materials being coated with a layer of pressure-sensitive adhesive, said apparatus comprising:
- 5 a frame constructed and arranged to removably mount the feed rolls;
a pair of nip rollers rotatably mounted to said frame, said nip rollers defining a nip area therebetween with a feed side and a discharge side;
- 10 an actuating mechanism constructed and arranged to affect nip roller rotation;
- said frame being constructed and arranged such that, when the feed rolls are removably mounted thereto, a master can be inserted between the feed rolls, the stock materials can then be unwound from each of feed rolls so as to be disposed on opposing sides of the master, and the master and the stock materials can thereafter be fed together into the feed side of the nip rollers;
- 15 said nip rollers being constructed and arranged to (a) apply pressure to the master and stock materials being fed into the feed side of the nip rollers as a result of said nip roller rotation so as to perform a laminating or adhesive transfer process wherein adhesive bonding is caused between the layer of pressure-sensitive adhesive and the master and stock materials and (b) subsequently discharge the processed master and stock materials outwardly from said discharge side thereof and then outwardly from said frame; and
- 20 an exit tray providing a substrate supporting surface that extends outwardly from said frame adjacent said discharge side of said nip rollers, said exit tray being positioned and configured such that said substrate supporting surface receives and supports the processed master and stock materials being discharged from the nip rollers in a substantially flat relation outside of said frame to thereby prevent downward bending of the processed master and stock materials as they are discharged outwardly from said nip rollers and then said frame.
- 25
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2. A laminating and adhesive transfer apparatus according to claim 1, wherein said substrate supporting surface has a plurality of generally parallel ridges extending longitudinally away from said nip rollers, said
5 ridges being configured to support the processed master and stock materials in spaced apart relation to the portions of said surface extending between said ridges.

3. A laminating and adhesive transfer apparatus according to
10 claim 2, wherein said exit tray is plastic.

4. A laminating and adhesive transfer apparatus according to claim 1, wherein said exit tray has a tapered edge extending into the
15 discharge side of said nip area.

5. A laminating and adhesive transfer apparatus according to claim 1, further comprising a feed tray disposed adjacent said feed side of said nip rollers, said feed tray providing a master supporting surface positioned and configured to guide and support the master as it is being fed into said nip
20 rollers.

6. A laminating and adhesive transfer apparatus according to claim 5, wherein said feed tray includes a wiper bar positioned and configured to engage an upwardly facing surface of the master on the master
25 supporting surface so as to wipe debris from the upwardly facing surface and smooth the master as it is being fed into said nip rollers.

7. A laminating and adhesive transfer apparatus according to claim 5, wherein said actuator is a manually rotatable crank handle disposed
30 exteriorly of said frame, said crank handle being operatively connected to said nip rollers such that manual rotation of said crank handle affects said nip roller rotation.

8. A laminating and adhesive transfer apparatus according to claim 7, wherein said crank handle is directly connected to one of said nip rollers.

5

9. A laminating and adhesive transfer apparatus according to claim 8, wherein said crank handle is threadingly engaged with an axle of said one nip roller such that both said crank handle and said one nip roller rotate coaxially.

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10. A laminating and adhesive transfer apparatus according to claim 7, wherein said nip rollers are covered by rubber sleeves.

11. A laminating and adhesive transfer apparatus according to claim 7, wherein said frame comprises a pair of opposing side walls, each of said side walls having a generally vertically extending nip roller receiving slot on an interior surface thereof, said slots being positioned and configured such that axles extending from opposing ends of both said nip rollers are inserted into said slots to rotatably mount said nip rollers to said frame,

20 said apparatus further comprising a pair of springs being removably mounted to said frame adjacent said slots and being positioned and configured to engage the axles of an upper one of said rotatably mounted nip rollers to thereby removably maintain said nip rollers in said slots.

25 12. A laminating and adhesive transfer apparatus according to claim 11, wherein said springs are U-shaped with one leg thereof engaging an axle of said upper one of said nip rollers.

30 13. A laminating and adhesive transfer apparatus according to claim 12, wherein each of said frame side walls have exit tray receiving slots on said interior surfaces thereof,

said exit tray having a pair of generally outwardly extending mounting tabs positioned and configured to be removably received in said exit tray receiving slots.

5 14. A laminating and adhesive transfer apparatus according to claim 1, further comprising a cutting assembly disposed on said discharge side of said nip rollers,

 said cutting assembly being positioned and configured to cut transversely through the processed master and stock materials being supported in substantially flat relation on said exit tray so as to separate a portion of the processed master and stock materials from the portion being discharged from said nip rollers.

 15. A laminating and adhesive transfer apparatus according to claim 14, wherein said cutting assembly comprises a blade mounted for transverse cutting movement in a transverse direction of said tray.

 16. A laminating and adhesive transfer apparatus according to claim 15, wherein said exit tray comprises a groove formed in said substrate supporting surface and extending in said transverse direction,

 said blade being mounted such that a portion thereof extends into said groove and below said supporting surface, thereby enabling said blade to cut through an entire thickness of the processed master and stock materials during said transverse cutting movement.

 17. A laminating and adhesive transfer apparatus according to claim 16, wherein said cutting assembly further comprises a transversely extending cutter bar, said blade being mounted for sliding movement along said cutter bar.

 18. A laminating and adhesive transfer apparatus according to claim 17, wherein said cutting assembly comprises a blade mounting

structure, said blade mounting structure being slidably mounted on said cutter bar and said blade being removably mounted to said mounting structure, the removable mounting of said blade enabling replacement of said blade when said blade becomes dull.

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19. A laminating and adhesive transfer apparatus according to claim 18, wherein said cutter bar has a groove extending in said transverse direction and said blade mounting structure has a mounting tab,

10 said blade being removably mounted by removably inserting said mounting tab through a hole in said blade and removably mounting said mounting structure on said cutter bar such that said mounting tab extends through said blade hole and into said groove.

20. A laminating and adhesive transfer apparatus according to claim 18, wherein said substrate supporting surface has a plurality of generally parallel ridges extending longitudinally away from said nip rollers, said ridges being configured to support the processed master and stock materials in spaced apart relation to the portions of said planar surface extending between said ridges.

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21. A laminating and adhesive transfer apparatus according to claim 20, wherein said exit tray is plastic.

22. A laminating and adhesive transfer apparatus according to claim 18, wherein said exit tray has a tapered edge extending into the discharge side of said nip area.

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23. A laminating and adhesive transfer apparatus according to claim 18, further comprising a feed tray disposed adjacent said feed side of said nip rollers, said feed tray providing a master supporting surface positioned and configured to guide and support the master as it is being fed into said nip rollers.

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24. A laminating and adhesive transfer apparatus according to claim 23, wherein said feed tray includes a wiper bar positioned and configured to engage an upwardly facing surface of the master on said master supporting surface so as to wipe debris from the upwardly facing surface and smooth the master as it is being fed into said nip rollers.

25. A laminating and adhesive transfer apparatus according to claim 23, wherein said actuator is a manually rotatable crank handle disposed exteriorly of said frame, said crank handle being operatively connected to said nip rollers such that manual rotation of said crank handle affects said nip roller rotation.

26. A laminating and adhesive transfer apparatus according to claim 25, wherein said crank handle is directly connected to one of said nip rollers.

27. A laminating and adhesive transfer apparatus according to claim 26, wherein said crank handle is threadingly engaged with an axle of said one nip roller such that both said crank handle and said one nip roller rotate coaxially.

28. A laminating and adhesive transfer apparatus according to claim 25, wherein said nip rollers are covered by rubber sleeves.

29. A laminating and adhesive transfer apparatus according to claim 25, wherein said frame comprises a pair of opposing side walls, each of said side walls having a generally vertically extending nip roller receiving slot on an interior surface thereof, said slots being positioned and configured such that axles extending from opposing ends of both said nip rollers are inserted into said slots to rotatably mount said nip rollers to said frame,

said apparatus further comprising a pair of springs being removably mounted to said frame adjacent said slots and being positioned and configured to engage the axles of an upper one of said rotatably mounted nip rollers to thereby removably maintain said nip rollers in said slots.

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30. A laminating and adhesive transfer apparatus according to claim 29, wherein said springs are U-shaped with one leg thereof engaging an axle of said upper one of said nip rollers.

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31. A laminating and adhesive transfer apparatus according to claim 30, wherein each of said frame side walls have exit tray receiving slots on said interior surfaces thereof,

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said exit tray having a pair of generally outwardly extending mounting tabs positioned and configured to be removably received in said exit tray receiving slots.

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32. A laminating and adhesive transfer apparatus according to claim 31, wherein opposing ends of said cutter bar are mounted in said exit tray receiving slots above said exit tray mounting tabs.

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33. A laminating and adhesive transfer apparatus according to claim 32, wherein said one leg of said U-shaped spring engages said cutter bar to thereby maintain said cutter bar and said exit tray in said exit tray receiving slots.

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34. A laminating and adhesive transfer apparatus according to claim 1, wherein the feed rolls are rotatably mounted in a removable cartridge, said frame being constructed and arranged to removably mount the removable cartridge.

35. A laminating and adhesive transfer apparatus according to claim 1, wherein said frame is constructed and arranged to removably mount the feed rolls individually.

5 36. A master processing apparatus for use with a pair of removable feed rolls, the removable feed rolls carrying a supply of stock material to be unwound, one of the supplies of stock material being coated with a layer of adhesive, said apparatus comprising:

a frame constructed and arranged to removably mount the feed rolls;

10 a pair of nip rollers rotatably mounted to said frame, said nip rollers defining a nip area therebetween with a feed side and a discharge side;

an actuating mechanism constructed and arranged to affect nip roller rotation;

15 said frame being constructed and arranged such that, when the feed rolls are removably mounted thereto, a master can be inserted between the feed rolls, the stock materials can then be unwound from each of the feed rolls so as to be disposed on opposing sides of the master, and the master and the stock materials can thereafter be fed together into the feed side of said nip rollers;

20 said nip rollers being constructed and arranged to apply pressure to the master and the stock materials being fed into the feed side of said nip rollers as a result of said nip roller rotation so as to perform a master processing operation wherein adhesive bonding is caused between the layer adhesive and the master and stock materials and then subsequently discharge 25 the processed master and stock materials outwardly from said discharge side;

a substrate supporting surface positioned and configured to receive and support a portion of the processed master and stock materials being discharged from the nip rollers; and

30 a cutting assembly disposed on said discharge side of said nip rollers, said cutting assembly being constructed and arranged to be moved in a transverse direction from one lateral side edge of the processed master and stock materials to the other lateral side edge of the processed master and stock

materials so as to cut transversely through the processed master and stock materials being supported on said surface,

said cutting assembly having a blade with a portion thereof extending downwardly below said supporting surface, the downward extent of said blade portion enabling said blade to cut through an entire thickness of the processed master and stock materials during the aforesaid transverse cutting movement.

37. A master processing apparatus according to claim 36, wherein said adhesive coated on said stock material is a pressure-sensitive adhesive and wherein said nip rollers are constructed and arranged to apply pressure to the master and the stock materials being fed into the feed side of said nip rollers as a result of said nip roller rotation so as to perform a laminating or adhesive transfer operation wherein said adhesive bonding is caused between the layer adhesive and the master and stock materials and then subsequently discharge the processed master and stock materials outwardly from said discharge side;

38. A master processing apparatus according to claim 37, wherein said supporting surface has a groove extending in said transverse direction, said blade portion being received in said groove.

39. A master processing apparatus according to claim 38, wherein said cutting assembly further comprises a transversely extending cutter bar, said blade being mounted for sliding movement along said cutter bar.

40. A master processing apparatus according to claim 39, wherein said cutting assembly comprises a blade mounting structure, said blade mounting structure being slidably mounted on said cutter bar and said blade being removably mounted to said mounting structure, the removable mounting of said blade enabling replacement of said blade when said blade becomes dull.

41. A master processing apparatus according to claim 40, wherein said cutter bar has groove extending in said transverse direction and said blade mounting structure has a mounting tab,

5 said blade being removably mounted by removably inserting said mounting tab through a hole in said blade and removably mounting said mounting structure on said cutter bar such that said mounting tab extends through said blade hole and into said groove.

10 42. A master processing apparatus, according to claim 38, further comprising an exit tray providing said supporting surface and said groove.

15 43. A master processing apparatus according to claim 37, wherein the feed rolls are rotatably mounted in a removable cartridge, said frame being constructed and arranged to removably mount the removable cartridge.

44. A master processing apparatus according to claim 37, wherein said frame is constructed and arranged to removably mount the feed rolls individually.

20

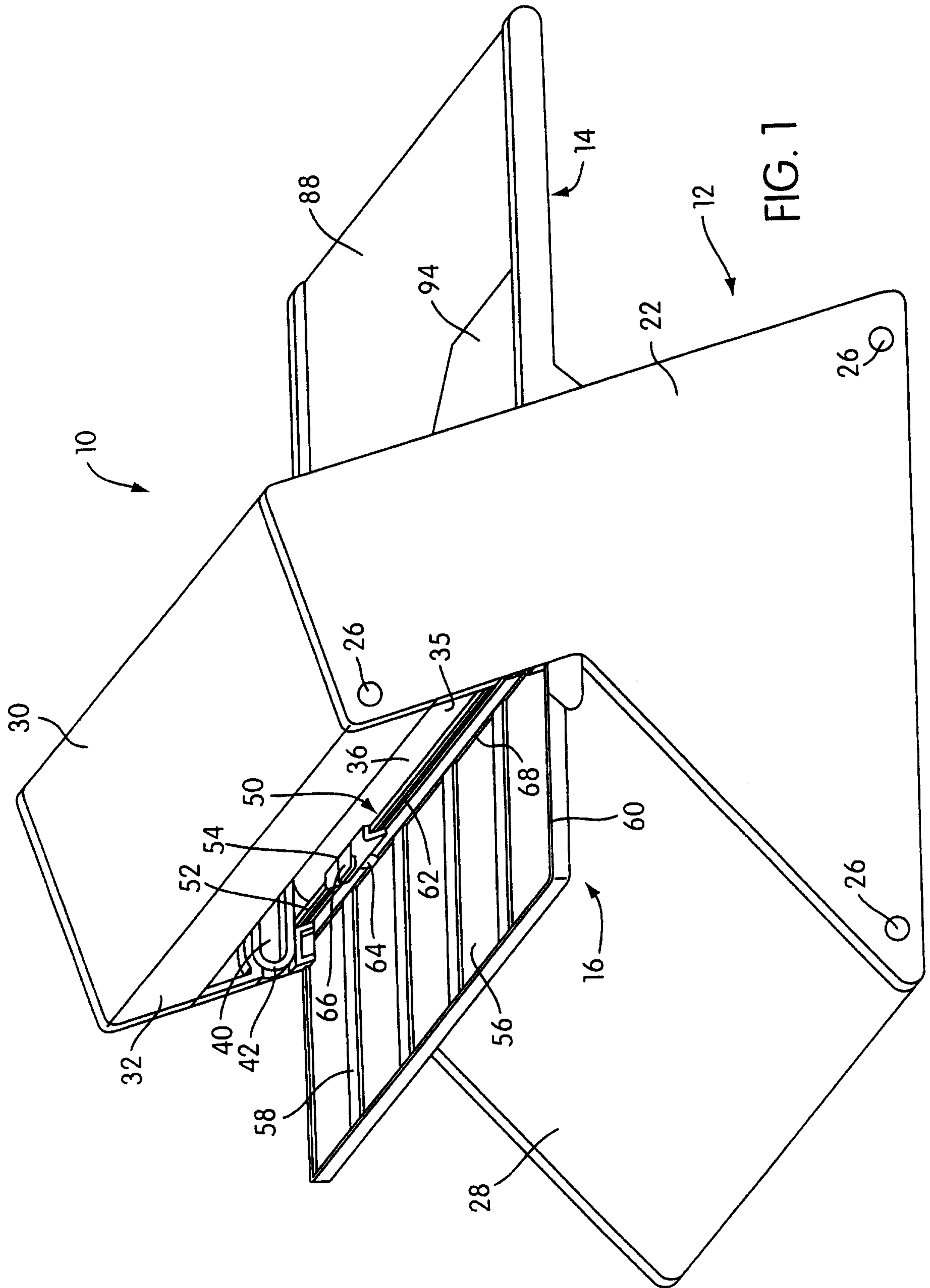


FIG. 1

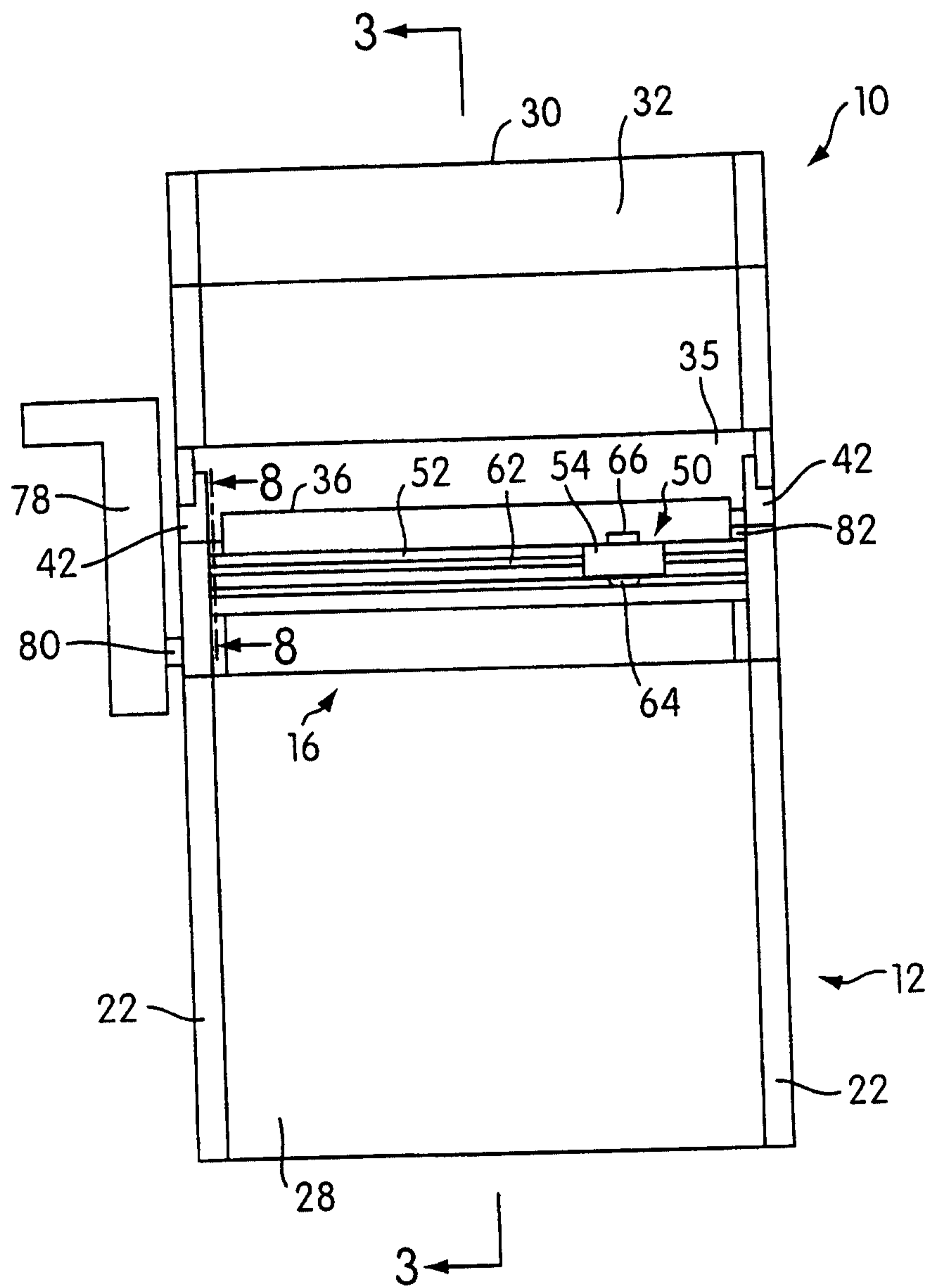


FIG. 2

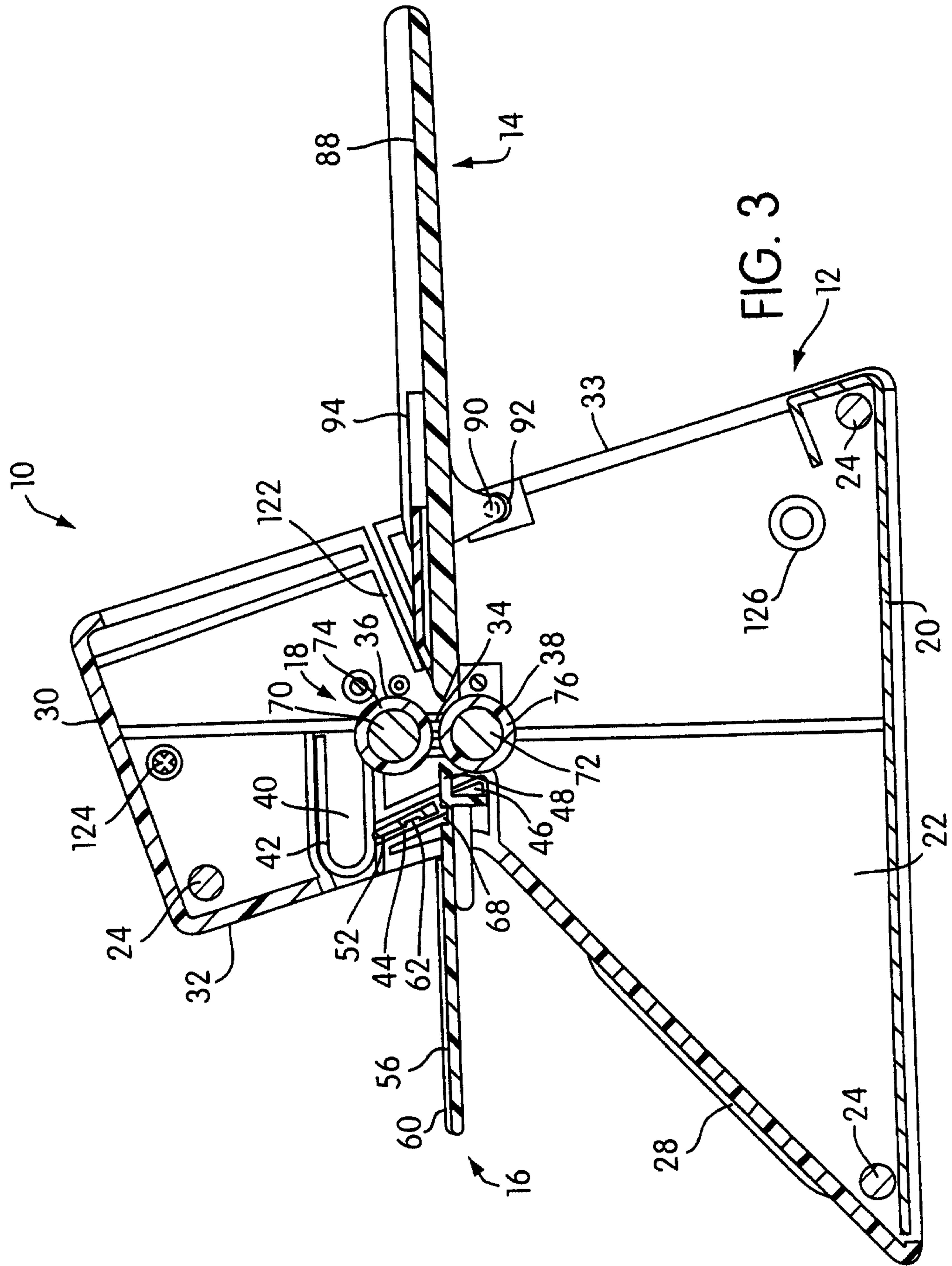


FIG. 3

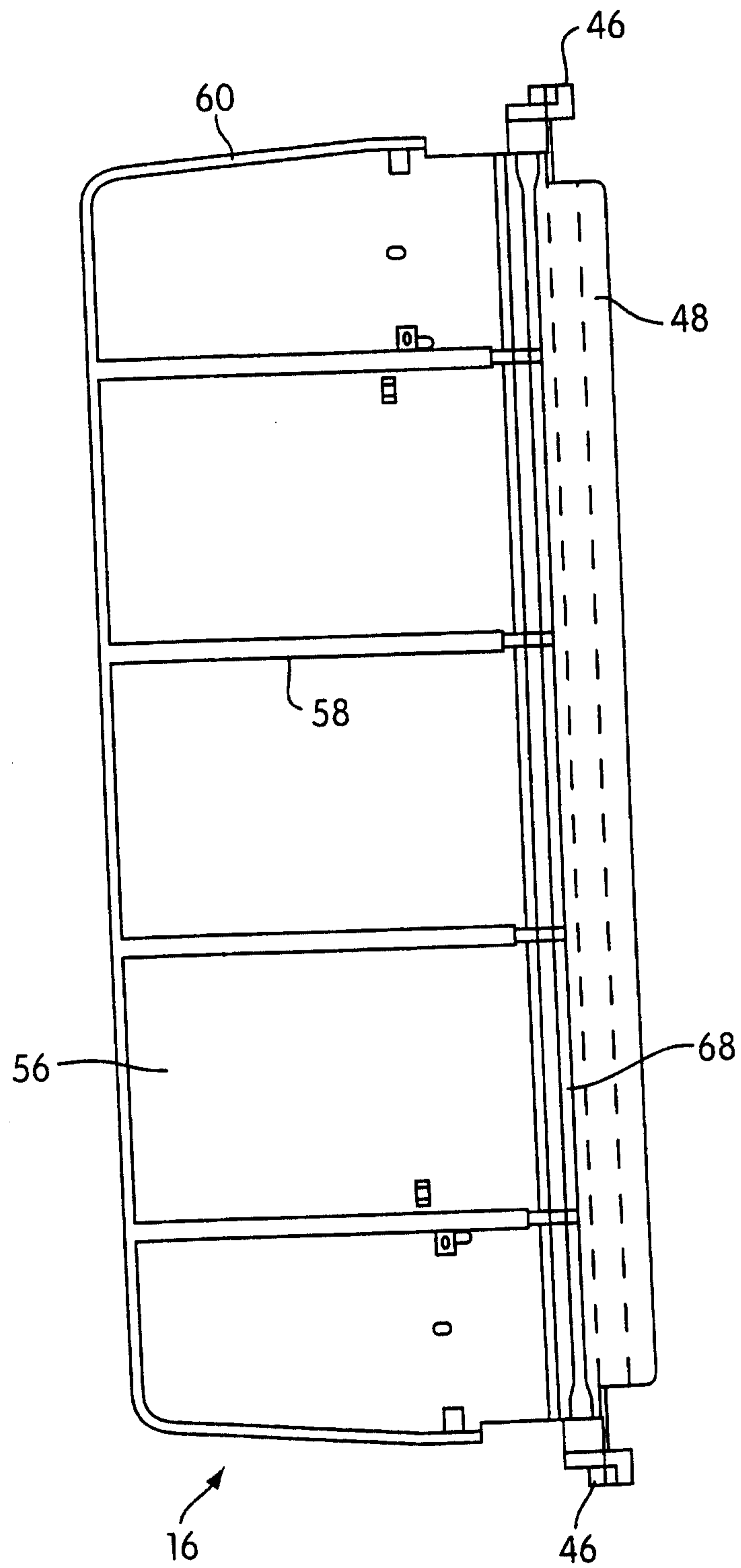


FIG. 4

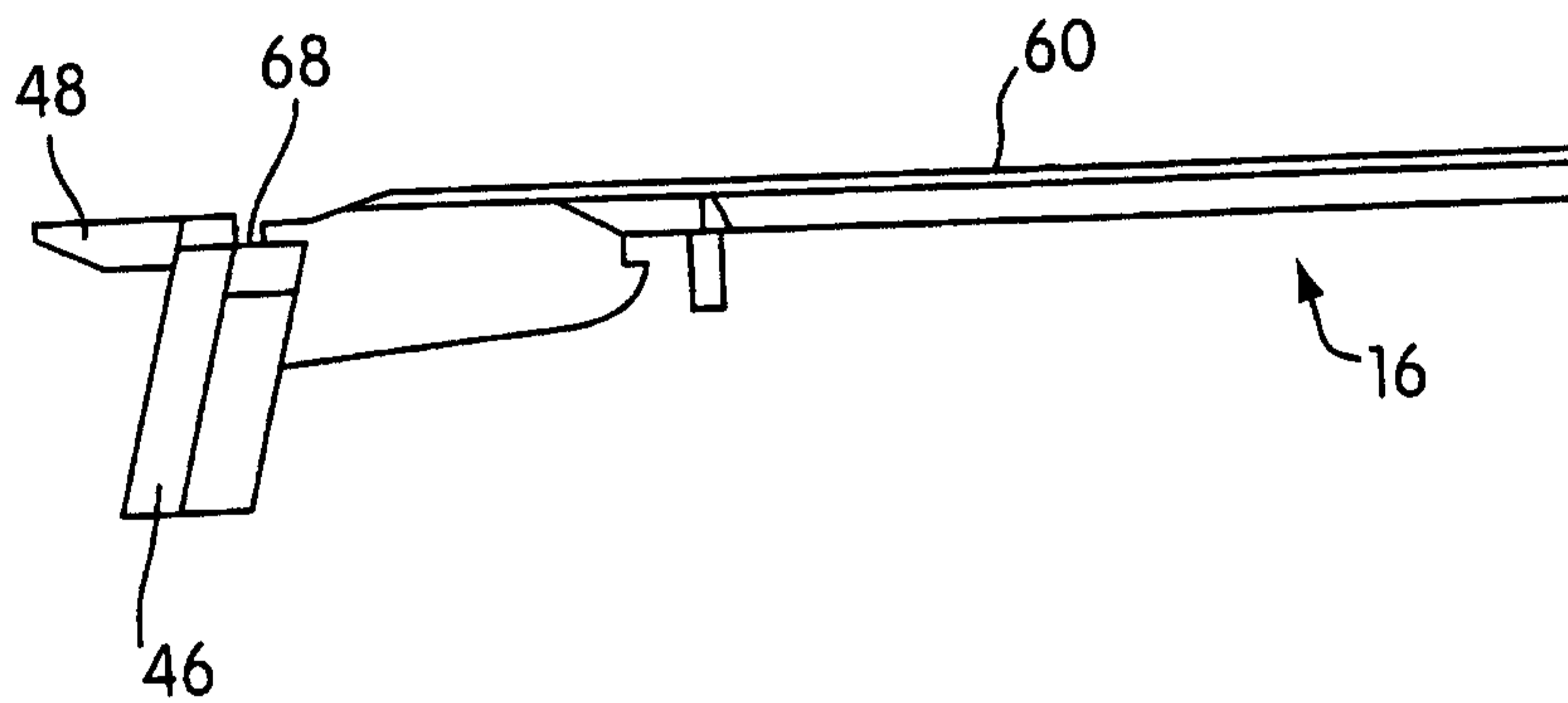


FIG. 5

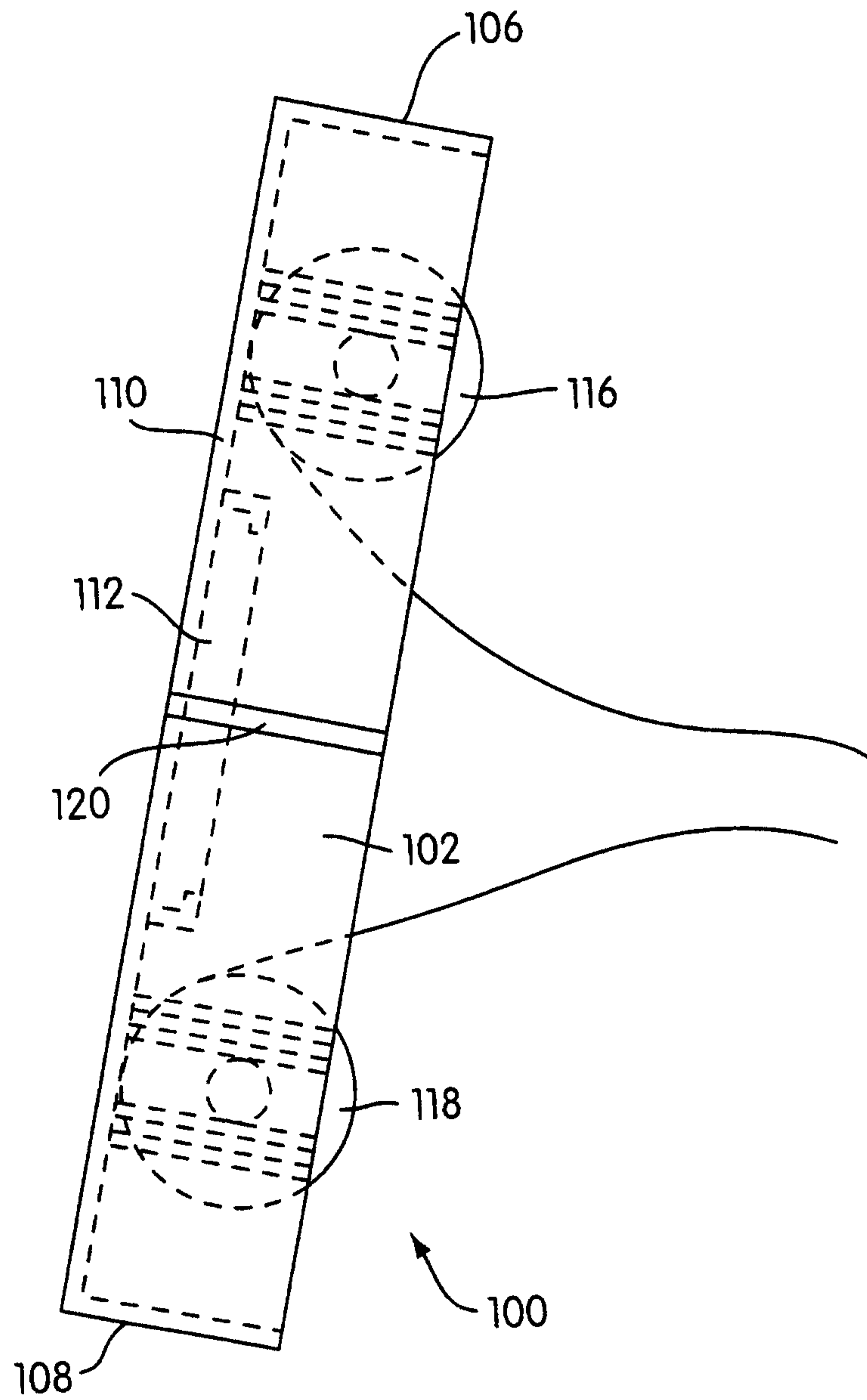


FIG. 6

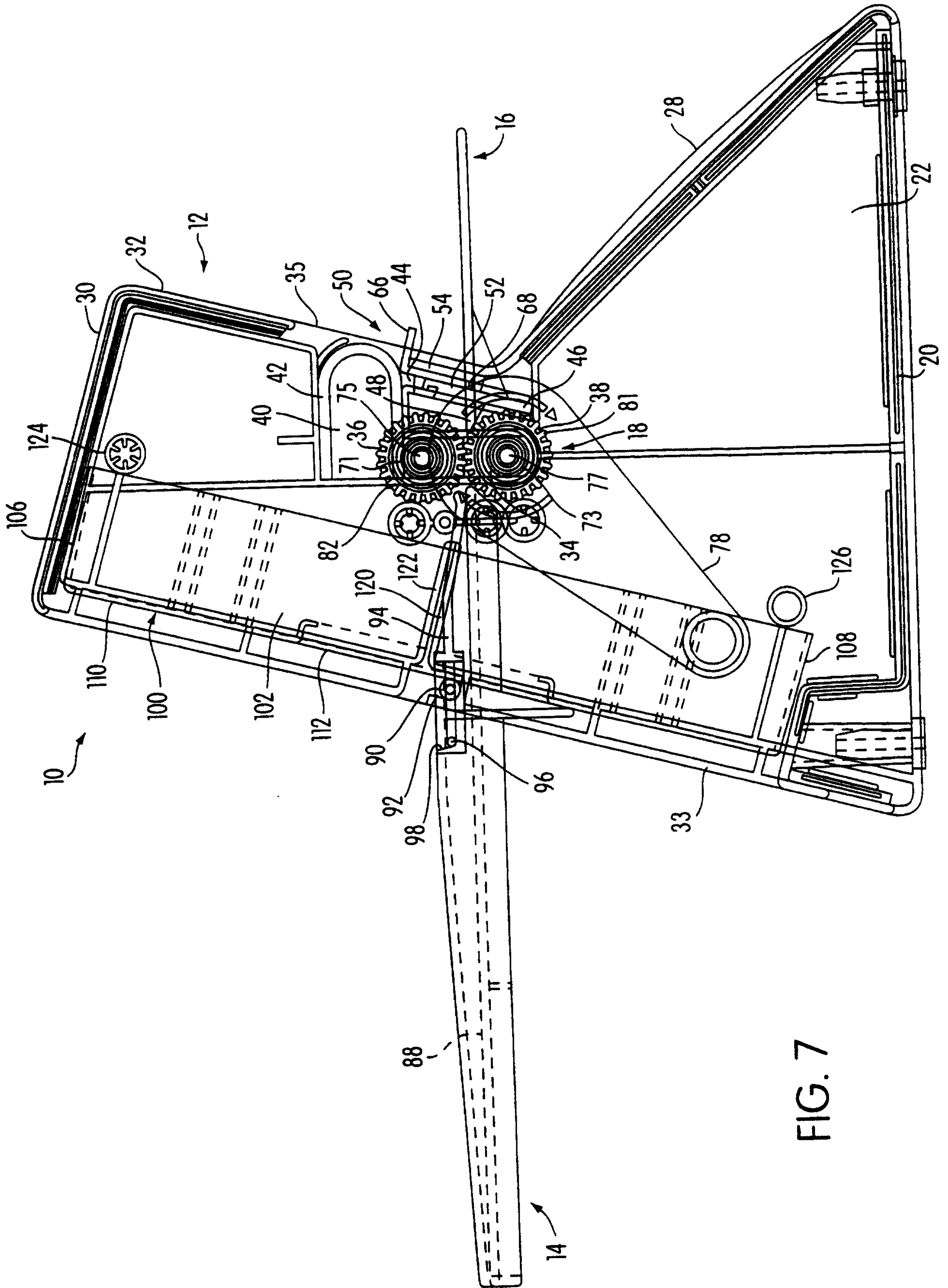


FIG. 7

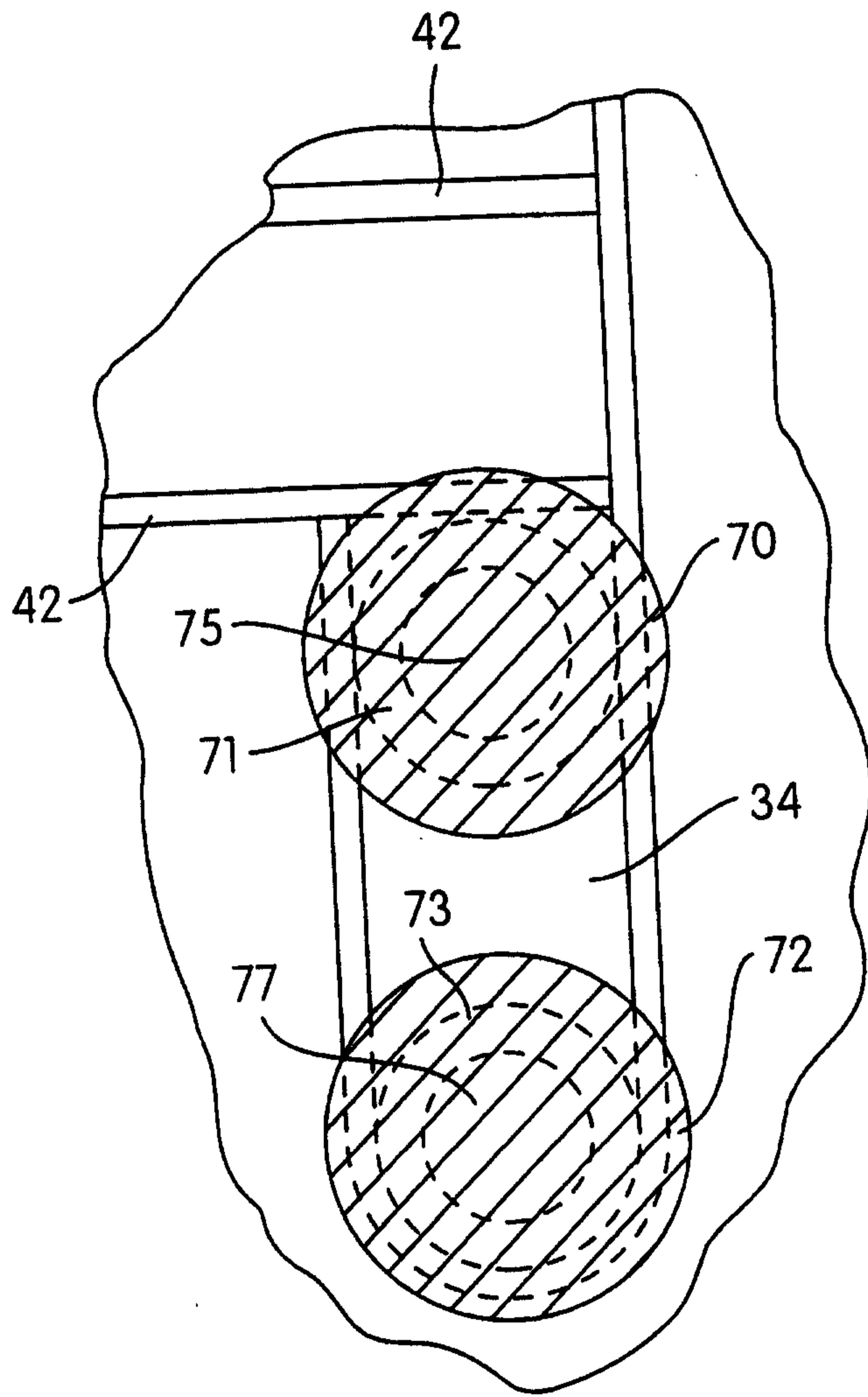


FIG. 8

SUBSTITUTE SHEET (RULE 26)