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(54) **MASTER PROCESSING APPARATUS WITH MASTER ENGAGING STRUCTURE FOR TENSIONING A MASTER**

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(22) Filed: **Aug. 2, 2000**

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Issued: **Aug. 4, 1998**
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Filed: **Dec. 3, 1996**

U.S. Applications:

(63) Continuation-in-part of application No. 08/354,222, filed on Dec. 12, 1994, now Pat. No. 5,580,417, which is a continuation-in-part of application No. 08/247,003, filed on May 20, 1994, now Pat. No. 5,584,962.

(51) **Int. Cl.**[7] **B32B 31/00**

(52) **U.S. Cl.** **156/539**; 156/538; 156/555

(58) **Field of Search** 156/494, 536, 156/538, 539, 555, 580, 582; 100/210

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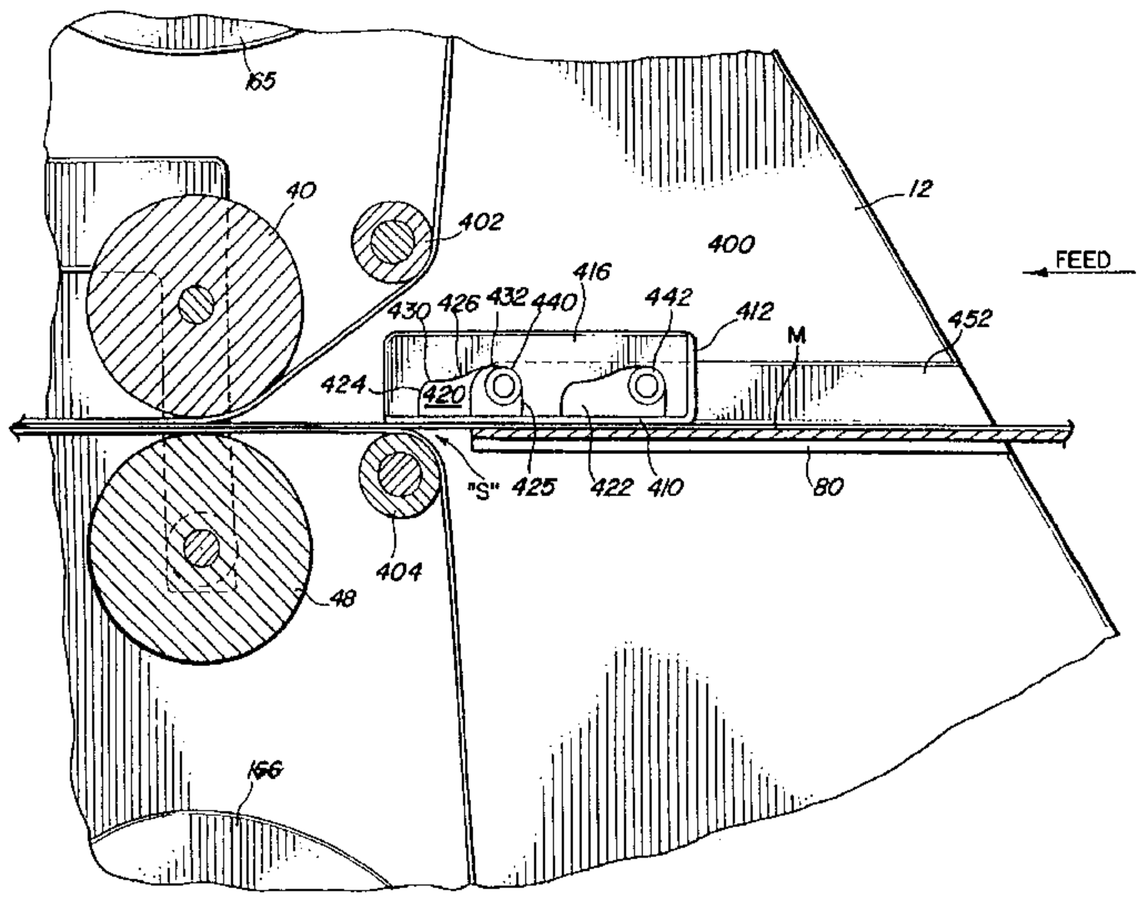
(74) *Attorney, Agent, or Firm*—Pillsbury Winthrop LLP

(57) **ABSTRACT**

A multi-purpose laminating and adhesive transfer apparatus having a frame supporting rotatably engaging nip rollers. A replaceable cartridge is insertable into the frame and has upper and lower feed rolls which may be a laminate, film or paper, or an adhesively coated film or a film having an affinity for adhesive. The upper and lower feed rolls containing the webs of laminating or adhesive transfer material have tensioning caps which can be adjusted to provide the proper tensioning to prevent the rollers from overrunning as they rotate. Tensioning caps and the cartridges are pre-set and provided to the user. A cutter blade is positioned at the discharge side of the nip rollers and may be actuated to sever the master at any desired location. The apparatus may be operated to apply lamination to either top or bottom surfaces of a substrate or an adhesive to the top or bottom surface of the substrate or to both surfaces.

64 Claims, 6 Drawing Sheets



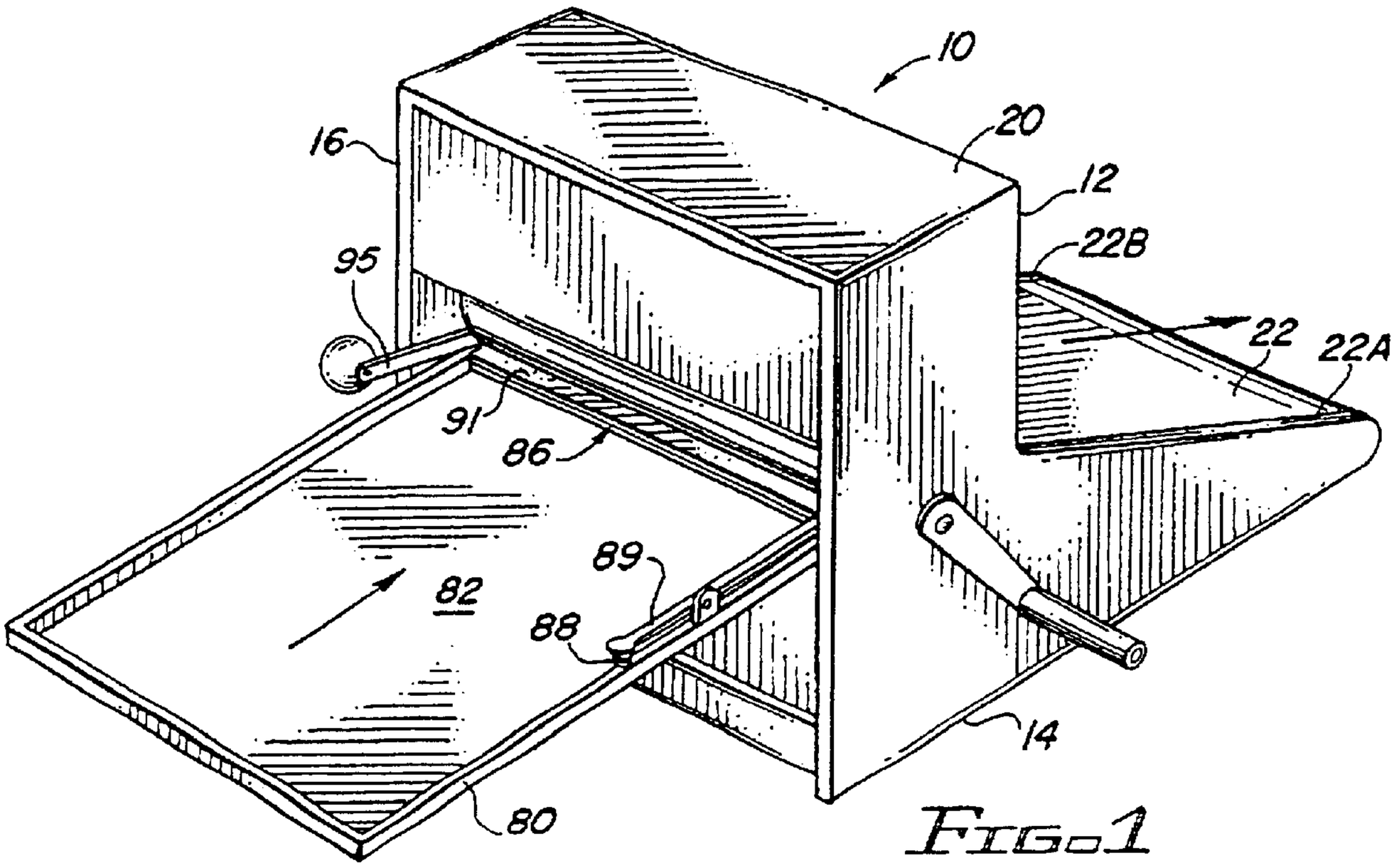


FIG-1

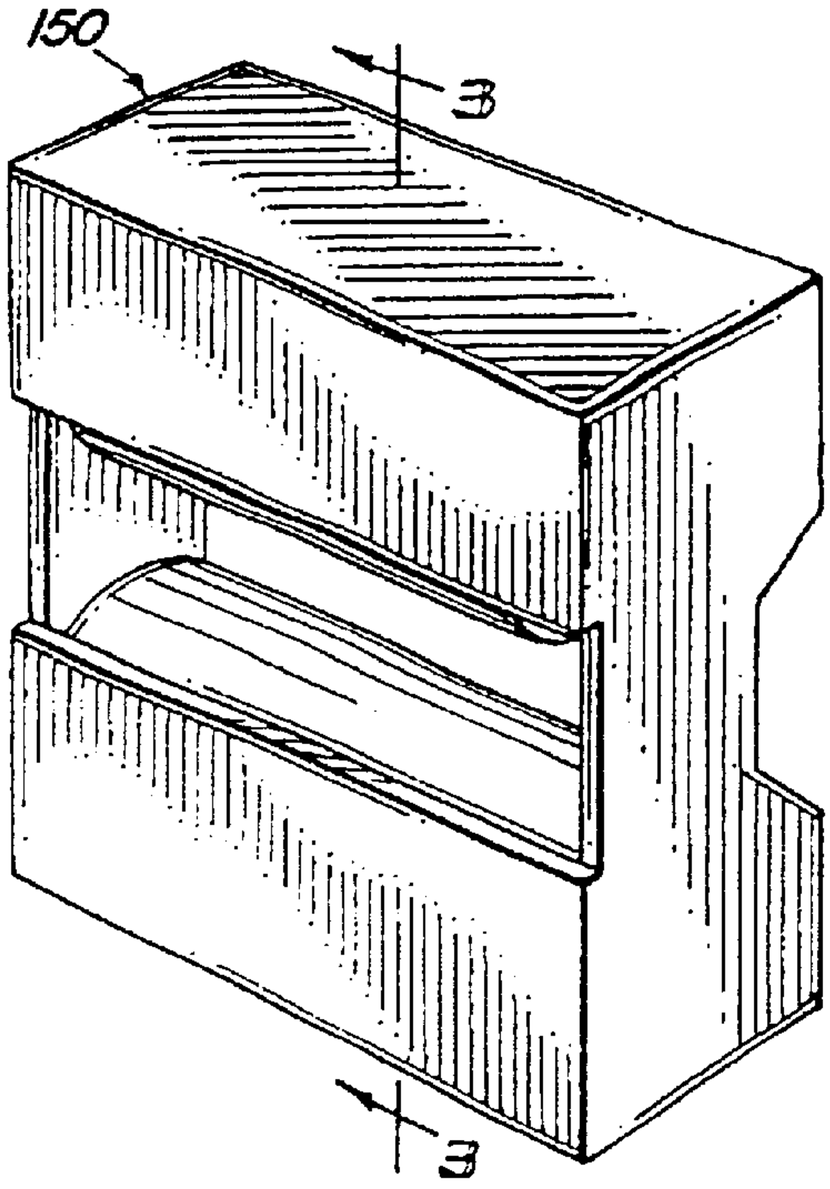


FIG-2

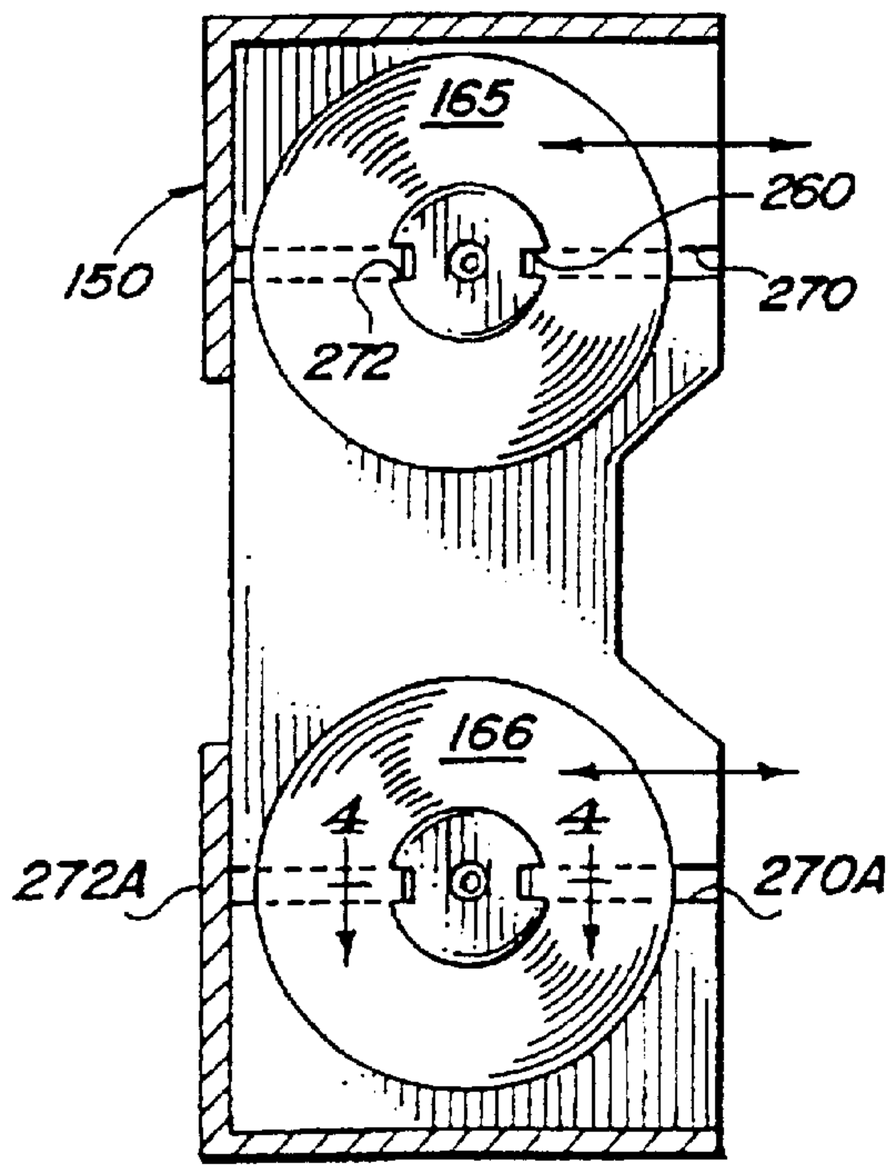


FIG-3

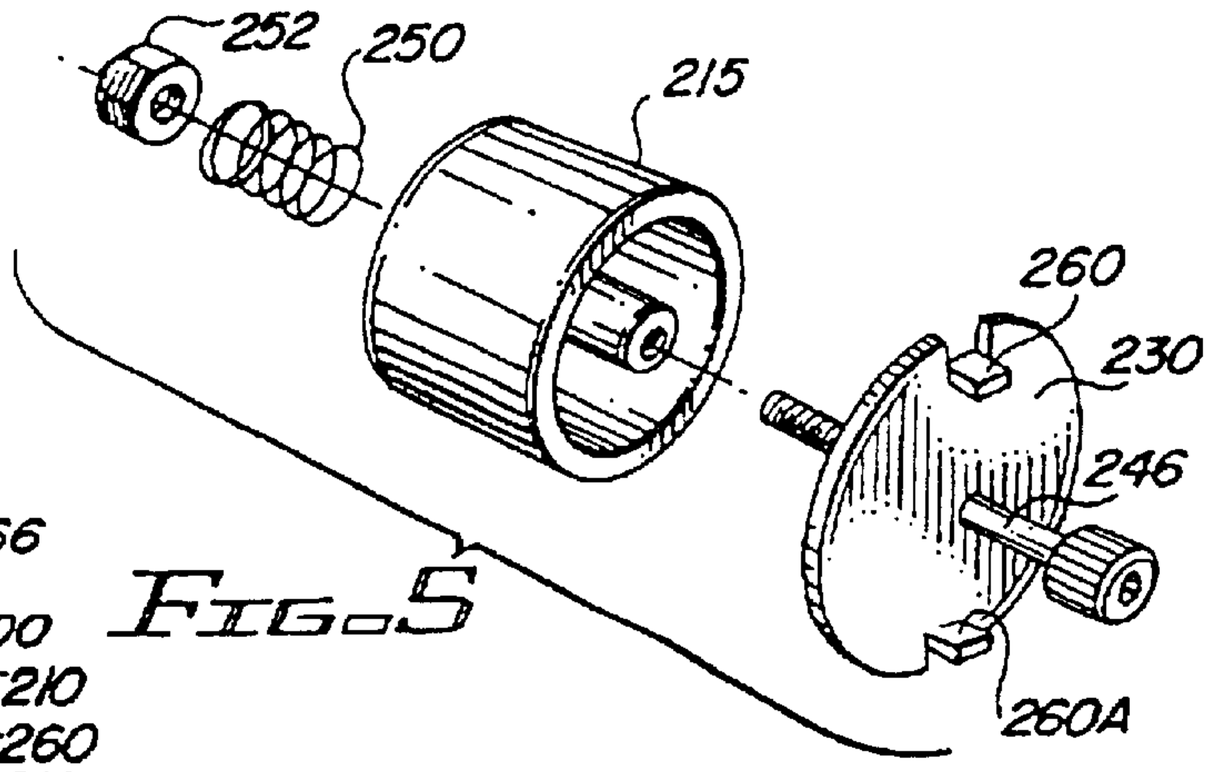


FIG-5

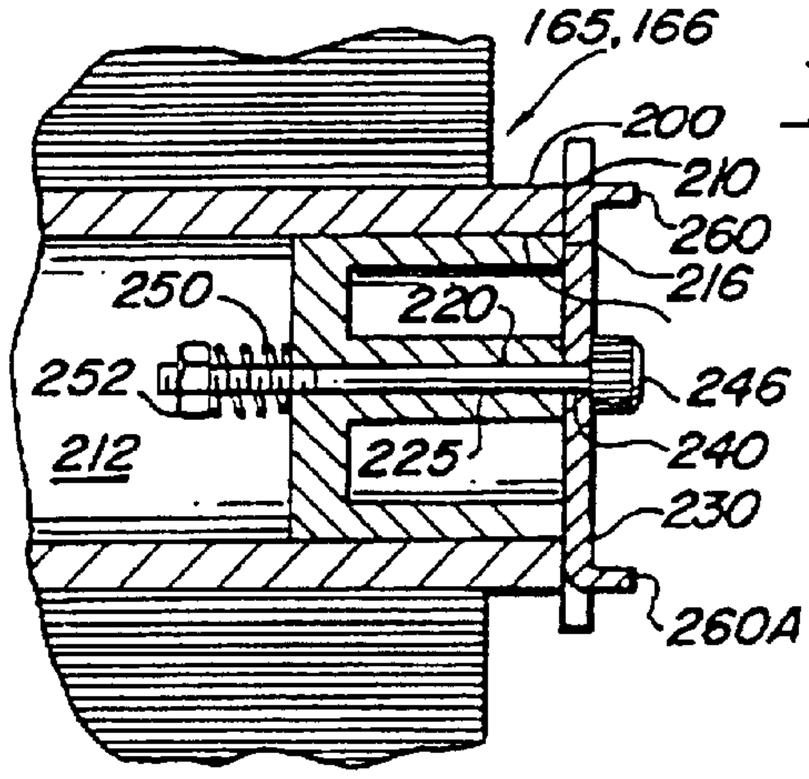


FIG-4

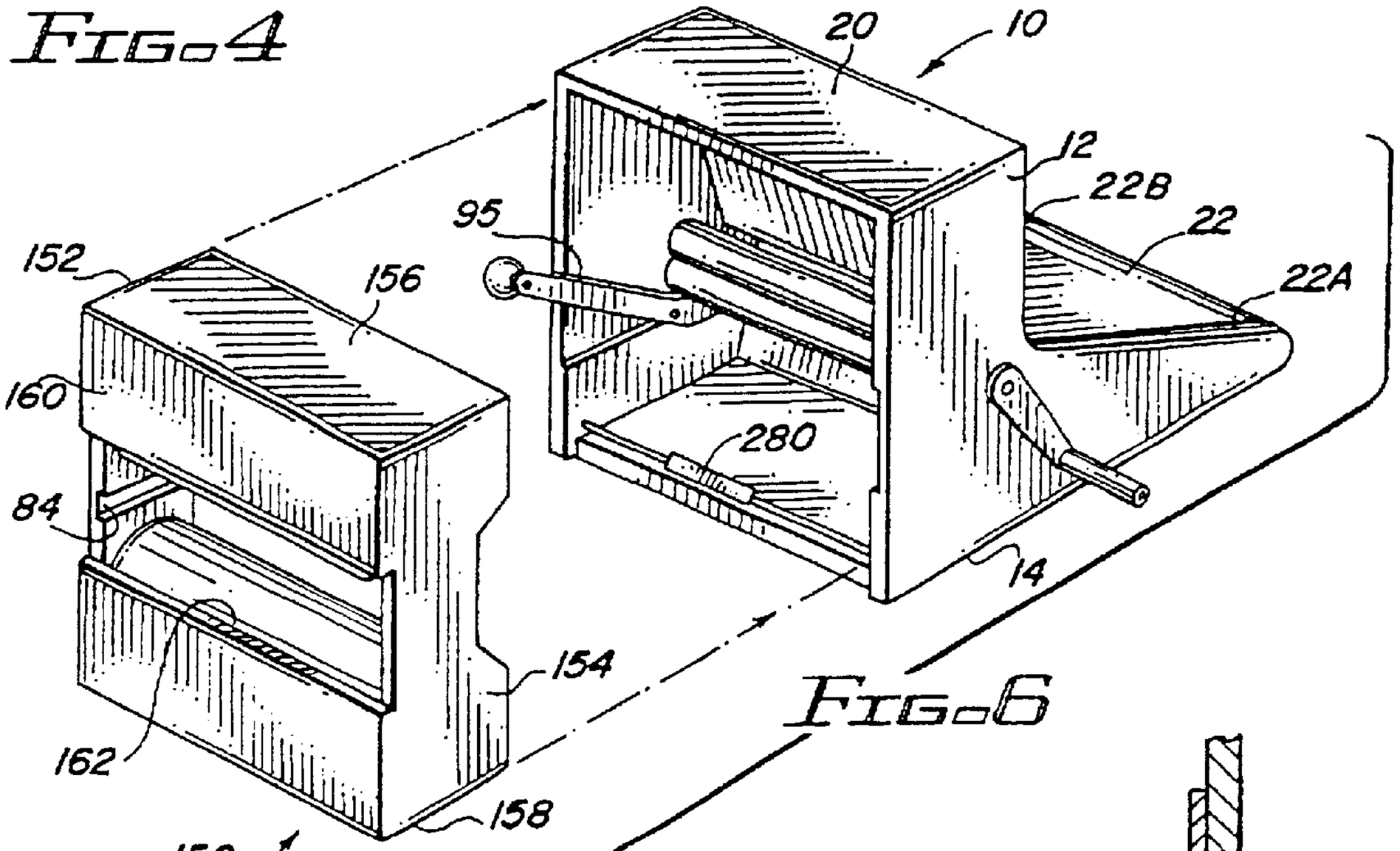


FIG-6

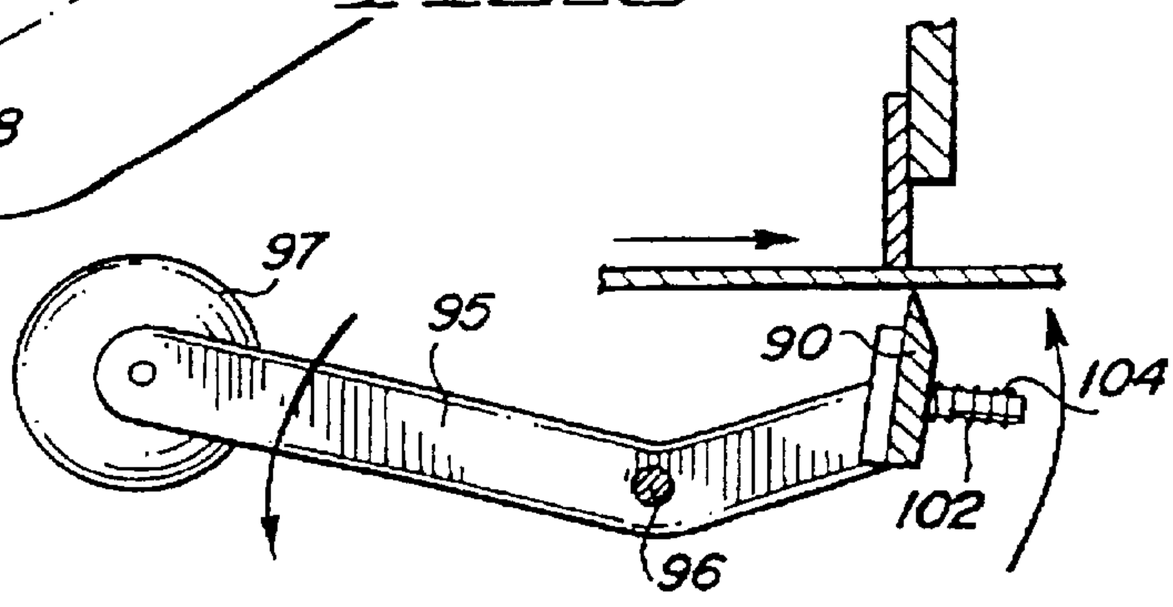


FIG-7

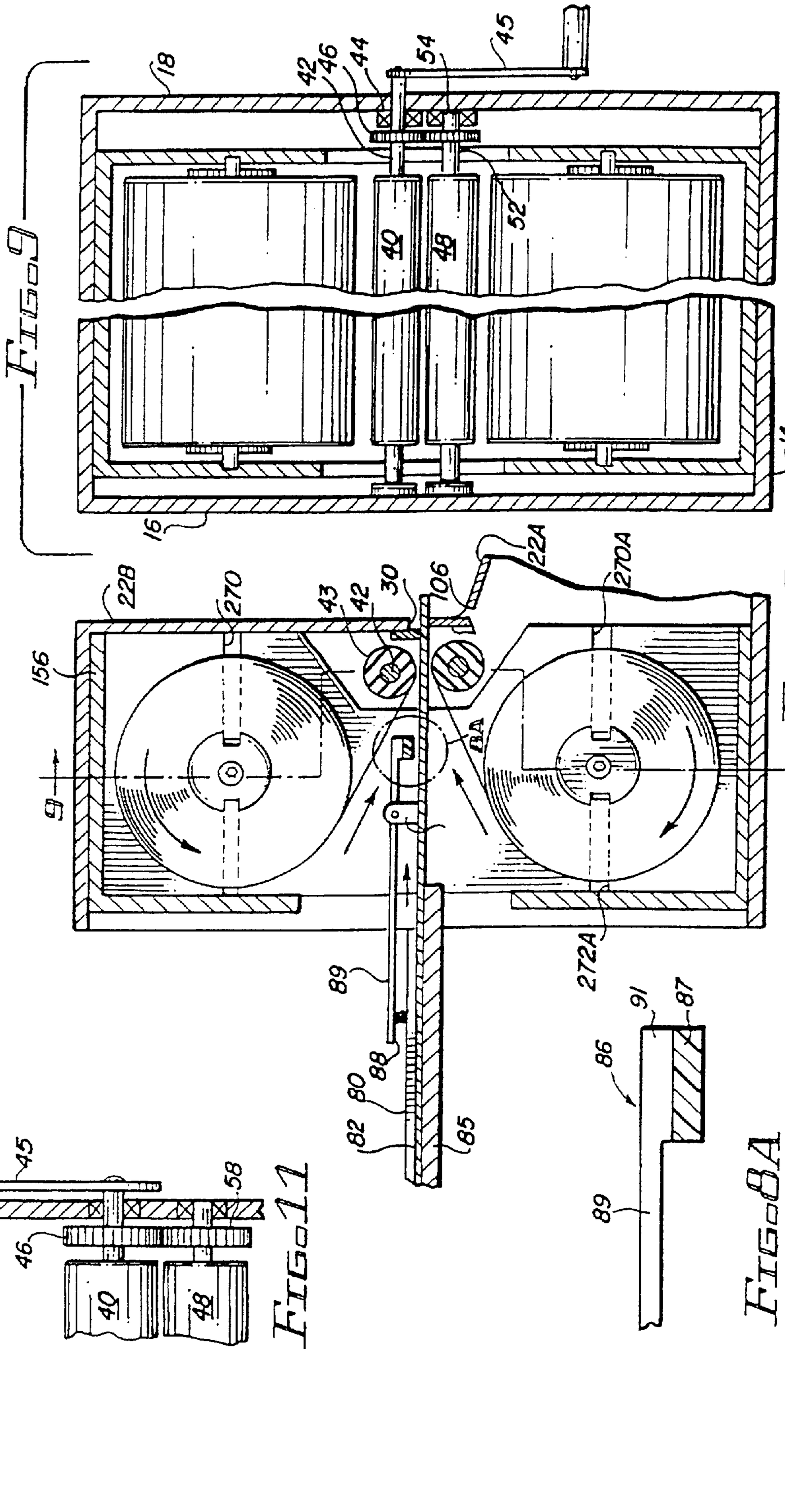


FIG. 9

FIG. 11

FIG. 8A

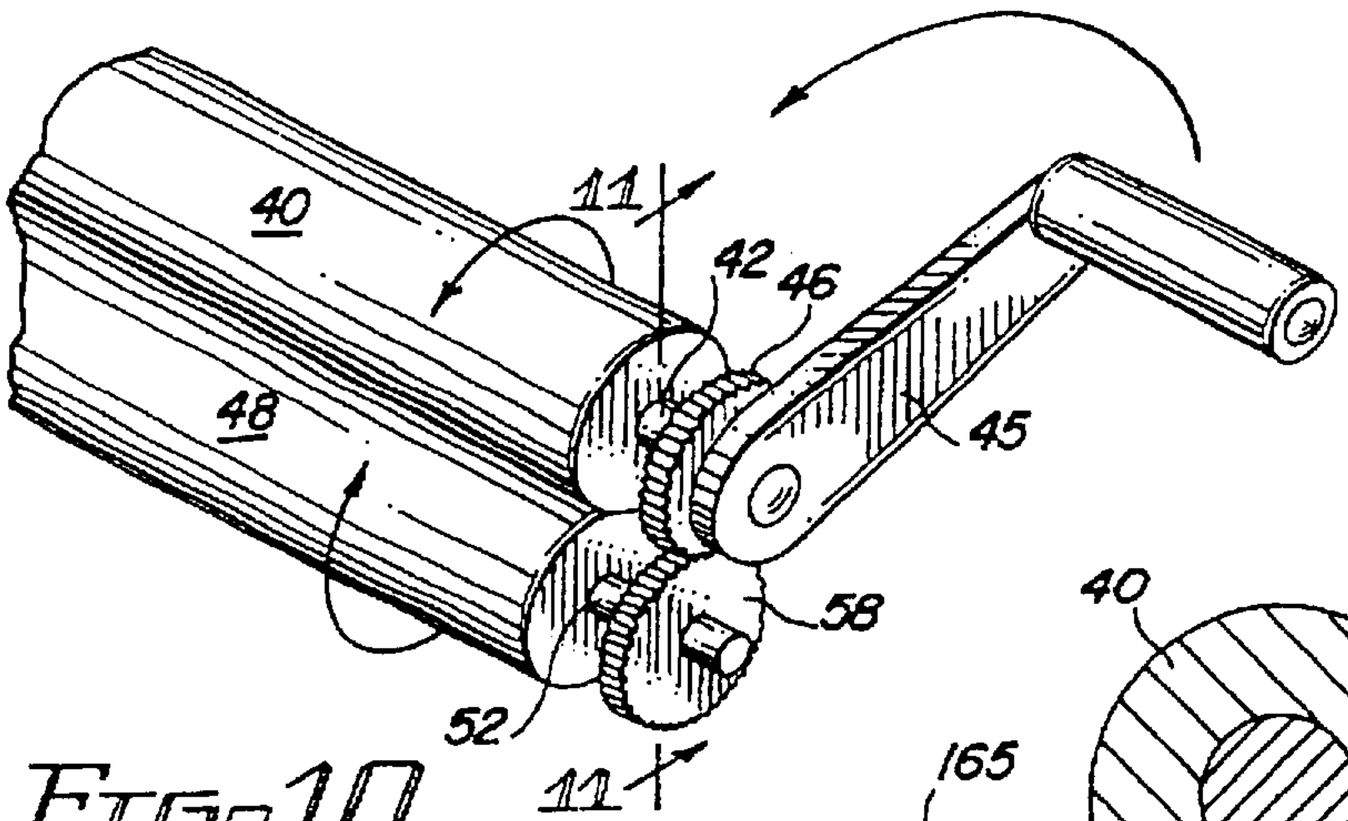


FIG-10

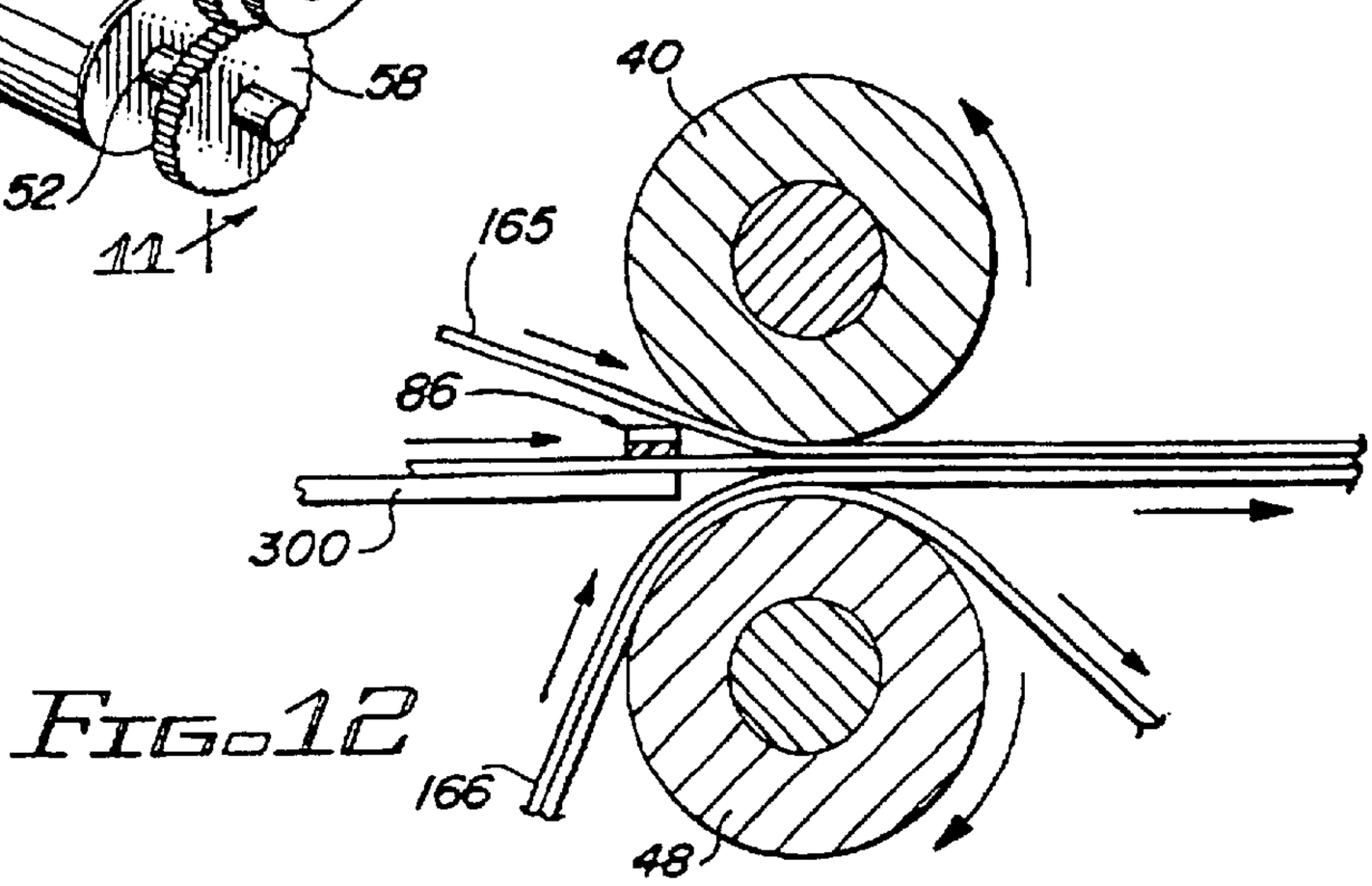
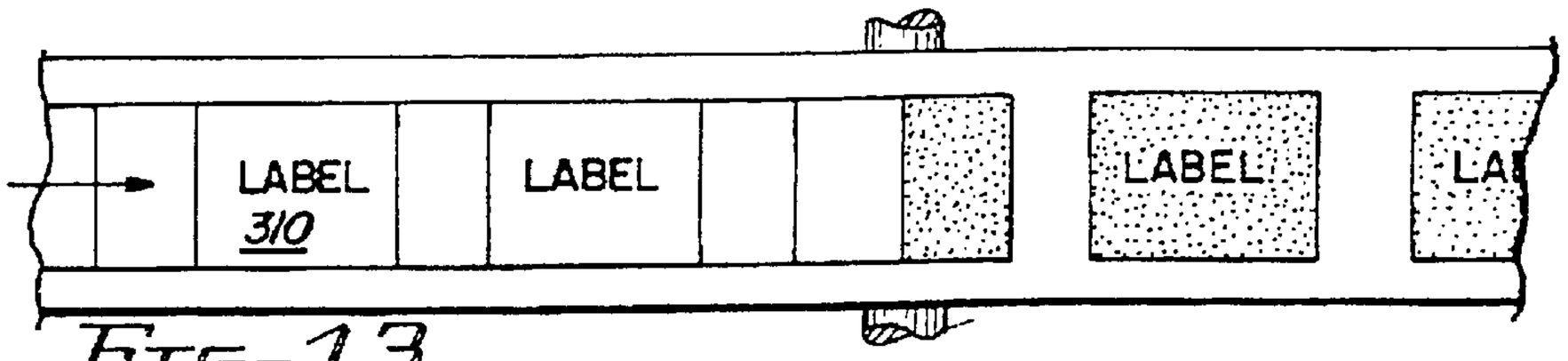


FIG-12



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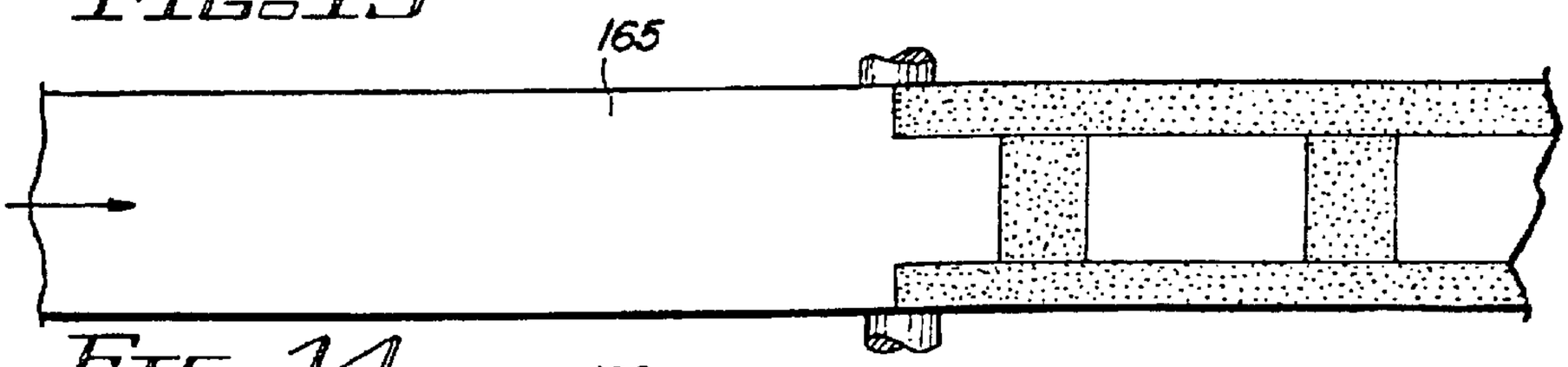


FIG-14

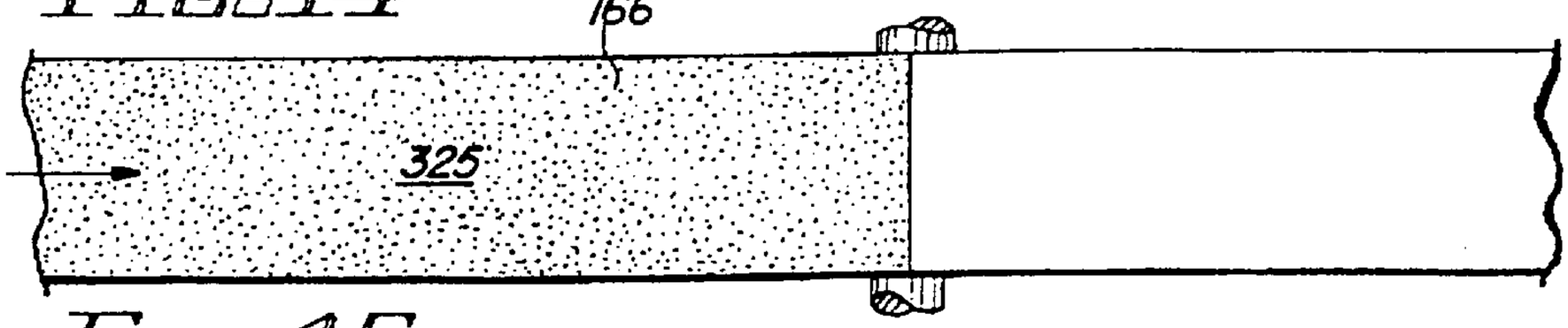
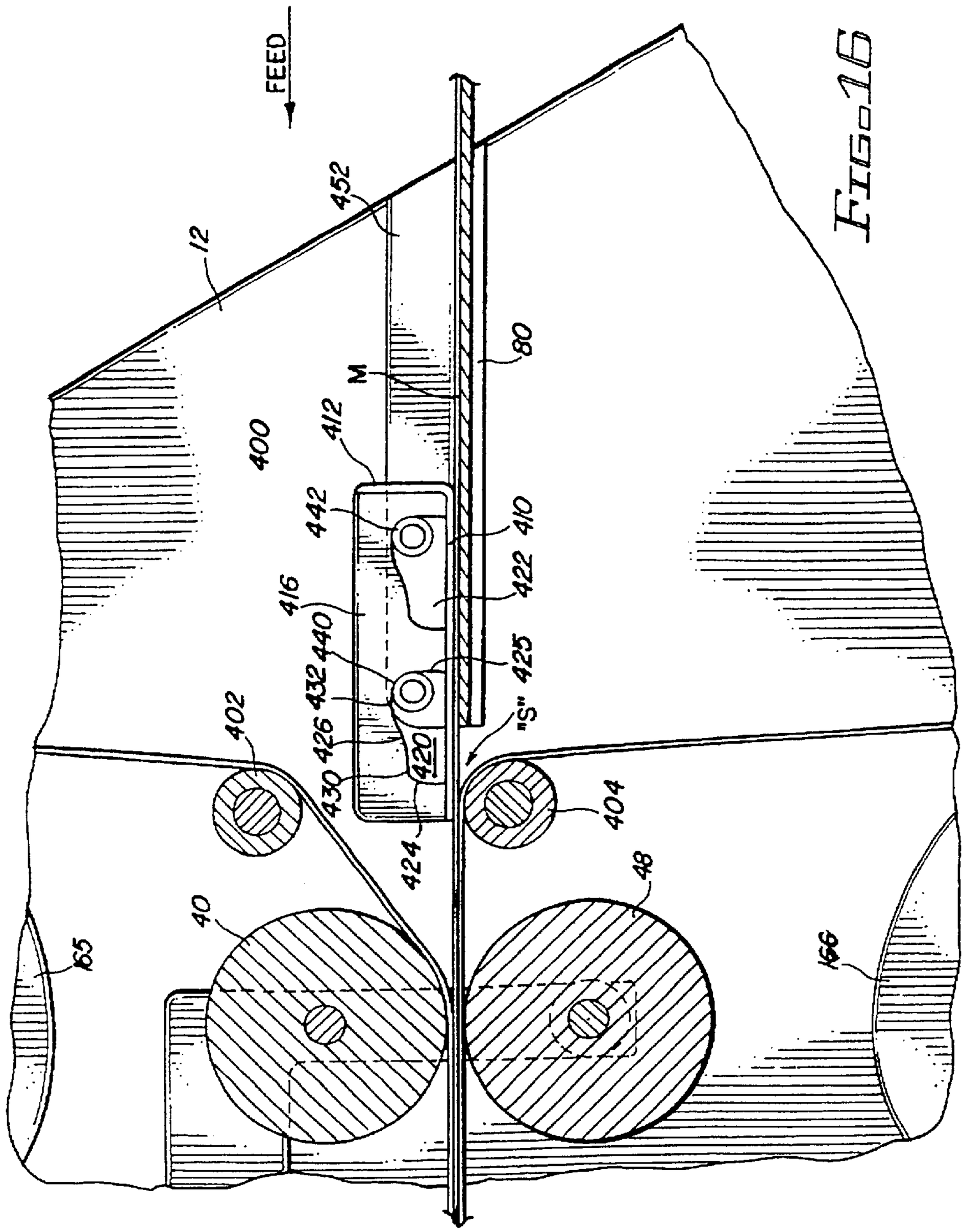


FIG-15


FEED
12
452
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412
442
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422
416
440
425
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420
"S"
402
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65
66

FIG-16

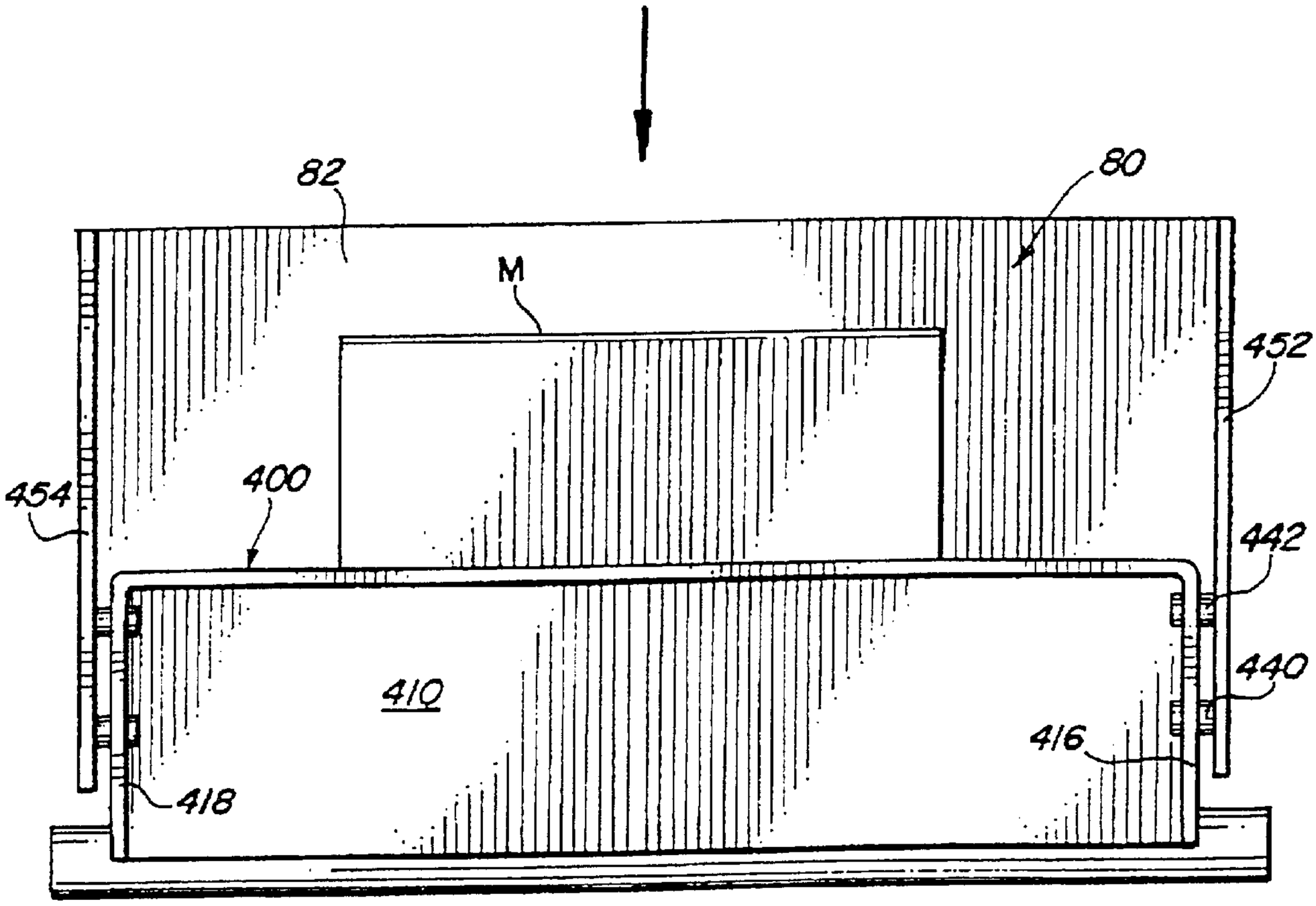
82
80
M
452
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FIG-17

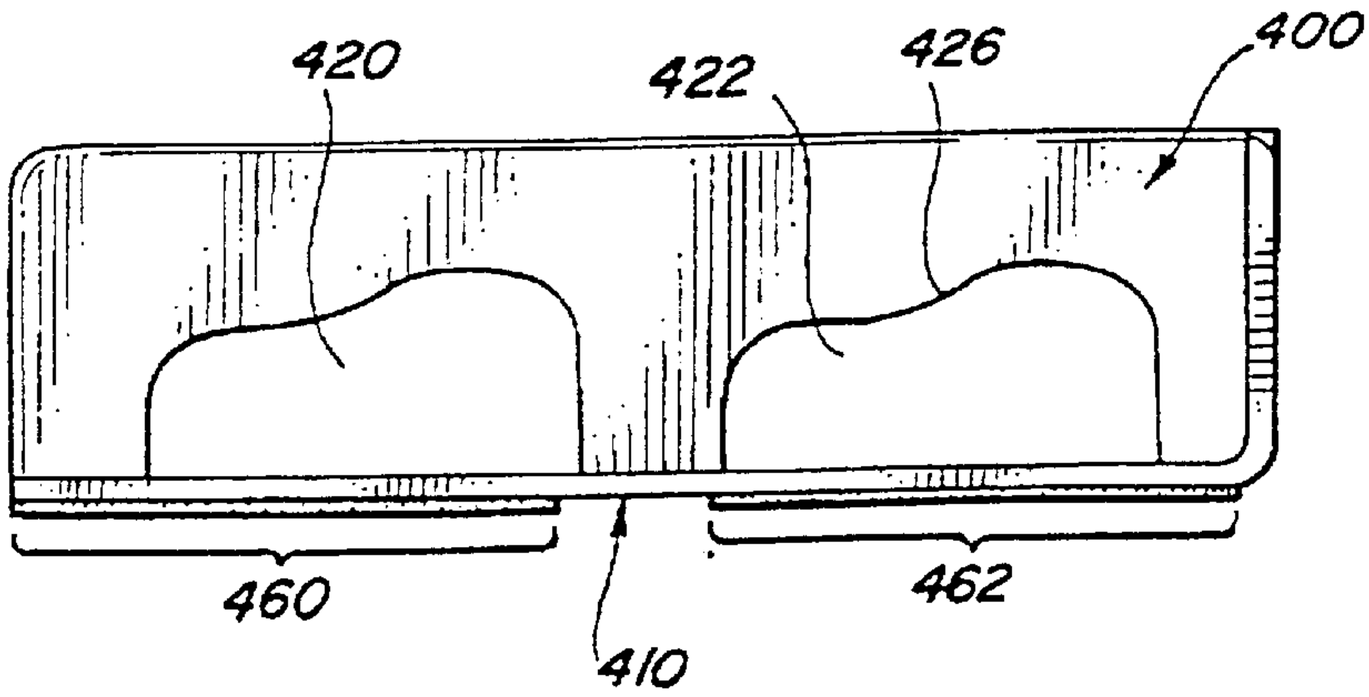
420
422
426
400
460
462
410

FIG-18

MASTER PROCESSING APPARATUS WITH MASTER ENGAGING STRUCTURE FOR TENSIONING A MASTER

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

The present invention is a *Reissue of application Ser. No. 08/753,921 filed Dec. 3, 1996, U.S. Pat. No. 5,788,806 which is a* continuation-in-part of application Ser. No. 08/354,222, filed Dec. 12, 1994, U.S. Pat. No. 5,580,417, entitled "Laminating and Adhesive Transfer Apparatus", which application is a continuation-in-part of Ser. No. 08/247,003, filed May 20, 1994, U.S. Pat. No. 5,584,962, also entitled "Laminating and Adhesive Transfer Apparatus".

FIELD OF THE INVENTION

[The present invention relates to an apparatus for laminating items and which apparatus will also transfer adhesives to substrates for purposes of producing articles such as labels and stickers.**]**

The present invention relates to a master substrate processing apparatus with a master substrate engaging structure for tensioning a master substrate.

BACKGROUND OF THE INVENTION

It is common practice to protect documents and other items such as cards by encasing them in clear plastic coverings. Various products known as protectors are available for this purpose. Another common way of protecting documents and similar items is to laminate them. Lamination involves sealing the document or item between oppositely applied transparent films and lamination is commonly applied to such items as driver's licenses, identification cards, membership cards and the like.

Another operation that is often applied to documents and papers is that of adhesive transfer. Adhesive transfer is an operation that is used to make articles such as labels and stickers. One manner of producting such labels is to print the labels on blanks provided for this purpose. The blanks generally have an adhesive backing and are secured to a liner from which they may be peeled at the time of use. Computer systems are available that have the capability of printing labels on liner label stock provided for this purpose. This manner of making labels or stickers is expensive and further is limiting in that the printed material must be adapted to the physical size or confines of the label or sticker carried on the liner. This limits the information and creativity that may be incorporated in label making.

[Based on the foregoing, there exists a need for a simple multi-purpose apparatus which can both serve to apply laminates to documents and papers and which will also serve to apply adhesive, including dry adhesives, to materials of various sizes so a wide variety of labels and stickers may be produced. The apparatus of the present invention can apply clear plastic laminates to master substrates of various sizes and can also transfer adhesive to substrates of various sizes not being limited by length. Adhesive transfer can be applied to either surface of the item as required. The apparatus can also apply dry adhesives from double sided release coated liners to a substrate.**]**

In apparatuses designed to perform laminating operations, adhesive transfer operations, both, or other such master substrate processing operations in which adhesive bonding occurs between a master and stock materials, it is desirable to keep the master substrate smooth, flat, and properly aligned as it enters the master substrate processing assembly. If the master substrate is misaligned or wrinkled as it advances through the master substrate processing assembly, the resulting end product may be less than satisfactory. For example, in a laminating operation, if a master substrate having straight side edges is angled with respect to the side edges of the laminating films, then the resulting laminated product will have a misaligned appearance; or, if the master substrate is wrinkled, the resulting laminated product may also be wrinkled. In an adhesive transfer operation, if the master substrate is wrinkled, then certain spots may be missed during transfer of the adhesive. The nature of adhesive bonding makes it difficult to correct such errors, and normally the user will have to repeat the operation with a new master substrate.

Consequently, there exists a need for a master substrate processing apparatus with a suitable device for smoothing and properly aligning a master substrate as it is advancing in a feeding direction into the master substrate processing assembly of the apparatus.

SUMMARY OF THE INVENTION

[Briefly, in accordance with the present invention, a multi-purpose laminating and adhesive transfer apparatus is provided which has a frame or housing with mounting means for receiving a cartridge which is insertable to supply material to perform the necessary laminating or adhesive transfer operation. The cartridge has a box-like housing in which upper and lower supply rolls containing webs of laminating or adhesive transfer material are rotatively secured. The rolls have tensioning caps which can be adjusted to prevent the supply rolls from overrunning as they pay-out material. The caps are pre-set in accordance with the operation being performed and the characteristics of the material. The tensioning caps may be pre-set by the material supplier at the time they are inserted into the cartridge. The user selects the cartridge appropriate to the operation to be performed.

First and second nip rollers extend transversely in the housing at a location intermediate the cartridge supply rollers. The nip rollers have a resilient coating and engage one another or are slightly spaced-apart in parallel relationship to one another. Preferably the lower nip roller is displaced forwardly from the upper nip roller in the direction of the cartridge. An actuator, which may be powered or may be manual such as a hand crank, is provided for driving or rotating at least one of the nip rollers which, in turn, drives the other roller.

A feed tray is removably mountable to the housing to facilitate feeding the article to be processed. Preferably the feed tray is removably secured in a general horizontal location aligned with the nip. The feed tray carries a transversely extending guide and wiper which smooths, cleans and positions the master fed along the tray. A discharge opening is provided at the rear of the housing and a cutter blade extends transversely across the housing adjacent the discharge. The cutter blade may be manually actuated by a lever to upwardly sever the substrate at a desired location in conjunction with an anvil bar.

By way of example, the lower feed roll may comprise a flexible film with an adhesive coating. The upper feed roll comprises a supply of film which has an affinity for adhesive. The upper and lower films are fed between the nip rollers. The tray 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 tray to the interface between the nip rollers passing between the tray surface and the wiper. Adhesive will be transferred from the bottom film to the labels with 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 cutting blade at the discharge opening. The labels may be peeled from the film substrate when used.

Accordingly, it is a primary and broad object of the present invention to provide a simple and efficient laminating or adhesive transfer device in which cartridges containing various types of films can be easily and selectively inserted for use in performing various laminating and adhesive transfer operations. The term "applicator and transfer apparatus" as used herein is to be understood to comprehend both adhesive transfer and laminating operations as the device both transfers laminates and adhesives to items.]

To meet the above need, the present invention provides a master substrate processing apparatus for processing a master substrate. The apparatus of the present invention comprises a first supply roll comprising a wound supply of a first stock material carrying a layer of adhesive; a second supply roll comprising a wound supply of a second stock material; a master substrate processing assembly having structure constructed and arranged to process the master substrate and the unwound portions of the stock materials during advancement thereof in a feeding direction through the processing assembly to affect adhesive bonding between the master substrate and the adhesive; structure providing a master substrate supporting surface adjacent a feed side of the master processing assembly to support the master substrate thereon as the master substrate is being fed into the master substrate processing assembly; and a master substrate engaging structure extending generally transversely across the master substrate supporting surface, the master substrate engaging structure having a master substrate engaging surface that engages the master substrate while supported on the master substrate supporting surface so as to apply frictional resistance to advancement of the master substrate in the feeding direction to thereby tension the master substrate.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, advantages and features of the present invention will be more fully understood from the following description, claims and drawings in which:

FIG. **1** is a perspective view of the transfer apparatus of the present invention;

FIG. **2** is a perspective view of the supply roll containing a cartridge removed from the apparatus;

FIG. **3** is a sectional view taken along line **3**—**3** of FIG. **2**;

FIG. **4** is a sectional view taken along line **4**—**4** of FIG. **3**;

FIG. **5** is an exploded view of the tensioning cap associated with the supply rolls;

FIG. **6** is a perspective view illustrating the installation of a cartridge;

FIG. **7** is a detail view of the cutter mechanism;

FIG. **8** is a side view, partly in section, showing the cartridge in place and a master being fed into the device;

FIG. **8A** is a detail view of the wiper as indicated in FIG. **8**;

FIG. **9** is a sectional view taken along line **9**—**9** of FIG. **8**;

FIG. **10** is a detail view of the nip rollers;

FIG. **11** is a sectional view taken along line **11**—**11** of FIG. **10**;

FIG. **12** is a side view showing a master being fed between the nip rollers;

FIG. **13** shows labels as they receive adhesive;

FIG. **14** is a plan view of the upper feed web showing the pick up of excessive adhesive thereon;

FIG. **15** illustrates removal of the adhesive from the lower web;

FIG. **16** is a detailed side view of a portion of the adhesive transfer apparatus illustrating a paddle for flattening and cleaning a master as it is fed into the machine;

FIG. **17** is a top view showing the paddle arrangement of FIG. **16**; and

FIG. **18** is a side view of the paddle.

DETAILED DESCRIPTION OF THE DRAWINGS

Turning now to the drawings, particularly FIGS. **1** to **11**, the transfer apparatus of the present invention is generally designated by the numeral **10** and includes a housing member generally designated by the numeral **12** having a base **14**, opposite side walls **16** and **18**, a top **20** and a rear wall **22**. The rear wall **22** of the housing is upwardly and forwardly inclined at panel **22**A from the base **14** to a location where the rear wall extends vertically at panel **22**B. As seen in FIG. **8**, an opening **30** is defined between the panels **22**A and **22**B through which the substrate and processed articles are discharged.

As best seen in FIGS. **8**, **9** and **10**, an upper nip roller **40** extends transversely between the side walls of the frame spaced rearwardly from the edge of the side walls. The upper nip roller includes an axial shaft **42** rotatable in suitable bearings or bushings **44** at opposite ends. The shaft is covered by a cylindrical roller member **43** of resilient material such as rubber. Shaft **42** extends exteriorly of the side plate and is shown carrying a hand crank **45** for manually rotating the roller and shaft. Alternatively, the rollers may be powered by an electrical motor, not shown. A pinion gear **46** is secured to one end of the shaft adjacent the interior surfaces of the side wall.

A second nip roller **48** extends transversely between the side walls **16** and **18** positioned parallel to the upper nip roller. The lower nip roller may be vertically aligned with the upper nip roller but preferably is forwardly displaced a distance forward of the upper nip roller, as for example approximately ¼" as best seen in FIG. **8**. The terms "forward" and "rearward" or "front" and "rear" as used herein, refer to the orientation of the feed path through the device. The lower nip roller has a shaft **52** which is rotatable in bearings **54** located at the interior of the opposite side walls. A pinion gear **58** is mounted at one end of the shaft **52**. Pinion gear **58** engages the pinion gear **46** on the upper nip shaft so that actuation of the upper nip roller by means of the crank **45** or other power means will impart opposite rotation to both nip rollers as indicated by the arrows in FIG. **10**.

The upper and lower nip rollers 40,48 comprise pressure applying and substrate advancing structures that both apply pressure to the master substrate M and unwound end portions of the stock materials wound on supply rolls 165 and 166. Broadly speaking, these nip rollers may be considered to constitute a master substrate processing assembly comprising a plurality of cooperating structures constructed and arranged to (a) advane the master substrate M and unwound portions of the stock materials on opposing sides thereof

through the master substrate processing assembly and (b) apply pressure to the master substrate and the unwound portions of the stock materials to affect adhesive bonding between the master substrate M and the adhesive on the stock materials.

Feed tray **80** has **[**of**]** a planar feeding surface **82** with opposite extending flanges **85** which flanges are removably insertable in horizontal recesses **84** of the cartridge **150**. *The feeding surface 82 may also be referred to as a master supporting surface and the feed tray may be considered to be a structure providing that master supporting surface.* A *master substrate engaging structure in the form of a* wiper assembly **86** is mounted on the upper surface of the feed tray as seen in FIGS. **8** and **8**A. The wiper has a bar **91** which extends transversely across the tray adjacent the entrance to the nip area. The bar has a *master substrate engaging surface provided by a* pad **87** of felt or resilient or soft material such as felt, soft plastics, fabric or rubber, which lightly engages the master as it passes between the wiper and the tray surface. The wiper serves several functions and cleans, smooths and guides the master as it enters the nip between the rollers. A particularly important function of the wiper is to tension the master substrate keeping it flat and aligned with the laminate and adhesive webs resulting in better alignment especially when feeding sheets intermittently. The wiper has an arm **89** which is upwardly biased by spring **88**. Arm **89** is pivotally attached to the edge of the tray at fulcrum **93** so that the wiper is pressed into light engagement with the material passing beneath the pad **87**. The wiper bar **91** may be lifted to facilitate loading a master by manually depressing the outer end of the arm **89** against the force of spring **88**. Preferably the pad is replaceable as required.

Referring to FIGS. **6** and **7**, a blade **90** having a cutting edge extends transversely adjacent the discharge opening. The blade is movable vertically upward from a non-actuated position to a cutting position by means of lever **95** to which the blade **90** is attached. Lever **95** is pivotally secured to the interior of the housing side wall at pivot rod **96**. Downward movement of the lever at handle **97** will move the blade **90** upward into engagement with anvil bar **98** which is fixed and extends transversely. Preferably, the blade **90** is mounted on a carrier **99** by means of pins **102** having compression springs **104** thereon which bias the blade toward the cutting bar. Thus, when the cutting action occurs, the flat surface of the blade moves along the anvil which provides a self-cleaning action. The upper end of panel **22**A is slightly curved at **106** as seen in FIG. **8** to facilitate smooth discharge of the item being processed. The area indicated by the numeral **106** may be coated with a suitable low-frictional material such as that sold under the trademark "Teflon".

[A primary advantage of the present invention is that**]** *In the illustrated embodiment,* various substrates may be provided to the user in a self-contained, ready-to-use cartridge which allows the user simply to select and insert the appropriate cartridge. As indicated above, the device **[**of the present invention**]** *illustrated* can be used for multiple purposes for adhesive transfer and lamination. Adhesive can be transferred to either surface of the master and may be a dry adhesive. The cartridge is generally designated by the numeral **150** and includes a frame having opposite side walls **152**, **154**, a top **156**, and bottom **158**. A front wall **160** defines a substantial rectangular opening **162**. As shown, the cartridge includes an upper feed roll **165** and a lower feed roll **166** each containing a web of film or other flexible substrate material. **[**A significant advantage of the present invention is that**]** *In the illustrated embodiment,* the upper and lower feed rolls are provided to the user pre-wound and properly tensioned so as not to overrun during operation and to provide proper tracking. The proper tensioning of the feed rolls is accomplished by means of a tensioning device as best seen in FIGS. **3**, **4** and **5**.

In FIGS. **3**, **4** and **5**, which figures are representative of the construction of the both ends of both feed rolls, the substrate material is shown wound about the feed roll core **200**. The core **200** is a cylinder of cardboard or plastic having an end face **210**. Core **200** has a hollow interior **212** which receives an end cap **215**. The cap may be molded of plastic or other similar material having an interior outer wall **216**. A boss **220** is concentrically formed in the cap with respect to the cylinder wall **216**. Boss **220** defines an axial bore **225**. The cap **215** is positioned slightly inwardly of the end of the core and may be adhesively secured to the interior wall **212** of the roll core **200**.

A circular end plate **230** abuts the end of the core which plate has a diameter slightly greater than the diameter of the core. The end plate has a central aperture **240** which receives the threaded shaft of bolt **246**. A spring **250** is interposed between the head of the bolt and the interior face of the cap **215**. Nut **252** engages the threaded end of the bolt. The head of the bolt **246** bears against the exposed surface of the end plate **230** and the position of the nut along the shaft of the bolt determines the frictional resistance that exists between the interior surface of the end plate **230** and the end face of the core of the roller. This tension is pre-adjusted by the manufacturer to provide the proper roll tension depending upon the type of material on the roll, the size of the material, the thickness of the material and other factors. Mounting tabs **260** and **260**A project outwardly from the end plate and are slidingly engageable in mounting slots **270**, **270**A and **272**, **272**A provided on the interior surfaces of the cartridge side walls.

Thus, it will be seen that inserting a supply of suitable feed substrate is easily accomplished. The user simply selects the appropriate cartridge **150** and positions the cartridge in the opening at the front side of the housing. The cartridge is locked in place in the housing in a vertical position by locking detent members **280**. The feed rolls may be various types of stock such as clear laminates, paper or film for removing excessive adhesive or rolls of material having a loose adhesive coating and a release coating on the opposite surface. The feed tray **80** is inserted in a generally horizontal position in the opposite slots in the cartridge.

As mentioned above, the device may be used as a lamination device or as an adhesive transfer device. In the case of use as an adhesive transfer device, the lower feed roll which consists of a film carrying an easily transferable adhesive. The upper feed roll would typically be a web of flexible carrier material having release characteristics on a lower surface and adhesive coating on the other surface. With rolls of this type in position, the end of the web of the lower feed roll is extended over the lower nip roller. The upper feed roll, in the case of adhesive transfer, will consist of a web of material such as inexpensive paper or film, having an affinity for adhesive. The end of the web is extended between the nip rollers with the end of the web adhesively secured to the web of the master in the lower roll.

Referring to FIGS. **11** to **15**, the master which is designated by the numeral **300** consists of a continuous sheet of material having an upper surface and a lower surface. The upper surface carries labels **310** which have been pre-printed. Obviously, the master can be any pre-printed document or series of documents which can be generated by the

user, as for example on a computer. The labels **310** can be of varying size and shape and it is understood that the term "labels" as used herein is intended to be representative of printed materials of various types arranged on a flexible substrate.

The master is aligned on the feed tray with the leading free edge of the master positioned on the exposed adhesive surface of the lower feed stock material. **166** at the nip roller interface. The slight forward protrusion of the lower nip roller **48** facilitates securing the master at this location. The web **165** of the upper feed roller is fed from the cartridge to the nip roller interface on the upper side of master **300**.

The operator then actuates the machine by operating the crank which will rotate the upper nip roller and by means of the inter-engaging pinion gears, cause rotation of the lower nip roller. The rotation will also advance the upper web, the lower web and the master. The master is smoothed, guided and wiped clean as it passes between the wiper **86** and the upper surface of the tray. As the master proceeds between the nip rollers in the interface nip area, the exposed adhesive **325** from the lower web will be transferred to the lower surface of the master **300**. The upper web **165** will pick up any excessive adhesive not transferred to the master, as for example adhesive in the areas outside the perimeter of the label areas **310**. The upper web should be wider than the adhesive web. The master may then be easily severed into individual labels or strips of labels by operating the cutter by means of the lever as the master emerges from the discharge opening at the rear of the machine.

Note that the master can be oriented with either printing or indicia facing upwardly or downwardly depending on the user's requirements.

For example, if the user is making labels which are to be applied to the inside of a window, the master would, in most cases, be fed into the applicator with the printing disposed downwardly so adhesive would be applied over the printed area **310**. The apparatus can apply lamination to either top or bottom surfaces of a substrate or adhesive to the top or bottom surfaces of a substrate or to both surfaces. The device can also perform combination operations in applying of both the laminate and an adhesive to a substrate, the operation being determined by the selection of the cartridge and feed rolls within the cartridge that are inserted into the apparatus.

The characteristics of the lower web are such that the adhesive is a nonaggression adhesive loosely adhered to the surface of the web. Thus, the lower web serves as a peelable cover which can be stripped away at the time the master is to be used by adhesively applying the master to a surface.

[One significant advantage of the present invention is that**]** *In the illustrated embodiment,* the upper and lower feed rolls may be provided to the user pre-wound and properly tensioned so as not to overrun during operation. The proper tensioning is pre-set by the tensioning device described above.

In FIGS. **8** and **12**, a wiper assembly **86** is shown mounted at the upper surface of the feed tray which operates to clean the master and apply pressure to the master as it enters the nip area. In FIGS. **15** and **16**, an alternate form of **[**wiper assembly,**]** *the master substrate engaging structure* termed a "paddle", is shown which is generally designated by the numeral **400**. Referring to FIG. **16** in which the same numerals identify the same or similar elements appearing in previous drawing FIGS., the nip rollers **40** and **48** are shown and material from the upper and lower feed rolls, respectively **165** and **166**, is directed across idler rollers **402** and **404** to the interface between the nip rollers.

A master "M" to which a laminating or adhesive transfer operation is to be applied is fed along the tray **80** as indicated by the arrows in FIGS. **16** and **17**. The paddle **400** is associated with tray **80** spaced from the rollers **40** and **48**. The tray **80**, as has been explained previously, has a generally planar *master substrate supporting* surface **82** on which a master "M" to be processed is placed. The surface **80** of the tray is disposed a slight vertical distance, about 1/16", above the plane of the material **166** as it enters into the area between the feed rollers. This is illustrated by the space "S" in FIG. **16**. This space allows the master "M" to be properly oriented and aligned before it is picked up by the material **166** from feed roll **166**.

The paddle **400** is disposed above the tray and serves to flatten and attach the master to the material **166** and also cleans the master prior to processing such as an application of laminates. The paddle has a generally planar platen **410** which is formed having a vertical wall **412** and opposite side walls **416** and **418**. The paddle may be any suitable size, and typically may be approximately 25" in width. The opposite side walls **416** and **418** are each provided with openings **420** and **422**. The openings each extend vertically at **424** and **425** and have a rearwardly inclined upper cam surface **426**. A generally lower arcuate region **430** is provided at the forward end of the cam surface at an arcuate surface **432** at the rearward end of the cam surface. The upper surface forms a cam surface which rides on detent members **440** and **442** which are pins or rollers that are fixed to the opposite side walls **452** and **454** of the tray **80**.

Thus, it will be seen that by manually moving the paddle **400** forward toward the nip rollers, the paddle will be displaced downwardly as the cam surfaces **426** move along the associated detents **440** and **442**. In the forward position, the paddle rests on the master "M" which is positioned on the surface **82** of the tray **80**. The paddle applies a gentle downward pressure and/or applies a predetermined resistance or tension to the master as it passes beneath the paddle. Typically, for a paddle having a width of about 25", the weight of the paddle will be between 1 and 4 pounds.

By manually moving the paddle in the direction away from the nip rollers, the paddle will be elevated away from the surface of the master. FIG. **16** shows the paddle in the position in which it engages the master.

As indicated above, the purpose of the paddle is to apply light pressure to flatten the master and attach the master to the web and also to clean the master. The paddle also applies a controlled back tension to avoid wrinkling. Accordingly, the lower *master substrate engaging* surface of the platen **410** is specially fabricated to have characteristics to best perform these operations. As seen in FIG. **18**, the leading position of the platen in the area generally designated by the numeral **460** is treated with an elastomer which has non-stick characteristics. A typical material would be silicon rubber. Thus, when the bottom surface of the platen **460** is in contact with the master, this area of the base plate will tend to force the master into contact with the web from the feed roll **166** and against roller **404**. Again, it is noted that the surface of tray **82** is slightly above the plane of the material **166** as it passes over the idler roller and into the nip area.

The portion of the surface of the base plate indicated by the numeral **462** has characteristics to provide a slight resistance to the master as it moves or is advanced towards the nip area. The purpose of the resistance is to slightly flatten and tension the material to overcome any curl. Also, this area provides a cleaning and wiping action to the master

removing lint, dust and particulates. The slight tension also helps to flatten materials that may have a slight curl remaining due to be provided in a rolled condition. Accordingly, the surface of the paddle in this area is treated with a suitable material such as the material manufactured and sold under the trademark Ultrawipe™. The areas **460** and **462** preferably extend the entire width of the platen.

While the paddle has been described with respect to the adhesive transfer apparatus of the present invention, such as that designated by the numeral **10**, the paddle **400** has wide application to various apparatus and methods for processing substrates in which the substrate is required to be properly oriented, flat and clean at the time of processing.

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. To the extent these various modifications do not depart from the spirit and scope of the appended claims, they are intended to be encompassed therein.

We claim:

1. A **[**paddle for a**]** master substrate processing apparatus **[**in which**]** *for processing* a master substrate **[**is fed into a nip roll area to be processed**]**, said **[**paddle**]** comprising:

[(a) a tray disposed adjacent said nip area having a generally planar tray surface for receiving a master;

(b) a paddle having a platen surface disposed above said tray;

(c) means for moving said paddle between a first position elevated above said tray and a second position disposed against said tray; and

(d) said platen surface having a first area having characteristics of non-stick and a second area for applying a predetermined resistance to a master in contact with the platen surface**]**

a first supply roll comprising a wound supply of a first stock material carrying a layer of adhesive;

a second supply roll comprising a wound supply of a second stock material;

a master substrate processing assembly having structure constructed and arranged to process said master substrate and said unwound portions of said stock materials during advancement thereof in a feeding direction through said processing assembly to affect adhesive bonding between said master substrate and said adhesive;

structure providing a master substrate supporting surface adjacent a feed site of said master processing assembly to support the master substrate thereon as the master substrate is being fed into said master substrate processing assembly; and

a master substrate engaging structure extending generally transversely across said master substrate supporting surface, said master substrate engaging structure having a master substrate engaging surface that engages the master substrate while supported on said master substrate supporting surface so as to apply frictional resistance to advancement of the master substrate in said feeding direction thereby tension the master substrate.

2. **[**The paddle of**]** *A master substrate processing apparatus according to* claim **[1]** *12,* wherein said **[**tray**]** *master substrate supporting* surface is disposed a predetermined distance above the interface of the nip **[**roll area**]** *rollers*.

3. **[**The paddle of**]** *A master substrate processing apparatus according to* claim **[1]** *31, further comprising a frame and* wherein *said structure providing said master substrate supporting surface is a feed tray mounted to said frame and* said tray has opposite side walls **[**defining a cam surface which surfaces are in engagement with fixed detents whereby the tray may be manually moved between said first and second positions**]** *providing said camming members.*

4. **[**The paddle of**]** *The master substrate processing apparatus according to* claim **[1]** *35,* wherein said first area is treated with an elastomeric material and said second area is treated with a nonwoven fabric material.

5. **[**The paddle of**]** *A master substrate processing apparatus according to* claim **1** **[**in which**]**, *wherein* said *master* substrate processing apparatus is an adhesive transfer apparatus.

6. **[**The paddle of**]** *A master substrate processing apparatus according to* claim **1** **[**in which**]**, *wherein* said *master* substrate processing apparatus is a laminating apparatus.

7. **[**The paddle of**]** *A master substrate processing apparatus according to* claim **4** wherein said elastomeric material is silicon rubber.

8. A master substrate processing apparatus according to claim 1, wherein said structure of said master substrate processing assembly comprises a plurality of cooperating structures constructed and arranged to (a) advance said master substrate with unwound portions of said first and second stock materials on opposing sides thereof in a feeding direction through said master substrate processing assembly and (b) apply pressure to said master substrate and said unwound portions of said stock materials to affect said adhesive bonding between said master substrate and said adhesive.

9. A master substrate processing according to claim 8, wherein said master substrate engaging structure is movable between (a) a first position wherein said master engaging surface engages the master substrate while supported on said master substrate supporting surface so as to apply said frictional resistance to advancement of the master substrate and (b) a second position wherein said master substrate engaging surface is moved away from said master supporting surface so as to be disengaged from the master substrate.

10. A master substrate processing apparatus according to claim 9, wherein said cooperating structures include a pair of pressure applying and substrate advancing structures constructed and arranged to both (a) apply said pressure to the master substrate and the unwound portions of the stock materials and (b) advance the master substrate and the stock materials through said master processing assembly.

11. A master substrate processing apparatus according to claim 10, wherein said pressure applying and advancing structures include a rotatable nip roller.

12. A master substrate processing apparatus according to claim 10, wherein said pressure applying and advancing structures include a pair of rotatable nip rollers.

13. A master substrate processing apparatus according to claim 12, further comprising an actuator constructed and arranged such that operation thereof affects nip roller rotation.

14. A master substrate processing apparatus according to claim 13, wherein said actuator is a manually operated crank.

15. A master substrate processing apparatus according to claim 13, wherein said actuator is an electrically powered motor.

16. A master substrate processing apparatus according to claim 1, wherein said adhesive is a pressure-sensitive adhe-

sive and wherein said master substrate processing assembly affects said adhesive bonding without the use of heat transfer.

17. A master substrate processing apparatus according to claim 1, wherein said second stock material carries a layer of adhesive.

18. A master substrate processing apparatus according to claim 1, wherein said first and second stock materials are laminating films.

19. A master substrate processing apparatus according to claim 18, wherein said laminating films are transparent.

20. A master substrate processing apparatus according to claim 9, further comprising a biasing element biasing said master substrate engaging structure to said first position thereof.

21. A master substrate processing apparatus according to claim 20, wherein said biasing element is a spring.

22. A master substrate processing apparatus according to claim 21, wherein said spring is a coil spring.

23. A master substrate processing apparatus according to claim 9, wherein said master substrate engaging structure is pivotally movable between said first and second positions thereof.

24. A master substrate processing apparatus according to claim 23, further comprising a biasing element biasing said master substrate engaging structure to said first position thereof.

25. A master substrate processing apparatus according to claim 24, wherein said biasing element is a spring.

26. A master substrate processing apparatus according to claim 25, wherein said spring is a coil spring.

27. A master substrate processing apparatus according to claim 9, further comprising a frame and wherein said structure providing said master substrate supporting surface is a feed tray mounted to said frame.

28. A master substrate processing apparatus according to claim 27, wherein said feed tray is removably mounted to said frame.

29. A master substrate processing apparatus according to claim 27, wherein said master substrate engaging structure is movably mounted to said tray for movement between said first and second positions thereof.

30. A master substrate processing apparatus according to claim 29, wherein said master substrate engaging structure is pivotally mounted to said tray for movement between said first and second positions thereof.

31. A master substrate processing apparatus according to claim 9, wherein said master substrate engaging structure has a pad formed from a material selected from the group consisting of felt, soft plastic, fabric, and rubber, said pad providing said master substrate engaging surface.

32. A master substrate processing apparatus according to claim 9, wherein manual movement of said master substrate engaging structure in said feeding direction and opposite said feeding direction causes said master substrate engaging structure to move between said first and second positions thereof.

33. A master substrate processing apparatus according to claim 32, further comprising a frame and wherein said master substrate engaging structure provides camming surfaces and wherein said frame has camming members engaging said camming surfaces, said camming members and said camming surfaces being configured such that during movement of said master substrate engaging structure opposite the feeding direction said camming members cam against said camming surfaces to move said master substrate engaging structure upwardly away from said master substrate supporting surface to said second position thereof.

34. A master substrate processing apparatus according to claim 33, wherein said camming surfaces provide first and second detents in which said camming members are received when said master substrate engaging structure is in said first and second positions thereof, respectively.

35. A master substrate processing apparatus according to claim 32, wherein said master substrate engaging surface has first area of non-stick material and a second area for providing resistance to movement of the master.

36. A master substrate processing apparatus according to claim 9, further comprising a frame and wherein said first and second supply rolls are each removably mounted to said frame for removal and replacement thereof.

37. A master substrate processing apparatus according to claim 36, further comprising a cartridge having a cartridge body structure removably mounted to said frame, said first and second supply rolls being mounted to said cartridge body structure such that said cartridge body structure removably mounts both said first and second supply rolls to said frame for removal and replacement thereof.

38. A master substrate processing apparatus for processing a master substrate, said apparatus comprising:

a first supply roll comprising a wound supply of a first stock material carrying a layer of adhesive;

a second supply roll comprising a wound supply of a second stock material;

a pair of nip rollers constructed and arranged to advance the master substrate and unwound portions of the first and second stock materials in a feeding direction and apply pressure to the master and first and second stock materials to affect adhesive bonding between said master substrate and said adhesive;

structure providing a master substrate supporting surface positioned to support the master substrate thereon as the master substrate is being advanced into said nip rollers; and

a master substrate engaging structure extending generally traversely across said master substrate supporting surface, said master substrate engaging structure having a master substrate engaging surface that engages the master substrate while supported on said master supporting surface so as to apply frictional resistance to advancement of the master substrate in said feeding direction to thereby tension the master substrate.

39. A master substrate processing apparatus according to claim 38, wherein said master substrate engaging structure is movable between (a) a first position wherein said master engaging surface engages the master substrate while supported on said master substrate supporting surface so as to apply said frictional resistance to advancement of the master substrate and (b) a second position wherein said master substrate engaging surface is moved away from said master supporting surface so as to be disengaged from the master substrate.

40. A master substrate processing apparatus according to claim 38, further comprising an actuator constructed and arranged such that operation thereof affects nip roller rotation.

41. A master substrate processing apparatus according to claim 40, wherein said actuator is a manually operated crank.

42. A master substrate processing apparatus according to claim 40, wherein said actuator is an electrically powered motor.

43. A master substrate processing apparatus according to claim 38, wherein said adhesive is a pressure-sensitive

adhesive and wherein said nip rollers apply pressure to affect said adhesive bonding without the use of heat transfer.

44. A master substrate processing apparatus according to claim 38, wherein said second stock material carries a layer of adhesive.

45. A master substrate processing apparatus according to claim 38, wherein said first and second stock materials are laminating films.

46. A master substrate processing apparatus according to claim 45, wherein said laminating films are transparent.

47. A master substrate processing apparatus according to claim 39, further comprising a biasing element biasing said master substrate engaging structure to said first position thereof.

48. A master substrate processing apparatus according to claim 47, wherein said biasing element is a spring.

49. A master substrate processing apparatus according to claim 45, wherein said spring is a coil spring.

50. A master substrate processing apparatus according to claim 39, wherein said master substrate engaging structure is pivotally movable between said first and second positions thereof.

51. A master substrate processing apparatus according to claim 50, further comprising a biasing element biasing said master substrate engaging structure to said first position thereof.

52. A master substrate processing apparatus according to claim 51, wherein said biasing element is a spring.

53. A master substrate processing apparatus according to claim 52, wherein said spring is a coil spring.

54. A master substrate processing apparatus according to claim 39, further comprising a frame and wherein said structure providing said master substrate supporting surface is a feed tray mounted to said frame.

55. A master substrate processing apparatus according to claim 54, wherein said feed tray is removably mounted to said frame.

56. A master substrate processing apparatus according to claim 54, wherein said master substrate engaging structure is movably mounted to said tray for movement between said first and second positions thereof.

57. A master substrate processing apparatus according to claim 56, wherein said master substrate engaging structure is pivotally mounted to said tray for movement between said first and second positions thereof.

58. A master substrate processing apparatus, according to claim 39, wherein said master substrate engaging structure has a pad formed from a material selected from the group consisting of felt, soft plastic, fabric, and rubber, said pad providing said master substrate engaging surface.

59. A master substrate processing apparatus according to claim 39, wherein manual movement of said master substrate engaging structure in said feeding direction and opposite said feeding direction causes said master substrate engaging structure to move between said first and second positions thereof.

60. A master substrate processing apparatus according to claim 59, further comprising a frame and wherein said master substrate engaging structure provides camming surfaces and wherein said frame has camming members engaging said camming surfaces, said camming members and said camming surfaces being configured such that during movement of said master substrate engaging structure opposite the feeding direction said camming members cam against said camming surfaces to move said master substrate engaging structure upwardly away from said master substrate supporting surface to said second position thereof.

61. A master substrate processing apparatus according to claim 60, wherein said camming surfaces provide first and second detents in which said camming members are received when said master substrate engaging structure is in said first and second positions thereof, respectively.

62. A master substrate processing apparatus according to claim 59, wherein said master substrate engaging surface has first area of non-stick material and a second area for providing resistance to movement of the master.

63. A master substrate processing apparatus according to claim 39, further comprising a frame and wherein said first and second supply rolls are each removably mounted to said frame for removal and replacement thereof.

64. A master substrate processing apparatus according to claim 63, further comprising a cartridge having a cartridge body structure removably mounted to said frame, said first and second supply rolls being mounted to said cartridge body structure such that said cartridge body structure removably mounts both said first and second supply rolls to said frame for removal and replacement thereof.

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