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(54) **SYSTEM FOR DISPENSING PLASTIC FASTENERS**

SYSTEM ZUR ABGABE VON KUNSTSTOFFBEFESTIGUNGSELEMENTEN

SYSTEME DE DISTRIBUTION D'ATTACHES EN PLASTIQUE

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Description

[0001] The present invention relates generally to plastic fasteners and more particularly to devices used in the dispensing of plastic fasteners.

[0002] In U.S. Patent Number 4,039,078 to A.R. Bone there are disclosed several different types of plastic fasteners, or attachments, which are fabricated as part of continuously connected ladder stock. In each instance, the fastener has an H-shape, and the ladder stock is formed from two elongated and continuous plastic side members coupled together by a plurality of plastic cross links, the cross links preferably being equidistantly spaced. The stock may be produced from flexible plastics material including nylon, polypropylene and other similar materials by molding or by stamping.

[0003] Either manually or with the aid of specifically designed devices, individual fasteners may be dispensed from the ladder stock to couple buttons to fabric, merchandising tags to articles of commerce, or, in general, any two desired articles. In those instances where the dispensing device has dual needles, the attachments severed from the stock can be used like staples to secure objects and items.

[0004] Specifically designed devices for dispensing individual plastic fasteners are well known in the art. Plastic fastener dispensing devices are commonly used to sever individual plastic fasteners from continuously connected ladder stock and to attach the severed individual plastic fastener to items.

[0005] In commonly assigned U.S. Patent No. 5,615,816 there is disclosed an apparatus for dispensing attachments from continuously connected ladder stock of the type comprising a pair of plastic side members coupled together by a plurality of plastic cross links. The apparatus includes a mount, a support movably mounted on the mount, and a pair of carrier blocks mounted on the support. A needle block is mounted on each carrier block and a hollow, slotted needle is mounted on each needle block. A feed mechanism including a pair of feed wheels, is mounted on the support for advancing the ladder stock into the hollow slotted needles and a pair feed tracks, one for each hollow slotted needle, are provided through which the ladder stock passes from the feed wheels into the pair of hollow slotted needles. A pair of knives are provided for severing an attachment from the ladder stock, and a pair of ejector rods are provided for ejecting the severed attachment through the hollow slotted needles. The carrier blocks are disposed parallel to each other and movable sideways relative to each other so that the spacing between the hollow slotted needles can be changed for different applications. The feed wheels are disposed parallel to each other and are capable of being moved sideways relative to each other so that their spacing can be changed to accommodate different widths of ladder stock. In order to provide a path for the ladder stock form the feed wheels to the hollow slotted needles for different feed wheel spacings and/or needle spacings, each feed track assembly includes a pivotally mounted section.

[0006] The apparatus disclosed in U.S. Patent No. 5,615,816 is well known in the art and is commonly referred to in the art simply as a variable needle system (VNS).

[0007] Variable needle systems of the type described in U.S. Patent No. 5,616,816 are commonly used in the art to secure a product for sale, such as a toy, hardware item or houseware item, onto a display card using one or more plastic fasteners. As can be appreciated, when used to secure a product for sale onto a display card, plastic fasteners are commonly referred to as elastic staples in the art.

[0008] It should be noted that the use of a variable needle system of the type described in U.S. Patent No. 5,616,816 to secure a product of sale onto a display card using one or more elastic staples provides numerous advantages. Specifically, the capability of such a variable needle system to continuously dispense elastic staples from a roll of fastener stock increases the productivity in which an operator is able to secure products for sale onto associated display cards, which is highly desirable. Accordingly, variable needle systems of the type described in U.S. Patent No. 5,616,816 are commonly used on assembly lines for packaging products.

[0009] It should also be noted that the use of elastic staples to secure a product of sale onto a display card provides numerous advantages.

[0010] As an example, the particular construction of an elastic staple creates aesthetic benefits which are highly desirable. Specifically, the use of elastic staples enables the product for sale to be mounted onto a display card, thereby enabling the product to be presented to the potential customer in an ideal packaging to see, feel and manipulate the product at the point of purchase. Furthermore, it has been found that the elastic staple is barely visible when securing a product for sale onto its associated display card.

[0011] As another example, the elasticity of the staple allows for the fastener to be used in a wide range of applications and in conjunction with a variety of differently sized products, which is highly desirable.

[0012] As another example, the elasticity of the staple allows for the fastener to conform tightly against the product for sale, thereby creating a strong and durable attachment of the product for sale onto its associated display card, which is highly desirable. As a result, the product remains securely fastened onto the display card until after purchase.

[0013] Although well known and widely used in the art for securing products for sale onto display cards, variable needle systems of the type disclosed in U.S. Patent No. 5,615,816 suffer from a few notable drawbacks.

[0014] As a first drawback, the variable needle system disclosed in U.S. Patent No. 5,615,816 is typically fixedly mounted onto a support structure. Accordingly, in use, the operator is required to manually urge the items to be

coupled up against the pair of needles in such a manner so that the pair of needles penetrates through the items. As a consequence, it has been found that the user is at risk of inadvertently contacting the sharpened end of the needles, which is highly undesirable.

[0015] As a second drawback, the variable needle system disclosed in U.S. Patent No. 5,615,816 is constructed so that the operator can insert the needles into and through the items to be coupled at variable depths. Specifically, the operator is unable to regulate the degree of insertion of the needles through the items. As a result, if the needles are inserted too far through the items, the fastener can become overstretched and, as a result, will break, which is highly undesirable. Furthermore, if the needles are not inserted far enough through the items, the fastener is unable to penetrate through the items, thereby precluding proper coupling, which is highly undesirable.

[0016] As a third drawback, the variable needle system disclosed in U.S. Patent No. 5,615,816 fails to adequately support, or stiffen, the pair of needles. As a result, the needles are susceptible to bending and breaking when inserted through the items to be coupled together, which is highly undesirable.

[0017] An apparatus for feeding and serving fastener attachment stock corresponding to the preamble of claim 1 is disclosed in U.S. Patent Number 4,179,063 (David B. Russell). Singer et al. (

[0018] U.S. Patent Number 4,969,625) discloses a tool support apparatus for air- or electrically-driven power tools.

[0019] Suzuki et al. (U.S. Patent Number 4,402,446) discloses a tag-pin attaching apparatus.

[0020] A reactor plate assembly which serves as an anvil for a plastic fastener dispensing device is disclosed in the WO 01/20173 A2.

SUMMARY OF THE INVENTION

[0021] It is an object of the present invention to provide a new and improved system for dispensing a plastic fastener from a reel of fastener stock to couple together two or more items.

[0022] It is another object of the present invention to provide a system as described above which includes a module for dispensing the plastic fastener from the reel of fastener stock.

[0023] It is yet another object of the present invention to provide a system as described above which includes a stand onto which the module is mounted.

[0024] It is still another object of the present invention to provide a system as described above which enables an operator to displace the module relative to the stand.

[0025] Accordingly, there is provided a system for dispensing a plastic fastener from a reel of fastener stock to couple together two or more objects, said system comprising a module for dispensing the plastic fastener from the reel of fastener stock to couple together the two or more objects, a counterbalance for supporting said module a mounting stand for supporting said counterbalance and a reel holder coupled to said mounting stand for holding the reel of fastener stock.

[0026] Various other features and advantages will appear from the description to follow. In the description, reference is made to the accompanying drawings which form a part thereof, and in which is shown by way of illustration, various embodiments for practicing the invention. These embodiments will be described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that structural changes may be made without departing from the scope of the invention. The following detailed description is therefore, not to be taken in a limiting sense, and the scope of the present invention is defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] In the drawings wherein like reference numerals represent like parts:

Fig. 1 is a perspective view of a first embodiment of a variable needle system constructed according to the teachings of the present invention, the system being shown with the anvil mounted on a workstation, the workstation being shown in dashed form, the system also being shown with a supply of continuously connected ladder stock fed thereinto;

Fig. 2 is a fragmentary perspective view of the system shown in Fig. 1, the system being shown securing a product for sale onto a display card using a plastic fastener;

Fig. 3 is a front plan view of the product for sale secured onto the display card using a plastic fastener as shown in Fig. 2;

Fig. 4 is a perspective view of a length of continuously connected ladder stock which may be used with the system shown in Fig. 1;

Fig. 5 is a perspective view of the VNS module shown in Fig. 1, the VNS module being shown with a supply of continuously connected ladder stock fed thereinto;

Fig. 6 is an enlarged, fragmentary, perspective view of the VNS module shown in Fig. 1;

Fig. 7 is an exploded, perspective view of the VNS module shown in Fig. 1, the VNS module being shown with its enclosure removed;

Fig. 8 is an enlarged, fragmentary, perspective view of the VNS module shown in Fig. 1;

Fig. 9 is an enlarged, fragmentary, perspective view of selected components of the VNS module shown in Fig. 1;

Fig. 10 is an enlarged, exploded, fragmentary, perspective view of selected components of the VNS module shown in Fig. 1;

Fig. 11 is an enlarged, exploded, fragmentary, perspective view of selected components of the VNS

module shown in Fig. 1;

Fig. 12 is a enlarged, fragementary, front plan view of the VNS module shown in Fig. 1, the VNS module being shown with its enclosure removed;

Fig. 13 is a side view of the fixedly mounted needle guard of the first retractable needle guard assembly shown in Fig. 1;

Fig. 14 is a side view of the movable needle guard of the first retractable needle guard assembly shown in Fig. 1;

Fig. 15 is a side view of the first retractable needle guard assembly shown in Fig. 1, the first retractable needle guard assembly being shown in its protective position and disposed over a needle, the needle being shown in dashed form;

Fig. 16 is a side view of the first retractable needle guard assembly shown in Fig. 1, the first retractable needle guard assembly being shown in its retracted position and disposed over a needle, the needle being shown in dashed form;

Fig. 17 is a fragmentary, exploded, perspective view of the mounting stand shown in Fig. 1, the mounting stand being shown mounted on a workstation, the workstation being shown in dashed form;

Fig. 18 is a fragmentary, exploded, perspective view of the mounting stand shown in Fig. 1, the mounting stand being shown mounted on a workstation, the workstation being shown in dashed form;

Fig. 19 is a fragmentary exploded, perspective view of the counterbalance and mounting stand shown in Fig. 1;

Fig. 20 is a fragmentary, exploded, perspective view of the counterbalance, mounting stand, reel holder and continuous supply of fastener stock shown in Fig. 1;

Fig. 21 is a front perspective view of a second embodiment of a system for dispensing a plastic fastener from a reel of fastener stock to couple together two or more objects, said system being constructed according to the teachings of the present invention, said system being shown mounted onto a workstation surface, said system being shown with a supply of continuously connected ladder stock fed thereinto, said system also being shown in relation to an X-axis, a Y-axis and a Z-axis;

Fig. 22 is a front perspective view of the mounting stand shown in Fig. 21;

Fig. 23 is a front, exploded, perspective view of the mounting stand shown in Fig. 21; and

Fig. 24 is a rear, fragmentary, perspective view of the system shown in Fig. 21.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0028] Referring now to Fig. 1, there is shown a variable needle system (VNS) constructed according to the teachings of the present invention, the system being identified generally by reference numeral 10. As will be described further in detail below, system 10 is designed for use in dispensing plastic fasteners from a supply of continuously connected ladder stock 11.

[0029] As such, system 10 can be used in an automated packaging line. Specifically, system 10 may be used, for example, to secure a product P for sale, such as a toy, hardware item or houseware item, onto to a cardboard display card C using one or more plastic fasteners, as shown in Figs. 2 and 3.

[0030] Supply of continuously connected ladder stock 11 represents any well known continuous supply of plastic fasteners. For example, ladder stock 11 may be of the type described in U.S Patent Number 5,615,816 to Charles L. Deschenes et al. Specifically, Fig. 4 shows a perspective view of a prior art length of continuously connected ladder stock 11 with which the system of this invention may be used. Ladder stock 11 is preferably made of plastic and comprises a pair of side members 13 and 15 interconnected by a plurality of cross links 17. A fastener 18 which is obtained from ladder stock 11 is shown in Fig. 4 and is commonly referred to as an elastic staple in the art. Fastener 18 comprises a pair of end bars 19 and 21 which are interconnected by a filament 23, end bars 19 and 21 comprising sections of side members 13 and 15, respectively, and filament 23 comprising a cross link 17.

[0031] It should be noted that, for simplicity purposes only, system 10 will be described for use with ladder stock 11. However, it is to be understood that system 10 could be described for use with alternative types of ladder stock without departing from the spirit of the present invention. Specifically, system 10 is capable of being adjusted to accommodate changes in the size of the ladder stock to be used and also to adjust the needle spacing to accommodate changes in the size of the products with which the attachments are to be used.

[0032] It should be noted that ladder stock 11 is preferably wound onto a reel 27, reel 27 being sized and shaped to hold a supply of ladder stock 11 which includes approximately 10,000 fasteners 18. As such, the high volume reel 27 of fasteners 18 enables for continuous operation of system 10.

[0033] System 10 comprises a VNS module 29 for dispensing plastic fasteners 18 so as to secure a product P onto a display card C, a mounting stand 31 affixed to a workstation W, a counterbalance 33 affixed to workstation W for supporting VNS module 29, a reel holder 35 affixed to mounting stand 31 for supporting reel 27 of fastener stock 11 and an anvil 37 mounted onto workstation W for supporting product P and display card C. It should be noted that portions of system 11 not pertinent to this invention are neither shown nor described in detail herein.

[0034] Referring now to Figs. 5-7, VNS module 29 comprises a frame 39 and an enclosure 41 which are secured together by a plurality of screws 42, frame 39 and enclosure 41 together defining an internal cavity 43.

[0035] A handle 45 is fixedly mounted onto the exterior of enclosure 41 and serves to enable an operator to freely handle VNS module 29. In addition, a feed guide slot 47 is formed in enclosure 41, feed guide slot 47 being in communication with internal cavity 43.

[0036] A U-shaped bracket 49 is fixedly mounted onto frame 39 and includes a first tab 51 and a second tab 53. First tab 51 of U-shaped bracket 49 extends perpendicularly away from the top of frame 39 and is shaped to include an elongated feed slot 55. Second tab 53 of U-shaped bracket 49 extends perpendicularly away from the top of frame 39 and shaped to include an elongated feed slot, or fastener guide slot, 57 and a clip opening, or tether ring, 59.

[0037] As such, supply of fastener stock 11 is fed into VNS module 29 in the following manner. Specifically, the free end of fastener stock 11 is fed from reel 27, through feed slot 55 formed in first tab 51, through feed slot 57 formed in second tab 53, down through feed guide slot 47 and into internal cavity 43, as shown in Fig. 5.

[0038] It should be noted that, by disposing tether ring 59 above fastener guide slot 57, fastener stock 11 is capable of being fed from behind VNS module 29 and into feed guide slot 47 while VNS module 29 is suspended from counterbalance 33, as shown in Fig. 1, which is highly desirable.

[0039] Referring now to Figs. 7-11, VNS module 29 further comprises first and second spaced apart support plates 61-1 and 61-2 which are affixed onto frame 39 with screws 63, support plates projecting out orthogonally from frame 39.

[0040] First and second needle blocks 65-1 and 65-2 are mounted on a shaft 67 which extends laterally between first and second support plates 61-1 and 61-2. A manually rotatable needle spacing knob 69 is fixedly mounted onto one end of shaft 67. As can be appreciated, rotation of knob 69 laterally displaces first needle block 65-1 towards and away from second needle block 65-2, second needle block 65-2 remaining at a fixed position on shaft 67. In this manner, knob 69 can be used to adjust the spacing between needle blocks 65.

[0041] First and second needle holders 71-1 and 71-2 are fixedly mounted onto first and second needle blocks 65-1 and 65-2, respectively, by screws 73.

[0042] First and second hollowed needles 75-1 and 75-2 are mounted onto first and second needle holders 71-1 and 71-2, respectively. Each needle 75 is conventional in construction and includes a first end 77, a second end 79, an elongated channel 81 and an elongated slot 83 in communication with elongated channel 81. First end 77 of each needle 75 is sized and shaped to be fittingly disposed within a needle receptacle 78 formed in its associated needle holder 71, thereby enabling each needle 75 to project perpendicularly out from its associated needle holder 71. Second end 79 of each needle 75 is in the form of a spoon-shaped sharpened tip through which an end bar of fastener 18 may pass during the dispensing process.

[0043] As can be appreciated, the rotation of knob 69 enables needle 75-1 to slide laterally, as represented by arrow A in Fig. 11, towards and away from fixed needle 75-2 in order to adjust the spacing between needles 75.

[0044] Referring now to Figs. 7, 9 and 12, VNS module 29 also comprises an ejection mechanism 84 for dispensing a fastener 18 out through needles 75. Ejection mechanism 84 includes an ejector rod slide 85 which is adapted to slide vertically along frame 39, said ejector rod slide 85 comprising a pair of spaced apart sidewalls 87, a top wall 89 affixed to sidewalls 87, a plate 91 affixed to top wall 89, a bottom wall 93 affixed to sidewalls 87 and a ramp 95 formed onto bottom wall 93. Ejector rod slide 85 is powered for vertical displacement by an pneumatic system (not shown) which operates on 80 psi. Application of air pressure from the pneumatic system is achieved through the depression of an actuation button 97 formed on handle 45.

[0045] Ejection mechanism 84 also includes first and second ejector rods 99-1 and 99-2 which are disposed within a slot 101 formed into top wall 89 and are retained therein through the mounting of plate 91 onto top wall 89. Ejector rods 99-1 and 99-2 are positioned to extend down through needle blocks 65-1 and 65-2, respectively. Accordingly, as ejector rod slide 85 travels downward, first and second ejector rods 99-1 and 99-2 project into channel 81 of first and second needles 75-1 and 75-2, respectively, so as to dispense fastener 18 out from VNS module 29.

[0046] As can be appreciated, ejector rod slide 85 is adapted to slide vertically along frame 39 and includes a downward stroke in which first and second ejector rods 99-1 and 99-2 project into channel 81 of first and second needles 75-1 and 75-2, respectively, and an upward stroke in which first and second ejector rods 99-1 and 99-2 retract from needles 75-1 and 75-2, respectively.

[0047] It should be noted that the construction and functionality of ejection mechanism 84 does not serve as a principal feature of the present invention. As a result, it is to be understood that ejection mechanism 84 could be of the type disclosed in U.S. Patent No. 5,615,816 to Charles L. Deschenes et al. without departing from the spirit of the present invention.

[0048] VNS module 29 further comprises a feed mechanism 103 for continuously advancing fastener stock 11 therethrough. Feed mechanism 103 comprises a pair of spaced apart, sprocket feed wheels 105 which are fixedly mounted onto a shaft 107, as shown in Fig. 7. Feed wheels 105 are adapted to engage the filaments 23 of fasteners 18 to advance the supply of fastener stock 11 through VNS module 29. A feed knob 109 is fixedly mounted onto shaft 107 to allow for manual advancement of fastener stock 11 through module 29, which is highly desirable.

[0049] A ratchet wheel 111 is fixedly mounted onto shaft 107 and a pivotable feed pawl 113 is adapted to selectively engage ratchet wheel 111. As such, the pivoting of feed pawl 113 serves to rotate ratchet wheel 111

which, in turn, drives feed wheels 105, thereby disposing the lowermost fastener 18 in fastener stock 11 into position at the rear end of hollowed needles 75 for subsequent ejection.

[0050] Feed pawl 113 is, in turn, connected to a pivotable feed lever 115 and a movable feed link 117 by a bolt 118. As can be appreciated, as ejector rod slide 85 completes its upward stroke, a bolt 119 engages feed link 117 and pulls feed link 117 upwards. The upward displacement of feed link 117, in turn, causes feed pawl 113 to pivot about a pivot point 120 on feed lever 115, thereby advancing fastener stock 11 through VNS module 29.

[0051] It should be noted that the construction and functionality of feed mechanism 103 does not serve as a principal feature of the present invention. As a result, it is to be understood that feed mechanism 103 could be of the type disclosed in U.S. Patent No. 5,615,816 to Charles L. Deschenes et al. without departing from the spirit of the present invention.

[0052] VNS module 29 additionally comprises a severing mechanism 121 for severing the lowermost fastener 18 from fastener stock 11 prior to ejection through neeedles 75. Severing mechanism 121 comprises a pair of knife blades 123-1 and 123-2, each blade 123 being pivotably disposed between an associated needle block 65 and needle holder 71, as shown in Fig. 10.

[0053] Severing mechanism 121 also comprises a pair of knife levers 125-1 and 125-2 connected to knife blades 123-1 and 123-2, respectively. A pair spring-biased knife pivots 127-1 and 127-2 are connected to knife levers 125-1 and 125-2, respectively. A pair of knife rollers 129-1 and 129-2 are connected to knife pivots 127-1 and 127-2, respectively. As can be appreciated, knife rollers 129 are biased downward so as to continuously contact frame 39. Accordingly, as ejector rod slide 85 begins its downward stroke, knife rollers 129 travel up and over ramp 95. As knife rollers 129 travel up and over ramp 95, knife rollers 129 pivot knife pivots 127 which, in turn, pull knife levers 125. Resultingly, the pulling of knife levers 125 inwardly pivots knife blades 123, thereby severing the lowermost fastener 18 from fastener stock 11. It should be noted that spring-biased knife pivots 127 are designed only to pull knife levers 125 when as ejector rod slide 85 begins its downward stroke and not when ejector rod slide 85 completes its upward stroke.

[0054] It should be noted that the construction and functionality of severing mechanism 121 does not serve as a principal feature of the present invention. As a result, it is to be understood that severing mechanism 121 could be of the type disclosed in U.S. Patent No. 5,615,816 to Charles L. Deschenes et al. without departing from the spirit of the present invention.

[0055] VNS module 29 further comprises first and second retractable needle guard assemblies 131-1 and 131-2 which are disposed over first and second hollowed needles 75-1 and 75-2, respectively.

[0056] It should be appreciated, the particular construction and functionality of retractable needle guard assemblies 131 serve as an optional feature of the present invention. In addition, it should be noted that first and second retractable needle guard assemblies 131-1 and 131-2 are identical in construction. As a result, for simplicity purposes only, the details of first and second needle guard assemblies 131-1 and 131-2 will be described only with respect to first needle guard assembly 131-1.

[0057] First retractable needle guard assembly 131-1 comprises a fixedly mounted needle guard 133-1 which is affixed onto its associated needle holder 71-1 over needle 75-1 and a movable needle guard 135-3 which is slidably mounted on fixedly mounted needle guard 133-1.

[0058] Referring now to Figs. 11 and 13, fixedly mounted needle guard 133-1 comprises a base 137-1 in the shape of a half-disc which includes a substantially flat top surface 139-1 and a substantially flat bottom surface 141-1. Base 137-1 also includes a central needle bore 143-1, first guide pin bore 145-1, second guide pin bore 147-1 and a pair of mounting screw bores 149 pre-formed therein pre-formed therein.

[0059] Fixedly mounted needle guard 133-1 further includes an elongated, C-shaped in lateral cross-section, inner sleeve 151-1 which is integrally formed onto and extends orthogonally out from bottom surface 141-1 of base 137-1. Inner sleeve 151-1 includes an inner surface 153-1, an outer surface 155-1 and a free end 157-1, inner sleeve 151-1 being shaped to define an elongated central channel 159-1 which is sized and shaped to receive associated needle 75-1, as shown in phantom in Figs. 15 and 16. Outer surface 155-1 of inner sleeve 151-1 is shaped to include an enlarged flange 161-1 proximate free end 157-1.

[0060] Referring now to Figs. 11 and 14, movable needle guard 135-1 is slidably mounted over fixedly mounted needle guard 133-1 and comprises a collar 163-1 having a top surface 165-1 and a bottom surface 167-1. Movable needle guard 135-1 also includes first and second guide pins 169-1 and 171-1 which are integrally formed onto and extend orthogonally out from top surface 165-1 of collar 163-1, first and second guide pins 169-1 and 171-1 being sized and shaped to project into first and second guide pin bores 145-1 and 147-1, respectively. First and second compression springs 173-1 and 175-1 are sized and shaped to be slidably mounted onto first and second guide pins 169-1 and 171-1, respectively.

[0061] Movable needle guard 135-1 further includes an elongated, C-shaped in lateral cross-section, outer sleeve 177-1 which is integrally formed onto and extends orthogonally out from bottom surface 167-1 of collar 163-1. Outer sleeve 177-1 includes an inner surface 179-1, an outer surface 181-1, a free end 182-1 and is shaped to define an elongated central channel 183-1 which is sized and shaped to receive inner sleeve 151-1 of fixedly mounted needle guard 133-1. Inner surface 179-1 of outer sleeve 177-1 is shaped to include a stop 185-1.

[0062] Accordingly, with needle 75-1 mounted onto needle holder 71-1, with first end 77 of needle 75-1 fit-

tingly disposed within its associated needle receptacle 78 in needle holder 71-1, needle guard assembly 131-1 is mounted onto its associated needle holder 71-1 over its associate needle 75-1. Specifically, top surface 139-1 of base 137-1 is disposed against the bottom surface of needle holder 71-1. Screws 187 are then disposed through first and second mounting screw bores 149-1 and 151-1, respectively, in base 137-1 and into engagement within associated threaded bores 188 formed in needle holder 71-1, thereby fixedly securing needle guard assembly 131-1 onto needle holder 71-1 over needle 75-1.

[0063] As can be appreciated, with needle guard assembly 131-1 mounted onto its associated needle holder 71-1 over needle 75-1, each of first and second compression springs 173-1 and 175-1 is disposed to contact top surface 165-1 of collar 163-1 at one end and bottom surface 141-1 of needle holder 71-1 at the other end. As such, compression springs 173-1 and 175-1 resiliently urge collar 163-1 away from base 137-1, thereby enabling for guard assembly 131-1 to be disposed between a protective position and retracted position.

[0064] With needle guard assembly 131-1 disposed in its protective position, as shown in Fig. 15, compression springs 173-1 and 173-2 urge collar 163-1 away from base 137-1 until enlarged flange 161-1 of fixedly mounted needle guard 133-1 abuts against stop 185-1 formed in movable needle guard 135-1, thereby precluding further movement of movable needle guard 135-1 away from fixed needle guard 133-1. With needle guard assembly 131-1 disposed in its protective position, free end 182-1 of movable needle guard 135-1 extends just beyond the sharpened tip of the needle 75-1, thereby covering needle 75-1.

[0065] With needle guard assembly 131-1 disposed in its retracted position, as shown in Fig. 16, an upward force greater than the force of the compression springs 173-1 and 175-1 is applied onto free end 182-1 of movable needle guard 135-1, thereby displacing movable needle guard 135-1 upward relative to fixed needle guard 133-1 until top surface 165-1 of collar 163-1 is in contact against bottom surface 141-1 of base 137-1 and until free end 182-1 of outer sleeve 177-1 is substantially flush with free end 157-1 of inner sleeve 151-1. With needle guard assembly 131-1 disposed in its retracted position, a fixed length of needle 75-1 is exposed.

[0066] As can be appreciated, retractable needle guard assemblies 131 provide three principal advantages.

[0067] As a first advantage, retractable needle guard assemblies 131 provide increased safety for the operator by preventing inadvertent contact of the sharpened point of hollowed needles 75 when VNS module 29 is not in use, which is highly desirable.

[0068] As a second advantage, retractable needle guard assemblies 131 serve as a stiffening, or support, device for needles 75, thereby preventing needle bending and/or breakage, which highly desirable.

[0069] As a third advantage, retractable needle guard assemblies 131 serve as a needle stop for limiting the depth which needles 75 can be inserted through display card C. Specifically, needle guard assemblies 131 limit the length of needle 75 which can be inserted through display card C to a fixed constant length. In particular, the portion of each needle 75 from the sharpened tip at second end 79 to free end 182 of outer sleeve 177 is able to penetrate through display card C when needle guard assemblies 131 are in their retracted position. It should be noted that a constant degree of insertion of needles 75 through display card C is highly desirable because if needles 75 are over inserted through display card C, fastener 18 can become overstretched and will break during ejection, which is highly undesirable. Furthermore, if needles 75 are under inserted through display card C, fastener 18 will not adequately penetrate through display card C, thereby precluding proper coupling, which is highly undesirable.

[0070] Mounting stand 31 is installed onto workstation W and supports counterbalance 33 and reel holder 35.

[0071] Referring now to Figs. 17 and 18, mounting stand 31 is generally L-shaped and includes a vertical leg 187 and a horizontal leg 189 which are affixed together.

[0072] Vertical leg 187 is substantially straight and includes a first end 191 and a second end 193. A flat support plate 195 is affixed onto first end 191 of vertical leg 187. Flat support plate 195 is shaped to include a plurality of preformed holes 197. As such, a screw 199 can be disposed through each preformed hole 197 in support plate 195 and down into engagement into workstation W so as to fixedly secure vertical leg 187 onto workstation W, vertical leg 187 extending orthogonally from the top surface of workstation W.

[0073] Horizontal leg 189 is substantially straight and includes a first end 201 and a second end 203. A projection 205 is formed onto first end 201 of horizontal leg 189 and is sized and shaped to fit within a slot 207 formed in second end 193 of vertical leg 187, as shown in Fig. 18. A screw 209 is disposed through an opening 211 formed in second end 193 of vertical leg 187 and into threaded engagement within an opening 213 in projection 205 of horizontal leg 189 so as to fixedly secure horizontal leg 189 onto vertical leg 187 in such a manner that horizontal leg 189 extends generally orthogonally from vertical leg 187.

[0074] Counterbalance 33 is affixed onto mounting stand 31 and serves to support VNS module 29.

[0075] Referring now to Fig. 19, counterbalance 33 includes a box-shaped housing 215 and a U-shaped bracket 217 affixed onto housing 215, U-shaped bracket 217 being shaped to includes a pair of openings 219. A pin 221 is sized and shaped to be disposed through openings 219 in U-shaped bracket 217 and through an opening 223 formed in horizontal leg 189, thereby securing counterbalance 33 onto horizontal leg 189. A cotter pin 225 is sized and shaped to be slidably disposed through an

opening (not shown) formed in pin 221, so as to retain pin 221 through U-shaped bracket 217 and opening 223 in horizontal leg 189.

[0076] Counterbalance 33 is conventional in construction and includes a tether 227 which is wound within housing 215 and which includes a free end 229 disposed outside housing 215. As can be appreciated, free end 229 of tether 227 can be pulled away from housing 215. However, in the absence of the pulling force, tether 227 resiliently pulls free end 229 back to housing 215, a stop 231 proximate free end 229 limiting the retraction. A clip 233 is formed onto free end 229 of tether 227 and is sized and shaped to releasably dispose into and engage clip opening 59 in bracket 49.

[0077] Reel holder 35 is affixed onto mounting stand 31 and serves to support reel 27 of fastener stock 11.

[0078] Referring now to Fig. 20, reel holder 35 is in the form of a stiffened wire and comprises a first end 235 and a second end 237.

[0079] First end 235 of reel holder 35 is sized and shaped to extend horizontally through a central opening 28 formed in reel 27, thereby enabling reel holder 35 to support reel 27 of fastener stock 11. A pair of retainer clips 239 are sized and shaped to fixedly mount onto first end 235 of reel holder 35 on opposite sides of reel 27, thereby securing reel 27 onto first end 235 of reel holder 35 but enabling reel 27 to rotate on reel holder 35 without interference.

[0080] Second end 237 is sized and shaped to extend vertically down into a reel holder opening 241 formed into horizontal leg 189. As such, reel holder 35 supports reel 27 from horizontal leg 189 of mounting stand 31, as shown in Fig. 1.

[0081] Anvil 37 is mounted onto workstation W and serves to support product P and display card C during the fastening process.

[0082] Referring now to Fig. 2, anvil 37 preferably comprises a support block 243 and a plurality of filaments 245 disposed into support block 243.

[0083] Support block 243 is preferably constructed of polyvinyl chloride (PVC) and comprises a substantially flat top surface 247, a substantially flat bottom surface 249 and four sidewalls 251. Support block 243 has a length of approximately 102 mm (4.0 inches), a width of approximately 102 mm (4.0 inches) and a thickness of approximately 19 mm (0.75 inches).

[0084] A plurality of openings (not shown) are formed into top surface 247 of support block 243 and extend down a portion of the distance from top surface 247 towards bottom surface 249. Each opening is generally circular in lateral cross-section with a diameter of approximately 2.49 mm (0.098 inches). A tuft of nylon brush filaments 245 is disposed into each opening to form anvil 37.

[0085] In use, system 10 can be used to affix a product for sale P onto a display card C using one or more plastic fasteners 18 from fastener stock 11 in the following manner. Display card C is placed on top of filaments 245 of anvil 37 and product P for sale, in turn, is placed on top of display card C, as shown in Fig. 2. The user then grasps handle 45 of VNS module 29 and urges it downward so that needles 75 pierce through display card C, needles 75 being disposed on opposite sides of product P for sale. Needles 75 are disposed through display card C and down between filaments 245 of anvil 37. It should be noted that VNS module 29 is urged downward until needle guard assemblies 131 are in their fully retracted position. As such, needle guard assemblies 131 serve to accurately limit the degree of insertion of needles 75 through display card C, which is highly desirable. With needles 75 disposed through display card C and with needle guard assemblies 131 disposed in their fully retracted position, actuation button 97 is depressed so as to eject a single fastener 18 out through needles 75. The ejection of single fastener 18 disposes end bars 19 and 21 on the opposite side of display card C than product P, filament 23 of fastener 18 being drawn tightly against product P so as to securely couple product P to display card C, as shown in Fig. 3.

[0086] The process can be repeated as necessary, wherein a subsequent depression of actuator button 97 ejects another fastener 18 out through needles 75. Accordingly, because a continuous supply of fastener stock 11 can be loaded into VNS module 29, it is to be understood that system 10 can be used to continuously apply fasteners 18 without reloading.

[0087] It should be noted that counterbalance 33 enables VNS module 29 to be easily handled by the user during high volume packaging operations, such as assembly line packaging, which is highly desirable. Furthermore, it should be noted that supporting VNS module 29 onto counterbalance 33 is made possible by providing anvil 37 and needle guard assemblies 131 on VNS module 29 to ensure that fastener 18 is properly disposed through display card C.

[0088] It should be noted that numerous variations and modifications could be made to system 10. In particular, it has been found that system 10 suffers from a pair of notable drawbacks.

[0089] As a first drawback, system 10 allows for the free and unlimited movement of VNS module 29 in any direction. However, the primary application for system 10 is in an assembly line environment which only requires linear, vertical (i.e., straight up and down) displacement of VNS module 29. As a result, the operator of system 10 often introduces non-vertical displacement forces onto VNS module 29. The application of non-vertical displacement forces onto module 29 reduces the efficiency of the movements which the operator is required to undertake, which is highly undesirable. In addition, the application of non-vertical displacement forces onto VNS module 29 introduces inconsistencies in the position where the operator inserts needles 75 through the items to be coupled together, which is highly undesirable.

[0090] As a second drawback, system 10 allows for the unlimited displacement of VNS module 29 in the

downward direction. As can be appreciated, displacing module 29 too far in the downward direction can potentially damage the objects to be coupled and/or module needles 75, which is highly undesirable.

[0091] Accordingly, referring now to Fig. 21, there is shown a second embodiment of a system constructed according to the teachings of the present invention, the system being identified generally by reference numeral 310. As will be described further in detail below, system 310 is designed for use in dispensing individual plastic fasteners from a supply of continuously connected ladder stock 11.

[0092] System 310 is similar to system 10 in that system 310 comprises a module 29 for dispensing individual plastic fasteners, a mounting stand 311 affixed to a workstation W, a counterbalance 33 affixed to mounting stand 311 for supporting module 29, and an anvil 37 mounted onto workstation W for supporting the items to be coupled together with the one or more individual plastic fasteners.

[0093] The primary distinction between system 310 and system 10 is that system 310 comprises a mounting stand 311 which differs in construction and functionality from mounting stand 31. Specifically, mounting stand 311 is installed onto workstation W and serves to: (1) limit module 29 to linear displacement within a defined range; (2) support counterbalance 33; and (3) support reel 13 of plastic fasteners 11, as will be described further in detail below.

[0094] As seen most clearly in Figs. 22 and 23, mounting stand 311 comprises an elongated vertical leg 313 which includes a first end 315 and a second end 317. An end cap 318 is press-fit mounted onto second end 317 of vertical leg 313.

[0095] First end 315 of vertical leg 313 is affixed to a flat, metallic base plate 319. First end 315 of vertical leg 313 is fixedly secured in position against the top surface of base plate 319 using a plurality of conventional fastening devices. Specifically, first and second gussets 321 and 322 are disposed in contact against opposite sides of first end 315 of vertical leg 313 and the top surface of base plate 319. A first screw 323 is disposed through gusset 321 and into engagement with a threaded bore 325 formed in the top surface of base plate 319, thereby fixedly securing gusset 321 onto base plate 319. Similarly, a second screw 324 is disposed through gusset 322 and into engagement with a threaded bore 326 formed in the top surface of base plate 319, thereby fixedly securing gusset 322 onto base plate 319. A first T-bolt and nut fastener assembly 327 is disposed through gusset 321 and first end 315 of vertical leg 313, thereby fixedly securing gusset 321 onto vertical leg 313. Similarly, a second T-bolt and nut fastener assembly 328 is disposed through gusset 322 and first end 315 of vertical leg 313, thereby fixedly securing gusset 322 onto vertical leg 313.

[0096] Mounting stand 311 also comprises a first horizontal leg 329 which includes a first end 331 and a second end 333. An end cap 335 is press-fit mounted onto first end 331 of first horizontal leg 329.

[0097] Second end 333 of first horizontal leg 329 is affixed to vertical leg 313 proximate first end 315, horizontal leg 329 being coupled to vertical leg 313 in such a manner so that first horizontal leg 329 extends generally at a right angle relative to vertical leg 313. Second end 333 of horizontal leg 329 is fixedly secured to vertical leg 313 using a plurality of conventional fastening devices. Specifically, a gusset 337 is disposed in contact with second end 333 of first horizontal leg 329 and vertical leg 313. A first T-bolt and nut fastener assembly 339 is disposed through first horizontal leg 329 and gusset 337, thereby fixedly securing gusset 337 onto first horizontal leg 329. Similarly, a second T-bolt and nut fastener assembly 341 is disposed through vertical leg 313 and gusset 337, thereby fixedly securing gusset 337 onto vertical leg 313.

[0098] Mounting stand 311 additionally comprises a second horizontal leg 343 which includes a first end 345 and a second end 347. An end cap 349 is press-fit mounted onto first end 345 of second horizontal leg 343.

[0099] Second end 345 of second horizontal leg 343 is affixed to vertical leg 313 at the approximate midpoint between first end 315 and second end 317, horizontal leg 343 being coupled to vertical leg 313 in such a manner so that second horizontal leg 343 extends generally at a right angle relative to vertical leg 313. Second end 347 of horizontal leg 343 is fixedly secured to vertical leg 313 using a plurality of conventional fastening devices. Specifically, a gusset 350 is disposed in contact with second end 347 of second horizontal leg 343 and vertical leg 313. A first T-bolt and nut fastener assembly 351 is disposed through second horizontal leg 343 and gusset 350, thereby fixedly securing gusset 350 onto second horizontal leg 343. Similarly, a second T-bolt and nut fastener assembly 353 is disposed through vertical leg 313 and gusset 350, thereby fixedly securing gusset 350 onto vertical leg 313.

[0100] Mounting stand 311 further comprises a third horizontal leg 355 which includes a first end 357 and a second end 359. An end cap 360 is press-fit mounted onto first end 357 of third horizontal leg 355.

[0101] Second end 359 of third horizontal leg 355 is affixed to vertical leg 313 proximate second end 317, horizontal leg 355 being coupled to vertical leg 313 in such a manner so that third horizontal leg 355 extends generally at a right angle relative to vertical leg 313. Second end 359 of horizontal leg 355 is fixedly secured to vertical leg 313 using a plurality of conventional fastening devices. Specifically, a gusset 361 is disposed in contact with second end 359 of third horizontal leg 355 and vertical leg 313. A first T-bolt and nut fastener assembly 363 is disposed through third horizontal leg 355 and gusset 361, thereby fixedly securing gusset 361 onto third horizontal leg 355. Similarly, a second T-bolt and nut fastener assembly 365 is disposed through vertical leg 313 and gusset 361, thereby fixedly securing gusset 361 onto vertical leg 313.

[0102] A hanger, or ring, 367 is slidably mounted onto

third horizontal leg 355. Hanger 367 is fixedly secured in place onto horizontal leg 355 using conventional fastening devices. Specifically, a bolt 369 is disposed through hanger 367 and third horizontal leg 355. A nut 371 is mounted onto the free end of bolt 369 and is tightened, thereby fixedly securing hanger 367 in place on leg 355. As will be described further below, counterbalance 33 is coupled onto hanger 367.

[0103] A first elongated shaft 373 extends orthogonally between first horizontal leg 329 and second horizontal leg 343. First elongated shaft 373 is in the form of an elongated cylindrical post and includes a first end 375 and a second end 377. Similarly, a second elongated shaft 379 extends orthogonally between first horizontal leg 329 and second horizontal leg 343. Second elongated shaft 379 is in the form of an elongated cylindrical post and includes a first end 381 and a second end 383. As will be described further in detail below, shafts 373 and 379 define the linear path through which module 29 is capable of traveling.

[0104] First end 375 of first elongated shaft 373 and first end 381 of second elongated shaft 379 are sized and shaped to fittingly protrude into corresponding holes formed in a rod block 385. In turn, rod block 385 is disposed against the top surface of first horizontal leg 329 proximate first end 331. Rod block 385 is fixedly secured in place onto horizontal leg 329 using conventional fastening devices. Specifically, a bolt 387 is disposed through first horizontal leg 329 and rod block 385. A nut 389 is mounted onto the free end of bolt 387 and is tightened, thereby securing rod block 385 onto leg 329.

[0105] Similarly, second end 377 of first elongated shaft 373 and second end 383 of second elongated shaft 379 are sized and shaped to fittingly protrude into corresponding holes formed in a rod block 391. In turn, rod block 391 is disposed against the bottom surface of second horizontal leg 343 proximate first end 345. Rod block 391 is fixedly secured in place onto horizontal leg 343 using conventional fastening devices. Specifically, a bolt 393 is disposed through second horizontal leg 343 and rod block 391. A nut 395 is mounted onto the free end of bolt 393 and is tightened, thereby securing rod block 391 onto leg 343. As such, first and second shafts 373 and 379 are disposed in a parallel, spaced apart relation, shafts 373 and 379 extending generally orthogonally between first and second horizontal legs 329 and 343 and in parallel with vertical leg 313.

[0106] A first linear ball bearing 397 is slidably mounted onto first shaft 373 and is capable of displacement along the longitudinal axis of first shaft 373. A first bearing mount 399 is telescopingly mounted over first linear ball bearing 397. A pair of retaining rings 401 are also telescopingly mounted over first linear ball bearing 397 on opposite sides of bearing mount 399. Retaining rings 401 are sized and shaped to align and engage within corresponding grooves formed in linear ball bearing 397 so as to securely retain bearing mount 399 in place over linear ball bearing 397.

[0107] Similarly, a second linear ball bearing 403 is slidably mounted onto second shaft 379 and is capable of displacement along the longitudinal axis of second shaft 379. A second bearing mount 405 is telescopingly mounted over second linear ball bearing 403. A pair of retaining rings 407 are also telescopingly mounted over second linear ball bearing 403 on opposite sides of bearing mount 405. Retaining rings 407 are sized and shaped to align and engage within corresponding grooves formed in linear ball bearing 403 so as to securely retain bearing mount 405 in place over linear ball bearing 403.

[0108] A first rubber washer 409 is slidably mounted onto first shaft 373 between linear ball bearing 397 and rod block 385, washer 409 being capable of displacement along the longitudinal axis of first shaft 373. In addition, a first adjustable collar 411 is slidably mounted onto first shaft 373 between rubber washer 409 and rod block 385, collar 411 being capable of displacement along the longitudinal axis of first shaft 373. First adjustable collar 411 is adapted to be tightened, thereby reducing the diameter of its central opening. It should be noted that considerable tightening of first collar 411 fixes the position of collar 411 along shaft 373. Accordingly, together washer 409 and collar 411 serve as a stop for limiting the downward displacement of module 29, as will be described further below.

[0109] Similarly, a second rubber washer 413 is slidably mounted onto second shaft 379 between linear ball bearing 403 and rod block 391, washer 413 being capable of displacement along the longitudinal axis of second shaft 379. In addition, a second adjustable collar 415 is slidably mounted onto second shaft 379 between rubber washer 413 and rod block 391, collar 415 being capable of displacement along the longitudinal axis of second shaft 379. Second adjustable collar 415 is adapted to be tightened, thereby reducing the diameter of its central opening. It should be noted that considerable tightening of second collar 415 fixes the position of collar 415 along shaft 379. Accordingly, together washer 413 and collar 415 serve as a stop for limiting the upward displacement of module 29, as will be described further in detail below.

[0110] A bracket 417 for retaining module 29 is mounted onto bearing mounts 399 and 405. Bracket 417 is preferably constructed of sheet metal and is generally U-shaped in lateral cross-section. A plurality of bolts 419 are disposed through holes formed in mounts 399 and 405 and bracket 417. A corresponding nut 421 is threadingly mounted onto each bolt 419 so as to securely retain bracket 417 onto bearing mounts 399 and 405. As noted above, bracket 417 is sized and shaped to retain module 29, wherein a plurality of screws are disposed through bracket 417 and into module 29 to secure module 29 onto bracket 417.

[0111] A reel holder assembly 423 is affixed onto vertical leg 313 and serves to support reel 13 of fastener stock 11. Reel holder assembly 423 comprises a reel holder 425 which extends orthogonally away from vertical leg 313. Reel holder 425 is generally in the shape of an

elongated pin and is secured in place on vertical leg 313 by a nut 427. The free end of reel holder 425 is sized and shaped to extend horizontally through a central opening formed in reel 13, thereby enabling reel holder 425 to support reel 13 of fastener stock 11 but enabling reel 13 to rotate on reel holder 425 without interference.

[0112] In use, system 310 can be used in the following manner to affix together two or more items using at least one individual plastic fastener from fastener stock 11. The items to be coupled together are placed on top of the filaments of anvil 37 which, in turn, is mounted on top of workstation W. The user then grasps handle 45 of module 29 and manually urges it downward so that the one or more needles 75 penetrate through the items to be coupled, said one or more needles 75 extending down between the filaments of anvil 37. It should be noted that counterbalance 33 enables module 29 to be easily handled by the user during high volume packaging operations, such as assembly line packaging, which is highly desirable.

[0113] With needle 75 disposed through the items to be coupled module 29 is actuated to eject a single fastener out through needle 75, thereby coupling together the desired items. The fastener dispensing process can be repeated as necessary. Upon completion of the fastener dispensing process, the user manually displaces module 29 in the upward direction so that the one or more needles 75 retract from the items to be coupled. The coupled items are then removed from anvil 37, thereby completing the process for coupling together two items with one or more individual plastic fasteners.

[0114] It should be noted that mounting stand 311 limits module 29 to linear displacement. Specifically, mounting stand 311 limits module 29 to vertical (i.e., straight up and down) displacement at an parallel to the Y-axis shown in Fig. 21. In particular, mounting stand 311 limits module 29 to linear displacement at an angle parallel with the longitudinal axes of shafts 373 and 379, module 29 traveling along the linear path defined by line L in Fig. 24. As can be appreciated, limiting module 29 to linear displacement along line L eliminates unnecessary forces on module 29 in the direction of the X-axis and/or the Z-axis. As a result, in those applications in which only vertical displacement is required (e.g., certain assembly line applications), mounting stand 311 helps to improve the efficiency of the movements which an operator will undertake when using module 29, which is highly desirable. In addition, in those applications in which only vertical displacement is required (e.g., certain assembly line applications), mounting stand 311 helps to improve the consistency of the location in which the one or more needles 75 of module 29 penetrate through successive groups of items to be coupled together, which is highly desirable.

[0115] It should also be noted that washers 409 and 413 and collars 411 and 415 serve to limit the range of the linear vertical movement of module 29 along line L. Specifically, together washer 409 and collar 411 serve as a stop for limiting the downward vertical movement of module 295. Similarly, together washer 413 and collar 415 serve as a stop for limiting the upward vertical movement of module 29. Furthermore, washer 409 and collar 411 could be repositioned along shaft 373 to adjust the range of acceptable downward displacement of module 29. Similarly, washer 413 and collar 415 could be repositioned along shaft 379 to adjust the range of acceptable upward displacement of module 29. As a result, because the range of vertical displacement of module 29 can be adjusted, the operator is limited to moving module 29 within an efficient range, which is highly desirable. In addition, because the range of vertical displacement of module 29 can be adjusted, the operator is precluded from over-inserting the needles 75 of module 29 through the items to be coupled, thereby protecting the needles 75 of module 29 and the items to be coupled from damage, which is highly desirable.

[0116] Although system 310 is designed to allow module 29 to be manually displaced along a linear path, it should be noted that system 310 is not limited to the manual displacement of module 29. Rather, it is to be understood that system 310 could be alternatively constructed in such a manner so that module 29 could be automatically driven along its linear path, such as through the use of a conventional air cylinder, without departing from the spirit of the present invention.

[0117] The embodiments shown in the present invention are intended to be merely exemplary and those skilled in the art shall be able to make numerous variations and modifications to them within the scope of the present invention as defined in the appended claims.

Claims

1. A system (10, 310) for dispensing a plastic fastener (18) from a reel (27) of fastener stock (11) to couple together two or more objects, said system comprising a module (29) for dispensing the plastic fastener (18) from the reel (27) of fastener stock (11) to couple together the two or more objects, **characterized in, that** said system (10, 310) further comprises

   (a) a counterbalance (33) for supporting said module,
   (b) a mounting stand (31, 311) for supporting said counterbalance (33) and
   (c) a reel holder (35, 425) coupled to said mounting stand (31, 311) for holding the reel (27) of fastener stock (11).

2. The system (10, 310) of claim 1 further comprising an anvil (37) for supporting the two or more items to be coupled by the plastic fastener (18).

3. The system (10, 310) of claim 2 wherein said anvil (37) comprises a base and a plurality of tufts of filaments (23, 245) disposed into said base.

4. The system (10, 310) of claim 1 wherein said module (29) comprises

(a) a hollowed needle (75) having a sharpened tip,
(b) a retractable needle guard assembly (131) disposed over said hollowed needle (75),
(c) a feed mechanism (103) for advancing the fastener stock (11) into said hollowed needle (75),
(d) a severing mechanism (121) for severing the fastener (18) to be dispensed through said hollowed needle (75) from the fastener stock (11), and
(e) an ejection mechanism (84) for ejecting the severed fastener (18) through said hollowed needle (75).

5. The system (10, 310) of claim 4 wherein said retractable needle guard assembly (131) can be disposed between a protective position in which said retractable needle guard assembly (131) extends at least the length of said hollowed needle (75) and a retracted position in which said retractable needle guard assembly (131) extends a portion of the length of said hollowed needle (75) so as to expose the sharpened tip.

6. The system (10, 310) of claim 5 wherein said module (29) further comprises a needle holder (71) which is sized and shaped to hold said hollowed needle (75).

7. The system (10, 310) of claim 6 wherein said retractable needle guard assembly (131) comprises:

(a) a fixedly mounted needle guard (133) which is affixed onto said needle holder (71) over said hollowed needle (75), and
(b) a movable needle guard (135) which is slidably mounted onto said fixedly mounted needle guard (133).

8. The system (10, 310) of claim 7 wherein said fixedly mounted needle guard (133) comprises a base (137) and an elongated sleeve (177) formed onto said base (137), the elongated sleeve (177) of said fixedly mounted needle guard (133) including a free end (157) and an enlarged flange (161).

9. The system (10, 310) of claim 8 wherein said movable needle guard (135) comprises a collar (163) and an elongated sleeve (177), the elongated sleeve (177) of said movable needle guard (135) including a free end (182) and a stop (185).

10. The system (10, 310) of claim 9 wherein the flange (161) of the fixedly mounted needle guard (133) abuts against the stop (185) of the movable needle guard (135) when said retractable needle guard assembly (131) is disposed in its protective position.

11. The system (10, 310) of claim 10 wherein the collar (163) of the movable needle guard (135) abuts against the base (137) of fixedly mounted needle guard (133) when said retractable needle guard assembly (131) is disposed in its retracted position.

12. The system (10, 310) of claim 5 wherein said retractable needle guard assembly (131) further comprises at least one compression spring (173, 175) for resiliently urging said retractable needle guard assembly (131) into its protective position.

13. The system (10, 310) of claim 5 wherein said module (29) further comprises a handle (45) for holding said module (29) and an actuation button (97) on said handle (45) for activating the ejection mechanism (84) of said module (29).

Patentansprüche

1. System (10, 310) zum Ausgeben eines Kunststoffbefestigungselements (18) aus einer Spule (27) von Befestigungselementvorrat (11), um zwei oder mehr Objekte miteinander zu verbinden, wobei das genannte System ein Modul (29) zum Ausgeben des Kunststoffbefestigungselements (18) aus der Spule (27) von Befestigungselementvorrat (11) umfasst, um die zwei oder mehr Objekte miteinander zu verbinden, **dadurch gekennzeichnet, dass** das genannte System (10, 310) weiterhin umfasst:

(a) ein Gegengewicht (33), um das genannte Modul zu stützen,
(b) ein Halterungsgestell (31, 311), um das genannte Gegengewicht (33) zu stützen, und
(c) einen Spulenhalter (35, 425), verbunden mit dem genannten Halterungsgestell (31, 311), um die Spule (27) von Befestigungselementvorrat (11) zu halten.

2. System (10, 310) nach Anspruch 1, weiterhin umfassend einen Amboss (37) zum Stützen der zwei oder mehr Gegenstände, welche mittels des Kunststoffbefestigungselements (18) miteinander verbunden werden sollen.

3. System (10, 310) nach Anspruch 2, worin der genannte Amboss (37) eine Basis und eine Vielzahl von Fadenbüscheln (23, 245) umfasst, die innerhalb der Basis angeordnet sind.

4. System (10, 310) nach Anspruch 1, worin das genannte Modul (29) umfasst:

(a) eine Hohlnadel (75), welche eine geschärfte Spitze besitzt,
(b) eine zurückziehbare Nadelschutzanordnung (131), die über der genannten Hohlnadel (75) angeordnet ist,
(c) einen Transportmechanismus (103), um den Befestigungselementvorrat (11) in die genannte Hohlnadel zu befördern (75),
(d) einen Trennmechanismus (121) um das Befestigungselement (18), das durch die genannte Hohlnadel (75) ausgegeben werden soll, von dem Befestigungselementvorrat (11) abzutrennen, und
(e) einen Auswurfmechanismus (84), zum Auswerfen des abgetrennten Befestigungselements (18) durch die genannte Hohlnadel (75).

5. System (10, 310) nach Anspruch 4, worin die genannte zurückziehbare Nadelschutzanordnung (131) angeordnet sein kann zwischen einer Schutzposition, in welcher sich die genannte zurückziehbare Nadelschutzanordnung (131) wenigstens entlang der Länge der genannten Hohlnadel (75) erstreckt, und einer zurückgezogenen Position, in welcher sich die genannte zurückziehbare Nadelschutzanordnung (131) entlang eines Teils der Länge der genannten Hohlnadel (75) erstreckt, um somit die geschärfte Spitze freizulegen.

6. System (10, 310) nach Anspruch 5, worin das genannte Modul (29) weiterhin einen Nadelhalter (71) umfasst, welcher derart bemessen und geformt ist, dass er die genannte Hohlnadel (75) hält.

7. System (10, 310) nach Anspruch 6, worin die genannte zurückziehbare Nadelschutzanordnung (131) umfasst:

(a) einen unbeweglich angebrachten Nadelschutz (133), welcher an dem genannten Nadelhalter (71) über der genannten Hohlnadel (75) befestigt ist, und
(b) einen beweglichen Nadelschutz (135), welcher verschiebbar auf dem genannten unbeweglich angebrachten Nadelschutz (133) angebracht ist.

8. System (10, 310) nach Anspruch 7, worin der genannte, unbeweglich angebrachte Nadelschutz (133) eine Basis (137) und eine gestreckte Hülse (177) umfasst, welche auf der genannten Basis (137) ausgebildet ist, wobei die verlängerte Hülse (177) des genannten unbeweglich angebrachten Nadelschutzes (133) ein freies Ende (157) und einen erweiterten Flansch (161) umfasst.

9. System (10, 310) nach Anspruch 8, worin der genannte bewegliche Nadelschutz (135) einen Kragen (163) und eine gestreckte Hülse (177) umfasst, wobei die gestreckte Hülse (177) des genannten beweglichen Nadelschutzes (135) ein freies Ende (182) und einen Anschlag (185) einschließt.

10. System (10, 310) nach Anspruch 9, worin der Flansch (161) des unbeweglich angebrachten Nadelschutzes (133) an den Anschlag (185) des beweglichen Nadelschutzes (135) angrenzt, wenn die genannte zurückziehbare Nadelschutzanordnung (131) in ihrer Schutzposition angeordnet ist.

11. System (10, 310) nach Anspruch 10, worin der Kragen (163) des beweglichen Nadelschutzes (135) an die Basis (137) des unbeweglich angebrachten Nadelschutzes (133) angrenzt, wenn die zurückziehbare Nadelschutzanordnung (131) in ihrer zurückgezogenen Position angeordnet ist.

12. System (10, 310) nach Anspruch 5, worin die genannte zurückziehbare Nadelschutzanordnung (131) weiterhin wenigstens eine Druckfeder (173, 175) umfasst, um die genannte zurückziehbare Nadelschutzanordnung elastisch (131) in ihre Schutzposition zu drängen.

13. System (10, 310) nach Anspruch 5, worin das genannte Modul (29) weiterhin einen Griff (45) zum Halten des genannten Moduls (29) und einen Auslöserknopf (97) an dem genannten Griff (45) umfasst, zur Aktivierung des Auswurfmechanismus (84) des genannten Moduls (29).

Revendications

1. Système (10, 310) de distribution d'une attache en plastique (18) à partir d'un rouleau (27) de stock d'attaches (11) pour coupler ensemble deux objets ou plus, ledit système comprenant un module (29) pour distribuer l'attache en plastique (18) à partir du rouleau (27) de stock d'attaches (11) pour coupler ensemble les deux objets ou plus, **caractérisé en ce que** ledit système (10, 310) comprend en outre

(a) un contrepoids (33) pour supporter ledit module,
(b) un pied de montage (31,311) pour supporter ledit contrepoids (33) et
(c) un porte-rouleau (35, 425) couplé audit pied de montage (31, 311) pour maintenir le rouleau (27) de stock d'attaches (11).

2. Système (10, 310) selon la revendication 1 comprenant en outre un bloc (37) pour supporter les deux articles ou plus devant être couplés par l'attache en plastique (18).

3. Système (10, 310) selon la revendication 2 dans lequel ledit bloc (37) comprend une base et une pluralité de touffes de filaments (23, 245) disposées dans ladite base.

4. Système (10, 310) selon la revendication 1 dans lequel ledit module (29) comprend

(a) une aiguille creuse (75) ayant une pointe affûtée,
(b) un ensemble de protection d'aiguille rétractable (131) disposé par-dessus ladite aiguille creuse (75),
(c) un mécanisme d'alimentation (103) pour faire avancer le stock d'attaches (11) dans ladite aiguille creuse (75),
(d) un mécanisme de séparation (121) pour séparer l'attache (18) devant être distribuée à travers ladite aiguille creuse (75) du stock d'attaches (11), et
(e) un mécanisme d'éjection (84) pour éjecter l'attache (18) séparée à travers ladite aiguille creuse (75).

5. Système (10, 310) selon la revendication 4 dans lequel ledit ensemble de protection d'aiguille rétractable (131) peut être disposé entre une position de protection dans laquelle ledit ensemble de protection d'aiguille rétractable (131) s'étend au moins sur la longueur de ladite aiguille creuse (75) et une position rétractée dans laquelle ledit ensemble de protection d'aiguille rétractable (131) s'étend sur une partie de la longueur de ladite aiguille creuse (75) de façon à exposer la pointe affûtée.

6. Système (10, 310) selon la revendication 5 dans lequel ledit module (29) comprend en outre un porte-aiguille (71) qui est dimensionné et formé de façon à maintenir ladite aiguille creuse (75).

7. Système (10, 310) selon la revendication 6 dans lequel ledit ensemble de protection d'aiguille rétractable (131) comprend :

(a) une protection d'aiguille montée de façon fixe (133) qui est fixée sur ledit porte-aiguille (71) par-dessus ladite aiguille creuse (75), et
(b) une protection d'aiguille mobile (135) qui est montée de façon coulissante sur ladite protection d'aiguille montée de façon fixe (133).

8. Système (10, 310) selon la revendication 7 dans lequel ladite protection d'aiguille montée de façon fixe (133) comprend une base (137) et un manchon allongé (177) formé sur ladite base (137), le manchon allongé (177) de ladite protection d'aiguille montée de façon fixe (133) incluant une extrémité libre (157) et une bride élargie (161).

9. Système (10, 310) selon la revendication 8 dans lequel ladite protection d'aiguille mobile (135) comprend un collier (163) et un manchon allongé (177), le manchon allongé (177) de ladite protection d'aiguille mobile (135) incluant une extrémité libre (182) et une butée (185).

10. Système (10, 310) selon la revendication 9 dans lequel la bride (161) de la protection d'aiguille montée de façon fixe (133) vient buter contre la butée (185) de la protection d'aiguille mobile (135) lorsque ledit ensemble de protection d'aiguille rétractable (131) est disposé dans sa position de protection.

11. Système (10, 310) selon la revendication 10 dans lequel le collier (163) de la protection d'aiguille mobile (135) vient buter contre la base (137) de la protection d'aiguille montée de façon fixe (133) lorsque ledit ensemble de protection d'aiguille rétractable (131) est disposé dans sa position rétractée.

12. Système (10, 310) selon la revendication 5 dans lequel ledit ensemble de protection d'aiguille rétractable (131) comprend en outre au moins un ressort de compression (173, 175) pour pousser de façon résiliente ledit ensemble de protection d'aiguille rétractable (131) dans sa position de protection.

13. Système (10, 310) selon la revendication 5 dans lequel ledit module (29) comprend en outre une poignée (45) pour tenir ledit module (29) et un bouton d'actionnement (97) sur ladite poignée (45) pour activer le mécanisme d'éjection (84) dudit module (29).

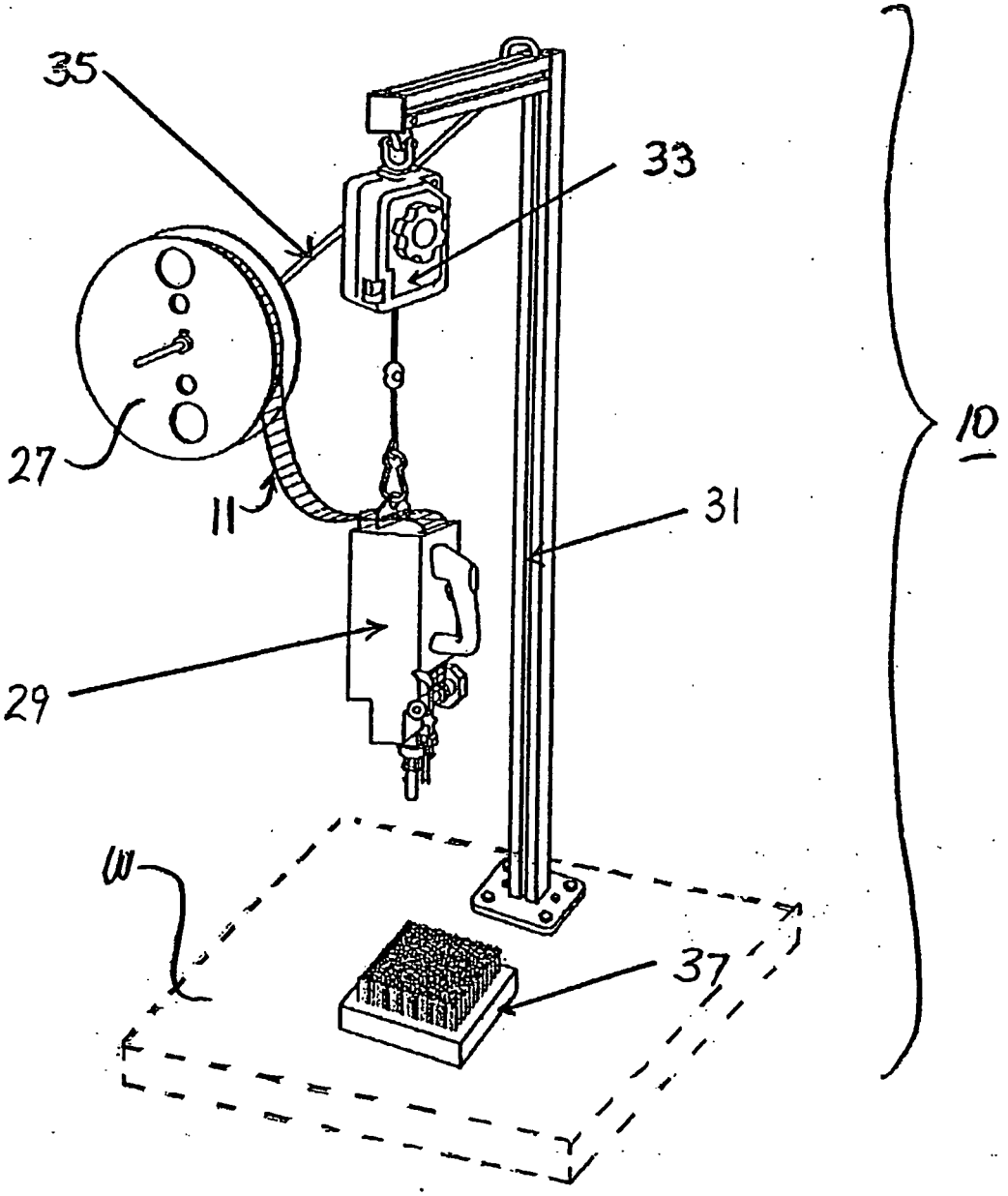


FIG. 1

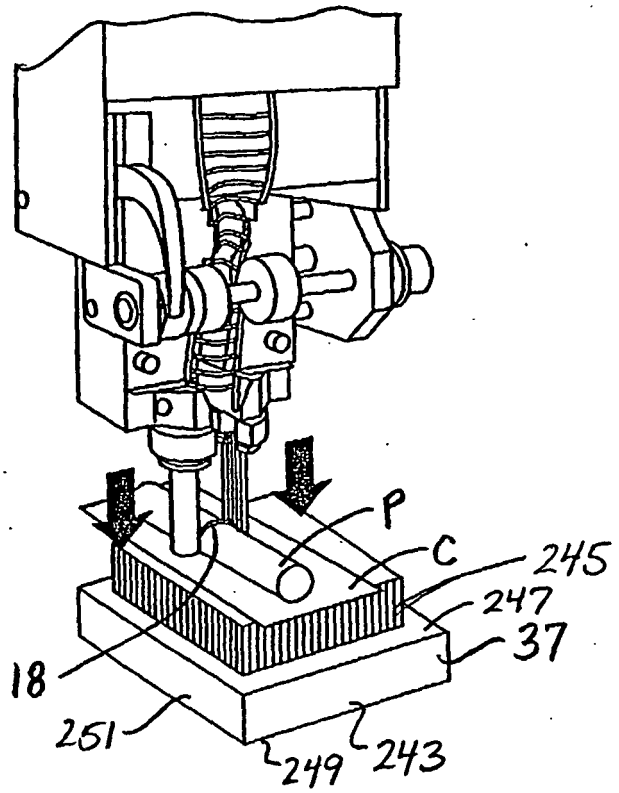


FIG. 2

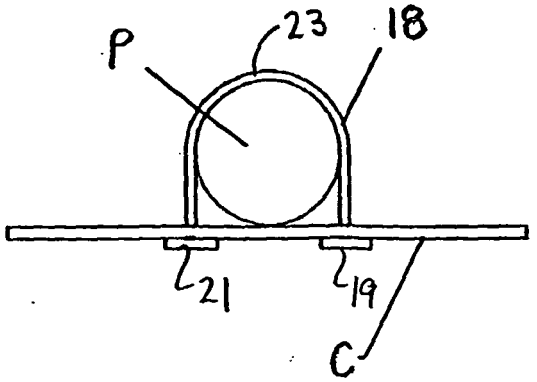


FIG. 3

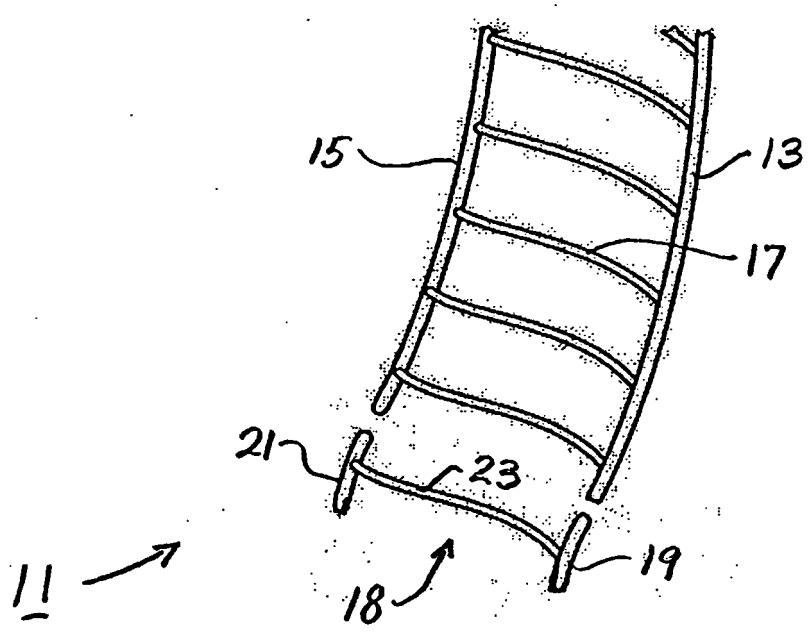


FIG. 4

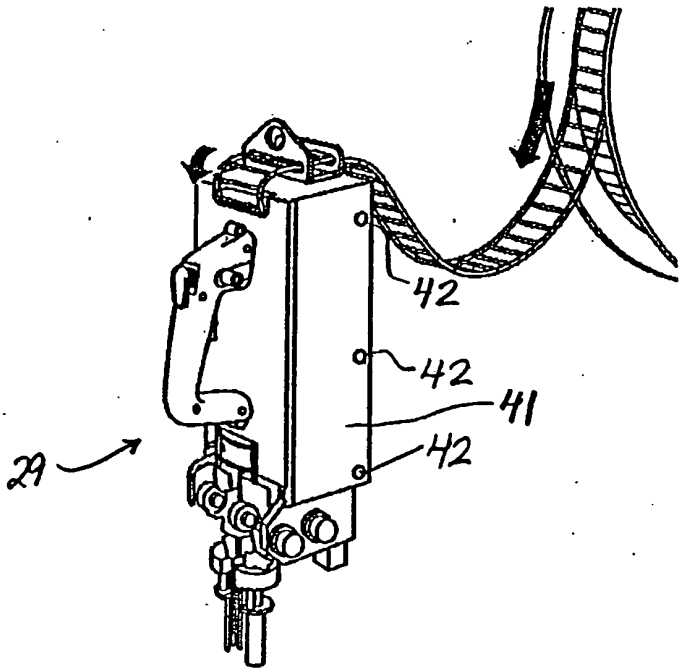


FIG. 5

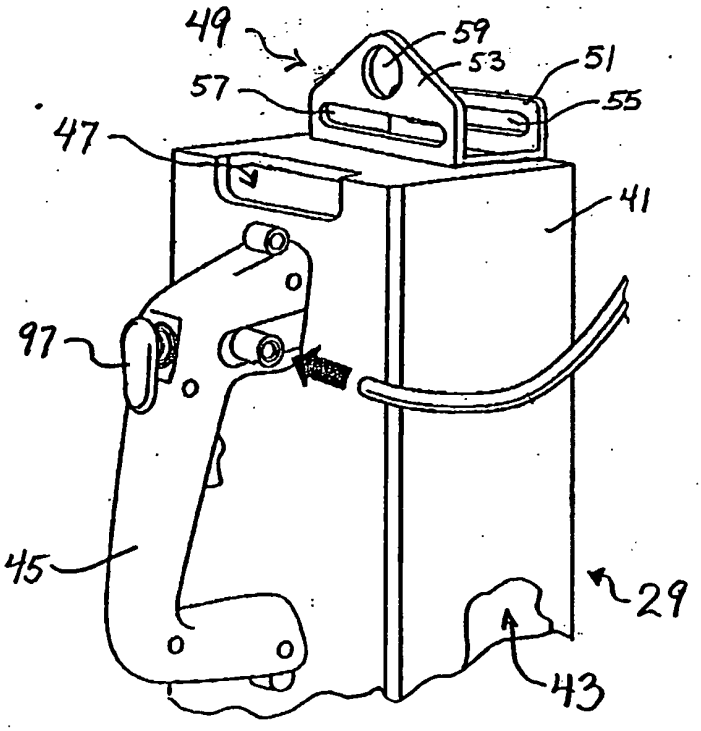


FIG. 6

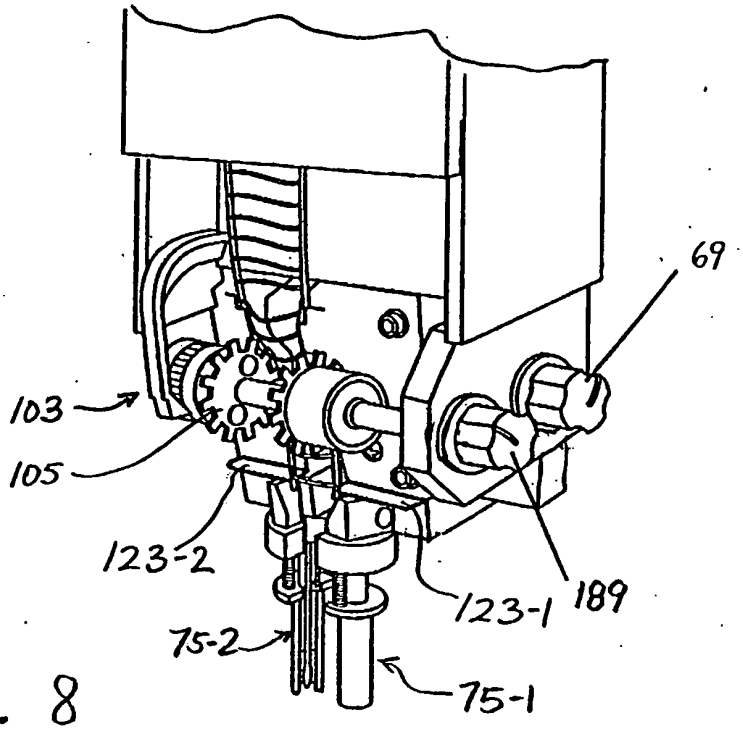

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FIG. 8

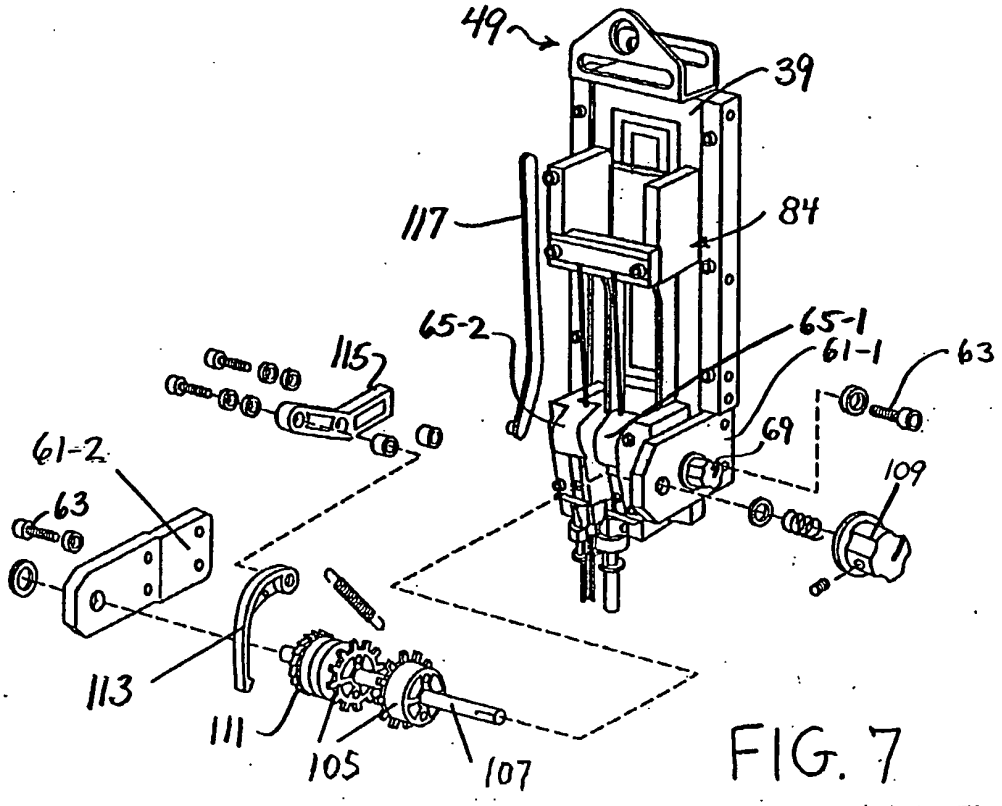

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FIG. 7

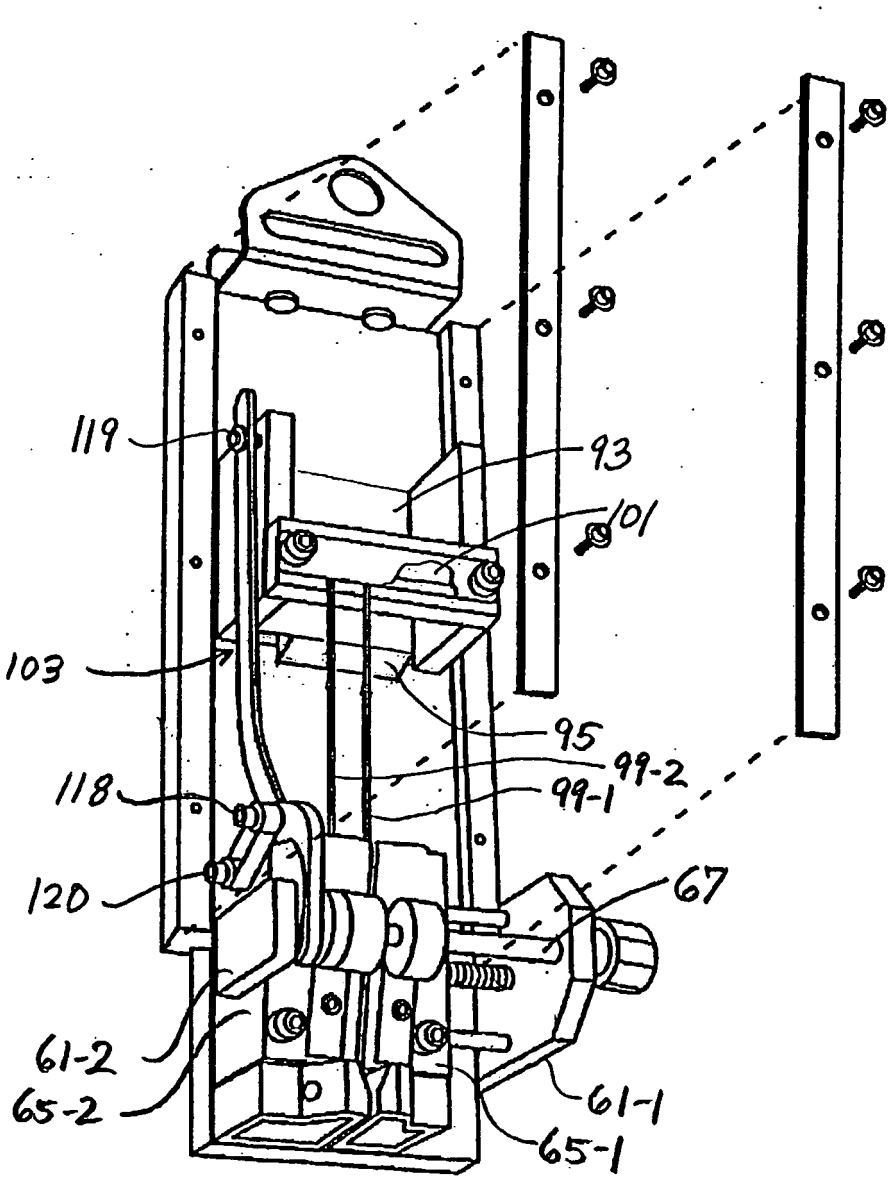


FIG. 9

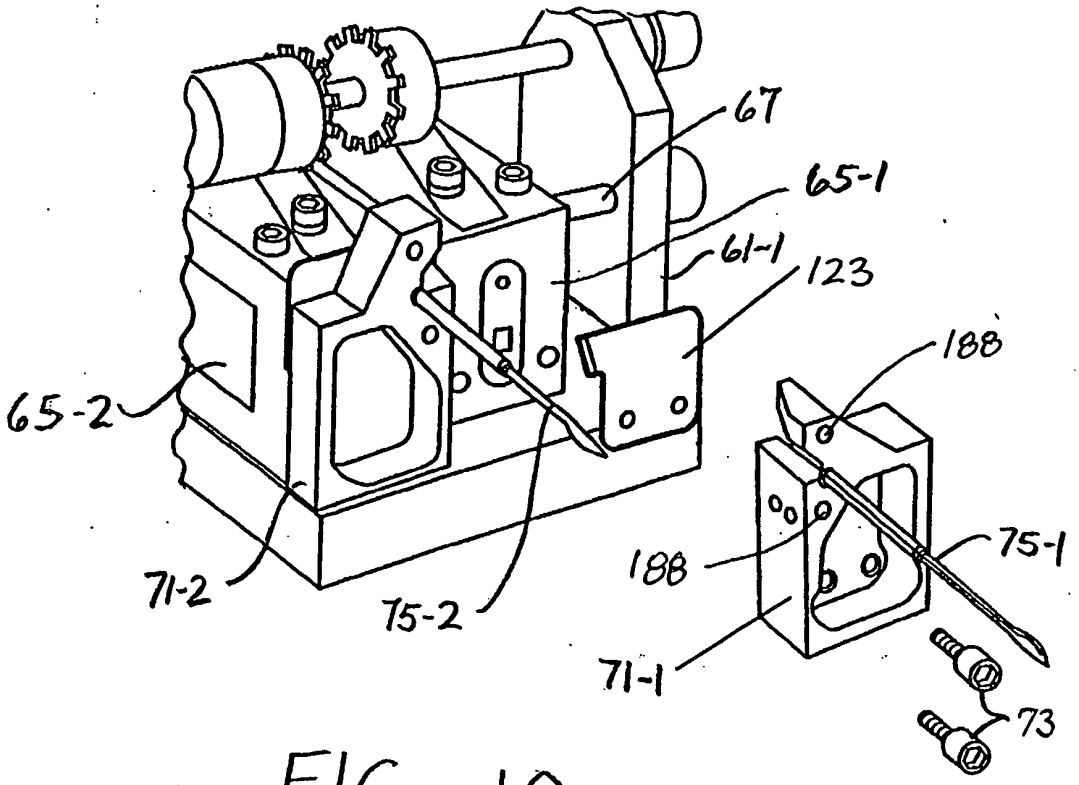

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FIG. 10

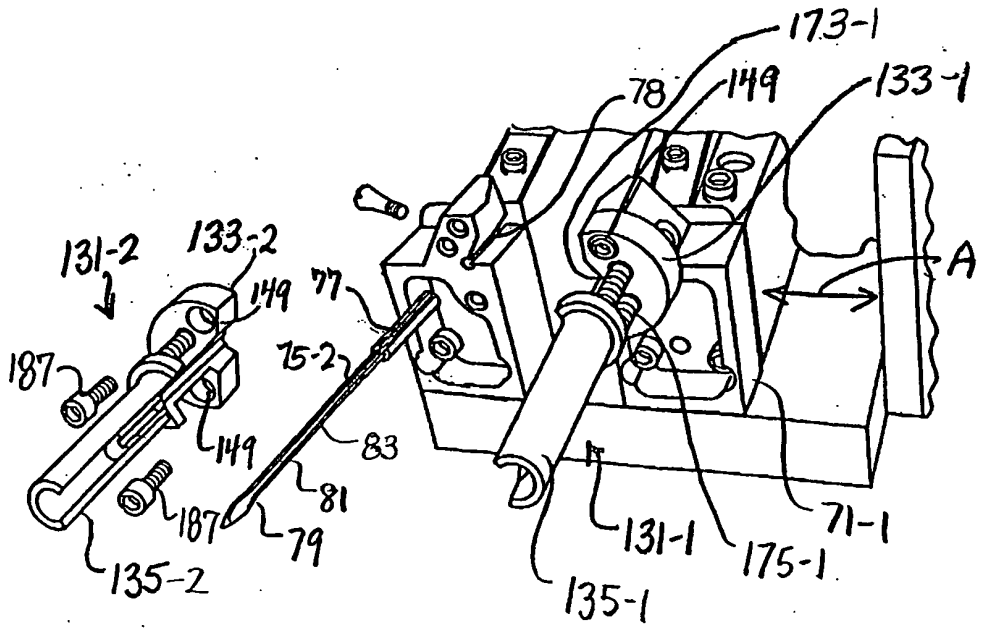

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135-1

FIG. 11

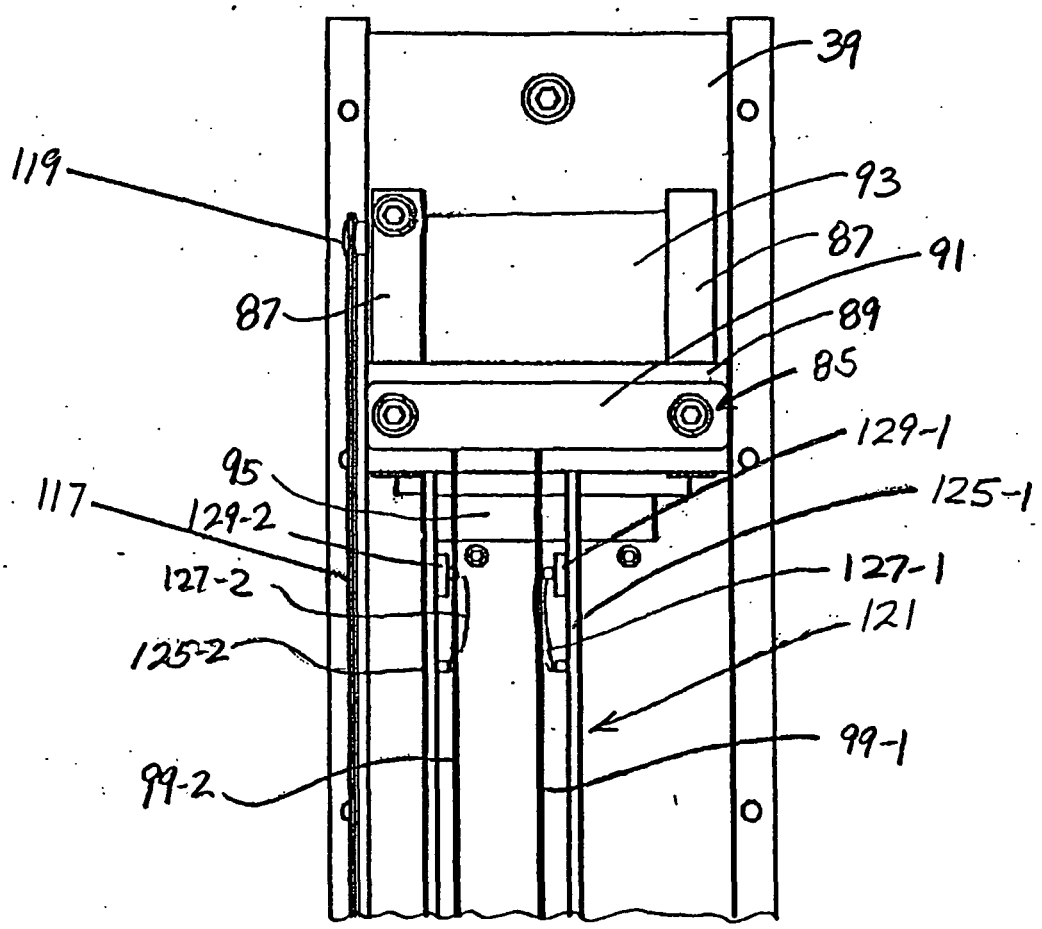

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FIG. 12

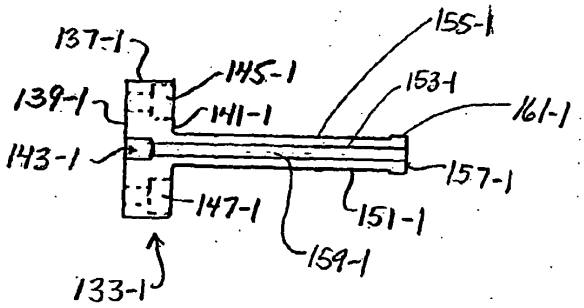


FIG. 13

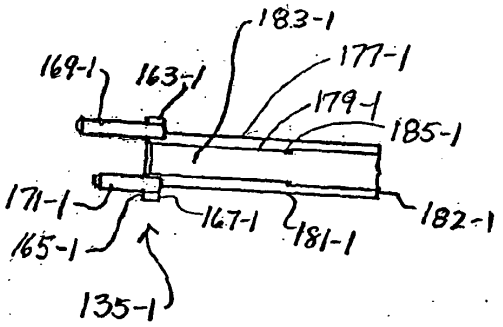


FIG. 14

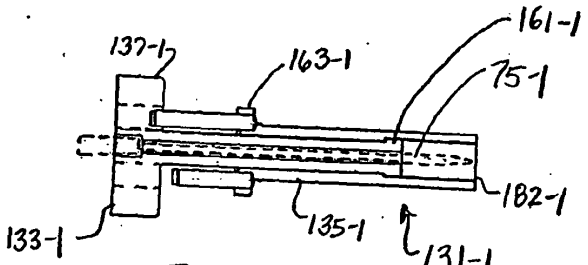


FIG. 15

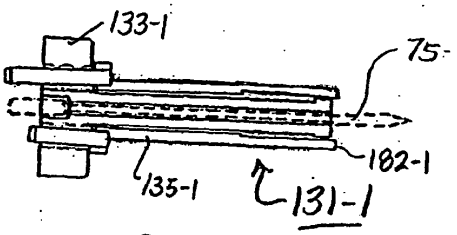


FIG. 16

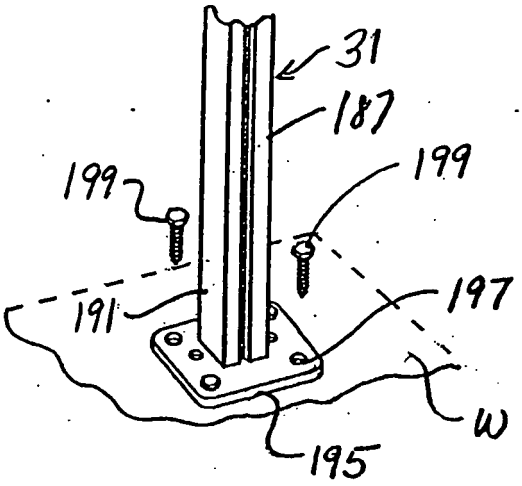

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FIG. 17

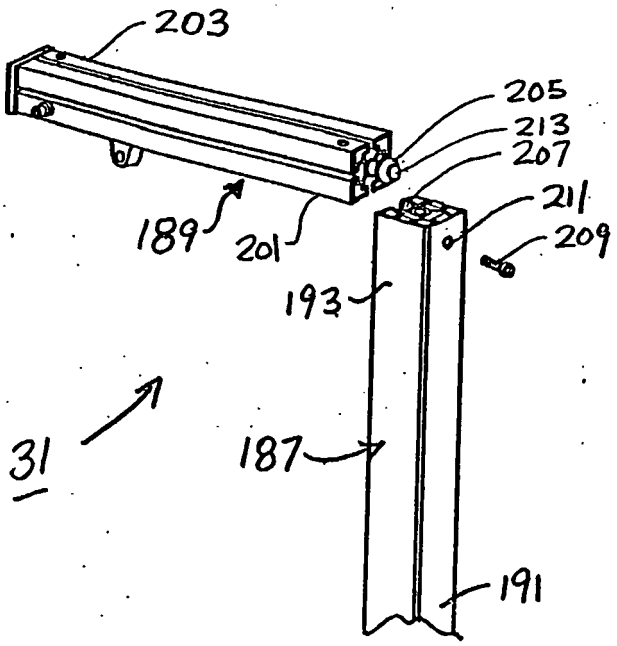

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FIG. 18

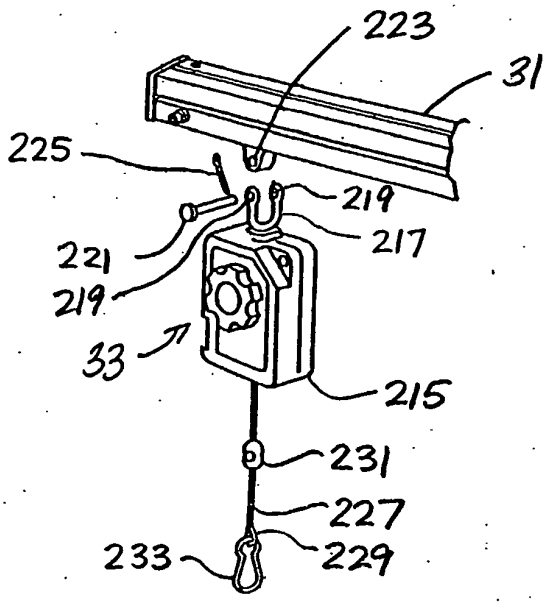

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FIG. 19

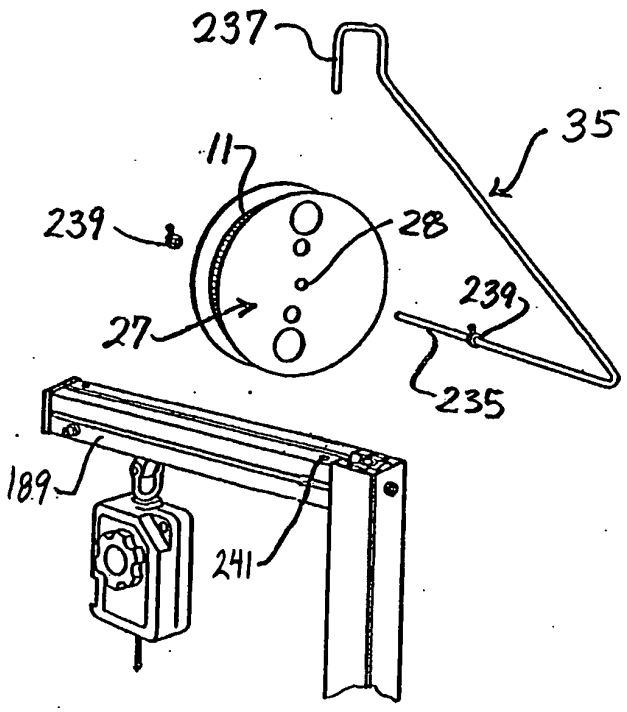

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FIG. 20

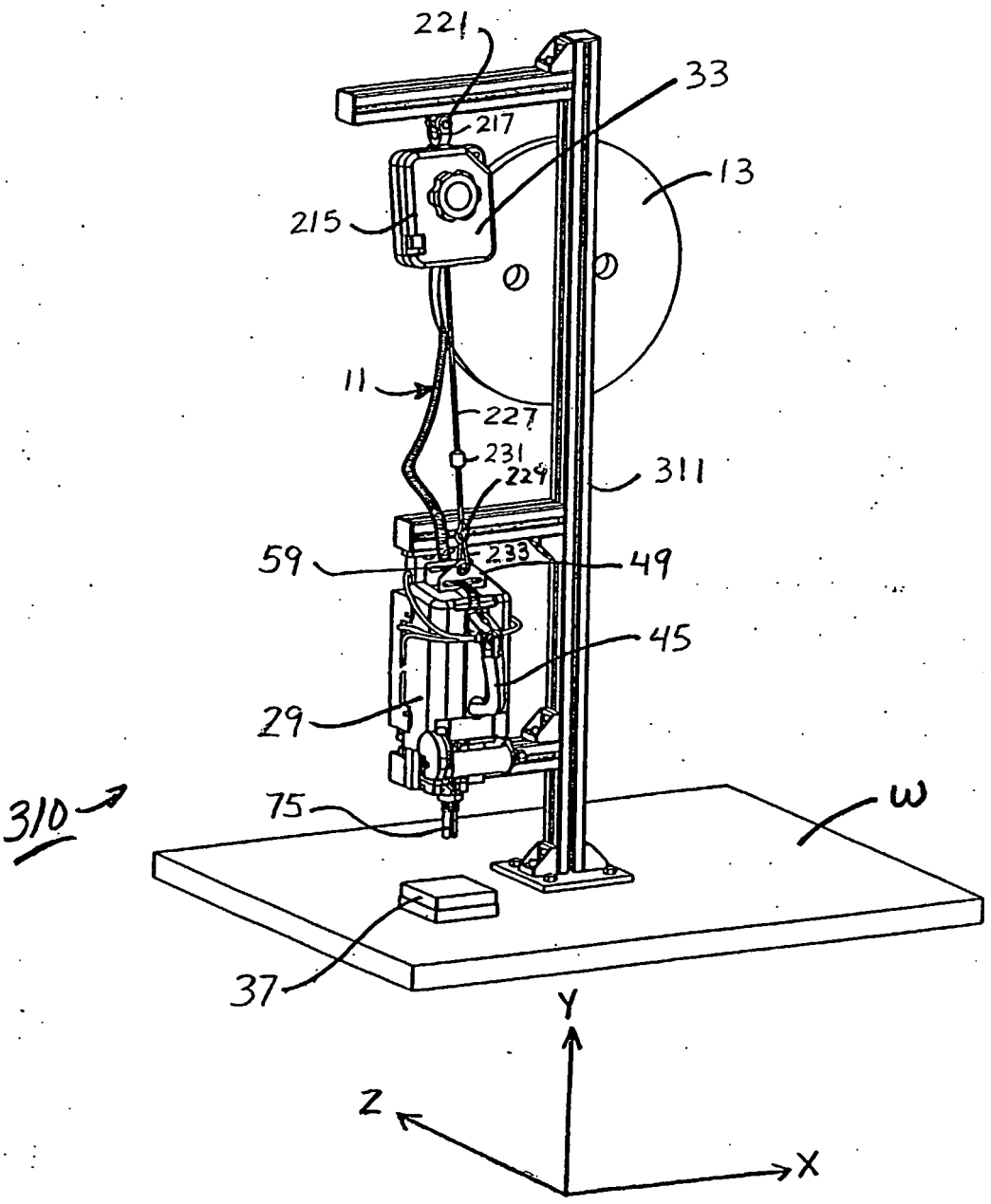


FIG. 21

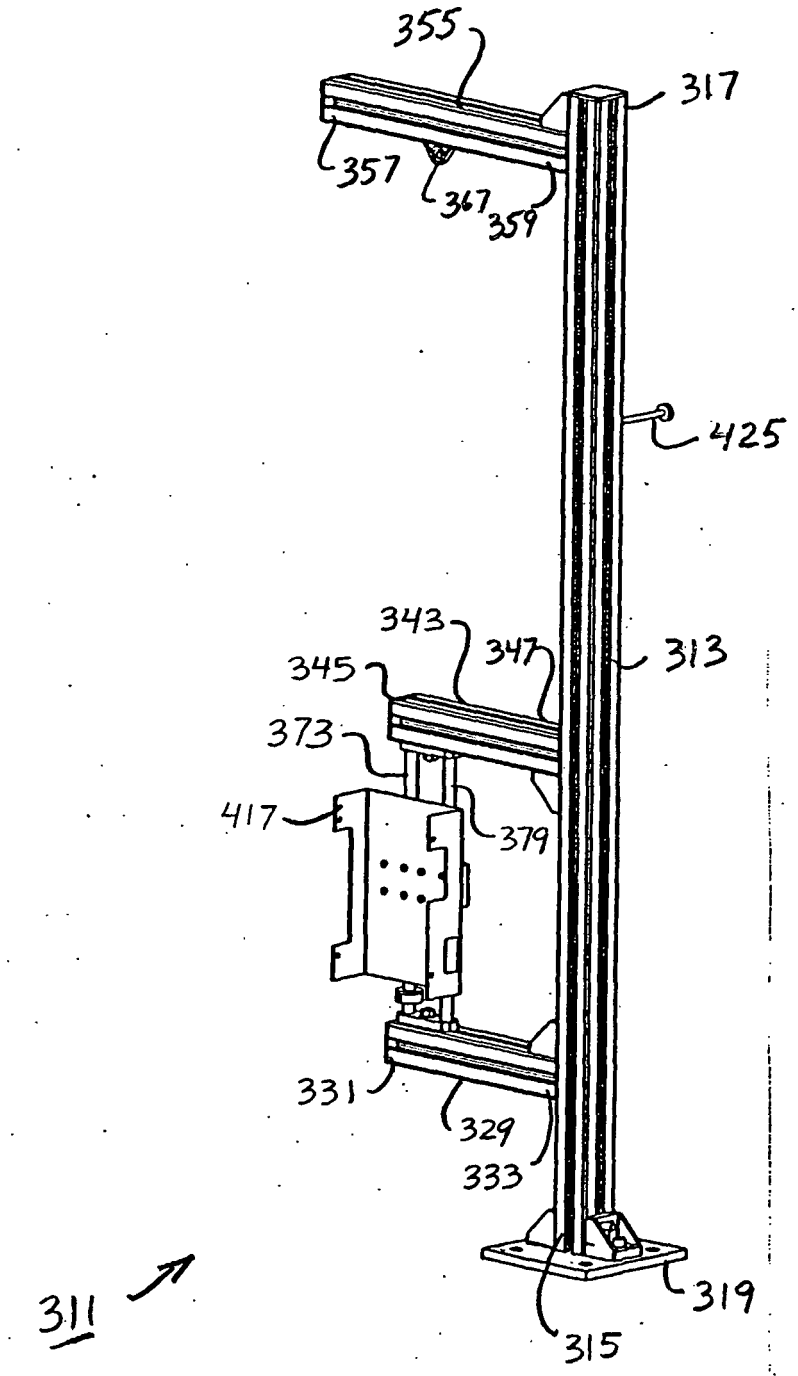

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FIG. 22

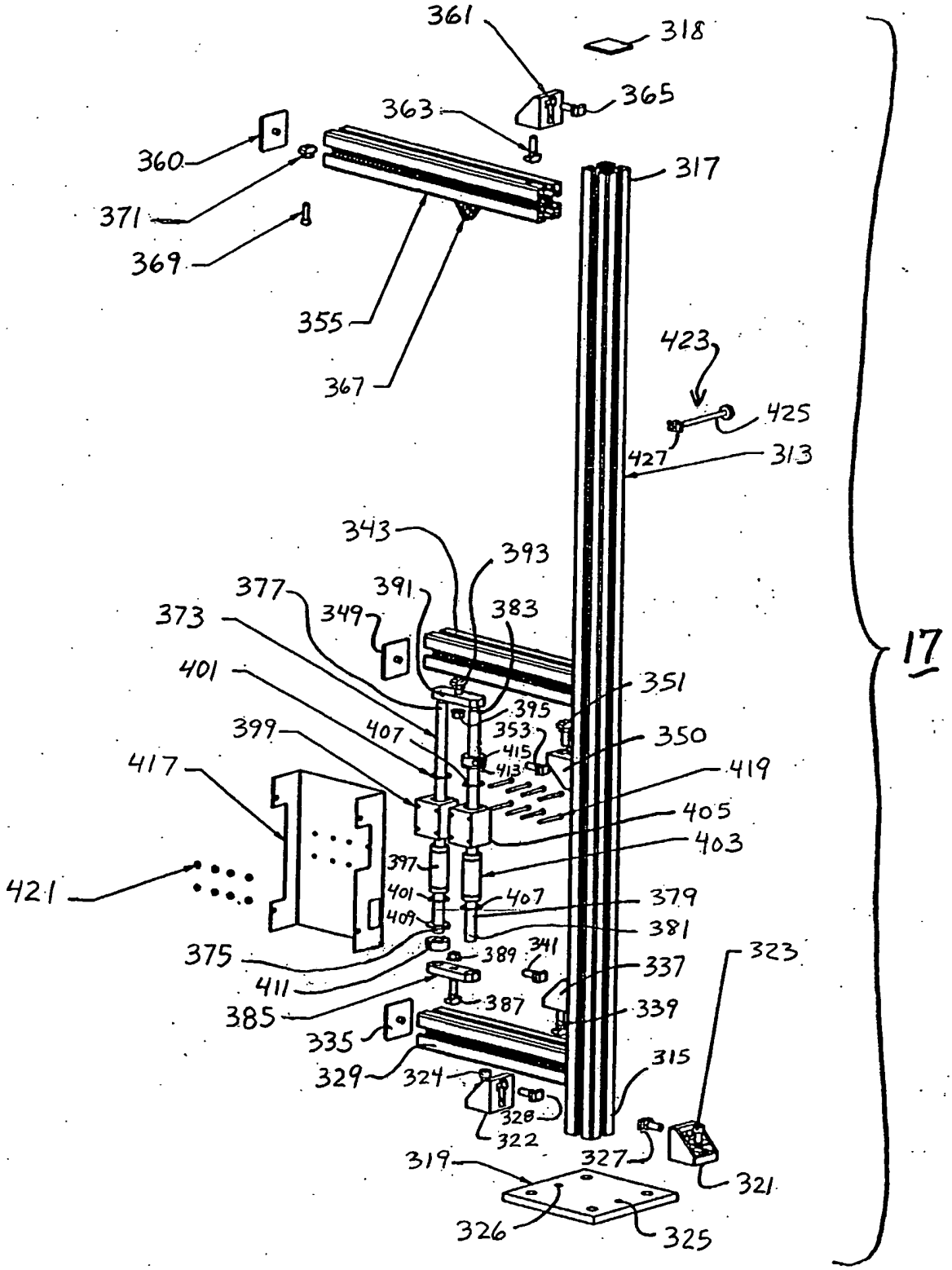

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FIG. 23

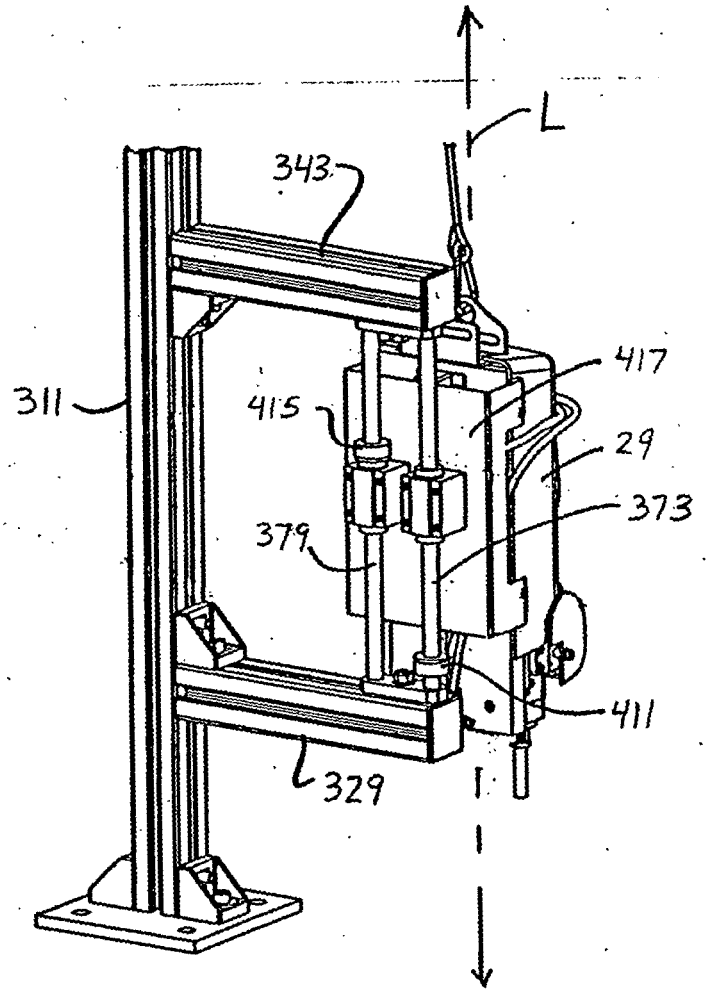


FIG. 24

REFERENCES CITED IN THE DESCRIPTION

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