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(54) **Code break mechanism for stacking apparatus.**

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(73) Proprietor: **PITNEY BOWES, INC.**
World Headquarters
One Elmcroft
Stamford Connecticut 06926-0700(US)

(72) Inventor: **Doeberl, Terrence M.**
111 Simpaug Turnpike
West Redding Connecticut 06896(US)
Inventor: **Rand, Ralph K.**
1 Honey Lane
Sandy Hook Connecticut 06982(US)
Inventor: **Payne, Larry S.**
13548 Castleton
Farmers Branch Texas 75234(US)
Inventor: **Fujimoto, Kazutoshi**
204 Guinivere
Arlington Texas 76014(US)
Inventor: **Monday, William C.**
3621 Hickox Road
Rowlett Texas 75088(US)

(74) Representative: **Cook, Anthony John et al**
D. YOUNG & CO.
21 New Fetter Lane
London EC4A 1DA (GB)

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EP 0 376 463 B1

Description

This invention relates to a code break mechanism for a stacking apparatus receiving a stream of articles, and more particularly to a code break mechanism for producing discontinuities in the article stream in accordance with a selected parameter change in the article stream.

In article processing systems, generally the last process step is the collection of processed articles. For example, in a conventional mail processing system a power stacker may be employed to collect envelopes ejected from a mailing machine. Generally, the power stacker receives the envelopes in seriatim and in a uniform manner and stacks the envelopes. An operator periodically removes the accumulated envelope stack from the stacker for packaging in preparation for subsequent deposit with a mail forwarding agent, e.g. a National Postal Authority.

Mail forwarding agents offer to the mailers special postage discount rates for mail which is presorted, for example, by an appropriate standard address code. Therefore, where the mail is processed in a presorted manner, for example, according to such a code, it would be advantageous to the operator for the power stacker to include a means for visually marking address code changes or breaks within the stacker received mail stream.

It is an aim of the present invention to present a code break mechanism particularly suited for employment in a power stacker.

One suitable form of power stacker includes a deck fixably mounted to and supported by a housing such that the deck is positioned at a 15° rearward reclined angle. A registration wall is fixably mounted to the housing and extends generally perpendicular relative to the deck. A stack wall is mounted for sliding movement relative to the housing at one end.

A stacker apparatus which includes a code break mechanism has been proposed in German Patent Application No. DE-A-1 254 950. However, this arrangement does not have a registration wall and apparently can only accept articles such as letters which are presented to it in a substantially vertical orientation. A different kind of stacker apparatus is shown by Faeber in U.S. Patent No. US-A-2 843 378. This is particularly directed to stacking signatures from a printing press in such a way that they stand substantially vertical. Faeber aims to prevent smearing or tearing of the signatures, and, for this purpose, a special design of stacking station is provided.

In German Patentschrift No. 426 209 (1926) there is disclosed an arrangement having a simple pusher for thrusting a group of envelopes sideways, at predetermined times during the operation

of the machine. The envelopes are tilted towards the vertical after being fed in. No registration wall, no spring biased rear wall, and no helical threaded hubs are to be seen in this German Patent.

According to the present invention, there is provided an apparatus for collecting delivered articles, comprising:

a power stacker having a support housing, a deck supported by said housing, a registration wall fixed to said housing and extending generally perpendicular to said deck, stack wall slidably mounted to said housing at one end of said deck, said stack wall being slidably mounted to said housing such that said stack wall can be horizontally displaced outwardly from said deck, means for causing said delivered articles to be forcibly stacked against said stack wall, support means slidably mounted to said housing for providing article support between said deck and said displaced stack wall and biasing means for providing a counter return force to said stack wall; characterised by the fact that:

(a) the registration wall is fixed to the housing and extending generally perpendicular to the deck, the stack wall having a reclined surface extending generally upwardly from said deck;

(b) a code break mechanism has a deflector means for encountering a selected one of said articles and causing said selected article to be stacked by said power stacker such that said selected article represents a visual discontinuity relative to said articles stacked by said power stacker;

(c) said deflector means has a deflector plate pivotally mounted in an opening in said registration wall, and drive means for causing said deflector plate to be selectively positionable from a first position coplanar with said registration wall to a second position pivotally displaced from said registration wall; and

(d) said drive means has a rotatable output shaft, a first link fixed to one end of said output shaft, and a linking means for connecting said other end of said first link with said deflector plate in such a manner that pivotal displacement of said first link causes said deflector plate to move either to said first or said second position.

In a preferred embodiment of the invention, the drive means is a rotary solenoid whose activation is caused by a motor controller in response to a code break lotter being discharged from a feed device.

The deflector means may further comprise biasing means for biasing said deflector plate in said first position, said biasing means acting on said linking means.

An apparatus according to an embodiment of the invention comprises a deflector plate pivotally mounted within a mating opening in the registration

wall. The deflector plate in a first or normal position is located coplanar with the registration surface of the registration wall. A solenoid, responding to a control signal from a controller, is fixed in the housing and communicates with the deflector plate through a linkage in such a way that actuation of the solenoid causes pivotal displacement of the deflector plate from the first position to the second position. When the deflector plate is positioned in the second position, it laterally deflects the next-arriving envelope. The code break-indicating envelope is thereby laterally misaligned with respect to the envelope stack allowing an operator to visually observe code breaks in the stack.

The invention will be better understood from the following non-limiting description of an example thereof given with reference to the accompanying drawings, in which:-

Fig. 1 is a partial side view of a power stacker usable in accordance with an example of the present invention;

Fig. 2 is a sectioned side view of the power stacker;

Fig. 3 is a sectioned end view of the power stacker of Fig. 1;

Fig. 4 is an end view of a code break mechanism in accordance with an example of the present invention; and

Fig. 5 is a schematic view of a motor control for said power stacker.

Referring to Figs. 1 and 2, one example of a suitable power stacker, generally indicated at 11, comprises a base or support housing 12 having a base 13. A plurality of vertically extending support posts 15 and 17 (refer to Fig. 3) are fixed to base 13 at one end. The base 13 also has fixed thereto, in vertical alignment, a forward wall 21 and a parallel rear wall 23 transversely spaced therefrom. End walls 25 and 27 are fixed to the base 13 in spaced relationship and at their ends to respective walls 21 and 23.

A deck 31 is fixed to walls 21, 23, 25 and 27 and along its underside to the support posts 15 and 17, such that the deck assumes an inclined position, front to rear (herein called a reclined position), of approximately 15° (fifteen degrees) from the horizontal. The deck 31 contains a plurality of slots 33, 35 and 37. Fixed to the underside of the deck 31 at the receiving or forward end are first and second adjustable tension brace assemblies 41 and 43, Fig. 3. Also fixed to the underside of the deck 31 at the other end are braces 45. Each brace 45 is longitudinally aligned to a respective brace assembly 41 or 43.

A motor mount 48, having a motor 49 mounted thereto, is fixed to the underside of the deck 31. The motor 49 includes an output shaft 51 having a pulley wheel 52 carried by the output shaft 51. A

shaft 53 carrying three friction wheels, one shown at 55, Fig. 2, is rotatably mounted in the braces 45. The friction wheels are respectively radially aligned to the first slots 33, 35 and 37, Fig. 3. A second shaft 63 is rotatably mounted in the brace assemblies 41 and 42. The shaft 63 carries three friction wheels, one shown at 65. These three friction wheels are radially aligned to the respective second slots 33, 35 and 37, Fig. 3. Endless belts 71, 73 and 74 extend around the respective friction wheel pairs.

The shaft 53 further includes a pulley wheel 81 which is in communication by an endless belt 83 with the motor 49 for providing a drive to the shaft 53. The shaft 53 further carries bevel gears 85 and 87 fixed thereto in axially spaced relationship. The rear wall 23 has an aperture 89 through which an end portion of the shaft 53 extends. The shaft 53 has fixed thereto a pulley 91.

End wall 25 has formed thereon a plurality of studs 94 and 93 through which extends a respective shaft 95 and 97 seated at one end in the end wall 25. Rotatively mounted around the other end of shafts 95 and 97 are respective threaded hubs 101 and 103. The threaded hubs 101 and 103 are mounted such that they partially extend into respective apertures, one seen at 104, formed into the deck 31. Bevel gears 92 and 93 are rotatively mounted around the respective shafts 95 and 97 in driving communication with the respective threaded hubs 101 and 103. The bevel gears 92 and 93 are in constant mesh with respective bevel gears 85 and 87.

A stack wall 111 has a formed facing surface 113 abutting to the outer face of end wall 25 leading upwardly to a reclined surface 115. A plurality of guide rods 117, 119 and 121 are fixed at one end to the facing surface of the stack wall 111. The guide rods 117, 119 and 121 extend slidably through respective apertures in the end wall and are slidably received by respective guide tabs 123, 125 and 127. The guide tabs 123, 125 and 127 are fixed to the underside of the deck 31. Referring to Fig. 3, slide rail assemblies 141 and 143 have rail portions fixed to the respective side walls 21 and 23. Another rail portion of rail assemblies 141 and 143 is fixed at one end to the facing surface 113 of the stack wall 111 such that the stack wall 111 can be slidably displaced.

Referring to Fig. 2, a registration wall 145 is mounted longitudinally along the rear wall 23 and oriented generally perpendicular to the deck. The registration wall 145 includes a recess 147 angled generally perpendicular to the reclined surface 115 of stack wall 111. A brace 149 is fixed to the back surface of the registration wall 145. The brace 149 includes a shaft 151 rotatably mounted therein such that the shaft 151 extends generally per-

pendicular to the reclined surface 115 of the stack wall 111. A pulley 153 is mounted on the shaft 151. An endless belt 155 runs round the pulley 153 and is in driving relationship with the pulley 91 mounted shaft 63. A threaded hub 157 is fixed on the shaft 151.

The registration wall 145 further includes a slot 160. A yoke 165 is pivotally mounted in slot 160 to the registration wall 145. The yoke 165 carries a yoke wheel 167 rotatively mounted between the forks of the yoke 165. The yoke 165 is adjustably mounted in slot 160 such that the yoke wheel rests on the deck 31. Also fixably mounted to the back of the registration wall 145 is a guide rod 169 which extends slidably through a slide member 169A fixably mounted to the registration wall 145 and pivotally mounted at one end to the stack wall 111. A return spring assembly 166 has one end of its flex strip 168 fixably mounted to the stack wall 111. In like manner a second return spring assembly 170 is fixably mounted to base 13 having one end of it flex strip 172 fixably mounted to the stack wall 111.

Referring to Fig. 4, the code break mechanism, generally indicated as 200, includes a deflector plate 202 pivotally mounted in a matting opening 204 in the registration wall 145. A bracket 201 is fixably mounted to the back face of the registration wall 145. Pivotally mounted to the bracket 201 is a generally L-shaped link 206 having a first slot 208 and a second slot 210. A pin 212 is formed to the back face of the deflector plate 202 such that the pin 212 is captured in the slot 208 of the link 206.

A bracket 214 is fixably mounted to the underside of the deck 31 and fixably supports a rotary solenoid 216. The output shaft 218 of the rotary solenoid 216 has fixably mounted thereto to one end of a link 220. The link 220 extends through an aperture 222 in the rear wall 23 and has a slot 224 formed in its other end. A second bracket 226 is fixably mounted to the rear wall 23. Slidably mounted through the brackets 201 and 226 is a link 228 having a hub 239 formed at one end slidably captured in slot 210 of link 206 and at the other end of link 228 a formed pin 232 is slidably captured in slot 224 of link 220. The link 228 includes a coupling 234. A spring 236 is coiled around the link 228 between the stop rim 234 and the bracket 201.

Referring further to Fig. 5, in operation, a suitable motor controller 171 is in electrical communication through line 173 with an envelope feed device 175, for example, a mailing machine, and through line 177 with the motor 49 and rotary solenoid 216 of the power stacker 12. The motor controller 171 synchronously controls the operating speed of the power stacker 12, rotary solenoid 216 and the feed device 175 such that envelopes, for

example, 5 inch envelope delivered by the feed device are received by the power stacker in a shingled fashion with approximately a .75 inch spacing between the leading edge of successive envelopes. The envelopes are transported by the belts 55, 57 and 59, which are under the drive influence of motor 49 through belt 83 and shaft 63, under the yoke roller 167 such that the leading edge of the lead envelopes engages the stack wall facing 115 and is caused to assume a generally vertical position against the stack wall. The subsequent envelopes are caused to assume a generally parallel orientation relative to the lead envelope. The positioning of envelopes is assisted by the edge engagement of the envelopes with the threaded hubs 101, 103 and 157.

Upon activation by the motor controller 171 occasioned by the presence of a code break letter being discharged from the feed device 175, the rotary solenoid 216 rotatively displaces link 220 in the direction of arrow A. The displacement of link 220 is transmitted by link 228 to cause link 206 to pivotally displace. The displacement of link 206 causes the deflector plate 202 to pivotally displace from a first position coplanar with the registration wall 145 to a second position whereupon the deflector plate 202 encounters the code break envelope in route. The code break envelope is consequentially displaced laterally relative to the other stacker received envelopes.

As the envelopes are caused to vertically stack, edge engagement of the envelopes with the threaded hubs 101, 103 and 157 cause the stack wall to displace outwardly. The rods 117, 119, 121 and 160 support the stacked envelopes as the stack wall is displaced. During vertical stacking of the envelopes, the code break envelope remains perceptibly displaced laterally.

The foregoing particular description is of the preferred embodiment of the present invention and should not be viewed as limiting the invention.

Claims

1. An apparatus for collecting delivered articles, comprising:

a power stacker (11) having a support housing (12), a deck (31) supported by said housing, a registration wall (145) fixed to said housing and extending generally perpendicular to said deck (31), a stack wall (111) slidably mounted to said housing at one end of said deck, said stack wall being slidably mounted to said housing such that said stack wall can be horizontally displaced outwardly from said deck, means for causing said delivered articles to be forcibly stacked against said stack wall, support means slidably mounted to said hous-

ing (12) for providing article support between said deck and said displaced stack wall and biasing means for providing a counter return force to said stack wall; characterised by the fact that:

(a) the registration wall (145) is fixed to the housing (12) and extending generally perpendicular to the deck (31), the stack wall (111) having a reclined surface (115) extending generally upwardly from said deck (31);

(b) a code break mechanism (200) has a deflector means (202-212) for encountering a selected one of said articles and causing said selected article to be stacked by said power stacker (11) such that said selected article represents a visual discontinuity relative to said articles stacked by said power stacker;

(c) said deflector means has a deflector plate (202) pivotally mounted in an opening (204) in said registration wall (145), and drive means (216) for causing said deflector plate (202) to be selectively positionable from a first position coplanar with said registration wall to a second position pivotally displaced from said registration wall; and

(d) said drive means (216) has a rotatable output shaft (218), a first link (220) fixed to one end of said output shaft, and a linking means (228) for connecting said other end of said first link (220) with said deflector plate in such a manner that pivotal displacement of said first link causes said deflector plate to move either to said first or second position.

2. An apparatus according to claim 1 in which the drive means (216) is a rotary solenoid whose activation is caused by a motor controller (171) in response to a code break letter being discharged from a feed device (175).

3. An apparatus as claimed in claim 1 or 2, wherein said deflector means (200-212) further comprises biasing means (236) for biasing said deflector plate in said first position, said biasing means acting on said linking means (228,234).

4. An apparatus as claimed in claims 1 or 3, further comprising control means (171) for selectively activating said code break mechanism (200).

Patentansprüche

1. Vorrichtung zum Sammeln abgelieferter Artikel mit:

einem Leistungsstapler (11) mit einem Halterungsgehäuse (12), einem Deck (31), das durch das Gehäuse gehalten ist, einer Registrierungswand (145), die an dem Gehäuse befestigt ist und sich im allgemeinen senkrecht zum Deck (31) erstreckt, einer Stapelwand (111), die gleitfähig angebracht ist an dem Gehäuse an einem Ende des Decks, wobei die Stapelwand so an dem Gehäuse gleitfähig angebracht ist, daß die Stapelwand horizontal nach außen von dem Deck verrückt werden kann, eine Einrichtung zum Veranlassen, daß die gelieferten Artikel gewaltsam gestapelt werden gegen die Stapelwand, einer Halterungseinrichtung, die gleitfähig angebracht ist an dem Gehäuse (12) zum Schaffen einer Artikelhalterung zwischen dem Deck und der verrückten Stapelwand und einer Vorspanneinrichtung zum Schaffen einer Gegenrückführungskraft zu der Stapelwand;

dadurch **gekennzeichnet**, daß

(a) die Registrierungswand (145) befestigt ist an dem Gehäuse (12) und sich im wesentlichen senkrecht zum Deck (31) erstreckt, wobei die Stapelwand (111) eine zurückgeneigte Oberfläche (115) hat, die sich im allgemeinen nach oben von dem Deck (31) erstreckt;

(b) ein Codeunterbrechungsmechanismus (200) eine Deflektoreinrichtung (202 - 212) hat zum Gegenübertreten einem ausgewählten der Artikel und Veranlassen, daß der ausgewählte Artikel so durch den Leistungsstapler (11) gestapelt wird, daß der ausgewählte Artikel eine sichtbare Diskontinuität relativ zu durch den Leistungsstapler gestapelten Artikeln darstellt;

(c) die Deflektoreinrichtung eine Deflektorplatte (202) hat, welche drehbar angebracht ist in einer Öffnung (204) in der Registrierungswand (145), und eine Antriebseinrichtung (216) zum Veranlassen, daß die Deflektorplatte (202) selektiv positionierbar ist von einer ersten Position, koplanar mit der Registrierungswand, zu einer zweiten Position drehbar verrückt von der Registrierungswand; und

(d) die Antriebseinrichtung (216) eine drehbare Ausgangswelle (218) hat, wobei eine erste Verbindung (220) angebracht ist an einem Ende der Ausgangswelle, und eine Verbindungseinrichtung (228) zum Verbinden des anderen Endes der ersten Verbindung (220) mit der Deflektorplatte auf solch

eine Art und Weise, daß eine Drehverrückung der ersten Verbindung veranlaßt, daß sich die Deflektorplatte entweder in die erste oder die zweite Position bewegt.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Antriebseinrichtung (216) eine Drehspule ist, deren Aktivierung verursacht wird durch einen Motorkontroller (171), ansprechend auf einen Codeunterbrechungsbrief, der von einer Zuführungsvorrichtung (175) entladen wird. 5
3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Deflektoreinrichtung (200 - 212) weiterhin eine Vorspanneinrichtung (236) umfaßt zum Vorspannen der Deflektorplatte in der ersten Position, wobei die Vorspanneinrichtung auf die Verbindungseinrichtung (228, 234) wirkt. 10 15 20
4. Vorrichtung nach Anspruch 1 oder 3, gekennzeichnet durch eine Steuereinrichtung (171) zum selektiven Aktivieren des Codeunterbrechungsmechanismus (200). 25

Revendications

1. Appareil pour rassembler des objets fournis, comportant: 30
 - un empileur mécanique (11) ayant un carter de soutien (12), un plateau (31) soutenu par ledit carter, une paroi d'enregistrement (145) fixée audit carter et s'étendant généralement perpendiculairement audit plateau (31), une pa- 35
 roir pour empilage (111) montée de façon coulissante sur ledit carter, à une extrémité dudit plateau, ladite paroi pour empilage étant montée de façon coulissante sur ledit carter de façon que ladite paroi pour empilage puisse être déplacée horizontalement vers l'extérieur dudit plateau, un moyen pour provoquer par force l'empilage desdits objets fournis contre ladite paroi pour empilage, un moyen de soutien monté de façon coulissante sur ledit carter (12) pour fournir un soutien pour l'objet entre ledit plateau et ladite paroi pour empilage dé- 40
 placée, et un moyen de poussée pour fournir une force antagoniste à ladite paroi pour empilage; caractérisé par le fait que: 45
 - (a) la paroi d'enregistrement (145) est fixée au carter (12) et s'étend généralement perpendiculairement au plateau (31), la paroi pour empilage (111) ayant une surface inclinée (115) s'étendant généralement vers le 50
 haut depuis ledit plateau (31); 55
 - (b) un mécanisme de discontinuité par code (200) comporte un moyen de déviation

(202-212) destiné à rencontrer un objet sélectionné parmi lesdits objets et à provoquer l'empilage dudit objet sélectionné par ledit empileur mécanique (11), de façon que ledit objet sélectionné représente une discontinuité visuelle parmi lesdits objets empilés par ledit empileur mécanique;

(c) ledit moyen de déviation comporte une plaque de déviation (202) montée pour pivoter dans une ouverture (204) de ladite paroi d'enregistrement (145), et un moyen d'entraînement (216) pour faire en sorte que ladite plaque de déviation (202) puisse être positionnée de façon sélective depuis une première position coplanaire avec ladite paroi d'enregistrement vers une seconde position déplacée par pivotement depuis ladite paroi d'enregistrement; et

(d) ledit moyen d'entraînement (216) comporte un arbre de sortie rotatif (218), une première liaison (220) fixée à une extrémité dudit arbre de sortie, et un moyen de liaison (228) pour connecter ladite autre extrémité de ladite première liaison (220) avec ladite plaque de déviation, d'une manière telle que le déplacement par pivotement de ladite première liaison provoque le déplacement de ladite plaque de déviation soit vers ladite première, soit vers ladite seconde position.

2. Appareil selon la revendication 1, dans lequel le moyen d'entraînement (216) est un solénoïde rotatif dont l'activation est provoquée par un contrôleur de moteur (171) en réponse à une lettre présentant une discontinuité de code, fournie depuis un dispositif de chargement (175).
3. Appareil selon la revendication 1 ou 2, dans lequel ledit moyen de déviation (200-212) comporte en outre un moyen de poussée (236) pour pousser ladite plaque de déviation dans ladite première position, ledit moyen de poussée agissant sur ledit moyen de liaison (228, 234).
4. Appareil selon la revendication 1 ou 3, comportant en outre un moyen de commande (171) pour actionner de façon sélective ledit mécanisme de discontinuité par code (200).

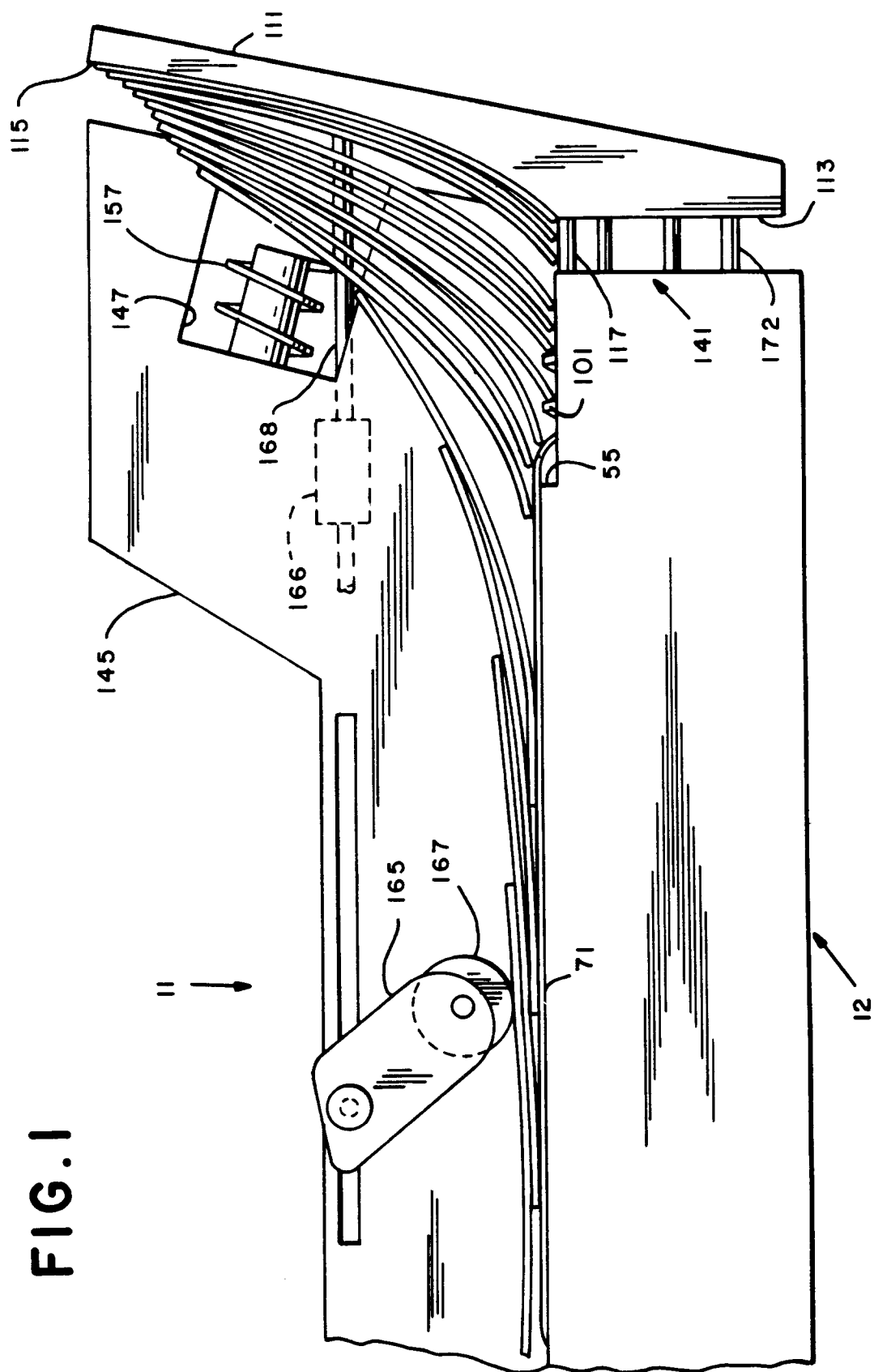
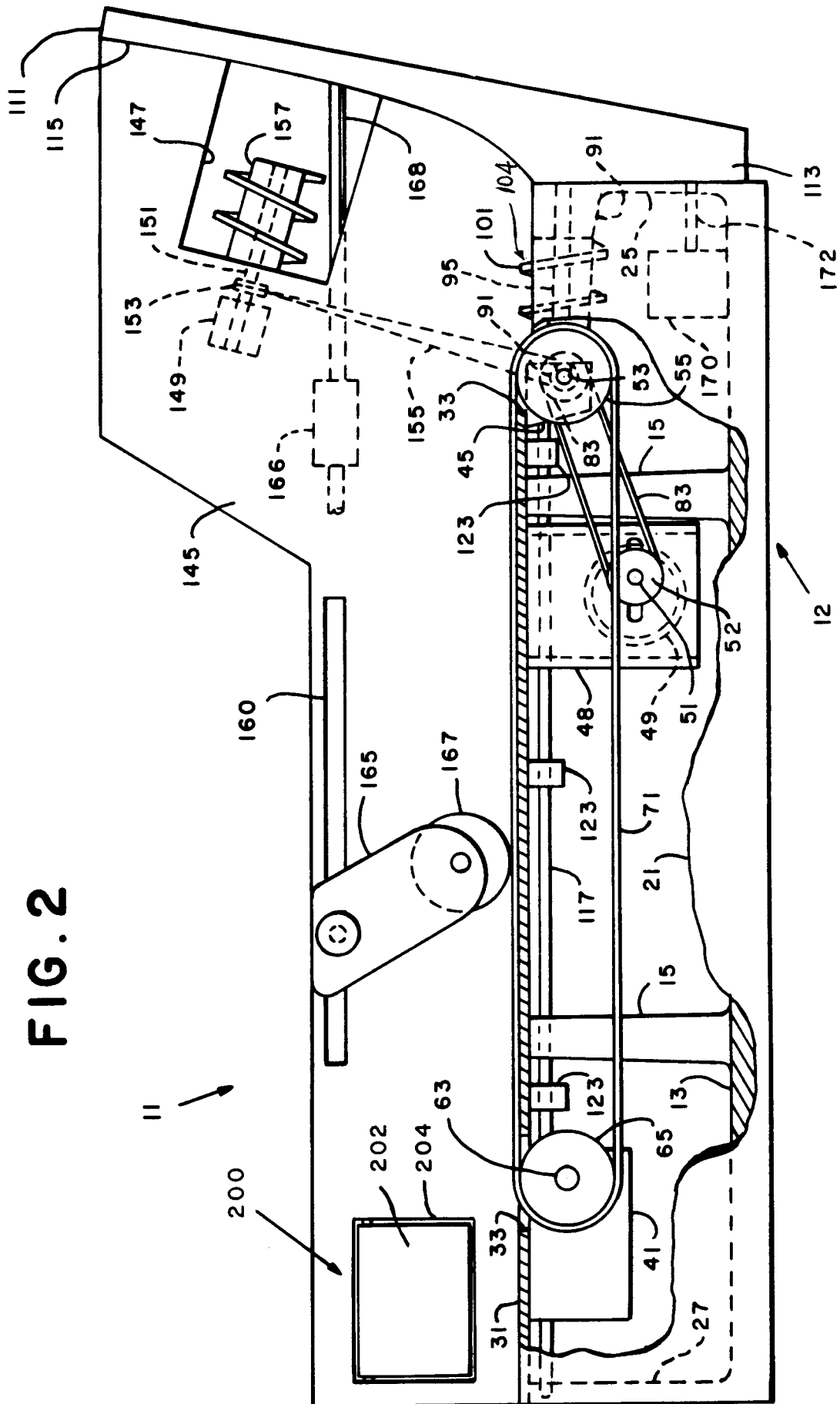


FIG. 2



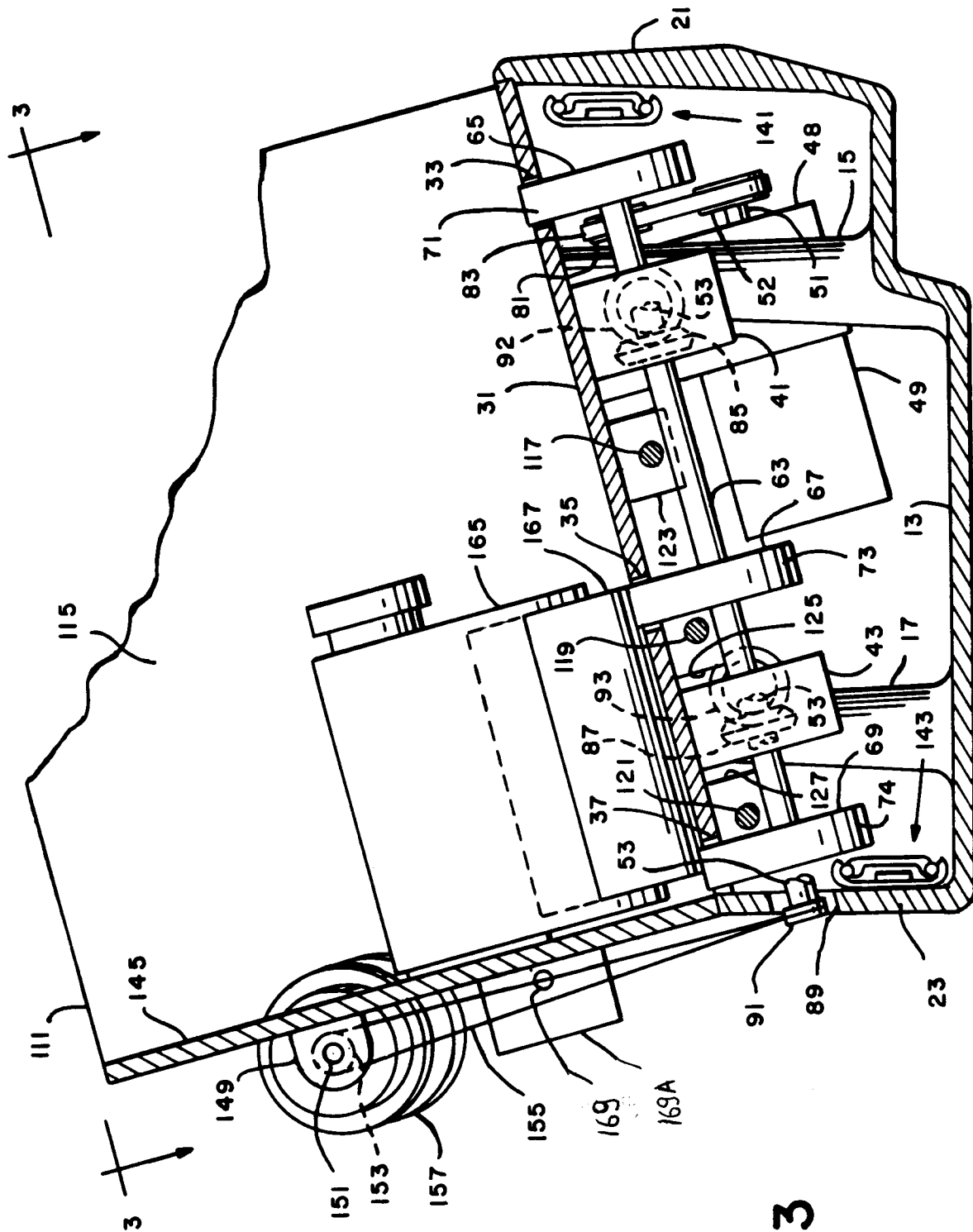
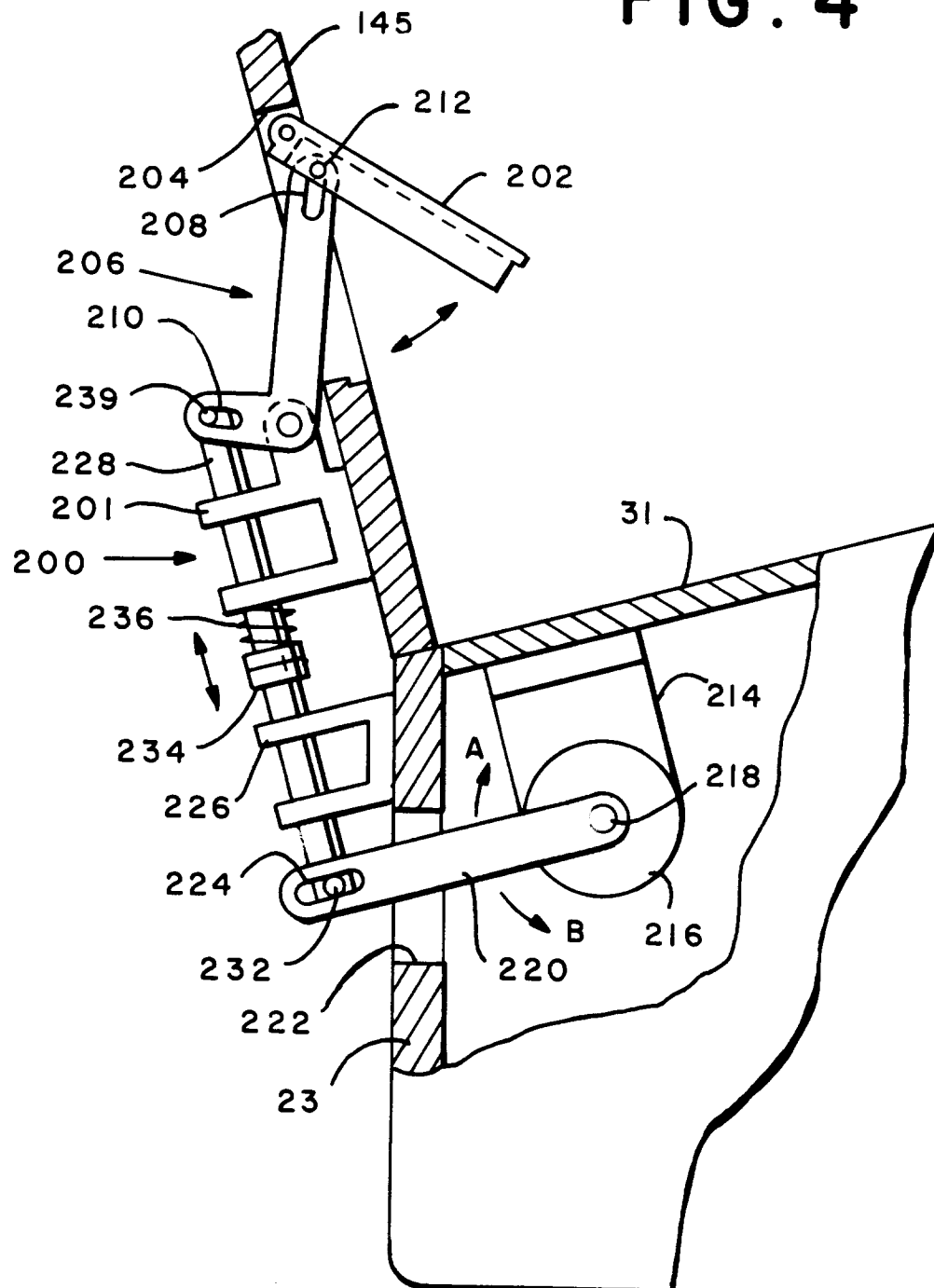


FIG. 3

FIG. 4



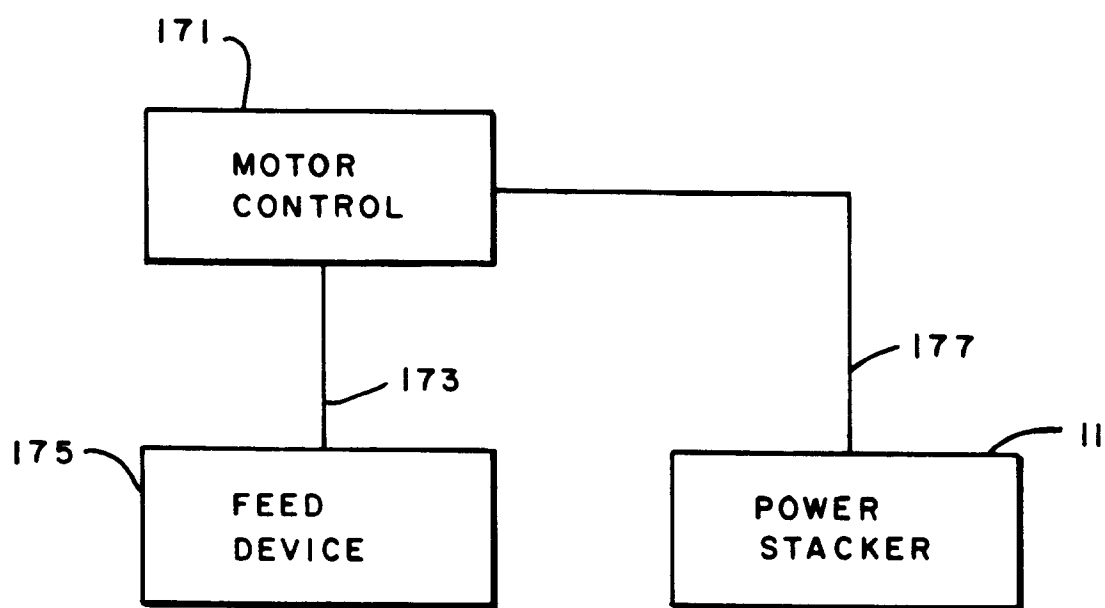


FIG. 5