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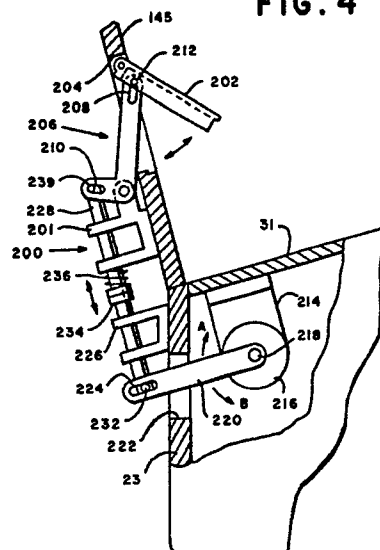
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54 **Code break mechanism for stacking apparatus.**

57 A code break mechanism is preferably employed in a stacker apparatus. The stacker apparatus has a support housing, a deck (31) fixably mounted to and supported by the housing, a registration wall (145) fixed to the housing and extending generally perpendicular to the deck. A deflector plate (202) is pivotally mounted in an opening (204) in the registration wall. A rotary solenoid (216) in communication with a linkage train (206, 208, 220) causes the deflector plate (202) to be selectively positionable from a first position coplanar with the registration wall (145) to a second position pivotally displaced from the registration wall.

**FIG. 4**



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## Code Break Mechanism for Stacking Apparatus

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 code break mechanism 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 useable 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 (ref. to Fig. 4) 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 is fixably mounted to walls 21, 23, 25 and 27 and along its underside to the support posts 15 and 17, such that the deck assumes a reclined position, front to rear, of approximately 15° (fifteen degrees) from the horizontal. The deck 31 contains plurality slots 33, 35, and 37. Fixably mounted to the underside of the deck 31 at the receiving or forward end is a first and second adjustable tension brace assemblies 41 and 43. Also fixably mounted to the underside of the deck 31 at the other end are braces 45. The braces 45 are longitudinally aligned to a respective brace assembly 41 or 43.

A motor mount 48, having a motor 49 mounted thereto, is fixably mounted to the underside of the deck 31. The motor 49 includes an output shaft 51 having a pulley gear 52 fixably mounted around the output shaft 51. A shaft 53 carrying a plurality of fixably mounted friction wheels 55, 57, and 59 therearound is rotatively mounted in the braces 45. The friction wheels are radially aligned to the respective first slots 33, 35 and 37. A second shaft 63 is rotatively mounted in the brace assemblies 41 and 42. The shaft 63 carries a plurality of friction wheels 65, 67 and 69 radially aligned to the respective second slots 33, 35 and 37. A plurality of endless belts 71, 73, and 74 extend around the

respective friction wheel pairs 55-67, 59-65 and 57-69.

The shaft 53 further includes a pulley gear 81 which is in endless belt 83 communication with the motor 49 for providing driving force to shaft 53. The shaft 53 further includes bevel gears 85 and 87 fixably mounted therearound in axial spaced apart relationship. The rear wall 23 includes an aperture 89 through which an end portion of the shaft 53 extends and has fixably mounted therealong a pulley 91.

End wall 25 has formed thereon a plurality of studs 91 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 the threaded hubs 101 and 103 partially extend into respective recesses 104 and 106 formed into the deck 31. A bevel gear 92 and 93 is 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 to a vertically reclined surface 115. A plurality of guide rods 117, 119, and 121 are fixably mounted 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 fixably mounted to the underside of the deck. Referring to Fig. 3, slide rail assemblies 141 and 143 having a rail portion fixably mounted to the respective side walls 21 and 23. Another rail portion of rail assemblies 141 and 143 is fixably mounted 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 fixably mounted longitudinally along the rear wall 23 and orientated 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 fixably mounted to the back surface of the registration wall 145. The brace 149 includes a shaft 151 rotatively mounted therein such that the shaft 151 extends generally perpendicular to the recline surface 115 of the stack wall 111. A pulley 153 is fixably mounted to the of shaft 151. The pulley 153 is an endless belt 155 in driving communication with the pulley 91 mounted shaft 63. A threaded hub 157 is fixably mounted around 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 adjustable 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 166 which extends slidably through a slide member 165 fixably mounted to the registration wall 145 and pivotally mounted at one end to the stack wall 111. A return spring assembly 166 having 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. Pivotaly 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 a 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 a 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 consequently 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 perceptively 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. A code break mechanism for employment with a stacker apparatus (11), said stacker apparatus being arranged for receiving and stacking received articles in a generally uniform manner, said stacker apparatus having a support housing (12), a deck (31) fixably mounted to and supported by said housing, and a registration wall (145) fixably mounted to said housing and extending generally perpendicular to said deck; the said code break mechanism including a deflector means (202) for encountering a selected one of said articles and causing said selected article to be stacked by said stacker apparatus such that the selected article presents a visual discontinuity in the article stack.

2. A code break mechanism as claimed in claim 1, wherein said deflector means comprises a deflector plate (202) pivotally mounted in an opening in the registration wall; and drive means for causing said deflector plate to be selectively moved between a first position coplanar with said

registration wall and a second position pivotally displaced from said registration wall.

3. A code break mechanism as claimed in claim 2 wherein said drive means comprises a rotary solenoid (216) having a rotary output shaft; a first link (220) fixably mounted at one end to said output shaft; and linking means (206, 208) for connecting said other end of said first link with said deflector plate such that pivotal displacement of said first link causes said deflector plate to move to said first or second position.

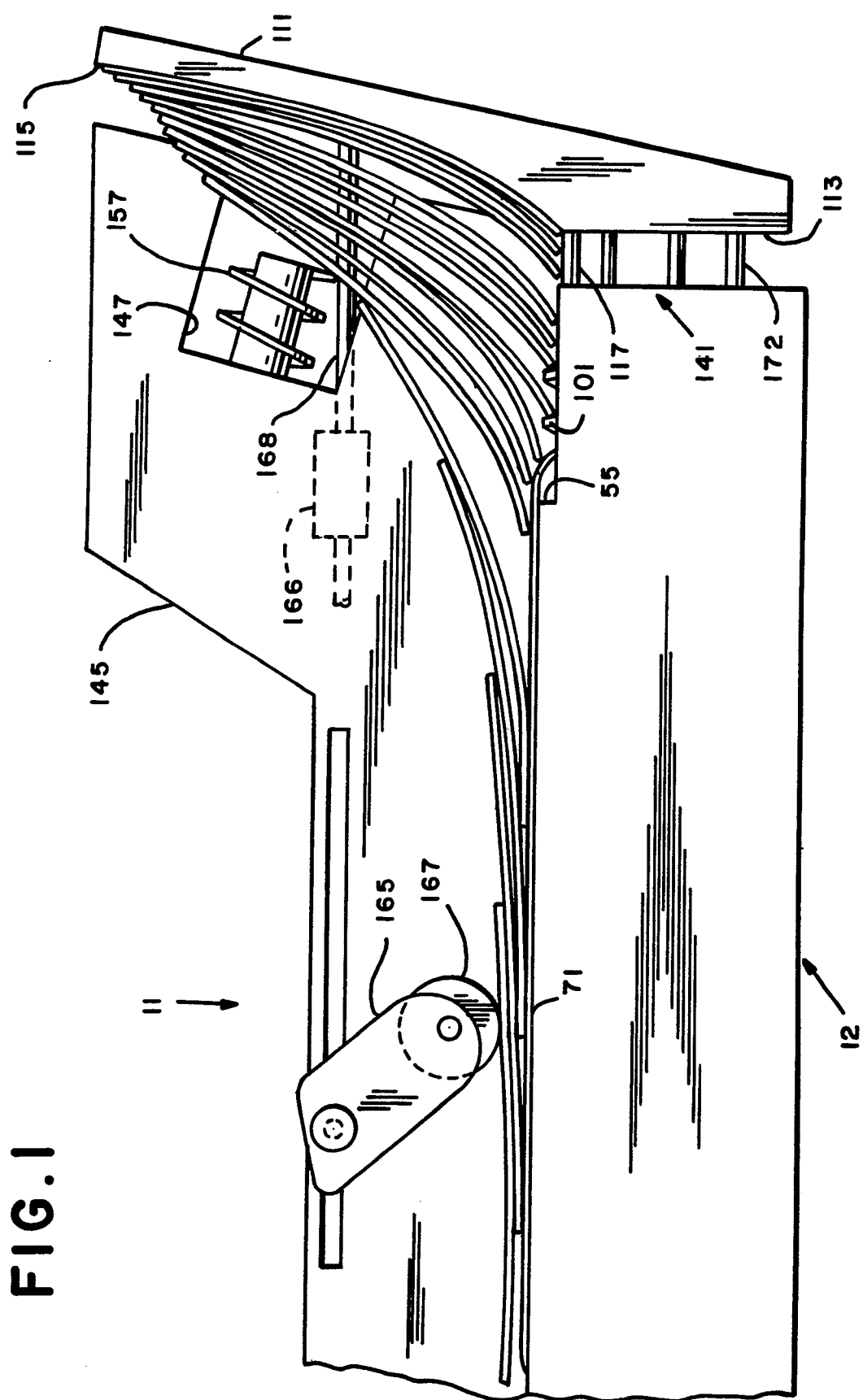
4. A code break mechanism according to any preceding claim in which the stacker apparatus includes a stack wall attached to said housing opposite one end of said deck and means for causing said delivered articles to be collected against said stack wall.

5. A code break mechanism as claimed in claim 3, wherein said drive means is arranged for causing said deflector plate to be selectively movable from a first position coplanar with said registration wall to a second position pivotally displaced from said registration wall.

6. A code break mechanism as claimed in claim 5, wherein said deflector means further comprises biasing means for biasing said deflector plate towards said first position and acting on said linking means.

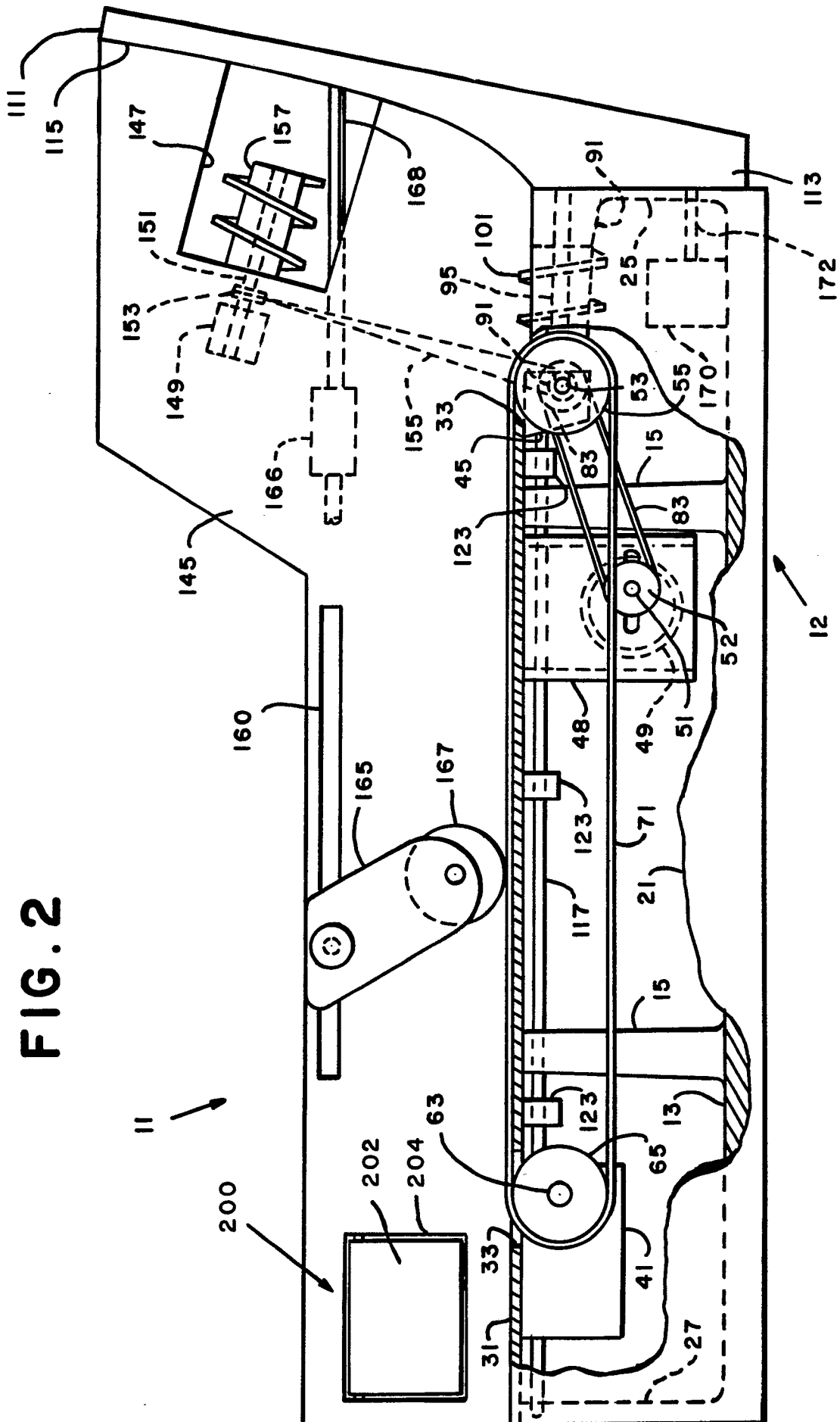
7. A code break mechanism as claimed in any one of claims 4, 5, or 6, further comprising control means for selectively activating said code break mechanism.

8. A document stack comprised of a plurality of documents segregated by category and stacked in a generally uniform manner with the first document of each category being stacked in an off-set manner to create a respective discontinuity in the document stack.



**Fig. 1**

**FIG. 2**



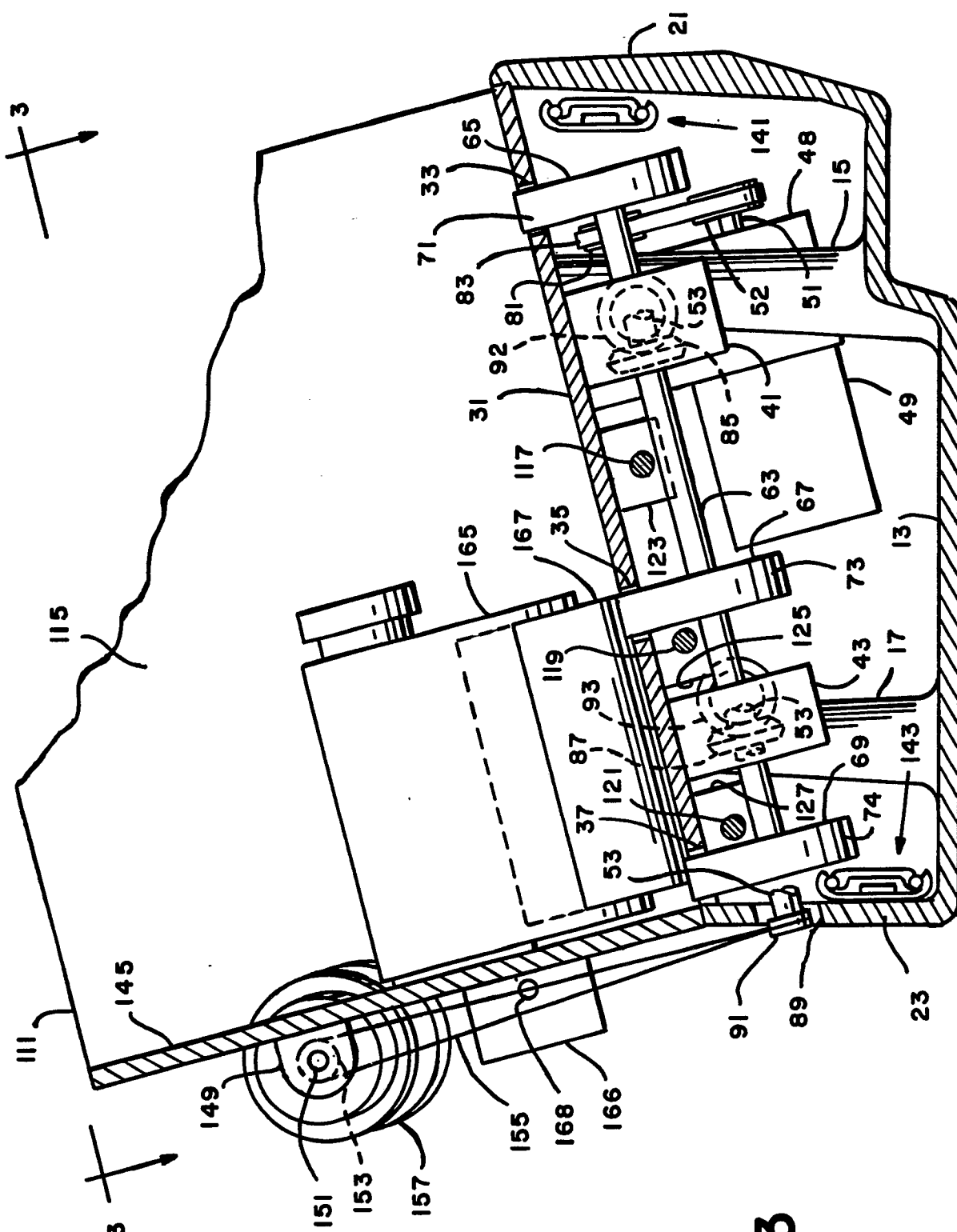
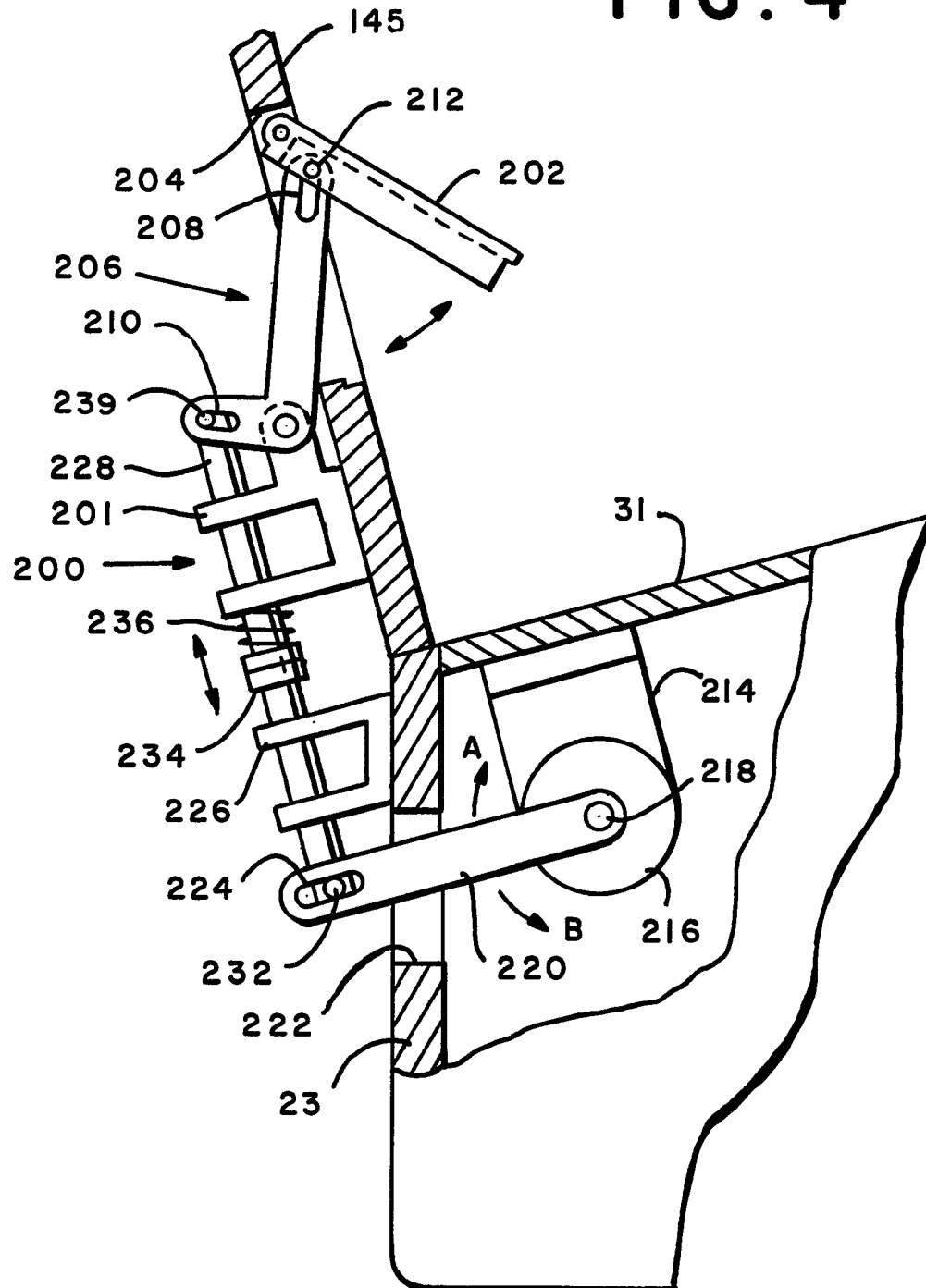
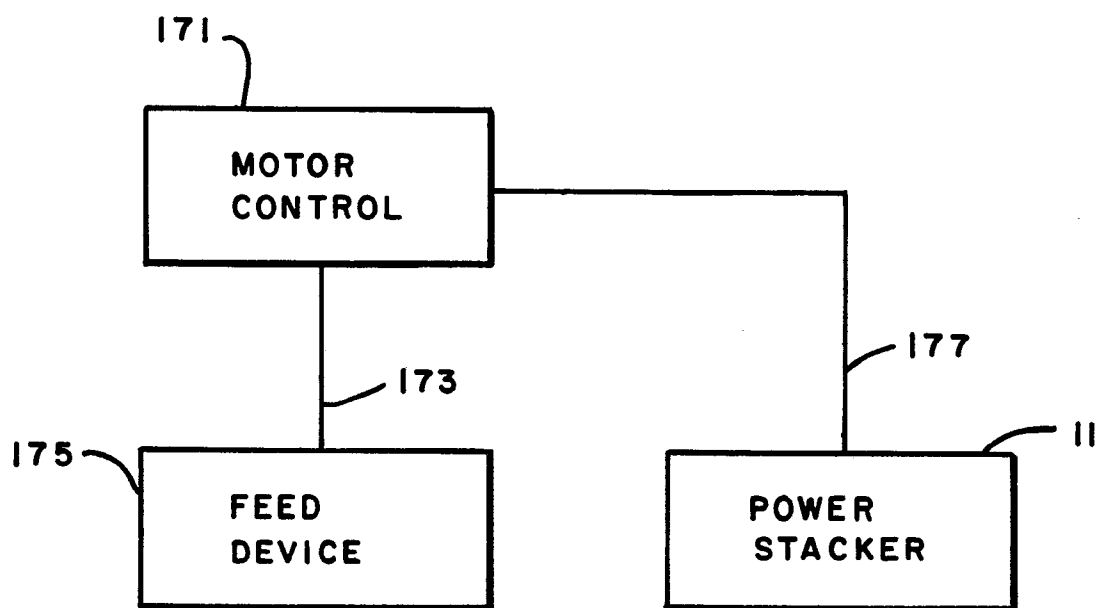


FIG. 3

**FIG. 4**







**FIG. 5**