



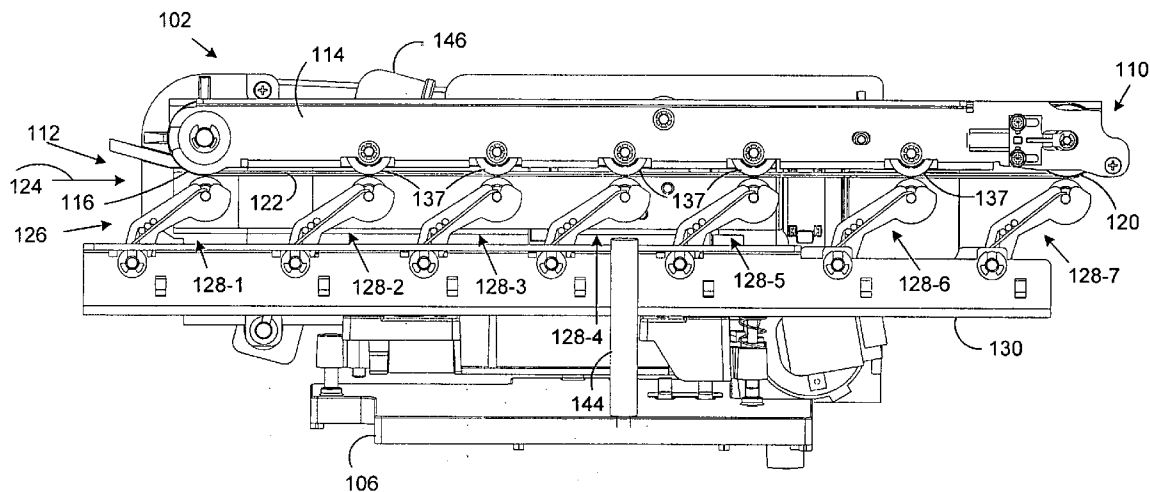
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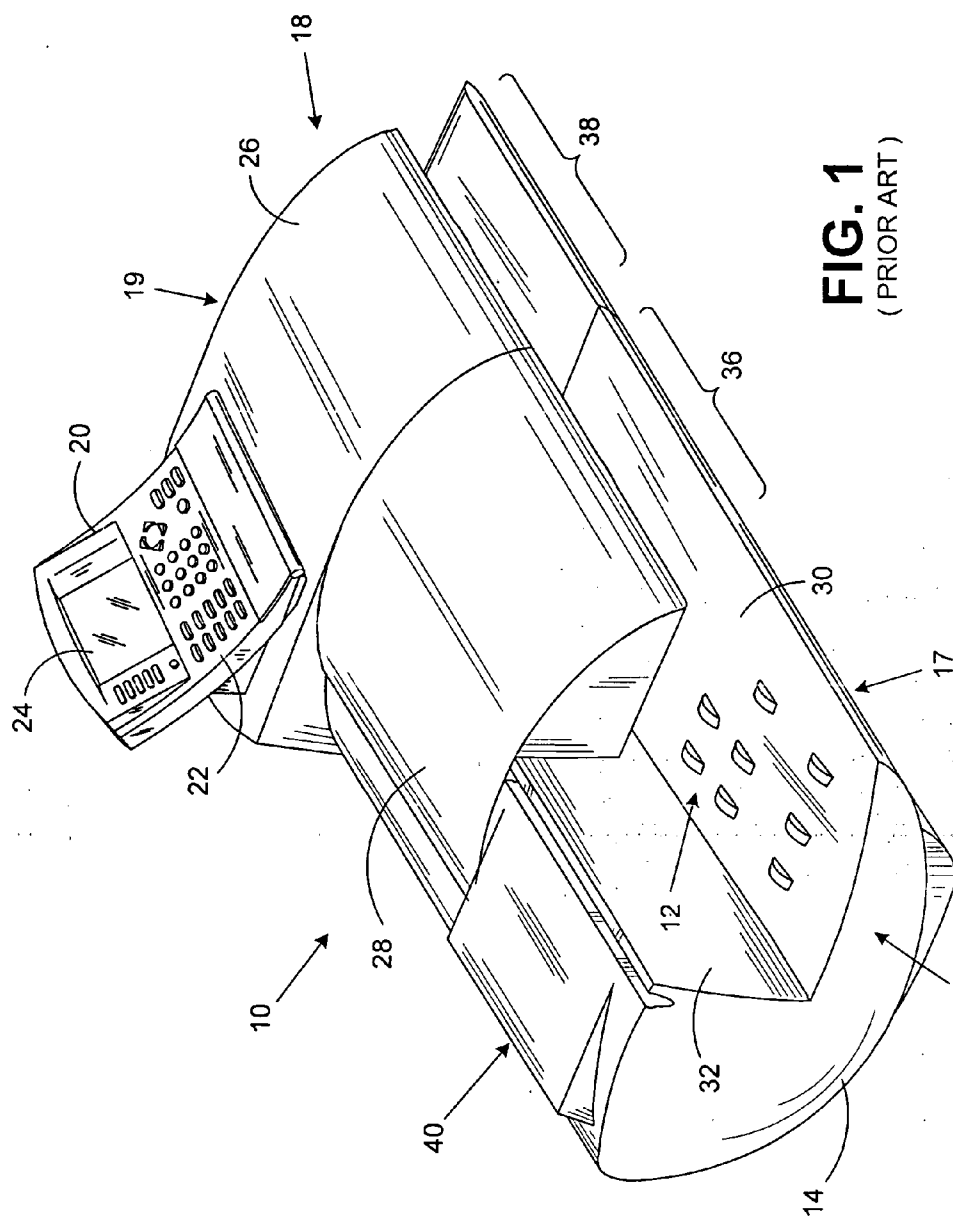
(19) **United States**(12) **Patent Application Publication**
Sye(10) **Pub. No.: US 2006/0220294 A1**(43) **Pub. Date: Oct. 5, 2006**(54) **JAM RELEASE MECHANISM FOR A MAILING MACHINE****Publication Classification**(51) **Int. Cl.**
B65H 5/00 (2006.01)(52) **U.S. Cl.** **271/2**(75) Inventor: **Chiping Sye**, Stamford, CT (US)

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(73) Assignee: **Pitney Bowes Incorporated**, Stamford, CT(21) Appl. No.: **11/086,965**(22) Filed: **Mar. 21, 2005**(57) **ABSTRACT**

The present invention includes apparatus and methods for feeding a mailpiece along a feed path in a mailing machine. An endless drive belt has a lower belt run adapted to feed a mailpiece in a downstream direction. A plurality of pivot arms are mounted in a sequence below the lower belt run. Each pivot arm has a respective pressure roller mounted on a free end of the pivot arm. A respective bias mechanism associated with each pivot arm biases the pivot arm in an upward direction such that the pressure roller contacts the lower belt run. A jam-relief mechanism selectively and simultaneously pivots the pivot arms against the respective biasing force applied to each of the pivot arms by the bias mechanism. The pivoting of the pivot arms by the jam-relief mechanism moves the pressure rollers in a downward direction away from the lower belt run of the endless belt.





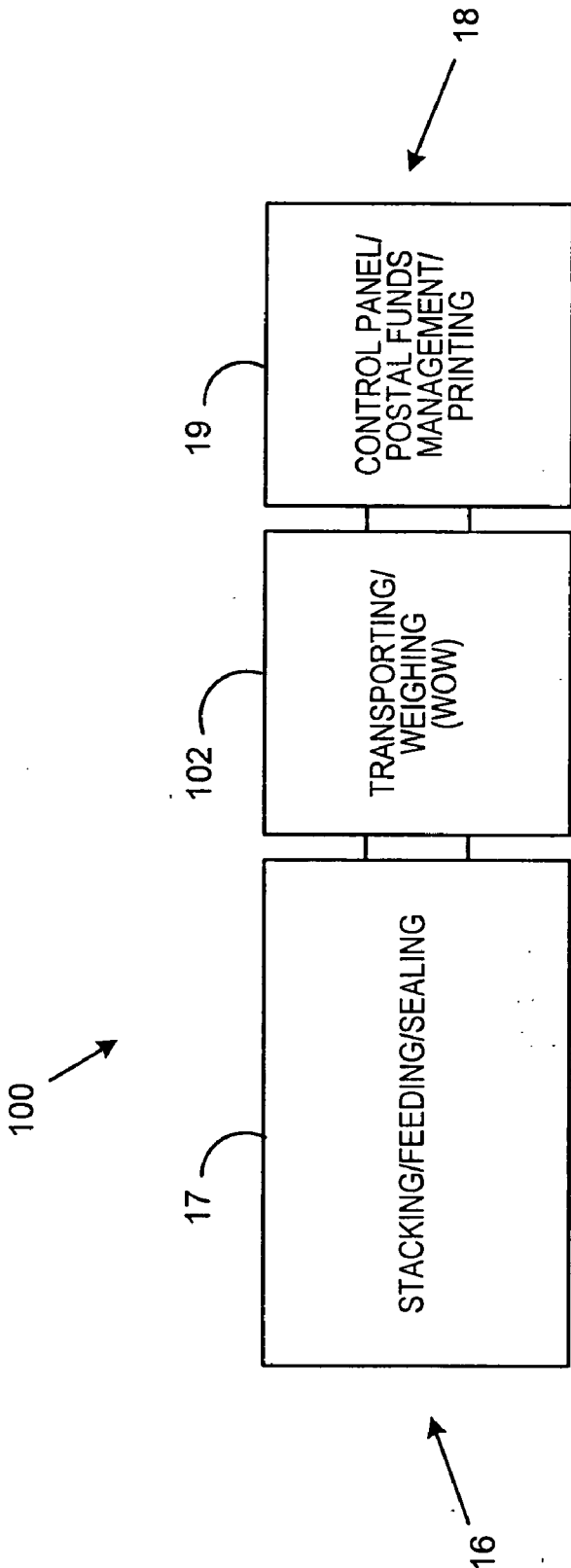


FIG. 2

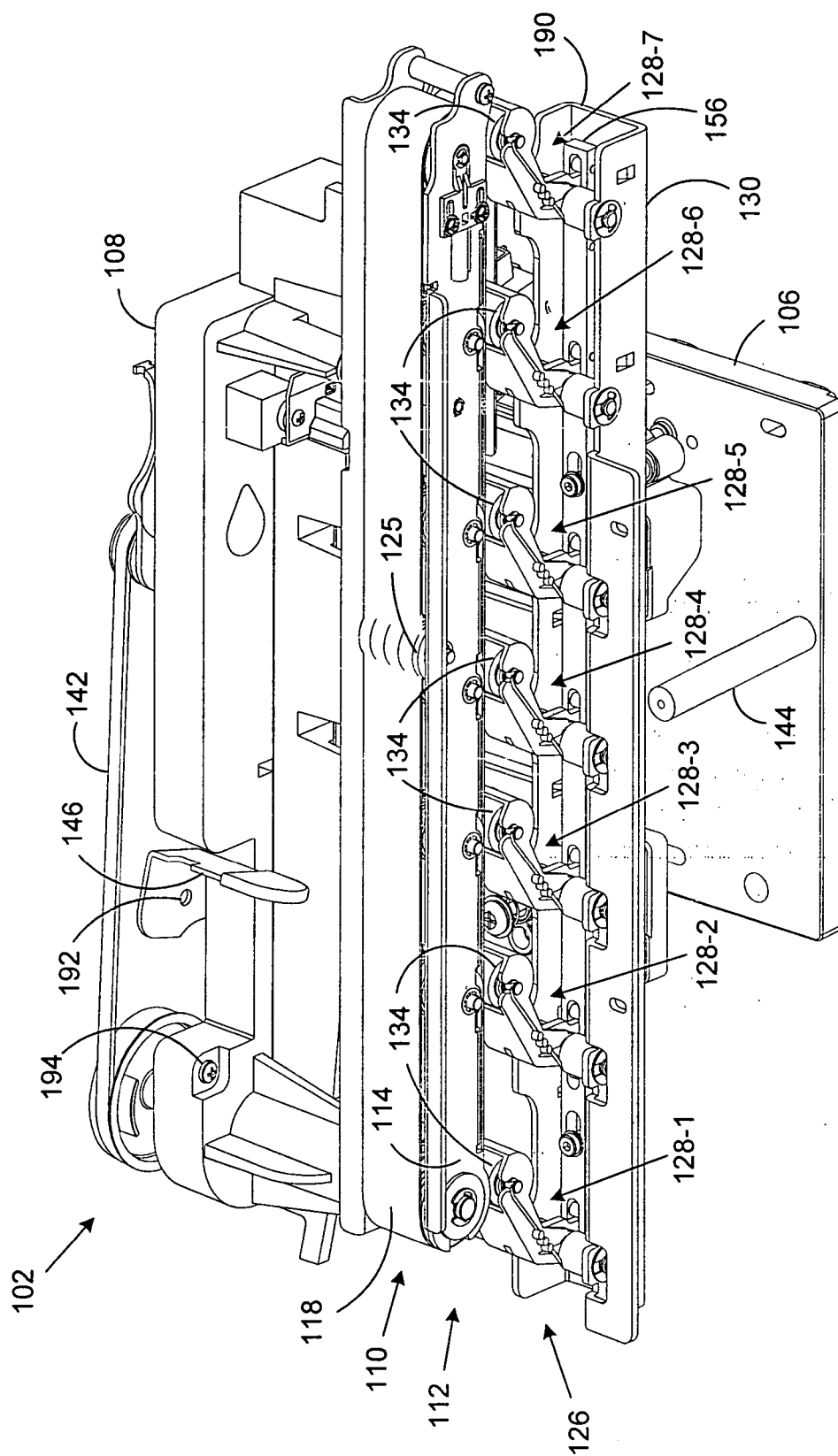


FIG. 3

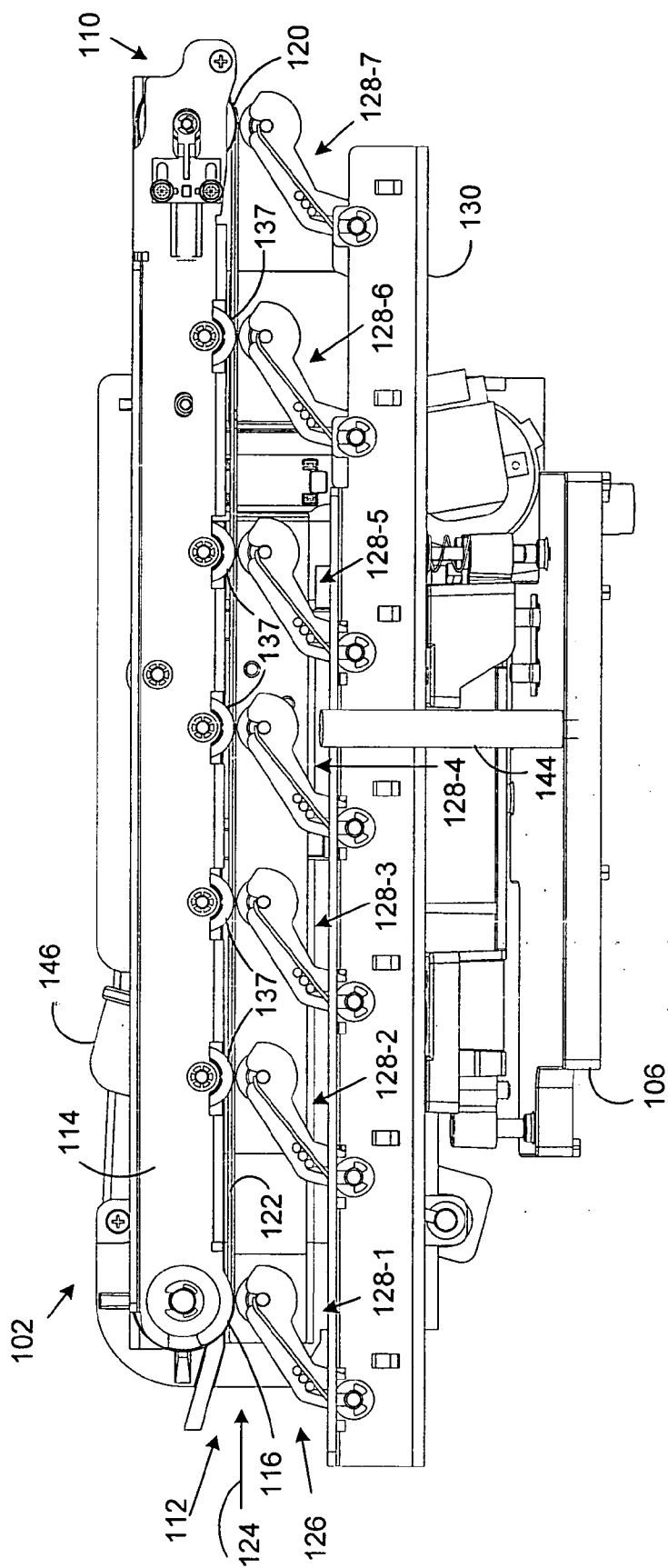


FIG. 4

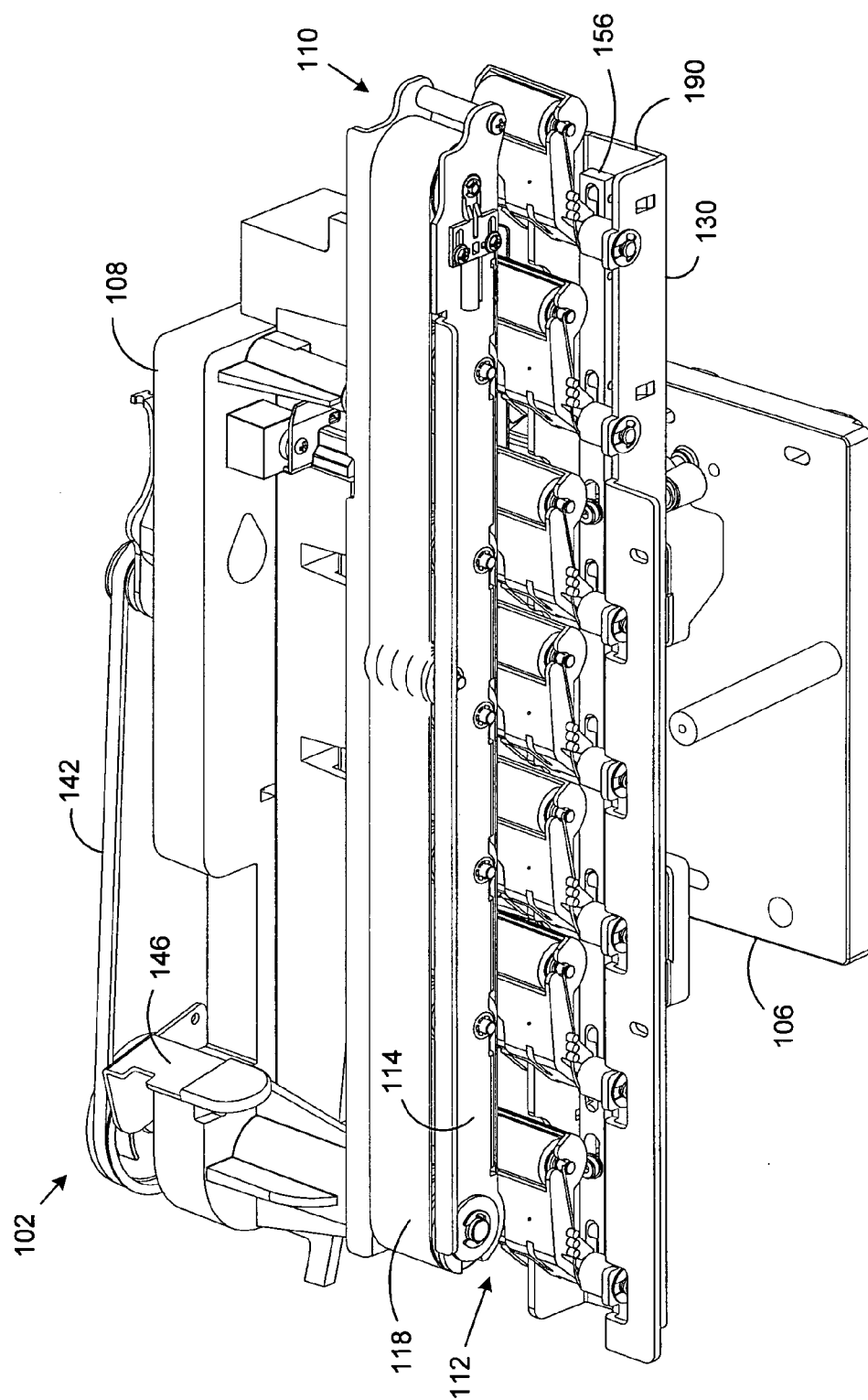


FIG. 5

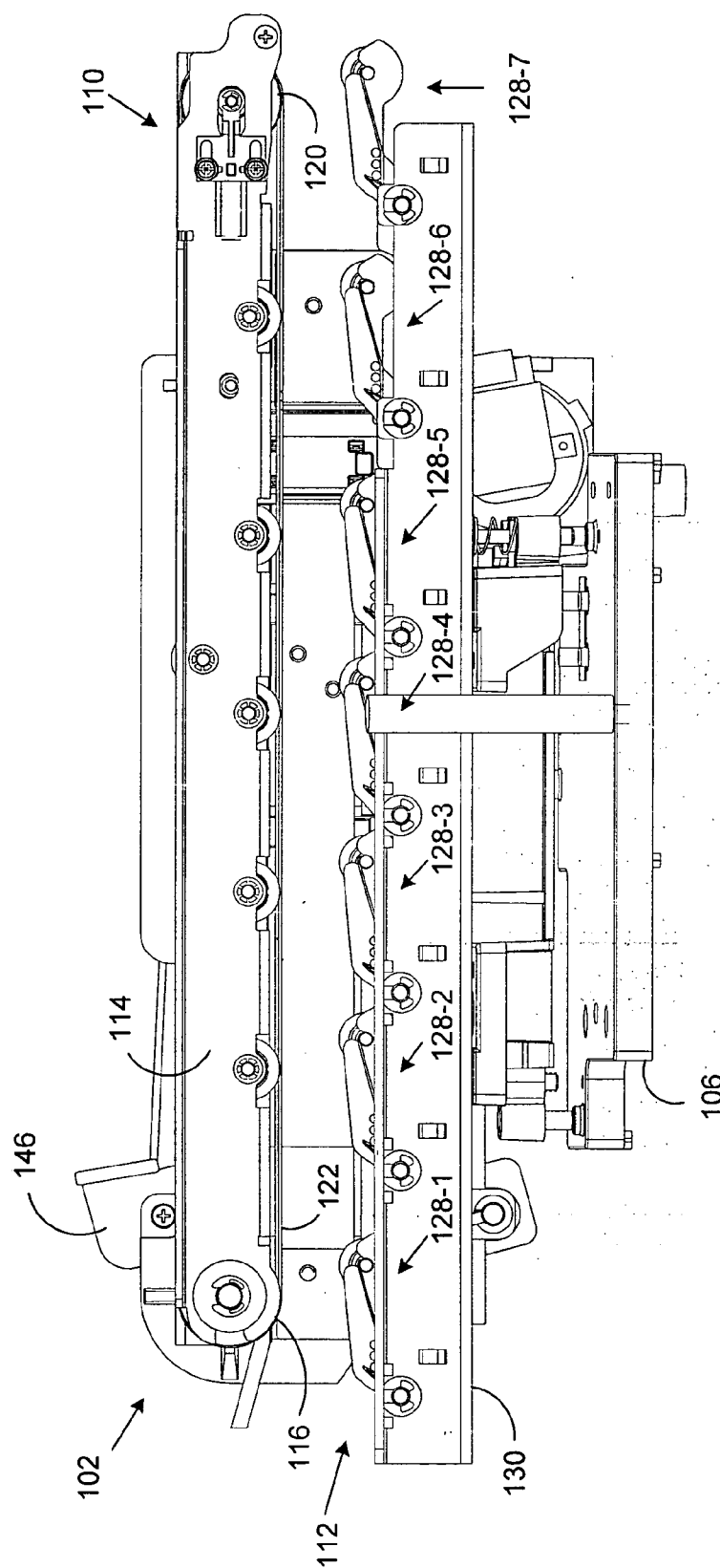


FIG. 6

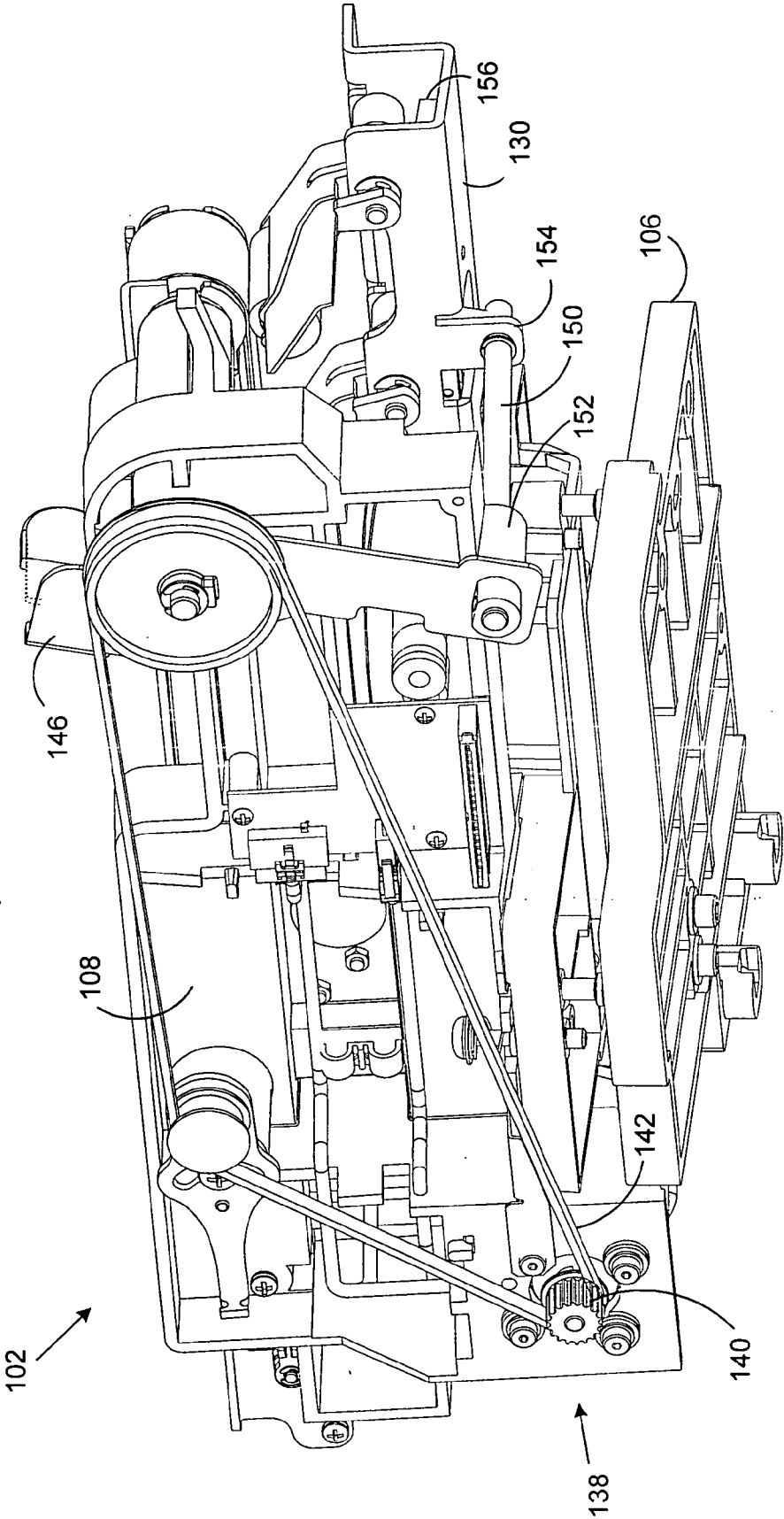


FIG. 7

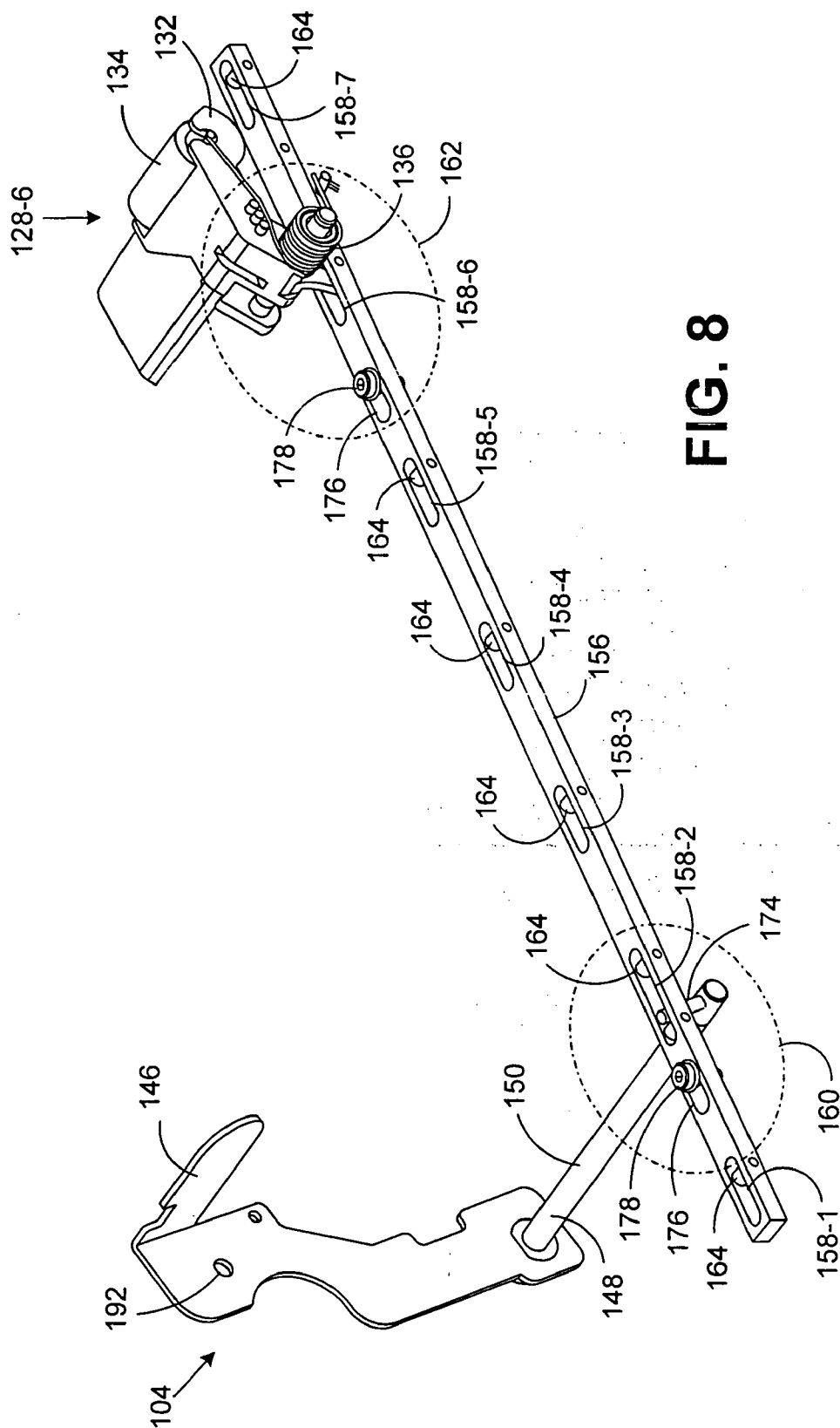


FIG. 8

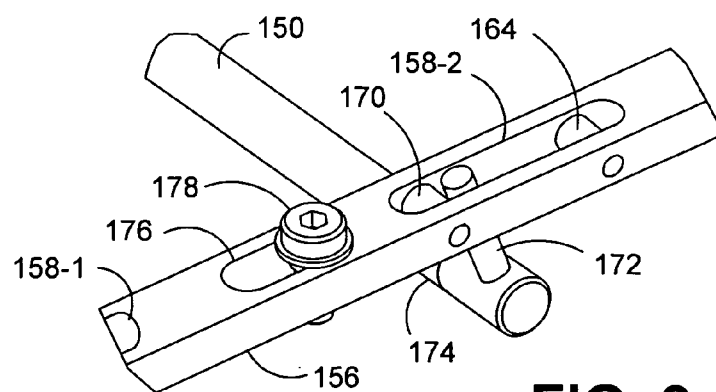


FIG. 9

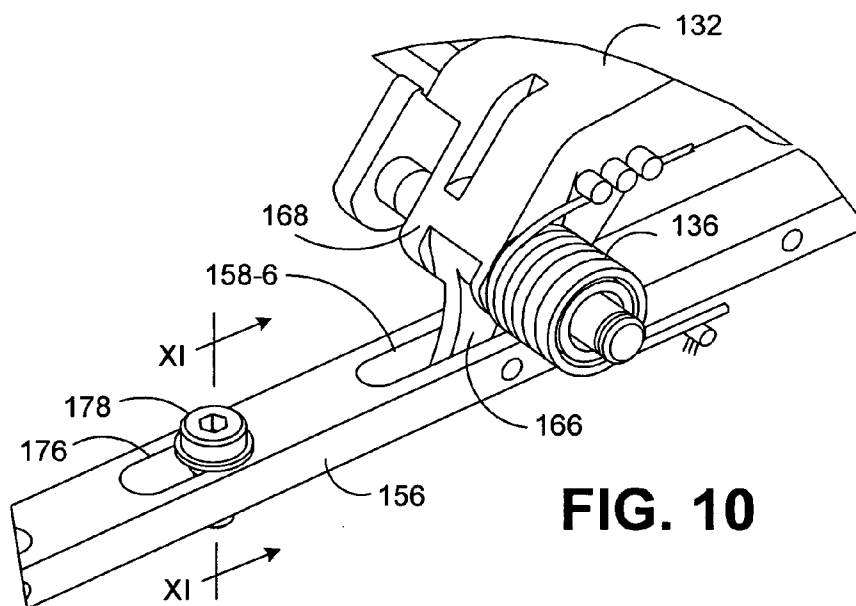


FIG. 10

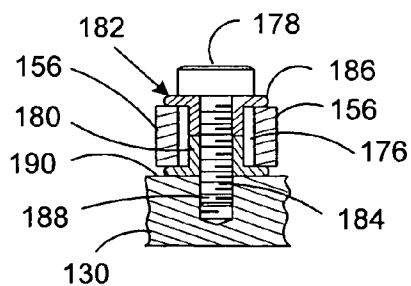


FIG. 11

JAM RELEASE MECHANISM FOR A MAILING MACHINE

BACKGROUND

[0001] This invention relates generally to the field of mailing machines, and more particularly to mechanisms for allowing clearance of paper jams from mailing machines.

[0002] Generally, a mailpiece transport on a mailing machine transports envelopes and other mailpieces along a feed path so that various functions may be performed on the mailpiece at different locations along the feed path. For example, at one location along the feed path the mailpiece may be weighed, at another location the mailpiece may be sealed, and at a further location an indicia for postage may be applied to the mailpiece. Drive rollers and/or drive belts may be employed to contact the mailpiece to propel the mailpiece along the feed path.

[0003] When a drive belt is employed, structures must be provided to keep the mailpiece in contact with the drive belt. In conventional arrangements, spring-loaded pivot arms are provided along the drive belt. At a free end of each pivot arm, a pressure roller is mounted to contact the mailpiece as the mailpiece is driven by the drive belt and to apply a force to the mailpiece so that the mailpiece is maintained in frictional contact with the drive belt. To prevent the drive belt from deflecting due to the force imparted by the pivot arm, a backup roller is provided behind the drive belt at each point where the belt is in contact with a pressure roller mounted on a pivot arm. Each pair of rollers formed of a pivot arm roller and the corresponding backup roller constitutes a spring-loaded nip through which the mailpiece is fed by the drive belt.

[0004] For the most part, mailpiece transport arrangements operate satisfactorily and some mailpiece transports are capable of processing large numbers of mailpieces over a period of time. However, malfunctions may occasionally take place that result in a mailpiece being jammed in the transport. In such cases, human intervention is typically required to remove the jammed mailpiece. In previously proposed arrangements to facilitate jam removal, an assembly which supports the drive belt may be hinged at one end (e.g., the upstream end) to allow the other end (e.g., the downstream end) of the assembly to be released and pivoted upward to allow the drive belt to be upwardly displaced from the pressure rollers. Often this disengages the mailpiece from the transport, and allows the human operator to pick the jammed mailpiece away from the pressure roller of the nip at which the jam occurred.

[0005] One possible drawback of this type of jam clearance arrangement is that the need to accommodate upward pivoting of the drive belt assembly may come into conflict with a desired spatial requirement for another element of the mailing system.

SUMMARY

[0006] Accordingly, an improved apparatus and method for transporting a mailpiece along a feed path in a mailing machine is provided. The improved apparatus includes an endless belt that has a lower belt run that extends in a generally horizontal direction. The belt run is adapted to feed the mailpiece in a downstream direction. The apparatus

also includes a plurality of pivot arms mounted in a sequence below the lower belt run. Each pivot arm has a respective pressure roller mounted on a free end of the pivot arm. A respective bias mechanism is associated with each pivot arm to bias the pivot arm in an upward direction such that the pressure roller contacts the lower belt run. A jam-relief mechanism is provided to simultaneously pivot the pivot arms against a respective biasing force applied to each of the pivot arms by the bias mechanism, the pivoting being performed to move the pressure rollers in a downward direction away from the lower belt run of the endless belt.

[0007] For example, the jam-relief mechanism may include an actuator arm for simultaneously contacting each pivot arm at a respective lower end of the pivot arm. The actuator arm may extend in a direction parallel to the downstream direction and may include a plurality of contact rollers. Each contact roller is for contacting a respective one of the pivot arms at the respective lower end of the respective pivot arm.

[0008] The jam-relief mechanism may also include a lever to receive force from a human operator's hand to actuate the jam-relief mechanism and may also include a coupling mechanism coupled to the lever and in contact with the actuator arm for transmitting to the actuator arm the force from the human operator's hand. The coupling mechanism may include a shaft which has the lever mounted on a first end of the shaft and an actuation cam finger which extends radially outwardly from a second end of the shaft. The second end of the shaft is opposite its first end and the actuation cam finger is in contact with the actuation arm. Movement of the lever causes the shaft to rotate about a longitudinal axis of the shaft and the rotation of the shaft causes the actuation cam finger to pivot so as to shift the actuation arm in a direction opposite to the downstream direction.

[0009] The mailpiece processing device may include a support that extends in the downstream direction with the pivot arms mounted along the support. The support may have a generally U-shaped cross-section with the actuation arm supported on the floor of the support.

[0010] The mailpiece processing device may further include a mechanism for locking the lever in an actuated position such that the pressure rollers are held spaced from the lower belt run of the endless belt.

[0011] In another aspect, there is provided a method for clearing a jammed mailpiece from a mailpiece transport device. The method includes applying force to a lever to shift an actuating arm to simultaneously lower a plurality of pressure rollers from a first position in which the rollers apply pressure to a drive belt to a second position in which the rollers are spaced from the drive belt. The method can also include removing the mailpiece from the transport device.

[0012] In still another aspect, a device for processing a mailpiece includes a feed mechanism for feeding the mailpiece along a feed path. The device also includes a support which extends parallel to and below the feed path. The device further includes a plurality of roller assemblies. Each roller assembly includes a pivot arm that has a proximal end mounted to the support and a distal end opposite to the proximal end. Each roller assembly also includes a roller

mounted for rotation at the distal end of the pivot arm and a bias mechanism to bias the distal end of the pivot arm in an upward direction. The device also includes an actuation arm in contact with the respective proximal end of each of the pivot arms, and a mechanism for shifting the actuation arm in a direction opposite to the feed path direction to simultaneously pivot the pivot arm to move downward the distal ends of the pivot arms.

[0013] For example, the shifting mechanism may include a lever operatively coupled to the actuation arm to transmit force to the actuation arm from a human operator's hand in contact with the lever. The support may have a substantially U-shaped cross-section to define a channel below the feed path, with the actuation arm being located in the channel.

[0014] The shifting mechanism may also include a shaft that has the lever mounted at an inboard end of the shaft and that has an actuation cam finger which extends radially outwardly from an outboard end of the shaft, with the actuation cam finger in contact with the actuation arm.

[0015] The device may further include a weighing scale on which the support and the feed mechanism are mounted.

[0016] Therefore, it should now be apparent that the invention substantially achieves all the above aspects and advantages. Additional aspects and advantages of the invention will be set forth in the description that follows, and in part will be obvious from the description, or may be learned by practice of the invention. Various features and embodiments are further described in the following figures, description and claims.

DESCRIPTION OF THE DRAWINGS

[0017] The accompanying drawings illustrate presently preferred embodiments of the invention, and together with the general description given above and the detailed description given below, serve to explain the principles of the invention. As shown throughout the drawings, like reference numerals designate like or corresponding parts.

[0018] **FIG. 1** is a perspective view of a typical mailing machine constructed and arranged in accordance with the prior art.

[0019] **FIG. 2** is a block diagram representation of a mailing machine provided in accordance with the present invention.

[0020] **FIG. 3** is a perspective view of a "weigh-on-the-way" (WOW) unit that is part of the mailing machine of **FIG. 2**, with some components of the WOW unit having been removed.

[0021] **FIG. 4** is a front elevation of the WOW unit of **FIG. 3**, with some components of the WOW unit having been removed.

[0022] **FIG. 5** is a view similar to **FIG. 3**, showing the WOW unit in a condition in which a jam-relief mechanism is actuated.

[0023] **FIG. 6** is a view similar to **FIG. 4**, showing the WOW unit in the condition in which the jam-relief mechanism is actuated.

[0024] **FIG. 7** is a perspective view taken from behind the WOW unit of **FIGS. 3-6**, with some components of the WOW unit having been removed.

[0025] **FIG. 8** is a schematic view showing in isolation the jam-relief mechanism of the WOW unit.

[0026] **FIG. 9** is a perspective view showing in isolation a detail of the jam-relief mechanism of **FIG. 8**.

[0027] **FIG. 10** is a perspective view showing in isolation another detail of the jam-relief mechanism of **FIG. 8**.

[0028] **FIG. 11** is a quasi-cross-sectional view taken at line XI-XI in **FIG. 10**.

DETAILED DESCRIPTION

[0029] The present invention includes an apparatus and a method for clearing a jammed mailpiece from a feed path in a mailing machine. The feed path is defined by a drive belt and a sequence of pressure rollers below the drive belt. Each of the pressure rollers is brought into contact with the drive belt by a respective pivot arm. A jam-relief mechanism, to be actuated by a human operator upon occurrence of a jam, simultaneously pivots the pivot arms so that the pressure rollers are lowered from their normal operating position in contact with the drive belt. In this way the jammed mailpiece is released from the nip or nips in which it was caught so that the jammed mailpiece may be easily removed from the feed path. The lowering of the pivot arms may be a more space-efficient strategy for jam clearance than previously proposed strategies that require the drive belt and its associated assembly to be raised in order to clear a jam.

[0030] Referring now to the drawings, and particularly to **FIG. 1**, the reference numeral **10** indicates generally a typical mailing machine provided in accordance with the prior art. The mailing machine **10** includes a base unit generally designated by the reference numeral **14**. The base unit **14** has a mailpiece input end, generally designated by the reference numeral **16** and a mailpiece output end, designated generally by the reference numeral **18**. The mailing machine **10** may be a modular apparatus formed of a first unit **17**, hereinafter referred to as a stacking/feeding/sealing unit, and a second unit **19**, hereinafter referred to as a control/metering/printing unit. Together, respective deck portions of the stacking/feeding/sealing unit **17** and the control/metering/printing unit **19** form a feed deck **30** which extends from the mailpiece input end **16** to the mailpiece output end **18**.

[0031] The control/metering/printing unit **19** includes a control unit **20**, which includes one or more input/output devices, such as, for example, a keyboard **22** and a display **24**. The control/metering/printing unit **19** also includes a pivotally mounted cover member **26** which is movable between a closed position shown in **FIG. 1** to an open position (not shown) to expose various operating components and parts for service and/or repair as needed. Such parts may include a postage printing unit (not visible in **FIG. 1**) which also forms part of the control/metering/printing unit **19**. In addition, the control/metering/printing unit **19** includes a postage security device (PSD) which is not separately shown, but which may be incorporated with and/or temporarily mountable in the control unit **20** or may be removably housed under the cover member **26**.

[0032] The stacking/feeding/sealing unit **17** may also include a cover member **28** which is movable between the closed position shown in **FIG. 1** and an open position (not shown) to expose operating components and parts of the

stacking/feeding/sealing unit 17. In addition, the stacking/feeding/sealing unit 17 may include a plurality of nudger rollers 12 suitably mounted under the feed deck 30. The nudger rollers 12 project upwardly through openings in the feed deck so that the periphery of the rollers 12 is slightly above the upper surface of the feed deck 30 and can exert a forward feeding force on a succession of mailpieces placed in the input end 16. A registration wall 32 defines a mailpiece registration surface substantially perpendicular to the feed deck 30 that extends substantially from the input end 16 to the output end 18. Mailpieces placed in the input end 16 are fed by the nudger rollers 12 along the feed deck 30, with the top edge of the mailpiece being registered along the wall 32. The mailpiece may be passed through one or more modules. The modules may include, for example, a singulator module, a moistening module and a sealing module which are all part of the stacking/feeding/sealing unit 17 housed under the cover member 28 and located generally in the area indicated by reference numeral 36. The mailpieces are then passed to the postage printing unit which is part of the control/metering/printing unit 19 and is housed under the cover member 26 and located generally in the area indicated by the reference numeral 38.

[0033] In some conventional mailing machines, a mailpiece weighing scale (not shown), may be located in the area indicated at 40 and may be in data communication with the control unit 20 or otherwise suitably coupled to aid in setting of the proper amount of postage to be printed on the mailpieces. After a mailpiece (which may be a sample of a larger mailing) is weighed on the scale, it may be picked up by the human operator from the scale and deposited on the nudger rollers 20 for feeding into the mailing machine 10.

[0034] FIG. 2 is a block diagram representation of a mailing machine 100 that may be provided in accordance with principles of the present invention. The mailing machine 100 may include a conventional stacking/feeding/sealing unit 17 at the mailpiece input end 16 of the mailing machine, and may include a conventional control/metering/printing unit 19 at the mailpiece output end 18 of the mailing machine, but with a weigh-on-the-way (WOW) unit 102 provided in accordance with the invention and coupled between the stacking/feeding/sealing unit 17 and the control/metering/printing unit 19. The WOW unit 102 is capable of weighing mailpieces as they are being transported through the mailing machine 100, thereby increasing throughput of the mailing machine 100 as compared with mailing machines that require manual weighing and feeding. Except for the presence of the jam-relief mechanism described below, the WOW unit 102 may be constructed in accordance with conventional principles.

[0035] FIG. 3 is a partial perspective view of the WOW unit 102 taken from above and in front of the WOW unit. For example, in this and other views a cover which may be part of the WOW unit 102 is not shown. FIG. 4 is a partial front elevational view of the WOW unit 102. FIG. 5 is a view similar to FIG. 3, but showing the effect of actuation of a jam-relief mechanism which will be described further below. FIG. 6 is a view similar to FIG. 4, showing the effect of actuation of the jam-relief mechanism. FIG. 7 is a partial perspective view of the WOW unit 102 taken from behind the WOW unit. Like FIGS. 5 and 6, FIG. 7 shows the WOW unit in a condition resulting from actuation of the jam-relief mechanism. FIG. 8 is a schematic perspective

view showing the jam-relief mechanism (generally indicated by reference numeral 104) in isolation. FIGS. 9-11 show certain details of the jam-relief mechanism 104.

[0036] As seen from FIGS. 3-7, the WOW unit 102 includes a scale platform 106. The scale platform 106 may be supported on a load cell (not shown) or the like. The scale platform is part of a weighing scale that is part of the WOW unit 102. The WOW unit 102 further includes a frame 108 (best seen in FIGS. 3 and 5) which is supported on the scale platform 106. The frame 108 generally supports the mailpiece transport and jam-relief components of the WOW unit 102. Supported in turn on the frame 108 is a drive belt assembly 110 which is part of the mailpiece transport mechanism 112 included in the WOW unit 102. The drive belt assembly 110 includes an elongate belt support member 114. A drive roller 116 (FIGS. 4 and 6) is mounted for rotation at one end of the belt support member 114. An endless belt 118 (FIGS. 3 and 5) extends around the drive roller 116 and an idler roller 120 (FIGS. 4 and 6) mounted adjacent the other end of the belt support member 114. The belt 118 includes a lower belt run 122 which extends in a generally horizontal orientation and feeds mailpieces along a feed path (generally indicated by an arrow 124, FIG. 4) defined by the mailpiece transport mechanism 112. The mailpieces are fed in a downstream direction indicated by the arrow 124.

[0037] The upper run of the belt 118 is interrupted by a bearing roller 125 (FIG. 3) mounted at a central top location on the belt support member 114. By dividing the span of the upper run of the belt 118 into two shorter spans, the bearing roller may reduce vibration of the belt 118 and thereby enhance the accuracy of the weighing operations of the WOW unit 102.

[0038] A sequence (generally indicated by reference numeral 126, FIGS. 3 and 4) of pressure roller assemblies 128 are mounted to a support 130 along the feed path 124 and below the lower belt run 122. In the embodiment shown, seven pressure roller assemblies 128 are provided, although the number may be varied. As best seen in FIGS. 3 and 5, the support 130 has a generally U-shaped cross-section to define a channel below the feed path 124 (and also below the sequence 126 of pressure roller assemblies mounted on the support 130).

[0039] Each pressure roller assembly 128 includes a respective pivot arm 132 (best seen in FIG. 8) by which the roller assembly is mounted to the support 130 (FIGS. 3-6, omitted from FIG. 8). A respective pressure roller 134 is mounted on the free end (distal end) of each of the pivot arms 132. Each roller assembly includes a torsion spring 136 associated with the respective pivot arm 132 and mounted so as to bias the pivot arm 132 in an upward direction to bring the pressure roller 134 into contact with the lower belt run 122 (FIG. 4, not shown in FIG. 8) of the belt 118. The pressure roller assemblies 128 are provided to maintain the mailpieces in frictional contact with the belt run 122 as the mailpieces are fed along the feed path. The pressure roller assemblies 128 may all be constructed and mounted in accordance with conventional practices. In accordance with conventional practices, a respective backup roller 137 (FIG. 4) is mounted on the belt support member 114 at the locus of each of the pressure roller assemblies 128-2 to 128-6. Each of the backup rollers 137 is in contact the lower belt

run 122 of the mailpiece drive belt 118 to form a nip with the adjacent pressure roller. It will be understood that pressure roller assembly 128-1 is backed up by the drive roller 116 and pressure roller assembly 128-7 is backed up by idler roller 120.

[0040] The drive system 138 (FIG. 7) for the mailpiece drive belt 118 is mounted at the rear of the frame 108. The drive system 138 includes a motor 140 and a pulley belt 142.

[0041] The WOW unit 102 also includes a support post 144 (FIGS. 3 and 4) which is mounted on, and extends upwardly from, the scale platform 106. The function of the support post 144 is to support a deck section (not shown) which in turn provides support for outboard portions of mailpieces (not shown) transported down the feed path 124.

[0042] Discussion will now focus on the jam-relief mechanism 104, which is schematically shown in isolation in FIG. 8. In terms of its over-all function, the jam-relief mechanism, when actuated by the human operator, simultaneously pivots the pivot arms 132 of all of the pressure roller assemblies 128 (only one pressure roller assembly shown in FIG. 8) against the biasing force applied to the pivot arms by the torsion springs 136 (only one shown in FIG. 8). Such pivoting of the pivot arms 132 moves the pressure rollers 134 (only one shown in FIG. 8) in a downward direction away from the lower belt run 122 (FIGS. 4 and 6) of the mailpiece drive belt 118. The actuation of the jam-relief mechanism 104 results in the condition shown in FIG. 6, with the roller assemblies 128 and their pressure rollers 134 spaced downwardly from the lower belt run 122.

[0043] The jam-relief mechanism 104 includes an actuation lever 146 (FIGS. 3-8). The actuation lever is provided to be actuated by the human operator (not shown) and thus to receive force from the human operator's hand to actuate the jam-relief mechanism 104. The actuation lever 146 is mounted on the inboard end 148 of a shaft 150, as best seen in FIGS. 8 and 7. The shaft is rotationally mounted to the frame 108 by mounts 152, 154 (FIG. 7) and extends forwardly from the actuation lever 146 in a horizontal direction that is transverse to the feed path 124 (FIG. 4). It will be noted (FIG. 7) that outboard mount 154 may be integrally formed with the support 130.

[0044] The jam-relief mechanism 104 also includes an actuator arm 156, seen most clearly in FIG. 8. The actuator arm 156 is for simultaneously contacting the respective pivot arm 132 of each of the pressure roller assemblies 128. The actuator arm 156 is generally in the form of a rather thin elongate bar and extends in the direction of the feed path 124 (FIG. 4), that is, in the downstream direction for feeding the mailpieces. As seen from FIGS. 3, 5, 7, the actuator arm 156 is located in, and extends along, the channel formed by the support 130 below the pressure roller assemblies 128. As seen from FIG. 8, the actuator has slots 158 formed therealong. The slots 158 are open to the upper and lower surfaces of the actuator arm 156 and are elongate in the longitudinal direction of the actuator arm 156. The number of slots 158 may be the same as the number of the pressure roller assemblies 128.

[0045] FIG. 9 shows on a larger scale a detail 160 of FIG. 8. FIG. 10 shows on a larger scale a detail 162 of FIG. 8. Slot 158-2 of actuator arm 156 is visible in FIG. 9 and slot 158-6 is partially visible in FIG. 10. Each of the slots 158

has mounted transversely therewithin a contact roller 164 (FIGS. 8 and 9). Each contact roller 164 is for contacting a finger 166 (FIG. 10) which extends downwardly at the lower end (proximal end) 168 of the pivot arm 132 mounted at the locus of the respective slot 158. All of the slots 158 may be identical, except for slot 158-2 (FIGS. 8 and 9) which is at the locus of the shaft 150. Slot 158-2 may be longer than the other slots 158 and may have mounted transversely therewithin a second contact roller 170 (FIG. 9) spaced upstream from the contact roller 164 also mounted within slot 158-2. The function of the second contact roller 170 is to be contacted by an actuation cam finger 172 which extends radially outwardly from the outboard end 174 of the shaft 150. It will be observed from FIG. 8 that the outboard end 174 of the shaft 150 is the opposite end of the shaft from its inboard end 148.

[0046] In some embodiments, the contact rollers 164, 170 are mounted for rotation within the slots 158. In other embodiments, some or all of the contact rollers are fixedly mounted and are formed of a low-friction material.

[0047] In addition to slots 158, the actuator arm 156 also has mounting slots 176 formed therein. A respective mounting screw 178 is inserted through each mounting slot 176. FIG. 11 is a quasi-cross-sectional view taken at line XI-XI in FIG. 10 and showing details of the mounting of actuator arm 156 to support 130. (The details shown in FIG. 11 are characteristic of the mounting arrangements at both of the mounting slots 176.) In particular, actuator arm 156 is supported on a lower bearing half 180 of a spool-shaped two-part low-friction bearing 182 that wraps around the shaft 184 of the mounting screw 178. The upper half of the bearing 182 is indicated by reference numeral 186. The tip 188 of the shaft 184 of the mounting screw 178 is threadedly engaged with the floor 190 of the support 130. The bearing 182 rests on the floor 190 of the support 130 so that the actuator arm 156 is supported on the floor 130 via the bearing 182. With this arrangement, the actuator arm 156 is positioned just above the floor 190 of the support 130 and is allowed by slots 176 to be moved longitudinally along the channel formed by the support 130. Interaction of the slots 176 with the screws 178 limits the motion of actuator arm 156 in either direction along the support 130.

[0048] As seen from FIGS. 3 and 8, a locking hole 192 is formed in a portion of the actuation lever 146 that is oriented in a plane parallel to the feed path 124 (FIG. 4). The locking hole is provided to allow the actuation lever and hence the jam-release mechanism to be locked, in an actuated position, by a locking screw 194 (FIG. 3) threadedly mounted on the frame 108.

[0049] Operations of the WOW unit 102, as pertinent to the jam-relief mechanism 104, will now be described.

[0050] During normal operation, mailpieces (not shown) are fed seriatim along the feed path 124 (FIG. 4) and are weighed by the WOW unit 102 while being transported. Weight data generated by a scale component of the WOW unit 102 may be used to set the amount of postage to be printed on the mailpiece downstream at the control/metering/printing unit 19 (FIG. 2) of the mailing machine 100.

[0051] If a jam occurs in the mailpiece transport mechanism 112 of the WOW unit 102, the motor 140 and the mailpiece drive belt 118 are stopped in accordance with

conventional practices. The human operator uses one of his/her hands (e.g., the left hand) to apply force to the actuation lever **146** to move the actuation lever from the un-actuated position shown in **FIGS. 3 and 4** to the actuated position shown in **FIGS. 5 and 6** (that is, the actuation lever is moved to the left, as viewed in **FIGS. 3-6**). This movement of the actuation lever **146** causes the shaft **150** (**FIG. 8**) to rotate around its longitudinal axis, thereby pivoting the actuation cam finger **172** (**FIG. 9**) in a counter-clockwise direction. The pivoting of the actuation cam finger **172** shifts the actuation arm **156** in an upstream direction (via contact between the actuation cam finger **172** and the contact roller **170**) within the channel formed by the support **130**. The upstream shifting of the actuator arm **156** causes the pivot arms **132** of the pressure roller assemblies **128** to be pivoted simultaneously in a downward direction (clockwise as viewed in **FIGS. 3-6 and 8**) by virtue of contact between the contact rollers **164** and the fingers **166** (e.g., **FIG. 10**) of the pivot arms **132**, and against the biasing force of the torsion springs **136**. The downward pivoting of the pivot arms **132** causes the pressure rollers **134** of the roller assemblies **128** to be moved downwardly away from the lower belt run **122** (**FIGS. 4, 6**) of the mailpiece drive belt **118**. Consequently the roller assemblies and pressure rollers are moved to the position shown in **FIGS. 5 and 6**, so that the pressure rollers are spaced downwardly from the belt **118**, thereby releasing any jammed mailpieces (not shown) from the nip or nips in which they were caught.

[0052] The human operator may now use his/her other hand (e.g., the right hand) to remove the jammed mailpiece(s) from the transport mechanism **112** while continuing to hold the actuation lever **146** in the actuated position. Once the jammed mailpiece(s) has/have been removed, the human operator may release the actuation lever **146**. At that point, the biasing force of the torsion springs **136** pivots the pivot arms **132** upwardly so that the pressure rollers **128** are again brought into contact with the mailpiece drive belt **118**. The pivoting of the pivot arms causes the actuator arm **156** to be shifted in the downstream direction within the channel formed by the support **130**. This shifting of the actuator arm **156** is brought about by contact between the fingers **166** (e.g., **FIG. 10**) of the pivot arms **132** and the contact rollers **164** (**FIGS. 8 and 9**) of the actuator arm **156**. The downstream shifting of the actuator arm **156** causes the actuation cam finger **172** (**FIG. 9**) to be pivoted in a clockwise direction, via contact from the contact roller **170**, to rotate the shaft **150** (**FIGS. 8 and 9**) and thereby return the actuation lever **146** to its un-actuated or home position, as shown in **FIGS. 3 and 4**. The WOW unit **102** is now ready to resume normal operation.

[0053] From the foregoing it will be appreciated that the actuation lever, though not connected to the actuation arm, is operatively coupled thereto. As used herein and in the appended claims, "operatively coupled" includes but does not necessarily imply connectedness; "operatively coupled" includes for example the type of operational relationship which obtains between a cam and a cam follower, and generally includes a physical relationship in which force is transmitted from one object to another.

[0054] The jam-relief mechanism described above works well and does not require a space-consuming pivot-path to be provided for the drive belt assembly. Also, the jam-relief mechanism described above opens all nips of the mailpiece

transport mechanism. Moreover, the jam relief-mechanism may be locked in an actuated position when the WOW unit is to be shipped so that the pressure rollers are held spaced apart from the mailpiece drive belt during shipment. This may prevent damage that might otherwise occur to the pressure rollers as a result of adhesion to the mailpiece drive belt if the WOW unit were exposed to high heat during shipment/storage.

[0055] The words "comprise," "comprises," "comprising," "include," "including," and "includes" when used in this specification and in the following claims are intended to specify the presence of stated features, elements, integers, components, or steps, but they do not preclude the presence or addition of one or more other features, elements, integers, components, steps, or groups thereof.

[0056] A number of embodiments of the present invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. For example, the jam-relief mechanism described above may be implemented with a mailpiece transport mechanism that is not part of a WOW unit (i.e., is not supported on a weighing scale). Other variations relating to implementation of the functions described herein can also be implemented. Accordingly, other embodiments are within the scope of the following claims.

What is claimed is:

1. A device for processing a mailpiece, comprising:

an endless belt having a lower belt run that extends in a generally horizontal direction and is adapted to feed the mailpiece in a downstream direction;

a plurality of pivot arms mounted in a sequence below the lower belt run of the endless belt, each pivot arm having a respective pressure roller mounted on a free end of the pivot arm and a having a respective bias means associated with the pivot arm for biasing the pivot arm in an upward direction such that the pressure roller contacts the lower belt run of the endless belt; and

jam-relief means for simultaneously pivoting the pivot arms against a respective biasing force applied to each of the pivot arms by the bias means, said pivoting to move the pressure rollers in a downward direction away from the lower belt run of the endless belt such that the pressure rollers do not contact the lower belt run of the endless belt.

2. The device according to claim 1, wherein said jam-relief means includes an actuator arm for simultaneously contacting each pivot arm at a respective lower end of said each pivot arm.

3. The device according to claim 2, wherein said actuator arm extends in a direction parallel to said downstream direction and includes a plurality of contact rollers, each contact roller for contacting a respective one of said pivot arms at the respective lower end of the respective pivot arm.

4. The device according to claim 3, wherein said contact rollers are mounted on the actuator arm in a manner to allow rotation of said contact rollers.

5. The device according to claim 3, wherein said contact rollers are fixedly mounted on said actuator arm.

6. The device according to claim 2, wherein said jam-relief means includes:

a lever to receive force from a human operator's hand to actuate the jam-relief means; and

coupling means coupled to said lever and in contact with said actuator arm for transmitting to said actuator arm the force from the human operator's hand.

7. The device according to claim 6, wherein said coupling means includes:

a shaft, said lever being mounted on a first end of said shaft; and

an actuation cam finger extending radially outwardly from a second end of said shaft, said second end opposite said first end, said actuation cam finger in contact with said actuation arm;

wherein:

movement of said lever causes said shaft to rotate about a longitudinal axis of said shaft; and

said rotation of said shaft causes said actuation cam finger to pivot to shift said actuation arm in a direction opposite to said downstream direction.

8. The device according to claim 7, wherein said shift of said actuation arm is in a direction parallel to a longitudinal axis of said actuation arm.

9. The device according to claim 8, further comprising:

a support that extends in said downstream direction, said pivot arms mounted along said support, said actuation arm supported on said support.

10. The device according to claim 8, further comprising:

means for locking said lever in an actuated position such that said pressure rollers are held spaced from said lower belt run of said endless belt.

11. The device according to claim 1, wherein said plurality of pivot arms includes at least five pivot arms.

12. The device according to claim 11, wherein said plurality of pivot arms includes seven pivot arms.

13. A method for clearing a jammed mailpiece from a mailpiece transport device, the method comprising:

applying force to a lever to shift an actuating arm to simultaneously lower a plurality of pressure rollers from a first position in which said rollers apply pressure to a drive belt to a second position in which said rollers are spaced from the drive belt; and

removing the jammed mailpiece from the transport device.

14. The method according to claim 13, wherein said force is applied to the lever by a human operator's hand.

15. The method according to claim 14, wherein the human operator applies said force to the lever using one of the human operator's hands and, while applying said force, removes the mailpiece from the transport device using the other of the human operator's hands.

16. A device for processing a mailpiece, comprising:

feed means for feeding the mailpiece along a feed path in a feed path direction;

a support extending parallel to and below the feed path;

a plurality of roller assemblies, each roller assembly including:

a pivot arm having a proximal end mounted to the support and a distal end opposite to the proximal end;

a roller mounted for rotation at the distal end of the pivot arm; and

bias means to bias the distal end of the pivot arm in an upward direction;

an actuation arm in contact with the respective proximal end of each of the pivot arms; and

means for shifting the actuation arm in a direction opposite to said feed path direction to simultaneously pivot the pivot arm to move downward said distal ends of said pivot arms.

17. The device according to claim 16, wherein said means for shifting includes a lever operatively coupled to said actuation arm to transmit force to the actuation arm from a human operator's hand in contact with said lever.

18. The device according to claim 17, wherein said support has a substantially U-shaped cross-section to define a channel below said feed path, said actuation arm being located in said channel.

19. The device according to claim 17, wherein said means for shifting further includes a shaft having said lever mounted at an inboard end of said shaft and having an actuation cam finger extending radially outwardly from an outboard end of said shaft, said actuation cam finger in contact with said actuation arm.

20. The device according to claim 16, further comprising a weighing scale on which said support and said feed means are mounted.

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