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FEED AND SEPARATOR ROLLER WEAR COMPENSATOR

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This invention relates to a letter feeding device for use with mail handling machines and more particularly to means for automatically maintaining a predetermined normal spaced relation between the adjacent wearable surfaces of a separator roller and a feed roller.

In feeding individual pieces of mail from a stack of mail which is to be cancelled, stamped or sealed for example, each piece of mail passes between a feed roller and a separator roller. A space is normally maintained between the rollers which is sufficient to permit the thinnest piece of mail matter to pass, such as a post card, and it is important to constantly maintain such spacing to restrict the passage to only a single piece of mail.

It has been the practice to provide a manual adjustment for the separator roller, which when attended with reasonable diligence, would answer the purpose. Adjustments were seldom made however, until the space between the rollers increased sufficiently to allow two or more pieces of mail matter to pass through together.

An improvement over the manual adjustment is also known, which includes a compensating means whereby the position of the separator roller may be automatically adjusted. This improved structure is limited however in that the compensating means is only associated with the separator roller and wear of the feed roller has no effect upon its adjustment.

In the present invention an automatically adjustable means is provided which is controlled from both the separator roller and the feed roller, thereby providing a universal adjustment which will compensate for the wear of both rollers.

It is the principal object of this invention therefore, to provide in a machine having a wearable feed roller and a wearable separator roller, means whereby a predetermined space may be substantially maintained, while the diameters of the rollers are reduced as a result of wear during the constant use of the machine.

It is another object to provide means whereby the mounting for the separator roller may yield to permit mail matter of varying thickness to pass between the feed and separator rollers without affecting the adjustable compensating devices.

Another object is to provide in a machine having a wearable feed roller and a wearable separator roller, a stop member which is adapted to change its position in proportion to changes in the diameter of one of the rollers due to wear, thereby establish a standard for a compensating device which is affected by changes, due to wear, in the diameter of the other roller.

With the foregoing and other objects in view which will appear as the description proceeds the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A preferred embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a plan view of a mail handling machine showing a feed roller, a separator roller, and compensating means associated with each of said rollers;

Fig. 2 is a side elevational view of Fig. 1 taken in the direction of the arrow 2, with parts in section; and

Fig. 3 is an end view with parts in section and parts broken away taken in the direction of the arrow 3.

Referring to Fig. 1, the machine, which includes a table 8 and letter feed plate 9, is provided with a driven feed roller 10 which roller is supported upon a shaft 11, having preferably a fixed axis.

A device which is adapted to compensate for wear of the feed roller is provided which comprises a stop member or slide plate 13 and a bell crank member 14. Said bell crank 14 is mounted upon a stud 15, projecting from the machine table 8, and has a roller 16 rotatably mounted upon a stud 16a positioned at the end of one arm 14a of the bell crank, which roller is adapted to engage the peripheral surface of the feed roller 10. The other arm 14b of the bell crank is secured to the slide plate 13, as indicated at 13a. Motion of the bell crank 14 is thus transferred to the slide plate 13, and due to the roller 16 of the bell crank 14 being maintained in constant engagement with the peripheral surface of the feed roller 10, by a compression means to be hereinafter described, any reduction in the surface of said feed roller, due to wear, will cause a movement of the bell crank 14 and will therefore effect a change in the position of the slide plate 13.

A separator roller 12 is rotatably mounted upon a shaft 20, which is mounted within a support 17 and is driven by means of a flexible coupling 18a. The support 17 is preferably pivotally mounted upon a stud 18 in such manner that the sepa-
rator roller 12 is adapted to be rocked away from the feed roller when overweight pieces of mail pass between the feed roller and separator roller. Said separator roller 12 is normally maintained in a rest position and is urged toward the feed roller by means of a compression spring 19. Associated with said spring 19 is a rod 21, which is connected at one end to the separator roller support 17 and has its opposite end fixed within a lug 22 to the machine 8. The spring 19 is compressed between the lug 22 and a collar 23 fixed to said rod 21.

AGuard member 26 is provided for the purpose of directing the course of the mail M to the separator and feed rollers, has one curved end 25 normally extending into the path of the mail matter and has its opposite end pivotally mounted upon the separator roller support stud 18.

A compensating means which is associated with the separator roller 12, comprises a rocker lever 26, which is pivotally mounted upon a stud 27, and has a roller 28 rotatably mounted at one end thereof. An abutment pin 29 which is freely mounted at the other end thereof, extends perpendicularly outward from the rocker lever 26 and is guided within an opening 30 within the separator roller support 17. The supporting stud 27 is fixed within an arm 31 extending from the separator roller support 17. The arrangement of said rocker lever 26 and its associated members is such that the roller 28 is maintained in engagement with the periphery of the separator roller 28 at a position substantially diametrically opposite the mail engaging surface of said separator roller while the abutment pin 29 is maintained in engagement with the guard member 26. The opposite face of said guard member is engaged by a flanged end 32 of the slide plate 13, which end 32, in cooperation with the roller 16, is the means for maintaining a predetermined position of the said guard member 24 with respect to the feed roller 10.

From the foregoing it will be seen that the pressure of the spring 19 will urge the separator roller support 17 in the direction of the feed roller 10 and, through the arrangement of the compensating roller 28 and the pin 29, will cause the force exerted by said spring 19 to effect a force against the said guard member which force will be absorbed by the flanged end of the slide plate 13.

It is to be noted that the position of the roller 16, on the bell crank 14, will determine the position of the flange 32 of the slide plate 13, and that such position of the flanged end will change in accordance with the changes in the diameter of the feed roller resulting from the wear of said roller. It is also to be noted that the flanged end 32 of the slide plate 13 will establish a stop position by means of which the entire compensating system is controlled.

With regard to the compensating means associated with the separator roller 12; as wear occurs on said separator roller 12, the roller 28 will change its position in accordance with the wear, which change will effect a change in position of the rocker lever 26 and the abutment pin 29. Then, since the pressure of the spring 19 affects the position of the rocker lever mounting pin 29, and since the guard member 24 provides a stop for abutment pin 29, the resulting effect is a pressure upon the surface of the separator roller 12, which causes same to be forced in the direction of the feed roller 10 to the limit of the stop as effected by the flanged end 32 of the slide plate 13. A complete and automatically controlled means of adjustment is thereby provided which is adapted to maintain a substantially fixed predetermined space between the feed roller and separator roller irrespective of the wear of said rollers.

Means may also be included to provide for an adjustment during the initial setting of the spacing between the feed roller and separator roller. A simple means of adjustment may include an elongated slot 35 in the bell crank arm 14a, within which said roller 16 is adapted to slide, which carries the roller 16. A lateral adjustment of the roller 16 may thus be made and when the desired separation between the feed and separator rollers is determined, the stud 16a may be fixed in its adjusted position by means of a nut 38. Having described the invention, what is claimed is:

1. In a mail handling machine, the combination with a letter feed roller having a wearable surface, and a separator roller having a wearable surface and maintained at a normal predetermined spaced relation to said letter feed roller; and compensating mechanisms including means movable proportionately to the wear of each of said rollers, and devices controlled by said movable means for adjusting the relative position of said rollers in accordance with the wear thereof to constantly maintain substantially the predetermined spaced relation between said rollers.

2. In a mail handling machine, the combination with a letter feed roller having a wearable surface, and a separator roller having a wearable surface and maintained at a normal predetermined spaced relation to said letter feed roller; and means to permit the transverse movement of one roller relative to the other roller, compensating mechanisms including means movable proportionately to the wear of each of said rollers, and devices controlled by said movable means for adjusting the relative position of said transversely movable roller to the other in accordance with the wear to constantly maintain substantially the predetermined spaced relation between said rollers.

3. In combination, a feed roller having a wearable surface, a separator roller having a wearable surface and positioned at a predetermined spaced distance from the feed roller, a movable support for one of said rollers, means to maintain the predetermined spacing between the rollers irrespective of the wear of said roller including devices arranged to contact the periphery of each of said rollers, and means controlled by said devices to alter the position of the movable support in accordance with the wear of said rollers.

4. In combination, a feed roller having a wearable surface, a separator roller having a wearable surface and positioned at a predetermined spaced distance from the feed roller, a movable support for the separator roller, means to maintain the predetermined spacing between the rollers irrespective of the wear of said rollers including a variable control member having contact with the feed roller and adapted to alter the position of said variable control member in accordance with the wear of the periphery of said feed roller, and means associated with the separator roller and support and affected by changes in the position of the variable control member to alter the position of the separator roller support.

5. In a mail handling machine, the combination with a letter feed roller having a wearable surface, and a separator roller having a wearable surface and maintained at a normal predetermined spaced relation to said letter feed roller; and compensating mechanisms including means movable proportionately to the wear of each of said rollers, and devices controlled by said movable means for adjusting the relative position of said rollers in accordance with the wear thereof to constantly maintain substantially the predetermined spaced relation between said rollers.
face and maintained at a normal predetermined spaced relation to said letter feed roller; of means to permit the transverse movement of one roller relative to the other roller, a compensating mechanism including means engaging each roller and movable proportionately to the wear of each roller, and devices associated with said rollers and devices controlled from the movable means which is associated with one of said rollers and adjustable in accordance with the movement of said movable means, and means controlled by the position of said stop member for establishing a standard of adjustment for the movable means and devices associated with the other roller, whereby a predetermined distance between the adjacent surfaces of the two rollers is constantly maintained.

6. In a mail handling machine, the combination with a letter feed roller having a wearable surface, and a separator roller having a wearable surface and maintained at a predetermined spaced relation to said letter feed roller; of a stop member, means associated with said stop member and movable to adjust the position of said stop member in accordance with the wear of said feed roller, and devices associated with said separator roller including a movable separator roller support, means to urge said support toward the feed roller, a movable guard member associated with said support and engaging said stop member, and devices carried by said support contacting both the guard member and the periphery of the separator roller, whereby the position of the guard member is adjusted in accordance with changes in the position of the stop member and the separator roller and the separator roller support is adjusted in accordance with changes in the position of the guard member to thereby maintain the predetermined spaced relation between said rollers irrespective of the wear of said rollers.

7. In a mail handling machine, the combination with a letter feed roller having a wearable surface, and a separator roller having a wearable surface and maintained at a predetermined spaced relation to said letter feed roller; of a stop member, means associated with said stop member and movable to adjust the position of said stop member in accordance with the wear of said separator roller, and devices controlled by said movable compensating means for adjusting the relative positions of each of said rollers, and devices controlled by said movable compensating means engaging the periphery of the feed roller, connections between said stop member and compensating means whereby changes in the position of the compensating member due to wear of the feed roller effect a change in the position of the stop member, and devices associated with said separator roller and controlled by said stop member, including a movable separator roller support, means to urge said support toward the feed roller, a movable guard member associated with said support and engaging said stop member, and devices carried by said support contacting both the guard member and the periphery of the separator roller, whereby the position of the guard member is adjusted in accordance with changes in the position of the stop member and the position of the separator roller support is adjusted in accordance with changes in the position of the guard member thereby maintaining the predetermined spaced relation between said rollers irrespective of the wear of said rollers.

10. In a mail handling machine, the combination with a letter feed roller having a wearable surface, and a separator roller having a wearable surface and maintained at a predetermined spaced relation to said letter feed roller; of a yieldable support for the separator roller, a pivotal member having a portion thereof engaging the periphery of the feed roller, stop means controlled by the movement of the pivotal member in accordance with the wear of the feed roller, and devices associated with the separator roller and support and controlled by the stop means, whereby the predetermined spaced relation between the feed roller and separator roller may be maintained irrespective of the wear of either of said rollers.

11. In a mail handling machine, the combination with a letter feed roller having a wearable surface, and a separator roller having a wearable surface and maintained at a predetermined spaced relation to said letter feed roller; of a pivotal member having a portion thereof engaging the periphery of the feed roller, stop means controlled by the movement of the pivotal member in accordance with the wear of the feed roller, and devices associated with the separator roller including a movable separator roller support, means to urge said support toward the feed roller, a movable guard member associated with said support and engaging said stop member, and devices carried by said support contacting both the guard member and the periphery of the separator roller, whereby the position of the guard member is adjusted in accordance with changes in the position of the stop member, and the position of the separator roller support is adjusted in accordance with changes in the position of the guard member, to thereby maintain the predetermined spaced relation between said rollers irrespective of the wear of said rollers.

12. In a mail handling machine, the combination with a letter feed roller having a wearable surface and rotatable about a fixed axis, and a separator roller having a wearable surface and rotatable about a transversely movable axis, each of which rollers are maintained at a normal predetermined spaced relation to each other; of compensating mechanism including means engaging the periphery of each roller and movable proportionately to the wear of each of said rollers, and devices controlled by said movable compensating means for adjusting the relative positions.
of said rollers in accordance with the wear, means controlled by the compensating mechanism which is associated with the latter feed roller to establish a limit stop, a guard member, means to yieldingly urge said guard member against said limit stop, a support for the separator roller, and a connection between the guard and the compensating means which is associated with the separator roller, whereby the separator roller support may be moved in accordance with the wear of the separator roller under control of the limit stop and the limit stop may be moved in proportion to the wear of the feed roller to thereby maintain the normal spaced relation between the two rollers constant.

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