

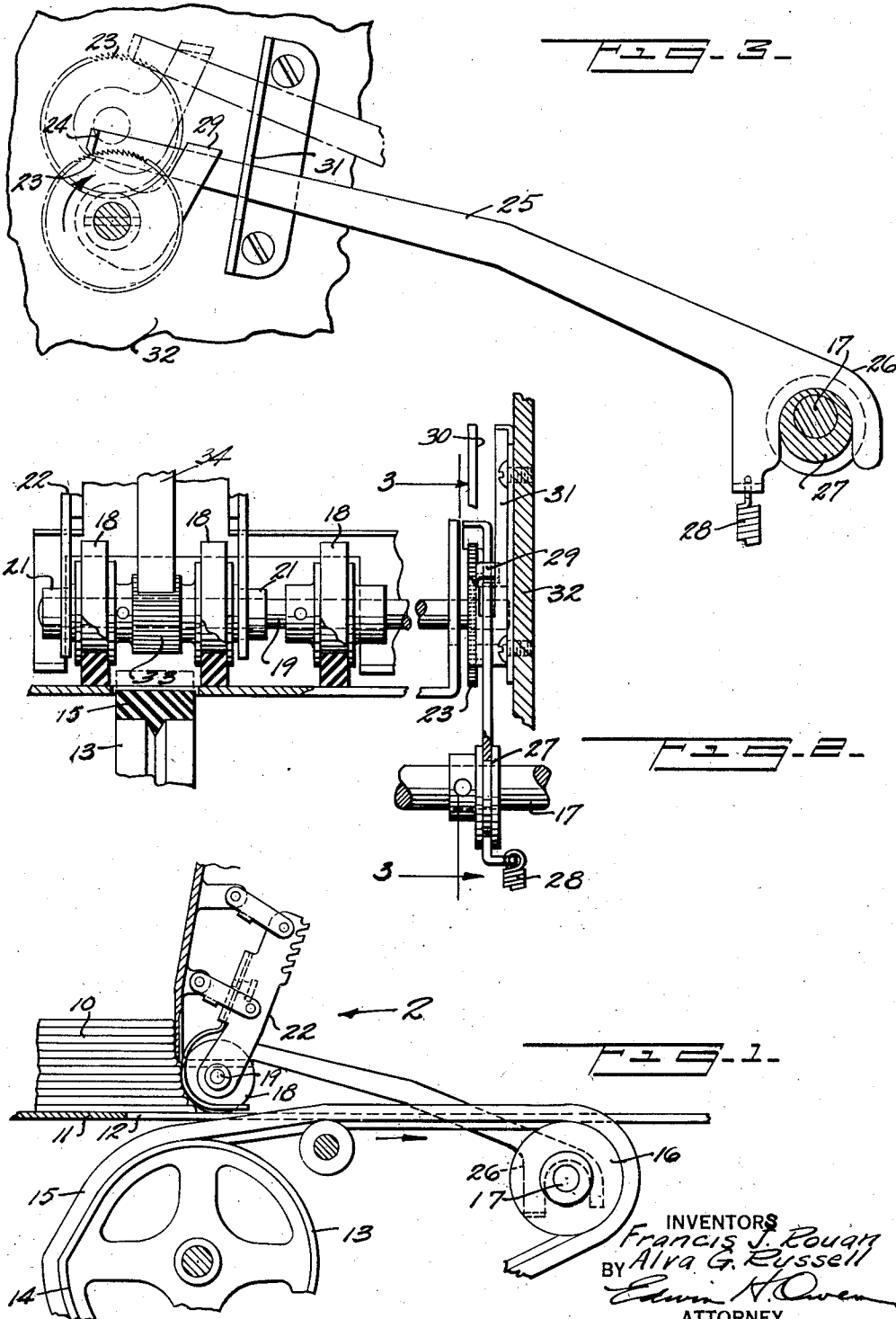
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SEPARATOR ROLLER CONTROL

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2 Sheets-Sheet 1



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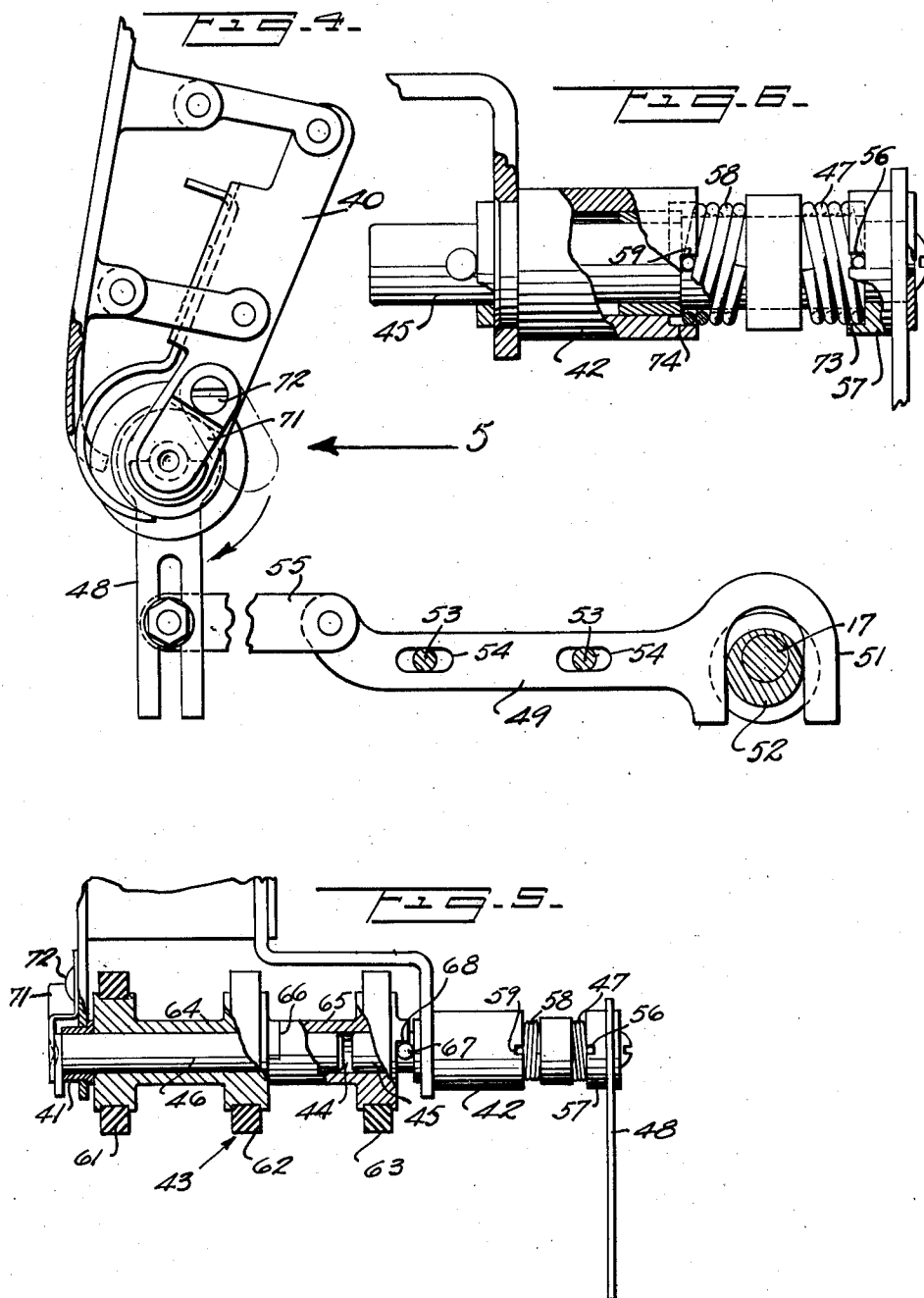
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SEPARATOR ROLLER CONTROL

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13 Claims. (Cl. 271—35)

This invention relates to means for stripping letters from the bottom of a stack prior to the feeding of same through a mailing or like machine, and is more particularly related to a means for controlling separator rollers for the distribution of wear, which is effected when the letters pass therebeneath.

In feeding letters to a mailing machine from a stack, it is common practice to engage the bottom of the lowermost letter in the stack with some friction device to remove said letter to a letter feeding position. In order that the letter directly above is not carried forward with the one which is being stripped, an obstruction is provided which comprises frictional rollers normally positioned directly in front of the letters. The rollers are normally fixed against rotation and when the lowermost letter is being stripped, the rollers are subjected to wear through the frictional engagement of the letters therewith.

It is the principal object of this invention therefore, to provide means, whereby the rollers may be rotatively adjusted at predetermined intervals to thereby constantly move a new surface into operative position and distribute the wear.

It is a further object to provide an intermittent rotative adjustment for the separator rollers in one direction and to prevent any reverse movement thereof.

It is a further object to provide a double spring clutch structure, one to effect the drive of a shaft in one direction and the other to prevent the reverse drive of the shaft.

It is also an object to provide means for the quick replacement of worn separator rollers.

With the above 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 drawings, wherein:

Fig. 1 is a side elevational view with parts in section and parts broken away showing part of a letter feed device with letters stacked thereabove, and a separator device in letter obstructing position;

Fig. 2 is an enlarged front elevational view with parts broken away and parts in section, taken in the direction of the arrow 2 of Fig. 1;

Fig. 3 is a view partly in section, taken along the lines 3—3 of Fig. 2, and showing a ratchet

drive means for the intermittent rotation of the separator rollers;

Fig. 4 is a side elevational view of a separator device with a modified intermittent drive means;

Fig. 5 is a front view taken in the direction of the arrow 5 on Fig. 4, with parts broken away and parts in section; and

Fig. 6 is an enlarged detail view showing a spring clutch drive for the separator rollers.

Referring now to the drawings in detail, letters 10 are stacked in a supporting frame structure 11, which frame structure has an opening 12 in the lower surface thereof to expose a portion of the lowermost letter to a feed or stripper device. Said stripper device may be of any conventional type and in the present disclosure comprises a driven wheel 13 having a bump 14 thereon, and a belt 15 over its periphery. A pulley 16, which also supports the belt, is fixed on a drive shaft 17, which shaft is adapted to be driven in any desired manner such as by motor drive or manual means.

A plurality of separator rollers are spaced apart and fixed upon a shaft 19, which shaft is rotatively supported in bearings 21—21 forming a part of a separator frame structure 22. A ratchet wheel 23 is fixed to the inner end of the shaft 19 and has an actuating pawl 24 engaged therewith. Said pawl 24 is formed on one end of an arm 25, the opposite end of which arm is of yoke formation as at 26, and is adapted to rest upon an eccentric collar 27, fixed to the shaft 17. By means of a spring 28, the said yoked end is maintained in engagement with the collar 27.

Rotation of the drive shaft 17 therefore, will, through the collar 27, effect a reciprocating movement of the arm 25 and pawl 24, to thus effect a drive of the ratchet wheel in a clockwise direction, as viewed from Fig. 3. The pawl end of the arm 25, is retained in a driving relation with the ratchet wheel 23 by means of a retainer bracket 29, and is further guided within a slot 30 in guide member 31, which guide is carried by a portion of the machine frame 32.

Owing to the fact that letters are of varying thicknesses, the separator roller supporting means is movable upwardly in variable amounts, in accordance with the thickness of any letter passing beneath the rollers. When this occurs, the ratchet wheel and its pawl 24 are adapted to move, while remaining intact, as indicated by the dot and dash position of Fig. 3, as a result of the structure of the guide 31 and retaining member 39.

An anti-reverse ratchet 33 is also provided for the separator roller structure which is engaged by a pawl 34, to prevent rotation of the separator rollers 18 in a counterclockwise direction by the frictional engagement of the letters with the separator rollers, when letter feeding is effected.

In operation, the feed wheel 13 is rotated by the drive of pulley 16 and belt 15, to move the bump portion 14, and particularly the belt at the location of the bump portion, into engagement with the lowermost letter of the stack of letters 10. Upon engaging said lowermost letter, it is moved by the frictional force of the belt beneath the separator rollers 18. The said rollers 18 will frictionally engage the upper surface of the letter which is fed and will therefore obstruct movement of the letter next above. The frictional driving contact of the bump portion 14 is sufficient to overcome the resistance offered by the separator rollers 18. The wiping of the letter across the lower surface of the rollers 18 causes considerable wear of the said roller surfaces and it is for this particular reason that the intermittent adjustment of said rollers is provided to effect an even distribution of the wear.

In Figs. 4, 5 and 6, a modified form of structure is shown, wherein an intermittent drive and anti-reverse motion of the separator roller shaft are provided by means of a novel arrangement of clutch spring mechanisms. Said mechanisms are supported by a frame 40 which has two bearings 41 and 42 for the support of the separator roller assembly, generally indicated at 43.

The shaft structure, on which the separator roller assembly is mounted, is split as indicated at 44, thus comprising two parts, one part 45 being mounted to rotate within the bearing 42, and the other part 46 being adapted to rotate within the bearing 41. The shaft portion 45 is adapted to be intermittently driven by means of a spring clutch 47, which is controlled from an actuator arm 48. Said arm 48 is rotatable about the shaft 45 and is adapted to be rocked by means of a reciprocating bar 49, which bar has a yoked end 51 engaging an eccentric collar 52 on the drive shaft 17. Said arm 49 is also guided on pins 53—53, which project in slots 54—54, and is linked to the arm 48 by means of a link 55. Rotation of the drive shaft 17 therefore, will effect the reciprocation of the bar 49 through the eccentric drive of collar 52 and thereby rock the arm 48.

The clutch spring 47 has one end anchored in a slot 56 of a hub 57, projecting from the arm 48, the remaining portion of this spring being coiled around the shaft 45 in such direction that, when the arm 48 is rocked clockwise, as viewed from Fig. 4, the spring will bind on the shaft and effect the drive of the shaft. When the arm returns or moves in a counter-clockwise direction, the spring will move free on the shaft.

To prevent an anti-reverse movement of the shaft 45, when letters are being fed beneath the separator rollers, another clutch spring is provided as at 58. Said spring 58 is wound in a direction in the reverse of the spring 47 and has one end anchored in a slot 59 provided in the bearing 42. Said spring is coiled around the shaft 45 similar to the spring 47, but, owing to its reverse winding, when the shaft has a tendency to rotate in a counter-clockwise direction, as viewed from Fig. 4, it will cause the spring 58 to bind. Due to the one end being fixed in the stationary bearing 42, rotation of the shaft is prevented. It is found preferable to confine at least the first coil of each of the anchored ends of the springs 47 and 58 within counterbores 73, 74 respectively for best results.

The separator roller assembly comprises a plurality of rollers 61—62 and 63, said rollers having preferably rubber or similar frictional en-

gaging surfaces. In this embodiment the rollers 61 and 62 form part of a sleeve structure 64, and the roller 63 is mounted upon a sleeve 65, said sleeves being adapted to be detachably clutched together as at 66. By means of a pin 67 fixed in the shaft 45, which pin has each of its ends projecting and engaging shoulder portions 68 of the sleeve structure 65, the said roller 63 also rollers 61 and 62 are adapted to be driven.

In view of the constant wear to which the rollers 61, 62 and 63 are subjected, they must be changed quite frequently. To provide for the quick change of said rollers, the shaft 46 is detachable, the same being insertable through the bearing 41 and sleeve 64, with one end also projecting into a portion of the sleeve 65. By means of a retaining clamp 71, which is pivotally mounted at 72, and which is adapted to have its free end clamped against the end of the shaft 46, said shaft is normally maintained in its assembled position with relation to the sleeves 64—65.

When it is desired to change the separator rollers, the clamp 71 is rocked about its pivot to the dot and dash position shown in Fig. 4, to thus free the shaft 46. The shaft is then slipped out endwise from its engagement with the sleeves 64 and 65, thus permitting the separator roller assembly to collapse at the clutch joint 66 and be removed. A new roller assembly may then be quickly reassembled in the place of the worn rollers.

Having described the invention, what is claimed is:

1. In a letter feeding device having yieldable separator rollers normally obstructing the feed of all but one letter of a stack of superimposed letters, and having feed means engageable with the lowermost letter to advance same past the separator rollers; means including a spring clutch associated with the separator rollers to prevent rotation of the separator rollers by the frictional engagement of the letters therewith, and driven means including a second spring clutch associated with the separator rollers to rotatively adjust the rollers a predetermined distance periodically in a direction opposed to the letter feed and thereby distribute wear resulting from the wiping of each letter over the said separator rollers.

2. In a letter feeding device having a plurality of spaced separator rollers yieldably mounted and normally obstructing the feed of all but one letter of a stack of superimposed letters, and having feed means engageable with the lowermost letter to advance same past the separator rollers; a shaft for the support and drive of the separator rollers, a drive for the feed means, and intermittent drive means operatively connecting the feed drive with the shaft, whereby the separator rollers may be adjusted to expose a different surface to the letters during each cycle of the feed drive.

3. In a letter feeding device having a plurality of spaced separator rollers yieldably mounted and normally obstructing the feed of all but one letter of a stack of superimposed letters, and having feed means engageable with the lowermost letter to advance same past the separator rollers; a shaft for the support and drive of the separator rollers, a drive for the feed means, and intermittent drive means including a ratchet wheel on the separator roller shaft and a pawl operatively connecting the feed

drive with the ratchet wheel, whereby the separator rollers may be adjusted to expose a different surface to the letters during each cycle of the feed drive.

4. In a letter feeding device having a plurality of spaced separator rollers yieldably mounted and normally obstructing the feed of all but one letter of a stack of superimposed letters, and having feed means engageable with the lowermost letter to advance same past the separator rollers; a shaft for the support and drive of the separator rollers, a drive for the feed means, an intermittent drive including a spring clutch on the separator roller drive shaft and means operatively connecting the feed drive with the spring clutch to effect the drive of the separator rollers, whereby the separator rollers may be adjusted to expose a different surface to the letters during each cycle of the feed drive.

5. In a letter feeding device having a plurality of spaced separator rollers yieldably mounted and normally obstructing the feed of all but one letter of a stack of superimposed letters, and having feed means engageable with the lowermost letter to advance same past the separator rollers; a shaft having the separator rollers mounted in driving engagement therewith, a ratchet wheel supported by said shaft, a pawl operatively connected with said ratchet wheel, and means to intermittently effect reciprocation of said pawl to partially rotate the ratchet and separator wheels, whereby wear of the surfaces of the separator rollers may be distributed.

6. In a letter feeding device having a plurality of spaced separator rollers yieldably mounted and normally obstructing the feed of all but one of a stack of superimposed letters, and having feed means engageable with the lowermost letter to advance same past the separator rollers, a shaft having the separator rollers fixed thereon, a ratchet member fixed to said shaft, a drive, and reciprocating means actuated by said drive and connected with the ratchet member to effect an intermittent drive of the separator rollers, whereby wear of the surfaces of the separator rollers may be distributed.

7. In a letter feeding device having a plurality of spaced separator rollers yieldably mounted and normally obstructing the feed of all but one of a stack of superimposed letters, and having feed means engageable with the lowermost letter to advance same past the separator rollers, a shaft having the separator rollers fixed thereon, a ratchet member fixed to said shaft, a drive including a shaft having an eccentric member thereon, and a link connecting said eccentric member and ratchet member, whereby the ratchet and separator rollers are rotated partially during each cycle of rotation of the drive shaft to thereby adjust the separator rollers and distribute the wear.

8. In a letter feeding device having a plurality of separator rollers, a support for said rollers including a removable shaft structure, a drive including coupling means between the shaft and rollers, and adjustable retaining means to maintain the shaft in an operative position within the rollers and support, said latter means being releasable to permit withdrawal of the shaft from the rollers, whereby the rollers are freed for quick replacement.

9. In a letter feeding device having a plurality of separate rollers, a support for said rollers including a split shaft structure, a drive connected with one portion of the shaft, said rollers

being supported on the other portion of the shaft, means to maintain both portions of the split shaft intact when in driving position, said latter means being releasable to permit withdrawal of the shaft portion which supports the rollers, whereby the rollers are freed for quick replacement.

10. In a letter feeding device having a plurality of separator rollers, a support for said rollers including a split shaft structure, said split shaft comprising a drive portion and a detachable driven portion, said rollers being supported on the driven portion of the shaft, a support for the drive shaft portion, a support for the driven shaft portion, said rollers and drive shaft portion being in driving relation when assembled, and said driven shaft being removable from within its support and rollers for quick replacement of rollers.

11. In a letter feeding device having a plurality of separator rollers, a support for said rollers, means whereby the rollers may be quickly released for replacement comprising, a split shaft structure, supporting bearings for said shaft structure, one portion of said shaft structure being detachable, the other portion of said shaft structure being secured within one supporting bearing, said separator rollers including a sleeve structure, one end of the sleeve structure being coupled with the shaft in the bearing, said detachable shaft being insertable through the other bearing and the sleeve structure, and retaining means manually movable into locking engagement with the outer end of the detachable shaft to maintain the entire roller and shaft unit in operative relation and to permit the quick removal of the detachable shaft for replacement of worn rollers.

12. In a letter feeding device having a plurality of separator rollers, a support for said rollers, means whereby the rollers may be quickly released for replacement comprising, a split shaft structure, supporting bearings for said shaft structure, one portion of said shaft structure being detachable, the other portion of said shaft structure being secured within one supporting bearing with the shaft ends projecting therefrom, one projecting end including a coupling and the other projecting end having a drive connected thereto, said separator rollers including a sleeve structure, one end including a coupling coupled with the coupling end of the shaft in the bearing, said detachable shaft being insertable through the other bearing and the sleeve structure, and retaining means manually movable into locking engagement with the outer end of the detachable shaft to maintain the entire roller and shaft structure in operative relation and to permit the quick removal of the detachable shaft for replacement of worn rollers.

13. An intermittent drive comprising a shaft, a bearing for said shaft, a power driven reciprocating member on the shaft, said shaft being freely movable in the bearing and member, a driving clutch spring wound around the shaft and having one end anchored in the reciprocating member, whereby movement of the arm in one direction will bind the spring on the shaft to drive same, and an anti-reverse clutch spring wound around the shaft in a direction opposite to the driving spring and having one end anchored in the bearing, whereby rotation of the shaft in a reverse direction is checked.

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