Jan. 21, 1964 R. R. LOGAN 3,118,663

MAILING MACHINES

Filed Nov. 16, 1961 2 Sheets-Sheet 1

FIG. 1

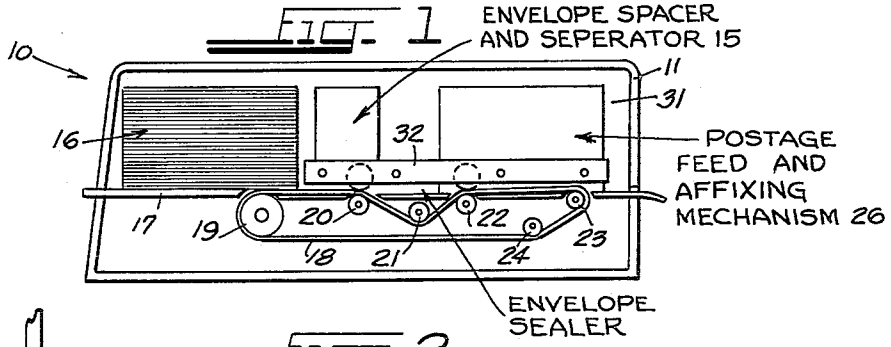



FIG. 2

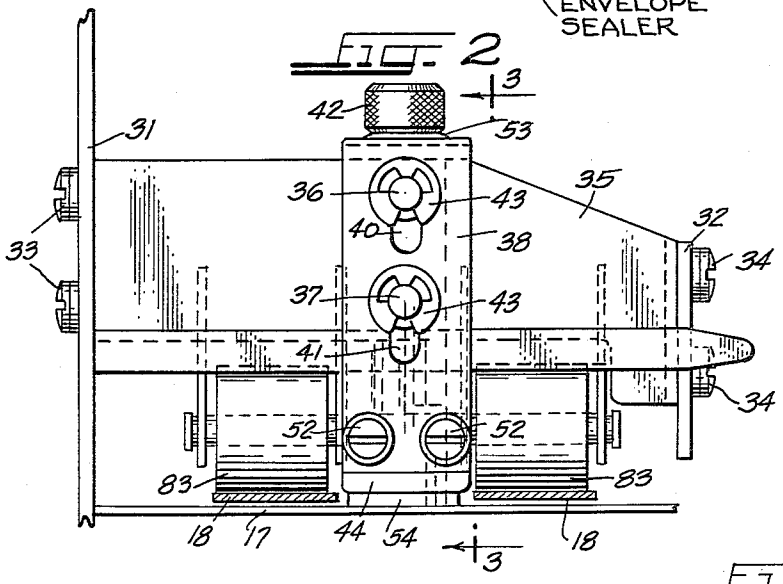



FIG. 3

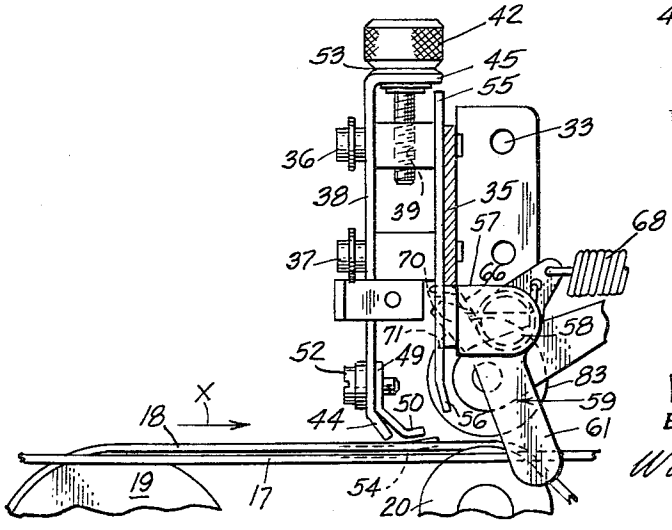
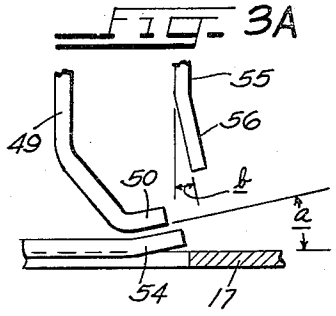



FIG. 3A




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Fig. 4

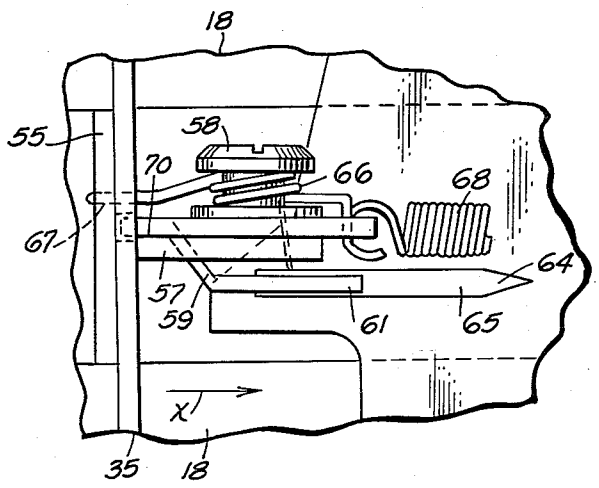
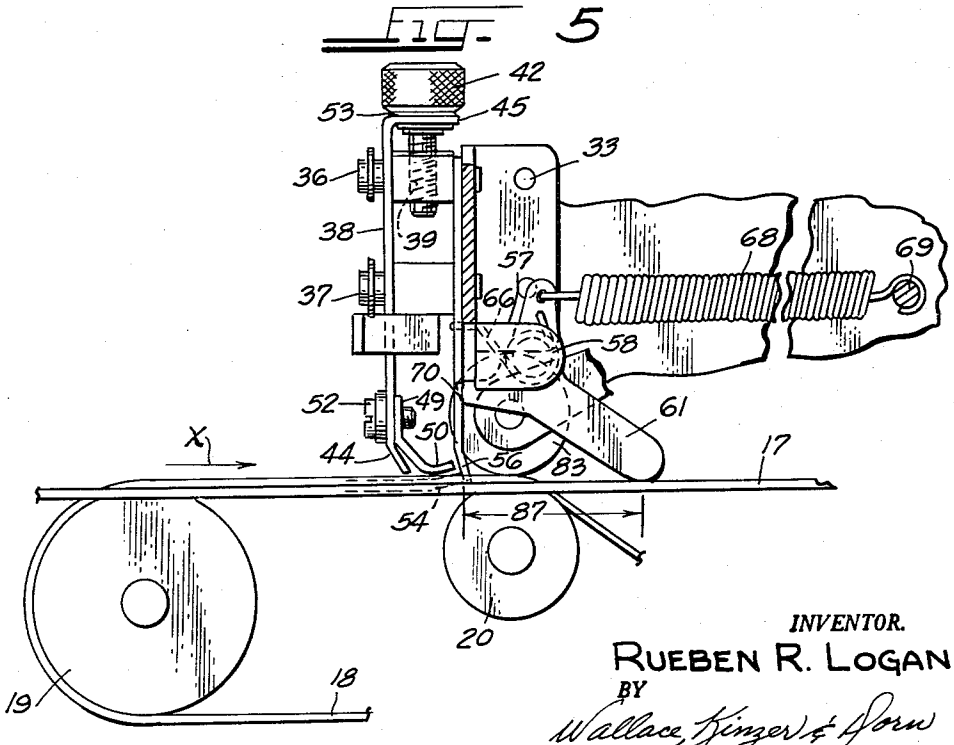



Fig. 5




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3,118,663

# MAILING MACHINES

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4 Claims. (Cl. 271—35)

This invention relates to a new and improved separating and spacing mechanism. More particularly, the invention relates to an improved separator and spacer mechanism for mailing pieces such as envelopes, post cards and the like, utilized in the feeding of such mailing pieces through a general purpose mailing machine.

In a mailing machine, in which postage in one form or another is to be applied to individual mailing pieces, it is essential that a given surface of each mailing piece be exposed to permit application of the postage thereto. It is also desirable to provide for spacing between mailing pieces, as they are fed through the machine. This is particularly true in a machine of the kind described in the co-pending application of Ronald V. Dorn and Reuben R. Logan, Serial No. 667,382, filed June 24, 1957, in which the envelope or other mailing pieces being driven through the machine control the actuation of all postage feeding and affixing apparatus.

The necessity for establishing a sequential flow of mailing pieces through a machine of this kind, and for spacing the individual pieces from each other, is complicated by the fact that the mailing pieces may be quite different from each other in dimensions and in other physical characteristics. For example, a general purpose mailing machine may be required to handle legal size and smaller envelopes intermixed with each other. Preferably, the same machine should also be capable of accepting post cards or other different-sized mailing pieces without requiring substantial adjustment. Of course, a relatively light-weight airmail envelope is considerably less stiff than a conventional bond paper envelope; even greater stiffness is afforded by mailing pieces of card stock and the like. Consequently, substantial problems are presented in affording a separator and spacer mechanism that is not subject to jamming of the mailing pieces yet which effectively separates the mailing pieces and provides uniform spacing therebetween regardless of dimensional variations.

It is a principal object of the invention, therefore, to provide a new and improved mailing piece separator and spacer mechanism for a general purpose mailing machine, or the like, which segregates the mailing pieces so that they are fed one-by-one into the machine and which spaces the mailing pieces in a uniform manner.

Another object of the invention is to provide positive means to avoid jamming in a mailing piece separator and spacer mechanism suitable for use in a general purpose mailing machine.

A specific object of the invention is to utilize a linearly movable slide member as a spacer gate, in a spacer mechanism adapted for use in a general purpose mailing machine, and at the same time to provide means for effectively moving the gate away from each mailing piece at the time the gate releases the mailing piece for movement into the machine.

Accordingly, the present invention is directed to an envelope separator and spacer mechanism for a mailing machine or like apparatus including a conveyor for moving mailing pieecs along a substantially linear path through the machine. The mechanism of the invention comprises an initial gate member that is positioned to limit movement of mailing pieces into the machine to one mailing piece at a time. Guide means are provided for deflecting each mailing piece from the aforesaid linear path,



at an acute angle, immediately following the aforementioned initial guide member. The mechanism further includes a spacer gate member that is movable between an initial position and a blocking position. In the initial position, the spacer gate member is displaced from the mailing piece path by a relatively large distance; in its blocking position, the spacer gate member extends into the mailing piece path and blocks movement of any envelope or other mailing piece along the path. Preferably, the blocking portion of the spacer gate member extends normal to the aforementioned guide means. The mechanism further includes a spacer actuating member that is movable between an initial position and an actuation position by engagement with a mailing piece moving along the aforementioned linear path. Resilient drive means connect this spacer actuating member to the spacer gate member to drive the spacer gate member toward its blocking position when the actuating member is moved to its actuation position. However, the resilient drive means permits the spacer gate member to ride upon the surface of each mailing piece in an intermediate position until the trailing edge of the mailing piece clears the spacer gate member, at which time the drive means completes the movement of the spacer gate member to its blocking position. Further, restoration means are provided to restore the spacer gate member and the spacer actuating member to their respective initial positions each time the trailing edge of a mailing piece clears engagement with the actuating member.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what is now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a simplified elevation view of a general purpose mailing machine, with the covers removed, in which the spacer and separator mechanism of the present invention is incorporated;

FIG. 2 is a detail elevation view of the separator and spacer mechanism of the invention, taken approximately along line 2—2 in FIG. 1;

FIG. 3 is a sectional view taken approximately along line 3—3 in FIG. 2 and FIG. 3A is a detail of FIG. 3;

FIG. 4 is a detail plan view of a part of the mechanism of FIGS. 2 and 3; and

FIG. 5 illustrates a portion of the mechanism in a view similar to FIG. 3 but with the operating parts in a different operating position.

The general purpose mailing machine 10 illustrated in FIG. 1 is essentially similar to that described and claimed in the aforementioned co-pending application of Ronald V. Dorn and Reuben R. Logan. It comprises a suitable housing 11, a portion of which has been removed to show the internal operating elements of the mailing machine. A back frame member 31 is provided in the machine and an upper front frame member 32 is mounted at the near side of the machine as seen in FIG. 1. The front frame member 32 may be mounted in cantilever fashion from the back frame member 31 by a series of support shafts or the like.

A feed table 17 extends longitudinally of the machine 10, the left-hand portion of the table 17 being utilized to support a stack of envelopes or other mailing pieces as generally indicated by the reference numeral 16. Conveyor means are provided for driving the envelopes or

other mailing pieces from the stack 16 through the machine 10, the envelopes moving from left to right as seen in FIG. 1. This conveyor means, in the machine shown in FIG. 1, comprises one or more conveyor belts 18 engaged with a drive roller 19 and a plurality of individual idler rollers 20–24. For the most part, the drive belts 18 extend across the surface of the table 17, but a portion of the conveyor is located below the table, adjacent the idler 21, to permit incorporation of an envelope sealer mechanism in the machine. The envelope sealer, generally identified by the reference numeral 25, does not constitute a part of the present invention and, accordingly, is not shown in detail. This is also true of the postage feed and affixing mechanism 26, which is shown only generally in FIG. 1. The present invention is concerned with the envelope spacer and separator 15 located immediately adjacent the stack 16 at the input station of the machine 10.

In operation of the machine 10, individual envelopes or other mailing pieces are fed from the bottom of the stack 16 along the table 17. The spacer and separator mechanism 15 prevents the feeding of more than one mailing piece at a time. Moreover, this device also spaces the individual envelopes or other mailing pieces so that there is a definite gap between them as they move through the mailing machine. This is important in order to permit each mailing piece to control operation of the postage feed and affixing mechanism 26 so that there is no need to provide special timing apparatus for the mechanism 26. From the mechanism 15, each envelope passes through the sealer 25, which seals the envelope. Thereafter, postage is affixed to each mailing piece by the mechanism 26, and the envelopes are discharged from the machine at the right-hand side thereof.

The envelope separator and spacer mechanism 15 is illustrated in detail in FIGS. 2–4. It comprises a spacer frame 35 that extends across the input portion of the machine 10 between the back frame member 31 and the upper front frame member 32. The spacer frame 35 is mounted on the frame members 31 and 32 by suitable means such as a plurality of mounting screws 33 and 34.

At the central portion of the spacer frame 35, a pair of separator guide studs 36 and 37 are secured to the spacer frame. These guide studs are generally similar in configuration to each other except that the upper stud 36 is provided with a vertical tapped opening 39 for receiving a threaded adjustment screw 42. The two studs 36 and 37 are riveted, staked, or otherwise firmly secured to the spacer frame 35.

On the side of the studs 36 and 37 facing the envelope stack 16, a separator slide member 38 is mounted. The slide 38 is provided with two elongated openings 40 and 41 into which the studs 36 and 37, respectively, project. The slide 38 is retained on the studs 36 and 37 by suitable means such as a pair of retainers 43. The lower end 44 of the slide 38 is bent away from the envelope stack at a relatively small angle (see FIG. 3). The upper portion of the slide affords a horizontally extending bracket or ear portion 45 having a central aperture through which the adjustment screw 42 extends. A spring washer 53 or other suitable means may be utilized to prevent displacement of the adjustment screw 42 during operation of the machine, which might otherwise result from vibration or jarring of the machine.

The lower end of the slide 38, immediately above the angle portion 44, carries a spacer guide 49. The spacer guide 49 may be secured to the slide by any suitable means. Preferably, the mounting arrangement provides for limited vertical adjustment of the guide 49 relative to the slide 38 to permit accurate adjustment of the machine and to compensate for manufacturing variations. In the illustrated arrangement, a pair of mounting screws 52 are utilized for this purpose. The lowermost end of the guide 49 should be even with the lowermost tip of the slide 38. The end 50 of the spacer guide 49 is bent upwardly at a small angle *a* relative to the table 51 of the machine for a purpose described in detail hereinafter. The portion 54 of the table immediately adjacent the lower end 50 of the spacer guide is also bent upwardly at the same angle.

A spacer gate member or slide 55 is also mounted for vertical sliding movement on the studs 36 and 37 (see FIGS. 3 and 5). The lower portion 56 of the slide 55 is bent at a slight angle *b* from the vertical; this angle should be the same as the angle *a* of the members 50 and 54 with respect to the horizontal, so that an envelope projecting between the members 50 and 54 is approximately normal to the lower end 56 of the spacer slide. The angles *a* and *b* should be made as large as possible without undue bending of the envelopes being fed through the machine 10 and without interfering with envelope feed. For a general purpose mailing machine, the preferred angle is approximately eleven degrees.

The spacer frame 35 is provided with a central bracket portion or ear 57 in which a screw 58 is mounted (see FIG. 4). A spacer actuating member 59, referred to hereinafter as a spacer arm, is pivotally mounted on the screw 58. The normal position for the spacer arm 59, prior to operation of the machine, is shown in FIG. 3. In this position, the projecting sensing portion 61 of the spacer arm projects outwardly through a slot 65 in the table 17 of the machine (FIG. 4). As shown in FIG. 4, the nose 64 of the slot 65 is substantially V-shaped in configuration, this being done to prevent jamming of envelopes in the slot during operation of the spacer mechanism as described hereinafter.

A torsion spring 66 is mounted on the screw 58. One end of the torsion spring projects below the frame member 35 and is connected to the slide 55, projecting through a suitable aperture 67 in the slide. The other end of the torsion spring is connected to the spacer arm 59, being engaged in a suitable hole in the spacer arm. A bias spring 68 is also connected to the spacer arm 59, the other end of the spring 68 being connected to a fixed shaft 69. Thus, the spring 68 normally maintains the spacer arm 59 in the position shown in FIG. 3. Moreover, a projecting portion 70 of the spacer arm 59 engages in a slot 71 in the slide 55 and maintains the slide in the elevated position shown in FIG. 3.

With the machine in operation, and the belts 18 driven in the direction indicated by the arrow X, a relatively small number of envelopes in the stack 16 are moved underneath the lower end of the machine housing (not shown) and into engagement with the lower portion 44 of the separator slide 38. The slide 38 does not move in the course of machine operation; rather, this member is constructed as a slide solely to provide for adjustment of the height of the entrance gate to the machine. The adjusting screw 42 is used to adjust the height of the gate or slide 38 to permit the machine to accommodate envelopes of varying thickness. The lowermost envelope is driven beneath the gate portion 44 of the separator slide 38 and between the spacer guide element 50 and the upwardly bent portion 54 of the table 51. The angular position of the gate element 44 tends to cam the leading edge of each envelope downwardly, thereby minimizing jamming at the entrance gate. The first envelope does not engage the gate portion 56 of the spacer slide 55, since the latter is held in the elevated position of FIG. 3 at the beginning of machine operation. Thus, the first envelope passes freely beneath the slide 55 and engages the depending portion 61 of the spacer arm 59.

The advancing movement of the first envelope deflects the spacer arm 59 from the position shown in FIG. 3 to the alternate position illustrated in FIG. 5. Thus, the spacer arm 59 is rotated in a counterclockwise direction about the pivot screw 58, against the biasing force afforded by the spring 68. The pivotal movement of the spacer arm moves the projection 70 downwardly, permitting the torsion spring 66, which is also rotated, to carry the

slide 55 downwardly toward the position shown in FIG. 5. As the first enevlope continues its forward movement, the spacer arm 59 is maintained nearly in the position of FIG. 5 and the bottom portion 56 of the slide rides on the upper surface of the envelope. This condition obtains until the trailing edge of the envelope clears the lower end 56 of the spacer slide 55. When this happens, the spacer slide 55 moves downwardly through a very small distance, approximately that of the thickness of the envelope, into full blocking position as shown in FIG. 5. In this position, the lower end 56 of the spacer slide prevents the feeding of a second envelope into the machine between the idler feed rollers 20 and 83.

With the slide 55 lowered to its full blocking position (FIG. 5) the next envelope being fed into the machine is passed between the spacer guide 49 and the upwardly bent portion 54 of the table and is blocked by the lower portion 56 of the spacer slide 55. It should be noted that the lower end 56 of the slide extends below the upper surface of the table extension 54, at the point at which these elements meet, so that the second envelope cannot creep under the spacer slide after the trailing edge of the progressing envelope passes from under the lower end of the slide 55.

As the forward movement of the first envelope is continued, the trailing edge of the envelope eventually clears engagement with the projection 61 on the spacer arm 59. When this occurs, the spring 63 acts to pivot the spacer arm back in a clockwise direction toward the position shown in FIG. 3. The pivotal movement of the spacer arm, in turn, elevates the slide 55 by virtue of the engagement of the projection 70 in the slide aperture 71. That is, the projection 70 on the spacer arm drives the slide 55 back to the position shown in FIG. 3. This clears the lower portion 56 of the slide from its blocking engagement with the leading edge of the second envelope and permits the second envelope to move from the stack 16 into the machine 10. It is important to note that the angular relation of the lower end 56 of the slide to the position of the envelope, as determined by the configuration of the members 50 and 54 (see FIGS. 3 and 5), in effect causes the slide to move away from the end of the envelope as it is elevated. As a consequence, there is little or no tendency to pull the envelope upwardly with the slide, and jamming from this source is avoided.

From this point, the movement of the second envelope through the machine duplicates that described above for the first envelope. It is thus seen that the mechanism shown in FIGS. 1–4 permits only one envelope to enter the machine at a time and establishes a definite spacing between the individual envelopes, this spacing being independent of variations in envelope length. The inter-envelope spacing is established by the distance 87 between the lower or blocking portion 56 of the spacer slide 55 and the contact point of the extension portion 61 of the spacer arm 59 with the envelope (see FIG. 5).

Perhaps the most critical feature of the present invention is the angle *a* through which each envelope, after the first, is deflected as it approaches the blocking portion 56 of the spacer slide 55, and the corresponding angle *b* of the element 56. As noted above, a good working angle for general purpose machines is about eleven degrees. If the angle is made substantially greater, lightweight paper mailing pieces tend to curl up and jam the machine. If the angle is much smaller, the envelopes tend to catch on the blocking portion 56 of slide 55 when the slide is raised, again tending to jam the machine. A minor variation from the normal relation of parts 56, 44 and 54, as described above, can be tolerated, but substantial changes are likely to produce poor operation with varying mailing piece inputs.

Hence, while a preferred embodiment of the invention has been described and illustrated, it is to be understood that it is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A separator and spacer mechanism for a general purpose mailing machine or the like including a conveyor for moving mailing pieces along a given path through the machine, said mechanism comprising: separator means positioned to limit movement of mailing pieces into the machine to one mailing piece at a time; guide means for deflecting each mailing piece from said path, at an acute angle, immediately following said separator means; a spacer gate member movable between an initial position, in which the gate member is displaced from said path to permit free passage of a mailing piece, and a blocking position in which said gate member extends into said path and blocks movement of any mailing piece therealong, the blocking portion of said gate member extending normal to said guide means; a spacer actuating member, projecting into said path beyond said gate member, said spacer actuating member being mounted for movement between an initial position and an actuation position by engagement with a mailing piece moving along said path; resilient drive means, connecting said actuating member to said gate member, for driving said gate member from its initial position toward its blocking position in response to movement of said actuating member to its actuation position, but permitting said gate member to ride upon the surface of each mailing piece in an intermediate position until the trailing edge of the mailing piece clears the spacer gate member to its blocking position; and means for restoring said gate member and said actuating member to their respective initial positions each time the trailing edge of a mailing piece clears said actuating member.

2. A separator and spacer mechanism for a mailing machine or the like including a conveyor for moving mailing pieces along a given linear path through the machine, said mechanism comprising: a separator member positioned to limit movement of mailing pieces into the machine to one mailing piece at a time; guide means comprising a first guide element mounted on said separator member and a second guide element located in parallel spaced relation thereto, for deflecting each mailing piece from said path, at an acute angle, immediately following said separator member; a spacer slide, linearly movable between an initial position, in which the slide is displaced from said path to permit free passage of a mailing piece, and a blocking position in which said slide extends into said path and blocks movement of any mailing piece therealong, the blocking portion of the slide extending normal to said guide elements; a spacer actuating member, including a sensing element projecting into said path beyond said spacer slide, mounted for movement between an initial position and an actuation position by engagement with a mailing piece moving along said path; resilient drive means, connecting said actuating member to said spacer slide, for driving said spacer slide from its initial position toward its blocking position in response to movement of said actuating member to its actuation position, but permitting said spacer slide to ride upon the surface of each mailing piece in an intermediate position until the trailing edge of the mailing piece clears the slide, at which time said drive means drives the spacer slide to its blocking position; and means for restoring said spacer slide and said spacer actuating member to their respective initial positions each time the trailing edge of a mailing piece clears said sensing element of said actuating member.

3. A separator and spacer mechanism for a general purpose mailing machine including a conveyor for moving mailing pieces along a given horizontal path through the machine, said mechanism comprising: a separator member comprising an adjustable fixed vertical gate positioned to limit movement of mailing pieces into the machine to one mailing piece at a time, said separator mem-

ber having a cam portion tending to force the leading edges of the mailing pieces toward said conveyor; guide means for deflecting each mailing piece from said path, at an acute angle, immediately following said separator member; a spacer gate member movable between an initial clearance position, displaced from said path, and a blocking position in which said spacer gate member extends into and blocks said path at the outlet of said guide means; a spacer actuating member, positioned to sense movement of a mailing piece moving along said path; drive means, connecting said spacer actuating member to said spacer gate member, for driving said spacer gate member from its initial position toward its blocking position in response to engagement of said actuating member by a mailing piece; and means for restoring said spacer gate member to its initial position each time the trailing edge of a mailing piece clears said actuating member.

4. A spacer mechanism for a general purpose mailing machine or the like including a conveyor for moving mailing pieces along a given path through the machine, said mechanism comprising: guide means for deflecting each mailing piece from said path, at an angle of about eleven degrees; a spacer gate member movable normal to said path between an initial position, in which the spacer gate member is displaced from said path to permit free



passage of a mailing piece, and a blocking position in which said spacer gate member extends into said path at the outlet of said guide means and blocks movement of any mailing piece therealong, the blocking portion of said gate member being approximately normal to said guide means; a spacer sensing and actuating member, projecting into said path beyond said spacer gate element, mounted for movement between an initial position and an actuation position by engagement with a mailing piece moving along said path; drive means, connecting said spacer actuating member to said spacer gate member, for driving said spacer gate member from its initial position toward its blocking position in response to engagement of said actuating member by a mailing piece; and means for restoring said spacer gate member to its initial position each time the trailing edge of a mailing piece clears said actuating member.

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