

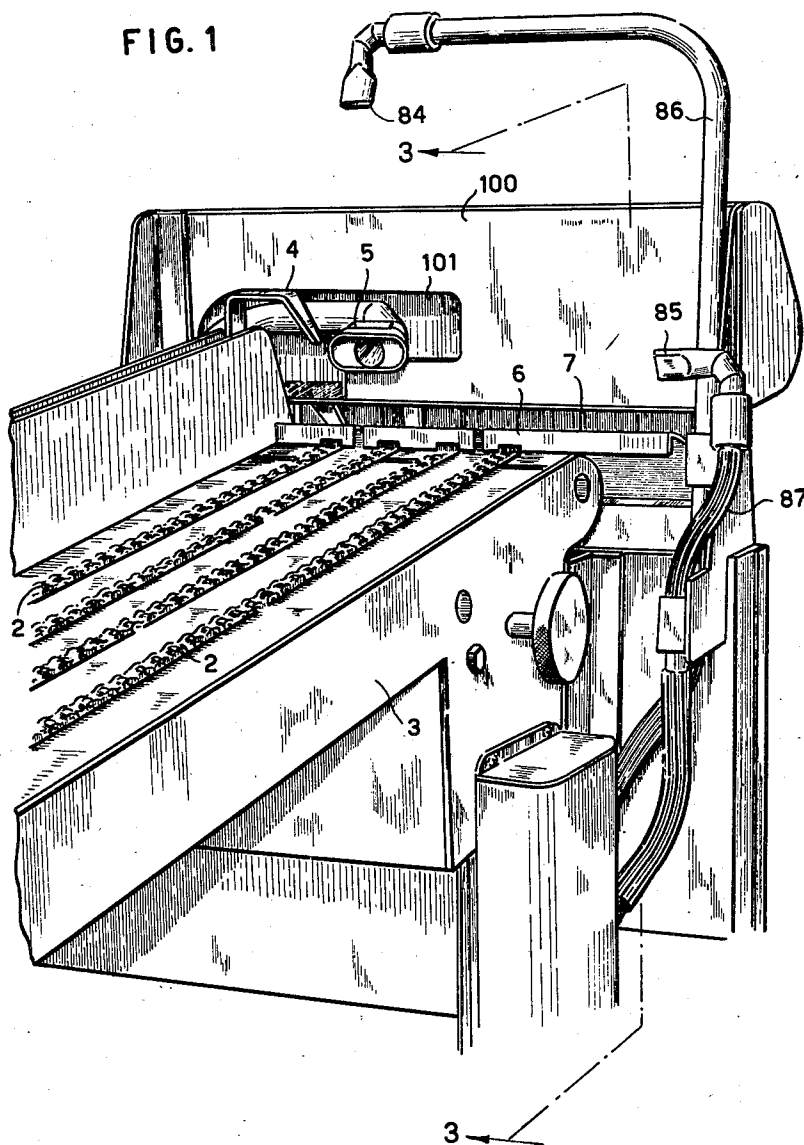
May 14, 1957

F. VAN MARLE
MAIL HANDLING EQUIPMENT

2,792,218

Filed Oct. 19, 1955

5 Sheets-Sheet 1



INVENTOR.
FREDERICK VAN MARLE
BY
J. Anderson Davis

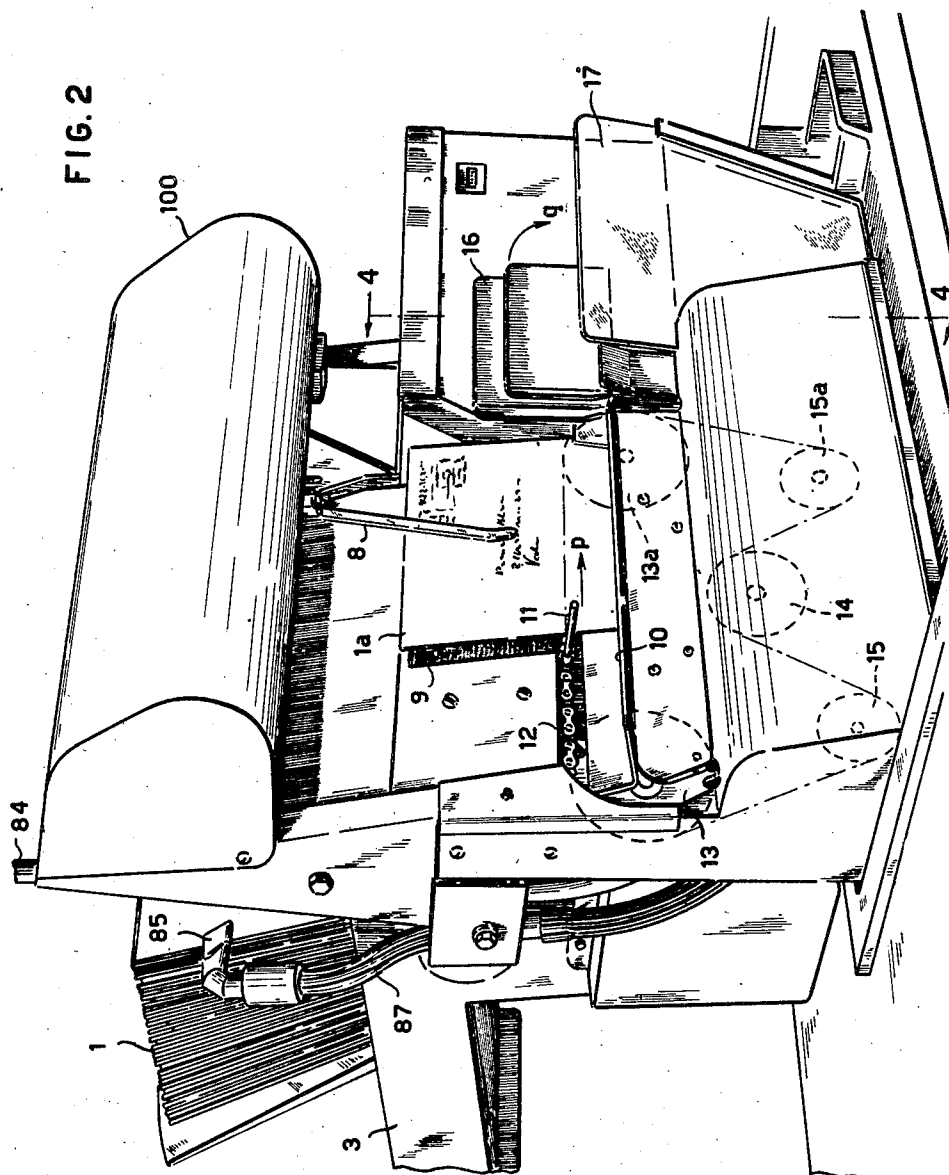
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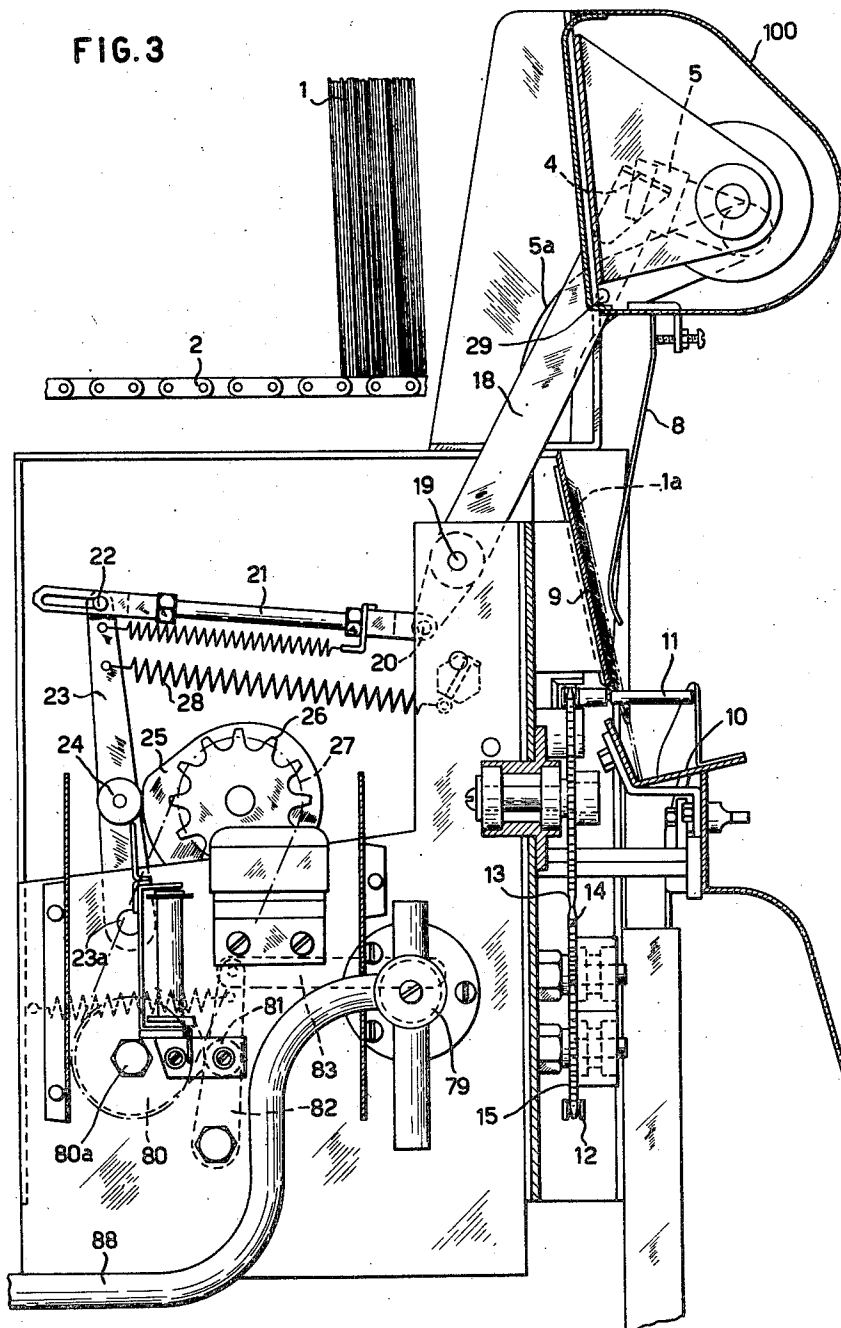
INVENTOR
FREDERICK VAN MARLE

BY
Frederick Van Marle

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MAIL HANDLING EQUIPMENT

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FIG. 3



INVENTOR.
FREDERICK VAN MARLE
BY
J. H. H. H. H.

May 14, 1957

F. VAN MARLE

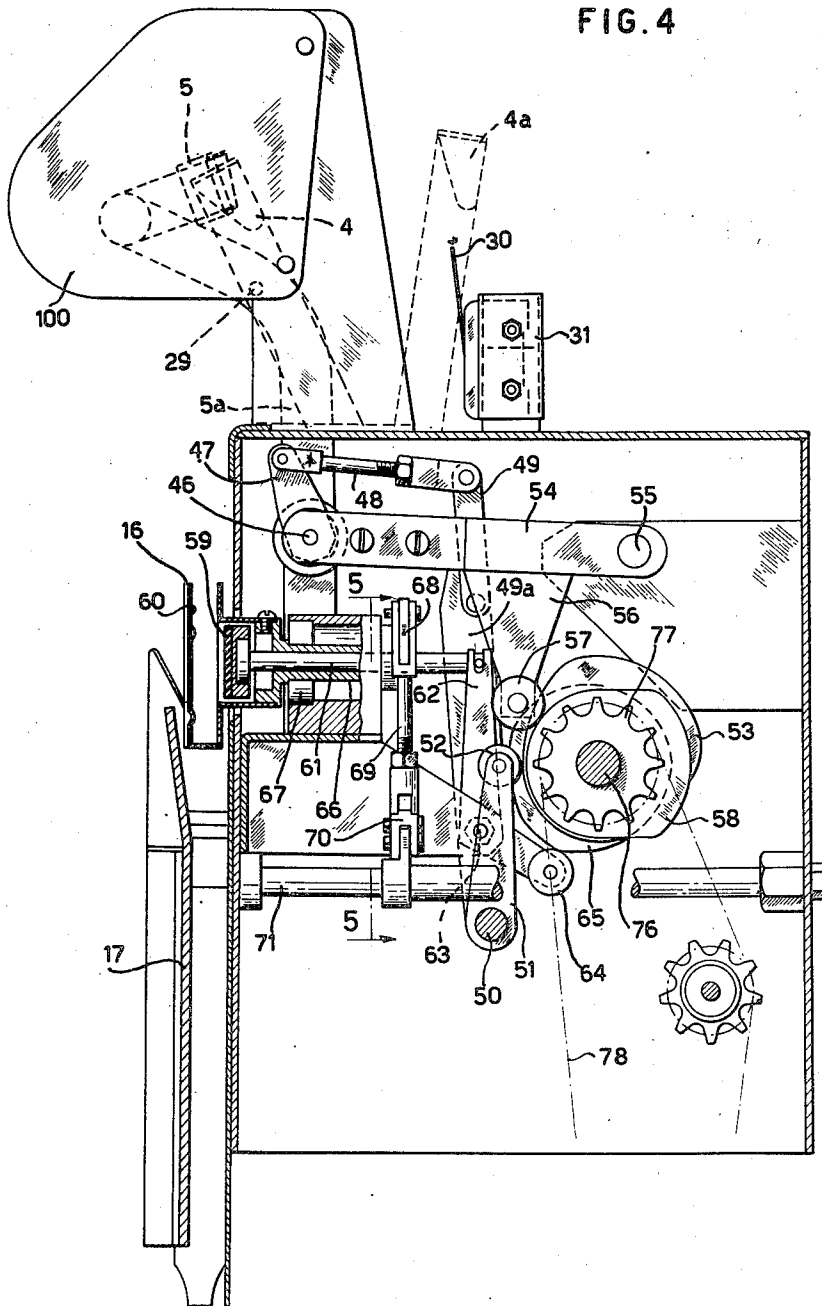
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FIG. 4



INVENTOR.
FREDERICK VAN MARLE

BY

Frederick Van Marle

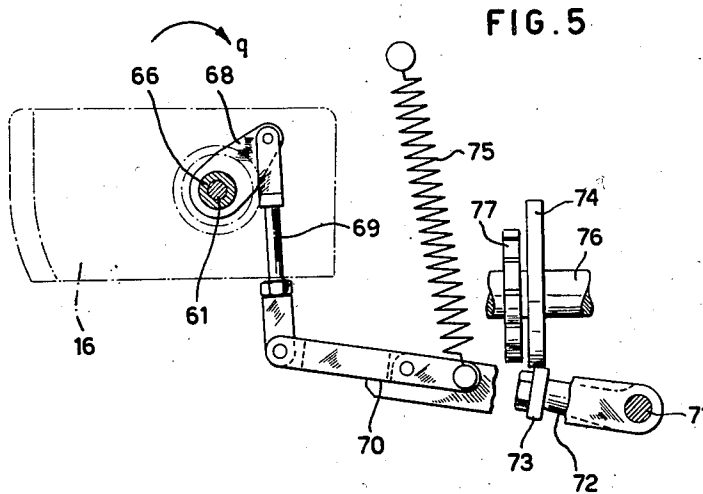
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5 Sheets-Sheet 5



INVENTOR.
FREDERICK VAN MARLE
BY
J. Lindsay Davis

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2,792,218

MAIL HANDLING EQUIPMENT

Frederick van Marle, The Hague, Netherlands, assignor to N. V. Technische Maatschappij Marchand-Andriessen, The Hague, Netherlands, a limited liability company of the Netherlands

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16 Claims. (Cl. 271—5)

This invention relates to mail handling equipment and has for its object to provide improvements in a mail sorting machine.

More particularly it is an object of this invention to provide improved means for progressively and automatically presenting individual mail pieces to inspection by an operator so that he may code the addresses thereof in a minimum lapse of time and with the expenditure of a minimum amount of physical energy, and thereupon automatically to remove each mail piece from the point of inspection to a routing chute.

It has long been a problem to provide a device which will pick off individual mail pieces from a stack and to bring them to rest promptly before the eye of an operator. Previous attempts to accomplish this have been unsuccessful because the device or mechanism which picks off each mail piece must drop it to a point of inspection. When the mail piece falls it often bounces or dances then comes to rest at any one of a number of points in the trough or platform which stops it. The result is that there is a loss of time while waiting for the mail piece to come to rest, and there is eye strain on the operator who is trying to read the address both because of the dancing or bouncing of the mail piece and because it may not come to rest at the same position as the previous one. While attempts have previously been made to guide each mail piece and to damp its fall, the most successful previous practice has been for the operator to lift each mail piece with one hand, read its address, code with the other hand, then drop it into a routing chute. This invention obviates the necessity for handling of the mail pieces by the operator and overcomes the bouncing, dancing and irregular positioning of each mail piece at inspection. The result is that less time is consumed for inspection and coding and there is substantially less strain on the operator. An operator can read and code letters thus equipped at a speed of approximately one mail piece per second.

Another object of the invention is to provide a machine bed upon which mail pieces are horizontally stacked, to cause the stack to move forwardly by small intermittent movements and to pick off the leading mail piece from the stack for automatic delivery to a point of inspection. As will be seen, two air blasts are employed to insure proper delivery of the mail pieces individually. One of the air blasts acts as the leading mail piece is being picked from the stack and its function is to separate the leading mail piece from a second one which may adhere thereto. The second air blast acts as the mail piece is being released by the picking nozzle and prevents the opening of an unsealed letter flap.

Another object of this invention is to provide timed means for removing each mail piece from its point of inspection rapidly, and for positively directing it into a conveying device. While the entire sorting machine is not here illustrated, it should be understood that there are usually five operators, each one of which directs his mail pieces into every fifth carriage of a conveyor which

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passes beneath the point of inspection. If each operator codes one letter in approximately one second then it will be seen that the conveyor carriages pass each operator at the rate of approximately five per second so that it is important that the removal of each mail piece from its point of inspection be made rapidly and also that the mail piece must be given accurate and positive motion in a new direction.

Other objects and advantages will become hereinafter more fully apparent as reference is had to the accompanying drawings in which

Figure 1 is a partial perspective taken from the rear of my improved sorting machine showing the mail feeder table, the mail piece pick-up and allied parts,

Figure 2 is a partial perspective of the front of the machine of Figure 1,

Figure 3 is a transverse vertical section taken along the line 3—3 of Figure 1,

Figure 4 is a transverse vertical section taken along the line 4—4 of Figure 2, and

Figure 5 is a detail vertical section taken along the line 5—5 of Figure 4.

Referring first to Figures 1 and 2, 1 indicates the mail pieces which are placed in a horizontal stack on the transport chains 2 which move longitudinally along the bed or table 3. The chains move in response to the movements of a sensing member or feeder 4, as will be more fully described hereinafter.

As the mail pieces 1 reach the front end of the table 3 they are lifted singly from their position as seen in Figures 2 and 3 by a suction nozzle 5. This nozzle 5 has a range of movement from the position within the head 100 illustrated in Figure 3 to a position where it can contact the leading mail piece in the stack. It is connected to a source of low air pressure or vacuum so that contact with the leading mail piece in the stack lifts it away from the others in the stack. The nozzle transports the mail piece over the ledge 6. When the nozzle enters the head 100 the mail piece is dislodged from the nozzle by the walls of the opening 101 (Figure 1). In other words, the opening 101 is smaller than a mail piece so that when the nozzle withdraws into the opening the front of the opening stops the mail piece, thus breaking the vacuum. The mail piece then falls downwardly into the chute 7. Two air nozzles 84 and 85 play jets of air onto the mail piece being transported by the nozzle 5. The air jet from the nozzle 85 is directed laterally to separate the mail piece being picked off by the nozzle 5 from the adjacent mail piece which may adhere thereto, and the nozzle 84 has, as its principal function, the prevention of the opening of unsealed flaps of letters when the letter falls down the chute 7.

The nozzle 84 is supplied with air under pressure by a pipe 86 which is connected through a valve 79 (Figures 1 and 3) to a pressure line 88. The nozzle 85 is connected by a hose 87 through the valve 79 to the line 88. The valve 79 is intermittently opened and closed by a cam 80 which acts against a roller 81 mounted on a rocker arm 82. The rocker arm 82 is mounted at one end on a fixed pivot while the other end is pivotally connected to a link 83 connected to the valve.

As each individual mail piece drops down the chute 7 it falls between a transparent, flexible guiding strip 8, and the rear wall of the slot 7 then comes to rest in a trough 10. The strip 8 is anchored at one end to the head 100 and has its other end freely pressing against the rear wall of the slot 7. The dropped mail piece thus arrives at the position illustrated in Figure 2 where it is visible to the operator of the machine. He reads the address and routes the mail piece, for instance by pressing the keys of a keyboard (not shown). Each mail piece must come to rest at this point for an appreciable time so that it can

be read by an operator. Since the machine is operated at a speed such that a mail piece drops to the reading position at a rate of about 3,000 per hour, or almost one per second, it is essential that each piece comes to rest instantaneously upon arriving at the trough. If no means are provided to cause this to happen, the mail piece may bounce or dance, thus precluding the operator from reading it until it comes to rest. A portion of the time allowed for reading is thus lost to the operator. In order to prevent bouncing I form the rear wall of the chute 7 on a slight rearward incline and line it with sealskin 9. The hair of the skin is cut uniformly and placed so that the hairs point downwardly. Mail pieces falling along the skin and pressed thereagainst by the strip 8 come to rest in the trough 10 without bouncing. While it may be possible to use other friction materials to line the rear wall of the chute 7, I have tried many types and am convinced that the sealskin is superior for this purpose and, in fact, is the only one which has been entirely satisfactory.

Associated with the trough 10 is a chain 12, which engages the cog wheels 13, 13a, 14, 15 and 15a (Figures 2 and 3). This chain 12 has a finger 11 mounted thereon for movement parallel to the bottom of the trough 10. It transports the mail piece 1 along the trough to the right where it enters the holder 16. Each mail piece is then brought to a stop, the holder 16 rotates and then drops the mail piece into the chute 17 where it is received by a conveyor (not shown) for transport to a destination box according to the manipulation of the keys of the keyboard by the operator. The keyboard and the conveyor are not a part of this invention and hence are not illustrated.

The mechanism for rotating the holder 16 is shown in Figures 4 and 5 in which it will be seen that this holder is carried by a hollow shaft 66 journaled to rock in a bearing 67. The shaft 66 has an extension 68 which is pivotally attached to linkage 69, this linkage being pivotally attached at its lower end to a second rocker arm 70 carried by a rock shaft 71. As shown in Figure 5, the driven shaft 76 has a cam 74 mounted thereon. As the cam 74 rotates it depresses a rocker 72 by contact with a roller 73 mounted on the outer end thereof thus rocking the shaft 71 which rocks the rocker arm 70.

Centrally through the shaft 66 is a plunger shaft 61 which has an enlarged end which acts as a plunger and which is covered by a friction pad 59. This plunger moves axially, at intervals, in order to stop a mail piece as it arrives in the holder 16. The shaft 61, at its other end, has a pin therethrough in yoke engagement with one end of a rocker arm 62 mounted on a shaft 63, its other end having a roller 64 mounted thereon. The driven shaft 76 has a cam 65 mounted thereon which engages the roller 64 and which causes the intermittent actuation of the plunger shaft 61. It functions in timed relation with the movement of the finger 11 which delivers the mail piece to the holder 16.

The shaft 76 which has a sprocket wheel 77 for engagement by a chain 78 which is driven by a motor (not shown), also has a cam 58 which actuates the carrier nozzle 5, as will now be described. The nozzle 5 is mounted on an arm 5a which is mounted on a shaft 46. Journaled on the shaft 46 is an arm 54 pivotally attached to a fixed pin 55. Integral with the arm 54 is a depending arm 56 having a roller 57 mounted on the lower end thereof. The cam 58 contacts the roller 57 and during its rotation intermittently elevates the arm 54 and the carrier nozzle 5.

In addition to intermittent elevation, the nozzle 5 also has a simultaneous rocking movement. A rocker arm 47 fixedly mounted on the shaft 46 is pivotally attached at its upper end to a link 48 pivotally attached to a vertical arm 49. The arm 49 is in rigid operating contact with a rocker arm 49a fixedly mounted on a rock shaft 50. Also fixedly mounted on the shaft 50 is a rocker arm

51 having a roller 52 on the outer end thereof for engagement by the cam 53 on the shaft 76. Thus, as the cam 53 rotates it rocks the rocker arm 51 intermittently, thus rocking the shaft 50, the arms 49a, 49, the link 48, the rocker arm 47, the shaft 46 and the arm 5a. The carrier nozzle 5 is thus moved from the position within the head 100 as shown in Figure 3 to a position where it contacts the leading mail piece and back to its position within the head. As it picks the leading letter from the stack it elevates it over the apron 6 of the chute 7.

The actuating mechanism of the feeler 4 is best shown in Figure 3 in which it is seen that the feeler is mounted on an arm 18 pivoted intermediate its length on a fixed pin 19. The lower end of this arm is pivotally attached at 20 to one end of a link 21 having a slot at its other end which receives a pin 22. A rocker arm 23 carries the pin 22 at its upper end and is mounted on a rock shaft 23a at its lower end. Intermediate its ends the arm 23 carries a roller 24 for contact by a cam 25 driven by a sprocket wheel 26 and a chain 27. This chain overrides a second sprocket wheel 80 mounted on a driven shaft 80a.

The operation is as follows: As the cam 25 rotates it rocks the arm 23 on the shaft 23d, the roller 24 being urged into contact with the cam by the spring 28 which is anchored to the arm 23 at one end and to a fixed point at its other end. This movement causes reciprocating movement of the link 21 which rocks the arm 18 about the pin 19. If the mail pieces are contacted by the feeler 4 prior to the end of its travel it will stop thus lifting the roller 24 from contact with the cam. If the feeler does not find contact with a mail piece throughout its total maximum travel then a pin 29 carried thereby will contact a lever 30 of an electrical switch 31. This closes the circuit through a relay to an electric motor which drives the chain 2 through a small predetermined distance such as 1/8 inch. The details of the operating mechanism of the chain 2 is not a part of this invention and is not shown in detail.

Various modifications may be made without departing from the spirit of the invention, I therefore desire to be extended protection within the scope of the appended claims, wherein what I claim is:

1. In mail handling equipment wherein horizontally stacked mail pieces are transported to a selected point, a chute having the rear wall thereof inclined, means lifting the pieces individually from the stack and dropping them vertically into said chute an animal skin with the fur side exposed lining the lower portion of the rear wall of said chute whereby each said mail piece slides thereover during its fall, the hairs of said skin being directed downwardly thereby damping the bouncing of each said mail piece after its arrival at the bottom of the chute, said chute having the lower part of the front wall thereof removed, said mail pieces when coming to rest at the bottom of said chute presenting their addresses for inspection by an operator of said equipment.

2. In mail handling equipment wherein horizontally stacked mail pieces are transported to a selected point, a chute having the lower portion of the rear wall thereof inclined forwardly, means lifting the pieces from said stack and thereupon dropping them vertically, one at a time, into said chute, the lower part of said rear wall being lined with seal skin having a hair side exposed, said mail pieces each sliding over said skin on their way to the bottom of said chute, the hairs of said seal skin being directed downwardly and constituting means for preventing bouncing of each mail piece after its arrival at the bottom of said chute.

3. In mail handling equipment wherein horizontally stacked mail pieces are transported to a selected point, a chute means lifting the pieces individually from said stack and dropping them vertically into said chute, said chute having the lower portion of the rear wall thereof inclined forwardly, an animal skin lining for said lower portion

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having its hair side exposed and with the hairs thereof directed downwardly, a flexible transparent strip having one end anchored to the front wall of said chute and a free end pressing against said skin, the falling mail pieces passing between said skin and said strip and being damped thereby against bouncing, the lower portion of the front wall of said chute being removed whereby the addresses of said mail pieces may be read by an operator of the equipment upon arrival thereof at the bottom of said chute.

4. In mail handling equipment, a chute means transporting a stack of mail pieces to a predetermined point near the top of said chute, means progressively lifting the leading piece from said stack and dropping it into said chute, said chute having the lower portion of one wall lined with an animal skin having its hair side exposed, a flexible, transparent finger anchored to said chute at one end and having its other end freely pressing against the hair side of said skin, said mail pieces each falling between said skin and said finger, said hair side having the hairs directed downwardly whereby each said mail piece is precluded from bouncing upon arrival at the bottom of said chute, the lower portion of the front wall of said chute being omitted whereby each mail piece may be inspected by the operator of the equipment when it is at the bottom of the chute.

5. In mail handling equipment in which a horizontal stack of mail pieces is transported to a predetermined position, a vertical chute, a nozzle subjected to vacuum pressure, means causing said nozzle progressively to lift the leading mail piece from said stack and to transport each piece to a position above said chute, means dislodging each mail piece from said nozzle whereby it falls into said chute, said chute having the lower portion of its rear wall lined with an animal skin having the hair side exposed and with the hairs directed downwardly, a flexible finger having one end pressing against said hair side, mail pieces which fall down said chute passing between said finger and said hair side thereby being damped against bouncing after arrival at the bottom of said chute, the lower portion of the front wall of said chute being omitted whereby the mail pieces at the bottom of said chute may be inspected by an operator of said equipment.

6. The combination as set forth in claim 5 together with timed means periodically removing each mail piece from the bottom of said chute as said nozzle lifts another mail piece from said stack and drops it into said chute.

7. In mail handling equipment having a bed upon which a horizontal stack of mail pieces is placed, automatic means feeding said stack toward the front end of said bed, an arm pivotally mounted near said bed and having a nozzle on the end thereof subjected to vacuum pressures, means intermittently rocking said arm and moving said nozzle into contact with the leading mail piece of said stack, a chute, said means elevating and reversely rocking said arm and moving said nozzle with its mail piece to a position above said chute, means dislodging said mail piece from said nozzle while above said chute, a trough at the bottom of said chute receiving each mail piece as it is dropped by said nozzle, said mail pieces when in said trough being in position for inspection by an operator of said equipment, and timed means removing each mail piece horizontally from said trough pending the dropping of another mail piece into said chute by said nozzle.

8. In mail handling equipment wherein a stack of mail pieces is fed toward a selected point, means including a vacuum nozzle for picking said pieces individually and progressively from said stack, said means transporting each of said pieces to a position above an inspection point and releasing said pieces thereonto, means damping the bouncing and dancing of said pieces upon arrival at said inspection point, means transporting said pieces horizontally away from said point of inspection, a holder stopping and gripping each of said pieces as it leaves said point of inspection, means rotating said holder with its

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piece, and means causing said holder to release its piece after rotation whereby said piece falls into a vertical routing chute.

9. In mail handling equipment wherein a stack of mail pieces is fed toward a selected point, means including a vacuum nozzle for picking said pieces individually and progressively from said stack, said means transporting each of said pieces to a position above an inspection point and releasing said pieces thereonto, means damping the bouncing and dancing of said pieces upon arrival at said inspection point, means transporting said pieces horizontally away from said point of inspection, a holder into which said means are transported, timed means stopping and gripping each of said mail pieces upon arrival in said holder, and means rotating said holder through an arc of approximately ninety degrees, said timed means thereupon releasing said mail pieces whereby each one falls from said holder into a routing chute.

10. In mail handling equipment wherein a horizontal stack of mail pieces is placed on a bed, means responsive to the position of the leading piece in said stack causing movement of the entire stack toward a point of inspection, said chute, means comprising a vacuum nozzle progressively picking off the leading mail piece from said stack and dropping it into said chute, a trough at the bottom of said chute stopping said letter before the eyes of an operator for inspection, timed means removing said mail piece horizontally from the point of inspection, a holder receiving and gripping said mail piece as it leaves said point of inspection, and timed means rotating said holder and releasing its grip on said mail piece whereby said mail piece falls into a routing chute, said timed means also rotating said holder to its original position immediately upon release of said mail piece.

11. In mail handling equipment wherein a horizontal stack of mail pieces is placed on a bed, means responsive to the position of the leading mail piece in said stack causing movement of the entire stack toward a point of inspection, means including a vacuum nozzle for picking off the leading mail piece of said stack and for transporting it above a point of inspection, means directing a blast of air laterally against each of said mail pieces as it is being picked off said stack whereby a mail piece adhering to the leading mail piece is separated therefrom, a trough forming the point of inspection, said nozzle releasing said mail piece whereby it falls onto said trough, means damping the bouncing and dancing of said mail piece as it arrives in said trough, and means travelling horizontally across said point of inspection transporting said mail piece to a routing chute.

12. In mail handling equipment wherein a horizontal stack of mail pieces is placed on a bed, means responsive to the position of the leading mail piece in said stack causing movement of the entire stack toward a point of inspection, a trough, means including a vacuum nozzle for picking off the leading mail piece of said stack and for transporting it above said trough, means directing a blast of air laterally against each of said mail pieces as it is being picked off said stack whereby a mail piece adhering to the leading mail piece is separated therefrom, said nozzle releasing said mail piece whereby it falls onto said trough for inspection, means damping the bouncing and dancing of said mail piece as it arrives in said trough, a holder, timed means travelling horizontally above said trough pushing said mail piece away from the point of inspection and into said holder, said holder stopping said mail piece, and means rotating said holder through approximately ninety degrees and releasing said mail piece therefrom whereby said mail piece falls into a routing chute.

13. In mail handling equipment wherein a horizontal stack of mail pieces is placed on a bed, means responsive to the position of the leading piece of said stack causing small movements of said stack toward a point

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of inspection, means including a vacuum nozzle picking off the leading mail piece from said stack and transporting it to a position vertically above a point of inspection, means directing a blast of air laterally against said leading mail piece as it is being picked off by said nozzle thereby separating a mail piece adhering to the leading piece, a trough, said nozzle releasing said mail piece whereby it falls onto said trough for inspection by an operator, means directing a blast of air vertically onto said mail piece as it is released by said nozzle thereby preventing an unsealed flap of the mail piece from opening, means damping the bouncing of said mail piece as it arrives at said trough, timed means automatically removing said mail piece from said trough, and timed means directing said piece into a routing chute.

14. In mail handling equipment wherein a horizontal stack of mail pieces is placed on a bed, means responsive to the position of the leading piece of said stack causing small movements of said stack toward a point of inspection, a trough, means including a vacuum nozzle picking off the leading mail piece from said stack and transporting it to a position vertically above said trough, means directing a blast of air laterally against said leading mail piece as it is being picked off by said nozzle thereby separating a mail piece adhering to the leading piece, said nozzle releasing said mail piece whereby it falls onto said trough for inspection by an operator, means directing a blast of air vertically onto said mail piece as it is released by said nozzle thereby preventing an unsealed flap of the mail piece from opening, means damping the bouncing of said mail piece as it arrives at said trough, a holder, timed means movable horizontally above said trough transporting said mail piece from the point of inspection into said holder, gripping means associated with said holder stopping said mail piece therein, means rotating said holder through ninety degrees, and means releasing said gripping means whereby said mail piece falls from said holder into a routing chute.

15. In mail handling equipment wherein a horizontal stack of mail pieces is placed on a bed, means responsive to the position of the leading piece of said stack causing small movements of said stack toward a point of inspection, means including a vacuum nozzle picking off the leading mail piece from said stack and transporting it to a position vertically above a point of inspection, means directing a blast of air laterally against said leading mail piece as it is being picked off by said nozzle thereby separating a mail piece adhering to the leading

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piece, a trough, said nozzle releasing said mail piece whereby it falls into said trough for inspection by an operator, means directing a blast of air vertically onto said mail piece as it is released by said nozzle thereby preventing an unsealed flap of the mail piece from opening, a piece of sealskin having the hair side exposed and with the hairs directed downwardly placed immediately above and in rear of said trough, each mail piece sliding along said sealskin on its way to said trough, a transparent finger pressing each mail piece against said sealskin while in said trough thereby preventing the bouncing of said mail piece after arrival at its point of inspection in said trough, and timed means removing said mail piece from said trough and directing it toward a routing chute.

16. In mail handling equipment wherein a horizontal stack of mail pieces is placed on a bed, means responsive to the position of the leading piece of said stack causing small movements of said stack toward a point of inspection, means including a vacuum nozzle picking off the leading mail piece from said stack and transporting it to a position vertically above a point of inspection, means directing a blast of air laterally against said leading mail piece as it is being picked off by said nozzle thereby separating a mail piece adhering to the leading piece, a trough below said nozzle, said nozzle releasing said mail piece whereby it falls onto said trough for inspection by an operator, means directing a blast of air vertically onto said mail piece as it is released by said nozzle thereby preventing an unsealed flap of the mail piece from opening, a piece of sealskin having the hair side exposed and with the hairs directed downwardly placed immediately above and in rear of said trough, each mail piece sliding along said sealskin on its way to said trough, a transparent finger pressing each mail piece against said sealskin while in said trough thereby preventing the bouncing of said mail piece after arrival at its point of inspection in said trough, a holder, timed means transporting said mail piece along said trough and into said holder, gripping means associated with said holder stopping and holding each mail piece as it arrives therein, and means rotating said holder through a ninety degrees arc, said gripping means releasing said mail piece whereby it falls onto a routing chute.

References Cited in the file of this patent

UNITED STATES PATENTS

2,295,461 Federwitz ----- Sept. 8, 1942