United States Patent [19]

Russell et al.

[11] **3,764,049**

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[54] **ENVELOPE OPENING METHOD AND APPARATUS**

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[21] Appl. No.: **182,619**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 74,060, Sept. 21, 1970, which is a continuation-in-part of Ser. No. 817,619, April 16, 1969.

[52] **U.S. Cl.** **225/3,** 83/912, 225/4, 225/100, 225/106

[51] **Int. Cl.** **B26f 3/02**

[58] **Field of Search** ..... 225/2, 3, 4, 100, 225/99, 98, 106; 83/912; 53/3, 381 R

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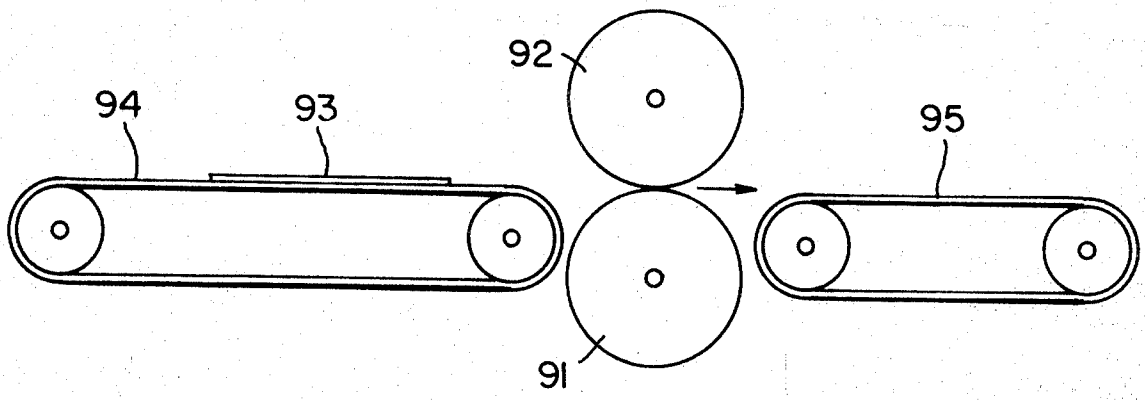
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Primary Examiner—Frank T. Yost
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[57] **ABSTRACT**

A method and apparatus for opening and exposing the contents of an envelope wherein one or more of the side or edge connections of the envelope have been preweakened. The method and apparatus applies a shearing force to the respective panels of the envelope to sever the preweakened edge connections to open and expose the contents. The frictional forces are created by elements which engage the opposite sides of the envelope. The engaging elements may both be moving elements or one of them may be static.

22 Claims, 9 Drawing Figures



5 Sheets-Sheet 1

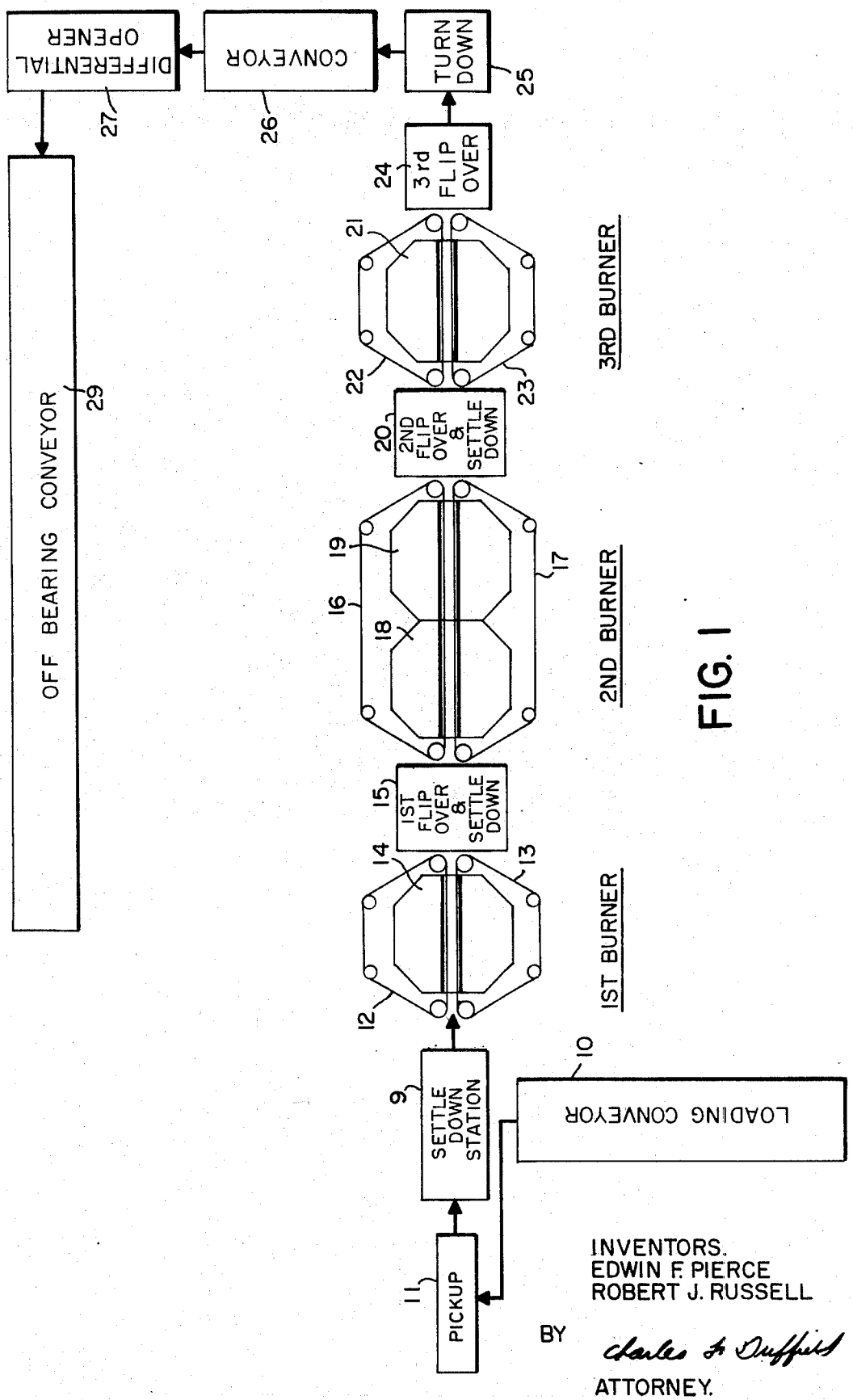


FIG. 1

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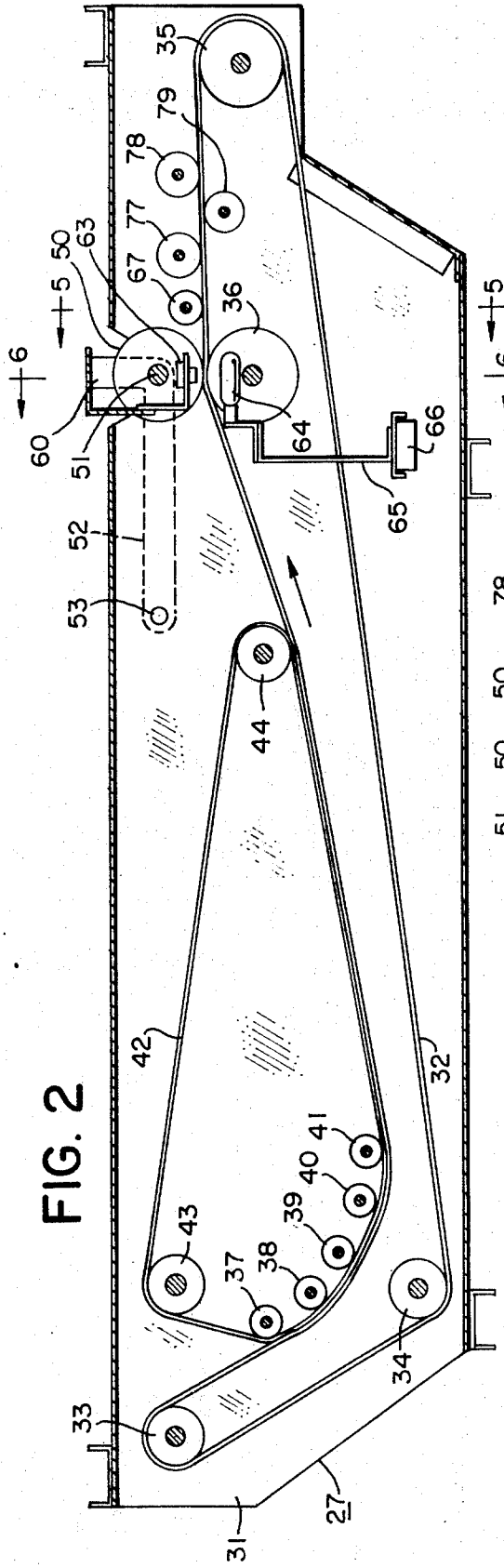


FIG. 2

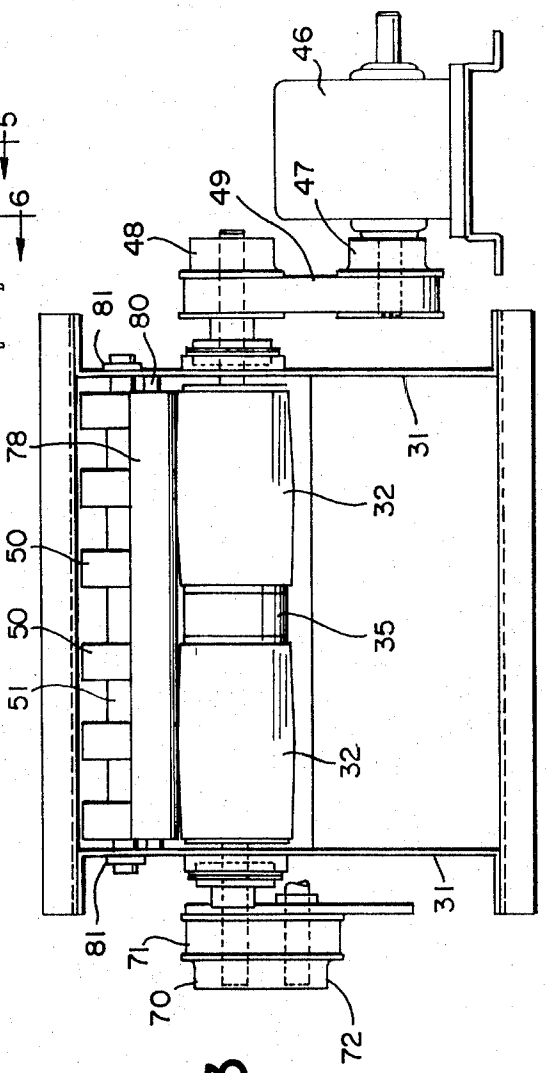
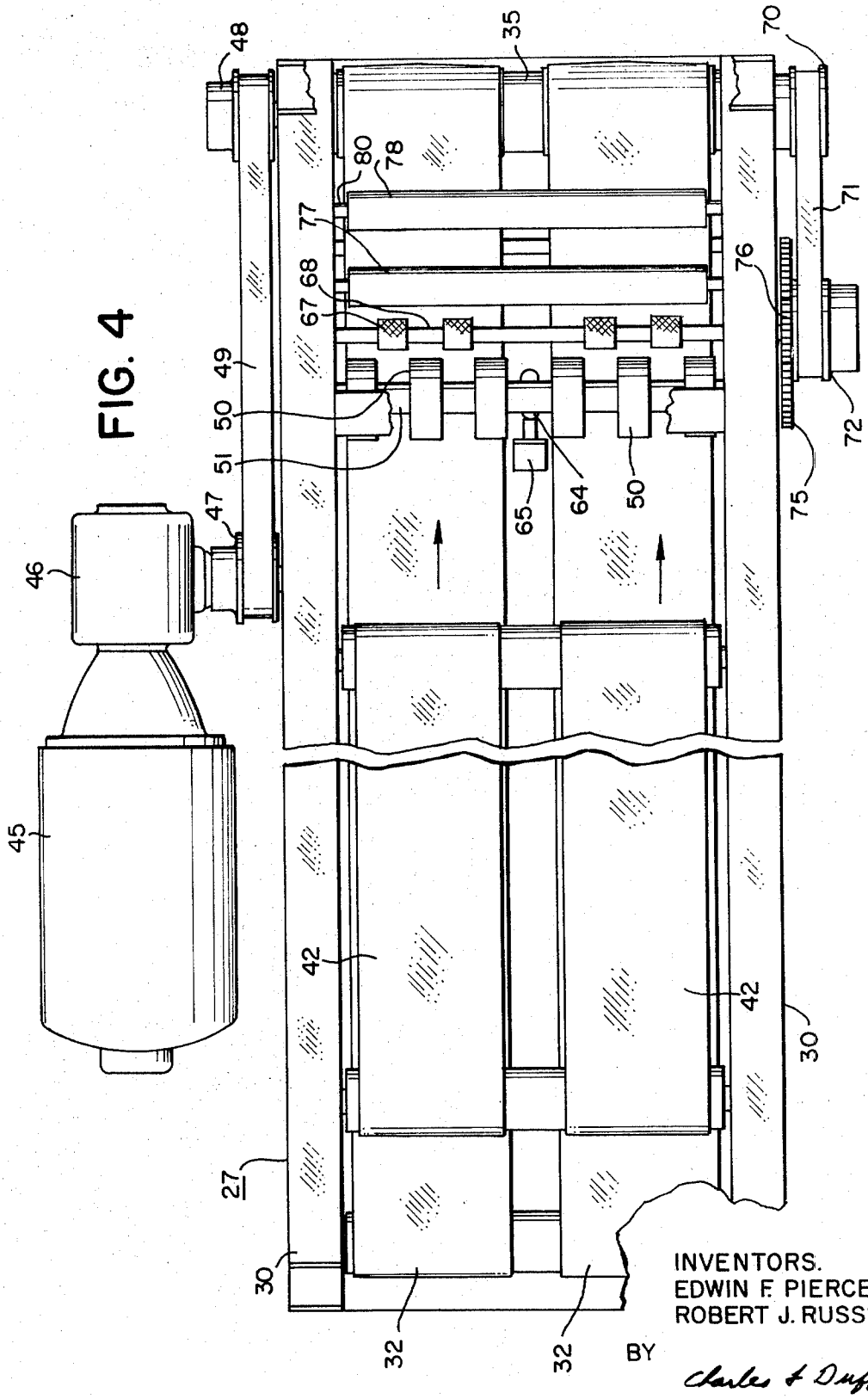


FIG. 3

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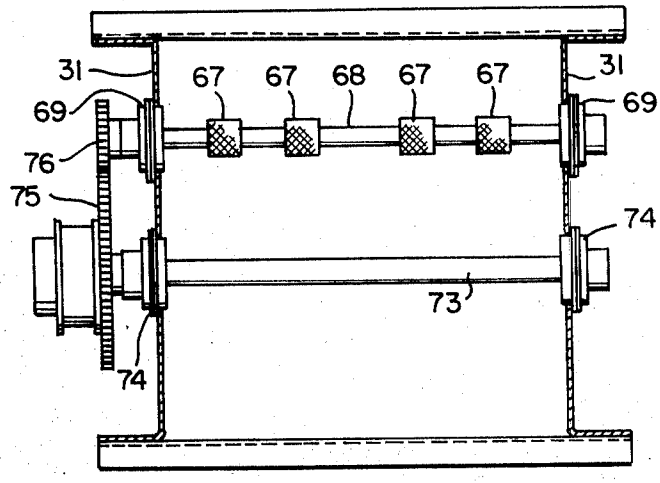
FIG. 4



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FIG. 5



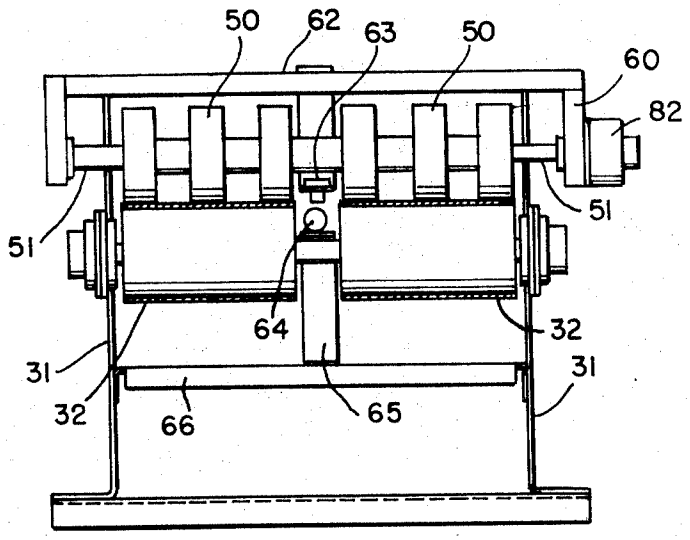


FIG. 6

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FIG. 7

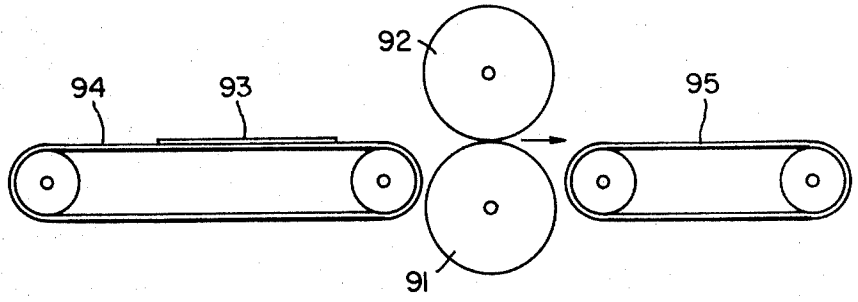


FIG. 8

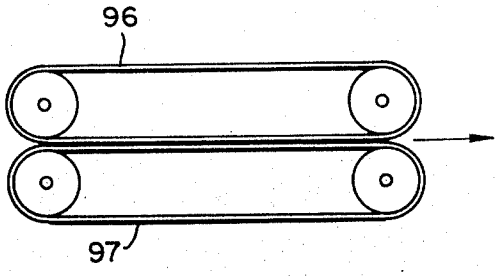
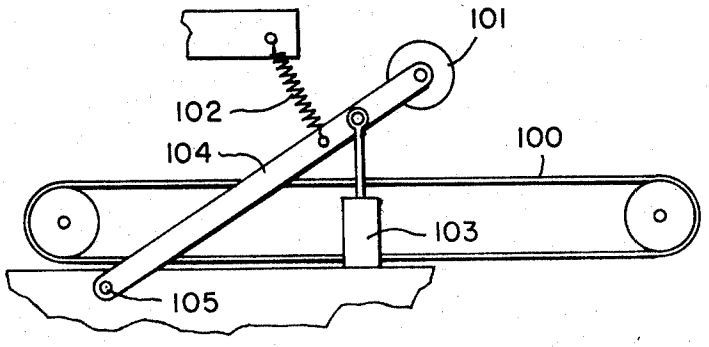


FIG. 9



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ENVELOPE OPENING METHOD AND APPARATUS

The present invention is concerned with methods and apparatus for opening envelopes and, particularly, to a method and apparatus by which the opposite sides of an envelope are subjected to shearing forces to sever preweakened edge connections of the sides of the envelope. The present application is a continuation-in-part of application Ser. No. 74,060 filed Sept. 21, 1970, which in turn, is a continuation-in-part of application Ser. No. 817,619 filed Apr. 16, 1969.

BACKGROUND OF INVENTION

Any business today, such as the large credit card companies, experience an extremely large volume of mail every week which needs to be opened. The apparently simple task of opening the envelopes becomes a rather major task and an extremely expensive one when large volumes of mail are involved. In some businesses, literally hundreds of thousands of pieces of mail are received weekly and must be physically opened by personnel.

A number of machines have been proposed to open mail and operate on a variety of different principles. For example, there are a number of machines which operate on the principle of cutters which slice one or more edges of the envelopes. One of the drawbacks of these machines is that, quite frequently the contents of the envelope are sliced as well.

Another type of apparatus is that of the abraiding type which, rather than slice the envelope, abraids the edge of the envelope, thus severing it. The problems inherent in this type of device are that the edges of the envelope must be straight or certain sections thereof will not be completely opened.

Common to all these prior devices is the fact that the envelopes are merely severed at their edges. The final task of opening the envelope to expose the contents is left to individuals once the abraiding or slicing operation is completed. None of the prior art devices fully treat the envelope to open the envelope to expose the contents thereof as a result of the overall operation.

SUMMARY AND OBJECTS OF INVENTION

The apparatus and method of opening envelopes of the present invention overcomes the problems of the prior art and completely and mechanically opens the envelope so as to expose the contents thereof. The opened envelope is then delivered on a conveyor to personnel who need merely remove the contents therefrom and need not be concerned with physically opening the envelope.

The envelopes which are employed in the apparatus and method of the present invention have one or more of their edges preweakened before passing through the apparatus of the present invention. This preweakening process may occur during the manufacture of the envelope and, consequently, the preweakened envelopes need only be fed into the apparatus of the present invention to be opened. However, if desired, the preweakening process can occur at the mail receiver's location immediately prior to the envelopes being passed into the apparatus of the present invention. A technique and machine for effecting such a process is disclosed in the applicant's co-pending U.S. Pat. application No. 74,060 and filed Sept. 21, 1970 and also in the applicant's patent 3,590,548 issued July 6, 1971.

In accordance with the applicant's invention, the preweakened envelopes are passed between engaging members which engage the respective sides of the envelope and exert a shearing force on the sides of the envelope to sever the preweakened edges thereof. One or more edges of the envelope may be preweakened in accordance with the invention.

The engaging elements which exert the shearing forces upon the sides of the envelope may be relatively rotating members such as belts, rollers, or a combination of both. Additionally, the shearing force may be exerted by one moving member and a static or stationary member which may be brought into intermittent contact with the opposite face of the envelope or exert a drag force against the opposite face.

Accordingly, it is an object of the present invention to provide apparatus and methods of opening an envelope wherein the edges have been preweakened by applying a shearing force to the opposite sides of the envelope to sever the preweakened edges thereof to expose the contents.

Other objects and advantages of the present invention will become apparent from the detailed description thereof, taken in conjunction with the drawings.

DESCRIPTION OF DRAWINGS

FIG. **1** is a diagramatic view of a complete envelope opening system within which the apparatus and method of the present invention may be employed;

FIG. **2** is a side sectional view of the envelope opening apparatus of the present invention;

FIG. **3** is an end view of the apparatus of FIG. **2**;

FIG. **4** is a top plan view of the envelope opening apparatus of the FIG. **2**;

FIG. **5** is a sectional end view taken along the line **5** — **5** of FIG. **2**;

FIG. **6** is a sectional end view taken along the line **6** — **6** of FIG. **2**;

FIG. **7** is a side view of another embodiment of envelope opening apparatus, according to the present invention;

FIG. **8** is a side view of a further embodiment of envelope opening apparatus according to the present invention; and

FIG. **9** is a side view of yet a further embodiment of envelope opening apparatus according to the present invention.

DETAILED DESCRIPTION OF INVENTION

The envelope opening apparatus and method of the present invention is concerned with performing certain operations on an envelope which has one or more sides thereof preweakened. The preweakening process may be performed during the manufacture of the envelope; for example, by perforation of one or more edges of the envelope. In this case, the envelope will be used in a normal manner and, when received at the addressee's point, will then be feed into and opened by the apparatus of the present invention.

In many instances, it will not be practical to have the envelopes perforated or otherwise preweakened in advance of mailing. In such situations, the envelopes will be preweakened at the point of receipt. Such a preweakening process may be by the heretofore known slitting or abraiding operation, whereupon they will be passed into the apparatus of the present invention.

Another way of preweakening one or more of the edges of the envelope preparatory to use in the invention of the present invention is by means of the apparatus disclosed in the applicant's co-pending application Ser. No. 74,060 and also as that described in the applicant's U.S. Pat. No. 3,590,548. Such a process is diagrammatically shown in FIG. **1.** In this process, the envelopes to be opened are loaded onto a loading conveyor **10.** A pick-up mechanism removes the envelopes from the loading conveyor and passes them to a settle-down station **9.** The settle-down station **9** preferably orientates the envelopes in respect to a first burner assembly **14.** The settle-down station **9** operates in sequence with the pick-up mechanism **11** and moves the envelop into the opposed belts **12** and **13** in sequence with the next delivery of an envelope to the settle down station by the pick-up mechanism.

The loading conveyor **10** and pick-up mechanism **11** are so arranged that the envelopes are fed into the opposed belts standing on one of their two shorter edges. As the belts move, the envelopes through the burner **14,** the edges thereof are carbonized and weakened by passing through a burner assembly within which hot air and/or radiated energy are directed against the edge of the envelope. The heating of the edges of the envelope will carbonize and weaken the edges of the envelope.

The weakened envelope is then moved by conveyor belts **12** and **13** into a first flip-over and settle-down mechanism **15.** The flip-over mechanism **15** is actuated by a photo-electric device upon the presence of any envelope and rotates the envelope through 90°. Upon the envelope being rotated through 90°, the next adjacent elongate edge of the envelope passes through a second pair of opposed conveyor belts **16** and **17.** The conveyor belts **16** and **17** carry the envelope through a double set of burner assemblies **18** and **19.** The elongate end edges are then carbonized in the same manner as the first edge in the burner assembly **14.**

Two burners, **18** and **19,** are required for the elongate edge to maintain the flow rate through these burners without interference with the following envelopes, inasmuch as the elongated edges are approximately twice the length of the shorter edges thereof. The speed of belts **16** and **17** are adjusted accordingly.

On the envelope completing its passage of the double burner assembly **18** and **19,** it is then passed into a second flip-over and settle-down mechanism **20** which is identical to the first flip-over and settle-down mechanism **15.** In the second flip-over **20,** the envelopes are then again rotated and passed into a third burner assembly **21.** At the completion of the second flip-over, the next adjacent shortened edge of the envelope is presented to the third burner assembly. The envelope is then carried through the third burner assembly by a third set of opposed belts **22** and **23** and delivered to a third flip-over mechanism **24.**

The third flip-over mechanism **24** operates in an identical manner to that of the first and second flip-over mechanism **15** and **20** respectively. Upon the envelope passing the third flip-over mechanism, its uncarbonized edge is then turned down and the envelope fed into a turn-down mechanism **25.** The turn-down mechanism engages the envelope and lowers it to a conveyor **26.** The envelope, at this time, is in such a disposition that its unburned edge is trailing on the conveyor **26.** The envelopes, so arranged, are then passed into the differential opener **27** of the present invention. The differential opener **27** will, in accordance with the present invention, impose shearing forces upon the respective sides of the envelope severing the sides or panels of the envelope at the preweakened edges and lay back the sides of the envelope exposing the contents thereof. After this operation, the envelope and its exposed contents are moved onto an off-bearing conveyor **29,** whereupon personnel remove the contents and properly catalog and file them.

The details of one of the embodiments of the differential assembly of the present invention are shown in FIGS. **2 – 6** of the drawings. As best seen in FIGS. **2** and **4,** the differential opener **27** includes side rails **30** which secure into place side plates **31** (one only shown in FIG. **2**). The side rails **30** and side plates **31** form the carriage within, which the operating mechanism of the differential conveyor is supported.

Supported between side plates **31** is a pair of continuous belts **32.** The belts **32** form a closed loop around idler pulleys **33, 34,** drive pulley **35,** differential roller idler **36,** common idler pulleys **37 – 41** and idler pulley **33.** Likewise, a second continuous pair of belts **42** form a closed path around idler pulleys **43** and **44,** and common idler pulleys **37 – 41.**

The convergence of belts **32** and **42** between idler pulleys **33** and **43** forms a feed hooper into which the envelopes are delivered, one at a time, preparatory to opening. The envelopes may be fed into this feed hooper by the conveyor **26** of the envelope preweakening apparatus shown in FIG. **1.** However, the differential opener may also be fed envelopes by any number of available feeding apparatus' suitable for inserting the envelopes, one at a time, into the hopper. Such would be the case where envelopes preweakened prior to mailing are opened in the apparatus.

Refering to FIG. **4,** a drive motor **45** operating through a gear reduction unit **46** operates, through a pair of pulleys **47, 48** and drive belt **49** to propel the drive pulley **35.** As the drive pulley **35** rotates, the belts **32** will be moved in the direction of the arrow. As this occurs, envelopes which are fed into the hooper formed by the convergence of the belts **32** and **42,** will be moved between the belts toward the differential opening station.

The differential opening station, as best shown in FIGS. **2, 4** and **6,** employ a differential roller **50.** As can best be seen in FIGS. **4** and **6,** the roller **50** includes a plurality of rollers journaled upon a shaft **51.** As may be seen in FIG. **2,** the ends of the shaft **51** are secured into floating arms **52** at either side of the side plates **31.** The end of the arms **52,** opposite the point at which the shaft **51** is journaled, is pivoted on a shaft **53** secured in the side plates **31.** This arrangement will permit the differential rollers **50** to float up and down in respect to the belts **32** to accommodate for varying thicknesses of envelopes passing between the roller **50** and the differential belts **32.**

Refering to FIG. **2,** the arms **52** include vertical extensions **60.** A bridge **62** (FIG. **6**) between these extensions provides a support for a photocell **63.** The photocell **63** is positioned between the parallel belts **32.** Positioned beneath the photocell **63** is a light source **64** carried by a supporting member **65** secured to a cross brace **66.**

As best seen in FIG. **5,** a plurality of narrow rollers **67** are provided. These rollers **67** are carried by a shaft **68** which is suitably journaled in side plates **31** by bear-

ing arrangements **69.** The rollers **67** are positioned adjacent the exit of the differential rollers **50** and will function as hereinafter described. Drive pulley **35,** which drives the belts **32** also drives pulley **70** at one end of the shaft. The pulley **70,** in turn drives a belt **71** which operates a driven pulley **72** which is journaled on idler shaft **73** by means of bearings **74** at either end of the shaft which is anchored into the side plates **31.** A spur gear **75** connected to the driven shaft **73** operates a mating spur gear **76** which is keyed to the shaft **68** to drive the narrow rollers **67.** The belt and gear ratio in the drive arrangement for the narrow rollers is such that the narrow rollers will operate with a surface speed approximately that of the belt **32** when in operation.

Positioned adjacent to and following the narrow rollers **67** are a plurality of ironing rollers **77, 78** and **79** (FIG. **2**). Two of the rollers, **77** and **78** are disposed above the belt while the roller **79** is disposed below belt **32** and itermediate the axis of the rollers **77** and **78.** All three rollers are journaled on their shafts **80** at either end by a suitable bearing means **81** secured in the side plates **31** of the differential opening assembly. An end view of the roller **78** and its shaft and bearing arrangement is shown in FIG. **3.** The rollers are arranged in their axial displacement such that the surfaces of the rollers engage the belt **32** with a slight interference for the purpose to be hereinafter described.

As best shown in FIG. **6,** the shaft **51** which carries differential rollers **50** terminates in an electric brake **82.** The brake **82** is of the type in which the housing of the brake is secured to the one of the support arms **52** which carry the differential roller assembly. The shaft **51** is secured to a brake disc within the brake assembly **82.** The brake disc is free to revolve in the housing of the brake assembly so long as the assembly is not energized. Whenever the brake assembly is energized, a magnetic solenoid will engage the brake disc introducing a drag force or locking the shaft **51** depending upon the setting of the brake.

In operation, as best may be appreciated from viewing FIG. **2,** an envelope will be dropped into the hopper between the idler pulleys **33** and **43** with the preweakened edge leading. The belts **32** are driven in the direction of the arrow and will thus convey the envelope between the belts **32** and belts **42** toward and into the differential opening station. The interference and friction between the belts **42** with the belts **32** will cause the belts **42** to move along with the belts **32.** At the differential station, the envelope with its preweakened edge leading, will pass between the differential rollers **50** while disposed on the conveyor belt **32.** The differential supporting roller **36** disposed below the belt **32** will give a firm foundation for the belt **32** against which the differential rollers **50** will press.

The photocell **63** will sense the appearance of the leading edge of the envelope at the differential station inasmuch as the leading edge will break the light beam from the light source **64.** When the envelope is first sensed at the differential station, a control signal is generated which is fed to the differential brake assembly **82.** The brake **82** will then become engaged creating a drag force or locking the differential rollers **50** depending upon the desired setting of the brake. As this occurs, the top portion of the envelope will have exerted on it a shearing force relative to the bottom face of the envelope. The shearing forces are exerted along the preweakened leading and side edges of the envelope and will break the preweakened connections of the edges of the envelope.

The brake assembly **82** is maintained engaged only for a short predetermined period of time. This time period is adjusted such that the top panel of the envelope will be broken and displaced slightly backwards in the open direction from the bottom face of the envelope. Once this position has been obtained, the brake is released. By this time, the leading edge of the envelope and the contents therein have reached the narrow nip rollers **67.**

The function of the narrow rollers **67** are to grip the leading edge of the envelope and pull it on through with the belt **32.** The top panel which was broken and pulled back slightly by the differential roller **50** will be pulled beneath the roller **50** whereupon it will be laid back in a trailing position at the front panel and contents of the envelope pass beneath the nip roller **67.**

The envelope which has been opened now passes between the ironing rollers **77, 78** and **79.** The interference positioning of the ironing rollers creates a reverse bending effect on the envelope and its contents to iron out or straighten any of the contents which may have become bent in passing through the differential station.

After the envelopes have passed through the ironing station, they are then conveyed by the belt **32** to the off bearing conveyor **29** as shown in FIG. **1.** The conveyor **29** is an elongate conveyor about which a number of personnel are disposed. As the envelopes pass in their opened state, the contents thereof are picked off and properly sorted and filed.

The belts **32** and **42** are preferably fiber reinforced rubber belts. Likewise, the rollers **36** and **50** are preferably of a rubber or rubber like composition in order to generate the proper frictional engagement between the rollers and the belts. The knurled roller **67** is preferably a steel roller with a knurled finish therein to give a good gripping action on the envelope and the rollers. The ironing rollers **77, 78** and **79** may be of a soft rubber composition.

From the foregoing description of one embodiment of the invention, it will be appreciated that it is fundamental in the present apparatus and method of opening envelopes that one or more sides thereof be preweakened and the opening be accomplished by engaging the opposite sides of the envelope and applying a shearing force thereto generally co-planner with the sides of the envelope. The apparatus above described is one apparatus for accomplishing this purpose. Other variations and modification of the described apparatus will now become apparent to those skilled in the art and may be employed to practice the inventive concept. Examples of such apparatus are shown in FIGS. **7 – 9.**

For example, as shown in FIG. **7,** two opposed rollers **91** and **92** may be employed to create the shearing force. The envelope **93** can be delivered to the rollers by a first conveyor belt **94** while a second conveyor belt **95** picks up the opened envelopes at their exit from the differential rollers.

Likewise, as shown in FIG. **8,** two opposed belts, **96** and **97** may be employed to create the shearing forces. In this modification, the shearing forces are applied to the entirety of both sides of the envelope.

Yet another modification of the apparatus which may employ the inventative concept of the present invention is that shown in FIG. **9.** In this embodiment, belt **100** carries the envelope beneath a drag roller **101.** A

spring mechanism **102** maintains the roller **101** out of engagement with the envelope until a predetermined position of the envelope with respect to the roller **101** is reached. At that point, a solenoid **103** is energized which brings the drag roller **101** into contact with the upper surface of the envelope for a predetermined time. This intermittant action will create a quick but definite shearing force on the edge of the envelope cracking or opening the envelope and pulling back the top edge thereof after which the envelope is released. The roller **101** may be completely fixed against rotation or employ an internal drag brake depending on the nature of the envelope to be opened. A suitable pivot arm **104** is anchored at a pivot point **105** to provide the intermittent action of the roller **101.**

From the foregoing, it will be appreciated that the relatively rotating members which practice the inventative concept and method may take many forms. The relatively rotating members may both be rollers, both be belts, or a combination of one belt and one roller. Additionally, it is contemplated that a plurality of rollers and belts may be arranged in a number of configurations to practice the invention.

The shearing forces created by the relatively rotating members may be created by operating the members at different speeds in the same surface direction, or one of the members may be operated in the opposite direction. Additionally, it will be appreciated from the above description that one of the members may be driven while the other member follows the driven member in contact with the upper surface of the envelope and applies a brake or drag force wherein the rotating member may be completely stopped or merely dragged on the surface of the envelope. Likewise, the shearing force developed by the relatively moving members may be a constant shearing force or the force may be intermittently applied as in the case of the energized breaking action.

The position of the relatively moving members to one another is a matter of choice depending upon the type of envelopes being opened. For example, the relatively moving members, such as rollers, may operate in a position from an interference with each other to a positive spacing between the rollers depending upon the thickness of the envelope being opened. Likewise, as in the embodiment of FIGS. **2 – 6,** one of the relatively moving members may be free to float against a bias to accommodate for varying thicknesses. Thirdly, the relatively moving members may be brought into contact with each other intermittently as in the case of FIG. **9.**

It is also apparent from the foregoing that the shearing forces applied to the sides of the envelope may be created by engaging all or only portions of one or both sides of the envelope. The embodiment of FIGS. **2 – 6** engages only a portion of the upper surface with the drag brake for a momentary period of time. In this embodiment, only a portion of the edge of one side of the envelope is engaged while the entire underneath side of the opposite side is engaged. In the embodiment of FIG. **8,** the shearing forces are applied to the entirely of both sides of the envelope to effect the differential action. Accordingly, it will be obvious that the extent to which the shearing forces are applied to the respective sides of the envelope will vary depending upon the application but will be within the inventative concept expressed herein.

It is also contemplated within the realm of the present invention that the preweakening process may take different forms as, for example, by carbonization as described, by abraiding, or by slitting. Additionally, such preweakening processes as perforating or scoring of the edges of the envelope may be employed. It is likewise contemplated that the preweakened envelopes which are applicable for use in the present invention may employ two different forms of preweakening on the same envelope. For example, envelopes which are perforated or scored at their short edges at the time of manufacture may be employed. Such an envelope, when received, could then be passed through a conventional slitter or abraider which will weaken one of the long edges of the envelope. Thereafter, the envelopes could be fed through the differential opener of the present invention to shear the perforated shorter edges thereof and open the one side of the envelope to expose the contents.

All of the foregoing modifications are by way of example only are not intended to be limiting of the invention. Other variations and modifications will become apparent to those skilled in the art in view of the foregoing description of the invention. Accordingly, the scope of the invention is not intended to be limited to the described modifications and variations but is to be that expressed in the claims.

We claim:

1. The method of opening an envelope having a pair of flexible facing panels secured together along adjacent pairs of edges by weakened connections, which method comprises, applying generally opposite forces to respective panels generally co-planar with the respective panels to sever the weakened connections.

2. The method of opening envelopes according to claim **1,** further characterized by applying said forces by frictionally engaging said panels.

3. The method of opening an envelope according to claim **1,** further characterized in effecting said frictional engagement by engaging said panels with relatively rotating members having different surface speeds.

4. Apparatus for opening an envelope by applying generally opposite forces to opposite faces of an envelope, said apparatus comprising frictional backing means for frictionally engaging one face of an envelope disposed thereagainst and frictionally rotating means adjacent to and spaced from said backing means for frictionally engaging the other face of an envelope of said backing means and mounting means for mounting said frictional rotating means relative to said backing means for applying generally opposite forces in respective faces of an envelope substantially co-planner with the envelope facing.

5. Apparatus for opening an envelope according to claim **4,** said backing means comprising a conveyor belt for moving the envelope through and beyond frictional engagement with said rotating means.

6. Apparatus for opening an envelope according to claim **5,** said rotating means comprising a roll having its axis or rotation parallel to that of said conveyor belt.

7. A differential roller assembly for opening envelopes having three edges thereof preweakened comprising:

a first conveyor belt for carrying the envelope through the assembly;

a roller disposed above and in engagement with the conveyor means and between which the envelope passes during opening thereof;

brake means connected to the roller for selectively applying the braking action to the roller, and;

means responsive to the appearance of an envelope within the opening mechanism to apply the brake to the roller for a predetermined period of time to create a shearing force on the opposed sides of the envelope to roll back one end thereof exposing the contents.

8. A mail opening apparatus comprising;

a first rotating member;

a second rotating member rotating at a speed different than the first member, and;

means for passing envelopes between said rotating members whereby shearing forces will be exerted on the opposite panels thereof to sever the preweakened edges of the envelope to expose the contents thereof.

9. The method of opening an envelope having opposed side panels and edges connecting the side panels where one or more of the edges have been preweakened comprising:

operating a first member at a given surface speed;

operating a second member at a surface speed different than the first member and in close proximity to said first member, and;

passing the envelope to be opened between said first and second members to generate shearing forces along the preweakened edges thereof to burst the envelope open.

10. The method of opening envelopes comprising;

preweakening one or more edges of the envelopes;

engaging one panel of the envelope with a first frictional engaging element;

engaging the opposite panel of the envelope with a second frictionally engaging element, and;

applying a differential force to said preweakened edges to shear the edges resulting in opening and exposing the contents of the envelope.

11. Apparatus for opening respective faces of an envelope by applying a differential shearing force to the respective edges thereof comprising:

a first engaging member for contacting at least a portion of one panel of the envelope;

a second engaging member supported for engagement with at least a portion of the opposite panel of the envelope, and;

means innerconnecting said first and second engaging elements to apply said elements to the respective faces of the envelope to generate co-planar shearing forces on the respective panels of the envelope to sever the edges thereof to expose the contents.

12. The apparatus of claim **11** wherein the first and second engaging members are members driven in the same direction but at different surfaces speeds.

13. The apparatus of claim **11** wherein the first and second engaging members are driven in generally opposite directions from one another at the point of engagement with the respective faces of the envelope.

14. The apparatus of claim **11** wherein one of the engaging members is stopped and the other moves at a surface speed relative to the other at the point of engagement with the respective faces of the envelope.

15. The apparatus of claim **11** wherein the first and second engaging members move relative to one another at the point of engagement with the respective faces of the envelope and intermittently change relative speeds to effect the shearing action between the respective faces of the envelope.

16. The apparatus of claim **11** wherein the first and second engaging members are both rollers operating in close proximity to one another.

17. The apparatus of claim **11** wherein the first and second engaging members are both belts running in close proximity to one another.

18. The apparatus of claim **11** wherein the first and second engaging members are a belt and a roller operating in a close proximity to one another.

19. The apparatus of claim **11** wherein one of said engaging members engages only the opposite outside edges of the envelope.

20. The apparatus of claim **11** wherein one of said engaging members is supported with respect to the other to vary the spacing therebetween in accordance with the thickness of the envelope passing between the engaging members.

21. The apparatus of claim **11** wherein one of said engaging members is supported above the other engaging member until appearance of an envelope between the engaging members and further including means responsive to the appearance of the envelope to bring the engaging members into contact with the faces of the envelope to effect the shearing forces.

22. The apparatus of claim **11** wherein the first engaging member operates at a given surface speed and engages one face of the envelope to carry the envelope along therewith and wherein the second engaging member is a relatively rotating member having a drag force exerted thereon and which engages the opposite face of the envelope to exert a shearing force to open the envelope.

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