Sept. 2, 1969 H. R. DAY 3,464,621

SHEET MATERIAL SEPARATION DEVICE

Filed April 24, 1967

FIG. 1

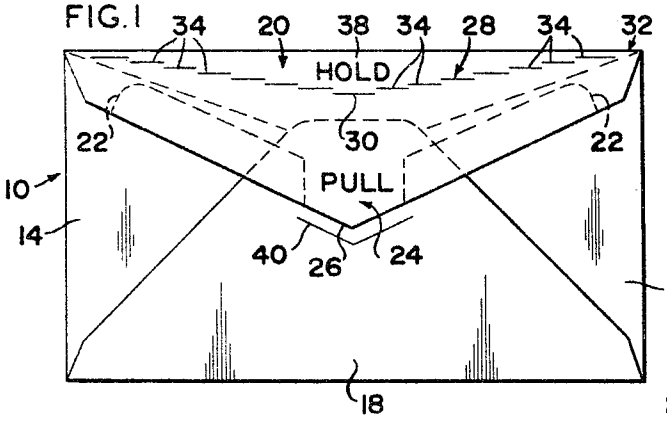


FIG. 4

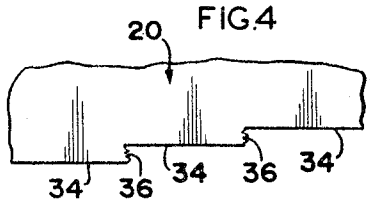


FIG. 2

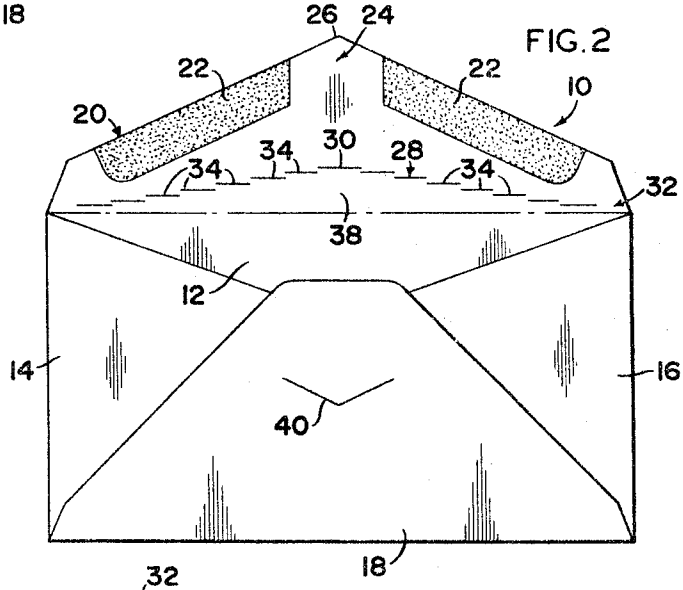


FIG. 5

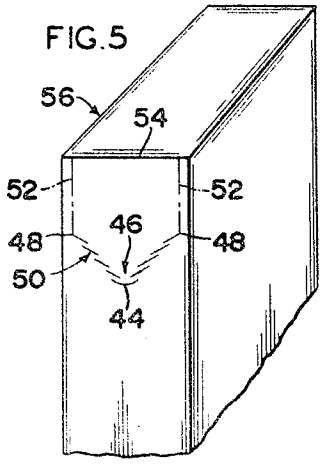


FIG. 3

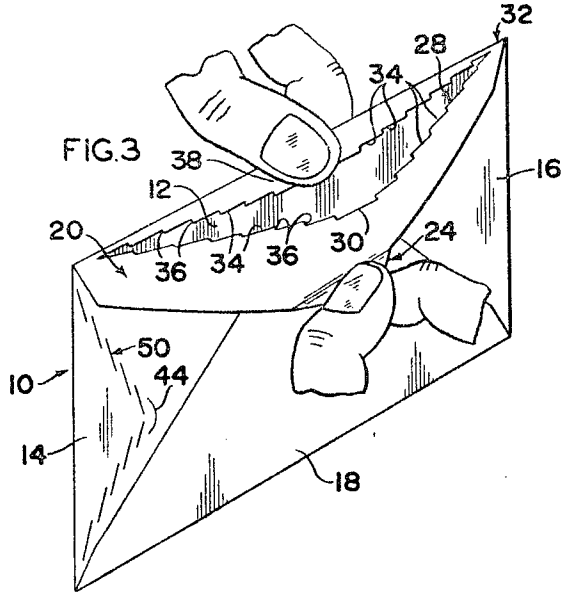
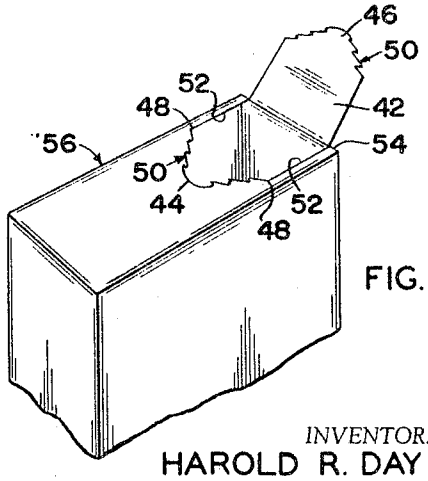


FIG. 6



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SHEET MATERIAL SEPARATION DEVICE

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ABSTRACT OF THE DISCLOSURE

An easy opening envelope having a bidirectionally oriented zone of weakness extending across the flap between the glue line and the envelope edge to which the flap is fastened, and with a pull tab adjacent to the free edge of the flap. A succession of staggered scores provides controlled tear in the zone of weakness. The staggered score with integral flap is also applicable as a sheet material separation device.

This invention broadly relates to a controlled, easy tear paper separating device. More particularly, this invention relates to an easy opening envelope, used as for example as return bill envelopes for check payment remittances and the like.

THE PROBLEM

The opening of large quantities of envelopes of the bill return type poses, among others, the following problems. As the envelopes are received in the mail room by the clerks, they are conventionally sorted and stacked for processing by a power slitter, or by hand. When a power slitter is used, the clerk must then stand in line and wait a turn for slitter time to have the stack of envelopes slitted and opened. One disadvantage of a slitter is that it will occassionally mangle either the envelope or its contents. If the contents are cut, in addition to the envelope, this means that the clerk must tape the contents back together, and of course, as will be evident to those skilled in the art, this takes time, which costs money and reduces clerical efficiency.

Additionally, the power slitter produces a very sharp, razor-like edge. As a result, many painful finger cuts result from these sharp edges as the clerk reaches into the slitted envelope to remove the contents.

From the foregoing it will be evident that the present power-slitting procedure is time consuming, causes waste in the form of mangled envelopes and/or contents and time for repair, and produces many cut fingers in removing the contents.

When envelopes are opened by a manual slitter, essentially the same problems arise, as discussed relative to the power-driven mechanical slitter. Thus, the clerk must manually open each envelope, which sometimes results in mangled contents, and put the letter opener down and remove the contents. Thus, the procedure is time consuming, cumbersome and inefficient.

Therefore, a novel, easy opening envelope that could simply be pulled open manually, at a rapid rate, and avoid the foregoing problems of prior slitters would provide a substantial advance to the art.

Further, a novel easy opening envelope which would make it possible for the opening operation and the contents removal operation to be substantially a single and simultaneous movement, would provide a substantial advance to the art.

Further, an envelope that would provide a high speed and efficient opening operation, equaling or surpassing the rate of a comparable mechanical slitter operation would provide a substantial advance to the art.

Further, an easy tear device for paper or the like, broadly applicable to the opening of packages—analogous to letter opening—that would obviate mechanical openers and provide high speed, and efficiency equivalent or superior to mechanical opening would provide a substantial advance to the art.

Accordingly it is an important object of the present invention to provide a novel envelope that is so constructed as to enable it to be readily opened without the use of a mechanical slitter or other bladed instrument.

A further object is to provide an envelope having an elongated zone of weakness producing a tear path, adjacent to a pull tab, thereby providing a quick opening feature.

A further object is to provide an easy opening envelope by supplemental or simultaneous operation on a standard envelope during its manufacture, so that a great improvement to the functionality of the envelope is provided at substantially no increase in cost.

A still further and broader object is to provide an easy opening sheet material separation device, applicable to a broad variety of uses.

These and other objects of the invention will appear in the following description and appended claim, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

FIGURE 1 is a rear elevational view of an envelope embodying the present invention, showing the flap of the envelope in sealed position;

FIGURE 2 is an elevational view similar to FIGURE 1, with the flap of the envelope in a raised position;

FIGURE 3 is a rear perspective view of the envelope as it is being manually opened;

FIGURE 4 is an enlarged, fragmentary view illustrating in detail the staggered score zone of weakness, comprising an important part of the invention;

FIGURE 5 is a plan view of the invention in another aspect, as applied to provide a tear open tab in substantially any kind of manually rupturable sheet material, such as cardboard, soft metal sheets and the like; and

FIGURE 6 is a perspective view of a box having the embodiment of FIGURE 5 incorporated therein to provide an opening tab and a pour spout.

Before specifically describing the envelopes here illustrated in detail for the disclosure of the present invention, it is to be understood that envelopes and sheet materials embodying the invention may take various forms, and the invention is not to be limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the terminology and the phraseology used herein are for the purposes of description and not of limitation, as the scope of the invention is denoted by the appended claim.

In accordance with its broadest aspects, the present invention provides an easy opening device for a broad variety of sheet materials, and is advantageously applicable to envelopes.

An important feature of novelty of the invention is the score pattern which produces accurately controlled directional opening, obviating wild tears and difficult opening as encountered in the prior art.

A further important feature of novelty of the invention is that the invention provides fast and efficient ease of opening where an opening operation is repeated, as in the practice of opening a large number of return bill envelopes.

RELEVANCE TO THE PRIOR ART

The present invention is somewhat analogous in application (not principle) to my previously issued Patent No. 3,051,371, dated Aug. 28, 1962. However, the present invention is clearly distinguishable from the prior patent in that it uses an entirely different score pattern and produces greatly improved opening efficiency and directional control.

In the prior patent, an interrupted line of scoring, or line perforation was employed. In order to reduce, but still not entirely eliminate wild runs during the opening, it was necessary that the score interruptions (nonscored portions) be made very small and be present in minor amount, else opening was fraught by wild tear runs, incomplete opening, and extremely difficult opening.

By the present invention, a very substantial improvement is provided by a particular staggered score pattern which is so constructed as to absolutely eliminate wild tear runs while at the same time providing greatly improved ease of opening.

Further, the score pattern is oriented in a particular manner, in the direction of the desired tear, so as to direct the tear in a controlled manner.

As the following description develops, the crisp manner of improvement by the present invention over the art will be made clearly apparent. For purposes of comparison, reference is hereby made to my prior Patent 3,051,371.

THE INVENTION IN DETAIL

Referring now to the drawings, and more particularly to FIGURES 1 and 2, the present invention is shown embodied into an envelope **10**. As is standard practice in the industry, the envelope **10** is made from a single, die-cut sheet of paper that is automatically folded on folding machinery into the configuration shown. Thus, there is a rectangular front panel **12** and four generally triangular back flaps **14**, **16**, **18** and **20**, which make up the back side of the envelope. The flaps **14** and **16** are end flaps and these are folded inwardly from the side or end edges of the rectangular front panel **12** so as to overlie the rear surface thereof. The flap **18** is a bottom flap and is folded upwardly from the bottom edge of the front panel **12** to also overlie the rear surface thereof. The bottom flap **18** also overlies the lower edge portions of the flaps **14** and **16**. The upper edge of the bottom flap **18** is adhesively secured to the lower edges of each of the end flaps **14** and **16** which provides the envelope with an upwardly opening pocket for contents.

The flap **20** is the top or sealing flap, which is folded down from the top edge of the front panel **12** and also overlies the rear surface of the front panel.

The top or sealing flap **20** is so proportioned with respect to the other three flaps **14**, **16** and **18**, that when it is folded down for closing of the envelope, the lower edge portion overlies the upper edge portions of the other three flaps, as best shown in FIGURE 1.

In order to seal the envelope **10**, the inside of the lower edge portion of the sealing flap **20** is provided with a suitable adhesive pattern **22**. The manner of adhesive application, however, departs from the standard envelope practice in that the apex portion **24** of the sealing flap **20** is retained free of adhesive.

The omission of the adhesive converts the apex portion **24** into a pull tab **26** for use in opening the envelope as will be made clear later.

FURTHER IMPORTANT FEATURES OF THE INVENTION

For envelope opening purposes, the sealing flap **20** is provided with a particular score pattern **28** which progresses in a generally inverted triangular manner or V-shaped configuration, from an apex point **30** to each upper corner **32** of the sealing flap **20**. The score pattern **28** generally corresponds to the configuration of the lower edge of the sealing flap **20**, although the angle

formed by the two sides of the V of the score pattern is a much larger angle than that formed by the two sides of the V of the lower edge of the sealing flap **20**.

More broadly stated, the score pattern **28** extends generally along a path lying across the envelope or spaced relative to the upper and lower edges of the sealing flap **20**, other than along the adhesive pattern **22**. Therefore, the invention is applicable to a broad variety of flap shapes varying from the sharp triangular flap **20**, shown in FIGURES 1, 2 and 3, to a very shallow type of flap that would have a lower edge of configuration generally similar to the configuration of the score pattern **28** shown, though having a lower edge extending lower down on the envelope for proper closure.

The score pattern **28** is distinguishable from a scored line or even an intermittent score line and can more properly be described as a scored zone of weakness; and still further can be defined as a monodirectionally oriented zone of weakness as distinguishable from a line of weakness.

It will be noted that the individual scores **34**, FIGURE 4, progressively lie nearer the upper edge of the sealing flap **20**. Thus, each successive score **34** lies stepped or staggered slightly above the previous score. The scores may be parallel, but this is not limiting. Thus, a stair step type of progression is used. It will also be noted that the end of each successive score is substantially in alignment with the end of the previous score **34**—or preferably will overlap, at the end, to a very slight degree. This score pattern produces runs **36** which are interrupted from the end of the lower score by an intermediate portion of the next succeeding score **34**. Thus, the score pattern is absolutely effective to prevent wild tear runs, by the fact that the tear at the end of a given score **34** will run into or be interrupted by the next score instead of running off to some other area of the sheet material, other than in the zone of weakness provided by the successive score pattern. Thus, wild tears are completely eliminated by the present invention, and a consistent and completely clean opening or rupturing operation is provided in every instance.

At this point it is to be understood that the stair step score pattern of the invention is clearly distinguishable not only from an intermittent line score pattern or perforation pattern, but is also clearly distinguishable from a double line intermittent score pattern where opposed scores are staggered relative to one another. In that situation, as compared to the present invention, the tearing is very difficult; and further, the tearing is uncontrolled as to directionality, as in the present invention, resulting in a number of wild tears.

The present score pattern may be defined as a unidirectionally oriented stair step pattern or progressive score. It might also be described as an elongated zone of unidirectionally oriented weakness as compared to the line of weakness of the prior patent and as compared to line-type perforations of the prior art.

Further, in the present invention, no mateial is removed from the score patten as in a line-type perforating operation. The present invention is provided entirely by a steel rule die or knife operation, without removal of stock.

USEFUL OPERATION OF THE ENVELOPE

In use, an envelope embodying the invention is closed and sealed in the usual manner. In actual tests, the envelopes have been sent through the mails around the country and post office canceling has not produced any damage. The sealed condition of the envelope is shown in FIGURE 1. It will be noted that the envelope differs but slightly in appearance from a standard envelope and the casual observer is not aware of any difference in appearance at all.

OPENING THE ENVELOPE

The manipulation involved in opening the envelope is shown in FIGURE 3. Thus, both thicknesses of the envelope above the score pattern **28**, particularly above the apex point **30** of the scored portion, constitutes a holding portion **38**, which is adapted to be manually grasped and held, such as by the thumb and forefinger of one hand of the person opening the envelope. The pull tab **26** is similarly grasped and held, such as by the thumb and forefinger of the other hand of the person opening the envelope. The envelope also can be opened by one hand by placing it on a flat surface, grasping the pull tab between the thumb and index finger and putting the third or other finger above the score line on the holding portion **38**. Application of pulling force between the fingers causes the envelope to open equally readily. Further, the person's teeth can be substituted either above the score pattern **28** at the portion **38**, or at the pull tabe **26** for ready opening of the envelope. Thus, if the person has only one usable hand, the envelope can nevertheless be readily and easily opened.

With the holding portion **38** above the score pattern **28** being held and the pull tab **26** grasped, a light pull force is applied and this may be of abrupt character, to separate the held area and the pull tab **26** with a quick snap operation. The result is that the envelope is quickly and easily parted or torn open along the score pattern **28** as in FIGURE 3, with the pattern of successive tears **36**, as shown in FIGURE 4. With the application of a relatively abrupt separating force, the envelope will snap open along the entire length of the score pattern **28** in practically an instantaneous manner.

CONTENT REMOVAL

In substantially the same motion, the individual's thumb and forefinger above the score pattern can be inserted into the envelope for quick removal of the contents.

TIME STUDY

In actual use of the present invention, clerks are able to open in six hours and remove contents from the same number of envelopes that formerly required eight hours by the power slitter method, including standing in line for the slitter, repairing mutilated contents and bandaging cut fingers. Thus, actual use tests have proved that up to two clerical hours per day can be saved by the present invention. The present invention may therefore well supplant automation.

EXTENDED SCOPE OF INVENTION

If desired, as shown in FIGURE 1, the envelope may have instruction symbols printed on for the opening of the envelope. For example, "Hold" may be printed in the upper portion of the sealing flap **20**, such as above the apex point **30** of the score pattern **28** to indicate where the envelope is to be held. In a similar manner the word "Pull" can be applied to the pull tab **26**.

Within the scope of the invention, the pull tab can be of varying configuration. Also, the pull tab can be provided by means of an appropriately shaped score **40** through the material of the back of the envelope. This is shown in FIGURE 1 as a small V-shaped continuous score just beneath the tip of the apex portion **24** of the flap **20**. By this operation, the conventional continuous adhesive pattern can be preserved whereby conventional envelope manufacturing procedure is not altered in the least as far as basic manufacturing manipulation is concerned, even though it is an easy task to alter the glue operation.

Broadly the invention is applicable to the easy opening of most any container made of relatively thin, manually tearable sheet material. Thus, as shown in FIGURES 5 and 6, a pour spout **42** can be formed on a cereal or soap box using the present score pattern and using an enlarged score segment **44** at the apex to provide a pull tap **46**. It will be noted that this pour spout **42** is substantially narrower than the width of the envelope of FIGURE 1. Thus, no separate hold portion is here required because the parting operation is effected somewhat differently. However, in the application of FIGURE 1, the pull tab is required because of the shallowness of depth of the V pattern which requires a separating force and thus spaced points to physically hold onto, to provide a separating pull operation.

In the present embodiment, note that the ends **48** of the score pattern **50** terminate in straight line scores **52**, running to the edge **54** of the box **56**. The flap **42** thus terminates at the box edge **54**, which automatically forms a hinge for reclosing the flap in order to preserve the contents from the atmosphere.

Relative to this embodiment of the invention, the principle of operation is different from the embodiment of FIGURES 1–4, and true analogy runs only to the score pattern that is common to each. The mode of operation between the integral tear tab **46** of FIGURE 6 and the separate tear tab **26** of FIGURE 1 will be evident.

Within the extended scope of the invention, the embodiment of FIGURES 5 and 6 can be applied to the end of an envelope, visualizing the top of the box **56** as the back of an envelope. In this aspect, the score pattern would be directed around the end of the seal flap so as to open the end along its full dimension. This is shown in dotted outline at the left hand side of FIGURE 3, and designated **50**, **44**.

Within the scope of the invention, a pull tab can be secured to the sheet material as by adhesive, spot welding riveting, or the like. The mode of operation of such a tab with the integral tear tab **46** of FIGURES 5 and 6, and the separate tear tab **26** of FIGURES 1–4 will be clearly evident to one skilled in the art.

It is probable that the present invention can be extended to sheet materials as in coffee cans, aluminum and spiral paper wrapped frozen orange juice cans and the like, where the score would not completely penetrate the sheet material, but would function to weaken it to the point where manual effort could complete the severance. By so operating, the contents of the container would be preserved by being isolated from the ambient atmosphere.

In some instances in working with light gauge sheet metals of the tougher variety, it may be possible to have the score pattern completely penetrate the sheet and then apply a protective coating of plastic material on the inside or outside to protect the contents of the container from air.

Although the invention appears at the present time to be preferentially applicable to fibrous sheet materials, such as paper, cardboard and the like, there may be substantial applications to thin sheet metals, plastic films and the like. Accordingly, such applications are to be encompassed within the scope of the invention.

The present invention may also find application to gummed kraft paper tapes and the like, wherein the tear open tab portion would be at least partially unglued so that the tear could be effected, in the nature of that shown in FIGURES 5 and 6.

From the foregoing it will be evident that envelopes embodying the present invention are particularly useful where large quantities of incoming mail must be handled in a fast and efficient manner at the lowest possible labor cost. The envelopes of the present invention are quickly and easily opened, each with one abrupt motion, and without any possibility of damaging the contents. Physically handicapped persons can readily open the envelopes and the use of opening implements, such as the usual bladed letter opener are wholly unnecessary. The cost of the envelopes over the standard envelopes is negligible and the difference in appearance is not noticeable. Further, the durability of the envelopes is not hampered as proven by actual mail tests.

To those skilled in the art to which the present invention relates, other features and advantages of envelopes embodying the invention will be obvious and such are to be construed within the scope of the appended claim.

I claim:

1. In an envelope of the class described, having a front panel and a back section defining a pocket, and a closure flap integral with one edge of said front panel for overlapping envelope-closing engagement with portions of said back section, and said closure flap having a free edge and an apex, said closure flap free edge other than said apex being provided with adhesive means for envelope sealing purposes,

said closure flap being provided between said sealing means and said one edge with a tear zone comprising a continuous series of slits arranged in a general V-pattern with the apex being spaced from said one edge to provide between said apex and said one edge a closure flap grasping portion for grasping in fixed relation to that portion of said front panel which is in alignment with said grasping portion, said slits being each parallel to said one edge and successively staggered from one another and separated at the ends by unsevered material,

and said nonadhesive apex of said closure flap comprising pull tab means which can be conveniently grasped,

whereby the opening of the envelope, when sealed, along the tear zone in said closure flap can be readily effected by manually holding said closure flap grasping area in fixed relation to that portion of the said front panel which is in alignment thereby and manually grasping and pulling said pull tab in a direction away from said front panel.

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