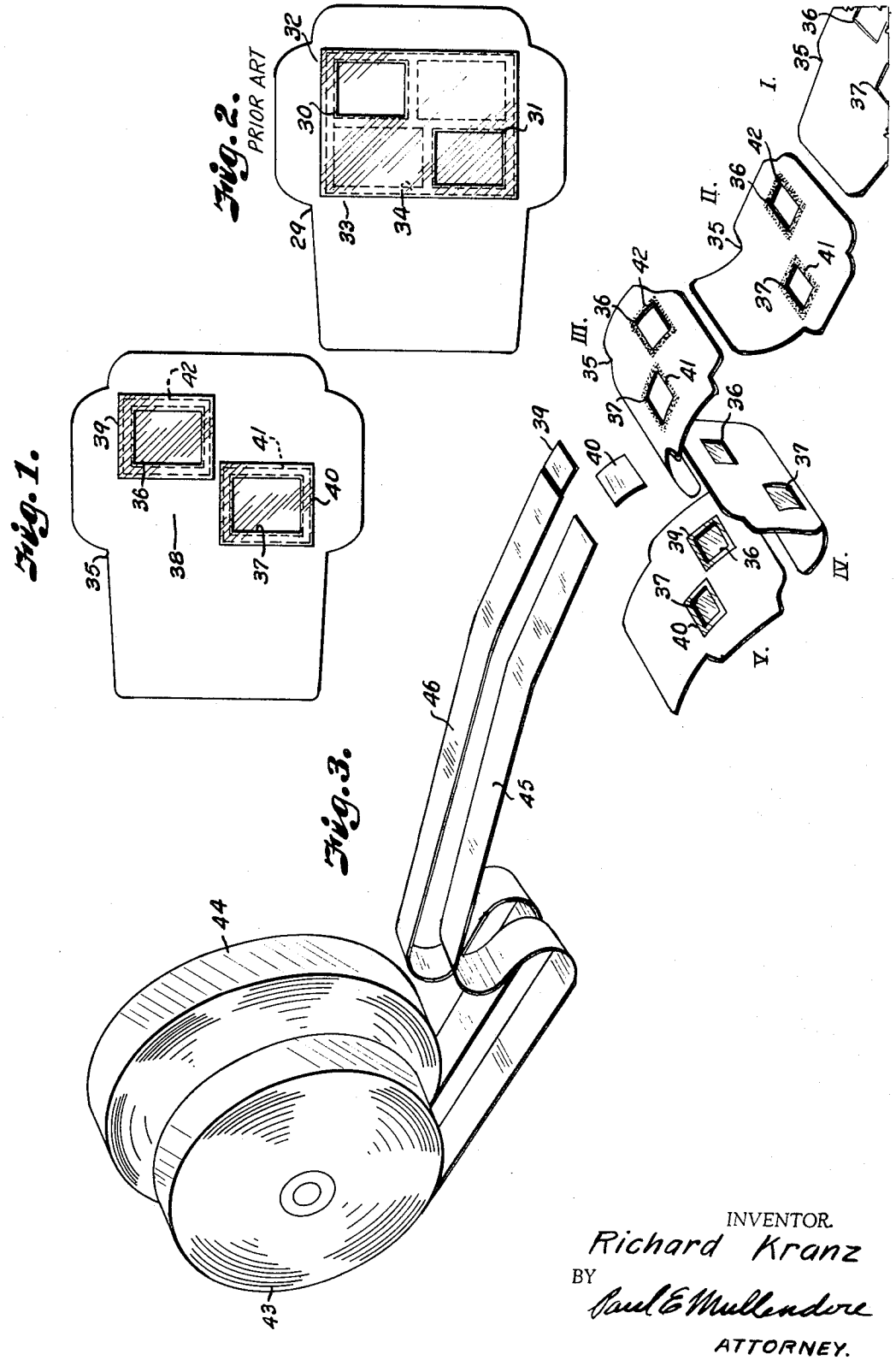
Nov. 26, 1968 R. KRANZ 3,412,655

APPARATUS FOR CUTTING AND APPLYING ENVELOPE PATCHES

Filed April 18, 1966 2 Sheets-Sheet 1



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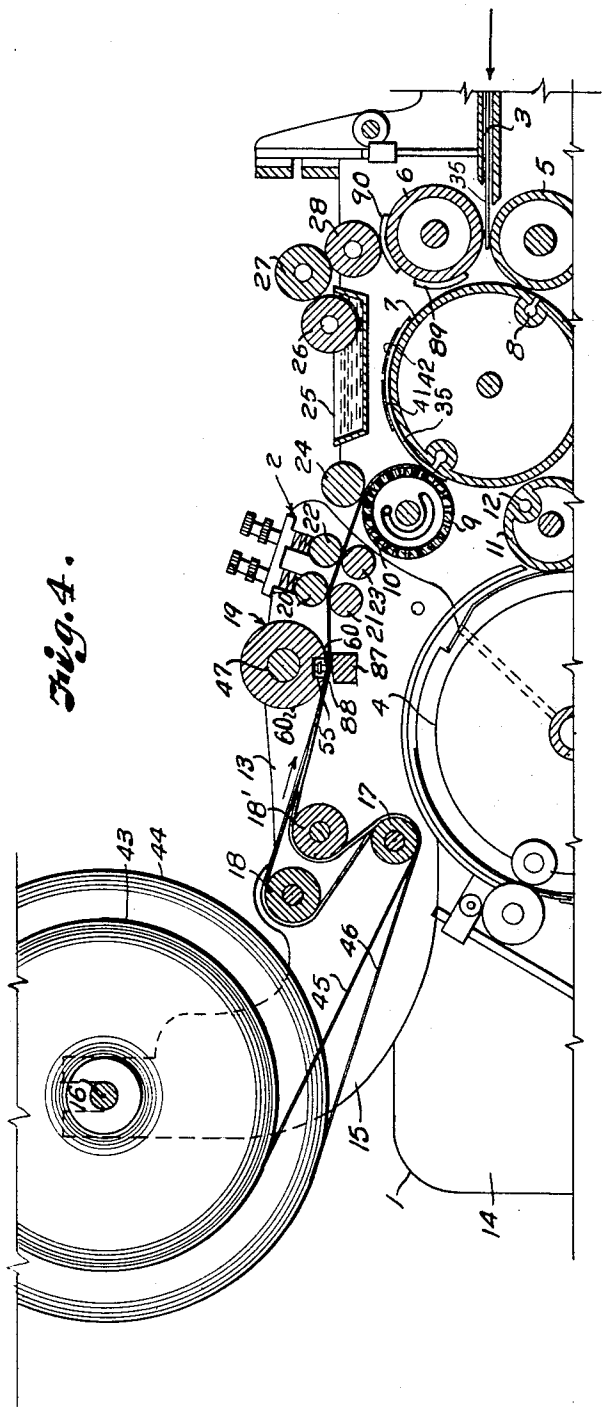


Fig. 4.

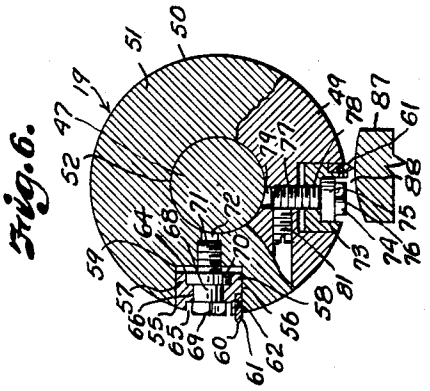


Fig. 6.

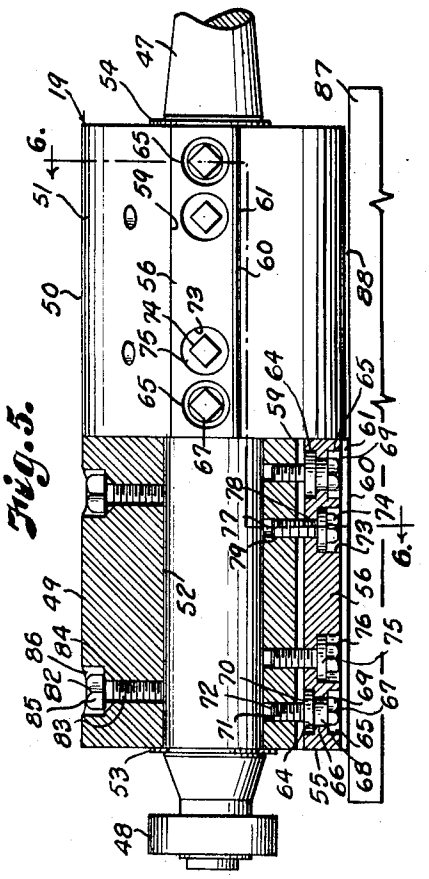


Fig. 5.

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APPARATUS FOR CUTTING AND APPLYING ENVELOPE PATCHES

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ABSTRACT OF THE DISCLOSURE

Patches are applied in laterally staggered relation to envelope blanks in a rotary envelope machine by supporting separate rolls of patch material in lateral relation, separately withdrawing the webs of material from the rolls, at different speeds if desired to alter patch length, and providing a rotary projecting cutter for each web on a common shaft, the cutters being mounted in circumferentially staggered relation.

This invention relates to an apparatus for cutting and applying a plurality of patches in laterally staggered locations upon a paper web or envelope blanks in the process of making window envelopes.

The use of envelopes with staggered windows in one or both panels has become popular, but the cost of making such envelopes is high, since they cannot be produced inexpensively on present high speed rotary envelope making machines. This is because such machines are only equipped to apply a single patch or equally sized patches in laterally aligned registry. The patches cannot be of differential size or located in staggered positions. To make envelopes of this style in standard present day high speed rotary envelope making machines, the single patch must be applied to cover all of the window openings. Thus it is obvious that this method is extremely wasteful of the transparent patch material, which is not only expensive but adds to the weight of the envelope. The only other course is to apply one of the patches in a separate patch applying machine and then to transfer the patched blanks to the envelope folding and gumming machine, in which the second patch is applied incidental to the formation of the blanks into envelopes. This method involves extra handling of the blanks, so that the saving in material is offset, or more than offset, by the cost of such extra handling of the blanks.

With the above in mind, it is a principal object of the present invention to make this type of envelope in complete assembly on a standard high speed rotary envelope making machine, using only sufficient patch material to cover each opening individually, thereby eliminating waste and the cost of extra handling.

In accomplishing this and other objects of the invention, the single patching mechanism with which a standard envelope making machine is initially equipped is replaced with a unit of similar size having accommodation for separate rolls of patch material and mechanism for cutting the patches to proper size for covering only related openings, and for placing and sealing the patches in registry with the respective openings in the blanks, as illustrated in the accompanying drawings, wherein:

FIG. 1 is a plan view of an envelope blank having laterally staggered window openings covered with patches in accordance with the present invention.

FIG. 2 is a similar view illustrating a blank with similarly arranged openings and produced in a standard window envelope making machine, using a single patch, and particularly illustrating the comparative waste of patch material and adhesive required in properly affixing the patch to the blank.

FIG. 3 is a diagrammatic, perspective view of the rolls of patch material, the cutting off of the respective patches, and application thereof to the envelope blanks as they are moved through a standard envelope making machine equipped with the mechanism of the present invention.

FIG. 4 is a longitudinal section of the improved patch applying mechanism as applied to a standard high speed rotary envelope making machine.

FIG. 5 is an enlarged section through the cutting roller, illustrating one of the cutting units in section and the other in elevation to better illustrate its construction.

FIG. 6 is a section through the cutting roller on the line 6—6 of FIG. 5, the upper portion of the section showing the nearest cutting unit, and the lower part of the section showing the other cutting unit.

Referring more in detail to the drawings:

1 designates the window patch applying portion of a standard high speed rotary envelope making machine equipped with a patch applying mechanism 2, and includes a guide means 3 for delivering envelope blanks in successive spaced relation toward a collating drum 4. The patch applying mechanism is interposed between the guide means 3 and the collating drum 4 and includes a lower roller 5 cooperating with an adhesive applicating roller 6 between which the blanks are picked off by a suction roller 7 having suction ports 8 to seize the blanks and carry them under a patch applying roller 9 which seizes a patch by suction through ports 10 to deposit the patch upon the adhesive as the blank is carried therebetween to a transfer roller 11. The suction of the roller 7 is cut off as the blank reaches the transfer roller 11 and suction through ports 12 in the transfer roller seizes the blank and carries it to the collating drum 4. All of the above are standard parts of the rotary envelope making machine handling blanks on which a single patch is applied.

The patch supplying mechanism which supplies the patches in the conventional machine may be carried by the main frame of the machine, or it may be supported by side frames 13 carried by the side frames 14 of the envelope making machine. Since FIG. 4 is a longitudinal sectional view, only one of the side frames appears in the drawings, but it will be understood that like frames are on the side of the machine not shown. The side frames 13 have rearwardly extending brackets 15 supporting a shaft 16 for ordinarily mounting a single roll of patch material. The web from the roll travels under and around a tensioning roller 17 and a driving roller 18, also carried by the frames 13, to feed the web through a cutter mechanism 19 under control of forwarding rollers 20–21 and 22–23 and which advance the patches between a pressure roller 24 and suction roller 9. The pressure roller 24 and suction roller 9 are driven at a surface speed according to speed of the blanks advanced by the suction roller 7.

Adhesive is supplied from a pan 25 to a pickup roller 26 which revolves in the pan and applies adhesive to transfer rollers 27 and 28 to the adhesive applying roller 6. The mechanisms just described are generally found in the usual envelope making machine for applying a single patch, as illustrated in FIG. 2.

The envelope blank 29 illustrated in FIG. 2 has staggered openings 30 and 31 in the front panel 32 wherein the single patch 33 covers both openings.

It will also be noted that if the patch 33 is to be sealed around the edges thereof to prevent interference with insertion of enclosures into the finished envelope, a large amount of adhesive is required in addition to the adhesive for sealing around the window openings 30

and 31, as indicated by the numeral 34. Consequently, there is a waste of materials, both in the adhesive and patch, that increases the cost of this type of envelope, which amounts to a considerable sum when the envelopes are made by the thousands.

In FIG. 1 is illustrated an envelope blank 35 of like size and having laterally staggered openings 36 and 37 in the front panel portion 38 thereof. However, separate patches 39 and 40 are applied over the respective openings 36–37 and secured with adhesive extending around the openings, as shown by the dotted lines indicated by the numerals 41 and 42.

By comparison of FIGS 1 and 2, it will be noted that the envelope blank of FIG. 1 has considerably less patch material and less adhesive is required, yet the envelope of FIG. 1 is just as satisfactory and can be produced at less cost.

In order to apply the patches 39 and 40 to the blank illustrated in FIG. 1 when the blank is being conveyed in the envelope making machine as above described, the patch applying mechanism 2 is modified as to certain of the parts. For example, the shaft 16 is adapted to support two separate rolls 43 and 44 of patch material, positioned in side to side relation in respective alignment with the openings 36 and 37 of the blanks as the blanks are carried through the guide means 3. Also, both patches are cut from the webs 45 and 46 that are drawn from the rolls 43 and 44 about the tensioning roller 17, with one web extending over the driving roller 18 and the other web over a like driving roller 18'. Two separate driving rollers are used to feed the webs at differential speeds when the patches are to be of different length, as later to be described.

The cutter mechanism 19 of the present invention is best illustrated in FIGS. 5 and 6 and includes a driven shaft 47 having its ends suitably journaled in the side frames 13 on bearings 48, only one of which is illustrated in FIG. 5, but it is to be understood that a similar bearing carries the other end of the shaft. Rotatably adjustable on the shaft 47 are separate knife carriers 49 and 50. The knife carriers are each of the same construction and the same description will suffice for both of them. Each includes a cylindrical body 51 having an axial bore 52 of a diameter to provide a snug rotatable fit on the shaft 47. Each cylindrical body 51 is retained from outward lateral movement on the shaft by a lock ring 53 or 54, respectively, or the like, engaging the outer end faces thereof to hold the inner end faces in abutment. Each of the knife carriers 49 and 50 has a blade supporting means 55 which is shown as including a bar 56 having side portions 57 and 58 closely fitting within a longitudinal groove 59 of the cylinder body, and in which the bar is adapted to be adjusted for radially positioning the cutting edge 60 of a cutting blade 61. The knife blade 61 is fixed within a rabbet groove of the bar by suitable fastening devices, such as screws 62. The bar is relatively thick to provide in the respective inner and outer faces recesses 64 and 65 near the end of the bar. The recesses are interconnected by axial openings 66 to accommodate fastening devices 67 having cylindrical necks 68 journaled within the axial openings 66, with heads 69 thereon being located within the outer recesses 65 to permit application of a socket wrench, not shown. The cylindrical necks 68 have annular flanges 70 fixed thereto and rotatably journaled in the inner recesses 64. The threaded shanks 71 of the fastening devices 67 are turned within threaded openings 72 in the bottom of the groove 59.

Each bar 56 also is provided with recesses 73 on the outer side of the bar to accommodate heads 74 and flanges 75 of fastening devices 76 which have the shank portions 77 thereof extending through openings 78 in the bar and into internally threaded openings 79 in the bottom of the groove, similar to the internally threaded openings 72.

It is thus apparent that the flanges 70 of the fastening devices 67 and the flanges 75 of the fastening devices 76 bear against the bottoms of the recesses 64 and 73 from opposite sides of the bars 56, so that when the shanks are threaded into the openings 72 and 79, the bar is adjustably supported in fixed relation with its carrier to adjust the cutting edges 60 of the knife blades radially of the axis of rotation. After an adjustment is made, the bars are locked in position by set screws 81 (FIG. 6) to bear upon the shanks 77 of the fastening devices 76.

The knife carriers 49 and 50 are secured in adjusted position on the shaft by set screws 82 having shanks 83 threaded into internally threaded openings 84 in the body of each carrier, the heads 85 of the set screws being inset within counter openings 86, as shown in FIG. 5. The cutter mechanism 19 also includes a rigid bar or platen 87 rigidly supported by the frames 15 under the knife carriers 49 and 50 so that a space or pass 88 is provided therebetween for the webs 45 and 46.

The adhesive applicating roller 6 carries applicating heads 89 and 90 properly located on the roller 6 to register with the openings 36 and 37 of the blanks 35 for depositing adhesive 41 and 42 around the respective openings at the time the blanks pass over the roller 5.

In making the apparatus ready for applying patches to envelope blanks having window openings arranged as shown in FIG. 1, two rolls 43 and 44 of patch material having widths spanning the respective openings 36 and 37 are mounted on the shaft 16 and spaced apart on the shaft so that the median longitudinal lines of the webs register, respectively, with the median lines of the openings 36 and 37. The webs 45 and 46 are passed around the roller 17, but the web 45 is applied on the driving roller 18 and the web 46 is applied on the driving roller 18'. The ends of the webs are threaded through the pass 88 between the knife carriers and the platen bar 87 of the cutter mechanism. Cutting edges of the knife blades 61 are adjusted by moving the bars 56 in or out by manipulating the screws 62 and 67 so that the edges 60 just clear the platen bar 87. Thus the cutting edges will penetrate the webs without actual contact with the platen bar 87, the only purpose of the platen bar being to back the webs and assure penetration of the edges through the patch material.

In order to cut off the proper length of patches in proper sequence, the knife carriers 49 and 50 are adjusted circumferentially on the shaft 47 upon loosening the set screws 82 and turning them to bring the cutting edges in the desired position in the circumference of rotation. The set screws 82 are then tightened against the shaft 47.

The adhesive applicators 89 and 90 of proper shape are mounted in position on the roller 6.

When the machine is in operation, envelope blanks 35 are being advanced in successive order through the guide means 3 as shown in the position I, FIG. 3, to pass between the roller 5 and adhesive applicator roller 6. Adhesive is being removed from the pan 25 on the surface of the pickup roller 26 for transfer by way of the transfer rollers 27 and 28 onto faces of the adhesive applicators 89 and 90. It is to be understood that the applicators 89 and 90 are traveling at the same speed as the blanks, to apply the adhesive 41 and 42 to the laterally staggered areas of the blanks upon which patches are to be applied, as shown in the position II, FIG. 3. A blank, on passing the adhesive applicator roller 6, is seized by suction through the ports 8 in the suction roller 7 and carried on the periphery thereof, as illustrated in the blank position III of FIG. 3. As the blank approaches the suction roller 11, the suction through the ports 8 is shut off and suction through the ports 12 is effective to seize the blank and carry it around the roller 11, as shown in the blank position IV of FIG. 3.

At this time the webs 45 and 46 are being withdrawn from the rolls of patch material 43 and 44 by the driving

rollers **18** and **18'** to feed the webs through the pass **88** to the forwarding rollers **20–21** and **22–23**, which maintain the webs under tension as long as the edge **60** of a knife blade **61** has not moved into the pass **88** for cutting off a patch.

The length of the patches is, therefore, controlled by the position of the knife blades at cutoff time. Enough of the webs will travel freely through the pass **88** up to the cutoff times to make the desired length of patches for covering the respective window openings. The respective webs are cut off successively on each revolution of the knife blades. Since the openings **36** and **37** in the illustrated instance are substantially the same size, the driving rollers **18** and **18'** will be driven at the same speed to produce equal sized patches **39** and **40**. As the patches **39** and **40** pass between the roller **24** and suction roller **9**, the suction through the ports or orifices **10** will seize the patches thereto and carry them into sealing contact with the adhesives on the blank that is then being carried on the periphery of the suction roller **7**. The blank and the patches will roll together between the rollers **7** and **9**. As soon as the adhesive takes hold, the suction is cut off through the orifices **10**, but the suction through the ports **8** remains in effect until the blank reaches the roller **11**, at which time the suction through the ports **8** shuts off, and suction through the ports **12** is effective to carry the blank with the patches thereon to the collating drum **4**.

If the patches **39** and **40** need to be of different lengths, the rollers **18** and **18'** are driven at different speeds. For example, if the patches **39** are to be the longer, then the roller **18** will be driven at higher speed to feed more web between the knife carrier **49** and the platen bar **87** between each revolution of the knife carried thereby. If the patches **40** are the longer, then the roller **18'** is speeded up.

It is to be understood that the suction rollers and mechanisms for controlling suction therethrough are parts of the conventional rotary envelope making machine, and are illustrative of one type of means for conveying envelope blanks through an envelope making machine.

While the invention is illustrated and described to apply patches over windows in an envelope blank, is is to be understood that the invention is fully adapted for application of any patches in lateral staggered relation, such as patches providing supplemental pockets, a window patch and a pocket patch in combination, or any other patches to be applied in staggered relation.

It is also to be understood that the patches can be applied to any portions of an envelope blank, such as one patch on the front panel portion and one on the back panel portion.

It is also obvious that the patches can be applied in like manner to a continuous web, before the web is cut into blanks.

What I claim and desire to secure by Letters Patent is:

1. An apparatus for cutting and applying patches in laterally staggered relation to envelope blanks when making envelopes in a rotary envelope making machine, said apparatus including:

(a) means supporting separate rolls of patch material in lateral relation and in alignment with said blanks,

(b) means for separately withdrawing webs of said patch material from the rolls,

(c) a cutting means for each web, each of said cutting means including a rotary cutter and cooperating backing means,

(d) means mounting the cutters in side-to-side relation transversely of the respective webs and in circumferentially staggered relation to provide said patches,

(e) said rotary cutters each having a projecting cutting edge for each web,

(f) said means mounting the cutters rotating about a common axis transversely of the opposite face of the webs at said backing member to provide a path between said cutters and said backing means for freely passing the webs therethrough in timed relation with the cutting edges, and

(g) means for applying the cut patches to said blanks.

2. An apparatus for cutting and applying patches in laterally staggered relation to envelope blanks when making envelopes in a rotary envelope making machine, as described in claim **1**,

(a) in which the web withdrawing means includes a separate roller for each web, each operating at a different speed, to provide patches of different length.

3. An apparatus for cutting and applying patches in laterally staggered relation to envelope blanks when making envelopes in a rotary envelope making machine, as described in claim **1**, wherein

(a) said backing means comprises a fixed support across the webs of patch material for backing one face of the webs.

4. An apparatus for cutting and applying patches in laterally staggered relation to envelope blanks when making envelopes in a rotary envelope making machine, said apparatus including,

(a) means supporting separate rolls of patch material in lateral relation and in alignment with said blanks,

(b) means for separately withdrawing webs of said patch material from the rolls,

(c) a cutting means for each web including a backing member having fixed support across the webs of patch material for backing one face of the webs, and a rotary cutter, the rotary cutters each having a projecting cutting edge for each web, with the cutting edge of one cutter being in advance of the other,

(d) a shaft mounting the cutters for rotation about a common axis in side-to-side relation and transversely of the opposite face of the web at said backing member to provide a path between said cutters and said backing member for freely passing the web therethrough in timed relation with the cutting edges to provide said patches,

(e) means for applying the patches to said blanks, and

(f) means mounting the cutters for movement circumferentially of said shaft to adjust the position of the cutting edges to vary the staggered relation of the patches.

5. An apparatus for cutting and applying patches in laterally staggered relation to envelope blanks when making envelopes in a rotary envelope making machine, said apparatus including,

(a) means supporting separate rolls of patch material in lateral relation and in alignment with said blanks,

(b) means for separately withdrawing webs of said patch material from the rolls,

(c) a cutting means for each web including a backing member having fixed support across the webs of patch material for backing one face of the webs, and a rotary cutter, the rotary cutters each having a projecting blade with a cutting edge for each web, with the cutting edge on one cutter being in advance of the other,

(d) a shaft mounting the cutters for rotation about a common axis in side-to-side relation transversely of the opposite face of the web at said backing member to provide a path between said cutters and said backing member for freely passing the webs therethrough in timed relation with the cutting edges to provide said patches, and

(e) means for applying the patches to said blanks,

(f) said cutters including individual cylindrical members having axial bores for accommodating said shaft, means fixing the cylindrical members on the shaft, said cutting blade being carried longitudinally of each cylindrical member,

(g) each cylindrical member having a longitudinal groove in the periphery thereof and the cutting blade being fixed to a supporting bar, and

(h) means for adjustably retaining the supporting bar in its groove for radial projection of the cutting edge relatively to the backing member for uniform penetration of the cutting edge transversely of the webs,

(i) the means for adjusting the supporting bar including screws turned into internally threaded sockets in the cylindrical members and certain of the screws having flanges thereon for pushing against the supporting bars and other of the screws having flanges engaging under the supporting bars.

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