Feb. 25, 1969 H. SUBKLEW 3,429,237

APPARATUS FOR APPLYING TRANSPARENT MATERIAL TO WINDOW OPENINGS OF ENVELOPE BLANKS AND THE LIKE

Filed Sept. 1, 1967 Sheet 1 of 4

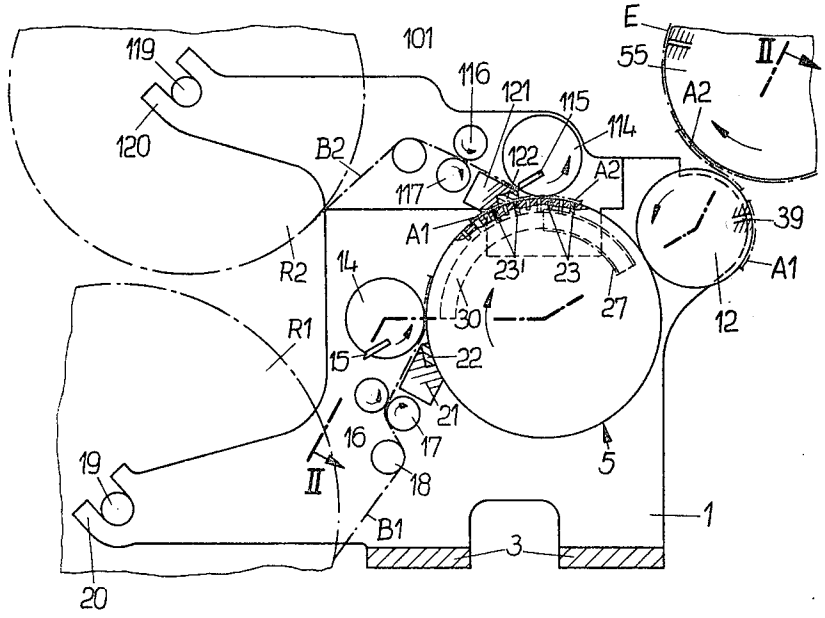


Fig. 1

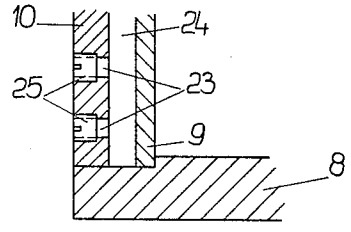
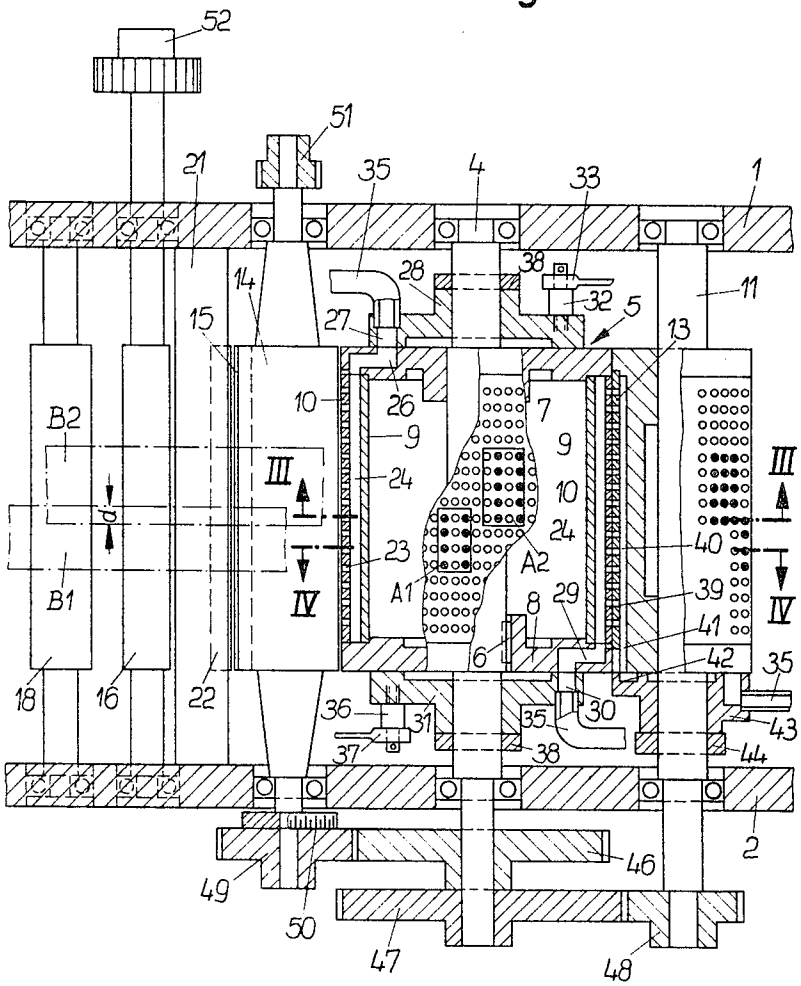


Fig. 5

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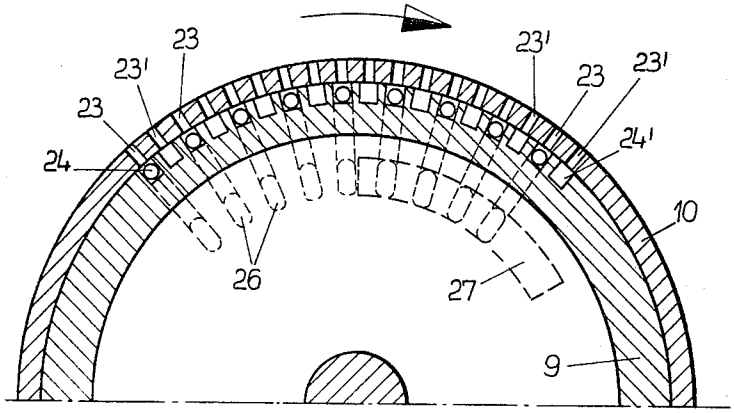
Fig. 2



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Fig. 3



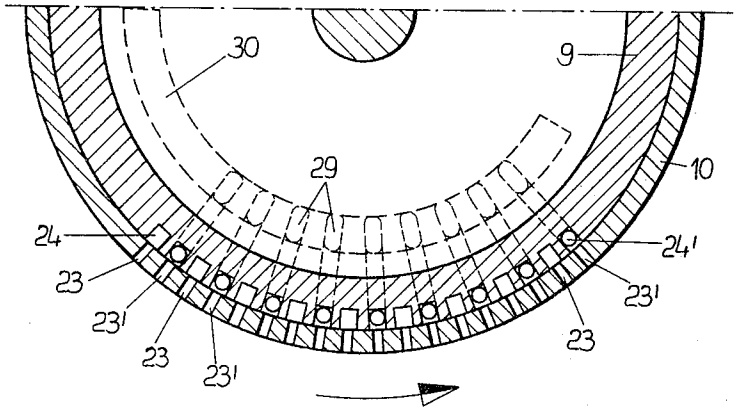
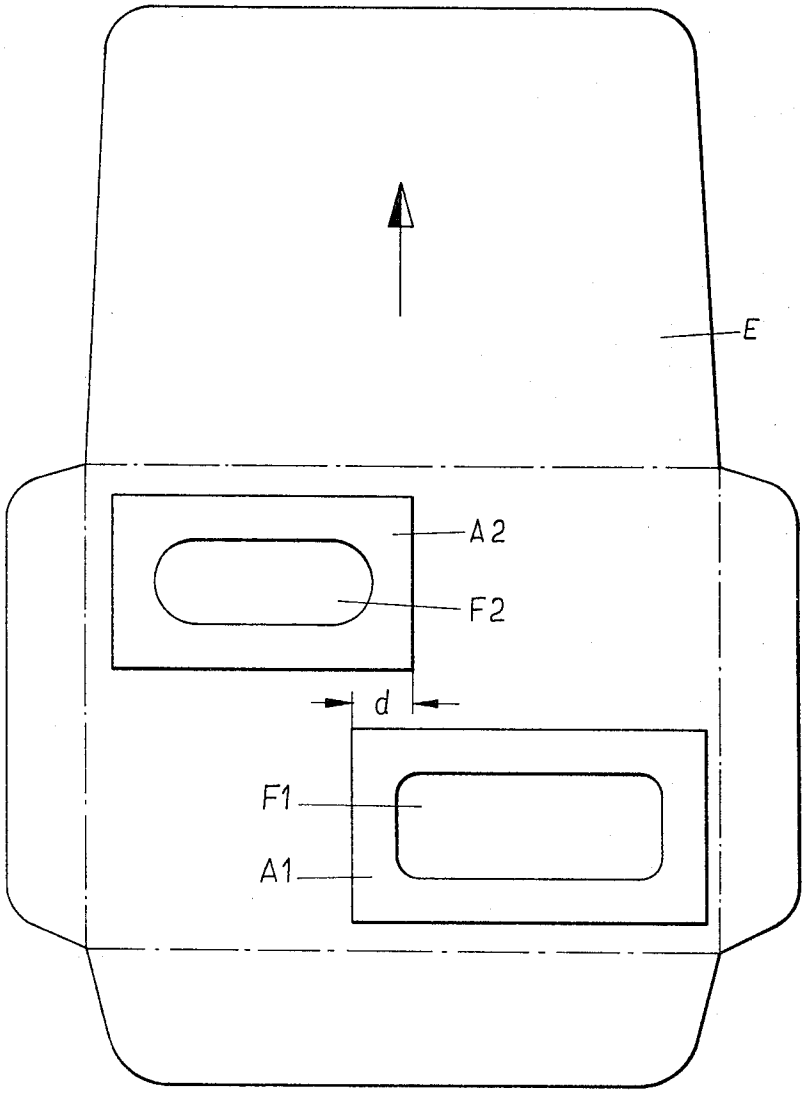


Fig. 4

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Fig. 6



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APPARATUS FOR APPLYING TRANSPARENT MATERIAL TO WINDOW OPENINGS OF ENVELOPE BLANKS AND THE LIKE

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U.S. Cl. 93—61 4 Claims
Int. Cl. B31b 1/82, 1/12

ABSTRACT OF THE DISCLOSURE

A machine for making envelopes and the like includes an apparatus containing a number of units corresponding to the number of window openings in each envelope blank, which feed and cut strips of generally transparent material and transmit them to a central rotary suction roller provided with groups of suction apertures, each group having its own suction air control. Selected apertures transmit the strips to means applying them to the blanks.

This invention relates to an apparatus constituting a part of a machine for making envelopes, flat bags and the like (hereinafter referred to as "envelopes") and used for applying generally transparent sheets to the window openings of the envelopes. The invention is particularly concerned with an apparatus for applying a transparent window material to window apertures in moving separate or webwise attached blanks made of paper or the like, in machines for the manufacture of envelopes, each envelope having two or more windows disposed at a relatively considerable distance from one another, the window material used for adhesion to the various window openings of each individual blank being fed from at least two different supply rolls, being divided into portions of necessary length and being glued over the window openings.

In the mechanical manufacture of envelopes each of which has a plurality of window openings, it has been the practice to use a portion of window material of such length and width that it covers all the window openings of an envelope blank with a margin adequate for gluing. However, at the present time envelopes are often made with windows situated widely apart. Thus this method results in a high consumption of window material. The theoretical possibility of applying two separate window portions to envelope blanks having two widely spaced window apertures, in two separate runs, was not found economical for use in window gluing machines.

According to an earlier invention belonging to the same assignee, two or more strips of window material drawn from supply rollers are divided into portions of the same or different lengths. These portions can be applied to the window apertures cut out at various locations on a strip or on an individual blank.

In this simple apparatus the suction roller which grips the separated window covering portions and applies them to the window apertures and which is adapted to apply the window covering portions to window apertures in continuous webs, operates at a web speed and not in rhythm with the arriving portions of window material. Consequently, the suction apertures which are connected to the suction line are occassionally not covered by portions of window material, which results in a relatively high suction demand. Furthermore, with this known apparatus it is not possible to apply individual window portions to, for example, two separate window apertures

which are so located upon the blank of an envelope that the two strips of window material overlap to a certain extent.

An object of the present invention is to improve these prior art devices.

Another object is the provision of an apparatus of the described type which, with the minimum suction requirement, deposits two or more window covering portions of the same or different length, width and possibly color on individual synchronously fed blanks of envelopes having each two or more separate window apertures in any position alongside or in sequence, with a high rate of output.

Other objects of the present invention will become apparent in the course of the following specification.

In the accomplishment of the objectives of the present invention it was found desirable to provide a number of units corresponding to the number of window portions to be applied to each blank which are adapted to feed and separate a strip of window material and which are associated with a central suction roller rotating synchronously with the blanks to which the windows are to be applied, and on the outer shell of which there are disposed in alternate rows, a number of independent groups of suction apertures corresponding to the number of units for feeding and separating a strip of window material, each group having its own suction air control.

Each unit for feeding and separating the strip of window material consists essentially of a pair of rollers for feeding the strip of window material and a rotary transverse cutter operating in synchronism with the blanks.

The central suction roller which takes over the window portions cut from the strip by the rotary transverse cutter is so large that the units for feeding and cutting off the window material from the strips, as well as a conveyor roller to which the window portions are then passed, can be disposed around it. Therefore, it preferably makes only a half or a third of a revolution per stroke or blank. A separate suction air control for the suction holes disposed in rows on the cylindrical part of the suction roller is provided for each unit for feeding and separating a strip of window material.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings, showing diagrammatically and by way of example, an embodiment of the present invention used for applying two portions of window material on each individual envelope blank having two window apertures.

In the drawings:

FIGURE 1 is a layout diagram showing the location of the apparatus of the present invention in an envelope making machine, partially in cross section.

FIGURE 2 is a longitudinal section through the apparatus along the line II—II of FIG. 1, on an enlarged scale.

FIGURE 3 is a cross section through the central suction roller along the line III—III of FIG. 2, on a still larger scale.

FIGURE 4 is a cross section through the central suction roller along the line IV—IV of FIG. 2, on the same scale as FIG. 3.

FIGURE 5 is a sectional detail at X in FIG. 2, on an enlarged scale.

FIGURE 6 shows an envelope blank with windows processed in the apparatus according to the present invention.

As shown in the drawings, the side walls 1 and 2 of the apparatus of the present invention are mounted on transverse supports 3 of an envelope making machine. A central suction roller 5 comprises two discs 7 and 8 secured by keys 6 in a rigid manner on the spindle 4 which is rotatably mounted in the side walls 1 and 2. A

tubular inner shell 9 and an outer shell 10 which preferably consist of two half-shells are rigidly secured against turning upon the discs 7 and 8. The shells 9 and 10 will be described in greater detail hereinafter.

A conveyor roller 12 is keyed upon a shaft 11 and has a shell 13 which also preferably consists of two half-shells. The shaft 11 is rotatably mounted in the side walls 1 and 2; the roller 12 is located at a distance from the central roller 5 which is necessary for the passage of paper.

Also rotatably mounted in the side walls 1, 2 are the rotating portions of a transverse cutter 14 carrying a rotating knife 15 as well as two strip feed rolls 16 and 17 and a reversing roller 18 for the strip B1 which is drawn by the strip feed rolls 16, 17 in a manner which will be described in greater detail hereinafter, from a storage roll R1 mounted on a shaft 19 which is rotatable in forks 20 mounted on the side walls 1 and 2. Rigidly fixed on the side walls 1 and 2 is a cross-beam 21 to which the fixed knife 22 of the transverse cutter is bolted. The spacing of the rotating cutter part 14 and its rotating knife 15 from the outer shell 10 of the central suction roller 5 is sufficient for the passage of paper.

As best shown in FIGS. 2 to 4, the outer shell 10 of the central suction roller 5 has rows of suction holes 23 located over slots 24 of the inner shell 9, while rows of suction holes 23' are situated over slots 24' of the inner shell. The slots in the inner shell, alternately designated as 24 and 24' are identical. They differ only in that all slots 24 are in air-conductive connection with a circular slot 27 of a suction control head 28 through a passage 26 while all the slots 24' which are disposed between the slots 24 are connected through a passage 29 to the circular groove 30 of a control head 31. Thus, all the suction holes 23 are connected with or separated from the suction air line 35 of the machine at the correct moment, in rows, through the suction head 28 which is mounted on the spindle 4 and which is prevented from rotating along with the central suction roller by a bolt 32 and an eye screw 33, while all the suction holes 23' are connected with a separate suction air line 35 of the machine through the suction head 31 which is likewise prevented from rotating along with the central suction roller by a bolt 36 and an eye screw 37. The suction heads 28 and 31 are secured against longitudinal displacement by setting rings 38. The eye screws 33 and 37 permit correct angular adjustment of the suction heads. All suction holes 23 and 23' which are not covered by the window portions A1 or A2 of a blank located above them are closed by threaded pins 25 or even by having a Tesa film or the like glued over them. All suction holes 23, 23' and 39 which are covered by window portions are marked by black spots in FIG. 2. The preferred arrangement is that the rows 23, 23' of both groups of suction holes are evenly distributed over the outer shell 10 on two opposite quarters thereof, so that within each quarter the rows of suction holes 23 and 23' alternate.

Disposed in rows in the shell 13 of the conveyor roller 12 are suction holes 39 which are situated over slots 40 formed in the roller body. All the slots 40 connect through passages 41 in an air-conductive manner with the circular slot 42 of the control head 43 which is prevented (in a manner not shown but similar to that of the control heads 28 and 31) from rotating along with the conveyor roller 12 and is secured against longitudinal displacement by a setting ring 44. When not covered by a window portion, the suction holes 39 of the roller 12 are also closed by threaded pins or Tesa film.

Gear wheels 46 and 47 are keyed on the spindle 4 of the central suction roller so that the conveyor roller 12, through a gear wheel 48, and the rotating part 14, 15 of the transverse cutter, through a gear wheel 49, rotate at twice the speed of the central suction roller. The peripheral speeds of the rollers 5 and 12 are the same. The gear wheel 49 is angularly adjustable in relation to the rotary transverse cutter according to a scale 50 so that the position of the window portion A1 separated from the strip B1 can be varied.

Keyed on the other pivot of the rotary transverse cutter portion 14, 15 is a gear wheel 51 through which, by means of change wheels (not shown), the gear wheels 52 of the strip feed rolls 16 and 17 are driven in such manner that, for every rotation of the rotary transverse cutter portion 14, 15, they feed the strip B1 forwards according to the desired length of the window portion A1.

The unit for feeding and cutting the strip B2 of window material from a supply roll R2 is the same as the above-described unit for feeding and separating the strip B1, as illustrated in the drawing. Therefore it is believed unnecessary to describe this unit in detail. Its corresponding parts are designated in the drawings by the additional numeral "1." Thus this unit has a rotary cutter 114, 115, feed rolls 116 and 117, a fork 120 etc. Its two side walls 101 and 102 are detachably mounted on the side walls 1 and 2. Thus the entire unit can be removed if the envelope machine is, for a prolonged period, producing only envelopes having one single window.

FIG. 6 shows a blank E of an envelope with transparent window portions and a double lateral adhesion. The window aperture F1 has a window portion A1 glued over it, while window portion A2 is glued over window aperture F2. With this location of the window apertures, the two strips of window material overlap by *d*, as also shown in FIG. 1.

The operation is as follows:

The central suction roller 5, the conveyor roller 12 and the suction roller 55 which belongs to the envelope making machine rotate in the direction indicated by the arrows at the same peripheral speed. The strip B1 drawn from the supply roll R1 by the strip feed rolls 16 and 17, and the strip B2 drawn by the strip feed rolls 116 and 117 from the supply roll R2 have their free ends initially loosely applied upon the central suction roller 5, above which and at a slight distance from its outer shell 10, there may be curved guides (not shown). Shortly before the window portion A1 is cut off by the transverse cutter 15, 22, or before the window portion A2 is cut off by the transverse cutter 115, 122, open suction holes 23, 23' (marked black in the drawing) move under the end of the strip. When the window portions have been completely separated from the strips, these suction holes entrain the cut portions. All the suction holes which are connected to the suction line but are not covered by the separated window portions are closed. As soon as the window portions reach the conveyor roller 12, they are released by the central roller 5 and are taken by the open (marked black) suction holes 39 of the conveyor roller 12, which applies the window portions to a prepared blank which has already been provided with glue around its window apertures and is held by the suction roller 60.

While the present invention relates primarily to the application of the transparent window material to window apertures, it is not limited to this purpose, but also includes the application of pieces of other types in the manufacture of envelopes, flat bags or the like. All such and other variations and modifications are to be included within the scope of the present invention.

What is claimed is:

1. In a machine for manufacturing envelopes and the like, each of which has at least two separate window openings, an apparatus for applying window covering material to said openings, said apparatus comprising a plurality of rolls supplying strips of the window covering material, a plurality of cutters cutting said strips into window covering sections, the number of said rolls and of said cutters being equal to the number of window openings in one envelope, a rotary central suction roller receiving

the cut window covering sections from said cutters, said central section roller comprising an outer shell having a plurality of separate groups of suction apparatus disposed in rows, the number of said groups being equal to the number of window openings in one envelope, separate suction control means for each group, means moving blanks having window openings synchronously with the rotation of said central suction roller, and means receiving the cut window covering sections from said central suction roller and applying them to said blanks.

2. An apparatus in accordance with claim 1, wherein said groups of suction apertures are disposed in alternating rows, one row of apertures of one group alternating with a row of apertures of another group.

3. An apparatus in accordance with claim 1, wherein each envelope has two separate window openings and wherein, consequently, there are two separate groups of suction apertures in said shell, the rows of suction apertures of both groups being evenly distributed over said

outer shell on two opposite quarters thereof, the rows of suction apertures of the two groups alternating in each quarter.

4. An apparatus in accordance with claim 1, wherein each of said cutters comprises a rotary transverse cutter, a rotary knife carried by said cutter and a stationary knife cooperating with said rotary knife, and means rotating said rotary cutter in synchronism with said blank moving means.

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