STATIONERY BONDING APPARATUS

Apparatus for producing stationery assemblies comprising means for moving a plurality of superposed webs along a path of travel, tab-cutter which cuts a plurality of superposed tabs in said webs and bends the tabs so that their free ends extend outwardly of the webs and in a leading direction along said path of travel, and a roller adhesive applicator which rotates in a direction opposite to the direction of movement of the webs. A controlled amount of quick-drying adhesive is simultaneously applied to the free ends of the tabs by the roller, with the position of the roller relative to the webs and the speed of rotation thereof being adjustable to vary the amount of adhesive applied to the free ends of the tabs and also to vary the area of the tabs to which the adhesive is applied.
STATIONARY BONDING APPARATUS

This is a division of my copending application Ser. No. 788,673 filed Dec. 27, 1968, now abandoned, which is a continuation in part of my copending application Ser. No. 635,474 filed May 15, 1967 now abandoned.

This invention concerns method and apparatus for producing stationary assemblies.

Continuous stationary assemblies are generally in the form of reels or folded packs and comprises a number of superposed webs of paper with, for example interposed transfer paper or, preferably, with one or more transfer coatings on the front and/or the reverse side of the paper. It is common practice to provide such assemblies with control holes, such as marginal spaced feed holes, which co-operate with a pin-feeding device in a machine to control both feed of the stationary and registration throughout the assembly. It is found, however, that a number of problems arise in the use of such stationary, in particular there is a possibility of the formation of air-pockets and of relative transverse movement between the webs, causing unsatisfactory feeding and imperfect copies to be produced.

According to one aspect of the present invention a continuous stationary assembly comprises at least two superposed webs, the webs being cut to provide at least one tab in each web, which tabs, at least partially, overlap one another and are secured together.

The invention is applicable to all types of stationary assembly but is particularly advantageous in connection with continuous stationary. Conventionally, when the invention is applied to continuous stationary, the tab or tabs are situated in the feed hole margin, and preferably are interposed between the feed holes of the assembly.

According to a further aspect of the present invention apparatus for producing stationary assemblies comprises one or more web feeding devices for feeding a web or assembly of webs to a tab-cutter, means for applying an adhesive to the tabs either before or after they are cut and further web-feeding means for delivering the assembly after the tabs have been secured to at least one adjacent web in the assembly or to tabs associated with an adjacent web.

Preferably, the apparatus is arranged to cut tabs in at least two superposed webs and adhesive is applied to the tabs associated with such web simultaneously.

The invention is hereinafter more particularly described with reference to the accompanying drawings in which:

FIG. 1 is a diagrammatic representation of the tab-cutter;
FIG. 2 is a diagrammatic representation of the application of adhesive to the cut tabs;
FIG. 3 is a schematic representation of the tab-cutter;
FIG. 4 shows diagrammatically the resulting tabs having a small area of adhesive.
FIG. 5 is a schematic representation of a simple stationary assembly-producing apparatus according to the invention;
FIG. 6A and 6B are a schematic representation of a more elaborate stationary assembly-producing apparatus broken along the line A—A.

A particular stationary assembly is described below, by way of example. The assembly comprises five contiguous webs in folded form having a set of feed holes disposed along one margin thereof. Between a pair of feed holes four parallel rectangular tabs are cut in all four webs, the tabs being attached to their parent webs by the shorter sides of the rectangular tab being uncut. This uncut line of attachment conventionally forms the leading edge when the stationary is being fed to a machine to ensure that the tabs pass easily therethrough.

The tabs are elongated, having a length: breadth ratio of about 4:1 and the length of the tab is approximately one-third of the distance between a feed hole spacing. The tabs are provided at a spacing such that there is at least one set of tabs on each section of the assembly between successive folds. In this particular embodiment four sets of four tabs are provided for each section. The free ends of the corresponding tabs of each web in the assembly are secured together with a quick-drying adhesive as described in more detail below.

FIG. 1 shows a series of five tabs 11 being cut from five superposed webs 10 by means of a cutter blade 12 which co-operates with a support wheel 13 having a peripheral channel 14 to receive the blade. The application of adhesive is shown in FIG. 2, the webs moving from left to right and the applicator wheel 15 having an adhesive layer 16 moving in a counterclockwise direction. The relative movement causes the tabs to adopt a configuration as shown in FIG. 2 and adhesive is applied to the end of each tab.

It can be seen from FIG. 2 that successive tabs are supplied with a greater area of adhesive on that tab of the lowermost web having the largest area. Thus the "holding effect" of the tabs can be varied by varying the area of the tabs to which adhesive is applied and two extreme examples are shown in FIGS. 3 and 4 of the drawings. In FIG. 3 the small quantity of adhered area 17 provides a hold with little tenacity but great flexibility whilst in FIG. 4 the adhered area 18 provides a hold with great tenacity but with little flexibility.

The "holding effect," may, of course, be varied in other ways, for example variations in the number, disposition, size and shape of the tabs and the type and amount of adhesive used.

The stationary assemblies of the invention thus provide a flexible securement between the webs which overcomes the problems associated with the direct securement, (e.g., by spots or lines of adhesive) of the contiguous webs, such problems being, for example, "tenting or peaking" (i.e., bulging at the folds of the assembly) and securement out of registration.

It will be apparent that the above described assembly can be modified while still retaining the benefits of the invention. The tabs can be of any convenient shape, may be irregularly arranged along the webs, and may be situated other than in the feed hold margin. Also, where more than one tab is used at one location, each tab may be different and they may be arranged in an irregular pattern. In addition the tabs may form part of another feature of the assembly. Only a proportion of the tabs may be glued in order to leave some unglued for different operational requirement.

The invention also provides a method of, and apparatus for, producing continuous stationary assemblies. The method comprises producing tabs in at least two superposed webs in a stationary assembly, applying adhesive to said tabs either before or after they are produced, displacing the tabs towards one side of the assembly, and urging the adhesive-carrying portions of corresponding tabs into contact.

One form of apparatus according to this invention is shown in FIG. 5 of the accompanying drawings. A pin feed device 20 feeds the assembly between a pair of co-operating rolls carrying a tab-cutter 12 and die 13 respectively. If desired the assembly is then fed to a register-adjusting section which comprises a pin feed device having a pair of smaller diameter rolls disposed on either side of the pin feed device. The position of the first small roll is fixed but that of the second roll is adjustable in a direction perpendicular to the assembly path. The relative movement through this apparatus causes the tabs to adopt a configuration as shown in FIG. 2. After the tabs have been secured together they may, if desired, be returned to lie in the plane of the webs.

In the embodiment shown the register adjusting section is omitted and a single tensioning roller 23 employed. The assembly is then passed over a support tray 24 and to an adhesive unit which contains a lower roller 15 fed with adhesive from a reservoir 26 by two co-rotating rolls 27 and 28 and an upper roller 29 having a pair of diametrically opposed projections 30 which alternately present an impression surface to the top of the sets to ensure that the tabs are extending to the web with the ends of the tabs staggered to receive adhesive when they reach the adhesive roll. The speed of rotation and disposition of the roll 15 relative to the webs is preferably variable to enable various types of "hold" to be obtained as described above. The adhesive used should be sufficiently quick-drying to ensure that it is dry when the assembly is folded into a pack or rolled and is preferably a "hot melt" adhesive which sets very quickly.
The assembly is then delivered by means of the pin-feed roll 31 which also serves to urge the tabs into contact with one another.

A more elaborate arrangement for the production of continuous multielement assemblies is shown in FIGS. 6A and 6B. A web assembly is passed over each of pin-feed rolls 40 and 41 and the combined assembly passed to tab-cutter 12 and die 13 similar to that of FIG. 5. The assembly then passes beneath an adjustable register roll 44, over a further pin-feed roll 45 and beneath a vertically adjustable register roll 46.

The registered assembly then passes over a support plate 58 to an adhesive unit 47 similar to that in FIG. 5. The assembly, now with adhesive coated tabs, is passed upwardly and over a blower or fan 48 and then down to a tab contacting unit which comprises a pair of rolls 49 and 50 each having a pair of diametrically opposed projections, the upper roll 50 rotating at a speed such that a projection passes through each tab-hole so that the tabs are flicked to a forward position and urged between the projections. The projections may be chamfered at their tab-contacting extremities to ensure close-contacting of the tabs over their terminal area.

The assembly is then passed beneath roll 52 where a further web is superposed thereon and over pin-feed roll 53 where two further webs are added beneath the assembly. The combined assembly is cut in a second tab-cutter 54 and die 55 similar to the first tab cutter 12 and 13. The use of this second cutter ensures that the first tabs have not become adhered to the webs, which reduces the flexibility of the hold, but also serves to cut tabs in the additional webs. These are not secured to adjacent webs but provide a temporary attachment thereto by virtue of the interengagement of the tabs and the holes in the webs from which tabs have been cut.

Further webs are added to the assembly via roll 56 and pin-feed roll 57, these webs having no holding feature. It will be seen that for the sake of clarity only three webs have been shown passing through the apparatus the added webs being omitted from the assembly as shown.

It will be appreciated that the apparatus described above will cut only one line of tabs, but by suitable arrangement of cutters and dies any number of lines of tabs, both in transverse alignment of staggered, may be produced. Furthermore, a plurality of adhesive applying units can be provided so that different webs in the assembly may be provided with more or less flexible holdings.

1. Apparatus for producing stationery assemblies comprising means for moving a plurality of continuous superposed webs along a general path of travel, cutter means adjacent said path for forming a plurality of at least partially superposed tabs in said webs and for bending said tabs so that their free ends project outwardly from one side of said webs and said path of travel and extend in a leading direction along said path of travel, adhesive applying means comprising roller means mounted for rotation adjacent said path of travel on said one side thereof, said roller means being positioned to engage said free ends of said tabs and simultaneously apply a controlled amount of adhesive thereto as said webs are moved along said path, and means for rotating said roller means in a direction generally opposite the direction of movement of said webs so that said free ends of said tabs, upon engaging said roller means, are bent away from said webs.

2. Apparatus for producing stationery assemblies as defined in claim 1, comprising means for varying the disposition of said roller means toward and away from said webs and means for varying the speed of rotation of said roller means to variably control the amount of adhesive applied to said free ends of said tabs and the area of said tabs to which the adhesive is applied.

3. Apparatus for producing stationery assemblies as defined in claim 2, said web moving means comprising feed roller means receiving said webs after they have passed said adhesive applying means and urging said adhesively coated tabs into contact with one another.

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