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H. E. LEE

2,307,142

METHOD OF AND APPARATUS FOR SUPERPOSING AND SEVERING WEBS

Filed Oct. 25, 1941

2 Sheets-Sheet 1

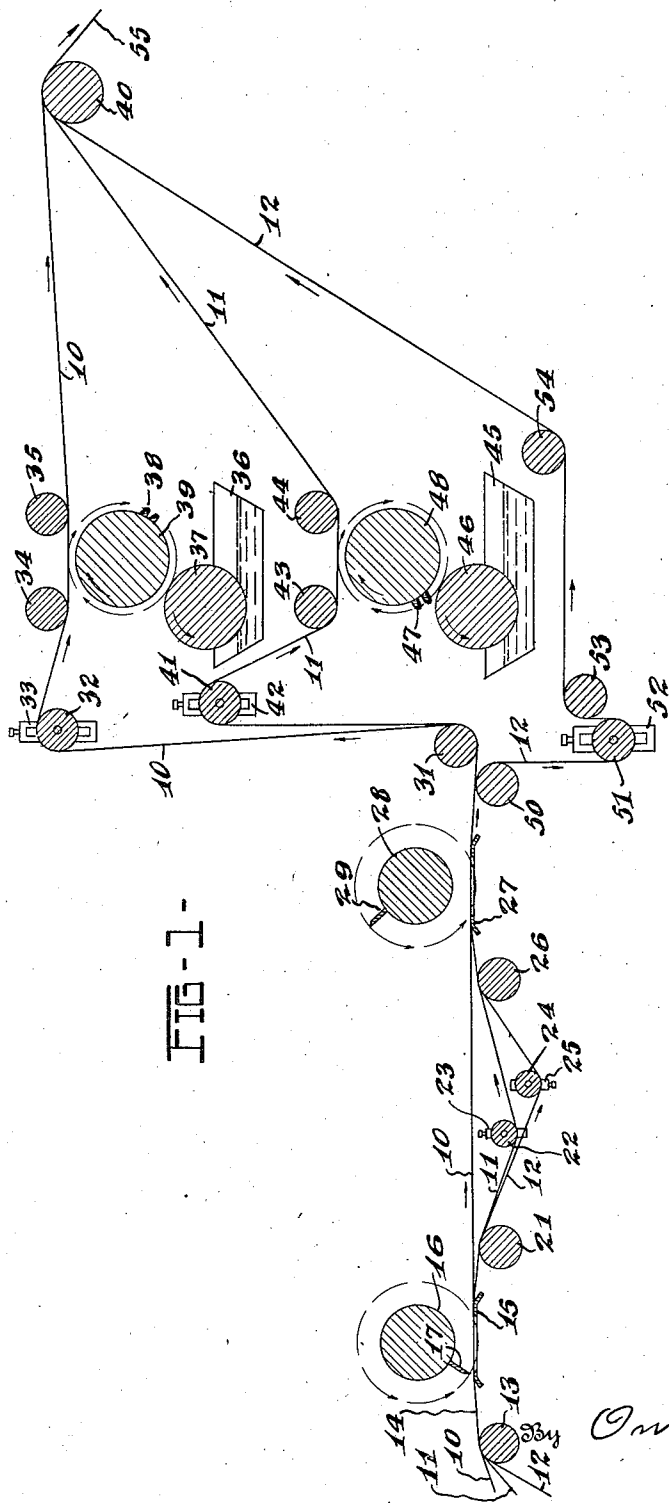


FIG-1-

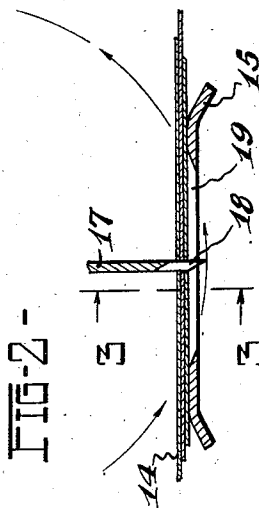


FIG-2-

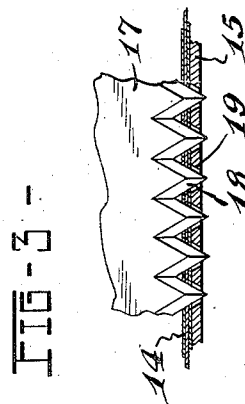


FIG-3-

Inventor
HARRY E. LEE

Owen & Owen

Attorney

Jan. 5, 1943.

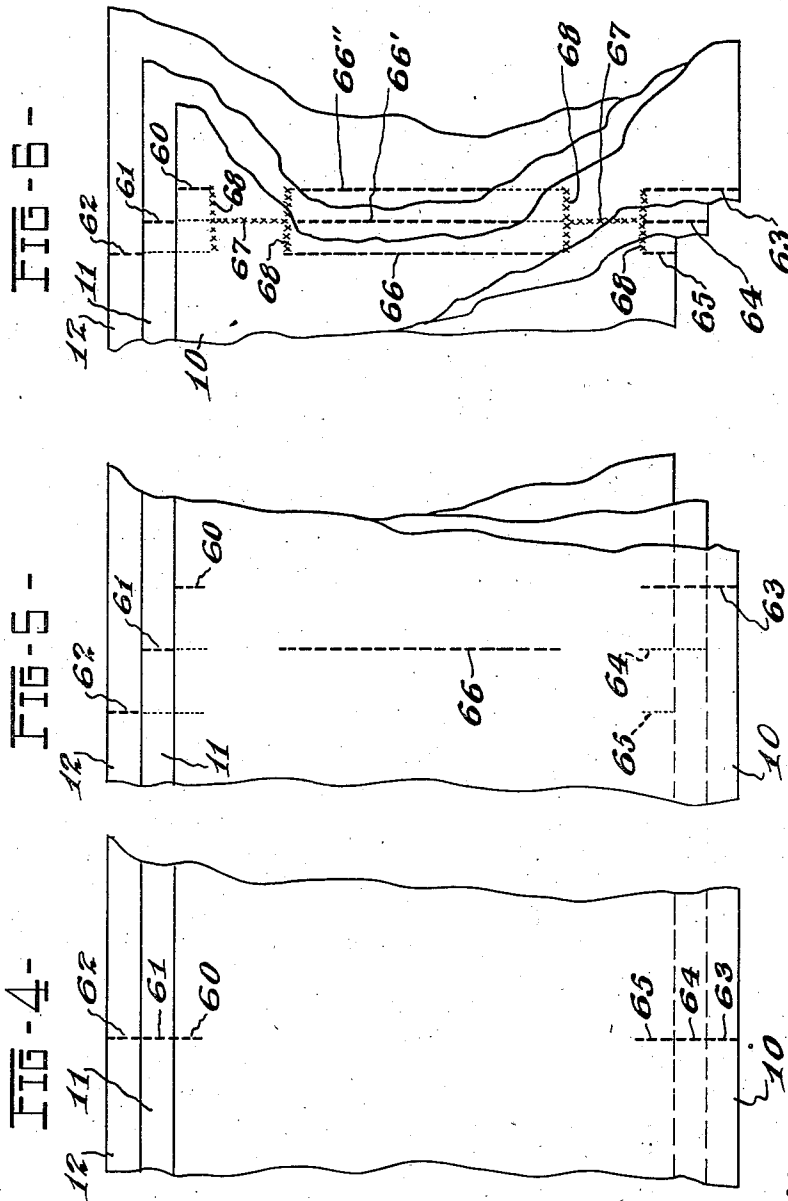
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METHOD OF AND APPARATUS FOR SUPERPOSING AND SEVERING WEBS

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2 Sheets-Sheet 2



Inventor

HARRY E. LEE

By *Owen & Owen*

Attorneys

UNITED STATES PATENT OFFICE

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METHOD OF AND APPARATUS FOR SUPER-
POSING AND SEVERING WEBSHarry E. Lee, Oswego, N. Y., assignor to St. Regis
Paper Company, New York, N. Y., a corporation
of New York

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6 Claims. (Cl. 270-52)

This invention relates to a method of and apparatus for superposing and severing webs.

More particularly, it relates to a method and device of this kind where the webs are to be formed into a tube and the tube severed into lengths suitable for the formation of multiply bags with at least portions of the ends of the plies severed at different lengths.

The object of the invention is to provide a method and means whereby webs may be superposed and perforated or cut along common lines and then shifted so that the lines are staggered relative to each other in order that the webs when finally separated will have staggered edges.

Where it is desired that the severed edges of the webs will be staggered at certain portions differently from their staggering at other portions, the process may be repeated.

Details of the invention and minor objects will appear as the description proceeds.

In the drawings forming a part of this application

Fig. 1 is a diagrammatic side view of apparatus for carrying out the process;

Fig. 2 is an enlarged detail section through a portion of the perforating device;

Fig. 3 is a section on the line 3-3 of Fig. 2;

Figs. 4, 5 and 6 are diagrammatic plan views of successive steps in the severing operation.

In the form of the invention disclosed in the drawings, there is provision made for superposing and severing three webs of paper. As arranged, there is an upper web 10, an intermediate web 11 and a lower web 12. It will be readily understood that the number of webs may be decreased or increased as desired with appropriate additions or omissions in the apparatus.

At the left of Fig. 1, the three webs are shown as being drawn from any desired source which usually will be large rolls of paper. The webs are brought together over guide roll 13 and then drawn in superposed relation, as indicated at 14, to and over a grid 15. Above the grid 15, there is a cutter support 16 which carries a perforating knife 17 having teeth 18 adapted to enter between the bars 19 of grid 15, as clearly indicated in Figs. 2 and 3. By this means, perforations are produced through the superposed webs of paper along such portions of the width as desired.

In the form of device disclosed, web 10 is drawn in a substantially straight line from grid 15, but webs 11 and 12 are bent downward over guide roll 21. From thence web 11 is guided beneath roller 22 which is mounted by suitable

means, indicated at 23, for vertical adjustment. Web 12 in similar manner is guided beneath roller 24 which likewise is mounted for vertical adjustment by suitable means 25. From rollers 22 and 24 webs 11 and 12 are brought together over guide roll 26 and together with web 10 are drawn over grid 27 where they may be perforated along such portion of the width as desired by a rotatable carrier 28 which carries a cutter or perforator 29 similar to perforator 17.

From grid 27, webs 10 and 11 are guided under roller 31 and thence upward. Web 10 is carried up over guide roll 32, which is mounted by a suitable means 33 for vertical adjustment. From thence, web 10 is led beneath guide rolls 34 and 35. A paste pan 36 is provided beneath guide rolls 34 and 35 and a glue roll 37 transfers the glue, paste or other adhesive in pan 36 to a paste pad 38 mounted upon a suitable carrier 39.

In a similar manner, web 11 is carried up over roller 41 mounted for vertical adjustment by means of a suitable mounting 42 and beneath guide rollers 43 and 44. A pan 45 is located beneath rollers 43 and 44 and is provided with a transfer roller 46 for transferring adhesive to paste pads 47 upon a suitable carrier 48.

Web 12 is led downward around guide roll 50 and beneath guide roll 51 which is mounted for vertical adjustment by suitable means 52. The web is led upward from adjusting roll 51 over guide roll 53 and beneath guide roll 54. From rolls 53, 44 and 54, respectively, webs 10, 11 and 12 are drawn over a guide roll 40 from which they are led together, as indicated at 55, to a suitable tubing machine where they may be formed into a tube, after which the completion of the severance may be effected.

It will be readily apparent that, after lines have been perforated by perforating device 17, webs 11 and 12 will be retarded in successive degrees with respect to web 10 so that, when they reach grid 27, the lines perforated over grid 15 will be shifted with respect to each other. Thereupon, device 29 may perforate the webs along the desired portion.

Thereafter by proper adjustment of the rolls 32, 41 and 51, the length of the paths from grid 27 to roller 40 may be so adjusted that when the webs reach roller 40 the perforated lines will have the desired relation one to another. Pads 38 and 47 are arranged to apply adhesive to the webs so that, when superposed over roller 40, they will be adhered together for subsequent manipulation.

It will be readily seen that, by apparatus of this construction, the portions of the webs which

are perforated by members 17 and 29 may be varied by suitable variations of these members, and that the relative final positions of these perforated lines may be readily adjusted, as desired, by proper adjustment of rollers 22, 24, 32, 41 and 51 so that a great many variations in the final design of the lines may be effected. Figs. 4, 5 and 6 indicate diagrammatically one arrangement which may be made which will take advantage of this apparatus to produce successive bag lengths having ends suitable for being closed by the usual pasting operation and having their side flaps stepped oppositely so that each ply of each side flap will be adhered to the corresponding ply of the other side flap.

The operation of the device may be described in connection with the diagrammatic views.

In Fig. 4, there is a plan view of the superposed webs 10, 11 and 12 as they leave grid 15. It will be seen that they are stepped laterally for convenience in adhering their edges together subsequently to form a multi-ply tube. It will be seen at the top of Fig. 4 that there is indicated a line of perforations 60 in web 10, 61 at the edge of web 11, and 62 at the edge of web 12. It will be readily understood that the perforations extend through all webs so that perforated lines 61 and 62 extend down as far as line 60. Similarly, at the bottom of Fig. 4, there is a similar row of perforations, but in this case, the row 63 in the upper web 10 is longer than the rows 64 and 65 in the lower webs. Fig. 5 is a diagrammatic plan view of the webs as they leave grid 27. Webs 11 and 12 are retarded relatively to web 10 so that when again superposed over grid 27, lines 61 and 62 and 64 and 65 are retarded to successive degrees behind lines 60 and 63 in the upper web 10. By means of member 29, there is produced another line of perforations, indicated at 66.

Fig. 6 is a diagrammatic plan view of the relation of the webs and their perforations as they leave roller 40. Between grid 27 and roller 40 in the construction shown the webs 10 and 11 are retarded somewhat with respect to web 12 so that the row of perforations 66 in web 10 is behind the row 66' in web 11, and row 66'' in web 12, these three rows having been formed simultaneously by member 29. It will be readily seen that if the superposed webs are then folded into a tube with their edges adhered along a median longitudinal line of the tube, the unperforated portions of each web will come at the edges of the tube when the tube is collapsed. In this case, the tube may then be run under a cutting apparatus and all webs cut off squarely across the lines indicated at 67 and slit along lines indicated at 68. It will be understood, of course, that after the cutting of the paper along lines 67 and 68, suitable tension may be placed upon the tube so as to tear the webs along the respective lines of perforation so as to complete the severance of the tube.

Thereupon, it will be seen that the corners of the bags will be severed along lines which form continuations of perforated lines 61 and 66' while the web 10 will extend a longer distance in one of the side flaps up to lines 60 and 63 while it will be shorter on the other side flap, terminating at line 66. Conversely, web 11 will be cut off shorter at line 62 and 65 on the side flap where web 10 extends the farthest, while web 12 will extend to line 66'' on the side where web 10 is the shortest. In this way, the two side flaps will be stepped in opposite directions.

As indicated above, it will be readily understood that by variation in the portions of the web which are perforated by the respective perforating members and variation in the shifting of the webs after the first perforation and after the second perforation, if desired, the final pattern may be varied widely, the one indicated in Figs. 4, 5 and 6 being merely one pattern which has been found desirable for certain purposes.

It will be readily understood also that where the desired pattern at the end of the tube is more simple, only one shifting of the webs may be necessary after the perforating operation. For example, if it was satisfactory to step both side flaps in the same direction, the single perforating operation with subsequent shifting of the webs would accomplish this purpose. On the other hand, more complicated designs could be produced by introducing extra shifts as to one or more webs and in the construction it will be readily seen that two or more webs might be guided together through any one or more of the desired shifts. For example, if it should be desired to shift one of the webs with respect to the others in order to produce an extending portion of one ply only at a part of the end of the bag, this could be done readily by perforating that portion of the bag with the webs superposed and then shifting the single web with respect to the other webs the desired distance.

While means have been indicated for applying paste to certain portions of the adjacent surfaces of the plies during the final shifting so as to adhere them together, it will be readily understood that this means may be varied in accordance with the pattern desired, and may be omitted if not found necessary.

It will be readily seen that by this method and apparatus, there has been devised an arrangement wherein a single perforating member may be employed for simultaneously perforating as many webs as desired, and at the same time, the perforations in the webs may be shifted relative to each other in the final tube to the degree desired simply by adding the desired guide rolls and adjusting them as required.

What I claim is:

1. Apparatus for perforating webs comprising means for superposing a plurality of webs, means for advancing the superposed webs, means for perforating the webs along at least a portion of a line transverse to the line of movement of the webs, means for separating and again superposing the webs, and means for adjusting the lengths of the individual paths of the webs between such separation and second superposition.

2. In apparatus for perforating elongated webs of paper, means for superposing the webs and moving them forward longitudinally of the webs, means for perforating a portion of the webs transversely of the line of movement, means for thereafter separating and again superposing the webs a plurality of times, means for adjusting the lengths of the individual paths of the webs between each separation and resuperpositioning, and means for perforating an additional portion of the webs transversely of their line of movement at each successive superposition except the last.

3. Apparatus comprising means for superposing a plurality of webs of paper, means for forming perforations through the superposed webs along a certain line, means for then separating the webs, and means for applying adhesive to a surface of one of the separated webs that is towards another of the webs, and means for again super-

positioning the webs with the lines of perforations shifted and with the adhesive uniting the webs in said shifted position.

4. The method of perforating webs of paper which comprises superposing a plurality of webs, producing perforations along certain lines through the superposed webs, thereafter separating the webs, shifting them with respect to each other, and again superposing them with the perforated lines shifted respectively from each other.

5. A method which comprises superposing a plurality of webs of paper, producing perforations through the superposed webs along a certain line, separating the webs and again superposing them with the lines of perforations shifted with respect

to each other, and again perforating the superposed webs along another line, again separating them, and again superposing with the perforations along said other line shifted with respect to each other.

6. The method which comprises superposing a plurality of webs of paper, forming perforations through the paper along a line, separating the webs, applying paste to at least one of the webs while separated on a face towards one of the other webs, then again superposing the webs with the lines of perforations shifted with respect to each other, and affixing them in said shifted position by means of said adhesive.

HARRY E. LEE.