Nov. 29, 1938. F. W. HART ET AL 2,138,788

METHOD OF MAKING FOLDERS

Original Filed Nov. 22, 1933 2 Sheets-Sheet 1

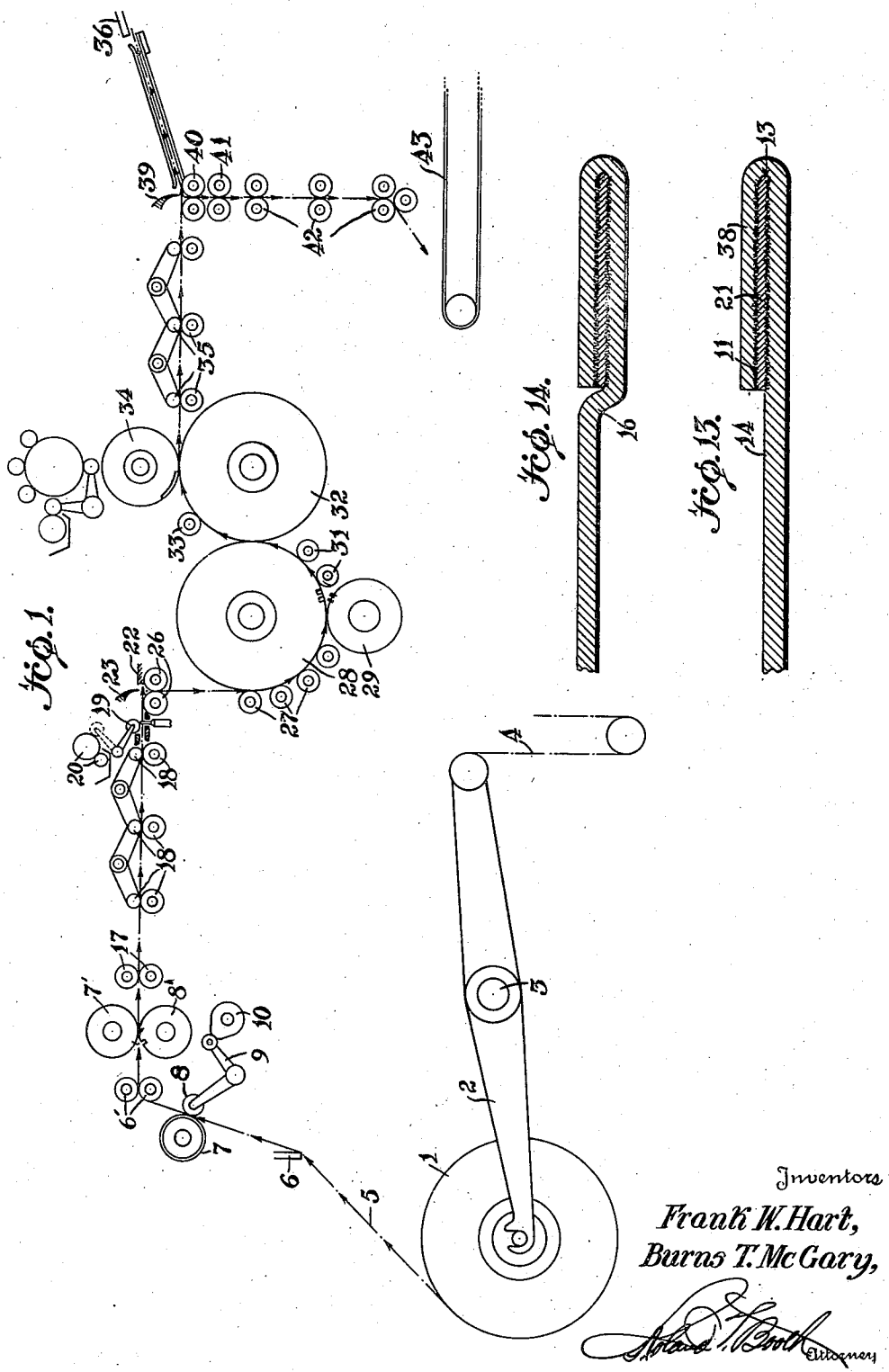


Fig. 1.

Fig. 14.

Fig. 13.

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METHOD OF MAKING FOLDERS

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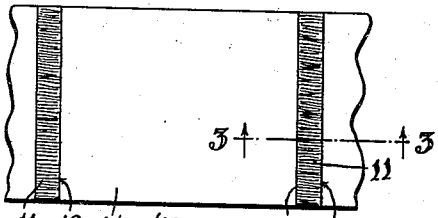


Fig. 2.

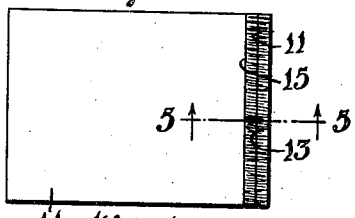


Fig. 4.

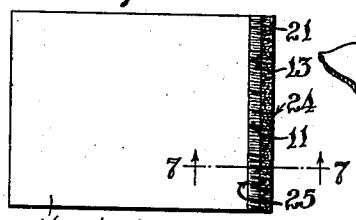


Fig. 6.

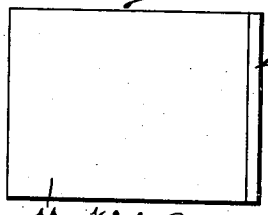


Fig. 8.

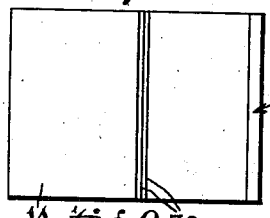


Fig. 9.

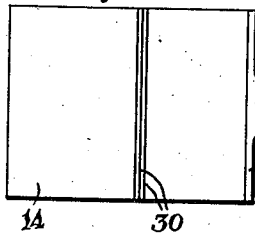


Fig. 10.

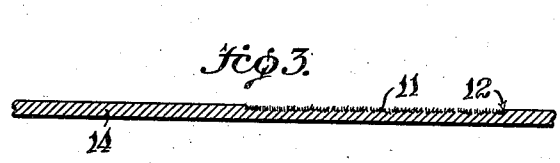


Fig. 3.

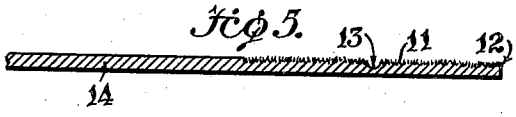


Fig. 5.

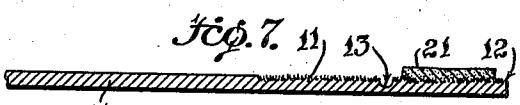


Fig. 7.

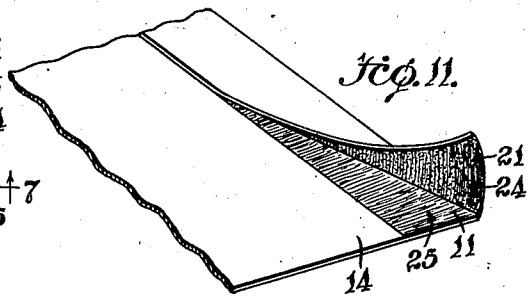


Fig. 11.

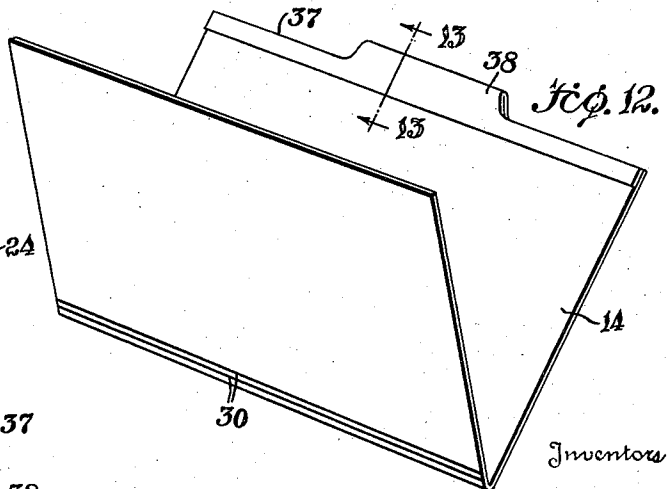


Fig. 12.

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UNITED STATES PATENT OFFICE

2,138,788

METHOD OF MAKING FOLDERS

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Original application November 22, 1933, Serial No. 699,150. Divided and this application October 22, 1936, Serial No. 107,006

6 Claims. (Cl. 93—1)

This application is a division of application Serial No. 699,150, filed November 22, 1933.

This invention relates to improvements in file or correspondence folders or wrappers and the method of making the same.

Prior to the present invention folders of a similar character were made from a single sheet of paper to provide a front and back fold in which the back fold was provided with a flap on the free end folded over and pasted on the back, to form an index tab and a strip along the upper edge of the back of the folder. These folders were made from paper produced by the Fourdrinier process. The paper was soft, having sufficient absorptive qualities that it would readily absorb the adhesive applied to the flap for pasting it to the back. The longitudinal and transverse strength of the paper was about equal and the wearing qualities of the folders were limited on account of the softness of the paper used. The paper was also highly flexible resulting in the paper changing position in the folders in insertion, removal and other handling of the folders in filing which in some instances caused the index tabs on the upper ends of the back of the folder to be pulled down into a concealed or partially concealed position in the file drawer.

It has been desirable for some time past to produce folders of this character from better grades of paper stock of a different character having less flexibility, greater strength and wearing qualities and at the same time overcoming the disadvantages of the soft paper heretofore used in the handling of the folder in filing.

It is also desirable to use a paper having a glossy and hard surface, and also a heavier stock in order to make stronger folders for withstanding wear in frequent handling. No means have been heretofore found prior to this invention that will firmly unite the reinforcing flap on the free end of the back portion of the folder with glossy hard-surfaced paper, as it is found that ordinary glue will not provide the proper adhesive properties to secure the flap to the back because of the gloss and hard surface, and as a result the flaps tear loose very easily when they are merely glued according to previous practice. Hot glue may be used but the manufacture of folders using hot glue is very slow, whereas the economical manufacture of folders under present conditions requires very rapid production usually obtained on machines with a minimum of labor.

The present invention comprehends the rapid production of folders from all different kinds of papers, including glossy hard-surfaced papers, of heavier stock than heretofore used if desired; of folders having a flap secured to the upper or free edge of the back and integrally united therewith through having the opposed surfaces of the flap and back roughened to loosen the fibers of the paper and by means of using an adhesive with these roughened surfaces of the flap and back, the flap is rigidly united with the back. This provides for the use of hard-surfaced glossy paper, such for example as paper made by the cylinder process which is steam treated in going through the paper making machines before the paper reaches the calender rolls, putting a gloss on the paper and giving it a skin hardness desirable for use in folders.

Stronger paper stock may be used with the grain of the paper running longitudinally through the folder so as to strengthen the folder and provide a folder structure, that will have considerably longer wearing qualities and will not buckle and crease in being inserted and removed from a file drawer, or change its shape so that the index tab will become concealed. By means of roughening the surfaces of the flap and back a firm uniting of the flap with the back is secured with these sized, glossy and hard-surfaced papers of any suitable weight that is desired, producing folders from papers that have not heretofore been adapted to the manufacture of these folders with flaps secured to the back, because the flaps would not stay permanently fixed in position. The scoring of the paper between the flap and back also cooperates with the roughening in securing the flap to the back.

The invention further comprehends the provision of a new method of manufacturing folders having flaps secured to the free edge of the back so as to provide for the rapid production of the folders, consisting in making the folders from a paper strip or sheet that is continuously fed through a treatment zone and has spaced rather small or short sections thereof roughened to loosen the fibers in the paper throughout the section, the sheet being scored across this roughened section intermediate the edges thereof to define the line of fold between the flap and the back of the folder, while the sheet is further scored intermediate separated roughened sections to define the fold line between the front and back of the folder.

The sheet is cut into sections corresponding to the length of the folder including the front and back plus the flap, the severed sheets subsequently having quick-drying glue applied to the roughened face of each section and the flaps

afterwards folded along the score to superimpose the flap on the back and join the adhesively coated roughened portions so as to integrally unite the flap and back. The method further includes the subsequent folding of the sheet to form the front and back of the folder along the score line provided for this purpose, and the delivery and stacking of the folders from the zone of treatment in a manner which enables them to be readily packed in counted lots. The method also comprehends the treatment of the paper sheet so that after it is roughened at spaced sections and scored, the cutting of the sheet into sections will arrange one roughened section at the corresponding end of each severed sheet section so the flap will be at one end of the sheet in order that the mere folding of the sheet on the score line through the roughened section will complete the application of the flap to the back without further cutting of the paper. After the flap is united with the back the edge of the flap and back may be tab-cut by removing portions of the free edge of the united flap and back in the zone of treatment of the paper strip so that a projecting tab portion remains on the folder.

The invention provides for the making of folders in pairs during passage through said treatment zone in which a pair of folders are formed from the paper strip simultaneously in the manner set forth above. The pair of folders are arranged in end to end relation across said strip and each pair forms one of the sheet sections. The sheet sections are divided to form the pair of folders by suitable cutters at the delivery end of the treatment zone after the sections have been roughened, cut, scored, and the flaps pasted down and tab-cut. Advantages are secured in making folders in pairs due to the ability to more positively and uniformly feed the sheets and gauge the positioning of the sheets so as to secure accurate folding, scoring, roughening and cutting.

The invention further comprehends the offsetting of the free marginal portion of the back of the folder which is preferably done after the surface of the paper sheet has the sections thereof roughened so that the offset portion accommodates the flap in folded position on the back with the free edge of the flap seating against the shoulder at the juncture between the offset portion and the remaining part of the back of the folder. This protects the edge of the flap against being engaged by the edge of the papers during their removal from the file and provides for the smoother operation of the folders upon being inserted and removed from a file drawer or in the insertion or removal of the papers from the file.

In the drawings:

Fig. 1 illustrates diagrammatically the treatment zone through which the sheet of paper passes and how it is handled to form a folder according to the invention.

Fig. 2 is a plan view of the paper sheet showing the roughened zones or sections on one face of the sheet.

Fig. 3 is an enlarged diagrammatic illustration of a roughened portion of the sheet of paper taken on line 3—3 of Fig. 2.

Fig. 4 shows the scoring in the roughened section, and shows the paper sheet after it has been cut to form a strip equal to the length of one folder.

Fig. 5 is an enlarged cross section taken on line 5—5 of Fig. 4.

Fig. 6 illustrates the application of the glue to the roughened section of a folder.

Fig. 7 is an enlarged cross-section taken on line 7—7 of Fig. 6.

Fig. 8 shows the flap on the folder in the folded position which takes place after the application of the glue as shown in Fig. 6.

Fig. 9 shows another scoring operation on the folder to define the juncture between the front and back portions of the folder.

Fig. 10 illustrates a tab-cut folder in which the tab-cutting is performed on the folder after it is formed in the manner illustrated in Fig. 9.

Fig. 11 is an enlarged fragmentary perspective showing one corner of the folder with a portion of the flap curled up to clearly illustrate the roughened and glued portions that are superimposed in face-to-face contact for obtaining a firm integral uniting of the flap with the back of the folder.

Fig. 12 shows a finished tab-cut folder made according to this invention, in perspective.

Fig. 13 is a magnified cross-section taken on line 13—13 of Fig. 12 showing the flap in superimposed rigidly secured position on the back of the folder, the roughened surfaces and adhesive being diagrammatically illustrated.

Fig. 14 is a cross-section through a folder similar to the folder illustrated in Fig. 12 with the marginal portion of the back offset so that the flap portion lies substantially in the plane of the remaining part of the back.

Folders are continuously and rapidly produced according to the invention by rotatably mounting a roll of paper indicated diagrammatically at 1 on movable arms indicated diagrammatically at 2 fulcrumed in a suitable manner at 3 operated by suitable means diagrammatically indicated at 4 for moving the arms on the fulcrum to maintain the paper roll at the proper elevation. The paper sheet diagrammatically indicated at 5 as it leaves the roll is continuously and uniformly fed past a straightening bar diagrammatically indicated at 6 to take the curl out of the paper. This straightening bar eliminates the curling tendency of the paper so that it will pass through the remaining treatment zone as shown in Fig. 1 without curling during the processing of the paper to form the finished folder.

The sheet 5 is then continuously fed into feed rolls 6' and before the paper reaches feed rolls 6' the paper sheets move past a roll indicated diagrammatically at 7 having a roughened abrasive surface with which it is periodically engaged in its movement to roughen one face of the paper in predetermined uniformly spaced sections thereof. This is obtained by providing a pressing roll diagrammatically indicated at 8 carried by bell crank 9 suitably operated periodically by cam 10 to move pressing roll 8 into engagement with the web of paper passing the roll and forcing the web of paper against the rotating roughened roll 7. This operation is timed so that a roughened surface is formed throughout a relatively short section of the paper sheet at spaced intervals as indicated at 11 in Fig. 2. This roughening occurs only on one face of the paper sheet and extends transversely thereof as shown in Fig. 2. The roughening removes the gloss and loosens the fibers on the surface of the paper so that the surface is somewhat softened and the fibers raised throughout the section to provide for the ready absorption and carrying of an adhesive for securing the flap to the back in a manner which will presently be described.

After passing through feed rolls 6' the paper strip then passes between cutting and scoring rolls

7' and 8' that cooperate to sever the sheet along the forward edge of each scored section 11 substantially along the line indicated at 12 in Fig. 2 so as to sever the sheet into a series of sections each of which is provided for forming a folder. The rolls 7' and 8' simultaneously score the sheet intermediate the edges of the roughened portion 11 as indicated at 13 in Figs. 4 and 5. The sheet sections designated by numeral 14 may also be offset if desired, by forming the rolls 7' and 8' for offsetting the roughened section of the paper at the opposite edge of the roughened section from the portion indicated at 12 along a portion indicated by the line 15 in Figs. 2 and 4 for producing the offset indicated at 16 in Fig. 14. It will be understood that the offset is not actually illustrated in Figs. 2 and 4 but is formed as indicated in Fig. 14, the position of formation being along the line 15 so that the line illustrates the position of the offset in relation to the roughened section 11 and the ends of sheet sections 14.

For producing this offset, roll 7' is provided with a radial projection extending parallel to the axis across its periphery equal in height to the amount of offset desired and having a width equal to the distance between lines 12 and 15. This projection is located with one edge at the cutter and arranged to follow the cutter in operation. Roll 8' will be formed with a recess complementary to the projection of a size sufficient to receive the projection and the thickness of the paper engaged about said projection.

The sheet sections continuously move through the zone of treatment or operation as illustrated in Fig. 1, the sheet sections being engaged and fed by feed rolls 17 into feed rolls 18 that operate at a higher speed than feed rolls 17 and successively space the sheet sections apart.

As the sheet sections 14 leave feed rolls 18, a suitable layer of adhesive is applied by the roll indicated diagrammatically at 19 to the roughened sections 11, the glue being supplied to the roll 19 by a suitable series of rolls 20 which transmit the glue from a reservoir diagrammatically shown in Fig. 1. A glue or adhesive of suitable character may be used that is unheated and therefore operated at normal temperatures and provided with suitable ingredients to cause it to become quick-drying upon its application to the roughened sections 11. The adhesive coating or layer is shown in Figs. 6 and 7 at 21.

The sheet sections are then moved into engagement with a stop member 22 immediately after the glue is applied and a folding blade 23 immediately operates to engage score 13 to fold the roughened section 11 of each sheet section 14 substantially in half along score 13 so as to superpose portion 24 as indicated in Figs. 6 and 11 onto portion 25. The portion 24 forms the flap of the folder and the portion 25 is the free margin of the back of the folder onto which the flap is superposed by folding blade 23. The folding is completed through the folding blade cooperating with rolls 26 diagrammatically illustrated in Fig. 1 which roll or force the flap onto the back of the folder to bring the roughened faces of sections 24 and 25 together in superimposed relation so that the adhesive will immediately and firmly integrally unite the flap with the back.

The sheet sections 14 are then fed into the combined pressure and feed rolls 27 cooperating with roll 28 formed to operate with scoring roll 29 for scoring the central portion of each sheet section to provide a plurality of spaced parallel scores 30 as shown in Figs. 9 and 10 for defining a fold line and the fold portion between the front and back of the folder and the portion of each sheet section 14 that joins the front and back of the folder. Feed rolls 31 then cooperate with roll 28 to feed the sheet sections 14 between roll 28 and roll 32, and by means of feed roll 33 cooperating with roll 32, sheet sections 14 are fed between roll 32 and printing roll 34 where any suitable printed matter may be printed onto the folder that may be desired.

Feed rolls 35 feed sheet sections 14 continuously into engagement with a suitable stop and tab-cutting unit 36. The back of the folder with the flap has its free edge fed into engagement with tab-cutting unit 36, the operation of which is timed to tab-cut the edge of the folder through the flap and back as indicated at 37 in Fig. 10 to provide the tab 38 on the folder. Immediately upon the completion of the tab-cutting, the folding blade 39 operates to engage one of the score lines 30 in the center of the sheet section 14 and folds the sheet section so that the front and back will be superposed one upon the other and fed into folding rolls 40 that complete the folding operation. These rolls 40, in addition to folding the front and back of the folder into superimposed relation, feed the folder in this folded condition through trimming rolls 41 to trim the ends of the folder by cutting a small strip portion off of the ends of the folder or the side edges of sheet sections 14 to provide for a uniform size and straight edges on all folders.

The folders are then continuously fed into the delivery rolls 42 that deliver the finished folders onto an endless conveyor 43, the folders being successively fed onto this conveyor with corresponding portions of each folder in corresponding relation. As the folders are continuously moved through the various parts or portions of the treatment zone hereinabove described and each sheet section 14 is only slightly separated from the next adjacent one, it will be understood that the folders when delivered by the delivery rolls 42 will be superimposed in offset overlapping relation one upon the other on conveyor 43 in condition for inspection, as well as in a readily assembled order from which the folders may be taken in counted groups and immediately packed.

Folders produced from a sheet of paper in roll form in the manner above described through the continuous feeding of the sheet and sheet sections through the zone of operation including the various forming operations on the sheet are produced at the rapid rate of approximately eighty or more folders per minute successively by this continuous method from a single strip of paper and where two or more folders are made simultaneously the rate of production is accordingly increased.

The invention further contemplates the production of two folders simultaneously from the same sheet of paper, the two folders being formed integrally through the entire operation above described and being separated by a center trimming roll formed in conjunction with trimming rolls 41, so that as the side edges of the sheet are trimmed off in these trimming rolls, the center portion is simultaneously cut or trimmed by the removal of a center section of the sheet to separate each sheet section 14 in its complete folded form into a pair of separate folders that are simultaneously delivered by the delivery rolls 42 in side-by-side relation onto conveyor 43.

There are advantages obtained in the feeding and handling of sheet sections 14, in the rough-

ening of the sheets to provide roughened sections 11, and in scoring, gluing and folding the various portions of the sheets by making two folders simultaneously as here described, because proper facilities for guiding the sheet sections and feeding them through the feed rolls in the various parts of the zone of treatment where the sheet is operated upon can be more accurately gauged and the feed made substantially more positive and uniform. More uniform folding of the sheets for superposing the flap on the back and folding the sheets to superpose the front and back on one another are obtained where two folders are made simultaneously and contained in single sheet form in the form of sheet section 14 until they are separated into the two folders by trimming rolls 41.

The roughening of the paper on the surfaces of the flap and back that are superposed upon one another to loosen the fibers of the paper provide such integral intimate and permanent attachment of the flap to the back that the reinforcement along the edge of the back is materially increased over the folders previously made and the firmness of the folder along the edge of the back is considerably improved and the useful life of the folder considerably lengthened in comparison to folders made prior to the present invention.

This roughening of the surfaces of the flap and back provides for the use of heavier grades of paper, paper having a hard surface, glossy finish made by the cylinder process and known as cylinder roll paper, and in fact most any type of paper which is found suitable for folder purposes. As hereinbefore explained it was not possible to use cylinder roll paper and glossed or hard-surfaced papers in a folder having the construction above described because it was not possible to secure the gluing of the flap on the back particularly where the folders are produced at a high rate of speed. This firm integral connection of the flap to the back by the cooperation of the roughened fiber surface of the flap and the back in superposed relation and the penetration of the adhesive secures a firmer edge on the back of the folder after it is die-cut to form the tab 38 which has better and longer wearing qualities along the die-cut portions than has been heretofore obtained. Where the edge of the back is offset as shown in Fig. 14, the wearing qualities of the folder at the flap portion are increased to a greater extent and the free edge of the flap is protected by the offset in the back portion so that papers in being inserted and removed in the folder will not catch on the free edge of the back of the flap, the inside of the folder being disposed upwardly as illustrated in Fig. 14 while the outside or back of the folder is disposed downwardly. The back of the folder will also smoothly ride over any papers projecting in the file adjacent thereto during insertion and removal from a drawer containing a series of folders so that there will be no interference with other papers in the file in which the folder is used.

The scoring of the roughened sections 11 at 13 obtains a uniform smooth folding of the paper without breakage along the folded edge, and compacts the fibers in the paper to a substantial extent along the folded edge so as to provide the folder with better wearing qualities along the edge of the tab which is the portion most frequently fingered in the manipulation of the folder. This wearing quality is further increased by the firm integral uniting of the flap with the back occasioned through the cooperation of the adhesive with the roughened fiber surfaces on the opposed contacting faces of the flap and back.

It is to be further understood in connection with this folder as shown in Fig. 12 that the front portion is of shorter length than the back portion in the preferred embodiment of the folder construction so that the free edge of the front portion terminates in the folded position of the folder at approximately the inner free edge of the flap, but variations in this relation of the front and back may be made to fit the needs of particular folders but it is customary in all cases to have the tab portion 38 extend above the upper edge of the front.

The use of the offset as shown in Fig. 14 facilitates indexing the folder in a typewriter because it avoids the difficulty of having the edge of the flap catch on the line gauge or other parts of the typwriter during insertion and removal of the folder for typing an index on the tab. This is in addition to the advantage of having the folder work smoother with papers due to avoiding the catching of the papers on the edge of the flap.

The invention claimed is:

1. A continuous method of making file folders at a rapid rate, consisting in substantially continuously feeding a paper strip through a zone of treatment, roughening one face of separated sections of said strip during movement in said zone, then scoring said strip in the central portion of said roughened sections, severing said strip into sheet sections having said roughened sections at one end of each separated section, applying adhesive to said roughened sections, folding said roughened sections along said transverse scoring to provide a flap on the end of said separated sheet sections having the roughened surfaces on opposite sides of said scoring secured together in superimposed integral relation, and subsequently folding said separated sections in the central portions successively and discharging said folded separated sections from said zone of treatment as separate finished file folders.

2. A continuous method of rapidly making file folders, consisting in substantially continuously feeding a paper sheet through a zone of treatment roughening one face of sections of said strip at one place during movement through said zone, scoring said strip transversely in the central portion of said roughened sections successively at another point in said zone to form a flap for said folder and to indicate the part of the sheet at the juncture between the flap and back of the folder, severing said sheet into separated sections, each having a roughened section on an end thereof, applying an adhesive at another point in said zone to said roughened section, folding said flap at another point in said zone into superimposed relation on the back of said folder to integrally unite the roughened portions at opposite sides of said scoring, and scoring and folding said sheet in the central portion of each separated sheet section at other points in said zone to provide a finished folder.

3. A continuous method of making file folders at a rapid rate, consisting in substantially continuously feeding a paper strip through a zone of treatment for the formation of pairs of folders simultaneously in connected end to end relation, roughening one face of separated sections of said strip during movement in said zone, scoring said strip transversely in the central portion of said roughened sections, severing said strip into sections having said roughened sections at one end of

each separated sheet section, each separated sheet section forming a pair of connected folders, applying adhesive to said roughened section, folding said roughened section along said transverse scoring to provide a flap on the end of each separated sheet section having the roughened surfaces on opposite sides of said scoring secured together in superimposed integral relation, subsequently folding said separated sections in the central portion successively, and finally severing said separated sections to divide the pair of folders formed therein into individual folders and simultaneously discharging said separated folders in pairs from said zone of treatment to form separate finished file folders.

4. A continuous method of making file folders at a rapid rate, consisting in substantially continuously feeding a paper strip through a zone of treatment, roughening one face of sections of said strip during movement in said zone, scoring said strip intermediate the edges of said roughened sections, offsetting said roughened sections from the remaining portion of the strip, severing said strip into sections having said roughened sections at one end of each separated section, applying adhesive to said roughened sections, folding said roughened sections along said transverse scoring to provide a flap on the end of said separated sheet sections having the roughened surfaces on opposite sides of said scoring secured together in superimposed integral relation, said flap portion in folded relation lying in the plane of the remaining portion of said separated sections, and subsequently folding said separated sections in the central portions successively and discharging said folded separated sections from said zone of treatment as separate finished file folders.

5. A continuous method of rapidly making file folders, consisting in substantially continuously feeding a paper sheet through a zone of treatment, roughening one face of separated sections of said strip at one place during movement in said zone, scoring said strip transversely in the central portion of said roughened sections successively at another point in said zone to form a flap for said folder on one end of said separated sections, said scoring indicating the part of the sheet at the juncture between the flap and back of the folder, severing said strip into separated sheet sections each having a roughened section thereon, applying an adhesive at another point in said zone to said roughened sections in the movement of said separated sections past said point, folding said flap at another point in said zone during the movement of said sheet therethrough into superimposed relation on the back of said folder to integrally unite the roughened portions at opposite sides of said scoring, pressing the said flap and back together during the movement of the sheet through another portion of said zone to firmly retain the flap and back with the roughened surfaces in intimate relation to aid in the uniting of the flap with the back, transversely scoring said separated sections in the central portion of each section in another portion of said zone to define the juncture between the front and back portions of said folder, and folding said separated sections at another point in said zone along the last-mentioned transverse scoring to complete said folder.

6. A continuous method of rapidly making file folders, consisting in substantially continuously feeding a paper sheet through a zone of treatment, roughening one face of transverse portions of said strip at one place during movement in said zone, transversely scoring said strip in the central portion of said roughened portions successively at another point in said zone to form a flap for said folder and to indicate the part of the sheet at the juncture between the flap and back of the folder and substantially simultaneously severing said strip to form sheet sections with a roughened section at each end of each sheet section, feeding each of said separated sheet sections at a faster rate of speed than the fed of said strip to separate one sheet section from another after severing from said strip, applying an adhesive at another point in said zone to said roughened sections, folding said flap in said zone into superimposed relation on the back of said folder to integrally unite the roughened portions at opposite sides of said scoring, cutting said flap and back portion along the free edge thereof to form a tab at another place in said zone, scoring the central portion of each separated sheet section transversely thereof at another point in said zone and folding said sheet sections along the last-named scoring to form a finished file folder.

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