

Jan. 6, 1942.

V. J. SIGODA

2,268,625

METHOD AND MEANS FOR APPLYING REINFORCING STRIP OR TAPE

Filed March 23, 1939

2 Sheets-Sheet 1

Fig. 1.

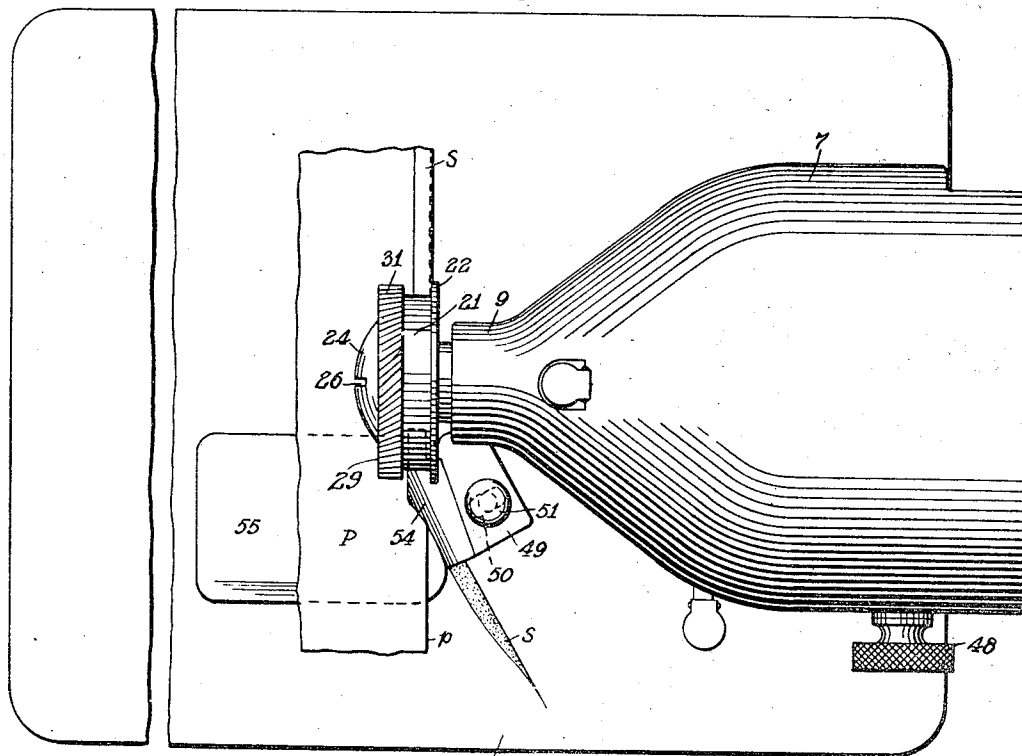


Fig. 3.

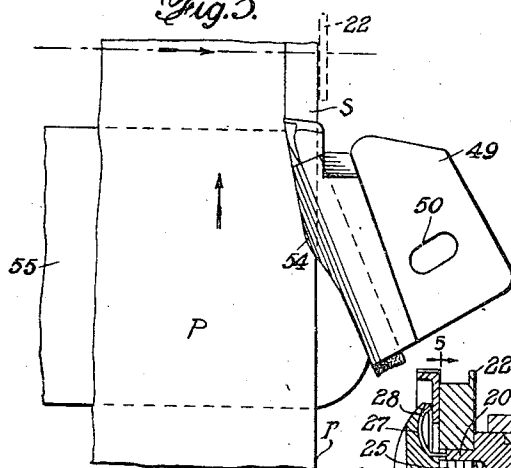
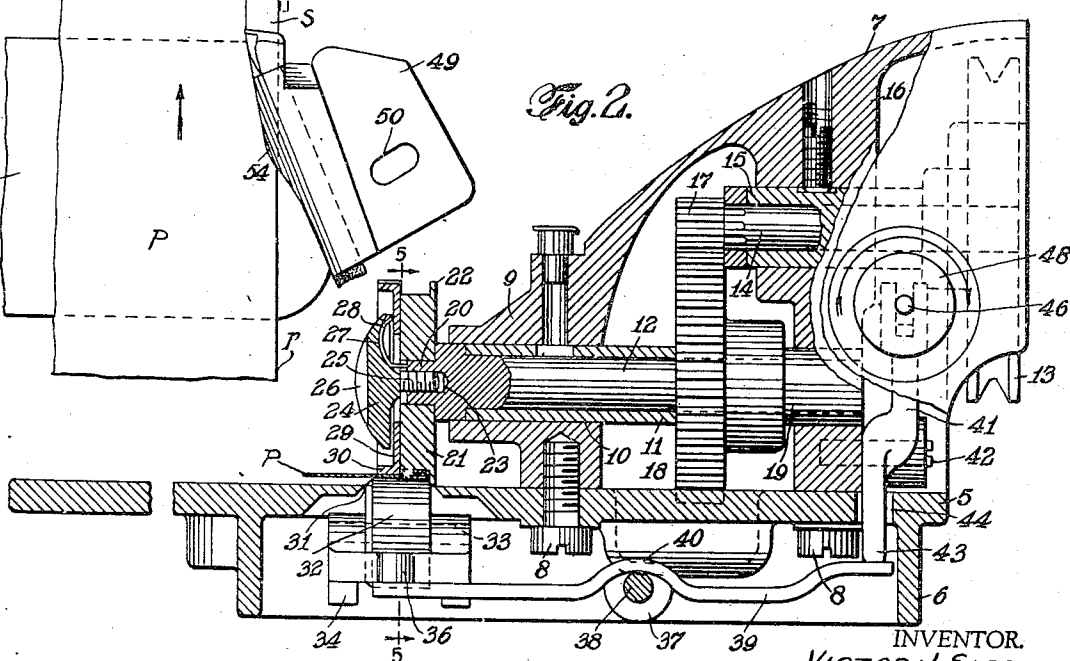


Fig. 2.



INVENTOR.
VICTOR J. SIGODA

BY

M. C. Lyddane
ATTORNEY.

Jan. 6, 1942.

V. J. SIGODA

2,268,625

METHOD AND MEANS FOR APPLYING REINFORCING STRIP OR TAPE

Filed March 23, 1939

2 Sheets-Sheet 2

Fig. 4.

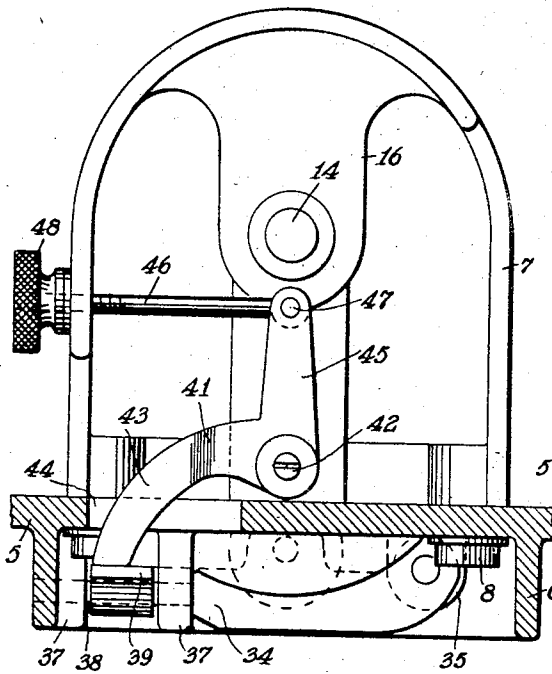


Fig. 5.

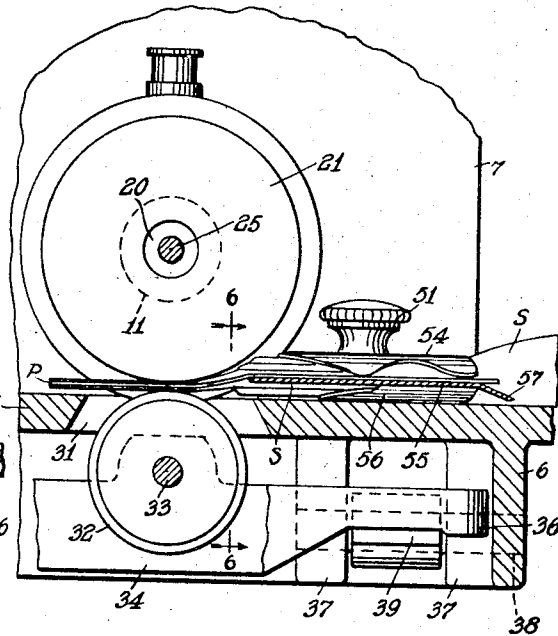


Fig. 6.

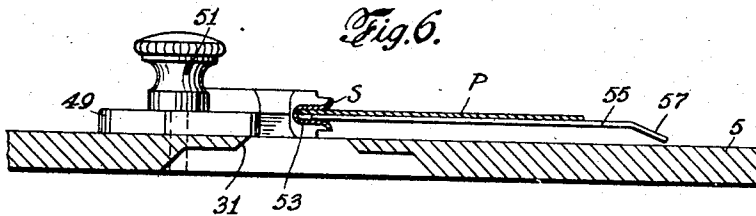


Fig. 7.

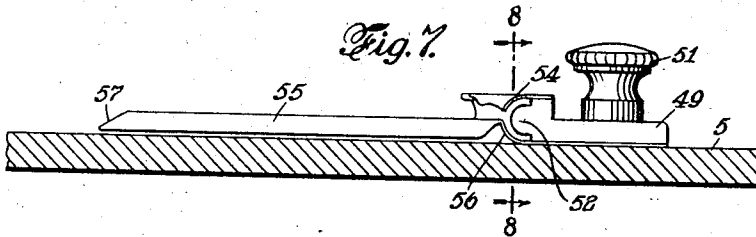


Fig. 8.

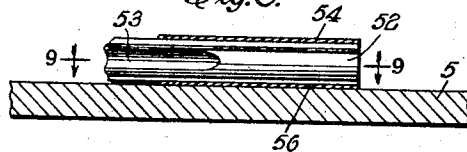
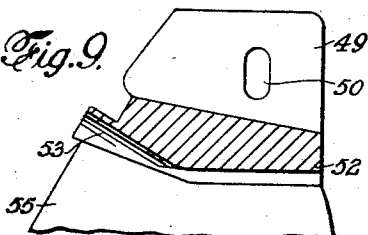


Fig. 9.



INVENTOR.
VICTOR U. SIGODA

BY

M. C. Spillane
ATTORNEY.

UNITED STATES PATENT OFFICE

2,268,625

METHOD AND MEANS FOR APPLYING
REINFORCING STRIP OR TAPE

Victor J. Sigoda, Brooklyn, N. Y., assignor to
Man-Sew Pinking Attachment Corp., New
York, N. Y., a corporation of New York

Application March 23, 1939, Serial No. 263,742

14 Claims. (Cl. 93—1)

This invention relates to a method and means for applying reinforcing strip material and has for its general object and purpose to facilitate the rapid, accurate and secure application of a folded strip of Cellophane, paper, fabric or other reinforcing material to the edges of index cards, loose leaf or data sheets and the like.

Heretofore, attempts have been made to provide an efficient machine for automatically folding and applying a gummed strip of reinforcing material to the edge of a paper or cardboard sheet, but such attempts have failed to meet the practical needs of the art. These failures were due to non-uniformity in the feeding movement of the paper and the reinforcing strip, and the inability of such machines to maintain a uniformly close contacting relation between the bight of the folded strip and the edge of the paper sheet at the point of pressure application whereby the strip was caused to adhere to the opposite sides of the paper sheet. Indentations would thus form in the folded edge of the reinforcing strip resulting in an uneven appearance. Such machines were also relatively slow in operation and production was correspondingly limited.

It is therefore, an important object of the invention to provide a simply constructed machine for operation at high speeds whereby the above noted difficulties will be overcome and maximum quantity production of the finished product obtained.

It is another object of the invention to provide an improved construction of a folder guide for the gummed reinforcing strip whereby the strip may be accurately and speedily guided to the point of application and accurately folded over the edge of the synchronously moving paper sheet.

In carrying out my new method, the reinforcing strip is fed towards the moving paper sheet at an angle of approximately 30° with respect to the edge of said sheet. The strip is first folded outwardly and its gummed surface engaged with the edge of the sheet at the bight of said fold. As the progressive feeding movement of said sheet and strip continues, the strip is then reversely folded inwardly upon opposite sides of the paper sheet. Pressure is then applied, as the paper sheet is forced laterally into close contact at its edge with the bight portion of the folded reinforcing strip, with the edges of said strip in accurate alignment, and caused to adhesively adhere to the opposite faces of said sheet.

It is also an additional object of the invention to provide a machine for the above purpose having means for positively feeding the paper sheet in accurate relation with the reinforcing strip

and which will automatically accommodate itself to sheets of varying thickness.

With the above and other objects in view, the invention consists in the improved method and means for applying reinforcing strip material, and in the form, construction, and relative arrangement of the several parts of the machine or apparatus as will be hereinafter more fully described, illustrated in the accompanying drawings and subsequently incorporated in the subjoined claims.

In the drawings wherein I have illustrated one simple and practical embodiment of the invention, and in which similar reference characters designate corresponding parts throughout the several views:

Fig. 1 is a top plan view illustrating one desirable embodiment of the invention,

Fig. 2 is a longitudinal sectional view,

Fig. 3 is a detail plan view of the folder guide for the reinforcing strip,

Fig. 4 is an end elevation partly in section,

Fig. 5 is a vertical sectional view taken substantially on the line 5—5 of Fig. 2,

Fig. 6 is a sectional view taken substantially on the line 6—6 of Fig. 5,

Fig. 7 is a front end elevation of the folder guide,

Fig. 8 is a detail vertical section taken on the line 8—8 of Fig. 7,

Fig. 9 is a horizontal sectional view taken on the line 9—9 of Fig. 8.

In the accompanying drawings, I have illustrated one form of apparatus for carrying out the present invention which includes a suitable base 5 adapted to be secured in any preferred manner upon a work table or other support. As herein shown, this base is provided with a depending flange 6 which is adapted to fit within a suitably shaped opening formed in the work support.

Upon the base 5, a housing, generally indicated at 7, is adapted to be detachably mounted by means of the screws indicated at 8. The walls of this housing have a graceful external longitudinal contour, terminating at the forward end thereof in a neck portion 9 of reduced diameter. This neck portion is provided with a bore 10 for receiving a bearing bushing 11 for the operating shaft 12.

At its rear end, the wall of the housing 7 partially encloses the power driven wheel 13 fixed on one end of the shaft 14 supported in the bushing 15 mounted in the vertical wall or web 16 of the housing 7.

The forward end of the shaft 14 is provided with a pinion 17 in constant mesh with the gear 18 fixed to the shaft 12. The rear end of the latter shaft is supported in the bushing 19 mounted in the housing wall or web 16.

The front end of the shaft 12 is formed with a reduced axial extension 20 upon which the pressure applying wheel or disc 21 is fixed. This wheel has a smooth peripheral face and at the side thereof adjacent the housing neck 9 is formed with an outwardly projecting annular flange 22.

This end of the shaft 12 is also provided with a threaded bore 23 to receive the threaded stem 25 of a retaining member 24. Preferably this member has a circular head with a convex outer face provided with a kerf 26 to receive an adjusting bit. The inner face of said head is provided with a plurality of radially extending grooves, one of which is indicated at 27, the base walls of said grooves extending in concave arcs from the stem 25 to the outer periphery of the member 24. Each of said grooves houses and conceals a leaf spring 28. The outer ends of these springs are reversely curved in an inward direction for bearing contact against the outer face of a feeding disc 29 so that said springs constantly urge said disc into close frictional contact against the side face of the pressure disc or member 31. Obviously, by adjusting the member 24 relative to the end of shaft 12, this frictional coaction between the two discs may be regulated as required so as to produce more or less frictional resistance to the eccentric shifting movement of the disc 29 relative to the disc 21.

The outer edge of the feeding disc 29 is provided with an annular flange 30 and the peripheral face of this flange is formed with blunt edged teeth 31 extending across said face at an angle relative to the axis of rotation of said disc.

It will be noted that the internal diameter of the disc 29 is materially greater than the inner end portion of the member 24 so that said disc may eccentrically shift relative to the pressure disc 21 to the extent required for the proper feeding of the paper or other sheet material, regardless of its thickness. In any case, a proper gripping action of the feeding disc with the material in its unitary rotation with the shaft 12 and pressure disc 21 will be obtained, so as to secure an evenly progressive, non-slipping feeding action.

Beneath the pressure disc 21 and feeding disc 29 the base 5 is provided with a slot or opening 31 which accommodates a vertically movable pressure roller 32. This roller is rotatably mounted on the shaft 33 fixed at its opposite ends in the spaced arms of a cradle 34, pivoted at one of its ends on the lug 35 integrally cast on the underside of the base plate 5. The other end of this cradle is provided with a longitudinal extension or arm 36, the purpose of which will be presently explained.

The underside of the base plate is also provided with spaced depending lugs 37 in which the ends of a fulcrum rod 38 are fixed. A comparatively heavy leaf spring 39 has an intermediate curved or bowed section 40 in bearing contact upon rod 38. One end of this spring, as seen in Figs. 2 and 5, exerts an upward bearing pressure upon the arm 36 of the cradle 34, and therefore tends to urge the pressure roller 32 upwardly through the opening 31 and into contact with the peripheries of the pressure disc 21 and feed disc 29, and the materials interposed therebetween, in a direction which is perpendicular to the axis of rotation of said discs.

I also provide a simple and easily adjustable means for regulating or varying the upward pressure of spring 39 against the roller cradle. In the present instance, this adjusting means is in

the form of a bell-crank lever 41 fulcrumed at the juncture of its arms upon the bolt 42 threaded in the vertical wall 16 of the housing 7. One arm 43 of this lever is arcuately curved and extends downwardly through a slot or opening 44 in the base plate 5 to apply a downward bearing pressure upon the other end of the spring 39 as clearly seen in Fig. 4 of the drawings. This arm is slightly offset from the plane of the other lever arm 45 which extends vertically upward from the fulcrum bolt 42 and to the upper end of which one end of a rod 46 is pivotally connected as at 47. This rod extends transversely of the housing 7, the other end portion thereof being threaded and projecting exteriorly of the housing through an opening in one side wall of said housing. Upon this outer threaded end of the rod 46 the adjusting member 48 has threaded engagement and is in bearing contact with a suitable surface provided upon the housing wall.

It will be apparent from the above description that when the member 48 is rotated in the direction indicated by the arrow in Fig. 2, rod 46 will be drawn outwardly to rock the lever 41. The arm 43 of this lever is thereby moved downwardly through the opening 44, said lever arm in effect constituting a cam exerting a downward pressure on the end of spring member 39 and moving transversely across its upper surface. Said spring member is thus placed under greater tension as it urges the pressure roller 32 upwardly into contact with the discs 21 and 29. In this manner, very sensitive regulation or adjustment of the pressure action of roller 32, in accordance with the particular character of the material being operated upon, can be obtained.

In advance of the pressure disc 21 and feed disc 29, a folder guide for the reinforcing strip is mounted upon the base 5. As herein shown this guide includes a base flange 49 having a slot 50 therein to receive the threaded shank of the adjusting screw 51 which is threaded into an opening in the base 5, and whereby said guide may be adjustably positioned relative to the pressure applying members 21 and 32. One edge of the flange 49 is formed with a convex rib or bead 52 which extends for substantially one-half the length of said guide and at its inner end merges into a longitudinally extending channel or groove 53, said rib and groove being disposed in obtuse angular relation to each other. Above the rib 52 and spaced therefrom, a concentric folder plate or flange 54 is secured to said guide. A plate 55, disposed in a horizontal plane substantially bisecting the rib 52 and groove 53, is provided at one of its ends with a flange extension fixed to the guide and having the curved portion 56, constituting a second folder flange and spaced from the lower side of the rib 52, corresponding to the flange 54. The front and end edges of the plate 55 are curved or flanged downwardly as indicated in 57 so that said edges substantially contact the surface of the base 5.

As indicated in Fig. 1 of the drawings, the folder guide is adjusted and fixed in position on the base 5 so that the rib 52 thereof extends at an angle of approximately 30° with respect to the path of movement of the paper or cardboard sheet P fed over the plate 55 and between the disks 21 and 29 and roller 32, while the groove or channel 53 extends in accurately parallel relation with said path of movement of the paper sheet. The folder guide is also so adjusted on the base 5 that said groove 53 will be disposed

in accurately predetermined relation to the inner face of the flange 22 on the disk 21.

In operation, the reinforcing strip S of Cellophane, paper, fabric, or other suitable material and of a desired predetermined width, has an adhesive composition applied to one surface thereof so that said surface, without the application of moisture, will remain tacky. This reinforcing strip is drawn under tension through the guide folder in the feeding movement of the paper P and is first folded in an outward direction between flanges 54 and 56 over the surface of the rib 52, the tacky surface of the strip being opposed to said flanges but out of contact therewith so that the reinforcing strip will move freely through said guide. It will be understood that the space between the rib 52 and flanges 54 and 56 is much greater than the thickness of the strip S. The edge p of the paper sheet is disposed in close parallel relation to the base of the groove or channel 53 of the guide so that as said paper sheet and the reinforcing strip S are synchronously fed through said guide, the strip S upon moving from the rib 52 into the channel or groove 53 is reversely folded around the edge p of the paper sheet, with the two portions of the strip extending inwardly for the same distance on opposite sides of the paper sheet and with the tacky surfaces of said strip portions opposed to said sheet. After moving beyond the folder guide, the edge of the paper sheet and the reinforcing strip move between the disk 21 and the pressure roller 32 with the fold or bight of the strip S in substantial contact with the face of the flange 22. The feeding disk 29 engages the surface of the paper sheet P inwardly of the reinforcing strip and in cooperation with the pressure roller 32 positively feeds said sheet with the reinforcing strip between said pressure roller and the disk 21. The angular teeth 31 on the periphery of the feeding disk 29, as they successively contact the surface of the paper sheet P, tend to urge said sheet laterally and insure uniformly close contact of the edge p of said sheet with the bight portion of the reinforcing strip S as the latter is subjected to pressure and adhesively secured to opposite sides of the paper sheet.

It will be evident that a device of the above description may be operated at very high speeds and by the provision of the feed disk 29 and my novel form of folder guide, the gummed reinforcing strip is applied to the edge of the paper sheet with uniform accuracy and in continuous contact at all points with the extreme edge of said sheet. Thus I am able by means of my invention, to produce a high quality product on a quantity production basis and at correspondingly low cost.

It will be seen that, by reason of the method which I employ in feeding and applying the reinforcing strip to the edge of the sheet material, very high speed operation is possible without contact of the tacky surface of the reinforcing strip with metal surfaces, and with the accurate folding of said strip in relation to the edge of the moving sheet. The mechanism which I provide for carrying out this new method, is inexpensive and durable in construction, as well as reliable and efficient in operation, and by reason of the eccentrically movable disk 29 automatically accommodates itself to various thicknesses of the sheet material P with a proper gripping and feeding engagement with said sheet in cooperation with the vertically yieldable pressure roller 32.

The machine as above described will also efficiently operate to apply the reinforcing strip or tape to paper or other sheet material having either a convex or concave edge. This is possible by reason of the fact that before pressure is applied, the sheet is shifted laterally relative to its path of movement so that the folded tape or strip at its point of contact with the flange 22 will assume the shape or contour of the edge of the moving sheet.

While I have herein disclosed an embodiment of the apparatus which I have found preferable for the purpose in view, it is nevertheless to be understood that the same may be susceptible of more or less modification as to the form, construction and relative arrangement of its several parts. Accordingly, I reserve the privilege of incorporating the essential features of the present disclosure in such other combinations or arrangements of the various mechanical parts as may be fairly comprehended within the spirit and scope of the appended claims.

I claim:

1. The method of applying reinforcing strip to sheet material which consists in continuously moving the sheet in its own plane, guiding a reinforcing strip having a tacky surface toward the edge of the moving sheet and, first folding said strip longitudinally with its tacky surface outwardly disposed and with said fold extending substantially to the edge of the sheet, thereafter reversely folding said strip over the edge of said sheet to dispose the tacky surfaces of the strip portions in opposed relation to the sheet, urging said sheet laterally with respect to its path of movement and in close edge contact with the internal surface of the fold bight, and finally applying pressure to said strip portions to adhesively secure the same to the faces of the sheet.

2. The method of applying reinforcing strip to sheet material which consists in continuously moving the sheet in its own plane, guiding a reinforcing strip having a tacky surface toward the edge of the moving sheet and, first folding said strip longitudinally with its tacky surface outwardly disposed and with said fold extending substantially to the edge of the sheet, thereafter reversely folding said strip over the edge of said sheet to dispose the tacky surfaces of the strip portions in opposed relation to the sheet and guiding said fold to contact its bight portion with an abutment surface, urging the sheet and folded strip laterally towards said abutment surface to closely contact the edge of the sheet with the internal surface of the fold bight, and finally applying pressure to said strip portions to adhesively secure the same to the faces of the sheet.

3. The method of applying reinforcing strip to sheet material which consists in synchronously feeding the sheet and a reinforcing strip having a tacky surface past an abutment, guiding said strip in a path disposed at an oblique angle toward the edge of said sheet in spaced relation from said abutment and first forming a longitudinal fold in said strip extending substantially to the edge of the sheet and with its tacky surface outwardly disposed, thereafter reversely folding said strip over the edge of said sheet to dispose the tacky surfaces of the strip portions in opposed relation to the sheet and guiding said strip to contact its bight portion with the abutment, urging the sheet and folded strip laterally toward the abutment to secure close contact of the sheet edge with the internal surface

of the fold bight, and finally applying pressure to said strip portions to adhesively secure the same to the faces of the sheet.

4. Means for applying reinforcing strip to paper or other sheet material, comprising opposed pressure applying members, means for rotating one of said members, and an eccentrically shiftable feeding disk associated with and frictionally driven by the latter pressure member and cooperating with the other pressure member to feed the sheet material and reinforcing strip between said pressure members.

5. Means for applying reinforcing strip to paper or other sheet material, comprising opposed pressure members, one of said members having an abutment flange, means for rotating one of said members, and means associated with and driven by the latter pressure member for feeding the sheet material and reinforcing strip between said members and including means acting to urge the sheet and strip laterally relative to the path of feeding movement towards said abutment flange.

6. Means for applying reinforcing strip to paper or other sheet material, comprising opposed pressure members and an abutment at one side of said members, means for rotating one of said pressure members, and means rotatable as a unit with the latter pressure member having peripherally spaced parts angularly disposed relative to the axis of said member for feeding the sheet material and reinforcing strip between said pressure members and urging the same laterally with respect to its path of feeding movement toward said abutment.

7. Means for applying reinforcing strip to paper or other sheet material, comprising opposed pressure members and an abutment at one side of said members, means for rotating one of said pressure members, and a feeding disk associated with and frictionally driven by said rotatable pressure member and eccentrically movable relative thereto, said disk having peripheral means cooperating with the other pressure member to feed the sheet material and reinforcing strip between said pressure members and urge the same laterally with respect to its path of feeding movement toward said abutment.

8. Means for applying reinforcing strip having a tacky surface to the edge of sheet material, comprising means for guiding the strip material in a path obliquely inclined to the edge of the sheet material and then longitudinally folding said strip over the edge of the material, means for applying pressure to the folded strip, and means for progressively feeding the sheet material and reinforcing strip having means for urging the material laterally relative to its path of movement into close edge contact with the bight portion of the folded strip at the point of pressure application.

9. Means for applying reinforcing strip having a tacky surface to the edge of sheet material, comprising means for guiding the strip material in a path obliquely inclined to the edge of the sheet material and then longitudinally folding said strip over the edge of the material, means for applying pressure to the folded strip, an abutment associated with said pressure applying means, and means operated by the pressure applying means for progressively feeding the sheet material and reinforcing strip and in-

cluding means for urging said material laterally relative to its path of movement and toward said abutment to maintain close edge contact of said material with the bight of the folded reinforcing strip at the point of pressure application.

10. In a method of applying reinforcing strip to sheet material, the steps which consist in folding the strip over an edge of the sheet and synchronously feeding said sheet and strip with the strip fold in contact with an abutment, urging the sheet in an angular direction relative to the path of feed toward the abutment to closely contact the sheet edge with the inner surface of the fold bight of the strip, and then securing the edge portions of the reinforcing strip to the opposite side faces of the sheet.

11. In a method of applying reinforcing strip having a tacky surface to sheet material, the steps which consist in synchronously feeding said sheet and strip with the strip positioned at an oblique angle of approach to an edge of the sheet and contacting the tacky surface of the strip with said sheet edge, then folding the edge portions of the strip inwardly upon opposite side faces of the sheet, then contacting the fold bight with an abutment surface and urging the sheet laterally into close edge contact with the inner surface of said fold bight, and then applying pressure to the edge portions of the reinforcing strip to adhesively secure the same to the faces of the sheet.

12. Means for applying reinforcing strip to paper or other sheet material, comprising opposed pressure applying members, means for rotating one of said members, means cooperating with the other of said members and diametrically movable with respect to both of said members for feeding the sheet material and reinforcing strip between said members, and means operatively connecting said feeding means with said rotatable pressure member.

13. In a method of applying reinforcing strip to the edge of a sheet of fibrous material, rectilinearly moving the sheet in its own plane, guiding a reinforcing strip through a horizontally oblique path coincident with the plane of the moving sheet toward the edge thereof and longitudinally folding said strip in the movement of the strip through said path, and contacting the convex surface of the strip at its median point with the edge of said sheet, and thereafter guiding said strip in parallel relation with the edge of the moving sheet and folding the edge portions of said strip inwardly into contact with the respective upper and lower faces of said sheet.

14. A folder guide for edge reinforcing strip for sheet material, comprising a base having a vertical side face formed with a longitudinal channel therein at one of its ends to receive the edge of the sheet and with a convex rib in alignment with said channel and merging with the inner end thereof, said rib being disposed at a horizontally oblique angle with respect to said channel and adapted to first longitudinally fold the strip and direct the convex surface thereof into contact with the edge of the sheet, and the channel walls thereafter reversely folding the strip to engage its edge portions with the opposite side faces of the sheet.

VICTOR J. SIGODA.