Jan. 8, 1946. A. B. GARDELLA 2,392,375

STRIP ASSEMBLING AND FINISHING MACHINE

Filed Dec. 2, 1943 2 Sheets-Sheet 1

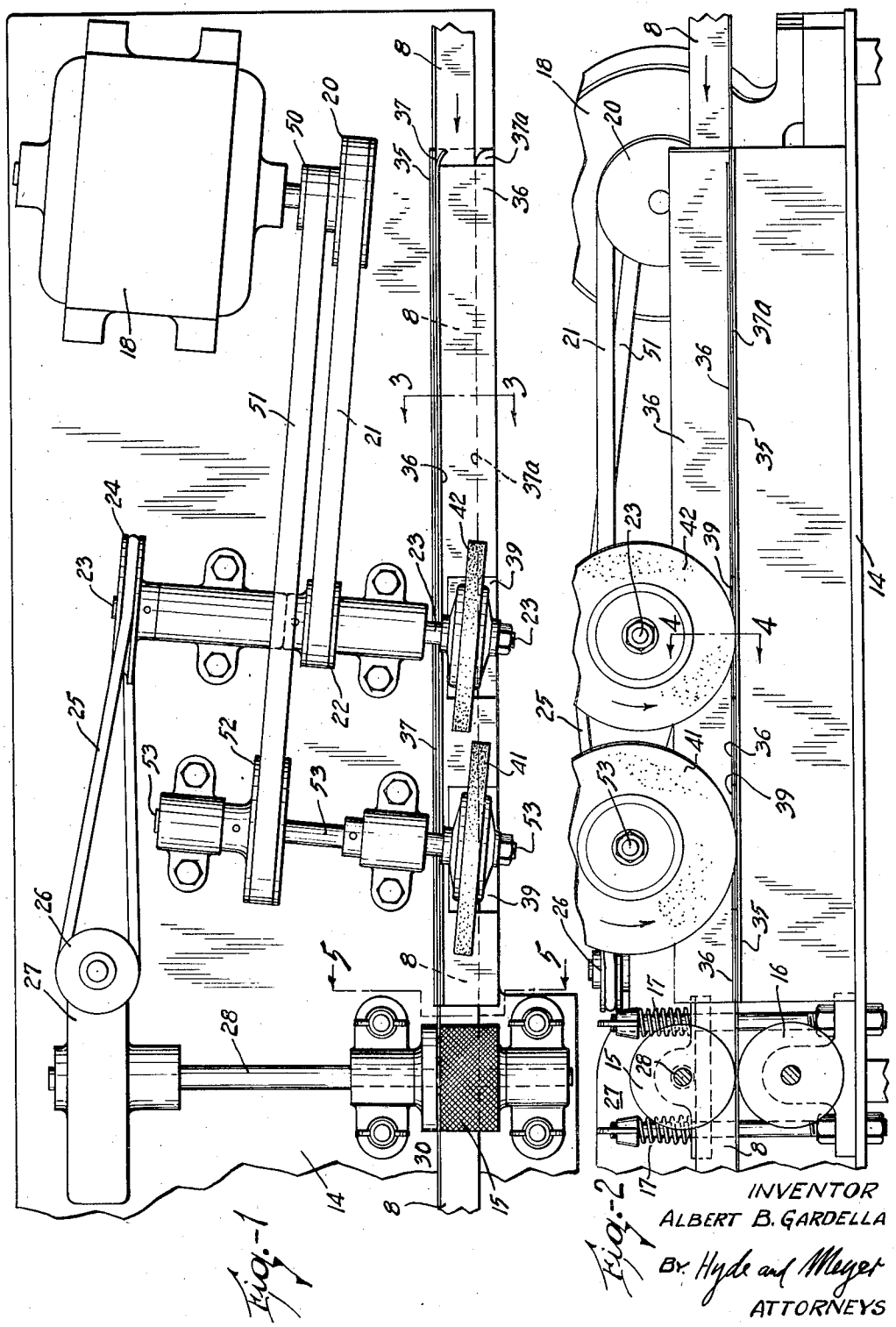


Fig. 1



Fig. 2

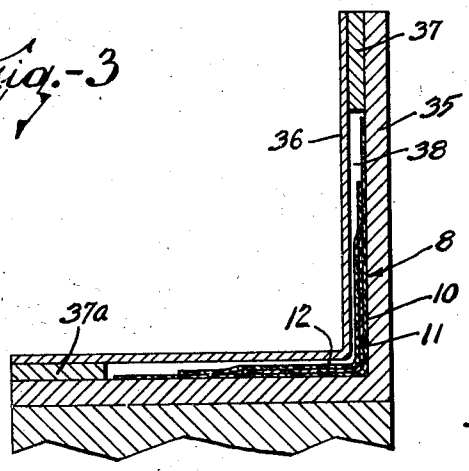
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Fig.-3



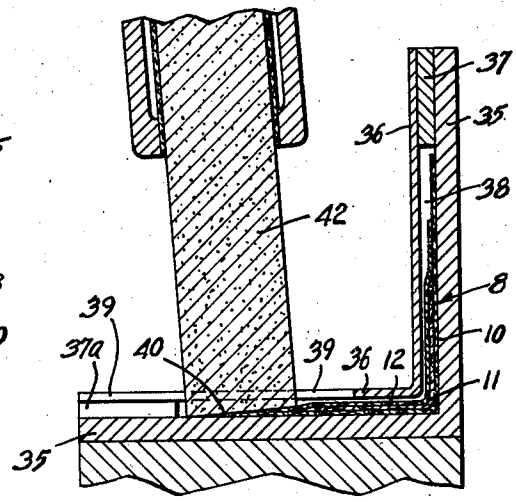




Fig.-4

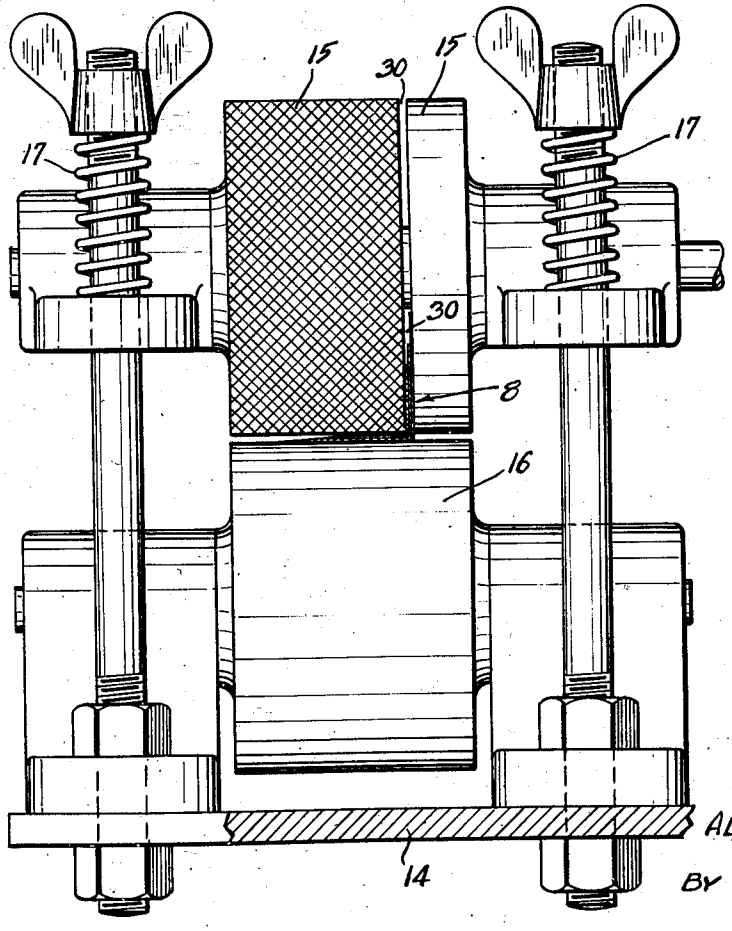



Fig.-5

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# UNITED STATES PATENT OFFICE

2,392,375

## STRIP ASSEMBLING AND FINISHING MACHINE

Albert B. Gardella, Cleveland, Ohio

Application December 2, 1943, Serial No. 512,537

6 Claims. (Cl. 51—78)

The invention relates to apparatus for finishing laminated, flexible strip such as is shown, for example, in my copending application for corner strips, Serial No. 493,551, filed July 5, 1943, or in United States Patent No. 2,315,360, granted March 30, 1943, to Raymond R. Ward.

Briefly, the aforesaid application and patent disclose laminated strips consisting of superposed layers or ribbons of flexible material, such as paper, the layers being of equal length but unequal width, and being mutually adhesively united in such manner that there is a predetermined lateral overlap along at least one edge, as in the aforesaid patent to Ward, or at both edges, as in the aforesaid copending application of this applicant. Such laminated strip is used in construction or finishing of room interiors or appurtenances, said strip generally underlying wall paper or other surface covering at seams or corners, to smooth out or mask irregularities or to provide a slightly inclined, planar transition between adjoining surfaces of slightly varying heights.

To accomplish this or related purposes to an optimum degree it is desirable that the stepped edge of the laminated strip, resulting from the lateral overlap as aforesaid, be planed, ground, or smoothed to eliminate the corner lines which would otherwise produce obvious demarcation lines in the surface covering superimposed on the laminated strip.

One object of the present invention, therefore, is to provide a novel and improved apparatus for tapering or feathering a lateral edge portion of a ribbon or strip.

A further object of the invention is to provide an apparatus of the nature defined which operates successfully and economically, while its construction is simple and sturdy.

Other objects and advantages will appear from the accompanying drawings and specification, and the essential features thereof will be set forth in the claims.

In the drawings Fig. 1 is a top plan view of a strip feathering apparatus embodying the present invention; Fig. 2 is a side elevation partially broken away of the apparatus as viewed from the lower edge of Fig. 1; Fig. 3 is a sectional view somewhat enlarged taken on the lines 3—3 of Fig. 1; Fig. 4 is a sectional view somewhat enlarged taken on the lines 4—4 of Fig. 2, and Fig. 5 is a sectional view, somewhat enlarged, taken on the line 5—5 of Fig. 1.

In its essentials the apparatus comprises means for advancing the strip to be feathered, means for guiding the strip in a predetermined path, grinding means for feathering the strip, and a power source and power transmission means. The power transmission means includes suitable means for controlling the speed and direction of application of force of the strip-advancing means and the strip-feathering means.

For the purpose of illustration, and not of limitation the apparatus and mode of operation will be described with reference to the feathering of an elongated, angular strip 8 of the nature illustrated and described in my aforesaid copending application, Serial No. 493,551. As best seen in section in Fig. 3, this strip is assembled from three layers of unequal widths, the base or outer layer 10 being widest and the intermediate layer 11 being narrowest, so that the top layer 12 overlaps the layer 11. When used as a finishing strip on inside corners the strip is bent to the required angle, here shown as a right angle, the strip assembling and bending operations being performed prior to the feathering operation, and consequently not being here shown or described.

The apparatus now to be described is conveniently arranged on top of a suitable bench or table 14. The strip advancing means is located at the left (Figs. 1 and 2) and comprises an upper, driven roll 15 and a lower idler roll 16. The upper roll has a friction type surface and is maintained in frictional contact with the lower roll by suitable means, such as springs 17, power being transmitted to the roll 15 from motor 18 through pulley 20, belt 21, pulley 22, shaft 23, pulley 24, belt 25, pulley 26, speed reduction gearing 27, and shaft 28. The bearings, their supports and other necessary elements for these and other moving parts are conventional, and, while shown in outline, will not be specifically characterized or discussed.

The laminated strip, bent into right angled sectional contour as aforesaid, and traveling from right to left in Figs. 1 and 2, is introduced between strip advancing means such as rolls 15 and 16 in such manner that the horizontal component of the strip is frictionally gripped between the rolls, and the vertical component of the strip passes through a vertical circumferential slot 30 in roll 15 (Fig. 5). Slot 30 extends radially inwardly a sufficient distance to provide clearance for all strip sizes to be feathered. After manual introduction of the leading edge of the strip between rolls 15 and 16, as indicated, the strip will be frictionally drawn therethrough as long as the motor continues to run, or until the trailing end of the strip passes rolls 15 and 16.

Guide means is provided for predetermining the

path of travel of the strip. In the present specific embodiment, as shown in section in Figs. 3 and 4, this guiding means comprises a pair of nested structural shapes, right angular in transverse section, and consisting of an outer guide member 35 and an inner guide member 36 separated along their edges by spacing strips 37 and 37a to thereby provide an elongated angular housing or passage 38 through which the strip travels freely along a controlled path, in part of which controlled path the strip is ground or feathered by mechanism now to be described.

The feathering mechanism comprises rotatable tool means having peripheral cylindrical cutting surfaces, and here shown as a pair of grinding discs or wheels 41 and 42 which are disposed in specific and novel angular relationship to the traveling strip. As best shown in Fig. 4, which is a section taken through disc 42 the inner guide member 36 has been cut back at 39 to permit the peripheral edge of disc 42 to abut the upper lateral edge of the horizontal part of the strip.

Power is transmited to disc 42 from motor 18 by means of pulley 20, belt 21, pulley 22, and shaft 23 and the driving arrangement is such that disc 42 rotates counter to the direction of travel of the strip, or, in other words, while the strip travels to the left in Fig. 2, the disc is turning counterclockwise as indicated by the arrow. The power transmission linkage between the motor, the traction roll 15 and the grinding disc 42 is such that the disc rotates at a considerably higher speed than the traction roll.

The angular relationship of the plane of the grinding disc 42 to the general plane of that portion of the strip being feathered is a distinctive and fairly critical one.

As best seen in Fig. 1 a plane of rotation of the disc 42 is not coincident with a line defining the direction of strip travel but is slightly askew with respect thereto, the angle being preferably not more than 5 degrees. As is well known to those skilled in the art certain types of paper, and particularly the relatively inexpensive type of paper used in making strip of the nature here described, have pronounced directional properties, tearing or exfoliating much more readily in the general direction of the longitudinal fibers, and I have found that the angular disposition of the grinding disc as just described produces the smoothest grinding effect while avoiding the normal tendency to tear the paper.

Likewise, as best seen in Fig. 4, a plane of rotation of the disc 42 is not perpendicular to the horizontal portion of the moving strip but is tilted slightly outwardly at the top to produce the desired inclination of the line of abrading contact of disc and paper, to thereby effect the desired taper or gradient of the feathered portion of the strip edge. Said line of abrading contact is indicated by reference numeral 40 in Fig. 4, being the line of contact of a cylindrical periphery with a plane.

To more accurately locate and define the inclination of the grinding disc with respect to the general plane of the strip being feathered, I may in other words say that the axis of rotation of the disc is slightly askew to a line horizontally transverse to the direction of strip travel, whereby to prevent tearing of the strip, and said axis of rotation is also inclined or tilted with respect to the plane of the strip surface, whereby to provide a proper taper for the feathered edge.

From a consideration of the principles just disclosed it will be apparent that the width of the peripheral grinding face of disc 42 in contact with the edge portion of the strip, as indicated by reference character 40, determines the lateral extent of the feathering effect, and the inclination of the axis of the grinding wheel from the horizontal determines the feathering gradient, said axis being coincident with shaft 23. Such lateral extent of the feathering, and the gradient thereof are naturally a matter of choice, being dependent to some extent on factors such as the total width of the strip, the number and relative spacing of the laminations, and the thickness of each lamination.

From disc 42 the strip travels towards, and is engaged by grinding disc 41, which has a finer abrasive surface and which gives the roughly feathered edge a final cut and a smooth finish. Power is transmitted to disc 41 from motor 18 by means of pulley 50, belt 51, pulley 52 and shaft 53. Disc 41 likewise travels counter to the direction of travel of the strip, and is preferably angularly inclined in two planes in the manner already described with respect to disc 42.

As best seen in Fig. 1 a comparison of the relative diameters of the various pulleys in the power transmission arrangements, respectively, for discs 41 and 42, makes it apparent that the second and finer grinding discs 41 has a lower peripheral speed than disc 42.

The other edge of the angular strip may be feathered in like manner by re-inserting the strip in the apparatus with the formerly vertical component in a horizontal position. Other methods may be used, such as an arrangement wherein a duplicate apparatus is disposed in tandem with the first, but with the grinding wheels of the second apparatus set up at an angle of 90 degrees to those of the first.

By a suitable modification in the shape of the guides and the strip-advancing rolls, in a manner not here shown but obvious to those skilled in the art, strips of other angular contours, or flat strips, may be feathered in apparatus embodying the invention hereinabove disclosed. Gradual wear of the abrasive discs may be compensated for by upward adjustment of the position of the guides, or by a lowering of the bearings carrying the disc shafts, as will be apparent.

The character of the abrasive discs may vary with the feathered surface desired, and while I have shown discs 41 and 42 as emery wheels, a close packed wire bristle wheel has proven quite satisfactory.

What I claim is:

1. Apparatus for feathering the lateral edge portion of an elongated strip, including means for advancing said strip, guiding means for maintaining the strip in a predetermined path, and means for abrading the said lateral edge portion of said strip comprising an abrasive tool having a cylindrical cutting surface rotatable in peripheral contact with said lateral edge portion, means for rotating said tool, the axis of rotation of said tool being slightly angularly inclined with respect to the plane of the strip surface, and said axis of rotation being also slightly askew with respect to a line horizontally transverse to the direction of travel of the strip.

2. Apparatus for feathering the lateral edge portion of an elongated strip, including means for advancing said strip, guiding means for maintaining the strip in a predetermined path, and means for abrading the said lateral edge portion of said strip comprising an abrasive disc

having a cylindrical cutting surface rotatable in peripheral contact with said lateral edge portion, means for rotating said disc, the axis of rotation of said disc being slightly angularly inclined with respect to the plane of the strip surface, said axis of rotation being also slightly askew with respect to a line horizontally transverse to the direction of travel of the strip, and the direction of rotation of said disc, as determined at the line of contact of disc and strip, being counter to the direction of travel of said strip.

3. Apparatus for feathering the lateral edge portion of an elongated strip, comprising means for advancing said strip, guiding means for maintaining the strip in a predetermined path, and means for abrading the said lateral edge portion of said strip comprising a pair of abrasive discs disposed in tandem at spaced points along the path of travel of said strip, each such disc having a cylindrical cutting surface rotatable in peripheral contact with said lateral edge portion, means for rotating said discs, the axis of rotation of each said disc being slightly angularly inclined with respect to the plane of the strip surface, the axis of rotation of each said disc being also slightly askew with respect to a line horizontally transverse to the direction of travel of said strip, and the direction of rotation of each said disc as determined at its respective line of contact with the strip being counter to the direction of travel of said strip, there being a substantial variation between the respective peripheral linear speeds of said discs.

4. Apparatus for feathering the lateral edge portion of an elongated strip, comprising means for advancing said strip, guiding means for maintaining the strip in a predetermined path, and means for abrading the said lateral edge portion of said strip comprising a pair of abrasive discs disposed in tandem at spaced points along the path of travel of said strip, each such disc having a cylindrical cutting surface rotatable in peripheral contact with said lateral edge portion, means for rotating said discs, the axis of rotation of each said disc being slightly angularly inclined with respect to the plane of the strip surface, the axis of rotation of each said disc being also slightly askew with respect to a line horizontally transverse to the direction of travel of said strip, and the direction of rotation of each said disc as determined at its respective line of contact with the strip being counter to the direction of travel of said strip.

5. Apparatus for feathering the lateral edge portion of an elongated strip, comprising means for advancing said strip, guiding means for maintaining the strip in a predetermined path, and means for abrading the said lateral edge portion of said strip comprising a pair of abrasive discs disposed in tandem at spaced points along the path of travel of said strip, each such disc having a cylindrical cutting surface rotatable in peripheral contact with said lateral edge portion, means for rotating said discs, the axis of rotation of each said disc being slightly angularly inclined with respect to the plane of the strip surface, the axis of rotation of each said disc being also slightly askew with respect to a line horizontally transverse to the direction of travel of said strip, and the direction of rotation of each said disc as determined at its respective line of contact with the strip being counter to the direction of travel of said strip, there being a substantial variation between the respective peripheral linear speeds of said discs, and the abrasive disc first contacted by the strip having a higher peripheral speed than the abrasive disc thereafter contacted.

6. Apparatus for feathering the lateral edge portion of an elongated strip, comprising means for advancing said strip, guiding means for maintaining the strip in a predetermined path, and means for abrading the said lateral edge portion of said strip comprising a pair of abrasive discs disposed in tandem at spaced points along the path of travel of said strip, each such disc having a cylindrical cutting surface rotatable in peripheral contact with said lateral edge portion, means for rotating said discs, the axis of rotation of each said disc being slightly angularly inclined with respect to the plane of the strip surface, the axis of rotation of each said disc being also slightly askew with respect to a line horizontally transverse to the direction of travel of said strip, and the direction of rotation of each said disc as determined at its respective line of contact with the strip being counter to the direction of travel of said strip, and the abrasive disc first contacted by the strip having a higher peripheral speed than the abrasive disc thereafter contacted.

ALBERT B. GARDELLA.