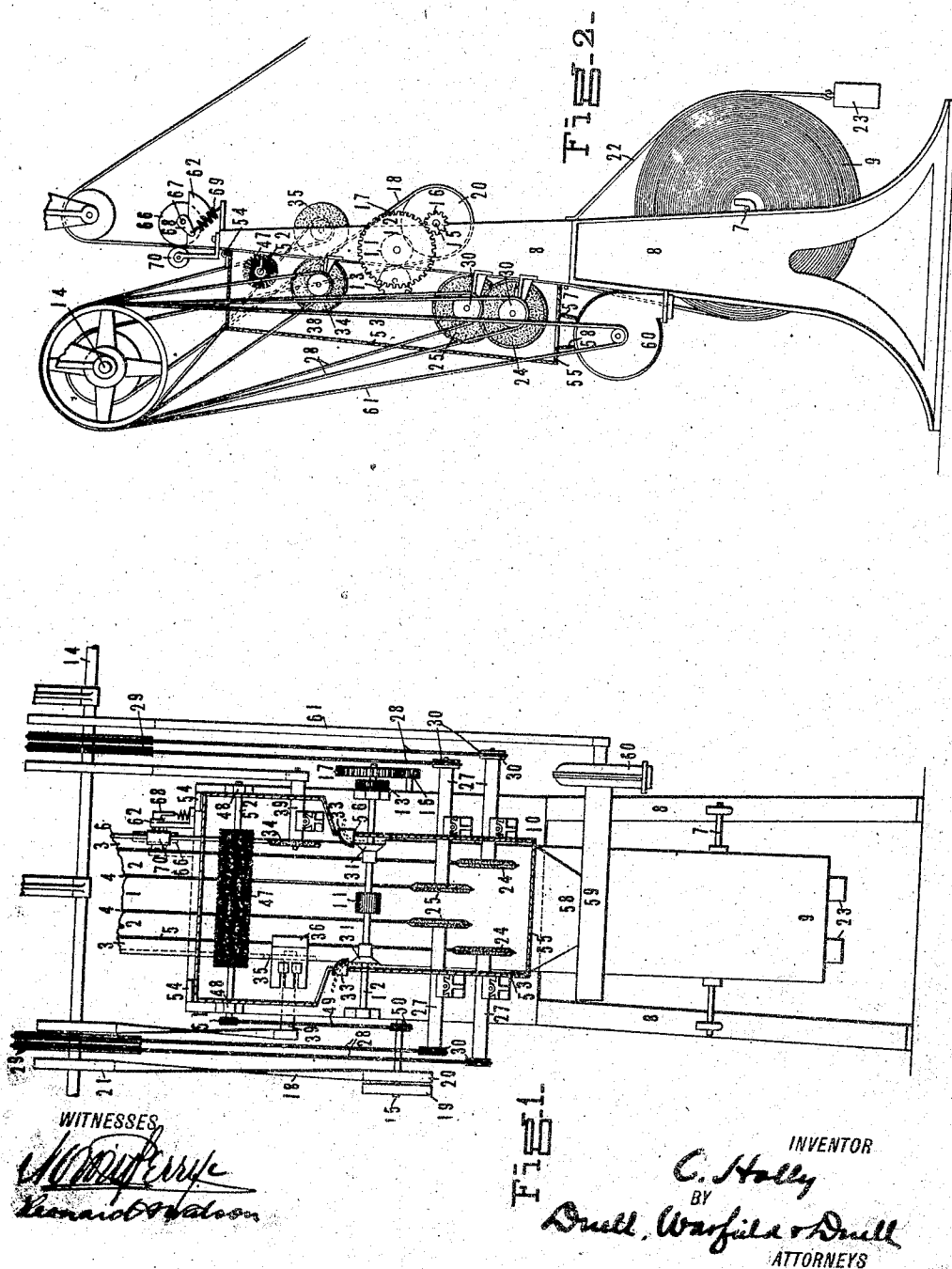


1,173,575

C. HOLLY.
APPARATUS FOR TREATING WEBS.
APPLICATION FILED FEB. 25, 1911.

Patented Feb. 29, 1916.
2 SHEETS—SHEET 1.



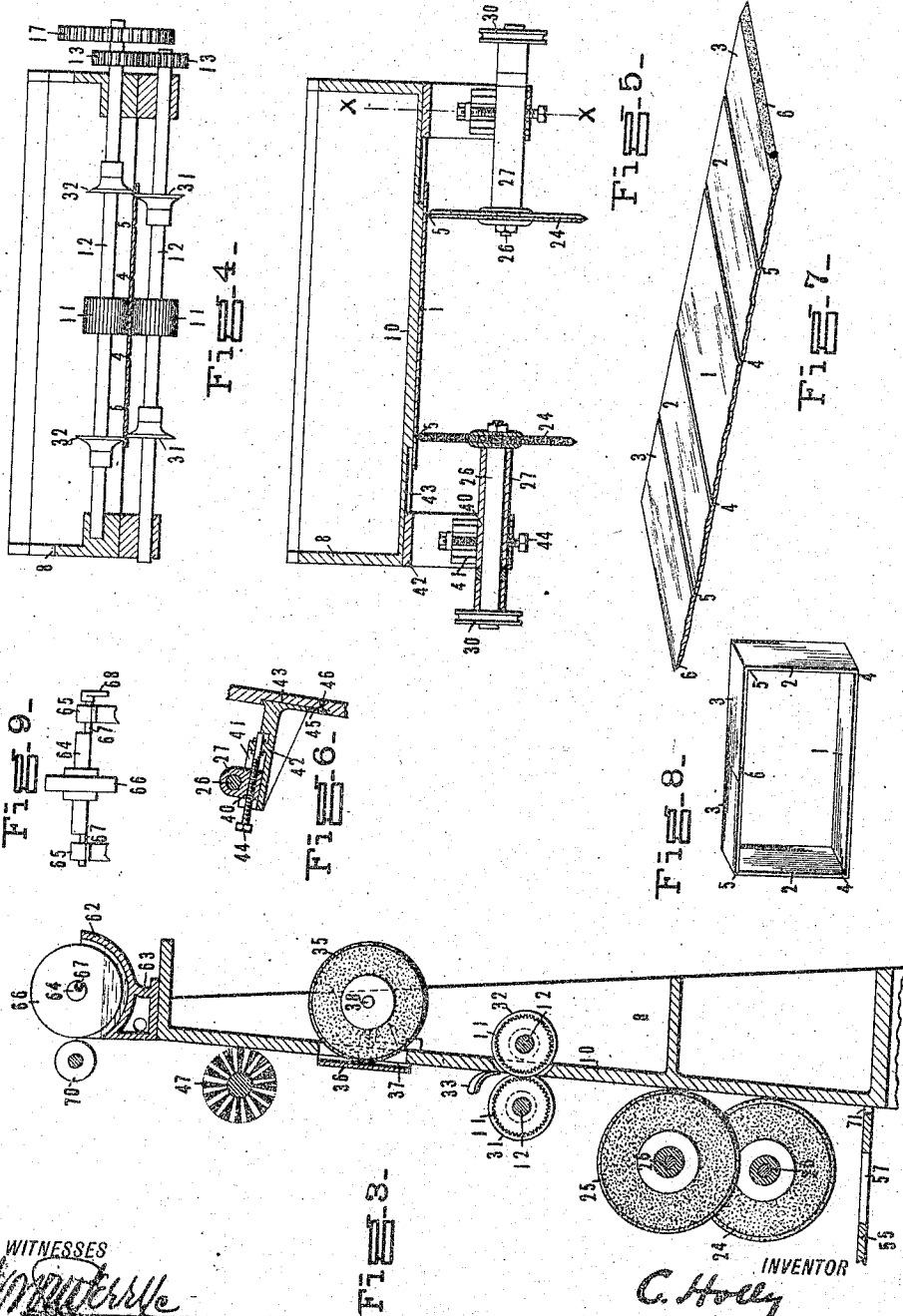
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TREATING WEBS.

1,173,575.

Specification of Letters Patent.

Patented Feb. 29, 1916.

Application filed February 25, 1911. Serial No. 610,766.

To all whom it may concern:

Be it known that I, CARLOS HOLLY, a citizen of the United States, residing at Lockport, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Apparatus for Treating Webs, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to apparatus for preparing foldable blanks, but inasmuch as certain advantageous characteristics of the invention lie in its utilization for forming parallel grooves in a continuous web of comparatively heavy paper or similar material and otherwise treating said web to prepare blanks adapted to be subsequently formed into box flanges, it will be conducive to clearness to specifically describe the same in connection with such an embodiment thereof.

One of the objects of the invention is the provision of a device whereby a web may be prepared, and sections of which, when folded to form a box flange, will be characterized by sharp, square corners and by uniform thickness of material throughout.

Other objects will be in part obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings wherein similar reference characters refer to similar parts throughout the several views, Figure 1 is a rear elevation, the hood being shown in section; Fig. 2 is a side elevation, the hood being in section and certain other parts being illustrated by broken lines; Fig. 3 is an enlarged sectional view showing certain of the parts in greater detail; Fig. 4 is a sectional detail view showing the feed rollers and trimmers; Fig. 5 is a similar view showing the outer pair of scoring grinders; Fig. 6 is a section taken on line X—X of Fig. 5 showing the adjustable mounting of one of the scoring wheels; Fig. 7 is a perspective view of a portion of the web showing the

condition thereof as it issues from the machine; Fig. 8 is a perspective view of a completed box flange; and Fig. 9 is a detail view of the dauber shaft and bearings.

As tending to a more ready understanding of this invention, reference is here made to my now pending application, Serial No. 492,029, filed April 24, 1909, wherein is disclosed a machine and method for the production of a box, consisting substantially of a flat head or body, a marginal flange extending around the edge of the head and a binder connecting the head and flange. These parts are preferably made of paper of suitable thickness, but if desired, other materials may be used. Referring to the said flange, to which, in the present specific embodiment, this invention more particularly relates, it will be seen to consist of a strip having a central section 1, two intermediate sections 2, 2 arranged on opposite sides of its central section and two end sections 3, 3 arranged at the extremities of the flange. On its inner side the flange is provided with transverse front scores or grooves 4, 4 between the central section and the intermediate sections and with transverse rear scores or grooves 5, 5 between the intermediate sections and the end sections, respectively, and the ends of the flange are beveled to form scarfs, as shown at 6, 6, the scarf at one end being on the inner side of the flange and that at the other end at the outer side thereof. In its completed form the scarfed portions of the end sections of the flange overlap one another and are united by paste, cement, glue, or other adhesive which will answer the purpose, and the scoring or grooves are arranged on the inner sides of its corners and the sides of each groove or score are folded toward each other in bending the sections of the flange to form a corner, thereby causing the outer side of the corner to be sharp and square. It should be noted that the said groove or score is preferably formed with straight sides spaced at such an angle that when the corners are formed the said sides will be approximately in contact with each other, thus substantially closing the space therebetween. It is also to be noted that if it is attempted to form the grooves by merely depressing

the material from which the flange is made it will be found that, when the sections of the flange are bent to form the corners thereof, there will be an excess of material, causing blisters or wrinkles in the material and uneven corners.

In carrying out the present art, scores or grooves are formed by abrading the web to positively remove material therefrom, preferably by means of suitable grinding mechanism, thereby insuring smooth, square corners on the complete flange. It is to be also noted that by forming scarfs on the flanges on opposite sides of the ends thereof the said ends may be neatly and effectively joined together and the flange will have the same thickness of material at the joint as throughout the other portions thereof. It is worthy of note that when an attempt is made to secure the adherence of two surfaces, as the scarfed ends described herein, by application of glue thereto, immediately before the surfaces are lapped one over the other, that the same do not reliably stick to each other and that this difficulty is overcome by applying the glue to these scarfed edges for a sufficient length of time before the scarfed joint is formed to enable the glue to become partly dried or tacky. This difficulty is overcome in carrying out the present art by coating one of the scarfed edge of the web with glue a sufficiently long time before it is desired to complete the flange to enable the glue to become dry, or nearly so, whereby this preliminary gluing operates as a sizing and causes said edge to become firmly united with the other scarfed edge of the flange blank when the two are subsequently brought together, glue being applied to said other edge just before the two are brought together, so that it will be sufficiently moist to permit of a reliable joint between the ends of the flange blank. It is to be understood, however, that the present invention relates specifically to the treatment of the web, feeding, scoring, trimming, scarfing and the application of glue to one of its scarfed edges, and that no claim is herein made to the subsequent severing of the flange blanks and their utilization in forming a box. Although various means may be employed for scoring and scarfing the flange web and performing the various other steps herein described in relation to the present art, it is preferred to use for this purpose the mechanism which is shown in the accompanying drawings and which is constructed as follows:

7 represents a horizontal arbor, shaft or mandrel which is journaled transversely on the frame 8 of the machine and upon which is mounted a roll 9 of flange web. From this roll the flange web is unwound from the rear side thereof and passes upwardly with its inner or front side over the rear

side of a support 10 which is constructed as an upright plate formed on the frame 8.

The flange web may be propelled upwardly along this supporting plate or table by various means, but, preferably, by means of two feed rollers 11, 11 engaging with opposite sides of the central part thereof and mounted on transverse shafts 12, 12 which are journaled in suitable bearings on the rear part of the frame. These feed rollers are compelled to turn in unison by means of intermeshing gear wheels 13, 13 secured to corresponding ends thereof, as shown in Figs. 1, 2 and 4, and motion is transmitted to these feed rollers from an overhead driving shaft 14 by means of a counter shaft 15 provided with a pinion 16 at one end which meshes with a gear wheel 17 on one of the feed roller shafts 12, and a belt 18 passing around tight and loose pulleys 19, 20 on the counter shaft and a pulley 21 on the driving shaft.

In order to prevent the roll of flange web from unwinding too freely, a retarding or braking device is provided which preferably consists of one or more brake bands or straps 22 engaging with the front side of the roll of flange web and connected at their upper ends with the adjacent part of the frame while their lower ends are provided with weights 23 whereby these straps or bands are held frictionally in contact with the flange web roll and prevent turning thereof, except when the web is unwound therefrom by the action of the feed rollers 11, 11.

As the flange web passes upwardly along the supporting plate it is operated upon by the devices which produce the longitudinal scores 4 and 5 and the bevels or scarfs 6, 6 at opposite edges thereof. These scoring and scarfing operations may be effected either simultaneously or one after the other, as desired, but in the organization of the machine herein shown, the flange web during its upward movement is first subjected to the action of the devices which produce the outer or rear longitudinal scores 5, 5, then to the devices which produce the inner or front longitudinal scores 4, 4, and then to the devices which produce the scarfs 6, 6 at the opposite edges thereof.

The scoring devices whereby the longitudinal scores or grooves are produced in the flange web preferably comprise a plurality of rotatable scoring wheels or disks 24, 24, 25, 25 which are constructed of emery, carborundum or other abrasive material and each of which is provided with a comparatively narrow peripheral edge of convex or beveled form in cross section, so that upon engaging the rear or outer side of the flange web a groove or score will be ground or cut in the latter as the same is moved past the scoring wheel, which groove is formed by 130

actual removal of the stock or body of the flange web and not by compression of the fibers thereof. As shown in Fig. 1, the two scoring wheels 24, 24 which produce the outer scores are arranged axially in line and engage with the lower part of the flange web while the two scoring wheels 25, 25 which produce the inner scores are also arranged axially in line with each other but engage with the flange web above the outer scoring wheels, by which arrangement the scoring mechanism is distributed so as to permit of a more convenient construction and render the parts more easily accessible for adjustment, cleaning, inspection and repairing. Each of the scoring wheels is mounted on the inner end of a short transverse shaft 26 which is journaled horizontally parallel with the flat side of the flange web in a bearing 27 on the adjacent part of the frame and is driven by means of a belt 28 passing around a large pulley 29 on the driving shaft and a small pulley 30 on the outer end of the scoring wheel shaft.

Prior to the scarfing operation hereinafter described, the flange web is trimmed off at its opposite longitudinal edges so that the blanks subsequently cut therefrom will be of the proper length for association with the other parts of the boxes with which the same are to be assembled. This trimming is desirable on account of the impracticability of making the web of the proper width in the first instance and it has therefore been found more convenient to make it somewhat wider than is necessary for producing the flange blanks and to trim off this surplus before the web reaches the blank severing mechanism. This trimming mechanism is preferably located above the scoring wheels and consists of two pairs of rotatable cutting disks or wheels 31, 32, the members of each pair being arranged on opposite sides of the path of the flange web and cooperating with each other to trim off one edge of the flange web. These cutter disks are preferably operated by the shafts 12, 12 which drive the feed rollers 11, 11, the cutters of both pairs on one side of the flange web being secured to the shaft of the feed roller on the corresponding side of the web and the two other disks of the cutters or trimming devices on the opposite side of the web being mounted on the shaft of the feed roller which is arranged on the other side of the flange web, as shown in Fig. 4.

The edge portions of the flange web upon being trimmed off by the cutters, are preferably deflected rearwardly and laterally from the machine so that they do not become mixed with the working parts thereof and interfere with their operation. The preferred means for accomplishing this purpose consists of two rearwardly and laterally curved deflecting plates 33, each of

which is secured to the frame adjacent to one edge of the web and above the respective cutting disks, so that the web trimming is intercepted and directed rearwardly from the cutters, passing through apertures provided in the hood 53 for that purpose, to a position exteriorly of said hood where the same may be easily removed and disposed of without interfering with the machine. After being thus trimmed the flange web is scarfed or beveled on its opposite sides and adjacent to its opposite edges by means of two scarfing devices which preferably comprise two scarfing wheels 34, 35 arranged respectively on opposite sides of the flange web adjacent to opposite edges thereof and preferably constructed of emery, carborundum or other abrasive material, whereby these wheels, upon engaging the flange web, grind off the stock or body of the flange web at its edges. The axes of these scarfing wheels are preferably arranged parallel with the flat sides of the flange web and the peripheries thereof are beveled to correspond with the angle which it is desired to give the bevels or scarfs on the web. While the flange web is being operated upon by the rear scarfing wheel 34 this web is supported by the adjacent flat side of the supporting plate 10, but the other edge of the web, while being operated upon by its scarfing wheel 35 on the opposite side, is supported during this operation by means of an auxiliary supporting plate 36 which is secured on the rear side of said supporting plate 10, an opening 37 being formed in the latter through which front scarfing wheel 35 projects rearwardly into engagement with the front side of the flange web, as shown in Fig. 3. The scarfing wheels are mounted on the inner ends of horizontal transverse shafts 38 which are journaled in bearings 39 on the adjacent part of the frame and are driven from the overhead driving shaft by means of belts passing around suitable pulleys secured to the main driving shaft and the outer ends of the respective scarfing wheel shafts, as shown in Figs. 1 and 2.

For the purpose of permitting the scoring and scarfing wheels to be accurately adjusted to the proper position relatively to the flange web for producing the scorings and the scarfings thereon at the proper places and also to permit of taking up the wear on these wheels, the bearing of the shaft of each of these wheels is mounted on the frame in such manner that the same is capable of adjustment toward and from the flat side of the flange web and also in a direction parallel with this flat side. The preferred means for this purpose shown in the drawings consists in mounting each of these bearings on a slide 40 which is capable of moving horizontally toward and from the face or flat side of the web and guided in a way

41 formed on a slide 42 which is capable of moving horizontally and transversely or parallel with the flat side of the web in a guideway 43 formed on the adjacent part of the frame, as shown in Figs. 5 and 6. The longitudinally movable slide is adjusted on the companion transversely movable slide by means of a screw 44 working in a threaded opening in the slide 40 and journaled on the slide 42 so as to be held against axial movement, whereby upon turning this screw the respective grinding wheel will be moved toward or from the flat face of the web. The transverse movement of the slide 42 in its way 43 is effected by hand pressure and after adjustment the same is held in place by tightening one side 45 of this guideway which for this purpose is made separate from the frame and secured thereto by a clamping screw 46.

As the flange web passes upwardly beyond the scarfing devices the same is subjected to the action of a cleaning or a clearing device which operates to detach therefrom the particles of dust or fiber which have been ground off from the web by the action of the scoring and one of the scarfing wheels but still remain sticking or adhering thereto. This clearing device preferably consists of a rotatable brush 47 horizontally supported in suitable bearings 48 in a position parallel to the web and disposed to sweep the rear or outer side thereof at a point above the scarfing wheels. The bristles thereon, which are preferably arranged in longitudinally extending sinuous lines, clear said rear side of the web and the scores and rear scarfed edge thereof, of the particles above mentioned. If desired, a short brush, not shown, either rotatable or stationary, may be secured to the front side of the support for removing adhering particles on the corresponding scarfed edge of the web. The brush 47 is driven by means of a belt 49 passing around a pulley 50 secured upon the shaft 15 and the pulley 51, fastened to the brush shaft 52.

Means are provided for collecting the particles of stock or fiber, which are removed from the flange web in the form of dust by the scoring and scarfing wheels, in order to prevent the same from collecting in the machine and interfering with its operation and also vitiating the air in the room in which the machine is installed. For this purpose a hood 53 is hinged to the supporting plate 10 at 54 and extends outwardly and downwardly, completely covering the various web operating means hereinbefore described, and resting at its lower edge upon a plate 55 projecting outwardly from the rear side of the support 10. The sides of the hood are bent inwardly into close relation with the said support, portions thereof being removed for the passage therethrough of the

various shafts disposed upon the outer side of the support. The sides of the hood are also cut away as at 56 to provide openings through which the web trimmings are discharged from the machine. An opening 57 in the plate 55 communicates by means of a down tube 58 with an exhaust pipe 59, from which the air is exhausted and the dust discharged in any convenient manner, but preferably by means of a fan 60 connected with the exhaust pipe, and discharging at any convenient place. As the fan operates the dust resulting from the grinding action of the scarfing and scoring wheels in forming the scarfs and grooves in the flange web is drawn through the space inclosed by the hood and exhaust pipe into the fan case and is delivered as described above. The blades of the fan may be rotated in any suitable manner, for instance by means of a belt 61 passing around suitable pulleys on the driving and fan shafts.

After the web has been operated upon by the brush it passes to the device for sizing the front scarfed edge, as hereinbefore described. This gluing or sizing device is preferably located on the frame above the clearing brush and is constructed as follows: 62 indicates a tank or pot arranged upon the upper part of the frame adjacent the front scarfed edge of the flange web and is designed to contain a bath of liquid glue, which is retained in a fluid condition by a heating device, preferably consisting of a jacket 63 arranged below the tank and through which a heating medium is circulated, such as hot water or steam. Above this tank is arranged a horizontal transverse shaft 64 supported in suitable bearings 65 on the adjacent part of the machine and carrying a paste wheel or dauber 66 which is free to turn on its shaft with the lower portion thereof submerged in the glue contained in said pot. The journals 67 of the shaft are formed eccentric with the wheel carrying portion thereof, and a crank 68 rigidly secured thereto is constantly acted upon by the spring 69 to hold the periphery of the pasting wheel in operative relation to the flange web, which passes rearwardly thereof. The web is held in place while the pasting wheel or dauber is engaging the forward scarfed edge thereof by means of a supporting roller 70 arranged to the rear of the web in line with the place of contact of the dauber. In operation the dauber is rotated by the passing web and moving through the glue and against the said scarfed edge of the web picks up glue and deposits the same upon the web. The glue deposited is comparatively thin so that it soaks into the fiber of the web and becomes dried quickly and merely acts as a sizing for subsequently insuring its firm adhesion to the front scarfed edge when the la

being supplied with fresh glue, is ready to be united therewith. A slot or opening 71 formed in the plate 55 permits the flange web to pass by said plate during its upward travel along the support 10.

It will be noticed that the plate 10 provides a stationary supporting surface for the web, serving as an abutment. The abrading wheels being relatively narrow and convex at their edges, have a tendency to cause the material of the web on the face opposite the grooves to bulge, but said bulging is practically entirely avoided or restrained by providing the abutment plate. The axes 10 of the abrading wheels being stationary their position relative to each other and to the supporting plate may be accurately fixed so that the grooves may be formed at predetermined distances from each other and the 20 depths of the grooves accurately determined. The feeding wheels being disposed to grip the web between the grooves, said grooves will not be flattened or otherwise affected by the feed mechanism.

As many changes could be made in carrying out the above method, and in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the 30 scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of 40 the invention, which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In apparatus for treating a web, in combination, a web support, means adapted to propel a web on said support, a plurality of transversely spaced rotary abrading elements disposed opposite said support so as 50 to scarf the edge of the web, supporting bearings for said elements, means adapted to adjust said elements toward and from said support, and means adapted to adjust said elements longitudinally of said support.

2. In apparatus for treating a web, in combination, means for propelling the web, an abrading device adapted to engage the edge of the web and scarf the same, and means for carrying away the particles of the web removed by the scarfing device. 60

3. In apparatus for treating a web, in combination, means for propelling the web, a plurality of abrading wheels engaging said web between its edges and adapted to produce longitudinal scores or grooves in the 65

same, abrading wheels engaging with opposite sides of the web at opposite edges thereof and adapted to scarf the same, a hood extending over all of said abrading devices, and exhaust means connected to said hood. 70

4. In apparatus for treating a web, in combination, means for propelling the web, means for scoring and scarfing said web, and means for clearing the particles of the web which have been removed by said scoring 75 and scarfing means.

5. In apparatus for treating a web, in combination, means for propelling the web, abrading means for scoring and scarfing said web, and means for clearing the particles of the web which have been removed by said scoring and scarfing means comprising a brush engaging with the web. 80

6. In apparatus for treating a web, in combination, means for propelling the web, 85 abrading means for scoring and scarfing said web, and means for clearing the particles of the web which have been removed by said scoring and scarfing means comprising a rotatable brush engaging with the web 90 and means for rotating said brush.

7. In apparatus for treating a web, in combination, means for propelling the web, abrading means for scoring and scarfing said web, means for clearing the particles 95 of the web which have been removed by said scoring and scarfing means, and a pneumatic device coacting with said clearing means.

8. In apparatus for treating a web, in 100 combination, a support for said web, means for feeding the web past said support, means for abrading said web to produce longitudinal scores therein, means for trimming the edges of said web, means for deflecting the 105 web trimmings away from the line of travel of the web, abrasive means for scarfing the said edges of the web, a brush for cleaning the web of particles formed in scoring and scarfing the same, an abutment extending 110 outwardly from the face of said support, and positioned beneath all of said means, said abutment being slotted to permit the passage of the web, a hood hinged above said brush and normally positioned with 115 the lower edge thereof in contact with said abutment and the sides thereof in contact with said support, whereby all of said means and said brush are completely covered, means permitting the egress of said trim- 120 mings from beneath said hood, and an exhaust device communicating through said abutment with the space beneath said hood, whereby the said particles are removed from the apparatus. 125

9. In an apparatus for treating a web, in combination, a stationary plate, means adapted to propel a web along said plate, a relatively stationary wheel opposite the plate adapted to abrade the web on one face, 130

a slot in said plate, an auxiliary supporting plate opposite said slot, and a second relatively stationary wheel projecting into the slot and cooperating with the auxiliary support to abrade the web.

10. In an apparatus for treating a web, in combination, a stationary plate, means adapted to abrade the web, a cutter adapted to trim the edge of the web, a hood inclosing the abrading and severing means, and a deflector adapted to remove the severed strip from the hood.

11. In an apparatus for treating a web, in combination, a stationary plate, means adapted to propel a web along said plate, a wheel stationarily mounted relatively to the plate adapted to abrade the web, a slot in said plate, cutting wheels mounted on opposite faces of the plate and cooperating through said slot adapted to trim the web, a second abrading wheel adapted to scarf one edge of the web, a slot in said plate adjacent its opposite edge, an auxiliary supporting plate opposite the last mentioned slot, and a relatively stationary wheel projecting into the last mentioned slot, and cooperating with the auxiliary support to abrade the other edge of the web.

12. In an apparatus for treating a web, in combination, a stationary plate, means adapted to propel a web along said plate, a wheel stationarily mounted relatively to the plate adapted to abrade the web, a slot in said plate, cutting wheels mounted on opposite faces of the plate and cooperating through said slot adapted to trim the web, a second abrading wheel adapted to scarf one edge of the web, a slot in said plate adjacent its opposite edge, an auxiliary supporting plate opposite the last mentioned slot, a relatively stationary wheel projecting into the last-mentioned slot and cooperating with the auxiliary support to abrade the other edge of the web, a brush adapted to engage the abraded portions of the web, a hood inclosing the brush, abrading and trimming devices, an exhaust device connected to said hood, and means to remove the severed strips from the hood.

13. In apparatus for treating a web, in combination, an upright fixed supporting plate with which one side of the web is adapted to engage, rotatable scoring and scarfing elements adapted to operate on the web, means adapted to continuously propel the web between the plate and the scoring and the scarfing devices, and means to rotate the scoring and scarfing elements while the web is propelled.

14. In apparatus for treating a web, in combination, means adapted to provide an endless supply of web, means adapted to continuously feed the web from the supply means, and means adapted to score the web intermediate its edges and provide a beveled

scarf on an edge thereof in lines substantially parallel with the direction of feed of the web.

15. In apparatus for treating a web, in combination, means for scoring the web intermediate its edges, means for scarfing the edge of the web, and means comprising an eccentrically mounted gluing roller adapted to size the scarfed edge.

16. In apparatus for treating a web, in combination, a fixed supporting plate for a web, means adapted to continuously propel a web along said plate, means adapted to provide continuous scores intermediate the edges of the web, a continuous scarf at one edge, and a continuous sizing of the scarfed edge as the web is fed comprising rotatable scoring and scarfing elements, and means adapted to rotate said scoring and scarfing elements as the web is fed.

17. In an apparatus of the character described, in combination, a stationary web supporting surface, means adapted to continuously feed a web on said surface, a plurality of rotary abrading wheels having stationary axes, respectively, said wheels being positioned so as to contact the web at points spaced from each other in the direction of feed of the web and transversely of the direction of feed of the web, and means adapted to continuously rotate said wheels as the web feeds relatively thereto.

18. In an apparatus of the character described, in combination, a stationary web supporting surface, means adapted to continuously feed a web on said surface, a plurality of rotary abrading wheels having stationary axes, respectively, said wheels being positioned so as to contact the web at points spaced from each other in the direction of feed of the web and transversely of the direction of feed of the web, means adapted to continuously rotate said wheels as the web feeds relatively thereto, and means for independently adjusting the axes of said wheels toward and from said surface and parallel thereto.

19. In an apparatus of the character described, in combination, a stationary web supporting surface, a plurality of rotary web abrading wheels having stationary axes, respectively, said wheels being positioned to contact a web on said surface at points spaced from each other transversely of the direction of feed of the web and groove the web on parallel lines, and rotary feeding wheels adapted to grip the web between the lines of said grooves without gripping the web in line with any of said grooves.

20. In an apparatus of the character described, in combination, a stationary web supporting surface, a plurality of rotary abrading wheels having convex edges and parallel stationary axes, respectively, said

wheels being spaced from each other transversely of said surface and means adapted to propel a web on said surface between the same and the edges of said wheels, whereby parallel grooves having inclined side walls will be formed in the surface of said web.

21. In an apparatus of the character described, in combination, a stationary web supporting surface, a plurality of rotary web abrading wheels having stationary axes, respectively, said wheels being positioned to contact a web on said surface at points spaced from each other transversely of the direction of feed of the web and groove the web on parallel lines, a plurality of rotary web scarfing wheels adapted to contact the web adjacent its edges, respectively, and rotary wheels adapted to grip the web between the lines of said grooves and feed the same relatively to the abrading and the scarfing wheels, and means adapted to continuously rotate said wheels.

22. In an apparatus of the character described, in combination, a stationary web supporting surface, a plurality of rotary web abrading wheels having stationary axes, respectively, said wheels being positioned to contact a web on said surface at points spaced from each other transversely of the direction of feed of the web and groove the web on parallel lines, a plurality of rotary web scarfing wheels disposed to contact the opposite sides of the web adjacent its opposite edges, respectively, and rotary wheels adapted to grip the web and feed the same relatively to the abrading and the scarfing wheels, and means adapted to continuously rotate said wheels.

23. In an apparatus of the character described, in combination, a stationary web supporting surface, a plurality of rotary web abrading wheels having stationary axes, respectively, said wheels being positioned to contact a web on said surface at points spaced from each other transversely of the direction of feed of the web and groove the web on parallel lines, a plurality of rotary web scarfing wheels adapted to contact the web adjacent its edges, respectively, means adapted to continuously feed

the web past said abrading and said scarfing wheels, means adapted to continuously rotate said wheels, and means adapted to size one of said scarfed edges as the web is fed.

24. In an apparatus of the character described, in combination, a stationary web supporting surface, a plurality of rotary web abrading wheels having stationary axes, respectively, said wheels being positioned to contact a web on said surface at points spaced from each other transversely of the direction of feed of the web and groove the web on parallel lines, a plurality of rotary web scarfing wheels adapted to contact the web adjacent its edges, respectively, means adapted to continuously feed the web past said abrading and said scarfing wheels, a size tank, means adapted to continuously rotate said wheels, an eccentrically mounted rotatable dauber adapted to feed glue from said tank into contact with the scarfed edge of the web, and means adapted to support the web opposite said dauber.

25. In an apparatus of the character described, in combination, a stationary web supporting surface, a plurality of rotary web abrading wheels having stationary axes, respectively, said wheels being positioned to contact a web on said surface at points spaced from each other transversely of the direction of feed of the web and groove the web on parallel lines, said surface forming an abutment restraining the bulging of the web in line with said grooves on the side of the web opposite said wheels, means adapted to continuously feed the web past the abrading wheels, pairs of rotary cutting wheels disposed adjacent the opposite edges of the web and adapted to trim the opposite edges of the web on lines parallel to said grooves and means adapted to continuously rotate said wheels.

In testimony whereof I affix my signature, in the presence of two witnesses.

CARLOS HOLLY.

Witnesses:
GEORGE W. RILEY,
L. C. ROLMER.