Nov. 3, 1931. C. E. YATES ET AL 1,829,886

METHOD AND APPARATUS FOR MAKING ROOFING MATERIALS

Filed Oct. 26, 1929 3 Sheets-Sheet 1

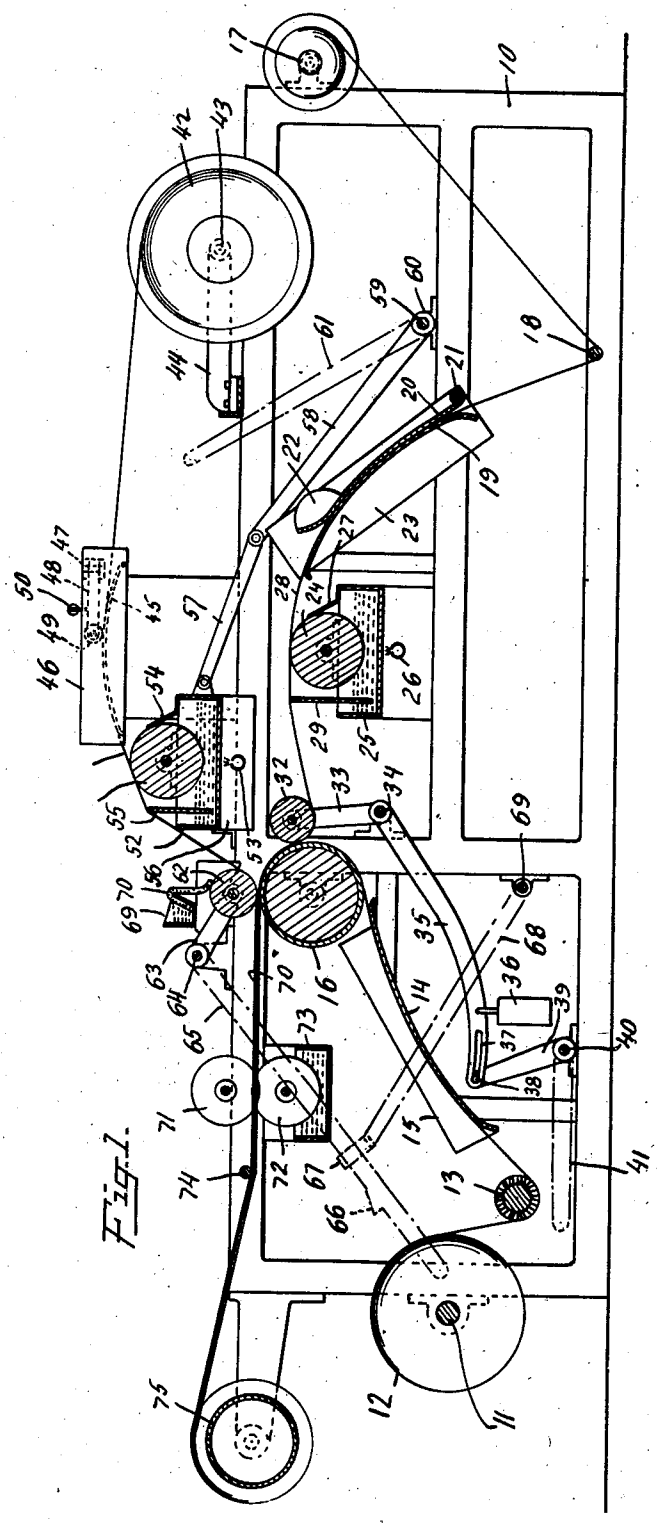


Fig. 1.

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Filed Oct. 26, 1929 3 Sheets-Sheet 2

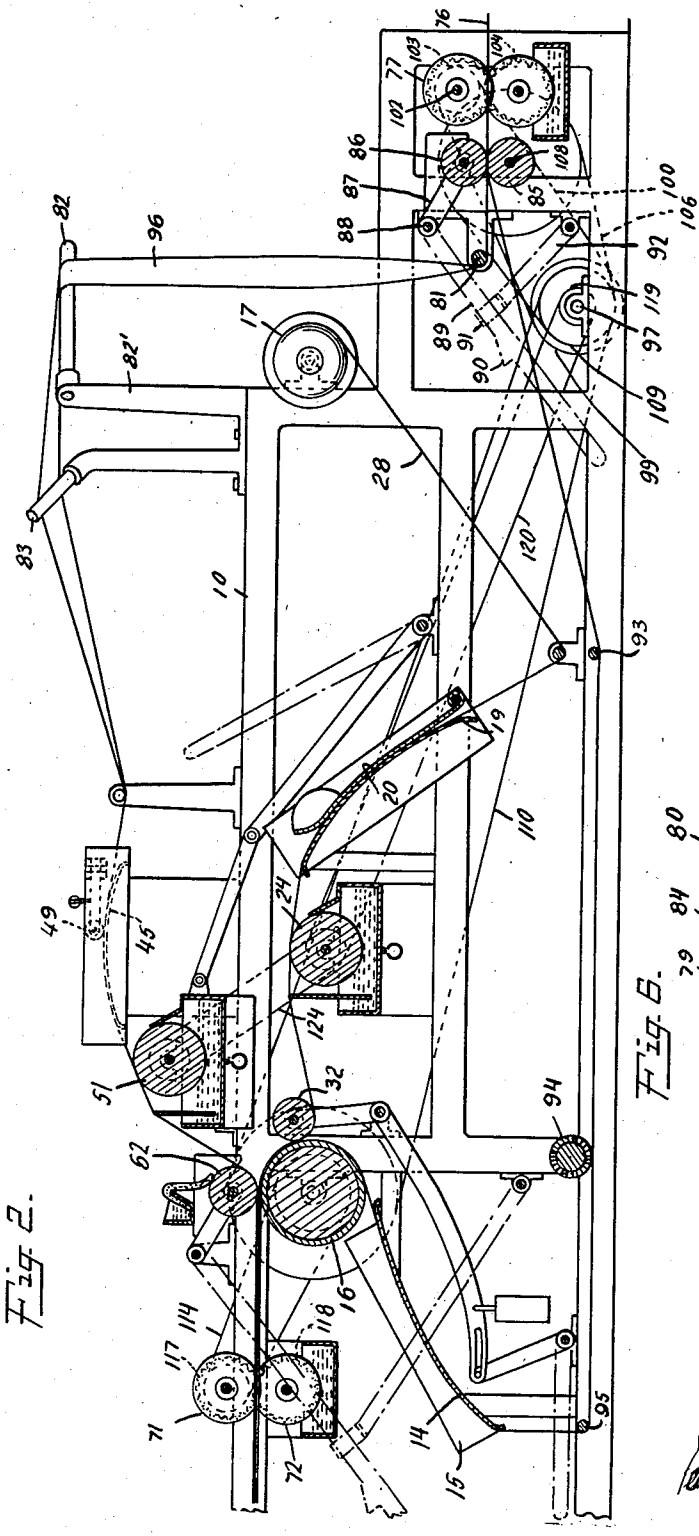


Fig. 2.

Fig. 6.

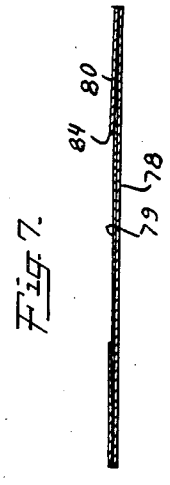


Fig. 7.

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METHOD AND APPARATUS FOR MAKING ROOFING MATERIALS

Filed Oct. 26, 1929 3 Sheets-Sheet 3

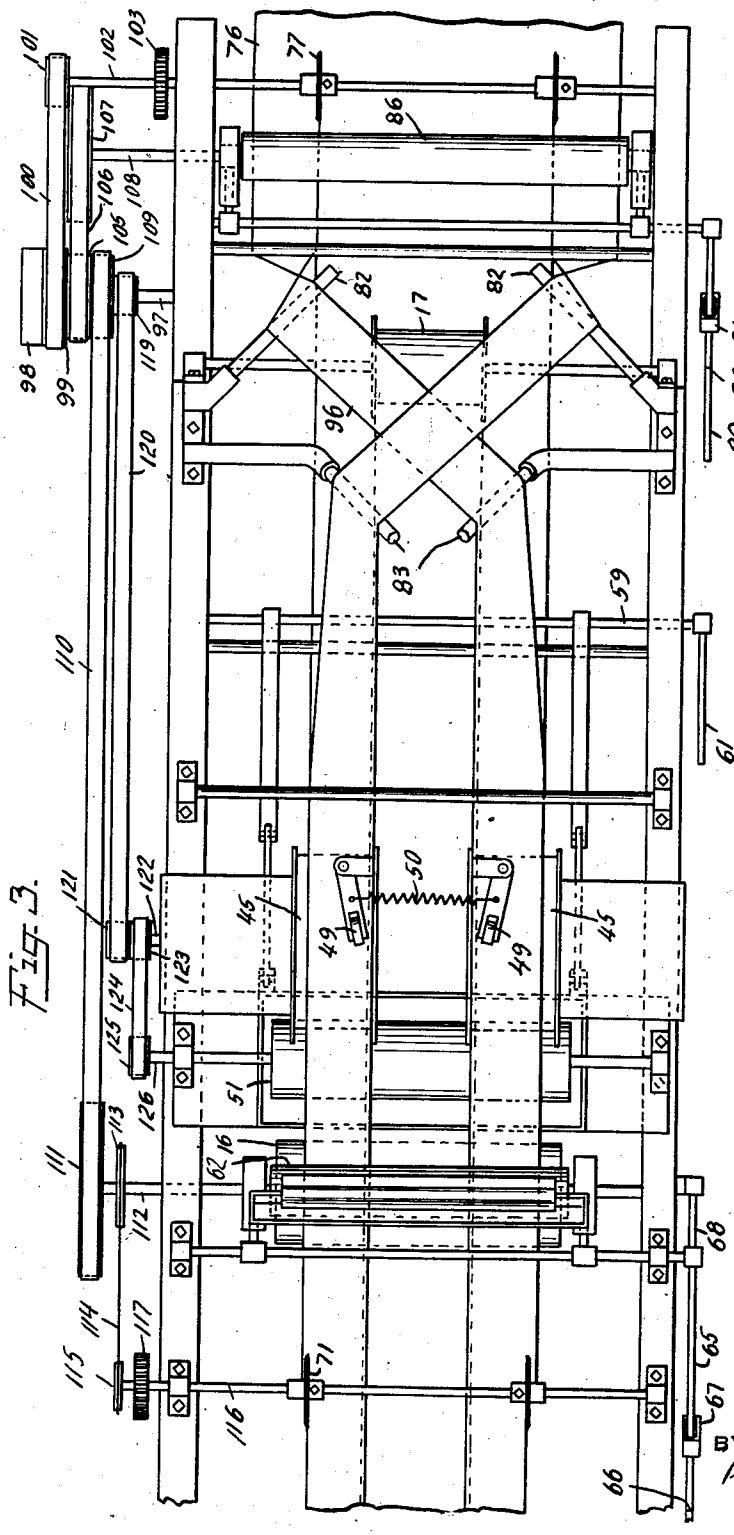


Fig. 3.

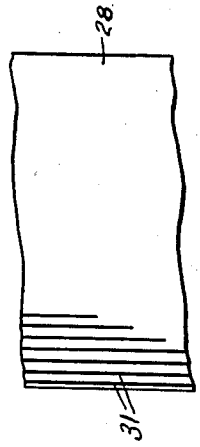


Fig. 5.

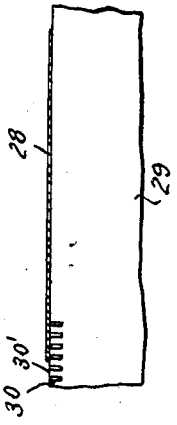


Fig. 4.

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UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR MAKING ROOFING MATERIALS

Application filed October 26, 1929. Serial No. 402,631.

This invention relates to the manufacture of roofing material and is concerned more particularly with apparatus for producing a roofing material of the type illustrated and described in the co-pending application of Shakespeare, Serial No. 343,743, filed March 1, 1929.

The material of the Shakespeare application is intended for use primarily as a flashing or in valleys and it comprises a base or web of thin felt or roofing paper, to one face of which is affixed a band of relatively thin metal, such as copper or the like, which is resistant to corrosion. The metal band is narrower than the web and is applied along the median line thereof. In order to strengthen the material and to prevent separation of the base and metal by the seepage of water between the two, additional strips of the base material are affixed to the marginal edges of the base in such manner as to overlie the edges of the band to a slight extent.

The machine of the present invention is constructed for the manufacture of this material at a low cost and at a relatively high output rate. In one form of this machine, the web, the band, and the strips are mounted in the form of rolls and devices are provided for drawing the band and the strips separately from their supplies, applying an adhesive to one face thereof and then affixing the band to the web and thereafter affixing the strips to the web, one on each side of the band. Suitable devices are provided for maintaining the component parts of the material under proper tension and for guiding them so that they are all properly positioned at the time of their combination into the finished product.

In a modified form of the invention, the web of base material employed is substantially wider than the finished material and strips are severed from the web along the edges thereof. These strips may be wound on rolls and used thereafter for application to a web along its edges or may be advanced at the same speed as the web and coated and applied thereto. In the first case, the strips are cut from one web and ordinarily applied to another, while in the second case, the strips are applied to the same web from which they are cut.

For a better understanding of the invention, reference may be had to the accompanying drawings, in which

Fig. 1 is a view in longitudinal section of one form of the apparatus of this invention;

Fig. 2 is a similar view of a modified form of the apparatus;

Fig. 3 is a plan view of the apparatus shown in Fig. 2;

Fig. 4 is a view in side elevation of one of the parts of the apparatus;

Fig. 5 is a fragmentary plan view of a piece of the material being acted on at one stage in the operation;

Fig. 6 is a sectional view illustrating the manner in which the several parts of the finished product are assembled, and

Fig. 7 is a sectional view through the finished product, the parts in Figs. 6 and 7 being somewhat out of proportion in order to illustrate the construction more clearly.

Referring now to the drawings, the machine is illustrated as formed of a pair of side frame members 10 of any convenient construction. Near one end of the frame members is an arbor 11, on which is mounted a roll 12 of the base or web which is preferably of relatively light weight felt. The web is led from this roll around a guide roller 13 which may be of felt or wood, or may, if desired, be in the form of a cylindrical brush. The felt web is saturated with asphalt and has an asphalt coating on one surface. This surface is the one which comes into contact with the guide roll 13 and by constructing the roll of wood or felt or by using a cylindrical brush for the purpose, the adherence of the felt to the roll is prevented. Beyond the guide roll the felt passes over a curved plate 14 which places a drag on the felt and at the edges of the drag plate are guide plates 15 which center the felt properly for the later operations. The felt passes from the guide plate around a driven pressure roller 16.

The roll of metal band is mounted on an arbor 17 supported in suitable brackets on the frame members 10. This band is led from

the roll down around a guide roll 18 and then over a curved drag plate 19. A plate 20 pivotally supported at 21 and provided with a weight 22 at one end bears against the surface of the band as it passes over plate 19 and places the band under substantial tension. On each side of the drag plate 19 is a guide plate 23 which serves as an edge guide for the band.

The metal, after leaving the guiding and tensioning device, passes over the surface of a coating roll 24. This roll is supported in suitable bearings at the top of a tank 25 in which there is a quantity of the adhesive compound. Asphalt of a suitable melting point is preferably used for this purpose, the asphalt being maintained in fluid condition by means of a burner 26 which directs its flame against the bottom of the tank. The roll is of sufficient diameter so that it dips beneath the surface of the asphalt and it rotates in the same direction as the moving band of metal. At one side of the tank is a doctor blade 27 which removes excess asphalt from the surface of the roll so that beyond that point the roll carries a thin film of asphalt which is applied to the under surface of the metal band 28. Just beyond the roll is another doctor blade 29.

The doctor blade 29 is illustrated more clearly in Fig. 4. This doctor is made of thin sheet metal mounted so that its lower end lies below the surface of the asphalt so that it absorbs heat therefrom and is maintained at a temperature sufficiently high to prevent asphalt from adhering thereto. The upper edge of the doctor is provided with a plurality of slots 30 and lands 30′ and the metal band moves over the slotted edge so that the asphalt coating on the under surface of the band is scraped therefrom except at those points where the doctor is slotted. Beyond the doctor the under surface of the metal is coated in stripes, as indicated at 31 (Fig. 5), and the asphalt in these stripes spreads out to cover the intervening spaces when the metal is applied to the felt base. The doctor 29 thus insures that the correct amount of asphalt will be applied to the metal and since the lower edge of the doctor is below the surface of the fluid asphalt in the tank and the doctor is at a relatively high temperature, any asphalt scraped from the under surface of the metal flows freely down the doctor blade and returns to the tank. The doctor blade described forms the subject matter of a co-pending application of Shakespeare, Serial No. 417,425 filed December 30, 1929.

Beyond the doctor 29, the metal band passes around a pressure roll 32, which bears against the surface of the felt moving around the driven roll 16. The pressure roll 32 is mounted in arms 33 fast on a rod 34 pivotally supported on the framework in any desired manner. Fast on the rod is an arm 35 to which is attached a weight 36. The arm is slotted at 37 beyond the weight and in the slot runs a pin 38 on an arm 39 pivotally mounted at 40 on the frame member. A handle 41 is attached to the arm 39 and when the handle is raised, the movement of the pin 38 in slot 37 swings arm 35 and arms 33, this causing the roll 32 to move away from the surface of the roll 16. In operation, the roll 32 bears against the roll 16 under the action of the weight 36, and the metal band passing between the rolls 32 and 16 is brought into contact with the surface of the felt web and firmly affixed thereto by means of the adhesive and by the application of pressure.

The felt strips 42 are mounted side by side in spaced relation on an arbor 43 in arms 44 attached to the top longitudinal members of the frame 10. Each strip is led from its roll and passes over a curved drag plate 45 which is provided with an upright guide plate 46 along one side thereof. Attached to the guide plate is a bracket 47 in which is pivotally mounted an arm 48 provided with a roll 49 on its end. The two arms 48 above the guide plates 45, one for each strip, are drawn toward each other by means of a spring 50 (Fig. 3). The rolls 49 consequently run on the top surface of the felt strips at an angle to the longitudinal axes of the strips and act to force the strips to run in edge contact with the upright guide plates which lie between them. The rolls consequently cooperate with the guide plates to position the strips properly for later operations.

Leaving the guide plates, the strips pass over a coating roll 51 mounted for rotation on the top of a tank 52, the roll dipping below the surface of the coating material, such as asphalt, contained in the tank. The tank is heated from beneath by means of a burner 53 and it is provided with the doctors 54 and 55 corresponding in construction to the doctors 27 and 29, respectively. The tank 52 is mounted on lugs 56 which rest on top of the longitudinal members of the frame 10 and attached to the tank at one end is a link 57 connected to a crank 58 mounted on a rod 59 supported in bearings 60 on any convenient part of the frame. A handle 61 attached to the rod 59 permits the rod to be rocked, which movement is transmitted to the tank through the links and moves the tank so that the coating roll 51 lies clear of the strips 42.

Beyond the doctor 55, the two strips pass beneath a weighted roll 62 which forces the strips down against the surface of the felt web passing around the roll 16. The roll 62 is mounted in the ends of a pair of arms 63 pivotally mounted on a rod 64 in suitable brackets. The arms are fast on the rod and also secured thereto is a crank 65 provided with a wedge-shaped lug 66. This crank passes

through a sleeve 67 on the end of a rod 68 pivotally mounted on a part of the frame at 69. By swinging the end of the rod 65 in a counter-clockwise direction, the sleeve 67 on arm 68 will slide down rod 65 beyond a lug 66. When the crank 65 is then released, the arm 68 holds the crank in a position such that the roll 62 is clear of the surface of the roll 16. Disposed above the roll 62 is a pan 69 containing water and leading from the pan is a wide strip of wicking 70, the end of which rests on the upper surface of the roll 62. Water carried out of the pan 69 through the wicking by capillary action serves to moisten the surface of the roll 62 and prevent the adhesion of the asphalt coating on the strips to the roll.

The web, the metal band and the strips are combined into a single unit by the cooperation of the rolls 16, 32, and 62, and the composite web 70 is then carried along between rotary trimming knives 71, 72. These knives cooperate to trim the edges of the composite web and the lower knife of each pair dips beneath the surface of water in a tank 73, the water keeping the knives cool and also preventing the adhesion of asphalt and felt particles thereto. Beyond the knives the web passes around a guide roll 74 and then is wound up on a suitable arbor 75 at the end of the apparatus.

The apparatus in the form above described serves to assemble a web of felt, a band of metal, and strips of felt previously cut to the desired width. For this cutting operation, a part of the machine may be employed. For this purpose, a web of felt of the desired width is mounted on the arbor 11 and is carried around the roll 16. The rolls 32 and 62 are displaced to inoperative position and the web of felt is carried around the roll and passes to the trimming knives 71 and 72. The pairs of knives are adjustable toward and away from each other so that they may be placed to sever strips of the desired width from the web of felt along the edges thereof. The wide web of felt which remains after the trimming operation is then rolled up on the arbor 75, while the strips are removed and rolled up on another arbor ready for assembly in the manner above-described. During the operation of severing strips, the tank 52 is moved to inoperative position beneath the drag plate 45.

In some instances, it may be desirable to carry on the operations of cutting the strips and assembling these strips with the web and band in a continuous operation. For this purpose, the apparatus is modified, as indicated in Fig. 2. In this form of the invention, a wide web of felt 76 is employed, this web being passed through rotary trimming knives 77 so as to sever strips from the edges thereof. The felt used in making the finished product is provided with a coating on one surface, and in the finished product the coating lies on the under surface of the material, as indicated at 78 (Fig. 6). The metal band 79 is applied to the smooth surface of the felt and strips 80 are also applied to the smooth surface of the felt with their coated surfaces uppermost. As a consequence, all exposed surfaces of the felt are protected either by the coating or by metal. When the machine in Fig. 2 is employed and the strips of felt are severed from the wide web, these strips must be turned upside down so that as the webs and strip pass through the machine, the coated surfaces are on opposite sides. Accordingly, after the strips have been severed from the web by the action of the driven trimming rolls 77, they pass around a guide roll 81 and then each strip is led around a guide bar 82 mounted in suitable supports 82′ at the top of the frame members 10. The strip at one side of the machine passes up over a guide bar 82 and then across the machine to another guide bar 83, the strip being twisted in its passage so that it is turned upside down.

The purpose of crossing the strips in their movement through the assembly devices is as follows. The wide web from which the strips are cut is likely to have ragged edges and it is desirable that in the finished product the inner edge 84 of each strip should be clean-cut. When the strips are severed from the web, their clean-cut edges are opposed to each other, but when the strips are turned upside down as is necessary on account of the coating on one surface thereof, the rough edges of the strip lie inward. To take care of this situation, the strips are crossed as shown at Fig. 3 after the face reversal has taken place, and this insures that the inner edges of the strips will be those which have been formed by the trimming knives 77.

The web is drawn through the trimming knives by a driven roll 85 on which bears an idler roll 86 mounted in arms 87 on a rod 88 supported in any convenient location in the frame. Fast on this rod is a handle 89 having a wedge-shaped lug 90 and the rod passes through a sleeve 91 on a pivotally mounted arm 92. The handle 89 and arm 92 provide a convenient means for holding the roll 86 clear of the roll 85 whenever desired. The web passing from between the rolls 85 and 86 is led down around a guide roll 93 near the bottom of the frame and beneath a driven brush 94 which cleans the smooth face thereof. The web then passes down around a guide roll 95 and up over the drag plate 14 which is provided with upright side guide plates 15. The web then passes around a roll 16 and between that roll and the weighted roll 32.

The metal band 28 is drawn from the supply roll on arbor 17, passes over the drag plate 19 beneath the weighted tension plate 20 and then over the coating roll 24 with

doctor blades, where it receives a coating of adhesive on its under surface The coated metal band and web of felt are pressed together by the cooperation of rolls 16 and 32.

The strips 96, which have been severed from the edges of the original web, are led around the guide rods 82 and 83, crossing, as indicated in Fig. 3, and each strip then passes over a drag plate 45 on which bears the roller 49 mounted in inclined position. The two strips then pass over the coating roll 51 with doctor blades and then beneath the roll 62 where the strips are affixed to the felt web along the edges thereof at each side of the metal band. The composite web then passes through the trimming rolls 71 and 72 and is wound on the take-up arbor as previously described.

The apparatus is driven by the parts illustrated in Fig. 3. Mounted on the shaft 97 is a pulley 98 on which runs a drive belt. The shaft carries a pulley 99 on which runs a belt 100 leading to a pulley 101 on a shaft 102. On this shaft are mounted the upper trimming knives 77 and the shaft carries a gear 103 meshing with a similar gear 104 on the shaft of the lower trimming knives of each pair. Also mounted on the shaft 97 is a pulley 105 on which runs a belt 106 which also runs over a pulley 107 on a shaft 108. On this shaft is mounted the roll 85 (Fig. 2). On another pulley 109 on the shaft 97 runs a belt 110 running over a pulley 111 on a shaft 112. On this shaft is mounted the roll 16 and the shaft also carries a sprocket wheel 113, on which runs a chain 114, driving a sprocket wheel 115 on a shaft 116. Shaft 116 carries the upper trimming knives 71 and is provided with a gear 117 meshing with a similar gear 118 on a shaft carrying the lower trimming knives 72. Shaft 97 is provided with a pulley 119 on which runs a belt 120 running over a pulley 121 on shaft 122. On this shaft is the adhesive roll 24 and the shaft is provided with another pulley 123, on which runs a belt 124 leading to a pulley 125 on a shaft 126, on which is mounted the adhesive roll 51.

The operation of the device will be clearly understood from the description above given. In the simpler form of the apparatus, the wide web of felt is first run through the machine and the felt strips are severed from along the edges thereof. These strips are then wound up on an arbor to be mounted in the arms 44. The take-up arbor on which the remaining web of felt has been wound is then restored to its original position in the machine. The felt web, the strips and the metal band are then threaded between various rolls in the manner described and the machine operates to combine the web, the band, and the strips into a single finished product. In this form of the machine, it is apparent that a web of felt of any convenient width may be first cut up into strips, and these strips wound up for later application to other felt webs.

The felt used is preferably ordinary asphalt felt having an asphalt coating covered with talc or other non-stick material. If desired grit-surfaced felt may be used, the grit covering the entire back surface and side edges of the web, and also covering the upper face of each strip in the finished product.

In the modified form of the apparatus, the formation of the strips is carried on simultaneously with the combination of the web, band, and strips into the final product. By the devices provided, the strips are reversed both as to horizontal position and turned upside down so that the proper faces of the strips are outermost and the clean-cut edges of the strips lie toward the median line of the finished material. In this manner, the trimming operations produce sharp, clean felt edges throughout and the appearance of the finished material is thus greatly improved.

What we claim is:

1. A method of making a building product, which comprises moving a web endwise, cutting strips therefrom along its edges, progressively affixing a metal band to the surface of the web, and progressively affixing to the web along its edges strips similar to those severed therefrom.

2. A method of making a building product, which comprises moving a web endwise, cutting strips therefrom along its edges, winding said strips into rolls, progressively affixing a metal band to the surface of the web, and drawing off strips from rolls thereof and progressively affixing them to the web one along each side thereof and partially overlying said band.

3. A method of making a building product, which comprises moving a web endwise, cutting strips therefrom along its edges, affixing a band of metal to the web, advancing said strips at the same speed as said web and in such movement reversing the strips face for face and crossing the strips to reverse their positions relative to the web, and affixing the strips to the web one along each edge thereof.

4. Apparatus for producing a building product, which comprises means for drawing a web, a band of metal, and a pair of spaced strips simultaneously from supplies thereof and pressing them into face-to-face contact, means for applying adhesive to the face of the band which is to engage the web prior to said contact, and means for applying adhesive to one face of each of said strips prior to said contact.

5. Apparatus for producing a material suitable for building and other purposes which comprises means for moving a web endwise, means for progressively affixing a

band of metal narrower than the web to one face thereof along the median line of the web, and means for affixing a pair of strips to the same face of the web, one strip along each edge of the web.

6. Apparatus for producing a material suitable for building and other purposes which comprises means for moving a web endwise, means for advancing a band of metal and applying an adhesive to one face thereof, means for affixing the coated band to one face of the web along the median line thereof, and means for affixing a pair of strips to the same face of the web, one strip along each edge of the web.

7. Apparatus for producing a material suitable for building and other purposes which comprises means for applying adhesive to one face of a band of metal, means for affixing the band to one face of a moving web along the median line thereof, means for applying adhesive to one face of each of a pair of strips, and means for affixing the strips to said face of the web, one strip along each edge of the web.

8. Apparatus for producing a material suitable for building and other purposes which comprises means for drawing a web, a band of metal, and a pair of spaced strips simultaneously from supplies thereof and pressing them into face-to-face contact, means for applying adhesive to the face of the band which is to engage said web prior to said contact, means for applying adhesive to one face of each of said strips prior to said contact, and means for maintaining said strips with their adjacent edges a selected distance apart to space said strips relative to said web.

9. Apparatus for producing a material suitable for building and other purposes which comprises means for coating one face of a band of metal with an adhesive, means for applying adhesive to one face of each of a pair of strips, means for advancing a web, said band and said strips and pressing them into face-to-face contact with the adhesive between, separate means for tensioning said web and band, and means for tensioning said strips and maintaining them with their adjacent edges in fixed relation during their advance.

10. Apparatus for producing a material suitable for building and other purposes which comprises means for coating one face of a band of metal with an adhesive, means for applying adhesive to one face of each of a pair of strips, means for advancing a web, said band and said strips and pressing them into face-to-face contact with the adhesive between, and means for guiding and tensioning said strips including a drag and guide plate for each strip, and a rotary element bearing on each strip at an angle to the axis thereof and forcing said strip into edge contact with its guide plate.

11. Apparatus for producing a material suitable for building and other purposes which comprises means for coating one face of a band of metal with an adhesive, means for applying adhesive to one face of each of a pair of strips, means for advancing a web, said band and said strips and pressing them into face-to-face contact with the adhesive between, and means for tensioning said strips and guiding them in spaced relation including a drag and guide plate for each strip, said guide plates lying between the strips, and means engaging one surface of each strip and forcing it into edge contact with its guide plate.

12. Apparatus for producing a material suitable for building and other purposes which comprises means for coating one face of a band of metal with an adhesive, means for applying adhesive to one face of each of a pair of strips, means for advancing a web, said band and said strips and pressing them into face-to-face contact with the adhesive between, and means for guiding said strips side by side in spaced relation including a pair of guide plates between the strips and a rotating element bearing on the surface of each strip and forcing the strip into edge contact with its guide plate.

13. Apparatus for producing a material suitable for building and other purposes which comprises means for coating one face of a metal band with adhesive including a coating roller contacting with the band and applying adhesive thereto and a doctor for limiting the coating to spaced lines on the band, means for coating one face of each of a pair of strips disposed side by side in spaced relation, means for guiding said strips, and means for advancing a web, said coated band and coated strips and pressing them into face-to-face contact with the strips engaging said web one at each side of said band.

14. Apparatus for producing a material suitable for building and other purposes which comprises means for tensioning and guiding a metal band including a drag plate and a presser member forcing the band against the drag plate, means for coating one surface of said band with an adhesive, means for advancing a web, said band, and a pair of strips and pressing them into face-to-face contact, and means for maintaining said strips in spaced relation side by side during their advance.

15. Apparatus for producing a material suitable for building and other purposes which comprises means for coating one surface of a metal band with an adhesive, means for tensioning and guiding a pair of strips side by side in spaced relation including a pair of guide plates between the strips and a roller engaging each strip at an angle to its

longitudinal axis and forcing it into edge contact with its guide plate, means for coating one face of each of the strips with an adhesive, and means for pressing the coated band and strips progressively into contact with a web, the strips engaging the web one at each side of the band.

16. Apparatus of the type described comprising the combination of means for guiding and tensioning a band, means for applying adhesive to one face of the band, means for pressing the band into face contact with an advancing web, means for tensioning and guiding a pair of strips side by side in spaced relation, means for applying an adhesive to one face of each of said strips, and means for pressing the strips into face contact with said web with one strip at each side of said band.

17. Apparatus of the type described comprising the combination of means for guiding and tensioning a band, means for applying adhesive to one face of the band, means for pressing the band into face contact with an advancing web, means for tensioning and guiding a pair of strips side by side in spaced relation, means for applying an adhesive to one face of each of said strips, means for pressing the strips into face contact with said web with one strip at each side of said band, and means for trimming the edges of said web and strips.

18. In apparatus of the type described, the combination of means for severing a strip from each edge of an advancing web, means for crossing said strips and turning them upside down, means for guiding said strips side by side in spaced relation, means for applying adhesive to one surface of each of said strips, and means for pressing said strips into face contact with said web, one along each edge thereof.

19. In apparatus of the type described, the combination of means for severing a strip from each edge of an advancing web, means for crossing said strips and turning them upside down, means for guiding said strips side by side in spaced relation, means for applying adhesive to one surface of each of said strips, means for affixing a band of metal to said web along the median line thereof, and means for affixing said strips to the web one on each side of said band.

20. In apparatus of the type described, the combination of means for advancing a web, means for severing a strip from each edge thereof, means for turning said strips upside down and crossing them, means for guiding said strips side by side in spaced relation, means for affixing a band to said web along the median line of said web, and means for affixing said strips to said web, one along each side thereof.

21. In apparatus of the type described, the combination of means for advancing a web, means for severing a strip from each edge thereof, means for affixing a band of metal to said advancing web, and means for drawing strips from rolls thereof and affixing said strips to said web one along each edge thereof in position to overlie the band on the web to a small extent.

22. A method of making a building product which comprises moving a web endwise, progressively affixing a band to one face of the web, advancing a pair of spaced strips simultaneously from supplies thereof, and affixing the strips to said face of the web, one at each side of said band.

23. A method of making a building product which comprises simultaneously advancing a web, a band of less width than the web, and spaced strips from supplies thereof, affixing the band to one face of the web to be between the edges thereof, and affixing the strips to said face of the web one at each side of the band and partially overlying the band.

24. Apparatus for producing a building product which comprises means for drawing a web, a band narrower than the web, and a pair of spaced strips simultaneously from supplies thereof, means for progressively affixing the band to one face of the web between the edges thereof, and means for progressively affixing the strips to said face of the web, one at each side of the band.

In testimony whereof we affix our signatures.

CHARLES E. YATES.
HARRY C. MACAN.