June 1, 1926. 1,586,892

A. C. FISCHER

PAPER ROOFING MACHINE

Filed May 28, 1920 4 Sheets-Sheet 1

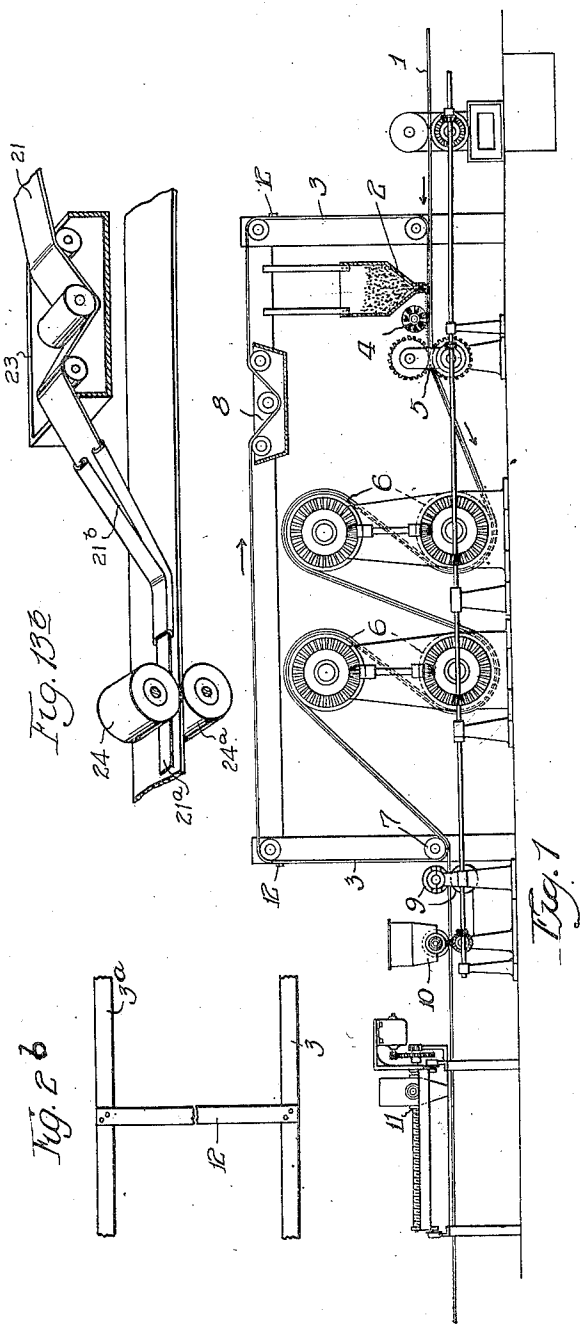


Fig. 1

Fig. 1a

Fig. 2b

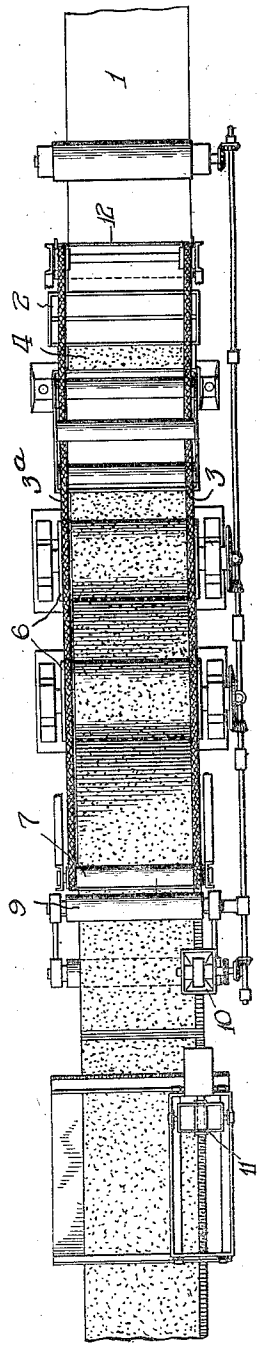


Fig. 2

Witness:

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A. C. FISCHER

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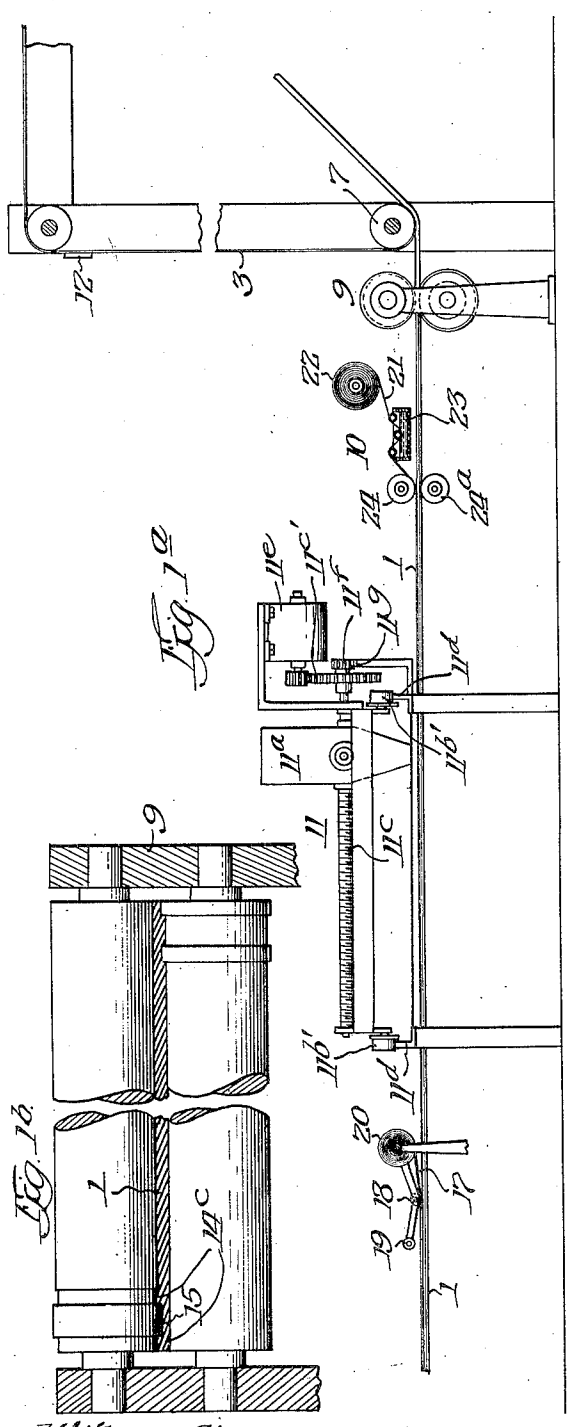


Fig. 1a

Fig. 1b

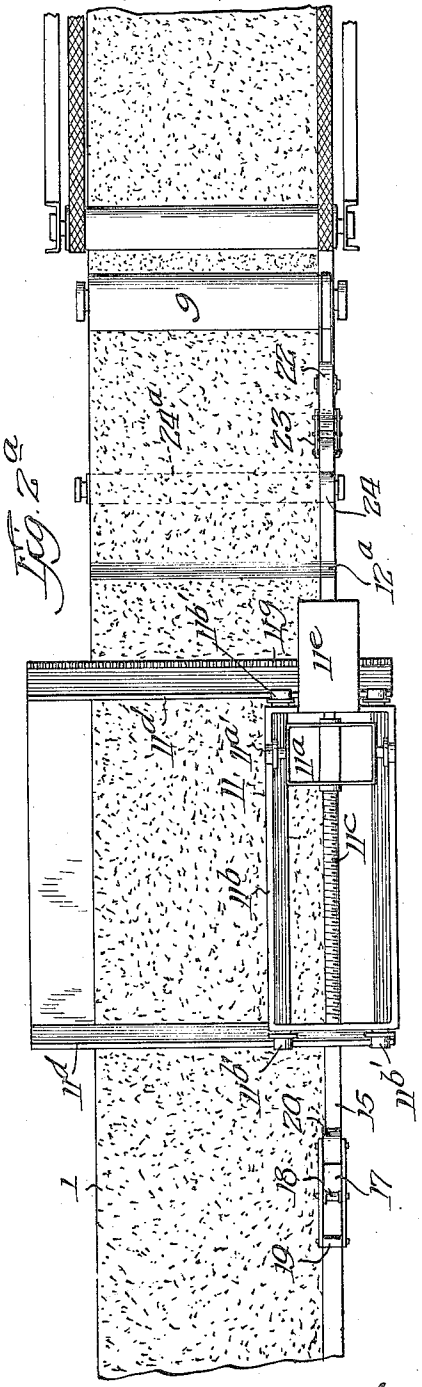


Fig. 2a

Witness:

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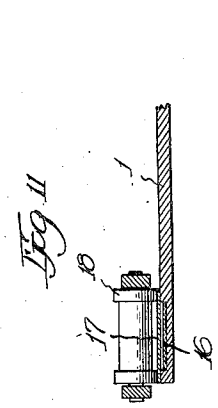
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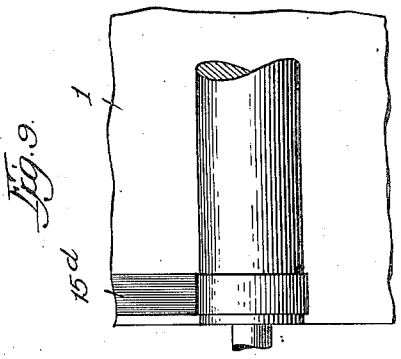
June 1, 1926. 1,586,892

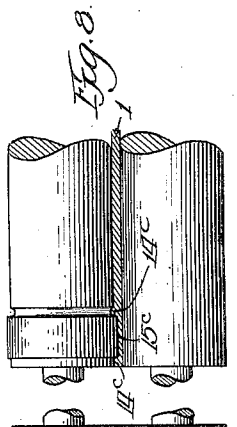
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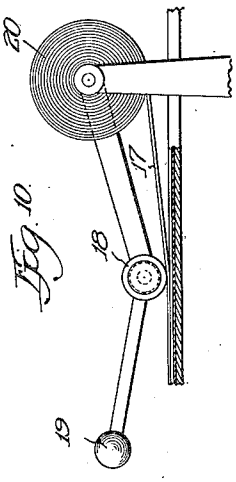
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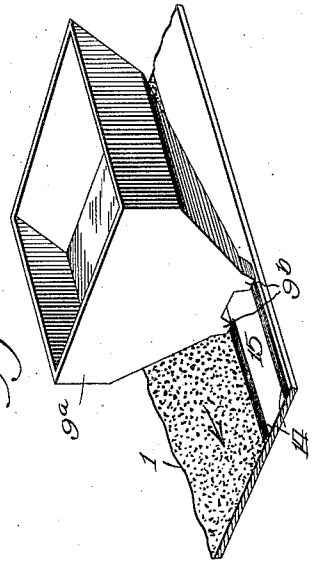
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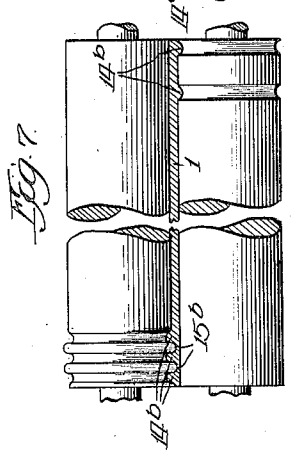


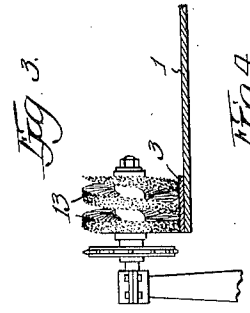


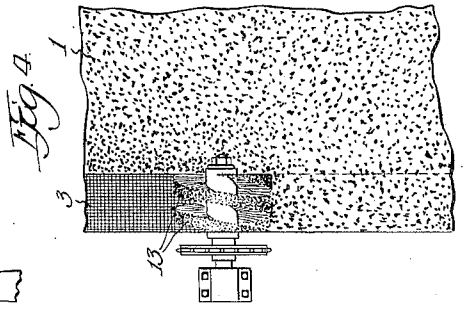


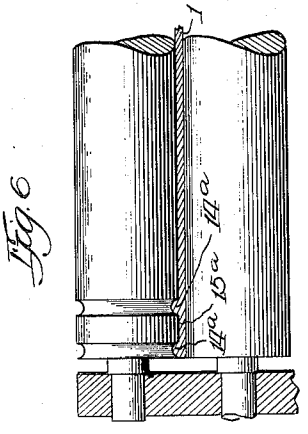












Witness:
Geo. E. Davison

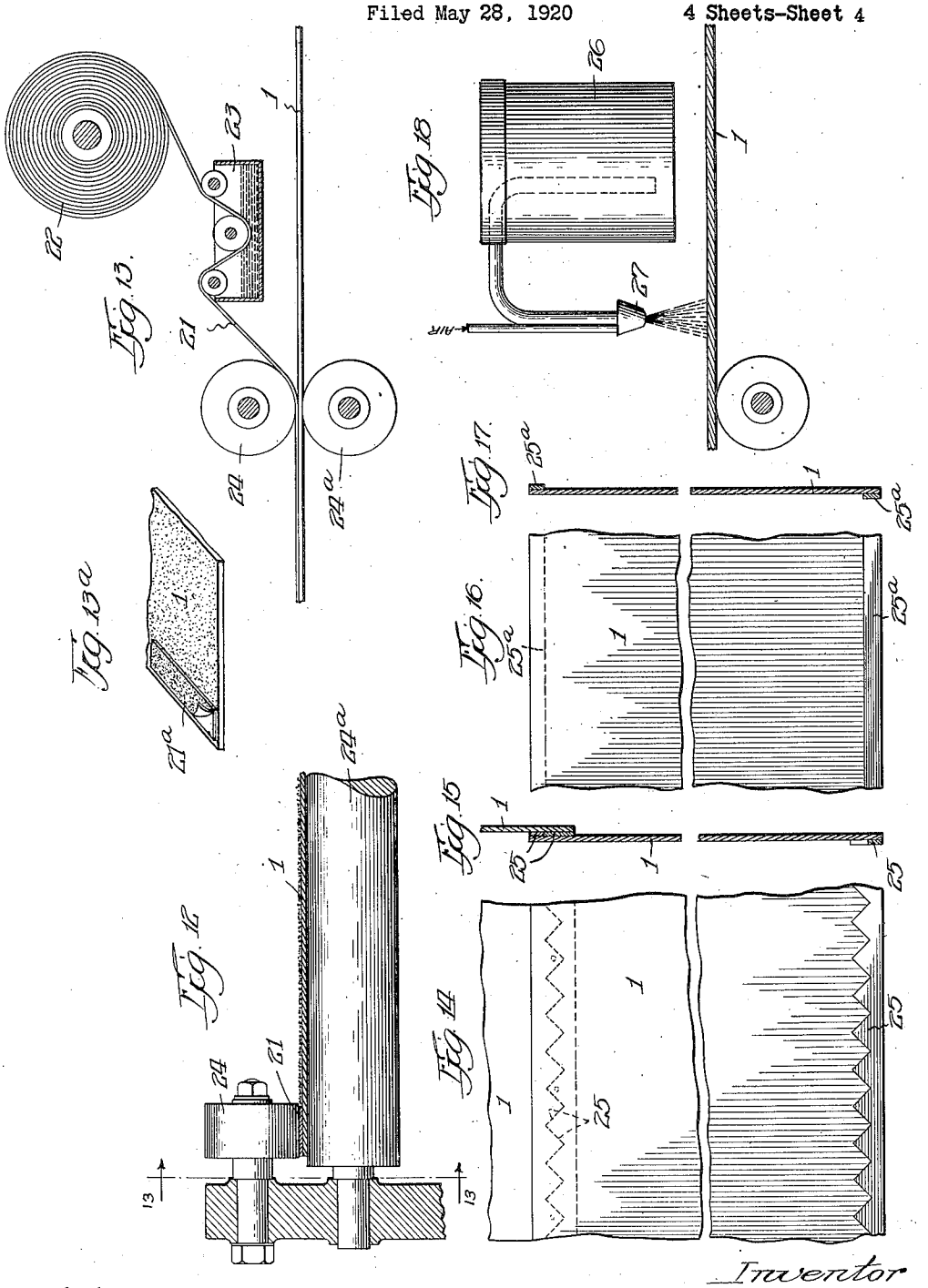
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June 1, 1926. 1,586,892

A. C. FISCHER

PAPER ROOFING MACHINE

Filed May 28, 1920 4 Sheets-Sheet 4



Witness:

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Patented June 1, 1926. 1,586,892

UNITED STATES PATENT OFFICE.

ALBERT C. FISCHER, OF CHICAGO, ILLINOIS.

PAPER-ROOFING MACHINE.

Application filed May 28, 1920. Serial No. 384,879.

This invention relates to a machine for use in treating paper or other sheet roofing material for the purpose of adapting it to form joints between overlapping portions of such roofing when put into use. For convenience, this treatment of the material will be hereinafter referred to as "seam treatment", and the portions of the sheet so treated will be referred to as the "seaming areas" thereof.

In the manufacture of roofing it is customary to treat the main area of the web of roofing material to certain materials which prevent adhesion of the surfaces when the material is in the roll, as, for instance, by spreading a powder thereover. It is also customary to apply to the outer or weather surface of the web subdivided slate, rock, or other mineral for the purpose of rendering the surface more ornamental and better adapting it to withstand weather conditions. Inasmuch as these two steps of surfacing the web are substantially the same in their bearing upon the seaming process, I shall use the expression "weathering" or "weather surfacing" in this specification as applying to both of them. These weather-surfacing treatments render the surface of the web somewhat less adapted to receive the lap cement or mastic commonly applied in weatherproofing joints in the roofing, and, on this account, it has been the practice in the manufacture of roofing to omit weathering or surfacing material from restricted areas, for instance, the seaming areas. But this has usually been done by simply omitting from the seaming area the top coat of asphalt which is usually applied over the surface of such roofing material in addition to that with which the belt is saturated. This surfacing has usually been applied in what is known as the coating machine, and the web has usually been passed from the latter to the apparatus in which mineral weathering material was dropped on to the surface, so that such mineral material could be pressed in while the web was in a warm, pliable state. Where the surface coating was omitted, the weathering material did not adhere, and these areas were consequently left free, and in many instances were used for overlapping and seaming purposes. But this method is objectionable in that it leaves certain portions of the roofing material with less than the full proportion of weathering materials embodied therewith.

It has also been proposed to apply the surface coating over the entire surface of the web, and to lay upon those portions where the presence of mineral weathering material was undesirable strips of paper that would cover up the adhesive over such areas and prevent adhesion of the weathering material, such paper being permitted to remain and to receive the lap cement at the roof when such protected areas were used for seaming purposes. But this method is objectionable because the unsurfaced paper remains absorptive as to moisture, and often provides a means for destroying the integrity of the seam by causing a damp separating sheath to lie between the lap cement and the sheet of roofing material which carries the strip, thereby rendering the lap cement worthless in weatherproofing the seam. Even where gritty or mineral weather surface material is left off of certain areas, the surface has heretofore been treated to prevent adhesion in the roll, and supplied with a coating of lap cement at the time of applying the roofing, the asphaltic material with which the roofing is saturated being insufficient to cause adhesion at the joints.

The object of the present invention is to provide means whereby the web of roofing material will not only have its seaming areas left free from weathering surfacing, but will have such materials fully protected by a surfacing of mastic material, and will be left in such a state that the roofing material will automatically adhere without the application of additional lap cement, as, for instance, by leaving upon the seaming areas a substance of lasting adhesiveness that is exposed by the opening up of a roll, or which may be exposed by the removal of a temporary protecting cover therefrom, or which is of such a nature that it may readily be rendered adhesive by the application thereto of a solvent spread on at the time of laying the roof, or applied by dipping the end of the roll in the solvent before unrolling, or, if desired, brought into contact with the soluble adhesive through means of the overlapping roofing member serving as a vehicle for the solvent, and gradually acting upon the soluble adhesive after the lap joint has been permanently secured upon the roof.

When desired, the material applied to the seaming areas may be of such consistency

that it will develop in the form of walls or beads along the seaming area for the purpose of confining lap cement or mastic, or for the purpose of causing lapped margins of roofing sheet to interlock against drawing apart in the plane of the sheet, and also to provide areas or walls to prevent the weathering material on the main surface of the sheet from working down over the prepared seaming areas while the roofing material is in transport or storage.

The invention will be fully understood upon reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying certain features of the present invention.

Figure 1^a is a side elevation of the left hand end of the machine showing the preferred construction and arrangement of the elements for finishing the seaming areas of the web.

Figure 1^b shows in front elevation the channelling rolls employed in Figures 1 and 1^a.

Figure 2 is a plan view of the same.

Figure 2^a is a plan view of that portion of the machine shown in Figure 1^a.

Figure 2^b is a detail view on an enlarged scale of a portion of the protecting band carrier through means of which weathering treatment is excluded from seaming areas of the web of roofing material.

Figures 3 and 4 are detail views in vertical section and plan, respectively, of the brush for clearing the weathering material from the band which protects the seaming areas, as used in the machine of Figure 2.

Figures 5, 6, 7, 8, and 9 are detail views representing different methods of providing walls or beads upon the surface of the web of roofing material, and providing channels thereon to receive the lap cement, mastic, or the like; Figure 5 illustrating the formation of the beads from thick self-sustaining mastic; Figures 6, 7, and 8 showing various forms of rolls for developing walls or beads by compression of the material of the paper web; and Figure 9 being a plan view of the arrangement shown in Figure 8.

Figures 10 and 11 are detail views illustrating the method of providing a removable protecting strip over the seaming area after the mastic has been applied thereto.

Figures 12 and 13 show, by transverse section and side elevation, the method of applying a mastic to the seaming area of a web through means of a fabric used as a vehicle therefor.

Figure 13^a is a detail view representing a form of strip that may be applied through either of the means illustrated in Figures 10, 12, or 13 when modified by the introduction of a folder, and which, when applied, will constitute a vehicle for mastic of lasting adhesiveness, and made available by simply folding back the top ply of the strip to open up the adhering surfaces thereof.

Figure 13^b illustrates the use, in connection with a strip applying means, of a known type of folder for turning a web or strip upon itself.

Figures 14 and 15 represent by plan and sectional views another form of seaming wall or bead, as well as a different use therefor.

Figures 16 and 17 show by plan and edge views a modification of the form of bead shown in Figures 14 and 15; and

Figure 18 illustrates still another means of applying the lap cement or mastic to the seaming area of the web.

Referring to Figures 1 and 2, 1 represents a web of roofing material, preferably in the condition in which it issues from the machine that builds it from two or more plies of asphalt-saturated material, or roofing material produced in any approved manner and in condition to receive the weathering material or other surface material that is applied to it; that is to say, with an exposed surface of hot and sticky substance. 2 represents means for supplying weathering material to the web 1, and which will be located in what I shall herein term the "weathering zone" of the machine. As the web 1 enters the weathering zone 2 it encounters a protecting band 3 that overlies that portion of the area of the web 1 which is to be reserved for seaming purposes, or, as I shall herein term it, the "seaming area" of the web; the object of thus covering a restricted portion of the web 1 being to exclude therefrom the weathering material in the form of subdivided mineral, powder, or whatever it may be desired to use. 4 represents a rotary brush coinciding in axial dimension with the width of the band 3 and adapted to remove the weathering material from the band before the web 1 passes between the pressing rolls 5 where the weathering material is embedded firmly into the surface of the web. From the rolls 5 the web 1, preferably with the protecting band 3 still associated therewith, passes around the setting and drying rolls 6, beyond which the band 3 leaves the web at any suitable point, as, for instance, the deflecting roller 7. From this point the band 3 returns to the point at which it first encounters the web 1, and thus may advantageously be in the form of an endless continually-running belt. At some point in the circuit of the band 3, the band is dipped into a moistening vat 8 which keeps it saturated preferably with moisture and thus prevents it adhering to the sticky surface of the web 1 while passing through the weathering and drying zones. The web passes beyond the

deflecting rolls 7 to further elements in the seam treatment of the web, as, for instance, ribbing, channelling, or beading rolls 9 by which the surface of the web is developed into form specially adapted to receive the lap cement, such, for instance, as illustrated in Figures 6 to 9. The cement applying apparatus 10 may be of any construction adapted to distribute upon the seam area or desired portions thereof the particular form of lap cement, mastic, or other material desired, and may use either a vehicle as suggested in Figure 13 or a direct spray as shown in Figure 18. I prefer, however, to use the apparatus shown in detail in Figures 12 and 13, wherein 21 represents a continuous strip vehicle, preferably of material similar to that of the web, supplied from a roll 22, and passing through an impregnating vat 23, and thence between rollers 24, 24^a, between which the web 1 also travels, and by which the vehicle with the cementing substance of lasting adhesiveness adhering thereto is laid in the channel 15^c of the web; the roll 24, as shown in Figure 12 having an axial dimension corresponding to the width of the vehicle 21, and the channel 15^a and the roller 24^a preferably corresponding to the full width of the web 1. The transversely acting seam treating device 11 acts periodically to apply lap cement to transverse seaming areas occurring at the intervals where the webbing is to be severed into lengths suitable to make the rolls into which the material is developed for shipment.

The transverse seam treating element 11 for the application of cement to the transverse seaming areas 12^a may consist of a container 11^a for the cement, mounted through rollers $11^{a'}$ upon a carriage 11^b, and caused to move thereon by a screw 11^c synchronously with the advance of the web 1 while the transverse area is being treated; the movement transversely of the web being permitted by rollers $11^{b'}$ traveling on tracks 11^d. The screw 11^c is driven through the gearing $11^{c'}$ by the electric motor 11^e, and the transverse movement of the carriage 11^b is imparted by the pinion 11^f running on the rack 11^g.

In addition to the longitudinally acting protecting band 3, transverse protecting bands 12 may be employed to overlie transverse seaming areas 12^a of the web at intervals at which the web is to be severed for making rolls, or at more frequent intervals if it be desired to provide for cutting up the material of a roll into definite lengths. The transverse band 12 is carried by the longitudinally acting band 3 which overlies one longitudinal margin of the web 1 and by the twin band 3^a which, while traveling with the band 3, is beyond the edge of the web 1 and has no effect upon the latter. In order that the transverse band 12 may resist the weathering material 2 as the web 1 and the overlying band 12 pass between the pressing rolls 5, each transverse band 12 is preferably of a metallic nature. The longitudinal band 3 will not require a protecting sheath; instead, it is subjected to the action of the brush 13 (Figures 3 and 4) which like the brush 4, Figure 1, cleans the granular substance therefrom before the band enters the rolls 5 with the web 1.

The channelling or beading device 9 may, if desired, be in the form of a hopper 9^a having outlets 9^b adapted to deposit upon the seaming area of the web 1 plastic material in the form of a pair of beads 14, which take on a permanent set of sufficient hardness to maintain their form during shipping and until the web is put into use. The material, however, need not be so hard but that it will gradually yield when the lap seam is made on the roof. The material may even be of such character that either by reason of its original constituency, or as a result of having its surface diluted with a suitable solvent, it will be ready to adhere to the overlapped roofing member and thus assist in effecting a watertight joint.

According to Figures 6, 7, and 8, beads 14^a, 14^b, and 14^c are formed in the material of the web 1 by merely pressing the material, while its impregnating asphalt is still hot, between a suitably grooved or ribbed roll and a smooth roll. The effect of Figure 5, as well as Figures 6, 7, and 8, is to make a channel or channels 15, 15^a, 15^b, or 15^c in the web 1 which will receive lap cement and confine it against running while the material is in the roll. The beads also have the effect of pressing tightly against the adjoining surface of material in the roll and forming an effective barrier against the settling of the finely divided material which has been applied to the roofing as a weathering surface, and which would otherwise settle upon and adhere to the mastic in a manner to interfere with the joint.

According to Figure 9, a channel 15^d is formed in the web 1 while leaving the walls thereof flush with the main surface of the web. This arrangement will be of especial advantage when it is desired to place a mastic 16 of lasting adhesiveness either alone or borne upon the saturated vehicle strip into the groove of the roofing material and to cover it with a protecting strip 17, which can be readily peeled off to expose the mastic for use when the roofing is to be applied.

Any suitable means may be used for applying the protective strip 17, but this preferably consists in the roller 18 acting under

the influence of a counter-weight 19 to press the tape coming from the supply 20 down upon the surface of the web, where it will be caused to adhere by the adhesive nature of the impregnating asphalt of the roofing material, and which will ordinarily still be warm and unset when the web reaches the strip-applying means.

By properly selecting the beading rolls, the web 1, as shown in Figures 14 to 17 may be provided with interlocking beads 25, which will preferably have the quality of not only interlocking the sheets against pulling apart in the plane of the sheet, but also of adhering to the overlapped surface of the sheet so as to render the joint weathertight, even in addition to nailing which may be readily employed. If the beads 25 be made of thick mastic, they will be self sealing around the nails that are driven in.

If desired, the vehicle employed for applying the mastic of lasting adhesiveness to the seaming area may be in the form of a folded strip 21^a, as shown in Figure 13^a, as, for instance, by passing the strip through a suitable folder 21^b (Fig. 13^b) after it leaves the vat 23 and before it reaches the applying roll 18 (Figure 10) or 24 (Figure 13) and sprinkling the usual surfacing material on the outer face, so that when the material gets on the roof it is merely necessary to peel back the upper ply of the vehicle to expose an effective area of lap cement in adhesive condition.

In Figures 14 and 15 the beads 25 have their abutting edges serrated to make a tighter joint, whereas in Figures 16 and 17 they are represented at 25^a as having plain edges.

In Figure 18, 26 represents a supply of lap cement and 27 an air blast nozzle through which such cement can be directed upon the seaming area of the web 1.

It is to be understood that any of the seam treatments herein described can be applied to the under side as well as the upper side of the roofing material, and also to intermediate transverse areas thereof, as, for instance, to adapt the roofing, when severed into conventional lengths, to be ready for automatic end seaming as well as longitudinal marginal seaming.

The present invention is particularly advantageous when used in connection with self seaming roofing materials such as described in my pending applications, Serial No. 336,713 filed November 8, 1919, and Serial No. 365,901, filed March 15, 1920.

It is to be understood that the invention is not limited to any particular form of beaded or ribbed interlock formed along the margin of the roofing member, but that these beads or ridges may be either straight, serrated, or pointed, in the form of tongues and grooves, or dovetails, or any other design adapted to produce an overlap in the direction of the plane of the sheet. It is also to be understood that the application of various materials to the margin of the sheet as herein described reinforces the edge of the sheet and adds to its holding power.

It is further to be understood that the adhesive may be applied into the bottoms of the grooves on both of two overlapping roofing members, and, if desired, in such quantity that when so applied the cement will be spread until it covers practically the entire contacting surfaces of the overlapping portions.

By the term "seam treating," as herein employed, it is the purpose to indicate any of the herein disclosed treatments of restricted portions of the roofing materials to better adapt them to effect weatherproof joints when brought into conjunction with complementary pieces of roofing material.

I claim:

1. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating a restricted area of said web, comprising means for developing on said web a defining wall and means for depositing a mastic substance adjacent said wall.

2. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating a restricted area of said web, comprising means for developing on said web a channel, and means for delivering a seaming mastic to said channel.

3. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating a restricted area of said web, comprising means for developing upon said web a plurality of ribs in position to interengage a correspondingly ribbed section of such a web and prevent two sections drawing apart edgewise, and means for depositing in the channel between ribs on one section an adhesive that receives the ribs of another section.

4. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating a portion of said web, comprising a mastic vehicle strip-supplying means and means for pressing the strip therefrom upon the surface of the web.

5. In a roofing machine, means for presenting a web of roofing material, means for seam-treating a portion of said web, comprising a web channeling means, a mastic vehicle strip-supplying means and means for pressing the strip therefrom into the channel of the web.

6. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating a portion of said web, comprising a mastic-supplying means acting upon a restricted area of said web

and a strip-supplying means applying a protective strip over the area of the supplied mastic.

7. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating said web, comprising a web-channeling means, means supplying mastic to the channel provided by said channeling means, and means for supplying a protective strip over the mastic in said channel.

8. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating said web, comprising a web-channeling means, means supplying mastic to the channel provided by said channeling means, means for supplying a protective strip over the mastic in said channel, and means for pressing said protective strip upon the surface at the sides of the channel.

9. In a roofing machine, means for presenting a web of roofing, means for surface treating the same, means for excluding such surface treatment from a seaming area of said web, and means for seam-treating said seaming area.

10. In a roofing machine, means for delivering to a weathering zone a web of roofing material with exposed adhesive surface, means for delivering a weathering treatment to said surface in said zone, and means for excluding the weathering treatment from a seaming area of said web while in said zone, comprising a wet band feeding with and covering said seaming area during traverse of said zone; said machine having pressing rollers through which the web passes with said band after receiving its weathering material.

11. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating a longitudinally extending area of said web and also periodically occurring transversely extending areas thereof, comprising a continuing longitudinal covering band overlying the longitudinal seaming area of the web, and a transverse covering band encountering the web at intervals and overlying the transverse seaming area thereof.

12. In a roofing machine, means for presenting a web of roofing material, and means for seam-treating a longitudinally extending area of said web and also periodically occurring transversely extending areas thereof, comprising a longitudinally acting mastic applying means and an intermittently operated transversely acting mastic applying means.

13. In a roofing machine, means for presenting a web of roofing material, and means for applying over a seaming area thereof, a strip-like vehicle for seaming mastic, folded upon itself with mastic between its folds, and in condition to be exposed for seaming purposes by the unfolding of the strip.

Signed at Chicago, Illinois, this 22nd day of May, 1920.

ALBERT C. FISCHER.