

April 11, 1950

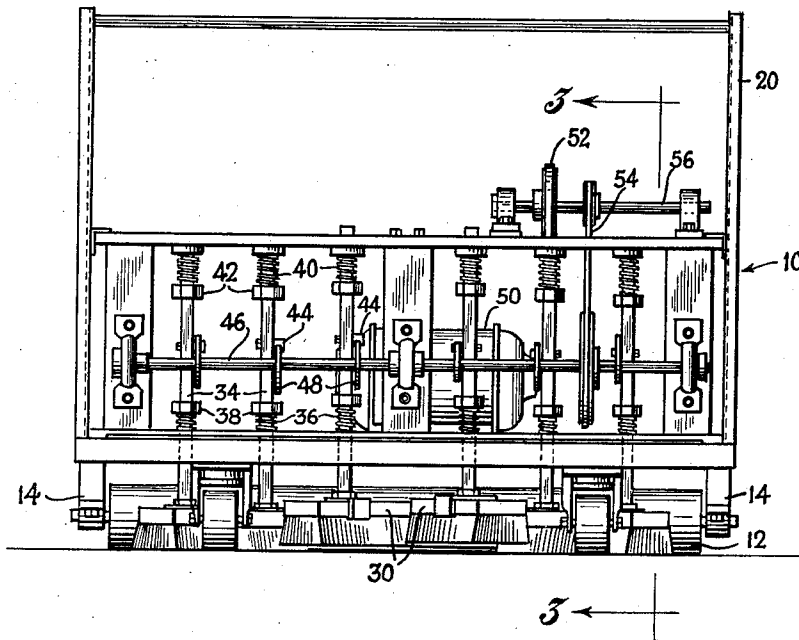
M. L. MOYER  
APPARATUS FOR TAMPING IN SHEET MATERIAL  
FOR ROOFS AND THE LIKE

2,503,560

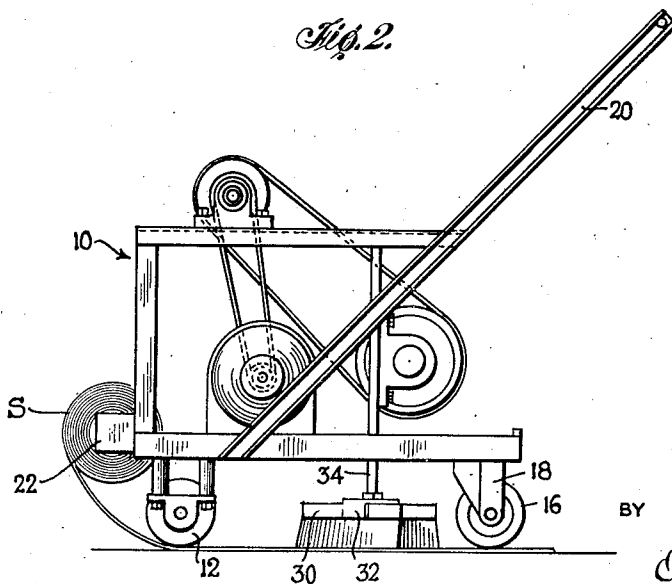
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2 Sheets-Sheet 1

*Fig. 1.*



*Fig. 2.*



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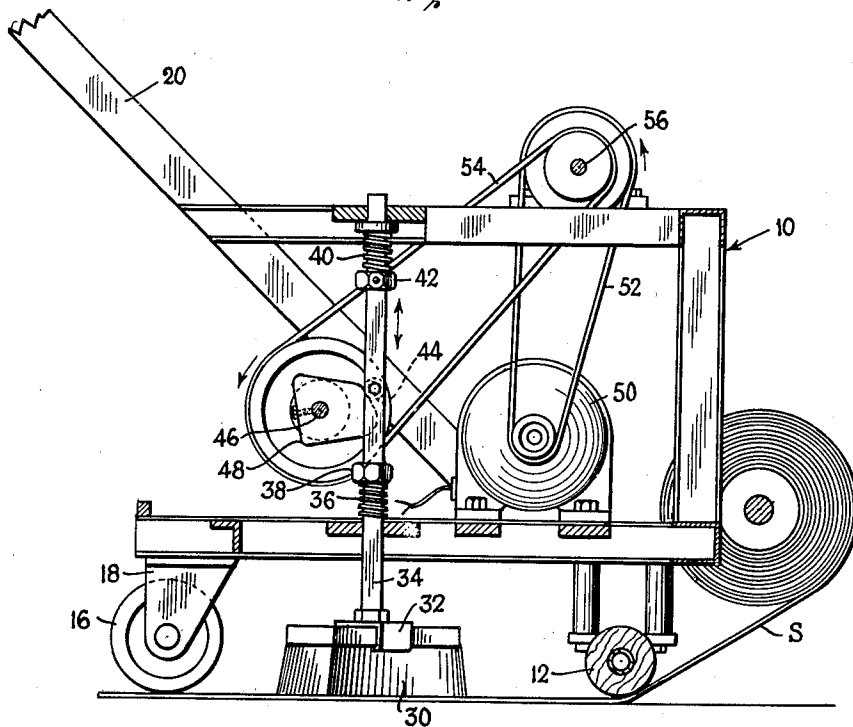
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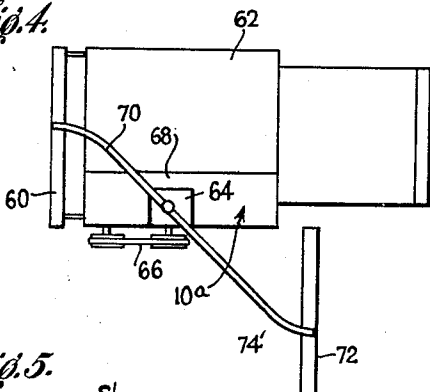
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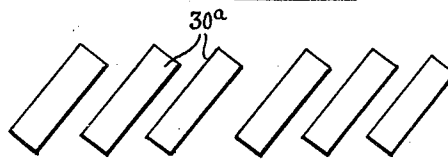
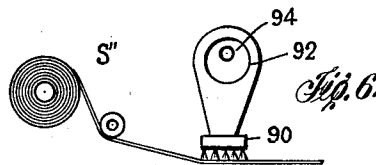
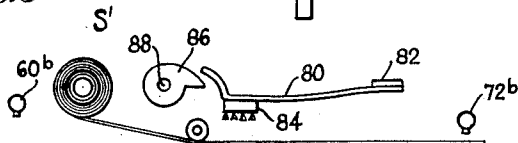
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



*Fig. 7.*

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## UNITED STATES PATENT OFFICE

2,503,560

## APPARATUS FOR TAMPING IN SHEET MATERIAL FOR ROOFS AND THE LIKE

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Application April 2, 1947, Serial No. 739,036

16 Claims. (Cl. 216—20)

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This invention relates to apparatus for applying flexible sheet material to a plastic base, and, more particularly, is concerned with substantially automatic apparatus for tamping in metal foil, or other flexible sheet material, into a plastic base, for example, a layer of tar on a roof.

It has been proposed heretofore to employ metal foil in conjunction with roofs, walls, tanks, and the like, to assist in sealing the surface, and this has generally been achieved by first brushing on a layer of tar, or other plastic base, then laying down the metal foil, which is rolled or brushed on, followed by a final layer of brushed on tar or other bituminous plastic. A very good roof, for example, is thus provided, except for the fact that it is very difficult to eliminate all air pockets underneath the metal foil, and if these air pockets are not eliminated, they swell and collapse during temperature changes, make the roof undesirable to walk upon, roll things over, and the like, and are a potential source of breakdown and leakage in the surface treated. In known hand operations of rolling or brushing in the metal foil, very considerable numbers of air pockets are encountered unless a great deal of tedious hand work is performed, and sometimes in spite thereof, which handwork is extremely hard on the roofer or other operator.

Also, in the application of metal or other flexible foils to roofs and the like in known processes, it has been the usual practice to first give the roof or other surface a coat of tar or other plastic sealing material, followed by the application of the foil, felt, or other flexible sheet material. This means that with part or all of the entire roof covered by tar, it is very difficult for a workman to function effectively on the roof, the tar laying in advance of the roll of foil or felt being a constant hazard and very messy. The same is true after the foil or felt has been applied to the surface when the entire roof is brushed or coated with the final plastic layer.

It is the general object of my invention to avoid and overcome the foregoing and other difficulties of and objections to known practices and apparatus by the provision of an improved relatively inexpensive, easily operated apparatus for quickly and mechanically applying foil, felts, or other flexible sheet material to the plastic coated surface of a roof, or the like, with the flexible sheet material being tamped in over its entire area to avoid the formation of air pockets or other potential trouble spots.

Another object of my invention is to provide apparatus of the character described including a

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frame which supports a roll of the sheet material so that when the frame is rolled over the surface the sheet material is laid down on the surface, and with the frame carrying power driven tamping means which are moved into and out of engagement with the sheet material a large number of times a minute to embed the sheet material very positively over its entire area with the plastic base material.

Another object of my invention is the provision of apparatus for tamping in metal foil and the like in the manner described, with the apparatus including a plurality of brushes resiliently held toward the sheet material, but with the brushes being adapted to be lifted away from the sheet material against the action of the spring by motor driven cams which lift up and drop the brushes a large number of times each minute against the sheet material, the brushes being positioned in overlapping relation to cover substantially the entire width of the sheet material.

Another object of my invention is to provide apparatus of the type herein set forth and which includes spray nozzles positioned in association with the front and/or the side of the apparatus for laying down an even coating of the plastic underneath of the sheet material being unwound from the apparatus, and, if desired, to the side of the apparatus to cover the length of sheet material previously laid by the apparatus, the plastic being laid down only as the apparatus is moved forward to thereby insure a uniform coating of the plastic.

The foregoing objects of my invention, and other objects which will become apparent as the description proceeds, are achieved by the provision of apparatus including a frame, means removably and rotatably mounting a roll of sheet material on the frame, a roller substantially the width of the sheet material, said roller supporting one end of the frame, and underneath which the sheet material passes, means rotatably supporting the other end of the frame, a plurality of brushes or tamping means carried on the frame in transverse overlapping relation, means carried by the frame to individually tamp the brushes into engagement with the sheet material a large number of times a minute over the full width of the sheet material to embed the sheet material without air pockets into a plastic base, and handle means on the frame for guiding the frame over the plastic base. The means for effecting the tamping action ordinarily include spring means for urging the brushes towards the sheet material and motor driven cam means for lifting

the brushes against the action of the springs and dropping the brushes to allow the tamping action. I may also incorporate with the apparatus spray means for laying down plastic at the front of the apparatus, conveniently underneath the sheet material as it is unwound, and, if desired, for spraying plastic on a previous length of sheet material laid by the apparatus, the plastic being fed to the spray nozzles only when the apparatus is advanced across the surface to be covered so that the coating of plastic is uniform on the surface.

For a better understanding of my invention reference should be had to the accompanying drawings, wherein:

Fig. 1 is an elevation of the back of one embodiment of apparatus incorporating the principles of my invention;

Fig. 2 is an end elevation of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged cross-sectional view through the apparatus as taken substantially on line III—III of Fig. 1;

Fig. 4 is a diagrammatic plan view, on a reduced scale, of the apparatus of my invention incorporating plastic spray equipment;

Fig. 5 is a diagrammatic side elevation of a modification of my apparatus;

Fig. 6 is a view similar to Fig. 5 of still another form of my invention; and

Fig. 7 is a diagrammatic showing of one of the possible relationships of the brushes of the apparatus illustrated.

Having particular reference to the drawings, and to Figs. 1 to 3 thereof, the numeral 10 indicates a frame which is made from angle irons, plates, bars, castings, or other suitable material, and usually light weight metal, such as aluminum or magnesium. The front of the frame 10 rotatably supported for movement over a surface, and the rotatable supporting means may take the form of a wide roller 12 which is usually crowned, and is journaled in suitable bearings 14 which are fastened to the bottom of the forward end of the frame 10. The back end of the frame 10 is supported for movement over a surface by one or more rotary elements, such as a pair of wheels 16 carried in caster brackets 18 at the back of the frame, with the caster rollers being adapted to turn about vertical axes to permit the frame 10 to be turned during its movement over the surface to be treated. A handle 20 extending upwardly from the frame is adapted to be grasped by the operator of the apparatus to move the apparatus over the surface.

Associated with the front of the frame 10 are bearings 22 which rotatably support in a quickly releasable manner a roll of flexible sheet material S, for example, metal foil, felt, or the like, with the sheet material ordinarily being in a relatively wide roll, usually in the neighborhood of from twenty-four inches to thirty-six inches wide, the sheet material being pulled off of the roll, passed under the roller 22, and back under the apparatus so that on the forward movement of the apparatus the sheet material will be unrolled from the roll and progressively applied to the surface to be covered. Of course, my apparatus can be built smaller to handle flexible sheet material narrower than twenty-four inches wide if this be desired. In this connection, I may incorporate features of my invention into a small hand-held apparatus having one or two brushes and adapted to tamp narrow strips of foil as flashing around corners, chimneys, and the like.

Associated with the frame 10 are tamping means for compacting the sheet material S onto the plastic covered surface to which the sheet material is to be applied. Such tamping means may take a variety of forms including brushes, cellular or soft rubber blocks, cloth pads, or the like, and may be of a variety of sizes. In the form of the invention illustrated, the tamping means includes a plurality of brushes 30 each of which is adapted to be tamped a large plurality of times a minute against the upper surface of the sheet material S, as will be evident from Figures 2 and 3. The tamping action on the brushes is conveniently obtained by securing each brush in a quickly releasable clamp 32 mounted upon the bottom end of a rod 34, the rod being adapted to be reciprocated up and down by any known means. The reciprocation of the rod 34 can be obtained by electric solenoids, air motors, or other known prime movers, but one particularly practical way of achieving the desired result is to employ rotary cams for lifting and dropping each rod.

Having reference to Figs. 1 and 3 of the drawings, it will be noted that each rod 34 is mounted in the frame 10 for vertical sliding movement, the downward sliding movement of the rod being limited by a spring 36 and an adjustably positioned nut 38, and the upward movement of the rod 34 being limited by a spring 40 and an adjustably positioned nut 42. Near its center, each rod 34 carries a rotatable cam follower 74. A shaft 46 rotatably journaled in the frame 10 carries a cam 48 adjacent each cam follower 44 so that upon rotation of the shaft 46 each rod 34 will be lifted up against the action of the spring 40 to move the brush 30 away from the surface of the sheet S until the high spot of the cam 48 passes by the cam follower 44 whereupon the force in the compressed spring 40 will throw the rod 34 downwardly to give a good sharp tamp of the brush 30 against the sheet material S. The shaft 46 is driven from a gasoline or an electric motor 50 mounted on the frame, the drive from the motor 50 including belts 52 and 54 and a jack shaft 56 mounting pulleys carrying the respective belts. In certain light-weight or other forms of my invention, I may effect the drive for the tamping means directly from the wheels and eliminate the motor 50.

Fig. 1 illustrates that the rods 34 and brushes 30 are mounted side by side transversely of the frame 10, with the brushes being held at an angle so that the brushes will form an overlapping pattern whereby the tamping action of the brushes on the sheet material will take place substantially over the full width of the sheet material. In the form of the invention shown in Fig. 1 of the drawings, the three right hand brushes are positioned at an angle of somewhat less than 90 degrees with respect to the axis of the roller 12, and the three left hand brushes are positioned at the same but an opposite angle to the axis of the roller 12. The actual pattern that the brushes form may be widely varied as long as the brushes overlap, and in Fig. 7 I have shown one more of the various overlapping patterns which may be used with the brushes, the position of each brush in Fig. 7 being indicated by the numeral 30<sup>a</sup>.

It is believed that the operation of the apparatus of Figs. 1 to 3 will be understood from the foregoing description, suffice it to say here that the surface to be covered with the sheet material S is ordinarily provided with a plastic base, such as tar, bituminous material, or other waterproof-

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ing material or material possessing desired characteristics, whereupon the apparatus of the present invention with the sheet material positioned as in Fig. 2 or 3 is moved over the plastic base by an operator grasping the handle 20, and with the motor 50 operating by having a long extension cord running back to a source of electric power. If the motor 50 is a gasoline motor, and is self contained, it is sometimes advantageous inasmuch as the dragging of a long electric cord over the roof is eliminated. Also, it might be noted here that I may clutch the motor in and out to drive the roller 12 or otherwise propel the apparatus so that it will be unnecessary for the operator to push it.

In any event, with the motor 50 operating the brushes 30 will be tamped a large number of times a minute across the entire width of the sheet material S to embed the sheet material in a particularly positive and satisfactory manner in the plastic base material on the surface to be covered. Any air pockets in the sheet material are eliminated and a particularly effective and permanent bond between the sheet material and the plastic base is effected. After a length of the sheet material has been laid down, the sheet material is usually cut between the roll of sheet material and the roller 12, the machine is turned around and aligned to go back down over the surface in a path immediately adjacent and parallel to the strip of sheet material just laid, whereupon the sheet material is pulled from the roll under the roller 12 and a second strip of sheet material is laid down, this second strip usually overlapping the first strip by one or more inches depending upon the type of joint or seam to be made.

Now, having reference to Fig. 4 of the drawings, the apparatus of Figs. 1 to 3 is illustrated with several additional features attached thereto. Particularly, mounted in front of the frame 10<sup>a</sup> is a spray nozzle 60 having spray slots or nozzles adapted to distribute a substantially uniform coating of plastic base material over the surface on which the sheet material is to be applied. The plastic base material is adapted to be applied by the spray nozzle 60 immediately in front of the sheet material just before the sheet material is laid down by the roller 12 as heretofore described. The plastic base material may be fed to the spray nozzle 60 in any one of several different ways, one convenient manner of achieving this result is by mounting a tank 62 on the top of the frame 10<sup>a</sup>, the tank being adapted to contain the plastic base material. Or, instead of the tank 62, the plastic base material may be fed by a flexible conduit to the frame 10<sup>a</sup>. Regardless of the manner of supplying the plastic base material in association with the frame 10<sup>a</sup>, I preferably incorporate suitable means in combination with the supply of plastic base material to the spray nozzle 60 so that a uniform coating of the plastic base material will be applied to the surface.

In order to achieve this, it is usually necessary to provide means which will control the flow of plastic base material so that the plastic base material will flow to the spray nozzle 60 only at the time that the apparatus is being advanced over the surface to be treated. There are several ways to accomplish this, for example, a control valve may be positioned in the conduit supplying the nozzle 60, with such control valve being opened only in response to the forward movement of the vehicle. Another manner of

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obtaining the desired result is to provide a pump 64 on the top of the frame 10<sup>a</sup>, the pump 64 being operated by a belt 66 running down and being connected to the roller 12. Usually one to three gallons of plastic are applied per square of surface, i. e., an area of one hundred square feet. To control the quantity of plastic applied, the pump 64 may be a variable volume pump, or it may be driven from selectable different diameter pulleys. A conduit 68 supplies the plastic base material from the tank 62 to the pump 64, and a conduit 70 runs from the output of the pump 64 to the spray nozzle 60. In this combination of parts, the pump 64 will be operated only upon the forward movement of the apparatus over the roof or other surface being treated, at which time the pump 64 will pump the plastic base material from the tank 62 through the conduit 70 and out of the spray nozzle 60 in a uniform manner both transversely and longitudinally of the area covered by the apparatus, and only upon the forward movement of the apparatus.

As an additional feature upon this improved form of my invention, I may mount a side nozzle 72 at the side of the frame 10<sup>a</sup> and run a conduit 74 thereto from the pump 64, the side nozzle functioning to apply a surface coating of the plastic over the strip of sheet material S previously applied to the surface by the apparatus.

Figs. 5 and 6 illustrate modifications of the mechanism for effecting the tamping action of the brushes, and in so doing illustrate only several of the many additional ways the tamping action can be obtained.

More specifically, in Fig. 5, a spring lever 80 is fastened at one end to a frame member 82, the other end of the spring member carries a brush, rubber block, pad, or other tamping means 84, and this end of the spring member 80 is adapted to be picked up and dropped by a cam 86 carried on a shaft 88 which is journaled in the frame of the apparatus and is adapted to be rotated by any suitable prime mover and associated mechanism in the manner heretofore described. A roll S' of sheet material is carried at the front of the apparatus and is adapted to lay down a length of the sheet material underneath the tamping mechanism upon the forward movement of the apparatus, all in the manner heretofore described. A front spray nozzle 60<sup>b</sup> and a rear and side spray nozzle 72<sup>b</sup> may be included in the combination of parts.

In Fig. 6, a roll of sheet material S' is fed to meet a brush or other tamping means 90 which is adapted to be tamped into and out of engagement with the strip of sheet material laid down on the surface by means of an eccentric and strap mechanism 92 driven from a shaft 94 carried on the apparatus.

From the foregoing, it will be recognized that the various objects of my invention have been achieved by the provision of a relatively simple, inexpensive, easily handled and operated apparatus, adapted to apply sheet material, such as metal foil, felt, and the like, to a plastic base on a roof or other surface. My improved apparatus largely eliminates the drudgery and back breaking effort of hand applying operations, and a much improved bond between the flexible sheet material and the surface is effected. When spraying means for applying the plastic base material are incorporated with my apparatus in the manner shown in Fig. 4, further hand operations and messiness are eliminated. In the actual use of

an apparatus incorporating the features of my invention, the amount of metal foil laid in a given roof operation by a single operator has been multiplied many fold over known hand methods, and the quality of the job done is strikingly superior to that formed by hand methods.

While in accord with the patent statutes, I have specifically illustrated and described at least one known embodiment of my invention, it is to be particularly understood that I am not to be limited thereto or thereby, but that the scope of my invention is defined in the appended claims.

I claim:

1. Apparatus for applying flexible sheet material to a plastic base on a roof or the like comprising a frame, means removably and rotatably mounting a roll of sheet material on the frame, a roller substantially the width of the sheet material, said roller supporting one end of the frame and underneath which the sheet material passes, means rotatably supporting the other end of the frame, a plurality of brushes carried on the frame in transverse overlapping relation, means carried by the frame to individually tamp the brushes into engagement with the sheet material a large number of times a minute over the full width of the sheet material to embed the sheet material without air pockets into the plastic base, and handle means on the frame for guiding the frame over the plastic base.

2. Apparatus for applying flexible sheet material to a plastic base on a roof or the like comprising a frame, means removably and rotatably mounting a roll of sheet material on the frame, means rotatably supporting the frame, a plurality of brushes carried on the frame in transverse overlapping relation, means carried by the frame to individually tamp the brushes into engagement with the sheet material a large number of times a minute over the full width of the sheet material to embed the sheet material without air pockets into the plastic base, and handle means on the frame for guiding the frame over the plastic base.

3. Apparatus for applying flexible sheet material to a plastic base on a roof or the like comprising a frame, means removably and rotatably mounting a roll of sheet material on the frame, means rotatably supporting the frame, a plurality of brushes carried on the frame, means carried by the frame to individually tamp the brushes into engagement with the sheet material a large number of times a minute over the full width of the sheet material to embed the sheet material without air pockets into the plastic base, and handle means on the frame for guiding the frame over the plastic base.

4. Apparatus for applying flexible sheet material to a plastic base on a roof or the like comprising a frame, means removably and rotatably mounting a roll of sheet material on the frame, means rotatably supporting the frame, a plurality of brushes carried on the frame, means carried by the frame to individually tamp the brushes into engagement with the sheet material a large number of times a minute over the full width of the sheet material to embed the sheet material without air pockets into the plastic base, and means for moving the frame over the plastic base.

5. Apparatus for tamping metal foil into a roof surface or the like coated with plastic including a rotatably supported frame, means rotatably supporting a roll of foil on the frame, means for moving the frame over the surface with the foil

unwinding from the roll onto the surface, a plurality of brushes carried on the frame, said brushes being positioned so that together they are adapted to engage with the foil over its full width, a motor on the frame, spring means urging each brush into contact with the foil, cam means operated by the motor for lifting each brush away from the foil against the action of the spring means and for then dropping the brush so that the spring means throws the brush into tamping engagement with the foil.

6. Apparatus for tamping metal foil into a roof surface or the like coated with plastic including a rotatably supported frame, means rotatably supporting a roll of foil on the frame, means for moving the frame over the surface with the foil unwinding from the roll onto the surface, a plurality of brushes carried on the frame, said brushes being positioned so that together they are adapted to engage with the foil over substantially its full width, a motor on the frame, springs urging each brush into contact with the foil, and a cam operated by the motor for lifting each brush away from the foil against the action of its springs and for then dropping the brush so that the spring throws the brush into tamping engagement with the foil.

7. Apparatus for tamping sheet into a roof surface or the like coated with plastic including a rotatably supported frame, means rotatably supporting a roll of sheet on the frame, means for moving the frame over the surface with the sheet unwinding from the roll onto the surface, a plurality of brushes carried on the frame, said brushes being positioned so that together they are adapted to engage with the sheet over substantially its full width, a motor on the frame, springs urging each brush into contact with the sheet, and a cam operated by the motor for lifting each brush away from the sheet against the action of its spring and for then dropping the brush so that the spring throws the brush into tamping engagement with the sheet.

8. Apparatus for tamping sheet into a roof surface or the like coated with plastic including a rotatably supported frame, means rotatably supporting a roll of sheet on the frame, means for moving the frame over the surface with the sheet unwinding from the roll onto the surface, a plurality of brushes carried on the frame, said brushes being positioned so that together they are adapted to engage with the sheet over substantially its full width, and means associated with each brush for periodically throwing the brush into tamping engagement with the sheet.

9. Apparatus for tamping metal foil into a roof surface or the like coated with plastic including a rotatably supported frame, means rotatably supporting a roll of foil on the frame, means for moving the frame over the surface with the foil unwinding from the roll onto the surface, brush means carried on the frame, and means carried on the frame for constantly tamping the brush means into and out of engagement with the foil.

10. Apparatus for tamping sheet into a roof surface or the like coated with plastic including a rotatably supported frame, means rotatably supporting a roll of sheet on the frame, means for moving the frame over the surface with the sheet unwinding from the roll onto the surface, brush means carried on the frame, and means carried on the frame for constantly tamping the brush means into and out of engagement with the sheet.

11. In apparatus of the character described, a frame, means rotatably supporting a roll of flexible sheet material on the frame, means for moving the frame over a surface to lay the sheet material over the surface, means carried on the frame for progressively tamping the sheet material into the surface as the material unwinds, a series of spray nozzles positioned in front of the frame to apply plastic to the surface just before the sheet material is laid down, a series of spray nozzles positioned at the side of the frame to apply plastic to a length of sheet material previously laid down, a source of plastic supply associated with the frame, and pump means operated in relation to the forward movement of the frame for pumping plastic out of the spray nozzles.

12. In apparatus of the character described, a frame, means rotatably supporting a roll of flexible sheet material on the frame, means for moving the frame over a surface to lay the sheet material over the surface, means carried on the frame for progressively tamping the sheet material into the surface as the material unwinds, a series of spray nozzles positioned in front of the frame to apply plastic to the surface just before the sheet material is laid down, a source of plastic supply associated with the frame, and pump means operated in relation to the forward movement of the frame for pumping plastic out of the spray nozzles.

13. In apparatus of the character described, a frame, means rotatably supporting a roll of flexible sheet material on the frame, means for moving the frame over a surface to lay the sheet material over the surface, means carried on the frame for progressively tamping the sheet material into the surface as the material unwinds, a series of spray nozzles positioned in front of the frame to apply plastic to the surface just before the sheet material is laid down, a series of spray nozzles positioned at the side of the frame to apply plastic to a length of sheet material previously laid down, a source of plastic supply associated with the frame and pump means for pumping plastic out of the spray nozzles.

14. In apparatus of the character described, a frame, means rotatably supporting a roll of flexible sheet material on the frame, means for moving the frame over a surface to lay the sheet material over the surface, means carried on the frame for progressively tamping the sheet material into the surface as the material unwinds, a series of spray nozzles positioned in front of the frame to apply plastic to the surface just before the sheet material is laid down, a source of plastic supply associated with the frame, and pump means for pumping plastic out of the spray nozzles.

15. In apparatus of the character described, a frame, means rotatably supporting a roll of flexible sheet material on the frame, means for moving the frame over a surface to lay the sheet material over the surface, means carried on the frame for progressively tamping the sheet material into the surface as the material unwinds, and a series of spray nozzles positioned in front of the frame to apply plastic to the surface just before the sheet material is laid down.

16. In apparatus of the character described, a frame, means rotatably supporting a roll of flexible sheet material on the frame, means for moving the frame over a surface to lay the sheet material over the surface, and means carried on the frame for progressively tamping the sheet material into the surface as the material unwinds.

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