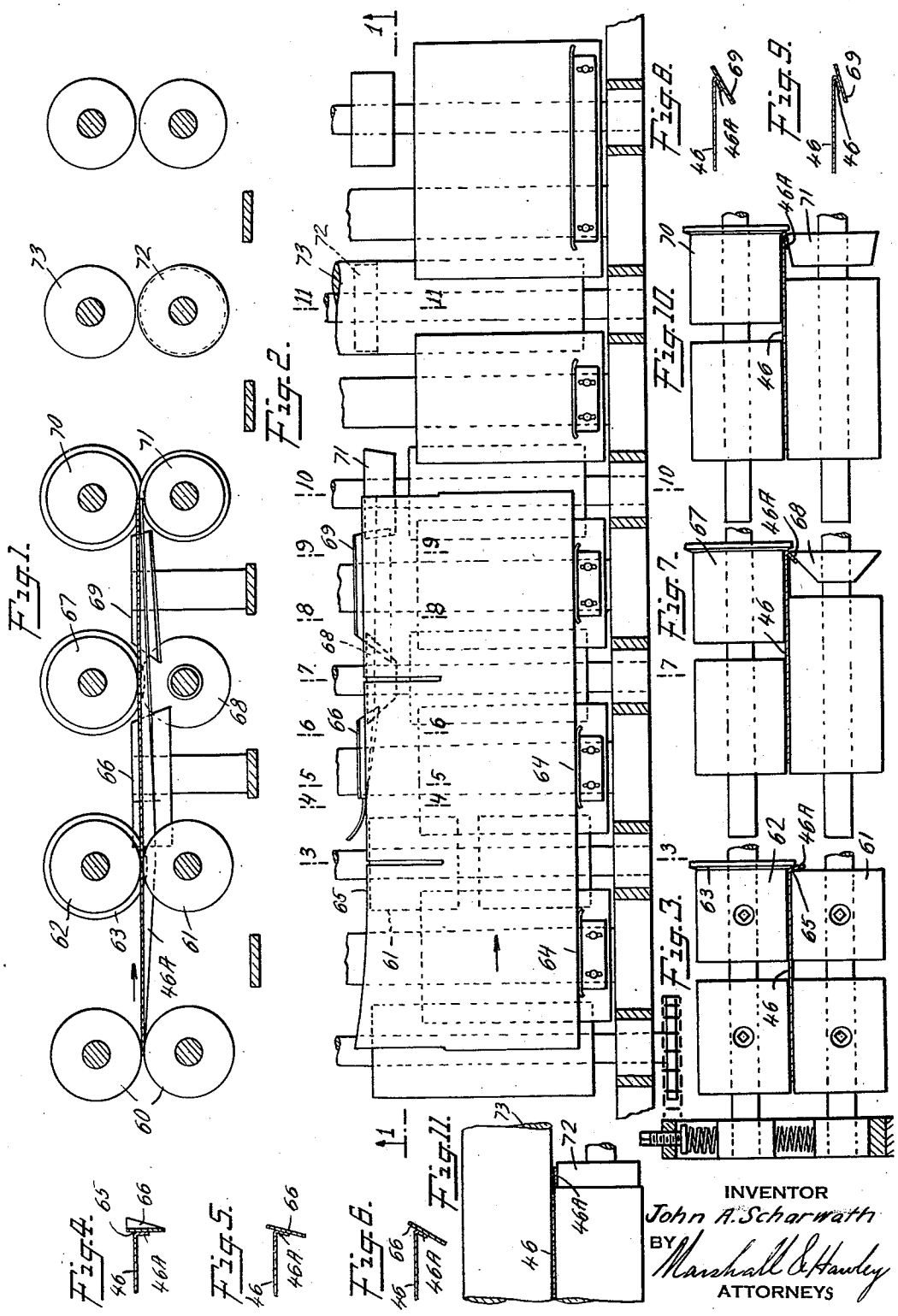
May 14, 1935. J. A. SCHARWATH 2,001,399

MACHINE FOR MAKING SHINGLES

Filed Dec. 10, 1932 4 Sheets-Sheet 1



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MACHINE FOR MAKING SHINGLES

Filed Dec. 10, 1932 4 Sheets-Sheet 2

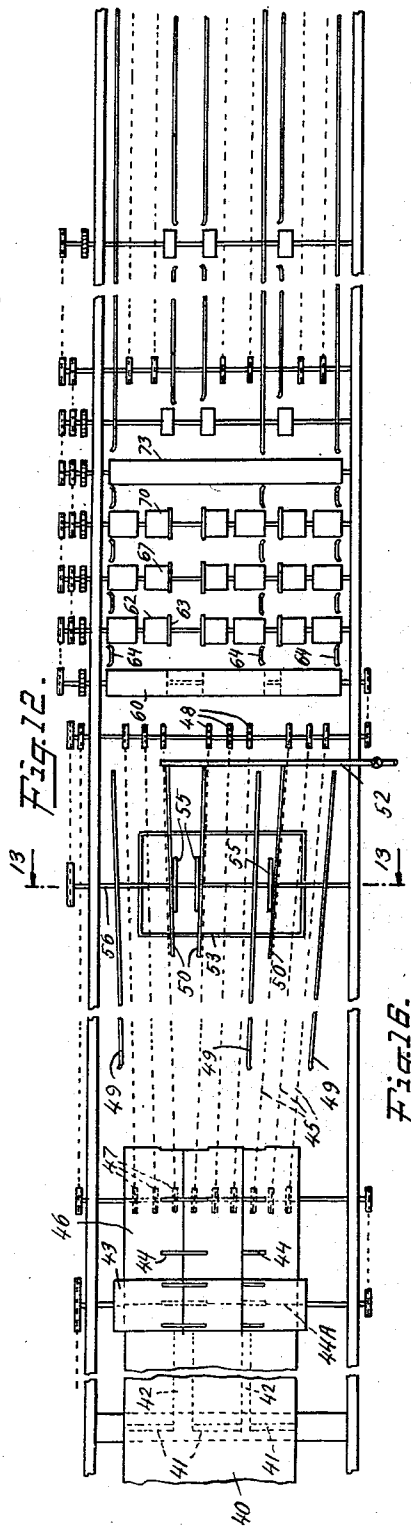


Fig. 12.

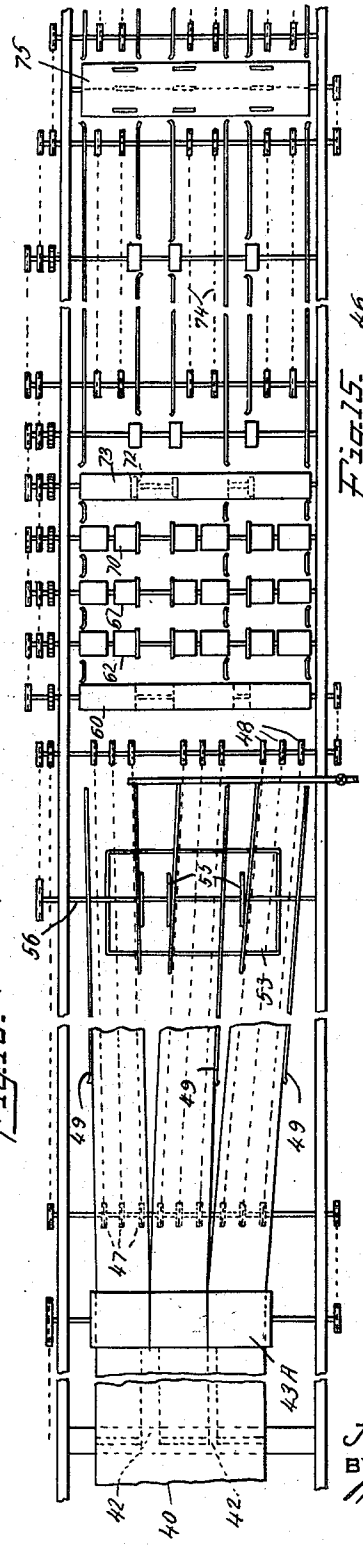


Fig. 16.

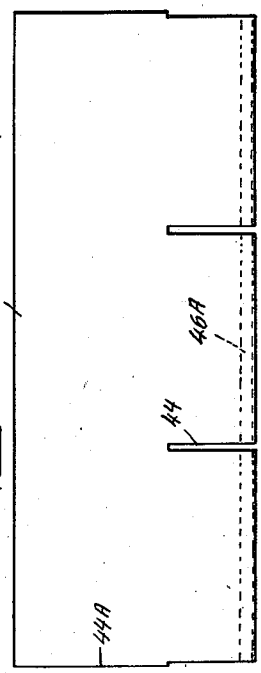


Fig. 15.

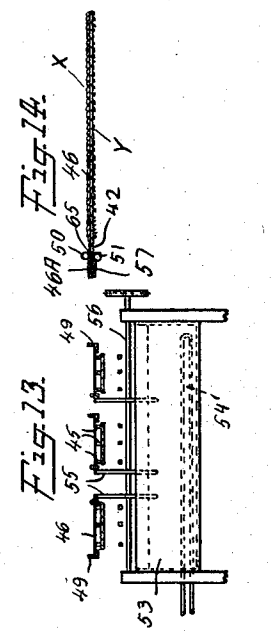


Fig. 14.

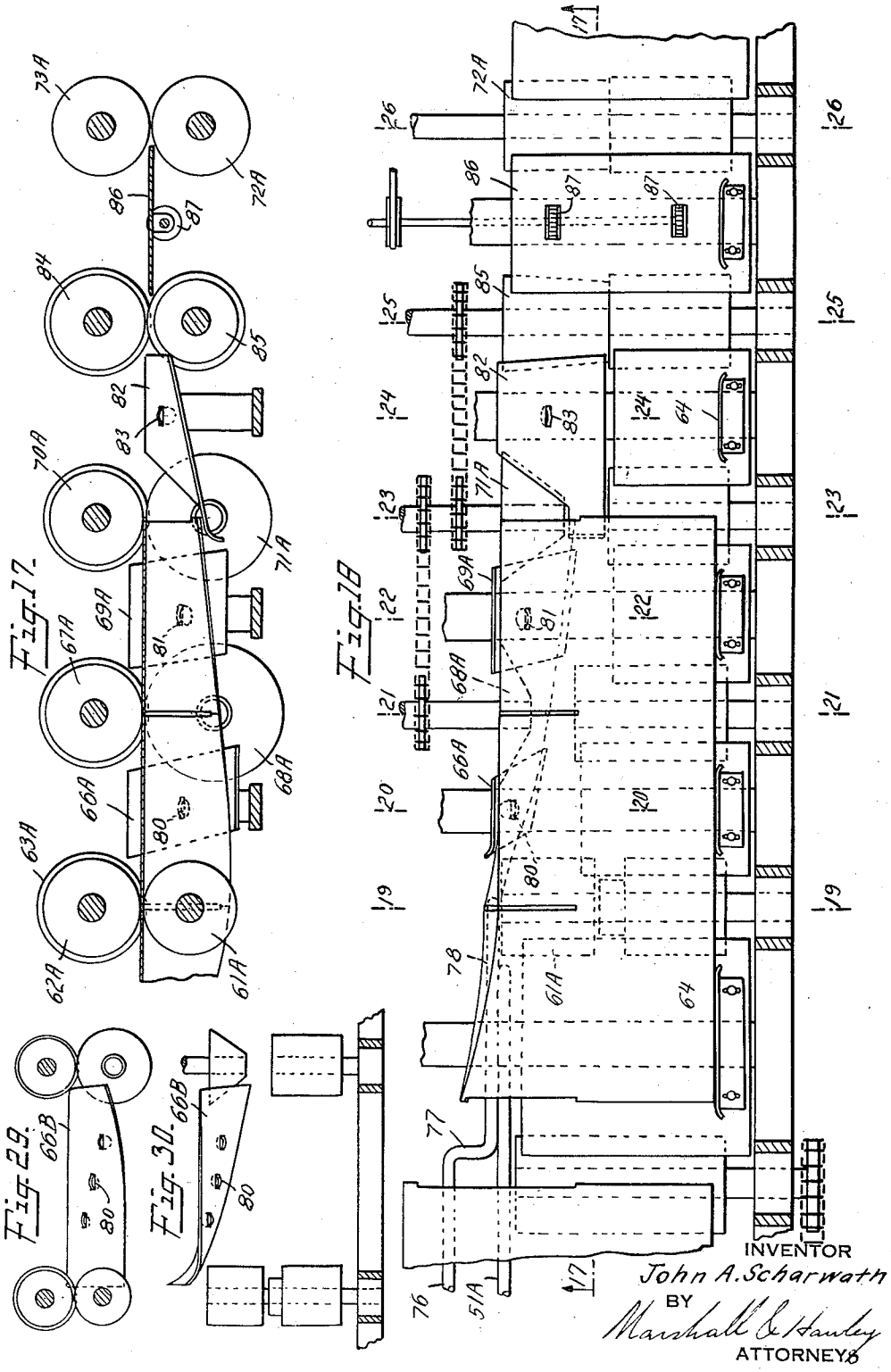
Fig. 13.

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MACHINE FOR MAKING SHINGLES

Filed Dec. 10, 1932 4 Sheets-Sheet 3



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MACHINE FOR MAKING SHINGLES

Filed Dec. 10, 1932 4 Sheets-Sheet 4

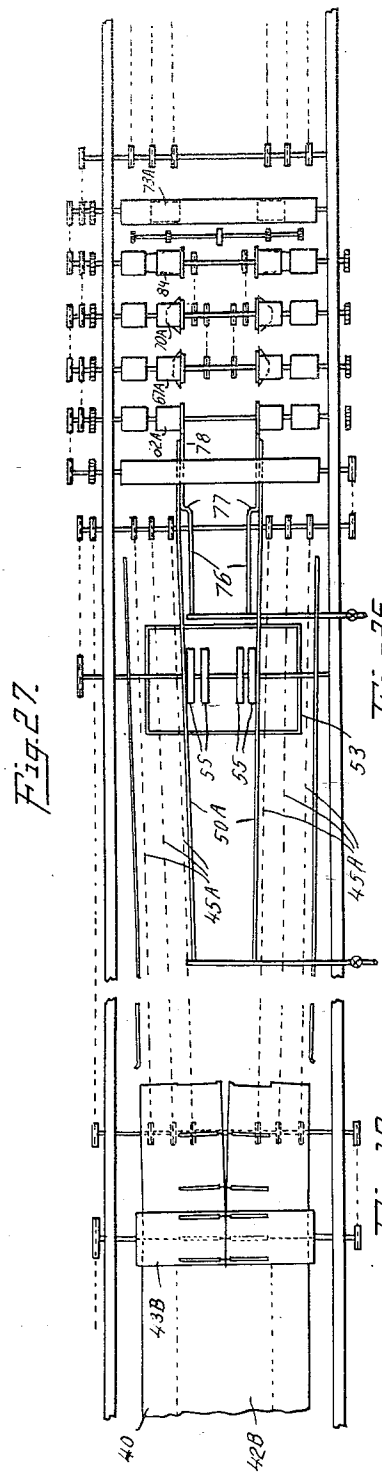


Fig. 27.

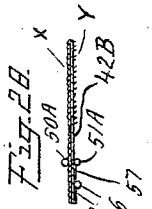


Fig. 28.

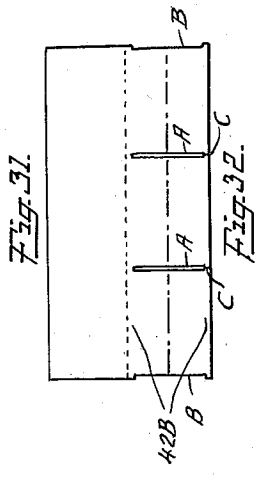


Fig. 31.

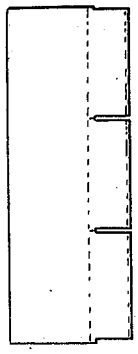


Fig. 32.

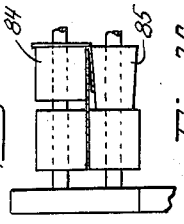


Fig. 25.

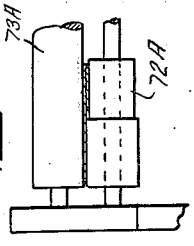


Fig. 26.

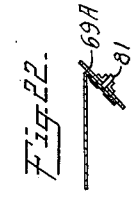


Fig. 22.

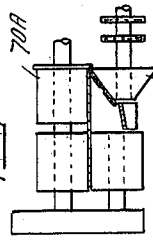


Fig. 23.



Fig. 24.

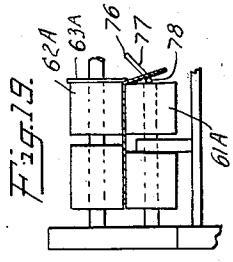


Fig. 19.

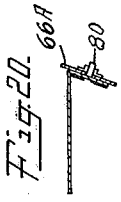


Fig. 20.

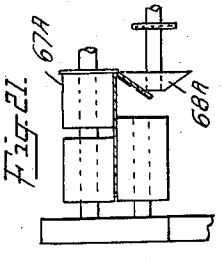


Fig. 21.

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Patented May 14, 1935 2,001,399

UNITED STATES PATENT OFFICE

2,001,399

MACHINE FOR MAKING SHINGLES

John Andrew Scharwath, Jersey City, N. J.

Application December 10, 1932, Serial No. 646,608

19 Claims. (Cl. 91—15)

This invention relates to improvements in machines for making shingles.

Its object is to provide a simple and efficient machine for folding shingles of the types which are made of felt or the like in a novel manner.

More particularly, its object is to provide an apparatus for folding sheets of felt-like material which is saturated with a bituminous material, such as asphalt, and coated with grit or granular matter in order to form a folded edge or butt and to provide shingles of improved appearance and usefulness.

These and other objects of the invention will appear in the following specification in which the invention will be described and its novel features will be set forth in appended claims.

Referring to the drawings,

Fig. 1 is a diagrammatic side elevation of parts of a machine which embodies my invention and by means of which the novel method herein disclosed may be carried out, the section being taken on the line 1—1 of Fig. 2;

Fig. 2 is a plan view of the parts of the apparatus which are shown in Fig. 1;

Fig. 3 is a transverse elevation, partly in section, of the apparatus shown in the preceding figures, the section being taken on the line 3—3 of Fig. 2, and shows the way in which the fold is initiated by means of a flanged roll;

Figs. 4, 5 and 6 are transverse sectional elevations taken respectively on the lines 4—4, 5—5 and 6—6 of Fig. 2, showing the manner in which the bend is increased by a folding plate;

Fig. 7 is a transverse elevation, partly in section, taken on the line 7—7 of Fig. 2, illustrating a part of the machine in which the folded edge is maintained in a straight line and the fold increased, between a pair of rolls;

Figs. 8 and 9 are sectional elevations taken respectively on the lines 8—8 and 9—9 of Fig. 2, illustrating the effect of another folding plate;

Fig. 10 is an elevation, partly in section, taken on the line 10—10 of Fig. 2, showing a pair of cooperating rolls used in continuing the process;

Fig. 11 is a partial transverse section of a part of the apparatus shown in Figs. 1 and 2, the section being taken on the line 11—11 of the latter figure. In this figure a pair of rolls are shown between which the fold is completed;

Fig. 12 is a plan view on a smaller scale of the novel parts of a complete shingle machine of which parts are shown in the preceding figures;

Fig. 13 is a transverse section taken on the line 13—13 of Fig. 12, illustrating parts of a heating arrangement and a material applying mechanism which are used in carrying out the invention;

Fig. 14 shows a transverse section of a shingle with a layer of bituminous material applied to the under side of one of its edges in its condition prior to folding;

Fig. 15 is a front elevation of a square butt shingle which is made according to the method herein described and on the apparatus illustrated in the preceding figures;

Fig. 16 is a plan view similar to Fig. 12 of a machine of modified construction by means of which transverse cuts are made in the shingles after the fold therein has been completed;

Fig. 17 is a side elevation similar to Fig. 1 of parts of a machine of modified construction which also embodies my invention, which is arranged to make another kind of shingle;

Fig. 18 is a plan view of the parts of the apparatus which are shown in Fig. 17;

Fig. 19 is a transverse elevation, partly in section, on the line 19—19 of Fig. 18, showing a pair of cooperating rolls between which the fold is started and a device for supporting the flap or portion of the shingle which is to be folded under the upper or face portion of the shingle;

Fig. 20 is a section on the line 20—20 of Fig. 18, showing the first folding plate and roller by means of which the fold is increased;

Fig. 21 is a section on the line 21—21 of Fig. 18, showing a pair of rolls for imparting a further bend to the fold;

Fig. 22 is a transverse section on the line 22—22 of Fig. 18, showing the second folding plate and one of its rollers;

Fig. 23 is a view similar to Fig. 21 showing another pair of cooperating folding rolls, the section being taken on the line 23—23 of Fig. 18;

Fig. 24 is a view similar to Fig. 22 but taken on the line 24—24 of Fig. 18, illustrating a third folding plate and one of its rollers;

Figs. 25 and 26 are sections taken respectively on the lines 25—25 and 26—26 of Fig. 18, showing the fourth and the final pairs of folding rolls;

Fig. 27 is a plan view of the machine of which parts are shown in Figs. 17 to 26;

Fig. 28 is a transverse section taken on the line 28—28 of Fig. 27;

Fig. 29 is a side elevation and Fig. 30 a partial plan view on a larger scale of a modified form of plate; and

Figs. 31 and 32 are front elevations of the shingle formed on the latter machine, Fig. 31 showing it cut but not folded and Fig. 32 showing it folded and completed.

Referring to Figs. 1 to 15, 40 designates a sheet of roofing material, such as asphalt impregnated felt covered on its upper face with granular matter X, such as crushed slate. This may be omitted from that part of the sheet which is to be folded under. It is usual to apply to the opposite surface a coating of a non-adhesive substance Y, such as talc or pulverized mica. In this machine a device is used to apply such matter only to those parts of the sheet which are not to be folded or covered by the folds, leaving uncovered bands 42 on the other portions. The device is indicated as comprising spaced transverse nozzles 41 through which the pulverulent material is directed to the desired parts of the sheet.

The sheet then runs under a cutter roll 43 which slits it longitudinally and cuts out transverse slots 44, and also cuts it through transversely, as at 44A, in a usual manner. Chain conveyors 45 are shown to carry the strip shingles 46, thus formed along independently and to separate them transversely. These conveyors, as shown, each comprise three parallel chains on sprockets 47 and 48, the sets of sprockets 48 being separated from the adjacent set or sets a greater distance than are the sets 47. Longitudinal guides 49 engage the unslotted edges of the shingles.

As the shingles advance on the conveyors and along the guides they pass between steam pipes 50 and 51 from headers 52. These pipes are parallel to the paths of movement of the shingles, and from Fig. 14 it will be seen that pipes 50 are over the shingles and that pipes 51 are under them. During this part of their movement they pass over a vat 53 in which is asphalt kept hot and fluid by a steam coil 54, or other suitable means. 55 are rollers on a shaft 56 which run in the hot asphalt and carry some of it up to the under side of the shingles to which strips of it are applied to the uncoated bands 42, as at 57 (Fig. 14).

Pairs of cylindrical rolls 60 then carry the shingles along to other pairs of rolls 61, 62. The latter or upper roll 62 of each of these pairs is flanged, as at 63. The flanges engage overhanging portions 46A of the shingles, the width of which is determined by gauges 64 between rolls 60 and 61, 62 which engage the uncut edges of the shingles, and the flanges bend them along the lines 65 which have been heated by the steam pipes 50, 51.

After the initial bend has been formed the shingles move along folding plates 66, three sections of which are shown in Figs. 4, 5 and 6, which cause their edge portions 46A to be bent into the position shown in the latter figure.

Then they pass between upper flanged rolls 67 and lower conical rolls 68. Here the outer edge of the bend is kept straight by the flanges on rolls 67 and the fold is increased by the rolls 68.

Another fold plate 69 then folds the edge portions 46A of the shingles, first to the position shown in Fig. 8 and finally to the position shown in Fig. 9.

Next the edges of the shingles pass between flanged rolls 70 and conical rolls 71 which are flatter than rolls 68, which nearly close the fold, as shown in Fig. 10.

Final pressure is applied to the fold by passing the shingles over rolls 72 which have cylindrical surfaces of different diameters, as may be seen from Fig. 11 and under cylindrical rolls 73. These press the parts 46A against the under side of the body of the shingle to which they adhere because the asphalt coating cements itself to the unsurfaced band or strip 42 and these adjacent surfaces stick together and the pressure causes the interposed asphalt 57 to intermingle with the asphalt which permeates the sheet. From rolls 72, 73 the finished shingles are carried along to suitable counting and stacking units.

A finished shingle is shown in Fig. 15. The edge portion 46A is back of and parallel with the body of the shingle and its lower edge is rounded and of double thickness, thus forming a thick butt. It is also within the scope of my invention to interpose filling strips between the folded layers of the shingle thus made, to form a still thicker butt. The advantages of a shingle of such form have long been recognized in the art and a suitable way of making it has been sought.

The machine shown in Fig. 16 differs from that described in that the sheet 40 of roofing material is slitted longitudinally by a roll 43A and is run through the heating, coating and folding units in the form of long strips. These strips with one of the edges of each folded under are carried from rolls 72, 73 on conveyor chains 74 under a cutter roll 75 which cuts the slots in the folded edges and severs them into shingle lengths.

The method performed by this form of machine has the advantages of folding the edges in long unbroken lines and in making the edges of the slots sharp. Cutting through the folded material produces a further pressure at the edges of the slots which causes the two layers to adhere somewhat more firmly at these lines.

When it is desired to form a shingle with a wide fold, such as shown in Fig. 32, the apparatus shown in Figs. 17 to 28 may be used. In this case parallel portions or a single wider portion 42B of the back of the sheet is left unsurfaced with mica. The cutter roll 43B slits the sheet 40 through its center, cuts out slots A, A, cuts the strips into shingle lengths, notches the ends as at B, B and cuts slits C, C, from the ends of slots A, A, through to the adjacent edge of the strip (see Fig. 31). From the cutter roll the two strips are carried by diverging sets of conveyor chains 45A, 45A between steam pipes 50A, 51A over vat 53 which in this case has pairs of wheels 55, 55 which put the two lines 57, 57 of the heated asphaltic material on the strips, as shown in Fig. 28. 76 designates additional steam pipes between the lines of asphalt 57, 57 which serve to prevent the asphalt from cooling and hardening. These extend beyond the pipes 51 and are bent, as at 77, to follow the positions of the parts of the shingles which are bent downwardly and to support them, as shown at 78 in Fig. 19.

In this machine the bend is initiated by a pair of rolls 61A, 62A, the latter having a flange 63A, as shown in Fig. 19. This figure shows how the folded part is supported by the steam pipe 78 which is interposed between the lines 57, 57 of asphalt.

The bend is increased by a folding plate 66A which may be provided with anti-friction rollers 80. This part of the operation is illustrated in Fig. 20.

The folded sheet is then run between a flanged roll 67A and a conical roll 68A, as shown in Fig. 21. Then a second folding plate 69A with anti-friction rollers 81 bends the sheet into the form shown in Fig. 22.

In this machine are a third pair of flanged and conical rolls 70A, 71A (Fig. 23), a third folding plate 82 with roller 83 (Fig. 24), a fourth pair of rolls 84, 85 (Fig. 25), and a pair of finishing rolls 72A, 73A (Fig. 26). Between rolls 84, 85 and

72A, 73A, the shingles are supported on a table 86 over which their movement is assisted by roughened rollers 87.

The operation is similar to that previously described, the blank shown in Fig. 31 being folded into the form of shingle shown in Fig. 32 in which the part of the strip which has been folded under extends beyond the inner end of the slots.

If desired, the long folding plate 66B in Figs. 29 and 30 may be used instead of the shorter folding plates 66A and 69A, in which case rolls 67A, 68A are omitted.

The various rolls shown and described are transversely adjustable on their respective shafts and the positions of the folding plates are likewise transversely adjustable so that the machines may be used for different sizes of shingles. The width of the fold may be varied at will from enough to barely form a double edge or butt, up to the full width of the shingle. The shafts of the various rolls and of the rollers 87 are driven by suitable mechanism, preferably of a differential type so that they may be rotated at desired relative rates. It is also within the scope of my invention to fasten the adjacent layers of the shingle formed by folding in any suitable manner, as by sewing or by stapling.

I have illustrated and described different kinds of machines in order to show that the invention is not limited to any specific form or construction of apparatus and the method herein described may be carried out by hand or by other machines than those described. I intend no limitations other than those imposed by the appended claims.

What I claim is:

1. An apparatus for making shingles which comprises means for heating a part of the shingle material to be bent and a plurality of pairs of rolls engaging the material adjacent the heated part thereof, one of each pair having a flange and the other having a conical surface and a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively.

2. An apparatus for making shingles which comprises means for heating a part of the shingle material along a line, and a plurality of alternately disposed folding plates and pairs of rolls engaging the material adjacent the heated part thereof, one roll of each pair having a flange and the other having a conical surface, said plates and rolls being arranged to fold said material gradually and successively.

3. An apparatus for making shingles which comprises means for applying a surfacing of non-adhesive material to a part of one side of a sheet of roofing material, means for heating a part of the shingle material along a line, and a plurality of alternately disposed folding plates and pairs of rolls engaging the material adjacent the heated part thereof, one roll of each pair having a flange and the other having a conical surface, said plates and rolls being arranged to fold said material gradually and successively.

4. An apparatus for making shingles which comprises means for heating the shingle material along a line, a plurality of pairs of rolls engaging the material adjacent the heated part thereof, one of each pair having a flange and the other having a conical surface, and a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively, and a pair of presser rolls to engage the folded material.

5. An apparatus for making shingles which comprises means for heating the shingle material along a line, means for applying adhesive, a plurality of pairs of rolls, one of each pair having a flange and the other having a conical surface, and a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively.

6. An apparatus for making shingles which comprises means for heating the shingle material along a line, means for applying adhesive, and a plurality of alternately disposed folding plates and pairs of rolls, one roll of each pair having a flange and the other having a conical surface, said plates and rolls being arranged to fold said material gradually and successively.

7. An apparatus for making shingles which comprises means for heating the shingle material along a line, means for applying adhesive, a plurality of pairs of rolls, one of each pair having a flange and the other having a conical surface, a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively, and a pair of presser rolls to engage the folded material.

8. An apparatus for making shingles which comprises means for heating the shingle material along a line, means for applying a surface of non-adhesive material to a part of one side of a sheet of roofing material which is not to be folded or covered by a fold, means for applying adhesive to an unsurfaced portion of the same side, and a plurality of alternately disposed folding plates and pairs of rolls, one roll of each pair having a flange and the other having a conical surface, said plates and rolls being arranged to fold said material gradually and successively.

9. An apparatus for making shingles comprising a slitting cutter for severing a sheet of roofing material longitudinally into strips of widths greater than those of the finished shingles, an adhesive applying device, means for heating a narrow band of said strips, a conveyor for carrying the severed strips across the adhesive device and the heating means, a plurality of pairs of folding rolls and a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively.

10. An apparatus for making shingles comprising a slitting cutter for severing a sheet of roofing material longitudinally into strips of widths greater than those of the finished shingles, an adhesive applying device, means for heating a narrow band of each strip, conveyors for carrying the severed strips across the adhesive device and the heating means, a plurality of pairs of folding rolls for each strip, and a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively.

11. An apparatus for making shingles comprising a slitting cutter for severing a sheet of roofing material longitudinally into strips of widths greater than those of the finished shingles, an adhesive applying device, means for heating a narrow band of each strip, conveyors for carrying the severed strips across the adhesive device and the heating means, a plurality of pairs of folding rolls for each strip, a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively, and a pair of presser rolls for each strip to engage the folded material.

12. An apparatus for making shingles comprising a slitting cutter for severing a sheet of roofing material longitudinally into strips of widths greater than those of the finished shingles, a vat for holding bituminous material, a heater for the vat and rollers for applying the heated bituminous material to the strips, heaters in the paths of movement of the strips, conveyors for carrying the severed strips across said rollers and heaters, and means for folding the strips.

13. An apparatus for making shingles comprising a slitting cutter for severing a sheet of roofing material longitudinally into strips of widths greater than those of the finished shingle, a vat for holding bituminous material, a heater for the vat, rollers for applying the heated bituminous material to the strips, heaters in the paths of movement of the strips, conveyors for carrying the severed strips across said rollers and heaters, a plurality of pairs of folding rolls for each strip, a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively, and a pair of presser rolls for each strip.

14. An apparatus for making shingles comprising a slitting cutter for severing a sheet of roofing material longitudinally into strips of widths greater than those of the finished shingles, a vat for holding bituminous material, a heater for the vat and rollers for applying the heated bituminous material to the strips, heaters in the paths of movement of the strips, diverging conveyors for separating the severed strips and carrying said strips across said rollers and heaters, a plurality of pairs of folding rolls for each strip, a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively and a pair of presser rolls for each strip.

15. An apparatus for making shingles comprising a cutter roll for severing a sheet of roofing material longitudinally into strips of widths greater than those of the finished shingles and transversely into shingles of desired length and shape, a vat for holding bituminous material, a heater for the vat and rollers for applying the heated bituminous material to the strips, pairs of superimposed steam pipes in the paths of movement of the severed strips, diverging conveyors for separating the severed strips and carrying said strips across said rollers and between the steam pipes, a plurality of pairs of folding rolls for each strip, one roll for each pair having a flange and the other having a conical surface, folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively, and a pair of presser rolls for each strip.

16. An apparatus for making shingles comprising means for applying surfacing of non-adhesive material to a part of one side of a sheet of roofing material, a slitting cutter for severing said sheet longitudinally into strips of widths greater than those of the finished shingles, an adhesive applying device, a heater in the path of movement of each strip, conveyors for carrying the severed strips across the adhesive device and the heaters, a plurality of pairs of folding rolls and a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively.

17. An apparatus for making shingles comprising means for applying surfacing of non-adhesive material to a part of one side of the sheet of roofing material, a slitting cutter for severing said sheet longitudinally into strips of widths greater than those of the finished shingles, means for cutting slots in the edges of the strips and for cutting the strips transversely into shingle lengths, an adhesive applying device, a heater in the path of movement of each strip, conveyors for carrying the severed strips across the adhesive device and the heaters, a plurality of pairs of folding rolls and a folding plate interposed between adjacent pairs of rolls, said rolls and plate being arranged to fold said material gradually and successively.

18. An apparatus for making shingles comprising means for applying surfacing of non-adhesive material to a part of one side of a sheet of roofing material, a slitting cutter for severing said sheet longitudinally into strips of widths greater than those of the finished shingles, a vat for holding bituminous material, a heater for the vat and rollers for applying the heated bituminous material to unsurfaced parts of the strips, heaters in the paths of movement of the strips, conveyors for carrying the severed strips across said rollers and heaters, a plurality of pairs of folding rolls for each strip, a folding plate interposed between adjacent pairs of rolls, said plate and rolls being arranged to fold said material gradually and successively, and a pair of presser rolls for each strip to engage the folded material.

19. An apparatus for making shingles comprising means for applying surface of non-adhesive material to a part of one side of a sheet of roofing material, a cutter roll for severing said sheet longitudinally into strips of widths greater than those of the finished shingles and transversely into shingles of desired length and shape, a vat for holding bituminous material, a steam coil in the vat and rollers for applying the heated bituminous material to unsurfaced parts of the strips, pairs of superimposed steam pipes parallel with the paths of movement of the severed strips, diverging conveyors for separating the severed strips and carrying said strips across said rollers and between the steam pipes, a plurality of pairs of folding rolls for each strip, one roll of each pair having a flange and the other having a conical surface, folding plates interposed between adjacent pairs of rolls, said rolls and plates being arranged to fold said material gradually and successively, and a pair of presser rolls for each strip to engage the folded material.

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