July 24, 1934. A. E. F. MOONE 1,967,419

ROOFING MACHINE

Original Filed Sept. 4, 1928 5 Sheets-Sheet 1

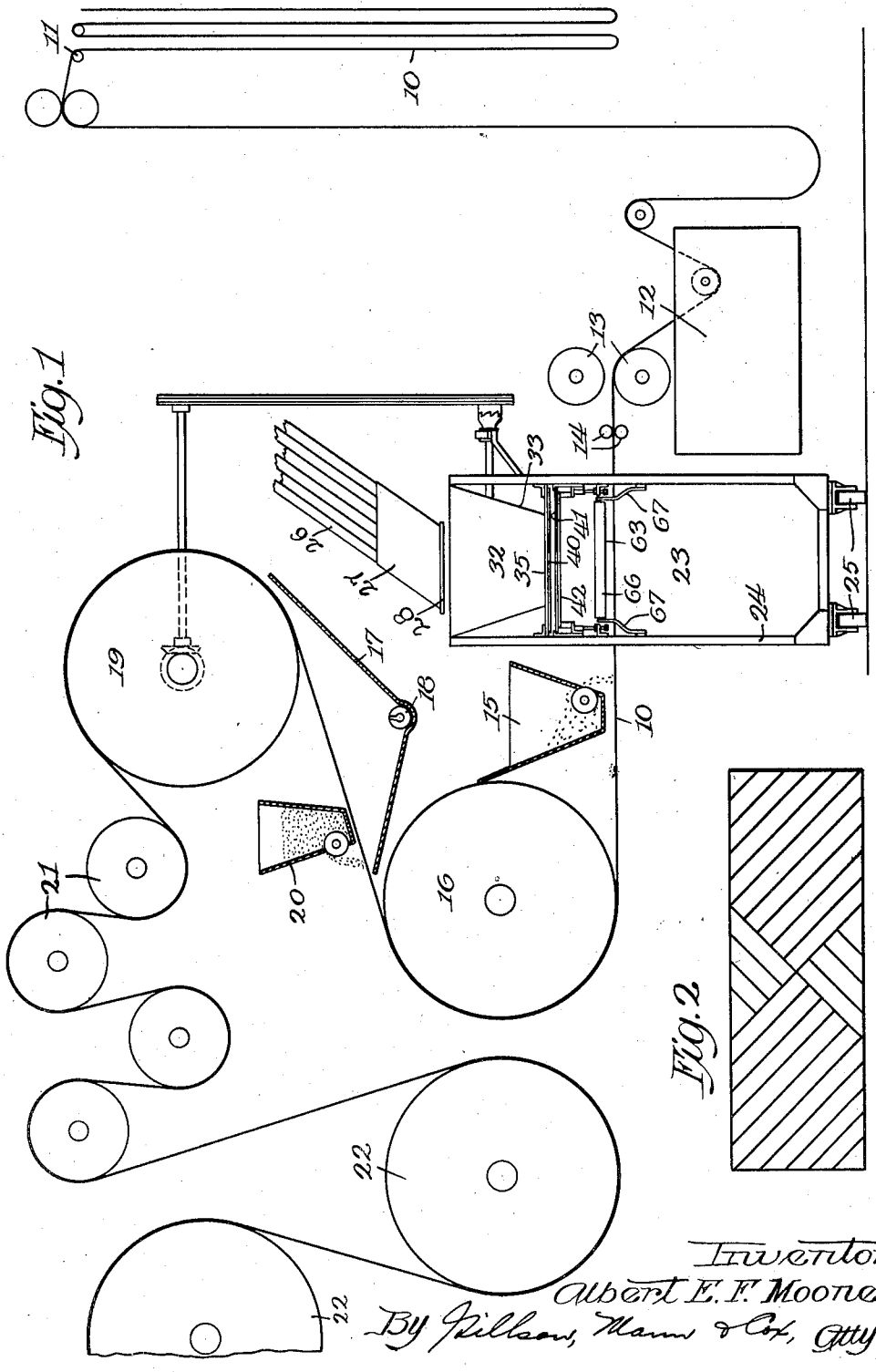


Fig. 1

Fig. 2

Inventor
Albert E. F. Moone
By Gillson, Mann & Co., Attys.

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ROOFING MACHINE

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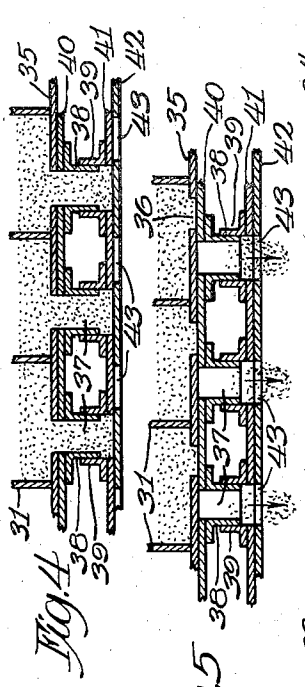


Fig. 4

Fig. 5

Fig. 3

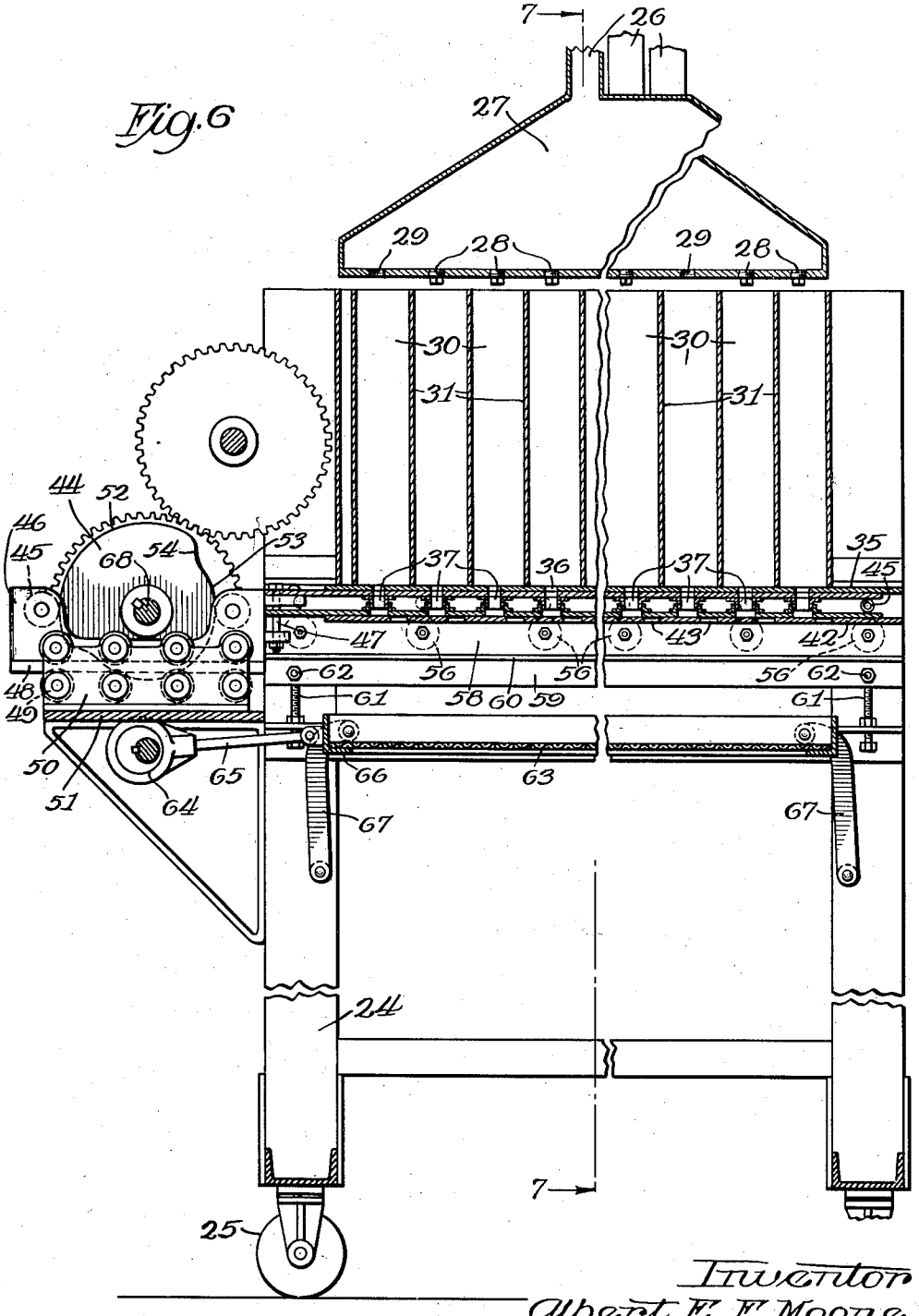
Inventor
Albert E. F. Moone
By Gillson, Mann & Co. Attys.

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ROOFING MACHINE

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Fig. 6



Inventor
Albert E. F. Moone
By Pillsbury Madison & Co. Attys

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ROOFING MACHINE

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Fig. 7

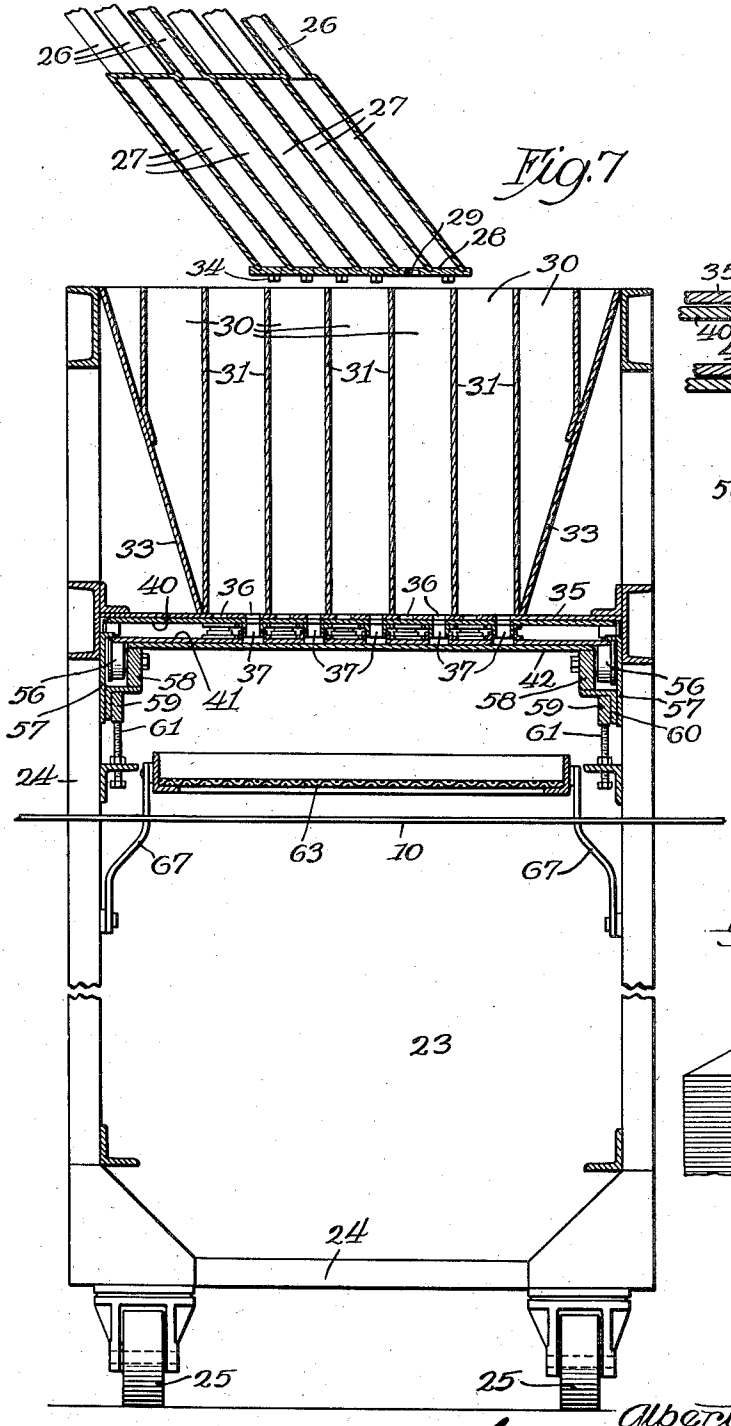


Fig. 8

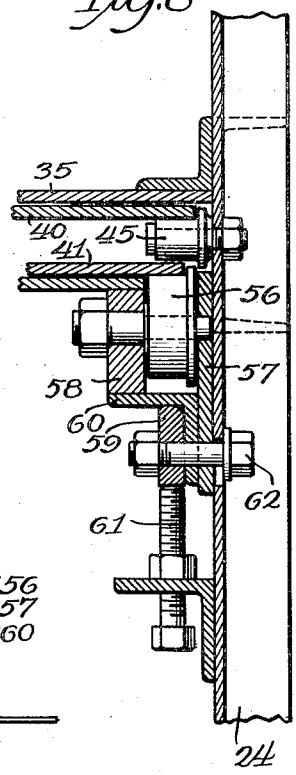
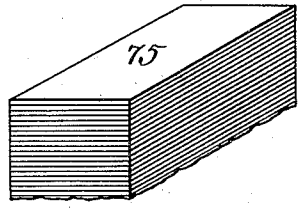


Fig 11



Inventor
Albert E. F. Moone
By Gilson, Mann & Co., Attys.

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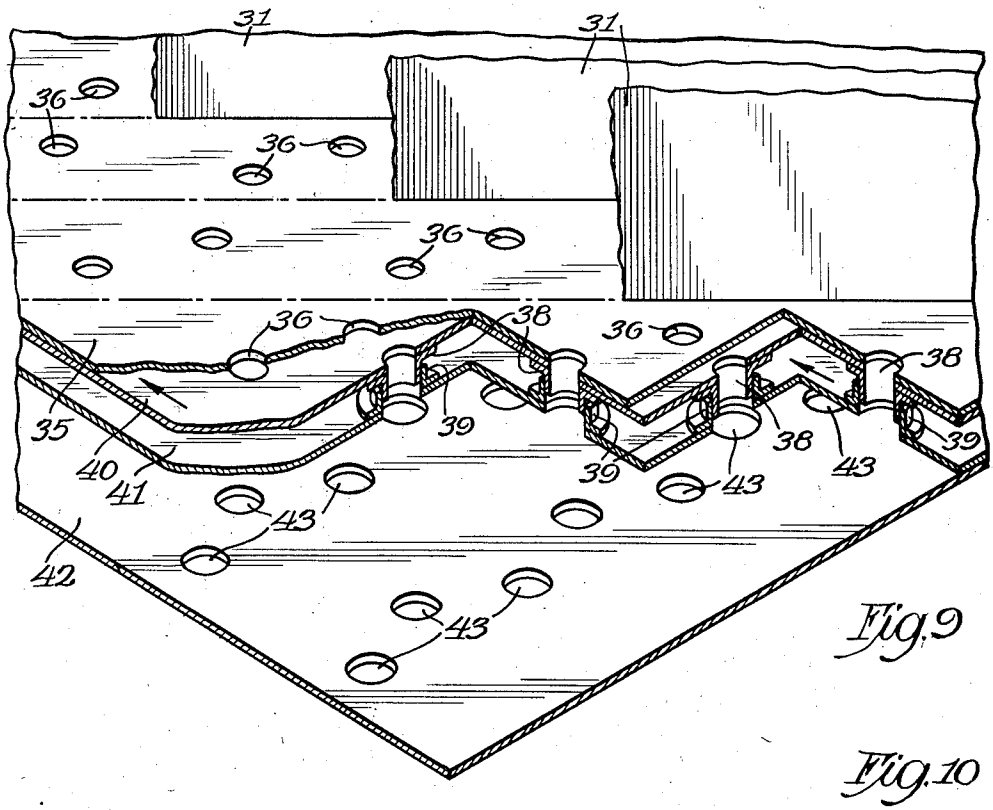
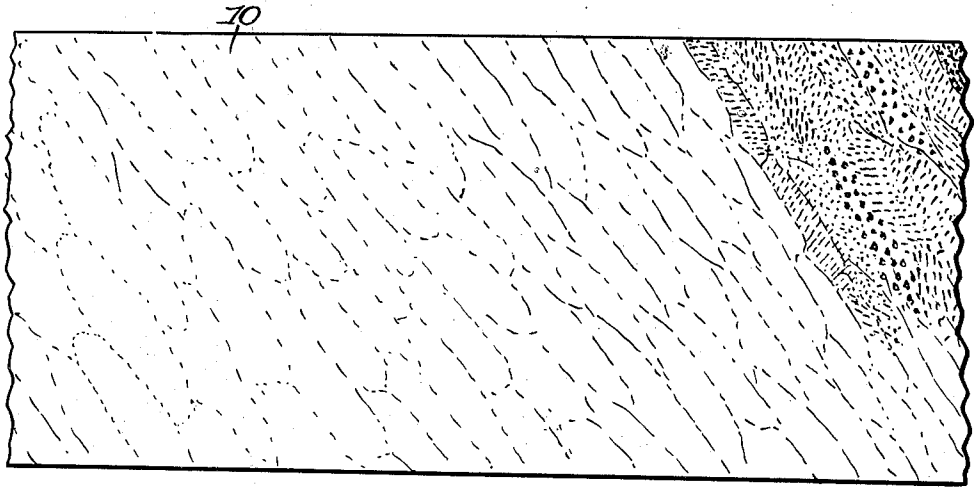


Fig. 9

Fig. 10



Inventor
Albert E. F. Moone
By Gillson, Mann & Cox,
Attys.

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UNITED STATES PATENT OFFICE

1,967,419

ROOFING MACHINE

Albert E. F. Moone, Wilmington, Ill., assignor to The Lehon Company, a corporation of Illinois

Continuation of application Serial No. 303,623, September 4, 1928. This application October 10, 1932, Serial No. 637,190

20 Claims. (Cl. 91—43)

The invention relates primarily to prepared roofing, but many of its novel features are applicable to other things.

Among its manifold objects are to produce prepared roofing surfaced with grit in a plurality of colors and having qualities superior to anything heretofore obtainable, to eliminate duplication in the surface appearance of shingles or shingle strips, and, hence, the repetition of color designs or forms on the roof, to permit a design or scheme illustrated on paper to be readily produced in colored grit on roofing, and to provide a unit for applying colored grit that can be quickly inserted and removed from conventional roofing machines.

Further objects and advantages of the invention will be revealed as the disclosure proceeds and the description is read in connection with the accompanying drawings illustrating a selected embodiment of the invention, and in which

Fig. 1 is a diagrammatic view of a roofing machine including a unit made according to this invention for applying colored grit;

Fig. 2 is a diagrammatic plan of one arrangement of hoppers for colored grit;

Fig. 3 is a plan view of a unit made according to the present invention and capable of being readily inserted and removed from a conventional roofing machine;

Figs. 4, 5 and 6 are sectional views taken on the lines 4—4, 5—5 and 6—6, respectively, of Fig. 3;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is an enlargement of a fragment of Fig. 7;

Fig. 9 is a perspective view of the hoppers and measuring devices for grit, parts being broken away to permit a better view of the measuring devices;

Fig. 10 is a plan view in which it is attempted to illustrate one pattern or design that may be produced in colored grit by proceeding according to this invention; and

Fig. 11 is a perspective view of a package of shingles.

But the specific illustration and the correspondingly specific description are used solely for the purpose of disclosure, for it is realized that the invention may be embodied in a great variety of machines, not only for making roofing, but other things composed of materials of different colors laid, or arranged in a pattern or design.

It is common practice to cover composition roofing with colored granules and to employ different colors in the form of patterns of one type or another.

It has also been proposed to blend the colors at the edges of the patterns in one way or another but the devices for applying the colored grit or granules to the roofing, as heretofore used are so constructed that they are required to operate at a predetermined speed in order to secure the results intended. Furthermore, the blending of the different colored portions of the roofing has caused more or less trouble. The present invention seeks to avoid these difficulties by the provision of a new and improved method of, and apparatus for, applying colored grit or granules to the roofing material. It has been learned by experiment that if the differently colored granules be collected in separate bulks and the bulks dropped on the roofing material in a salvo or series of salvos of charges, the desired patterns may be obtained with satisfactory blending of the colors, and the patterns be properly formed, irrespective of the speed of the device and roofing material.

Referring now to the drawings, the reference character 10 indicates a continuous sheet of felt which has been saturated with an asphaltic waterproof composition and supported on a looper 11, see Fig. 1, preparatory to passing through a coater 12, equipped with calender rolls 13, and a scraper 14.

In conventional roofing machines there is also a grit or granule feeding device 15 of some form for scattering grit or granules on the upper surface of the sheet 10, just after it leaves the coater and just before it passes around a roll 16 which serves to press the grit into the coating. Excess grit is delivered into a hopper 17 equipped with a conveyor 18 for disposing of it according to conditions. The sheet ordinarily is reversed by a roller 16, and a cooperating similar roller 19 and talc, or the like, is applied to the opposite side by some device 20, that is pressed into the coating as the sheet passes over the roller 19. Thereafter the sheet is usually passed about a set of small rolls, generally indicated at 21, before going to the cooling rolls, generally indicated at 22.

Machines including devices of the general character described are in common use for the manufacture of roll roofing, individual shingles, shingle strips, etc.

The numeral 23 in Fig. 1 indicates generally a unit or machine adapted to be readily inserted in, and as readily removed from, between the coater and the grit applying device. It includes a frame 24 made of commercial sections and mounted on

wheels 25 whereby it is readily removed into and out of place.

A plurality of gravity conveyors 26 (Figs. 1, 6 and 7) bring grit or granules of different colors from storage bins (not shown) to extended delivery hoppers 27, which have a common bottom plate 28 provided with perforations 29 for discharging grit therefrom into a plurality of supply hoppers 30 formed by inserting partitions 31 in a large hopper 32 of rectangular form in plan, and having sloping sides 33. The delivery to the hopper 30 is made selective by providing plugs 34 for closing any of the holes 29 to thereby prevent the delivery of grit or granules of a color to any particular hopper 30.

The schematic arrangement is perhaps best illustrated in Fig. 3, which shows the hoppers 30 in plan and the delivery hoppers 27 in section, just above the hoppers 30, and it will be clear that by selecting perforations 29 a great variety of assortments of colored grit or granules may be provided.

The hoppers 30 are provided with a common bottom 35, having a large number of perforations 36 through which the grit may escape from the hoppers into measuring devices 37, which successively assemble measured charges or charges of predetermined bulk of grit of different colors arranged in accord with the color design or effect to be produced, and from which those charges are discharged onto the sheet 10.

The measuring devices (Figs. 4 and 5) consist of telescoping sleeves 38 and 39 fixed to perforated plates 40 and 41, respectively.

The plate 41 rests upon a plate 42, having perforations 43 arranged the same as the perforations 36 in the common bottom 35 of the hoppers, but out of line therewith.

The measuring devices are first brought into register with the perforations 36, substantially as shown in Fig. 4, and thus receive a charge of colored grit or granules by gravity. Afterward they are shifted out of register with the perforations 36 to sever the flow from above and into register with perforations 43, substantially as indicated in Fig. 5, to permit the discharge by gravity of their contents.

Incidentally the measuring devices in the machine here illustrated are arranged in two groups, one of which is in register with perforations 36, and therefore is being charged, as illustrated in Fig. 4, while the other is in register with perforations 43 and is being discharged, as indicated in Fig. 5.

The plates 40 and 41, with their attached telescoping sleeves, are shifted by a cam 44 (Figs. 3 and 6), cooperating with anti-friction rollers 45, carried by brackets 46 made fast to the plates 40 and 41 by bolts 47, and equipped with guides 48 running between sets of anti-friction rollers 49, journaled in flanges 50 on the sheet or apron 51.

The measuring device may be regarded as a member provided with chambers each having an inlet port and an outlet port, which ports are alternately opened and closed, i. e., when the inlet ports are open the outlet ports are closed, and when the outlet ports are open the inlet ports are closed.

The cam has a surface slightly less than semi-circular, a small surface 53 also slightly less than semi-circular, and these are connected by surfaces 54. When the cam rotates clockwise in Fig. 6, the surface 54 is brought against the right anti-friction roller 45 and shifts all the measuring devices to the right, where they remain until the same surface 54 strikes the left roller 45, when they are brought back to the position shown in Fig. 6. It will, therefore, be obvious that the measuring devices will shift somewhat quickly and between shifts are allowed to remain stationary for an interval sufficient to permit charging and discharging.

The capacities of the measuring device may be adjusted by adjusting the relative position of the plates 40 and 41. To this end the plate 40 is supported on anti-friction rollers 45 (Fig. 8), and the plate 41 is supported on similar rollers 56 carried by an adjustable frame including bars 57, 58, 59 and 60, which may be adjusted by the bolts 61 and held in adjustment by the bolts 62.

This adjustment is provided to permit such accurate measuring or metering of the total amount of grit delivered to the sheet per unit of travel that there is only sufficient excess to insure that no blank places will occur.

The sheet 10 passes through this part of the machine at an appreciable distance below the plate 42 and the measured charges of grit or granules descending from the measuring devices are consequently spread to a considerable extent in passing through the air. It is, however, preferable to interpose between the measuring devices and the sheet a screen 63, which, in this instance, is given a somewhat rapid oscillating motion by an eccentric 64 (Fig. 6), equipped with a connecting rod 65 pivoted to the frame 66 in which the screen 63 is mounted. The frame 66 is supported by links 67 pivoted to it and to the frame 24 of the machine. The eccentric 64 is driven from the shaft 68, carrying the cam 44, in a ratio of eight to one, from which it will be obvious that the descending charges of grit or granules are acted upon by rapidly moving wires, or other things constituting the screen, after they have had sufficient fall to spread considerably.

When a particular design is to be produced an appropriate selection of plates 35, 40, 41, 42, and sleeves 38 and 39, are inserted in the machine and also an appropriate selection of perforations 29 in the plate 28 are opened. Grit or granules in the number of colors and the appropriate amount will be delivered by the conveyors 26, and the delivery hoppers 27, to the supply hoppers 30.

The measuring devices will successively withdraw from the supply hoppers 30 measured charges of the selected colors arranged roughly in accord with the design to be produced and discharge them onto the sheet 10, which may be continuously driven, as is customary, or intermittently driven, if desired.

The pattern to be produced is determined, in the first instance, by the shape, capacity and arrangement of the measuring devices, for they, in effect, assemble the required quantities of differently colored grit or granules and discharge them as a salvo of charges against the sheet. In other words, these measuring devices isolate measured charges of the grit from the mass and drop the charges onto the sheet, thereby projecting the design as a composite of the several patterns produced by the scattered charges. This effect, however, is modified to some extent by the action of the screen 63, and by selecting the movement given that screen it can be modified still more.

By making the area of the sheet covered by each salvo of charges of such a dimension lengthwise to the sheet that it is neither a multiple nor a divisor of the corresponding dimension of a

shingle or shingle strip in which the sheet is to be cut, duplication of design or pattern occurs at such rare intervals as to be practically eliminated.

By arranging the measuring devices in two groups discharging alternately, the dimensions of the machine or unit for applying the grit is greatly reduced.

The number and nature of the modifications that can be made to vary the effects produced are so great that no attempt will be made to show or describe them. The forms shown in the drawings, however, are sufficient to illustrate the fundamental features of the invention, and those skilled in the art will be able to make forms of mechanism for performing the steps of the process as required to produce the effects desired.

The machine here illustrated will produce a design or pattern in which the areas covered by particular colors are very irregular in form and size, and in which the marginal portions are blended with the colors of adjoining areas. It will be obvious that the shape and size of the areas may be varied at will by changing the shape or arrangement of the measured charges, the manner of projecting them, and the motion given the screen.

In Fig. 11 there is illustrated at 75 a bundle of shingles which, in accordance with this invention, are each of a different design from all the others, and hence the roofer need give no attention to the order in which they are laid, for it is impossible that any duplication of designs on individual shingles or patterns on the roof can occur.

This is a continuation of my application Serial No. 303,623, filed September 4, 1928.

I claim as my invention:

1. In a machine for applying grit to the foundation sheet of prepared roofing, a plurality of hoppers having perforations in their bottoms, a plate spaced from the bottoms of the hoppers and provided with perforations out of line with those of the hopper bottoms, a group of measuring devices between the plate and the bottoms of the hoppers, means for shifting the measuring devices into and out of register with said perforations and means for moving said sheet beneath said measuring devices.

2. In a machine for applying grit to the foundation sheet of prepared roofing, a plurality of hoppers having perforations in their bottoms, a plate spaced from the bottoms of the hoppers and provided with perforations out of line with those of the hopper bottoms, two groups of measuring devices between the plate and the bottoms of said hoppers and means to shift one group into register with the perforations in the hopper bottoms and the other group into register with the perforations in the plate.

3. In a machine for applying grit to the foundation sheet of prepared roofing, a portable unit for supplying grit of different colors to said sheet comprising a supporting frame, a plurality of hoppers for grit of different colors mounted on said frame, a group of measuring devices supplied by said hoppers, and means for intermittently charging said devices and discharging the same onto said sheet and means for varying the capacities of said devices.

4. In a machine for applying grit to the foundation sheet of prepared roofing, means for supplying grit of different colors to said sheet comprising a supporting frame, a plurality of hoppers for grit of different colors mounted on said frame, a group of measuring devices supplied by said hoppers, and means for intermittently charging said devices and discharging the same onto said sheet, and adjustable means for varying the capacities of said devices.

5. In a machine for applying grit to the foundation sheet of prepared roofing, a frame, means for moving said sheet horizontally across said frame, a plurality of hoppers for containing grit of different colors supported above said sheet, a measuring device beneath said hoppers and above said sheet having a plurality of chambers and an inlet port and a discharge port for each chamber, and means for opening said inlet ports to said hoppers and simultaneously closing said discharge ports to fill said chambers from said hoppers by gravity and for opening said discharge ports and simultaneously closing said inlet ports to discharge the grit contained in said chambers onto said sheet.

6. In a machine for applying grit to the foundation sheet of prepared roofing, a frame, means for moving said sheet horizontally across said frame, a plurality of hoppers for containing grit of different colors supported above said sheet, a measuring device beneath said hoppers and above said sheet having a plurality of chambers and an inlet port and a discharge port for each chamber, a reticulated screen between said measuring device and said sheet and extending substantially parallel with said sheet, means for oscillating said screen relatively to the measuring device, and means for opening said inlet ports to said hoppers and simultaneously closing said discharge ports to fill said chambers from said hoppers by gravity and for opening said discharge ports and simultaneously closing said inlet ports to discharge the grit contained in said chambers onto said sheet.

7. In a device for applying colored grit to the foundation sheet of prepared roofing, a plurality of hoppers for containing grit of different colors, means for supporting and moving said sheet in substantially horizontal plane beneath said hoppers, means for isolating measured quantities of grit from said hoppers and discharging the same onto said sheet, a screen interposed between said sheet and said means, and means for oscillating said screen relatively to the isolating and discharge means.

8. The process of applying grit to the foundation sheet of prepared roofing which includes successively collecting predetermined bulks of differently colored grit adjacent to the sheet and in accord with the areas to be covered by the respective colors in a selected design, continuously moving said sheet beneath said bulks of grit and abruptly discharging such measured bulks of grit on the foundation sheet during its movement.

9. The process of applying grit to the foundation sheet of prepared roofing, which includes causing said sheet to move longitudinally in a substantially horizontal plane, successively withdrawing predetermined bulks of colored grit from independent sources of supply, holding said bulks above said sheet while isolating the bulks from said sources of supply and then discharging said predetermined bulks abruptly in a prearranged pattern on the foundation sheet.

10. The process of applying grit to the foundation sheet of prepared roofing which includes causing said sheet to move in a horizontal plane, successively collecting charges of predetermined bulks of differently colored grit from a source of supply above the foundation sheet, isolating said charges from each other and from the source of

supply, discharging the charges downwardly and so striking the grit in flight as to scatter it on the foundation sheet in accord with a selected design.

11. In a machine for applying grit to the foundation sheet of prepared roofing, a plurality of juxtaposed hoppers for differently colored grit, means for moving said sheet beneath said hoppers, means for depositing predetermined bulks of grit on said sheet in accord with the design to be produced, a screen below the measuring devices and means for vibrating said screen relatively to the measuring devices.

12. In a machine for applying grit to the foundation sheet of prepared roofing, a group of measuring devices arranged in accord with the design to be produced, means for supporting and moving said sheet beneath said devices and means to successively fill first and then abruptly discharge the entire contents of the measuring devices onto said sheet while the same is in motion.

13. In a machine for applying grit to the foundation sheet of prepared roofing, means for maintaining a plurality of separately juxtaposed masses of differently colored grit, means for successively isolating predetermined bulks from each of said masses and discharging them in bulk and movable means acting on the charges in flight to scatter them over distinct areas blended at their margins with adjacent areas.

14. In a machine for applying grit to the foundation sheet of prepared roofing, means for moving said sheet, means for successively isolating predetermined bulks of differently colored grit, and depositing them as a group on an area of the moving sheet whose dimensions lengthwise to the sheet is neither a multiple nor a divisor of the dimension of the roofing in it to be produced when measured in like manner.

15. In a machine for applying grit to the foundation sheet of prepared roofing, means for successively isolating predetermined bulks of differently colored grit and discharging them abruptly on distinct areas, each blended at its margins with adjacent areas and covering as a group an area whose dimension lengthwise to the sheet is neither a multiple nor a divisor of the dimension of the roofing in it to be produced measured in like manner.

16. In a machine for applying grit to the foundation sheet of prepared roofing, a plurality of juxtaposed hoppers for differently colored grit, means for moving said sheet, a group of measuring devices for containing said grit arranged below the hoppers in accord with a design to be produced and valve means for successively filling said devices with predetermined bulks of grit and later discharging substantially simultaneously all the material in each bulk as a salvo on said sheet in salvos.

17. In a machine for applying grit to the foundation sheet of prepared roofing, means for maintaining separate supplies for differently colored grit, a first and second group of measuring devices and means to cause the devices of the first group to be charged with predetermined bulks of grit while the second group is being discharged and vice versa.

18. In a machine for applying grit of different colors to the foundation sheet of prepared roofing, a plurality of supply hoppers, a plurality of delivery hoppers above said supply hoppers, each of said delivery hoppers extending over a plurality of supply hoppers and having a discharge opening above each supply hopper, a closure for each opening whereby each delivery hopper may be selectively placed in communication with the supply hoppers beneath, means for supporting said sheet beneath said hoppers and means for discharging grit of different colors from said supply hoppers onto said sheet.

19. The process of applying grit and the like to the foundation sheet of prepared roofing which includes successively isolating predetermined quantities of differently colored grit, moving said sheet beneath said colored grit and causing all of the material in each of said predetermined quantities to be deposited substantially simultaneously as a salvo on corresponding areas of the foundation sheet as it is moving along.

20. The process of applying grit to the foundation sheet of prepared roofing which includes moving said sheet in a substantially horizontal plane, successively collecting predetermined bulks of differently colored grit adjacent to and above the sheet and in accord with the areas to be covered by the respective colors in a selected design that differs in successive operations, isolating the bulks and abruptly discharging substantially simultaneously all of the material of each bulk on the foundation sheet during its movement.

ALBERT E. F. MOONE.