APPARATUS FOR SURFACING ROOFING

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3 Sheets-Sheet 3
This invention relates to improvements in apparatus for surfacing composition roofing fabricated from continuous sheets of felt or the like impregnated with waterproofing material and coated on one or both faces thereof with a bituminous waterproofing and weather-resisting substance such as blown asphalt. My invention is concerned with apparatus for surfacing the coated sheet with granular mineral, and has as one of its objects, the provision of means for rapidly and uninterruptedly changing the operation from the manufacture of roofing surfaced with granules of one color to the manufacture of roofing surfaced with granules of a different color.

Quite a substantial portion of the prepared roofing now being manufactured is surfaced with granular or comminuted mineral of different colors, the differently colored granules or grits being distributed over the sheet in devious ways and usually in accordance with some preconceived plan so that when the finished roofing is cut to the desired size and shape and laid up on a roof, desirable harmony of color blends or multi-color effects are produced.

In the manufacture of so-called multi-color roofing in one of its forms, the sheet is colored with longitudinal bands of differently colored grits or combination of grits, several successive runs being made wherein the color bands in one run are different from one or more of the color bands laid down in the other runs, or such color bands are arranged in a different sequence across the sheet, the shingles cut from the sheet in the several runs being subsequently assembled in packages in a predetermined order, so that when taken therefrom and applied in courses on a roof the desired color arrangement will be secured.

In the practical operation for the production of this type of roofing product, it has hitherto been necessary, when changing from one color to that of another color or mixture of colors, either to stop the machine entirely, in order to make the change, or else make the change without stopping the machine, but in the latter case, there would be produced upon the sheet a considerable zone of mixed grits resulting from the mixing of the grits of the successive charges in the hoppers and before delivery upon the coated sheet. The shingles cut from the zone of the sheet surfaced with the mixture from successive charges cannot ordinarily be used in laying up the roof, in combination with shingles covered with the selected arrangement of colors and must therefore be discarded as "seconds."

My invention has as another of its objects the provision of simplified mechanism for rapidly changing the surfing operation from one wherein granules of one color or group or arrangement of colors, are being deposited upon the sheet to one wherein granules of different colors or a different group or arrangement of colors is so deposited, without necessitating stoppage of the sheet or interruption to any part of the manufacture, and without producing upon the sheet any substantial zone of mineral comprising mixtures of the granules from the successive differently colored charges.

My improved mechanism for accomplishing the foregoing object is so designed as to provide also for selectively continuing the deposition of mineral in any one of the longitudinal bands or ribbons, while permitting a change to be made in the color or colors of the mineral forming the remaining band or bands across the sheet.

In the accompanying drawings forming part of this specification,

Figure 1 is an elevation of a number of hoppers containing granular mineral with which a sheet of roofing base is to be surfaced, and showing one mechanism for carrying out my invention.

Figure 2 is a fragmentary detail, in perspective, of one of the hoppers.

Figure 3 is a vertical section through one of the hoppers.

Figure 4 is a fragmentary view similar to Figure 1 but showing certain of the parts in another position.

Figures 5, 6 and 7 are details of mechanism shown in Figures 3 and 4. Figures 6 and 7 being taken along lines 6—6 and 7—7, respectively of Figure 4 and Figures 8 and 9 illustrate a modified op-
ering mechanism that may be employed.

Referring more in detail to the several views, the letter S indicates a horizontally and continuously moving sheet of roofing base intended to be surfaced with granular mineral by my improved apparatus, it being understood that the sheet at this point has been thoroughly impregnated with waterproofing saturant and coated on its upper face with a layer of coating material such as molten asphalt having a melting point of 200 to 250° F.

The apparatus beneath which the sheet is shown to be travelling, comprises a series of hoppers 20 arranged side by side, and mounted in suitable supporting frames 21, there being for purposes of illustration, six hoppers. Obviously the number of hoppers may vary to suit the width of the sheet being treated, or one or more of the hoppers may remain idle where the sheet is narrower than the aggregate span of the entire installation. Each of the hoppers is adapted to contain a supply of granular material such as crushed slate, or the like, and where multi-colored roofing is being manufactured, the color of the granules in the several hoppers will be different so that longitudinal bands of differently colored minerals will be formed on the sheet. The mineral from the several hoppers is discharged from the lower open ends thereof into a distributing hopper 23 from whence it is delivered in a regulated flow by a feed roller 23 onto the coated sheet, the latter then passing over press rolls 24 for firmly imbedding the granules in the coating.

Each of the hoppers 20 has associated therewith a shelf or plate 25 passing through corresponding openings 26 in one of the end walls of the hoppers and arranged for sliding movement in parallel guideways 27 fixed to the side walls of each hopper. Normally, when mineral of selected color is being supplied to the hoppers and from the hoppers to the sheet, the shelves or plates 25 will be partially, at least, withdrawn from the respective hoppers so that mineral supplied to the hoppers will be free to gravitate to the discharge ends thereof, but where a change is to be made to mineral of a different color or mixture of colors, the shelves or plates will be brought to the "full-in" position shown in Figure 3. In order to provide for actuating the plates to and from the position shown in Figure 3, each plate is connected by a link 30 and a cooperating slotted-link 31 to a sleeve or collar 32 loosely mounted upon a shaft 33. The shaft 33 is supported in spaced aligned bearings 34 formed integrally with the standards 35 which are fixed to the upper ends of the several hoppers.

One end of each of the collars is toothed as at 36 for cooperation with corresponding teeth 37 on the end of a cooperating clutch-collar 38 keyed to the shaft as shown in detail in Figures 5 and 6. When the several clutch collars are in meshing engagement with their cooperating sleeves 32, the plates 25 of the several hoppers may be actuated in unison by rotation of the shaft 33. For rotating the shaft 33, an operating handle 40 is fulcrumed as at 41 to the supporting frame 21 and connected by a link 42 to a rocker-arm 43 fixed to the shaft at one end thereof. By selectively disengaging any one or more of the clutch-collars 38 from its cooperating sleeve 32, actuation of the corresponding plate 25 will be avoided, thus permitting selective ones of the hoppers to be continuously operated in the normal way to supply a stream of mineral to the sheet while the supply in the other hoppers is being changed from mineral of one color to that of another. An advantageous flexibility and latitude in the operation is thus afforded.

One mechanism for selectively disengaging the sleeves 32 from the shaft is shown in Figures 1 to 6 and comprises operating levers 45 pivoted as at 46 to the framework 21 and formed with slots 47 at their upper ends, the slots 47 being each engaged by a headed-bolt 48 screwed or otherwise fixed to each of the clutch-collars 38, so that upon swinging the operating levers 45 in one direction or the other, the clutch-collars may be engaged with or disengaged from associated sleeves 32.

Somewhat modified mechanism for disconnecting the plates 25 from actuation by the shaft 33 is shown in Figures 8 and 9. In this form, the slotted links 31α, are formed on one side thereof with openings 50 through which the links 30 may be withdrawn and reinserted at will.

In operation, it will be assumed that the sheet is being surfaced with a plurality of bands extending longitudinally thereof, the several bands being composed of mineral of more or less different color or shade. When a sufficient length or run of the sheet has been thus surfaced, and it is desired to then vary the color of each of the several bands, the level of the mineral contained in the several hoppers will be permitted to drop to a point below the lowermost position of the plates 25, whereupon the shaft 33 may be actuated to bring all of the plates to their "full-in" position as shown in Figure 3. The new mineral selected for each of the several hoppers is then fed thereto through suitable conveyors or pipe connections so as to be caught and accumulated upon the plates 25 in the respective hoppers. In Figure 3, the new mineral accumulated upon a plate 25 in one of the hoppers is indicated by the letter A, while the mineral previously supplied by the hopper is indicated at B. Just as the last portions of the mineral B are being drained from the hopper, the operating handle 40 is
moved to actuate the shaft 33 in the direction which will move the plates 25 outwardly of their respective hoppers to thereby release the supply of mineral A and permit the same to fall on top of the last bit of mineral B, as nearly as possible to the moment that the hopper is exhausted of the mineral B. The stream of mineral delivered from the hopper will thus be uninterrupted and the change made from one mineral to another in a very rapid and fairly accurately controlled manner. Although the first portions of the mineral A to reach the bottom of the hopper will become mixed to some extent with the last traces of mineral B therein, and form zones of the mixed minerals upon the sheet, the operation can be conducted by a skilled operator in such a way that these zones of mixed minerals are reduced to an insignificant value, thus reducing and substantially eliminating the production of shingle "seconds" by virtue of the appearance of undesirable mixtures of mineral A and mineral B thereon.

It will be obvious that subsequent changes to mineral of still other colors or shades may be effected in a similar manner.

When manufacturing roofing wherein one or more of the color bands are changed from time to time, while the remaining bands are kept constant so that the latter will predominate in the finished product, the change of mineral in the hoppers corresponding to the variable bands may be effected in the manner already described, while the remaining hoppers continue to supply the same colors. In these latter hoppers, therefore, the plates 25 will be drawn outwardly, and disconnected from the plate-operating mechanism so as not to be affected thereby and so that mineral supplied to these hoppers will flow uninterruptedly therethrough and to the delivery spout for discharge into the distributing hopper 23. Disengagement of the desired plates from the operating mechanism may be effected either by manipulation of the corresponding operating levers 45 whereby to disengage the corresponding clutch-collars 38 from the sleeve 32, or as shown in Figures 8 and 9, by simply removing the links 30 through the opening 50 in the corresponding slotted links 31a.

I claim as my invention:

1. Apparatus for applying granular mineral to coated roofing material comprising a plurality of hoppers each adapted to contain a supply of granular mineral, and including means for discharging the mineral from said hoppers upon the coated sheet in a plurality of distinct bands, a plate member slidable in each of said hoppers for accumulating a supply of other granular mineral in each of said hoppers and above the respective first named supplies therein, manually operated means for withdrawing said plate members from said hoppers, and means for selectively connecting said plate members with said manually operated means.

2. Apparatus for applying granular mineral to coated roofing material comprising a hopper for containing a supply of granular mineral material, and including means for discharging and distributing said mineral upon the coated sheet, means for accumulating a supply of other granular mineral in said hopper above the first named supply, and means operable to release substantially all the mineral of said second supply substantially at the moment said first supply is exhausted.

3. Apparatus for applying granular mineral to coated roofing material comprising a hopper for containing a supply of granular mineral material, and including means for discharging said mineral upon the coated sheet, a plate member slidable in said hopper for accumulating a supply of other granular mineral in said hopper above the first named supply, and means for withdrawing said plate member from the hopper whereby to release substantially all the mineral accumulated thereon.

4. Apparatus for applying granular mineral to coated roofing material comprising a plurality of hoppers each adapted to contain a supply of granular mineral and including means for discharging the mineral from said hoppers upon the coated sheet, means for accumulating a supply of other granular mineral in each of said hoppers and above the respective first named supplies therein, and means for simultaneously releasing substantially all the mineral of said second supplies.

5. Apparatus for applying granular material to coated roofing material comprising a plurality of hoppers each adapted to contain a supply of granular mineral, means for discharging said mineral from said hoppers into a common feeding means, a plate member in each of said hoppers intermediate the upper and lower portions thereof and slidable operable in and out of said hoppers, and means for selectively operating said plate members.

6. Apparatus for applying granular material to coated roofing material comprising a plurality of hoppers each adapted to contain a supply of granular mineral, means for feeding the mineral from said hoppers onto said material, plate members slidable operable in and out of said hoppers arranged intermediate the upper and lower portions thereof and means to selectively and simultaneously operate any desired group of said plates.

Signed at Chicago Heights, in the county of Cook and State of Illinois, this 21st day of February, A. D. 1929.

ELBERT S. DONAHUE.