Jan. 19, 1943. W. G. DAVIS 2,308,589

APPARATUS FOR PRODUCING SIDING

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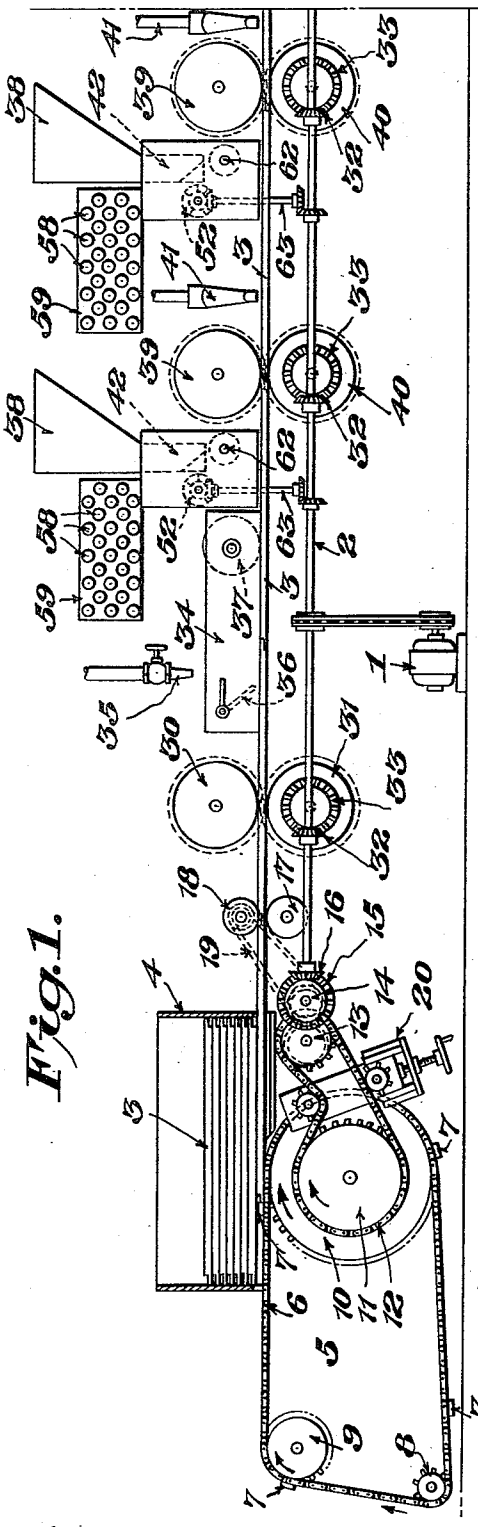


Fig. 1.

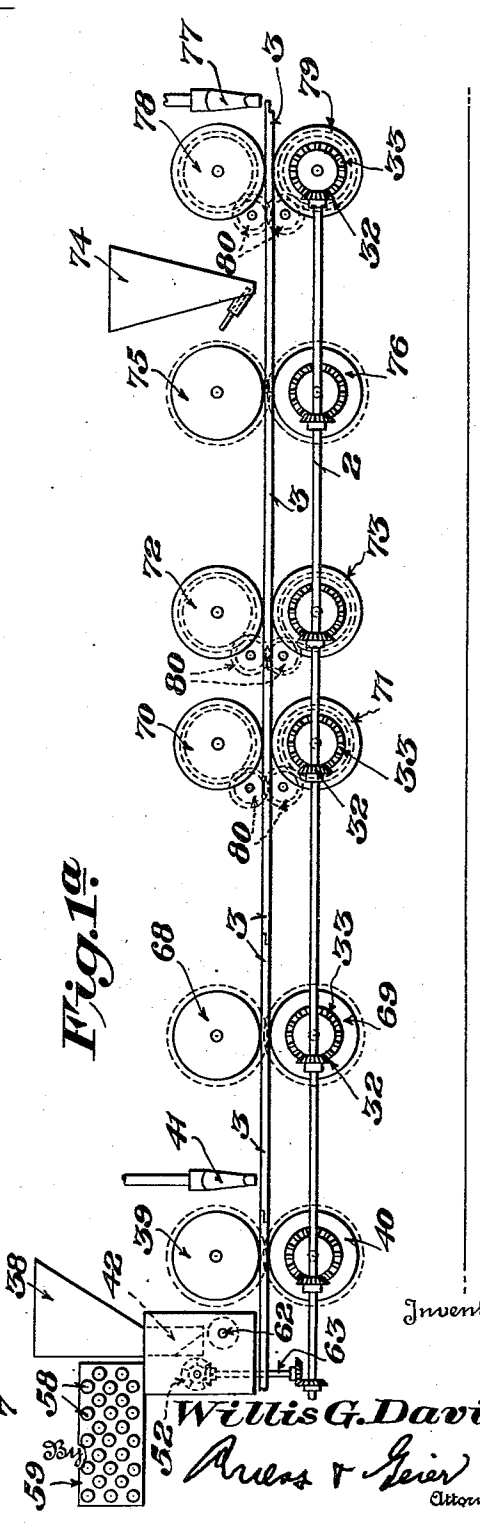


Fig. 1a.

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APPARATUS FOR PRODUCING SIDING

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Fig. 2.

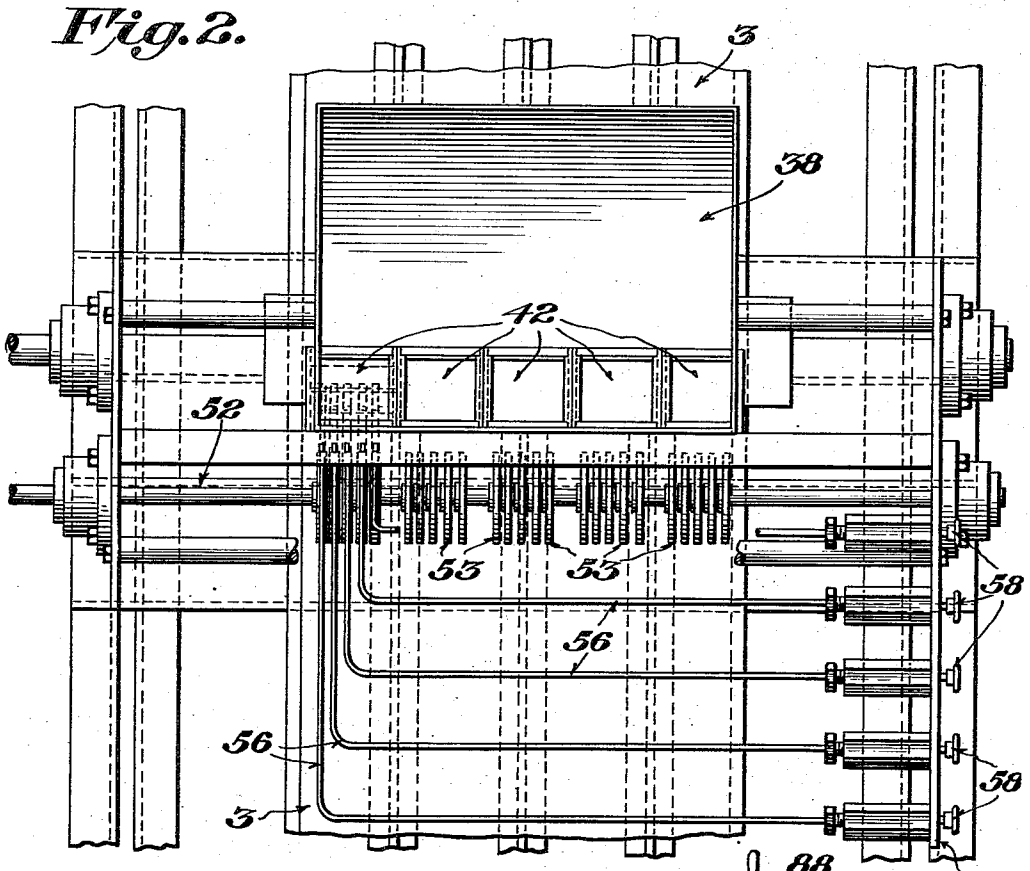


Fig. 6.

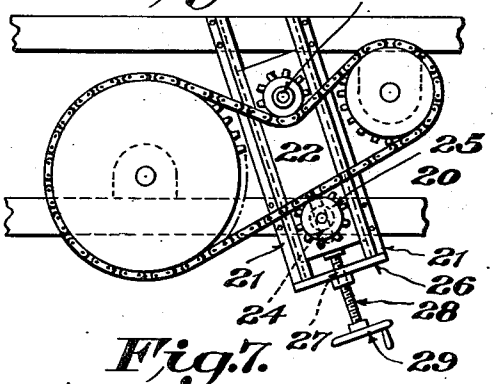


Fig. 7.

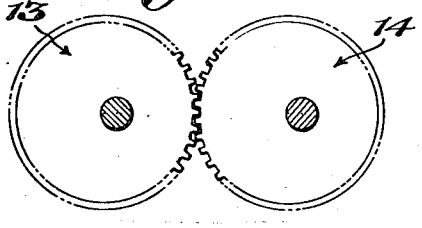
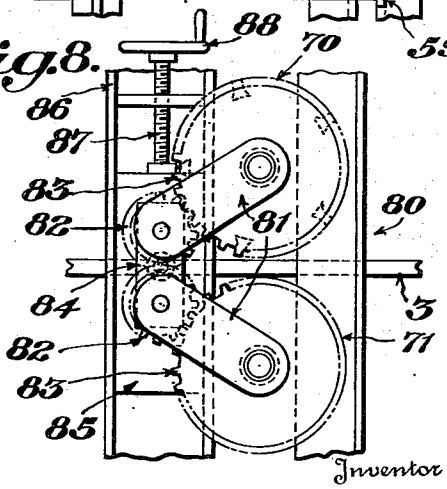


Fig. 8.



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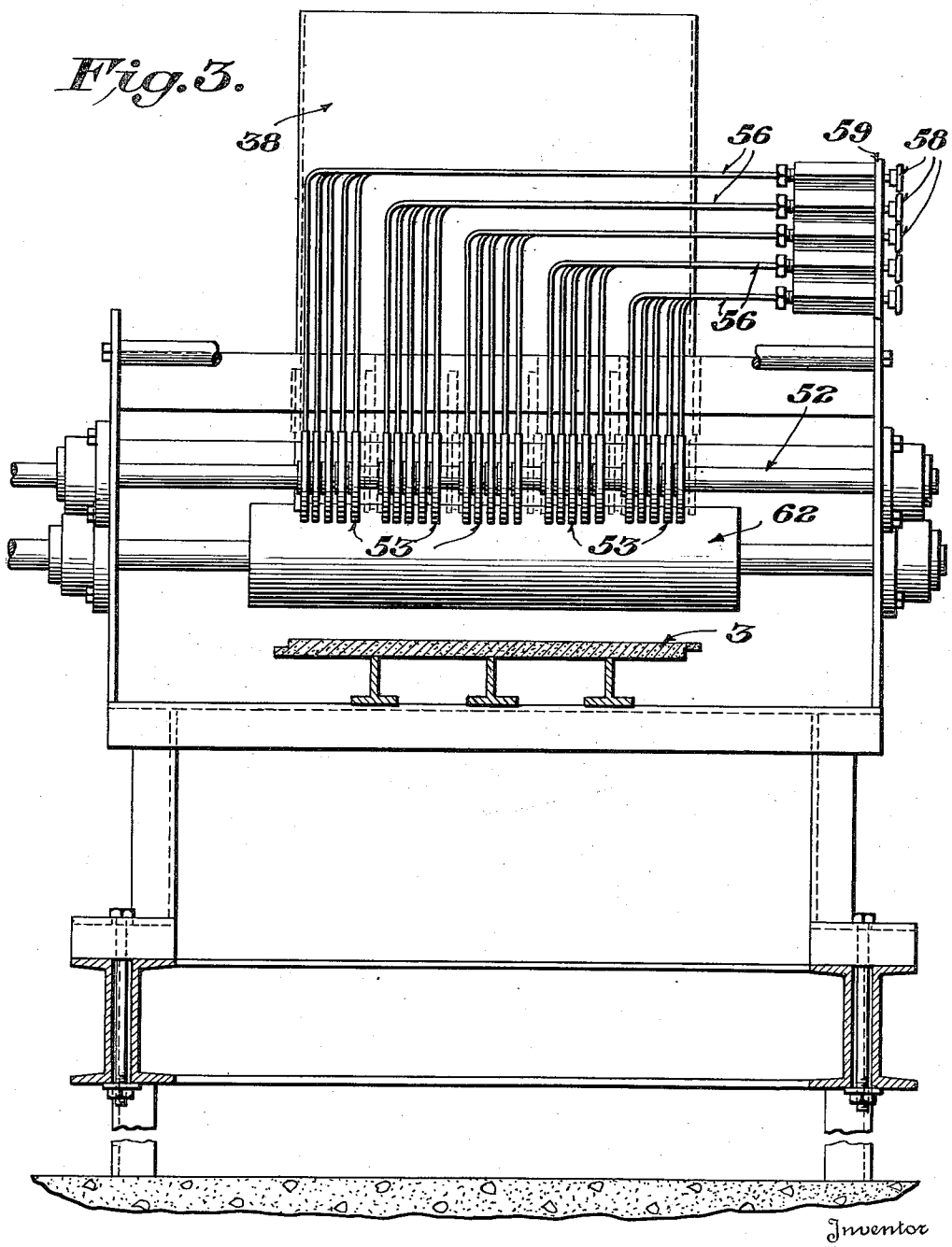
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Fig. 3.



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Fig. 4.

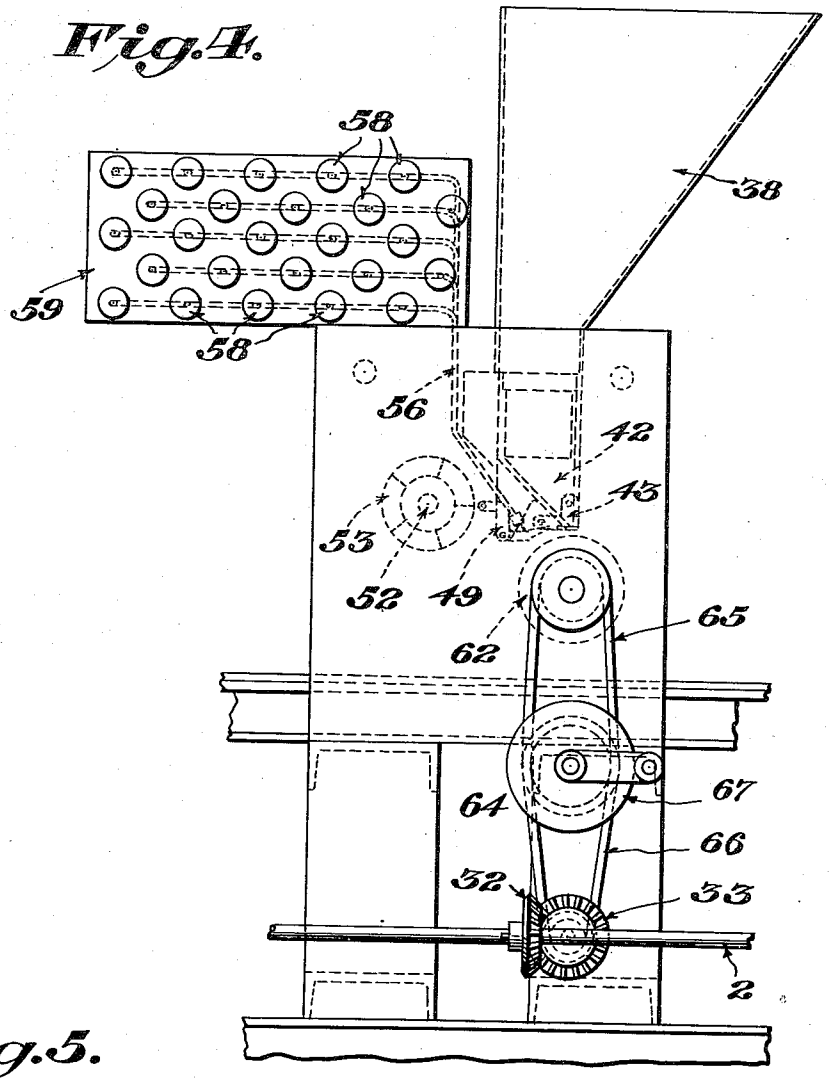
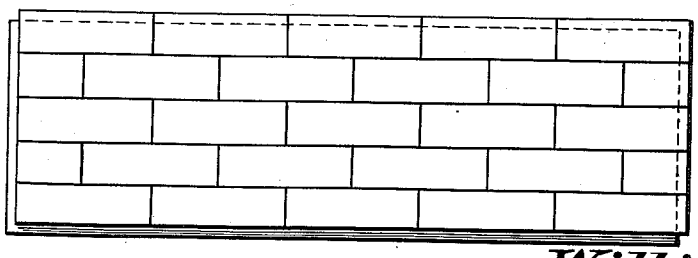


Fig. 5.



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Fig. 9.

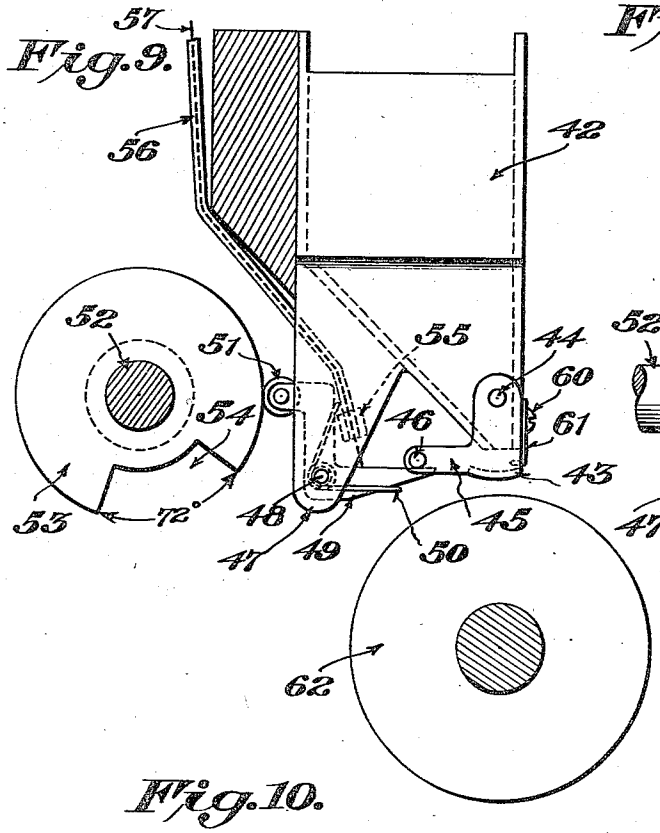


Fig. 11.

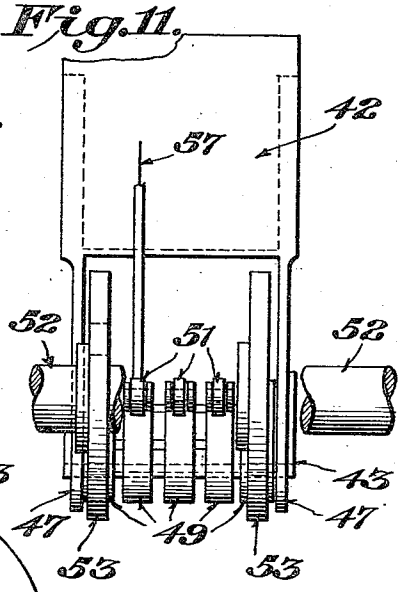


Fig. 10.

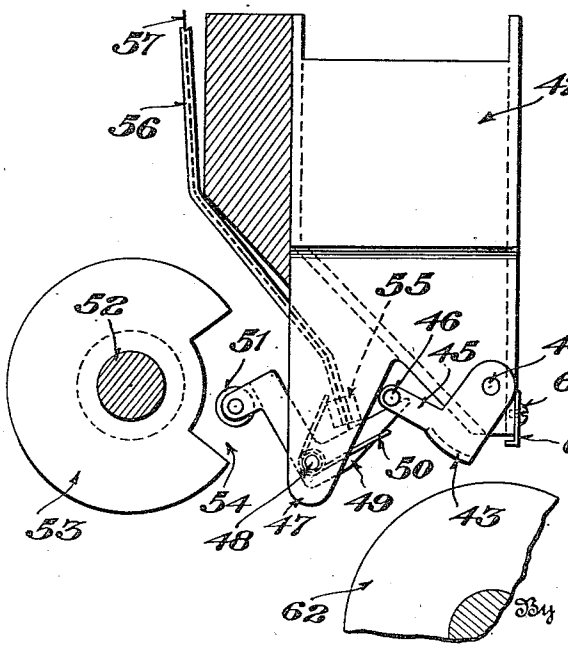
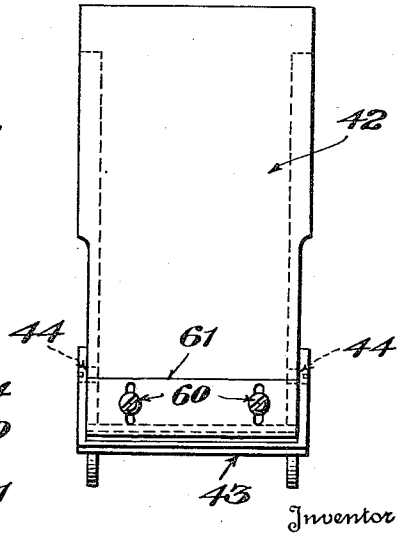


Fig. 12.



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Patented Jan. 19, 1943

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UNITED STATES PATENT OFFICE

2,308,589

APPARATUS FOR PRODUCING SIDING

Willis G. Davis, Pompton Plains, N. J., assignor to Ascote, Inc.

Application April 16, 1941, Serial No. 388,909

2 Claims. (Cl. 91—16)

This invention relates to an apparatus for producing siding, and more particularly siding units employed in connection with the walls of buildings or other structures, which siding in its completed form resembles or simulates a course or courses of plain and/or vari-colored laid brick. However, it will be apparent from the following disclosure that this apparatus can be readily adapted for producing and coating other materials.

The primary object of this invention is to provide an apparatus for forming and coating siding, which may be composed of fibre board such as celotex or any other suitable material, in a continuous and accurate manner to simulate a course or courses of laid brick.

Another important object of this invention is to provide an apparatus of the above character wherein the siding units or boards are continuously fed into the machine in end-to-end lapped relation to one another so as to eliminate any space between the units during the subsequent coating treatment thereof, and to prevent such coating material from passing downwardly between the adjacent ends of the units.

Another important object of this invention is to provide apparatus of the above character wherein various colors may be selectively deposited and distributed upon the material in accordance with a predetermined pattern.

Another important object of this invention is to provide an apparatus of the above character wherein the siding units are automatically coated with a suitable substance, such as asphalt, of a predetermined thickness, then selectively covered with colored granules in accordance with a predetermined pattern and finally embossed under pressure so as to obtain a siding unit having the appearance of a course or courses of laid brick.

Still another important object of this invention is to provide an apparatus of the above character which is simple and efficient in operation, and one whereby siding units may be manufactured and placed upon the market at a reasonable cost.

The foregoing and other objects and advantages of the above named apparatus will be apparent throughout the course of the following description and drawings, in which:

Figs. 1 and 1*a* illustrate a diagrammatic view of one form of apparatus by which the invention may be practiced;

Fig. 2 is a fragmentary plan view of a color hopper and the selective mechanism for controlling the same, each of said hoppers being divided into five sub-hoppers and each sub-hopper representing one longitudinal course of brick in the finished product;

Fig. 3 is a fragmentary front elevation, partially in section of the color hopper and the selective control mechanism as shown in Fig. 2;

Fig. 4 is a fragmentary side elevation of the mechanism shown in Figs. 2 and 3, with portions of the color feeding mechanism in dotted lines;

Fig. 5 is a front elevation of one section of siding made in accordance with the present invention;

Fig. 6 is a fragmentary side elevation in detail of a device for adjusting or indexing the timing of the unit receiving and feeding mechanism as shown to the left of Fig. 1;

Fig. 7 is a sectional view of a pair of eccentric gears forming a part of the mechanism for feeding the boards, such as shown in dotted lines in Fig. 1, whereby each succeeding board is accelerated in speed so as to move the same into end-to-end lapped relation with the preceding board;

Fig. 8 is a fragmentary side elevation with parts in dotted lines, showing an adjusting means for indexing one of the embossing rolls with respect to its paired pressure feed roll;

Fig. 9 is a fragmentary side elevation partly in section of one of the sub-hoppers, of which each main hopper is composed, together with a discharge operating cam and a color receiving roller or cylinder and with the sub-hopper in its inoperative position;

Fig. 10 is a fragmentary side elevation similar to Fig. 9, with the sub-hopper in its operative position;

Fig. 11 is a fragmentary front elevation of the sub-hopper with some of the cams and the color receiving roller removed; and

Fig. 12 is a rear elevation of the sub-hopper, showing means to vary the size of the discharge opening.

Referring to the accompanying drawings, and more generally to the diagrammatic disclosure of the apparatus, as shown in Figs. 1 and 1*a*, it will be noted at the outset that all stations of operation upon the material are preferably arranged in a straight path upon any suitable supporting frame and that all moving parts, whether intermittently or continuously operated, are driven from a single source of power, namely, a variable speed motor driving through a line or power take-off shaft 2.

Initially, the prepared boards or siding units 3, having each of their edges formed to provide

lap-joint connections with adjacent units when the same are disposed in end-to-end abutting relation during movement through the apparatus or in place upon a building or other structure, are fed by gravity from a hopper 4 onto a flexible endless conveyor 5.

The endless conveyor 5 is composed of a pair of spaced chains 6 connected together by transversely extending spaced bars 7, which latter during the forward travel of the conveyor engage and move the siding units from the hopper. The conveyor 5 is mounted upon progressively larger sprocket gears 8, 9, and 10 respectively, and the latter in turn is fixedly connected to and driven by a sprocket gear 11 through sprocket chain 12.

The sprocket chain 12 is driven from the power shaft 2 through the medium of a pair of eccentrically mounted meshed gears 13 and 14, see Fig. 7, the latter of which is connected to and constantly driven by power shaft 2 through beveled gears 15 and 16, whereby one-half the cycle of movement of conveyor 5 is accelerated as to speed and the remaining half cycle of movement is decelerated. This action results in giving an added impetus to each section of siding to cause the latter to abut and overlap at the moment adjacent ends of the siding sections meet between a pair of light pressure feed rolls 17 and 18, the latter of which is driven at a constant speed by the power shaft 2 through a sprocket mounted on the same shaft as, and behind, gear 14 and sprocket chain 19. An additional purpose of the above described accelerated and decelerated action of the conveyor 5, is to produce a time lag in order to allow each succeeding siding unit to overcome its inertia and to drop upon and be carried forward by the conveyor to meet at a point at the axis of the constantly driven light pressure feed rolls 17 and 18.

In order to bring the conveyor 5 into timed relation with the eccentric meshed gears 13 and 14, there is further provided, an adjusting mechanism 20 shown in detail at Fig. 6, of the drawings. This adjusting mechanism consists of a pair of spaced guide members 21—21 rigidly secured in any suitable manner to the supporting frame of the assembled machine. Mounted for sliding movement between the guide members 21—21 is a slide 22 carrying adjacent one end thereof a rotary sprocket gear 23. The opposite end of the slide 22 is provided with an elongated slot 24 to slidably receive the bearing of a rotary sprocket gear 25 whereby the latter, by any suitable means, not shown, may be adjusted on the slide 22 toward and away from the gear 23. One of each of the ends of the guide members 21—21 are connected by a cross bar 26 having a bearing 27 therethrough and formed to receive a screw 28 having one of its ends provided with a hand operated wheel 29 and having its opposite end connected to the adjacent end of the slide 22 to reciprocate the latter in the guide members to thereby index the movement of the conveyor 5 to bring the same into synchronization with the feed rolls 17 and 18.

Rearwardly of the light pressure feed rolls 17 and 18 and spaced therefrom is a pair of heavy feed rolls 30 and 31 driven from the line shaft 2 through the medium of beveled gears 32 and 33. The power and pressure of the feed rolls 30 and 31 are sufficient to force the siding units 3 past the open bottom coating trough 34 into which the coating material such as asphalt or the like is fed from a source, not shown, through the manually controlled nozzle 35. The forward end of the coating trough is provided with a gravity actuated reverse flow check valve or gate 36, while the opposite end thereof is provided with an asphalt doctoring means 37, which latter forms the subject matter of a separate application filed Apr. 16, 1941, Serial No. 388,906.

Arranged rearwardly of the coating trough 34 and in spaced relation to each other is a series of groups of color applying mechanisms, which are shown as three in number by way of example only, each group consisting of a sequentially arranged selectively controlled color depositing hopper 38, shown in detail in Figs. 2, 3, 4, 9, 10, 11 and 12, and to be hereinafter more fully described; a pair of color applying or setting pressure feed rolls 39 and 40; and a surplus color removing suction nozzle 41 connected to any suitable source of suction, not shown.

Each color hopper 38 is formed with a series of five sub-hoppers 42, which latter are in alinement in a path transversely to the path of travel of the siding units through the machine. The open bottom of each sub-hopper 42 is closed by a valve member 43 shown in Figs. 9, 10, and 12, pivoted at 44 to the side walls defining said sub-hopper. The valve 43 is provided at each of its ends with rearwardly extending arms 45 connected by a bar 46.

Dependent spaced legs 47 are carried by each sub-hopper and supported therebetween is a rod 48 upon which is pivotally mounted a series of five independently movable spaced L-shaped cranks 49, each normally urged in a counter-clockwise direction by individual and complementary spring members 50.

The L-shaped cranks 49, each have their forwardly extending arms constantly engaged with the bar 46 carried by the valve 43, while their rearwardly extending free ends are each provided with a roller or other suitable anti-friction bearing 51.

A rotary transversely extending shaft 52, having its ends suitably journaled in the machine frame, is disposed rearwardly of the sub-hoppers 42 and has rigidly keyed thereto a series of five spaced disks 53, each of said disks being complementary to each of the L-shaped cranks, and formed with a notch 54 extending substantially 72° throughout the circumference thereof, each of said notches also being staggered or displaced circumferentially with respect to the notch in the next or adjacent disk in the series.

At this point, it is to be noted that the number of sub-hoppers and their related parts are merely arbitrary ones and chosen only by way of example, it being expressly understood that such number may be increased or decreased at will and being dependant entirely upon the number of courses and bricks in each course to be impressed upon the siding unit, see Fig. 5.

To proceed, each of the rollers 51 are adapted to be normally engaged with the periphery of the disks for substantially 288° of the circumference thereof to permit the valve 43 to remain closed under the influence of gravity, see Fig. 9, while the valve is moved to open position under the influence of the spring or springs 50 when the rear end of the L-shaped crank 49 moves into its complementary notch 54, see Fig. 10.

Supported between the dependant legs 47 of each of the sub-hoppers and above the L-shaped cranks 49 is a transverse bar 55 formed with a series of five spaced openings in each of which

is supported the lower end of a guide tube 56. Movable through each of said tubes is a control wire 57 whose lower end is adapted in one position to engage with and block counterclockwise movement of its complementary L-crank so as to prevent movement of the rear end of the latter into the notch of its alined disk, see also Fig. 9.

The upper ends of the control wires 57 lead to and are connected with manually operable indicating buttons 58 mounted upon a board 59, said board and indicating buttons being either closely or remotely associated with the color hoppers 38 and designed, if desired, to represent as a pattern, the object being operated upon.

Mounted upon the front wall of the sub-hoppers by means of screws 60 or the like, is a vertically adjustable lip or deflector 61, whereby the splash and waste of coloring matter discharged from the hoppers may be controlled or avoided as the pivoted valves 43 close.

Supported in suitable bearings in the machine frame, and beneath the pivoted discharge valves 43, is a transversely extending distributing roller 62 having its surface covered with rubber or other suitable material.

While the shaft 52, carrying disks 53 is driven at a constant speed from the power shaft 2, by suitable connections 63, the distributing roller 62 is independantly and variably driven from the power shaft 2 by any suitable variable speed drive, such as by a mechanism, well known on the market as the Toledo Timer, indicated generally at 64 in Fig. 4. The important object of the distributing roller 62 is to level the granules and deposit same evenly on the board performing at the same time a definite metering action. Thus, if the roller 62 is revolved rapidly, a large quantity of granules is deposited while at reduced speeds the quantity is correspondingly decreased. As explained herein, the variation in speed of roller 62 is accomplished by timer 64, which in brief consists of a pair of belts 65 and 66 each engaging a pulley 67 having a changeable diameter. However, such change speed mechanism, per se, forms no part of the present invention, except in the general combination and consequently a detailed description thereof is deemed unnecessary.

Rearwardly of the series of color applying mechanisms 38, 39, and 40 is another pair of heavy pressure rollers 68 and 69, driven by suitable means from the power shaft 2, which further embed the granules in the coating.

Spaced from the pressure feed rollers 68 and 69 are two pairs of spaced embossing rollers driven through suitable connections from the power shaft 2, one pair consisting of rollers 70 and 71 and the following pair consisting of rollers 72 and 73.

Rollers 70 of the first-mentioned pair of embossing rollers has its surface so formed and timed that it will form only the half bricks occurring at each end of the siding units, see Fig. 5, such surface being designed to corrugate or impress the unit with markings simulating wire-cut bricks, thus resulting in the illusion of a full brick, and thereby substantially eliminating any appearance of a joint when the ends of adjacent units are lapped or connected together.

The embossing surface of roll 70 may be modified so that full bricks may be corrugated either at random or at predetermined locations, or even over the entire surface of the board.

It may be desirable at times to produce siding of the character or kind described herein, on which the mortar joints are to appear comparatively shallow or flush with the surface of the predeposited granules. This can be accomplished by the following method: Roll 72 is raised to permit the board to pass through without having any mortar joints embossed therein. Rolls 75 and 76 perform as hereinafter described.

Roller 72 of the second pair of embossing rollers has its surface formed to impress the transverse and horizontal mortar lines on the siding units, and the pressure exerted by said rollers is such that the previously deposited colored granules are forced beneath the asphalt coating, resulting in black mortar lines at this stage of the operation.

The siding units 3 then pass between a pair of pressure rollers 75 and 76 the roller 75 of which has a plain surface and which is intended to iron out the irregularities and ridges that occur in the surfacing of the granule coating or only to smooth or iron out the ridges which usually occur on either side of the mortar lines after the units have passed between the embossing rollers 72 and 73.

Immediately to the rear of the pair of pressure rollers 75 and 76 is a hopper 74 from which is deposited on the entire surface of the board a covering of white or colored granules or crystals, a portion of which latter represent the mortar lines in the completed unit.

In that case, the operating sequence is then as follows: After the boards have passed by roll 68, hopper 74 coats the entire surface of the board with white or colored granules which are not disturbed until said boards pass beneath embossing roll 78 which embeds the white or colored granules into the surface.

A suction nozzle 77 connected to any suitable source of suction, not shown, is spaced rearwardly of the rollers 78 and 79 and is adapted to remove all of the granules deposited by hopper 74, except those which have been deposited and impressed in the horizontal and transverse mortar lines.

Following hopper 74 are a pair of rollers 78 and 79 suitably driven from power shaft 2, the surface of the roller 78 being formed to re-emboss the horizontal and transverse mortar lines occurring on said units.

In order that the impressions simulating wire-cut half bricks and the mortar lines will occur in precisely the intended place upon the surface of the units, the pairs of rollers 70—71, 72—73, and 78- 79, each have associated therewith an indexing mechanism 80, the latter being shown in more detail in Fig. 8. However, such indexing mechanism forms the subject matter of a separate application filed Apr. 16, 1941, Serial No. 388,907, and consequently only a brief description thereof is deemed to be necessary herein.

The indexing mechanism 80 consists briefly of a pair of convergent arms 81—81, Fig. 8, each having one of its ends pivoted to the shafts of the associated pressure rollers. The opposite ends of said arms each carry rotary gears 82—82 meshed together and each of which is also in meshed engagement with teeth 83—83 on its complementary pressure roller. The ends of the arms 81—81 which carry the rotary gears 82—82 are connected together for free swinging movement in an arcuate path by a link 84 which latter in turn is pivoted to a slide 85 moving in a fixed vertical path in a suitable guide member 86 connected to the adjacent side frame of the machine. A screw 87, having a hand wheel 88 at-

tached thereto, is secured to the slide 84 to manually shift the same and thereby the gears 84—84 in an arcuate path about the periphery of the rollers. Thus from the foregoing it will be seen that in the event that the impression rollers are out of time with respect to the movement of a siding unit therebetween, either upward or downward movement of the slide 85 will shift the upper roller carrying the embossing members either in a clockwise or counterclockwise direction so as to bring the impression or embossing elements into their indexed positions with respect to the length of the board, such action being accomplished even though the machine is in operation.

In the operation of the assembled machine as depicted in the diagrammatic views of Figs. 1 and 1a, the siding units 3 having under-cut edges, are stacked in the hopper 4 on the feed table. Through the medium of gravity and the transverse bars 7 mounted on the endless chain 6, the units are ejected singly from the bottom of the hopper so that the abutted and lapped ends meet on the longitudinal axis of the light pressure feed rollers 17 and 18.

This meeting of the abutted and lapped ends of adjacent units on the axis of the pressure rollers 17 and 18 eliminates any space which might ordinarily occur between such units, such meeting of the units being accomplished by the speed of the conveyor 6 which is acelerated by the eccentric gears 13 and 14 through the latter half of the cycle of movement of the conveyor.

The abutted units after passing through the light pressure rollers 17 and 18, are picked up and moved forward by the heavy pressure rollers 30 and 31 with sufficient force to push the units beneath and pass the asphalt which is deposited thereon from the hopper 34. The thickness of the asphalt coating thus applied, is controlled by a doctoring device 37 which latter also has an angular adjustment to vary the pitch of the surface coating and to compensate for any irregularities which might occur in the surface of the units.

After the units have received a coating of asphalt of predetermined thickness they then pass beneath the first hopper 38 of the series of coloring mechanisms which contain granules of any predetermined color. The granules in the hoppers 38 are fed through sub-hoppers 42, the outlet valves of which are controlled by manually operable buttons 58 on the pattern board 59. At this point it is to be noted that the valve 43 of each of the sub-hoppers 42 is held against opening movement by blocking the counterclockwise movement of the L-cranks 49 by means of the rods 57 which latter are operable by depressing the buttons on the control board 59.

When the boards are passed beneath the series of hoppers 38, the feed of the granules therefrom may be further controlled as to the quantity deposited by regulating the speed of the feed roller 62.

Assuming that the coated unit is to represent five horizontal rows of brick of five bricks each, the granules in any hopper 38 may be deposited over the entire surface of the unit by pulling all of the buttons 58 so as to unblock the L-cranks 49 and thus the same move into corresponding notches 54 as the disks 53 are rotated at indexed or timed speed from the power shaft 2. However, the unit may be colored only at predetermined areas such as, for example, one brick in course 1, counting from the top of the unit, three bricks in course 2, alternate bricks in course 3, one brick between the half bricks in course 4, and all of the bricks in course 5, by merely pulling out the buttons corresponding to such predetermined areas so that the valve is automatically operated when the corresponding L-crank is moved counterclockwise by the spring 50 to force the L-crank into the notch or cut-out 54 of the respective disks 53.

Upon receiving the predetermined amount of colored granules from the first hopper 38 the units pass between pressure rollers 39 and 40 so as to imbed such granules in the asphalt coating. Any of the granules not imbedded in the asphalt by the rollers 39 and 40 are then removed by means of suction through the nozzle 41.

The depositing of additional and various other colors upon the uncoated areas of the unit are accomplished in like manner by the remaining mechanisms 38—38 of the series, each color being subsequently imbedded by the following pressure rollers and the surplus removed by the suction devices 41. From the series of depositing mechanisms above described the siding units then pass between rollers 68 and 69 whereby an additional pressure is applied to more firmly imbed the deposited granules in the coating. Upon completion of the foregoing operations the units are then fed forwardly between a pair of rollers 70 and 71, the roller 70 of which has its surface so formed and the speed of rotation thereof so timed relative to the forward movement of the units as to accurately emboss the surface areas which are to simulate the half bricks occurring at the ends of courses 2 and 4, see Fig. 5.

The embossed design in the half brick areas represent wire-cut bricks whereby when adjacent units are abutted and overlapped in use, an illusion of full bricks is had at the joints, which illusion substantially eliminates the appearance of a joint between the siding units. Such illusion may also be produced by depositing blue black granules on the area representing the half bricks at the ends of each of the units.

Following the operation of the rollers 70 and 71, the units next pass between the rollers 72 and 73, where the same are embossed by the roller 72 to form horizontal and transverse depressions represent mortar lines. The pressure of these latter rollers is such that the previously deposited colored granules are forced completely beneath the surface of the asphalt coating leaving mortar lines which are devoid of any granules.

The units 3 next pass between the pressure rollers 75 and 76 where all irregularities and ridges are ironed out. After passing through rollers 75 and 76, a coating of white granules from hopper 74 is deposited over the entire surface of the board. Following this the white granules are impressed into the areas representing the mortar lines by rollers 78 and 79, the surplus granules occurring in the areas representing bricks being finally removed by suction nozzle 77, thus bringing the units to their final form.

It is to be understood that the form of my invention as disclosed by the herein shown and described apparatus, is to be taken as a preferred example of the same and that various changes therein may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a siding apparatus, means for coating a siding with a bituminous body, means to feed and

distribute granular material on areas of predetermined size and shape on said body, means to force the material into the body, means to force the granular material at the margins only of said areas into the body so as to conceal the material and to simultaneously form depressions simulating mortar joints, means to deposit coloring matter in the depressions, means to apply pressure to the coloring matter to positively embed same in the depressions, and means to operate all of the aforesaid recited means in timed relation.

2. An apparatus for continuously and automatically feeding and coating sections of siding which are pre-formed with undercut edges to provide lap joints with adjacent sections, including means to move and feed the sections into end-to-end abutted and lapped relation with each other, means to coat the siding sections, said siding feeding means including a pair of interengaged eccentrically mounted gear members which accelerate the speed of the feeding means during a portion of its cycle of movement, and means interposed between said feeding and coating means to receive and force said abutted and lapped sections past said coating means, whereby to prevent downward passage of the coating material between the abutted sections of siding during the application of coating material thereto by said coating means.

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