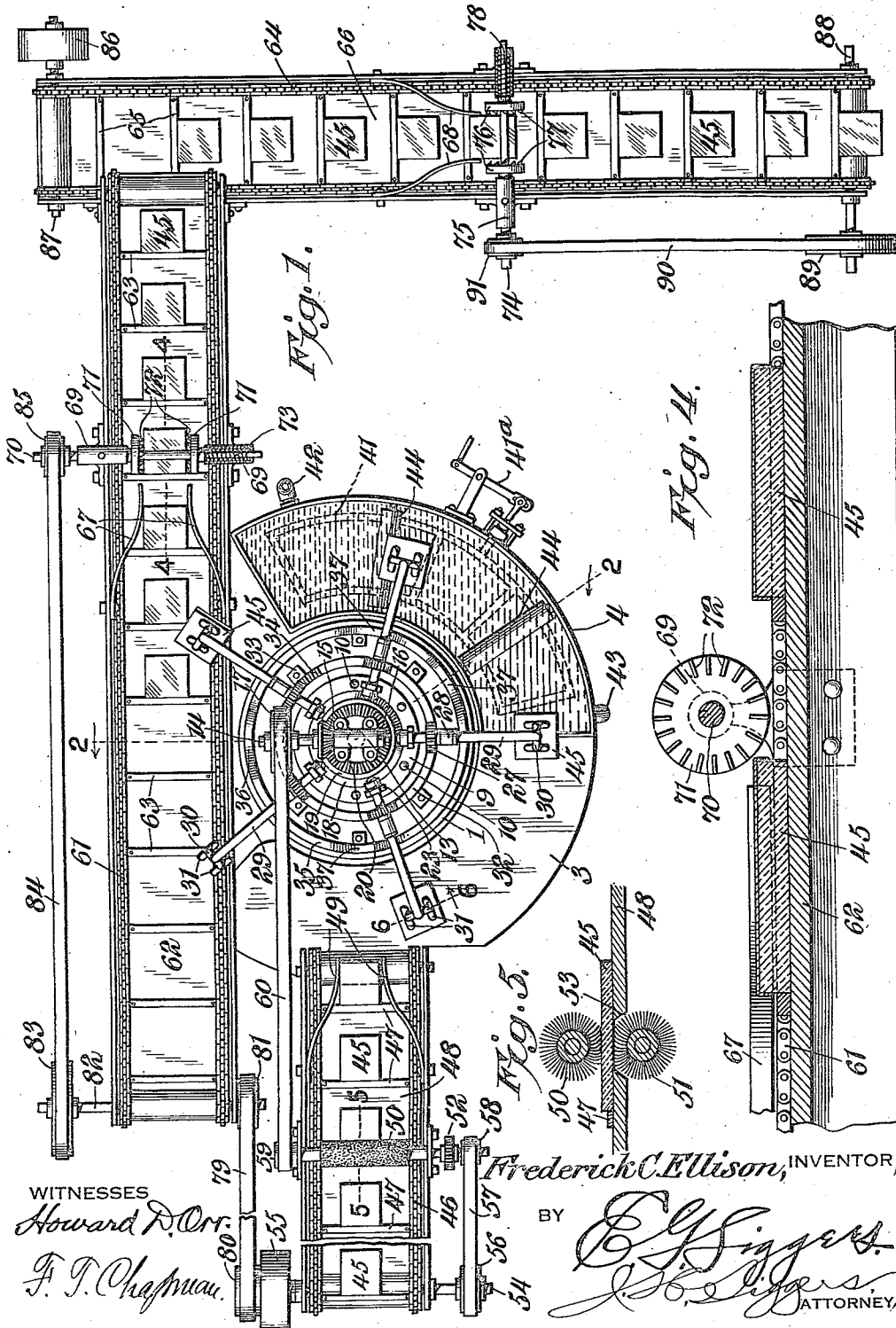


F. C. ELLISON.
TILE COATING MACHINE.
APPLICATION FILED OCT. 27, 1913.

Patented Mar. 2, 1915.

2 SHEETS—SHEET 1.

1,130,383.

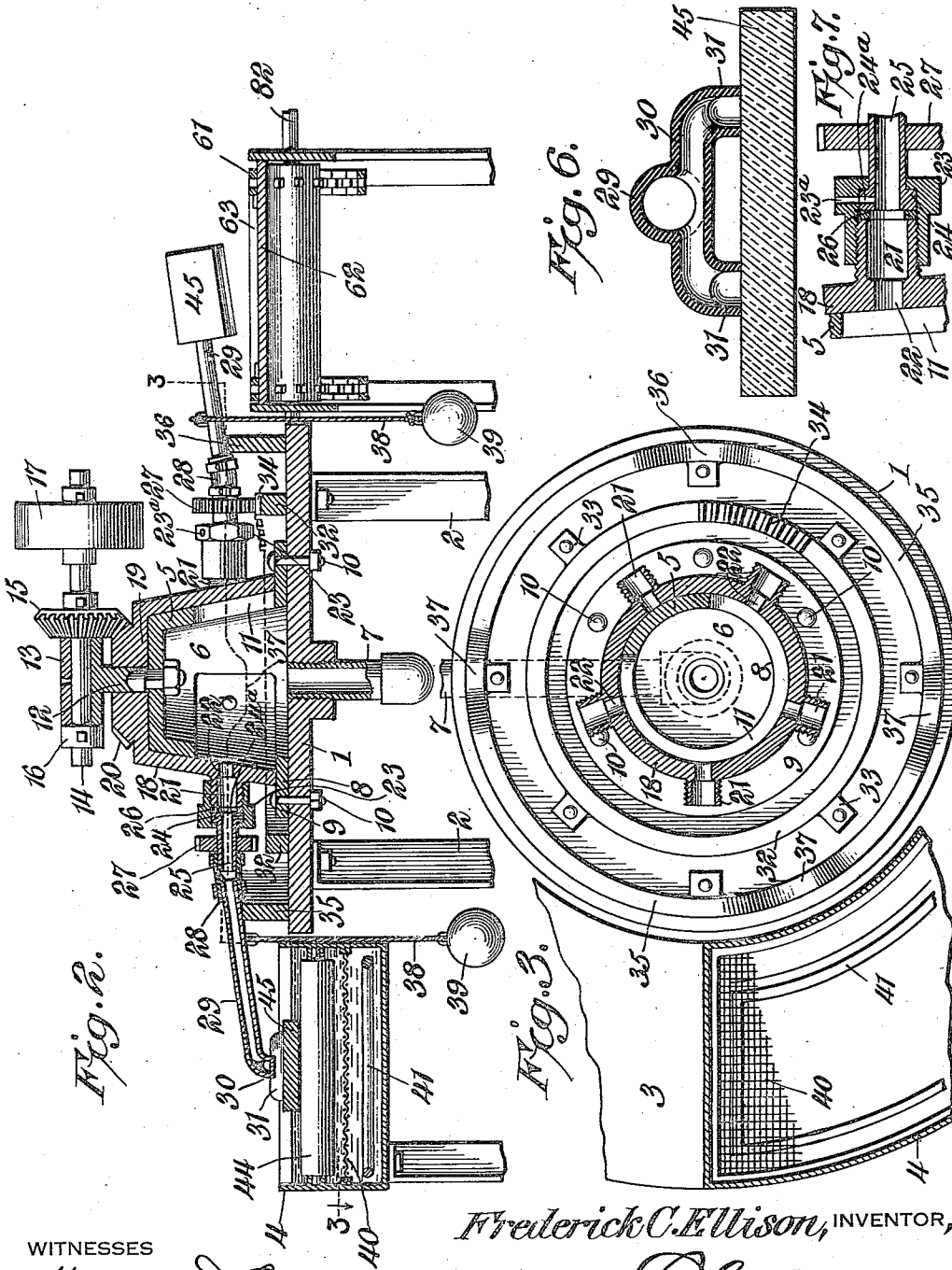


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WITNESSES

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TILE-COATING MACHINE.

1,130,383.

Specification of Letters Patent.

Patented Mar. 2, 1915.

Application filed October 27, 1913. Serial No. 797,583.

To all whom it may concern:

Be it known that I, FREDERICK C. ELLISON, a citizen of the United States, residing at Perth Amboy, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Tile-Coating Machines, of which the following is a specification.

This invention has reference to improvements in machines for coating tiles, and is designed to provide a machine which will closely simulate the operation of hand coating.

In accordance with the present invention there is provided means whereby the tiles are presented to the dipping machine in a cleaned condition and are then picked up successively by devices arranged to be attached to the tiles by atmospheric pressure, and in this condition are carried through the coating tank face downwardly, after which the tiles are deposited face upwardly upon a suitable conveyer by which they are carried between fettling devices which remove the coating from the edges of the tile.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification with the further understanding that while the drawings show a practical form of the invention, the latter is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention.

In the drawings:—Figure 1 is a plan view of the machine embodying the present invention. Fig. 2 is a section on the line 2—2 of Fig. 1 but drawn on a larger scale. Fig. 3 is a section on the line 3—3 of Fig. 2, omitting the pneumatic tile carrying arms. Fig. 4 is a detail section on the line 4—4 of Fig. 1 drawn on a larger scale and showing the parts in a somewhat different position from the disclosure of Fig. 1. Fig. 5 is a fragmentary section on the line 5—5 of Fig. 1 and drawn on a larger scale. Fig. 6 is a fragmentary section on the line 6—6 of Fig. 1. Fig. 7 is a detailed section through a portion of one of the pneumatic tile-carrying arms and its support.

Referring to the drawings there is shown a plate 1 which may be in the form of a casting, or may be constructed in any suitable manner, this plate being supported upon legs 2 or otherwise. Extending about the plate 1 concentric therewith is a segmental table 3, and connected at one end to the corresponding end of the table 3 is a segmental tank 4 also concentric with the plate 1, the table 3 and tank 4 being curved on substantially the same radius about the center of the plate 1.

Mounted centrally of the plate 1 is a hollow frusto-conical post 5 inclosing a chamber 6 with which there communicates a pipe or duct 7 shown in the drawings as extending below the plate 1 and communicating with the chamber 6 through the center of the plate 1. The post 5 is provided with a basic portion 8 from which outstands a flange 9 by means of which the post 5 is attached to the plate 1 by bolts 10 or in any other suitable way. The upright walls of the post 5 are pierced by a slot 11 which may include more than half the circumference of the post for a purpose which will hereinafter appear. Erected on the post 5 is a stem 12 having a journal bearing 13 at its upper end for a shaft 14 carrying a bevel pinion 15 at one end of the journal bearing 13, while a set collar 16 on the shaft 14 at the other end of the bearing prevents lengthwise movement of the shaft. Mounted on the shaft 14 is a pulley 17 by means of which power may be applied to the shaft to rotate it.

Mounted on the frusto-conical post 5 is a frusto-conical sleeve 18 having a cap portion 19 adapted to the top of the post and traversed by the stem 12, while formed on this cap portion is a gear wheel 20 meshing with a pinion 15. The wider or lower edge of the shell 18 extends to the base 8 and the shell covers the slot 11 in the post 5. The shell 18 is formed or has attached thereto coincident with the slot 11 a circular series of nipples 21 each communicating with the interior of the shell by a passageway 22, the nipples extending radially upward from the shell with respect to the axis of rotation of the shell on the post 5, such rotation being brought about by power applied to the shaft 14 and the gear connections 15 and 20.

Applied to each nipple 21 is a gland 23

receiving the flanged end 24 of a short hollow shaft 25, there being interposed between the flanged end 24 of the shaft 25 and the outer end of the corresponding nipple a packing washer 26 which may be held
 5 by the gland in a manner substantially air tight, but at the same time not interfering with the turning of the shaft 25 in a manner to be described. The shaft 25 has thereon
 10 between the ends a gear wheel 27, while at the outer end of each shaft there is applied a flexible tube 28 of suitable material, say, flexible metal or rubber hose, and received by the outer end of each flexible member 28
 15 is one end of a tubular arm 29 terminating in a head 30 composed of oppositely directed hollow arms each ending in an extended portion 31 open on the side or face remote from the head 30 where connecting to the
 20 arm 29 and the extensions 31, which are arranged in parallelism in the general direction of the length of the arm 29, have their open faces in substantially one plane and the whole head is in communication with the
 25 chamber 6 through the arm 29, flexible connection 28, hollow shaft 25 and respective nipple 21 except when the passages 22 are blanked or closed by the gate portion of the post 5 between the ends of the slot 11.
 30 Mounted on the plate 1 concentric with the post 5 and exterior to the lugs 9, is a ring 32 having lugs 33 by means of which it may be fastened to the plate, and at an appropriate portion of the ring 32 it is provided with a series of gear teeth 34
 35 arranged to be engaged by the gear wheels or pinions 27 for a purpose which will hereinafter appear.

Concentric with and outside of the ring 32 is another ring 35 having its upper edge formed with a cam elevation 36 and cam depressions 37 for a purpose which will hereinafter appear. The ring 35 is so arranged
 40 as to support the arms 29 and cause them to rise and fall as the shell 18 is rotated, and these arms are brought into active relation to the cam elevation 36 or depressions 37, the rise and fall of the arms being permitted by the flexible connections 28. The
 45 weight of the arms is not wholly depended upon to cause their fall, but each arm has fast thereto one end of a flexible strand 38, the other end of which carries a weight 39 and the strands are so located that they may
 50 travel outside but close to the outer margin of the plate 1.

The tank 4 contains a screen 40 at an intermediate point of its depth, and between the screen and the bottom of the tank is an
 55 agitating member 41 movable to and fro in the tank as by a rocker 41^a to prevent liquid glazing material within the tank from settling, while the screen 40 prevents the agitating member 41 from so affecting the surface of the liquid coating material as to dis-

turb such surface by causing ripples or eddies or the like. The showing of the agitator 41 is only indicative for any other suitable agitating means adapted to the purpose
 60 may be used. The liquid material is fed into the tank through an inlet pipe 42 and an overflow 43 serves to maintain the level of liquid in the tank sensibly constant. Within the tank above the screen 40 and below the
 65 determined liquid level are rollers 44, which, because the tank is segmental, may be arranged radial to the axis of generation of the tank.

In the drawings the tiles are designated 45 and these tiles are fed to the table 3 by
 70 means of a conveyer 46 having slats 47 engaging the tiles to move them along a support 48, so that the tiles may be placed upon the support 48 and are caused to move along the same and ultimately to and upon the
 75 table 3. To definitely locate the tiles upon the table 3 approaching guide arms 49 engage the tiles just before they are delivered upon the table 3, wherefore the point of delivery is predetermined.

Above and below the support 48 are brushes 50, 51 connected together by gear wheels 52 so as to rotate in opposite directions, one above and the other below a tile
 80 propelled along the support 48, the brush 51 being in part lodged in an opening 53 in the support 48.

The conveyer 46 may be driven by a main drive shaft 54 receiving power by way of a belt pulley 55 mounted on the shaft or in
 85 any other suitable manner, while another pulley 56 on the shaft 54 is utilized to drive a belt 57 extending to a pulley 58 on a prolongation of the shaft of the brush 50 and another pulley 59 on the same shaft is utilized
 90 to drive a belt 60 extending to the pulley 17, it being understood that the several parts are properly proportioned to suitably time the operation to be described. There is also provided another conveyer 61
 95 properly related to the path of the arms 29 to perform a function to be described. This conveyer travels over a support 62 while the conveyer 61 is provided with slats 63 similar to the slats or flights 47. The conveyer 61
 100 delivers upon another conveyer 64 provided with slats or flights 65 and traveling over a support 66 similar to the other conveyers. In fact, the particular construction of the conveyers is not material to the present invention and other types of conveyers may
 105 be employed, those shown being suitable for the purpose and are to be taken as indicative of any suitable type of conveyer. The frame of the conveyer 61 carries approaching guide arms 67 designed to locate tiles placed upon the conveyer, and the frame of the conveyer 64 carries at an appropriate
 110 point guide arms 68 similar to the guide arms 67 and 49.

Carried by the frame of the conveyer 61 are journal bearings 69 for a shaft 70 over-riding the conveyer, and this shaft at appropriate points has disks 71 mounted thereon and each disk has upon the face toward the other a series of teeth or projections 72. The two disks are spaced apart sufficiently to permit the tile to pass between them and are elastically held so as to yield somewhat to the passage of the tile. To permit the yielding each disk 71 is mounted on the shaft 70 to slide a short distance lengthwise thereof while the springs 73 on the shaft tend to force the disks one toward the other, but these springs are only sufficiently strong to keep the disks in contact with the opposite edges of a tile passing between them without such pressure as would be harmful to the tile. The conveyer 65 adjacent to the discharge end of the guide arms 68 has a shaft 74 mounted in journal bearings 75 carried by the frame of the conveyer, and on this shaft are disks 76 similar to the disks 71 and provided with teeth 77 similar to the teeth 72. The disks 76 are urged one toward the other by springs 78 like the springs 73 already described.

The conveyer 61 is driven by a belt 79 coming from a pulley 80 on the shaft 54 and engaging a pulley 81 on a shaft 82 arranged to directly drive the conveyer 61. The shaft 82 carries a pulley 83 which by way of a belt 84 engaging a pulley 85 on the shaft 70 serves to drive the latter.

The conveyer 66 is driven by power applied to a pulley 86 mounted on a shaft 87 arranged to actuate the conveyer 64 and another shaft 88 driven by the conveyer 64 carries a pulley 89 driving a belt 90 carried about a pulley 91 mounted on the shaft 74.

The various driving arrangements are more or less indicative of any suitable driving arrangements for the moving parts and other forms of driving arrangements may be employed as desired.

Uncoated tiles are placed upon the support 48 and are successively carried between the brushes 50 and 51 and are thereby cleansed and are afterward deposited successively upon the table 3. At the same time the series of arms 29 rotate about the axis of the sleeve 18 at a suitable speed so that an arm 29 is brought into position above each tile as deposited upon the table 3. At this point a depression 37 in the cam ring 35 is reached by an arm 29 and the head 30 is lowered by the action of the respective weight 39 until it encounters the tile 45 just previously deposited upon the table 3. Just before this position of the arm 29 is reached it is placed in communication with the interior of the post 5 where subatmospheric pressure exists by the opening 22 coming into the range of the slot 11. Subatmospheric pressure is thereby thus established

in the head 30 and the extensions 31 of the head 30 being brought into engagement with the tile, the suction immediately attaches the tile to the arms of the head 30 so that the tile is compelled to travel with and is supported by said extensions of the head 30 of the respective arm 29. The continued movement of the arm 29 causes it to leave the depression 37 under consideration and travel along a higher part of the ring 35, thus lifting the tile from the table 3. As the arm 29 under consideration is moved along the cam ring 35 it ultimately reaches a depression 37 which occurs adjacent to the tank 4 and in line with a roller 44, so that the tile is lowered into the liquid within the tank 4 and the depth of dipping into the tank is determined by the engagement of the tile with the roller 44. The further progressive movement of the arm causes it to travel out of the depression 37 thus lifting the tile from the liquid and later the arm is brought to a second depression 37 still within the range of the tank 4 and the tile is again dipped into the liquid in the tank and the depth of dipping is determined by a second roller 44. The number of dippings and the number of depth-limiting rollers may be as many as desired and the number of rollers and dippings is not of necessity limited to two. After the tank has been passed the arm 29 under consideration then approaches the conveyer 61, but just before reaching the conveyer the gear wheel or pinion 27 of the arm engages the rack teeth 34 and the number of these teeth is sufficient to cause a rotation of the arm with the tile to an extent to invert the tile, the cord or strand 38 being correspondingly wound upon the arm and the weight 39 correspondingly lifted. The arrangement is such that by the time the tile is nearly inverted, whereby the coated face is uppermost, the opening 22 through the shell 18 belonging to the arm 29 under consideration is brought to the gate portion of the stem 5, and a passage 23^a in the gland 23, and open to the atmosphere, is reached by a passage 24^a in the flange 24, so that normal atmospheric conditions are restored and the tile is no longer held to the head 30 and readily gravitates on to the conveyer 61. The parts are timed in operation to cause the escape of the tile from the arm, so as to move into the path of a bar or flight 63 of the conveyer, the tile resting upon the support 62. The coated tile thus deposited upon the support 62 is moved until the arms 67 direct it between the disks or heads 71 and these being continuously rotated serve to remove any of the coating of the tile along the edges represented toward said heads or disks, the heads or disks thus becoming fettling heads or disks. The coated tile thus cleansed along two opposite edges is ultimately moved to the end of the conveyer 61,

and this end discharges on to the support 66 in the path of the flights of the conveyer 64, whereupon the tiles are moved to and between the arms 68 to be properly centered with relation to the fettling disks 76 to be cleansed thereby and ultimately discharged from the machine.

The operation of the machine as a whole is of course continuous, the uncoated tiles being fed to the machine at an appropriate point and the operations of dipping and fettling following, while the dipping simulates very closely the desirable hand dipping.

Most tiles are rectangular, but in case of tiles of other shapes the apparatus is readily changed to correspond.

The device has been described as a tile dipping machine, but it will be understood that the structure is not of necessity limited to such specific use, for it is adapted to other structures than tiles and hence throughout this case the word tile is to be understood as indicating any object other than a tile to which the machine is adapted.

What is claimed is:—

1. In a machine for the purpose described, pneumatic means for supporting a tile, said pneumatic means including a suction head and air exhaust means communicating therewith, a liquid container, and means for moving the pneumatic means in a direction to dip the tiles carried thereby into liquid in the container.

2. In a machine for the purpose described, pneumatic means constructed to engage and transport tiles, said pneumatic means including a suction head and air exhaust means communicating therewith, a dipping tank in the path of tiles carried by the pneumatic means, means for moving the pneumatic carrying means in a direction to dip the tiles face downwardly in liquid in the dipping tank, and means associated with the pneumatic means for releasing the dipped tiles with the dipped face uppermost.

3. In a machine for the purpose described, a rotatable series of hollow arms mounted for individual up and down movement, each arm terminating at one end in a suction head and at the other end communicating in common with the other arms with an air suction means, means for raising and lowering the arms, a receptacle for fluid into which the tiles are to be dipped arranged in the path of tiles carried by the heads of the arms, and means for inverting the tiles after dipping and then causing their release from the suction heads.

4. In a machine for the purpose described, a rotatable series of hollow arms each terminating in a suction head and each arm being arranged for communication with air suction means during a portion of the rotative movement, a support for tiles in the

path of the arms, a dipping tank in the path of the arms, means for causing movement of the arms toward and from the tile support and toward and from the dipping tank, and means associated with the arms for causing each arm to move in a direction to invert the dipped tile carried thereby and to then release the tile from the arm.

5. In a machine for the purpose described, a supporting member, a hollow post mounted thereon and provided with an extended passage defining a gate between the ends of the passage, a sleeve mounted to rotate on the post, a series of flexibly mounted hollow arms carried by the sleeve and opening to the interior thereof, each arm terminating at the end remote from the sleeve in a suction head, a weight carried by each arm with connections thereto capable of being wound on the arm, a support for the series of arms arranged in the path thereof to cause up and down movements of the arms, and means for causing a partial rotation of each arm at a predetermined point in the travel thereof.

6. In a machine for the purpose described, a supporting member, a hollow post mounted thereon and provided with an extended passage defining a gate between the ends of the passage, a sleeve mounted to rotate on the post, a series of flexibly mounted hollow arms carried by the sleeve and opening to the interior thereof, each arm terminating at the end remote from the sleeve in a suction head, a weight carried by each arm with connections thereto capable of being wound on the arm, a support for the series of arms arranged in the path thereof to cause up and down movements of the arms, and means for causing a partial rotation of each arm at a predetermined point in the travel thereof, said last named means including a gear pinion on each arm and gear teeth in the path of the pinion at predetermined points in the travel of the arm.

7. In a machine for the purpose described, a supporting member, a hollow post mounted thereon and provided with an extended passage defining a gate between the ends of the passage, a sleeve mounted to rotate on the post, a series of flexibly mounted hollow arms carried by the sleeve and opening to the interior thereof, each arm terminating at the end remote from the sleeve in a suction head, a weight carried by each arm with connections thereto capable of being wound on the arm, a support for the series of arms arranged in the path thereof to cause up and down movements of the arms, and means for causing a partial rotation of each arm at a predetermined point in the travel thereof, said last named means including a gear pinion on each arm and gear teeth in the path of the pinion at predetermined

points in the travel of the arm, and the post and sleeve being provided with inter-connecting driving means for the sleeve.

8. In a machine for the purpose described, a rotatable series of flexibly mounted arms each terminating in a suction head, and a dipping tank in the path of the arms, said dipping tank being provided at predetermined points with rollers located below the normal level of liquid in the tank and in the path of tiles carried by the suction heads.

9. In a machine for the purpose described, a rotatable series of suction arms each terminating in the suction head, a support for tiles in the path of the suction heads, a dipping tank in the path of tiles carried by the suction head, means for rotating each arm after leaving the dipping tank to invert the tile carried by the suction head thereof, and means for cutting off the suction from the arm on the inversion of the tile carried thereby.

10. In a machine for the purpose described, a rotatable series of suction arms each terminating in the suction head, a support for tiles in the path of the suction heads, a dipping tank in the path of tiles carried by the suction head, means for rotating each arm after leaving the dipping tank to invert the tile carried by the suction head thereof, and means for cutting off the suction from the arm on the inversion of the tile carried thereby, said arm being provided with means operative in opposition to the means for rotating the arm to invert the tile, for returning the arm to its first position.

11. In a machine for the purpose described, a tile receiving member, means for feeding tiles successively thereto, means associated with the feeding means for cleaning the tiles before reaching the tile receiving means, pneumatic means for engaging the tiles when deposited on the tile receptacle, a dipping tank associated with the pneumatic tile engaging means, means for imparting rotative movement to the pneumatic tile engaging means for transporting the tiles over and dipping them into the dipping tank, means for receiving the tiles from the pneumatic means after dipping, and transporting them away from the point of reception, and fettling means associated with the last-named transporting

means for removing the coating received in dipping from the edges of the tile, all the parts being associated to operate automatically and in succession on the tile to mechanically produce a coating thereupon.

12. In a machine for the purpose described, means for dipping tiles into a coating liquid, and means for removing coating from the edges of the coated tile comprising rotatable fettling heads associated to engage the tiles on opposite edges.

13. In a machine for the purpose described, means for dipping tiles into a coating liquid, and means for removing coating from the edges of the coated tile comprising rotatable fettling heads associated to engage the tiles on opposite edges, said fettling means having guide arms associated therewith for directing tiles approaching the fettling means into operative relation thereto.

14. In a machine for the purpose described, means for dipping tiles into a coating liquid, and means for removing coating from the edges of the coated tile comprising rotatable fettling heads associated to engage the tiles on opposite edges, said fettling means having guide arms associated therewith for directing tiles approaching the fettling means into operative relation thereto, and said fettling means being yieldable to the passage of a tile between them.

15. In a machine for the purpose described, means for depositing tiles successively in a predetermined position, means for taking up the tiles one by one and carrying them away from the point of deposition, a dipping tank in the path of the tile carrying means, means associated with the tile carrying means for causing each tile to be lowered into the dipping tank and removed therefrom, means associated with the tile dipping means for depositing each tile with the dipped face upwardly after dipping, and means for removing the coating from the edges of the tiles, all the parts being associated and driven to automatically act upon each tile in the order named to mechanically produce a coating thereupon.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK C. ELLISON.

Witnesses:

H. W. HANSON,
Edw. COLLINS.