(No Model.) 3 Sheets—Sheet 1.

I. BROOME.

APPARATUS FOR ORNAMENTING ARCHITECTURAL TILES.

No. 493,244. Patented Mar. 14, 1893.

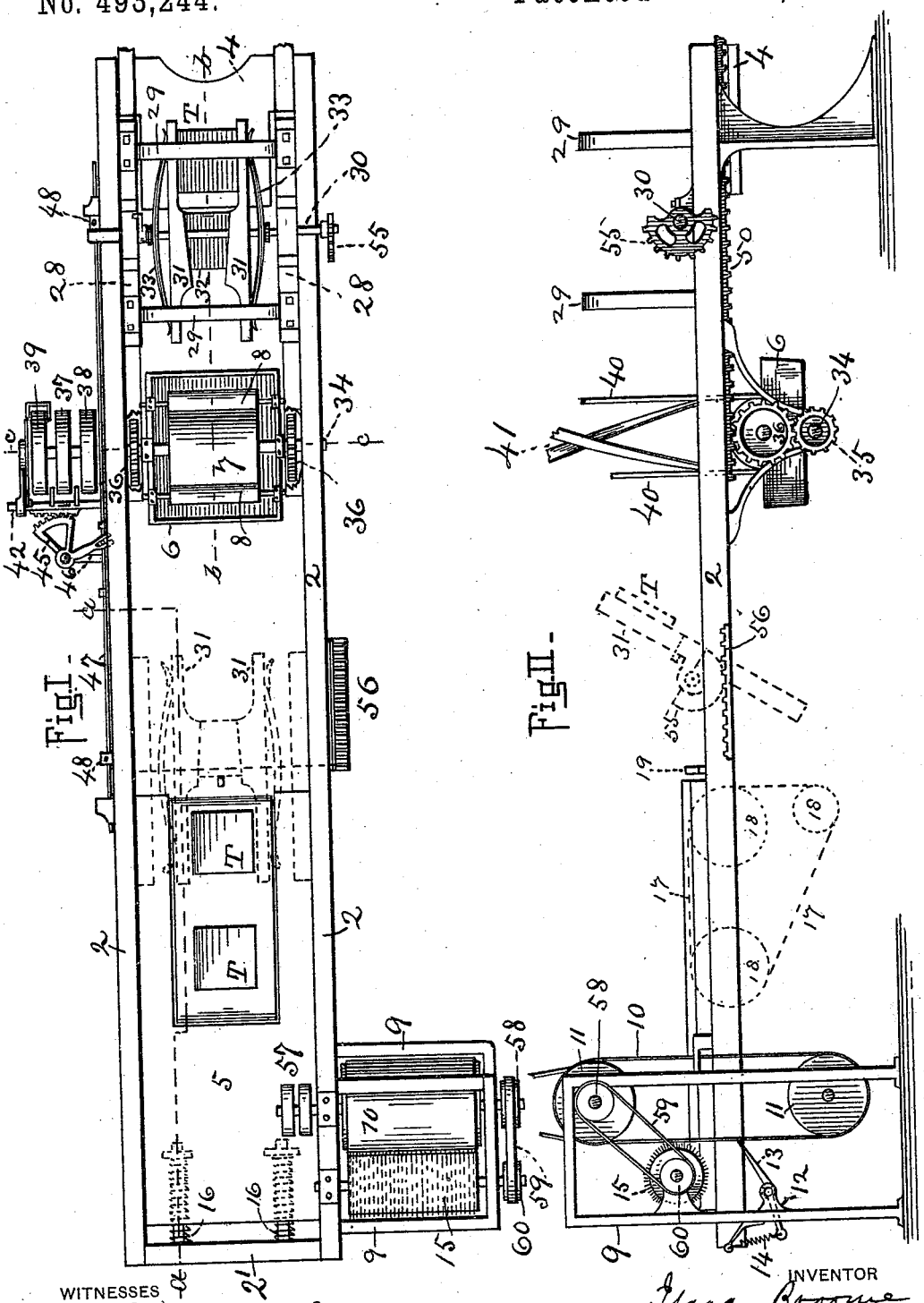

Fig. I.

Fig. II.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. III.

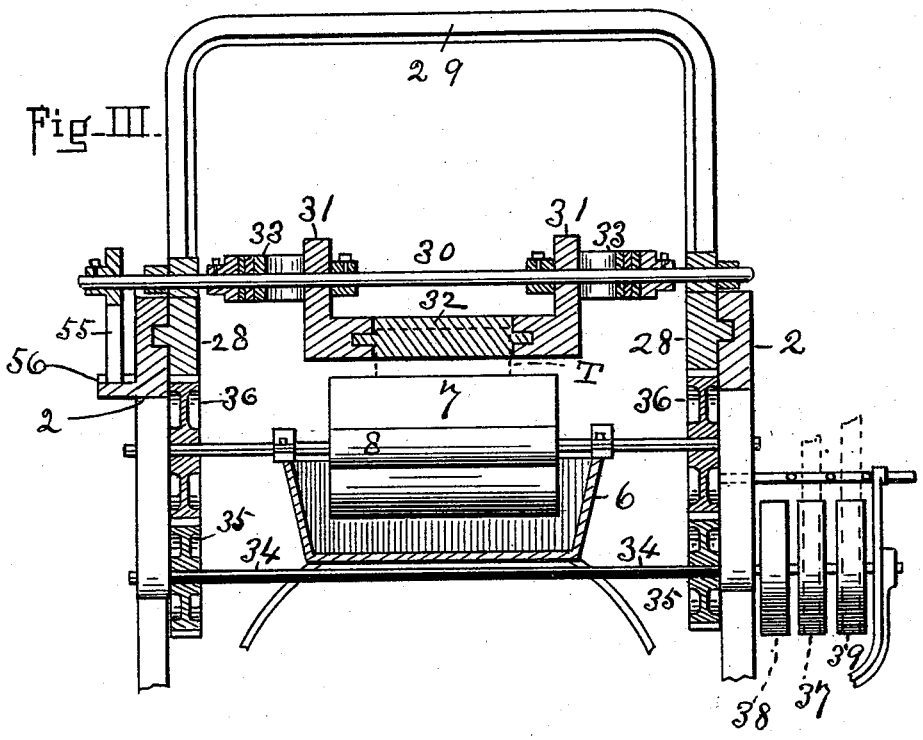

Fig. IV.

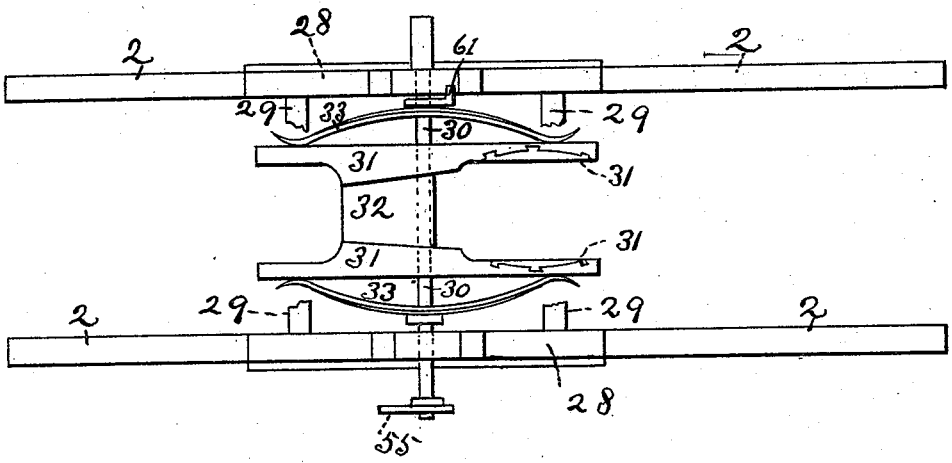

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Fig. V.

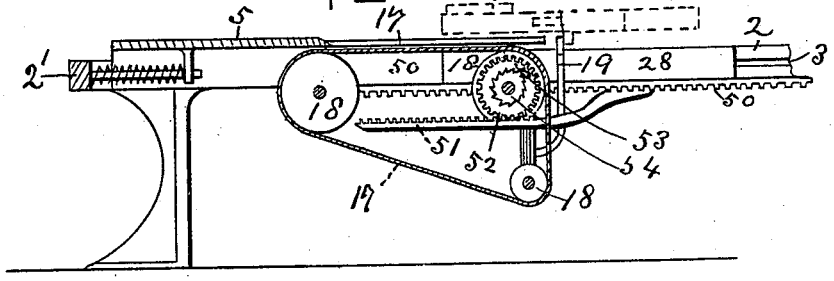
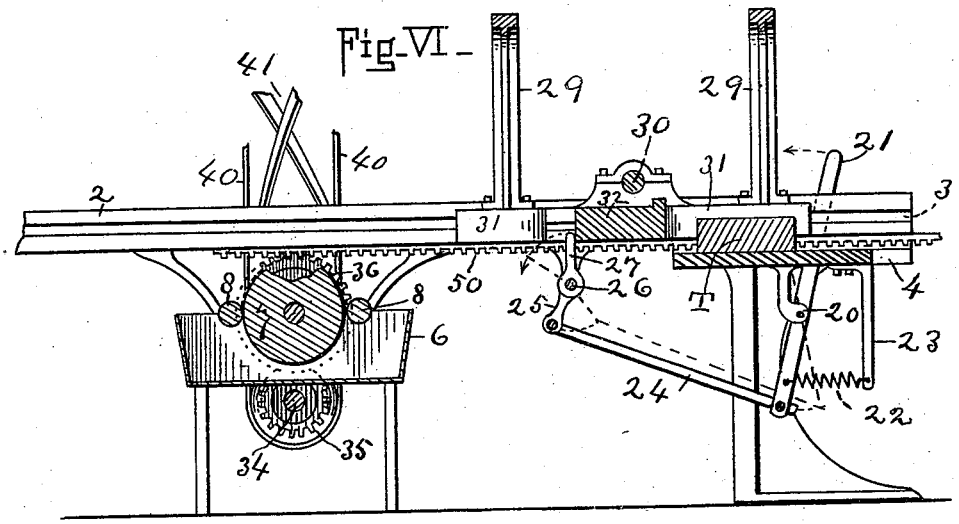


Fig. VI.



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UNITED STATES PATENT OFFICE.

ISAAC BROOME, OF NEW BRIGHTON, PENNSYLVANIA.

APPARATUS FOR ORNAMENTING ARCHITECTURAL TILES.

SPECIFICATION forming part of Letters Patent No. 493,244, dated March 14, 1893.

Application filed April 4, 1892. Serial No. 427,747. (No model.)

To all whom it may concern:

Be it known that I, ISAAC BROOME, a citizen of the United States, residing at New Brighton, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Decorative Painting; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a new apparatus for ornamenting architectural tiles and other cognate articles of ceramic or metal.

The object is to improve the mechanism by adapting it to an automatic performance of the substantial details of decoration.

The invention consists first in the co-operation of a tank for containing decorating liquid, provided with mechanically operated appliances for applying the liquid to articles to be decorated, with a carriage adapted to bring the articles to the tank for decoration.

It consists, secondly, of a carriage devised to successively take up, transport and deliver an architectural tile, respectively before, during, and after the process of decoration.

It consists, thirdly, in the device of a grip to mechanically seize, hold and release an architectural tile subjected to the herein described process of decoration.

It consists, fourthly, in a specially devised mechanical trip to enable the grip hereinbefore mentioned to seize and hold a tile intended for decoration.

It consists, fifthly, in the devising and arrangement of mechanism for reversing the position of a tile after its under surface has been liquidly decorated, and prior to its release from the grip containing it and its subjection to the finishing operation.

It consists, sixthly, in the mechanism provided for automatically reversing, without sensibly arresting the motion of the tile-transporting carriage between the ends of the bed or platform provided for the support of the machinery.

It consists, seventhly, of the mechanism devised for cleansing the tile edges of the overflow liquid, after the proper face of the tile has been decorated.

The following is a general description of the drawings, in which the several and various parts are indicated by numerals and letters; the same number and letter designating the same part throughout the series of views:

Figure I is a top plan of the entire machine; the front end of the machine being at the right hand side of the view, and the carriage, represented in true position and arrangement at the tile-feeding end of the machine bed, being reproduced in dotted lines, and in true arrangement, at the place where the tile is to be delivered after decoration. Fig. II is an elevation of the left hand or delivery side of the machine, showing, among other things, the decorated tile in process of being brought with its wet face upward, for deposit upon a traveling belt for conveyance to the finishing mechanism. Fig. III is an enlarged, vertical cross section through the line *c c* of the first view, the tile, in dotted lines, being in contact with the surface of the decorating roller within the tank. Fig. IV is a top plan of the carriage; the jaws of the grip being spread in readiness to receive a tile. Fig. V is a longitudinal, vertical section on the line *a a* of the first view, showing particularly the means for operating the traveling belt that receives the decorated tile and conveys it to the finishing machinery. Fig. VI is a longitudinal, vertical section on the line *b b* of the first view, showing especially the trip mechanism for releasing the jaws of the grip to enable it to grasp a tile at the feed, otherwise the front end of the machine bed.

The following is a detailed description of the parts shown and indicated in the drawings:

A bed, 2, has top rims at its sides, and a straight groove, 3, is in the inner face of each rim. A feed table, 4, is fitted between and below the grooves at the front end of the bed. A delivery table, 5, is fitted into the grooves at the other end. A tank, 6, is sunk in the bed toward the front end. Journaled in the tank is a large roller, 7, and smaller rollers, 8, the faces of which are in contact with the face of the principal roller. The roller 7 rises above the rim of the tank and also above the horizontal planes of all the rollers 8, leaving the upper segment or segmental line of the roller 7 clear of the tank and smaller rollers.

Projected from one of the sides of the bed,

at the rear end, is a framework, 9, carrying a vertical belt, 10, which travels upon rollers 11, supported in the frame. A bracket, 12, projected from the bed, pivotally supports a scraper, 13, the edge of which is in contact with the belt 10, and a spring, 14, keeps the edge of the scraper in tension against the belt. Journaled behind the belt 10 is a brush wheel, 15, which is also in contact with said vertical belt above the scraper. The mechanism described in this paragraph, consisting of the parts 9 to 15, both inclusively, I reserve as subject matter for a separate application for a patent; but I illustrate and describe it here as helping to show how my decorating process is mechanically executed or aided to the finish, and to make the mechanisms herein claimed more readily if not better understood.

At the rear end of the bed are tension springs, 16, connected to the delivery table, and over said table, and in connection therewith, is a horizontal traveling belt, 17, moving upon rollers, 18, two or more in number. In front of this traveling belt is a stop, 19, fixed to the bed.

Near the front end of the bed is a vertical lever, 21, fulcrumed between its ends to a bracket, 20, projected from the bed; said lever being connected, near its lower end, with a tension spring, 22, which is supported by a bracket, 23, depending from the bed. A horizontal rod, 24, is pivoted at one end to the lever 21, and to the other end of this rod is pivoted a short arm, 25, which arm, at its other end, is rigidly attached to a shaft, 26, journaled in the bed at a right angle with the vertical lever and horizontal rod. A trip, 27, is keyed upon the shaft, forming an obtuse angle with the short arm aforesaid.

Sliding in the grooves of the bed is a carriage, consisting of two side pieces, 28, connected and held in mutual relation by elevated girders, 29, preferably two in number. Journaled in and through the side pieces is a shaft, 30, upon which is a pair of grippers, 31, each having lateral movement, but splined upon the shaft, so as to be incapable of tilting upon the shaft. The inner faces of these grippers are obliqued in outline, substantially as shown, and a flat, broad wedge, 32 is carried between the grips. Upon the shaft, keyed each between an inner face of the carriage and an outer face of the grips, are bowed springs, 33, bent inward.

Journaled in and through the bed, beneath the tank, is a shaft, 34, to which is keyed a toothed wheel, 35, meshed with a similar wheel, 36, on the shaft of the large roller within the tank, and I may prefer to duplicate these two wheels, as indicated in the drawings. The shaft 34 carries, outside the vertical planes of the machine bed, three band wheels, whereof the middle wheel, 37, turns loosely and the inner and outer wheels, 38 and 39, respectively, are rigid upon the shaft. Connected with this set of band wheels are the straight band, 40, and the cross band, 41; and these bands are to be understood as passed around a power-operated drum or cylinder, suitably located and supported beyond and apart from the mechanism herein described. A bar, 42, above and behind the band wheels, has end play within a suitable socket provided in the side of the bed and is passed through a guide, 43, supported from the end of the proximate shaft or from the bed. The bar has three teeth, 44, projected above and toward the band wheels; the outer tooth being prolonged and bent into a guard. On the rear edge of the bar is a ratchet meshed with the teeth of an armed sector, 45, fulcrumed upon a support, 46, projected from the bed and this sector is pivoted by its arm to a stud or wrist upon a bar, 47, which is supported from and along the side of the bed, and has an end play within its supports, determined by the dogs, 48, fixed upon said bar. At the middle of the bar 42 is a weighted lever, 49, fulcrumed at its lower end upon a stud or wrist provided in the machine bed, below the horizontal plane of the bar, to which bar the lever is pivoted, as shown. This belt-shifting mechanism, embracing the parts 37 to 49, both inclusively, I reserve as the subject matter of a separate application for patent, but I show and describe it here as illustrating one effective method of reversing the direction of the tile carriage as it travels to and fro along the machine bed.

Upon the under part of one of the sides of the carriage is a rack, 50, which gears with the proximate wheel 36, on the shaft of the glazing roller of the tank, and projected sidewise and rearward from this rack is a supplementary rack, 51, the teeth of which are in the reverse position of those of the principal rack, and gear with a toothed wheel, 52, fitted loosely upon the shaft of the upper forward roller of the traveling belt 17, at the delivery table. Upon this toothed wheel is a gravity pawl, 53, which engages with a ratchet, 54, keyed to the said shaft.

At one end of the shaft of the carriage, and outside the vertical planes of the machine bed, is a sector gear, 55, which meshes with a rack, 56, projected from the proximate side of the bed.

At one end of the shaft of the upper roller of the vertical traveling belt 10 is a pair of band wheels, 57, either one of which turns loosely upon, while the other is keyed to the shaft. To these wheels a band is to be brought from the exterior power operated drum, or cylinder, already mentioned as in connection with the band wheels 37 and sequents. When the vertical traveling belt is not to be operated, the band may be carried on the loose wheel and thence suitably shifted to the keyed wheel as needed.

On the same shaft that carries the band wheels 57, but at the other end, is a fixed pulley, 58, upon which is a belt, 59, which also passes around a fixed pulley, 60 on the shaft

of the brush wheel behind the vertical traveling belt.

The operation is as follows: Liquid glaze or color is manually placed in the tank, to such a height as will enable the roller 7 to take it up sufficiently. Undecorated tiles, T, commonly called biscuits are manually supplied, decorative face downward, to the feed table as fast as needed. By means of one of the power actuated belts 40 and 41, the shaft 34 is rotated in the direction of the feed table. This by means of the wheel 35 and rack 50, moves the carriage 28 along the machine bed, and in the grooves thereof, to the feed table. As the carriage reaches that table, the lever 21 is struck by the side piece 28 of the carriage, which is on the same side of the bed as that lever whereby the rod 24 is pushed upward, causing the shaft 26 to partially rotate and bringing the trip 27 forcibly against the rear of the wedge 32, which, being thus pushed forward, releases the grippers 31 and enables them to grasp the sides of the tile fed to them. At the same time, the bar 47, having been carried along with the carriage by the pressure of the projected carriage shaft against the nearest fixed dog on the bar, the sector 45 has been so turned upon its fulcrum that it has pulled out the bar 42 so far that the inner tooth has shifted the inner belt from the active band wheel 38, to the idle band wheel 37, and the middle tooth, the outer belt from the idle wheel to the active band wheel 39, thus reversing the motion of the shaft 34, whichever of the two belts is crossed. This shift of belts is both speeded and steadied by the fall from its perpendicular line of the weighted lever 49, attached to the long shifting bar. As the carriage recedes from the feed table, the spring 22, through the connecting parts, pulls down the trip 27, out of the way of the carriage and tile. The carriage now passes the gripped tile over and in contact with the roller 7 in the tank, which roller is turning in the same direction that the carriage is moving, being actuated by means of its gear 36, meshing with the wheel 35 on what may be regarded as the motor shaft of the machine. The roller paints the contact face of the tile, the friction rollers 8 evenly spreading the liquid upon the decorating roller. As the carriage continues to move toward the delivery table, the sector gear 55 engages with the rack 56, whereby the shaft 30, carrying the grips, makes a half turn, bringing the tile in front and with its decorated surface above, instead of underneath. The stop 61, keyed to the gripper shaft, prevents that shaft from making more than the desired half turn. The wedge is then struck by the fixed stop 19, spreading the grips, and causing the tile to fall upon the traveling belt 17, over the delivery table. At the same time the long shift bar has so turned the sector 45 that the short bar 42 has been pushed into its socket and the belts 40 and 41 restored to their former position on the band wheels, again reversing the motion of the carriage. While the carriage is approaching the delivery table, the supplementary or offset rack 51 is turning the ratchet wheel 52 idly on its shaft. But when the carriage is returning to the feed table the toe of the pawl 53 locks with the teeth of the fixed ratchet 54, causing the upper roller 18 of the traveling belt to rotate and moving the traveling belt 17 with its lading of decorated tiles in the direction of the rear end of the bed. The decorated tiles brought by the traveling belt 17 are manually taken therefrom and the edges successively pressed against the front of the vertical belt 10, which travels in a downward direction. This forces some of the decorating liquid into the pores of the tile edges, but chiefly removes the liquid from the edges altogether, and so makes them smooth and true. The surface of the belt is kept clean by the scraper 13 and the brush wheel 15, the operation of which is obvious. Whenever it is not desired to move the vertical belt, the power operated band that actuates it may be suitably shifted from that band wheel 57 which is rigid upon the upper roller 11, to the other band wheel, which is loosely sleeved upon that roller in order to be idle. The traveling belt 17 is tensioned by the springs 16, which pull upon the delivery table at its under side; the front part of the belt being attached to the rigid part of the machine bed.

For simple glazing, the roller 7 is faced with a coating of coarse woolen cloth; but for figuring the tile, the roller is coated with felting or rubber, bearing the pattern in relief or in intaglio. But any suitable flexible material may be substituted for the wool, rubber or felted facing. The roller may be hollow and suitably heated when desired.

The cleaning or "trimming" belt 10 may be of leather, rubber, felt, cloth or other flexible material.

The grippers may have their gripping faces made flexible, or may be fitted with adjustable bearings to accommodate them to the edges of tiles to be gripped.

I claim as follows:

1. The combination of a vertical lever, fulcrumed between its ends; a horizontal rod, pivoted at one of its ends to the lower end of the vertical lever; a short arm, pivoted by one of its ends to the opposite end of the horizontal rod; a shaft, journaled at right angles to the aforesaid lever and rod, and rigidly attached to said rod; a trip, rigidly attached to said shaft and forming an obtuse angle with the aforesaid arm; a tension spring, connected to the vertical lever near its lower end, and suitable supports for said lever, shaft and spring; all substantially in the manner described, whereby the aforesaid trip is quickly and forcibly thrown into a relatively vertical position, and projected above an arranged and constant horizontal plane, whenever the vertical lever is struck upon its inner side or face, and restored to its normal position, be-

low said horizontal plane, by the pull of the said spring upon the vertical lever, whenever the pressure upon said lever is withdrawn.

2. In the carriage of a tile decorating machine, the combination of the side pieces forming the base thereof, the elevated girders rigidly connecting said side pieces, the shaft journaled in and through the side pieces, the grippers splined upon said shaft and having obliqued inner faces, the adjustable wedge between said grippers, and the springs, keyed upon said shaft and having each a bearing upon the outer face of its proximate grip; all substantially as and for the purposes described.

3. The combination, in a tile decorating machine, of the tile carriage consisting of the side pieces, elevated girders, journaled shaft, grippers, adjustable wedge, and pressure springs, and having, also, a sector gear keyed upon one of the ends of the aforesaid shaft, with a rack, supported upon the bed of such a machine and meshing with said sector gear; all substantially in the manner described, for the purpose of imparting a half turn to the aforesaid shaft and grippers, whereby the tile conveyed by said carriage is shifted from the rear to the front of the carriage and its under face brought upward.

4. The combination, in a tile decorating machine, of the tile carriage consisting of the side pieces, elevated girders, journaled shaft, grippers, adjustable wedge and pressure springs and having also a rack upon the under face of one of the side pieces of the carriage, with a gear wheel, meshing with said rack and journaled in the bed of such a machine, and rotated by a suitable motor; all substantially in the manner described, for the purpose of moving said carriage along the bed of the machine.

5. In a machine for decorating tiles, wherein the tiles are fed to a gripping carriage, which conveys and holds them during the process of liquid decoration and then delivers them to a receiver, the combination of the flexibly faced decorating roller, journaled in the bed of the machine and having a gear upon its shaft; one or more spreading rollers, journaled in the bed of the machine and having their faces in contact with that of the decorating roller; the carriage, having the bottom-side pieces and the girders rigidly connecting said side pieces; the shaft, journaled in the side pieces of the carriage; the grippers, splined upon said shaft and having the inner faces obliqued; the adjustable wedge fitted between the inner faces of the grippers; the springs, attached to the carriage shaft and having each a bearing upon the outer face of the adjacent gripper; the sector gear keyed to said shaft; the rack, supported from the machine bed and meshing with said sector gear; the rack on one of the bottom pieces of the carriage; the gear wheel, journaled in the machine bed, on the shaft of the aforesaid decorating roller, and meshing with said rack; the shaft, journaled in the machine bed and having a ratchet wheel meshing with the gear on the shaft of the decorating roller; the lever-operated trip, journaled in the bed of the machine near the feed end thereof; the fixed stop, projected above the plane of the machine bed near the delivery end thereof, and means to rotate in either direction the shaft heretofore mentioned as in gear with the shaft of the decorating roller; the whole constructed and arranged substantially as described, for the purpose of automatically taking up, transporting and releasing architectural tiles, from, along, and upon the surface of a machine bed or platform, and ornamenting their proper faces with decorating liquid.

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

ISAAC BROOME.

Witnesses:
FRANK M. NAIR,
J. F. MERRIMAN.