Feb. 9, 1926. 1,572,188

M. E. CROWELL

BRICK OR BLOCK PAVING MACHINE

Filed Dec. 23, 1921 5 Sheets-Sheet 1

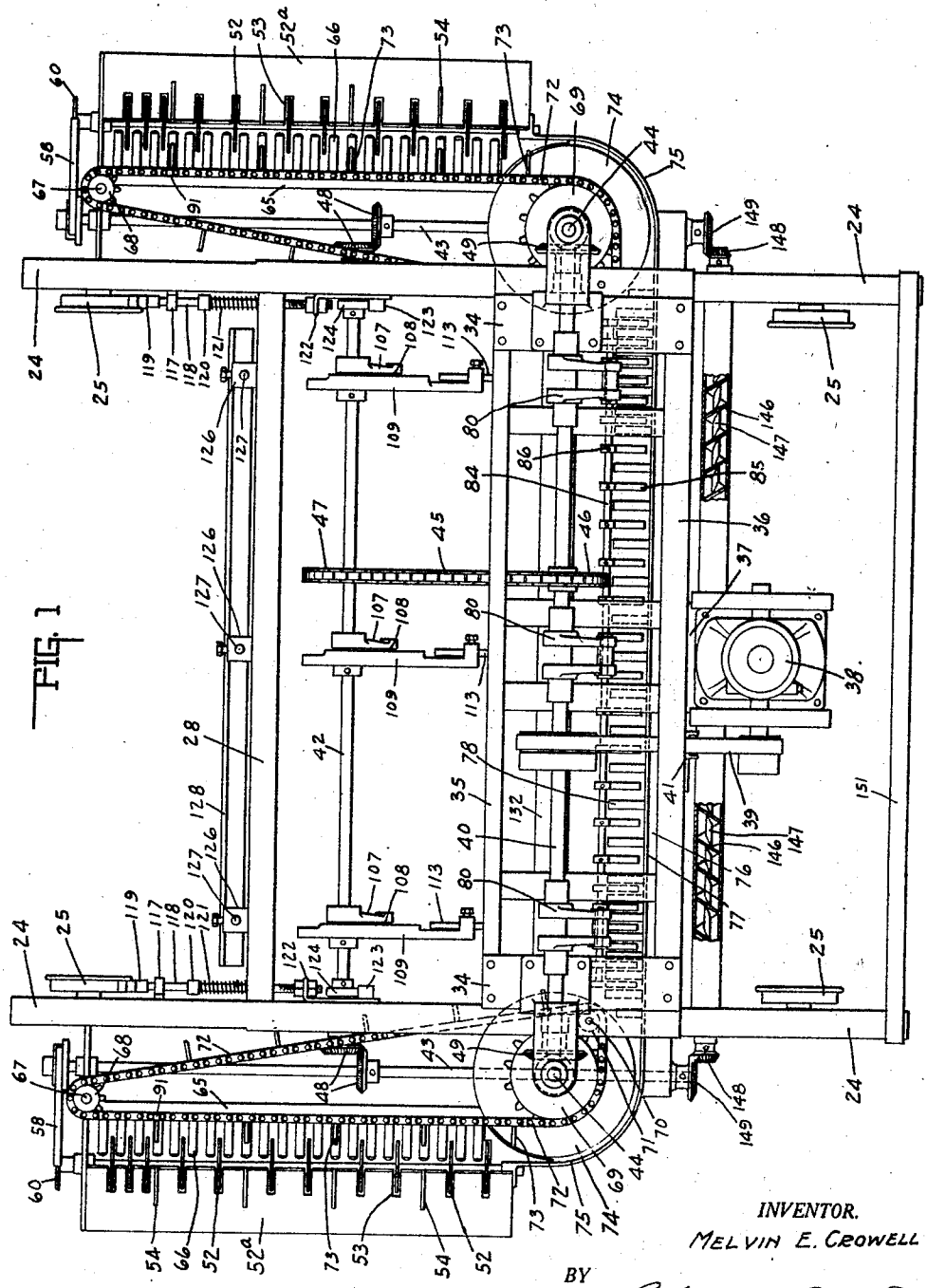


FIG. 1

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BRICK OR BLOCK PAVING MACHINE

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FIG. 2

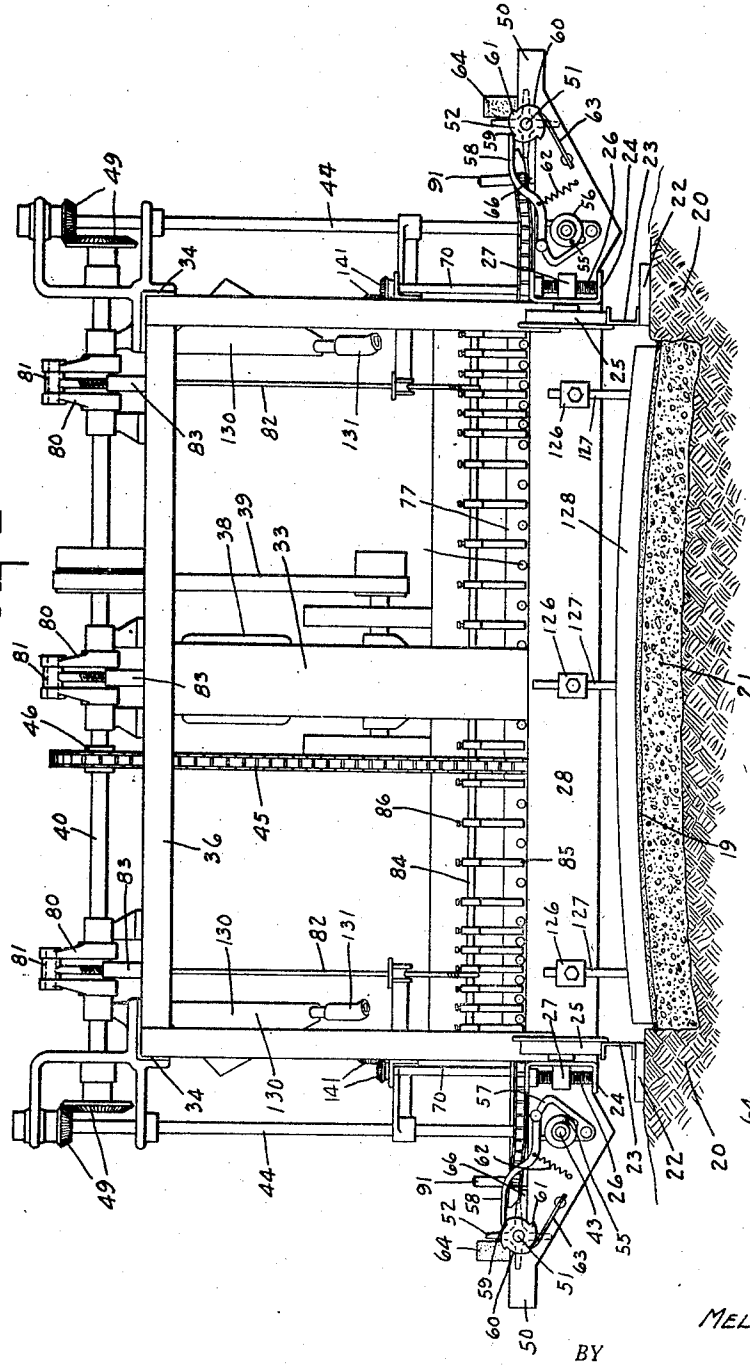


FIG. 11

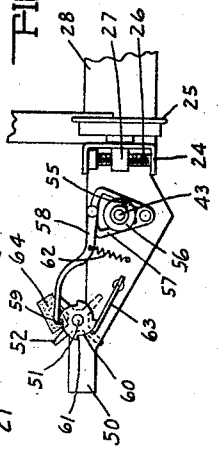
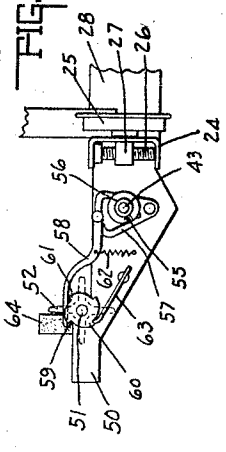


FIG. 10



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BRICK OR BLOCK PAVING MACHINE

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FIG. 12

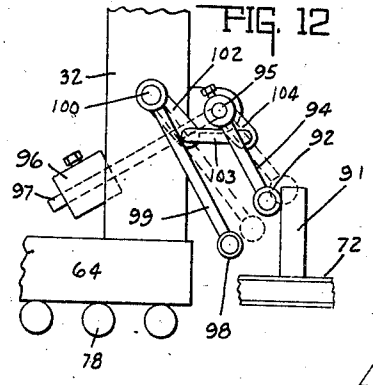


FIG. 3

FIG. 13

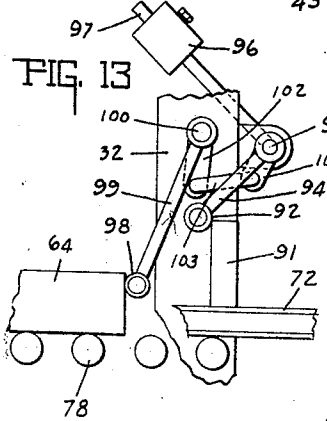


FIG. 4

FIG. 14

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BRICK OR BLOCK PAVING MACHINE

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FIG. 5

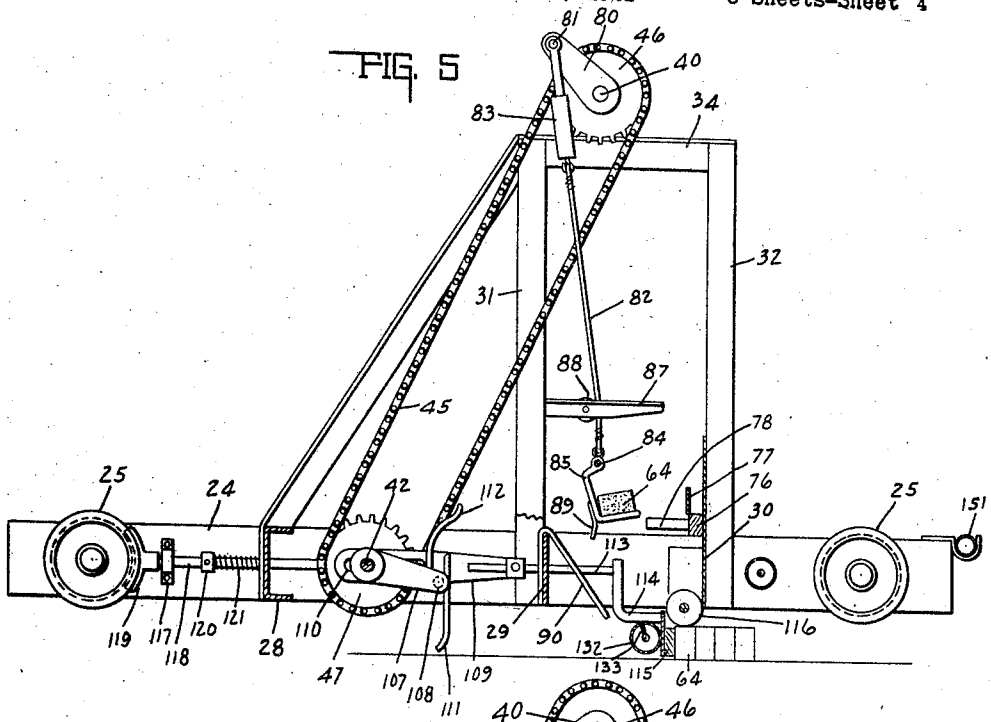
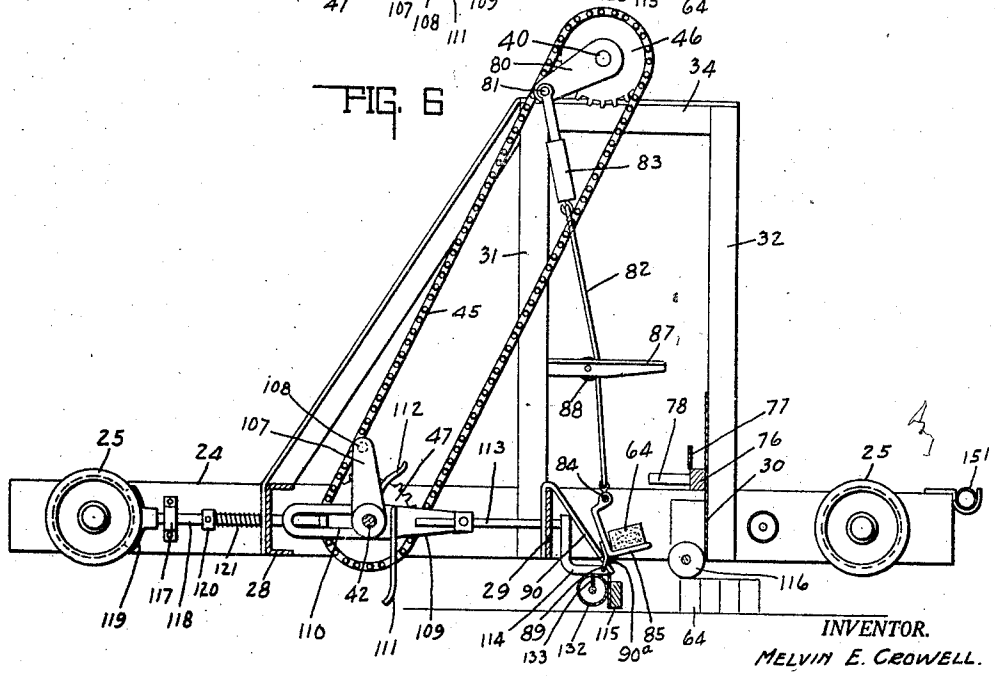


FIG. 6



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BRICK OR BLOCK PAVING MACHINE

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FIG. 7

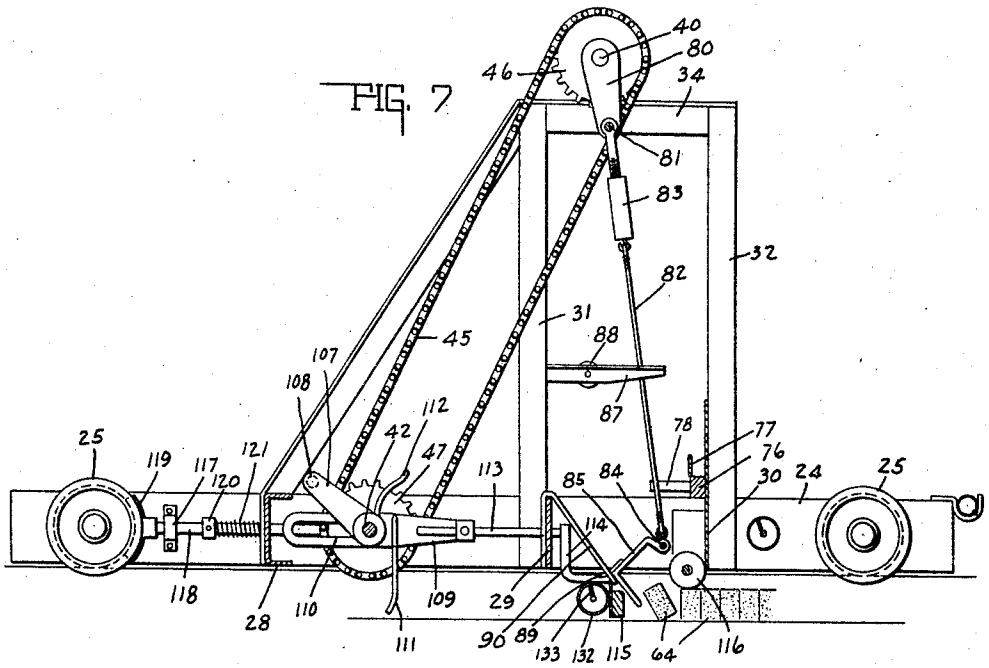


FIG. 8

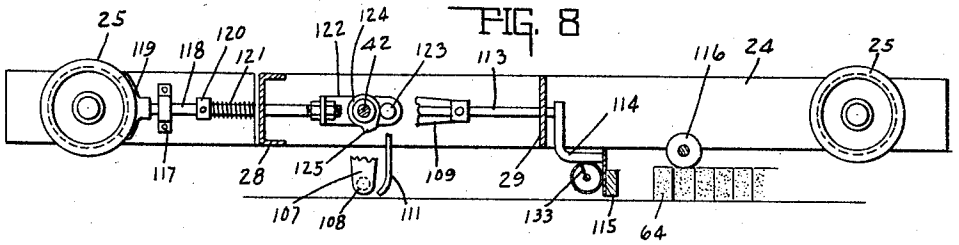
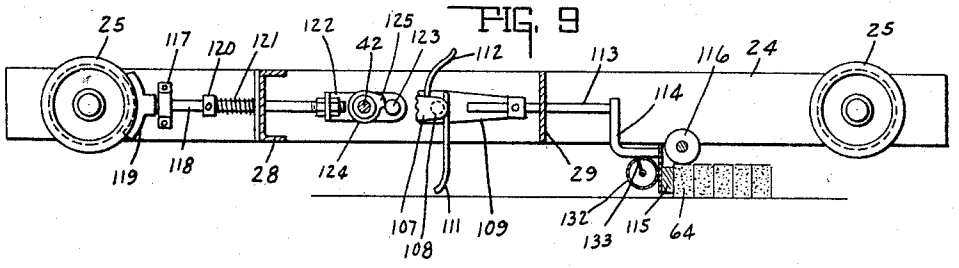


FIG. 9



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Patented Feb. 9, 1926. 1,572,188

UNITED STATES PATENT OFFICE.

MELVIN E. CROWELL, OF FRANKLIN, INDIANA.

BRICK OR BLOCK PAVING MACHINE.

Application filed December 23, 1921. Serial No. 524,437.

To all whom it may concern:

Be it known that I, MELVIN E. CROWELL, a citizen of the United States, and a resident of Franklin, county of Johnson, and State of Indiana, have invented a certain new and useful Brick or Block Paving Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention relates to a machine for handling and laying bricks, blocks or the like, and is primarily used in building street surfaces, roadways and the like by handling the brick or blocks and positioning the same upon a prepared road-bed to form a roadway.

The chief feature of the invention consists in the several mechanisms which are associated together to position the brick in pavement-forming relation with respect to other bricks and to secure the same in said position to form a pavement.

Another feature of the invention is the provision of means for presenting the brick to the aforesaid mechanisms in a predetermined position.

Still a further feature of the invention is the provision of other means which are adapted to prepare the road-bed for the reception of the bricks, etc.

Still a further feature of the invention is the provision of means for treating the exposed pavement surfaces after the bricks have formed the same.

Another prime feature of the invention is the association of the several mechanisms so that the machine will move along the roadway as the same is being built by said machine and the aforesaid movement is secured in conjunction with the tamping of the bricks into pavement-forming position.

Before proceeding to a detailed description of the drawings and the parts illustrated therein, the sequence of operation will be briefly outlined. The several bricks are presented or placed upon a receiving platform. Herein the manual placing of the brick upon the platform is contemplated, although a suitable magazine feed may be associated therewith. The bricks are removed from the platform by a tilting device which operates in timed relation with other mechanisms of the machine and presents the bricks which form a row or a portion of a row of bricks in the pavement in such a manner to a conveyor that all of the bricks are received by suitable receiving means in a predetermined position. Other means thereupon in timed relation with the aforesaid means takes the bricks from the receiving means, transports the same to the road-bed and deposits them thereon in a pavement-forming position. Thereupon other means engage the bricks to exert a lateral pressure thereupon, and in said engagement the machine is moved forwardly and the weight of the machine engages the bricks just deposited to exert downward pressure thereon and embed the bricks in the road-bed. Simultaneously with the last-mentioned movements, the before-mentioned brick transporting means is positioned preparatory to receiving another row of bricks, and after receiving the same, the weight of said bricks upon the transporting means assists the power means in exerting lateral pressure upon the bricks in the pavement-forming position, as well as assists in the movement of the machine forward upon the pavement. Simultaneously with all of the aforesaid operations, it will be understood that suitable brake means are associated with the frame supporting wheels so that said wheels are free to move at the desired time. Other means are associatd with the machine, such as the means for leveling the cushion layer which usually consists of sand upon the road-bed. Likewise, the lateral pressure applying means is adapted to discharge a cementitious or other suitable binding mixture upon the cushion layer, and there are other means for supplying a cementitious or other suitable surface material to the surface of the pavement after the bricks have been laid, and still other means are associated with all of the foregoing for supplying water to the pavement to wet the same and the surface material applied thereto. The machine is so constructed that the bricks will be laid to form a crowned roadway in which the curvature is relatively true and not an approximation as found in hand constructed roadways.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings, Fig. 1 is a top plan view of the machine. Fig. 2 is a front elevational view of the machine. Fig. 3 is a side elevational view taken upon the right side of the machine. Fig. 4 is a sectional view showing the brick receiving means, the lateral pressure means and the downward pressure means with both pressure means in the non-pressing position. Fig. 5 is a similar view of the same parts shown in Fig. 4 with the brick transporting means in an intermediate brick transporting position, and the lateral and downward pressure means exerting pressure in both directions. Fig. 6 is a similar view of the same parts with the brick transporting means in position preparatory to depositing the brick, and the lateral pressure means retracted. Fig. 7 is a similar view of the same parts shown in Figs. 4, 5 and 6 with the brick transporting means in the depositing position, the lateral pressure means in the retracted position and the downward pressure means in the pressing position. Fig. 8 is a similar view of some of the parts shown in Figs. 4, 5, 6 and 7, and illustrates said lateral pressure means and downward pressure means in the non-pressing position, but the brick in pavement-forming position. Fig. 9 is a view similar to Fig. 8 but illustrates both pressure means in the pressure applying position and the brake means in non-braking position so that the machine will be moved as a unit by means of the lateral pressure applying means. Fig. 10 is an elevational view of a portion of the parts shown in Fig. 2 and illustrates said parts in a different position. Fig. 11 is an elevational view of the parts shown in Fig. 10 and illustrates said parts in an intermediate position from that shown in Figs. 2 and 10. Fig. 12 is an enlarged elevational view of the mechanism for taking up the slack in a row of bricks preparatory to their reception by the transporting means, the same parts being illustrated in Fig. 3 in connection with the remainder of the machine. Fig. 13 is a similar view of the same parts shown in Fig. 12, but shows said parts in the pressure applying or slack eliminating position. Fig. 14 is a plan view with parts in section of the parts illustrated in Figs. 12 and 13.

In the drawings 20 indicates the supporting earth upon which is placed or formed a road-bed 21. At both sides of the road-bed 21 is a trackway 22 supporting a track herein shown in the form of a channel 23. The trackway 22 and channel 23 are laid to the grade at which the road is to be made, or to which the road is to conform. Herein a unitary form of the machine is illustrated, but in the actual construction of the machine, it is contemplated that the same will be constructed in units which may be secured together so that the machine may be extended to construct any width of roadway. This can be readily accomplished by forming the framework of the machine of two end or side sections and an intermediate central section, said side sections being detachable from the central section so that intermediate sections may be interposed therebetween.

As herein illustrated, the machine includes a pair of supporting channels 24 which adjustably support the wheels 25 by means of the adjusting screw 26 and the pivotally supported arm 27. The wheels 25 ride upon the track 23 and thus the machine will be supported at the desired elevation to form a roadway which will conform to the desired grade. The main frame channels 24 are connected together at suitable intervals by transverse connecting bars 28, 29 and 30. Also supported by the framework herein described is a pair of standards 31 and 32 at each side of said framework. Suitable intermediate standards 33 may be supported by said framework where necessary. The standards 31 and 32 are connected by a cross member 34, and the upwardly extending frames formed by the standards 31, 32 and 34 are connected together by a suitable number of cross members, and herein two transverse bars 35 and 36 as shown, see Fig. 1.

Suitably supported by the aforesaid framework is a platform 37 which supports a power unit herein illustrated in the form of an internal combustion engine 38 having the power belt 39. The power unit 38 may be suitably connected to one or more of the supporting wheels 25 for propelling the machine into position if the same is desired. However, the aforesaid connection is not illustrated in the present drawings.

Suitably mounted in bearings upon the upper framework comprising the supporting members 34, 35 and 36 is a main power shaft construction 40 which is adapted to be driven by the belt 39. Said driving connection is adapted to be controlled by a suitable belt shifter or equivalent clutch mechanism 41. A second shaft 42 parallel to the main shaft 40 is rotatably supported in the framework of the machine near the base portion thereof, and said shaft 42 preferably extends through the channels 24, as illustrated in Fig. 1. A pair of shafts are rotatably supported at the sides of the machine and said last mentioned shafts extend transversely of the beforementioned shafts and are adapted to be driven by the shaft 42. Said shafts are indicated by the numeral 43. At each side of the machine there is also rotatably supported a vertical shaft indicated by the numeral 44, see Figs. 1 and 2. The shaft 44 is driven by the shaft 40 although it is to be understood that the aforesaid driving connections may be modified as desired.

Herein the shaft 42 is driven by the shaft 40 through the medium of the endless chain 45 and the sprocket wheels 46 and 47 upon the shafts 40 and 42 respectively. The shaft 43 is driven by the shaft 42 through a pair of bevel gears 48 and the shaft 44 is driven by the shaft 40 through the bevel gears 49. Any other desired connection, however, may be utilized.

Brick tilting and conveying mechanism.

Reference will now be had particularly to Figs. 1, 2, 10 and 11 wherein the brick tilting and brick conveying mechanisms are illustrated in detail. A suitable auxiliary frame 50 is suitably secured to the main frame and rotatably supports a shaft 51 which carries a plurality of sets of radially extending prongs or teeth 52 to form a plural spider construction. Herein said spiders are positioned upon said shaft such that the prongs or teeth engage simultaneously the entire row of bricks and two of the teeth of each spider engage each single brick. Herein said spiders are positioned upon said shaft such that two or more of the spiders are adapted to engage a single brick. A platform 52ª is suitably slotted at 53 to permit the teeth 52 to pass without interference. The platform is also provided with a plurality of guides 54 which herein are so positioned that they are adapted to receive a single brick. The forward end portion of the platform is provided with a plurality of slots 53 and the shaft 51 is provided with a plurality of radially extending teeth 52, so that the tilting mechanism is adapted to engage and tilt a half brick or bat. The means for actuating the shaft 51 comprises a cam pin 55 carried by a collar 56 upon the forward end of the shaft 43. Pivotally supported upon the frame 50 and adjacent the shaft 43 is a cam yoke 57 which pivotally supports a reciprocating arm 58 having a tooth 59 at the end thereof. The shaft 51 on its forward end is provided with a ratchet wheel 60 having the teeth 61, which teeth are engageable by the tooth 59 of the reciprocating rod or arm 58. Suitable means, such as the spring 62, maintains the arm and tooth in engagement with the ratchet wheel 60. A yielding dog 63 prevents reverse rotational movement of the ratchet wheel 60. As shown clearly on Sheet 2 in Figs. 10 and 11, the aforesaid mechanism is adapted to transform rotational movement of the shaft 43 into intermittent rotational movement of the shaft 51 carrying the radial teeth 52. Herein the teeth 52 are shown positioned at 90 degrees to each other, and, therefore, are adapted to engage two adjacent sides of a brick 64.

Reference will now be had to Fig. 1 wherein the conveyor is illustrated in detail. Suitably mounted on the frame 50 is a supporting member 65 which pivotally supports a plurality of supporting rollers 66. The rollers, as shown in Fig. 2, are inclined slightly, so that when the brick is deposited thereon by means of the spider construction hereinbefore described, said bricks will slide towards the member 65. The frame 50 pivotally supports a vertical stub shaft 67 which carries a sprocket wheel 68. The shaft 44 carries a large sprocket wheel 69, and adjacent thereto and suitably supported by the main frame is a stub shaft 70. The stub shaft 70 carries a sprocket wheel 71. The gear 69 is the power gear and derives its power from the shaft 44. A suitable endless link chain construction 72 is adapted to be driven by the sprocket wheel 69 and also ride upon the sprocket pinions 68 and 71. The endless chain carries a plurality of brick engaging fins or fingers 73 and these are so positioned upon the chain that a pair of them are adapted to receive a single brick. The chain conveyor herein described is operated in timed relation with the tilting spider so that the bricks when tilted on the rollers 66 are positioned between the fins so that said fins more the bricks with the endless chain from the rollers to a rotating table or platform 74 also carried by the shaft 44. The bricks are prevented from discharging from the table except in the desired direction by an arcuate guard plate 75.

Brick receiving and transporting mechanism.

The machine frame supports a transverse supporting member 76 and also a transverse guide member 77. Suitably and pivotally supported upon the transverse supporting member 76 are a plurality of brick supporting rollers 78, which rollers extend outwardly from said supporting member and are in spaced relation with each other and in such spaced relation that at least three of said rollers include the length of one brick. The aforesaid roller support is herein termed the receiving mechanism.

Reference will now be had to Figs. 1, 2 and 4 for a detailed description of the brick transporting means and thereafter reference will be had to Figs. 4 to 7 inclusive to illustrate the different positions assumed by the brick transporting mechanism. It will be remembered that 40 designates the main shaft generally, and as shown clearly in Figs. 1 and 2, said main shaft 40 is a divided shaft; and at each division thereof is secured a pair of crank arms 80 which carry a pin 81. The crank pin 81 supports a cable or chain 82 having a turn buckle or equivalent device 83 included therein for adjusting purposes. The cables 82 support a rod 84, which in turn supports a plurality of U-shaped brick engaging and transport-

ing fingers 85. These fingers are rigidly but adjustably secured upon the transverse rod 84 by any suitable means, such as the set screws 86. As shown clearly in Fig. 2, the fingers 85 are secured to said rod 84 in spaced relation with each other, and so spaced as to pass between the rollers 78 so that the fingers when positioned beneath the bricks 64, see Fig. 4, may thereafter be elevated into a position intermediate that illustrated in Figs. 4 and 5. When in said elevated position, continued rotation of the crank construction moves the rod 84 and also the bricks supported thereby laterally of the receiving platform construction into the position shown in Fig. 5. Suitably supported upon the framework is a slotted guide member 87, and adjacent the base of the slot is pivotally supported an idler wheel 88. The cable 82 engages the wheel 88, see Fig. 5, and continued rotational movement of the crank construction lowers the fingers 85 with the bricks thereon, see Figs. 5 and 6. One or more of the fingers 85 carries a tilting cam projection 89, see Fig. 5, which engages in the downward movement of the fingers grooved cam slide 90 which terminates near the free end thereof in a recess 90ª, see Fig. 6, and said recess is adapted to receive the projection 89, as shown clearly in Figs. 6 and 7. Continued rotational movement of the crank arms from the position shown in Fig. 6 to the position shown in Fig. 7 causes the fingers to be tilted, as shown in Fig. 7 to deposit the brick in pavement-forming position. Thereafter continued rotation of the crank arms causes said finger construction to move from the position shown in Fig. 7 to the position shown in Fig. 4 preparatory to removing another brick or row of bricks from the receiving mechanism.

Slack arresting mechanism.

Reference will now be had to Figs. 3, 12, 13 and 14 wherein there is illustrated means for taking up the slack among the bricks as they are positioned upon the receiving mechanism hereinbefore described. Suitably secured upon the conveyor or chain 72, see Figs. 1 and 3, is a projecting cam pin 91, and it will be understood that said projecting cam pin may be adjustably positioned upon the conveying chain 72 adjacent the last brick conveying finger or fin 73. Thus after all of the bricks which are to constitute a row of bricks to form the row of bricks in the roadway are positioned upon the receiving platform or rollers, the cam pin 91 actuates suitable mechanism shown in detail in the aforesaid figures to move all of the bricks into abutting relation and eliminate the slack or spaces therebetween. It will be understood that the machine is by-lateral in its arrangement, and therefore, the pushes or shoves imparted by the mechanism to be described in detail are in opposite directions and towards each other so as to entirely remove all of the slack in the row of bricks when positioned upon the receiving platform.

The mechanism consists of a roller 92 carried upon a lateral projection 93 of an adjustably supported arm 94 carried by a rock shaft 95 suitably supported upon the frame. The rock shaft 95 also carries a counterweight 96 which is adjustably secured to a counterweight arm 97 supported by said shaft. There is suitably supported a brick engaging roller 98 carried by a lateral projection of an adjustably supported finger 99. The adjustably supported finger 99 is pivotally supported upon a stub shaft or spindle 100, and associated therewith is a collar 101 carrying an arm 102 which is connected by a link 103 to an arm 104 of a collar 105 mounted upon and rigid with the rock shaft 95. The collar 101 and the finger 99 are yieldingly connected together by means of a coiled spring 106. From the foregoing it will be understood that as the cam pin 91 engages the cam roller 92, the rock shaft 95 will be tilted, and the tilting motion thereof through the link construction hereinbefore described rocks the collar 101 on the spindle 100. Said rocking movement is communicated through the spring 106 to the brick engaging roller or bumper 98, and thus a push or shove is imparted to the last or adjacent brick 64 positioned upon the receiving platform, as shown in Fig. 4. After the cam pin 91 has passed from beneath the cam roller 92, the counterweight 96 returns all of the aforesaid elements to their original and retracted position. It will, of course, be understood that the roller 98 in its normal position, shown dotted in Fig. 12 is positioned to permit the brick 64 to pass beneath the same. Subsequent engagement of the cam pin 91 with the cam roller 92 moves the brick engaging roller 98 into position, see Fig. 12, to engage the brick 64 and give the same a shove, as shown in Fig. 13. The aforesaid construction also provides a yielding connection between the brick engaging roller 98 and the cam engaging roller 92, so that a slight variation in the row of bricks will not interfere with the aforesaid mechanism, and such variations will be absorbed or compensated for by the coiled spring or yielding connection 106.

Lateral pressure applying mechanism and machine moving mechanism.

Reference will now be had to Fig. 1 for the general plan view of the lateral pressure applying mechanism, and to Figs. 4 to 9 inclusive to show the details of construction and the several positions assumed thereby. The shaft 42 it will be remembered carries

the wheel 47 which is driven by the belt or chain 45, in turn driven by the wheel 46 carried by the main shaft 40. At suitable intervals the shaft 42 is provided with a crank arm 107 which carries a cam pin 108 which supports a roller if desired. A slide 109 slotted at 110 to slide upon the shaft 42 carries a downwardly extending cam projection 111 and an upwardly extending cam projection 112, the former being an interior cam and the other being an exterior cam. The slide 109 adjustably supports a slidable rod 113, the other end of which is secured to an offset supporting member 114 which carries a transversely extending pressure bar 115 the bottom edge of which may be curved to the crown of the road. Fig. 4 illustrates what may be turned the first position of the lateral pressure applying mechanism. In this position the pin 108 engages the interior cam 111 and moves the slotted slide 109 with the rod 113 and presser bar 115 rearwardly from the position shown in Fig. 4 to the position shown in Fig. 9 to apply lateral pressure to the brick 64 which has been deposited by the transporting means hereinbefore described. Continued movement from the position shown in Fig. 4 to the position shown in Fig. 9 applies lateral pressure to said brick and forces the same against the brick in the adjacent row. Thereupon continued rotational movement of the crank arm 107 causes the pin 108 to engage the exterior cam 112 to retract the presser bar construction, as shown in Fig. 6. The rotational movement from Fig. 6 to Figs. 7 and 8 constitutes the idle portion of the cycle of the presser bar operation, and it is during this period, see the same figures, that the presser bar is maintained in the retracted position to permit the transporting fingers to deposit a brick upon the road-bed.

It will be understood from the aforesaid figures that as the presser bar is projected rearwardly into engagement with the row of bricks to exert lateral pressure thereon, the machine is moved forwardly through such lateral pressure assisted by the weight of the bricks upon the transporting mechanism, said weight being transmitted through the cables 82 to the main shaft 40, as in the positions shown in Figs. 5 and 9.

There is also supported upon the frame of the machine a plurality of rollers 116, and these rollers are preferably adjustably supported upon said machine so as to produce the true crown curve determined or desired to be imparted to the roadway. Thus the mechanisms of the machine are so timed in their operation that lateral pressure is simultaneously applied to the bricks, such lateral pressure being assisted by the weight of another row of bricks and simultaneously therewith the machine is moved forwardly by the action of the aforesaid cam construction. Such movement carries with it the rollers 116 to exert downward pressure upon the bricks and position the same in crowned relation to form a crowned roadway.

The means for maintaining the machine stationary during the desired periods of operation and permitting the same to be moved during another period of operation is shown clearly in Figs. 4 to 9 inclusive. Slidably supported in a bracket 117 upon the channel frame 24 is a brake rod 118 which carries a brake shoe 119. The brake rod 118 is provided with a collar 120 by which the tension of the spring 121 is adjusted. Said spring tends to maintain the shoe 119 in engagement with the wheel 25. The brake rod 118 terminates in an angular construction 122 adjustably supported by said terminating ends. Said angular construction carries a collar pin or roller 123 and the shaft 42 carries a cam 124 having the raised cam portion 125 which is adapted to engage the pin 123 to retract the brake rod in opposition to the spring 121, and releases the brake shoe 119 from engagement with the wheel 25. Thus it will be noted that the brakes are released, see Figs. 5 and 9, during the time that the cam pin 108 is in engagement with the interior cam 111, to exert lateral pressure upon the row of bricks upon the road-bed.

Auxiliary mechanisms associated with the brick laying mechanisms.

The frame of the machine suitably supports a plurality of sockets 126 which are adapted to adjustably receive and support a plurality of supporting rods 127 which are connected to a leveling construction 128, see Figs. 2 and 4. Said leveling construction, as shown clearly in the first mentioned figure, is curved and is adapted to level the cushion layer 19 upon the road-bed 21, thereby providing a true crowned cushioned road-bed.

Also supported upon the framework are the hoppers 130, and said hoppers are connected by means of the flexible conduit connections 131 to a drum or tubular construction 132 which herein is illustrated as supported by the same mechanism which supports the presser bar 115. Said tubular member 132 is provided with suitable discharge means such as a longitudinally extending aperture or a plurality of apertures 232 see Fig. 4. Positioned within the tubular member 132 is a pair of oppositely working screws 133 which moves the material from the outer ends of the tubular member towards the center, and simultaneously forces the same from the discharge apertures.

The aperture 232 is controlled by a closure

member 233 which is provided with a plurality of forwardly extending rods 234. The forwardly extending rods 234 are provided with an angular extension 235, which angular extension portion is slidably supported in a pivotally supported bearing 236. The bearing 236 is supported upon the frame by the depending arm 237. Suitable stops are associated with the angular extension 235, and the rod portion 234, such as the adjustably positioned collars 238 and 239. In the forward movement of the presser bar 115 and the tubular member 132 the collar 238 engages the bearing 236 and moves the closure member 233 into open position. Thereafter upon the return or forward movement of the machine as a unit, the screw conveyor is adapted to discharge the cementitious or binding material through the aperture 232. When the machine has become stationary and the presser bar 115 and tubular member have been retracted, the stop 239 engages the pivotal support 236 and serves to move the closure member 233 into closing position such that in the forward movement of the presser bar and tubular member, the latter will not be permitted to discharge cementitious material upon the roadway. It will, of course, be understood that the tubular member may be made to conform to the curvature of the roadway if the same is excessive. This may be readily accomplished by dividing the tubular member in the middle and adjustably supporting the ends of each of the sections.

The means for actuating the screw conveyors within the tubular member 132 comprises a sprocket gear 134, see Fig. 3, driven by a sprocket chain 135, which sprocket chain is supported by an idler pulley 136 rotatably supported upon a pivotally supported arm 137, which arm adjustably supports a counterweight 138. The chain is driven by a sprocket gear 139 rigid with a shaft 140. A pulley 141 also is interposed in the chain construction. From the foregoing it will be understood that as the presser bar 115 carrying the tubular member 132 therewith is moved forwardly, the pivoted arm 137 moves downwardly to permit such movement, and simultaneously permits the chain to drive the screw conveyor 133 within said tubular member 132. The power for driving the sprocket pinion 139 is the supporting shaft 140 which terminates in a bevel gear 141 which is driven by a similarly indicated meshing bevel gear upon the upper end of the shaft 70. It will be remembered that the shaft 70 carries the sprocket pinion 71, see Fig. 1, which is driven by the chain 72, in turn driven by the sprocket wheel 69 which derives power through the vertical shaft 44 from the main shaft 40, see Fig. 2. It will, of course, be apparent that the aforesaid operations occur in timed relation as hereinbefore described.

Reference will now be had to Figs. 1, 3 and 4. Positioned rearwardly of the rollers 116 is another transversely extending tubular member 142 which is suitably or similarly apertured at 143. Associated with said aperture is a control member 144 therefor, which is provided with a depending plate portion 145 which constitutes a spreader or leveler. Within the tubular member 142 is a screw conveyor 146 supported upon a shaft or spindle 147. The shaft or spindle 147 carries a bevel gear 148 which meshes with another bevel gear 149 carried upon the shaft 43, which, it will be remembered, derives its power through the bevel gear 48 and auxiliary shaft 42 from main shaft 40.

The tubular member 142 is connected with the hoppers 130 by suitable flexible conduits 150. The closure member 144 is connected by means of a link bar 160 to the free end of a lever 161. The lever is pivotally supported at 162 upon the frame of the machine and engages a cam pin 163 carried by one of the crank arms 80 rotatable by the main shaft 40. Thus the tubular construction 142 is adapted to discharge surfacing material at a predetermined time determined by the positioning of the cam for actuating the lever 161. It will, of course, be remembered that the depending portion 145 in the forward movement of the machine is adapted to distribute the surfacing material after the same has been deposited upon the bricks. The tubular construction described may likewise be parted through the central portion to permit adjustment to the desired crown of the road, and from the foregoing it will also be understood that within the tubular construction 142, there is positioned a pair of oppositely extending screws 146. Upon the rear end of the machine is positioned a moistening conduit 151 which discharges upon the depending moistening pad or apron 152 which wets the roadway after the tubular member 142 has discharged surfacing material upon the top of the bricks which have been laid. It will, of course, be understood that the tubular member 132 discharges a suitable binding material upon the cushion layer 19.

While the invention has been described in great detail in the aforesaid specifications and some modifications have been suggested, it will be understood that all of the aforesaid is illustrative rather than restrictive in character, and the beforementioned modifications, as well as others which will readily suggest themselves to those skilled in the art to which the invention applies are all

considered to be within the broad purview of the same as outlined by the appended claims.

The invention claimed is:

1. In a machine for laying bricks or the like for forming road or like surfaces, the combination of a brick supporting platform, a brick engaging endless conveyor having laterally projecting brick engaging members, and a spider construction including a supporting shaft and a plurality of laterally projecting brick engaging members arranged in spaced relation about and along said shaft for removing a plurality of bricks from the platform and depositing the same in tandem and row forming relation and into position for engagement by said endless conveyor brick engaging lateral projections.

2. In a machine for laying bricks or the like for forming road or the like surfaces, the combination of a supporting framework, a slotted platform supported by said framework, a spider construction including a supporting shaft and a plurality of laterally projecting brick engaging members arranged in spaced relation about and along said shaft and movable through the slots of the platform, and a plurality of rollers adjacent the platform and supported by said framework in parallel relation to said lateral projections, said spider projections being movable between said rollers.

3. In a machine for laying bricks or the like for forming road or the like surfaces, the combination of a supporting framework, a slotted platform supported by said framework, a spider construction including a supporting shaft and a plurality of laterally projecting brick engaging members arranged in spaced relation about and along said shaft and movable through the slots of the platform, a plurality of rollers adjacent the platform and supported by said framework in parallel relation to said lateral projections, said spider projections being movable between said rollers, and a brick engaging conveyor positioned adjacent said rollers and adapted to engage the brick when deposited thereon by said spider construction for conveying said brick from the rollers.

4. In a machine for laying bricks or the like for forming road or like surfaces, the combination of a pair of brick supplying means, a receiving device interposed therebetween for receiving bricks from said brick supplying means and in opposite directions, and means for transporting the brick from the brick receiving device to a road-bed.

5. In a machine for laying bricks or the like for forming road or like surfaces, the combination of a pair of brick supplying means, a receiving device interposed therebetween for receiving bricks from said brick supplying means and in opposite directions, means for transporting the brick from the brick receiving device to a road-bed, and a pair of mechanisms adjacent the ends of the brick receiving device for imparting additional movement to the bricks and in opposite directions to eliminate the slack therebetween.

6. In a machine for laying bricks or the like for forming road or like surfaces, the combination of a brick receiving mechanism, an endless brick conveyor, and means operable by said endless brick conveyor for causing relative movement between said conveyor and the brick to eliminate slack between the brick.

7. In a brick laying machine, the combination of a brick receiving mechanism, a brick supplying mechanism, and a slack arrester mechanism for eliminating slack among the brick upon the first mentioned mechanism, comprising a rock shaft, a brick engaging member, means for tilting said rock shaft, a connection between said rock shaft and said brick engaging member, and means for returning the brick engaging member to the non-engaging position.

8. In a brick laying machine, the combination of a brick receiving mechanism, a brick supplying mechanism and a slack arrester mechanism operable by the second mentioned mechanism for eliminating slack among the brick upon the first mentioned mechanism, comprising a rock shaft, a brick engaging member, means for tilting said rock shaft and operable by said brick supplying means, a yielding connection between said rock shaft and said brick engaging member, and means for returning the brick engaging member to the non-engaging position when released by the brick supplying means.

9. In a brick laying machine, the combination of a brick receiving mechanism, a brick supplying mechanism, and a slack arrester mechanism operable by the second mentioned mechanism for eliminating slack among the brick upon the first mentioned mechanism, comprising a rock shaft, a brick engaging member, means for tilting said rock shaft and operable by said brick supplying means, a connection between said rock shaft and said brick engaging member to the non-engaging position when released by the brick supplying means.

10. In a machine for laying brick or the like for forming road or like surfaces, the combination of a brick supporting platform provided with a plurality of slots therein, brick receiving means adjacent said platform, and a rotatable spider construction with its arms movable in the slots of the platform for transferring a row of bricks

from the platform to the brick receiving means in tandem relation.

11. A machine for laying brick or the like for forming road or like surfaces including a pair of means each arranged to furnish a row of brick in tandem relation, a brick receiving means having opposite ends formed for receiving simultaneously and from opposed directions from said first mentioned means the tandem arranged brick for forming a single slackless arranged row of brick when the brick in each row abut each other.

12. A machine for laying brick or the like for forming road or like surfaces, including a plurality of brick supplying means, a common brick receiving means for receiving bricks from said brick supplying means and from opposite directions and in tandem relation for forming a single row of brick, and a single transferring mechanism for removing the row of brick from the common brick receiving means and transporting the same to a road bed.

13. In a machine for laying brick or the like for forming road or like surfaces, the combination with a brick receiving mechanism, a brick conveyor for supplying brick in tandem relation, and means operable in timed relation with said brick conveyor for imparting additional movement to the bricks while upon the receiving mechanism to eliminate the lateral slack between the same prior to discharge.

14. In a brick laying machine the combination of a receiving mechanism for receiving brick in tandem or row-formation, and a slack arresting mechanism for striking the end brick upon the brick receiving mechanism for eliminating the lateral slack among all the brick therein.

15. A machine for laying brick or the like in rows for forming a surface including means for conveying and laying the brick or the like in rows, means for depositing a coating of material for the reception of said brick, and means controlling said depositing means to permit the same to deposit said material only prior to the actuation of the laying means.

16. In a brick laying machine, the combination with a brick supplying mechanism, a brick receiving mechanism, and a slack arrester mechanism operable by the first mentioned mechanism for striking a brick and eliminating lateral slack among the brick upon said second mentioned mechanism.

17. In a machine for laying brick or the like for forming a road or like surface, the combination of brick receiving means, means including a movable brick support for engaging the side and face of said brick to elevate the same from the receiving means and move said brick to clear the same, and thereafter position said brick beneath the receiving means in substantially the same position prior to positioning in surface-forming position upon the roadway.

18. In a machine for laying brick or the like for forming road or like surfaces, the combination of brick receiving means, means including a movable brick support for engaging the side and face of said brick to elevate the same from the receiving means and move said brick to clear the same, and thereafter position said brick beneath the receiving means in surface-forming position upon the roadway by tilting the brick.

19. A machine for laying brick or the like in rows for forming a surface including continuously operable means for conveying and intermittently laying the brick in rows, and means for directing lateral pressure against the laid brick to maintain the rows thereof in proper engagement with each other, the weight of the brick next to be laid and the conveying means therefor assisting the pressure directing means in the application of lateral pressure to said brick just laid.

20. In a machine for laying brick or the like to form a surface, the combination of brick receiving means, tiltable and movable means for engaging said brick to elevate the same from the receiving means and move said brick to clear the same and thereafter lay said brick beneath the receiving means in surface-forming position, and means for engaging said brick engaging means to tilt the same to turn and deposit said brick.

21. A machine for laying brick or the like for forming surfaces including a movable frame structure, continuously operable means for conveying and intermittently laying the brick, means adapted to press laterally against the brick when laid to form a surface and simultaneously moving said frame structure forwardly, the weight of the brick next to be laid and the conveyer means therefor assisting the pressure directing means in the application of lateral pressure to the brick just laid.

22. A machine for laying brick or the like for forming surfaces including a frame structure, supporting wheels for said frame structure, means adapted to press against the brick when laid to form a surface for properly placing the brick and simultaneously moving said frame structure forwardly, and brake means associated with said supporting wheels normally maintaining said wheels in non-rotatable relation and releasable when said pressure means is applying pressure to the brick.

23. A machine for laying brick or the like for forming surfaces including a frame structure, continuously operable brick engaging, transporting and laying means, supporting wheels for said frame structure, brake means for said wheels, and means for

exerting lateral pressure against the brick when laid to form a surface and assisted by the weight of the bricks engaged by the brick engaging means and for simultaneously moving said frame structure forwardly upon the release of the brake means during the application of lateral pressure.

24. A machine for forming a road or like surface including means for supplying brick to the machine to lay the same in rows with broken joints, means for removing the lateral slack between said bricks, means for laying said brick upon a road-bed in slackness and row formation, and means for exerting pressure upon said brick to embed the same in road and surface-forming position.

In witness whereof, I have hereunto affixed my signature.

MELVIN E. CROWELL.