

Dec. 30, 1930.

F. C. LAYER

1,786,622

BRICKLAYING MACHINE

Filed March 6, 1929

7 Sheets-Sheet 1

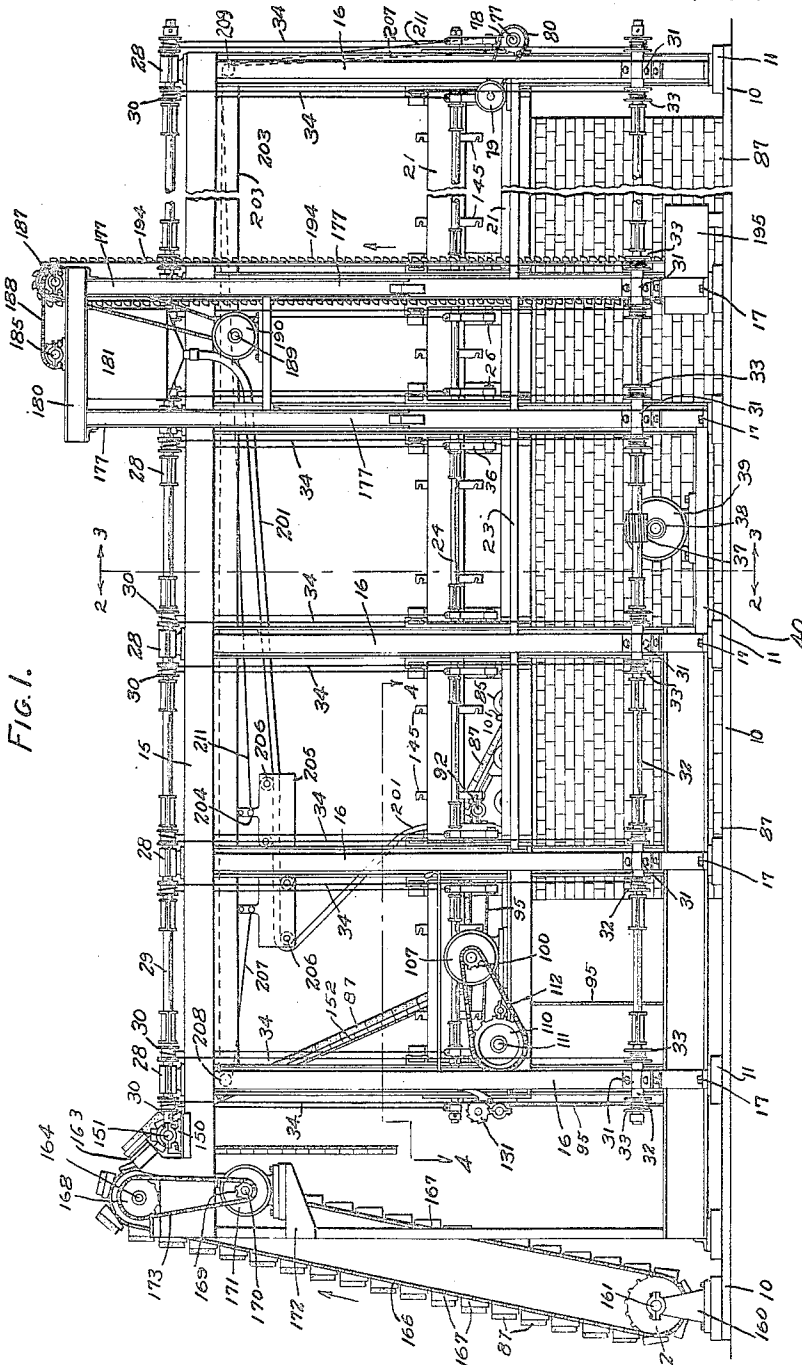


FIG. 1.

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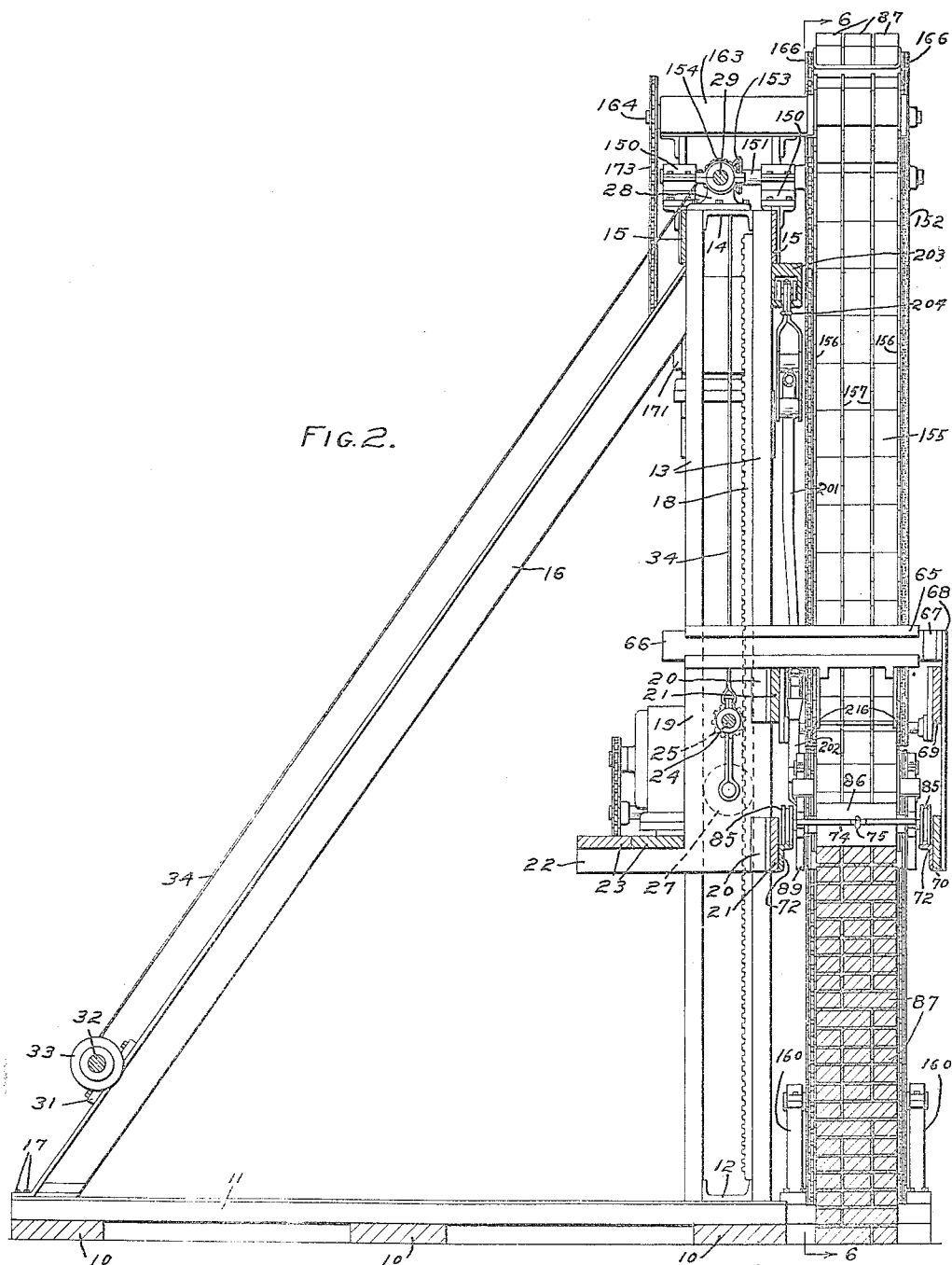
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BRICKLAYING MACHINE

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7 Sheets-Sheet 2



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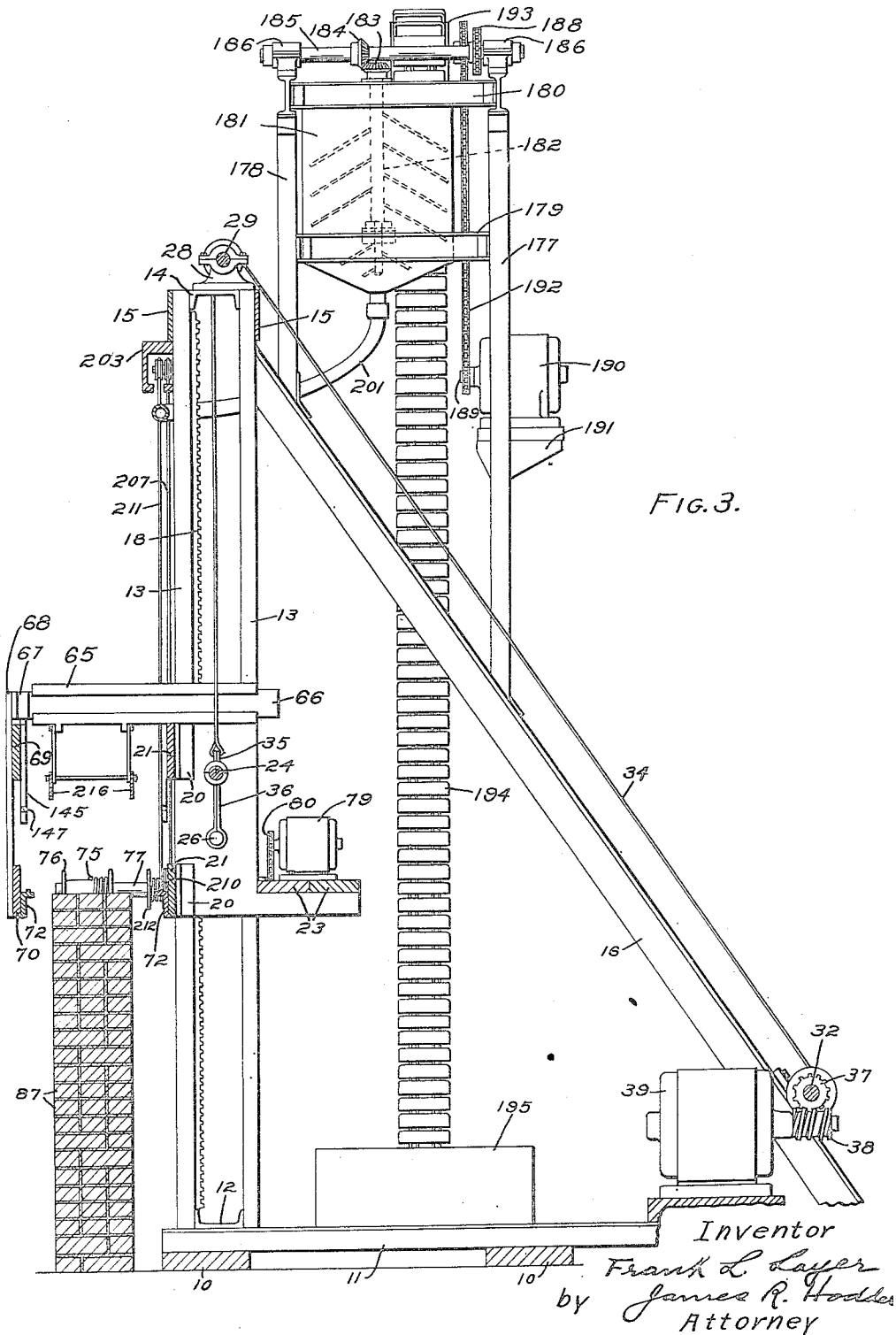
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BRICKLAYING MACHINE

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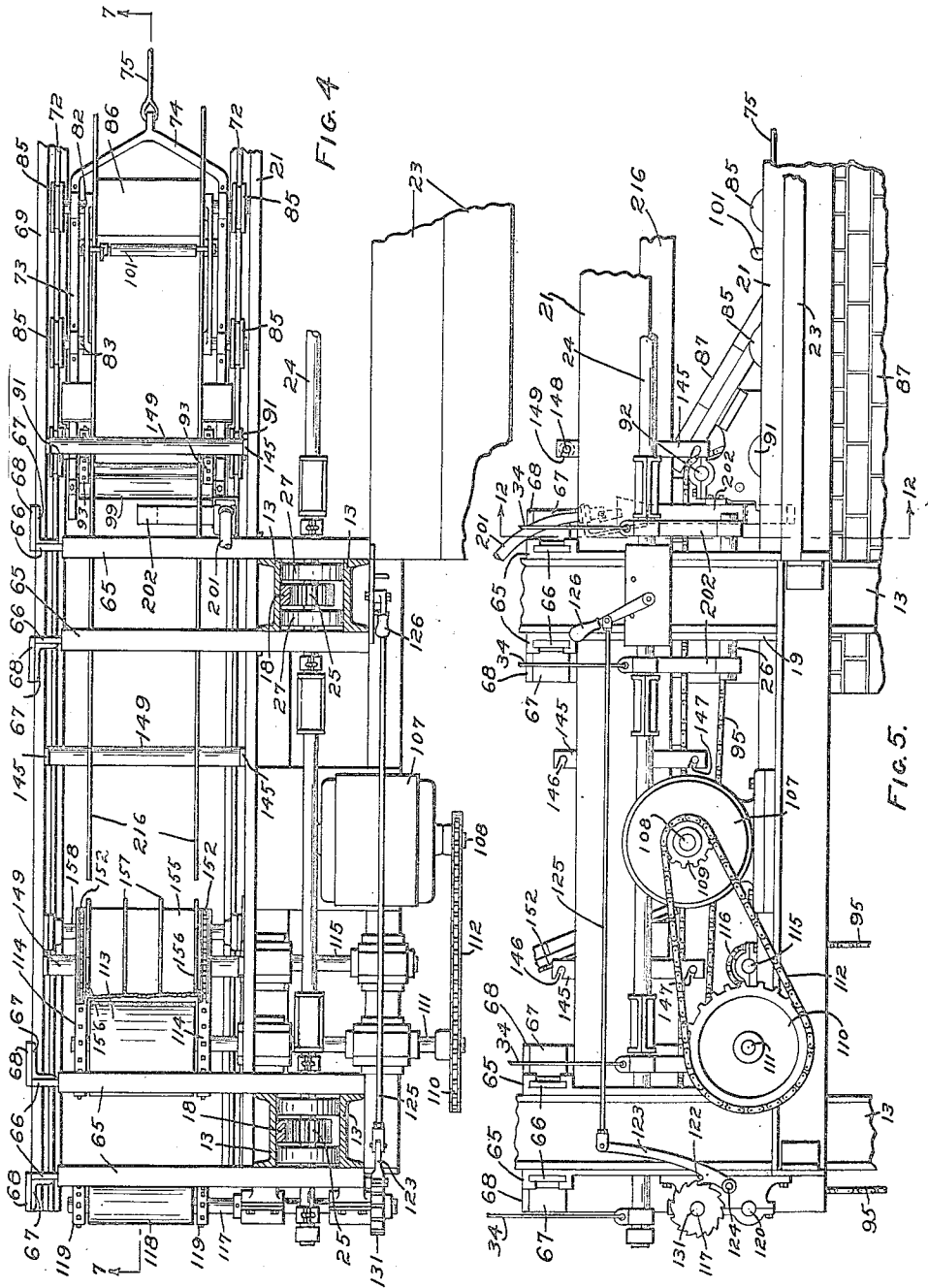
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BRICKLAYING MACHINE

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7 Sheets-Sheet 4



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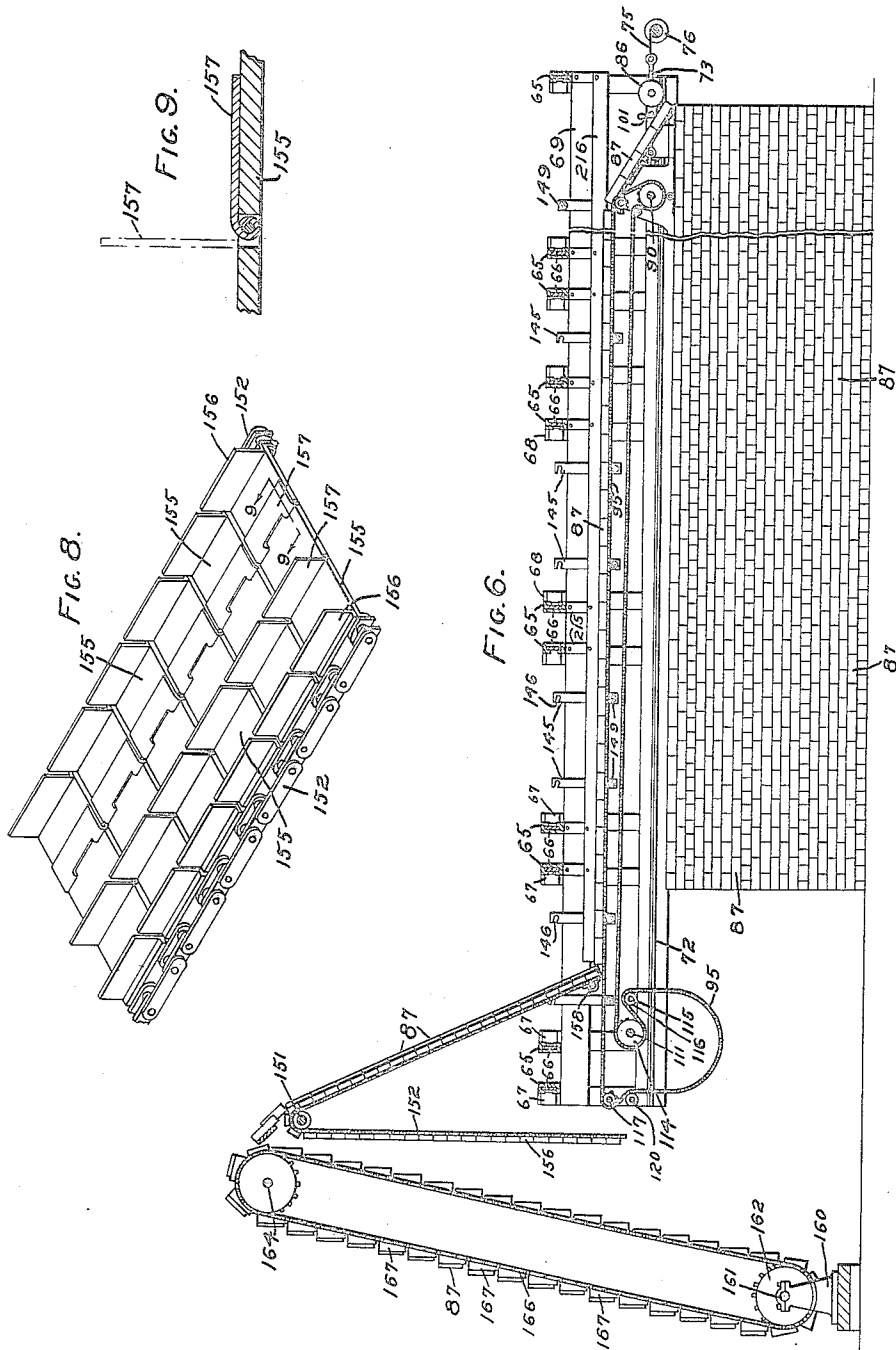
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BRICKLAYING MACHINE

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7 Sheets-Sheet 5



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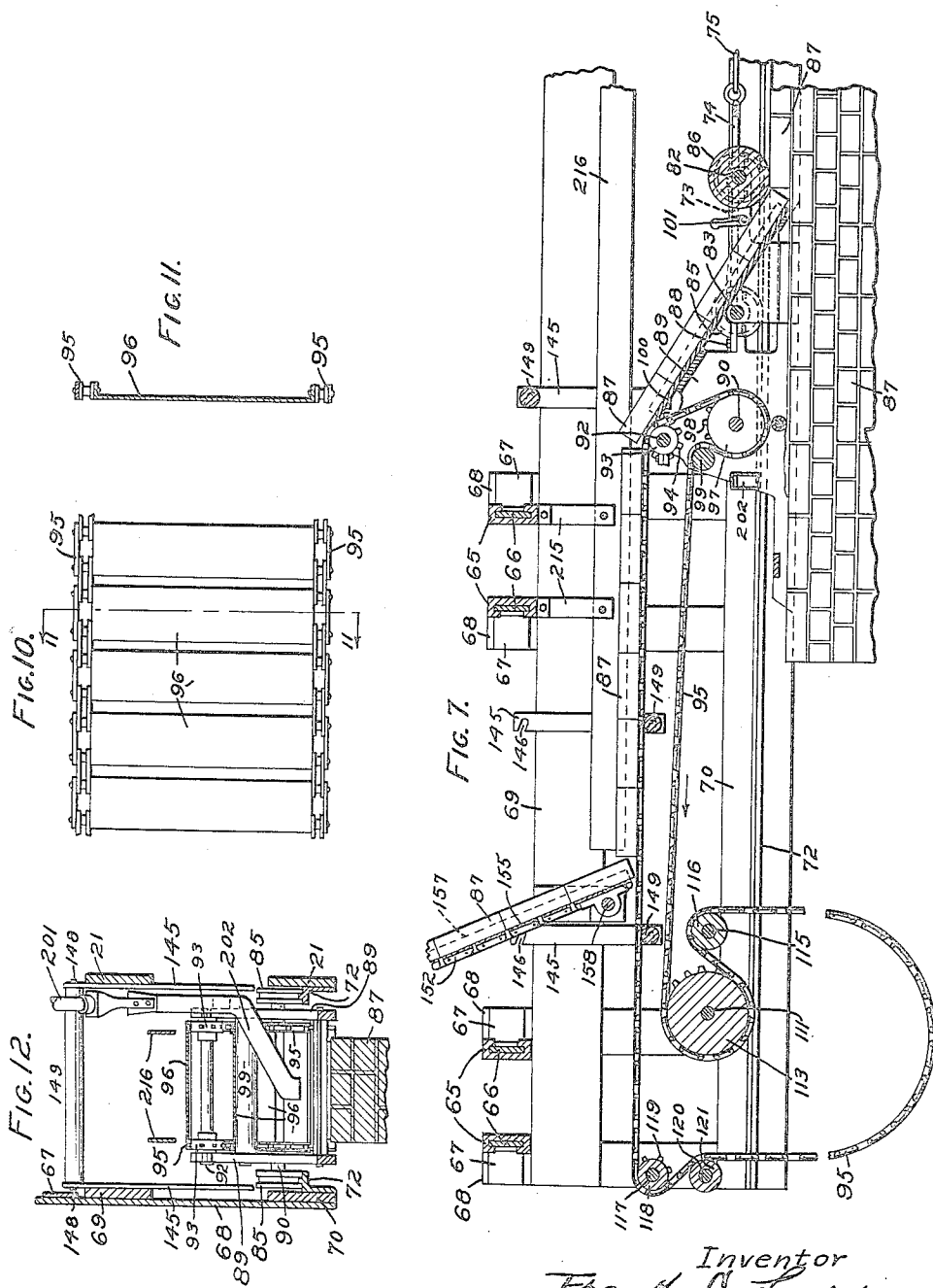
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BRICKLAYING MACHINE

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7 Sheets-Sheet 6



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BRICKLAYING MACHINE

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7 Sheets-Sheet 7

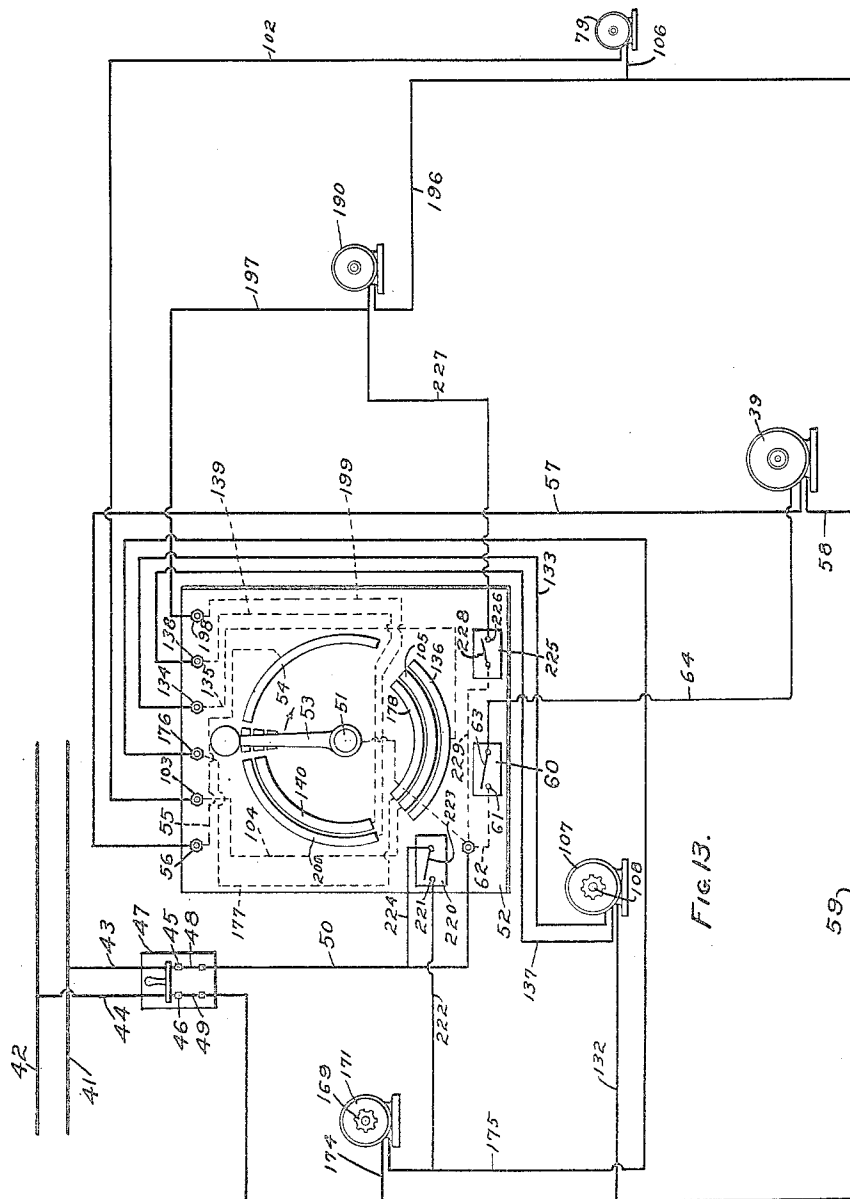


FIG. 13.

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UNITED STATES PATENT OFFICE

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BRICKLAYING MACHINE

Application filed March 6, 1929. Serial No. 344,725.

My present invention relates to apparatus for laying brick, and more particularly to an improved brick laying machine.

My present invention is designed to lay brick in a wall or in piers, and to dispense with the great percentage of manual labor at present necessary to successfully operate existing machines of this character. In my improved machine I am able to lay brick in courses in a wall or in piers and when a wall is being laid, the machine automatically lays header courses at proper intervals in the height of the wall. Also, my machine is adapted to provide for openings in a wall, as for example, openings necessary to insert windows or doors, assuming that the wall is to be a wall of a house. Also, in my improved machine the mortar is fed at a predetermined rate in advance of the laying of the brick and each course of brick is laid throughout the width of the wall simultaneously, so that there is but one laying operation necessary for each course of brick regardless of the width of the wall. Further, the machine is self-contained and may be moved along the length of the wall whenever desired and the actual brick laying devices are carried by a vertically adjustable platform to which the brick and mortar are fed simultaneously.

The object of my invention, therefore, is an improved brick laying machine.

In the accompanying drawings illustrating a preferred embodiment of my invention;

Fig. 1 is a side elevation;

Fig. 2 is a section on the line 2—2 looking in the direction of the arrows;

Fig. 3 is a section on the line 3—3 of Fig. 1 looking in the direction of the arrows;

Fig. 4 is a sectional plan view on the line 4—4 of Fig. 1;

Fig. 5 is a side elevation of Fig. 4;

Fig. 6 is a section on the line 6—6 of Fig. 2;

Fig. 7 is a section on the line 7—7 of Fig. 4;

Fig. 8 is a perspective view of a portion of the general brick slide;

Fig. 9 is a section on the line 9—9 of Fig. 8;

Fig. 10 is a plan view of a portion of the horizontal chain conveyor.

Fig. 11 is a section on the line 11—11 of Fig. 10;

Fig. 12 is a section on the line 12—12 of Fig. 5; and

Fig. 13 is a circuit diagram of the controlling motors.

Referring to the drawings, 10 designates a plurality of beams arranged parallel to and spaced apart from each other. Secure to the top surface of the beams 10 at suitable intervals along the length of such beams 10 and arranged parallel to each other are cross beams 11 and such beams 10 and 11 may be of wood or any other suitable material. Secured to the top surface of the beams 11 adjacent to one end thereof so as to be substantially over one of the lengthwise beams 10 is a channel plate 12, this plate 12 being substantially equal to the length of the beams 10. Secured to the channel plate 12 along the length thereof are pairs of upright channel beams 13 arranged as shown in Fig. 2 for example, there being a pair of such channel beams 13 for each of the transverse beams 11. The top ends of the pairs of channel beams 13 are secured to a channel beam 14 of dimensions similar to the channel plate 12. Secured to the outside of the channel beams 13 at the upper end thereof are plates 15, as clearly shown in Figs. 2 and 3. Secured to each pair of channel beams 13 adjacent to the top thereof and on each side thereof is a T-member 16, and each of these T-members 16 extend downwardly at an angle to the channel beams 13 and are secured by bolts 17 to the outer end of the beams 11. On the outermost channel beam 13 of each pair of channel beams 13 and on the inner face of such outer beam is secured a vertically arranged rack 18, for a purpose to be hereinafter described. On each side of each pair of channel beams 13 is arranged a plate 19 and to each of said plates at one edge thereof are secured angle irons 20. Secured to each of the angle members 20 and, therefore, to the plates 19 are spaced plates 21, the plates 21 and 19 forming a unit. Some of the plates 19 have formed integral therewith and extending laterally outward therefrom extensions 22, on which is built a platform composed of the boards 23. The plates 19 are provided with bearings in alinement with each other and in which bearings is rotatably

mounted a shaft 24 and to this shaft 24 at intervals along the length thereof are secured pinions 25, which mesh with the racks 18 above referred to. The unit composed of the plates 19 and plates 21 is movable upward and downward on the pairs of channel beams 13 and the shaft 24, pinions 25 and racks 18 insure that the unit is maintained in a horizontal plane at all times. In each pair of plates 19 is secured a shaft 26, and on each said shaft are arranged freely rotatably rolls 27, such rolls engaging with one or the other of the pairs of channel beams 13 as the unit above referred to moves upward or downward on such channel beams. At the upward end of each pair of channel beams 13 and secured to the channel beam 14 are bearing blocks 28, that are in alinement with each other and in such bearing blocks is rotatably mounted a shaft 29. To the shaft 29 adjacent to and on each side of each of the pillow blocks 28 are arranged drums 30. On each of the T-members 16 adjacent the lower end thereof are arranged pillow blocks 31 in alinement with each other and in such pillow blocks is rotatably mounted a horizontally disposed shaft 32. This shaft 32 is provided with a plurality of drums 33, such drums being equal in number to the drums 30 on the shafts 29 and the drums 33 and 30 are in alinement with each other. Secured to each of the drums 33 is one end of a wire cable 34, such wire cables passing over the drums 30 and extending downwardly, and the other end of each of such cables 34 is attached to an eye 35 formed in a strap 36 secured to the shafts 24 and 26. Secured to the shaft 32 intermediate its ends is a worm wheel 37 which meshes with and is driven by a worm 38 secured to the drive shaft of a motor 39. This motor is secured to a platform 40 extending between two of the transverse beams 11. Power for operating the motor 39 is taken from the power conductors 41 and 42 leading to any suitable source of power. The conductors 41 and 42 are connected by conductors 43 and 44 respectively to the switch contacts 45 and 46 of a switch 47. Switch blades 48 and 49 are adapted to engage with the switch contacts 45 and 46 respectively. The switch blade 48 is connected by conductor 50 to a conducting post 51 centrally mounted on a switchboard 52. Rotatably mounted on the post 51 is a switch arm 53 adapted to engage with an arcuate contact plate 54. The arcuate plate 54 is connected by conductor 55 to a binding post 56 on the switchboard 52. Connecting the binding post 56 and one end of the energizing winding of the motor 39 is a conductor 57, the other end of the energizing winding of the motor 39 being connected by conductor 58 to a return wire 59 that leads back and is connected to the switch blade 49. It is obvious, therefore, that by rotating the switch arm 53 on the post 51 and bringing the same into engagement with

the arcuate plate 54 that a circuit will be completed for the motor 39 and will cause rotation of the armature and main shaft thereof in a given direction. Also mounted on the switchboard 52 is a switch 60, the contact 61 of which is connected by conductor 62 to the conductor 50, and the switch blade 63 of which is connected by conductor 64 to a second energizing winding (not shown) for the motor 39. This second energizing winding is also connected by conductor 58 to a conductor 59. Therefore, with the blade 53 in the position shown in Fig. 13, that is, with the motor 39 stopped, the operator may, by connecting the switch blade 63 with the contact 61 cause a rotative movement of the armature and driving shaft of the motor 39 in a direction reverse to that above described. By means, therefore, of the switch blade 53 or the switch blade 63, the motor 39 may have its drive shaft rotatable in either direction at will. The operator may, therefore, by such means of control cause a raising or lowering of the framework comprised of the members 19 and 21, the shaft 24 and gears 25 in co-operation with the rack 18, insuring that such framework will be held in a horizontal plane regardless of the height to which it may be raised or lowered.

Formed at the upper end of each of the members 19 and on the outer face of such members are horizontal transversely extending guideways 65 and in each of such guideways is slidably mounted a rectangular plate 66. To each of such slidable plates 66 is secured on its outer face an angle iron 67, and secured to such angle iron 67 and extending downwardly therefrom is a plate 68. Secured to the inner face of each of the downwardly extending plates 68 and parallel to the plates 21 are plates 69 and 70. Secured to the inner face of the plate 70 and the inner face of the lower plate 21 and extending along the length thereof, while in horizontal alinement with each other, are track members 72. There tracks 72 form a runway for a carriage composed of a rectangular framework 73 brought together at one end, as indicated at 74, and to which end is secured one end of a cable 75, that has its end secured to and is capable of being wound on a drum 76 secured to a shaft 77 rotatably mounted in suitable bearings secured to the right hand end pair of beams 13. Secured to the shaft 77 is a sprocket 78 in alinement with a similar sprocket (not shown) secured to the drive shaft of a motor 79, and the shaft 77 is driven by a chain 80 from the motor 79. Rotatably mounted in suitable bearings on the rectangular frame 74 are parallelly arranged shafts 82 and 83, and on such shafts and on each end thereof are secured grooved wheels 85, which engage with and roll on the tracks 72. On the shaft 82 is mounted a roller 86 which is adapted to engage with the upper

edge or surface of the bricks 87, as will be hereinafter described. Secured to the rear end of the rectangular frame 73 by bolts 88 is a framework 89 and in this framework is rotatably mounted a shaft 90 similar to and parallel with the shafts 82 and 83. Secured to the outer end of the shaft 90 are grooved wheels 91 similar in all respects to the grooved wheels 85 and which likewise roll on the rails 72. Rotatably mounted in the frame 89 parallel to the shaft 90 is a shaft 92 on which is mounted a drum 93 provided with sprocket wheels 94 at each end thereof, these sprocket wheels 94 being adapted to engage with the sprocket chains 95 located at each side of and forming part of a horizontal chain conveyor. This chain conveyor is shown in detail in Figs. 10 and 11 and comprises the chains 95 above referred to, which chains are connected together and spaced apart by transverse plates 96. On the shaft 90 is mounted a drum 97 provided at each end with sprocket wheels 98 which likewise engage with the sprocket chains 95 above referred to. Rotatably mounted in the frame 89 is a roll 99 and over which the chain conveyor composed of the members 95 and 96 runs, as indicated for example in Fig. 7. This chain conveyor and the means by which the same is driven and operated will be described more in detail hereinafter. The drum 93 is at the delivery end of the chain conveyor above referred to and associated with this delivery end is a sloping deck 100 and along which the bricks 87 slide, passing under the roller 86 above referred to. Associated with the sloping deck 100 and at the delivery end thereof is a clamp 101 which may be operated either manually or automatically as may be desired, the purpose being to clamp the bricks 87 thereon to prevent bricks from coasting off the deck 100 under certain conditions which will be hereinafter described.

The motor 79 is connected by conductor 102 to a terminal 103 on the switchboard 52 and over such terminal 103, by conductor 104, to an arcuate contact plate 105, which arcuate plate is adapted to be engaged by the switch blade 53 in the rotation thereof about the post 51. Also the motor 59 is connected by conductor 106 to the conductor 59 above referred to as extending to the switch blade 49. It is obvious, therefore, that as the switch blade 53 is rotated about the post 51, such blade will be brought into engagement with the arcuate plate 105, closing, therefore, an energizing circuit for the motor 79 at the will of the operator and such energization of the motor 79 will cause a movement of the rectangular frame 73 to the right, as shown in Figs. 1 and 6 for example.

Adjacent the left hand pair of spaced beams 13 and on the vertically movable framework above referred to is mounted a motor 107 on the drive shaft 108 on which is

secured a sprocket pinion 109. This sprocket pinion 109 is in alignment with the sprocket 110 secured to the shaft 111 rotatably mounted in suitable bearings mounted on the framework composed of the members 19 and 21 above referred to. Over the sprocket pinion 109 and sprocket 110 runs a sprocket chain 112 and by means of which power is transmitted from the motor shaft 108 to the shaft 111. On the shaft 111 is mounted a drum 113 provided at each end with sprockets 114 that engage with the sprocket chains 95. Rotatably mounted in the framework above referred to and parallel with the shaft 111 is a shaft 115 and on this shaft is a drum 116 and over which the conveyor chain, composed of the members 95 and 96, runs as clearly shown in Figs. 6 and 7. Also rotatably mounted in the framework above referred to is a shaft 117 that carries a drum 118. At each end of the drum 118 is located a sprocket wheel 119 for engaging the sprocket chain 95. Rotatably mounted in the framework and parallel to the shaft 117 is a shaft 120 carrying a drum 121 and over which runs the conveyor composed of the members 95 and 96, as clearly shown in Figs. 6 and 7. At one end of the shaft 117 is secured a ratchet 131 adapted to be engaged by a pawl 122 mounted on a lever 123 that is pivotally mounted at 124. Pivotaly secured to the upper or free end of the lever 123 is a connecting rod 125 that is pivotally attached to an operating lever 126. The operating lever 126 is conveniently located within reach of the operator of the machine and the ratchet and pawl 131 and 122 respectively are for a purpose to be hereinafter described. The motor 107 has one end of its energizing winding connected by conductor 132 to the return lead 59 that extends to the switch blade 49. The other end of the energizing winding is connected by conductor 133 to binding post 134 on the switchboard 52 and this binding post 134 is connected by conductor 135 to the arcuate contact plate 136, which plate is adapted to be engaged by switch arm 53 as the same is rotated about the shaft 51, bringing the switch arm 53 into association with the arcuate contact plate 136. This will close an energizing circuit for the motor 107 from conductor 41, conductor 43, switch blade 48, conductor 50, post 51, switch arm 53, arcuate plate 136, conductor 135, conductor 134, energizing winding of the motor 107, conductor 132, conductor 59, switch blade 49, conductor 44, and to conductor 42. This circuit will cause the drive shaft 108 of the motor 107 to rotate in a clockwise direction for example. Also associated with and forming part of the motor 107 is an energizing winding to one end of which is connected the conductor 132. The other end of this what may be called a reverse winding is connected by conductor 137 to binding post 138 and the binding post

in turn is connected by conductor 139 to arcuate contact plate 140. Therefore, if we assume that the arm 53 has closed the circuit for the energizing winding of the motor 107 by engaging with the arcuate plate 136, that such circuit will be broken when the arm 53 rides off the end of such plate 136 and that when the arm 53 is moved onto the arcuate contact plate 40, an energizing circuit will be closed through what may be called the reverse winding of the motor 107 through the conductor 137 and, therefore, the drive shaft 108 of such motor will rotate in the reverse direction, or for example, in a counter-clockwise direction. This mechanism, therefore, makes it possible for an operator to move the upper reach of the chain conveyor, composed of the sprocket chains 95 and transverse plates 96, either to the right or to the left, as viewed, for example, in Fig. 6.

When the rectangular framework 73 with all parts associated therewith has been moved to the extreme right hand position, or in the position shown in Fig. 6, it is obvious that the upper reach of the chain conveyor will be of considerable length and if a load of brick 87 were placed thereon that such upper reach would sag considerably as it is only supported on the rolls 93 and 118. To prevent such an occurrence I have arranged along the lengths of the framework composed of the members 19, 21, 69 and 70 a plurality of pairs of vertically arranged bars 145, such bars being secured to the inner faces of the upper one of the plate 21 and the upper part of the plate 69. The pairs of bars 145 are provided adjacent their top end with slots 146 and at their lower end with corresponding slots 147. In the slots 146 and 147 fit the ends of shafts 148 on which are mounted rollers 149. The slots 146 are utilized as means for housing the shafts 148 and associated rollers 149 when not in use, while the slots 147 are utilized when it is desired to place the rolls 149 on the shafts 148 into association with the under face of the upper reach of the chain conveyors composed of the sprocket chains 95, and the transverse plates 96. Therefore, as the rectangular frame 73 is moved from the position shown, for example, in Fig. 7 to that shown in Fig. 6, the operator will remove the roll 149 and associated shaft 148 from the slots 146 and will deposit the same in the slots 147 at the lower end of the bars 145, and conversely as the framework 73 moves from the position shown in Fig. 6 to that shown, for example, in Fig. 7, an operator will remove the rolls 149 from the lower slots 146 and will place such rolls and associated shaft 148 in the slots 146 at the upper end of the bars 145. At the left-hand end of the channel beam 14 and side plates 15, as viewed in Fig. 1 and on the top thereof but spaced apart from each other, are secured alined bearings 150 and in such bear-

ings is rotatably mounted a shaft 151. Such shaft extends laterally outward from the channel beam 14 and at one side thereof and this extending end is provided with spaced sprockets for engaging with the spaced conveyor chains 152. Secured to the shaft 151 intermediate the bearings 150 is a bevel pinion 153 which meshes with and is driven by a bevel pinion 154 secured to the longitudinally extending shaft 29. The shaft 153, therefore, rotates in synchronism with the shaft 29 and also with the shaft 32. The conveyor chains 152 are spaced apart from each other by being secured to the opposite sides of transversely extending plates 155, as clearly shown in Fig. 8, and the outer ends of such plates 155 are provided with upstanding side plates 156, the side plates 156 therefore defining the width of the conveyor. On each transverse plate 155 is pivotally attached spaced plates 157 which may be moved from the full position shown in Fig. 9, for example, to the dotted position shown in such figure, this being desirable when header courses are to be built in the wall. The operation of this device will be hereinafter described. One end of the chain conveyor above described is secured to a transversely arranged shaft 158 extending between the plates 69 and the upper plate 21. The other end of the chain conveyor is left free, as shown in Fig. 6, and this free end is long enough to allow the horizontally arranged frame, composed of the members 19, 21 and 69, to be moved into its extreme downward position without the sprocket chains 152 becoming disengaged from the sprockets on the shaft 151. As the horizontally arranged frame composed of the members 19, 21 and 69 is moved upwardly, the shaft 151 will be rotated to take up the slack in the chain conveyor illustrated in Figs. 6 and 8. The longitudinally extending members 10 extend to the left, as viewed in Fig. 1, beyond the end of the last pair of uprights 16 and on such members 10 or several of them are secured spaced bearing members 160, these bearings being in alinement with each other and rotatably mounted therein is a shaft 161. Secured to the shaft 161 adjacent each of the bearing members 160 are sprocket wheels 162. Mounted at the top of the channel beam 14 is a bearing member 163 in which is rotatably mounted a shaft 164 arranged parallel to the shaft 161. This shaft 164 extends laterally outward from the bearing member 163 and such laterally extending end is provided with sprocket wheels 165 that are in alinement with the sprocket wheels 162. Over the sprocket wheels 162 and 165 run a pair of sprocket chains 166, these sprocket chains being tied together by transversely arranged plates or carriers 167 and in which plates or carriers the brick 87 are placed for delivery to the chain conveyor illustrated in Fig. 8. On one end of the shaft

164 is secured a sprocket 168 that is in alignment with a sprocket 169 secured to the drive shaft 170 of a motor 171 that is secured to a bracket 172. From the aligned sprockets 168 and 169 runs a sprocket chain 173 and by means of which power is transmitted from the motor 171 to the shaft 164 so as to drive the spaced sprocket chains 166 in the direction of the arrow shown in Fig. 1. The motor 171 has one end of its energizing winding connected by conductor 174 to the return conductor 59 which leads back to the conducting wire 42. The other end of the energizing winding is connected by conductor 175 to a binding post 176 on the switchboard 52 and this binding post 176 is connected by conductor 177 to an arcuate contact plate 178, which arcuate plate is adapted to be engaged by the arm 53 so as to close the energizing circuit for the motor 171. An operator will stand at the lower end of the conveyor comprised of the sprocket chains 166 and containers 167 and will place the brick 87 in such containers so as to have such brick 87 delivered to the chain conveyor shown in Fig. 8 in the proper manner and an operator also will set the pivoted plate 157 associated with the transverse members 155 whenever it is necessary to provide brick for the header course so as to leave the stretcher portions thereof either on the inside or the outside of the wall to be built.

Secured to a pair of adjacent T-members 16 and extending upwardly therefrom and spaced apart from each other so as to provide a rectangular frame are uprights 177 and 178, these members being tied together intermediate their ends by bars 179. Also at the top ends of the uprights 177 and 178 is formed a rectangular framework indicated generally by the reference numeral 180. Secured in position within the rectangular framework composed of members 177 and 178 is a mortar holding tank 181 within which is rotatably mounted a stirring device 182. This stirring device is provided at its top end with a bevel pinion 183 which meshes with and is driven by a bevel pinion 184 secured to a shaft 185 that is rotatably mounted in bearings 186 on the top of the rectangular frame 180. Also on the top of the rectangular frame 180 and at one side thereof is rotatably mounted a shaft 187, such shaft being parallel to the shaft 185 and the shaft 187 and 185 are provided with aligned sprockets, over which runs a sprocket chain 188 and by means of which power is transmitted from the shaft 187 to the shaft 185 to thereby rotate the mixer 182. Also on the shaft 187 is secured a sprocket wheel that is in alignment with the sprocket wheel on the drive shaft 187 of a motor 190, such motor being mounted on a bracket 191 secured to the uprights 177. Over the sprockets on the shafts 187 and 189 runs a sprocket chain 192 and by means of

which power is transmitted from the motor 190 to the shaft 187. On the shaft 187 is mounted a drum 193 over which runs a chain bucket conveyor 194. This chain bucket conveyor 194 is endless and the lower end extends into a mortar box 195 mounted on a pair of transverse members 11, a drum (not shown) being located in the mortar box 195 for engaging with the chain bucket conveyor 194. The motor 190 has one end of its energizing winding connected by conductor 196 with the return wire 59 above referred to and the other end of the energizing winding of such motor is connected by conductor 197 to a binding post 198 on the switchboard 52. The binding post 198 is connected by conductor 199 to an arcuate contact plate 200, and such arcuate contact plate is adapted to be engaged by the switch arm 53. Therefore, when the arm 53 is in engagement with the arcuate contact plate 200, the energizing circuit for the mortar motor 190 is closed and the chain bucket conveyor 194 operated to move mortar contained in the mortar box 195 upwardly and deposited in the mortar holder 181. To the lower end of the mortar holder 181 is connected one end of a delivery pipe 201 and the other end of this delivery pipe is associated with a delivery nozzle or chute 202 mounted on the framework 89. Secured to the spaced beams 13 beneath one of the plates 15 is a runaway 203, and in this runaway is mounted a wheeled carriage 204. Suspended from the wheeled carriage 204 is a framework 205 provided with rolls 206 under and over which runs the delivery pipe 201, as clearly shown in Fig. 1. To one end of the wheeled carriage 204 is connected one end of a cable 207, and this cable passes over a roller or sheave 208 rotatably mounted at one end of the runaway 203. This cable 207 passes over the roller or sheave 208 at one end of the runaway 203 and over a roller or sheave 209 at the other end of such runaway 203. From thence the cable 207 extends downwardly and its lower end is secured to a drum 210 on the shaft 77. To the other end of the wheeled carriage 204 is secured one end of a cable 211 and this cable extends over a roller mounted in axial alignment with the roller or sheave 209 and from such roller or sheave the cable 211 extends downwardly and has its lower end secured to a drum 212 secured to the shaft 77. The cables 207 and 211 are so connected to the drums 210 and 212 that when one of them, as the cable 207, is being wound up on this drum 210, the other cable 211 is being unwound from its drum 212. If we assume the parts to be in the position shown in Fig. 1, that is with the frame 73 in its extreme lefthand position, then the wheeled carriage 204 supporting the intermediate portion of the delivery pipe 201 will be in its extreme left-hand position, so that when the operator, by moving the switch arm 53 to close a circuit for the motor 79 at the

arcuate member 105, the shaft 77 will be rotated to move the rectangular framework 73 and associated parts to the right, as viewed in Fig. 1 and will also move the wheeled carriage 204 to the right as shown in said figure.

Secured to the slide members 65 above the upper reach of the conveyor illustrated in Figs. 10 and 11 by straps 215 are plates 216, the distance between such plates being equal to the width of the wheel composed of the bricks 87, and such members 216, therefore, act as a guide for the bricks 87 as they are moved to the right on the upper reach of the conveyor above referred to.

In order that I may operate the motor 171 independently of the control arm 63 on the switchboard 52, I have arranged a switch 220, a contact 221 of which is connected by conductor 222 to one end of the energizing winding of the motor 171. The switch blade 223 of such switch 220 is connected by conductor 224 to the conductor 50. Also, it is desirable to provide means for operating the motor 190 independently of the control means shown on the switchboard 52, and for this purpose I have provided a switch 225, the contact 226 of which is connected by conductor 227, to one end of the energizing winding of the motor 190 and the switch blade 228 of which is connected by conductor 229 to the conductor 50.

The operation of my device is as follows, it being assumed that the device has been constructed and the parts arranged as above described and with the apparatus in position parallel to the position in which it is desired to build a wall. On this assumption, the horizontally arranged framework composed of the members 19, 21 and 69 is in its lowest position, mortar is mixed and in the mortar box 195 and an operator is in position to load bricks into the containers 167 on the endless conveyor shown at the left of Fig. 1. Also, the rectangular framework 73 with everything associated therewith is assumed to be in its extreme left hand position with respect to Fig. 1, that is, with the upper or receiving end of the angularly disposed member 100 at the delivery end of the chain conveyor shown in Fig. 152. The operator will, therefore, bring the switch arm 53 into engagement with the arcuate contact member 54, closing the energizing circuit for the motor 39 so as to cause an upward movement of the horizontally arranged framework above referred to and when such framework has reached a sufficient high position above the base of the wall, the operator will move the switch arm 53 off the arcuate contact member 54 ready to go into engagement with the arcuate contact members 105, 136, and 178. The operator will then bring the switch blade 223 into engagement with the contact 221 to close the energizing circuit for the motor

171, and begins to pile brick in the proper relation in the containers 167 on the conveyor shown at the left of Fig. 1. This movement of the conveyor and the feeding operation will continue until the brick 87 have been fed off the conveyor onto the device shown in Fig. 8 and until the inclined member 100 is loaded with the brick 87. The operator will now operate the clamp 101 so as to clamp the lowermost set of bricks on the inclined member 100 and will bring the switch arms 53 into engagement with the arcuate contact members 105, 136, and 178 respectively, throwing into operation simultaneously the motors 79, 107 and 171 respectively. While such motors are operating, the operator will move the switch blade 223 out of engagement with the contact 221. The motor 79 operating, the cable 75 will be wound on the drum 78 and the rectangular framework 73 with all parts associated therewith will be moved to the right, as shown in Figs. 1, 6 and 7. The motor 107 will operate to rotate the drum 113 to feed the endless sprocket chains 95 to the right of such figures and the motor 171 will operate to continue the motion of the conveyor mechanism shown at the left of Fig. 1. As the upper reach of the endless chains 95 and transverse members 96 continues, the bricks 87 will be fed off the chain conveyor shown in Fig. 8, and when the extreme right-hand position has been attained by the rectangular framework 73 and associated parts, the upper reach of the endless chain conveyors 95 and transverse members 96 will be filled with a layer of brick 87 corresponding, if it is the first course for the wall, to a header course, as shown for example in Fig. 6. As soon as the rectangular framework 73 has reached its extreme right-hand position, as shown in Fig. 6, the operator will move the switch arm 53 off the arcuate contacts 105, 136 and 178 respectively, thereby stopping the motors 79, 107, and 171 and all parts are brought to a position of rest. The operator now by bringing the switch blade 228 into engagement with the contact 226 will close an energizing circuit for the mortar motor 190, which thereby causes operation of the bucket conveyor 194 to lift mortar from the mortar box 195 and deposit the same into the mortar container 181 located at the top of the framework composed of the members 177 and 178. The operation of the motor 190 will not only cause the operation of the bucket conveyor 194 but will cause a rotary movement to take place on the part of the stirring apparatus 182 in the mortar container 181 and such mortar will be fed through the conduit 201 and into and out of the delivery pipe or chute 202 which is located to the left of the delivery end of the inclined member 100. As soon as the mortar begins to flow through the chute

202, the operator will operate the lever 126 to bring the pawl 122 into engagement with the ratchet 131 to lock the shaft 117 against rotary movement and will bring the switch arm 53 into engagement with the arcuate contact members 140 and 200 simultaneously, to thereby cause the simultaneous operation of the motor 107 in a reverse direction to what it was operated formerly and will cause the continued operation of the mortar motor 190. The operator at this point releases the switch blade 228 from the contact 226. Also the operator will release the clamping member 101 from the lowermost brick on the inclined member 100. The motor 107 operating in the reverse direction will rotate the shaft in a counter-clockwise direction and will begin to pull the lower reach of the chain conveyors 95 and transverse members to the left, as shown in Figs. 6 and 7, and the brick 87 on the inclined member 100 and on the upper reach of the endless chain conveyors 95 and 96 will be deposited on the bed of mortar that is spread on the base of the wall from the chute 202. When the frame 73 with the parts associated therewith has reached its extreme left-hand position again, the operator operates the cam 101 to clamp the remaining brick 87 in position on the inclined member 100 and moves the switch arm 53 off the arcuate contact members 140 and 200, thereby bringing the entire apparatus into a position of rest. This completes the sequence of operations of laying a course of brick in the wall and is repeated for each layer.

Should a wider wall be desired the rectangular frame 73 is replaced by a wider rectangular frame and associated parts by moving outward the slide 66 carrying the members 69 and 70 and the tracks 72. Also if it is necessary to arrange for openings in the wall to be built, the operator, when brick is led up to the right-hand edge of the opening as viewed in Fig. 1, will stop the machine, operate the clamp 101 and the entire apparatus may be moved by any convenient means (not shown) to the left, as viewed in Fig. 1 until the left-hand edge of the desired opening is reached, when the laying operation may be again started. The length of the wall to be laid will depend entirely upon the length of the machine, although it is desirable to make such machine in moderate size units for convenience in handling, particularly where openings in such wall is desired. It is obvious also that although the machine has been described in considerable detail, that I am not to be limited to the exact details of construction shown other than as pointed out in the appended claims.

Having thus described my invention, what I claim as new is:

1. In a brick laying machine, the combination of a framework, a second framework

slidably mounted thereon and movable vertically with respect thereto, a carriage mounted for reciprocating movement on said second framework, mortar and brick delivering means associated with said carriage and arranged to deliver mortar in advance of the delivery of the brick in the reciprocating movement of the carriage, a presser roller associated with the carriage for forcing the delivered brick into a horizontal position and into the spread mortar, and means for reciprocating said carriage.

2. In an improved brick laying machine the combination of a framework, a second framework slidably mounted thereon and movable vertically with respect thereto, a carriage mounted for reciprocating movement on said second framework, an endless conveyor mounted in the second framework and associated with the carriage, and means for maintaining the upper reach of the endless conveyor stationary during the reciprocating movement of the carriage in one direction only.

3. In a brick laying machine, the combination of a framework, a second framework slidably mounted thereon and movable vertically with respect thereto, a carriage mounted for reciprocating movement in said second framework, an endless conveyor mounted in said second framework and associated with the carriage, means for delivering brick to the upper reach of said endless conveyor, means for moving the upper reach of said endless conveyor during the movement of the carriage in one direction on the second framework, and means for maintaining the upper reach of said conveyor stationary during the movement of the carriage in the other direction and during the delivery of brick from the endless conveyor to the carriage.

4. In a brick laying machine, the combination of a framework, a second framework slidably mounted thereon and movable vertically with respect thereto, a carriage mounted for reciprocating movement in the second framework, said carriage being provided with an inclined receiving platform and a presser roller at the delivery end thereof, a mortar receiving chute associated with the carriage, means for moving said carriage in one direction during the delivery of mortar and brick from the carriage with the mortar delivered in advance of the brick, means for spreading said mortar in an even layer to receive the brick, said brick, in the movement of the carriage, being pressed into horizontal position and into the layer of mortar, and means for reciprocating said carriage in either direction at will.

In testimony whereof, I have signed my name to this specification.

FRANK C. LAYER.