Jan. 26, 1932. W. H. MASSEN 1,843,092

BRICKLAYING MACHINE

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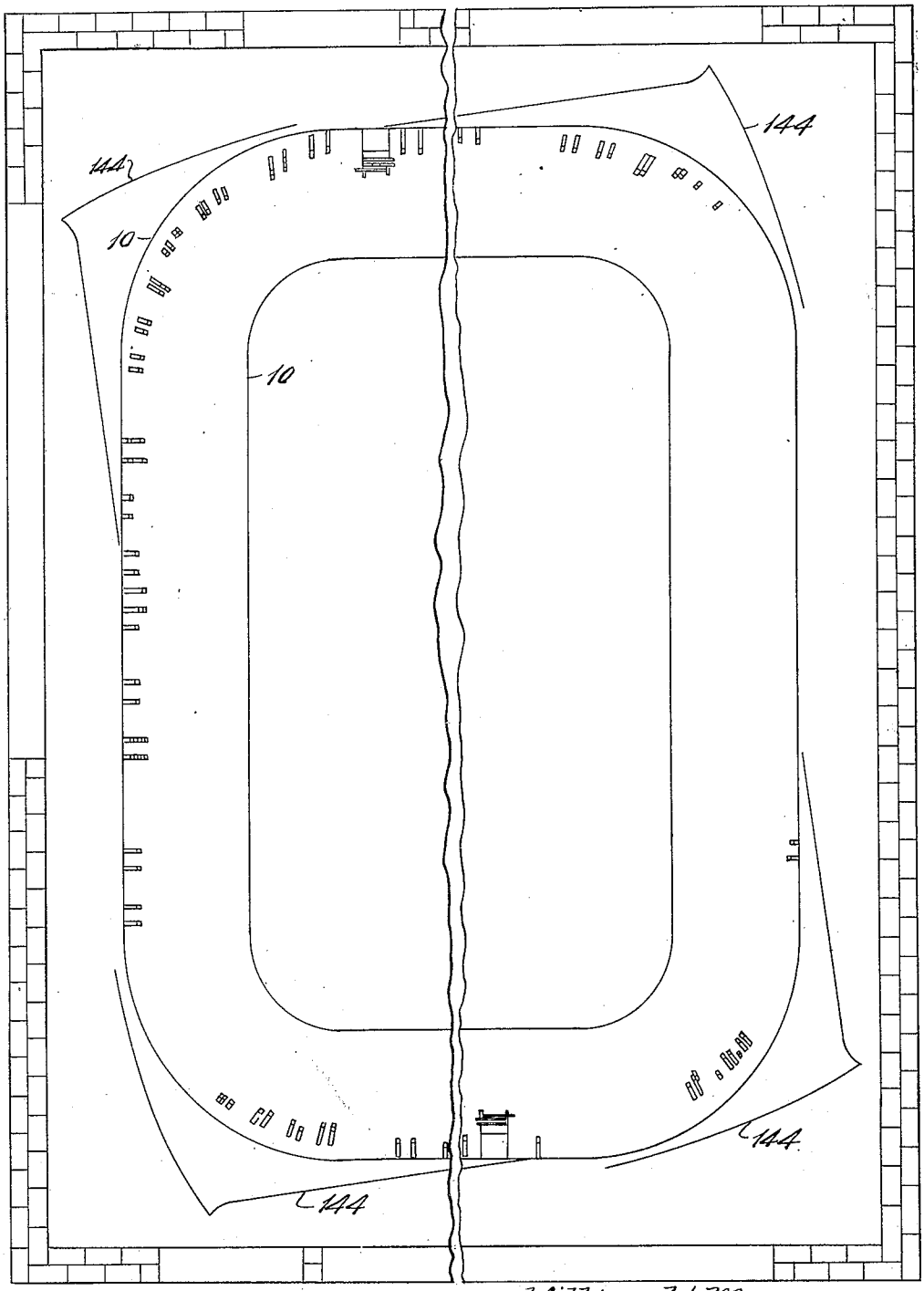



Fig. 1.

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Fig. 86.

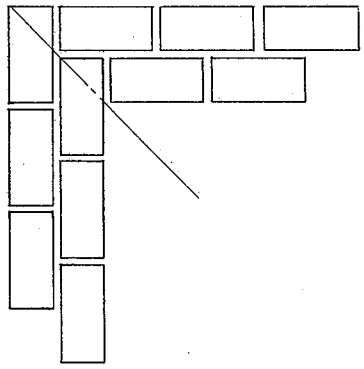


Fig. 87.

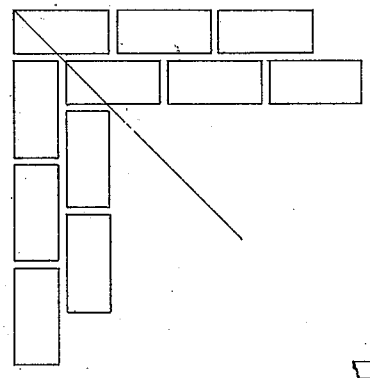


Fig. 88.

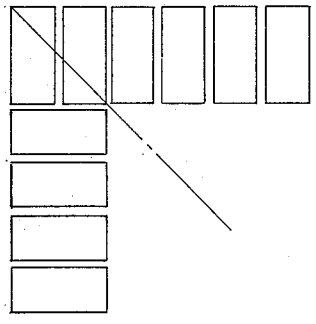


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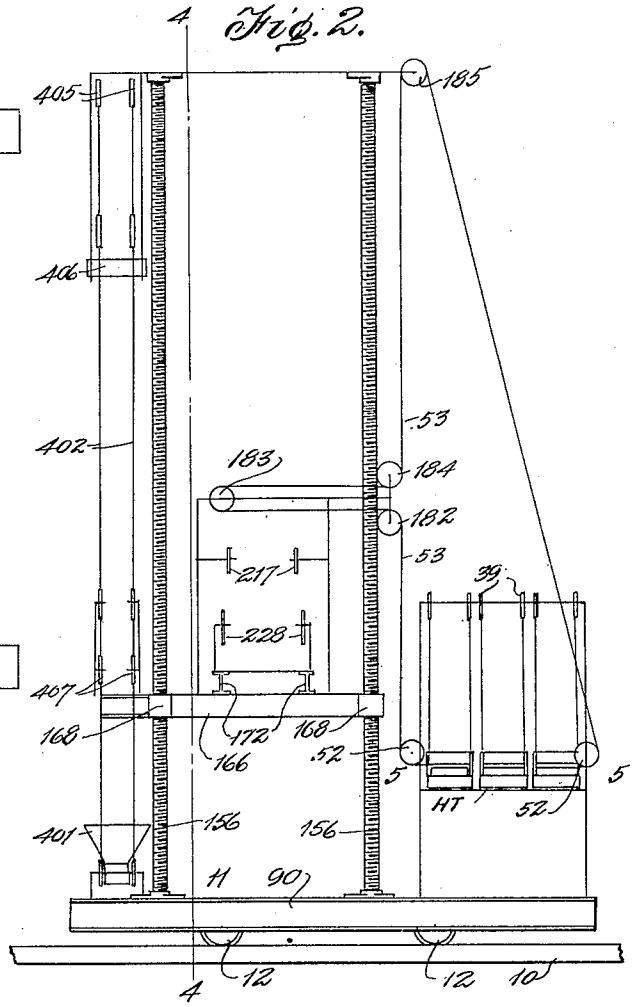
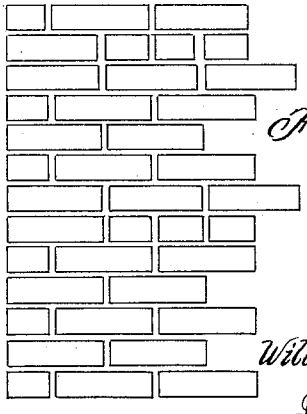



Fig. 85.



INVENTOR.
William H. Massen,
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Fig. 3.

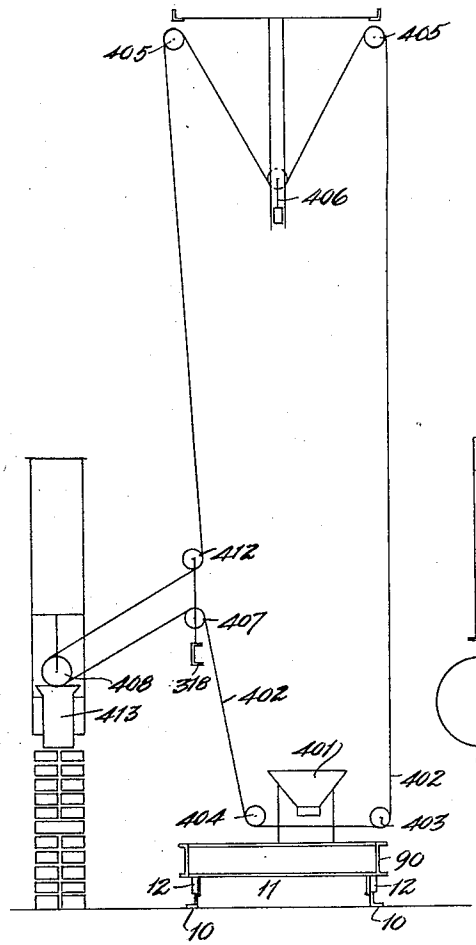
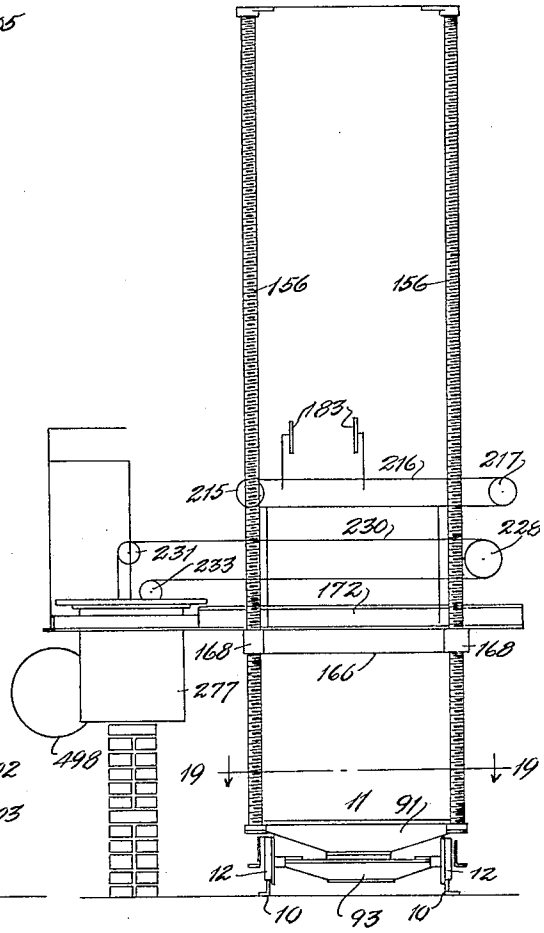



Fig. 4.




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Fig. 5.

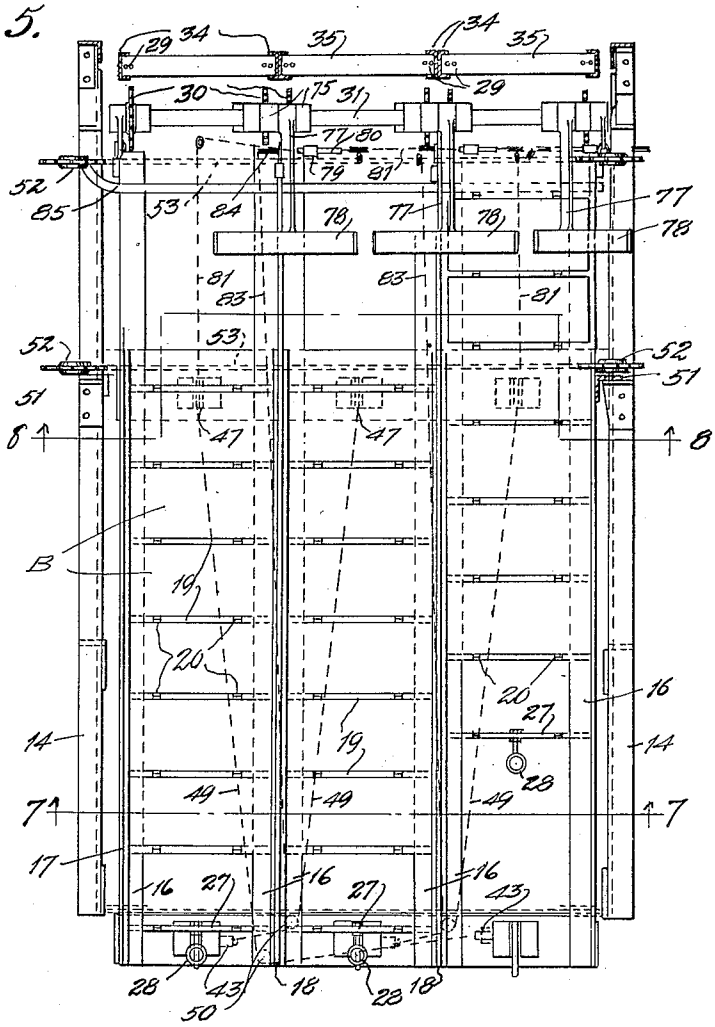
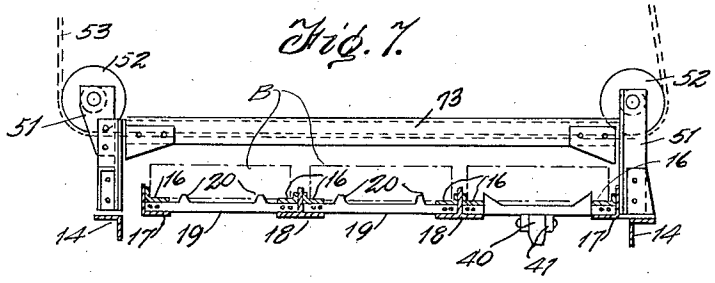



Fig. 7.




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Fig. 14.

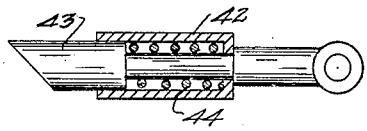



Fig. 6.




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Fig. 8.

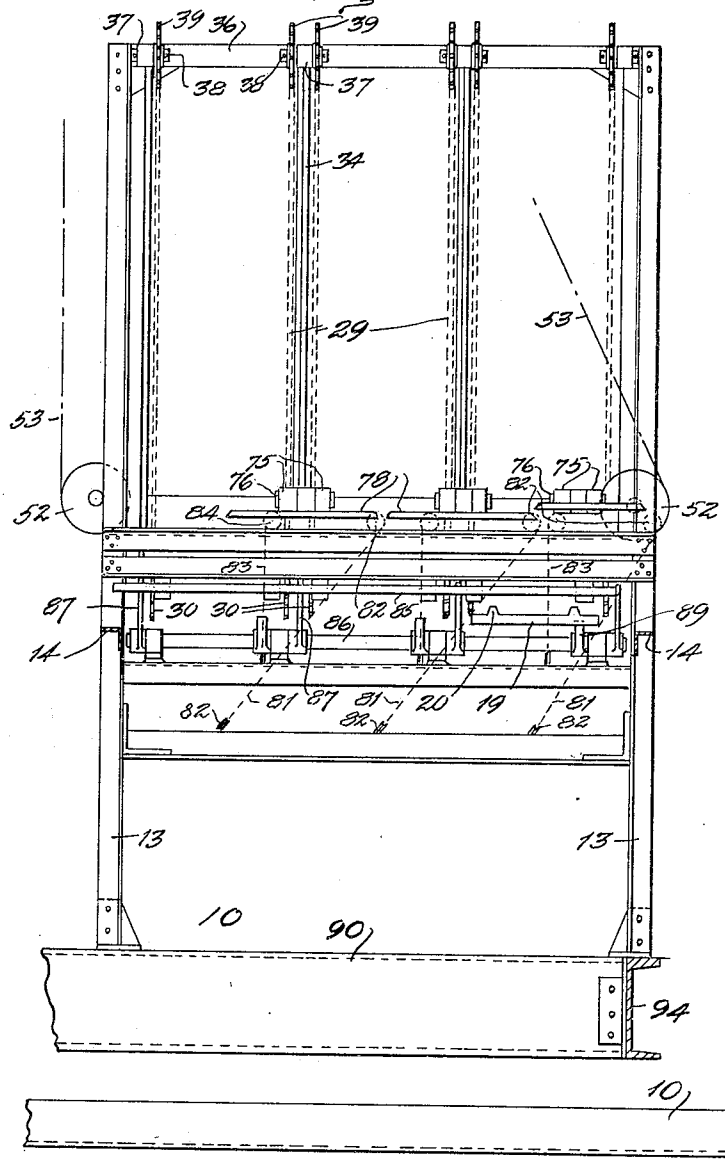
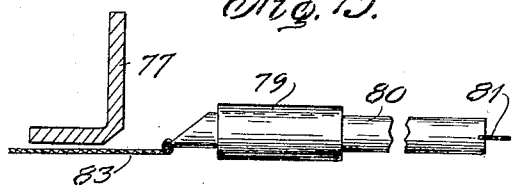



Fig. 13.




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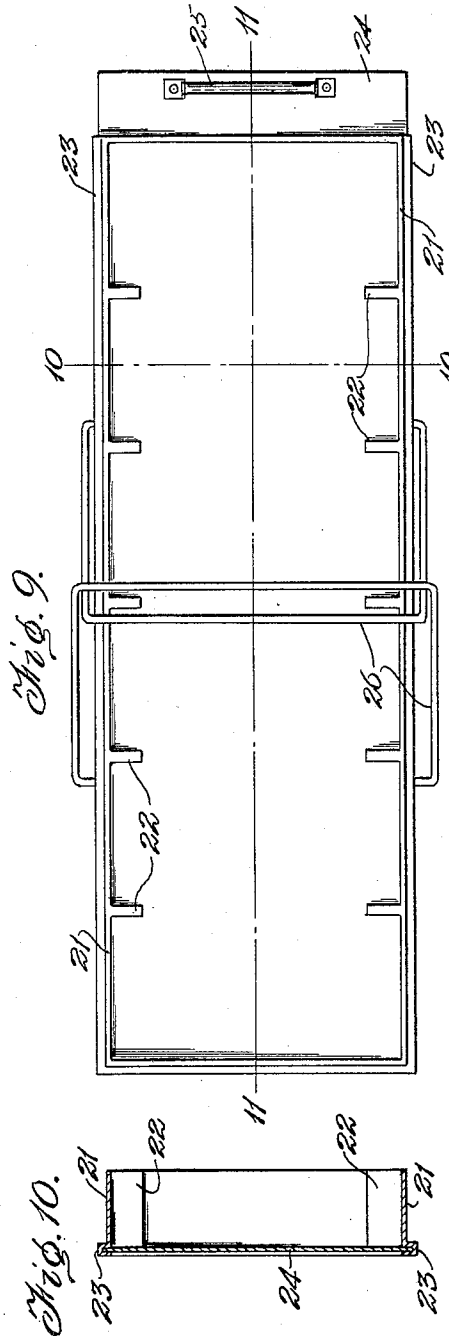



Fig. 9.

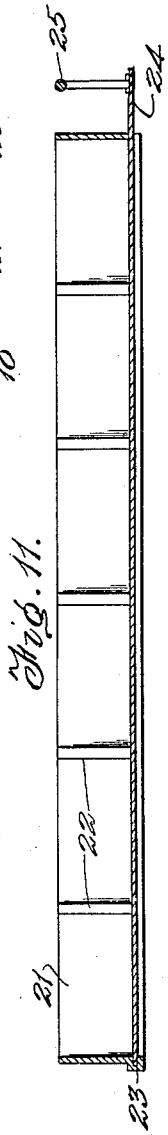



Fig. 11.

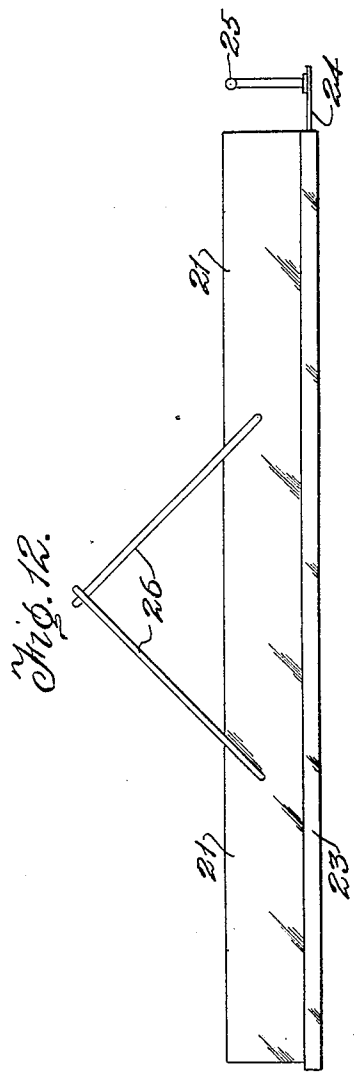



Fig. 12.




Fig. 10.

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Fig. 15.

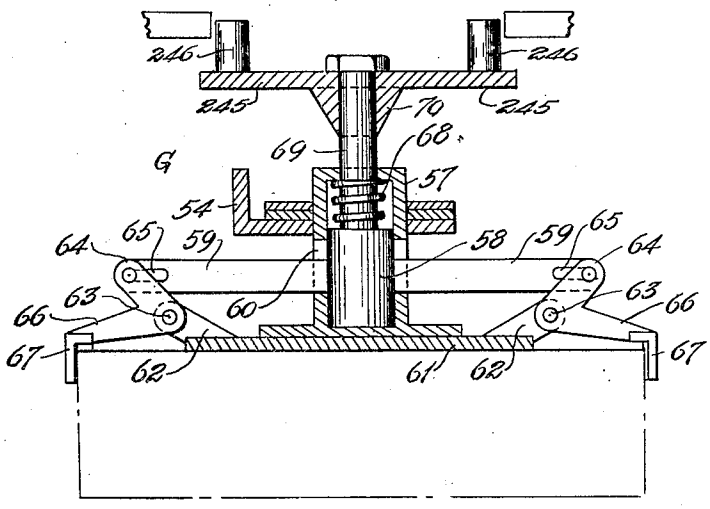
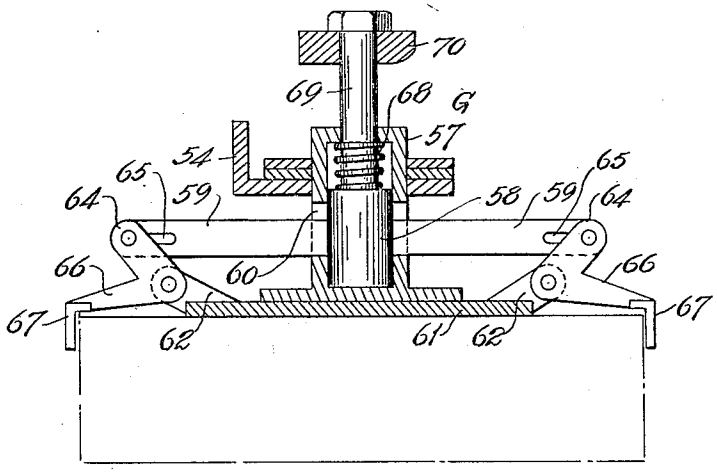



Fig. 16.




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Fig. 17.

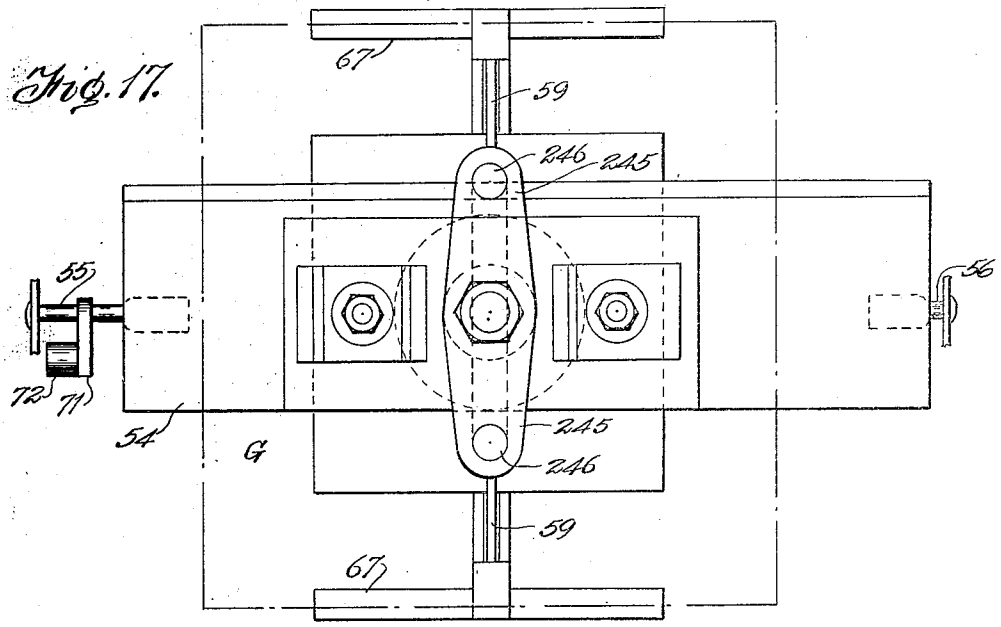
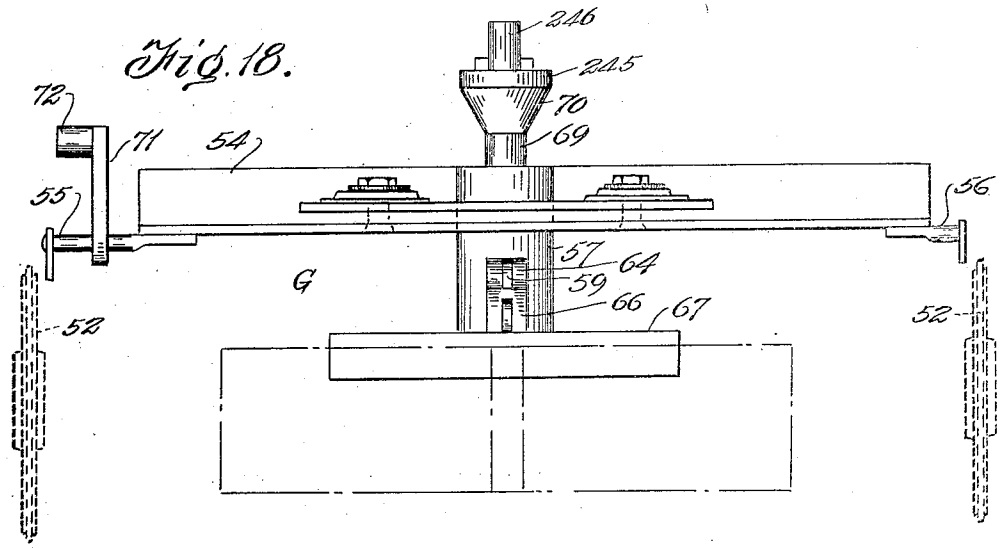



Fig. 18.




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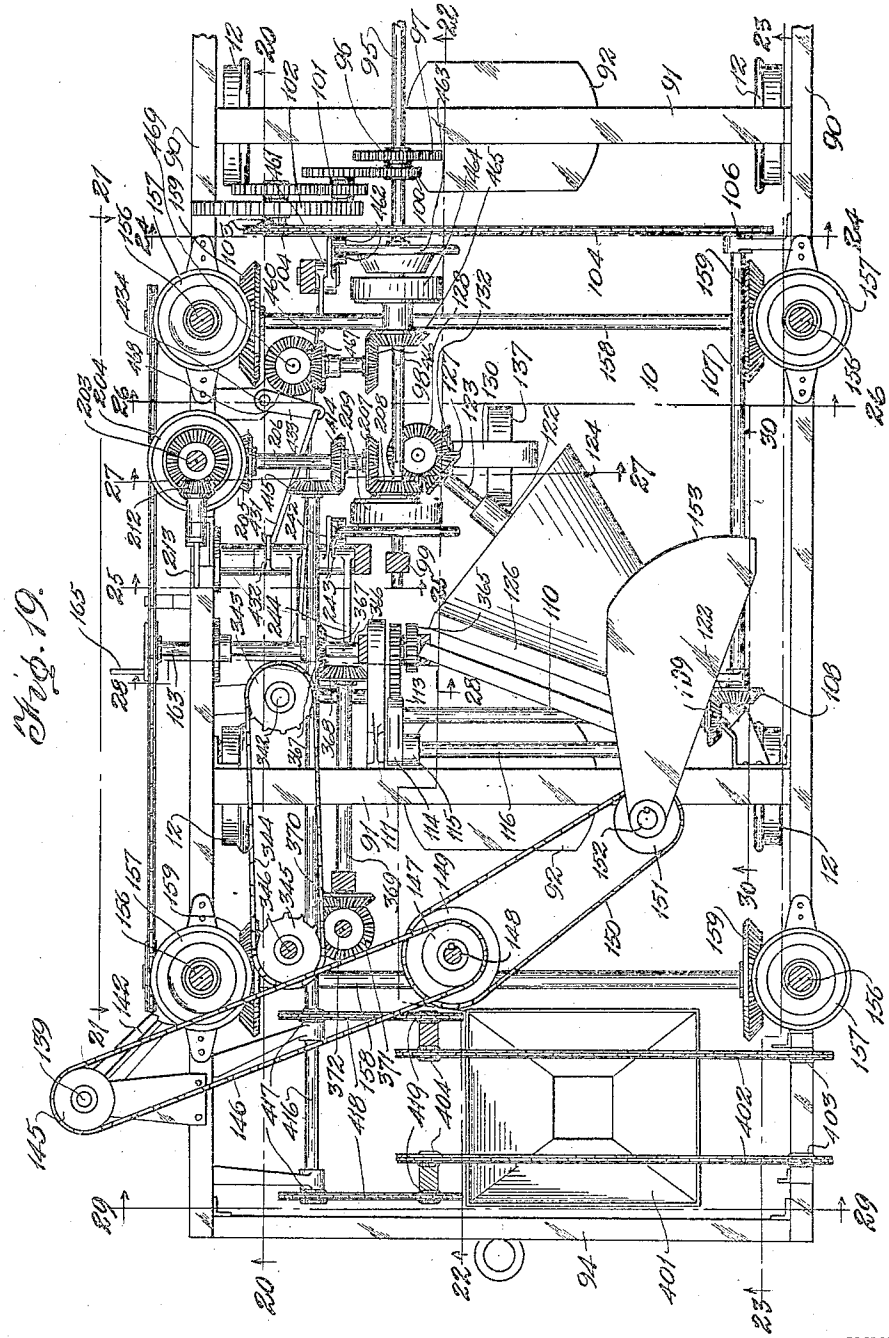


Fig. 19.

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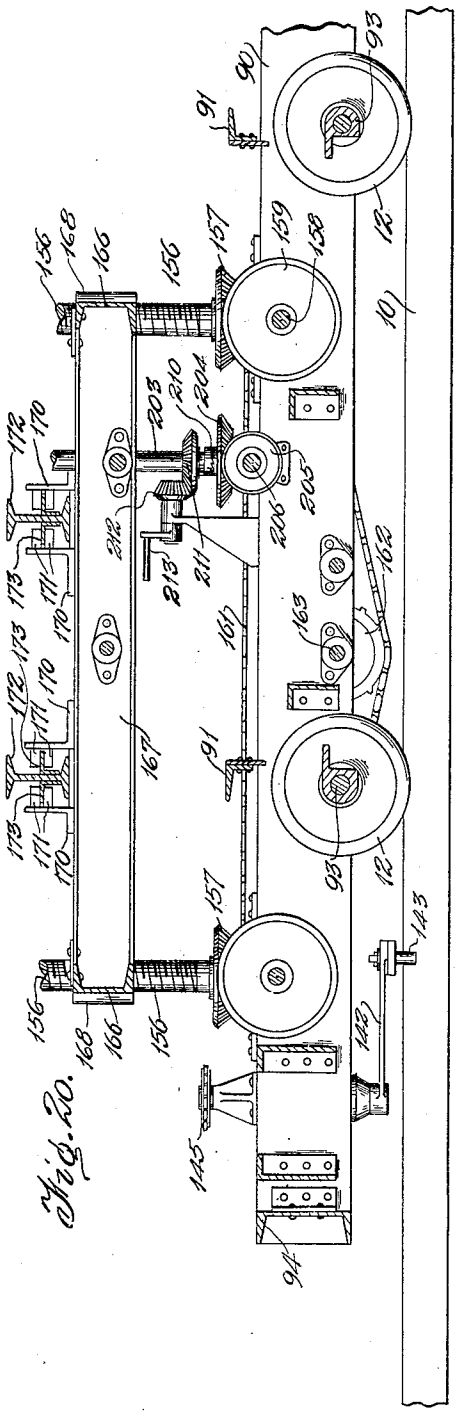


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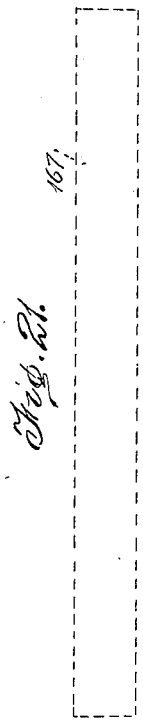


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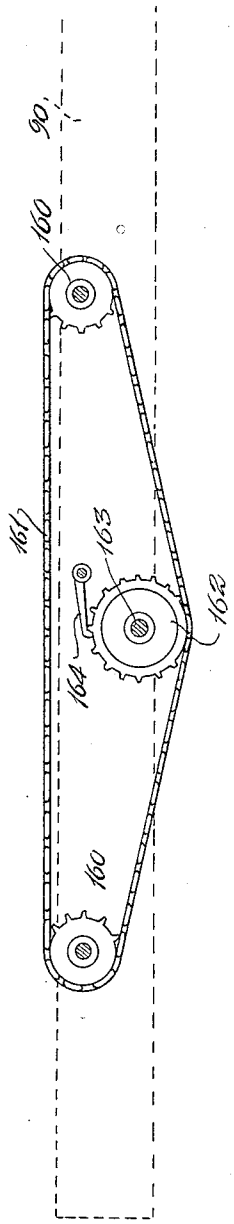


Fig. 22.

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Fig. 22.

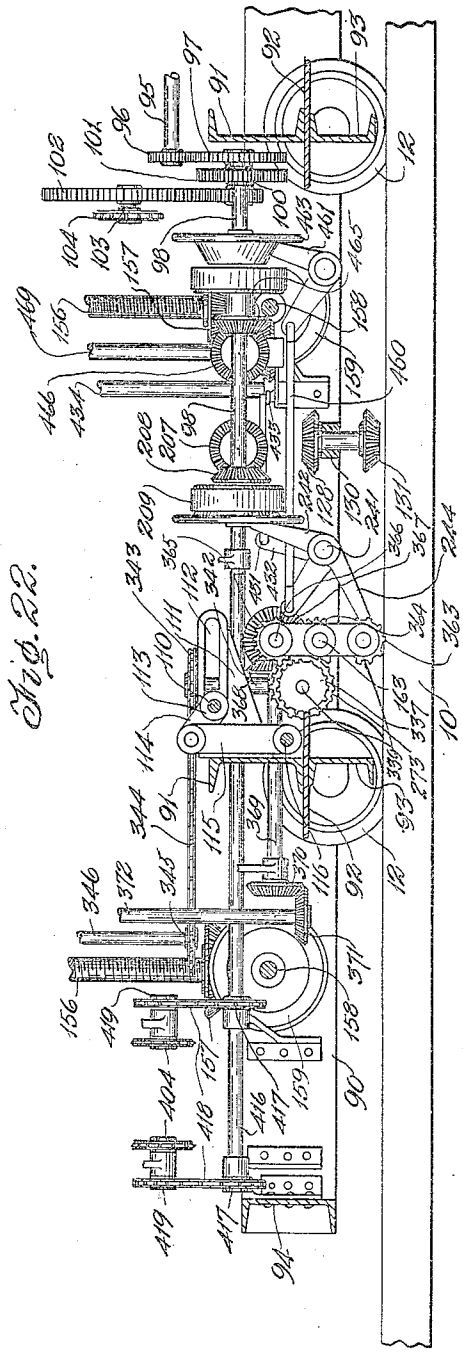
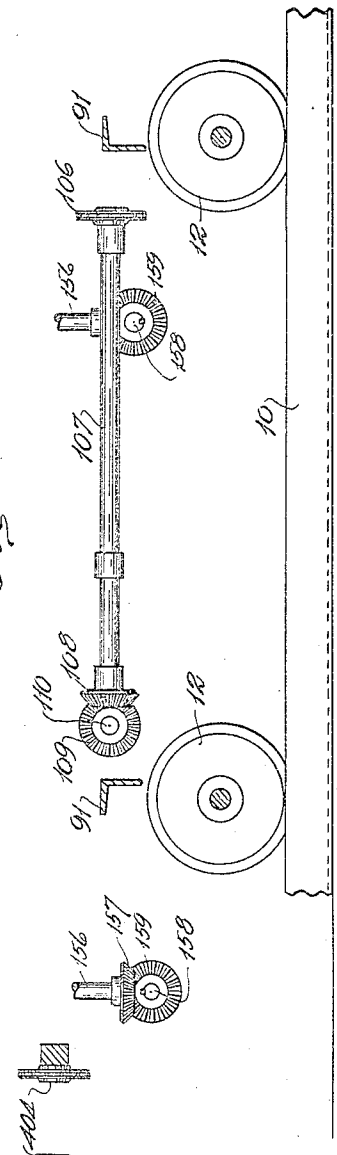


Fig. 23.



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Fig. 24.

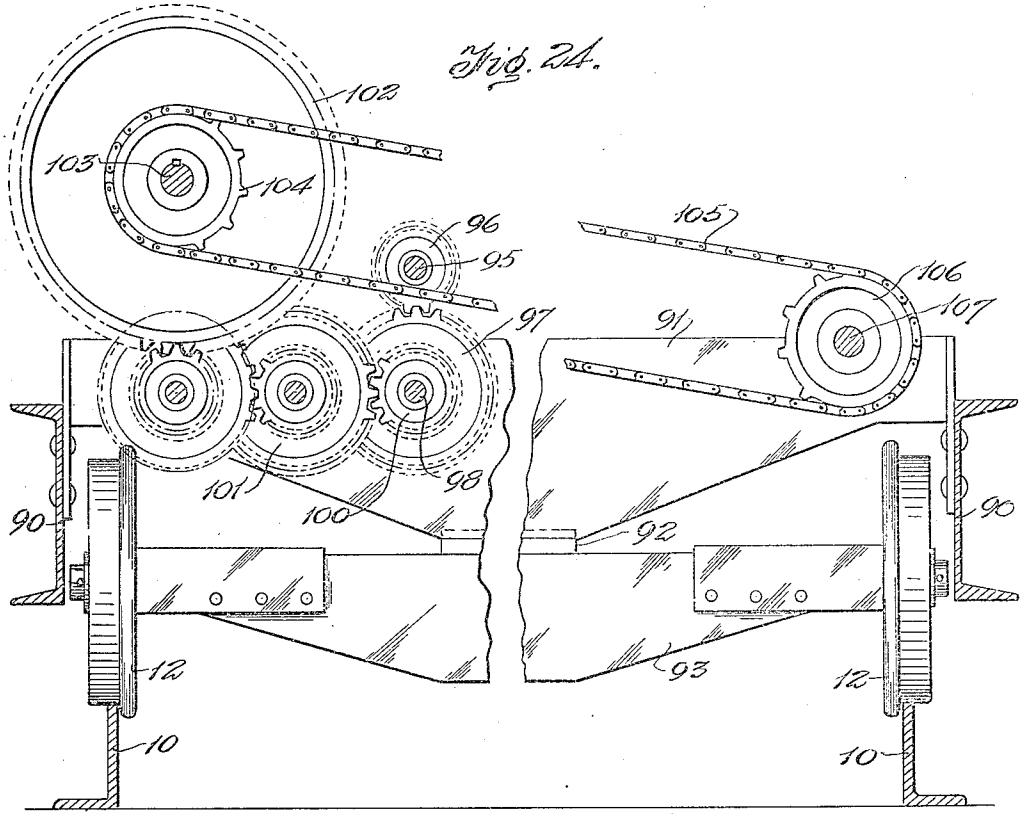
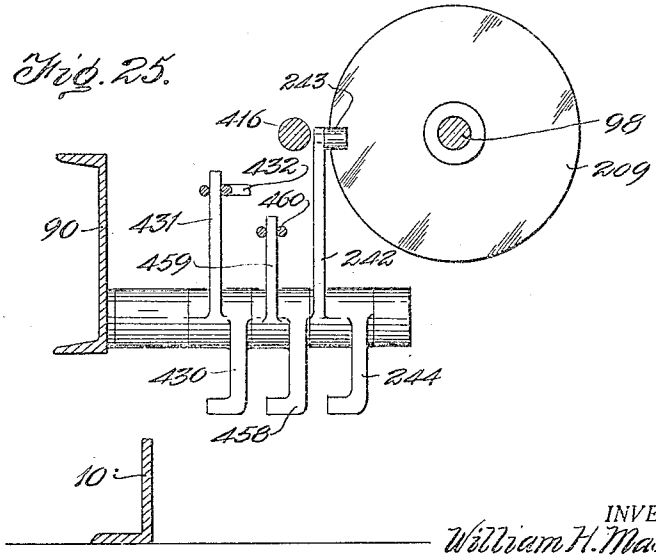



Fig. 25.




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Fig. 26.

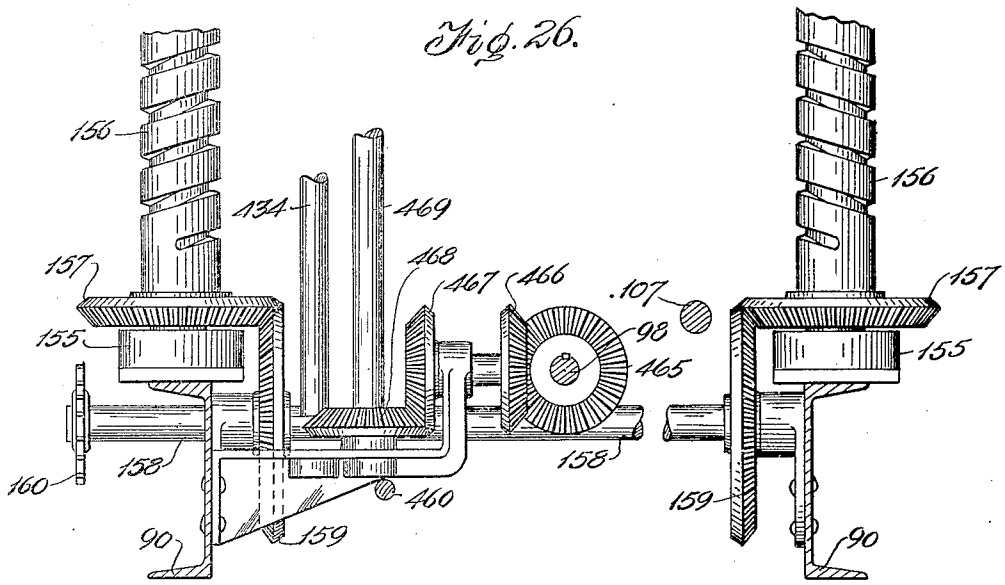
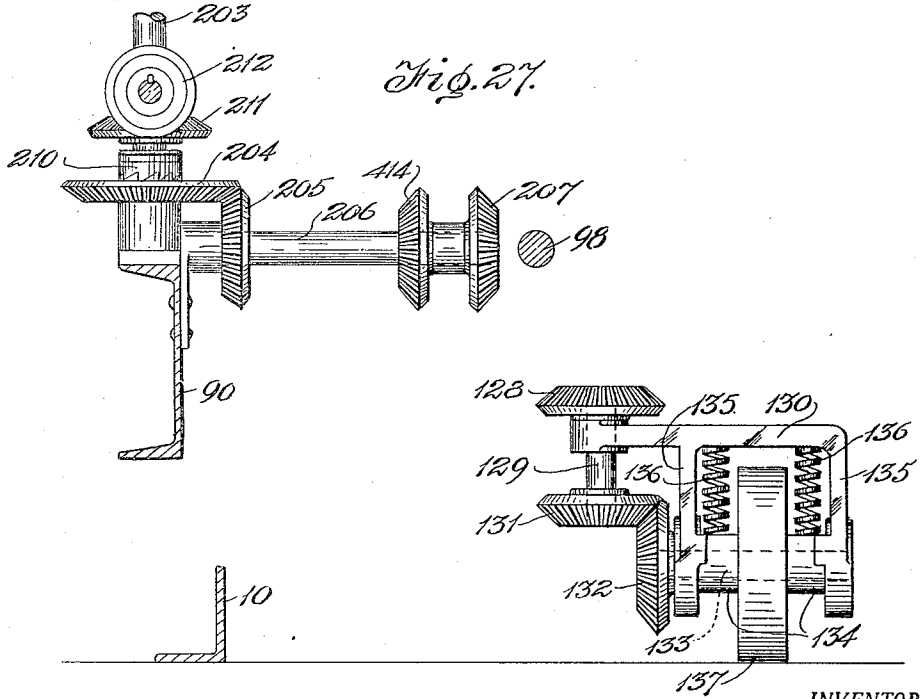



Fig. 27.




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Fig. 28.

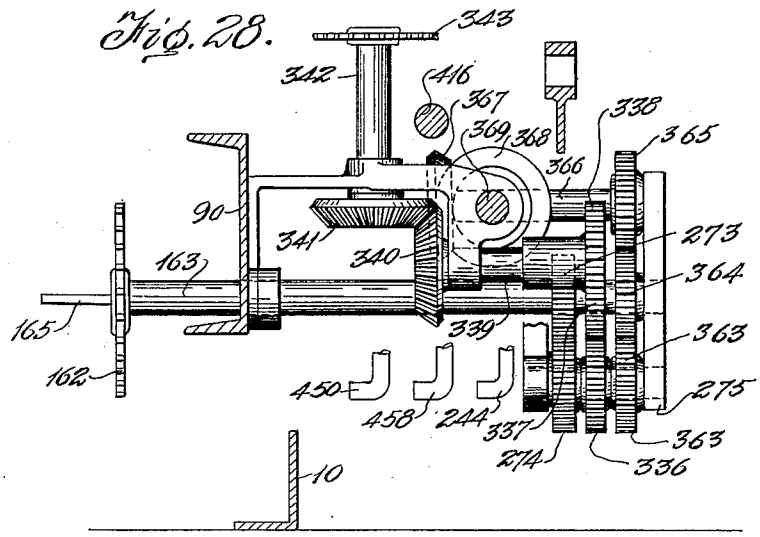



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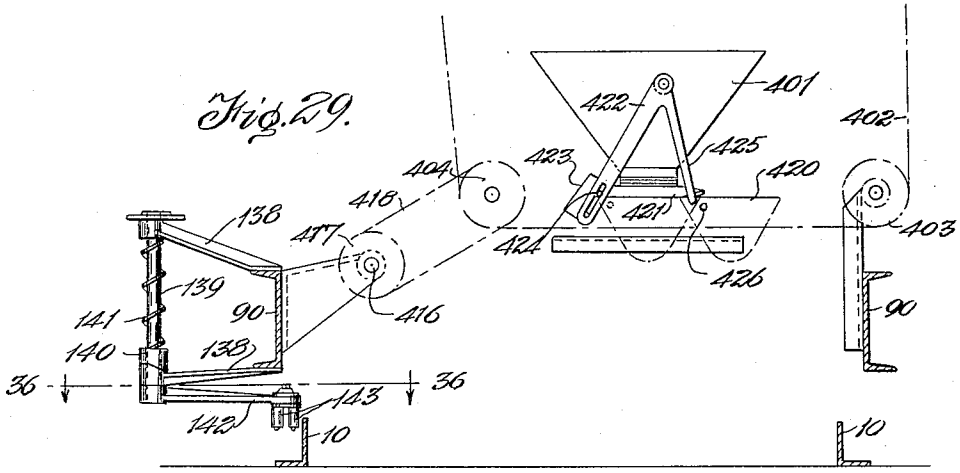
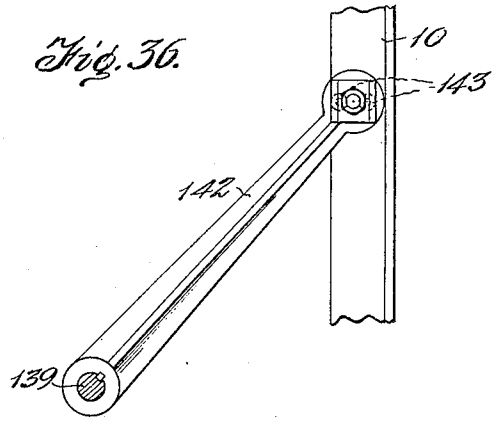



Fig. 36.




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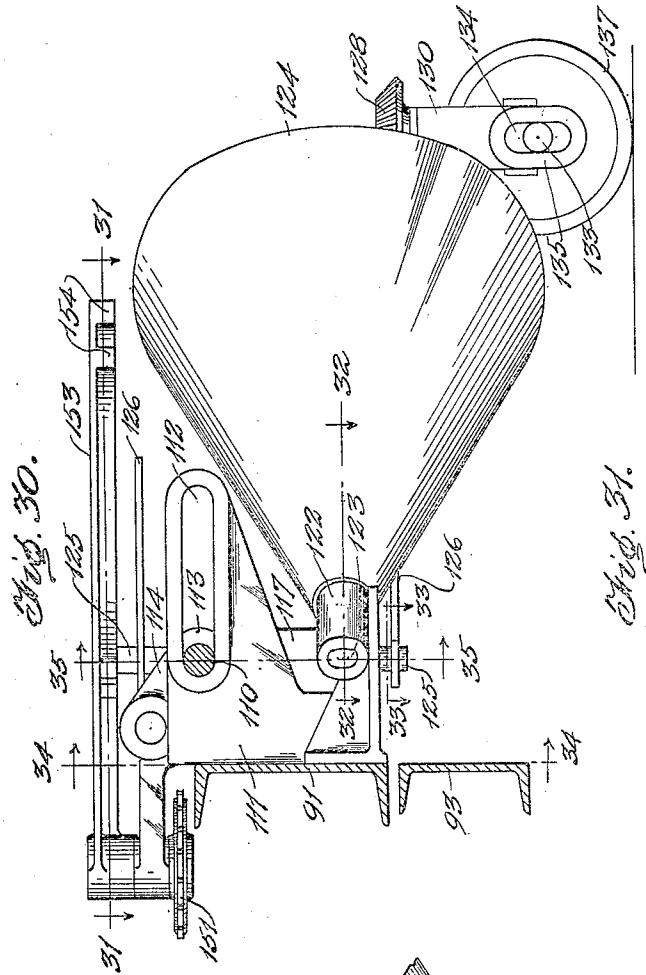


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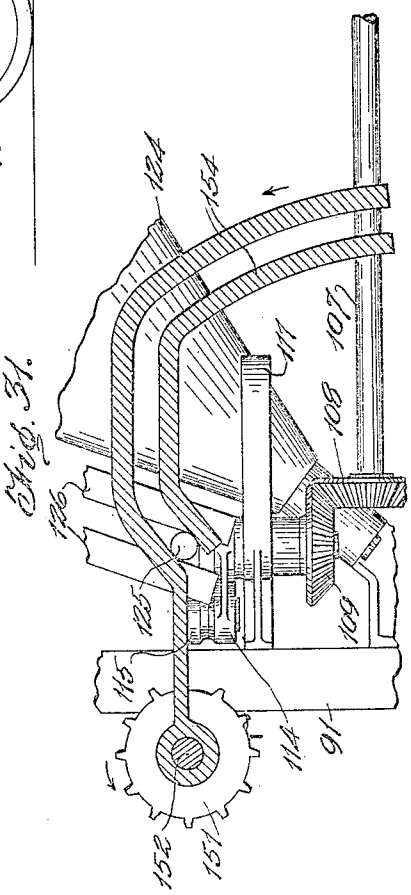


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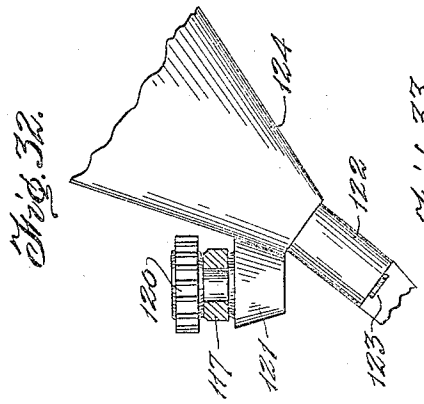


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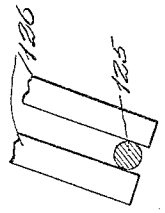


Fig. 33.

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BY J. Hahlan

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Fig. 34.

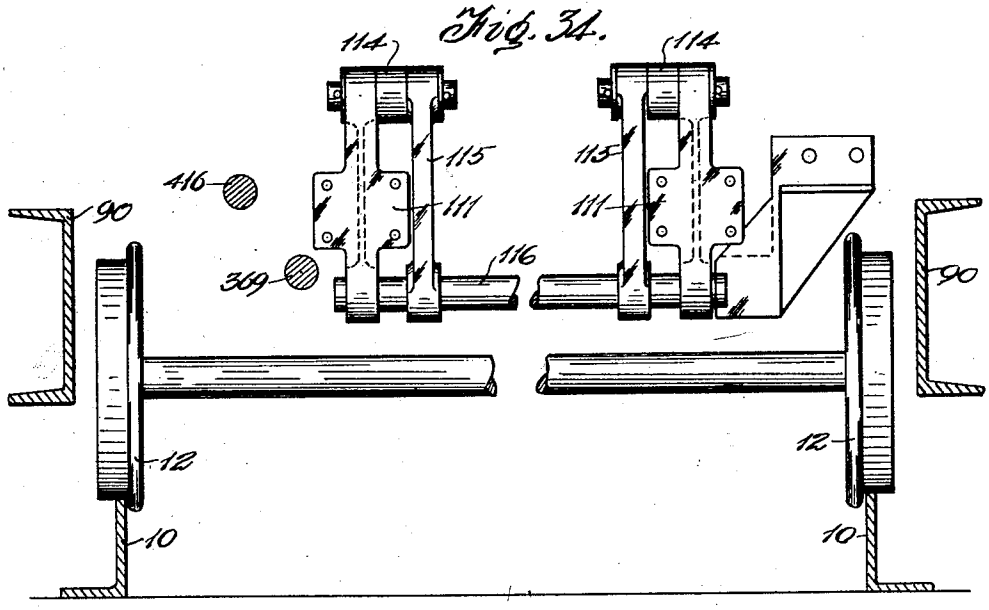
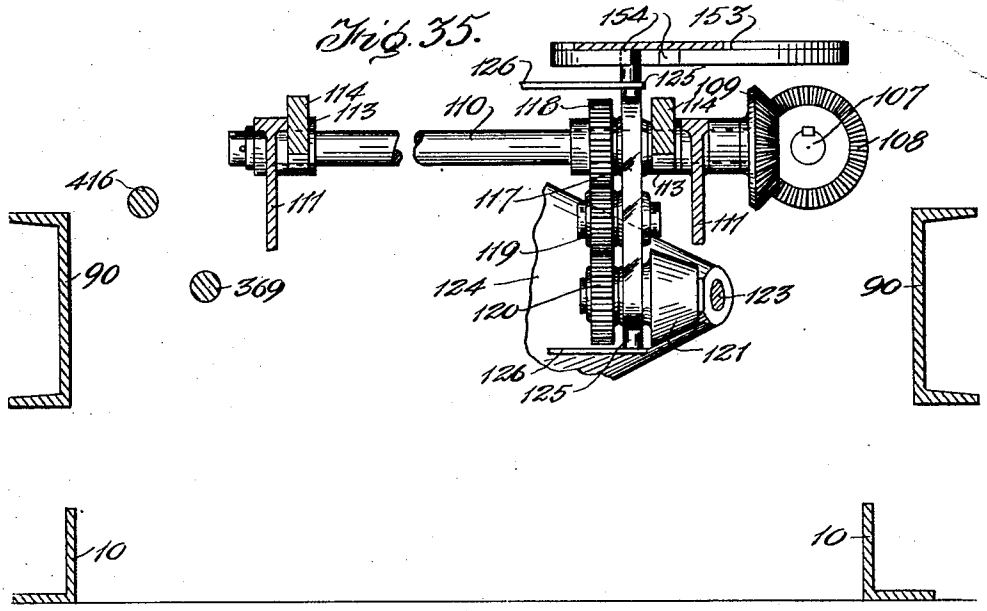



Fig. 35.




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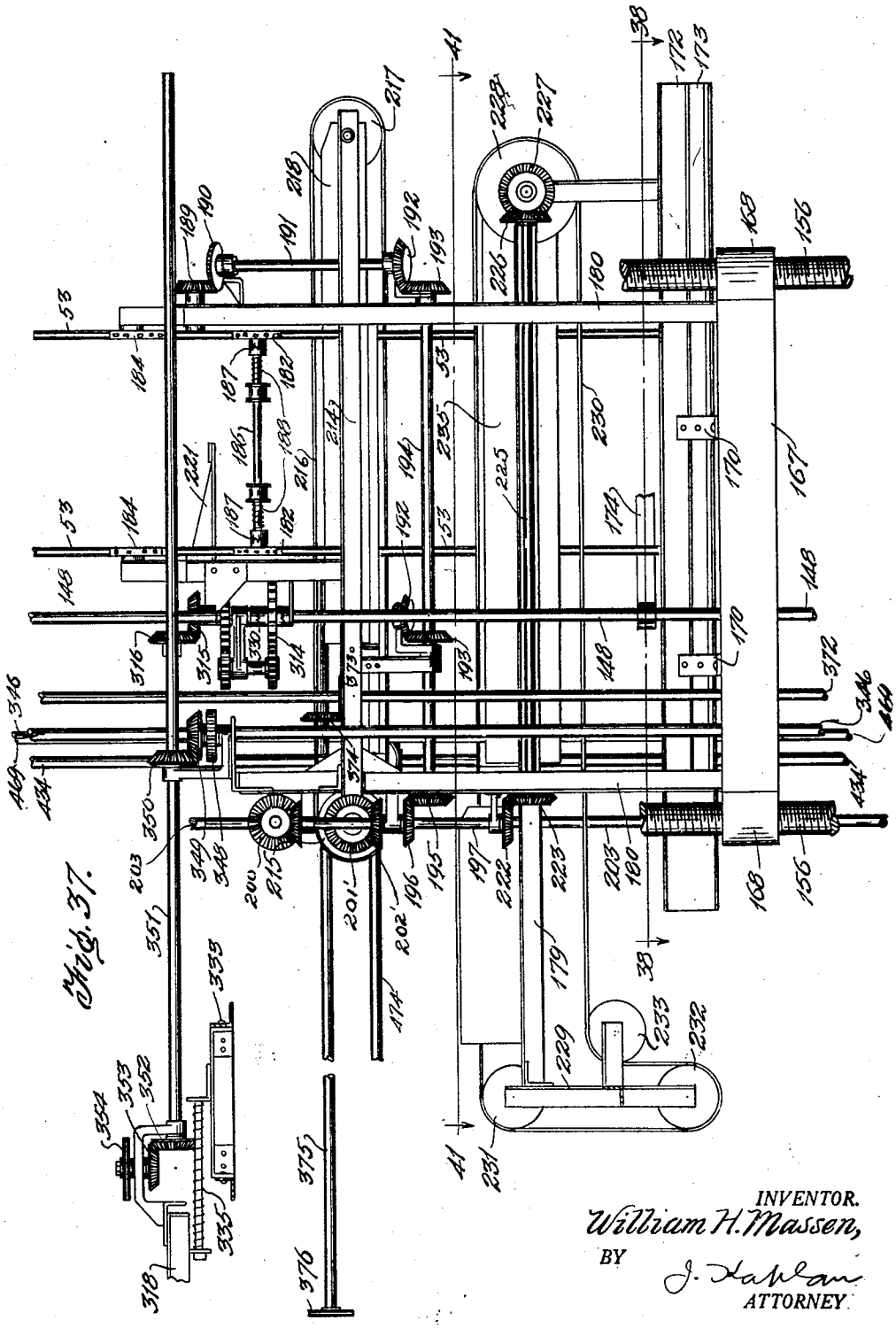


Fig. 37.

INVENTOR.
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Fig. 38.

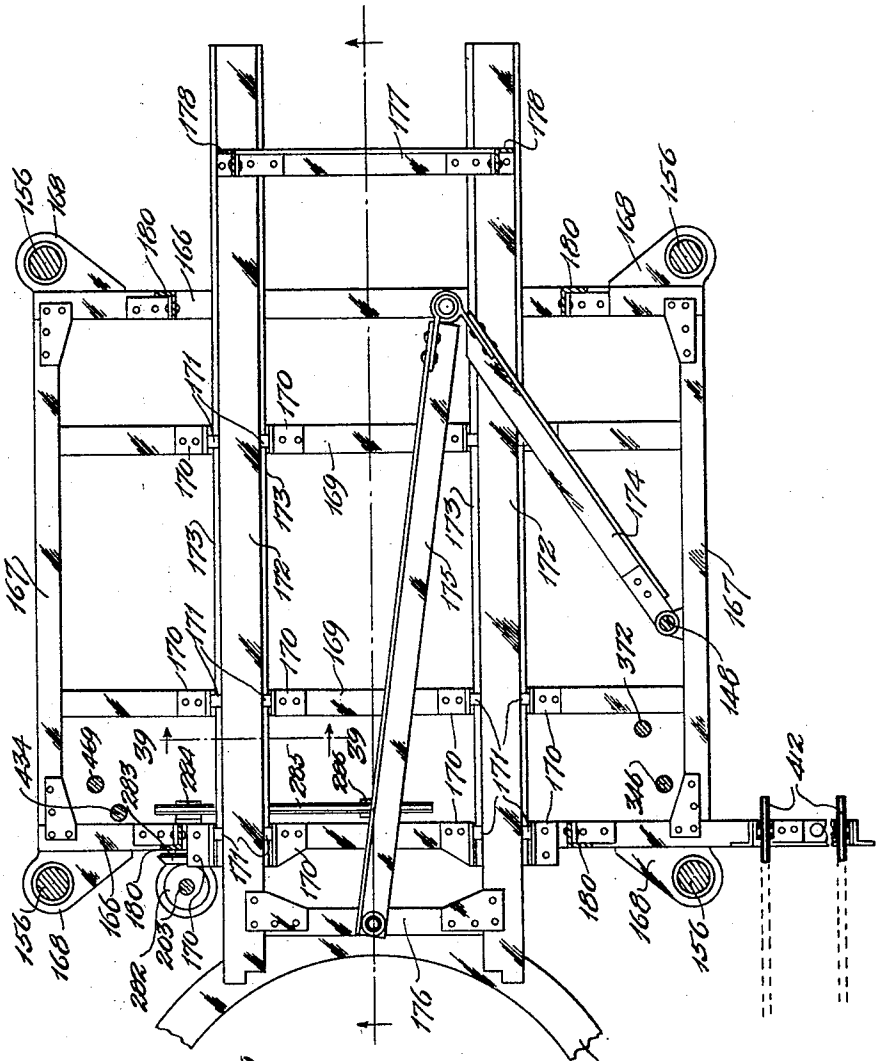


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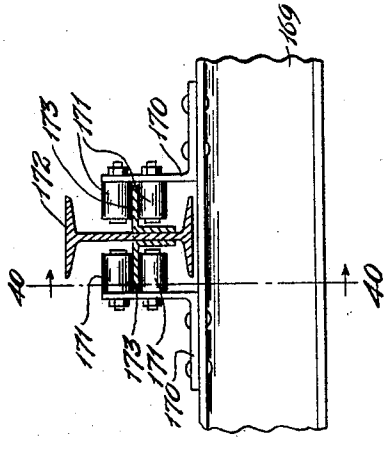
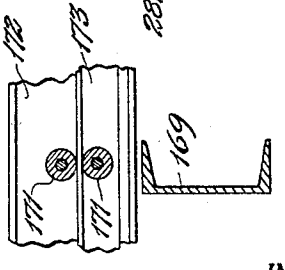


Fig. 40.



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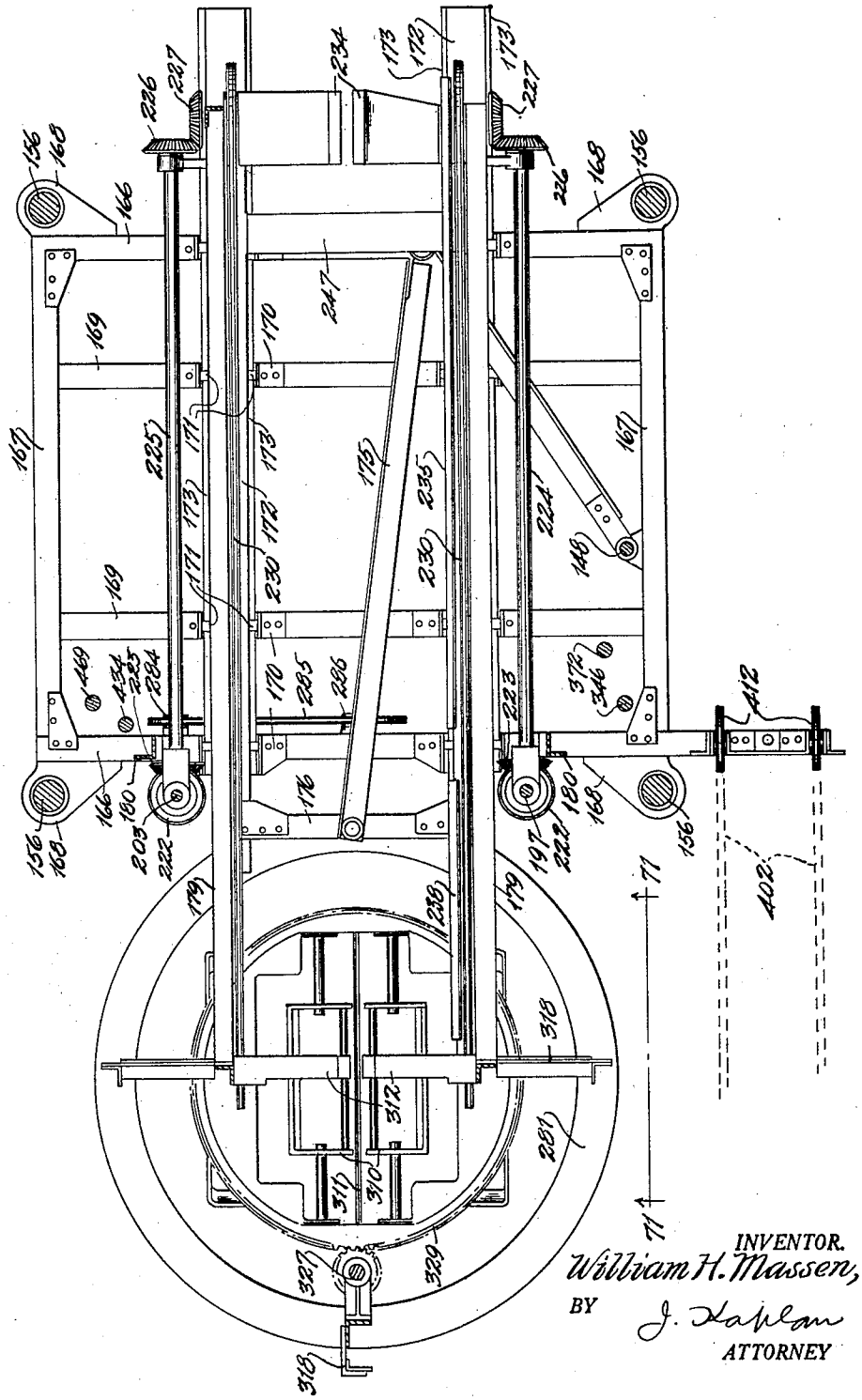


Fig. 11.

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BY J. Kaplan
ATTORNEY

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Fig. 92.

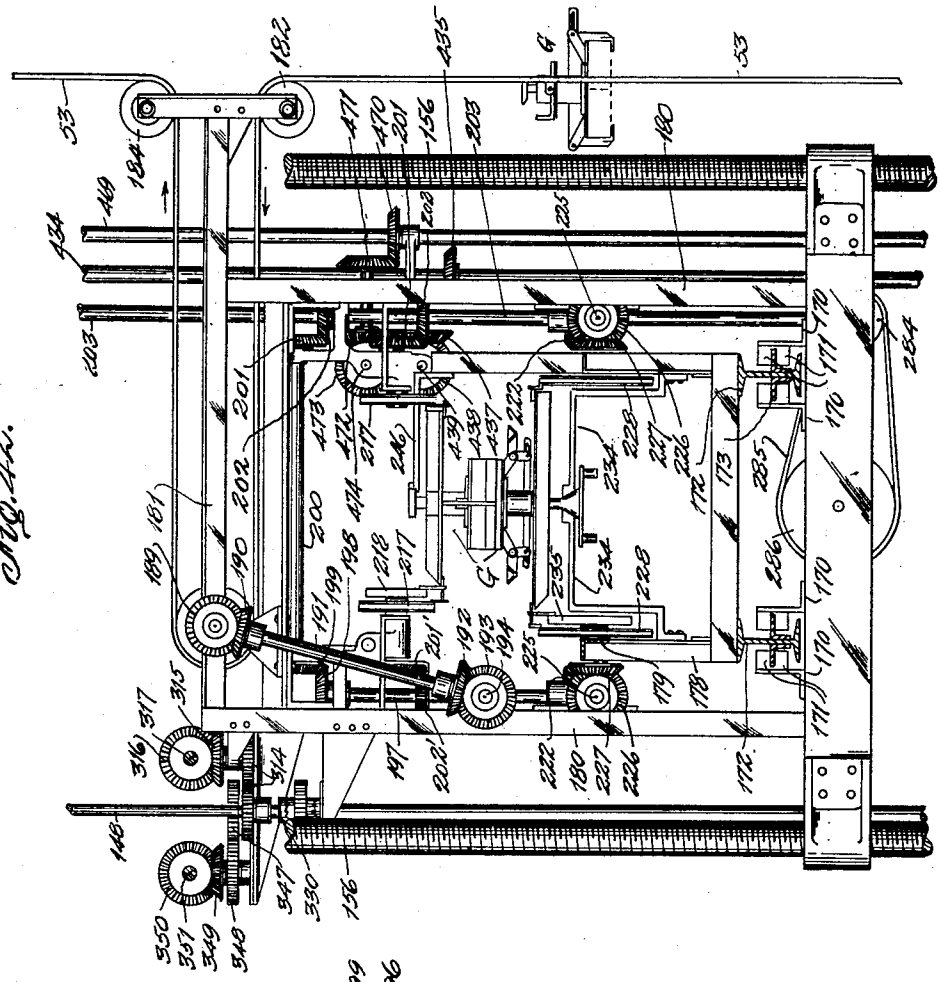
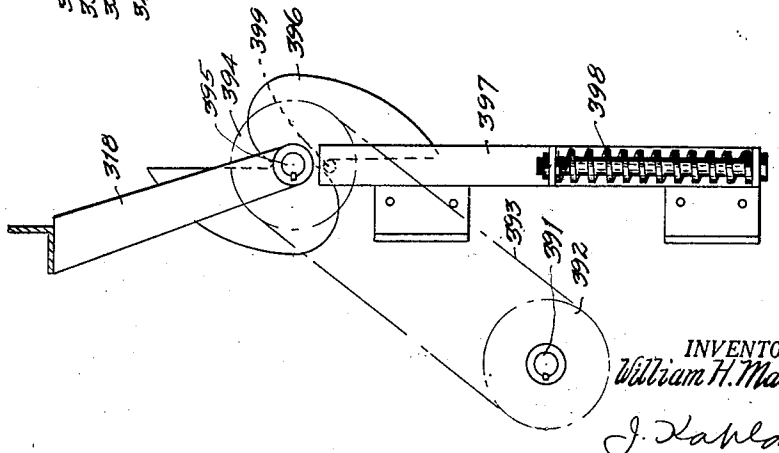


Fig. 93.



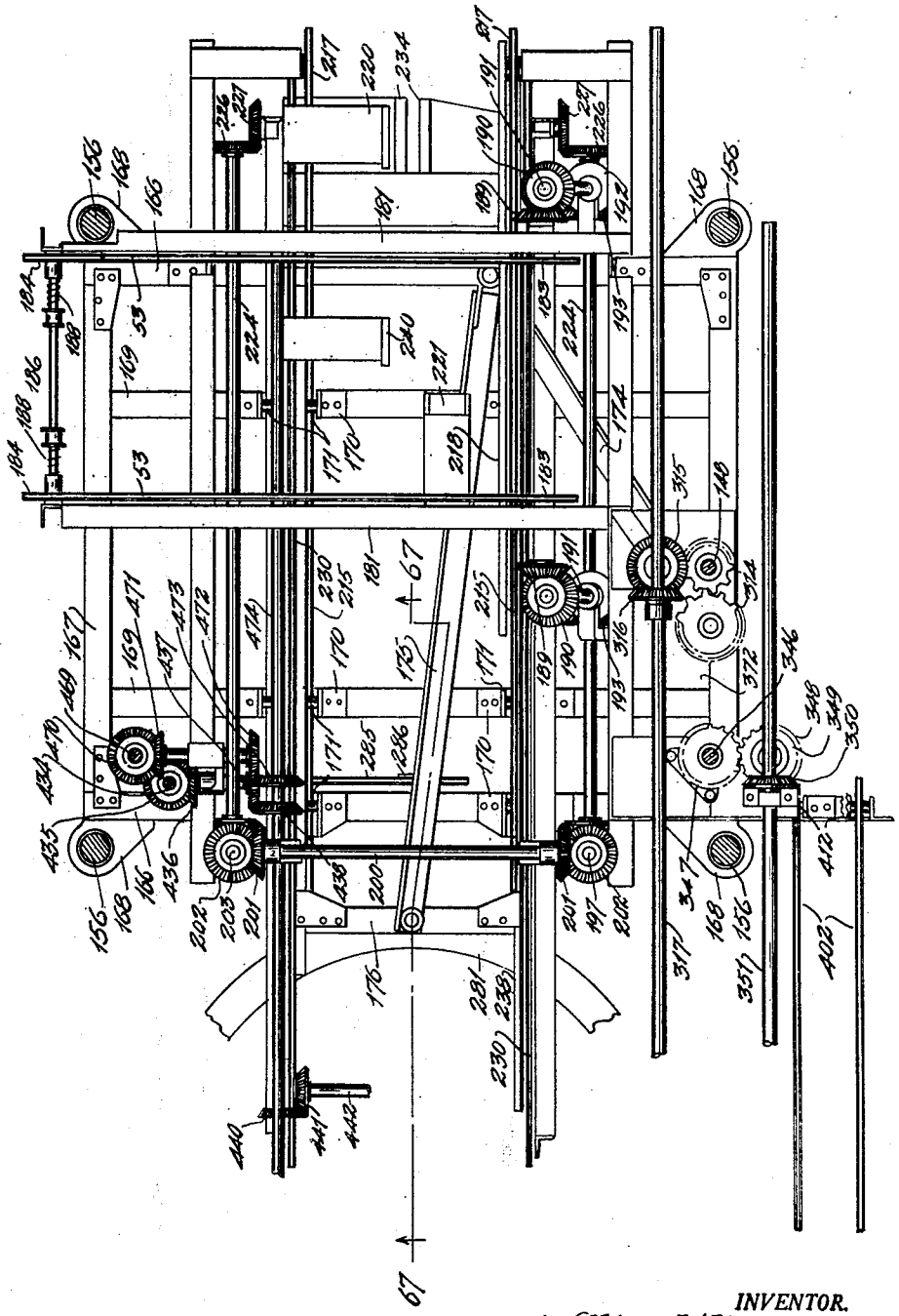
INVENTOR.
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J. Kaplan
ATTORNEY.

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Fig. 43.



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Fig. 44.

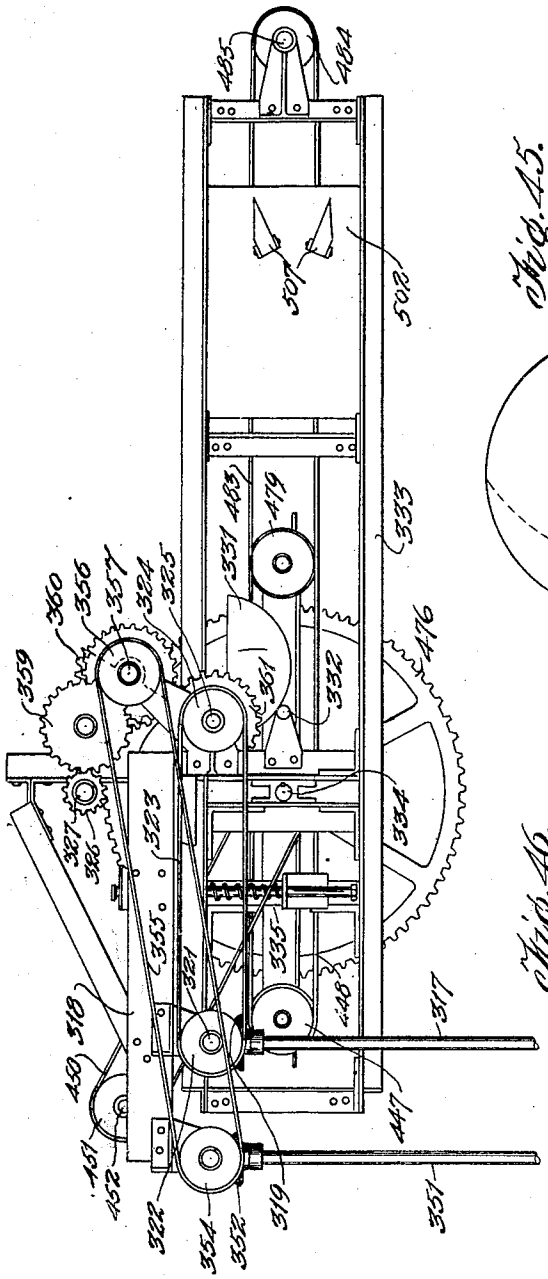



Fig. 45.

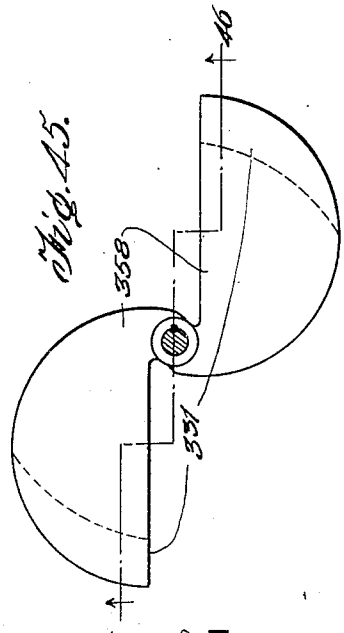
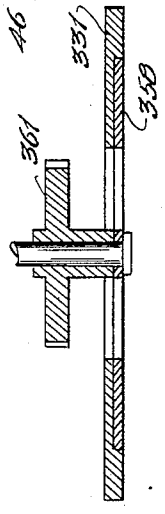



Fig. 46.




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Fig. 47.

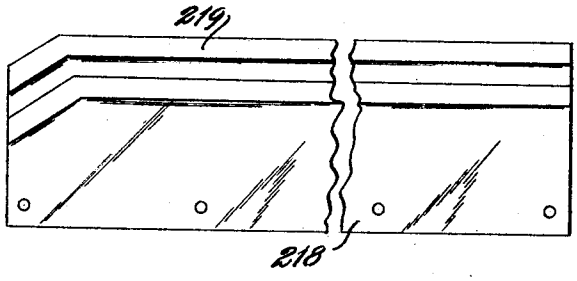
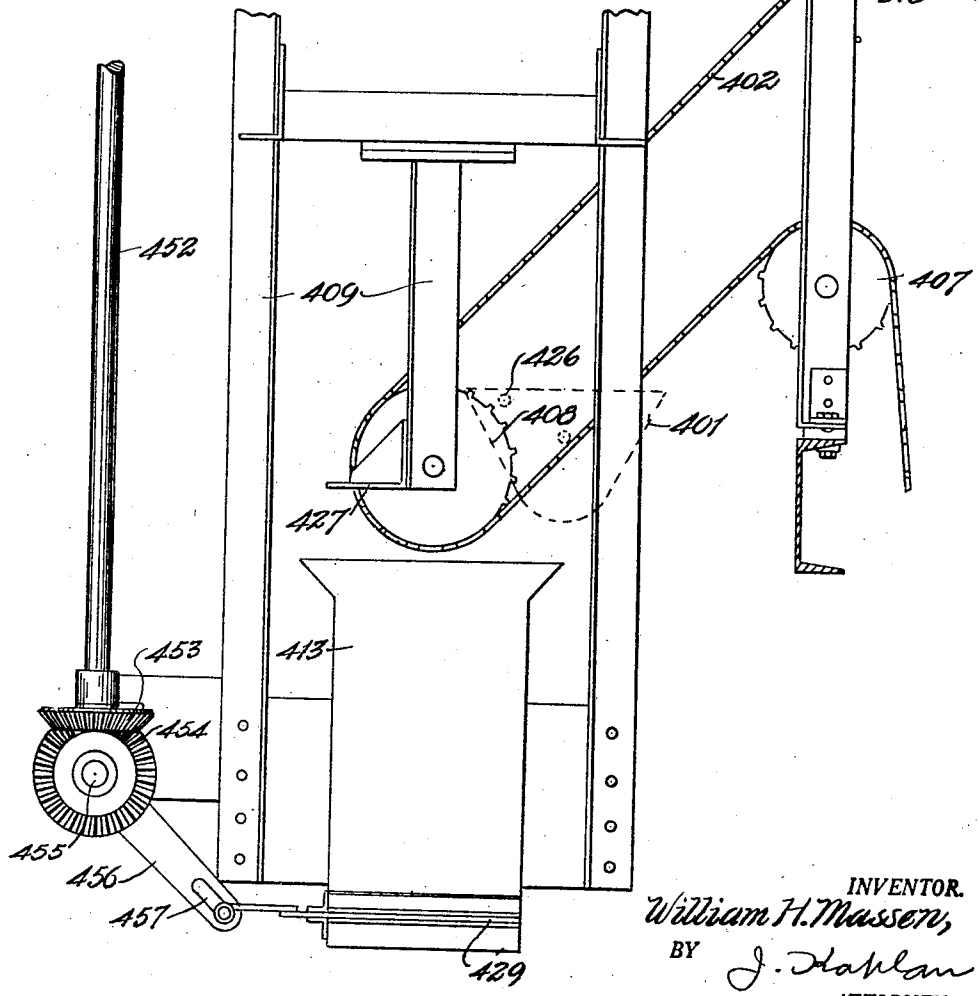



Fig. 69.

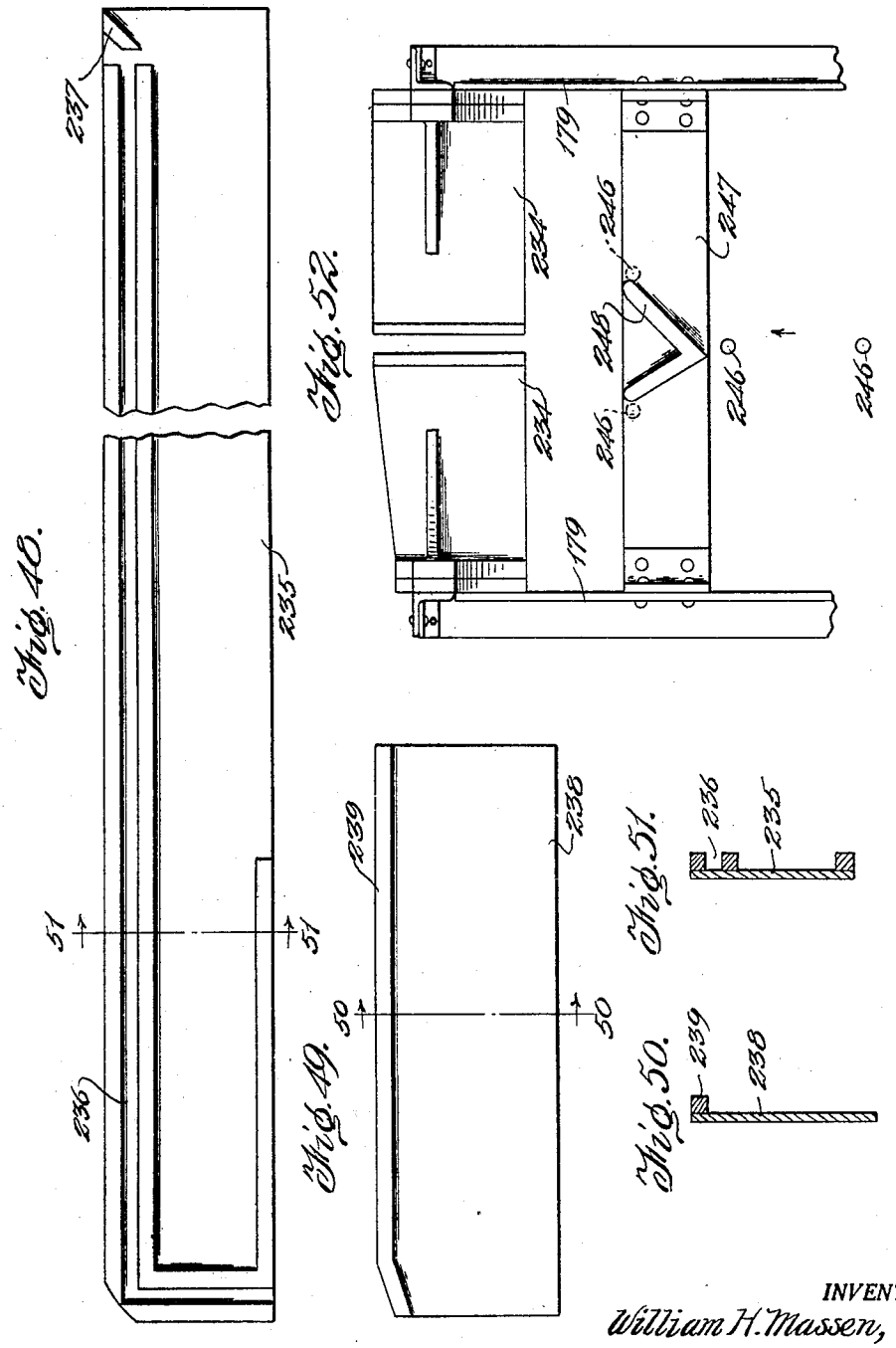



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Fig. 53.

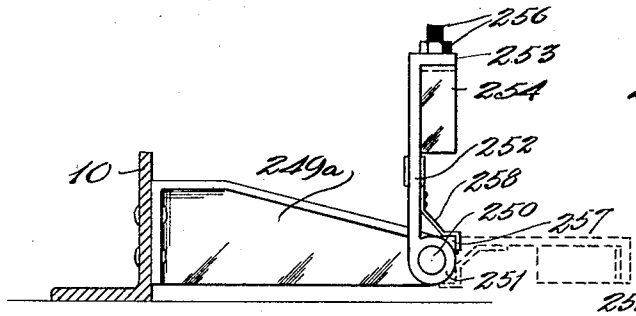



Fig. 54.

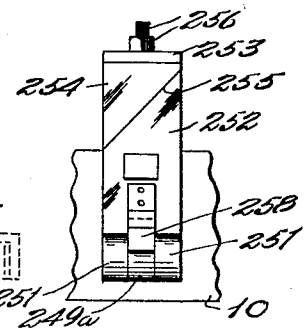



Fig. 55.

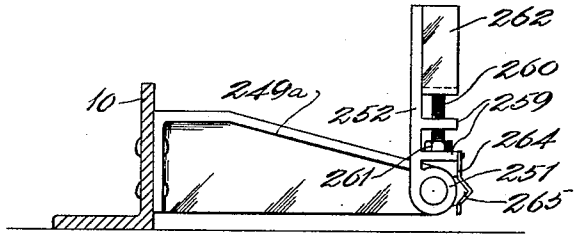



Fig. 56.

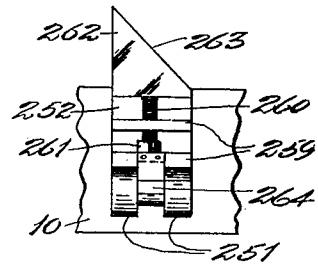



Fig. 57.

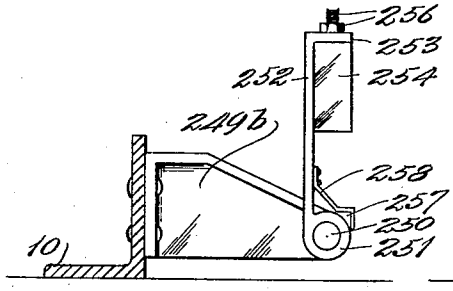



Fig. 58.

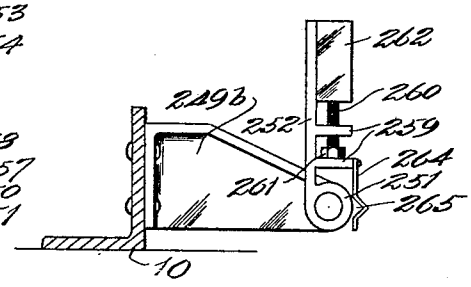



Fig. 59.

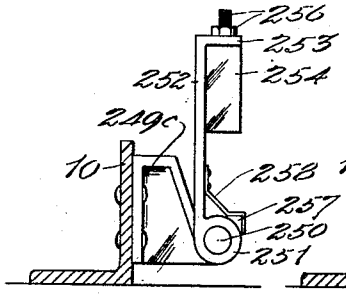
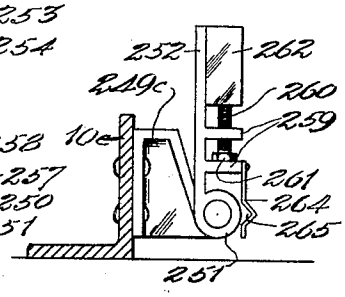



Fig. 60.




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Fig. 61.

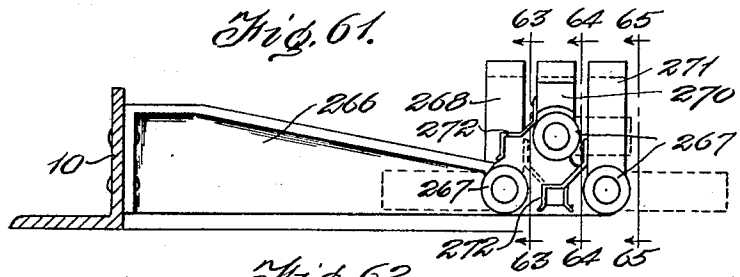



Fig. 62.

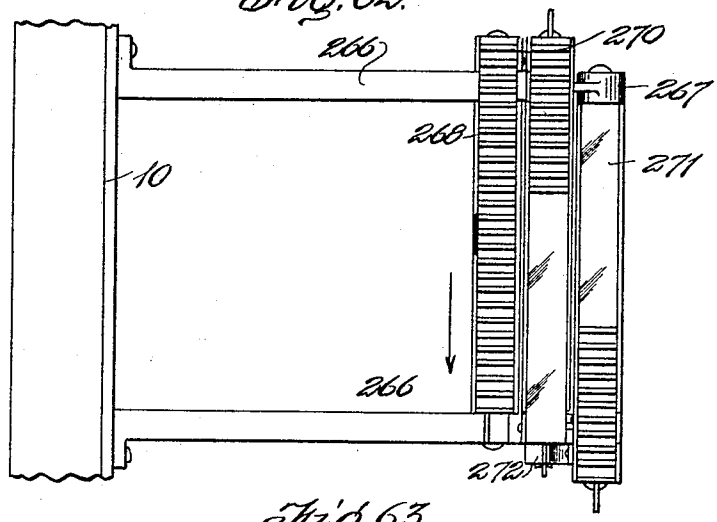



Fig. 63.

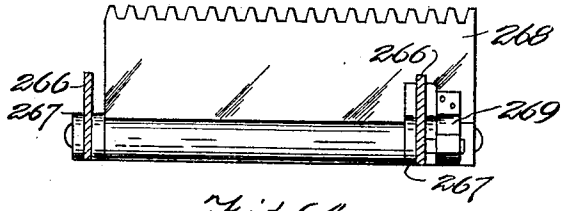



Fig. 64.

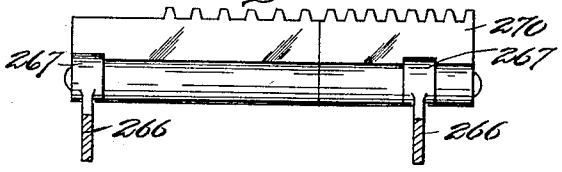
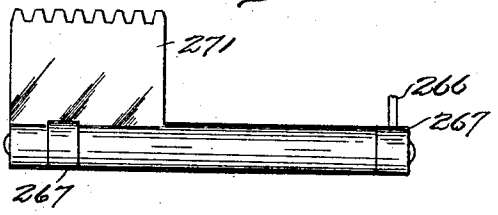



Fig. 65.



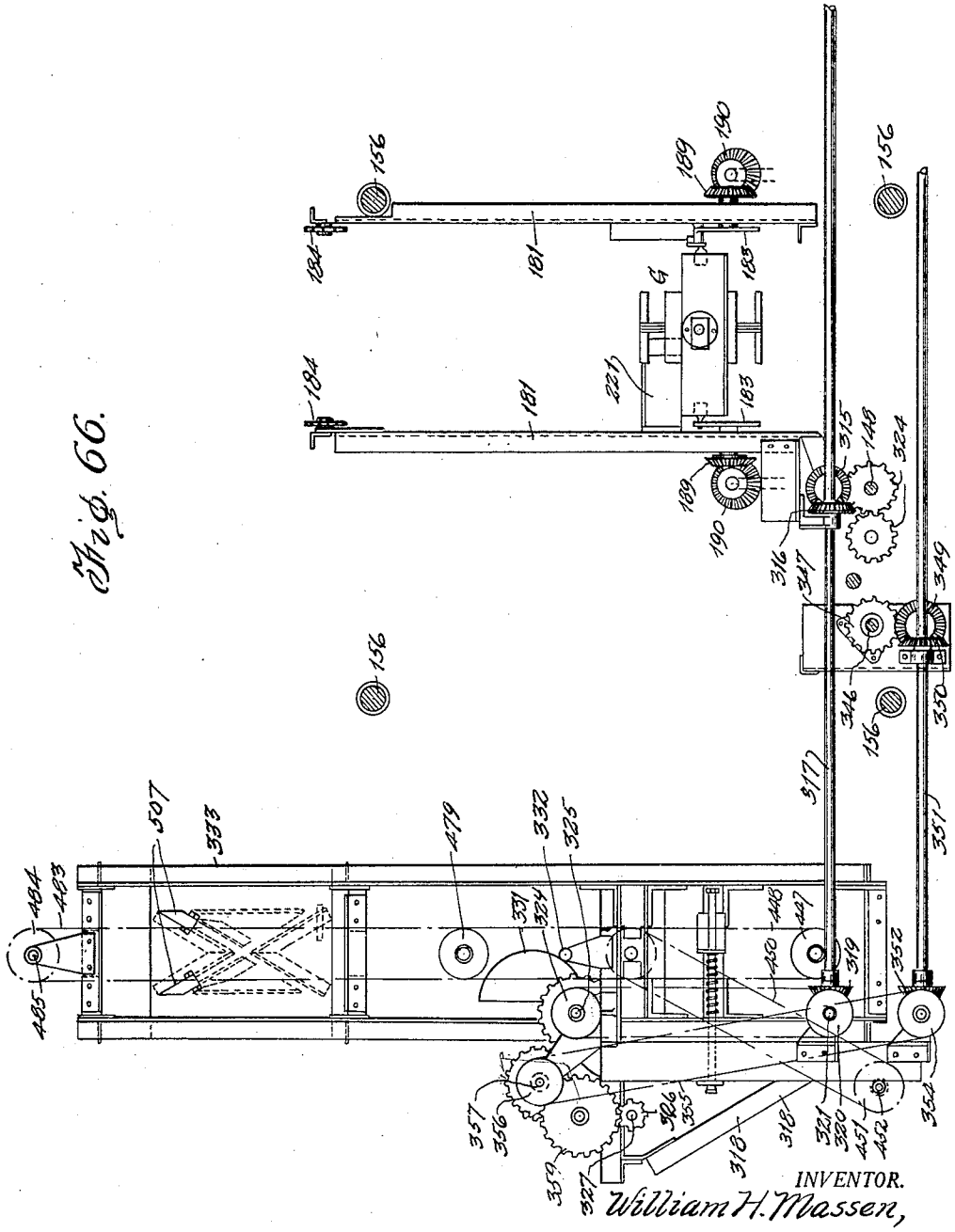

INVENTOR.
William H. Massen,
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Fig. 66.

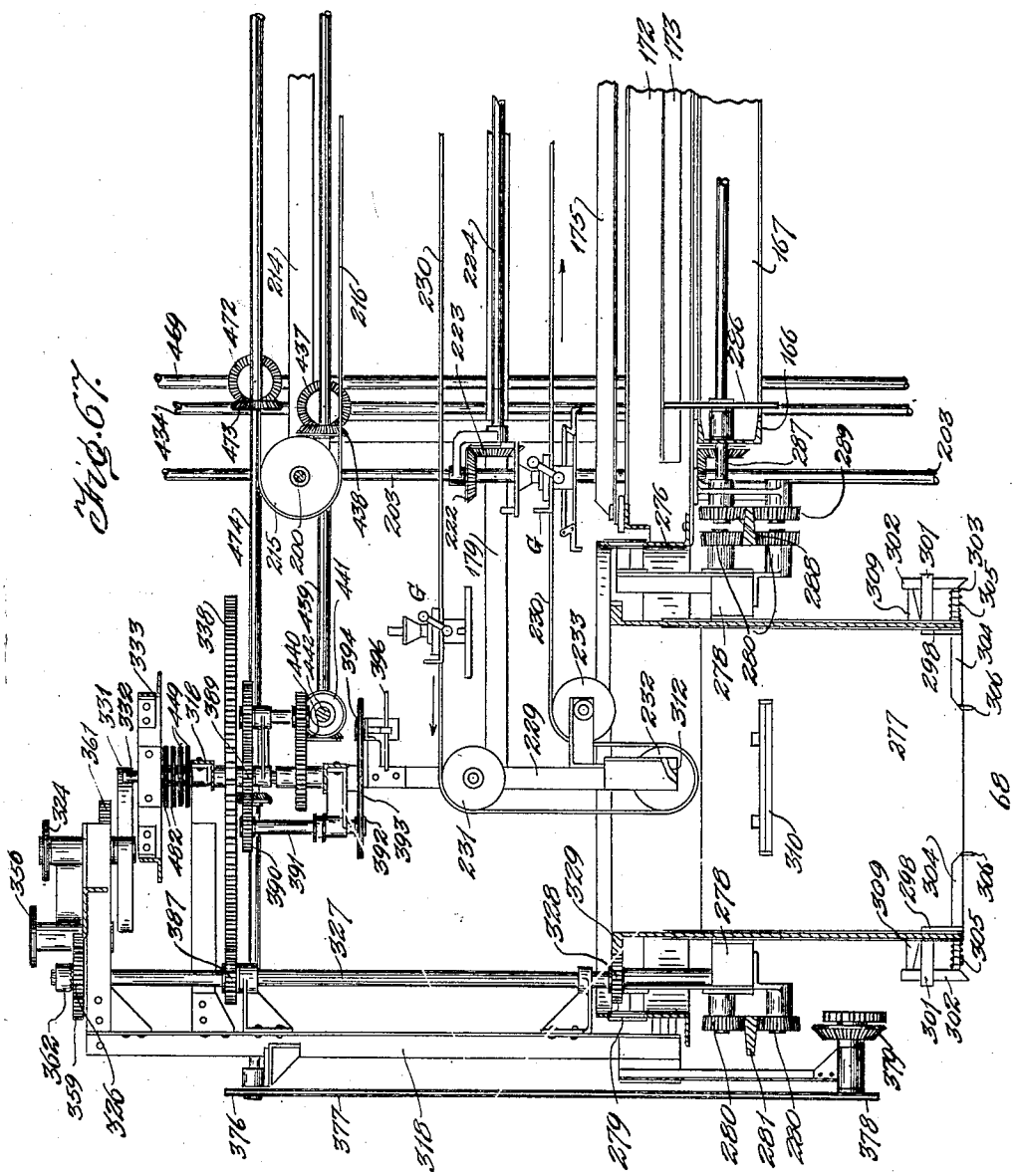



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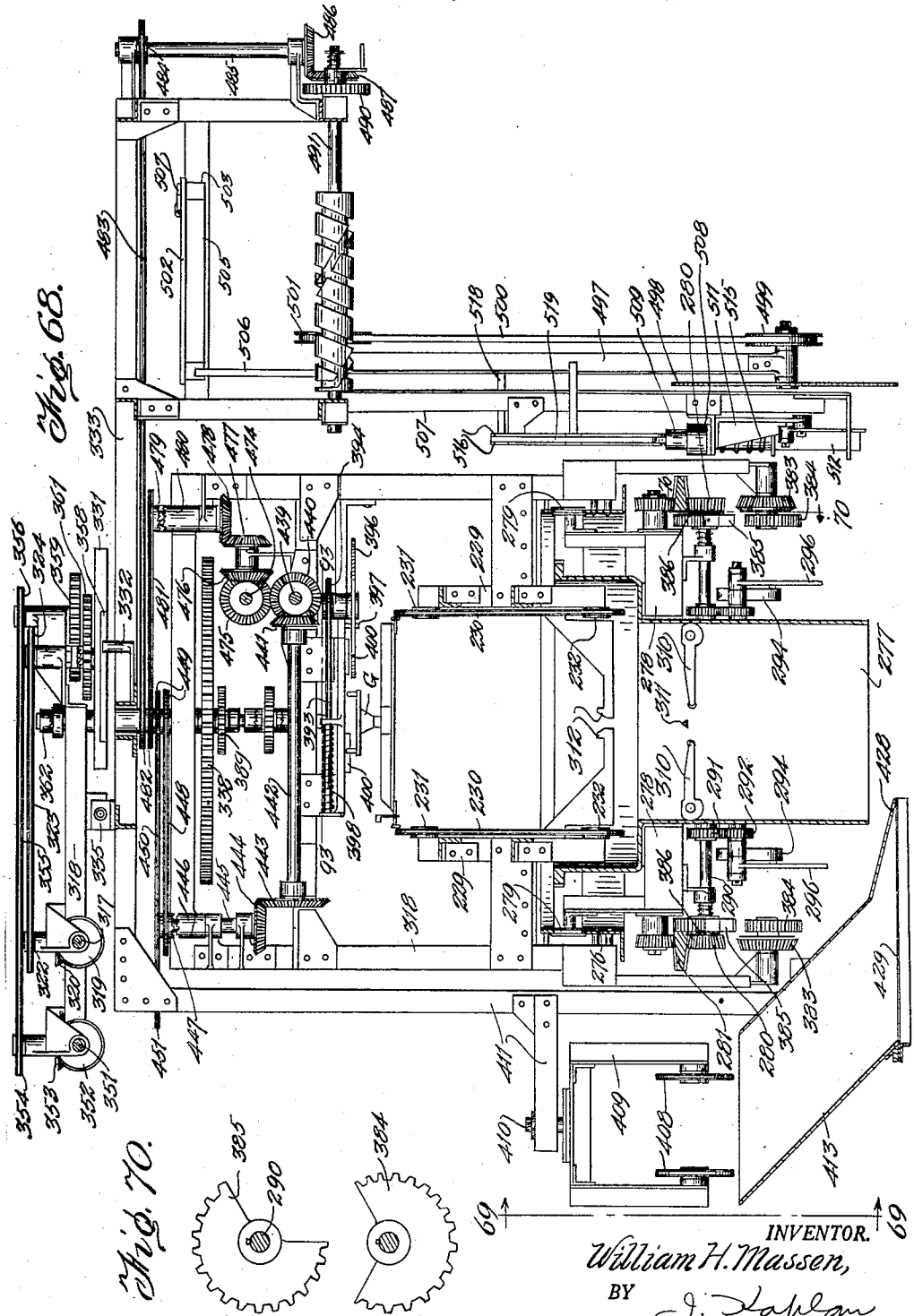


Fig. 68.



Fig. 70.

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BRICKLAYING MACHINE

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Fig. 71.

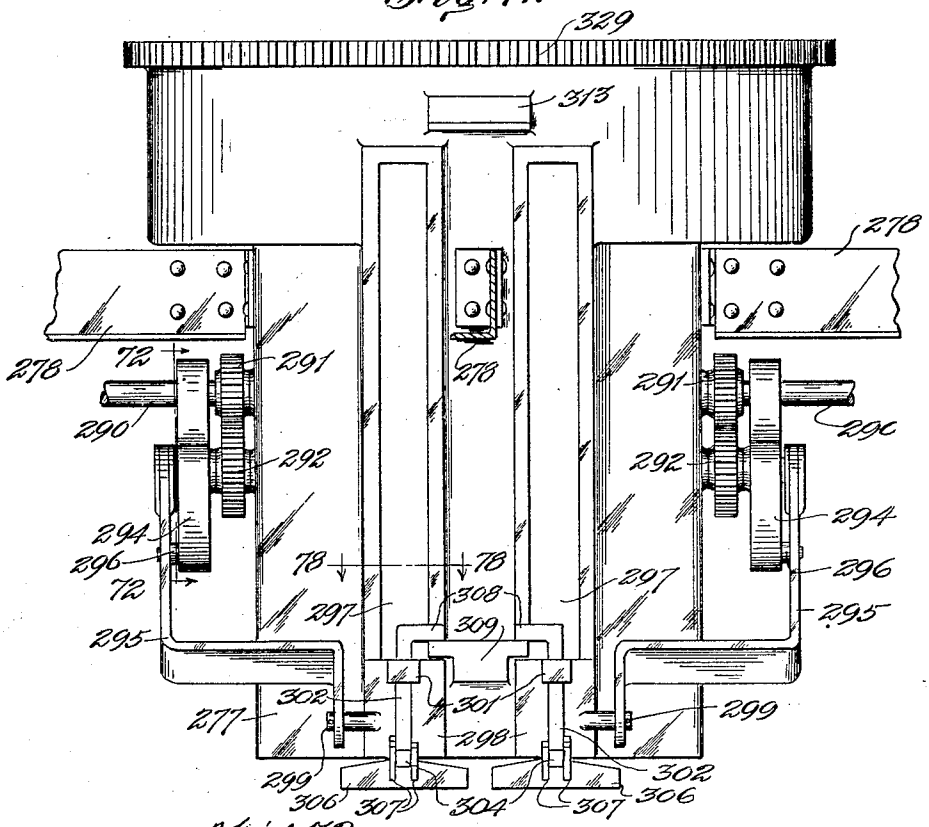



Fig. 72.

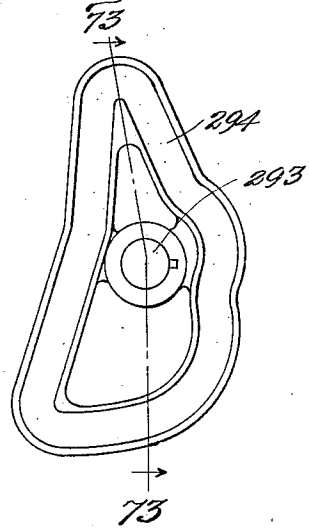
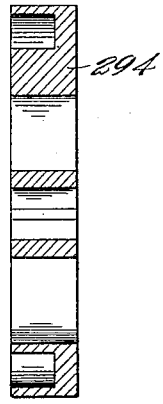



Fig. 73.




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Fig. 74.

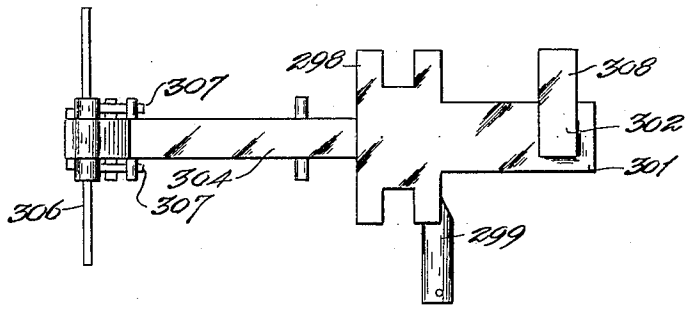



Fig. 75.

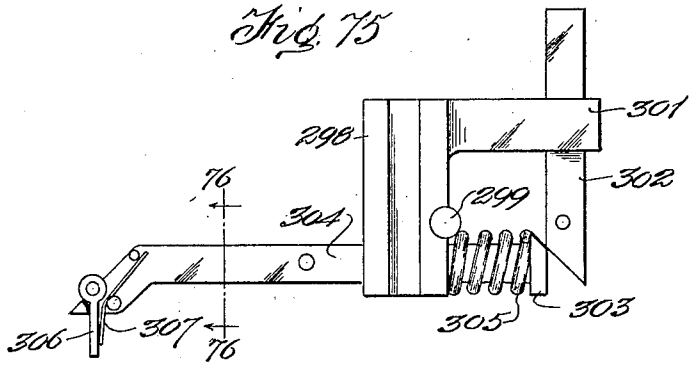



Fig. 76.

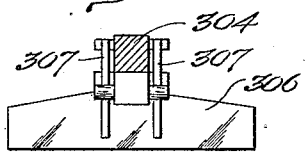



Fig. 78.

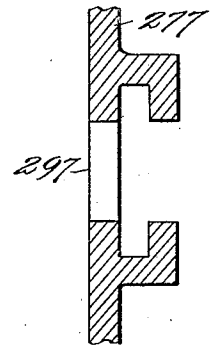
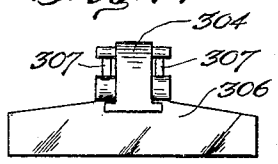



Fig. 77.




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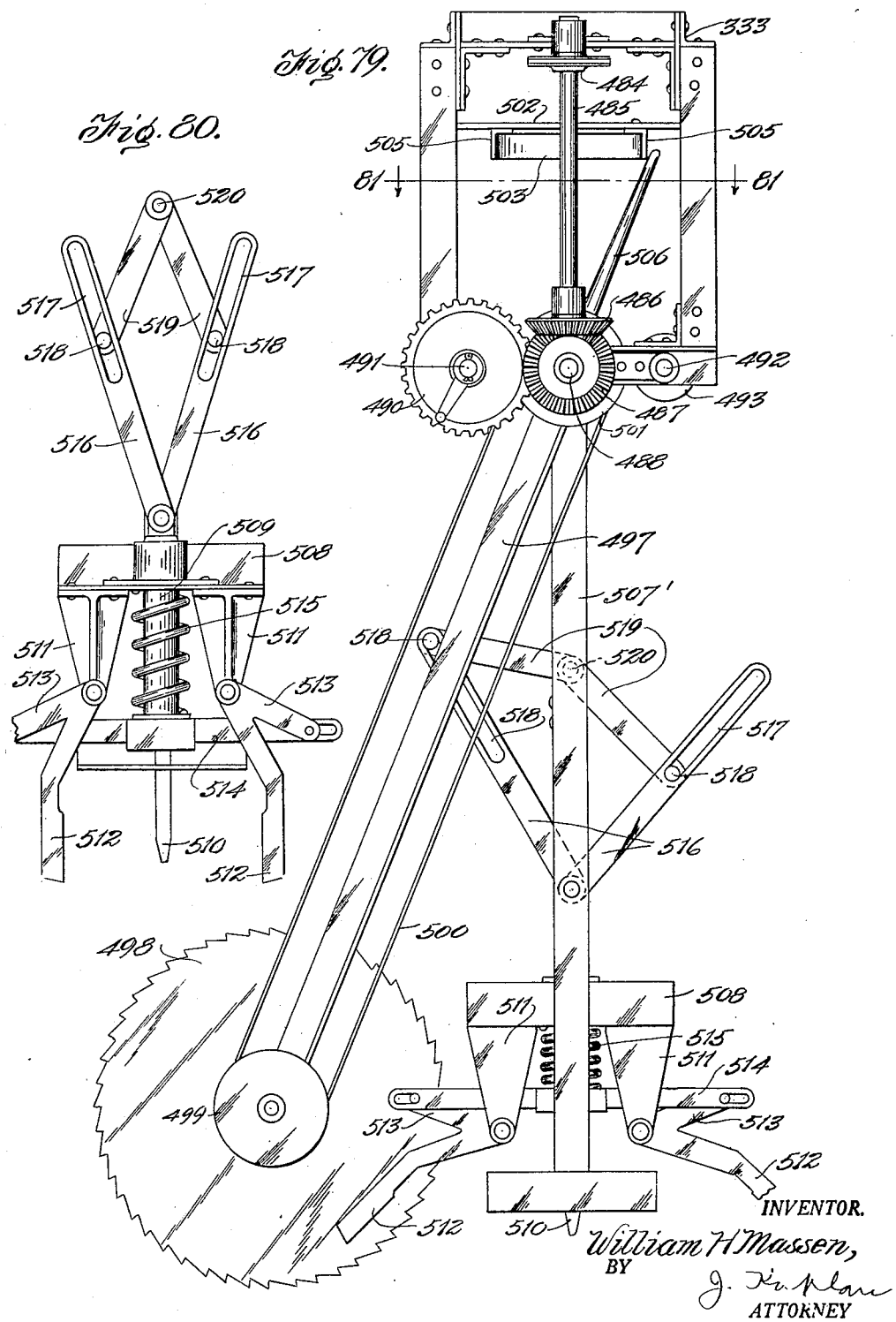
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Fig. 79.

Fig. 80.




INVENTOR.

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Jan. 26, 1932. W. H. MASSEN 1,843,092

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Fig. 63.

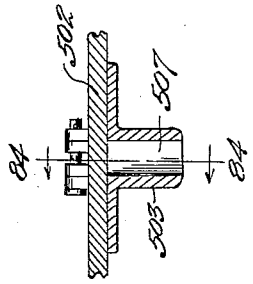



Fig. 64.

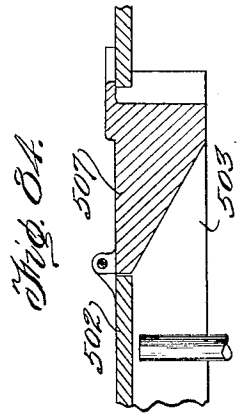



Fig. 61.

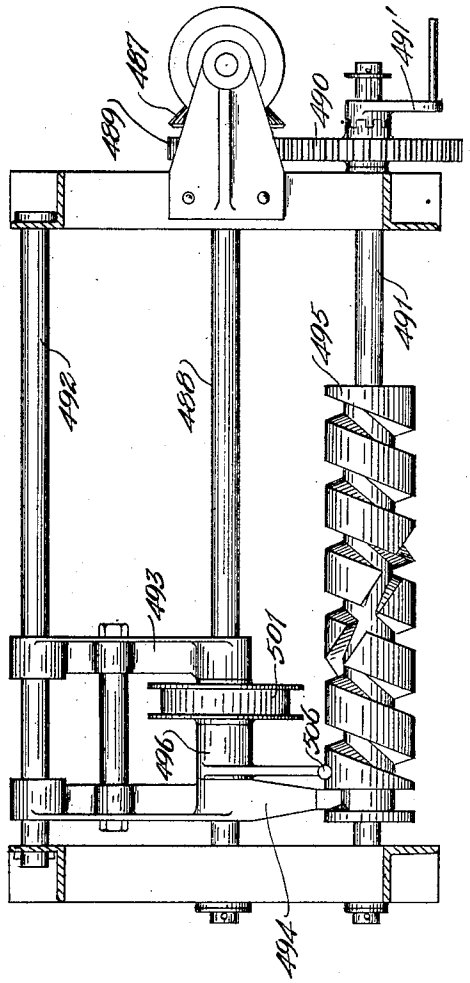
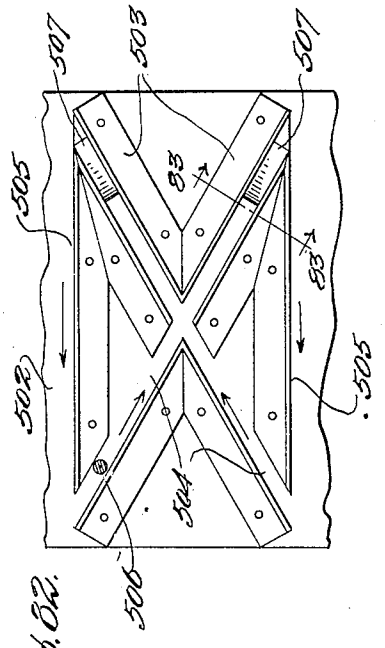



Fig. 62.




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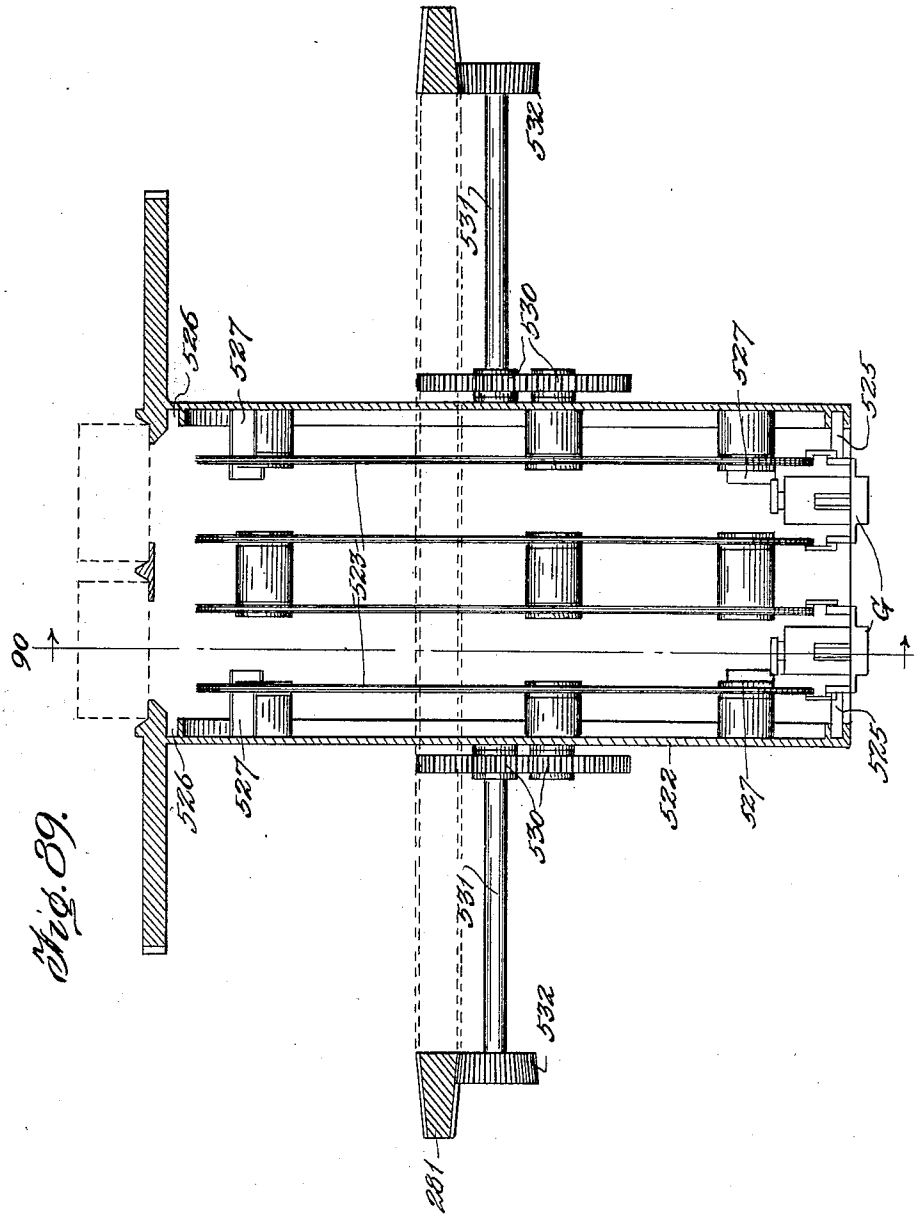



Fig. 89.

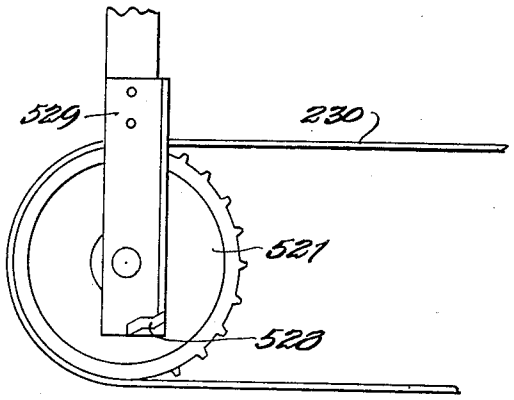
INVENTOR.
William H. Massen,
BY
J. Kaplan
ATTORNEY.

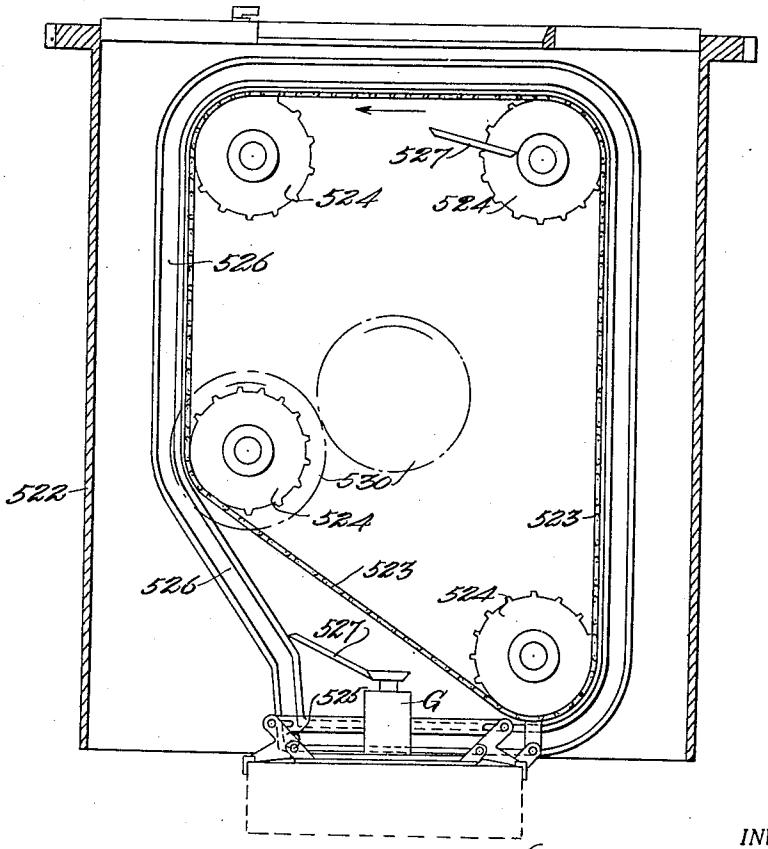
Jan. 26, 1932. W. H. MASSEN 1,843,092

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Fig. 90.




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BRICKLAYING MACHINE

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Fig. 91.

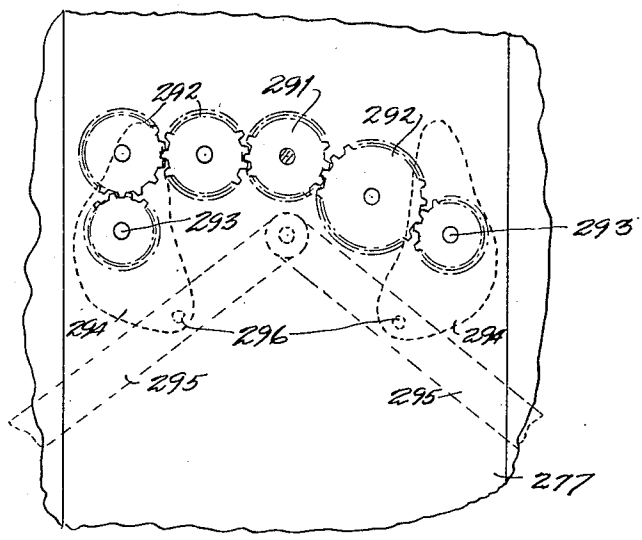
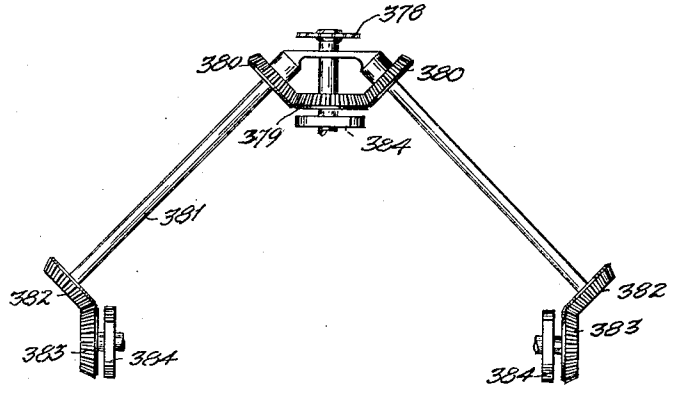



Fig. 92.



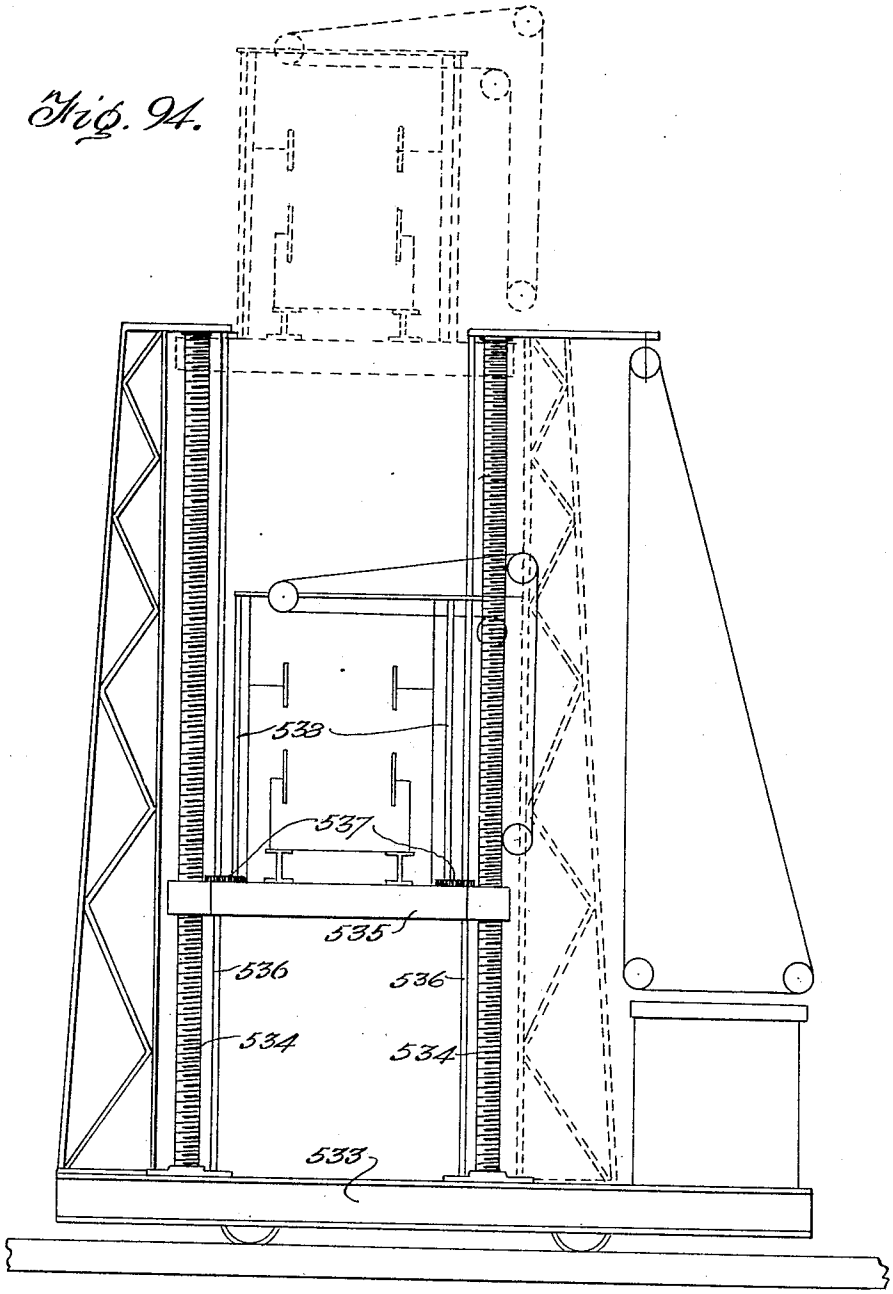

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BRICKLAYING MACHINE

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Fig. 94.




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Patented Jan. 26, 1932 1,843,092

# UNITED STATES PATENT OFFICE

WILLIAM H. MASSEN, OF WINDSOR, ONTARIO, CANADA

## BRICK LAYING MACHINE

Application filed April 5, 1929. Serial No. 352,759.

This invention relates to the construction of houses and has special reference to a brick laying machine.

One important object of the invention is to provide an improved form of brick laying machine which will operate within the walls of a building to lay bricks, course after course, around the entire walls of said building, the machine acting to lay the bricks properly at the corners or angles of the building as well as along the middle parts of the walls.

A second important object of the invention is to provide an improved brick laying machine of this character wherein the machine operates on a track laid on the rough flooring of the building parallel to the walls of the building at their middle portions, the parallel parts of the track being connected at the corners by curves and the machine being so constructed that the laying continues in straight lines to the corners of the building automatically so that these corners are true right angles and do not follow the curvature of the track.

A third important object of the invention is the provision of means whereby the laying of the bricks is automatically interrupted at door and window openings so that the machine passes, at such an opening, from one side thereof to the other without in any way operating to lay bricks, the brick laying being resumed at the opposite side of the opening.

A fourth important object of the invention is to provide, in such a machine, means whereby the machine may lay courses of stringers or courses of headers as may be desired by the operator.

A fifth important object of the invention is to provide, in such a machine, means whereby whole stringers may be laid at the door and window openings to project into such openings, the machine being provided with means whereby the projecting portions of such stringers are cut off flush with the side of the opening.

A sixth important object of the invention is to provide a machine of this description having a novel arrangement of carriage for running on the track before mentioned.

A seventh important object of the invention is to provide, in a machine of this description, a novel arrangement of platform for supporting those parts of the machine directly associated with the laying of the bricks so that this part of the mechanism can be raised upon the completion of each course to properly lay the next course above.

An eighth important object of the invention is to provide, in a machine of this description, a hod table whereon the bricks are carried prior to being laid and also to provide a system of conveyors so arranged as to be automatically projected and retracted as the carriage moves around the curved portion of the track whereby laying of the brick along straight lines is accomplished.

A ninth important object of the invention is to provide, in a machine of this description, means on the machine for carrying a suitable quantity of mortar and depositing it properly on the wall.

In the carrying out of these objects the machine consists in general of a track of ordinary description, the rails of the track being bolted to the rough flooring of the building upon which the work is to be done. In order to permit the machine to move easily at the corners of the building the tracks are curved at this point, being parallel to the walls between the curved portions. On these tracks runs a carriage which is driven along the tracks by a suitable wheel engaging the rough floor and actuated by an ordinary electrical motor or the like although obviously the machine may be driven by any other desired form of power. This carriage supports the entire working apparatus of the machine and consequently, as the machine moves around the corners of the track it moves in a curve which increases the distance of the machine from the straight wall on one side until the corner is reached and then decreases the distance from the corner of the wall to the straight portion as the machine passes the corner position. Hods are provided which hold the bricks side by side and these hods are filled at the brick pile, the bricks being separated from each other by suitable separation. Having been

filled the hods are carried inside the building and laid on the floor so as to be convenient for the man operating the hod table which forms part of the carriage. As the bricks are wanted the hods are placed on the hod table, the removable bottoms with which they are provided are withdrawn and the bricks dropped into their proper position on the hod table, stops being provided by means of which the hods are positioned in placing the bricks ready for being acted on by the laying machine. It is to be noted that the arrangement is such that there are several lines of these bricks and they are fed one after another in each line to position for being grasped by certain mechanism which is preferably termed the graspers. The carriage supports a movable platform which is raised and lowered by suitable screws driven by gearing so that all the screws rotate at the same time and these screws are used to bring the platform, which carries the laying machinery proper, to the required height. On this platform are three brick conveyors the combined purpose of which is to convey the bricks from the hod table to the layer proper. These conveyors are preferably termed the main conveyor, transfer conveyor and the conveyor to the layer. The main conveyor extends across one end of the lines of bricks and over this end of the lines of bricks are arranged, one for each line or row, a grasper opener which acts to open the graspers at the proper time to seize the end bricks of the particular line from which bricks are being taken for laying, automatic means being provided whereby when one line of bricks has been exhausted the grasper operating on that line will be drawn out of service and that operating on the next line brought into service so that the lines are emptied one after the other. The bricks are carried by the graspers along the main conveyor and thence along the transfer conveyor to the conveyor to the layer. The transfer conveyor is necessitated by reason of the fact that the layer travels along two lines at right angles to each other during the time when the carriage is running on the curved portion of the track and thus the distance from the center line of the main conveyor to the center line of the layer varies as the machine travels around these corners. In order to accomplish the varying of this distance stops are provided along the track which may be turned up or down between operative and idle positions and the apparatus is controlled by certain levers and rocks which engage these stops when upturned to effect the actuation of the various parts of the apparatus. Furthermore, these stops are also arranged to allow the conveyors and layer to rest in passing door and window openings as will be noted in the detail description of the device. The third conveyor or the conveyor to the layer delivers the bricks to certain shelves on the layer which, as has been previously noted, travels always in straight lines and associated with the layer are certain graspers which close on the bricks on the swinging shelf and carry them downwardly to press them into the mortar on the wall. The action of these graspers varies in accordance with whether stretchers or headers are being laid as will be presently set forth. The mortar supply is carried in a hopper which has a valve bottom so that buckets, which travel between this hopper and what is termed the mortarer may intermittently deliver mortar from the hopper to the mortarer which is associated with the layer so that it travels in straight lines therewith. This mortarer is so arranged that it deposits the mortar between the bricks of the course previously laid and at the same time leaves a layer of mortar about three-quarters of an inch thick on top of the previous course so that the bricks of the next course about to be laid may be laid thereon.

In connection with the other mechanism there is provided a saw. This saw travels along the same path as the layer and is used to saw off the half bricks of the stretchers which project into the door and window openings thus making smooth sides to these openings and it is to be noted that this saw is controlled by a suitable lever. The foregoing is merely intended to give a general idea of the makeup of the machine and is not intended as a specific description either of the machine or its operation, both the machine and its operation thereof being fully described hereinafter.

Figure 1 is a view showing the general layout for a rectangular building of the track on which this invention runs.

Figure 2 is a diagrammatic elevation showing the general arrangement of the mechanism on the track from the side of said track.

Figure 3 is a view similar to Figure 2 but taken at right angles thereto.

Figure 4 is a detail diagrammatic view showing certain parts of the mechanism on the line 4—4 of Figure 2, the mechanism to the rear being omitted.

Figure 5 is a plan view, partly diagrammatic, of a certain hod table used herewith, the view being taken on the line 5—5 of Figure 2.

Figure 6 is a side elevation, partly diagrammatic, of said hod table.

Figure 7 is a section on the line 7—7 of Figure 5.

Figure 8 is a section on the line 8—8 of Figure 5.

Figure 9 is a plan view of a certain brick hod used in connection with the table.

Figure 10 is a section on the line 10—10 of Figure 9.

Figure 11 is a section on the line 11—11 of Figure 9.

Figure 12 is a side elevation of the brick hod.

Figure 13 is an enlarged detail view of a certain latch used in connection with the gripper openers of the brick table.

Figure 14 is a view of a certain latch used to releasably hold the means for moving rows of bricks forward on the table.

Figure 15 is a detail sectional view showing one form of grasper used herewith.

Figure 16 is a view similar to Figure 15 but showing a second form of grasper.

Figure 17 is a plan view of the grasper shown in Figure 15.

Figure 18 is a side elevation of said grasper.

Figure 19 is an enlarged detail section on the line 19—19 of Figure 4.

Figure 20 is a detail section on the line 20—20 of Figure 19.

Figure 21 is a detail section on the line 21—21 of Figure 19.

Figure 22 is a section taken substantially on the line 22—22 of Figure 19.

Figure 23 is a detail section taken through the lower part of Figure 19 on the line 23—23.

Figure 24 is an enlarged detail section on the line 24—24 of Figure 19.

Figure 25 is a detail section taken on the line 25—25 of Figure 19, only certain parts being shown.

Figure 26 is an enlarged detail section on the line 26—26 of Figure 19, the parts behind the section being omitted.

Figure 27 is an enlarged detail section taken substantially on the line 27—27 of Figure 19, certain of the parts being omitted and other behind the plane of section not being shown.

Figure 28 is a section taken substantially on the line 28—28 of Figure 19, the parts behind the section not being shown.

Figure 29 is a view partly in section on the line 29—29 of Figure 19 and partly diagrammatic.

Figure 30 is a detail section on the line 30—30 of Figure 19, certain of the parts being omitted.

Figure 31 is a detail section on the line 31—31 of Figure 30.

Figure 32 is a detail view partly in elevation and partly in section substantially along the line 32—32 of Figure 30.

Figure 33 is a detail section on the line 33—33 of Figure 30.

Figure 34 is a detail section on the line 34—34 of Figure 30.

Figure 35 is a detail section partly in elevation on the line 35—35 of Figure 30.

Figure 36 is an enlarged detail view on the line 36—36 of Figure 29.

Figure 37 is a view looking from the front end of the apparatus but showing only those parts above the carriage proper, certain parts to the left of the carriage being shown.

Figure 38 is a section on the line 38—38 of Figure 37.

Figure 39 is a section on the line 39—39 of Figure 38.

Figure 40 is a section on the line 40—40 of Figure 39.

Figure 41 is a section through the apparatus on the line 41—41 of Figure 37.

Figure 42 is a view looking from the right side of Figure 37 toward the left side, the view being an elevation and being partly in section.

Figure 43 is a plan view of the parts right over the carriage, certain of the parts of the left being shown.

Figure 44 is a plan view of the upper part of the device to the left of Figure 43.

Figure 45 is a bottom plan view of certain cams disclosed in Figure 44.

Figure 46 is a section on the line 46—46 of Figure 45, the parts being shown in their proper elevational relation.

Figure 47 is a detail view looking from the center of the machine and showing the grasper inverting cam for the transverse conveyor, the same being broken away in its central part.

Figure 48 is a view similar to Figure 47 showing one of the cam members for inverting the grasper of the conveyor which goes to the laying mechanism proper.

Figure 49 is a view similar to Figure 48 of the other cam or guide for the last mentioned conveyor.

Figure 50 is a section on the line 50—50 of Figure 49.

Figure 51 is a section on the line 51—51 of Figure 48.

Figure 52 is a detail view showing the bottom of certain openers and positioning means used in connection with the graspers or grippers of the last mentioned conveyor.

Figure 53 is a side elevation of a certain stop carried by the track and used in the operation of the conveyor.

Figure 54 is an end view thereof.

Figure 55 is a side elevation of a second form of stop used in connection with the conveyor and designed to close one of the clutches of the invention, the first form opening the clutch.

Figure 56 is an end view of the stop shown in Figure 55.

Figure 57 is a side view of one form of stop used in connection with certain of the mechanism which operates part of the mortar spreading instrumentalities, this stop being used for opening one of the clutches.

Figure 58 is a view of the stop similar to Figure 55 for closing the last mentioned clutch.

Figure 59 is a side view of a throw-out

stop for certain other parts of the mechanism.

Figure 60 is a view of a throw-in stop to coact with the stop of Figure 59.

Figure 61 is a side elevation of certain gear actuating racks used in connection herewith.

Figure 62 is a plan view of the racks in Figure 61.

Figure 63 is a section on the line 63—63 of Figure 61.

Figure 64 is a section on the line 64—64 of Figure 61.

Figure 65 is a detail view on the line 65—65 of Figure 61.

Figure 66 is a general diagrammatic plan of certain parts of the machine.

Figure 67 is a detail section on the line 67—67 of Figure 43.

Figure 68 is a detail section on the line 68—68 of Figure 67.

Figure 69 is an enlarged detail view looking from the plane of the line 69—69 of Figure 68.

Figure 70 is an enlarged detail view of certain interrupted gears, the view being taken on the line 70—70 of Figure 68.

Figure 71 is a detail elevation of certain of the parts as disclosed in looking from the line 71—71 of Figure 41.

Figure 72 is an enlarged detail section on the line 72—72 of Figure 71.

Figure 73 is a section on the line 73—73 of Figure 72.

Figure 74 is a plan view of certain parts used in firmly setting the bricks in position and disclosed at the bottom of Figure 71.

Figure 75 is a side elevation of the parts shown in Figure 74.

Figure 76 is a section on the line 76—76 of Figure 75.

Figure 77 is an end view of a portion of the mechanism shown in Figure 75, the view being taken from the left hand end.

Figure 78 is a detail section on the line 78—78 of Figure 71.

Figure 79 is a view from the rear of the machine, the right hand end of Figure 68, showing on a large scale the saw and the means for holding the brick while being sawed, said means being shown in opening position.

Figure 80 is a view of the lower part of Figure 79 from the opposite side and showing the parts in brick holding position.

Figure 81 is a detail section on the line 81—81 of Figure 79.

Figure 82 is a bottom plan view of the swinging cam for the saw, the view being taken on an enlarged scale and looking upwardly from the line 81—81 of Figure 79.

Figure 83 is a detail section to enlarged scale on the line 83—83 of Figure 82, the parts being shown in proper erect position.

Figure 84 is a section on the line 84—84 of Figure 83.

Figure 85 is a diagrammatic elevation of the corner of a brick wall as laid by this machine.

Figure 86 is a diagrammatic view of one form of stretcher course in such a wall.

Figure 87 is a diagrammatic view of a second form of stretcher course in the wall.

Figure 88 is a diagrammatic plan view of a header course in such a wall.

Figure 89 is a vertical median section through a modified form of brick setting mechanism used in connection herewith.

Figure 90 is a detail section, partly in elevation, on the line 90—90 of Figure 89.

Figure 91 is a side view showing certain brick setting cams and associated parts as used herein.

Figure 92 is a detail section showing certain gearing and taken on the line 92—92 of Figure 67.

Figure 93 is a detail section to enlarged scale on the line 93—93 of Figure 68.

Figure 94 is a diagrammatic view of a form of the device employing a modified drive for certain parts.

It will be noted that the track in this device is provided with the usual rails 10 and the mechanism is mounted on a carriage having a frame 11 supported on wheels 12 which run on the rails 10. From an inspection of the diagrammatic view in Figure 2 it will be noted that at one end of the carriage there is provided certain hod supporting and mechanism driving means indicated in general at HT, the device being called a hod table. More particularly the construction of this hod table is shown in Figures 5 to 8. Referring now to these figures it will be seen that there is attached to the frame 11 certain supports 13 which carry longitudinal members 14 which are connected by transverse members 15 preferably formed of angle iron. These transverse members support opposed pairs of angle irons 16, the angle irons having one flange vertical and the other flanges of each pair confronting each other. From an inspection of Figure 7 it will be seen that there is an angle iron 16 at each side of the hod table and pairs of angle irons arranged back to back between the side angles. Associated with each side angle is an angle iron 17 having a horizontal leg spaced below the leg of the angle 16. T-irons 18 have their stems embraced between the intermediate back to back pairs of angles and their heads spaced below the horizontal legs of the intermediate angles 16. Thus the spaces provided form guide channels for receiving the ends of brick separators or spacers 19 having upstanding prongs or lugs 20 by means of which bricks resting on the horizontal flanges of the angles 16 may be held in proper spaced relation, such bricks being indicated at B.

To prepare the bricks for positioning on the table certain hods are used each of which

consist of a rectangular metallic frame 21 having opposed spacers 22 projecting inwardly from its sides and at the bottom this hod is provided with a pair of opposed channels 23 wherein is slidably mounted a removable sheet metal bottom 24 having a handle 25 upstanding at one end. These hods are provided with swinging wire handles 26 by which they may be transported. In the form here shown each hod holds six bricks in proper spaced relation and these hods are filled, with the bottoms in position, from any convenient brick pile and are brought into the building area and stacked conveniently to the hod table operator on the floor. When it is desired to use a hod full of bricks the hod is lifted and placed on the rails or angle irons 16 in such position that the spacers 19 may have their lugs 20 enter in the spaces formed by the lugs 22 of the hod. Then the handle 25 is grasped and the bottom 24 withdrawn so that the bricks themselves rest directly on the angle irons 16 and the hods can be removed for refilling.

With the bricks thus positioned on the table there will be a spacer 19 between each two adjacent bricks in each line. At the end of each row or line of bricks there is provided a pusher having a body 27 and a rearwardly projecting loop or handle 28. This pusher runs in the guides at its sides and to the sides of the pusher are attached the ends of chains 29 which pass forwardly in the guides and run under idler pulleys 30 mounted on shafts 31 supported by brackets 32 from a transverse angle member 33 carried by the frame. At the rear end of the hod table behind each line of bricks there is arranged a pair of vertical guide channels 34 wherein slides a counterweight 35. The tops of these channels are held in proper spaced relation by a transverse member 36 which supports brackets 37 carrying shafts 38 on which are journaled the upper idler sprockets 39. The chains 29 pass under the lower idlers, up in front of and over and down behind the upper idlers 39 and have their depending ends connected to the counterweights 35. By the action of these counterweights the rows of bricks are urged constantly towards the rear of the machine, the spacers being secured to the chains to effect movement of the bricks. At the front end of each pair of guides and central below the guides is pivotally mounted a lever 40, the upper end of which is engageable in the respective loop or handle 28, the lever being supported on a bracket 41. This lever, upon its upper end being tilted forward and engaged in said loop constitutes feed preventing means since, so long as the lever is held in this position the bricks cannot move to the rear. In order to hold the lever in this position there is provided a spring latch having a housing 42 mounted beneath the respective bracket 41. In this housing slides a beveled nosed bolt 43 urged outwardly by a spring 44 and having on its tail end an eye 45. Projecting downwardly from each pusher 27 is a lug 46 and toward the rear end of each row of bricks, between and below the respective guides, is a bracket 47 whereon is pivoted a lever 48 the upper end of which lies in the path of the lug 46 so that, as the lug engages this lever its upper end is tilted rearwardly. The upper end of each of these levers 48 has connected thereto one end of a pull wire 49 which passes around an idler pulley 50 to the eye 45 in the next succeeding row of bricks to be operated after a particular row is exhausted, the lever 48 being so positioned as to be engaged by the lug 46 at this time. In the hod table here shown it will be seen that provision is made for three rows of bricks which are successively used from right to left. The lever 48 of the first row is thus connected to the eye 45 of the second row; the lever of the second row being connected to the eye of the third row and the lever of the third row to the eye 45 of the first row. Normally the bolt 43 prevents release of the lever 40 but retraction of this bolt permits release of this lever 40 and consequent feeding of the row of bricks rearwardly.

Mounted on brackets 51 at each side of the hod table near the rear thereof are pairs of alined idler sprockets 52, there being one pair at each side of the hod table. These sprockets support the main conveyor chains 53 which run from side to side of the hod table beneath the sprockets. Spaced at intervals along these chains are brick carrying devices which are termed graspers and are indicated in general at G. Each of these devices in the present form consists of an angle bar body 54 having at its ends trunnions 55 and 56, the trunnion 55 being considerably longer than the trunnion 56. In the horizontal leg of the body angle there is formed an opening wherethrough extends a housing 57 in which slides a plunger 58 having diametrically disposed arms 59 which project through slots 60 formed in the sides of the housing. The lower end of this housing supports a plate 61 on the opposite edges of which are provided brackets 62 carrying shafts 63. These shafts extend through the angle portions of bell crank levers each having an arm 64 connected by a pin and slot connection 65 with the free end of a respective arm 59. The other arm 66 of each bell crank carries an angle member 67 forming a grasper jaw. A spring 68 in the housing urges the plunger downwardly to effect movement of the jaws toward each other to grasp the rearmost pair of bricks in the line. Extending from the plunger through the top of the housing is a stem or shank 69 carrying a cam member 70 having a beveled underside. On the trunnion 55 is fixed an arm

71 carrying at its upper end a roller 72 which engages a guide rail 73 extending from side to side of the hod table. The purpose of this roller and guide rail is to prevent tilting of the graspers under the influence of the jaw opening means now to be described, the roller and rail acting to steady the graspers.

Across the rear, as seen in Figure 6, of the table above the shaft 31 extends an angle member 74 having, for each row of bricks, a pair of bearing brackets 75 supporting a shaft 76 whereon is mounted a forwardly projecting arm 77 carrying at its forward end a camming bar 78 adapted to engage beneath the grasper cam 70 upon being operatively positioned so that the plunger is raised and the jaws opened at the proper time, the camming bar terminating at such point that the jaws will drop and close on the bricks in just the right position. Supported from the member 74 are wedge bolt housings 79 in each of which slides a wedge bolt 80 adapted, when moved in one direction, to engage and raise the respective arms 77 to cam operating positions and, when moved in the opposite direction, to allow these arms 77 to fall to inoperative positions. Each wedge bolt lies beneath its respective arm during the feeding forward of the respective row of brick but, upon the row being exhausted and the lug 46 engaging the lever 48, a retracting wire 81, connected to the lower end of the lever 48 and running over idlers 82, draws upon and retracts this bolt. Also a wire 83 running over idlers 84 connects this bolt to the release wire 49 of its own line of bricks so that, as the bricks of the line are released for rearward movement, the wedge bolt is protracted to cam operating position.

In order to hold the chains 29 against movement temporarily while a pair of bricks is being moved transversely by the grasper there is provided across the rear of the lines of bricks a stop bar 85 mounted for forward and rearward movement just in front of the cross bar 33. Between the sides of the table extends a rock shaft 86 on which is a rock arm 87 connected to the bar 85 by a push rod 88. Also on this shaft 86 is a set of rock arms 89 which, when raised by rearward movement of the stop bar, engages a respective spacer 19 thus checking the movement of the chains 39 until the two bricks at the rear are removed whereupon the stop bar moves forwardly, the engaged arm 89 moves to free the spacer and the line of bricks moves to the rear to again engage the stop bar and operate the arms 89.

Considering now the construction of the main carriage 11 which supports the entire structure it will be observed that this carriage is provided with a pair of side rails 90 which are connected intermediate their ends by bolsters 91 which form part of the body of the carriage and may thus be termed body bolsters. On the underside of these bolsters are mounted the bolster plates 92 whereto are pivoted the truck or wheel bolsters 93. By this construction the wheels may swivel in passing around a curve, as at the corners of a building. The ends of the carriage frame are formed by channels one of which is shown in Figure 19 at 94. On the rear end of this carriage frame there is supported a suitable motor which may be of any desired type and only the shaft 95 is deemed necessary to be here shown as indicating a driving means for the entire device. On the shaft 95 is keyed a gear 96 which meshes with a gear 97 on a shaft 98 which extends longitudinally of the carriage, being of course supported in suitable bearings one of which is indicated at 99 in Figure 19. On the shaft 98 is mounted a pinion 100 which forms the first gear of a reducing train 101 having for its last gear a wheel 102 which is mounted on a shaft 103. Also on this shaft 103 is a sprocket 104 which is connected by a chain 105 to a sprocket 106 fixed on a shaft 107. This shaft 107 runs along one side of the frame and at its rear end carries a bevel gear 108 which meshes with a bevel gear 109 mounted on a shaft 110 which is slidably and rotatably supported in the longitudinal brackets 111, the shaft passing through slots 112 in said brackets as can be seen in Figures 22 and 30. This shaft 110 also passes through bearings 113 formed in the ends of links 114 the other ends of which are pivoted to rocker arms 115 fixed on a shaft 116 extending transversely of the machine. Referring to Figure 35 it will be seen that the shaft 110 also passes through a vertical bracket 117 and on the shaft is a gear 118 which meshes with an idler 119 and this in turn meshes with a gear 120 carried on a shaft which extends through the bracket 117 and supports at its other end a frusto-conical friction pinion 121. Supported in bearings 122 (see Figure 19) is a shaft 123 whereon is fixed a frusto-conical friction gear 124. The bracket 117 is provided at its upper and lower ends with guide pins 125 which work in the space between guide bars 126, these bars being positioned in such manner as to be parallel, in plan, to the adjacent side of the friction gear 124. By this means the friction pinion 121 is kept tightly pressed against the friction gear. On the shaft 123 is a bevel gear 127 which meshes with a bevel gear 128 carried on a shaft 129, Figure 27, supported in a frame 130 and having on its lower end a bevel gear 131 which meshes with a bevel gear 132 fixed on a shaft 133 which passes through bearings 134 slidably vertically in the legs 135 and urged to lowermost position by springs 136. Between the bearings there is fixed on the shaft 133 a ground or driving wheel 137 which engages the floor or

platform on which the device is placed so that as this wheel is rotated the carriage is driven forwardly.

Now it can be understood from what has just been said that as long as the engine drives the shaft 95 the ground wheel 137 will drive the device along the track and it will also be plain that the speed of travel along the track may be varied in accordance with the position of the friction pinion 121 along the friction gear 124.

It is, of course, obvious that the gear 118 is splined on the shaft 110 because, as will be seen from Figure 19, the gear slides along the guide bars 126 and moves transversely of the machine at the same time it moves forward.

It is desirable at certain times in the operation of the device, especially in turning corners, that the speed of movement along the track should be automatically varied because, by reference to Figure 1, it will be seen that the track has curved portions at the corners of the building so that the length of wall which is laid during the time that the carriage is turning the right angle at the corner is much greater than the length of the track. In other words, so long as the machine is running parallel to the wall a brick is laid every time the machine moves forward a space equal to the length of ½ brick plus ½ thickness of mortar between adjacent bricks, reference being had to stretchers, but in passing around the corner considerably more brick will be laid than the length of the arc traversed by the machine so that the machine must lay brick at lessened distances along the path of the machine around such arc. Furthermore, these distances will vary in accordance with the position of the machine on the arc. Now, the machine is arranged so that brick are laid in proportion to the number of revolutions of the shaft 95, this being the cam driving shaft which controls all operations. On reaching the corner the action of all other parts continues uniform, that is to say the brick are still evenly spaced along the wall and the mortar and saw operate the same as if the machine was running along a straight wall but in order to permit this uniform spacing of the laying operations a variable travel around the corner is essential and this is accomplished by the following mechanism.

Mounted on one of the side members 90 is a pair of brackets 138 wherein is mounted a vertical shaft 139 on which is a camming or positioning collar 140 having a beveled under surface which cooperates with a similar surface on the lower bracket 138. A spring 141 holds this collar in normal position such as is shown in Figure 29. Fixed to the lower end of the shaft 139 is a lever 142 carrying a downwardly projecting pair of rollers 143 which, on the machine approaching a corner engage and straddle a guide rail 144, see Figure 1. This guide rail is so shaped in accordance with the building and the corner to be passed as to properly effect movement of the arm 142 and shaft 139. On the upper end of the shaft 139, see Figure 19, is a sprocket 145 which is connected by a chain 146 with a sprocket 147 mounted on a shaft 148. It may here be mentioned that the shaft 148 extends up vertically through the machine and assists in moving the laying mechanism in and out from the track in accordance with the varying distance of the wall from the track at the corners. This shaft also has other functions which will be later explained. On the shaft 148 is likewise fixed a sprocket 149 which is connected by a chain 150 with a sprocket 151 fixed on a shaft 152 carrying a cam member 153. This cam member is clearly disclosed in Figures 19, 30 and 31. It will be seen that on the underside of the cam member there is a pair of guide ribs 154 and between these ribs is positioned the upper end of the upper pin 125. Now, referring especially to Figure 31 and to Figures 29 and 19 it can be seen that as the arm 142 is swung out by the guide rails the shaft 152 will be rotated through the medium of the sprockets and chains just described. Consequently, the pin 125, the rotation taking place in the direction of the arrow in Figure 31, will be forced outwardly along the guides 126 so that the driving pinion 121 will travel outwardly to engage increased dimetral portions of the friction pulley 124 and consequently the driving wheel 137 will have its speed of revolution decreased as the cam is rotated. Obviously, the particular shape of this cam is a matter of mechanical design to produce the required effect. Also, referring to Figure 1, the guides 144 not only guide the lever 142 to swing away from the track rails 10 but, after the carriage has reached its maximum distance from the wall and again approaches the wall these guide rails effect swinging of the lever, and consequently the cam, back to normal position for drive along a straight track.

It is, of course, necessary that bricks must be laid at different heights from the floor and to accomplish this purpose the brick laying devices are supported from a vertically movable frame or platform. On top of each member 90, as shown in Figure 6, is mounted two thrust bearings 155 wherein are seated the lower ends of elevating screws 156. At the bottom each screw is provided with a bevel gear 157. The screws are arranged in pairs opposite each other and the screws of each pair are connected by a shaft 158 supported in suitable bearings and carrying the bevel gears 159 which mesh with the respective gears 157. These shafts 158 project laterally through one side of the carriage frame and on the projecting end of each shaft is a sprocket wheel 180, the wheels 160 being

connected by a sprocket chain 161 which passes under a sprocket 162, see Figure 21, fixed on a shaft 163. The sprocket 162 is normally held from unscrewing by means of a dog 164. Furthermore, on the shaft 163 is mounted a crank 165 so that rotation of the sprocket 162 by means of this crank will effect corresponding rotation of the screws 156. The vertically movable frame includes a lower frame or platform having side members 166 and end members 167. At the corners of these side and end members are threaded brackets forming nuts 168 so that revolution of the screws 156 in one direction or the other causes the frame to be raised or lowered as the case may be. Connecting the end frame members 167 are longitudinal members 169 and on each of these longitudinal members and also on the left hand end member 166 are pairs of brackets 170. Each bracket 170 supports a pair of rollers 171, see Figure 39, the rollers on one bracket of the pair confronting the rollers on the other bracket. Between these rollers are mounted the laterally movable I-beams 172, each of which carries a pair of angle irons 173 the horizontal legs of which fit between respective pairs of rollers 171. Thus the I-beams and parts attached thereto may move transversely of the carriage, in and out on the left hand side thereof. Now, these I-beams support that part of the apparatus which acts directly to lay the bricks and mortar and to effect sawing off of those parts of the brick portions that project into the openings for doors, windows and the like. As previously set forth in the explanation of the manner in which the speed of linear travel of the carriage is varied at the corners, the track at each corner gradually recedes from one wall and approaches the wall at right angles thereto. Consequently, the carriage and all the parts supported thereon gradually moves further away from the first wall and then, after reaching its maximum distance from this wall for laying bricks thereon, gradually approaches the wall at right angles thereto. Consequently, just as the speed of travel is slowed up in going around the corner the I-beams 172 must first be projected outwardly until the wall corner is reached and then retracted to normal position. Now, the shaft 148, as we have previously seen, has its position controlled by the working of the lever 142 over the tracks 144. By reference to Figure 38 it will be noted that this shaft 148 extends upward through the upper part of the apparatus and keyed to this shaft adjacent one of the frame ends 167 is an arm 174 which is connected by a link 175 with a tie member 176 connecting the forward ends of the beams 172. By reason of this construction the rotation of the shaft 148 under the influence of the lever 142 effects swinging of the arm 174 and consequent protraction and retraction of the beams 172. Obviously, the parts are so arranged that the extent of protraction is such that the apparatus carried by these beams follows the rectilinear wall line to the corner of the wall and then similarly follows the wall line of the adjacent portion of the wall extending at right angles to the first portion.

Now it may here be noted that all of the vertical shafts such as 148 extend upwardly through the apparatus a sufficient distance to correspond with the maximum elevation obtainable by rotation of the screws 156. Also it is to be here noted that all parts driven by the vertical shafts and subject to vertical movement are splined on these shafts.

Also connecting the I-beams 172 are transverse members 177 from which extend upwardly vertical members 178, the members over each I-beam being connected by horizontal members 179 which extend above the respective I-beam and are parallel thereto. These members 177, 178 and 179 form the frame for the third conveyor which may be termed the conveyor to the layer. Obviously, this third conveyor must move in and out along with the I-beams in order that the laying may be properly accomplished. Mounted on the frame members 166 are vertical frame members 180. The upper ends of the frame members 180 are connected by the longitudinally extending frame members 181 which project rearwardly so that they have their rear ends in such position that the conveyor from the brick table may have certain of its guide wheels carried thereby as will be now explained. The arrangement of these conveyor pulleys is shown best in Figure 2 in a diagrammatic manner but the details are disclosed in Figures 37, 42 and 43.

The conveyor chains 53 run from the rear sprocket 52 up to an idler sprocket 182 and thence forwardly to the underside of a driving sprocket 183. They pass around this sprocket and return to an idler sprocket 184 from whence they pass upward to sprockets 185 at the top of the machine and thence downward to the forward sprocket 52. Now, by an inspection of Figure 2 it will be seen that this arrangement permits the platform to be raised and lowered without interferring with the operation of the main conveyor which takes the bricks from the brick table to the vertically movable platform. It will also be noted from Figure 2 that the brick table is located right above the engine space at the rear end of the carriage. The two sprockets 184 are mounted on a shaft 186 on which they are freely revoluble. Each of these sprockets is connected to the shaft by a bevel tooth clutch member 187 which is held in clutching position by a spring 188. Shaft 186 is keyed at both ends to casting so that it cannot rotate. This leaves sprockets 184 free to revolve when machine is lay-

ing bricks, but locks these sprockets when movable platform is being raised, so that chain must pull up with movable platform and thereby keep constantly in the proper position the brick graspers in the layer box ready for the next course. Springs 188 are strong enough to hold sprockets locked when lowering movable platform, but if they should move when lowering position of layer box graspers can if necessary be changed by means of hand crank 213 (Fig. 19).

Each of the sprockets 183 (see Figure 42) is driven by a bevel gear 189 which is in turn driven by a bevel gear 190 mounted on a downwardly extending diagonal shaft 191 and carrying at its lower end a bevel gear 192. The bevel gears 192 mesh with bevel gears 193 which are carried on a shaft 194 extending horizontally and transversely of the machine. On the left hand end of this shaft (see Figure 37) is a bevel gear 195 which meshes with a bevel gear 196 mounted on a vertical shaft 197. On this shaft 197 is also a bevel gear 198 which is located at the top of the shaft and this bevel gear meshes with a bevel gear 199 which is mounted on a second conveyor shaft 200 which extends longitudinally and horizontally of the machine. At the rear end of the shaft 200 is a bevel gear 201 which meshes with a bevel gear 202 splined on one of the main vertical shafts 203. On the lower end of the shaft 203 just above the carriage frame is a bevel gear 204 wherewith meshes a bevel gear 205 carried on a transverse shaft 206 which has on its inner end a bevel gear 207 meshing with a bevel gear 208 which is revolubly mounted on the shaft 98 and is adapted for connection with and disconnection from said shaft by means of a clutch 209. Thus the main conveyor is driven from the engine shaft 95. The construction just referred to may be seen in Figures 19, 20 and 27. Moreover, from Figure 27 it will be seen that the bevel gear 204 is connected to the shaft 203 by a ratchet clutch 210 and that adjacent this gear 204 the shaft 203 carries a bevel gear 211 wherewith meshes a bevel pinion 212 actuated by a crank 213. Thus the shaft 203 may be rotated by hand in the event that it is desirable to move the conveyor chains for the adjustment of the same. As will presently be described this same shaft 203 operates the other conveyors.

On each of the shafts 203 and 197 is mounted a bevel gear 202′ wherewith meshes a bevel gear 201′ carried on a short shaft whereon is mounted a sprocket 215 driving the transverse conveyor chains 216, these chains passing over idler sprockets 217 at the right side of the machine. Now, it will be observed that this conveyor runs in a direction transverse the machine while the main conveyor runs longitudinally of the machine, the main conveyor crossing over the transverse conveyor. Along one side of the conveyor extends a cam member 218, the construction of which is seen in Figure 47, and this cam member is provided with a camming groove 219 for the reception of the rollers 72 which controls the position of the grasper. The graspers on the transverse conveyor normally hang in suspended position but, as the grasper reaches the right hand end of this conveyor the roller 72 engages in the groove 219 so that as the grasper passes around the idlers 217 it is turned upside down and held in that position. In the path of the member 70 of this grasper is an opener 220 which acts to open the grasper at certain points in its travel with the conveyor. This opener may be seen by reference to Figure 43. Similarly, an opener 221 is provided for the main conveyor and these two openers are so positioned and the graspers are connected to the chains at such points that as the inverted transfer or transverse grasper passes the center of the main conveyor the grasper on this conveyor will be directly over it and will open so that the bricks from the main conveyor will be received by the transfer conveyor and gripped by the closing of its grasper.

On the lower end of the shaft 197 (see Figure 37) is a bevel gear 222 which meshes with a bevel gear 223 splined on a shaft 224. Also similar gearing connects the shaft 203 with a shaft 225. These two shafts 224 and 225 run along side of the conveyor to the layer and on each of these shafts at its right hand end is a bevel gear 226 which meshes with a bevel gear 227 mounted on a short shaft carrying a drive sprocket 228 for the conveyor to the layer. The conveyor to the layer is supported on the transverse frame members 179 and at the left end of these members carry a downwardly extending frame 229. The upper run of the conveyor chains 230 which pass around the sprockets 228 extends laterally and passes downwardly over an idler sprocket 231 at the top of this frame 229. At the bottom of the frame is a second idler sprocket 232 for each chain, the chain passing around this sprocket and thence up and around a return idler 233 from which it passes to the driving sprocket 228. Fixed to the transversely movable part of the frame work carried by the elevating platform is an opener 234 for the grasper or graspers of the conveyor to the layer and, as best seen in Figures 48 to 51, there is provided along one side of this conveyor a camming member 235 having a cam groove 236 for receiving the roller 72. At the delivery end of the groove 236 there is a diagonal cam portion 237 and beyond the cam member 235 is a second cam member 238 having a guide rib 239. Now, in the operation of this it will be noted from Figures 42 and 52 that the openers 234 engage the grasper for the third conveyor in its inverted position thus opening it as shown in Figure 42.

At the same time, as shown in the same figure, an opener 240 is likewise carried on the transversely movable frame and is positioned in such relation to the second or transfer conveyor that the grasper of the second conveyor will be opened just at the time it is over the open and inverted grasper for the third conveyor so that the bricks are delivered from the second to the third conveyor. Now, obviously since the openers 234 and 240 travel with the transversely movable frame the third conveyor can be run in and out without in any way interfering with the transfer of brick from the second to the third conveyor. By means hereinafter explained the third conveyor releases its brick by the opening of its grasper or graspers at the instant such grasper passes around the lowest point of the idler 232 and this delivers the brick to the setting mechanism. Now, obviously in laying a continuous wall one brick must be laid for each brick space occupied and it may be here said that the invention is to be used for brick of the ordinary standard proportions in which the length is substantially twice the width and the width twice the thickness. Also it may be mentioned that the graspers are intended to hand two bricks at a time. Consequently, two bricks are to be laid for every brick length of wall, that is about every eight inches. So long as the wall is laid continuously and there are no openings therein the conveyors may run continuously but, if a door, window or other opening be reached the laying of the brick must be interrupted for a distance equal to the width of the opening and consequently the brick must not be delivered to the setting or laying mechanism proper and the conveyors must stop. In order to effect this stopping of the conveyors the carriage is provided with a shaft 241 whereon is mounted a lever having one arm 242, see Figures 19 and 22, which extends upward and is provided with a pair of rollers 243 straddling a rim formed on the clutch 209. Connected to the arm 242 is an arm 244 and this arm extends down in position to engage certain stops, presently to be described, which are positioned along the track at proper points in relation to the openings. It may here be noted that these stops may be moved into and out of active position. These stops are arranged in pairs in the path of the arm 244 one of the pair effecting closing of the clutch and the other opening of said clutch. Now, so long as the courses of brick are continuous and without openings but one stop will be necessary and that one will be the one to throw the clutch into action so that the conveyors will be driven. Obviously, such continuous layers or courses of brick will only occur above all openings since the door openings must come down to the floor. Accordingly, at the side of each door and window opening to which the machine first comes in its movement on the track there will be positioned a stop for throwing the clutch out while on the further side of such opening there will be positioned a stop for throwing the clutch in. Consequently, as the machine moves along the track and reaches a door opening the action of the conveyors will be interrupted and will be only resumed when the machine is in position to lay brick at the far side of said opening. When the level of the window openings have been reached, other pairs of stops being positioned at each side as with door openings, the operator throws the window stops into effective position and the conveying of brick will be interrupted at these openings.

As before noted it is intended to handle two bricks in each grasper and in the third conveyor so the layer arrangement is made for presenting these bricks either as headers or as stretchers. To this end, reference being had to Figures 15, 17 and 18, the head or camming member 70 of the graspers on the third conveyor is provided with oppositely disposed extensions 245 each of which carries an upstanding pin 246. Now, these pins may be either alined in the direction of movement of the grasper as shown in Figure 15 or transversely of that direction at the proper point in their travels as will be hereinafter explained and whenever such pins are alined transversely the whole grasper swings in the member 54. Furthermore, the pins must always be alined transversely of the movement whenever this grasper is receiving brick from a grasper on the second conveyor. To effect this just before the opener 234 is reached the frame members 179 are connected by a transverse member 247 having a V-shaped guide 248 on its under surface to engage and turn the grasper as can be readily understood from an inspection of Figure 52 wherein the pins are shown in one position in full lines and in a second position in dotted lines.

It should be mentioned that the member 238 has for its purpose to steady the grasper as it leaves the member 235 as there will be a natural tendency, when this member swings from inverted to normal position, for the heavy brick to affect the grasper as though it were a pendulum.

Referring now to the several stops and operating mechanisms located along side of the track and disclosed in Figures 53 to 65 inclusive it will be noted that the stops in Figures 53 to 60 work in pairs one of which serves to close or cause operation of certain mechanism while the other disconnects such mechanisms or effects reversal of movement. All of the stops have their movable parts of identical construction while the brackets whereby they are connected to proper places on the rails 10 are of similar construction but

vary in length according as to whether the stops are to work in conjunction with one or the other of said trains of the machinery. It has been mentioned that the conveyor system is controlled by the clutch 209 and that this clutch is operated by means of a lever 244. By reference to Figure 25 it will be seen that the end of this lever is bent at right angles to its body so that the end may engage either above or below a stop. Now, each of the stops shown in Figures 53 to 60 includes a bracket 249, these brackets being indicated in accordance with their length by the lower case suffixes "*a*", "*b*" and "*c*" respectively. Each of these brackets has its base secured in proper position on the outer rail 10 and projects inwardly toward the inner rail to provide at its free end a pivot shaft 250. Mounted on this shaft are the forked bearing ends 251 of a stop arm 252. In the form shown in Figures 53, 54, 57 and 59 the upper end of the arm 52 extends inwardly at right angles to the body as shown at 253 and mounted beneath this portion 253 is an adjustable block 254 which may be termed the cam block, the block having its underside beveled as at 255. This block is held in position by means of a screw and nut 256. The inner end of the bracket 249 is provided with an angular projection 257 wherewith engages the free angular end of a spring 258 secured to the arm 252 so that, as shown in Figure 53, the stop is normally held in raised position for use but may be turned down to the dotted line position when it is not desired to use the same. The other type of stop can be seen by reference to Figures 55, 56, 58 and 60. In this type of stop the stop arm 252 has adjacent its pivot point a pair of inwardly extending fingers 259 wherethrough passes a screw 260 having thereon a lock nut 261, the screw carrying a cam block 262 similar to the block 254 but having its upper face 263 beveled in place of the beveled under face 255. In this form of the device the angled spring 264 is carried by the lower finger 259 and operates on a lug 265. In the devices shown in Figures 61 to 65 there is provided a pair of brackets 266 which are fastened to the outer rail 10 and at their inner ends these brackets carry each three bearings 267, the bearings on one bracket being alined with the bearings of the other brackets and the three bearings being arranged in triangular form with the central bearing at the apex of the triangle. The bearings nearest the rail 10 have journaled thereon a folding rack bar 268 which is provided with the usual stop spring 269 to hold the bar normally erect. The upper bearings support the folding rack bar 270 and it will be noted that while the rack bar 268 is provided with teeth throughout its entire length the rack bar 270 is split to have its ends move independently, the carriage traveling over the rack bars in the direction of the arrow in Figure 62. Similarly, the outer bearings support a third rack bar 271 but in this case the rack teeth are at the front end. These rack bars are provided with the usual stop springs 272, best seen in Figure 61 and by reference to this figure it can be seen that the bars may either be turned up as shown in full lines or down to inoperative position as shown in dotted lines.

Now, referring to the operation of the conveyor system it will be remembered that the lever 244 is the controlling lever. The actuating members for this lever are those shown in Figures 53 and 55 and in its passage around the track the car brings the lever 244 at each opening into engagement with the throw-out stop 254 which releases the clutch 209. On arriving at the far edge of the opening the lever 244 engages the corresponding stop block 262 which lifts the lever and throws the clutch into engagement so that the conveyors and other apparatus operating therewith are thrown into service. Obviously, in those courses which run continuously above or below the opening in question the stop arms 252 may be turned down to dotted line position so that there will be no stopping of the operation.

It has been noted that the vertically movable platform may be moved by means of the crank 165 but with each complete travel of the car around the building the shaft 163 is operated automatically to effect raising of the platform for the next course of brick. Referring now to Figures 22 and 28 it will be seen that on the inner end of the shaft 163 there is provided a gear 273 wherewith meshes a gear 274 revolubly mounted on a shaft supported in a frame 275. This gear 274 is in such position that the travel of the car along the track brings the gear past the rack bar 268 so that the gear meshes with this rack bar, provided the same is raised, and rotates the shaft 163 which, as previously described, will effect rotation of the screws 156 so that the vertically movable platform is raised to the extent of one course of brick. Now by reference to Figure 1 it will be seen that two of these sets of rack bars are provided so that the mortarer will not hit the first brick laid of the course being finished.

We will now consider the apparatus for setting the bricks in place. The ends of the beams 172 support a ring 276 which forms an annular track-way and centrally of this ring is a casing 277 of tubular form to which various parts of the brick setting apparatus are connected and supported. Extending laterally from the ring 277 are brackets 278 which carry on their upper ends grooved wheels or rollers 279 resting on the track 276. By this means the casing is supported so that it may revolve freely in the ring 276. Also mounted on the brackets 278 are pairs of spaced bevel gears 280 between which is a

bevel ring gear 281 as can be clearly seen by reference to Figures 67 and 68. On the shaft 203 is a bevel gear 282 which which meshes with a bevel gear 283, see Figure 38, on a short shaft supported on the member 166 and carrying at its inner end a sprocket 284 which is connected by a chain 285 with a sprocket 286 fixed on a shaft 287 and carrying at its outer end a bevel gear 288 which meshes with the ring gear 281, a corresponding bevel gear 289 being provided for steadiness of motion. Thus, all the time the conveyors are in motion the ring gear 281 will be rotated. Now, referring to Figure 68 it will be seen that on opposite sides of the casing 277 certain of the gears 280 below the ring gear 281 are mounted on shafts 290 which carry the driving gears 291 of gear trains having their terminal gears 292 fixed on shafts which carry the cams 294. It will be observed from Figure 91 that these cams 294 are arranged in pairs, one pair being at each side of the casing 277. Pivoted centrally between the cams of each pair is a pair of lift levers 295 which carry rollers 296 received in the grooves of the cams 294, these cams being face cams. Opposite sides of the casing 277 are provided with guide slots 297, see Figure 71, wherein slides certain brick gripping and setting means, shown best in Figures 74 to 77 inclusive and also disclosed in Figure 71. These brick setting means each comprises a body 298 grooved to engage the edges of the guide slots so that the body may raise and lower in these slots. Projecting from this body is a pin 299 which engages in a slot 300 in a respective lever 295. The body 298 has an outwardly extending portion or lug 301 wherethrough slides a vertically movable cam member 302 having a beveled lower end which engages the bevel edged head 303 of a presser bar 304 which slides inwardly and outwardly of the casing through the lower part of the body 298.

This presser bar is urged outwardly by a spring 305 and carries at its inner end a yieldable brick gripping jaw 306 held in normal position by springs 307. The vertical cam member 302 is provided at its upper end with a laterally extending lug 308 engageable on a bracket 309 fixed in the path of this lug to the casing, this bracket acting as a stop for the cam. Just below the upper end of the movement of these brick grippers is a pair of downwardly swinging shelves 310 between which is located a spacer bar 311 and on the lower end of the frame 229 is a gripper opener or release 312.

Now the operation of this part of the device is as follows. As the gripper is carried by the chains 230 below the wheels 232 the opener 312 engages and opens the grasper so that the bricks drop on the shelves 310, being held in separated position by the bar 311. At this time at least one pair of the gripper bodies 298 has been raised, one pair being up and the other down when laying stretchers and both pairs moving up and down together when laying headers, and the spring jaws 306 engage and grasp the brick. The movement of the ring gear 281 rotates the cams 294 through the gearing connected to said cams and thus causes vertical movement of the levers 295 and consequent vertical movement of the gripper bodies 298 and the parts carried thereby. When these bodies reach delivery position, just as the bricks have been set on the wall, the brackets 309 engage the lugs 308 and raise the cam members 302 so that the jaws 306 spring open but at the upper position the lugs 308 strike the brackets 313, see Figure 71, while the bodies continue to move upwardly so that the bars 304 are pushed in to grip the brick.

In passing around the curved portions of the track at the corners obviously the center line extending laterally of the apparatus through the axis of the casing 277 and lying between the beams 172 will assume angular relation to the wall. Consequently, unless provision was made to rotate the casing 277 under such conditions the bricks would not be laid straight along the wall. Provision is, therefore, made to ensure the laying of the bricks in straight lines at the corners of the wall and to this end the same shaft 148 which controls the movement in and out of the beams and casing also controls the shifting of the casing 277 so that the brick may be laid in their proper positions on the wall. Now, referring to Figures 37, 43, 44 and 67 it will be seen that the shaft 148 drives a gear train 314 which carries a bevel gear 315 meshing with a bevel gear 316 splined on a horizontal shaft 317 which extends out to the left of the carriage. Supported on the ring track 276 is a frame work 318 and this shaft 317 is in turn supported on this frame work and carries a bevel gear 319. This bevel gear 319 meshes with a bevel gear 320 carried on a vertical shaft 321 supported from the frame 318 and on the upper end of the shaft 321 is a sprocket 322 which is connected by a chain 323 with a sprocket 324 fixed to the upper end of a shaft 325 supported from the frame 318. This shaft 325 is connected by a gear train, which will be presently described more particularly, to a gear 326 fixed on the upper end of a shaft 327 which extends downwardly and carries at its lower end a pinion 328 meshing with a large gear 329 on the upper end of the casing 277. Now, it will be observed from Figure 37 that the gear train 314 includes ratchet clutch elements 330 the purpose of which is to convert the oscillating movement of the shaft 148 into intermittent rotary movement in one direction. Thus, as the carriage moves from the straight portion of the track half way around the corner so that the transverse center line above mentioned inter-

sects the corner of the wall, the setting mechanism carried by the casing 277 will be given a clockwise movement corresponding to the angular position of said center line with respect to the wall.

Referring now to Figure 44 it will be seen that on the shaft 325 is a double cam member 331 which rotates with the shaft. This cam member bears against a lug 332 carried by a suitable bracket mounted on a frame 333 which is pivoted on a pivot 334 carried by the frame 318 in vertical axial alinement with the center of the setting mechanism. This double cam member has two arms each shaped as somewhat in plan so that one revolution of the cam will swing the frame 333 twice between its extreme limits. A suitable spring return device 335 holds the lug 332 constantly against the cam 331 and effects return of the frame as the lug drops off the high parts of the cam. It may here be mentioned that the mortar spreader and saw are carried by this frame as will be hereinafter explained. This double cam may be termed the equalizer cam. As the machine goes around a corner the mortar spreader, setting mechanism and saw besides being fed outwards and forward by the beams 262 must also rotate clockwise until the corner is reached, it being understood that the carriage travels around the track in a counter-clockwise direction. At the instant the corner is reached the mortar spreader and saw must both make a quick turn of 90° counter-clockwise while the brick setting mechanism at the same time makes a quick turn clockwise. This keeps the mortar spreader and saw in their correct positions relative to the brick setting mechanism and brings the next bricks to be laid in their correct positions. The mortar spreader, brick setting mechanism and saw, then all rotate clockwise together until the normal position of the carriage with its beams 163 at right angles to the wall is reached at which time the parts mentioned will be alined above the wall. It will now be seen that with the double cam 331 rotating clockwise the frame 333 will likewise be rotated clockwise until the corner is reached whereupon the arm will rotate quickly in an anti-clockwise position. Now the first lobe of the equalizer cam 331 acts to move the frame 333 45° in a clockwise position from its normal position but when it drops back under the influence of the spring mechanism 335 it moves 90° backwards, being 45° on the other side of its normal position and being restored to normal position by the action of the second lobe of the equalizer cam.

At the conclusion of the laying of each course, and before the next course is commenced, the brick setting mechanism must be rotated clockwise 180° if the next course be stretchers or 90° if the next course be headers. This is necessary in order to bring the brick in the setting mechanism in the correct position for laying the first brick of the new course, if the point where each course commences is to be kept constant. Also, the point at the corner where the layer makes its 90° quick turn clockwise varies with each alternate course. On one course the quick turn will be made just before reaching the corner, while on the next course the turn will be made just after passing the corner. The mechanism for accomplishing these purposes will now be described, reference being had to Figures 19, 28, 37, 43, 44, 67 and 68 particularly. Referring first to Figure 28 it will be remembered that in Figure 62 certain mechanism was described wherewith the gears in Figure 28 engage and that the rack 270 was the central rack of Figure 62. Now observing Figure 28 it will be seen that in axial alinement with the gear 274 is a gear 336 which meshes with an idler 337 which in turn meshes with a gear 338 carried on a shaft 339 whereon is mounted a bevel gear 340 meshing with a bevel gear 341 mounted on the lower end of a vertical shaft 342 which carries at its upper end a sprocket 343. Now, referring to Figure 19 it will be seen that this sprocket 343 is connected by a chain 344 with a sprocket 345 fixed on a vertical shaft 346. Referring to Figure 43 it will be noted that on the shaft 346 is splined a gear 347 which meshes with a gear 348 on a short shaft which also carries a bevel gear 349 which meshes with the bevel gear 350 splined on the long horizontal shaft 351 which runs parallel to the shaft 317 and like it extends to the frame 318 where it is provided with a bevel gear 352 as may be seen by reference to Figures 66 and 44. This bevel gear meshes with a bevel gear 353 mounted on a short vertical shaft carrying at its upper end a sprocket 354 which is connected by a chain 355 with a sprocket 356 fixed on a shaft 357 supported on the frame 318. Thus every time the carriage moves past the triple rack arrangement shown in Figure 62 the shaft 357 will be rotated to the required extent for 90° or 180° movement of the layer according as one or both halves of part 270 are turned into active position. Now the double cam 331 has housed on its under side a second double cam 358 as may be seen by reference to Figures 45 and 46. It is to be noted that the tips or outer ends of the halves of the cam 331 vary slightly and this variation determines the drop back of the lug 332 so that according to which half of the cam 331 is presented the lug will be permitted to drop back either just before or just after passing the corner. The purpose of providing the extra cam 358 is so that the lug 332 will be held in proper position by this second cam while the double cam 331 may rotate. From Figures 68 it will be seen that this lug 332 does not actually engage the edge of the cam

331 but is engaged by the edge of the cam 358 in its normal position though, toward the outer ends of the cam 331 the lug 332 rides on the edge of said cam. Under these conditions the cam 331 may be rotated 180° without swinging the arm 333 and thus, in passing from one stretcher to a second stretcher course the revolution of the setting mechanism may be accomplished without in any way interfering with the position of the saw and mortar spreader. The shaft 356 is connected by the gear train 359 and is further connected by a semi-circular segmental gear 360 with a gear 361 fixed to the cam 331. The provision of this segmental gear governs the action of the cam 331 as it only engages the gear 361 for one half of its revolution or during the last 90° of the 180° turn of the shaft 357 so that the cam 331 is turned for headers but is also turned for stretchers as required. Referring to Figure 67 it will be seen that the gear 326 is connected to the shaft 327 by a ratchet clutch 362 so that rotation of this gear is transmitted to the cam 331 but movement of the cam is not transmitted to the gear. It will be remembered that it has been mentioned that the grippers of the brick setter work on the stretcher courses in alternation. This is necessary because the bricks of one row in the course must be displaced longitudinally of the wall a distance of half a brick and the brick setter grippers each operate once for each brick length traversed by the setting mechanism. In laying headers, however, they must be laid in pairs and in changing from a stretcher course to a header course it is necessary to bring the lowermost brick gripper of the setting mechanism up to position along side the upper brick gripper. The mechanism for effecting this will now be described.

Referring again to Figures 19, 28 and 62 it will be seen that the rack 271 is in position for meshing with a gear 363 supported on the frame 275 and driving an idler 364 which in turn drives a gear 365 fixed on a short transverse shaft 366 which carries a bevel gear 367 meshing with the bevel gear 368 mounted on the front end of a shaft 369. At the rear end this shaft is provided with a bevel gear 370 which meshes with a bevel gear 371 fixed on a long vertical shaft 372. Splined on this shaft 372 is a bevel gear 373 which meshes with a bevel-gear 374 on a long transverse shaft which is supported by the frame 318 and carries at its extremity a sprocket wheel 376, see Figures 37 and 67, which is connected by a sprocket chain 377 with a sprocket wheel 378 on the lower end of the frame. This sprocket wheel is mounted on a shaft which carries a bevel gear 379. This gear 379 meshes with a gear 380 which is carried on a shaft 381 which shaft has at its other end a gear 382 meshing with a bevel gear 383, the axis of which is at right angles to the axis of the gear 379 as can be seen by reference to Figure 92. The shafts of the gears 383 and 379 carry segmental gears, best seen in Figure 70, 384 and on each of the shafts 290 is a gear 385 engageable by the respective gear 384 when in proper position above said gear. The gears 384 engage with and rotate the gears 385 only when the grippers carried by the casing 277 are down and when thus engaged serve merely to raise the down grippers. Clutch mechanisms 386 serve to permit action of the segmental gears without the gears 280 being affected and thus the ring gear 281 rotated.

Now, since in going around a corner the casing 277 and all the mechanism carried thereby is rotated it is necessary that the grasper delivering brick to the shelves or platforms 310 be correspondingly rotated so that the brick will be placed on the grasper in the proper position. In order to effect this there is provided on the shaft 327 a gear 387 which meshes with a large gear 388 supported by the frame 318. Connected to this large gear is a gear 389 which meshes with a gear 390 mounted on the upper end of a short vertical shaft 391. On the lower end of the shaft 391 is a sprocket 392 which is connected by a chain 393 with a sprocket 394 mounted on a shaft, see Figure 93, 395 which has at its lower end a double cam 396 which is preferably termed the adjuster cam. Suitably supported to slide transverse the path of the grasper as it is carried by the chains 230, see Figures 67, 68 and 93, is a sliding member 397 which is held in normal position by a spring 398. This sliding member carries a lug 399 which is engaged by the cam 396 to move the slide against the influence of the spring. On the slide 397 are cam lugs 400 which, by the movement of the slide, may be brought selectively into engagement with one or the other of the pins 246 which project upwardly from the grasper. Depending on the extent of movement of the slide the grasper will be rotated to a greater or less extent and since the movement of the casing 277 and that of the cam 396 are controlled by the same shaft a given rotation of the casing will produce a corresponding rotation of the grasper. The method of restoring this part of the device has been previously described, this restoration being effected by the means illustrated in Figure 52.

We will now consider the manner in which mortar is handled in the apparatus. The general layout of the mortar storing, carrying and applying apparatus is shown in Figure 3 and the details are brought out in Figures 19, 22, 29, 68 and 69. Referring especially to Figures 19 and 29 it will be seen that there is provided on the carriage a mortar holding hopper 401 below which runs a pair of mortar conveyor chains 402 which pass at one side over idlers 403 and at the other

side over the drive sprockets 404. These chains run from the idlers 403 up to the top of the machine where they pass over idlers 405 at each side of the top, the chains between the idlers supporting tensioning means indicated at 406. From the drive sprockets 404 the chains pass upward to pass over idlers 407 on a part of the frame 318 and from there pass downwardly and outwardly to extend around sprockets 408 carried on a frame 409 mounted to rotate on a shaft 410 journaled in a depending extension 411 of the swinging frame 332. From the sprockets 408 the chains pass back to idlers 412 on the frame 318 above the idlers 407. Now, by means of this arrangement the swinging of the frame 333 is permitted since the tension means allow for movement of the idlers 408 toward and from the frame 318 and at the same time the shaft 410 permits these idlers to have their axes constantly parallel to the axes of the idlers 407 and 412. The sprockets or idlers 408 are located just above the open upper end of a hopper 413 which may be termed the spreader hopper.

In order to drive these chains there is provided on the shaft 206 a bevel gear 414, see Figures 19 and 27, which meshes with a bevel gear 415 carried on a shaft 416 on which is mounted a pair of sprockets 417 which are connected by chains 418 to sprockets 419 fixed on the shafts which carry the sprockets 404. Thus whenever the other conveyors are driven the mortar conveyor is driven. Now the mortar conveyor chains support buckets 420, see Figure 29, and the hopper 401 has a slide 421 normally closing the bottom. Pivoted to the side of the hopper is an arm 422 which carries a suitable weight 423 keeping it normally down and this arm is connected by a pin and slot connection 424 with the slide 421. Extending from the arm 422 is an arm 425 and on each bucket is a pin 426 which engages the lower end of the arm 425, as can be seen in Figure 29, and acts to effect opening of the hopper so that material from the hopper will pass into the bucket, the arm 425 releasing from the pin before the bucket passes away from beneath the hopper 401 so that the slide falls back and cuts off further passage of mortar from the hopper. Referring now to Figure 69 it will be seen that the frame 409 carries adjacent the sprockets 408 trip members 427. The buckets 401 have the usual pivotal connection with the conveyor and as they pass around the sprockets 408 the pins 426 of these buckets engage the trips 427 and tip the buckets so that the material in the buckets is dropped into the spreader hopper 413. This spreader hopper is extended rearwardly to provide a spreader lip 428 and the bottom of the hopper is normally closed by a laterally movable slide 429.

Obviously, the mortar must be laid on the preceding brick only at such points as will be occupied by the brick of the next course. That is to say, at openings for doors, windows and the like no mortar should be laid and the slide of the spreader should not be open. Accordingly mechanism similar to that controlling the actual setting of the brick and operation of the conveyors is used to control the action of the slide 429. Referring now to Figures 50 and 60 there are shown the type of stops which operate the control for this slide. In Figure 25 it will be noted that there is provided a lever 430 corresponding to the lever 244 and this lever is supported on a sleeve carrying an arm 431 which is connected by a link 432 with a lever 433 fixed on the bottom of a vertical shaft 434 which extends up from the carriage through the movable platform. Splined on this shaft to move with the platform is a bevel gear 435 which meshes with a bevel gear 436 carried on a short shaft having a bevel gear 437 at its inner end which meshes in turn with a gear 438 splined on a long horizontal shaft 439 similar to the shafts 317. This construction can be well seen in Figure 43. Now referring to Figure 68 is will be seen that on the shaft 439 is a bevel gear 440 which meshes with a bevel gear 441 mounted on a shaft 442 supported from the stationary frame 318. On this shaft is a bevel gear 443 which meshes with a bevel gear 444 on the lower end of a short vertical shaft 445 carrying a clutch mechanism 446 by which a sprocket 447 revoluble on the upper end of the shaft may be driven, the clutch mechanism being provided so that rotation of the shaft 445 will drive the sprocket but rotation of the sprocket will not drive the shaft. This sprocket is connected by a chain 448 to one of a pair of integrally movable sprockets 449 mounted on the swinging frame 333 axially thereof. The other of this pair of sprockets is connected by a chain 450 with a sprocket 451 at the upper end of a shaft 452, see Figure 68. On this shaft 452 at its lower end is a gear 453 which meshes with a gear 454 fixed on a short shaft 455 on which is an arm 456 connected by a pin and slot connection 457 with the slide 429. Now, under these circumstances whenever the arm or lever 430 is rocked in one direction the slide 429 will be then drawn and when rocked in the other direction it will be closed. Obviously, the stops which act on this arm 430 are arranged so that they will close the slide in passing openings in the wall and hold it open at all other times.

It has been previously explained that in laying courses of stretchers one brick of each pair is staggered with respect to the other brick of each pair laid so that it projects beyond the second brick to the extent of one half a brick length. Now obviously when a door or window opening is reached there will either have to be left a series of gaps one half brick in length in the stretcher courses or, as the present machine performs the oper-

ation, certain of the brick will be allowed to project one half a brick length into the door or window opening. Obviously, these projecting halves must be removed and to that end certain sawing mechanism is provided in connection with the other mechanism of the invention, the sawing mechanism being arranged to saw the operation of the brick setting mechanism and to swing into and out of the openings in the wall to cut off the projecting brick ends. Obviously this sawing mechanism operates only at the openings and accordingly stops such as are shown in Figures 57 and 58 are used to initiate and conclude the action of the saw. Referring to Figure 25 it will be seen that there is a third downwardly projecting lever 458 which projects from a sleeve carrying an arm 459 connected by a link 460, see Figure 19, with a rocker having an arm 461 similar to the arm 242 and like it provided with a pair of spaced rollers 462. These rollers operate on the movable member 463 of a clutch which is splined to the shaft 98 and movement of the arm 461 causes this member to engage with and disengage from a cooperating clutch member 464 carrying a bevel gear 465 which meshes with a bevel gear 466 on a short horizontal shaft carrying a bevel gear 467 which meshes with a bevel gear 468 carried on a long vertical shaft 469 passing upwardly through the movable platform. This construction may also be seen in certain of its parts in Figure 26.

Turning now to Figure 43 it will be seen that there is splined to the shaft 469 a bevel gear 470 which meshes with a bevel gear 471 mounted on a short shaft carrying at its other end a bevel gear 472 meshing in turn with a bevel gear 473 splined on a long horizontal shaft 474 which may be also seen in Figure 68. On the shaft 474 is mounted a bevel gear 475 which meshes with a bevel gear 476 on a short shaft carrying a second bevel gear 477 which meshes in turn with a bevel gear 478 on the lower end of a short vertical shaft carrying at its upper end a sprocket 479 adapted to be driven by clutch mechanism 480 so that the shaft may drive the sprocket but the sprocket cannot drive the shaft. This sprocket is connected by a chain 481 with one of a pair of integrally moving sprockets 482 mounted in alinement with the sprockets 449 and the other of said sprockets 482 is connected by a chain 483 to a sprocket 484 mounted on a vertical shaft 485 carried by the swinging frame 333. Now considering especially Figures 44, 66 and 79 to 84 inclusive it will be seen that this shaft 485 is at the extreme right of Figure 68 and has its lower end carried on a depending part of the frame 483. At the lower end of the shaft 485 is a gear 486 which meshes with a bevel gear 487 mounted on a shaft 488. On this shaft 488 is a pinion 489 which meshes with a gear 490 clutched on a shaft 481. Slidably mounted on the shaft 488 and on a supporting bar 492 is a carriage 493 from which projects a finger 494. This finger engages a traversing screw 495 having a slow movement left hand thread cut therein and a quick movement right hand thread joining the ends of the slow movement thread so that rotation of the shaft 491, referring to Figure 81, traverses the carriage 493 slowly to the right of that figure until the end of the screw is reached and then rapidly returns the carriage. Now the general movement of the whole apparatus past the opening in the wall is in the direction of the arrow and the pitch of the screw 495 at its rate or rotation are such that relative to the wall the carriage 493 remains stationary during the engagement of the finger 494 with the left hand thread of the screw while the latter is rotated. Between the sides of this carriage there is rotatably mounted on the shaft 488 a sleeve 496 and depending from this sleeve is a swinging arm 497 having journaled at its lower end a saw 498 on the arbor of which is mounted a belt pulley 499 connected by a belt 500 with a belt pulley 501 splined on a shaft 488. Thus rotation of the shaft 488 drives the saw 498. Extending across the depending portion of the frame 333 is a plate 502 on the lower side of which are mounted a series of guide angles 503 arranged to provide X-shaped guide slots 504 and outer guide portions 505. Thus, as can be seen in Figure 82 the guide structure has a general resemblance to the figure-8. Projecting upwardly from the arm 497 is a guide finger 506 which travels as shown by the arrows in Figure 82 through this figure-8 guide, hinged stops 507 being provided at the outlet ends of the X-slots 504. According as the carriage 493 moves backward and forward the arm 497 and saw are similarly swung backward and forward.

Obviously, unless the bricks are held firmly in position during the sawing the saw would dislodge them during the sawing from their proper place. To hold these bricks there is provided, projecting downwardly from the carriage 493, a fixed arm 507′ carrying at its lower end a head 508 wherethrough works a plunger 509 having at its lower end a brick spreading finger 510. Depending from the head is a pair of hangers 511 to which are journaled gripper arms or jaws 512 operating on opposite sides of the finger 510. On these jaws project operating arms 513 which are connected by pin and slot connections to a cross bar 514 at the lower end of the plunger 509, this cross bar being urged downwardly by a spring 515. Pivoted to the upper end of the plunger 509 are a pair of swinging arms 516 provided with slots 517 wherethrough pass jaws 518 carried on the free ends of independently movable arms 519 con-

nected to the arm 507 by a pivot 520. Now the normal position of the saw at rest is that shown in Figure 79 and under these conditions the jaws 512 are held raised but when the saw swings into sawing position, in passing from one side to the other of the arm 507, the jaws 512 will close on the bricks, the finger 510 preventing the bricks being squeezed together and keeping them in normal position. Thus, while the saw is working the bricks are firmly held but upon completion of the saw movement one of the jaws 518 is engaged by the swinging arm 497 and, in consequence, the parts are moved from the position shown in Figure 8 to the position shown in Figure 79 and the bricks are released, the jaws moving outwardly and upwardly so as to pass over those bricks which are not to be sawed.

In place of the mechanism for setting the bricks there has been illustrated in Figures 89 and 90 a modified form. In this modified form the conveyor chains 230 do not extend downwardly into a casing or housing but simply extend around a sprocket 521 and the structure previously described for setting the bricks is replaced by a structure carried in a housing 522 wherein two pairs of sprocket chains 523 are led over sprockets 524 and each pair of these chains carries a grasper G of the usual construction except that at one side this grasper is provided with a pin 525 which travels in a guide-way 526 at the side of the casing or housing. Grasper openers 527 are provided at the top and bottom of the travel of the grasper and a grasper opener 528 is provided on that part of the frame 529 which supports the sprocket 521. One of each set of sprockets 524 acts as a driving sprocket and is connected by gearing 530 with a shaft 531 carrying a bevel gear 532 driven from the ring gear 281. Now it will be obvious that in the movement of the grasper around the endless guide-way 526 it will be inverted at the top and can thus receive brick from the table 522′ to which they have been carried by the grasper on chains 230 which will open as it comes opposite said table, the grasper moving in the guide-way being opened by the upper opener 527 and closing on the bricks to draw them off the table. The bricks will then be carried around to the position shown in Figure 90 where the grasper opens to drop them into place.

Since the operation of each feature of the device has been particularly and specifically set forth it is not deemed necessary here to again go into the operation.

In the modified form of the device as diagrammatically shown in Figure 94 the carriage 533 supports a set of guide frames and also has the elevating screws 534 for raising and lowering a platform 535, these parts corresponding to the screws and platform of the previously described form. However, instead of the vertical drive shafts in this form extending above the top of the frame work supported on this platform as in the first instance the modified form has a suitable number of vertical drive shafts 536 which only extend slightly above the floor of the platform and are connected by gearing 537 having splined connection with the shafts 536 to short vertical jack shafts 538 carried with the platform and its frame. Thus the long vertical shafts necessary in the first form may be replaced by much shorter shafts without affecting the total operative lift of the platform and its machinery.

It will be noted that shaft 491 is provided with a clutched hand crank 491′ for manual operation in setting the saw in or out in starting or completing jobs. Also (Fig. 38) it will be seen that idlers 412 and 407 are pivoted to allow for change of position of mortarer.

Having thus described the invention, what is claimed as new, is:

1. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, and means to control the conveyor mechanism to cause bricks carried thereby to be delivered selectively in position longitudinally and transversely of the conveyor to the placing mechanism for laying selectively as headers and stretchers.

2. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, and means to operate said conveyors.

3. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting

table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, and means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers.

4. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, and means to control the conveyor mechanism to cause bricks carried thereby to be delivered selectively in position longitudinally and transversely of the conveyor to the placing mechanism for laying selectively as headers and stretchers.

5. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, and means to operate said conveyors.

6. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, and means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers.

7. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, and stops along the track controlling the clutches and thereby the starting and stopping of the brick placing mechanism and conveyors.

8. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, and stops along the track controlling the clutches and thereby the starting and stopping of the brick placing mechanism and conveyors.

9. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means including clutches to operate said conveyors, and stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors.

10. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative con-

nection including a clutch with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means including clutches to operate said conveyors, means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers, and stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors.

11. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, and stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors.

12. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, and stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors.

13. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means including a clutch to operate said conveyors, and stops along the track controlling said cluthes and thereby the starting and stopping of the brick placing mechanism and conveyors.

14. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means including a clutch to operate said conveyors, means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers, and stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors.

15. In a machine of the kind described, a brick table including means to support bricks in a row, conveyor chains working across one end of said row, a gripper including gripping jaws and carried by said chains and movable across the end bricks of the row, a gripper opener adjacent the path of said gripper and engageable therewith to open said jaws prior to the gripper reaching the rows of bricks, said gripper opener being movable into and out of gripper engaging position, and means to move the opener out of gripper engaging position upon exhaustion of the bricks in the row.

16. In a machine of the kind described, a brick table including means to support bricks in a row, conveyor chains working across one end of said row, a gripper including gripping jaws and carried by said chains and movable across the end bricks of the row, a gripper opener adjacent the path of said gripper and engageable therewith to open said jaws prior to the gripper reaching the rows of bricks, means to feed the bricks successively into position to be gripped by the gripper, said gripper opener being movable into and out of gripper engaging position, and means to move the opener out of gripper engaging po-

sition upon exhaustion of the bricks in the row.

17. In a brick layer, a brick table having means to support bricks in a plurality of rows, conveyor chains working across one end of said rows, a gripper including gripping jaws and carried by said chains and movable across the end bricks of respective rows, an individual feeding device for each row urging the end bricks of the row beneath the gripper, an individual and releasable restraining means for each row preventing feeding of the bricks to gripping positions, an individual gripper opener for each row adjacent the path of the gripper and engaging the gripper to open it prior to the gripper reaching the respective row, each gripper opener being movable into and out of gripper opening position, and means to move the respective opener out of gripper opening position upon exhaustion of the bricks in the row wherewith said respective opener is associated.

18. In a brick layer, a brick table having means to support bricks in a plurality of rows, conveyor chains working across one end of said rows, a gripper including gripping jaws and carried by said chains and movable across the end bricks of respective rows, an individual feeding device for each row urging the end bricks of the row beneath the gripper, an individual and releasable restraining means for each row preventing feeding of the bricks to gripping positions, an individual gripper opener for each row adjacent the path of the gripper and engaging the gripper to open it prior to the gripper reaching the respective row, each gripper opener being movable into and out of gripper opening position, means to move the respective opener out of gripper opening position upon exhaustion of the bricks in the row wherewith said respective opener is associated, and means to release the restraining means of the next successive row upon exhaustion of the bricks in a row and to effect movement of the gripper opener for said next row into gripper engaging position.

19. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

20. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

21. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

22. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

23. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

24. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

25. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, stops along the track controlling the starting and stopping of the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

26. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along the track controlling the starting and stopping of the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

27. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, stops along the track controlling the starting and stopping of the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

28. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers, stops along the track controlling the starting and stopping of

the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

29. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, stops along the track controlling the starting and stopping of the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

30. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along the track controlling the starting and stopping of the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

31. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, stops along the track controlling the starting and stopping of the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

32. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection with the motor means, a brick supporting table carried by said carriage, means to project and retract the brick placing mechanism laterally relative to said carriage, a primary brick conveyor for removing bricks from the table, a transfer conveyor receiving bricks from the primary conveyor, a third conveyor receiving bricks from the transfer conveyor and delivering them to the placing mechanism, means to operate said conveyors, means to control the third conveyor to cause bricks carried thereby to be delivered to the placing mechanism in position for laying selectively as headers and stretchers, stops along the track controlling the starting and stopping of the brick placing mechanism and conveyors, and guide means adjacent the track and engageable by the means to project and retract the placing mechanism to cause the same to follow the wall plan at the angles of said wall.

33. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, stops along the track controlling the clutches and thereby starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, and an operative connection between the motor means and the mortar conveying and spreading means.

34. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing

mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along the track controlling the clutches and thereby starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, and an operative connection between the motor means and the mortar conveying and spreading means.

35. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vetically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, stops along the track controlling the clutches and thereby starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said frame, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, and an operative connection between the motor means and the mortar conveying and spreading means.

36. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along the track controlling the clutches and thereby starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said frame, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, and an operative connection between the motor means and the mortar conveying and spreading means.

37. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, stops along said track controlling the actuation of said clutches and thereby controlling the operating said conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the mortar conveying and spreading means, and other stops along said track controlling the operation of the clutch of the mortar conveying and spreading means.

38. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along said track controlling the actuation of said clutches and thereby controlling and operating said conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the mortar conveying and spreading means, and other stops along said track controlling the operation of the clutch of the mortar conveying and spreading means.

39. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, stops along said track controlling the actuation of said clutches and hereby controlling

and operating said conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the mortar conveying and spreading means, and other stops along said track controlling the operation of the clutch of the mortar conveying and spreading means.

40. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along said track controlling the actuation of said clutches and thereby controlling and operating said conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the mortar conveying and spreading means, and other stops along said track controlling the operation of the clutch of the mortar conveying and spreading means.

41. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the clutch of the mortar conveying and spreading means, and other stops along said track controlling the operation of the mortar conveying and spreading means.

42. In a brick layer, a track, a carriage movable along said track, motor means supported on the carriage, means driven by the motor means for imparting movement to said carriage, brick placing mechanism supported by said carriage and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said carriage, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the mortar conveying and spreading means, and other stops along said track controlling the operation of the clutch of the mortar conveying and spreading means.

43. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said frame, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the mortar conveying and spreading means, and other stops along said track controlling the operation of the clutch of the mortar conveying and spreading means.

44. In a brick layer, a track, a carriage movable along said track, motor means supported on said carriage, a vertically movable frame supported on said carriage, means to raise and lower said frame, brick placing mechanism supported from and movable vertically with said frame and having operative connection including a clutch with the motor means, a brick supporting table carried by said carriage, conveyor means arranged to convey bricks from the table to the placing mechanism and having operative connection including a clutch with said motor means, means to control the conveyor mechanism to

cause bricks carried thereby to be delivered to the placing mechanism for laying selectively as headers and stretchers, stops along the track controlling said clutches and thereby the starting and stopping of the brick placing mechanism and conveyors, a mortar receptacle supported from said frame, means to convey mortar from said receptacle and spread it in position in advance of the bricks being laid, an operative connection including a clutch between the motor means and the mortar conveying and spreading means, and other stops along said track controlling the operation of the clutch of the mortar conveying and spreading means.

In testimony whereof I affix my signature.

WILLIAM HARVEY MASSEN.