Feb. 2, 1926. 1,571,386

H. R. STRAIGHT

MACHINE FOR LAYING BRICK PAVING AND THE LIKE

Filed June 15, 1922 5 Sheets-Sheet 1

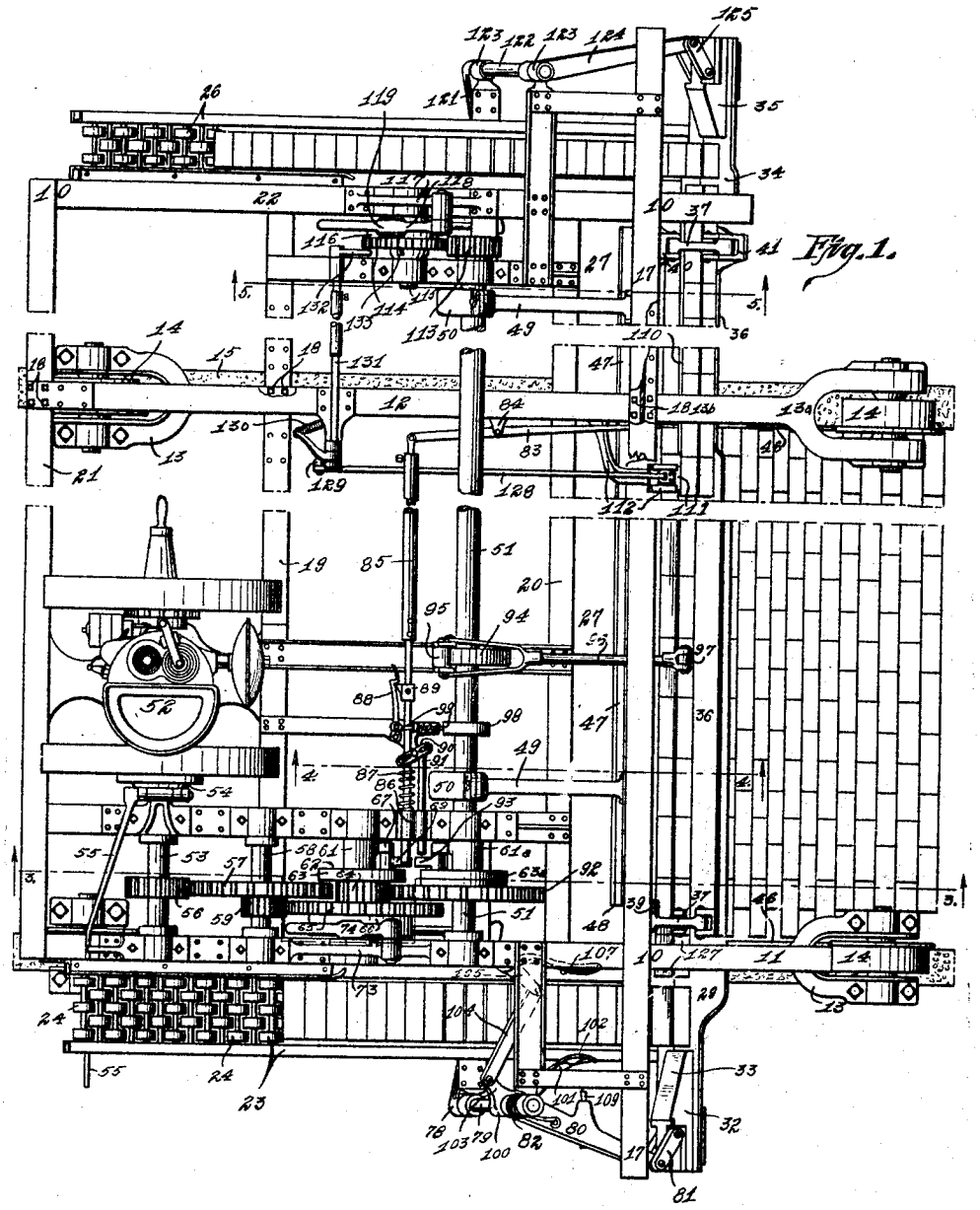


Fig. 1.

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Fig. 2.

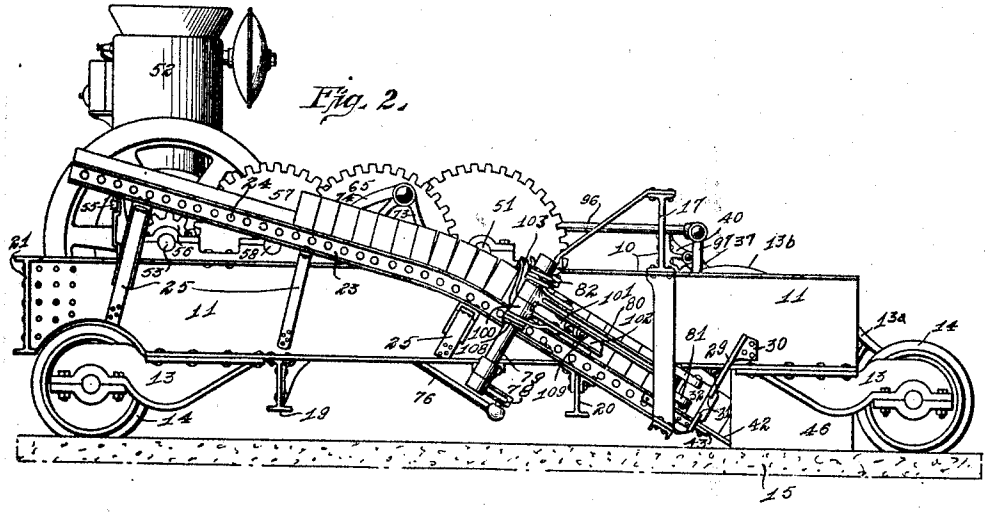
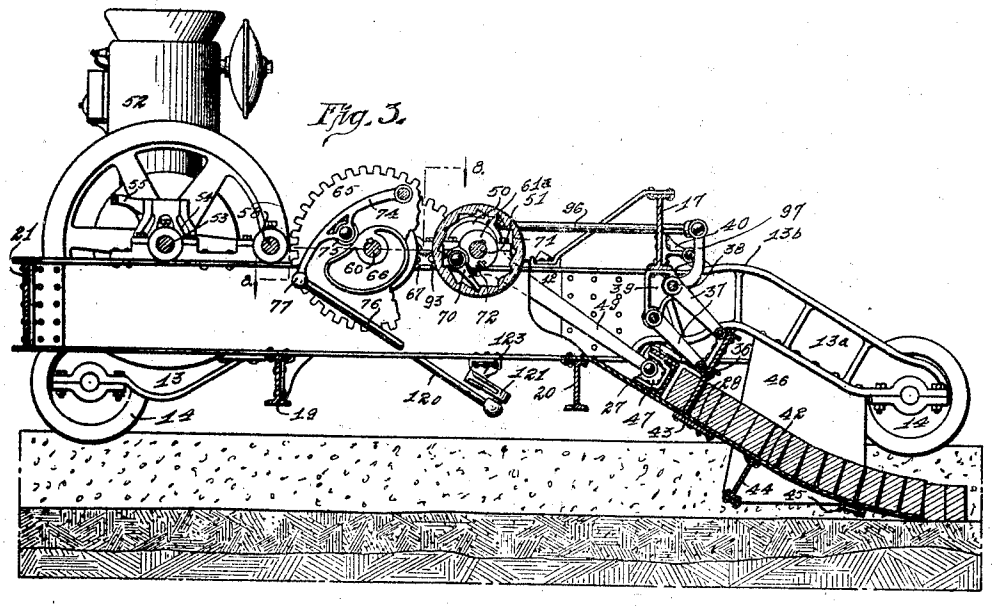


Fig. 3.



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Fig. 2.

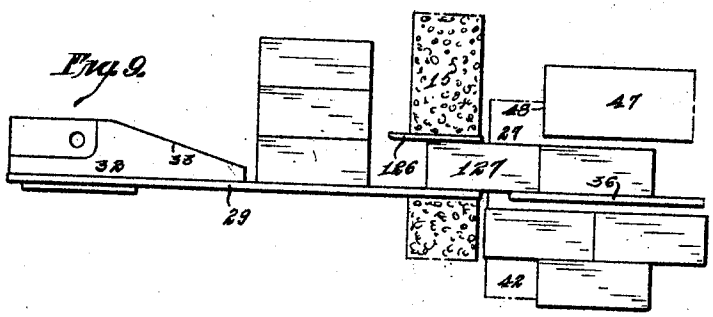


Fig. 4.

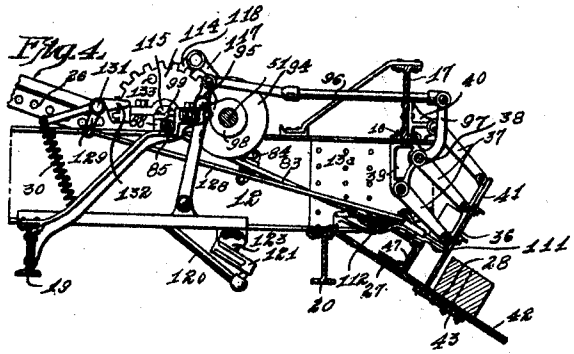
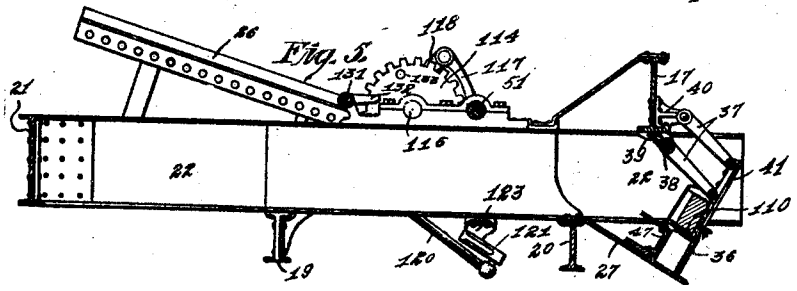


Fig. 5.



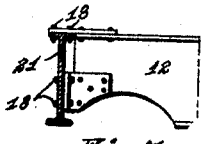


Fig. 7.

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MACHINE FOR LAYING BRICK PAVING AND THE LIKE

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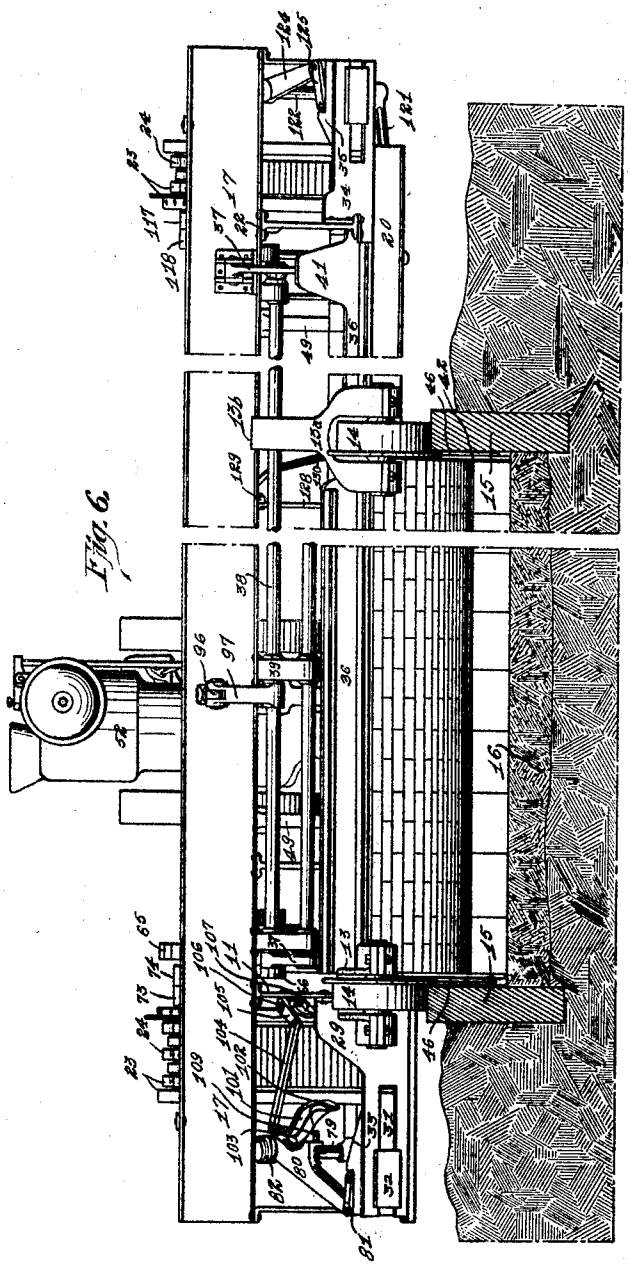


Fig. 6.

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Fig. 8.

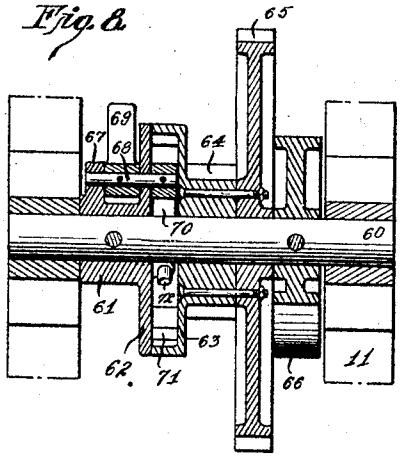
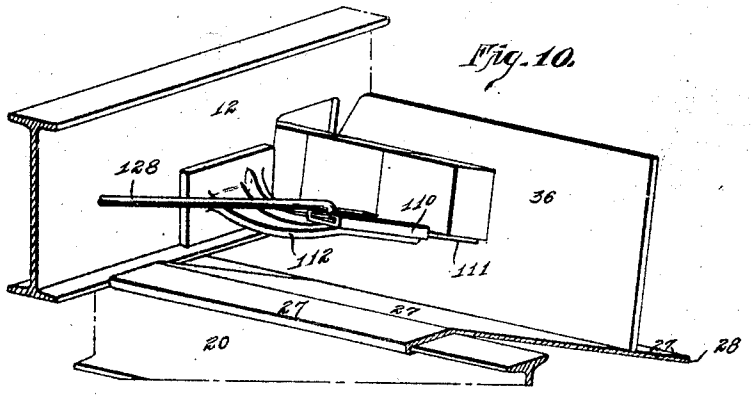


Fig. 10.



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Patented Feb. 2, 1926. 1,571,386

UNITED STATES PATENT OFFICE.

HALVER R. STRAIGHT, OF ADEL, IOWA.

MACHINE FOR LAYING BRICK PAVING AND THE LIKE.

Application filed June 15, 1922. Serial No. 568,385.

To all whom it may concern:

Be it known that I, HALVER R. STRAIGHT, a citizen of the United States, and a resident of Adel, in the county of Dallas and State of Iowa, have invented a certain new and useful Machine for Laying Brick Paving and the like, of which the following is a specification.

The object of my invention is to provide a machine having brick receiving hoppers or feed conveyors adapted to receive a number of brick, and so arranged and constructed that a brick will be automatically taken from the hopper and laid in the regular formation over the top of a road bed for the purpose of forming a brick paving.

A further object is to provide a mechanism of comparatively simple, durable and inexpensive construction adapted to automatically receive brick from hopper provided for that purpose and to deliver them in a systematical and proper manner to the upper surface of a road bed, and to provide in such a device means whereby half bricks will be automatically fed to each alternate row of brick for the purpose of placing them in staggered relation with each other.

A further object is to provide in a paving brick laying machine receiving hoppers and means for automatically placing the brick from the receiving conveyors into a series of positive rows extending transversely across the road bed, and to provide in such a device means for successively forcing each succeeding row adjacent to the previous row, the said forcing means being designed to simultaneously advance the machine forward.

A further object is to provide in an automatic machine for laying paving improved means for mounting and advancing the machine relative to the road bed, so that the paving will be of a uniform height and to a predetermined grade.

A further object is to provide in an automatic machine for laying brick paving, improved means whereby road beds of different widths may be laid with a very slight and inexpensive change in the machine for adjusting it from one road bed to another.

These and other objects will be apparent to those skilled in the art.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of my improved machine for laying brick paving.

Figure 2 is an end elevation of Figure 1.

Figure 3 is a vertical, longitudinal, sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a vertical longitudinal, detail, sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a vertical, longitudinal, sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a front elevation of Figure 1 showing a portion of the curbing and road bed in section.

Figure 7 is a segmental, detail view of one end of one of the supporting beams.

Figure 8 is a horizontal, detail, sectional view taken on the line 8—8 of Figure 3.

Figure 9 is a diagrammatical detail view illustrating the manner in which one end of the paving is laid.

Figure 10 is a detail view of the mechanism for dropping the half brick into position.

My improved device comprises a frame 10 formed of a series of longitudinally and transversely arranged beams, the weight of the machine being carried by the longitudinal beams 11 and 12.

Each end of each of the beams 11 and 12 is provided with a bracket 13, each of which has a flanged wheel 14, best shown in Figure 2. The wheels 14 are designed to travel on the upper edge of the cement curbing 15 at each side of the road bed 16.

Extending transversely above the forward end of the beams 11 and 12 is a beam 17. The beam 11 is permanently fixed near one end of the beam 17, while the beam 12 is adjustably fixed near the opposite end of the beam by means of bolts 18.

By this arrangement, it will be seen that each end of the beam overhangs the longitudinal beams.

Secured transversely beneath the longitudinal beams are transverse beams 19 and 20 which are rigidly secured to the beam 11 and adjustably secured to the beam 12. A rear beam 21 is also provided which is fixed to the beam 11 and also adjustably secured to the beam 12. A longitudinal beam 22

is fixed to the right hand end of the beams 17, 19, 20 and 21. The last said beams and the beam 11 form a rigid frame of a given length, and of such length as to cover a maximum road bed, while the beam 12 is adjustably connected in such a manner as to be moved toward or from the beam 11 so that the wheels 14 may engage the top surface of curbings of different spacings.

The beams just mentioned form the main supporting frame, other minor transverse and longitudinal beams being provided for the purpose of carrying the mechanism to be described, which will not be mentioned in detail as the exact placing of these beams is immaterial any other than to carry the mechanism for producing the results hereinafter described, the positions of which are clearly shown in the drawings.

Mounted adjacent to the outside of the beam 11 is a feed conveyor 23 comprising a suitable frame provided with a bottom formed of a series of rollers 24, the said conveyor being of a width slightly greater than the length of the paving brick, and the bottom of the conveyor having its front end mounted in an elevated position and inclined downwardly and rearwardly, as clearly shown in Figure 2, so that when the brick are placed on the rollers 24 they will feed rearwardly by gravity, the brick being placed with their width vertical, or what is commonly known as on edge.

Suitable brackets 25 are provided for holding the conveyor in position relative to the beam 11. A similar conveyor 26 is provided at the right hand end of the machine adjacent to the beam 22 and of such width as to carry brick of half length, or what is commonly known as half brick which are also placed on edge and designed to feed brick downwardly and rearwardly.

Secured to the under side and beneath the rear ends of the beams 11 and 12 and in line with the bottom and front end of the conveyors 23 is an inclined plate 27, Figures 1 and 3.

The upper edge of the plate 27 is secured to the upper face of the beam 20 while its lower edge terminates at a point indicated by the numeral 28, Figure 3. This plate forms the lower end of the conveyor 23, and is designed to receive the brick delivered therefrom.

The downward movement of the bricks of the conveyor 23 is limited by means of a plate 29 placed in position substantially perpendicular to the plate 27 and near its lower edge. The inner end of the plate 29 is secured to the beam 11 by means of a bracket 30, Figure 2, the inner end extending beneath the said beam.

The outer end of the plate 29 is provided with a slot 31 in which is slidably mounted a feed plunger 32 provided with a beveled face 33, the inner end of the plunger 32 being thinner than the back end, and designed to engage one end of an adjacent brick for the purpose of sliding it out from beneath the brick above and inwardly along the bottom of the plate 27. The bevel 33 is for the purpose of permitting the column of brick on the conveyor 23 to move downwardly gradually as the plunger 32 is moved outwardly from beneath them.

The opposite end of the plate 27 is provided with a plate 34, similar to the plate 29, which is provided with a plunger 35 similar to the plunger 32, and being arranged to move a half brick inwardly, one end of the plate 34 being secured to the beam 22 and extended beneath.

Extending transversely between the beams 11 and 22 and in line with the plates 29 and 34 I have provided a plate 36, best shown in Figures 1 and 5. This plate 36 is of a width slightly greater than the width of a brick and designed to pass beneath the bracket 13^a of the beam 12. This bracket 13^a is provided with an upwardly curved portion 13^b above the plate 36. The said plate 36 is pivotally mounted to one end of a set of parallel bars 37.

The bars 37 are arranged in a number of pairs and attached to the plate 36 at various points throughout its length so that the said plate may be rigidly mounted against downward movement of the bricks, and at the same time free to move upwardly to permit the bricks in front to slide beneath the same.

The upper ones of the bars 37, which are mounted to the plate 36 between the beams 11 and 12, are secured to a transversely arranged shaft 38, Figures 3 and 6, so arranged that when the said shaft is rocked the plate 36 will be elevated and lowered. The lower ones of the said members 37 are pivotally connected to brackets 39 secured to the lower face of the beam 17. The lower ones of the members 37, which are adjacent to the right hand end of the plate 36, is attached to the shaft 38 while the upper one is pivoted to a bracket 40 secured to the beam 17. The upper one of the last said members 37 is pivotally connected to an upwardly extending portion 41 of the plate 36, clearly shown in Figure 6. Any number of these members 37 may be placed as desired so as to stiffen the plate 36.

Thus it will be seen that as the feed plunger 32 is reciprocated in its slot, a row of brick will be fed transversely through the entire width of the road bed on the plate 27 adjacent to the front face of the plate 36. When the row has reached a predetermined length, mechanism hereinafter to be described will automatically elevate the plate 36 and permit the row of brick to slide downwardly upon a downwardly and for-

wardly inclined plate 42, the upper edge of which joins the lower edge of the plate 37 by means of a union plate 43, the said plate 42 being carried by beams 44 and 45. The plate 42 is of a length equal to the distance between the curbings of the road bed.

The beams 44 and 45 are supported at each end by means of downwardly extending plates 46 from their respective brackets 13 and 13a.

Thus it will be seen that as the rows of brick are pushed in position in front of the plate 36 and are then released beneath it, they will slide downwardly until they engage the upper face of the road bed, as clearly shown in Figure 3.

In order to force each succeeding row of bricks adjacent to the one which is last laid upon the upper surface of the road bed, I provide the ram bar 47 which rests normally on top of the plate 27 and adjacent to the front surface of a transversely moving row of bricks in front of the plate 36. This ram bar is of a length less than the distance between the beams 11 and 22, but half the length of a brick, the space being provided at the left hand end inside of the beam 11 at the point 48, the purpose of which will hereinafter be made clear.

Pivotally secured to the ram bar 47 is a series of links 49, each of which has its upper end mounted on an eccentric 50. Each of the eccentrics is secured to a shaft 51 rotatively mounted in suitable bearings of the main frame, so arranged that as the said shaft is rotated, the ram bar 47 will be moved rearwardly and forwardly, the bar 47 being moved forwardly at the time the plate 36 is elevated. This will cause the rows of bricks in front of the plate 36 to engage the one just below it and the rows of bricks which engage the upper face of the road bed to be forced into engagement with each other. This movement will also cause the whole machine to be moved rearwardly a distance equal to the thickness of a brick. No other means for advancing the machine being provided. The means for rotating this shaft will be hereinafter described.

The mechanism for operating these devices above described is as follows:

Mounted upon the frame members 21 and 19 I have provided preferably an internal combustion engine 52. In line with the crank shaft of the said engine I have provided a drive shaft 53 which is rotatively mounted in the main frame. A clutch device 54 is provided for operatively connecting and disconnecting the engine with the shaft 53, the said clutch being provided with a lever 55 for operating it. This clutch may be of any of the ordinary friction clutches and need not be described in detail.

The shaft 53 is provided with a pinion 56 which is in mesh with a gear 57 mounted on a rotatively mounted shaft 58. The shaft 58 is provided with a pinion 59.

Parallel with the shaft 58 I have provided a shaft 60, shown in detail in Figure 8. This shaft is provided with a sleeve 61 on which is mounted a disk 62. Adjacent to the disk 62 is a drum 63 which is provided with a pinion gear 64. The pinion gear 64 and the drum 63 are rigidly secured to a gear 65, all of which are loosely mounted on the shaft 60.

Adjacent to the gear 65 is a cam 66 which is secured to said shaft 60. The sleeve 61 is provided with a lug 67 in which is pivotally mounted a shaft 68 having a trip arm 69. One end of the shaft 67 extends through the disk 62 and has on its inner end a pawl 70. This pawl is designed to be engaged by ratchet teeth 71 on the inner face of the drum 63, the said pawl 70 being yieldingly held in engagement with the said teeth by means of a spring 72, Figure 3.

Pivotally secured to a bracket 73 on the upper face of the beam 11 is an arm 74, Figures 1 and 3. This arm 74 is provided with a roller 75 which is designed to engage the cam 66. The free end of the arm 74 is pivotally connected to a link 76 by means of a ball and socket joint 77. The lower end of the link 76 is pivotally connected to a rock arm 78 which is mounted on the lower end of a slightly inclined shaft 79 mounted in suitable bearings and outside of the conveyor 23, Figure 2.

The upper end of the shaft 79 is provided with a rearwardly and downwardly extending arm 80, the lower end of which is pivotally connected to the feed plunger 32 by means of links 81. The said arm 80 is pivotally mounted on the shaft 79 and operatively connected therewith by means of a coil spring 82, the said spring being of such stiffness that the arm 80 will actuate normally in unison with the shaft 79, but if the plunger 32 should be rigidly held against movement, as will hereinafter be described, on account of the row of brick engaging the fixed plate at its opposite end, the shaft 79 will be permitted to finish its movement without breakage.

Thus it will be seen that if the shaft 53 is rotated the gears 56, 57, 59 and 65 will be rotated. This will cause the drum 63 in turn to be rotated and the disk 62 through the pawl 70, and the cam 66 in turn will rotate, which will cause the free end of the arm 74 to be oscillated and the shaft 79 rocked by its connecting links. This in turn will cause the free end of the arm 80 to be swung about the pivot of the shaft 79 through said shaft, and the plunger 32 moved inwardly and outwardly and at the time it is moved inwardly, a brick will be pushed in from beneath the pile, as before described.

This movement will continue until a complete column of bricks have been moved upon the plate 27, at which time the said end will engage the free end of a lever 83, pivotally connected on a bracket 84 of the beam 12, clearly shown in Figure 1.

The opposite end of the lever 83 is provided with a telescopic link 85 which is slidably mounted in a bearing 86 adjacent to the sleeve 61 in such a manner that as the member 85 is reciprocated it will be moved into and out of engagement with the arm 69. As the column of bricks is being completed, the free ends of the lever 83 will be engaged thereby and moved outwardly, which will cause the free end of the member 85 to be moved into engagement with the arm 69, while said arm is being rotated about the shaft 60 by means of the pawl 70. Thus the said pawl 70 will be moved out of engagement with the ratchet teeth 71 and the operation of the feed plunger 32 stopped.

A spring 87 is provided for moving the rod 85 out of engagement with the arms 69. This outward movement is prevented by means of a spring actuated hook 88 which engages a lug 89 of said rod 85.

Pivotally mounted adjacent to the rod 85 is a lever 90 which carries a rod 91 slidably mounted in the bearing 86 in such a manner that as the rod 85 is moved in one direction, the rod 91 will be moved in the opposite direction.

Mounted on the shaft 51 is a sleeve 61^a similar to the sleeve 61 and a drum 63^a similar to the drum 63. The drum 63^a, however, being secured to a gear 92. This gear 92 is in mesh with the pinion 64 of the the drum 63, and the sleeve 61 is provided with an arm 93 similar to the arm 69 and designed to be engaged by the rod 91.

Thus it will be seen that as the rod 85 engages the arm 69 to throw the shaft 60 out of operative relation with the gear 65, the rod 91 will be moved out of engagement with the arm 93 to throw the shaft 51 into operative engagement with the gear 92, thereby causing the said shaft 51 to be rotated.

Secured to the central portion of the shaft 51 is a cam 94 in operative relation with a roller 95 carried by a link 96, the free end of said link being operatively connected to an arm 97 mounted on the shaft 38, so that as the shaft 51 starts to rotate in an anti-clockwise direction, as illustrated in Figure 4, the upper end of the arm 97 will be swung toward the shaft 51 and the plate 36 lifted through the arms 37.

In this part of the movement of the shaft 51, the ram bar 47 is being moved downwardly toward the row of bricks in front of the plate 36, a slight distance being provided between the ram and said bricks for the purpose of this movement.

Just after the lower edge of the plate 36 has been elevated above the upper edge of the bricks, the ram 47 engages the said bricks and forces them downwardly and the machine forwardly, as before described.

Mounted on the shaft 51 adjacent to the pivotal connection of the lever 88 is a cam 98 which is designed to engage a pin 99 just before the shaft has completed one revolution. This pin 99 is pivotally connected to the lever 88 and causes the same to disengage the lug 89. The spring 87 will then move the rod 85 out of engagement with the arm 69 and cause the rod 91 to engage the arm 93 thereby throwing the shaft 51 out of operative relation with the drive gear 92, and the shaft 60 into operative relation with the gear 65.

Loosely mounted on the shaft 79 I have provided a sleeve 100 which has a rearwardly and inwardly extending arm 101, the free end of which is provided with a shoe 102 designed to be moved intermittently into and out of engagement with the outer ends of the bricks of the conveyor 23.

A forwardly extending arm 103 is also attached to the sleeve 100 to which is connected one end of a link 104. The opposite end of the link 104 is connected to an arm 105, Figure 6, which in turn is mounted on a shaft 106, the lower end of said shaft being provided with an arm 107 having a shoe similar to the shoe 102 for the purpose of striking the inside ends of the bricks simultaneously with the shoe 102, the link 104 being connected in such a manner that the two shoes will be moved toward each other and apart simultaneously, the said shoes being yieldingly held at their outer limit of movement by means of a spring 108, and the shoes being forced inwardly by means of a pin 109 mounted in the arm 80, said pin being designed to engage the shoe 102 when the plunger 32 is moved inwardly. The outward movement of the shoes is limited by the shoe of the arm 107 engaging the beam 11 upon which the shaft 106 is mounted.

Thus it will be seen that if the bricks are piled on the conveyor 23 in a more or less staggered relation, the ends will be moved into alinement with each other by the said shoes so that they will always be in proper alinement to be engaged by the plunger 32.

In order that the bricks of each row of bricks on the plates 27 and 42, may be laid in staggered relation to its adjacent row, I have provided means for feeding half bricks into the right hand end of each alternate row of bricks. This I have accomplished by setting the conveyor 26 on a slightly higher elevation than the conveyor 23 by a distance slightly greater than the width or height of a brick. The lower end of the conveyor 26 terminates on a plate 110 parallel and above the plate 27, as clearly illustrated in

Figure 5. The plate 35, before described, is mounted on top of this plate 110.

The plate 110 extends inwardly to a point slightly inside of the beam 12. This, of course, has to be made of a different length whenever the beam 12 is adjusted laterally.

Adjacent to and in alinement with the inner end of the plate 110, I have provided a slidably mounted plate 111 which is mounted in a bracket 112 secured to the beam 12. This plate 111 is designed to move forwardly a sufficient distance to permit the bricks on top of it to fall to the plate 27 as the said plate 111 is moved from beneath it, the plate 111 being of a width substantially equal to the length of the half bricks. The half bricks are fed to the said plate longitudinally on top of the plate 110 by means of the plunger 35 which is reciprocated once during every other revolution of the shaft 51 by the following mechanism:

Mounted on the right hand end of the shaft 51 is a pinion 113 which is in mesh with a gear 114 mounted on a shaft 115. This shaft is provided with a cam 116 similar to the cam 66. Pivotally mounted to a bracket 117 is a lever 118 which is provided at its central portion with a roller 119 designed to engage the cam 116. The forward end of the lever 118 is provided with a link 120 which has its lower end connected to a crank arm 121 mounted on a vertically arranged shaft 122 supported by suitable bearings 123. This shaft 122 is provided with an arm 124, the free end of which is provided with links 125 operatively connected with the slide plunger 35.

Thus it will be seen that during every other revolution of the shaft 51 the plunger 35 will be operated and consequently a half brick will be moved on to the plate 111 for each alternate row of bricks which are moved on to the plate 27, the mechanism being so timed that the slide plate 111 will be operated slightly before the ram 47 has reached its forward limit of movement and before a row of bricks has been moved on the plate 27. The half brick is then moved into position against the lever 83 by the incoming row of bricks through the action of the plunger 32. The stroke of the plunger 32 is ordinarily such that a brick will be moved a distance equal to one and one-half its length, but when the half brick engages the lever 83 the said lever will be moved to position whereby the plunger 32 is stopped when it has moved a distance equal to the length of a brick. This will leave the left hand end of the brick extending to the left and beyond the previous left hand brick a distance equal to the length of the half brick.

In actual practice the distance between the inner end of the row of bricks of the conveyor 23 and the left hand end of the rows of bricks as they are laid in the paving is slightly greater than the length of a half brick, but when the half brick has been dropped into position on the plate 27, the next time the plunger 32 is actuated, it will move but a distance slightly greater than the length of a single brick, thereby leaving the bricks of two adjacent rows in staggered relation with each other.

When a half brick has been dropped in position, the movement of the plunger 32 will be consequently limited to two-thirds of what it ordinarily moves. The shaft 79, however, will make its complete movement due to the driving mechanism before described, the said movement being permitted by the spring 82.

The inner end of the plate 29 extends inwardly a distance equal to the length of a brick inside of the inner edge of the row of bricks of the conveyor 23. The left hand end of the ram 47 terminates at a distance of a half brick inside of the end of the plate 29, as clearly shown in Figure 9.

When a half brick has been dropped into position and the column is complete and the plate 36 is elevated, the ram 47 will move rearwardly but does not engage the inner end of the last brick moved into position. Thus the column is moved rearwardly with the exception of this last half brick which rests on the plate 27 and is held against moving forwardly by means of a plate 126 and the plate 29. This last brick which is indicated by the numeral 127, Figure 9, is pushed into position by the next incoming brick in the regular manner.

Thus it will be seen that the left hand end of the paving is laid with the space for a half brick in each alternate row. These half spaces are filled in manually after the machine has passed on. The right hand end of the paving, however, is completely filled in.

The plate 111 is actuated by means of a rod 128 extending forwardly and having its forward end pivotally connected to a rock arm 129 which is caused to move yieldingly rearwardly by means of a spring 130.

The arm 129 is mounted on one end of a shaft 131, the opposite end of which is provided with a finger 132 designed to be engaged by a pin 133 mounted on the gear wheel 114.

Thus it will be seen that I have provided a machine of comparatively simple construction which is provided with means for receiving brick which may be laid on the feed conveyors by hand, which, after they have been so placed, may be fed and laid automatically into a paving and pressed into position.

In practice I pile the brick along the side of the road bed outside of the curbing in small piles which are convenient for the

attendant to grasp so they may be placed on the conveyor with the least amount of exertion, the whole brick being placed on one side of the road bed and the half brick on the opposite side.

By making the beam 12 adjustable relative to the frame, I have provided means whereby the same mechanism is adapted to lay paving of different widths but in a predetermined range. I have found in actual practice that the conveyor 26 does not need to overhang the beam 12 much more than eight or ten feet at any time, as eight or ten feet is generally all the variation in the ordinary road beds.

I claim as my invention:

1. A brick laying machine comprising a main frame, a support for said frame comprising a fixed beam and an adjustable beam, a pair of flanged wheels for each of said beams, a gravity feed conveyor for whole bricks at one end of said frame, a gravity feed conveyor for half bricks at the other end of said frame, a transverse receiving plate, means for feeding the bricks from the first said conveyor and arranging them in transverse rows on said receiving plate, and means for delivering them from the last said means to the road bed, and means for feeding a half brick to each alternate row of bricks.

2. A brick laying machine comprising a main frame, a support for said frame comprising a fixed beam near one end of said frame and an adjustable beam near the other end of said frame, roller supports for each of said beams, said beams being arranged longitudinally with the respective outer edges of a road bed, an inclined gravity feed conveyor parallel and adjacent to the fixed beam, an inclined gravity feed conveyor parallel and adjacent to the adjustable beam, a downwardly and rearwardly curved plate extending between said supporting beams, the rear end of said plate being substantially level with the road bed, means for feeding bricks from the first said conveyor transversely upon said inclined plate in rows, means for feeding the transverse rows of bricks on said plate rearwardly and at the same time advancing said machine forwardly, and means for feeding half brick from the second conveyor to each alternate transverse row of bricks.

3. A brick laying machine comprising a main frame, means for supporting said main frame, wheels for said supporting means, said wheels being designed to rest on the top edge of the curbings of a road bed, means for adjusting said supporting means toward or from each other so that brick may be laid in road beds of different widths, a feed conveyor at each end of said frame, means for feeding bricks from said feed conveyors to a road bed in transversely arranged rows between said curbings, one of said feed conveyors being designed to receive whole bricks and the other half bricks.

4. A brick laying machine comprising a frame, means for supporting said frame transversely above a road bed, means for adjusting said supporting means to and from each other to accommodate road beds of different widths, a feeding hopper supported at one end of said main frame, means for delivering bricks from said hopper to said road bed in transversely arranged rows, and means for adjusting the last said means so that the length of the said transversely arranged rows of brick may be varied to meet road beds of various widths.

5. A brick laying machine comprising a main frame, means for supporting said main frame transversely above a road bed, a downwardly and rearwardly inclined conveyor adjacent to one end of said main frame designed to receive a row of transversely arranged bricks and to feed them by gravity to its lower end, means for limiting the backward movement of said bricks, a plate arranged transversely across and above said road bed, said plate being inclined downwardly and rearwardly to terminate at a point substantially level with the road bed, a movable plate extending perpendicularly above said downwardly and rearwardly extending plate, means for moving bricks from said conveyor to said transverse plate and adjacent to said movable plate, means for raising and lowering said movable plate, a ram for forcing the rows of bricks formed on said transverse plate rearwardly, and means for operating the above said means.

6. A brick laying machine comprising a main frame, means for supporting said main frame transversely above a road bed, a combined hopper and gravity conveyor at each end of said main frame, one of which is designed to carry whole bricks and the other half bricks, means carried by said main frame for receiving brick from the hopper carrying the whole bricks and delivering them to the road bed in transversely arranged rows, and means for delivering the half bricks from the other one of said hoppers to each alternate row of bricks, and means for automatically operating the above said means.

7. A brick laying machine comprising a main frame, means for supporting said main frame transversely above a road bed, wheels for said supporting means, said wheels being designed to run on the top of the curbings at the sides of the road beds, one of said supporting means being adjustable to and from the other supporting means, a downwardly and rearwardly inclined conveyor adjacent to one end of said main

frame designed to receive a row of transversely arranged bricks, and to feed them by gravity to its lower end, means for limiting the backward movement of said brick, a plate arranged transversely across and above said road bed, said plate being inclined downwardly and rearwardly to terminate in a point substantially level with the road bed, a movable plate extending perpendicularly above said downwardly and rearwardly extending plate, means for moving bricks from said conveyor on to said transverse plate and adjacent to said movable plate, means for raising and lowering said movable plate, a ram for forcing the row of bricks formed on said transverse plate rearwardly, means for throwing said brick feeding means out of gear after a complete row of bricks has been formed, and means for throwing said ram and said movable plate operating mechanism in gear.

8. A brick laying machine comprising a main frame, means for supporting said main frame transversely above a road bed, wheels for said supporting means, said wheels being designed to run on top of the curbings at the sides of the road bed, one of said supporting means being adjustable to and from the other supporting means, a downwardly and rearwardly inclined conveyor adjacent to one end of said main frame designed to receive a row of transversely arranged bricks, and to feed them by gravity to its lower end, means for limiting the backward movement of said brick, a plate arranged transversely across and above said road bed, said plate being inclined downwardly and rearwardly to terminate in a point substantially level with the road bed, a movable plate extending perpendicularly above said downwardly and rearwardly extending plate, means for moving bricks from said conveyor on to said transverse plate and adjacent to said movable plate, means for raising and lowering said movable plate, a ram for forcing the row of bricks formed on said transverse plate rearwardly, means for throwing said brick feeding means out of gear after a complete row of bricks has been formed, means for throwing said ram and said movable plate operating mechanism in gear, a rearwardly and downwardly inclined conveyor at the opposite end of said main frame in a horizontal plane above the first conveyor, and means for feeding half bricks on the last said conveyor transversely and inwardly above a row of bricks being fed by the first said conveyor, and means for dropping a half brick from the row above into the one below as each alternate row of bricks is formed by the first feeding mechanism.

9. A brick laying machine comprising a rectangular frame, means for supporting said frame transversely above a road bed, a downwardly and rearwardly extending gravity conveyor at each end of said frame, each of said conveyors being designed to receive a longitudinal row of transversely arranged bricks, a plate for forming transversely arranged rows of bricks above the road bed, and means for successively moving bricks from one of said conveyors on to said row forming plate, and means for delivering the row of bricks formed on said plate laterally as a whole to the road bed, said means being designed to advance the machine forwardly, and means for feeding a half brick from the other feed conveyor to each alternate row of bricks so that the adjacent rows of bricks will be arranged in staggered relation relative to each other.

Des Moines, Iowa, March 3, 1922.

HALVER R. STRAIGHT.