P. S. COYNE.

PAVING MACHINE.

APPLICATION FILED APR. 7, 1916.

1,221,689.

Patented Apr. 3, 1917.

4 SHEETS—SHEET 1.

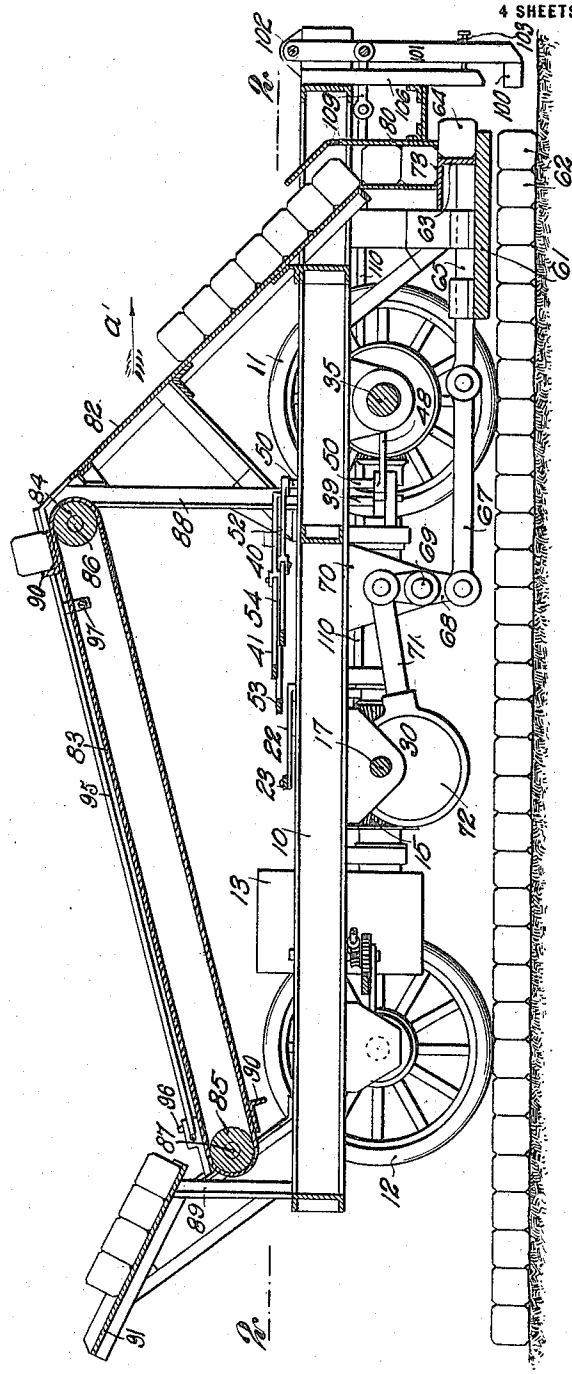


FIG. 1.

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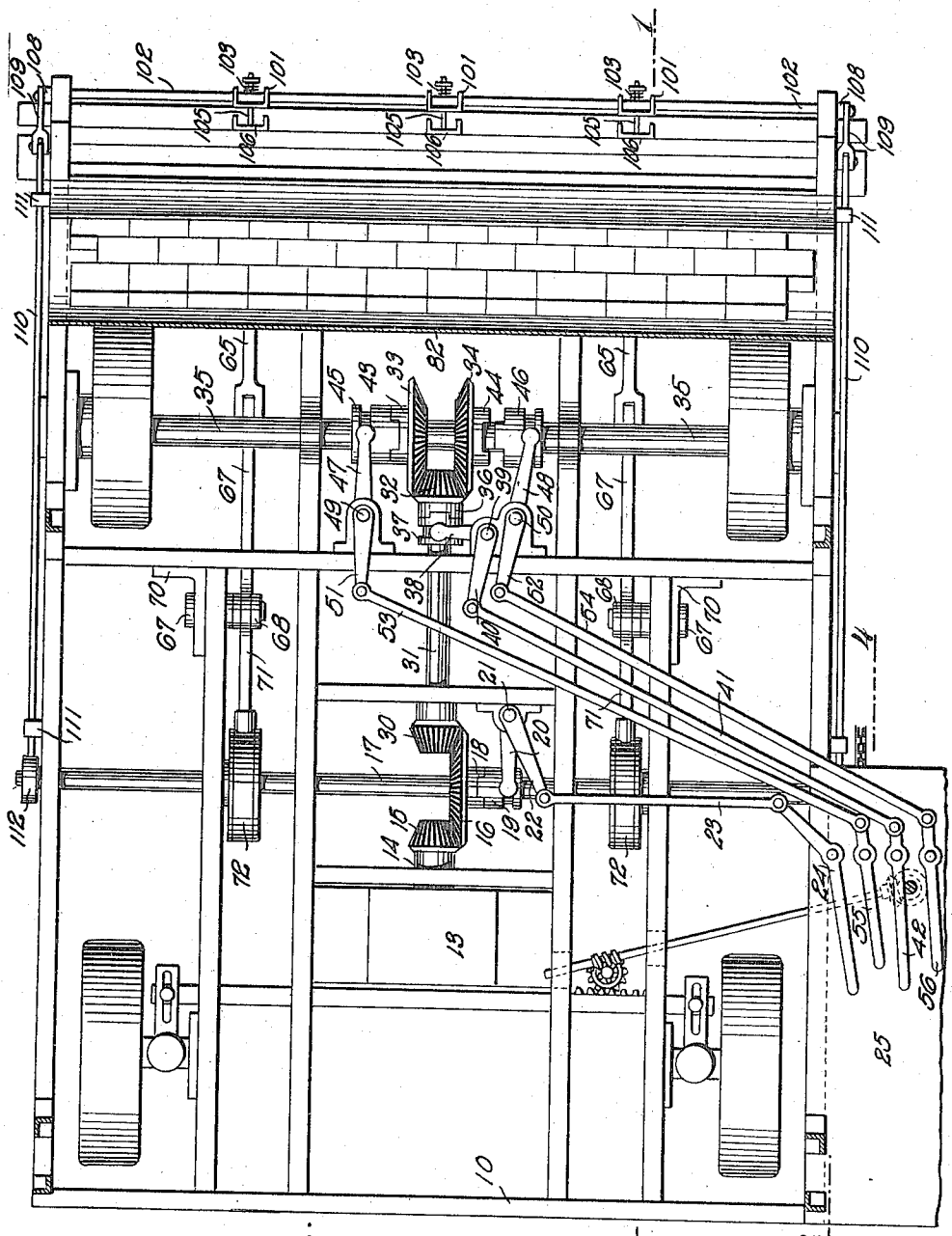
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Fig. 2

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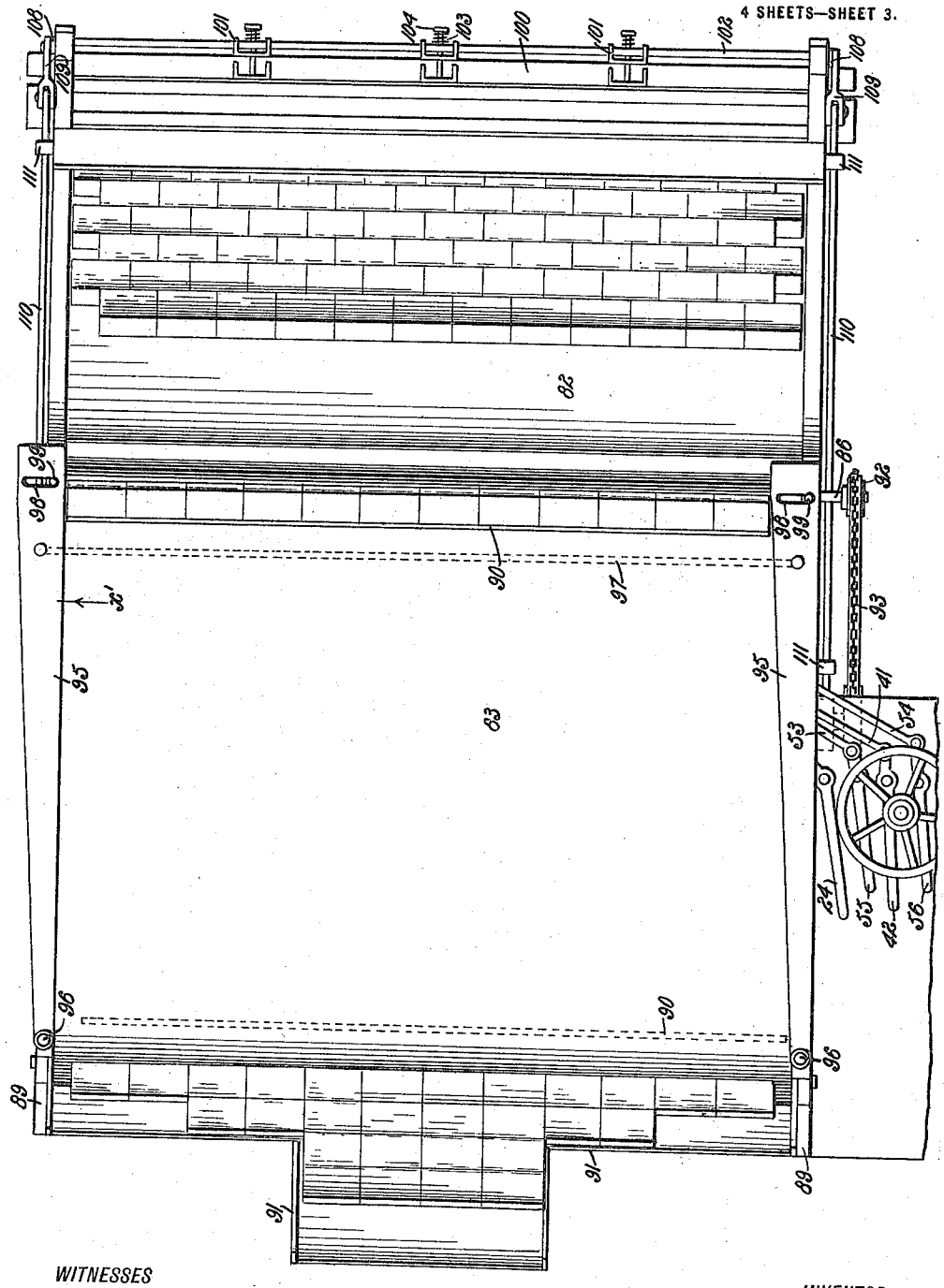
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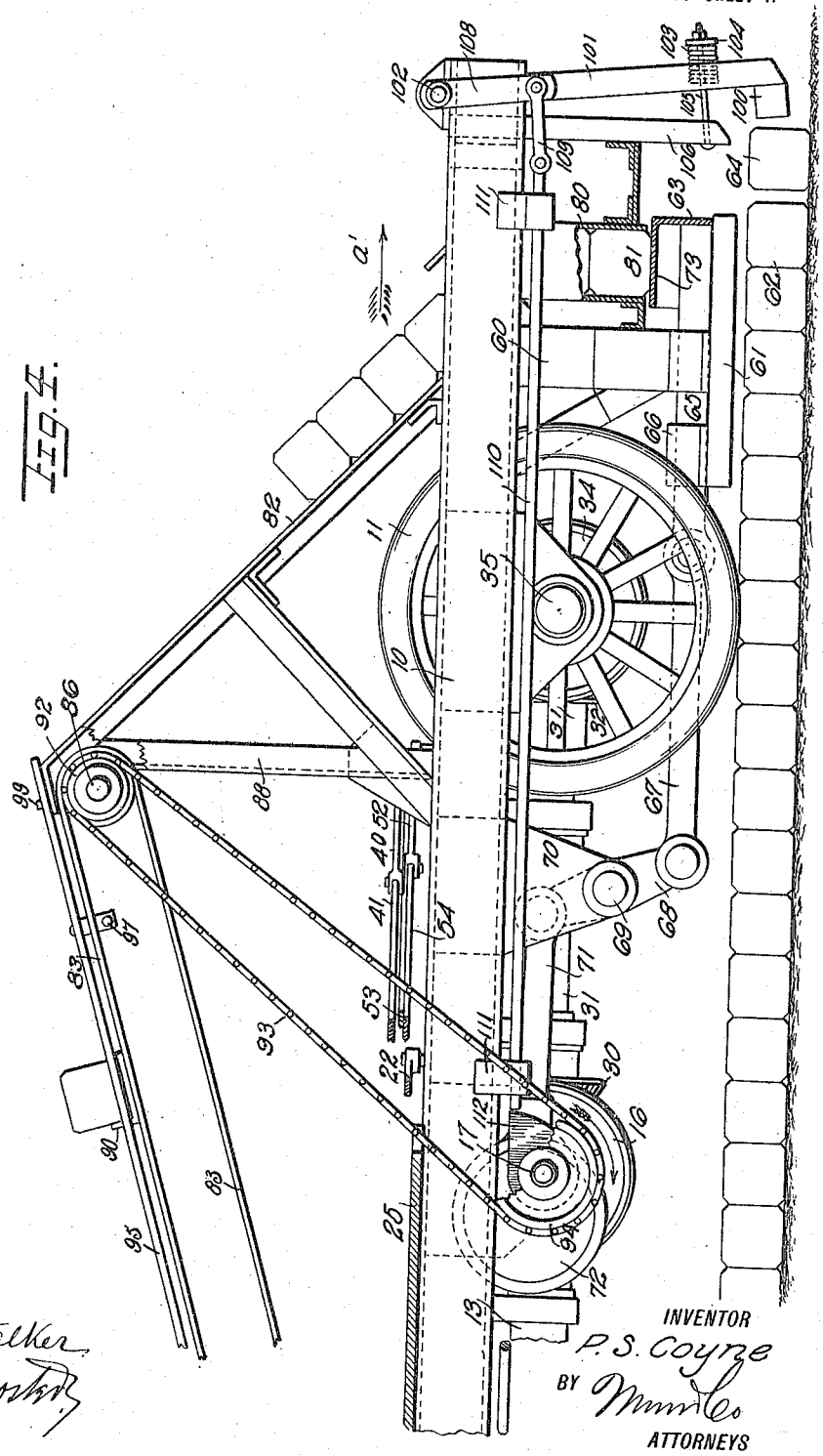
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4 SHEETS—SHEET 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

PATRICK STANISLAUS COYNE, OF KANSAS CITY, MISSOURI.

PAVING-MACHINE.

1,221,689. Specification of Letters Patent. Patented Apr. 3, 1917.

Application filed April 7, 1916. Serial No. 89,558.

To all whom it may concern:

Be it known that PATRICK STANISLAUS COYNE, a citizen of the United States, and a resident of Kansas City, in the county of Jackson and State of Missouri, have invented a new and Improved Paving-Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved paving machine arranged to automatically place paving stones, bricks or similar paving blocks in position on the previously prepared foundation of a roadbed, and to hammer or drive the paving blocks into place against the transversely laid course, at the same time insuring proper alinement of the blocks.

In order to accomplish the desired result, use is made of a truck provided with a motor, a chute mounted on the truck and adapted to contain, at least, one transverse row of paving blocks, a table fixed on the truck and extending a distance below the said chute for a row of blocks to drop from the chute onto the table, and a reciprocating pusher operating over the said table and adapted to push a row of blocks off the table onto the bed of the roadway. Use is also made of an alining and hammering device mounted on the said truck and operating in unison with the said pusher to push a row of blocks dropped onto the roadway against a previously laid course.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of a paving machine on the line 1—1 of Fig. 2;

Fig. 2 is a sectional plan view of the same on the line 2—2 of Fig. 1;

Fig. 3 is a plan view of the same; and

Fig. 4 is an enlarged side elevation of the front portion of the machine with parts in section on the line 4—4 of Fig. 2.

The paving machine is preferably mounted on a motor truck adapted to travel in the direction of the arrow a' during the time the paving stones, bricks or other paving blocks of any material are laid on the roadway, as hereinafter more fully explained.

The motor truck consists of a chassis 10, driving or traction wheels 11, steering wheels 12 and a motor 13 connected with the driving wheels 11 for moving the machine over the previously laid roadway in the direction of the arrow a', or for driving the machine in an opposite direction whenever it is desired to move the paving machine from one place to another. The steering wheels 12 are controlled in the usual manner by the operator so that further description of the same is not deemed necessary.

The motor 13 is provided on its shaft 14 with a bevel pinion 15 in mesh with a bevel gear wheel 16 mounted to rotate loosely on a transversely extending main shaft 17 journaled in suitable bearings on the chassis 10. The bevel gear wheel 16 is provided on its hub with a clutch member 18 adapted to be engaged by a clutch member 19 mounted to slide on the shaft 17 and rotating with the same, so that when the motor is running and the clutch member 19 is in engagement with the clutch member 18 then a rotary motion is given to the shaft 17. The clutch member 19 is engaged by a shifting fork 20 secured on the lower end of a vertically disposed shaft 21 journaled on the chassis 10 and provided at its upper end with an arm 22 connected by a link 23 with a controlling lever 24 mounted on a support 25 attached to one side of the chassis 10 to be within convenient reach of the attendant of the machine.

The bevel gear wheel 16 is in mesh with a bevel pinion 30 secured on the rear end of a shaft 31 extending longitudinally and journaled in suitable bearings on the chassis 10. On the forward end of the shaft 31 is mounted loosely a bevel pinion 32 in mesh with bevel gear wheels 33 and 34 both mounted to rotate loosely on the axle 35 of the drive wheels 11. The pinion 32 is provided on its hub with a clutch member 36 adapted to be engaged by a clutch 37 mounted to slide lengthwise on the shaft 31 and to rotate with the same so that when the clutch member 37 is in engagement with the clutch member 36 and the shaft 31 is rotated then a like rotary motion is given to the pinion 32. The clutch member 37 is controlled by a shifting fork 38 secured on the lower end of a shaft 39 journaled in suitable bearings on the chassis 10, and on the upper end of the said shaft 39 is secured an arm 40 connected by a link 41 with a controlling lever 42 mounted on the support 25 and within convenient reach of the attendant of the machine. The hubs of the

bevel gear wheels 33 and 34 are provided with clutch members 43, 44 adapted to be engaged by clutch members 45 and 46 mounted to slide transversely on the axle 35 and rotating with the same. When one of the clutch members 45 or 46 is in engagement with the corresponding clutch member 43 or 44 and the pinion 32 is rotating then a rotary motion is transmitted by the corresponding gear wheel 33 or 34 to the axle 35 to rotate the latter in either a forward or a backward direction according to which of the clutch members 45 or 46 is in engagement with the corresponding clutch member 43 or 44 at the time. The clutch members 45 and 46 are controlled by shifting forks 47, 48 secured to vertically disposed shafts 49 and 50 journaled on the chassis 10. The shafts 49 and 50 are provided with arms 51, 52 connected by links 53, 54 with controlling levers 55, 56 fulcrumed on the support 25 and under the control of the attendant for moving either of the clutch members 45 or 46 in engagement with the corresponding clutch member 43 or 44.

On the forward portion of the chassis 10 are secured depending brackets 60 supporting at their lower ends a table 61 extending a short distance above the courses of paving blocks 62 already laid, the forward end of the table 61 being close to the forward edge of the last course of paving blocks 62. On top of the table 61 reciprocates a pusher 63 for pushing a transverse row of paving blocks 64 off the table 61 onto the roadway immediately in front of the last course of paving blocks laid on the roadway, as will be readily understood by reference to Figs. 1 and 4, the latter figure showing the rows of paving blocks 64 dropped from the table 61 onto the roadway. The pusher 63 is provided with rearwardly extending arms 65 mounted to slide in suitable bearings 66 arranged on the table 61, and the rear ends of the said arms 65 are pivotally connected by links 67 with the lower ends of levers 68 fulcrumed at 69 on brackets 70 depending from the chassis 10. The upper ends of the levers 68 are pivotally connected with eccentric rods 71 of eccentrics 72 secured on the main shaft 17 so that when the latter is rotated a reciprocating motion is given to the pusher 63 by the mechanism just described.

Above the front portion of the table 61 and above the plunger 63 is arranged a chute 80 disposed vertically and attached to the chassis 10. The chute 80 is adapted to contain, at least, one row of paving blocks 81 held in the chute until the plunger 63 has returned to rearmost position. The pusher 63 is provided with a supporting plate 73 adapted to pass under the lowermost row of paving blocks 81 in the chute 80 to support the said row of paving blocks until the plunger 63 has returned to rearmost position, to allow this row of paving blocks to drop onto the table 61 to be then pushed off the same onto the roadbed during the next forward movement of the plunger 63, as previously mentioned. The upper end of the chute 80 connects with a rearwardly and upwardly extending incline 82 mounted on the chassis 10 and having its upper end in close proximity to an endless conveyer belt 83 for delivering rows of paving blocks to the upper end of the chute 80 to allow the said rows to slide down the same into the chute 80. The endless conveyer belt 83 extends rearwardly and downwardly and passes around rollers 84 and 85 having their shafts 86 and 87 journaled in suitable bearings arranged on overhead structures 88, 89 attached to the chassis 10. The conveyer belt 83 is provided with two transversely extending ribs or carriers 90 spaced apart and each adapted to accommodate a transverse row of paving blocks. The paving blocks are delivered onto a carrier or rib 90, then at the rear lower end of the conveyer belt 83, by hand, over an inclined table 91 mounted on the overhead rear structure 89 previously mentioned. The paving blocks are passed on to the incline 91 from a car or other conveyance. One end of the shaft 86 is provided with a sprocket wheel 92 connected by a sprocket chain 93 with a sprocket wheel 94 secured on the driving shaft 17 so that when the latter is rotating a traveling motion is given to the endless conveyer belt 83 to carry the paving blocks in rows upwardly and forwardly from the incline 91 to the incline 82 down which the paving blocks slide into the chute 80.

In order to break joint between successive courses of paving blocks (see Figs. 3 and 4) use is made of two shifting plates 95 extending above the upper run of the conveyer belt 83 at opposite sides thereof. The shifting plates 95 are fulcrumed at 96 on the structure 89 and are connected with each other by a transverse link 97 to swing the plates 95 simultaneously first to one side and then back to the opposite side. In order to impart a swinging motion to the plates 95 the two carriers or ribs 90 are staggered so that the rib 90 shown uppermost shifts the plates 95 in the direction of the arrow x' while the rib 90 now in lowermost position shifts the plates in inverse direction of the arrow x' at the time this rib 90 travels upward with the conveyer belt 83. It will be noticed that the rows of paving stones are delivered onto the belt 83 from the table 91 in the same order but are shifted transversely by the plates 95 during the upward travel of the paving blocks so that blocks in successive rows of paving blocks break

joints. The upper ends of the plates 95 are provided with transverse guide slots 98 into which project guide pins 99 attached to the structure 88.

In order to aline the dropped row of paving blocks 64 and to hammer the same back against the last row of blocks already laid on the paving blocks, use is made of a transversely extending hammer 100 mounted to swing forward and backward a distance in front of the table 61. The hammer 100 is attached to the lower ends of arms 101 attached at their upper ends to a shaft 102 extending transversely and journaled in suitable bearings on the forward end of the chassis 10. Each of the arms 101 is pressed on by a spring 103 engaged by a washer 104 held on a rod 105 extending rearwardly and attached to a bracket 106, the several brackets being attached to a crossbar 107 attached to the chassis 10. The shaft 102 is provided at its ends with depending arms 108 pivotally connected by links 109 with rods 110 mounted to slide longitudinally in suitable bearings 111 attached to the sides of the chassis 10. The forward ends of the rods 110 abut against the peripheral faces of cams 112 secured on the driving shaft 17 so that when the latter is rotated the cams 112 impart a forward sliding movement to the rods 110 which by the links 109 impart a forward swinging movement to the arms 108 to rock the shaft 102 with a view to swing the arms 101 and the hammer 100 in a forward direction. The cams 112 are so shaped that after the hammer 100 has reached a foremost position a quick return movement of the hammer is had by the action of the springs 103 and at the time the plunger 63 starts on the return movement after having pushed a row of paving blocks 64 onto the bed of the roadway (see Fig. 4). The sudden and forcible return movement of the hammer 100 causes the row of blocks 64 to move rearward against the previously laid row of blocks at the same time insuring alinement and firm contact with the said previously laid row of blocks.

The operation is as follows:

When the several parts are in the position shown in Fig. 1 and the motor is running then the pusher 63 moves forward and pushes the row of paving blocks 64 off the table 61 onto the roadway and during this time the hammer 100 swings forwardly and its arms 101 compress the springs 103, as shown in Fig. 4. During the forward movement of the pusher 63 its support 73 moves under the lowermost row of blocks 81 in the chute 80 thus supporting the blocks therein until the pusher 63 has returned to its rearmost position. When the pusher 63 begins its return movement the rods 110 reach the steep portions of the cams 112 so that a quick return movement is had of the hammer 100 by the action of the springs 103 so that the hammer 100 moves the dropped blocks 64 rearwardly against the previously laid course at the same time alining all the blocks in the row. When the pusher 63 reaches the rearmost position the row of blocks 81 in the chute 80 drop onto the table 61 to be pushed off the latter on the next forward movement of the pusher 63. The intention is to so gear the machine that during the process of laying the blocks it will be in continual motion, moving at the rate of approximately one mile in ten hours, but the operation may be carried on intermittently. Thus after a course of blocks 64 has been laid the attendant throws in the clutch 45 to rotate the axle 35 to move the machine forward a distance corresponding to the course of blocks laid so that the table 61 is in proper position for dropping the next row of paving blocks beyond the previously laid one. It is understood that when the machine reaches the adjusted position the clutch member 45 is thrown out of mesh with the clutch member 43 so that the axle 35 comes to a standstill, the other clutch member 46 being out of engagement with its clutch member 44 during the laying of the rows of blocks. When the machine is to be run forward the clutch member 45 is thrown out of the clutch member 43 and the clutch member 46 is thrown into engagement with the clutch member 44. It will be noticed that when the motor is running a traveling motion is given to the belt 83 to carry the rows of blocks from the incline 91 to the incline 82 for keeping the chute 80 filled, thus insuring rapid laying of the paving blocks.

When the machine is not used for laying paving blocks or is run from one place to another then the clutch member 19 is thrown out of mesh with the clutch member 18 to stop the main driving shaft 17 and hence also stop the pusher 63, the hammer 100 and the feed belt 83.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A paving machine provided with a table, a delivery device for successively delivering transverse rows of paving blocks to said table, a pusher movable over said table for pushing a row of blocks forwardly off the table onto the bed of a roadway, a cut-off carried by said pusher and adapted to separate the pushed row of blocks from the next row, and an alining and hammering device for alining the blocks in a row on the road bed and to hammer the same in place.

2. A paving machine provided with a paving block laying device, and delivery means for delivering rows of paving blocks to the said laying device, the said delivery means having shifting devices for shifting

the rows of paving blocks transversely to cause the paving blocks of successive rows to break joints.

3. A paving machine, comprising a truck provided with a motor, a chute mounted on the truck and adapted to contain at least one row of paving blocks, a table fixed on the truck and extending a distance below the said chute for a row of blocks to drop from the chute onto the table, and a reciprocating pusher operating over the said table and adapted to push a row of blocks off the table onto the bed of the roadway.

4. A paving machine, comprising a truck provided with a motor, a chute mounted on the truck and adapted to contain at least one row of paving blocks, a table fixed on the truck and extending a distance below the said chute for a row of blocks to drop from the chute onto the table, a reciprocating pusher operating over the said table and adapted to push a row of blocks off the table onto the bed of the roadway, and an alining and hammering device mounted on the said truck and adapted to aline the row of blocks on the bed of the roadway and to hammer the same in position thereon.

5. A paving machine, comprising a truck provided with a motor, a chute mounted on the truck and adapted to contain at least one row of paving blocks, a table fixed on the truck and extending a distance below the said chute for a row of blocks to drop from the chute onto the table, a reciprocating pusher operating over the said table and adapted to push a row of blocks off the table onto the bed of the roadway, an alining and hammering device mounted on the said truck and adapted to aline the row of blocks on the bed of the roadway and to hammer the same in position thereon, and means to actuate the said hammering device in unison with the said pusher.

6. A paving machine, comprising a truck provided with a motor, a table supported on the truck a short distance above the roadway, a vertical chute mounted on the truck above the said table, and extending across the table for dropping a transverse row of paving blocks onto the table, a rearwardly and upwardly extending incline leading to the upper end of the said chute, an endless conveyer belt mounted on the truck and extending downwardly and rearwardly from the upper end of the said incline, a feed table mounted on the rear of the truck and extending onto the rear end of the said conveyer belt to supply the latter with transverse rows of paving blocks, a pusher reciprocating over the said table, a hammering device mounted on the truck in front of the same table, and means connecting the said motor with the said pusher, the said hammering device and the conveyer belt.

7. In a paving machine adapted to deposit a transverse row of blocks adjacent the front of the machine, a hammer device suspended across the front of the machine for pushing the transverse row rearwardly and tamping it in place, spring mechanism acting normally to force the hammer device rearwardly, a cam device operably connected with the hammer device to move the same forwardly to permit deposit of the transverse row of blocks, and permit the spring mechanism to quickly and forcibly move the hammer device rearwardly into contact with the aforesaid transverse row of blocks and force the same against a previously laid course of paving blocks.

8. A paving machine, comprising a truck, a table mounted on the forward portion of the truck a short distance above the roadway, a chute above the said table for delivering a transverse row of paving blocks to the said table, a pusher for pushing the row of blocks off the table onto the roadway, a spring-pressed hammer mounted to swing forward and backward in front of the said table and having a hammer head a distance below the table, the said hammer head being adapted to engage the row of blocks pushed off the said table by the said pusher and to hammer the said row of blocks rearwardly against a previously laid course of paving blocks, a driven shaft, an actuating connection connecting the said shaft with the said pusher to reciprocate the latter, and a cam mechanism connecting the said shaft with the said hammer to swing the latter forward and allow its spring to swing it suddenly and forcibly rearward against the dropped row of paving blocks.

9. A paving machine provided with an endless conveyer having spaced ribs arranged in staggered relation, and pivoted shifting plates controlled by the said ribs for shifting the rows of paving blocks carried by the said ribs to cause the paving blocks of successive rows to break joints.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PATRICK STANISLAUS COYNE.

Witnesses:
J. D. FORRESTER,
JAMES M. FORD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."