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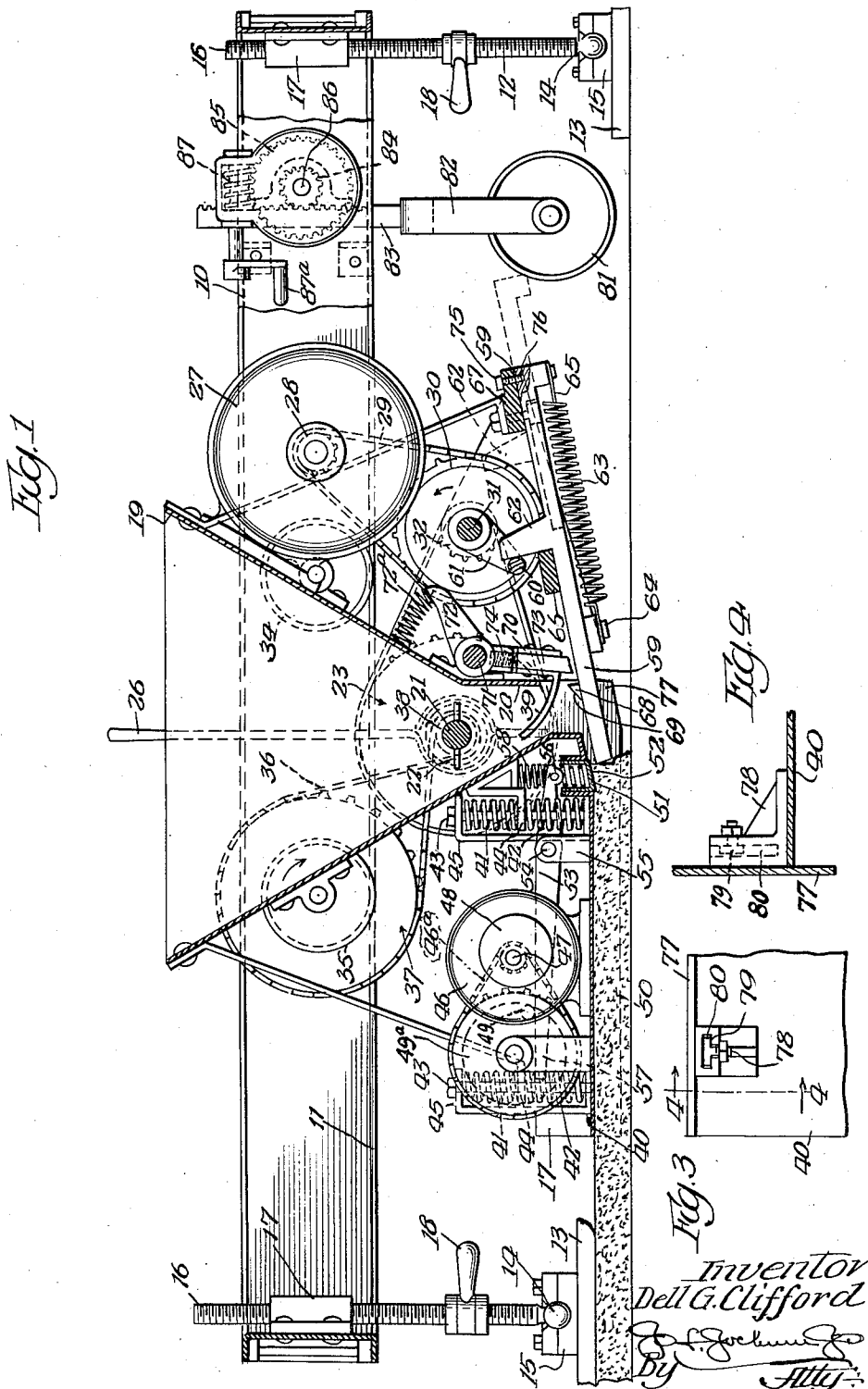
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CONCRETE LAYING MACHINE

Filed Aug. 19, 1929

2 Sheets.-Sheet 1



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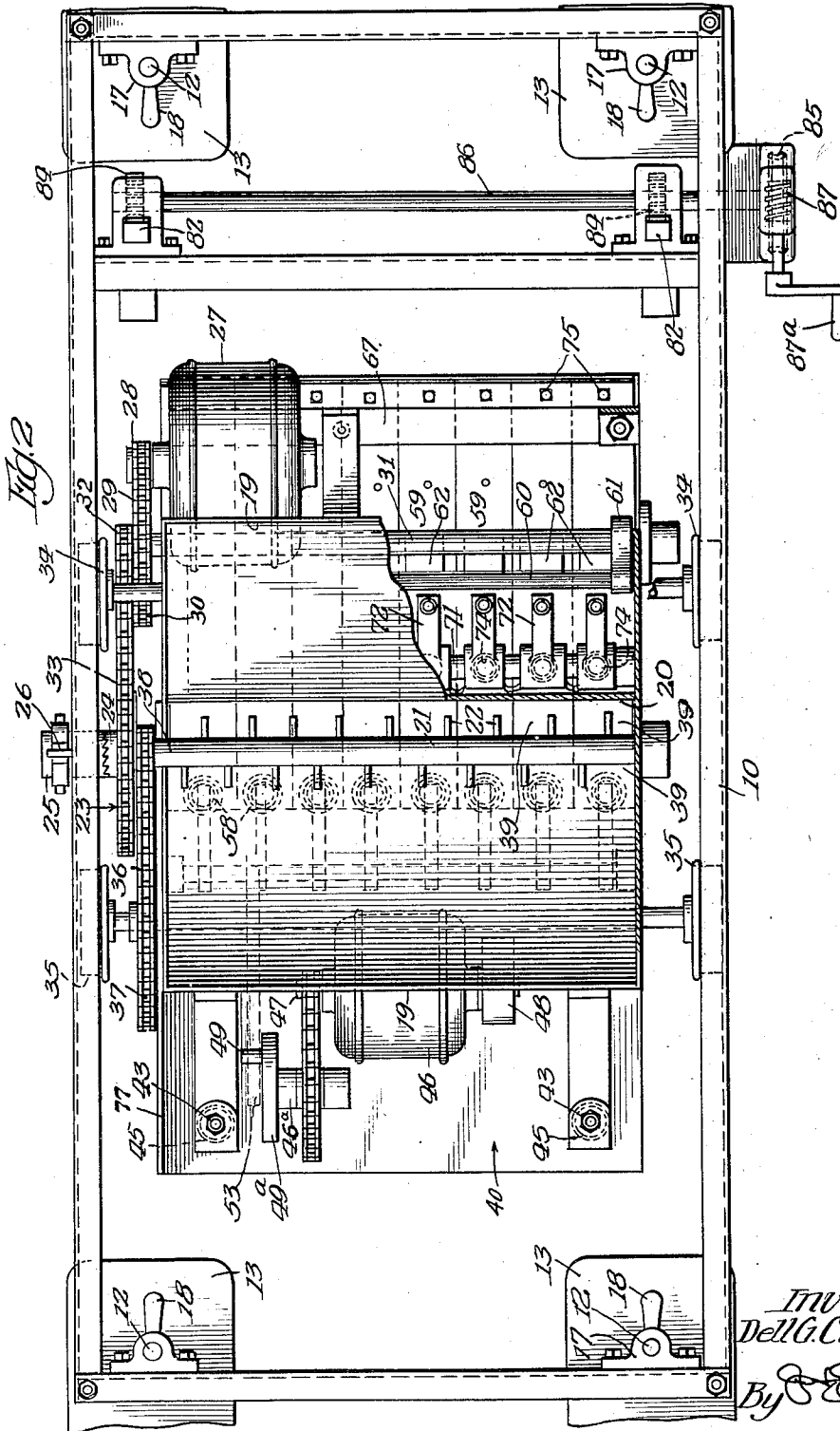
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UNITED STATES PATENT OFFICE

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CONCRETE LAYING MACHINE

Application filed August 19, 1929. Serial No. 386,996.

This invention relates to machines for laying concrete and the like, and one of the objects of the invention is to provide an improved machine of this character by means of which a much drier or denser mixture may be laid than heretofore, and by means of the use of which the necessity of pouring a large area and then tamping the same will be avoided.

A further object is to provide an improved machine of this character movable upon guides insuring a more level flow or surface, the tamping of the mixture being done and the work completed as the material is laid, thereby insuring a more intimate relation or contact of the material with the supporting surface, as well as the previously laid material.

A further object is to provide in a machine of this character improved means for tamping the material and improved means whereby a predetermined portion of the tamping mechanism may be rendered inactive at will to adapt the machine for laying a predetermined width or strip of material.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a view partly in longitudinal section, partly in elevation and with parts omitted, of a machine of this character constructed in accordance with the principles of this invention.

Figure 2 is a top plan view of Figure 1.

Figure 3 is a detail top plan view of a portion of the end board support.

Figure 4 is a view taken on line 4—4, Figure 3.

Referring more particularly to the drawings the numeral 10 designates a supporting structure or frame upon which the machine is mounted, the frame being constructed of any suitable material and being of any desired size and configuration, but is prefer-

ably shaped so that the side members 10 thereof are provided with inwardly projecting flanges 11 to form a track or guideway upon which the mechanism is mounted.

The supporting frame may itself be held in position in any suitable manner, but preferably by means of upright rods 12 which are supported by means of platforms or feet 13 adapted to rest upon the surface to which the mixture is to be applied. Each upright 12 has a ball and socket connection 14—15 with the base 13 so as to adapt the uprights 12 for universal movement with respect thereto. The upper ends of these members 12 are provided with threads 16 engaging in threaded sockets 17 carried by the supporting structure.

A suitable handle 18 may be connected with the uprights 12 so that by rotating the handles the supporting frame may be raised and lowered.

The numeral 19 designates generally a hopper of any desired size and configuration and is provided with a delivery or discharge outlet 20. Arranged within the hopper and extending thereacross adjacent the outlet 20 is a shaft 21 having agitators or fingers 22 connected therewith. This shaft is journaled in suitable bearings and is adapted to be rotated so as to operate the agitator fingers 22 and thereby insure a delivery of the material from the hopper.

Loosely mounted upon the shaft 21 is a sprocket wheel 23 having a clutch face 24. Keyed upon one end of the shaft 21 is a clutch member 25 adapted to be moved into engagement with the clutch member 24 to lock the shaft 21 for rotation with the sprocket wheel 23.

A control lever 26 is provided for moving the clutch member 25 into and out of operative relation with the clutch member 24 thereby locking or unlocking the shaft 21 for rotation with the sprocket wheel 23.

The shaft 21 is rotated in any suitable manner preferably by means of a motor 27 suitably mounted. Connected with the shaft of the motor is a sprocket wheel 28 over which a sprocket chain 29 passes and this sprocket chain also passes over another sprocket wheel

30 secured to a shaft 31 for rotation therewith.

A sprocket wheel 32 is connected with the sprocket 30 for rotation therewith and a sprocket chain 33 passes over the sprocket wheels 32 and 23 for rotating the shaft 21 when the clutch members 24 and 25 are in operative connection.

The motor and the operative drive connection with the shaft 21 are supported by the hopper 19 in suitable bearings and connected also with the hopper 19 are supporting wheels 34—35 which operate upon the track or flange 11 for advancing the machine.

Motion may be imparted to the wheels 35 from the motor 27 in any suitable manner, preferably through the medium of a sprocket chain 36 which passes over a sprocket wheel 37 that is connected with the wheel 35 and the sprocket chain 36 also passes over a sprocket wheel 38 secured to the shaft 21. Thus it will be seen that when the motor 27 is operated motion will be imparted to the drive wheels 35 for advancing or moving the hopper.

As a means for permitting the advancement of the machine and for maintaining the agitator or fingers 22 and the agitator shaft 21 idle, the clutch 24—25 is provided so that by shifting the lever 26 the shaft 21 may be unlocked so that it will stand idle during the advancement of the machine.

A cut off 39 in the form of a gate is provided for closing the discharge outlet 20 of the hopper and this gate is adapted to be automatically operated so as to open and close the hopper to discharge material therefrom, in a manner to be hereinafter described.

Supported by the hopper in any suitable manner is a tamper plate 40 which is maintained for yielding vibratory movement and supported by means of springs 41 and co-operating springs 42 through the medium of rods 43 which pass through suitable bearings 44 and are encompassed by the respective springs, one end of one of the springs abutting the tamper plate 40, while their opposite ends abut the brackets 44. The ends of the springs 41 abut the brackets 44 and abutments or stops 45 so as to yieldingly support the tamper plate and permit it to have the desired vibratory motion.

This plate 40 may be vibrated in any suitable manner, but a simple and efficient manner embodies a motor 46 mounted upon the tamper plate 40. To the shaft 47 of the motor is eccentrically connected a fly wheel or member 48.

As the motor operates and the shaft 27 rotates, the eccentrically disposed element 48 connected with the shaft 47 will cause a vibratory motion to be imparted to the plate 40 and which motion is utilized to tamp upon the material 50 as the machine is being advanced.

Disposed adjacent the end of the plate 40 is another tamping element 51 which is preferably provided with a beveled or inclined face 52. Connected with the tamper 51 is a lever 53 which is pivotally supported intermediate its ends as at 54 upon a fulcrum 55.

One end of the lever 53 is loosely connected as at 56 with the tamper 51 while the other end 57 is arranged in the path of movement of a pin or projection 49 on a rotatably mounted member 49^a, which latter may be rotated from the motor 46 through a belt connection 46^a. A spring 58 tends to move the tamper 51 in one direction while the lever 53 moves the tamper 51 in the opposite direction against the stress of the spring.

The tamper 51 operates upon the top of the material 50 just as it is being laid and as the machine is advancing. A plurality of additional tampers 59 are provided and these tampers 59 are arranged at an incline to the horizontal surface. Each of the tampers 59, any number of which may be provided, is suitably supported and is adapted to be moved in one direction by means of an extension 60 on a crank arm 61 connected with the shaft 31 and which extension 60 engages a projection 62 carried by the tamper member 59. A spring 63 is anchored at one end as at 64 to a fixed support and at its other end as at 65 with a portion of the tamper 59, so that when the sprocket wheel 30 is rotated in the direction indicated by the arrow in Figure 1, the crank 61 will be rotated and the projection 60 will engage the projection 62 and thereby move the tamper 59 backwardly and against the stress of the spring 63, after which the tamper is released by means of the projection 60 passing out of engagement with the extension 62, so as to allow the spring 63 to contract and thereby permit the spring 63 to rapidly and forcibly move the tamper 59 in the opposite direction.

Stops 66—67 may be provided to be engaged by the extension 62 on the tamper to arrest its movement in each direction.

The gate 39 is adapted to be opened automatically by the rearward movement of the tamper, and to that end there may be provided a shoulder 68 on the tamper which is provided with an inclined surface 69.

Members 70 are oscillatably mounted upon a shaft 71 and to which shaft an arm 72 is connected. A spring 72^a operates upon the arm 72 and tends normally to close the gate or cut off 39. Carried by the member 70 is a spring pressed portion or member 73, which latter will be projected by means of a spring 74 into the path of movement of the shoulder 68 so that the gate or cut off 39 will be opened thereby when the tamper moves in one direction. When, however, the tamper moves in the opposite direction under the stress of the spring 63, the spring controlled element 73 will yield to permit the shoulder 68 to pass

thereunder. This construction will permit the tampers to be operated a number of times independently of the gates or cut offs 39.

When the tampers 59 are moved to the right in Figure 1, the shoulder 68 will engage the element 73 and rock the member 70 upon the shaft 71 and thereby withdraw or open the gate or cut off 39. This will move the arm 72 against the stress of the spring 72^a. As the shaft 31 is being rotated and the projection 60 on the arm 61 engages the projection 62 on the tamper 59, the latter will be moved to the dotted line position in Figure 1, against the stress of the spring 63 until the projection 60 passes out of engagement with the projection 62. This will release the tamper 59 and it will spring back under the stress of the energy stored in the spring 63, to engage the material 50. The crank 61 will continue to rotate in the same direction until the projection 60 thereon again engages the projection 62 to again retract the tamper. When the material has been sufficiently tamped the tampers 59 will assume the full line position in Figure 1, so that upon the next retraction of the tamper the shoulder 68 will engage the member 73 and actuate the gate or cut off 39 to allow a supply of material to be delivered upon the surface. Obviously, the operation of all of these parts is in timed relation.

When it is desired to render a predetermined number of tamper elements 59 inactive, so as to lay a smaller strip or area, any number of tamper elements may be held against operation, by moving them to the dotted line position shown in Figure 1, and then inserting a pin or holding member 75 into an opening 76 in the tamper and behind the stop 67.

The gate or cut off 39 and the elements 73 together with the arms 72 are individual to the tamper members and as they are all of the same construction and operation, the description of one applies equally as well to them all.

An end member, board or plate 77 may be provided to extend downwardly below the tamper member 40 and thereby serve as a closure for the space beneath the tamper member 40 and the surface upon which the material is deposited, so as to prevent the material from spreading out during the operation of the machine. This member 77 is adjustably held in position in any suitable manner, preferably by means of the tamper member 40, and to that end there may be provided any number of uprights 78 preferably substantially T shaped in cross section, each having a head 79 which enters a guide 80 carried by the member 77. The other end of the space is open so that the material can be laid against a strip of material already deposited upon the supporting surface.

As shown in Figure 1 of the drawings, the

supporting standards or uprights 12 at the ends of the supporting frame may be adjusted to different heights, as the supports at one end of the frame may rest upon the finished surface 50, while the supports at the other end may rest upon the surface to which the finish is applied. By means of these uprights and their adjustability, it will be manifest that the machine may be set in an accurate and horizontal position.

As a means for facilitating the transporting of the machine or for moving it from one position to another after a predetermined area of material has been laid, there may be provided supporting wheels 81 carried by adjustable members 82, the latter being adapted to be raised and lowered by racks 83 with which gears 84 mesh. A worm gear 85 connected with a shaft 86 which in turn is connected with the gears 84 may be operated by a worm 87, through the medium of a handle 87^a. By operating the handle 87 the wheels 81 may be raised and lowered.

Thus it will be seen that when these caster wheels are lowered the machine may be readily advanced as the caster wheel will roll upon the surface to which the finishing product is to be applied.

It will be manifest that with this improved construction of machine a more dense material may be employed, that is the amount of water in proportion to the other ingredients may be materially reduced and by the constant tamping or vibration of the parts to compact the material as it is laid, a better product and a smoother finish will result. At the same time there will be a more intimate contact or binding relation between the material which has already been laid and the material which is being laid.

Obviously, suitable bearings, supports and brackets for the various parts, not shown, may be employed wherever necessary, and therefore it is desired that the drawings herewith submitted shall be considered as being merely diagrammatic.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a tamper operable upon the top of the material as it is laid, means for operating said tamper, a tamper operating upon the material as it is laid and between the top and bottom thereof, and means for operating the last said tamper.

2. A machine for laying concrete embodying a hopper having a discharge outlet for

the material, a tamper operable upon the top of the material as it is laid, means for operating said tamper, a tamper operating upon the material as it is laid and between the top and bottom thereof, means for operating the last said tamper, and means for automatically controlling the delivery of the material through said outlet.

3. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a tamper operable upon the top of the material as it is laid, means for operating said tamper, a tamper operating upon the material as it is laid and between the top and bottom thereof, means for operating the last said tamper, and means responsive in its operation to the actuation of the last said tamper for controlling the discharge of the material through said outlet.

4. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a tamper operable upon the top of the material as it is laid, means for vibrating said tamper, a tamper operable upon the material in a plane disposed at an angle to the plane of operation of the first said tamper, means for actuating the last said tamper, and means for advancing the machine.

5. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a tamper operable upon the top of the material as it is laid, means for vibrating said tamper, a tamper operable upon the material in a plane disposed at an angle to the plane of operation of the first said tamper, means for actuating the last said tamper, and a cutoff for controlling said discharge outlet, the said cutoff being responsive in its operation to the operation of the last said tamper.

6. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a tamper operable upon the top of the material as it is being laid, a plurality of tampers operable upon the material between the top and bottom thereof, means operating automatically to control the supply of material being delivered, means for actuating the last said tampers, and means for rendering a predetermined number of the last said tampers inactive, at will.

7. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a tamper operable upon the top of the material as it is being laid, a plurality of tampers operable upon the material between the top and bottom thereof, means responsive in operation to the operation of the last said tampers for controlling the supply of material, and means for rendering a predetermined number of the last said tampers inactive.

8. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a plurality of tampers, means for

actuating the tampers, means individual to the tampers and responsive in operation to the operation of the tampers for controlling the supply of material through said outlet in proportion to the number of tampers that are active, and means for rendering a predetermined number of tampers inactive at will.

9. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a plurality of tampers, means for actuating the tampers, means individual to the tampers and responsive in operation to the operation of the tampers for controlling the supply of material through said outlet in proportion to the number of tampers that are active, means for rendering a predetermined number of tampers inactive at will, and a vibrating tamper operating upon the top of the material as it is laid.

10. A machine for laying concrete embodying a hopper having a discharge outlet for the material, a plurality of tampers, means for actuating the tampers, means individual to the tampers and responsive in operation to the operation of the tampers for controlling the supply of material through said outlet in proportion to the number of tampers that are active, means for rendering a predetermined number of tampers inactive at will, and a vibrating tamper operating upon the top of the material as it is laid, the first said tampers operating upon the material in a plane at an angle to the plane of operation of the second recited tamper.

11. A machine for laying concrete in a strip embodying a hopper for the material adapted to be advanced as the material is laid, tampers operating upon the material throughout the width of the strip as it is laid, means for automatically controlling the supply of material in accordance with the width of strip laid, and means for varying at will the width of said strip.

12. A machine for laying concrete in a strip embodying a hopper for the material adapted to be advanced as the material is laid, tampers operating upon the material throughout the width of the strip as it is laid, means for automatically controlling the supply of material by the operation of said tampers and in accordance with the width of the strip laid, and means for varying at will the width of said strip.

13. A machine for laying concrete in a strip embodying a hopper for the material adapted to be advanced as the material is laid, tampers operating upon the material throughout the width of the strip as it is laid, means for automatically controlling the supply of material in accordance with the width of strip laid, means for varying at will the width of said strip, standards for supporting the machine, and means adjustably connecting the machine supporting structure

with the standards whereby the machine may be adjusted towards and away from the surface to which the material is applied.

14. A machine for laying concrete embodying a hopper for the material having a discharge outlet, a tamper operating upon the top of the material as it is laid, means for vibrating said tamper, a tamper operable upon the work below the first said tamper and at an angle to the latter, means for actuating the second recited tamper, and means responsive in its operation by the actuation of the last said tampers for controlling the supply of material from said hopper.

15. A machine for laying concrete embodying a hopper for the material having a discharge outlet, a tamper operating upon the top of the material as it is laid, means for vibrating said tamper, a plurality of tampers operable upon the work below the first said tamper and at an angle thereto, means individual to and responsive in operation to the respective second recited tampers for controlling the supply of material from the hopper, means for actuating the second recited tampers, and means for rendering a predetermined number of the second recited tampers inactive at will to vary the width of strip of material laid by the machine.

16. A machine for laying concrete embodying a hopper for the material having a discharge outlet, a tamper for operating upon the top of the material as it is laid, a vibrator carried with the tamper for vibrating the latter, a tamper operable upon the material between the top and bottom thereof as the material is laid, means for actuating the last said tampers, and means for automatically controlling the supply of material delivered from the hopper.

17. A machine for laying concrete embodying a hopper for the material having a discharge outlet, a tamper for operating upon the top of the material as it is laid, a vibrator carried with the tamper for vibrating the latter, a tamper operable upon the material between the top and bottom thereof as the material is laid, means for actuating the last said tampers, and means responsive in its operation to the actuation of the last recited tampers for automatically controlling the supply of material from the hopper.

18. A machine for laying a strip of concrete embodying a hopper having a discharge outlet, a tamper for operating upon the top of the material as it is laid, a vibrator carried with the tamper for vibrating the latter, a plurality of tampers operable upon the material between the top and bottom thereof as the material is laid, means for actuating the last said tampers, means whereby a predetermined number of the last said tampers may be rendered inactive to vary the width of the strip of material being laid, and means individual to and controlled by the operation

of the last said tampers for controlling the amount of material delivered from said hopper.

19. A machine for laying a strip of concrete embodying a hopper having a discharge outlet, a tamper for operating upon the top of the material as it is laid, a vibrator carried with the tamper for vibrating the latter, a plurality of tampers operable upon the material between the top and bottom thereof as the material is laid, means for actuating the last said tampers, means whereby a predetermined number of the last said tampers may be rendered inactive to vary the width of the strip of material being laid, means individual to and controlled by the operation of the last said tampers for controlling the amount of material delivered from said hopper, an additional tamper disposed between the first and second recited tampers, and means for actuating said additional tamper.

20. A machine for laying concrete embodying a guide supported above the surface upon which the concrete is to be laid, a tamper plate supported by and adapted to travel upon said guide and provided with an extended flat surface resting upon the top of the material as it is being laid, and means for vibrating said plate with respect to said guide, said plate also operating to smooth the surface of the work.

21. A machine for laying concrete embodying a guide supported above the surface upon which the concrete is to be laid, a tamper plate supported by and adapted to travel upon said guide and also upon the top of the material as it is being laid, means for vibrating said plate with respect to said guide, and means connected with the tamper plate and depending below the face thereof to form a guide movable along the edge of the material being laid.

22. A machine for laying concrete embodying a guide disposed above and out of contact with the surface upon which the concrete is to be laid, means for supporting the guide, a tamper plate supported by and adapted to travel upon the guide and provided with an extended flat surface resting upon the top of the material as it is being laid, and means for vibrating the plate with respect to the said guide, said plate also operating to smooth the surface of the work.

23. A machine for laying concrete embodying a guide disposed above and out of contact with the surface upon which the concrete is to be laid, means for supporting the guide for adjustment in directions towards and away from the said surface and for maintaining the guide in its adjusted position, a tamper plate supported by and adapted to travel upon the guide and also upon the top of the material as it is being laid,

and means for vibrating the plate with respect to the said guide.

24. A machine for laying concrete embodying a guide, means supporting the guide above the surface upon which the concrete is to be laid, a portion of the said means resting upon said surface and another portion thereof resting upon the surface of the previously laid material, a tamper plate supported by and adapted to travel upon the guide and also upon the surface of the material as it is being laid, and means for vibrating said plate with respect to said guide.

In testimony whereof I have signed my name to this specification, on this 2nd day of August, A. D. 1929.

DELL G. CLIFFORD.

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