E. L. RANSOME.

APPARATUS FOR LAYING CONCRETE COURSES.

APPLICATION FILED NOV. 14, 1908.

1,042,822. **Patented Oct. 29, 1912.**

3 SHEETS—SHEET 1.

Fig. 1.

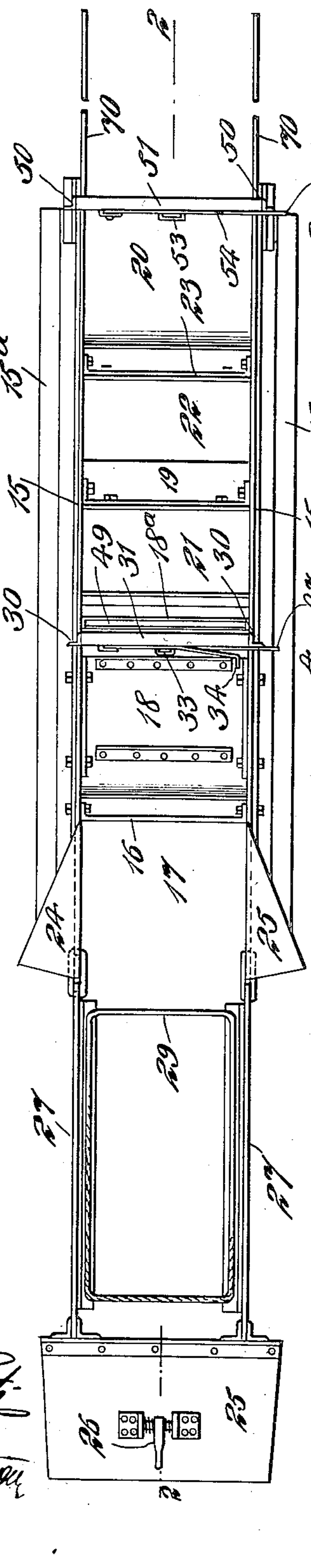
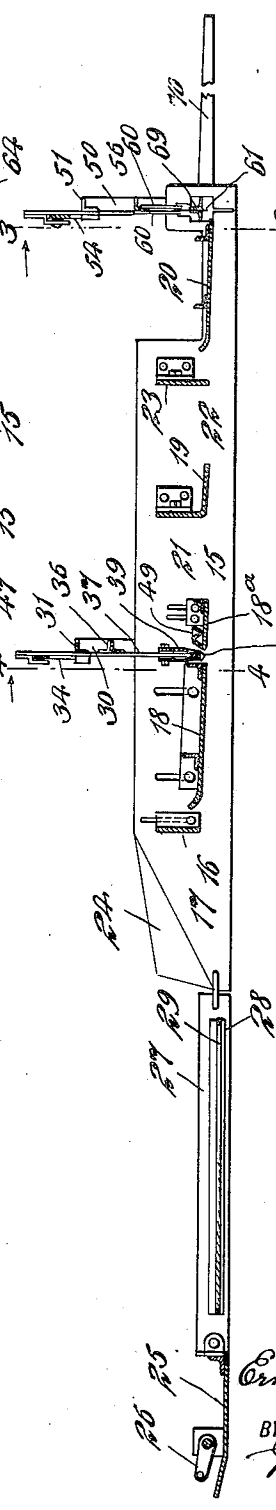


Fig. 2.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 3

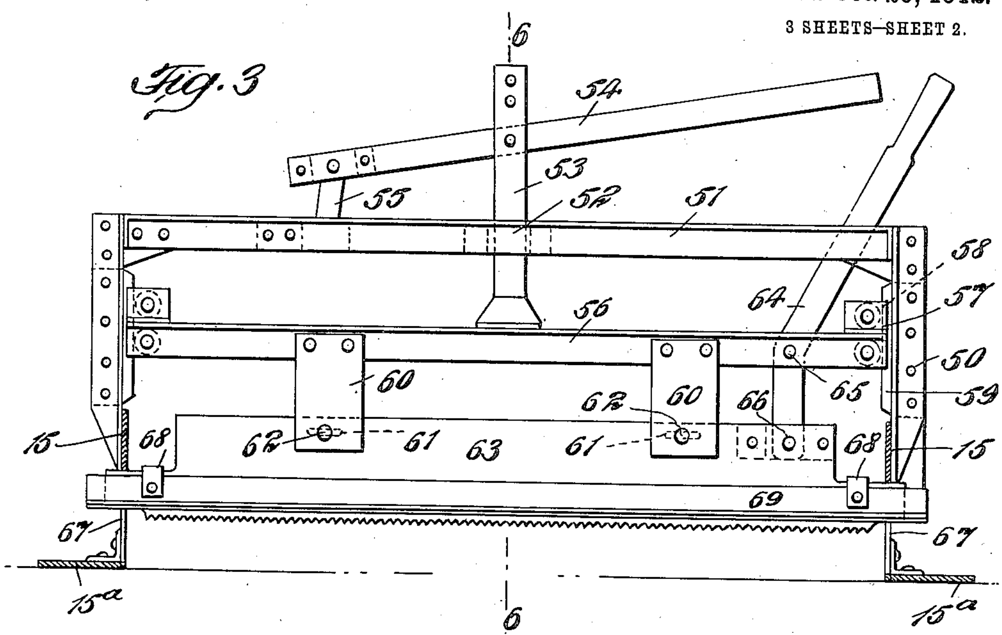


Fig. 4.

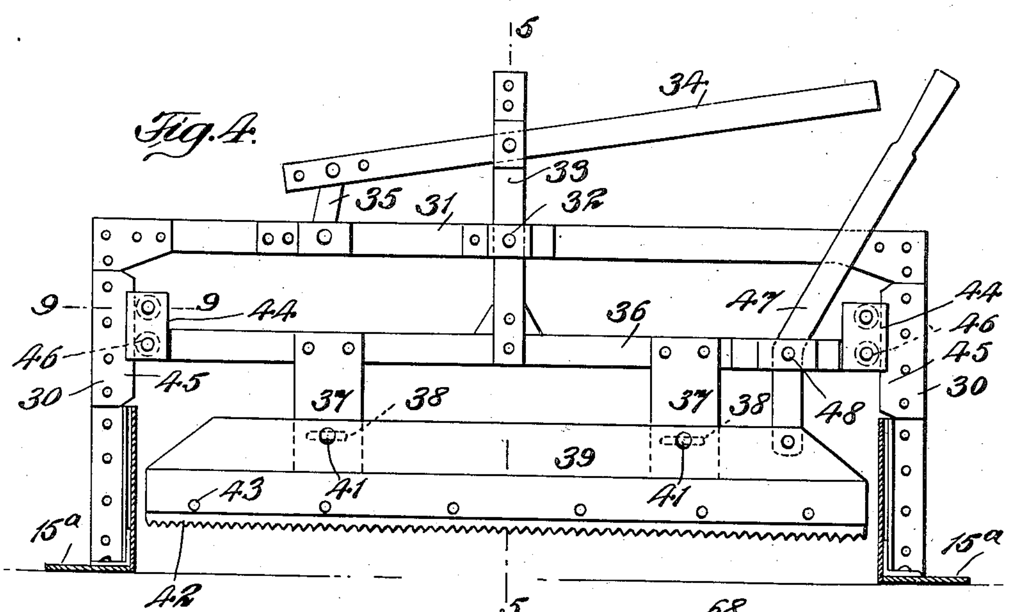


Fig. 7.

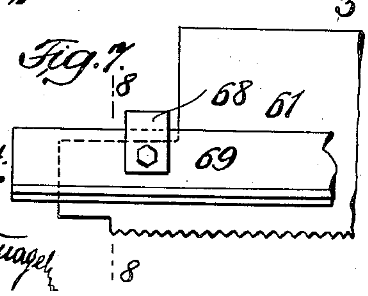
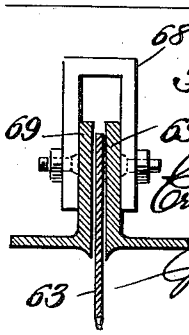


Fig. 8.



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3 SHEETS—SHEET 3.

Fig. 5.

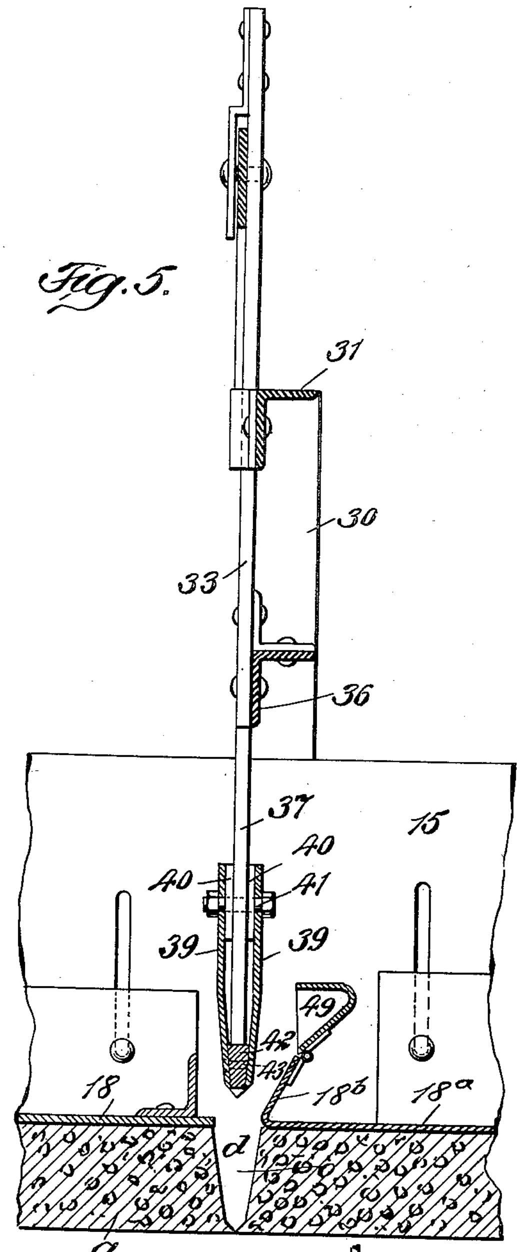
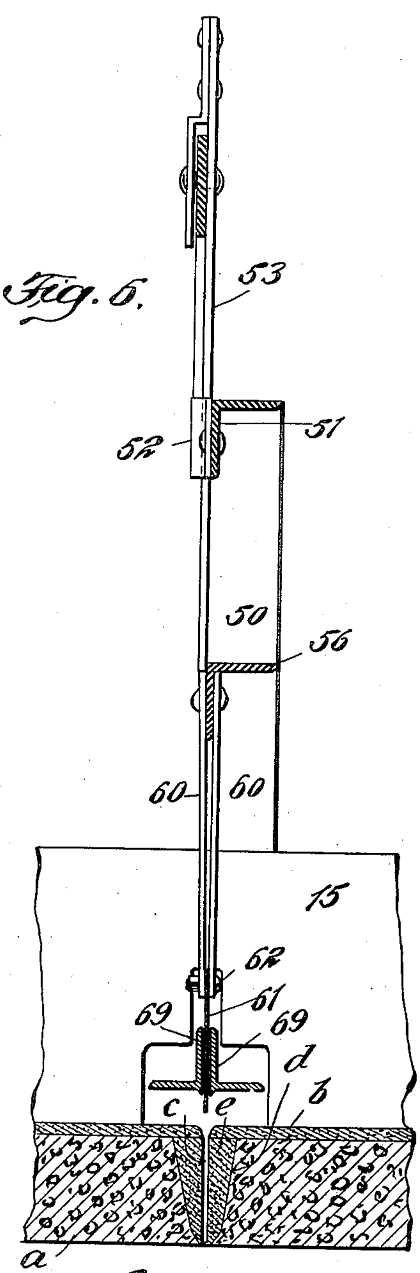


Fig. 6.



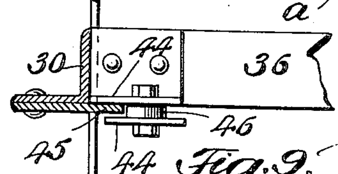


Fig. 9.

WITNESSES

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UNITED STATES PATENT OFFICE.

ERNEST LESLIE RANSOME, OF NEW YORK, N. Y.

APPARATUS FOR LAYING CONCRETE COURSES.

1,042,822. Specification of Letters Patent. Patented Oct. 29, 1912.

Application filed November 14, 1908. Serial No. 462,542.

To all whom it may concern:

Be it known that I, ERNEST L. RANSOME, of the borough of Richmond, city and State of New York, have invented certain new and useful Improvements in Apparatus for Laying Concrete Courses, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a machine for forming concrete courses such as sidewalks, curbs, gutters and various other work; and it consists in certain improvements on and additions to the construction set forth in my copending application filed December 17, 1907, Serial No. 406832.

In the formation of continuous concrete courses such as sidewalks, curbs, gutters and the like it is desirable to divide the work transversely into separate sections so that upon shrinkage of the concrete and exposure to the weather it will not crack irregularly. It is also desirable to divide such work for various other purposes, as for example to enable the work to be laid in a continuous course in a factory yard and then divided into sections or slabs in which form it may be conveyed to the place of use and laid like flagging.

An important feature of my present invention therefore relates to means by which these transverse divisions may be easily and neatly formed.

A further object of the invention is to provide convenient and effective means for reinforcing the work, by the introduction of reinforce iron or other metal into the concrete when plastic.

Still a further object of the invention is to improve the general construction of the mold, rendering it easier to construct and stronger and more durable in operation.

I attain these and other objects by means of certain peculiar devices and features of construction all of which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is had to the accompanying drawings which illustrate as an example the preferred embodiment of my invention and in which drawings,

Figure 1 is a plan view of the mold; Fig. 2 is a central longitudinal section thereof on the line 2—2 of Fig. 1; Fig. 3 is an enlarged elevation of the devices for forming the final cut or kerf in the work, said view with the mold in section on the line 3—3 of Fig. 2. Fig. 4 is a similar view of the devices for forming the initial or broad kerf, said view with the mold in section on the line 4—4 of Fig. 2. Fig. 5 is a still further enlarged view representing a vertical section through the devices for forming the broad cut or kerf, said view in section on the line 5—5 of Fig. 4. Fig. 6 is a similar view of the devices for forming the final cut, said view in section on the line 6—6 of Fig. 3. Fig. 7 is an enlarged detail of one end of the saw or plate for forming the final kerf, showing also the finishing or trowel members which coact therewith. Fig. 8 is a sectional elevation on the line 8—8 of Fig. 7. Fig. 9 is a detail section on the line 9—9 of Fig. 4.

As set forth in my copending application above referred to, the body of the mold is formed of side walls 15 having a cut off or leveling wall 16 with a charging opening or space 17 ahead of it and troweling and compression top walls 18, 19 and 20 rearward of the cut-off wall 16. At their lower edges the side walls 15 have runners 15^a adapted to bear on the ground. The wall 19 is separated from the walls 18 and 20 by gaps or openings 21 and 22 and immediately ahead of the wall 20 is a cut off wall 23. The two cut-off walls 16 and 23 and the top walls 18, 19 and 20 extend transversely between the side portions of the mold and are adjustably fastened thereto. The wall 18 has a rearward extension wall 18^a divided therefrom by a gap for a purpose which will hereinafter fully appear.

The rough body of the concrete course indicated at *a* in Figs. 5 and 6 is charged into the opening 17, the side walls of the mold at this point being flared outward as indicated at 24 to direct the material into the charging opening; and as the mold advances the cut-off wall 16 levels off the work while the same is troweled and compressed by the inclined wall 18 and its extension 18^a. At the openings 21 and 22 the top finish or wearing surface of finer grade cement, indicated at *b* in Fig. 6, is introduced and the same is leveled off and troweled down by the devices 19, 23, and 20. The mold may be advanced continuously or intermittently depending upon the peculiar conditions of the operation all of which will fully appear hereinafter.

25 indicates a shoe to which suitable draft devices 26 are connected and which shoe is adapted to be drawn along the bottom of the trench or other surface on or along which the work is laid. Connected pivotally with the rear edge of this shoe are two parallel, longitudinally extending draft rails 27 which project rearward to the mold proper and are articulated to the front ends of the side walls 15 thereof as indicated in Fig. 2. Secured to the inner surfaces of these draft rails are ledges 28 which may be of any desired form and which are adapted to form a support for the rectangular reinforce bars or ties 29 one of which is shown in position in Figs. 1 and 2. The concrete is placed around this bar and as the mold advances the bar remains embedded in the concrete. Reinforce bars of this sort are successively fitted into the rack formed by the flanges 28 and therefore are embedded in the continuous course at certain definite intervals depending upon the rapidity with which the reinforce bars are introduced.

The body *a* of the sidewalk or other course is formed of rough concrete mixture such as cement, sand, gravel and broken stone and after the same is laid it is impracticable, owing to the rock and gravel in the mixture, to form therein a cut or kerf such as that indicated at *c*, in Fig. 6. I, therefore, first form a wide kerf or cut indicated at *d* in Figs. 5 and 6; fill into the same a finer grade of cement mixture without gravel or rock as indicated at *e* in Fig. 6; and then form in this fine grade material while the same is plastic a very narrow clear cut kerf *c* which constitutes the final division between the two sections of concrete.

For forming the wide rough kerf *d* I employ the devices which are shown in detail in Figs. 4 and 5 and which are mounted on and form a part of the mold at the point of the line 4—4 in Fig. 2 as shown on a smaller scale in said view. Attached to the side walls 15 of the mold at the point of the division between the top molding sections 18 and 18^a are two vertical arms or frame members 30 connected at their upper ends by a cross beam 31. To this cross beam 31 is attached a guide 32 in which a vertically disposed arm 33 is reciprocally held. 34 indicates a hand lever by which vertical motion may be imparted to said arm and which lever is fulcrumed on the beam 31 through the medium of an articulated link 35. Secured rigidly to the lower end of the arm 33 is a cross head 36; and depending therefrom are two guide plates 37. These are slotted as indicated at 38 and fit loosely between two cheek or clamp plates 39. If desired wear plates 40 may be attached to said clamp plates as shown in Fig. 5 and the clamp plates are held firmly with respect to each other by bolts and thimbles 41 which extend through the slots 38 in the guide plates 37. In this manner the cheek or clamp plates 39 are mounted to slide horizontally with respect to the guide plates 37. The lower edges of the clamp plates 39 incline slightly toward each other and carry a heavy, blunt saw-like blade 42 fastened rigidly to the clamp plates by rivets 43. The cross head 36 moves vertically with the bar 33 and for this purpose the ends of the cross heads are provided with guide plates 44 which embrace rails 45 on the vertical arms 30 and carry rollers 46 which engage the edges of the rails as shown in Figs. 4 and 9. Pivoted between the clamp plates 39 is one end of a lever 47, which is fulcrumed intermediate its ends to the cross head 36 as indicated at 48.

When it is desired therefore to form the broad kerf *d*, the lever 34 is operated to lower the cross-head 36 and its connections until the saw blade 42 bears on the top of the rough body of the work. The operator, holding this blade in its position, actuates the lever 47 to impart a horizontal reciprocation to the clamp plates 39 and saw 42; and said saw works its way down through the rough concrete mixture pushing aside the broken rock and gravel and forming the broad kerf *d* as shown in Fig. 5. During this operation the saw and clamp plates descend through the gap between the walls 18 and 18^a and after the kerf is formed the lever 34 should be operated to raise the saw blade from the kerf. When this is done a transversely elongated cup 49 is thrown over from the position shown in Fig. 2, to the inverted or dumping position shown in Fig. 5; and the cup having first been charged with a fine cement mixture in plastic form, dumps its contents into the kerf *d*. Said cup is hinged on an upward extension 18^b of the wall 18^a so that it may be freely thrown from one position to another. The contents of the cup fill the broad kerf *d* and the lever 34 should then be operated to impart a rapid vertical motion to the cross head and the attached saw 42, which saw then operates as a tamper or ram and packs the fine grade cement closely into the broad kerf *d* filling the same in the manner indicated at *e* in Fig. 6. This operation of forming the broad kerf *d* is carried out, by the devices described, very rapidly and may be performed either while the mold is moving slowly or the mold, if desired, may be stopped during the formation of the broad kerf. I prefer to stop the mold at this time, though, by reason of the fact that the broad kerf may be roughly made, the mold might be allowed to continue its slow progressive motion during the time that the saw is cutting the kerf. The mold proceeds after the formation of the broad kerf and the filling thereof by the cement *e*; and im-

mediately thereafter the top wearing surface *b*, if provided, is applied through one or both of the openings 21 and 22. When this has been laid it becomes necessary to form the final or narrow kerf *c*. This is made by the devices illustrated in detail in Figs. 3, 6, 7, and 8 which are located on and form part of the mold at the point of the line 3—3 in Fig. 2 as shown in said view on a smaller scale. From the side walls 15 of the mold, vertical frame arms 50 rise and carry at their upper ends a cross beam 51. Said beam has a guide 52 carrying a vertical reciprocal bar 53 actuated by a hand lever 54, fulcrumed to the cross bar 51 through the medium of an articulated link 55, the same as the parts 33, 34 and 35 before described. At its lower end the arm 53 carries rigidly a cross head 56 having guides 57 at its ends which, with rollers 58, travel on tracks 59 on the arms 50, so that the cross head may move freely up and down between the guides.

Depending from the cross head 56 are two pairs of guide plates 60, which are slotted as indicated at 61 and receive in such slots pins 62 carried by a thin saw-like blade 63. This construction causes the blade to move vertically with the guide plates and cross head, but allows the blade to reciprocate independently of these parts. To effect this reciprocation a lever 64 is provided, which is fulcrumed on the cross head at 65 and pivoted to the blade 66. The saw blade projects through openings 67 formed in the side walls 15 as shown in Fig. 3 and its ends are reduced in width to accommodate the saddles 68. These saddles are of inverted U-form and, as shown best in Fig. 8, have securely attached to them trowel blades 69. By means of these saddles the trowel blades are held snugly at opposite sides of the saw blade 61. Said trowel blades are supported by the saw when the saddles 68 rest on it in the manner shown in Fig. 7, but as the blade 61 descends into the concrete, the trowel blades 61 rest on the top surface thereof. The saw blade then moves down relatively to the trowel blades, so that the saddles 68 no longer bear on the saw, the trowel blades being supported solely by and resting on the concrete course. The trowel blades also project through the openings 67, and as the saw blade 61 reciprocates the trowel blades are forced to follow its motion.

As the motion of the mold brings the saw blade 61 over the broad kerf *d*, the same being then filled with the fine cement *e*, the mold should be stopped and the lever 54 operated to depress the cross head 56 and its connections. This forces the edge of the saw blade 63 into the fine cement *e* and upon swinging the lever 64 the saw blade is caused to reciprocate quickly cutting its way down through the fine cement *e* and forming the narrow final kerf *c*. Simultaneously with this operation the trowel blades 69, resting on the surface of the work, are moved back and forth across the same, smoothing and rounding the sharp edges left by the saw blades 63 and giving the work the finished form shown in Fig. 6. 70 indicates measuring arms which may be one or two in number as desired and which project rearward from the machine to indicate the points at which the kerfs are to be made. These, however, are not essential and may be dispensed with if desired. In the operation of the mold, therefore, the apparatus is advanced with an intermittent motion and the body of the work charged into and formed at the openings 17. If the work is to be reinforced the bars 29 are embedded in the concrete one after the other at points between the transverse kerfs in the finished work. The rough body of the concrete is leveled off by the wall 16 and packed and compressed by the inclined wall 18. After the body of the work takes its final shape, the saw 42, is operated to form the broad kerf *d* as described. The mold then resumes its motion and the top finish or wearing surface *b* of the work is applied and finally the narrow kerf *c* is formed.

The organization of the machine is such that as the broad kerf *d* is being formed the fine cement in the kerf *d* immediately preceding the one being formed, is being acted on by the blade 61 to form the narrow kerf *c* the devices for forming these kerfs being mounted on the main frame at a distance from each other equal to the distance between the kerfs. This facilitates and expedites the operation, but it is not an essential arrangement. Neither is the precise location of the saws relative to the mold and to each other an essential matter; the positions of these parts, particularly of the saw 42 forming the broad kerf, may be changed in numerous respects without materially effecting the operations of the machine; and various other changes and modifications in the details of the device may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the preferred embodiment of my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. The combination of a mold for laying continuous concrete courses, means mounted thereon for forming a kerf in the course adapted to be filled with a finer grade material and means also mounted on the mold for forming a narrower kerf in such finer grade material.

2. In a machine for dividing concrete courses, the combination with a traveling frame adapted to move over the course, of

means thereon and traveling therewith for forming a kerf in the concrete course adapted to be filled with a finer grade material and means on the frame rearward of the first named means for forming a narrower kerf in such finer grade material.

3. The combination of a mold for laying continuous concrete courses, means thereon for forming a kerf in the course, means for filling such kerf with a finer grade material, and means following the means first named for forming a narrower kerf in such finer grade material.

4. In an apparatus for forming concrete courses, the combination with a traveling frame of means thereon for forming a kerf in a concrete course, means also on the frame to fill the kerf with a finer grade material and means on the frame following the first named means to form a narrower kerf in such finer grade material.

5. The combination of a mold having a top molding surface and downwardly extending side molding surfaces, the mold adapted to form continuous concrete courses and to advance progressively with the formation thereof, means on the mold for forming a kerf in the course adapted to be filled with a finer grade of material and means on the mold behind the first named means to form a narrower kerf in such finer grade material.

6. The combination of a mold having a top molding surface and downwardly extending side molding surfaces, the mold adapted to form continuous concrete courses and to advance progressively with the formation of the same, means on the mold to form a kerf in the course, means on the mold to fill such kerf with a finer grade material and means on the mold behind the two first named means to form a narrower kerf in such finer grade material.

7. In a machine for forming concrete courses, the combination of a traveling mold to lay and shape the course, a tool carried thereon and adapted to act on the concrete and means for moving the tool toward and from the work and reciprocating it in the work across the line of movement first named.

8. In a machine for forming divisions in concrete work, the combination of a blunt tool adapted to act on the concrete and means for moving it toward and from the work and reciprocating it in the work across the line of movement first named, whereby after the division or kerf is formed by the blunt tool, the same may be employed to tamp material into the division or kerf.

9. In a machine for forming divisions or kerfs in concrete work, the combination of a tool adapted to act on the concrete, means for moving it toward and from the work and reciprocating it in the work across the line of movement first named and means for filling such division or kerf with a finer grade of material.

10. In a machine for forming divisions or kerfs in concrete work, the combination of a tool adapted to act on the concrete, means for moving it toward and from the work and reciprocating it in the work across the line of movement first named and a cup mounted adjacent to said tool and adapted to dump its contents into the division or kerf.

11. In a machine for forming divisions or kerfs in concrete work, the combination with a traveling framing of a blunt tool on said frame adapted to be moved toward and from the work and reciprocated in the work across the line of movement first named, means also on the frame for filling the division or kerf with a finer grade of material and a relatively narrow tool on the frame following the first tool and adapted to form a kerf or division in the finer grade material.

12. In a machine for forming divisions or kerfs in concrete work, the combination of a tool adapted to act on the work a vertically movable cross head on which the tool is mounted to slide horizontally, means for reciprocating the cross head and means for independently reciprocating the tool.

13. In a machine for forming kerfs or divisions in the surface of concrete work, the combination of a blade adapted to move toward and reciprocate in the work to form the kerf and a finishing member loosely mounted at the side of the blade to reciprocate therewith and presenting a surface substantially parallel to the edge of the blade for the purpose specified.

14. In a machine for forming kerfs or divisions in concrete work, the combination of a blade adapted to move toward and reciprocate in the work, and a finishing member suspended to move vertically independently of the blade and connected to reciprocate therewith for the purpose specified.

15. A machine for forming concrete courses including oppositely disposed side walls, each provided with an aperture therein, a blade extending transversely of the course and movable through said apertures, said blade being movable vertically toward and from the material between said walls and means for reciprocating said blade horizontally.

16. A machine for laying concrete courses including oppositely disposed side walls, a blade extending transversely from adjacent one wall to adjacent the other and movable toward and from the material between said walls for forming a kerf or groove therein, a second blade in the rear of said first-mentioned blade and movable toward and from the material for forming a kerf

or groove narrower than the first-mentioned groove or kerf and means intermediate said blades for smoothing the upper surface of the material after the formation of the first groove.

17. A machine for laying concrete courses having a blade adapted to move toward and from the surface of the work, a cup extending longitudinally of the blade and adapted to contain finer material for filling said groove and means at the rear of said cup for smoothing the surface of the course after the filling of the groove by said finer material.

18. A machine for laying concrete courses having oppositely disposed side walls movable along the course for defining the sides of the latter, a blade extending transversely of the course and movable toward and from the surface of the material for forming a groove or kerf therein and a smoother in the rear of said blade for engaging with the upper surface of the course to smooth the latter.

19. In a machine for forming kerfs or divisions in concrete work the combination of a blade having a cutting edge extending substantially parallel to the surface of the concrete work and movable toward said work to form the kerf and a finishing member having a surface extending substantially parallel to the surface of said work, said member being movable toward said work into engagement with the same and movable longitudinally along the surface of said work.

20. In a machine for forming kerfs or divisions in concrete work, the combination of a blade having a cutting edge extending substantially parallel to the surface of the work and adapted to move toward and from the same to form the kerf or division and a finishing member movable toward said work with said blade and movable lengthwise of said kerf.

21. In a machine for forming said kerfs or divisions in concrete work, the combination of a blade having a cutting edge extending substantially parallel to the surface of the work and adapted to move toward the same, and a finishing member having parts disposed upon opposite sides of said blade and movable toward said work into engagement with said surface so as to be supported by the latter and means for moving said finishing member lengthwise of the kerf and along said surface.

22. A machine for laying concrete courses having oppositely disposed side walls movable along the courses for defining the sides of the latter, a smoothing member connecting said side walls and adapted to level off the surface of the course as said side walls advance and a blade carried by said side walls in the rear of said smoothing member and movable toward and from the surface of the course for forming transverse kerfs or grooves therein.

23. A machine for laying concrete courses having oppositely disposed side walls movable along the course for defining the sides of the latter, a smoothing member connecting said side walls and adapted to level off the top surface of the course as said side walls advance and a tool carried by said side walls and having a movement transversely of the upper surface of the course and adapted to form a groove or kerf completely across the width of the upper surface of the course to divide the latter into sections in the rear of said smoothing member.

24. A machine for forming concrete courses having two substantially parallel side walls, a member connecting said side walls and adapted to level off the surface of the course as said side walls advance supports in advance of said member for supporting a reinforcing unit said supports being movable from beneath said unit to leave the latter embedded in the concrete as said walls advance, and a vertically movable blade carried by said side walls in advance of said member for forming successive kerfs in the upper surface of the concrete between successive reinforcing units.

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

ERNEST LESLIE RANSOME.

Witnesses:
FLORENCE J. WALSH,
M. L. ORPHAL.