

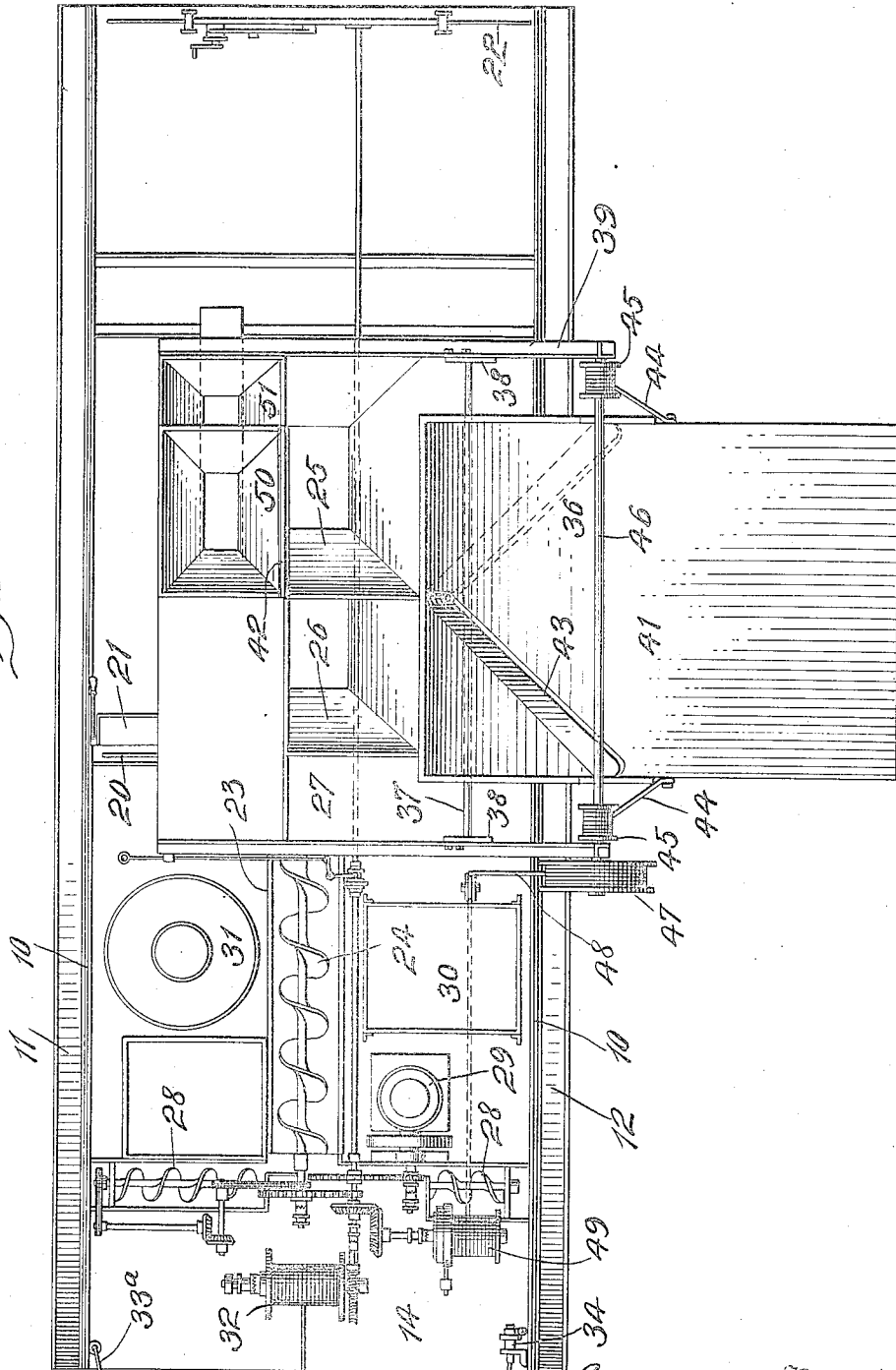
E. L. RANSOME.
LAYING OR CONSTRUCTING CONCRETE COURSES.
APPLICATION FILED AUG. 31, 1912.

1,163,770.

Patented Dec. 14, 1915.

5 SHEETS—SHEET 1.

Fig. 1.



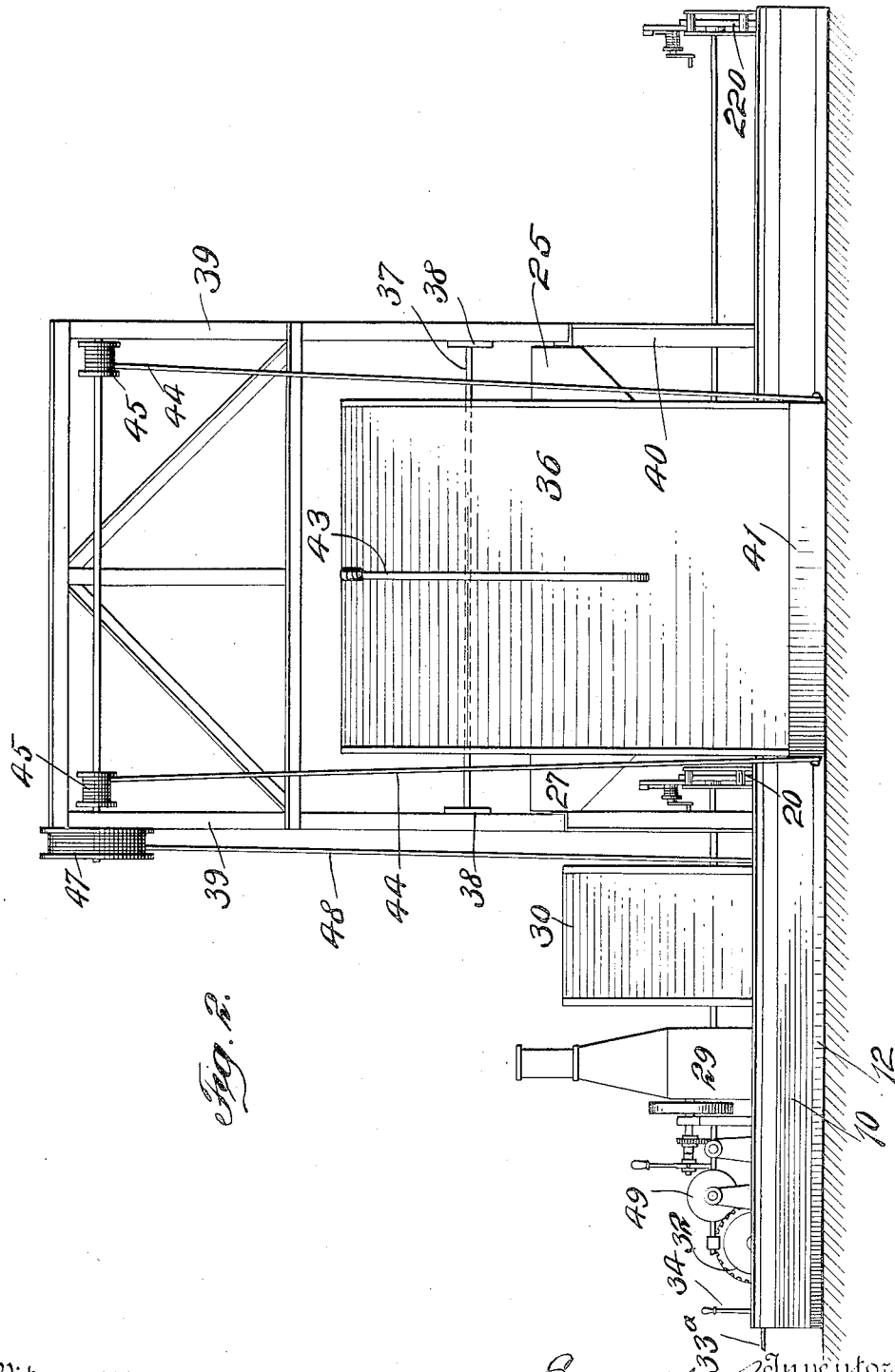
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5 SHEETS—SHEET 3.

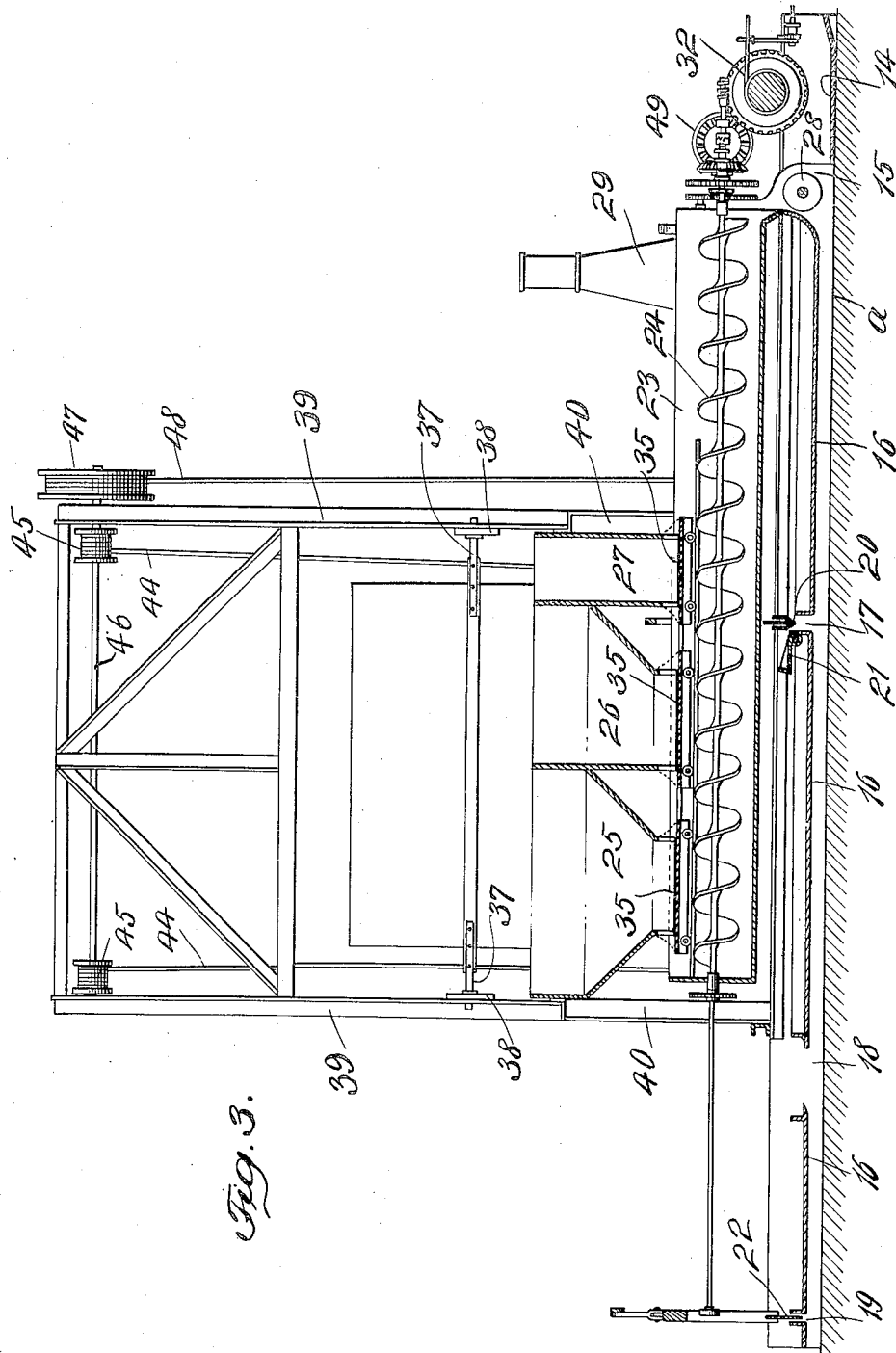


Fig. 3.

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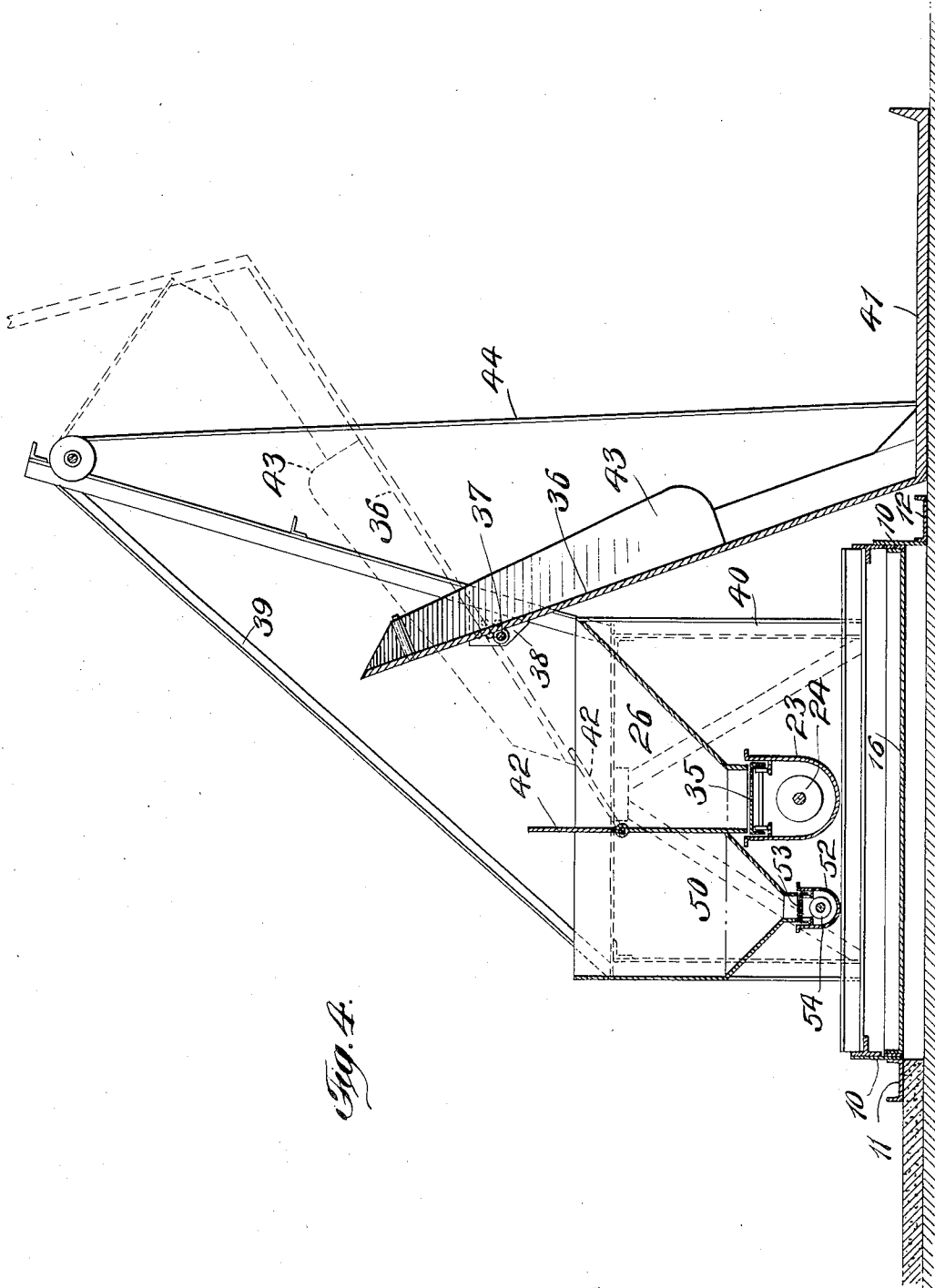


Fig. 4.

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5 SHEETS—SHEET 5.

Fig. 5.

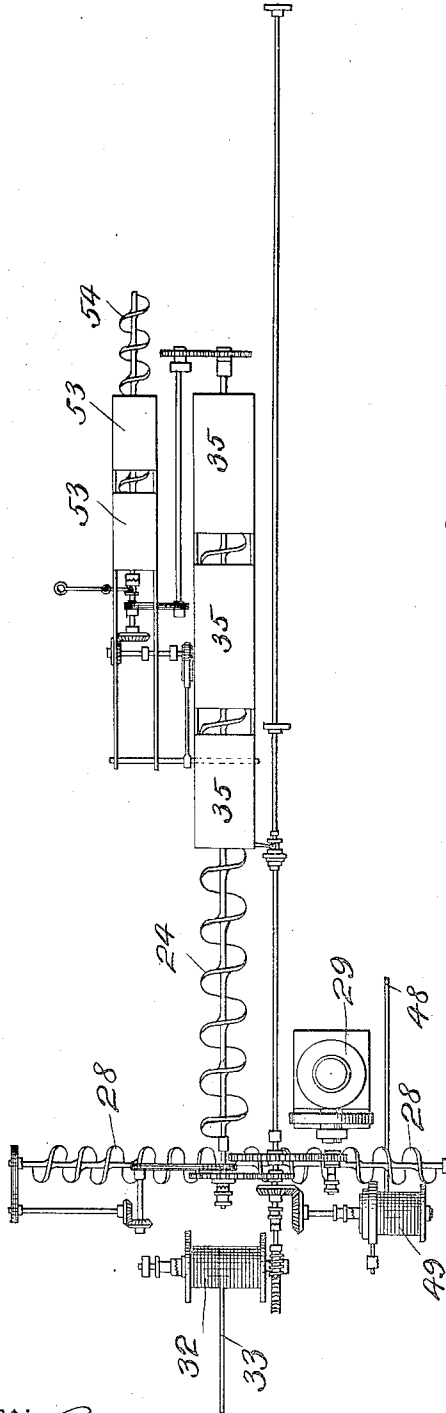


Fig. 6.

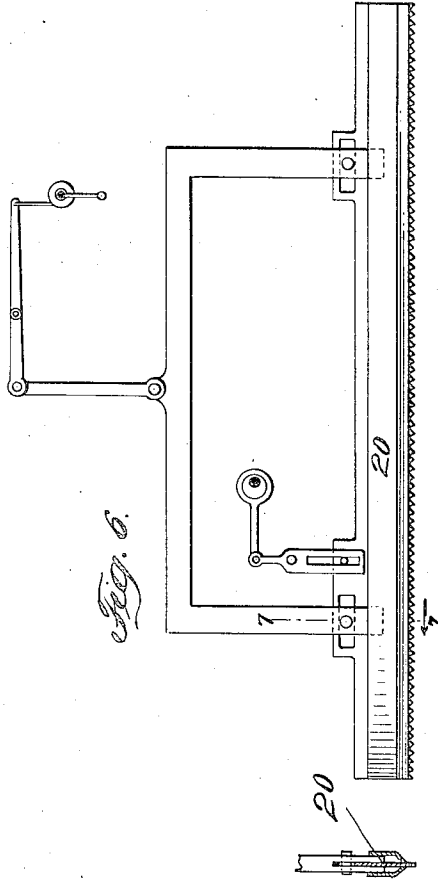
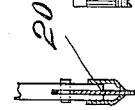


Fig. 7.



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UNITED STATES PATENT OFFICE.

ERNEST LESLIE RANSOME, OF PLAINFIELD, NEW JERSEY.

LAYING OR CONSTRUCTING CONCRETE COURSES.

1,163,770.

Specification of Letters Patent.

Patented Dec. 14, 1915.

Application filed August 31, 1912. Serial No. 718,168.

To all whom it may concern:

Be it known that I, ERNEST L. RANSOME, a citizen of the United States, and a resident of Plainfield, State of New Jersey, (whose post-office address is 90 West street, borough of Manhattan, New York city, county and State of New York,) have invented certain new and useful Improvements in Laying or Constructing Concrete Courses, of which the following is a specification.

My invention relates to laying or constructing concrete courses in horizontal or substantially horizontal directions such, for example, as pavements, sidewalks and tubes or conduits, and particularly to long reaches of such work.

Heretofore molds have been devised which were designed to travel progressively with the formation of the work of this character, and to shape and compress the concrete, forming the finished pavement or sidewalk or other work. No provision, however, was made for supplying a mold with the materials of which the pavement or sidewalk was formed, and usually such materials, commonly called concrete, were shoveled manually into or in advance of the mold.

My invention seeks to provide means by which the concrete or other composition may be made on the mold by mixers and like devices to which the raw materials are supplied, thus attaining the double advantage of a self-contained machine by which all of the work may be performed, and which, advancing as a unit over the work, will permit the application thereto of the necessary amount of pressure or weight to the concrete and at the same time utilizing the load involved for the useful purpose of mixing or compounding the materials of which the pavement is formed.

I will now describe in such detail as may be necessary for a thorough understanding, a specific and preferred embodiment of my invention. To this end reference is had to the accompanying drawings, which illustrate such preferred embodiment or example of the practical form of the apparatus.

In these drawings Figure 1 is a plan view of the machine, Fig. 2 is a left side elevation thereof, Fig. 3 is a central longitudinal section, Fig. 4 is a cross section at the point of the elevator, Fig. 5 is a diagram-like plan of the gear for driving various of the moving parts, Fig. 6 is a cross sectional elevation of one of the dividing blades and the

gear for driving it, and Fig. 7 is a detailed section on the line 7-7 of Fig. 6.

As shown best in Figs. 3 and 4, the machine is supported at its sides by runners or downwardly projecting side walls 10 furnished with shoes 11 and 12, one at each side. These shoes engage the foundation surface or ground and, with the leveler shoe, to be hereinafter mentioned, constitute the main supports of the machine, when not in operation. They run the whole length of the machine except as they may be broken at one point or another for the addition of some other part. At the front end of the machine, as shown in Fig. 3, a horizontally disposed leveler shoe 14 reaches across the width of the machine from one side to the other and is adapted to slide over the foundation ground line indicated at *a* in the drawings, smoothing or finishing the same preparatory to the application of the main body or lower strata of the concrete work constituting the pavement or other structure to be formed. This leveling shoe 14 has just rearward of it a gap 15 for the said main body or lower strata of the concrete work, through which the material constituting the said main body is passed and delivered upon the ground or foundation *a*. Just rearward of this gap is a horizontal molding wall, 16, which extends from side to side the whole length of the machine, and slides over said main body of the concrete work, smoothing, compacting and leveling it off and giving it the form which it takes in the finished structure. This wall 16 extends from the said gap 15 rearward to the rear extremity of the machine, though it is broken at certain points, as will be hereinafter explained. Fig. 4 shows said wall 16 in its relation to the side walls and runners 10. These side walls or runners and the molding wall 16 therefore shape and form the concrete structure and the cross sectioned form of such structure depends upon the cross sectional relation of the parts 15 and 16. As here shown, such cross sectional form is rectangular, as would be the case in forming a pavement or sidewalk.

Obviously the parts 10 and 16 may be varied to suit the nature of the work being formed. For instance if a pavement is being constructed the wall 16 may have an arch or camber to allow for the drainage to the gutters. In the said molding wall 16 there are gates or openings 17, 18 and 19. The first of these is for the operation of a

transversely disposed blade 20 which is driven by suitable mechanism through the main body of the concrete to form a transverse kerf or division gap therein. This is afterward filled in with a body of finer grade concrete or sand and cement by the operation of a hinged cup 21. The gap 18 is adapted to permit charging under the molding wall 16 a comparatively thin layer of the finer grade concrete or cement, which forms the top finish or wearing surface of the structure being laid; and finally the gap 19 accommodates the transverse blade 22, which produces in the fine grade of concrete which fills the first formed kerf, a thin kerf or incision for the purpose of preventing the pavement from cracking as it hardens and dries.

The apparatus so far described is the same as my prior Patents, No. 1,042,822 of Oct. 29, 1912, and No. 940,061, of Nov. 16, 1909.

My present improvements lie in a combination of such traveling mold with a device for mixing and forming the concrete mixtures and the gearing and prime mover or engine for driving the apparatus.

23 indicates a centrally located longitudinally disposed trough in which is arranged a worm or screw 24 adapted to rotate on its central axis. These parts constitute a combined concrete mixing apparatus and conveyer for receiving materials of which the concrete is formed from the hoppers 25, 26 and 27 and simultaneously mixing such materials together to form what is commonly termed concrete and advancing the same forward to the gap 15. Here such concrete is received upon two oppositely pitched screws or worms 28 which take up the concrete and in constantly rotating, spread the same out transversely across the width of the machine and drop it to the full length of the opening 15. In this manner the concrete is spread out uniformly between the said side walls or runners of the machine, filling the space between the runners and the walls 16. The machine is intended to advance continuously except when the kerfs are being formed in the work, and therefore the molding parts, 10 and 16, slide over the concrete and compress and shape the same into the finished structure.

The machine, of course, is suitably framed, but I will not now go into the details of this framing, since it is quite immaterial to the invention. On said frame, however, is erected a power plant which is here shown as a steam plant involving an engine 29, a water tank, 30, and a boiler and accompanying furnace, 31. From the engine 29 the gearing passes in suitable train to the said mixers and conveyers 24 and 28, thus rotating the same in the manner described.

The machine is intended to be drawn

ahead by the operation of a drum 32 which is driven from the engine 29 under proper control and which operates on a cable 32. This cable is anchored ahead of the machine so that by the operation of the drum the machine is drawn toward the anchor. This cable passes a block at the anchor and is returned to the machine as indicated at 33^a in Fig. 1, and one part of the bridle has a device 34 connected therewith for adjusting it on the machine. This serves to lengthen or shorten such part of the bridle, and in this manner the machine may be slewed or "cut" from one side to the other, thereby steering the machine and enabling it to be kept correctly on the course over which the work is to be laid.

The concrete of commerce is usually composed of stone, sand and cement, and for the reception of these ingredients the said hoppers 25, 26 and 27 are provided, the hoppers 25 and 26 being adapted for the stone and sand while the hopper 27 is adapted for the cement. Under said hoppers reciprocating gates 35 are located which are driven by a suitable mechanism from the engine in such a way that they measure and deliver with each reciprocation, quantities of concrete ingredients into the trough 23, where they are mixed with the concrete and advanced as explained.

The details of the mechanism for reciprocating said gates 35 will not be here explained, since they have nothing to do with the essential features of the invention. The hoppers 25 and 26 are designed to be charged from time to time by an elevator 36. This is in the form of a plane chute adapted to swing around a longitudinally disposed shaft, 37, said shaft being arranged with bearings in bracket plates, 38, by which the position of the chute can be adjusted to accommodate the position of the elevator for a purpose which will be hereinafter explained, and which will be also observed on the superstructure 39, may be readily reversed on the form 40 so that the said chute or elevator 36 may be conveniently arranged at either side of the machine. The chute or elevator 36 has at its outer end a platform 41 attached thereto and swinging with it. On this platform the materials of the concrete may be dumped from wagons or carts when the elevator is in the lower position shown by full lines in Fig. 4. Then by raising the elevator to the position shown in the broken lines in Fig. 4 the concrete of the elevator will slide by gravity inward and downward and pass from the inner end of the elevator into the said hoppers 25 and 26 or into certain other hoppers to be hereinafter described, according to the adjustment of the gate 42. 43 indicates a switch pivotally mounted in the elevator which may be thrown to one or the other

side as indicated by the broken lines in Fig. 1, thereby directing the contents of the elevator into either the hopper 25 or 26 as may be desired. The elevator is raised in the manner described by means of cables 44 running over drums 45. These drums are carried on a shaft 46 in the superstructure 39. Said shaft also carries a drum 47 over which a cable 48 runs, past a suitable wedge block to drum 49, geared with and driven from the engine, under the control, of course, of a proper clutch device.

The elevator 36 is mainly intended to fill or supply the hoppers 25 and 26. The hopper 27, containing the cement, it is preferred to fill by dumping the bags of cement into the hopper manually. These bags, however, may be raised on the platform of the machine by means of the elevator 36 already described. The position of the gate 42 as shown by full and broken lines in Fig. 4, determines whether the contents of the elevator fall into the said hoppers 25 and 26 or whether they pass over into two smaller hoppers, 50 and 51. These hoppers are arranged alongside of the hoppers 25 and 26 and discharge into a trough 52 which is similar to the hopper 23 but smaller than the hopper and designed to contain the higher grade of material for forming the top or wearing surface of the pavement. A series of reciprocating gates 53 control the discharge of the hoppers 50 and 51 into the said trough 52 and a mixing screw 54 is located in said trough to mix and advance the said higher grade of concrete and cement to the opening 18 in the molding wall 16. At this point said higher grade of concrete is spread over the top of the main body of the concrete and smoothed over and molded into shape by the rearward extremity of the molding wall 16.

It will therefore be seen that I provide a mold with a power plant which serves the dual purpose of drawing the mold ahead with the formation of the work and driving the various mixing devices and the devices for disposing of or feeding the concrete and the devices for forming the joints. It will also be seen that there are two mixing devices respectively for the main body of the concrete and the higher grade or wearing surface, and that these are intended to be supplied with materials by an elevator which is adjustable to either side of the machine according to the exigencies of the work. The forward motion of the machine is stopped from time to time as the various kerfs or divisions are to be formed in the work, and at these intervals the sand, stone and cement, and other materials may be loaded upon the elevator from wagons or other suitable means of transportation. The machine may be constructed in any width within reasonable limits, and this width may

be equal to the entire width of the work to be formed, or of a part of the work. In the construction of pavements it will be advisable, particularly in wide streets, to make the machine so that but a part of the width of pavement is laid at one movement, and then the machine may be advanced along the street a second or even a third time to complete the other part of the pavement. For this purpose it will be necessary to provide for the adjustment of the pivotal point 37 of the elevator 36. This I have already explained. Through the plurality of bearings of the brackets 38 it will also be convenient to adjust the shoes 15 and 12 vertically on the said walls, 10, and it will be seen by reference to Fig. 4 that this is provided for. There the shoe 11 is shown raised to the elevation of the molding wall 16 while the shoe 12 is placed at the elevation of the loading platform 41. This contemplates the arrangement of the machine where a length of pavement has already been constructed,—that is to say, the length at the left hand side of the pavement on Fig. 4. The shoe 11 then runs on top of the length of pavement thus constructed, while the shoe 12 drops down to the ground line on which the pavement is formed. If the elevator 36 is located on the pavement side (the left hand side on Fig. 4) its pivotal point 37 must be correspondingly raised as explained.

The molding wall 16 compresses the concrete during the operation of the machine while the side walls or runners 10, limit the downward or compressing motion.

The exact form and construction of the molding surface 16 shown in the drawings is not important and may therefore be altered to suit the work which the machine is performing, and other conditions under which it is operated, all of which may be effected without departing from the spirit of my invention, as long as the principles of operation and organization herein described are carried out.

Having thus described my invention, I claim as new—

1. Apparatus for forming reaches of concrete work comprising a mold adapted to move over the work, shoes at the sides of the mold and means for vertically adjusting the shoes on the mold whereby said shoes may ride at different elevations one on the finished and the other on the unfinished portion of the work.

2. An apparatus for forming reaches of concrete work comprising a mold adapted to travel along the work, a shoe on each side of the mold and independently adjustable means for mounting the shoes on the mold whereby each shoe may ride either on the finished or unfinished portions of the work and the apparatus adapted to construct the entire width of the work at a single move-

ment over the same or to construct separate matching sections of the work by successive movements.

3. An apparatus for forming concrete reaches comprising a mold adapted to advance progressively with the formation of the work, to shape and compress the same said mold having two discharging points respectively for concrete of different grades, means for loading the materials of which the concrete is formed on to the mold and two combined mixing and conveying devices extending from the loading means respectively to said points of discharge whereby the concrete of different grades is simultaneously mixed and advanced to the respective discharge points.

4. In an apparatus for forming reaches of concrete work, the combination of plural molding means two conveying mixers working in opposite directions respectively to discharge the concrete to said molding means, a group of bins juxtaposed to said mixers to supply thereto the concrete materials, and a means for delivering and distributing the materials to said bins.

5. In an apparatus for forming reaches of concrete work, the combination of plural molding means two conveying mixers working in opposite directions respectively to discharge the concrete to said molding

means, a group of bins juxtaposed to said mixers to supply thereto the concrete materials, and a means for delivering and distributing the materials to said bins, comprising an elevator and a switch therein to throw said materials to one or the other of the bins.

6. An apparatus for forming continuous reaches of concrete work comprising a mold adapted to advance continuously along the work progressively with the formation thereof and adapted to shape and compress the same, means for loading on to said apparatus the materials of which the concrete is formed without interrupting the continuous movements thereof and a combined mixing and conveying means mounted on the mold and extending from said means for loading the materials to the point of discharge of the concrete whereby simultaneously to mix said materials and deliver the mixed concrete to the point of discharge.

In testimony whereof I have subscribed my name to this specification in the presence of two subscribing witnesses this 5th day of August, 1912.

ERNEST LESLIE RANSOME.

Witnesses:

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