No. 693,844. Patented Feb. 25, 1902.

J. T. DEMPSEY.

MACHINE FOR PREPARING AND LAYING CONCRETE.

(Application filed Mar. 15, 1901.)

(No Model.) 3 Sheets—Sheet 1.

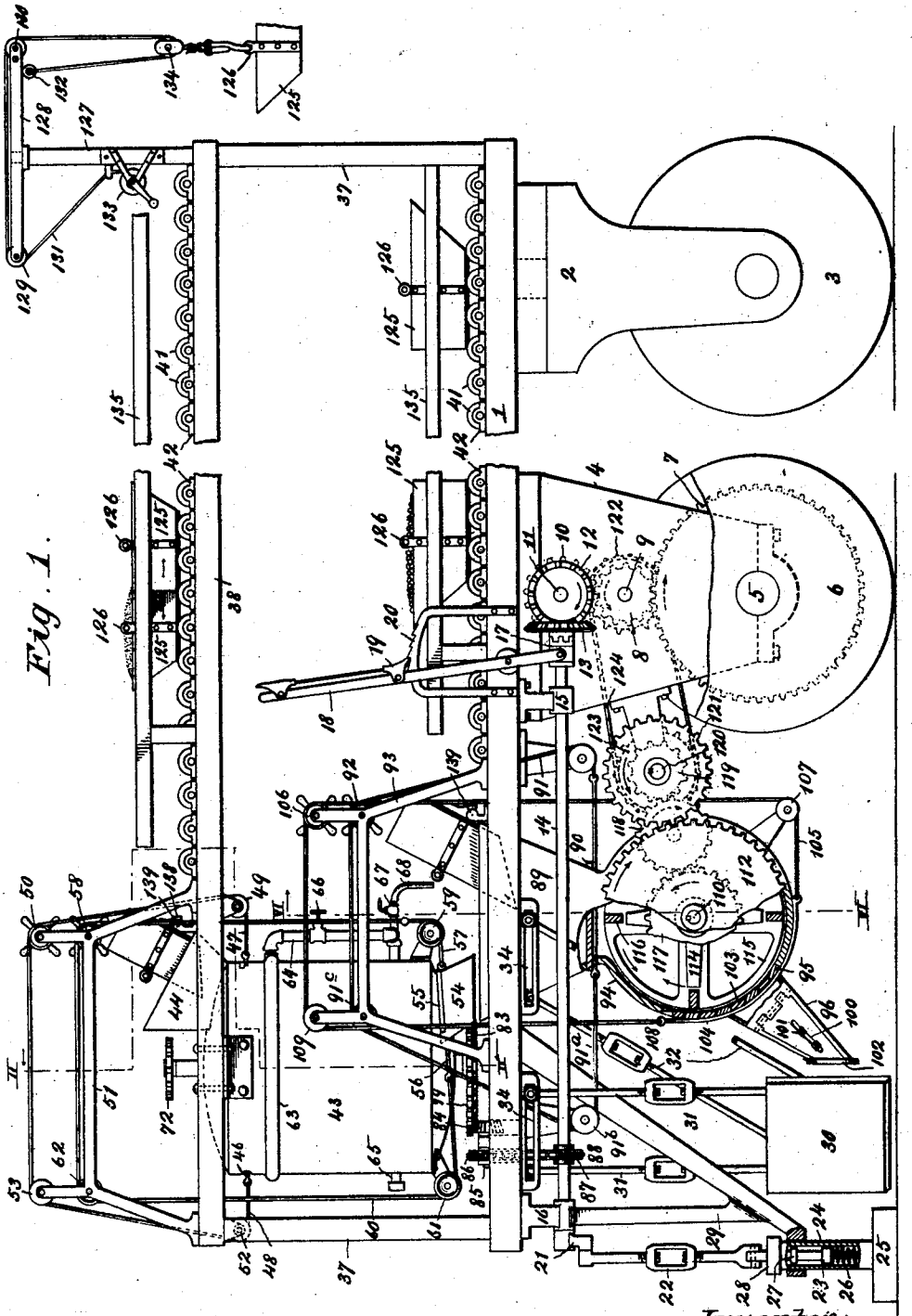

Fig. 1.

Witnesses:
H. C. Rodgers.
Arthur McArthur

Inventor:
J. T. Dempsey
By Fischer & Thorpe
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

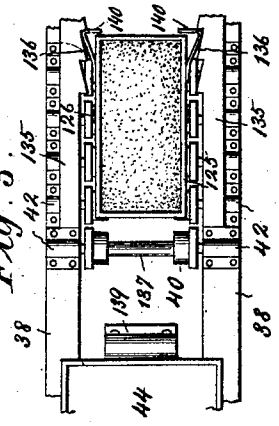

Fig. 4

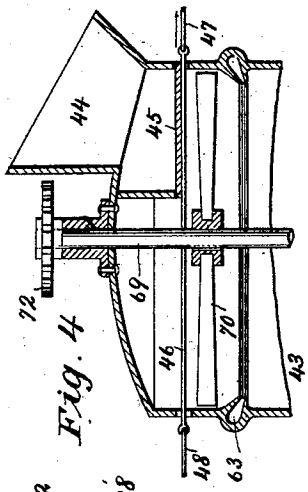

Fig. 5.

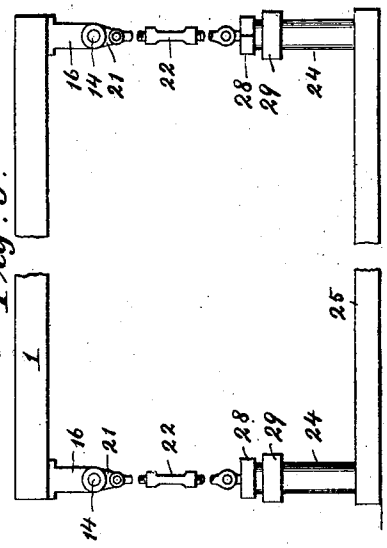

Fig. 2.

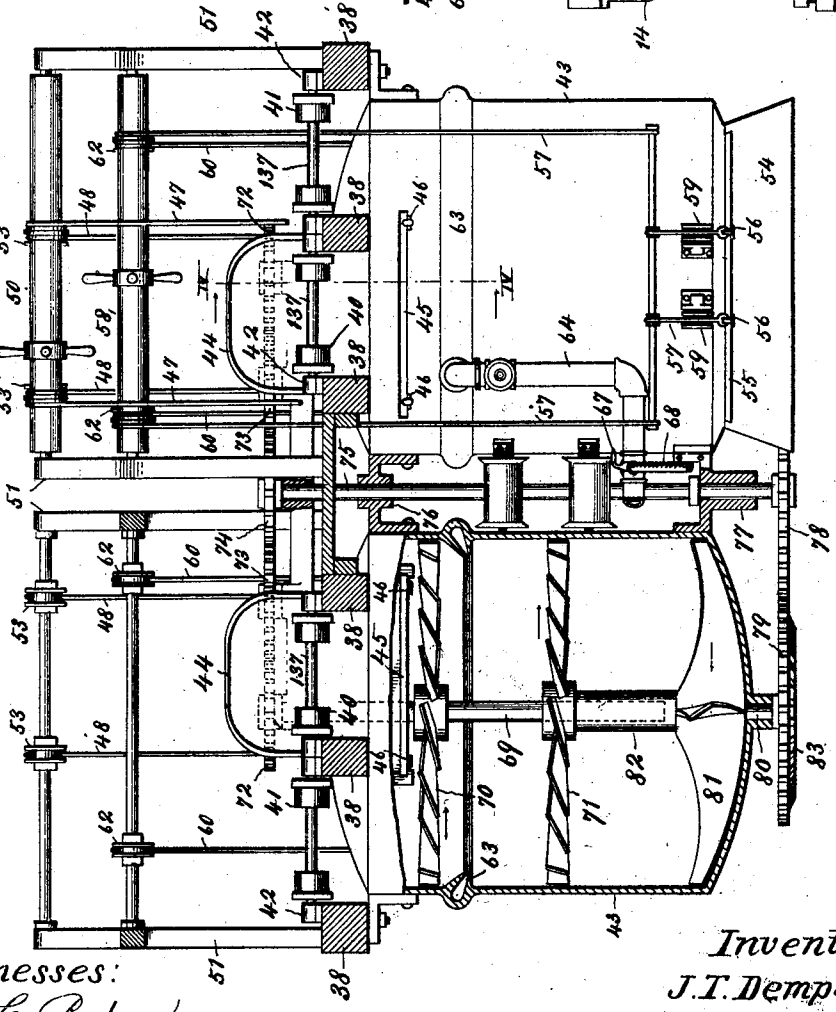

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Fig. 8.

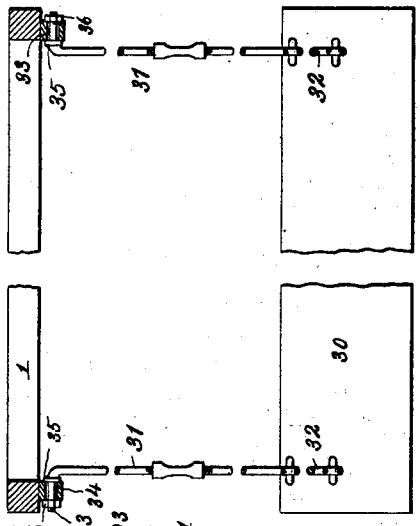


Fig. 7.

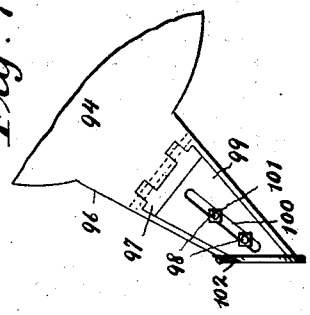
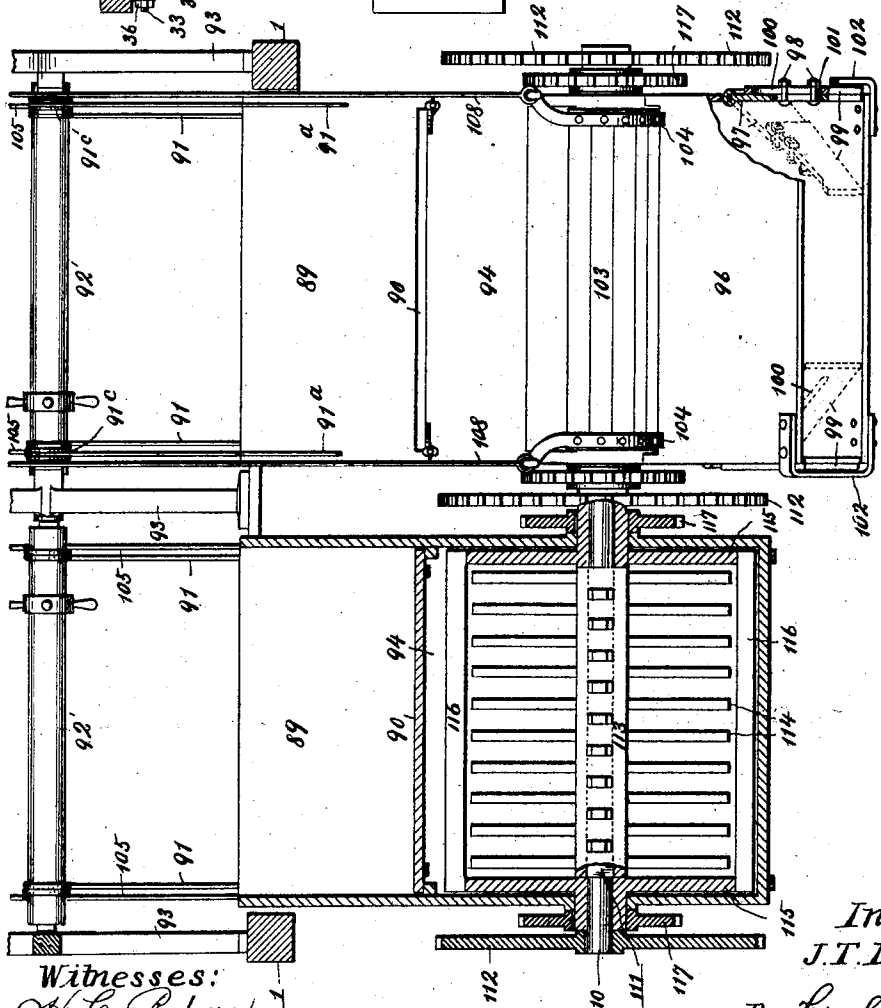


Fig. 6.



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Arthur McArthur

Inventor:
J. T. Dempsey
By Fischer & Thorpe
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES T. DEMPSEY, OF KANSAS CITY, KANSAS, ASSIGNOR OF ONE-HALF TO PATRICK W. CAREY, OF KANSAS CITY, KANSAS.

MACHINE FOR PREPARING AND LAYING CONCRETE.

SPECIFICATION forming part of Letters Patent No. 693,844, dated February 25, 1902.

Application filed March 15, 1901. Serial No. 51,232. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. DEMPSEY, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Machines for Preparing and Laying Concrete, of which the following is a specification.

My invention relates to machines for preparing and laying concrete for street-paving purposes; and it consists, essentially, in the combination of a wheeled frame, instrumentalities for mixing cement thereon and for preparing concrete by mixing said cement with crushed rock, means for discharging the cement in a stream of uniform thickness, an adjustable leveler to level and regulate the depth of the concrete, a tamper to tamp the concrete immediately after it is leveled, and a roller to pack or solidify the ground preliminary to the deposit thereon of the concrete in order that the latter may not be more deeply embedded therein at some points than at others by the tamper.

The object of the invention is to produce a machine embodying the essential elements enumerated which shall perform its function efficiently in less time and more economically than it could be performed by manual labor.

With this general object in view the invention further consists in certain novel and peculiar features of construction and combinations of parts, as hereinafter described and claimed, and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1 represents a view, principally in side elevation, of a machine embodying my invention. Fig. 2 represents a view, partly in front elevation and partly in section, on the line II II of Fig. 1. Fig. 3 is a plan view of a portion of the upper part of the machine. Fig. 4 is a vertical section taken on the line IV IV of Fig. 2. Fig. 5 is a rear view of the tamper. Fig. 6 represents a rear view of one-half of the concrete-preparing apparatus and a vertical section of the other half, said section being taken on the line VI VI of Fig. 1. Fig. 7 is an elevation showing the extensible slide-doors of one of the discharge-spouts of the concrete-preparing apparatus. Fig. 8 is a broken front view of the leveler.

In the said drawings, 1 designates a platform having swiveled to and depending from its front end an arch 2, carrying a guide and pressure roller 3 to pack and solidify the earth before the bed of concrete is laid thereon. At the opposite side of its center (the machine being broken away because of its great length) bearings 4 depend from the platform, and journaled therein is a shaft 5, upon which wide wheels or rollers 6 are mounted, said wheels or rollers being driven through the medium of the intermeshing gear-wheels 7 and 8 on shafts 5 and 9, respectively, the latter being also journaled in bearings 4. This shaft is adapted to be driven by a suitable engine (not shown) suspended from the platform and connected to said shaft in any well-known manner. Meshing also with gear-wheel 8 and driven thereby is a gear-wheel 10 on shaft 11, also journaled in bearings 4, and said shaft carries a bevel-gear 12 to rotate a similar wheel 13 on a longitudinal shaft 14, journaled in bearings 15 and 16, depending from the platform, said shaft being thrown in or out of gear with wheel 12 through the medium of the clutch mechanism 17, of the usual type, and the lever 18, fulcrumed on the platform, said lever carrying a dog 19 to engage the sector 20.

The parts described from 7 to 20, inclusive, except shafts 9 and 11, are in duplicate, by preference, and mounted upon the rear end of said shafts 14 are crank-arms 21, pivotally connected to the upper ends of extensible links 22, carrying plungers 23, fitting in cylinders 24, connected by a cross-bar 25 at their lower ends, said cross-bar constituting a tamper, and in order that no injury shall result to any part of the mechanism through the failure of the tamper to descend its full distance by contact with a rock or other impediment stiff springs 26 are fitted in the cylinders between their lower ends and the lower ends of the plungers, said springs unyielding except under the contingencies mentioned, and in order that the tamper may be moved upward with the movement of the plungers the latter are provided with collars or enlargements 27 to engage the under side of caps 28, closing the upper ends of the cylinders, and in order that the tamper shall rise and fall in vertical lines the cylinders extend through

guide-frames 29, depending from the platform and formed integral, by preference, with bearings 16.

Arranged just in advance of the tamper is a leveler 30, the same extending obliquely and suspended from the platform by extensible links 31 and braced from the platform by extensible braces 32, and in order that the angle at which said leveler extends with reference to the movement of the machine may be varied the upper ends of said rods and braces are bent to form arms 33, slidingly mounted in slotted brackets 34, secured to the platform, said arms having shoulders 35 at one end and clamping-nuts 36 at their opposite ends to clamp them reliably at the desired point. By varying the angle of said leveler the machine may be caused to spread the concrete in varying widths. Furthermore, by varying the angle of movement the draft is increased or diminished.

37 designates standards erected at the corners of platform 1, and 38 a series of longitudinal beams supported in the plane of the upper ends of the standards.

40 designates a horizontal series of rollers, and 41 similar series of rollers, all journaled in bearings 42, secured to beams 38, the series of rollers 40, however, being arranged inward of the rollers 41 for a reason which hereinafter appears.

About vertically above the leveler and upon the platform 1 is supported in any suitable manner a pair of cylinders 43, arranged side by side and provided at their upper front ends with hoppers 44, having slide-doors 45 to control the passage of material from the hoppers to the cylinders, these slide-doors being mounted upon plates 46, extending through the cylinders and connected at their front ends to cables 47 and at their rear ends to cables 48, the front cables being guided upwardly by pulleys 49 to a winding-drum 50, journaled at the front end of the superstructure 51, erected on the upper deck, the rear cables 48 also being suitably guided to said drum by guide-pulleys 52 and 53 in order that the rotation of the drums in one direction or the other shall open or close the sliding doors 45.

Vertically below the sliding doors the cylinders are provided with discharge-spouts 54, controlled by slidable cut-offs 55, mounted upon straps 56, the latter being connected at their front ends by cables 57 to the drums 58 in said superstructure, guide-pulleys 59, suitably supported, serving to properly guide the cables. Said slide-straps are connected at their rear ends by cables 60 to said drum, said cables 60 being guided around pulleys 61, supported from the cylinder, and pulleys 62 of the superstructure. Each cylinder is provided with a mechanism for mixing sand and cement and is provided with an annular internal jet-passage 63 for spraying water upon the sand and cement, said passages being supplied with water by the branch pipes 64 of a supply-pipe 65, the latter being adapted to be connected to any suitable source of supply, each branch pipe being provided with a valve 66, whereby the flow of water is regulated, and projecting from said supply-pipe at the point of junction with the branch pipes is a short valve-controlled pipe 67, having a flexible nozzle 68.

69 designates a shaft depending vertically in each cylinder and carrying a pair of paddle-wheels 70 71, the former preferably above the water-jet passage 63. The upper ends of shafts 69 carry cog-wheels 72, meshing with idle gears 73, driven by gear-wheel 74 on vertical shafts 75, journaled in bearings 76 77, secured to the cylinders, (see Fig. 2,) the lower ends of said shafts carrying larger gear-wheels 78, meshing with gear-wheels 79 on short shafts 80, journaled in the lower ends of the cylinders and depending from mixing-wheels 81 of said cylinders, said mixing-wheels also having upwardly-projecting sleeve portions 82, which are journaled on and form a journal for the lower ends of shafts 69.

By the gearing just described it is obvious that the mixing and paddle wheels will be operated in opposite directions, and the means for operating the same comprise bevel-gears 83, formed with gear-wheels 79 and driven by bevel-pinions 84 on short shafts 85, journaled upon the platform, said shafts also carrying sprocket-wheels 86, connected by chains 87 with sprocket-wheels 88 on shafts 14, (see Fig. 1,) the arrangement being such that the paddle and mixing wheels shall rotate in the directions indicated by the adjacent arrows and thoroughly mix the sand, cement, and water together, said mixing-wheels 81 also serving to force the prepared cement down through discharge-spouts 54 when slide-valves 55 are withdrawn and into a hopper 89 vertically below, there being a hopper 89 below each cylinder, depending through platform 1 and provided with a sliding bottom 90, the front end of the same being connected by cables 91, suitably guided to the winding-drums 92 of the superstructures 93 upon platform 1, the rear ends of said sliding bottoms being also connected by cables 98^a to said drums, said cables being guided around pulleys 91^b and 91^c, suitably supported from the platform and said superstructures, respectively. Said hoppers are adapted to supply transversely-extending cylinders 94, suspended therefrom, said cylinders being provided with openings 95 in their rear side, communicating with discharge-spouts 96, said spouts depending downwardly and rearwardly to deposit the concrete upon the ground just in advance of the leveler, and in order that the concrete may be discharged from said spouts in streams of varying width the ends of the spouts are partially in the form of hinged plates 97, provided with outwardly-projecting bolts 98, and sliding plates 99, provided with longitudinal slots 100, engaging said bolts, clamping-nuts 101 engaging the latter

and clamping said plates together. Said hinged portions are prevented from swinging outwardly by guard-brackets 102, secured to the end spouts, and from moving inwardly when in operation by the concrete.

When it is desired to contract the width of the stream of concrete before it begins to flow, the doors are swung inwardly and are then extended by sliding plates 99 downward until the walls of the spout prevent further movement in that direction and incidentally prevent the doors from swinging outward again. The width of the stream of concrete therefore cannot greatly exceed the distance between the lower ends of said doors.

103 designates a flexible cut-off controlling the passage between each cylinder 94 and its spout, said cut-off being carried by the curved straps 104, connected at their front ends by cables 105 to drum 106 of the superstructure, said cables being guided around pulleys 107, supported from the cylinder. The opposite ends of the straps are connected by cables 108 to said drum, said cables being guided around pulleys 109 of the superstructure. Extending through said cylinders 94 is a shaft 110, squared, as at 111, within the cylinders and carrying similar gear-wheels 112 at its ends and between the cylinders, by preference, and mounted upon the square portions of shaft 110 are agitators, (one in each cylinder,) each comprising a rectangular sleeve portion 113 and outwardly-projecting arms 114. Companion agitators within said cylinders comprise the end portions or wheels 115, journaled in the cylinders and forming journals for shaft 110 and connected by a series of cross-bars 116 to operate in a circle beyond that of the agitators above described. Mounted on the hubs of said end portions 115 are gear-wheels 117, geared through the medium of wheels 118 and 119 to a shaft 120, said shaft also having gear-wheels 121, meshing with the large wheels 112 on shafts 110, shaft 120 being driven by shaft 9 through the medium of the sprocket-wheels 122 123 and chains 124, connecting said wheels. By this arrangement it will be seen that the agitators are oppositely rotated in the directions indicated by the contiguous arrows, Fig. 1.

For the purpose of supplying the cylinders 43 with sand and cement I employ a series of buckets 125, tapered at their front ends, preferably, and provided with suitable bails or handles 126, these buckets being charged with sand and cement or a mixture thereof and loaded on wagons, which may follow the machine for the purpose of supplying the latter when necessary.

Mounted upon the front end of the machine is a standard 127, and swiveled thereon is a beam 128, carrying pulleys 129 130 at its opposite ends, a cable 131 extending over said pulleys and having one end attached, as at 132, to the swiveled beam and its opposite end, as at 133, to the hoisting mechanism, which may be in the form of a hand-windlass, as shown, but preferably will be in the form of a power-hoist, (not shown,) located at a point adjacent to lever 18, by preference.

The buckets are attached to a pulley-block 134, as shown, or in any other suitable or preferred manner and are elevated to the upper or lower platform, as desired, it being understood that the lower platform is also provided with a series of rollers corresponding in all respects to and numbered the same as those already described, and in order to guard against any of the buckets slipping laterally off the machine guard-rails 135 are provided a slight distance above the roller-platforms, said rails having ratchet-tooth faces 136 at their inner sides for a purpose which is hereinafter explained, and in order that the buckets shall travel freely upon the rollers the latter are provided with central longitudinal grooves 137, produced by reducing the diameter of the rollers, these grooves being necessary because of the brackets 138 depending from the bottoms of the buckets, said brackets being adapted as the front ends of the buckets overhang the hoppers 44 or 89, as the case may be, to arrest further longitudinal movement by striking against the cylindrical stops 139, these stops being provided only in alinement with the inner series of rollers—viz., those in line with said hoppers—these rollers being selected as the tracks for the loaded buckets, because the operator walking on the middle of platform 1 can move the buckets thereon with less exertion than if he had to reach a greater distance. Each bucket, as hereinbefore explained, is raised by the hoisting mechanism and then deposited upon the desired platform by swinging beam 128 around. The pulley-block is then detached from the pulley and the bucket given a forcible push by the operator, or he may walk upon the platform and push the bucket before him, the bucket being provided at its opposite sides with spring-catches 140, which successively engage the ratchet-teeth 136, and thus serve to prevent the buckets sliding off the platform while the machine is moving from one point to another, it being impossible for them to slide off the rear end of the platform, because the rearmost bucket would came in contact with the cross-bar 139 in its path.

In dumping as the stop-bracket 138 of the bucket arrests further movement by bracket 139 the bucket by a slight pressure is caused to swing pivotally downward and forward, with the stop-bar as a fulcrum, and discharge its contents into hopper 44 or 89, as the case may be, and as soon as the bucket is emptied the attendant lifts it off the hook and deposits it upon one of the contiguous outer series of rollers and shoves it back to the front end of the machine, where it can be lowered by the windlass or in any other suitable manner, it being understood that the machine is of such proportion that the attendant walking on platform 1 towers above the upper deck in or-

der that he may conveniently reach the buckets of the latter and the winding-drums 50.

Assuming that the requisite quantity of cement and sand has been deposited in hopper 44, the attendant manipulates drum 50 to open door 45 and permit the charge to enter the cylinder, where it is thoroughly mixed together by the rotating paddles 70 71 and is charged with water from jet-passage 63, the mixing operation being completed and the cement discharged by mixing-wheels 81 through spout 54, (the latter being opened by proper manipulation of drum 58,) it being understood that the mixing of cement takes place, preferably, in only one cylinder at a time. Before the cement is discharged through spout 54, however, the crushed rock dumped into cylinder 89 by the buckets in the manner above described is saturated with water from flexible nozzle 68 in order that the cement will adhere to said rock. This being accomplished, the operator, by the manipulation of drum 106, slides the sliding bottom rearwardly, so as to permit the rock and cement to pass gradually into the communicating cylinder 94 below, wherein a couple of complete revolutions of the agitators will serve to efficiently coat each piece of rock with cement. The winding-drum 92 is then manipulated to open cut-off 103 and permit the agitators to force the concrete through spout 96, the latter serving to distribute it in a layer of uniform thickness in advance of the leveler, which spreads it at the required depth, the rapidly-operating tamper packing it solidly and leaving it in condition to receive its coating of asphalt or other material, roller 3 at the front end of the machine, as hereinbefore stated, serving to pack or solidify the earth and leave it in proper condition to receive the concrete.

From the above description it will be apparent that while I have illustrated and described the preferred embodiment of the invention which now appears to me most practical I wish it to be understood that I reserve the right to make such changes in its form, proportion, detail construction, and arrangement of the parts as shall not involve a departure from the spirit and scope or sacrifice any of its advantages.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a cylinder provided with a hopper, a slide door or valve controlling communication between the hopper and cylinder, a slide door or valve controlling the discharge from said cylinder, a pair of wheels or mixers within the cylinder, the shaft of one forming a journal for the other, a gear-wheel mounted rigidly on the shaft of each wheel or mixer, gearing connected to said gear-wheels so as to synchronously turn said shafts in opposite directions, a superstructure, winding-drums and guide-pulleys mounted therein, guide-pulleys supported contiguous to the slide doors or valves, and flexible connections between the opposite ends of said slide doors or valves and said drums, and guided around said pulleys, said connections operating only in conjunction with their respective doors or valves, drums, and pulleys, substantially as described.

2. In a machine of the character described, a horizontal cylinder having a discharge-spout, a valve controlling the passage of material from the cylinder to the spout, agitators within the cylinder, one comprising end portions or wheels having tubular journals mounted in the cylinder and connected together peripherally, and the other consisting of a shaft journaled in said tubular journals, and of square cross-section intermediate thereof, a sleeve fitting snugly on the square portion of said shaft, and provided with outwardly-projecting arms, and means for rotating said agitators in opposite directions simultaneously, substantially as described.

3. In a machine of the character described, a cylinder provided with a discharge-spout, said discharge-spout having its end portions embracing hinged plates, and sliding plates mounted on the hinged plates, substantially as described.

4. In a machine of the character described, a cylinder provided with a discharge-spout, said discharge-spout having its end portions embracing hinged plates, bolts carried thereby, slotted plates mounted slidingly on the bolts, and clamping-nuts engaging said bolts to secure the plates in the desired relation, substantially as described.

5. In a machine of the character described, a cylinder provided with a discharge-spout, the latter having its end portions embracing hinged plates and slide-plates mounted on the hinged plates, and guard-brackets secured to the spout to limit the outward movement of said hinged portions and the sliding plates carried thereby, substantially as described.

6. In a machine of the character described, a horizontal cylinder provided with a superposed hopper, and agitators for thoroughly mixing the contents of the cylinder, and a spout for discharging the mixed contents, a flexible cut-off controlling the point of communication between the cylinder and its spout, curved straps carrying said flexible cut-off, and cables connected to opposite ends of said straps for moving them in opposite directions and thereby opening or closing the cut-off, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

JAMES T. DEMPSEY.

Witnesses:
H. C. RODGERS,
G. Y. THORPE.