April 22, 1958 R. J. KONWAY 2,831,408

MACHINE FOR SHAPING GUTTERS

Filed March 3, 1954 3 Sheets-Sheet 1

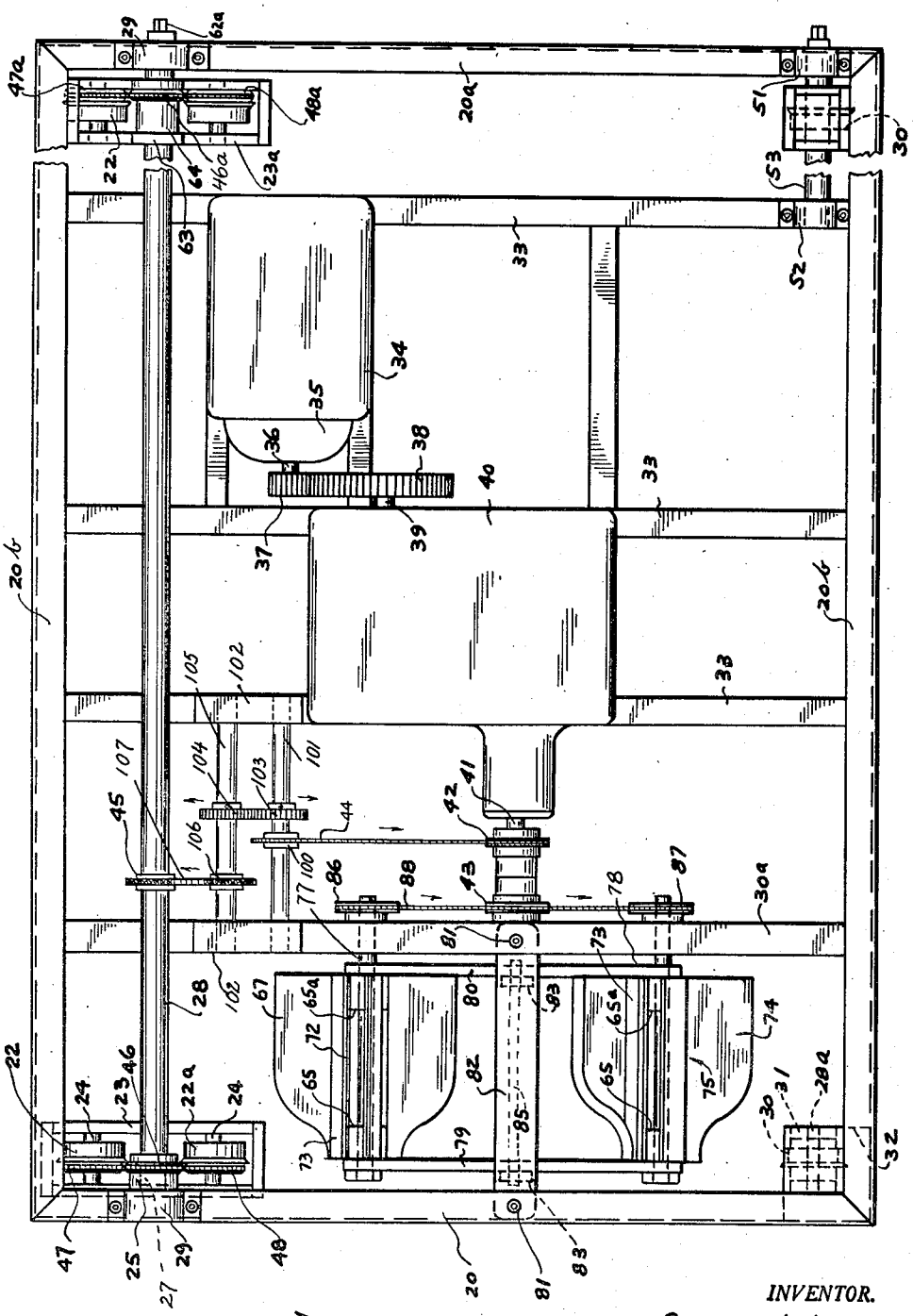


FIG. 1

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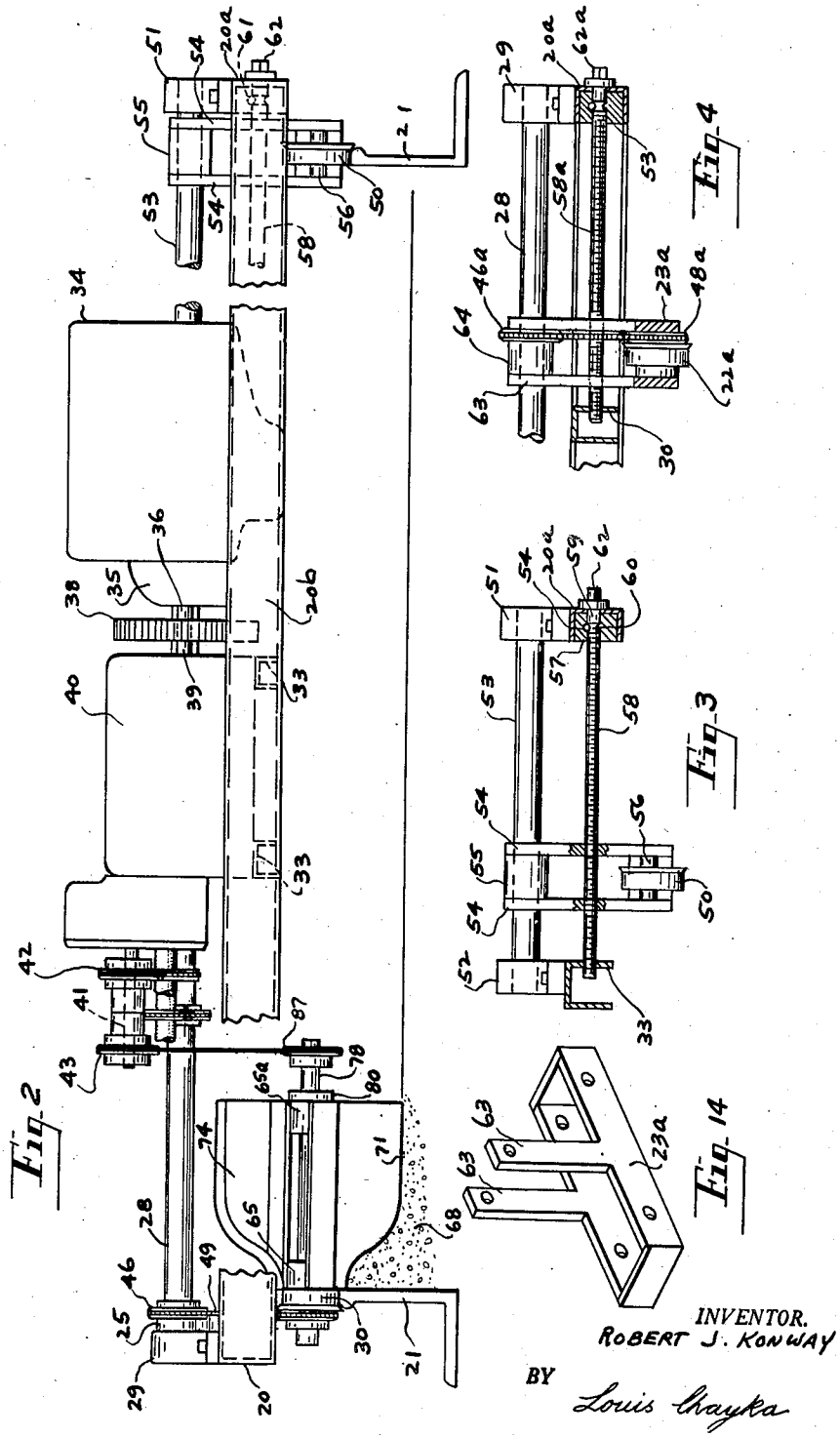


Fig. 2

Fig. 4

Fig. 3

Fig. 14

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3 Sheets-Sheet 3

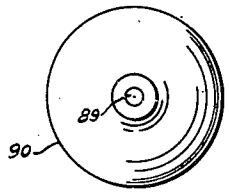


Fig. 11

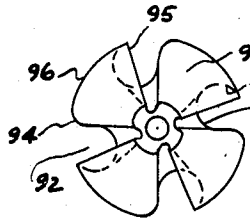


Fig. 13

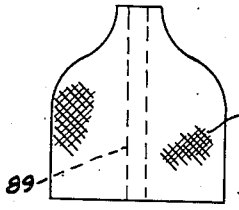


Fig. 10

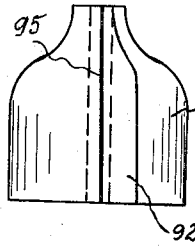


Fig. 12

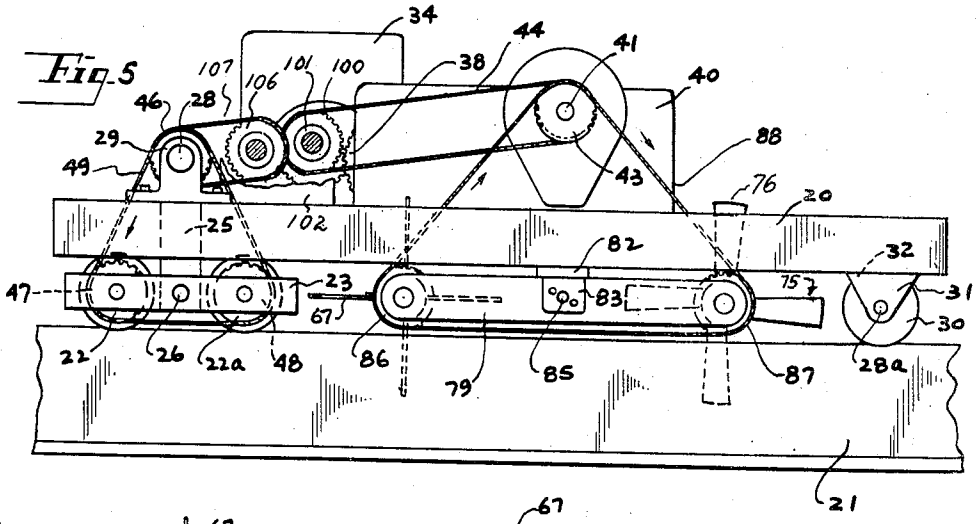


Fig. 5

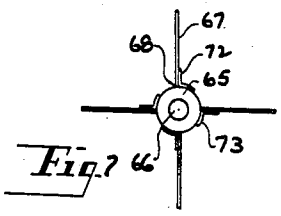


Fig. 7

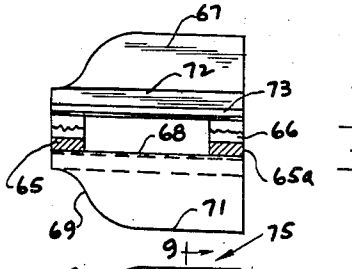


Fig. 6

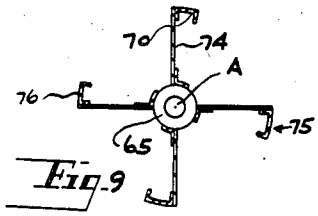


Fig. 9

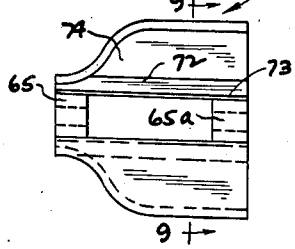


Fig. 8

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2,831,408

MACHINE FOR SHAPING GUTTERS

Robert J. Konway, Detroit, Mich.

Application March 3, 1954, Serial No. 413,801

2 Claims. (Cl. 94—45)

The machine is of a type which for its operative purposes moves on parallel lengths of rails placed along the pavement to be provided with gutters, and includes rotary means for imparting the required form to the mass of concrete out of which the curb is to be made while the concrete is in its plastic condition.

Generally, the object of the invention is to provide a machine of high operative efficiency. More specifically, the object of the invention is to provide a machine which will shape the gutter rapidly at uniform dimensions all along the length thereof, and which, following said shaping, will impart to it a smooth finish.

Other advantages of the employment of the machine for the purposes indicated herein will appear from the following description. In the course of said description, I will refer to the accompanying drawings in which:

Fig. 1 is a top elevational view of the machine;

Fig. 2 is a rear end view thereof as it is supported by parallel lengths of rails upon which the machine is adapted to move during its operative action;

Fig. 3 is an enlarged elevational view of a mechanism for adjustment of the lateral spacing of the wheels supporting the machine at the rear end thereof;

Fig. 4 is a side elevational view of a similar mechanism as applied to a pair of wheels at the front end of the machine;

Fig. 5 is a reduced side elevational view of the machine;

Fig. 6 is a side elevational view of a rotary concrete-shaping device, the device including a plurality of blades extending radially from the hub portion thereof;

Fig. 7 is an end view of the device shown in Fig. 6;

Fig. 8 is a side elevational view of a rotary finishing device, including a plurality of radial blades each of which is provided with a smoothing member along the outer edge thereof;

Fig. 9 is a sectional view of the device on line 9—9 of Fig. 8;

Figs. 10 and 11 show a finishing drum both in side elevation and in an end view, respectively, in the numeral order named herein;

Figs. 12 and 13 show another species of a finishing device both in side elevation and in an end view, respectively, in the order named herein;

Fig. 14 is a perspective view of a wheel-supporting assembly being a part of my machine.

Similar numerals refer to similar parts throughout the several views.

The machine includes a rectangular, horizontal framework composed of two side members, **20** and **20***a*, and two transversely-set members, **20***b*, all said members being preferably made of U-shaped stock. On each side, the framework is mounted upon flange wheels for movement on rails **21**, as shown in Fig. 2. A pair of such wheels, **22** and **22***a*, respectively, is mounted within a box frame **23** under the framework of the machine on each side thereof, said wheels being located on what will be designated the front portion of said framework. The

axles **24** of the wheels are journalled in the side members of the box frame **23**.

A vertical standard **25** is on one side welded to side **20** of the framework from within, and supports at its lower end a cross-pin **26**. The ends of the pin project into the opposite sides of the box frame **23** midway their ends so that the box frame, with the flange wheels therein, is pivotally mounted on said pin in the manner of a lever fulcrumed midway the length.

Rising above the top surface of the framework, the standard contains an aperture **27** for reception of a shaft **28**. The latter extends across the framework of the machine and is supported for rotation at each side of the machine by a pillow block **29**. The blocks are mounted upon the top surface of the sides **20** and **20***a*, as best shown in Fig. 2. At the opposite, or rear, end, the framework is supported on side **20** by a single flange wheel **30**, the axle of the wheel being journalled at each end in a pair of ears **31** depending from the opposite sides of a rectangular plate **32** welded to the underside of the framework at the junction of sides **20** and **20***b* thereof.

Mounted upon a pair of cross-beams **33** made of inverted U-stock, and joining the sides **20***b* of the framework, is a motor **34** including a semi-spherical end wall **35** containing a bearing for an axial shaft **36**. A pinion **37** keyed to the outer end of said shaft **36** is in mesh with a gear wheel **38**, which, being mounted on a shaft **39**, is one in the chain of reduction gears contained in a housing **40**. The latter is mounted on another pair of beams **33**, as shown in Fig. 1.

The power output at a reduced speed is delivered by a shaft **41** extending from the housing **40**. Axially keyed to the shaft **41** are two sprocket wheels, **42** and **43**, respectively. One of the wheels, **42**, is connected, by means of an endless chain **44**, to a sprocket wheel **100** axially keyed to a shaft **101** journalled for rotation about its axis in a pair of standards **102** mounted on the cross-beams **33** and **33***a*, respectively. Keyed to the same shaft **101** in a position adjoining the sprocket **100**, is a pinion **103**, this being in mesh with a similar pinion **104** axially mounted for rotation about its axis with a shaft **105**. The shaft is disposed parallel to shaft **101** and is supported by the above-named standards **102**.

A sprocket **106**, driven by said shaft **105**, is connected by an endless chain **107** to a sprocket **45** which is axially secured to the above-named shaft **28** for rotation therewith. Keyed to the same shaft **41**, in a position adjoining the pillow block **29**, is sprocket wheel **46**. Sprocket wheels **47** and **48** are axially mounted on wheels **22** and **22***a*, each axle having its sprocket adjoining the wheel mounted thereon. A chain **49** imparts a rotary movement to wheels **22** and **22***a* by means of said sprockets **47** and **48** under the drive of the sprocket **46**.

As already stated, the machine moves on two parallel lengths of rails. The rails, it will be understood, may be adjusted laterally with respect to each other, according to the nature of the road on which the machine is to be used. For this purpose, I have provided means in combination with the framework of the machine whereby the wheels on one side **20***a* of the framework may be shifted transversely with respect to the rails to a spacing corresponding to the spacing of said rails. This mechanism shown by me is best shown in Figs. 2, 3, and 4.

Referring to the rear wheel **50** under the side **20***a* of the framework, the mechanism includes two pillow blocks **51** and **52**, the first being mounted upon the top side of member **20***a* and the other upon a cross-beam **35** extending parallel thereto. The pillow blocks serve to hold up a horizontal guiding rod **53**.

Depending from said rod **53** are two planks **54** spaced from each other by a short interposed collar **55**, the latter

being slidingly disposed upon said rod 53. At their lower ends, the planks straddle the wheel 50, providing aligned bearings for the reception of axle 56 of the wheel.

Passing through an aperture in the side member 20*a* of the framework, and located within a block member 57 directly below the pillow block 51, is a threaded rod 58. One end of it is devoid of threads, as shown at 59, and is provided within that portion with an annular groove 60 for engagement with a ball 61 seated therein, this being a well-known means of preventing longitudinal means of the rod. At the last-named end, the rod terminates with an angular stud 62 extending laterally from said member 20*a* for application of a crank. At the opposite end the rod 58 is located for rotation about its axis in a bearing within a cross-beam 33, as shown in Fig. 3.

A similar mechanism for the lateral adjustment of the position of the two-wheel unit supporting the front portion of the machine is shown in Fig. 4. Reference is here made to the two-wheel unit, laterally alined with the similar two-wheel unit on side 20 of the framework. A pair of flange wheels at the front of the machine on side 10 has already been described. At the opposite side of the framework two wheels, 22 and 22*a*, are located within a box frame 63. The latter is suspended from shaft 28 by means of two planks 63 straddling a block 64 which is disposed slidingly upon said shaft 28. At their lower ends the planks are welded to the side members of the box frame 63, as shown in Fig. 14. A threaded shaft 58*a*, analogous to that shown in Fig. 3, serves to shift the whole assembly, the planks, the frame 63, and the wheels mounted therein cross-wise to the rails on which the framework is supported. This is done by means of a crank applied to the angular stud 62*a* at the outer end of the shaft 58*a*. Numerals 46*a*, 47*a*, and 48*a* indicate sprockets analogous to sprockets 46, 47, and 48, respectively, at the other side of the framework.

It will be noted that certain elements pertaining to the above-described mechanism for the adjustment of the spacing between the wheels on opposite sides of the framework have been omitted from side 20*a* in the drawings in Fig. 1, this having been done for a better disclosure of elements disposed under the top level of the framework.

Located on one side of the framework, specifically, on the side which is marked 20, is one curb-shaping device and one curb-surface-finishing device, these constituting the principal feature of my invention. A curb-shaping device, or, briefly, a shaper, is shown in Figs. 6 and 7. It includes two axially-alined hub members 65 and 65*a*, these being spaced from each other and each being provided with an axial bore 66. One of the members, 65, will be referred to as the outer hub. Mounted on both, radially thereto, are a plurality of blades 67. Each of them is defined on one side thereof by a straight line 68, this being the side which is in abutment with the hub members 65 and 65*a*. The opposite or operative edge of the blade, as viewed with said operative edge down, is partly defined by a sinuous curve 69, which curve outlines the outer surface of the curb 70 from the side of the roadbed and by a straight line 71 parallel to the straight edge 68. The straight line 71 above mentioned would correspond substantially to the level of the pavement adjoining the curb.

At the base along the straight edge 68 of the blade, the latter is reinforced by an oblong plate 72 welded thereto and by an integrally-formed arcuate base 73 of the same length as said plate, the base being welded to the periphery of each of the hub members 65 and 65*a* so as to join them together into one unit.

Serving as a complementary member to said shaper is a surface-finishing device, the structure of which is in all respects analogous to that of the shaper, with the exception of the outer or operative edge of each of its blades. The blades 74 are also mounted on a pair of hub members 65 and 65*a*, respectively; they are kept in place by braces composed of said plates 72 and bases 73, and have the same outline along their respective operative edges, but each blade 74 includes along its said operative edge a smoothing member which is generally indicated by numeral 75.

The member is of a U-shaped channel stock in which the bottom portion 76 is slightly arcuate, being drawn to a radius equal to the distance from the axis of the hub portion of the device A in Fig. 9 to the outer end of a blade 74. This is best seen in Fig. 9. The channel member follows the outline of the operative edge of the blade, one side of the channel member being welded to the marginal portion of said blade 74 along its said operative edge.

For the operative use of the shaper and the finishing device, each is mounted axially upon a separate shaft, the shaper on shaft 77 and the finishing device on shaft 78. The shafts are disposed parallel to each other, as shown in Fig. 1, their ends being journalled in two parallel bars 79 and 80, respectively.

Secured by bolts 81 to the underside of the framework, specifically, to side 20 thereof, and the beam 30*a* is a horizontal bar 82. Welded to the underside of the bar, adjoining each end thereof, is a vertical ear 83, each of said ears being provided with a bearing for reception of a rocking pin 85. One end of said pin fits into an aperture in bar 79 midway its length; the other end of the pin fits into an alined aperture in bar 80, so that the whole assembly, that is, the two bars 79 and 80, the shaper, and the finishing device are capable of being rocked upon said pin 85.

Both shaft 77 of the shaper and shaft 78 of the finishing device project inwardly through the bearings in bar 80 and are keyed axially to sprockets 86 and 87, respectively. The sprockets are connected by a drive chain 88 to the sprocket 43, the latter being mounted axially on the shaft 41. As already stated in the course of this specification, said last-named shaft delivers the power needed for the operation of the machine as a whole.

The curb-finishing device shown in Figs. 10 and 11 is made in the shape of a drum having an axial bore 89 for reception of an axle on which the drum has to be mounted for rotation therewith. The drum, as seen in side elevation, corresponds in outline to the outline of radial blades in the device shown in Fig. 8. The important feature of this species of the finishing device is the knurled operative surface 90 thereof, said knurled surface serving, during the rotation of the device, to dislodge and to remove small pebbles and similar objects from the surface of the curb after it has been formed by the shaper of my machine, as shown by numerals 92*a* and 92*b*.

Another species of my finishing device, shown in Figs. 12 and 13, has the same outline in side elevation as the species shown in Fig. 10. However, the drum-shaped body 91 of the device is cut longitudinally by slots 92, each of which, in cross-section, has the outline of a part of a circle. As a result, the body includes a plurality of what might be called thick blades 93, each of the blades including a leading edge 94 and the following edge 95, the first of them having a curved contour to avoid any cutting or shaving action. The peripheral surface 96 of each blade is smooth.

The blades in the shaping device described above are radially disposed with respect to the supporting shaft, each blade being in a plane passing through the axis of the shaft. It is this type of blades that has been shown in the drawings. It will be understood, however, that the blades may have a pitch, that is, they may be curved to a screw pitch analogous to the helical curvature of a propeller.

This applies also to that type of the finishing device which employs sheet metal blades, as shown in Fig. 9. In both cases, the advantage of using this type of blade

lies in the fact that this helical curvature of the blades would serve to sweep excess concrete shaved off by the operative action of the edges away from the curb.

For operation, the machine is placed on two parallel lengths of rails **21**, the flange wheels **22** and **22***a* on each side of the frame of the machine serving as traction wheels. If necessary, the spacing between the flange wheels on one side of the frame of the machine and the wheels on the opposite side thereof may be adjusted to correspond to the spacing between the parallel lengths of said rails.

This is effected by the mechanisms shown in Figs. 3 and 4, the first-named mechanism being applicable to the single flange wheel at the rear of the frame on the side **20** thereof. As already indicated herein, said wheel may be shifted laterally with respect to the respective rail by means of the threaded shaft **58**. As the shaft is rotated about its axis by means of a crank applied to the stud **62**, the wheel, with two planks **54** which support it, may be moved as desired towards or away from the opposite side **20** of the framework.

The mechanism shown in Fig. 4 is applicable to the pair of traction wheels **22** and **22***a* at the front portion of the framework under side **20***a* thereof. It is operated by means of the threaded shaft **58***a* for the purpose of shifting the wheels laterally with respect to the rails in order that the wheels may be properly seated upon the respective length of said rails.

When the machine has been properly set on the rails, the shaper and the finishing device will be disposed transversely to the road bed on which the rails rest, the constricted ends of the shaper and of the finishing device, respectively, adjoining the respective rail **21**. This is shown in Fig. 2 in the end view of the machine, in which view only the finishing device is disclosed.

The concrete out of which the curb is to be shaped has to be deposited ahead of the machine next to the respective rail **21**, either manually or by a suitable mechanical equipment. Once the motor **34** has been started, the chain and sprocket drives, including sprockets **42** and **100** as one pair and sprockets **106** and **45** as another pair, will rotate shaft **28**. The latter, coupled by means of a sprocket **46** to sprockets **47** and **48**, will operate the traction wheels **22** and **22***a* on each side of the framework so that the machine will move forwardly. Simultaneously, the sprocket wheel **43** will drive sprocket wheels **86** and **87**, thereby imparting a rotary movement to the shaper mounted on shaft **77** and to the finishing device mounted on shaft **78**. It will be noted that the wheels **22** and **22***a* rotate in the opposite direction to that of the shaper and the finishing device, as shown in Fig. 5 by arrows applied to chains **88** and **49**, respectively. This opposite rotation is effected by employment of the above-named pinions **100** and **106** shown in Figs. 1 and 5.

During the rotation of the shaper, each blade thereof will come into a position under the shaft **77** when it will be a vertical plane, in which position the operative edge of the blade will define the desired profile of the curb. Any mass of concrete above that edge will be excess material. As the blades rotate in a clock-wise direction, each blade will push said excess material forwardly, where it will be presently available to be formed into a portion of the curb by the advancing blades. Should the shaper be of a kind in which each blade is shaped to a helical curvature, then the excess material would be, in part at least, shifted away from the curb.

The object of the finishing device which rotates in the same direction and at the same speed as the shaper is to impart a smooth surface to the just-shaped curb and to remove small pebbles, lumps, and other objects which might mar said surface. It is for this purpose that one type of the finishing device is provided with serrations or corrugations on its operative surface, and that another type is divided with slots running substantially transversely to the length of the curb.

It will be understood that some changes may be made in the structure of my machine as a whole and in the individual operative elements thereof without departing beyond the range of equivalents of the features shown by me.

What I, therefore, wish to claim is as follows:

1. A curb-shaping and finishing machine for use with a rail track, the machine including a framework, a plurality of wheels on each side thereof, the wheels including traction wheels to advance the machine upon said tracks, a curb-shaping device composed of a horizontal shaft supported for rotation about its axis by means depending from said framework in a position transversely to said track, a plurality of radial blades mounted on the shaft by intermediate means for rotation therewith, the face of each blade being substantially in a transverse plane to the tracks, each blade having an operative edge conforming to the desired outline of the curb to be shaped, a finishing device rearwardly of the shaping device, the finishing device including a horizontal shaft supported for rotation about its axis by means depending from said framework transversely to the track, a drum-shaped body axially mounted on the shaft for rotation therewith, the body having, in side elevation, the outline corresponding to the outline, in side elevation, of the curb-shaping device, including the shaft and the radial blades thereof, motor means upon said framework to drive the traction wheels, the shaft supporting the blades of the shaping device, and the shaft of the finishing device.

2. A curb-shaping and finishing machine for use with a rail track, the machine including a framework, a plurality of wheels on each side thereof, the wheels including traction wheels to advance the machine upon said tracks, a curb-shaping device composed of a horizontal shaft supported for rotation about its axis by means depending from said framework in a position transversely to said track, a plurality of radial blades mounted on the shaft by intermediate means for rotation therewith, the face of each blade being substantially in a transverse plane to the tracks, each blade having an operative edge conforming to the desired outline of the curb to be shaped, a finishing device readwardly of the shaping device, the finishing device including a horizontal shaft supported for rotation about its axis by means depending from said framework transversely to the track, a plurality of radial blades mounted upon said shaft by intermediate means for rotation with said shaft, each blade having an operative edge of the same form as the blades first named, but including along its edge a member including a face extending transversely of said edge for a sliding contact with the surface of the curb after it has been shaped by the aforesaid curb-shaping blades, motor means upon said framework to drive the traction wheels, the shafts supporting the blades of the shaping device, and the blades of the finishing device.

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