Dec. 30, 1952 E. S. CLARK ET AL 2,623,446

CURB AND GUTTER PAVING MACHINE

Filed Aug. 30, 1948 5 Sheets-Sheet 1

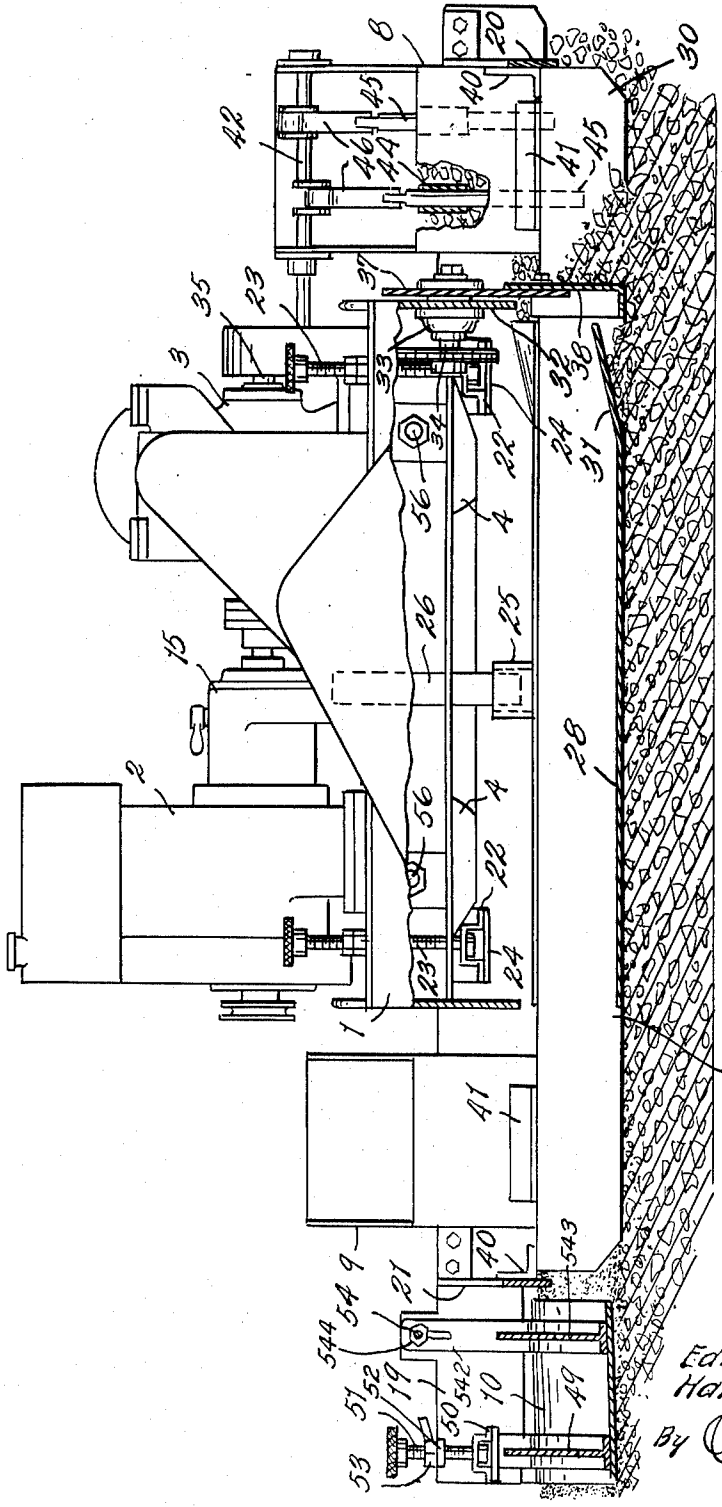


FIG. 1

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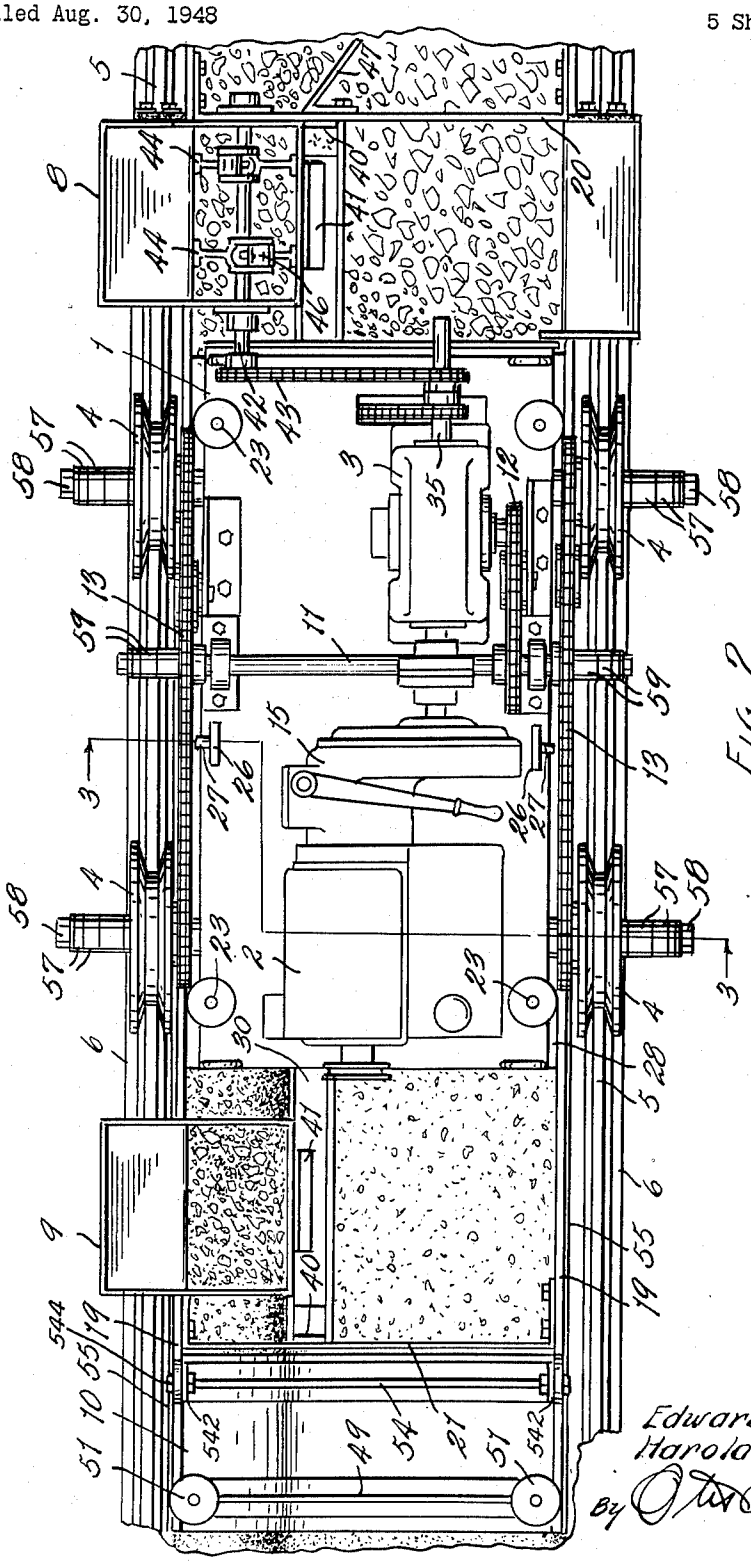


FIG. 2

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CURB AND GUTTER PAVING MACHINE

Filed Aug. 30, 1948 5 Sheets-Sheet 3

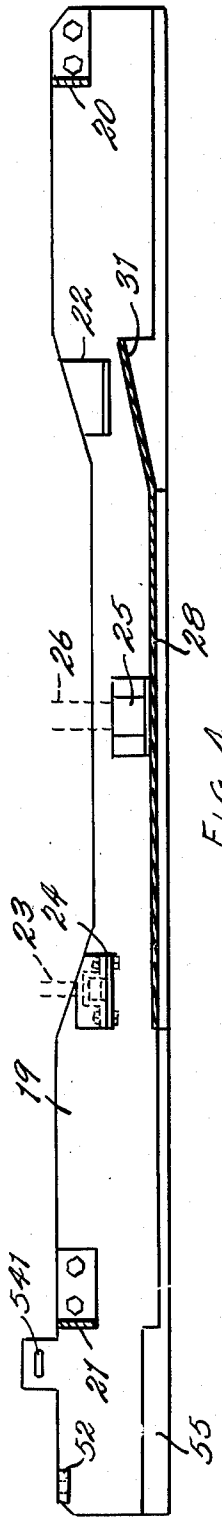


FIG. 4

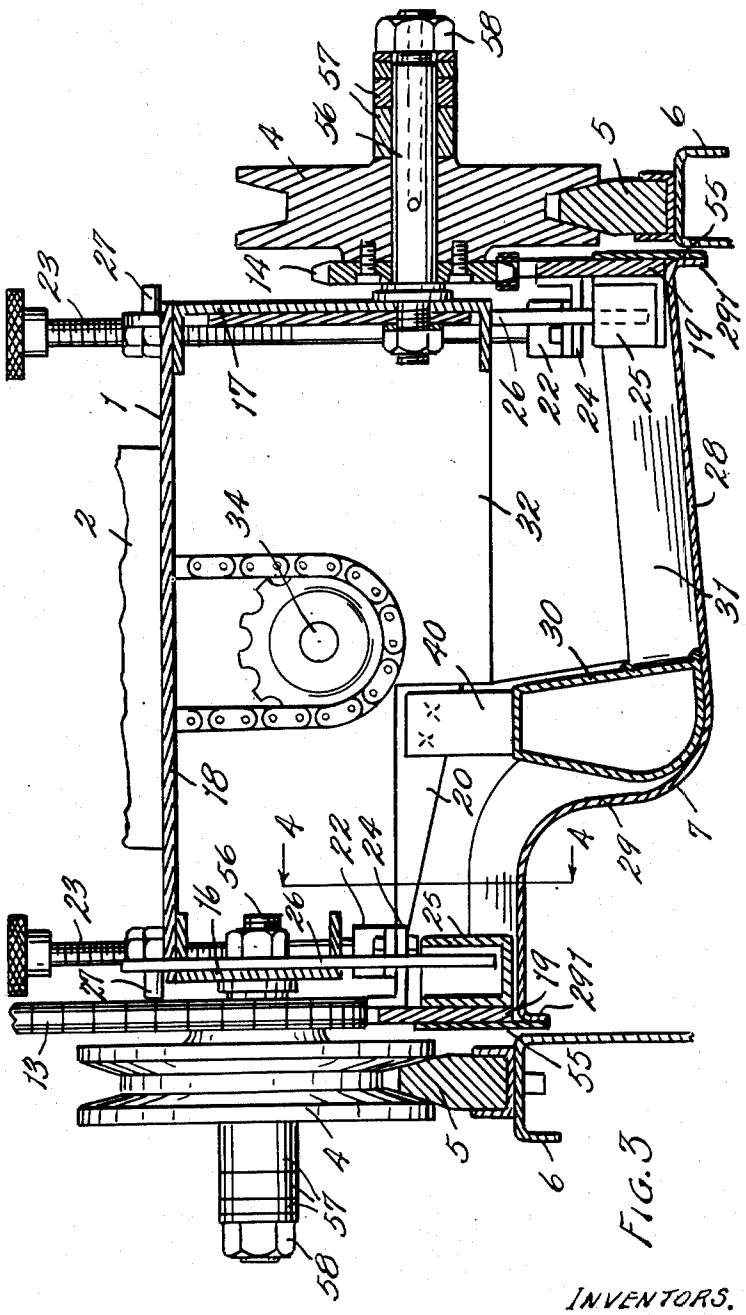


FIG. 3

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CURB AND GUTTER PAVING MACHINE

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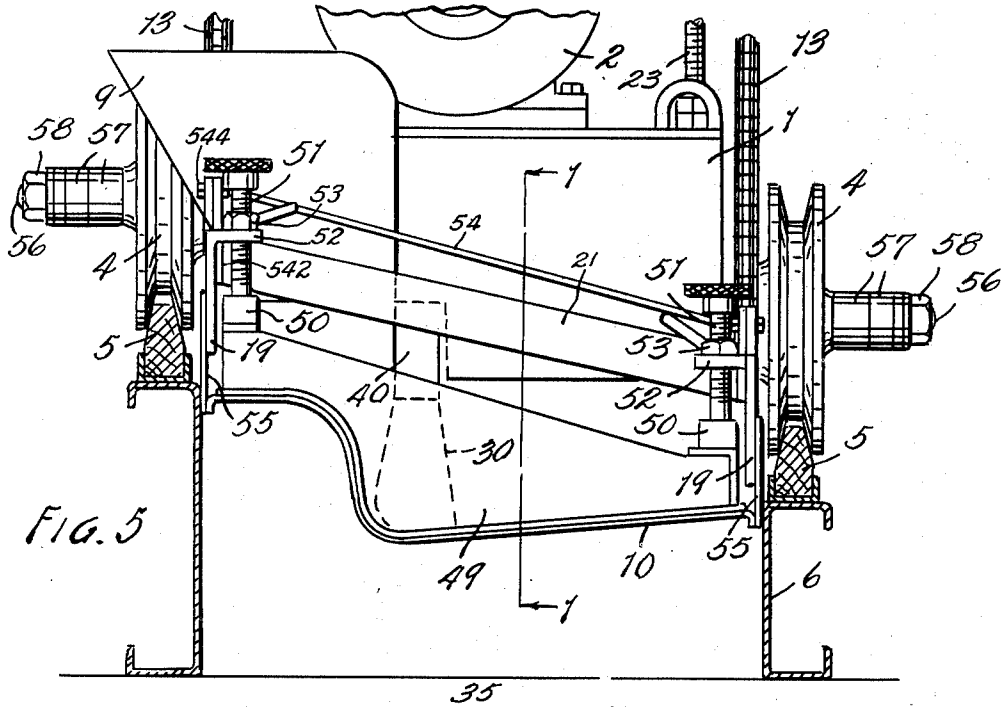


FIG. 5

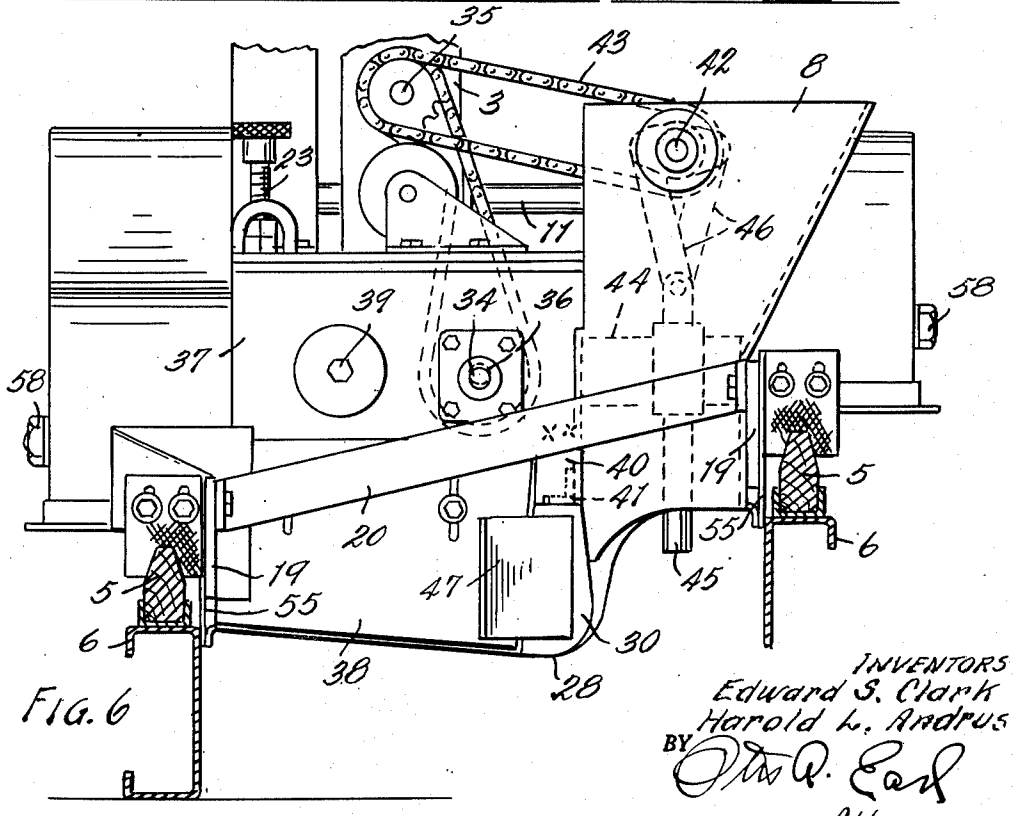


FIG. 6

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CURB AND GUTTER PAVING MACHINE

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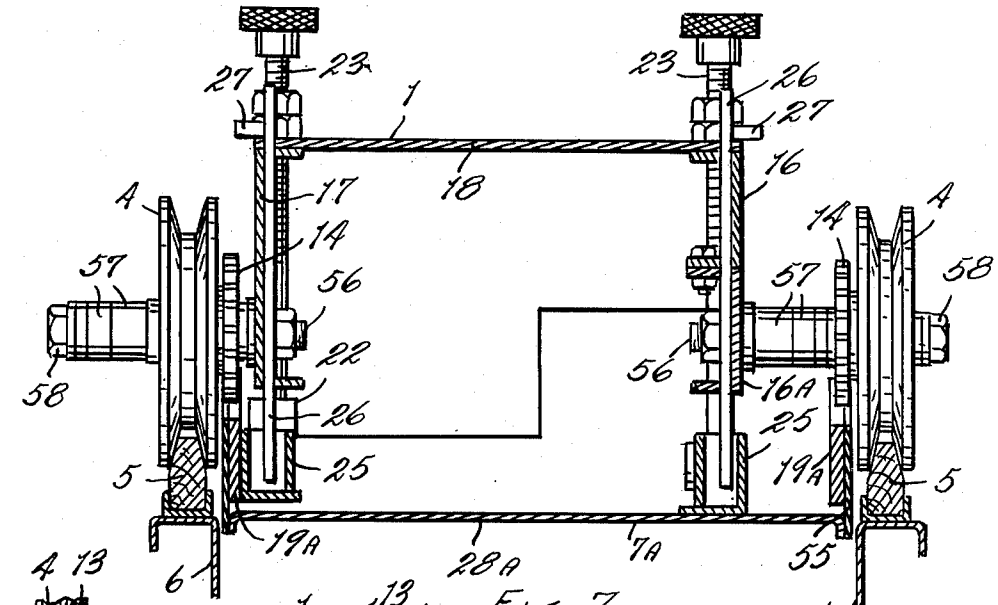


FIG. 7

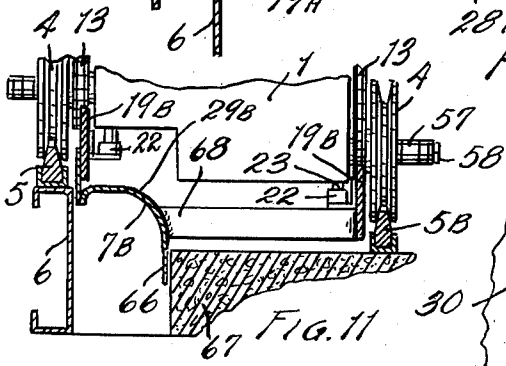


FIG. 11

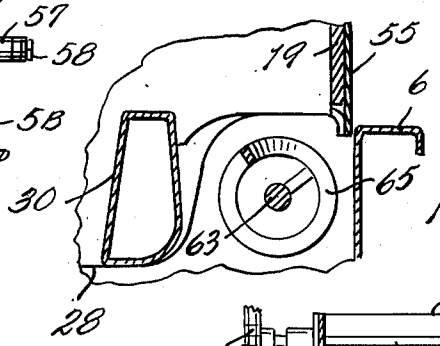


FIG. 10

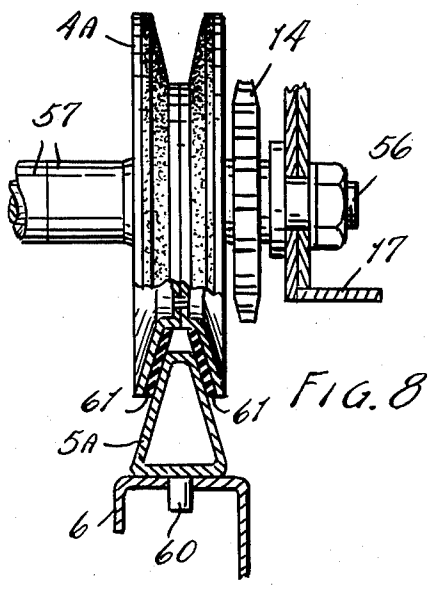


FIG. 8

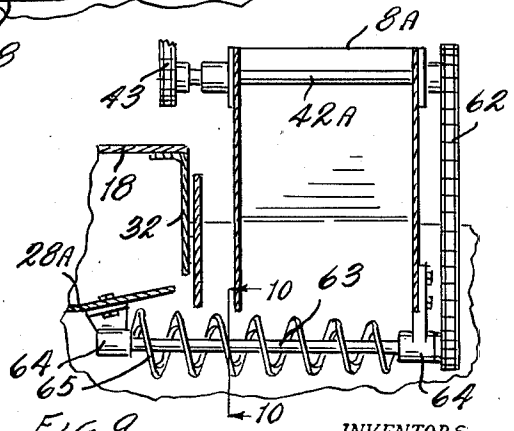


FIG. 9

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Patented Dec. 30, 1952

2,623,446

UNITED STATES PATENT OFFICE

2,623,446

CURB AND GUTTER PAVING MACHINE

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Application August 30, 1948, Serial No. 46,868

3 Claims. (Cl. 94—46)

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This invention relates to improvements in machine for making curbs and gutters.

The principal objects of this invention are:

First, to provide an improved form of machine for making curbs and gutters with a secondary feed hopper and finishing trowel for obtaining a fully formed and smoothly finished curb section.

Second, to provide a mechanism on a curb and gutter forming machine for firmly compacting concrete into the curb section.

Third, to provide a mechanism on a curb and gutter machine for assuring an adequate supply of concrete to that portion of the machine which forms the upstanding curb.

Fourth, to provide a concrete forming machine which is easily adjustable for forming combined curbs and gutters of various cross sections or for forming a strip of relatively flat concrete as for widening roadways, or for adding a curb to existing roadways.

Fifth, to provide a curb and gutter forming machine which is readily adjustable to form gutters of varying widths.

Sixth, to provide a curb and gutter forming machine which requires less attention and manual labor incident to the forming of a combination curb and gutter section.

Other objects and advantages pertaining to details of the machine will be apparent from a consideration of the following description and claims and the attached drawings.

The drawings of which there are five sheets, illustrate a preferred form of our curb and gutter forming machine with two types of mechanisms for compacting concrete into the curb section and modified forms of a carrying wheel and concrete shaping screed for the machine.

Fig. 1 is a side elevational view of our machine as viewed from the street side of the curb and gutter being formed, and looking toward the curb. The view is partially broken away in vertical longitudinal section along the plane indicated at 1—1, Fig. 5.

Fig. 2 is a plan view of the machine.

Fig. 3 is a transverse vertical cross sectional view through the machine taken along the plane indicated by a broken line 3—3 in Fig. 2.

Fig. 4 is a fragmentary longitudinal cross sectional view through the screed of the machine taken along the plane of the line 4—4 in Fig. 3.

Fig. 5 is an elevational view of the rear end of the machine.

Fig. 6 is an elevational view of the front end of the machine.

Fig. 7 is a fragmentary transverse cross sectional view through the machine showing the machine adjusted for forming a walk or strip for widening a roadway and with a modified form of screed for forming a flat surface on the strip.

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Fig. 8 is a fragmentary elevational view partly broken away in cross section and illustrating a modified form of carrying wheel for the machine.

Fig. 9 is a fragmentary vertical longitudinal cross sectional view illustrating a modified form of mechanism for feeding and compacting concrete in the curb section of a curb and gutter.

Fig. 10 is a fragmentary transverse cross sectional view through the compacting mechanism and taken along the plane of the line 10—10 in Fig. 9.

Fig. 11 is a fragmentary cross sectional view of a modified screed for forming a curb alongside of a roadway.

The machine forming this invention is an improved form of the similar type of machine described and claimed in our patent for Machines for Making Curbs and Gutters, Patent No. 1,985,220, issued December 18, 1934.

The machine which constitutes this invention consists generally of a body member 1 which carries a gasoline or other motor 2 and gear box 3. The body member is provided with V-grooved carrying wheels 4 which are adapted to travel on rail sections 5 formed on or secured to the top of gutter forms 6. The body member 1 supports a concrete working and placing screed 7 and the screed in turn supports an initial filling and compacting mechanism 8 for supplying the necessary concrete to form the curb section of a curb and gutter. The screed 7 further carries a secondary hopper 9 and finishing trowel 10 for creating a smooth, accurately shaped surface on the curb and gutter. The entire sub-assembly of the screed 7, compacting mechanism 8, hopper 9 and trowel 10 may be referred to as a forming mechanism.

The machine is driven by the motor 2 by means of a jack shaft 11 mounted on top of the body 1 and driven from the gearbox 3 by the chain 12. The jack shaft 11 is provided with sprockets at its ends engageable with the driving chains 13. The chains 13 are drivingly engaged with sprockets 14 secured to the carrying wheels 4. A clutch 15 is interposed between the motor and gear box 3.

The body member 1 is formed of side frame members 16 and 17 secured to the underside of a top plate 18. The side frame members are of opposed channel shaped cross section and it will be

noted particularly from Fig. 3 that the side rail 16 positioned on the curb side of the machine is narrower than the opposed frame member 17 positioned over the inner or street edge of the gutter.

The gutter shaping mechanism 7 consists of a pair of supporting side rails 19 which are joined by front and rear cross members 20 and 21 respectively. The side rails 16 and 17 are provided with hanger fixtures 22 which are arranged to receive the lower ends of four supporting screws 23 carried near the four corners of the body 1. As is most clearly illustrated in Figs. 1 and 3, the hanger fixtures 22 consist of downwardly opening yokes secured to the angle clip 24. The angle clips 24 are in turn secured as by welding to the side rails 19. The side rails 19 are further provided with upwardly opening socket members 25 adapted to receive the lower ends of draft bars 26 which project downwardly from the body to move the shaping element along with the body 1. The draft bars 26 extend upwardly through slots provided therefor in the flanges of the side frame members 16 and 17. Fingers 27 on the upper ends of the draft bars prevent the bars from falling out of the body when the shaping element 7 is removed. Secured between the undersides of the side rails 19 is a screed 28 having upwardly turned facing portion 29 for forming the curb portion of the curb and gutter. The side edges of the screed 28 are turned downwardly as at 291 to finish the corners of the curb and gutter section formed by the machine. The screed 28 is supported and stiffened intermediate of its end extremities by the interior rail 30 of hollow box-like cross section, which rail extends longitudinally in front of and behind the body 1. The front edge of the screed 28 is flared upwardly as at 31 to form a downwardly and forwardly facing recess for receiving concrete over which the machine may pass.

The front cross plate 32 of the body 1 supports a bearing 33 for a vibrator shaft 34. The shaft 34 is driven from the power shaft 35 from the gear box and is provided at its forward end with an eccentric 36 (see Fig. 6) on which the strike-off support plate 37 is mounted. The support plate 37 carries the adjustable strike-off plate 38 the lower edge of which is arranged to level off any unevenness in the mass of concrete positioned in front of the machine. The strike-off plate is vibrated as in our above mentioned patent to have a compacting effect on the concrete which forms the gutter section. Idler support pin 39 connects the front cross plate 32 of the body with the strike-off support plate 37 to assist the eccentric pin 36 in supporting the strike-off plate. It will be appreciated that the hanger screws 23 can be adjusted to locate the forming element 7 and screed 28 at the desired angular relation relative to the wheels of the machine. The screed is preferably set at a slightly upwardly and forwardly inclined angle with respect to the path of travel of the machine so that as the machine is advanced over the mass of wet concrete the concrete is vibrated and compacted into the desired shape by the weight of the forming mechanism.

The side rails 19 and center rail 30 extend longitudinally to the front and rear of the screed 28 where they are connected by the cross members 20 and 21. The center rail 30 is connected to the cross members by upwardly extending straps 40. At the front of the machine the inner side rail 19 and the center rail 30 support the feed hopper 8 for receiving the extra amount of concrete required to form the raised curb section. The hopper 8 is secured to the center rail by an angle shaped bracket 41 and is secured as by welding to the inside of the side rail 19. In the preferred form of the machine illustrated in Figs. 1 to 6, the front and back walls of the hopper 8 are provided with bearings for supporting a two-throw crank shaft 42. The shaft 42 extends to the rear of the hopper and is provided with a sprocket arranged to engage the chain 43 driven from the power shaft 35 of the gear box. Below the crank shaft 42 the hopper is provided with a pair of transverse struts 44 supporting guides for the tamper rods 45. The rods 45 are connected to the throws of the crank shaft by the connecting rods 46. Thus when the machine is in operation the attendant may shovel in an extra supply of concrete into the hopper which is positioned over the curb. The tamper 45 will be reciprocated to compact this concrete into the curb section and thus assure a solid fully formed curb. The front end of the center rail 30 carries the angled baffle plate 47 for further collecting part of the concrete dumped in the forms ahead of the machine and directing the concrete into the curb section.

To the rear of the body the center rail 30 and inner side rail 19 serve to support a secondary hopper 9 over the curb section so that the attendant can shovel in an additional supply of concrete which is preferably selected from the mass of concrete ahead of the machine to have a relatively finer, wetter aggregate than the average of the concrete being used. This relatively fine concrete will flow on to the top of the partly finished curb section and will immediately be operated upon by the trowel 10.

The trowel 10 consists of a relatively narrow plate curved to conform to the contour of the curb and gutter and reinforced by a transverse fillet 49. The fillet 49 is provided at its upper edge with a pair of hangers 50 arranged to engage the lower ends of the vertical adjusting screws 51. The adjusting screws extend downwardly through the brackets 52 provided therefor on the side rails 19 and lock nuts 53 are provided for locking the screws in position. The leading or forward edge of the trowel is pivotally supported on a rod 54 extending between the slots 541 at the upper edges of the side rails 19. The rod 54 extends through hanger arms 542 extending upwardly from the ends of a second fillet 543. The arms are vertically slotted to adjustably receive the rod 54 and are clamped in place by nuts 544 on the rod. Thus the front edge of the trowel can be vertically adjusted and the rear edge can then be further adjusted by the screws 51 to vary the longitudinal angle of the trowel relative to the main screed and the forms or rails between which the curb and gutter is being formed. It will be noted that the side edges of the trowel 10 and the main screed 28 are connected by the finishing side plates 55 which are lapped upon the sides of the main side rails 19. The finishing side plates 55 slide closely adjacent to the sides of the tracks or forms 6 and provide a sharp corner on the inner and outer edges of the curb and gutter in cooperation with the downturned side edges of the screed and trowel.

It will be appreciated that curbs and gutters having different cross sectional shapes can be formed with our machine by simply dropping the forming mechanism which includes the main screed 28 and trowel 10 from the body of the machine. This is accomplished by unscrewing the adjusting screws 23 on the body and per-

mitting the side rails 19 to be removed from the machine.

In order to adjust the machine for wide or narrow gutters the supporting wheels 4 are mounted on stub shafts 56 bolted to the side plates 16 and 17 of the body. The shafts 56 are considerably longer than the thickness of the wheels 4 and a set of spacer washers 57 is positioned around each shaft to locate the wheel on the shaft. When it is desired to operate on wider spaced tracks, the spacer washers 57 are removed by removing the end nuts 58 and placed on the inside of the wheel 4 as is most clearly shown at the right side of Fig. 7. The tread of the wheels can thus be changed by moving the washers on one or both sides of the machine. The jack shaft 11 is provided with similar spacing washers 59 (see Fig. 2) so that the driving sprockets on the jack shaft can be kept in alignment with the sprockets on the wheels 4.

Fig. 7 illustrates our machine set up to form a flat strip of concrete which can be used either as a side walk or as an extension along the side of a roadway. Since in this instance the rails 6 will be approximately level, the short side member 16 of the body of the machine has bolted to it an extension channel 16A which makes the side 16 the same height as the opposing side channel 17. The stub shafts 56 are moved to the extension channel 16A and forming mechanism including the side rails 19A and screed 28A are mounted upon the body as in the first form of the machine illustrated. It will be understood that a finishing trowel not illustrated having a flat surface will be carried on the rear ends of the side rails 19 in the same manner as in the first form of the machine.

Fig. 8 illustrates a novel form of rail and wheel for supporting the machine in which the rail 5A is of hollow generally triangular cross section secured upon the tops of the forms 6 by pins 60. In order to provide adequate driving friction between the rails 5A and the wheels 4A the wheels which are formed of two stamped sections having their hubs welded together are provided with rubber or other friction faces 61 for engaging the rail 5A. We have found that the friction facing is often necessary, particularly when operating on hills, because the weight of the entire machine is insufficient to provide necessary traction on the rails for advancing the machine.

Figs. 9 and 10 illustrate a modified mechanism for feeding and compacting concrete into the curb section being formed. In this form of the machine the advance hopper 8A carries a simple lay shaft 42A in placing of the crank shaft 42 in the first form of the machine. The shaft 42A serves to transmit power from the chain 43 to a chain 62 for driving the auger shaft 63 positioned longitudinally beneath the bottom of the hopper 8A and located in the area of the curb section. The shaft 63 is supported by bearings 64 carried at the bottom of the leading edge of the screed 28A and at the bottom of the leading edge of the hopper 8A. The shaft 63 carries a spiral auger 65 consisting of a spirally wound strip of metal having its intermediate turns spaced from the shaft 63. The auger 65, which is rotated when the machine is operating, functions to feed concrete from the hopper 8A into the curb forming section of the screed and to assure a completely filled and firmly packed curb section.

In Fig. 11 there is illustrated a modified form of concrete shaping mechanism 7B in which the side rails 19B are provided with a curb forming screed 29B. The screed 29B is of the proper transverse curvature to form a curb of the desired contour and extends downwardly at its inner edge as at 66 to finish the edge of the curb along the side of an existing strip of roadway indicated at 67. The screed is braced to the opposite side rail by suitable struts 68 spaced above the level of the roadway. When this type of screed is used a finishing trowel (not illustrated) of similar contour is provided at the rear of the shaping mechanism 7B. In using the machine to lay only a curb with this screed and trowel, one of the rails 5B is laid directly on the existing roadway.

We have thus described a highly practical commercial imbodiment of our curb and gutter forming machine and various modifications and adaptations of the machine to various types of concrete forming jobs. The machine operates effectively in all of its forms to form solid smoothly finished concrete strips of the desired cross section and is easily adjustable as explained to form various cross sections.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In combination with a curb and gutter forming machine having a body and wheels for advancing the body along a track, inner and outer flat side rails vertically adjustably mounted on said body and extending to the rear thereof, a center rail of hollow cross section extending below said body parallel to said side rails and to the rear of said body, cross members connecting said rails, a main screed secured to said rails underneath said body and transversely curved upwardly between said center and outer side rails to form a curb and gutter of the desired contour, a hopper supported by said rails over the curb section of said curb and gutter and spaced from the rear of said body and screed, a finishing trowel spaced behind said hopper having its rear edge vertically adjustably supported from said side rails and having its front edge supported on a transverse pivot by said side rails, and driving mechanism carried on said body for rotating said wheels.

2. In combination with a curb and gutter forming machine having a body and wheels for advancing the body along a track, inner and outer side rails vertically adjustably mounted on said body and extending to the front and rear thereof, a center rail extending below said body parallel to said side rails and to the front of said body, cross members connecting said rails, a screed secured to said rails underneath said body and transversely curved upwardly between said center and outer rails, a finishing trowel located behind said screed having its rear edge adjustably supported from said side rails and having its front edge spaced from said screed and supported on a transverse pivot by said side rails, and driving mechanism carried on said body for rotating said wheels.

3. In combination with a power driven machine for forming a combined curb and gutter and having a carriage adapted to move along forms, a first screed shaped to form the surface of said curb and gutter and vertically and angularly adjustably mounted on said carriage, supporting members connected to and extending rearwardly from said screed relative to the path of travel of said machine, a hopper supported on said supporting members and spaced behind said screed and over the curb section of said curb and

gutter, and a finishing trowel vertically adjustably carried by said supporting members and spaced from the rear of said hopper.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
940,061	Ransome	Nov. 16, 1909
1,923,632	MacRae et al.	Aug. 22, 1933
1,967,178	Jaeger	July 17, 1934
1,985,220	Clark et al.	Dec. 18, 1934
2,013,407	Gibbs	Sept. 3, 1935
2,098,870	Heltzel	Nov. 9, 1937
2,125,254	Creason	July 26, 1938
2,204,021	Leatherman	June 11, 1940
2,225,015	Lebelle	Dec. 17, 1940
2,297,978	Oswald	Oct. 6, 1942
2,332,688	Baily	Oct. 26, 1943
2,351,592	Barber	June 20, 1944