Aug. 19, 1958 H. L. ANDRUS ET AL 2,847,916

MACHINE FOR FORMING A COMBINED CURB AND GUTTER STRIP IN A CONTINUOUS OPERATION

Filed May 31, 1952 2 Sheets-Sheet 1

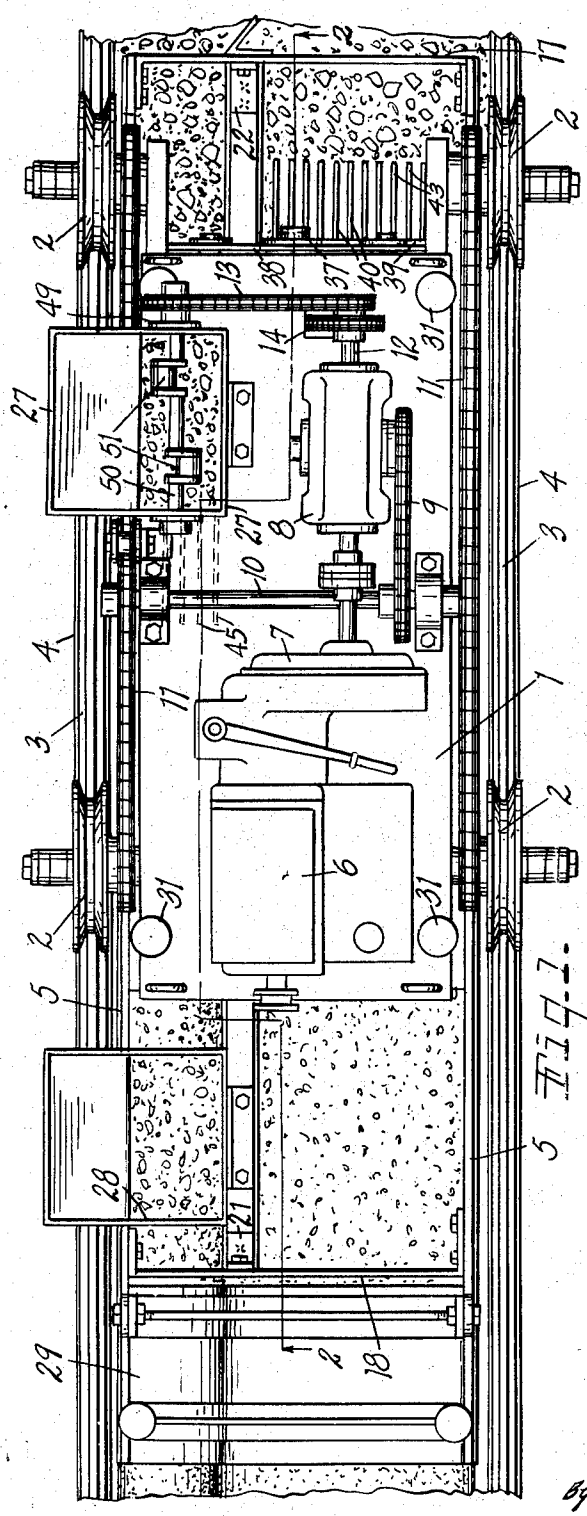


FIG. 1.

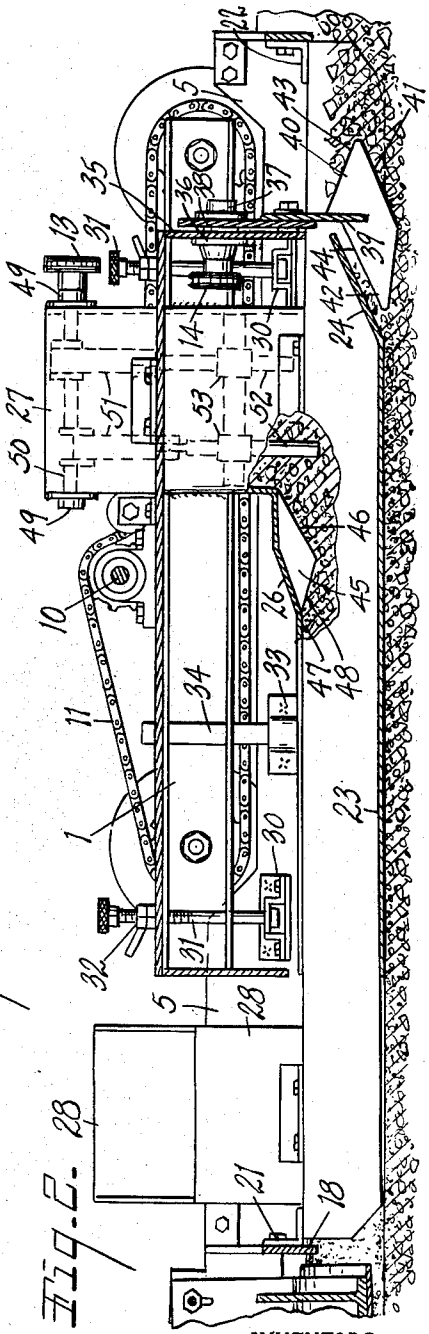


FIG. 2.

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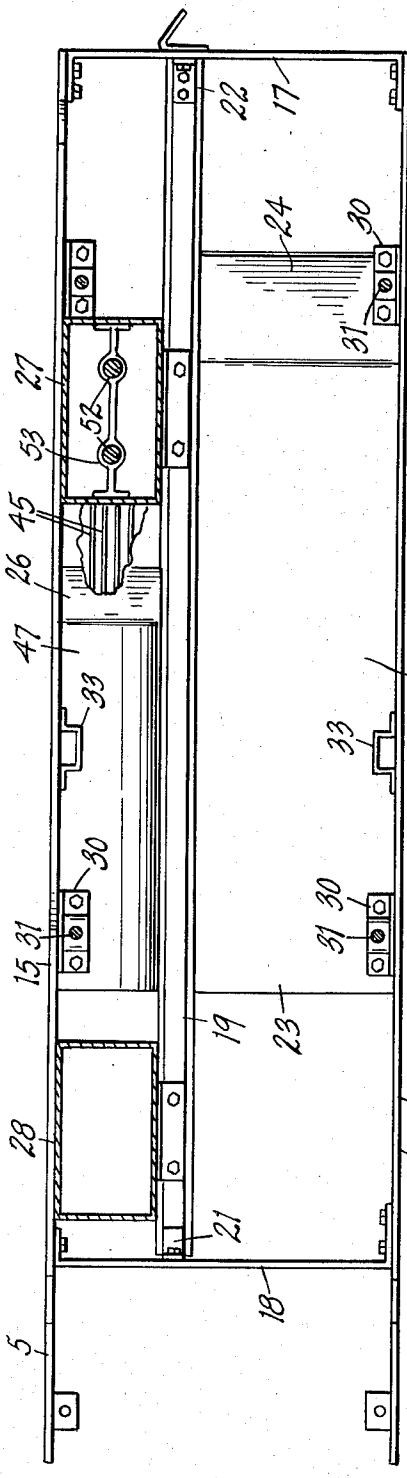


FIG. 4.

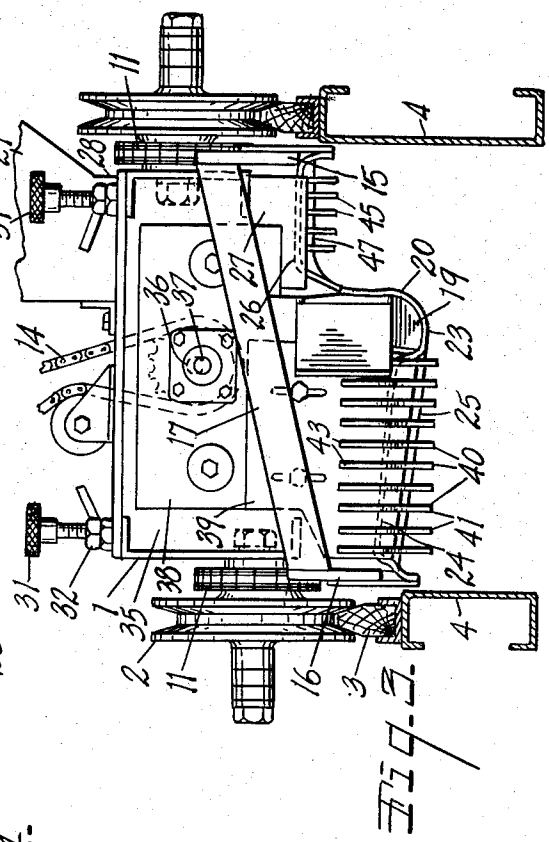


FIG. 3.

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# MACHINE FOR FORMING A COMBINED CURB AND GUTTER STRIP IN A CONTINUOUS OPERATION

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11 Claims. (Cl. 94—46)

This invention relates to improvements in a machine for forming a combined curb and gutter strip in a continuing operation.

The principal objects of this invention are:

First, to provide a machine that will smoothly compact a combined curb and gutter strip in a continuous operation with the curb portion of the strip firmly and smoothly compacted after the gutter portion has been formed and is retained in its plastic condition underneath the forming screed of the machine.

Second, to provide a curb and gutter forming machine that will smoothly compact the plastic concrete of the curb and gutter strip and embed or depress the larger portions of the concrete aggregate well below the surface of the strip so that the strip is smoothly finished.

Third, to provide a screen or aggregate depressor at the front of a concrete forming screed that will depress large stones and other aggregate below the surface of the strip, leaving the finer aggregate on the surface for easy smoothing and compacting.

Fourth, to provide a machine for forming concrete curbs and gutters which is provided with vertically and longitudinally extending plates spaced transversely of the machine and vibratorily mounted thereon to compact the plastic concrete ahead of the screed which forms the surface of the strip being formed, and which depress large pieces of aggregate well below the final surface of the strip.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims.

The drawings, of which there are two sheets illustrate a highly practical form of the invention.

Fig. 1 is a plan view of the machine in operative position on supporting side rails between which the curb and gutter is being formed.

Fig. 2 is a fragmentary vertical longitudinal cross sectional view through the machine taken along the plane of the line 2—2 in Fig. 1.

Fig. 3 is a fragmentary elevational view of the front or leading end of the machine, the supporting guide rails therefor being shown in cross section.

Fig. 4 is a plan view of the surface forming screed that is carried by the carriage of the machine, and which operates on the surface of the plastic concrete to form the same as desired.

The machine consists generally of a rectangular carriage 1 having wheels 2 adapted to move the carriage along the rails or tracks 3. The tracks are conveniently mounted on the upper edges of the forms 4 between which the curb and gutter is to be formed. The concrete in plastic form is deposited roughly between the forms ahead of the machine, and the machine is advanced to the right as viewed in Figs. 1, 2 and 4 to work the surface of the plastic mass and form it into the desired curb and gutter. Adjustably carried on the underside of the carriage 1 is a forming structure as illustrated in Fig. 4 and indicated generally by the numeral 5. A motor 6



for driving the wheels 2 is mounted on top of the carriage and the motor drives through a clutch structure 7 to a gear box 8. One output shaft of the gear box drives the chain 9 for rotating the cross drive shaft 10. Chains 11 engaged with the cross drive shaft are connected to sprockets associated with each of the wheels 2 to advance the carriage. A second output shaft of the gear box indicated at 12 drives a first chain 13 for operating a tamping apparatus within the curb section being formed, while a second chain 14 extends downwardly through the top of the carriage to vibrate a strike-off structure at the front of the carriage, all as will be described in greater detail presently.

The concrete forming structure 5 more specifically includes an outer side rail 15 and an inner side rail 16 in the form of vertically and longitudinally extending plates. The plates are interconnected by a front cross piece 17 and a rear cross piece 18. Spaced transversely between the side rails 15 and 16, and extending parallel thereto is a center rail 19 that is desirably of hollow box cross section. As is most clearly illustrated in Fig. 3 the lower and outer surface of the center rail 19 is conformed as at 20 to form the desired surface curvature on the side face of the curb section of the strip to be formed. The rear end of the center rail 19 is secured to the cross piece 18 by a bracket 21, and the front end of the center rail is secured to the cross piece 17 by a bracket 22.

Secured to the under sides of the side rails 15 and 16, and the center rail 19 intermediate of the ends thereof is a primary forming screed 23. The screed is curved or conformed transversely to provide the desired surface contour on the curb and gutter being formed, and closely follows the curvature of the center rail as is illustrated in Fig. 3. The forward or leading edge of the screed 23 is turned upwardly as at 24 between the center rail and the inner rail to form a depressor or plow portion for forcing the mass of plastic concrete downwardly to the level of the gutter forming portion of the screed which is indicated at 25. Outwardly from the center rail 19 the screed 23 has its leading edge offset rearwardly to an upturned depressor or plow portion 26 positioned over the curb section of the strip being formed.

Mounted between the outer rail 15 and the center rail 19, and supported thereby are a forward hopper 27 and a rear hopper 28. The forward hopper 27 extends upwardly through an opening provided therefor in the top of the carriage 1 and is positioned longitudinally between the front plow portion 24 on the gutter forming section of the screed and the front plow portion 26 on the curb forming section of the screed. The rear hopper 28 is positioned rearwardly from the main screed 23 and is adapted to feed fine finishing concrete to the surface of the newly formed curb for further finishing by a finishing trowel 29 adjustably mounted between the side rails 15 and 16 at the rear of the machine.

The side rails 15 and 16 carry hanger brackets 30 adapted to receive the headed ends of suspension bolts 31 that extend upwardly through the top of the carriage and which are vertically adjustably supported from the carriage by the nuts 32. The elevation of the forming structure 5 as a whole, and screed 23 in particular can thus be adjusted relative to the carriage and the tops of the tracks 3. Sockets 33 mounted on the side rails are adapted to receive driving plates 34 that extend downwardly from the carriage into the sockets to transmit the driving force of the carriage to the forming structure.

The front end of the carriage 1 includes a vertically and transversely extending plate 35 that has a bearing 36 mounted therein for rotatably receiving the eccentric shaft 37. The shaft 37 extends forwardly through and is secured to a movable front plate 38 that is vibratorily

driven through the shaft **36** by the previously mentioned chain **14**. Adjustably secured to the front of the movable plate **38**, and between the center rail **19** and the inner rail **16** is a strike-off plate **39**. The plate **39** extends downwardly below the level of the front edge of the plow portion **24** and serves as a support for a plurality of tamper plates **40**. The plates **40** are arranged in vertical longitudinally extending position and are transversely spaced across the width of the gutter section being formed. As is most clearly illustrated in Fig. 2, the tamper plates **40** have downwardly and rearwardly inclined front edges **41** that extend downwardly to below the level of the gutter forming portion **25** of the main screed. The lower rear edge of the plates then extends rearwardly and upwardly as at **42** to approximately the level of the gutter forming portion of the screed. The upper front edge of the tamper plates is inclined upwardly and rearwardly as at **43** to the strike-off plate **39**, and the upper rear edge of the plates is inclined downwardly and rearwardly as at **44** to space the plates underneath the plow portion **24** at the front of the gutter forming portion of the screed.

The tamper plates **40** as thus described are positioned to be translated forwardly with the carriage and to simultaneously be vibrated by the eccentric shaft **37**. The plates are spaced transversely from each other by a sufficient distance to permit small aggregate and fine portions of the concrete to pass therebetween, but to prevent large stones and pieces of aggregate from working between the plates. The front lower edges of the tamper plates thus pick up and press downwardly on large pieces of aggregate and depress these pieces well below the surface of the gutter as formed by the gutter forming portion **25** of the screed. Such large pieces of aggregate as are lifted upwardly by the upper leading edges of the tamper plates can be periodically raked forwardly into the mass of unformed concrete. The plow portion **24** and gutter forming portion **25** of the screed are thus able to work primarily on the finer portions of the plastic concrete to form the concrete into a smooth compact gutter portion.

Secured to the under side of the plow portion **26** of the curb forming portion of the screed is a second set of vertically and longitudinally extending depressor plates **45**. The lower leading edges of the depressor plates **45** extend downwardly and rearwardly as at **46** to below the level of the curb forming section **47** of the screed. The lower rear edges of the depressor plates **45** extend upwardly and rearwardly as at **48** for connection to the plow portion **26**. The depressor plates **45** function similarly to the tamper plates **40** in that they engage and depress large pieces of aggregate in the curb section being formed below the level of the portion of the screed that forms the surface of the curb. The depressor plates **45** are not vibratorily mounted in the example illustrated, but may be so mounted if desired.

The forward hopper **27** is provided with bearings **49** in its front and rear walls for supporting the longitudinally extending crank shaft **50**. The crank shaft **50** is rotated by the previously described chain **13** and has crank throws and connecting rods **51** adapted to reciprocate a pair of tamper bars **52**. The tamper bars are vertically guided by bearings **53** supported between the sides of the hopper. The tamper bars **52** function to compact concrete into the curb section of the curb and gutter being formed, while the hopper **27** serves to provide an auxiliary supply of concrete for the curb section should an insufficient amount of concrete be picked up between the outer rail **15** and the center rail **19** by advancing motion of the carriage.

A highly practical and efficient form of the invention has thus been described so that others may reproduce and operate the same without further disclosure. Obviously various modifications and adaptations of the several features of the machine may be made without departing from the spirit of the invention as defined in the claims.

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

1. A machine for forming a combined curb and gutter comprising, a carriage adapted to be advanced along forms for the curb and gutter, a forming structure carried below said carriage and including longitudinally extending inner and outer side rails and a center rail, a main forming screed carried by said rails and extending upwardly and laterally outwardly between said center rail and said outer rail to form the curb section, a vertically and transversely extending strike-off plate vibratorily mounted on said carriage and positioned at the front of said screed between said center rail and said inner rail, a first plow portion on the front of said screed inclined upwardly and forwardly between said center rail and said inner rail, a set of transversely spaced vertically and longitudinally extending depressor plates mounted on said strike-off plate, said depressor plates having forward points inclined upwardly and rearwardly and downwardly and rearwardly to below the level of the main portion of said screed, a second plow portion on said screed spaced rearwardly from said first plow portion and positioned between said center rail and said outer rail, said second plow portion being inclined forwardly and upwardly from the curb forming portion of said screed, another set of transversely spaced vertically and longitudinally extending depressor plates secured to the underside of said second plow portion, said other depressor plates having downwardly and rearwardly extending lower edges extending to below the level of the top of the curb forming section of said screed, the depressor plates in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates, a hopper positioned between said center rail and said outer rail and longitudinally between said plow portions to introduce concrete to the curb section, and concrete compacting mechanism positioned in said hopper.

2. A machine for forming a combined curb and gutter comprising, a carriage adapted to be advanced along forms for the curb and gutter, a forming structure carried below said carriage and including longitudinally extending inner and outer side rails and a center rail, a main forming screed carried by said rails and extending upwardly and laterally outwardly between said center rail and said outer rail to form the curb section, a vertically and transversely extending strike-off plate positioned at the front of said screed between said center rail and said inner rail, a first plow portion on the front of said screed inclined upwardly and forwardly between said center rail and said inner rail, a set of transversely spaced vertically and longitudinally extending depressor plates mounted on said strike-off plate, said depressor plates having pointed forward ends inclined upwardly and rearwardly and downwardly and rearwardly to below the level of the main portion of said screed, a second plow portion on said screed spaced rearwardly from said first plow portion and positioned between said center rail and said outer rail, said second plow portion being inclined forwardly and upwardly from the curb forming portion of said screed, another set of transversely spaced vertically and longitudinally extending depressor plates mounted in front of said second plow portion, said other depressor plates having downwardly and rearwardly extending lower edges extending to below the level of the top of the curb forming section of said screed, the depressor plates in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates and a hopper positioned between said center rail and said outer rail and longitudinally between said plow portions to introduce concrete to the curb section.

3. A machine for forming a combined curb and gutter

comprising, a carriage adapted to be advanced along forms for the curb and gutter, a forming structure carried below said carriage and including longitudinally extending inner and outer side rails and a center rail, a main forming screed carried by said rails and extending upwardly and laterally outwardly between said center rail and said outer rail to form the curb section, a vertically and transversely extending strike-off plate positioned at the front of said screed between said center rail and said inner rail, a set of transversely spaced vertically and longitudinally extending depressor plates mounted on said strike-off plate, said depressor plates having pointed forward ends inclined upwardly and rearwardly and downwardly and rearwardly to below the level of the gutter forming portion of said screed, another set of transversely spaced vertically and longitudinally extending depressor plates secured to the underside of the top of the curb forming portion of said screed and positioned substantially rearwardly from said first depressor plates, said other depressor plates having downwardly and rearwardly extending lower edges extending to below the level of the top of the curb forming section of said screed, the depressor plates in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates and a hopper positioned between said center rail and said outer rail and longitudinally between the two sets of depressor plates to introduce concrete to the curb section.

4. A machine for forming a combined curb and gutter comprising, a carriage adapted to be advanced along forms for the curb and gutter, a forming structure vertically adjustably carried below said carriage and including longitudinally extending inner and outer side rails and a center rail, a main forming screed having a gutter forming section carried by said rails and extending upwardly and laterally outwardly between said center rail and said outer rail to form the curb section, a set of transversely spaced vertically and longitudinally extending depressor plates mounted between said center rail and said inner rail and in front of said screed, said depressor plates having forward ends inclined downwardly and rearwardly to below the level of the gutter forming portion of said screed, another set of transversely spaced vertically and longitudinally extending depressor plates mounted between said center rail and said outer rail and spaced substantially rearwardly from said first depressor plates, said other depressor plates having downwardly and rearwardly extending lower edges extending to below the level of the top of the curb forming section of said screed, the depressor plates in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates and a hopper positioned between said center rail and said outer rail and longitudinally between the two sets of depressor plates to introduce concrete to the curb section.

5. A machine for forming a combined curb and gutter comprising, a carraige adapted to be advanced along forms for the curb and gutter, a forming structure carried below said carriage and including longitudinally extending inner and outer side rails and a center rail, a main forming screed carried by said rails and extending upwardly and laterally outwardly between said center rail and said outer rail to form the curb section, the forward end of said curb forming portion of said screed being spaced substantially rearwardly of the front of the gutter forming portion of said screed between said center rail and said inner rail, a first plow portion on the front of said screed inclined upwardly and forwardly between said center rail and said inner rail, a first set of transversely spaced vertically and longitudinally extending



depressor plates mounted in front of said gutter forming portion, said depressor plates having pointed forward ends inclined upwardly and rearwardly and downwardly and rearwardly to below the level of the gutter forming portion of said screed, a second plow portion on said screed spaced rearwardly from said first plow portion and positioned between said center rail and said outer rail, said second plow portion being inclined forwardly and upwardly from the curb forming portion of said screed, a second set of transversely spaced vertically and longitudinally extending depressor plates mounted in front of said curb forming portion, said second set of depressor plates having downwardly and rearwardly extending lower edges extending to below the level of the top of the curb forming portion of said screed, the depressor plates in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates, a hopper positioned between said center rail and said outer rail and longitudinally between said sets of plates to introduce concrete to the curb section, and means for vibrating one set of said plates.

6. A machine for forming a combined curb and gutter comprising, a carriage adapted to be advanced along forms for the curb and gutter, a forming structure carried below said carriage and including a main forming screed extending upwardly and laterally outwardly at one side to form the curb section, the front of the curb forming portion of the screed terminating substantially rearwardly from the front of the gutter forming portion of said screed, a first set of transversely spaced vertically and longitudinally extending depressor plates mounted in front of the gutter forming portion of said screed, said depressor plates having forward ends inclined downwardly and rearwardly to below the level of the gutter forming portion of said screed, a second set of transversely spaced vertically and longitudinally extending depressor plates mounted in front of the curb forming portion of said screed, said second set of depressor plates having downwardly and rearwardly extending lower edges extending to below the level of the top of the curb forming portion of said screed, the depressor plates in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates and means for vibrating one of said sets of plates.

7. A machine for forming a combined curb and gutter comprising, a carriage adapted to be advanced along forms for the curb and gutter, a forming structure carried below said carriage and including a main forming screed extending upwardly and laterally outwardly at one side to form the curb section, the front of the curb forming portion of the screed terminating substantially rearwardly from the front of the gutter forming portion of said screed, a first set of transversely spaced vertically and longitudinally extending depressor plates mounted in front of the gutter forming portion of said screed, said depressor plates having forward ends inclined downwardly and rearwardly to below the level of the gutter forming portion of said screed, and a second set of transversely spaced vertically and longitudinally extending depressor plates mounted in front of the curb forming portion of said screed, said second set of depressor plates having downwardly and rearwardly extending lower edges extending to below the level of the top of the curb forming portion of said screed, the depressor plates in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates.

8. A forming structure for a concrete finishing machine comprising, a framework adapted to be advanced longitudinally, a screed carried by said framework and hav-

ing a longitudinally extending gutter forming section, an upwardly and forwardly inclined plow portion at the front of said gutter forming section, a raised portion on the side of said screed constituting a curb forming section, the front of said curb forming section terminating substantially rearwardly from the front of said gutter forming section, an upwardly and forwardly inclined plow portion at the front of said curb forming section, a plurality of transversely spaced longitudinally extending depressor elements positioned in sets at the fronts of said curb forming section and said gutter forming section, said depressor elements having downwardly and rearwardly inclined front edges extending downwardly below the level of their associated section of said screed, the depressor elements in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates and means for vibrating one of said sets of depressor elements.

9. A forming structure for a concrete finishing machine comprising, a screed adapted to be advanced longitudinally and having a longitudinally extending gutter forming section, a raised portion on the side of said screed constituting a curb forming section, the front of said curb forming section terminating substantially rearwardly from the front of said gutter forming section, a plurality of transversely spaced longitudinally extending depressor elements positioned in sets at the fronts of said curb forming section and said gutter forming section, said depressor elements having downwardly and rearwardly inclined front edges extending downwardly below the level of their associated section of said screed, the depressor elements in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates and means for vibrating one of said sets of depressor elements.

10. A forming structure for a concrete finishing machine comprising, a screed adapted to be advanced longitudinally and having a longitudinally extending gutter forming section, a raised portion on the side of said screed constituting a curb forming section, the front of said curb forming section terminating substantially rearwardly from the front of said gutter forming section, and a plurality of transversely spaced longitudinally extending depressor elements positioned in sets at the fronts of said curb forming section and said gutter forming section, said depressor elements having downwardly and rearwardly inclined front edges extending downwardly below the level of their associated section of said screed, the depressor elements in said sets being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support pieces of large aggregate between adjacent plates.



11. A forming structure for a concrete finishing machine comprising, a screed adapted to be advanced longitudinally and having a longitudinally extending gutter forming section, a raised portion on the side of said screed constituting a curb forming section, the front of said curb forming section terminating substantially rearwardly from the front of said gutter forming section, and a plurality of transversely spaced longitudinally extending depressor elements positioned at the front of one of said sections, said depressor elements having downwardly and rearwardly inclined front edges extending downwardly below the level of their associated section of said screed, the depressor elements being spaced apart far enough to pass the fine aggregate of concrete therebetween but being close enough together to intercept and support large pieces of aggregate between adjacent elements.

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