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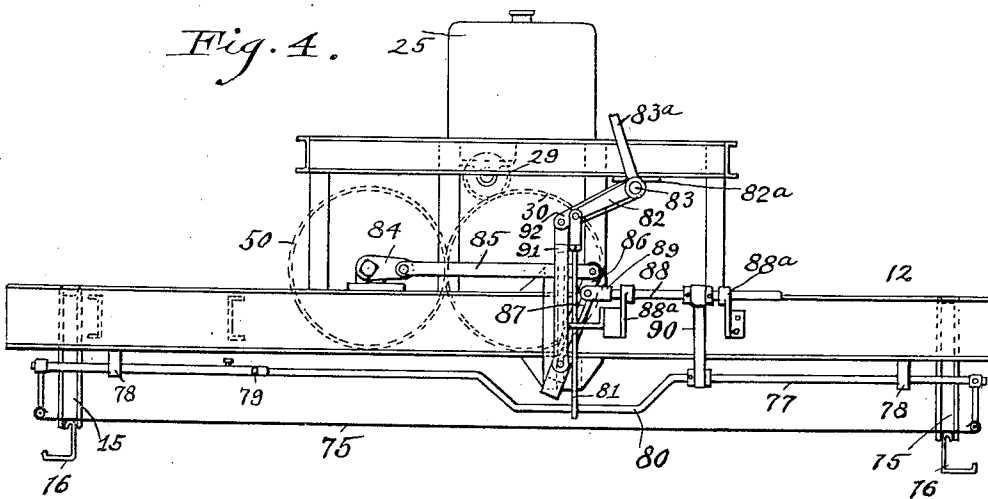
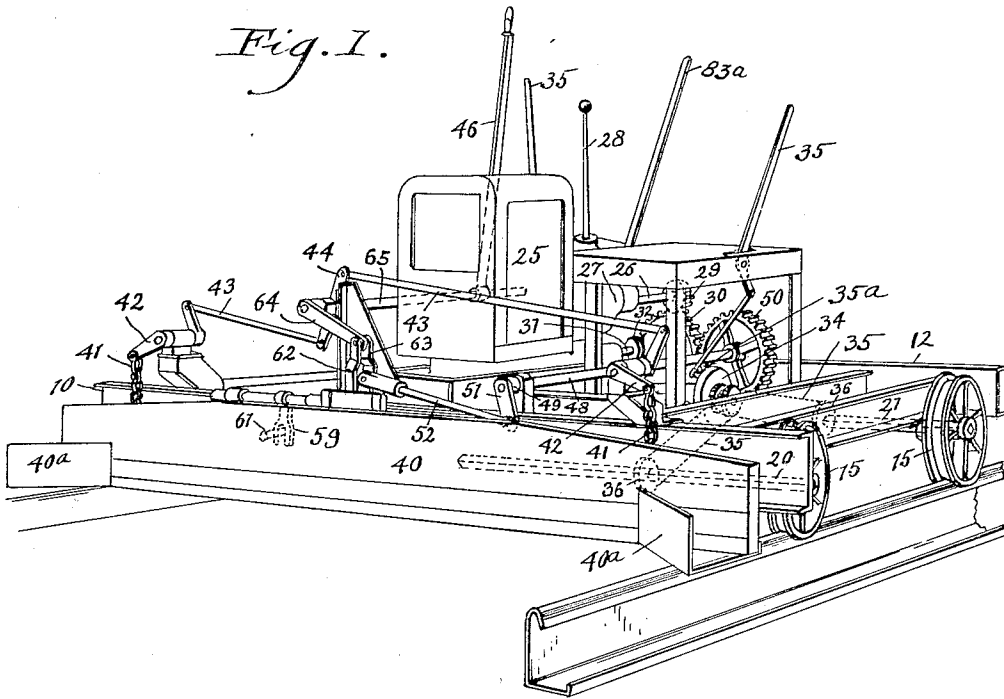
J. H. MOSEL ET AL

1,817,161

MACHINE FOR SPREADING AND SURFACING CONSTRUCTION MATERIAL

Filed March 10, 1928

4 Sheets-Sheet 1



Inventors.
Joseph H. Mosel
Clarence J. Bohmer.
Kerr Hudson & Kent
attys.

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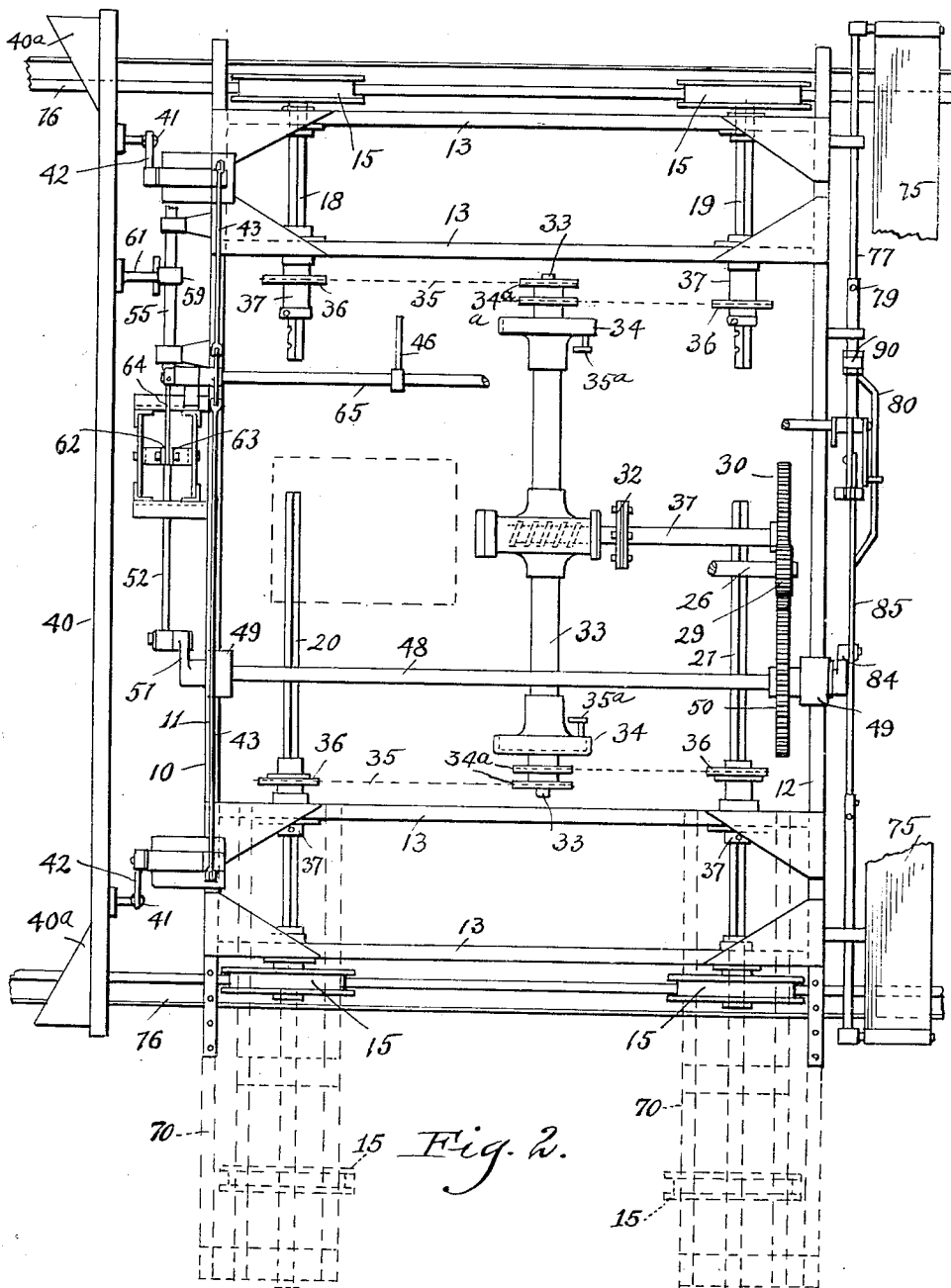
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MACHINE FOR SPREADING AND SURFACING CONSTRUCTION MATERIAL

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4 Sheets-Sheet 2



Inventors:
 Joseph H. Mosel
 Clarence J. Bohmer.
 Cross Hudson & Kent
 attys.

Aug. 4, 1931.

J. H. MOSEL ET AL

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4 Sheets-Sheet 3

Fig. 3.

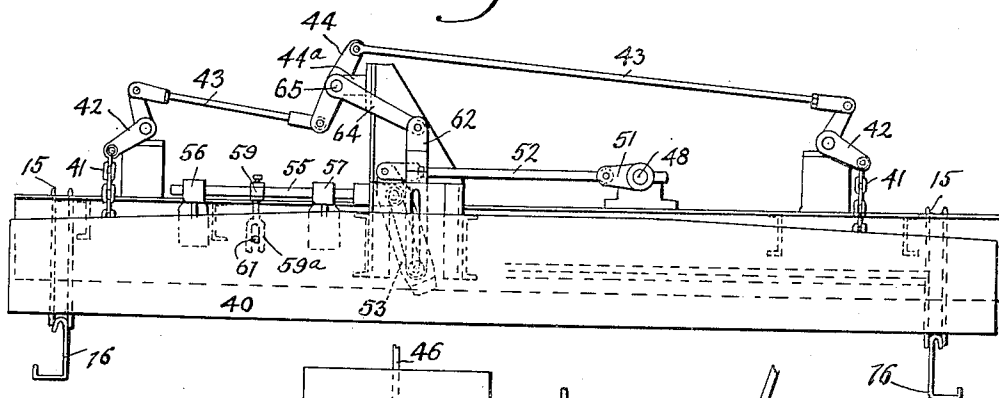


Fig. 5.

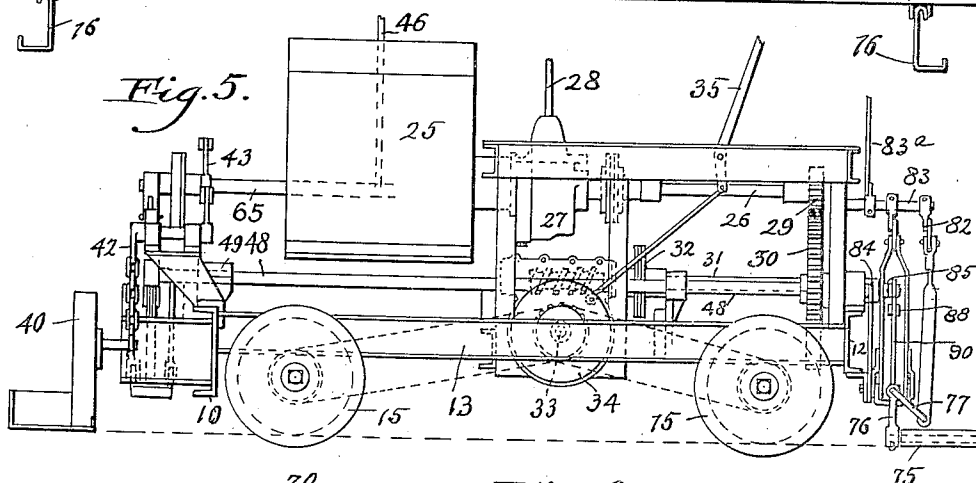


Fig. 6.

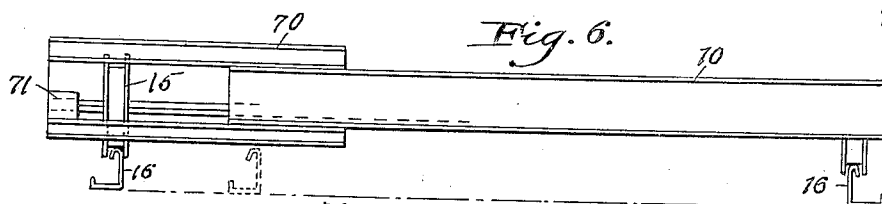


Fig. 7.

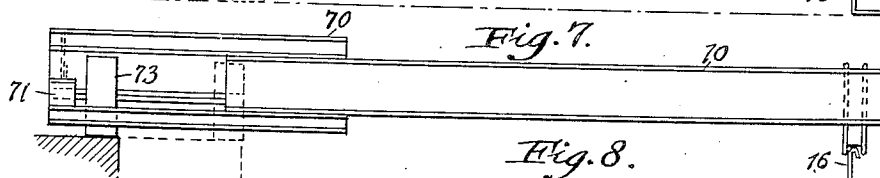


Fig. 9

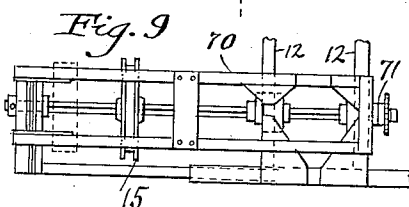
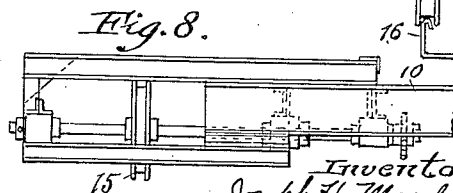


Fig. 8.



Inventors,
Joseph H. Mosel
Clarence J. Bohmer.
Kiver Hudson & Kent attys.

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4 Sheets-Sheet 4

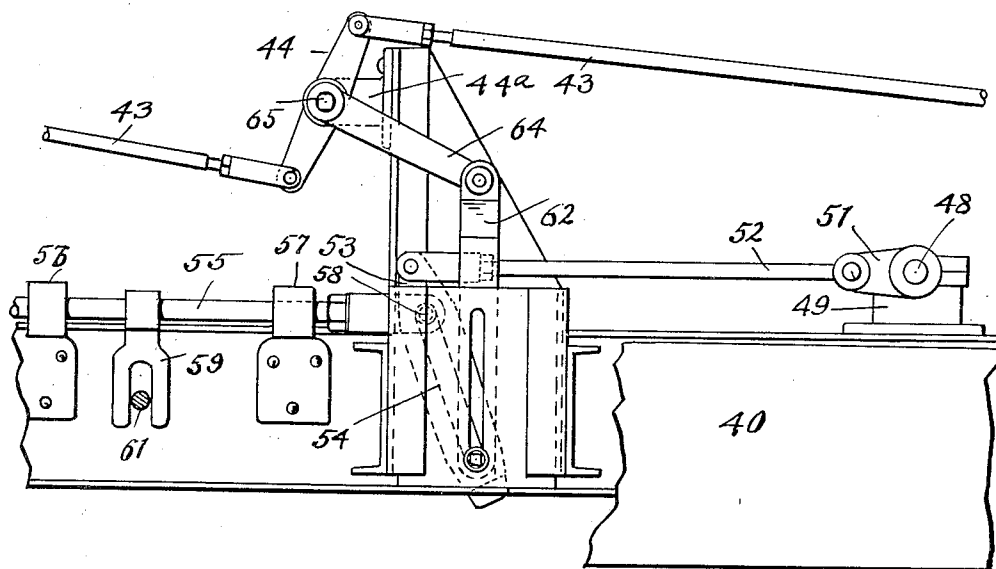


Fig. 10.

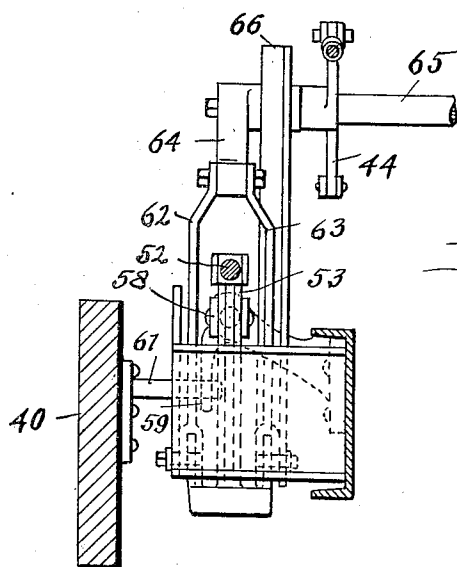


Fig. 11.

Inventors

Joseph H. Mosel
Clarence I. Bohmer.

By

Knox Hudson & Kent

Attorneys

UNITED STATES PATENT OFFICE

JOSEPH H. MOSEL, OF LAKEWOOD, AND CLARENCE I. BOHMER, OF BAY VILLAGE, OHIO,
ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE JAEGER MACHINE COMPANY, OF
COLUMBUS, OHIO, A CORPORATION OF OHIO

MACHINE FOR SPREADING AND SURFACING CONSTRUCTION MATERIAL

Application filed March 10, 1928. Serial No. 260,640.

This invention relates to surfacing machines and it has particular reference to machines for spreading and leveling concrete, asphalt or other road building materials, but is also adapted for use in connection with the construction of floors, foundations, etc., or, in other words, wherever the material is to be formed into slabs.

In highway construction operations after the confining forms are placed in position, concrete batches in plastic state are poured or dumped promiscuously into the forms, after which the concrete is leveled and given a smooth outer surface.

In the past few years highway construction has undergone important changes. The great increase in the number of motor vehicles in use, raising of speed limits and concerted effort toward safety in driving have been partially responsible for these changes. The modern highway is of such a width as to permit several vehicles to pass at the same time and where curves occur is still wider. Shoulders are being added to the older highways and their curves also are being widened.

The present method of construction, therefore, is to build the highway in slabs of one-half the width of the finished road.

The widening of curves has heretofore presented a serious problem from the standpoint of time and labor consumed as it has necessitated the laying of supplemental or "false forms." These forms are laid outside the regular width form and are filled and tamped by hand, the removal of the regular form being very difficult and requiring still another hand operation to fill the space from which the form has been removed.

It is with a view to overcoming these difficulties and objections and to combine in a single, self-propelled machine means for performing these various operations that the present invention was conceived.

An object of the invention is to provide a machine of the type above referred to that is adapted to travel by its own power along a track which constitutes a part of the form within which the concrete is to be confined.

Another object is to provide a machine that is adjustable to different widths of slabs

and which is particularly adapted to operate upon widened curves in highways.

A further object is to provide a machine embodying a reciprocatory member adapted to subject the mass of material to a kneading and compacting action during the leveling operation, the throw of said member being adjustable manually during operation of the machine.

A still further object is to provide means for aligning the machine with respect to the forms.

Other objects and advantages will be derived from practice of the invention which will become apparent from a perusal of the following specification in which a preferred embodiment of the invention is described, considered in connection with the accompanying drawings illustrating the same, wherein—

Fig. 1 is a view in perspective of a machine constructed in accordance with the invention;

Fig. 2 is a plan view of the machine;

Fig. 3 is a front elevational view, certain parts being illustrated diagrammatically;

Fig. 4 is a rear elevational view;

Fig. 5 is a side elevational view;

Figs. 6 to 9 inclusive are detail views in elevation, illustrating an extension member adapted to be utilized with the machine on certain types of work;

Figs. 10 and 11 are front and end elevational views, respectively, illustrating in detail the screed operating mechanism.

The numeral 10 designates a frame or supporting structure comprising front and rear transverse members 11 and 12 respectively which are connected at intervals by longitudinal braces 13, the entire structure being formed preferably of channel irons bolted or otherwise secured together to form a rigid frame. The frame is supported on double flanged wheels 15 disposed in pairs at opposite sides thereof and mounted on squared shafts 18, 19, 20 and 21 secured in suitable bearings carried by the frame 10.

The wheels 15 are adapted to engage rails 16 which constitute a part of the sectional

forms within which the concrete mixture is to be confined.

As stated above, the machine is adaptable to variations in width between the forms and to this end the axles or shafts 20 and 21 are considerably longer than shafts 18 and 19, and may be adjusted axially.

A source of power, such as an internal combustion motor, indicated diagrammatically at 25, is mounted on the frame and is adapted to drive a shaft 26, the power being transmitted through a sliding gear transmission device 27 controlled by a lever 28. The shaft 26 carries a pinion 29 that is constantly in mesh with a relatively large gear 30 secured on one end of a shaft 31. The opposite end of the shaft 31 is connected through a universal joint 32 with a differential gearing mechanism which is adapted to drive either or both of a pair of oppositely disposed axles 33. Braking devices 34 having manually controlled levers 35a are provided whereby either of the axles 33 may be held against rotation.

For driving individually the wheels 15, there are provided adjacent the outer end of each of the axles 33 a pair of sprockets 34a which are connected by sprocket chains 35 with similar sprockets 36 adjustably secured on the squared shafts 18, 19, 20 and 21 by means of collars 37. It will thus be seen that either side of the machine may be propelled forward or backward independently of the other side so that the machine may at all times be kept square with respect to the forms. This feature is particularly important when operating around a curve in a roadway.

The means employed for spreading and surfacing the concrete comprise, respectively, a reciprocating member hereinafter termed a screed, which is mounted on the forward part of the frame, and a reciprocating belt mounted at the rear of the frame. Both are driven by the same source of power which propels the machine and are adapted to operate simultaneously with the forward or backward movement of the machine along the forms.

The screed member, designated by the numeral 40, is supported by means of heavy chains 41 from a pair of bell crank levers 42 mounted in suitable bearings at opposite sides of the frame and connected by links 43 to a rock arm 44 carried by a bracket 44a on the machine frame and controlled by hand lever 46, the manipulation of which raises or lowers the screed as desired.

Reciprocatory movement is imparted to the screed by a mechanism including a power driven shaft 48 extending from the front toward the rear of the frame and mounted in suitable bearings 49 and having secured thereon a large gear 50 which is constantly in mesh with the gear 30. The shaft 48 carries at its forward end a crank arm 51 to which is piv-

otally secured one end of a rod 52. The opposite end of the rod 52 has pivotally suspended therefrom a relatively long link 53 formed with an elongated slot 54, the function of which will be described presently. A shaft 55 is mounted so as to slide freely within a pair of spaced bearings 56 and 57 suitably secured on the forward end of the frame 10 and has one of its ends secured within the slot 54 by means such as a pin connection 58, the pin normally engaging the uppermost end of the slot and connection being such as to permit free movement of the link 53 with respect to the shaft 55.

A member 59 having a bifurcated lower end portion 59a is secured on the shaft 55 and depends therefrom, the bifurcated end engaging a pin 61 secured to and projecting rearwardly from the inner face of the screed 40. It will thus be apparent that upon rotation of the crank arm 51 a reciprocatory movement will be transmitted through rod 52, link 53, shaft 55 and member 59 to the screed 40, such movement being approximately equal to the throw of the crank arm 51.

As a means for preventing the material from overflowing the sides and to insure proper filling of the forms, guide members or deflectors 40a are provided. These deflectors are mounted adjacent the ends of the screed 40 so as to extend forwardly and outwardly at an angle thereto. Each deflector comprises a flat base portion which is disposed beneath the lower edge of the screed and is formed with an upwardly extending flange adapted to be bolted or otherwise secured to the rear face thereof. Accordingly, as the screed is reciprocated during movement of the machine the material directly in front of the screed piles up against the deflectors and is guided toward the center thereof, thus insuring a uniform distribution of the material within the forms and greatly reducing the overflow along the sides.

In order to adapt the machine to operate with a maximum efficiency, it is desirable, under certain conditions, to vary the throw or the length of the path of movement of the screed member 40, and to attain this end means are provided whereby the effective throw of the crank arm 51 with respect to the shaft 55 may be adjusted manually, the means referred to including a pair of spaced, parallel links 62 and 63 between which the link 53 is secured by means of a bolt passing through the lowermost end of the slot 54. The uppermost ends of the links 62 and 63 are pivotally connected to an arm 64 secured on a shaft 65 extending from the front toward the rear of the frame and carried by the bearing bracket 44a. The movement of the shaft 65 to raise or lower the arm 64 and link 62 is controlled by the hand lever 46 mounted on the frame.

Thus, with the parts in the position illus-

trated in Figs. 1 and 3, the screed 40 will reciprocate through a path equal to substantially the full throw of the crank arm 51. If, however, it is found desirable to decrease the path of movement of the screed, the hand lever is moved toward the left, as viewed in Fig. 1, which causes the arm 64 to swing upwardly carrying the links 53 and 62. The connection between shaft 55 and link 53 now assumes a position spaced from the end of slot 54 a distance determined by the extent of movement of the hand lever 67. It will be readily appreciated that with the crank arm 51 in motion only a part of its throw will be transmitted to the screed 40, the remainder being absorbed by the link 53.

The final surfacing of the concrete is accomplished by means of a reciprocating belt 75 formed preferably of heavy canvas fabric. The belt is mounted at the rear of the frame 10 and in operative position has its broad face disposed parallel with the roadway. The operation of the belt 75 and the mechanism therefor is very similar to that used in connection with the screed 40. The belt 75 is supported upon a pair of L-shaped brackets 76 which are carried by a laterally extending shaft 77 which in turn is slidably and rotatably supported from hangers 78 secured on the main frame 10. The shaft 77 comprises telescoping sections and is adjustable as to length by means of set screws 79, the belt 75 also being adjustable as to length by means such as an ordinary buckle and loop. At a point substantially midway of its length, the shaft 77 is formed with an offset or crank portion 80 which is connected through a link 81 with an arm 82 secured on a shaft 83 supported for rotation in bearings 82a carried by the frame 10.

The hand lever 83a is keyed or otherwise secured on the shaft 83 for controlling the movement thereof.

The reciprocatory movement of the belt is effected by means including a crank arm 84 secured on the shaft 48 which shaft also carries at its opposite end the crank arm 51 for moving the screed. The crank arm 84 is adapted to actuate a connecting rod 85 from the end of which is pivotally suspended a link 86 formed with an elongated slot 87.

A relatively short rod 88 is supported substantially in alignment with the connecting rod 85 by means of spaced bearing brackets 88a. One end of the shaft 88 is freely secured within the slot 87 by means such as a pin and clevis connection 89 so that as the rod is caused to reciprocate by reason of its connection with the crank arm 84 similar movement is imparted to the shaft 88. A rigid connection comprising a clamp bar 90 is provided between the shaft 88 and the shaft 77 which carries the belt 75.

The lower end of the slot 87 is connected

by means of a link 91 with an arm 92 similar to the arm 82 and likewise secured on the shaft 83.

In order to adapt the machine to operate around widened curves, the present invention contemplates the provision of extension members indicated generally by the numeral 70. These extensions are illustrated by Figs. 6 to 8 inclusive, and each comprises a substantially square frame having a bearing 71 suitably supported at one end. The opposite ends of the extension frames are adapted to be bolted to the main frame 10. In preparing the machine for widened curve work on the first half of the roadway, the two inside flanged wheels 15 are removed and the extension 70 bolted to the side of the frame 10 adjacent its front and rear ends.

The squared axles or shafts 20 and 21 are then loosened and pulled outwardly and the wheels replaced, the ends of the axles being subsequently inserted in the bearings 71, the wheels being left free to slide along the axles within the limits of the extension member 70. It will be readily understood that as the machine travels around the widened curve the wheels within the extensions will slide along the squared axles, being guided along the forms by means of the double flanges.

When operating upon the second half of the roadway, the double flanged wheels in the extension members 70 are replaced by flat tread wheels 73 which are set at maximum width on the finished slab and are made fast on the axles 20 and 21. As the widened portion of the curve is reached, the double flanged wheels guide the machine and the flat tread wheels 73 are caused to move in or out on the smooth surface of the finished slab as the width of the second half is increased or diminished.

The features described in the two preceding paragraphs constitute an important part of the invention inasmuch as they render unnecessary the setting of false forms on widened curve operations as hereinbefore described.

The operation of the machine is as follows:

The forms having been laid to the desired width, the flanged wheels are correspondingly adjusted so that the double flanges engage the rails, constituting a part of the forms. Concrete in plastic state is delivered between the forms and the machine is started. By manipulation of the proper control lever power is transmitted to the four drive wheels and the machine is caused to move forward at the optional rate of 8 feet or 15 feet per minute.

Through the link mechanism described hereinbefore, the screed 40 is caused to reciprocate through a path which is adjustable from 1 inch to 6 inches in length and at approximately 35 strokes per minute.

These speeds obviously are directly dependent upon the ratios between the actuating gears.

During the forward movement of the machine the mass of plastic concrete is pushed ahead of the screen 40, and at the same time is subjected to a kneading and compacting action by the lateral reciprocation of the screed, the surface of the material lying beneath and to the rear thereof being left substantially smooth. As the forward movement continues, the reciprocating belt at the rear of the machine completes the leveling operation, giving the concrete its final, smooth finish.

When in the course of operation of the machine it is found desirable to decrease the throw of the screed 40 or to stop its movement without effecting the other parts of the machine, it is only necessary for the operator to move the hand lever 67 toward the left from the position shown in Fig. 1. A slight movement of the lever will cause the slotted link 53 to be lifted, causing the point of connection between the shafts 52 and 55 to be moved to a position nearer the bottom of the slot 54, resulting in increased movement of the link and decreased movement of the screed. If the lever 67 be moved so as to lift the link 53 sufficiently to cause the connection of shaft 55 to move to the end of the slot, all movement of the crank arm 51 and shaft 52 will be taken up by the link 53 and the screen will remain stationary.

The movement of the belt 75 may be controlled in a similar manner by manipulation of the hand lever 83a which will cause the slotted link 86 to be lifted or lowered to decrease or increase the movement of the belt. If the lever 83a be moved to its extreme righthand position, as illustrated in Fig. 4, the belt will be lifted clear of the roadway and swung to a position at right angles thereto by reason of the rotation of the crank portion 80 of shaft 77 as the link 81 is raised. Also the reciprocatory movement of the belt will cease as the connection of shaft 88 is moved to the lower end of the slot 87.

It is believed that the construction and operation of the machine will be apparent from the foregoing description, and it will be understood that we do not desire to be confined to the precise construction and arrangement of parts illustrated and described but desire that only such limitations be imposed as shall come within the scope of the appended claims.

Having thus described our invention, we claim:

1. In a machine for spreading and surfacing material, a transversely reciprocable member, means for reciprocating the same, and means including an adjustable lever connection for varying the throw of the member during reciprocation thereof.

2. In a machine for spreading and surfacing material, a transversely reciprocable member, means for reciprocating the same, and means for varying the throw of the member during reciprocation thereof.

3. In a traveling machine for spreading and surfacing material, a transversely reciprocable member, means for reciprocating the same, and means for varying the throw of the member during the travel of the machine.

4. In a machine for spreading and surfacing material, said machine being adapted to travel along the forms between which the material is confined, means for varying the gauge of the machine to conform to variations in the transverse distance between the forms, said means including wheels arranged to be slid longitudinally upon the axles supporting the same.

5. In a machine for spreading and surfacing material, said machine being adapted to travel along the forms within which the material is confined, means for varying the gauge of the machine to conform to variations in the transverse distance between the forms, said means including axially slidable wheels.

6. In a machine for spreading and surfacing material, said machine being adapted to travel along the forms within which the material is confined, means for controlling the movement of either side of the machine independently of the other side, said means including a plurality of individually driven wheels and mechanism for selectively breaking the rotation of the various wheels.

7. In a machine for spreading and surfacing material, a pair of transversely reciprocable members, means for reciprocating the same, and means for varying the throw of the members during the reciprocation thereof, one of said members being adapted to initially spread the material and the other of said members being adapted to surface the material.

8. In a machine for spreading and surfacing material, a transversely reciprocable member, a crank for reciprocating the same, and means for varying the effective throw of the crank with respect to the member during the operation of the reciprocable member.

9. In a machine for spreading and surfacing material, said machine including a frame having a source of power mounted thereon, an extension member adapted to be secured to said frame, a driven shaft journaled in said extension member and a wheel slidably secured on said shaft for rotation therewith.

10. In a machine for spreading and surfacing material, said machine including a frame having a source of power mounted thereon, a plurality of extension members adapted to be secured to said frame, driven shafts journaled in said extension members and a wheel

slidably secured on each of said shafts for rotation therewith.

11. In a machine for spreading and surfacing material, said machine being adapted to travel along the forms within which the material is confined, individually propelled driving wheels upon which the machine is supported, driving mechanism therefor, and means for braking the driving mechanism for one side of the machine independently of the other side.

In testimony whereof, we hereunto affix our signatures.

JOSEPH H. MOSEL.
CLARENCE I. BOHMER.