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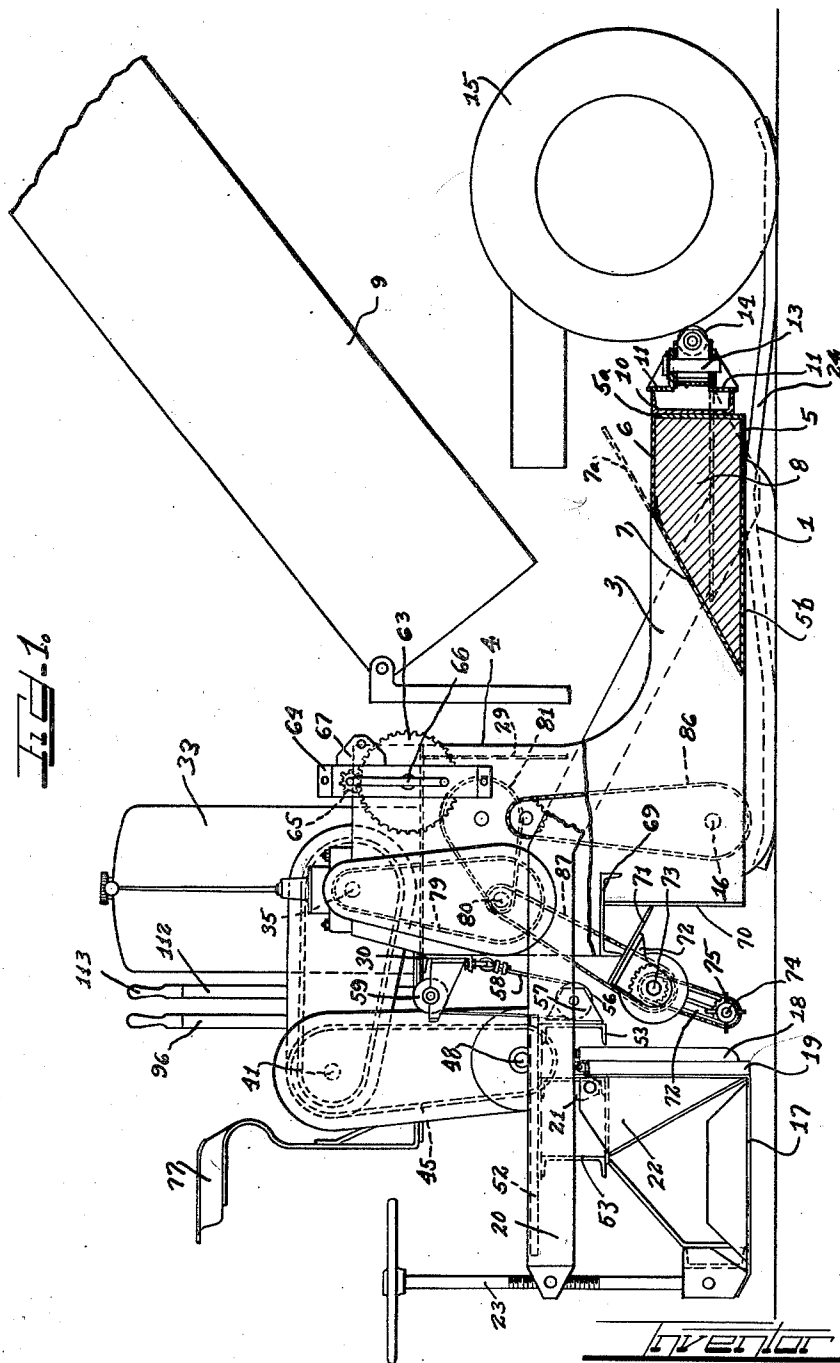
H. H. BARBER

2,168,507

PROPELLING AND FINISHING UNITS

Filed Dec. 17, 1936

5 Sheets-Sheet 1



Harry H. Barber.

Charles E. Barber.

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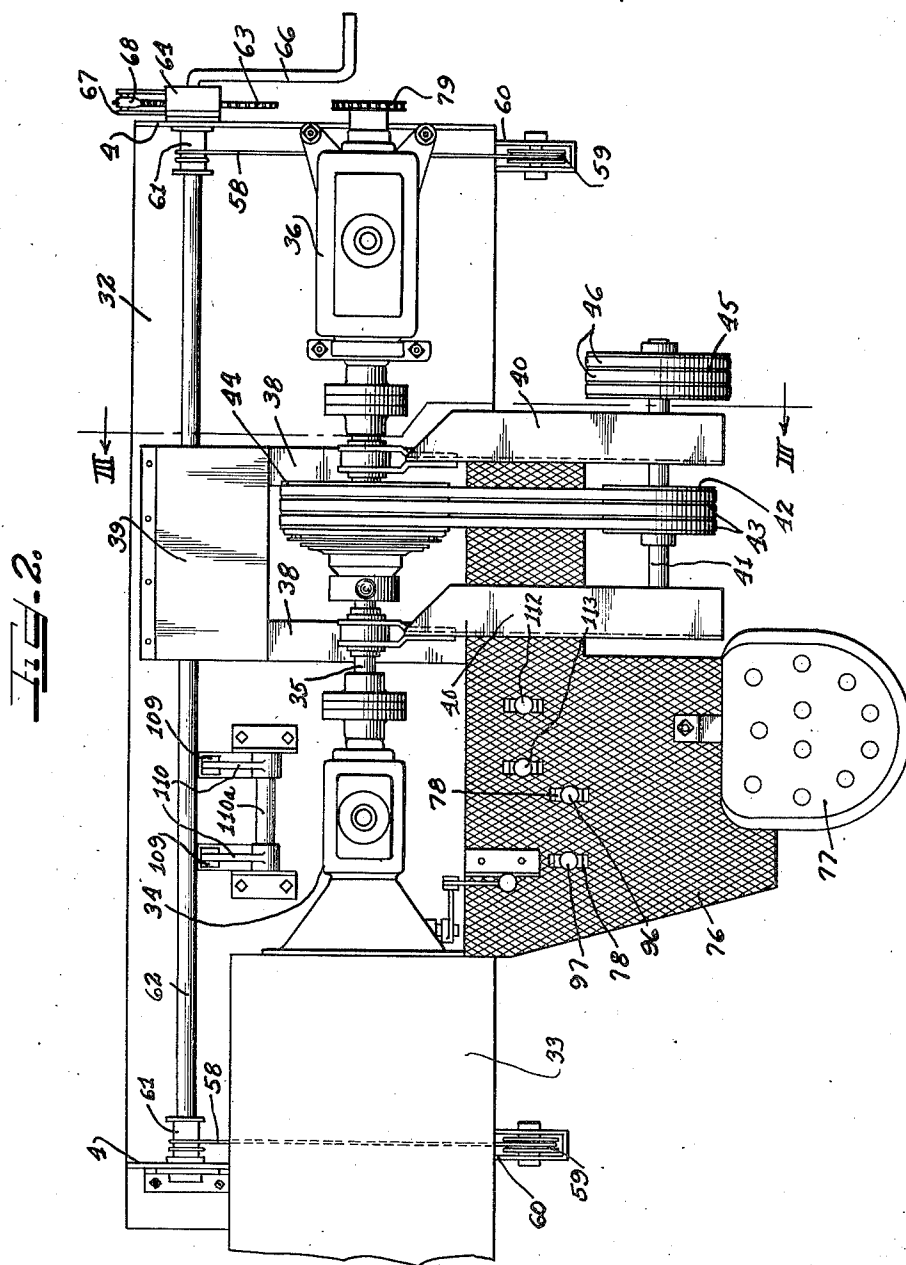
H. H. BARBER

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5 Sheets-Sheet 2



Inventor
Harry H. Barber.
Charles Hill, Att'y.

Aug. 8, 1939.

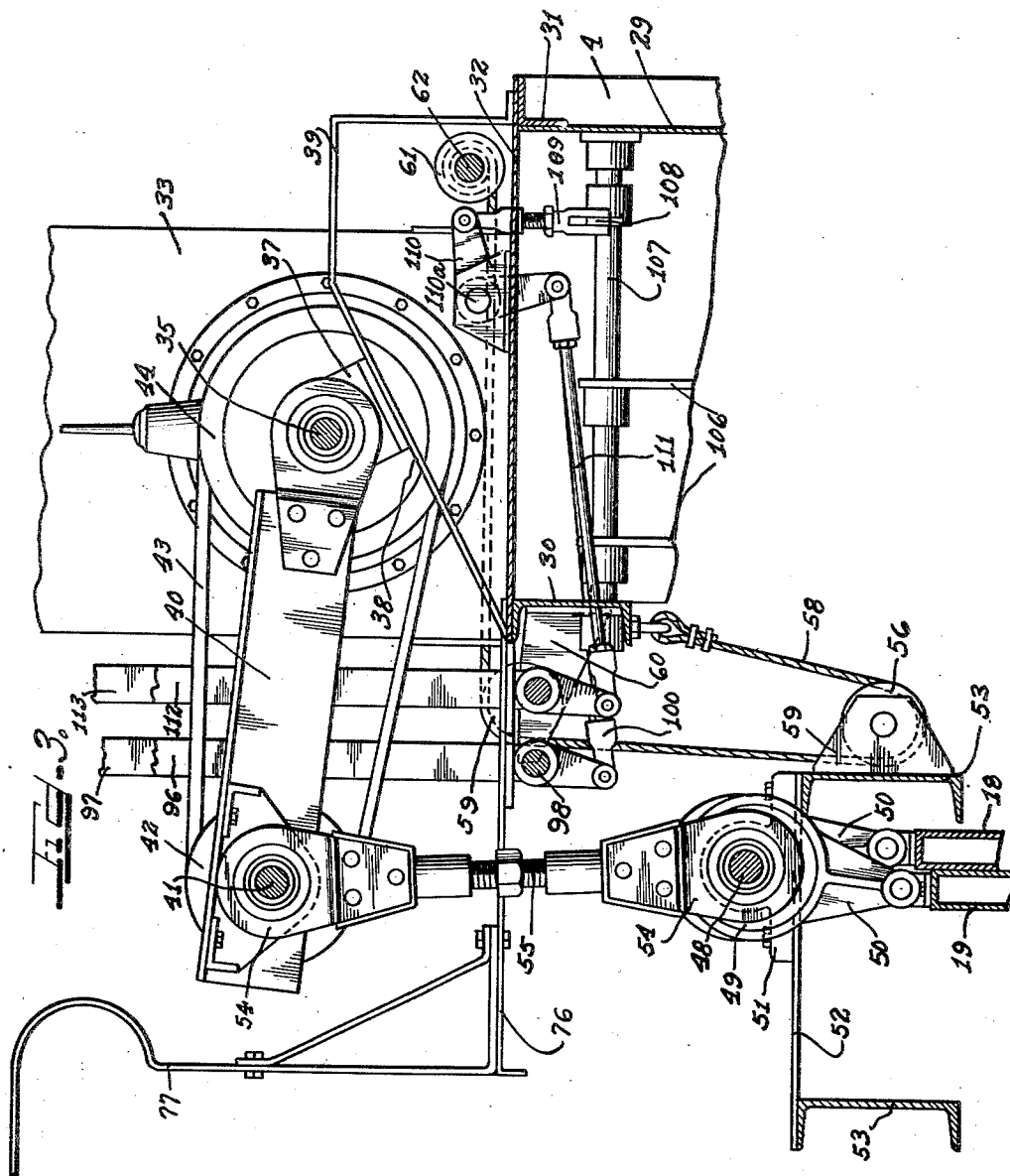
H. H. BARBER

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5 Sheets-Sheet 3



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Inventor
Harry H. Barber.
Charles H. Barber
Attys.

Aug. 8, 1939.

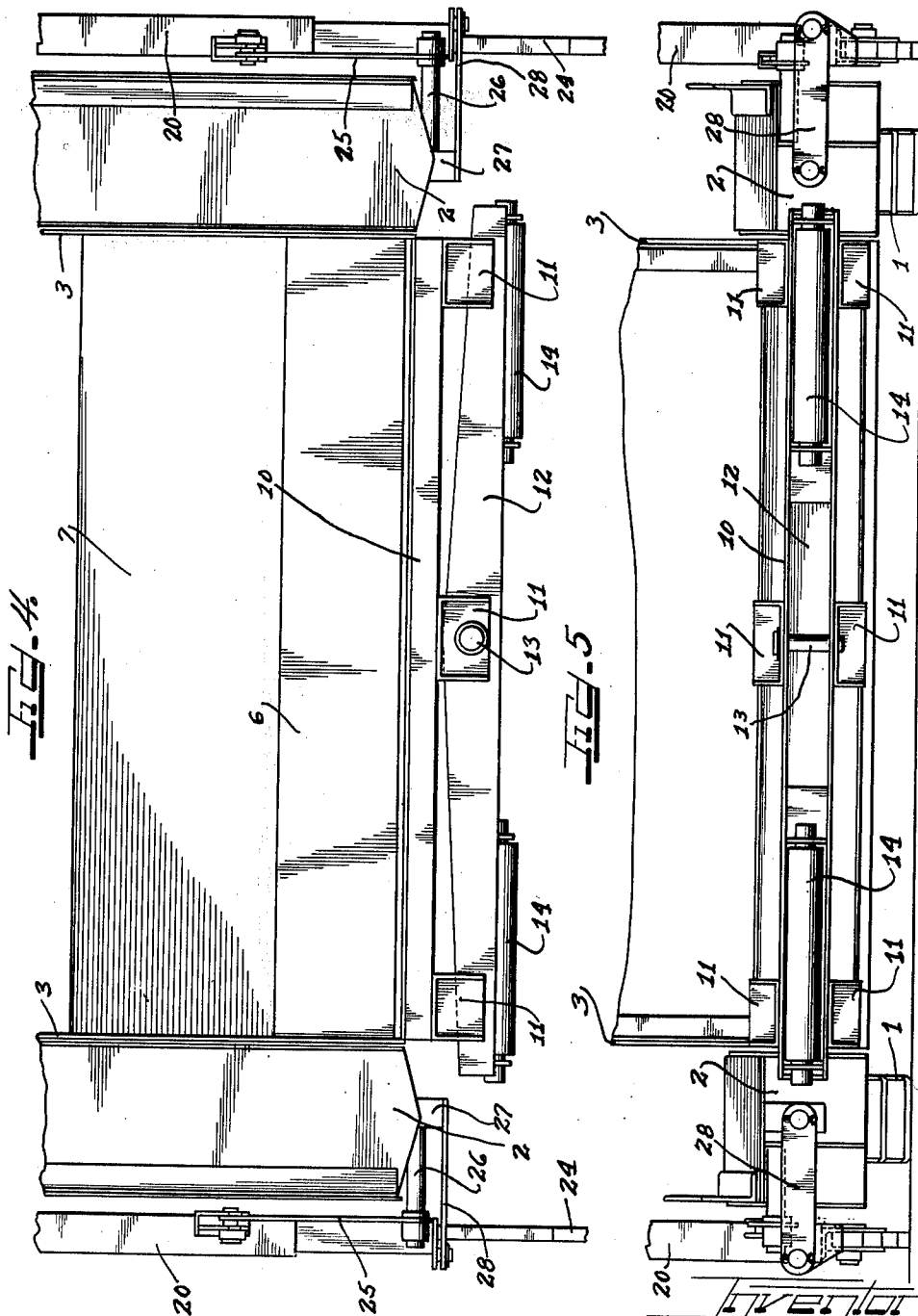
H. H. BARBER

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5 Sheets-Sheet 4



Inventor
Harry H. Barber.
Charles B. Barber
Attys.

Aug. 8, 1939.

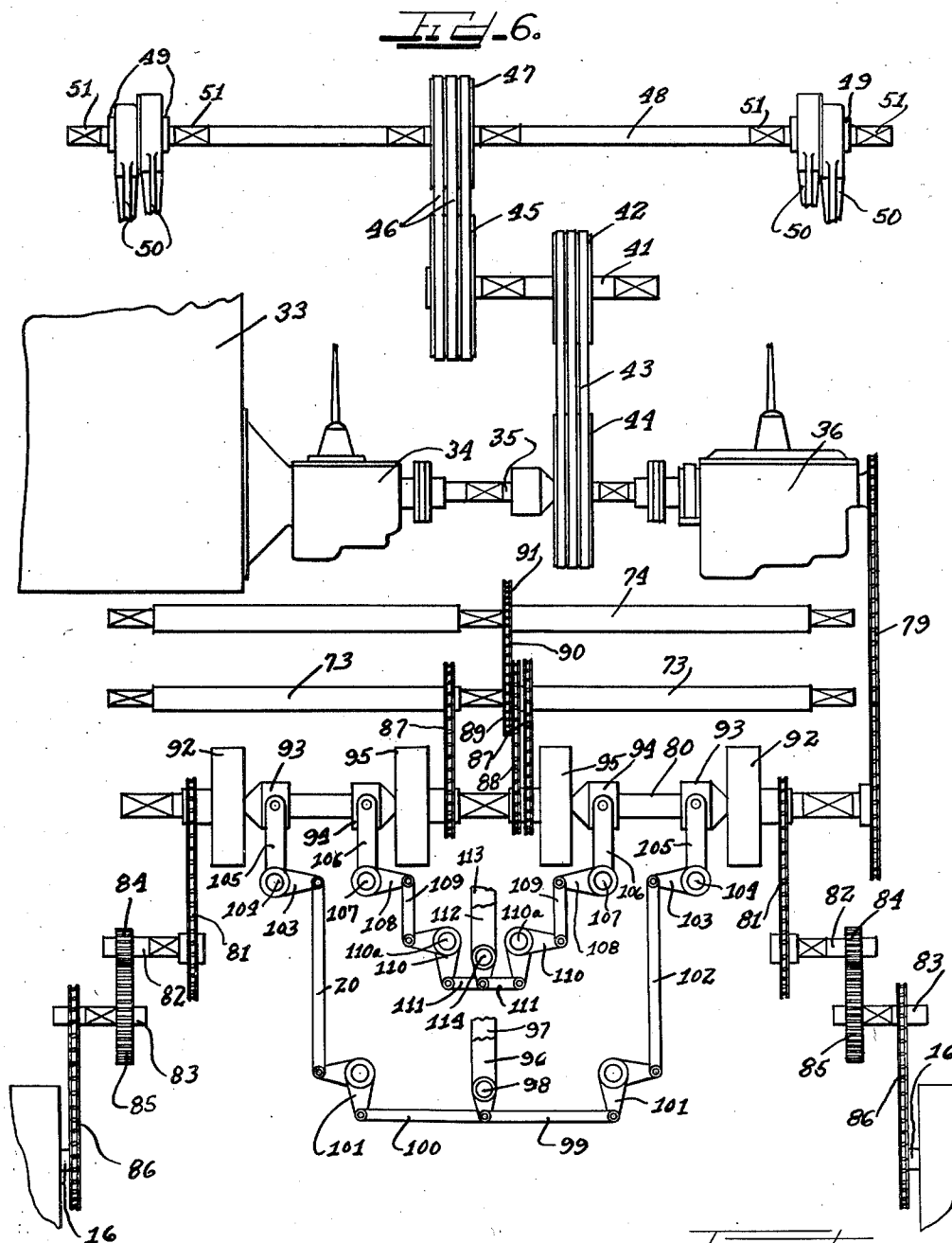
H. H. BARBER

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PROPELLING AND FINISHING UNITS

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5 Sheets-Sheet 5



INVENTOR
Harry H. Barber.

Charles H. Allen

Attys.

64

UNITED STATES PATENT OFFICE

2,168,507

PROPELLING AND FINISHING UNITS

Harry H. Barber, Aurora, Ill., assignor to Barber-Greene Company, Aurora, Ill., a corporation of Illinois

Application December 17, 1936, Serial No. 116,283

22 Claims. (Cl. 94—45)

This invention relates to a self-propelled finishing machine designed for travelling movement under its own power and adapted for propelling a truck that delivers the road building material.

5 It is an object of this invention to combine such a pavement finishing machine, as shown in United States Letters Patent No. 2,138,828, with power means for propelling the same so that prepared road making material may be dumped in front of
10 the same by a truck or the like.

It is a further object of the invention to provide means for elevating the screed and tampers and supporting the same in elevated position for obtaining a predetermined thickness of pavement or for travelling purposes.

It is also an object of this invention to provide operating means for the tampers that will adjust itself for adjustment of the screed and tampers.

20 With these and other objects in view which will become apparent in the following description, this invention comprises the novel structure and combinations of parts hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred form of this invention and in which similar reference numerals refer to similar features in the different views:

30 Figure 1 is a side elevational view of a road finishing machine involving this invention, with parts shown in section.

Figure 2 is a top plan view of the machine with the front parts omitted.

35 Figure 3 is an enlarged sectional view of the machine taken substantially upon the line III—III of Figure 2, looking in the direction of the arrows.

40 Figure 4 is an enlarged fragmentary top plan view of the front part of the machine.

Figure 5 is an enlarged fragmentary front end elevational view of the machine.

Figure 6 is a diagrammatic plan view of the operating parts of the machine.

45 The machine is supported upon a pair of crawlers 1 which are covered with frame housings 2. Adjacent the inner side of each housing 2 there is located a plate 3 that has an upwardly extending vertical portion 4 (Figure 1) that extends
50 beyond the rear end of the crawlers. To the front ends of the plates 3, there is welded an angle plate 5 (Figure 1) which consists of a vertical flange 5a extending between the front edges of the plates 3 and a horizontal flange 5b that is
55 welded at its ends to the lower margins of the

plates 3. The top margins of the front portions of the plates 3 are connected by a plate 6 which is welded thereto and which is also welded to the top of the flange 5a. The plate 6 is shorter than the plate 5 and the inner edges of these plates have a diagonal plate 7 welded thereto that naturally slopes downwardly and rearwardly. If desirable, an extension plate 7a shown in dotted lines may be hinged to the top of the plate 7, to form an extension of said plate for a purpose that will later appear. It will of course be understood that the plate 7a should be so hinged that it can be superposed upon the plate 7 and that the hinges will maintain the same, as shown in dotted lines, when the same is extended. The plates 5, 6 and 7 form a box-like structure adapted for containing some material 8 for counter-balancing purposes. It might be mentioned that the sloping plate 7 and its extension 7a, when used, serve as a chute down which road building material 20 may be poured from a truck 9.

Upon the front face of the angle plate 5, there is welded a channel bar 10. Upper and lower angle guide blocks 11 are welded to the flanges of the channel 10. An equalizing bar 12 in the form of a channel is located between the upper and lower guide blocks 11 and is pivotally connected to the two center guide blocks by a pivot pin 13. Elongated rollers 14 are suitably journaled in the channel of the equalizing bar 12 adjacent the ends thereof. These rollers project slightly beyond the channel for engaging the wheels 15 (Figure 1) of the truck 9 for advancing the same during the operation of the finishing machine.

The side frame plates 3 are pivotally supported by means of the operating shaft 16 (Fig. 1) for the crawlers that extend through suitable apertures in said plates. These side plates 3 constitute the load sustaining members for the engine and operating mechanism, and for this reason the counter-balance 8 is required.

The road paving elements comprise a screed 17 and a pair of tampers 18 and 19, as in my co-pending application. The screed 17 is attached to a pair of side arms 20 in a manner similar to that shown in my issued patent, by means of lugs 21 on the side arms pivoted to the side plates 22 of the screed and by means of screw rods 23 threaded in pivot blocks on the arms and screed. These screws are adjustable for tilting the screed for varying the thickness of the pavement.

The front ends of the arms 20 which incline downwardly are pivoted to shoes 24 which slide upon the roadway adjacent the crawlers. These arms 20 are pivotally connected by means of links

25 (Figure 4) to the front end of the crawler housings 2. For this purpose, suitable studs 26 secured to the front ends of the crawler housings by means of blocks 27 project to the outer sides of said housings for pivotally supporting the forward ends of said links. The front ends of said arms are also pivotally connected to said blocks 27 by means of lateral links 28 which tend to prevent side sway of said arms.

10 Between the vertical portions 4 of the plates 3 and adjacent the forward edges thereof, there is welded a plate 29 (Figure 3) that extends downwardly to a point adjacent the curves in the front edges thereof, as shown in dotted lines in Figure 1. 15 Rearwardly of the plate 29, a channel bar 30 is welded between the plate portions 4. An angle bar 31 is welded to the front surface of the plate 29 at the same elevation as the channel bar 30. A platform 32 is supported upon the channel bar 30 and the angle bar 31 for sustaining the engine 33. It will be noted that the vertical portion 4 of the plate 3 adjacent the engine 33 terminates substantially flush with the platform 32 so that the engine may project beyond the same, as shown 25 in Figure 2. The engine shaft extends into a conventional change speed transmission casing 34 from which a shaft 35 extends across the platform 32 and into a second change speed transmission casing 36. 30 The intermediate portion of the shaft 35 is supported by bearings 37 (Figure 3) extending from inclined supports 38. The inclined supports 38 are in spaced relation, as shown in Figure 2, and they extend downwardly from the top of a sheet metal box or structure 39 resting upon the platform 32 until they abut the platform 32.

Upon the shaft 35 are journaled a pair of arms 40 that support a shaft 41. A pulley 42 secured upon the shaft 41 has a plurality of belts 43 trained thereover and also over a pulley 44 on the driving shaft 35. The shaft 41 is hence rotated from a driving connection with the shaft 35 and is capable of moving in an arc with the shaft 35 as a center without affecting such driving connection. A pulley 45 is secured upon the end of the shaft 41. A plurality of belts 46 45 trained over the pulley 45 and over a pulley 47 secured on a shaft 48 forms a driving connection for the shaft 48 which is the tamper operating shaft. 50

The shaft 48 is provided with two pair of eccentrics 49 at each end which are connected by eccentric straps 50 with the tampers 18 and 19. The shaft 48 is journaled in bearings 51 secured to a plate 52 supported upon channel bars 53 supported by the screed. The plate 52 is of course provided with suitable apertures for the eccentric straps. The shafts 41 and 48 are shown as provided with bearings 54 (Figure 3) adjustably connected by a rotatable screw 55. Any number of such bearings 54 with screw connections 55 may be used as desired for maintaining said shafts in proper spaced relation. The adjustment of the screws 55 will of course serve to 65 tighten the belts 46.

The tampers and screed are adapted to be manually raised or lowered by means of the mechanism which will now be set forth. Upon opposite end portions of the forward channel 53 70 are secured pulleys 56 by means of suitable pulley blocks 57 (Figures 2 and 3). Cables 58 which are anchored to the channel bar 30 are trained around the pulleys 56 and hence over guide pulleys 59 supported by brackets 60 secured to the channel beam 30. The cables 58

then extend horizontally and are secured to drums 61 fastened upon a shaft 62 which extends through the box-like structure 39. The ends of the shaft 62 are journaled in the plate portions 4 which may be provided with suitable bearings 5 for such a purpose. One end of the shaft 62 extends through its side plate 4 and supports a spur gear 63. A housing 64 supported by the side plate extends above the gear 63. A small spur gear 65, shown in dotted lines in Figure 1, 10 is mounted in said housing upon an arm of an operating crank 66 which is journaled in said housing. The spur gear meshes with the gear 63 with the result that when the crank 66 is rotated, in the proper direction, the shaft 62 will 15 be rotated for winding up the cables 58 for elevating the screed. A pair of bracket arms 67 extend from the housing 64, and between these arms 67 there is pivotally mounted a pawl 68 that engages the gear 63 and prevents reverse 20 rotation thereof. To lower the screed from an elevated position, the pawl 68 is disengaged from the gear, whereupon the screed and tampers will descend by gravity.

Between the side plates 3, there is welded a 25 channel bar 69 (Figure 1) and a vertical plate 70 below the said channel. A second plate 71 extends between the side plates 3 and is welded thereto and also to the channel bar 69 and the plate 70 so as to extend at an angle to a vertical plane. Bearing brackets 72 are attached to the plate 71, and shafts 73 and 74 are journaled in these brackets. The shaft 73 carries spirals for spreading the road building materials while the shaft 74 carries agitating pins 75 35 for agitating the materials, as disclosed in my copending application.

An operator's platform 76 carrying a seat 77 is secured to the platform 32 and extends rearwardly thereof. This platform 76 is provided 40 with a plurality of slots 78 for receiving the various control levers for the different clutches or the like, as will later more fully appear.

In referring to Figures 1 and 6, it will be observed that the transmission in the housing 36 is 45 connected by suitable sprocket gearing 79 with a jack shaft 80 suitably supported upon the framework of the machine. The shaft 80 is connected by sprocket gearing 81 to the shafts 82 which in turn are geared to shafts 83 by spur 50 gears 84 and 85. The shafts 83 are geared to the crawler shafts 16 by means of sprocket gearing 86.

The jack shaft is also geared to the two aligned spiral spreaders 73 by two sets of sprocket 55 gearing 87. The jack shaft 80 is also geared by a sprocket chain 88 to a double sprocket 89 loosely mounted upon one of the spiral spreader shafts 73, and a sprocket chain 90 operatively connects the double sprocket with a sprocket 91 60 on the agitating shaft 74.

The connection between the shaft 80 and the sprocket gearing 81 is effected through clutch elements 92 and 93. The driving connection between the jack shaft 80 and the aligned spiral 65 spreading elements is effected through clutch elements 94 and 95. The clutch levers for operating these clutches extend through the operator's platform for ready manipulation. The levers for controlling the clutch elements 93 are 70 indicated at 96 and 97. These levers are mounted side by side upon a cylindrical support 98. One lever is connected to a link 99 while the other is connected to a link 100. The links 99 and 100 are connected to bell crank levers 101 75

which in turn are pivotally connected by links 102 to arms 103 operating rock shafts 104 upon which shifter levers 105 are secured that are connected to the clutch elements 93.

5 The clutch elements 94 are actuated by shipper levers 106 upon rock shafts 107 which have arms 108 pivotally connected to links 109, which in turn are pivotally connected to bell crank levers 110 supported upon studs 110a. The bell crank 10 levers 110 are pivotally connected to links 111. One of the links 111 is connected to an operating lever 112 and the other to a lever 113. The levers 112 and 113 are rockably mounted upon a support 114. Thus, it will be apparent that 15 each spiral spreading element and each crawler may be independently controlled and driven with respect to the other.

In the operation of this machine, the road building material may be placed upon the road, 20 as desired. If desirable, it may be hauled by a truck and gradually poured in front of the machine so as to descend in front of or upon the inclined plate 7. In such an event, the truck can be gradually propelled forward through the engagement with the rollers 14. 25

The material deposited upon the roadbed will be spread over the roadbed by the spiral elements and agitated by the rotary agitator. Behind the rotary agitator are the tampers that 30 alternately rise and fall for tamping the material and the screed for smoothing the same.

Before starting the machine, the tampers and screed may be adjusted to the proper elevation by the operation of the winding shaft 62, the 35 arms pivoting on the shoes during such adjustment. Thereafter the screed may be adjusted by operating the screws 23 as explained in my issued patent. When the machine is travelling from place to place, the screed and tampers may be 40 elevated a suitable distance above the road by the winding shaft 62, as previously explained.

The machine involving this invention is especially useful in paving streets in cases where the paving material is already prepared and 45 taken to the roadway ready for use, in that it is a self-propelled machine. It will be appreciated that the feature of pivotally supporting the main structure on the crawlers and counter-balancing the same provides an advantageous flexibility that is very desirable in such machines. 50

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted 55 hereon otherwise than is necessitated by the prior art.

I claim as my invention:

1. In a road-finishing machine, a pair of ground 60 travelling members, a frame pivoted to said members, means for counter-balancing said frame, a screed rearward of said frame, tampers supported on said screed, side bars pivoted to said screed and connected to said members, and operating 65 mechanism on said frame connected to said tampers and automatically adjustable for vertical movements of said screed.

2. In a road-finishing machine, a frame, means 70 for supporting said frame for travelling movements, a screed rearward of said frame, a tamper supported on said screed, arms pivoted to said screed and connected to said means, and operating mechanism on said frame operatively connected 75 to said tamper and unaffected by vertical movements of said screed.

3. In a road-finishing machine, a pair of crawlers, a framer connected to said crawlers, a screed rearward of said frame, a tamper supported on said screed, arms connected to said screed and extending forwardly thereof, shoes adapted for 5 travelling upon the ground connected to the forward ends of said arms, and operating mechanism upon said frame connected to said tamper and responsive to vertical movements of said screed. 10

4. In a road finishing machine, a main frame, a screed in trailing relation to said main frame, a tamper carried by said screed, arms pivoted to said screed and extending forwardly thereof, shoes adapted for travelling upon the ground 15 pivoted to the forward ends of said arms, links connecting said arms and machine, operating mechanism on said frame connected to said tamper, and means for elevating said screed and tamper and maintaining said operating mechanism 20 effective.

5. In a road-finishing machine, a main frame, a screed rearward of said frame, a tamper supported by said screed, operating mechanism on said main frame connected to said tamper, and 25 hoisting means for elevating said screed and tamper and maintaining said operating mechanism effective.

6. In a road-finishing machine, a pair of crawlers, a frame pivotally sustained by said crawlers, 30 a screed, a tamper supported by said screed, arms pivoted to said screed and having means adapted for travelling upon the road, links connecting said arms and crawlers for imparting traction to said screed, a hoisting shaft, and cable means connecting said shaft and screed. 35

7. In a road-finishing machine, including a frame, a screed in trailing relation to said frame, arms pivoted to said screed, means connecting 40 said arms and frame, a tamper supported by said screed, operating mechanism on said frame, including a driving member swingable in an arc, and an adjustable connection between said driving member and tamper. 45

8. In a road-finishing machine, a pair of crawlers, a frame pivoted to said crawlers and comprising a vertical portion and a forwardly extending portion having means for engaging and 50 advancing a truck, said forwardly extending portion of said frame also forming a chute for receiving road building material from said truck, a screed in trailing relation to said frame and supported directly on the surface of the previously 55 laid pavement and a tamper adjacent said screed and operating mechanism on the vertical portion of said frame for operating said tamper.

9. In a road-finishing machine, a pair of crawlers, a frame secured to said crawlers, and comprising a vertical portion and a forwardly extending horizontal portion having means at its forward 60 end for engaging and advancing a truck, said forwardly extending portion defining a space for receiving road building material from said truck, means carried by said frame for spreading said 65 material, a screed in trailing relation to said frame, arms pivoted to said screed and extending adjacent said crawlers, means upon the forward ends of said arms for travelling upon the roadway, and drag links for connecting said arms to 70 said crawlers.

10. In a road-finishing machine, a power unit, a screed connected in trailing relation to said power unit, an operated shaft supported upon said screed, a tamper in front of said screed, means 75

connecting said tamper and shaft and operating mechanism on said power unit for rotating said shaft including a connection uneffected by different elevations of said screed.

- 5 11. In a road-finishing machine, a pair of crawlers, a frame comprising a vertical portion and a horizontally and forwardly extending portion, means pivotally connecting said frame to said crawlers, said forwardly extending portion of said frame having an equalizing bar for engaging and advancing a truck and being formed to provide a chute for receiving material from said truck, means carried by said frame for spreading road building material, a screed in trailing relation to said frame and supported directly on the surface of the previously laid pavement and means for connecting said screed to said crawlers.

- 10 12. In a road building machine, a screed adapted to ride upon the pavement and being of substantial width for supporting a substantial portion of the weight of the machine directly upon the surface of the finished road, a tamper adjacent the front edge of the screed and supported thereby, means between the tamper and the screed for causing relative vertical movement between the tamper and the screed, means for controlling the thickness of the finished pavement by adjusting the portion of the area of the screed which makes contact with the tamped portion of the pavement being constructed, traction means for embracing the roadway, and common drive means connecting said tamper and traction means together into a single unit adapted to be propelled along the roadway by said traction means.

- 15 13. In a road paving machine, a screed adapted to be supported directly upon the pavement, means having support upon the roadway and connected to said screed for tilting the screed for varying the thickness of the pavement, compacting means supported upon said screed, a power means including tractor means for drawing said screed over the roadway, and means on said power means for operating said compacting means, said power means and screed being connected together for propulsion as a single unit along a roadway.

- 20 14. In a road building machine, means for compacting road material to a predetermined level on the road-bed, means for controlling said level including a screed movable lengthwise of the roadway and located to the rear of the compacting means and supported directly upon the top of the compacted road, adjustable means for changing the angular relation of said screed to the level of said laid pavement to change the thickness of the pavement being compacted, a traction device having means for receiving and depositing road paving material upon the road-bed in advance of the compacting means, and a power plant common to said traction device and said compacting means.

- 25 15. In a road building machine, means for compacting road material to a predetermined level on the road-bed, means for controlling said level including a screed movable lengthwise of the road and located to the rear of the compacting means and supported directly on the top of the freshly tamped and previously laid road, traction means for propelling the machine along the roadway, a means connecting said traction means and screed together for propulsion together as a unit along the roadway, a prime mover common to both the compacting means and the traction means and supported with its weight substantially applied to the screed, and adjustable means

for changing the angular relation of said screed to the level of the laid pavement to readjust thereafter the thickness of the pavement being compacted, said adjustable means including a leverage means pivotally connected to the screed and extending forwardly of the compacting means for embracing the unpaved roadway and arranged and constructed to effect a return of the screed to a horizontal position upon adjustment and forward movement of the screed.

- 10 16. In a road building machine, a screed member adapted to be supported directly on the freshly laid pavement having a substantially vertical front plate and a bottom plate adjustable relative to the horizontal to vary the thickness of the pavement, tamping means supported upon said screed member adjacent said front plate, traction means including a pair of spaced caterpillar crawlers for propelling said screed forward over the roadway, a prime mover common to both said tamping means and said traction means and movable therewith along the roadway as a single unit, and material chute means disposed directly between said crawlers and being arranged to discharge road materials rearwardly toward said tamping means.

- 15 17. In a road finishing machine, a pair of road traveling members, a frame pivoted to said members, said frame comprising a portion for sustaining the operating mechanism of the machine and a forwardly extending counterweighted portion having an opening through which road paving material is adapted to be deposited upon the road, means upon the forward end of said frame for engaging and propelling a truck, a screed, a tamper supported at the forward edge of said screed, means for connecting said screed and tamper in trailing relation to said frame and road traveling members, and means on said frame for operating said tamper.

- 20 18. In a road finishing machine, a frame, means for supporting said frame for traveling movements, a screed rearward of said frame, a tamper supported upon said screed and adapted for tamping the road in advance of said screed, arms pivoted to said screed and having support upon the roadway in advance of the screed, a connection between said arms and means, and operating mechanism on said frame operatively connected to said tamper and unaffected from an operating standpoint by vertical movements of said screed.

- 25 19. In a road finishing machine, a frame having a vertical portion for sustaining the operating mechanism of the machine, and having a forwardly extending substantially horizontal portion at a lower elevation slightly spaced above the road, said forwardly extending horizontal portion forming a chute adapted for receiving road paving material, traveling members for supporting said frame for traveling movements, a screed rearward of said frame, arms pivotally connected to said screed and extending forwardly thereof, means upon the forward ends of said arms for traveling upon the roadway, connections between said arms and traveling members, a shaft supported upon said arms adjacent the forward portion of said screed, a tamper supported by said shaft, and means on said frame for operating said shaft and tamper.

- 30 20. In a road finishing machine, a frame having a portion for sustaining operating mechanism and a forwardly extending substantially horizontal portion at a lower elevation and in the nature of an open chute adapted for receiving paving material and allowing it to freely pass

therethrough to the road bed, said horizontal portion having means at its forward end adapted for engaging and propelling a truck, traveling members for supporting said frame, a screed solely supported upon the pavement rearwardly of said frame and having a pivotal connection with said traveling members, a tamper carried by said screed, and means on said frame for operating said tamper.

21. In a road building machine, a power unit having a forwardly extending open frame forming a chute for guiding paving material upon the road bed and having means at its forward end adapted for engaging and propelling a truck, a finishing unit in trailing relation to said power unit, said finishing unit comprising a screed solely supported upon the pavement and having a pivotal connection with said power unit, a tamper carried by the forward portion of said screed, and means on the power unit for operating said tamper.

er for tamping the paving material in advance of the screed.

22. In a road building machine, a pair of crawlers, a frame pivoted to said crawlers and comprising a vertical portion rearward of said crawlers adapted for sustaining operating mechanism, and a horizontal forwardly extending portion that is slightly spaced above the roadway, said forwardly extending portion being in the nature of an open frame adapted for receiving road building material and having means at its forward end adapted for engaging and propelling a truck, means connected to the forward portion of said frame for counterbalancing the frame, means rearward of the horizontal portion of the frame for spreading said material and tamping and smoothing means in trailing relation to said frame and having a drag link connection with said crawlers.

HARRY H. BARBER.