Aug. 13, 1929. J. F. ROBB 1,724,043

CONCRETE SPREADING MACHINE

Filed Feb. 15, 1926 3 Sheets-Sheet 1

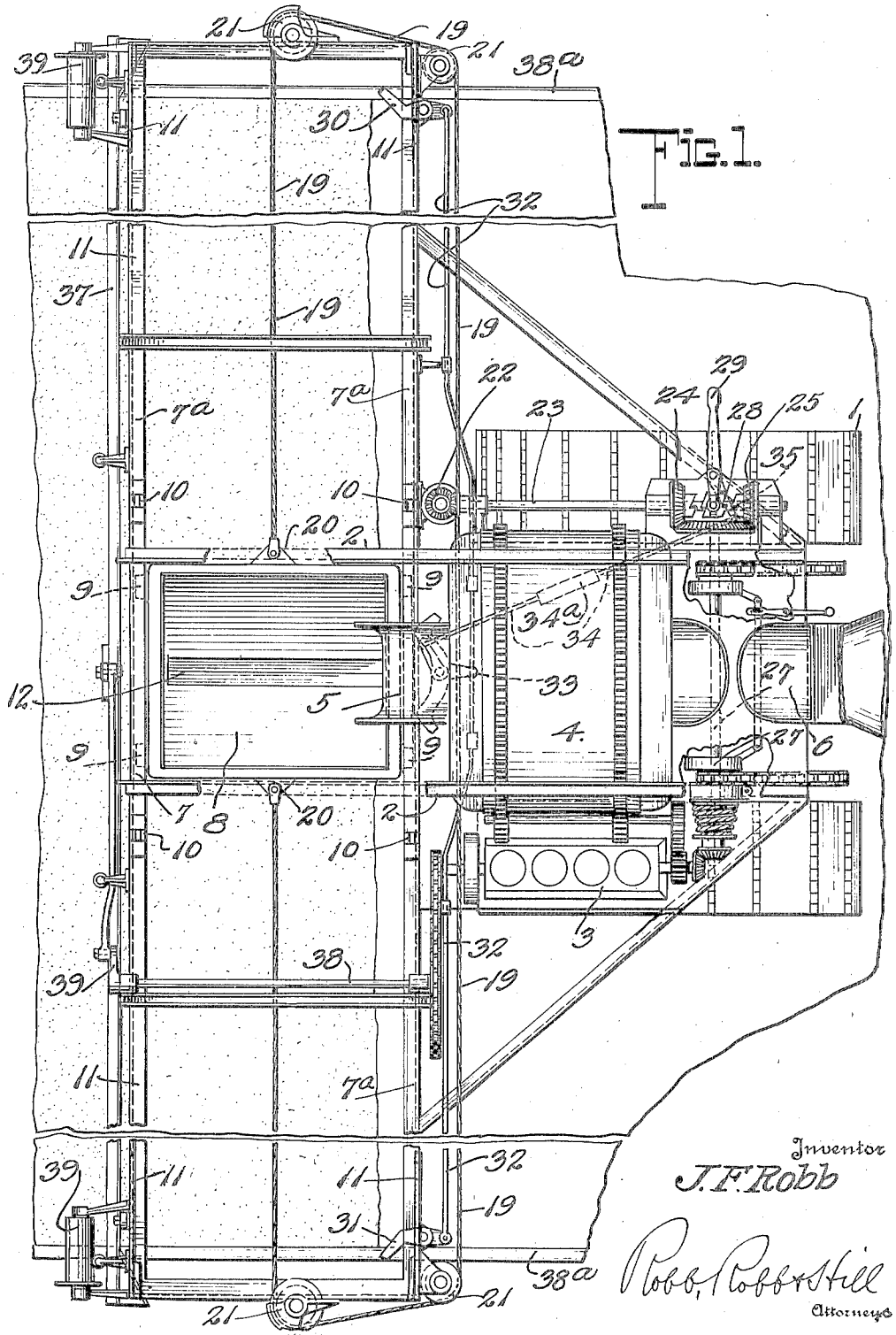


Fig. 1.

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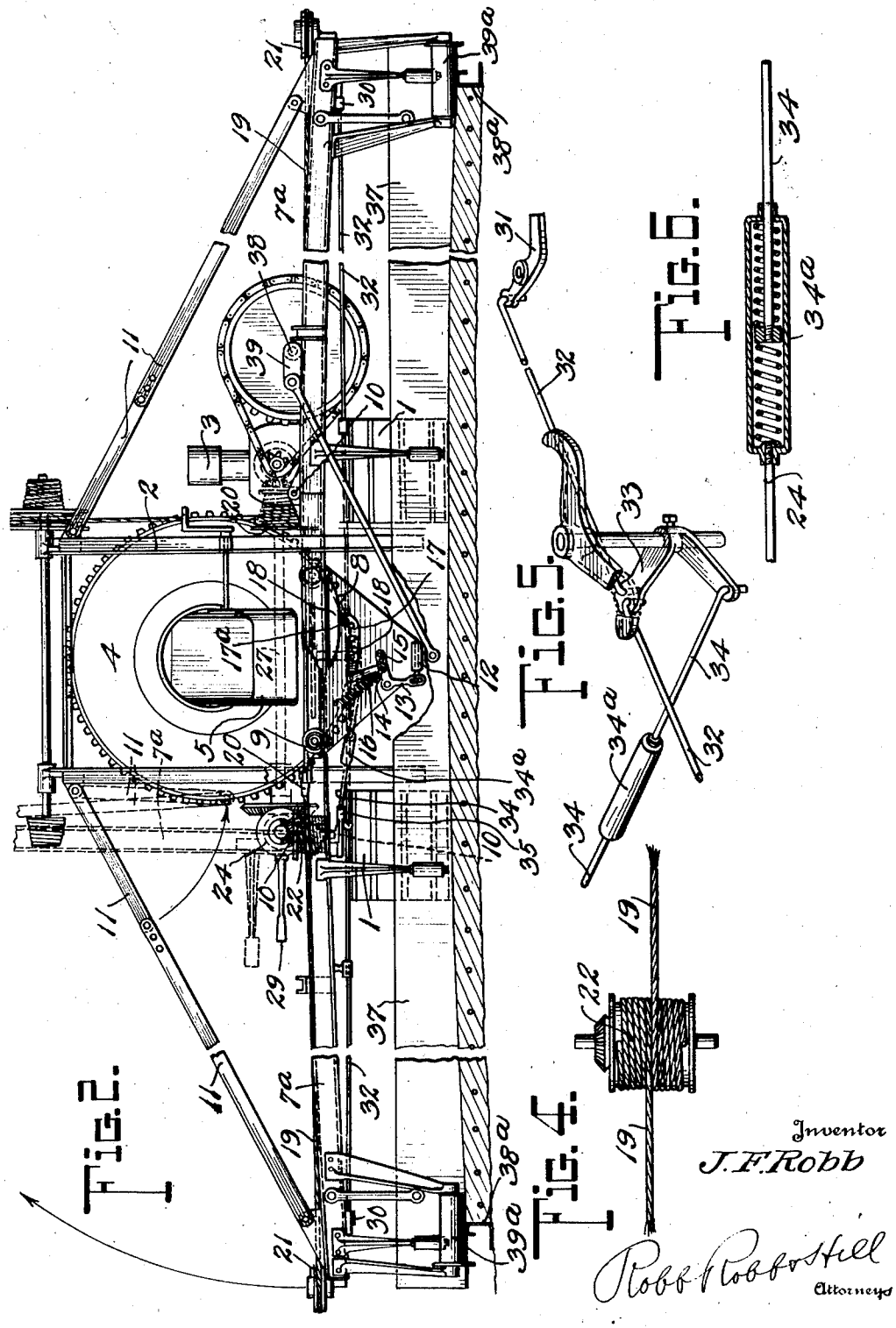


Fig. 2.

Fig. 6.

Fig. 5.

Fig. 4.

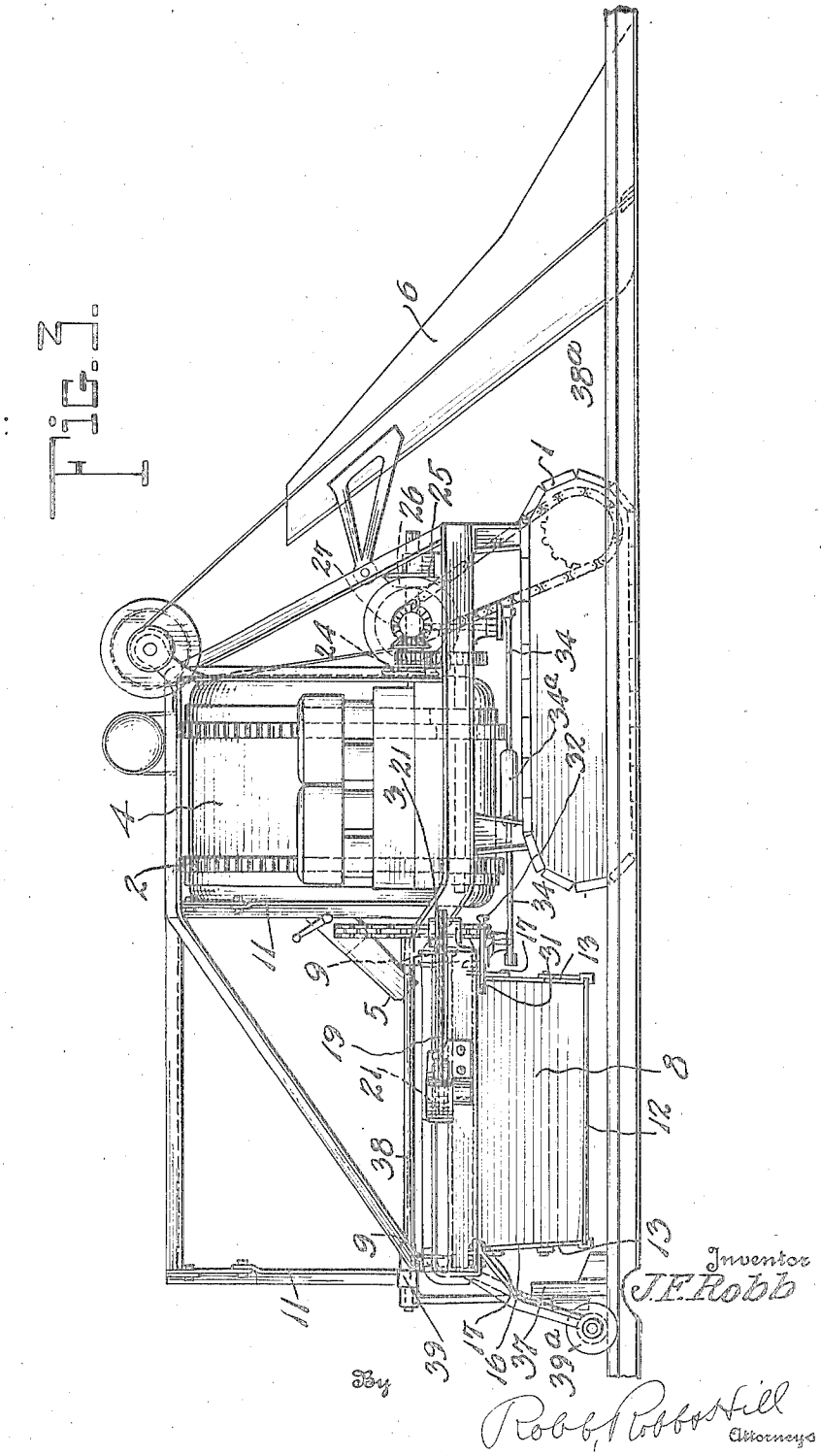
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Filed Feb. 15, 1926 3 Sheets-Sheet 3

Fig. 1.



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UNITED STATES PATENT OFFICE.

JOHN F. ROBB, OF CLEVELAND HEIGHTS, OHIO, ASSIGNOR TO KOEHRING COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION.

CONCRETE-SPREADING MACHINE.

Application filed February 15, 1926. Serial No. 88,444.

In the building of concrete roads, large machines comprising combined mixing and distributing instrumentalities are used for mixing the concrete aggregates and emplacing them upon the road sub-grade. In the operation of these machines, a maximum of economy is obtained if the concrete may be deposited upon the sub-grade as nearly as possible in the condition in which it will form the pavement as ultimately laid and finished.

With the above in view, a special objective of the present invention has been to design a concrete paving machine, so called, wherein the mixed aggregates, after being properly operated upon by the mixing drum or instrumentality, are discharged therefrom into a spreading receptacle, the said receptacle being susceptible of movement cross-wise of the road sub-grade on which the pavement is being laid.

The spreading receptacle of the invention, being movable rectilinearly of the axis of the road, is adapted to lay cross-wise strips of concrete, so to speak, of substantially the width of the spreading or distributing receptacle itself, and the operation of the invention enables the road concrete to be emplaced in progressive transverse strips of predetermined widths and of predetermined thickness, as regards the layer of concrete deposited.

Another feature of the invention resides in the special transverse structure utilized for supporting the spreading receptacle and enabling the latter to travel over the entire width of the road. This transverse supporting structure, while a part of the paving machine proper, and therefore advanced progressively with the said paving machine that carries the mixer, is preferably adapted to be supported upon the road forms which are customarily located at the opposite sides of the road sub-grade and provide the mold sides, virtually, between which the concrete road aggregates are received and set in due course to form the rigid road bed.

This invention involves further operative details whereby the necessary movement transversely of the road, is transmitted to the spreading or distributing receptacle or hopper and speed controlling devices for governing the movement of the said spreading hopper.

With the foregoing outline of the invention in view, a full understanding of the machine thereof, and its preferred construction and method of use will be had upon reference to the following detailed description, and to the accompanying drawings, in which:

Figure 1 is a top plan view of a preferred embodiment of the invention.

Figure 2 is a rear elevation showing more particularly the track frame and spreading receptacle carried thereby.

Figure 3 is a side view of the paving machine.

Figure 4 is a detail view showing more particularly the cable operating drum by which the spreading hopper is moved along the track frame.

Figure 5 is a fragmentary detail view showing more clearly the trip lever mechanism controlling the reversal and neutralizing of the clutch driving means for the spreading hopper.

Figure 6 is a detail view of the elastic connection intermediate the manual clutch lever and the trip rod devices.

Those versed in the art to which the invention relates, will be generally conversant with the main construction of my paving machine, in so far as it comprises a traction base or support 1, carrying a super-structure 2 on which is mounted the engine or motor 3 that operates the mixing drum 4. The mixing drum may be of any conventional type commonly used, and is equipped with an automatic or otherwise discharge chute 5 at its discharge end. The said mixing drum 4 which is the mixer element of the machine, may be supplied with aggregates to be mixed by means of a loading skip partly illustrated at 6, or by means of a suitable hopper into which may be fed a batch of dry aggregates that are to be operated upon by the mixer. Thus far, the general mixer structure described may be substantially according to the conventional types now in common use.

The new construction embodied in my invention, however, consists primarily of providing at the delivery or discharge end of the mixer 4, a transverse or cross-wise arranged track frame 7 on which track frame is adapted to travel, at right angles to the axis of the road bed, on which the mixed concrete is to be laid, a spreading receptacle or hopper 8. This spreading hopper 8 may be designed sufficiently large to receive the

entire contents of the mixer 4 which constitutes a batch of mixed aggregates. The hopper 8 is equipped with trolley wheels or rollers 9, that are adapted to travel upon the sides of the track frame 7 which preferably consist of angle bars or like structural units.

My track frame 7 is designed to be of a length substantially equal to the width of an ordinary concrete road and on this account I preferably make the track frame in sections, there being provided the end sections 7^a preferably pivotally mounted at 10 upon the main middle portion of said track frame 7, the end sections 7^a of the track 7 may be detachable so that where different sizes of concrete roads are being constructed, in relation to the width of the road, if desired, the end sections 7^a suitable for one width of road, may be replaced by other end sections either shorter or larger, to accommodate for a construction of frame suitable for a different width of road. The reason why I preferably mount the end track sections 7^a pivotally, is to enable these sections to be folded upwards into an approximately vertical position so that when the machine is transported from place to place, as from one job to another, the width of the machine which depends largely upon the length of the track frame 7, may be reduced enabling the machine to pass through narrow quarters in its movement to a fresh road laying operation. To facilitate the folding of the end sections 7^a upwardly upon the main middle section of the track frame 7 I utilize foldable brace connections 11, seen best in Figure 2. Any suitable means may be employed to lock the parts 7^a in upwardly folded condition.

The spreading receptacle or hopper 8 is of peculiar formation, in that it is provided with a discharge or distributing opening at its bottom, of a considerably contracted formation so as to provide a restricted discharge for the hopper. This restricted discharge opening tends to retard the outflow of concrete from the hopper as the concrete passes to the sub-grade and the retarding action is facilitated by a discharge door 12 provided at the bottom of the hopper 8 to open and close said opening. The discharge door 12 is operable by a bell-crank lever 13 adjustably connected by a pin 14, adjustable in openings 15, with a link 16 attached to a door controlling lever 17 suitably pivoted at 18 on the trolley wheel supporting frame of the hopper 8, or on the hopper itself. When the spreading hopper 8 is in its batch receiving position in relation to the mixer 4, that is midway of the ends of the track frame 7, a roller 17^a on the lever 17 is in normal engagement with a cam 18 on the track frame 7. This normal engagement maintains the lever 17 in a position holding the discharge door 12 of the hopper 8 closed. When however, the hopper 8, under the influence of movement compelling means to be shortly described, travels away from the cam 18 toward either end of the track frame 7, the lever 17 escapes from the detaining action of the cam 18 and is permitted to rock upwards and thereby cause opening of the door 12 for the discharge of the contents of the hopper. Since the hopper is provided with a long narrow discharge opening disposed longitudinally of the road, and of the main axis of the machine, it will be evident that the contents of said hopper will be fed therefrom in a layer-like form so that the concrete aggregates are laid down on the road of a predetermined thickness in such layer-like form.

I shall now describe the means for moving the hopper 8 along its track, the said means consisting preferably of a cable device 19 with actuating mechanism therefor. The cable device 19 consists of a cable, the ends of which are attached to the hopper 8 at 20, said cable passing around sheaves 21 at each outer end of the end track frame sections 7^a and thence leading to a drum 22 about which the cable is wound in opposite directions. The drum 22 is driven by being geared to a shaft 23 having loose bevel gears 24 and 25 thereon. The gears 24 and 25 mesh with a driving bevel gear 26 driven by a shaft 27 geared to the engine 3, or geared to one of the ring gears of the mixing drum 4. It makes no material difference just how power of driving is transmitted to the shaft 27 so long as it is constantly driven. Intermediate the bevel gears 24 and 25, the shaft 23 carries a double clutch member 28 keyed thereto and adapted to engage adjacent clutch elements to the opposite sides thereof and formed rigidly with the gears 24 and 25, a manually operable clutch throwing lever 29 is connected with the clutch member 28 to shift it in opposite directions for engagement with the gears 24 and 25. When the clutch member 28 is engaged with the gear 24, the drum 22 will be turned in one direction and cause a pull on one end of the cable 19 to carry the spreading hopper 8 toward the one end of the track frame 7. Conversely, when the clutch member 28 is engaged with the gear 25, the movement of the shaft 23 and its drum 22 will be reversed and said hopper 8 will be caused to move in an opposite direction to that previously referred to. By proper manipulation of the lever 29, the hopper 8 may be caused to approach each outer end of the track frame 7 and as it starts to move from its middle position where it received the aggregates from the mixer 4, the discharge door 12 will open and feed the aggregates to the sub-grade laying them down on the sub-grade in a layer of predetermined thickness.

As an automatic means for reversing the

movement of the hopper 8 when it reaches either outer end of the track frame 7, I employ an automatic trip mechanism. This mechanism consists of trip levers 30 and 31 pivoted near the outer extremities of the track frame sections 7ª. These levers are connected by rods 32 with a middle trip lever 33 connected by a rod 34 with the manual clutch throwing lever 35. Thus when the hopper 8 reaches a point in its travel where it strikes the trip lever 31, the middle trip lever 33 is rocked to exert a pull on the rod 34 and disengage the clutch member 28 from the gear 24 at the same time throwing the clutch member 28 into engagement with the gear 25. The hopper 8 thereupon returns to its mid-position on the frame 7 and strikes the middle trip lever 33 rocking the latter sufficiently to neutralize the clutch member 28. When the hopper 8 moves toward and engages the opposite trip lever 30, the action is practically the same except that the rod 34 is pushed instead of being pulled, in order to reverse the clutch 28.

I provide in the length of the rod 34, a spring cushion device 34ª which enables the preliminary manual setting of the lever 35 to engage the clutch 28 with either gear 24 or 25, while the trip lever 33 remains in neutral adjusted position.

It is to be understood that I may have recourse to other means for moving the hopper 8, that illustrated being simply exemplary of one operation of my invention. Obviously, the hopper 8 might be operated to remain closed until it reaches an end of the track frame 7, then opened and caused to traverse the whole length of the frame 7 as it drops and spreads the concrete, being thereupon reversed and brought to the middle discharging position for a second subsequent operation. I do not therefore wish to be limited to the precise timing of the operation of my spreading hopper because by simple variations in the action of the tripping mechanism the operation may be changed as to the extent of distributing movement and the direction of said distributing movement.

On the rear side of the track frame 7 there may be mounted a reciprocating screed or strike-off 37 adapted to be driven by a shaft 38 having an end crank 39 for effecting such reciprocation of the strike-off. Thus as the paving machine is advanced after laying down the concrete in a transverse strip of predetermined thickness, a strike-off operation may be performed to impart to the surfaces of the concrete a preliminary or ultimate finish as may be found desirable. The ends of the strike-off 37 may operate on the top portions of the side road forms 38.

Since the transverse track frame 7 for different widths of roads may have to have a span which is of considerable length, I propose to provide on the outer ends of the end track frame sections 7ª supporting rollers 39 carried by suitable brackets affixed to the parts 7ª. The rollers 39 will travel upon the heads of the road forms or rails at the sides of the road subgrade between which forms the aggregates are laid. Under these conditions, the weight of the hopper 8 may be carried partly by the forms 38 in an obvious manner.

Moreover, I so design the track frame members 7 and 7ª that these members are curved longitudinally so as to conform with the crown of the road.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a paving machine, a portable support, a transverse supporting frame carried by said portable support, a spreading hopper operating on said frame to move transversely to the road along which the paving machine moves, said hopper having its discharge opening arranged so as to effect a spreading of the contents incident to its transverse movement and means for feeding materials to be spread to said spreading hopper.

2. In a paving machine, a portable support, a transverse supporting frame carried by said portable support, a spreading hopper operating on said frame to move transversely to the road along which the paving machine moves, and means for feeding materials to be spread to said spreading hopper, the transverse support comprising end sections so mounted as to enable the length of said support to be shortened when the machine is to be moved from one place to another.

3. In a paving machine, a portable support, a transverse supporting frame carried by said portable support, a spreading hopper operating on said frame to move transversely to the road along which the paving machine moves to effect spreading action of its contents and having regulatable means controlling the distributing flow of said contents during such movement, means for feeding materials to be spread to said spreading hopper, and roller means carried by said transverse support and adapted to travel longitudinally along the subgrade to perform a supporting function as the hopper travels toward an end of the said transverse support.

4. In a paving machine, a portable support, a transverse supporting frame carried by said portable support, a spreading hopper operating on said frame to move transversely to the road along which the paving machine moves, means for feeding materials to be distributed to said spreading hopper, means to shift the hopper transversely to

effect a deposit of a predetermined layer of material as it moves, and roller means mounted on the outer extreme portions of the transverse support and adapted to travel upon road forms over and between which the transverse support moves in carrying the feeding hopper in its travel along said support.

5. In a paving machine, a portable support, a transverse track frame carried by said portable support, a spreading hopper mounted to travel along said transverse frame and provided with a distributing opening arranged longitudinally of the road subgrade over which the machine travels so as to deposit a transverse strip of material during its traverse, and means for feeding materials to be distributed to said hopper.

6. In a paving machine, a portable support, a transverse track frame carried by said portable support, a spreading hopper mounted to travel along said transverse frame and provided with a distributing opening arranged longitudinally of the road subgrade over which the machine travels, and means for feeding materials to said hopper, means for moving the hopper along the track frame to effect distribution of its contents, and means for controlling the passage of aggregates from the distributing opening of the hopper to cause said aggregates to issue from said opening in a layer of predetermined thickness.

7. In a paving machine, a portable support, a transverse track frame carried by said portable support, a spreading hopper mounted to travel along said transverse frame and provided with a distributing opening arranged longitudinally of the road subgrade over which the machine travels, and means for feeding materials to said hopper, means for moving the hopper along the track frame, and means for automatically reversing the movement of the hopper upon the track frame.

8. In a paving machine, a portable traction support, a track frame carried by said portable traction support, and disposed transversely of the longitudinal axis of the machine so as to span a road subgrade transversely thereof, a hopper supported on the track frame and traversable transversely and capable of discharging material while moving, and means for moving said hopper to cause such discharge.

9. In a paving machine, a portable traction support, a track frame carried by said portable traction support, and disposed transversely of the longitudinal axis of the machine so as to span a road subgrade transversely thereof, means for feeding materials to the hopper and means for causing movement of the hopper along the track frame to discharge the contents upon the subgrade therebeneath, said last means comprising a manual device for causing a starting off movement of the hopper, and automatic means for returning the hopper to a position in which it is adapted to receive the materials from the feeding means.

10. In a paving machine, a portable traction support, a track frame carried by said portable traction support, and disposed transversely of the longitudinal axis of the machine so as to span a road subgrade transversely thereof, a distributing hopper mounted to move on said frame, means for feeding materials to the hopper and means for causing movement of the hopper along the track frame to discharge and effect spreading of the contents upon the subgrade therebeneath, said last mentioned means comprising a power driven cable connected with the hopper to move the same back and forth upon the transverse track frame.

11. In a paving machine, a portable traction support, a track frame carried by said portable traction support, and disposed transversely of the longitudinal axis of the machine so as to span a road subgrade transversely thereof, a distributing hopper mounted to move on said frame, means for feeding materials to the hopper, means for causing movement of the hopper along the track frame to discharge the contents upon the subgrade therebeneath with a spreading movement, said last mentioned means comprising a power driven cable connected with the hopper to move the same back and forth upon the transverse track frame, together with separate means for initiating each of said movements.

12. In a paving machine, a portable traction support, a transverse track frame mounted thereon, a distributing hopper mounted upon the track frame, the said track frame being transverse to the portable support, and comprising movable end sections adapted to be adjusted to fold into positions materially shortening the length of the track frame.

13. In a concrete paving machine, in combination, a portable traction support, spreader mechanism mounted thereon comprising a frame adapted to span a road subgrade transversely thereof, a spreading hopper mounted on said frame and adapted to move transversely thereof, said spreading hopper being equipped with a spreading discharge arranged transversely to the said frame so as to lay a transverse strip of concrete corresponding in width to the width of the discharge.

14. In a concrete paving machine, in combination, a portable traction support to travel along a road subgrade, a transverse hopper supporting frame carried by said support and arranged to span the road subgrade transversely thereof, a distributing hopper adapted to travel along said hopper

supporting frame and to deposit aggregates on the subgrade in its travel, and means for supplying mixed aggregates to said hopper.

15. In a concrete paving machine, in combination, a portable traction support to travel along a road subgrade, a transverse hopper supporting frame carried by said support and arranged to span the road subgrade transversely thereof, a distributing hopper adapted to travel along said hopper supporting frame and to deposit aggregates on the subgrade in its travel, and means for supplying mixed aggregates to said hopper, discharge controlling means for the hopper, and automatic means for rendering said discharge controlling means operative to feed concrete to the subgrade on initiating movement of the hopper transversely of the latter.

16. In a concrete paving machine, in combination, a portable traction support, a hopper supporting frame carried thereby and transversely thereof so as to assume position in which it spans a road subgrade crosswise of the same, a hopper carried by said frame and movable along the same to deposit mixed concrete on the subgrade, means for supplying mixed concrete to the hopper, means for moving the hopper on its supporting frame to effect discharge of its contents, and means operable as an incident to the movement of the hopper to cause discharge of the contents thereof and to prevent discharge.

17. In a concrete paving machine, in combination, a portable traction support, a hopper supporting frame carried thereby and adapted to span a road subgrade crosswise of the same, a hopper mounted to travel along said frame and having a discharge opening, discharge controlling means for said hopper, means for moving the hopper and automatic provisions whereby the discharge controlling means of the hopper will be operated as an incident to movement of the hopper on its frame.

18. In a concrete paving machine, in combination, a portable traction support, a hopper supporting frame carried thereby and adapted to span a road subgrade crosswise of the same, a hopper mounted to travel along said frame and having a discharge opening, discharge controlling means for said hopper, means for moving the hopper and automatic provisions whereby the discharge controlling means of the hopper will be operated as an incident to movement of the hopper on its frame, means for supplying mixed aggregates to the hopper, said automatic provisions being such as to operate the discharge controlling means to close the hopper discharge when the hopper assumes a position wherein it receives mixed aggregates from the supply means.

19. In a concrete paving machine, in combination, a portable traction support, a hopper supporting frame carried thereby and adapted to span a road subgrade crosswise of the same, a hopper mounted to travel along said frame and having a discharge opening, discharge controlling means for said hopper, means for moving the hopper and automatic provisions whereby the discharge controlling means of the hopper will be operated as an incident to movement of the hopper on its frame, the hopper discharge comprising an opening parallel with the axis of the road subgrade spanned by the supporting frame, and the discharge controlling means being such as to feed the mixed materials from the hopper to the subgrade in a layer of predetermined thickness.

20. In paving apparatus of the class described, a portable support, a transverse supporting frame connected with said support, a spreading hopper mounted upon said frame for movement transversely to the road along which the apparatus moves, feeding means arranged at a point intermediate the length of said frame for delivering materials to said hopper for distribution by the same, a door for controlling the discharge of the contents of said hopper, and means arranged adjacent to the feeding means aforesaid for holding the door in closed position, said means being rendered inoperative when the hopper is shifted upon the frame in either direction with relation to the feeding means.

21. In paving apparatus of the class described, a portable support, a transverse supporting frame connected with said support, a spreading hopper mounted upon said frame for movement transversely to the road along which the apparatus moves, feeding means arranged at a point intermediate the length of said frame for delivering materials to said hopper for distribution by the same, a door for controlling the discharge of the contents of said hopper, means arranged adjacent to the feeding means aforesaid for holding the door in closed position, said means being rendered inoperative when the hopper is shifted upon the frame in either direction with relation to the feeding means, manual means for initiating movement of the hopper in either direction aforesaid at will, and separate means for returning the hopper to its initial position.

22. In paving apparatus of the class described, a portable support, a transverse supporting frame connected with said support, a spreading hopper mounted upon said frame for movement transversely to the road along which the apparatus moves, feeding means arranged at a point intermediate the length of said frame for delivering materials to said hopper for distribution by the same, a door for controlling the discharge of the contents of said hopper, means arranged adjacent to the feeding means aforesaid for holding the door in closed position, said means being rendered inoperative when the

hopper is shifted upon the frame in either direction with relation to the feeding means, means for initiating spreading movement of the hopper toward either end of the frame, means for automatically returning the hopper to contents receiving position, and means for automatically discontinuing the movement upon arriving at said position.

23. In paving apparatus of the class described, a portable support, a transverse supporting frame connected with said support, a spreading hopper mounted upon said frame for movement transversely to the road along which the apparatus moves, feeding means for feeding materials to the hopper, power means for shifting the hopper to and fro on said frame to effect a distribution and spreading movement of the contents, means for initiating the spreading movement, and separate means for effecting return movement of the hopper to contents receiving position, the operation of said last named means being initiated by the hopper.

In testimony whereof I affix my signature.

JOHN F. ROBB.