July 31, 1951 T. E. LUTZ 2,562,430

BITUMINOUS ROAD MIXER AND RESURFACING MACHINE

Filed Feb. 24, 1947 5 Sheets-Sheet 1

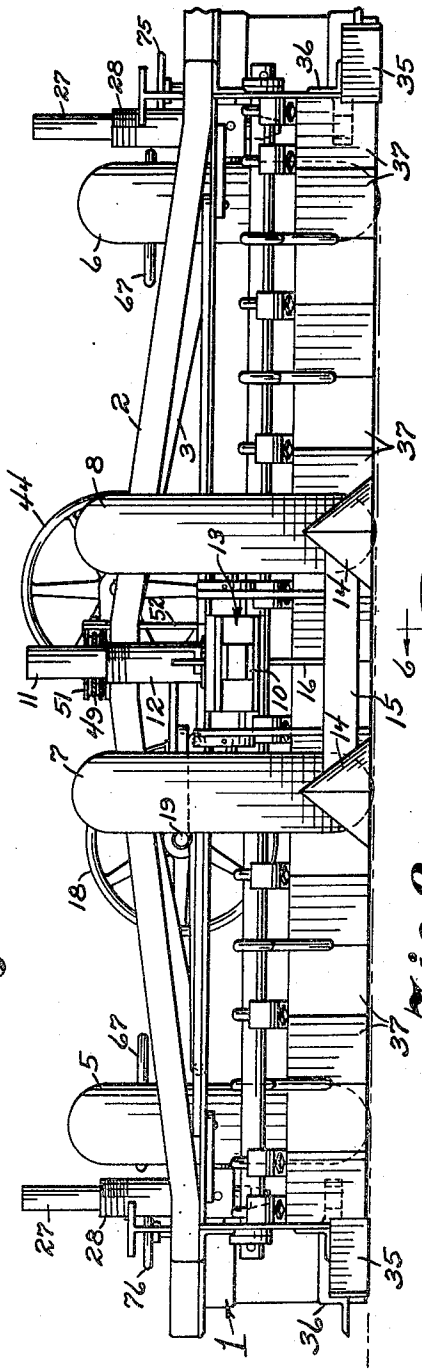


Fig. 1.

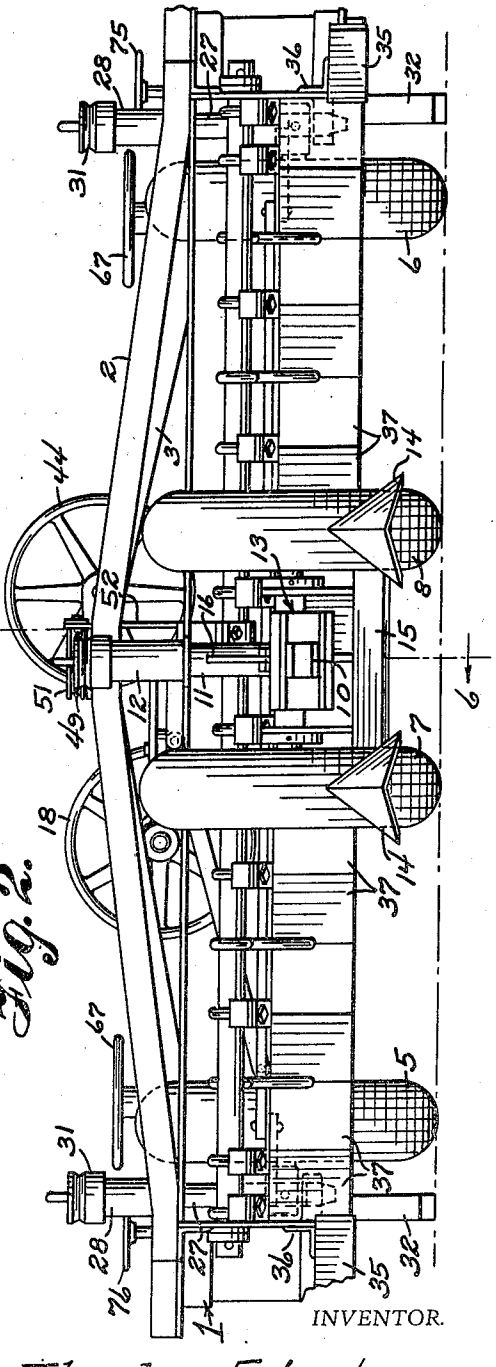


Fig. 2.

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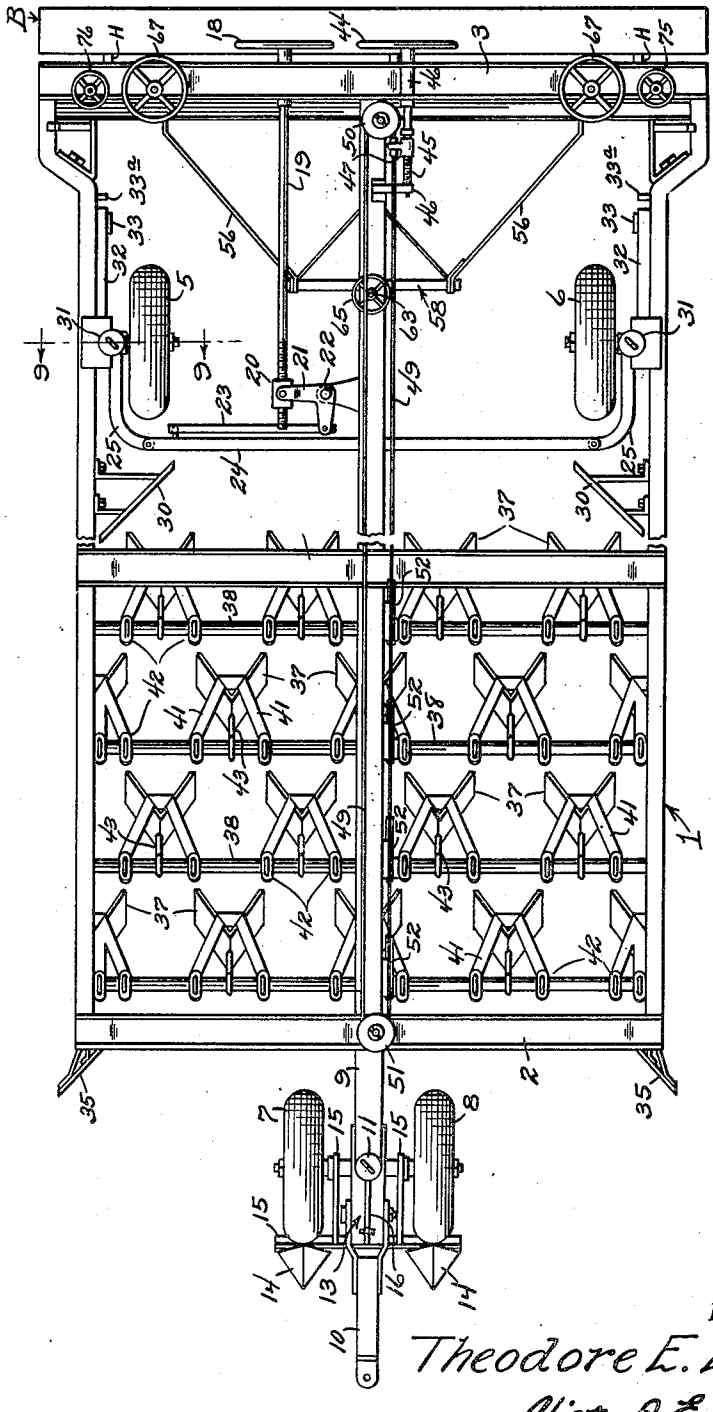


Fig. 3.

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BITUMINOUS ROAD MIXER AND RESURFACING MACHINE

Filed Feb. 24, 1947 5 Sheets-Sheet 3

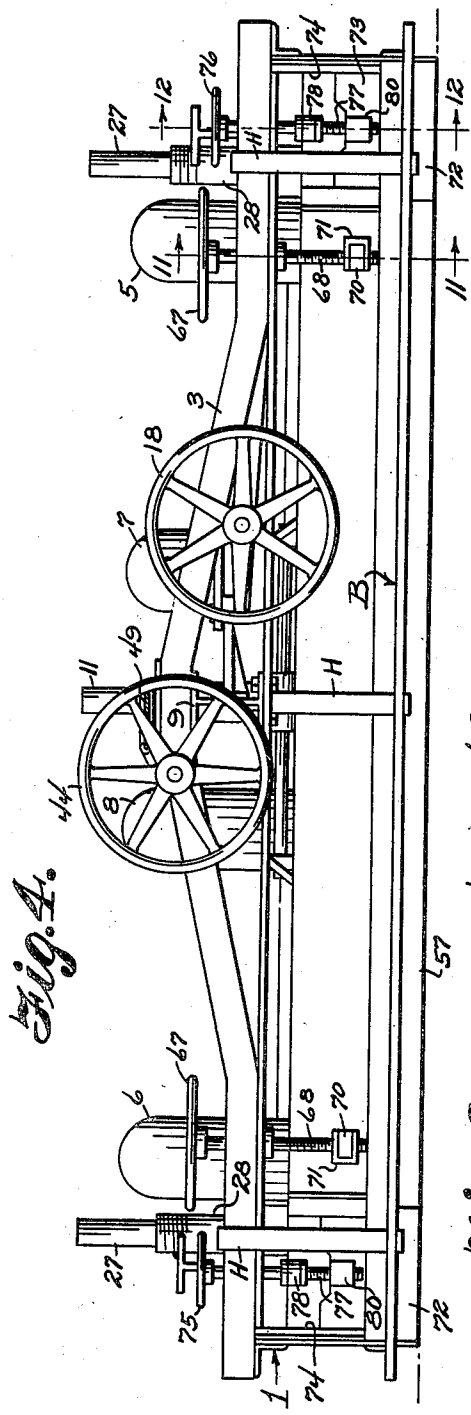


Fig. 4.

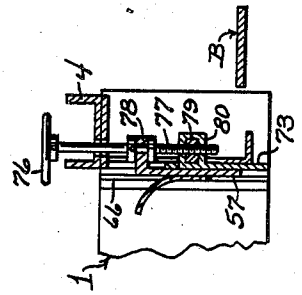


Fig. 12.

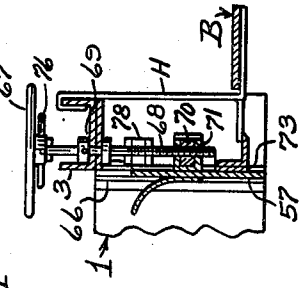


Fig. 11.

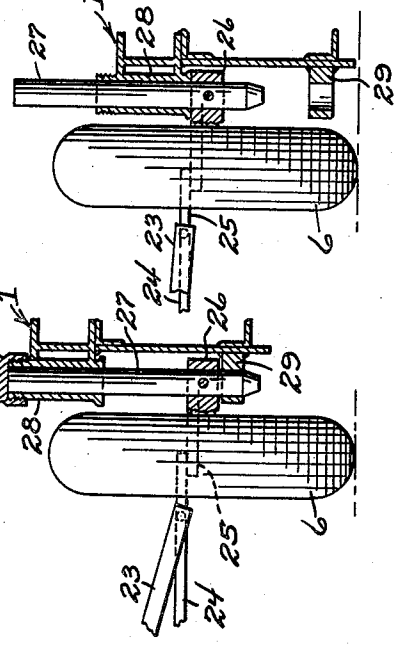


Fig. 10.

Fig. 9.

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BITUMINOUS ROAD MIXER AND RESURFACING MACHINE

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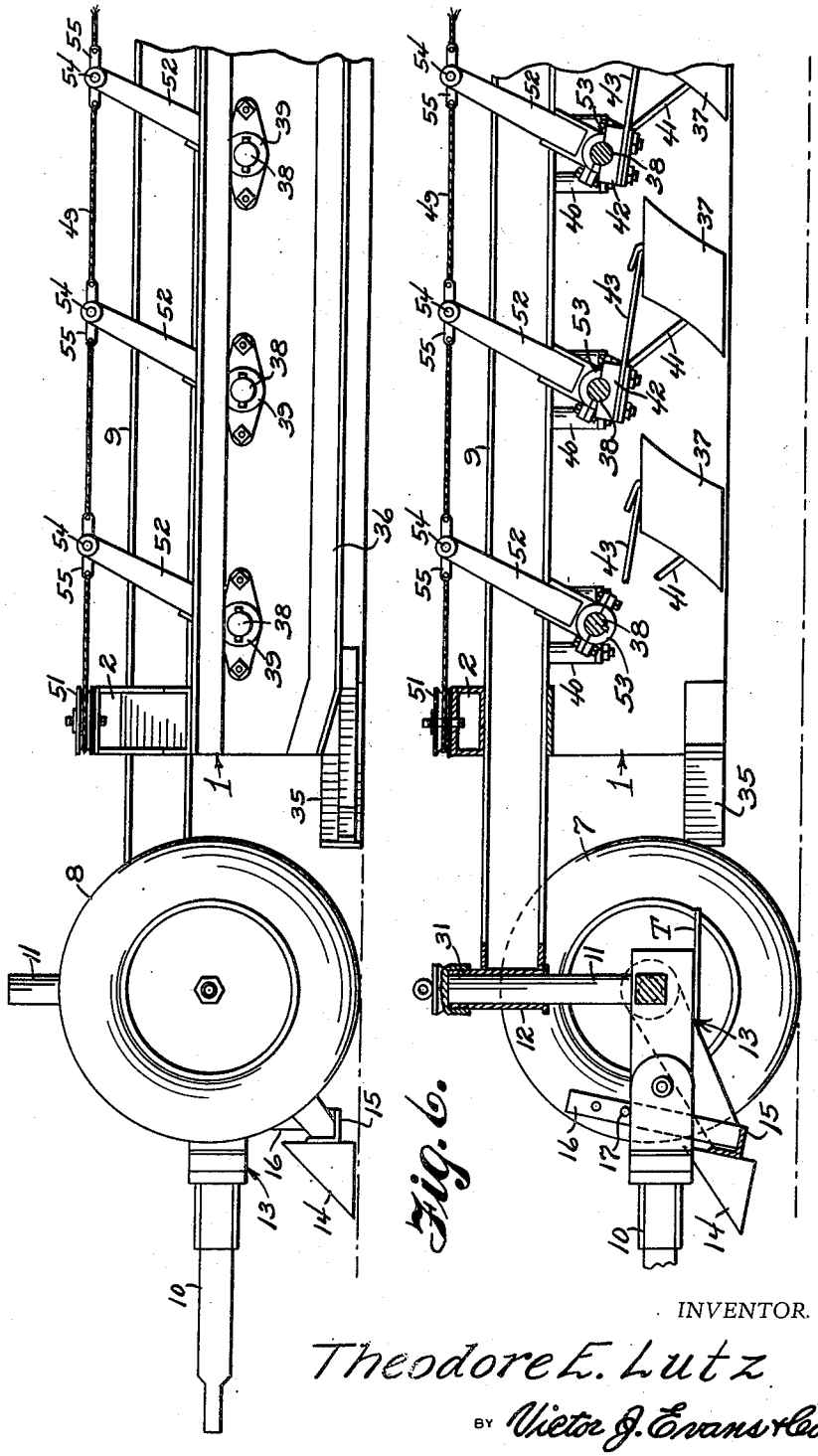


Fig. 5.

Fig. 6.

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BITUMINOUS ROAD MIXER AND RESURFACING MACHINE

Filed Feb. 24, 1947 5 Sheets-Sheet 5

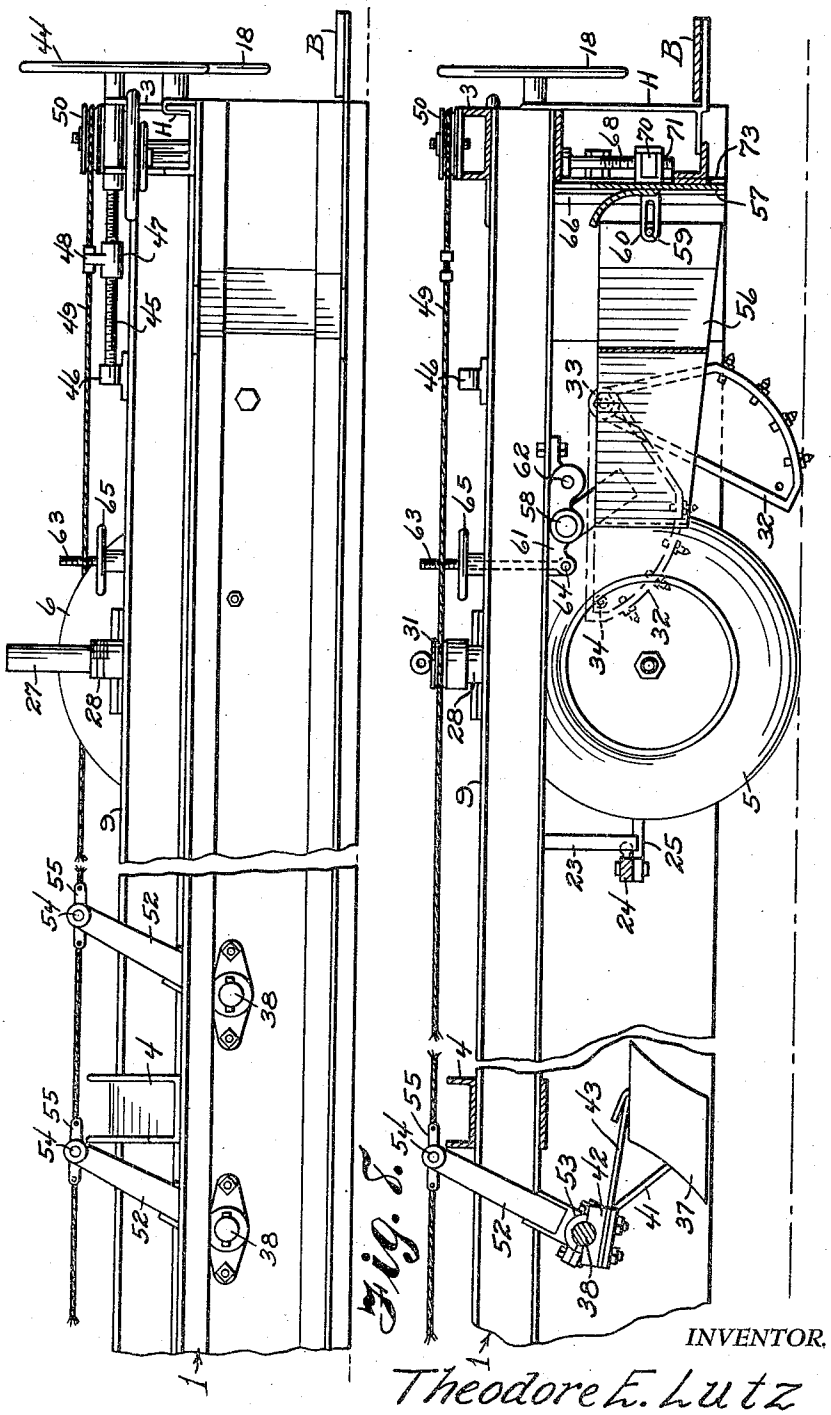


Fig. 1.

Fig. 2.

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Patented July 31, 1951

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UNITED STATES PATENT OFFICE

2,562,430

BITUMINOUS ROAD MIXER AND RESURFACING MACHINE

Theodore E. Lutz, Galion, Ohio, assignor of one-eighth to Charles W. Kimerline, Bucyrus, Ohio

Application February 24, 1947, Serial No. 730,389

3 Claims. (Cl. 94—44)

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My present invention relates to wheeled implements or apparatus for distributing material over and treating the surfaces of highways, roads and pavements, and more specically to an improved bituminous road mixer and resurfacing machine of the wheeled type that is designed to be towed by means of a tractor or other automotive vehicle, and which is manually steered and controlled by an operator or operators stationed on the implement. The primary object of the invention is the provision of a heavy duty machine that is of simple construction and operation, which may be maneuvered and handled with facility for thoroughly mixing, spreading and distributing the bituminous paving composition or aggregate in uniform sheets over a road surface preparatory to the subsequent operations of rolling the coated roadbed.

As is well known the paving material or aggregate is initially spread continuously in a layer of the required thickness upon the roadbed and then sprayed with a bituminous or other binder. Following the spraying operation the mixing machine mixes, distributes, levels, and finally lays the aggregate uniformly over the entire surface of the roadbed to be covered.

In the construction and maintenance of the roadbed of highways, roads, or pavements, the implement or machine is pulled in one direction by the tractor, and manually steered to spread the aggregate over a specified area, and to strike off and finish the surface by a single one-way passage of the implement over the area, after which the roadbed is rolled as usual.

The invention consists in certain novel combinations and arrangements of parts involving the use of multiple plows or spreaders, and strike-off or finishing blades, with resilient means for holding the spreaders to the roadbed to compensate for irregularities in the roadbed; with manually controlled adjusting means whereby the thickness of the sheet or coating may be varied in surfacing, or in re-surfacing operations; and in means for adjusting the strike-off or finishing mechanism located at the rear of the multiple spreaders. Means are also provided for elevating the working equipment of the wheeled implement into inoperative position in order that the implement may be transported with facility and dispatch.

These and other features of construction and operation will hereinafter be described, and more specifically set forth in my appended claims.

In the accompanying drawings I have illustrated one complete example of a physical embodiment of my invention in which the parts are combined and arranged in accord with one mode I have devised for the practical application of the principles of my invention. It will however, be understood that changes and alterations are contemplated, and may be made in these exemplifying drawings, within the scope of my claims, without departing from the principles of the invention.

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Figure 1 is a view in front elevation of a wheeled implement in which the invention is embodied, showing the main frame in lowered position and the equipment under the frame in working position; and Figure 2 is a similar view with the main frame and equipment elevated above the roadway for transportation purposes, showing also two of the elevators for the rear end of the main frame.

Figure 3 is a top plan view of the wheeled implement showing the general assembly and relation of parts.

Figure 4 is a rear end elevation of the implement with parts in working position, and showing especially the strike off and finishing mechanism, the hand steering wheel, the adjusting wheel for the plows or spreaders; and the running board or platform for the operator or operators of the equipment.

Figure 5 is a view in side elevation at the front end of the implement with parts in working position; and Figure 6 is a vertical longitudinal sectional view through the structure of Fig. 5, showing the arrangement of the front swiveled truck and wheels, and some of the multiple spreaders in elevated position, at line 6—6 of Fig. 2.

Figure 7 is a view in side elevation, partly broken away, disclosing the rear end of the implement complementary to the structure of Fig. 5.

Figure 8 is a vertical longitudinal sectional view of the mechanical structures of Fig. 7, with parts elevated, and showing the operation of one of the elevators for the rear end of the implement.

Figure 9 is a detail vertical sectional view at line 9—9 of Fig. 3 showing one of the rear-wheel spindles and the means for supporting the main frame in elevated position; and Figure 10 is a similar view but with the main frame in lowered position.

Figure 11 is a detail vertical sectional view at line 11—11 of Fig. 4; and

Figure 12 is a vertical sectional detail view at line 12—12 of Fig. 4.

In the form of the invention illustrated in the

drawings I employ a main frame 1 made up of usual channel plates and angle irons that are welded, bolted, or otherwise united at their joints to form a rigid rectangular frame extending longitudinally of the machine and including cross plates 2, 3, and 4 at the front and rear ends and intermediate these ends, and upon which the working equipment is carried.

The main frame is supported by means of two laterally spaced rear wheels 5 and 6 located near the rear end of the implement and within the side members of the frame as best seen in Fig. 3; and a pair of front, twin wheels 7 and 8 are included in a central assembly or truck unit located in front of the main frame. The longitudinally extending, central beam 9 of the frame is supported on the steering truck unit, and the truck is equipped with a centrally located draw bar or draft tongue 10 to which a tractor or other automotive vehicle may be coupled for towing the implement over the road bed to be surfaced, or re-surfaced, and for transporting the implement as required.

The front truck is equipped with an upright king pin or spindle 11 that affords a single central support for the front portion of the main frame, and the front projecting end of the central I-beam or channel beam 9 of the main frame is equipped with an upright cylindrical bearing sleeve 12 preferably welded to the end of the beam to accommodate the spindle 11 that is journaled therein. The front end of the main frame is thus mounted on the spindle 11 of the truck 13, and adapted to be raised or lowered with relation to the truck as will be described.

The two front wheels are equipped with scraper-guards or fenders 14, 14 that are designed to plow through the aggregates and clear a path for the wheels, and these fenders are mounted on a frame that is indicated as 15 and pivotally supported on the truck axles. In Fig. 6 it will be seen that the fender frame is provided with a rigid upright plate or post 16 perforated with pin holes to accommodate a pin 17 that is selectively mounted in the holes to support the fenders in raised or lowered position.

The operators for the working parts of the machine are stationed at the rear end of the machine, and they stand upon a transversely extending platform or board B that is suspended from the rear end of the main frame by suitable hangers H.

The two rear wheels 5 and 6 are employed for steering the machine by the operator standing on the board B, who manipulates a vertically arranged hand wheel 18 to turn a screw bar 19 that is journaled in bearings of the main frame. This forwardly extending horizontal screw bar, which forms the steering rod, passes through a swiveled nut 20 that is mounted in one arm of a bell crank lever 21 which is pivoted at 22 in a bracket that is rigidly mounted on the main frame. A link 23 connects the other arm of the bellcrank lever with a transversely arranged tie-rod 24, and knuckle arms 25 at the opposite ends of the tie rod are pinned through hubs 26 on the posts or spindles 27, 27 of the steering wheels, which spindles are journaled in cylindrical sleeves 28 at the top of the main frame and alined collars 29 fixed near the bottom of the main frame.

Like the front wheels, the rear wheels also are guarded as by fenders or scrapers 30, 30, depending from the inner sides of the side members of the frame and disposed in oblique position to pass or direct material from in front of the respective wheels toward the longitudinal center of the forwardly traveling machine.

The main frame is vertically adjustable with relation to the ground surface on the three spindles 11 and 27, 27, and for transportation purposes the frame may first be elevated by sliding upwardly the bearing sleeves on the spindles, and then a screw cap 31 is threaded, by hand tool, upon the top threaded end of the slide bearing sleeves 12, 28, 28, for supporting the frame in elevated position.

For elevating the main frame to non-working position, I preferably employ means for elevating the rear end of the frame, and separate means for elevating the front end of the machine, but it will be understood that other appropriate and suitable means may be utilized for this purpose, when the machine is to be transported from one project to another location.

For elevating the rear end of the main frame, a pair of laterally spaced lifting cams or elevators 32, 32, are each pivoted at 33 in one of the side members of the frame, as indicated in Fig. 8, adjacent the wheels, and suitable stops or abutments 33*a* are mounted on the frame at the rear of the elevators to limit their movement to upright and elevating position. When not in use the elevators are retained in suspended non-working horizontal position by means of suitable catches or latches as indicated at 34 by dotted lines in Fig. 8. When desired for use, the catches are released to drop the elevators to the ground surface, and then the wheeled implement is pulled forward so that the advancing movement causes spiked and curved or cam faces of the elevator to ride over the ground to lift the main frame, or rather the rear end of the frame from position of Fig. 10 to the position of Fig. 9. When thus elevated the screw threaded supporting caps 31 may be applied to the threaded sleeves 28 for supporting the rear end of the frame on the two spaced spindles near the rear end of the frame.

With equal facility the front end of the main frame may also be elevated by sliding the sleeve 12 up to the top of the spindle 11 for mounting of the cap 31 on sleeve 12; and this may be accomplished by the use of a conventional jack of the portable hand operated type which may be mounted on a horizontal plate T rigidly fixed to the wheel truck 13 and placed beneath the longitudinally extending central beam 9 of the main frame.

In the operations of surfacing and re-surfacing the road bed with sheets of the aggregate, the machine is towed, as by a tractor, or drawn to the left in Fig. 3, and the deposited material is pulled or forced inwardly toward the longitudinal center of the advancing implement by a pair of oppositely disposed, obliquely arranged scrapers, as 35, 35, each of which is rigidly mounted at a front corner of the rectangular main frame and braced on the bottom side rails or angle bars 36—36 of the main frame that extend longitudinally of the machine.

The layer of aggregate is evenly distributed and spread entirely over the surface of the roadbed by means of multiple plows or spreaders 37, preferably in the form of double mold-boards, or double shovels, including obliquely disposed blades, and arranged in desired numbers and relations to effectively spread the material over a specific area of the roadbed surface. As here shown the spreaders are staggered and arranged in groups or gangs and mounted upon four longitudinally spaced and transversely extending rock

shafts 38 journaled at their opposite ends in bearings 39 of brackets or hangers 40 that depend from the longitudinal beams of the main frame.

As indicated in Fig. 3 the plows or spreaders occupy the front or forward portion of the implement, and each plow or spreader is provided with a frame 41 having bearings 42, 42, on a rock shaft, and a spring 43 is suspended between the rock shaft and the plow frame to resiliently hold the spreader in working position on the roadbed so that it may automatically rise and fall as it passes over inequalities or irregularities in the roadway.

These flexible and resilient spreaders may be held in working position, under adjusted spring tension, and they may also be elevated out of working position for transportation purposes, by means of a hand-operated wheel 44 that is mounted in a vertical plane at the rear of the implement where it is readily accessible for use by the operator who stands on the board B.

The hand wheel 44 is rigidly mounted on the rear end of a screw bar 45 which extends longitudinally of the main frame and is journaled in bearings 46 on the rear arched transverse beam 3 and the longitudinal central main beam 9 of the frame. A non-rotary, but traveling nut 47 is threaded on the screw bar, and it is clamped at 48 on a looped, endless cable 49 horizontally disposed at the longitudinal center of the machine, which cable passes around a sheave or pulley 50 journaled at the rear of the frame, and which also passes around a second guide pulley 51 journaled near the front of the frame.

For co-action with this endless cable each rock shaft is equipped with a rocker arm 52 clamped at 53 rigidly on the shaft, and the upper end of each arm is pivotally connected at 54 to the chain by a suitable joint member or clevis 55, which connections are made to a single flight of the endless cable. Thus, by turning the hand wheel 44 in one direction the cable is moved to operate the arms 52 to rock the shafts and swing the spreaders or plows upwardly from the roadway to elevated position for transportation; and by turning the wheel in the opposite direction, when the spreaders are lowered, the arms are operated to swing the scrapers or spreaders downwardly to the road surface to increase the tension of the springs 43 in holding the spreaders in working position.

As the machine advances the plows or spreaders pick up and turn over the aggregate a number of times and the material is spread over the roadbed before the material encounters the last or rearmost row of spreaders, and then the material is further mixed, distributed, and leveled as it encounters and is met by two transversely disposed leveling blades 56 that direct the material to the far corners of the rear end of the machine, and co-operates with a final strike-off blade 57 mounted at the rear end of the machine.

As best seen in Fig. 3 the two blades 56, 56, are obliquely arranged at opposite sides of the longitudinal center of the implement to spread the material toward the opposite rear corners, and their front ends are united by a cross bar 58 while their rear ends are pivotally mounted by bolts 59, and slotted brackets 60 that are mounted on the final strike-off blade 57. For vertically adjusting these semileveling blades with relation to the roadbed, the cross bar 58 is mounted in a bearing bracket 61 that is hinged at 62 at the longitudinal center of the main frame, and an upright screw bar or bolt 63 is pivoted at 64 to the hinged

bearing bracket. The screw bar extends upwardly above the main frame and a hand wheel 65 is threaded on the screw bar against a bearing in position so that the wheel may be turned in opposite directions to raise and lower the hinged bracket 61 and thus adjust the oblique distributor blades 56.

The passage of the plows or spreaders through the aggregate, while spreading the material, at the same time causes the formation of furrows or low hills extending longitudinally of the roadbed, and these irregularities are flattened and eliminated by the passage of the semi-mixing, distributing, and leveling blades 56, which may be vertically adjusted as described, for the purpose.

The final strike-off blade 57 is mounted at the rear end of the implement and it extends the full width of the frame, which, as indicated in Fig. 3 is widened, and provided with upright guides 66, made up of angle irons and arranged in pairs at opposite sides of the frame, to permit raising and lowering of the strike-off assembly, and the upper portion of the strike-off blade is preferably curved inwardly and forwardly, in order to roll rather than push any excess material encountered thereby.

The final strike-off blade is vertically adjustable to vary and determine the thickness of the sheet of coating applied to the road bed, and also to permit the blade to pass over excess material if and when desired. The vertical adjustment of the blade is controlled by a pair of spaced hand wheels 67, 67, each mounted on the upper end of an upright screw bar 68 journaled as at 69 on top of the cross channel beam 3 of the main frame, and the hand wheels are readily accessible to the operators standing on the tail board B.

Each screw bar is threaded through a non-rotatable, but traveling nut 70 that is operatively mounted in a bearing bracket 71 rigidly mounted on the rear face of the blade, and the blade may readily be adjusted to desired position by operation of the hand wheels.

The wheeled implement is designed to operate on one stretch of surface at one side of the longitudinal center of a roadway, and then operate on a complementary stretch at the other side of the center of the road, thus leaving a joint at the center of the roadbed to be finished. To provide an extra supply of material, if desired, to be utilized in surfacing the central joint in the roadbed, two comparatively small auxiliary gates 72 and 73 are located at the opposite ends of the strike-off blade, for selective use in arranging and placing the material alongside the central joint, when the second half of the roadbed is to be coated.

These gates are vertically adjustable in upright guides 74 of the main frame, and the hand wheels 75 and 76 are mounted in position accessible to the operators, on the upper ends of upright screw bars 77, journaled at 78 to turn in the frame, and the threaded ends of the bars pass through non-rotary but traveling nuts 79 mounted in bearing brackets of the gates. The auxiliary gates are utilized in conjunction with the strike-off blade, and their use is selective for disposing of material at the rear end of the implement; and if desired, other auxiliary devices, which may be detachably mounted on the main frame, may be employed for the performance of specific functions in the disposition of the material and the formation of the material in sheets.

Having thus fully described my invention, what

I claim as new and desire to secure by Letters Patent is:

1. In a road-surfacing wheeled implement, the combination with a main frame, multiple longitudinally spaced and transversely journaled rocker shafts mounted on the frame, and means for rocking the shafts, of multiple spreader plows journaled on each shaft, and a resilient connection between each of the plows and its respective shaft for maintaining the plow in ground-engaging position.

2. In a road-surfacing wheeled implement, the combination with a main frame having vertically slide bearings, means for elevating the frame, and means for supporting the frame in elevated position, of multiple transversely arranged rock-shafts journaled on the frame and means for rocking the shafts, multiple spreader plows journaled on each shaft, and resilient connections between each of the plows and its respective shaft for maintaining the plow in contact with a roadbed.

3. In a road-surfacing wheeled implement, the combination with a main frame, multiple transversely arranged rock-shafts journaled on the

frame, multiple spreader-plows mounted on the shafts, and resilient means connecting each of the plows with its respective shaft for holding the plows under tension against a roadbed, of a lever mounted on each shaft, an endless cable operatively mounted on the frame, operative connections between one flight of the cable and said arms, and means for moving said cable to actuate the arms for the purpose described.

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