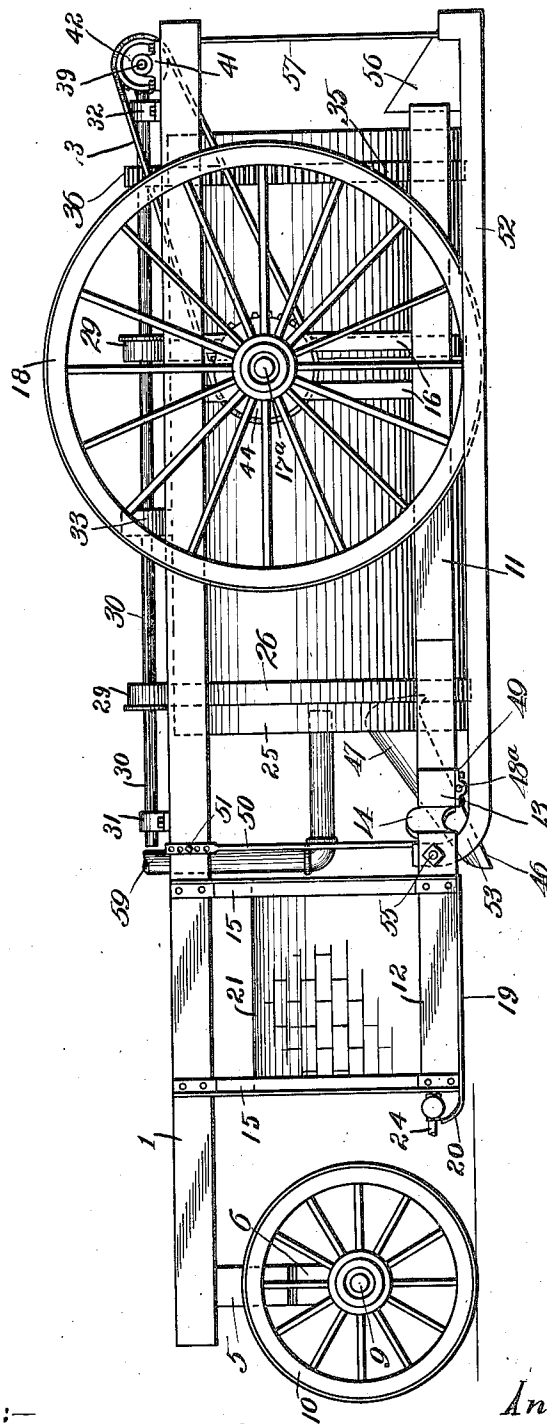


942,866.

M. A. POPKESS.
ROAD WORKING MACHINE.
APPLICATION FILED NOV. 27, 1908.

Patented Dec. 7, 1909.
4 SHEETS—SHEET 1.

Fig. 1.

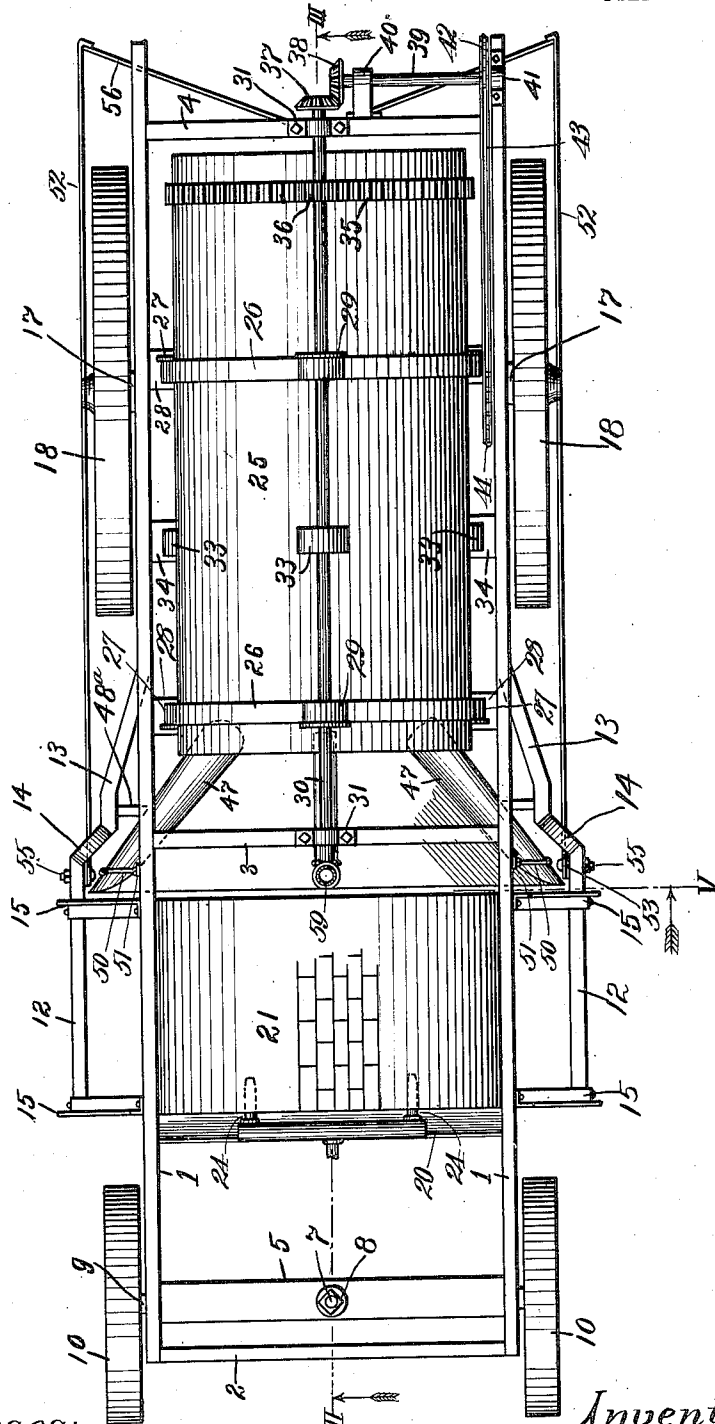


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Fig. 2.



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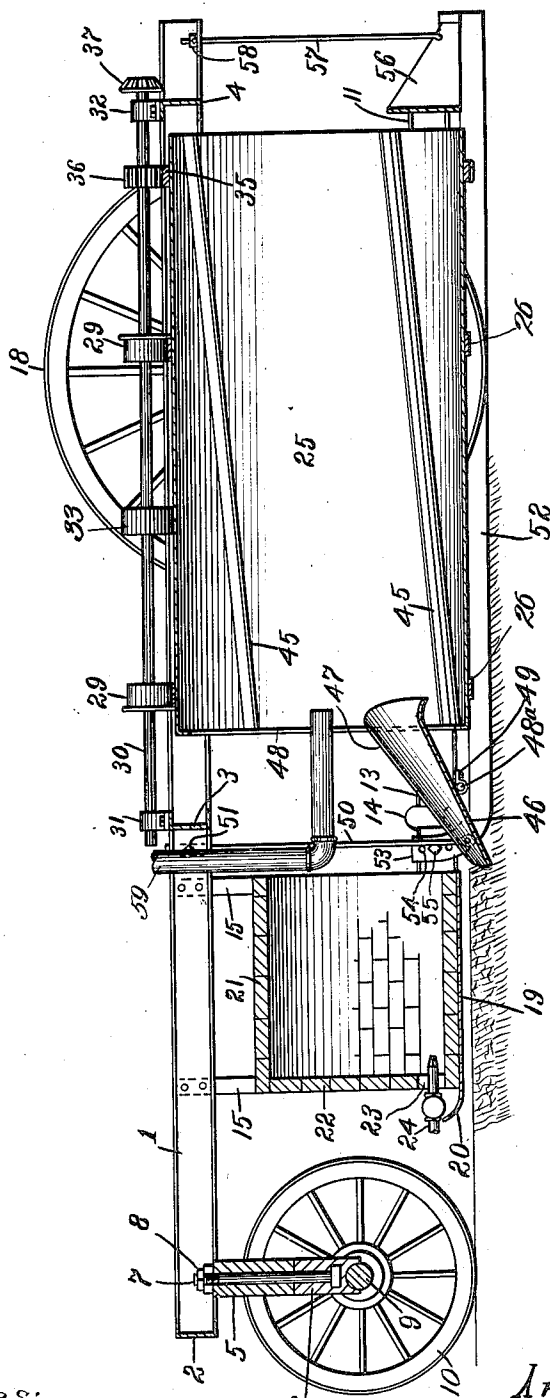
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Fig. 3.



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4 SHEETS—SHEET 4.

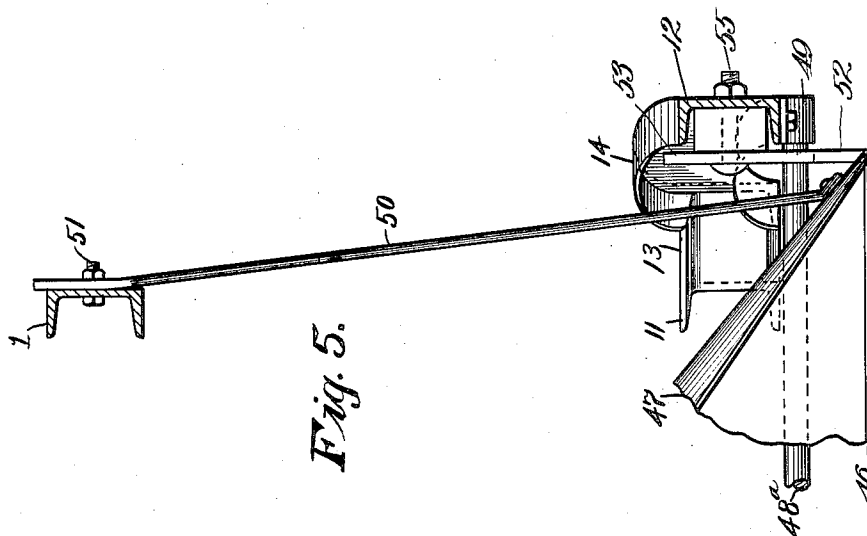
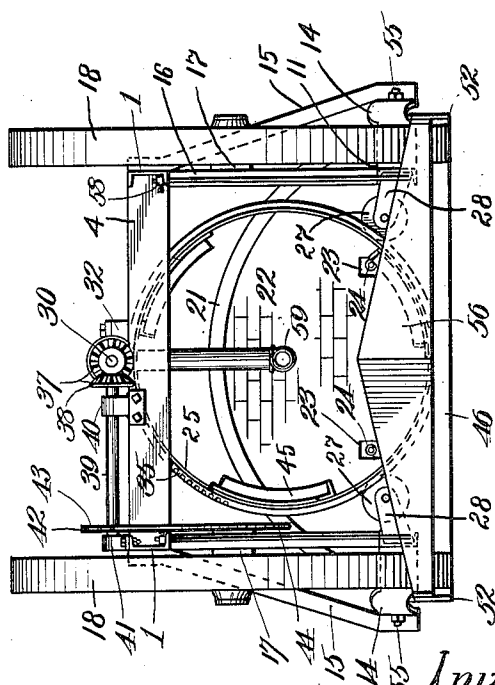


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

MICHAEL A. POPKESS, OF KANSAS CITY, MISSOURI.

ROAD-WORKING MACHINE.

942,866.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed November 27, 1903. Serial No. 464,776.

To all whom it may concern:

Be it known that I, MICHAEL A. POPKESS, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Road-Working Machines, of which the following is a specification.

This invention relates to road-working machines, and more especially to a machine capable of use as a traveling earth-surfacing-material heater, or traveling mixer of such material with a binder in liquid condition and preferably having tough, tenacious, sound-deadening and water-proof properties.

With these objects in view the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which;

Figure 1 is a side elevation of a machine embodying my invention, arranged for raising loosened comminuted or pulverized earth-surfacing material and for heating the same while elevated or for mixing a binder with the elevated material. Fig. 2 is a top plan view of the same. Fig. 3 is a section on the line III—III of Fig. 2. Fig. 4 is a rear view of the machine. Fig. 5 is an enlarged vertical section on the dotted line V of Fig. 2.

Referring now to the drawings, 1 indicates a pair of parallel channel bars arranged horizontally and connected by cross-bars 2, 3 and 4, and also by a cross-bar 5 resting upon a bolster 6 equipped with a king-bolt 7 forming the pivot for bar 6, and engaged at its upper end by a retaining nut 8, the bolster forming a journal for shaft 9 equipped with carrying wheels 10.

A pair of horizontal bars consists of parallel portions 11 arranged vertically under the rear portions of bars 1, the parallel front portions 12 arranged a greater distance apart than portions 11, and bent portions 13 connecting the front ends of portions 11 with the rear ends of portions 12 and provided at the rear ends of the latter with arches 14. The portions 12 of the horizontal bars are spaced more widely apart than portions 11 to accommodate the plow or shovel hereinafter referred to which projects laterally beyond portions 11 and wheels 18

hereinafter more particularly referred to, in order that said wheels may run on the bottom of the furrow or channel made in the ground by said plow or shovel.

15 indicates upright bars secured at their upper ends to bars 1 and at their lower ends to portions 12 of the lower bars, the portions 11 of the lower bars being connected to the upper bars by parallel upright bars 16.

17 indicates blocks carried by bars 16 and forming bearings for short shafts 17^a on which are mounted the rear carrying-wheels 18 arranged by preference in line with the front wheels at the corresponding sides of the rigid frame described, the rear wheels depending to a lower plane than the front wheels for a purpose hereinafter explained; and it is desired in this connection, to state that any other type of ground-engaging supports may be employed in lieu of the wheels referred to, and that the machine is adapted to be propelled by horse-power or any other power desired.

19 indicates a horizontal plate connecting the lower bar-portions 12 at their lower edges by preference, and provided with an upturned front end 20 to cause it to more readily ride over obstructions in its path.

20 indicates a fire-brick or equivalent combustion or heat-concentrating chamber superposed upon plate 19 and open at its rear end, its front end being closed by a wall 22 provided with one or more openings 23 through which rearwardly project one or more valve-controlled burners 24 for use in connection with fuel in fluid condition, the holder for the fuel being omitted as forming no essential part of the invention, as it may be carried by the wheeled frame or extraneously thereof.

25 indicates a hollow cylinder arranged longitudinally of the frame and provided with a pair of circumferential tracks 26 engaged peripherally by flanged rollers 27 journaled in brackets 28 carried by portions 11 of the lower longitudinal bars of the frame, and said rollers being disposed below the axis of the cylinder and at opposite sides of the same, similar rollers 29 engaging the circular tracks vertically above the axis of the cylinder and being mounted on a longitudinal shaft 30 journaled in bearings 31 and 32 carried by cross-bars 3 and 4 respectively. The flanges of rollers 27 and 29 engage the adjacent edges of the circular tracks and thus guard against endwise move-

ment of the cylinder when it is revolved, as hereinafter explained, it being noticed in this connection that additional rollers 33 may be employed to assist in supporting the cylinder, two of which rollers are mounted in brackets 34 similar to brackets 28, and the third on shaft 30 as shown most clearly in Fig. 2. The cylinder is also provided with a circular rack 35 engaged by drive-pinion 36 secured rigidly on shaft 30. The shaft is also provided with a bevel-gear 37 meshing with a similar gear 38 on a transverse shaft 39 journaled near its opposite ends in a bearing 40 carried by cross-bar 4 and a bearing 41 carried by one of the bars 1. Rigidly secured on shaft 39 is a sprocket-wheel 42 connected by a chain 43 with a sprocket-wheel 44 rotatable with one of the shafts 17^a, so that as the machine travels the last-named traction-wheel 18 imparts rotatable movement through the gearing described, to the cylinder 25, and in order that the cylinder may elevate and drop loose earth-surfacing material in such movement, I provide the cylinder internally with cleats 45 arranged spirally for purposes of imparting rearwardly movement to such material and eventually dropping it upon the roadway.

46 indicates a plow or shovel pitched downwardly and forwardly at such an angle that its front end occupies the horizontal plane of the lower side of wheels 18, its rear end projecting into the front end of the cylinder a slight distance. The front end of the plow or shovel is slightly wider by preference than the distance between the outer sides of wheels 18 and at its converging sides is provided with flanges or mold-boards 47 which curve upwardly and inwardly for the purpose of concentrating the material scooped up and discharged into the cylinder, an inturned flange 48 being provided to guard against any of such material escaping from the front end of the cylinder. The plow or shovel is provided with a rod 48^a pivotally engaging bearings 49 secured to the underside of portions 13 of the lower bars of the frame, and pivotally secured at their lower ends to the plow or shovel forward of its pivotal point, are stay-rods 50 adjustably bolted at their upper ends at 51, to the upper bars 1 of the frame. By proper adjustment of the stay-rods the plow or shovel can be arranged to cut or operate at varying depths or be raised to inoperative position above the ground.

To prevent the walls of loose earth, produced at opposite sides by the plow or shovel in its passage, from falling inward behind said plow or shovel, I provide a pair of guards 52 arranged parallel, in vertical planes between the plow or shovel and wheels 18. Said guards underlie the arched portions 14 of the lower bars of the frame

and forward of said portions curve upward at 53, the curved ends having a series of holes 54 through any one of which of each bar, a pivot-bolt 55 carried by the adjacent lower bar of the frame, pivotally extends. The guards 52 project beyond the rear end of the cylinder and at their rear ends carry a connecting spreader 56 of V-shape in plan view, said spreader being arranged with its lower edge in substantially the same horizontal plane as the lower portions of wheels 10. The function of this spreader is to distribute the material as discharged from the cylinder upon the underlying bed of earth so as to fill the furrow produced by the plow or shovel. As a means of securing the spreader and the rear ends of the guards 52 above the surface of the ground, a pair of rods 57 are secured at their lower ends to the spreader and at their upper ends extend slidably through the channel bars 1 and are equipped with adjustable collars 58 to rest on said bars.

The earth-surfacing material is first loosened and comminuted or pulverized to a suitable depth by any suitable implements, rocks of objectionable size being incidentally removed. The machine is then propelled in as straight a course as possible over the prepared material, the burner or burners being first set in operation so as to discharge a flame or flames rearwardly through the combustion or heat-concentrating chamber, this chamber being preferably of sufficient length to accommodate a large volume of hot-air and thus facilitate and insure perfect combustion of the fuel, in order that an exceedingly hot blast may play upon the mass of loosened material gathered up by the plow or shovel and deposited in the cylinder at its front end. The said blast in practice, will be sufficient to effect a consumption of practically all organic matter contained in the material thus elevated. As the material thus heated, falls into the cylinder, the revolution of the latter through the instrumentality of cleats 45 lifts the material and, according to its speed, drops the same or through centrifugal force, scatters such material so that in such scattered or widely distributed condition it shall be subjected to the drying and heating influence of the hot-air passing continually through the cylinder from front to rear. In the revolution of the cylinder the material is not only scattered to render it more susceptible to the heat but it is fed continually rearward because of the pitch or inclination of the cleats and through the constant advance of the machine, it being obvious that the material while falling from the upper to the lower part of the cylinder has a relative rearward movement with regard to the advancing machine. The material is raised to the desired temperature by the time it attains the rear end

of the cylinder and falls therefrom back upon the underlying bed or roadway so as to refill the furrow or channel produced by the plow or shovel, it being noticed in this connection that the rear wheels 18 travel in said furrow or channel and therefore upon a substantially solid bed and thus tend to regulate the depth of cut of the plow or shovel. It will also be noticed in this connection that the cleats 52 flanking the rear wheels and the plow or shovel, act to prevent the walls of loosened material produced by the passage of the plow or shovel, from falling into the furrow or channel in the path of wheels 18. The heated material as it falls from the rear end of the cylinder tends to pile up, and to spread or distribute this material and cause it to eventually fill the furrow or channel, the spreader 56 is provided, though it is to be understood that I do not wish to restrict myself to the use of the spreader as it is not an indispensable element.

When it is desired to employ the machine in mixing a binder in liquid condition, with the earth-surfacing material, such binder, preferably while hot, will be discharged from a tank (not shown) carried on or movable with the machine, through a suitable jet pipe 59 onto the earth-surfacing material as the same enters the cylinder, by preference. The material thus sprayed with the binder is stirred and thoroughly amalgamated with such binder, in its passage through the cylinder, the resultant product of such mixture being eventually distributed by the spreader in the furrow or channel produced by the plow or shovel, as will be readily understood, it being of course apparent that the burner or burners and the binder-supplying apparatus are not operated simultaneously. In practice the machine will be first operated to heat the earth-surfacing material and then, while the material is hot, will be caused to travel over the same path for the purpose of reelevating the material and mixing with it a binder of the character described. After the surfacing material has been heated and the binder incorporated in it, it may be harrowed if desired, to effect a more intimate and thorough mixture, and then it is compacted or compressed by tamping, rolling or in any other suitable manner, so as to constitute a comparatively smooth, even and dense surfacing possessing resilient, sound-deadening and water-proof properties.

From the above description it will be apparent that I have produced a machine for heating loosened earth-surfacing material which embodies the features of advantage enumerated as desirable in the statement of the object of the invention and while I have illustrated and described the preferred embodiment of the same I reserve the right to

make such changes in the form, proportion, detail construction and arrangement of the parts as properly fall within the appended claims.

Having thus described the invention what I claim as new and desire to secure by Letters-Patent, is:

1. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder.

2. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, and means for scattering or distributing the material within the cylinder and causing it to eventually drop from the rear of the latter, onto the solid bed or roadway.

3. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, means for scattering or distributing the material within the cylinder and causing it to eventually drop from the rear end of the latter, onto the solid bed or roadway, and means movable with the machine, for spreading or distributing the material evenly discharged from the cylinder, in the furrow or channel produced by its original elevation by the plow or shovel.

4. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, means for scattering or distributing the material within the cylinder and causing it to eventually drop from the rear end of the latter, onto the solid bed or roadway, and a V-shape spreader movable with and arranged at the rear end of the frame to evenly spread the material discharged by the cylinder.

5. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in or-

der to scoop up earth-surfacing material and deliver it into the cylinder, and a pair of parallel guards movable with the machine and extending rearwardly from the front and lower edge of the plow.

5 6. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, a pair of parallel guards movable with the machine and extending rearwardly from the front and lower edge of the plow, and a spreader back of the cylinder and connected at its opposite ends to the said guards.

10 7. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, a pair of parallel guards movable with the machine and extending rearwardly from the front or lower edge of the plow, a spreader back of the cylinder and connected at its opposite ends to the said guards, means whereby the front ends of the guards may be elevated, means whereby the rear ends of said guards and the spreader may be elevated, and means for raising the front end or cutting edge of the plow.

35 8. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, and one or more burners movable with the frame and adapted to direct flame toward the cylinder and upon the earth-surfacing material as the same is scooped up by the plow.

40 9. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, a heat-concentrating chamber carried by the frame forward of the plow and opening toward the latter, and one or more burners movable with the frame, projecting into the chamber through its front wall to direct flame upon the earth-surfacing material elevated by the plow.

60 10. A road-working machine, comprising a frame provided with ground-engaging

supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, and means movable with the machine for discharging a liquid binder onto the earth-surfacing material during the progress of same through the machine.

75 11. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, and means for rotating the cylinder during the travel of the machine.

80 12. A road-working machine, comprising a frame provided with ground-engaging supports, a cylinder carried by said frame, a plow or shovel carried by the frame and adapted to be pitched downwardly and forwardly below the level of the ground in order to scoop up earth-surfacing material and deliver it into the cylinder, spirally-arranged cleats secured to the inner side of the cylinder, and means for imparting rotation to the cylinder during the travel of the machine.

85 13. A road-working machine, comprising a suitable frame, a pair of front and a pair of rear ground-engaging supports for said frame, the supports at corresponding sides of the machine being longitudinally alined, and the rear supports depending to a lower plane than the front supports, a cylinder arranged longitudinally of the frame between the rear supports, and a plow or shovel carried by the frame in front of the cylinder and pitched downwardly and forwardly to dispose its front or cutting edge below the level of the ground, and substantially in the horizontal plane of the undermost parts of the rear supports, said plow or shovel at its cutting edge slightly exceeding the distance between the outer sides of the rear supports and from such edge converging rearwardly and terminating within the front end of the cylinder and provided at its converging edges with upwardly projecting flanges.

100 14. A road-working machine, comprising a suitable frame, a pair of front and a pair of rear ground-engaging supports for said frame, the supports at corresponding sides of the machine being longitudinally alined, and the rear supports depending to a lower plane than the front supports, a cylinder arranged longitudinally of the frame between the rear supports, a plow or shovel carried by the frame in front of the cylinder and pitched downwardly and forwardly to dis-

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pose its front or cutting edge below the level of the ground, and substantially in the horizontal plane of the undermost parts of the rear supports, said plow or shovel at its cutting edge slightly exceeding the distance between the outer sides of the rear supports and from such edge converging rearwardly and terminating within the front end of the cylinder and provided at its converging edges with upwardly projecting flanges, and parallel guards at the outer sides of the rear supports and extending rearwardly beyond the latter from the front or cutting edge of the plow or shovel and having their lower edges in the horizontal planes of such edges of the shovel.

15. A road-working machine, comprising a suitable frame, a pair of front and a pair of rear ground-engaging supports for said frame, the supports at corresponding sides of the machine being longitudinally alined, and the rear supports depending to a lower plane than the front supports, a cylinder arranged longitudinally of the frame between the rear supports, a plow or shovel carried by the frame in front of the cylinder and pitched downwardly and forwardly to dispose its front or cutting edge below the level of the ground, and substantially in the horizontal plane of the undermost parts of the rear supports, said plow or shovel at its cutting edge slightly exceeding the distance between the outer sides of the rear supports and from such edge converging rearwardly and terminating within the front end of the cylinder and provided at its converging edges with upwardly pro-

jecting flanges, parallel guards at the outer sides of the rear supports and extending rearwardly beyond the latter from the front or cutting edge of the plow or shovel and having their lower edges in the horizontal planes of such edges of the shovel, and a spreader or distributor rearward of the cylinder and connected to the rear ends of the guards with its lower edge above the lower edge of the latter.

16. A road-working machine, comprising a suitable frame, a pair of wheels supporting the front end of same, a pair of wheels at the rear end of the same and arranged in line with the front wheels and projecting downward to a lower plane, a plow or shovel carried by the frame forward of the rear wheels and pitched downwardly and forwardly to substantially the same plane as the undermost parts of the rear wheels and having its front or lower edge of width slightly exceeding the distance between the outer sides of said rear wheels and converging inwardly from said edge to its rear end and provided at its converging sides with upwardly projecting flanges, a cylinder carried by the frame and arranged longitudinally thereof and receiving the rear end of the plow or shovel, and means for transmitting rotary movement to the cylinder from one of the said rear wheels.

In testimony whereof I affix my signature, in the presence of two witnesses.

MICHAEL A. POPKESS.

Witnesses:

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G. Y. THORPE.