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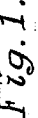


Fig. 2.

Milton P Davis

INVENTQR

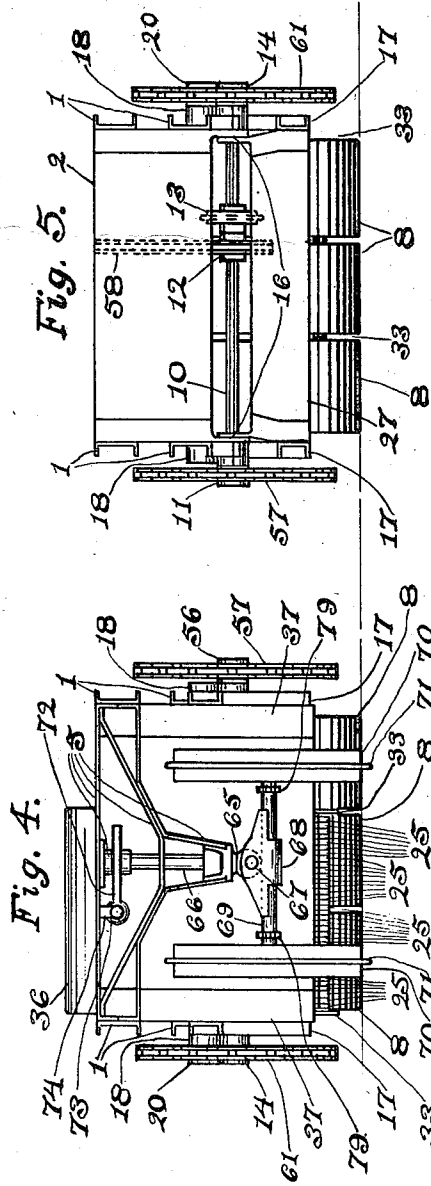
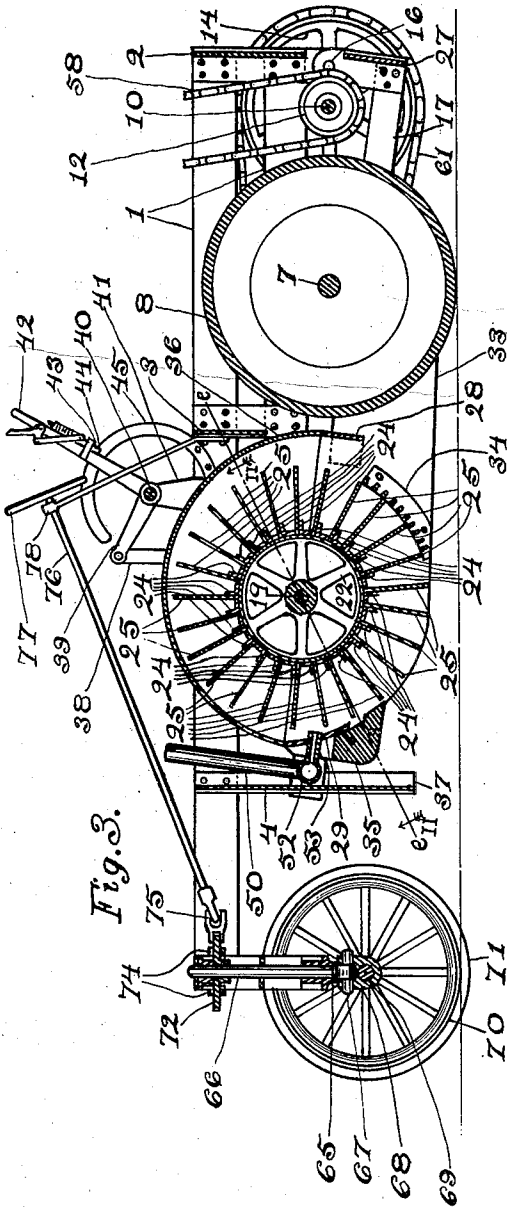
INVENTOR
William F. Davis.

W. F. DAVIS.
ROAD OILING MACHINE.
APPLICATION FILED OCT. 1, 1909.

1,044,999.

Patented Nov. 19, 1912.

4 SHEETS—SHEET 2.



WITNESSES:

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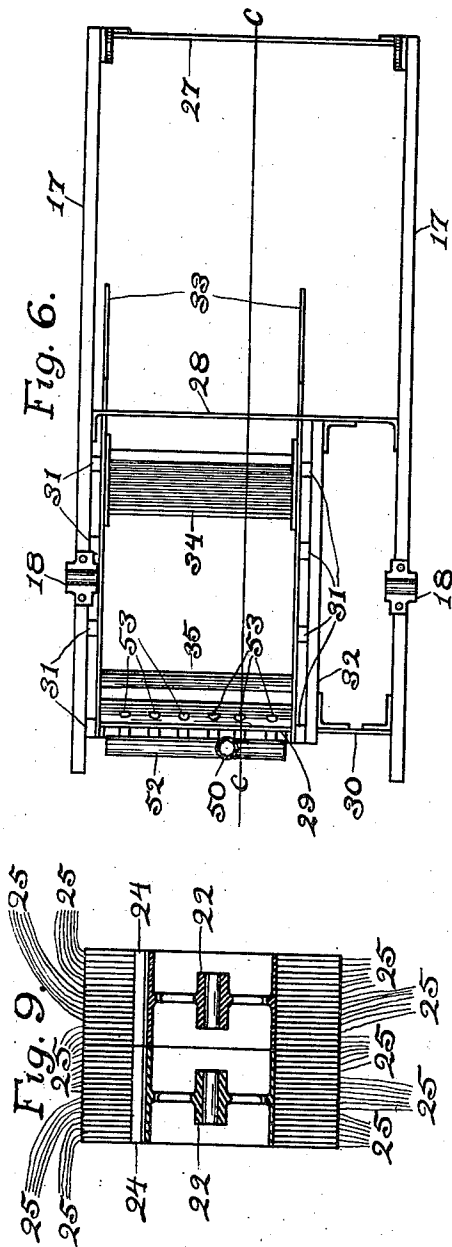
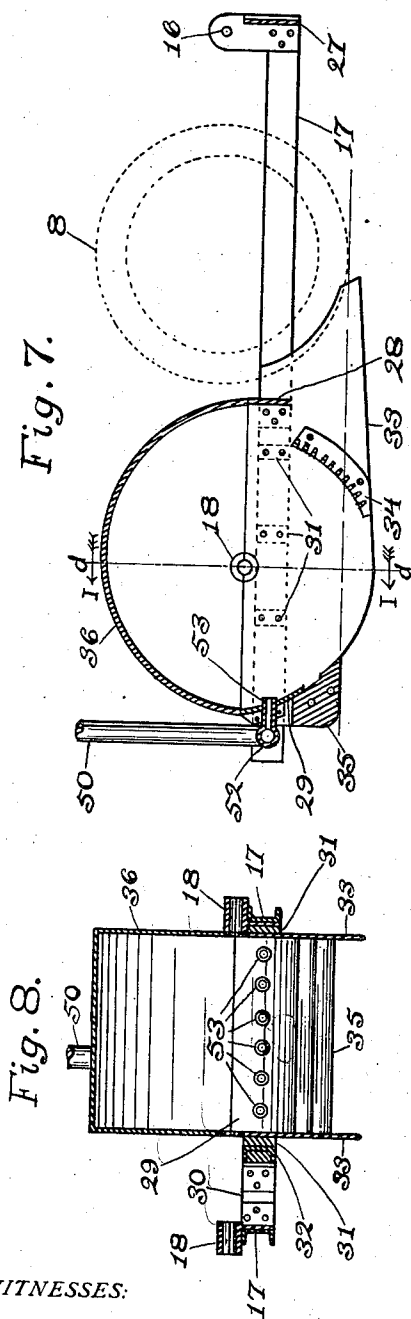
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4 SHEETS—SHEET 3.



WITNESSES:

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4 SHEETS—SHEET 4.

Fig. 13.

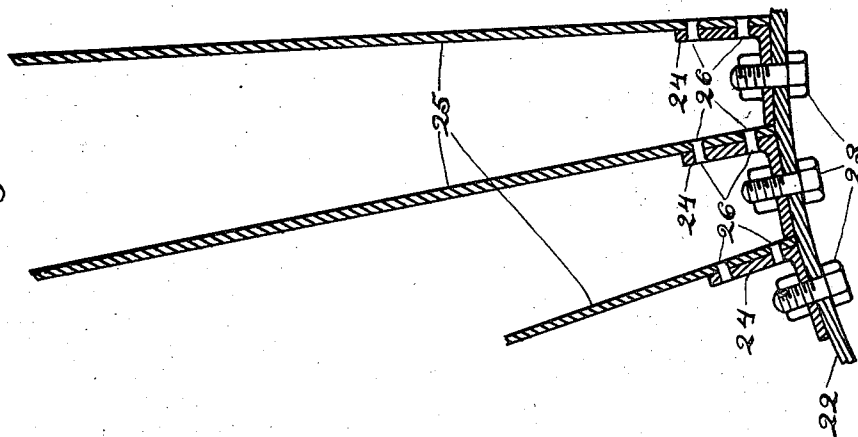


Fig. 12.

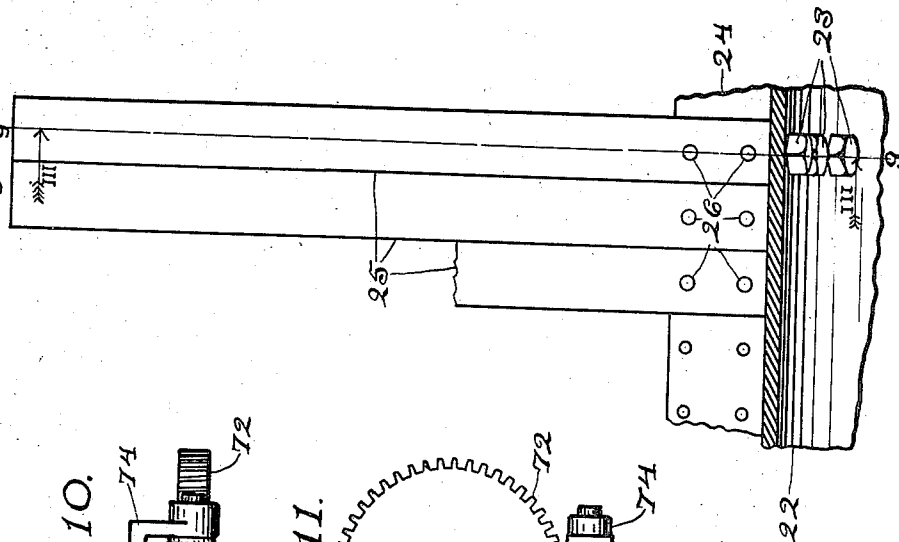


Fig. 10.

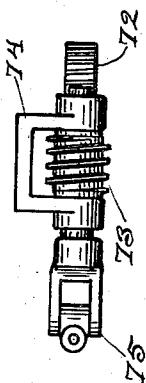
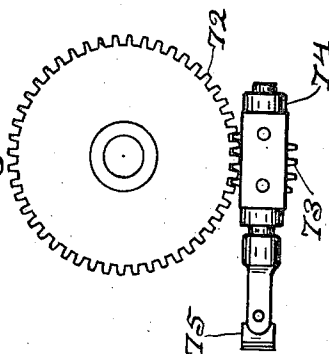


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM F. DAVIS, OF KANSAS CITY, KANSAS.

ROAD-OILING MACHINE.

1,044,999.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed October 1, 1909. Serial No. 520,547.

To all whom it may concern:

Be it known that I, WILLIAM F. DAVIS, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Road-Oiling Machines, of which the following is a specification.

The invention relates to machines for oiling roads, railroad beds and the like and seeks to provide a simple and efficient form of machine that will reduce road material and mix therewith oils, melted asphalt, coal tar and other liquids, hot or cold, and refers more particularly to a machine that, without applying heat to road material, simultaneously reduces said material and mixes therewith a hot liquid that congeals at normal temperature, effecting the mixture in so brief a time as to be practically instantaneous and before the liquid can congeal, thus making a mixture that cools as it is made and may be immediately rolled into a dense water proof mass of a sufficient depth to sustain the heaviest travel.

Roads have been oiled since far back in the past century by spreading oil, melted asphalt and other liquids on the surface and then plowing, harrowing and tamping it in; this has proven a very expensive as well as unsatisfactory method, because of the impossibility of a thorough or even mixture, even with exhaustive efforts.

Oils consisting chiefly of heavy asphalt or tar are the most desirable for road oiling and this class of oil cannot be incorporated with road material by plowing, harrowing and tamping, even though the oils be heated to a high temperature when spread upon the surface of the road, because the oils congeal before they can be mixed with the road material by this method.

Mixing machines wherein a considerable quantity of material is stirred and agitated at one time, as mud mixing machines and asphalt mixing machines and the like, are old but cannot be employed in mixing oils that congeal when cooled, with cold road material, because their action is slow and the oils congeal before the mixture can be accomplished.

The term oil is employed throughout this specification and in the claims appended to designate petroleum, asphalt, coal tar or any liquid that may be used for the purpose of improving roads and refers more particu-

larly to such liquid as will congeal when cooled. By road material is meant any material of which the road may be composed, whether it be the natural material or hauled upon the road, but such material as clay, soil, sand, gravel and macadam is particularly meant.

Machines for heating road material and mixing asphalt, tar and other liquids therewith are as old as the asphalt pavement, but clay and soil have not been so extensively used in the past as other materials, because heat dries the moisture from material, and clay and soil, when hot and dry, absorb asphalt and other liquid to the extent that it requires about twice the amount of oil or asphalt to bind them together as that required by other materials in common use; by drying the moisture from soil and clay the life of the road is impaired and the cost of the road is greatly increased by reason of the extra quantity of oil required.

Clay and soil are very desirable in roads when containing moisture, owing to the inexpensiveness of the application of the oil and the equipment required for the oiling and the superiority of such roads over macadam and other forms of roads, but oil that will congeal can only be mixed therewith by a practically instantaneous mixture. The clay and soil portions of road material compact more readily and produce a more dense, plastic and otherwise desirable road with the moisture contained therein.

It is essential in machines for oiling roads and mixing oil with earth for like purposes that the earth portions of the material be cut or scraped into fine particles and the oil or other liquids be present during the scraping operation so that heavy oils may be delivered to the machine in a melted condition and incorporated with the earth material before the oils have time to congeal. Hard lumps of earth will not pulverize by agitation and damp earth becomes more compact when agitated. For this reason road oiling machines must be provided with projections that cut or scrape, which travel at a high rate of speed and scrape the material off in thin layers, separating it into fine particles, and the oil must be present during the scraping operation, because oil that congeals at normal temperature, such as is desirable for oiling roads, will not be absorbed by a mass of earth and can only be mixed by separating both the earth and the

oil into thin layers or minute portions and bringing them together.

It is not desirable for road material such as soil and clay to absorb the oil, for the reason that absorption requires more oil and has a tendency to make the road soft, which reduces the firmness when rolled; it is more advantageous to scrape the material into thin layers or small particles and bind them together by coating them with the oil.

The present invention has provided an efficient machine, simple and inexpensive in construction and operation, that instantaneously cuts, scrapes and brushes earth material for roads, railroad beds and the like into fine particles and mixes oils, melted asphalt or other liquids therewith during the scraping and brushing operation and effects the mixture before any heated oil or liquid has time to congeal. By cutting or scraping the material it is handled but once during the oiling operation and then only for an instant, which results in a great saving of power over any means of heating, agitating and stirring and enables a small and inexpensive machine to have an enormous capacity.

A further object of the invention is to provide projections sufficiently rigid to handle gravel and macadam roads, yet slightly flexible so they will spring and brush over large stones or other solid obstructions of too great a size to be moved.

A still further object of the invention is to rub the material by the brushing action of the projections against a series of obstructions, to more thoroughly mix the oil with the earth material.

With these and other objects in view the invention consists in the novel features of construction, combinations and arrangements of parts as hereinafter set forth, illustrated in the drawings accompanying this specification and more particularly pointed out in the claims appended.

In the drawings:—Figure 1 is a view in elevation of a machine embodying my invention. Fig. 2 is a plan view. Fig. 3 is a vertical longitudinal section on line *a—a* of Fig. 2. Fig. 4 is a front elevation with certain parts removed. Fig. 5 is a rear elevation with certain parts removed. Fig. 6 is a plan of a detached fragment of the machine. Fig. 7 is a vertical longitudinal section of Fig. 6 on line *c—c* of Fig. 6, but with certain parts added. Fig. 8 is a vertical cross section on line *d—d* of Fig. 7 looking in the direction of arrows I—I. Fig. 9 is a section of a detached fragment on line *e—e* of Fig. 3. Fig. 10 is an enlarged view in elevation of the worm gear 72, worm 73, bracket 74 and a portion of the knuckle 75. Fig. 11 is a plan view of Fig. 10 on the same scale. Fig. 12 is an enlarged view in section of a fragment of the scraping projec-

tion 25, the angle 24 and a portion of the rim of pulley or hub 22, as indicated on line *e—e* Fig. 3 looking in the direction of arrows II—II. Fig. 13 is a vertical cross section of Fig. 12 on line *g—g* looking in the direction of arrows III—III.

The frames 1 are connected by cross ties 2, 3 and 4 and bolster 5 and provided with boxes 6, in which is journaled shaft 7 which passes through roller 8 and is secured thereto in any suitable manner. Frames 1 are also provided with boxes 9 and journaled therein is shaft 10 to which is rigidly secured sprocket wheels 11, 12 and 13, while sprocket wheel 14 is loosely mounted on shaft 10 and engages therewith through friction clutch 15 of any suitable type.

Hinged to frames 1 at the point indicated by numeral 16 is a swinging frame 17 provided with boxes 18, in which is journaled shaft 19 mounted securely with sprocket wheel 20, gear 21 and preferably pulleys or hubs 22, to which is secured projections preferably in the form of scrapers or cutters 25 in any suitable manner, but preferably by bolts 23, angles 24 and rivets 26. The reducing and mixing wheel is composed of hubs 22, bolts 23, angles 24, rivets 26 and cutters or scrapers 25; it is manifest, however, that the construction can be varied within wide limits without changing the results or the spirit of the invention.

Frames 17 are secured together by cross ties 27, 28, 29 and 30, filling blocks 31, a short intermediate frame 32 and wheel housing plates 33.

The cross tie 4 is provided with angles 37 extending downward from the frames 1 and forming a guide for the front end of frame 17. The frame 17 lies close to this guide on either side and is free to be raised to position shown in Figs. 3, 4 and 5, or lowered to position illustrated in Figs. 1 and 2. The lifting bars 38 are connected in the usual manner to arms 39 of the lifting shaft 40, which is supported by bracket boxes 41 extending from the frames 1 and controlled by lever 42, provided with a latch 43 designed to engage the notch 44 in the quadrant 45.

The wheel-housing is composed of side plates 33, cross ties 28 and 29, shoe 35 and the wheel cover portion 36. The shoe 35 is for the purpose of closing the wheel housing in front of the mixing wheel and it is preferably allowed to slide on the ground or road when the machine is in operation.

The grate or rubbing bars 34 are preferably set to slightly engage the projections 25 for the purpose of rubbing the material and oil more thoroughly together. It will be apparent that the most of the earth material will pass through the bars, but macadam or any substance that will not pass through will be brushed over the top of the

bars. Where a large amount of macadam is mixed with the road material it is found to be desirable to remove the grate from the machine.

5 A pump 46 of any suitable type is supported on the frame 1 and provided with sprockets 47 and 48, secured to the pump shaft 49. The discharge pipe 50 with a flexible portion 51 leads from the pump to
10 the header 52, from which a number of branches 53 enter the wheel housing through cross tie 29. The suction pipe 54 is provided with a flexible portion 55, which is intended to connect to the source of supply
15 not shown because of common and well known construction.

Mounted on the shaft 7 and designed to turn therewith is a sprocket wheel 56 from which a chain 57 drives sprocket 11
20 and shaft 10.

Carried by the side frames 17 and intermediate frame 32 is an engine 59 of any suitable type provided with a gear 60 meshing into gear 21 on shaft 19 for the purpose
25 of turning said shaft. Sprocket chain 61 connects sprocket wheels 20 and 14 and is for the purpose of driving the shaft 19 and mixing wheel from counter shaft 10 and roller 8 through sprockets 11 and 56 and
30 chain 57, the chain 61 will only be used for this purpose, however, when the engine 59 is not in use. It will be understood that the chain 61 may be used to drive the counter shaft 10, roller 8 and pump 46 through shaft
35 19 and gears 60 and 21 from the engine 59.

The bolster 5 is supported by shoulder 65 on vertical shaft 66 which is carried by pin 67 passing through a saddle 68 resting on the axle 69. To the axle 69 is journaled
40 wheels 70 provided with annular flanges 71 extending outward radially from the wheels. To the shaft 66 is secured worm gear 72 meshing into worm 73 journaled in bracket 74 secured to the bolster 5 and provided at the rear end with a universal coupling or joint 75. From the universal joint
45 75 a steering shaft 76 extends rearwardly and upwardly to the steering wheel 77 and is supported at the rear end by bracket 78.

50 The axle 69 is provided with a short tongue connection 79 to which is coupled a pole 80 with pins 81 and 82. It will be understood that when pin 81 or pin 82 is removed the pole portion of the tongue is
55 free to move to either side without moving the wheels and the tongue connection is so constructed for the purpose of allowing the machine to be guided by the steering wheel independent of the tongue.

60 The improved machine is shown in Fig. 1 and Fig. 2 in working position with the wheel-housing lowered to allow the mixing or brush wheel to enter the ground, while in Figs. 3, 4 and 5 the wheel is lifted from the
65 ground and in this position the machine is

moved from place to place; the wheel is held in raised position by the bars 38, arms 39, shaft 40, boxes 41, lever 42, latch 43 and quadrant 45.

Where the road to be oiled has the desired
70 level and is not in a solid compact condition, no preparation of the road is necessary for the successful operation of the machine. There are many combinations of details by which the machine can be advantageously
75 operated, the preferred method, however, is to haul the machine with animals or other power and with the engine 59 running over toward the roller 8 and turning the mixing or brush wheel through gears 60 and 61 over
80 from the roller 8 at a high rate of speed; throw the lever 42 forward when the weight of the mixing wheel, wheel-housing and connected parts cause the side plates 33 to sink into the ground until the shoe 35 strikes and
85 rides thereon. It requires a portion of this weight to hold the side plates in the ground, the remainder of the weight is preferably supported by the shoe 35 which causes it to iron or smooth the top surface of the ground
90 and make a bearing that prevents the mixing wheel from throwing oil on the ground in front of the wheel-housing. As the lever 42 is thrown forward the projections on shaft 19 cut the ground in thin layers, break
95 it into minute particles and brush it rearwardly, depositing it in the path of the roller 8 which rolls it down. As the dirt or other material of which the road is composed is brushed rearwardly by the brush-
100 wheel it is brushed against and through the rubbing grate 34 which has a kneading effect that is very beneficial to oil and dirt roads.

The pump 46 is driven from shaft 10 by
105 sprocket wheel 12 through chain 58 and sprocket 47 but the chain 58 may be shifted to sprockets 13 and 48 and is designed to shift for the purpose of changing the speed of the pump. Sprocket 13 is smaller than
110 sprocket 12, likewise sprocket 47 is smaller than sprocket 48. It will be understood that when the chain 58 is on sprockets 13 and 48 the pump will run slower than when the chain is on sprockets 12 and 47.
115

The pump is used for the purpose of regulating the quantity of oil delivered to the mixing wheel in proportion to the amount of material oiled by the machine, so that a known quantity of oil is applied to the road
120 for each square yard of road oiled. Some roads require more oil than others owing to local conditions and the depth oiled; for this reason it is desirable to have a changeable speed pump. The pump is preferably
125 driven from the roller 8 rolling on the ground and driving through shaft 7, sprocket wheel 56, chain 57, sprocket wheel 11, shaft 10 and sprocket wheel 12, chain 58, sprocket wheel 47 and shaft 49, or sprocket
130

wheel 13, chain 58, sprocket wheel 48 and shaft 49. The oil is supplied from any convenient source to the flexible portion 55 of the suction pipe 54 from where it is received and forced by the pump 46 through pipe 50 and 51 to the header 52 and discharged through branches 53 into the wheel-housing and mixing or reducing wheel where it is received by the projections 25 and immediately discharged into the fine particles of dirt or other material as it is being cut and scraped from the road. As the wheel removes nothing at the bottom point of travel the material is brushed and kneaded during the movement rearwardly and has been found in practice to be in a condition to make an excellent road before it reaches the rubbing grate 34, the additional rubbing and kneading, however, improves the condition.

It is preferred to steer the machine by the steering wheel 77 so that the operator can hold the mixing or reducing wheel to the desired position on the road while oiling it; roads are usually wider than the improved machine, for this reason it is generally necessary to make several trips side by side finishing each strip the width of the reducing wheel or side plates 33 at one operation; the steering wheel enables the operator to oil each strip after the first up to or against one that has been previously oiled.

As the roller 8 passes over the oiled earth or other material it is finished, although additional rolling with a heavy roller will improve some roads. It is very desirable to finish the width oiled at one operation leaving it in a rolled and compacted condition, as the road can always be used immediately after oiling and in case of a sudden rain storm the machine is stopped in the midst of a job and the part that is oiled will not absorb moisture, because it is rolled when the machine is stopped.

The road oiling machine is of chief importance for the oiling of roads, but may be advantageously employed in the oiling of railroad beds and the like. It is manifest that numerous changes may be made in the details set forth without departure from the essentials of the invention.

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

1. In a road oiling machine, the combination with a road roller, of a frame having a portion movable up and down, means constructed to raise and lower said movable portion, a rotary scraper journaled in said frame in front of the roller and constructed to scrape the surface of the road toward the roller, and oil-serving devices arranged to discharge oil in close proximity to the scraper whereby the oil and scrapings are at once associated in the path of the roller.

2. In a road oiling machine, the combination with a road roller, of a frame having a portion movable up and down, means constructed to raise and lower said movable portion, a rotary scraper journaled in said frame in front of the roller and having its axis parallel with the axis of the roller, the said scraper being constructed to scrape the surface of the road toward the roller and having radial elastic scraping blades, and oil-serving devices arranged to discharge oil in close proximity to the scraper whereby the oil and scrapings are at once associated in the path of the roller.

3. In a road oiling machine, the combination with a road roller, of a frame having a portion movable up and down, means constructed to raise and lower said movable portion, a rotary scraper journaled in the said frame in front of the roller and constructed to scrape the surface of the road toward the roller, a curved grating arranged contiguously to the scraper whereby the scrapings are rubbed through the grating by the operation of the scraper, and oil-serving devices arranged to discharge oil in close proximity to the scraper whereby the oil and scrapings are at once associated in the path of the roller.

4. In a road oiling machine, the combination with a road roller, of a frame having a portion movable up and down, means for raising and lowering said movable portion, a rotary scraper journaled in said frame in front of the roller and having its axis parallel with the axis of the roller, the said scraper being constructed to scrape the surface of the road toward the roller and having radial elastic blades, a curved grating arranged contiguously to the lower part of the scraper whereby the scrapings are rubbed through the grating by the operation of the scraper, and oil-serving devices arranged to discharge oil in close proximity to the scraper whereby the oil and scrapings are at once associated in the path of the roller.

5. In a road oiling machine, the combination with a road roller, of a frame having a portion movable up and down, means constructed to raise and lower said movable portion, a rotary scraper journaled in said frame in front of the roller and constructed to scrape the surface of the road toward the roller, and oil-serving devices arranged to discharge oil into the scraper above the surface of the road whereby the oil is at once applied by the said scraper to the scrapings in the path of the roller.

6. In a road oiling machine, the combination with a road roller, of a frame having a portion movable up and down, means constructed to raise and lower said movable portion, a rotary scraper journaled in said frame in front of the roller and having its

axis parallel with the axis of the roller, the said scraper being constructed to scrape the surface of the road toward the roller and having radial blades, and oil-serving devices arranged to discharge oil upon the blades of the scraper whereby the oil is at once applied by the scraper to the scrapings in the path of the roller.

7. In a road oiling machine, the combination with a road roller, of a rotary scraper journaled in said frame in front of said roller and constructed to scrape the surface

of the road toward the roller, means constructed and arranged to raise and lower the said scraper, oil-serving devices arranged to discharge oil in close proximity to the scraper whereby oil and the scrapings of said scraper are at once associated in the path of said roller.

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Witnesses:

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