

April 12, 1955

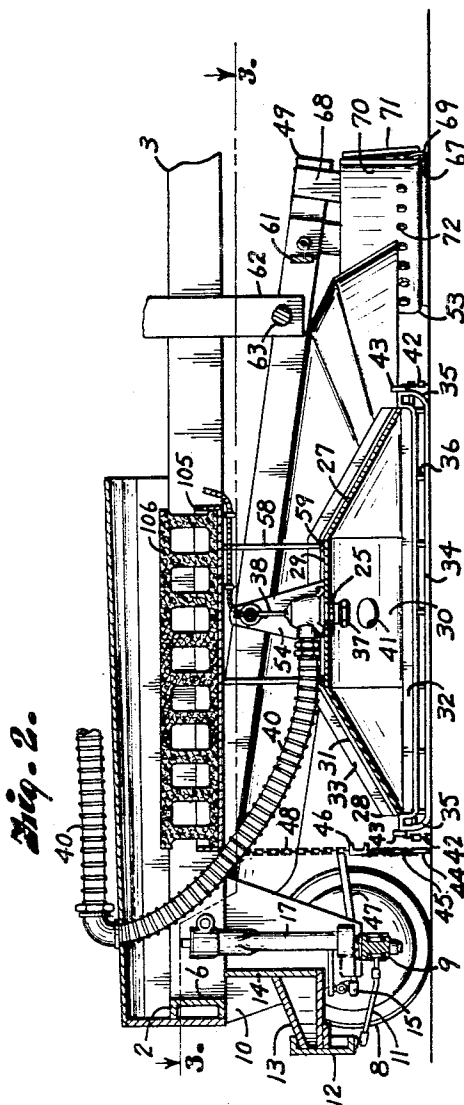
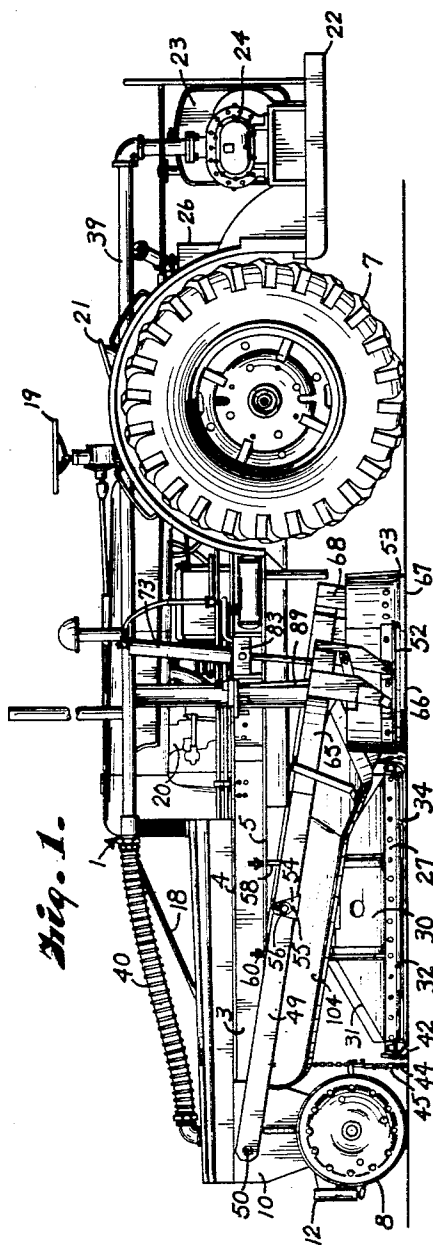
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2,705,906

ASPHALT ROAD HEATER PLANER

Filed May 8, 1952

2 Sheets-Sheet 1



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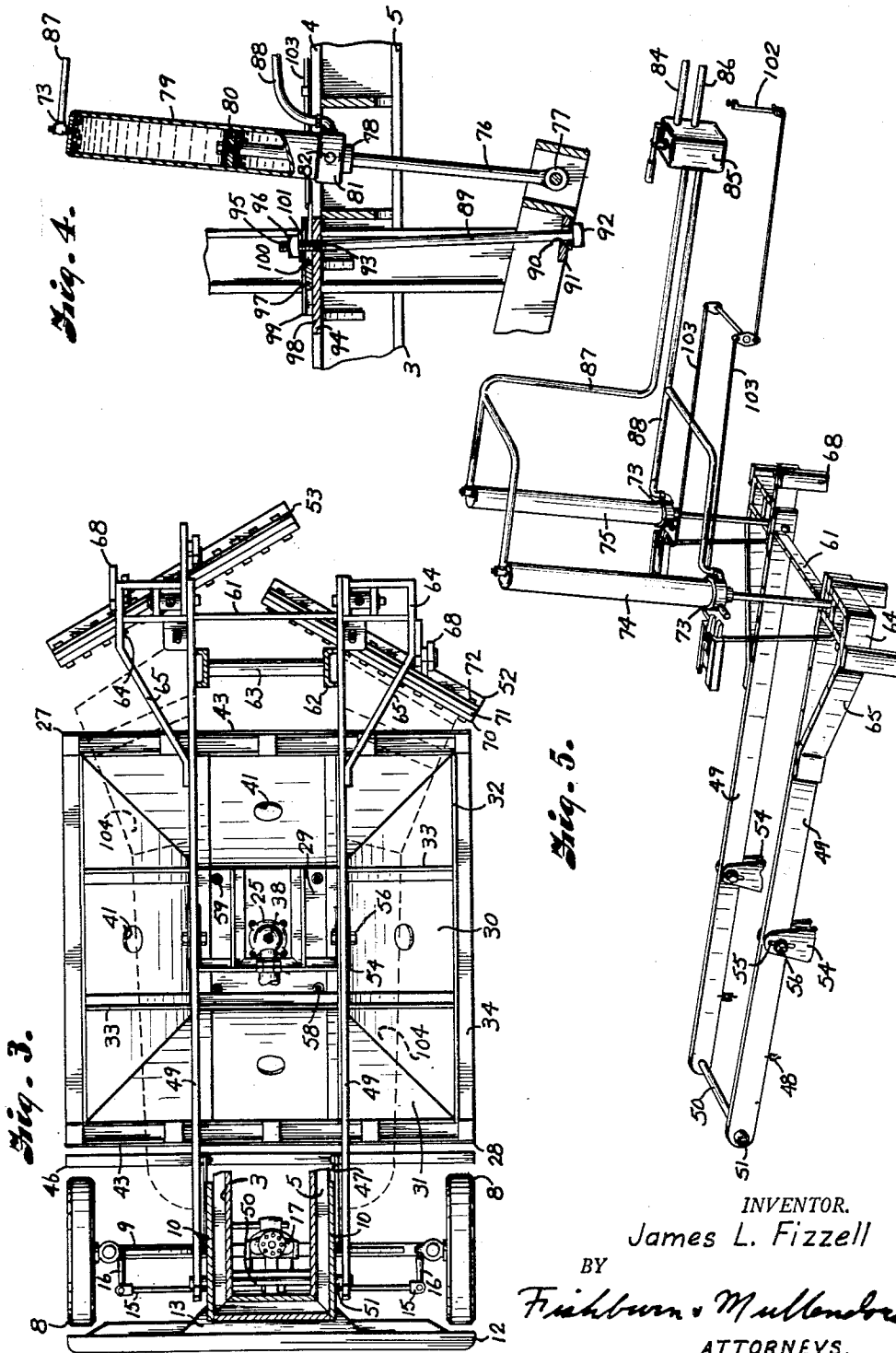
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2 Sheets-Sheet 2



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ASPHALT ROAD HEATER PLANER

James L. Fizzell, Kansas City, Mo.

Application May 8, 1952, Serial No. 286,744

4 Claims. (Cl. 94—39)

This invention relates to apparatus for planing and smoothing the surface of macadam and asphalt roads or pavements, and more particularly to a machine for heating the road surface and planing same to a smooth surface while it remains in a heated, softened condition.

Asphalt and macadam roads and pavements develop irregularities and become rough and uneven during use. Also the surface of the asphalt or bituminous coating ages tending to become brittle and porous as the volatile material leaves same, allowing water to penetrate into the coating and cause further deterioration and injury of the asphalt and base or foundation of such roadway. The irregularities that develop in the surface of asphalt or macadam roads increase the shock from traffic thereover, and, if allowed to continue, the base or foundation of the roadway will be injured and require major repairs or replacement. It is therefore desirable to remove the dead asphalt or bituminous coating from the road surface and smooth the irregularities thereof to prepare same for another sealing coat of bituminous material to restore the road surface to its original condition.

The objects of the present invention are to provide a machine movable over the surface of the road and apply heat to soften the top surface and plane a portion therefrom for leveling and smoothing same; to provide a self-propelled machine for movement over an asphalt road surface to be conditioned with a burner for directing a flame on the road surface and a hood surrounding said burner and adapted to ride on the road surface to confine the application of heat thereto; to provide planer blades rearwardly of and adjacent the burner hood and having drawbars pivotally connected to the machine forwardly of the burner hood to maintain a low angle between the drawbar and road; to provide power adjusting means for selectively elevating and lowering the planer ends of the drawbar to regulate the depth to which the road surface is planed, said power adjusting means being operable to elevate the planers and burner hood to space same from the road surface for transportation of the machine; to provide adjustable stops connected to the rearward portion of the drawbars which together with the power adjusting means and low angle of the drawbars prevent chatter of the planers on the road surface; to provide a heater planer structure wherein the supporting wheels thereof pass over the planed road surface to assure a smooth, uniform surface; to provide a suspension of the heater hood relative to the drawbars and frame whereby the heater will ride on the road surface during planing operations of various depths but will be elevated from the road surface upon elevation of the planers; to provide heat protecting baffles and screen-like members for protecting portions of the machine from the burner flame and heat thereof; and to provide a heater planer machine of this character which is efficient in leveling of a road surface in a relatively rapid and inexpensive manner without disintegrating or injuring of the asphalt or foundation thereof.

In accomplishing these and other objects of the present invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevational view of an asphalt road heater planer constructed in accordance with the present invention.

Fig. 2 is a longitudinal sectional view through the forward portion of the heater planer.

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Fig. 3 is a horizontal sectional view through the heater planer on the line 3—3, Fig. 2.

Fig. 4 is a detail view of the planer elevation adjusting means.

Fig. 5 is a perspective view of the drawbars, adjusting means and controls therefor.

Referring more in detail to the drawings:

1 designates a self-propelled heater planer machine which includes a frame 2 having laterally spaced side members 3, preferably of structural shapes such as I-beams or channels, arranged with flanges 4 and 5 extending laterally, outwardly toward the sides of the machine. The side members of the frame are suitably spaced and shaped and connected together by suitable transverse members 6 to form a rigid, strong frame. The frame 2 is supported adjacent its rear end by a pair of traction wheels 7 which have a spacing less than the width of the road surface to be planed as the machine moves therealong. The forward end of the frame 2 is supported by a pair of wheels 8 which are suitably mounted on an axle 9 whereby the wheels 8 may be turned for steering the machine. The axle 9 is rigidly secured to laterally spaced, reinforced plates 10, the upper ends of which are rigidly secured to the forward portion of the frame 2. The axle 9 is suitably braced as, for example, by radius rods 11 connected to a bumper 12 which is secured to suitable arms 13 which extend forwardly from a transverse plate 14 arranged between and connected to the plates 10. The wheels 8 are suitably steered by means of rods 15 connected to an arm 16 extending from a steering gear housing 17 mounted on the axle 9 and extending upwardly between the side members 3. The steering gear structure is operatively connected by a jointed shaft 18 to a steering wheel 19 arranged adjacent the position of the driver and operator of the machine, which is preferably between the traction wheels 7.

A motor 20, together with its accessories, hoods and the like, is supported on the frame 2 forwardly of the operator's position 21, said motor being suitably connected to the traction wheels 7 for selectively driving the machine. The frame 2 is provided with a rearward extension 22 carrying an auxiliary motor 23 and a blower 24 driven thereby for supplying air to a burner 25, as later described. Fuel tanks 26 are also arranged rearwardly of the operator's position, whereby said fuel tanks, auxiliary motor 23 and blower 24 being rearwardly of the traction wheels 7, and the motor 20 being forwardly of said wheels, a substantial portion of the weight of the entire machine is distributed forwardly and rearwardly of the large traction wheels 7 and supported thereby. This arrangement also places the motors and controls therefor adjacent the operator to facilitate access for adjustment and regulation.

A burner hood 27, generally rectangular in shape, is arranged under the frame 2 with the forward end 28 spaced rearwardly of the front wheels 8. The burner hood is preferably formed of heavy sheet metal and has a substantially horizontal portion 29 centrally thereof and terminating at its edges in downwardly and outwardly sloping side walls 30 and end walls 31 which are joined at their adjacent edges. The lower edges of the side and end walls are secured to a rectangular frame 32 which is also connected to reinforcing members 33 arranged on the outer faces of the side and end walls and horizontal portion of the hood as by welding to form a strong, sturdy structure.

Runners 34 are arranged longitudinally of the machine and under the sides of the frame 32 in spaced relation thereto, said runners curving upwardly at the ends thereof as at 35 whereby the runners will pass over irregularities in the road surface. A plurality of longitudinally spaced posts 36 connect the runners 34 to the sides of the frame 32 to maintain the spacing therebetween and provide flame openings. The burner, of suitable design, is secured to the horizontal portion 29 of the housing with the nozzle 37 thereof extending downwardly inside the hood. A fuel pipe 38 connected to a suitable source of supply of fuel is connected to the burner and primary air is supplied by the blower 24 through a pipe 39 extending longitudinally of the machine and connected by a suitable hose 40 to the burner 25. Secondary air

enters the hood through a plurality of openings 41 in the side and end walls thereof. With this arrangement fuel and air are supplied to the burner 25 under pressure where they are mixed and discharged through the nozzle 37 to direct a flame downwardly against the surface of the road. The flame impinging on the road surface is turned outwardly in all directions therealong, through the space between the road surface and the forward and rearward ends of the end walls 31 and through the space between the runners 34 and the side members of the frame 32. The travel of the flame forwardly and rearwardly of the hood is limited by suitable fire guards 42, for example a plurality of closely arranged chains depending from bars 43 secured to the ends of the runners 34 and extending transversely of the hood, said chains being of such length as to engage the road surface when the hood runners 34 are resting thereon.

The front wheels are also protected from the heat by a baffle 44 preferably consisting of a plurality of hinged connected plates 45 extending transversely of the machine. The plates 45 are arranged between the forward fire guard 42 and the front wheels and supported by a transverse bar 46 suitably spaced from the front wheels by means of links 47 having ends pivotally connected to the front axle and bar 46. The heat guard 44 is mounted for vertical movement and is preferably connected by flexible members 48 to drawbars 49 which extend longitudinally of the machine on opposite sides of the frame side members 3. The drawbars 49 preferably are substantially parallel and the forward ends thereof are connected to a shaft extending through the frame side members 3 adjacent the forward ends thereof and suitably mounted for rotation about an axis transversely of the frame. While the drawbars 49 are connected to the shaft 50 and the shaft rotatably mounted in bearings 51 carried by the side members 3, it is obvious that the bearing members could be on the drawbars and said drawbars rotatable on the shaft 50 or other suitable trunnions, providing the structure is such that necessary force can be transmitted through the drawbars to pull the planers 52 and 53 as later described.

The drawbars 49 are swingable in substantially parallel, vertical planes and such vertical movement will lower the heat guard 44 until the lower edge thereof substantially engages the road surface when the heater planer machine is in operation and will raise said heat guard when the heater planer is not in operation as, for example, when being transported from one job site to another. The hood 27 is also connected to the drawbars 49 by means of spaced ears 54 fixed on the hood and extending upwardly therefrom and straddling the drawbars 49. The ears 54 each have vertically arranged slotted openings 55. Bolts 56 extend through apertures in the drawbars, through the slotted openings 55 and have nuts 56 threaded thereon to retain the bolts in place. The slotted openings 55 are so arranged that when the drawbars are swung upwardly to transporting position, the upper ends of the slotted openings will engage the bolts 56 whereby the drawbars raise the hood to provide suitable clearance between the runners 34 and the road surface, and when the drawbars are swung downwardly to operating position the runners 34 will engage the road surface and the bolts 56 will be spaced from the ends of the slotted openings whereby the hood rides on the pavement surface and remains in engagement therewith while passing over normal irregularities. Downward movement of the hood is limited by rods 58 having their lower ends secured to the hood as at 59 and their upper portions slidably mounted in suitable openings in the lower flange 5 of the side members 3 of the machine frame. Adjusting nuts 60 are threadedly mounted on the upper ends of the rods 58 whereby said nuts are spaced from the flange 5 to permit limited vertical movement of the hood 27 as it passes over irregularities in the road surface, but said nuts 60 will engage the flange 5 to prevent excessive downward movement of the hood.

The drawbars 49 extend rearwardly beyond the rear end of the hood 27 and are connected adjacent their rear ends by a rigid cross member 61 to maintain the spacing of said drawbars. Also, the adjacent surfaces of the drawbars slidably engage depending members 62 on the frame 2 to limit lateral movement of the drawbars. The lower ends of the depending members 62 have a rigid spacer 63 therebetween to form a rigid structure. The drawbars 49 terminate at their rear ends

between the traction wheels 7 and the burner hood 27, and adjacent the rear ends of said drawbars are lateral extensions 64, the outer ends of which are rigidly connected by braces 65 to the drawbar. Planers or cutting blade assemblies 66 and 67 are supported on spaced, depending arms 68 on the drawbars and lateral extensions. The blade assemblies are arranged with their outermost ends substantially in alignment with the side edges of the runners 34, said blades extending rearwardly and inwardly at a suitable angle to the direction of travel of the machine. It is preferable that one blade be mounted forwardly of the other and the inner edges thereof overlap, as illustrated in Fig. 3. The blade assemblies are preferably arranged approximately at an angle of 60° to the direction of travel of the machine with the blade assembly 66 forwardly of the blade assembly 67, and the inner end of the blade assembly 67 extending behind the inner end of the blade assembly 66 and in spaced relation thereto whereby as said blades are moved in cutting engagement with an asphalt surface which has been softened by the heat of the burner the two-section planing blade arrangement will cut a width corresponding to the width of the burner hood and runners and will windrow the cut material centrally between the traction wheels 7. Each of the cutting blade assemblies preferably consists of blades 69 having portions clamped between plates 70 and 71 by fastening members 72 with the lower edges of the blades extending downwardly from the lower edges of the plates. The plates 71 are rigidly secured to the depending arms 68, however, if desired said plates may be pivotally mounted on the arms with suitable brace members connected thereto for adjustment of the pitch of said blades.

The rear or traction wheels 7 have less spacing than the width of the burner hood and width of the cut by the planing blades causing the traction wheels to always be on the newly planed surface thus assuring a uniform and true surface. Suitable elevating means 73 connects the drawbars adjacent the rear ends thereof to the frame whereby the drawbars and planing blades may be moved upwardly or downwardly to vary the depth of the cut or to move the blades to transporting position. It is desirable that the elevating means and depth control be easily and quickly operated but capable of applying constant powerful force to aid in preventing chattering or irregularity of the planed surface. The elevating means 73 preferably consists of hydraulically operated jacks 74 and 75 connected to the respective drawbars.

In the illustrated structure the piston rods 76 of said jacks have their lower ends pivotally connected as at 77 to the drawbars and said piston rods extend through packed lower ends 78 of cylinders 79 and have pistons 80 on the upper ends thereof. Fixed adjacent the lower ends of the cylinders 79 are collars 81 having laterally extending trunnions 82 pivotally mounted in a bracket 83 fixed to the side members 3 of the frame. Hydraulic fluid under pressure from a suitable pump or the like (not shown) is delivered by a pipe 84 to a valve 85 having a return connection 86 to a reservoir of the fluid. The valve 85 is connected by pipes 87 to the upper ends of the cylinders 79 and by pipes 88 to the lower ends of the cylinders whereby operation of the control valve 85 selectively supplies hydraulic fluid under pressure to the inlet ends of the cylinders 79, and when fluid under pressure is being supplied to one end of said cylinders the other ends of the cylinders are connected with the return pipe 86.

A positive depth limit control is connected to each of the drawbars, said depth limit control consisting of rods 89 extending through apertures 90 of brackets 91 on the respective drawbars, heads 92 being arranged on the lower ends of the rods and in engagement with the underside of the brackets 91. The upper ends of the rods 89 extend through apertures 93 of horizontal plates 94 suitably fixed to the side members 3 of the frame, the upper ends of said rods being threaded as at 95 and having nuts or the like 96 screwed thereon. Wedge members 97 are slidably mounted on the upper faces 98 of the plates 94 being spaced guide flanges 99, said wedges having slots 100 extending longitudinally thereof to provide spaced portions straddling the rods 89.

Suitable washers 101 are preferably arranged between the nuts 96 and the wedges 97. Longitudinal movement of the wedges 97 is effected by means of a lever pivotally mounted on the machine adjacent the position of the

operator, said lever being connected by suitable linkage 103 to the wedges 97. The approximate depth of the planing cut is preferably determined and with the wedges 97 substantially midway their limits of movement, the nuts 96 are threaded on the rods 89 to adjust the length thereof to permit the drawbars and planing blades to be lowered to the desired depth. Further adjustment of the depth limit is by operation of the lever 102 to move the wedges 97. When in operation at the desired depth of cut, fluid pressure is maintained in the upper portion of the cylinders 79, whereby downward force is applied through the piston rods 76 to the drawbars to hold the planing blades at the desired depth, the bracket 91 in engagement with the head 92 and the nut 96 bearing on the washer 101 which is in engagement with the upper surface of the wedge 97.

The burner hood 27 aids in directing the heat from the burner onto the area of pavement to be heated; however, considerable heat rises therefrom and around the edges of the hood. In order to protect the motor and other portions of the machine from such heat, laterally extending shields 104 are suitably secured to the drawbars 49.

Due to the spacing of the wheels 7 and 8 and the arrangement of the motor 20 on the frame, there is considerable length between the forward end of the engine and the front of the frame. It is preferable that a transverse member 105 be arranged between the side members 3 forwardly of the motor and that suitable weights 106 be supported on the transverse member to increase the weight of the forward end of the machine.

In using a machine constructed as described, the drawbars are swung upwardly to raise the burner hood and planing blades. The machine is then moved to an area to be planed. The nut 96 is then adjusted on the rod whereby the length of same is such as to limit the depth of cut to approximately that desired. The auxiliary motor 23 is then started to drive the compressor 24, fuel pump and the hydraulic pressure supply. The burner 25 is then ignited and the operator actuates the valve 85 to apply fluid pressure through the pipes 87 to the upper ends of the cylinders 79, swinging the drawbars 49 downwardly until the runners 34 on the hood 27 engage the surface to be planed. The machine is then started forwardly and additional fluid pressure supplied to the upper ends of the cylinders 79 to further swing the drawbars 49 downwardly and press the cutting edge of the planer blades into the road surface. The downward swinging of the drawbars is continued until the heads 92 of the rods 89 engage the brackets 91 and the washers 101 are engaged between the nuts 96 and wedges 97, the pressure in the cylinders 79 tightly holding the drawbars downwardly to maintain the tension in the rods 89 and engagement of the limiting parts thereof. If it is desired to vary the depth of the cut the lever 102 is moved to effect longitudinal movement of the wedges 97 to raise or lower the heads 92 relative to the surface being planed. The long drawbars connected at the forward end of the frame, whereby there is a small angle between the drawbars and the surface being planed, together with the angularity of the planing blades and the action of the hydraulic fluid in the cylinders 79, together with the depth limit control, eliminate chatter whereby a smooth surface is planed.

Also the traction wheels 7 are spaced less than the width of the heater hood 27 operate on the freshly planed surface, assuring a uniform and true surface. The burner directs the flame downwardly against the road surface, whereby the flames spread outwardly thereover to pass through the spaces between the runners and side edges of the hood and between the pavement and the end edges of the hood. The flames heat the dead asphalt coating to soften same and also draw volatile material upwardly in the remaining portion of the asphalt so that when the top surface of the asphalt pavement is planed off the remaining asphalt will be in good condition with a smooth, even, upper surface. The asphalt may then be covered with a sealing coat or any other desired addition of asphalt or bituminous material.

It is believed that I have provided an efficient heating planing machine that is easily operated and controlled to provide a desired depth of cut and assure a smooth, uniform surface on the planed road.

What I claim and desire to secure by Letters Patent is:

1. In a machine for heating and planing asphalt, macadam and like road surfaces, a frame, front and rear

wheels supporting said frame, drawbars pivoted relative to the frame adjacent the forward end thereof and extending rearwardly along opposite sides of the frame, said drawbars terminating in rear ends arranged forwardly of the rear wheels, road planing means including blades fixed to the respective drawbars adjacent the rear ends thereof, said blades having their adjacent ends in spaced overlapped relation between the paths of the rear wheels and extending forwardly and outwardly at an angle to the direction of travel of the machine, said forward outer ends of the blades having a spacing greater than the width of the path for the rear wheels whereby said rear wheels run on the planed area and the material cut from the road surface is windrowed between said rear wheels, a burner hood having an open bottom, means suspending the hood from the drawbars intermediate the length thereof, said hood having a width substantially corresponding to the spacing between the forward outer ends of the blades, the said suspension means for the hood being a loose connection of the hood to the drawbars whereby the blades at the ends of the drawbars may be adjusted relative to the hood while the hood is resting on the pavement, a burner means in the hood and operable to heat and soften substantially all the road surface under the hood, and adjustable means connecting the drawbars and frame for varying the normal angle between the road surface and drawbars and raising and lowering said drawbars and road planing means thereon.

2. In a machine for heating and planing asphalt, macadam and like road surfaces, a frame, front and rear wheels supporting said frame, drawbars pivotally mounted on opposite sides of the frame adjacent the forward end thereof, said drawbars extending rearwardly alongside the frame, said drawbars terminating in rear ends arranged forwardly of the rear wheels, road planing means including blades fixed to the respective drawbars adjacent the rear ends thereof, said blades having their adjacent ends in spaced overlapped relation between the paths of the rear wheels and extending forwardly and outwardly at an angle to the direction of travel of the machine, said forward outer ends of the blades having a spacing greater than the width of the path for the rear wheels whereby said rear wheels run on the planed area and the material cut from the road surface is windrowed between said rear wheels, a hood having an open bottom, means suspending the hood from the drawbars intermediate the length thereof, runners on the hood spaced from the outer lower edges thereof and adapted to slide on the road surface for supporting said hood thereon with the spaces between the hood edges and runners defining outlet openings for burner flames, the said suspension means for the hood being a loose connection of the hood to the drawbars for limited vertical movement of the drawbars relative to the hood while the hood is supported on the runners and for lifting the hood upon additional vertical raising movement of the drawbars, a burner means in the upper central portion of the hood and operable to heat and soften substantially all the road surface under the hood, stop means on the hood and engageable with the frame for limiting downward movement of the hood, fire guard means at the ends of the hood to limit extent of the flame travel from under the hood, and adjustable power means connecting the drawbars and frame for raising and lowering the drawbars and planing means and hood thereon.

3. In a machine for heating and planing asphalt, macadam and like road surfaces, a frame, front and rear wheels supporting said frame, drawbars pivotally mounted on opposite sides of the frame adjacent the forward end thereof, said drawbars extending rearwardly alongside the frame, said drawbars terminating in rear ends arranged forwardly of the rear wheels, road planing means including blades fixed to the respective drawbars adjacent the rear ends thereof, said blades having their adjacent ends in spaced overlapped relation between the paths of the rear wheels and extending forwardly and outwardly at an angle to the direction of travel of the machine, said forward outer ends of the blades having a spacing greater than the width of the path for the rear wheels whereby said rear wheels run on the planed area and the material cut from the road surface is windrowed between said rear wheels, a hood having an open bottom, means suspending the hood from said drawbars intermediate the length thereof, runners on the hood

spaced from the outer lower edges thereof and adapted to slide on the road surface for supporting said hood thereon with the spaces between the hood edges and runners defining outlet openings for the burner flames, the said suspension means for the hood being a loose connection of the hood to the drawbars for limited vertical movement of the drawbars relative to the hood while the hood is supported on the runners and for lifting the hood upon additional vertical raising movement of the drawbars, a burner means in the upper central portion of the hood operable to heat and soften substantially all the road surface under the hood, fire guard means at the ends of the hood to limit extent of flame travel from under the hood, stop means on the hood engageable with the frame for limiting downward movement of the hood, adjustable power means pivotally mounted on the frame and connected with the drawbars adjacent the rear ends thereof for raising and lowering the drawbars and planing means and hood thereon and applying pressure to force the planing means into the road surface, and adjustable stop means on the frame engaging the drawbars for limiting depth of material planed from the road surface.

4. In a machine for heating and planing asphalt, macadam and like road surfaces having a self-propelled front and rear wheel supported frame, drawbars pivotally mounted on opposite sides of the frame adjacent the forward end thereof, said drawbars extending rearwardly alongside the frame, said drawbars terminating in rear ends arranged forwardly of the rear wheels, road planing means including blades fixed to the respective drawbars adjacent the rear ends thereof, said blades having their adjacent ends in spaced overlapped relation between the paths of the rear wheels and extending forwardly and outwardly at an angle to the direction of travel of the machine, said forward outer ends of the blades having a spacing greater than the width of the path for the rear wheels whereby said rear wheels run on the planed area and the material cut from the road surface is windrowed between said rear wheels, a hood having an open bottom, means suspending the hood from the drawbars between the planing means and the front wheels, said hood having

a width substantially corresponding to the spacing between the forward outer ends of the blades, runners on the hood adapted to slide on the road surface for supporting said hood thereon, the said suspension means for the hood being a loose connection of the hood to the drawbars for limited vertical movement of the drawbars relative to the hood while the hood is supported on the runners and for lifting the hood upon additional vertical raising movement of the drawbars, a burner means in the upper central portion of the hood operable for heating and softening substantially all the road surface under the hood, fire guard means at the ends of the hood to limit extent of flame travel from under the hood, stop means on the hood engageable with the frame for limiting downward movement of the hood, hydraulically operated jacks pivotally mounted on the frame and connected with the drawbars adjacent the rear ends thereof for raising and lowering the drawbars and planing means and hood thereon and applying pressure to force the planing means into the road surface, wedge means slidably mounted on the frame, stop means having portions engaging the drawbars and wedge means for limiting depth of material planed from the road surface, and means for moving the wedge means to vary the downward limit of movement of the drawbars and planing means.

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