Nov. 26, 1935. H. A. INGALLS 2,022,287

ROAD TREATING AND SURFACING APPARATUS

Filed Feb. 6, 1932 3 Sheets-Sheet 1

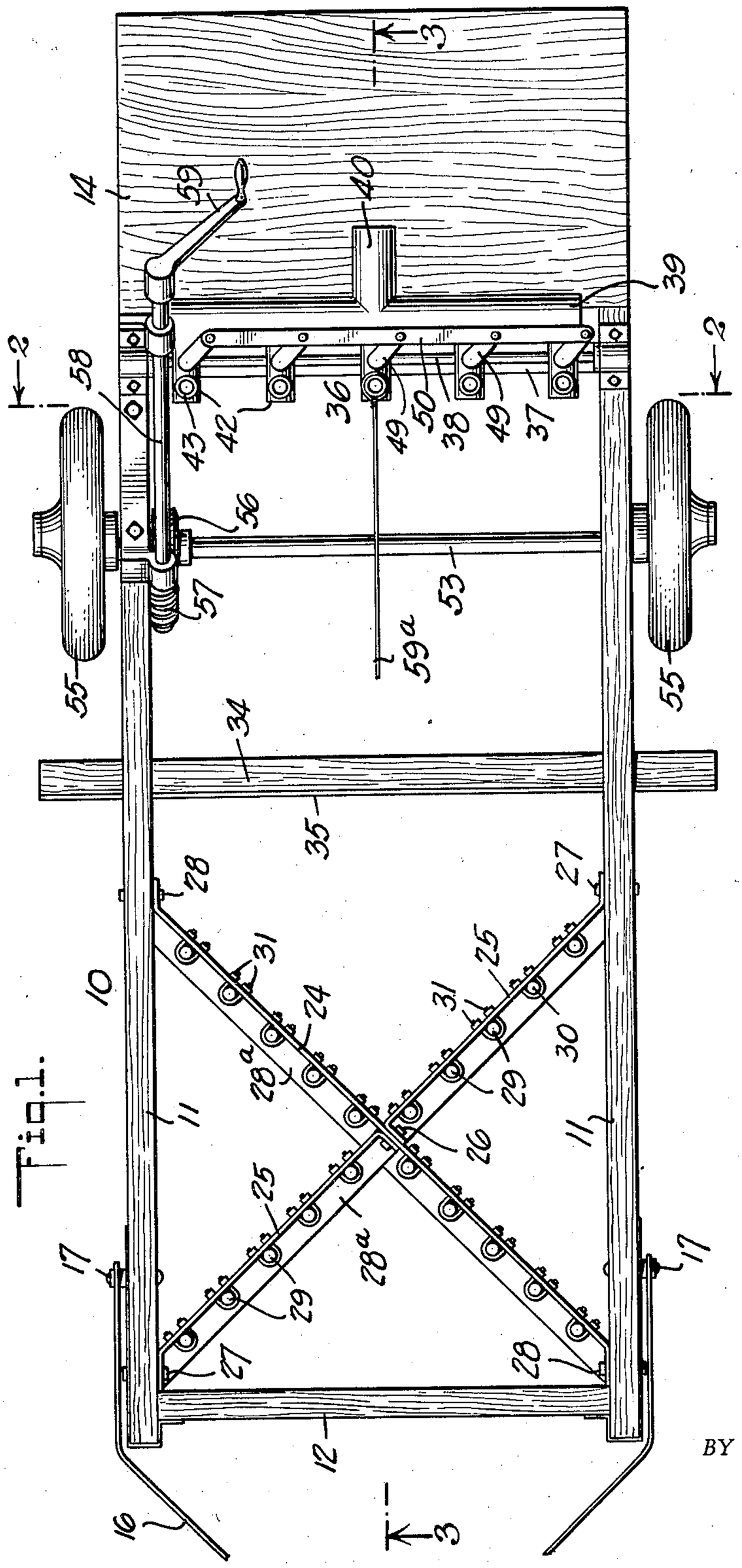

Fig. 1.

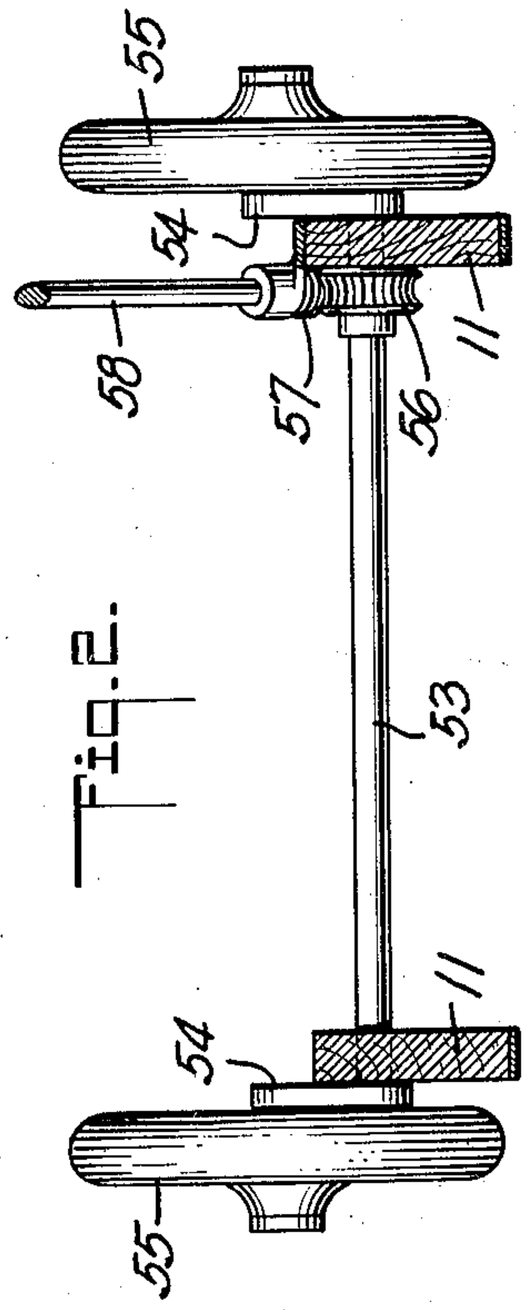

Fig. 2.

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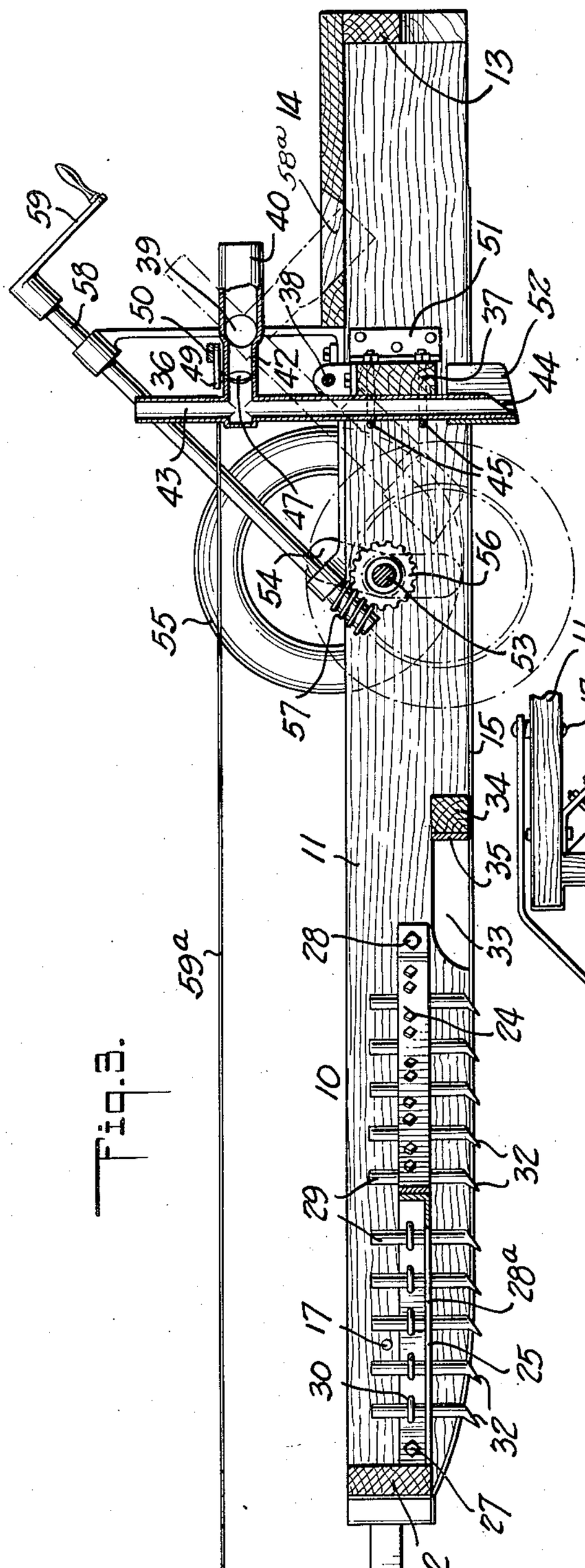

Fig. 3.

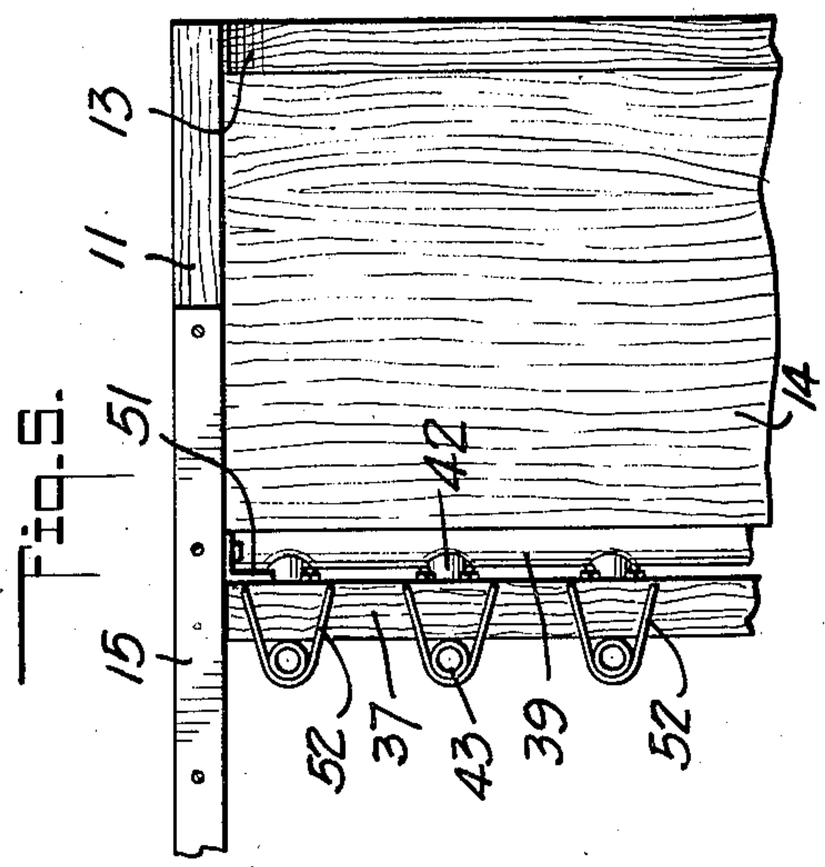

Fig. 5.

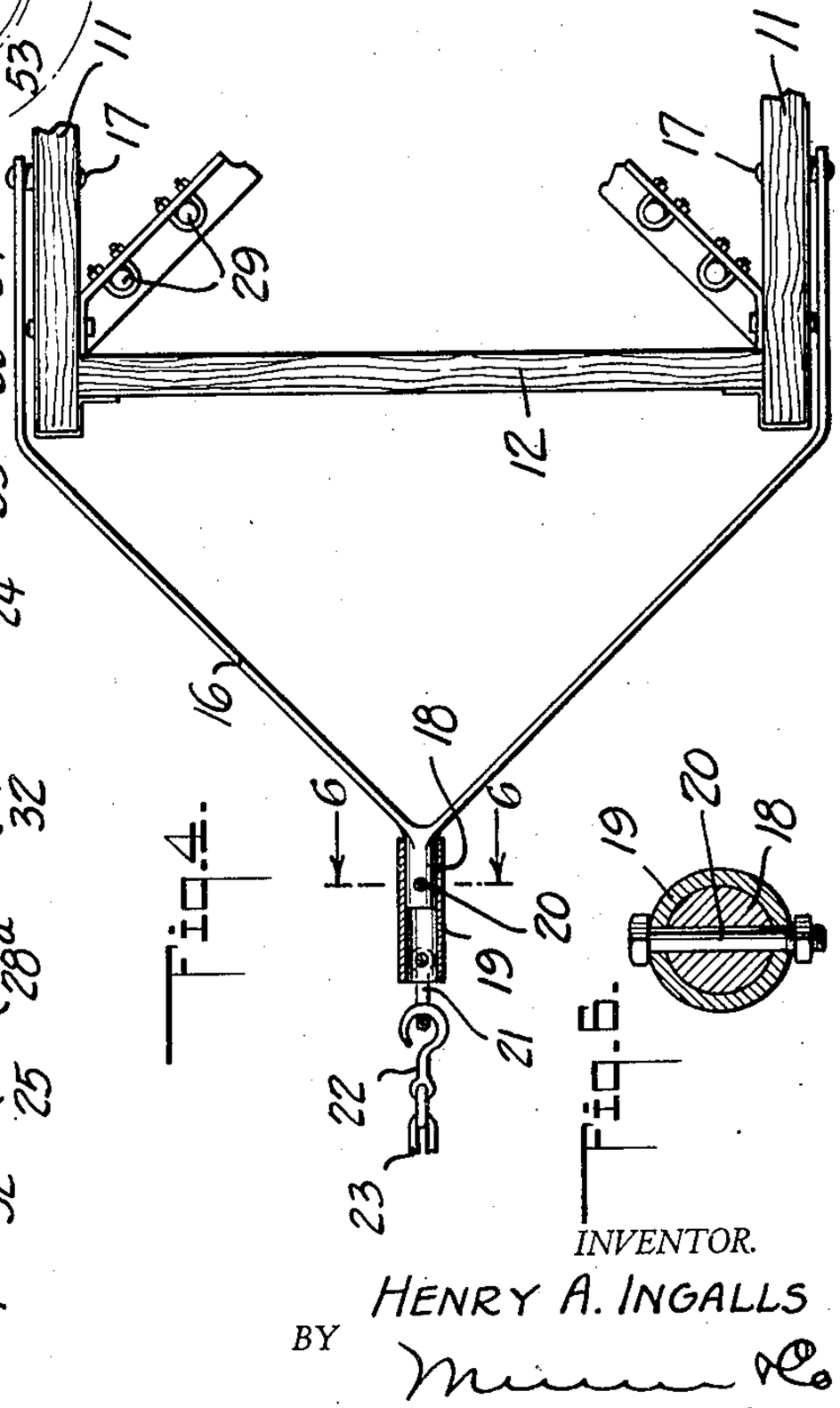

Fig. 4.

Fig. 6.

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Fig. 7.

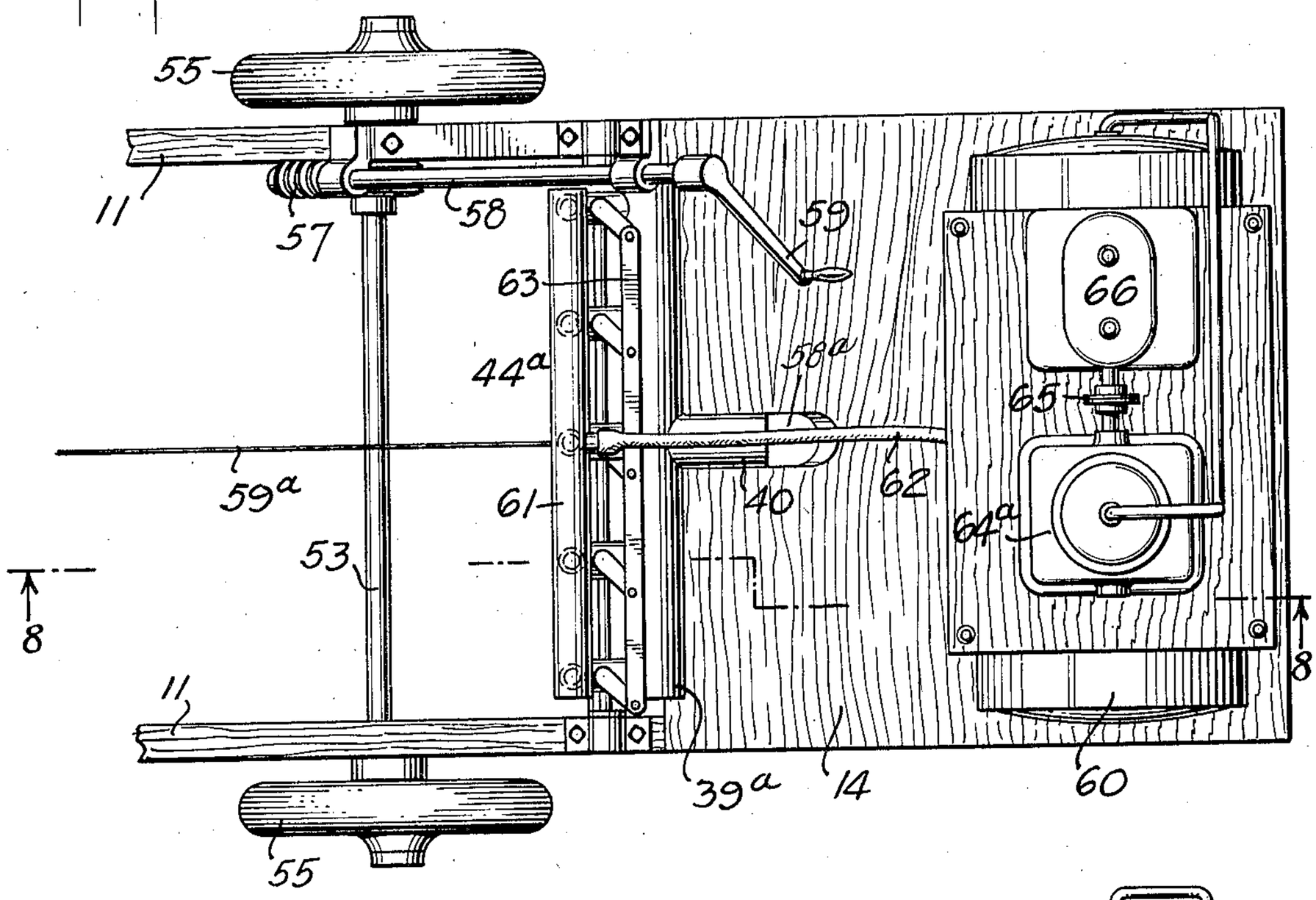
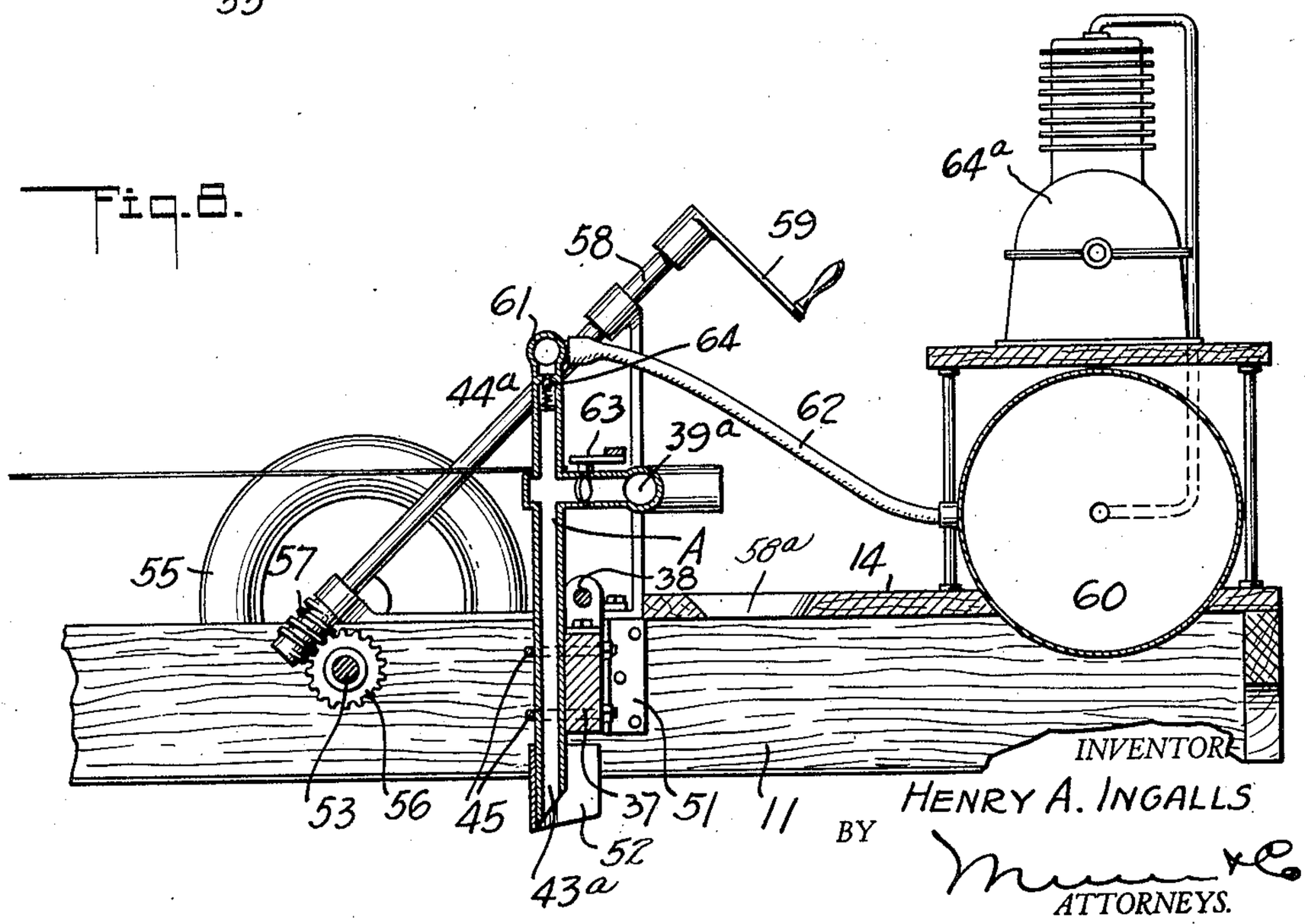


Fig. 8.



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UNITED STATES PATENT OFFICE

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ROAD TREATING AND SURFACING APPARATUS

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Application February 6, 1932, Serial No. 591,404

2 Claims. (Cl. 94—44)

This invention relates to road treating and surfacing apparatus and has for its primary object the provision of an organization of this character for effectively scratching the surface of a roadway and for leveling or planing the surface in advance of subjecting the soil to the action of a scarifier and for delivering fluid, such as oil or water, to a point beneath the surface of the soil during the scarification of the latter, whereby the top of the soil will be kept entirely free from those ordinary sloppy and oily conditions which heretofore have offered serious impediment to the work in progress and serious depreciation in the efficiency with which such work must ordinarily be conducted.

Another object of my invention is to provide apparatus of this character whereby portable tankers may be employed to effect a gravity feed of the oil treating fluid to the distributing mechanism which forms a part of my organization.

A still further object of my invention is to provide an apparatus of this character wherein the planer or road leveling means employed will effectively function to produce a track for the free passage of the supporting wheels of the structure.

A still further object of the invention is to provide novel and effective means for controlling the depth of penetration of the scarifying teeth and for raising the teeth entirely above the ground line at the option of the operator.

In the accompanying drawings,

Figure 1 is a plan view of the apparatus;

Figure 2 is a transverse section taken on the line 2—2 of Figure 1;

Figure 3 is a longitudinal section taken on the line 3—3 of Figure 1;

Figure 4 is a plan view of the forward end of the supporting frame;

Figure 5 is a bottom plan view of a portion of the frame;

Figure 6 is a section on line 6—6 of Figure 4;

Figure 7 is a view in top plan of a portion of my machine illustrating a slightly modified form thereof;

Figure 8 is a longitudinal section on the line 8—8 of Figure 7.

In carrying the invention into practice, use is made of a rectangular frame 10 which consists of a pair of longitudinal beams 11, 11, a front end beam 12, a rear end beam 13, and an operator's platform 14, the latter extending for a suitable distance from the rear cross beam 13 so as to satisfactorily accommodate an operator whose presence is desired when effecting actuation of the scarifier. The said longitudinal beams 11, 11, are in the nature of runners, and same are preferably faced on their under surfaces with metallic wear strips 15. A substantially V-shaped draft bar 16 finds pivotal connection at 17 at the forward portion of the said beams 11, 11, and as illustrated in Figure 4 the said draft bar is provided with a cylindrical portion 18 which is adapted to enter a coupling sleeve 19 and to be detachably secured thereto by a bolt 20, the latter passing through the said sleeve 19 and through the said portion 18. The forward extremity of the sleeve 19 is provided with a clevis 21 which has removable connection with the hook 22 of a draft chain or similar well-known connection 23, the latter adapted to be coupled to a vehicle such as a tanker or the like, by means of which it is intended that the apparatus shall be drawn over the road surface under treatment.

In the forward portion of the frame 10 is a scuffer or primary scarifier, and same preferably comprises a diagonal tooth bar 24 and a plurality of diagonal tooth bars 25, 25, the latter arranged in relative alinement and being positioned at the respective sides of the aforementioned bar 24 and arranged preferably at right angles thereto. The inner ends of the bars 25, 25, are rigidly connected at 26 to the middle portion of the bar 24 and their outer ends are fixedly connected at 27 to the beams 11. The extremities of the bar 24 are fixedly connected at 28 to the beams 11. The bars 24 and 25, 25, are of angle construction, and adjustable vertically in the horizontal flanges 28*a* of each thereof are teeth 29. These teeth may be satisfactorily confined in selected positions of vertical adjustment by U-shaped bolts 30, 30, which will find attachment at 31 to the vertical flanges of the said angle bars. These teeth project through the bottom of the frame 10 and each is formed with a forwardly and downwardly inclined penetrating point 32 adapted to penetrate the top surface of the soil for a sufficient depth to operate thereon preparatory to operation upon the soil by the scarifying mechanism at the rear end of the apparatus.

Immediately behind the scuffer or preliminary scarifier just above referred to and formed in the beams 11, 11, are alined longitudinally extending dirt passages 33. Extending crosswise of the frame structure 10 and passing through the alined passages 33 is a leveling or planing bar 34 which is preferably of rectangular form in transverse section, as shown in Figure 3 of the drawings. The front face of this bar is provided with a metallic facing strip 35 so as to prevent the bar

from undue abuse incident to constant contact therewith of the dirt. It will be noted upon reference to Figure 1 that the respective extremities of the bar **34** project for an appreciable distance beyond the sides of the frame **10**. This is in order that tracks may be cleared for the passage thereover of the supporting wheels of the apparatus, as will be made clear as the description proceeds. From the construction of the bar **34** and the manner of correlating same with the openings **33**, it follows that dirt gathered by the bar during the leveling or planing operation will find lateral exit through said passages.

Immediately in advance of the operator's platform **14** is a scarifying mechanism **36**, the same including a cross beam **37** adjustably supported at **38** to swing in a vertical plane so that it may assume either of the two positions shown, respectively, in full and dotted lines in Figure 3. Located preferably in a position above the platform **14** is a manifold or distributing head **39** having an intake branch **40** adapted to be connected in any suitable well known manner with a source of supply, such, for instance, as a tanker which I have hereinbefore referred to as a suitable means for drawing the apparatus over the roadway under construction. A flexible hose (not shown) may be led from the tanker to the said intake branch **40** of the said manifold. Extending in a forward direction from the manifold are fluid outlet pipes **42**, and joined thereto and arranged in open communication therewith are hollow scarifying teeth **43**. These teeth are in the nature of steel pipes, and they are preferably welded to the forward extremities of the pipes **42**. These pipes project in a downward direction between the beams **11**, **11**, and to a point below the platform **14**, **14**, whereby, when they are elevated into the position shown in dotted lines in Figure 3, the lower roadway grooving ends **44** thereof will be entirely clear from the surface of the roadway, whereas when the said teeth are in the said full line position shown in Figure 3 the effective sharp lower ends thereof will be positioned where they will penetrate the road surface to such extent as may depend upon predetermined vertical adjustment of these teeth upon the supporting beam **37**. At this point, it will be noticed that the said teeth are strapped to the beam **37** by U-bolts **45**, and it is through their provision that means are herein provided for regulating the vertical adjustment of said teeth. In each of the pipes **42** is a controlling valve **47**, by means of which the operator can regulate the amount of road treating fluid which is to be delivered into the soil from the lower extremities of the pipes **43**. All of these valves are connected by links **49** to an oscillating bar **50**. The said bar **50** may thus be actuated to simultaneously control the flow of fluid through the aforementioned scarifying teeth **43**.

Angle plates **51** carried by the longitudinal beams **11**, **11**, are disposed in the path of downward tilting movement of the cross beam **37**, so as to retain the teeth **43** in their vertical scarifying positions shown in full lines in Figure 3. Winged guards **52** are secured to the cutting ends of said teeth **43** and are designed to penetrate the soil and to act upon same to prevent clogging of the teeth when the machine is in action.

The wheel base of my machine consists of an axle **53** journaled in the beams **11**, **11**, the same provided at its ends with crank arms **54** whose free end portions revolubly support the ground wheels **55**. The axle **53** carries a worm gear **56** which meshes with a worm **57** at the lower end of a controlling shaft **58**. The said shaft **58** extends upward and rearwardly to a point above the right hand end of the apparatus platform **14** and same is provided with a crank handle **59** adapted to be manually actuated. It has been stated that the teeth **43** can be adjusted vertically in order that the extent of their penetration into the soil may be initially determined. By this is meant the extent of their penetration when the wheels **55** are in the extreme elevated full line positions shown in Figures 2 and 3. It manifestly follows that by reason of the means employed herein for changing the positions of wheels **55** relatively to the lower faces of the beams **11**, **11**, it is possible to govern the degree of pressure exerted there against and also to control the extent of penetration of the said teeth **43** into the ground. In other words, it is possible to tilt the rear portion of the machine vertically without causing the forward portion of the machine to leave the surface of the roadway under treatment. This permits also the regulation of the action of the teeth **29** upon the ground to control the scuffing effect thereof as desired. When the teeth **43** are tilted in their dot-and-dash positions shown in Figure 3 and the wheels **55** adjusted to the positions where their tread surfaces are below the lower surfaces of the beams **11**, **11**, as shown by the dot-and-dash lines, Figure 3, both sets of teeth **29** and **43** are renderd inactive relatively to the ground.

In operation, let it be assumed that the machine is being drawn over a roadway and that both the scuffing teeth **29** and the scarifying teeth **43** occupy the positions shown in Figure 3. In consequence thereof, the surface of the roadway will be gouged or scuffed by the teeth **29**, the action of which said teeth is succeeded by the leveling or planing bar **35**. Dirt collected by the said bar is deflected laterally and outwardly and is compelled to find exit from between the beams **11**, **11**, by way of the openings **33**. Following the planing of the soil as just referred to, the scarifying teeth **43** act upon the ground beneath the top surface of the roadway and to a depth appreciably in excess of that of the penetration of the teeth **29** and at the very depth of said penetration of said teeth **43**, a soil treating fluid such as oil or water is effectively administered to the soil where it will not unduly muss or make sloppy the said top surface. Whenever the occasion necessitates, a rod or the like may be projected downwardly into the teeth **43** to clear same of foreign matter so that a free outlet is provided for the flow of fluid from said teeth.

The manifold **39** and the fluid feeding pipes which extend forwardly therefrom serve to overbalance the teeth **43** when the lower ends of the latter are out of the ground and to move this part of the organization to the said dot-and-dash line position shown in Figure 3, at which time the pipe **40** to which the supply hose or the like is adapted to be connected is received in a slot **58***a* in the operator's platform **14**. By means of a forwardly extending cable **59***a* whose rear end is attached to one of the teeth **43** near the top thereof, the teeth **43** can be manually thrown into their operative scarifying positions by actuating said cable at the driver's seat of the tanker from which the machine is drawn.

In the form of my invention shown in Figures 7 and 8 of the drawings, compressed air in a tank **60** upon the operator's platform **14** is connected with a distributing manifold **61** by a flexible tubing **62**. The said manifold opens at **63** into the

upper ends of the respective hollow teeth **43***a* of a scarifying mechanism **44***a*. Below the point of entrance to each of said teeth, the manifold is provided with a downwardly opening check valve **64** which may be of any suitable well known construction adapted to be opened by the force of air pressure from the tank **60**. The oil or fluid distributing manifold **39***a* is substantially the same as the manifold **39** first above referred to, and it will be observed that its point of entrance to the respective hollow teeth **43***a* is located beneath the manifold **61** so that when air under pressure is discharged downward into the upper ends of said teeth, suction will be induced at the point A so as to accelerate the movement of the fluid from the manifold **38***a* and insure free passage thereof in the direction of the lower soil penetrating ends of said teeth. In this manner, it manifestly follows that the soil treating fluid may be more effectively distributed into the soil as the machine is normally drawn over the surface under treatment or construction. Whenever it may be necessary to clean the bores of the teeth, the valve mechanism **63** at the distributing manifold **39***a* can be manually actuated to close the teeth against the discharge of fluid thereinto, at which time air from the tank may be forced into the teeth and any obstructions contained therein will be rapidly expelled from the lower ends thereof.

Air may be supplied to the tank **60** through a compressor **64***a* carried by the platform **14**. Said compressor is operatively connected at **65** to a power plant **66**, such as an internal combustion engine.

I do not wish to be limited to the form of scarifying mechanism herein shown, and it is my intention to substitute therefor any suitable well known form of scarifier, just so long as provision is made in company therewith to distribute the soil treating fluid to the soil at a point at the effective soil digging or scarring surfaces of the implement employed.

What is claimed is:

1. In a fluid distributing mechanism for road building machines, a fluid intake and discharge manifold having a longitudinal series of spaced apart soil penetrating pipes; a vertically adjustable portable frame on which the manifold is mounted to tilt about a horizontal axis transversely of the frame to vertically dispose the pipes in positions to penetrate the soil when lowering the frame and retract therefrom when raising the frame; and means for adjusting the frame for the purpose stated and for controlling the extent of said adjustment to regulate the depth of penetration of the pipes into the soil.

2. In a fluid distributing mechanism for road building machines, a fluid intake and discharge manifold having a vertical series of fluid distributing pipes depending therefrom; means for controlling the discharge of fluid from the pipes; a vertically adjustable portable frame on which the manifold is mounted; means for raising and lowering the frame to enable the pipes to pierce the soil when lowering the frame and retract from the soil when raising the frame; a source of fluid supply with which the manifold is connected to enable fluid to pass to the manifold from the source; and means for imposing pressure upon the fluid to force injection of the fluid into the soil when the frame is lowered.

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