

May 16, 1961

W. R. THOMPSON ET AL

2,984,026

ROAD-WORKING MACHINE

Filed March 12, 1956

5 Sheets-Sheet 1

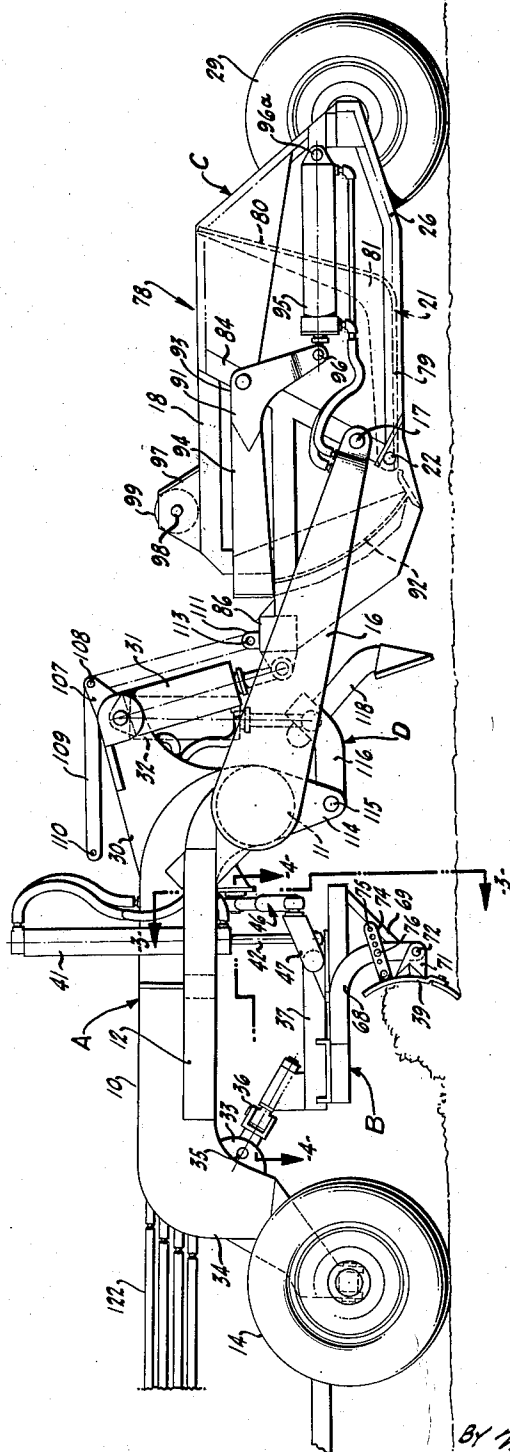


FIG-1

INVENTORS
WILLIAM R. THOMPSON
CYRIL E. SAUNDERS
DONALD E. MURRAY

BY Meelin and Hanscom
ATTORNEYS

May 16, 1961

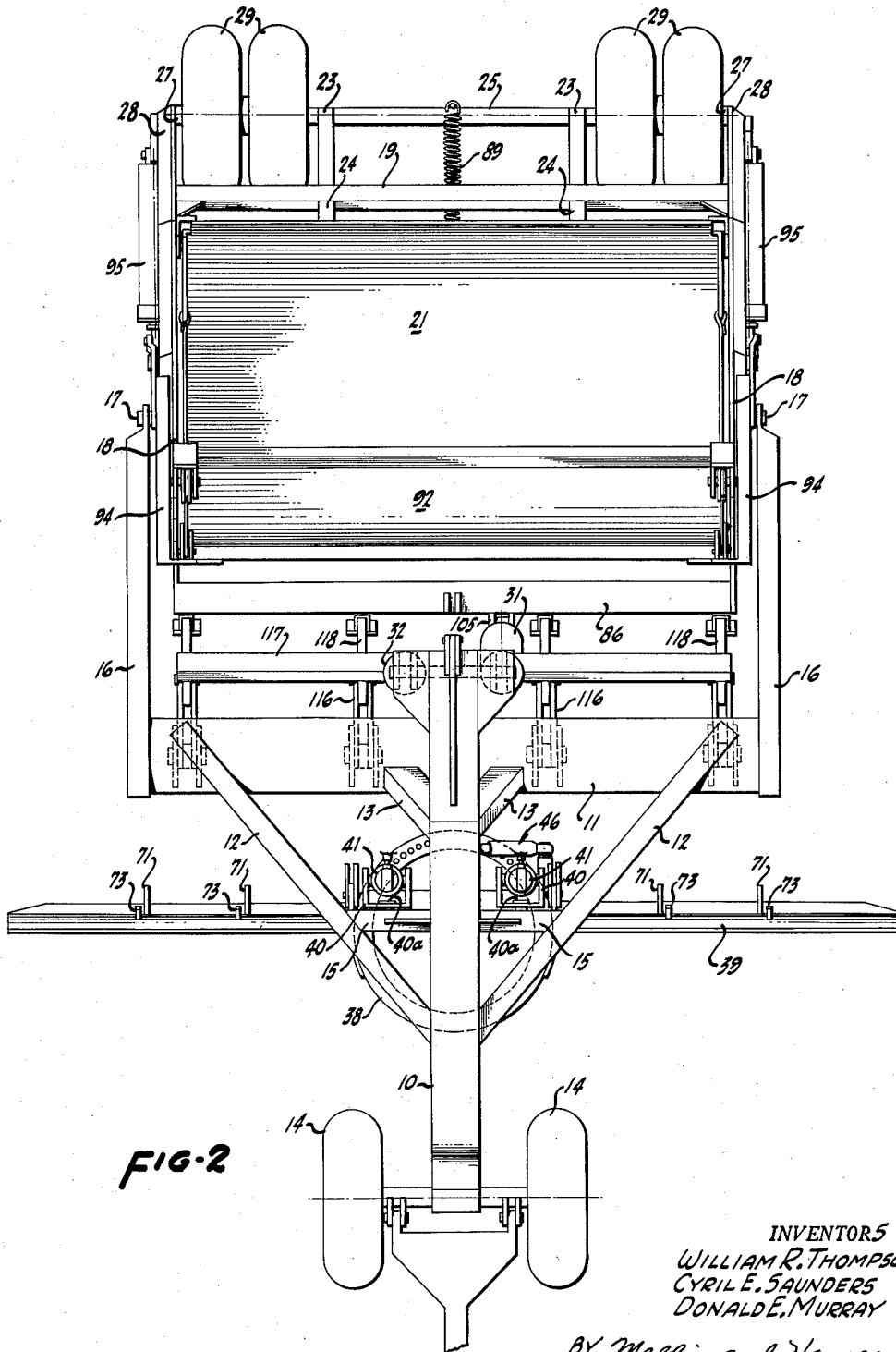
W. R. THOMPSON ET AL

2,984,026

ROAD-WORKING MACHINE

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5 Sheets-Sheet 2



INVENTORS
WILLIAM R. THOMPSON
CYRIL E. SAUNDERS
DONALD E. MURRAY
BY Mellin and Hanscom
ATTORNEYS

May 16, 1961

W. R. THOMPSON ET AL
ROAD-WORKING MACHINE

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5 Sheets-Sheet 3

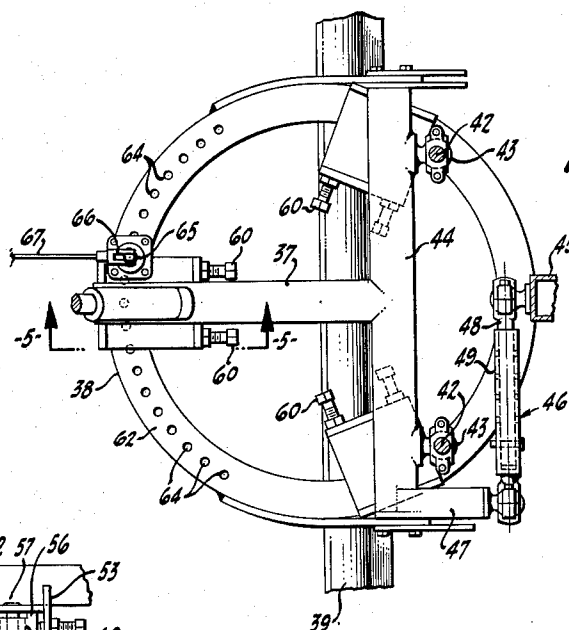
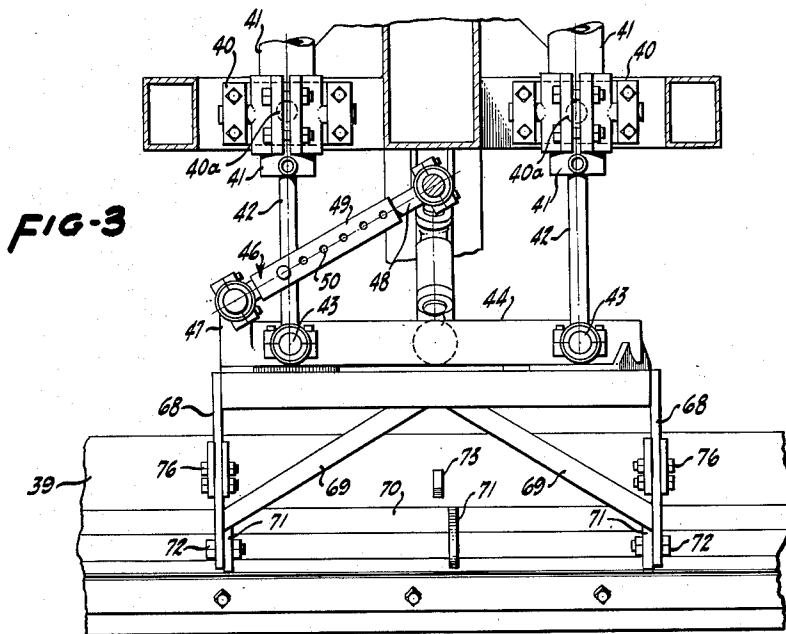
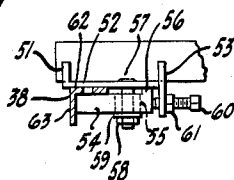


FIG-5



INVENTORS
WILLIAM R. THOMPSON
CYRIL E. SAUNDERS
DONALD E. MURRAY

By *McClintock and Hanson*
ATTORNEYS

May 16, 1961

W. R. THOMPSON ET AL

2,984,026

ROAD-WORKING MACHINE

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5 Sheets-Sheet 5

FIG-8

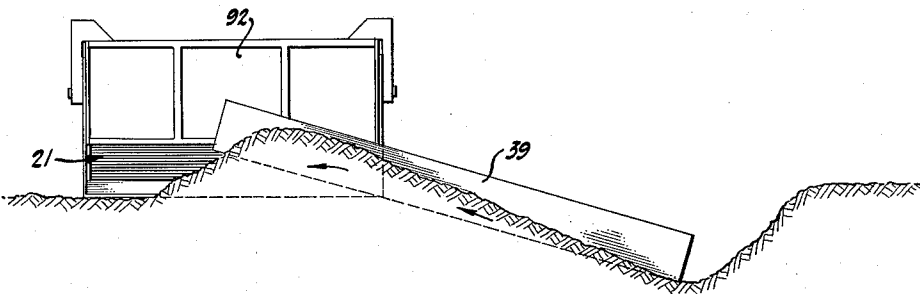
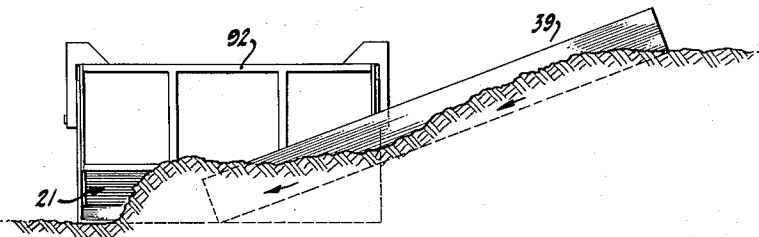


FIG-9

INVENTORS
WILLIAM R. THOMPSON
CYRIL E. SAUNDERS
DONALD E. MURRAY

BY *Mellin and Hamcom*
ATTORNEYS

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2,984,026

ROAD-WORKING MACHINE

William R. Thompson, Salinas, Cyril E. Saunders, San Francisco, and Donald E. Murray, Turlock, Calif., assignors to Thompson Scoop-Grader, Inc., San Francisco, Calif., a corporation of California

Filed Mar. 12, 1956, Ser. No. 571,008

7 Claims. (Cl. 37—126)

This invention relates to and, in general, has for its object the provision of a combination grader, scarifier and road-working machine capable of simultaneously cutting or scraping dirt from a bank, culvert or road bed and delivering said dirt to a scoop for carting the same away.

There are, of course, various types of road-working machines, including scoops and scraper blades. However, none of them is so arranged that the scraper may be used in co-operation with the scoop so that the scraper can cut dirt from a bank or a culvert and deliver that dirt to the scoop for carrying it away before the supporting wheels of the machine pass over the dirt.

It is one of the objects of this invention to provide a road-working machine, including front wheels, a frame section, a scraper blade assembly pivotally mounted adjacent the front end of said frame rearwardly of the front wheels of the machine, a scoop fixed intermediate the front and rear ends of said frame, a scarifier assembly mounted between the said scraper blade and scoop, means for selectively adjusting the level of the frame, scoop, scarifier and scraper relative to the ground, and ground-engaging wheels for supporting the rear end of said frame.

It is a further object of the present invention to provide a road-working machine that has included therein scraper, scarifier and scoop assemblies, wherein said assemblies can be selectively operated singly or in a combination of any two or all three thereof.

It is a further object of the invention to provide a road-working machine that includes scraper, scarifier and scoop assemblies, wherein said assemblies can be so adjusted that a surface of material on a road, such as gravel, can be conveyed laterally of the machine, the subsurface of the road-bed scarified to loosen up the same, and the loosened earth of the subsurface picked up by the scoop and carried away. In this way, by proper adjustment and co-operation of the various assemblies, three operations can be accomplished on one pass of the machine. Thereafter, when the road has been properly graded, the machine can pass along the road, and by proper adjustment of the scraper blade assembly, can reconvey the gravel back onto the road surface and spread it to the desired depth.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where that form of the invention which has been selected for illustration in the drawings accompanying and forming a part of the present specification is outlined in full. In said drawings, one form of the invention is shown, but it is understood that it is not limited to such form since the invention as set forth in the claims may be embodied in other forms.

Referring now to the drawings:

Fig. 1 is a side elevation of the road-working machine embodying the objects of our invention.

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Fig. 2 is a top plan view of the machine illustrated in Fig. 1.

Fig. 3 is a vertical section taken on the section line 3—3 of Fig. 1.

Fig. 4 is a horizontal section taken on the section line 4—4 of Fig. 1.

Fig. 5 is a vertical section taken on the section line 5—5 of Fig. 4.

Fig. 6 is a fragmentary side elevational view of the scarifier and scoop assembly, showing the same with the scarifier in use and the scoop being loaded.

Fig. 7 is a fragmentary side elevational view of the scarifier and scoop assembly, showing the scarifier assembly raised and the load being dumped from the scoop.

Fig. 8 is a diagrammatic view showing the scraper cutting into a bank or shoulder and conveying the dirt to the scoop.

Fig. 9 is a diagrammatic view showing the scraper cutting into or cleaning out a culvert and conveying the dirt to the scoop.

The road-working machine illustrated in the drawings comprises a main frame A, a scraper blade assembly B suspended from said main frame rearwardly of the front ground-engaging wheels of the machine, a scoop assembly C mounted between the end of said main frame and the front ground-engaging wheels, an adjustable scarifier assembly D mounted between the said scraper blade assembly and the scoop assembly and means for operating the various parts of said four assemblies.

Main Frame A

Figs. 1 and 2 show a main frame including a front frame section arcuate in side elevation, a pair of parallel intermediate arms and the side walls of the scoop assembly. Said front frame includes a front arcuate frame member 10 and a transverse cross-member 11. A pair of intermediate arms 12 is welded at one end thereof adjacent the forward end of the front frame 10 and extends rearwardly and outwardly. Said intermediate arms 12 are welded at their other ends adjacent each end of the transverse cross-member 11. A pair of reinforcing arms 13 is welded at one end adjacent the rear end of the frame 10 and extends rearwardly and downwardly and is welded at its other end to said transverse cross-member 11. Pivotaly mounted at the forward end of said front arcuate frame member 10 is a pair of ground-engaging wheels 14 for supporting the forward end of the rig and more particularly the forward end of said front frame 10. A pair of lateral braces 15 is welded centrally of the arms 12 and the front frame 10. Welded to the ends of the transverse cross-member 11 is a pair of parallel intermediate arms 16 that extends rearwardly and downwardly, with the free end thereof journaled by pins 17 to side walls 18 of the scoop assembly. The side walls 18 of the scoop assembly are parallel and identical in shape and construction and form a part of said main frame. Said side walls 18 are connected by transversely extending cross-members 19 and 20. A pivotal bucket 21 is journaled to the side walls 18 at the lower forward portion thereof by pins 22. A fabricated axle-supporting frame is welded and depended from the cross-members 19 and 20. Said supporting frame has arms 23 and 24, a cross-member 25 and a horizontal member 26. Axles 27 are affixed to the cross-member 25 and to the rear end of the side wall 18 as indicated at 28. Journaled on said axles 27 are ground-engaging wheels 29 for supporting the rear end of the rig and, more particularly, the rear end of the scoop assembly. A frame extension 30 is welded to the rear end of said

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front frame member 10. The purpose of said extension 30 is to pivotally secure hydraulic jacks 31 and 32 that are employed to raise and lower the scoop assembly C and scarifier assembly D, respectively.

Scraper assembly B

Lugs 33 are welded to the under side of a forward arm 34 of the front frame 10. Pivotally secured to said lugs 33 by a pin 35 is a universal joint 36. This joint, in turn, is connected to the forward end of a sub-frame 37 formed with a T-shape that carries a flanged ring 38 on which a scraper blade 39 is mounted.

U-shaped brackets 40 are pivotally affixed to each of the lateral braces 15 by pins 40a and pivotally mounted in said U-shaped brackets 40 are hydraulic jacks 41. This arrangement forms a toggle connection between the hydraulic jacks and the braces 15. Piston rods 42 of said hydraulic jacks 41 are pivotally attached at 43 to said T-shape frame 37 adjacent the ends of a cross-bar 44 of the said T-frame 37. As a result of this construction, the scraper blade assembly can be raised or lowered and angularly tilted from the horizontal.

A boss 45 is welded to the under side of the rear of the arcuate frame 10. An adjustable arm 46 is pivotally attached to said boss 45 at one end thereof while the other end of said adjustable arm 46 is pivotally attached to an extension 47 of the cross-bar 44 of said T-frame 37. Said adjustable arm 46 is formed with an inner bar 48 that slides in a sleeve 49. Said bar 48 and sleeve 49 are provided with a series of spaced holes 50 arranged to register with one another. By inserting a pin through these holes, the length of said adjustable arm 46 can be altered so that the scraper assembly is held from shifting angularly.

Formed integrally with each end of the T-frame 37 is a bracket 51 (Fig. 5). Said bracket has an upper plate 52, a downwardly extending inner flange 53, and an adjustable lug 54 formed with an elongated slot 55 therein. The inner end of said lug 54 has land 56 that holds said lug in spaced relation to the upper plate 52. Studs 57 are welded to the upper plate 52 and project downwardly therefrom through said elongated slots 55. Said studs 57 are threaded at their outer end and a nut 58 and a washer 59 holds said lugs 54 in place. The outer end of said lugs 54 supports the annular flanged ring 38. The elongated slots formed by arrangement of said lugs 54, land 56 and plate 52 permit the annular flanged ring 38 and the scraper blade 39 to be rotated horizontally. The lugs 54 are adjustable laterally by a pair of set screws 60 that are threaded through the inner flange 53 and bear against the adjustable lugs 54. Lock nuts 61 lock said set screws 60 in proper position.

The annular flanged ring 38 is formed with a flat upper ring 62 and a downwardly extending skirt 63. A series of spaced holes 64 is formed in a portion of the flat upper ring 62. A spring-loaded plunger 65, arranged to register with the holes 64, is mounted on the bracket 51 adjacent the universal joint 36. By raising the plunger 65, the ring 38 and the scraper blade 39 may be rotated about a horizontal plane and, when said scraper blade is in the desired relative angular position, the plunger is inserted into one of the holes 64, locking the ring 38 and the scraper blade 39 in said desired angular position. A lever arm 66 is attached to said plunger 65. Fastened to the outer end of said arm 66 is a cable 67 for operating the plunger 65. Said cable extends to the operator's station on the draft vehicle. To assist in holding the ring 38 in the desired angular position, the lugs 54 may be forced outwardly against the skirt 63 by adjustment of the set screws 60.

Welded to and depending from the ring 38 at diametrically opposed points thereon is a pair of arcuate fingers 68. Said fingers are reinforced by cross-braces 69. The curved scraper blade 39 is provided on its rear face with a stiffening flange 70. Welded to said flange 70 is a series

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of bifurcated lugs or fingers 71. The said scraper blade 39 is adjustably connected to the lower ends of the arcuate fingers 68 by bolts 72. A series of lugs 73 is welded to said rear face of the scraper blade 39 adjacent the upper edge thereof and in alignment with the lugs or fingers 71. Secured to said lugs 73 and extending rearwardly from said lugs 73 adjacent the fingers 68 are arms 74 which are provided with a series of spaced holes 75 arranged to register with a hole formed in each of the fingers 68. By inserting a bolt 76 through these holes, the scraper blade can be locked at any desired inclination.

It is therefore apparent that as a result of this construction the scraper blade 39 can be selectively tilted, angled, elevated or lowered under the influence of the hydraulic jacks 41, which are under the control of suitable fluid valves located on the draft vehicle pulling the rig. By means of the lugs 71 and 73 the scraper blade 39 can be adjusted laterally of the rig. Lateral adjustment of the scraper assembly is accomplished by means of adjusting the lengths of the arm 46, plunger 65 and lugs 54. It should be noted that fluid under pressure for actuating the fluid motors is derived from suitable pumps mounted on the draft vehicle.

Scoop assembly C

Pivotally mounted between the rear ends of the intermediate arms 16 by the pins 17 is a bowl or scoop generally designated by the reference numeral 78, including the side walls 18 and the pivotal bucket 21, said bucket having a bottom 79 and a back 80. The pivotal bucket 21 is journaled to the side walls 18 by the pins 22. The said bottom 79 and back 80 are integral with each other, being welded to and supported by angular arms 81, as shown in Figs. 6 and 7.

The bottom of the bowl or scoop 78 terminates at its forward end in an inclined, excavating lip 82 having a sharp cutting edge 83. Each of the side walls 18 is reinforced by reinforcing member 84 welded to said side walls. Also welded to the forward ends of said side walls 18, to reinforce and hold said side walls 18 in spaced relationship, is a cross-member 86.

Welded to the rear of the side walls 18, adjacent the upper edge thereof, are stops 87 against which the back 80 of the bucket rests when said bucket 21 is being loaded or is in carrying position. The back 80 of the bucket has a finger 88 welded to the outer side thereof. A spring 89 is affixed at one end to said finger 88 and at its other end to the cross-member 25. Said spring 89 tends to keep the pivotal bucket 21 in loading position at all times.

Pivoted to the side walls 18 by pins 90 are angular arms 91. Affixed to the forward ends of said angular arms 91 is a front apron 92 arranged to swing across and close or crack open the front end of the bowl or scoop 78. The said angular arms 91 are formed with downwardly extending arms 93 and forwardly extending arms 94. Hydraulic jacks 95 are pivotally attached to the lower end of said downwardly extending arms 93 at 96. The opposite ends of said hydraulic jacks 95 are pivotally attached adjacent the rear end of the side wall 18 by pins 96a.

A pair of bifurcated, upwardly extending lugs 97 is formed at the forward upper end of each of the side walls 18. Journaled between said lugs 97 on shafts 98 are sheaves 99. Positioned immediately below said sheaves 99 is a pin 100. Cables 101 are affixed at one end to the forward end of said arms 94 at 102 and at their other end they are affixed to the angular arm 81 of the bucket at 103. When the pivotal bucket 21 is in loading position, said cables 101 are slack, as illustrated in Fig. 6. When it is desired to dump the load, the hydraulic jacks 95 are actuated, forcing piston rods 104 of said jacks forwardly. Said piston rods 104 bear against the downwardly extending arms 93 of the angular arms 91, forc-

ing said angular arms 91 to swing upwardly about the pins 90. By movement of the angular arms 91 upwardly, the cables 101 are tightened against the sheaves 99 and pull the pivoted bucket 21 upwardly about the pivot pins 22, dumping the contents of said bucket 21. When the jacks 95 are retracted, the spring 89 pulls the bucket 21 back to loading position. The pins 100 hold the cables 101 in place and in alignment with the sheaves 99. They also act to guide the cable 101 when the front apron 92 is closed against said side walls 18 and excavating lip 82 and the load of dirt is being transported to another location for unloading. The cable 101 is of sufficient length, of course, to permit said front apron 92 to move to closed position.

Located centrally of the cross-member 86 is a pair of bifurcated lugs 105, and pivotally attached to said lugs 105 by a pin 106 is the hydraulic jack 31. By actuating said jack 31, said scoop assembly may be raised or lowered. The adjustment of said scoop assembly can be made independently of adjustment of other parts of the rig.

Lugs 107 are attached to the frame extension 30, and journaled to said lugs 107 by a pin 108 is an arm 109. Formed at the free end of said arm 109 is a hole 110. Affixed centrally of the cross-member 86 are lugs 111 that have formed therein holes 112. When it is desired to transport the rig for any distance, either loaded or unloaded, and the operator wishes to take the weight of the load or scoop assembly off of the hydraulic jack 31, the arm 109 can be rotated clockwise so that the hole 110 in said arm 109 is in alignment with the hole 112 of the lugs 111. A pin 113 can then be inserted in said aligned holes 110 and 112 and the arm 109 thus positioned, as shown in dotted lines in Fig. 1, holds the scoop assembly in raised position.

Scarifier assembly D

Attached to the transverse cross-member 11 is a series of pairs of bifurcated lugs 114. Pivotaly affixed to each pair of said lugs 114 by pins 115 are scarifier arms 116. A transverse scarifier bar 117 is welded to the free ends of said scarifier arms 116. Attached to said scarifier bar 117 in spaced relation is a series of scarifier blades 118. Said blades have a sharp cutting toe 119.

Located centrally of, and on the front face of the transverse scarifier bar 117, is a pair of bifurcated lugs 120. Pivotaly attached to said lugs 120 by a pin 121 is the hydraulic jack 32. The vertical positioning of the scarifier blades 118 is controlled by actuating the hydraulic jack 32. It is also to be noted that said scarifier blades 118 may be controlled independently or may be used in co-operation with the scoop or scraper blade by actuation of the hydraulic jack 32.

Mounted on the draft vehicle (not shown) is a bank of valves for controlling the various fluid lines 122 communicating between the various hydraulic jacks, the source of fluid under pressure and the control valves.

Operation

Referring more particularly to Figs. 1, 6, 7, 8 and 9:

In Fig. 1, the bowl or scoop 78 is shown in its dirt-carrying position with its pivotal bucket 21 in normal position, its side arms 94 substantially horizontal, and the front apron 92 in its closed position. The hydraulic jack 31 is in retracted position, lifting the bowl or scoop 78 to raised carrying position. The scoop 78 can be either full of dirt or empty and the scraper blade 39 can be in either its raised, inoperative position or in its depressed, operative position. If it is desired to transport the rig for any distance, the jacks 31, 32 and 41 are maintained in retracted condition so that the scoop, scraper and scarifier are held in raised position, thus permitting the rig to be freely moved.

By extending the jack 31, the scoop 78 can be bodily lowered to its excavating or loading position, as illus-

trated in Fig. 6, wherein the apron 92 has been raised to a cracked position by partially extending the jack 95. Thus, when the scoop is so positioned, on moving the rig forward, the scoop 78 can be filled. By retracting the jack 31, the bucket 21 is raised and thereafter the jack 95 is retracted, closing the apron 92, and the load can be transported to another location and there dumped. After the rig has been transported to the place where it is desired to dump the load (Fig. 7), the operator extends the jacks 95 against the arms 93, which results in raising the apron 92. At the same time, this operation pulls on the cables 101 which are attached to the bucket 21, causing said bucket to pivot about the pins 22, raising the same to unloading position, all as shown in Fig. 7. After the load has been dumped, the hydraulic pressure on the jacks 95 is then cut and the spring 89 attached to the said bucket returns the same to normal loading position.

In some instances, it is desirable to accomplish three operations at once; namely, moving the surface material away from the action of the scoop, scarifying the sub-surface soil to dig up the same, and loading the loose subsurface soil dug up by the scarifier into the scoop.

For example, if a heavily gravelled road is being worked on and it is desirable to move aside the loose gravel surface, grade the road-bed, and then re-use the gravel, or if it is desired to save and replace top soil in a field that is being graded, the said scraper blade 39 is adjusted to clear the gravel or top soil from the surface of the road or field and convey it laterally of the scoop 78. The scarifier blades 118 may be vertically adjusted by the hydraulic jack 32 to dig into the subsurface of the road or field, digging and loosening the said subsurface material immediately in front of the scoop 78. Then said loosened subsurface material may be picked up by the scoop 78 and carted away. Thus, in one pass, three operations may be accomplished. Thereafter, if it is desired to replace the gravel or top soil, the scraper may be adjusted to move said gravel or top soil back in place.

The present machine may also be used with only the scraper blade 39 and scoop 78. For example, if it is desired to dig or clean out a culvert or cut down a bank or shoulder along the side of a road as shown in Figs. 8 and 9, in such a case, with the wheels of the rig still on the roadway, the scraper blade assembly may be moved to extend from the side of the rig by adjustment of the scraper blade 39 laterally in the lugs 71. Then by actuating the jacks 41, said scraper blade may be tilted upwardly into a bank, as shown in Fig. 8, or downwardly into a culvert, as shown in Fig. 9. Thereafter, when said rig is moved forward, earth from the culvert or bank, as the case may be, is conveyed laterally by said scraper into the path of the scoop and loaded thereon.

This sequence of operation is of great importance, for the position of the scraper blade 39 can be set relative to, and independently of, the frame, the scoop, the scarifier and the ground-engaging wheels of the rig. The rig may be pulled down a road or highway with the wheels thereof on the surface of the highway, the scraper blade so adjusted can dig, clear or clean a culvert, conveying the dirt or debris onto the roadway to be picked up in the scoop, or, if it is desired to cut down or remove a bank or shoulder adjacent the road, said bank or shoulder may be cut into or cut down by angular adjustment of the scraper blade and the dirt therefrom conveyed laterally onto the roadway, picked up in the scoop and carted away.

It will be noted in Fig. 6 that the scarifier blades 118 are in lowered position, so that they are digging into the subsurface and loosening the earth immediately forward of the scoop 78 to facilitate the loading thereof.

Of course the rig may also be used, employing only the scraper blade or the scarifier or the scoop. Thus, the instant rig is very flexible in use, whereby by co-operation of its several parts, one, two or three operations

can be accomplished selectively at the choice of the operator.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A road-working machine comprising a main frame including a front arcuate frame member mounted on a front wheel, a transverse cross member, and a pair of parallel arms mounted rigidly to the ends of said cross member and extending rearwardly therefrom; a scraper assembly, means for supporting said scraper assembly from said arcuate front frame member and vertically raising and lowering said assembly; a scarifier assembly, means for supporting said scarifier assembly from said transverse cross member and vertically raising and lowering said assembly; a scoop assembly pivotally mounted between the ends of said pair of parallel arms and being supported upon rear wheels, and means for pivoting said scoop assembly between lowered and raised positions.

2. A road-working machine comprising a main frame including a front arcuate frame member mounted upon front wheels, a transverse cross member, and a pair of parallel arms mounted rigidly to the ends of said cross member and extending rearwardly therefrom; a scraper assembly, means including at least one fluid operated jack for supporting said scraper assembly from said arcuate front frame member; a scarifier assembly, means including a fluid operated jack for supporting said scraper assembly from said transverse cross member; a scoop assembly pivotally mounted between the ends of said pair of parallel arms and being supported upon rear wheels, a fluid operated jack pivotally mounted from said front frame member and having a piston rod pivotally connected to said scoop assembly, and means for selectively connecting said scoop assembly to said front frame member in a raised traveling position.

3. A road-working machine comprising a main frame including a front arcuate frame member mounted upon front wheels, a transverse cross member, and a pair of parallel arms mounted rigidly to the ends of said cross member and extending rearwardly therefrom; a scraper assembly, means including at least one fluid operated jack for supporting said scraper assembly from said arcuate front frame member; a scarifier assembly, means including a fluid operated jack for supporting said scraper assembly from said transverse cross member; a scoop assembly pivotally mounted between the ends of said pair of parallel arms and being supported upon rear wheels, a fluid operated jack pivotally mounted from said front frame member and having a piston rod pivotally connected to said scoop assembly, said scoop assembly including an excavating lip, a pivotal bucket mounted upon a horizontal axis adjacent said lip, a front apron pivotally mounted upon a horizontal axis parallel to said bucket axis, means including a fluid operated jack for actuating said front apron between a lowered and raised position, and motion transmitting means interconnecting said apron and bucket for moving said bucket into a dumping position upon actuating said apron into a raised position.

4. A road-working machine comprising a main frame including a front arcuate frame member mounted upon front wheels, a transverse cross member, and a pair of parallel arms mounted rigidly to the ends of said cross member and extending rearwardly therefrom; a scraper assembly universally supported from said front frame member, a pair of fluid operated jacks pivotally mounted on said front frame member and having piston rods vertically disposed and pivotally connected to said scraper assembly at laterally spaced points thereon; a scarifier assembly pivotally mounted from said transverse cross member upon a horizontal axis, a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scarifier assembly; a scoop assembly pivotally mounted between the ends of said pair of parallel

arms and being supported upon rear wheels, and a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scarifier assembly.

5. A road-working machine comprising a main frame including a front arcuate frame member mounted upon front wheels, a transverse cross member, and a pair of parallel arms mounted rigidly to the ends of said cross member and extending rearwardly therefrom; a scraper assembly universally supported from said front frame member, a pair of fluid operated jacks pivotally mounted on said front frame member and having piston rods vertically disposed and pivotally connected to said scraper assembly at laterally spaced points thereon; a scarifier assembly pivotally mounted from said transverse cross member upon a horizontal axis, a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scarifier assembly; a scoop assembly pivotally mounted between the ends of said pair of parallel arms and being supported upon rear wheels, a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scoop assembly, and means for selectively connecting said scoop assembly to said front frame member in a raised traveling position.

6. A road-working machine comprising a main frame including a front arcuate frame member mounted upon front wheels, a transverse cross member, and a pair of parallel arms mounted rigidly to the ends of said cross member and extending rearwardly therefrom; a scraper assembly universally supported from said front frame member, a pair of fluid operated jacks pivotally mounted on said front frame member and having piston rods vertically disposed and pivotally connected to said scraper assembly at laterally spaced points thereon; a scarifier assembly pivotally mounted from said transverse cross member upon a horizontal axis, a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scarifier assembly; a scoop assembly pivotally mounted between the ends of said pair of parallel arms and being supported upon rear wheels, a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scarifier assembly, said scoop assembly including an excavating lip, a pivotal bucket mounted upon a horizontal axis adjacent said lip, a front apron pivotally mounted upon a horizontal axis parallel to said bucket axis, means including a fluid operated jack for actuating said front apron between a lowered and raised position, and motion transmitting means interconnecting said apron and bucket for moving said bucket into a dumping position upon actuating said apron into a raised position.

7. A road-working machine comprising a main frame including a front arcuate frame member mounted upon front wheels, a transverse cross member, and a pair of parallel arms mounted rigidly to the ends of said cross member and extending rearwardly therefrom; a sub-frame universally supported from said front frame member, a pair of fluid operated jacks pivotally mounted on said front frame member and having piston rods vertically disposed and pivotally connected to said sub-frame at laterally spaced points thereon, a scraper rotatably supported on said sub-frame; a scarifier assembly pivotally mounted from said transverse cross member, a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scarifier assembly; a scoop assembly pivotally mounted between the ends of said pair of parallel arms and being also mounted upon rear wheels, and a fluid operated jack pivotally mounted on said front frame member and having a piston rod pivotally connected to said scoop assembly.

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