Sept. 23, 1958 W. W. SIMMONDS 2,852,992

COMPACTOR APPARATUS

Filed Nov. 28, 1955 5 Sheets-Sheet 1

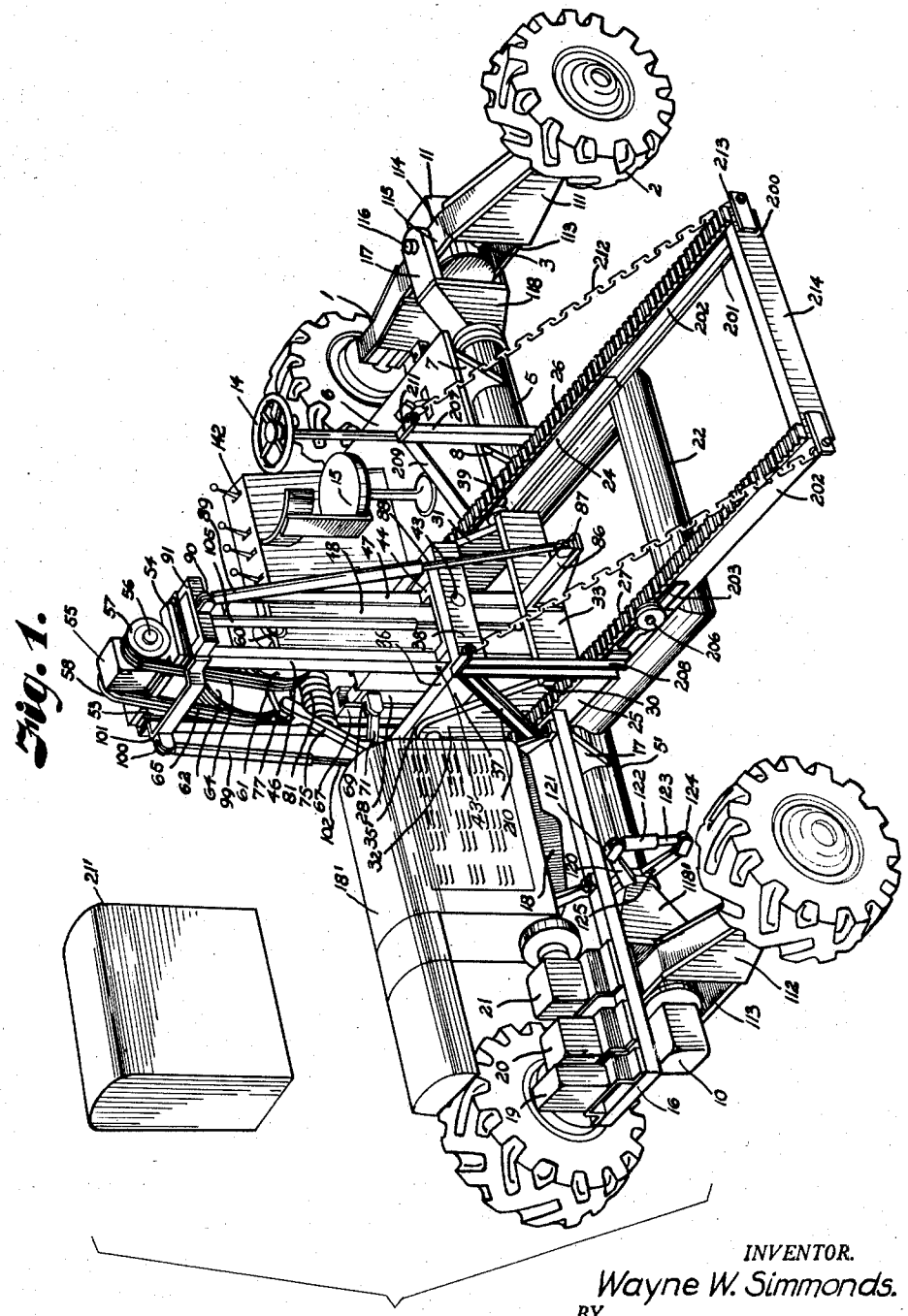


Fig. 1.

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COMPACTOR APPARATUS

Filed Nov. 28, 1955 5 Sheets-Sheet 2

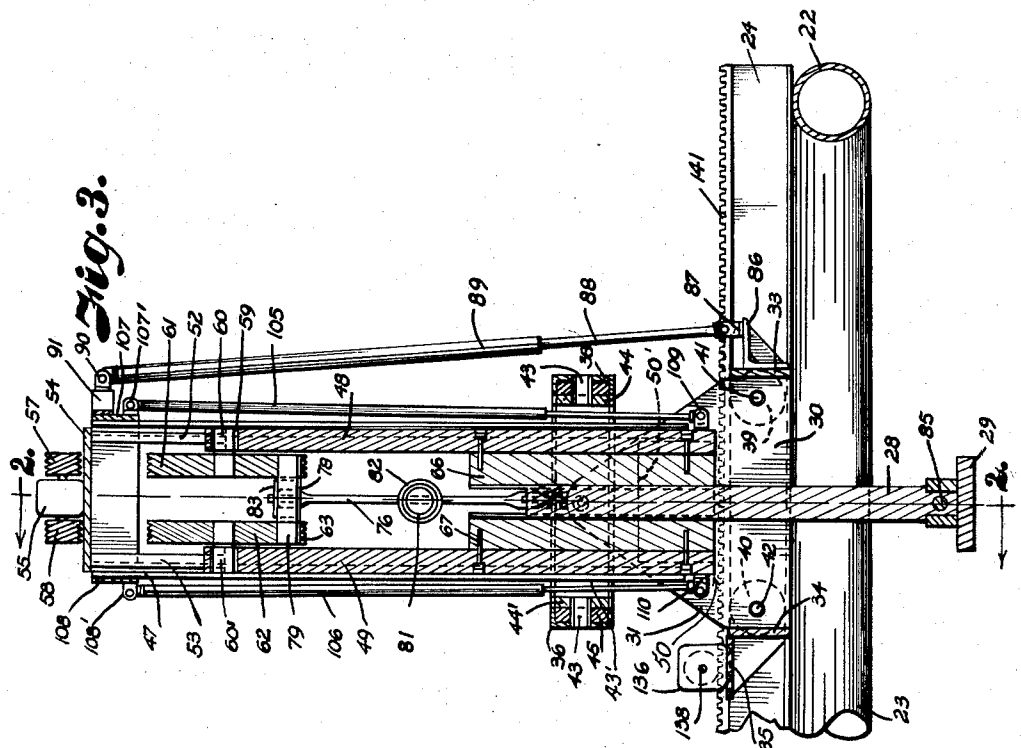


Fig. 3.

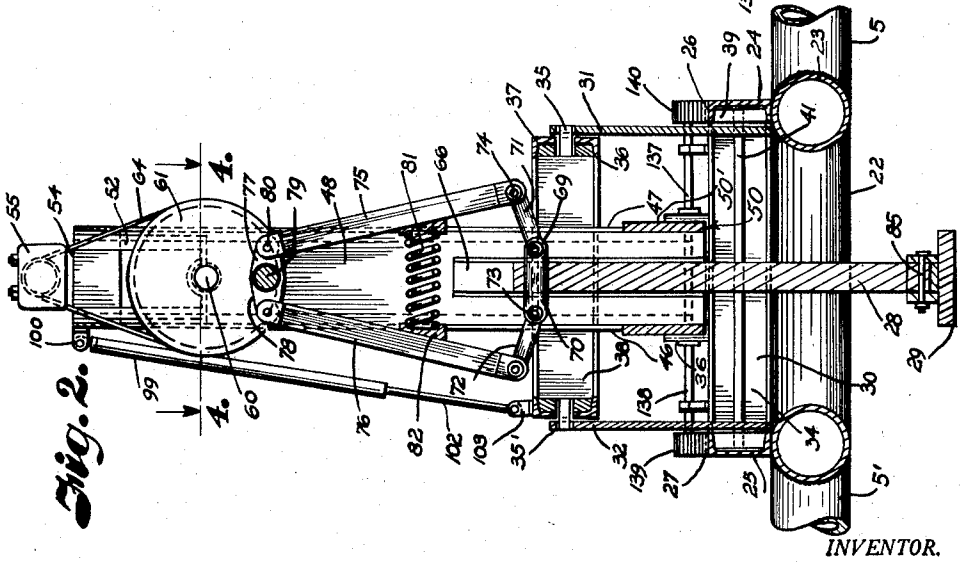


Fig. 2.

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COMPACTOR APPARATUS

Filed Nov. 28, 1955 5 Sheets-Sheet 3

Fig. 4.

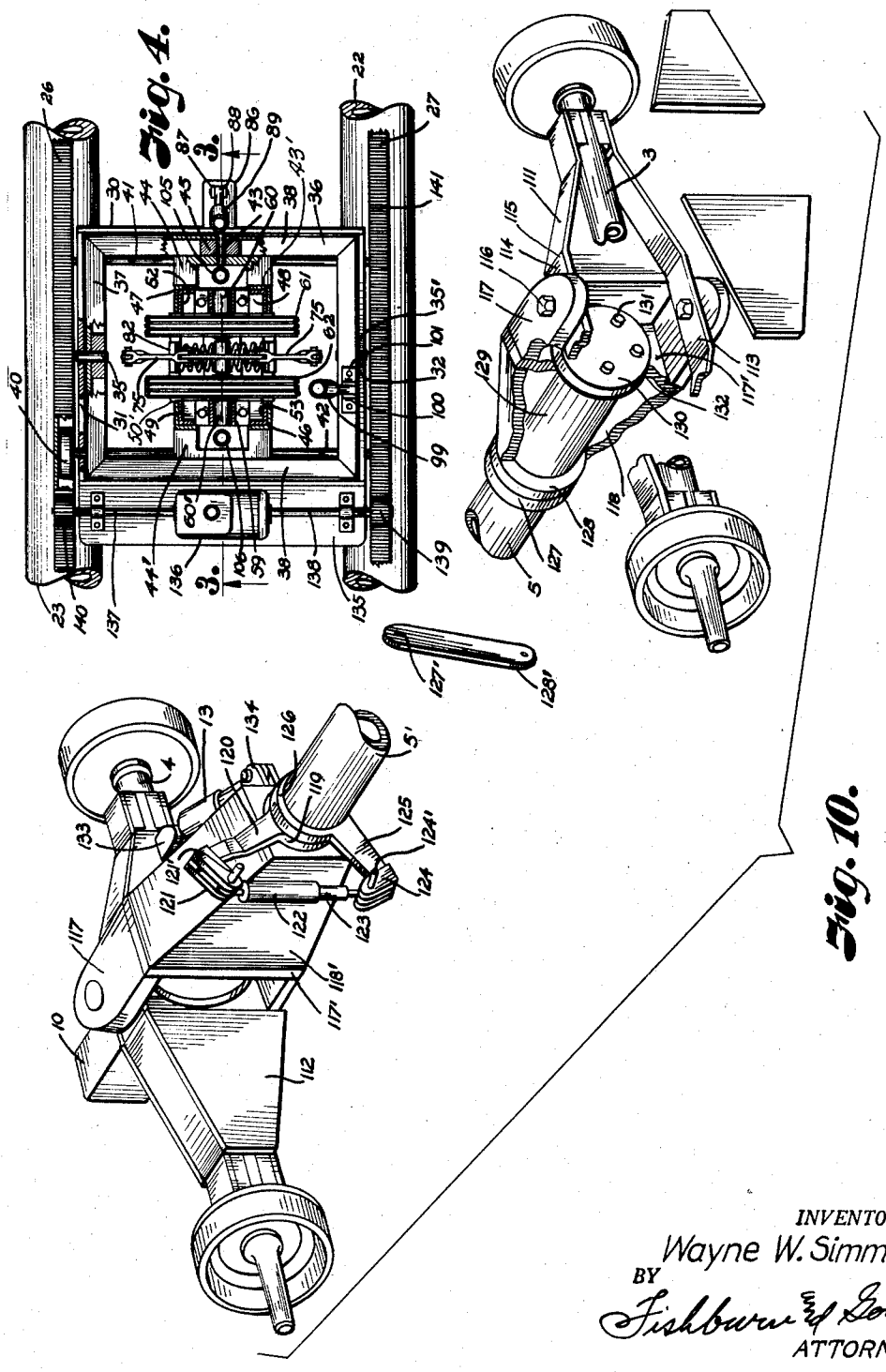


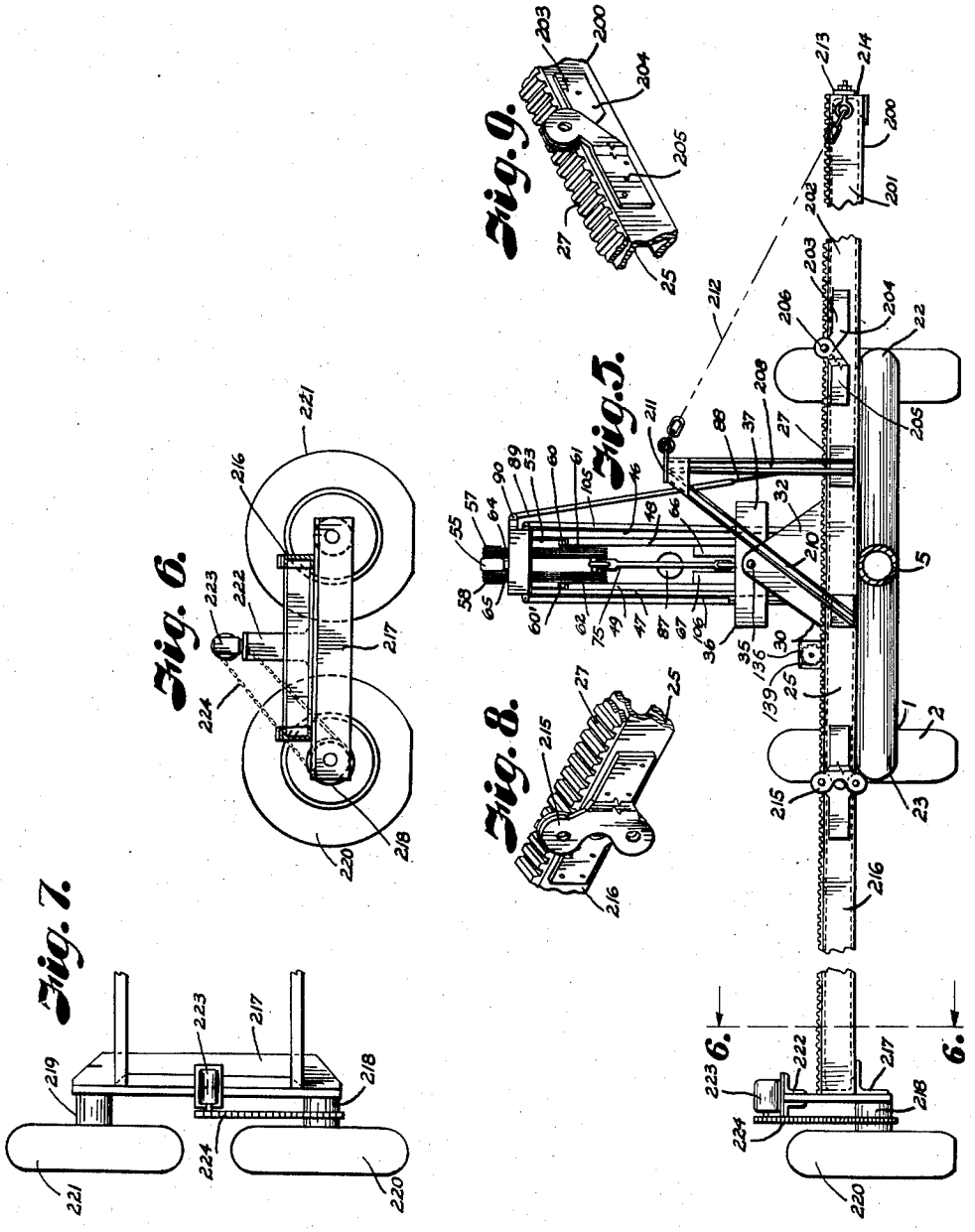
Fig. 10.

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Sept. 23, 1958 W. W. SIMMONDS 2,852,992

COMPACTOR APPARATUS

Filed Nov. 28, 1955 5 Sheets-Sheet 4



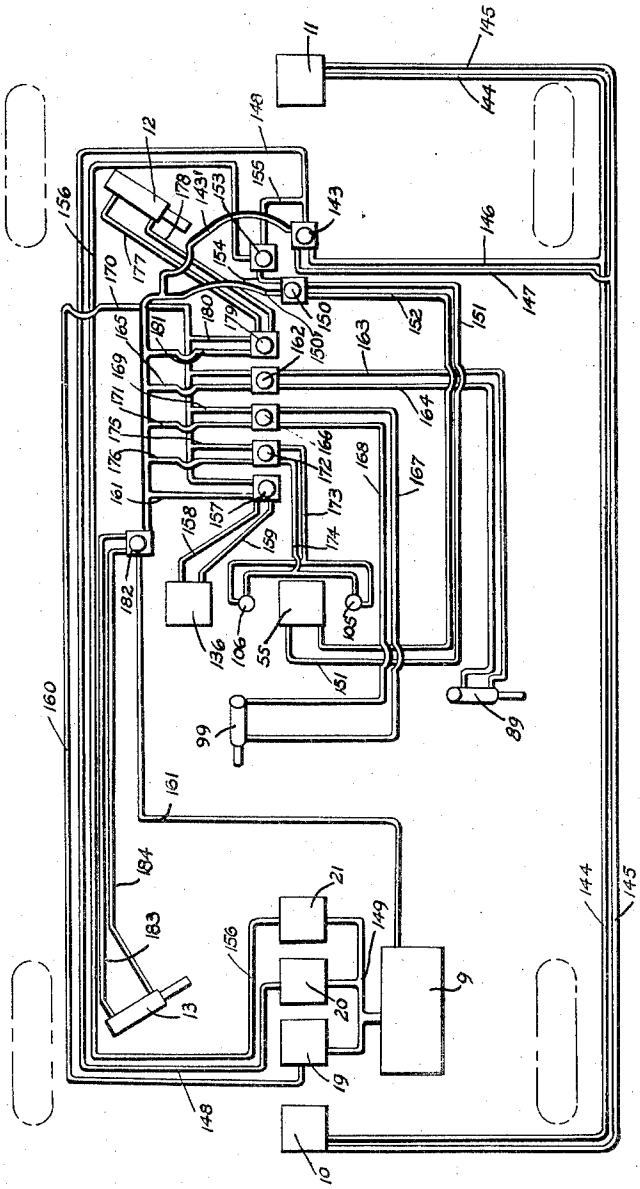
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COMPACTOR APPARATUS

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Fig. 11.



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2,852,992

COMPACTOR APPARATUS

Wayne W. Simmonds, Tulsa, Okla., assignor to John H. Lucas, as trustee

Application November 28, 1955, Serial No. 549,353

8 Claims. (Cl. 94—49)

This invention relates to compactor apparatus, and more particularly to an apparatus for tamping dirt in ditches and other places in close proximity to the vehicle supporting the apparatus and for breaking pavement and the like.

The principal objects of the present invention are to provide a mobile vehicle upon which is pivotally mounted a frame for supporting a vertical frame which may be tilted longitudinally of the main frame and transversely thereof; to provide means for mounting a ram on the vertical frame upon the end of which is a head for contacting the pavement or earth; to provide hydraulic means for raising and lowering the vertical frame carrying the ram with respect to the main frame to raise and lower the ram with respect to the work encountered; to provide hydraulic means for adjusting the frame laterally of the vehicle to maintain the frame in horizontal position when the wheels of the vehicle encounter uneven ground; to provide lateral extensions on the main frame; to provide track means on said lateral extension for movement of the vertical frame laterally of the main frame so that the ram and impactor elements may be operated from the side of the vehicle; to provide extensions for the track means on the lateral frame for movement of the driving elements, including the vertical frame, to one side of the vehicle; to provide hydraulic means for movement of the vertical frame on said lateral tracks; to provide a movable support for the lateral extensions to the side of the vehicle; to provide such support with means for driving the mobile support to carry said mechanism alongside of the tractor when the tractor is moving; to provide means on the vertical frame for mounting the ram and driving the same in hammer-like movements; to provide a belt and pulley mechanism for connection to helve links for movement of the ram in vertical movements; to provide a hydraulic pump for supplying fluid from a source of supply carried by the vehicle to the various hydraulic means for movement of the vertical frame fore and aft and laterally of the main frame and for movement of the vertical frame laterally of the main frame on the track mechanism; to provide hydraulic means for movement of the tractor proper and for supplementing such hydraulic means for operation of the hammer; and to provide control means for operation of said hydraulic means as desired.

Other objects of the invention are to provide a motor on top of the vertical frame and movable therewith having a belt and pulley connection with pulleys for raising and lowering the ram in successive hammer blows; to provide a swivel frame for the hammer and ram; to provide guide means for the ram; to provide links connecting the ram with the links on the pulleys driven by the motor on the vertical frame; to provide driving means for the lateral carriage assembly to move the vertical frame laterally on the lateral extensions of the frame; to provide means for connecting the lateral extensions to the rack of the lateral means on the frame, and to provide a device of this character simple and economical to manufacture.

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 perspective view of my invention with the motors in disassembled relation.

Fig. 2 is a vertical cross sectional view of the ram and its helve linkage connection with the driving mechanism taken on a line 2—2, Fig. 3.

Fig. 3 is a vertical cross sectional view taken on the line 3—3, Fig. 4.

Fig. 4 is a sectional plan view taken on the line 4—4, Fig. 2.

Fig. 5 is a sectional view particularly illustrating the extensions on the lateral frame showing the wheel arrangement for movement of the extension along with the mobile unit.

Fig. 6 is a sectional view taken on the line 6—6, Fig. 5.

Fig. 7 is an end view of the wheel arrangement for the end of the extension.

Fig. 8 is an enlarged fragmentary view of the track arrangement and its connection to the lateral extensions.

Fig. 9 is a view similar to Fig. 8, showing the connection when the extension is down-grade.

Fig. 10 is a disassembled view showing the mechanism for placement of the frame with respect to the wheels of the vehicle to keep the frame in horizontal position.

Fig. 11 is a diagrammatic view of the hydraulic pumps, motors, valve and line arrangement for operation of the apparatus.

Referring more in detail to the drawings:

1 designates a vehicle, such as a tractor or the like, having a plurality of wheels 2, axles 3 and 4 for supporting outer ends of longitudinal frame members 5 and 5', as shown to be cicrular formation and may be of a tube, if desired, upon which is mounted a platform 6 by brackets 7 and 8 rigidly secured to the member 5 by welding or other suitable means. The vehicle is hydraulically driven, 9 representing a tank (Fig. 11) for a supply of fluid and motors 10 and 11 are mounted on each end of the vehicle for driving the wheels 2 through suitable connection, as will later be described. The vehicle is steered hydraulically by hydraulic cylinders 12 and 13 through steering wheel 14 mounted on the platform 6 through suitable connection (not shown) to the wheel. A seat 15 is also mounted on the platform for the operator of the vehicle.

A platform 16 is mounted on the rear portion of the vehicle by brackets or the like 17 and mounted thereon is an engine 18 with a housing 18' and pumps 19, 20 and 21 for operating the hydraulic motors of the vehicle, as later described. 21' designates a cover for the pumps.

The inner ends of the longitudinal frame members 5 and 5' are spaced apart and rigidly mounted between the ends of the tubular members 5 and 5' is a substantially rectangular shaped frame forming substantially U-shaped members 22 and 23 extending laterally of the frame members 5 and 5', illustrated to be of tubular formation and mounted between the platforms 6 and 16. The U-shaped frame members and longitudinal frame may be tubular and utilized as a reservoir for fluid supply, if desired. Mounted on the members 22 and 23 and extending transversely of the vehicle are channel trackways 24 and 25 and on the upper faces thereof are mounted gear racks 26 and 27.

28 designates a ram or shaft for a hammer head 29 for breaking the pavement or the like and in order to movably mount the hammer on the vehicle, I provide a carriage frame 30 having side brackets 31 and 32 and ends 33 and 34. Movably mounted inside the upper parts of the side brackets 31 and 32 by pins 35 or the like, as in-

dicated at 35', is a hammer swivel frame 36 consisting of U-shaped side members 37 and ends 38 for a purpose later to be described. Mounted on the respective side brackets 31 and 32 near the ends 33 and 34 are rollers or wheels 39 and 40 adapted to engage in the trackways 24 and 25 for movement of the carriage on said trackways. The wheels are mounted on the shafts 41 and 42 carried in the respective corners of the side bracket arms 31 and 32. Movably mounted upon the respective ends 38 of the swivel frame 36 by pins 43 or the like are U-shaped members 44 and 44' of a hammer frame 43'. The U-shaped members are spaced from the ends 38 by blocks 45. The hammer frame 43' has rigidly mounted on the arms of the U-shaped members 44 and 44', spaced elongated, vertically extending angle members or guides 46 and 47 defining ways therebetween. Slidably arranged inside the angle members 46 and 47 respectively are plates 48 and 49 of a ram frame 50, said side plates having side edges engaged in said ways and having their lower ends connected by side braces 50'. Rigidly mounted on the upper ends of the plates 48 and 49 on the respective sides thereof are angle-shaped members 52 and 53 upon which is mounted a head plate 54 which connects said angle shaped members 52 and 53 and supports a motor 55 having a shaft 56 extending from each side thereof for mounting pulleys 57 and 58 having V-shaped grooves.

Secured to the upper edge of the respective plates 48 and 49 are bearings 59 for shafts 60 and 60' upon which are mounted spaced pulleys or crank plates 61 and 62. The pulleys also have a plurality of grooves, as indicated at 63, and adapted to run over the pulleys 57 and 58 and 61 and 62 are V-belts 64 and 65 rotating the pulleys 61 and 62 from the operation of the motor 55. A pair of channel guide members 66 and 67 are secured to the inside of the plates 48 and 49 near the lower end of said members and in which the ram 28 is adapted to engage and be reciprocated. The ram is provided near its upper end and on each side thereof, with outwardly extending ears 69 and 70. Helve links 71 and 72 are provided having one end pivotally attached to the ears 69 and 70 by pins or the like 73 and their other end pivotally attached by bolts or the like 74 to arms 75 and 76. The upper ends of said arms are pivotally secured to arms 77 and 78, the center of which is sleeved over a pin 79 extending through and carried by one side edge of the pulleys or crank plates 61 and 62, the arms 75 and 76 being secured to the arms on the pin 79 by pins or the like 80. The arms work in the space between the pulleys 61 and 62. A helve spring 81 has its respective ends engaging in keepers 82 on the respective inner sides of the arms 75 and 76, as best illustrated in Fig. 2. The arms 77 and 78 have a sleeve bearing, as indicated at 83 (Fig. 2) so that the arms are loosely mounted on the pin 79. The tamper foot or head 29 is mounted on the lower end of the ram by tapered pins, as indicated at 85.

The end plate 33 of the carriage frame 30 has an outwardly extending arm 86 adapted to receive the end of a piston rod 88 of a cylinder 89 having its upper end pivotally attached to outwardly extending ears 90 secured to a bracket 91 on the outside of the vertical angle members 46 and 47. The piston and the cylinder 89 are operated by fluid from pump 19 for swinging movement of the swivel frame together with the hammer frame transversely of the vehicle when it is desired to use the hammer when the frame of the vehicle is setting at an angle. By straightening of the hammer frame to the vertical through operation of the hydraulic cylinder, this may be accomplished. The swivel frame is pivoted on pins or bolts 35 secured in the top of the side brackets 31 and 32 and through the side arms 37 of the swivel frame 36.

The hammer frame 43' which consists of U-shaped members 44 and 44', and angle members or guides 46 and 47, may also be rotated or moved longitudinally of the vehicle or slanted longitudinally of the vehicle on pins 43 extending through the ends 38 of the swivel frame

36 and the U-shaped members 44 and 44' which are rigidly secured to the angle members 46 and 47, the pins 43 forming a bearing for rotation of the hammer frame. This movement of the hammer frame together with the ram frame 50, fore and aft is accomplished by a cylinder 99 having its end pivotally secured to ears 100 extending outwardly from a bracket 101 having its ends secured to the side of said vertically extending angle members 46 and 47, as best illustrated in Fig. 2. The cylinder has a piston rod 102 having its lower end pivotally secured to ears 103 mounted on one of the side members 37 of the swivel frame 36, as best illustrated in Fig. 2. Fluid from pump 19 will operate the piston in the cylinder to move the hammer frame fore and aft of the vehicle.

The ram frame 50 which consists of the plates 48 and 49, side braces 50', angle members 52 and 53, head plate 54, guide members 66 and 67 and plates 107 and 108 which connect the upper ends of the angle guide members 52 and 53. The ram frame may be raised and lowered together with ram 28 with respect to the carriage by means of hydraulic cylinders 105 and 106 having their upper ends secured to outwardly extending ears 107' and 108' on the plates 107 and 108, as best illustrated in Fig. 3. The cylinders 105 and 106 are provided with pistons having rods extending downwardly and pivotally secured to outwardly extending ears 109 and 110 secured to the lower ends of the plates 48 and 49. By operating the cylinders 105 and 106, they will cause the plates which carry the pulleys 61 and 62 and the angle-shaped members 52 and 53 carrying the plate 54 and motor 55 to be raised and lowered within the vertically extending angle members or guides 46 and 47 to regulate the distance of the hammer from the object to be contacted, either the pavement or earth material which it is adapted to strike.

The axles 3 and 4 of the vehicle are housed within housings 111 and 112 connected by plates 113 and 114, the centers of which are provided with plane surfaces, as indicated at 115, and are provided with openings adapted to receive pins 116 extending through aligned openings in ear-like members 117 which are extended from walls 117' on housings 118 and 118' turnably secured to the longitudinal frame member 5, as now to be described. Rigidly secured to the ends of the housing 118' by welding or other suitable means is a collar 119 having an upwardly extending arm 120 with pivoted ears 121 adapted to receive the end of a hydraulic cylinder 122 having piston rod 123 with their ends attached to ears 124 of an arm 125 welded or otherwise suitably secured to a collar or ring 126 on the longitudinal frame member 5', as best illustrated in Fig. 10. The cylinder 122 is connected to the pump 19 as later described, whereby said cylinder 122 may be operated to extend or retract the piston rod 123. Extension or retraction of piston rod 123 moves arm 125 which rotates the longitudinal frame member 5' and thereby members 22, 23 and 5 about the longitudinal axis through the longitudinal members 5 and 5'. Said rotation is relative to axles 3 and 4 due to arm 120 being fixed to collar 119 on housing 118'. The forward end of the longitudinal member 5 is provided with an enlarged ring or collared end 127 which engages against a collar 128 of the housing 118 similar to the ring or collar on housing 118'. The ears 121 and 124 have pins 121' and 124' extending outwardly therefrom adapted to engage in openings 127' in the ends of a plate 128' for locking the main frame in position.

The ends of the longitudinal members 5 and 5' are provided with closure plates 130 which are of a slightly larger diameter than the frame members and are rigidly secured to the frame members by means of bolts 131 or the like. The ends 129 extend into the housings 118 and 118' and through the collars 119 and 128. The ends also extend through an opening 132 in the walls 117' and are kept in place by the closure plates 130, in other words, the housings 118 and 118' are retained between the col-

lars **126** and **127** of the ends **129** and the closure plates **130** respectively.

The hydraulic cylinders **12** and **13**, provided for steerage of the vehicle, are mounted between the housings **118** and **111** and housings **118'** and **112**. The upper part of the cylinders is pivotally mounted on extending ears **133** on the housing **111** and **112** and the piston rods having connection to ears **134** on the housings **118** and **118'**. In Fig. 10, I have only shown the mounting of the steering cylinder **12** but the connection of the cylinder **13** to the front axle and the longitudinal frame **5** would be similar.

The plate **135** is secured on the end **34** of the hammer carriage **30** and mounted thereon is a motor **136** having shafts **137** and **138** extending to the gear rack **26** and **27** and mounted on the shafts are gears **139** and **140** adapted to engage the teeth **141** on said gear racks for movement of the carriage longitudinally of said racks and laterally of the frame.

The hydraulic fluid system for operating the vehicle and the hammer mechanism, as well as the drilling arrangement, as partly above described, is diagrammatically illustrated in Fig. 11 wherein the operating arrangement for the valves may be mounted on the platform **6** near the driver's seat **15**, as indicated at **142**.

Referring specifically to Fig. 11, **143** designates a valve for operating the vehicle driving motors **10** and **11** and are connected by lines **144** and **145** to branch lines **146** and **147**. Line **148** leads from the valve **143** to the pump **20** having connection with a line **149** which leads to the fluid supply tank **9**.

A valve **150** connects with motor **55** through lines **151** and **152**. The valve also connects with a two-way valve **153** through line **154**. Valve **153** has connection with line **148** through line **155** and also connects with the pump **21** through line **156** which also connects with line **149** leading to the supply tank **9**. The operation of the motor **55** will cause the belts **64** and **65** operating over pulleys or crank plates **61** and **62** to rotate said crank plates thereby causing the ram **28** with the hammer or tamper foot thereon to be raised through the helve arms **75** and **76** and links **71** and **72**, respectively. By regulating the speed of the motor **55**, the speed of the hammer may be regulated to suit the user. It will be noted valves **143** and **150** have return lines **143'** and **150'** connecting with line **161** for return of fluid to the tank **9**.

A valve **157** connects with motor **136** through lines **158** and **159** to move the carriage on the gear racks **26** and **27**. Valve **157** has a line **160** leading to the pump **19** which in turn is connected to the reservoir tank **9** through line **149**. Valve **157** also has a return line **161** leading back to the tank.

The cylinder **89** is connected to a valve **162** through lines **163** and **164**. The valve **162** also connects with line **160** which leads to pump **19**. The valve is also connected with line **161** through line **165**. Cylinder **99** is connected to a valve **166** through lines **167** and **168** which valve also connects with the line **170** through branch line **169** to line **160** leading to pump **19** and also connects with the return line **161** through line **171**. The cylinder **89** is for tilting the hammer frame transversely while the cylinder **99** is for tilting the hammer frame longitudinally of the vehicle.

The cylinders **105** and **106** are connected to the valve **172** through lines **173** and **174** and the valve is also connected to line **160** leading to pump **19** through line **175** and to the return line **161** by branch line **176**. The cylinders are the vertical cylinders that raise and lower the hammer frame.

The cylinder **12** has lines **177** and **178** connected to a valve **179** which has a branch line **180** leading to line **160** which is connected with the pump **19**. A line **181** is connected to the return line **161** leading to the supply tank **9** by a valve **182** for the steering cylinder **13**. The cylinder **13** has lines **183** and **184** leading to the valve **182** having connection with line **161** and line **181** to the valve **179** and through line **180** to line **160** leading to pump **19**. The valves are operated for steering the front and rear wheels independently of each other.

The cylinder **122** (not shown in Fig. 11) will also have similar lines leading to a valve mounted on the platform **6** and connections to the pump **19** and supply tank **9** for operation of the cylinder for controlling the tilting of the frame with respect to the vehicle.

An extension rack **200** may be provided for connection to one side of the gear racks **26** and **27** by extension of U-shaped frame **201** having channel-shaped side arms **202** so that the wheels or rollers **39** and **40** may travel therein. The extension is connected to the main gear rack by a hinge member **203** which comprises arms **204** and **205** connected at their ends by pin **206**, as best illustrated in Fig. 9, that the extension may be extended horizontally or it may be elevated upwardly or lowered downwardly from the plane of the main gear rack, as desired. In order to lend support to the extension, I attach to the carriage frame standards **207** and **208** having brace arms **209** and **210** provided with top plate **211** to which are attached chains or the like **212** having their outer ends secured to plates **213** mounted on the end **214** of the extension.

Fig. 8 has illustrated a hinge member having the arms in vertical position and which if it is desired to have the extension elevated upwardly, the upper arm is used for the pin member, and indicated at **215**, and the lower opening used when the extension is desired to be used at a lower elevation than the main rack.

This form of hinge, as illustrated in Fig. 5, wherein an elongated rack member **216** is used having the same channel members for the wheels on the carriage member and gear rack as in the main gear rack mechanism. On the outer end of the extension **216** is a frame **217** having spaced axles **218** and **219** for mounting wheels **220** and **221**. The frame includes a mounting **222** for a motor **223** having a chain and sprocket connection **224** with the axle **218**, as illustrated in Figs. 5 and 7, for driving of the outer end of the extension along with the vehicle when the vehicle is being moved so as to prevent side draft on the extension.

In operation of the apparatus assembled and constructed as described, the vehicle may be moved by operation through the motors **10** and **11** by operation of pump **20**. The operation of the two-way valve **153**, which has connection with pump **21**, may be utilized for moving the vehicle. Also, the operation of the two-way valve **153**, which has connections through lines **155** and **148** with pump **20**, this pump may also be utilized for operating the hammer through motor **55**.

It will be obvious from the foregoing that I have provided an improved apparatus on the hydraulic driven vehicle with a fluid medium supply on the vehicle for movement of the vehicle; hydraulic means for movement of the carriage frame on the vehicle frame in transverse and fore and aft position with respect to the vehicle, as well as for movement of the hammer frame in the main vertical frame for raising and lowering the tamping head with respect to the work. By utilizing the hydraulic means for moving the tamping ram and head in various positions and for movement of the carriage laterally of the vehicle, I have provided an extremely mobile device and further the extensions on the lateral portions of the frame enable use of the hammer at a distance to the side of the vehicle, either in a raised or lowered position.

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

1. A compactor of the character described comprising, a mobile vehicle including a frame having spaced portions extending laterally of the direction of travel of the vehicle, a carriage mounted on the frame, a swivel frame pivotally mounted on the carriage for tilting movement laterally of the vehicle, opposed pairs of spaced vertical

members pivotally mounted on the swivel frame for tilting movement longitudinally of said vehicle, said spaced vertical members defining ways therebetween, a ram frame mounted in the ways for travel therein and including vertically extending plates engaged in the ways and a head connecting the upper ends of said plates, extensible means between the ram frame and ways for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the mobile vehicle frame, a motor on the head, means operably connecting the motor to the ram whereby operation of the motor alternately raises and lowers the ram relative to the ram frame, and extensible hydraulic means between the swivel frame and carriage for tilting the swivel frame about its mounting relative to the carriage.

2. A compactor of the character described comprising, a mobile vehicle including a frame having spaced portions extending laterally of the direction of travel of the vehicle, a carriage mounted on the frame, said carriage having vertical standards on two opposite sides thereof, a swivel frame pivotally mounted on the standards for tilting movement laterally of the vehicle, opposed pairs of spaced vertical members pivotally mounted on the swivel frame for tilting movement longitudinally of said vehicle, said spaced vertical members defining ways therebetween, a ram frame mounted in the ways for travel therein and including vertically extending plates engaged in the ways and a head connecting the upper ends of said plates, extensible means between the ram frame and ways for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the mobile vehicle frame, a motor on the head, means operably connecting the motor to the ram, said means including pulleys mounted on said ram frame having driving connection with said motor, a crank pin on the pulleys, links connected with said crank pin and said ram whereby operation of the motor alternately raises and lowers the ram relative to the ram frame, and extensible hydraulic means between the swivel frame and carriage for tilting the swivel frame about its mounting relative to the carriage.

3. A compactor of the character described comprising, a mobile vehicle including a frame having spaced portions extending laterally of the direction of travel of the vehicle, a carriage mounted on the frame, means for moving said carriage laterally on the lateral frame portions, said carriage having vertical standards on two opposite sides thereof, a swivel frame pivotally mounted on the standards for tilting movement laterally of the vehicle, opposed pairs of spaced vertical members pivotally mounted on the swivel frame for tilting movement longitudinally of said vehicle, said spaced vertical members defining ways therebetween, a ram frame mounted in the ways for travel therein and including vertically extending plates engaged in the ways and a head connecting the upper ends of said plates, extensible means between the ram frame and ways for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the mobile vehicle frame, a motor on the head, hydraulic means for operating said motor, means operably connecting the motor to the ram, said means including pulleys mounted on said ram frame having driving connection with said motor, a crank pin on the pulleys, links connected with said crank pin and said ram whereby operation of the motor alternately raises and lowers the ram relative to the ram frame, extensible hydraulic means between the swivel frame and carriage for tilting the swivel frame about its mounting relative to the carriage, and extensible hydraulic means between the spaced vertical members and swivel frame for tilting the spaced vertical members and ram frame relative to the swivel frame.

4. A compactor of the character described comprising, a mobile vehicle having axles and a frame of aligned longitudinal tubular members, said members having U-

shaped lateral extensions rigidly secured to the adjacent ends thereof substantially midway between the axles, means for rotating the longitudinal tubular members about a longitudinal axis through said members and which rotation is relative to the axles, a carriage mounted on the U-shaped extensions, means for moving said carriage on the extensions laterally of the vehicle, said carriage having vertical standards on two opposite sides thereof, a swivel frame pivotally mounted on the standards for tilting movement laterally of the vehicle, opposed pairs of spaced vertical members pivotally mounted on the swivel frame for tilting movement longitudinally of said vehicle, said spaced vertical members defining ways therebetween, a ram frame mounted in the ways for travel therein and including vertically extending plates engaged in the ways and a head connecting the upper ends of said plates, extensible means for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the mobile vehicle frame, a motor on the head, hydraulic means for operating said motor, means operably connecting the motor to the ram, said means including pulleys mounted on said ram frame having driving connection with said motor and a crank pin on the pulleys, links connected with said crank pin and said ram whereby operation of the motor alternately raises and lowers the ram relative to the ram frame, extensible hydraulic means between the swivel frame and carriage for tilting the swivel frame about its mounting relative to the carriage, and extensible hydraulic means between the spaced vertical members and swivel frame for tilting the spaced vertical members and ram frame about the said spaced vertical members mounting relative to the swivel frame.

5. A compactor of the character described comprising, a mobile vehicle including a frame having spaced portions extending laterally of the direction of travel of the vehicle, trackways including gear racks extending laterally of the frame on the said lateral portions, a carriage having wheels engaged in said trackways, a swivel frame pivotally mounted on said carriage for tilting movement laterally of the vehicle, means between the swivel frame and carriage for tilting said swivel frame relative to the carriage, opposed pairs of spaced vertical members on the swivel frame and defining ways therebetween, a ram frame slidably mounted in said ways and including plates engaged in the ways, a head connecting the plates at their upper end, extensible means for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the vehicle frame, a motor on said head, means operatively connecting said motor to said ram, hydraulic means for operating said motor whereby operation of the motor alternately raises and lowers the ram relative to the ram frame, extension trackways having gear racks for extending outwardly of the first named trackways and gear racks, hinge means for removably and pivotally mounting said trackway extensions on said first named trackways, means for moving said carriage along said trackways and trackway extensions whereby said swivel frame and spaced vertical extending members and ram frame carried thereby may be moved laterally to the side of the mobile vehicle, ground engaging wheels on the outer ends of said extensions for supporting same, and means for driving said ground engaging wheels for movement of said extension simultaneously with the movement of the mobile vehicle.

6. A compactor of the character described comprising, a mobile vehicle having axles and a frame of aligned tubular members, said members having U-shaped lateral extensions rigidly secured to the adjacent ends thereof substantially midway between the axles, means between said frame and axles for rotating the longitudinal tubular members about a longitudinal axis through said members and which rotation is relative to the axles, trackways including gear racks extending laterally of the frame on

said lateral extensions, a carriage having wheels engaging in said trackways, said carriage having vertical standards on two opposite sides thereof, a swivel frame pivotally mounted on the standards for tilting movement laterally of the vehicle, opposed pairs of spaced vertical members pivotally mounted on the swivel frame for tilting movement longitudinally of said vehicle, said spaced vertical members defining ways therebetween, a ram frame mounted in the ways for travel therein and including vertically extending plates engaged in the ways, a head connecting the upper ends of said plates, extensible means for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the vehicle frame, a motor on the head, means operatively connecting the motor to the ram whereby operation of the motor alternately raises and lowers the ram relative to the ram frame, extensible hydraulic means between the swivel frame and carriage for tilting the swivel frame about its mounting relative to the carriage, extensible hydraulic means between the spaced vertical members and swivel frame for tilting the spaced vertical members and ram frame relative to the swivel frame, extension trackways having gear racks for extending outwardly of the first named trackways and gear racks, hinge means for removably and pivotally mounting said trackway extensions on said first named trackways, means for moving said carriage along said trackways and trackway extensions whereby said swivel frame and spaced vertical extending members and ram frame carried thereby may be moved laterally to the side of the mobile vehicle, ground engaging wheels on an outer end of said extensions for supporting same, and means for driving said ground engaging wheels for movement of said extensions simultaneously with the movement of the mobile vehicle.

7. A compactor of the character described comprising, a mobile vehicle having axles and a frame of aligned longitudinal tubular members, said members having U-shaped lateral extensions rigidly secured at the adjacent ends thereof substantially midway between the axles, extensible means between the frame and axles for rotating the longitudinal tubular members about a longitudinal axis through said members and which rotation is relative to the axles, trackways including gear racks extending laterally of the frame on said lateral extensions, a carriage having wheels engaging in said trackways, said carriage having vertical standards on two opposite sides thereof, a swivel frame pivotaly mounted on the standards for tilting movement laterally of the vehicle, opposed pairs of spaced vertical members pivotally mounted on the swivel frame for tilting movement longitudinally of said vehicle, said spaced vertical members defining ways therebetween, a ram frame mounted in the ways for travel therein and including vertically extending plates engaged in the ways, a head connecting the upper ends of said plates, extensible means for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the vehicle frame, a motor on the head, hydraulic means for operating said motor, pulleys mounted on the said ram frame having driving connection with said motor, a crank pin on the pulleys, arms pivotally mounted on said crank pin, links connecting the said arms to the upper end of the ram whereby operation of the motor alternately raises and lowers the ram relative to the ram frame, extensible hydraulic means between the swivel frame and carriage for tilting the swivel frame about its mounting relative to the carriage, extensible hydraulic means between the spaced vertical members and swivel frame for tilting the spaced vertical members and ram frame about the said vertical members mounting relative to the swivel frame, extension trackways having gear racks for extending outwardly of said first named trackways and gear racks, hinge means for removably and pivotally mounting said trackway extensions on said first named trackways, means for moving said carriage along said trackways and trackway extensions whereby said swivel frame and spaced vertical extending members and ram frame carried thereby may be moved laterally to the side of the mobile vehicle, ground engaging wheels on an outer end of said extensions for supporting same, and means for driving said ground engaging wheels for movement of said extensions simultaneously with the movement of the mobile vehicle.

8. A pavement breaker of the character described carried by a mobile vehicle comprising, a frame on said vehicle having an open bay in substantially the center thereof, supports movably mounted on said frame above said open bay, opposed pairs of spaced vertical members pivotally mounted on said movable supports above said open bay, said spaced vertical members defining ways therebetween, a ram frame mounted in the ways for travel therein and including vertically extending plates engaged in the ways, a head connecting the upper ends of said plates, extensible means for moving the ram frame in said ways, a ram mounted in the ram frame and extending downwardly of the vehicle frame into the said open bay, a motor mounted on said head and having a shaft extending laterally therefrom, spaced pulleys on said shaft, spaced pulleys mounted on said ram frame between the plates, a crank pin on said last named pulleys, an arm member sleeved on the said crank pin, spaced arms each having one end secured to said sleeved arm member, a pair of links, means securing said links to the upper end of the ram and their free ends to the other ends of said last named arms, hydraulic means for operating the motor whereby operation of the motor alternately raises and lowers the ram relative to the ram frame through the said open bay, and extensible hydraulic means between said movable supports and the vertical members for tilting the vertical members and ram frame about the pivotal mounting of said spaced vertical members.

References Cited in the file of this patent

UNITED STATES PATENTS

110,010	Case	Dec. 13, 1870
569,573	Buchanan	Oct. 13, 1896
2,438,159	Faber	Mar. 23, 1948
2,659,584	Dorkins	Nov. 17, 1953
2,731,892	Simmonds	Jan. 24, 1956
2,732,197	Cornett	Jan. 24, 1956