

June 14, 1960

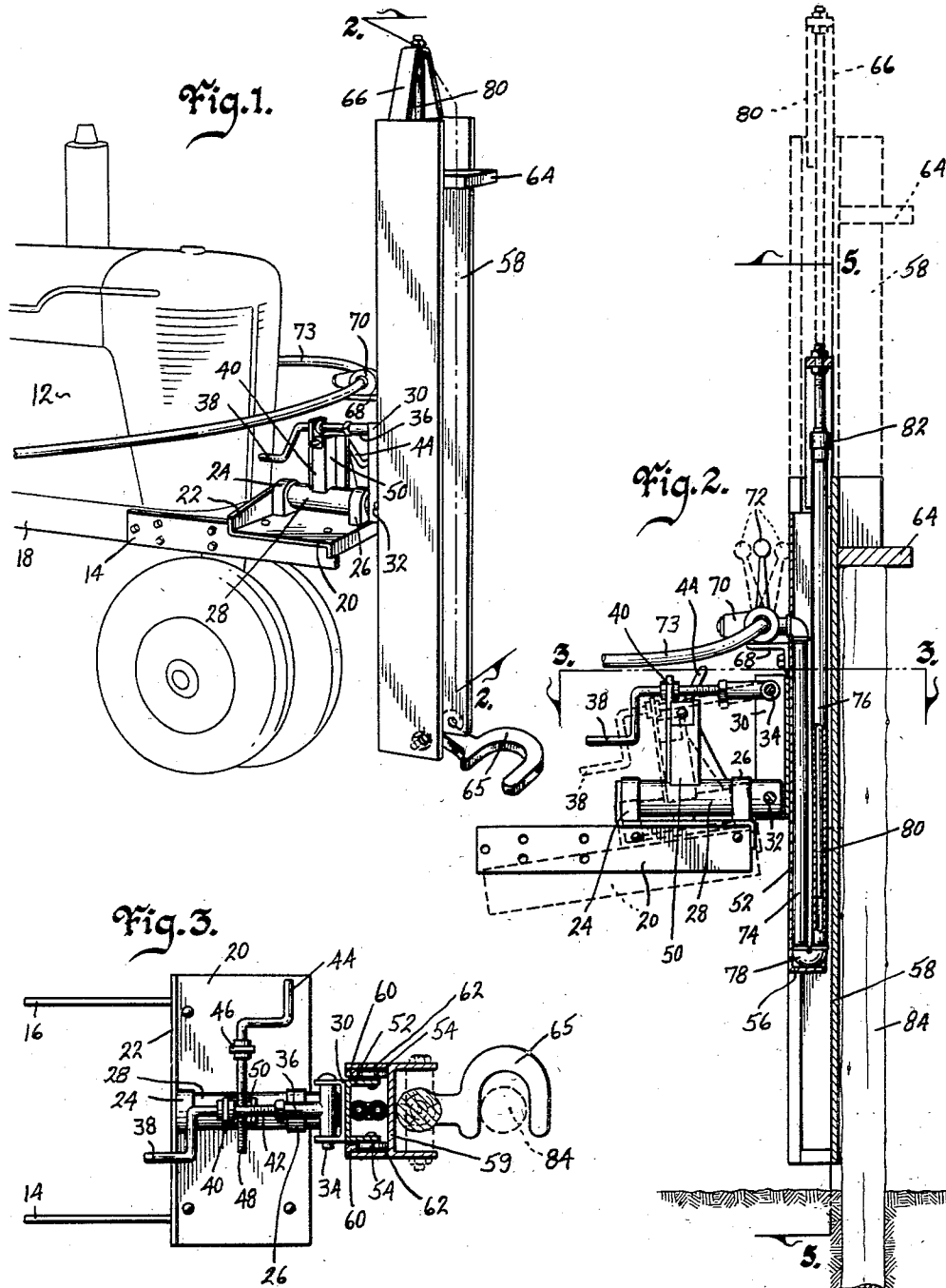
G. F. SHAVER

2,940,267

POST DRIVER AND PULLER

Filed April 27, 1953

3 Sheets-Sheet 1



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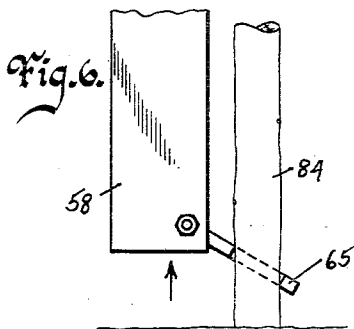
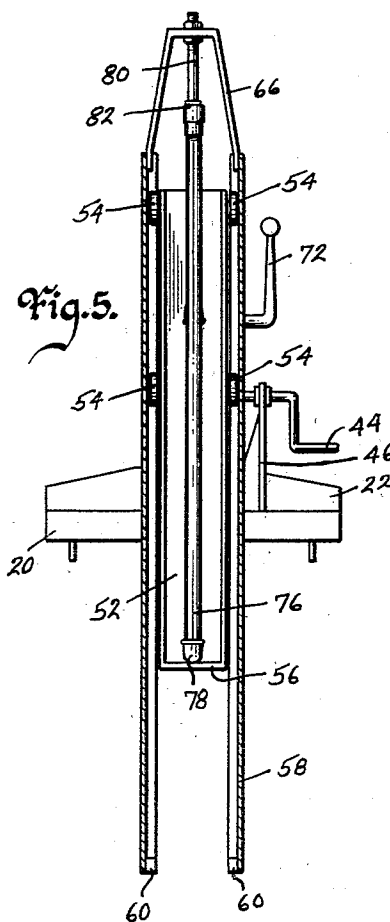
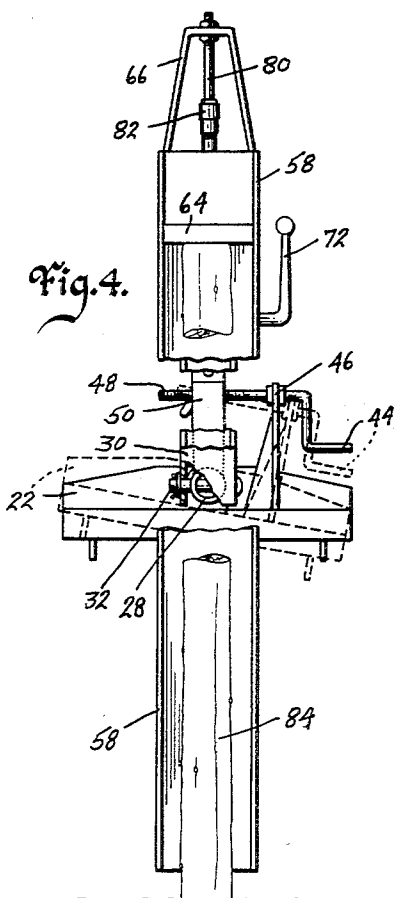
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POST DRIVER AND PULLER

Filed April 27, 1953

3 Sheets-Sheet 2



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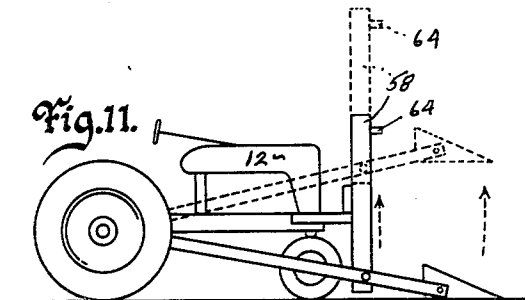
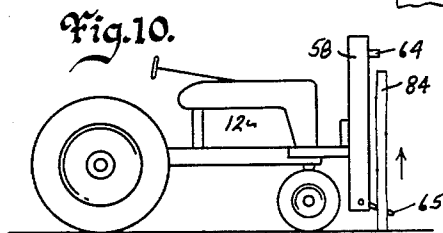
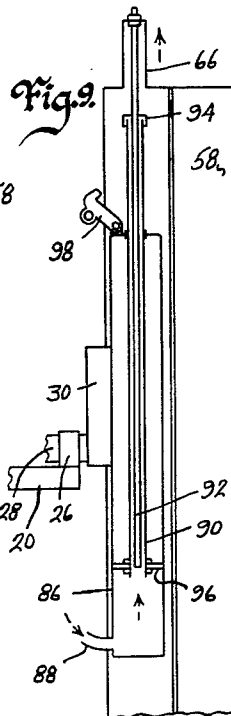
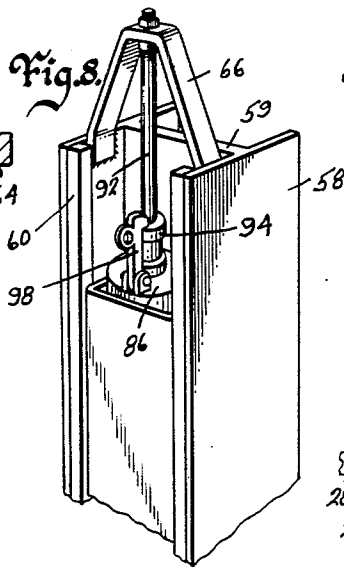
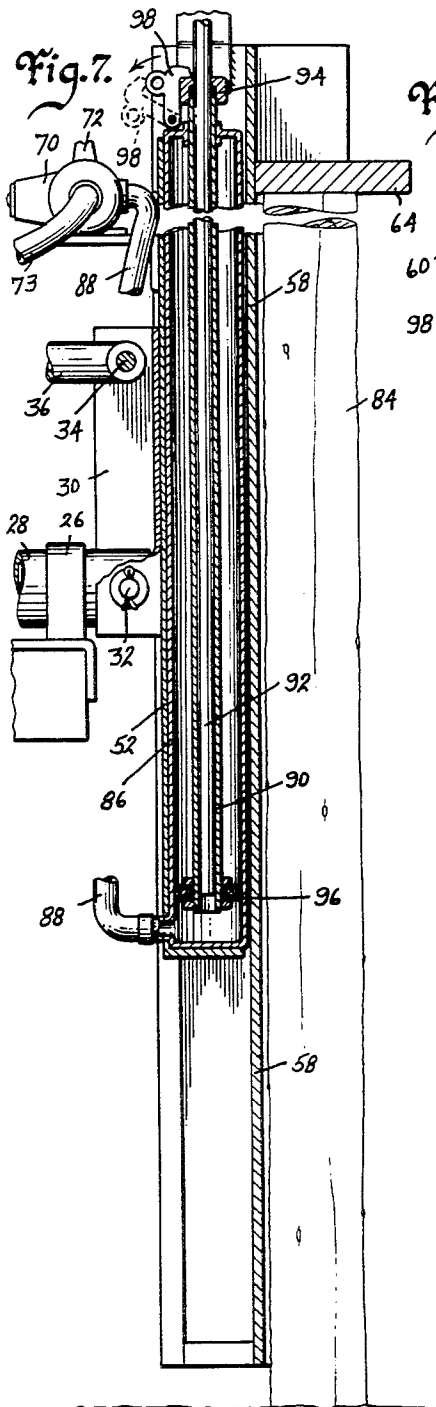
June 14, 1960

G. F. SHAVER
POST DRIVER AND PULLER

2,940,267

Filed April 27, 1953

3 Sheets-Sheet 3



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2,940,267

POST DRIVER AND PULLER

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Filed Apr. 27, 1953, Ser. No. 351,222

11 Claims. (Cl. 61—73)

My invention relates to improvements in post drivers and has for one of its important objects the providing of a post driver that may also be adapted to post pulling.

Another object of this invention is to provide my invention with means adaptable to a tractor for using the same as a load lifting mechanism.

A further important object of my invention is to provide a post driver that utilizes the force of a percussion driving block for driving the post and which has a pulling or lifting force provided by the use of a hydraulic piston and cylinder. In this respect the lifting force is also utilized in raising the driving block to its position of release for its percussion contact.

Still another object of my invention is to adapt the same for tractor mounting and with suitable adjusting means for maintaining it in vertical position when on uneven ground.

These and other objects will be apparent to those skilled in the art.

My invention consists in the construction, arrangement, and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, and specifically pointed out in my claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of a preferred embodiment of my invention shown mounted on a tractor,

Fig. 2 is a longitudinal section view of this invention taken on the line 2—2 of Fig. 1,

Fig. 3 is a top plan view of the adjusting means on this invention and a cross sectional view of my driving assembly taken from the line 3—3 of Fig. 2,

Fig. 4 is a front view of this device partly broken away to more fully illustrate its construction,

Fig. 5 is a longitudinal section view taken on the line 5—5 of Fig. 2,

Fig. 6 is a fragmentary elevational view of the bottom of my driving mechanism to illustrate the position of a pulling claw or hook,

Fig. 7 is a modified form of a hydraulic piston arrangement shown in a longitudinal sectional view.

Fig. 8 is a fragmentary enlarged perspective view of the top of this invention to illustrate my locking means for providing a selective means of varying the hydraulic lifting force,

Fig. 9 is a diagrammatic view illustrating the operation of my modified driving assembly, and

Fig. 10 and Fig. 11 are diagrammatic views illustrating the use of my invention as a post puller and a lifting mechanism respectively.

Referring to the drawings a tractor is shown generally at 12 to illustrate a preferred means of mounting my invention although it will be understood that the same may be placed on a trailer or on any other suitable place. A pair of spaced mounting brackets 14 and 16 are secured to the respective front sides of the tractor frame 18 and extend forwardly thereof to carry the horizontal

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base plate 20 which has the rear upstanding flange 22. On base plate 20 in spaced relationship from rear to front are the respective bearing members 24 and 26 with member 24 abutting the flange 22 and member 26 being disposed at the forward edge of plate 20. Rotatably journaled in the members 24 and 26 is a support tube 28 that protrudes forwardly of member 26 as shown in Figs. 2 and 3. A relatively short carrier mounting channel member 30 is vertically positioned so that its bottom portion embraces the forward end of tube 28 and is secured thereto by means of a pin or bolt 32 (Fig. 4) that extends transversely through tube 28 at its forward end portion. Thus arranged, it will be appreciated that channel 30 will tilt sideways when tube 28 is rotated, and also that this channel will tilt forwardly and rearwardly on pin 32 independently of the rotation of tube 28.

At the top of channel 30 a pin 34 is pivotally disposed transversely of the channel sides and carries a rearwardly extending socket 36 that is internally threaded. A leveling crank 38 suitably mounted in a support 40 on tube 28 has an externally threaded shank 42 which engages socket 36 so that the rotation of crank 38 in different directions at times will tilt channel 30 rearwardly and forwardly respectively and in this respect it is pointed out that the point of support between crank 38 and plate 40 has sufficient play so that crank 38 can move in other than a direction parallel to tube 28. However, a pivotal or other suitable connection at this point may be employed to accomplish the rearward and forward tilt of the carrier channel without departing from the principle of this invention. A second leveling crank 44 mounted in a support 46 on base plate 20 has external threads 48 for engagement with complementary threads in a support 50 secured to tube 28 and is so arranged that cranks 38 and 44 are perpendicular to each other. Thus, rotation of crank 44 will rotate tube 28 to provide a lateral tilt to channel 30.

A carrier channel member 52, which is longer than the carrier mounting channel 30 is secured as by welding or the like thereto, back to back so as to extend both upwardly and downwardly therefrom as appears in Fig. 2. On the outer channel sides of member 52 I provide a plurality of carrier rollers 54 in vertical spaced relationship and at the bottom of channel 52 is the support plate 56. A hammer member 58 in the form of an elongated H beam is provided on the inner side of web 59 with slide rails 60 along one side (Fig. 3) whereby there is formed between each rail 60 and the web 59 of the H beam, the oppositely disposed tracks 62 and with a portion of side of the web 59 serving as a rail complementary to the rails 60. Thus arranged, the hammer 58 is vertically slidably mounted on the carrier channel 52 so that rails 60 and the web 59 of the H beam form a pair of rails at each side for riding over rollers 54. Near the top of hammer 58 and on the outer side of web 59 is a driving block 64 rigidly secured between and laterally protruding from the beam sides and near the bottom thereof on the outer side of the web and below block 64 I provide a removable vertically hingeable grappling claw or hook 65. The top of beam 58 carries an elevated lifting saddle 66 which may be of any suitable form and which I preferably illustrate as formed from a metal bar bent into the shape of an inverted modified U.

On carrier channel 52 above channel 30 is placed a bracket 68 on which is mounted an hydraulic control device valve 70 operated by the lever 72 and connected by hose 73 to a source of hydraulic pressure which in the drawings disclosed will be the tractor. Connected also to valve 70 is the cylinder or tube portion 74 which is disposed in channel 52 and extends from valve 72 downwardly. A second cylinder or tube 76 is arranged

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in channel 52 adjacent member 74 but is longer and protrudes from the top of channel 52. Both tubes 74 and 76 are connected at the bottom by a U-fitting 78, supported by plate 56, so that in effect they form one continuous conduit from valve 70. In tube 76 is placed a hydraulic piston 80 that is slidable through a suitable seal 82 and with its free end connected to the lifting saddle 66 as shown in Figs. 4 and 5.

Thus constructed and arranged, this invention will operate in the following manner. For post driving the claw 65 will be removed and the hammer positioned so that block 64 will be directly over any post 84 to be driven. If the ground is not level, the manipulation of cranks 38 or 46 or both as described in the description of the leveling structure will allow any compensation necessary so that hammer 58 is vertically disposed due to the fact that channels 30 and 52 are secured together. Hammer 58 is then elevated to its uppermost position by moving lever 72 forward so as to apply hydraulic pressure to piston 80. Pressure on piston 80 may be locked at any point by moving lever 72 to its solid line or center position and when hammer 58 is to be released, lever 72 is moved rearwardly which releases the hydraulic pressure. As this release is established, hammer 58 will drop by gravity as a dead weight to afford a percussion contact of the driving plate 64 against the top of the post 84. Hammer 58 is then elevated by hydraulic pressure as above described and the dropping of the hammer is repeated as many times as necessary. The distance between the bottom of the hammer 58 and the driving plate 64 will determine the height of the post above the ground so that all posts can be driven to a uniform height without specific markings or measuring.

Piston 80 may be relatively small in diameter since the weight of the hammer requires no great force for lifting and consequently relatively little fluid is used in creating the necessary pressure. As a result, as soon as hydraulic pressure is released, with the hammer in elevated position, fluid from cylinder 76 is immediately expelled through conduit 74 and valve 70 and offers no appreciable resistance to the dropping of the hammer.

The hydraulic power used for elevating the hammer can be utilized for post pulling by attaching the claw 65 as described so as to frictionally grip the post as illustrated in Fig. 6. In this respect it will be appreciated that the smaller the diameter of piston 80, the less hydraulic pressure will be required to raise hammer 58 and consequently the maximum pounds pressure of a small piston may be insufficient at times to pull some posts. Therefore, I have shown a modified structure for increasing the hydraulic pressure so that this invention can be fully utilized not only for its primary function of driving posts, but also for pulling posts or as a lifting mechanism illustrated in Figs. 10 and 11 respectively.

Referring now to Figs. 7, 8 and 9, I have mounted within carrier channel 52, the cylinder 86 connected at the bottom to a hose 88 which in turn connects to valve 70. Concentrically slidably arranged within cylinder 86 is the cylinder 90 which extends upwardly through the top thereof and in which is disposed the hydraulic piston 92 that connects to the lifting saddle 66 the same as piston 80 in Fig. 4. A seal 94 is provided at the top of cylinder 90 and a seal and cylinder head 96 is formed around the bottom of cylinder 90 so as to be slidable within cylinder 86. On top of cylinder 86 is a manually operated latch or hook 98 adapted to hold seal 94 against upward movement, but which can be moved out of engagement therewith as indicated by the dotted lines in Fig. 7 and in the diagrammatic sketch of Fig. 9. The effect of this arrangement is to utilize only a minimum hydraulic pressure when this invention is used only for post driving, but to make available additional pressure for post pulling or load lifting and such result is accomplished as follows. With latch 98 engaging seal 94 as shown in Fig. 8, cylinder 90 cannot move as hydraulic pressure builds up

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against head 96. Consequently, this pressure will act only on piston 92 which will obviously move under a relatively small pressure. However, if latch 98 is released, it will be appreciated that head 96 together with cylinder 90 and piston 92 is movable so that hydraulic pressure over the wider area of head 94 will substantially increase the force transmitted to the saddle 66.

It is submitted that the invention shown and described is aptly suited to achieve the purposes intended and is characterized by a combination of highly useful and mutually cooperating elements that combine their respective and proportionate functions in accomplishing the objects sought to be obtained.

Some changes may be made in the construction and arrangement of my post driver and puller without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. A post driver, comprising, a vertically disposed carrier channel, means for supporting the same, roller members on each side of said carrier channel, an elongated H-beam, oppositely disposed rails formed longitudinally within one side of said H-beam, a driving block secured to the other side of said H-beam, said H-beam mounted on said carrier channel so said rails are vertically movable over said roller members, a vertically movable hydraulic piston assembly disposed in said carrier channel, the upper end of the piston in said assembly connected to the upper end of said hammer, a hydraulic valve means connected to said piston assembly and designed to connect to a source of hydraulic pressure, said hammer movable upwardly by said piston assembly under hydraulic pressure and when said hydraulic pressure is released, said piston assembly movable downwardly by said hammer as said hammer drops by gravity as a dead weight to deliver a percussion contact to a fence post or the like.

2. A post driver, comprising, a vertically disposed carrier channel, means for supporting the same, roller members on each side of said carrier channel, an elongated H-beam, oppositely disposed rails formed longitudinally within one side of said H-beam, a driving block secured to the other side of said H-beam, said H-beam mounted on said carrier channel so said rails are vertically movable over said roller members, two cylinders disposed vertically and adjacent each other in said carrier channel, a hydraulic valve connected to one of said cylinders, said valve designed to connect to a source of hydraulic pressure, said cylinders connected at the bottom by a U-fitting, a hydraulic piston in the other cylinder, said piston having its upper end connected to the upper portion of said H-beam, said H-beam movable upwardly by said piston assembly under hydraulic pressure and when said hydraulic pressure is released, said H-beam dropping by gravity as a dead weight whereby said driving block can deliver a percussion contact to a fence post or the like.

3. A post driver, comprising, a carrier channel, means for supporting the same, a hammer vertically slidably mounted on said carrier channel, a driving block on said hammer, a first hydraulic cylinder vertically disposed in said carrier channel, a hydraulic control valve connected at one end to the bottom of said cylinder and designed to connect at its other end to a source of hydraulic pressure, a second hydraulic cylinder smaller in diameter than the first and concentrically arranged within the first so as to protrude from the top of the first and be vertically slidable therein, a cylinder seal at the top of the smaller cylinder, a hydraulic piston disposed in the smaller cylinder and having its upper end connected to the upper end of said hammer, a cylinder head formed around the bottom of the smaller cylinder, a seal on said cylinder head engaging the walls of the larger cylinder, a hook on top

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of the larger cylinder removably engageable with the seal on the smaller cylinder whereby when said hook is engaged and hydraulic pressure is applied, said smaller cylinder cannot move and only a relatively small force from the hydraulic pressure is required to move said hydraulic piston, and when said hook is disengaged by the hydraulic piston, said small cylinder and cylinder heads are movable by the increased force due to the greater area acted upon by the hydraulic pressure, the movement of said hydraulic piston moving said hammer upwardly, when said hydraulic pressure is released, said hammer dropping by gravity as a dead weight whereby said driving block can deliver a percussion contact to a fence post or the like.

4. A device as defined in claim 3 characterized by a grappling claw detachably hingedly secured to the bottom of said hammer for use at times in gripping and pulling a post when said hammer is being elevated, with said hydraulic pressure adjustable as described for increasing the pulling or lifting force when required.

5. A post driver, comprising, a carrier channel, means for supporting the same, a hammer vertically slidably mounted on said carrier channel, a driving block on said hammer, a vertically movable hydraulic piston assembly disposed in said carrier channel, the upper end of the piston in said assembly secured to the upper end of said hammer and vertically movable therewith both upwardly and downwardly, a hydraulic valve means designed to connect to a source of hydraulic pressure, a single fluid conduit connecting said hydraulic valve and said piston assembly, said hammer movable upwardly by the extension of said piston from said piston assembly under hydraulic pressure and when said hydraulic pressure is released, said hammer dropping by gravity as a dead weight whereby said driving block can deliver a percussion contact to a fence post or the like, and the downward movement of said hammer moving said piston therewith to a retracted position in said piston assembly during which operation fluid in said piston assembly used for hydraulic pressure is dispelled from said piston assembly through said conduit and said valve means to the source of fluid supply.

6. A post driver, comprising, a carrier channel, means for supporting the same, a hammer vertically slidably mounted on said carrier channel, a driving block on said hammer, a vertically movable hydraulic piston assembly disposed in said carrier channel, the upper end of the piston in said assembly secured to the upper end of said hammer and vertically movable therewith both upwardly and downwardly, a hydraulic valve means connected to said piston assembly and designed to connect to a source of hydraulic pressure, said hammer movable upwardly by the extension of said piston from said piston assembly under hydraulic pressure and when said hydraulic pressure is released, said hammer dropping by gravity as a dead weight whereby said driving block can deliver a percussion contact to a fence post or the like, the downward movement of said hammer moving said piston therewith to a retracted position in said piston assembly during which operation fluid in said piston assembly used for hydraulic pressure is dispelled from said piston assembly through said valve means to the source of fluid supply, and means associated with said carrier channel for tilting it forwardly, rearwardly and laterally respectively.

7. A post driver, comprising, a support member, a hammer mounted thereon for vertical reciprocation, a driving block on said hammer, a vertically disposed hydraulic cylinder on said support member, a vertically reciprocating piston in said cylinder, the upper end of said piston connected to said hammer so as to vertically reciprocate therewith, a hydraulic valve means designed to connect with a flow line to a source of hydraulic pres-

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sure, a single conduit connecting said valve means with the bottom of said cylinder, said hammer movable upwardly by the extension of said piston under hydraulic pressure on the bottom thereof applied through said conduit, said hammer dropping by gravity as a dead weight when said hydraulic pressure is released, and the downward movement of said hammer moving said piston therewith to expel fluid in said cylinder through said conduit and said valve means directly into the flow line of the source of hydraulic pressure.

8. A post driver, comprising a carrier channel, means for supporting the same, roller members on each side of said carrier channel, an elongated H-beam, oppositely disposed rails formed longitudinally within one side of said H-beam, a driving block secured to the other side of said H-beam, said H-beam mounted on said carrier channel so said rails are vertically movable over said roller members, a vertically movable hydraulic piston assembly disposed in said carrier channel, the upper end of the piston in said assembly connected to the upper end of said H-beam, a hydraulic valve means designed to connect to a source of hydraulic pressure, a conduit connected at respective ends to said piston assembly and said valve means, said H-beam movable upwardly by said piston assembly under hydraulic pressure through said conduit, said H-beam dropping by gravity as a dead weight when said pressure is released, and said piston moving downwardly with said H-beam to expel fluid from said piston assembly through said conduit and said valve means.

9. A device as defined in claim 8 characterized by a grappling claw detachably hingedly secured to the bottom of said H-beam for use at times in gripping and pulling a post when said hammer is being elevated.

10. A device as defined in claim 8 including means associated with said carrier channel for tilting it forwardly, rearwardly and laterally respectively.

11. A post driver, comprising, a support member, a hammer mounted thereon for vertical reciprocation, a driving block on said hammer, a vertically disposed hydraulic cylinder on said support member, a vertically reciprocating piston in said cylinder, one end of said piston connected to said hammer so as to vertically reciprocate therewith, a hydraulic valve means designed to connect with a flow line to a source of hydraulic pressure, a single conduit connecting said valve means with said cylinder, said hammer movable upwardly by said piston under hydraulic pressure applied through said conduit, said hammer dropping by gravity as a dead weight when said hydraulic pressure is released, and the downward movement of said hammer moving said piston therewith to expel fluid in said cylinder through said conduit and said valve means directly into the flow line of the source of hydraulic pressure.

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