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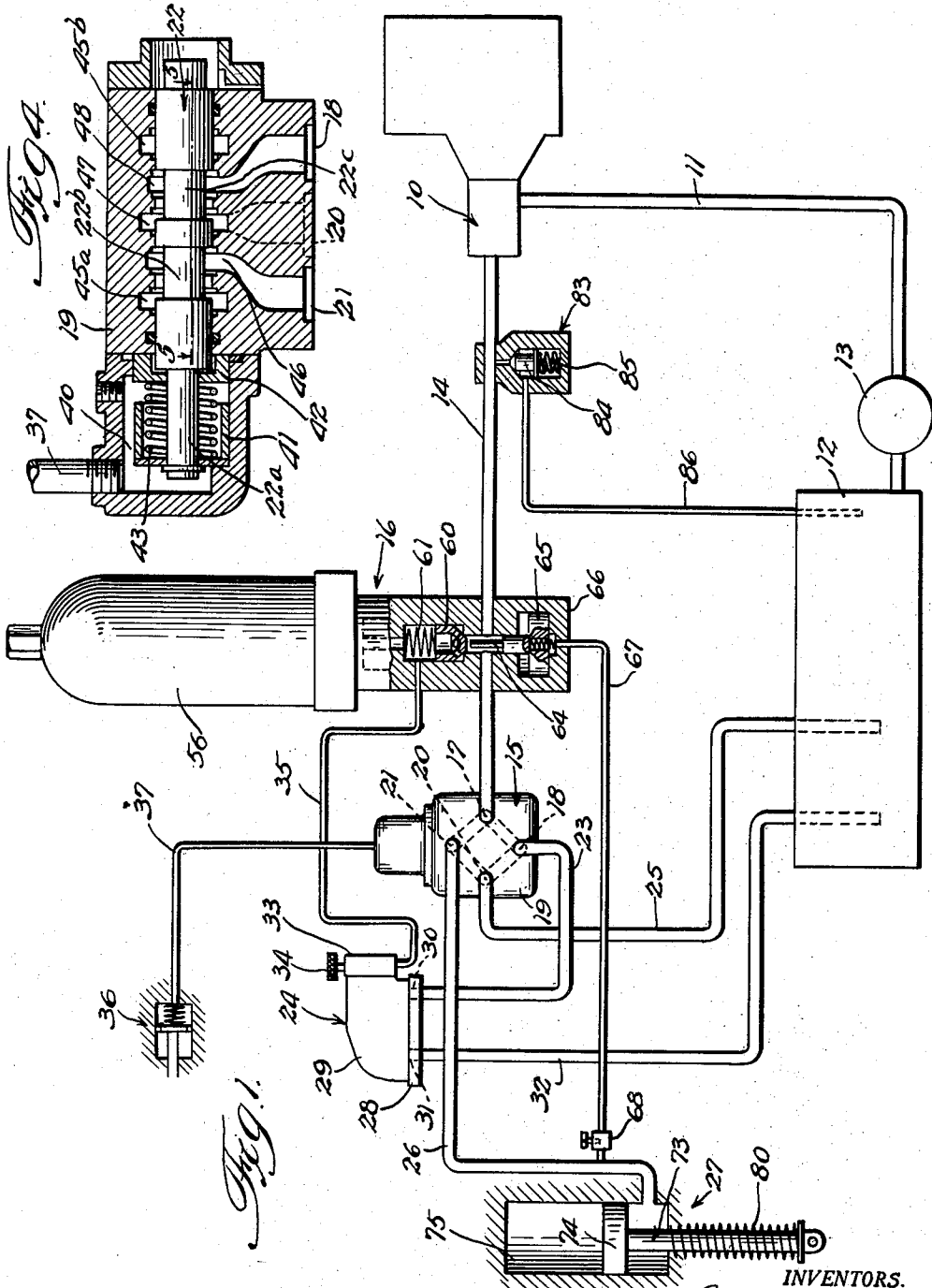
I. SUBLETT ET AL

2,846,187

HYDRAULIC SPIKE PULLING APPARATUS

Filed Aug. 30, 1954

4 Sheets-Sheet 1



INVENTORS.
Ira Sublett &
BY *Charles D. Johnson.*
Thos. Oba, Mecklenburg,
von Holst, & Colman. *Attys.*

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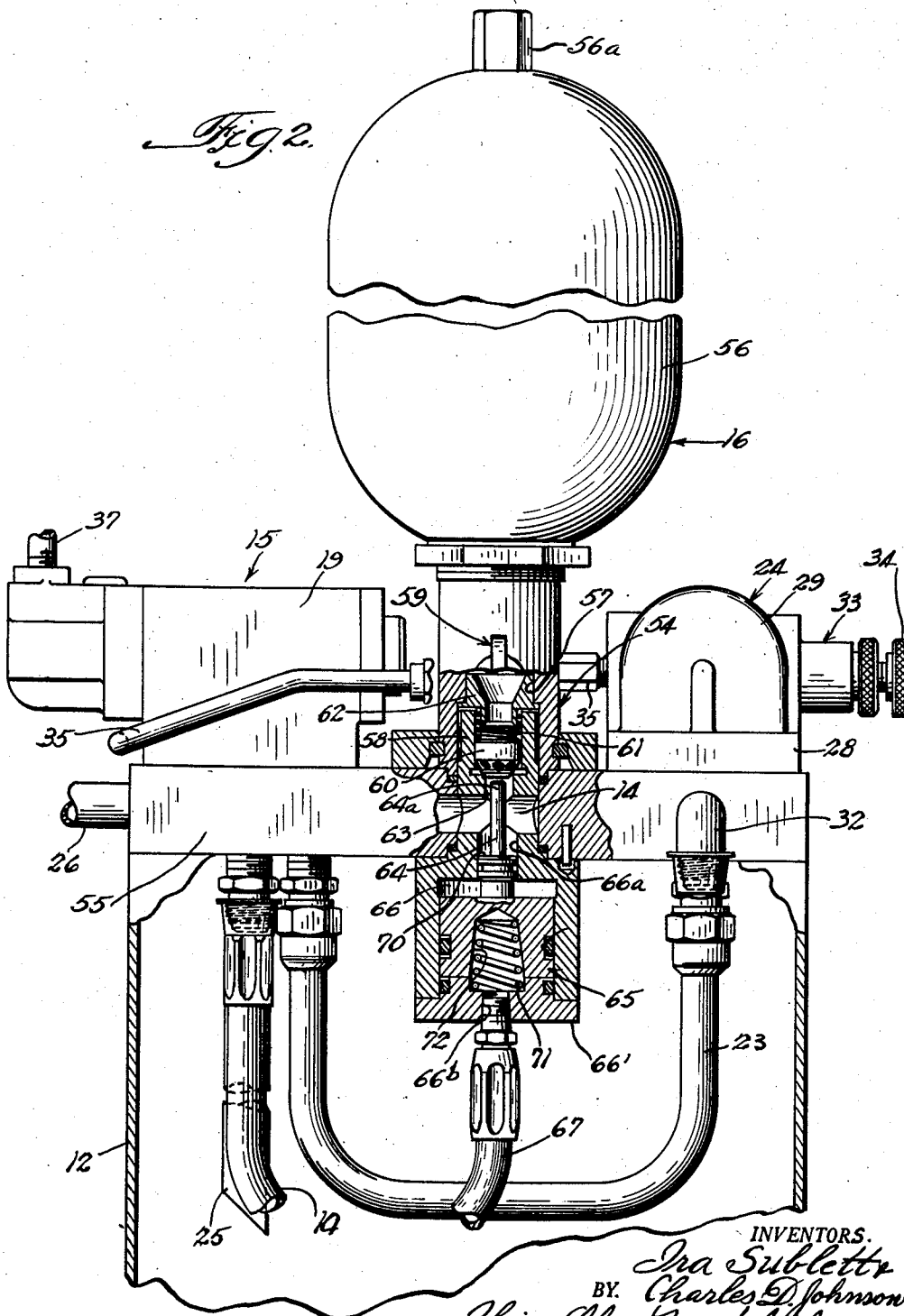
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HYDRAULIC SPIKE PULLING APPARATUS

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4 Sheets-Sheet 2



INVENTORS.
Ira Sublett
BY *Charles D. Johnson*
Thies, Olson, Mecklenburg,
von Holst, & Colman.

Aug. 5, 1958

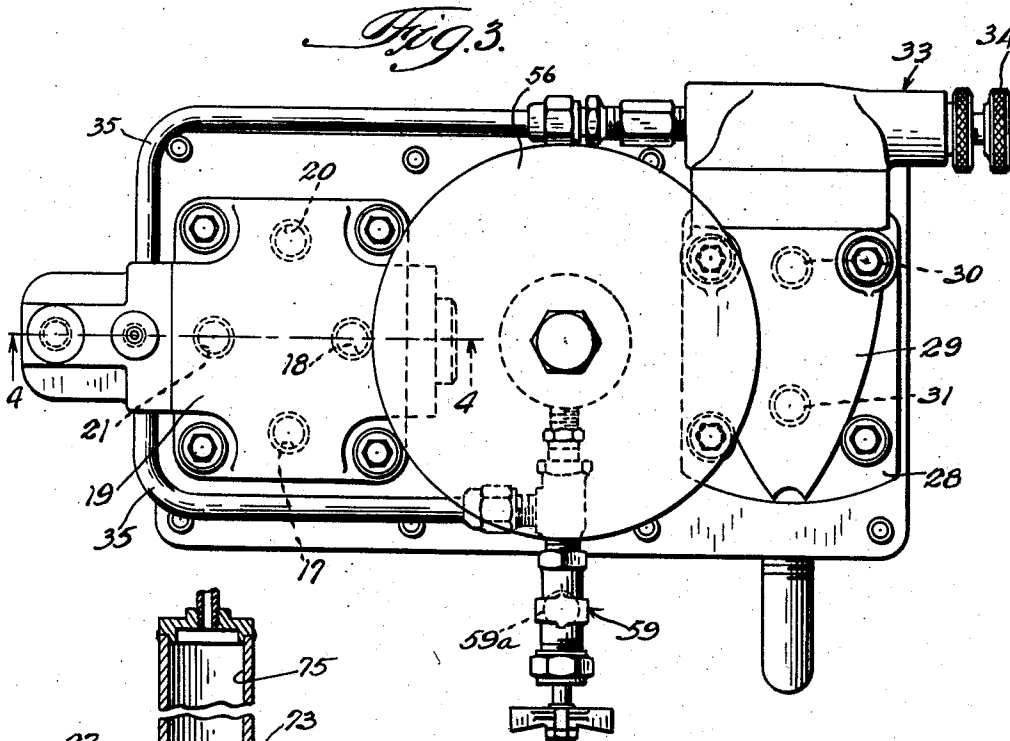
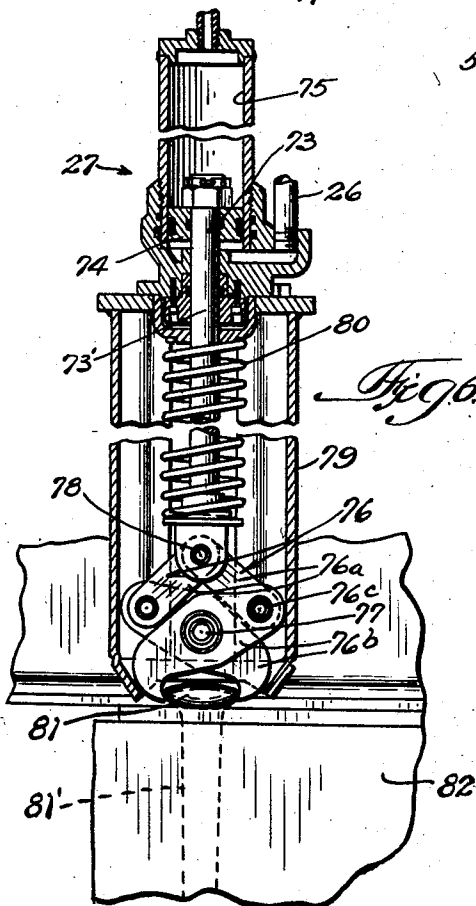
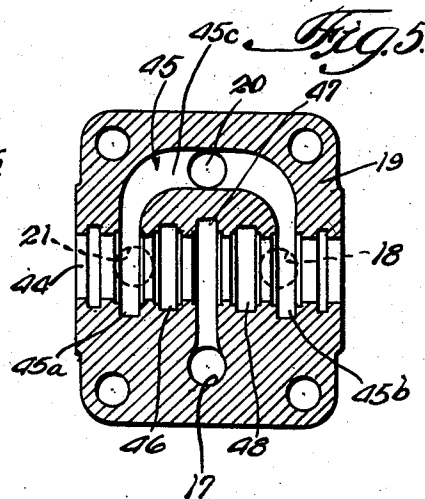
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4 Sheets-Sheet 3



INVENTORS.
Ira Sublett &
BY *Charles D. Johnson*
Thos. Allen, Mechanical Eng'r.
rm Holst, & Caltman, Attys

Aug. 5, 1958

I. SUBLETT ET AL
HYDRAULIC SPIKE PULLING APPARATUS

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4 Sheets-Sheet 4

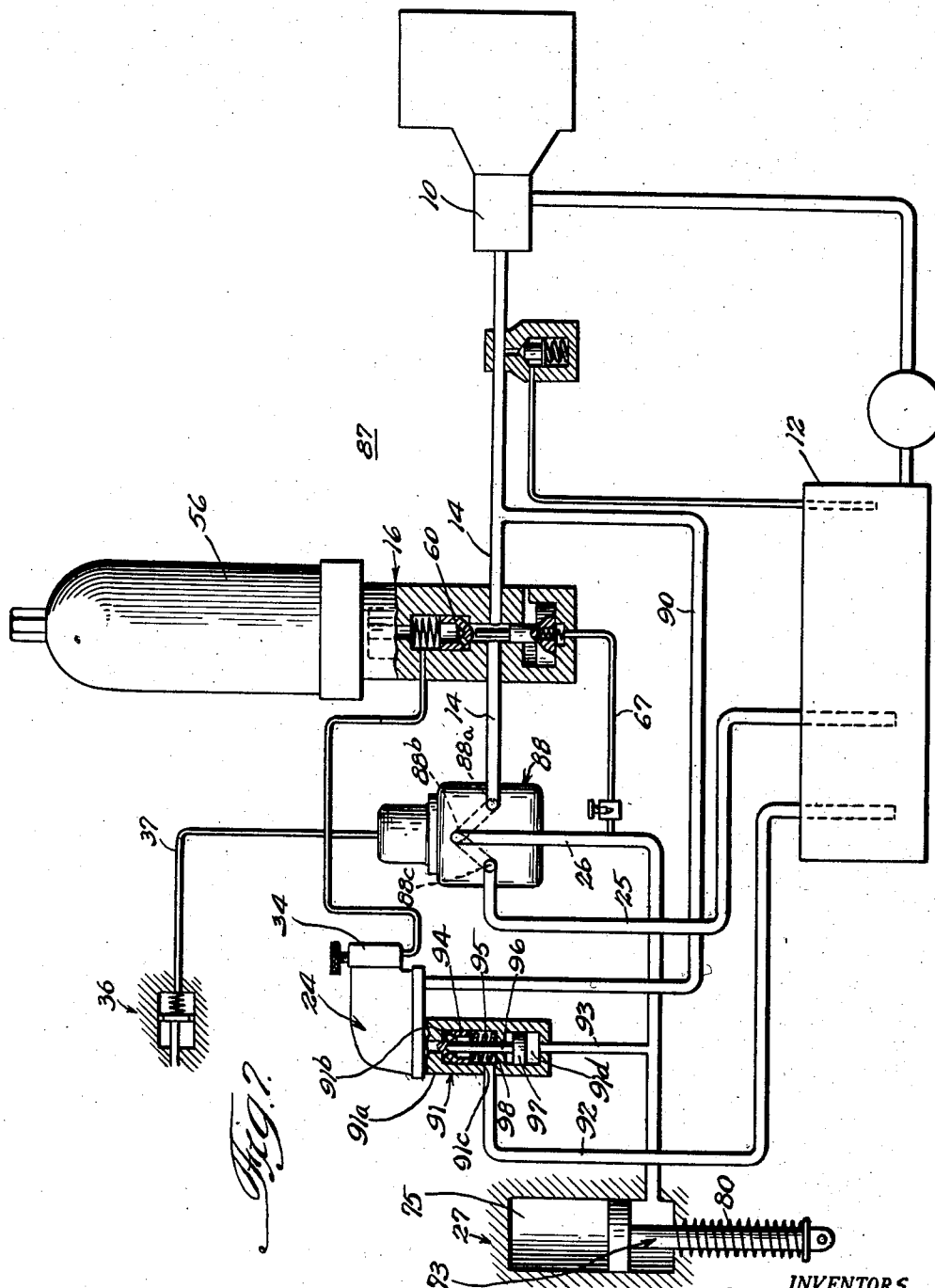


Fig. 7

INVENTORS.
Ira Sublett &
BY. Charles D. Johnson.
Theiss, Olsen, Mackelburg &
von Holst & Colman.

2,846,187

HYDRAULIC SPIKE PULLING APPARATUS

Ira Sublett and Charles D. Johnson, Fairmont, Minn.,
assignors to Fairmont Railway Motors, Incorporated,
Fairmont, Minn., a corporation of Minnesota

Application August 30, 1954, Serial No. 452,832

7 Claims. (Cl. 254—18)

This invention relates to a hydraulically operated object-moving apparatus and more particularly to a hydraulic system for such an apparatus.

One adaptation of such an apparatus, in which the improved hydraulic system is incorporated, is a spike pulling machine used for withdrawing spikes and the like from railroad ties and tie plates. A machine of this general type is shown and described in the application, Serial No. 339,392 of Ira Sublett, now abandoned.

Because of the particular function to be performed by a spike pulling machine and the rough, and oftentimes unskilled, manner in which the machine is handled, it is necessary, as well as desirable, that the machine be possessed of certain important structural characteristics. In the first instance the pulling load, to which the machine is subjected during operation, will vary widely at different times depending upon the condition of the tie accommodating the spike, and therefore it is necessary that the hydraulic mechanism incorporated in the machine be capable of readily meeting these load variations. Secondly, the head of the spike is oftentimes somewhat inaccessible or awkward to reach with the machine thereby making it difficult, if not impossible, for the operator to quickly attain proper gripping of the spike head before full pulling force is exerted on the spike. Thus, the action of the gripping jaws of the machine should be readily under the control of the operator and be capable of being moved relatively slowly into gripping position so as to permit proper alignment and engagement of the spike head by the jaws and thereby effect more efficient operation of the apparatus. Thirdly, the likelihood of the jaws slipping off the spike head once the full pulling force has been applied should be minimized, and thus by having the operation of the gripping jaws properly controlled and slow-acting, the possibility of the jaws being damaged by reason of such slippage is substantially averted with the result that the useful life of the jaws is materially prolonged. Fourth, the hydraulic pressure accumulated by the machine should be utilized exclusively for withdrawing the spike and not dissipated in part in preliminarily actuating the gripping jaws, thus enabling the machine to successfully and expeditiously meet the heavy load conditions which are encountered. Lastly, the hydraulic mechanism should be substantially fool-proof in operation, of rugged construction capable of withstanding rough handling, should require minimum attention to maintain in proper working order, and be of compact design and possessed of great mobility.

Thus, it is an object of this invention to provide an apparatus which fully meets all of the aforementioned structural and functional requirements which were not heretofore possessed by prior machines of this type.

Further and additional objects will appear from the description, accompanying drawings, and appended claims.

In accordance with one embodiment of this invention, an object-moving apparatus is provided comprising a movable hydraulically operated element for effecting movement of the object upon actuation of the element in one direction, and means for actuating the element in said one direction. The means includes a hydraulic pressure accumulator operatively connected to the element,

and a hydraulic pump communicating with and supplying pressure to said element and accumulator. The pressure provided by the pump effects initial actuation of the element in the one direction, and the pressure accumulated within the accumulator supplements that of the pump in effecting final actuation of the element in the same direction.

For a more complete understanding of this invention, reference should be made to the drawings wherein:

Figure 1 is a diagrammatic view of the hydraulic system for the improved object-moving apparatus;

Fig. 2 is an enlarged fragmentary elevational view, partially in section, of the hydraulic pressure accumulator and associated mechanism;

Fig. 3 is a top plan view of Fig. 2;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 3;

Fig. 5 is a fragmentary sectional view taken along line 5—5 of Fig. 4;

Fig. 6 is an enlarged fragmentary view in vertical section of the object-contacting element shown in initial contact with an object; and

Fig. 7 is a diagrammatic view of a modified form of hydraulic system for the improved object-moving apparatus.

Description of first form of hydraulic system

Referring now to the drawings and more particularly to Fig. 1, an improved hydraulic system for the object-moving apparatus, such, for example, as a spike pulling machine, is shown diagrammatically. The hydraulic system, in this instance, includes a motor driven pump 10 having the suction side thereof connected by means of a line or conduit 11 to a reservoir 12 for the hydraulic fluid. Disposed within line 11 intermediate the reservoir and pump is a conventional strainer 13. Extending from the discharge side of pump 10 is a line 14 which terminates at a control valve 15. Disposed within line 14, intermediate the control valve 15 and the discharge side of pump 10, is a hydraulic pressure accumulator 16. The control valve 15, in this instance, is provided with a housing 19 having four ports, 17, 18, 20, and 21, formed therein. Port 17 communicates with line 14; port 18 communicates with a line 23 which, in turn, communicates with an unloader valve 24; port 20 communicates with a line 25 leading to reservoir 12; and port 21 communicates with a line 26 leading to the object-contacting element or spike pulling assembly 27. The valve 15 has reciprocally mounted within housing 19 an elongated shuttle 22. The relative position of the shuttle therein determines which pairs of ports of the valve are to be simultaneously in communication with one another. The construction of the valve will be discussed more fully hereinafter.

The unloader valve 24 is provided with an apertured base plate 28 forming the underside of a housing 29. One of the apertures 30 formed in plate 28 communicates with line 23 leading from control valve 15. A second aperture 31 is formed in plate 28, spaced from aperture 30, and has extending therefrom a line 32 which terminates in reservoir 12. Disposed within housing 29 is an open and close valve mechanism, not shown, which is positioned between and in communication with apertures 30 and 31. This valve mechanism normally assumes a closed position. The unloader valve 24 is of conventional construction and believed well understood by those familiar with this art. The operation of the enclosed valve mechanism is controlled by a pressure-responsive unit 33 which is mounted on one side of housing 29. The pressure at which unit 33 will effect opening of the enclosed valve mechanism is determined by the setting of the threadably mounted manually adjusted

screw 34. Unit 33 is connected by line 35 to the accumulator 16 so that the operation of unit 33 is dependent upon the pressure accumulated within the accumulator.

The relative positioning of shuttle 22, disposed within housing 19 of valve 15, is regulated by a manually operated piston assembly 36 which is readily accessible for manipulation by the operator of the machine. Piston assembly 36 is connected by line 37 with a chamber 40 formed within valve housing 19, see Fig. 4. Protruding into chamber 40 is an end section 22a of shuttle 22. Secured to the terminus of end section 22a is a piston head 41 which is responsive to the hydraulic pressure created by piston assembly 36 and introduced into chamber 40 through line 37. Upon pressure being exerted on piston head 41, the shuttle 22 is caused to move to the right a predetermined distance, as viewed in Fig. 4. Once pressure in line 37 has been relieved, the piston head and shuttle 22 are returned to normal position, as seen in Fig. 4, by means of a coil spring 43 which is disposed between head 41 and the side of the chamber 40 and in encompassing relation with the protruding shuttle end section 22a. The remainder of shuttle 22 is accommodated within an elongated bore 44 formed in housing 19, see Fig. 5. Chamber 40 and bore 44 are separated from one another by a sealing collar 42. Extending laterally from bore 44 are a plurality of passageways 45, 46, 47, and 48 which are disposed in axially spaced relation, see Figs. 4 and 5. Passageway 45 is substantially U-shaped and has the opposite ends thereof, 45a and 45b, communicating with bore 44. The right portion 45c of the passageway is in communication with port 20 which is connected to reservoir 12. Adjacent to passageway section 45a and spaced axially therefrom is an annular passageway 46 which, in turn, communicates with port 21 connected by line 26 to the spike pulling assembly 27. Centrally disposed with respect to bore 44 is passageway 47 which is in communication with port 17 connected to pump 10 by line 14. Disposed on the opposite side of passageway 47 and intermediate the latter and passageway end section 45b is passageway 48 which communicates with port 18 which, in turn, is connected to unloader valve 24. The shuttle 22, as seen in Fig. 4, is provided with a pair of axially spaced valleys or annular grooves 22b and 22c which serve as connecting conduits for various parts of the passageways 45a, 46, 47, 48 and 45b, depending upon the relative position of the shuttle. When the shuttle is in its normal position, as seen in Fig. 4, valley 22b effects communication between passageway end 45a and passageway 46, thereby enabling the fluid within assembly 27 to drain into the reservoir 12. Valley 22c, on the other hand, when the shuttle is in its normal position, effects communication between passageway 47 leading to pump 10 and passageway 48 leading to unloader valve 24. Upon the shuttle being moved to the right by piston assembly 36 being manipulated by the operator, valley 22b will effect communication between passageway 47 and 46, and valley 22c will effect communication between passageway 48 and passageway end 45b thereby causing the pump pressure to be directed to the cylinder and to by-pass unloader valve 24 while the latter is simultaneously vented to reservoir 12.

The accumulator and associated parts

The accumulator 16, as seen more clearly in Fig. 2, comprises a hollow base 54 which is secured to a plate 55, the latter also having secured thereto, on opposite sides of base 54, control valve 15 and unloader valve 24. Secured to the underside of plate 55 is the reservoir 12. Connected to the upper end of base 54 is container or tank 56 in which a predetermined hydraulic pressure is accumulated. The tank 56 is of conventional construction and, if desired, may have disposed within the interior thereof an expandable bag, not shown, which is

filled with a predetermined volume of compressible gas through connection 56a atop the tank. The gas-filled balloon is compressed a predetermined amount by the hydraulic fluid entering the tank 56. The base 54 is provided with a center opening 57 communicating with the interior of tank 56 and in which is located a valve seat 58. The valve seat 58 accommodates a valve member 60 which is urged by means of a coil spring 61 to normally assume a closed position with respect to a restrictive opening 63 formed at the base of seat 58 and in communication with the line 14 connecting pump 10 to control valve 15. The upper end of spring 61 contacts a retainer 62 disposed within base 54 above the valve seat 58.

When control valve 15 is in its normal position and unloader valve 24 is closed, flow of hydraulic fluid through valves 15 and 24 from pump 10 is blocked and therefore the fluid is caused to flow past valve member 60 into tank 56 where it is accumulated until a predetermined hydraulic pressure is reached at which point unloader valve 24 is automatically opened by unit 33 whereby, by reason of pressure differential, valve member 60 returns immediately to close position preventing discharge of the accumulated fluid and simultaneously therewith the discharge side of the pump is vented to the reservoir through control valve 15 and unloader valve 24. The system will remain in this condition until the operator manipulates piston assembly 36 causing shuttle 22 to be moved from its normal position.

As noted in Figs. 2 and 3, mounted on accumulator base 54 and extending transversely therefrom is a hand operated valve 59 which, when in an open position, will permit the pressure accumulated within tank 56 to be relieved into reservoir 12 through port 59' formed in the valve housing. Valve 59 is utilized only when the machine is to be shut down for an extended period and it is desirable, from a standpoint of safety, not to have a high pressure accumulated within tank 56. Furthermore, it is desirable to have the pressure in tank 56 reduced so that when the pump is started up once again, it will not be initially subjected to the high load of the accumulated pressure.

To effect unseating of valve member 60, after the predetermined pressure has accumulated within tank 56, a plunger 64 is provided which has the upper end 64a thereof axially aligned within the restrictive opening 63 and terminating adjacent the underside of valve member 60. Upon the plunger 64 being moved upwardly, the upper end 64a thereof strikes valve member 60 and causes the latter to be raised off the valve seat member 58 whereupon the accumulated hydraulic pressure within tank 56 is discharged through base 54 into line 14 and from there through valve 15 and line 26 to the spike pulling assembly 27. Plunger 64 has the lower end thereof in the form of a relatively large piston head 65 which is mounted for reciprocatory movement within a chamber 66 formed in a housing 66', the latter being secured to the underside of plate 55 and in communication with line 14 through a restrictive opening 66a which is aligned with opening 63 formed in valve seat 58. Opening 66a functions as a cylinder for the center portion 70 of plunger 64. The diameter of portion 70 is larger than the upper end of plunger 64 but is not as large as the diameter of head 65. The importance of the area differential between portion 70 and head 65 will become apparent from the discussion to follow hereinafter. Communicating with a port 66b formed in the base of housing 66' is line 67 which, in turn, joins line 26 at a point adjacent assembly 27, see Fig. 1. A restrictor 68 is formed in line 67 between line 26 and housing 66' to eliminate any surge in pressure which might result in line 26 when the accumulated pressure within the tank 56 is discharged. The differential in area of head 65 and the center portion 70 of plunger 64 is such that when the pressure within line 26 reaches a

predetermined amount, less than maximum pump pressure, the head 65 will move upwardly within chamber 66, notwithstanding the fact that maximum pump pressure is being exerted on the face of portion 70 which is disposed adjacent line 14, whereupon plunger 64 will unseat valve 60. At other times, however, when control valve 15 is in its normal position or before the pressure in line 67 reaches a predetermined amount, the pressure in line 14, acting on center portion 70, will cause the plunger to remain out of contact with valve 60.

To insure quick withdrawal of the spike, even though the latter offers little resistance to pull because of a rotted tie in which it was driven, a spring 71 is positioned within a cavity 72 formed within the face of piston head 65 adjacent port 66b. The spring 71 exerts a constant and upward force on head 65 and, in turn, plunger 64. Thus, only a small amount of pressure in line 67 will be adequate to raise head 65 against the resistance of the accumulator pressure acting against the seat area of valve 60, and the full pump pressure acting on the face of center portion 70 and cause valve 60 to be unseated by plunger 64. The amount of pressure in line 67 to effect the unseating of valve 60 will depend upon the size and tension of spring 71 which is utilized. In certain instances, the spring 71, if desired, can be omitted.

The object-moving assembly

The object-moving element or spike pulling assembly 27, as seen more clearly in Fig. 6, is comprised of a piston 73 having the head 74 thereof disposed within a cylinder chamber 75. The lower end of chamber 75 is in communication with line 26 leading from unloader valve 24. Extending downwardly from piston head 74 is rod 73' to the lower end of which is pivotally connected a pair of clamping jaws 76. Each jaw 76 is formed of two sections 76a and 76b pivotally connected together at 76c. The lower sections 76b of the jaws are pivotally connected together at a point 77 intermediate their ends. The lower end of section 76b is substantially talon-shaped so as to bite into the underside of the spike head 81 which has the shank 81' thereof penetrating the tie 82. The upper ends of the upper jaw sections 76a are pivotally connected at 78 to the lower end of rod 73'. The jaws and exposed portion of piston rod 73' are disposed within a shield 79 which has the lower end thereof open to accommodate the head 81 of a spike. Upon the piston being initially urged upwardly in cylinder 75 by the pressure from pump 10, the jaws 76 will be actuated into gripping relation with spike head 81. After initial gripping of the spike has been effected, the resistance to movement offered by the spike shank 81' and the return spring 80 encompassing rod 73', will cause pressure within line 26 to reach a predetermined amount which will actuate plunger 64 upwardly and unseat accumulator valve 60 in a manner heretofore described. By reason of the fact that the jaws are initially urged into gripping relation solely by the pressure developed by pump 10, the movement of the jaws is relatively slow thereby affording the operator an opportunity to properly align the jaws with respect to the spike head, and thus avert any damage which might be caused to the jaws by reason of slipping off the spike head 81, when the full accumulated pressure is exerted on the piston 73. The manner in which the spike pulling assembly 27 is mounted on the machine and the various mechanisms associated therewith is disclosed in the aforementioned application, Serial No. 339,392 of Ira Sublett.

The automatic safety valve

Disposed intermediate the pump 10 and the accumulator 16 is an automatic safety valve 83 for relieving any excessively high pressure which might develop in the system without causing damage to any part of the system. The valve 83 is provided with a valve member

84 which is normally held in a closed position by a spring 85, the latter being adjusted to a predetermined tension. The valve 83 communicates with line 14 and when the valve member 84 is unseated, the high pressure is relieved through line 86 to the reservoir 12.

Modified hydraulic system

A modified form of hydraulic system 87 is shown in Fig. 7 which is substantially the same as the system shown in Fig. 1 and heretofore discussed with but a few exceptions. In system 87 a modified form of control valve 88 has been provided in place of control valve 15. Control valve 88 is a shuttle type valve having three ports 88a, 88b, and 88c formed in the valve housing. Port 88a communicates with line 14 to the pump and accumulator; port 88b communicates with line 26 to the spike pulling assembly 27; and port 88c communicates with line 25 to the reservoir. The shuttle, not shown, when in its normal position, blocks flow of fluid through valve 88, whereupon the fluid flowing from pump 10 passes through by-pass line 90 connected at one end to line 14 and at the other end to the intake side of unloader valve 24. Connected to the discharge side of unloader valve 24 is a spring-actuated check valve 91. Valve 91 is provided with a housing 91a having the upper interior portion 91b thereof communicating with port 31 formed in valve 24. A second port 91c is provided in the housing which communicates with the upper interior portion 91b. A line 92 is connected to this second port which leads to reservoir 12. Disposed within the upper housing interior portion 91b is a valve member 94 which is urged upwardly by means of spring 95 to close off the connection between port 31 of unloader valve 24 and the upper housing interior portion, thereby shutting off fluid flow from unloader valve 24 to reservoir 12. Also disposed within housing 91a is a plunger 96 having the upper end portion thereof terminating within housing interior portion 91b and the lower end thereof terminating within a piston head 97, the latter being disposed within the lower housing interior portion 91d. The upper and lower housing interior portions 91b and 91d are separated by a flange 98. The flange is provided with a center opening through which the plunger 96 extends. The lower housing interior portion 91d is connected by means of line 93 directly to the line 26 leading from control valve 88 to the spike pulling assembly 27. When there is pressure within line 93, such pressure acting upon the face of head 97 causes the plunger 96 to keep the valve 94 closed. The function of check valve 91 is that of blocking off fluid from pump 10 through unloader valve 24 to the reservoir 12 when the shuttle of control valve 88 is moved from its normal position. Aside from control valve 88 and check valve 91, modified hydraulic system 87 and the hydraulic system shown in Fig. 1 are substantially the same.

Operation of first described system

Summarizing the operation of the system, shown in Fig. 1, it is as follows: (a) The hydraulic fluid from pump 10, when the shuttle 22 is in its normal position, is caused to flow through valve 15, line 23 to unloader valve 24 at which point it is blocked; (b) By reason of the fact that the passage of the hydraulic fluid into line 23 is blocked by unloader valve 24, the fluid flow from the pump is diverted through the accumulator valve 60 into accumulator tank 56 wherein it is accumulated; (c) Once a predetermined pressure has accumulated within tank 56, the unloader valve 24 is opened by the pressure-responsive unit 33 whereupon the flow of hydraulic fluid from pump 10 is once again directed through control valve 15, line 23, unloader valve 24, and line 32 to reservoir 12; (d) Upon shuttle 22 being moved to the right from its normal position, line 14 is brought into communication with line 26 leading to assembly 27 and simultaneously therewith line 23, from the unloader valve

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24, is brought into communication with line 25 leading to the reservoir; (e) With the shuttle in this position, the pressure from pump 10 reacts upon piston 73 and effects initial upward movement thereof which causes the jaws 76 to assume a gripping relation with the spike head; (f) Once the resistance encountered by the spike pulling assembly is of sufficient magnitude, this resistance is reflected back through line 67, in the form of increase pressure, causing accumulator check valve 60 to be unseated by plunger 64 and the pressure accumulated within tank 56 to be discharged into line 14 and supplement the pressure of pump 10 to assembly 27 whereupon piston 73 will quickly move upwardly overcoming the load resistance and cause the spike to be rapidly withdrawn.

Operation of modified system

The operation of the modified hydraulic circuit 87 is substantially the same as that of the system first described except that control valve 88, when in its normal position, blocks passage of hydraulic fluid from pump 10 through valve 88, and simultaneously therewith flow through line 90 is blocked by unloader valve 24 thereby diverting flow of such fluid into accumulator tank 56 through valve 60. Upon the unloader valve 24 being opened the pump pressure is sufficient to overcome the resistance of check valve 94 and thereby permit the hydraulic fluid to flow from unloader valve 24 through line 92 to reservoir 12. When the control valve 88 is in its normal position, line 26 leading to cylinder assembly 27, and line 25 leading to the reservoir 12 are in communication with one another thereby enabling the coil spring 80 to act upon piston 73 and cause the latter to move downwardly with respect to cylinder 75. Upon control valve 88 being moved out of its normal position, lines 14 and 26 become interconnected and line 25 is blocked thereby permitting flow of hydraulic fluid from pump 10 to the lower end of cylinder 75 through control valve 88 and cause the piston 73 to be moved upwardly. As soon as control valve 88 is shifted from its normal position, the pressure from the pump in line 26 will cause valve 94 to close and thereby block fluid flow through unloader valve 24. The unseating of the accumulator check valve 60 is accomplished in the same manner as indicated in aforementioned step (f).

Conclusion

Thus, it will be seen that a hydraulic circuit has been provided for an object-moving apparatus, such as a spike pulling machine, which enables the operator of such machine to initially position the relatively slow moving jaws in proper gripping relation with the object or spike to be pulled before the full pressure of the accumulator is utilized for effecting withdrawal or movement of the object or spike. By reason of this fact the wear on the jaws is reduced to a minimum and more effective utilization of the machine results. The improved apparatus conserves the accumulated hydraulic pressure for use exclusively in overcoming the difficult loads encountered by the machine and not in effecting initial or closing action of the gripping jaws on the object to be moved or withdrawn.

While the improved hydraulic systems have been discussed in connection with a spike pulling machine, it is to be understood, of course, that it is not to be so limited as it may have numerous applications in other machines which are designed to quickly overcome high load resistances.

While several embodiments of this invention are shown above, it will be understood, of course, that the invention is not to be limited thereto, since many modifications may be made, and it is contemplated, therefore, by the appended claims, to cover any such modifications as fall within the true spirit and scope of this invention.

We claim:

1. A spike-pulling apparatus comprising operable jaws

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for accommodating and gripping the head of a driven spike, said jaws normally assuming a released position, a piston-cylinder assembly having the piston thereof operatively connected to said jaws for initially actuating the latter into gripping relation with the spike head upon partial retraction of the piston into the cylinder of said assembly and subsequently actuating said jaws in a linear direction upon continued retraction of said piston into said assembly cylinder, a hydraulic pressure accumulator communicating with the end of said cylinder adjacent said jaws, a hydraulic pump communicating with and supplying pressure to the end of said cylinder adjacent said jaws and said accumulator, and operative means in communication with said pump, accumulator, and the end of said cylinder adjacent said jaws, and responsive to a predetermined hydraulic pressure developed within the interior of said cylinder adjacent said jaws for initially supplying hydraulic fluid under only pump pressure to said cylinder whereby partial retraction of said piston within said cylinder occurs at a relatively slow rate of speed; said means, upon said predetermined hydraulic pressure being developed within said cylinder, being further operative and supplying hydraulic fluid under accumulator pressure to said cylinder whereby complete retraction of said piston into said cylinder occurs at a relatively rapid rate of speed.

2. A spike-pulling apparatus comprising operable jaws for accommodating and gripping the head of a driven spike, a piston-cylinder assembly having the piston thereof operatively connected to said jaws and biased to normally assume an extended position with respect to the cylinder of said assembly and maintain said jaws in a released position, said piston upon partial retraction thereof into said cylinder initially actuating said jaws into gripping relation with the spike head and subsequently actuating said jaws in a linear direction upon continued retraction of said piston into said assembly cylinder, a hydraulic pressure accumulator operatively connected to the end of said cylinder adjacent said jaws, a hydraulic pump communicating with and supplying pressure to the end of said cylinder adjacent said jaws and to said accumulator, pressure-responsive first means communicating with said accumulator for automatically limiting the accumulated pressure within said accumulator supplied by said pump, and operative second means in communication with said pump, accumulator, and the end of said cylinder adjacent said jaws and responsive to a predetermined hydraulic pressure developed within the interior of said cylinder adjacent said jaws for initially supplying hydraulic fluid under only pump pressure to said cylinder whereby partial retraction of said piston within said cylinder occurs at a relatively slow rate of speed; said second means, upon said predetermined hydraulic pressure being developed within said cylinder being further operative and supplying hydraulic fluid under accumulator and pump pressures to said cylinder whereby complete retraction of said piston into said cylinder at a relatively rapid rate of speed.

3. A spike-pulling apparatus comprising operable jaws for accommodating and gripping the head of a driven spike, a piston-cylinder assembly having the piston thereof operatively connected to said jaws, said piston, upon partial retraction within said assembly cylinder, initially actuating said jaws into gripping relation with the spike head and subsequently actuating said jaws in a linear direction upon continued retraction of said piston into said assembly cylinder, a hydraulic pressure accumulator, a hydraulic pump, a reservoir for hydraulic fluid, adjustable control means operatively connected to said pump, reservoir, accumulator, and the end of said cylinder adjacent said jaws, said control means, when in one position of adjustment, communicating said pump with said accumulator and simultaneously therewith communicating said cylinder with said reservoir, and, when

in a second position of adjustment, communicating said pump with said cylinder whereby said piston is partially retracted into said cylinder at a relatively slow rate of speed by only the pressure of said pump; said control means being responsive to a predetermined hydraulic pressure developed within said cylinder upon partial retraction of said piston whereby said accumulator automatically supplies hydraulic pressure to said cylinder to effect complete retraction of said piston into said cylinder at a relatively rapid rate of speed.

4. An object-moving apparatus comprising a movable hydraulically operated object-contacting element for effecting movement of the object upon actuation of said element in one direction, a hydraulic pressure accumulator operatively connected to said element, a hydraulic pump communicating with and supplying pressure to said element and said accumulator, and a valve communicating with said accumulator and pump for permitting flow of hydraulic fluid into said accumulator from said pump during predetermined periods and flow of hydraulic fluid out of said accumulator to said element during other predetermined periods; said valve including a valve piece biased to normally close off communication between said accumulator and said element, and a movably mounted member disposed adjacent said valve piece for contacting and moving the latter out of normal close-off position upon movement of said member in one relative direction with respect to said valve piece, said member having a first portion thereof of a given surface area communicating with said pump and a second portion thereof of a greater surface area than said first portion communicating with said element whereby, upon a predetermined pressure of less magnitude than the pump pressure being exerted on said second member portion, said member is actuated to effect movement of said valve piece out of normal close-off position.

5. An object-moving apparatus comprising a movable hydraulically operated object-contacting element for effecting movement of the object upon actuation of said element in one direction, a hydraulic pressure accumulator operatively connected to said element, a hydraulic pump communicating with and supplying pressure to said element and said accumulator, and a valve communicating with said accumulator and pump for permitting flow of hydraulic fluid into said accumulator from said pump during predetermined periods and flow of hydraulic fluid to said element from said pump; said valve including a valve piece biased to normally close off communication between said accumulator and said element, a movably mounted member disposed adjacent said valve piece for contacting and moving the latter out of normal close-off position upon movement of said member in one relative direction with respect to said valve piece, said member having a first portion thereof communicating with said pump and a second portion thereof communicating with said element, and spring means contacting said second portion and biasing said member in said one relative direction whereby a predetermined pressure of less magnitude than said pump pressure exerted on said second portion effects movement of said member in said one relative direction to effect movement of said valve piece out of normal close-off position and effect communication of said accumulator with said element.

6. An object-moving apparatus comprising a movable hydraulically operated object-contacting element for effecting movement of the object upon actuation of said element in one direction, and hydraulic means for effecting actuation of said element in said one direction; said means including a hydraulic pump, a reservoir for hydraulic fluid communicating with the suction side of said pump, an adjustable control valve communicating with the discharge side of said pump, said element being in communication with the discharge side of said pump through said control valve, only when the latter is in

a first position of adjustment and out of communication with the discharge side of said pump and in communication with said reservoir, only when said control valve is in a second position of adjustment, a normally closed unloader valve communicating with the discharge side of said pump, when said control valve is in said second position of adjustment, and said unloader valve, when in open position, effecting communication of said reservoir with the discharge side of said pump, a pressure-responsive regulator operatively connected to said unloader valve to effect opening thereof upon said regulator being subjected to a predetermined pressure, means communicating with said reservoir for interrupting communication of the discharge side of said pump with said reservoir upon said control valve being in said first position of adjustment, a hydraulic pressure accumulator connected to the discharge side of said pump at a point intermediate said pump and control valve, said accumulator communicating with the discharge side of said pump and accumulating pressure therefrom only when said control valve is in said second position of adjustment and said unloader valve is closed, said accumulator communicating with said regulator and actuating same, when the accumulated pressure within said accumulator is the predetermined pressure for said regulator, the accumulated pressure within said accumulator supplementing the pressure from said pump to said element, only when said control valve is in said first position and initial actuation of said element in said one direction has been effected by the pump pressure alone.

7. An object-moving apparatus comprising a movable hydraulically operated object-contacting element for effecting movement of the contacted object upon actuation of said element in one direction, and hydraulic means for actuating said element in said one direction; said means including a hydraulic pump, a reservoir for hydraulic fluid communicating with the suction side of said pump, an adjustable control valve communicating with the discharge side of said pump, said element being in communication with only the discharge side of said pump through said control valve when the latter is in a first position of adjustment and in communication with only said reservoir through said control valve when the latter is in a second position of adjustment, a normally closed unloader valve communicating with the discharge side of said pump through said control valve only when the latter is in said second position of adjustment, said unloader valve, when in an open position, effecting communication of the discharge side of the pump to said reservoir, a pressure-responsive regulator operatively connected to said unloader valve to effect opening thereof only when said regulator is subjected to a predetermined pressure, a hydraulic pressure accumulator connected to the discharge side of said pump at a point intermediate said pump and control valve and in communication with the discharge side of said pump only when said control valve is in said second position of adjustment and said unloader valve is closed, said accumulator communicating with said regulator and exerting a predetermined pressure thereon upon said predetermined pressure being accumulated within said accumulator, said accumulated pressure being discharged from said accumulator and supplementing the pump pressure to said element only when said control valve is in said first position and initial actuation of said element in said one direction has been effected by the pump pressure alone.

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