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PORTABLE HYDRAULIC POWER UNIT

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2 Sheets-Sheet 2

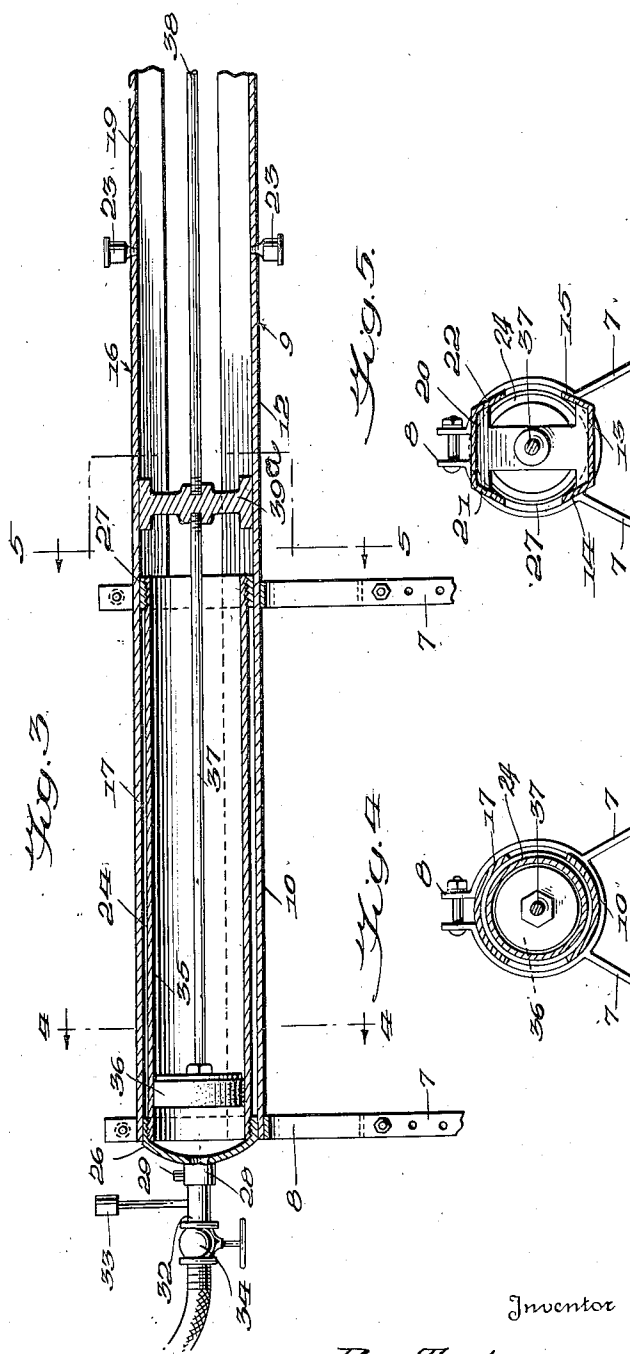
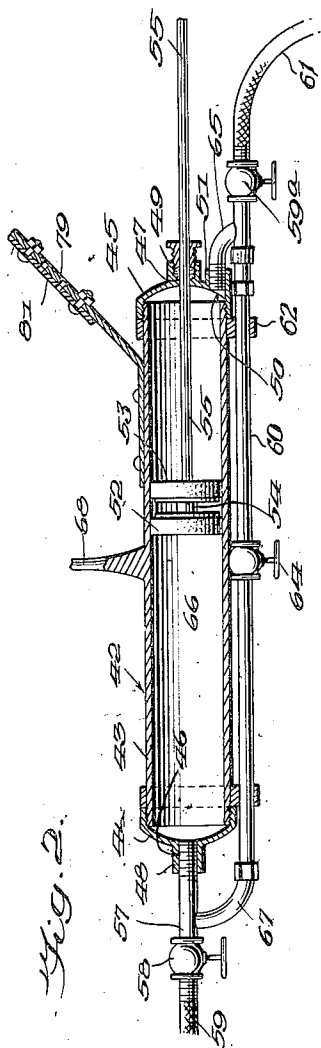
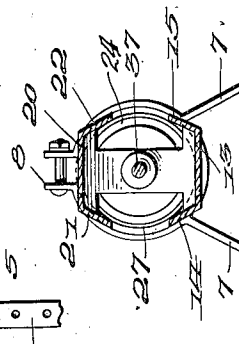


Fig. 5.



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PORTABLE HYDRAULIC POWER UNIT

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2 Claims. (Cl. 60—54.5)

This invention relates to a portable hydraulic power unit designed primarily for driving or operating cross cut saws, but it is to be understood that a unit in accordance with this invention may be employed in any connection for which it is found applicable, and the invention has for its object to provide, in a manner as hereinafter set forth, a portable, controllable unit of the class referred to for efficiently operating, when desired, a cross-cut saw.

A further object of the invention is to provide, in a manner as hereinafter set forth, a portable, controllable hydraulic power unit for operating cross-cut saws and including means to constitute a guide for the saw during the reciprocation of the latter.

A further object of the invention is to provide, in a manner as hereinafter set forth, a portable, controllable hydraulic power unit for driving a cross-cut saw and including a pair of oppositely operable pressure generating mechanisms or cylinders and a driving mechanism or cylinder alternately communicating with the pressure generating mechanisms or cylinders and further including means whereby the said cylinders may be expeditiously supplied with fluid, such as water or oil, when occasion requires.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a portable, controllable hydraulic power unit which is comparatively simple in its construction and arrangement, strong, durable, compact, conveniently handled, readily controlled, thoroughly efficient in its use, quickly repaired when occasion requires, and comparatively inexpensive to set up.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and are as illustrated in the accompanying drawings wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:—

Figure 1 is an elevation of a hydraulic controllable power unit in accordance with this invention,

Figure 2 is a fragmentary view in longitudinal section illustrating the driving mechanism or cylinder,

Figure 3 is a fragmentary view in longitudinal section illustrating one of the pressure generating mechanisms or cylinders,

Figure 4 is a section on line 4—4, Figure 3,

Figure 5 is a section on line 5—5 of Figure 3, Figure 6 is a fragmentary sectional view illustrating the guide or track for the saw, and

Figure 7 is a detail illustrating a handle member.

The unit includes a supporting structure formed of a series of pairs of upstanding lengthwise adjustable supports 7. Each pair of supports 7 is provided at its upper end with an adjustable split annular coupling member 8. Mounted within and supported by the several couplings 8 is a lower supporting member 9 formed of a pair of end stretches 10, 11 of segmental contour in transverse section and an intermediate stretch 12. The latter with reference to Figure 5 includes a flat bottom 13 and a pair of oppositely outwardly extending sides 14 and 15. Positioned within the several couplings 8 and arranged against the inner face of the upper portions thereof is a holder member 16 of the same form as the member 9 but it is oppositely disposed with respect to the latter. The end stretches of the member 16 are indicated at 17, 18 and are of segmental contour in transverse section. The intermediate or central stretch of the member 16 is indicated at 19 and with reference to Figure 5 it includes a flat top portion 20 and a pair of depending oppositely outwardly inclined side portions 21, 22. The stretches 12, 19 of the members 9, 16 coact to provide a slide-way or track for a purpose to be referred to. The said stretches 12, 19 have connected thereto lubricant cups 23.

Arranged between the stretches 10, 17 of the members 9, 16 is a hydraulic pressure generating mechanism or cylinder 24. Arranged between the stretches 11, 18 of the members 9, 16 is a hydraulic pressure generating mechanism or cylinder 25. The mechanisms 24, 25 are arranged in endwise spaced relation and are substantially of the same construction but oppositely disposed. Each mechanism is open at its inner end and includes an outer head 26 provided with a fluid outlet nipple axially thereof as at 28 and the said nipple is provided with an air vent 29 for a purpose to be referred to. Attached to the nipple 28 is a pipe branch 32 provided with a safety valve 33. Pipe branch 32 opens into a cut-off valve 34. Operating in the cylinder 35 of each of the said mechanisms is a piston 36. Piston rods are attached to the said pistons and extend from the open inner ends of said mechanisms. The piston rod of the mechanism 24 is indicated at 37 and that of the mechanism 25 is designated 38. Interposed in the pipe branch 32 of the mechanism

25 is a filler valve 39. The structural difference between the mechanisms 24, 25 resides solely in the interpositioning of the filler valve 39 in the pipe branch 32 of the mechanism 25. The pistons 36 of the said mechanism alternately operate in opposite directions. Spacer rings 27 hold the open ends of the cylinders in alignment.

The coupling devices 8 encompass the members 9 and 16 and when in coupling position tightly couple the mechanism 24, 25 with the supports 7.

Mounted for reciprocation within the stretches 12, 19 of the members 9, 16 respectively is a slidable bearing block 39^a to which the outer ends of the piston rods 37, 38 are detachably connected. Connected with the block 39^a is a crank arm 40 operating from any suitable means, not shown, for reciprocating the block 39^a thereby providing for the operation of the pistons 36 alternately in opposite directions.

The unit includes a portable driving mechanism or cylinder 42 alternately operated in opposite directions from the hydraulic pressure generated in the mechanisms 24, 25. The mechanism 42 includes a tubular body 43 closed at its ends by the heads 44, 45 formed with axially arranged openings 46, 47 respectively. Extending outwardly from head 44 is an interiorly threaded nipple 48 which registers with the edge of opening 46. The head 45 carries on its outer face a packing means 49 which surrounds the opening 47. The head 45 adjacent opening 47 is formed with an opening 50 and an outwardly directed interiorly threaded nipple 51 registering with the edge of opening 50. Operating in the body 43 is a pair of oppositely disposed pistons 52, 53 arranged in close relation and connected together by a coupling piece 54 to cause said pistons 52, 53 to move bodily together. Connected to the piston 53 and extending through the opening 47 and packing means 49 is a piston rod 55 which constitutes an operating element for the saw or tool 56.

Anchored in the nipple 48 is an outwardly directed pipe 57 provided at its outer end with a cut-off valve 58. Leading from the valve 34 of the mechanism 24 to the valve 58 of mechanism 42, is a flexible hydraulic pressure conducting line 59 which may be of any length desired. When valve 58 is closed it prevents the supply of hydraulic pressure from mechanism 24 to mechanism 42. When valve 34 of mechanism 24 is closed it prevents the outlet of pressure from mechanism 24. Leading from the valve 34 of mechanism 25 to a cut-off valve 59^a on one end of a by-pass pipe 60 is a flexible hydraulic pressure conducting line 61 which may be of any length desired. The pipe 60 is secured to and in lengthwise relation with respect to body 43 by the coupling means 62. The pipe 60 intermediate its ends is provided with a throttle valve 64. The pipe 60 in proximity to valve 59^a is formed with a branch 65 coupled to the nipple 51 for supplying hydraulic pressure to the piston chamber 66 to act upon piston 53 for the purpose of bodily shifting pistons 52, 53 in a direction towards head 44. The other end of pipe 60 is formed with an extension 67 which opens into pipe 57 for the purpose of by-passing the pressure from pipe 57 to line 61. The line 59 supplies pressure to chamber 66 for action on piston 52 to provide for pistons 52, 53 bodily moving in a direction towards the head 45. The alternate application of pressure to pistons 52, 53 provides for the reciprocation of the piston rod 55. Pressure is supplied for action on piston 52 on the operation of the piston 36 of mechanism 24 in a direction towards

the head 26 of the said mechanism 24. Pressure is supplied for action on the piston 53 on the operation of the piston 36 of the mechanism 25 in a direction towards the head 26 of the said mechanism 25. Pressure is relieved on piston 52 when the piston 36 of mechanism 24 moves away from the head 26 of said mechanism 24. Pressure is relieved on piston 53 when the piston 35 of mechanism 25 moves away from the head 26 of the said mechanism 25. The by-pass pipe 61 and the manner in which it is arranged for communication with piston chamber 66 provides for the reciprocation in unison of the pistons 52, 53. The mechanism 43 is provided with a hand grip 68 for holding and shifting it.

The unit includes a curved handle 69 for the saw or tool 56. The handle 69 consists of a plurality of detachably connected adjustable sections for increasing or decreasing the length thereof to compensate for saws of different lengths. The outer sections of the handle are formed with couplers 70, 71 for detachably connecting the ends of the saw thereto. The coupler 70 is universally connected to the outer end of piston rod 55, as at 72. The central section of the handle has fixed thereto a block 73 formed with a passage 74. Revolvably mounted in block 73 and extending into the passage 74 are superposed bearing rollers 75. The block 73 carries a lubricant cup 76 and is provided with lubricant conduits 77.

The unit includes a combined holder, guide and suspension element 78 for the handle 69. The element 78 consists of an angle-shaped base member 79 which is anchored to and extends from the mechanism 42. Adjustably connected to and suspended from the base member 79 is a hanger member 80 formed with an inclined inner end stretch 81, an intermediate stretch 82 and an outer end stretch 83 disposed inwardly at right angles to stretch 82. The latter is of greater length than the stretches 81, 83 and extends through the passage 74 between the rollers 75. The stretch 82 constitutes a guide for the saw or tool during the reciprocation of the latter. The stretch 83 has extended outwardly therefrom a handle member 84, which when used in connection with the grip 68, facilitates the arranging of the driving mechanism and saw in any desired position with respect to the work to be operated upon.

The valves 34, 58, 59^a are closed when substituting pressure conducting lines 59, 61 of different lengths when desired.

When the unit is in use, the mechanisms 24, 25 are connected to the supports 7 and the mechanism 42 shifted to the desired position relative to the work by the attendants and held in such position during the operation of the saw.

The pressure conducting lines 59, 61 are detachably connected to the valves 34, 58, 59^a in a manner to permit the convenient removal thereof when desired.

The vent 29 is employed for exhausting air when filling.

In operation the pistons 36 are reciprocated by the pitman or member 40. This causes the fluid in the cylinder 24 to pass through the pipes 59 and 61 into the cylinder 43 at opposite ends thereof and, upon the valve 64 being closed, the pistons 52 and 53 reciprocate to actuate the saw. Obviously a small amount of air may be left in the system to compensate for the effective cross sections of the cylinder 43 at its two ends, there being a slight difference between the two ends due to

the presence of the rod 55 in one end. However, even if no air is allowed to remain in the system the difference in capacity of the two ends of the cylinder 43 will not interfere with the operation because a small vacuum space can exist as pistons 52 and 53 move towards the left of Figure 2 at one side or the other of these pistons.

What I claim is:—

1. In a hydraulic power unit, a pair of spaced elongated trough-shaped frame members having flaring sides and confronting each other in parallelism, a pair of cylinders fixed between the respective end portions of said frame members, said cylinders having heads at their remote ends and being open at their adjacent ends, a bearing block forming a cross head slidably mounted in said frame members between said cylinders, a piston in each cylinder, piston rods connecting said pistons and cross-head means to reciprocate said cross head, a third cylinder having both ends closed, a piston in the third cylinder, a piston rod extending from the last mentioned piston

through one of said heads, and flexible pipe means connecting the ends of the third piston with the head ends of the first pair of cylinders.

2. In a hydraulic power unit, a pair of spaced elongated trough-shaped frame members having flaring sides and confronting each other in parallelism, a pair of cylinders fixed between the respective end portions of said frame members, said cylinders having heads at their remote ends and being open at their adjacent ends, a bearing block forming a cross head slidably mounted in said frame members between said cylinders, a piston in each cylinder, piston rods connecting said pistons and cross-head means to reciprocate said cross head, a third cylinder having both ends closed, a piston in the third cylinder, a piston rod extending from the last mentioned piston through one of said heads, flexible pipe means connecting the ends of the third piston with the head ends of the first pair of cylinders, and a valved by-pass connecting the ends of the third cylinder.

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