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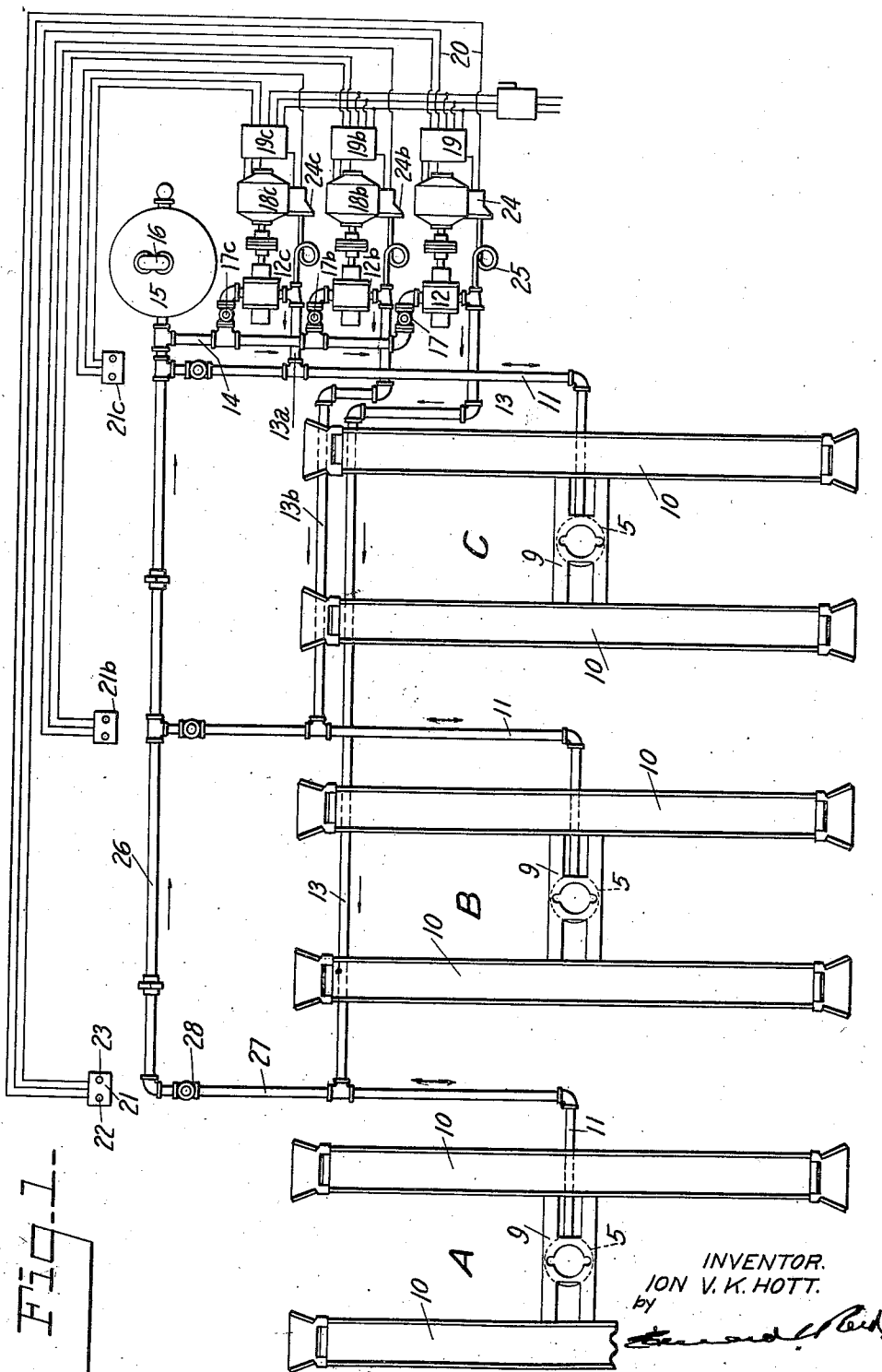
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1,903,763

HYDRAULIC LIFTING MECHANISM

Filed July 15, 1930.

2 Sheets-Sheet 1



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Fig. 2.

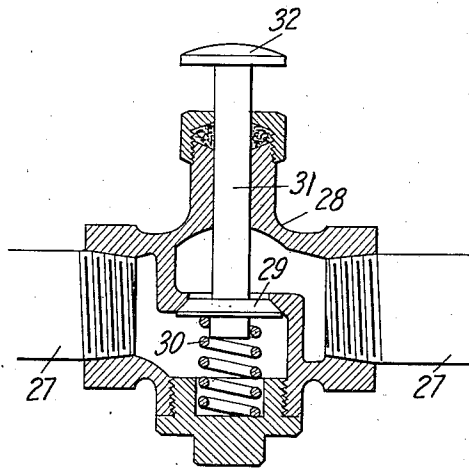
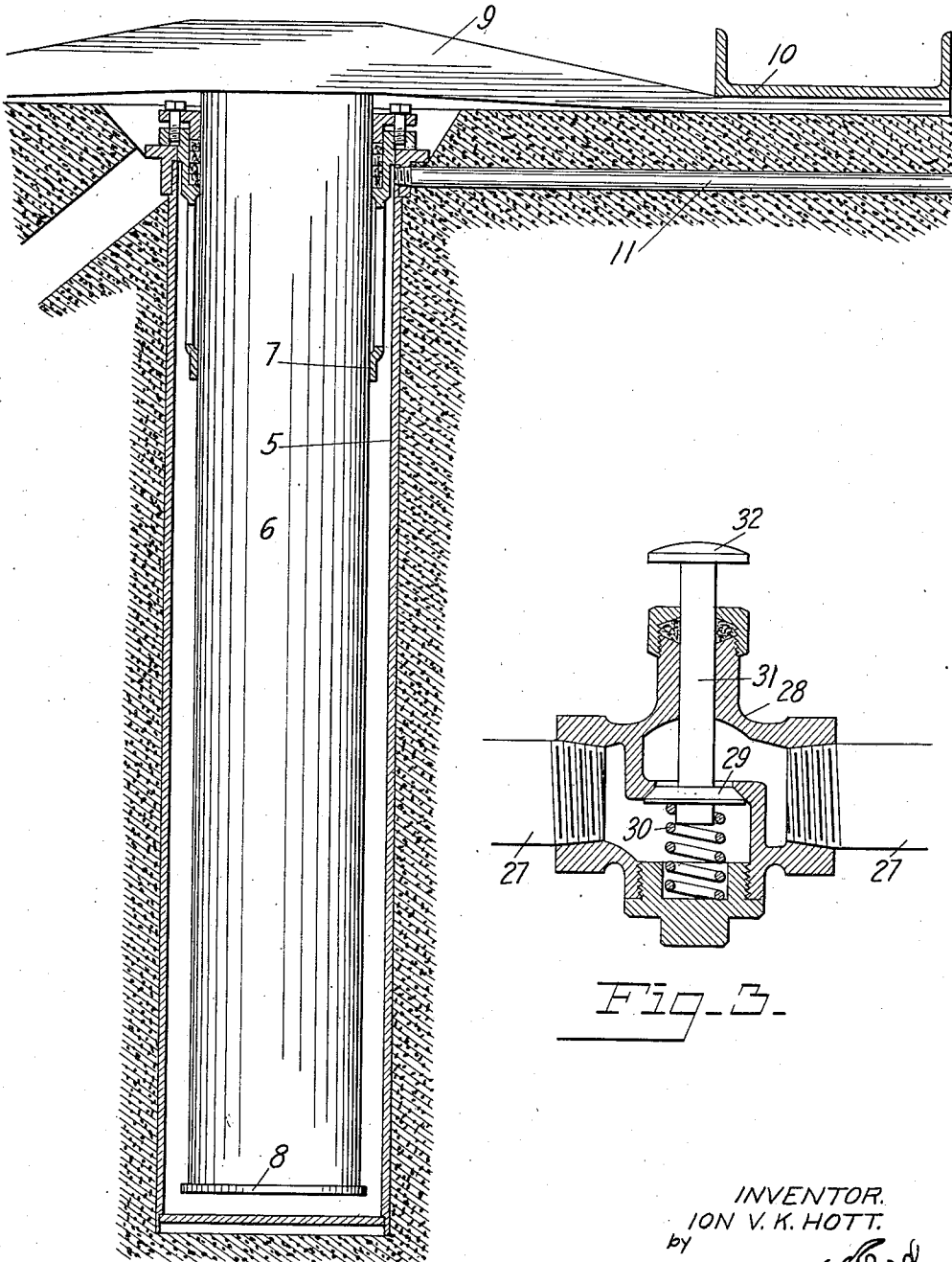


Fig. 3.

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HYDRAULIC LIFTING MECHANISM

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This invention relates to a hydraulic lifting mechanism and more particularly to that type of lifting mechanism commonly employed for elevating an automobile to permit access to be had to the underside thereof for the purpose of greasing or otherwise servicing the same.

One object of the present invention is to provide a lifting mechanism in which fluid under pressure will be delivered directly to the cylinder from a pump and having simple and efficient means for controlling the operation of the pump.

A further object of the invention is to provide such a lifting mechanism having means for automatically interrupting the operation of the pump when the lifting element reaches the limit of its movement.

A further object of the invention is to provide a lifting mechanism and operating devices therefore of such a character that the operating devices for a battery of lifting mechanisms may be grouped at a point spaced from the lifting mechanisms and controlled by the operators from their stations adjacent to the respective lifting mechanisms.

Other objects of the invention will appear as the mechanism is described in detail.

In the accompanying drawings Fig. 1 is a plan view of an installation comprising a series of lifting mechanisms and the operating devices therefor; Fig. 2 is a vertical sectional view taken through one of the lifting mechanisms; and Fig. 3 is a sectional detail view of the check valve in the return pipe.

In these drawings I have illustrated one embodiment of my invention and have shown the same in connection with a lifting mechanism of a well known type but it will be understood that this amendment has been chosen for the purpose of illustration only, that the invention may take various forms and may be applied to lifting mechanisms of various kinds.

In the particular installation here illustrated I have shown three lifting mechanisms, A, B and C, which are connected with a common source of supply for fluid and are provided with separate pumps for delivering fluid thereto and for controlling the operation thereof.

The several lifting mechanisms are identical in character and construction and it will suffice to describe one of them.

Each lifting mechanism, in the form here shown, comprises a cylinder 5 which is sunk in the ground and is usually embedded in concrete. A piston 6 is mounted within the cylinder and is here shown as of a diameter considerably less than the diameter of the cylinder, the latter being provided at its upper end with a bearing 7 in which the piston is slidably supported. The piston has at its lower end a stop, such as a circumferential shoulder 8, arranged to engage the lower end of the bearing 7 and thus limit the upward movement of the piston. Mounted on the upper end of the piston above the cylinder is a supporting device 9 which carries a pair of parallel tracks or runways 10 onto which the automobile may be driven when the piston is in its lower position. Fluid under pressure, preferably oil, is delivered to the cylinder, to operate the piston, through a pipe 11 which, in the present instance, communicates with the cylinder near the top thereof, the bearing 7 being spaced from the wall of the cylinder to provide a free passage for the fluid.

The oil or other fluid is delivered to the cylinder by a pump 12, preferably of a rotary type, the discharge side of which is connected with a pipe 13 leading to the cylinder and, in the present instance, connected with the pipe 11. The intake side of the pump is connected by a pipe 14 with a suitable source of supply for fluid, such as a storage reservoir 15, which is here shown as having a goose neck vent pipe 16. A check valve 17 is interposed in the pipe 14 between the pump and the reservoir to prevent the return flow of the fluid. The pump 12 is directly connected with an electric motor 18, the operation of which is controlled by an electro-magnetic switch 19, which may be of a well known construction and is not here shown in detail. The electro-magnetic switch is connected by means of conductors 20 with a manually operated controlling switch 21 located at a point adjacent to the lifting device. This manually operated switch is here shown as of the push button type and comprises a starting button 22 and

a stopping button 23, the arrangement being such that when the starting button is pressed the electro-magnetic switch will close the circuit through the motor and when the stopping button is pressed the electro-magnetic switch will interrupt the circuit through the motor. The pump and its operating mechanism are preferably located at a point more or less remote from the lifting mechanism and by placing the controlling switch adjacent to the lifting mechanism the operator may control the motor and pump without leaving his station at the lifting mechanism. The operation of the pump will force fluid into the cylinder under sufficient pressure to lift the piston and the load thereon. The movement of the piston can be stopped at any time by interrupting the operation of the motor, and inasmuch as the check valve 17 prevents the return flow of the fluid through the pipe 13 and the pump the piston and its load will be locked in the position to which it has been elevated. Usually the piston is elevated to its full height, that is, until the stop 8 engages the lower end of the bearing 7 which thus positively checks the movement of the piston. The operator should then stop the motor but to avoid the possibility of the motor and pump continuing in operation after the piston has reached the limit of its movement, and during the servicing of the automobile, I have provided means for automatically stopping the motor and pump when the movement of the piston is stopped. For this purpose I have connected in the controlling circuit for the electro-magnetic switch a pressure switch 24, which may be of any well known type and is not here shown in detail. This pressure switch is connected with the cylinder of the lifting mechanism, in the present instance by connecting it with the pipe 13 by means of a tube 25. The pressure switch is of such a character and is so adjusted that the normal pump pressure which lifts the load on the piston will not operate the switch but when the movement of the piston has been interrupted the continued operation of the pump will cause the pressure to build up within the cylinder and this excess pressure will operate the pressure switch 24 to open the circuit through the electro-magnetic switch 19 and cause that switch to break the circuit through the motor.

The cylinder of the lifting mechanism is connected with a return pipe 26 which, in the present construction, leads back to the storage reservoir 15. This pipe may be connected with the cylinder in any suitable manner but as here shown it is connected by a pipe 27 with the pipe 11. A check valve 28 is interposed in the pipe 27 between the return pipe and the pipe 11 and normally prevents the flow of the fluid through the return pipe but is provided with means whereby it may be opened by the operator

to permit the escape of the fluid from the cylinder through the return pipe, thus permitting the piston and its load to move downwardly by gravity. The check valve may take any suitable form but, as here shown in Fig. 3, it comprises a valve member 29 which is held against its seat by a spring 30 and by the back pressure of the fluid in the pipe 27. The stem 31 of the valve member extends upwardly beyond the casing and is provided with a head 32 which may be engaged by the operator to open the valve. Usually the pipe would be embedded in the concrete or below the floor and the head 32 of the valve stem may project above the floor a short distance so that it may be readily engaged and operated by the foot of the operator.

The cylinders of the several lifting mechanisms are connected with separate pumps which are separately controlled. The operating mechanism above described is connected with the lifting mechanism A. The pipe 11 of the lifting mechanism B is connected by a pipe 13b with a pump 12b, the intake side of which is connected with the reservoir 15 through the pipe 14, a check valve 17b being interposed between the pump and the pipe. Likewise the pipe 11 of the cylinder of the lifting mechanism C is connected by a pipe 13c to a pump 12c, the intake side of which is connected with the pipe 14 through a check valve 17c. The pumps 12b and 12c are operated by motors 18b and 18c which are controlled by magnetic switches 19b and 19c, each magnetic switch being provided with a remote controlling switch, 21b and 21c. Associated with each motor is a pressure switch, 24b and 24c operating as above described to automatically stop the motor when the lifting element has reached the limit of its movement.

The pumps and their associated operating mechanisms are preferably grouped at a point remote from the lifting mechanism, where they will be out of the way and suitably protected. The controlling mechanism is of such a character that the pump for each lifting mechanism may be controlled by the operator from his station adjacent to that lifting mechanism and when the lifting element reaches the limit of its movement the operation of the pump will be automatically interrupted without action on the part of the operator.

While I have shown and described one embodiment of my invention I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a mechanism of the character de-

scribed, a plurality of hydraulic lifting mechanisms each comprising a cylinder, a piston, and means carried by said piston to receive and support an automobile; a separate pump connected with the cylinder of each lifting mechanism, said pumps being grouped at a point remote from said lifting mechanism and having their intakes connected with a common supply reservoir, check valves interposed between said intakes and said reservoir, a return pipe connected with the cylinder of each lifting mechanism, a check valve interposed between said return pipe and each cylinder, means arranged adjacent to the respective lifting mechanisms and under the control of the operator for separately actuating said check valves to permit the escape of fluid from said cylinders, a separate motor connected with each pump, manually operated means arranged adjacent to the respective lifting mechanisms to control the starting and stopping of said motors, and pressure operated switches associated with the respective motors and connected with the cylinders of the corresponding lifting mechanisms and adapted to be operated by excess pressure in said cylinders to interrupt the operation of the respective motors.

2. The combination with a plurality of automobile lifting mechanisms each comprising a cylinder, a piston and means carried by the piston for supporting an automobile, of a plurality of pumps grouped at a point remote from said lifting mechanisms, conduits connecting the several pumps with a common source of fluid supply, a check valve in each of said conduits, other conduits connecting said pumps with the cylinders of the respective lifting mechanisms, electric motors operatively connected with the respective pumps, switches for starting and stopping said motors arranged adjacent to the respective lifting mechanisms, return conduits leading from the cylinders of the respective lifting mechanisms to said source of fluid supply, a normally closed check valve in said return conduits adjacent to the respective lifting mechanisms, and means under the control of the operator for separately opening said check valves.

In testimony whereof, I affix my signature hereto.

JON VON KERT HOTT.

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