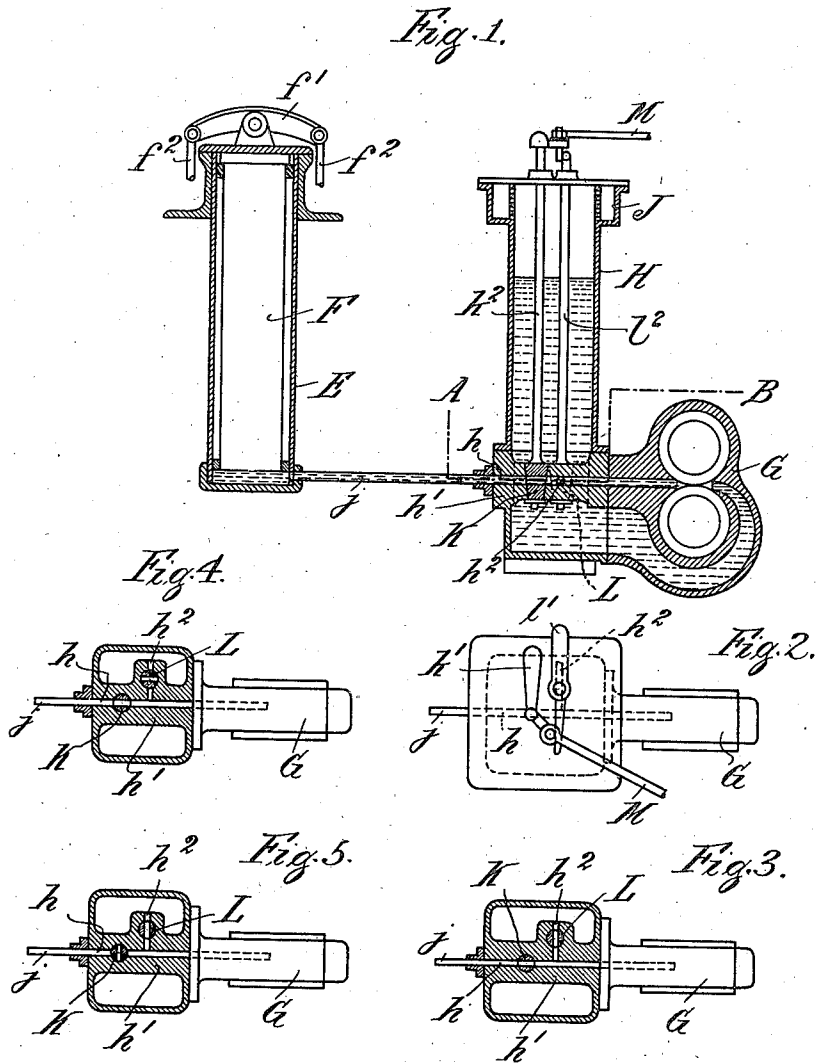


K. H. W. L. SECK.
HYDRAULIC LIFTING MECHANISM.
APPLICATION FILED JAN. 28, 1913.

1,093,151.

Patented Apr. 14, 1914.

2 SHEETS—SHEET 1.



Witnesses:
Charles D. Brompton
John A. Percival

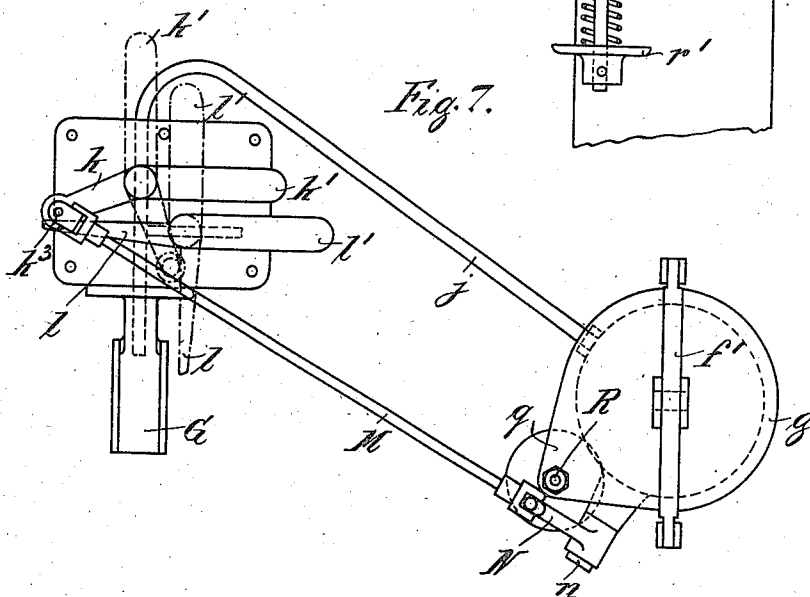
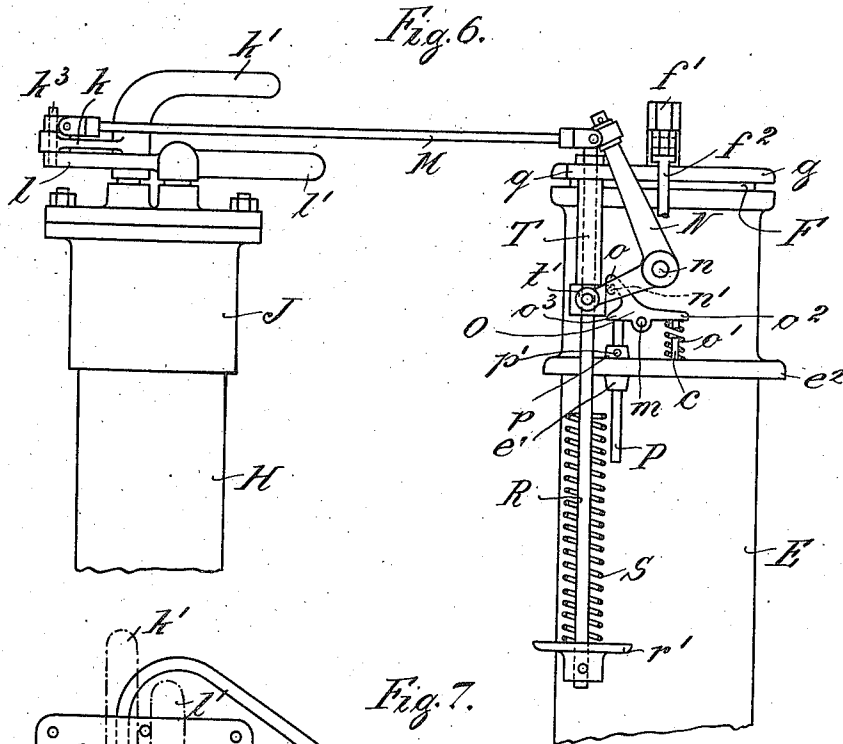
Inventor:
K. H. W. L. Seck
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UNITED STATES PATENT OFFICE.

KARL HEINRICH WILHELM LUDWIG SECK, OF MANNHEIM, GERMANY, ASSIGNOR
TO THE FIRM OF HEINRICH LANZ, OF MANNHEIM, GERMANY.

HYDRAULIC LIFTING MECHANISM.

1,093,151.

Specification of Letters Patent.

Patented Apr. 14, 1914.

Application filed January 28, 1913. Serial No. 744,648.

To all whom it may concern:

Be it known that I, KARL HEINRICH WILHELM LUDWIG SECK, subject of the German Emperor, residing at 22 Augusta Anlage, Mannheim, in the German Empire, have invented certain new and useful Improvements in Hydraulic Lifting Mechanism, of which the following is a specification.

This invention relates to an improved hydraulic lifting mechanism particularly intended for lifting and lowering the hoes or other cultivating implements of motor-driven cultivating machines.

According to the present invention the hoes or cultivators are suspended from a piston working within a cylinder and adapted to be raised or lowered therein by the passage of a fluid to or from the cylinder, the fluid being supplied thereto from a suitable receptacle by means of a fluid pump whose receiving end is always in communication with the fluid receptacle, valve means being provided for enabling the pump either to supply the fluid to the cylinder or to idly circulate the fluid to and from the fluid receptacle and for enabling the fluid in the cylinder to be returned to the fluid receptacle on the lowering of the cultivators.

In order that the invention may be more clearly understood, reference is made to the accompanying drawings showing one embodiment of the invention by way of example.

Figure 1 is a detail vertical sectional elevation showing the pump, fluid receptacle, cylinder, and piston, the parts being shown in the same plane for the sake of clearness. Fig. 2 is a plan view of the pump and fluid receptacle, and Figs. 3, 4 and 5 are horizontal sectional views on the line A—B of Fig. 1, showing the position of the valves at different stages of the raising and lowering operation. Fig. 6 is a detail side view of the upper part of the fluid receptacle and piston cylinder, and Fig. 7 is a plan view thereof.

The cultivators are suspended from a piston F working within a cylinder E, the piston F supporting at its upper end a balanced lever f' from which the cultivators are suspended by means of connecting rods f^2 and a transverse bar. The piston F is adapted to be raised within the cylinder E by supplying a fluid, preferably oil, thereto from a pump G preferably of the rotary

geared-vane type and adapted to be driven from any suitable source of power.

The pump G takes oil from an oil receptacle H which is always in communication with the receiving end of the pump G and which has a valve casing h' therein bridged across the interior of the receptacle H and provided with a transverse passage h connecting the pressure space of the pump G with a pipe j leading to the cylinder E. Rotatably mounted in the valve casing h' are two valves or cocks K and L, the cock K controlling the passage h while the cock L controls a branch passage h^2 connecting the passage h with the interior of the oil receptacle H as may be readily seen in Figs. 3 to 5. The cocks K and L are adapted to be rotated by means of levers k' and l' respectively mounted on the top of the oil receptacle H and connected to the valves by means of valve rods k^2 and l^2 respectively. The pump G is adapted to supply oil from the receptacle H to the cylinder E or to idly circulate the oil to or from the receptacle H according to the position of the cocks K and L respectively. When the cultivators are in their lowermost condition the cocks K and L are in the position illustrated in Fig. 3, in which both cocks are open, the pump G taking oil from the receptacle H and returning it thereto through the passages h and h^2 .

If it is desired to raise the cultivators, the cock L is closed as illustrated in Fig. 4, so that the pump G will now no longer return the oil to the receptacle H and in consequence thereof the oil will be forced through the open cock K to the cylinder E and raise the piston F therein together with the balanced lever f' and connecting rods f^2 , thus raising the cultivators. When the cultivators have been raised to the desired height, the cock K may be closed and the cock L opened, as illustrated in Fig. 5; whereupon the oil will be prevented from returning from the cylinder E while the pump G will again idly circulate oil to and from the receptacle H. If the cultivators are to be lowered the cock K is again opened as illustrated in Fig. 3 whereupon the oil in the cylinder E will be forced back automatically under the weight of the piston F and the parts connected thereto, thus returning the oil to the receptacle H through the passages h and h^2 .

It will thus be seen that by proper control of the cocks K and L the cultivators may be raised to any desired position. In order that the cultivators may not be raised above a pre-determined height mechanism is provided for automatically controlling the cocks K and L, this mechanism being more clearly illustrated in Figs. 6 and 7. For this purpose the valve operating levers k' and l' have extensions k and l respectively on the other side of their axes of rotation, the extension k being connected to a connecting rod M by a pin k^3 extending downwardly into the path of the extension l so as to bear thereagainst. Accordingly, if the lever k' is turned into the position illustrated in dotted lines in Fig. 7, the lever l' will be turned therewith, as likewise illustrated in dotted lines in Fig. 7, thus bringing the cocks K and L into the position illustrated in Fig. 5.

The connecting rod M is connected to one arm of an elbow lever N pivoted at n to the cylinder E and having on its other arm a projecting pin n' adapted to engage with the arm o of a three-armed lever O pivoted at m to the cylinder E, the arm o being held against the pin n' by a spring o' guided on a pin c on the cylinder E and bearing against the second arm o^2 of the three-armed lever O whose third arm o^3 abuts against a pin P passing through a boss e' on a flange e^2 on the cylinder E, said pin P being screwed or otherwise adjustable in a nut or sleeve p normally resting upon the flange e^2 . The pin P may be held fast in the nut or sleeve p by a pinching screw p' .

The cover g from which depends the piston F has a projecting lug g to which is secured one end of a vertical rod R supporting at its lower end a disk r' . Threaded on the rod R is a spring S supported by the disk r' and adapted, when raised, to bear against a loose sleeve T on the rod R and connected at its lower end t' to the lower arm of the elbow lever N.

When oil is supplied to the cylinder E from the pump G the cocks K and L are in the position illustrated in Fig. 4 and the levers k' and l' in the position illustrated in Fig. 7 in full lines. As the piston F is raised the rod R moves upwardly therewith causing the spring S to be compressed against the lower end of the sleeve T which is prevented from movement by the engagement of the arm o with the pin n' of the elbow lever N. As the rod R continues its upward movement, the disk r' thereon strikes the pin P, raising the latter and releasing the pin n' from the arm o , whereupon the elbow lever N is suddenly rotated by the action of the spring S on the sleeve T, thus causing the elbow lever N to pull the rod M sharply, thus swinging the levers k' and l' into the position illustrated in dotted lines

in Fig. 7 corresponding to the position of the cocks K and L in Fig. 5, thus cutting off the supply of oil to the cylinder E and causing the oil to be idly circulated to or from the receptacle H.

It will be readily understood that the moment at which the valves are automatically operated and consequently the height of the cultivators may be varied by corresponding adjustment of the pin P.

In order to prevent the entry of dust into the oil receptacle H a filtering device J may be arranged on the open end of said receptacle H.

I claim:—

1. Hydraulic lifting mechanism comprising a cylinder, a piston working therein and adapted to be connected to an element to be lifted, a rotary geared-vane pump connected to said cylinder; a fluid receptacle between said pump and cylinder and open always to the receiving end of said pump, and valves in said receptacle for enabling said pump either to supply fluid from said receptacle to said cylinder or to circulate it idly to and from said receptacle, while the fluid in said cylinder may return to said receptacle without passing through said pump.

2. Hydraulic lifting mechanism comprising a cylinder, a piston working therein and adapted to be connected to an element to be lifted, a rotary geared-vane pump, a fluid receptacle connected to and open always to the suction side of said pump, a valve casing bridged across the interior of said receptacle, a pressure fluid passage passing through said valve casing from the pressure side of said pump to said cylinder, a branch fluid passage in said valve casing leading from said pressure fluid passage and opening into said receptacle, rotatable valves in said valve casing for controlling said fluid passages, and means for manipulating said valves.

3. Hydraulic lifting mechanism comprising a cylinder, a piston working therein and adapted to be connected to an element to be lifted, a rotary geared-vane pump, a fluid receptacle connected to and open always to the suction side of said pump, a valve casing in said receptacle, a pressure fluid passage passing through said valve casing from the pressure side of said pump to said cylinder, a branch fluid passage in said valve casing leading from said pressure fluid passage and opening into said receptacle, valves in said valve casing for controlling said fluid passages, and mechanism for automatically closing the valve in said pressure fluid passage and for automatically opening the valve in said branch fluid passage on a pre-determined movement of said piston.

4. Hydraulic lifting mechanism comprising a cylinder, a piston working therein and adapted to be connected to an element to be

lifted, a fluid receptacle, a pump, a fluid passage from the pressure side of said pump to said cylinder, a branch fluid passage leading therefrom into said receptacle, a connection from said receptacle to the suction side of said pump, valves in said fluid passages, operating levers for said valves, and mechanism for automatically operating said levers on a pre-determined movement of said piston.

5. Hydraulic lifting mechanism comprising a cylinder, a piston working therein and adapted to be connected to an element to be lifted, a fluid receptacle, a pump, a fluid passage from the pressure side of said pump to said cylinder, a branch fluid passage leading therefrom into said receptacle, a connection from said receptacle to the suction side of said pump, valves in said fluid passages, operating levers for said valves, an elbow lever pivoted on said cylinder, one arm of which is connected to said operating levers, means for temporarily locking said elbow lever, a spring adapted to bear against the other arm of said elbow lever on the outward movement of said piston, and mechanism for releasing said locking means on a pre-determined outward movement of said piston to enable said spring to actuate said elbow lever.

6. Hydraulic lifting mechanism comprising a cylinder, a piston working therein and adapted to be connected to an element to be lifted, a fluid receptacle, a pump, a fluid passage from the pressure side of said pump to said cylinder, a branch fluid passage leading therefrom into said receptacle, a connection from said receptacle to the suction side of said pump, valves in said fluid passages, operating levers for said valves, an elbow lever pivoted on said cyl-

inder, one arm of which is connected to said operating levers, a pin on the other arm of said elbow lever, a spring-controlled locking member engaging said pin, an adjustable pin actuating said locking member to disengage it from the pin on said elbow lever, a rod connected to said piston, an abutment thereon adapted to engage said pin on a pre-determined outward movement of said piston, and a spring on said rod adapted to be compressed against the pin-carrying arm of said elbow lever on the outward movement of said piston.

7. Hydraulic lifting mechanism comprising a cylinder, a piston working therein and adapted to be connected to an element to be lifted, a fluid receptacle, a pump, a fluid passage from the pressure side of said pump to said cylinder, a branch fluid passage leading therefrom into said receptacle, a connection from said receptacle to the suction side of said pump, valves in said fluid passages, operating levers for said valves, an elbow lever pivoted on said cylinder, a connecting rod from one arm of said elbow lever to one of said operating levers, an abutment on the last mentioned operating lever abutting against the other operating lever, means for temporarily locking said elbow lever, a spring adapted to bear against the other arm of said elbow lever on the outward movement of said piston, and mechanism for releasing said locking means on a predetermined movement of said piston.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLY SECK.

Witnesses:

H. MEYER,
JOSEPH HEIFFER.