

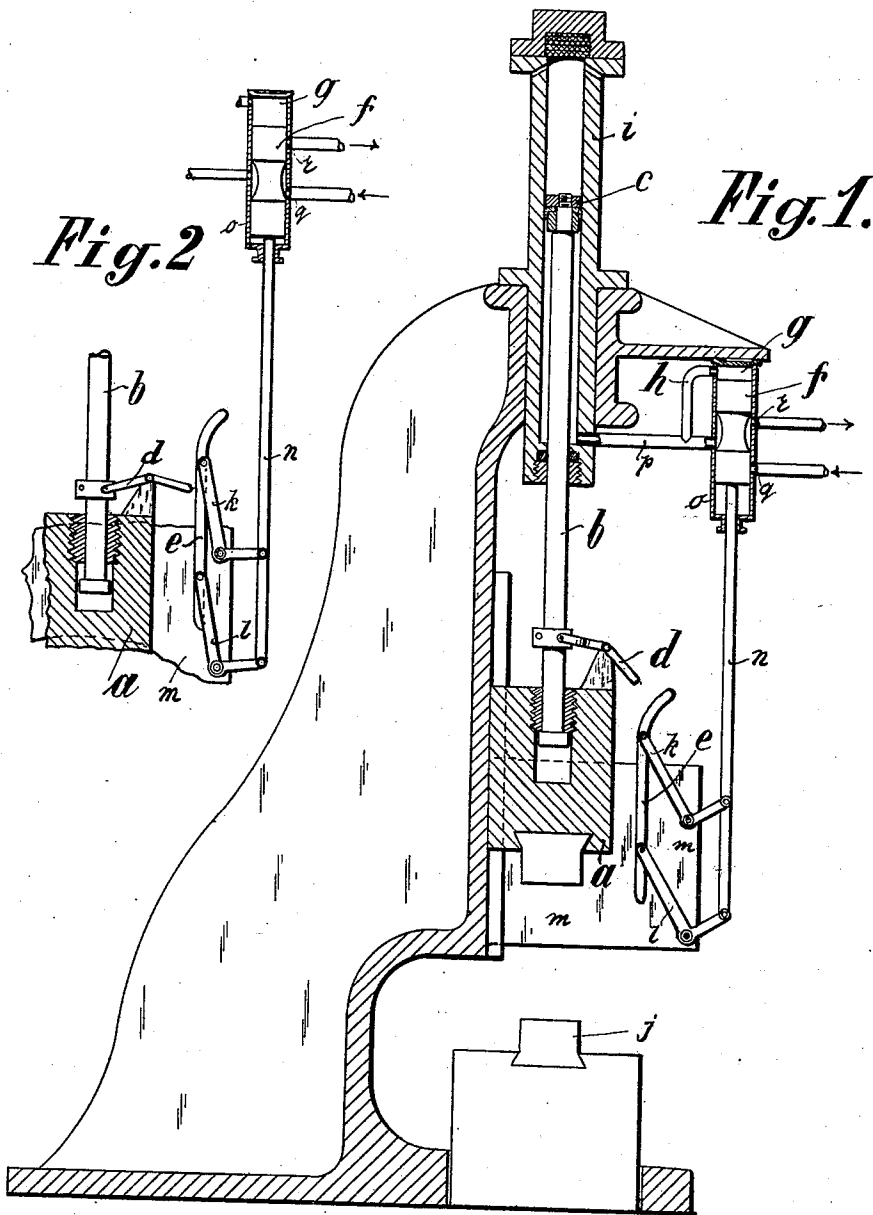
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PATENTED JUNE 4, 1907.

C. PRÖTT.

DROP HAMMER.

APPLICATION FILED JUNE 9, 1906.



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# UNITED STATES PATENT OFFICE.

CARL PRÖTT, OF HAGEN, GERMANY.

## DROP-HAMMER.

No. 855,976.

Specification of Letters Patent.

Patented June 4, 1907.

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*To all whom it may concern:*

Be it known that I, CARL PRÖTT, a citizen of the German Empire, and a resident of Hagen i. W., Germany, have invented certain new and useful Improvements in Drop-Hammers, of which the following is a specification.

In steam and air drop-hammers the piston-rod is, as a rule, connected with the hammer head or drop either rigidly or resiliently. The latter connection is effected by placing between the end of the piston rod and the drop an elastic pad, by which, on the latter dropping down, the inertia of the piston-rod is neutralized.

In the drop-hammer which forms the subject matter of this invention the piston-rod in a similar way slides in the hammer head, but no elastic pad is used. The inertia of the piston-rod sliding in the drop is utilized here for reversing.

The drawing illustrates a hydraulically worked drop-hammer with a self-acting slide.

Figure 1 of the same shows a drop-hammer in the position in which, during the free drop of the hammer-head the slide of the reversing-mechanism allows the motor fluid to escape from the cylinder. In Fig. 2 the reversing mechanism is shown with the piston rod in a changed position, so that the motor fluid is admitted under the piston to raise it with the hammer-head.

Similar letters refer to similar parts throughout the two views.

The hammer head *a* is connected with the piston-rod *b* in the usual manner so that its lower end can slide in the drop to a certain extent. The piston *c* at the upper end of the rod *b* plays in the cylinder *i* in the ordinary manner, and the pressure fluid is admitted into the cylinder to lift the hammer.

A lever *d* is fulcrumed on the hammer head and one end is pivotally connected to the piston-rod *b* in any suitable manner, so that said lever will turn as soon as the piston-rod slides down by inertia, as soon as the impact of the drop is broken by striking the work piece upon the anvil *j*. *e* is a vertical bar with curved upper end suspended by two bell-crank levers *k*, *l* fulcrumed to a bracket *m* fixed to the frame of the machine. The arms of the bell-crank levers opposite those which suspend the rod *e*, are connected to the stem *n* of a piston-valve *f*, movable within a valve chest *o* which communicates by means of a

pipe *p* with the cylinder *i*. In Fig. 1 this valve-piston is shown in a position, in which the free end of lever *d* can pass along the front edge of the bar *e*, and in this position the motor fluid from under the piston *c* can escape as indicated by an arrow. Consequently the hammer-head drops, and when at the end of the stroke the piston-rod *b* descends, the lever *d* by turning presses back the rod *e* as shown in Fig. 2, thus turning the two bell-crank levers and pulling the valve-piston *f* down at first into a position in which both the inlet port *q* and exhaust port *r* of the valve chest are closed. The rest of the water or other motor fluid under the piston *c* is now adapted to take up the inertia of piston-rod *b* to prevent any injury to the parts, and the confined water finds an escape by a branch pipe *h* communicating with the space *g* above the valve-piston *f*, hereby throwing the same fully into its lowest position as shown in Fig. 2 in which the exhaust port *r* is closed and the inlet port *q* is open so as to admit the motor fluid again under the piston *c* to raise the hammer-head. When the latter reaches the end of the up-stroke the valve is brought back into the position shown in Fig. 1 by hand, or, if several blows are to be struck in rapid succession, by any suitable automatic device, not shown. One means of returning the bar *e* and its connections to the position shown in Fig. 1 is to grasp either the bar *e*, one of the bell-crank levers, or the piston rod *n* and manually return the rod *e* and its connections to the position shown in Fig. 1.

Having thus described my invention, what I claim is:

1. In a drop-hammer apparatus, the combination with a hammer, of a piston-rod carrying the hammer and adapted to move downwardly therein, a pressure cylinder for the piston, a valve-controlling the flow of the pressure fluid in the pressure cylinder, means coacting with the piston-rod hammer and valve whereby the movement of the piston rod within the hammer when the latter is stopped by the impact of striking a blow, shifts the valve.

2. In a drop-hammer apparatus, the combination with a pressure cylinder, of a piston and its rod, a hammer carried by the piston-rod, the hammer being recessed to permit the downward movement of the piston-rod within the hammer when the latter is stopped in striking a blow, a valve and its stem, a valve

chest having inlet and exhaust ports, a passage connecting the valve chest with the pressure cylinder, bell-crank levers pivoted to the frame each having one of its arms connected to the valve stem, a rod pivotally suspended by the other arms of the bell-crank levers, a lever fulcrumed on the hammer and pivotally connected to the piston-rod and adapted to engage the pivotally suspended rod to shift the valve as the piston-rod moves downwardly within the hammer, and means whereby the valve may be returned to the position from which it was shifted.

3. In a drop-hammer apparatus, the combination with a pressure cylinder, of a piston and its rod, a hammer carried by the piston-rod the hammer being recessed to permit the downward movement therein of the piston-rod when the hammer is stopped in striking a blow, a valve chest having inlet and exhaust ports, a pipe connecting the valve chest with the pressure cylinder, a branch leading from the pipe to the exhaust end of the valve-chest, a valve having a stem and mounted to slide in the valve chest, and

timed to permit the pressure fluid to exhaust as the hammer descends, bell-crank levers pivoted to the frame each having one of its arms connected to the valve-stem, a rod pivotally suspended by the other arms of the bell-crank levers, a lever fulcrumed to the hammer and pivotally connected to the piston-rod and adapted by the continued downward movement of the piston-rod when the hammer is stopped in striking a blow, to press back the bell-crank-suspended rod thereby initially moving the valve to a position closing both the inlet and exhaust ports the final movement of the valve to a position opening the inlet-port being accomplished by the column of pressure fluid thus impounded under the piston and pressing upon the end of the valve through the branch pipe.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL PROTT.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.