

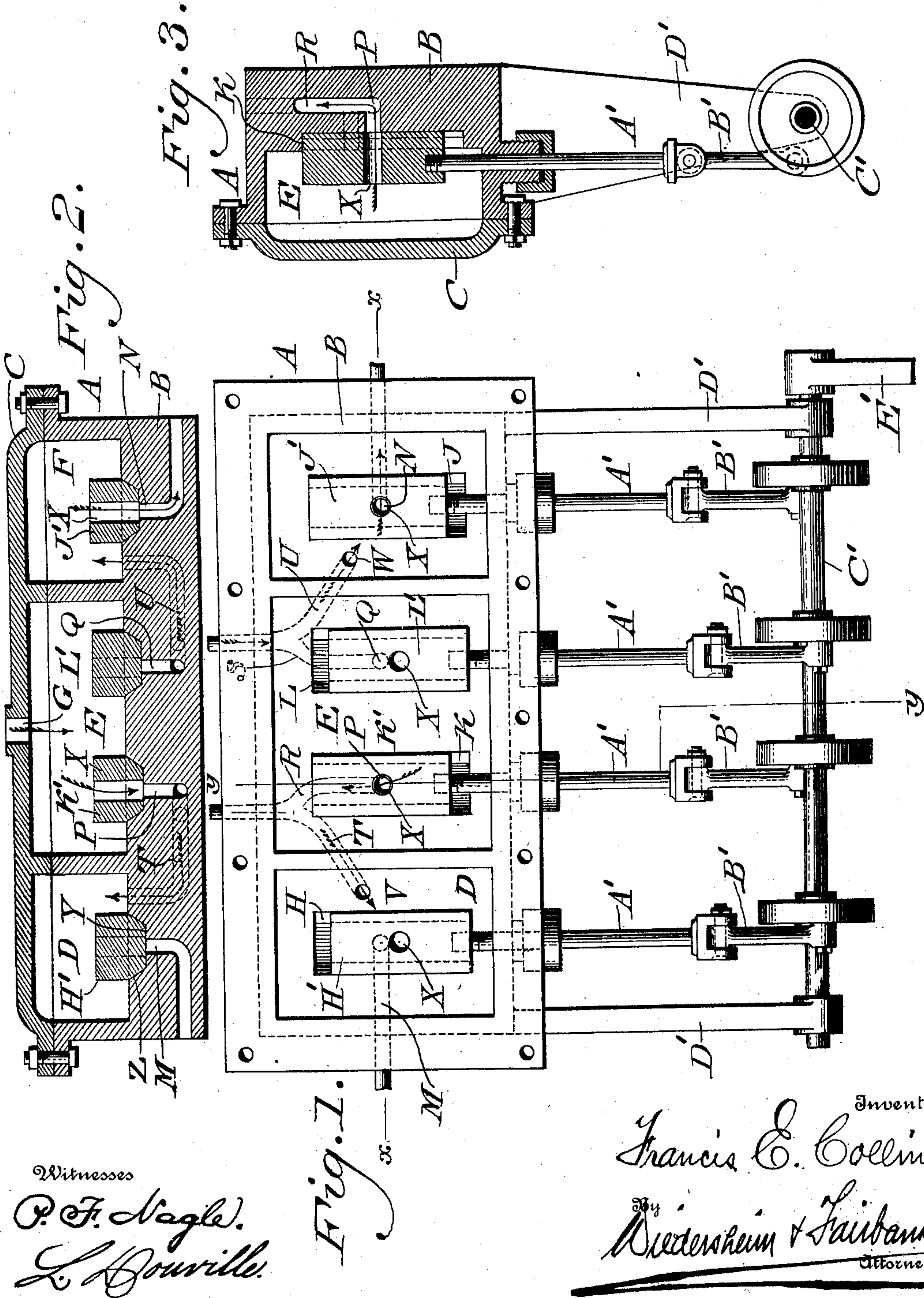
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PATENTED FEB. 3, 1903.

F. E. COLLINS.
VALVE.

APPLICATION FILED FEB. 19, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

FRANCIS E. COLLINS, OF CONSHOHOCKEN, PENNSYLVANIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 719,750, dated February 3, 1903.

Application filed February 19, 1902. Serial No. 94,780. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS E. COLLINS, a citizen of the United States, residing at Conshohocken, in the county of Montgomery, State of Pennsylvania, have invented a new and useful Improvement in Valves, of which the following is a specification.

My invention consists of improvements in valves which although useful in many other connections are especially adapted for use in connection with high-pressure hydraulic motors, one of the principal objects being to prolong the life of the working faces of the valve and valve-seat, as will be hereinafter fully described and claimed.

My invention further consists in the features of construction and combination of parts hereinafter fully described and claimed.

Figure 1 represents a plan view of the valves and gearing embodying my invention for controlling a hydraulic motor, the front plate of the valve-casing being removed. Fig. 2 represents a section thereof, taken on the line *xx* of Fig. 1. Fig. 3 represents a section taken on the line *yy* of Fig. 1.

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates the valve-casing, the same consisting of the base-plate B and front plate C, suitably secured together. The said base and front plates are recessed to form the chamber E and the auxiliary valve-chambers D and F, the intermediate chamber E being larger than the side chambers D and F and being provided with an inlet-port G, communicating with the source supplying water under pressure. The side chambers D and F are each provided with a valve-seat H and J, while the intermediate chamber has valve-seats K and L, said valve-seats extending longitudinally within the chambers. In the bottom of the seats H and J are ports M and N, through which the exhausts from the lower and upper sides respectively pass. These ports M and N have lower horizontal portions extending in opposite directions, as seen clearly in Fig. 2. In the bottom of the seats K and L are the ports P and Q, respectively, which communicate, respectively, by means of passages R and S with the lower and upper sides of the hydraulic cylinder. A branch passage

T, leading from said passage R, and a branch passage U, leading from said passage S, terminate, respectively, in ports V and W in the chambers D and F.

Mounted in the valve-seats H, J, K, and L are the slide-valves H', J', K', and L', respectively, the same being provided with ports X, situated about midway between the ends of the same. As shown in Fig. 2, the valve-seats have a straight or flat bottom wall Y and inclined side walls Z, while the working faces of the valves are correspondingly shaped, thus providing increased means for maintaining a close joint, it being noted that a close joint is thus doubly assured, for if the joints formed by either of the inclined sides should be broken the joint between the bottom of the valve and valve-seat will hold the pressure. The said valves are shorter than the valve-seats to allow sufficient play to open and close the ports in the bottom of the valve-seat, the valve also projecting above the seats, so that the stems A', passing through openings in the ends of the chambers, may be connected therewith. These stems are connected by pitmen B' with the crank-shaft C', mounted upon the arms D', said crank-shaft C' being operated by the lever E'. The connections between the valves and the crank-shaft are such that the valves K' and L' are reversely operated while the valves H' and J' are reversely operated and also reversely as regards the adjacent intermediate valves K' and L'.

The operation is as follows: When the parts are in the position shown in said drawings, the passage of the water is shown by the arrows, the arrow in passage T showing that the water has filled the chamber D, the valve H' being closed. Valve K' being opened, the water is passing through passage R to the lower-side of the cylinder. Valve L' being closed and valve J' being open, the water passes from the upper side of the cylinder through passage U, chamber F, and port N to the exhaust. Upon turning the rock-shaft C' the position of each valve is reversed, reversing the passage of the water through the different passages and making the pressure at the upper end of the cylinder and the exhaust from the lower end.

Among the other advantages which I claim

for my invention is the fact that the working faces of the valve and valve-seat are protected from the rush of the water when the valves are opened. In valves ordinarily in
5 use in connection with high-pressure hydraulic motors the water passes over the working faces of the valve and its seat when the valve is open, and owing to the high pressure under which the water is maintained
10 these working faces are injured, and thus reduce the life of the valve, probably owing to the impurities contained in the water, which, although minute, are sufficient under the high pressure of the water to cause this result. In
15 my invention it will be noticed that when the water passes through the valve it does not come in contact with the faces of either the valve or its seat, and thus these parts are not subjected to the wearing action above re-
20 ferred to.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A valve-chamber having inlet-port,
25 valve-seats in the bottom of said chamber having ports for communication with the opposite sides of a hydraulic cylinder, auxil-

iary chambers, passages leading therefrom to said valve-chamber and reciprocating valves having ports substantially midway between
30 the sides and ends thereof to register with the ports in said valve-seats, and means for reciprocating said valves.

2. A chamber and auxiliary chambers, an inlet-port to the intermediate chamber, valve-
35 seats in all of said chambers, each having a port substantially midway between its sides and ends, alternately oppositely movable slide-valves fitted to said seats and each hav-
40 ing a port transversely therethrough substantially midway between its sides and ends, exhausts from the opposite sides of the ports of the auxiliary chambers, connections be-
45 tween the ports of the intermediate chamber and the upper and lower sides of a hydraulic cylinder and branch passages from said connections to the auxiliary chambers, and means for reciprocating said valves alternately, reversely in opposite directions.

FRANCIS E. COLLINS.

Witnesses:

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