

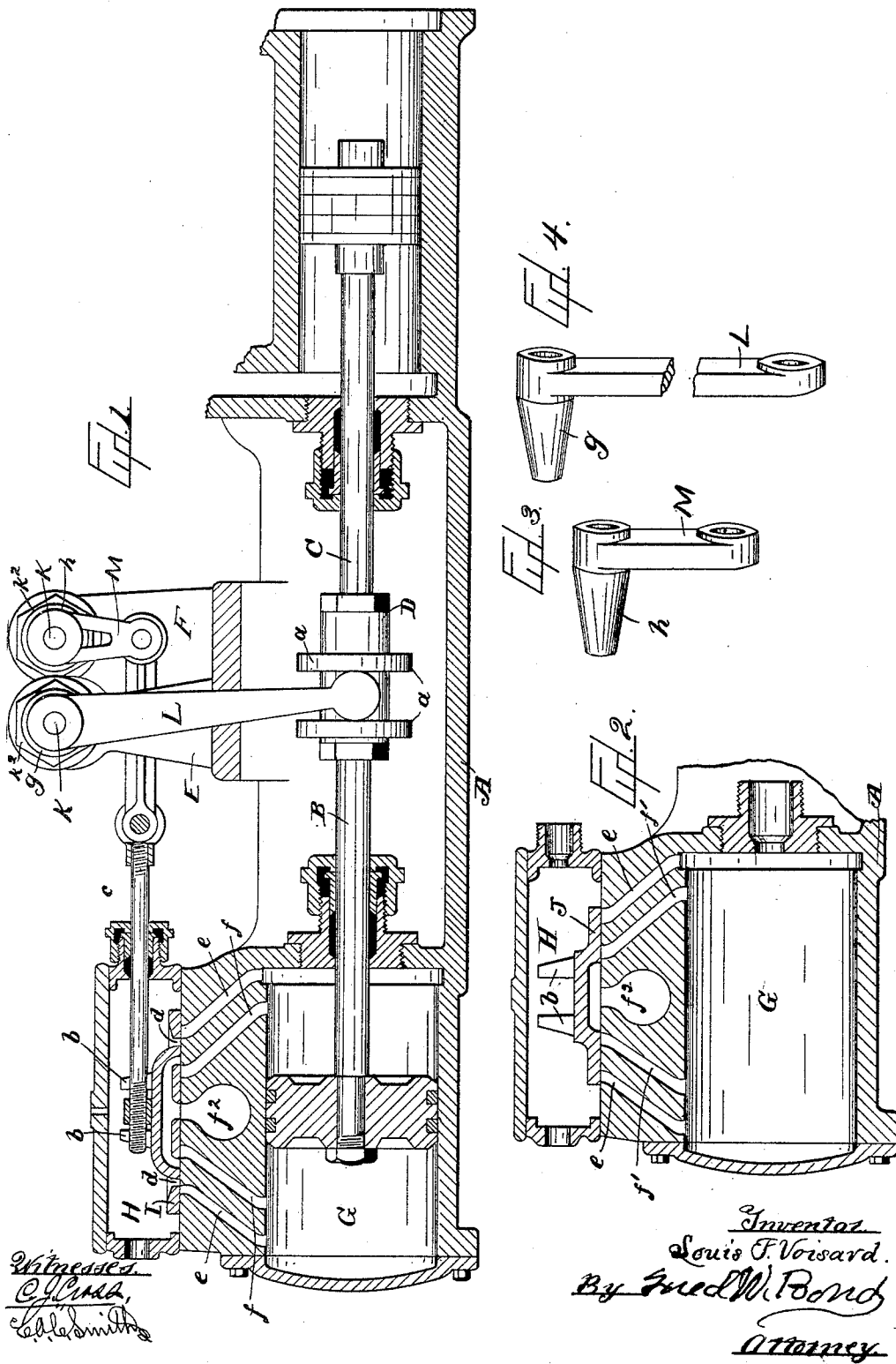
(No Model.)

3 Sheets—Sheet 1.

L. F. VOISARD.
DUPLEX STEAM PUMP.

No. 460,900.

Patented Oct. 6, 1891.



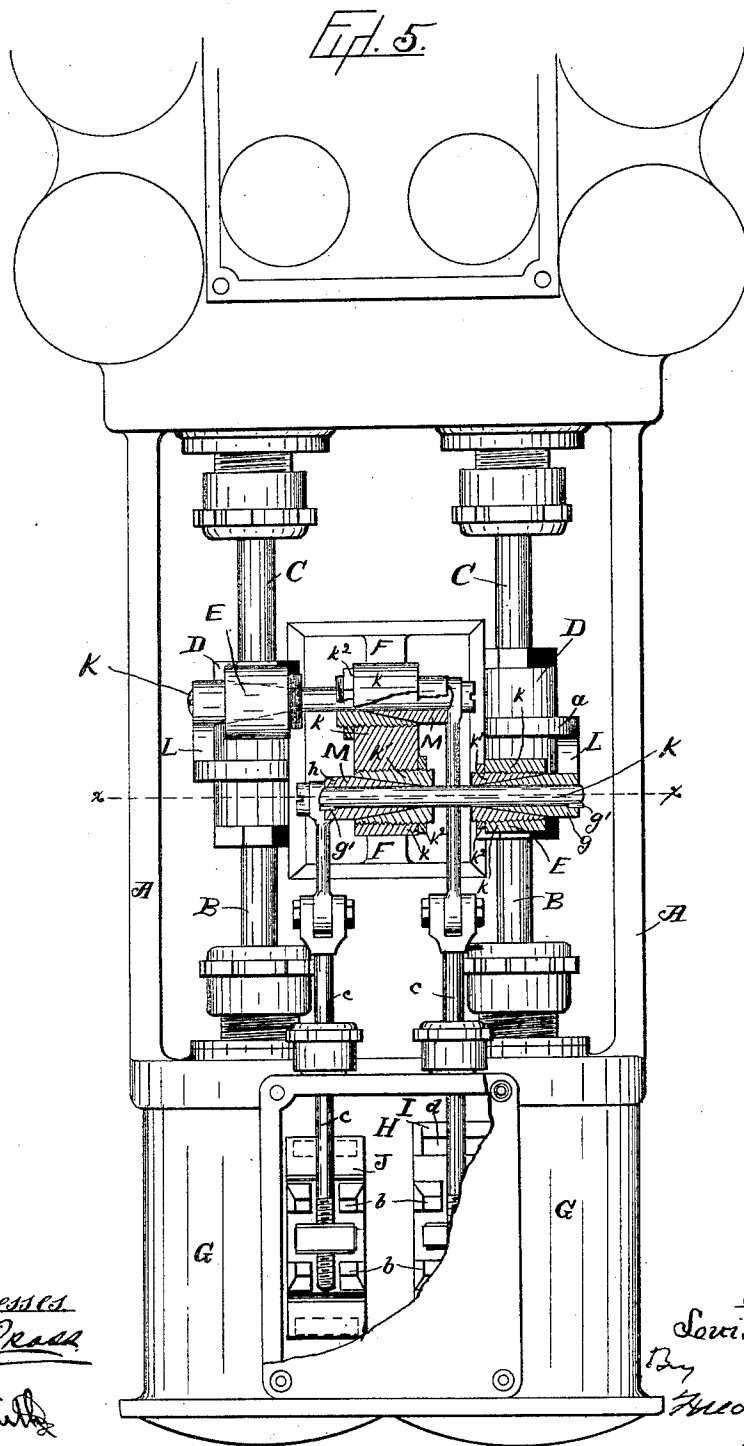
(No Model.)

3 Sheets—Sheet 2.

L. F. VOISARD.
DUPLEX STEAM PUMP.

No. 460,900.

Patented Oct. 6, 1891.



Witnesses
C. J. Cross
E. Smith

Inventor
Louis F. Voisard.
By *Wm. W. Bond*
Attorney.

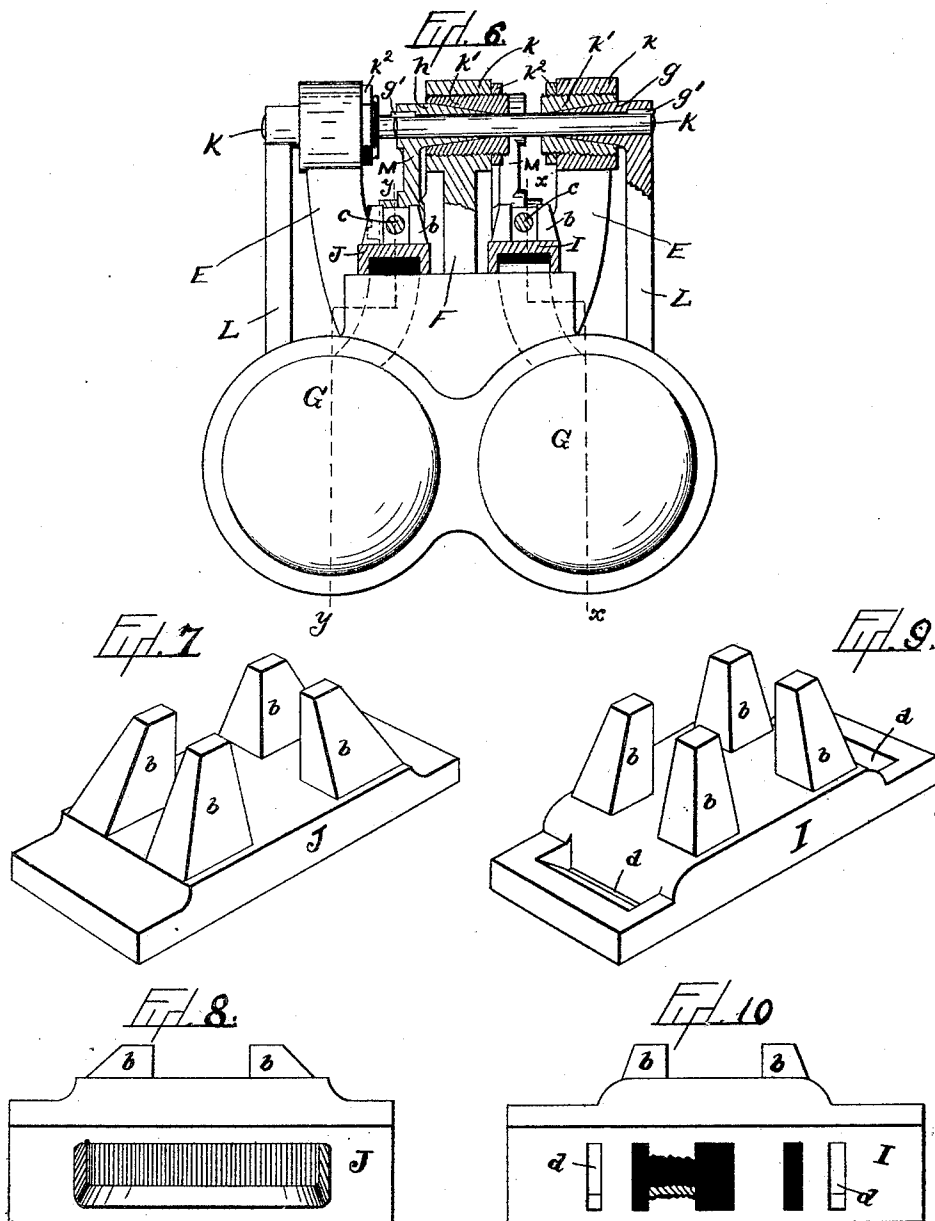
(No Model.)

3 Sheets—Sheet 3.

L. F. VOISARD.
 DUPLEX STEAM PUMP.

No. 460,900.

Patented Oct. 6, 1891.



Witnesses
C. J. Cook,
Edw. Smith

Inventor
Louis F. Voisard.
By And W. Bond
Attorney

UNITED STATES PATENT OFFICE.

LOUIS F. VOISARD, OF CANTON, OHIO, ASSIGNOR OF ONE-HALF TO WILLIAM J. PIERO, OF SAME PLACE.

DUPLEX STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 460,900, dated October 6, 1891.

Application filed March 14, 1891. Serial No. 385,017. (No model.)

To all whom it may concern:

Be it known that I, LOUIS F. VOISARD, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Duplex Steam-Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a longitudinal section through one of the steam-cylinders, showing the improved form of slide-valves, also showing the location and arrangement of the piston-rod and pump-piston and its valve connection. Fig. 2 is a longitudinal section of one of the steam-cylinders, showing a common slide-valve. Fig. 3 is a detached view of one of the cone-bearings and its valve-rod arm. Fig. 4 is a detached view of one of the cone-bearings, showing its actuating-arm. Fig. 5 is a top view showing section through one set of the cone-bearings. Fig. 6 is an end view of the steam end, showing one set of the cone-bearings in section and the steam-valves in section. Fig. 7 is a perspective view of an ordinary steam slide-valve. Fig. 8 is an under side view of the valve shown in Fig. 7, illustrating its exhaust-cavity. Fig. 9 is a perspective view of the improved valve. Fig. 10 is an underside view of the valve shown in Fig. 9, illustrating the exhaust-cavity and ports.

The present invention has relation to duplex steam-pumps; and it consists in the different parts and combination of parts hereinafter described, and particularly pointed out in the claim.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

In the accompanying drawings, A represents the base, to which the steam-cylinders and the pump-cylinders are attached, said parts being attached in any convenient and well-known manner. The piston-rod B is constructed in the ordinary manner, and is connected to the pump-piston rod C by means of the screw-threaded nut D, and for the purpose hereinafter described the screw-threaded nut

D is provided with the annular flanges *a*. The base A is provided with the posts E and F, which are for the purpose hereinafter described.

To the top or upper side of the steam-cylinders G are attached in any convenient and well-known manner the steam-chest H, within which steam-chest are located the valves I and J, which valves are provided with the arms *b*, which arms are for the purpose of providing a means for attaching the valve-rods *c*. For the purpose of causing steam to enter opposite ends of the steam-cylinders G the valve I is provided with the ports *d*, and the valve J is formed without ports, as illustrated in Fig. 2, thereby providing a means for opening the ports *e* at opposite ends of the cylinders G, which in turn reverses the motion of the pistons and at the same time giving opposite time to the pistons. For the purpose of providing a means for exhausting steam the ports *f* and *f'* are provided, and also the chamber *f*². For the purpose of communicating reciprocating motion to the valve-rod *c* the rock-shafts K are provided, which rock-shafts are journaled to the top or upper ends of the posts E and F, as hereinafter described.

The actuating-arms L are provided at their top or upper ends with the cone extensions or arms *g*, which cone-extensions are securely attached to the rock-shafts K by means of the key or wedge *g'* or its equivalent. The actuating-arms L extend downward and engage the annular collars or flanges *a*, substantially as illustrated in Fig. 1. To the opposite ends of the rock-shafts K are securely attached the valve-arms M, by means of the cone-extensions *h*. For the purpose of providing a means for reversing or giving opposite time motion to the pump-pistons the valve-rods *c* are geared from the opposite piston-rods B, as illustrated in Fig. 5. The top or upper ends of the posts E and F are provided with the screw-threaded apertures *k*, which screw-threaded apertures are for the purpose of receiving and holding in proper position the female cones *k'*, the outer peripheries of which are screw-threaded to receive the screw-threads of the apertures *k*. Within the female cone *k'* are located the cone-extensions *g* and *h*; and for the purpose of preventing any ac-

cidental displacement of the female cone k' the screw-threaded nuts k^2 are provided, which screw-threaded nuts are located upon the female cones k' , as illustrated in Figs. 5 and 6.

5 It will be understood that by providing the cone-extensions g and h and locating them upon the rock-shafts K and placing the same within the female cone k' the bearings of the rock-shafts K will be transferred to the cone-extensions g and h . The object and purpose
10 of providing the cone-extensions g and h and the female cones k' is to provide a means for taking up the wear from use without changing the positions of the cone-extensions g and h
15 and the arms L and M.

When it is desired to tighten the bearings of the rock-shafts K, the screw-threaded nuts k^2 are turned so as to disengage their faces from the sides of the posts E and F, at which
20 time the female cone is rotated until the

proper adjustment is given said female cone to the cone-extensions g and h , after which the nuts k^2 are tightened.

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

In a duplex steam-pump, the combination of the steam-cylinders G, the steam-chests H, the ports $e f$, the valve I, provided with ports d , the valve J, without ports, the valve-rods c ,
30 the valve-arms M, the rock-shafts K, and the actuating-arms L, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

LOUIS F. VOISARD.

Witnesses:

FRANK DECORPS,
F. W. BOND.