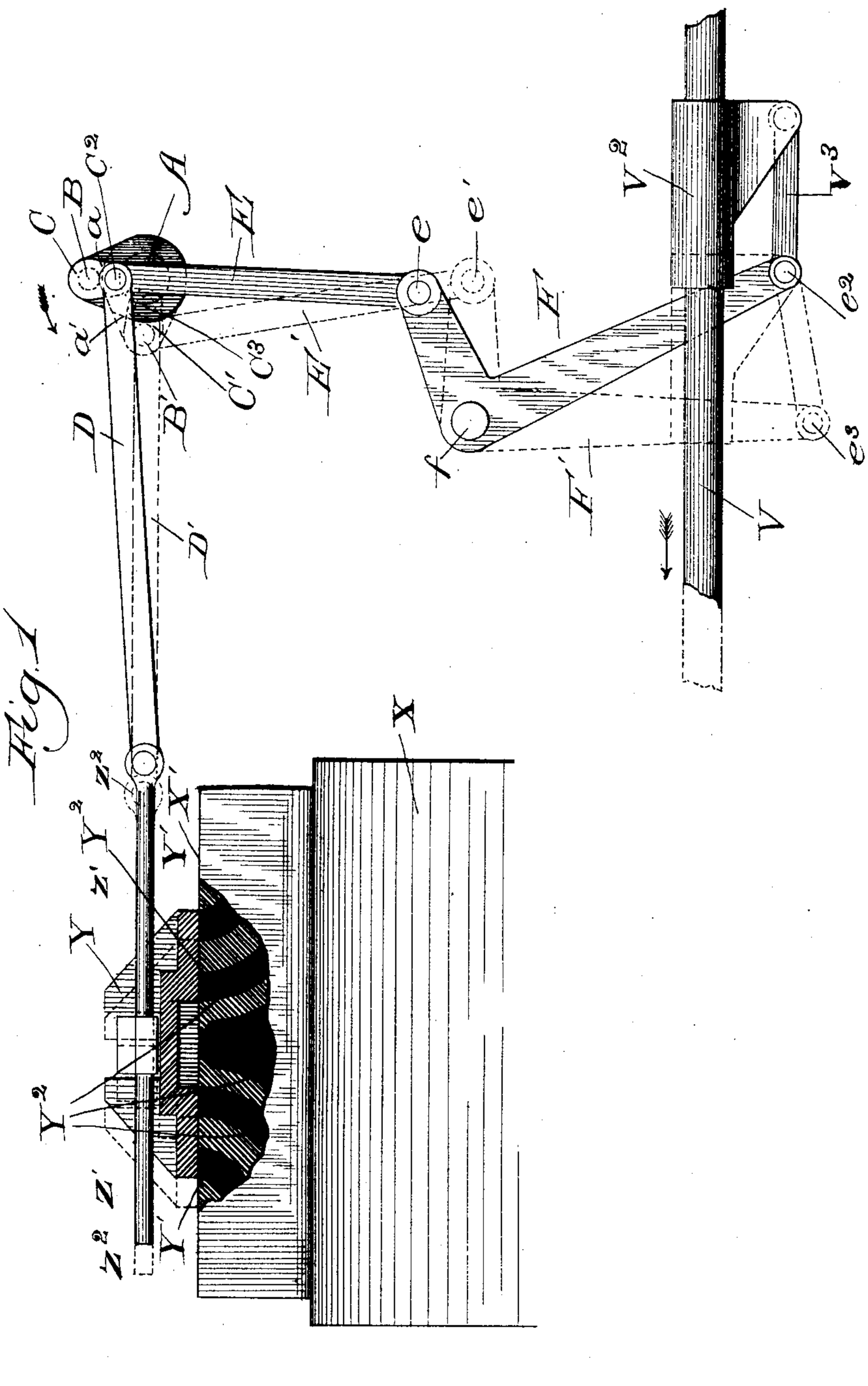
(No Model.) 2 Sheets—Sheet 1.

W. J. LEWIS.

VALVE GEAR FOR DUPLEX PUMPS.

No. 326,996. Patented Sept. 29, 1885.



Witnesses:
Chas. E. Gaylord
Flora L. Brown.

Inventor:
Wallace J. Lewis.
By Charles T. Brown
Atty.

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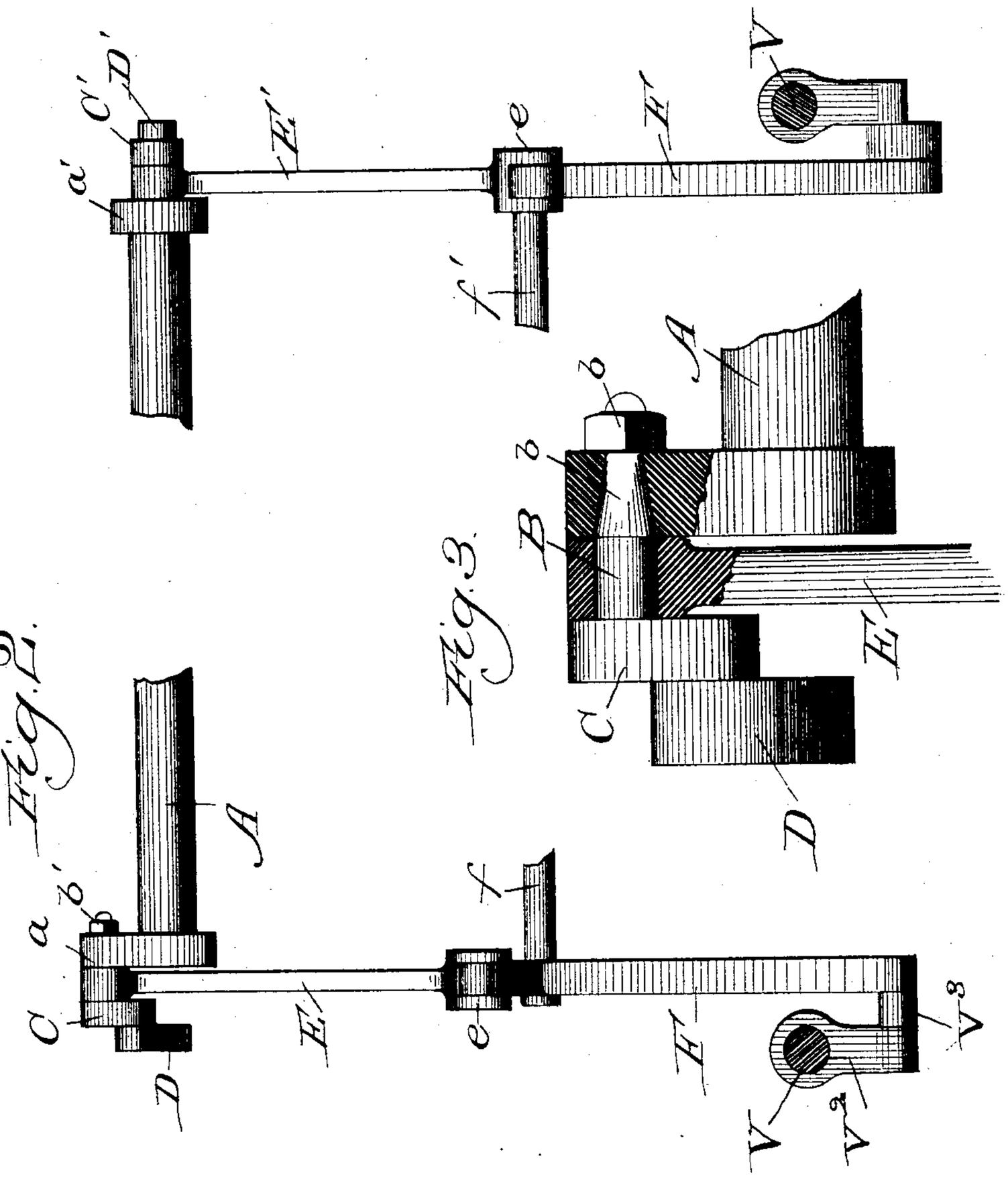

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UNITED STATES PATENT OFFICE.

WALLACE JAMES LEWIS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO W. A. SAMPSON, OF SAME PLACE.

VALVE-GEAR FOR DUPLEX PUMPS.

SPECIFICATION forming part of Letters Patent No. 326,996, dated September 29, 1885.

Application filed July 22, 1885. (No model.)

To all whom it may concern:

Be it known that I, WALLACE J. LEWIS, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valve-Gear for Duplex Pumps, of which the following, when taken in connection with the drawings accompanying the same and forming a part thereof, is a full and complete description, sufficient to enable those skilled in the art to which it appertains to construct and use the same.

My invention relates to duplex steam-pumps; and the object of my invention is, primarily, to secure a constant and unvarying length of stroke in the piston of the duplex pump to which it is attached, without reference to and independent of the speed or number of strokes or movements per minute of said piston; and, further, to obtain a full and complete movement of the valve operated by my said improvement; and, secondarily, to attain an effective and easy method of securing, adjusting, and controlling a "lap" and "lead," so called, in said valve on the seat thereof.

I have illustrated my invention as attached to a duplex pump having auxiliary exhaust-ports.

Figure 1 is an elevation of my invention with a portion of cylinder broken away, showing the valve and valve-seat in section. Fig. 2 is an end elevation. Fig. 3 is an end elevation on an enlarged scale, showing the main and auxiliary crank used in my invention, the main crank being shown in part section.

Like letters refer to like parts throughout the several views.

V V′ are the piston-rods.

V^2 is a sleeve on each of said piston-rods V V′.

V^3 is a rod or link connection between sleeve V^2 and bell-crank F.

X is the steam-cylinder.

X′ is the valve-seat.

Y is an ordinary slide-valve.

Y′ Y′ are ports, used in the construction here illustrated as steam-ports.

Y^2 Y^2 are exhaust-ports.

Z is the block or nut on valve Y.

Z′ Z^2 are the valve-stems.

A is a quarter-crank shaft. Shaft A makes one revolution to each completed movement of valve Y.

a a′ are cranks on shaft A.

B is the crank-pin.

b is a tapering portion of crank-pin B.

b′ is an ordinary nut on crank-pin B.

C C′ are the heads of crank-pin B.

C^2 C^3 are pins in heads C C′ of crank-pin B.

D D′ are valve-rods.

E E′ are rods connecting bell-crank F F′ and crank-shaft A.

F F′ are bell-cranks.

f f′ are the fulcrums on which bell-cranks F F′ rock or vibrate.

e e are pins.

e^2 e^3 are pins.

The dotted lines indicate the relative position of the different duplicated parts shown to the right and left in Fig. 2. Crank-shaft A, Fig. 2, is continuous, being illustrated as broken in said figure to indicate that piston-rods V V′ may be any desired distance apart.

The operation of my invention is: Piston-rod V′ being in the position illustrated (clearly indicated in Fig. 2) by the dotted lines in Fig. 1, steam is admitted in port Y′, on the right-hand side in the drawings, and the piston-rod is moved thereby in the direction indicated by the arrow over said piston-rod in Fig. 1. This movement of the piston-rod causes crank-shaft A to revolve in the direction of the arrow over said shaft.

It will be observed that in the position said valve Y is, as indicated by the dotted lines in Fig. 1, it is fully opened, and the piston and bell-crank, as indicated also by the dotted lines in said figure, are each in about the middle of the forward stroke or movement. The quarter-rotation of crank-shaft A, as described, will cause the valve illustrated by the dotted lines to assume the position of the valve indicated by the full lines in said figure, and at the same time the piston-rod will have completed its forward movement or stroke. Further rotation of crank-shaft A causes the steam-port on the opposite end of the steam-cylinder to open, and at the same time opens the exhaust-port to the right (in the drawings) of the steam-cylinder, thus permitting said piston to be forced back on its return-stroke. While said piston is completing the forward movement,

as above described, crank-pin B, Fig. 1, is carried over its "dead-center," so called, and by the time the pin B′ (indicated by the dotted lines, Fig. 1) has reached its dead-center further revolution of crank-shaft A is maintained by piston and bell-crank indicated by the full lines. A constant rotary movement is thus imparted to crank-shaft A, the amount of force imparted to said shaft by the said bell-cranks and their connections constantly varying, though working in unison or collectively to maintain the rotary movement of said shaft A.

By the tapering portion *b* of crank-pin B, and nut *b′* thereon, I am able to so adjust pins C^2 C^3 that the circle described by said pins may be larger or smaller to a given extent, and I thus secure and control a lap or lead in the valve.

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

1. In a valve-gear for duplex pumps, a quarter-crank shaft having each crank provided with an auxiliary crank thereon, connected with the steam-valve of said pump, in combination with bell-cranks having rod-connection with the piston-rods of said pump and with said quarter-crank shaft, all substantially as described, and for the purpose specified.

2. In a valve-gear for duplex pumps, a quarter-crank shaft having each crank provided with an auxiliary crank thereon, adjustably attached thereto and connected with the steam-valve of said pump, in combination with bell-cranks having rod-connection with the piston-rods of said pump and with said quarter-crank shaft, all substantially as described, and for the purpose specified.

WALLACE JAMES LEWIS.

Witnesses:
CHARLES T. BROWN,
D. W. EVANS.