

(No Model.)

J. H. McGOWAN.
DUPLEX STEAM PUMP.

No. 427,784.

Patented May 13, 1890.

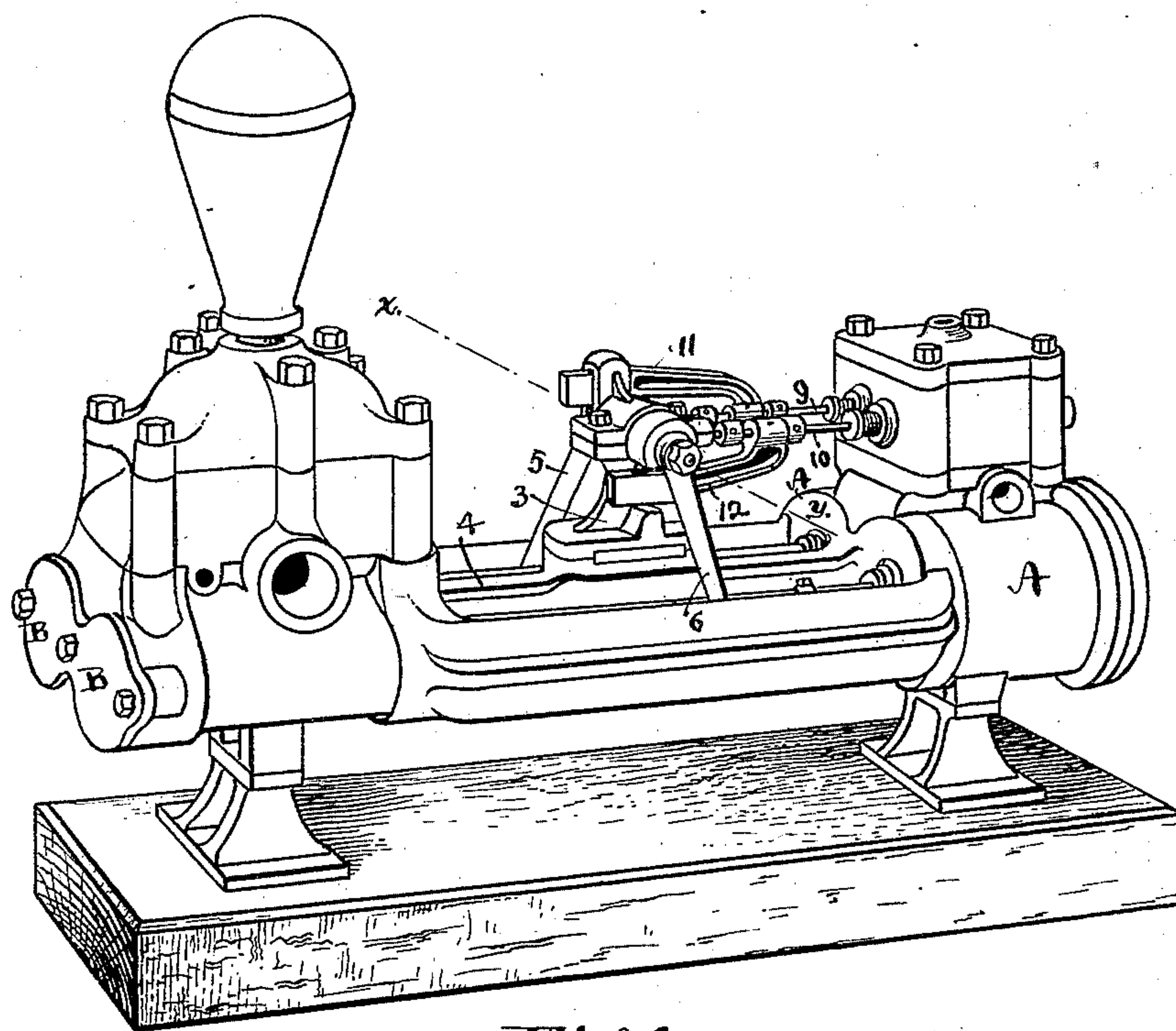


Fig. 1.

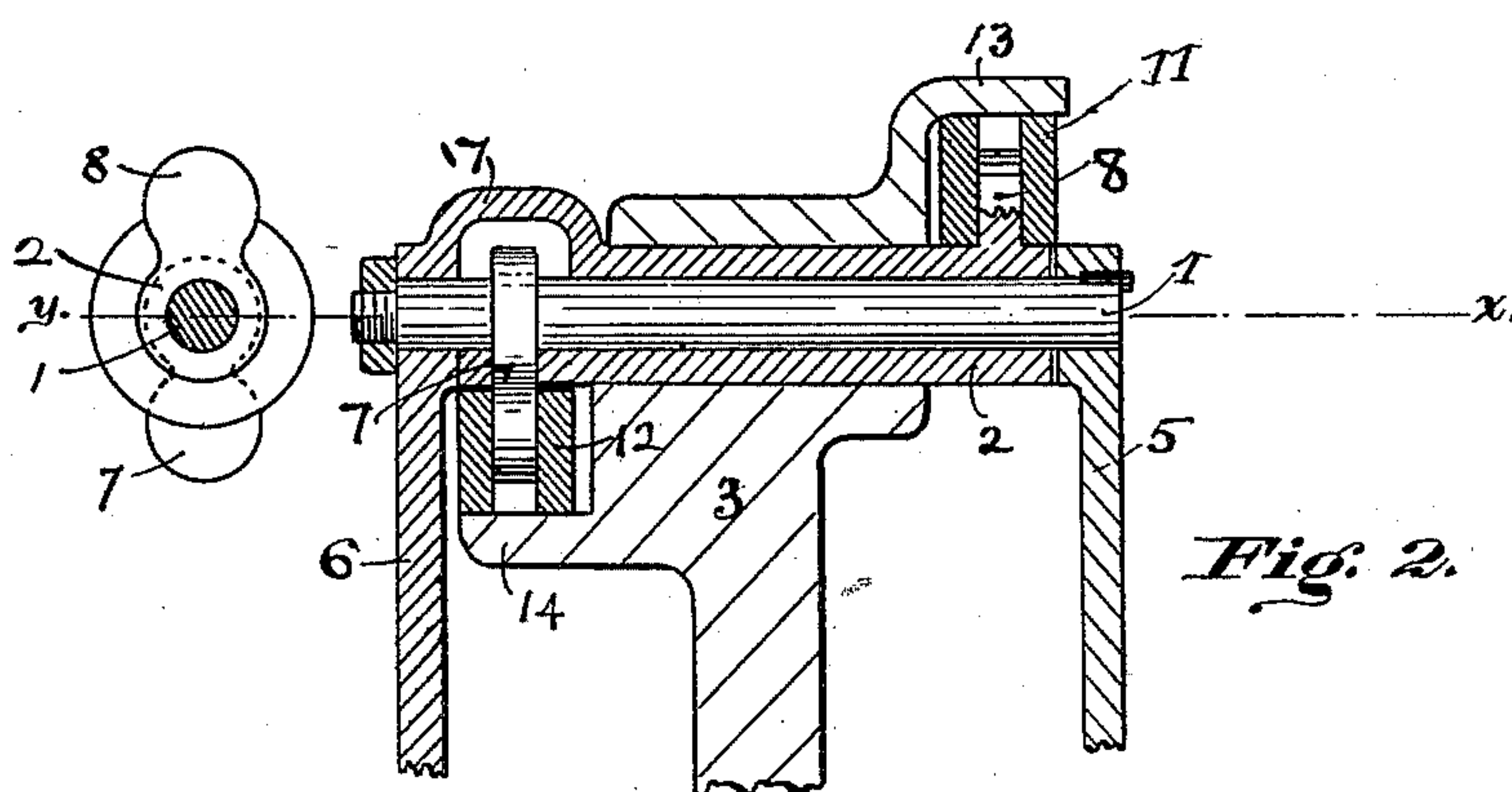


Fig. 2.

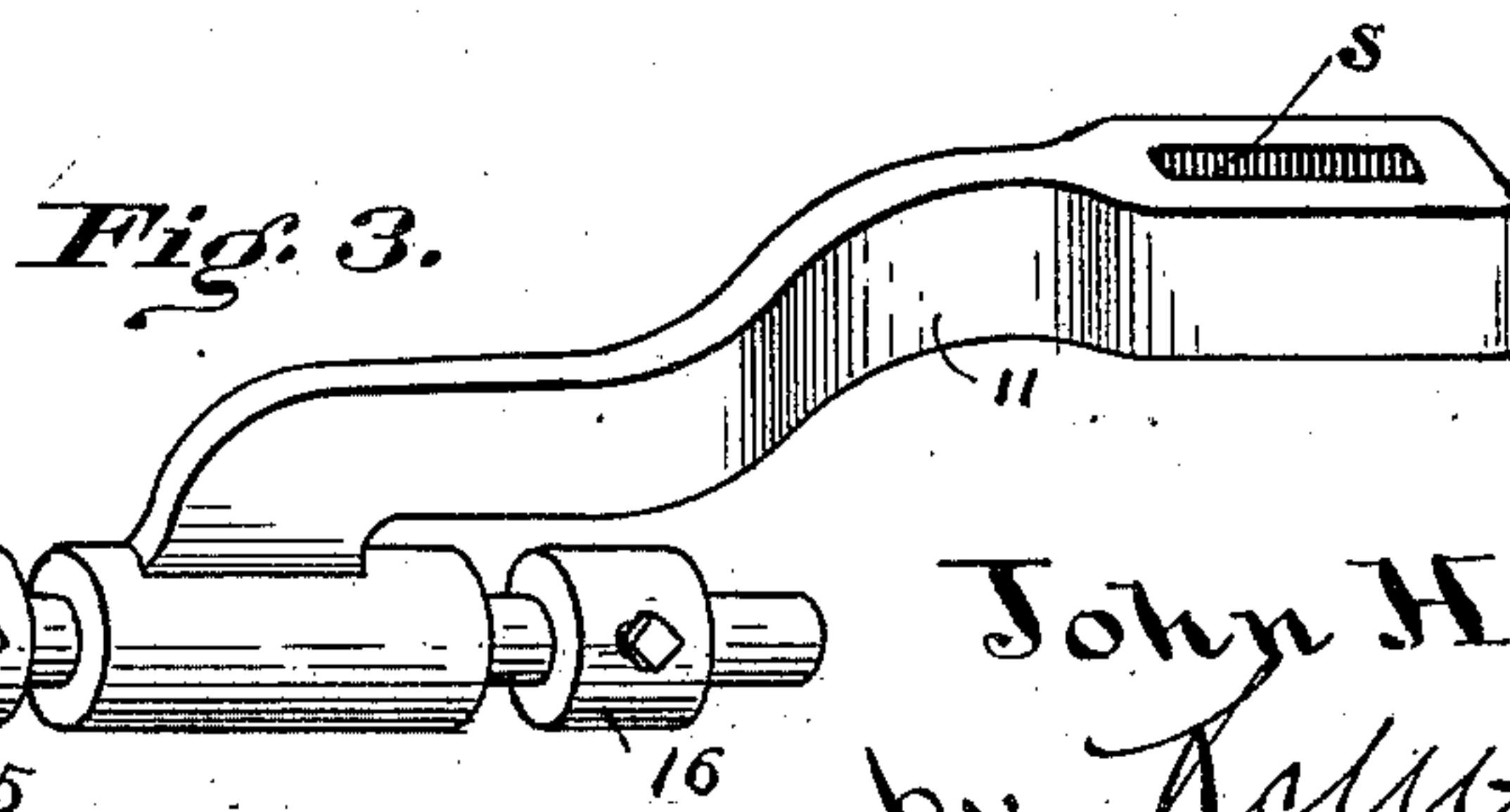


Fig. 3.

Attest.
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UNITED STATES PATENT OFFICE.

JOHN H. MCGOWAN, OF CINCINNATI, OHIO.

DUPLEX STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 427,784, dated May 13, 1890.

Application filed February 20, 1888. Serial No. 264,601. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. MCGOWAN, a citizen of the United States, residing at Cincinnati, Hamilton county, State of Ohio, have
5 invented new and useful Improvements in Duplex Steam-Pumps, of which the following is a specification.

My invention relates to valve-actuating mechanism for duplex steam-pumps, having
10 in view the triple object of simplifying the construction, operating the valves from a common fulcrum or center of movement, so as to obtain equal motions, and to move the valve-rods in horizontal lines to avoid pivotal
15 joints and undue wear upon the packings.

A further object of my invention is to obtain, in connection with these advantages, a means of adjusting the motion of the valves in relation to the steam-pistons, all as herein-
20 after more fully set forth.

Mechanism embodying my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective elevation of a duplex steam-pump, showing the invention as
25 applied in use. Fig. 2 is a longitudinal section of the duplex rock-shaft with its bearings in the line *x y* of Fig. 1, and the valve-link guides with a cross-section of the rock-shaft, showing the cam projections; Fig. 3, a
30 detached side view of one of the valve-rod links, showing the adjusting-collars upon the valve-rod, and indicating the form of the slot in which the cam projection operates.

Referring now to the drawings, A A and B B designate, respectively, the steam and
35 pumping cylinders of a duplex steam-pump of the class in which each governing steam-valve is actuated through connections from the reciprocating piston of the opposite steam-
40 cylinder. The entire construction, excepting as to the valve-motion, is of the well-known type, and a detailed description is unnecessary.

The valve-motion is as follows: Concentric
45 rock-shafts 1 2, operating one within the other—that is, one being a sleeve upon the other—are carried in a common bearing upon a standard 3, erected upon the central connecting-brace 4 of the cylinders. The projecting ends of the shafts 1 and 2, respectively,

are provided with the ordinary depending lever-arms 5 6, which engage in any suitable manner (not shown) with the respective piston-rods below. The reciprocation of the
55 piston-rods thus gives a partial rotation to and fro of the shafts 1 and 2, respectively. Each shaft is provided with a cam-finger, respectively 7 and 8, the former projecting downward and the latter upward, attached
60 firmly to the shaft and sleeve and formed substantially as indicated in Fig. 2. The sleeve is slightly enlarged at the proper point (indicated at 17) to admit the finger 7 of the shaft 1, and is also open sufficiently to allow
65 the finger 7 to play through the same. The valve-rods 9 10 project forward into guide-sockets formed in the face of the standard 3, and to each of the rods is attached a link, respectively 11 and 12, formed, as shown in Fig.
70 3, to embrace the valve-rod at one end, and terminated at the other by a head having an open rectangular slot *s* opening vertically through the same across its length. The links when in position rest respectively against the
75 sleeve 2, one above and one below, the cam-fingers projecting into the slots respectively, and moving the links forward and backward. The links are held and guided in the horizontal movement at one side by the sleeve,
80 against which they rest, and at the other by a lateral projection, respectively 13 and 14, of the standard, one projecting over and the other under its link. The positions are clearly indicated in Fig. 2. Each link loosely
85 embraces its valve-rod between adjustable collars 15 16. (Shown in Fig. 3.) These collars are set to allow play of the links upon the rod for a limited part of the movement without moving the valve, in order to leave the steam-
90 ports open during the greater part of the stroke, as usually required in steam-pumps. They may also be adjusted to give a short stroke should such be desired.

The operation is sufficiently indicated by
95 the construction. The valve-rods move in horizontal lines in their guide-sockets and through the stuffing-boxes of the steam-chests as impelled by the rock-shafts, whose cam projections engage the links in the open slots
100 *s*. The links are guided horizontally between the projections of the bearing-standard and

the sleeve 2, being held against lateral displacement by the cam-fingers. It will be observed that the motion of the links and valve-rods is always horizontal, and consequently
5 there is no side wear in the stuffing-boxes; also that by adjustment of the collars upon the valve-rods the play of the valves may be to a great extent regulated.

I am aware of the patents to Blake, No.
10 200,890, March 5, 1878; Deane, No. 288,214, November 13, 1883, and the German patent, No. 37,146, and would have it understood that I do not broadly claim any feature of construction therein.

15 I claim as new and desire to secure by Letters Patent of the United States—

1. In a duplex steam-pump, the combination of the concentric rock-shafts having cam-fingers and each provided with a lever that
20 connects with one of the piston-rods, the fixed central bearing for the rock-shafts, the slotted links engaged by the cam-fingers, the valve-

rods moved by said links, and the horizontal guides for said valve-rods, substantially as described. 25

2. In a duplex steam-pump, the combination of the concentric rock-shafts having cam-fingers and each actuated by a lever connected with a piston, the valve-rods provided with adjustable collars, the slotted links engaged by the cam-fingers and embracing the
30 valve-rods between the collars, the horizontal guides for the valve-rods, and the fixed central bearing for the rock-shafts, said bearing provided with horizontal guiding projections
35 for the links, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN H. MCGOWAN.

Witnesses:

L. M. HOSEA,
L. E. HOSEA.