

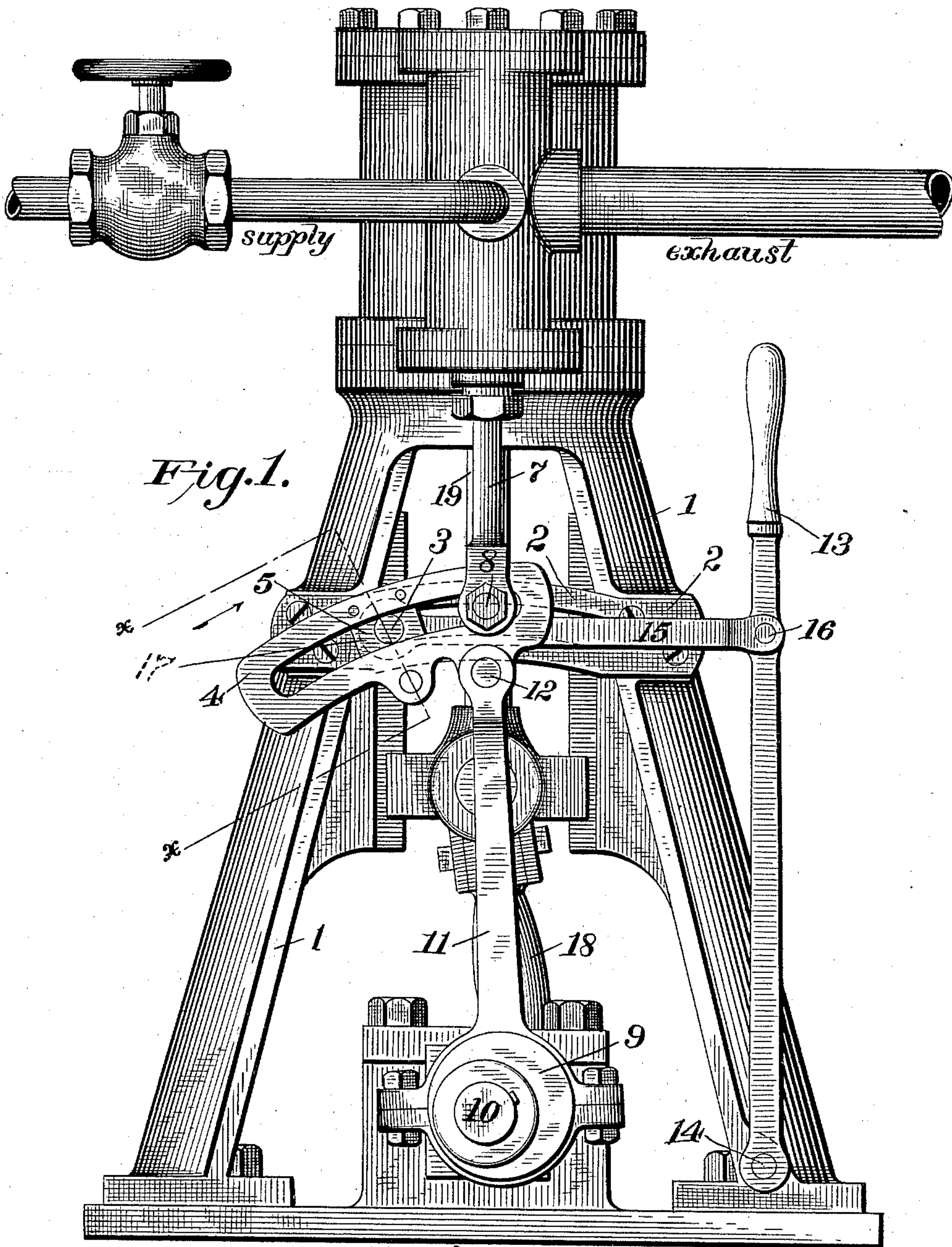
(No Model.)

2 Sheets—Sheet 1.

J. HAMILTON.
VALVE GEAR FOR ENGINES.

No. 476,229.

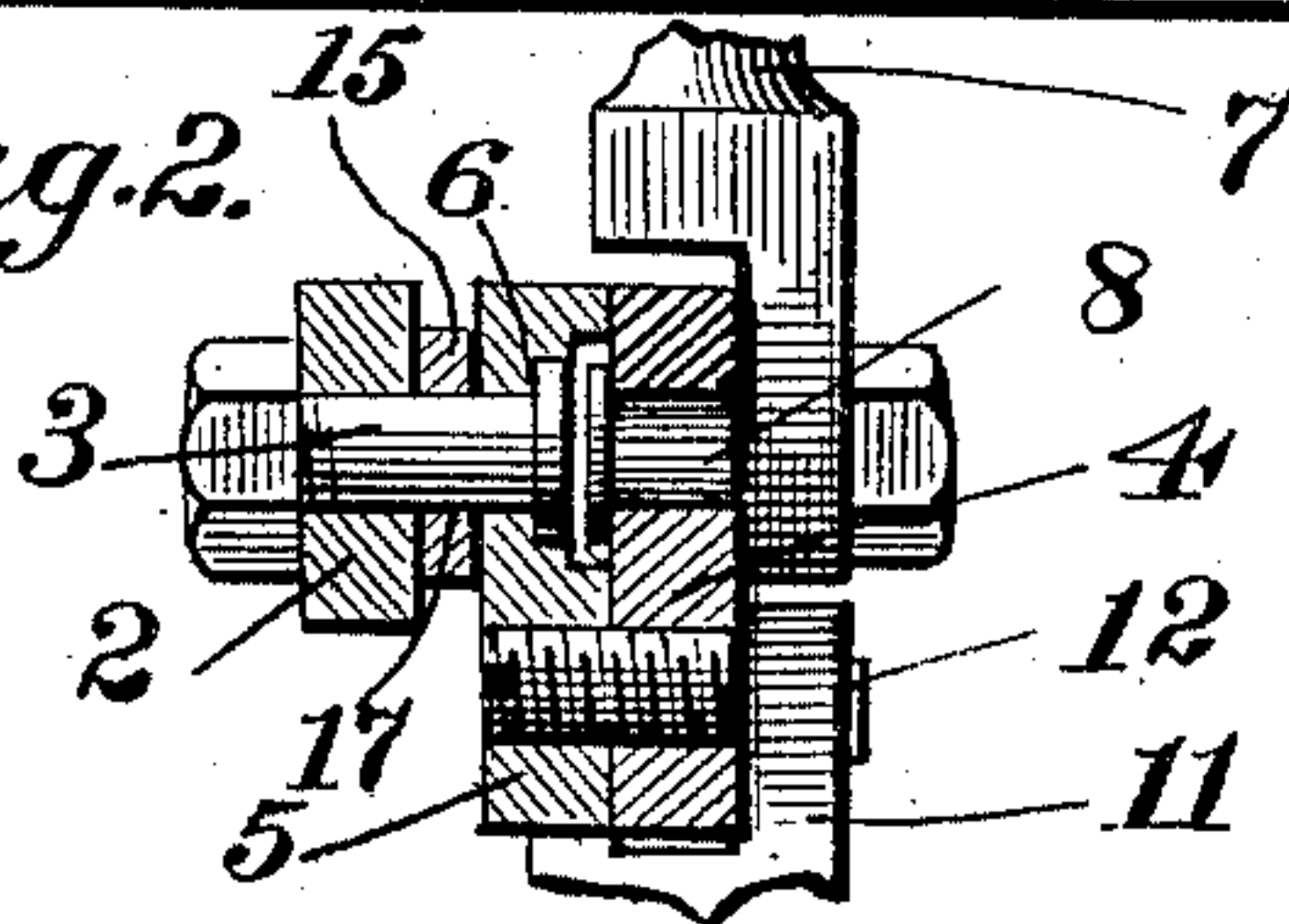
Patented May 31, 1892.



WITNESSES:

J. Finch.
S. Williamson.

Fig. 2.



INVENTOR

James Hamilton

BY

F. W. Smith Jr.

ATTORNEY

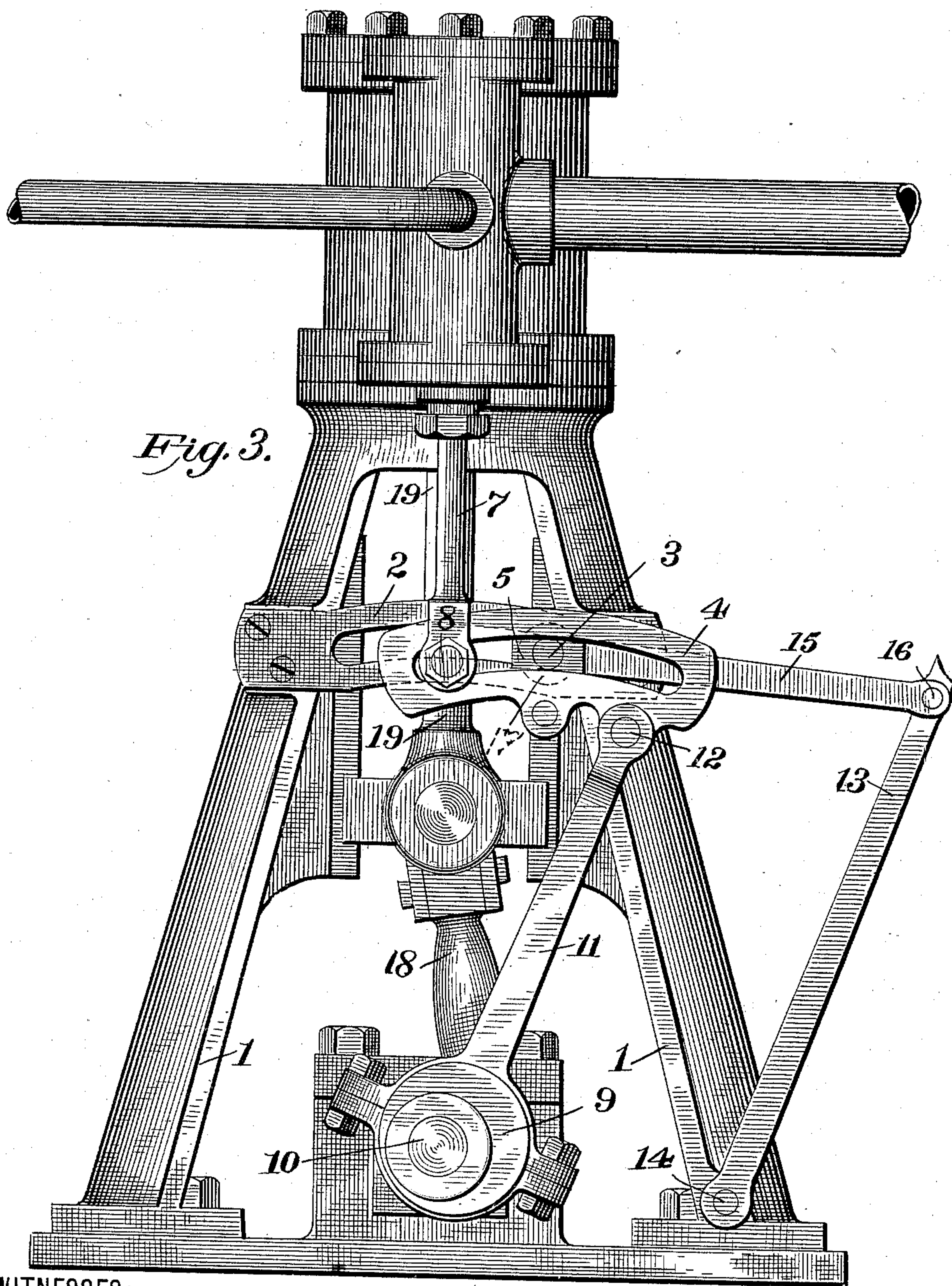
(No Model.)

2 Sheets—Sheet 2.

J. HAMILTON.
VALVE GEAR FOR ENGINES.

No. 476,229.

Patented May 31, 1892.



WITNESSES:

J. Hinch.
S. Williamson.

INVENTOR

James Hamilton

BY

T. W. Smith

ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES HAMILTON, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO HUNTER, PATCHEN & HAVENS, OF SAME PLACE.

VALVE-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 476,229, dated May 31, 1892.

Application filed August 31, 1891. Serial No. 404,330. (No model.)

To all whom it may concern:

Be it known that I, JAMES HAMILTON, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Valve-Gears for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in valve-gears for steam-engines, and has for its object to simplify such gear to such an extent that a single eccentric may be employed to effect the reversing movements of the engine; and my invention therefore has especial reference to locomotives or marine engines.

In order that those skilled in the art to which my invention appertains may fully understand the same, I will proceed to describe its construction and operation, referring by numbers to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is an elevation of my improvement; Fig. 2, a detail section at the line *xx* of Fig. 1; and Fig. 3, a view similar to Fig. 1, but showing the position of the valve-gear reversed.

Similar numbers of reference denote like parts in the several figures.

1 is any ordinary frame or stand, and 2 a guide-link secured thereto. 3 is a pin within said link and adapted to slide freely therein.

4 is the valve-stem link, having rigid with the back thereof the block 5, which latter is pivoted at 6 to the outer end of the pin 3, so that it will be readily understood that said link will rock freely on said pivotal point 6.

7 is the valve-stem, having at its lower end a stud 8, which extends laterally within the link 4.

9 is the eccentric on the usual crank-shaft 10, and 11 the eccentric-rod pivoted at 12 to one end of the link 4, so that it will be clearly seen that the reciprocation of said rod will cause the link 4 to rock on the point 6.

13 is the usual hand-lever, pivoted at 14 to the lower part of the frame, and 15 is a con-

necting-bar whose ends are respectively pivoted at 16 to said lever and at 17 around the pin 3, said lever operating to shift the link 4 to and fro, for the purpose presently explained.

18 is the usual crank-rod, operatively connected in the ordinary manner with the piston-rod 19 and crank; but as said crank, crank-rod, and piston-rod form no part of my present invention I have not illustrated their connection with each other.

From the foregoing description it will be obvious that the pivotal point of the valve-stem link never changes with respect to said link, but, on the contrary, is itself capable of being shifted within the guide-link 2 to different vertical planes relative to the valve-stem. Therefore if the pin 3 be brought into the same vertical plane with the valve-stem there will be no motion imparted to the latter by the rocking of the valve-stem link; also, if the lever 13 be operated to shift the valve-stem link in such position that the eccentric-rod is in the same vertical plane with the valve-stem, as shown at Fig. 1, a full-throw motion will be communicated to said stem from the eccentric in a direct vertical line. On the other hand, if the lever 13 be operated to shift the valve-stem link in such position that the eccentric-rod is at its greatest angle to the vertical plane of the valve-stem, as shown at Fig. 3, a full-throw motion will be communicated to said stem from the eccentric through the medium of the rocking link 4. It will, however, be readily understood that the effect of the action of the eccentric on the valve-stem when the parts are in the position shown at Fig. 1 will be the reverse of the effect of the action of said eccentric on said stem when the parts are in the position shown at Fig. 3, and the valve is thereby caused to perform its reverse functions, whereby the piston is operated, as in the usual manner, to reverse the engine.

Although I employ but a single eccentric, and thereby do away with two systems of valve-gears and greatly simplify the construction and operation of the engine and increase its durability and capacity, still I do not wish to be understood as claiming, broadly, a sin-

gle eccentric, since I am aware that the same has been shown and described in a prior patent.

The gist of my invention rests in the broad idea of providing the valve-stem link with a pivotal point, which latter never changes its position relative to said link, but is capable of being shifted to and fro to positions on opposite sides of the valve-stem, the said pivoted joint when in its intermediate position being in alignment with the pivotal connection of the valve-stem and the link. I am aware that prior to this invention gears have been used somewhat similar to that described above; but in all such devices the pivotal joint of the link and frame and link and valve-rod are not in alignment when the link is thrown to stopping position, and as a consequence the valve-stem has been rocked and bent by the continued oscillation of the link caused by the momentum of the machinery; but, as will be seen, such a result is obviated by my construction.

In applying my invention to a locomotive there would be an eccentric for each cylinder, each eccentric being equipped with the herein-described pivoted valve-stem link, and the latter may be operated by a lifting-shaft, such as is commonly used on locomotives, or in any other manner adapted to the conditions of use.

Where piston-valves are used my invention is admirably adapted, because the application of power is more direct, and there is an apparent saving in the original cost of construction and maintenance of friction, and lost motion is reduced to a minimum, since there are very few joints and connections between the eccentric and the valve-stem.

I claim—

1. In a valve-gear for steam-engines, the valve-stem link having a pivotal rocking joint which never changes its position with respect to said link and which is in alignment with a portion of the path of the connection between the valve-stem and the said link, in combination with a valve-stem loosely

connected within the said link, a single eccentric operatively connected to one end of the said link, whereby the latter is rocked on its pivotal joint, and means for shifting the pivotal joint of said link to and fro on opposite sides of the valve-stem or to cause the said pivotal joint to be in direct alignment with the base of the said valve-stem, substantially as described.

2. The combination, with a stationary guide-link, of the pin adapted to slide freely therein, the pivoted hand-lever and operative connections between said lever and pin, whereby the latter may be shifted to and fro within said guide-link, a valve-stem link pivoted around said pin, the said pin being in direct alignment with a portion of the path of the stud upon the valve-stem, a valve-stem having a stud extending within the valve-stem link, a single eccentric on the crank-shaft of the engine, and the eccentric-rod operatively connected to said eccentric and pivoted to one end of the valve-stem link, substantially as described.

3. The combination, with a driven eccentric, of a frame having a stationary curved guide-link therein, a valve-stem link having a block rigidly secured to the central portion of the back thereof, a pin contained within the said block in alignment with the center of the slot within the link and moving freely within the guide-link, an eccentric-rod operatively connected to the said eccentric and pivoted to one end of the valve-stem link, a rigid valve-stem movably contained within the slot of the said valve-stem link, and means whereby the said pin may be shifted to and fro on opposite sides of the said valve-stem or whereby it may be placed in direct alignment with the stud upon the base of the said stem, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES HAMILTON.

Witnesses:

F. W. SMITH, Jr.,
J. S. FINCH.