No. 755,453. PATENTED MAR. 22, 1904.

J. M. CLARK.

STEAM ENGINE.

APPLICATION FILED APR. 11, 1903.

NO MODEL.

FIG. 1.

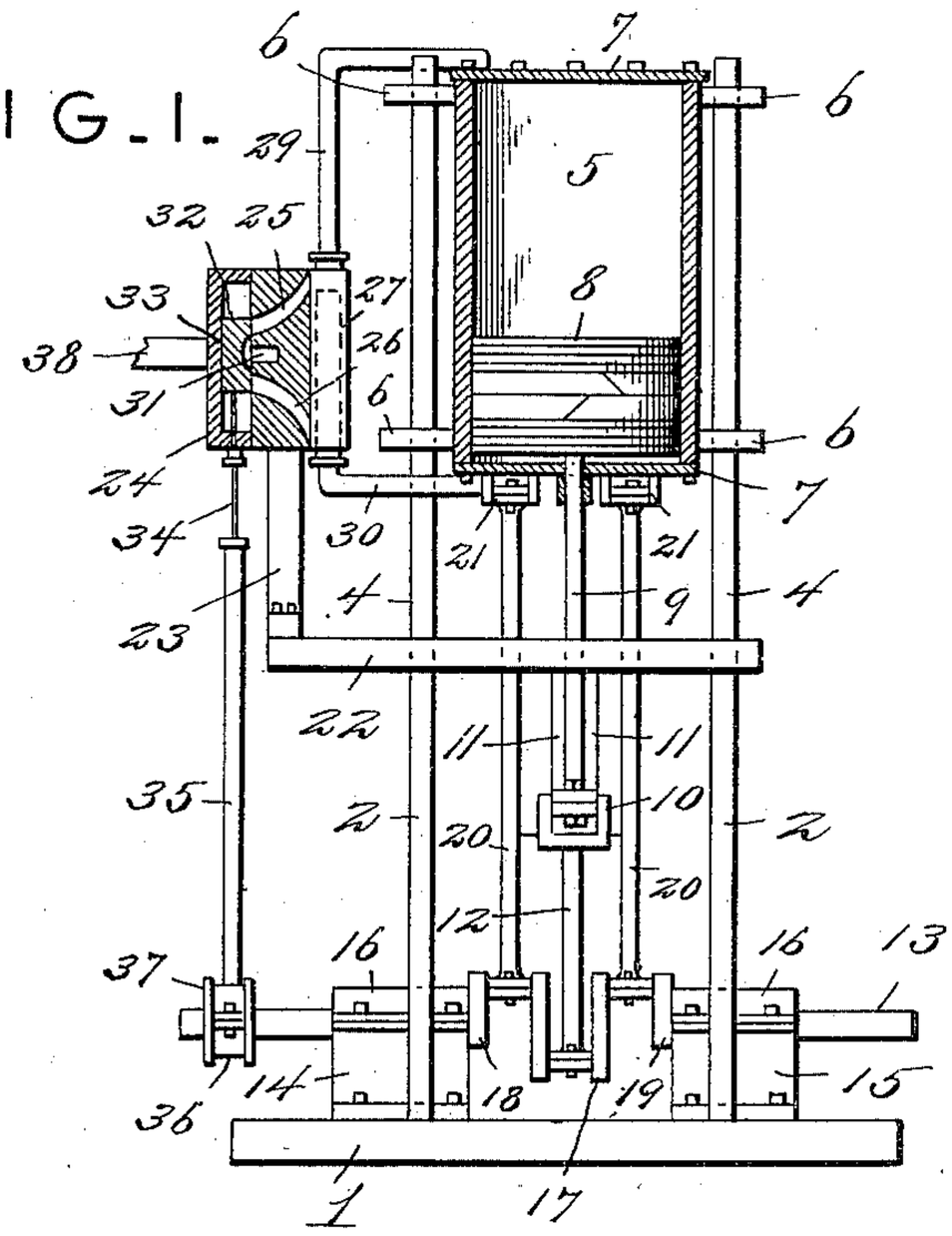
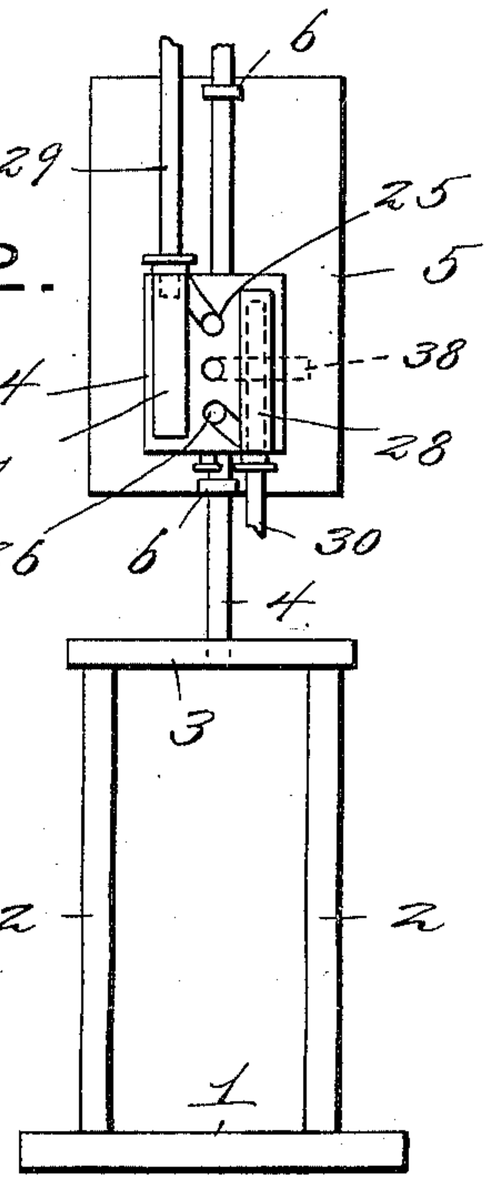


FIG. 2.



Witnesses

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No. 755,453. Patented March 22, 1904.

UNITED STATES PATENT OFFICE.

JOHN M. CLARK, OF WHITESTONE, NEW YORK.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 755,453, dated March 22, 1904.

Application filed April 11, 1903. Serial No. 152,214. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. CLARK, a citizen of the United States, residing at Whitestone, in the county of Queens and State of New York, have invented new and useful Improvements in Steam-Engines, of which the following is a specification.

This invention relates to improvements in steam-engines of a type wherein the cylinder and the piston are reciprocated in opposite directions; and the object is to provide an improved and simplified steam-engine of the kind stated characterized by a novel valve arrangement for controlling the inlet and exhaust of the motive fluid.

With this object in view the invention consists in the novel construction of parts and their assemblage or aggroupment in operative combination, as will be hereinafter fully specified, and the novelty claimed particularly pointed out and distinctly declared.

This invention is fully and clearly illustrated in the accompanying drawings, to be taken as a part of this specification, and wherein—

Figure 1 is a view in elevation of the complete mechanism, the steam-cylinder and the valve-chest being shown in vertical central section. Fig. 2 is a side elevation of the supporting-frame, the steam-chest, and the steam-cylinder.

Referring to the drawings, 1 designates a proper supporting-base, from which rise strong standards 2, having their lower ends firmly fixed in or to the base 1 and their upper ends connected by cross-pieces 3, from the center of which the vertical slide-rods 4 rise, having their lower ends fixed to the cross-pieces and extending the proper height parallel with each other, as shown in Fig. 1 of the drawings.

5 designates the steam-cylinder, which may be of the usual construction and of such capacity as may be desired or required. Diametrically opposite to each other closely adjacent to the upper and lower ends of the steam-cylinder are bearing-lugs 6, formed with apertures which slidably take on the standards 4 and guide the cylinder in its reciprocations. The cylinder is provided with the usual heads 7, substantially as shown in Fig. 1 of the drawings.

Within the steam-cylinder 5 is disposed the piston 8 of any suitable make and provided with a piston-rod 9, the lower end of which has connection to a cross-head 10, sliding between guide-plates 11 and pivotally connected to the crank-rod 12, which has its lower end connected to the wrist of the main crank of the driving-shaft 13.

14 15 designate bearing-blocks secured on the base 1 and provided with the proper bearings wherein the shaft 13 is revolubly mounted and secured against displacement by the usual caps 16.

The driving-shaft 13 is a triple crank-shaft having a main crank 17 central between the bearings and to which the crank-rod 12 is connected. A crank 18 19 is arranged on each side of crank 17, the cranks 18 19 being arranged opposite in direction to the crank 17, substantially as seen in the drawings. To the wrists of the cranks 18 19 are pivotally connected the lower ends of connecting-rods 20, the upper ends of which are jointed to short hangers 21, formed on or secured to the lower head of the steam-cylinder. The main crank 17 has the same stroke as the shorter cranks 18 19 in order that the piston shall have double the stroke of the cylinder in order to permit the piston to pass the quarter dead-points, and thus increase the power, and the cylinder and piston, it is intended, shall balance each other. It will be perceived that by the opposite disposition of the cranks the initial movements of the cylinder and the piston are in opposite directions and that by the arrangement of the cranks those relative movements are continued.

To the supporting-frame is secured stout cross-pieces 22, extended beyond the frame the proper distance and provided with vertical standards 23, which support the steam-chest 24, formed with oppositely-directed steam-passages 25 26 to direct the steam to the upper and lower ends of the cylinder. These steamways open into steam-sleeves 27 28, which lead into the steam-pipes 29 30, opening into the steam-cylinder at the upper

and lower ends thereof, respectively, and consequently above and below the piston-head, as is clearly indicated in the drawings. An escape-port 31 is provided in the steam-chest, as usual, and in the steam-chest is made the usual valve-chamber 32, wherein is slidingly posited the slide-valve 33, formed with the usual recess to straddle either steamway and the exhaust-port. To the slide-valve is secured a valve-rod 34, the outer end of which is suitably connected to a rod 35, the lower end of which is fastened to a strap 36, mounted on an eccentric 37 on the driving-shaft 13. Of course the valve connections are so arranged as to act to produce the required effects on the associated reciprocable cylinder and piston. The end portions of the steam-pipes 29 and 30 are slidably arranged in the sleeves 27 28, but do not reach the full length thereof, so as to leave a steam-space at their ends, as shown in the drawings. A steam-pipe 38 enters the valve-chamber and leads from a well-known source.

The operation is readily perceived from the foregoing description, taken in connection with the drawings. Steam being let into the steam-chest, it finds its way through the open port into the steam-cylinder and pushes the piston in direction of the applied force, which eventuates in rotating the driving-shaft, which in sequential order moves the cylinder in the opposite direction to the movement of the piston, and these relative movements are continued throughout the operation and with the attained results of increased power and expedited action.

Having thus fully described the invention, what is claimed as new is—

1. In a single-acting steam-engine, the combination of a reciprocable steam-cylinder, a reciprocable piston in the steam-cylinder, means to operate the cylinder and the piston in relatively opposite directions, a valve-chest formed with sleeves, oppositely-extending steam-pipes slidingly disposed in the sleeves and rigidly connected to and opening into opposite ends of the steam-cylinder, and means to actuate the valve.

2. In a steam-engine, a reciprocable steam-cylinder, a valve-chest formed with steam-sleeves, steam-pipes extending from opposite ends of the cylinder and having their end portions slidingly arranged in the sleeves and operatively fixed to the cylinder, a valve in the valve-chest, a piston in the steam-cylinder, a crank-shaft connected to the piston and the cylinder to reciprocate them in relatively opposite directions, and an eccentric on the crank-shaft and connected to the valve.

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

JOHN M. CLARK.

Witnesses:
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