

F. W. KLINE.

VALVE.

APPLICATION FILED OCT. 17, 1906.

Patented Nov. 10, 1908.

903,201.

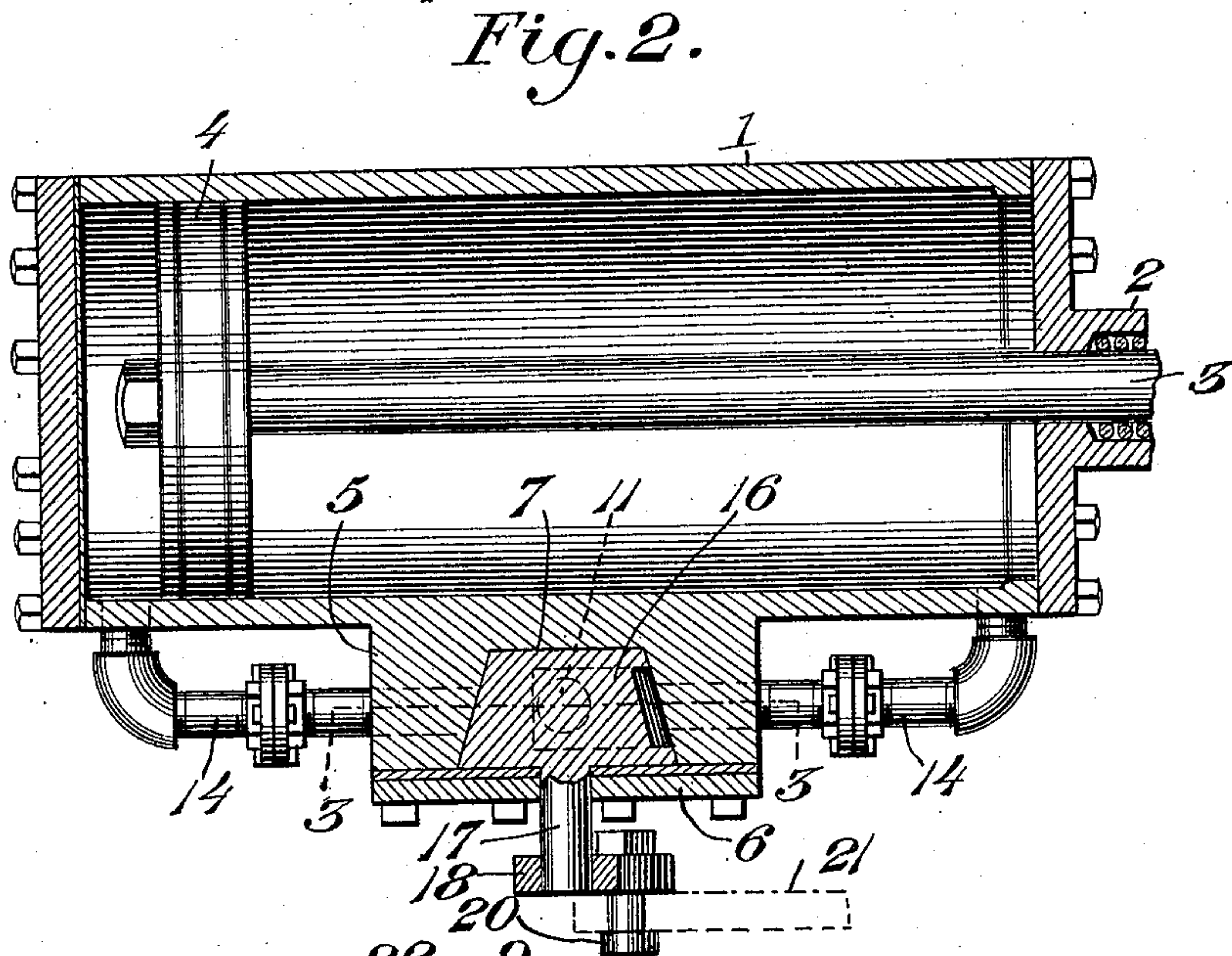
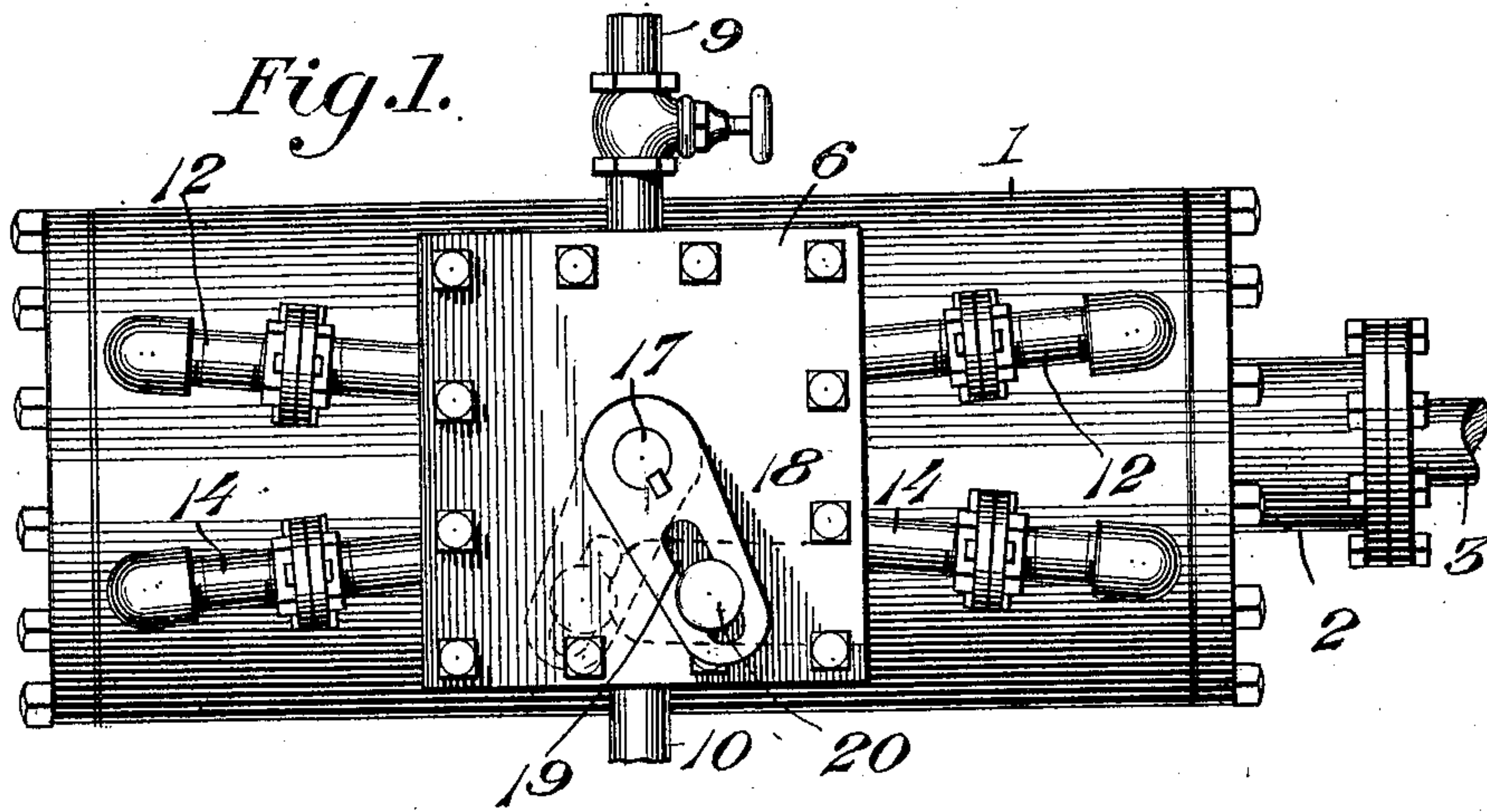
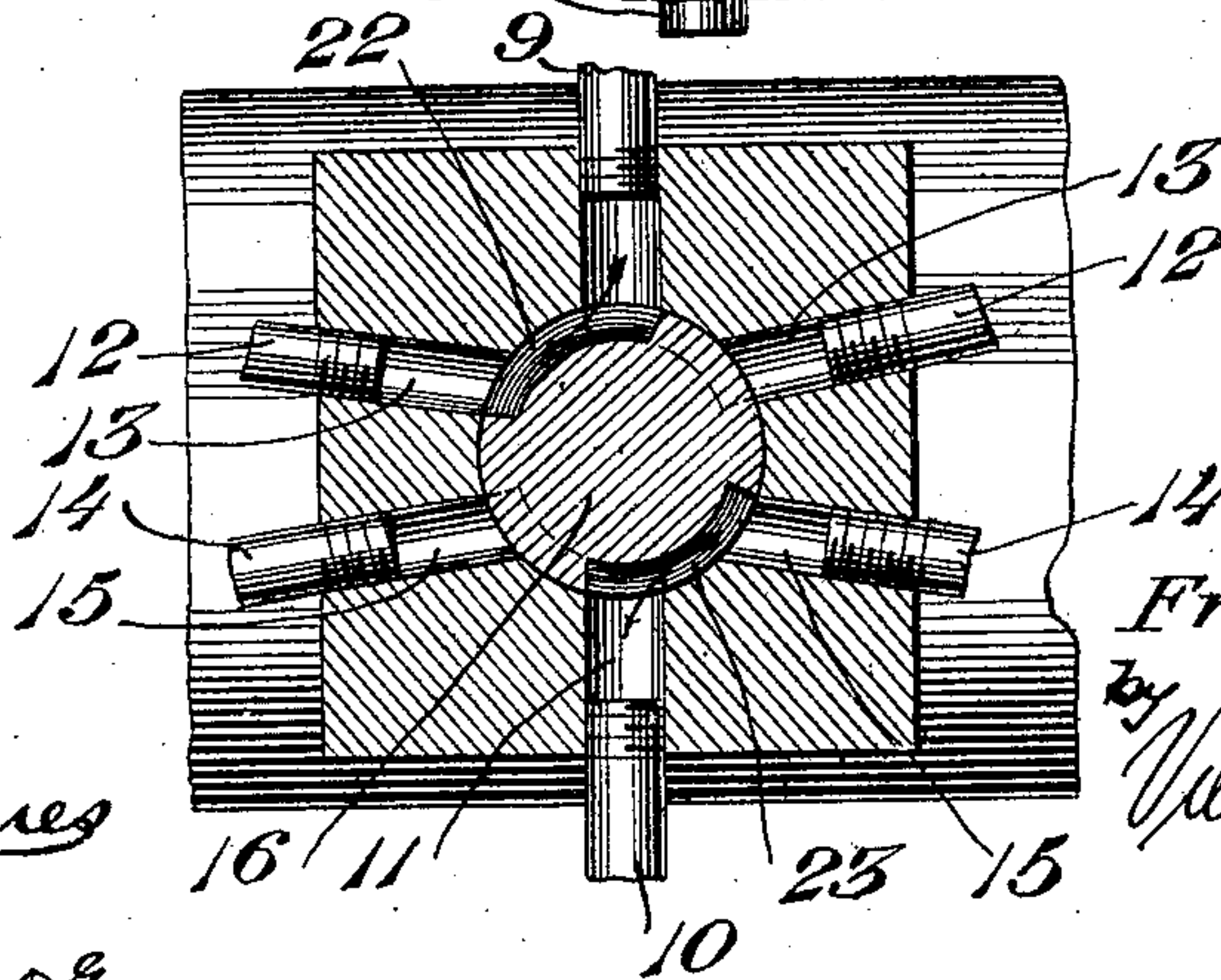


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK W. KLINE, OF NORTH GERMANTOWN, NEW YORK.

VALVE.

No. 903,201.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed October 17, 1906. Serial No. 339,402.

To all whom it may concern:

Be it known that I, FRANK W. KLINE, a citizen of the United States, residing at North Germantown, in the county of Columbia and State of New York, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates to valves of the rotary type, designed especially for use in controlling the steam inlet and exhaust of engine cylinders, and has for its objects to provide a comparatively simple, inexpensive device of this character which may be readily operated, one which in action will be ground to its seat, thus insuring a constantly effective joint for preventing leakage, and one which may be adjusted for regulating the amount of steam admitted to and exhausted from the cylinder to govern the speed of the engine.

With these and other objects in view, the invention comprises the novel features of construction and combination of parts more fully hereinafter described.

In the accompanying drawings: Figure 1 is a side elevation of an engine cylinder equipped with a valve mechanism embodying the invention. Fig. 2 is a horizontal section taken centrally and longitudinally through the cylinder. Fig. 3 is a detail, sectional view taken on the line 3—3 of Fig. 2.

Referring to the drawings, 1 designates an engine cylinder having at one end a stuffing box 2 through which is extended a piston rod 3 provided with a piston head 4 arranged for reciprocation within the cylinder, these parts, which are conventionally shown herein, being of the usual or any appropriate construction and material and adapted in practice to perform their ordinary functions.

Formed on one side of the cylinder 1 is a valve casing 5 having a removable face plate 6 and provided with an internal valve chamber 7, preferably of trunco-conical form, as shown, there being connected with the casing and for communication with the chamber 7 through the medium of a port 8 a main steam supply pipe 9 and a main exhaust pipe 10 which communicates with the chamber through the medium of a port 11, while communicating at their outer ends with the cylinder 1 and at points adjacent the ends of the latter is a pair of oppositely extended branch inlet pipes or ducts 12 having communication at their inner ends with the chamber 7 through passages 13 and a pair of

branch exhaust pipes or ducts 14 communicating with the valve chamber through passages 15.

Fitted in the chamber 7 is a rotary trunco-conical valve 16 provided with a central, outwardly projecting stem 17 on which is fixed a crank arm 18 provided with a longitudinal slot 19 in which is adjustably arranged a crank pin 20 through the medium of which the arm 18 is connected with an operating rod 21 in turn connected in the usual manner with the engine eccentric for operating the valve in the usual manner, there being formed at opposite points in the periphery of the valve a pair of channels or depressions 22, 23, constituting passages for connecting the inlet and exhaust pipes during the operation of the device and in the manner more fully hereinafter explained.

In practice, supposing the valve 16 to be in the position illustrated in Fig. 3, the inner end of the port 8 and one of the ports 13 will be connected for communication through the medium of the passage 22, thus admitting steam from the supply pipe 9 through the left-hand pipe 12 to the cylinder for imparting an outstroke to the piston, the port 11 being at the same time connected for communication with the right-hand port 15 through the medium of the passage 23, thus to establish communication between the exhaust pipe 10 and appropriate branch pipe 14 for permitting steam to exhaust from the cylinder during the outstroke of the piston. At the completion of the outward movement of the piston, the rod 21 will be actuated for partly rotating the valve, through the medium of the crank arm 18, to establish communication between the inlet pipe 9 and other branch pipe 12 and between the exhaust pipe 10 and left-hand branch pipe 14, as illustrated by dotted lines in Fig. 3, whereby steam is admitted to the cylinder for effecting instroke of the piston and permitting the proper exhaust of the steam during such stroke.

It is to be particularly observed that in operation the valve will be constantly ground on its seat for maintaining a steam tight joint between the parts, and further, that by adjusting the crank pin 20 back and forth longitudinally of the slot 19 the degree of movement of the valve may be varied to control the amount of steam admitted to the cylinder and consequently govern the speed of the engine. Also it is to be noted that the

crank arm 18 may be manually operated for properly manipulating the valve in the operation of starting or stopping the engine, and further that by adjusting the valve to an intermediate position for cutting off communication between pipe 9 and both of the pipes 12, at which time communication between the pipe 10 and both of the pipes 14 will be closed, the operation of the engine will be fully stopped.

Having thus fully described my invention, what I claim is:

1. The combination of a cylinder having in its cylindrical wall a pair of inlet and outlet ports adjacent each end, a casing at one side of the cylinder and disposed between the ends thereof, said casing open at one side and having a frusto-conical chamber and threaded openings in the walls of the chamber and arranged in pairs at opposite sides of the casing, a frusto-conical valve in the chamber provided with arcuate ports in its surface, a stem on the valve, a plate having an aperture for receiving the stem, fastenings for securing the plate to the valve casing for closing the open side thereof, means for oscillating the valve, tubular conduits independent of the casing and cylinder and having threaded engagement in the said openings and ports and located outside the casing and cylinder, a supply pipe connected with the casing to communicate with one of said valve ports, and an exhaust pipe connected with the casing to communicate with the other of said valve ports.

2. The combination of a cylinder having a pair of spaced inlet and outlet ports in its side adjacent each end and each pair being arranged approximately the same distance from the end of the cylinder, a valve casing formed integral with the cylinder and projecting outwardly therefrom and having a chamber, the axis of which is disposed at right angles to that of the latter, said casing being provided with oppositely disposed live steam inlet and exhaust steam outlet openings and also with a pair of openings at opposite sides of the casing, supply and exhaust pipes having threaded engagement in the in-

let and outlet openings, a pipe between each opening of the casing and one of said cylinder ports, the pipes being composed of separate parts having threaded engagement in the ports and side openings, couplings connecting the parts of each pipe together, an oscillatory valve in the casing arranged with its axis at right angles to the axis of the cylinder and provided with ports arranged to connect the inlet and exhaust openings of the casing with the side openings of the latter, a plate bolted to the casing for covering the chamber thereof and retaining the valve in position, and means for oscillating the valve.

3. In an apparatus of the class described, the combination of a cylinder having a laterally extending valve casing and a pair of threaded openings adjacent each end, and arranged in the same transverse plane, oppositely disposed inlet and outlet steam pipes connected with the casing, a pair of supply and exhaust ducts extending from each side of the casing and engaging in the threaded openings of the cylinder, a frusto conical valve mounted in the casing for rocking movement and provided with peripheral ports one arranged to connect the inlet pipe with one of the supply ducts connected with the forward end of the cylinder while the other connects the exhaust duct leading from the rear end of the cylinder to communicate with the outlet pipe, a plate secured to the casing for holding the valve therein and having an opening, a packing between the plate and casing, bolts extending through the plate and screwing into the casing, a stem on the valve passing through the opening in the plate in a direction at right angles to the axis of the cylinder, an arm on the stem for rocking the latter, and an adjustable reciprocating member connected with the arm.

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

FRANK W. KLINE.

Witnesses:

SAMUEL C. SNYDER,
FRED H. KLINE.