B. JACOBY & C. S. JOHNSON.

THROTTLE VALVE.

APPLICATION FILED NOV. 14, 1913.

1,102,410.

Patented July 7, 1914.

2 SHEETS—SHEET 1.

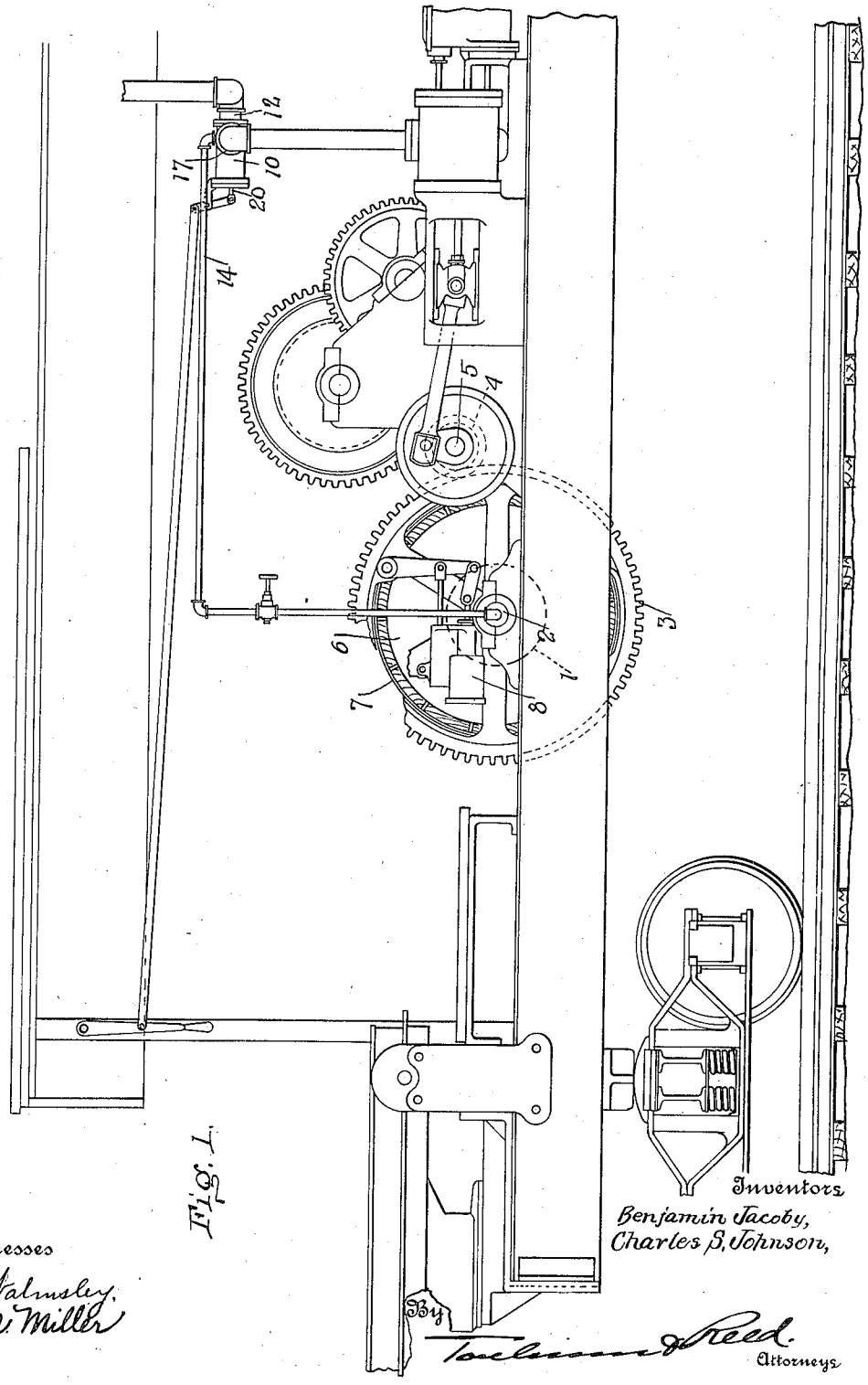


Fig. 1.

Witnesses

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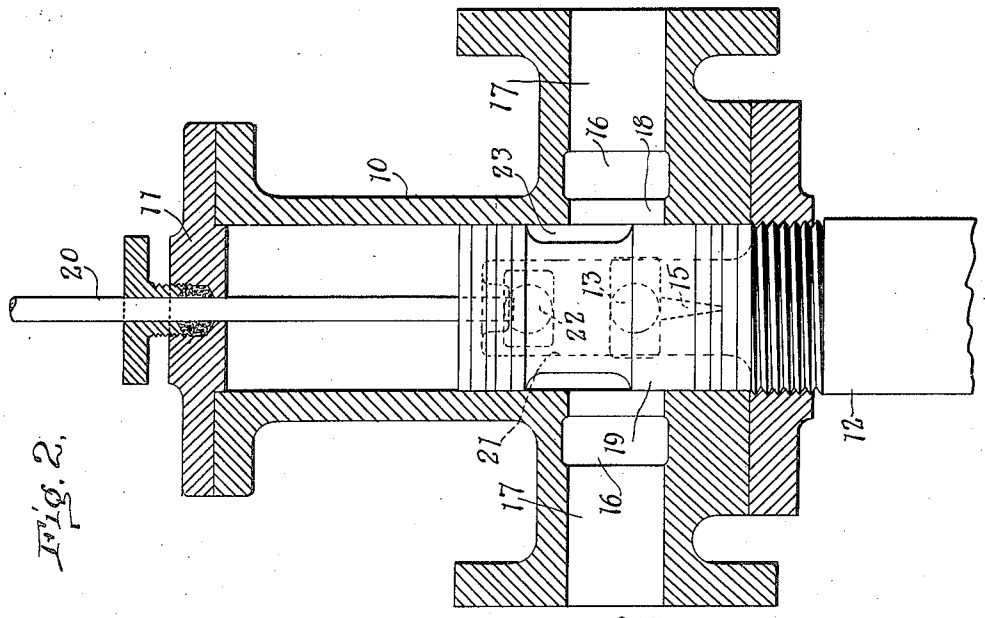


Fig. 2.

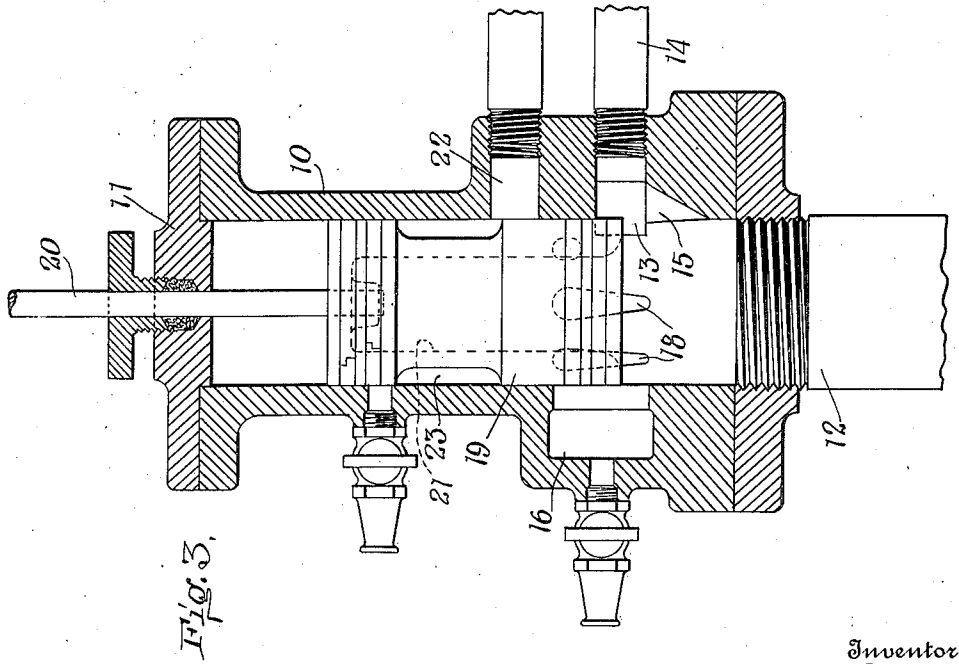


Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

BENJAMIN JACOBY AND CHARLES S. JOHNSON, OF MARION, OHIO, ASSIGNORS TO THE MARION STEAM SHOVEL COMPANY, OF MARION, OHIO, A CORPORATION OF OHIO.

THROTTLE-VALVE.

1,102,410. Specification of Letters Patent. Patented July 7, 1914.

Application filed November 14, 1913. Serial No. 801,077.

To all whom it may concern:

Be it known that we, BENJAMIN JACOBY and CHARLES S. JOHNSON, citizens of the United States, residing at Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Throttle-Valves, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to throttle valves and more particularly to a throttle valve designed to control both the hoisting engine and the actuating device for the clutch mechanism, by which the engine is connected with the hoisting drum.

Heretofore it has been customary to provide separate throttle valves for controlling the clutch mechanism and the engine. This requires two distinct acts on the part of the operator to set the hoisting drum in motion, first, he must operate that throttle which controls the flow of steam to the actuating device or, as it is commonly called, ram for the clutch. Then after the clutch has been properly placed he must actuate that throttle which controls the engine for the hoisting drum.

The object of the present invention is to provide a single device for controlling the flow of steam both to the ram and to the engine, thereby enabling the hoisting mechanism to be put in operation by a single act on the part of the operator.

It is also an object of the invention to so construct and arrange the throttle valve that the steam will be gradually admitted to the ram to properly set the clutch mechanism, and when this mechanism has been set to gradually admit the steam to the engine to slowly start the movement of the hoisting drum and gradually increase this movement to full speed.

In the accompanying drawings Figure 1 is an elevation of the hoisting mechanism for a steam shovel showing our invention applied thereto: Fig. 2 is a sectional view taken horizontally of a throttle valve embodying our invention: and Fig. 3 is a vertical sectional view taken centrally through such a valve.

We have illustrated our invention as embodied in a throttle valve connected with the hoisting engine and ram forming parts of the hoisting mechanism of a steam shovel of a well known construction but it will be understood that the invention may be embodied in various forms and may be applied to mechanisms other than that here illustrated.

The hoisting mechanism here illustrated comprises a drum 1 about which passes the usual hoisting cable and which is mounted on a shaft 2. This drum is adapted to be connected with a driving gear 3 mounted on the shaft 2 and meshing with a pinion 4 on the engine shaft 5, the connection being formed by means of a suitable clutch mechanism which is here shown as consisting of a friction drum 6 about which extends a friction band 7. The clutch mechanism is actuated by a steam ram 8 which is mounted upon the gear 3 and to which steam is admitted through a conduit formed in the shaft and hub of said gear. The engine shaft 5 is driven by a suitable engine or engines in a well known manner. So much of the mechanism as has been described is in common use in a well known type of steam shovel and similar excavating mechanism.

In order that the ram and the engine may both be controlled by a single act of the operator we have provided a throttle valve which we have connected with both the ram and the engine, and we have so arranged the ports and the valve members that the ram will be first actuated and after the clutch mechanism has been set steam will be admitted to the engine to impart movement to the hoisting drum. The throttle valve as shown in the present embodiment of the invention consists of a cylindrical valve casing 10 having one end closed by a cylinder head 11, and having the other end connected with a steam supply pipe 12 leading to the boiler. The valve casing is provided at a point near its forward end, that is, the end connected with the steam supply, with a port 13 leading to a pipe 14 which is connected with the ram. This port has a forwardly extending tapered extension 15 terminating a short distance from the forward end of the casing. The valve casing is also provided with a port or ports leading to the engines, there being two in the present form of the device. A conduit 16 extends about the circumference of the casing and communicates with passage ways 17 which are connected with the hoisting engines. The conduit 16 communicates with the interior of the valve casing by means of a port or

ports formed in the casing, and, in the present instance, a plurality of these ports are arranged in annular series. These ports, which are indicated at 18, taper forwardly, and have their extreme forward ends arranged in substantially the same plane as the forward edge of the body portion of the port 13. The ports are controlled by a piston valve 19, operated by a valve rod 20 extending through the cylinder head 11, and it will be apparent that when this valve member or piston is in its extreme forward position all the ports so far described will be closed against the entrance of steam. The piston valve is preferably made hollow or provided with a longitudinal conduit 21 to permit the steam to pass to the rear of the piston valve, thereby providing substantially equal steam pressure on both ends of the valve and causing the same to balance. If the valve is moved rearwardly, the point of the extension 15 will be first uncovered, and as the valve continues its rearward movement the extension will be completely opened, thereby gradually admitting steam to the ram and causing the clutch band to be set slowly, thus avoiding the shock or jar which would result from the sudden operation of the ram. As the piston valve clears the rear end of the extension 15 of the ram port it will open the forward ends of the ports 18 leading to the engine. Consequently, as soon as the ram has been fully operated the steam will be admitted to the engines and these started slowly into operation. As the piston continues its movement the admission of steam to the engine is gradually increased until it is in full operation and at the same time the main ram port 13 is uncovered to admit the full pressure to the ram.

The valve casing is also provided with an exhaust port 22 leading to the exhaust pipe, and the piston valve 21 has an annular passage way or by-pass 23 so arranged that, as the piston is moved forward, it will first connect the exhaust port with the engine port 18 and then, on the further forward movement of the piston valve, with the ram port 13. In this manner the steam is allowed to escape from the engine and ram thereby relieving the back pressure on the pistons thereof.

The operation of the mechanism will be readily understood and it will be apparent that by means of our invention the operator by a single movement of a single operating lever, which will be connected with the piston valve, will cause the ram and the engine to be successively operated in the proper manner, thereby not only simplifying the mechanism as a whole but also simplifying the duties of the operator. Thus by reducing the number of parts the operation and control of the machine as a whole is facilitated and further by the reduction of the number of parts which it will be necessary for the operator to actuate in the control of the machine, the probabilities of his making a mistake and operating the wrong part or lever are decreased.

While we have shown and described one embodiment of our invention it will be understood that this has been chosen for the purposes of illustration only and that we do not wish to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. The combination with a drum, an engine, a clutch to connect said drum with said engine and a steam operated ram to actuate said clutch, of a single throttle valve to admit steam successively to said ram and said engine.

2. The combination with a drum, an engine, a clutch to connect said drum with said engine, and a steam operated ram to actuate said clutch, of a throttle valve comprising a cylindrical valve casing having ports connected respectively with said ram and said engine and a piston mounted in said cylinder, said ports being so arranged that the movement of said piston will successively uncover the ports leading to the ram and to the engine.

3. In a throttle valve a casing communicating with a source of steam supply and having ports leading respectively to a clutch operating device and to an engine, and a valve member to control said ports, said ports being so arranged relatively one to the other and to said valve member that the manipulation of said member will operate, first, that port leading to the clutch operating device and then the port leading to said engine.

4. A throttle valve comprising a cylindrical casing connected at one end with a source of steam supply, a port arranged near the forward end of said casing, a second port arranged beyond the first mentioned port and having its forward end overlapping the rear end of said first mentioned port, said ports being connected, respectively, with two fluid operated devices arranged for successive operation, and a piston valve to successively uncover said ports.

5. A throttle valve comprising a cylindrical casing communicating at one end with a source of steam supply and having a port provided with a portion tapered toward said source of steam supply, and having a second port also having a portion tapered toward said source of steam supply, the tapered portion of said last mentioned port overlapping the body por-

tion of said first mentioned port, said ports being connected, respectively, with two fluid operated devices arranged for successive operation, and a piston mounted in said casing to successively uncover said ports.

6. A throttle valve comprising a casing communicating at one end with a source of steam supply, having a port leading to a clutch operating device and having a second port arranged in the rear of the first mentioned port and connected with an engine, said ports being connected, respectively, to two fluid operated devices arranged for successive operation, said casing also having an exhaust port arranged beyond the last mentioned port, and a valve member mounted in said casing arranged to control said ports and having a by-pass to connect both of the first mentioned ports with the exhaust port when said first mentioned ports are cut off from said source of steam supply.

In testimony whereof, we affix our signatures in presence of two witnesses.

BENJAMIN JACOBY.
CHARLES S. JOHNSON.

Witnesses:
FRANCIS BANELL JENNINGS,
HERBERT E. ROUSH.