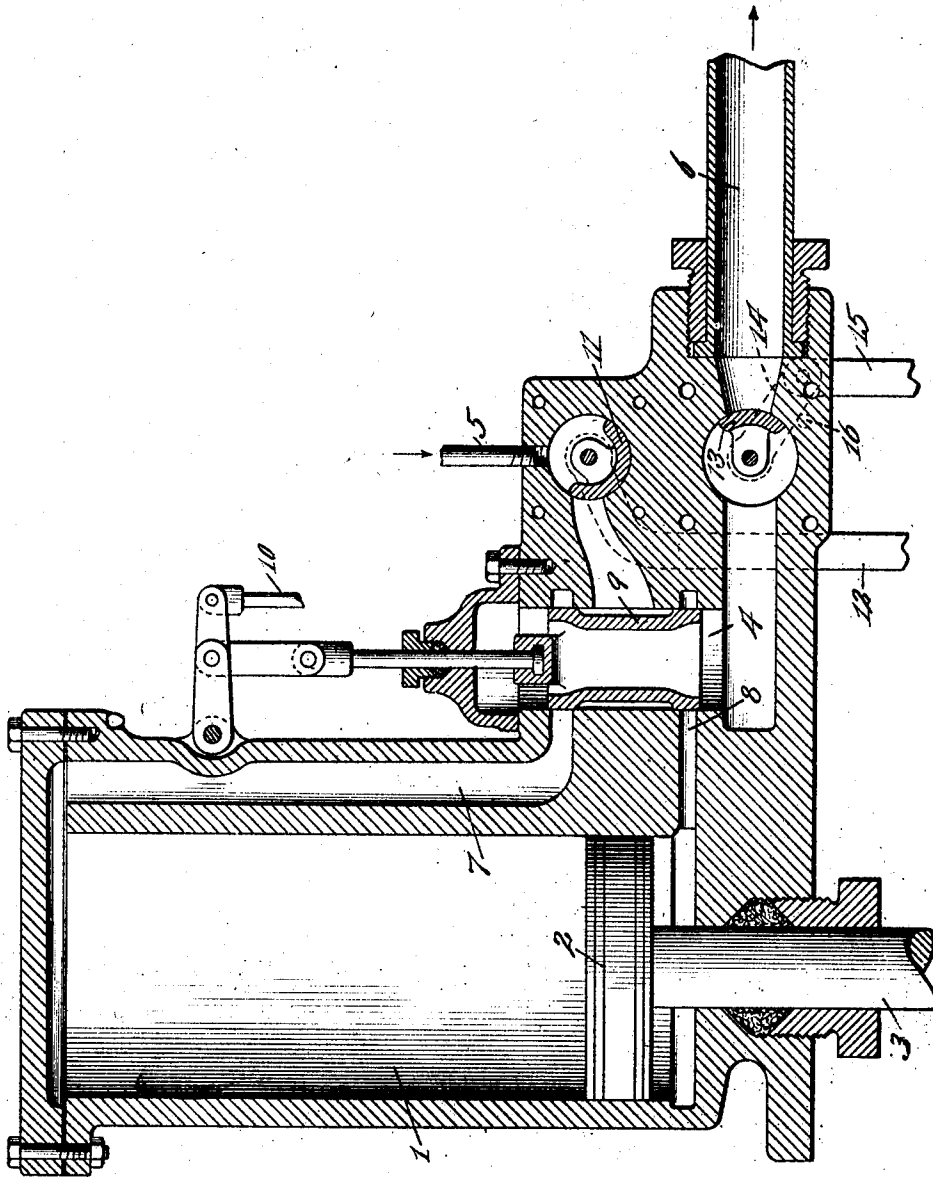


W. J. HAGMAN.
STEAM HAMMER.
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972,368.

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UNITED STATES PATENT OFFICE

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STEAM-HAMMER.

972,368.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM J. HAGMAN, a citizen of the United States, residing at Philadelphia, Philadelphia county, Pennsylvania, have invented certain new and useful Improvements in Steam-Hammers, of which the following is a specification.

This invention relates to an improved valve system for steam hammers and the invention will be readily understood from the following description taken in connection with the accompanying drawing which is a vertical longitudinal section of the cylinder and steam chest of a steam hammer exemplifying my present invention.

In the drawing:—1, indicates the steam cylinder; 2, the piston thereof; 3, the hammer-rod and piston-rod; 4, the steam chest; 5, the steam inlet pipe to the steam chest; 6, the exhaust-pipe from the steam-chest; 7, a steam passage leading from the steam-chest to the upper end of the cylinder; 8, a passage leading from the steam-chest to the lower end of the cylinder; 9, the main valve adapted to place the upper end of the cylinder in communication with the steam inlet and at the same time place the lower end of the cylinder in communication with the exhaust outlet, or, on the other hand, place the lower end of the cylinder in communication with the steam inlet and at the same time place the upper end of the cylinder in communication with the exhaust outlet; 10, the usual link mechanism for reciprocating the valve and serving to typify well known operating means connected with the main valve; 11, a steam throttle valve disposed in the conduit between the steam inlet and the steam chest; 12, a lever by means of which the steam throttle valve may be actuated; 13, an exhaust throttle-valve disposed in the conduit between the steam-chest and the exhaust outlet; 14, an arm for actuating the exhaust throttle valve; 15, a link attached to this arm and serving as means by which the arm may be raised and the valve opened; and 16, a stop to limit the descent of the arm to a position corresponding with closed position of the exhaust throttle valve.

Disregarding for the present the presence of the exhaust throttle-valve, the hammer would be operated precisely as usual with ordinary steam hammers and, as usual, when the present work of the hammer was over,

the steam throttle valve would be closed. After a more or less extended time the hammer would again need to be used and it would be found that the cylinder and its accessories had cooled off to such an extent as to interfere with the prompt, delicate and accurate working of the hammer. Following the usual custom, the steam throttle-valve would be opened more or less and steam would be allowed to blow through the steam-chest and cylinder and out of the exhaust until things were properly warmed up. This will manifestly have resulted in some loss of time and in some loss of steam. But, in my present system, the exhaust throttle-valve closes automatically by the weight of link 15 whenever the operator ceases to hold that link in elevated position corresponding with the open position of the exhaust throttle-valve, a position to which he holds the exhaust throttle valve while the hammer is working. The result is that when the present work of the hammer is over it may be left under full steam pressure to keep its parts hot, and the only loss will be such as is due to condensation. When the hammer is to be used again then the exhaust throttle-valve is to be opened by the operator and the use of the hammer may be instantly proceeded with in the usual manner under the best conditions, the exhaust throttle-valve again automatically closing when the operator ceases to hold it open.

It is to be observed that with the exhaust throttle-valve closed, which is its normal condition when the hammer is idle, the steam may be admitted freely to the steam chest and to both ends of the cylinder, which latter result may be accomplished by actuating the main valve. But the main valves of steam hammers are notorious for leaking, owing to the peculiar conditions of working and it will therefore generally be sufficient to open the steam throttle-valve and permit the steam to have free flow to the steam-chest, the steam finding its way to both ends of the cylinder, even if the main valve be on lap as to both ends of the cylinder, with sufficient freedom to keep all the parts sufficiently warm for instant response to duty when the hammer is required for use.

It will, of course, be understood that link 15 and arm 14 and stop 16 simply constitute exemplifying mechanism providing, first, for the actuation of the exhaust throttle-valve

and, second, for its automatic closure except when held open by the operator.

I claim:—

1. A steam hammer comprising, a steam
5 cylinder provided with passages leading to
its opposite ends, a steam-chest connecting
with said passages and provided with a
steam-inlet and provided with a single ex-
haust outlet to coöperate with both said
10 passages, a main valve disposed in the
steam chest and adapted to place either one
of the cylinder passages in communication
with the steam inlet while the other one of
the cylinder passages is placed in communi-
15 cation with the exhaust outlet, a throttle-
valve in the steam inlet, a throttle-valve dis-
posed in the passage between the steam-chest
and the exhaust outlet, and independent
means for controlling said throttle valves,
20 whereby while the hammer is idle steam may
be freely admitted to both ends of the cylin-
der without escaping from the exhaust out-
let, combined substantially as set forth.

2. A steam hammer comprising, a steam

cylinder, a steam - chest provided with a 25
steam inlet and an exhaust outlet and with
passages leading to the opposite ends of the
cylinder, a main valve disposed in the steam
chest and adapted to place either one of the
cylinder passages in communication with the 30
steam inlet while the other one of the cylin-
der passages is placed in communication
with the exhaust outlet, a throttle-valve in
the steam inlet, a throttle-valve disposed in
the passage between the steam-chest and the 35
exhaust outlet, independent means for con-
trolling said throttle valves, and means for
automatically closing the exhaust throttle-
valve, whereby while the hammer is idle
steam may be freely admitted to both ends of 40
the cylinder without escaping from the ex-
haust outlet, combined substantially as set
forth.

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Witnesses:

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