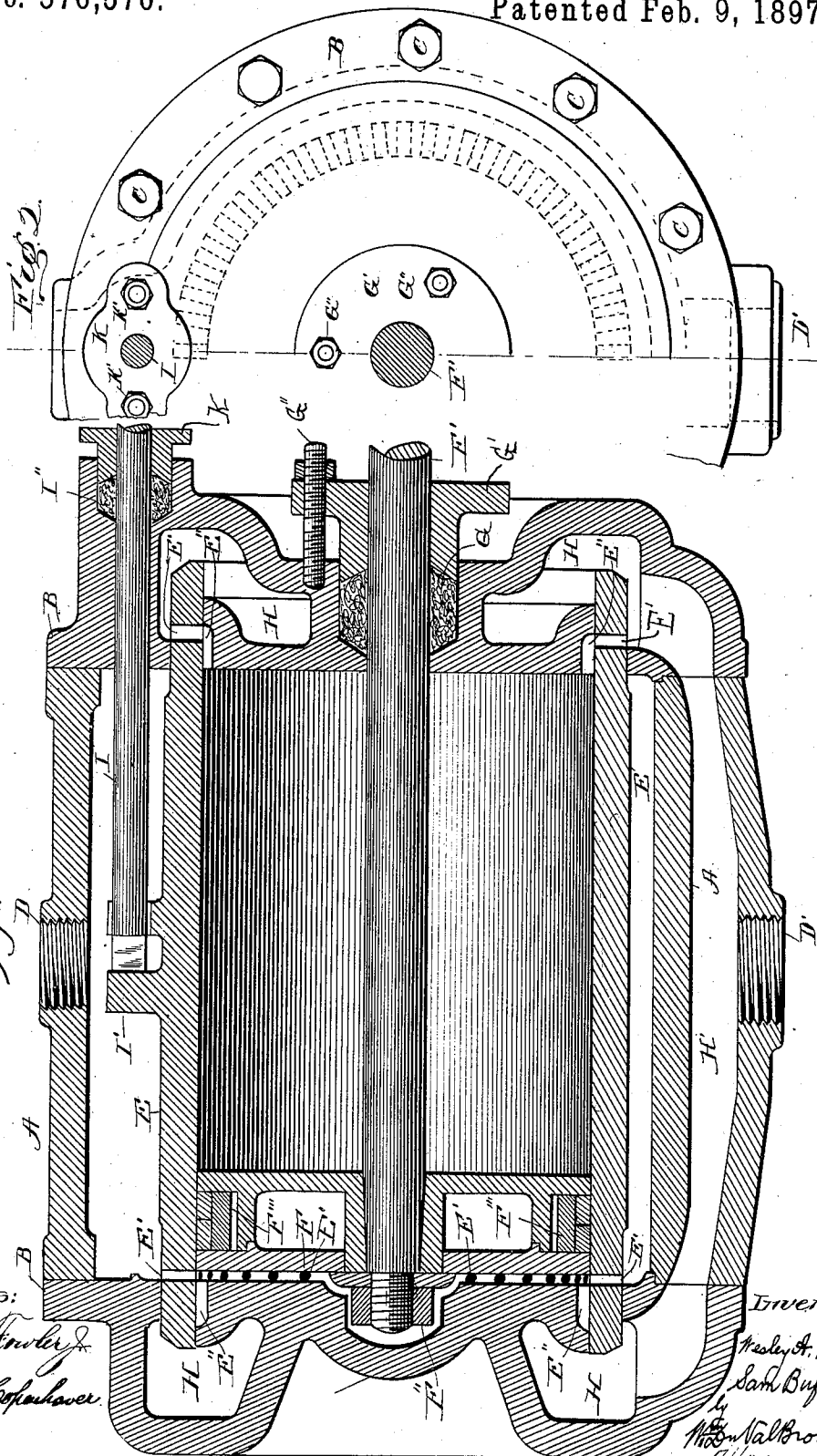


(No Model.)

W. A. HAUGHN & S. BUFKIN.
STEAM ENGINE.

No. 576,576.

Patented Feb. 9, 1897.



Witnesses:
J. M. Fowler
G. M. Carpenter

Inventors
Wesley A. Haughn
Saml. Buffkin
by
M. S. Talbott
Attorney.

UNITED STATES PATENT OFFICE.

WESLEY A. HAUGHN AND SAM BUFKIN, OF COLUMBUS, OHIO.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 576,576, dated February 9, 1897.

Application filed May 11, 1896. Serial No. 591,126. (No model.)

To all whom it may concern:

Be it known that we, WESLEY A. HAUGHN and SAM BUFKIN, citizens of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Steam-Engines; and we 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 apper-
10 tains to make and use the same.

This invention relates to a new and useful improvement in steam-engines; and it consists in the construction and arrangement of parts hereinafter described, and definitely
15 pointed out in the claims.

The invention relates more particularly to means for controlling the passage of steam in the cylinder for actuating the piston; and it consists of a cylinder and a sliding shell within the cylinder which surrounds the piston and controls the entrance and exit of steam. It is the purpose to provide a device which saves the waste steam commonly known as "clear-
25 ance," and also allows the water of condensation to readily pass out of the cylinder, and at the same time provides a perfect balance for the shell, thereby dispensing with much of the friction of an ordinary slide-valve.

It is, furthermore, the object to provide a device which can be readily secured in place, cheaply manufactured, and easily operated.

These and other objects not hereinbefore mentioned are accomplished by the construction illustrated in the accompanying draw-
35 ings, wherein like letters of reference indicate corresponding parts in both views, and in which—

Figure 1 is a vertical central longitudinal section through a cylinder, and Fig. 2 is an end elevation of the same.

In the drawings the cylinder consists of the shell A and cylinder-heads B, which are secured to the shell by means of the bolts C, as shown in Fig. 2. These parts form a cyl-
45 inder which can be readily secured to a boiler or bracket in any well-known manner. D designates the inlet-port. E designates the inner shell, which is adapted to slide within
50 the cylinder, as hereinafter described, and F designates the piston, which is surrounded

by the shell. The piston F is provided with the piston-rod F', secured to the piston by the nut F'' and the usual packing F'''. The piston-rod passes through the ordinary packing
55 G, which is secured in place by the head G' and bolts G''.

The cylinder-heads B are provided with annular passages H, which connect with the horizontal passage H', which leads to the ex-
60 haust-port D'. The passage-way H' is secured to the bottom of the cylinder, and the outlet-port is directly under the inlet-port.

The inner shell E is made longer than the outer shell A and has its opposite ends ex-
65 tending into the passage-ways H in the cylinder-heads. The ends are provided with holes or ports E', which control the ingress and egress of steam to the piston, as herein-
after described. The interior of the heads
70 B are provided with the cut-away portions E'', which form ports or passages which register with the holes E' in either end of the shell, according to the position of the shell. When the holes E' in one end of the shell reg-
75 ister with the ports E'', thereby forming a passage-way from the interior of the shell to the passages H in the cylinder-head, the holes in the opposite end of the shell will form a pas-
sage-way from the exterior of the shell to the
80 interior on the opposite side of the piston.

The shell E is moved in the opposite direction to the piston in any well-known manner by means of the rod I, secured to the ears I' on the shell. The rod passes through the
85 usual rod-packing I'', secured in place by the head K and bolts K'. As shown in the drawings, the shell has been moved to the right and the piston to the left, both the shell and piston having reached the limit of their move-
90 ment. Steam entering through the inlet-port D will surround the inner shell and pass through the holes E' in the left-hand end of the shell and move the piston to the right, and at the same time the steam within the
95 shell on the opposite side of the cylinder will exhaust through the ports E'' and holes E' in the opposite end of the shell and through the passages H and H' to the exhaust-port D'. It will be seen that a steam-chamber will be
100 formed entirely around the inner shell and that the pressure against the shell will be

equally balanced, and therefore the only friction will be that caused by the weight of the shell in its bearings, and that the shell will slide as easily as if the steam was cut off.

5 The weight of the shell is but slight, and by equalizing the pressure of the steam on all sides the shell can be slid with but little power. The upper portion of the steam-chamber is made a little larger to provide room for the
10 rod I'. This enlarged portion may be located on the side or bottom, if desired, the location not being important.

We do not desire to limit ourselves to any number of holes. These holes extend entirely
15 around the shell, so that any water of condensation within the shell can readily drip out through the lower holes. It will further be noticed in this device that we save the waste steam or clearance, the only clearance being
20 the steam which is taken to fill the holes E', and as these holes are less than an inch in diameter it will readily be seen that the clearance is reduced to practically nothing.

The steam left within the shell between the
25 end of the cylinder and the piston upon the return stroke of the piston will not be wasted, but compressed and reused with the next stroke thereof.

We are aware that many minor changes
30 can be made in the construction and arrangement of parts without in the least departing from the nature and principles of our invention.

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

1. The combination with a cylinder having an inlet and exhaust port, of a piston, and a sliding shell surrounding the piston and with-
40 in which the piston works, the shell and cylinder forming a steam-chamber around the shell, the chamber communicating with the inlet-port of the shell, and the shell provided with a hole at its opposite ends, the hole act-
45 ing as a passage-way for the inlet and exit for the steam to and from the interior of the shell, and the hole at each end communicating alternately with the steam-chamber and ex-
50 haust-port of the cylinder, substantially as described.

2. The combination with a cylinder having an inlet and exhaust port, of a piston, and a sliding shell entirely surrounding the piston, and within which the piston works, the shell
55 and cylinder forming a steam-chamber around the shell, the chamber communicating with the inlet-port, the shell provided with holes at its opposite ends, the holes extending entirely around the shell, and the holes at each
60 end communicating alternately with the

steam-chamber and with the exhaust-port of the cylinder, substantially as described.

3. The combination with a cylinder having an inlet and exhaust port and a passage-way at opposite ends of the cylinder communicat- 65 ing with the exhaust-port, of a piston, and a sliding shell surrounding the piston provided with a hole at its opposite ends, the holes acting as a passage-way for the inlet and exit for the steam to and from the interior of the shell, 70 and the hole at each end communicating alternately with the inlet-port of the cylinder and with the passage-way at the ends of the cylinder, substantially as described.

4. The combination with a cylinder having 75 an inlet and exhaust port, and an annular passage-way at opposite ends of the cylinder communicating with the exhaust-port, of a piston, and a sliding shell surrounding the piston provided with holes at its opposite 80 ends, the holes extending entirely around the shell and the holes at each end communicating alternately with the inlet-port of the cylinder and with the annular passage-way at the ends of the cylinder, substantially as de- 85 scribed.

5. The combination with a cylinder having an inlet and exhaust port, and an annular passage-way at opposite ends of the cylinder communicating with the exhaust-port, of a 90 piston, and a sliding shell surrounding the piston, the opposite ends of the shell extending within the annular passage-ways and the ends provided with holes, the holes at each end connecting alternately the interior of the shell with the annular passage at the ends of 95 the cylinder and with the inlet-port of the cylinder, substantially as described.

6. The combination with a cylinder having an inlet and exhaust port, and an annular 100 passage-way at opposite ends of the cylinder communicating with the exhaust-port, of a piston, and a sliding shell surrounding the piston provided with holes at its opposite 105 ends, the holes at each end communicating alternately with the inlet-port of the cylinder and with the passage-way at the ends of the cylinder, and ports in the ends of the cylinder leading from the interior of the shell adapted to register with the holes at the end 110 of the shell which are in communication with the annular passage-way, substantially as described.

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

WESLEY A. HAUGHN.
SAM BUFKIN.

Witnesses:

FRED H. CROUGHTON,
EDMUND DUNN.