

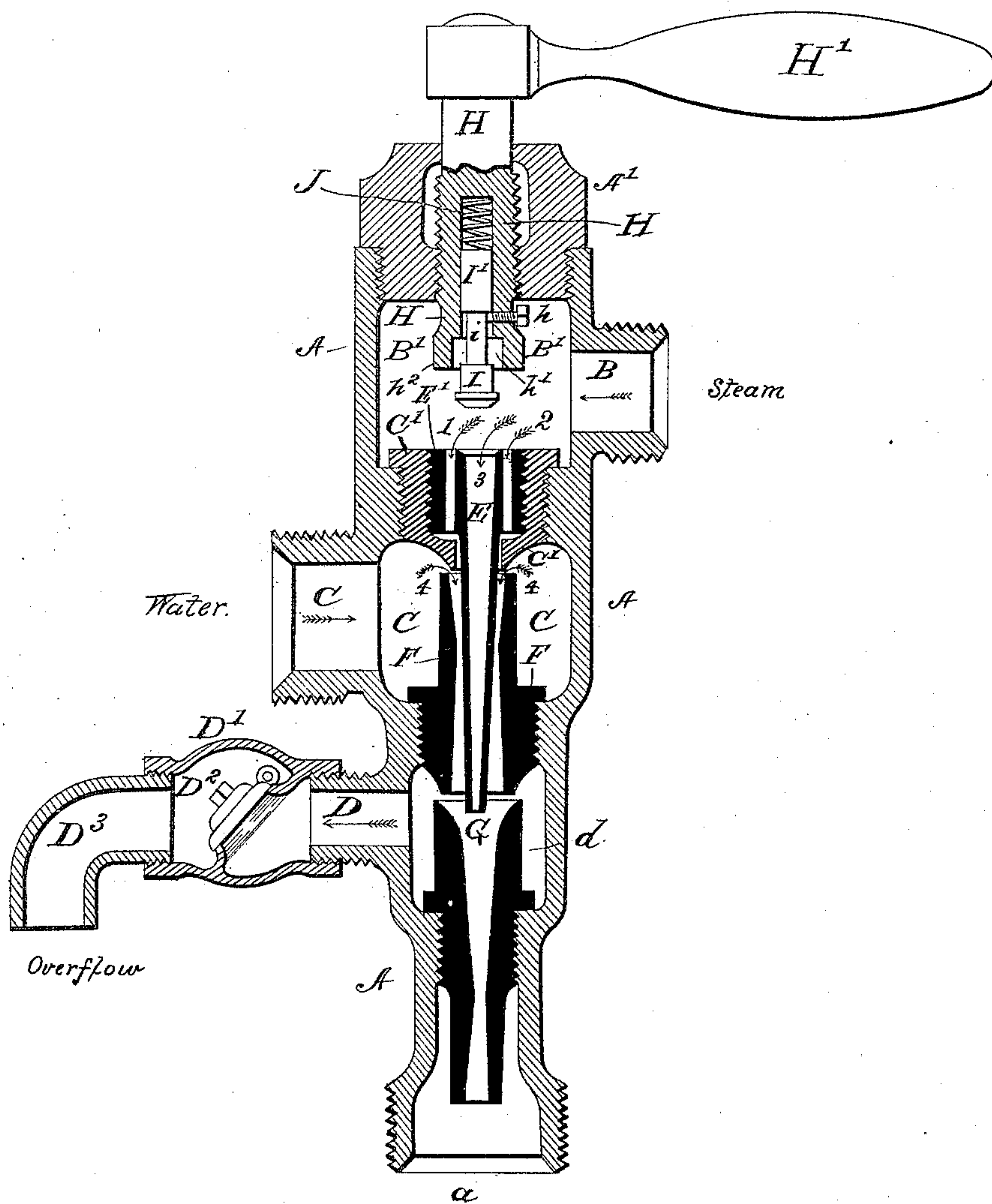
(Model.)

N. W. GIRDWOOD.

INJECTOR.

No. 338,950.

Patented Mar. 30, 1886.



WITNESSES

Chas. H. Davis.
Jm. H. Case

INVENTOR

N. W. Girdwood.
By C. M. Alexander
his Attorney

UNITED STATES PATENT OFFICE.

NORMAN W. GIRDWOOD, OF ASHEVILLE, NORTH CAROLINA.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 338,950, dated March 30, 1886.

Application filed July 2, 1885. Serial No. 170,513. (Model.)

To all whom it may concern:

Be it known that I, NORMAN W. GIRDWOOD, a citizen of the United States, residing at Asheville, in the county of Buncombe and State of North Carolina, have invented certain new and useful Improvements in Injectors for Steam-Boilers, of which the following is a specification, reference being had to the accompanying drawing.

10 The object of this improvement is an injector for steam-generators of simple construction and positive, reliable operation, not liable to get out order. These results are attained by the means illustrated in the drawing herewith
15 filed as part hereof, and which is a vertical sectional representation of an injector embodying the features of my improvement.

20 A is the outer shell or body of the injector, having a steam-inlet, B, a steam-recess, B', a water inlet and chamber, C C C, an overflow-outlet, D, connected to which is a valve-chamber, D', provided with a valve, D², and an overflow or drain pipe, D³.

25 C' is a tube screwed into the body of the shell A at the lower part of the steam-chamber B'.

30 E is a tube having a screw-threaded rectangular extension, E', by means of which it is secured to the tube C'. The extension E' of the tube E is recessed vertically, forming a tube, as shown at the arrows 1 and 2.

F is a tube surrounding the tube E, and screwed into the body of the shell A.

35 G is a tube screwed into the body of the shell A.

A' is a screw-threaded cap, closing the top of the shell.

40 H is a valve having a screw-thread corresponding to that in the cap A', in which it is vertically adjustable by means of the wrench or operating-handle H'. The lower part of the valve H is provided with a recess, h', for a purpose hereinafter set forth.

45 I is an additional valve, having a stem, I', extending into a recess of the valve H, which is also provided with a spiral spring, J, the object of which is to hold the valve I in its seat in the tube E as the valve H is moved away from the same until the screw h engages
50 with the shoulder formed in the valve-stem by the reduction in its body. (Shown at i.) The

object of the valve D² is to prevent the injector from drawing air; but it may be dispensed with. When the valve H is moved down on its seat C', the valve I, which will first close
55 the tube E, will enter the recess h' of the lower part of the same, and its enlargement h² will cover and close the recesses of the extension E' of the tube E, (shown at the arrows 1 and 2,) when the injector will be non-acting. 60

To operate the injector, raise the valve H
65 sufficiently to admit steam through the recesses shown at arrows 1 and 2, and through the recess in the lower part of the tube C', into the tube E, which will exhaust the air from
70 the water pipe and chamber C C C, and thus allow the water to come in contact with the steam from the tube C', which will force the water through the tube F into the tube G and overflow D³. When the water appears at the
75 overflow, open the valve mechanism H I full, as shown, which will let the steam through the tube E, and force all the water through the tube G against the pressure of the boiler, and stop the waste water at the overflow without the use of cocks or valves.

Having explained the construction and operation of my improvement, what I claim as new, and desire to secure by Letters Patent, is— 80

1. The valve H, having a recess provided with an additional spring-actuated valve, I, arranged to operate as specified, for the purpose set forth.

2. The tubes C' and E E', in combination
85 with the valve mechanism and the shell, as and for the purpose set forth.

3. The combination of the tubes C' E E' F G, the tube E extending through tube C' and into tube G, as shown, with the shell A, as
90 and for the purpose set forth.

4. The combination of the valves H I, cap A', tubes C' E E' F G, and shell A, constructed substantially as described, and arranged to operate as specified, for the purpose set forth. 95

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

NORMAN W. GIRDWOOD.

Witnesses:

JAMES RILEY,
J. H. BOARDMAN.