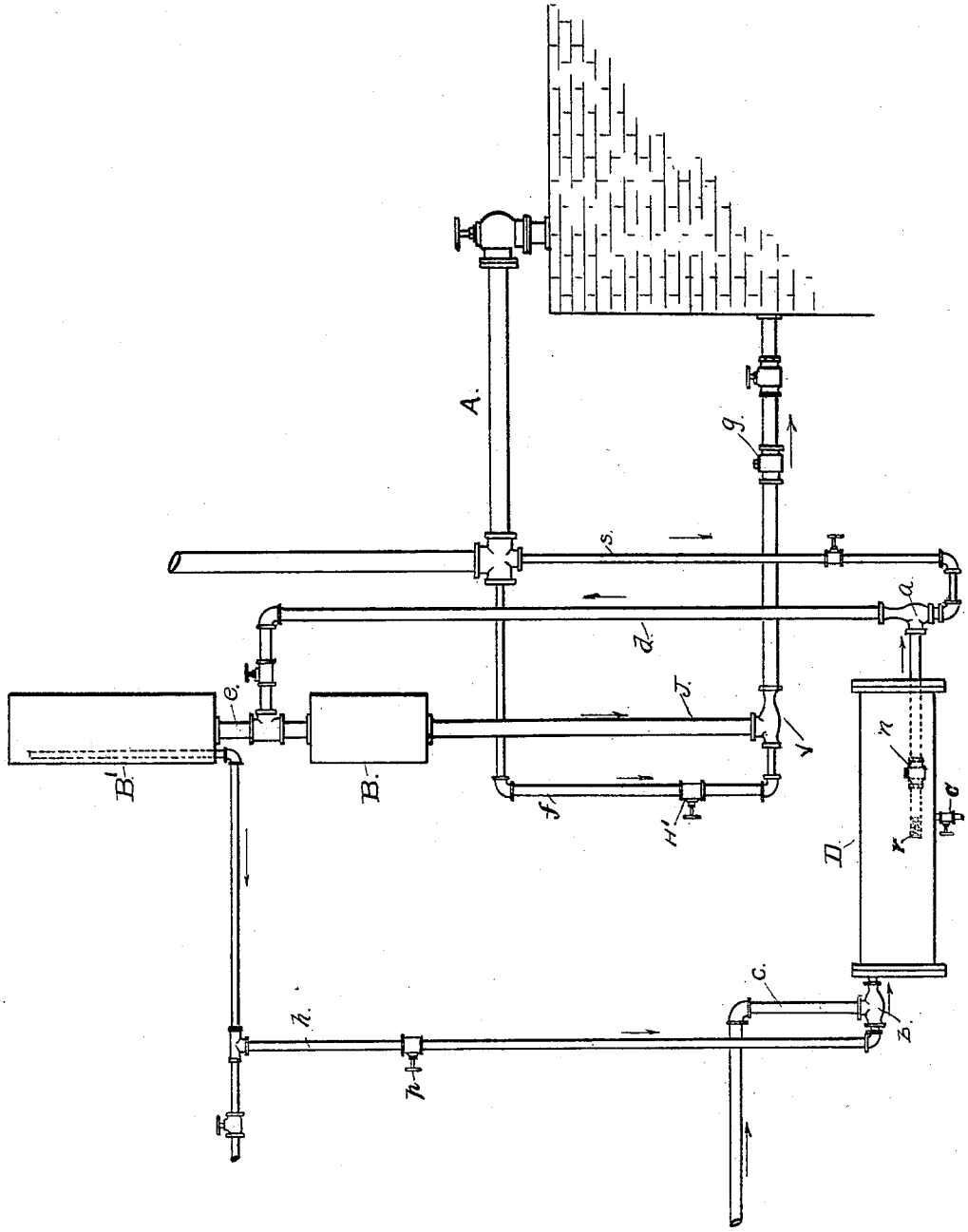
(No Model.)

E. B. BENHAM & J. McALLISTER.

WATER RETURN SYSTEM FOR STEAM GENERATORS.

No. 569,318. Patented Oct. 13, 1896.



Witnesses.

Howard E. Barlow.

L. J. Bush

Inventors.

Elijah B Benham.

James McAllister

By Berg Arnold Otty

UNITED STATES PATENT OFFICE.

ELIJAH B. BENHAM, OF MYSTIC, CONNECTICUT, AND JAMES McALLISTER, OF PROVIDENCE, RHODE ISLAND; SAID BENHAM ASSIGNOR TO SAID McALLISTER.

WATER-RETURN SYSTEM FOR STEAM-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 569,318, dated October 13, 1896.

Application filed January 20, 1896. Serial No. 576,109. (No model.)

To all whom it may concern:

Be it known that we, ELIJAH B. BENHAM, of Mystic, in the county of New London, State of Connecticut, and JAMES McALLISTER, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Water-Return Systems for Steam-Generators; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which forms a part of this specification.

This invention relates to that class of steam apparatus used for returning the water of condensation to the steam-boiler without the aid of pumping machinery, and also to the heating of the water before entering the boiler. It is fully explained and illustrated in this specification and the accompanying drawing, which represents, partly in elevation and partly by diagram, the parts, their arrangement and connections, that constitute the apparatus embodying the system.

The object of the invention is to obviate certain difficulties that are met with in using a system for returning water of condensation that depends on gravity only for its operation.

Referring to the drawing, A is the steam-pipe from the boiler.

B is a chamber of the stand-pipe.

B′ is an upper chamber of the stand-pipe.

D is a receiving-chamber for the water of condensation received through the pipe C from the engine, heating apparatus, &c.

d is a connecting-pipe between the receiving-chamber D and the chamber of the stand-pipe B B′.

s is a smaller pipe leading from the steam-main A to the lower end of the vertical pipe *d*. An ejector is placed in this pipe *s*, or in the lower end of the pipe *d*, in position to discharge upward in the pipe *d*. The lower end of the pipe *d* is carried off horizontally to enter the receiving-chamber D and has a strainer *r* on its end in the chamber, and a check-valve *n* is placed in the pipe between its end and the ejector *a* to prevent the water from the pipe *d* returning into the chamber D.

A discharge-pipe *c*, with a hand-valve in it, is put in the bottom of the chamber D, under the strainer *r*, that can be opened at will to wash out any debris that may collect on the strainer. A short vertical pipe *e* connects the chambers B and B′ of the stand-pipe together and receives the discharge of the water from the pipe *d* that falls into the chamber B. A pipe *h*, connected at its lower end to the condensed-water pipe C, has its upper end inserted up through the bottom of the chamber B′ and extends up some way in the chamber to conduct the surplus of water, if it rises in the upper chamber B′, down into the pipe C, to be returned to the chamber D. A valve is put in this pipe *h* at *p* to control its operation as desired.

An injector is put at *b* in the pipe *h*, by which the pressure in the chamber B′ may be used to draw the water of condensation into the chamber D by the pipe C, which leads from the engine, heaters, &c. From the chamber D it is forced by the ejector *a* up the pipe *d*, through the pipe *e*, into the chamber B. From the chamber B it finds its way down by gravity through the pipe J and check-valve *g* to the boiler. If the pressure in the stand-pipe chambers is not high enough to allow the water to flow down from its weight, the ejector *v*, supplied with steam from the main A by the pipe *f* and valve H′, will force it into the boiler.

Having thus described our improvements, we claim as our invention and desire to secure by Letters Patent—

1. In a water-returning apparatus, the combination of a stand-pipe having two chambers connected by a pipe, a receiving-chamber, a pipe connecting said receiving-chamber and the chambers of the stand-pipe, a pipe from the steam-main to the pipe connecting the receiving-chamber with the chambers of the stand-pipe, an ejector in said pipe from the steam-main arranged to discharge into the pipe connecting the receiving-chamber with the stand-pipe chambers, a pipe connecting the stand-pipe chambers and the boiler, an ejector in said pipe between the stand-pipe chambers and the boiler, and an auxiliary pipe from the steam-main arranged to discharge through said ejector, and an auxiliary pipe

connecting the upper stand-pipe chamber and the receiving-chamber, an ejector in said auxiliary pipe arranged to discharge into said receiving-chamber, substantially as set forth.

2. In a water-returning apparatus, the combination of a stand-pipe having two chambers connected by a pipe, a receiving-chamber, a pipe connecting said receiving-chamber and the chambers of the stand-pipe, a pipe from the steam-main to the pipe connecting the receiving-chamber with the chambers of the stand-pipe, an ejector in said pipe from the steam-main arranged to discharge into the pipe connecting the receiving-chamber with the stand-pipe chambers, an auxiliary pipe connecting the upper stand-pipe chamber and the receiving-chamber, an ejector in said auxiliary pipe arranged to discharge into said receiving-chamber, substantially as set forth.

ELIJAH B. BENHAM.
JAMES McALLISTER.

Witnesses:
HOWARD E. BARLOW,
BENJ. ARNOLD.