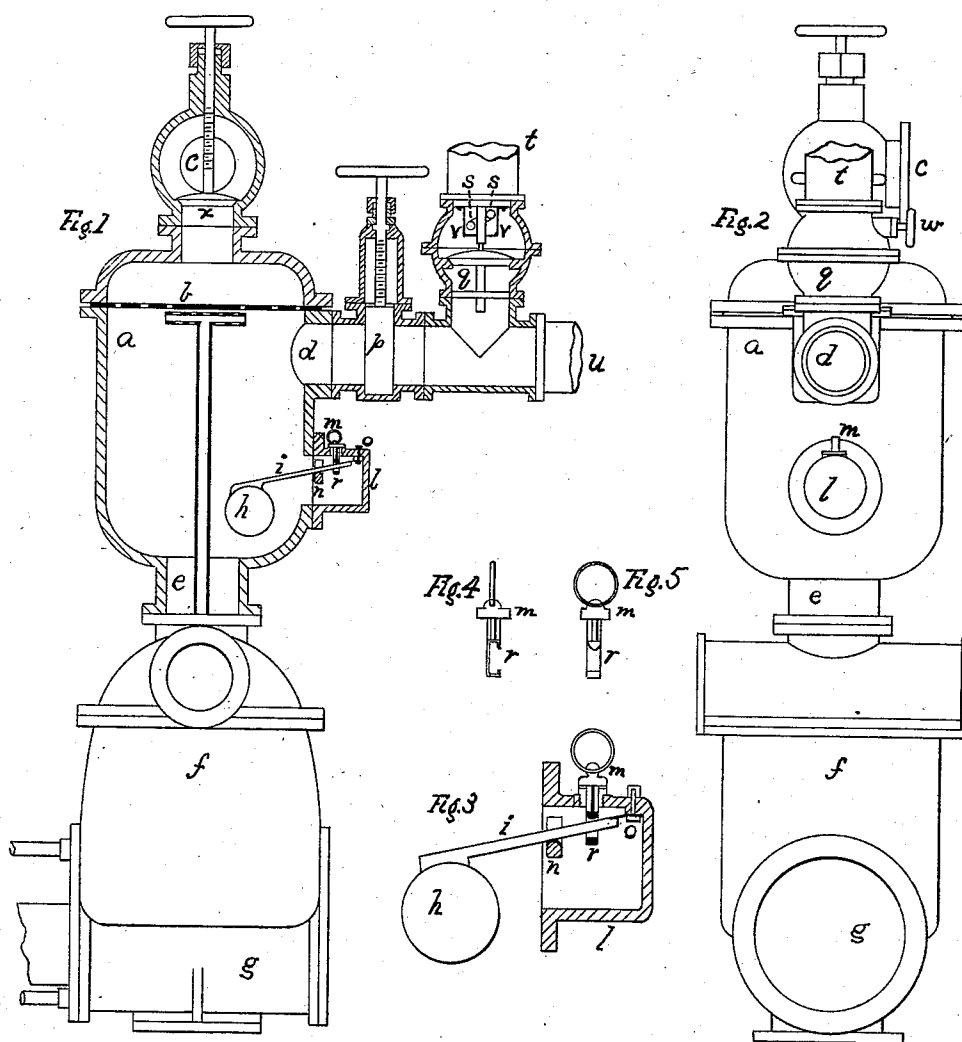


(No Model.)

C. P. DEANE.  
STEAM CONDENSER.

No. 256,651.

Patented Apr. 18, 1882.



WITNESSES.—

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# UNITED STATES PATENT OFFICE.

CHARLES P. DEANE, OF SPRINGFIELD, MASSACHUSETTS.

## STEAM-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 256,651, dated April 18, 1882.

Application filed December 5, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES P. DEANE, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Steam-Condensers, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to the condenser used in connection with steam-engines, when such condenser is furnished with an air-valve and float to automatically break the vacuum on the stopping of the air-pump, and thus prevent the injection-water from passing out of the condenser and into the cylinder of the engine; and its object is, first, to provide a more compact and convenient device than that heretofore used for operating the air-valve by the float rising and falling with the water in the condenser; and, secondly, to provide another automatic device, and to combine it with the one above named, whereby upon the stopping of the air-pump, and consequently of the process of condensation, the exhaust-steam from the engine is immediately allowed free escape to the external atmosphere, thus by the complete apparatus preventing automatically not only the possible injury to the engine resulting from the water passing into its cylinder from the condenser, but at the same time preventing any interruption of its work while the pump is being attended to and put in operation, avoiding, therefore, by one combination, the whole difficulty incident to the stopping of the pump from choking or other cause.

Figure 1 of the drawings is a vertical longitudinal section of the condenser and adjuncts, with the connected air-pump in elevation. Fig. 2 is an end elevation of the entire machine shown in Fig. 1. Figs. 3, 4, and 5 are enlarged views of parts shown also in Fig. 1, and there indicated by the same letters.

To make my invention and its construction and operation plain, I shall in describing the same briefly refer to the main parts of the whole apparatus in which it is embodied.

Referring to Fig. 1 of the drawings, the condenser *a* has its usual spray-plate at *b*. *c* is the injection-inlet, *d* the steam-inlet, and *e* the

passage communicating with the induction-chamber *f* of the air-pump *g*. The float *h* in my arrangement is attached to a lever, *i*, which extends into the projecting chamber *l*, where it is provided with a forked guide, *n*, and is connected by means of the stirrup *r* with the air-valve *m*, and hinged at *o* to the wall of the chamber *l* by a piece of spring-brass.

At *p* is the usual gate-valve for shutting off the condenser from the engine when desired. In my arrangement *q* is a check-valve opening upward when there is a pressure of steam below it, and *v v* are two springs pressing upon the spindle of the valve *q*, so that when the latter is raised their ends are carried by the coil into the neck turned in the spindle, as shown, below the springs, and the valve is thereby held in its open position, thus avoiding the noise of its up-and-down movement otherwise occasioned by the pulsating pressure of the exhaust-steam.

By *s s* is indicated the inner end of a forked lever whose outer end is furnished with a handle, (shown at *w* in Fig. 2,) by means of which the engineer, giving a partial rotary movement to the lever, may at will press the springs *v v* out of the neck or groove in the spindle above mentioned, whereupon the valve *q* will fall to its seat.

The construction of the several parts of my invention is made so obvious by the drawings, in which different views are given, that further description is unnecessary.

The operation is as follows: The injection-water, by reason of the vacuum produced by the air-pump, is carried by atmospheric pressure from a reservoir outside through the inlet *c* into the condenser *a*, (the hand-valve *x* being of course open,) and is converted into spray by passing through the perforated plate *b*. The exhaust-steam from the engine, entering by the inlet *d*, is condensed by the spray, and the water and air are alike drawn from the condenser by the air-pump; but if the pump cease to operate the water accumulating in the condenser will raise the float *h*, and by means of lever *i* raise the air-valve *m*, so as to allow air from without to enter and destroy the vacuum, whereupon the injection-water will of necessity cease to enter; but as the process of

condensation will now cease there will immediately follow a pressure of steam in the pipe *w* and below the valve *q* sufficient to raise the latter into its open position, where it will be held by the springs *v v*, allowing the steam to escape quietly and freely through pipe *t* to the external atmosphere without interrupting the action of the engine—now non-condensing—while the air-pump is being attended to; and when the latter is again started, the valve *q* being dropped to its seat as aforesaid, the proper condensation will go on as at first.

Now, I do not claim broadly the breaking of the vacuum in a condenser for the purpose described by means of an air-valve opened automatically by a float rising with the water in the condenser, as I am aware that this has been done before. In the previous device, however, the air-valve placed at the top of the condenser, or vertically above the float, is rigidly connected with the latter by an intervening vertical rod; but by my device, which employs the lever in the manner described, the automatic apparatus is made much more distinct, compact, and convenient of access. It may all be readily reached by removing the small chamber *l* without disturbing the main parts of the con-

denser, and as the power of the lever may be whatever is desired, the float may be much smaller and yet secure a more certain movement of the valve than under the previous arrangement.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, with the condenser *a*, air-valve *m*, and float *h*, of the check-valve *q*, arranged and operating substantially as and for the purpose described.

2. The combination, with the condenser *a*, air-valve *m*, float *h*, and lever *i*, of the check-valve *q*, arranged and operating substantially as and for the purpose described.

3. The combination, with the main condenser *a* and the float *h*, placed therein, of the removable side chamber, *l*, the air-valve *m*, placed in the wall of the side chamber, and the lever *i*, connecting the float with the air-valve, all arranged and operating substantially as and for the purpose described.

CHARLES P. DEANE.

Witnesses:

GEORGE H. DEANE,  
M. C. DEANE.