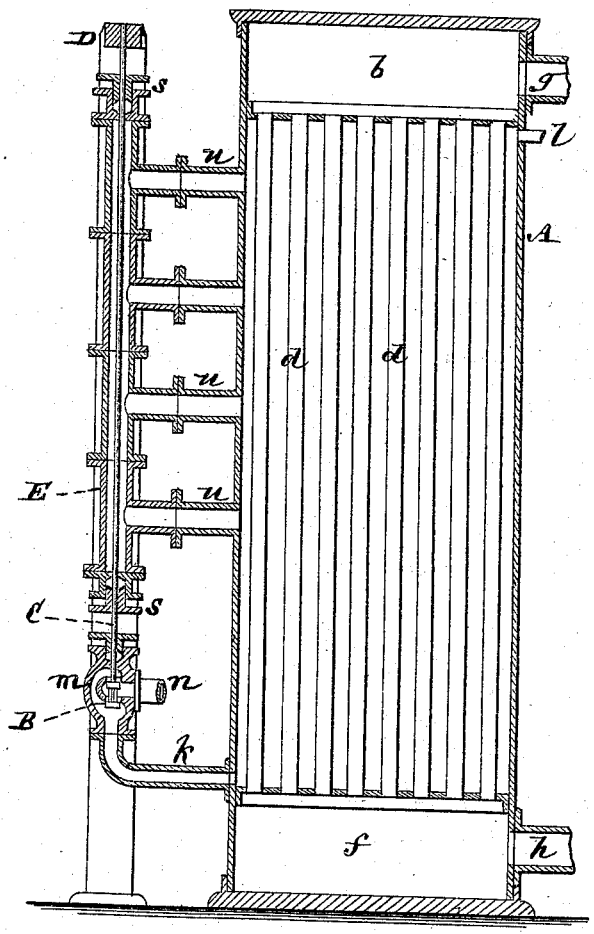
C. W. ISBELL.

SURFACE GAS CONDENSERS.

No. 182,580. Patented Sept. 26, 1876.



Witnesses.
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UNITED STATES PATENT OFFICE

CHARLES W. ISBELL, OF NEW YORK, N. Y.

IMPROVEMENT IN SURFACE GAS-CONDENSERS.

Specification forming part of Letters Patent No. **182,580**, dated September 26, 1876; application filed January 4, 1876.

To all whom it may concern:

Be it known that I, CHARLES W. ISBELL, of the city, county, and State of New York, have invented certain new and useful Improvements in Surface-Condensers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

This invention more particularly relates to surface-condensers used in the manufacture of illuminating and other gases, and will here be described exclusively with reference to such use.

My invention consists in a novel construction of a feed-water regulator as applied to or connected with a surface-condenser, whereby not only an automatic action of the regulator is obtained by means of an expanding and contracting rod arranged outside of or free from the condenser, and so that it works independently of the latter by or through the temperature of the fluids or gases to be cooled as they pass through the condenser, but whereby a very sensitive action is obtained for the rod and the efficiency of the regulator generally is improved.

The drawing represents a sectional elevation of a surface-condenser to be used in the manufacture of gas, and having my improved feed-water regulator attached.

A is the condenser or condensing-cylinder, through which the gas is passed from the retort to produce a gradual and perfect cooling of it to the desired temperature. Such equalization of the temperature of the gas, however, is a difficult result to obtain, inasmuch as, when manufacturing coal or other like gas, for instance, the same is subject to almost constantly changing conditions. Thus, when the smallest amount of gas is coming over, it has the largest amount of heat, and then more condensing-water is necessary; but when the retort is fresh charged and more gas comes over, then the latter is cooler, and less condensing-water is necessary. It consequently has been usual to vary the supply of feed-water to the condenser by hand, which is both uncertain and laborious, especially as the pressure of the supply-water frequently varies. My invention obviates these difficulties, and not only insures a uniform temperature to the gas as it leaves the condenser, but also economizes the water used to effect the condensation.

The cylinder A has an upper gas-receiving chamber, *b*, which is connected, by tubes *d*, with a lower chamber or tar-well, *f*, the gas entering by an inlet, *g*, passing downward through the tubes *d*, and out through an exit-opening, *h*, as in other upright condensers, the water of condensation circulating between the tubes. The interior construction of the condenser, however, may be changed.

The feed-water is supplied to the condenser by a pipe, *k*, below, and the surplus or hot water passed off by an outlet, *l*, above. The pipe *k* connects with a valve-box chamber, *m*, to which the general feed-water inlet *n* is attached, said valve-box chamber containing a balance-valve, B, of any suitable construction, and which serves to control the admission of water to the condenser. This valve B is automatically operated, as regards its admitting, regulating, or shutting off feed-water to the condenser, by means of a copper or other suitable metal expansion-rod, C, which, accordingly as it is expanded or contracted, actuates the valve to determine the supply of feed-water to the condenser. To get the full benefit of the expansion and contraction of this rod for said purposes, it is altogether disconnected from the condensing-vessel or condenser proper A, so that it is free to work independently of said condenser, and is not restricted by the slower or different expansibility of the condenser. Thus said rod is attached at its top to an independent frame, D, and connected at its lower end with the valve B; and, furthermore, said rod C passes through a water jacket or tube, E, which is provided with a stuffing-box, *s*, at either end, and is connected, at different points throughout its height, with the water-space of the condenser by branches *u*, whereby a free circulation of the water is kept up between the condenser and the tube D, and the temperature of the water in the latter kept uniform with that in the condenser at different altitudes, to insure a sensitive action of the rod C on the valve B

as affected by the heat of the gas in its passage through the condenser, or as communicated to the water.

The expansion of the rod C opens the valve B, and the contraction of it has the reverse effect.

I claim—

1. The combination, with a surface-condenser, of the independently-acting expansion-rod C, arranged outside of the condensing-vessel A, but exposed to the water of the condenser, and the valve B, connected with the free end of the rod for controlling the supply of feed-water to the condenser, substantially as herein described.

2. The combination of the outside water tube or jacket E with the expansion-rod C, inclosed therein and immovably attached above, the water-connections *u*, arranged at varying heights between said tube and the condenser, the valve B, controlled by said rod, and the feed-water supply-pipe *k*, substantially as shown and described.

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Witnesses:
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