I. N. Stanley,

Gas Condenser.

No. 113,942. Patented Apr. 18, 1871.

Fig. 1,

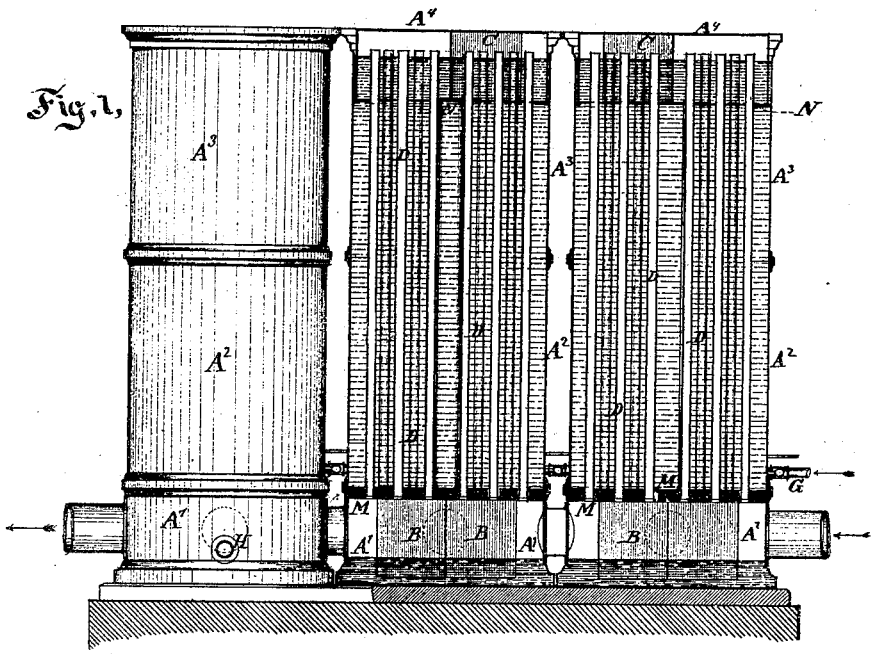
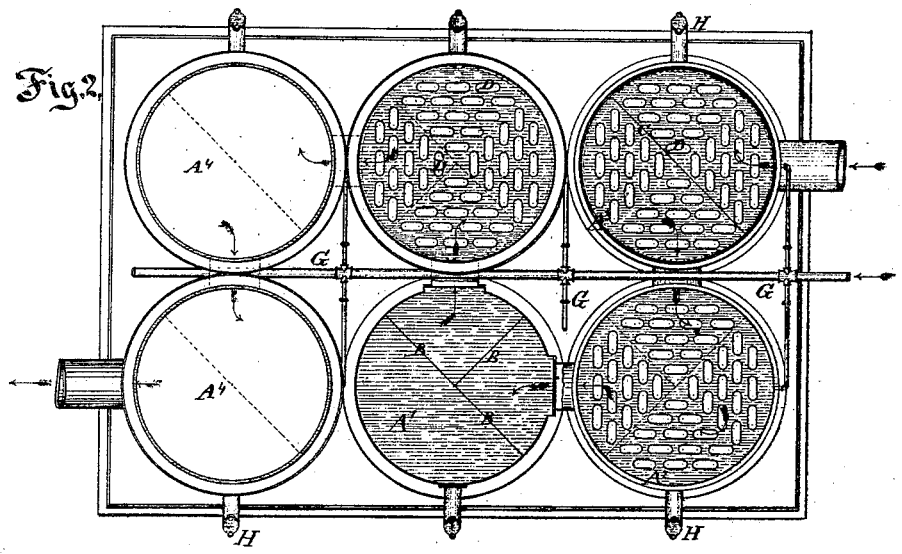


Fig. 2,



WITNESSES.

Josephine Booth

A. Hoermann.

INVENTOR.

I. N. Stanley

by his attorney

T. D. Stetson

UNITED STATES PATENT OFFICE

IRA N. STANLEY, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN GAS-CONDENSERS.

Specification forming part of Letters Patent No. **113,942**, dated April 18, 1871.

To all whom it may concern:

Be it known that I, IRA N. STANLEY, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Condensers, of which the following is a full and exact description.

I employ flat upright tubes, peculiarly arranged in sections, within inclosing-cases filled with water.

I secure a sufficient condensing-surface, with great economy in the construction and facility in the circulation of the gas and water, and in cleaning and repairs.

I will proceed to describe the best means of carrying out my invention.

The accompanying drawing forms a part of this specification.

Figure 1 represents a side elevation of one of the sections, and vertical sections through two others. Fig. 2 represents horizontal sections on different planes.

There are six represented. The one at the lower right-hand corner is a section at about the middle height of the structure or through the cylinder A^2.

The middle one in the lower tier is a section through the partitions B or in the cylinder A^1, near the base.

The right-hand upper is a section near the top or through the partition C, and the two at the left hand are plan views.

Similar letters of reference indicate like parts in both the figures.

I form cylindrical casings of cast-iron or other material in pieces A^1 A^2 A^3, and mount these casings side by side in the positions represented. The lowermost casing, A^1, is provided with nozzles, placed "quartering" with each other, and with provisions for drawing off the condensed water, coal-tar, &c., which gathers and trickles down from the cooling gas in the condensers.

The interior of the casing A^1 is divided by partitions radiating T-wise from the axial line of the cylinder, and descending from the horizontal plate M nearly to the bottom of the structure. These partitions are cast in one with each other and with the walls of the cylinder A^1, and with the plate M, which extends across the top of the cylinder A^1. They are marked B in the figures. Their bottom edge is so low that it will be certain to be immersed in the water and tar, which is never entirely emptied from the vessel, and thus entirely divide the three chambers into which the partitions B divide the cylinder A^1, except as they are connected through the medium of the tubes.

The cylinders A^2 and A^3 are fitted tightly together by rust-joints or otherwise, in the position represented, over the foundation-chambers A^1.

The top of the upper cylinder, A^3, is closed by a tight cover, A^4, extending over the whole, with a deep rim fitting easily down within the cylinder A^3, as shown, and having a single hanging partition, C, cast in one piece therewith. This partition crosses the top of the cylinder diametrically, and its edges are immersed in the water, with which the condensing-chambers are nearly filled.

D D, &c., are flat tubes of metal. They are tightly set in the horizontal plate M, and extend upward nearly to the top of the structure, open at both ends. They are steadied near their upper ends by a light open-work horizontal framing, N.

Although I confine myself to no particular dimensions, in all cases the proportions of the apparatus are important.

I make my flat tubes of a cross-section ten inches long and three inches wide. I arrange them so as to connect with the several chambers, as represented. The diameter of each of the cylinders A^1 A^2, &c., adapted to the largest-sized gas-works, is about eight feet.

The nozzles for the gas, arranged quartering or at right angles to each other in the cylinder A^1, open into different chambers. The gas flowing in rises through the flat tubes which are connected with that chamber, and emerge at the top of the tubes. Thence it travels across a portion of the space at the top, and descends through the next section on the right. Emerging at the bottom of this section, it traverses across a portion of the bottom and rises again through a third section of the tubes D. Moving still farther to the right at the upper end, it descends into the fourth or last section of the chamber at the base, which connects, through the proper nozzle, with the next cylinder and its tubes, and so on. The gas

flowing into the next cylinder repeats the same series of double returns. There may be any number of vertical structures or sets of cylinders A^1 A^2 A^3. In each cylinder it ascends through one set of pipes and descends through another, and then repeats this operation before going through the next cylinder with its sets of pipes or tubes.

It has long been common to condense gas in upright tubes surrounded by water, or rather to condense the watery or tarry matter therein. I do not claim that feature. I supply the water in liberal quantities by pumping or otherwise, so as to maintain a low temperature in the pipes, and I remove the tarry and other condensed matter at intervals or constantly by ordinary provisions. I provide for letting out the water and tar and for heating up the tubes and entire apparatus by steam at intervals, to thoroughly liquefy the tar in the tubes and cleanse the apparatus.

The water-pipes are indicated by G, and the nozzles for the valves or analogous provisions for removing the coal-tar and water are indicated by H.

The cylindrical casings A^1 A^2, &c., being independent of each other, afford a facility for access, repairs, and substitution, which is not afforded by the ordinary aggregating of the tubes in a single large tank. The flat form of the tubes presents a great cooling-surface, while allowing for the employment of large tubes, which may be cheaply constructed, and are not liable often to be clogged or obstructed.

My partitions B and C, cast in one with the inclosing cylindrical walls and the horizontal plate above, with a considerable space at the bottom to be stopped by fluid, form reliable and complete arresters for conducting the gas, while in no way interfering with the level of the water and tar and the freedom of motion of these fluids in supplying or abstracting the same. The partitions and their adjacent parts are also, by this construction, made very cheaply, and may be easily accessible by breaking the joints below in case of necessity for cleaning or repairs.

I can employ a greater number of the double returns of the gas, but do not consider it desirable under ordinary circumstances. One and a half or two and a half returns may be used by connecting the top of alternate sets of cylinders, as will be obvious; but I prefer exactly the arrangement shown.

What I claim as my invention is—

1. The flat tubes D, grouped in sections, submerged in water within independent upright casings with the partitions B and C, and suitable nozzles, water-supplying means, and draining means, arranged relatively to each other, substantially as and for the purposes herein specified.

2. The arrangement of tubes D and diaphragm B C, or their equivalents, in the top and bottom of the vessel, so as to pass the gas four or more times through one cylinder, substantially as herein set forth.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

IRA N. STANLEY.

Witnesses:

THOMAS D. STETSON,

C. C. LIVINGS.