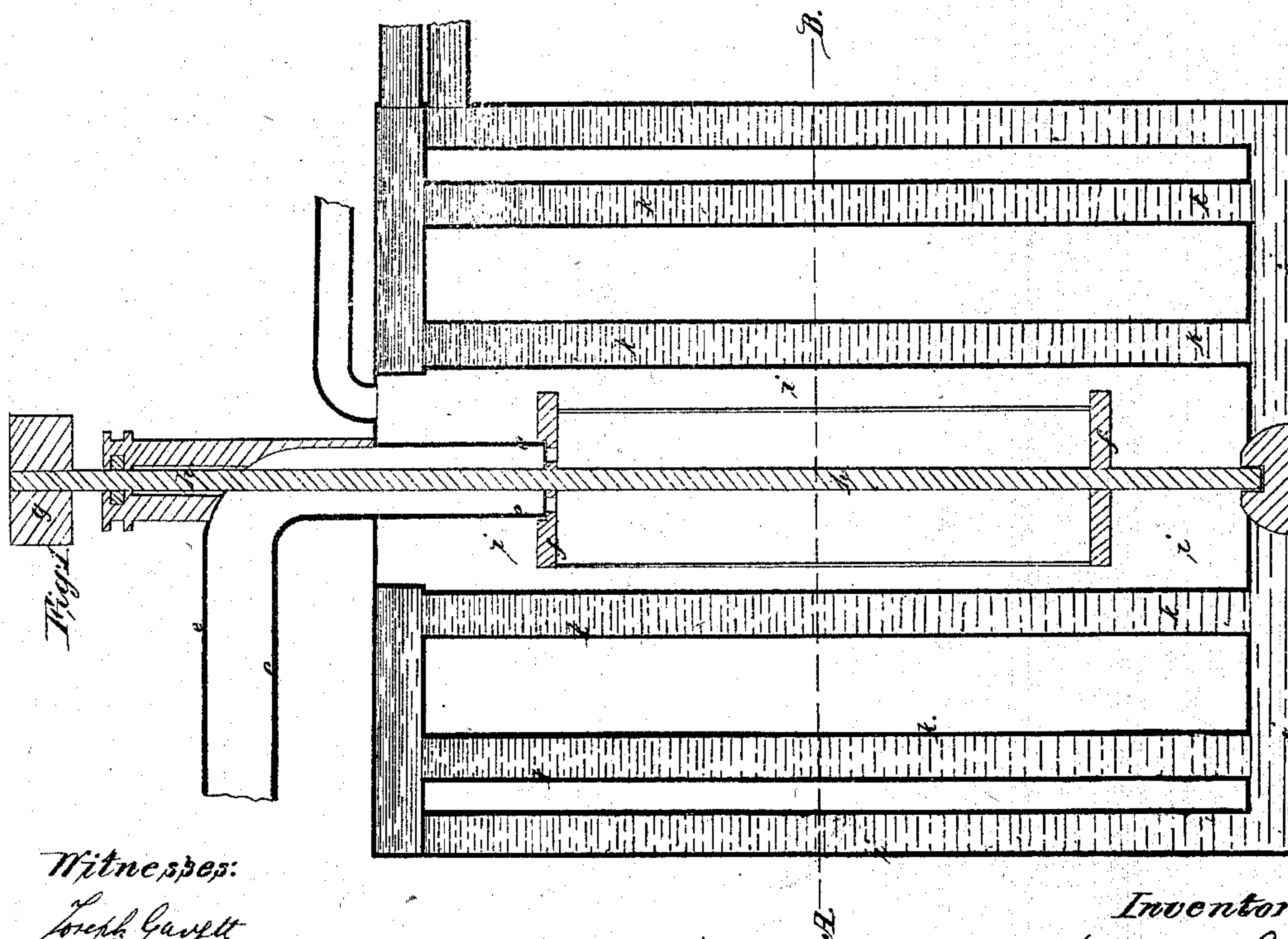
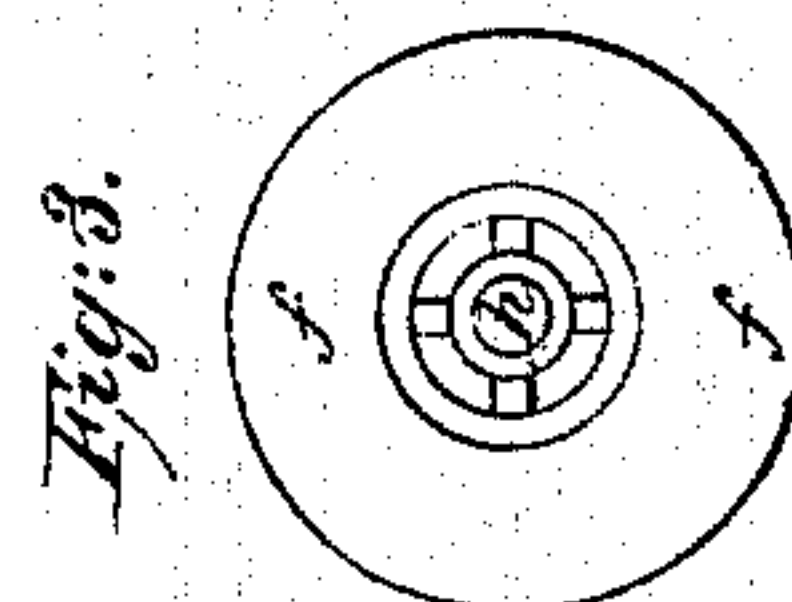
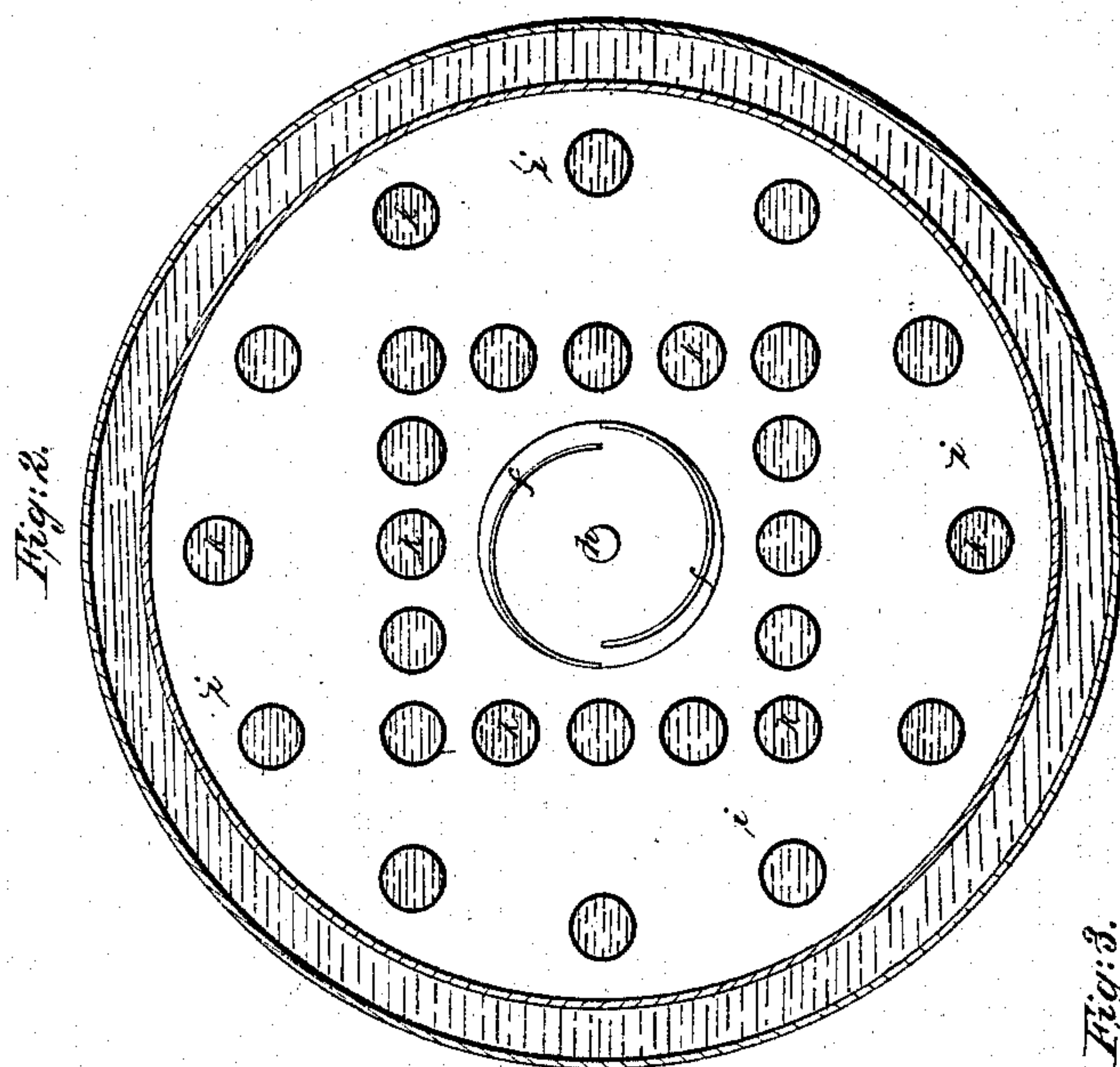


A. SMITH.
CONDENSER.

No. 26,529.

Patented Dec. 20, 1859.



Witnesses:
Joseph Garrett
Albert W. Brown

Inventor:
August Smith

UNITED STATES PATENT OFFICE.

ANANIAS SMITH, OF NIAGARA FALLS, NEW YORK.

SURFACE CONDENSER FOR STEAM-ENGINES.

Specification of Letters Patent No. 26,529, dated December 20, 1859.

To all whom it may concern:

Be it known that I, ANANIAS SMITH, of Niagara Falls, in the county of Niagara and State of New York, have invented certain
5 new and useful Improvements in the Apparatus Used for Condensing Steam in Steam-Engines, and that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a
10 full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together
15 with such parts as I claim and desire to have secured to me by Letters Patent.

The figures of the accompanying plate of drawings represent my improvements.

Figure 1 is a general sectional view of my
20 improved condenser. Fig. 2 is a section taken in the plane of the line A B, Fig. 1. Fig. 3 is a detail section.

The evils resulting from the use of impure water in steam boilers are well known, as
25 are also the many unsuccessful devices attempted for supplying boilers with pure water, such as surface condensers, which were supposed to have accomplished the desired results, and to prove of great use in
30 marine engines, as they permitted the use of fresh water for the boilers by employing the feed-water over and over again. Their imperfections in practice have long been demonstrated and need not be here enumerated.
35

The present invention accomplishes all the desirable results heretofore aimed at in condensing apparatus, such as supplying the boiler with pure water, and thereby preventing the formation of scales and the deposit of impurities in the boiler—using the same feed water over and over again—feeding the boiler with heated water and thereby making a great saving in the consumption of
45 fuel—keeping the water in the boiler always at one uniform level so as to form a perfect water-gage—preventing all back pressure of steam upon the piston—and many other advantages which will readily
50 be apparent to engineers and others by inspection of the apparatus as hereinafter described and represented in the drawings.

In my new apparatus the exhaust steam is condensed in such a manner and by such a
55 mechanical device, that a vacuum or a partial vacuum or space is formed between the

said device and the cooling liquid so that the exhaust steam will impinge, without the interposition of any metallic surface, directly upon a large extent of cooling surface and
60 be condensed, the refrigerating element being kept cool, or at the desired temperature, by a water jacket, or by coils of pipes through which cooling water is made to flow or circulate, in any proper manner.
65

The device which I employ consists of a bucket or wheel revolving in the cooling liquid and communicating with the exhaust steam-pipe, so that when the wheel or bucket is revolving, the exhaust steam will rush
70 through the same, strike against the cooling liquid and be condensed. The simplicity of this arrangement, the non-liability of its getting out of order and the effectiveness of its operation, effect the desideratum long
75 sought for, viz; a practical condensing apparatus by which the boiler could be fed with its own condensed steam or with pure water that forms the constant and never failing supply thereto.
80

Having thus premised the general features of my invention I will now proceed to describe in detail the construction of my apparatus.

e e represent the exhaust steam-pipe from
85 the steam chest. The exhaust steam-pipe communicates directly with a bucket or wheel *f f* revolved by a belt on a pulley *g* attached to the shaft *h* of the bucket or wheel *f f*. The bucket or wheel *f f* is constructed with curved floats so as to leave
90 issuing ports thereto, as shown in Fig. 2, and is placed in a vessel of water *i i i* kept at the desired temperature by means of a water-jacket through which cold water is
95 continually made to circulate or through pipes *k k*, &c.

From the foregoing description it will be seen that by revolving the bucket or wheel *f f* in a direction the reverse of its issues,
100 it will by centrifugal force be kept free of the water in the vessel *i i* and will thus leave free ingress to the exhaust steam which passes through the pipe *e e* and the bucket or wheel *f f* and is condensed by striking
105 against the water in the vessel *i i*. This water may rise to a temperature of 200° Fahrenheit, which is sufficiently low to condense steam, and the portion that overflows in the vessel *i i* is taken by a pump and fed
110 into the boiler, thus feeding the boiler with warm and distilled water, the advantages

of which in the saving of fuel &c are evident, and moreover keeping the water in the boiler always at one and the same level, thus serving as a perfect water-gage. A
5 reserve water tank may be used to supply the boiler, by means of a pump, with what small quantity of water may be lost by leaks, &c., in the joints. When a supply is not
10 wanted from this tank a cock shuts off its communication with the pump.

Having thus fully described my said improvement in apparatus for condensing steam, what I claim as new and useful and
15 desire to have secured to me by Letters Patent is—

1. The employment, in connection with a steam-engine and its boiler, of a revolving bucket wheel arranged to receive the exhaust steam from the engine and made to
20 rotate in a reverse direction to its issues in a cylinder or vessel containing water from which the boiler of the engine is fed;

the exhaust steam being condensed by direct impingement with and adding to said feed water essentially as specified. 25

2. The combination, with the revolving bucket or wheel constructed to receive the exhaust steam from the engine, and cylinder or vessel containing the condensing liquid or feedwater in which the wheel rotates and by direct contact with which water
30 the exhaust steam is condensed in the manner described,—of a surface cooling apparatus, formed by providing said feed water vessel with a jacket or tubes, or their equivalents, through which a cooling liquid is
35 made to pass or circulate free from admixture with the water in the vessel that directly effects the condensation of the steam substantially as specified.

ANANIAS SMITH.

Witnesses:

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