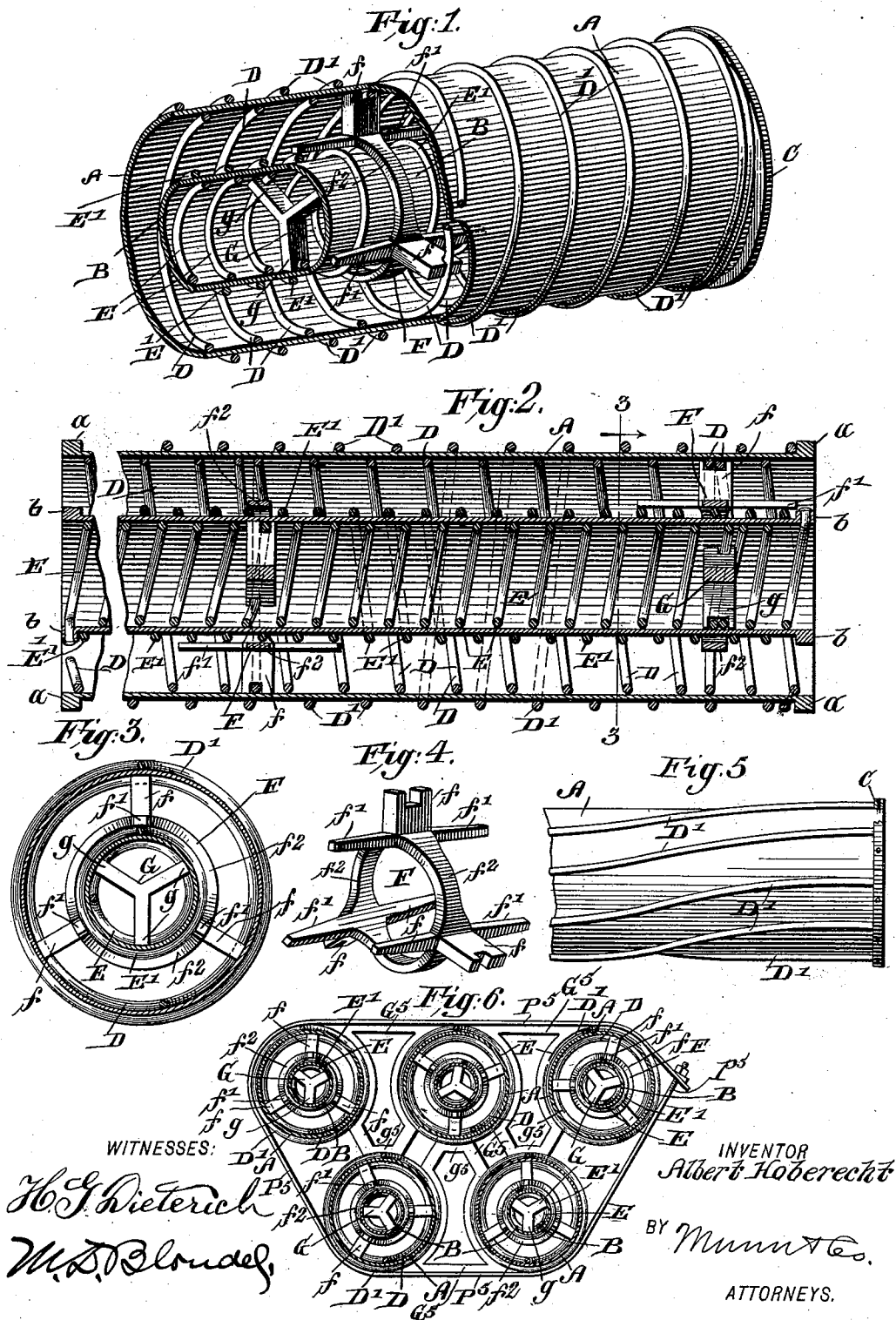


(No Model.)

A. HOBERECHT.
SURFACE CONDENSING TUBE.

No. 556,630.

Patented Mar. 17, 1896.



UNITED STATES PATENT OFFICE.

ALBERT HOBERECHT, OF ENSENADA, MEXICO.

SURFACE-CONDENSING TUBE.

SPECIFICATION forming part of Letters Patent No. 556,630, dated March 17, 1896.

Application filed June 11, 1895. Serial No. 552,473. (No model.)

To all whom it may concern:

Be it known that I, ALBERT HOBERECHT, residing at Ensenada, Mexico, have invented certain new and useful Improvements in Surface-Condensing Tubes, of which the following is a specification.

My invention relates to an improved construction of surface-condensing tubes, and it refers more particularly to tubes having a supplemental internal central air-tube member—such, for instance, as shown in my application filed November 7, 1894, Serial No. 528,131; and such invention primarily has for its object to provide a condensing-tube having internal and external condensing-surfaces of a material which will conduct heat quickly and of a minimum thickness, whereby the air will have an increased cooling action on the outside of the outer tube and the inside of the inner tube.

The invention also has for its object to provide certain strengthening means for the tubes which, while giving the thin tubes the strength required to stand vacuum and pressure needed, will not interfere with the condensing action of the tubes.

With other minor objects in view, which hereinafter will be referred to, the invention consists in a condensing-tube constructed substantially as hereinafter first described in detail and then pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a portion of a condensing-tube constructed in accordance with my invention. Fig. 2 is a longitudinal section thereof. Fig. 3 is a transverse section of the same, taken on the line 3 3 of Fig. 2. Fig. 4 is a perspective view of one of the spider-braces detached. Fig. 5 is a view of a modified form hereinafter referred to, and Fig. 6 is a transverse section of a series or nest of tubes constructed in accordance with my invention and illustrating the supplemental or bracing spiders hereinafter referred to.

In its practical application my invention embodies an outer tube, A, and an inner tube, B, which are held spaced apart and strengthened in the manner presently described. These tubes A and B are made of the thinnest kind of metal which when bent will hold its shape—such as, for example, very thin sheet

metal—the ends of which may terminate in thickened portions *a* and *b*, as shown in Fig. 2, or be connected by separate collar members C C, screwed, riveted, or otherwise secured thereto.

The inside faces of the tubes A and B are strengthened by the spiral-spring wire-coils D and E respectively, while the outer faces of such tubes are similarly strengthened or reinforced by the wire-coils D' and E' respectively. These wires, as also the tubes, are strengthened by a series of spiders or transverse supports F G, the inner ones, G, being solid castings and of a size to fit inside of the inner tube, while the outer one, F, is centrally apertured, whereby it will slip over the inner tube and the external spring E therefor, its arms *f* being arranged to bear against the internal wall of the outer tube.

The internal spider, G, it will be noticed by reference to Fig. 3, has the ends of its arms *g g* formed with seats, whereby it can bear on the internal spring-coil and form thereby practically, when in position, a rigid brace.

The spiders F have lateral feet or extensions *f'* at the ring portion *f*², which bear upon the external spring E, while the outer ends of the wings *f* have seats to engage the internal spiral wire, D, as clearly shown in the aforesaid Fig. 3.

The reinforce-wires are all put in a spiral and run in opposite directions on each tube, so that the outside wire runs one way and the inside wire the other way around, (right and left,) which will make the said wires cross at every half-wind about the tubes, and to still further strengthen the tube the outside wire may have a little solder on every round or more to hold the wire in place. It is manifest that the number of spider-like braces required for the tubes will depend upon the diameter and length of such tubes.

As before stated, the tubes can be made with thick ends or a collar placed thereon, the outside or inside, or both, to put on lock-nuts, or rolled as boiler-flues (tubes) so that the tubes can be fastened on body of condenser.

By referring to Fig. 2 it will be noticed the inside wires of the tubes extend slightly beyond the ends of the collars or thickened portions, such extensions being passed to aper-

tures in the collars or thickened portions, riveted and then soldered to make an air-tight connection. The outside wires run up to the enlarged ends of the tubes and at such point are wound closely two or more times and then soldered. This will effectively further strengthen the tubes next the collar or thick ends.

While I prefer to strengthen the tubes by the spiral arrangement of wires, I do not limit myself to such construction, as the wires may be put on the tubes lengthwise, as shown in Fig. 5, and soldered or otherwise secured. Neither do I confine myself to the particular manner shown for fastening the ends of the wires or collars on the ends of the tubes or how to secure the tubes to a condenser, as the said arrangement of parts may be varied as the conditions may make necessary without departing from my invention. The spiral wires are spaced apart closely or otherwise, as may be required, to give the thin tubes the necessary strength to stand the internal and external pressure.

So far as described it will be readily seen that by constructing condensing-tubes in the manner described the tubes proper can be made of the thinnest possible kind of material and yet be of great strength. Hence air has an absolute free cooling action on the inside of the inner tube and the outside of the outer tube for condensing purposes.

By using round wire it will be seen but a very small part thereof touches the tubing, and this gives the air almost free action on the tubing. The wires and the spiders actually or reasonably so form no obstruction to the action of the air or the vapor going between the inner and outer tube-sections.

When set up for use in a nest form, as shown in Fig. 6, the several tubes are braced and held spaced apart by supplemental spider members G^5 , which are formed of a skeleton or open frame shape, so as to admit of a circulation of air, their bearing portions g^5 being curved to fit the outer faces of the tubes. To hold such nest of tubes secure strap-irons P^5 are passed around the same, one end of which terminates in a threaded bolt-like portion p^5 , while the outer end is apertured for the passage of the end p^5 , on which is fitted an adjusting-nut, which, when tightened, will serve to draw the tubes together and hold them and the braces P^5 in a secure condition.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A surface-condensing tube of sheet metal having external and internal spiral reinforcing-strands the internal strand being coiled reversely to the external one substantially as shown and described.

2. A tube for surface condensers, consisting of an outer tube and an inner tube formed each of a very thin material, brace members for holding the inner and outer tubes spaced apart, and reinforcing or strengthening ribs held to engage the outer faces of the tubes, all arranged substantially as specified.

3. A surface-condensing pipe formed of an inner and an outer tube of a very thin material, spider-braces between the tubes to hold such tubes spaced apart, and wire-coil members surrounding the internal faces of the said tubes, as specified.

4. A surface condenser having an outer tube and an inner tube of a much less diameter, each tube being formed of a thin material, such tubes having each internal and external diagonally-disposed reinforcing members, the reinforcing members of the internal tube being inclined in a reverse direction to the similar members on the outer tube, and spider braces intermediate the outer and inner tubes for holding such tubes spaced apart, all arranged substantially as shown and described.

5. A tube for surface condensers, consisting of an outer tube member, and an inner tube member formed of a very thin material and having thickened ends whereby the tube can be secured, brace members for holding the inner and outer tubes spaced apart and reinforcing or strengthening ribs held to engage the inner and outer faces of the tubes, all arranged substantially as shown and described.

6. The combination with the inner and outer tube members and the internal wire reinforcing or strengthening members of the spider-braces having their extending arms formed with seat portions to engage the spiral wires substantially in the manner shown and for the purposes described.

7. The combination with the internal and external tubes and the external and internal spiral strengthening members held between the two tubes, of a centrally-apertured spider-brace, having laterally-extending foot portions adapted to seat on the external wire member, and having its radial arms formed with seats to engage the internal wire member all arranged substantially as shown and described.

8. A surface-condensing pipe formed of an inner and outer tube of a very thin material, said tubes being held spaced apart, spider-braces held in the inner tube and between the inner and outer tubes, and the wire-coil members surrounding the internal and external faces of the two tubes, all arranged substantially as shown and described.

ALBERT HOBERECHT.

Witnesses:

F. E. BATES,
CHAS. BENNETT.