No. 775,860. PATENTED NOV. 22, 1904.

J. H. SAGER & G. D. GREEN.

MEANS FOR COOLING HEATED SURFACES.

APPLICATION FILED OCT. 14, 1902.

NO MODEL.

Fig. 1.

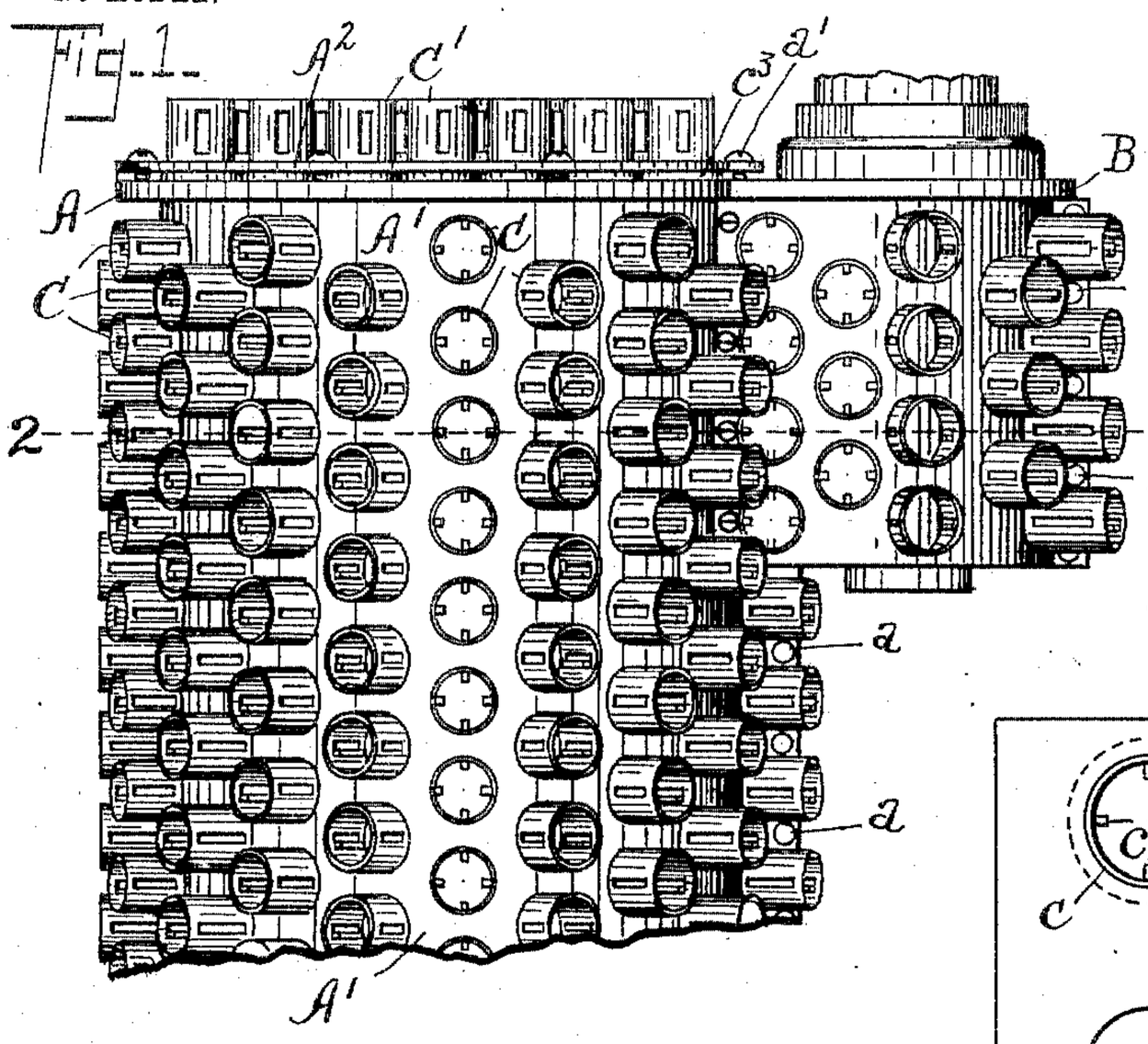


Fig. 3.

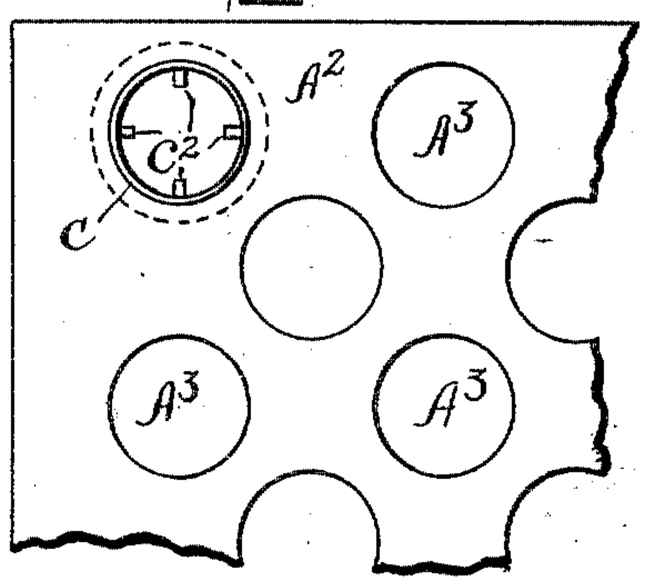


Fig. 2.

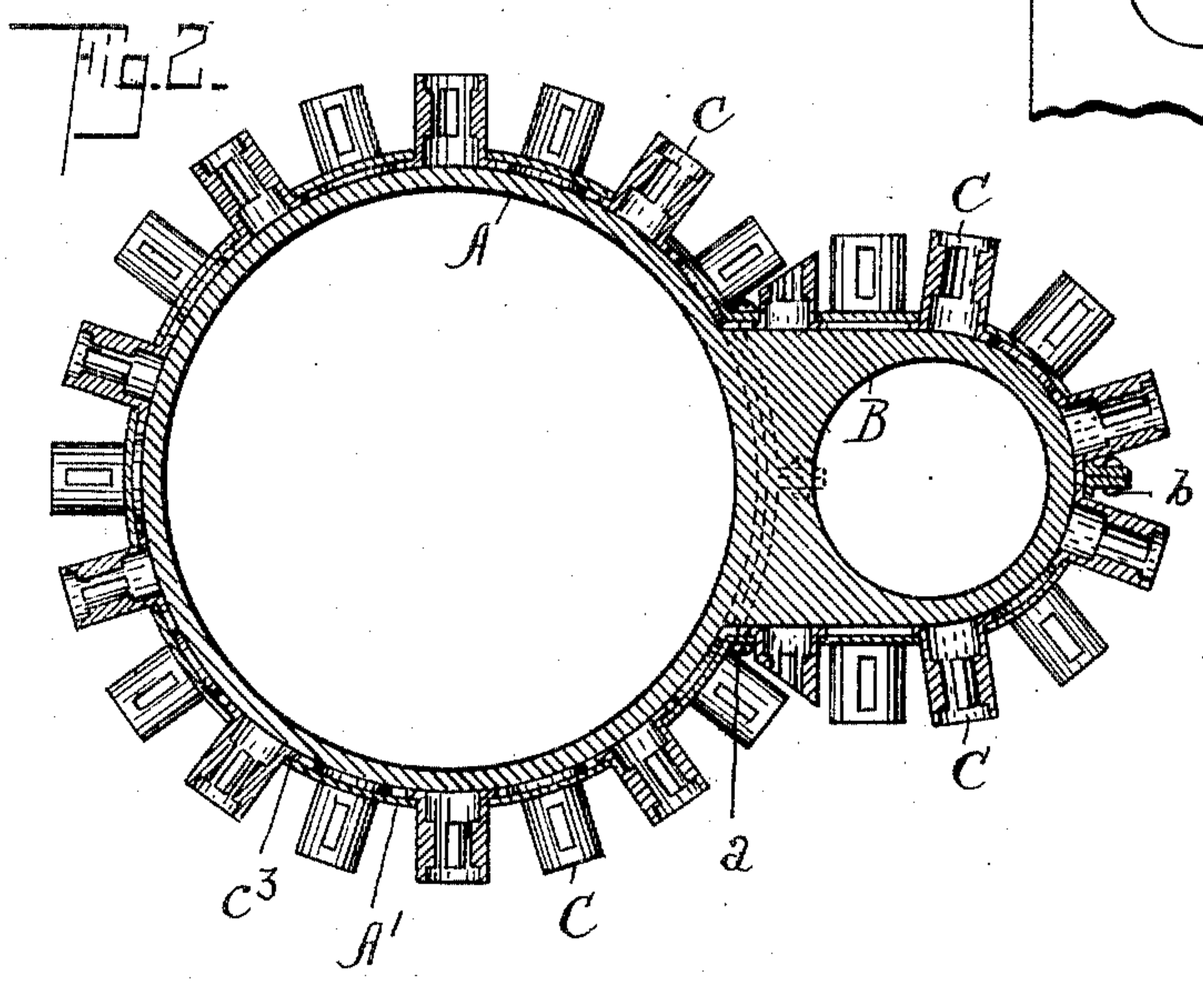


Fig. 4.

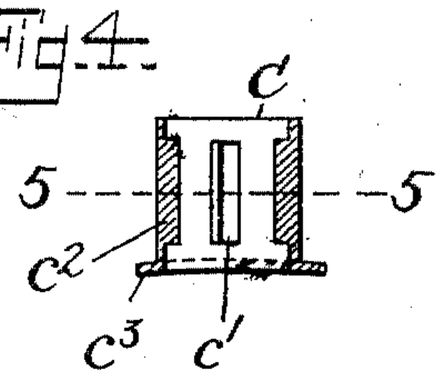
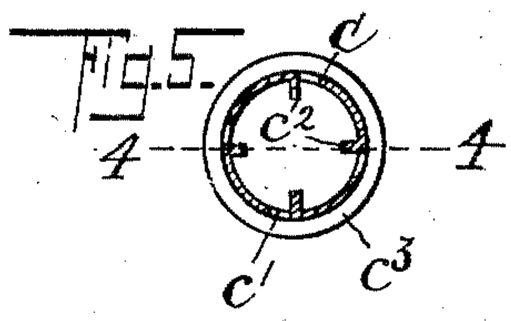


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES H. SAGER AND GEORGE D. GREEN, OF ROCHESTER, NEW YORK, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO REGAS AUTOMOBILE COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

MEANS FOR COOLING HEATED SURFACES.

SPECIFICATION forming part of Letters Patent No. 775,860, dated November 22, 1904.

Application filed October 14, 1902. Serial No. 127,273. (No model.)

To all whom it may concern:

Be it known that we, JAMES H. SAGER and GEORGE D. GREEN, both citizens of the United States, and residents of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Means for Cooling Heated Surfaces, of which the following is a specification.

This invention relates to means for cooling heated surfaces, such as cylinder and valve-cases of gas-engines, and has for its object to provide means for reducing the temperature of such surfaces by radiation.

In the drawings, Figure 1 shows an elevation of part of the explosion-cylinder and valve-casing of a gas-engine provided with the cooling means which form the subject of this invention. Fig. 2 is a cross-section on the line 2 2 of Fig. 1. Fig. 3 shows certain parts of the invention; and Figs. 4 and 5 show one of its features, Fig. 4 being a vertical section on the line 4 4 of Fig. 5, and Fig. 5 being a cross-section on the line 5 5 of Fig. 4.

A represents the explosion-cylinder, and B the valve-case of a gas-engine of a well-known type. Tubes C project radially out from the surfaces of said cylinder and valve-case, by which the heat is conducted from said surfaces and from which it is dissipated by radiation. The construction of said tubes is shown in Figs. 4 and 5. Said figures show that each of said tubes has a flange c at its base and has several longitudinal slots c' in its circumference. The portions of the circumference of the tubes C that are cut away to form said slots c' are represented as turned inwardly, as flanges c^2. Thus each tube presents a large extent of surface from which the heat may radiate.

Tubes C (of any desired cross-section) are represented in the drawings as projecting radially in parallel rows from both said cylinder and valve-case and are so arranged that they substantially cover both of said surfaces. These tubes C may be secured to the surfaces with which they are to be employed as radiators in any suitable manner. In the drawings they are represented as secured to said cylinder A and valve-case B by means of a jacket A′, which is so perforated that it receives said tubes C, but engages their flanges c. When the jacket A′ is fastened around the cylinder A and valve-case B, the bases c of the tubes C will be held down in contact with said cylinder and valve-case, and said tubes will be secured upon them and project radially out from them, as represented in Figs. 1 and 2.

The jackets A′ may be secured to the cylinder A and valve-case B in any suitable manner. In the drawings, said jacket is represented as secured to said cylinder and valve-case by means of the screws a, which fasten it to the cylinder, and the screws b, which clamp its ends together around the valve-case.

The tubes C′ may be placed also upon the top of the explosion-cylinder A, as represented in Fig. 1. In order to secure them thereon, the tubes C′ are inserted through perforations A^3 in the plate A^2 and are locked therein and upon the top of the cylinder by means of screws a', which hold the plate A^2 down upon the bases c^3 of said tubes C′, so as to bring said tubes in contact with the top of the cylinder by means of screws a'.

This construction affords an efficient means for radiating heat from a heated body, for it gives a large radiating-surface made up of the sum of the surfaces of the perforated tubes C′ plus the exposed parts of the surfaces of the cylinder A and valve-case B, and it also presents to the air the maximum amount of edge surface, from which form of surface heat readily radiates. Furthermore, by employing tubes as radiators a circulation of air is obtained around the radiating-surface. The perforations in the tubes open them to the air, so that it circulates freely through them as well as around them. The peculiar arrangement of the tubes shown in Fig. 1, in which the tubes of each row come opposite spaces in adjacent tubes, is adapted not only to the use of the maximum number of tubes upon a surface, but is best adapted to present each tube to the air.

What we claim is—

1. The combination, with a heated body, of

tubes projecting therefrom, each tube having one end fastened to said heated body and transverse perforations through the walls of said tube between the ends.

2. The combination, with a heated body, of tubes projecting outwardly therefrom, each tube having one end fastened to and closed by said heated body and transverse perforations through the walls of said tube, whereby the tube is heated by the heated body, and air is drawn into and discharged from the interior of the tubes.

3. The combination, with a heated surface, of perforated tubes projecting radially therefrom; flanges upon said tubes; and means for securing said tubes upon such surface, substantially as shown and described.

4. The combination, with a heated surface, of tubes having flanges at their bases; a perforated jacket adapted to receive said tubes and engage the flanges at their bases; substantially as shown and described.

5. The combination, with a heated surface, of the tubes C having the base-flanges c, the slots c' and the side flanges c^2; and means for securing said tubes upon such surface.

6. The combination, with a heated surface, of the tubes C having the base-flange c, the slots c', and the side flanges c^2; the perforated jacket A'; and means for securing said jacket to said heated surface, substantially as shown and described.

7. The combination, with a heated surface, of the tubes C having the slots c' and so arranged, in parallel rows, upon said heated surface, that each tube shall be opposite the space between adjacent tubes in each of the rows of tubes on each side; and means for securing said tubes upon such heated surface.

8. The combination, with a heated body, of tubes projecting outwardly therefrom, each tube having one end fastened to and closed by said heated body, each tube having a perforated wall, whereby air is drawn into the interior of said tube and is discharged from the open end thereof.

9. The combination, with a gas-engine, of a multiplicity of tubes, open at their outer ends, and secured to the engine by and closed at their inner ends, said tubes being slotted or perforated between their ends.

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