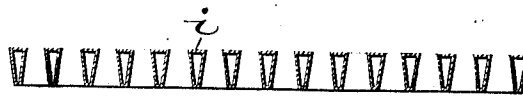
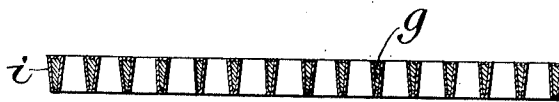
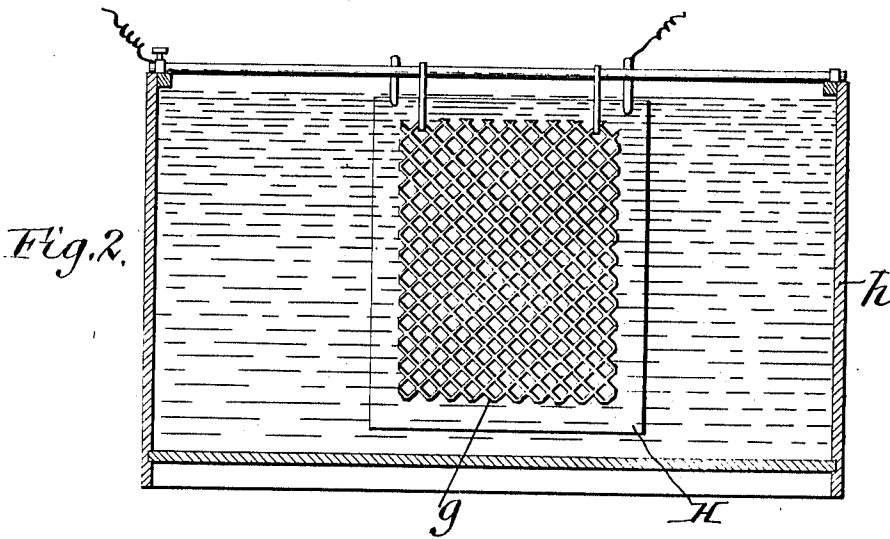
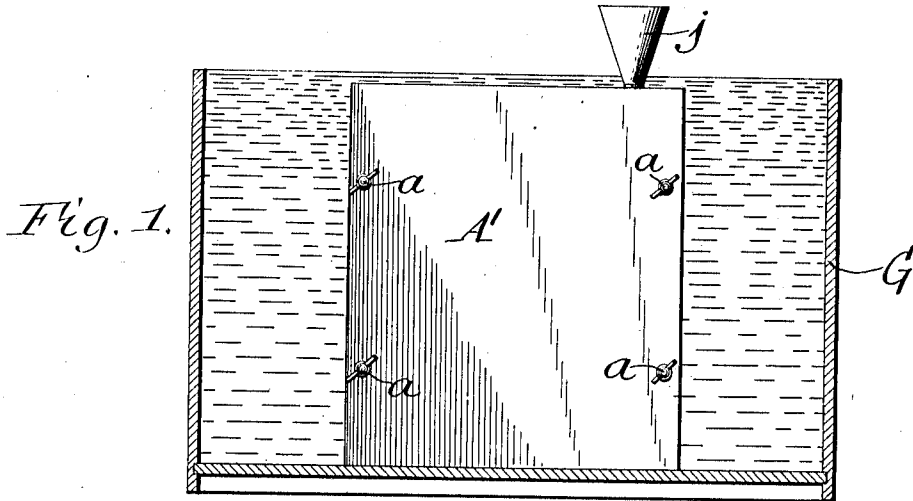


J. PORZEL.
PROCESS FOR MAKING RADIATORS.
APPLICATION FILED JULY 8, 1910.

1,019,916.

Patented Mar. 12, 1912.

2 SHEETS—SHEET 1.



Witnesses:
Richard Sommer.
Alfred Borkenhagen.

Fig. 4.

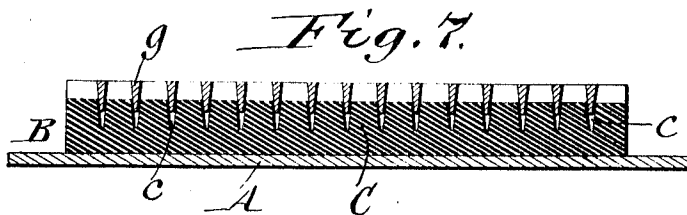
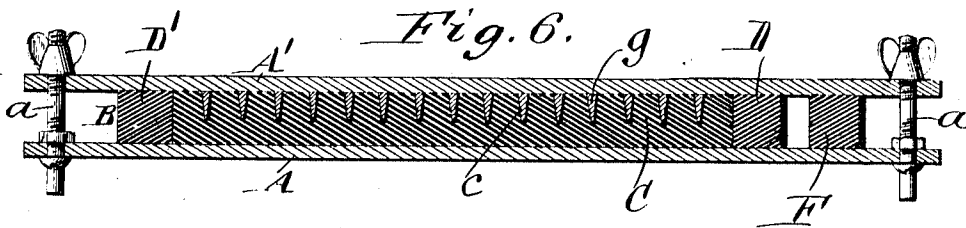
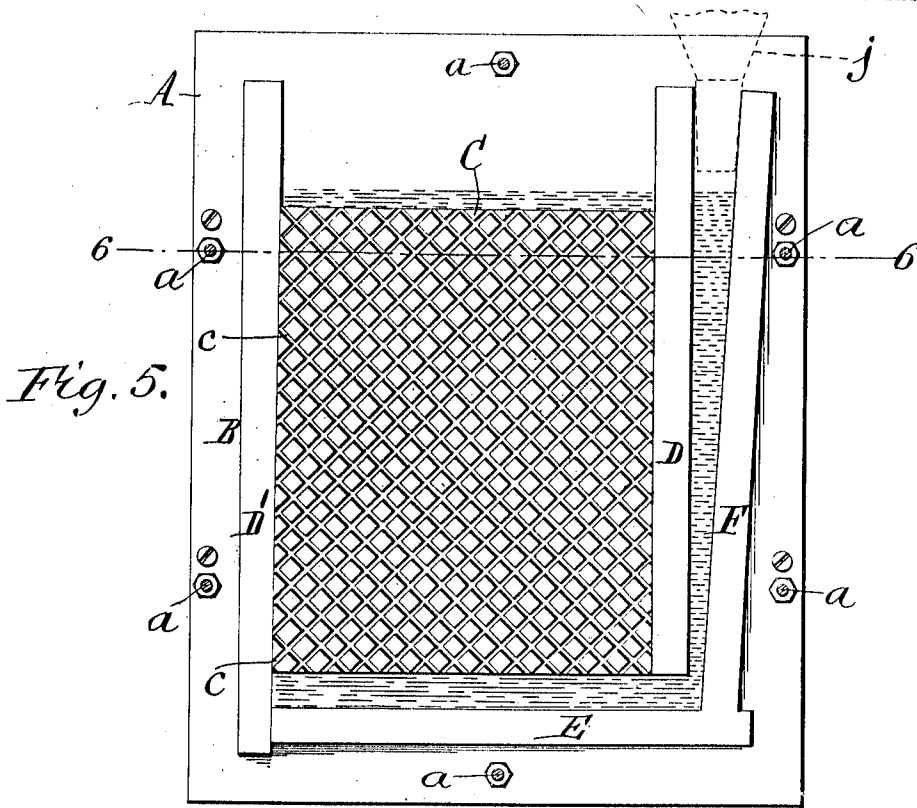
Inventor
Joseph Porzel
by Geyer & Topp
Attorneys

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UNITED STATES PATENT OFFICE.

JOSEPH PORZEL, OF BUFFALO, NEW YORK.

PROCESS FOR MAKING RADIATORS.

1,019,916.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed July 8, 1910. Serial No. 571,002.

To all whom it may concern:

Be it known that I, JOSEPH PORZEL, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Processes for Making Radiators, of which the following is a specification.

This invention relates to a process for making radiators for automobiles and other uses, and has the object to provide a method for this purpose whereby such radiators may be produced electrolytically at comparatively low cost.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a sectional elevation of a cooling tank containing the mold for casting the matrix used in the making of a radiator. Fig. 2 is a similar view of an electrodepositing tank containing the matrix and the anode for producing the radiator. Fig. 3 is a cross section of the radiator shell which has been electrolytically deposited on the matrix. Fig. 4 is a similar view showing the shell with the matrix removed. Fig. 5 is an elevation, partly in section and on an enlarged scale, of the mold in which the matrix is cast. Fig. 6 is a horizontal section, on an enlarged scale, of the mold in line 6—6, Fig. 5, looking upward. Fig. 7 is a fragmentary horizontal section of the mold showing the matrix partly removed therefrom.

Similar letters of reference indicate corresponding parts throughout the several views.

The mold in which the matrix is cast for use in making the radiator preferably comprises two outer sections A, A¹ and an intermediate section B. Each of the outer sections is preferably constructed of a flat plate of iron or other suitable metal.

The intermediate section is constructed of flexible or elastic material preferably rubber, although other material having like properties may answer the purpose. This intermediate mold section preferably comprises a cellular central part or body C which is closed on one side and provided on its opposite side with a plurality of grooves *c* arranged according to the design desired of the cellular part of the radiator. This central part of the intermediate mold section is preferably permanently secured at its closed side against the plate A by cement or otherwise.

Adjacent to the upright edges of the central part of the intermediate mold section are arranged two upright strips D, D¹ of rubber or similar flexible material which close the ends of the grooves *c* which terminate at these edges of the central part C. The upper ends of the strips D, D¹ extend above the central part or body C but the front strip D terminates at its lower end flush with the lower edge of the body and the rear strip D¹ extends at its lower end below the body. Below the mold body C and separated therefrom by an intervening space is a horizontal lower strip E of rubber or similar flexible material which engages at its rear end with the lower end of the rear strip D¹.

Adjacent to the front strip D is arranged an auxiliary or outer upright-strip F of rubber or similar flexible material which is separated by an intervening space from the front strip D and terminates at its upper end flush with the latter while its lower end engages the front end of the lower strip E. The several strips are of the same thickness transversely as the body of the intermediate mold section and are mounted on the side section A so as to be flush with the groove side of the mold body C.

The side plate A¹ engages with the groove side of the mold body C and the adjacent sides of the strip, thereby closing the outer sides of the grooves and forming with the same the mold cavity for the matrix to be cast and also closing the sides of the spaces between the mold body and lower strip and between the front upright strip and the auxiliary upright strip, thereby forming with these spaces the sprue through which the metal for the fusible matrix *g* is poured into the mold cavity.

The side section A¹ is detachably engaged with the intermediate section by connecting the same with the other side section by means of clamping or coupling screws *a*. The matrix metal may be directed into the sprue by a funnel *j* or by any other suitable means. Preparatory to pouring the matrix metal into the mold the latter is heated above the fusing temperature of the matrix metal and while the matrix metal is being poured into the mold the latter is immersed in a bath of water contained in a tank G, as shown in Fig. 1, said water being heated above the fusing point of the matrix metal, thereby causing the metal to flow readily.

Inasmuch as the sprue of the mold leads to the lower edge of the cellular central part of the mold the cavity of the latter is filled from the lower toward the upper edge thereof, thereby expelling the water upwardly from the mold cavity instead of trapping any of the same within the mold, thereby insuring perfect casting of the matrix. After the mold has been filled with metal the matrix and mold are cooled by removing these parts from the hot water in the tank G and immersing the same in cold water or by substituting cold water for the hot water in the tank G while the filled mold remains therein or by any other suitable means. After the matrix has been thus cast, the mold is removed from the cooling tank and the removable side wall, section or plate A¹ detached from the intermediate section and the other side section, thereby exposing the groove or open side of the intermediate mold. The cast matrix *g* is now removed sidewise from the mold cavity, as shown in Fig. 7. If during this removal the casting should be tilted or shifted unevenly the same will not stick in the mold but can still be removed freely owing to the flexible character of the intermediate part of the mold which yields, springs or stretches as much as necessary to permit the cast matrix to easily clear itself from the mold.

After the matrix has been removed from the mold the surplus metal is trimmed off and then the same is placed together with an anode H in the electrolyte contained in the tank *h* of an electro-plating outfit, as shown in Fig. 2. This anode and electrolyte may be varied to suit the character of the radiator shell desired. Inasmuch as copper is the most desirable metal for radiators the anode of the electro-plating outfit is of copper and the electrolyte of corresponding composition.

While the metal matrix is immersed in the electro-plating bath or solution and the current is turned on, a shell *i* of copper or other metal is deposited electrolytically on the matrix, as shown in Fig. 3. When this shell is sufficiently thick, the matrix and

shell are removed from the electrolyte and the same are heated to a temperature sufficiently high to melt the matrix but not affect the shell. When thus heated the matrix melts or fuses and runs out of the shell leaving the latter empty, as shown in Fig. 4, and ready to be assembled with other parts to produce a cellular radiator having vertical internal passages through which the water circulates and horizontal external passages through which the air moves and operates to cool the water by radiation. The metal is permitted to run out of the shell by forming openings in the lower end of the same for the escape of the melted matrix and providing openings in the upper end of the shell for admitting air into the same while the matrix is flowing out. A radiator produced in this manner is not only cheaper than those heretofore in use but the same is also more efficient on account of the uniformity in the thickness of the metal and less troublesome owing to reduced liability of leakage.

I claim as my invention:

1. The hereindescribed method of producing radiators comprising casting a matrix of fusible material in a mold having parts of flexible material, removing said matrix from the mold and electrolytically depositing thereon a radiator shell, and then removing the matrix from the shell by fusion.

2. The hereindescribed method of producing a cellular radiator comprising casting a matrix of metal fusible at a low temperature in a mold having its cell forming parts constructed of rubber, removing said matrix from the mold and electrolytically depositing thereon a shell of metal fusible at a higher temperature than the matrix, and then removing the matrix from the shell by fusion.

Witness my hand this 2nd day of July, 1910.

JOSEPH PORZEL.

Witnesses:

ANNA HEIGIS,
E. M. GRAHAM.