F. GARGUILO.

RADIATOR FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JUNE 16, 1921.

1,426,725.

Patented Aug. 22, 1922.

2 SHEETS—SHEET 1.

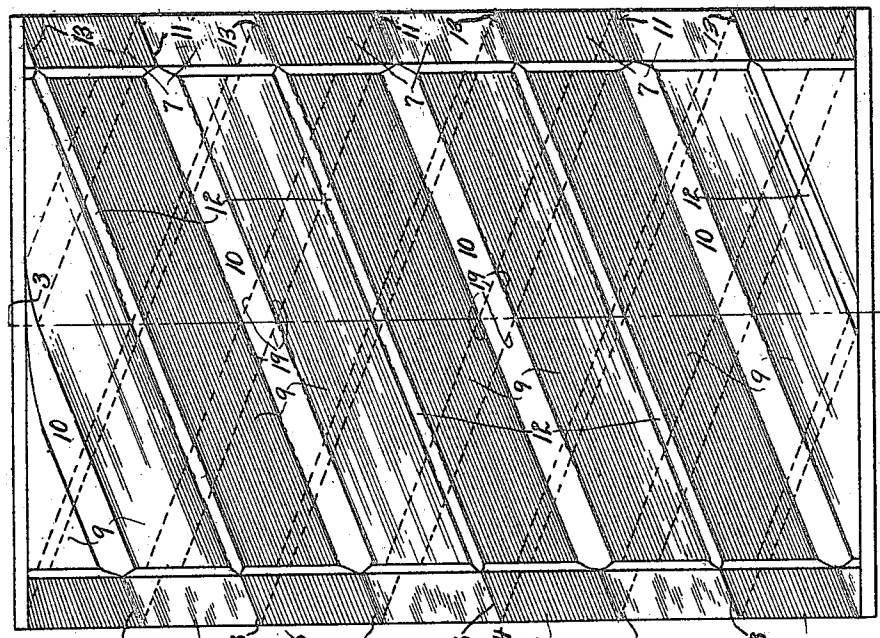


Fig. 2.

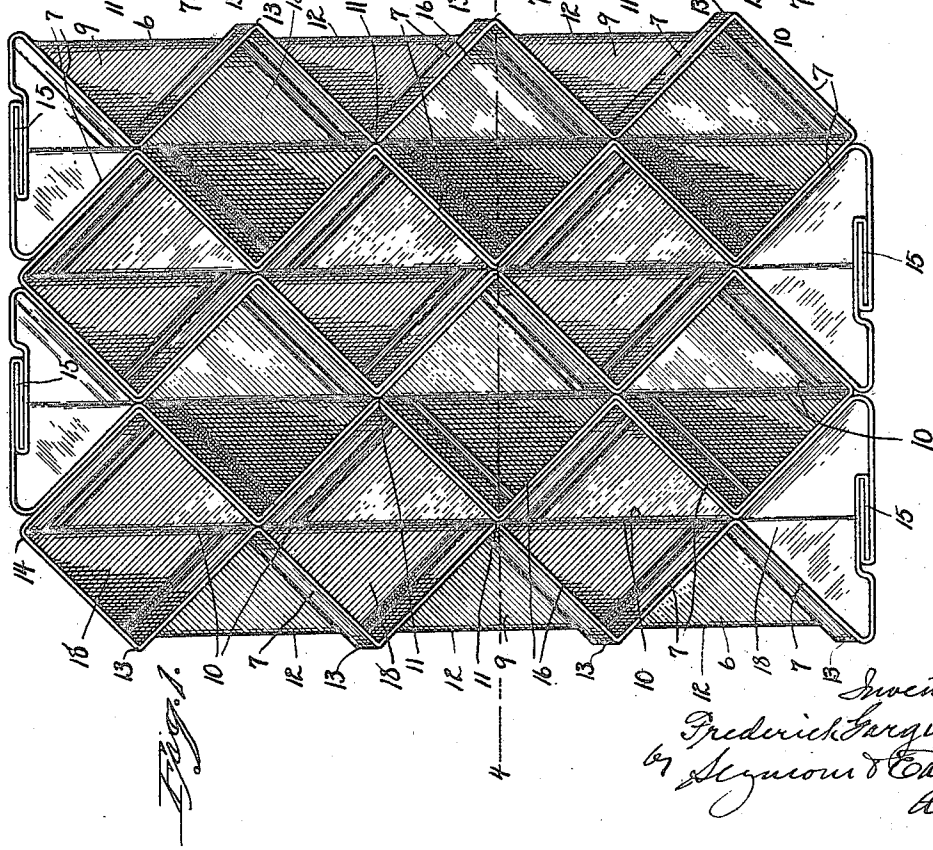


Fig. 1.

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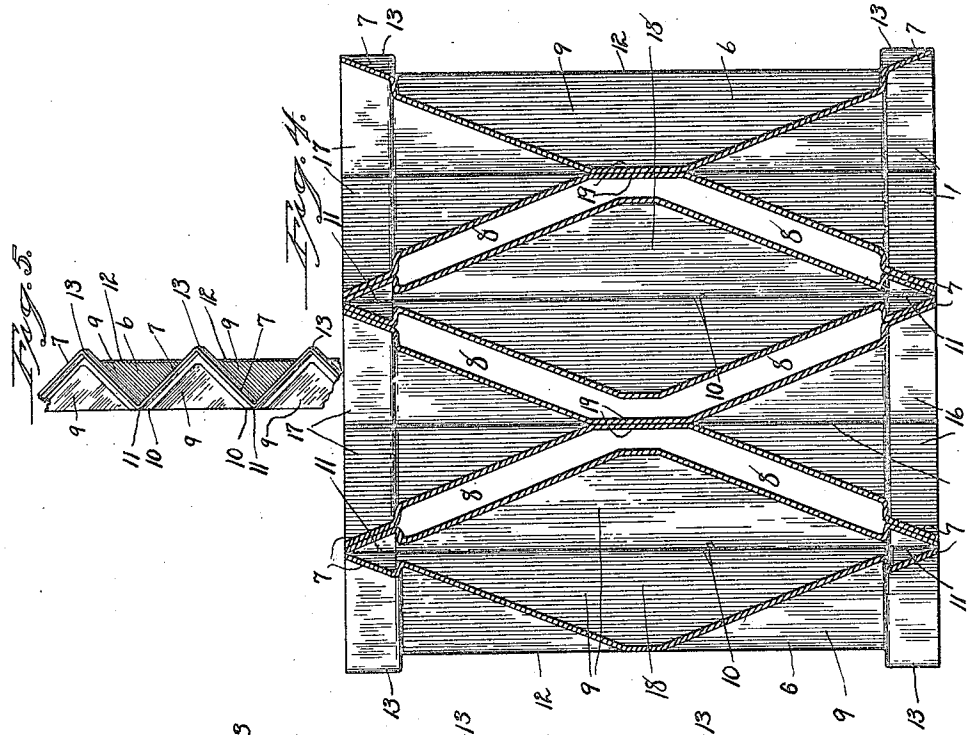


Fig. 4.

Fig. 5.

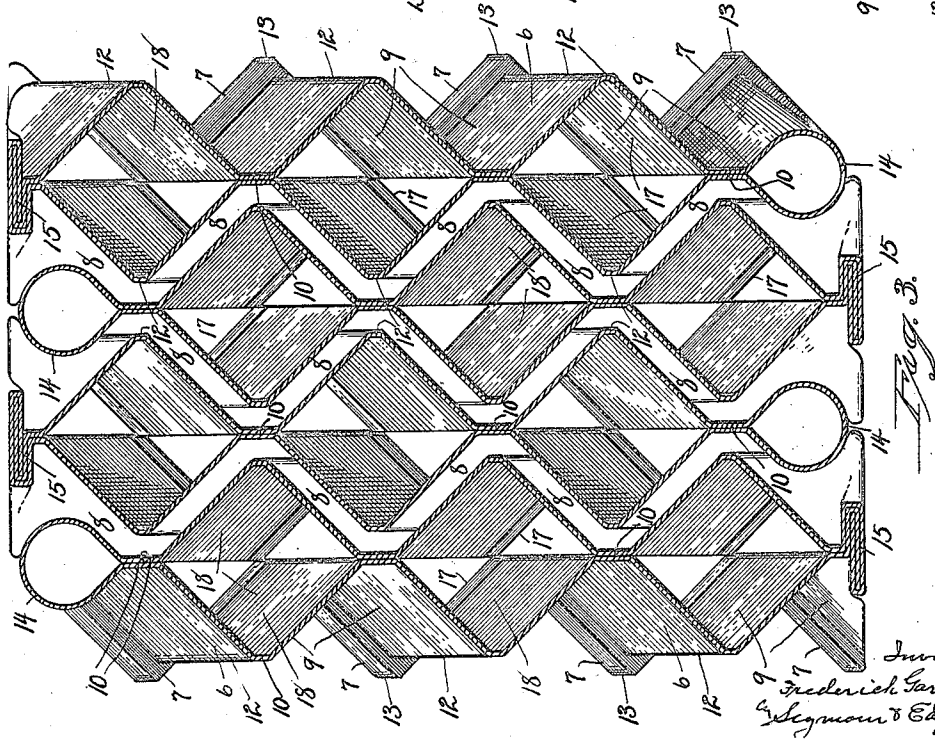


Fig. 3.

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UNITED STATES PATENT OFFICE.

FREDERICK GARGUILO, OF NEW HAVEN, CONNECTICUT.

RADIATOR FOR INTERNAL-COMBUSTION ENGINES.

REISSUED

1,426,725. Specification of Letters Patent. Patented Aug. 22, 1922.

Application filed June 16, 1921. Serial No. 477,900.

To all whom it may concern:

Be it known that I, FREDERICK GARGUILO, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Radiators for Internal-Combustion Engines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Fig. 1 a broken view in front elevation of a section of a radiator-structure embodying my invention.

Fig. 2 an edge view thereof.

Fig. 3 a vertical sectional view thereof on the line 3—3 of Figure 2.

Fig. 4 a horizontal sectional view thereof on the line 4—4 of Figure 1.

Fig. 5 a front edge view of a portion of a stock-strip such as I use in the production of my improved radiator-structure.

My invention relates to an improvement in radiators for the cooling systems of internal combustion engines such as are employed for automobiles, air craft, etc., the object being to produce a structure of superior stiffness and efficiency, having the external appearance, front and back, of a radiator of the so-called cellular type, but internally distinguished therefrom by having vertically intercommunicating air-passages, the walls of which are inclined to commingle the air and deflect it upwardly and downwardly.

With these ends in view, my invention consists in a radiator-unit having cellular air-inlet and air-outlet openings larger than and leading into and out of upwardly and downwardly inclined air-passages vertically intercommunicating throughout the length of the unit.

My invention, further consists in a radiator-structure having certain details of construction as will be hereinafter described and pointed out in the claims.

In carrying out my invention, as herein shown, I employ thin, sheet-metal stock-strips 6 having their edges correspondingly offset to form combined spacing-and-assembling flanges 7, which are offset to half the depth of the ultimate water-channels 8 of the completed structure, as shown in Figure 4, and which provide means for soldering the strips and the units together. Each stock-strip 6 is also formed with transverse, regularly-spaced, parallel corrugations 9, inclined with respect to the longitudinal axis of the strip and extending through and including the offset combined spacing-and-assembling flanges 7 thereof, as clearly shown in Figure 2. The apices of the corrugations 9 are flattened as at 10 on the air-passage side of the strip to the plane of the apices 11 of the corrugations of the flanges 7 on the same side of the strip, while the apices of the corrugations 9 on the water channel side of the strip, are flattened as at 12, below the level of the apices 13 of the corrugations of the flanges 7 on the water-channel side of the strip, the flattened apices 10 being wider than the flattened apices 12.

Stock-strips formed as above described are transversely folded midway of their lengths, as at 14 (Figure 3) and lock-seamed at their opposite ends, as at 15 (Figure 3), to form the radiator-units. By folding each unit-strip as described, cellular air-inlet openings 16 are formed in the front edge of the unit, while corresponding air-outlet openings 17 are formed in the rear edge of the unit, these cellular openings giving the radiator-structure of my invention the external front and back appearance of true cellular radiator-structures. These openings 16 and 17 lead into and out of air-passages 18 (Figure 4) having upwardly and downwardly inclined walls and vertically intercommunicating from the top to the bottom of the unit, the said openings being as much larger than the said passages as the flanges are offset from the planes of the stock-strips. The broken air-passages are intermediate between the said openings 16 and 17 which open into and lead out of them. By folding the strip at 14, as described, the opposed apices 11 of the flanges 7 are brought into contact, as shown in Figures 1 and 3, while, at the same time, the opposed flattened apices 10 of the corrugations of the strip are brought into localized line contact midway the width of the strip, as shown by the diamond-shaped outlines 19, appearing in Figures 2 and 4, the peculiar diamond-shaped form of the contact 19 proceeding from the crossing of the apices 10 at angles determined by the inclined character of the corrugations of the strip. The radiator-units so produced are nested in the usual

manner for the production of the water-channels 8, which are continuous from the top to the bottom of the structure, as well as from front to rear, the constriction of these passages being avoided by the slight flattening of the apices 12 of the corrugations on the water-channel side of the strip. In order to nest such units, the alternate units must be formed from strips identical in every other respect but oppositely corrugated.

The radiator-structure thus produced is characterized by having the front and back appearance of an ordinary cellular radiator on account of its cellular air-intake openings and cellular air-outlet openings, but internally all of the air-passages, with their upwardly and downwardly inclined walls, due to the inclination of the corrugations of the strip, are vertically intercommunicating, so that all the pencils of air entering the cellular air-inlet openings will be broken up and commingled, instead of passing directly from front to rear through the radiator structure, as do the integral air-pencils of the cellular radiator-structures of the prior art, whereby my improved structure is increased in efficiency, since all portions of the air are brought into contact with the walls of the water-channels, which are continuous from the top to the bottom of the structure, without substantial constriction. In other words, the pencils of air entering the cellular air-intake openings 16 completely loose their identity as pencils of air before the air is discharged through the cellular air-outlet openings 17 at the back of the radiator-structure.

I claim:

1. A sheet-metal stock-strip for use in producing radiator-structures for internal combustion engines, the said stock-strip having its edges offset to produce combined spacing-and-assembling flanges, and being transversely corrugated from edge to edge at an inclination to its longitudinal axis through the said flanges, and the apices of the corrugations on the air-passage side of the strip being flattened to permit the apices of the corrugations of the flanges to come into contact with each other when the strip is folded upon itself for the production of the radiator-unit.

2. A radiator-unit consisting of a corrugated, sheet-metal strip folded upon itself and having its ends secured together, the said sheet-metal strip having its edges offset to form combined spacing-and-assembling flanges, and the strip being transversely corrugated from edge to edge throughout its length at an angle to its longitudinal axis, and the apices of the corrugations on the air-passage side of the strip being flattened to permit the apices of the flanges on the said side of the strip to make contact.

3. A radiator-structure for internal combustion engines, consisting of a plurality of radiator-units, each consisting of a sheet-metal strip folded upon itself and having its edges formed with offsetting combined spacing-and-assembling flanges, and formed throughout its length with transverse corrugations extending from edge to edge and inclined to its longitudinal axis, and the apices of the corrugations on the air-passage side of the strip being flattened to permit the apices of the flanges on the same sides of the strip to make contact, the radiator-structure thus produced having cellular air-inlet openings and cellular air-outlet openings, and intermediate, vertically-intercommunicating, upwardly and downwardly inclined air-passages, and continuous water-channels.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

FREDERICK GARGUILO.

Witnesses:

HELEN S. LANYON,

CHAS. OPPE.