June 7, 1938. A. P. BALL 2,120,085

STAMPED METAL RADIATOR

Filed April 15, 1935 2 Sheets-Sheet 1

Fig. 1

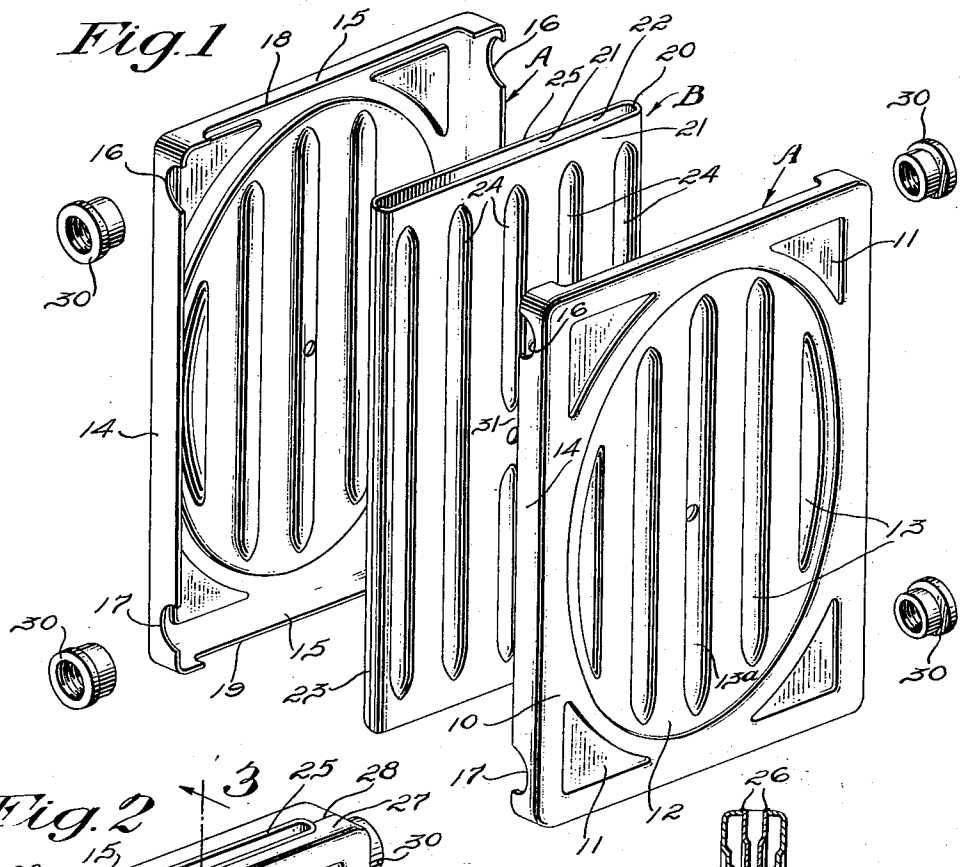


Fig. 2

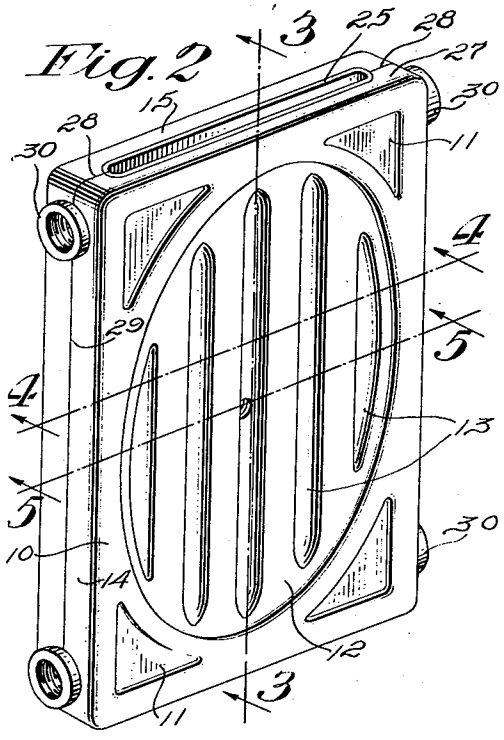
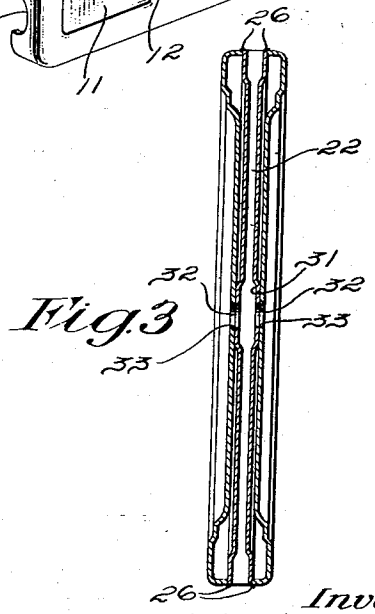


Fig. 3



Inventor
Albert P. Ball
By Dike, Calver & Gray
Attorneys.

June 7, 1938. A. P. BALL 2,120,085

STAMPED METAL RADIATOR

Filed April 15, 1935 2 Sheets-Sheet 2

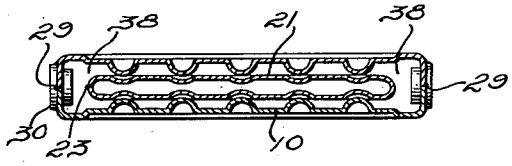


Fig. 4

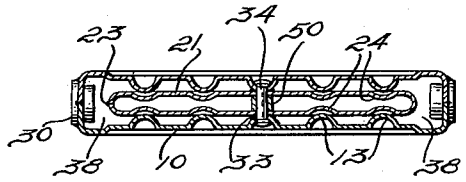


Fig. 5

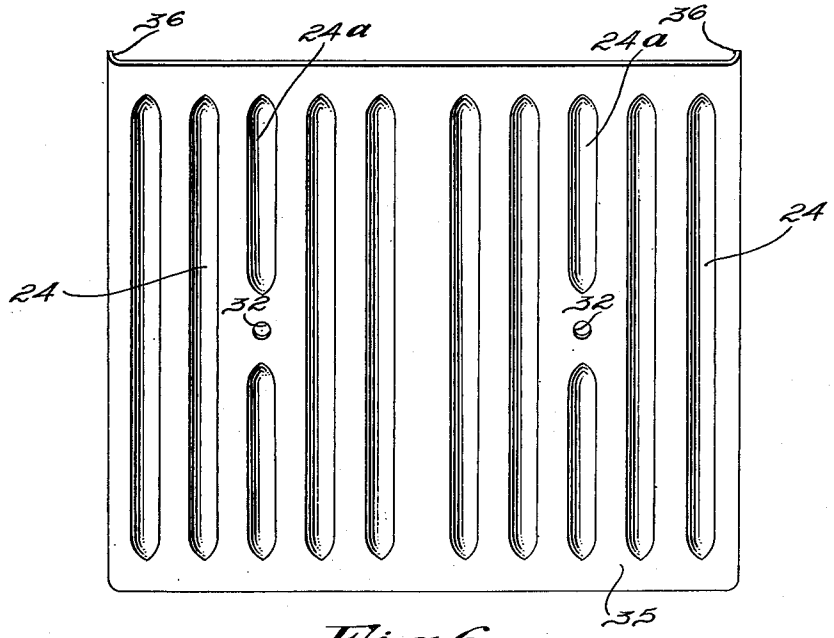


Fig. 6

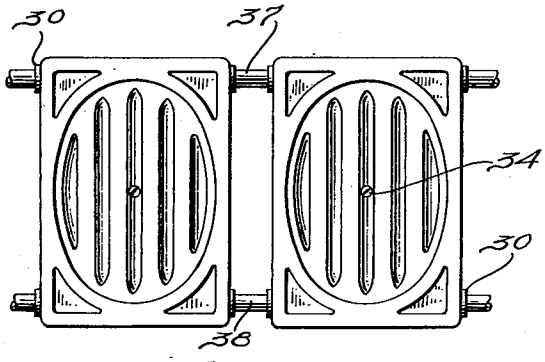


Fig. 7

Inventor:
Albert P. Ball

By Dike, Calver & Gray
Attorneys.

Patented June 7, 1938

2,120,085

UNITED STATES PATENT OFFICE

2,120,085

STAMPED METAL RADIATOR

Albert P. Ball, Detroit, Mich., assignor to Briggs Manufacturing Company, Detroit, Mich., a corporation of Michigan

Application April 15, 1935, Serial No. 16,322

6 Claims. (Cl. 257—139)

This invention relates to radiators or heat exchange units adapted particularly for heating or cooling purposes, air conditioning or the like. An object of the invention is to provide a radiator or heat exchange unit which is relatively simple in construction, economical to manufacture, durable and serviceable in use, and effective to provide a maximum area of direct heat conducting and radiating surface without, as heretofore, sacrificing desired qualities of attractiveness and ornamental appearance.

A further object of the invention is to provide a radiator which may be readily and economically pressed or formed from sheet metal, containing a minimum number of easily formed stampings or parts, and combining the desired qualities of ornamental appearance and maximum heat exchange efficiency.

Another object of the invention is to provide a radiator or heat exchange unit, preferably stamped or pressed from sheet metal and embodying but three major parts, and wherein inner and outer double-wall heat conducting and radiating surfaces are provided, the inner surfaces being adapted to have approximately the area of the outer surfaces.

A further object of the invention is to provide a radiator which may be composed of inner and outer shells, the outer shell being formed from duplicate stampings, and the inner shell being in the form of an elongated open ended sleeve or tube enclosed by but having its walls spaced from the walls of the outer shell whereby inner and outer double-wall heat conducting and radiating surfaces are provided.

Other objects and advantages of the invention will be apparent from the following description and appended claims when considered in connection with the accompanying drawings forming a part of this specification.

Fig. 1 is an exploded view, in perspective, illustrating the component parts of a radiator embodying the present invention.

Fig. 2 is a perspective view of the radiator with the parts assembled.

Fig. 3 is a vertical section taken through line 3—3 of Fig. 2 in the direction of the arrows.

Figs. 4 and 5 are transverse sectional views taken respectively through lines 4—4 and 5—5 of Fig. 2 in the direction of the arrows.

Fig. 6 is a front elevation in perspective, illustrating a partly formed blank for producing the inner shell.

Fig. 7 is a side elevation illustrating a pair of radiator units connected together by piping.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the claimed invention herein beyond the requirements of the prior art. It is also understood that the term "radiator" is used herein in a generic sense to comprehend heat exchange devices utilized for heating, cooling, air-conditioning, etc., and that the invention is susceptible of a variety of uses readily apparent to those skilled in the art.

Referring to the drawings wherein there is illustrated, by way of example, a present preferred embodiment of the invention, it will be seen that the radiator or heat exchange unit may, if desired, be composed of three major pieces or parts, each preferably stamped or pressed from sheet metal. Any suitable metal having the desired characteristics of heat conductivity and radiation may be utilized, such, for example, as sheet steel, aluminum, copper and their alloys. In the present embodiment the radiator comprises an outer shell or casing composed of duplicate stamped or pressed metal panels A and an inner sleeve-like casing or shell B which may economically be formed from a single metal blank. These parts are preferably welded together along their juxtaposed edges thereby forming between the walls of the inner and outer shells or casing a closed fluid chamber or passage, while at the same time the construction is such as to provide inner and outer double-wall heat conducting and radiating surfaces exposed to the surrounding atmosphere.

The panels or casing members A are each stamped from a flat sheet metal blank to provide an outer wall 10 which may be embossed within its area at 11 and 12 in accordance with any desired ornamental pattern. The outer wall 10 of each panel A may also be pressed to provide, for example, a plurality of grooves or channels 13 which form inwardly directed ribs. The metal blank, from which each of the panels A is produced, is stamped or pressed to provide inwardly extending vertical side flanges 14 and inwardly extending top and bottom flanges 15, the flanging being continuous around the side edges of the panels. The flanges 14 are punched or pierced to

provide upper and lower semi-circular notches 16 and 17. The juxtaposed notches of the two panels A, when the panels are assembled, mate to form circular inlet and outlet openings for the reception of pipe couplings. In the present example upper and lower pairs of openings 17 are shown although it is understood that the radiator may be provided with a single inlet and a single outlet opening. The upper and lower horizontal flanges 15 are, in the present instance, cut away or recessed along the lines 18 and 19 (Fig. 1) so as to embrace and conform to the contour of the terminal edges of the inner sleeve or casing B when the parts are assembled together.

The inner shell or casing B is preferably formed from a single metal blank which may be bent upon itself at 20 to provide spaced parallel walls 21 forming a sleeve-like member having a continuous passage 22 therethrough. In the present instance this passage extends in a vertical direction. The terminal side edges of the walls 21 are flanged inwardly into abutting relation and are butt-welded along the vertical line 23, thus forming a continuous walled sleeve which is open at its top and bottom.

The metal blank, from which the sleeve B is formed, is preferably provided before the folding operation with a series of rib-forming grooves or channels 24 corresponding in relative location to the grooves or channels 13 in the outer panels when the parts are assembled together.

In assembling the sleeve-like shell B with the outer panels, it will be seen that the upper and lower edges 25 of the sleeve fit snugly within the recessed portions 18 and 19 of the outer panels, these portions being cut to conform to the configuration of the sleeve. The edges 25 are continuously welded to the edges 18 and 19 of the outer panels as indicated at 26 in Fig. 3. The abutting edges of the panels A are also continuously welded along the lines 28 and 29 as indicated in Figs. 2 and 4. In this manner, therefore, the panels A are continuously welded together along their abutting edges and along the upper and lower edges 25 of the inner shell to provide a fluid tight jacketed casing. The openings 16 and 17 in the outer casing, after assembly, are fitted with suitable tapped pipe couplings 30 which may be welded in place around the marginal edges of the openings.

With reference to Figs. 3, 4 and 5, it will be seen that the interiorly directed ribs 13 of the outer casing are normally spaced from the walls of the sleeve B by means of the grooves 24 which provide sufficient clearance to permit the unobstructed passage of fluid between the walls of the outer and inner shells. The ribs 13 not only provide a desirable ornamental appearance to the unit but also increase the heat conducting and radiating surfaces of the outer shell. In like manner, the rib-forming grooves 24 of the inner shell B increase the radiating surfaces thereof.

In the present embodiment the parallel inner and outer walls of the members A and B are secured together at a suitable common point, preferably centrally thereof, so as to prevent buckling or bulging of the walls. This is accomplished in the present instance by interrupting the groove 24a of the inner shell B to provide a central relief 31. As a consequence, when the parts are assembled together, the inner face of the central rib 13a of each outer panel will abut against the flat ungrooved or relief portion 31 of each inner wall 21, as shown in Figs. 3 and 5. The abutting portions of the walls 10 and 21 at the locality of the area 31 are pierced to provide alined apertures 32. The walls 10 and 21 are continuously welded at 33 around the marginal edges of the apertures 32 and these apertures may be closed and the walls of the inner and outer shells rigidly anchored together by means of a through rivet or bolt 34 carrying a spacer 50 overlapping and abutting against the inner faces of the walls 21 around the marginal edges of the apertures 32, as shown in Fig. 5.

With reference to Fig. 6, it will be seen that the inner sleeve-like shell B may be produced, if desired, from a single blank 35 which may be pressed or punched by suitable die operation to provide corresponding curved end flanges 36, duplicate sets of grooves or ribs 24 and 24a, and duplicate apertures 32. This blank, when thus formed, may be bent upon itself along a vertical central line and folded so as to bring the edges of the flanges 36 into abutting relation whereby they may be readily welded to produce the sleeve or shell B illustrated in Fig. 1.

A number of radiator units, constructed as illustrated in Fig. 2, may be readily hooked up in a series in a heating or cooling system by inlet and outlet piping 37 and 38 connected to the threaded couplings 30 as illustrated in Fig. 7. If desired, particularly for use as domestic units, the radiator may be utilized as a single individual unit, in which case a lesser number of openings 16 or 17 and couplings 30 may be provided in the unit.

From the foregoing it will be seen that the outer and inner shells provide substantially parallel walls which are spaced apart to form a fluid chamber or fluid passages 38 between the walls 21 and the walls 20 as particularly illustrated in Figs. 4 and 5. Since each of these walls has one inner surface thereof forming a wall of the fluid chamber and, therefore, in heat exchange relation with the fluid flowing therethrough, it will be seen that the entire unit provides four heat conducting walls which are approximately co-extensive in area. Moreover, since the inner shell B provides a vertical passage which is open through the upper and lower ends of the outer shell, an air flue is thus produced through the unit permitting the rising air (if heated) to flow centrally through the passage 22 of the unit. This air will be in heat exchange relation with the inner walls 21 which thus provide radiating surfaces. The unit, therefore, is composed of inner and outer double-wall radiating surfaces, the inner surfaces being nearly as co-extensive in area as the outer surfaces and thereby materially increasing the heat exchange efficiency of the device.

I claim:

1. A sheet metal radiator comprising an inner sleeve-like shell, an outer shell enclosing the same and composed of duplicate stampings welded together along their abutting edges and also along edges abutting the sleeve to form a fluid chamber between the shells and an air passage through the inner shell.

2. A sheet metal radiator comprising an inner sleeve-like shell, an outer shell enclosing the same and composed of duplicate stampings welded together along their abutting edges and also along edges abutting the sleeve to form a fluid chamber between the shells and an air passage through the inner shell, said inner shell comprising a sheet metal blank folded upon it-

self and welded along the meeting edges of the folds.

3. A heat exchange unit comprising a flat open-ended central tube, a flat outer shell surrounding the tube and secured to its ends, and reenforcing means connected to the shell and extending across the tube.

4. A heat exchange unit comprising a flat open-ended central tube, a flat outer shell surrounding the tube and secured to its ends, spacing means between the sides of the central tube, portions of the shell and the central tube being in contact with each other adjacent the spacing means on both sides of the unit, and reenforcing means extending across the tube and through holes in the parts of the tube and shell in contact with each other.

5. A sheet metal radiator comprising an inner sleeve-like shell, an outer shell enclosing the same and composed of a pair of stampings welded together along their abutting edges and also along abutting edges of the sleeve to form a fluid chamber between the shells and an air passage through the inner shell.

6. A sheet metal radiator comprising an inner sleeve-like shell, an outer shell enclosing the same and composed of a pair of stampings having opposed angular peripheral flanges welded together along their meeting edges, the line of weld being interrupted along portions at the top and bottom ends of the radiator, said opposed flanges along said portions having relieved sections abutting the edges of the sleeve and welded thereto to form a fluid chamber between the shells and an air passage through the inner shell.

ALBERT P. BALL.