May 9, 1933. J. D. ERSKINE 1,907,527

RADIATOR CONSTRUCTION

Filed June 16, 1930 4 Sheets-Sheet 1

Fig. 1.

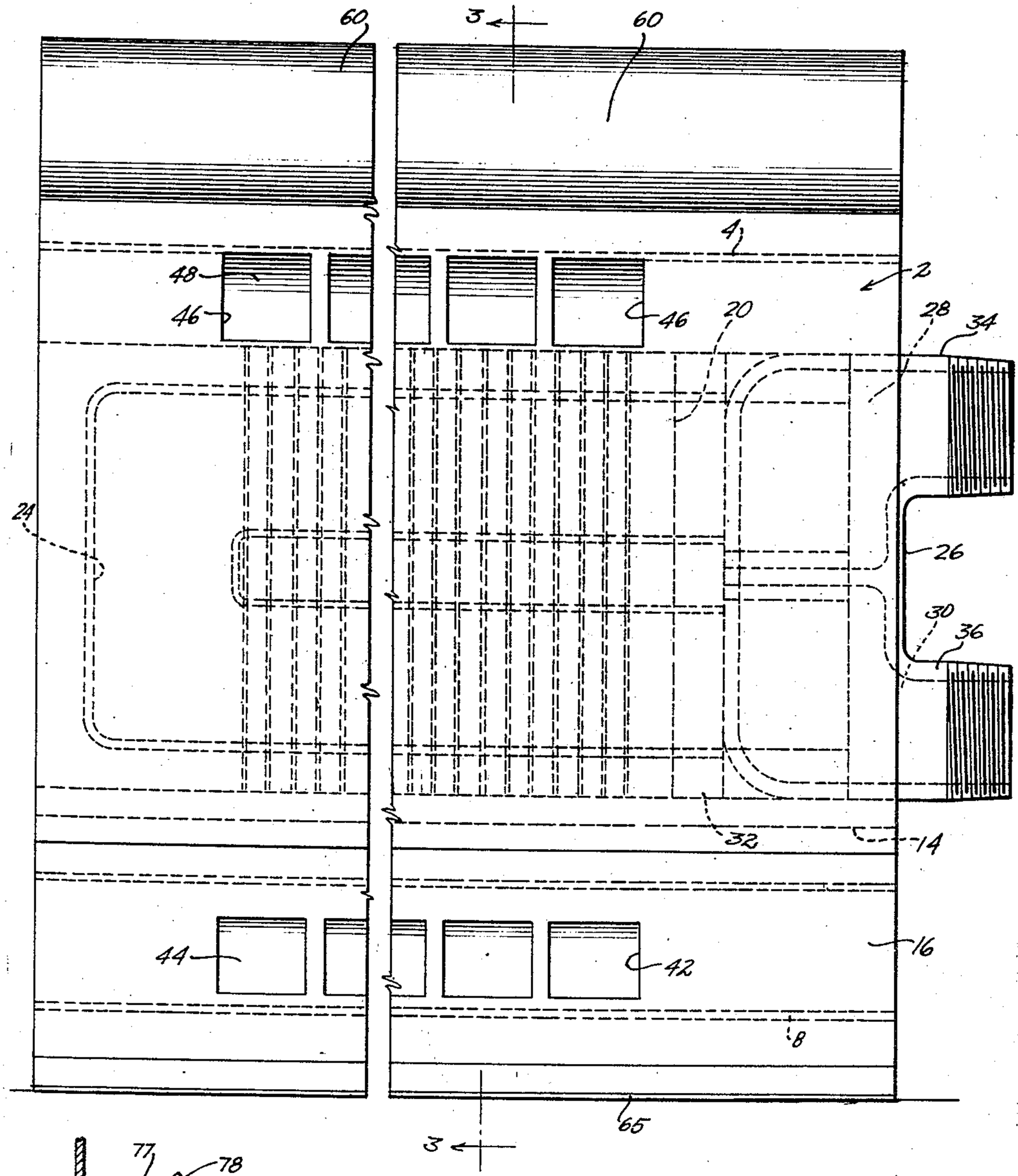
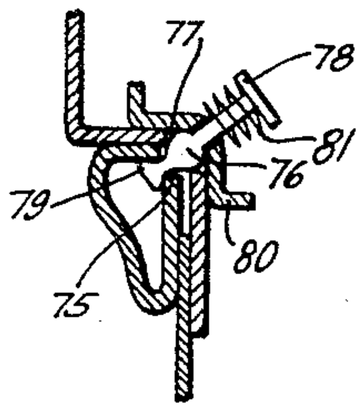


Fig. 9.



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RADIATOR CONSTRUCTION

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Fig. 2.

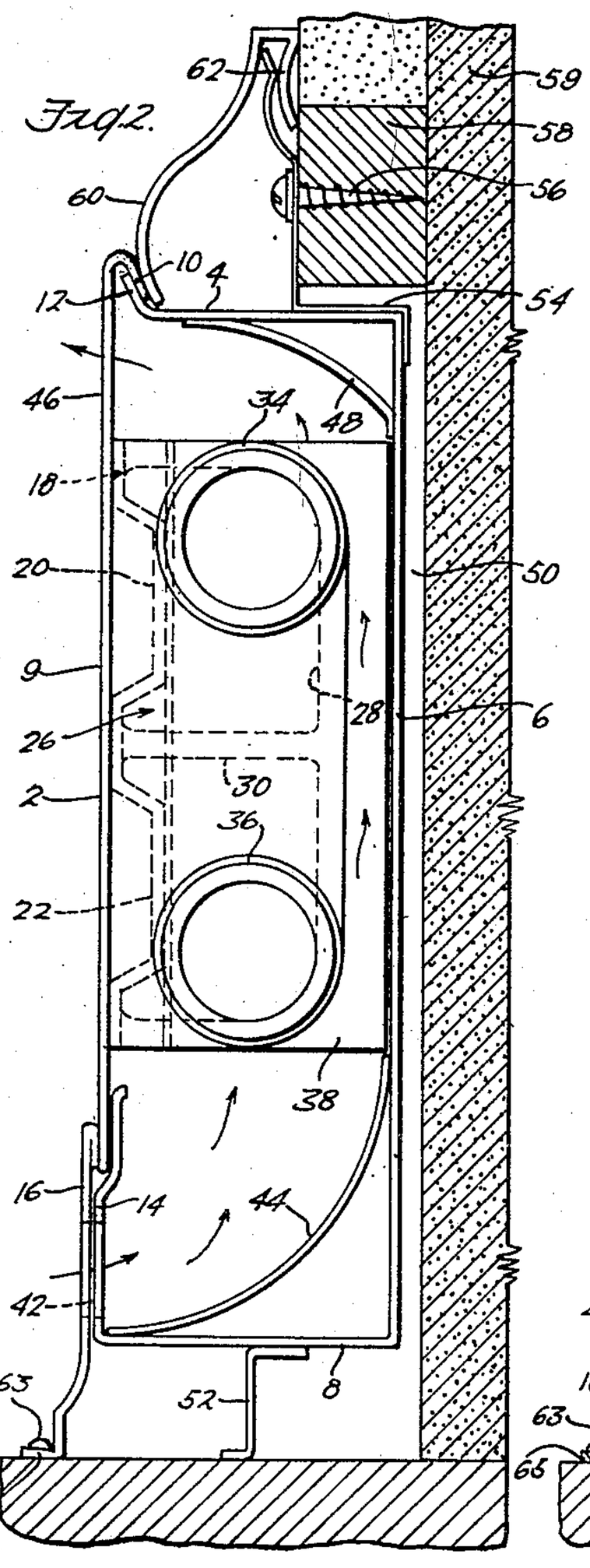


Fig. 3.

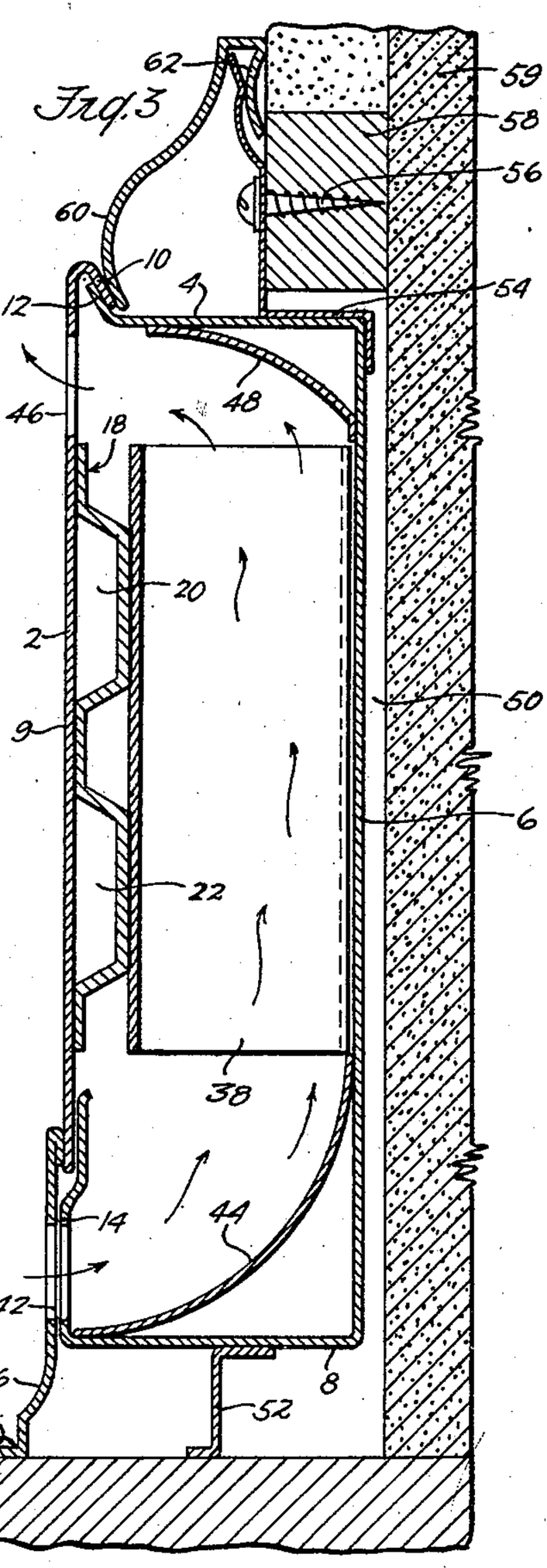
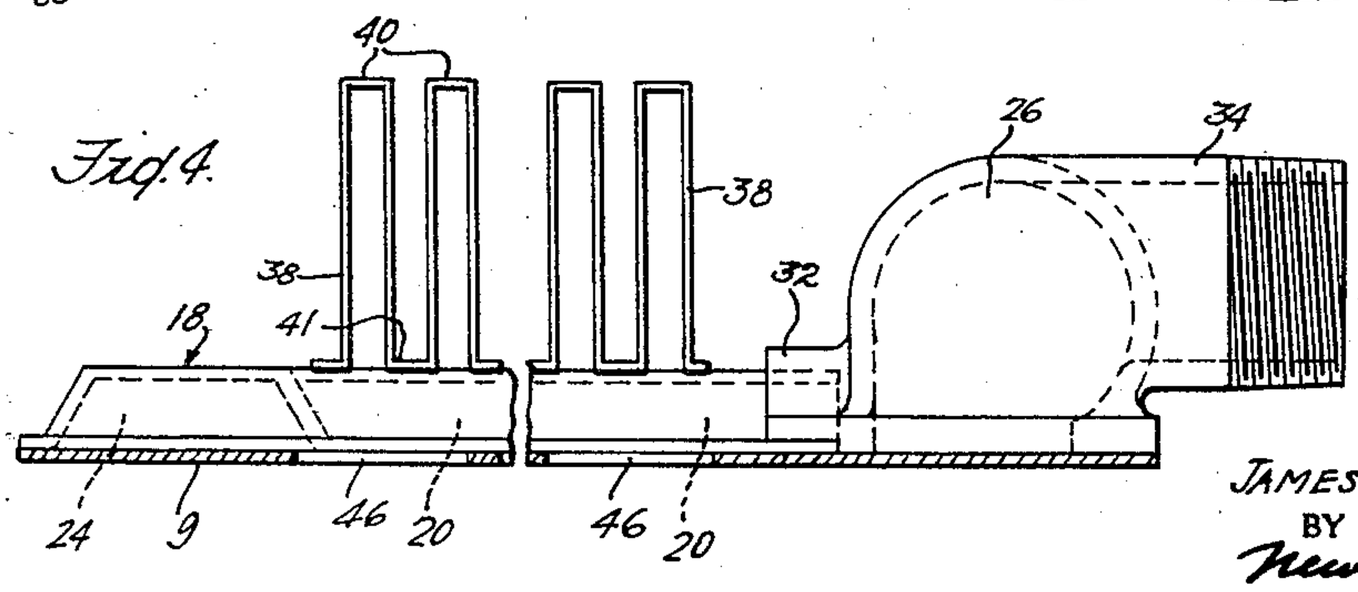


Fig. 4.



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RADIATOR CONSTRUCTION

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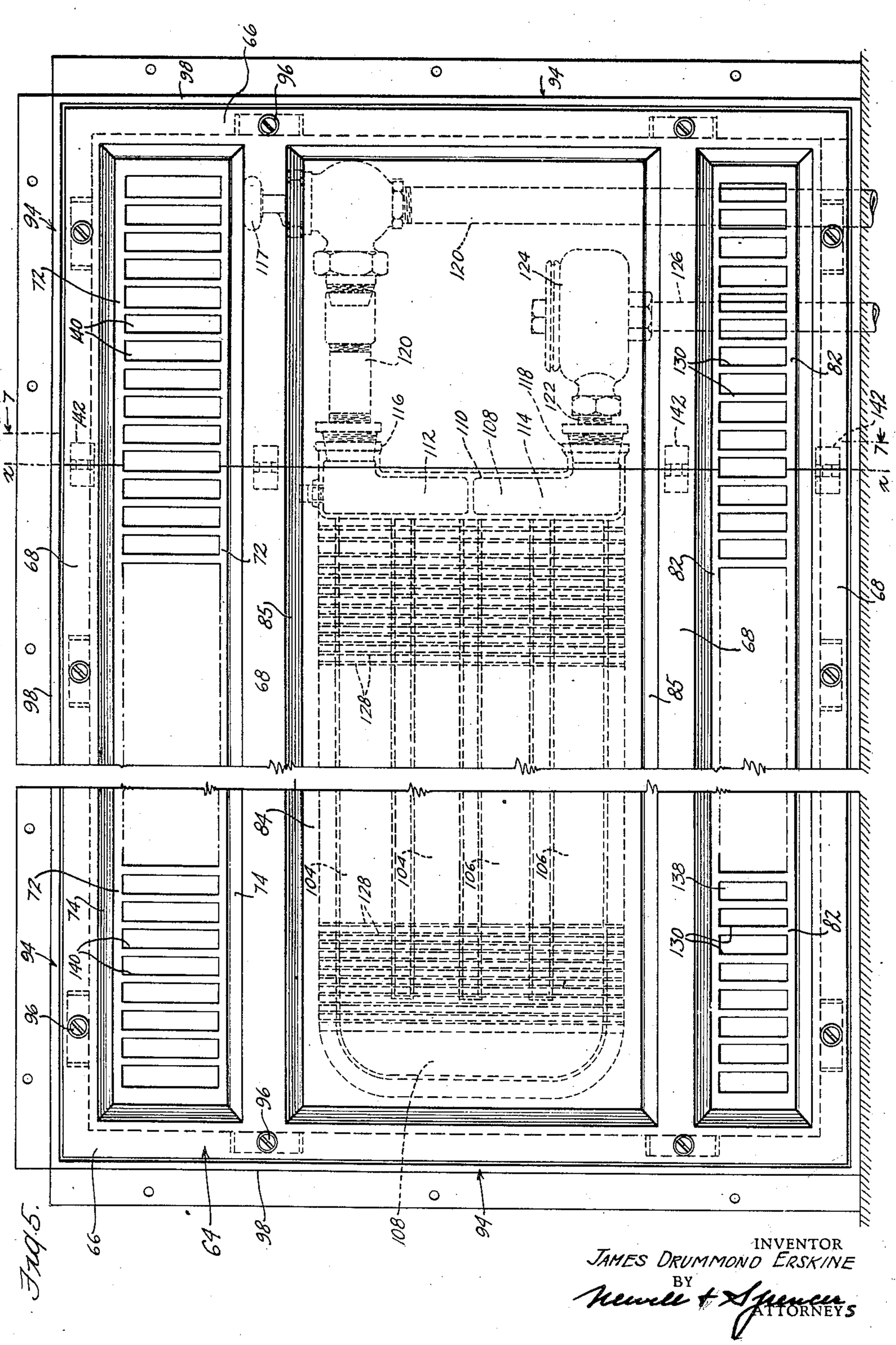

May 9, 1933.

J. D. ERSKINE

RADIATOR CONSTRUCTION

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Fig. 6.

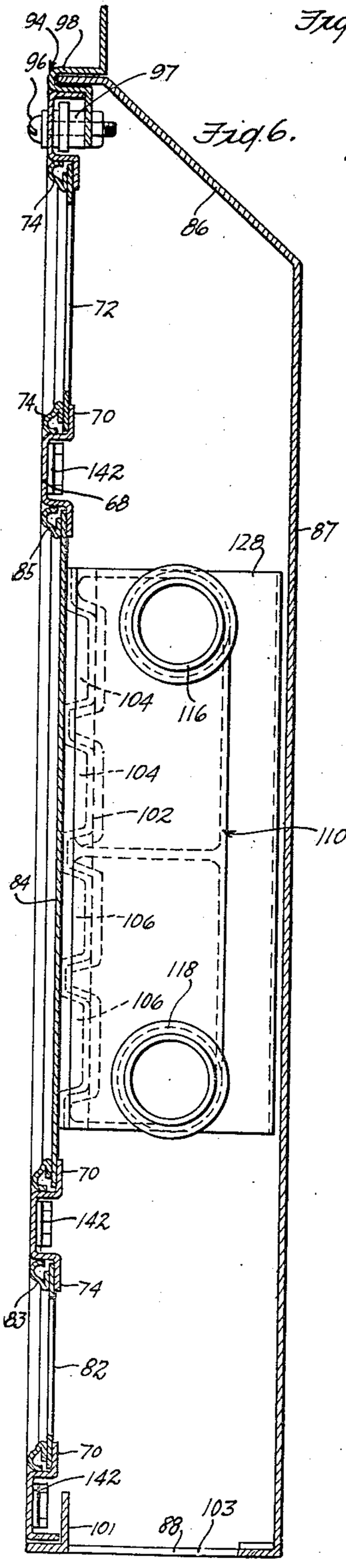


Fig. 7.

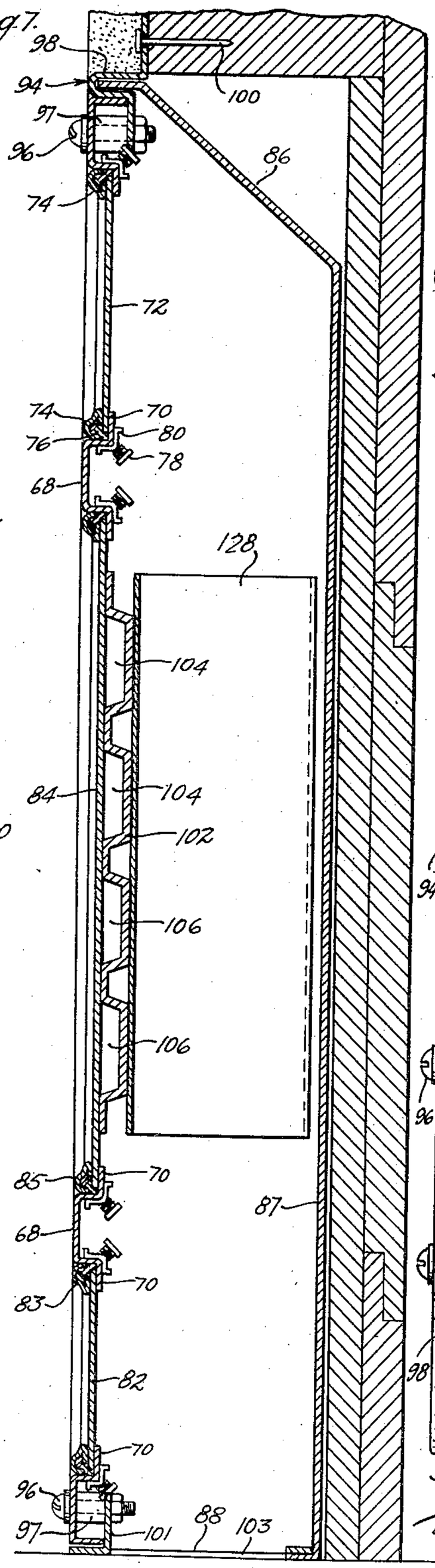
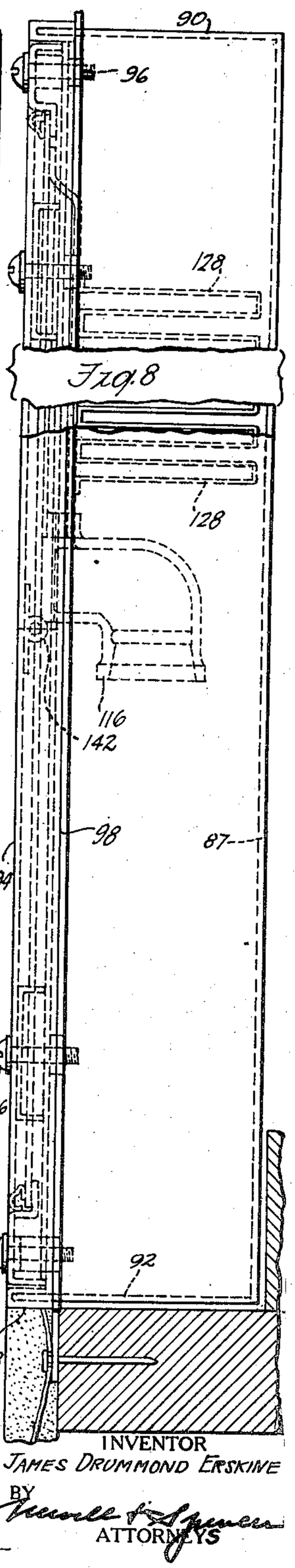


Fig. 8



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Patented May 9, 1933 1,907,527

UNITED STATES PATENT OFFICE

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RADIATOR CONSTRUCTION

Application filed June 16, 1930. Serial No. 461,431.

This invention relates to radiator constructions and more particularly to radiators of the class comprising a casing enclosing or partially enclosing the heating devices and constructed for the circulation of air therethrough.

Certain features of the present invention relate to radiators particularly adapted to be applied or attached to the wall of a room.

Certain features of the invention relate to a radiator construction arranged to be inserted in a recess in a wall of a room and having the front of the radiator constructed to form part of the wall configuration.

Certain features of the invention are particularly adapted to be embodied in a baseboard radiator while other features are of general adaptation to radiators of the class referred to above.

Certain objects of the invention are to improve the construction and mode of operation of radiators of the class referred to above and to produce a radiator of this class which is efficient in operation and in which the parts may be cheaply manufactured and readily assembled.

Another object of the invention is to produce a radiator of the class referred to above which is inconspicuous and blends with the decorative scheme of the room in which it is installed.

With the above and other objects in view, the invention comprises the novel and improved constructions and combinations of parts hereinafter described and particularly pointed out in the claims, the advantages of which will be readily understood and appreciated by those skilled in the art.

The invention will be clearly understood from the accompanying drawings illustrating the invention in its preferred form and the following detailed description of the constructions therein shown.

In the drawings:

Fig. 1 is a view in front elevation illustrating a radiator embodying the invention;

Fig. 2 is a view in end elevation of the radiator;

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a view partly in plan and partly in horizontal section illustrating certain of the parts of the radiator shown in Figs. 1 to 3 inclusive;

Fig. 5 is a view in front elevation illustrating another form of the invention;

Fig. 6 is a view partly in vertical section and partly in end elevation of the radiator illustrated in Fig. 5;

Fig. 7 is a view in vertical section taken substantially on the line 7—7 of Fig. 5;

Fig. 8 is a plan view of the construction shown in Fig. 5; and

Fig. 9 is a detail sectional view illustrating a construction for securing together certain parts of the radiator shown in Figs. 5–8 inclusive.

The radiator shown in Figs. 1 to 4 inclusive is adapted to be embodied in a baseboard construction extending around the lower part of the wall of a room. This construction comprises a casing arranged to be set into a recess in the wall along the base of the wall and devices located within said casing for the flow of a fluid heating medium through the casing.

The casing comprises a front wall, indicated as a whole at 2, an upper wall 4, a rear wall 6, and a lower wall 8. The upper part of the front wall 2 consists of a plate 9 preferably of sheet metal having the form in cross section shown in Figs. 2 and 3 and provided at its upper margin with a downwardly and rearwardly directed flange 10 arranged to overlap, on the outside thereof, a forwardly and upwardly directed flange 12 formed on the upper wall 4. The upper, rear and lower walls of the casing are preferably made of a single section of sheet metal bent into channel shape to form said walls. The said section of sheet metal is shaped to form a wall portion 14 extending upwardly from the forward margin of the lower wall 8 and arranged to overlap upon the inside thereof the lower margin of the plate 9. The lower margin of said plate 9 on the outside thereof is overlapped by the upper margin of a plate 16 located in front of and substantially parallel with the wall portion 14 and projecting downwardly beyond the lower wall 8 of the

casing so as to engage the floor, as shown in Figs. 2 and 3. This plate 16 is secured to the upwardly projecting wall portion 14 by any suitable means.

In order to provide for the circulation of a fluid heating medium through the casing, a plate 18 preferably of sheet metal is attached to the plate 9 and is shaped to provide flow and return passages for the heating medium between said plates. As shown in Figs. 1 and 3, the plate 18 is corrugated or channeled to provide said plate with parallel longitudinal recesses and with a transverse connecting recess and is attached to the plate 9 in the manner shown in this figure to form substantially parallel longitudinal conduits 20 and 22 and a transverse conduit 24 connecting the same for the passage of the fluid heating medium. The plate 18 is preferably welded or brazed to the plate 9 at the points at which it contacts with the latter plate. Attached to the plates 2 and 18, in the manner shown in Figs. 1 and 4, is a member 26 preferably consisting of a suitable casting and having therein conduits 28 and 30 respectively connected with the conduits 20 and 22. As shown in Fig. 4, this member 26 is provided with a flat forward face contacting with the plate 2 and with a projecting portion or portions 32 overlapping the adjacent margin of the plate 18 and is preferably welded or brazed to said plates. The member 26 is provided with tubular projecting portions 34 and 36 to which may be attached pipes for the delivery and return of the fluid heating medium. The fluid medium may be delivered through either of these tubular portions and returned through the other tubular portion. The pipes connected with the tubular portions 34 and 36 of the radiator are preferably provided with valves for controlling the flow of the heating medium, and the pipes and valves are preferably arranged within a casing having substantially the same construction as the casing enclosing the radiator proper and comprising a plate having the same construction as the plate 9 forming the greater part of the front wall of the radiator casing.

In order to increase the heat radiating surface of the heating devices, a series of heat radiating fins 38 are mounted upon the projecting recessed portions of the plate 18 and are arranged to extend rearwardly therefrom in spaced substantially parallel relation, as shown in Fig. 4. These fins are preferably formed from a continuous strip of sheet metal bent to form a series of reverse loops, as shown in Fig. 4. This shaping of the strip forms the fins 38 and portions 40 and 41 at right angles to the fins, connecting the fins. The fins are attached to the plate 18 by welding or brazing the connecting portions 41 to the plate.

The casing is preferably provided with means for inducing a circulation of air through the same. To this end, the lower portion of the front wall formed by the plate 16 and the upwardly projecting portion 14 are provided with a series of openings 42 through which the air from the room enters, as indicated by the arrows in Figs. 2 and 3. Within the lower part of the casing between the rear and lower wall is mounted a curved plate 44 against which the incoming air impinges and by which the air is directed upwardly. The plate 44 may be merely set in position with its forward margin contacting with the lower wall of the casing and with its rear margin contacting with the rear wall, as shown in Figs. 2 and 3, or it may be welded or brazed to the lower and rear walls of the casing, if desired. The plate 2 is provided adjacent its upper margin with a series of openings 46 through which the air passes from the casing. Within the upper part of the casing is mounted a curved plate 48 located between the rear wall and the upper wall of the casing to deflect the air outwardly through the openings 46. The plate 48 is secured to the upper and rear walls of the casing preferably by welding or brazing the same to said walls. In circulating through the casing the air enters through the openings 42, passes upwardly between the heat radiating fins 38 and is discharged from the casing through the openings 46.

Figs. 2 and 3 show the manner in which the casing is mounted so that it projects into a recess 50 formed in the wall of the room. The casing is supported upon the floor by the plate 16 and by a strip 52 preferably made of sheet metal and having reversely bent margins. This strip is attached to the lower wall of the casing preferably by welding or brazing and is arranged to rest on the floor. To the upper part of the casing is attached a strip 54 preferably of sheet metal and bent into the cross-sectional shape illustrated in Figs. 2 and 3. This strip is fitted to the upper and rear walls of the casing, as shown in these figures, and is secured to the casing preferably by brazing or welding. This strip is attached by means of a series of securing devices 56 to a member 58 extending along the upper part of the recess in the wall 59 in the room in which the casing is mounted, the member 58 forming a part of said wall. The strip 54 is provided with an outwardly deflected upper margin extending away from the inner surface of the wall of the room. The angular space between the upper wall of the casing and the strip 54 is covered by a molding 60, the lower margin of which engages a flange 10 on the plate 9. The molding is provided with a downwardly directed marginal portion 62 spaced from the body of the molding and arranged to engage between the upper marginal portion of the strip 54 and the wall, said marginal portion of the

strip engaging in the recess between the marginal portion 62 of the molding and the body of the molding, as clearly shown in Figs. 2 and 3.

Before installation, all of the parts of the above described radiator structure except the front plate 9 with the attached parts and the molding 60 are assembled and secured together to form a unitary structure. In installing a radiator in a room, this structure is applied to the wall with the body of the casing extending into the recess in the wall and with the strip 52 and the plate 16 resting upon the floor. The parts are secured in place at the base by inserting a series of screws 63 through an out-turned foot 65 on the plate 16 and into the floor. The strip 54 is then secured to the wall member 58 by the screws 56. The plate 9, carrying the conduits for the heating fluid and the heat radiating plates 38, is then placed in position with the lower margin of said plate engaging between the upper margins of the plates 16 and 14 and with the flange 10 hooked over and engaging the flange 12 on the upper wall of the casing. The molding 60 is then placed in position with the body of the molding engaging the flange 10 and with the flange 62 on the molding extending back of the upper margin of the strip 54. The front plate 9 with the conduits and heat radiating plates may be removed from the casing merely by first lifting away the molding 60 and then lifting the plate 9 to disengage the flange 10 from the flange 12 and to disengage the lower margin of the plate 9 from between the plates 16 and 14 and then moving the plate laterally to carry the conduits and heat radiating plates out of the interior of the casing.

As above stated, the pipes for conducting the heating fluid to and from the radiator and the valves for controlling the flow of said fluid are preferably mounted in a casing having substantially the same construction as the casing enclosing the conduits and heat radiating plates. These pipes and valves may be exposed for adjustment or repair merely by removing the molding and front plate corresponding to the molding 60 and the front plate 9.

In the construction shown in Figs. 5 to 8 inclusive, the radiator is also constructed and arranged to be mounted in a recess in a wall of the room. This radiator also comprises a casing adapted to be mounted in the recess in the wall and means for conducting a fluid heating medium through the casing. The casing is provided with a front wall comprising a skeleton frame work 64 preferably made of sheet metal formed into the desired shape. This frame work comprises uprights 66 at the ends of the casing and tranverse connecting members 68. Each of the uprights and transverse members of the skeleton frame has a channel shape in cross-section and is provided with laterally extending flanges 70.

Within the enclosing frame formed by the two upper transverse members 68 and the upright members 66 is mounted a central sheet metal plate 72 engaging the flanges 70 on these members of the frame. A molding 74 preferably of sheet metal is applied about the margin of the plate 72, and the molding and plate are secured to the members of the skeleton frame by suitable fastening devices. Fig. 9 shows in detail the construction of the fastening devices which preferably are employed. As shown in Figs. 6, 7 and 9, the molding 74 is provided with a longitudinal slot 75 extending the whole length of the molding strip. The fastening devices each comprise a pin 76 arranged to pass through a slot 77 in one of the members of the skeleton frame and through the slot 75 in the molding. The pin is provided at one end with a head 78 and at its opposite end with an enlargement 79 having one of its dimensions transverse to the pin considerably greater than the other. This enlargement is shaped so that when placed in a position with its greater dimension longitudinally of the slot 75, it may be inserted through the slot and that when the pin is thereafter turned to place the enlargement with its greater dimension transverse to the slot, as shown in Fig. 9, the pin cannot be withdrawn from the slot. Upon the pin is mounted an angular washer 80 arranged to engage the angular portion of the skeleton frame in which the slot 77 is formed, and a coiled spring 81 is mounted on the pin between the washer and the head of the pin. In attaching the molding and plate 72 to the skeleton frame by one of the fastening pins, the pin is passed through the slot 77 in the skeleton frame and through the slot 75 in the molding, and the pin is then turned substantially 90° and released. During the insertion of the pin, the spring 81 is compressed and upon the release of the pin, the spring forces or tends to force the pin outwardly thereby clamping the molding and the plate 72 to the skeleton frame.

A similar panel construction is formed by the two lower transverse members 68 of the skeleton frame, the upright members 66 of said frame, a plate 82 engaging the flanges 70 on said members of the frame, and a molding 83 applied about the margin of the plate 82. The molding and plate are secured to the skeleton frame by fastening devices having the same construction and mode of operation as the fastening devices for securing the molding 74 and plate 72 to said frame.

The front wall of the casing also comprises a central plate 84 mounted in the enclosing frame formed by the inner transverse members 70 and the uprights 66, this plate engaging the flanges 70 on said members of

the frame. A molding 85 is applied about the margin of the plate 84, and the molding and plate are secured to the members of the skeleton frame by fastening devices having the same construction and mode of operation as the fastening devices for securing the molding 74 and the plate 72 to the frame. Thus, the members of the skeleton frame, the plate 84 and the molding 85 form the central panel of the front wall of the casing.

The casing is also provided with an upper wall 86, a rear wall 87, a lower wall 88 and end walls 90 and 92. The upper wall 86 is preferably shaped at an angle to the rear and front walls in order to form an air deflector. The upper, lower, rear and end walls of the casing are preferably formed from a single section of sheet metal bent into the proper shape to form these walls. The front wall of the casing is provided at its upper and side margins with marginal attaching strips 94 having the shape in cross-section clearly shown in Figs. 6, 7 and 8, and attached to the upper transverse member 68 and the upright members 66 of the skeleton frame by bolts 96. Between the members of the skeleton frame and the attaching strips 94 are interposed spacing members 97 through openings in which the bolts 96 are passed. The strips 94 are formed with central U-shaped portions 98 in which are received the forward marginal portions of the upper wall and of the side walls of the casing. The attaching strips may be attached together at their ends, as shown in Fig. 5, or they may constitute separate strips. The attaching strips are adapted to be attached to the wall to hold the casing in place in the recess in the wall by means of securing devices 100 passing through openings in marginal flanges on the attaching strips and extending into the wall. The lower transverse member 68 of the skeleton frame is attached to the lower wall 88 of the casing by means of bolts 96 passing through the skeleton frame, through spacing devices 97 and through a flange 101 turned upwardly from said lower wall. The lower wall of the casing is provided with an opening 103 through which the pipes for conducting the heating fluid to and from a radiator may pass. The lower wall 88 of the casing, as shown in the drawings, engages the floor of the room.

In order to enable the fluid medium to be conducted through the casing, a plate 102 is attached to the plate 84 preferably by welding or brazing and is formed with parallel longitudinal recesses and a transverse recess connecting the same. This plate is attached to the plate 84 in the manner shown in Fig. 7 to form parallel longitudinal conduits 104 and 106 and a transverse conduit 108 connecting the ends of said conduits 104 and 106. To the plate 84 is also attached a member 110 preferably consisting of a casting and having therein a conduit 112 connected with the conduits 104 and a conduit 114 connected with the conduits 106. This member 110 is preferably welded or brazed to the plates 84 and 102. The member 110 is provided with tubular projecting portions 116 and 118 to which may be connected pipes for the circulation of a suitable fluid heating medium. As shown in Fig. 5, the fluid medium is delivered to the conduit 112 of the member 110 and to the conduits 104 through a series of delivery pipes 120 one of which is connected with the tubular projection 116 on the member 110. The flow of the heating fluid through the delivery pipes 120 is controlled by a hand operated valve 117. The fluid heating medium is delivered from the radiator through a delivery pipe 122 connected with the tubular projection 118 on the member 108, and through a valve casing 124 and a pipe 126 connected with said valve casing.

In order to increase the heat radiating surface of the radiator, a series of heat radiating fins 128 are mounted on the projecting recessed portions of the plate 102 in substantially vertical positions and in spaced and substantially parallel relations. These fins have substantially the same construction as the fins 38 of the radiator shown in Figs. 1 to 4 inclusive and are mounted and secured in position in substantially the same manner.

The plate 82 is provided with a series of openings 130 through which air enters the lower portion of the casing. The plate 72 is provided with a series of similar openings 140 through which the air passes from the casing. The air enters the casing through the openings 130, passes upwardly between the fins 128 and is discharged from the casing through the openings 140.

In order to enable access readily to be gained to the valves 117 and 124 and to the pipes for the delivery and return of the fluid heating medium, the front wall of the casing is constructed so that a portion thereof may be opened. To this end the horizontal portions of the skeleton frame and of the moldings 74, 85 and 83 and the plates 72, 84 and 82 are divided along the line x—x, Fig. 5. The portions of the horizontal members of the skeleton frame to the right of the line x—x, Fig. 5, are connected by hinges 142 to the portions of said horizontal members to the left of this line. With this construction, on removing the bolts 96 which connect the section of the front of the casing to the right of the line x—x with the attaching strips, the said section may be swung outwardly about the hinges 142.

Before installation, the skeleton frame, the plates 72, 82 and 84 and the moldings for overlying the margins of these plates are all preferably assembled and secured together, and the attaching strips 98 are also prefer-

ably secured to the members of said frame. The front wall of the casing is then applied to the body thereof comprising the upper, lower, rear and end walls so that the marginal portions of the upper and end walls engage in the recesses in the U-shaped portions of the attaching strip and that the lower transverse member of the skeleton frame engages the flange 101 on the lower wall. The lower transverse member then may be attached to the flange 101 by the bolts 96. The assembled parts are then inserted in the recess in the wall of the room with the outwardly extending flanges on the attaching strips engaging a surface on said wall about the margin of the recess, and the casing is secured in position by inserting the fastening devices 100.

The construction shown in Figs 5 to 9 inclusive also has the advantage that the parts may be readily disassembled. The entire front wall of the casing may be quickly and easily detached from the remainder of the casing by removing the bolts 96. The skeleton frame, the plates 72, 82 and 84 and the moldings 74, 83 and 85 may be readily disassembled by removing the connecting pins 76.

In the constructions shown, the radiator is provided with flow and return pipes for the heating medium for producing definite circulation of the heating medium through the radiator so that all parts of the radiator are heated substantially uniformly. In the construction shown in Figs. 1 to 4 inclusive, the air in the room receives a great deal of heat from the plate 9. A portion of the wall of each of the conduits 20 and 22 is formed by a part of the plate 9 so that the outer surfaces of these parts of each plate constitute, what are termed in the heating art, "prime surfaces". The remainder of the heat from the radiator is transmitted by the heated air contacting with the inside surfaces of those parts of the plate 102, forming portions of the walls of the conduits 20 and 22, which also constitute prime surfaces, and by contact of the air with the heat radiating fins 38, the surfaces of which constitute "secondary surfaces". A similar result is secured in the construction shown in Figs. 5, 6, 7 and 8. In this construction the outer surfaces of the portions of the plate 84 and of those portions of the plate 102 which form parts of the walls of the conduits through which the heating medium is passed constitute "prime heating surfaces" and the surfaces of the fins 128 constitute "secondary heating surfaces".

The principal parts of the radiator constructions shown in the drawings of this application may be stamped from sheet metal. The front of the radiator in each instance forms a part of the wall configuration and is formed so as to present an attractive and ornamental appearance.

The radiator construction shown in Figs. 1 to 4 inclusive may be embodied as a part of a sheet metal baseboard with which modern fire proof buildings are ordinarily provided. The passage ways formed respectively between the plates 16 and 52 and the lower wall of the casing and between the plate 52, the outer surface of the recess 50 and the lower wall of the casing, may be used for reception of electric light wires, telephone wires or other electrical conductors.

In the construction shown in Figs. 5 to 8 inclusive, the front wall of the radiator is formed with a series of panels and presents a particularly attractive appearance.

It is to be understood that the invention is not limited to the particular construction and arrangement of parts of the illustrated embodiments of the invention but that the invention may be embodied in other forms within the scope of the claims.

Having explained the nature and object of the invention, and having specifically described a construction embodying the invention in its preferred form, what is claimed is:

1. A radiator construction comprising a casing having a plate forming a portion of the front wall thereof, a second plate secured to the rear face of said first plate and having a series of channels forming in connection with said first plate connected flow and return conduits for the passage of a fluid heating medium, and heat radiating fin plates secured to the latter plate and having secondary heat transmitting surfaces.

2. A radiator construction comprising, in combination, a casing having a front wall conforming generally to a plane and having openings respectively in the upper and lower portions thereof for the inlet and outlet of air, and a plate secured to the rear face of the front wall and shaped to form in connection with said front wall definite flow and return passages for a fluid heating medium between the upper and lower portions of said wall.

3. A radiator construction comprising a casing arranged to be located in a recess in the wall of a room and having upper and lower walls and a front wall connected to the upper and lower walls at their forward margins, means attached to the portion of said front wall between the upper and lower margins thereof and terminating within said margins for forming, in connection with said front wall, one or more definite passages for a fluid heating medium, heated and delivered to the radiator from an outside source, means connected with one of said passages for delivering the heating medium thereto and fin plates extending rearwardly from the walls of said passages within the casing, said front wall of the casing having openings above and

below said passages for the circulation of air through the casing.

4. A radiator construction comprising, in combination, a casing having sheet metal front, rear, upper and lower walls connected together, a sheet metal plate attached to the front wall and forming in connection therewith conduits for the passage of a fluid medium, and sheet metal fin plates attached to the latter plate and extending transversely of said conduits.

5. A radiator construction comprising a casing having sheet metal front, upper, lower and rear walls, sheet metal means attached to the front wall to form one or more conduits for the circulation of a fluid medium heated and delivered from an outside source, means connected with one of said conduits for delivering the heating medium thereto and sheet metal fin plates attached to said conduit forming means.

6. A radiator construction comprising a casing having a front wall, conduits carried by said front wall between the upper and lower margins thereof for the circulation of a fluid medium heated and delivered from an outside source, means connected with one of said conduits for delivering the heating medium thereto, the front wall of the casing having openings above and below the conduits for the entrance and delivery of air.

7. In a radiator construction, a sheet metal plate conforming generally to a plane, a second sheet metal plate having one or more channels and margins contacting with and secured to said first plate to form, in connection with said front plate, one or more definite conduits for the passage of a fluid heating medium, and means engaging the margin of said first plate for supporting the same.

8. A radiator construction comprising, in combination, one or more conduits for the passage of a heating fluid, pipes connected with said conduits and one or more valves for controlling the flow of the heating fluid, a casing enclosing said conduits, pipes and valves, said casing having a portion of one wall thereof movable to permit access to the interior of the casing.

9. In a radiator construction, a casing comprising a sheet metal front plate, conduits carried by said front plate between the upper and lower margins thereof for the circulation of steam, water or similar fluid medium, said margins extending above and below said conduits, fin plates carried by said front plate within the casing and having heat exchange connections with said conduits, and means engaging the upper and lower margins of said front plate for holding the same in position to form a portion of the front wall of the casing.

10. A radiator comprising, in combination, a casing having a removable front wall, one or more conduits carried by said front wall for the circulation of steam, water or similar fluid medium, fin plates carried by said front wall within the casing and having heat exchange connections with said conduits, and means connected with one of said conduits for delivering the heating medium thereto.

Signed at New York, N. Y., this 2nd day of June 1930.

JAMES DRUMMOND ERSKINE.