W. M. FULTON.

RADIATOR CASING.

APPLICATION FILED APR. 20, 1914.

1,176,536.

Patented Mar. 21, 1916.

3 SHEETS-SHEET 1.

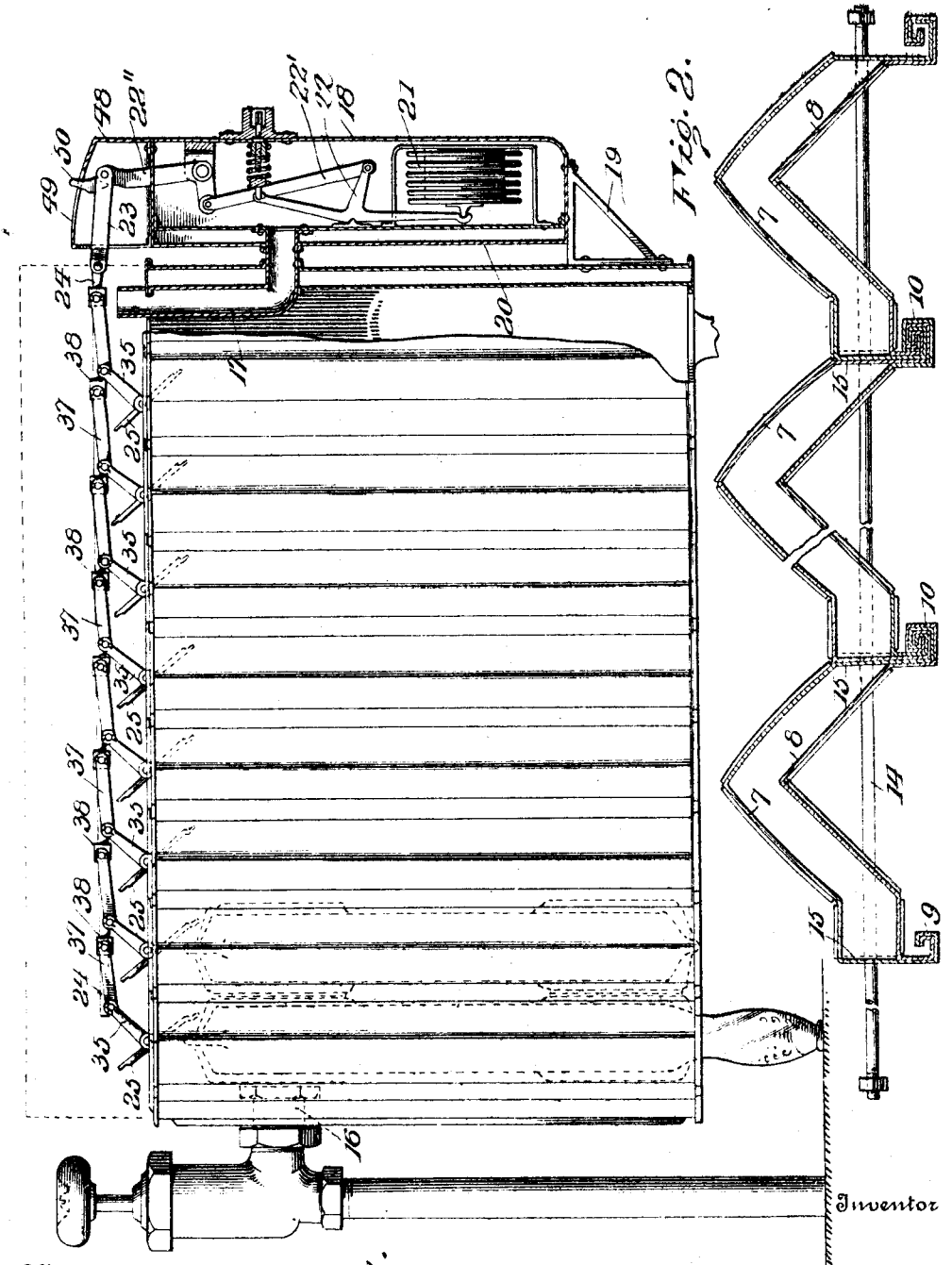


Fig. 1.

Fig. 2.

Witnesses
L. B. Wegenast
Jas. H. Anderson.

Inventor
Weston M. Fulton,
By Mauro, Cameron, Lewis & Kessler
Attorneys

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

W. M. FULTON.

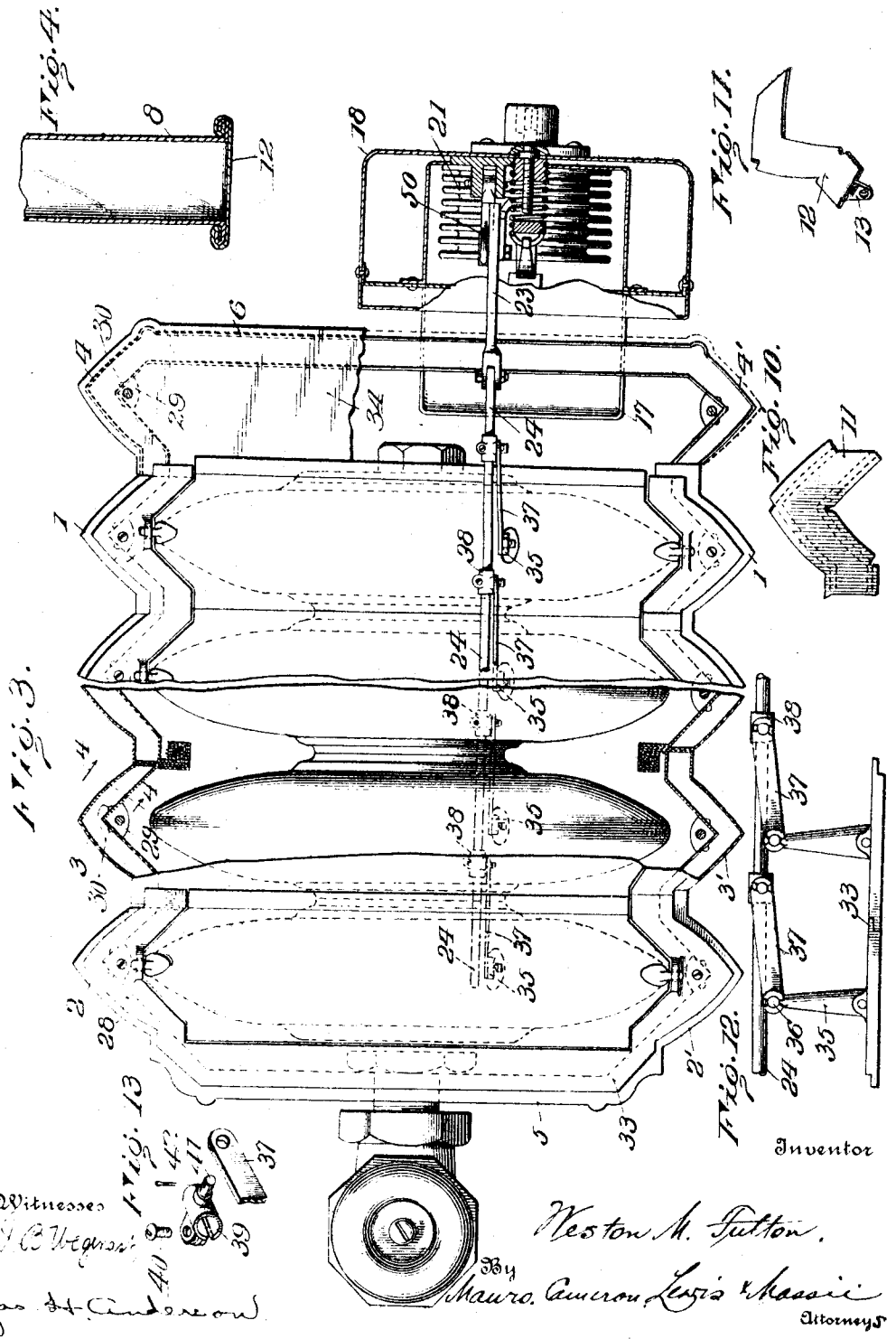
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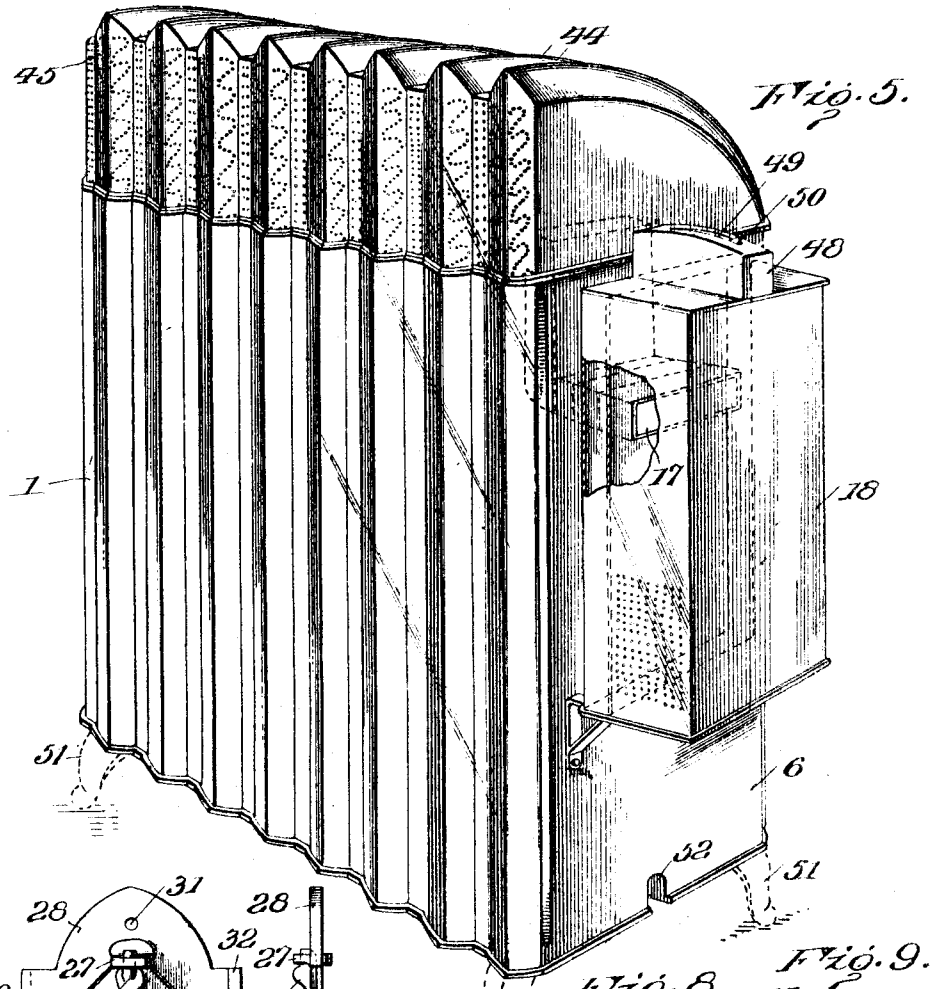


Fig. 5.

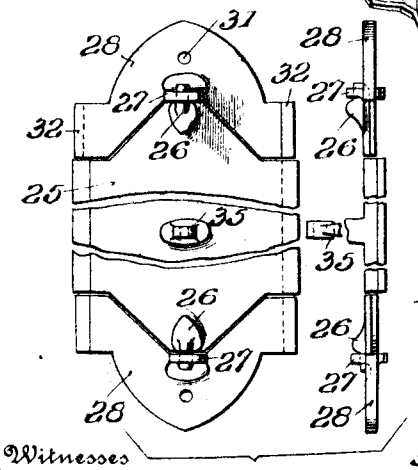


Fig. 6.

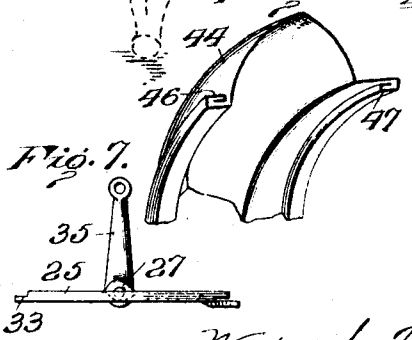


Fig. 8.

Fig. 7.

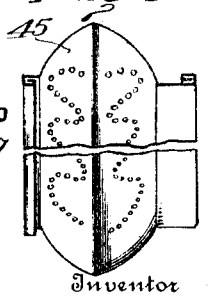


Fig. 9.

Witnesses

L. B. Wegenast

Jas. H. Anderson

Inventor

Weston M. Fulton.

By Mauro, Cameron, Lewis & Massie

Attorneys

UNITED STATES PATENT OFFICE.

WESTON M. FULTON, OF KNOXVILLE, TENNESSEE, ASSIGNOR TO THE FULTON COMPANY, OF KNOXVILLE, TENNESSEE, A CORPORATION OF MAINE.

RADIATOR-CASING.

1,176,536. Specification of Letters Patent. Patented Mar. 21, 1916.

Application filed April 20, 1914. Serial No. 833,238.

To all whom it may concern:

Be it known that I, WESTON M. FULTON, a citizen of the United States of America, and a resident of Knoxville, Tennessee, have invented a new and useful Improvement in Radiator-Casings, which invention is fully set forth in the following specification.

This invention relates to radiator jackets or casings, and more particularly to jackets or casings of this class having heat lagged walls and which are provided with automatically controlled dampers.

Radiator casings of the kind above referred to, as heretofore made, lack adaptability to fit radiators having the same sized sections but differing in the number of sections. This has been a serious limitation to their use. The cost of fitting casings to such radiators often prohibits their installation and, when a casing is selected large enough to fit the longest radiator in a building, its use on smaller sizes of radiators presents an unsightly appearance and occupies space in the room needed for other purposes.

My invention overcomes the above objections by providing a radiator casing adapted to be assembled by addition of unit sections to fit any length of radiator.

The sections may be made any size or configuration to fit any form of radiator. Each section or unit preferably is made to conform to that of the radiator section to be housed and the units may be, and preferably are, made in standard sizes corresponding to the standard sized radiator sections now on the market. Jackets of different lengths or sizes may thus be assembled from a stock of standardized units to fit any radiator and, if desired, the units in their knocked down form may be shipped to the place of use and there assembled. The casing sections are preferably made of sheet metal, such as sheet iron or zinc, the walls of which are double with an air space between them adapted to retard the transfer of heat across the casing wall. Each section is provided with means, such as interlocking seams, for readily securing it to its neighbor. To give a certain degree of longitudinal adjustability to the casing to compensate for differences in thickness of radiator sections, I provide connections between the sections and parts carried thereby which permit of slight play between the sections. For this purpose I preferably use lapped joint seams and tie the sections together by a tie rod provided with adjusting nuts at their ends.

With a view of utilizing the radiant heat given out by the radiator inclosed in the casing, I preferably coat the inside of the casing walls facing the radiator with a good heat-absorbing material. Of the several materials known to possess this quality, I prefer to use lamp-black because of its cheapness and efficiency, though I do not care to be limited to lamp-black, but may use any suitable material for this purpose.

I also provide the casing with a sectional hood preferably opening toward one side of the radiator casing and adapted to be built up by addition of units corresponding to the units of the casing and to fit the top of the casing and house the damper-operating means. The hood sections are preferably made with a single wall instead of with double walls, since they are not called upon to perform all the functions of the casing walls.

The unit principle of construction is also applied to the arrangement of the dampers which I generally locate at the top of the casing. Each casing section which includes the two opposite walls between which is located one or more radiator sections is provided with its individual damper. This damper is arranged to make overlapping joints with the dampers of the adjoining sections to enable proper closure of the opening, thus giving play to the joints under contraction and expansion of the sections due to variations of temperature.

The dampers are connected through an operating rod and may be manipulated by hand or by automatic means, such as by a thermostat housed in a casing, so as to secure a more complete heat insulation of the thermostat from the radiator as will be later explained.

In order that the invention may be more readily understood, reference is had to the accompanying drawings which show by way of example one mechanical expression of the invention, but such drawings are designed merely as illustrations to assist the description and not as defining the limits of the invention.

In the drawings:—Figure 1 is an elevational view, partly in broken section and with certain parts removed, showing a sectional radiator casing embodying my im-

provements; Fig. 2 is a sectional view showing a portion of the double wall of the casing; Fig. 3 is a plan view of the casing with the hood removed and parts broken away exposing to view the radiator sections and the damper construction; Fig. 4 is a broken sectional view of the wall taken on line 4—4 of Fig. 3; Fig. 5 is a perspective view of the casing hood and the housing for the thermostat; Figs. 6 and 7 are detail views of the damper construction; Figs. 8 and 9 are detail views showing the manner of connecting the hood sections; Figs. 10 and 11 are broken detail views of the closures for the top and bottom of the double wall of a section; Fig. 12 is a detail elevational view of a damper with its adjustable operating means; and Fig. 13 is a detail perspective view of the adjustable clamping means.

Referring to the drawings, 1 designates the body portion of the radiator casing comprising a plurality of built-up chambered sections 2, 2′, 3, 3′, 4, 4′ (Fig. 3), constituting the side walls, and sections 5 and 6 constituting the end walls. The chambered walls are preferably made of sheet metal. Each section is formed in two pieces stamped in suitable shape to form, when assembled, a hollow chamber having an outer wall 7 and an inner wall 8 (Fig. 2). The vertical meeting edges of the sheets are curled or otherwise shaped so as to form interlocking joint members 9, 10 which permit the sections to be united by slipping the interlocking edges one within the other. To strengthen the meeting edges, rivets may be used, provided they are so located that the heads of the rivets do not interfere with the sliding action in joining the sections. The top of each chamber section is provided with a closure 11, Fig. 10, and consists of a strip of sheet metal which is cut to the shape of the top opening of the chamber to be fitted and is slightly larger than the opening to enable the edges of the closure or cap to be crimped or otherwise secured to the corresponding edges of the walls. The bottom of the chamber is also provided with a closure 12 which may be in all respects like that described above. To the bottom closure I preferably secure or form thereon a tab 13 which extends downwardly and has an opening to receive a tie rod 14, as indicated in Fig. 2. This tie rod adds rigidity to the casing wall and enables a certain amount of adjustment of the length of the casing.

The unit sections may take on various forms or shapes, but I prefer to give them the general outline shown, wherein each pair of oppositely disposed unit sections generally conforms to and incloses a section of the radiator. The several units, when assembled, constitute a wall having a plurality of dead air spaces, or the several spaces may communicate with each other through openings in the narrow walls 15. I prefer, however, the form shown with separate chambers.

The end sections 5, 6 of the sectional casing comprise, as stated above, two unit sections 2, 2′ and 4, 4′ united by chambered sections 5, 6, respectively. The two end sections may be made one with the side sections, or the end sections 5, 6 may be made separately and be joined to their side members by curled slip joints, as explained above. For the purpose of making connection between a riser of the supply pipe, as in Fig. 1, and the radiator within the casing, an opening may be made in the wall 5 and a nipple 16 inserted to receive the connection. The opposite end wall is similar in construction to the wall 5, except that, in the event a thermosensitive device is used such as shown and described in my U. S. Patent No. 998,767, a draft flue 17 is introduced through the wall 6 and communicates with a housing 18, preferably supported by a bracket 19 on the wall 6. The housing wall on the side next the radiator casing has a chambered wall 20 which is set away from wall 6 to leave an air space between the two, the purpose of which is to reduce interchange of heat between the radiator casing and the housing 18 which contains a thermostat 21 having operating connections through a system of levers 22, 22′, 22″ and link 23 with a damper-operating rod 24. As indicated in Fig. 5, the housing preferably on one wall is perforated to permit the air from the room to pass into the casing and circulate around the thermostat and then pass out through flue 17, as explained in my above-named patent. The dead air space in wall 20 and the space between the housing 18 and the radiator casing effectively protects the thermostat from influence of heat from the radiator and enables the thermostat to respond to the condition of the temperature in the room, thereby eliminating the disturbing effect of the radiator.

In order that sectional casings built up of varying numbers of sections may each be provided with means for regulating the flow of air, I provide a special arrangement of dampers which are assembled by addition of units to fit any length of sectional casing. Each section of the casing is provided with its individual damper and damper supports. A description of one will suffice for all. Referring to Figs. 3, 6 and 7, 25 is a damper provided with trunnions 26 which are supported in bearings 27 formed on plates 28. Each plate 28 which is of the general outline of the top of a unit section rests on the top of the section and is secured thereto by means of an angular casting 29 made fast to the inner wall of the section by a rivet 30 or like means. In this casting is tapped a threaded opening which is adapted to regis-

ter with a hole 31 in damper-supporting plate 28 and a screw is introduced to fasten the parts together. The right and left-hand edges of plates 28 are provided with lips or projections 32 which make lapped joints with neighboring plates on each side and thereby form joints which permit more or less expansion and contraction between the plates, without opening the joints. The dampers 25 also are adapted to break joints with each other and for this purpose present at their meeting edges overlapping portions as indicated at 33 in Figs. 7 and 12. This construction permits considerable lengthwise adjustment of the dampers without opening the joints between them and provides for adjustment for small irregularities in the size of the radiator sections.

The end damper-supporting plate 28 which is located at one end of the radiator casing, the left-hand end as shown in Fig. 3, is preferably made integral with the top plate 33 which rests on the top of the end wall 5. At the opposite end of the radiator casing the top of the end section is closed by a plain plate 34 through which the draft flue 17 passes.

For the purpose of operating the dampers, each damper plate is provided with an arm 35 located in the line of the turning axis of the damper. This arm may be cast integral with the damper plate or otherwise made fast thereto. To the end of each arm 35 is pivoted one end of a link 37 having, by preference, an adjustable connection 38 which may be of any suitable form, such as shown in Fig. 13, wherein the connection consists of a split sleeve 39 for slipping over the damper rod 24 and is provided on one side with jaws adapted to be clamped down on the rod by means of a clamp-screw 40. The opposite side of the sleeve has a stud 41 for receiving the end of link 37. A cotter-pin 42 engages the stud to hold the link in place.

I preferably provide the sectional casing with a hood and to enable the hood to fit casings of different lengths. I make it in sections. By addition of such units, the hood may be made of any desired length corresponding to the casing which it is to fit. In Figs. 5 and 9, I have shown a hood of this character consisting of a plurality of curved sections or units 44 of single thickness of sheet metal and a plurality of vertical sections 45 corresponding in number and width with the curved sections. These sections may be united in various ways, but the manner I prefer is to crimp the edges of each piece in such manner that the crimped edge of one piece may be slipped into the crimp on the companion piece to lock the pieces together. In Fig. 8 is shown a curved section having its left-hand edge provided with a crimp 46 to receive the right-hand edge of its left-hand neighbor which is provided with an extended edge terminating in a crimped portion like that at 47 on section 44. The upright sections 45 are similarly provided with crimped edges, Fig. 9, and are united to each other in a like manner. Where the upper ends of the upright sections 45 meet the front ends of curved sections 44, the ends are cut at an angle of 45° and the edges united by the well-known method of curling.

The front face of the hood is perforated to permit the discharge of heated air toward the front of the radiator and away from the wall of the room where the radiator is usually located. The purpose of the hood being to deflect the heated air and house the dampers and their operating means, double walls are unnecessary.

With a view of enabling the position of the concealed dampers, whether opened or closed, to be known at any time, I have provided damper position-indicating means. On the top of the housing 18 for the thermostat, I have located a small hood 48 having in its top wall a slot 49 through which projects an indicating-hand 50 which is an extension of the upper arm of the bell-crank lever 22 which is connected with the damper-operating rod 24. In appropriate positions on the wall of the casing, the words "Open" and "Closed" may be placed, thereby giving a correct indication of the open and closed positions of the dampers when the hand 50 is opposite these designations.

To give free access of air to the bottom of the casing, legs 51 are provided for raising the casing off the floor, although the casing may rest on the floor and suitable openings in the walls provided, through which air may have access to the interior.

52 is a slotted opening in the end wall for receiving a pipe connection to the radiator.

I preferably coat the inner walls of the casing with a material capable of absorbing radiant heat to facilitate the radiator in its function of heating and for this purpose I may, and preferably do, use lamp-black mixed in a suitable oil, such as linseed oil, and with or without the addition of a gum dissolved in a volatile solvent. The composition is applied with a brush and allowed to dry to a dead finish.

The assembling and operation of the device will be readily understood from the preceding description. Having decided on the number of casing sections required for a given radiator, the sections may be assembled at the factory or may be shipped in knocked down condition to the place of use. In general, the assembling may be as follows:—The walls of the casing are set up around the radiator by slipping the crimped edge of one unit section into the edge of its companion, as explained. The angle castings 29 are secured in place and plates 28

with their dampers are fastened to the top walls by screws passing through the plates and entering threaded openings in the castings 29. The damper rod 24 is inserted through the adjustable damper connections 38 and the connections are clamped in proper position by screws 40, and the links 37 secured to the damper arms 35 and their connecting members 38. The damper rod is now connected to the position indicating hand 50 through link 23. The rods 14 are slipped through the openings in tabs 13 which depend from the bottom closures 12 and held in place by nuts in the ends of the rods. The sections of the hood are coupled together as explained and placed in position over the casing and may merely rest thereon or made fast thereto. In cases where the radiator is connected to a riser, the end wall of the casing will be provided with an opening to receive such connection. Any slight irregularity in the thickness of the radiator sections can be compensated for in assembling the sections by adjusting the nuts on the tie rods which will act on the yielding joints between the sections. The peculiar arrangement of the damper-supporting plates and their dampers permits of the necessary adjustment in the length of the casing to meet any ordinary variation due to irregularities of the radiator sections and permit of expansion and contraction in the casing walls. The parts having been assembled and secured together in position over the radiator and the thermostat properly adjusted to maintain the desired temperature, air heated by the radiator sections ascends through the casing past the dampers and is discharged through the perforated walls of the hood. Owing to the dead air spaces in the walls of the casing, little heat from the radiator passes through the walls of the casing. The inner walls of the casing are therefore maintained at an elevated temperature and thereby become more efficient as sources of heat for raising the temperature of the air passing through the casing. This efficiency is further increased by the provision of the heat absorbing coating which is used on the inner walls of the casing. The heat radiated from the surfaces of the radiator sections, in the form of so-called dark heat rays, passes through the air without appreciable effect, but on reaching the blackened surface causes a rise of temperature in the surface which then becomes a source of heat for the air passing over its surface. In this manner, the casing becomes an effective means for heating the air and effects an economy in heating.

The thermostat in the present arrangement has been made entirely dependent on room temperature, because of the effective shielding of its casing from radiation from the radiator by the interposition of a wall containing a dead air space and the location of this wall so as to form an air circulating space between the two casings.

What is claimed is:—

1. In combination, a damper-controlled radiator casing having a chambered end wall, a housing provided with a damper operating thermostat and having a flue delivering through said casing, the side wall of the housing opposite said end wall being chambered and forming with the latter an air circulating space for insulating the housing from the casing.

2. In combination with a radiator casing provided with dampers and a thermosensitive device for operating said dampers, a casing for said thermostat having a flue connection with said casing, and a chambered wall facing a wall of the casing and separated therefrom by an air space to prevent interchange of heat between the radiator casing and the thermostat.

3. A radiator casing comprising a plurality of sections yieldingly secured together, a closure therefor comprising a plurality of dampers, and damper supporting plates, the edges of said dampers and plates having overlapping edges to permit longitudinal adjustment of the casing without breaking joints, and thermostatic means for operating said dampers.

4. In combination with a radiator casing provided with dampers and a thermosensitive device for operating said dampers, a casing for said thermostat having a chambered wall facing the wall of said casing and separated therefrom by an air space thereby preventing heat interchange between said casing and the thermostat.

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

WESTON M. FULTON.

Witnesses:
H. T. PATTON,
J. V. GIESLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."