No. 838,966. PATENTED DEC. 18, 1906.

S. DREW.

RADIATOR.

APPLICATION FILED DEC. 29, 1905.

FIGURE 1.

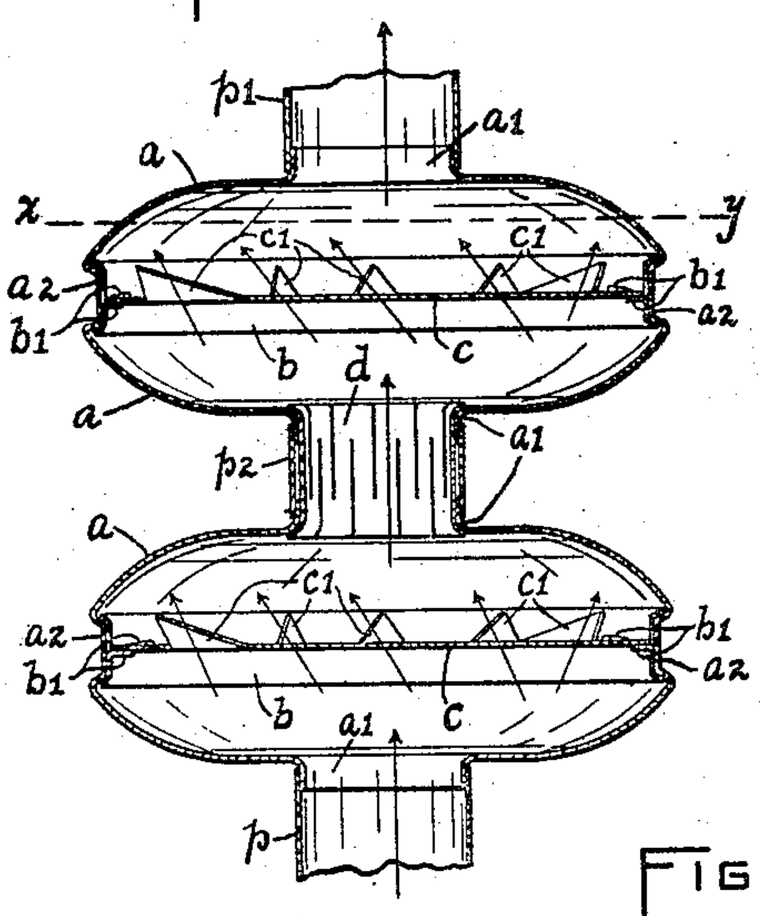


FIG. 2.

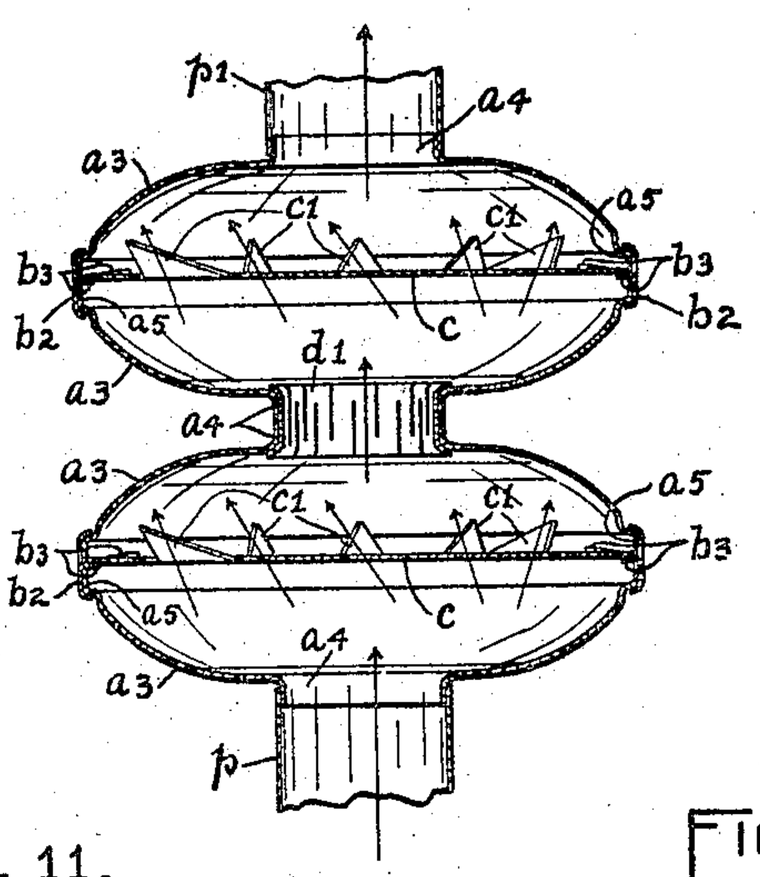


FIG. 11.

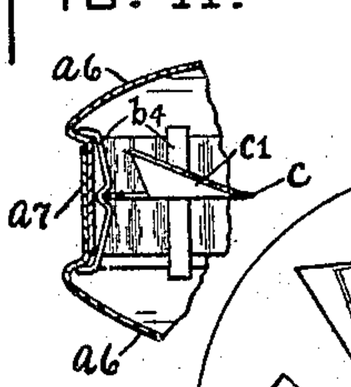


FIG. 3

FIG. 9.

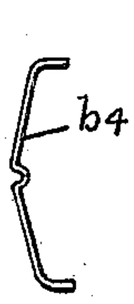


FIG. 4.

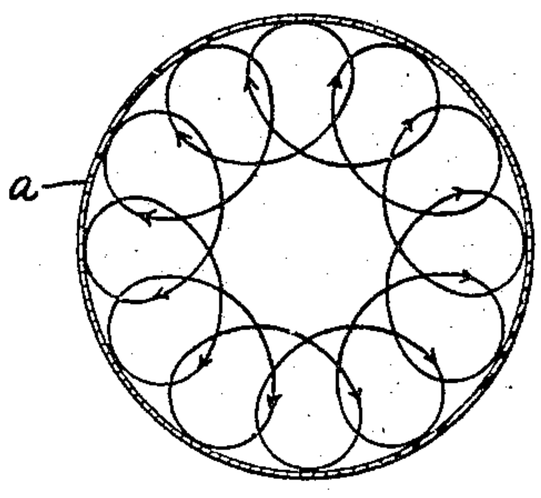


FIG. 10.

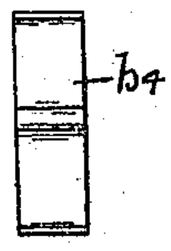


FIG. 5.

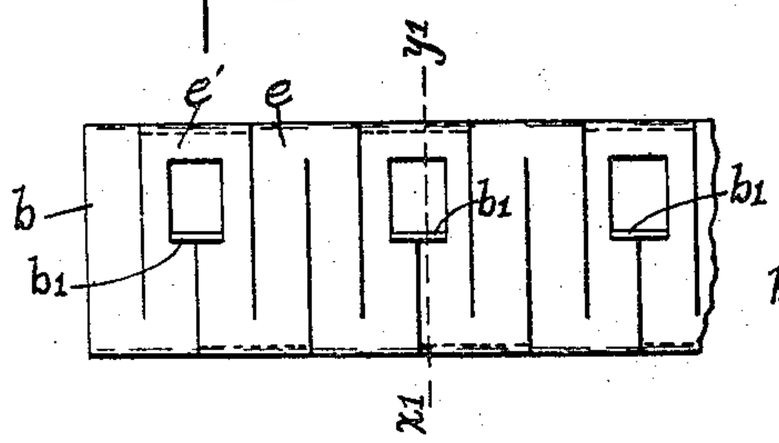


FIG. 6.

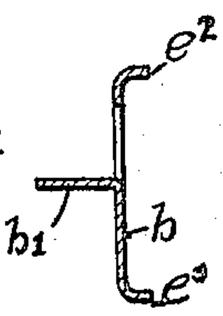


FIG. 7.

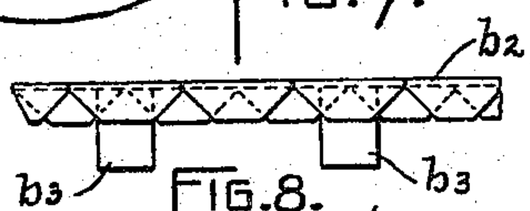
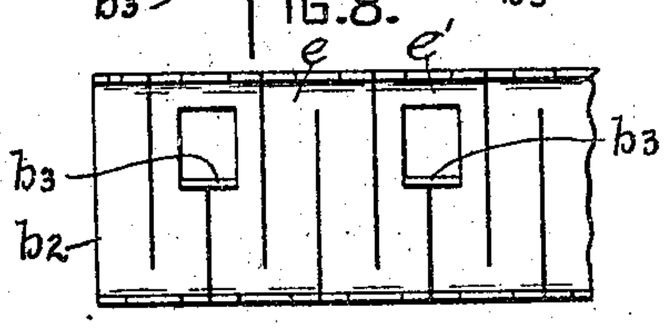


FIG. 8.



WITNESSES:

Albert C. Bell

Clara M. Sinnet

INVENTOR:

Samuel Drew

By Wm. H. Cooley.

ATTY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

SAMUEL DREW, OF ROCHESTER, NEW YORK.

RADIATOR.

No. 838,966. Specification of Letters Patent. Patented Dec. 18, 1906.

Application filed December 29, 1905. Serial No. 293,725.

To all whom it may concern:

Be it known that I, SAMUEL DREW, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented an Improvement in Radiators, of which the following is a specification.

My invention consists, essentially, in a radiator composed of one or more connected drums for use in pipes through which heated gases pass, such as the smoke-pipes of furnaces, stoves, &c., for the purpose of heating the air surrounding such drums.

The object of my invention is to so construct the heating-drums and parts connected therewith as to more completely bring all the gases into contact with the walls thereof than has been done heretofore, and thus to more completely radiate or transfer the heat of such gases to the air surrounding such radiator.

Another object of my invention is to so construct the heating-drums that the wall of each will consist of but two elements or pieces of metal similarly formed by the same dies and drawn from flat blanks without folding or seaming.

A still further object of my invention consists in providing an elastic means for holding the parts of such heating-drums together and at the same time holding firmly in proper position the means used for directing the gases as they pass through such heating-drums.

The several drawings illustrating my invention are as follows:

Figures 1 and 2 show in vertical sectional view two different modifications of my radiator, taken along the center lines thereof. Fig. 3 shows in top view one of the diaphragms used to direct the heated gases as they pass through the heating-drums of the radiator. Fig. 4 is a sectional view taken along the dotted line $x\ y$ of Fig. 1 and shows diagrammatically the path of the gases in the upper part of each heating-drum as caused by the directing-diaphragms. Fig. 5 shows in detail the construction of the means used to hold together the elements composing each heating-drum for the modification shown in Fig. 1; and Fig. 6 is a sectional view thereof, taken along the dotted line $x'\ y'$ of Fig. 5. Figs. 7 and 8 are top and face views of the means used to hold together the elements of the heating-drums shown in Fig. 2. Figs. 9 and 10 are edge and face views of still another form of device used to hold the elements of the heating-drum together and also support the diaphragm for the modified form of heating-drum partially shown in vertical central sectional view in Fig. 11.

Similar letters refer to similar parts throughout the several views.

Referring to Figs. 1, 3, 4, 5, and 6, each heating-drum consists of two similar sections or elements a, so drawn by suitable dies from flat sheets of metal that each element or section is dished somewhat and has formed at its smaller end a flange a' and at its larger end a flange a^2. The flange a^2 is of somewhat smaller diameter than the maximum diameter of the element a and has formed between it and the body of such element a a shoulder adapted to be engaged by the strip b. (Indicated in Figs. 5 and 6.) This strip b is cut transversely, as shown in Fig. 5, to form a series of alternating and oppositely-extending spring-sections e and e', having flanges e^2 and e^3, respectively, bent at right angles to the plane of such sections at their free ends, such flanges adapted to engage the shoulders formed at the inner ends of the flanges a^2 when the elements a are properly assembled, as indicated in Fig. 1. The letters of reference are omitted from the spring-sections e and e' and the flanges e^2 and e^3, respectively, thereon, except in the enlarged views shown in Figs. 5, 6, and 7, to avoid the confusion resulting from the multiplicity of such letters and leading lines thereto in other figures.

At regular intervals along the middle of the strip b and in a direction opposite to that of the flanges formed on the spring-sections a series of tongues b' are pressed from and at right angles to the strip b for engaging and supporting in proper position the directing-diaphragm c. This diaphragm c has pressed from the plane thereof a number of vanes c', proportioned and arranged to direct obliquely upward and outward against the wall of the section a the gases passing through the openings made in such diaphragm by forming such vanes therefrom, which results in imparting a rotary motion to such gases and at the same time producing therein, in practically horizontal planes, eddy-currents, as indicated diagrammatically in Fig. 4. This results in bringing more thoroughly into contact with the wall of the heating-drum the gas that is passing through the same, and thus imparting to the wall of the drum, and

therefore radiating into the air outside of the drum, the maximum amount of heat.

In assembling one of the heating-drums the strip b, just long enough to encircle the diaphragm c, is bent around such diaphragm, with every other one of the tongues b' below and the intermediate tongues b' above such diaphragm, and then the strip b is pressed into engagement with the flange a^2 on the lower section a of the heating-drum and is held in proper position in such flange by the curved wall of the lower section a. Then the upper section a is pressed down against the flanges formed on the upper spring-sections, and the flange a^2 of such upper section a forces these upwardly-extending spring-sections inward until the flanges a^2 contact with each other, in which position the flanges on the spring-sections engage the shoulders formed on the inner ends of the flanges a^2, and thus the strip b constitutes a means for holding the elements a and the diaphragm c in proper position, and it also forms a practically continuous connecting-pipe inside the flanges a^2.

As shown in Fig. 1, the lower heating-drum is connected with a supply-pipe p, by means of which the heated gases are communicated to the same, and the two heating-drums shown are connected by an intermediate pipe p^2 and are held together by the spring-strip d, formed in a manner similar to the strip b, excepting that central tongues are not formed in such strip d. The upper heating-drum is supplied with a suitable outlet-pipe p' for conducting away the gases after passing through the several heating-drums.

In the modification shown in Fig. 2 the heating-drum consists of similar elements or sections a^3, formed in a manner similar to the sections a, excepting that the shoulders on the flanges at the larger ends of these sections are outside instead of inside the drums. In this case the flanges a^5 at the larger ends of the sections a^3 are engaged by a strip b^2, formed in a manner similar to the strip b, excepting that the flanges on the spring-sections are turned in the same direction as the tongues b^3, formed along the middle portion of such strip, and that such flanges are formed on both ends of such spring-sections. In this modification the strip b^2 must be taken of a length to encircle the flanges a^5, and the ends of such strip are secured together in any suitable way, as by riveting. The strip b^2 has sufficient elasticity to permit the diaphragm c to be inserted with the tongues b^3 in proper supporting position after the ends of such strip b^2 have been secured together, and then such strip is sprung around the flanges a^5 in a manner similar to that described in reference to Fig. 1.

In the modification shown in Fig. 2 the heating-drums are connected to suitable supply and outlet pipes, as before; but in this modification the smaller ends of the two heating-drums are shown as coming directly together without an intermediate connecting-pipe and are shown as held in such position by the spring-strip d', similar to the strip d, but of such length as to properly engage the flanges a^4.

In the modification shown in Fig. 11 the sections a^6 of the heating-drum have flanges a^7 formed at their larger ends in a manner similar to the flanges a^2 of the section a, with this exception, that after being formed such flanges are slightly crimped to permit one flange to be forced inside the other in assembling the sections, as indicated. The sections a^6 are held in this position by a series of spring-clips b^4, formed, as indicated in Figs. 9 and 10, with central transverse channels for holding the diaphragms c and flanges bent on the ends for engaging the shoulders of the flanges a^7. The parts of the sections a^6 not shown in Fig. 11 are similar to those already described, and reference to such parts is therefore unnecessary. In assembling the parts shown in Fig. 11 the diaphragm c is first placed in one of the sections a^6, the other section a^6 is then placed in proper position by telescoping the flanges a^7 of such sections, and the clips b^4 are inserted in proper position through the smaller end of the second section a^6, and then the diaphragm c is pressed forcibly into engagement with such clips until it properly engages the channels formed in the middle portions thereof.

The direction of the gases as they pass through the several pipes and directing-diaphragms is indicated in the drawings by arrows, and it will be understood that the diaphragm c is nearly or quite as large in diameter as the inside of the strip b, as shown in Fig. 1, or the inside of the flange a^5, as shown in Fig. 2, or the inside of the flange a^7, as shown in Fig. 11, and that the most of the heated gases must necessarily pass through the openings in such diaphragms and be directed by the vanes c' against the walls of the heating-drums in the manner already described. This operation is the same in all of the modifications, and the parts are so proportioned that the eddy-currents produced in the gases in the upper part of each heating-drum will sufficiently retard the progress of the gases through the drums to permit the heat to be imparted to the walls of the drums both above and below the diaphragm c, and yet that the resistance to the passage of the gases therethrough offered by the heating drum or drums used will not be so great as to seriously interfere with the draft.

The number of heating-drums used will of course depend upon the draft and can be adjusted for any particular set of conditions until the maximum amount of heat is given out by the radiator for the permissible diminution in draft.

The operation of my device is believed to be sufficiently obvious from the above description to call for no further explanation.

What I claim is—

1. In a heating-drum and in combination with the body portion thereof, a deflector adapted to produce eddy-currents in practically horizontal planes in the gases passing therethrough.

2. In a heating-drum and in combination with the body portion thereof, a deflector adapted to produce eddy-currents in practically horizontal planes in the gases passing therethrough and detachable means for supporting such deflector in operative position.

3. In a heating-drum and in combination with the body portion thereof, a deflector adapted to produce eddy-currents in practically horizontal planes in the gases passing therethrough and detachable means for supporting such deflector in operative position and for holding the parts of such drum together.

4. In a heating-drum and in combination with the body portion thereof, a deflector adapted to produce eddy-currents in practically horizontal planes in the gases passing therethrough and detachable means for supporting such deflector in operative position and for holding the parts of such drum together and adapted to be held in place by such deflector.

5. In a heating-drum and in combination with the body portion thereof, a deflector adapted to produce eddy-currents in practically horizontal planes in the gases passing therethrough and detachable and elastic means adapted by its resiliency to hold such deflector in operative position and permit the removal of the same.

6. In a heating-drum and in combination with the body portion thereof, a deflector adapted to produce eddy-currents in practically horizontal planes in the gases passing therethrough and detachable and elastic means adapted by its resiliency to hold such deflector in operative position and permit the removal of the same and adapted also to hold the parts of such drum together.

7. In a heating-drum and in combination with the body portion thereof, a deflector adapted to produce eddy-currents in practically horizontal planes in the gases passing therethrough and detachable and elastic means adapted by its resiliency to hold such deflector in operative position and permit the removal of the same and adapted also to hold the parts of such drum together and to be held in place by such deflector.

8. A heating-drum having a body portion comprising two separable sections, a deflector and detachable means for supporting such deflector in operative position and for holding the sections of such drum together and adapted to be held in place by such deflector.

9. A heating-drum having a body portion comprising two separable sections, a deflector and detachable and elastic means adapted by its resiliency to hold such deflector in operative position and permit the removal of the same and adapted also to hold the sections of such drum together.

10. A heating-drum having a body portion comprising two separable sections, a deflector and detachable and elastic means adapted by its resiliency to hold such deflector in operative position and permit the removal of the same and adapted also to hold the sections of such drum together and to be held in place by such deflector.

SAMUEL DREW.

Witnesses:
CLARA M. SIENER,
ALBERT C. BELL.