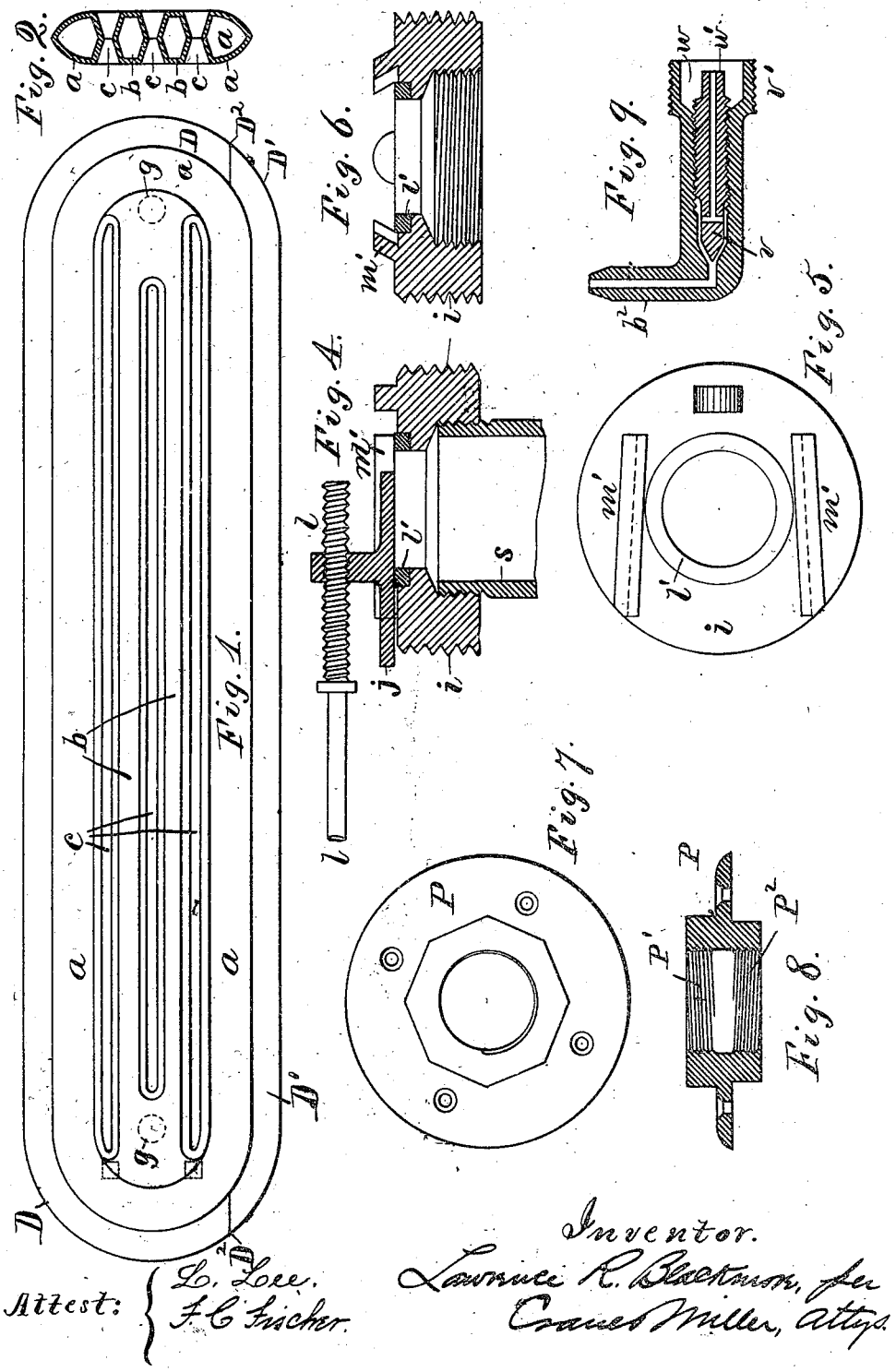
(No Model.) 2 Sheets—Sheet 1.

L. R. BLACKMORE.

HEATING RADIATOR.

No. 421,042. Patented Feb. 11, 1890.



Attest: L. Lee. F. C. Fischer.

Inventor. Lawrence R. Blackmore, per Cranes Miller, attys.

(No Model.) 2 Sheets—Sheet 2.

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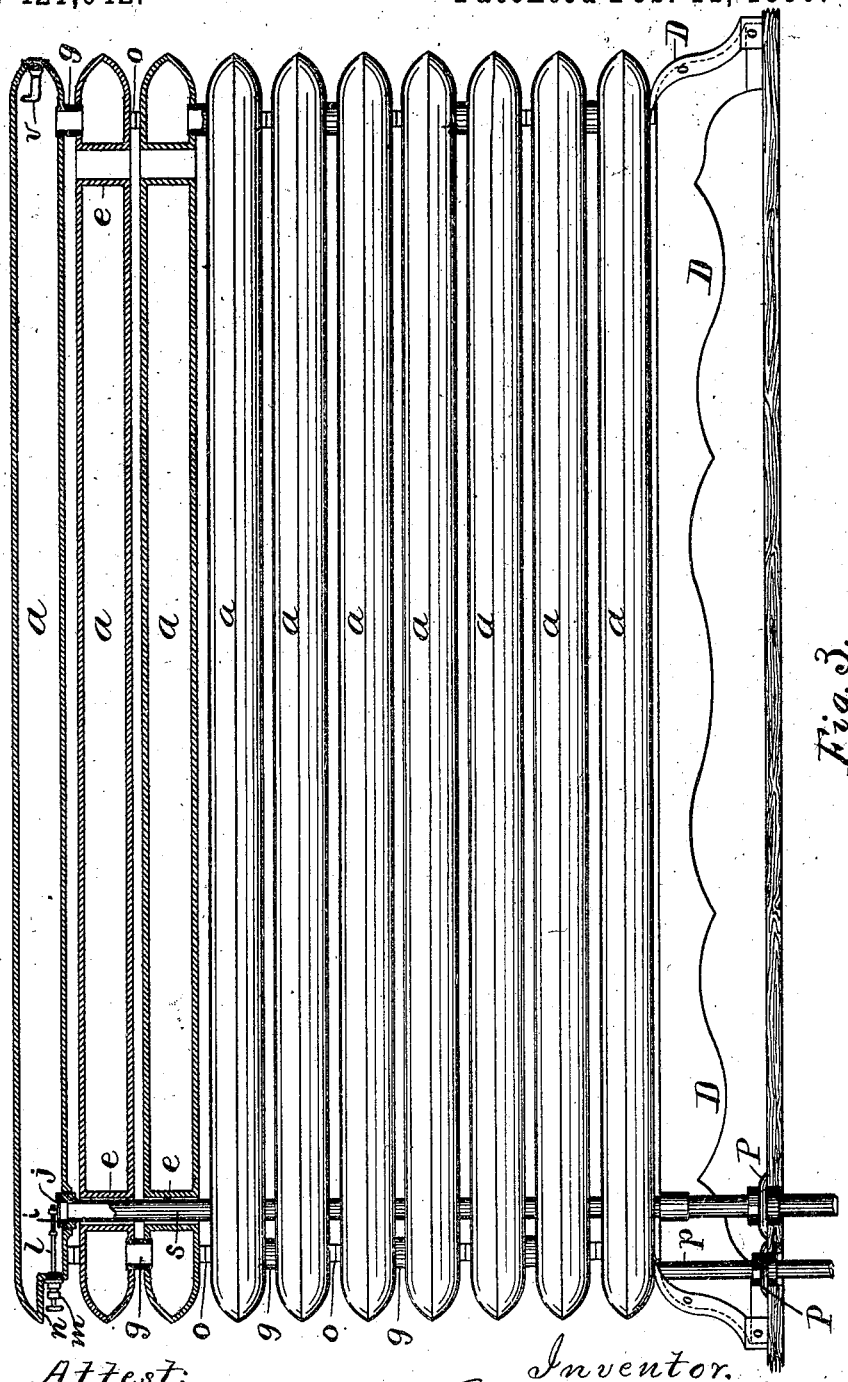

Fig. 3.

Attest:
L. Lee,
F. C. Fischer

Inventor.
Laurence R. Blackmore, Jr.
Cranes Miller, Attys.

UNITED STATES PATENT OFFICE.

LAWRENCE R. BLACKMORE, OF NEWARK, NEW JERSEY.

HEATING-RADIATOR.

SPECIFICATION forming part of Letters Patent No. 421,042, dated February 11, 1890.

Application filed June 5, 1889. Serial No. 313,146. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE R. BLACKMORE, a citizen of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Heating-Radiators, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention consists in the improvements in radiators hereinafter set forth.

In the annexed drawings, Figure 1 is a plan, Fig. 2 a transverse section, and Fig. 3 an elevation in section where hatched, of a radiator constructed with my improvements. Fig. 4 is a transverse section, Fig. 5 a plan, and Fig. 6 a transverse section taken at right angles to that shown in Fig. 4, of the inlet-valve. Fig. 7 is a plan, and Fig. 8 a transverse section, of the floor-plate to which the supply-pipe is attached. Fig. 9 is a central longitudinal section of the air-valve.

The grated cover customarily applied to the tops of radiators of this class is omitted from the drawings, as its use is already well known.

The radiator shown herein comprises a series of flat horizontal sections *a*, each having its ends or heads connected by narrow water-spaces *b*, separated by vertical longitudinal slots *c*, the latter being provided in order to permit the free circulation of air adjacent to the heating-surfaces, as in other constructions heretofore in use. The sections are connected together alternately at their opposite ends by nipples *y*, and are provided at their other ends with lugs *o*, to hold their surfaces apart, so as to allow the free passage of air between them.

In radiators of this class it has been found desirable to connect the supply-pipe directly with the upper section and the outlet-pipe with the lower section. To effect this object without disfiguring the radiator by the application of an external vertical pipe, I form each of the sections below the top one with transverse sockets *e* near the ends and project the vertical supply-pipe *s* through the same to the top section at one end of the radiator. For convenience in casting the separate sections to be united at their alternate ends both the heads are shown formed with the sockets *e*, although the socket at one end only is utilized when the section is connected.

In Fig. 3 the supply-pipe *s* is shown extended from the floor up through the sockets in the several sections to the under side of the top section, where it is connected with a thimble *i*, having a valve-seat formed upon its upper face and provided with a slide-valve *j*, having a rod *l* extended outside of the section from a stuffing-box *m*. Beveled guides *m'* force the valve down on a packing *l'* in the seat. A recess *n* is cut in the sloping face at the underside of the section where the valve-stem projects, so as to permit the application of the stuffing-box where it would be covered by the edge of the section, and thus both the valve and the means for operating the same are concealed by the upper section to which they are applied. It is obvious that the sections must be alternately reversed in connecting them on top of one another, so as to bring the apertures for the nipples in a suitable position, which reversal of the sections in building the radiator involves the formation of the sockets *e* at both ends of each section, so as to provide a continuous aperture through the sections when superposed for the supply-pipe *s*. To conceal the air-valve *r* from view, it is constructed to fit wholly within the radiator-section, being attached to a shank *v'* of sufficient size to permit the passage of the air-valve through the threaded hole into which the shank is screwed, as shown in Fig. 3. The shank is formed with a recess *w* in its outer end, in which the stem *w'* of the valve is inclosed, and in which a key may be inserted to adjust the valve when required, as shown in Fig. 9. The inner neck of the air-valve is bent at right angles to the shank, and is thus adapted by suitably turning the shank to project up to the highest point within the radiator. The introduction of such bent neck b^2 is effected by making the same considerably smaller than the shank, so that it can be introduced through the threaded hole in the upper section to which the shank is fitted. The supply and outlet pipes, being applied at the under side of the bottom sec-

tion, may be entirely concealed by a base B, which is shown in Fig. 3 supporting the sections and adapted to conceal the pipes.

To facilitate the connection of the pipes with the radiator, the base D D′ would be divided at one side, as upon the line D^2 in Fig. 1, and the part D′, removed from Fig. 3, would be secured by screws or other suitable fastenings, and the pipes *s* and *p* would be screwed in their places by providing the floor with plates P, having right and left hand threads formed, respectively, in their lower and upper surfaces, as shown in Figs. 7 and 8. By such construction the pipes designed to fit the radiator would be brought flush with the surface of the floor and the floor-plates screwed upon them by the right-hand threads provided in their under sides. The left-hand threads in the top of the floor-plates would then afford the means of securing the pipes *p* and *s* simultaneously into the radiator, all the sections of which would thus require only right-hand threads to connect them. The separate sections, of which ten are shown in Fig. 3, would be first secured together by the nipples *g*, and would then be secured to the floor-plates by turning the pipes *s* and *p* simultaneously around in the proper direction, access being afforded to such pipes by removing the side piece D′ from the base, as shown in Fig. 3.

It is obvious that the sections may be connected at both ends, if desired, as in forming radiators for the use of steam, where an extended travel for the steam would be objectionable by increasing the difficulty of discharging the condensed water from the sections. Where the sections are connected at both ends, the inlet and outlet pipes would be connected to the bottom section only, (at its opposite ends,) employing the same kind of floor-plates and right and left connections as are described above.

I am aware that it is not new to construct a radiator of a series of horizontal sections connected together alternately at their opposite ends, as in United States Patent No. 86,481, dated February 2, 1869; nor to form a radiator of a series of slotted sections, as shown in United States Patent No. 355,216, dated December 28, 1886. I am also aware that it is not new to apply an inlet-valve within the radiator with its stem projecting through and operated from without the same, as shown in United States Patent No. 313,883, dated March 17, 1885. My construction differs from the latter in having a recess *n* formed in the under side of the top section, and in having the valve-stem project horizontally into the said recess and concealed therein. I am also aware of German Patent No. 32,789, dated February 15, 1885, which shows a valve provided with a conical plug having a stem with a screw-thread for adjusting it, and also provided with a threaded shank for its attachment to the radiator. My invention differs from such construction in having a shank adapted to be screwed into the upper radiator-section, with its outer end flush with the surface of the section, and with the recess *w* therein to give access to the stem *w′* for its adjustment, and in having the neck b^2 turned upward at right angles to the shank to the highest point in the interior of the radiator. I am also aware that it is not new to form a floor-plate with a single screw-socket, as shown in United States Patent No. 198,351, dated December 18, 1877. My invention differs from the said construction in having a screw-thread in each end of the socket to adapt it for a pipe-coupling as well as a floor-plate. I hereby disclaim each of the said patents, limiting myself to the specific improvements for a radiator claimed herein.

Having thus set forth my invention and distinguished it from others, what I claim herein is—

1. A heating-radiator composed of flat horizontal sections provided with the transverse sockets *e* and connected together by intermediate nipples, and having the supply-pipe extended upward through such sockets and connected to the interior of the top section, substantially as shown and described.

2. The combination, with a heating-radiator composed of flat horizontal sections provided with the transverse sockets *e* and connected together by intermediate nipples, the top section being provided with the recess *n* and thimble *i*, having a valve-seat upon its upper surface, of the valve *j*, applied to the said valve-seat and provided with the stem *l*, projected through the edge of the section into the said recess, and the supply-pipe extended upward through the said sockets and connected with the thimble *i*, substantially as shown and described.

3. The combination, with a heating-radiator composed of flat horizontal sections provided with the transverse sockets *e* and connected together by intermediate nipples, of an air-valve applied to the top section and consisting of a shank *v′*, having the recess *w* and conical plug *v*, with hollow stem *w′*, and the supply-pipe extended upward through the said sockets and connected with the interior of the top section, substantially as shown and described.

4. The combination, with a heating-radiator composed of flat horizontal sections provided with the transverse sockets *e* and connected together by intermediate nipples, of an air-valve applied to the top section consisting of a shank *v′*, having the recess *w* at its outer end, and the neck b^2, bent at right angles to the shank at its inner end, and the conical plug *v*, with hollow stem *w′*, and the supply-pipe extended upward through the said sockets and connected with the interior of the top section, substantially as and for the purpose set forth.

5. The combination, with a radiator composed of flat horizontal sections provided with

transverse sockets *e* and connected together by intermediate nipples, of the floor-plate P, having a transverse socket provided with right and left hand screw-threads P^2 and P′, and the supply-pipe screwed into the floor-plate and extended upward through the sockets *e* in the sections and connected with the interior of the top section.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LAWRENCE R. BLACKMORE.

Witnesses:
G. C. BLACKMORE,
THOS. S. CRANE.