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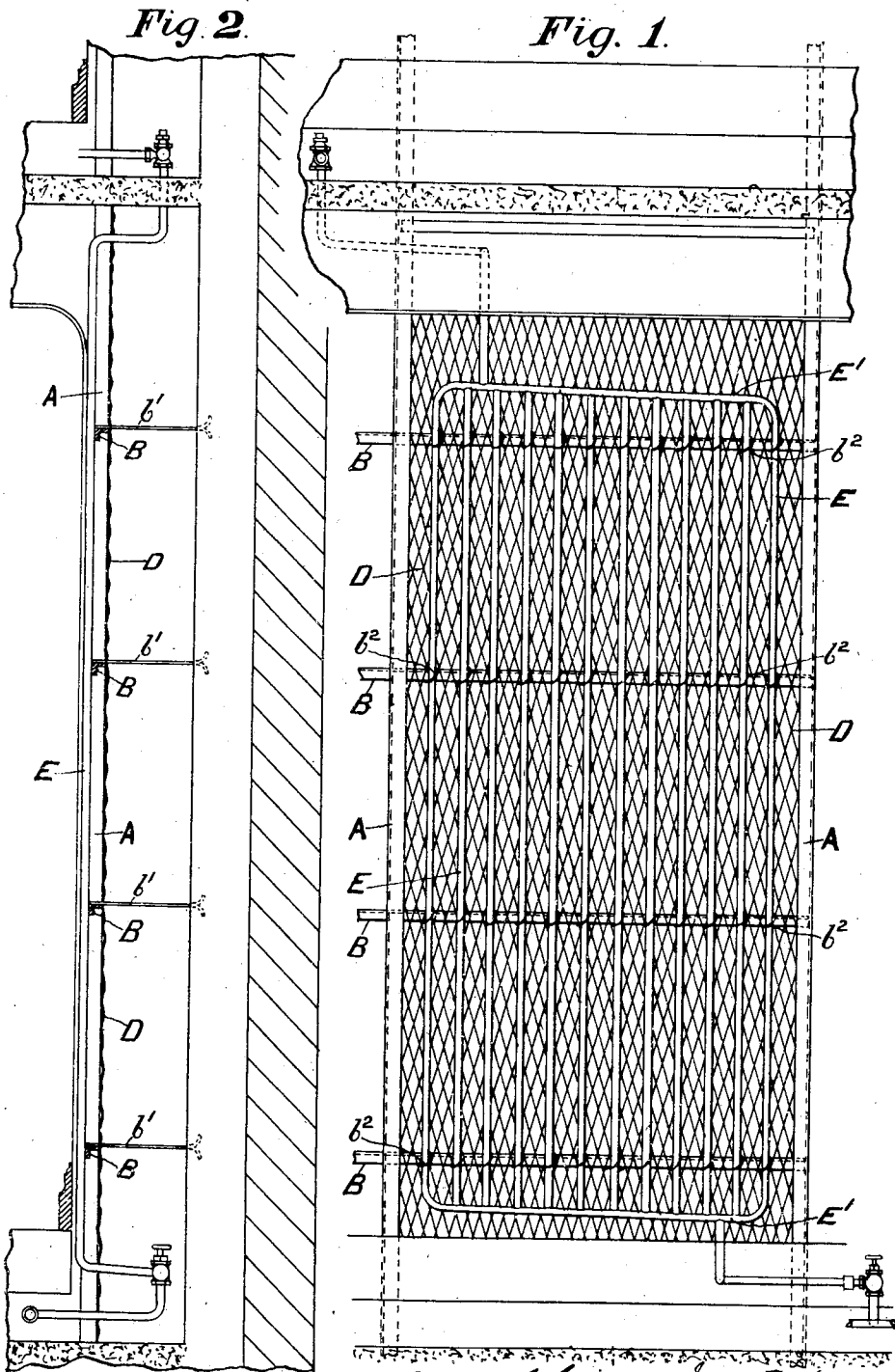
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1,718,533

HEATING AND COOLING OF BUILDINGS

Filed Sept. 20, 1923

2 Sheets-Sheet 1



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*Fig. 3.*

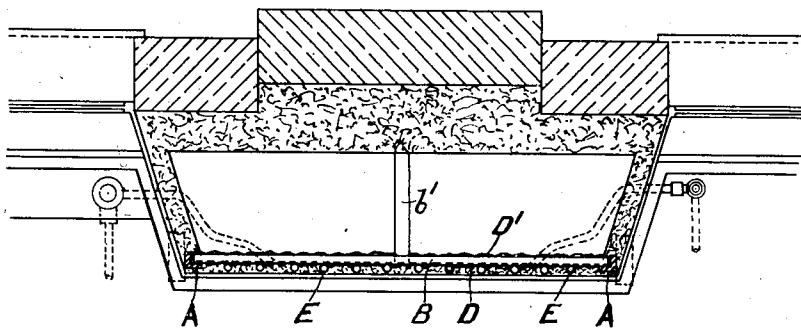
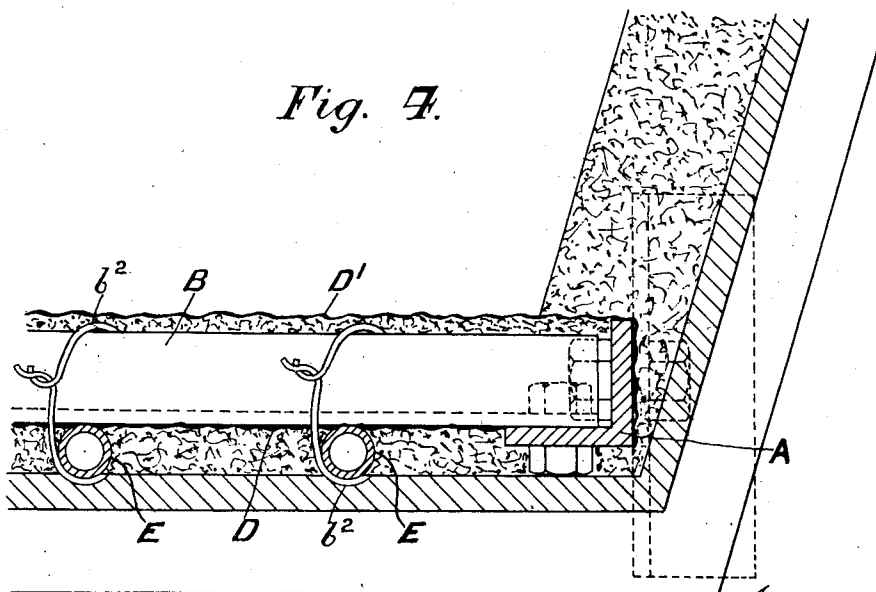


*Fig. 4.*



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## UNITED STATES PATENT OFFICE.

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## HEATING AND COOLING OF BUILDINGS.

Application filed September 20, 1923, Serial No. 663,861, and in Great Britain November 10, 1922.

This invention refers to that system of heating or cooling buildings in which the heat or cold radiates from the surface of the wall, floor or ceiling, and has particular reference to the circulation of a heating or cooling fluid as applied to partitions or party walls, floors and ceilings.

According to one form of this invention we first form a structure consisting of metal or reinforced concrete uprights of the required length between which metal lathing or netting is stretched which may be reinforced by a number of cross bars. The uprights and cross bars may be of H, U, L or any convenient cross section and the lathing or wire netting or expanded metal may be wrapped round or bolted or wired to the uprights or cross bars.

The pipes through which the fluid circulates consist of a number of tubes, preferably running parallel, either diagonally or upright, communicating at their extremities with a header or cross tube having an inlet and outlet. These tubes are secured to the framework and the whole structure is then covered with concrete or cement so as to just leave the surface of the tubes protruding, the apertures of the expanded metal causing the concrete or cement to key itself to the structure.

This surface is then covered in the usual manner with plaster from which the heat or cold radiates.

By this system of construction we are enabled to overcome the difficulties of expansion and contraction and prevent cracking or fracture of the surface from which the heat radiates.

The invention is illustrated on the accompanying drawings.

Fig. 1 is a part sectional broken elevation showing a portion of the wall of a building with our system of heating or cooling, when using rigid or inflexible pipes, applied thereto.

Fig. 2 is an end elevation of Fig. 1.

Fig. 3 is a sectional plan view of a wall panel constructed according to this system.

Fig. 4 is a broken view on an enlarged scale of a portion of the plan view shown by Fig. 3.

The framework shown consists of the metal uprights A, reinforcing cross bars B, and the lathing or netting D, preferably expanded metal, which is stretched across the uprights A in front of the bars B. Stays or rods  $b'$  are also secured to the cross bars B.

The pipes or tubes through which the fluid circulates are represented at E, and E' represents the header or cross tube with which the extremities of the tubes E communicate. The tubes E are secured to the framework by wires  $b^2$  (omitted in Fig. 2) passing around said tubes and around the cross bars B as clearly shown by Figs. 1 and 4. Expanded metal D' may also be stretched across the back of the uprights A. The whole structure is then covered or embedded in concrete or cement so as to just leave the surface of the tubes E protruding, such concrete or cement entering the apertures of the expanded metal and causing it to key itself to the structure.

The surface of this structure is then covered in the usual way with plaster which may be reinforced by textile fabric or in any other manner, the heat given off from the pipes E radiating from the surface of this plaster.

The pipes or tubes of the heating or cooling system being secured to the framework will result not only in the reinforcement of the concrete, but the heat or cold units will also be conducted by the metal framework and distributed throughout the concrete structure, in order that the heat or cold will be radiated from the surface of said structure in an effective manner. The expanded metal will also assist the framework in distributing the heat or cold throughout the area of the structure included by the fluid pipes or tubes.

What we claim as our invention and desire to secure by Letters Patent is:—

1. In a building, a concrete structure having a heating or cooling surface within the building, a heating or cooling system having spaced pipes for the flow of fluid therein to heat or cool the interior of the building and embedded in the concrete close to said surface, said pipes being distributed over an area of said surface, and a metal reinforcing frame also embedded in the concrete near said surface and extending throughout said area, the pipes being secured to and supported by said frame in metallic contact therewith so that the frame is heated or cooled by said pipes and assists in distributing the heat or cold throughout said area.

2. In a building, a concrete structure having a heating or cooling inner surface within the building, a heating or cooling system having spaced pipes for the flow of fluid therein to heat or cool the interior of the building and embedded in the concrete close to said surface,

said pipes being distributed over an area of said surface, a metal reinforcing frame also embedded in the concrete close to said surface and extending throughout said area, the  
5 pipes being secured to and supported by said frame in metallic contact therewith so that the frame is heated or cooled by said pipes and assists in distributing the heat or cold throughout said area, and metal netting em-  
bedded in the concrete and extending across 10 and secured to said frame throughout said area to further distribute the heat or cold throughout said area.

In testimony whereof we have signed our names to this specification.

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