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2,182,686

BUILDING CONSTRUCTION AND SYSTEM FOR CIRCULATING AIR

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2 Sheets-Sheet 1

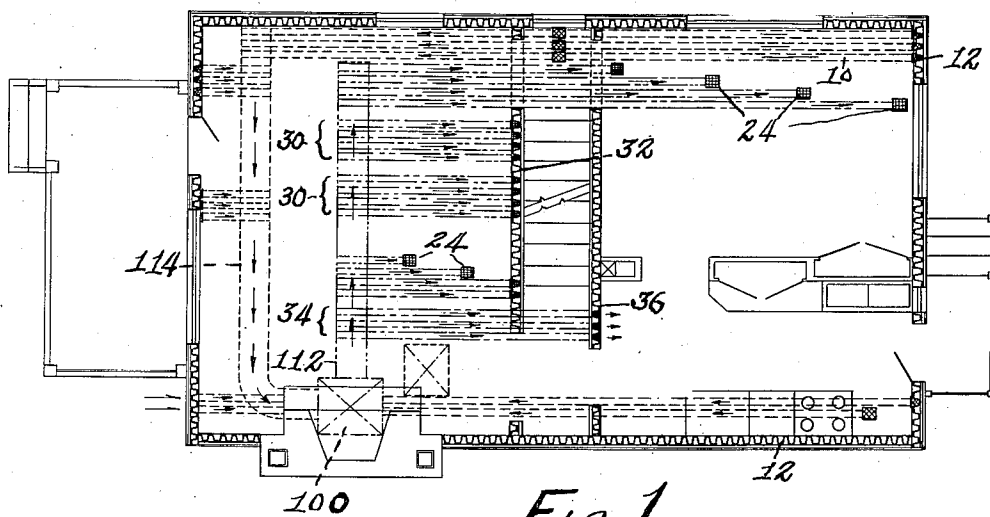


Fig. 1

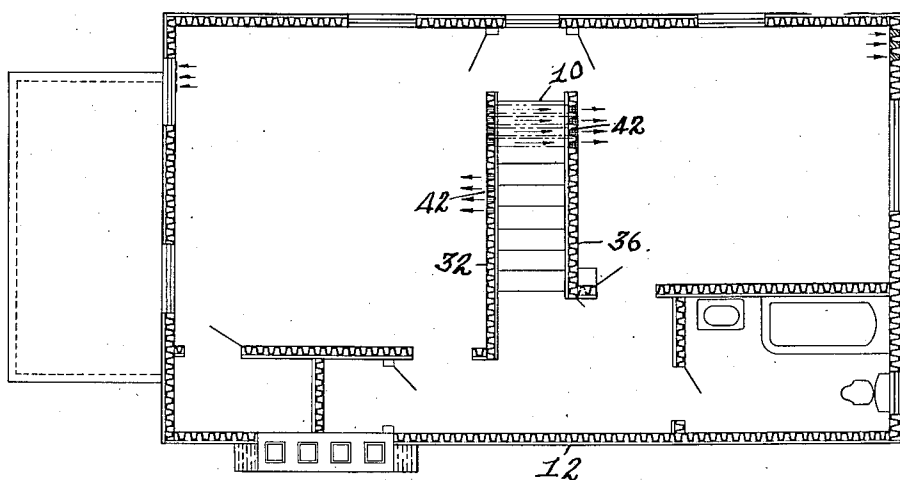


Fig. 2.

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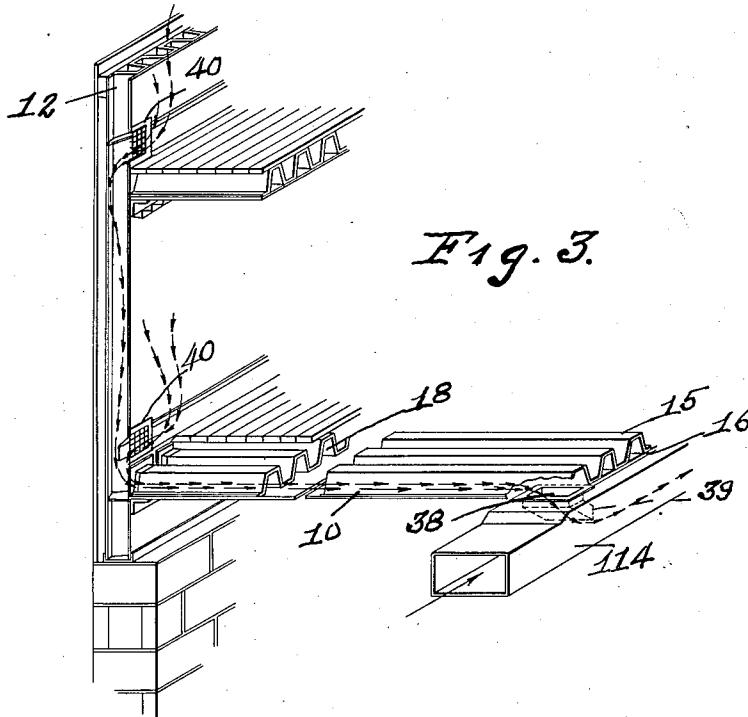
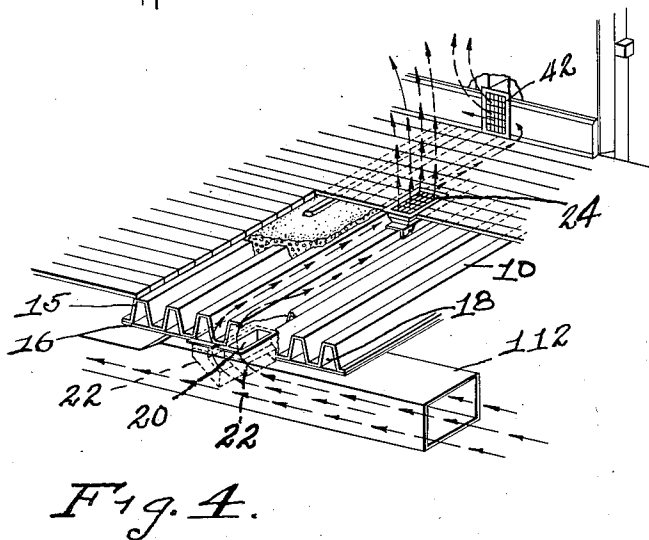
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BUILDING CONSTRUCTION AND SYSTEM
FOR CIRCULATING AIR

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Application August 7, 1936, Serial No. 94,788.

3 Claims. (Cl. 98—32)

This invention relates to a building construction and to a system for supplying and distributing conditioned air to a building.

In general the object of the invention is to provide a novel building construction in which provision is made for supplying and distributing conditioned air to different parts of a building by novel and highly efficient means and in an economical, practical manner.

With this general object in view and such others as may hereinafter appear, the invention consists in the building construction, in the air conditioning system in the building, and in the various structures, combinations, and arrangements of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating one embodiment of the invention, Fig. 1 is a sectional plan view illustrating the first floor of a dwelling house and embodying the present invention; Fig. 2 is a similar view of the second floor of the dwelling house; Figs. 3 and 4 are isometric views illustrating the details of the air conditioning system showing particularly the manner in which the conditioned air is distributed and introduced into the room and unconditioned air exhausted therefrom.

The supply of conditioned air to different parts of both industrial and residential buildings has heretofore involved more or less elaborate and expensive systems of ducts for carrying the air to the different parts of the building and to the conditioning apparatus. By the term "conditioned air" it is meant to define air which is conditioned as to temperature, or quality, such as heated air, refrigerated air, or air conditioned as to humidity.

In accordance with the present invention, a construction of building is provided in which the floor or partitions and preferably both, comprise the metallic cellular flooring material forming the subject matter of my United States Patent No. 1,867,433, dated July 12, 1932. As shown in said patent, such flooring material comprises a plurality of corrugated steel sheets arranged to form a series of closely spaced cells whose walls form the load carrying members of the floor or partition. The sheets are preferably arranged end to end forming rows with the cells in substantial alignment, and provision is preferably made either by abutting the ends of the sheets or by means of connecting members between the sheets for connecting the cells of one sheet with those of a succeeding sheet in a row, to form a plurality of elongated conduits as a part of the floor or of a

partition or a wall, extending from one portion of the building to another.

In accordance with the present invention, provision is made for connecting the elongated conduits with a source of conditioned air and for distributing the air efficiently to the various parts of the building through suitable outlets or registers placed in the cellular floor and in the cellular partitions or walls of the building as will be described. Provision is also made for connecting selected others of said cells in either the floors or partitions or walls or in both, with a return duct to the end that the unconditioned air may be exhausted from the building and returned to the air conditioning apparatus, as will be described.

Referring now to the drawings, the invention has been illustrated in a typical dwelling house in which provision is made for conditioning air in any usual or preferred form of air conditioning apparatus 100 which may be conveniently located in the basement of the building as is the usual practice. The air conditioning apparatus is provided with a discharge duct 112 through which the conditioned air is delivered by the air conditioning apparatus 100. The unconditioned air, whether it be fresh air from without the building or air which is withdrawn from the interior of the building to be passed through the air conditioner 100, is caused to be moved through a return duct 114.

In accordance with the invention, as is illustrated in my patent above referred to, the floors and/or partitions or walls of the building may and preferably will comprise the metal cellular floor material of said patent and as clearly disclosed in said patent such flooring or partition material may be made by welding one corrugated sheet to another sheet which may be corrugated or uncorrugated, to form a multi-cellular sheet member in which the cells are substantially parallel and closely spaced to form elongated cells or conduits. In practice the partitions may be formed by utilizing such flooring material with the individual sheets erected with the cells vertical.

As illustrated in the drawings, both the floor and the partitions or walls 12 are shown as comprising a cellular metallic structure formed by welding together a corrugated metal sheet 15 and a flat sheet 16, although it will be understood that any other desired and suitable form of metallic cellular structure may be used if desired.

In erecting the metal floor the usual construction practice may be followed and it is preferred to so lay the members of the floor that the individual cells 18 are extended substantially parallel

to one another and preferably lengthwise of the house or building. In erecting the walls and partitions of the house or building the flooring material may be erected so that the cells extend vertically. It is also preferred to utilize the flooring material as partition members or inner walls, as illustrated in the drawings.

As illustrated in Figs. 1 and 4, the air conditioning apparatus 100 is, as above stated, preferably located in the basement of the house and is provided with the discharge duct 112 through which the conditioned air is forced by the usual fan or blower (not shown) forming a part of the air conditioning apparatus. The discharge duct 112 is preferably arranged to extend transversely of the individual cells comprising the floor and, as illustrated in Fig. 4, the duct 112 may be erected so that its upper surface contacts the under surface of the floor and provision is made for operatively connecting the interior of selected cells of the floor with the interior of the duct 112 in order to permit the conditioned air to pass into said cells. As herein shown, connecting openings 20 are provided in the bottom of the cells of the floor and in the upper wall of the duct 112 and suitable sheet metal deflecting elbows 22, preferably of sheet metal, are provided and arranged to extend into the duct 112 at different levels therein so as to deflect a portion of the conditioned air stream into the respective floor cells while permitting the remainder of the air stream to continue to flow through the air duct 112. These floor cells may be provided with discharge outlets 24 communicating with the interior of the rooms on the first floor of the house or building, and, as herein shown, various floor registers or outlets 24 are illustrated as disposed in different parts of the rooms upon the first floor. In this manner the desired amount and distribution of conditioned air to the various parts of the various rooms upon the first floor of the building may be conveniently effected.

In order to supply the conditioned air to the portions of the building on the succeeding floors above the first floor, provision is made for operatively connecting the duct 112 with the selected cells of the partitions or walls of the building. As illustrated in Fig. 1, a number of cells 30 of the metallic flooring comprising the first floor are connected to corresponding cells of one of the partitions 32 and other cells 34 of said flooring are connected to corresponding cells of a second partition 36. The details of connection between the cells of the floor and the corresponding cells of the partition may be made in various ways and one convenient way is to cut back the upper corrugated sheet of the metal flooring and extend the projecting end thereof into a suitably formed opening in the cells of the partition or wall and a suitable sheet metal flange may be used to form a substantially air tight connection between the cells of the partition and walls. In this manner a portion of the stream of conditioned air passing through the duct 112 may pass through such cells as 30, 34, illustrated in Fig. 1, and thence through the vertical cells of the partition to be discharged through an outlet or register 42 in the vertical cells at the first, second, third, or any succeeding floor or room of the building. The supply of conditioned air to other rooms upon the succeeding stories of the building may be made by connecting other ducts with corresponding cells of another partition and the latter may be provided with suitable

discharge registers or outlets leading to the desired room to be conditioned.

In order to return the unconditioned air from the various rooms of the building, outlet registers 40 may be provided in either the floor or the vertical walls or partitions of the different rooms throughout the building and such outlets connected through selected vertical cells of the partitions or walls to selected floor cells of the first floor and the latter are connected through an opening 38 and deflecting elbow 39 to the discharge duct 114 leading back to the air conditioning apparatus in the basement. The details of such connections are illustrated in Fig. 3.

From the description thus far and from the inspection of Figs. 1 and 2 it will be observed that the present air conditioning system possesses great flexibility and that the desired number of cells of the various floors of the building and of the various walls and partitions may be connected into an air circulating system capable of handling the various volumes of conditioned air and of distributing the same to any desired part of the building with minimum disturbance in the appearance or the interior finish of the building and at a minimum expense.

The present application comprises a continuation in part of my co-pending application for Building construction and method of circulating air, Serial No. 559,426, filed August 26, 1931.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a building, in combination, a multi-cellular metallic building section supporting structure having a plurality of elongated substantially parallel air cells closed in cross section whose walls form hollow load supporting members providing the primary load supporting members of said structure, an air delivery conduit extending transversely of said cells and connected to a selected plurality thereof, registers communicating with the interior of said building and connected to said selected cells at points spaced from said conduit to supply air to said interior, an air discharge conduit extending transversely of said cells and being connected to a selected plurality of other of said cells, other registers communicating with said interior and connected to said other cells at points spaced from said discharge conduit to withdraw air from said interior, and means for causing air to flow through said delivery conduit, said first mentioned cells and said first mentioned registers into said interior and be discharged from said interior through said other registers, said other cells and said discharge conduit.

2. In a building, in combination, a multi-cellular metallic flooring having a plurality of elongated, horizontally extending, substantially parallel air cells closed in cross section whose walls form hollow load supporting members providing the primary load supporting members of said flooring, an air delivery conduit positioned below said cells and extending transversely thereof, said conduit being connected to a selected plurality of said cells, registers communicating with the interior of said building and connected to said selected cells at points spaced from said conduit to supply air to said interior, an air discharge conduit positioned below said cells and

extending transversely thereof, said discharge conduit being connected to a selected plurality of other of said cells, other registers communicating with said interior and connected to said other cells at points spaced from said discharge conduit to withdraw air from said interior, and means for causing air to flow through said delivery conduit, said first mentioned cells and said first mentioned registers into said interior and be discharged from said interior through said other cells, said other registers and said discharge conduit.

3. In a building, in combination, a multicellular metallic flooring having a plurality of elongated, horizontally extending, substantially parallel air cells closed in cross section whose walls form hollow load supporting members providing the primary load supporting members of said flooring, a multicellular metallic wall structure having a plurality of elongated, vertically extending, substantially parallel air cells closed in cross section whose walls form hollow load supporting members providing the primary load supporting members of said wall structure, an air delivery conduit positioned below said horizontally extending cells of said metallic flooring

and extending transversely thereof, said conduit being connected to a selected plurality of said horizontally extending cells, at least some of said selected cells being connected to a selected plurality of said vertically extending cells, registers communicating with the interior of said building and connected to said selected vertically extending cells to supply air to said interior, an air discharge conduit positioned below said horizontally extending cells and extending transversely thereof, said discharge conduit being connected to a selected plurality of other of said horizontally extending cells, at least some of said other horizontally extending cells being connected to a selected plurality of other of said vertically extending cells, other registers communicating with said interior and connected to said other vertically extending cells to withdraw air from said interior, and means for causing air to flow through said delivery conduit, said first mentioned selected horizontal and vertical cells and said first mentioned registers into said interior and be discharged from said interior through said other registers, said other vertical and horizontal cells and said discharge conduit.

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