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COMBINED BUILDING STRUCTURE AND HEATING SYSTEM

Filed Feb. 22, 1944

2 Sheets-Sheet 1

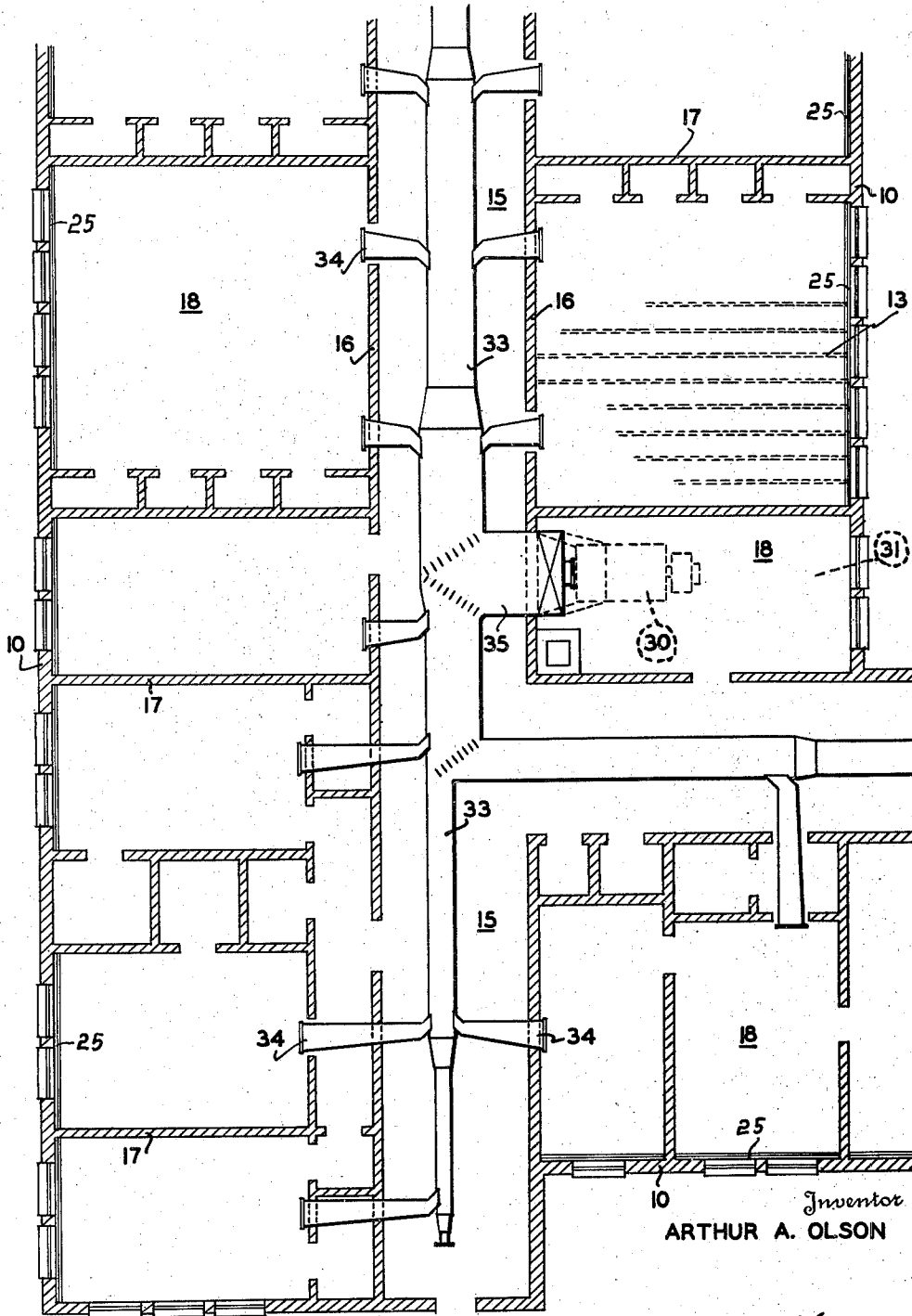


FIG. 1.

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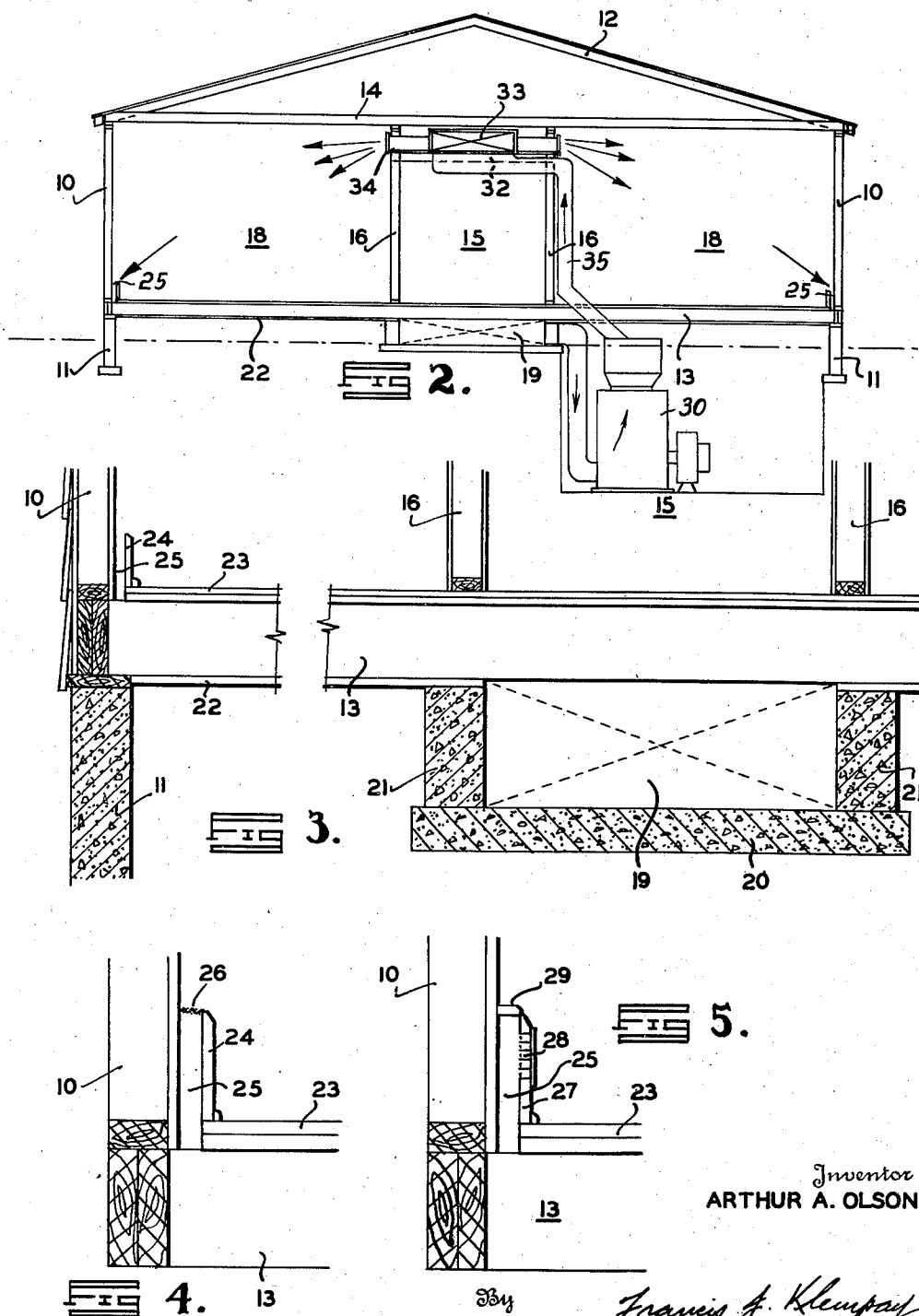
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UNITED STATES PATENT OFFICE

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COMBINED BUILDING STRUCTURE AND
HEATING SYSTEM

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1 Claim. (Cl. 98—33)

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This invention relates to a combined building structure and heating system and more particularly to the art of heating and ventilating the spaces in building structures which are constructed without basements or other enclosed bottom spaces suitable for the housing of conventional air duct systems.

A primary object of the invention is the provision of an improved building construction of the general type mentioned above whereby definite economies are effected in the construction of the building and in the incorporation in the structure of the building of an adequate space heating and ventilating system. This object is accomplished, in accordance with the invention, by utilizing, to a greater extent than has heretofore been proposed, certain structural elements of the building as operative air confining and directing elements of the heating and ventilating system.

A further object of the invention is the provision of an improved heating and ventilating system for a building enclosure in which definite economies as to space utilization are effected in the incorporation of the various constituent elements of the heating and ventilating system in the building structure, in which dampness is eliminated from the floors and lower portions of the rooms of the basement-less structure, and in which a uniform distribution of the heating and ventilating air is obtained throughout the entire spaces of the rooms of the building.

These and other objects and advantages of the invention will become apparent upon consideration of the following detailed specification and the accompanying drawing wherein there is disclosed a preferred embodiment of the invention.

In the drawing:

Figure 1 is a horizontal section through a combined building structure and heating system constructed according to the principles of the invention;

Figure 2 is a transverse section through the building of Figure 1;

Figure 3 is a fragmentary transverse sectional view, on an enlarged scale, of the building of Figure 1;

Figure 4 is a fragmentary sectional view showing a detail of the system of Figure 1; and

Figure 5 is a sectional view showing a modified form of detail.

Referring to the drawing, reference numeral 10 indicates, in general, the side walls of a building having outside foundation walls 11 and a roof 12. The building shown is a single story structure

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having transversely extending but longitudinally spaced floor joists 13 and a ceiling structure 14. Further, the building may be provided with a longitudinally extending corridor 15 defined by the spaced longitudinally extending partition walls 16 which are also spaced inwardly from the outer walls 10 to define with transversely extending partition walls 17 individual enclosures or rooms 18 on opposite sides of the building. In constructing the above described building I provide a trough-like enclosure 19, constructed of masonry materials and extending longitudinally below the space to be occupied by the corridor 15. Thus I may cast a bottom wall or floor 20 of concrete and build spaced parallel walls 21 on the floor 20, the arrangement being such that the walls 21 extend longitudinally below the partition wall 16 of the corridor 15 and support these partition walls. Supported on the outer foundation walls 11 and on the walls 21 of the duct 19 are the transversely extending but longitudinally spaced floor joists 13 and the spaces between these joists are utilized as return air ducts in a manner to be hereinafter more fully described. For this purpose the lower edges of the joists 13 and the spaces therebetween are sheathed over with suitable material 22 preferably of an insulating and moisture resistance character.

I provide suitable openings between the lower outer portions of the spaces within the enclosures 18 and the spaces between the joists 13 whereby air may be withdrawn from the enclosures 18 at points spaced along the baseboards which are adjacent the outer walls 10 of the building structure. While any suitable expedient may be employed for this purpose I preferably terminate the outer edge of the floor boards 23 which are laid on the joists 13 short of the inner surface of the finished outer wall 10 as shown more clearly in Figures 3, 4 and 5. This provides an opening extending throughout the entire length of the outer walls of each of the enclosures 18 and insures a uniform withdrawal of air throughout the extent of the enclosures. If conventional baseboards, as shown at 24 in Figures 3 and 4 are employed, the same are set in positions spaced inwardly from the inner surfaces of the outer walls 10 to provide passages 25 for the flow of air into the spaces between the joists 13. Grills or screens 26 extend across the inlets to the passages 25. In Figure 5 the baseboard, indicated by reference numeral 27, is provided with a longitudinally extending grill 28 or with a series of longitudinally spaced grilled openings whereby

the air from the enclosure may enter the passage 25. In this case a suitable molding 29 may be placed between the upper edge of the baseboard and the inner surface of the outer wall 10 as will be understood.

I provide a suitable air heating and moving means 30 positioned in a furnace room 31 located below one of the more centrally disposed enclosures 18 and either through suitable duct means, not shown, or through an opening between the main return duct 19 and the space within the furnace room the air which is withdrawn from each of the enclosures is directed to the inlet or inlets of the air heating and moving means 30.

The ceiling of the corridor 15 is furred down as shown at 32 to provide for the housing of the principal conditioned air distributing duct 33 which, as shown, is provided with a number of branch ducts 34 leading into the enclosures 18 through the upper portions of the partition walls 16. The discharge ends of ducts 34 are preferably provided with grills and deflectors as will be understood. Distributing duct 33 is connected with the air outlet of the air heating and moving means 30 by means of a large duct 35.

In operation, air is drawn from the enclosures 18 at a multiplicity of points spaced along the baseboards of the outer walls 10 of the building enclosure while heated or otherwise conditioned air is furnished the enclosures through the ducts 34, the circuit being traceable through passages 25, spaces between the joists 13, duct 19, air conditioning and moving means 30, duct 35, and duct 33 to ducts 34. The return air in passing through the floor structure of the enclosures 18 and immediately under the floor of the corridor 15 maintains these floors warm and dry thus contributing to the comfort and well-being of the occupants. Also the positioning of the main distributing duct in the ceiling of the corridor of the structure and the discharging of the conditioned air into the upper zones of the enclosure 18 not only makes for economical utilization of the space within the structure but also provides a shield against the excessive loss of heat from the air within the enclosure by radiation through the ceiling and roof assembly of the structure.

It should now be apparent that I have provided an improved combined building structure and air heating and ventilating system which accomplishes the objects initially set out. By the use of the invention it is possible to attain the advantages enumerated above without increasing the cost of the building structure and, in fact, the use of the parallel supporting walls 21 and the floor structure as air collecting ducts enhances the soundness and life of the building.

The above specifically described embodiment of the invention should be considered as illustrative only as obviously many changes may be

made therein without departing from the spirit or scope of the invention. For example, in smaller structures the corridor 15 may extend along one of the outer side walls of the building in which case one of the side walls of the duct 19 would be provided by an outside foundation wall as will be readily understood. Reference should therefore be had to the appended claims in determining the scope of the invention.

10 What I claim is:

In a building structure having outer side walls and a corridor formed of spaced partition walls defining enclosures on either side of said corridor, foundation walls below said outer side walls and said partition walls and being substantially co-extensive therewith, floor joists extending between the outer foundation walls and transversely of said corridor and extending across the top of the foundation walls below said partition walls, a heating and ventilating air source, means comprising a duct positioned in the upper portion of said corridor for distributing air from said source throughout said enclosures, cover means secured to the bottom surface of said joists intermediate the outer side foundation walls and the foundation walls below said partition walls to provide air duct means between said joists, means providing communication between the lower outer portions of said enclosures and spaces between said joists at points spaced along said outer walls whereby return air may be drawn from said enclosures into the space between the foundation walls below said partition walls, and means to conduct air from said last mentioned space to said heating and ventilating air source.

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