

July 9, 1935.

A. S. MACDONALD

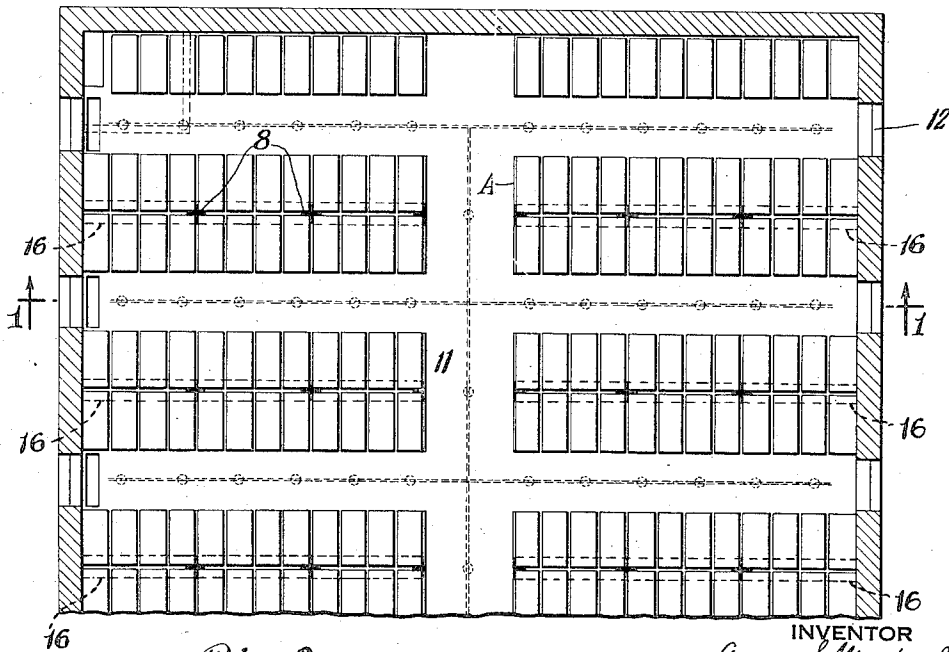
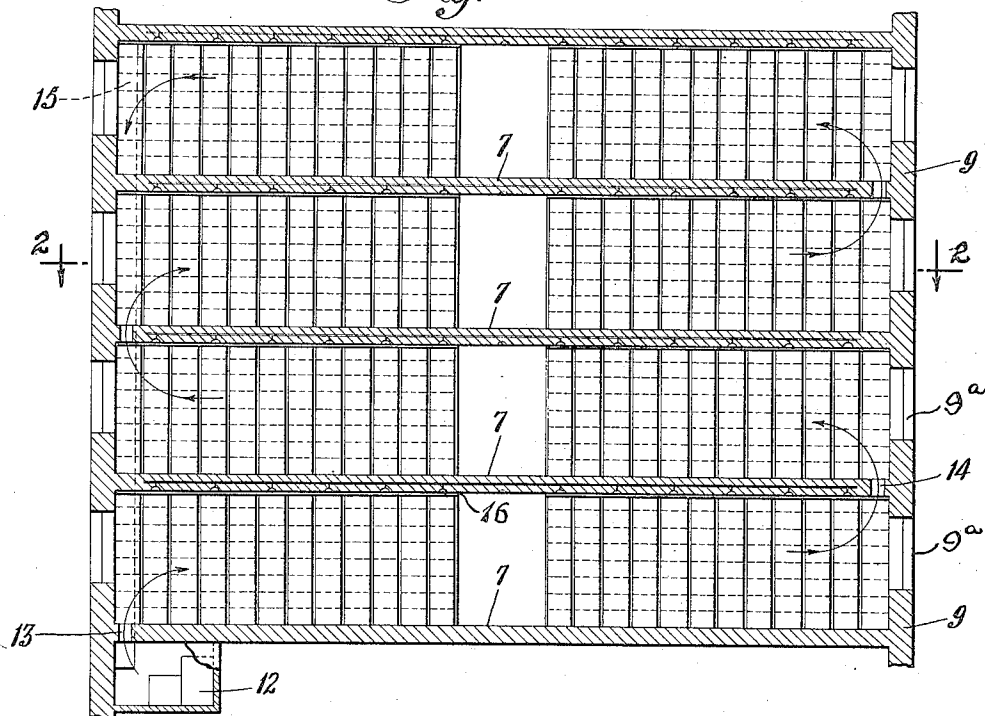
2,007,655

LIBRARY

Original Filed July 2, 1930

2 Sheets-Sheet 1

*Fig: 1.*



*Fig: 2.*

INVENTOR  
*Angus S. Macdonald*  
BY *Symonstudd & Lechner*  
ATTORNEY

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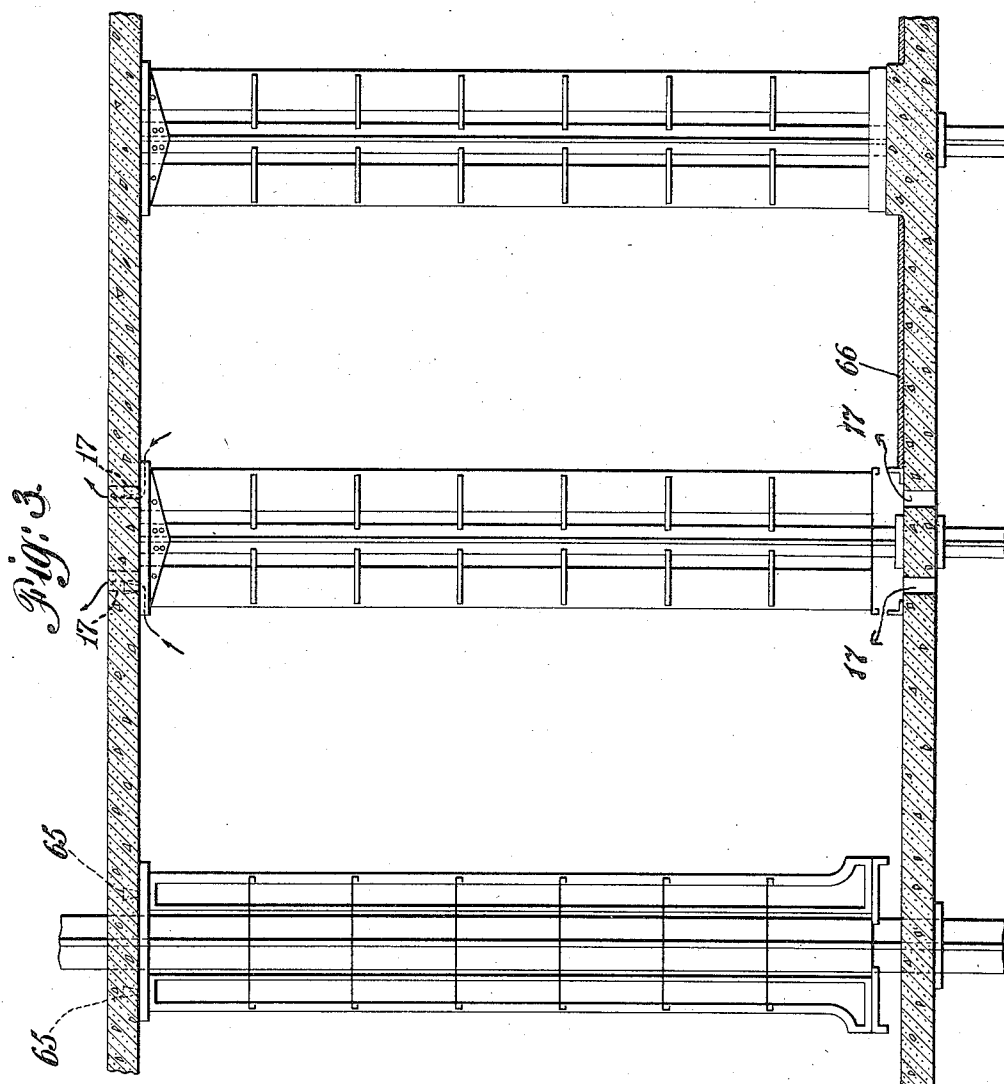
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INVENTOR  
*Angus S. Macdonald*  
BY  
*Symon, Trott & Lechner*  
ATTORNEY

## UNITED STATES PATENT OFFICE

2,007,655

## LIBRARY

Angus S. Macdonald, New York, N. Y., assignor  
to Snead & Company, Jersey City, N. J., a cor-  
poration of New Jersey

Original application July 2, 1930, Serial No.  
465,321. Divided and this application January  
6, 1932, Serial No. 585,009

## 7 Claims. (Cl. 98—1)

This invention relates to improvements in li-  
braries and has to do primarily with ventilation  
thereof. This application is a division of my co-  
pending application Serial No. 465,321, filed July  
2, 1930, now matured into Patent No. 1,854,158.

One of the primary objects of the invention is  
to improve the ventilation in libraries and the  
nature of my invention will be best understood  
from the following.

The usual way of ventilating the libraries is to  
provide deck slits in the aisles adjacent the  
ranges, conditioned air being supplied at the  
lower floor and returned from the topmost floor,  
the air being free to flow upwardly from floor  
to floor through the deck slits. In winter the air  
is, of course, warmed, and in summer it is cooled  
in the conditioning apparatus.

With this system of ventilation there are dead  
areas and diffusion of heat or cold does not take  
place very well, in consequence of which there is  
non-uniformity of temperature even on floors,  
this condition being particularly aggravated in  
regions adjacent windows in cold weather. Fur-  
thermore, the air as it warms, has a tendency to  
rise directly through the slits from deck to deck,  
which makes the upper floor stuffy in both warm  
and cold weather, and makes the lower floors  
chilly in cold weather. In this connection the  
heating effects of the lighting are very substan-  
tial in libraries, a rise in temperature between  
entering and outgoing air being noticeable with  
only twenty percent of the lights turned on. It  
might here be mentioned that the location and  
number of lamps for given areas is approximately  
the same for most libraries.

Furthermore, according to this arrangement,  
the heating effect of radiators is localized rather  
than distributed, and it is practically impossible  
to correct conditions in one portion of the library  
without upsetting them in other portions.

The velocity of the air is also relatively low and  
this in connection with the dead areas tends to  
cause dust deposit on the books.

It is the purpose of the present invention to  
overcome these difficulties by providing a simple  
and effective way of ventilating.

It is another object of the invention to provide  
ventilation of a character in which the air moves  
at relatively higher velocity, producing a pleasing  
effect in warm weather and tending to minimize  
dust deposit.

I secure the foregoing, together with such other  
objects and advantages as may hereinafter ap-  
pear, by means of a construction which I have

illustrated more or less diagrammatically in the  
accompanying drawings, wherein—

Fig. 1 is a vertical section through a portion of  
a library embodying my invention, the section  
being taken on the line 1—1 of Figure 2.

Fig. 2 is a section taken on the line 2—2 of  
Fig. 1.

Fig. 3 illustrates a modification of the inven-  
tion.

Referring now to the drawings, I make the  
floors of the library of flat slab construction in  
which the lower surface of the flooring forms the  
ceiling of one level or deck of the library and the  
upper surface the floor of the succeeding level or  
deck and so on. Stack columns 8 are provided  
at suitably spaced intervals, these supporting the  
flat slab flooring and being in turn supported by  
the latter, so that any suitable shell 9 may be  
used to enclose what may be termed the library  
unit.

By the use of flat slab flooring and the stack  
columns, the interconnecting horizontal steelwork  
between columns may be entirely omitted, al-  
though in some cases it may be desirable to con-  
nect the columns of a row, lengthwise of the row  
with beams or the like to supplement the support  
afforded by the flooring.

Either construction is one which permits of  
the stacks being carried substantially from floor  
to ceiling providing aisles which, for all practical  
purposes when the stacks are filled, are non-com-  
municating except in regions where there are  
crossing aisles. In other words, the arrangement  
is one by which the stacks are, in effect, partition  
walls. In addition to effectively utilizing substan-  
tially all of the vertical space between floors, the  
arrangement assists in providing for effective  
ventilation.

In the form shown in Figs. 1 and 2 the ventila-  
tion is provided as follows: at a suitable point,  
as, for example, in the basement there is an air  
conditioning apparatus indicated at 12. Condi-  
tioned air is supplied the floor immediately above  
through a series of inlet openings 13 which are  
preferably located at the end of the longitudinal  
aisles provided by the bookstacks. The air en-  
tering through the apertures 13 flows horizontally  
along the aisles to the opposite end where it passes  
through similar apertures 14 in the ceiling, in  
passing thereto flowing over the space immedi-  
ately adjacent the windows 9a and over any radi-  
ators which are usually located at the ends of  
aisles. The air now travels to the left to the op-  
posite end of the aisle and then up through the  
next ceiling, as before, and so on from floor to

floor, the air eventually being taken downwardly to the conditioning apparatus through suitable conduit means indicated at 15. If desired, sealing material may be provided between the stacks and the flooring longitudinally of the rows of columns, as indicated at 16 in Figures 1 and 2, to form a seal for the space at the top of the stacks.

By this arrangement the air is caused to sweep laterally over the decks, there is no dead space in any of the aisles, and rapid diffusion occurs, producing uniformity of conditions on the various floors, the only difference in temperature as between floors being that due to the absorption of heat, as from the lights. The heating effect of the radiators is rapidly distributed. The difficulties pointed out are thus overcome and in addition the air is more or less automatically caused to flow with substantial velocity, producing the pleasing effect noted and also tending to minimize dust deposit.

The ranges of Figs. 1 and 2 are composed of rolling cases, arranged end to end on either side of the longitudinal rows of columns. They roll into the aisles to provide access to the books. The distance between columns is a multiple of the width of the rolling cases. Rolling cases are used for such portions of the library as are relatively inactive. Ordinarily they would be employed for storage. In other portions of the library where books in active circulation are to be stored, standard forms of stacks such as shown in Fig. 3 may be employed. In such portions the ventilation employed in Figs. 1 and 2 may also be provided, or ventilation may be provided as indicated in Fig. 3 through ports 17 arranged beneath the stacks to spread out laterally. These ports, however, are so located in the respective floors as to cause lateral flow throughout the length of the aisles and then upward to the next level with lateral flow throughout the aisles before again passing to the next floor, and so on as indicated by the arrows in Figure 3.

In the construction shown in Fig. 3 the shelving may be suspended from brackets secured to the flooring by expansion bolts 65 or the like. Also flooring 66 may be laid between curb angles.

The advantages and economy of the present invention will be appreciated on comparison with the methods of ventilation heretofore employed in library bookstacks.

It will be noted that the floors are tight, that is, continuous both in the aisles and under the ranges, whereby it is possible to rearrange the cases in various ways, as, for example, by substituting rolling cases for the more or less fixed cases, without interfering with the ventilation system.

I claim:—

1. In library construction, a plurality of substantially tight slab decks, side walls, ranges of stacks with aisles therebetween, each deck having an air circulation slit for each aisle at one end thereof, with the slits in succeeding decks arranged at opposite ends thereof to cause the air to flow lengthwise through the aisles of a deck on its way to the aisles of the next deck, means for admitting air at the bottom deck, air outlet means at the top deck, and means for

setting up a flow of air to said air admitting means to flow consecutively through the aisles of the decks to the outlet means.

2. In library construction, a plurality of substantially tight slab decks, side walls, ranges of stacks with aisles therebetween, each deck being slitted adjacent a side wall, with the slits in succeeding decks being at opposite ends thereof, means for admitting air at the bottom deck, air outlet means at the top deck, and means for setting up a flow of air to said air admitting means to flow consecutively through the aisles of the decks to the outlet.

3. In library construction, a plurality of flat slab decks, side walls, ranges of stacks with aisles therebetween, each deck having an air circulation slit for each aisle adjacent a side wall, with the slits in a succeeding deck being at the end opposite to that of the slits of a preceding deck, means for admitting air at the bottom deck, air outlet means at the top deck, the ranges of each floor extending substantially from floor to ceiling, and means for setting up a flow of air to said air admitting means to flow consecutively through the aisles of the decks to the outlet means.

4. In library construction, a plurality of substantially tight decks, ranges of stacks with aisles therebetween, each deck being slitted at one end of the aisles to serve the aisles with air, and means for setting up air flow through the aisles, said slits being at the opposite ends of the aisles in successive decks whereby the air flow zigzags through the aisles from floor to floor.

5. In library construction, a plurality of substantially tight decks, ranges of stacks with aisles therebetween, said stacks extending substantially from floor to ceiling, said decks being slitted at one end of the aisles to serve the aisles with air, and means for setting up air flow through the aisles, the slits in successive decks being at opposite ends of the aisles thereof, whereby the air is caused to flow through the aisles of successive decks in opposite directions.

6. In library construction, a plurality of substantially tight decks, ranges of stacks arranged similarly on the decks with aisles therebetween, each deck having an air slit at one end of each aisle for serving the aisles with air, and means for setting up air flow through the aisles, said slits being at the opposite ends of the aisles in successive decks; whereby a plurality of independent vertical zigzag air lanes, one for each vertical set of aisles, are provided.

7. In library construction, a plurality of substantially tight decks, ranges of stacks with aisles therebetween, each deck having air circulation openings at one end of each aisle for serving each aisle of a deck independently with air, and means for setting up air flow through the aisles with air inlet at the lowermost deck and air outlet at the uppermost deck, the openings in successive decks being at opposite ends of the aisles thereof; whereby a plurality of independent vertical streams of air flowing zigzag through the aisles of successive decks are provided.

ANGUS S. MACDONALD.