Dec. 5, 1939. W. C. BOND 2,182,422

LIBRARY BOOKSTACK

Filed Sept. 30, 1933 3 Sheets-Sheet 1

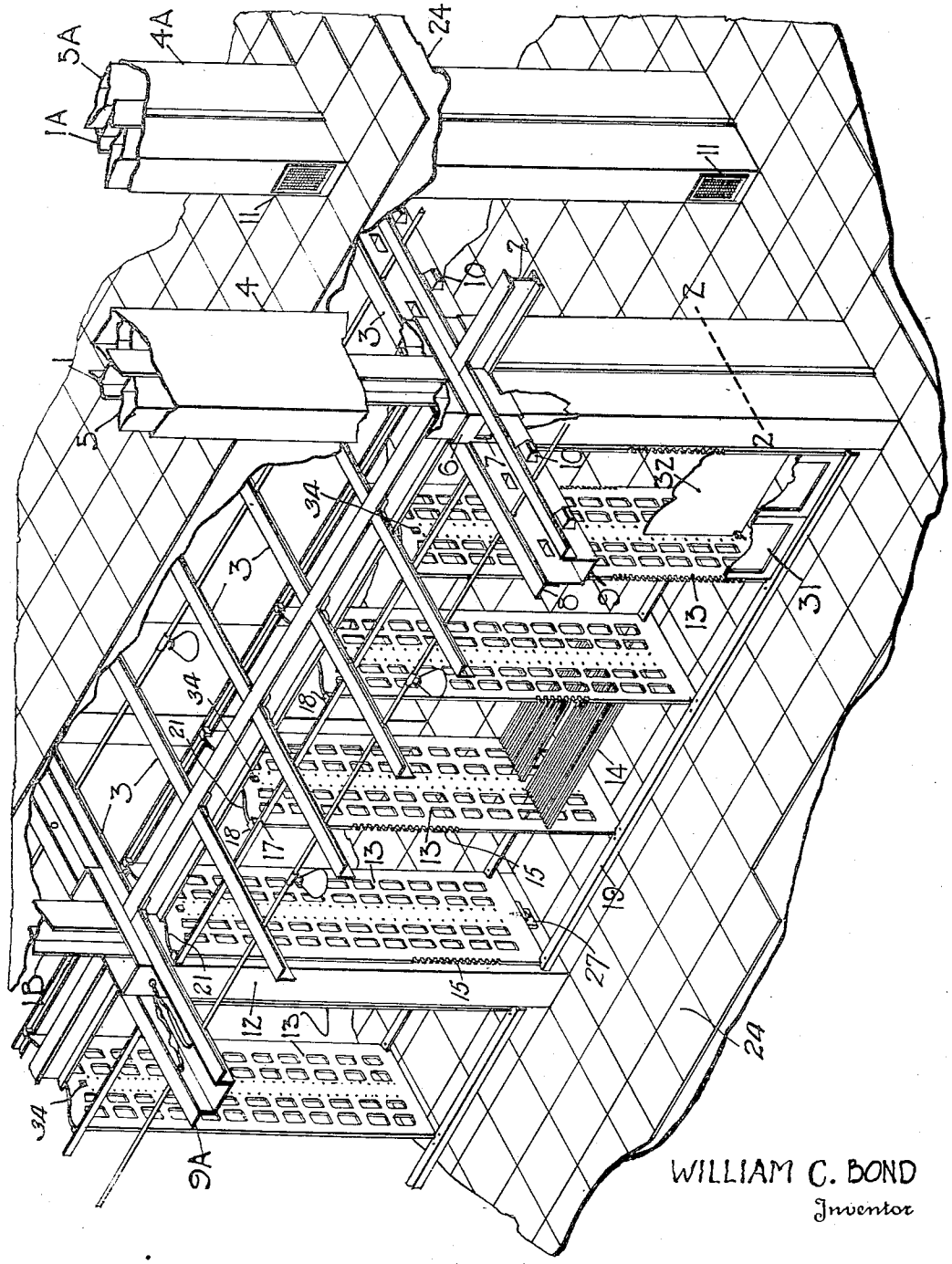


FIG. 1.

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LIBRARY BOOKSTACK

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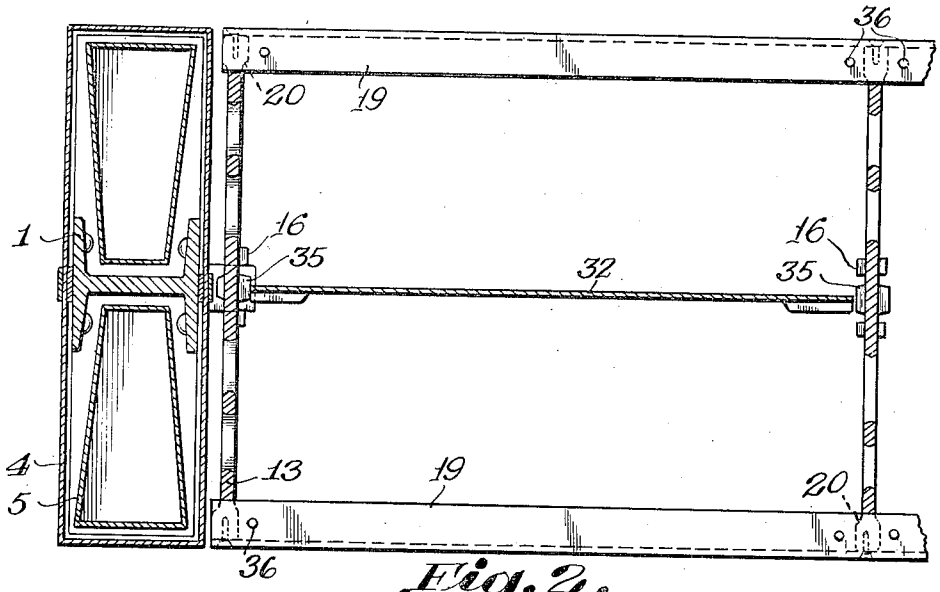


Fig. 2.

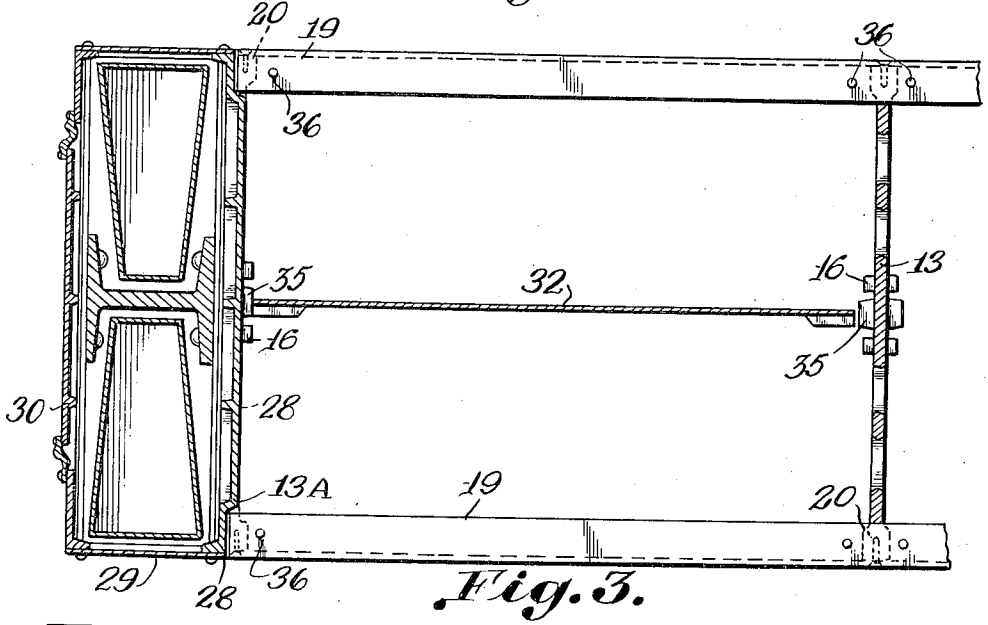


Fig. 3.

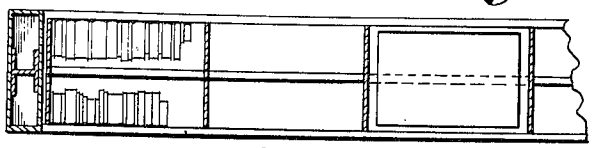


Fig. 4.

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Fig. 5.

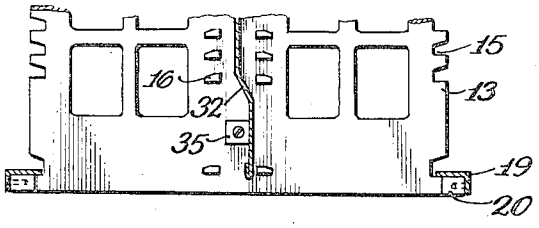


Fig. 6.

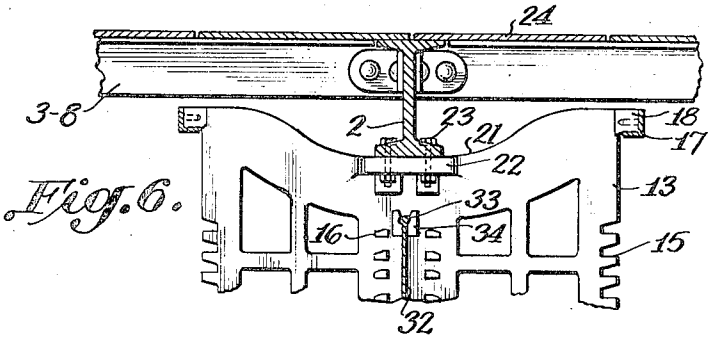
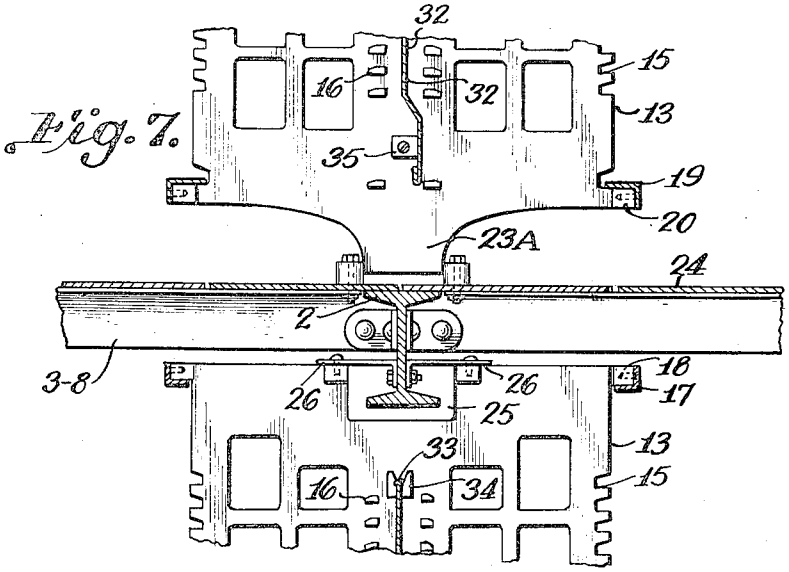


Fig. 7.



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UNITED STATES PATENT OFFICE

2,182,422

LIBRARY BOOKSTACK

William C. Bond, Washington, D. C.

Application September 30, 1933, Serial No. 691,717

16 Claims. (Cl. 98—1)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon in accordance with the provisions of the act of March 3, 1883 (Ch. 143, 22 Stat. L. 625) as amended by the act of April 30, 1928 (Ch. 460, 45 Stat. L. 467).

This invention relates to bookstacks for libraries and, more particularly, to a structure for a bookstack in which the supporting members, claimed by my divisional application Serial Number 45,122, for the shelves themselves can be removed or replaced at will in order to create work or study spaces.

An object of the invention is to construct a library bookstack which will eliminate a large number of the structural columns which are conventionally used in the prior art.

A further object of the invention is to incorporate as an integral portion of the bookstack a ventilating and air conditioning system to insure a constant circulation of conditioned air around and through the shelves at all times.

A still further object of the invention is the provision of improved support and suspension means for the partitions, of my aforementioned divisional application, supporting the shelves.

It is also an object of the present invention to provide means so that any portion of the stack, including the aisles, can be converted into locked enclosures.

Another object is to provide a structure for a system of shelving of universal size to accommodate either conventional rows of books or for the storage of large bound volumes of newspapers.

Another object is to utilize the space in certain stack columns as electrical wire ducts.

Another object is to design a structure for a stack in which the accurate location of the supporting partitions for the shelves can be maintained independently of any variations in the structural members that may occur during construction.

In order to fully describe the structure claimed herein and one of its designed purposes it becomes necessary to also describe and illustrate the structure intended for conjoint use therewith, as claimed in my divisional application Serial Number 45,122.

In the drawings, Fig. 1 is a broken away view in perspective of a section of a complete bookstack installation.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional view of a modified construction taken on line 2—2 of Fig. 1.

Fig. 4 is a plan view of the shelving adapted for use in connection with the supporting structure claimed herein.

Fig. 5 is a detail elevation of the lower end of a suspended type of partition.

Fig. 6 is a side detail elevation of the top of a partition of the type shown in Fig. 5.

Fig. 7 illustrates a section in side elevation of a modified form of the structure shown in Figs. 5 and 6.

Referring to the drawings in detail, it will be seen from the perspective layout in Fig. 1 that numerals 1, 1A and 1B denote vertical structural columns formed of I-beams and encasing members, to which are attached at the various floor levels longitudinal beams 2 and transverse angle floor beams 3. Between longitudinal aligned columns 1 and 1B lies a section of shelving, the details of which will be described hereinafter and claimed in the aforesaid divisional application. The passageway between columns 1 and 1A permits access to the shelves facing each other in the several sections.

The vertical I-beams of the columns 1 are preferably enclosed in sheet metal casings 4 of such a size as to permit inwardly tapered ducts 5 to be fitted in either open portion of the I-beam. At the various floor levels sheet metal collars 6 enclose the casings 4. These collars are formed with openings 7 registering with corresponding openings in the casing 4 and ducts 5.

Bearing against the longer sides of the collar 6, and tending to hold the collars in engagement with the casings 4, are spaced parallel angle beams 8 which extend along the whole series of columns 1 and 1A. Between columns 1 and 1A, and abutting the ends of the collars provided with openings 7, are U-shaped troughs 9 which snugly fit between and are suspended from angle beams 8 and are closed across the top by floor plates 24. At regular intervals are nozzles or louvers 10 communicating with the troughs 9.

The alternate vertical columns 1A are also provided with conduits 5A encased in a casing 4A similar to those of column 1. Instead of the passageways of troughs 9 communicating with the passageways of the conduits, the columns 1A have large registers 11 just above the floor levels communicating through the casings 4A with openings in the conduits 5a.

In practice, air, conditioned as desired by any

suitable apparatus, is forced up ducts 5 and distributed throughout the aisles and shelves of each deck by the nozzles or louvers 10. The ducts 5A on the other hand are part of a return system, returning the air to the conditioning apparatus, not shown. Thus, it will be seen that a complete ventilating or air conditioning system is incorporated as an integral part of the bookstack.

Referring to the next vertical column 1B of the range, it will be observed that, while it is encased in a sheet metal casing 12, no ventilating apparatus is contained therein, as in practice only one ventilating column, either supply or exhaust, is ordinarily necessary for each stack range. It is preferable to have the supply and exhaust columns adjacent the corridors between the ends of the ranges. These additional longitudinally aligned columns 1B, however, are used completely concealing the vertical runs of electrical wiring necessary for lighting. Troughs 9A, similar to the troughs 9, permit all wiring to be carried where desired, while the casings 12 allow the wiring to be carried from deck to deck.

The book shelving proper comprises a plurality of cast vertical partitions 13, equi-spaced between the range columns and each section holding adjustable shelves 14 as required. The shelves 14 are retained in fixed position by means of notches 15 in the front edges of the partitions 13 and rear lugs 16, the latter being in vertical alignment near the middle line of the partitions. To rigidly hold the several partitions of a series in position, angle bars 17 are tied to upper offset corner lugs 18, while the bottom corner edges of the partitions are similarly tied by angle bars 19 to offset bottom corner lugs 20.

The distribution of the weight on the shelves and partitions is a problem of major importance and may be satisfactorily accomplished by suspending the partitions 13 from the horizontal beams 2, as shown in Fig. 6, or by supporting the partitions on the floor directly above the beam 2, as shown in Fig. 7.

As disclosed in Fig. 1, the upper edge of the partitions 13 are formed with a curved depression 21 near the middle to accommodate the horizontal girder 2. Integral lugs 22, having openings therethrough are cast near the top of the partitions and are bolted to the bottom flanges of the girder by bolts 23. As shown in Fig. 1 the bottoms of the partitions terminate several inches above the floor 24 so that the conditioned air may circulate under the stacks and also permit cleaning under the shelves.

If it is desirable to support the shelving directly on the floor, it may be readily done, as shown in Fig. 7, by forming the bottom edge of the partitions 13 with a depending central offset portion 23A which may be bolted through the floor plates 24 on either side of the beam 2. The top of the floor supported partitions may be constrained by providing a cutaway section 25 at the center of the upper end in which girder 2 may lie, whereby angle plates 26 may be fastened to the top of the partitions and bolted to the web of the girder.

It is necessary to secure the ends of each stack section where the partitions 13 abut the vertical casings 4, 4A and 12. This end construction may take the form disclosed in either Figs. 2 or 3. In Fig. 2, the end partition 13 lies parallel to and slightly spaced from the side wall of the casing. The partition and casing may be retained in position by an angle bracket 27 bolted to the center of the bottom edge of the partition and to the vertical column.

The modified stack end illustrated in Fig. 3 makes use of an end partition 13A, to which the shelves are supported on hangers positioned in offset section 28, to form one side of a column casing. An ornamental plate 30 forms the opposite side of the column casing which with side plates 29 and partition 13A completely encompass the ducts and I-beam.

As shown in Fig. 1, pivoted doors 31 may be hung on upper and lower angle bars 17 and 19 using the holes 36 provided for this purpose in angle bars 17 and 19 so that a section of the range may be enclosed. If desirable, the end doors on opposite sides of the aisle may be fastened to one another to completely block off the entrance to the entire aisle.

Provision is made for horizontally dividing the book shelves by hanging a sheet metal barrier 32 down the center of the partitions 13. This is easily accomplished by making an enlarged top edge 33 on the barrier sheet 32 and suspending the ends of the sheet in slotted lugs 34 formed on the inside of the cast partitions 13. The bottom of the sheets 32 are kept aligned by fastening to lugs 35 cast on the lower section of the partitions.

What I claim is:

1. A bookstack including spaced vertical supporting beams, horizontal beams connecting the vertical beams, casings enclosing the vertical beams and forming columns, book-shelves supported by the horizontal beams between aligned columns, air ducts positioned in said casings, and louvered branch ducts connecting spaced columns, each of said branch ducts being in fluid communication with at least one of said air ducts.

2. In a library bookstack, spaced vertical beams, vertically extending ventilating conduits adjacent said beams, floor and ceiling beams connecting said vertical beams, a plurality of spaced vertical partitions held by said ceiling beams between pairs of vertical beams, a terminal partition of said plurality abutting a vertical beam and forming a side plate therefor, end plates attached to said side plate and a second side plate attached to said end plates to completely encase said beam and ventilating conduits adjacent thereto.

3. A ventilated library stack construction including a series of aligned and spaced columns, beams connecting the said columns, enlarged hollow casings surrounding said columns, bookstacks supported between the aligned columns, main conditioned air ducts carried interiorly of the said hollow casings, and branch conditioned air ducts in communication with said main ducts, the said branch ducts being supported and discharging conditioned air between adjacent spaced columns.

4. A ventilated library stack construction including a series of aligned and spaced vertical beams, spaced horizontal beams connecting the vertical beams, decks supported on said horizontal beams, bookstacks mounted between aligned vertical beams, casings surrounding the vertical beams, ventilating ducts carried interiorly of said casings, an outlet opening formed in one of said casings and communicating with one of said ducts, said outlet opening being positioned adjacent the floor on the said decks, and an inlet opening formed in one of said casings and communicating with another of said ducts, the said inlet opening being positioned adjacent the ceiling of the decks.

5. Metallic building construction comprising a vertical beam, a hollow column member forming a passageway and mounted against and encasing

the vertical beam, parallel beams fastened through the column member to the opposite sides of the vertical beam, and horizontal duct-covering plates supported on said beams.

6. Metallic building construction comprising a vertical beam, a hollow column member forming a passageway and mounted against and encasing the vertical beam, beams fastened through the column member to opposite sides of the vertical beams, certain of said beams being parallel and contiguous to the sides of said column member and others of said beams being at right angles to the said sides and duct-covering plates supported on said parallel beams.

7. Metallic building construction comprising a vertical beam, encasing members forming a passageway and mounted against opposite faces of the vertical beam and encasing the latter, horizontal beams fastened through the encasing members to opposite faces of the vertical beam, and members supported by said beams and forming ducts in communication with said passageway.

8. Metallic building construction comprising a vertical beam, a hollow column member mounted against and encasing the vertical beam and forming therewith a passageway, parallel beams fastened through the column member to opposite faces of the vertical beam, and a horizontal plate supported on said beams with its end abutting the hollow column member and forming a cover for a duct in communication with said passageway.

9. Metallic building construction comprising a vertical beam, a hollow column formed by members mounted against and encasing the vertical beam, parallel angle iron beams fastened horizontally against opposite sides of the hollow column, a horizontal plate supported on said beams with its end abutting the hollow column forming members.

10. Metallic building construction comprising a vertical beam, a hollow column member mounted against and encasing the vertical beam, parallel beams fastened to the vertical beam, a horizontal plate supported on said beams with its end abutting the hollow column member and a sheet metal trough having its upper edges in engagement with said beams.

11. Metallic building construction comprising a vertical beam, a hollow column member mounted against and encasing the vertical beam, beams with depending flanges fastened to the vertical beam, a horizontal plate supported on said beams, and a sheet metal trough having its upper edges in overlapping engagement with the depending flanges of said beams.

12. Metallic building construction comprising a vertical beam, a hollow column member mounted against and encasing the vertical beam, parallel beams fastened to the vertical beam, horizontal plates supported on said beams, a sheet metal trough communicating with the hollow column member, said trough having spaced ports and having its upper edges in engagement with and supported by said parallel beams.

13. Metallic building construction comprising a vertical beam, a hollow column member mounted against and encasing the vertical beam, parallel beams fastened to the vertical beam, a horizontal plate supported on said beams, a sheet metal trough having its upper edges in engagement with said beams, and an opening into said trough from the hollow column member.

14. Metallic building construction having a plurality of vertical columns each comprising a vertical I-beam disposed centrally of the column, beam encasing members mounted against opposite plane faces of the vertical beam and forming passageways on other faces of the beam, a passageway of one column having an inlet opening, and a passageway of another column having an outlet opening, and an auxiliary passageway leading from said column outlet opening to points removed from the column.

15. Building construction comprising a pair of parallel floor members having depending flanges, a flat floor extending across the floor members, and a sheet metal duct-forming trough having its upper edges snugly fit between and suspended from the said depending flanges.

16. Building construction comprising a vertical hollow duct, a pair of parallel floor members extending horizontally from the vertical duct, a floor extending across the floor members, a sheet metal trough having its upper edges in engagement with the said floor members, and an opening from the said trough into the vertical duct.

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