Feb. 6, 1951 W. L. MORRISON 2,540,956

CONTAINER HAVING REFRIGERATED PARTITION

Filed May 16, 1946 3 Sheets-Sheet 1

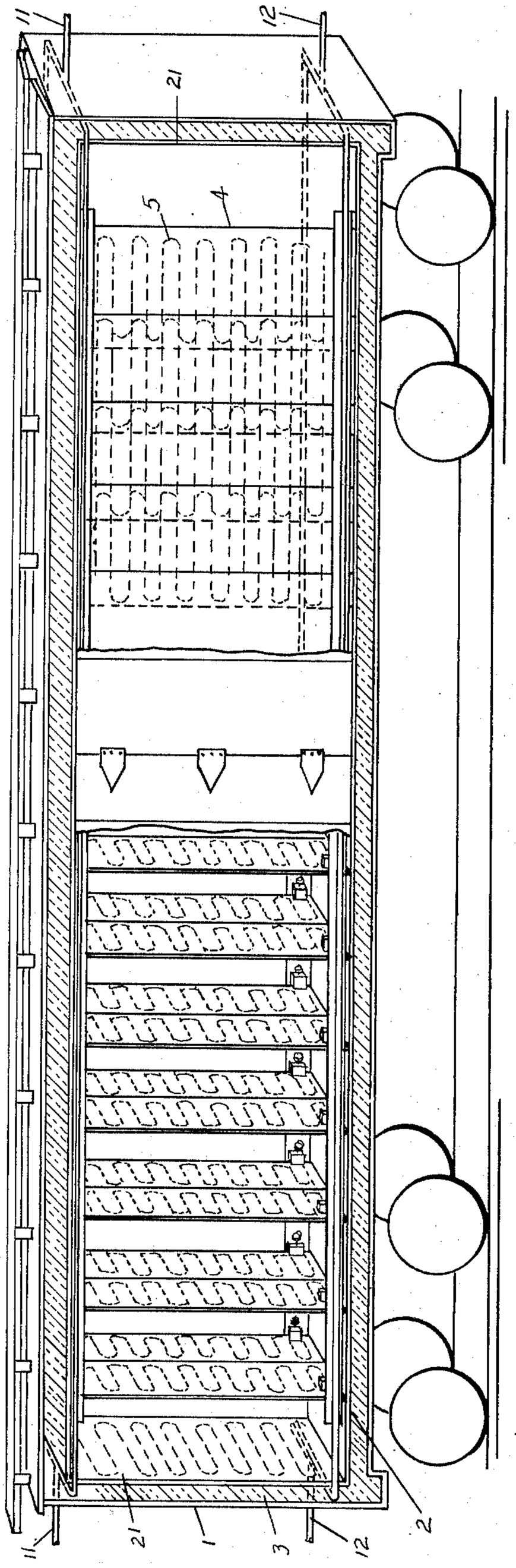

Fig. 1

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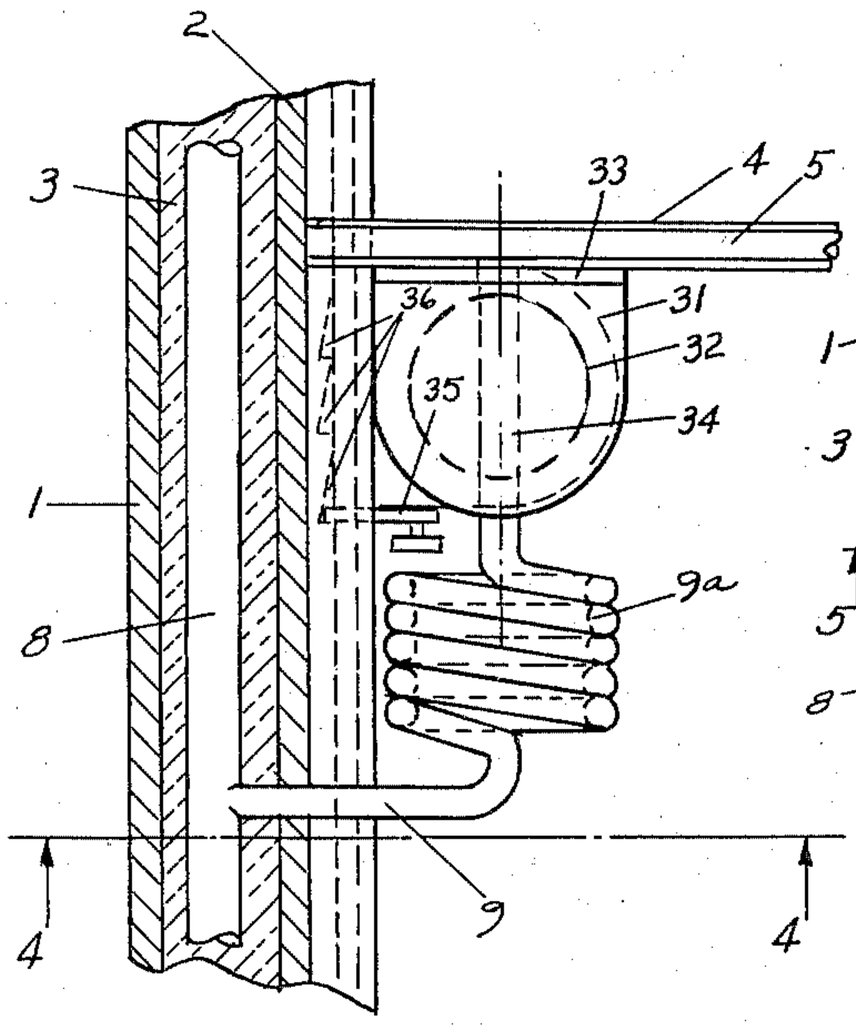

Fig. 2

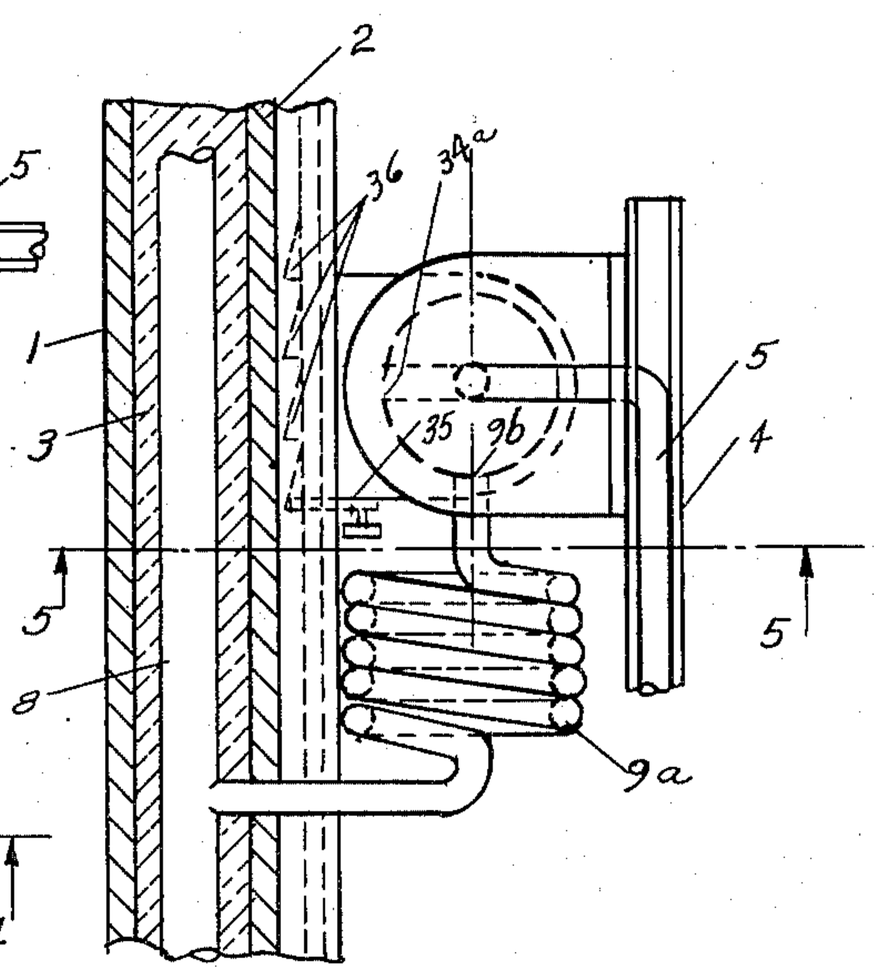

Fig. 3

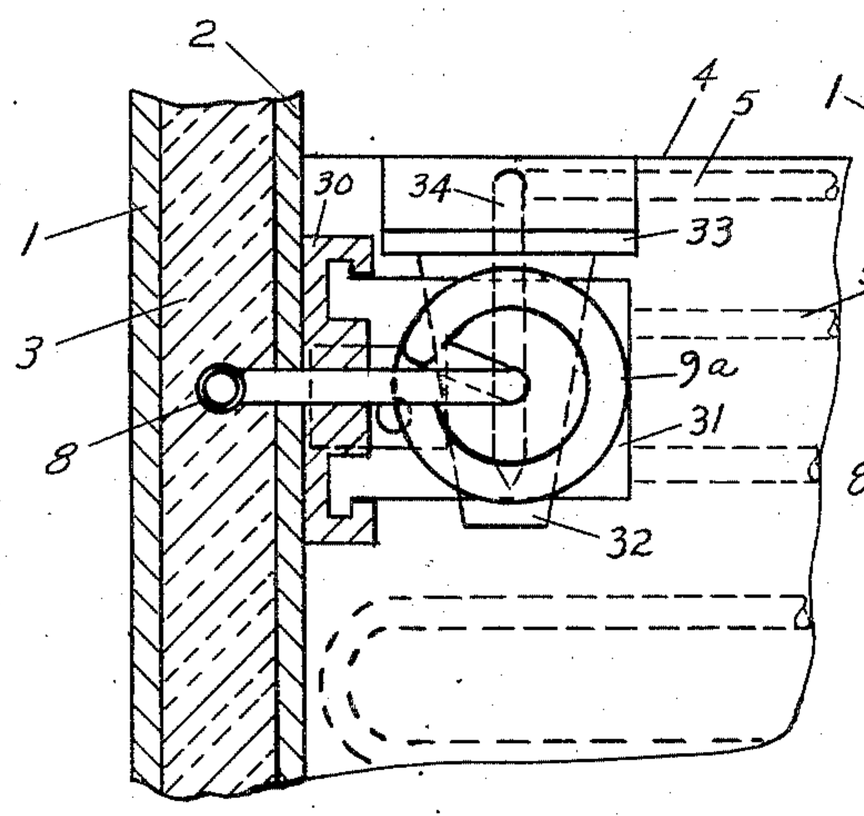

Fig. 4

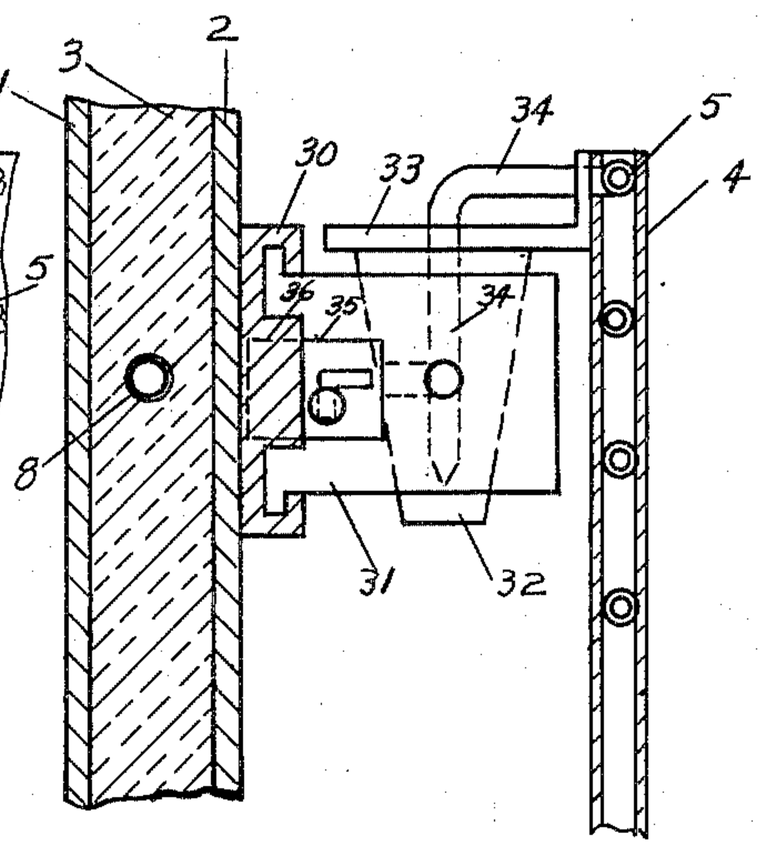

Fig. 5

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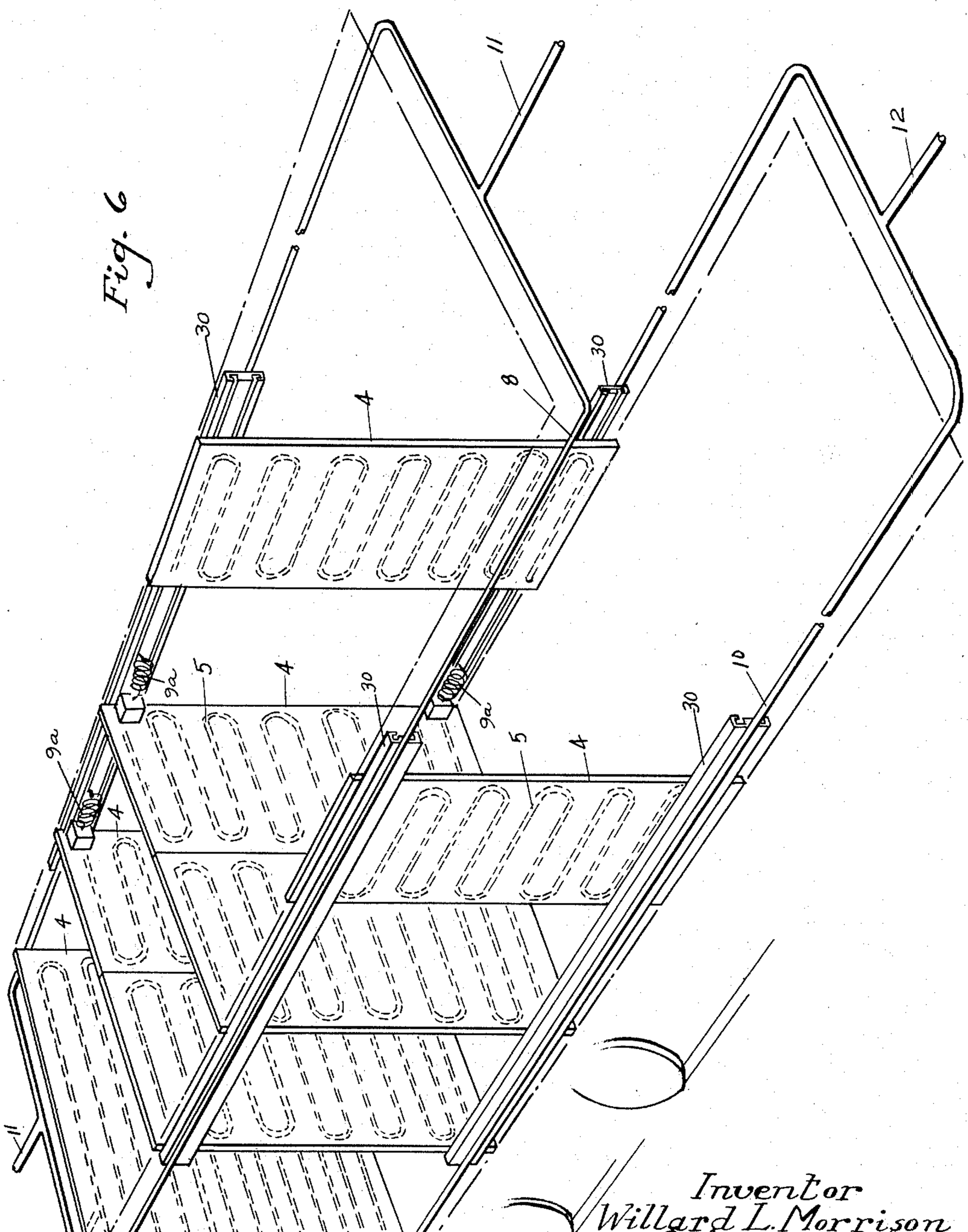
Fig. 6



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CONTAINER HAVING REFRIGERATED PARTITION

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Application May 16, 1946, Serial No. 670,218

10 Claims. (Cl. 62—101)

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This invention relates to an improved refrigeration container assembly for storing and shipping purposes.

One purpose of the invention is to provide an improved means for shipping pre-cooled materials which are initially reduced to a very low temperature.

Another purpose is to employ refrigeration members that will act as heat diffusers.

Another purpose is to employ a hinged door or partition carrying refrigerant.

Another purpose is to employ a hinge sealing means which disconnects the refrigerant when the partition is open.

Another purpose is to employ a common manifold for feeding refrigerant to a plurality of partitions and a second common manifold which returns the refrigerant from all the partitions.

Another purpose is to employ means whereby pre-cooled convective liquid can be pumped into the common manifold feed line when the invention is applied to a car and the car, truck or other conveyance is in position.

Another purpose is to employ a series of hinged doors or partitions which lie flat against the sides of the car or enclosure when not in use.

Another purpose is to employ hinged doors carrying refrigerant that are movable longitudinally in the car or container.

Another purpose is to maintain a refrigerated state within the car while it is being loaded.

Another purpose is to be able to restore a lower temperature to the articles after they are loaded in the conveyance.

Another purpose is to provide a means of loading the car at atmospheric temperature.

Another purpose is to provide an improved shipping assembly adaptable for shipping refrigerated materials in railroad cars, trucks, airplanes, ships and the like.

Other purposes will appear from time to time in the course of the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Fig. 1 is a perspective view with parts in section and parts broken away;

Fig. 2 is a horizontal section of the hinge member in conjunction with the door and side wall when the door is in a closed position;

Fig. 3 is a horizontal section of the hinge with the door in an open position;

Fig. 4 is a vertical section of Fig. 2 taken on the line 4—4 of Fig. 2, with parts in elevation;

Fig. 5 is a vertical section of Fig. 3 taken on the line 5—5 of Fig. 3, with parts in elevation; and

Fig. 6 is a perspective view from above with outside walls eliminated.

Like parts are indicated by like symbols throughout the specification and drawings.

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Referring to the drawings, in Fig. 1, I illustrate my invention applied to a freight car with the outer walls indicated as 1 and the inner walls indicated as 2 with the insulation 3 between them. The inner walls 2 may be of metal and have the doors 4 attached by a hinged means. The doors 4 are illustrated as double sheets of metal with the tubes 5 between them to carry the precooled convective liquid through a circuitous route to the bottom of the door. However, it should be understood that this means of refrigeration and door construction might be varied.

In the left half of Fig. 1, the doors are shown in a closed position. In the right half of the same drawing, the doors are shown in an open position, lying flat against the sides of the car, and completely out of the way while the car is being loaded. This position of the doors folded flat against the wall is an advantage if for some reason the car is used for another purpose than to carry frozen articles.

Figures 2 and 4 shows respectively a top and front view of the hinge in conjunction with the door and the wall when the door is in a closed position and the refrigerant is supplied from manifold 8 to tube 9 which is preferably formed of a metal flexible member 9*a* to allow adjustment of the doors 4 backward or forward along the container wall. Attached to the side wall by means of a track 30 is a hinge member 31 which cradles a cone shaped member 32. The cone 32 is attached to the door 4 by means of a crown 33. Within this cone shaped member or cock 32 is a passage 34 which forms with tube 9 an open circuit for the refrigerant when the door is in a closed position.

The track 30 is fastened to side wall 2 and holds firmly the hinge member 31. An adjustable tongue 35 and slot arrangement 36 is located between the track 30 and the hinge member 31 so that the doors 4 can be adjusted forward or backward, along the wall, to conform with the size of the load.

Figures 3 and 5 show respectively a top and front view of the hinge in conjunction with the door and side walls when the door is in an open position and the refrigerant circuit is closed. As the door 4 is swung open the cock 32 turns with the door while the hinge or cradle member 31 remains stationary. Thus the passage 34 does not connect with tube 9. Instead the passage 34 is shut off at 34*a* by the wall of the cradle 31. Likewise the tube 9 is shut off at 9*b* by the wall of the cock 32. Thus the pre-cooled connective liquid is locked in the passage 34 and tube 9 and flow to or from the door or partition is thus cut off.

This device of a track holding a cradle which supports a cock is employed at the top and bottom outer edge of each door. The refrigerant

is fed to the tubes in the door through the upper member and after it has traveled its circuitous path within the door drains off through the lower device near the bottom of the door.

The pre-cooled convective liquid is supplied through a common manifold 8 which carries the liquid to all the doors by means of the individual sub-passages 9.

Pre-cooled convective fluid can be supplied at either end of the freight car, or other container, through the passage 11 to the manifold 8 and after it has flowed through the tubes of the doors can be carried off from the return manifold 10 through the passage 12 at either end of the car. This can be done by a regular refrigeration means and in most cases will be done at the place where the freight car or container is loaded with frozen food. Thus as each section is packed with frozen articles the door is adjusted to position and closed and fastened, immediately pre-cooled convective fluid flows through the tubes of the door. The fluid also flows through the two stationary end wall plates 21. If the doors and the inside walls 2 are formed of metal they act as heat diffuser means and maintain an even temperature throughout the freight car. It is to be understood that while I illustrate my invention as used in a freight car, it can also be adapted to a truck, airplane or ship.

It will be understood that whereas there has been described and shown a practical and operative device, nevertheless many changes may be made in size, shape, number and disposition of parts without departing from the spirit of the invention, therefore the description and drawings are to be taken as in a broad sense, illustrative or diagrammatic.

The invention is not limited to a vehicle and may be employed in any type of container. The container may be stationary or may be movable and may be mounted upon or may form a part of any type of vehicle. The invention is not limited to any particular materials or construction. Many materials may be used without departing from the spirit of the invention. The invention is not limited to any particular valve arrangement. Generally speaking any valve which can be positioned between the container and partition and which in one position permits flow into the partition while preventing flow into the partition in another position is within the contemplation of the invention and may carry out the principle of the invention.

The use and operation of the invention are as follows:

In shipping pre-cooled or frozen articles it is necessary to have a means whereby the articles can remain in the car for a long period, such as thirty days without a dangerous change in temperature. By using a heat conductive metal for the sides and doors, an even temperature is maintained throughout the car.

Before the car is loaded, the series of doors or partitions are open and in a flat position along the side walls of the car or other container. As each section of the car is loaded the double doors are closed snugly upon the frozen articles and locked in position. In this position the cock opens the circuit and allows the pre-cooled convective fluid to flow from the supply manifold 8 into the tubes 5 of the doors. This cock connection is, preferably, identical on both the outer sides of the double doors as can be seen in Figure 6.

This manner of loading and refrigerating enables the articles to be restored to a lower temperature if they have accumulated some heat during the loading. It also provides means whereby the articles packed can be kept in a frozen state while the freight car door is open. And it allows the loading to take place under atmospheric conditions, thus eliminating the necessity for the men loading the car to wear special clothing, in view of the fact that only the packed or loaded part of the car or container is subject to full refrigeration.

The refrigerant may be, and usually is fed from an outside source and can enter the manifold 8 at either end of the car. In similar manner it leaves the lower manifold at either end of the car. This refrigerating process is preferably done at the place of loading, but it could be done at any desirable or convenient place. There may be instances when it will be desirable to refrigerate the car again before it reaches its desination. This can be done without in any way disturbing the shipment in the car by simply stopping at one of the refrigerant supply depots.

I claim:

1. In combination in a refrigerated container, housing parts defining an enclosed space, a partition movably mounted within said space and adapted, in one position, to subdivide said space into a plurality of chambers, refrigerant conduits supported upon said housing parts, and refrigerant passage members supported upon said partition, a valve and an actuating connection between the valve and the partition so arranged that when the partition is in the closed position the refrigerant conduits and the refrigerant passage members of the partition are in fluid communication, and so arranged that when the partition is in the open position, communication is shut off.

2. In combination in a refrigerated container, housing members defining an enclosed space, a partition movably mounted within said space and adapted in one position to subdivide said space into a plurality of chambers, a refrigerant conduit supported from said housing members, and a second refrigerant conduit supported from said partition, and automatic means controlled by the movement of the partition for putting the two conduits in communication when the partition is in closed position and for breaking such communication between said conduits when the partition is in open position.

3. In combination in a refrigerated container, housing members defining an enclosed space, a partition movably mounted within said space and adapted in one position to subdivide said space into a plurality of chambers, a refrigerant conduit supported from said housing members, and a second refrigerant conduit supported from said partition, and automatic means, controlled by the movement of the partition for putting the two conduits in communication and for breaking such communication between said conduits when the partition is in open position, said partition being hingedly supported within said space, and said automatic means comprising a valve positioned co-axially with and forming a part of said hinge.

4. In combination in a refrigerated container, housing members defining an enclosed space, a partition movably mounted within said space and adapted in one position to subdivide said space into a plurality of chambers, a refrigerant conduit supported from said housing members, and a second refrigerant conduit supported from said partition, and means, when the partition is in

one position, for putting the two conduits in communication, said means effective, when the partition is in another position, to break such communication between said conduits, and a hinge for supporting said partition, a part of said hinge being fixed with relation to said container, and a part of said hinge being fixed with relation to said partition, said last-mentioned means comprising a valve formed as a part of said hinge.

5. In combination in a refrigerated container, housing members defining an enclosed space, a partition movably mounted within said space and adapted in one position to subdivide said space into a plurality of chambers, a refrigerant conduit supported from said housing members, and a second refrigerant conduit supported from said partition, and means, when the partition is in one position, for putting the two conduits in communication, said means effective, when the partition is in another position, to break such communication between said conduits, and a hinge for supporting said partition, a part of said hinge being fixed with relation to said container, and a part of said hinge being fixed with relation to said partition, said last-mentioned means comprising a valve formed as a part of said hinge, and movable supporting means whereby that part of the hinge which is fixed with relation to the housing parts may be adjusted to a plurality of positions with relation to said housing parts.

6. In combination in a refrigerated container, housing members defining a main cavity, and a plurality of partition members movably positioned within said cavity and adapted to be moved toward portions of said housing members and to be moved to subdivide said cavity into a plurality of separate chambers, refrigerant fluid conduits supported from said housing members, and additional refrigerant conduits supported upon said partitions, hinge means for supporting said partitions, passage members contained in part in the hinge means adapted to place the refrigerant conduits of said partitions in communication with the refrigerant conduits of said housing members, said hinge means including valve parts adapted in one position to open communication from housing conduits to said conduits in said partitions, and in another position to close said passages.

7. In combination in a refrigerated container, housing members defining a main cavity, and a plurality of partition members movably positioned in pairs within said cavity and adapted to be moved toward portions of said housing members and to be moved to subdivide said cavity into a plurality of separate chambers, refrigerant fluid conduits supported from said housing members, and additional refrigerant conduits supported upon said partitions, hinge means for supporting said partitions, passage members contained in part in the hinge means adapted to place the refrigerant conduits of said partitions in communication with the refrigerant conduits of said housing members, said hinge means including valve parts adapted in one position to open communication from housing conduits to said conduits in said partitions and in another position to close said passages.

8. In combination in a refrigerated container, housing members defining a main cavity, and a plurality of partition members movably positioned within said cavity and adapted to be moved toward portions of said housing members and to be moved to subdivide said cavity into a plurality of separate chambers, refrigerant fluid conduits supported from said housing members, and additional refrigerant conduits supported upon said partitions, hinge means for supporting said partitions, passage members contained in part in the hinge means adapted to place the refrigerant conduits of said partitions in communication with the refrigerant conduits of said housing members, said hinge means including valve parts adapted in one position to open communication from housing conduits to said conduits in said partitions, and in another position to close said passages, said hinge means being in part mounted upon said housing members for adjusted movement with respect thereto, said housing refrigerant conduits including movable portions joined to said hinge means.

9. In combination in a refrigerated container, housing members defining a main cavity, and a plurality of partition members movably positioned in pairs within said cavity and adapted to be moved toward portions of said housing members and to be moved to subdivide said cavity into a plurality of separate chambers, refrigerant fluid conduits supported from said housing members, and additional refrigerant conduits supported upon said partitions, hinge means for supporting said partitions, passage members contained in part in the hinge means adapted to place the refrigerant conduits of said partitions in communication with the refrigerant conduits of said housing members, said hinge means including valve parts adapted in one position to open communication from housing conduits to said conduits in said partitions and in another position to close said passages, said hinge means being in part mounted upon said housing members for adjusted movement with respect thereto, said housing refrigerant conduits including movable portions joined to said hinge means.

10. In combination, housing members defining a container, and a plurality of subdividing partitions movably positioned within said container, passage members for refrigerant positioned upon said partitions, and refrigerant conduits positioned within said container, pairs of relatively movable members positioned with one member of each pair supported from a housing member, and a cooperating member of each pair supported from a partition, said relatively movable members defining fluid passages in communication with said passage members and said conduits, and shaped to open said passages when a partition is in one position and to close said passages when a partition is in another position.

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