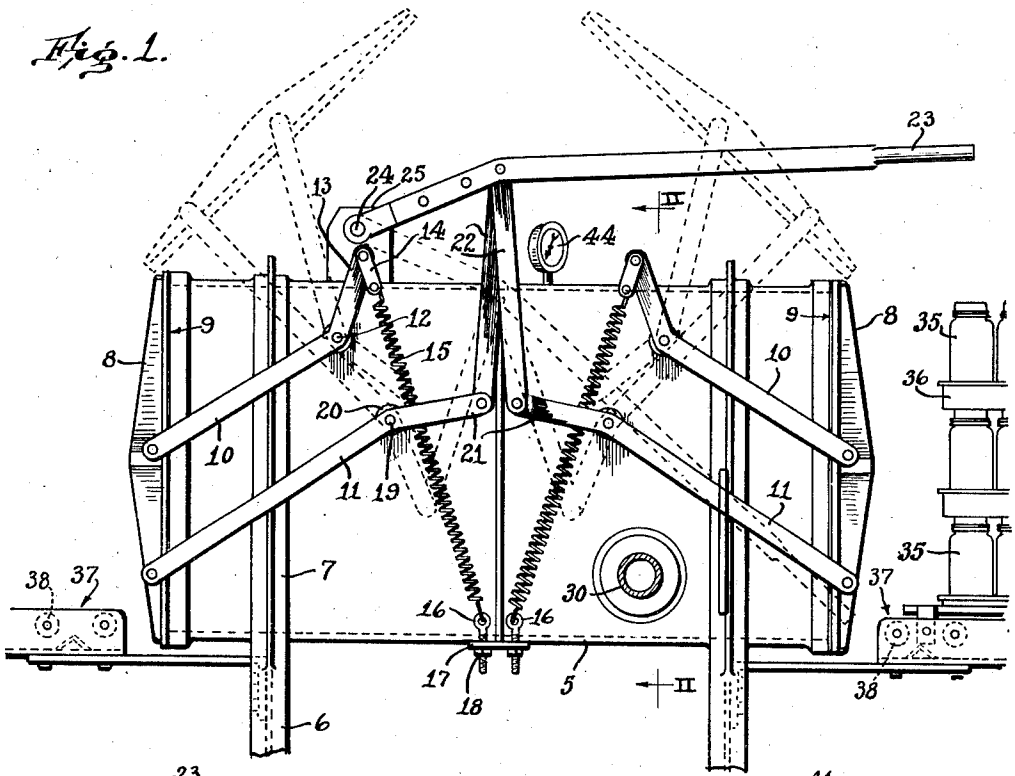
July 24, 1934. H. A. BARNBY 1,967,346

APPARATUS FOR VACUUMIZING AND SEALING CONTAINERS

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Fig. 1.



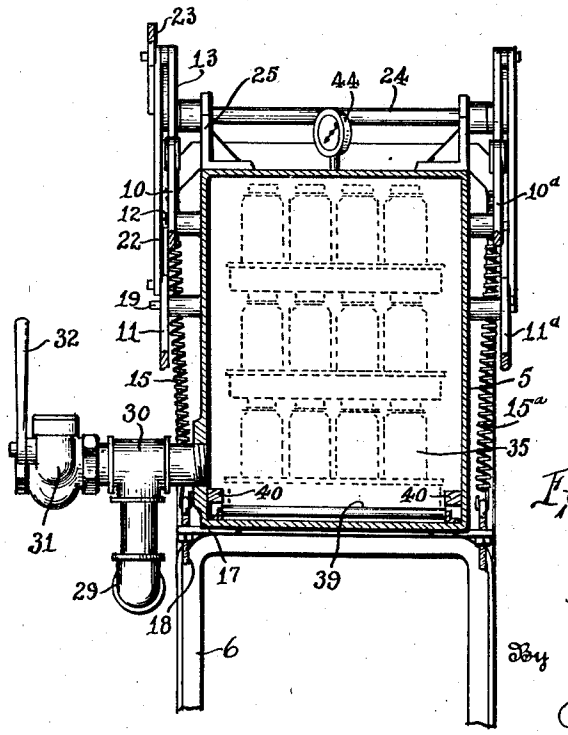


Fig. 2.

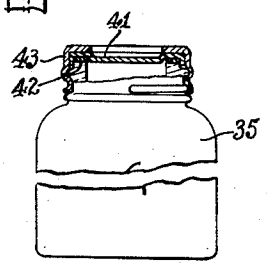


Fig. 3.

Inventor
Herbert A. Barnby,
By J. F. Rule
Attorney

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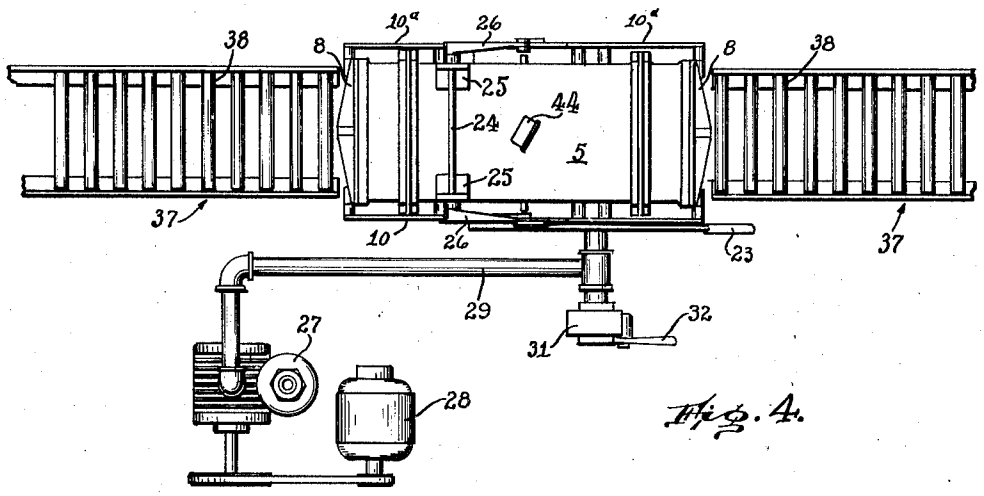


Fig. 4.

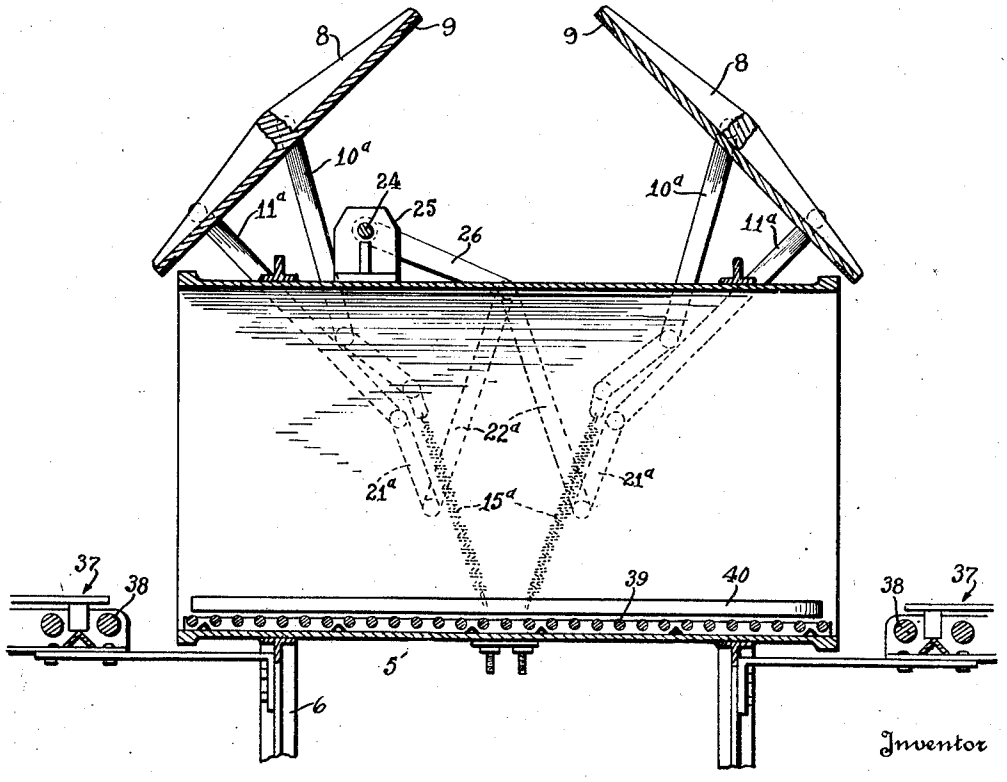


Fig. 5.

Inventor

Herbert A. Barnby

By

J. F. Rule, Attorney

July 24, 1934. H. A. BARNBY 1,967,346

APPARATUS FOR VACUUMIZING AND SEALING CONTAINERS

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Fig-6-

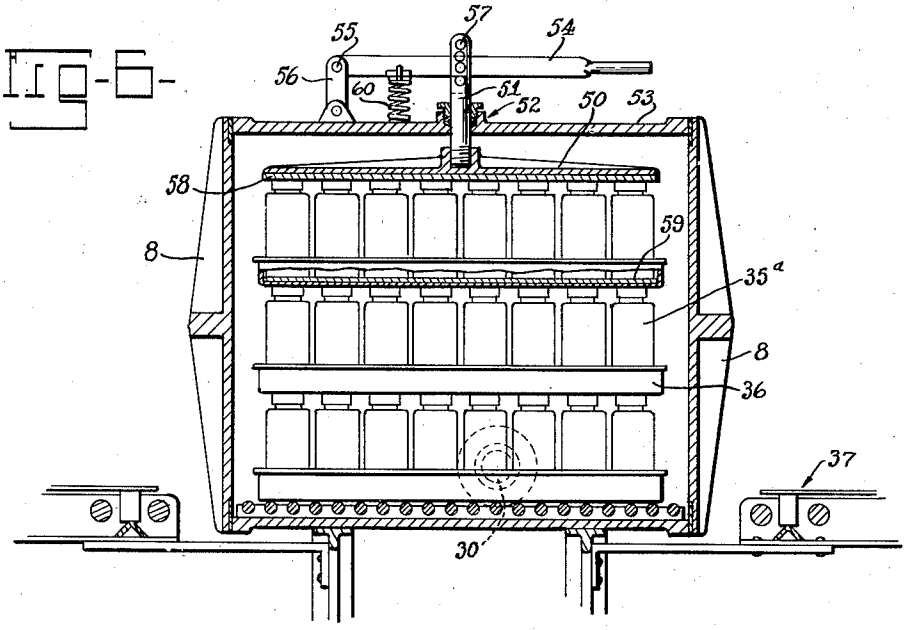
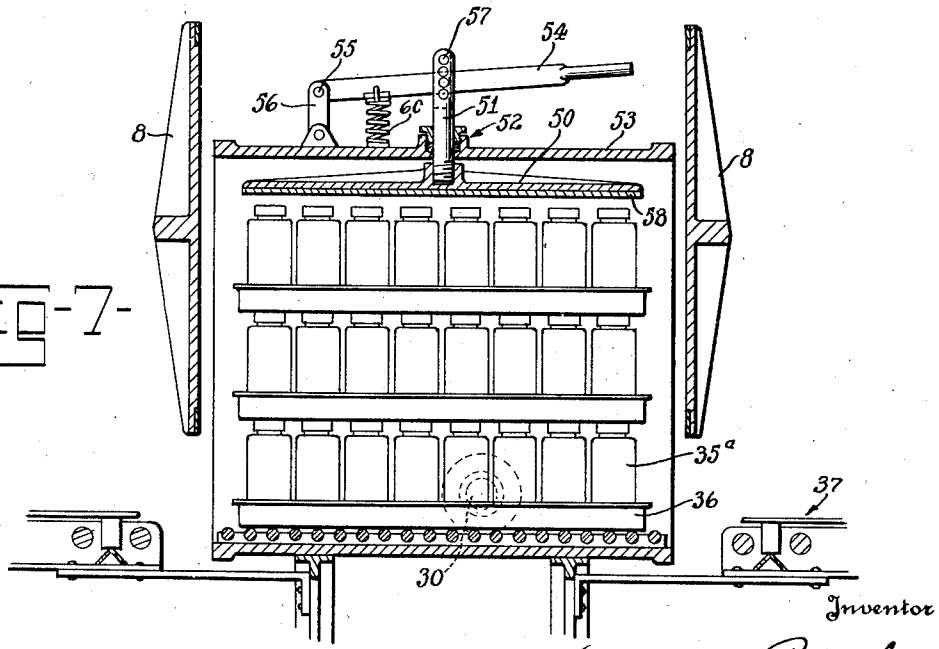


Fig-7-



Inventor

Herbert A. Barnby

By J. F. Rule.

Attorney

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UNITED STATES PATENT OFFICE

1,967,346

APPARATUS FOR VACUUMIZING AND SEALING CONTAINERS

Herbert A. Barnby, Toledo, Ohio, assignor to Owens-Illinois Glass Company, a corporation of Ohio

Application May 27, 1932, Serial No. 613,892

3 Claims. (Cl. 99—2)

My invention relates to a method and apparatus for vacuumizing and sealing glass jars or other containers filled with food products or other materials.

An object of the invention is to provide a simple, practical and efficient apparatus with which the vacuumizing process may be carried on with ease and rapidity.

Another object of the invention is to provide a novel method and apparatus by which the jars or other containers of products which are to be vacuumized, can be effectively sealed automatically while in the sealing chamber and without requiring any auxiliary apparatus or mechanism within the vacuum chamber.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is a side elevation of an apparatus constructed in accordance with my invention.

Fig. 2 is a sectional end elevation of the same, the section being taken at the line II—II on Fig. 1.

Fig. 3 is a part sectional view of a jar to be vacuumized.

Fig. 4 is a plan view of the apparatus.

Fig. 5 is a sectional elevation showing the end gates of the vacuum chamber in their elevated position.

Fig. 6 is a sectional elevation showing a modification of the apparatus, the door operating mechanism being omitted.

Fig. 7 is a view similar to Fig. 6, but showing the parts in a different relative position.

Referring to the drawings, a vacuum chamber 5, the walls of which may be made of aluminum or other suitable material, is preferably rectangular in form and may be supported on a framework 6. This framework includes ribs or bars 7 extending upward along the sides and across the top of the chamber and which may be cast integral with the chamber walls, to give sufficient strength and rigidity to the structure to withstand the atmospheric pressure when the air is exhausted from the chamber. End gates or doors 8 close the ends of the vacuum chamber. These doors have an inner marginal lining 9 of vulcanized rubber or other suitable sealing material to make an air tight connection between the doors and the end walls of the chamber.

The doors are lifted and lowered for opening and closing the chamber, by the following mechanism: Each door is carried on a pair of levers 10 and 11 on the front side of the chamber, and a corresponding pair 10^a and 11^a on the opposite side of the chamber. The levers of each pair are substantially parallel when the door is in closed position. The upper lever 10 is pivoted at its outer end to the door at a point about midway between the top and bottom of the door. The lever 10 is fulcrumed at 12 on a stud formed on the side wall of the chamber, said lever including an arm 13 extending upward from the fulcrum. The arm 13 is connected through a link 14 to a counterbalancing coil spring 15, the latter being attached at its lower end to a screw bolt 16 anchored to a plate 17 attached to the bottom of the chamber. A nut 18 permits adjustment of said bolt for adjusting the tension of the spring. The lever 11 is pivoted at 19 to a stud 20 on the chamber wall. The arm 21 of lever 11 is connected through a link 22 to a hand lever 23. The hand lever 23 is fixed to a pivot shaft 24 mounted in brackets 25, the latter being secured to the top wall of the vacuum chamber at opposite edges thereof.

Each lever 10^a on the rear side of the chamber is connected to a counterbalancing spring 15^a like the springs 15 and adjustable in like manner. Links 22^a connect the levers 11^a with an arm 26 secured to the shaft 24, the arm 26 being parallel with that portion of the lever 23 between the shaft 24 and the links 22.

It will be observed that the link and lever mechanisms are identical for the two doors, except that they are right and left handed. Also, the link and lever connections are alike on opposite sides of the chamber. Each pair of levers 10 and 11 are substantially parallel when the door is in closed position, but the lever 10 is shorter than the lever 11 and swings through a greater arc when the door is lifted or lowered. The arrangement is such that when the door is pulled upward by depressing the lever 23, it also swings inward to an inclined position over the vacuum chamber, as shown in dotted lines (Fig. 1). It will be apparent that when the hand lever 23 is moved downward the two doors will be moved upward simultaneously to the dotted line position. The tension of the springs 15 is preferably adjusted to substantially counterbalance the weight of the doors so that but little effort is required to lift the doors. It will also be noted that during the lifting of the doors, the springs contract and their tension is reduced. This reduction in the pull of the springs is offset in part by the increasing leverage obtained by the movement of the arms 13 toward a position perpendicular to the spring. The diminishing tension of the spring is further counteracted by

inward movement of the door toward a position over the pivots 12 and 19. The arrangement of parts is such that the doors 8 are substantially counterbalanced in all positions. The operator may, therefore, lift and lower both doors with little effort by lowering and lifting the lever 23.

When the vacuum chamber is closed, the air is exhausted therefrom by means of a vacuum pump 27 driven by an electric motor 28. The air is withdrawn from the chamber through an exhaust pipe 29 extending from the vacuum pump and uniting with a pipe section 30 opening into said chamber. A valve 31 actuated by a hand lever 32 can be opened for admitting atmospheric air through the pipe 30 into the vacuum chamber.

Jars or other containers 35 which may be filled with food products or other material which it is desired to vacuumize and seal within such container, are loaded on trays 36 for introduction into the vacuum chamber. The trays are carried to and from said chamber on horizontal conveyors 37 extending from opposite ends of the chamber. These conveyors may comprise series of parallel rollers 38 and are preferably arranged at substantially the floor level of the vacuum chamber. The floor of the chamber also comprises a series of parallel rollers 39. Horizontal guide strips 40 extending along the inner side walls of the chamber just above the rollers 39, serve to guide the trays 36 in their passage through the chamber.

As shown, a number of trays 36, each filled with jars 35, may be placed one on top of another, all of the trays being then moved into said chamber at one time. As shown, the jars are arranged in three tiers. The chamber may be of a length to accommodate two or more trays placed end to end therein.

The receptacle 35, as shown in Fig. 3, is a glass jar of usual construction having a top cover or liner 41, a sealing gasket 42 of rubber or other suitable material, and an outer sealing ring 43, the latter provided with screw threads to engage the correspondingly threaded neck portion of the container. The jar may be filled, for example, with ground coffee or any other material or product to be vacuumized and sealed.

Operation.—Assuming the valve 31 is open so that there is atmospheric pressure within the vacuum chamber, the operator lowers the hand lever 23, thereby lifting the end doors to the dotted line position (Fig. 1). A series of trays 36, each filled with jars 35 containing the product or material to be vacuumized, and which have been placed on a conveyor 37, as indicated, are then moved into the vacuum chamber. Before the jars 35 are placed on the trays, the top 41 of each jar is placed in position on the jar and the clamping ring 43 placed loosely in position. When the jars have been moved into the vacuum chamber, the operator raises the lever 23, thus lowering the end doors 8. He then operates the hand lever 32 to close the valve 31, thereby closing the chamber 5 to atmospheric air. The motor 28 may now be started, or may be running continuously, thereby operating the vacuum pump and withdrawing the air from the chamber. The containers 35 are thus vacuumized, the loosely seated covers 41 permitting the free escape of the air from within the containers. When a sufficiently high vacuum has been drawn, as indicated by the vacuum gauge 44, the operator may or may not stop the motor 28, and moves the hand lever 32 into position to open the valve 31. This valve and the pipe 30 are of sufficient size to permit a very rapid entrance of atmospheric air into the chamber, so that the pressure within the chamber rises instantaneously to atmospheric pressure. This sudden rise of pressure is immediately applied to the outer surfaces of the jar covers 41 so that they bear down on the sealing gaskets 42 and seal the jars. This sudden application of atmospheric pressure serves to seal the jars before there is opportunity for any appreciable amount of air to enter the jars. They are thus automatically sealed while containing a high vacuum or a vacuum substantially equal to that which is drawn in the chamber before the valve 31 is opened.

The operator now lowers the lever 23 and thus lifts the doors 8, permitting the trays containing the vacuumized jars to be moved forward out of the vacuum chamber onto the conveyor 37 at the discharge end of the chamber. The trays of jars which have been vacuumized may be pushed out of the chamber by pushing in the next set of trays which have been brought to position on the conveyor 37.

It will be seen that the jars are automatically sealed while in the vacuum chamber, without the use of any mechanism within the chamber and without requiring any valves or other special construction or attachments in connection with the jar covers. When the jars have been removed from the vacuum chamber, the sealing rings 43 may be screwed down tight.

Figs. 6 and 7 illustrate a modification in which there is provided mechanical means for momentarily applying top pressure to the jars or other containers at the moment the vacuum is released. With some types of containers, there is more or less irregularity in the sealing surfaces of some of the containers, so that in the vacuumizing process above set forth the admission of air pressure to the sealing chamber cannot be relied upon to seal all the containers without air leakage. In the form of invention shown in Figs. 6 and 7 there is provided an auxiliary means for mechanically applying a top pressure to the jar covers at the moment the vacuum is released, thus preventing entrance of air to the vacuumized jars before atmospheric pressure can operate to clamp the covers into sealing engagement with the jars.

This auxiliary means comprises a horizontally disposed pressure plate 50 within the vacuum chamber just below the roof 53 of the chamber, the length and width of the plate being approximately those of the vacuum chamber, so as to overlie all the jars in a full tray. A vertical stem 51 secured to the plate 50 extends upward through a packing gland 52 in the roof 53. A hand lever 54 is fulcrumed at 55 to a link 56 which connects the lever with the roof 53. The lever is adjustably connected to the stem 51, a series of openings 57 in said stem permitting such adjustment. This adjusting means permits the pressure plate 50 to be set at a height corresponding to the top level of jars of different lengths without carrying the lever 54 out of its normal range of operation.

The plate 50 is preferably provided with a bottom lining 58 of rubber or other resilient material, permitting a substantially uniform distribution of the pressure to all of the jars independently of slight irregularities or variations in the top level of the individual jars. The trays 36 may in like manner be provided with an inner bottom lining 59 of resilient material, which may either supplement or be uesd as a substitute for the lining 58, in distributing the pressure.

A compression spring 60 is interposed between

the lever 54 and roof 53 and serves to hold the pressure plate 50 in its elevated position, except when the lever is depressed by the operator. Fig. 7 shows the pressure plate held up by the spring 60 in position to clear the jars, and the doors 8 in an intermediate position assumed during opening and closing of the vacuum chamber.

In operation, the lever 54 is momentarily moved downward by the operator to the Fig. 6 position and pressure thereby applied to the covers of the receptacles while the valve 31 is opened and atmospheric pressure is being admitted to the vacuum chamber. In this manner there is prevented any danger of air entering the vacuumized containers before atmospheric pressure can operate effectively to clamp the covers in sealing contact with the jaws.

Modifications may be resorted to within the spirit and scope of my invention.

What I claim is:

1. The combination of a structure providing a vacuum chamber comprising top, bottom and side walls, end doors for said chamber, means for exhausting the air from said chamber, means for swinging said doors upwardly and inwardly from a closed position in which the doors are vertical, to an open position in which the doors are over the vacuum chamber and in an inclined position, said means including a pair of levers for each door, the levers of each pair being pivotally connected intermediate their ends to a side wall of the container and comprising parallel arms extending downward from their pivots in an inclined direction and pivoted to the door, the lower said arm of each pair being of greater length than the upper arm, whereby the doors are tilted to said inclined position as they are swung upward, a hand lever, and links connecting the latter to one of the levers of each said pair, said hand lever operable through said connections for swinging the doors to said open and closed positions.

2. The combination of a structure providing a vacuum chamber comprising top, bottom and side walls, end doors for said chamber, means for exhausting the air from said chamber, means for swinging said doors upwardly and inwardly from a closed position in which the doors are vertical, to an open position in which the doors are over the vacuum chamber and in an inclined position, said means including a pair of levers for each door, the levers of each pair being pivotally connected intermediate their ends to a side wall of the container and comprising parallel arms extending downward from their pivots in an inclined direction and pivoted to the door the lower said arm of each pair being of greater length than the upper arm, whereby the doors are tilted to said inclined position as they are swung upward, a hand lever, links connecting the latter to one of the levers of each said pair, said hand lever operable through said connections for swinging the doors to said open and closed positions, and counterbalancing springs connected to said lever and counterbalancing the weight of the doors.

3. The combination of a structure providing a vacuum chamber comprising top, bottom and side walls, end doors for said chamber, means for exhausting the air from said chamber, means for swinging said doors upwardly and inwardly from a closed position in which the doors are vertical, to an open position in which the doors are over the vacuum chamber and in an inclined position, said means including a pair of levers for each door, the levers of each pair being pivotally connected intermediate their ends to a side wall of the container and comprising parallel arms extending downward from their pivots in an inclined direction and pivoted to the door, a hand lever, links connecting the latter to one of the levers of each said pair, said hand lever operable through said connections for swinging the doors to said open and closed positions, and counterbalancing springs each connected to a lever of one of said pairs and extending in a direction such that as the corresponding door is lifted and the tension of the spring reduced, the distance of the spring from the fulcrum of the lever is increased in a direction perpendicular to that in which its tension is exerted, whereby the leverage of the spring acting through the connected lever is increased.

HERBERT A. BARNBY.