

No. 897,227.

PATENTED AUG. 25, 1908.

G. F. SCHRADER.
REFRIGERATOR.

APPLICATION FILED AUG. 16, 1908.

4 SHEETS—SHEET 1.

Fig. 1.

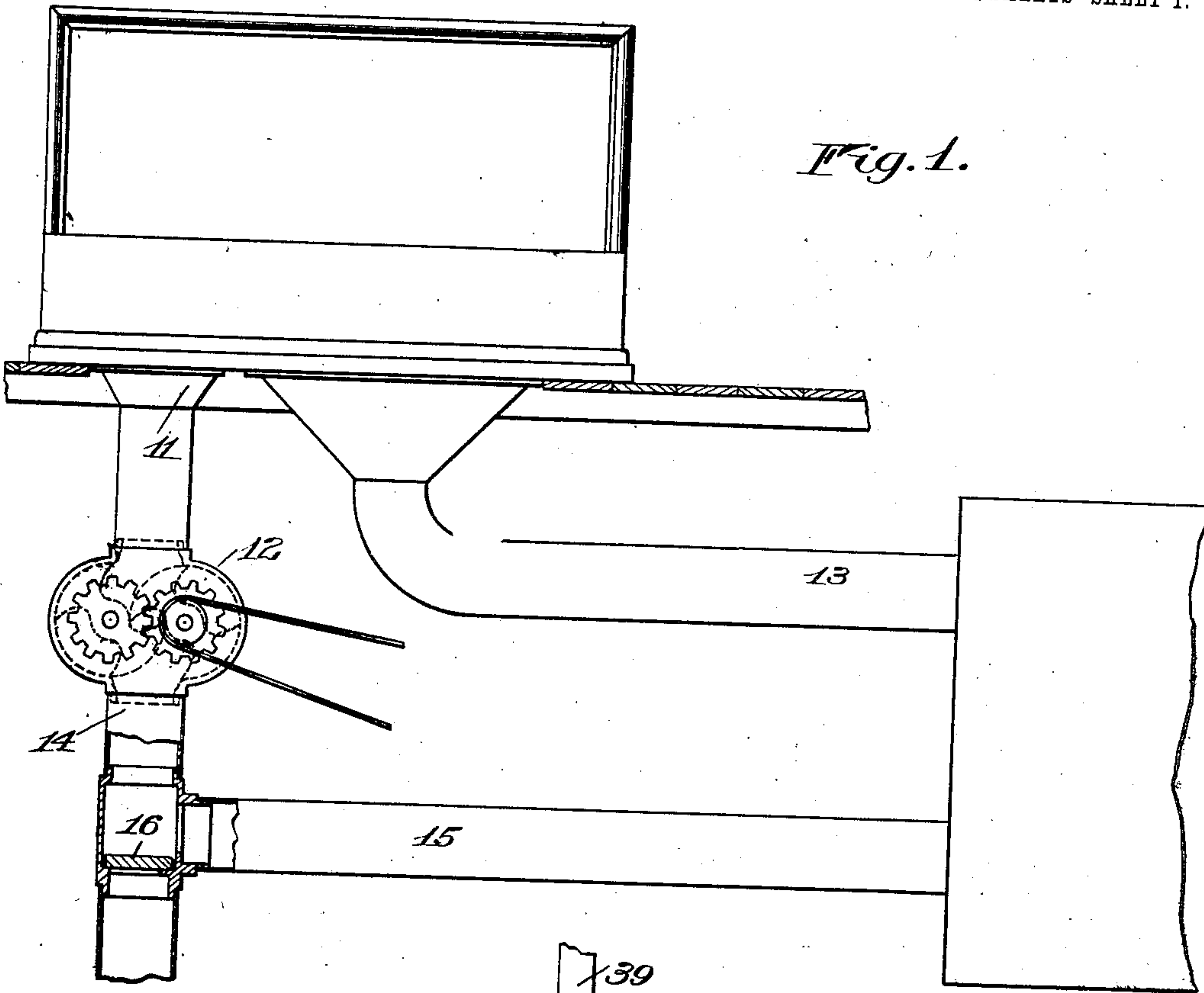
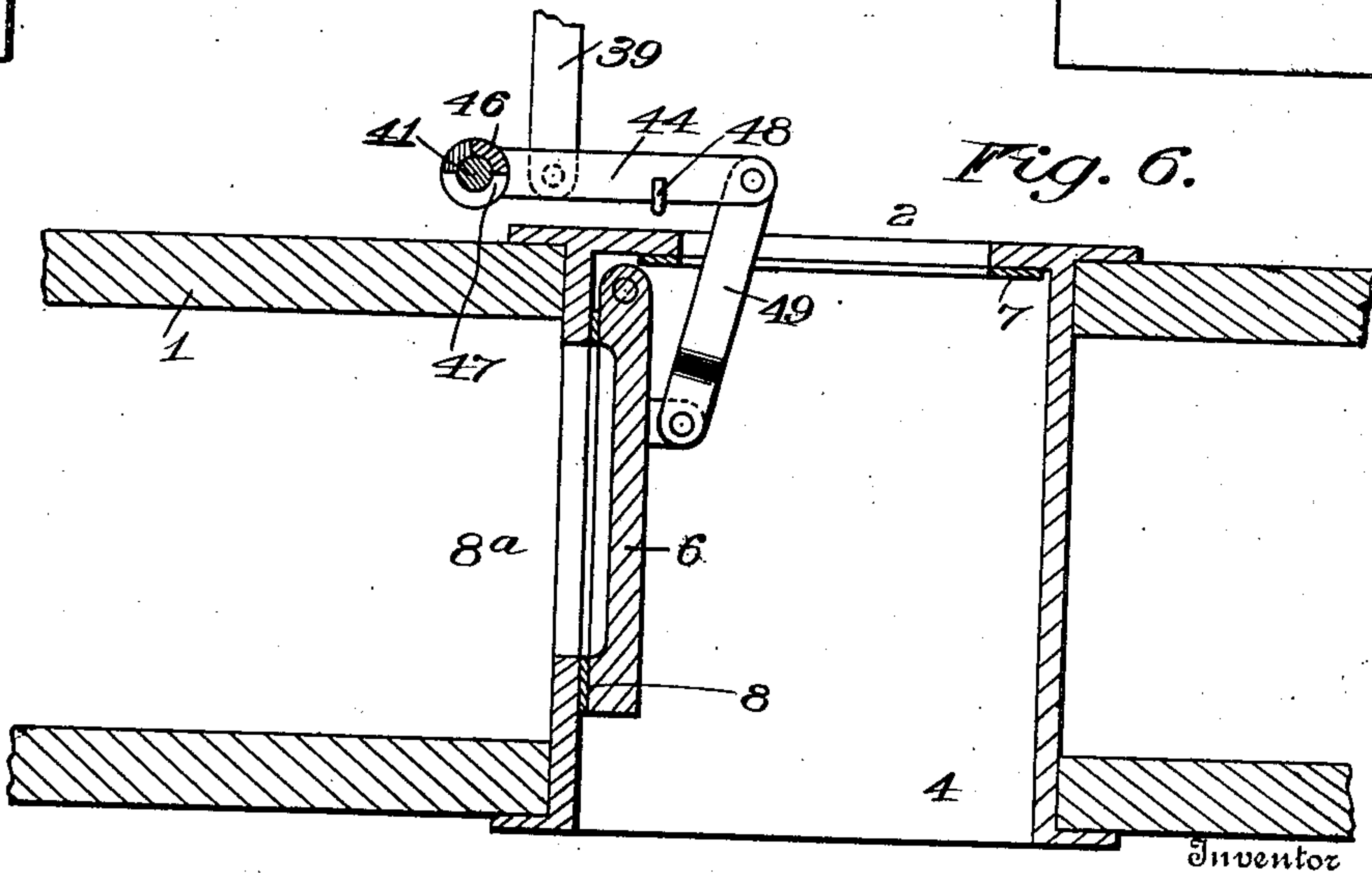


Fig. 6.



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4 SHEETS—SHEET 2.

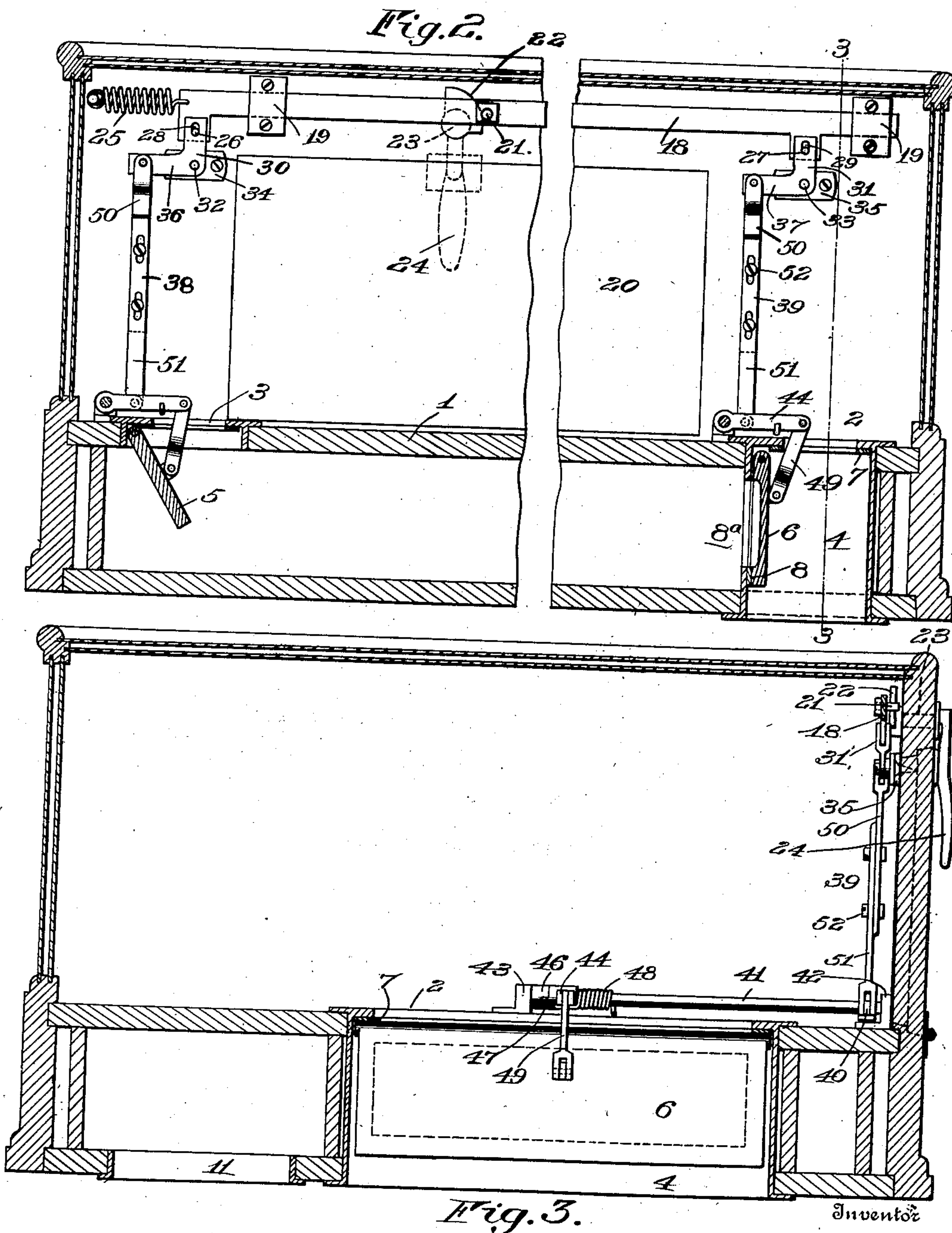


Fig. 3.

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4 SHEETS—SHEET 3.

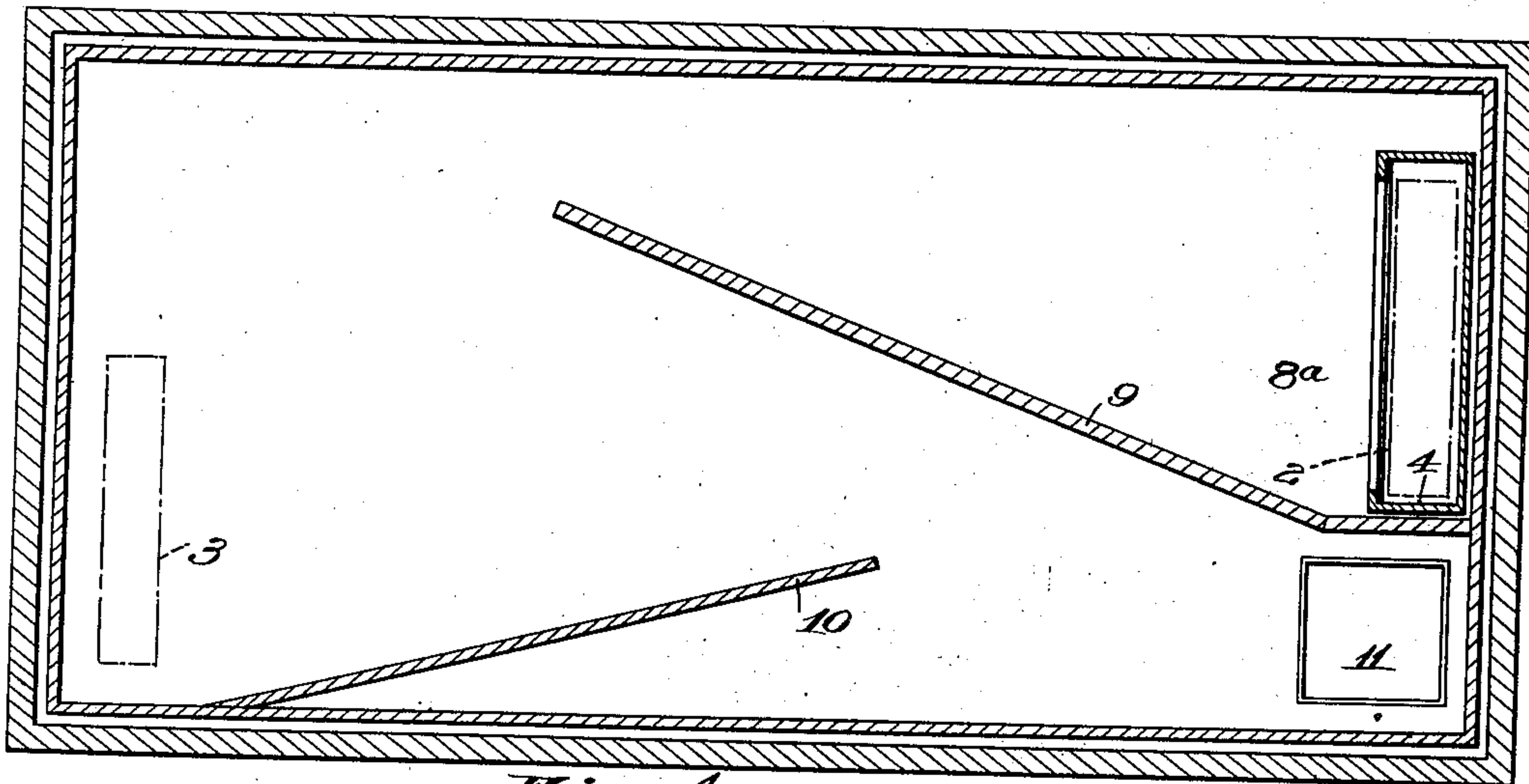


Fig. 4.

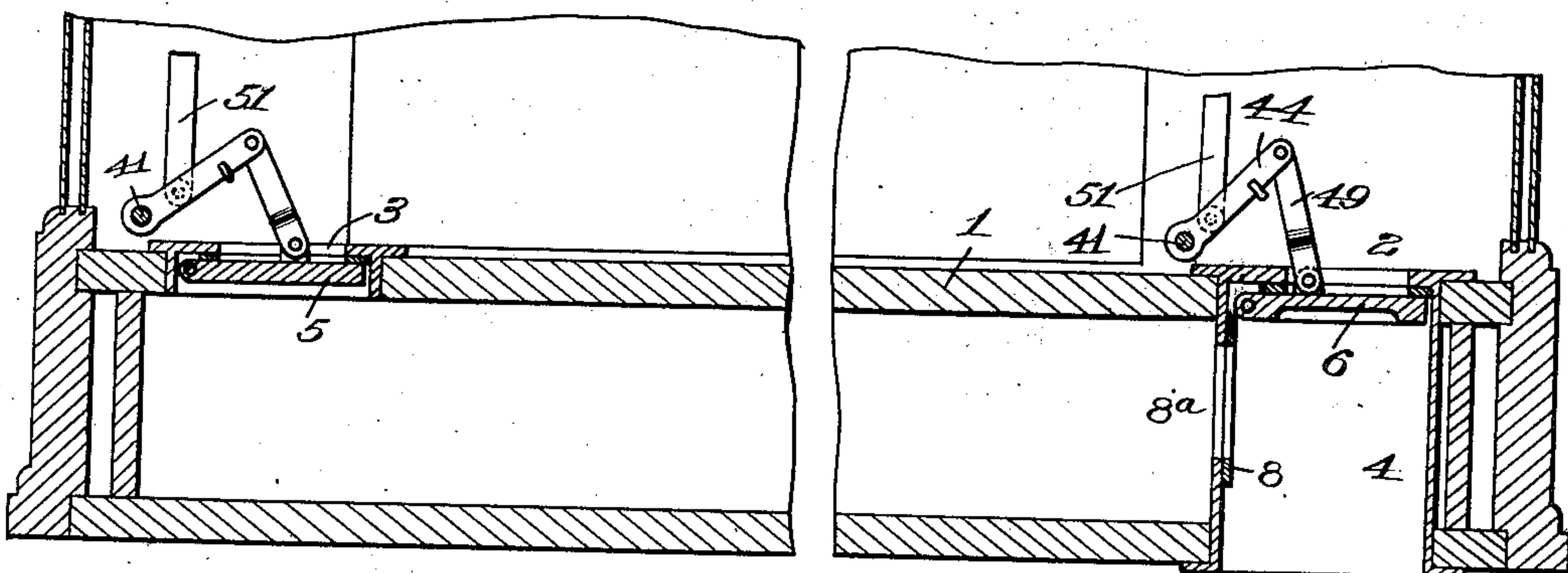


Fig. 5.

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4 SHEETS—SHEET 4.

Fig. 7.

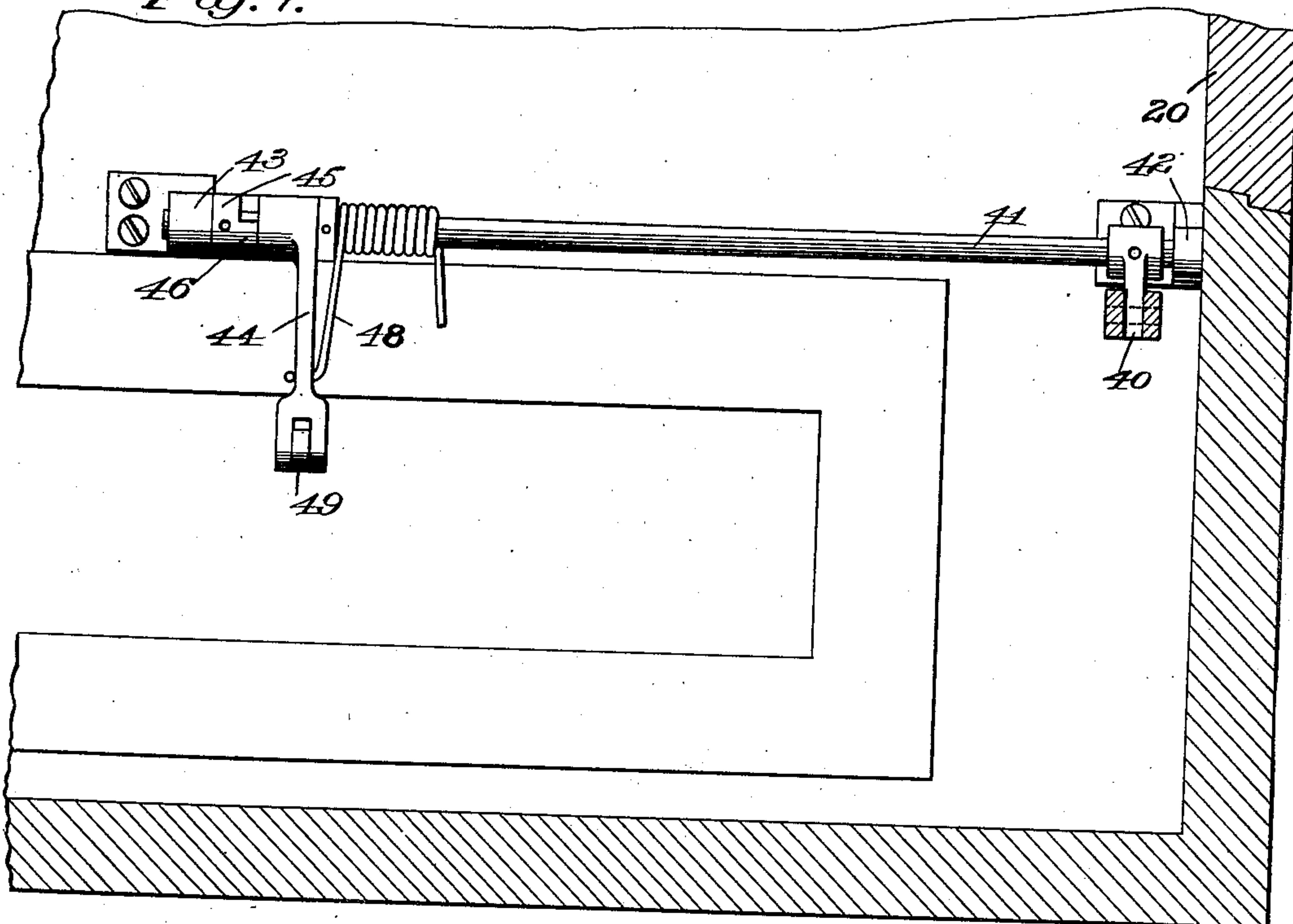
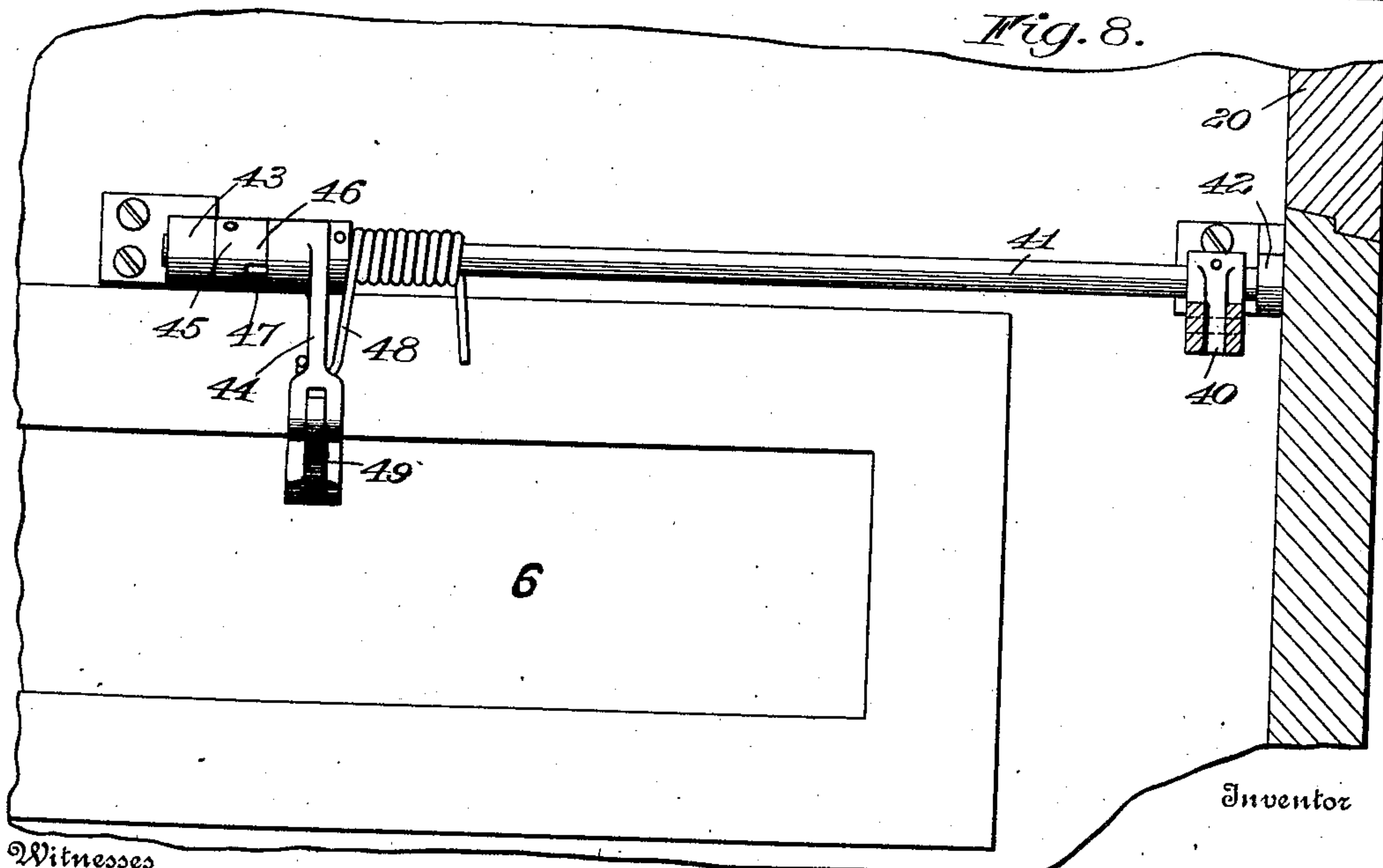


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE F. SCHRADER, OF SARANAC LAKE, NEW YORK, ASSIGNOR OF ONE-THIRD TO MILO B. MILLER AND ONE-THIRD TO BENJAMIN DUFFY, OF SARANAC LAKE, NEW YORK.

REFRIGERATOR

No. 897,227.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed August 16, 1906. Serial No. 330,765.

To all whom it may concern:

Be it known that I, GEORGE F. SCHRADER, of Saranac Lake, county of Franklin, and State of New York, have invented certain new and useful Improvements in Refrigerators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of the specification, and to the reference numerals marked thereon.

My present invention relates to improvements in cases for the preservation of meats, vegetables and other perishable goods, and its object is to provide such a case that is particularly adapted for use as a show case wherein the goods may be inclosed and protected from the atmosphere, while they may be displayed or on exhibition, the method of supplying and controlling the refrigerating medium being such that a positive circulation of the refrigerated air or other cooling medium is insured at all times, and the entrance of the warmer air from the atmosphere during the opening of the door or doors of the provision chamber, is prevented.

To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a front elevation of a show case constructed in accordance with my present invention, showing the method of supplying the refrigerated air or other cooling medium thereto. Fig. 2 represents a vertical longitudinal section of the case, the air-controlling valves being shown in such positions as to cause circulation of air through the provision chamber. Fig. 3 represents a transverse section through the case on the line 3—3 of Fig. 2. Fig. 4 is a horizontal section through the case, showing the flue arrangement in the base thereof. Fig. 5 represents a section through the inlet and outlet openings of the provision chamber, the air controlling valves being in proper positions to cause a direct circulation of air through the base, and Figs. 6, 7 and 8 are detail views of the valve operating and controlling devices.

Similar reference numerals in the several figures indicate similar parts.

My invention, briefly stated, embodies a suitably constructed case, preferably adapted for use as a show case for the display, as well as the preservation of perishable goods, and is provided with passages for conducting cold air to and from the provision chamber, the case having valves so constructed and arranged that under normal conditions a constant circulation of cold air will be maintained through the provision chamber and the base of the case, but while the door leading to the provision chamber of the case is in opened position, the circulation of air through the provision chamber will be interrupted in order to prevent entrance of the warmer air from the exterior of the case, the cold air at this time passing directly through the base beneath the provision chamber and it is preferable that the controlling valves should be operated before the provision chamber door has been opened, and also after it has been closed, for the reason that this will interrupt the circulation of air through the provision chamber before the door has been opened, and the circulation will not be reestablished until the door has been closed.

The refrigerator shown in the present embodiment of my invention comprises a lower or base section, and an upper section composed mainly of glass to form a transparently inclosed provision chamber, the glass plates at the top and sides of the upper section being double and suitably spaced to form an air insulating space between them; but it will be understood, of course, that any suitable form of provision chamber may be employed as desired.

The base section is formed of slate or other suitable material, and in form is generally rectangular and of suitable dimensions to cover and close the bottom of the provision chamber, a partition 1 formed of a slab of slate or other material, serving to separate the provision and base chambers, and also providing a floor for supporting the provisions to be refrigerated or preserved. In this partition are formed an air inlet 2 and an air outlet 3 for the provision chamber, the inlet being formed at the upper discharge end of the cold air supply casing 4, while the outlet from the provision chamber discharges into the base at the opposite end of the case, a valve 5 being provided for controlling the flow of air through this outlet.

Any suitable form of valves may be employed for controlling the flow of air through the inlet and outlet, those shown being of the pivoted door type, the valve 6 being pivoted at the upper end of the air supply casing 4 and arranged to cooperate alternately with the valve seats 7 and 8, the latter being arranged around an inlet opening 8^a leading directly from the air supply casing into the hollow base, the inflowing air being cut off from the base and passing into the provision chamber when the valve occupies the position shown in Fig. 2, while when this valve occupies the position shown in Fig. 5, the supply of air to the provision chamber will be cut off, and a direct passage for the air is established through the base.

In order to insure circulation of the cold air throughout all parts of the hollow base, it is preferable to provide one or more deflectors 9 and 10, to serve as flues for conducting the cold air to all parts of the base, the deflector 9 also serving to divide off the cold air inlet 8^a from the air outlet 11 through which the air from the provision chamber and the base discharges; and thus prevent the air from discharging directly without circulating through the base.

Refrigerated air is supplied to the case preferably from an ordinary ice box or cooling chamber such as are in common use in meat and provision markets for cooling and preserving perishable goods, and it is preferable to draw the cold air into the case by connecting an exhaust fan 12 to the air discharge 11 of the case, the air inlet for the case being connected to the ice box or cooling chamber by a pipe 13, so that as the fan exhausts the air from the show case, fresh air will be drawn from the ice box and the exhaust fan may be provided with a branched pipe 14, having one branch 15 leading back to the ice box, and the other branch leading to the atmosphere, a valve 16 serving to control the discharge of the air to either the ice box or the atmosphere as may be desired. Of course, in cold weather, instead of drawing the cold air from an ice box, it may be drawn from the atmosphere, and the show case is so constructed that it will operate equally well in either case.

The valves for controlling the air circulation through the case are provided for the purpose of enabling frequent access to the case for the purpose of removing and replacing goods without liability of spoiling the goods contained in the show case, and in order to prevent the entrance of warm air into the provision chamber wherever the door or doors leading thereto are opened, it is preferable to operate the air controlling valves automatically, that is to say, they should be so constructed and arranged that before the door to the provision chamber is opened, the controlling valves should be so

set that circulation of air through the provision chamber is cut off, and the valves should remain so set until after the door to the provision chamber has been closed, when the circulation of air through the provision chamber is automatically reestablished. This result is accomplished in the present embodiment of my invention by providing suitable operative connections between the securing or locking device for the door leading to the provision chamber, and the valves, so that when the door is unfastened preparatory to its opening, the valves will be automatically operated before the door is opened, to interrupt the circulation of air through the provision chamber, and after the door has been closed, manipulation of the doors securing device will automatically serve to operate the valves to reestablish the air circulation through the provision chamber.

Any suitable mechanical devices may be employed for accomplishing the automatic operation of the air controlling valves as above described, the devices shown in the present embodiment of the invention comprising a reciprocatory operating bar 18 mounted in suitable bearings 19 secured to the inside of the rear wall of the case adjacent to the opening for the door 20 which provides access to the provision chamber, and this bar is provided with a pin or projection 21 thereon arranged to cooperate with a cam 22 secured to the inner end of a stud shaft 23, the latter being journaled in and extending through the wall of the case and provided at its outer end with a locking device 24 adapted to be rotated by hand for locking and unlocking the door 20, the cam 22 serving to reciprocate the bar 18 to the right, Fig. 2, as the locking lever is rotated into unlocked position, and a spring 25 serving to return the bar 18 to normal position when the locking lever for the door is returned to locked position. This bar 18 is provided with projections 26 and 27 arranged to operate in the slots 28 and 29 of the bell crank levers 30 and 31 respectively, the latter being pivoted at 32 and 33 respectively to the relatively fixed bearing brackets 34 and 35 and having their free arms 36 and 37 pivotally connected to the links 38 and 39. The link 38 is pivotally connected to the valve 5 which controls communication between the base and the provision chamber, so that the operation of the bar 18 will reciprocate the link 38 to open and close this valve; while the link 39 has its lower end pivotally attached to the outer end of a crank arm 40 fixed to a rock shaft 41, the latter being mounted in suitable bearings 42 and 43, and having a valve-operating arm 44 mounted thereon.

For the purpose of insuring the firm closing of the valve 6 on its upper valve seat to effectually close the inlet 2 leading to the provision chamber, it is preferable to mount

the valve-operating arm 44 loosely on its shaft 41, and to fix on the shaft a stop-collar 45 having a projection 46 thereon arranged to cooperate with a corresponding projection 47 on the hub of the valve-operating arm 44, these stops serving to normally limit the movement of said arm under the action of a spring 48, the latter serving to yieldingly press the valve into cooperative engagement with its seat when the bar 18 has been operated by the unlocking movement of the door securing lever, the valve operating arm being pivotally connected to the valve 6 by means of the link 49, and should the operating bar move too far, the spring will compensate for the excess movement without disturbing the relation between the valve and the door-securing device. It is preferable to provide either or both of the links 38 or 39, which connect the main operating bar 18 with the air controlling valves, with suitable means of adjustment to enable proper setting of the valves, and this is conveniently accomplished in the present instance by forming the link of two sections 50 and 51 having overlapping ends slotted longitudinally to receive the securing bolts 52, such a connection between the sections of the link permitting the latter to be lengthened or shortened as may be necessary.

A refrigerator constructed in accordance with my invention is particularly adapted for use in cases where it is desirable or necessary to have frequent access to the goods contained therein, as the arrangement of the circulatory passages as described, and the automatically operated valves for controlling the flow of the cooling or refrigerating medium serve to automatically cut off communication between the circulating air and the provision chamber before access can be had to the latter, thereby preventing warm air from being drawn into the provision chamber whenever it is necessary to open the door thereof and remove or introduce the goods, and the continuous circulation of the cooling medium through the base, maintains the dividing partition between the provision and base chambers at a very low temperature, so that the goods resting thereon will be kept cool even though the door to the refrigerating chamber is opened frequently or kept open for comparatively long periods. Of course, in cases employing a plurality of doors for the provision chamber, the valves will be operated whenever any of the doors are operated, for in such cases the operating bar 18 is provided with a projection arranged to cooperate with the securing or locking device for each door, and this bar will be operated whenever any of the door securing devices are operated.

By supplying the refrigerated air or other cooling medium in the manner described, the annoyance and additional expense of keeping

ice in the show case is avoided, as the ice used in the usual ice box is utilized for cooling the show case, the piping between the ice box and show case being readily arranged in installing the show case, and it is advantageous to employ a suitable mechanical device for maintaining the circulation of air, for in this way an ample supply of cold dry air is insured, and the ventilation of the provision chamber is positive, so that decomposition or contamination of the provisions contained therein cannot occur.

I claim as my invention.

1. In a refrigerator, the combination with a base having a circulating passage therein, and a provision chamber supported on the base, and communicating at opposite ends with the passage and having a wall in common with the base, of means for positively circulating a cooling medium, having passages leading therefrom to the base circulating passage and provision chamber and means for controlling communication between the provision chamber and the circulating passage in the base.

2. In a refrigerator, the combination with a base having an air circulating passage therein, of a provision chamber located upon said base and having a wall in common with the base, openings providing communication between the ends of the provision chamber and the passage in the base, means for causing a positive circulation of air in the base and in the provision chamber, and valve devices for controlling the openings between the circulating passage and the provision chamber.

3. In a refrigerator, the combination with a provision chamber having a door for affording access thereto and means for supplying a cooling medium to the provision chamber, of valve devices for cutting off the cooling medium from the chamber, securing device for the door operable independently thereof and connections between said valve devices and the securing device insuring a complete closing of said valve devices before the door is opened.

4. In a refrigerator, the combination with a suitable refrigerating or provision chamber adapted to be connected to a source of cold air supply, a door for affording access to said chamber and a securing device for said door operated independently thereof, of means controlled by said securing device for insuring the cutting off of the flow of air to the provision chamber before the door is opened.

5. In a refrigerator, the combination with a provision chamber adapted to receive refrigerated air from a suitable source, a door for affording access to said chamber, and a device for locking and unlocking said door, of means operated by said device when the latter is moved to unlocked position for interrupting the circulation of air in the provision

chamber, and for establishing air circulation therein when said device is moved into locked position.

6. In a refrigerator, the combination with a provision chamber, and a base arranged adjacent thereto having a circulatory passage therein adapted to be connected to a source of refrigerated air supply, and an inlet and outlet communicating with the provision chamber, of means for closing the inlet and outlet leading to and from the provision chamber and simultaneously opening the circulatory passage of the base to establish a flow of air therethrough.

7. In a refrigerator, the combination with a base having a source of air supply connected thereto, and having a discharge therefrom, and a provision chamber having an inlet communicating with the source of air supply, and an outlet discharging into the base, of means for closing the inlet and outlet of the provision chamber and opening the inlet of the base to establish an air circulation in the base.

8. In a refrigerator, the combination with a suitable refrigerating chamber having an inlet and outlet therein, and a base arranged beneath said chamber having an inlet and discharge therein, of a valve having seats surrounding the inlets for the refrigerating chamber and the base and arranged to alternately close one of said inlets and open the other.

9. In a refrigerator, the combination with a refrigerating chamber having an air inlet and outlet therein, and a base arranged adjacent to said chamber having an air circulating passage therein, of an air supply casing connected to a suitable source of refrigerated air supply having a discharge into the circulating passage of the base and communicating with the air inlet for the refrigerator, and a valve mounted in said casing and arranged to close communication between the refrigerating chamber and the source of supply, and to establish a flow of air through the air circulating passage of the base.

10. In a refrigerator, the combination with a refrigerating chamber having an air inlet and outlet therein, and a base arranged beneath said chamber having an air circulating passage communicating with the outlet of the said chamber and having a discharge, of a valve adapted to be connected to a source of refrigerated air supply and arranged to open and to close the air inlet of the refrigerating chamber and to open and to close the circulating passage of the base.

11. In a refrigerator, the combination with a refrigerating chamber having an air outlet, and a hollow base having a discharge opening and communicating with the outlet of said chamber, and a valve controlling communication between the outlet of said chamber and the base, of an air supply casing adapted to be connected to a suitable source of refrigerated air supply and having air openings

leading to the refrigerating chamber and to the hollow base, and a valve for controlling said last mentioned openings.

12. In a refrigerator, the combination with a refrigerating chamber having air inlet and outlet openings therein, of a hollow base arranged adjacent to said chamber having communication toward one end with the outlet of the refrigerating chamber and provided with an air inlet and a discharge opening toward its opposite end, deflectors forming flue passages in the base for conducting the air from said air inlet to said discharge opening, and a valve for controlling the circulation of air in the refrigerating chamber and the base.

13. In a refrigerator, the combination with a refrigerating chamber, and a hollow base arranged adjacent to said chamber, of an air supply casing having openings leading to the refrigerating chamber and to the base, a valve seat for each opening, and a pivoted valve arranged to cooperate with either of said valve seats for controlling the flow of air to the refrigerating chamber and to the base.

14. In a refrigerator, the combination with a transparently inclosed provision chamber having air inlet and outlet openings, of a base arranged beneath said chamber having an air passage adapted to communicate with the outlet opening of said chamber and having a discharge opening therein, a valve for controlling said outlet opening, an air supply casing adapted to be connected to a suitable source of refrigerated air supply and having openings leading to the provision chamber and to the air passage in the base, and a valve for closing the air opening leading to the provision chamber and simultaneously opening the opening leading to base.

15. In a refrigerator, the combination with a refrigerating chamber communicating with a source of refrigerated air supply, a door for affording access to said chamber, and a securing device for said door, of a valve operated by the door securing device for insuring the cutting off of the circulation of air in said chamber before the door is opened.

16. In a refrigerator, the combination with a refrigerating chamber adapted to receive refrigerated air from a suitable source of supply, a door for affording access to the refrigerating chamber, and a securing device for said door operable independently of the latter, of a valve for controlling the flow of air through said chamber, a reciprocatory bar operatively connected to said valve, and means provided on the door securing device for operating said bar.

17. In a refrigerator, the combination with the refrigerating chamber having air inlet and outlet openings, and a base provided with inlet and discharge openings, of a pivoted valve arranged to swing into two positions to alternately close the inlet openings

of the chamber and base respectively, a rock shaft, a valve operating arm arranged on said shaft and operatively connected to the valve, and means for operating said rock shaft.

5 18. In a refrigerator, the combination with a refrigerating chamber having inlet and outlet openings therein, a door for affording access to said chamber, and a device for controlling the operation of said door, and a
10 base arranged adjacent to said chamber having inlet and outlet openings therein, of a valve for controlling the supply of air to the inlet openings of the chamber and base, a reciprocatory bar arranged to be operated by
15 said door controlling device, a rock shaft operatively connected to said bar, and a valve operating arm yieldingly connected to said rock shaft and operatively connected to the valve for operating the latter simultaneously with the operation of the door-controlling device.
20

19. The combination with a refrigerator embodying a provision chamber having a door for affording access thereto, and a base

adjacent to the provision chamber adapted 25 to communicate with the latter at its ends and having an air passage therein and a wall in common with the provision chamber, of means for maintaining a continuous and positive flow of cold air from a suitable source 30 through the refrigerator, and means for preventing the flow of air through the provision chamber thereof when the door of the latter is in opened position.

20. The combination with a refrigerator 35 embodying a provision chamber having a door for affording access thereto, and a base adjacent thereto having a passage therein, of means for positively inducing a flow of cold air from a suitable source to the refrigerator, 40 and means for controlling the flow of air through the provision chamber and the base passage of the refrigerator according to the position occupied by the said door.

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