

No. 675,764.

Patented June 4, 1901.

W. BACHNER.  
REFRIGERATOR.

(Application filed Oct. 2, 1899.)

(No Model.)

Fig. 3.

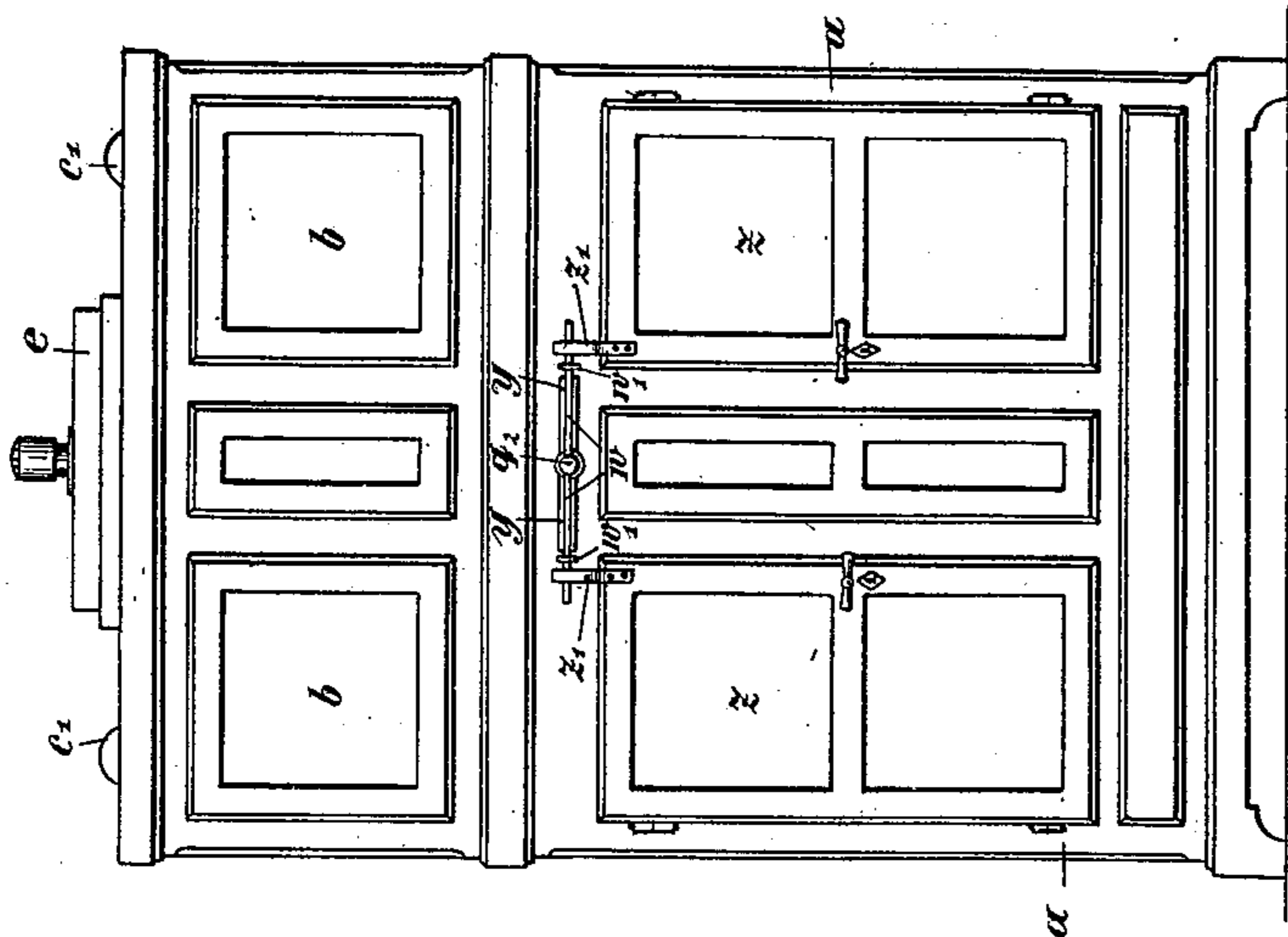


Fig. 2.

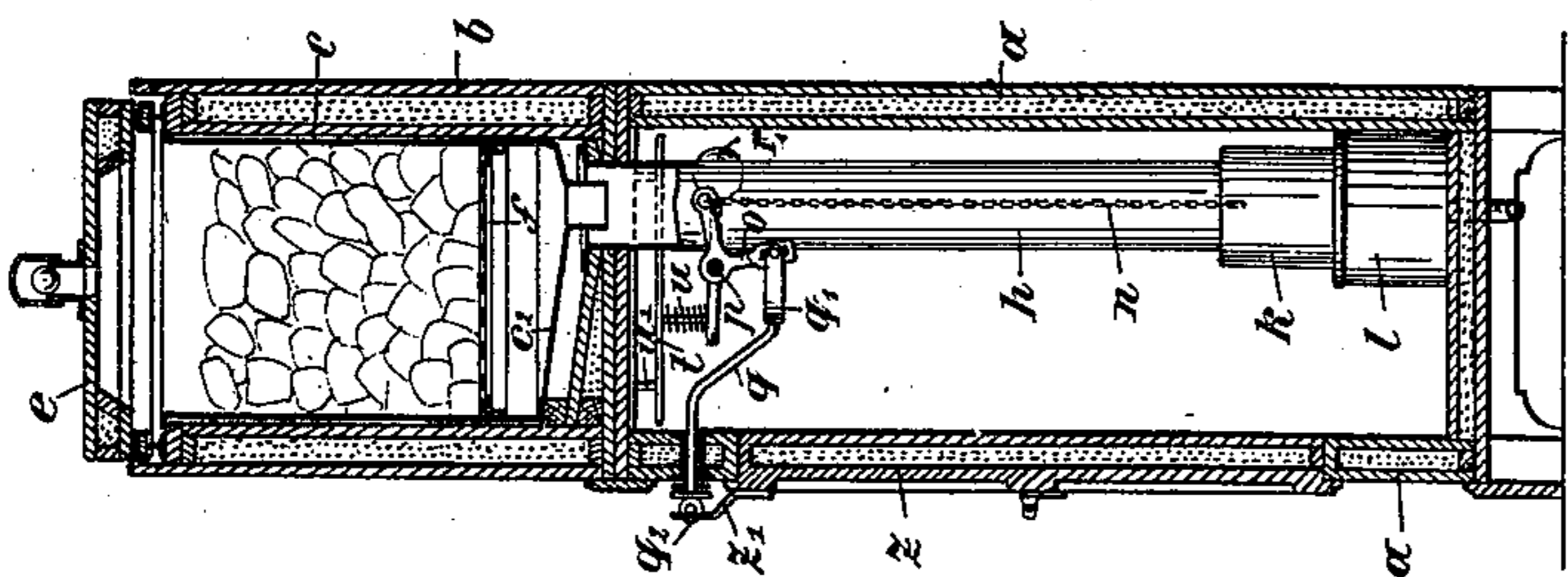


Fig. 1.

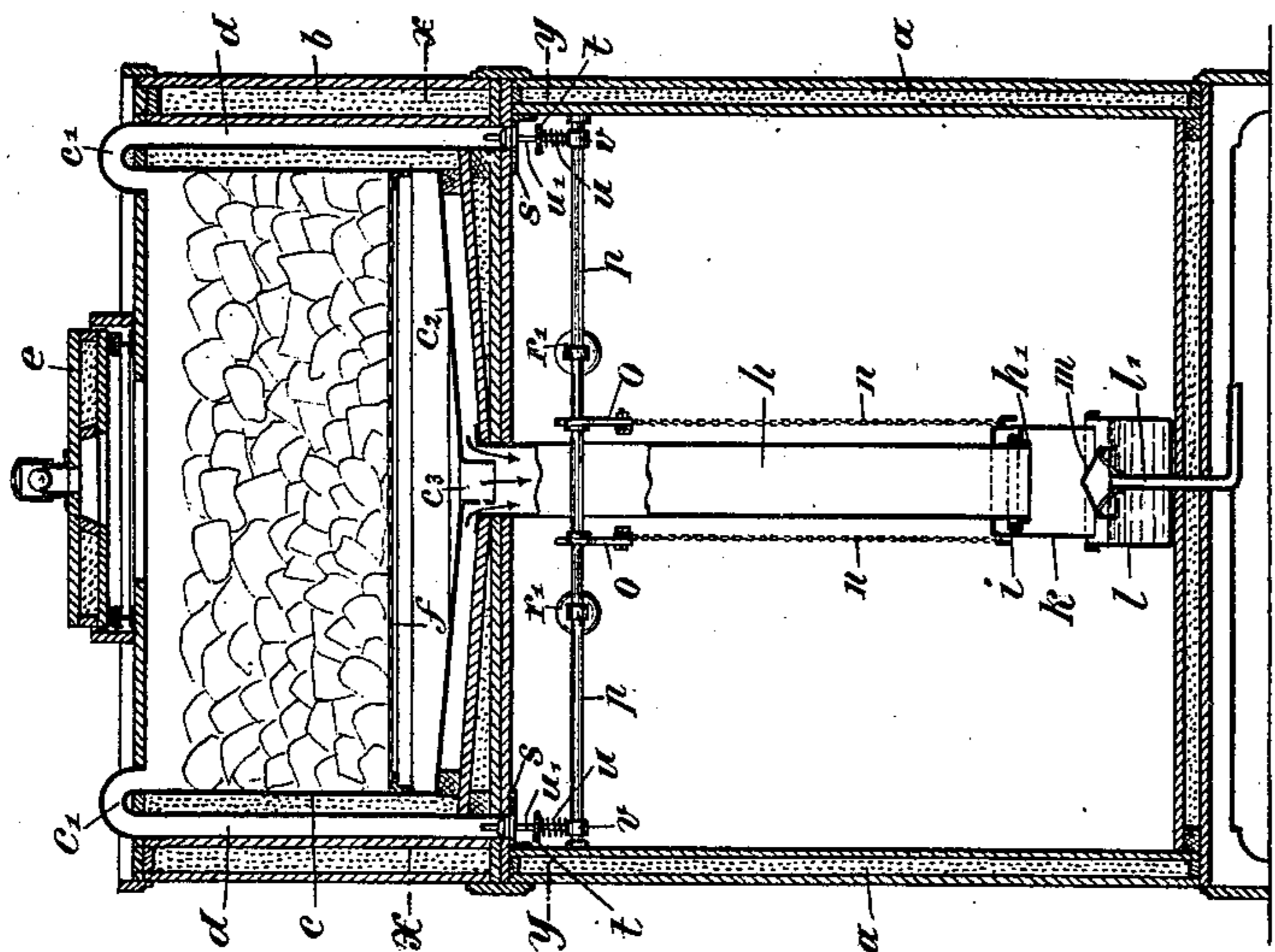


Fig. 5.

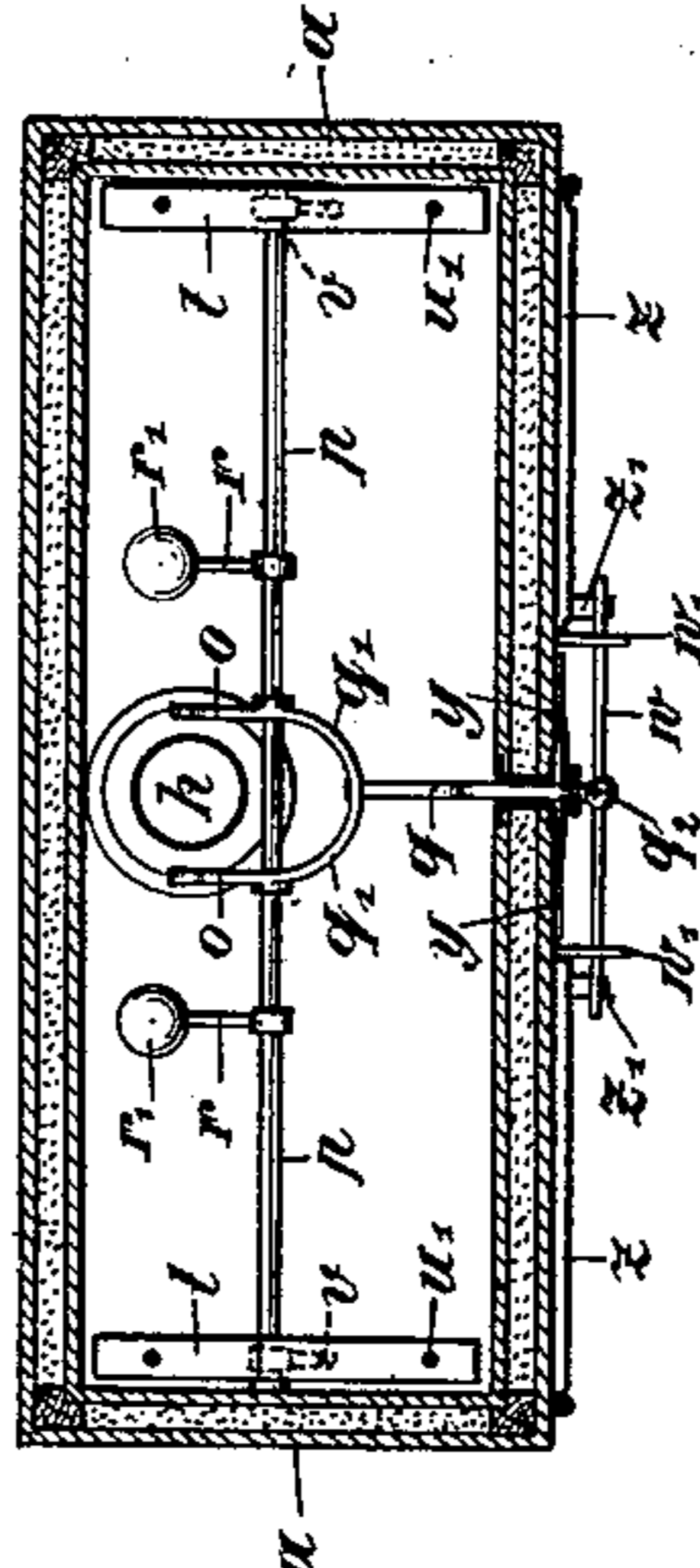


Fig. 6.

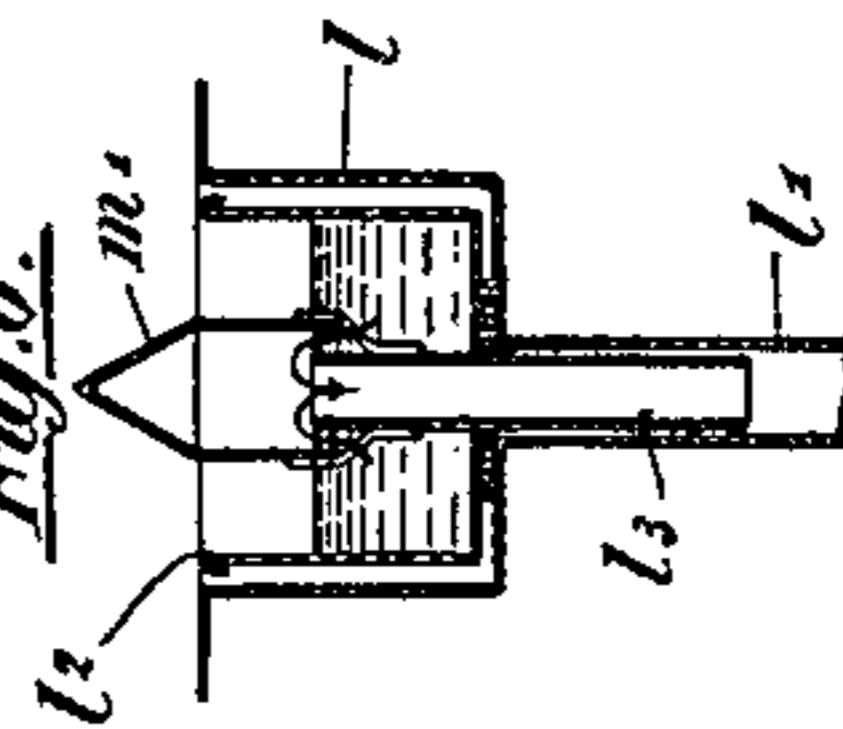
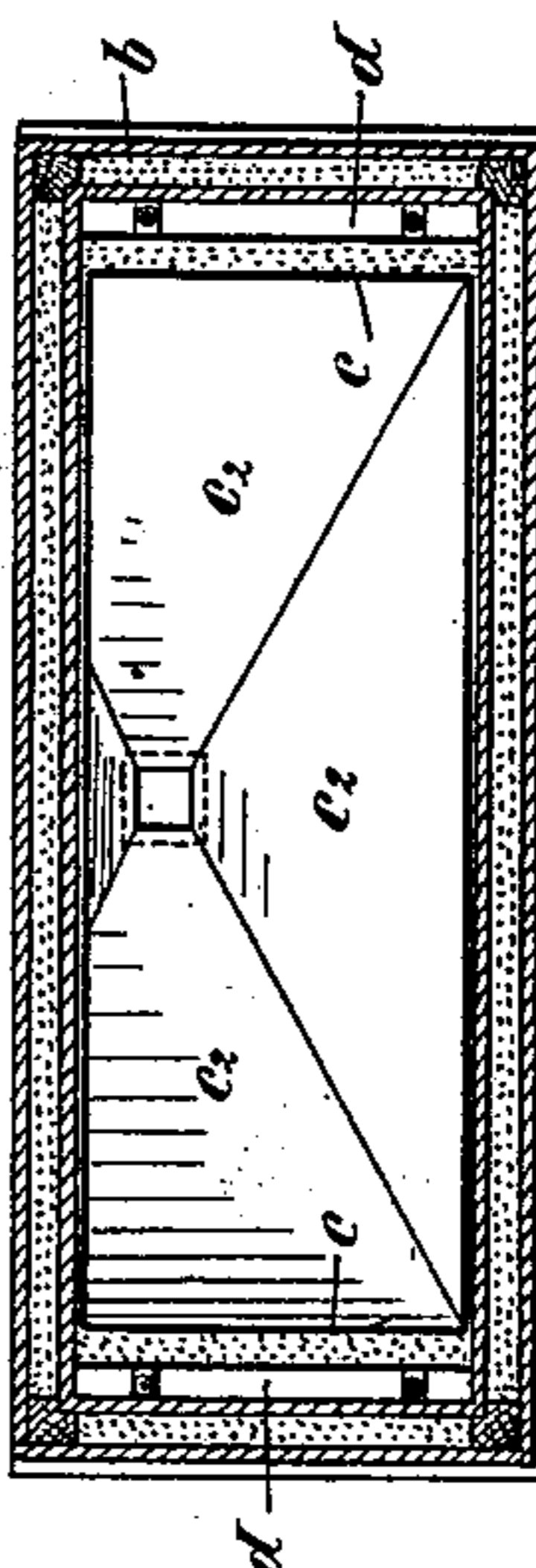


Fig. 4.



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# UNITED STATES PATENT OFFICE.

WILHELM BACHNER, OF STUTTGART, GERMANY.

## REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 675,764, dated June 4, 1901.

Application filed October 2, 1899. Serial No. 732,394. (No model.)

*To all whom it may concern:*

Be it known that I, WILHELM BACHNER, a citizen of the German Empire, residing at Stuttgart, in the Kingdom of Württemberg, Germany, 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 invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object the creation of an extraordinarily-powerful circulation of air in ice-safes or refrigerators, more particularly immediately after the closing of the doors which have been opened.

Numerous experiments with ice-safes undertaken by me have shown that a much more vigorous circulation of air is obtained if the ice-container lies higher than the safe, and therefore the lowest level of the ice should be at least at an equal height with the highest zone of the safe. A better cooling and stronger circulation is also obtained if during the opening of the safe both the inlet as well as the outlet openings of the air from the ice-container to the safe are entirely closed. In my former construction of refrigerators the ice-container was placed in the chamber of the safe itself, and, further, the openings for admitting air to the ice-container were not closed on the opening of the safe-doors, whereby much cold air escaped from the upper part of the ice-container into the open air. In the improved arrangement of the present invention this is avoided, and in the container a still larger space is provided below the ice for accumulating cold air during the period when the doors are open, and as no air can pass during this time into the ice-containing chamber the latter becomes filled with very cold air, which on the closing of the doors rapidly descends through the reestablishment of the communication between the ice-container and the safe, because the ice-container lies higher than the safe, and a strong circulation of air and vigorous cooling is produced in the safe immediately on the doors being closed.

In the accompanying drawings, Figures 1 and 2 are vertical sections, and Figs. 4 and 5 horizontal sections, while Fig. 3 is a vertical

front elevation of this improved ice-safe or refrigerator, the horizontal sections in Figs. 2 and 4 being made on the lines X X and y y of Fig. 1. Fig. 6 shows a detachable discharge vessel for the water from the melting ice.

The addition *b*, forming the ice-container, is here shown, for example, permanently or removably situated directly on the ice-safe *a*. The ice-container may, however, be arranged at any other suitable place and be put in communication with the safe by means of pipes or other suitable passages. The higher the ice-container is placed the better will be the circulation obtained. In the ice-container *c* a grating *f* is inserted, which divides the space of the container into two parts, the upper part of which, containing the ice, communicates by passages *c'* and *d* with the uppermost part of the refrigerating-safe, while the under part of the ice-container communicates, by means of pipes *c''* and *h*, with the under part of the refrigerating-safe. The passages *d* may have their lower ends opened or closed by means of valves *t*, which, guided in pins *u'*, fixed in bars of the valve-seat *s*, are raised or lowered by the turning of a spindle *p* by means of cranks *v*, mounted thereon. The passages *d* may thus be closed or opened, and by placing springs *u* on the cranks *v*, which springs press against the valves *t*, an elastic pressure of the valves *t* may be obtained. The closing of the pipe *h*, through which the cold air reaches the refrigerating-safe from the ice-container, is effected by means of a bell *k*, which may be raised or lowered by means of a connecting-chain *n* through the elbow-lever *o*, also mounted on the spindle *p*. On the lowering of the bell *k* it dips with its lower edge into a vessel *l*, which is filled with the water caused by the melting of the ice, the said water flowing away automatically from the said vessel by means of an overflow-pipe *l'*. The bell *k* after being immersed in the water rests on a washer-ring *i*, which lies on a ring *h'*, arranged at the bottom of the pipe *h*, and thereby causes a tight joint between the bell and the pipe *h* and shuts off the ice-containing chamber from the refrigerating-chamber when immersed in the water. The simultaneous closing or opening of

the valve *t* and bell *k* on the opening or closing of the doors of the refrigerating-safe is effected in the following manner:

Two elbow-levers *o* are connected by their 5 vertical arms with the ends of a fork *q'*, the fork-rod *q* of which is bent at an angle and is carried through the front wall of the ice-safe and at its outer end carries a stud or knob *q*<sup>2</sup>, in which a rod *w*, horizontally ad- 10 justable in elbow-pieces *w'*, is held fast. The adjustment of the rod *w* and the fork-bar *q* is effected on the closing of the doors *z* by loop-pieces *z'*, attached to said doors, encountering the rod *w* in such a manner that this 15 rod is pushed against the refrigerating-safe, and thereby the elbow-levers *v* are so turned that the bell *k* and the valve *t* are opened. On opening the doors of the refrigerator the curved pieces *z'* of said doors release the arm 20 *w* of the fork-bar *q*, and this latter, together with the arm *w*, is pressed outward by means of arms *r*, located on the spindle *p* and provided with weights *r'*. The forked rod *q* is further supported in this action by flat springs 25 *y*, arranged on the front of the safe, the free ends of which engage under the knob *q*<sup>2</sup> of the fork-rod *q* and tend to press the latter outwardly. On the fork-rod *q* moving forward the spindle *p*, together with levers *o* 30 and *v*, is turned, and the bell *k* and the valves *t* close the communication-openings from the ice-holder to the ice-safe or refrigerator.

In order that the overflow-pipe *l* for the water (caused by the melting of the ice) may 35 not be stopped by the sand, dirt, or the like usually adhering to the ice, a dirt cover or cap *m* is placed over the same.

To facilitate the ready discharge of the smut in the vessel *l*, containing the melting water, 40 a separate exchangeable vessel *l*<sup>2</sup> may be arranged within the latter, bearing likewise a protecting-cap *m'* above its discharge-pipe *m*<sup>2</sup>. The same would run along the inside of the discharge-pipe *l'*, which is firmly fixed to the 45 ice-safe, and may be taken out together with the vessel *l*<sup>2</sup>.

The ice-container *c* is closed above by a removable cover *e*. By the arrangement of shutting off entirely the ice-container from 50 the ice-safe on the opening of the doors of the latter no cold air escapes from the ice-container into the open air and a considerable quantity of such cold air accumulates at a suitable height over the refrigerator or safe until 55 the doors are again closed. As the temperature in the safe when the doors are open of course rises somewhat, immediately on the closing of said doors there takes place an extremely vigorous circulation of air through 60 the descent of the cold air from the ice-container into the ice-safe, which essentially assists to prevent the formation of damp deposit on the articles to be preserved and enables the latter to be kept fresh and usable for a 65 considerably longer time. The consumption of ice is less, because no cold air can escape

from the ice-container during the opening of the doors of the safe.

Having now particularly described and ascertained the nature of my said invention and 70 in what manner the same is to be performed, I declare that what I claim is—

1. In a refrigerator the combination with the upper ice-chamber, the cooling-chamber 75 located beneath said ice-chamber, and the pair of doors in said cooling-chamber, of constricted passage-ways disposed at opposite sides of the refrigerator and leading from the upper part of said cooling-chamber into the 80 upper part of said ice-chamber, a valve located in the lower part of each of said passage-ways, a larger passage-way leading from the lower part of said ice-chamber downwardly and opening into the lower part of 85 said cooling-chamber, a valve located at the lowermost part of said larger passage-way, a rock-shaft mounted in the upper part of the cooling-chamber, a crank on each end of said 90 rock-shaft and connected with said valves controlling said constricted passage-ways, additional cranks on said rock-shaft connected with the valve controlling said larger passage-way, other cranks on said rock-shaft having 95 weights attached to their free extremities and said weights adapted to rock said shaft to cause said valves to be normally closed, another pair of cranks on said rock-shaft, a lever connected to the extremity of each of 100 said latter pair of cranks, the free extremity of each of said levers being disposed in the path of movement of each of said doors so that on the closing of the door it will impinge on said lever and thereby cause it to rock said 105 shaft against the force of said weighted levers and open said valves, and on the opening of said doors said lever will be free and allow said weights to close said valves, substantially as and for the purposes set forth.

2. In a refrigerator, the combination with the upper ice-chamber, the cooling-chamber 110 located beneath said ice-chamber, and a pair of doors in said cooling-chamber, of constricted passage-ways at opposite sides of the refrigerator and leading from the upper part of 115 said cooling-chamber into the upper part of said ice-chamber, a valve located in the lower part of each of said passage-ways, a larger passage-way leading from the lower part of said ice-chamber downwardly and opening 120 into the lower part of said cooling-chamber, a valve located at the lowermost part of said larger passage-way, a rock-shaft mounted in said cooling-chamber and connected with said valves, said rock-shaft being adapted to open 125 and to close said valves simultaneously, means on said rock-shaft tending to retain said valves normally closed, and means for causing said rock-shaft to open said valves 130 when said doors are shut, said means comprising a pair of cranks mounted on said rock-shaft, a lever connected to one extremity of each of said cranks, the free extremity of each

of said levers being disposed in the path of movement of each of said doors so that on the closing of the door it will impinge on said lever and cause it to rock said shaft against the  
5 force of said means on the rock-shaft tending to retain the said valves closed, and thereby open said valves substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILHELM BACHNER.

Witnesses:

AUGUST DRAUTZ,  
HERMANN WAGNER.