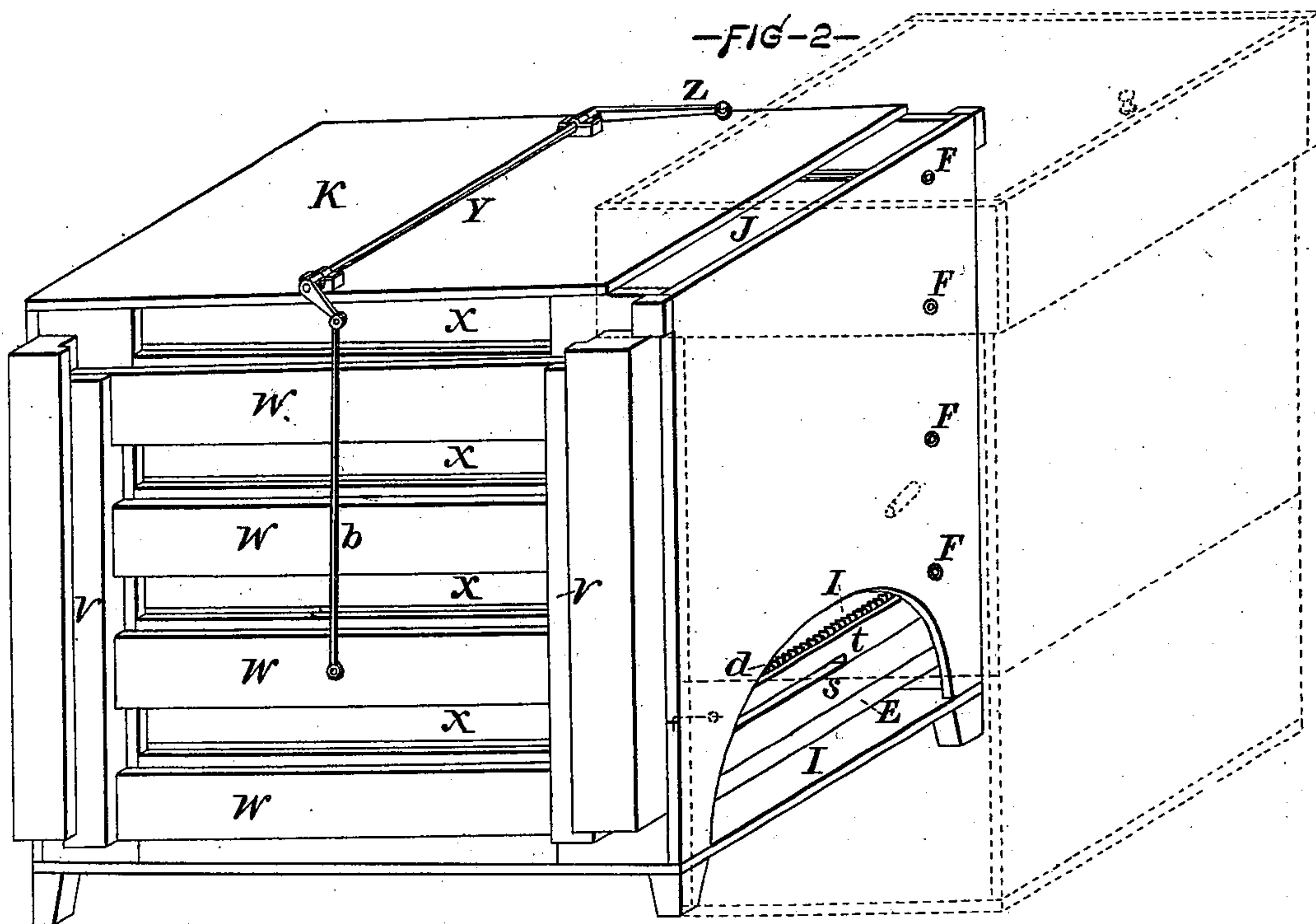
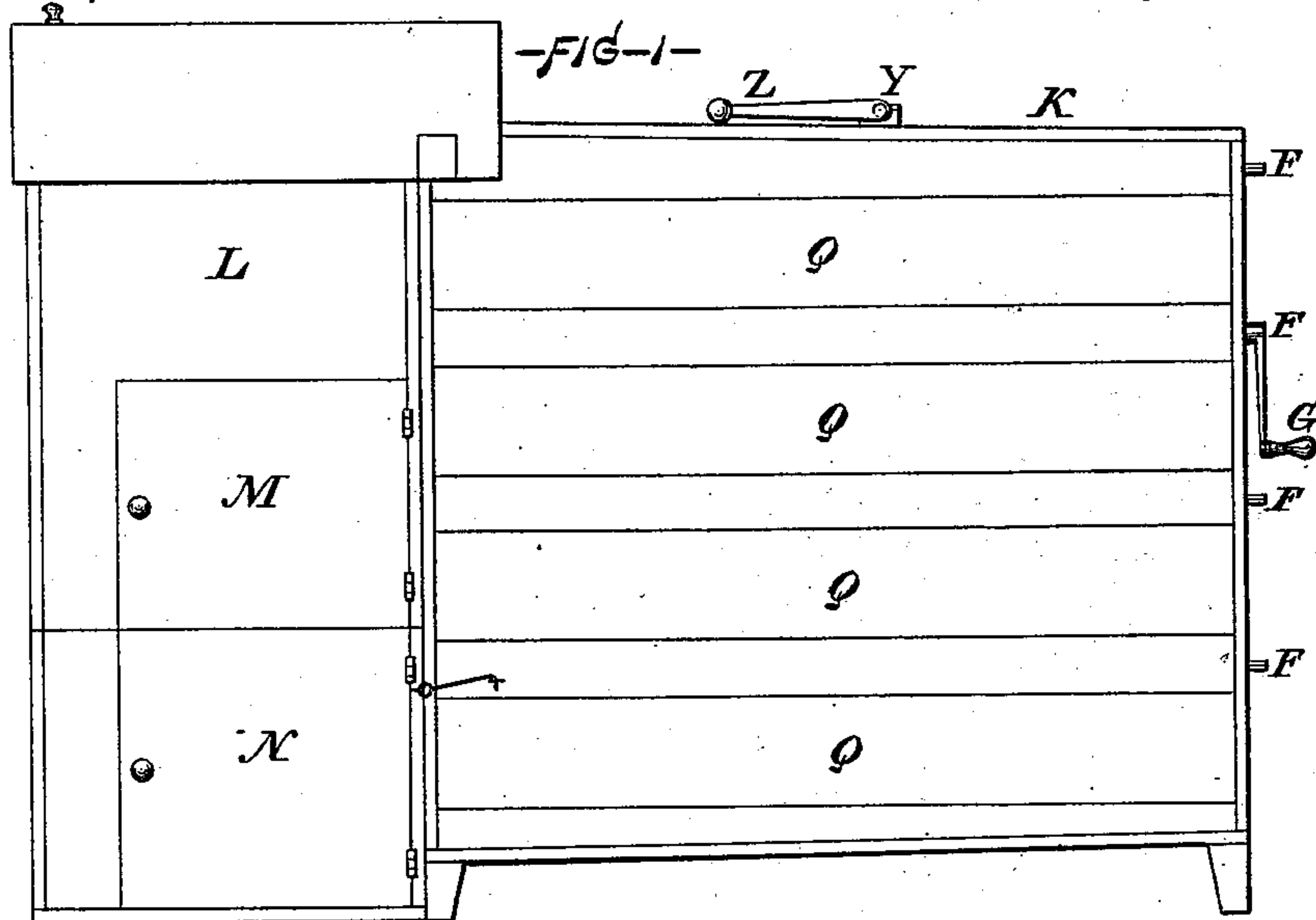


C. A. & G. A. MOSHER.
Dairy-Bureau.

No. 227,567.

Patented May 11, 1880



-WITNESSES-
H. Lisle Fleming.
Dennis J. O'Sullivan.

-INVENTORS-
Geo. A. Mosher
Chas. A. Mosher
Per Geo. A. Mosher's Attorney

2 Sheets—Sheet 2.

Patented May 11, 1880.



-INVENTORS-

Geo. A. Mosher
Chas. A. Mosher
Per Geo. A. Mosher Attorney

UNITED STATES PATENT OFFICE.

CHARLES A. MOSHER, OF SHARON, VERMONT, AND GEORGE A. MOSHER,
OF TROY, NEW YORK.

DAIRY-BUREAU.

SPECIFICATION forming part of Letters Patent No. 227,567, dated May 11, 1880.

Application filed December 27, 1879.

To all whom it may concern:

Be it known that we, CHARLES A. MOSHER, of the town of Sharon, county of Windsor, and State of Vermont, and GEORGE A. MOSHER, of the city of Troy, county of Rensselaer, and State of New York, have invented a new and useful Improvement in Dairy-Bureaus; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings through letters of reference marked thereon, forming part of this specification, in which—

Figure 1, Sheet 1, represents a front elevation. Fig. 2, Sheet 1, represents a rear elevation in perspective. Fig. 3, Sheet 2, represents a longitudinal section at *x x*, Fig. 5. Fig. 4, Sheet 2, represents a vertical cross-section at *y y*, Fig. 3. Fig. 5, Sheet 2, represents a vertical cross-section at *z z*, Fig. 3. Fig. 6, Sheet 2, represents a pan-frame in isometrical perspective. Fig. 7, Sheet 2, represents a pan-support in isometrical perspective.

The same letters indicate like parts in all the figures.

The object of our invention is to establish and maintain purity of air and uniformity of temperature, such as is suitable for dairy purposes, in an inclosure or bureau having movable pans which can be moved out and in, and so arranged one above another as to break joints and form a continuous air space or flue passing by one end of and immediately over each pan, the spaces between the pans being connected by the end passages, one end of each space with the space below and the opposite end with the space above, there being openings in the inclosure or bureau for the ingress and egress of cold or warm air (as compared with the external air) to and from the air space or flue, formed as aforesaid, by connecting such inclosure or bureau with a refrigerating-chamber in the warm seasons of the year and with a heating-chamber in the cold seasons, in such a manner as to produce under, around one end, and over the individual pans so inclosed either a relatively warm or a relatively cold air-current, as may be desired.

In Fig. 3, Sheet 2, which is a longitudinal section taken at the dotted lines *x x* in Fig. 5, Sheet 2, A are the pans, so arranged as to

form an air-flue in the direction indicated by the arrows, commencing at the opening I in the inclosure or bureau K and terminating at the opening J in bureau K.

L is a refrigerating-chamber, which permits the cold and heavier air to fall down the cold-air flue O through the compartment N and opening or flue I in the direction of the arrows into L again, thus forming a continuous current of the inclosed air, the strength of which will depend upon the difference in temperature of the inclosed air at the points J and upper O.

The inclosed air is cooled and purified at every revolution, and maintained during the hot season in a cooler and purer condition than the external atmosphere, with less consumption of ice than would be required if air were admitted from the outside.

During the cold season a warm-air current can be maintained in the same direction by placing some heated substance, as stone or iron, or some heating substance, as a lighted lamp, in the heating-chamber N.

When the external atmosphere is not extremely cold the cover of L may be left wholly or partly open for the admission of the outside air, or L and M may be removed altogether. The flue O may be closed and external air admitted at or near the bottom of N, and allowed to escape at J.

When neither heat nor cold artificially produced is required the compartment N may also be removed, the openings at I and J being protected by screens or closed, thus affording great economy of space when neither the refrigerating nor heating chambers are required.

The pans A, as will be seen by reference to Fig. 3, Sheet 2, are deeper at one end, which produces an ascending inclined plane to facilitate the progress of the air-current, and a descending inclined plane on the inside of the pan to facilitate emptying the same at the outlet B, from whence the contents may be conveyed in pipes to any desired receptacle placed on a lower plane. Milk will remain sweet in this apparatus during the hottest weather until the cream is in a condition fit to be skimmed from the surface. The powerful current established between the pans when the refrigerating-cham-

ber is attached makes it possible to have them very near together, which is a great economy of space in the use and of material in the manufacture of the apparatus.

5 The refrigerating-chamber L or the heating-chamber N may be removed to a distance or to another room or building by lengthening the cold and warm air flues connecting them with the inclosure or bureau K, as described.
10 The strength of the cold-air current will be increased by raising the refrigerating-chamber to a higher plane. The refrigerating-chamber L and the heating-chamber N are each provided with doors for the admission of the re-
15 frigerating or heating substances.

Another object of our invention is to preserve in the same apparatus or machine, and with the same cold or heat producing agency, heterogeneous substances which would taint
20 and injure one another if the same current of air should be brought in contact with each. This is accomplished by the position and use of the chamber M, the contents of which are entirely cut off from the air-current which passes
25 through the inclosure or bureau K, but at the same time passes around the chamber M, so as to maintain its contents at about the same degree of temperature. M is provided with a door in front, and may have a metallic lining
30 and be ventilated into the outside air.

Another object of our invention is to conveniently move out and in movable pans arranged one above another, with a space between, in an inclosure or bureau, K, by means
35 of a crank attached to a shaft with pinions which actuate plate-gears attached to the pans or frames on which they are supported. A part of one of the frames in which the pans rest is shown in perspective in Fig. 6, Sheet
40 2. Portions of the frames are also shown in Figs. 3 and 5, Sheet 2.

Q is the front of the frame, and P the back. D are the end pieces of the frame, to the top of which are attached the plate-gears *d*.

45 *a* are cross-pieces, on which one end of the pans A rest, and the spaces between *a* and D form part of the air-flue previously described. These spaces between *a* and D occur in the opposite ends of each succeeding frame, whether
50 above or below, as the same are arranged in the bureau K.

F is the shaft extending along the spaces between the pans, with bearings in two sides or ends of the bureau K, having pinions C
55 firmly attached thereto at points to fit into and actuate the plate-gears attached to the end pieces, D, which are moved back and forth. The crank G, with a handle, can be applied to either of the shafts F, there being one shaft
60 to each pan.

By revolving the shaft F in one direction the pans are moved out of their inclosure, and when revolved in the opposite direction the pans are moved in again, affording an easy
65 steady motion without a too violent agitation of the contents of the pans.

Instead of the pinions C and plate-gears at-

tached to frame D, ropes may be wound with one or two turns around the shaft F at the points where the pinions C are shown in the
70 drawings, and each end of the ropes drawn taut and fastened to the opposite side of the pan or frame which supports it.

Another object of our invention is to close the openings in the front of an inclosure or
75 bureau, K, provided with pans arranged one above another, through which the pans are moved in and out by the front side of the pan-frame Q when the pan is entirely inclosed, and by the rear side, P, of the pan-frame when
80 the pan is drawn wholly without the bureau K, thus securing the contents of the bureau K intact and wholly cut off from external objects, whether the pans are out or in the inclosure K. This is evident from the fact
85 that the sliding frame shown in Fig. 6, Sheet 2, and which supports a pan, moves out and in with its pan, as already shown.

Another object of our invention is to maintain the pans contained and arranged in an
90 inclosure or bureau one above another, and adapted to be moved out and in the inclosure in the same position relatively to a horizontal plane when moved out or partly out of their inclosure as they occupied when wholly with-
95 in the inclosure. This part of our invention is represented in Figs. 7, 5, and 3, Sheet 2 of the drawings.

Fig. 7 is an inside perspective view, wherein
100 *s* is a channeled sliding strip or slat, on which rests the pan or pan-frame D, itself resting upon the stationary cleat E, and provided with a dog, *o*, which fits into the notch *n* of the frame D, and is forced and held therein by the inner
105 top surface of the cleat E, on which the lower part of the dog *o* rests and slides whenever *s* is in motion, or into *m*, where it is held by D.

The dotted lines show the position of the parts when the pan is extended wholly with-
110 out the bureau. As the pan moves inward, the frame D advances to the right, but the sliding slat *s* is held immovable by the dog *o*, the lower projection of which rests in notch *m* of stationary cleat E, and is held therein by
115 its upper projection until the notch *n* in D is directly over it, when the incoming front Q of the pan-frame strikes *s* and forces it inward, thereby lifting the dog from *m* into *n*, where it is held by E, as *s* and D then slide along
120 together upon E wholly within the inclosure.

We now reverse the motion of the pan and send the frame D outward, to the left in the figure. The dog *o*, being held in notch *n* by
125 E, carries *s* along with D until the dog is over notch *m*, when the stop *p*, Fig. 5, comes in contact with the stationary cleat *t*, which acts as a trip and stops *s* just as the pan is half-way out the inclosure, or at any other desired
130 point, depending upon the positions of the stop *p* and strip *t*; then, as D continues to advance it forces the dog down into notch *m* and holds it there until *n* returns, as above explained, when the operation may be repeated at will.

The stationary cleat *t* projects out partly over *s* and holds its inner end down in position upon *E* when the pan is moved without the inclosure *K*, the top surface of *s* being wider than the bottom surface of *D*.

It will be seen, therefore, that as the pan moves forward and outward with the frame *D* it takes with it the strip *s* until the middle point of *s* rests upon the forward or front end of the stationary cleat *E*, and, if further advanced, the center of gravity of the pan would be outside its support *E* and incline it to tip and the strip *s* to bind upon both *E* and *t*, at which point its further progress is arrested by the stop *p*, as above described, and it is prevented from tipping by the projecting cleat *t*.

But the pan and frame *D* continue their forward and outward motion until the middle of *D* rests upon the forward or outer end of *s* so that if further advanced the center of gravity would be outside their support *s*, and incline the pan and frame to tip from the slat *s*, at which point the pan is wholly without the inclosure, and is prevented from any possibility of tipping or falling by the shaft *F* and pinion *C* resting upon the projection *T* of frame *D* and holding it in position upon *s*, from which it also appears that motion is not continued in any of the parts after the center of gravity is so changed as to incline those parts to tip and bind, thereby affording an easy and steady motion of the pans back and forth out and in the inclosure without the use of temporary props or supports.

The projection *T* of the end frames, *D*, when the pans are inclosed, pass into recesses in the rear wall of the inclosure. These projections (shown in Fig. 6, Sheet 2) not only permit the pans to be moved out by pinions *C*, so as to wholly project from the inclosure, but, in connection with the mechanism last above described, serve to maintain the pans in the desired upright position when so projected.

One of the principal objects of our invention being to establish a uniform temperature suitable for dairy purposes within a pan-inclosure, *K*, throughout the year, we are better able to accomplish it in cold seasons by inclosing some burning instead of merely heated substance in the inclosure *N*. We are able to maintain combustion in *N* without danger from fire or injury to contents of *K* from escaping fumes or gases by employing a metallic or any air-tight incombustible case, *j*, (represented by dotted lines in Fig. 3, Sheet 2, as situated in *N*, and provided with an opening at or near the bottom for the admission of the burning substance and of the air necessary to support combustion,) and an outlet at or near the top, connected by a flue, *k*, with the outside atmosphere, which affords a means of escape for the gases resulting from combustion. None of these gases are allowed to escape into inclosure *K*; but the heat radiated from the outer surfaces of case *j* and flue *k* will form an air-current within inclosure *K* in the direction of the arrows, as already explained. The open-

ing near the bottom of *j* may be protected by wire screen, through which air will but flames of fire will not pass. If the burning substance used is oil from a lamp placed in case *j*, the amount of combustion and resulting heat can be easily regulated to maintain a given temperature throughout the night. The flue *k* may pass within and along the air-flue of inclosure *K* as far as desired, or need not enter inclosure *K* at all.

Another object of our invention is a convenient method of ventilating an inclosure, *K*, containing pans one above another with air-spaces between, and is fully shown in Fig. 2, Sheet 1. This figure shows the rear part of inclosure *K*. *X* are lateral openings in the inclosure *K*. There may be one opposite each space between the inclosed pans. *V* is a frame provided with slats *W*, which cover or uncover the openings *X* as the frame is raised or lowered, which is done by crank-shaft *Y*, which is provided with handle *Z* and connecting-rod *b*. The crank-shaft and handle are so arranged that the weight of the frame and slats will press the handle down upon the top of the bureau *K* and hold them in a position either to open or to close the openings *X*, as may be desired.

Although we have described our invention as adapted to dairy purposes, it may be employed in the treatment of any substance requiring for its manufacture or preservation a temperature or atmospheric condition suitable for manufacturing or preserving milk, cream, butter, or cheese, as described.

The doors and walls of any or all the compartments or inclosures may be double, with space between, and they may be glazed in such parts as may be desired.

The inside surfaces of the top and bottom of the bureau *K* are inclined, as shown in the drawings, to facilitate the progress of the air-currents.

There may be buttons on the back side of the pans or pan-frames in bureau *K*, projecting above the pans, to prevent moving them out too far. There may be fixed partitions between the pans. The outer surfaces of the pans may be covered or protected by any poor heat-conducting substance. There may be two or more pans in inclosure *K*.

Two or more inclosures, *K*, may be used at the same time, in connection with one refrigerating-chamber, *L*, and one heating-chamber, *N*, by connecting the same with said refrigerating and heating chambers on different sides.

Any suitable cooling substance, whether ice or a series of cold-water pipes, may be used in connection with the compartments *L* and *O*.

We are well aware of the construction of an insulated milk-bureau provided with insulating-casters, and with an upper cooling-reservoir and a lower heating-reservoir, with intermediate milk-pans arranged one above the other, and adapted to be drawn out, so as to rest upon a support when out.

It is well known that a cold current of air

falling through warmer strata of air, or warm air rising through colder strata, will naturally seek the most direct route. In the insulated milk-bureau above mentioned the external air is forced within the inclosure, where it is cooled or heated and falls or rises past the ends and sides of the intermediate pans, leaving a comparatively dead-air space between the pans and in immediate contact with their contents. The cooling-reservoir being in the same inclosure and directly over the pans, the moisture arising from their contents is condensed on its bottom and sides until either a drip is formed or the moisture is absorbed again by the inclosed air, or both, while our device is so arranged that the pans form a continuous air-flue, which arbitrarily compels the air-currents, whether warm or cold, to pass under, around one end, and over the top surface of the pans in immediate contact with the contents of each; and it must be borne in mind that in our device the cold-air current enters the inclosure at or near the bottom, the same as the warm-air current, and in passing under, around one end, and over the pans is continually ascending, and consequently traveling in the direction along the air-flue which is naturally taken by the gases, moisture, and impurities arising from the contents of the pans, which latter assist instead of retarding the cold-air current, and are carried with it wholly without the pan-inclosure to the refrigerating-chamber, where the heat is absorbed in melting the ice, the moisture condensed by loss of heat, and the impurities deposited with the moisture on the surface of the ice, and left to run off in the drip of the melted ice, thus establishing a current of pure refrigerated air, which is brought in immediate contact with the contents of each pan.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an inclosure for regulating the temperature of substances, a series of draw-pans arranged one above another and making close connection at the side walls, and constructed to break joints at the end walls of the inclosure to form a continuous air-flue under, around one end of, and over each pan, and, in combination, an egress-opening, J, refrigerating-chamber L, flue O, and ingress-opening I, as shown and described, and for the purposes set forth.

2. In an inclosure for regulating the temperature of substances, and in combination, a series of draw-pans, arranged one above another and making close connections at the side walls, and constructed to break joints at the ends to form a continuous flue-passage under, around one end of, and over each pan, the ingress-opening I, heating-chamber N, and egress-opening J, as shown and described.

3. The combination and arrangement of a draw-pan inclosure, K, ice-chamber L, and cold-air flue O N, so as to form beneath and adjoining the ice-box and surround on four sides the refrigerating-chamber M, (provided with a door opening exteriorly,) the contents

of which chamber are cut off from atmospheric connection with any of the compartments or inclosures surrounding it, as described, and for the purposes set forth.

4. In an inclosure for regulating the temperature of milk for dairy purposes, and in combination, a movable pan, A, pan-carrying frame D P Q, provided at the ends D with plate-gears *d*, attached to the upper surfaces thereof, and the superimposed engaging-pinions C within the inclosure and connected by a crank-shaft, F, for the purpose of moving the pans out and in the inclosure with a steady uniform motion, and preventing them from tipping or falling when moved without the inclosure, the pan-frames being supported by suitable cleats and not by the plate-gears, as shown and described.

5. In an inclosure for regulating the temperature of milk for dairy purposes, and in combination, two or more draw-pans, A, corresponding apertures in one of the vertical walls of the inclosure, for the passage out and in of the pans, pan-carrying frames D, provided with front and rear sides or doors, Q and P, adapted to close said apertures, plate-gears *d*, and engaging-pinions C, connected by a crank-shaft, F, and refrigerating-chamber L with flue O, for the purposes of moving the pans out of the inclosure, and at the same time preventing the escape from the inclosure, while one or more of the pans are out, of the cold-air currents coming from the refrigerating-chamber when so combined, as shown and described.

6. In an inclosure, K, for regulating the temperature of milk for dairy purposes, a pan, A, adapted to be moved out and in the inclosure upon a carrying-frame, provided at its ends D with plate-gears *d*, and engaging-pinions C, connected by a crank-shaft, F, in combination with sliding strips *s*, which support the frame and plate-gears, for the purpose of easily and steadily moving the pan wholly out and in the inclosure, and at the same time maintaining the pan in a horizontal position when out of the inclosure, as shown and described.

7. In a draw-pan inclosure or bureau, K, for regulating the temperature of substances, a pan, A, provided with a carrying-frame having end pieces, D, with notches *n* in their lower sides, in combination with sliding strips *s*, provided with dogs *o*, adapted to fit into said notches *n*, for the purpose of compelling the strips *s* to accompany the pan during the first part of its movement outward, when moved out of the inclosure, as described and set forth.

8. In an inclosure or bureau, K, the dogs *o*, attached to sliding strips *s*, in combination with notches *n* in movable frames D, and with notches *m* in stationary cleats E, the dogs fitting and entering said notches alternately, as described, and for the purposes set forth.

9. In an inclosure for regulating the temperature of substances, and in combination, a pan, A, provided with a carrying-frame hav-

ing notched end pieces, D, with plate-gears *d*,
engaging-pinions C, and crank-shaft F, sta-
tionary notched supports E, sliding strips *s*,
provided with dogs *o*, and stops *p*, tripped by
5 stationary cleats *t*, as described, and for the
purposes set forth.

10. A sliding frame, V, provided with slats
W, crank-shaft Y, and connecting-rod *b*, in
combination with ventilating-openings X in
10 the side or sides of an inclosure, K, contain-
ing pans A, arranged one above the other,

with an air-space between, and the pans
adapted to be moved out and in the inclosure,
as described, and for the purposes set forth.

CHAS. A. MOSHER.

GEO. A. MOSHER.

Witnesses to signature of Chas. A. Mosher:

A. B. MOSHER,

M. M. BARROWS,

Witnesses to signature of Geo. A. Mosher:

GEO. R. DONNAN,

ALBERT SMITH.