

(No Model.)

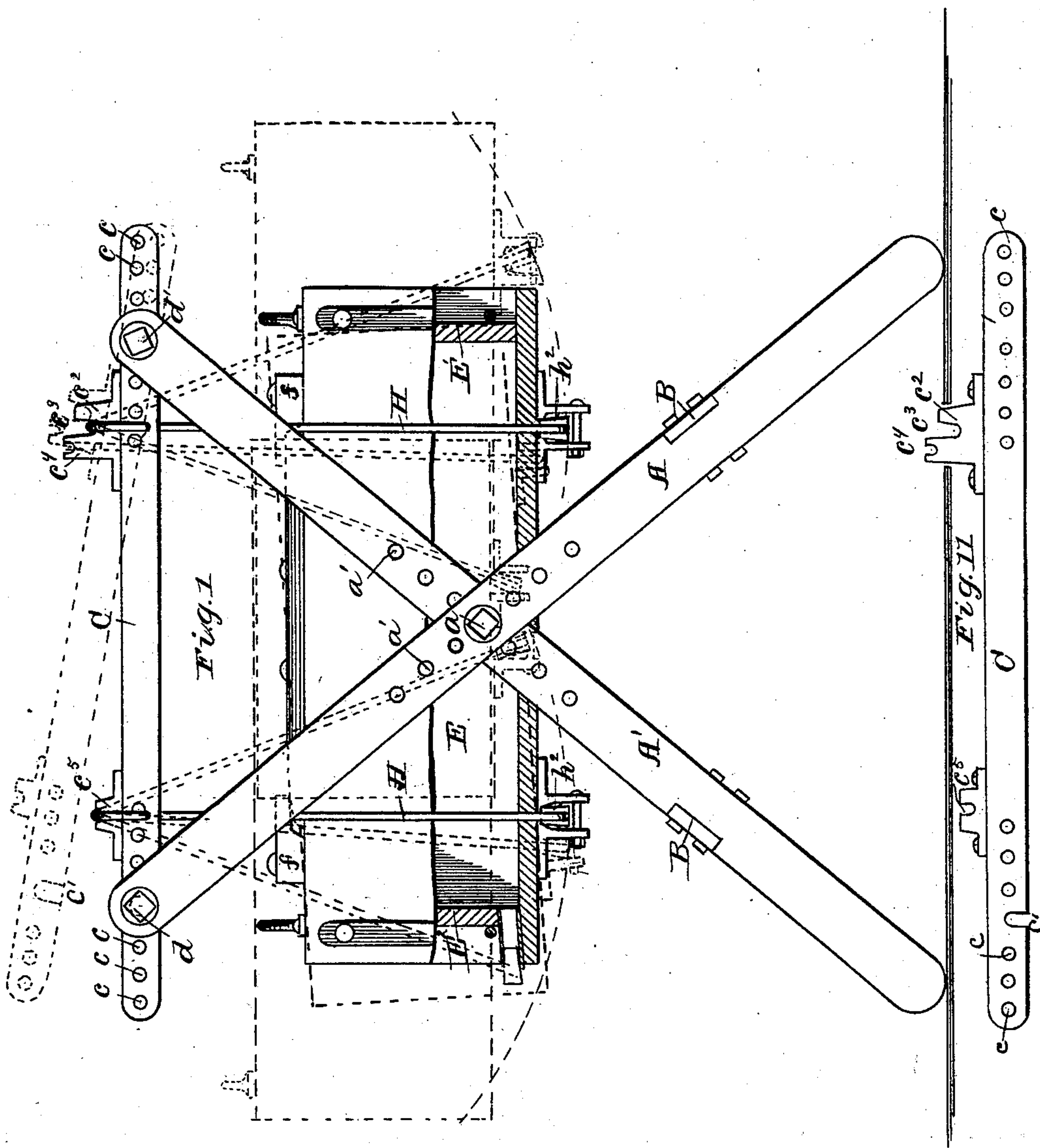
2 Sheets—Sheet 1.

J. H. ELWARD.

CHURN.

No. 361,150.

Patented Apr. 12, 1887.



Witnesses:

J. C. Turner

J. S. Doubleday

Inventor:

John H Edward

4 Dumbleday & Bliss at the

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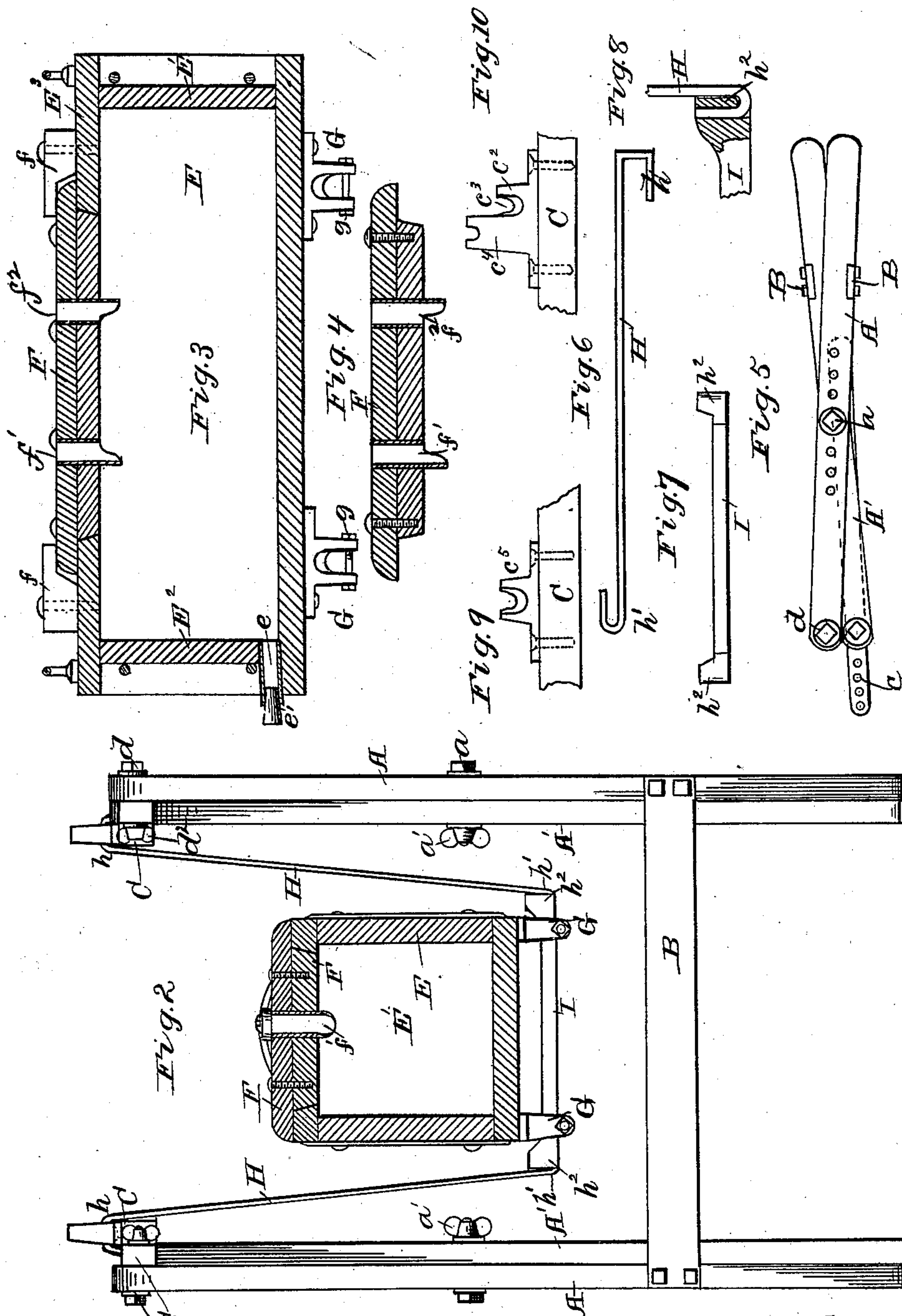
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John H. Elward
by Doubleday & Bliss attys.

UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, OF ST. PAUL, MINNESOTA.

CHURN.

SPECIFICATION forming part of Letters Patent No. 361,150, dated April 12, 1887.

Application filed January 4, 1887. Serial No. 223,359. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. ELWARD, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Churns, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in churns of the class in which the cream-receptacles are arranged to move bodily, more particularly those in which the body reciprocates on swinging supports. The object is to provide a construction in which the supporting-frame shall be simple in form, and which can be easily taken down and packed together, with improved supports for suspending the body from the frame.

The invention also relates to providing the churn with means for delivering air thereto of a novel and peculiar character.

Figure 1 is a side elevation (parts being in section) of a churn embodying my improvements. Fig. 2 is a transverse section of the churn-body, the other parts of the device being in elevation. Fig. 3 is a longitudinal section of the body. Fig. 4 is a section of the cover detached. Fig. 5 shows the supporting-frame with the parts folded together. Figs. 6, 7, and 8 show the parts of which the suspending devices are composed. Figs. 9 and 10 show the socket-pieces in which the suspending devices are held. Fig. 11 shows one of the top cross-bars detached.

The frame upon which the churn is suspended consists of the side bars, A A', joined by cross-bars B and top connecting-bars, C. The side bars are pivoted together at *a*, there being a series of apertures, *a'*, in each of the bars A A', so that the pivot *a* can be adjusted vertically. The top connecting-bars, C, are secured to the side bars, A A', by bolts *d d'*, said bolts being provided with thumb-nuts *d²*. At each end of the top bars, C, there is a series of apertures, *c*, adapted to receive the bolts *d d'*.

I prefer to construct each top bar C with one or more open slots, as at *c'*, to receive the bolt *d*. When so made, the bars C can be readily detached at one end from the bolt, as shown in dotted lines in Fig. 1, it swinging around the other bolt *d'*. When the churn is not in

use, or when it is being shipped from one point to another, the frame can be readily folded. To do so it is merely necessary to loosen the thumb-nuts *d²* of bolts *d d'*, detach the ends of the bars C, and swing the parts of the frame into the positions shown in Fig. 5.

The churn-body is suspended in the frame by means of hangers H, united at their lower ends to strong cross-bars I. The hangers H, as shown, are made with hooks *h'* at their lower ends, adapted to engage with apertures in the cross-bars I, and at their upper ends they are formed with hooks *h*, which engage with the frame. To prevent the lower ends of the hangers from twisting relatively to the bars I, I groove the ends of the cross-bars, as shown in Fig. 8, the ends of the bars being expanded, as shown at *h²*, to provide a long bearing for the hangers.

The cross-bars I engage with socket-pieces G, secured to the bottom of the churn-body, they being held in place by bolts *g*. The sockets are of such size relatively to the bars I that the churn-body can move freely longitudinally without twisting or cramping the hangers.

I am aware of the fact that churns have been heretofore suspended in bails extending continuously across the bottom and up the sides; but the construction herein shown is intended to overcome difficulties met with in using churns of the character referred to. I provide a strong cross-support under the bottom of the churn of such character as to prevent twisting or bending. Moreover, the parts of the suspending device are detachable and can be readily packed together and stored inside the body, so as to be in convenient form for handling.

At the upper ends the hangers H engage with metallic socket-pieces secured to the top cross-bars, C. One of these is shown at *c²*, having the socket *c³* therein, and the other is indicated at *c⁵*. When the operation of churning is in progress, the hooked parts *h* lie in sockets *c³ c⁵*. After the churning has been completed, and it is desired to withdraw the milk, the churn-body is elevated at one end and the hangers H are suspended in the socket-pieces at *c⁴*, which are at a point somewhat higher than those at *c⁵*. When so suspended,

the churn is tipped into the position indicated by the dotted lines shown in Fig. 1. The milk is allowed to escape through a pipe, *e*, closed by a plug or other suitable device, *e'*.

5 The churn-body is rectangular in section in either direction, it having side walls, *E*, end walls, *E'* *E''*, and top *E'''*. It is provided with a cover, *F*, held in place by buttons or cleats *f*. In the cover there are formed apertures, 10 into which are fitted pipes *f'* *f''*, so arranged as to have the air sucked in through them alternately as the cream moves longitudinally through the churn. When the cream is moved from the end *E'* to the end *E''*, the air is drawn 15 in forcibly through the pipe *f''*, and when it is moving in the opposite direction it is drawn through the other pipe, *f'*. It will be seen that the inner ends of these pipes are so shaped that the orifices are on inclined lines rather 20 than upon vertical ones; and hence the air is forced in by suction and intimately mixed with the liquid as it moves from end to end.

I have found that to get the best results in churning it is necessary to introduce a large 25 amount of air to the cream and cause it to come into direct contact with all the particles of the latter, and at the same time provide for the constant discharge of the gases and vapors which, as is well known, are characteristic of the cream, and which are rapidly developed 30 during churning, especially when oxygen is copiously delivered in currents of air. In my case the gases and vapors are expelled through the pipe *f'* while the air is being sucked 35 through the pipe *f''*, and vice versa.

The construction and arrangement of the pipes can be modified without departing from my invention in this respect.

I do not claim to be the first to have com- 40 bined air-pipes with churns, as I am aware of the fact that such pipes, broadly considered, have been used; but in all the earlier constructions with which I am acquainted the body has been so arranged that each of its 45 ends vibrated vertically relatively to the other end—that is to say, the bodies have been arranged to rock. The air-pipes have either been provided with valves, as is shown, for instance, in the patent to Rose, No. 76,350, or 50 have been terminated at the inner surface of the body-cover, as illustrated in the British Patent No. 3,407 of 1881, in order to prevent the escape of the liquid, such escape being made possible by the rocking motion of the body. 55 I project the air-pipes to points considerably below the cover or top of the body, and yet prevent the escape of the liquid without the necessity of valves. In my construction the body is always in a horizontal position, so 60 that there is no tendency to dash the material

outward through the air-pipes, the latter always being in vertical position. By projecting these pipes downward until they reach the lines (or a little below the lines) along which 65 travels the liquid as it returns from the adjacent end of the body, the air can be forced into contact and intimately commingled with the particles of the liquid. The dashing out of the liquid is further prevented by the peculiar construction of the inner ends of the 70 pipes, that side against which the liquid impinges in its return movement being extended down farther than the opposite side, so that the action of the liquid is to suck the air in at one of the pipes and drive it out through the 75 other without the liability of forcing upward the liquid.

What I claim is—

1. The herein-described folding frame for supporting a vibrating churn-body, it having 80 the inclined bars *A* *A'*, pivoted together, the cross-braces *B*, and the top connecting-bars, *C* *C*, hinged to one of the inclined bars and detachably connected to the other, substantially as set forth. 85

2. The combination, with the vibrating churn-body having socket-pieces *G* and the supporting-frame, of the suspending devices having the cross-bars *I*, and the hangers *H*, 90 detachably connected to the cross-bars and locked thereto to prevent the latter from twisting, substantially as set forth.

3. The combination, with the body and the hangers, of the frame having the bars *C* *C*, provided with the socket-pieces *c'* *c''*, secured 95 to said bars and formed with the sockets or depressions *c'* *c''*, substantially as and for the purposes set forth.

4. In a churn, the combination, with the body arranged to vibrate, of the air-pipes 100 passing through the top of the body and extended downward into the cream-chamber, the inside orifices of the said pipes being arranged to open in opposite directions, substantially as and for the purposes set forth. 105

5. In a churn, the combination, with the body arranged to vibrate, of the two air-pipes passing through the top of the body and extended down into the cream-chamber, each of 110 said pipes having its projecting inner end shaped substantially as set forth, with one side projecting downward below the other side, the shorter sides of the pipes being opposite to each other, substantially as set forth.

In testimony whereof I affix my signature in 115 presence of two witnesses.

JOHN H. ELWARD.

Witnesses:

JESSIE B. SALISBURY,
J. A. PARTRIDGE.