Dec. 3, 1935. W. H. McCORKINDALE 2,023,056

BUTTER CHURNING MEANS

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Fig. 1

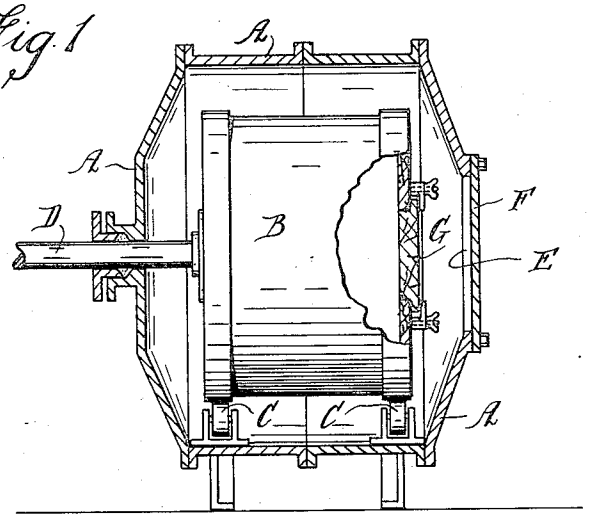
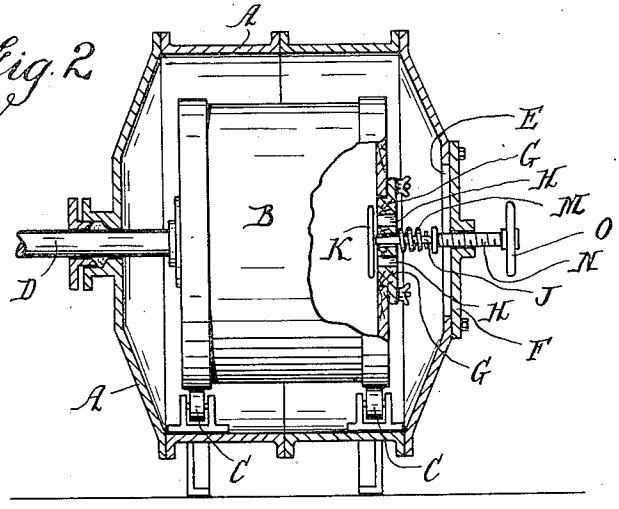


Fig. 2



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BUTTER CHURNING MEANS

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3 Claims. (Cl. 259—50)

This invention relates to butter churning machines of the class designed to provide for the churning and working operations being effected under vacuum conditions through the connection of the churn body with an exhausted sphere.

More particularly the invention is concerned with a construction of churn of this kind in which the churn body is of the rotating type and is enclosed within an airtight casing that is connected with air exhausting means to establish vacuum conditions therein, and in which the churn body is designed to be opened to the space within such casing in order to subject its contents to the exhausting action of such vacuum.

It is desirable in the churning operations that during the commencement portion of the operation, when the cream is in a liquid state, the churn body should be disconnected from the vacuum sphere in order thus to obviate the liability of the cream being drawn out of the body by the vacuum suction, and for the vacuum connection being established when the butter forming commences and the mass becomes more solid, or when it is being worked in the usual manner.

The invention has been devised with the object of affording facilities for effecting these operations by making provision whereby the rotating churn body may be sealed from connection with the enclosure casing, or may be opened to make connection with such casing. Thus with the churn sealed and the casing not under vacuum, the preliminary churning operations may be carried out, and with the churn open and the casing under vacuum conditions by connection with the air exhausting means, the final churning and (or) working operations may be carried on under the vacuum conditions desired.

The invention therefore consists in a combination construction of rotating churn body and enveloping casing adapted to have vacuum conditions produced therein, in which provision is made for the spaces enclosed by the churn body and by the casing being connected and disconnected at will by the opening and closing of the churn body. This may in its simplest form be effected by arranging an opening in one end of the casing adjacent to the side door opening of the churn body, which opening in the casing is made large enough to permit of the removal and replacement of the churn door and is provided with a removable cover for hermetically sealing it. This will allow of the churn body being closed and the casing being open, or alternatively, for the casing being closed and the churn body open, to carry out the butter making operations in the manner described.

Or the desired results may be effected without having to stop the churn and remove the respective opening covers, by forming the churn body door with a number of port openings therein and fitting a valve plate on the inside to cover the ports which valve plate is mounted on a stem piece that extends through to the outside of the door and is spring controlled to draw the valve plate closely upon the ports. The casing cover then has a screw threaded rod fitted into it in the axial alignment of the valve stem and this is operable from without to be screwed in to force the valve back and open the ports, or to be screwed out to permit of the valve closing on to the ports. By arranging the valve stem and the screw in the axial line of the churn body's rotation, this manipulation of the valve may be effected while the churn is rotating.

Other ways of giving effect to these operations in the churn body and enclosing casing combination may, however, be employed.

In the accompanying drawing the special provisions for effecting the purposes of the invention have been illustrated.

In such drawing:—

Figure 1 is an elevation, mainly in section, showing the enclosure casing and rotating churn body as made for giving effect to the first described method.

Figure 2 is a similar view but illustrating the second method.

In each instance a fixed cylindrical casing A is provided, this casing being made of such a nature as to adapt it for being exhausted of its air contents and maintained in such condition by connection with a suitable exhausting agency. The casing is arranged on a horizontal axis, and within it the rotating churn body B is fitted and supported on runner wheels C so that it may rotate concentrically in the casing. The rotation and the working of the churn members may be effected through the drive shaft D carried out through one end of the casing.

The casing A is made, at the reverse end from the drive shaft end, with an access opening E centrally disposed and this is provided with a cover plate F suitably securable upon it for sealing it hermetically.

The access door G for the churn body is arranged in the corresponding end of the body so that the usual charging and discharging of the churn may be effected through the casing opening E.

Thus with such an arrangement as shown in Figure 1, the churn body may be sealed by its door closure G and the first part of the churning carried on without respect to the outside conditions. Then when the final operations are required to be carried out under vacuum conditions, the door G may be removed, the casing sealed and connected with its exhausting means, and the churn then rotated to finish the butter making and (or) working operations with an open connection established between the churn body and the enclosed space of the casing.

In the arrangement shown in Figure 2, the door closure G of the churn body is formed with ports H therein disposed adjacent to its centre. A valve stem J is mounted to extend in through the centre of the door and upon its inner end a valve plate K is fitted, which plate is adapted to cover and seal the said ports. A spring M mounted on the outer end of the stem acts to draw the valve plate out on to the ports and to normally retain it there. The cover plate F of the casing opening has the screw threaded rod N arranged to screw in through its centre in axial alignment with the valve stem and this rod has a hand wheel O upon its outer end for turning it in such plate.

The screwing in of the rod N will thus cause its end to engage the end of the valve stem J and force back the valve K, to thereby open the ports H and connect the churn enclosure with the enclosure of the casing A, while the screwing out of the rod, will permit the spring M to act to close the ports. Thus, when the churn body has been originally charged with its cream contents and the body closed and also the casing closed, the first part of the butter making operations may be carried out with the churn body shut off from the casing enclosure space, and the latter part and the working of the formed butter carried out with the body opened up to such space. With these means arranged so that the valve stem and the screw rod are axially in line with the axis of the churn body's rotation, the operations of the valve may be effected while the said body is rotating.

I claim:—

1. A butter churn comprising an air-tight casing, a churn body rotatably mounted in said casing and provided with an opening in one end thereof to afford communication between the interior of the churn body and the interior of the casing, a valve associated with said opening, a spring urging said valve to a closed position, and a screw rod threaded through the corresponding end of the casing for opening said valve.

2. A butter churn comprising an air-tight casing, a churn body rotatably mounted in said casing and provided with an opening in one end thereof to afford communication between the interior of the churn body and the interior of the casing, a plate valve arranged on the inside of the body and adapted to cover the opening, a stem carrying said valve and slidably projecting through said end of the body beyond the outer surface thereof, a spring associated with said stem for drawing the plate against the inner surface of the end of the body to close the opening, said casing having a threaded opening in axial alignment with said stem, and a threaded rod extending through the threaded opening adapted to be screwed into engagement with said stem for moving the same against the action of the spring to remove the plate from the opening in the end of the churn body.

3. A butter churn according to claim 2, in which the said valve stem and the said screw rod are disposed in axial alignment with the axis of the rotating churn body.

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