

Sept. 2, 1958

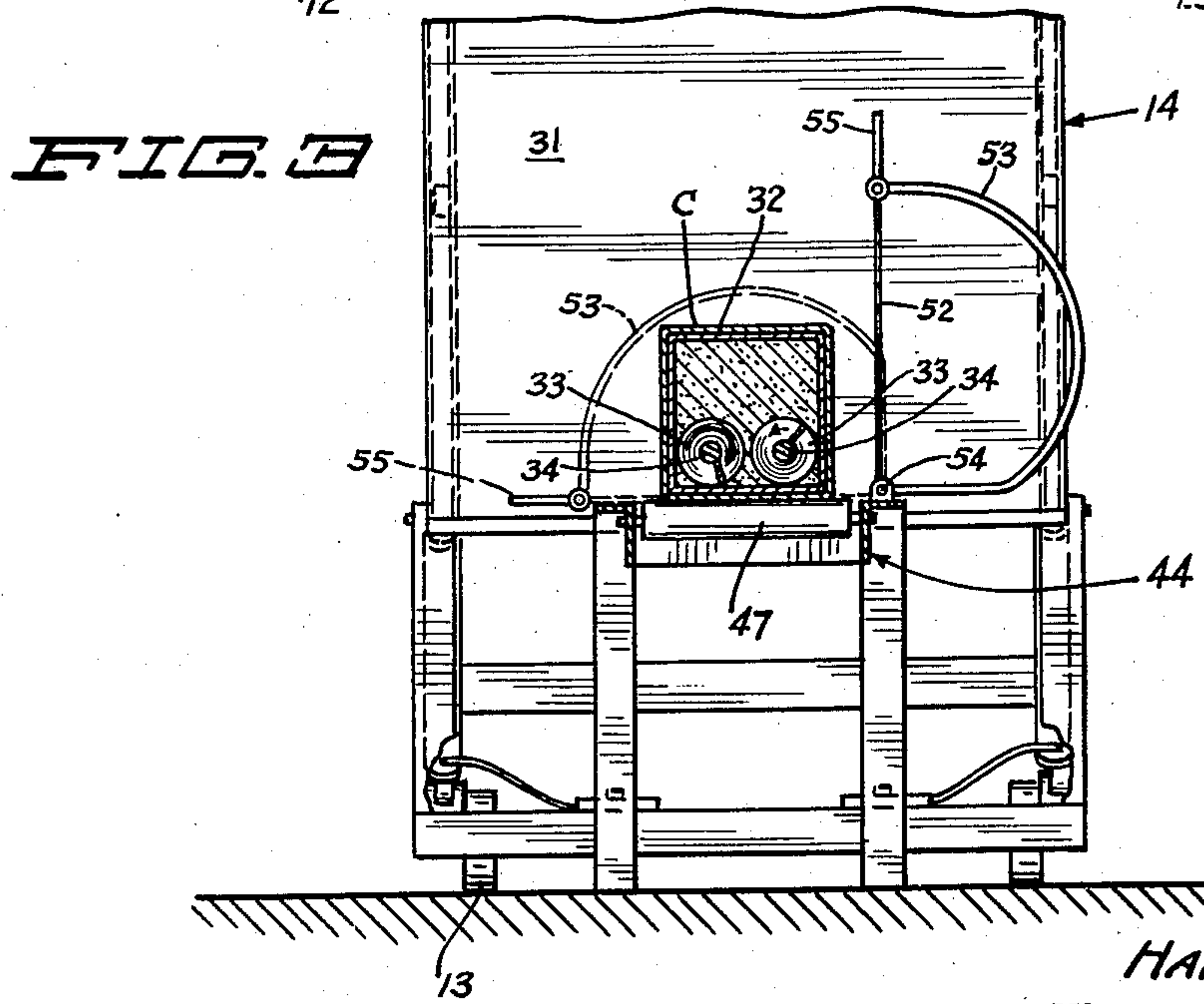
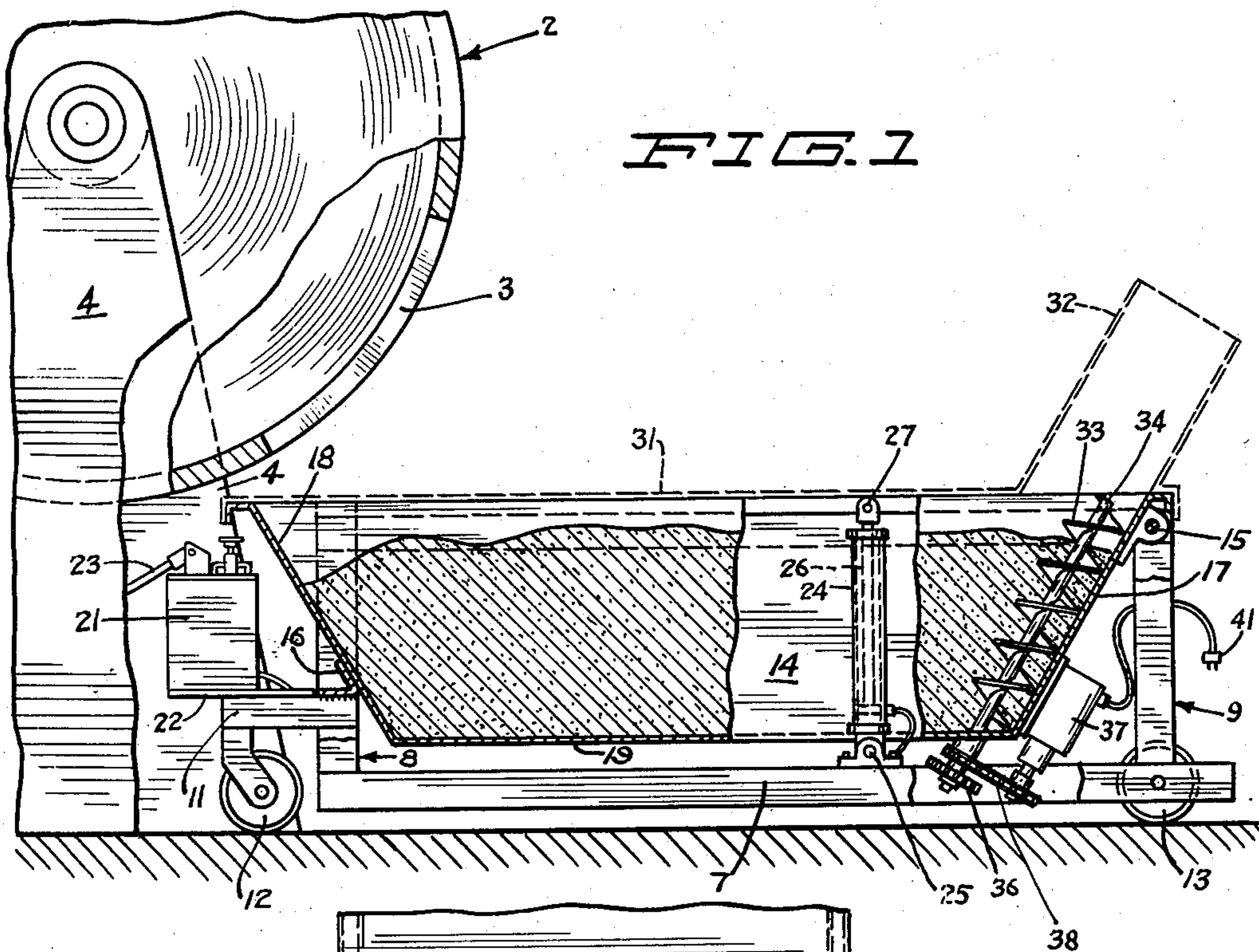
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2,850,052

BUTTER HANDLING APPARATUS

Filed Feb. 6, 1956

3 Sheets-Sheet 1



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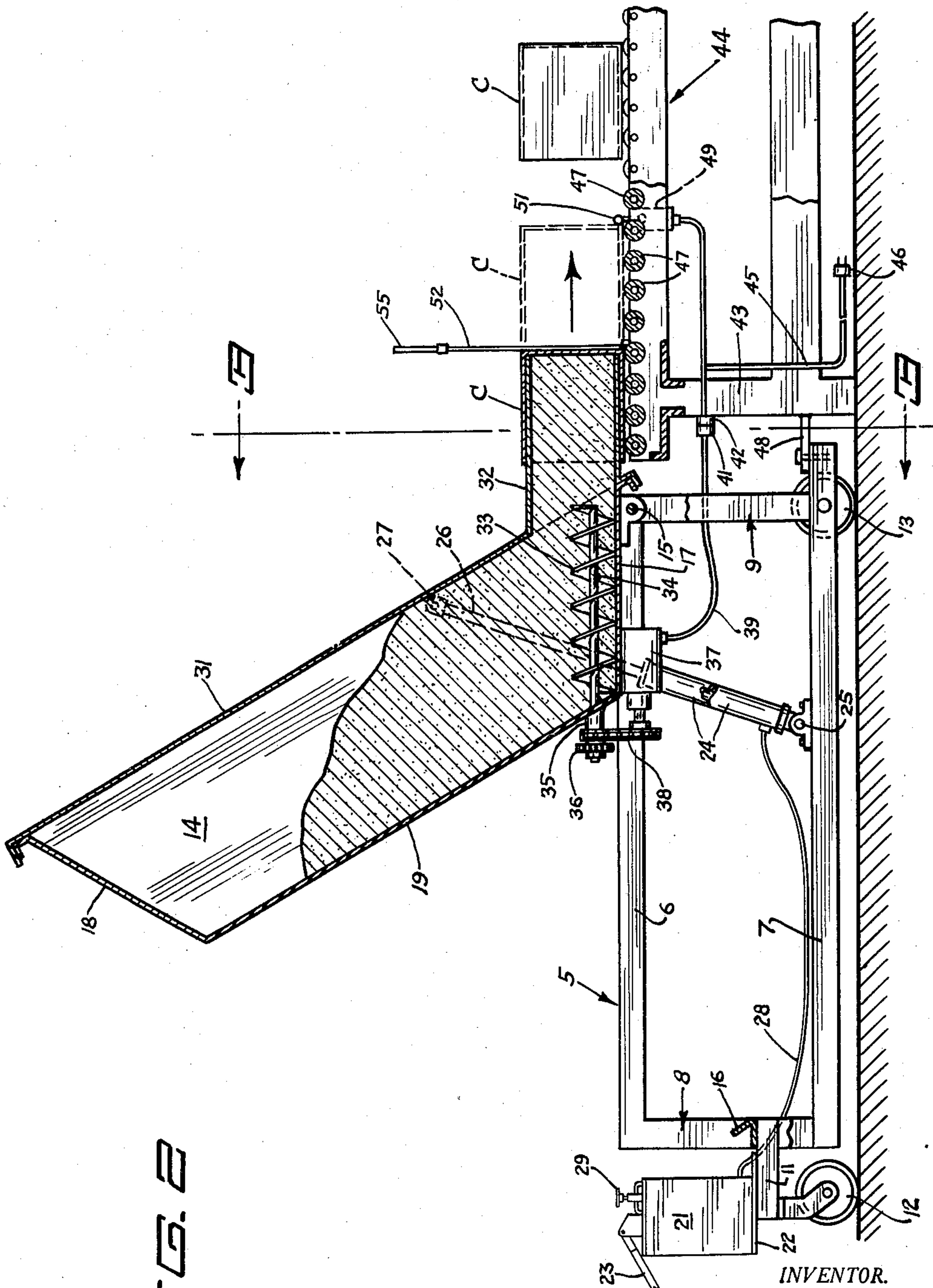


FIG. 2

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FIG. 5

FIG. 4

FIG. 6

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BUTTER HANDLING APPARATUS

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6 Claims. (Cl. 141—231)

This invention relates to new and useful improvements in butter handling apparatus and more particularly to an apparatus for transporting the butter from a churn to another station for further processing, whereby such operation may be accomplished with a minimum of manual labor.

In the commercial manufacture of butter, after the cream has been churned and the buttermilk drained from the churn, the butter is usually worked within the churn by a tumbling action imparted thereto as the churn is rotated, as in the churning operation.

After the butter has been adequately worked in the churn, it is removed therefrom for bulk packaging in suitable containers to prepare it for storage and for distribution to the trade. In the past, it has been common practice when installing large rotary churns such as in creameries, to mount the churn drum with its axis located approximately waist high from the floor, thereby to facilitate manual removal of the butter from the interior of the churn through the usual door opening provided in the cylindrical wall thereof. Heretofore, this has usually been accomplished by manually grasping the butter with the hands, or with a suitable scoop, and bodily lifting the butter from the interior of the churn and placing it upon a table or other receiving means for further processing.

In the operation of a large churn, such manual removal of the butter from the churn may involve considerable manual work, as it usually requires lifting of the butter at arms length. Such manual lifting of the butter from the churn may also result in contamination of the butter as a result of foreign matter dropping from the workman's clothing into the butter, as he leans forwardly over the opening in the wall of the churn to lift the butter, unless the workman continually exercises extreme care in his work.

Attempts have heretofore been made to facilitate the removal of bulk butter from the interiors of large rotary churns without having to reach into the churn and manually lift the butter therefrom. To thus reduce or minimize the work of manually removing the butter from a churn, some manufacturers have elevated the churns so that the butter may be dumped therefrom by gravity into a suitable container, usually known to the trade as a butter boat. Such boats have been in the form of large open pans which, in some instances, are mounted on a platform provided with suitable casters to facilitate moving the butter boat from one place to another, as from the churn to a packaging processing table. With such known apparatus, when the butter boat has been moved into position adjacent to the receiving table for further processing, the workman must manually lift the butter from the butter boat onto the table.

Such manual handling of the butter as hereinbefore stated, is objectionable and undesirable both from the standpoint of labor and sanitation, and an important object of the present invention, therefore, is to provide a novel apparatus adapted to be used in a creamery to facilitate the removal of the bulk butter from the churn and

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the transportation thereof from the churn to and placing it upon a processing or packaging table, whereby all manual lifting of the butter is completely and entirely eliminated, and whereby the handling of the butter between the churn and the packaging table may be expeditiously accomplished with relatively greater efficiency and with less danger of contamination, than has heretofore been possible with the use of conventional butter handling equipment.

A further object of the invention is to provide a portable butter boat comprising a frame mounted upon suitable carrying wheels and having means for pivotally supporting the butter boat thereon. The top of the butter boat, when in its normal horizontal position, being disposed at an elevation slightly below the door opening in the wall of the churn so that the butter may be dumped by gravity from the churn into the butter boat, without manually lifting the butter, after which the butter boat may readily be transported to a position adjacent to a packaging or processing table.

A further object of the invention is to provide power means for relatively tilting the loaded butter boat on its supporting frame from its normal horizontal to an elevated dumping position, whereby the butter may be dumped from the butter boat directly onto the processing table without manual labor.

A further object of the invention is to provide a wheeled supporting frame having a butter boat pivotally mounted thereon, and fluid operated means being provided for tilting the butter boat from its normal horizontal position to load dumping position.

A further object of the invention resides in pivotally mounting the butter boat at one end on its supporting frame and providing at said end of the butter boat a discharge spout having a spiral or screw type conveyor mounted therein and extending into the adjacent end of the butter boat, and means being provided for driving said conveyor to force the butter through said discharge spout into a receiving carton, whereby the butter may be removed from the churn and transported to the packaging table, and delivered into shipping cartons without manual handling or lifting of the butter.

A further and more specific object of the invention is to provide a butter handling apparatus comprising a wheeled frame having an elongated butter boat pivotally mounted at one end on said frame and having a discharge spout at said end, which spout corresponds in cross-section to the interior of the butter cartons into which the butter is to be packed, whereby an empty carton may be fitted over said discharge tube in the initial operation of filling the carton, and power means being provided for tilting the butter boat to an upright position to bring the discharge spout into parallel relation to the receiving table, whereby when an empty carton is fitted onto the spout, and butter is forcibly ejected from the butter boat through said discharge spout, the empty carton fitted thereonto is gradually filled and during the filling operation the carton is ejected from the filling spout onto the processing table, means being provided for automatically interrupting the operation of the butter ejecting means when the carton has been completely filled.

Other objects of the invention reside in the simple and inexpensive construction of the apparatus as a whole, whereby it may be manufactured in mass production at low cost; in the provision of such an apparatus which is extremely simple to maintain in a highly sanitary condition at all times; in the provision of means for cutting the column or mass of butter at the mouth of the carton to release the filled carton; and in the unique construction of the apparatus, as a whole, whereby all mov-

able parts are conveniently accessible for cleaning and inspection.

These and other objects of the invention and the means for their attainment will be more apparent from the following description taken in connection with the accompanying drawings.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a view showing a portion of a conventional drum type churn with the novel butter boat herein disclosed positioned to receive a batch of butter therefrom;

Figure 2 is a side elevation of the butter boat and its supporting frame shown positioned adjacent to one end of a butter packaging table, the butter boat being shown tilted to its butter discharging position with an empty carton fitted over the discharge spout thereof to receive a charge;

Figure 3 is a transverse sectional view on the line 3—3 of Figure 2, showing the twin augers or screws for forcibly discharging the butter from the butter boat into the carton, and also showing means for transversely cutting the bar or mass of butter at the mouth of the filled carton, when the latter has received its full charge;

Figure 4 is a view showing a slightly modified construction wherein the butter boat is pivoted along one of its top side edges;

Figure 5 is a top view of Figure 4; and

Figure 6 is an end view of Figure 4, showing in full and dotted lines the normal horizontal and dumping positions of the butter boat.

In the selected embodiment of the invention herein disclosed, there is illustrated in Figure 1 for purposes of disclosure, a portion of a conventional drum type churn comprising a drum 2 having a door opening 3 in its cylindrical wall which is normally closed by a suitable door, not shown in the drawings. The drum 2 is rotatably supported on suitable pedestals, generally indicated by the numeral 4, and is driven by suitable means, well known in the art.

Supporting frame

The novel butter handling apparatus herein disclosed is best illustrated in Figures 1 and 2, and comprises a suitable frame, generally designated by the numeral 5. This frame comprises upper and lower side frame members 6 and 7, respectively, and end frame members 8 and 9, all preferably constructed of structural steel to provide adequate strength and rigidity with a minimum of weight. The end frame 8, which will hereinafter be referred to as the rear end of the apparatus, is shown comprising an extension 11 to which a pair of casters 12 are secured for supporting said end of the supporting frame. The opposite or front end 9 of the supporting frame is provided with suitable carrying wheels 13, which, in conjunction with the caster wheels 12, permit the frame and butter boat to be readily transported from one place to another, as will be understood.

Butter boat

An elongated container or butter boat, generally designated by the numeral 14, is pivotally mounted at one end to the front end of the supporting frame 5, as indicated at 15 in Figures 1 and 2. The butter boat is normally disposed in a horizontal position as shown in Figure 1, and when so positioned its rear end may be supported on a cross member 16, constituting a portion of the rear end frame 8. The front and rear end walls 17 and 18, respectively, of the butter boat 14 are upwardly inclined from its bottom wall 19, as shown in Figures 1

and 2, and the side walls of the butter boat may also be slightly outwardly inclined to facilitate removal of the mass of bulk butter from the butter boat.

Butter boat tilting mechanism

The mechanism for tilting the butter boat upon the supporting frame 5 is best illustrated in Figures 1 and 2, and comprises a hydraulic pump, generally designated by the numeral 21. Pump 21 is shown mounted on a platform 22 secured to the rear extension 11 of the supporting frame 5, as best illustrated in Figure 2. The pump is here shown provided with an operating handle 23, which actuates a piston, not shown, to force fluid from a reservoir, which may constitute a portion of the pump 21, into a pair of hydraulic cylinders 24 pivoted to the lower frame member 7 of the supporting frame, as indicated at 25 in Figures 1 and 2. Each cylinder 24 has a piston rod 26, the upper ends of which are suitably pivoted to the upper portions of the side walls of the boat, as indicated at 27.

Obviously, if desired, a suitable motor driven pump of the usual well-known rotary type may be substituted for the manually operated pump here shown, without departing from the scope of the invention.

Flexible conduits 28 connect the pump 21 with the cylinders 24 so that when the pump is actuated, fluid is pumped into the lower ends of the cylinders to thereby force their piston rods upwardly to tilt the butter boat 14 to load dumping position, as shown in Figure 2. A suitable release valve 29 is preferably provided on the pump 21 for releasing the pressure fluid from the cylinders 24 to permit the butter boat to descend by gravity to its normal horizontal position shown in Figure 1.

Butter ejecting mechanism

In Figures 1, 2 and 3, the apparatus is shown provided with power means for ejecting or discharging the bulk butter from the butter boat 14 into suitable cartons, indicated by the letter C in Figure 2. To thus forcibly eject the butter from the butter boat into suitable containers, the butter boat is provided with a suitable cover 31 having means, not shown, for securing it in position over the open top of the butter boat, as shown in full lines in Figure 2. The cover is provided at its discharge end with a discharge spout 32, preferably of square cross-section, as best illustrated in Figure 3, and which is of such size that an empty carton may readily be fitted over the end thereof, as shown in full lines in Figure 2.

To eject the butter from the butter boat 14 into the cartons, a pair of feed screws or augers 33 are rotatably mounted at the discharge end of the butter boat in alignment with the lower portion of the discharge spout 32. The shafts 34 of the two augers or feed screws are rotatably supported in suitable bearings 35 shown secured to the bottom wall 19 of the butter boat, as illustrated in Figures 1 and 2. The two augers are operatively connected together for rotation in opposite directions, as indicated by the arrows in Figure 3, by suitable gearing, indicated at 36 in Figures 1 and 2. An electric motor 37 is shown secured to the end wall 17 of the butter boat and has a suitable drive 38 operatively connecting it to one of the shafts of the feed screws. The motor 37 is shown provided with an electric cord 39 having a plug 41 at its free end adapted to be received in a receptacle 42 fixed to the end frame member 43 of a suitable butter packaging table, generally designated by the numeral 44. The receptacle 42 has a conductor 45 carrying a plug 46, whereby the receptacle 42 may be energized by inserting the plug 46 into an electric supply receptacle of conventional construction.

The butter packaging table is preferably provided along its top surface with a plurality of anti-friction rollers 47 to facilitate moving the filled cartons over the top surface thereof, as will be understood. A coupling

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bar 48 is provided for anchoring the front end of the boat supporting frame 5 to the end frame 43 of the packaging table 44, thereby to assure that the butter boat will not travel away from the butter packaging table when the augers or feed screws are actuated to force butter into a carton fitted over the discharge tube 32 of the butter boat.

Automatic shut-off for motor

Means is provided for automatically shutting off the motor 37 when the carton C fitted over the discharge tube 32 has received its full charge of butter.

Such means is shown comprising a suitable cut-off switch 49, interposed in the electric supply circuit of the motor 37, as will be understood by reference to Figure 2. The switch 49 has an actuating arm 51 which normally is positioned in the path of the butter cartons traveling over the butter packaging table 44, as shown in Figure 2, whereby it is engaged by the leading end of the carton when the carton reaches the dotted line position indicated in Figure 2. Actuation of the switch arm 51 by the carton will automatically open the circuit to the motor 37, whereby the feed screws or augers 33 are automatically interrupted to prevent ejection of butter from the butter boat.

Butter cutting means

Means is provided for transversely cutting the column of butter being ejected from the butter boat, when the carton supported on the discharge tube 32 has received its full charge and reaches the dotted line position indicated in Figure 2, where it comes to rest because of its engagement with the switch lever 51. Such means is shown comprising a wire cutting element 52 supported in a frame 53 pivoted at 54 on the frame of the butter packaging table 44, as best illustrated in Figure 3. The pivoted frame 53 has an operating handle 55 normally positioned as shown in Figures 2 and 3. When the filled carton C comes to rest in the position indicated in dotted lines in Figure 2, the operator grasps the handle 55 and swings it downwardly to the dotted line position indicated in Figure 3, whereby the wire cutting element 52 traverses the column of butter in a plane parallel to the mouth of the carton, and thus separates the filled carton from the column of butter contained within the discharge spout 32. The filled carton may then be advanced on the conveyor 44 or removed therefrom to permit another empty carton to be fitted over the end of the discharge tube to receive a charge of butter.

In Figures 4, 5 and 6, there is illustrated a butter transporting apparatus of slightly different construction from that shown in the previous figures. The principal difference between the structure illustrated in Figures 1, 2 and 3, and the structure illustrated in Figures 4, 5 and 6, resides in the method of pivotally mounting the butter boat in its supporting frame. The butter boat 56, shown in Figures 4, 5 and 6, is pivotally mounted on a suitable supporting frame 57 along one of its side edges, as indicated at 58 in Figures 4 and 6.

The supporting frame 57 is generally L-shaped, as will be understood by reference to Figure 6. It comprises an upright supporting structure composed essentially of three upright frame members or posts 59, 61 and 62, to the upper ends of which the butter boat is pivotally connected as indicated at 58 in Figure 4. The supporting frame also comprises a horizontal portion, generally designated by the numeral 63, mounted on suitable carrying wheels 64 and 65, as illustrated in Figure 4.

Butter boat tilting mechanism

As hereinbefore stated, the butter boat 56, shown in Figures 4, 5 and 6, is mounted for tilting movement about the aligned axes of pivots 58. To tilt the butter boat 56 from its normal horizontal position, shown in full lines in Figures 4 and 6, to its load dumping position, indicated in

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dotted lines in Figure 6, a pair of hydraulic cylinders 66 and 67 are provided, one at each end of the butter boat, as illustrated in the drawings. Each such cylinder has its lower end pivoted to the horizontal frame portion 63, as indicated at 68. Each cylinder also has a piston rod 69 mounted for reciprocal movement therein, the upper ends of which are pivoted to the upper portions of the butter boat, as indicated at 71 in Figures 4, 5 and 6.

The pump 21 shown in Figure 4, has fluid conduits 72 connecting it with the lower ends of cylinders 66 and 67, as indicated, whereby fluid may be forced into the lower ends of said cylinders below their respective piston rods 69, by operation of the pump, thereby to eject the piston rods 69 from their respective cylinders and effect upward tilting of the butter boat 56 from its normal lowered position, shown in full lines in Figures 4 and 6, to its butter dumping or discharging position, indicated in dotted lines in Figure 6. When the butter boat is thus tilted to an inclined position, its contents may be dumped onto a suitable receiving means, such as a butter packaging or processing table, generally indicated by the numeral 73.

Means is provided for anchoring the apparatus to the floor adjacent to the table 73 during the operation of tilting the loaded butter boat to its dumping position. Such means is shown comprising a plunger-like element 74 having its upper end pivotally connected to an arm 75, as best illustrated in Figure 6. One end of the arm 75 is pivoted at 76 to the supporting frame 60, and its opposite end is connected to an operating member 77 which may be actuated to force the plunger-like element 74 into frictional engagement with the floor, thereby to prevent relative movement of the apparatus during loading and unloading operations of the butter boat.

Operation

In the operation of the novel butter boat shown in Figures 1, 2 and 3, when the butter working cycle has been completed, the usual door in the cylindrical wall of the churn is removed or opened, and the rear end of the butter boat is then moved under the door opening of the churn to substantially the position shown in Figure 1. The butter may then be delivered directly into the butter boat from the churn without requiring any manual lifting of the butter. Thus, the operation of transferring the butter from the churn into the butter boat may be greatly expedited by the use of the novel apparatus herein disclosed, as will readily be understood.

When all of the butter has been delivered into the butter boat from the churn, the butter boat is moved into a position adjacent to the end of the butter packaging or processing table 44, as illustrated in Figure 2. The forward end of the supporting frame of the butter boat is then anchored to the fixed frame 43 of the table 44 by the coupling element 48, to prevent the butter boat from moving relative to the processing table, during removal of the butter therefrom.

An empty carton C is next fitted over the upwardly inclined discharge spout 32 of the butter boat, after which the pump 21 is actuated to tilt the butter boat to the position shown in Figure 2. When so positioned, motor 37 is energized, whereupon the twin conveyors or feed screws 33 are actuated to force butter through spout 32 and against the bottom wall of the empty carton positioned thereon.

As the butter is ejected from the butter boat through its spout 32 into the carton C, the carton gradually moves forwardly on the anti-friction rollers 47 of the butter processing table, as indicated by the arrow in Figure 2, until the leading end of the filled carton engages and actuates the cut-off switch lever 51, and thereby automatically effects interruption of the motor 37, and therefore the interruption of the conveyors 33.

The cutting device 53 is then actuated by manipulation of the handle 55 after which the filled carton may be removed from the butter packaging table 44, or advanced

thereon to another station where the carton may be sealed and wrapped for storage and subsequent distribution to the trade. Another empty carton may then be fitted over the discharge spout 32, after which the carton-filling cycle is repeated.

From the foregoing, it will be noted that all manual lifting of the butter in the operation of transferring the bulk butter from the churn and placing it in shipping cartons is entirely eliminated. The apparatus also assures the utmost in sanitation in the initial handling of the butter, which is a highly desirable attribute in the handling of any food product. In addition, the operation of filling the cartons may be greatly expedited, as will be readily understood by reference to Figures 1 and 2.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, and the appended claims should be construed as broadly as permissible in view of the prior art.

I claim as my invention:

1. In an apparatus for transporting butter from a churn to a remote station for further processing and without requiring manual lifting of the butter, a mobile frame, an elongated butter boat pivotally mounted at one end in said frame and normally horizontally positioned therein to receive a batch of bulk butter from a churn, a discharge spout at the pivoted end of the butter boat, fluid-operated means for upwardly tilting the opposite end of the butter boat to facilitate removal of the bulk butter therefrom through said spout and delivering it into an empty carton, and power means for ejecting the butter from the butter boat through said discharge spout.

2. In an apparatus for transporting bulk butter from a churn to a packaging table, a mobile frame, an elongated butter boat pivoted at one end to said frame and normally horizontally positioned therein to receive a batch of bulk butter from a churn, a closure for the open top of the butter boat having means for securing it in position thereon, said closure having a discharge spout at the end thereof adjacent to the pivoted end of the butter boat, a feed screw in said spout, a motor for driving the feed screw to eject butter from the discharge spout and deliver it into a carton when the butter boat is

tilted to unloading position, and means for automatically interrupting operation of said motor, when the carton being filled has received a full charge.

3. An apparatus according to claim 2, wherein the means for automatically interrupting operation of the motor, when the carton has received a full charge, comprises an electric cut-out switch interposed in the motor circuit and having an arm normally positioned in the path of the carton advancing along the packaging table, whereby when each carton receives its full charge, said switch arm is actuated by the carton, thereby to open the motor circuit.

4. An apparatus according to claim 3, wherein means is provided on the packaging table for transversely cutting the column of butter at the discharge end of the spout, when the carton has received its full charge of butter.

5. In an apparatus for handling and packaging butter, a churn, a packaging station, a container normally positioned at a lowered elevation to facilitate delivering bulk butter thereinto from the churn, said container having a discharge spout, a screw conveyor in said container having one end portion extending into said discharge spout, a carton supporting table at the packaging station, means for elevating the container to bring its discharge spout into operative position relative to said table, and means for driving the conveyor to discharge butter from the container and deliver it into cartons.

6. An apparatus for handling and packaging butter as defined in claim 5, wherein said container is mounted for pivotal movement about a horizontal axis, and hydraulic means is provided for elevating the container to its butter discharging position.

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