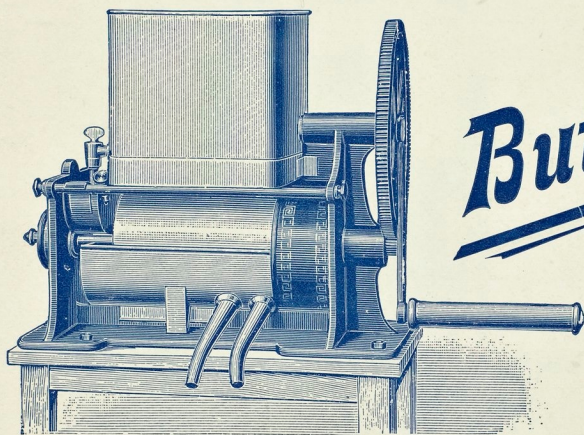




THE

MILK SEPARATOR



Butterfly

The Newest
and Best
Milk Centrifuge.



— HULT BROTHERS' PATENT —

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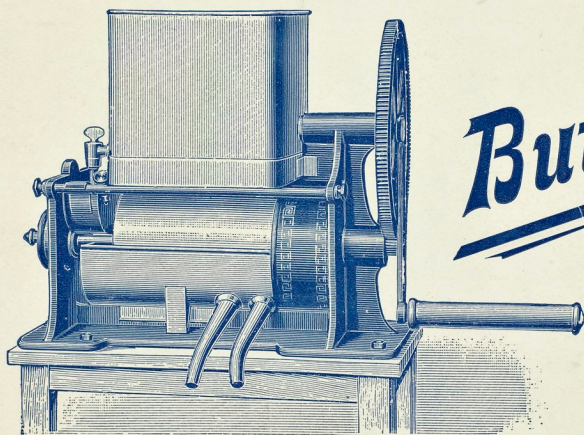
STOCKHOLM

(SWEDEN).



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MANUFACTURED BY

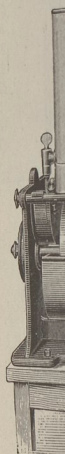
THE CENTRATOR COMPANY, LIMITED,

STOCKHOLM

(SWEDEN).

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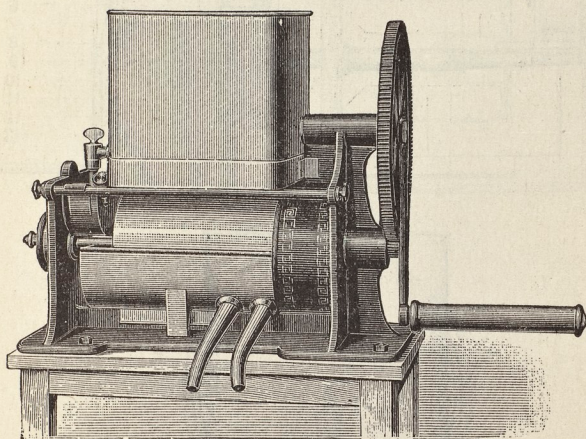


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THE "BUTTERFLY" HAND SEPARATOR

The Newest and Best Milk Centrifuge.

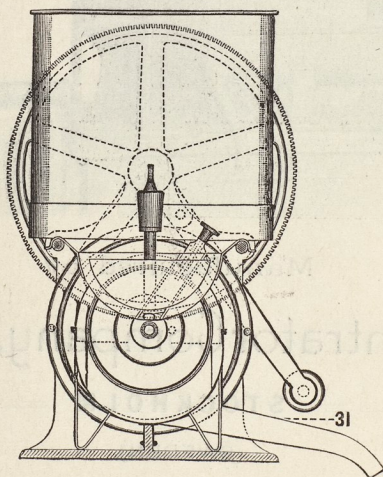
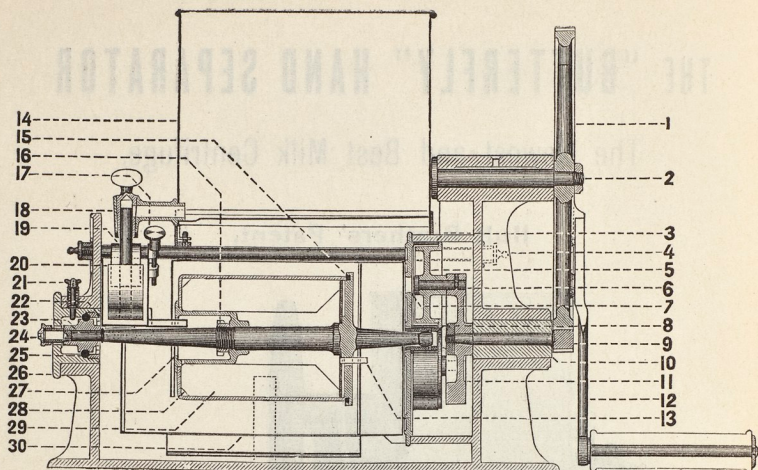
Hult Brothers' Patent.



Manufactured by
The Centrator Company, Limited,
— STOCKHOLM —
(SWEDEN).

STOCKHOLM, CENTRAL-TRYCKERIET, 1897.





Section of the "Butterfly" Hand Separator.



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1 Spur
2 First
3 Spring
4 Stays.
5 Roller
6 Studs
7 Oil ho
8 Small
9 Spur
10 Bush
11 Catch
12 Cran
13 Crea
14 Feed
15 Initi
16 Nut

The illustrations on the opposite side show the sectional elevation and the front and end views respectively of the "Butterfly" Separator (Centrifuge).

The following list refers to the numbers given in the sectional elevation.

- | | |
|------------------------------------|--------------------------------|
| 1 Spur driving wheel. | 17 Screw for feed regulator. |
| 2 First motion spindle. | 18 Feed tap. |
| 3 Spring rings. | 19 Float for feed regulator. |
| 4 Stays. | 20 Cup of ditto. |
| 5 Rollers for spring rings. | 21 Spring pin for bearing. |
| 6 Studs for roller. | 22 Screwed nipple for bearing. |
| 7 Oil hole in cover for the same. | 23 Spindle of bowl. |
| 8 Small friction roller. | 24 End screw and oil well. |
| 9 Spur pinion. | 25 India rubber bearing ring. |
| 10 Bush for spindle of ditto. | 26 Cap for bearing. |
| 11 Catchplate for rollers. | 27 Inlet chamber of bowl. |
| 12 Crank and driving handle. | 28 Bowl. |
| 13 Cream outlet tube in bowl. | 29 Wings in bowl. |
| 14 Feed tin. | 30 Tin covers. |
| 15 India rubber bowl ring. | 31 Spouts of tin covers. |
| 16 Nut for fixing bowl to spindle. | |



DESCRIPTION.

The principal parts of this separator are the framing, the bowl with its spindle, the milk vessels and the gearing, which is contained in the round casing at the right hand end of the machine and forms one of its chief specialities. This gearing consists of three double steel rings which, compressed between the inner side of the casing and a small hollow friction roller in the centre, on account of their elasticity exert a certain amount of pressure on the roller and the casing. Inside each ring is a roller which is carried on a stud, fixed to a catchplate, on which stud it revolves. This catchplate being mounted on the inner end of the second motion spindle is actuated by the spur wheel and pinion, outside the former of which is attached the driving handle. It will therefore be seen that, when the handle is turned, motion is imparted to the catchplate, carrying the rollers, by means of the wheel and pinion, and the rollers, pressing on the inner surface of the spring rings, cause these to revolve around their path and give motion to the small central hollow friction roller which is made to revolve at a very high velocity. Inside this hollow friction roller is a steel cross pin which engages in a slot, formed in the spherical end of the bowl spindle, by means of which motion is imparted to the bowl itself. The bowl rotates in a horizontal direction and is kept in position endways by means of a small screw at the opposite end from the gearing, the bearing at that end being surrounded by an india rubber ring.

By this arrangement of the gearing the following advantages are attained:

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1. An absolutely reliable frictional gear which does away with all possibility of slipping.
2. A roller bearing with the same flexibility as a rubber mounted bearing.
3. The machine has an easy, silent and agreeable motion, the bowl being able to centre itself quickly at both ends.
4. There is very little, if any, wear and tear on the gearing as it is all rolling gear, not liable to slipping and, besides, very wide.
5. Very little oil is required.

The skimming goes on in the following manner: The milk flows from the feed tin by means of the tap through the feed regulator (which ensures an even supply) into the machine and is conducted therefrom by a small tube into the inlet chamber, formed at the end of the bowl, from whence it is drawn through some small holes into the bowl, where, by the centrifugal action, the milk is separated from the cream. The cream being of a lighter gravity than the skim milk forms a layer on the inner surface of the milk and escapes by a small tube at the other end of the bowl into the cream compartment of the tin covers, from whence it flows through a spout. The skim milk being of a heavier gravity is found nearest to the sides of the bowl, from whence it is conducted through holes in the flange or spindle and delivered into the skim milk compartment of the tin covers, from where it flows through another spout.

In order to increase the skimming capacity of the machine, the diameter of the bowl has been made rather capacious, with the result that, according to an analysis made by Stockholm Chemical-Technical Office, the fat substance of the *separated* milk has been reduced as far as to 0.05 per cent.

The india rubber bushing is arranged in such a way that the oil should not enter into the casing and the

ring not swell out, and as the flexibility of the ring will always remain the same, it need not be tightened by screwing.

The lower tin cover has been provided with legs at both ends to prevent its being placed slantwise on the frame. Inside it has got a disc in the cream receiving department to prevent the cream from being thrown back into the milk compartment. In order to diminish the vibration of the feed tin by its resting on the stays, the latter have been fitted with small rings of india rubber at the resting points.

DIRECTIONS FOR USE.

Fixing.

1. The machine should be fixed by means of screws to the corner of a strong table or bench, so that the handle will clear the edge when turning, and the spouts project so as to deliver the cream and skim milk into the vessels placed alongside, *care being always taken that the machine is perfectly level when screwed down.*

Before using.

2. The separator should be taken apart and carefully cleaned, the following parts being oiled: Bearings of the first and second motion spindles (2 and 9), and also the studs (6), which is done by placing the spout of an oil can in the end hole and pressing the bottom of the can. This hole is easily reached

through the large hole (7) in the cover, the driving wheel being turned, so that each pin is brought in front of the same. Only a few drops of oil are required for this purpose.

When taking the machine apart and putting it together again the following instructions should be noted:

- a) Remove the feed tin (14) and take away the float (19) together with the regulator cup (20). The latter being kept in position by spring clips on the stays (4) its removal must be carefully brought about, in order that no damage may be caused to its outlet pipe. This done, remove the upper one of the tin covers which surround the bowl (30).
- b) The button of the spring pin (21) should then be drawn upwards to enable the bearing cap and the bearing being removed, after which the bowl can be drawn from its place in the friction roller (8) and lifted out. Then remove the lower one of the tin covers.
- c) The bowl is disconnected from the spindle by unscrewing the nut (16) with a spanner accompanying the machine. Should the bowl then be found to stick fast, strike *lightly* the spindle end against the wooden table, and the bowl will at once be released.
- d) Afterwards clean *carefully* the bowl, the spindle, the feed tin, the float, the regulator cup, and the tin covers with warm water in which a small quantity of soda has been placed; also clean on the inside (with the brushes provided) the feed tap (18), the tubes in the regulator cup and the float, the cream tube (13) and also the holes in the flange of the spindle, and the cream and skim-milk spouts of the tin covers.

- e) After the cleaning has thus been performed, the spindle is fitted in the bowl in such a position **that the index marks on the spindle flange come opposite to corresponding ones on the bowl**, after which the nut (16) is screwed up. Then place the lower one of the tin covers so that the clamp is fixed to the spring on the frame, and press it downwards until the feet rest flat on the bottom of the framing, and sideways as near as possible to the casing of the gearing.
- f) The bowl is then replaced by sliding the bearing end of the spindle through the bearing opening in to the frame and then the spherical end of the same into the recess of the friction roller (8), care being taken that the notch in the spindle end comes into gear with a cross pin fitted in the said friction roller. Then draw upwards the spring pin (21) to allow the bearing cap to be replaced when the other end of the spindle is fitted into the regulating bearing, *the bearing cap (26) being turned so that the spring pin falls into a small hole, provided for securely locking and keeping it in position.*

(As it has proved desirable to get the separator bowl as far as possible accessible to interior cleaning, the wings which make the milk rotate along with the bowl have been made removable by joining them as well as the bottom disc for the milk and the cream outlet and the interior perforated funnel or spreader to a tube, which is put on the spindle and firmly held by the same.)

OBSERVE: On no account must the separator be started before the bearing cap (26) has been properly locked.

- g) The regulator cup is then placed in position by carefully seeing that its outlet pipe is between the inlet chamber of the bowl and the spindle, and afterwards pressing down the spring clips over both stays (4). After that slide the cup close to the side of the frame.
- h) The upper one of the tin covers should then be placed so that it fits close to the upper edge of the lower cover.
- i) The float should then be placed in the regulating cup.
- k) Place the feed tin on both stays in such a position that the projecting pieces, attached to the outside of the bottom hoop, are fitted on the pins provided. At the same time the float should be connected to the feed tap.

Observe: The oiling of the regulating bearing is afterwards done through the hole of the oil well (24) which should be filled with oil.

Only pure separator oil must be used.

Temperature of milk.

3. The milk should in preference be separated direct as it comes from the cow; otherwise it must be warmed up to 28 or 30 degrees Celsius (85° Fahrenheit). If that is not done, the skimming will be imperfect.

Skimming.

4. The feed tin (14) should be filled with milk and the driving handle afterwards turned »with the sun»,

commencing very slowly until the speed is gradually increased to 50 (or 55) revolutions per minute which speed *must be kept evenly during the skimming.*

Observe. When working the machine it is best for an inexperienced person to control the speed with a watch until he has accustomed himself to this working, as the efficiency greatly depends on the speed being even and exact (50 to 55 revolutions a minute).

5. When the separator has attained the speed stated, the feed tap should be turned on, and the milk be allowed to flow. *See that the feed tin does not become empty during the skimming.* The thickness of the cream can during the working be regulated as desired by means of the regulating screw (17), which is connected to the regulator cup, on the inside of which is drawn a line showing the position of the screw in ordinary skimming. By raising this screw thinner cream is obtained, and thicker, if it is screwed down. To alter the consistency of the cream as required it is, however, only necessary to turn this screw *a trifle.*

After skimming.

6. When the feed tin is nearly empty, about half a gallon of the skim milk should be returned and passed through the separator; this removes any cream that may be left in the bowl.
7. Afterwards the handle should be released and the machine allowed to stop by itself.

Observe. When the bowl has stopped, a small quantity of skim milk will run out from both the spouts, and as even then the bowl will not be quite empty, it should be taken out of the frame with the

outlet chamber end down in the tin cover so that all milk may flow out.

After using.

8. Take the machine apart and clean it carefully, as before stated, immediately after the skimming, as it will then be cleaned in the easiest way. The bowl and all other parts of the machine should be kept in a dry place.

Management and maintenance of the separator.

9. To ensure a quiet motion, when at work, the separator should be firmly screwed to a steady bench, well fastened to the floor or the wall. This bench should, if possible, be made of two inch deals with steady legs. When screwing the machine to the bench, please see that the bottom of the frame fits closely to the bench, so that it cannot be moved out of its level when fixed by the screws. This can be done by putting some small wooden wedges into the openings between the bench and the frame.
10. Should the bowl in a new separator be found not to run smoothly, that is mostly caused by the india rubber ring (25) having become hardened through drying or by its sticking fast to the nipple (22) and hereby losing an amount of its flexibility; by removing the bearing and replacing the ring the machine will be found to work right. The fitting of a new ring is done by unscrewing the brass button from the oil well and also the nipple (22), thus allowing the regulating bearing to be pressed out from the bearing cap.

The bowl is also apt to vibrate if the handle is turned to slow. It is therefore very important, as aforesaid, that *the speed of 50 to 55 revolutions* a minute be kept up.

11. If the axle studs in the casing, where the frictional gear works, are oiled too copiously, some oil may possibly enter into that casing and thus interfere with the working of the machine. In such a case the cover of the casing should be removed by unscrewing the two screws; after which the casing and the rings may be cleaned by means of cotton waste or a rag. Before replacing the cover please see *carefully* that no dirt or waste is left on the rings or the inside surface of the casing.

In order to ensure proper working it is important that only rings of a special size and quality should be used, and such rings should therefore always be ordered from the agents of the separator.

Separator oil.

Only special separator oil should be used; otherwise it will clog the machine in the different parts and cause an amount of extra power in driving.

Separator oil can cheapest be obtained from the agents who sell the machine.



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