(No Model.)

A. DIEFENTHÄLER & H. RÖHL.

CENTRIFUGAL MACHINE.

No. 596,576. Patented Jan. 4, 1898.

Fig. 3.

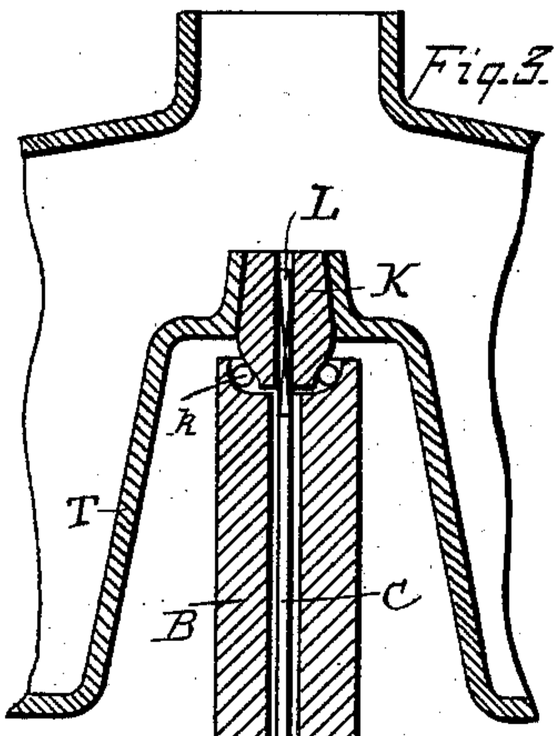
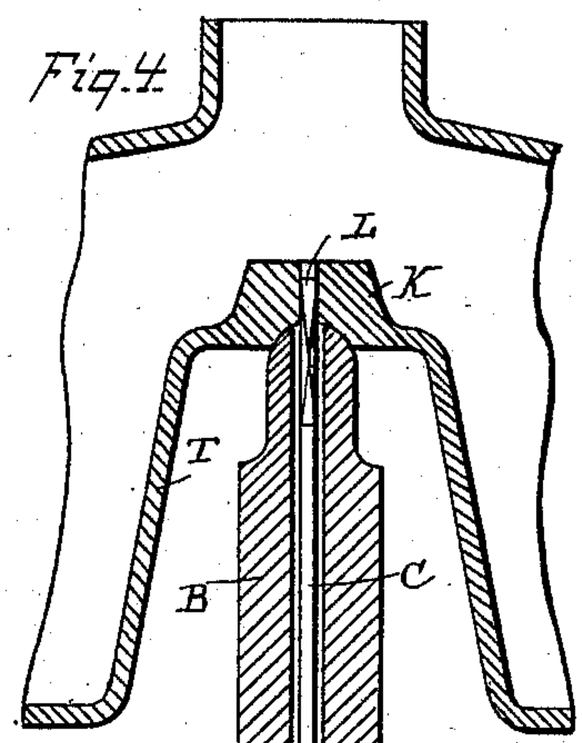


Fig. 4.



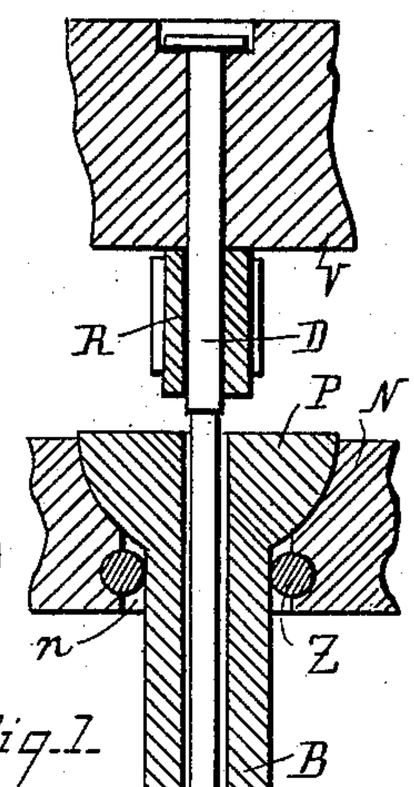


Fig. 1.

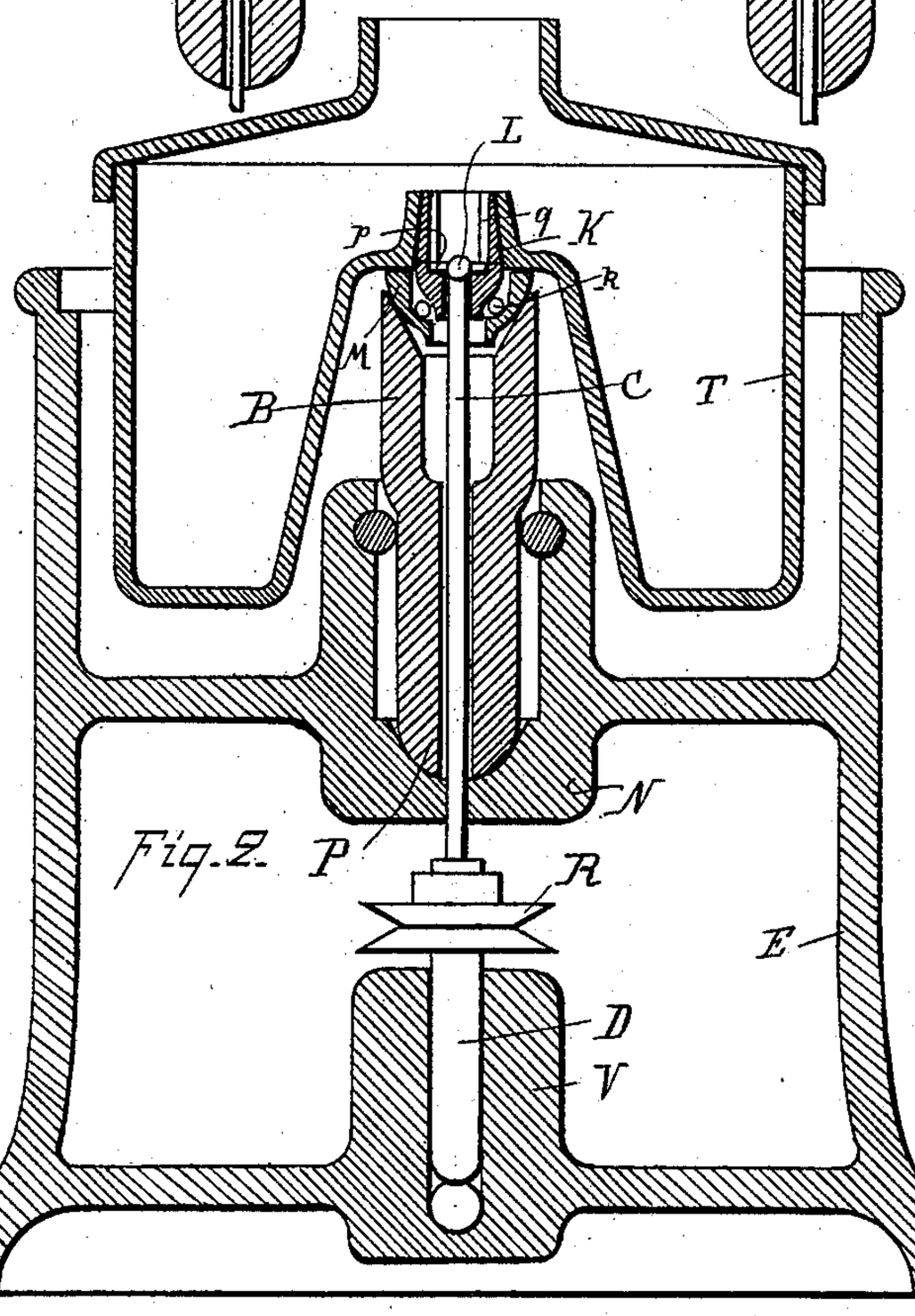
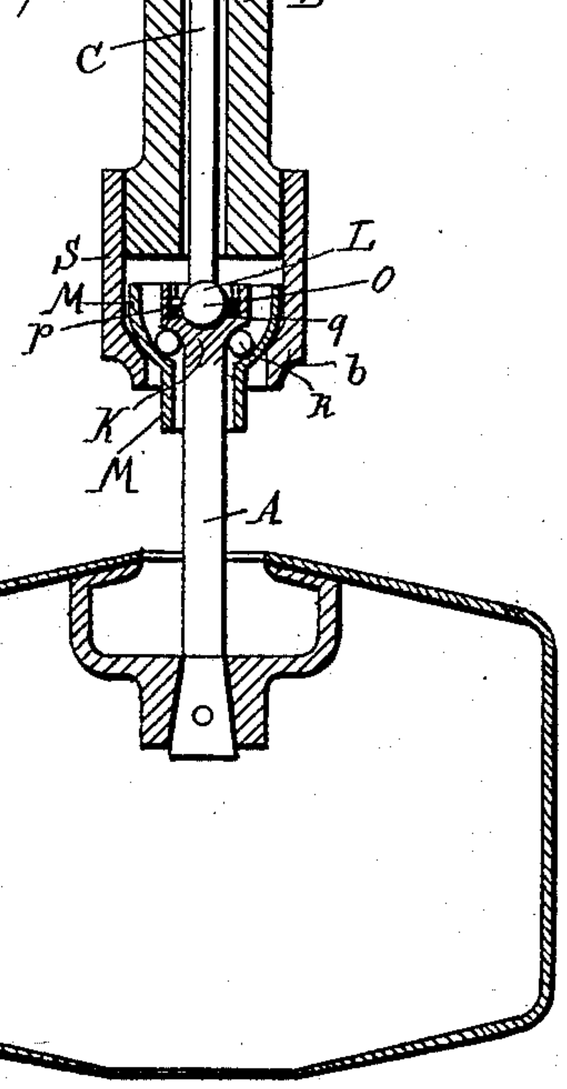


Fig. 2.



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UNITED STATES PATENT OFFICE.

AUGUST DIEFENTHÄLER AND HANS RÖHL, OF MANNHEIM, GERMANY,
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CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 596,576, dated January 4, 1898.

Application filed December 15, 1896. Serial No. 615,769. (No model.) Patented in France June 15, 1896, No. 257,258, and in Luxemburg October 21, 1896, No. 2,632.

To all whom it may concern:

Be it known that we, AUGUST DIEFENTHÄLER and HANS RÖHL, of Mannheim, in the Grand Duchy of Baden, Germany, have invented new and useful Improvements in Centrifugal Machines, (for which Letters Patent were granted in France June 15, 1896, No. 257,258, and in Luxemburg October 21, 1896, No. 2,632,) of which the following is a specification.

The invention relates to centrifugal machines, and has for its object to improve the means employed in supporting and rotating the drums, especially those used in cream-separators.

The apparatus consists generally of a rotating drum or receptacle for the milk from which the cream is to be separated, a tubular support for sustaining the weight of the receptacle and its contents while in motion, and a driving-shaft extending through the support and connected to the receptacle, so as to rotate the same, said shaft not being of itself adapted to carry the weight of the receptacle, and the support being non-rotating and preferably oscillating, and the connection between the receptacle and the driving-shaft being preferably above the center of gravity of the drum. An elastic or flexible shaft is employed for rotating the drum and is coupled with the same at the place of said bearing.

In order to enable those skilled in the art to carry out the invention, we show in the accompanying drawings, forming part of this specification, different modes of embodying the same.

Referring to the drawings, Figure 1 is a vertical central section of one form of the apparatus. Fig. 2 is a similar view of another form of the same. Fig. 3 is a similar section of a detail, showing slight modification of the bearing; and Fig. 4 is a similar view of a further modification.

Referring first to Fig. 1, the letter N indicates part of any suitable frame supporting the entire apparatus.

B is a tubular support having a hemispherical head P, by means of which it is suspended from the frame in a bearing on the upper side corresponding to the shape of the head P. The support B extends downward through the frame N and the opening through which it passes is enlarged, as shown at *n*, so as to permit the support to oscillate laterally, as above referred to. Between the walls of this opening and the support is a rubber or other elastic ring *z*, interposed for the purpose of more effectually holding the support normally in a central position in the opening.

The lower end of the support B is provided with a hollow head or casing *b*, the interior of which has a bearing-surface on which rests loosely and oscillates and may or may not rotate a cup-like ring or sleeve M, forming a separate bearing interposed between the tubular support and the shaft A.

The drum T is suspended, by means of a pendent rod A, from the support B through the intermediacy of a head or enlargement K on its upper end that has a suitable race on its under side for antifriction-balls *k*, whereby it is rotatably suspended immediately from the cup-like bearing ring or sleeve M.

The rod A and the drum or receptacle carried at its lower end are driven by means of the flexible or elastic shaft C, whose upper end D is hung in bearings in a suitable overhead frame or support V and has a driving-pinion R fixed on it between the parts V and N. The flexibility or elasticity of the shaft C is preferably obtained by making its body portion as thin as the safe transmission of the rotating momentum allows.

It will be noted that the shaft C plays no part in supporting the drum or receptacle, this office being entirely performed by the support B and the rod A. The connection between the rod A and shaft C, whereby the former and the drum are driven by the latter, is made by means of a spherical enlargement L on the lower end of the shaft C, that fits loosely against corresponding bearing-surfaces in a recess O in the head K at the upper end of the rod A, the recess being provided with grooves *q q* at diametrically opposite sides and the enlargement L having pins *p p*, fitting and sliding into said grooves, this mechanism forming a loose connection between the head and shaft.

The construction shown in Fig. 2 is in all

essential respects like that just described, the only practical differences being such as are due to supporting the apparatus from below instead of suspending it from above. In this construction the support B rests with its head P in bearings on a rest N, that is part of a base-frame E. The bearing sleeve or ring M rests in the upper open end of the support B, but has the same movement and relation to the contiguous parts as in Fig. 1. In this arrangement the drum T is hollowed out on its under side at the center, as shown, and the head K, which corresponds in function with the head of the rod A in the construction of Fig. 1, is secured to it at this point in practically the same manner as in the other form, the length or body of the rod merely being dispensed with. The end of the driving-shaft is connected with the head K in precisely the same manner, so as to form a loose connection, and the lower end D of the shaft is supported in a stepped bearing in the frame part V.

The modification shown in Fig. 3 merely omits the separate bearing sleeve or ring M and slightly alters the loose connections between the shaft C and the head K. In this form the antifriction-balls *k* run in a race formed directly on the upper end of the support B instead of in a separate bearing-sleeve, as in the other figures, and the end L of the shaft C is simply squared or made angular in cross-section and loosely fitted into a correspondingly-shaped recess in the head.

The modification shown in Fig. 4 goes a step further in simplifying the construction and dispenses with a separate head K, forming the same integrally with the drum, as shown, and rounding the upper end of the support B to fit in bearings in the same. We show no balls in this arrangement, but may use them, if desired. The connection between the shaft C and the part K in this form is practically the same as in that of Fig. 3.

The construction being as above described, it will be noted that the head K may take any position and the shaft A assume any direction corresponding to the centrifugal weights and that the drum may consequently quickly and easily adjust itself into the so-called "free axis of rotation."

Having thus described our invention, what we claim is—

1. The combination of a rotating drum or receptacle, a tubular, oscillating, support for the same, and a shaft for driving the receptacle, said shaft extending through the tubular support, and operating to rotate but not to support the receptacle.

2. The combination of a rotating drum or receptacle, a tubular, oscillating, support for the same, a shaft for driving but not supporting the receptacle, said shaft extending through the tubular support, and a head rigid with the drum at the point where it is sustained by the tubular support.

3. The combination of a rotating drum or receptacle, a tubular, oscillating support for the same, a head rigid with the drum at the point where it is sustained by the support, a shaft for driving but not supporting the drum, said shaft extending through the tubular support, and a bearing-sleeve interposed between the drum-head and the tubular support.

4. The combination of a rotating drum or receptacle, a tubular, oscillating, support for the same, a head rigid with the drum at the point where it is sustained by the support, a shaft for driving but not supporting the drum, said shaft extending through the tubular support, and a bearing sleeve or ring interposed between the head and the tubular support and being itself adapted to oscillate on the support.

5. The combination of the rotating drum or receptacle T, the tubular, oscillating, non-rotating support B, the head K rigid with the drum, and the shaft C for driving but not supporting the drum, said shaft extending through the tubular support and being loosely connected with the head K.

6. The combination of the rotating drum or receptacle T, the tubular, oscillating, non-rotating support B, the head K rigid with the drum, the shaft C for driving but not supporting the drum, said shaft extending through the tubular support and being loosely connected with the head K, and the bearing sleeve or ring M interposed between the head K and the tubular support and being itself adapted to oscillate on the support.

7. The combination of a rotating drum or receptacle, a tubular, oscillating support for the same, and a shaft for driving the receptacle, said shaft extending through the tubular support, and connected with the receptacle above its center of gravity, and the receptacle being adapted to oscillate on the support.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

AUGUST DIEFENTHÄLER.
HANS RÖHL.

Witnesses as to signature of August Diefenthäler:
N. HENDEL,
CARL LIPP.
Witnesses as to signature of Hans Röhl:
PAUL WANGERIN,
FR. KNÜPPE.