May 21, 1929. R. J. WIGHTMAN 1,713,579

CENTRIFUGAL TESTING MACHINE

Filed Aug. 17, 1927 2 Sheets-Sheet 1

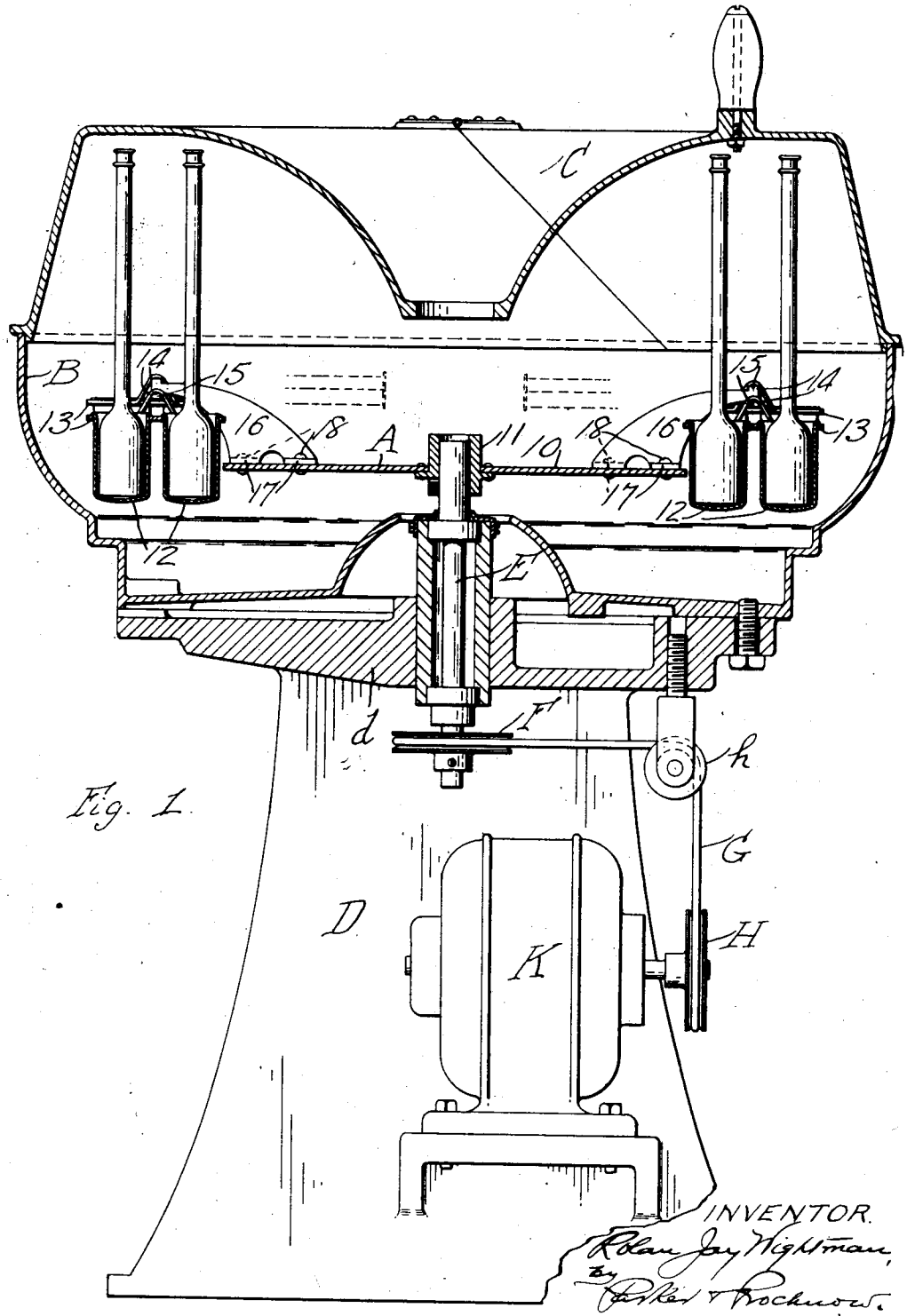


Fig. 1.

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Fig. 2.

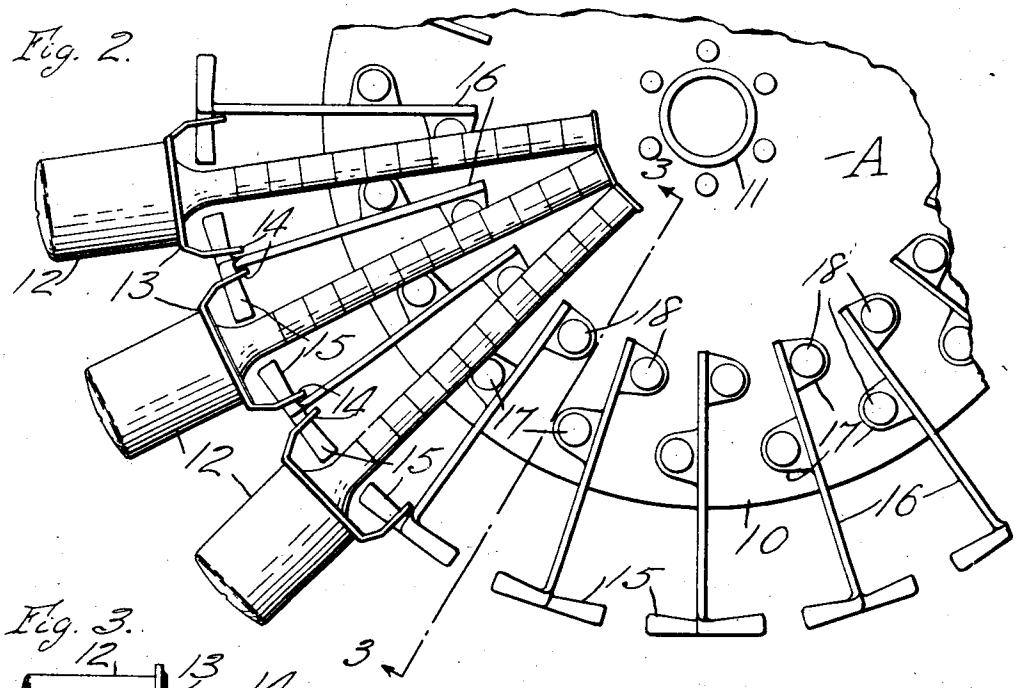
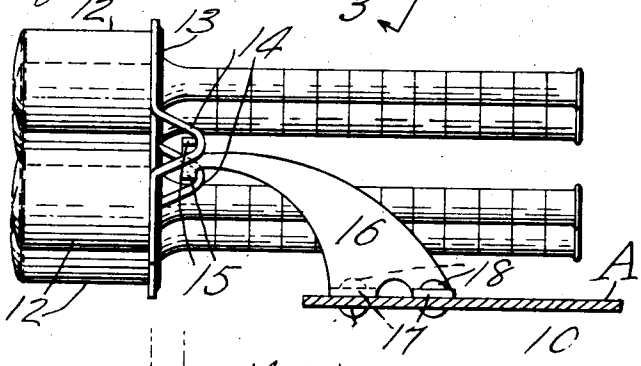


Fig. 3.



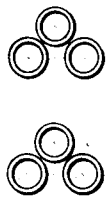


Fig. 4.

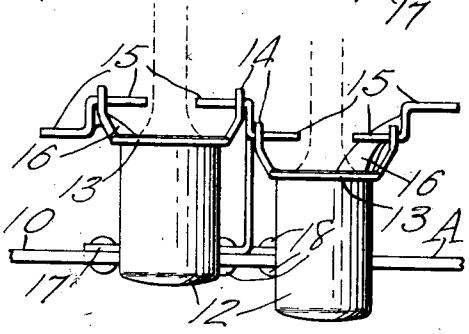


Fig. 5.

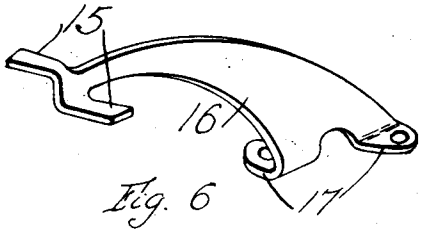


Fig. 6

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UNITED STATES PATENT OFFICE.

ROLAN JAY WIGHTMAN, OF LITTLE FALLS, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CHERRY-BURRELL CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

CENTRIFUGAL TESTING MACHINE.

Application filed August 17, 1927. Serial No. 213,535.

This invention relates to improvements in centrifugal testing machines or centrifuges of the sort, commonly employed for testing milk and cream, which are provided with a rotary bottle carrier on which the test bottles containing the material to be tested are pivotally mounted so as to adapt them to swing from a vertical to a horizontal position. As ordinarily constructed, the bottle carrier is equipped with swinging bottle holders or cups pivotally mounted on the peripheral portion of the carrier to swing in vertical, radial planes. The test bottles are set loosely in these cups or holders when the latter are vertical, which position they assume when the carrier is stationary. The carrier is then rotated, and as its speed increases, the bottle carriers with the bottles therein swing from a vertical position to a position in which the necks of the bottles extend radially toward the axis of the carrier. The bottle carriers are usually designed to carry several bottles, in some machines as many as thirty-six or more, and in the machines as heretofore constructed, unless the bottle carrier was of unduly large diameter, there was very little space between the inner ends of the necks of the bottles when in the radial position, and in many instances it has been found that the bottles clashed or struck together as they approached the radial position in the rotation of the carrier.

One object of my invention is to construct a bottle carrier for centrifuges so as to provide more space or room between the necks of the bottles when in their radial position, and thus enable a larger number of bottles to be supported on a carrier of given diameter, without danger of the bottle necks striking each other, and thereby preventing noise and possible breaking of the bottles incident to the contact of the necks of the bottles with each other.

Other objects of the invention are to pivotally mount the bottle holders in vertically staggered positions on the rotary carrier, or with the pivots of alternate holders at different elevations, so that when the holders swing to the horizontal position, the bottles in alternate holders will occupy different horizontal planes, and the necks of the bottles will be staggered or alternately one above the other, whereby the bottle holders can be arranged closer on the carrier without danger of the bottle necks striking each other; also to provide a rotary bottle carrier with swinging bottle holders or cups which are hung on pivots at the peripheral portion of the carrier, which pivots are arranged in pairs, one pair for each holder, with alternate pairs disposed in different horizontal planes, whereby the alternate bottle holders and their bottles, when in the horizontal position, will occupy horizontal planes one above the other; and also to improve centrifugal testing machines or centrifuges in the other respects hereinafter described and set forth in the claims.

In the accompanying drawings:

Fig. 1 is a sectional elevation of a centrifugal testing machine provided with a rotary bottle carrier embodying my invention.

Fig. 2 is a fragmentary, plan view of the bottle carrier, on an enlarged scale, showing a portion only of the bottle holders and bottles in place therein.

Fig. 3 is a radial, sectional elevation thereof, on line 3—3, Fig. 2, looking in the direction of the arrows.

Fig. 4 is an elevation, looking toward the mouths of the bottles, showing the relative positions of the same when the bottles are in horizontal position.

Fig. 5 is a fragmentary edge elevation of the bottle carrier showing two of the pivoted bottle holders or cups in their normal, vertical position.

Fig. 6 is a perspective view of a detached bearing arm or bracket of the bottle carrier.

A represents the rotary bottle carrier, which, as usually, is arranged to rotate in a horizontal plane within a stationary enclosing casing B. The casing may be of any usual or suitable construction, and the rotary carrier A may be rotatably mounted therein and driven in any usual or suitable manner. The machine illustrated in the drawing, except for the construction of the bottle carrier, is of known construction, and the casing B is of the usual bowl-shape and provided with a hinged cover C to afford access to the bottle carrier. This casing is secured on the top *d* of a stationary frame or standard D, and the vertical spindle E which supports the rotary carrier, extends through a central opening in the bottom of the casing and is suitably journalled in bearings on the

frame top *d*. At its lower end, below the top of the supporting frame, the spindle E is provided with a pulley F which is connected by a belt G passing over guide pulleys *h* to a pulley H on the shaft of the driving motor K, which is suitably mounted on the lower portion of the stationary frame. It will be understood that with the exception of the rotary bottle carrier, the machine may be of any other suitable construction, and the bottle carrier may be driven by any other suitable power or hand-operated drive mechanism.

The bottle carrier A shown, comprises a circular plate or disk 10 provided with a central hub 11 by which it is secured on the drive spindle E, and carries at its outer or peripheral portion a number of circumferentially disposed bottle holders or cups 12 which are hung or pivotally mounted so as to swing in vertical planes extending radially of the rotary carrier. As shown, the bottle cups are arranged in pairs, each pair of cups being supported in a yoke or swinging frame 13 with the cups disposed in a radial plane, one nearer to the center of the rotary carrier than the other. This arrangement of the bottle holders in pairs is to increase the capacity of the machine, but is usual in these centrifugal testing machines, and my improvements are not restricted to this arrangement of the bottle holder. They may be arranged singly or in pairs, as preferred. Each of the swinging cup frames 13 is provided at its opposite sides with side bearings or loops 14 by which it is pivotally hung on a pair of opposed pivots 15. In the construction shown in the drawings, these pivots project laterally from a circular series of bearing arms or brackets 16 which extend upwardly and radially from the plate 10 of the bottle carrier, each bracket 16 being provided with two of the pivots 15 projecting laterally to opposite sides thereof. The pivot at one side of each bracket 16 may be located in a horizontal plane above the pivot at the opposite side of the same bracket, and the brackets are so arranged that the opposed pivots for one bottle holder will be located below the plane of the pair of pivots for the next bottle holder so that the bottle holders will be alternately pivoted at different elevations, or in different planes perpendicular to the axis of the bottle carrier, every other bottle holder being pivoted in a different plane from the remaining bottle holders.

The bearing arms or brackets 16 are shown as being made from sheet metal stampings, each arm being provided with oppositely bent, perforated lugs 17 through which rivets 18 pass for securing the arm to the plate 10 of the bottle carrier, and the opposite pivots 15 on each arm or bracket are likewise formed by oppositely bent portions of the bearing arm blank. This is an inexpensive and desirable construction, and therefore preferred, but the bottle holders could be similarly supported alternately at different elevations by pivotal supports of other construction and arrangement.

When the rotary carrier is stationary, the bottle holders or cups 12 will hang vertically thereon, as shown in Figs. 1 and 5, and the test bottles can be placed in the bottle holders and will stand vertically, as shown in Fig. 1. When the bottle carrier is rotated, the bottle holders will swing outwardly and upwardly by centrifugal action, until they assume an outwardly projecting, horizontal position, and the bottles therein will then project horizontally, radially toward the center of the bottle carrier, as shown in Figs. 2 and 3. Due to the different elevations of the pivots for the alternate bottle holders, the bottle in one holder will lie in a horizontal plane above that of the next adjacent bottle, circumferentially of the machine. Thus, as indicated in Fig. 4, which shows the relative position of the inner ends of the necks of the bottles, the bottle necks will be disposed alternately in different horizontal planes, and therefore the bottle holders can be arranged closer together without causing the necks of the bottles to contact than if the bottles all occupied the same horizontal plane. In fact, this arrangement permits the bottle holders to be arranged so closely together circumferentially of the carrier that the inner ends of adjacent bottles in one plane will be spaced apart a distance less than the external diameter of the necks of the bottles, and nevertheless, they will not contact with the intervening bottle which is in a different horizontal plane.

The bearing loops on the swinging bottle holder frames and their cooperating pivots are preferably so proportioned and relatively arranged that the bottle holders can be detached from the carrier by first swinging the frames out of normal positions, and tilting the frames to disengage the bearing loops from the pivots.

I claim as my invention:

1. In a centrifugal testing machine, a rotary bottle carrier, pivotal supports for pivotally mounting test bottles thereon disposed around the axis of the bottle carrier with the pivotal suports for alternate bottles disposed in different planes perpendicular to the axis of rotation of the carrier.

2. In a centrifugal testing machine, a rotary bottle carrier, swinging bottle holders arranged around the axis of the carrier and pivotally mounted on the carrier to swing about pivots alternately disposed in different planes perpendicular to the axis of rotation of the carrier.

3. In a centrifugal testing machine, a rotary bottle carrier, bottles arranged cir-

cumferentially on said carrier and pivoted to swing in planes radial to the carrier, the pivots for different bottles being disposed in different planes perpendicular to the axis of rotation of the carrier.

4. In a centrifugal testing machine, a rotary bottle carrier, bottle holders arranged circumferentially thereof, said bottle holders being pivotally mounted on said carrier to swing in planes radial to the carrier, the pivots for different bottle holders being arranged in different planes perpendicular to the axis of rotation of the carrier.

5. In a centrifugal testing machine, a rotary bottle carrier, successive pairs of pivots disposed circumferentially on said carrier, and a bottle holder pivotally mounted on each pair of pivots, alternate pairs of pivots being disposed in different planes perpendicular to the axis of the bottle carrier.

6. In a centrifugal testing machine, a rotary bottle carrier, bottle holders arranged circumferentially on said carrier and pivotally mounted to swing in vertical planes radial to said carrier, said bottle holders being adapted to removably hold the bottles, and the pivots for the alternate bottle holders being disposed in different horizontal planes, whereby the alternate bottle holders are supported at different elevations, and when in their horizontal positions the bottles therein will be disposed in different horizontal planes.

7. In a centrifugal testing machine, a rotary bottle carrier provided with radial bearing arms, and bottle holders pivoted on said arms to swing radially, the pivots for alternate bottle holders being disposed in different planes perpendicular to the axis of rotation of the carrier.

8. In a centrifugal testing machine, a rotary bottle carrier provided with radial bearing arms each provided with a pair of oppositely projecting pivots, bottle holders pivotally mounted on said pivots, the pivots for alternate bottle holders being disposed in different planes perpendicular to the axis of rotation of the carrier.

9. In a centrifugal testing machine, a rotary bottle carrier provided with radially arranged bearing arms, each of said bearing arms being provided with opposite, laterally bent portions forming pivots disposed in different planes perpendicular to the axis of rotation of the carrier, and bottle holders hung between said bearing arms on said pivots to swing in planes radial to said carrier.

ROLAN JAY WIGHTMAN.