C. D. EHRET.

CENTRIFUGAL MACHINE.

APPLICATION FILED NOV. 1, 1904. RENEWED NOV. 6, 1906.

901,329. Patented Oct. 20, 1908.

Fig 1

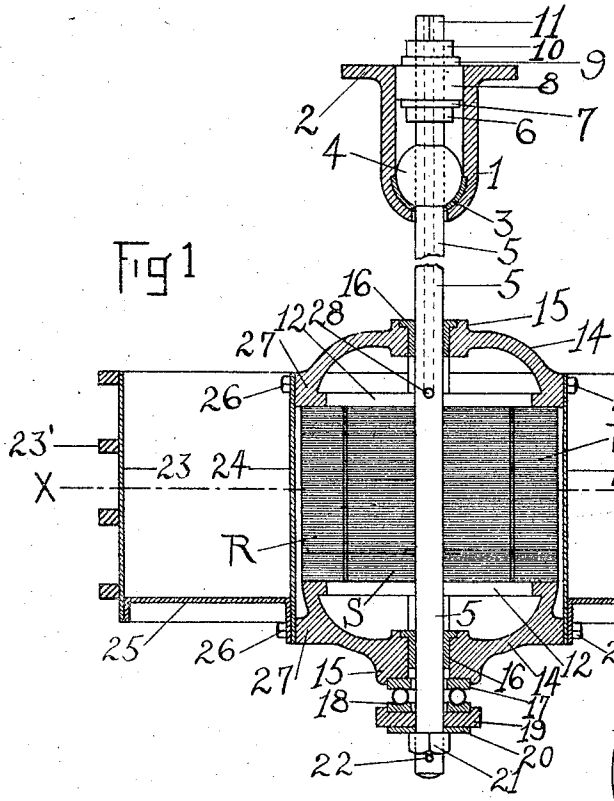


Fig 3

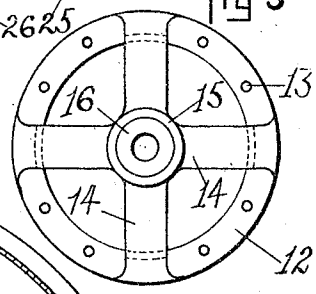
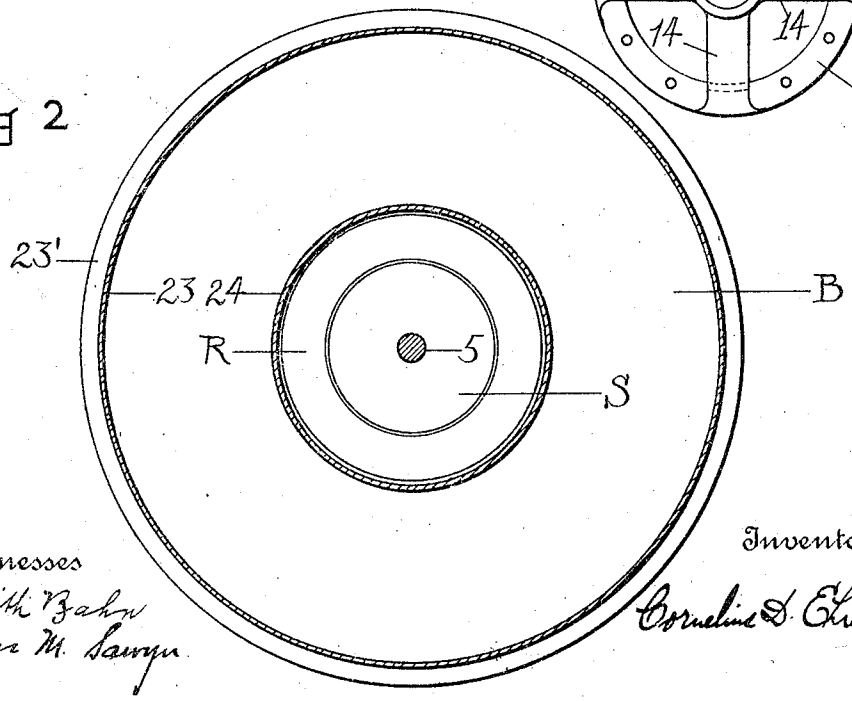


Fig 2



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CENTRIFUGAL MACHINE.

No. 901,329. Specification of Letters Patent. Patented Oct. 20, 1908.

Application filed November 1, 1904, Serial No. 230,923. Renewed November 6, 1906. Serial No. 342,294.

To all whom it may concern:

Be it known that I, CORNELIUS D. EHRET, a citizen of the United States, residing at Ardmore, in the county of Montgomery and State of Pennsylvania, have invented new and useful Improvements in Centrifugal Machines, of which the following is a specification.

My invention relates to driving mechanism for centrifugal machines, more especially to the type in which a basket is suspended in a manner to permit gyratory motion thereof while in operation.

The object of my invention is to attain a very compact arrangement of driving mechanism and centrifugal basket and suspension, and to that end I dispense with the prior arrangements wherein the driving mechanism and the basket are arranged one above the other on a suspension shaft, and on the contrary I mount the driving mechanism directly within the basket itself, thus economizing space by an amount equivalent to the longitudinal space heretofore occupied by the driving mechanism when located either above or below the basket.

In the operation of centrifugal baskets, as for example in the manufacture of sugar, salt, or other like materials, it is found that the material to be treated forms a wall immediately within the outer wall of the basket, such material being thrown against the outer wall and the center portions of the basket being practically empty and unused. Since the outer portions of the centrifugal basket only are useful, the central portion thereof may be employed for the driving mechanism, as for example, an electric motor as herein shown and described.

For an illustration of one of the numerous forms which my invention may take, reference is to be had to the accompanying drawings in which:

Figure 1 is a vertical sectional view of an apparatus embodying my invention. Fig. 2 is a horizontal sectional view taken on the line X—X of Fig. 1. Fig. 3 is a top plan view of the upper yoke of Fig. 1.

Referring to Fig. 1, 1 is a hanger consisting of a single casting or a two part casting as desired. This hanger is supplied with flanges 2 at its upper extremity for the purpose of securing the same to a fixed object, for example, a mixer. Within the hanger 1 is provided a babbitt bearing 3 for the spherical or ball member 4 which is shrunk upon or otherwise secured to the shaft or spindle 5. By this ball and socket arrangement the spindle or shaft 5 is permitted to gyrate in a manner understood in this art. Upon the shaft 5 is secured a collar 6 which supports a washer 7.

8 is a mass of rubber or other resilient material embracing the shaft 5 and filling the interior of the hanger 1 between the washer 7 and the washer 9 which may be forced down and held in place by the nut 10 threaded upon the shaft 5.

11 is the upper end of the shaft 5 made square for the purpose of engagement with a lock for the purpose of preventing the rotation of the shaft 5, such lock however permitting the gyration of the shaft 5. The resilient material 8 opposes the gyration of the shaft. The shaft 5 extends downwardly and has mounted thereon in a manner well understood in dynamo electric machinery the stationary element S of an electric motor. Surrounding the element S and separated from the same by the usual air gap is the rotatable motor element R. This motor may be either of the alternating current or direct current type. If of the alternating current type it may be an induction or asynchronous motor, the squirrel cage or short circuited or secondary winding being within or upon the element R, while the primary winding may be on the stationary element S. As well understood this type of motor requires no commutator and the only connections with the motor are with the primary winding upon the non-rotatable element S. Obviously however, the element R may carry the primary winding and the element S may carry the squirrel cage winding. In such case however sliding contacts must be employed to lead the current to the rotatable element R. If the motor is of the direct current type the rotatable element S may be either the armature or the field, and the rotatable element R may be the field or the armature. Obviously however, brushes and commutator must be provided, and if the armature winding is on the rotatable element the brushes will be stationary while the commutator revolves, and conversely if the armature winding is upon the non-rotatable element the commutator will be non-rotatable while the brushes rotate.

The rotatable element R is secured be-

tween the two rings 12, such rings being provided with bolt holes 13, the bolts passing through said rings and through the rotatable element R, care being taken to insulate said bolts from the element R in certain cases, as for example in the alternating current motor. Integral with the rings 12 are the yoke arms 14 which unite at their inner ends in hubs 15. Within these hubs are provided bearing bushings 16 which embrace the shaft 5 and afford guide bearings for the rotatable element R upon said shaft 5. The arms 14 constitute yokes for carrying bearings whereby the rotatable element R is maintained concentric with the non-rotatable element S, irrespective of the position the shaft 5 may take during gyration.

A ball bearing is provided at the lower yoke whereby the weight of the motor and basket are transferred to the shaft 5 and whereby friction is minimized in a well known manner. This ball bearing consists of the bearing ring 17 seated in the hub 15 of the lower yoke, and of a similar bearing ring 18 seated in the non-rotatable member 19 supported by the washer 20 and the nut 21 engaging the screw threads on the lower end of the shaft 5. To prevent the nut from coming off during operation, the transversely extending pin 22 is provided. The ring 17 rotates with the basket and the rotatable element R while the ring 18 is non-rotatable since it is secured to the shaft 5.

At B is represented the centrifugal basket consisting of the outer cylindrical wall 23 reinforced by the usual hoops or bands 23', the inner cylindrical wall 24, and the bottom 25, which may be stiffened or reinforced in a manner understood in the art. The basket is secured to the rotatable element of the motor by the nuts 26 which engage in the bosses 27 upon the yokes, the outer surfaces of said bosses being machined true.

From the foregoing description it is apparent that the driving mechanism, in this instance an electric motor, is mounted entirely within the basket, in a space which is practically useless in centrifugal baskets, in view of the fact that the treated material occupies a position against the outer walls only.

To afford electrical communication with the motor elements I provide a longitudinally extending hole beginning at the upper end of the shaft 5 extending axially therethrough to the transverse hole at 28. Through this axial hole and through the transverse hole 28 may be led the conductors for connecting the motor with the service wires. Though I have shown the shaft 5 solid with the exception of the conductor channel, it is to be understood that said shaft may be hollow throughout its length, this affording a very convenient means for leading conductors from the exterior to the motor. It is to be understood also that the proportions herein shown may be varied, as for example, the basket may be made of smaller diameter and of greater height and the motor elements may be so designed as to occupy a relatively greater space in a direction parallel with the shaft 5.

It is to be understood that though the motor may be entirely inclosed as herein shown that the motor elements may project above or below the basket. In any event a great economy in space is effected by placing the motor within the basket thus utilizing a space otherwise unused. It is to be understood also that my invention is not limited to the exact structure of basket as herein shown but that the basket may be constructed in any suitable manner so long as a space about the center of the same is provided to accommodate the driving mechanism.

It is to be understood that my invention is not limited to the location of the center of gyration or oscillation at a point above the motor and centrifugal, for it is obvious that such center of gyration or oscillation may be located at a point beneath the motor and basket; or at any other point as known in the art.

What I claim is:

1. In combination, a centrifugal basket, and an electric driving motor therefor, the rotatable element of said motor being substantially entirely surrounded by said basket.

2. In combination, a centrifugal basket, and an electric motor for driving the same, said motor being substantially entirely surrounded by said basket.

3. In combination, a centrifugal basket, and an electric driving motor therefor, the rotatable element of said motor being substantially entirely surrounded by and secured to said basket.

4. In combination, a centrifugal basket, comprising concentric cylinders of different diameters, and a driving motor therefor located within the cylinder of lesser diameter.

5. In combination, a centrifugal basket comprising outer and inner walls, and a driving motor therefor located in the space surrounded by said inner wall.

6. In combination, a gyratory member, the non-rotatable element of a motor secured to said member, the rotatable element of said motor deflectable with said non-rotatable element and maintained concentric therewith, and a centrifugal basket surrounding said rotatable motor element and secured thereto.

7. In combination, a gyratory shaft, the non-rotatable element of a motor secured to said shaft, the rotatable element of said motor deflectable with said non-rotatable element and maintained concentric therewith, and a centrifugal basket surrounding said rotatable motor element and secured thereto.

8. In combination, a gyratory shaft, the non-rotatable element of a motor secured to said shaft, the rotatable element of said motor deflectable with said non-rotatable element and maintained concentric therewith, and a centrifugal basket comprising concentric cylinders, the inner cylinder surrounding said rotatable motor element and secured thereto.

9. In combination, a motor mounted upon a gyratory suspension, and a centrifugal basket secured to the rotatable element of said motor and comprising outer and inner walls, said motor being surrounded by said inner wall.

10. In combination, a gyratory shaft, the non-rotatable element of a motor secured thereto, the rotatable element of said motor deflectable with said non-rotatable element and maintained concentric therewith, a centrifugal basket surrounding said motor and secured to the rotatable element thereof, and a ball bearing intermediate the rotatable members and said shaft.

11. In combination, a non-rotating gyratory shaft, a centrifugal basket supported by said shaft, the rotatable element of a driving motor surrounded by said basket, and the non-rotating element of said motor secured to said shaft.

12. In combination, a centrifugal basket, an electric motor of the alternating current induction type for driving said basket, the motor secondary being surrounded by and secured to said basket.

13. In combination, a centrifugal basket, and an electric motor for driving the same, the rotatable element of said motor being secured directly upon and surrounded by said basket.

14. In combination, an electric motor, a gyratory suspension therefor, and a centrifugal basket secured directly to and surrounding the rotatable element of said motor.

15. In combination, a gyratory spindle, the non-rotatable element of an electric motor secured thereto, the rotatable element of said motor mounted for gyration with said non-rotatable element, a channel in said spindle to receive conductors leading to said motor, and a centrifugal basket secured directly to the rotatable element of said motor.

16. In combination, a gyratory spindle, the primary of an induction motor secured thereon, a channel in said spindle to receive conductors leading to said primary, the secondary of said motor gyrating with said spindle, and a centrifugal basket secured directly to said secondary.

17. In combination, a gyratory spindle, a centrifugal basket surrounding said spindle and gyrating therewith, and an electric motor intervening between said basket and spindle for driving said basket.

18. In combination, a gyratory shaft, a non-rotatable element of a motor secured upon said shaft, a centrifugal basket surrounding the rotatable motor element, and a rotatable yoke supporting said basket and rotatable motor element in operative relation with respect to said shaft.

19. In combination, a gyratory shaft, a non-rotating element of a motor secured thereto, a centrifugal basket surrounding the rotatable motor element, a yoke having lateral and end bearings on said shaft, said basket and rotatable motor element being secured to said yoke.

20. In combination, a centrifugal basket, an electric motor of the alternating current induction type for driving said basket, the motor primary disposed within the motor secondary, a yoke supporting said basket and the motor secondary, said basket surrounding the motor secondary and secured thereto and to said yoke.

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