May 27, 1930. C. SCHAUM 1,760,286

CENTRIFUGAL

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Fig. 1,

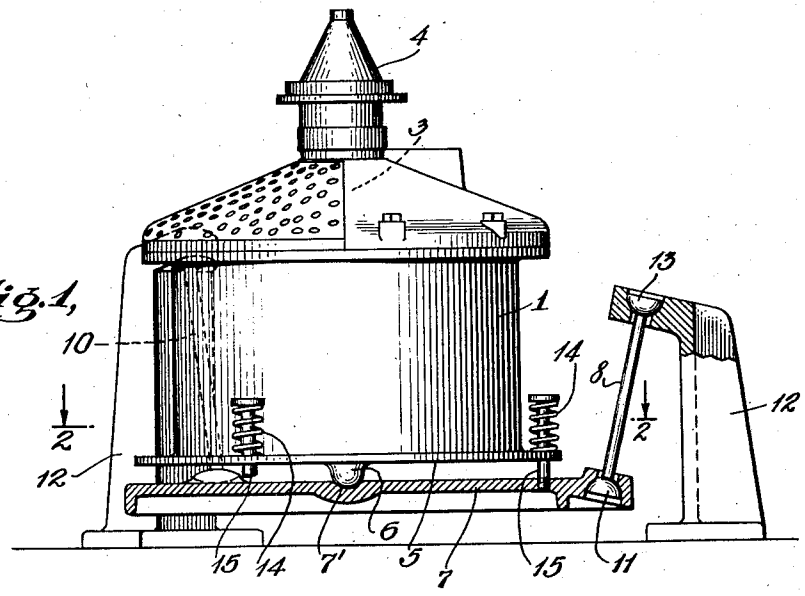


Fig. 2,

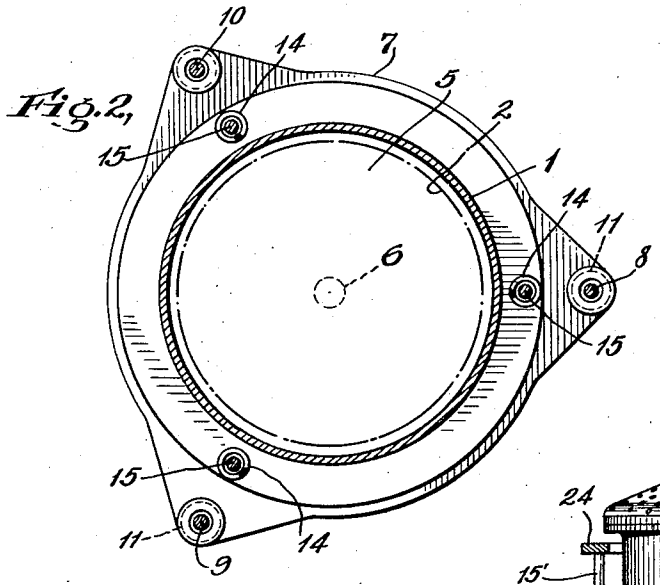
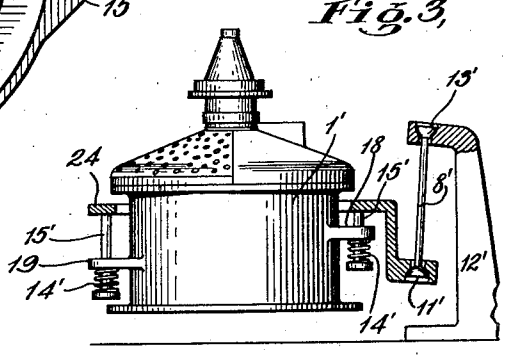


Fig. 3,



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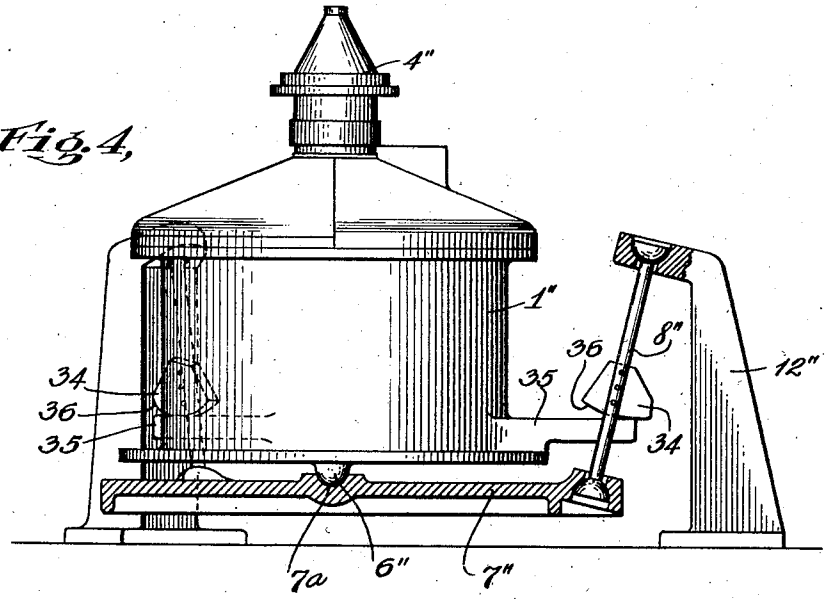
ATTORNEYS.

May 27, 1930. C. SCHAUM 1,760,286

CENTRIFUGAL

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Fig. 4,



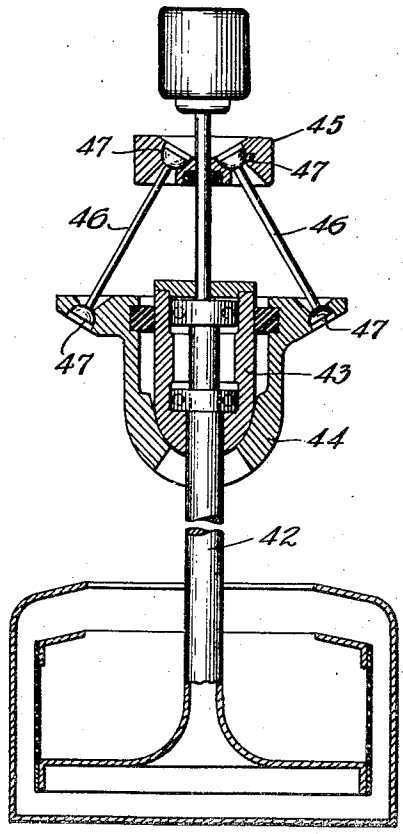


Fig. 5,

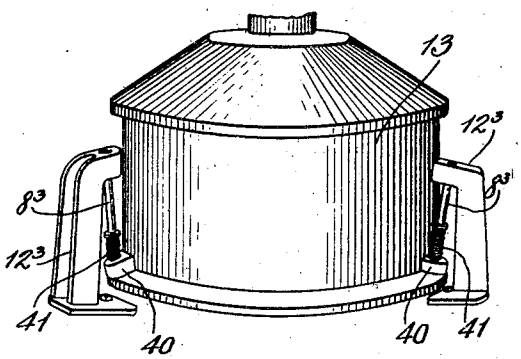


Fig. 6,

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Patented May 27, 1930 1,760,286

UNITED STATES PATENT OFFICE

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CENTRIFUGAL

Application filed March 18, 1926. Serial No. 95,550.

My invention relates to centrifugal machines employing a rotatable basket and non-rotatable tub and provides means for suspending or supporting the machine whereby dancing and chattering of the same due to unbalanced loading are eliminated, or at least reduced to a degree which is not detrimental to the apparatus nor objectionable.

Another object of my invention is the provision of a centrifugal machine so constructed and arranged that when in operation a motion of translation may be given to the shaft and basket due to the uneven stresses set up in the machine due to unbalanced loading, rather than a tilting action.

In general, the present invention provides a centrifugal wherein the tub is supported by hangers or the like, attached to the tub at points in different horizontal planes; or the objects of my invention may be accomplished by providing a suspension consisting in part of hangers which are of unequal lengths; or by providing a suspension having a motion of translation on which the tub of the centrifugal is pivotally mounted.

In the accompanying drawings, wherein I have illustrated my invention—

Figure 1 shows in part sectional elevation one form of centrifugal constructed in accordance with the present invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a part sectional elevational view of a modified form of my invention, the centrifugal in this form being suspended from hangers attached to the tub of the centrifugal in different horizontal planes;

In Fig. 4 I have illustrated a centrifugal in part sectional elevation slightly modified from the form shown in Fig. 1;

Fig. 5 shows in elevation a centrifugal in which the hangers or suspending means are of unequal lengths; and

Fig. 6 is a further modification of my invention, the centrifugal of this figure being suspended from overhead.

Referring to the drawings in detail and first of all to the forms of my invention illustrated in Figs. 1 and 2, 1 designates a non-rotatable tub or casing, while 2 designates a centrifugal basket which is mounted for rotation therein. The driving mechanism for the basket constitutes no part of the present invention and may be of any of the well known forms of drive, 3 designating the drive shaft of the basket and 4 the motor.

The bottom 5 of the tub is provided with a central boss or projection 6, or its equivalent, this boss being received in a bearing or depression 7′ provided in the upper surface of a cradle 7, disposed beneath the bottom of the tub, and adapted to have a motion of translation. This construction may be reversed if desired. The cradle 7 in plan may be of any suitable shape and may be of any suitable material, the same, however, being suspended from a series of hangers designated 8, 9 and 10, respectively, and of unequal lengths. Each one of these hangers is connected at its lower end by a ball and socket connection 11 to the cradle 7 at its periphery. The upper end of each of the hangers 8, 9 and 10 is flexibly attached to or suspended from a balancing stand 12, there being a stand for each hanger. The connection of the hangers to these stands is a ball and socket connection designated 13, and similar to the connection 11, above referred to. While the hangers 8, 9 and 10 have been illustrated as of unequal lengths, I believe that certain advantages would result from the use of hangers of equal lengths in combination with the cradle 7. The machine is steadied while starting and stopping by any suitable cushioning means such as the coil springs 14, here illustrated, and which springs, it will be observed, are mounted on bolts 15 attached to the cradle, each bolt passing through the periphery of the tub 1 and each spring being mounted on a bolt and interposed between the head thereof and the tub.

This arrangement therefore provides a centrifugal which is pivotally supported in a cradle lying beneath the centrifugal, the cradle in turn being suspended from suitable supports, which permits of the cradle having a motion of translation in a substantially horizontal plane, any tipping of the cradle, however, in its motion of translation being independent of the tub, so to speak, inasmuch as the tub is pivotally supported on the

cradle so that the tub may remain stationary, that is to say, upright, although the cradle is tipped. The tub and basket have a motion of translation also, the drive shaft 3 of the centrifugal basket, however, remaining in a vertical position at all times. In other words, the drive shaft may assume different positions due to the motion of translation of the centrifugal tub and basket, these various positions assumed by the shaft, however, being parallel to the position of the shaft when at rest. By this arrangement, therefore, unbalanced loads may be taken care of, the unbalanced load causing or tending to cause a motion of translation rather than a tipping of the centrifugal, thereby eliminating or at least reducing the dancing and chattering of the whole apparatus. I believe also that by making the hangers 8, 9 and 10 of unequal length I materially reduce the oscillation of the centrifugal without, however, reducing the steadying effect of its own weight, the suspending means by reason of their unequal lengths preventing harmonic vibration or oscillation of the several centrifugal supports.

In Fig. 3 I have shown a modified form of my invention in which I provide a non-rotatable centrifugal tub, 1′, suspended from a plurality of balancing stands similar to the stands 12 of Fig. 1 and designated 12′, one only of these stands being illustrated. Each of these stands 12′ is attached to the tub of the centrifugal through a rod or hanger 8′ at points which are in different horizontal planes, the stand 12′ illustrated being attached to the tub at the point 18, while the other stand, which does not show in the drawing, is attached to the tub at the point 19. From an inspection of the drawings it will be seen that the point of attachment 18 is above the center line of the centrifugal tub, while the point 19 is below the center line. Dampening or steadying means 14′ are employed in this embodiment of my invention, similar in construction and function to the steadying means shown in Fig. 1 and already described. Each of the stands 12′ has suspended therefrom a suspending rod 8′, having a ball and socket connection at its upper end to the stand, as indicated at 13′, while the lower end has a ball and socket connection 11′ to a ring or spider 24 surrounding the tub. The steadying means 14′, already referred to, comprise bolts 15′ passing through the attaching brackets 18 and 19 and upwardly to and into the spider 24. The suspending means 12′ may be of the same length or may be of unequal lengths, but I believe better results will be obtained if they are made of unequal lengths. It is unnecessary to go into the theory of operation of this apparatus, inasmuch as I believe it will be obvious that the novel suspension means above described in connection with Fig. 3 will permit of a motion of translation of the centrifugal without tipping the same, and that the suspension in different horizontal planes will overcome or reduce to a negligible amount the chattering and dancing of the centrifugal apparatus.

In Fig. 4 I have provided a further modified embodiment of my invention. In this figure 1″ designates a non-rotatable centrifugal tub in which, as will be understood, is mounted a rotatable centrifugal basket driven by a motor 4″ of any of the many well known forms of motor now employed for driving centrifugals. The tub 1″ is provided at the center of its bottom with a projection 6″ resting in a bearing 7^a in a freely suspended cradle 7″ lying beneath the tub. The cradle 7″ is supported upon balancing stands 12″. The number of these stands may be varied, three being the usual number. The connections between the cradle 7″ and the balancing stands are hangers 8″ having ball and socket connections with the cradle and balancing stand. On each of the hangers 8″ I provide a cam 34, the face of which engages a flange 35 or its equivalent provided on the tub 1″, the face 36 of this cam which engages this flange being so shaped as to maintain the centrifugal tub in a vertical position at all times irrespective of the fact that the cradle may be tipped as well as given a motion of translation.

This arrangement, therefore, provides a construction whereby any tendency of the tub to tip due to unbalanced loading, and dancing and chattering of the apparatus as a whole due to unbalanced loads, are overcome.

In Fig. 5, a still further modified form of my invention has been illustrated, this figure showing a non-rotatable centrifugal tub 13 in which is contained the usual centrifugal basket. In order that chattering and dancing in this form of my apparatus may be overcome, I suspend this tub from balancing stands 12^3, three or more of these stands being employed and each stand carrying a suspending rod or hanger 8^3 connected to the bottom edge or adjacent the bottom edge of the tub as indicated at 40. These suspending means or hangers are of unequal lengths. Each bolt carries a cushioning spring 41 provided for the purpose of steadying the machine in starting and stopping. This arrangement by reason of the unequal lengths of the suspending hangers prevents harmonic vibration of the hangers and hence chattering and dancing of the apparatus as a whole.

In Fig. 6, the novel features of the centrifugals above described have been incorporated in a centrifugal of the suspended type, that is to say, overhead suspended type. In this form of my invention the centrifugal drive shaft designated 42 is provided at its upper end with a head 43, lying in the bottom of a socket 44. The head 43 and socket 44

provide a ball and socket connection. The socket member 44 in turn is supported from any fixed means 45 by means of hangers 46. These hangers have ball and socket connections 47 at each end with the stationary member 45 and the socket 44, respectively. This construction permits of a motion of translation of the centrifugal without tipping so that chattering and dancing are eliminated or at least reduced to a minimum.

While I have described several embodiments of my invention, it is to be understood that the same may take other forms within the purview of the invention.

What I claim is:

1. A centrifugal comprising a centrifugal tub and basket, and a plurality of hangers of unequal lengths freely suspending the centrifugal tub and basket.

2. A centrifugal comprising a centrifugal tub, hangers from which said tub is suspended, said hangers being attached to the tub at points in different horizontal planes.

3. A centrifugal comprising a tub, a plurality of hangers, and a member suspended from hangers and resiliently attached to said tub at a plurality of points in different horizontal planes.

This specification signed this 16th day of March, 1926.

CARL SCHAUM.