May 27, 1924. 1,495,933

A. L. SWANCARA

CENTRIFUGE BALANCING DEVICE

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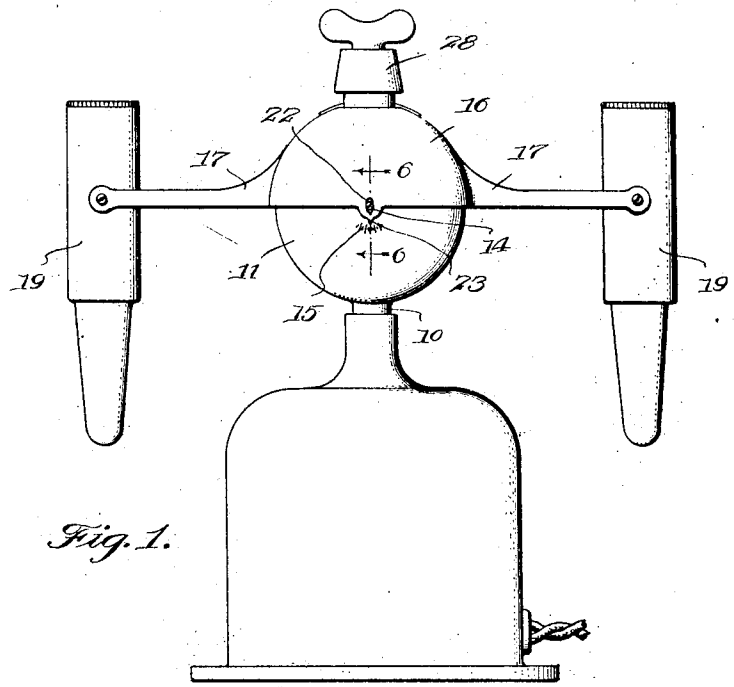



Fig. 1.

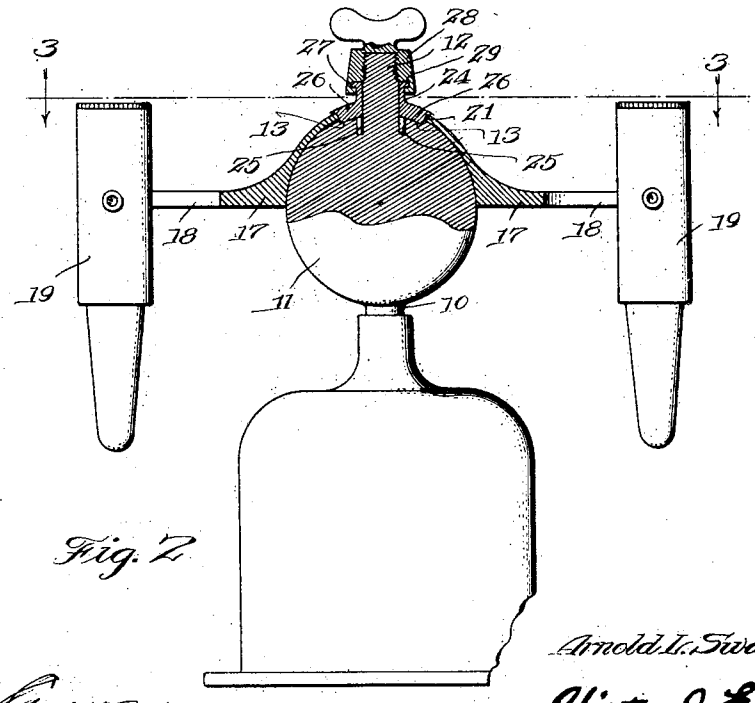



Fig. 2.

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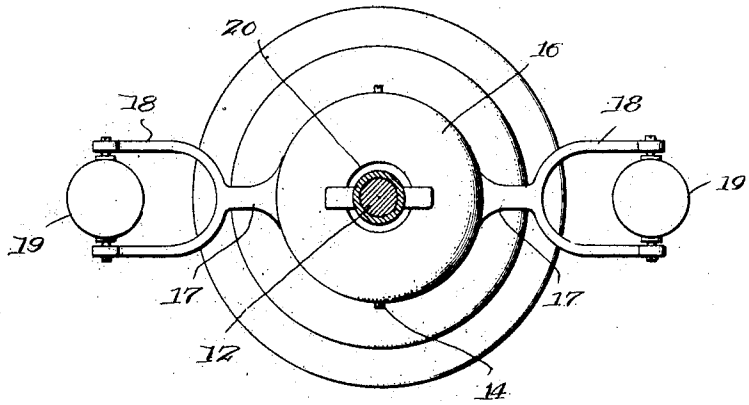
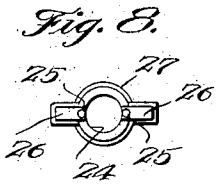



Fig. 3.

Fig. 4.

Fig. 8.



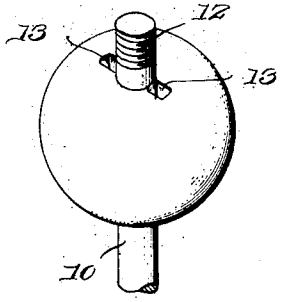




Fig. 9.

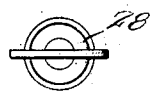
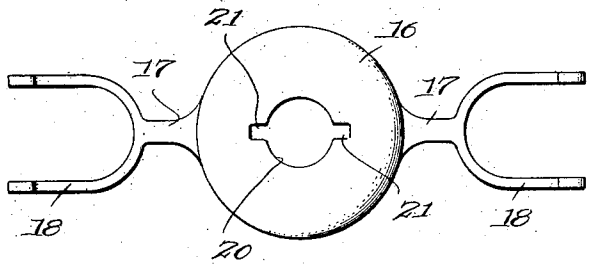



Fig. 5.




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CENTRIFUGE BALANCING DEVICE

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Fig. 6.

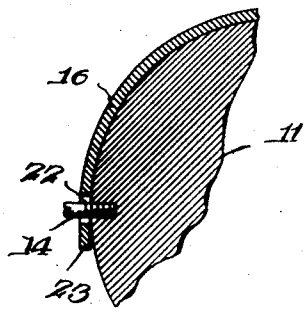



Fig. 10.

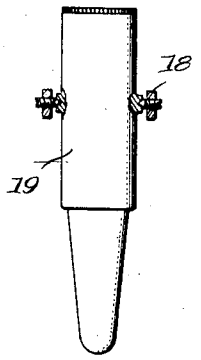
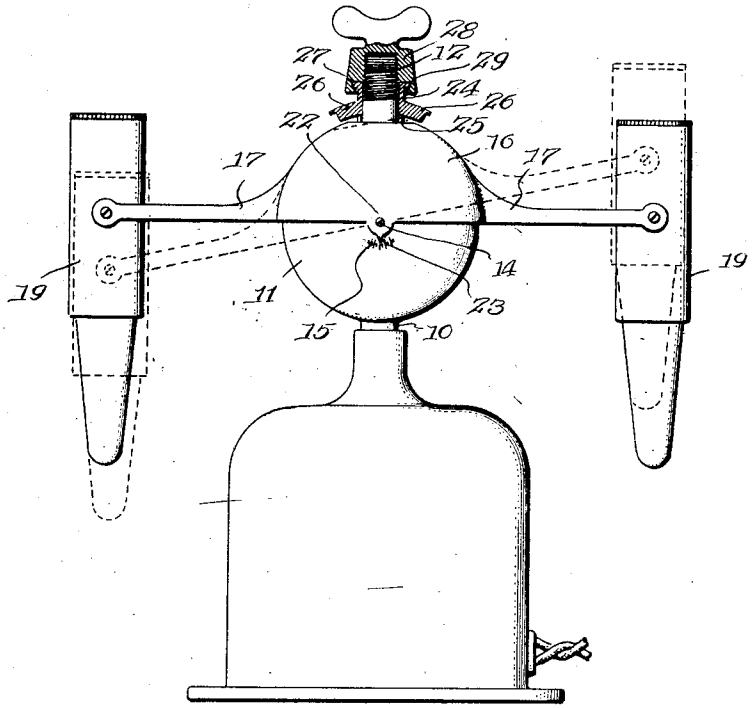



Fig. 7.




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WITNESS:

Patented May 27, 1924. 1,495,933

# UNITED STATES PATENT OFFICE.

ARNOLD LEO SWANCARA, OF PINE BLUFF, ARKANSAS.

## CENTRIFUGE-BALANCING DEVICE.

Application filed October 29, 1923. Serial No. 671,521.

*To all whom it may concern:*

Be it known that I, ARNOLD L. SWANCARA, a citizen of the United States, residing at Pine Bluff, in the county of Jefferson and State of Arkansas, have invented new and useful Improvements in Centrifuge-Balancing Devices, of which the following is a specification.

This invention relates to centrifugal machines and has for its object the provision of a novel centrifuge head which will automatically balance and thereby compensate for any difference between the weights of the two cups.

As is well known, under the present methods, the centrifuge cups must be taken out of their sockets and balanced on a separate device, a condition which is inconvenient and awkward especially because the centrifuge cups will not stand upright but must be supported in special holders.

Ordinary balances will not suffice as they are not provided with any means for holding the cups upright. As a matter of fact the difficulties experienced in balancing the cups or tubes are sufficiently annoying that many workers prefer not to balance the tubes at all. If the tubes are unbalanced the result is that the drive shaft of the machine wears so that in a short time the centrifuge becomes worthless. Another disadvantage of not balancing is that unless the machine be screwed down onto its support it will move about on account of the jar or vibration caused by the inequality in the weight of the tubes.

With the above facts in view I have designed the present device which comprises in the one machine the functions of the centrifuge and a balance so that separate devices will not be necessary.

An additional object is the provision of a device of this character which will be simple and inexpensive in manufacture, easy to use, positive in action, efficient and durable in service and a general improvement in the art.

With the above and other objects and advantages in view the invention consists in the details of construction to be hereinafter more fully described and claimed and illustrated in the accompanying drawings, in which:

Figure 1 is a front elevation of a machine constructed in accordance with my invention showing the parts locked,

Figure 2 is a vertical longitudinal section,

Figure 3 is a horizontal section on the line 3—3 of Figure 2,

Figure 4 is a perspective view of the ball member or support,

Figure 5 is a perspective view of the cap and beam,

Figure 6 is a detail section on the line 6—6 of Figure 1,

Figure 7 is a view similar to Figure 2 showing the parts in the position to permit use of the device for balancing.

Figure 8 is a plan view of the sleeve that is slidably mounted on the extension of the ball head.

Figure 9 is a plan view of the nut that adjusts the said sleeve.

Figure 10 is a view of a centrifugal cup or tube, showing the manner of mounting it on the rotary arm.

Referring more particularly to the drawings the numeral 10 designates an upright shaft of the device which is formed or which carries, at its upper end, a ball head 11 above which is a threaded extension 12. This head is formed with two sockets 13 located at opposite sides and is provided with an outwardly extending pin 14 beneath which is a series of graduations 15.

Mounted upon this ball head is the beam structure which includes a partially spherical shell cap 16 fitting upon the ball 11 and formed at opposite ends with arms 17 terminating in forks or yokes 18 between which are pivoted the centrifuge cups or tubes 19. The cap 16 is formed with an opening 20 for the passage of the extension 12 but this opening is of considerably greater diameter than the extension so that the beam may have rocking movement upon the ball head. Leading into the opening 20 at diametrically opposite points are slots 21 which register with the sockets 13, and formed in the lower portion of the cap is a vertically elongated slot 22 which receives the pin 14 whereby the beam will be prevented from rotary movement with respect to the head while at the same time it may have rocking movement with the pin 14 as a pivot. Beneath the slot 22 the beam is formed with a pointer 23 which is movable over the graduations 15 for indicating the balance or disclosing an inequality in the weights of the cups 19.

Slidable upon the extension 12 is a sleeve 24 formed with depending guide pins 25

which extend into the inner ends of the sockets 13 for preventing the sleeve from rotating with respect to the ball head. Formed on the sleeve are lateral lugs 26 which are adapted to enter the slots 21 and sockets 13. At its upper end the sleeve is formed with an outstanding flange 27.

Screwed onto the extension 12 is a nut 28 which is formed with a groove 29 receiving the flange 27. The sleeve 24 is naturally only semi-cylindrical in shape as otherwise the flange 27 could not be engaged within the groove 29.

In the use of the device, it will be apparent that when the nut 28 is unscrewed to a certain extent, the sleeve 24 will be raised so that the lugs 26 will be withdrawn from engagement within the sockets 13 and slots 21. The beam is then free to rock upon the ball head, the pivot point being the pin 14 or the axis at which the pin is located. Differences in the weight of the cups 19 and their contents will be disclosed by swinging movement of the beam and travel of the pointer 23 over the graduations 15. In this way the device acts as a balance so that the weight in the two cups may be made uniform.

After balancing has been effected, the nut 28 is screwed down whereupon the lugs 26 on the sleeve 24 will enter the slots 21 and socket 13 and consequently hold the beam firmly against any movement whatever other than rotary or so as to permit a very slight movement which will compensate for any very slight lack of balance.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided a simply constructed and very easily operated centrifuge in which the beam is so constructed and mounted that it may be used for balancing purposes, the machine thus having the advantage of being a combined device which will avoid necessity for the employment of a separate balance as is required under ordinary conditions. It is to be observed that ample means is provided for permitting the balancing action or for holding the beam rigid when the device is in motion. In actual practice I have discovered that the machine which is mounted upon the usual base, will run smoothly and will not vibrate or jar and consequently move about on its support.

While I have shown and described the preferred embodiment of my invention it is of course to be understood that I reserve the right to make such changes in the form, construction and arrangement of parts as will not depart from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention I claim:

1. In a centrifuge, a head, a beam rockably mounted upon the head and carrying cups, means for holding said beam against rotary movement with respect to the head, and means for holding the beam against rocking movement.

2. In a centrifuge, a ball head, a beam mounted thereon and including a partially spherical cap rockably engaged upon the head and further including arms carrying cups, and movably mounted means engageable with the cap for holding the beam against rocking movement.

3. In a centrifuge, a ball head carrying an extension at its top, a beam including cup carrying arms and a partially spherical cap rockably engaged upon the head, and means movably mounted on said extension and engageable with the cap for holding the beam against rocking movement.

4. In a centrifuge, a ball head carrying an extension at its top, a beam including cup carrying arms and a partially spherical cap rockably engaged upon the head, and means movably mounted on said extension and engageable with the cap for holding the beam against rocking movement, said means comprising a sleeve slidable on the extension and formed with lugs, a nut on the extension engaging the sleeve, and the ball cap and head being formed with openings for the reception of said lugs.

5. In a centrifuge, a head, a beam pivoted thereon for rocking movement, a pointer carried by the beam, and a plurality of graduations on the head over which the pointer travels, and means movably mounted on the head and engageable with the beam for holding the same against rocking movement.

6. In a centrifuge, a head formed with an upstanding threaded extension and formed with sockets at the sides of the extension, a beam rockably mounted upon the head, means for holding the beam against rotation with respect to the head, the beam having an opening for the passage of the extension and being formed with slots registering with said sockets, a sleeve on said extension carrying lugs adapted to be engaged within said slots and sockets, and a nut on the extension connected with the sleeve for raising and lowering the same.

In testimony whereof I affix my signature.

ARNOLD LEO SWANCARA.