No. 699,003. Patented Apr. 29, 1902.

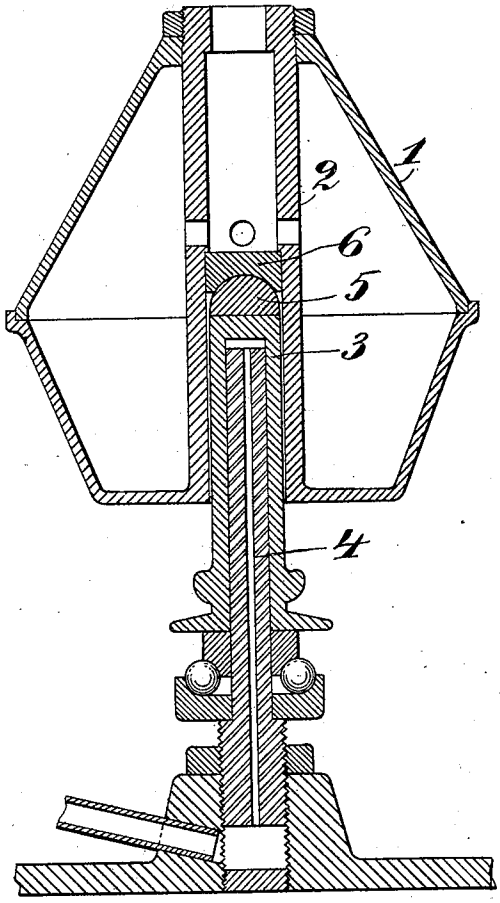
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CENTRIFUGAL MACHINE.

(Application filed Sept. 24, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



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Fig. 2.

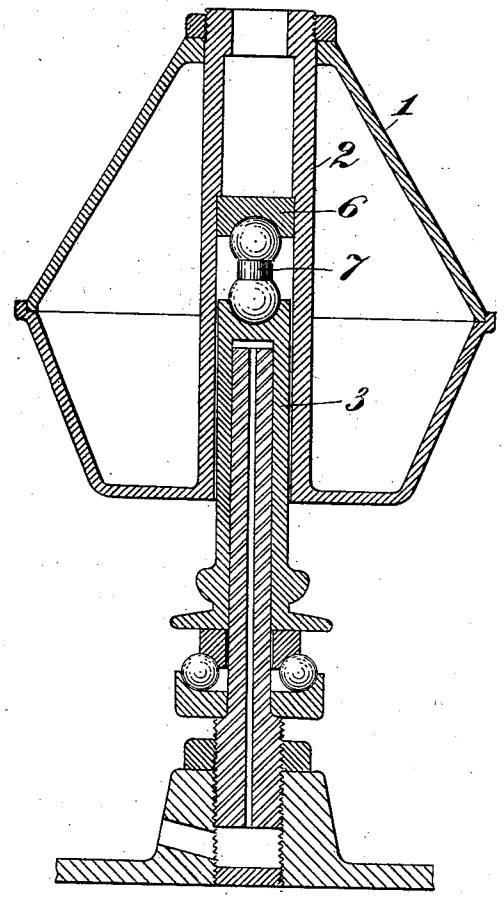
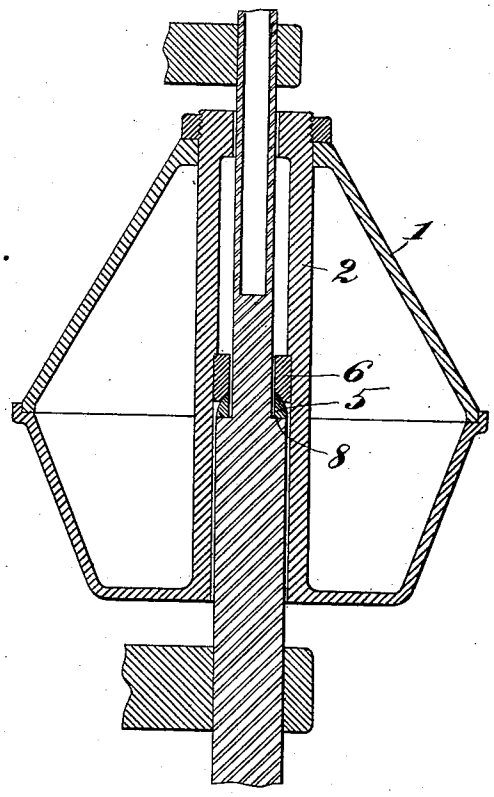


Fig. 3.



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OLOF OHLSSON, OF SÖDERTELJE, SWEDEN.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 699,003, dated April 29, 1902.

Application filed September 24, 1900. Serial No. 30,944. (No model.)

To all whom it may concern:

Be it known that I, OLOF OHLSSON, a citizen of the United States, residing in Södertelje, in the Kingdom of Sweden, have invented certain new and useful Improvements in Centrifugal Machines, of which the following is a specification.

This invention relates to the mounting of drums and other symmetrical objects to be rotated on upright shafts in such a manner that the object rotated may balance and adjust itself and rotate steadily. To attain this automatic balancing of the rotating drum of a centrifugal machine, several constructions have been heretofore employed. The shaft has been provided with laterally-yielding bearings, and the drum has been so mounted that it may oscillate about its point of suspension on the shaft, like a pendulum. In some centrifugal drums, however, and more especially those wherein solid matter suspended in a liquid is to be separated, it happens that the solid matter deposits irregularly on the drum-wall, and the center of gravity is thereby shifted so much as to render the above-described methods of balancing ineffective, and for this reason it has been found impossible to increase the rotary velocity of the drum beyond a certain limited maximum.

The present invention has for its object to remedy the difficulty arising from this lateral shifting of the specific gravity of the rotating mass by so mounting the drum or other object on its upright driving-shaft that the mass may shift laterally automatically when running to a limited extent and at the same time maintain its axis of rotation vertical at all times. This automatic adjustment also serves to maintain the coincidence of the axis of rotation of the mass with a vertical line which passes through the center of gravity thereof.

As the invention is especially applicable to centrifugal separators, it has been illustrated herein as embodied in an apparatus of this character.

In the accompanying drawings, Figure 1 is a vertical axial section of a centrifugal apparatus, illustrating the novel mounting of the drum on its shaft; and Figs. 2 and 3 are similar views illustrating variants thereof.

Referring primarily to Fig. 1, which illustrates the preferred construction, 1 is a centrifugal-separator drum. 2 is the tubular center, extending vertically through the drum. 3 is the tubular shaft of the drum, extending up into the center 2, and 4 is the upright spindle, about which the shaft 3 rotates. The manner of supporting the spindle and of supporting the shaft antifrictionally thereon is clearly shown in the drawings and being well known will require no description. Indeed, the construction of these parts is not important to my invention. The upper end of the shaft 3 is faced off flat at right angles to the shaft-axis to form a seat, and on this seat is seated a block 5, which does not exceed the shaft in diameter and which is rounded or spherical on its upper side. The rounded face of the block 5 fits in a correspondingly-formed seat in the lower face of the bearing-piece 6 in the bore of the center 2.

It will be noted that the diameter of the bore of the center 2, as far up as the bearing-point exceeds the shaft 3 in diameter, so that the block 5 may slide laterally in any direction on the upper end of the shaft to a limited distance, the drum, of course, moving with it. If it be assumed that normally the axis about which the drum rotates is coincident with the shaft-axis, both, of course, being vertical, and the center of gravity of the drum and contents shifts laterally from the cause mentioned or from any cause, the mass will shift laterally correspondingly, the block 5 sliding over the flat seat on the upper end of the shaft.

Fig. 2 shows a variation from the construction of Fig. 1, wherein the intermediate part 7, between the shaft and the bearing-piece 6, is rounded at both ends, the shaft in this instance having in it a hollow rounded seat.

Fig. 3 shows a variation adapted to a construction where the shaft extends up through the drum and has a bearing both above and below. In this construction the bearing-piece 6 and the block 5 are both annular, and the latter rests on a flat annular seat or shoulder 8 on the shaft. This construction is practically the same as that seen in Fig. 1.

In the mounting shown the shaft drives the drum through friction between the parts. With the automatic balancing devices of this invention the greater the rotative velocity the steadier will the drum run, and this mount-

ing enables the drum to be driven with a speed five times as great as that attainable in practice by drums as ordinarily mounted.

It will be noted that in my present construction the distinguishing feature is the freedom of the drum to move or shift bodily sidewise or laterally in any direction without disturbing the parallelism of its vertical axis and that of the driving-shaft and the interposition between the drum and shaft of a single movable supporting part. By "drum" as the word is herein used is meant anything of this general character which is to be rotated.

Having thus described my invention, I claim—

1. The combination with a drum, having a tubular center and a bearing-piece therein provided with a recessed seat in its under side, of an upright driving-shaft extending up into said center, said shaft being of less diameter than the bore in said center and said drum being free to move laterally in all directions with respect to said shaft, and a single separate intermediate part between a seat on the shaft and the recessed seat in said bearing-piece, said intermediate part being free to move laterally in all directions with, and following the lateral movements of the drum.

2. The combination with a drum, having a tubular center and a bearing-piece therein, of an upright driving-shaft extending up into said center, said shaft being of less diameter than the bore in said center and said drum being free to move laterally in all directions with respect to said shaft, a single intermediate block between a flat seat on the shaft and a seat in the bearing-piece, said block being flat on its under side or face and free to move laterally in all directions with, and following the lateral movement of the drum.

3. The combination with a drum, having a tubular center and a bearing-piece with a concave seat, of a shaft having a less diameter than the bore of the center and extending into said bore, and having a flat seat at its upper end, and the intermediate block 5, having a flat under side where it rests on the shaft, and a rounded upper surface fitting the seat in the bearing-block.

4. The combination with an upright, rotatable shaft, a single intermediate piece mounted on a bearing on said shaft and movable independently of the latter, and a drum supported centrally on said intermediate piece and movable laterally in all directions about said shaft, the latter rotating the drum through the medium of the said interposed supporting-piece, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

OLOF OHLSSON.

Witnesses:
ERNST SVANQVIST,
A. F. LUNDBORG.