

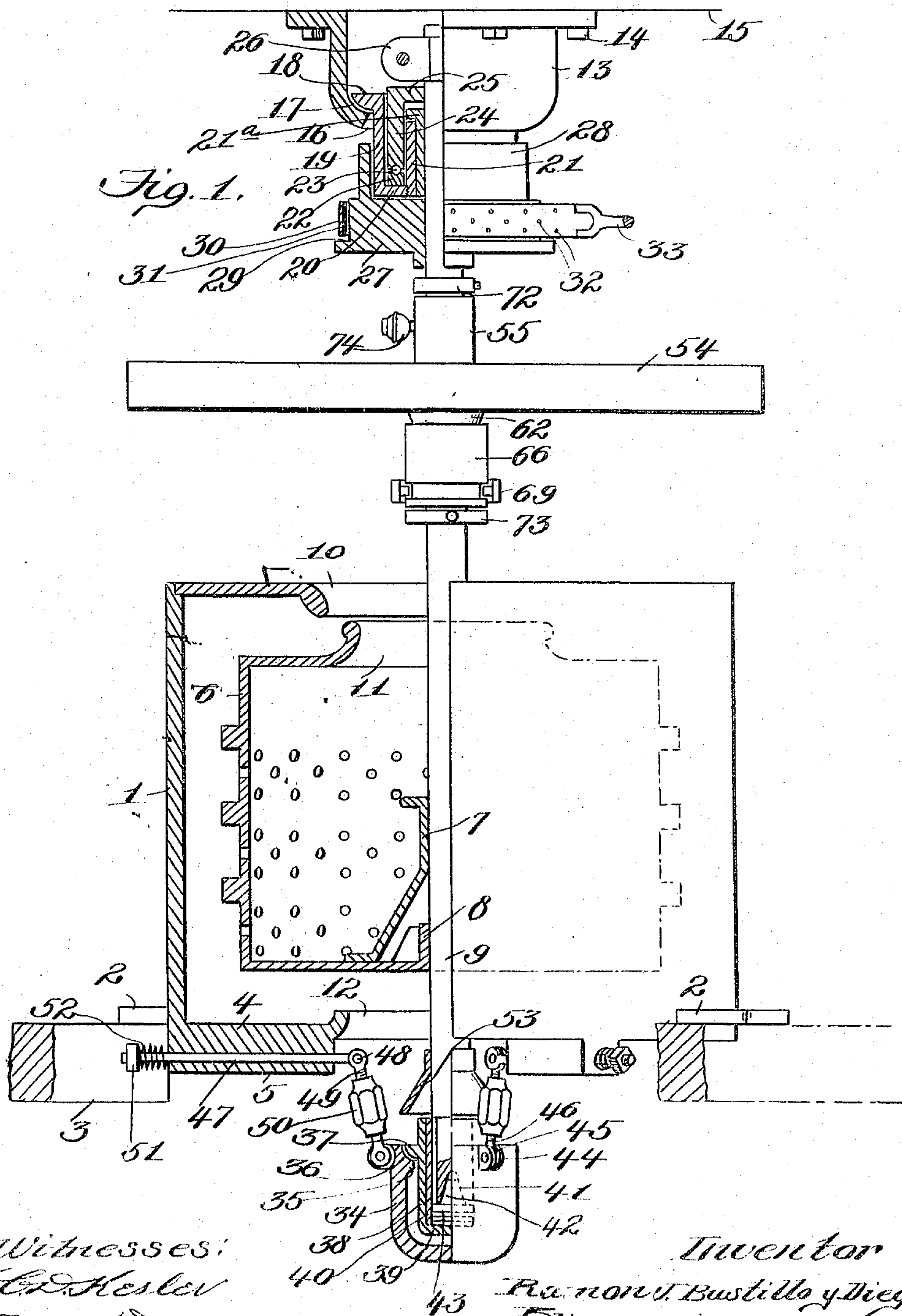
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SHAFT CENTERING DEVICE.

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919,819.

Patented Apr. 27, 1909.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## SHAFT-CENTERING DEVICE.

No. 919,819

Specification of Letters Patent.

Patented April 27, 1909.

Application filed June 4, 1907. Serial No. 377,277.

*To all whom it may concern:*

Be it known that I, RAMÓN J. BUSTILLO Y DIEGO, citizen of Cuba, residing at Habana, Republic of Cuba, have invented certain new and useful Improvements in Shaft-Centering Devices, of which the following is a specification.

This invention relates to a combined bearing and centering device for shafts particularly adapted for use in connection with suspended driving shafts of centrifugal machines, and the objects thereof are to provide a shaft centering device which shall be simple in its construction, strong, efficient in its use, automatic in its operation, durable, readily set up with respect to the shaft and inexpensive to manufacture.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In describing the invention in detail, reference is had to the accompanying drawing wherein is shown in elevation and partly in section the adaptation of a centering device in accordance with this invention in connection with a centrifugal machine and furthermore showing by way of example a means for suspending the shaft.

In the drawing the reference character 1 designates an outer imperforate casing formed with lateral extensions 2 which are mounted on a support 3. Within the casing 1 is arranged a perforated basket 6 connected by a bracket 7 and collar 8 to a driving or operating shaft 9 and by such construction it is evident that when the shaft 9 is revolved motion will be transmitted to the basket 6. The casing 1 at its top is formed with an inlet opening 10 which is arranged above an inlet opening 11 formed in the top of the basket 6. An outlet 12 is provided in the casing 1. The shaft 9 projects above and depends below the casing 1 and is suspended for rotation through the medium of a cup-shaped member 13 fixed by the hold-fast device 14 to a support 15. The member 13 has its bottom formed with an opening 16. The bottom of the member 13 at the side of the opening 16

is formed in a curvilinear manner as at 17 so as to constitute a seat for an annular flange 18, the flange 18 having its lower face of the same contour as the seat. The annular flange 18 is formed integral with a collar 19 which extends through the opening 16 and terminates at its bottom in an inwardly extending annular flange 20 connected to a vertically extending short sleeve 21. By such an arrangement the collar 19 is suspended upon the seat formed by the bottom of the member 13 and allows of the flange 18 tilting or rocking upon its seat, thereby imparting a like movement to the collar 19 and sleeve 21.

Mounted upon the inwardly extending flange 20 is a grooved ring 22 which forms a ball-race for the bearing balls 23 and mounted upon these latter is a sleeve 24 which terminates at its top in an inwardly extending annular flange 25 fixed to the shaft 9. The sleeve 24 in connection with the bearing balls 23, flange 20, collar 19, flange 18 and member 23, constitutes a suspension means for the shaft 9 and further allows of a tilting movement of the shaft from or to a perpendicular position when occasion so requires. The sleeve 24 is interposed between the collar 19 and sleeve 21 so that if the shaft 9 tilts, the sleeve 24 will either engage the sleeve 21 or the collar 19 and in view of the fact that the collar 19 can tilt or rock upon the bottom of the member 13, no interruption will be had to the tilting movement of the shaft 9 when it is moved from or to perpendicular position. Interposed between the sleeve 21 and shaft 9 is a bearing sleeve 21" and arranged in close proximity to the top of the sleeve 24 and fixed to the shaft 9 is a clamp 26 to prevent vertical movement in one direction of the sleeve 24. Secured to the shaft 9 in close proximity to the bottom of the collar 19 and sleeve 21 is a disk 27 having its upper face formed with a vertically extending sleeve 28 which incloses the collar 19. The periphery of the disk 27 is cut away so as to form a shoulder 29 which constitutes a support for the lower edge of a band brake used for retarding the motion of the shaft 9 when occasion so requires. The band brake consists of a steel band 30 lined with leather or other suitable means 31, which is secured in position by the rivets 32. The handle of the brake is indicated by the reference character 33. The driving means



for the shaft is illustrated by a pulley 54, the hub 55 of which is loosely mounted upon the shaft 9 and conventionally a clutch mechanism is shown and indicated by the reference characters 62 and 66 for connecting the pulley 54 to the shaft 9. A shifting element 69 for the clutch is also illustrated. Stop collars 72 and 73 are also carried by the shaft 9 to arrest the vertical movement of the pulley and the clutch. The foregoing construction is shown by way of example so that the adaptation of a centering device with a suspended operating shaft of a centrifugal machine can be thoroughly understood.

No claim to any of the foregoing parts or combination of parts is made herein.

The self-adjusting centering means in accordance with this invention for the shaft 9 and which also constitutes a bearing for the said shaft comprises a cup-shaped receptacle 34 having its inner face near the top thereof formed with an inwardly extending flange 35, the upper face of the flange 35 being curved as at 36 and which constitutes a seat for an annular off-set 37, the lower face of which corresponds in contour to the shape of the seat formed by the flange 35. The off-set 37 is an integral part of a vertically extending sleeve 38 having its lower end closed as at 39 and which is positioned within the receptacle 34 and has mounted therein a bearing sleeve 40 which surrounds the lower end of the shaft 9. The latter at its lower end is formed with a conoidal-shaped recess 41 in which extends a cone-shaped bearing member 42 mounted upon a series of anti-friction disks 43 seated within the lower portion of the bearing sleeve 40 and upon the bottom 39 of the sleeve 38. The receptacle 34 at its top is formed with three pairs of laterally extending apertured ears 44 and in each pair of ears 44 is pivoted as at 45 a screw-threaded rod 46. The reference character 47 denotes a radially extending bar. Three of such bars are provided and each of the bars extends through a radial projection 5 depending from the lower face of the bottom 4 of the casing 1. To the inner end of each of the bars 47 is pivoted as at 48 a screw-threaded rod 49, the latter being adjustably connected to a rod 46 through the medium of a turn-buckle 50. The bars 47 are of such length as to project outwardly from the projections 5 and the outer end of each of the bars 47 is screw-threaded and carries a nut 51. Between the latter and a corresponding projection 5 is a coil spring 52 which surrounds the bars 47. The rods 46 and 49 in connection with the turn buckles 50 and bars 47 suspend the receptacle 34 from the bottom of the casing 1 and owing to the providing of the sleeve 38 with the off-set 37, said sleeve 38 can tilt or rock upon the flange 35 so as to assist in moving the shaft 9 to a perpendicular position. Further-

more owing to the mounting of the sleeve 38 within the receptacle 34 and in connection with the elements carried by said sleeve 38, the lower end of the shaft 9 is prevented from swinging to any great extent. In such particular it will be stated that the movement of the sleeve 38 would be arrested by the receptacle 34, owing to the manner in which said receptacle is connected to the stationary casing 1. The turn buckles 50 provide means for vertically adjusting the receptacle 34 which in turn would vertically adjust the sleeve 38 to compensate for wear upon the wall of the bearing sleeve 40 in the bottom of the shaft 9 and also wear upon the cone-shaped bearing 42. The movement of the bars 47 is cushioned by the springs 52 during the centering of the shaft. A shield 53 is carried by the lower end of the shaft 9 for protecting the elements within the receptacle 34.

What I claim is:—

1. A self-adjusting centering means for suspended shafts comprising the combination with the shaft having a recess in the bottom thereof, of a bearing extending in said recess, a receptacle, a series of radially extending automatically shiftable bars, supports for the bars, a pair of members pivotally connected to the inner end of each of said bars and to said receptacle, means connecting the members of each pair to adjustably increase or decrease their combined length and means for suspending said bearing within said receptacle, said means being capable of tilting upon said receptacle.

2. A self-adjusting means for suspended shafts comprising the combination with the shaft having a recess in the bottom thereof, of a bearing extending in said recess, a receptacle, a series of radially extending automatically shiftable bars, supports for the bars, a pair of members pivotally connected to the inner end of each of said bars and to said receptacle, means connecting the members of each pair to adjustably increase or decrease their combined length means for suspending said bearing within said receptacle, said means capable of tilting upon said receptacle, and means for cushioning said bars during the shifting movement thereof.

3. A self adjusting centering means for suspended shafts comprising the combination with the shaft, of a pendent cup shaped member, bearing means movably supported in the cup shaped member and receiving the end of the shaft and supporting means for the cup shaped member comprising a plurality of radially disposed and shiftable bars and connections pivoted to the inner ends of the bars and to said cup-shaped member at the upper end thereof.

4. A self adjusting centering means for suspended shafts comprising the combination with the shaft, of a pendent cup shaped



member, bearing means movably supported  
in the cup shaped member and receiving the  
end of the shaft and supporting means for  
the cup shaped member comprising a plu-  
5 rality of radially disposed and shiftable bars,  
connections pivoted to the inner ends of the  
bars and to said cup shaped member at the  
upper end thereof and means for adjustably  
lengthening or shortening said connections.  
10 5. A self-adjusting centering means for  
suspended shafts comprising the combina-  
tion with the shaft having a recess in the  
bottom thereof, of a bearing extending in  
said recess, antifriction disks for said bear-  
15 ing, a pendent cup-shaped member, means  
movably supported in the cup-shaped mem-  
ber and suspending said bearing, and sup-  
porting means for the cup-shaped member  
comprising a plurality of radially disposed

and shiftable bars, supports for the bars, 20  
coil springs surrounding said bars for cush-  
ioning the same during the shifting move-  
ment thereof, a rod pivotally connected to  
the inner end of each of said bars, rods piv-  
otally connected to said cup-shaped member 25  
at the upper end thereof and turn-buckles  
connecting each pair of opposed rods pivoted  
to the bars and to said cup-shaped member  
to adjustably increase or decrease their com-  
bined length. 30

In testimony whereof I have hereunto set  
my hand in presence of two subscribing wit-  
nesses.

RAMÓN J. BUSTILLO Y DIEGO.

Witnesses:

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VICTOR NORMAND.