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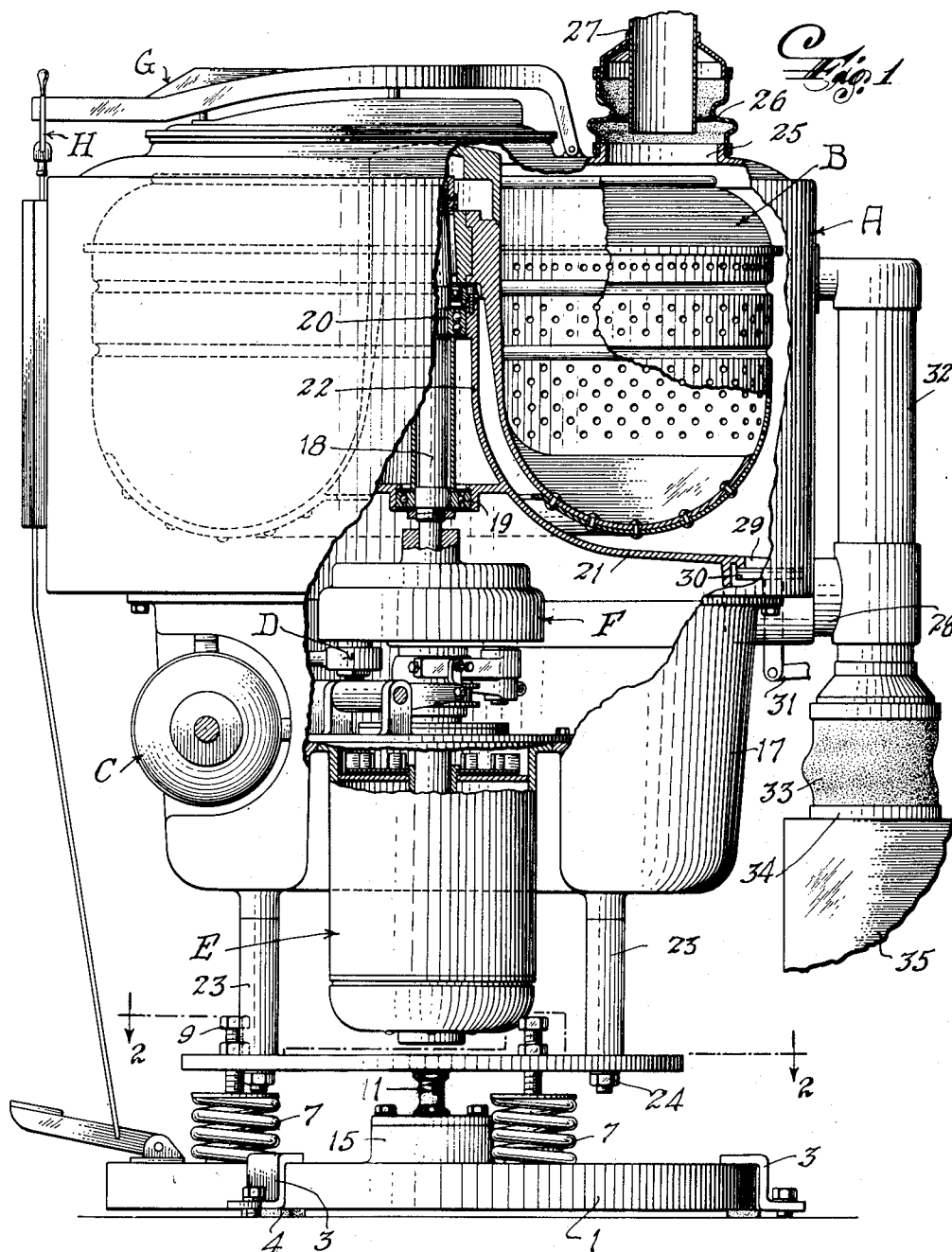
E. E. HALLANDER

2,665,007

MOUNTING FOR CENTRIFUGAL MACHINES

Filed Sept. 11, 1948

2 Sheets-Sheet 1



INVENTOR.

ELVIN E. HALLANDER
BY

BY

Harry R. Cook,
ATTORNEY

ATTORNEY

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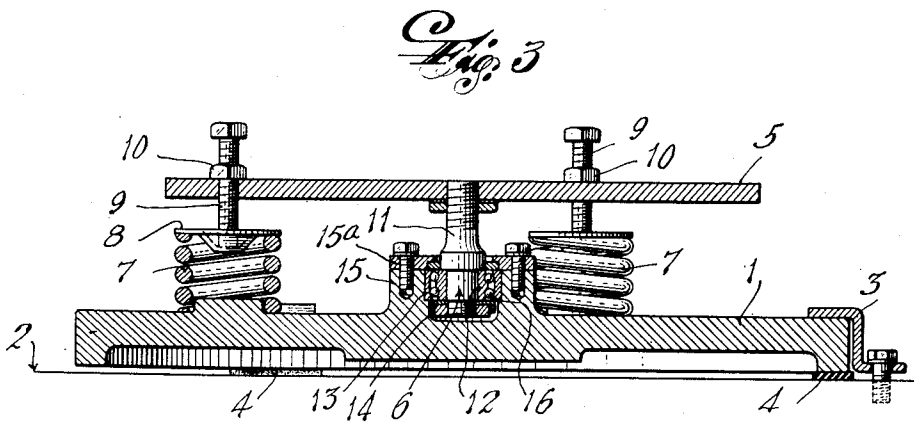
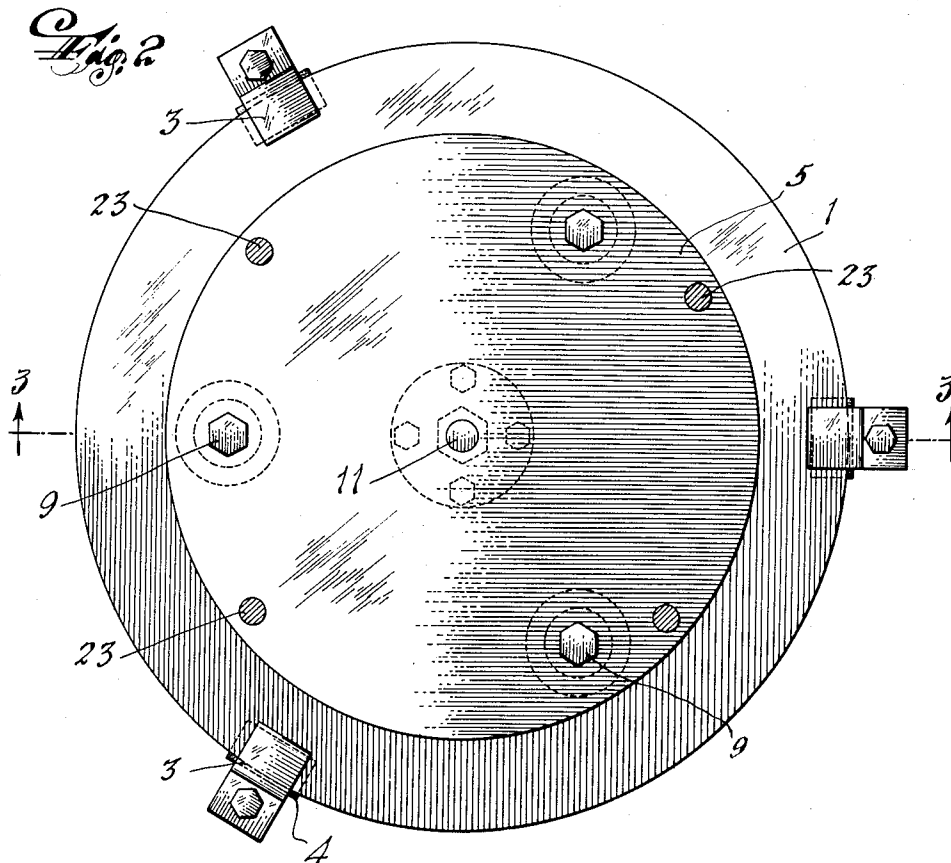
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INVENTOR.
ELVIN E. HALLANDER
BY

Harry R. Book,
ATTORNEY

UNITED STATES PATENT OFFICE

2,665,007

MOUNTING FOR CENTRIFUGAL MACHINES

Elvin E. Hallander, West Caldwell, N. J., assignor
to International Projector Corporation, Bloom-
field, N. J., a corporation of Delaware

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4 Claims. (Cl. 210—63)

1

This invention relates in general to centrifugal machines of the type including a container for solid materials, such as fabrics, which is adapted to be rotated at high speed about a vertical axis for the purpose of forcing a fluid through or from the solid materials by centrifugal force. More particularly, the invention contemplates a machine, such as a combined washer and extractor for dry cleaning garments or other articles, which comprises a main tank or receptacle and a container for the garments or other articles mounted to rotate about a vertical axis within said tank.

In dry cleaning apparatus of this character, there is used a solvent or cleaning fluid which is highly volatile and sometimes toxic, and this fluid or solvent is pumped into the tank, and, after the garments or articles in said container have been washed, is drained from the tank and generally pumped into a filter wherein the foreign matter removed from the washed garments is filtered from the solvent. After the garments have been washed, said container is rotated at high speed so as to remove the solvent from the garments by centrifugal action. During such operations, it is highly important that the tank be vapor and liquid-tight, and it is also essential that there shall be a minimum of vibration of the machine, especially while the container is being rotated at high speed.

Therefore, one object of the invention is to provide mounting means for centrifugal machines of this character which shall embody novel and improved features of construction wherein said tank, said container and the driving mechanisms for both thereof, shall be mounted as a unit on a common base and said base shall be capable of absorbing or compensating for the vibrations incident to rotation of the container within the tank.

Another object is to provide such a mounting for centrifugal machines which shall embody novel and improved features of construction, whereby said tank, said container and the driving mechanisms therefor, may swing against yielding resistance about a point in the axis of rotation of said rotatable container in planes of said axis of rotation in response to off-center or out-of-balance load conditions in said container.

A further object is to provide a mounting for centrifugal machines which shall include a novel and improved construction, combination and arrangement of a base plate, a mounting plate secured at its center on said base by a universal joint, whereby said mounting plate may tilt and

2

rotate in any of a plurality of directions, and springs for yieldingly resisting such tilting of the mounting plate.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the accompanying drawings, in which

Figure 1 is a front elevational view of a mounting for a centrifugal machine embodying my invention, with portions of the machine broken away and shown in section for clearness in illustration;

Figure 2 is a top plan view of the base of the machine, approximately from the plane of the line 2—2 of Figure 1, and

Figure 3 is a transverse vertical sectional view, approximately on the plane of the line 3—3 of Figure 2.

Specifically describing the invention, the machine includes a base that comprises a base plate 1, preferably circular in plan, which is secured to a floor or other foundation 2 in any suitable manner, for example, by Z-clamps 3. Desirably, some shock absorbing material, such as a ring or separate blocks 4 of rubber, is interposed between the base plate and the support.

A mounting plate 5, which is also preferably circular in plan, is connected by a coaxial universal joint 6 to the top of the base plate 1 so that said mounting plate may tilt in any direction relative to the base plate. The mounting plate is normally held in horizontal position by means of compression springs 7 that are in equidistantly spaced relation to said universal joint and to each other and interposed between the base plate 1 and respective bearing plates 8 that are abutted by corresponding adjusting screws 9 threaded in the mounting plate and held in adjusted position by jam nuts 10.

More particularly describing the details of construction, the universal joint 6 comprises a stud 11 secured to the mounting plate 5 at its center and projecting perpendicularly downward from its underside, upon which is mounted one race ring 12 of a spherical ball bearing, the other race ring 13 of which is mounted in a socket 14 provided in an upstanding boss 15 on the top of the base plate. Between the race rings are the usual balls 16 and a cap plate 17a holds the bearing in position.

The springs 7 are of such size and strength as to effectively absorb, resist or compensate for vibrations set up in the centrifugal machine during operation thereof as is now to be described. For the purpose of illustration, I have shown a

3

combined washer and extractor of the type described in United States Patent No. 2,223,998, dated December 3, 1940. As shown, this washer and extractor includes a main casing, tank or tub A at the bottom of which is secured a casing 17 for enclosing a part of the driving mechanism for a perforate container B which is mounted in the tank A on a coaxial vertical shaft 18 that is journaled in bearings 19 and 20 mounted respectively on the bottom wall 21 of the tank and on a vertical hollow standard 22 that projects upwardly from and forms a part of the bottom wall of the tank. At the bottom of the casing 17 are a plurality of feet or legs 23 spaced equidistantly circumferentially of the casing and equidistantly from the axis of rotation of the shaft 18, said feet being secured to the mounting plate 5 in any suitable manner, as by bolts 24, so that the tank A and shaft 18 are coaxial with the stud 11 and universal joint 6.

The shaft 18 may be driven with an oscillating motion from an electric motor C through suitable gearing and clutch mechanism D, for example, like that disclosed in said Patent No. 2,223,998; and said shaft may be continuously rotated at high speed by an electric motor E and suitable clutch mechanism F which also may be like the corresponding mechanism described in said patent.

The tank A has a hinged cover G through which the garments or other articles to be treated may be inserted and removed into and from the container B, it being understood that said container has an open top; and the cover G may be held in closed position by any suitable latch mechanism H.

The top wall of the tank A also has an inlet opening 25 for pumping solvent or other suitable liquid into the tank, said inlet opening being connected by a flexible tube 26 to a filling pipe 27 which is stationary and connected to the source of supply. The tank also has a draining mechanism for removing the liquid from the tank and which is schematically shown as comprising an outlet pipe 28 that communicates with an outlet opening 29 in the bottom wall of the tank which in turn is controlled by a valve 30 that may be operated in any suitable manner through linkage 31. Normally, this valve will be held closed and will be opened only when it is desired to drain the tank. The drain pipe 28 has an overflow pipe 32 projecting upwardly therefrom and communicating with the upper portion of the tank, while the lower end of the drain pipe is connected by a flexible tube 33, like the tube 26, to the inlet end 34 of a suitable stationary drain tank 35.

It will be understood that the flexible connections 26 are provided to compensate for the vibrations or bodily movements of the tank A relatively to the filling pipe 27 and drain tank 35 during operation of the centrifugal machine; and at the same time maintain liquid and vapor-tight connection between the filling pipe and the drain tank, respectively.

In normal operation of the machine as a washer and extractor, clean solvent is pumped into the tank A, the cover G is opened and the articles to be washed are inserted into the container B. Then the cover G is closed and the motor C is started in operation to oscillate the container B. This operation is continued until the articles are washed, whereupon the oscillation of the container is stopped and the solvent is drained from the tank A to the outlet 29. Then

4

the motor E is started to cause rapid rotation of the container B and force the solvent from the articles by centrifugal action, the extracted solvent being drained from the tank through the outlet 29.

During these operations, the vibrations incident to rotation of the motors, the gearing and the container B are effectually resisted and absorbed by the springs 7, and at the same time, the tank, container and driving mechanisms may swing about the universal joint 6 against the yielding resistance of the springs 7 in response to off-center or out-of-balance load conditions in the container. It will be noted that the center of the universal joint lies in an extension of the line of the axis of rotation of the container B and the whole mechanism may swing in any plane of said axis of rotation; and there are at least three springs 7 spaced equidistantly from each other and from said line of axis of rotation of the container B.

It will thus be seen that the tank may be maintained vapor and liquid-tight at all times during the operation of the container B, and excessive vibration of the machine as a unit is prevented. Moreover, my mounting takes advantage of the weight or mass of the whole machine including the tank, the driving mechanisms and the liquid in the tank in offsetting or counterbalancing of the vibrations and off-center movements of the machine during rotation of the container B.

While I have shown and described my invention as embodied in a certain type of machine, and as including certain details of construction, it should be understood that this is primarily for the purpose of illustrating the now preferred embodiment of the invention and that the invention may be utilized in other types of machines and the details of construction of the mounting can be modified and changed, all within the spirit and scope of the invention.

Having thus described the invention, what I claim is:

1. In a centrifugal machine, a tank, a perforated container mounted concentrically within said tank to rotate relatively to said tank about a vertical axis that is fixed with respect to said tank, means suspended on said tank for rotating said container, a normally horizontal mounting plate on which said tank is secured, a base supporting said mounting plate for tilting movement about a fixed point that lies in the line of the axis of rotation of said container, and compression springs interposed between said mounting plate and said base and yieldingly supporting the weight of said tank, said perforated container and said means suspended on the tank and resisting such tilting movement of said mounting plate.

2. In a centrifugal machine, a tank, a perforated container mounted concentrically within said tank to rotate relatively to said tank about a vertical axis that is fixed with respect to said tank, means suspended on said tank for rotating said container, a normally horizontal mounting plate on which said tank is secured, a base, a universal joint connection between said mounting plate and said base at a fixed point that lies in the line of the vertical axis of rotation of said container to permit tilting of said mounting plate at said universal joint, and compression springs interposed between said base and said mounting plate in equidistantly spaced relation to said line of axis and equidistantly spaced from each other,

5

said springs yieldingly supporting the weight of said tank, said perforated container and said means suspended on the tank and resisting such tilting movement of said mounting plate and means for individually adjusting the compression of said springs.

3. In a centrifugal machine, a tank, vertically alined bearings fixedly mounted in said tank centrally thereof, a vertical shaft journaled in said bearings, a container rigidly mounted on said vertical shaft to rotate therewith concentrically within said tank, a normally horizontal mounting plate on which said tank is secured, a base supporting said mounting plate for tilting movement about a fixed point that lies in the line of the axis of rotation of said container, and at least three compression springs interposed between said mounting plate and said base in equidistantly spaced relation to each other and to said line of axis, and said springs yieldingly supporting the weight of said tank, said bearings, said vertical shaft and said container and resist such tilting movement of said mounting plate.

4. In a centrifugal machine, a tank, vertically alined bearings fixedly mounted in said tank centrally thereof, a vertical shaft journaled in said bearings, a container rigidly mounted on said shaft to rotate therewith concentrically within said tank, a normally horizontal mounting plate on which said tank is concentrically secured, a base, a universal joint connection between said mounting plate and said base at a point that lies in the line of the vertical axis of rotation of said shaft to permit tilting of said mounting plate at said universal joint, said universal joint including complementary race rings of a spherical ball

6

bearing on one of which is secured the lower side of the mounting plate while the other is disposed on the upper side of said base, and balls between said race rings, whereby said mounting plate may tilt at said universal joint, at least three compression springs interposed between said base and said mounting plate in equidistantly spaced relation to said line of axis and equidistantly spaced from each other, said springs yieldingly supporting the weight of said tank, said perforated container and said means suspended on the tank and resisting tilting movement of said mounting plate and means for individually adjusting the compression of said springs.

ELVIN E. HALLANDER.

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