

Dec. 16, 1930.

G. W. DUNHAM

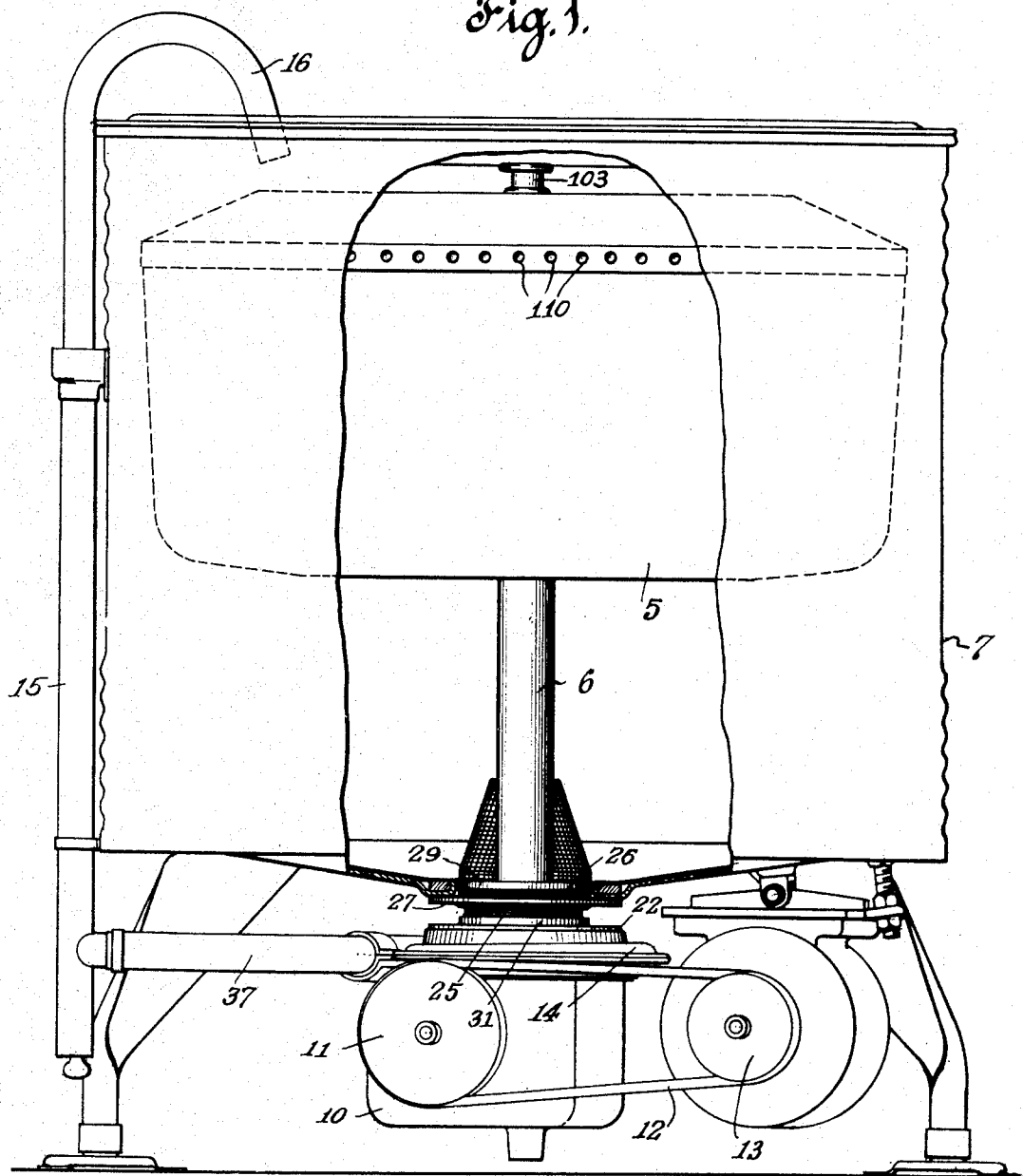
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LAUNDRY MACHINE

Filed May 16, 1925

3 Sheets-Sheet 1

Fig. 1.



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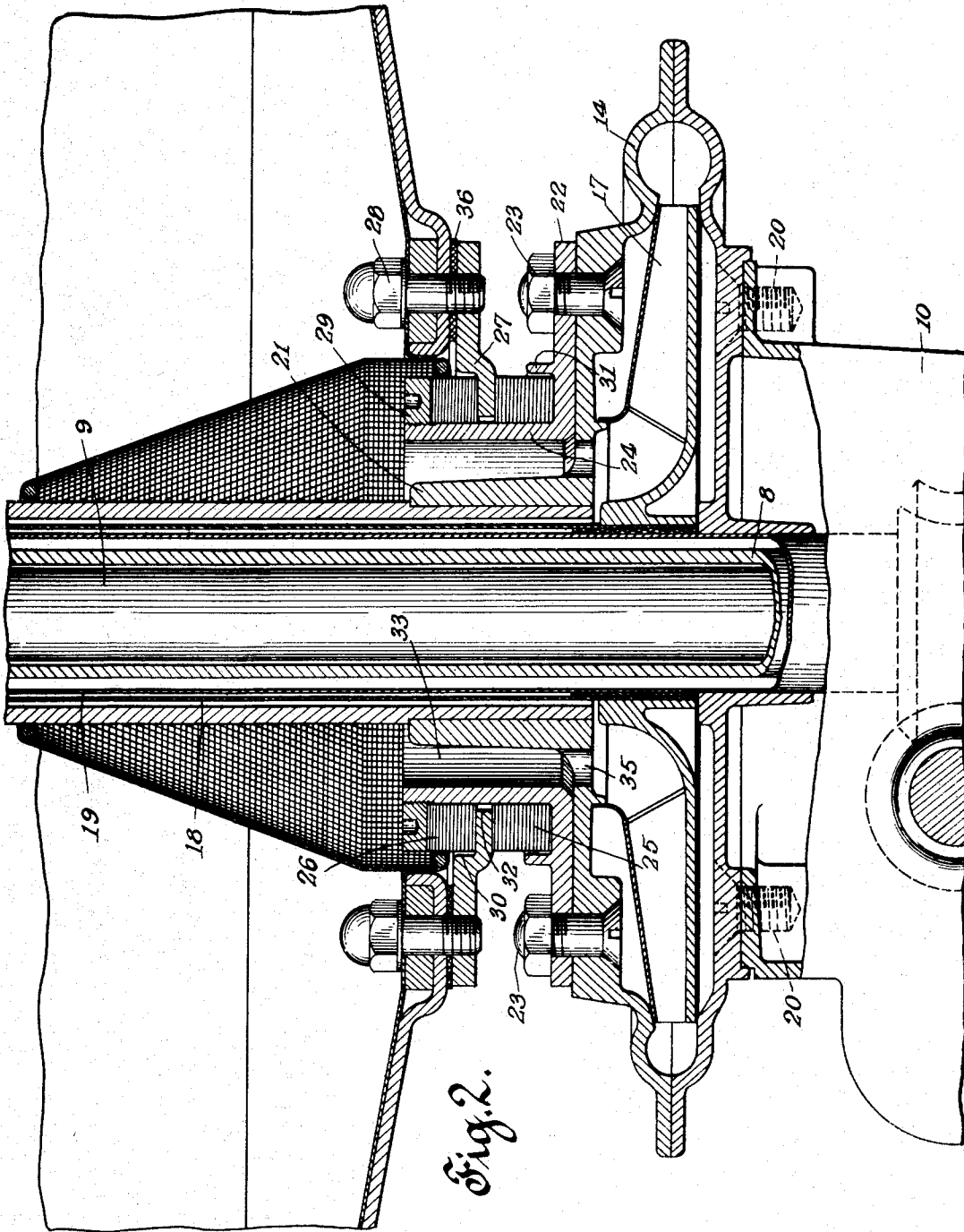


Fig. 2.

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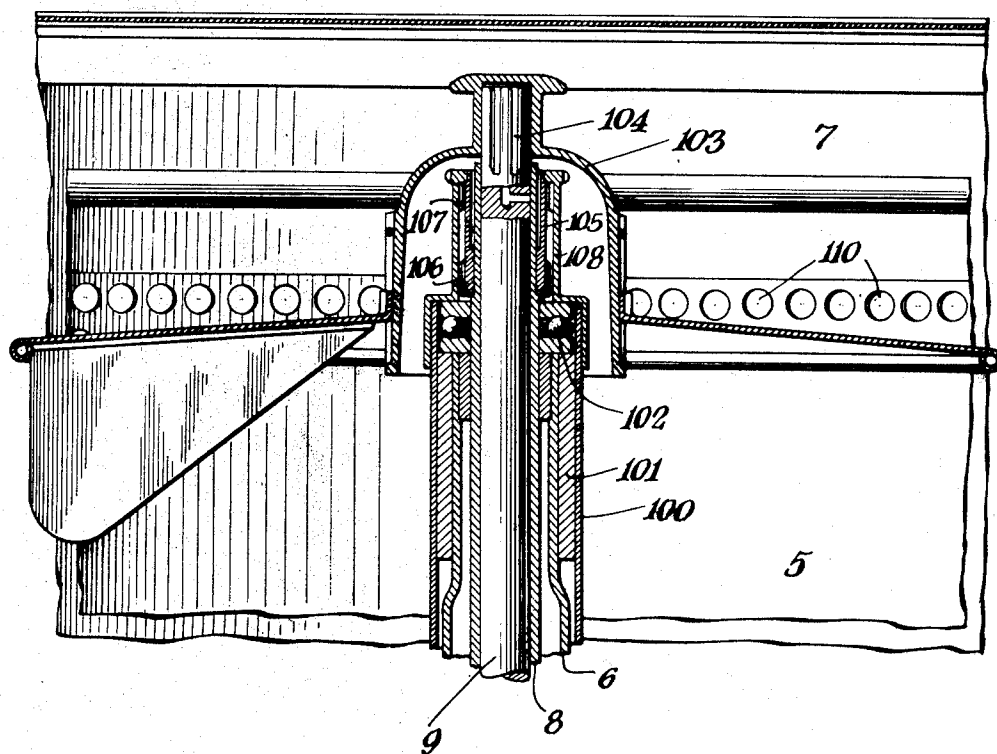
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Fig. 3



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UNITED STATES PATENT OFFICE

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LAUNDRY MACHINE

Application filed May 16, 1925. Serial No. 30,780.

The present invention relates to laundry machines of the type in which the clothes are contained in a receptacle supported for rotation on a vertical axis and particularly to machines of the type disclosed in my co-pending applications in which the receptacle is of an imperforate character to hold the washing liquid and therefore is required to carry a considerable weight. An objectionable characteristic of such machines has been the vibration resulting from the unbalanced condition of the clothes receptacle.

One of the primary objects of this invention is to eliminate or reduce this incidental vibration and co-related objects are to accomplish the same in a simple, practical and inexpensive manner and with a structure free of mechanical or other complications.

Special features of the invention, aiding in the attainment of these objects are the provision of a flexible or resilient mounting for the bearing which supports the clothes receptacle in the tank or container and the interposition of such support in the bottom of the tank where it also acts as a suspension means for the gearing, pump, or other drive mechanism of the machine.

Other novel features of the invention will appear in the course of the following specification.

In the drawings accompanying and forming part of this specification, a practical commercial embodiment of the invention is disclosed, but as such illustration is primarily for purposes of disclosure, it will be understood that the structure may be modified in various respects without departure from the broad spirit and scope of the invention as hereinafter defined and claimed.

Figure 1 is a front elevation of a washing machine like that of my co-pending applications referred to, with a portion of the tank broken away to illustrate the adaptation of the invention thereto.

Figure 2 is a broken enlarged sectional view of the mounting structure and associated parts.

Fig. 3 is a broken, enlarged sectional view through the top of the pedestal illustrating the mounting of the clothes receptacle.

In the general view the clothes receptacle is designated 5 and is indicated as rotatably mounted on an upstanding post or pedestal 6 supported from the bottom of the surrounding tank or container 7.

The clothes receptacle 5 is illustrated as being of the imperforate type having a closed bottom portion to hold washing liquid during washing operations, and a plurality of discharge openings 110 through which the liquid is discharged when the receptacle 5 is rotated at sufficient speed.

Receptacle 5 is provided with a hub 100 journaled on the top of the pedestal 6 by bearings 101 and 102. A tubular drive shaft 8 and an inner drive shaft 9 pass through pedestal 6 and are driven by gearing in the gear box 10, the solid shaft 9 having imparted thereto an oscillatory rotary motion and the tubular shaft 8 having imparted thereto a continuous rotary motion.

An agitator 103 is removably mounted on the top of the inner shaft 9 by spline connection 104. The clothes receptacle 5 is connected and disconnected from the tubular shaft 8 by a clutch collar 105 keyed to the tubular shaft 8 and having splines 106 engageable with splines 107 on the reduced extension 108 of the hub 100.

For washing, the clutch collar 105 is in its lower position and the agitator 103 is mounted on top of the inner shaft as shown in Fig. 3. For drying, the agitator 103 is removed from the machine and the clutch collar 105 is in its upper position to continuously rotate the receptacle 5 to drive the water from the laundry out of the receptacle through the discharge openings 110.

The gear box 10 is supported below the tank 7, as shown, and the gearing therein is driven by a belt 12 running on the pulleys 11 and 13, the pulley 13 being mounted upon a suitable electric motor which is also suspended from the bottom of the tank 7.

Attention is called to copending application Serial No. 18,086, above mentioned, for one construction of gearing which may be used in the gear box 10, but it is to be distinctly understood that, so far as the present invention is concerned, any gearing construc-

tion may be used in gear box 10 which will give the desired motions to shafts 8 and 9.

In the machine illustrated provision is made for returning the water discharged from the clothes receptacle into the container or for transferring liquid from the container up into the receptacle in the form of a pump at 14 interposed between the top of the gear box and the bottom of the tank, having an intake open to the tank and a discharge conduit 15 extended up the side of the tank and terminating in a spout 16 which can be turned inward to discharge into the top of the receptacle.

The impeller 17 of this pump is shown in Figure 2 as having a tubular shaft 18 extending up outside a tubular casing 19 which forms a water well about the drive shafts. It should be understood that this tubular pump shaft is connected with the high speed drive shaft at a point above the top of the water well 19, this particular feature not being shown as forming any part of the present invention, it being sufficient to know simply that the pump may be driven from the high speed shaft. Thus it will be understood that the opening in the lower wall of the pump casing through which the drive shaft 8 passes is effectively sealed to prevent washing liquid from passing down into the gear box 10, so long as the top of the well 19 is above the height of liquid in the tank 7.

In Figure 2 the pump casing is shown as secured to the top of the gear case by screws 20 and the tubular post or column which supports the clothes receptacle is shown as mounted in a hub 21 carried by the top of the pump casing, making the gearing, pump and supporting column practically a single unit and enabling the mounting of the gearing, pump and clothes receptacle by simply attaching this unit to the tank bottom. The supporting of this unit in a resilient mounting effects the absorbing or overcoming of any out of balance conditions in the rotating load, due to gravity, mechanical or gyroscopic forces or a combination of these forces, which otherwise would be transferred to the tank bottom and supports. By locating this resilient mounting at a point above the pump, the weight of the gearing and pump is utilized to in a way offset the weight of the clothes container and so, further reduce the vibration tendencies.

In the illustration, the resilient mounting is effected by a flange 22 bolted to the top of the pump casing at 23 and having an upwardly projecting hub 24 surrounded by resilient cushioning rings 25, 26, between which is entered, the inner rim of a flange 27 secured to the bottom of the tank by the bolts 28. A clamping ring 29 is shown screw threaded over the upper end of the neck or hub 24, serving as a shoulder for the upper resilient element and as a means for ad-

justably clamping the two resilient members on the interposed supporting flange 27. The inner engaged lip portion of this flange is shown as downwardly offset to provide an annular wall 30 for limiting the spreading tendency of the upper cushioning element and the companion supporting flange 22 is shown as having an upstanding annular wall 31 for confining and limiting the spreading tendency of the lower cushioning member.

The lip of the upper flange 27 is shown at 32 as of greater diameter than the neck 24 of the lower flange so that there can be no metal-to-metal engagement between these flanges.

The hub or neck portion 24 of the lower supporting flange is shown as sufficiently larger than the hub in which the supporting column is seated to provide an annular passage 33 between the hubs forming an intake for the pump open at the bottom through passages 35 into the top of the pump casing. A gasket 36 of suitable packing material is shown interposed between the upper supporting flange 27 and the bottom of the tank.

In addition to the shock absorbing and vibration dampening qualities, the resilient mounting dampens any noises from the gears or driving mechanism and provides a convenient and easily handled means for quickly attaching the pump gearing and clothes supporting post to the tank. The thickness and state of compression of the resilient rings, in addition to governing the cushioning effect, determines the position of the supporting column and hence the level of the clothes receptacle within the container. Thus, by varying these factors or adjustments, the position of the clothes container within the tank and the position of the gearing and pump below the tank may be governed to suit requirements. Thus by lowering the combined unit as a whole, the suspended weight of the pump and gearing may be made more effective to counterbalance the weight of the clothes receptacle and conversely by elevating the entire supported structure, the compensating effect of the suspended portions may be reduced.

The resilient connections form in effect an elastic diaphragm, affording both a spring support for the operating parts and a watertight connection between such parts and the tank. Because of the independent movement thus permitting the operating parts, the pump is shown as having a flexible connection in the form of a hose 37 interposed in the line between the discharge of the pump and the reservoir at the side of the tank, this flexible connection preventing transmission of vibration to the water connections on the tank.

What is claimed is:

1. In a laundry machine, a tank, a laundry receptacle within the tank, a pedestal for said receptacle rising from and supported by the bottom of the tank and a resilient connec-

tion between said pedestal and the tank bottom, means for supporting said receptacle on the top of said pedestal in rotatable relation thereto, and a drive shaft for said receptacle.

2. In a laundry machine, a tank, a supporting column, a resilient connection between the bottom of the tank and the foot of said column for carrying said column, a clothes receptacle within the tank, and means for supporting said receptacle on said column in rotatable relation thereto.

3. In a laundry machine, the combination with a tank and a supporting column rising from the bottom of said tank, a resilient connection between the foot of said column and the bottom wall of the tank for carrying said column, a clothes receptacle constructed to hold both the clothes and the washing liquid, and means for supporting said receptacle on said column in rotatable relation thereto.

4. In a laundry machine, the combination with a tank and a supporting column rising from the bottom of said tank, a resilient connection between the foot of said column and the bottom wall of the tank for carrying said column, a clothes receptacle constructed to hold both the clothes and the washing liquid during the washing operations, means for rotating said receptacle to discharge the liquid therefrom by centrifugal action, and means for supporting said receptacle on said column in rotatable relation thereto.

5. In apparatus of the character disclosed, the combination of a gear box, a pump above the same, a supporting column rising from said pump, a tank having an opening in the bottom of the same through which said column projects, a resilient supporting connection between the tank and pump structures and a clothes receptacle rotatably mounted on the column within the tank.

6. In a washing machine, the combination with a tank and a clothes receptacle therein, of a pedestal for the clothes receptacle and a resilient mounting for said pedestal carried by said tank and comprising flanges attached to the tank and pedestal respectively and cushioning elements interposed between said flanges, means for supporting said receptacle on said pedestal in rotatable relation thereto, and a drive shaft for said receptacle.

7. In a washing machine, the combination with a tank and a clothes receptacle therein, of a pedestal for the clothes receptacle and a resilient mounting for said pedestal carried by said tank and comprising flanges attached to the tank and support respectively, cushioning elements interposed between said flanges and means for adjustably compressing said cushioning elements, means for supporting said receptacle on said pedestal in rotatable relation thereto, and a drive shaft for said receptacle.

8. A laundry machine comprising a tank having a bottom opening with an inwardly

extending flange, a clothes receptacle within the tank, a supporting column for said receptacle projecting up through the bottom opening in the tank, a supporting flange at the base of said column having a neck extending up through the tank flange and clear of the same, annular cushions about said neck above and below the tank flange and a collar for said cushions adjustably engaged with the neck above the upper cushion.

9. In apparatus of the character disclosed, a tank structure having a bottom opening, a clothes receptacle within the tank, a column for rotatably supporting said receptacle extending up through the bottom opening, a flange about the bottom opening of the tank, a flange attached to the column, resilient cushioning elements disposed at opposite sides of one of said flanges and means for adjustably securing said cushioning elements to the other of said flanges.

10. In apparatus of the character disclosed, a tank, a supporting column projecting up from the bottom of the tank, a clothes receptacle journaled on said column within the tank, a pump and gearing secured to the column and disposed beneath the tank and a supporting connection between the tank and the column and arranged above the pump to enable the suspended pump and gearing below the tank to counterbalance the weight of the clothes receptacle within the tank.

11. In apparatus of the character disclosed, a tank, a supporting column projecting up from the bottom of the tank, a clothes receptacle journaled on said column within the tank, a pump and gearing secured to the column and disposed beneath the tank and a supporting connection between the tank and the column and arranged above the pump to enable the suspended pump and gearing below the tank to counterbalance the weight of the clothes receptacle within the tank, said supporting connection including resilient elements for cushioning vibration occasioned by unbalanced conditions of the clothes receptacle or other parts.

12. In apparatus of the character disclosed, a tank having a bottom opening, a tubular supporting column extending up through said opening, connecting means between the base of said column and the tank bottom, a clothes receptacle supported on the column within the tank, a pump and a gear case suspended from the base of the column below the tank so that the weight of the same acts as a counterbalance to the weight of the clothes receptacle within the tank and gearing within the gear case having driving means for the receptacle extending up through the tubular column.

13. In apparatus of the character disclosed, a tank having a bottom opening, a tubular supporting column extending up through said opening, connecting means between the base of said column and the tank

bottom, a clothes receptacle supported on the column within the tank, a pump and a gear case suspended from the base of the column below the tank so that the weight of the same acts as a counterbalance to the weight of the clothes receptacle within the tank and gearing within the gear case having driving means for the receptacle extending up through the tubular column, the connecting means including a resilient shock absorbing support for overcoming vibration tendencies set up by unbalanced conditions in the clothes receptacle.

14. In apparatus of the character disclosed, a tank, a water connection carried thereby, a clothes receptacle within the tank, a support for said clothes receptacle carried by said tank, a pump carried by said support, resilient connections between the tank and support and a flexible connection between the pump and the water connection carried by the tank.

15. In a laundry machine, a support, a pedestal device, means resiliently mounting said pedestal device on said support, a receptacle to hold articles to be laundered rotatably mounted at the upper end of said pedestal device and above said support, auxiliary mechanism to aid in balancing said receptacle at the lower end of said pedestal device and below said support, said pedestal device including drive connections between said receptacle and auxiliary mechanism.

16. In a laundry machine, a support, a pedestal device, means swingably mounting said pedestal device on said support, a receptacle to hold articles to be laundered rotatably mounted at the upper end of said pedestal device and above said support, auxiliary mechanism to aid in balancing said receptacle at the lower end of said pedestal device and below said support, and drive connections for driving said receptacle.

In testimony whereof I have hereunto set my hand.

GEORGE W. DUNHAM.

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