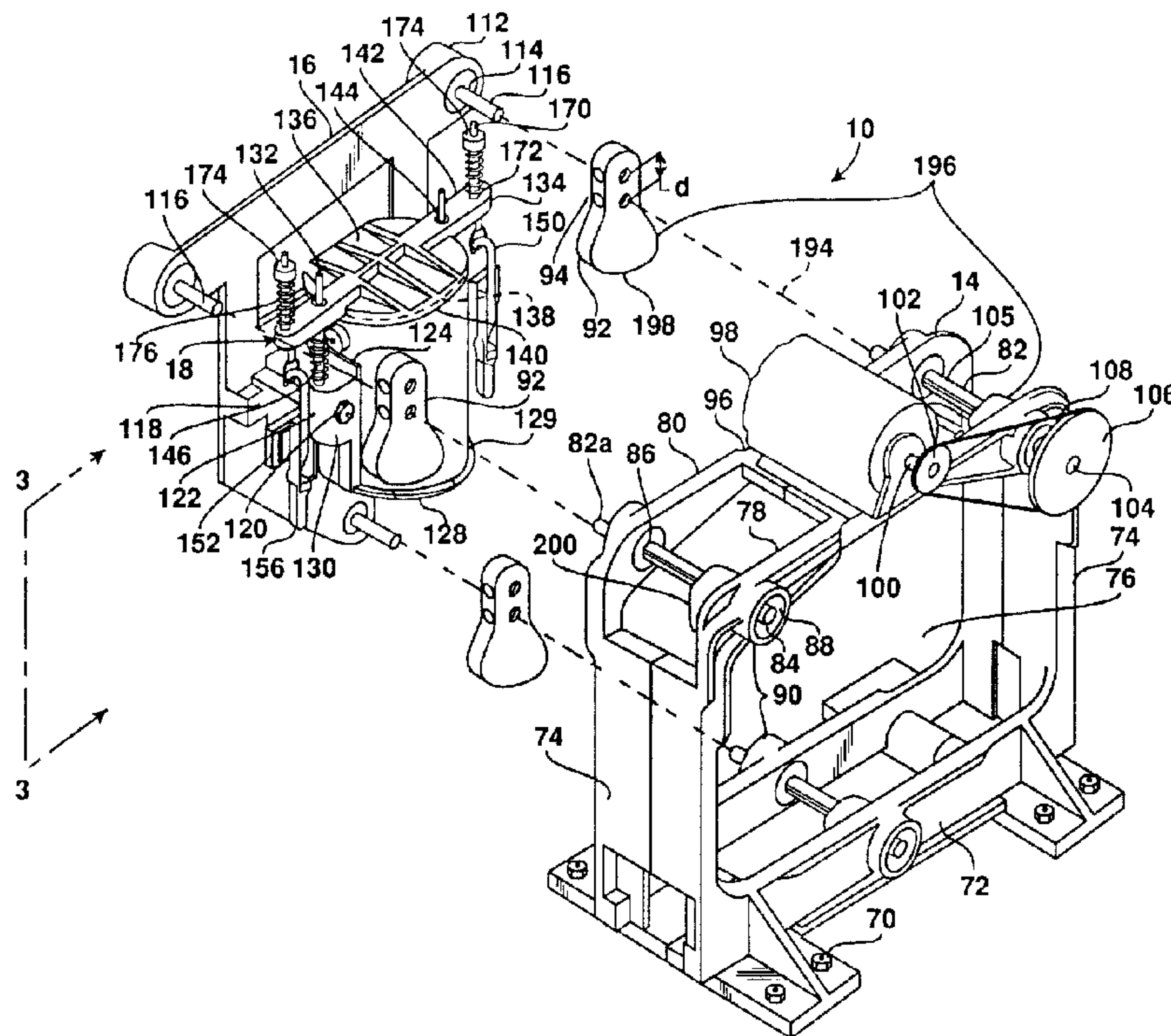




(22) Date de dépôt/Filing Date: 1994/05/09
 (41) Mise à la disp. pub./Open to Public Insp.: 1995/01/10
 (45) Date de délivrance/Issue Date: 2002/02/05
 (30) Priorité/Priority: 1993/07/09 (089,123) US

(51) Cl.Int.⁵/Int.Cl.⁵ B01F 9/10
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 (54) Title: MIXING ASSEMBLY



(57) **Abrégé/Abstract:**

A mixing assembly is provided which mixes liquids within a container. The mixing assembly has a vertically extending support frame enclosed within an outer cabinet. Attached to at least one crank which is in turn attached to the support frame, is a vertically extending rigid frame. A rotary drive apparatus rotates the crank to cause the rigid frame to orbit in a vertical plane about a horizontal axis. The mixing apparatus also includes an attachment device which removably attaches the container to the rigid frame. When the attachment device is in a lower position, the attachment device urges an upper support member against the top of the container to clamp the container between the upper support member and a lower support member. The attachment device also includes a spring to move the upper support member upward and off the top of the container when the attachment device is not locked in a lower position.

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Abstract of the Disclosure

A mixing assembly is provided which mixes liquids within a container. The mixing assembly has a vertically extending support frame enclosed within an outer cabinet. Attached to at least one crank which is in turn attached to the support frame, is a vertically extending rigid frame. A rotary drive apparatus rotates the crank to cause the rigid frame to orbit in a vertical plane about a horizontal axis.

The mixing apparatus also includes an attachment device which removably attaches the container to the rigid frame. When the attachment device is in a lower position, the attachment device urges an upper support member against the top of the container to clamp the container between the upper support member and a lower support member. The attachment device also includes a spring to move the upper support member upward and off the top of the container when the attachment device is not locked in a lower position.

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MIXING ASSEMBLY

Background of the Invention

The invention generally relates to an assembly for mixing liquids and more particularly to a machine for agitating and mixing a liquid within a container such as paints or the like.

Devices which mix liquids within a container by rapid, general oscillatory movement of the container are well known. However, to cause rapid movement of the container, forces must be applied to the container by the mixing device. The mixing device must balance the forces applied to the container, or vibration and/or damage to the mixing device may result.

To balance the forces applied to the container, several prior art devices were developed which spins the container about one or more axes which correspond to a central axis of the container. Because the container is being spun about the central axis, the centrifugal forces created by the rotation of the liquid are directed against the container and not against the machine. The mixing effect of these devices is minimal, however, along the axis of rotation. Therefore, these machines must be operated for a longer period of time to perform adequate mixing.

In addition, to prevent damage to the container by the mixing device during movement of the container, the container must be securely fastened to the mixing apparatus. The containers, however, are typically fungible; and therefore, the device which fastens the container to the mixing device should facilitate attachment and removal of the container. The

1 attaching device should also provide some indication of when the
2 container has been securely attached to the mixing device before
3 operation of the mixing device. Furthermore, the attachment
4 device must be able to attach containers having slightly
5 differing dimensions without compromising the attachment or
6 clamping force applied by the attaching device to the container.

7 It is therefore an object of this invention to provide
8 a device which mixes liquids held within a container.

9 It is a further object of the present invention to
10 provide a device which balances forces arising from the mixing
11 movement of the container.

12 Yet another object of the present invention is to
13 provide a device which mixes the liquids quickly.

14 It is a still further object of the present invention
15 to provide a mixing device which allows quick and secure
16 attachment and detachment of the container. A related object of
17 the present invention is to provide a mixing device which
18 provides an indication of when the secure attachment has
19 occurred.

20 It is also an object of the present invention to
21 provide a device which can securely mix liquids within containers
22 having slightly varying dimensions.

23 Summary of the Invention

24 Accordingly an assembly is provided for mixing fluid
25 held within a container. The mixing assembly includes a rigid
26 frame having a device for removably securing the container to the
27 frame. The assembly includes an intermediate frame which is
28 connected to and moves the rigid frame, and therefore the
29 container, in a generally circular planar orbit about a first
30 axis normal to the plane of the orbit. The orbital movement
31 agitates the liquid within the container to cause a complete
32 intermixing of the liquid in a short time.

33 The device which removably secures the container to the
34 rigid frame supports the container on a lower member and
35 resiliently urges an upper member against the top of the

1 container. The device compensates for containers having
2 differing heights and widths. The securing device also includes
3 a resilient spring for moving the upper member off the top of the
4 container to facilitate removal of the container from the mixing
5 assembly.

6 More particularly, the mixing assembly has a generally
7 vertically extending support frame, a first bearing means,
8 fixedly attached to the support frame, and a first axle
9 horizontally extending through and rotatably mounted in said
10 first bearing means. A rotational drive is operatively attached
11 to the first axle for rotating the first axle. A crank is
12 fixedly attached to the first axle, wherein the crank spins about
13 a horizontal axis defined by the first axle when the first axle
14 is rotated.

15 The mixing assembly also has a generally vertically
16 extending rigid frame, a second bearing fixedly attached to the
17 rigid frame, and a second axle extending through and rotatably
18 mounted in the second bearing, the second axle being generally
19 aligned with the first axle and fixedly attached to the crank at
20 a point spaced from the connection between the crank and the
21 first axle, wherein the second axle orbits in a vertical plane
22 about the horizontal axis when the crank spins about the
23 horizontal axis.

24 The mixing assembly further includes a device for
25 removably securing the container, the securing device is secured
26 to the rigid frame. Thus, the container is moved in an orbit in
27 a vertical plane about an axis parallel to the horizontal axis
28 by the spinning action of the crank as transmitted to the
29 container and the fluid.

30 Description of the Drawings

31 FIG. 1 is a perspective view, with parts broken away,
32 of a mixing assembly embodying the present invention;

33 FIG. 2 is an exploded perspective view of the mixing
34 device of FIG. 1 with the outer cabinet removed for clarity; and

35 FIG. 3 is a partial side view taken generally along line
36 3-3 of FIG. 2 and in the direction generally indicated.

1 Description of the Preferred Embodiment

2 Referring to FIGS. 1 and 2, the preferred embodiment
3 of the mixing apparatus is generally indicated at 10. The mixing
4 apparatus 10 includes an outer cabinet 12. Rigidly attached to
5 the cabinet 12 and contained within the cabinet is support frame
6 14. Movably connected to the support frame 14 is a generally
7 vertically extending rigid frame 16, and mounted to the rigid
8 frame is an attachment device, generally indicated at 18, for
9 securely and removably attaching a liquid-filled container to the
10 rigid frame.

11 Referring to FIG. 1, the cabinet 12 is of a general
12 box-like configuration and is preferably made of a rigid material
13 such as a high density plastic or metal. The cabinet 12
14 functions to prevent inadvertent contact with the moving rigid
15 frame 16 during operation of the mixing apparatus 10 and shield
16 the surrounding environment from the potential spillage of the
17 contents of a container during mixing.

18 The front 20 of the cabinet 12 forms a generally
19 rectangular opening 22, and the cabinet includes a door 24 which
20 is hingably mounted to the front 20 along the side of the opening
21 22. The door 24 is of a size so that it covers the opening 22
22 when the door is in a closed position, and the door may be clear
23 to allow viewing of the interior of the cabinet 12 during
24 operation of the mixing device 10. The door 24 and front 20 of
25 the cabinet 12 include a cabinet latching mechanism 26 so that
26 the door may be removably secured in the closed position.

27 The front 20 and door 24 of the cabinet 12 may also
28 include a sensing device 28 which gives an indication when the
29 door has been securely attached by the latching mechanism 26.
30 The sensing device may be a normally open electrical switch or
31 the like.

32 To provide selected mobility of the cabinet 12, the
33 cabinet includes retractable rollers 30. The rollers 30
34 preferably include a front roller 32 and a pair of back rollers
35 34 arranged to support the cabinet 12 in a tripod-like support
36 configuration. The front roller 34 is positioned over a frontal
37 opening 36 in the base 38 of the cabinet 12, and includes a

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1 spherical roller 40 within a circular housing 42. Extending
2 above the roller 40 and housing 42 is a bracket 44. A threaded
3 bolt 46 extends through the bracket 44 and contacts the upper
4 surface of the bearing 40. The rotation of the bolt 46 forces
5 the roller 40 downward through the opening 36 so that the roller
6 40 provides rolling mobility for the cabinet 12. Rotation of the
7 bolt 46 in the opposite direction allows the roller 40 to be
8 forced upward by the weight of the cabinet 12 until the base 38
9 of the cabinet 12 contacts a surface on which the cabinet is to
10 be placed.

11 The back rollers 34 include cylindrical rollers 50
12 attached to brackets 52 which are hingably mounted to the base
13 38 of the cabinet 12. Each of the brackets 52 is hinged so that
14 rotation of the bracket causes the cylindrical roller 50 to
15 either rotate downward through a rear opening 54 in the base 38
16 or rotate upward into the cabinet depending on the direction of
17 rotation of the bracket. Rigidly attached to each of the
18 brackets is a block 56 having a threaded opening 58 extending
19 through the block. Threaded through the opening is a rod 60
20 having a front end which is connected by a joint 62 to a
21 rotatable bolt 64 which extends through the front face of the
22 cabinet 12.

23 The rod 60 holds the bracket 52 in a desired position.
24 Rotation of the bolt 64 causes a corresponding rotation of the
25 rod 60. Rotation of the rod 60 causes either a pivoting of the
26 bracket 52 in one direction to force the roller 50 downward
27 through the opening 54 or a pivoting of the bracket in the other
28 direction to allow an upward retraction of the roller 50. Thus,
29 rotation of the bolt 46 and bolts 64 causes the mixing device 10
30 to be supported by the front roller 46 and rear rollers 50 for
31 selective movement of the mixing device. Once the mixing device
32 has been placed at a desired position, such as beneath a cabinet,
33 the bolt 46 and bolts 64 may be rotated in the opposite direction
34 to retract rollers 32 and 34, respectively, and allow the cabinet
35 to contact and be securely supported by the ground or other
36 surface.

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1 Referring to FIG. 2, the support frame 14 is rigidly
2 attached to the cabinet 12 preferably by bolts 70. The support
3 frame 14 includes a base 72, left and right sides 74. Spanning
4 from one of the sides 74 to the other to form a central opening
5 76 is a forward rib 78 and a rear rib 80. The forward rib 78 and
6 rear rib 80 are generally mirror images of each other.

7 Rotatably mounted to and horizontally extending through
8 the support frame 14 is at least one and preferably three
9 parallel rotary axles 82. The front end portion 84 and rear end
10 portion 86 of each of the rotary axles is rotatably mounted in
11 a pair of bearings 88 which are fixedly attached to the support
12 frame 14 by being housed in appropriately sized bosses 90 formed
13 in the support frame. A rearward end 82a of each of the rotary
14 axles 82 is connected to a vertically extending crank 92. The
15 crank 92 includes a roll pin 94 which securely fixes the rotary
16 axle 82 to the crank.

17 The support frame 14 also forms a mounting base 96 to
18 fixedly support a rotatable drive mechanism 98 such as an
19 electric motor. Attached to a drive axle 100 of the drive
20 mechanism 98 is a drive pulley 102. Fixedly attached to a
21 forward end 104 of at least one of the rotary axles 82 or a
22 driven rotary axle 105 is a driven pulley 106. A V-belt 108
23 extends about the drive pulley 102 and driven pulley 106 so that
24 rotation of the drive pulley by the drive mechanism 98 causes a
25 rotation in the driven pulley and a rotary driven axle 105.

26 The rigid frame 16 forms a number of bosses 112 at
27 least corresponding in number to the number of rotary axles 82
28 on the support frame 14. Each of the bosses 112 house a pair of
29 roller bearings 114 which rotatably support a horizontally
30 extending driven axle 116. The bosses 112 are arranged and
31 located on the rigid frame 16 so that the driven axles 116 are
32 similarly spaced to the rotary axles 82 on the support frame 14.
33 The driven axles 116 extend forward through the rigid frame 16
34 and connected to each of the cranks 94 at an offset with respect
35 to the rotary axle 82 or at a point spaced from the point where
36 the rotary axle 82 is connected to the crank. Thus the cranks

1 72 function as a means for connecting the rigid frame 16 to the
2 support frame 14.

3 To minimize the depth of the cabinet 12 the rotary
4 axles, cranks, and driven axles are configured so that the rigid
5 frame 16 is aligned with and in close proximity to the support
6 frame 14.

7 Because the driven axles 116 are similarly spaced on
8 the support frame 14 to the spacing of the rotary axles 82 on the
9 rigid frame 16, it is apparent that for each crank 94 the driven
10 axle will be spaced from the rotary axles 82 a generally equal
11 distance. Also the directional orientation between each of the
12 drive axles 116 and the corresponding rotary axle 82 will be the
13 same for each crank 72.

14 The rigid frame 16 includes a pair of arms 118 which
15 extend forward into the central opening 76 of the support frame
16 14. The attachment device 18 is rigidly secured to the arms 118,
17 preferably by bolts 120. The attachment device 18 has a bracket
18 122 which has a middle section 124 configured to allow the
19 frontal insertion of a container 126 having a generally circular
20 horizontal cross section. The bracket 122 also includes a lower
21 generally horizontal planer plate 128 for supporting the
22 container 126 in an upright position. To facilitate insertion
23 and removal of the container 126, the planar plate 128 may
24 include an upper teflon surface 129. Extending laterally from
25 the sides of the middle section 124 is a pair of ears 130.
26 Extending vertically upward from each of the ears 130 is a
27 locating rod 132.

28 The attachment device 18 also includes an upper support
29 member 134. The upper support member 134 includes a middle
30 portion 136 having a generally planar lower horizontal surface
31 138 and a downwardly depending circumferential rim 140. The rim
32 140 is sized so that when the upper support member 134 is in a
33 lower position, a position where the support member contacts the
34 top of the container 126, the rim fits about the upper portion
35 of the container to register and retain the container in the
36 upright position.

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1 The upper support member 134 also includes a pair of
2 laterally extending ribs 142 which are configured to be
3 vertically aligned with and extend over the ears 130 of the
4 bracket 122. Each of the ribs 142 forms an inner orifice 144
5 through which the locating rods 132 extend. A resilient means
6 or spring 146 extends about each of the locating rods 132, and
7 has an upper end seated against the rib 142 and the lower end
8 seated against the ear 130. The length of the spring 146 is such
9 that when the upper support member 134 is in the lower position,
10 the spring exerts an upwardly directed force against the upper
11 support member which, unless the upper support member is held in
12 the lower position, resiliently lifts the upper support member
13 off of the container to an upper position, a position which is
14 sufficient to clear the rim 140 from the top of the container.
15 The spring 146 facilitates removal of the container from the
16 attachment device 18 by insuring the upper support member 134 is
17 resiliently placed and retained in the upper position so that the
18 upper support member does not hinder the removal of the container
19 126.

20 The attachment device 18 also includes a clamping
21 device 150 to urge the upper support member 134 against the
22 container 126. Referring to FIG. 3, the clamping device 150
23 includes a pair of laterally extending braces 152 which are
24 rigidly attached to and extend outward from the middle section
25 124 of the bracket 122, preferably by being disposed between the
26 bracket 122 and braces 118 with the bolts 120 extending through
27 the braces 152. Each of the braces 152 includes a forward
28 extending hinge member 154 to which a lever 156 is rotatably
29 mounted. The levers 156 include handle portions 158 at the end
30 opposite the end of the levers connected to the hinge member 154.
31 Each of the levers 156 and braces 152 include a detachable latch
32 means 160, such as a cabinet lock assembly, which releasably hold
33 the lever in a downward depending position as shown in FIG. 3.

34 When the levers 156 are rotated to the downward
35 depending position, the latch means 160 retain the levers in the
36 downward position until an outward directed force is applied on
37 the handle portions 158 by the user. The latch means 160 also

1 functions as an indication that the levers 156 are securely held
2 in the downward position. This indication is provided by a
3 latching sounds when each of the latches 160 retains the
4 corresponding lever 156, and the user may then apply a small
5 outward force to determine that, in fact, the latch retains the
6 lever.

7 Referring to FIGS. 2 and 3, the clamping device 150
8 also includes a pair of elongated hooks 162 one of which is
9 rotatably attached to each of the levers 156. Each of the
10 elongated hooks 162 includes a hook portion 166 which is received
11 in a ring 168 attached to the lower end of an upward extending
12 bar 170 which extends upward through an outer orifice 172 formed
13 in each of the ribs 142. Fixedly attached to an upward end of
14 the bar 150 is a disk like seat 174. An urging means or spring
15 176 extends about the bar 170 and is seated against the seat 174
16 and rib 142.

17 When the levers 156 are rotated into the downward
18 position, the levers cause the hook 162 to pull the ring 168, bar
19 170 and seat 174 downward. The downward movement of the seat
20 compresses the spring 176. The springs 176 are sized so that
21 when the springs are compressed, the springs apply a downwardly
22 directed urging force on the rib 142 equal to or greater than one
23 half of the force necessary to overcome the resilient force
24 applied on the upper support member by springs 176 and to place
25 the upper member 134 against the top of the container 126 or in
26 the lower position. The urging force applied by the springs 176
27 also securely attaches the containers to the rigid frame 16
28 during operation of the mixer apparatus 10. The springs 176 are
29 also sized so that the necessary urging force is applied
30 regardless of whether the container has a height which slightly
31 varies. For example, it has been found that paint containers may
32 have heights which vary by a quarter inch or so.

33 Referring to FIG 1, the drive mechanism 98 is
34 electrically connected to a timer switch 190 which is located in
35 the front of the cabinet 12. The timer switch 190 is preferably
36 a manual dial type timer switch. The timer switch 190 is in turn
37 electrically connected to the sensing device 28 which prevents

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1 activation of the drive mechanism 98 if the door 24 is not
2 secured in the closed position.

3 Referring to FIG. 2, in operation, the container 126
4 is placed on the plate 128. The left and right levers 156 are
5 rotated into the downward position until the levers are snapped
6 into the latch means 160 thereby indicating the container 126 is
7 securely attached to the rigid frame 14. The downward movement
8 of the levers 156 causes the elongated hook 162 to pull the rod
9 170 and connected seat 174 downward. The downward movement of
10 the seat 174 compresses the spring 176 which then urges the upper
11 member 134 downward into contact with the top portion of the
12 container 126 or into the lower position.

13 The timer mechanism 190 is then set for the desired
14 amount of mixing time, and the door 24 of the outer cabinet 12
15 is closed thereby tripping the sensing device 28 which activates
16 the electric motor 98. The electric motor 98 rotates the drive
17 axle 100 and drive pulley 102. The drive pulley 102 in turn
18 rotates the driven pulley 106, rotary driven axle 115 and the
19 crank 72 connected to the rotary driven axle. The rotation of
20 the crank 72 connected to the rotary driven axle causes the
21 driven axle 116 connected to that crank to circularly orbit in
22 the vertical plane about a horizontal axis 194 or axis normal to
23 the plane of the orbit. The horizontal axis 194 is defined by
24 the rotating rotary axles 82 in each of the cranks. The radius
25 of the orbit being the distance "d" between the rotary axle 82
26 and driven axle 116.

27 Because the driven axles 116 are fixedly mounted in the
28 rigid frame 16, the orbiting of the driven axle connected to the
29 crank 72 which is connected to the driven rotary axle 115, causes
30 all the driven axles to orbit about the rotary axles 82 in each
31 of the crank. The radius of the orbits and the speed of orbiting
32 being the same.

33 The orbiting of the driven axles 116 causes the rigid
34 frame 16, and therefore the container 126, to also orbit in a
35 vertical plane about a horizontal axis with the same rotational
36 path and velocity as the driven axles. As the rigid frame 16 and
37 container 126 are orbited, the rigid frame and container are

1 maintained in the same vertical alignment. For example, the
2 container 126 is maintained in the upright position which
3 facilitates the intermixing of the contents of the container.

4 To orbit the container 126 and the rigid frame 16
5 centripetal forces are applied to the rigid frame by the rotary
6 axles 82. To compensate for or balance the centripetal forces,
7 the mixing assembly 10 also includes counterweights 196 which are
8 connected to each of the rotary axles 82 so that the orientation
9 between the center of mass of the counterweight and the rotary
10 axle 82 is opposite the orientation between the driven axle 116
11 and the rotary axle 82. Preferably the counterweights 196
12 include a first set 198 which are formed integrally with each of
13 the cranks 172. A second set 200 is securely attached to each
14 of the rotary axles 82 within the central opening 76 adjacent the
15 bosses 90 in the front of the support frame 14.

16 The orbiting of the container 126 agitates the liquid
17 within the container causing an intermixing of the liquid.
18 Because the container 126 is not spun around an axis of rotation,
19 but is instead orbited around an axis in an upright position, all
20 portions of the container are equally agitated.

21 The greater the radius of the orbit and the faster the
22 rotational speed the quicker the liquid within the container is
23 mixed; however, the greater the radius and the faster the speed
24 the more reaction force is applied on the attachment device 18
25 by the container and on the rotary axles 82 by the rigid frame
26 16 and container 126. It has been found that by rotating the
27 rotary driven axle 115 at about 690 RPM and offsetting the driven
28 axles 116 from the rotary axles 82 by 7/8", produces a desired
29 intermixing of paint within 30 seconds. By rotating the rotary
30 driven axle at lower speeds and maintaining the same 7/8" offset
31 the mixing time increases. Preferably the rotation is at 680 -
32 700 r.p.m. Mixing time is thus preferably maintained between 30
33 to 60 seconds.

34 After the desired mixing time has elapsed, the timer
35 mechanism 190 stops the motor 98. The door 24 is then opened and
36 the user grasps the handle portion 158 of the levers 156 and
37 applies an outward directed force to detach the lever from the

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1 detachable means 160 and rotate the levers into an up position.
2 As the levers 156 are rotated upwards, the springs 146
3 resiliently force and retain the upper support member 134 into
4 the upper position. The user may then remove the container 126.

5 A specific embodiment of the novel mixing apparatus for
6 liquid filled containers according to the present invention has
7 been described for the purposes of illustrating the manner in
8 which the invention may be made and used. It should be
9 understood that implementation of other variations and
10 modifications of the invention in its various aspects will be
11 apparent to those skilled in the art, and that the invention is
12 not limited by the specific embodiment described. It is
13 therefore contemplated to cover by the present invention any and
14 all modifications, variations, or equivalents that fall within
15 the true spirit and scope of the basic underlying principles
16 disclosed and claimed herein.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A mixing assembly for mixing fluid in a container, said mixing assembly comprising:

a rigid frame;

a support frame;

an attachment device for removably securing the container to the rigid frame, said attachment device including upper and lower members, between which the container is to be received, one of said upper and lower members being movable between a first position, wherein the upper and lower members are located distal to each other for permitting the container to be inserted therebetween, and a second position, wherein the upper and lower members are located proximate to each other for securing the container therebetween; and

a rotary drive secured to the support frame and operably connected to the rigid frame for moving the rigid frame and the container in a generally circular path about a first axis.

2. The mixing assembly of claim 1, wherein the support frame includes a first axle connected to the rotary drive, and the rigid frame includes a second axle, said first axle being connected to, and offset from, the second axle by a crank, said first axle being operable to rotate the crank, thereby causing the second axle to orbit about the first axle in a generally circular orbit.

3. The mixing assembly of claim 2, further comprising a counterweight attached to one of the first axle and the crank for counterbalancing the forces applied on the support frame by the generally circular movement of the rigid frame.

4. The mixing assembly of claim 3, wherein the counterweight is integrally joined to the crank.

5. The mixing assembly of claim 1, wherein the support frame includes a plurality of first axles spaced about the support frame, and the rigid frame includes a plurality of second axles spaced about the rigid frame, said first axles being connected to, and offset from, the second axles by a plurality of cranks.

6. The mixing assembly of claim 1, wherein the first axis is horizontal.

7. The mixing assembly of claim 1, wherein the upper member is movable between the first and second positions, and wherein the first position is an upper position, and the second position is a lower position.

8. The mixing assembly of claim 7, wherein the upper member is biased toward the upper position by at least one first spring.

9. The mixing assembly of claim 8, wherein the attachment device further comprises a clamping device for moving the upper member to the lower position, said clamping device comprising:

at least one bar extending through the upper member and having an upper end with a seat secured thereto;

at least one second spring disposed around the bar and positioned between the upper member and the seat;

at least one lever having an intermediate portion connected to the bar and an end portion pivotally connected to the rigid frame for movement between upward and downward positions, wherein when the lever is moved to the downward position, the lever moves the bar and the seat downward, thereby compressing the second spring and urging the upper member toward the lower position.

10. The mixing assembly of claim 9, wherein the clamping device further comprises latch means for releasably holding the lever in the downward position.

11. The mixing assembly of claim 1, wherein the rigid frame and the support frame are enclosed within a cabinet.

12. A mixing assembly for mixing fluid in a container having a central axis, said mixing assembly comprising:

a support frame having a first axle mounted thereto;

a rigid frame having a second axle mounted thereto;

a crank securing the first axle to the second axle;

an attachment device connected to the rigid frame for removably securing the container to the rigid frame such that the central axis of the container extends generally perpendicular to the first axle; and

a rotary drive operably connected to the first axle for rotating the first axle and the crank, thereby causing the second axle to orbit about the first axle in a generally circular orbit.

13. The mixing assembly of claim 12, wherein the first axle extends generally horizontal, and wherein the rigid frame moves in a generally circular path about a generally horizontal axis when the second axle orbits about the first axle.

14. The mixing assembly of claim 12, wherein the attachment device comprises upper and lower members, between which the container is to be received, said upper member being movable between an upper position, wherein the upper and lower members are located distal to each other for permitting the container to be inserted therebetween, and a lower position, wherein the upper and lower members are located proximate to each other for securing the container therebetween.

15. The mixing assembly of claim 14, wherein the upper member is biased toward the upper position by at least one first spring.

16. The mixing assembly of claim 15, wherein the attachment device further comprises a clamping device for moving the upper member to the lower position, said clamping device comprising:

at least one bar extending through the upper member and having an upper end with a seat secured thereto;

at least one second spring disposed around the bar and positioned between the upper member and the seat;

at least one lever having an intermediate portion connected to the bar and an end portion pivotally connected to the rigid frame for movement between upward and downward positions, wherein when the lever is moved to the downward position, the lever moves the bar and the seat downward, thereby compressing the second spring and urging the upper member toward the lower position; and

latch means for releasably holding the lever in the downward position.

17. The mixing assembly of claim 12, wherein the support frame defines a central opening, and wherein the attachment device extends into the central opening.

18. An assembly for mixing fluids within a fluid filled container, comprising:
a generally vertically extending support frame;
a first bearing means, fixedly attached to said support frame;
a first axle horizontally extending through and rotatably mounted in said first bearing means;
a rotational drive means operatively attached to said first axle for rotating said first axle;
a crank fixedly attached to said first axle, wherein said crank spins about a horizontal axis defined by said first axle when said first axle is rotated;
a generally vertically extending rigid frame;
a second bearing means fixedly attached to said rigid frame;
a second axle extending through and rotatably mounted in said second bearing means, said second axle being generally aligned with said first axle and fixedly attached to said crank at a point spaced from the connection between said crank and said first axle, wherein said second axle orbits in a vertical plane about said horizontal axis when said crank spins about said horizontal axis; and
means for removably securing the container, said securing means being secured to said rigid frame, the container being orbited in a vertical plane about an axis parallel to said horizontal axis by the spinning action of said crank as transmitted to the container.
19. The assembly of claim 18 wherein said crank extends generally vertical.
20. The assembly of claim 17 wherein said securing means includes; means attached to said rigid frame for supporting a lower surface of the container;
clamping means for clamping the container between said supporting means and said clamping means, said clamping means including;
an upper member adapted to fit about a top end portion of the container when said upper member is in a lower position, the top end portion of the container including the top surface;

resilient means contacting one of said rigid frame and said support means and also contacting said clamping means for moving said upper member to and maintaining said upper member in an upper position wherein the container may be removably inserted between said support means and said upper member; and

means attached to one of said rigid frame and said supporting means and contacting said upper member for shifting said upper member from said upper position to said lower position, said member shifting means including means for urging said upper member against the top surface when said upper member is in said lower position.

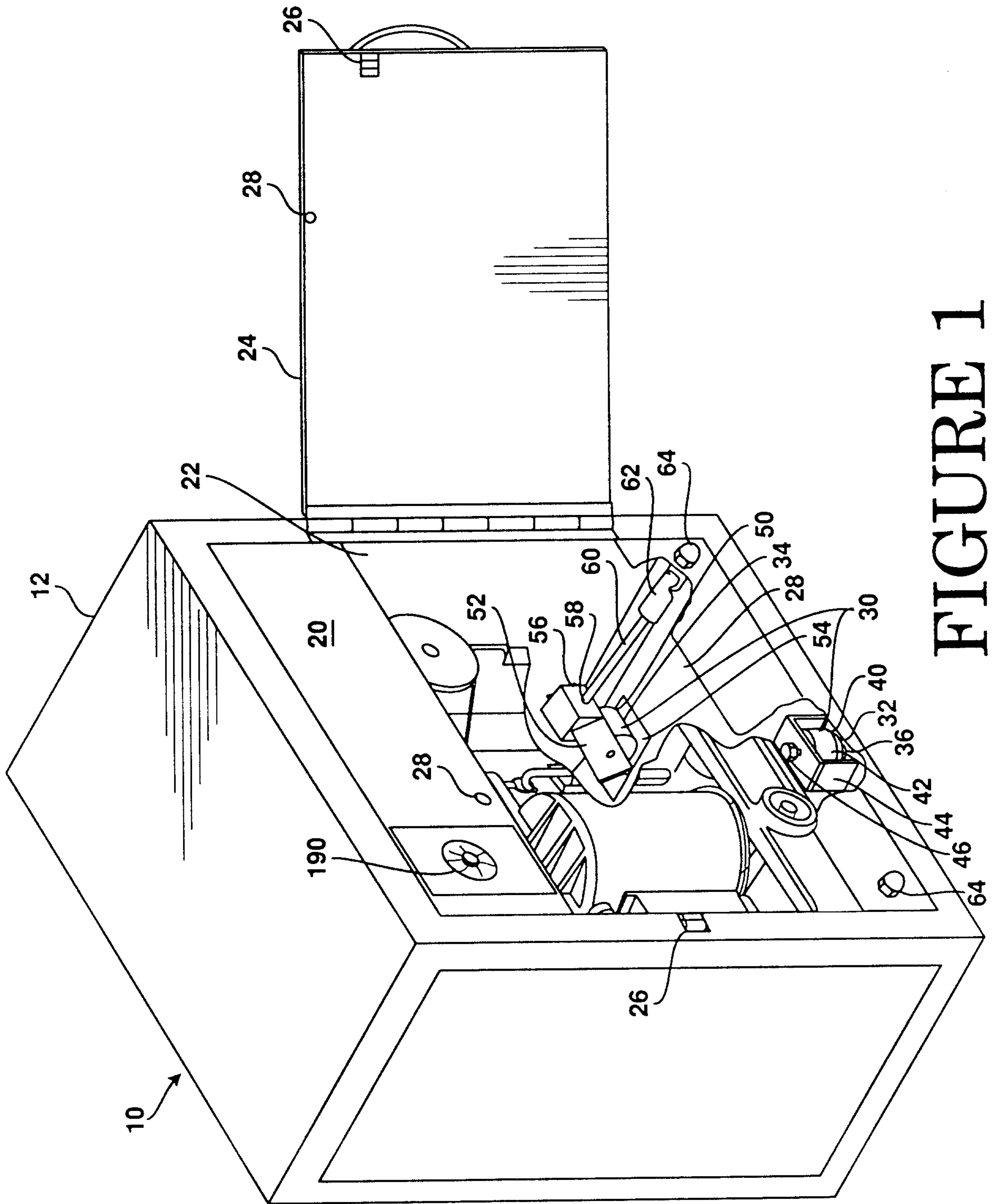


FIGURE 1

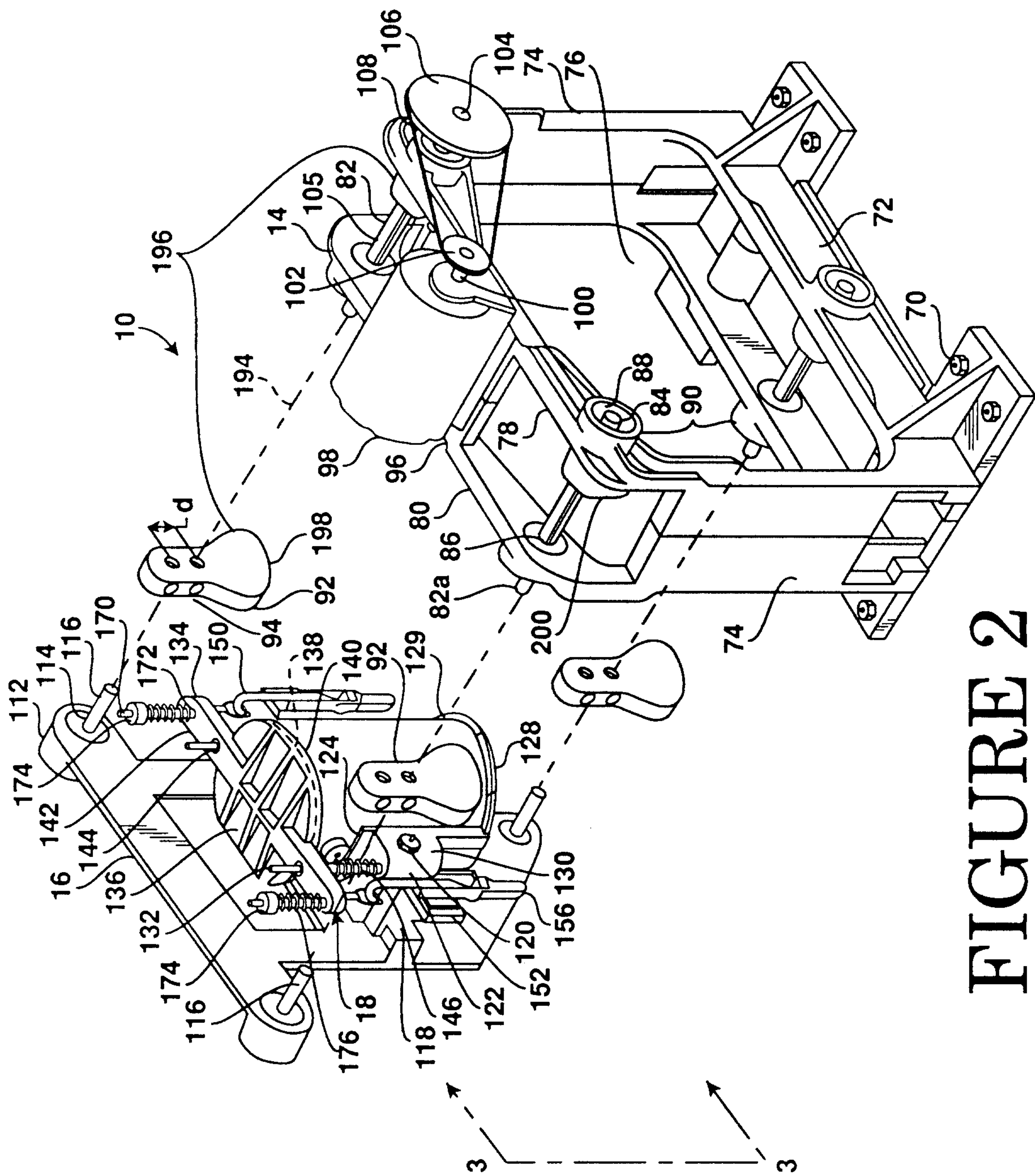


FIGURE 2

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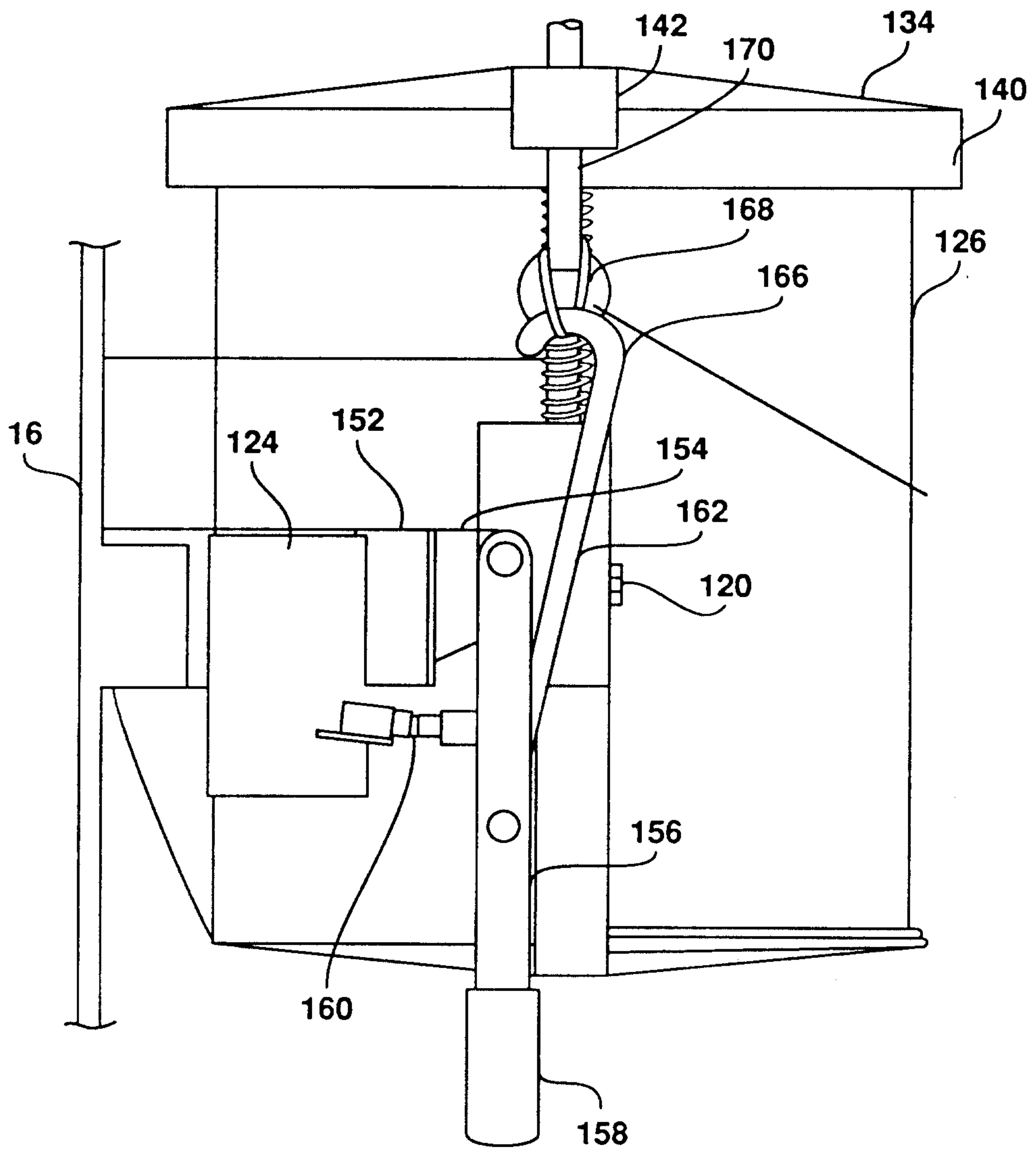


FIGURE 3

