Jan. 31, 1967 L. D. ORSER 3,301,534

PAINT SHAKER MACHINE

Filed March 22, 1965 3 Sheets-Sheet 1

Fig. 1

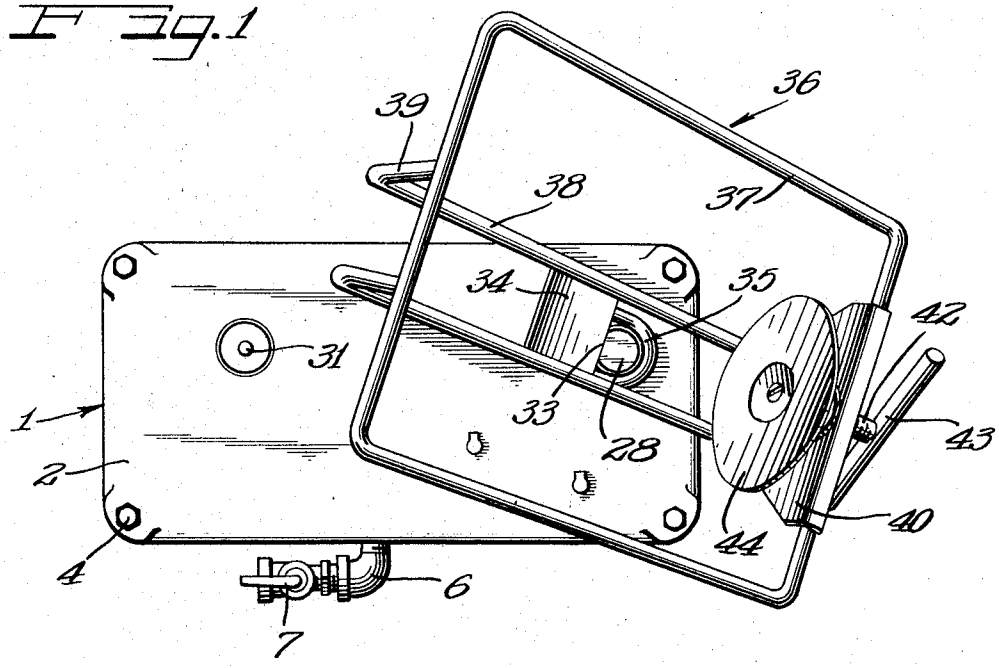
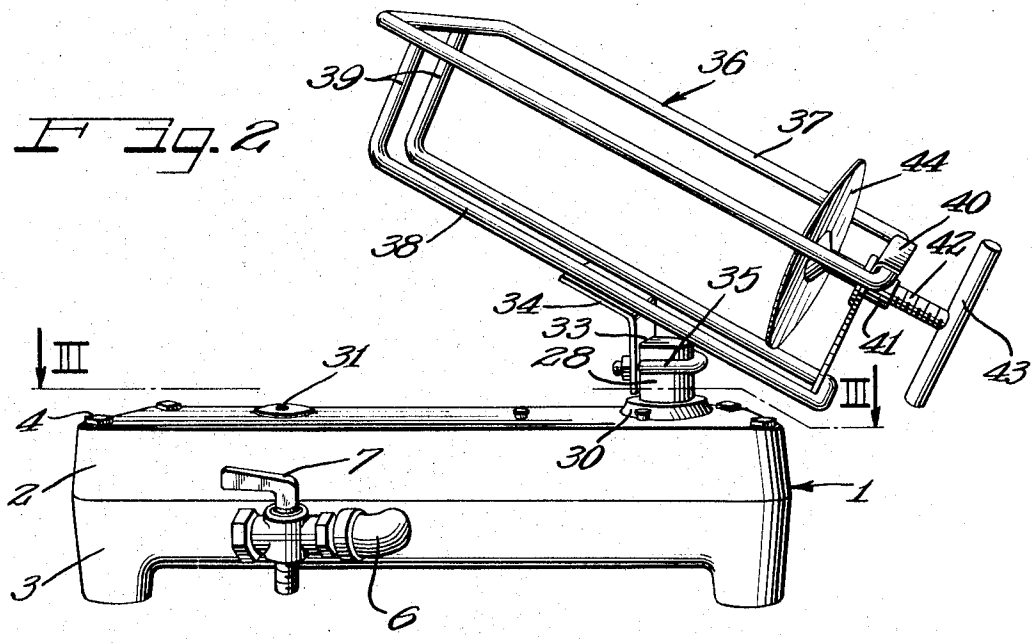



Fig. 2

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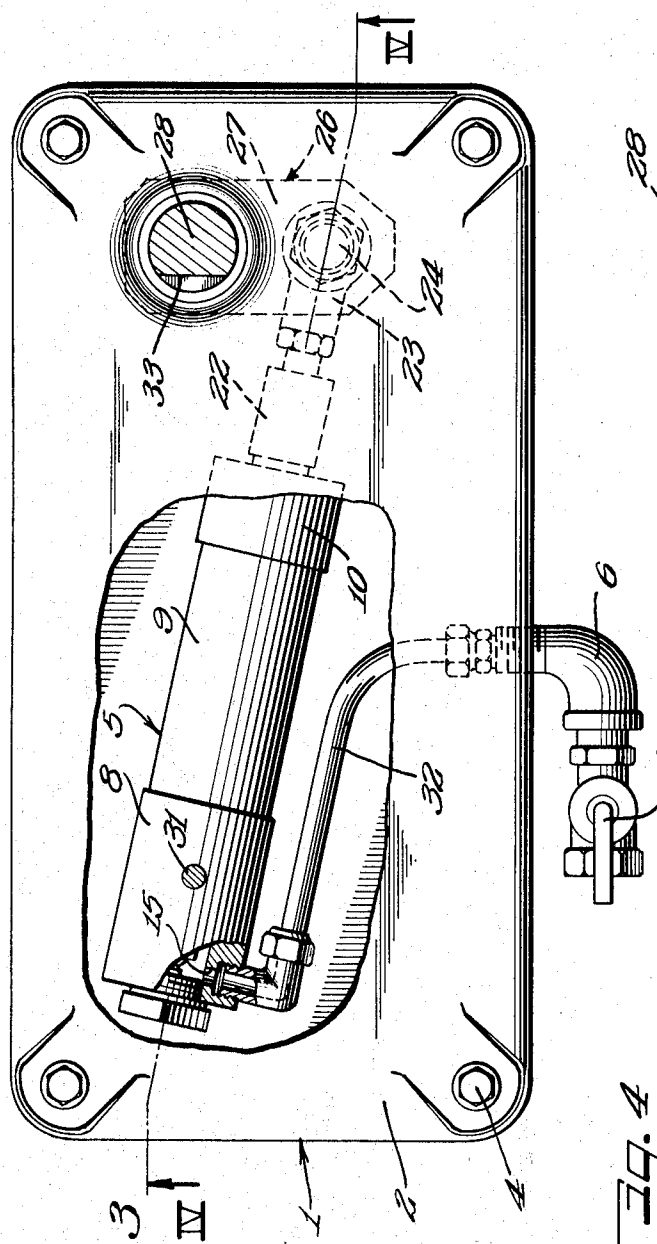


FIG. 3

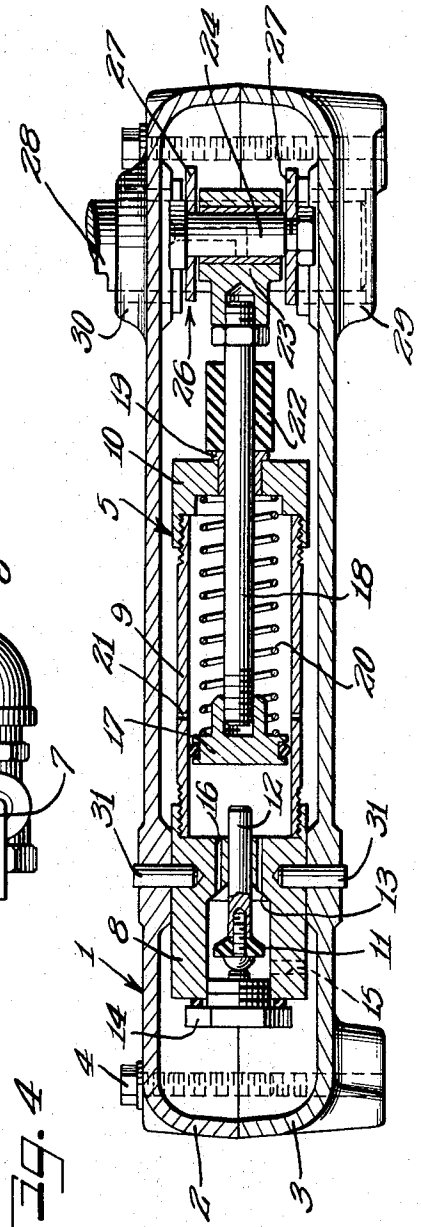


FIG. 4

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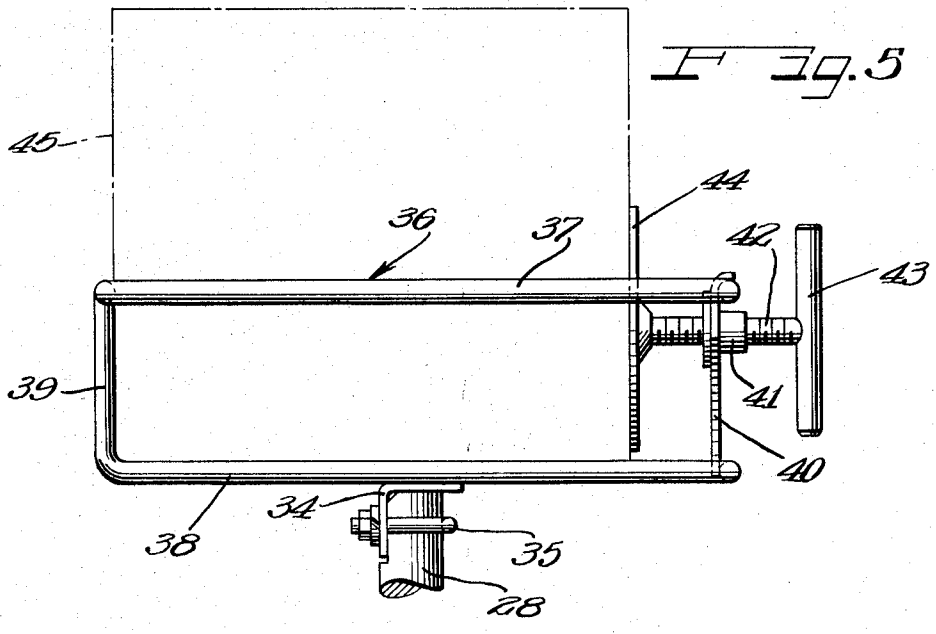
Fig. 5



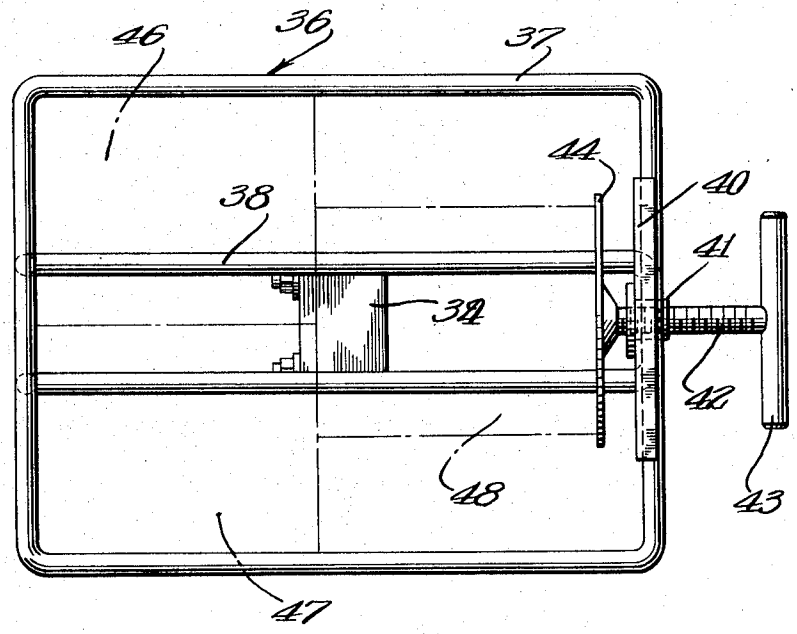




Fig. 6

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United States Patent Office

3,301,534
Patented Jan. 31, 1967



3,301,534

# PAINT SHAKER MACHINE

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Filed Mar. 22, 1965, Ser. No. 441,580
1 Claim. (Cl. 259—75)

This invention relates to improvements in a paint shaker machine, and more particularly to an economical form of device for thoroughly mixing paint while sealed in a can whereby the paint will have a uniform consistency throughout when the can is opened and the paint used, although the machine may have other uses and purposes as will be apparent to one skilled in the art.

In the past, various types of paint shaking machines have been developed but have proven objectionable mainly to their extremely high cost thus limiting their use to only the larger purveyors of paint, and prohibiting their use to the smaller paint distributors and retailers. Many of these formerly known machines were not manufactured to thoroughly shake smaller cans of paint. Also, most of these heretofore known machines had a complicated movement of the paint can in an endeavor to acquire thorough mixing of the paint and as a consequence the machines were cumbersome and involved numerous parts likely to become out of order. In other instances, formerly known paint shaking machines were dangerous in that they might create sparks in an explosive or inflammable atmosphere.

With the foregoing in mind, it is an important object of the instant invention to provide a paint shaking machine capable of handling even the smallest paint cans and which causes a thorough mixing of the contents of a can by a simple oscillatory motion.

Another important object of the instant invention is the provision of a simple form of paint shaker machine embodying an oscillatory rack disposed on the slant or inclined whereby when the rack is oscillated, the paint within the can will be sloshed against the ends of the can and thus insure paint of even consistency throughout the entire can.

It is also an object of this invention to provide a paint shaker machine which is equipped with and driven by an economic air motor, whereby there is no danger of spark production in a volatile and inflammable atmosphere.

It is also a desideratum of this invention to provide a paint shaker machine comprising relatively few parts with the actuating mechanism encased in the base of the machine and with a rack for cans projecting at an angle above the base.

The invention also contemplates the provision of a paint shaker machine highly desirable for any cans within the range of one-half pint to one gallon capacity and which is sufficiently economical for even the small retail paint store to use a machine to stimulate sales.

Still a further object of the invention is the provision of a paint shaker machine that is not only economical to produce but one that is extremely long lived and highly economical to operate, the machine operating quietly and efficiently and having a low compressed air consumption by virtue of its structure.

It will be understood that while the instant invention is shown and described herein in a small economical size for smaller cans of paint, it will be apparent to those skilled in the art that the machine may be made in larger sizes for handling five and ten gallon cans to be used in locations warranting such sizes. It will also be noted that the invention is not limited to the shaking and mixing of paint alone, but can be used for mixing other



and various liquids and solutions where thickening or settling is likely to occur in the bottom of the container. Obviously the invention, in its economical form, may readily be used by automotive repair and paint shops, fuel filling stations, and in numerous other locations where a supply of compressed air is normally present.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a top plan view of a paint shaker machine embodying principles of the instant invention;

FIGURE 2 is a side elevation of the structure of FIGURE 1;

FIGURE 3 is a plan sectional view taken substantially as indicated by the line III—III of FIGURE 2, looking in the direction of the arrows, and with parts broken away to disclose parts therebeneath certain of which are also shown in section;

FIGURE 4 is a fragmentary vertical sectional view taken substantially as indicated by the staggered section line IV—IV of FIGURE 3, parts being shown in elevation;

FIGURE 5 is a fragmentary side elevational view showing the positioning of a can of paint in the rack; and

FIGURE 6 is a fragmentary plan view illustrating the positioning of a single or a plurality of relatively small cans in the rack.

As shown on the drawings:

The illustrated embodiment of the instant invention includes a casing or housing generally indicated by numeral **1** which forms the base of the machine. This housing **1** may economically be manufactured from a pair of castings **2** and **3** held together by a plurality of through bolts **4** as best seen in FIGURE 4, or in any equivalent manner.

The drive means for the shaker machine are disposed within the base housing **1** and include an air motor generally indicated by numeral **5**. Compressed air is delivered to the motor through a fitting **6** secured in the side of the housing as best seen in FIGURE 2, and flow through the fitting is controlled by a valve **7** the body of which may be connected to any suitable source of compressed air.

The enclosure means for the motor include a valve housing **8** threaded or equivalently secured to a cylinder **9**, which is threadedly or equivalently secured to an end closure cap **10** passaged to permit the stroke of a piston rod therethrough, as best seen in FIGURE 4. The valve head **8** contains a valve **11** having an elongated stem **12** which may reciprocate through a suitable opening in the valve head adjacent which opening the valve head is provided with a seat **13** for the valve itself. The outer end of the valve head is closed by a removable plug **14** which not only seals the head against escape of air during operation, but also permits removal of the valve in case it should need attention. The valve head is also provided with a radial air inlet passage **15** as best seen in FIGURE 3, this passage **15** being shown in dotted lines out of its proper position in FIGURE 4 to best illustrate its point of entry into the valve head relatively to the valve **11**. Passage of air from the interior of the valve head to the cylinder **9** may be had in any well known manner, such as by a fluted valve stem, or, as illustrated, by a plurality of passages **16** through the inner wall of the valve head outside the passage for the valve stem, five or six such passages **16** being satisfactory in most cases.

Within the cylinder **9** is a reciprocatory piston **17**, provided with an elongated piston stem **18** which reciprocates within a suitable bearing **19** set in a central aperture in

the end cap 10. The piston is resiliently biased toward the valve stem 12 by means of a spring disposed around the piston rod 18 and bearing against the end cap 10 at one end and against the piston itself at the other end, as clearly seen in FIGURE 4. At a predetermined location, depending upon the length of stroke desired, the cylinder 9 is provided with a plurality of radially extending air outlet openings 21 through the wall of the cylinder, five or six such openings being satisfactory in most cases. On the portion of the piston rod extending outside the end cap 10 is a shock absorber 22 secured to the piston rod and made of rubber or equivalently resilient material.

Rigidly secured to the projecting end of the piston rod 18 is a connector 23 which embraces the smooth shank of an upstanding bolt 24, suitable bearing means being provided. This bolt forms the end portion of a crank, generally indicated by numeral 26 and comprising upper and lower like plates 27—27 through which the bolt 24 passes, and the connector 23 engaging the bolt between the plates which are maintained in spaced relationship. At the other ends thereof these plates are rigidly secured to an upstanding oscillatory shaft 28 journalled at its lower end in an underslung bearing housing 29 and at its upper end in a boss 30, the shaft projecting through the boss which may be an integral part of the upper base housing section 2. It will be noted from the showing in FIGURE 3 that the air motor 5 is positioned at an angle to the longitudinal axis of the base housing 1. This arrangement permits the use of a simple connector 23 rather than a more expensive doubly pivoted connecting rod as is usual in such cases, because there need only be a straight stroke for both the piston rod and connector in order to oscillate the crank 26. The air motor is maintained in position by means of the connection between the connector 23 and the bolt 24, and also by virtue of the fact that the valve head 8 is pinned to the base housing 1 as indicated at 31—31. Air is supplied to the motor from the air intake fitting 6 by any suitable form of air line 32 which connects directly with the inlet passage 15 in the valve head 8, as seen clearly in FIGURE 3.

In operation, the air motor is extremely simple and economical. When compressed air enters the inlet 15 it forces the valve 11 to the right as seen in FIGURE 4, but before the valve reaches the seat 13, compressed air is passed through the openings 16 into the cylinder moving the piston to the right as seen in this figure against the action of the spring 20. The piston is thus moved turning the crank 26 a partial revolution counterclockwise, until the piston passes cylinder openings 21 and the air is released, the valve having closed in the meantime against the seat 13, overlying the ports 16 and shutting off the supply of air to the cylinder. As soon as the pressure of the air is lost through the lateral openings 21, the spring 20 returns the piston to the left as seen in FIGURE 4, the piston head striking the valve stem and again opening the valve to approximately the position seen in FIGURE 4. On this return stroke, the crank 26 is oscillated clockwise along with the shaft 28. As soon as the valve is opened by the return of stroke of the piston, the operation is immediately repeated. The forward stroke of the piston is cushioned against shock by the action of spring 20 and loss of compressed air through the openings or ports 21, and the return stroke of the piston is cushioned against shock by the shock absorber 22 abutting the bearing 19.

The motor operates over a range of approximately 40 to 85 pounds air pressure, and partial power input may be controlled by the degree to which the valve 7 connected to the intake fitting 6 may be opened. Due to the short stroke of the piston that is necessary to effectively and rapidly oscillate the crank 26 and the shaft 28 there is extremely low air consumption adding to the economy of operation. It should also be noted that the use of an air motor in a machine of this character effectively eliminates the danger of fire or explosion in



volatile atmosphere locations because there is no danger of sparking.

Should it be desired to have a machine of increased capacity capable of handling five gallon paint cans or even larger cans of paint, it would be a simple expedient to increase the size of the base housing 1 and parallel two or more of the air motors 5, increasing the length of the crank 26 accordingly, and accordingly adjusting the lengths of stroke for the respective motors.

That portion of the oscillatory shaft 28 projecting above the base housing 1 is shaped to provide a flat vertical land 33 on the side thereof toward the air motor. This land provides a base for the flat face of an angle bracket 34, best seen in FIGURES 1 and 2, the bracket being retained in tight association with the shaft 28 by means of a U-clamp 35.

The other leg of the angle bracket 34 is welded or equivalently secured to an under portion of a container rack generally indicated by numeral 36. The interior angle of the bracket 34 is preferably in the neighborhood of 120° so that the rack 36 will be disposed at approximately a 30° angle to the horizontal, as seen in FIGURE 2. Inclining the rack in this manner insures the contents of a can sloshing over both ends of the can, whereby thorough mixing of the contents results without the need of any complicated motion, simply an ordinary oscillation of the shaft 28 and the rack.

The rack may be simply constructed of two wires, one wire 37 being bent in the form of a rectangle, and the other wire 38 being bent in the form of a U with parallel legs, the legs being upturned at one end, as seen at 39, and welded or equivalently secured to the wire 37. The legs of the U-shaped wire 38 form the bottom of the rack and are welded to the upper portion of the bracket 34. It will be noted that the rack extends over the base housing 1 so that the can or cans will be supported over the housing, and the entire machine is much more stable particularly when in operation.

The outer end of the rack is provided with a plate 40 welded or equivalently secured to the wire 38 and also to the wire 37 at the top so as to make a complete rigid structure of the rack. The plate 40 is provided with a nut 41 extending therethrough threaded to accommodate an elongated bolt 42 having a hand grip 43 on the outer end thereof by means of which the bolt may be adjusted as to position. The inner end of the bolt carries a disc 44 which is connected to the bolt by a loose fit so that the disc may properly locate itself when forced against a can by the actuation of the bolt 42.

In FIGURES 5 and 6, I have diagrammatically illustrated the positioning of cans in the rack 36. In FIGURE 5, a can 45 shown in dotted lines is the full capacity of the rack, this can being the largest for the particular size of machine. The can is merely placed in the rack, and the bolt 42 moved to clamp the disc 44 against one end of the can. This will tightly hold the can in position on the rack against dislodgment, the spaced legs of the wire 38 forming the bottom of the rack aiding in stabilizing the can. If the can is one with a snap-out lid, the disc 44 presses against the lid to maintain the same tightly closed.

When it is desired to shake a smaller size can, an arrangement such as illustrated in FIGURE 6 may be employed. In this instance, a pair of fillers 46 and 47 may be placed in the rack, and these can either be empty cans, full cans, or spacer blocks. The particular can 48 to be shaken, in the event it is the only one is positioned against the ends of the members 46 and 47 and with the disc 44 abutting it directly. Thus, the can 48 may be held positively in position while it is shaken, or a plurality of the same size cans may be shaken at one time. Numerous arrangements will be readily apparent to one skilled in the art for firmly positioning cans of any size up to the capacity of the rack.

In operation, the instant invention is extremely simple and positive. A can or cans may be placed in the rack

in the manner above described and clamped firmly in position. The valve **7** may then be utilized to energize the air motor and the degree of opening of this valve provides a partial power input control. The motor operates in the manner previously described to oscillate the shaft **28**, the rack **36** and its contents. The shaking may be had at relatively high speed to insure a thorough mixing of the contents of a can. This thorough mixing is further insured by the fact that the can is on an inclination to the horizontal which insures mixing of any sediment at either end of the can. It should also be noted that merely an ordinary oscillatory movement is all that is necessary to insure thorough mixing of the contents of the can.

The instant machine is economical in construction, highly durable, requires a minimum of space, may be disposed anywhere desired near a source of air pressure and readily picked up and moved to a different location whenever desired. The positioning of the can over the base of the machine insures stability so that the machine will not tend to be overbalanced, nor will it "walk" during operation. Tests have established that paint, for example, mixed in a can upon the instant machine will remain in a thoroughly mixed condition ready for use for a number of hours following the shaking operation.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

In a container shaker machine:

a base housing,



a vertical shaft projecting out of said housing and extending thereabove,

a crank in said housing with one end secured to said shaft,

an air motor in said housing disposed obliquely with respect to the axis of said housing,

a reciprocatory piston in said motor,

a rigid piston rod extending from said piston,

a connector rigidly connected to said piston rod and pivotally connected to the other end of said crank to regularly oscillate the crank and said shaft,

said shaft having a flat land at the upper end thereof,

an angle bracket with an included angle exceeding 90° having one leg thereof securely connected to said shaft at said flat land, and

a container rack secured to the other leg of said bracket and extending over said housing thereabove at an angle to the horizontal,

whereby a simple regular oscillation results in thorough uniform mixing of the contents of a container in said rack.

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