April 8, 1930. M. A. HARRIS 1,753,412

ELECTRIC PACKER

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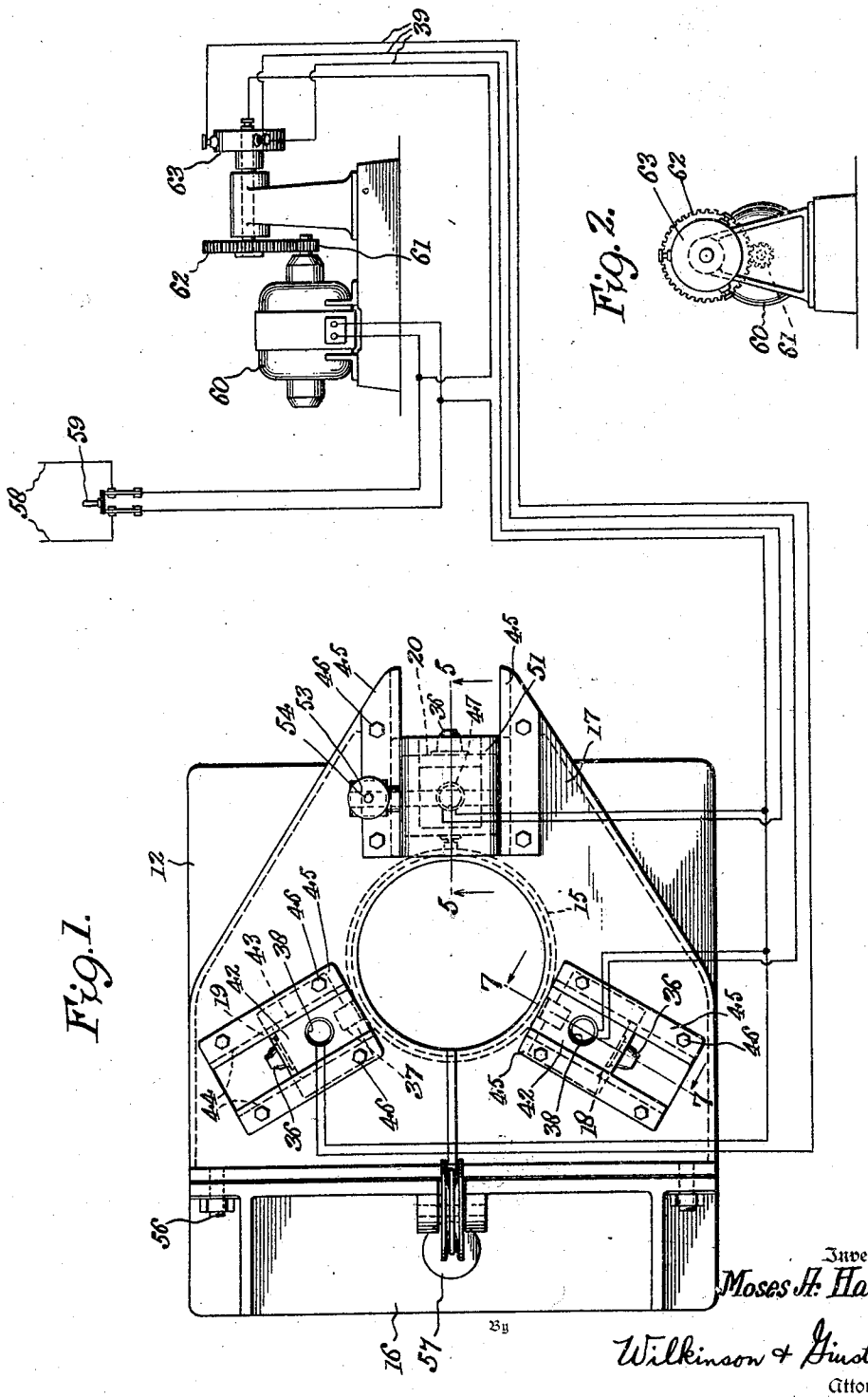

Fig. 1.

Fig. 2.

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Fig. 3.

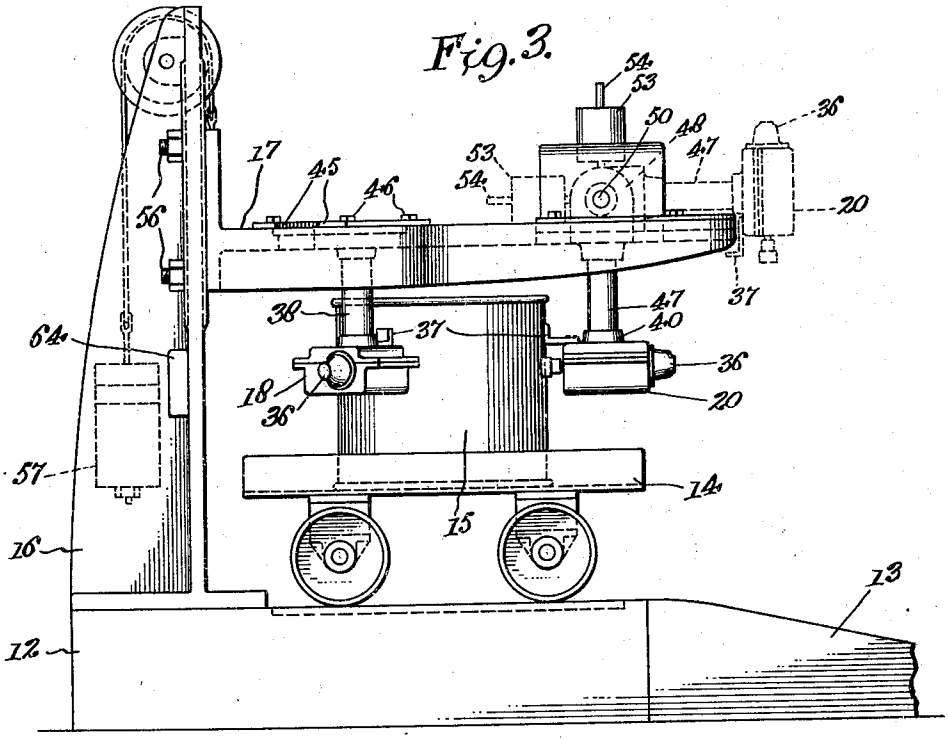

Fig. 4.

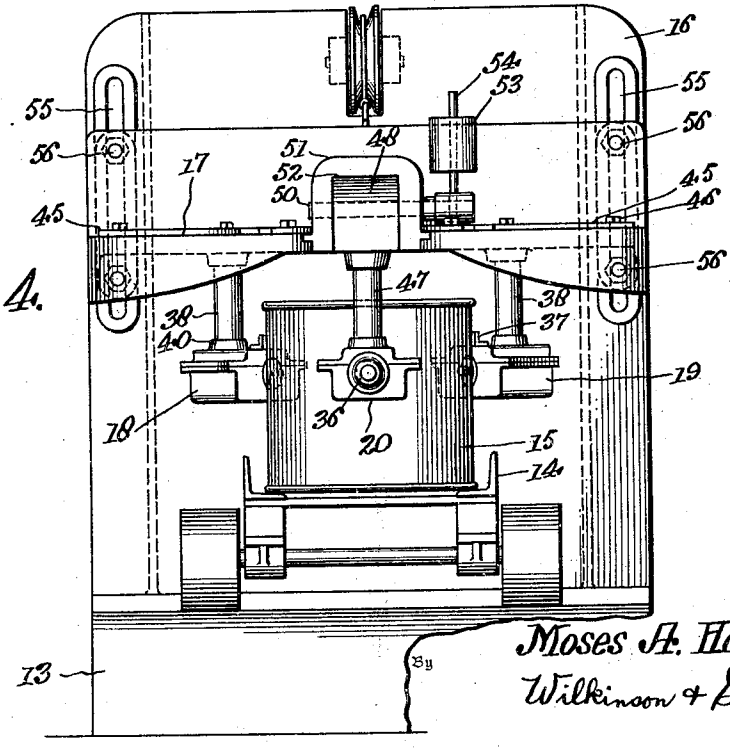

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Fig. 5.

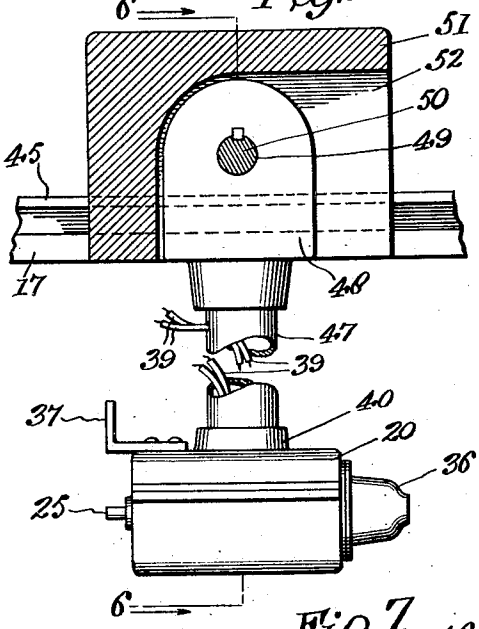


Fig. 6.

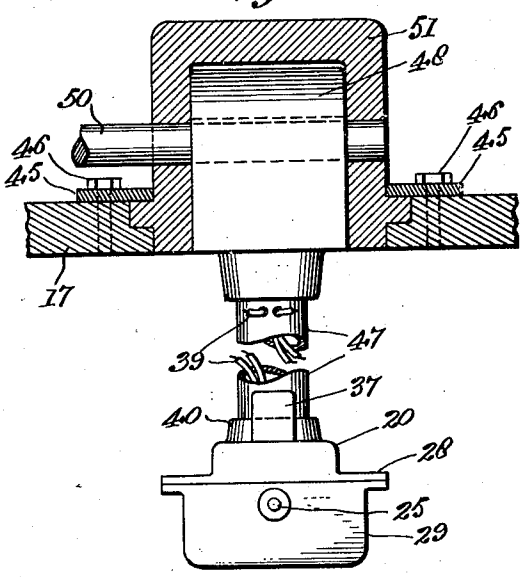


Fig. 7.

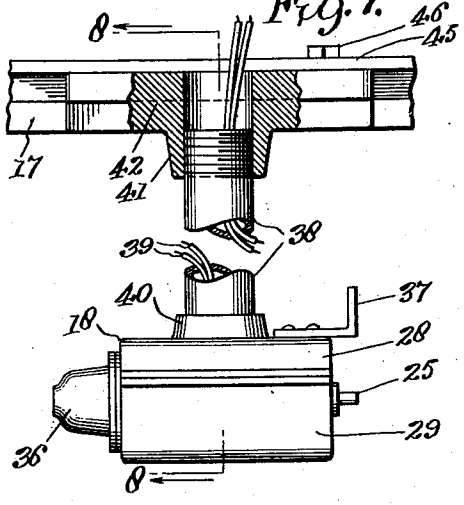


Fig. 8.

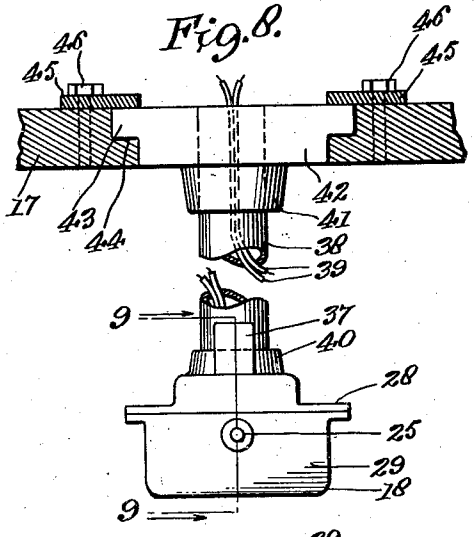


Fig. 9.

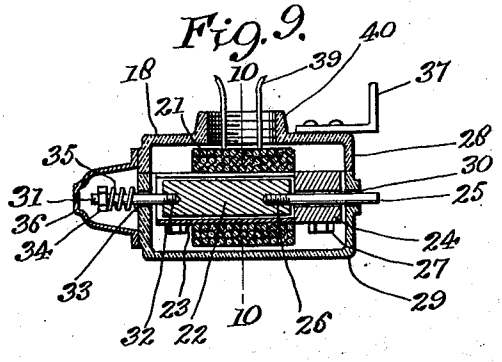
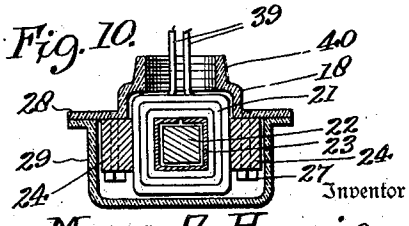


Fig. 10.



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UNITED STATES PATENT OFFICE

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ELECTRIC PACKER

Application filed June 20, 1929. Serial No. 372,388.

The present invention relates to improvements in electric packers, and has for an object to properly pack into cans or other containers such substances as flour, litharge and similar substances.

Another object of the invention resides in providing a jarring apparatus of improved form, which will permit the use of the present scale and filling platforms without any modification therein, but which will act as an accessory to such standard existing constructions and will operate upon the side walls of the cans to subject the contents of the can to a constant vibratory motion, such as will shake down and compact the contents during the act of filling the cans.

A further object of the invention lies in providing an improved packer in which a number of electric or solenoid vibrators are disposed at intervals circularly about the side wall of the can and are so controlled as to be actuated in sequence, whereby to provide a vibratory action which progresses about the can from one vibration unit to the next in a continuous circular series producing a screw effect in reducing the contents of the containers in a most compact form.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a top plan view of the improved electric packer and one form of electric installation which might be used in connection therewith.

Figure 2 is an end view of the motor and commutator unit as seen from the right in Figure 1.

Figure 3 is a side elevation of the improved packer showing one of the vibrator units in a raised position in dotted lines.

Figure 4 is a front elevation with parts broken away.

Figure 5 is an enlarged vertical section taken on the line 5—5 in Figure 1 and showing the swinging vibrator unit.

Figure 6 is a section taken on the line 6—6 in Figure 5.

Figure 7 is a vertical section taken on the line 7—7 in Figure 1.

Figure 8 is also a vertical section taken on the line 8—8 in Figure 7.

Figure 9 is a longitudinal section taken through one of the vibrator units along the line 9—9 in Figure 8, and

Figure 10 is a transverse section taken on the line 10—10 in Figure 9.

Referring more particularly to the drawings 12 designates the usual form of scale apparatus having a ramp 13 up and down which the trucks 14 carrying the cans 15 are moved.

The filling apparatus for loading the material into the cans is disposed above the apparatus shown in the drawings, but it is not illustrated as it forms no portion of the present invention. The improved apparatus is adapted to subject the cans 15 to the circulatory vibrating action heretofore referred to as they repose upon the trucks 14, and as the material is being loaded into the cans from above.

A frame 16 is provided on the scale apparatus 12 or upon any other appropriate support and this frame carries a head plate 17 from which three vibrator units 18, 19 and 20 are suspended and disposed at equal intervals about the circular circumference of the can 15. Of course, a greater or less number of vibrators might be provided, but I find three such vibrator units to be a convenient arrangement and best adapted to receive cans or varying diameters.

All three vibrators are intended to be adjustably mounted so that they may be shifted on radial lines toward and from the center of the cans, whereby to be moved into operative position on small and large cans. The vibrator unit 20 is adapted to be swung up to the dotted line position shown in Figure 3 in order to permit the truck with the cans thereon to move into and out of position upon the scale platforms.

Each vibrator unit, as shown more particularly in Figures 7 to 10 inclusive, includes a solenoid winding 21 through which

reciprocates a soft iron or other solenoid core 22. This core is preferably square in cross section to avoid its rotation in the winding and between the winding and core is preferably interposed a brass tube 23 which extends beyond the left end of the winding 21, as shown in Figure 9, but preferably terminates at the opposite end of the winding, bearing against the iron field 24, which surrounds the coil winding and through which the reciprocating plunger passes. The reciprocating plunger rod 25 is screw threaded or otherwise removably coupled to the core 22, as indicated at 26. The iron field 24 is secured as by the bolts 27 to the cover 28 of the casing 29 in which the various parts of the vibrator assembly are housed and protected; it being understood that such casing at one end is provided with the opening 30 through which the vibrator plunger rod 25 projects.

The other end of the movable core 22 removably receives a pin 31 as by the screw threaded connection 32. This pin projects slidably out through a perforation 33 and the other end wall of the casing 29 and is threaded on its outer end to receive a nut 34 by which the tension on a coil spring 35 may be adjusted. This coil spring 35 is wound about the pin 31 and it abuts at one end against the nut 34 and at its other end against the casing 29. The coil spring 35 has the effect to shift the core 22 to the left, viewing the device from the standpoint of Figure 9, and to yieldably hold it in this position. When the winding 21 is energized, the core 22 will be shifted in the opposite direction and the coil spring 35 will be compressed whereby on subsequent interruption of the circuit through the winding 21, such compressed coil spring 35 will expand and draw the core 22 back to its initial position. A cap 36 is fitted over the end wall of the casing 29 through which the pin 31 projects in order to protect the pin and spring from dust and from other foreign matter and to generally protect the same. A centering gage 37 is carried upon each vibrator unit. As shown this gage is in the form of an angle iron or heel riveted or otherwise affixed to the cover 28 of the casing, and it projects out in position to engage the can 15, as shown in Figure 3, whereby to locate the vibrator units relatively to the can to enable the vibrating plunger 25 to have a proper and maximum effect.

The vibrator units 18 and 19 are carried by hollow posts 38 through which the wires of conductors 38 extend to the energizing windings. The lower ends of the hollow posts 38 may be received in bosses 40 extending up from the cover plates 28 of the vibrator units. The upper ends of the posts 38 may be screw threaded into the downwardly extending bosses 41 which are carried by the sliding blocks 42. These blocks are provided with overhanging flanges 43 seated slidably upon the shoulders 44 formed in the head plate 17. The head plate is provided with slots to receive the blocks 42 and the shoulders provide guideways, whereby the blocks 42 may be moved toward and from the cans. The guideways are so arranged that the block and the vibrator units carried thereby are shifted on radial lines passing through the center of the can.

Clamp plates 45 are carried by the head plate 17 and they overlap the blocks 42 and are adapted to bind the same in position when the bolts or other fastenings 46 are tightened.

The vibrator unit 20 shown in Figures 5 and 6 is the same as its companions 18 and 19 except it is swingably supported. It is, therefore, mounted upon a post 47 having a head 48 provided with a transverse opening 49 to receive a shaft or pin 50.

The head 48 is made fast to the shaft 50 and the shaft 50 is mounted in a hood 51 having a slot 52 through its bottom and one side for permitting of the swinging movement of the head. As shown more particularly in Figures 3 and 4 a counter weight 53 is provided to balance the vibrator unit 20. This counter weight is adjustably mounted on an arm 54, which is affixed to the shaft 50.

As shown in Figure 4, the frame 16 is provided with vertically elongated slots 55 for receiving the bolts or other fastenings 56, which support the head plate 17, whereby such head plate may be adjusted up and down with reference to the height of the cans.

A counter-balancing weight 57 is provided for the head plate 17 as shown in Figure 3, whereby such head plate may be shifted up and down with comparative ease.

Referring more particularly to Figure 1, the house current or any other appropriate electrical supply is indicated at 58 and a main switch at 59. In this way current is supplied to the motor 60, through which the pinion 61 and gear wheel 62 drives the commutator 63 at high speed. The commutator 63 is connected to the wires 39 which lead to the various solenoid windings.

As shown in Figure 3, the distributor box is preferably elongated as indicated at 64 in Figure 3, and contains the motor and the commutator and the main switch. Of course, other disposition might be made of these parts.

In the operation of the device, the commutator is shown in Figure 2 to have three contacts which, of course, correspond to the solenoid windings 21 of the three vibrator units 18, 19 and 20. As the traveling contact arm in the commutator makes contact with the fixed contact in the shell, the circuit will be closed through the commutator windings 21. This will obviously take place in sequence

about the circumference of the can 15. In other words the three vibrator units 18, 19 and 20 will not be actuated simultaneously but rather in a progressive sequence running around the cans. At each actuation thereof, the plunger rod 25 will move through a very short distance but sufficient to strike the can a sharp blow causing the vibration of the can and its contents. Particularly the circuit will be interrupted and the coil spring 35 will restore the plunger rod to initial position in readiness for the next actuation. Preferably the arrangement will be such that each vibrator will impart to the can 600 impulses per minute. In other words the three vibrators will subject the cans to a total of 1800 impulses per minute. These impulses will circulate progressively about the can and will have a screw effect tending to pack the contents very tightly in the cans.

Both the installation and operating costs of this machine will be lower than is possible with systems now in use.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:—

1. In an electric packer, a plurality of vibrators extending in a circle at spaced intervals about the device to be packed and positioned to strike the sides of the device, and means for energizing said vibrators in circular sequence.

2. In an electric packer, a plurality of vibrators disposed circumferentially and at spaced intervals about the sides of the device to be packed and positioned to strike the sides of the device, and means for actuating said devices in a progressive sequence running around the device.

3. In an electric packer, a plurality of vibrators extending about the sides of a device to be packed, and means for supporting one of the devices to be swung up to admit the device between the vibrators and to remove same.

4. In an electric packer, a frame, a head plate thereon, a plurality of radially adjustable vibrators carried by said head plate, and means whereby one of said vibrators may be swingably supported.

5. In an electric packer, a frame, a counter balanced and vertically adjustable head plate on said frame, radially adjustable vibrators carried by said head plate, means whereby one of the vibrators is swingingly supported, and means for energizing said vibrators in sequence.

6. In an electric packer, in combination with a scale apparatus, a can to be weighed and filled on said scale, a plurality of electric vibrators extending about and in operative engagement to strike the sides of said can, and means to actuate said vibrators in a progressive sequence running around said can.

7. In an electric packer, the combination with a scale apparatus, and a can to be weighed and filled on said scale apparatus, a plurality of circularly arranged vibrators extending about the sides of said can, centering gages on said vibrators for resting against the sides of the can, plungers on the vibrators for striking the side of said can, and means for energizing said vibrators in a progressive series running around said can.

8. In an electric packer, the combination with a scale apparatus, a can adapted to be filled and weighed on said scale apparatus, a frame, a head plate extending above the can and the scale apparatus, blocks radially adjustable in said head plate, means to hold the blocks in adjusted position, vibrators depending from said blocks, one of said vibrators being swingingly supported in its block, centering gages carried by said vibrators for coming in contact with the sides of the can, and a commutator arrangement for energizing said vibrators in a sequence progressing about the side wall of the can.

9. In an electric packer, a can supporting device, a plurality of vibrators extending about the side walls of the can, plunger rods projecting from said vibrators, solenoid cores connected to said plunger rods, winding extending about said cores, a guide for said plunger rod, yieldable means to restore the cores to initial position, and a commutator arrangement for energizing said coils in sequence about the can.

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