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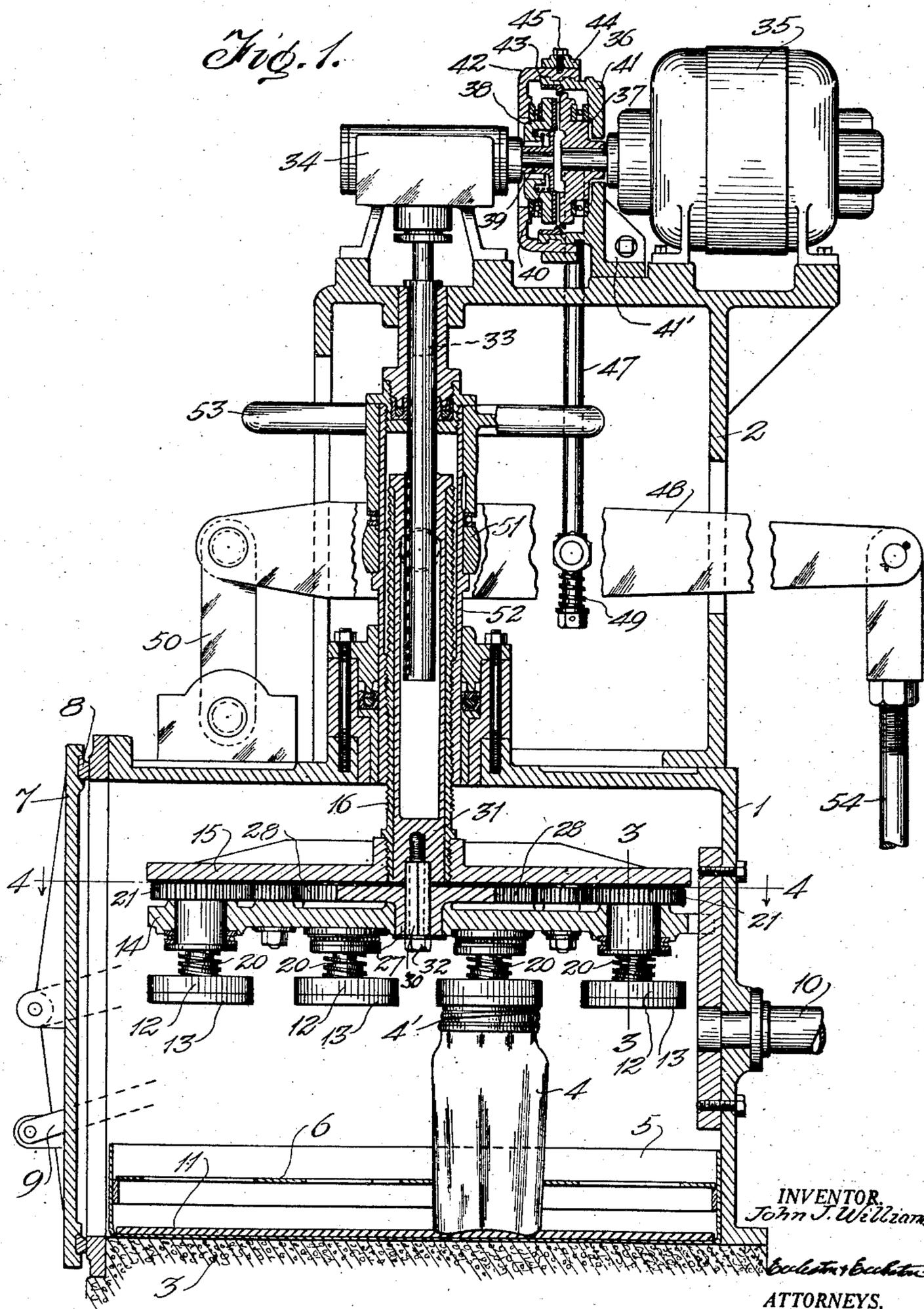
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VACUUM SEALER FOR SCREW CAP CONTAINERS

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3 Sheets-Sheet 1

Fig. 1.



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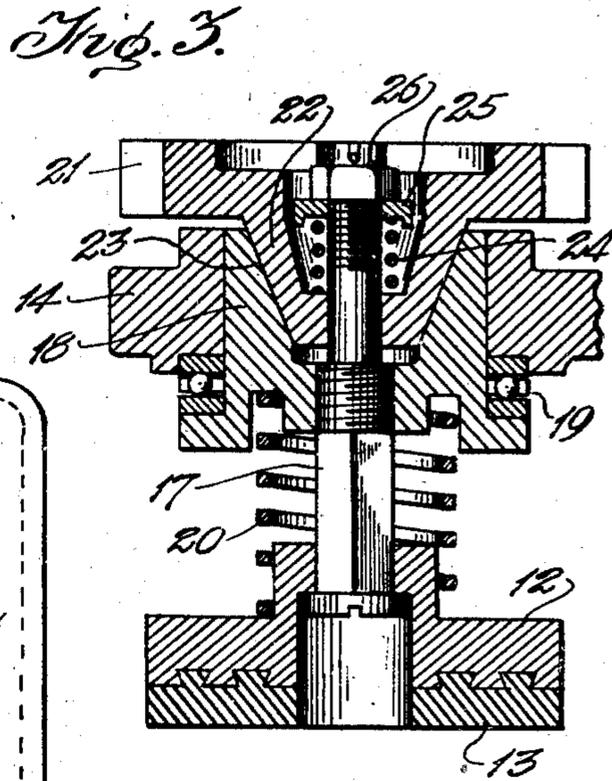
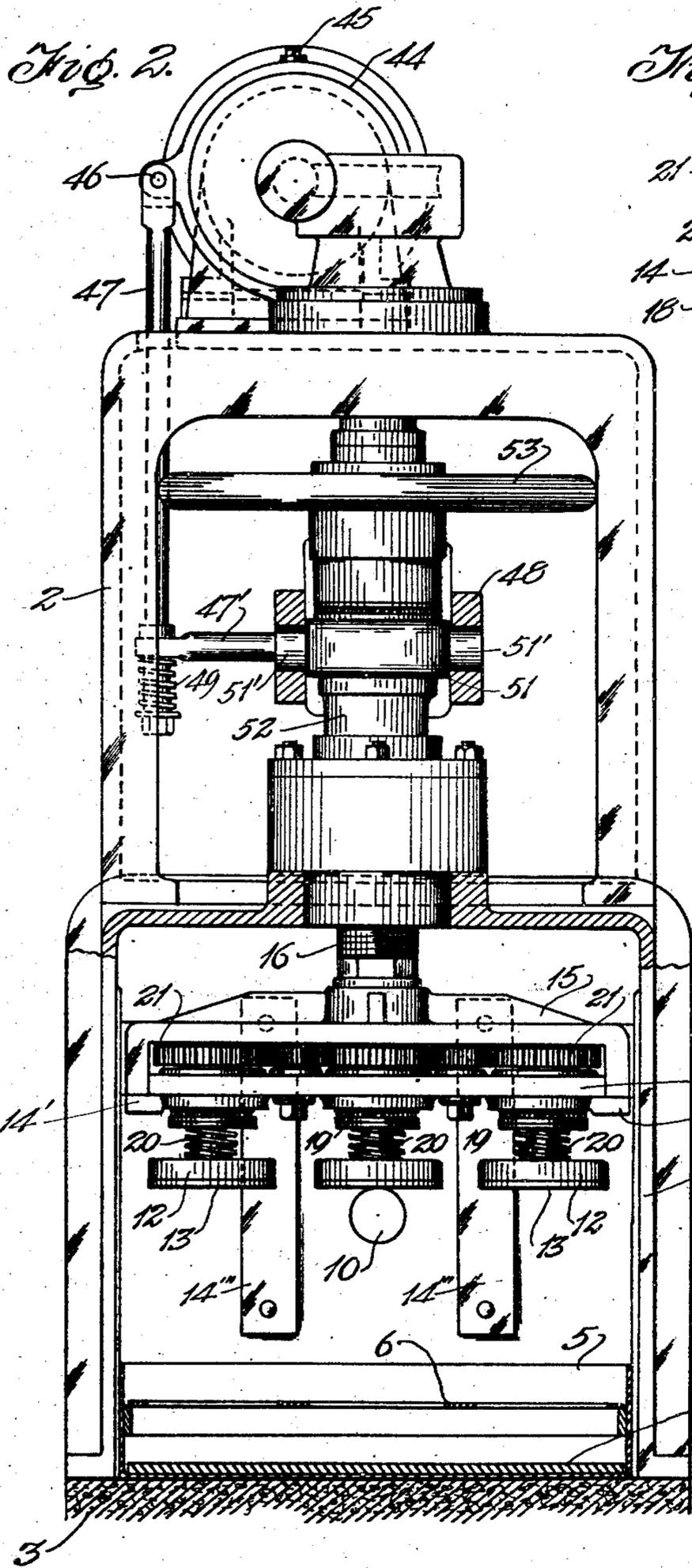
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VACUUM SEALER FOR SCREW CAP CONTAINERS

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3 Sheets-Sheet 2



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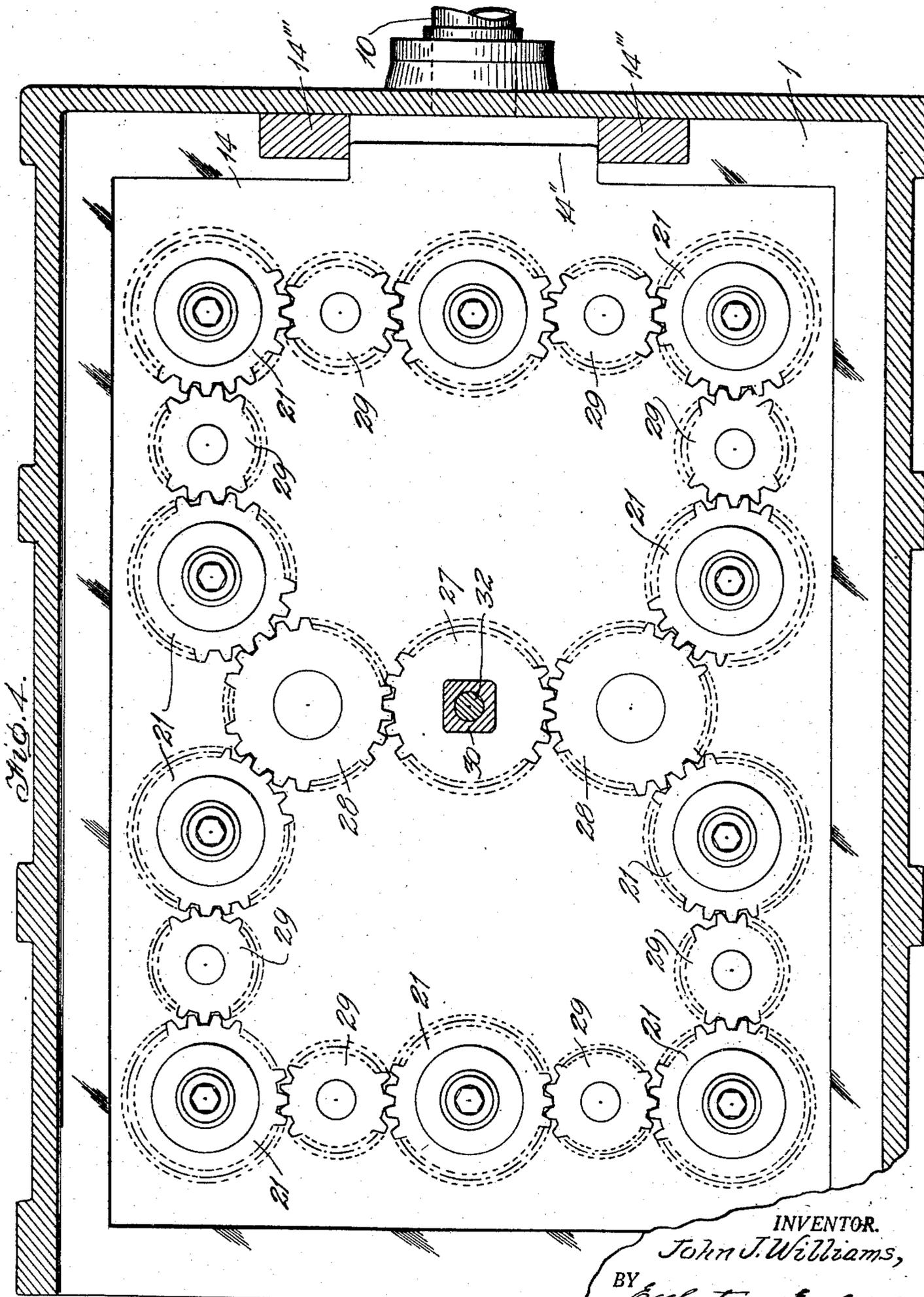
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VACUUM SEALER FOR SCREW CAP CONTAINERS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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VACUUM SEALER FOR SCREW CAP CONTAINERS

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The present invention relates to vacuum sealers and has for its primary object to provide a construction by means of which a plurality of containers may be simultaneously exhausted of air, and by which screw caps may then be simultaneously threaded onto the respective containers.

A further object of the invention resides in the provision of a sealer of the character indicated, which is adjustable to accommodate containers of various heights and diameters, and which may also be readily adjusted to vary the amount of force with which the screw caps are rotated to sealing position.

Another object of the invention consists in the construction of a vacuum sealer, for screw cap containers, which is not only strong and durable in operation but also is entirely automatic except the steps of placing the containers in the vacuum compartment and closing the door.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which

Figure 1 is a vertical sectional view of the apparatus.

Figure 2 is a vertical sectional view taken on a plane at an angle of 90° to that of Figure 1; parts being shown in elevation.

Figure 3 is a vertical sectional view through one of the sealing heads taken on line 3—3 of Figure 1; and

Figure 4 is a horizontal sectional view taken on line 4—4 of Figure 1, and looking in the direction of the arrows.

The apparatus, which comprises essentially a vacuum chamber 1 and a frame or superstructure 2, will preferably be mounted on a base or pedestal 3 in convenient reach of the operator whose duty it is to charge the chamber 1 with the containers 4 to be sealed.

In the present embodiment of the invention the apparatus is intended to vacuumize and seal ten containers 4, of the screw cap type, at each cycle of operation, and to this end a tray 5 is provided in which a removable spacer 6 is mounted for the purpose of centering each of the containers under its respective sealing head to be later described. A

door 7 having a suitable sealing gasket 8 serves to permit the entrance and withdrawal of tray 5, and is connected up with the air pump (not shown) by means of lever 9, so as to start the exhausting of air from chamber 1 through pipe 10 immediately upon the closing of the door 7.

In order to retain the containers 4 against movement during the operation of rotating the screw caps into sealing position, each of the trays 5 is provided with a mat 11 of rubber or the like, on which the containers rest and which serves to frictionally hold them against rotation. Likewise, each of the individual sealing heads 12 is provided with a friction pad 13 for gripping the screw caps 4' when the latter are to be rotated into sealing position as hereafter described.

The sealing heads 12 are rotatably mounted on a main head 14 which is fixedly secured at 14' to a vertically adjustable frame 15 threaded to a sleeve 16. In order to prevent any rotative movement of the head 14 it is desirable to provide a sliding connection between it and the wall of chamber 1. To this end the head is provided with a tongue 14'' which projects between the abutments 14''' fastened to the interior of the chamber wall. The heads 12, as more clearly indicated in Figure 3, are connected with their driving sleeves 18 by pins 17 screwed securely into the sleeves and the pins are provided with squared lower ends on which are mounted the heads 12. The sleeves are provided with ball races 19 to reduce friction between the parts during the sealing operation. A coil spring 20 surrounds each of the pins 17 and has its ends in contact with the sleeve 18 and head 12, thereby normally and resiliently holding the head in its lowermost position. Rotative movement is imparted to each head 12 by means of a driving gear 21, and this gear is provided with a cone portion 22 which is received in a complementary seat 23 in the sleeve 18, so as to provide a friction clutch between these elements. Pin 17 extends upwardly through the cone 22, and the frictional contact between the elements 22 and 23 is increased by means of a coil spring 24 which surrounds

the upper end of pin 17 and has its respective ends in contact with cone 22 and a washer 25 mounted on the pin and held in position by nut 26. The compression on spring 24 and hence the degree of friction in the clutch members 22—23 may be varied by adjustment of the nut 26 in the proper direction.

The driving gears 21 and their frictionally associated heads 12 are intermittently rotated by means of a master gear 27 and intermediate gears 28 and 29 so that all of the heads will be rotated in the same direction. Gear 27 is mounted on a squared sleeve 30 which is fixed to a driving shaft 31 by means of a screw bolt 32. This shaft 31 passes upwardly into the interior of the hollow exteriorly threaded sleeve 16 and is splined to a shaft 33 which is operated through reduction gearing 34 by motor 35. The shafts of the motor 35 and the reduction gearing 34 are releasably connected by means of a clutch mechanism 36 which will now be briefly described.

Keyed to the motor shaft is a disc 37 which is adapted to cooperate with a disc 38 associated with the shaft of the reducing gear. This latter disc is keyed for sliding movement on a sleeve 39 which is itself keyed to the shaft of the reducing gear. Coil spring 40 surrounds sleeve 39 and has its ends seated respectively on an end of said sleeve and on the disc 38 so as to normally hold the disc 38 spaced from its cooperating disc 37 on the motor shaft. The casing for the clutch comprises a section 41 which is provided with a bracket portion 41' bolted to the frame 2 and a section 42 which is threaded to part 41 as indicated at 43. The casing section 42 is in engagement with the disc 38 and when rotated on the threads 43 will project the disc into frictional engagement with the disc 37 against the pressure of the spring 40. Ball bearing races are provided, as indicated. Rotative movement may be imparted to section 42 by means of a ring 44 which is adjustably fixed to this section by a screw 45 adapted to seat in any one of a series of depressions formed in the periphery of the ring.

It is desirable, of course, that the clutch 36 be automatically operated and to this end the ring 44 has pivotally connected thereto at 46, an arm 47 which is in turn connected to a lever 48 which raises and lowers the sealing head. A spring 49 preferably encircles the lower end of rod or arm 47 and has its ends abutting a collar on the rod and a stud 47' by which the rod is connected to lever 48. By this arrangement the spring will take up any shock between the parts and afford a more gradual operation of the clutch.

The operating lever 48 briefly referred to above is pivoted to the top of the sealing chamber 1 by means of a link 50. The intermediate portion of the lever is pivoted on

bosses 51' formed on a ring 51 which is fixed to a sleeve 52. This sleeve surrounds the combined and extensible shaft 31—33 and is threaded to the hollow sleeve 16 which supports the head frame 15. Hand wheel 53 is keyed to the sleeve 52, and by rotating the same the position of the head 15 may be varied to accommodate the apparatus to containers of different heights. The opposite end of the lever 48 is pivoted to a connecting rod 54, which is controlled, in any desired or well known manner, by the extent of vacuum in chamber 1. When the desired degree of vacuum is attained in chamber 1, the rod will be moved downwardly so as to bring the sealing heads 12 into engagement with the caps of the containers which have been previously placed in the tray 5 and positioned in the chamber. This downward movement of lever 48 will, through the medium of rod 47, impart a rotary movement to ring 44 and clutch casing section 42 so as to engage the discs of the clutch 36, and thus cause a rotation of the heads 12 through the intermediate gearing.

The operation of the device is as follows, it being assumed that the hand wheel has been rotated in the proper direction so as to adjust the head 14—15 to a position best suited to the particular containers being sealed; and that the springs 24 on the individual sealing heads have been adjusted to give the desired frictional engagement between cone 22 and driving sleeve 18, so that the correct amount of rotative force will be applied to the screw caps. These caps are placed on the containers prior to their insertion in the chamber, and preferably are partly screwed thereon. The containers 4 are placed in a tray 5 having the proper spacer 6 mounted therein, and the tray is slid into the chamber 1 with the containers centered below the individual heads 12. The operator now closes the door 7, and in this movement of the door the link 9 starts the operation of the air pump to exhaust the air from chamber 1. As the air in the chamber reaches the barometric reading to which the vacuum system is adjusted the air pump stops and the lever 48 is drawn downwardly by rod 54 thereby bringing the several heads 12 into a fairly tight engagement with the screw caps 4'. The extent of the pressure on caps 4' will, of course, depend upon the strength of springs 20 and the particular adjustment of head 14—15 with respect to the caps. As the lever 48 brings down the head 14—15 it also, through the medium of rod 47, operates the clutch so as to cause the motor 35 to rotate shaft 31—33 and thus impart a rotary movement to the individual heads 12. The containers 4 together with their caps 4', it will be noted, are gripped between the rubber pad 11 on the bottom of tray 5 and the pads 13 on the individual sealing heads; consequently

as the heads 12 rotate they will impart a rotary movement to the caps 4' and screw them to sealing position. The amount of force applied in sealing the containers will, of course, depend on the adjustment of the springs 24, since, when the frictional engagement between the clutch members 22—23 is overcome rotation of head 12 will discontinue. After the caps are screwed to sealing position, the chamber 1 will be opened to atmosphere by any desired means (not shown), and the door 7 moved to open position to permit the removal of the tray 5 and its replacement by another tray of containers to be sealed.

From the above description considered in connection with the drawings it will be apparent to those skilled in the art that I have provided a vacuum sealer for screw cap containers, which is comparatively simple in construction and operation. It will also be observed that the mechanism is such as will not readily become disorganized when subjected to the rough usages to which such devices are exposed, and that due to the several refinements disclosed herein the device is not only adaptable to various sizes of containers but is also provided with means by which the amount of pressure used in sealing the container and consequently the amount of force required in its removal may be varied to suit the trade.

While I have described herein the preferred embodiment of the invention, as required by the patent statutes, nevertheless it is to be understood that various changes may be made in the construction without departing from the spirit of the invention, and all such possible alterations are intended to be included within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A vacuumizer for screw cap containers, including a vacuum chamber, a vertically reciprocable head frame within the chamber, a plurality of rotatable sealing heads carried by the frame, a gear associated with each sealing head, a master gear, and means for rotating the master gear.

2. A vacuumizer for screw cap containers, including a vacuum chamber, a vertically reciprocable head frame within the chamber, a plurality of rotatable sealing heads carried by the frame, a gear associated with each sealing head, a master gear, means for rotating the master gear, and means for vertically adjusting the head frame for ware of different height.

3. A vacuumizer for screw cap containers, including a vacuum chamber, a vertically reciprocable head frame within the chamber, a plurality of sealing heads carried by the head frame, a master gear for rotating all of the sealing heads in the same direction, an extensible shaft for driving the master gear,

means for reciprocating the head frame, and means for vertically adjusting the head frame.

4. A vacuumizer for screw cap containers, including a vacuum chamber, a rotatable sealing head adapted to be moved in the vacuum chamber into engagement with a screw cap, a shaft for rotating the sealing head, a clutch associated with the shaft, and means for automatically rendering the clutch operative as the sealing head moves downward.

5. A vacuumizer for screw cap containers, including a vacuum chamber, a rotatable sealing head adapted to be moved in the vacuum chamber into engagement with a screw cap, a shaft for rotating the sealing head, a clutch associated with the shaft, and means for automatically rendering the clutch inoperative as the sealing head moves upward.

6. A vacuumizer for screw cap containers, including a vacuum chamber, a rotatable sealing head adapted to be moved into engagement with a screw cap, a shaft for rotating the sealing head, a motor for driving said shaft, a clutch between the motor and the shaft, means for automatically operating the clutch, and means for adjusting the clutch.

7. A vacuumizer for screw cap containers, including a vacuum chamber, a vertically reciprocable head frame in the chamber, a plurality of rotatable sealing heads carried by head frame, a lever for reciprocating the head frame, a motor for rotating the sealing heads, a clutch associated with the motor, and means operatively connecting said clutch with said lever.

8. A vacuumizer for screw cap containers, including a vacuum chamber, a rotatable sealing head adapted to reciprocate in the vacuum chamber, means for rotating the head, means for reciprocating the head, a clutch associated with the first-mentioned means, and means operatively connecting the second-mentioned means with the clutch.

9. A vacuumizer for screw cap containers, including a vacuum chamber, a rotatable sealing head adapted to reciprocate in the vacuum chamber, means for rotating the head, means for reciprocating the head, a clutch associated with the first-mentioned means, means operatively connecting the second-mentioned means with the clutch, and means for adjusting the clutch.

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