Feb. 25, 1947. J. R. VEST 2,416,506

VACUUM APPARATUS FOR INVESTING PATTERNS

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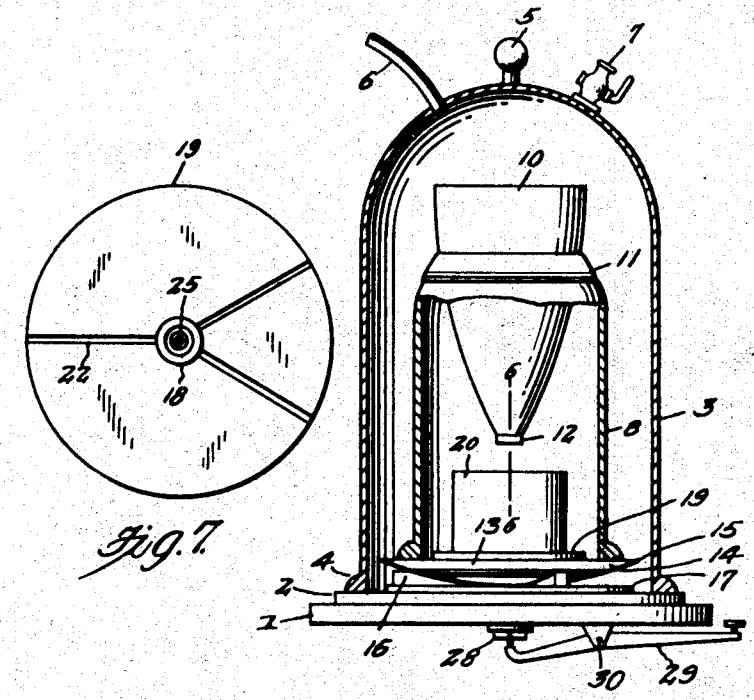


Fig. 1.

Fig. 7.

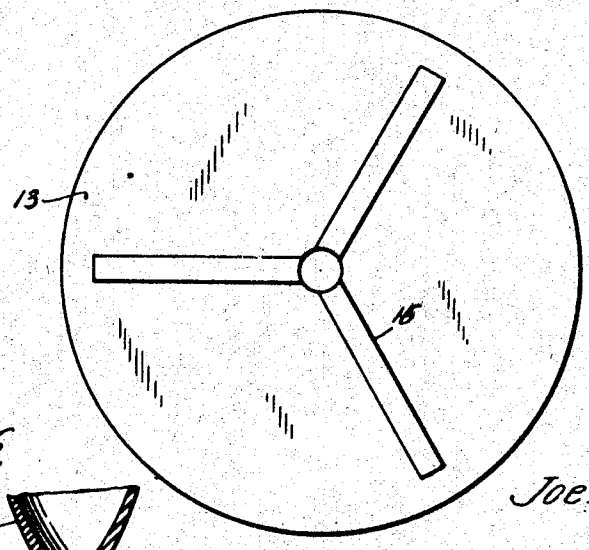
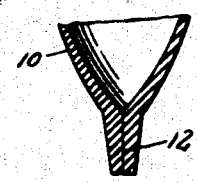


Fig. 4.

Fig. 6.



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Fig. 2.

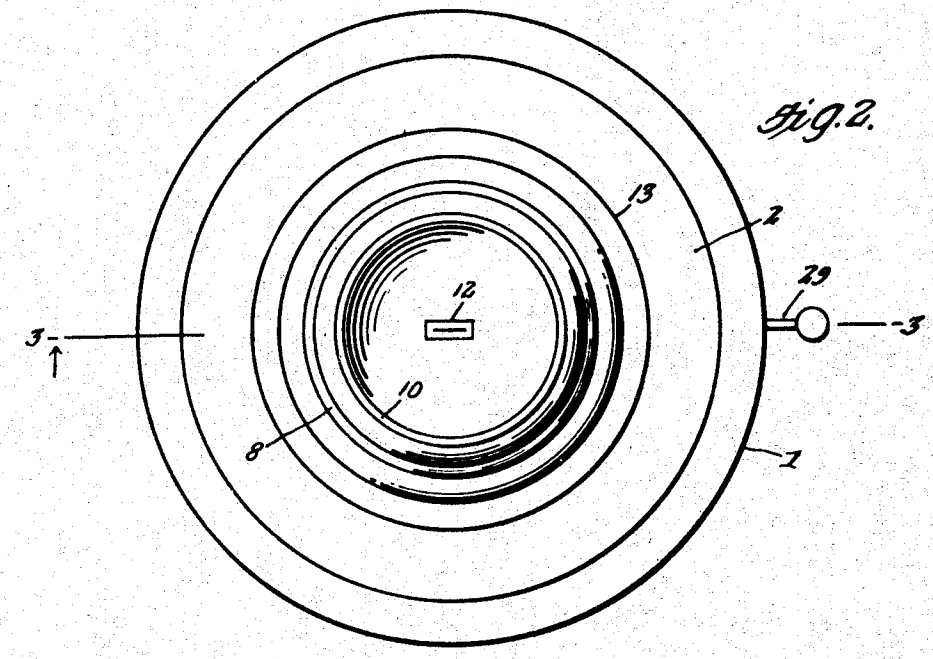


Fig. 3.

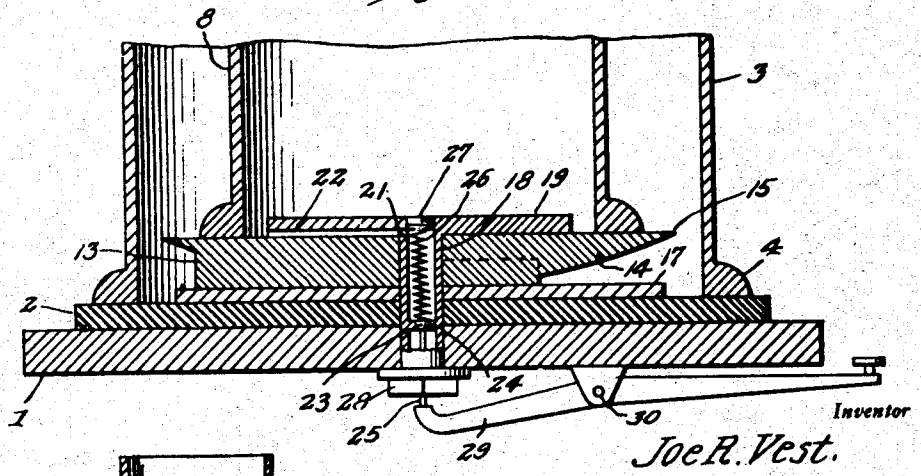
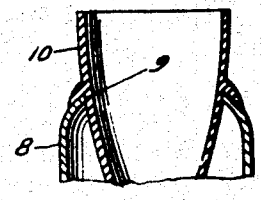


Fig. 5.



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UNITED STATES PATENT OFFICE

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VACUUM APPARATUS FOR INVESTING PATTERNS

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Application October 6, 1944, Serial No. 557,520

2 Claims. (Cl. 22—9)

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My invention relates to improvements in apparatus for investing wax patterns, under vacuum, with plaster composition, for subsequent use in metal castings, for instance, in dental work, the manufacture of jewelry and the like.

As is well known, in investing such patterns and mixing the plaster composition, air bubbles are liable to occur in the composition which cling to the patterns and result in a rough casting covered with small metal protuberances, the disadvantage of which will be manifest. Also, with complicated jewelry patterns having cavities and crevices therein, investing with present day apparatus is frequently unsatisfactory because the plaster composition does not enter such cavities and crevices.

With the foregoing in mind, the primary object of my invention is to provide highly efficient, simply constructed and comparatively inexpensive vacuum apparatus for investing wax patterns with plaster compositions, regardless of the character of the patterns, so as to obviate the formation of air bubbles and properly introduce the plaster composition into cavities, crevices, and the like.

Other and subordinate objects are also comprehended by my invention, all of which, together with the precise nature of my improvements, will be readily understood when the succeeding description and claims are read with reference to the drawings accompanying and forming part of this specification.

In said drawings:

Figure 1 is a view in vertical section of my improved apparatus, in a preferred embodiment thereof,

Figure 2 is a view in top plan, and drawn to an enlarged scale,

Figure 3 is a fragmentary view in transverse section taken on the line 3—3 of Figure 2, and drawn to a further enlarged scale,

Figure 4 is a view in bottom plan of the seat for the inner bell jar, drawn to an enlarged scale,

Figure 5 is a fragmentary view in vertical section of the container and inner bell jar,

Figure 6 is a view in vertical section taken on the line 6—6 of Figure 1 and drawn to an enlarged scale,

Figure 7 is a view in bottom plan of the flask-supporting disc and air inlet valve.

Referring to the drawings by numerals, in the illustrated, preferred embodiment thereof, my improved apparatus comprises a disc-like base 1 of wood, preferably, supporting thereon a concentric, relatively smaller rubber pad 2 forming a

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sealing means for a bell jar 3 adapted to surmount said pad. The bell jar 3 is provided with a widened flat rim 4 adapted to fit flat on said pad to form therewith an air-tight seal around the rim of said jar. The top of the jar 3 is provided with a suitable handle-forming knob 5. A vacuum line 6 extends from the top of said jar 3 for connection to a suitable vacuum pump, not shown. An air inlet valve is provided in the top of said jar 3, as at 7. Within the bell jar 3 is a relatively smaller inner bell jar 8 having an opening 9 in the top thereof. A substantially conical, rubber container 10 for plaster composition, not shown, extends part way into said jar 8 through the opening 9 and is fitted in said opening and provided with a downwardly flaring, circumferential rubber flap 11 fitting over the top of said jar 8 to form an air-tight seal around the opening 9. The container 10, at its lower end, terminates in a slit, rubber discharge nipple 12 normally closed and adapted to expand and thus open.

A fixed, rubber seat 13 of disc-like, flat-top form supports the inner bell jar 8, the lower rim of which is also widened and flat to form with said seat an air-tight seal around said rim.

The seat 13 is a particular feature of my invention, said seat having a convex bottom 14 forming a feathered, readily flexible edge 15 around the lower rim of said jar 8 which functions, as will presently more clearly appear, as a valve for opening and closing the bottom of said jar 8. Radial, flat-bottom ribs 16 are provided on the bottom of the seat 13 for fitting flat on a metal seat-supporting disc 17 imposed on the pad 2 concentrically thereof and within the bell jar 1.

A tubular air inlet valve casing 18 extends axially through the base 1, pad 2, disc 17 and seat 13 and maintains the same in concentric relation. The valve casing 18 forms an axial part of a flask-supporting disc 19 imposed on the seat 13 within the inner jar 8 for supporting the usual flask 20 adapted to contain the wax patterns, not shown. The valve casing 18 is provided at its upper end with radial ports, as at 21, which open into radial air discharge grooves 22 provided in the bottom of the disc 19. A valve 23 seats downwardly in a seat 24 in the valve casing 18, with a stem 25 extending out of the lower end of said casing. A coil spring 26 in said casing 18 interposed between the valve 23 and a threaded closure plug 27 for the end of said casing, normally seats said valve. A nut 28 turned onto the lower end of the valve casing 18, together with the disc 19, clamp the base 1, pad 2, plate 17, seat 13 and the disc 19 in assembled relation.

A suitable hand lever 29 is pivoted, as at 30, on the bottom of the base 1 for moving the valve stem 25 inwardly to unseat the valve 23 in opposition to the spring 20 and open the valve.

Referring now to the operation of the apparatus, with the patterns deposited in the flask 20, and the container 10 filled with the composition plaster, air is evacuated from the bell jar 3 by way of the vacuum line 6. In this operation, the air is also evacuated from the inner bell jar 8, the edge 15 of the seat 13 readily flexing to allow the air to be withdrawn out of said inner jar. Thus the vacuum in both jars is equalized and when this is accomplished, the vacuation operation is stopped. In the process of establishing a substantially complete vacuum in the inner bell jar 8, all air is removed from the plaster composition. Next, a small amount of atmospheric air is introduced into the bell jar 3 through the medium of the air inlet valve 7 so that there is a greater vacuum in the inner bell jar 8 which tends, under the suction in said inner jar, to draw the edge 15 of the seat 13 into sealing relation with the bottom rim of said inner jar. With this condition obtaining in said inner jar 8, the plaster is drawn through the nipple 12 and enters all cavities and crevices in the patterns without the formation of any air bubbles in the plaster composition or on the patterns. When the plaster composition passes through the nipple 12, air passes from the bell jar 3 into the inner bell jar 8 and the air pressure in both jars is equalized. The air inlet valve 7 may then be opened to achieve atmospheric pressure in both jars and the flask 20 removed. At any time during discharge of the plaster composition from the nipple 12, the hand lever 29 may be operated to unseat the valve 23 and admit atmospheric air into the inner bell jar 8 by way of the valve casing 18, ports 21 and air inlet grooves 22, thus stopping the flow of plaster composition from the container 10 when the desired quantity of plaster composition has been deposited in said flask 20.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly, the invention, as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the appended claims.

What I claim is:

1. Vacuum apparatus for investing patterns in a flask with powder composition comprising an outer bell jar, means for supporting said jar and forming under a vacuum created in said jar a seal around the rim of the jar, an inner bell jar in the outer jar, a composition container extending into said inner jar through the top thereof and provided with a discharge end adapted to be distended under the action of vacuum created in the inner jar to discharge composition therefrom, a seat for said inner jar adapted under the action of a vacuum in the inner jar to seal the same and under a vacuum in the outer jar with air pressure in the inner jar to open said inner jar, a vacuum line extending from the outer jar for connection to a vacuum pump to evacuate the air from said jars and create a vacuum therein, an air valve for admitting atmospheric air to the outer jar to break the vacuum therein and cause said seat to seal the inner jar, and means for supporting a pattern flask in the inner jar, said seat comprising a disc-like member of resilient material provided with a feathered edge underlying the rim of said inner bell jar.

2. Vacuum apparatus for investing patterns comprising an outer bell jar, an inner bell jar having an open top and bottom, a flask in said inner bell jar, a composition container extending part way into the inner bell jar and closing the top of the same, said container having a normally closed discharge end adapted to open under the influence of a vacuum in said inner bell jar and discharge composition into said flask, means to establish a vacuum in said outer and inner bell jars comprising a vacuum line to said outer bell jar, and a member normally closing the bottom of the inner bell jar and having a part flexible under the influence of a vacuum in the outer bell jar to open said bottom and establish communication between said jars, and means to break the vacuum in the outer bell jar to cause the vacuum in the inner bell jar to open said discharge end of said container.

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