H. M. SMITH.

MEANS FOR TESTING TUBES WITH COMPRESSED AIR.

APPLICATION FILED SEPT. 30, 1918.

1,431,704.

Patented Oct. 10, 1922.

2 SHEETS—SHEET 1.

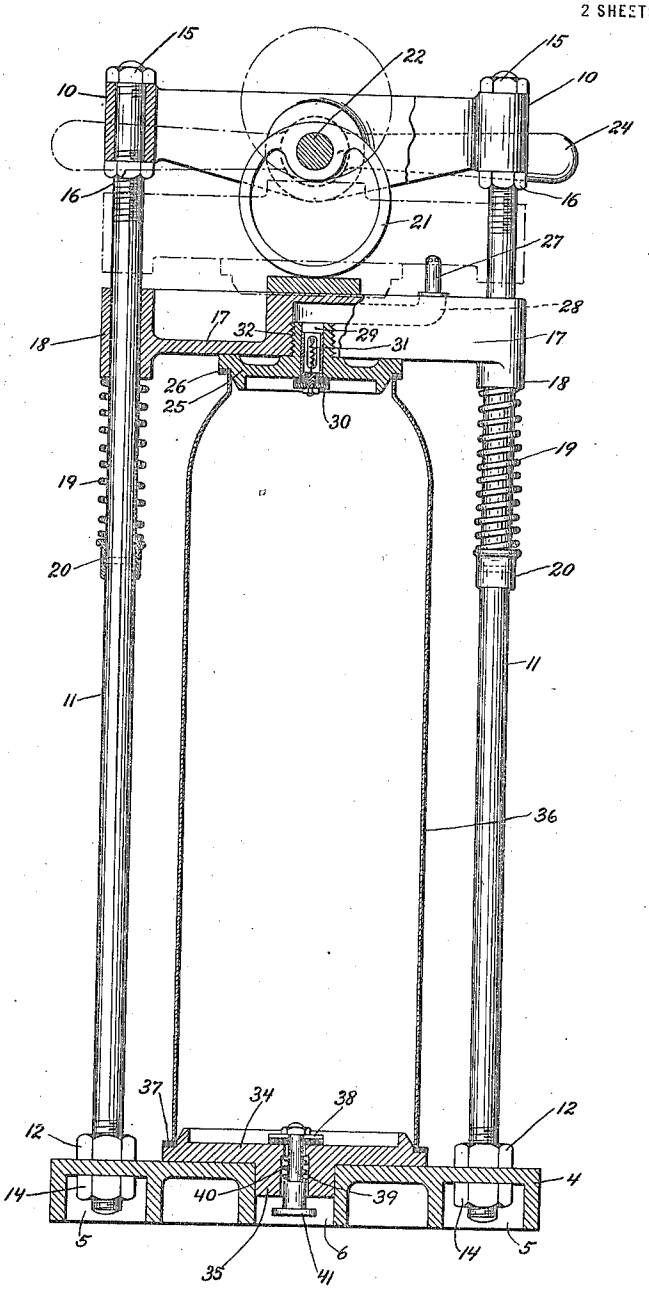


FIG 1

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2 SHEETS—SHEET 2.

Fig 2

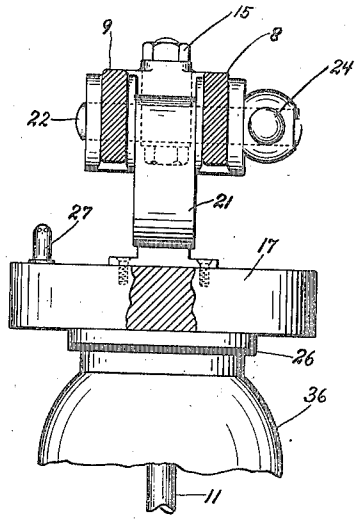
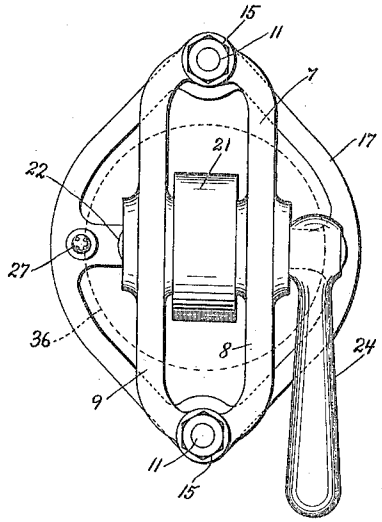


Fig 3



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UNITED STATES PATENT OFFICE.

HERBERT M. SMITH, OF GREAT BARRINGTON, MASSACHUSETTS, ASSIGNOR TO STANLEY INSULATING COMPANY, OF GREAT BARRINGTON, MASSACHUSETTS, A CORPORATION OF MAINE.

MEANS FOR TESTING TUBES WITH COMPRESSED AIR.

Application filed September 30, 1918. Serial No. 256,287.

To all whom it may concern:

Be it known that I, HERBERT MILLS SMITH, a citizen of the United States, residing at Great Barrington, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Means for Testing Tubes with Compressed Air, of which the following is a specification.

This invention relates to an apparatus for use in testing tubes, particularly welded tubes of sheet metal such as are employed in the manufacture of metallic vacuum bottles like that shown in the United States patent to William Stanley No. 1,071,817.

In the manufacture of these bottles it is customary to form the shells of flat material made into tubular form and with the edges welded together, the bottoms and ends being otherwise secured to these tubes. In the process of welding it sometimes happens that the joint is not everywhere tight; and though the openings are seldom large, the very slightest hole or imperfection in the joint is fatal, because the shells are to form the walls of a vacuous space. Hence, it becomes important to test these tubes for airtightness, and the apparatus which I have devised is adapted for this purpose.

An object of the invention is to provide an apparatus which may be used in connection with such a test, which apparatus is simple in its construction and easily and quickly manipulated.

Other objects and aims of the invention, more or less broad than those specified above, will be in part obvious and in part specifically referred to in the course of the following description of the elements, combinations, arrangements of parts and applications of principles constituting the invention; and the scope of protection contemplated will appear from the claims.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown a merely preferred form of embodiment of the invention, Figure 1 is a partly sectional elevation of an apparatus embodying the invention; Figure 2 is an end elevation of Figure 1 with parts broken away; and Figure 3 is a top plan view of the subject-matter of Figure 1.

Referring to the numerals on the drawings, there is shown at 4 a base plate provided with recesses 5 and with a central aperture 6. Numeral 7 indicates a top member generally oblong in contour and including two spaced arms 8 and 9 joined at their ends to form sleeves 10 for the accommodation of the upper ends of rods 11. The lower ends of these rods 11 pass through the base plate 4 and are held in position by means of suitable nuts 12 and 14, one above the base plate and one below, the lower one 14 being accommodated in each instance in socket 5 so that it does not protrude beyond the general bottom plane of the base 4. The upper ends of these rods 11 likewise pass through the sleeves 10 and are held in position by means of nuts 15 and 16 above and below the sleeves respectively. Slidable on the pair of rods 11 is a member 17 having sleeves 18 through which the rods 11 pass. This member 17 is normally pushed up to the dotted line position of Figure 1 by means of compression springs 19 which surround the rods 11 and bear between the sleeves 18 and fixed collars 20 on the rods 11. The member 17 may however be moved down to the full line position of Figure 1 when desired, by means of a cam 21 carried on a short rock shaft 22 pivoted between the arms 8 and 9 and operated by means of a handle 24. The member 17 is provided with a portion 25 for engaging in and over the mouth of a tubular shell, and this closure portion may include a gasket 26. The numeral 27 indicates a nipple for the attachment of a hose or pipe leading from a source of supply of compressed air or the like, and from this nipple 27 leads a passage 28 formed in the member 17 and leading through the closure part 25. The passage 28 and 29 is controlled by a check valve 30 of any ordinary construction which tends to close the passage. For instance, a coiled spring 31 may be employed to hold the valve up against the lower surface of the member 25 surrounding the passage 29. For simplicity of construction I have shown the closure portion 25 separable from the member 17, member 25 having an exteriorly threaded tubular boss 32 engaging in a correspondingly threaded socket in the under face of the member 17; and the valve rigging 30 as a whole is set into this tubular boss 31.

The numeral 34 indicates a closure mem-

ber for the lower end of a tubular shell, this member 34 having a central boss 35 which sets down into the central aperture 6 of the base plate 4. This bottom closure member 34 is formed to extend into and over the lower end of the shell 36 and may be provided at its pehriphery with a gasket 37 to engage the edge portions of the shell if desired, similar to the gasket 26 on the upper closure member. 38 indicates a check valve which normally is held down on the upper surface of the member 34 surrounding a passage 39, by means of a compression spring 40, but which may be operated to open the passage 39 by upward pressure against finger-piece 41.

The device thus described is used in the manner now to be described. By manipulation of the handle 24 the cam 21 is brought to the dotted line position of Figure 1. This permits the springs 19 to throw the member 17 to the dotted line position of Figure 1. A tubular shell 36 is now placed in position with its lower edges resting on the lower closure member 34, the inward projection of the closure member 34 into the shell serving to center the same and to line it up, so that when the handle 24 is now moved over to the full line position of Figure 1 the cam 21 engaging the member 17 will force the same downwardly until the upper closure member 25 enters into and covers the upper end of the tubular shell as shown in Figure 1, this engagement of the upper closure member 25 with the upper end of the tube being facilitated and made certain by reason of the fact that the member 25 is downwardly beveled as shown, to correspond with the beveled projection of the lower closure member 34. The tube is thus held in an air-tight manner both top and bottom, and the next step is to connect the nipple 27 with a source of supply of compressed air or other fluid, which entering through passages 28 and 29, opens the valve 30 and passes into the interior of the tube 36 and tends to keep the valve 38 even more tightly shut. A sufficient quantity of fluid under pressure having been introduced the supply hose is disconnected from the nipple 27. There can be no escape of the contained air from the upper end of the tube through the passages 28 and 29 because the pressure keeps the valve 30 closed. The whole apparatus is now picked up and held under water. If there are any pin holes or leaks in the welded joint, these will be betrayed by bubbles, whereupon the tube will be rejected and sent back for further treatment. After the under-water test has been made, and before the handle 24 is manipulated to release the seal at the upper end of the tube, the finger-piece 41 of the valve 38 is pressed upwardly to relieve the pressure of air within the tube, and then the handle 24 is manipulated to break the seal on the upper end of the tube. Without this provision for preliminary relief of pressure it is obvious that upon moving the handle 24 the member 17 would be apt to be driven upwardly with great force and it is to avoid this shock that the valve 38 is provided.

I claim:

1. A device of the kind described comprising a frame having a stationary closure for one end of a tube and a movable closure for the other end of the tube, means for introducing fluid under pressure through one of said closure means, a valve associated with the other of said closure means normally maintained seated by the fluid within the tube and means extending to the outside of said last mentioned closure for manually unseating the valve.

2. A device of the kind described comprising a portable frame having a stationary closure for one end of a tube and a movable closure for the other end of the tube, and means for introducing fluid under pressure through one of said closure means, the other of said closure means being provided with a normally seated relief valve, and means for unseating said valve substantially as and for the purpose described.

3. A device of the kind described comprising a portable frame having stationary means for sealing one end of a tube and means for sealing the other end of the tube normally biased away from the first sealing member, means for moving the second member towards the first member against its bias, one of said members being provided with means for introducing fluid under pressure through it into the interior of the tube, and with means for preventing the escape of such fluid in the other direction, the other sealing member being provided with a spring seated relief valve and a manually operable means for unseating said valve substantially as and for the purpose set forth.

4. A device of the kind described comprising a base piece and a top piece and a pair of rods connecting the same, a sealing member mounted on the base piece, a sealing member slidable on the rods, spring means urging the second sealing member away from the first, and means for forcing the second sealing member towards the first against the force of the spring means.

5. A device of the kind described comprising a portable frame having a stationary closure for one end of a tube and a movable closure for the other end of the tube, means for introducing fluid under pressure through one of said closure means, one of said closure means being provided with a spring seated relief valve and a manually operable means for unseating said valve substantially as and for the purpose set forth.

6. A device of the kind described comprising an apertured base piece and a top piece and a pair of rods connecting the same, a sealing member mounted on the base piece and provided with a relief valve arranged in registry with the aperture through the base piece, a second sealing member slidably arranged on the rods, means for introducing fluid under pressure through the second sealing member, resilient means normally urging the second sealing member away from the first and means for forcing the second sealing member towards the first against the force of the resilient means.

7. A device of the kind described comprising a centrally apertured base piece and a top piece and a pair of rods connecting the same, a sealing member detachably mounted on the base piece provided with a relief valve arranged in registry with the aperture through the base piece, a member slidably mounted upon the rods carrying a detachable sealing member, means for introducing fluid under pressure through the second mentioned sealing member, resilient means normally urging the second sealing member away from the first and means for forcing the second sealing member toward the first against the force of the resilient means.

8. A device of the kind described comprising a base piece and a top piece and a pair of rods connecting the same, a relatively stationary sealing head associated with said base piece and a relatively movable sealing head slidably mounted on said rods, means associated with the top piece and coacting with the movable sealing head to slide said head on the rods, and means for introducing fluid under pressure through the movable sealing head.

In testimony whereof I affix my signature.

HERBERT M. SMITH.