

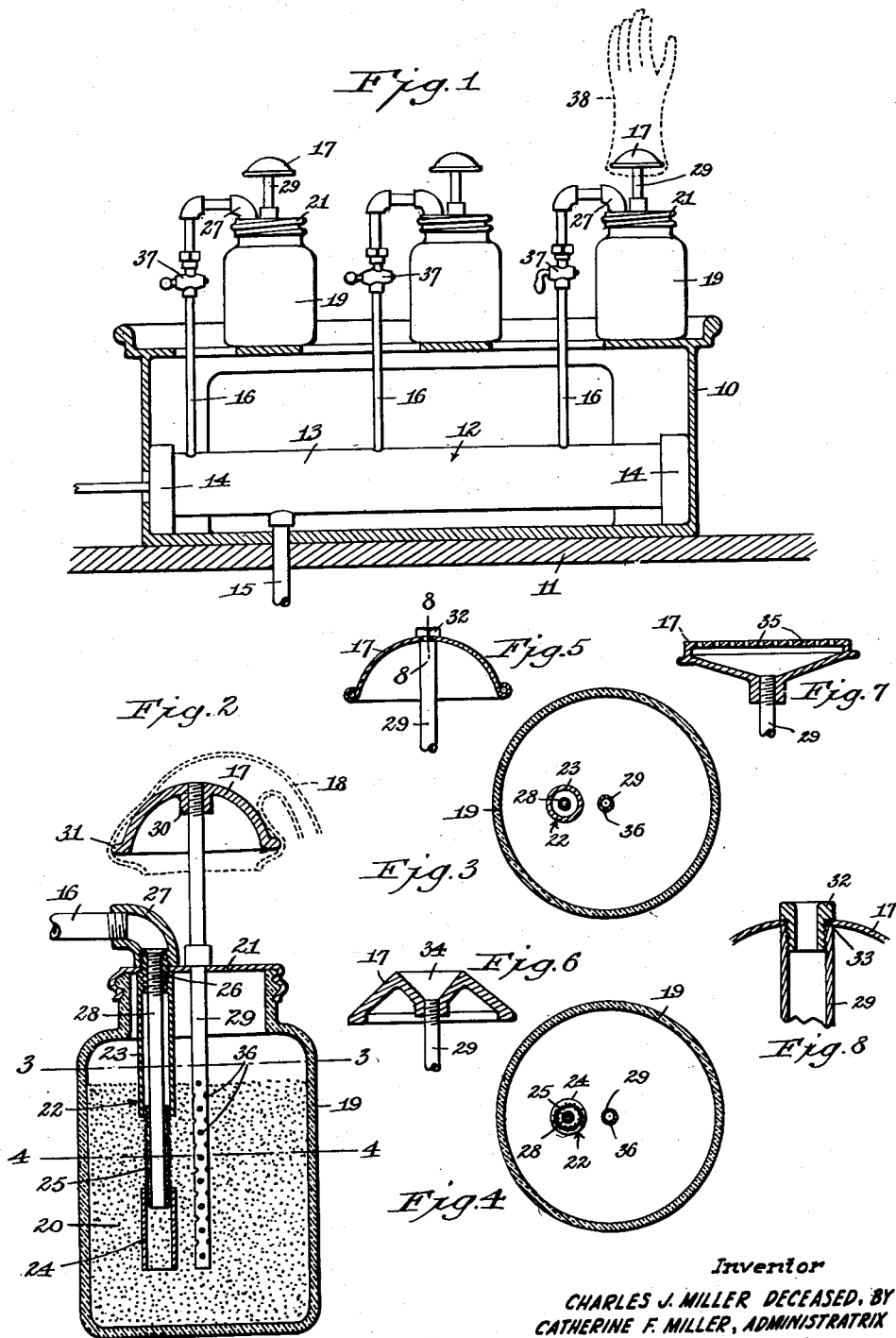
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APPARATUS FOR POWDERING THE INTERIOR OF SURGEONS' GLOVES

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APPARATUS FOR POWDERING THE INTERIOR OF SURGEONS' GLOVES

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This invention relates to an apparatus for powdering the interior of surgeons' gloves after sterilizing and drying the same.

It is common to clean surgeons' gloves by hand, even in large hospitals, and in such places the full time of one person is required in hand-cleaning and drying the gloves, after which the latter are coated interiorly with talcum or other powder to facilitate slipping the glove over the hand of the surgeon preparatory to operating. For this purpose this invention is designed to provide an apparatus such as set out in a co-pending application filed October 29, 1947, under Serial No. 782,809, now issued as Patent No. 2,565,455, and of which this application is a continuation-in-part; said co-pending application and the said patent now issued thereon illustrating as part thereof the features of the invention set out in this application, whereby after sterilizing and drying the gloves, talcum or similar powder is internally applied thereto for the purpose mentioned.

This application has for one of its objects to provide an apparatus to which surgeons' rubber gloves are applied in collapsed condition and by means of air under pressure passed through a container filled or partially filled with talcum or similar powder, the glove is expanded or inflated and simultaneously therewith a quantity of talcum or similar powder directed therein so as to powder-coat the entire interior thereof.

A further object of this invention is to provide novel supports or holders for the gloves in which provision is made for stretching the open wrist-portion of a glove around a powder-dispensing head or element in an air-tight manner; the stretch of the wrist-portion of the glove being such that air under pressure, such as used for directing the talcum or other powder into the glove, will not permit the powder to be forced outwardly between the glove and the powder-dispensing head or element.

In the drawings:

Fig. 1 is a sectional elevation of this improved apparatus.

Fig. 2 is an enlarged vertical section through one of the powder-dispensing devices, including a powder container, a glove support or holder and the means for directing air under pressure through the support or holder and into a surgeon's or other glove formed of stretchable material and applied to the powder-dispensing head or element of the device.

Fig. 3 is a horizontal section taken on line 3—3, Fig. 2.

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Fig. 4 is a horizontal section taken on line 4—4, Fig. 2.

Fig. 5 is a modified form of powder-dispensing head or element forming part of the powder-dispensing device.

Figs. 6 and 7 are further modified forms of powder-dispensing heads or elements.

Fig. 8 is an enlarged section taken on line 8—8, Fig. 5.

Reference being had to the drawings in detail, 10 10 designates a frame or housing designed to be mounted on a table 11 or similar object so as to position the powder-dispensing devices at an elevation convenient to apply the gloves thereto.

15 This frame or housing is of open-work construction, but may be of a type other than shown, so long as it properly supports the powder-dispensing device, to be hereinafter particularly described, in convenient position for use.

20 Associated with the frame or housing and preferably disposed therein is an air-chamber in the form of a manifold 12 and in the form shown is constructed of a length of pipe 13 having headers 14 applied thereto to close the ends of the pipe 25 in an air-tight manner.

An air-inlet pipe 15 is threaded into the pipe 13 at a suitable point in its length and this pipe 15 is shown as passing through the table 11 and the bottom of the frame or housing support 10.

30 Air-supply pipes 16 are threaded into the air-chamber or manifold 12 so as to extend upwardly therefrom. These pipes are held against lateral or swaying movement by passing them through openings in the top of the frame or housing, and indirectly connected to these air-supply pipes 35 are glove holders or supports 17 so formed as to retain surgical or other rubber gloves in collapsed condition thereon, as illustrated partly by the dotted lines 18 in Fig. 2.

40 In Fig. 1 a surgical or other rubber glove is shown applied in expanded or inflated condition to one of the glove holders or supports 17; such expanded or inflated condition being caused by the introduction of air thereinto in the manner to be hereinafter described.

45 Each of the powder-dispensing devices comprises a glass or other container 19 in which talcum or other similar powder 20 is placed, to be gradually dispensed therefrom.

50 In the form in which this container is used it has its upper end open and it is provided with a cap 21 which is threaded or otherwise applied thereto to close the same in an air-tight manner. Secured to the cap 21 and depending therefrom is a tube 22 comprising an upper imperforate 55

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rate section 23, a lower imperforate section 24 terminating at its lower end a distance from the bottom of the container and an intermediate foraminous section 25, preferably in the form of a fine mesh wire-screen. This tube 22 is open at its lower end and its upper end is attached to a nipple 26 passed through the cap 21 and held in place by a fitting 27 in the form of an elbow, or otherwise, forming part of the air-supply pipe 16 connected to the air-chamber or manifold 12. The upper end of the upper imperforate section is threaded tightly onto the nipple 26 and bears firmly against the under side of the cap 21, which causes the fitting 27 to be drawn firmly against the upper side of the cap.

Fitted into the nipple 26 and depending therefrom coaxially with the tube 22 is an imperforate tube 28 which terminates at its lower end within the lower imperforate section 24 of the tube 22.

A powder delivery tube 29 extends downwardly into each container 19 through the cap thereof and also upwardly therefrom and on this tube the glove holder or support 17 is mounted. The tube 29 is open at both ends and it opens upwardly through said holder or support in any of various ways in which this can be accomplished. For example in Fig. 2, this tube has its upper end threaded into a boss 30 formed on a substantially semi-spherical head having a rim 31 around its edge, the head being die-cast or otherwise cast to form. In this instance, the upper open end of the powder delivery tube serves as the powder-discharge opening of the holder or support 17.

In Fig. 5 a similar head formed of sheet metal is illustrated and shown in detail in Fig. 8, this head is placed over the end of the powder delivery tube 29 and fastened thereto by means of a hollow nipple 32 passed through an opening in the head and threaded into the upper end of said tube; said nipple being enlarged at its upper end to provide a downwardly facing shoulder 33 which bears against said head around the region surrounding the opening therein and securely fastens the head to the upper end of said tube. In this modification, the passage through the nipple serves as the powder-discharge opening of the holder or support 17.

In Fig. 6 the holder or support is shown in the form of a truncated cone having the tube 29 threaded axially therinto from the bottom and opening into an upwardly flaring cavity 34, the cavity serving to distribute the talcum or other powder as it is forcibly directed into the glove. It is to be understood, of course, that the upper open end of the tube 29 opens directly into the cavity 34 and serves as the powder-discharge opening of the holder or support 17.

In Fig. 7 the glove holder or support is shown in the form of a hollow head into which the upper end of the tube 29 opens, the upper flat face of the head being perforated, as at 35, to also aid in distributing the powder. In this modification the perforations 35 shown in the upper flat face of the head serve as powder-discharge openings.

The tube 29 is provided along its length with perforations 36 and each of the air-supply pipes 16 is provided with a valve 37 whereby the compressed air from the air-chamber 12 may be directed into the powder containers. Three such containers are shown in Fig. 1 of the drawings, the valves 37 of two of such containers being closed, while the valve of the other is open. The glove holder or support associated with the air-supply pipe having its valve shown in open posi-

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tion has a glove applied thereto, as shown by the dotted lines 38, the glove being inflated by the air passing through the powder container and into the glove, the wrist-portion of which latter is stretched around the holder or support in an air-tight manner so that the air directed through the container and carrying powder with it cannot escape at this point.

The diameter or perimeter of the glove holder or support 17, therefore, is such that in order to fasten the glove thereto, the wrist portion of the glove will be stretched over the rim of the holder or support and when applied in stretched condition, its inherent elasticity will result in its gripping the rim after the strain of stretching the glove has been relieved. Thus an air-tight joint or union is provided between the glove and its holder or support while the remainder of the glove lies or hangs limp over the holder or support.

The walls of the limp portion of the glove consequently encompass the powder discharge opening or openings of the various types of holders or supports suitable for use in this invention and when the powder is forced through said opening or openings under air pressure, such pressure will cause the limp portion of the glove to expand so as to expose all areas of the inner wall surfaces of the glove and assure an even distribution of the powder, which powder will adhere to said wall surfaces in a thin even layer and thus make it easy to apply the glove to the hand.

When the wrist portion of the glove is stretched over the rim of the holder or support 17, the extreme open end of the glove may or may not be stretched. If unstretched, it will also hang limp from the rim of the holder or support and if stretched, as may be the case with very small sizes of gloves, the depending portion will be stretched to a lesser degree than the portion directly in contact with the rim of the holder or support, with the result that assurance will be had of a firm attachment of the glove to the holder or support so that when the powder is directed into the glove under air pressure, such pressure will be insufficient to cause the glove to become detached from the holder or support.

It will furthermore be apparent that opening of the valves associated with the containers need not be extended over a long period of time, since immediately the valves are opened, the air carries a quantity of powder with it and distributes it within the expanded glove; the latter being expanded upon introduction of air therinto. Therefore, opening of a valve for an instant only is sufficient to properly powder a glove attached to the holder or support of a device.

While three powder containers are shown in the drawings, any number may be employed, each being under separate valve control, but not necessarily so. Upon opening a valve, such as shown at 37, or otherwise controlling the flow of compressed air into the container, the air enters the tube 28 and is directed against the powder within the tube 22; said tube 22 being surrounded by the powder within the container and a part of the powder being entered in the lower imperforate section 24 of said tube. Since the lower end of the tube 22 is filled with powder, the pressure of the air directed against the powder within this tube forces the powder through the foraminous section 25 of the tube 22 and exerts pressure against the portions of the powder surrounding said tube and also the portions thereof surrounding the tube 29, with the result that the

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powder is forced through the perforations 36 in said tube 29 and is carried upwardly through the latter, the powder being distributed over all interior surfaces of the fingers or digits of the glove as well as the body portion thereof; manipulation of the valves 37 for an instant being sufficient to properly coat the interior of the glove so that it is ready for instant use and can be easily slipped over the hand of the surgeon when preparing to operate.

It is to be noted that the pressure of the air is reduced by reason of its force being considerably expended within the powder container and it is therefore insufficient to cause the glove to be stripped from its holder or support.

Having thus described the invention, what is claimed is:

1. In a glove powdering apparatus, the combination with a housing, of a compressed-air chamber confined within said housing, a powder-container mounted outside of said housing, an air-supply pipe leading from said compressed-air chamber to said powder-container to deliver compressed air into the latter, means to control the delivery of air from said compressed-air chamber to said powder-container, a tube extending upwardly from said compressed-air container, a glove holder mounted on the upper end of said tube and having a powder discharge opening in communication with the interior of said tube, said glove holder having a contact-rim around its perimeter adapted to have the wrist-portion of a rubber glove stretched thereover and having its powder-discharge opening within the confines of said contact-rim, said rim forming an air-tight union with the glove when the wrist portion of the latter is stretched around said rim so as to inflate the remainder of the glove upon introduction of compressed air into said powder-container, powder within said container being delivered into said inflated glove with the compressed air to powder-coat the interior of said glove.

2. In a glove powdering apparatus, the combination with a housing, of a compressed-air chamber within said housing, a powder-container mounted on said housing, an air-supply pipe leading from said compressed-air chamber to said powder-container, a tube extending downwardly into said powder container and connected with said air-supply pipe, a second tube extending into said powder container and upwardly therefrom, said second tube being provided with perforations along the lower portion thereof, a glove holder secured to the upper end of said tube and having a contact rim at its perimeter over which the wrist-portion of a limp glove is to be stretched so that the portion of the glove disposed above said contact rim remains limp, the upper end of said tube opening into said glove when the latter is applied to said holder, and means to control the passage of compressed air from said compressed-air chamber to said powder-container to cause air to be directed into said powder-container, from the latter into said second tube and from said second tube into said glove to cause the limp portion of the glove above said rim to be inflated while the portion of the glove in contact with said rim remains gripped thereby and powder to be delivered from said powder-container into said glove to powder-coat the interior surfaces of all parts thereof.

3. An apparatus for powdering the interior of rubber gloves, comprising a powder container and an air-supply pipe connected thereto for direct-

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ing air under pressure thereinto, an imperforate tube connected to said air-supply pipe and extending downwardly into said container from the top thereof, a second tube surrounding said imperforate tube and spaced therefrom, said second tube having a foraminous portion between its ends and said first-mentioned tube terminating within said second tube, and an additional tube passed through the top of said container and having perforations along its length, said additional tube extending upwardly a distance above the top of said container, a glove holder secured to the upper end of said additional tube and having a contact rim at its perimeter designed to engage a ring-like region of the interior surface of the wrist portion of a rubber glove when stretched therearound and retain the same thereon, said glove being inflated upon introduction of said compressed air into said container and having the powder within said container forced through said foraminous section and through said additional tube and distributed over the interior surfaces of all parts of the inflated glove under the force of air introduced into said container through said imperforate tube.

4. An apparatus for inflating and powdering the interior of rubber gloves, comprising a support, an air-chamber, an air-inlet pipe leading to the latter from a source of compressed air, a powder container on said support, an air-supply pipe leading from said air-chamber and having its upper end connected to said powder container, means to control the passage of compressed air through said air-supply pipe, a tube extending from the terminal of said air-supply pipe downwardly into the powder in said container, a second tube in said container extending upwardly therefrom, and a glove holder mounted on the upper end of said second tube and adapted to have the wrist-portion of a rubber glove stretched thereover while the remainder of the glove remains limp, said air-supply pipe and the tube extending downwardly from the latter delivering air into said container to force the powder within the latter upwardly through said second tube and into the rubber glove to inflate the latter and interiorly powder-coat the same.

5. In an apparatus for powdering the interior of rubber gloves, a powder container having an air tube connected thereto for directing air under pressure thereinto, a second tube surrounding said air tube and having an imperforate upper portion, an imperforate lower portion terminating near the bottom of said container and a foraminous intermediate portion connecting said imperforate portions together, said air tube terminating within said imperforate lower portion, a third tube extending downwardly from the top of said container and terminating at its lower end near the bottom of the latter, said third tube being perforated along its length and extending upwardly above the top of said container, a glove holder secured to the upper end of said third tube and a glove-contacting rim adapted to have the wrist-portion of a rubber glove stretched around the same to retain said glove in an air-tight manner around the rim of said glove holder, said air tube directing air into said powder container to force air and powder from said second tube into said third tube through the perforations thereof so as to force air and powder upwardly through said holder and into the rubber glove applied thereto for the purpose of inflating said glove and coating the interior surfaces of all parts thereof.

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6. In an apparatus for powdering the interior of rubber gloves, a powder container having an air-supply tube connected thereto including a fitting bearing against the top of said container, a nipple passed through the top of said container and extending above and beneath the same, said nipple having said fitting threaded onto the upwardly-projecting portion thereof, a tube within said container connected to the lower projecting portion of said nipple and depending therefrom, a tube parallel with first-mentioned tube and extending upwardly a distance above the top of said container, a glove holder secured to the upper end of said second tube and having a glove-contacting rim portion adapted to have the wrist-portion of a rubber glove stretched around the same while the remainder of the glove hangs limp on said glove holder above and beneath said rim portion, and means to control the flow of compressed air

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through said air-supply pipe so as to force powder within said container upwardly through said second tube and into the rubber glove applied to said glove holder so as to inflate the limp portion of said glove above said rim portion and deliver air under pressure and powder into said rubber glove to coat the interior surfaces of all portions thereof with powder while thus inflated.

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deceased.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,830,598	Fagan	Nov. 3, 1931
2,219,208	Knight	Oct. 22, 1940
2,565,455	Miller	Aug. 21, 1951