

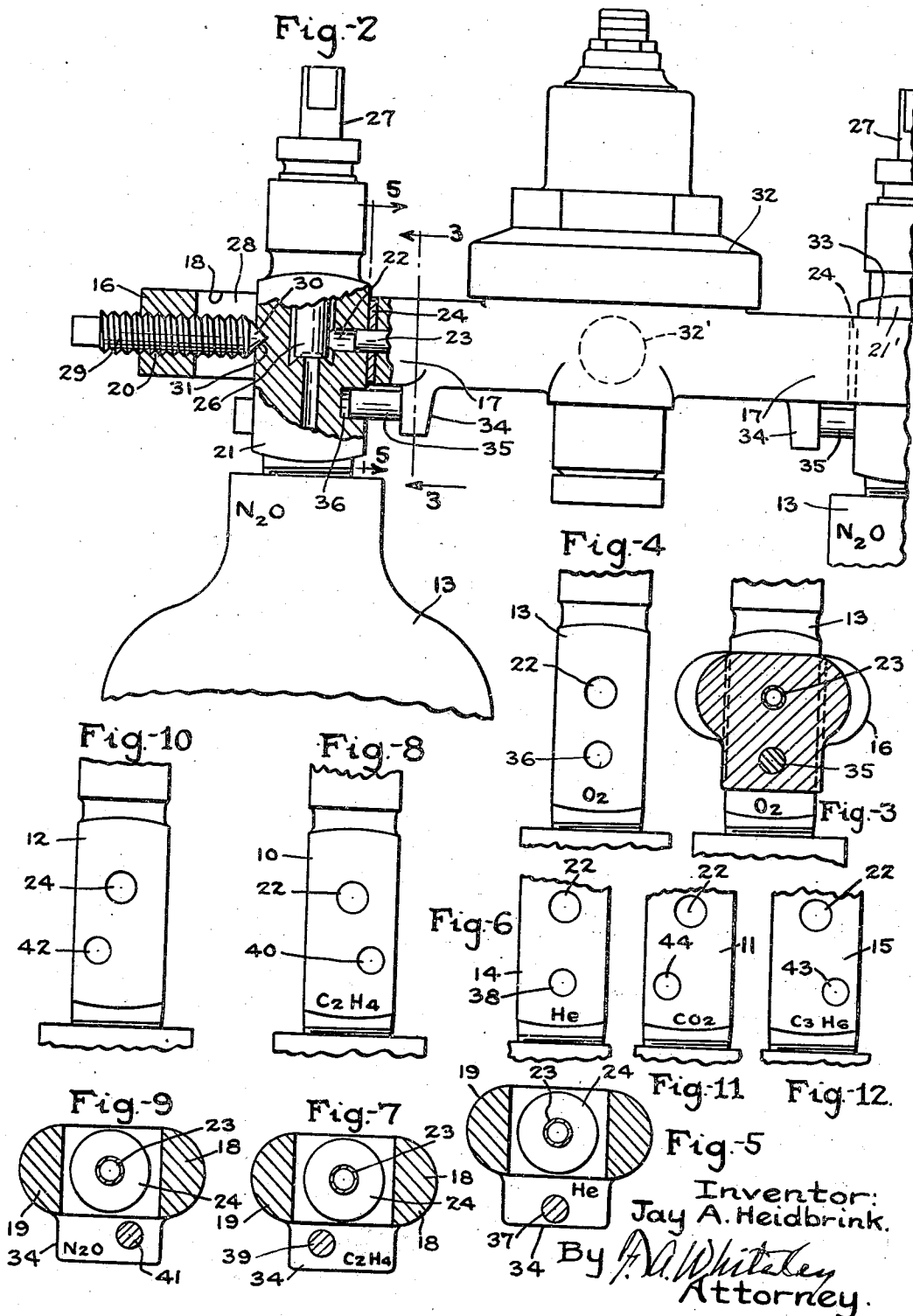
Feb. 2, 1943.

J. A. HEIDBRINK
DISPENSING GASES

2,310,021

Filed April 14, 1941

2 Sheets-Sheet 1



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Feb. 2, 1943.

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2 Sheets-Sheet 2

Fig-13

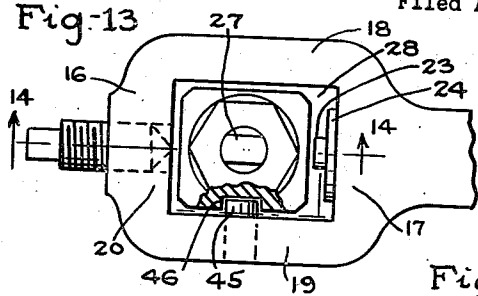


Fig-1

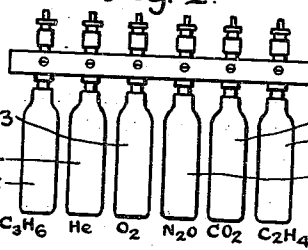


Fig-16

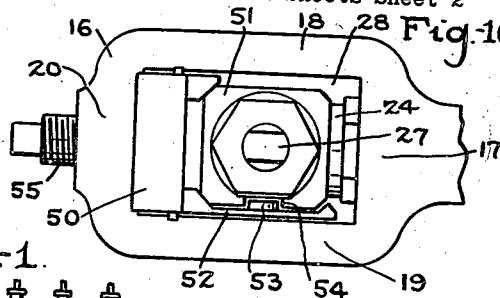


Fig-14

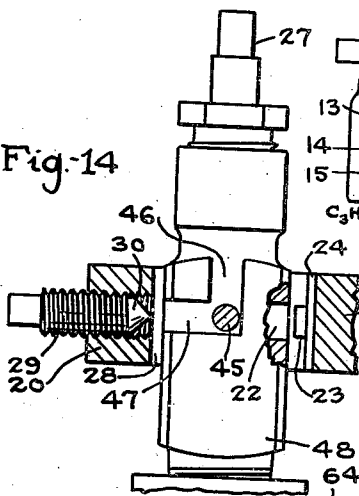


Fig-17

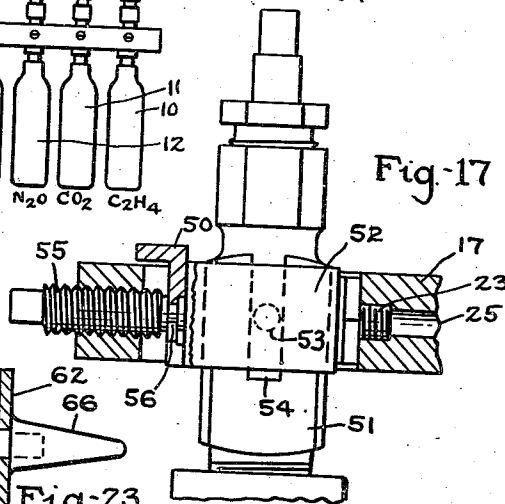


Fig-23

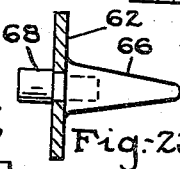


Fig-22

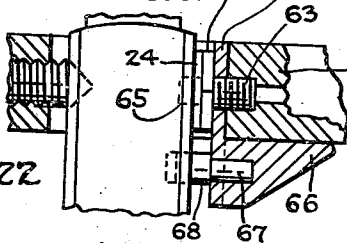


Fig-19

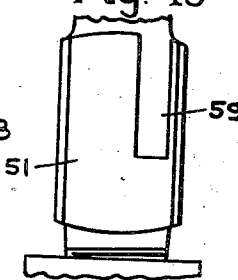


Fig-18

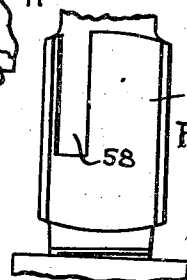


Fig-15

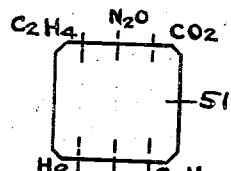
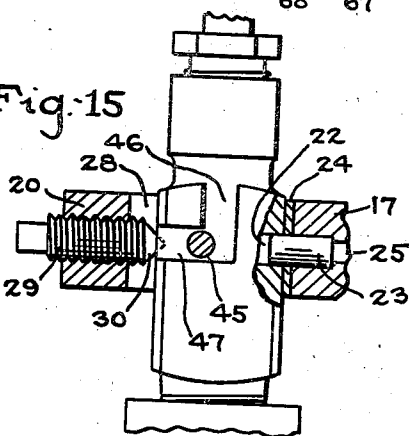
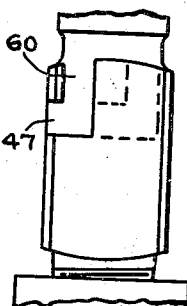


Fig-21

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Fig-20



UNITED STATES PATENT OFFICE

2,310,021

DISPENSING GASES

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Application April 14, 1941, Serial No. 388,448

5 Claims. (Cl. 128—188)

My invention relates to a method of dispensing gases for clinical use and means for safely positioning the containers of different gases in gas administering machines, and has for its object to effect connection of gas tanks, containing individually different gases with the gas conveying passages of a gas administering machine adapted for receiving indicated gases, in such manner that there can be applied to any particular gas passage of the machine only a gas container holding that particular designated gas.

In the administration of anesthetics, machines are customarily provided having means for delivering a considerable number of gases, such as helium (He), nitrous oxide (N_2O), oxygen (O_2), carbon dioxide (CO_2), ethylene (C_2H_4), and cyclopropane (C_3H_6). It is of great importance that certain gases are not caused to intermingle under high pressure, as some gases, such for example as ethylene and nitrous oxide, when mixed or intermingled under high pressure will spontaneously explode, and naturally such explosions might prove highly disastrous. It is customary in anesthetizing machines to provide double yokes leading to a single channel for conveying the gases to the administering passages. If tanks of different gases, such as ethylene and nitrous oxide, are set into these yokes, under certain conditions the gases may intermingle under pressure and such an explosion result. It is also important that connection of any indicated gas shall always be made with the proper administering passages.

It is a principal object of my invention, therefore, in a gas administering machine having interconnecting yokes for holding a plurality of tanks of the same gas, or multiple passages each arranged to deliver a different gas, to form, on the connecting means for each gas to go through the gas administering machine, a projecting portion differently positioned in respect to the nipple leading to the gas delivery passage for each said indicated gas, to form a depressed portion similarly shaped and positioned on the respective gas containers to be engaged by the projecting portion on the connector of the gas administering machine for the indicated gas, and filling said containers with the respective indicated gases whereby connection in the machine can be made only with a container of gas to go through the administering passages of the machine for that indicated gas.

It is a further object of my invention to provide a hanger yoke of an anesthetizing machine using multiple gases with means so related to

cooperating means on the several gas tanks or gas containers that it will be impossible to misplace tanks of specific gases in the machine or to secure a specific tank in the wrong position.

It is a further object of my invention to provide the hanger yoke with some kind of a projecting member adapted to enter a depression or opening in the body of the neck of the tank and to position these projections and openings in a respectively distinctive arrangement for each distinctive gas. It follows that only containers having an opening corresponding to the projection from a specific yoke on the machine can be applied to that yoke, and since that container will have stored within it by the gas manufacturer the particular gas designed to be delivered from that particular yoke, misplacing of containers will be prevented.

Specifically, it is an object of my invention to provide on the several yokes of a multiple gas administering machine a series of projecting pins each positioned in a different relation to the nipple on the yoke and to provide, in the securing necks of the various gas tanks, round holes correspondingly positioned whereby the tank containing the designated gas can be secured in operative position only in its proper place in the machine.

The full objects and advantages of my invention will appear in connection with the description in detail which will now be given, and the novel features by which the above enumerated advantageous results are obtained will be particularly pointed out in the claims.

In the drawings illustrating an application of my invention in one form:

Fig. 1 is a view showing diagrammatically an arrangement in an anesthetizing machine of a multiplicity of tanks of different gases as indicated by the symbols thereon.

Fig. 2 is an enlarged full sized view of a hanger yoke for any of said gases with some parts broken away and in section.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is a corresponding view of the tank neck showing the relative positions of the nipple seat and the pin seat for receiving a designated gas, say O_2 , in that particular yoke.

Fig. 5 is a view in the position of line 5—5 of Fig. 2 showing a different relative placing of the pin on the yoke.

Fig. 6 is a view of the side of the bottle neck showing the relative arrangement of the nipple seat and the pin seat corresponding to that of Fig. 5.

Fig. 7 is a sectional view similar to Fig. 5 with the pin in a different position relative to the nipple.

Fig. 8 is a view similar to Fig. 4 showing the arrangement of the nipple seat and the pin seat corresponding to that of Fig. 7.

Fig. 9 is a sectional view similar to Fig. 5 showing still another relative arrangement of pin and nipple.

Fig. 10 corresponds to the showing of Fig. 9 with the same arrangement of the valve pin relative to the nipple seat as that shown in Fig. 9.

Fig. 11 and Fig. 12 are similar to Figs. 4, 6, 8 and 10, showing other relative arrangements of nipple seat and pin seat.

Fig. 13 is a plan view of a yoke of standard construction and means of assembling the neck of a tank of gas therein for delivery of the gas through suitable passages to the machine.

Fig. 14 is a section taken on line 14—14 of Fig. 13 showing the parts before seating the gas delivering nipple in the nipple seat.

Fig. 15 is a view similar to Fig. 14 after such assembling has been completed.

Fig. 16 is a plan view of a slightly different form of assemblage of yoke and bottle neck.

Fig. 17 is a side elevation view of the parts shown in Fig. 16 with some parts in dotted lines.

Figs. 18 and 19 show necks of gas tanks with longitudinal slots positioned relatively in a different place from the slot of Fig. 17.

Fig. 20 discloses another form or another position of slot arrangement than that shown in Fig. 14.

Fig. 21 is a diagram showing that the variations of slot position of Figs. 17, 18 and 19 may be carried to opposite sides of the bottle neck of the gas tank.

Fig. 22 is a sectional view of a modification with a pin holder separated from the tank yoke.

Fig. 23 is a sectional edge view of the pin holding plate of Fig. 22.

As shown in Fig. 1, a series of tanks 10, 11, 12, 13, 14 and 15 may be supported in a single machine for administering anesthetizing gas in any suitable arrangement and each has connection through its yoke with valve passages (not shown) for delivering each of the specific gases in a certain definite way, as indicated on the machine. These several tanks might contain each a separate gas, for example, cyclopropane (C_3H_6), helium (He), oxygen (O_2), nitrous oxide (N_2O), carbon dioxide (CO_2) and ethylene (C_2H_4). Each of the different tanks of gas will be supported in a customary yoke 16 having a nipple base 17 connecting yoke arms 18 and 19 and screw base 20. As customarily formed, tanks 10, 11, 12, 13, 14 and 15 will be provided with tank neck 21 having a nipple seat 22 at one side for receiving a nipple 23 fast on the inside of the yoke, surrounded by a compression washer gasket 24. The nipple 23 leads to a passageway 25, Figs. 15 and 17, which conveys the gas from the tank to the regulator valve 32 and from there to the proper instrumentalities for delivering the gas to the patient, indicated in dotted lines as leaving the regulator valve at 32'. The gas is released by means of a valve piece 26, Fig. 2, operated by a valve head 27 adapted to receive a handle wrench for that purpose. As shown in Fig. 2 a second nipple base 33 is provided for connection with a second tank neck 21' having a nipple seat and nipple connection similar to the parts 22 and 23 shown at the right of Fig. 2. This is a customary double yoke

support for one indicated gas, in Fig. 2 indicated as N_2O .

In practice the neck 21 of any gas tank such as 10 to 15, inclusive, is inserted in the open space 28 of the yoke, Figs. 13 and 16, the nipple seat 22 pressed over the nipple 23 and the neck face forced into gas-tight junction with compression gasket 24 by means of a screw 29 which normally is provided with a conical end 30 adapted to enter a conical seat 31 in the side of neck 21.

My invention, consisting as it does of providing in the neck of the gas container some sort of opening or channel and providing on the yoke a projection for entering that opening or channel, the above parts being positioned in relation to the nipple seat and nipple so that only one so-formed container can be applied to a given yoke, will now be described, as to several different forms.

Referring to Figs. 2, 3 and 4, the yoke 16 provided with a depending portion 34 has formed thereon a pin 35 projecting outwardly directly below the nipple 23. The tank neck 13 (indicated for oxygen) in addition to the nipple seat 22 is provided with a cylindrical bore 36 positioned identically the same in relation to the nipple seat 22 as the pin is in relation to the nipple 23. With this arrangement it will be apparent that only a tank of gas having its neck so arranged can be applied to the nipple and yoke of Figs. 2 and 3.

Figs. 5 and 6 show the nipple 23 and nipple seat 22 in their customary position but disclose a pin 37 and a bore 38 which are still below the nipple and nipple seat but differently spaced from the pin 35 and bore 36 of the structure of Figs. 3 and 4 which would make impossible assembly of the bottle neck 14, indicated for helium, with the yoke arrangement of Fig. 3.

In Figs. 7 and 8 a pin 39 and bore 40 are angularly disposed to the nipple 23 and nipple seat 22 and hence present another combination wherein assembly of the gas tank 10, indicated for ethylene, could not take place with any yoke other than that having the disposition of the pin of Fig. 7. Likewise the structure of Figs. 9 and 10 have the pin 41 and bore 42 angularly disposed toward the opposite side of the yoke and tank neck from the disposition of these parts in Figs. 7 and 8 and hence the bottle neck 12 indicated for nitrous oxide can only be assembled with the yoke having the pin disposed as in Fig. 9, which in the anesthetizing machine would be the position for connection with the gas administering passages of nitrous oxide, and could not be assembled with any other yoke excepting that which would put the gas in communication with the nitrous oxide administering passages.

In Figs. 11 and 12 there are shown the tank necks 11 and 15 indicated for carbon dioxide and cyclopropane respectively wherein the bores 43 and 44 are angularly disposed with reference to the nipple seat 22, but are more widely spaced than are the nipple seats and bores 22, 40 and 22, 42 respectively and obviously these tank necks can be assembled only in yokes having pins positioned to enter the bores 43 and 44.

It will be noted in respect to Figs. 7 and 8 and Figs. 9 and 10 that since the respective yoke portions and tank neck faces are viewed in opposite directions the apparent arrangement of nipples 23 and pins 39 and 41 on the one hand and of nipple seats 22 and bores 40 and 42 on the other hand appear to have a variant angular disposition when, though factually, their disposition in each case is identically the same.

In the form of the invention shown in Figs. 13, 14 and 15, a pin 45 is fast on the side arm 19 of yoke 16. An L-shaped slot formed of a vertical portion 46 and a horizontal portion 47 is formed in the side of a tank neck 48, as clearly shown in Figs. 14 and 15, the horizontal slot 47 being in alignment with the nipple seat 22. In assembling, the tank neck 48 will be moved into the yoke so as to receive the pin 45 in the slot 46 and when the screw 29 is operated to lock the parts in position the pin 45 will travel along the slot 47. Obviously only when the pin 45 and the slots 47 are positioned respectively to be in alignment when assembly takes place, can there be such an assembly, so that the relative positioning of pin 45 and slot 46 will determine whether a designated tank can be assembled in a designated yoke.

In the form of the invention disclosed in Figs. 16 and 17, a piece 50 will be mounted to slide on the yoke arms 18 and 19. This piece carries a plate 52 adapted to be seated adjacent the inner wall of yoke member 19. Upon this plate 52 is an inwardly extending projection 53 which, in assembling, is adapted to enter a slot 54 on tank neck 51. A screw 55 engaging a bearing 56 on piece 50 forces the assemblage into gas conducting position. In Figs. 18 and 19 slots 58 and 59 are shown in the necks 51, which slots are offset to one and the other side from the position of slot 54.

It is obvious that only when the pin 53 on the plate 52 is so positioned relative to slot 54, 58 or 59 as to be able to enter the indicated one of said slots can the parts be assembled in gas-delivering position. It will be equally obvious that, by arranging a second set of slots similar to 54, 58 and 59 on opposite sides of tank neck 51 and, carrying plate 52 to said opposite side and correspondingly arranging the projections 53 thereon, a series of containers and yokes will be provided adapted for connection with all six gases indicated in Fig. 1.

As shown in Fig. 20 the same effect can be produced for the form of invention of Figs. 13, 14 and 15, by placing the vertical slot 60 toward one or the other edge of the side of the tank neck in relation to the horizontal slot 47.

As shown in Figs. 22 and 23, a modification of my invention permits the pin and hole connection of tank to yoke, of Figs. 2 to 12, inclusive, by means which is not directly connected or integral with the tank yoke, and which is adaptable to be applied to any tank yoke of existing gas administering machines, it being understood that the application of this feature will be made by the manufacturer and dispenser of the different gases.

In this form a plate 62 is secured upon the end of yoke 17 by means of a threaded shank 63 of a nut 64 which takes the place of nipple 23 and in fact has an extension indicated in dotted lines at 65 which constitutes the nipple extending through the gasket 24.

The plate 62 carries a depending part 66 which is adapted to engage the underside of yoke 17. Swaged into a hole in this depending part 66 is a pin member 67 which has a portion 68 extending outside of the face of plate 62. The exposed pin part 68 is adapted to enter the variously positioned holes 36, 38, 40, 42 and 44 formed in the necks of the gas containers.

In practice the plates 62 with the parts carried thereby will be attached to gas administering machine in use by or under the direction of an

agent of the gas dispenser, insuring their being properly so positioned. When that has been done it will be impossible to position any container of gas in that yoke and in connection with that indicated gas delivering passage excepting such a container as has the properly positioned hole which has been formed in the neck of the container at the factory, and such indicated gas as put in that container at the factory. It follows that with this arrangement equally with those heretofore described, mispositioning of any container of gas in the gas administering machine is rendered impossible.

The advantages of my invention will appear from the foregoing description thereof. Which-ever form of the invention is employed there will be means provided on the tank neck and yoke, respectively, wherein only a tank having complementary means on its neck can possibly be assembled in a given yoke in the machine, which yoke contains the gas delivering passages for taking to the patient an indicated gas. In this way the assembling of the wrong tank for delivery of a gas other than that indicated in the machine cannot take place.

A second highly important advantage is that this arrangement, particularly where the pin on the yoke enters an opening in the tank neck, provides a very effective tank stabilizer so that the invention serves a double purpose, each part of which is of great advantage in use.

I claim:

1. In a gas administering machine having yokes and nipples therein and passages leading from said nipples for the delivery of a plurality of indicated gases, means for connecting tanks of said gases in said yokes and to said nipples, comprising projections formed on the yokes, the projection on each yoke being differently positioned relative to the gas conducting nipple thereon from the position of projections in all other yokes, and depressions formed on the necks of the several tanks containing the indicated gases, the several depressions on each tank of said indicated gases corresponding in shape and position with the projections on the yokes for receiving the tanks of the several indicated gases, whereby a tank of an indicated gas can be secured only to the yoke and nipple leading to the passageway for delivering that indicated gas.

2. In a gas administering machine having yokes and nipples therein and passages leading from said nipples for delivery of a plurality of indicated gases, means for connecting tanks of said gases in said yokes and to said nipples, comprising pins formed on the yokes, the pin on each yoke being differently positioned relative to the gas conducting nipple thereon from the position of pins on all other yokes, and bores adapted to receive the pins formed on the necks of the several tanks containing the indicated gases, the several bores on each tank of said indicated gases corresponding in size and position with the pins on the yokes for receiving the tanks of the several indicated gases, whereby a tank of an indicated gas can be secured only to the yoke and nipple leading to the passageway for delivering that indicated gas.

3. In a gas administering machine having yokes and nipples thereon in pairs, and a passage leading from each pair of yokes for the delivery of an indicated one of a plurality of gases adapted to be supported on and administered by the machine, each yoke of said pairs having a projecting member similarly positioned,

the projecting members being differently positioned on the different pairs, and tanks having depressions in their necks similar and correspondingly positioned severally with the projections on the pairs of yokes for the indicated gases, whereby pairs of tanks of an indicated gas can be secured only to pairs of yokes and their nipples leading to the passageway for delivering that indicated gas.

4. A method of dispensing gases for clinical uses so as to make certain the position of containers of identical gases in double yokes each having a passageway leading to a common passageway for passing one indicated gas through each of said passageways and to insure correct delivery of each of a multiplicity of different indicated gases through the passages of different yokes of a gas administering machine for administering such indicated gases, said sets of passages for each yoke severally terminating in nipples, which consists in forming on the several yoke portions of each set of yokes projections differently positioned in respect to the nipple for gas delivery passage for each said indicated gas, forming a depressed portion similarly shaped and positioned on the connecting portions of the respective gas containers to be engaged by the projecting portion on the yoke for the indicated gas, filling said containers with the respective indicated gases, whereby connection in the machine can be made only with such a filled container of gas as indicated on the tank and on

the machine to go through the yoke passages and administering passages of the machine for that indicated gas, and applying the depressed portion of the neck to the projecting portion of the yoke and connecting the gas containers of an indicated gas with the indicated gas passages of the gas administering machine.

5. In a gas administering machine having double yokes and nipples thereon and a passage from each nipple leading to a common delivery passage, and said delivery passage leading from the yokes of each pair for delivery of an indicated one of a plurality of gases, containers for each of said gases adapted to be connected in pairs and supported by the successive double yokes, said gases to be administered by the machine, the yokes of each of said pairs of yokes having a formation thereon differently constructed and positioned from the formations on the yokes of each of the other pairs, the containers being formed with necks to be secured in the yokes and the containers for each different gas having formations thereon complementary to the formations of the pair of yokes indicated for administering said gas, whereby tanks of an indicated gas can be secured singly or in pairs only to the yokes indicated for the administration of the particular gas stored in the tanks and mingling of different gases in any yoke passageway will be prevented.

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