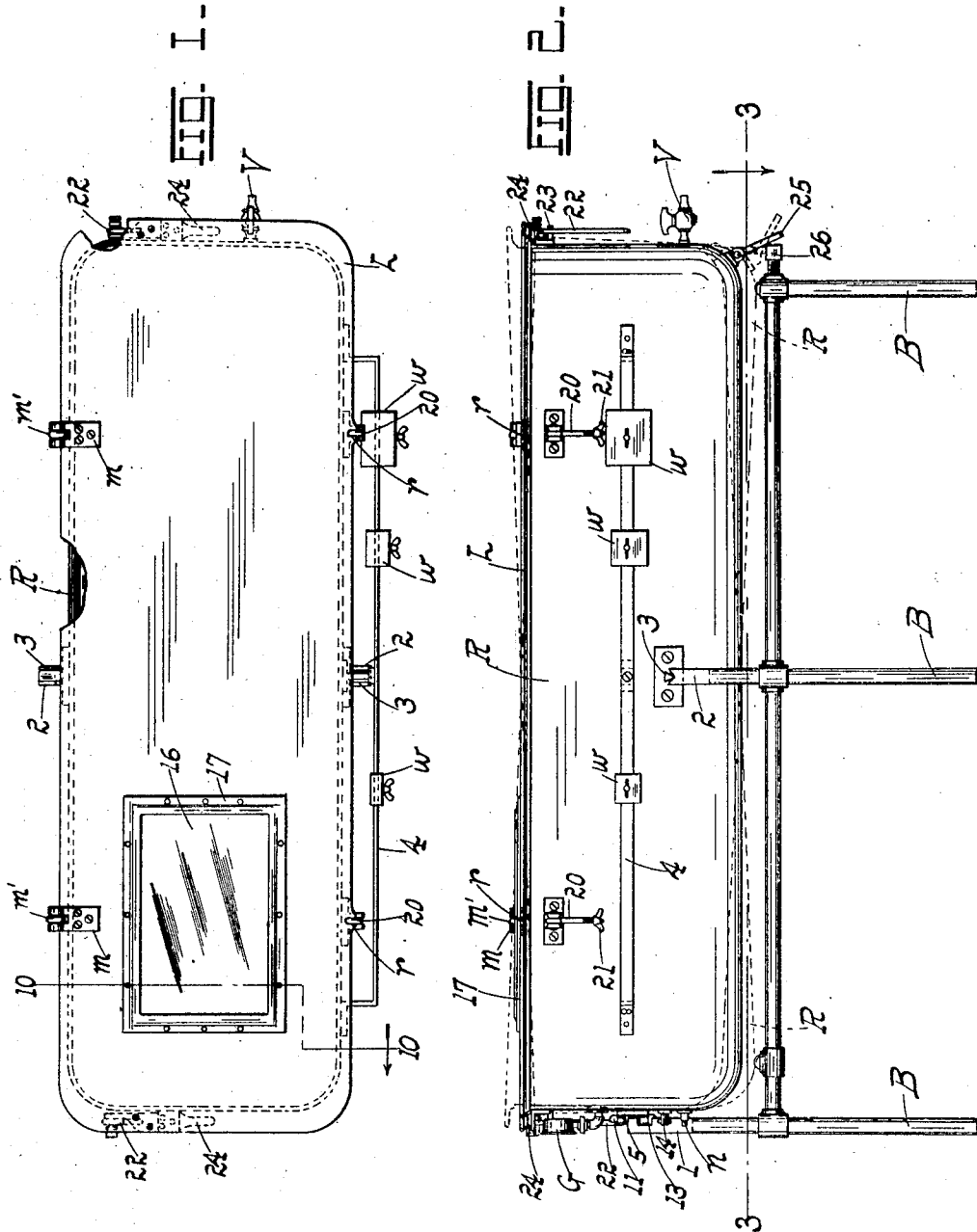


W. G. EUSTON.
RESUSCITATING APPARATUS.
APPLICATION FILED MAY 26, 1911.

1,031,109.

Patented July 2, 1912.

3 SHEETS—SHEET 1.



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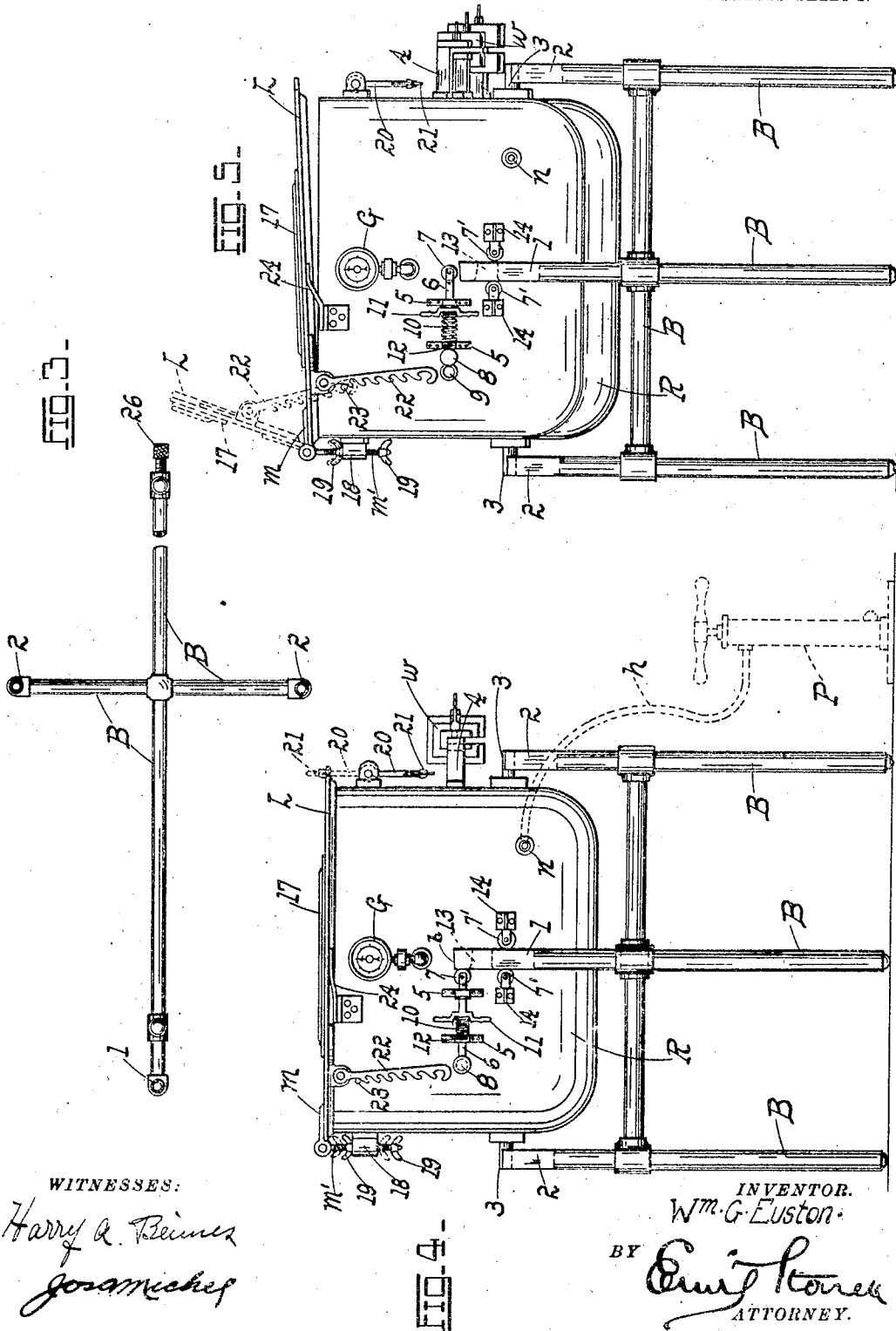
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3 SHEETS-SHEET 2.



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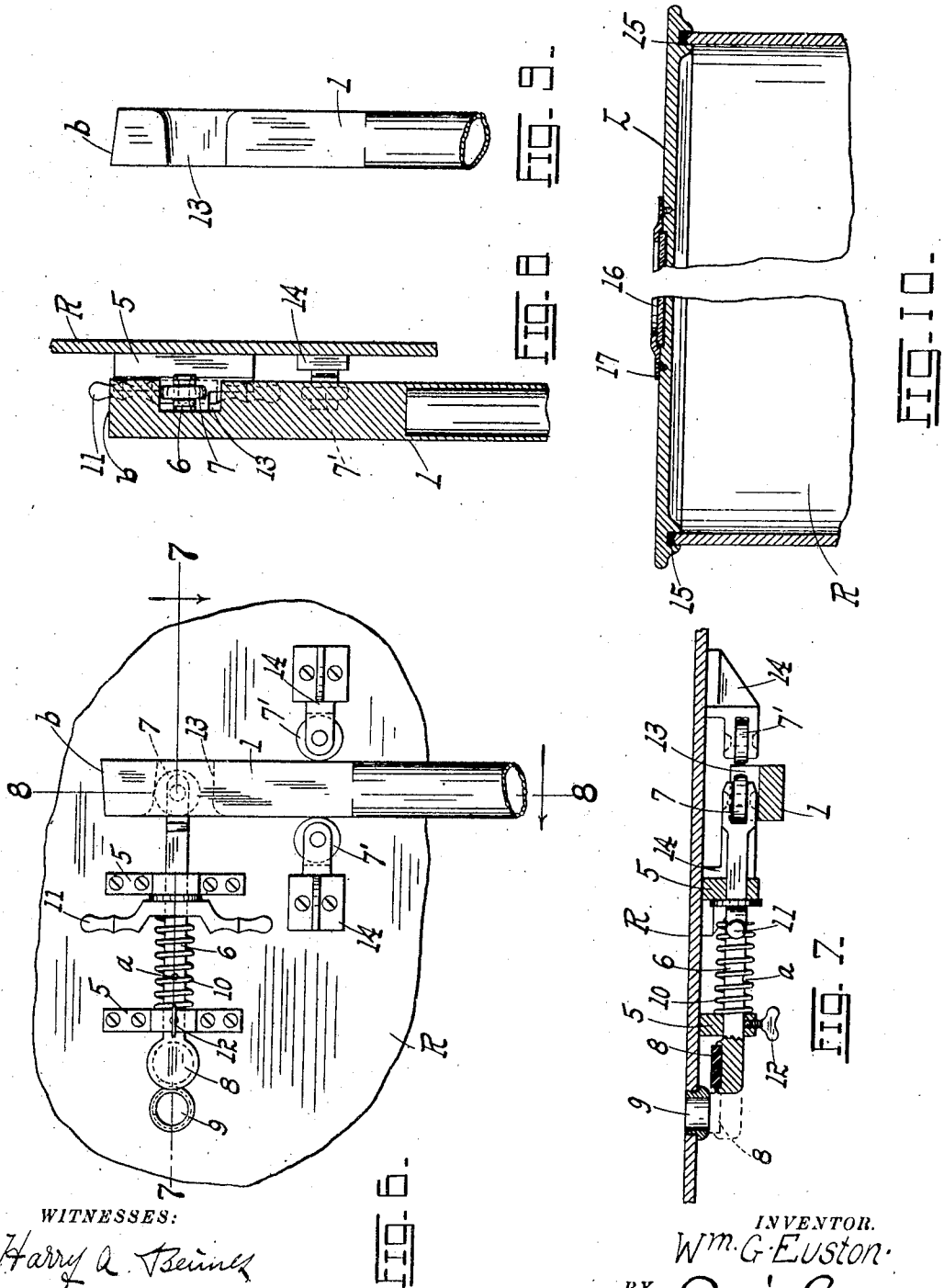
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3 SHEETS-SHEET 3.



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RESUSCITATING APPARATUS.

1,031,109.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed May 26, 1911. Serial No. 629,680.

To all whom it may concern:

Be it known that I, WILLIAM G. EUSTON, citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Resuscitating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in resuscitating apparatus; and it consists in the novel features of construction more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a top plan of the apparatus, with parts broken away; Fig. 2 is a side elevation showing the receptacle perfectly balanced and set for operation; Fig. 3 is a horizontal section on the line 3—3 of Fig. 2; Fig. 4 is an end elevation of Fig. 2; Fig. 5 is an end elevation showing the receptacle unbalanced or out of equilibrium; Fig. 6 is an enlarged elevational view of the spring-controlled trigger-valve and portion of the stationary frame cooperating therewith and with the receptacle or body-receiving casket; Fig. 7 is a horizontal sectional detail on the line 7—7 of Fig. 6; Fig. 8 is a vertical sectional detail on the line 8—8 of Fig. 6; Fig. 9 is an inner face view of the upper end of the guide-standard which cooperates with the trigger-valve carried by the tilting receptacle; and Fig. 10 is an enlarged cross-section on the broken line 10—10 of Fig. 1.

The principle of operation of the present apparatus depends on the fact that an apparently lifeless body deposited in a receptacle or chamber from which the air is partially (or wholly) exhausted, will respond to the unnatural environment thus produced, in the form of an involuntary muscular movement, such movement suggesting (if not indicating) the presence of life in such body. In one form of my invention such muscular movement is availed of to operate a valve (normally closed) so as to instantly admit an inrush of atmospheric air into the receptacle, thereby restoring not only the proper quantity of oxygen necessary to sustain life, but destroying the partial vacuum or rarefaction within the receptacle which produced the muscular movement referred to. In such embodiment of my invention the restoration of the normal conditions of pressure

and air within the receptacle is effected automatically, though the invention broadly contemplates such restoration either automatically or by the hand of the attendant observing such muscular movement, and it is therefore the object of my invention to provide an apparatus in which the process of air abstraction or rarefaction and subsequent restoration of the full complement of air may be carried on in a most convenient manner.

In detail the invention may be described as follows:—Referring to the drawings, B represents a suitable supporting frame or base composed of piping in the form of a T and having terminal legs (Fig. 3), the front leg having an upper extension or standard 1, and the side legs having upper extensions 2, the terminals of said extensions being preferably solid, and square in cross-section (Figs. 2, 5, 6, 8). The tops of the extensions 2 are provided with V-shaped bearings for the support of the knife-edge trunnions 3 disposed on the sides of the tilting body-receiving casket or receptacle R, one of the side walls of the latter being provided with a rail 4 along which are adapted to be shifted a series of counterpoise or balance weights *w* on the order of a scale-beam, the object of the weights being to accurately balance the receptacle R after the apparently lifeless body of a human (or other) being has been deposited therein for purposes of resuscitation. The suspension trunnions 3 are in the middle of the receptacle and the latter when empty balances perfectly; but after a body is deposited therein, (the trunk being as a rule heavier than the limbs) suitable adjustment by sliding the weights *w* along the rail 4 must be made to restore equilibrium to the receptacle.

Mounted to reciprocate in straps or bearing 5, 5, on the front end wall of the receptacle R, is a stem or trigger 6 one end of which (that adjacent the standard 1) is forked and carries an anti-friction roller 7, the opposite being provided with a disk gate-valve 8 adapted to cover and uncover a port formed by the hollow bushing or screw-ring 9 secured to the receptacle wall in the path of reciprocation of the stem 6. The latter is normally forced into engagement with the standard 1 by the expanding action of a compression spring 10 coiled about the stem and interposed between the outer strap 5 and

a handle-bar 11 carried by the stem, the handle-bar serving as a bearing for one end of the spring and the strap 5 serving as an abutment for the opposite end. The outer strap 5 too, is provided with a set-screw 12 which coöperates with a depression a formed in the stem or trigger 6 to hold the stem against movement when the apparatus is being set, as presently to be more fully described. The upper end of the standard 1 is formed with an inclined face b (Fig. 6) at a suitable distance below which the standard 1 has formed therein, and in the path of reciprocation (oscillation) of the roller 7, a notch or groove 13 for the reception of the roller when the latter has passed off the side or edge of the standard with any downward tilt of the receptacle R. The end wall of the latter is provided with anti-friction rollers 7' carried by brackets 14, the rollers engaging the opposite sides of the standard 1. The receptacle is provided with any conventional pressure or vacuum-gage G and with a suitable nipple n (with usual check-valve as understood in the art) for the attaching of a hose h leading from any convenient form of exhauster or vacuum-pump P.

The receptacle is provided with a lid L equipped with a rubber gasket or packing 15 adapted to engage the upper edges of the receptacle (Fig. 10), a glass plate or window 16 held by a frame 17 to the lid being placed in proper position to view the body deposited in the receptacle. The lid is hinged to the receptacle, and preferably by hinges composed of a leaf m secured to the lid, the leaf being hinged to a screw-bolt m' passed loosely through a bearing 18 on the side wall of the receptacle, and provided with wing-nuts 19, 19, on opposite sides of the bearing (Figs. 4, 5). The opposite wall of the receptacle is equipped with latch bolts 20 which may be swung into recesses or notches r , the tightening nuts 21 on the bolts coming over the notches whereby the driving home of the nuts clamps down the lid. To secure an even draft on the lid when clamping the same down, the lower nut 19 may be turned so as to pull down on the bolt m' (the upper nut being loosened temporarily the necessary degree as per dotted position in Figs. 4, 5) at the same time that the nuts 21 are being driven home. These mechanical expedients however, are not claimed herein as various constructions of lid and joints might be adopted by the skilled mechanic. The lid is provided with toothed swinging props 22, the notches between the teeth being adapted to engage a pin 23 on the receptacle wall, and thus hold the lid open to any desired degree while depositing the body of the person to be resuscitated into the receptacle. The latter is further provided with flexed-springs 24 which engage

the bottoms of the overhanging portions of the lid, and raise the same to admit air into the receptacle after the unfastening of the latch-bolts, as will be more fully subsequently explained.

The rear bottom corner of the receptacle R is provided with a pendent or swinging leg 25, which, for a balanced position of the receptacle R, or when the receptacle has tilted downwardly at that end, bears with its side against a plug or bearing 26 screwed into the end of the long pipe of the supporting frame B, but which, with the tilting of the receptacle in the opposite direction swings vertically into engagement with said bearing 26, thus serving as a prop for the receptacle, and holding the same against a possible return to its position of equilibrium, all as will be more fully apparent from a description of the operation of the invention, which is substantially as follows:—

The apparently lifeless person is deposited in the receptacle R, the lid L is clamped down as described, and the weights w are manipulated along the rail or beam 4 until the receptacle is perfectly balanced. While the receptacle is being balanced (or rather to permit of the balancing thereof), the attendant first draws the stem or trigger 6 so as to bring the valve 8 thereof opposite the port in the hollow ring 9, by seizing the handle-bar 11 and compressing the spring 10 until the depression a comes opposite the set-screw 12, whereupon by driving home the screw the stem will be held in the position referred to. The valve 8 being set to closed position, brings the roller 7 opposite the edge of the standard 1, so that with any oscillation of the receptacle, the roller will play along the standard. The arc of oscillation for the length of sweep accorded the roller in practice is so slight, that it is practically a straight line, the full sweep being confined between the terminal bevel face b and the recess 13. When the receptacle is balanced, the roller 7 bears against the edge of the standard 1 at a point substantially midway between the lower edge of the face b and the recess 13 (Fig. 4), and the receptacle is then considered to be set for action. At this moment the set-screw 12 is loosened to allow the spring 10 to act the moment the stem or trigger 6 is released by the passage of the roller 7 off the edge of the standard against which it bears, said release causing the stem to be forced either over the face b or into the recess 13 depending in which direction the receptacle has tilted. The moment the receptacle has been balanced, the attendant starts the vacuum-pump or exhauster P, thereby abstracting the air from the receptacle (or rarefying the atmosphere within it) and then immediately unfastening the latch-bolts 20 from the lid. The lid will now be held down not by the latch

bolts, but by atmospheric pressure alone. If the body in the receptacle has life in it, it will rebel against the vacuum (or partial vacuum) with which it is now surrounded, and give a spasmodic (muscular) movement, which movement will destroy the equilibrium of the receptacle and body, causing the receptacle to tilt in one direction or the other about its knife-edge trunnions 3.

Should the "head" of the receptacle drop or tilt down, the roller 7 will ride off the edge of the standard 1, the spring 10 forcing the stem 6 into the groove or recess 13, and drawing the valve 8 with it so as to uncover the port in the ring 9 (Figs. 6, 7), the pend-ent 25 dropping against the bearing 26 so as to prevent any accidental return of the receptacle to its original position. The opening of the valve 8 allows an inrush of air into the receptacle through the port in the bushing 9, thus restoring the necessary oxygen to the respiratory organs of the body in the receptacle. The inrushing air too, restores the atmospheric pressure within the receptacle, thus allowing the flexed springs 24 to act on the lid L and raise it to give the resuscitated person plenty of air. Should any spasmodic or muscular movement of the apparently lifeless person happen to tilt the receptacle in the opposite direction, that is, to depress the "foot" of the receptacle, the roller 8 will pass off the standard 1 and over the race 6 (Fig. 5), thus again uncovering the port in the bushing 9 and allowing an inrush of air into the partially exhausted chamber of the receptacle. The muscular movements of the body by which the equilibrium of the receptacle is destroyed are due to the unnatural environment brought about by the vacuum in the receptacle, against which environment the body rebels. A slight movement of course, destroys the equilibrium of the receptacle, and hence the valve-stem or trigger 6 responds instantly.

The production of a partial vacuum in the receptacle holding the body is of course but one method of abstracting the oxygen from the receptacle containing the body, such abstraction being the equivalent of rarefying the air (the nitrogen being abstracted simultaneously by the exhaustor or pump). Any other method (such as a chemical process) of destroying the oxygen within the receptacle so that the body may be convulsively or muscularly affected is within the contemplation of my invention, since it is the abstraction of oxygen which is primarily depended on to produce the result here sought.

The automatic action of the apparatus need not be depended on, for the attendant watching the body, may, the moment he observes signs of life therein, simply open an air-cock or valve V of any ordinary type,

and allow an inrush of air into the receptacle. The automatic action however may be used where no attendant may be present.

Having described my invention, what I claim is:—

1. In a resuscitating apparatus, a receptacle for the deposit of an apparently lifeless body, in combination with means for abstracting air from the receptacle, the latter being provided with means for admitting oxygen to the respiratory organs of the person in the receptacle.

2. In a resuscitating apparatus, a receptacle for the deposit of an apparently lifeless body, in combination with means for abstracting air from the receptacle, and means for readmitting a proper complement of air to the respiratory organs of the person in the receptacle, upon the body showing signs of life.

3. In a resuscitating apparatus, a suitable movably mounted receptacle having inclosing walls, and provided with means for exhausting the air from within the receptacle, the receptacle wall having an inlet port, a valve normally covering said port, and means for opening said valve and uncovering said port with a movement of the receptacle from a predetermined position.

4. In a resuscitating apparatus, a suitable tilting receptacle, mounted to oscillate about a substantially central axis, and provided with means for exhausting the air therefrom, an air inlet port being formed in one of the walls of said receptacle, a spring-controlled valve movable across said port, a stem for the valve, a member for engaging one end of the stem and arresting movement thereof to maintain the valve in position over the port, and suitable formations on said member to allow for the release of the stem with any oscillation of the receptacle whereby the port is uncovered and air admitted to the receptacle.

5. A resuscitating apparatus comprising a vertically oscillating receptacle balanced upon the deposit of the body therein, and suspended about a substantially central transverse axis, a fixed standard positioned in front of one of the terminal walls of the receptacle, said wall being provided with an air inlet port, a spring-controlled valve movable across the port, a stem for the valve moving in a line transverse to the standard, a roller on the stem engaging the standard and forced against the same by the expanding action of the spring, the standard having a recess or a portion removed from the body thereof, in the path of travel of the roller whereby with a given oscillation of the receptacle the roller end of the stem is brought opposite said recess or beyond the end of the standard, and the stem moved under the action of the spring and the port aforesaid is uncovered, and means for ex-

hausting the air from the receptacle whereby a movement in the body deposited therein takes place, and the necessary oscillation is imparted to the receptacle, for the purpose
5 set forth.

6. In a resuscitating apparatus, a vertically oscillating centrally mounted receptacle for the deposit of a living body, and suitable means for balancing the receptacle
10 and body deposited therein, a movement of the body being adapted to disturb the equilibrium of the receptacle.

7. In a resuscitating apparatus, a vertically oscillating centrally mounted receptacle for the deposit of a living body, means
15 for balancing the receptacle and body so deposited, and means for locking the receptacle against a return to its balanced position, once the equilibrium is destroyed by a
20 movement of the body in the receptacle.

8. In the resuscitation of persons apparently lifeless, the method of depositing the person in a receptacle, and abstracting therefrom suitable portions of oxygen whereby
25 the air within the receptacle and about the head and chest of the person is rarefied, and

admitting a proper complement of oxygen into the receptacle and to the respiratory organs of the body with any indications of life therein.

9. In the resuscitation of persons apparently lifeless, the method of placing the body in a receptacle and producing a partial vacuum in the same, and admitting a proper complement of air into the receptacle
35 to the respiratory organs of the body with any indications of life therein.

10. In the resuscitation of persons apparently lifeless, the method of exposing the respiratory organs and mouth of the person
40 while in a reclining position to a gas deficient in oxygen, whereby muscular movement in the body of such person results, then supplying a proper quantity of oxygen to said organs, upon detection of such move-
45 ment.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM G. EUSTON.

Witnesses:

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JOS. A. MICHEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."