Nov. 6, 1951 C. F. EATON 2,574,091

RESUSCITATION APPARATUS

Filed Jan. 8, 1948 2 SHEETS—SHEET 1

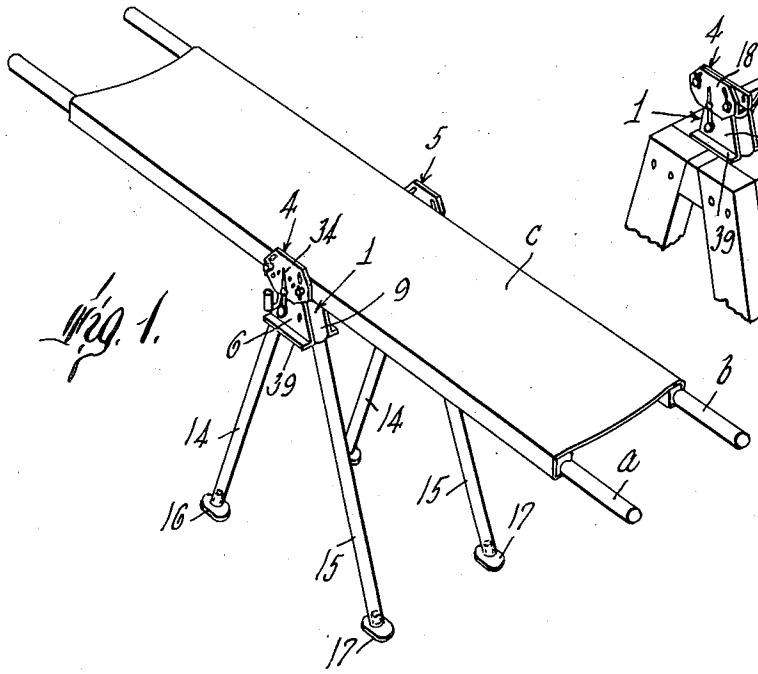


Fig. 1.

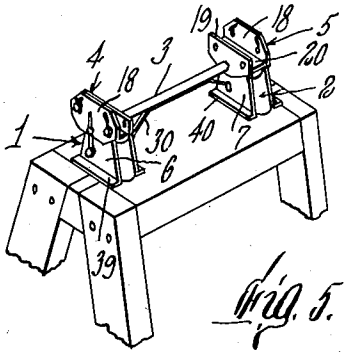


Fig. 5.

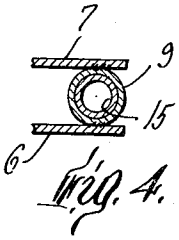


Fig. 4.

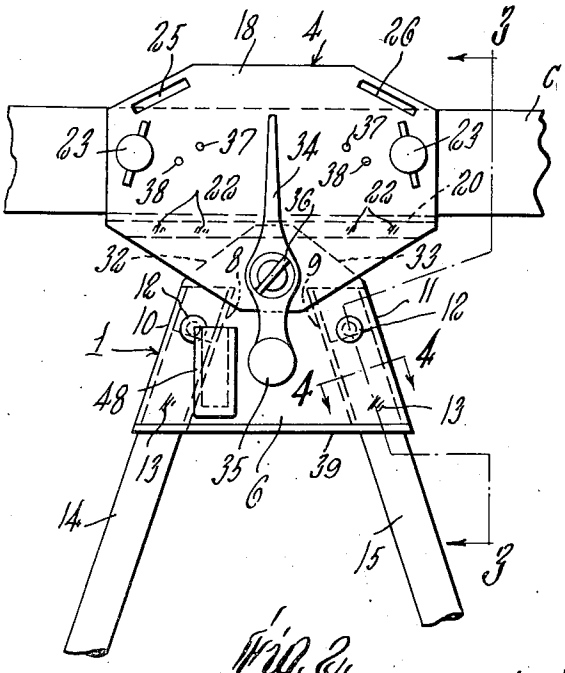


Fig. 2.

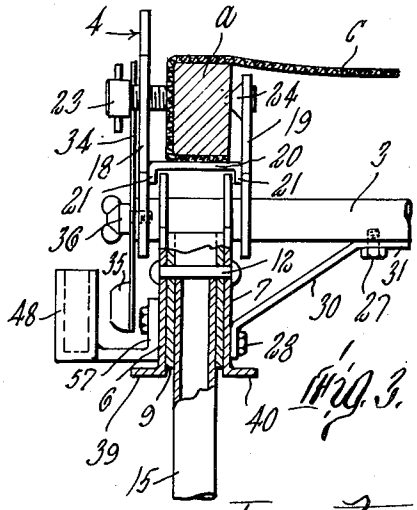


Fig. 3.

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Filed Jan. 8, 1948 2 SHEETS—SHEET 2

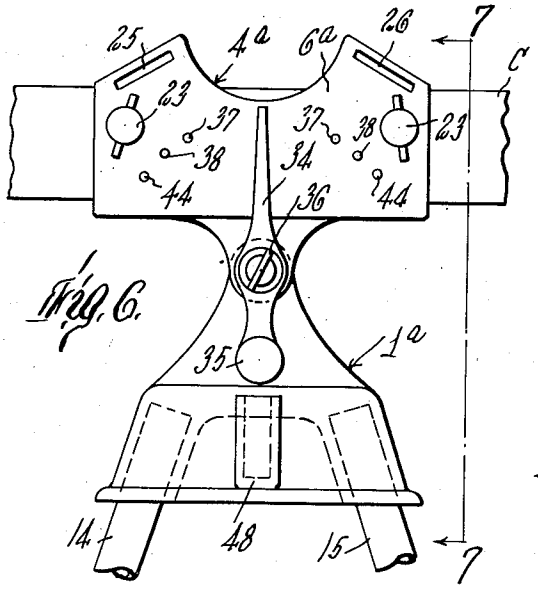


Fig. 6.

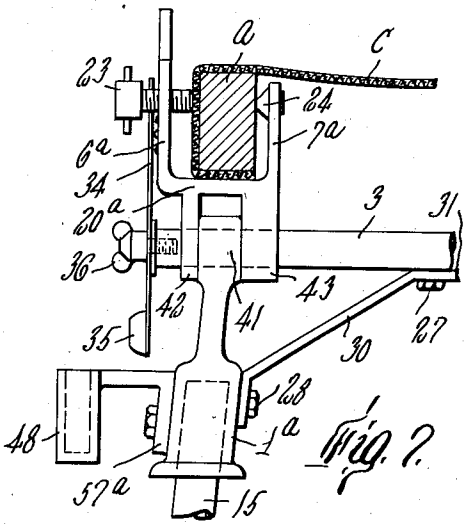


Fig. 7.

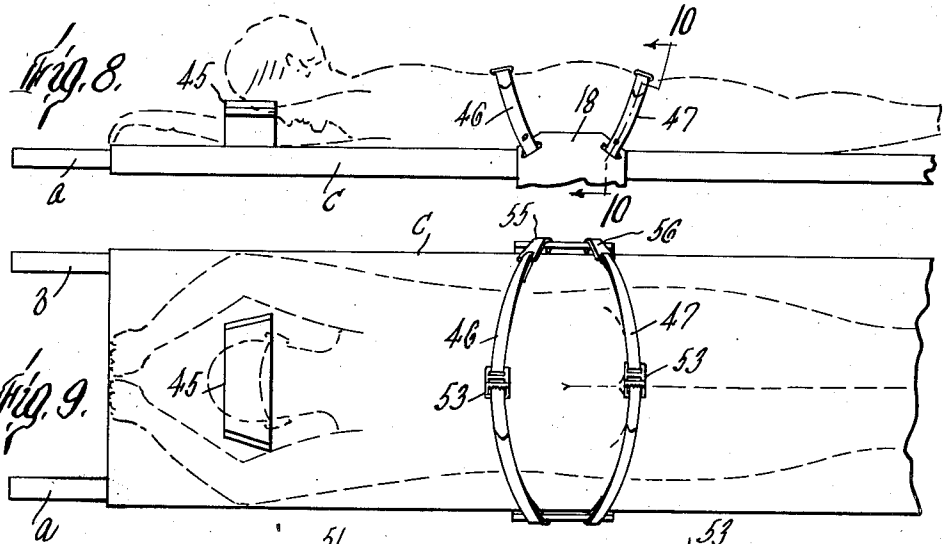


Fig. 8.

Fig. 9.

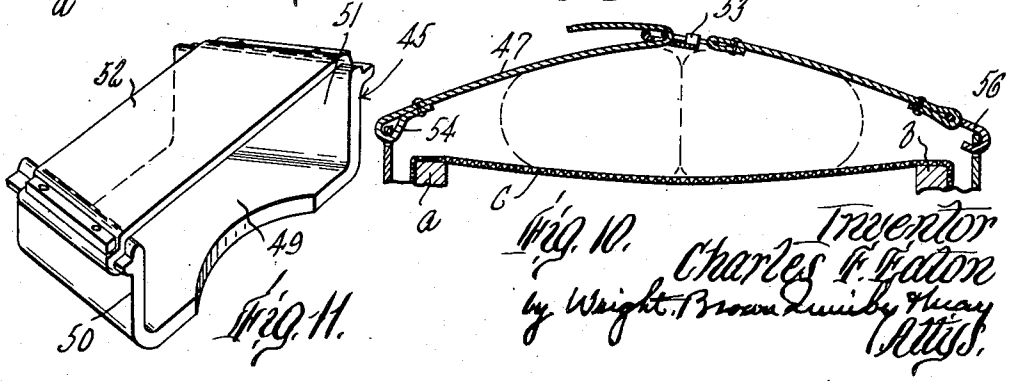


Fig. 11.

Fig. 10.

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UNITED STATES PATENT OFFICE

2,574,091

RESUSCITATION APPARATUS

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Application January 8, 1948, Serial No. 1,226

29 Claims. (Cl. 128—28)

1

The present invention relates to the method of resuscitation of persons who are victims of asphyxia, shock, or both, according to which the affected person, supported in a prone position, is rocked about a transverse horizontal axis so as to tilt his body alternately head downward and feet downward. In this procedure, when the body is tilted head downward, the abdominal organs and diaphragm are displaced by gravity toward the chest, compressing the lungs and thereby expelling water or asphyxiating gases, and a flow of blood to the brain occurs. When tilted so that the head is raised and the feet lowered from the horizontal position, the organs and diaphragm gravitate downward, expanding the lungs to draw in air and causing a reverse flow of blood. By rhythmic repetition of such alternating tilting movements, the apparently drowned or otherwise asphyxiated, but living, person is induced to breathe naturally and circulation of blood which has left the brain as the result of shock is restored.

Apparatus heretofore used for this purpose have included stretchers and fulcrum supports. In one type of such apparatus the fulcrum support is a framework having a wide base and a single cross bar at the top. Conventional collapsible stretchers are used with this support, the side bars of the stretcher extending over the cross bar of the support and being made fast thereto so that they will not slip when the stretcher is tilted at a steep angle. In using this apparatus, the unconscious victim must be lifted in order to be placed on the stretcher, which requires the cooperation of five or more people to hold the body straight while lifting it and to steady the stretcher; and care must be taken to locate the body on the stretcher with its center of gravity as near as possible to the cross bar. Also the cross bar prevents the overlying fabric of the stretcher from yielding under the weight of the body and makes a ridge which presses into the abdomen and impedes the movements of the organs which produce compression and expansion of the lungs. Another type of equipment, which is used on boats, includes a basket stretcher to which at mid length is permanently connected a cross bar, and two rigid uprights secured permanently to the deck of the boat having sockets at their upper ends in which to receive the trunnion ends of such cross bar. In using it, the victim of drowning is first lashed in the stretcher when pulled out of the water; and it is very likely that the body will be so placed that its center of gravity is distant from the cross bar.

2

The importance of centering the body as nearly as possible with the fulcrum axis is to avoid liability to derangement of the tilting rhythm and avoid excessive fatigue to the operators who, stationed at the opposite ends of the stretcher, raise and lower the ends alternately. If the combined weight of the person and stretcher is not evenly balanced, there is an ever present danger that the rhythm will be varied.

One of the objects of this invention is to provide a supporting means with which a stretcher can be connected for tilting movement after the victim of asphyxia or shock has been placed on the stretcher, and with respect to which the stretcher bearing the victim can be adjusted so as to bring the center of gravity thereof directly over the fulcrum axis. Another object is to furnish a demountable stretcher support which can be stowed away when not in use and erected for emergency use almost in an instant. A further object is to produce such apparatus at a cost moderate enough to enable them to be procured by municipal police and fire departments, the proprietors and custodians of bathing resorts, camps and other resorts, hospitals, etc., in numbers adequate to meet probable emergencies.

The invention comprises supporting units having the novel characteristics later described and combinations of such units with stretchers to form tiltable body supports.

This application is a continuation in part of my prior now abandoned application filed December 5, 1946, Serial No. 714,350, entitled Demountable Stretcher Support.

In the accompanying drawings which illustrate the invention in different embodiments,

Fig. 1 is a perspective view showing the combination of one form of my novel supporting means and a stretcher operatively assembled;

Fig. 2 is a side elevation of the central portion of the equipment shown in Fig. 1;

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

Fig. 4 is a detail sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a perspective view showing the stretcher supporting elements of the invention mounted on a trestle or horse;

Fig. 6 is a view similar to Fig. 2 showing a variation of the stretcher supporting elements;

Fig. 7 is a sectional elevation of the parts shown at the left of line 7—7 of Fig. 6;

Figs. 8 and 9 are, respectively, a side elevation and a plan view of the combined apparatus showing the position in which a person is placed on

the stretcher for resuscitation, means for holding his body thereon, and a head support;

Fig. 10 is a cross sectional view of the stretcher and holding means taken on line 10—10 of Fig. 8, showing the relation thereof to a person's body lying on the stretcher;

Fig. 11 is a perspective view of a head rest or support which forms a part of the equipment which constitutes this invention.

Like reference characters designate the same parts wherever they occur in all the figures.

In these drawings, *a* and *b* represent the side bars and *c* the body-supporting part of a stretcher; typifying any standard or other stretcher on which an unconscious person can be laid and carried by bearers. The novel features of the invention reside in supporting units combinable with a stretcher for the purpose precedently named, and also for making a temporary table.

The unit shown in Figs. 1–5 is composed of two bases 1 and 2, an axle 3, clips or stretcher connectors 4 and 5 coupled pivotally to the bases 1 and 2, respectively, by means of the axle 3, and a brace 30 secured to the axle and to the bases 1 and 2.

The bases 1 and 2 are alike and so also are the connectors 4 and 5 alike. Hence the description which follows of the base 1 and connector 4, shown on a larger scale in Figs. 2, 3 and 4, will suffice for both. Such base is made of two plates designated 6 and 7, respectively, and two short lengths of tubing 8 and 9, respectively. These plates and tubes are preferably of steel to have adequate strength with moderate dimensions and to permit of union by welding. The plates are cut with side edges 10 and 11 inclined to one another at an acute angle suitable for the flare of the legs later described, and the tubes are located between the plates near and parallel to these edges, as shown by broken lines in Fig. 2. Each of the tubes is secured to the plates 6 and 7 by a rivet 12 and one or more spot welds, such as those indicated at 13 in Fig. 2. The rivets serve not only as fastening means, but also as stops or abutments for inserted legs, and are located far enough inward from the lower ends of the tubes to permit entrance of the ends of legs to an adequate distance.

The tubes 8 and 9 constitute leg sockets. The legs previously referred to are shown at 14 and 15. They may be made of lengths of steel tubing of suitable diameter to slip easily into and out of the socket, and they have foot pieces 16 and 17 secured to the lower ends.

Alined holes are provided in the upper part of the plates 6 and 7 to contain one end of the axle 3. Such axle is a tube, or it may be a solid bar, of which the ends are located in the alined holes of both bases 1 and 2, and are of circular cross section to serve as pivots for the clips or connectors 4 and 5.

Each clip or connector is composed of an outer side plate 18, an inner side plate 19, and a bottom plate 20. The bottom plate 20 is located between these side plates at a height between the top and bottom edges thereof, and is formed with bent over flanges 21 at its opposite longitudinal edges, which are united to the side plates by spot welds, indicated by the shaded areas 22 in Fig. 2. The dimensions of the bottom plate 20 are such that, when thus united to the side plates 18 and 19, the latter are in parallel planes and are spaced apart widely enough so that the portions thereof which extend below the bottom plate, and are perforated to admit the adjacent pivot end of the axle 3, embrace the side plates of the base with freedom for rocking movement on the pivot. These overlapping side plates of the clip and base establish an interengaged relationship which prevents displacement of the clip along the axle. Also the spacing between these plates is wide enough to admit freely one of the side bars, as *a*, of the stretcher above the bottom plate 20.

Set screws 23 are threaded through the outer plate 18 and spurs or knobs 24 are mounted in alinement with them in the inner plate 19 to cooperate in gripping the stretcher bar when the latter is placed in the connector. Two such screws and spurs are shown, located near the opposite ends of the connector, as being the preferable number for security and also speed in setting up the apparatus.

The upper edge of the outer plate 18 extends above the inner plate 19 and contains inclined slots 25 and 26 near its opposite ends and upper edge, which edge is inclined adjacent to the slots in conformity with their inclinations. The height of these slots above the bottom plate 20 is such that they will be mainly above, and clear of, the adjacent side bar of a standard stretcher when the latter is placed on the bottom plate.

The assemblage of two bases and tilting connectors and the axle is made secure by the brace 30. This brace is a continuous bar having a central portion 31 which extends along the under side of the axle 3 and is secured thereto by bolts 27, and the ends of which are offset and secured to the inner side plates 7 of the bases by bolts 28. Such brace and the axle are of suitable lengths to hold the two tiltable connectors at a distance apart conforming to the width of a given stretcher and to retain the pivot ends of the axle in their necessary operative association with the two bases and connectors.

Provision is made to permit tilting of the connectors 4 and 5 through a wide enough angle to either side of neutral position and prevent them from tilting too far. The greatest allowable inclination for the tilting movement when the subject's head is downward is 50° from the horizontal. If tilted to a steeper angle, there is danger that the abdominal organs will be shifted so far as to collapse the lungs. To guard against excessive tilting, the upper extremities of the base plates 6 and 7 are formed with inclined edges 32 and 33 disposed to be engaged by the bottom plate 20 of the connector and limit tilting movement thereof. These edges, or the corners at which they join the lower side edges 11 and 12, form abutments so disposed as to stop the connector when it has rotated 50° to either side from the horizontal, when the base is set up so that the bisector of the angle between the leg sockets is vertical. To determine when the apparatus is set up in true relation with the vertical and horizontal, I have provided a pointer 34 which is pivotally connected with the unit and has a weighted arm 35 hanging below its pivotal support.

As a convenient measure of construction, the pointer is pivoted on a clamp screw 36 which is mounted centrally in the end of axle 3 and may be turned to clamp or release the pointer. When the screw is released, the weighted arm of the pointer acts as a plumb-bob with the aid of which the unit may be set true to the vertical; and when set up, the screw holds the pointer vertical whereby it serves as an index, with respect to which tilting movement of the apparatus can be measured.

Studs 37 and 38 are mounted on the outer face of the connector at opposite sides of the median line thereof and on radii of the pivot axis making angles of 30° and 40°, respectively, with the median line. These studs serve, in connection with the clamped pointer, to indicate angles of rocking movements, less than the maximum, which suffice to establish natural breathing after such has been initiated by rhythmic tilting through the maximum angle.

The legs 14 and 15 are used when the apparatus is to be supported directly on the ground or on a floor or platform. But it may be placed on an elevated support, such as the trestle shown in Fig. 5, or a bench or a beam, etc. without the legs. In order to provide a broad footing on such a support, the lower edges of the base side plates 6 and 7 are turned out as flanges 39 and 40 in a plane perpendicular to the side plates and to the bisector of the maximum total rocking angle. These flanges are located below the lower extremities of the socket tubes 8 and 9.

A modification of the base and rocking connector previously described is shown in Figs. 6 and 7. Here the base 1*a* is a casting having a wide bottom part which is recessed from the underside to provide sockets for reception of legs 14 and 15, and having an upstanding lug 41 containing a hole transverse to the plane in which the leg sockets are located, to receive the pivot end of axle 3. The rocking connector 4*a* is likewise a casting and is formed with upstanding separated walls 6*a* and 7*a* and a bottom 20*a* to receive and support one of the side bars of the stretcher. The front wall holds clamp screws 23 and contains slots 25 and 26 like the parts similarly designated in the preceding description, and the wall 7*a* supports spurs or studs 24. The connector is also made with depending lugs 42 and 43 spaced apart to embrace the lug 41 of the base and perforated to receive the pivot portion of axle 3, whereby the lugs are in interengaged relationship preventing displacement of the connector along the axle. A pointer having a weighted depending arm is associated with this alternative form also.

As no provision is made in this form for positively stopping the rocking movement of the connector, studs 44 are provided appropriately located to register with the pointer when the stretcher has been tilted to the steepest allowable angle.

Auxiliary elements forming parts of the comprehensive combination of this invention include a head rest 45, straps 46 and 47 to hold the body against shifting along the stretcher when tilted, and a socket 48 to receive a post adapted to support at an elevation a container for liquid, such as blood, a salt solution, etc. which an attending physician may wish to inject into a vein or tissues of the subject.

The head rest 45, shown in detail in Fig. 11, includes a bottom part 49 to rest flat on the fabric portion of the stretcher, two upright side portions 50 and 51, and a flexible elastic strip 52 fastened securely to the uprights 50 and 51 so as to extend across the space between them. The strip 52 preferably is a section taken from a thick sheet of sponge rubber, stretched and held under tension across the space between the uprights. It is adapted to be placed under the forehead of a subject lying on the stretcher face downward and to yield somewhat under the weight of the person's head. The uprights are of convenient height to hold the subject's face clear of the stretcher so that the head need not be turned sideways to permit flow of air into the nose and mouth, and so that an oxygen mask can be placed over the face if desired. These uprights and the bottom part 49 may be made as metal casting or a molded piece of other suitably rigid material as shown.

The straps 46 and 47 are each composed of two parts connected by a buckle 53. One of the parts of strap 46 passes through the slot 25 in the connector 4 or 4*a* and its end is made fast to form a permanent loop. The corresponding part of strap 47 is similarly interengaged with the slot 26, as shown at 54 in Fig. 10. The other parts or sections of the straps are attached to hooks 55 and 56 adapted to be placed in the slots 25 and 26 of the connector 5, or the connector of the second described form which is located opposite to connector 4*a*. The socket 48 is provided with a bracket portion 57 (Fig. 3) or a reversed form of an equivalent bracket 57*a* (Fig. 7) which is bolted to the outer side of one of the base members.

In the use of the apparatus, the victim is laid or rolled face downward on a stretcher lying on the ground and the head rest is placed under his forehead. The supporting structure is erected nearby. The stretcher is raised and engaged with the connectors 4 and 5, or the corresponding connectors of the second form, being adjusted longitudinally therein until satisfactorily balanced with respect to the axle. The straps 46 and 47, which have been lengthened, are passed across the body, one over the small of the back and the other across the thighs near the buttocks, and the hooks 55 and 56 entered into the slots with which they coact. The straps are then drawn sufficiently tight so that, by their restraint of the body above and below the buttocks, they will prevent the body from sliding either way when the stretcher is tilted. The apparatus can be thus set up with the victim in place, ready for commencement of the rocking procedure in a matter of thirty seconds from the time of arrival at the place where an asphyxiated person has been landed. Once the rocking procedure has been started, it can be carried on continuously until either the victim revives or is proved to be dead; and during its continuance an oxygen mask may be passed under the victim's head and applied to his respiratory channels, without interrupting the rhythmic motion. So also can blood or other fluid be transfused to the victim from a vessel supported on an upright contained in the socket 48.

When not in use, the apparatus can be disassembled and stowed compactly. Apparatus so characterized can be conveniently made part of the regular equipment of ambulances, as well as to be maintained as emergency equipment at places where drowning accidents are liable to occur, and elsewhere.

Although it is evident from the foregoing that the members of the combined unit may be made as castings or fabricated by union of separate pieces, I may note that the fabricated form has particular commercial utility, in that it can be produced at low cost and thereby made available for a wide field of service for saving human life.

What I claim is:

1. Resuscitation apparatus, comprising the combination with a stretcher, of a support, a holder or connector pivoted to said support, and means for connecting said holder to the stretcher at any one of a number of points along the length of the stretcher such as to enable the center of

gravity of the stretcher with a body resting thereon to be brought close to the pivotal axis of the holder.

2. Resuscitation apparatus, comprising the combination with a stretcher, of side bars, and a plurality of supporting bases and clips or connectors pivotally coupled to said bases and having channels to receive the side bars of the stretcher, said channels permitting engagement of the connectors with the stretcher bars at different points along the length of the latter and the connectors having means for restraining said bars against endwise movement in the channels.

3. In resuscitation apparatus, a support for a portion of a stretcher to enable such stretcher to be tilted in either direction from the horizontal, comprising a base member and a clip or holder in pivotal connection with said base member and having means for making detachable connection with a stretcher part at any of a multiplicity of different points along the length of such part.

4. In resuscitation apparatus, a support for a portion of a stretcher to enable such stretcher to be tilted in either direction from the horizontal, comprising a base member having leg sockets, legs removably contained at one end in said sockets, and a clip or holder in pivotal connection with said base member and having a bottom and lateral walls providing a channel in which a portion of a stretcher may be received and longitudinally adjusted, said holder having also means for restraining such stretcher portion from lengthwise displacement.

5. Resuscitation apparatus comprising the combination with a stretcher having side bars, of a pair of base members, holder clips or connectors pivotally coupled with said base members, and means for connecting said holders detachably to the side bars of the stretcher, said connectors and stretcher being free to be rocked about the pivot axis of the connectors by force manually applied to the stretcher.

6. Resuscitation apparatus comprising the combination with a stretcher, of a pair of base members, holder clips or connectors pivotally coupled with said base members, and means for connecting said holders detachably to structural side members of the stretcher, combined with a pointer or index connected with one of said base members and angle measuring indicators on the associated connector disposed for cooperation with said pointer to measure angles of rocking movement about the pivotal axis of the connectors.

7. The combination with a stretcher, of a pair of base members, holder clips or connectors pivotally coupled with said base members, and means for connecting said holders detachably to structural side members of the stretcher, combined with a pointer or index connected with one of said base members and angle indicators on the associated connector disposed for cooperation with said pointer to measure angles of rocking movement about the pivotal axis of the connectors, said pointer being angularly adjustable about the pivotal axis and having means for determining its relation to the horizontal.

8. The combination with a stretcher, of a pair of base members, holder clips or connectors pivotally coupled with said base members, and means for connecting said holders detachably to structural side members of the stretcher, combined with a pointer or index connected with one of said base members and angle indicators on the associated connector disposed for cooperation with said pointer to measure angles of rocking movement about the pivotal axis of the connectors, said pointer being angularly adjustable about the pivotal axis and having a weighted arm depending from the pivot for automatically placing it in a prescribed relation to the horizontal.

9. Resuscitation apparatus comprising the combination of two base members, clips or holders each pivotally connected with one of said base members, a stretcher connected at its opposite sides with the respective clips or holders, and straps detachably connected to the respective holders extending across the stretcher and arranged to overlie a human body lying prone on the stretcher above and below and close to the buttocks of such a body.

10. In a resuscitation apparatus, a stretcher supporting means comprising a base member constructed of two metal plates and leg sockets located between and secured to said plates, spaced apart and inclined to one another, a stretcher holder or clip constructed of parallel side plates and a bottom plate secured to the side plates between them at a height intermediate the upper and lower edges thereof, and an axle member passing through alined holes in the side plates of the base member and holder below the bottom plate of the holder.

11. In a resuscitation apparatus, stretcher supporting means comprising a base member constructed of two metal plates and leg sockets located between and secured to said plates, spaced apart and inclined to one another, a stretcher holder or clip constructed of parallel side plates and a bottom plate secured to the side plates between them at a height intermediate the upper and lower edges thereof, and an axle member passing through alined holes in the side plates of the base member and holder below the bottom plate of the holder, one of the side plates of the holder having slots for connection with hold-down straps.

12. In a resuscitation apparatus, stretcher supporting means comprising a base member constructed of two metal plates and leg sockets located between and secured to said plates, spaced apart and inclined to one another, a stretcher holder or clip constructed of parallel side plates and a bottom plate secured to the side plates between them at a height intermediate the upper and lower edges thereof, and an axle member passing through alined holes in the side plates of the base member and holder below the bottom plate of the holder, the base member having abutments disposed to limit tilting movement of the holder by engagement with the bottom plate thereof.

13. In a resuscitation apparatus, the combination of a base member, a clip or holder pivoted to said base member and having means for connection with a stretcher, and a pointer pivotally connected with the base member and stretcher having a depending weighted arm.

14. A support for a stretcher comprising two base members, an axle having its opposite end portions contained in said base members, means interengaged between the axle and a base member preventing rotation of the axle, stretcher holders or clips pivoted on the axle in interengaged relation with the respective base members having provisions for connection with a stretcher, an angularly adjustable pointer secured to the axle beside one of said holders, and indicators on said holder in position to measure angular

movements of the pivoted holder with reference to the pointer.

15. A support for a stretcher comprising two base members, an axle having its opposite end portions contained in said base members, and stretcher holders or clips pivoted on the axle in interengaged relation with the respective base members having provisions for connection with a stretcher; the base members having abutments located to be engaged by the associated holders to limit angular movements of such holders.

16. In resuscitation apparatus, a supporting structure, and stretcher holders spaced apart in pivotal connection with said structure having provisions for receiving and making detachable connection with the side bars of a stretcher, said holders having means for connection with straps arranged to hold such straps in locations close to, and respectively above and below the buttocks of a human body lying prone on a stretcher connected with said holders.

17. An apparatus for inducing respiration comprising a supporting structure, and means for connecting a stretcher pivotally with said supporting structure with the length of the stretcher transverse to the pivot axis, said connecting means having provisions for engaging the stretcher at any one of a number of points along the length thereof and retaining the stretcher against gravity induced endwise displacement.

18. An apparatus for inducing respiration comprising a supporting structure and two stretcher connectors pivotally mounted on said structure coaxially and spaced apart from one another, each of said connectors having a channel extending transversely of the pivot axis adapted to receive separably a longitudinal element of a stretcher and having means for making slip-preventing engagement with such longitudinal element.

19. An apparatus for inducing respiration comprising a supporting structure, stretcher connectors pivotally mounted coaxially on said supporting structure and spaced apart along their common axis, each connector having a supporting surface and a web rising from the supporting surface at one side thereof in a plane substantially perpendicular to the pivotal axis, said web having slots spaced apart transversely of the axis and inclined upwardly toward an intermediate axial plane of the connector.

20. An apparatus for inducing respiration comprising a supporting structure, stretcher connectors pivotally mounted coaxially on said supporting structure and spaced apart along their common axis, each connector having a supporting surface and a web rising from the supporting surface at one side thereof in a plane substantially perpendicular to the pivotal axis, said web having slots spaced apart transversely of the axis and inclined upwardly toward an intermediate axial plane of the connector, and straps extending across from one connector to the other, each strap being engaged with corresponding slots of both connectors.

21. An apparatus for inducing respiration comprising a supporting structure, stretcher connectors pivoted coaxially on said supporting structure and spaced apart along the common axis of the connector, a stretcher mounted at its opposite sides on the respective connectors, and straps coupled with the respective connectors extending across the stretcher and arranged to overlie a human body lying prone on the stretcher above and below and close to the buttocks of such body.

22. In an apparatus of the character described, a supporting structure and stretcher connectors spaced apart in pivotal connection with said structure on a common axis, said connectors having means for receiving detachably, and preventing sliding movement of, the side bars of a stretcher, and having strap connecting elements arranged to hold straps in locations close to and respectively above and below the buttocks of a human body lying prone on a stretcher engaged with said connectors.

23. An apparatus for inducing respiration comprising a supporting structure, stretcher connectors mounted on said supporting structure to rock about a common axis, a stretcher engaged with said connectors, and two straps coupled with one of the connectors arranged to extend across the stretcher to engagement with the connector at the opposite side of the stretcher, the straps being arranged to pass close to, and respectively above and below the buttocks of a human body lying prone on the stretcher.

24. An apparatus for inducing respiration comprising a supporting structure, stretcher connectors mounted on said supporting structure to rock about a common axis, a stretcher engaged with said connectors, the connectors having upstanding webs beside the stretcher with two slots in each disposed at opposite inclinations, and straps disconnectibly engageable with the slots of the connectors adapted to be passed across a human body lying prone on the stretcher with its mid length near the axis of the connectors, each of said straps, when so extended across the body, being in a plane inclined toward the respectively nearer end of the stretcher, whereby the straps embrace between them, and lie close to, the buttocks of such a body.

25. In apparatus for inducing respiration, a supporting structure, stretcher connectors mounted pivotally and coaxially on said structure and spaced apart along such axis adapted to hold the longitudinal side members of a stretcher, a pointer mounted on the supporting structure beside and adjacent to one of the connectors, and angle measuring indicators on the adjacent connector disposed for cooperation with said pointer to measure angles of rocking movement about the pivotal axis.

26. The combination with a supporting structure, of stretcher connectors pivotally coupled with said structure coaxially and spaced apart lengthwise of their common axis, a stretcher having structural side members mounted on said connectors, a pointer connected with said supporting structure beside one of the connectors, and angle indicators on the adjacent connector disposed for cooperation with said pointer to measure angles of rocking movement about the pivotal axis, said pointer being angularly adjustable about said axis and having means for determining its relation to the horizontal.

27. The combination with a supporting structure, of stretcher connectors pivotally coupled with said structure coaxially and spaced apart lengthwise of their common axis, a stretcher having structural side members mounted on said connectors, a pointer connected with said supporting structure beside one of the connectors, and angle indicators on the adjacent connector disposed for cooperation with said pointer to measure angles of rocking movement about the pivotal axis, said pointer being angularly ad-

justable about said axis having a depending weighted arm for automatically placing it in a prescribed angular relation to the horizontal.

28. In apparatus of the character described, a supporting structure including an axle, stretcher connectors mounted on said axle to rock thereon, a pointer pivoted coaxially on the axle adjacent to one of the connectors having a weighted arm arranged to place the pointer in a prescribed angular relation when the pointer is free to swing about its pivot connection, clamping means cooperative with the pointer to secure it immovably on the axle, means interengaging between the supporting structure and axle to prevent independent movement of the axle, and angle indicators on the connector which is adjacent to said pointer disposed for cooperation with the pointer to measure angles of rocking movement about the axis.

29. In apparatus of the character described, a supporting structure including an axle, stretcher connectors mounted on said axle to rock thereon, a pointer pivoted coaxially on the axle adjacent to one of the connectors having a weighted arm arranged to place the pointer in a prescribed angular relation when the pointer is free to swing about its pivot connection, clamping means cooperative with the pointer to secure it immovably on the axle, means interengaging between the supporting structure and axle to prevent independent movement of the axle, and angle indicators on the connector which is adjacent to said pointer disposed for cooperation with the pointer to measure angles of rocking movement about the axle, said angle indicators protruding from the connector by which they are borne and having distinct individual boundaries arranged for tactile perception.

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