Nov. 19, 1968 R. W. LANIGAN 3,411,766

OPERATING TABLE

Filed Feb. 23. 1966 3 Sheets-Sheet 1

Fig. 1.

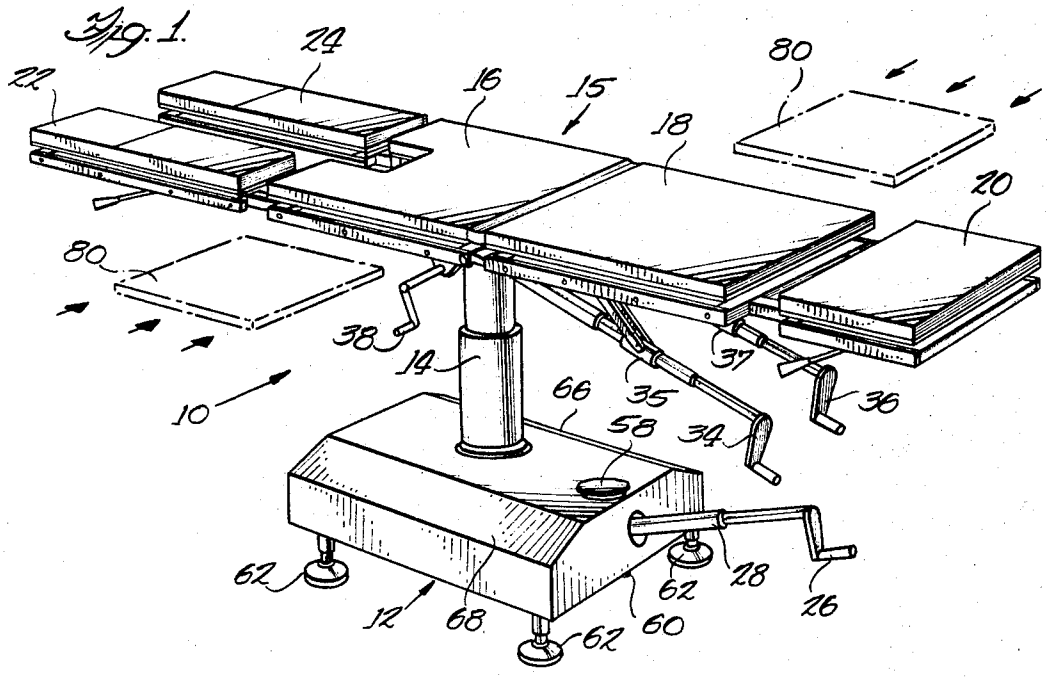


Fig. 7.

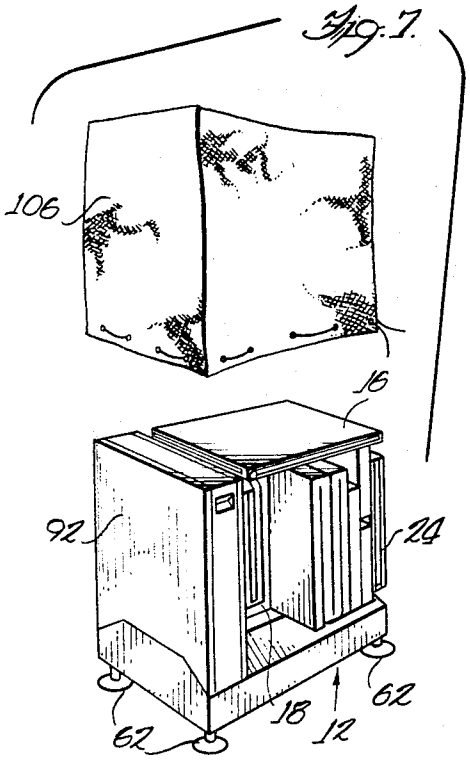
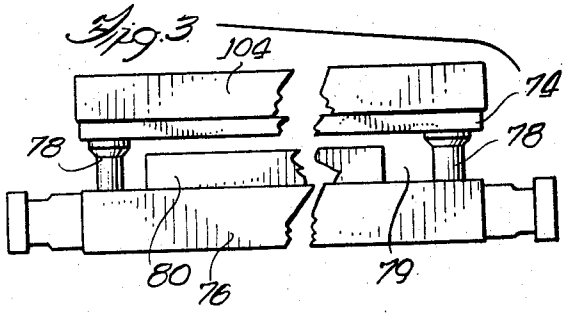


Fig. 3

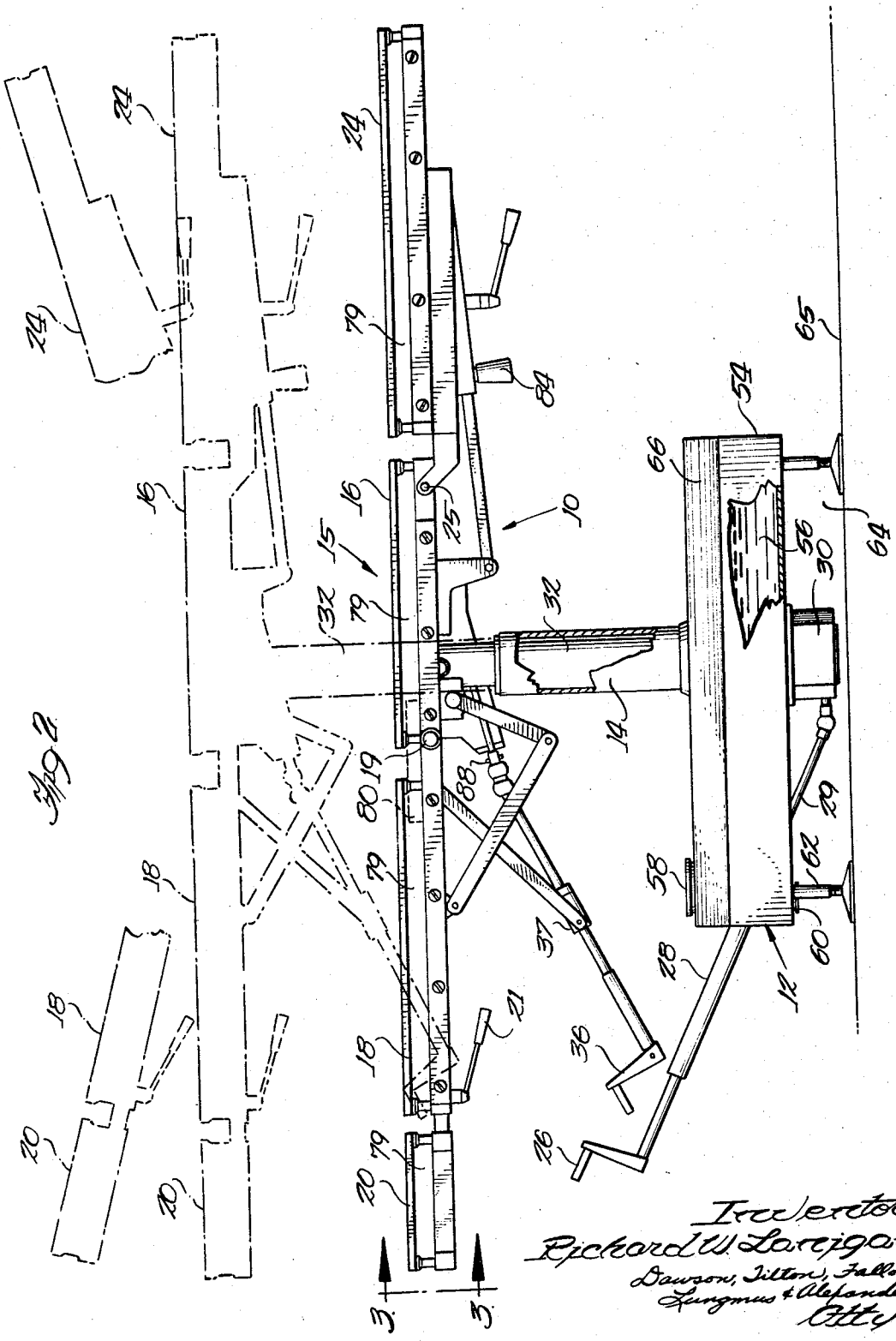


Inventor
Richard W. Lanigan
Dawson, Tilton, Fallon
Lungmus & Alexander
Attys

Nov. 19, 1968 R. W. LANIGAN 3,411,766

OPERATING TABLE

Filed Feb. 23. 1966 3 Sheets-Sheet 2



Nov. 19, 1968 R. W. LANIGAN 3,411,766

OPERATING TABLE

Filed Feb. 23. 1966 3 Sheets-Sheet 3

Fig. 4

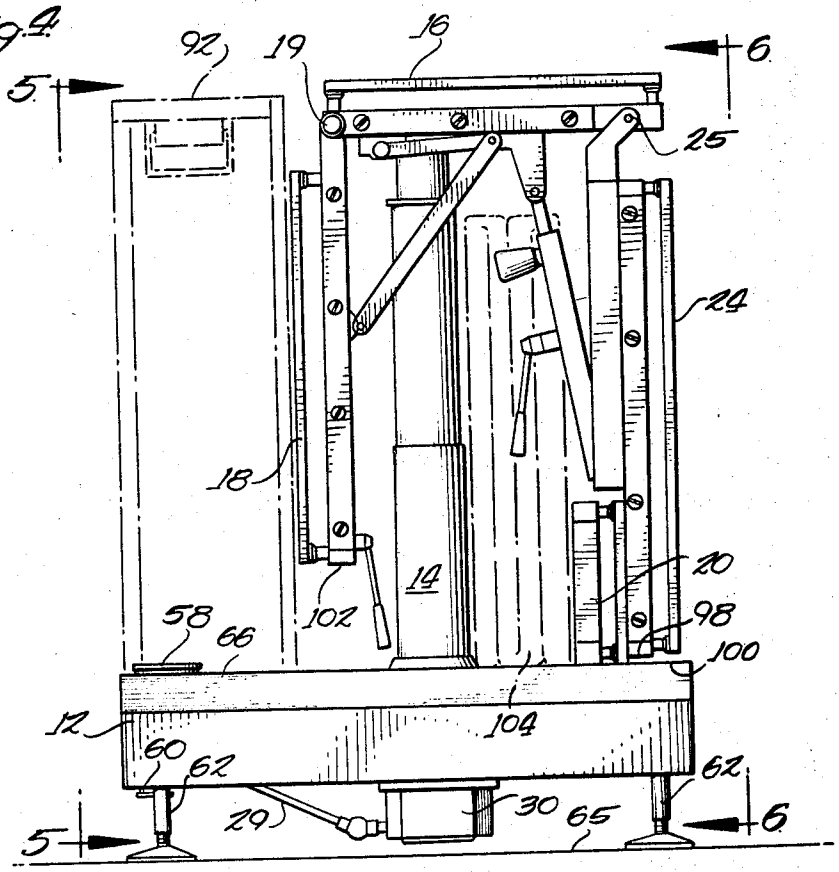


Fig. 5

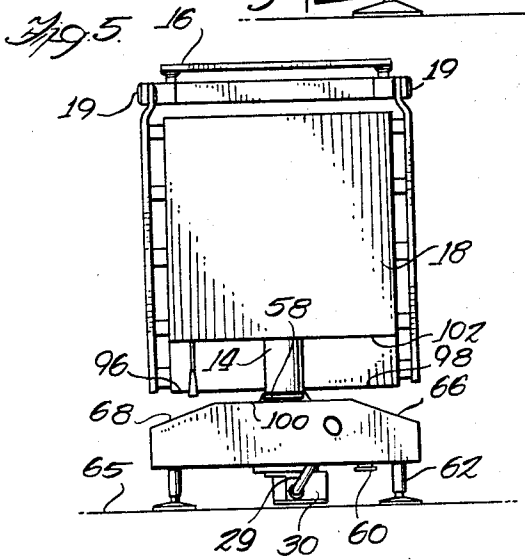
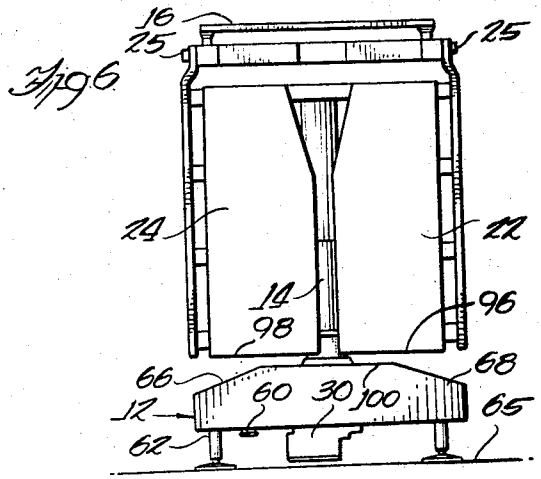


Fig. 6



Inventor
Richard W. Lanigan
Dawson, Tilton, Fallon
Lungmus & Alexander
Atty's

United States Patent Office 3,411,766 Patented Nov. 19, 1968

3,411,766

OPERATING TABLE

Richard W. Lanigan, Arlington Heights, Ill., assignor to American Hospital Supply Corporation, Evanston, Ill., a corporation of Illinois

Filed Feb. 23, 1966, Ser. No. 529,379
5 Claims. (Cl. 269—325)

ABSTRACT OF THE DISCLOSURE

A relatively light-weight and portable operating table readily transportable by air. The table includes a generally rectangular hollow base and a telescoping column extending upwardly therefrom. A rectangular seat section is mounted upon the column and rectangular head and leg sections are pivotally connected along opposite ends of the seat section, the head, leg and seat sections being no wider than the hollow base. When the table is collapsed for transportation and storage, the pivotal leg and head sections are swung into depending vertical positions within the horizontal limits defined by the base. The base constitutes a ballast tank which may be filled with water for added stability. At least one of the legs which supports the base above a floor surface is adjustable so that the base may be tipped for draining. Beneath the patient-supporting panels of the table are interconnecting compartments for receiving X-ray film cassettes, the panels being formed of X-ray permeable material.

This invention relates generally to an operating table and more particularly to a portable operating table.

In times of a national emergency or disaster, such as war, flood, or earthquake, it is often necessary to provide temporary hospital facilities at remote locations. Since there is usually little or no advance warning of the emergency or disaster, the temporary hospital facilities must be quickly established in order to provide maximum benefit to individuals who have been injured. However, during a war or other disaster the prompt construction of temporary hospital facilities in remote locations is usually impeded by disruption and destruction of roads and other transportation facilities. When roads and other forms of ground transportation have been disrupted, air transportation is commonly utilized to convey emergency facilities to the scene of a battle or disaster. If airfields are available, the hospital facilities can be flown in by plane. Since air fields are not always available in the many remote locations where wars and disasters strike, helicopters and parachutes are used for the rapid transportation of emergency facilities to the scene of a battle or disaster.

The shipping of large quantities of emergency equipment by air transportation is difficult due to the relatively limited freight hauling capacity of most airplanes and helicopters. The efficient use of the limited hauling capacity of helicopters and airplanes requires that as much equipment as possible be carried on each flight. Therefore, emergency hospital equipment which is intended for transportation by air, or any other available means, must be light weight and of a size and shape to permit maximum use to be made of the available cargo space. Once the equipment has arrived at the scene of the battle or other disaster, it must be quickly set up so that prompt medical attention can be rendered to the injured. In addition to being easily transported and set up, the hospital equipment must function efficiently for its intended purpose so that a large number of patients can be given the best possible medical treatment.

The equipment which is in normal hospital use today does not meet the requirements set forth above for emergency hospital equipment. The inadequacies of most hospital equipment for emergency use are epitomized in hospital operating tables. As is well known, standard hospital operating tables are large, heavy machines which have mechanisms for supporting a patient in almost any position for an operation. These operating tables greatly facilitate the work of a doctor and are very satisfactory for permanent installation in a hospital. However, due to their large size and weight they are unsatisfactory for air transportation. Also modern hospital operating tables cannot be quickly set up for use, since they normally include a large amount of complex auxiliary equipment for positioning a patient. These characteristics of size, weight, and complexity make prior art operating tables entirely unsatisfactory for emergency transportation and use. However, an operating table is almost indispensible to a doctor who must perform a large number of different operations on casualties resulting from a war or other disaster.

Therefore, one of the objects of this invention is to provide an efficient portable operating table which can be readily transported and quickly set up.

Another object of this invention is to provide a portable operating table which forms a compact unit for transportation.

Another object of this invention is to provide a portable operating table which is rugged and light weight.

Another object of this invention is to provide a portable operating table which can support a patient in different operating positions.

These and other objects and features of the invention will become more apparent from a reading of the following detailed description, taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of the operating table in a horizontal operating position;

FIG. 2 is a side view showing the construction of the operating table of FIG. 1;

FIG. 3 is an enlarged detail view, taken along the line 3—3 of FIG. 3, of the positioning of an X-ray cassette;

FIG. 4 is a side view of the operating table of FIG. 1 in the shipping position;

FIG. 5 is an end view taken along the line 5—5 of FIG. 4;

FIG. 6 is an opposite end view taken along the line 6—6 of FIG. 4; and

FIG. 7 is a perspective view of the operating table in the storage position.

Referring now to the drawings in greater detail, a preferred embodiment of the operating table is shown in FIG. 1. The operating table **10** includes a rectangular base **12** on which a cylindrical telescoping column **14** is centrally mounted. A patient-supporting structure or table **15** is connected to an uppermost end of the column by a joint which permits at least longitudinal and lateral pivoting movement of the structure **15** relative to the base **12**. The structure **15** is made up of a seat section **16**, a back section **18**, a head section **20**, and two leg sections **22** and **24**.

The sections, which make up the table **15**, are movable relative to each other so that portions of a patient's body can be held in different positions depending on the operation to be performed. Therefore, as is best seen in FIG. 2, the back section **18** is pivotably fastened at the joints **19**, to a forward edge of the seat section **16**. The interconnected back and seat sections, which are of the same width, form a movable support for the upper and lower trunk portions of a patient's body. The head section **20** is removably connected, by a latching mechanism **21**, to a forward end of the back section **18** to support a patient's head. The two leg sections **22** and **24** are privotably fastened, at the joints **25**, to a rear edge of the seat section **16** and provide support for a patient's legs. It is contemplated

that a foot support section could be connected to the leg sections and, if desired, an arm support section could be connected to a side of the back section.

The operating table **10** is shown in FIG. 2 with the support structure **15** in a horizontal position. The height of the structure **15** is adjusted by turning a vertical control handle **26** which is fastened to a shaft **28**. The shaft **28** releasably engages, by means of a socket which is not shown, the end of a shaft **29**. The shaft **29** extends through the base **12** and is connected to a known gear mechanism **30**. Actuation of the gear mechanism **30**, by rotating the shafts **28** and **29**, will raise and lower an inner tube **32** of the telescoping support column **14**. This vertical movement, which is obtained by means of a conventional screw and gearing arrangement, permits the operating table to be adjusted to an optimum working level for a doctor and other personnel.

In addition to being adjustable vertically, the support structure **15** is pivotable longitudinally to lower the leg sections **22** and **24** while raising the head section **20**, as indicated by dashed lines to the left of FIG. 2. The pivoting movement is obtained by turning the control handle **36** (shown in FIG. 1). Turning the control handle **36** counterclockwise causes screw drive mechanism **37** to pivot control **38** which tilts the support structure **15** de- the table. Conversely, turning the control handle **36** clockwise causes screw drive mechanism **37** to pivot the support structure **15** downwardly and lower the head section while raising the leg sections **22** and **24**, as indicated by the dashed lines to the right of FIG. 2. This longitudinal pivoting movement of the support structure **15** permits a doctor to position a patient at an angle while performing an operation.

A back control handle **34** is connected to a conventional screw drive mechanism **35** for raising and lowering the back section **18** relative to the seat section. When the back control handle **36** is turned counterclockwise the drive mechanism **35** pivots the back section upwardly about the joints **19**. When the control handle is turned counterclockwise the back section will be pivoted downwardly to the position shown in FIG. 2. It will be apparent to those skilled in the art that the combination of the back control adjustment and longitudinal pivot control adjustment permits the operating table **10** to be moved to a large number of the operating positions which are commonly utilized. The versatility of the table is further increased by a lateral pivot control **38** which tilts the support structure **15** degrees laterally, by means of a conventional screw drive, relative to the horizontal plane.

The base **12** includes a ballast tank **54** which is filled with water or other suitable liquid **56**. The ballast tank is filled through a normally covered mouth or opening **58** in the top of the ballast tank. A drain plug **60** is provided in the bottom of the ballast tank near one corner thereof so that the tank can be easily emptied. The ballast tank **54**, when filled with water, forms an extremely stable base for the operating table **10**. Since the center of gravity of a patient will be positioned directly above the telescoping column **14**, the table is stable even if the ballast tank **54** is empty. Thus, the operating table can be used in locations having an inadequate water supply. However, it will be apparent that the fluid **56** greatly enhances the stability of the table, and the tank should be filled, if possible, when operating. A suitable germicide or antiseptic can be added to the fluid **56** to permit the fluid to be used for cleaning up when the operating table is moved from the emergency location.

The ballast tank **54** is held above the floor on legs **62** which are mounted on the bottom of the ballast tank. One of the legs **62** nearest drain **60** is threadedly mounted for vertical adjustment so that the operating table **10** can be leveled on an uneven surface and, in addition, may be easily tilted for drainage of the ballast tank. In addition, the legs **62** provide a space **64** between a support plane **65** for the operating table and the bottom of the ballast tank **54**. The space **64** permits the feet of a doctor, and other personnel utilizing the operating table, to extend under the tank when working at the operating table. To further increase the comfort of operating personnel, the top portion of the ballast tank **54** includes a pair of oblique longitudinally extending sidewalls **66** and **68** which form a raised foot rest.

The head, back, seat and leg sections of the support table **15** have a similar construction which is best seen in FIG. 3. Since the sections all have substantially the same construction, only the head section **20** will be described in detail. The sections are constructed of an X-ray permeable plate **74** which is mounted above and substantially parallel to a base frame **76**. The plate **74** is held in this position by a series of mounting posts **78** at the corners of the plate to form a compartment **79**. This construction permits an X-ray cassette **80** to be inserted in the compartment **79**, as shown in dashed lines in FIG. 1, between the frame **76** and the plate **74**. Since the plate **74** is X-ray permeable, the film in the cassette **80** will be exposed when a patient is X-rayed, to photograph the portion of the patient directly above the cassette.

From an inspection of FIG. 3, it will be seen that the cassette **80** is slightly narrower than the distance between the mounting posts **78**. Therefore, the cassette may be moved longitudinally along the operating table from a compartment in one section to the adjoining compartment in another section. When the cassette is positioned between two compartments an X-ray may be taken of a portion of the patient's body which is intermediate two of the sections. Thus, when the cassette **80** is positioned between the seat and back sections, as shown in dashed lines in FIG. 2, an X-ray of a middle portion of a patient's trunk can be taken.

In order to form a compact shipping unit the support structure **15** can be moved from the operating position, shown in FIG. 2, to a storage or shipping position, shown in FIG. 4. The support table **15** is moved from the operating position to the shipping position by first disconnecting the head section **20** from the outer end of the back section **18** by releasing the latching mechanism **21**. After the head section **20** has been removed from the back section **18** the table is raised vertically, from the position shown in solid lines in FIG. 2 to the position shown in dashed lines in FIG. 2.

When the support structure **15** has been elevated the leg and back sections are pivoted downwardly to a shipping position adjacent the column **14**. The latch **84** is disengaged to swing the leg sections **22** and **24** downwardly, around joints **25**, from the horizontal position shown in FIG. 2 to the vertical storage position shown in FIG. 4. The vertical control handle **26** and the shaft **28** are then disconnected from the shaft **29**. Next the control handles **34** and **36**, and the associated screw drive mechanisms **35** and **37**, are disengaged, by loosening suitable pin connections **88**, from the support table **15**. Then the lateral pivot control handle **38** is removed and the back section **18** is pivoted, about joints **19**, from the horizontal position shown in FIG. 2 to the vertical position shown in FIG. 4. When the leg and back sections have been positioned as shown in FIG. 4, a storage chest **92** is positioned on the end of the base **12** adjacent to the vertically extending back section **18**. The storage chest **92** is utilized to store the handles **26**, **34**, **36** and **38**, which are removably connected to their rotating shafts and auxiliary supplies for use in connection with the operating table **10**.

Referring now to FIG. 4, taken in conjunction with FIGS. 5 and 6, the back section **18** and the leg sections **22** and **24** are shown in the shipping position wherein they are generally parallel to the column **14**. In this position the leg sections **22** and **24** are located with their outermost edges **96** and **98** adjacent to an upper surface **100** of the base **12**. Similarly, the back section **18** is positioned

with an outermost edge **102** adjacent the upper surface **100** of the base **12**. When the back section **18** and the leg sections **22** and **24** are so positioned, the operating table, with the auxiliary supply chest **92**, forms a relatively compact unit which requires relatively little space and cannot be easily damaged during shipment. When constructed as previously described a six foot operating table, in the shipping position, forms a unit which is approximately 38 inches high, 28 inches wide, and 23 inches thick. Since the back section **18** and the two leg sections **22** and **24** do not, in the shipping position, protrude outwardly, the entire unit may be readily stored for transporting with other materials. It is contemplated that the head section **20** will be stored, for shipment, between the two legs **22** and **24** and the column **14** (see FIG. 4). A suitable pad **104**, for the support structure **15**, may also be stored between the leg sections and column **4**. The pad **104** includes four sections, one for the seat and back section, two for each of the leg sections and a fourth for the head section. The entire unit is protected by shipping cover **106** while being transported.

For purposes of affording a more complete understanding of the invention, it is advantageous now to provide a functional description of the mode in which the component parts cooperate. The operating table **10** will be transported to the site where it is to be utilized by plane or other means with the table in the shipping position shown in FIGS. 4 and 7. When the operating table arrives at the location where it is to be used, the cover **106** is removed from the unit. The storage cabinet **92** is then lifted off the base **12**. Next the back section **18** is pivoted around the joint **19** to the horizontal position shown in FIG. 2. The control handles **26**, **34**, **36** and **38**, and their associated drive mechanisms, are then connected to the table. The two leg sections **22** and **24** are then pivoted to the horizontal position shown in FIG. 2. The head section **20** is attached to the outer edge portion of the back section **18**. The vertical control handle **26** is then rotated to lower the operating table to the position shown in solid lines in FIG. 2. The pads **104** are then placed in position. If water is available, the ballast tank **54** is filled and the operating table is ready for use.

If a patient has injuries requiring X-ray photographs to be taken, the film cassette **80** may be positioned in a compartment **79** immediately beneath the injury which is to be X-rayed. While the cassette may be inserted in a compartment **79** with the table in any selected position of adjustment, it may be desirable to first adjust the table sections into coplanar relation to permit shifting of the cassette from one section to another. After use of the table, when the temporary hospital facilities are to be moved to another location, the operating table is returned to the storage position by merely reversing the above procedure for setting up the table.

While particular embodiments of the invention have been shown; it should be understood, of course, that the invention is not limited thereto, since many modifications may be made; and it is, therefore, contemplated to cover by the appended claims any such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A portable operating table comprising: a hollow base of generally rectangular configuration having vertical side and end walls, a telescoping support column mounted on said base and projecting upwardly therefrom, a generally rectangular seat section mounted at the upper end of said column for supporting the lower trunk portion of a patient, said seat section being of

substantially the same width as said base and having lateral side edges normally parallel with and directly above the side walls of said rectangular base, a back section pivotally connected to a first end portion of said seat section for supporting an upper trunk portion of a patient, said back section having substantially the same width as said base and being pivotal about a horizontal pivot line above and parallel with one end wall of said base into a depending storage position wherein said back section is disposed entirely within the horizontal limits of said base, divided leg sections connected to a second end portion of said seat section for supporting the legs of a patient, said leg sections being pivotal downwardly into depending storage positions wherein said leg sections are disposed entirely within the horizontal limits of said base.

2. The structure of claim **1** in which said hollow base comprises a ballast tank for retaining a liquid to improve the stability of said operating table, said ballast tank having aperture means through which liquid may be added to and drained from said tank to alter the weight of said table, said base also including depending legs adapted to rest upon a floor surface for supporting said ballast tank in spaced relation thereabove.

3. The structure of claim **2** in which at least one of said legs is vertically adjustable for leveling said base and for tipping the same when said ballast tank is drained.

4. The structure of claim **1** in which each of said back, seat, and leg sections comprises a body-supporting plate, a frame spaced below said plate and substantially parallel therewith, and means extending between said frame and plate to space the same apart and to provide therebetween a compartment adapted to receive X-ray cassettes, said compartments of said respective sections communicating with each other when said sections extend in substantially the same plane, whereby, an X-ray cassette may be shifted from one section to another beneath a patient supported upon said table, said plate of each section being formed of X-ray permeable material.

5. A portable operating table comprising: a hollow base, table support means extending upwardly from said base, and a plurality of interconnected table sections mounted at the upper end of said support means; said base being generally rectangular in configuration and comprising a ballast tank provided with apertures for introducing liquid into said tank and for draining the same therefrom; said base also including depending legs adapted to rest upon a floor surface, at least one of said legs being vertically adjustable to facilitate tipping of said base when liquid is to be drained from said tank; said interconnected table sections having a width no greater than said base and being pivotally joined to each other for relative movement into collapsed condition, said interconnected table sections when shifted into collapsed condition having a horizontal length no greater than said base.

References Cited

UNITED STATES PATENTS

395,001	12/1888	Russell	269—326
2,693,987	11/1954	Wall	269—323
2,806,131	9/1957	Palmer	248—346 X
2,965,425	12/1960	Grinsell	269—326
3,065,344	11/1962	Chervenka	269—325 X
3,206,188	9/1965	Douglass	269—325
3,247,823	4/1966	Buck	248—346 X

ROBERT C. RIORDON, *Primary Examiner.*

J. F. McKEOWN, *Assistant Examiner.*