# United States Patent

[11] **3,601,122**


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[54] **POSTURAL DRAINAGE ASSISTER**
**8 Claims, 4 Drawing Figs.**


[52] **U.S. Cl.** ..... **128/55,** 128/68, 5/327
[51] **Int. Cl.** ..... **A61h 23/00**
[50] **Field of Search** ..... 128/24, 54, 55, 70, 68; 272/60; 5/327



[56] **References Cited**

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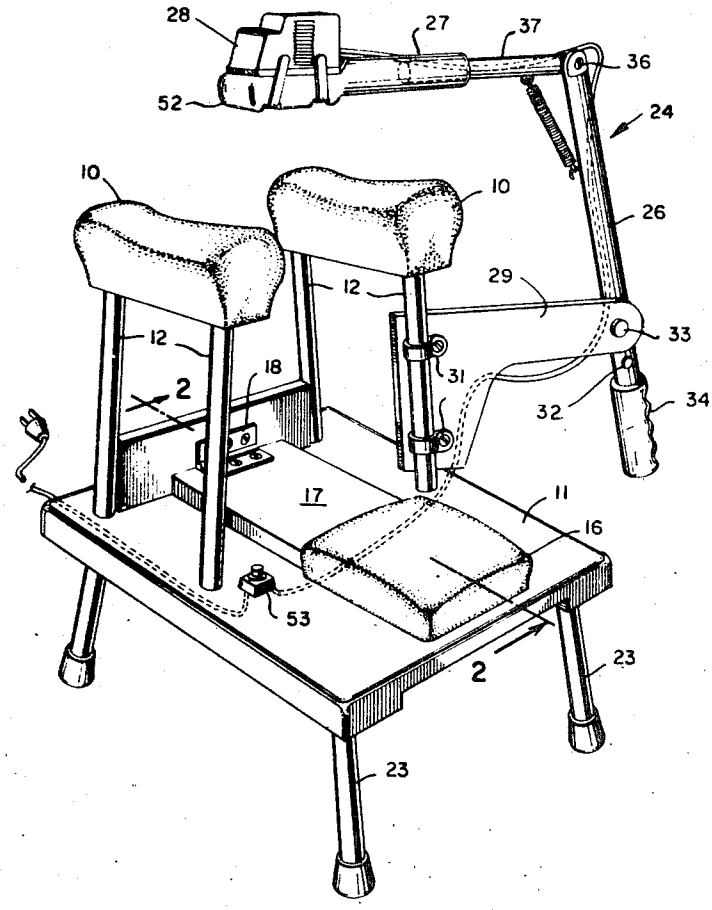
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**ABSTRACT:** Supporting devices for comfortably positioning the head and shoulders of a human patient in diagonally inverted position to facilitate drainage of fluids from the patient's lungs. Relative adjustment of the supported positions of the head and shoulders and selective height adjustment of the overall assembly are provided, and a movable vibratory percussion arm positioned for operation and movement by the patient further aids in the treatment of the patient.

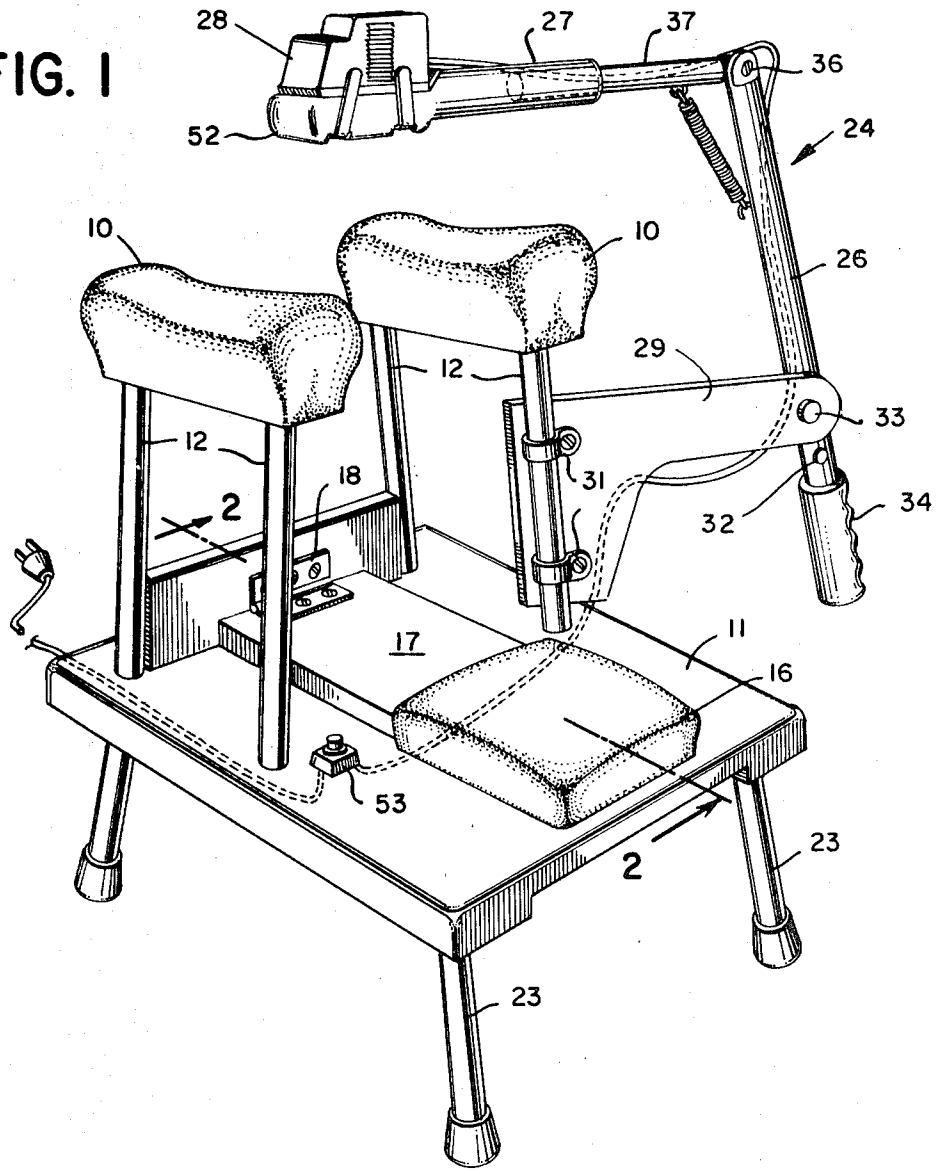



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SHEET 1 OF 3

FIG. 1




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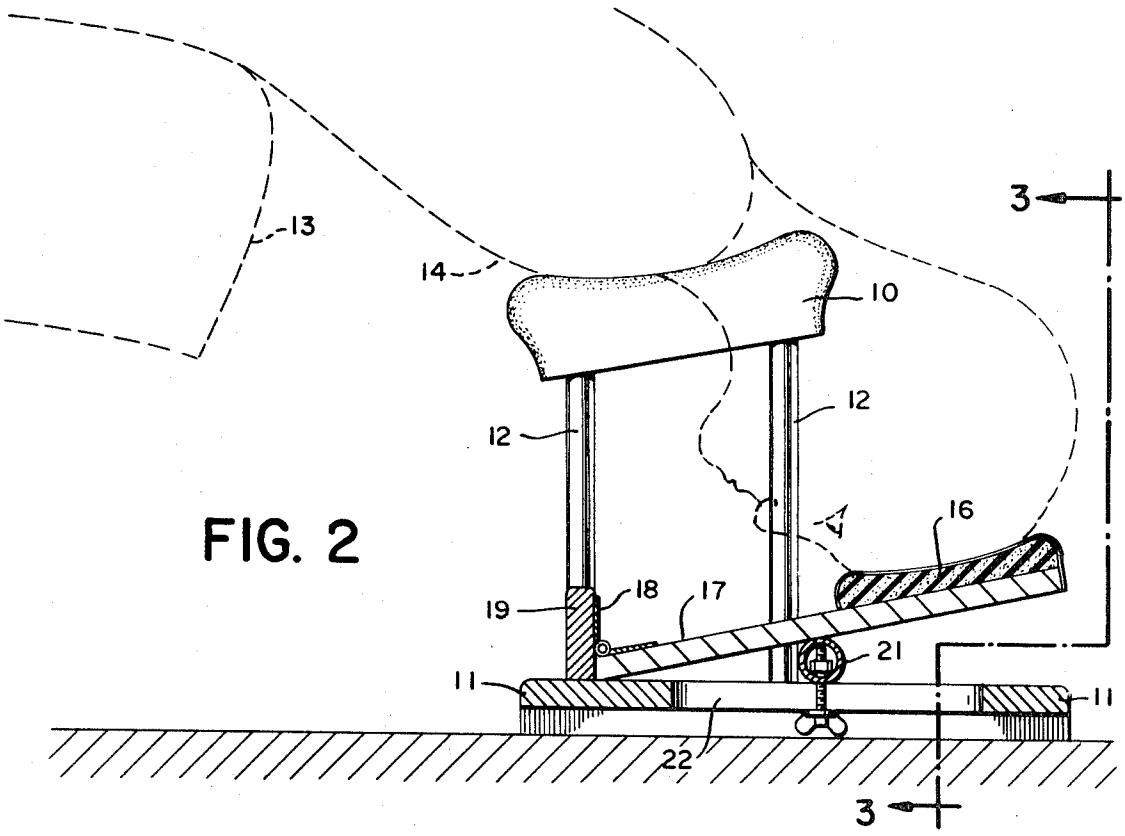



FIG. 2

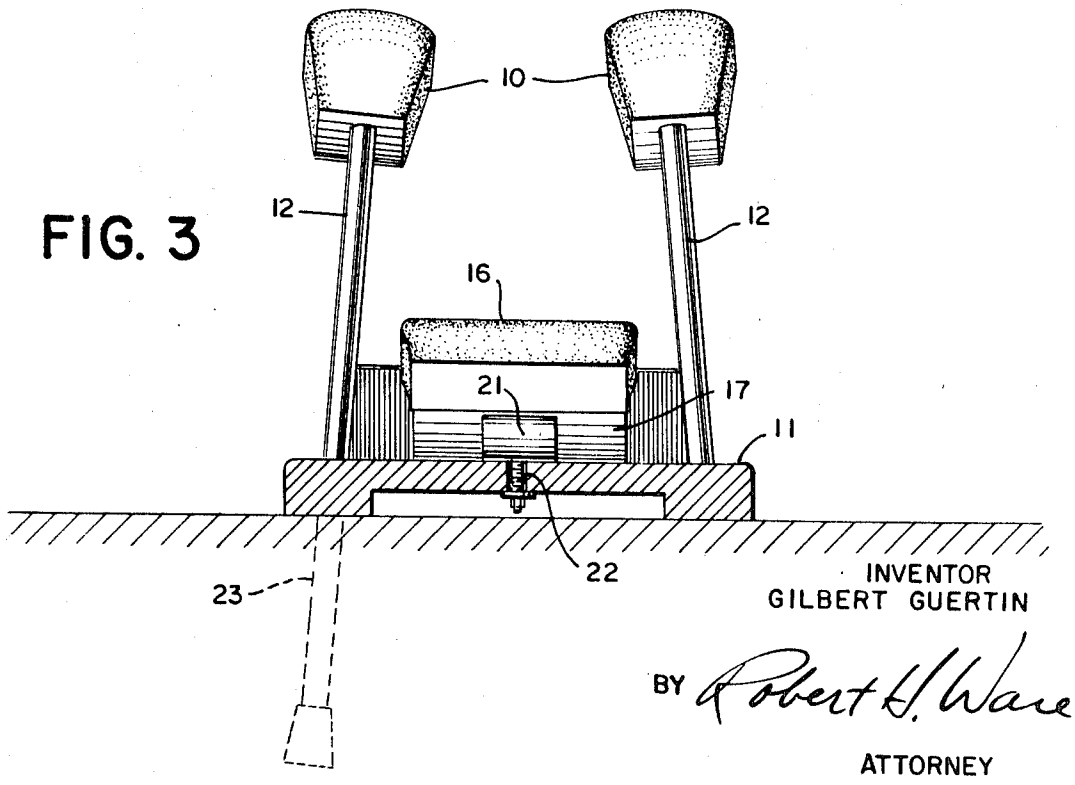


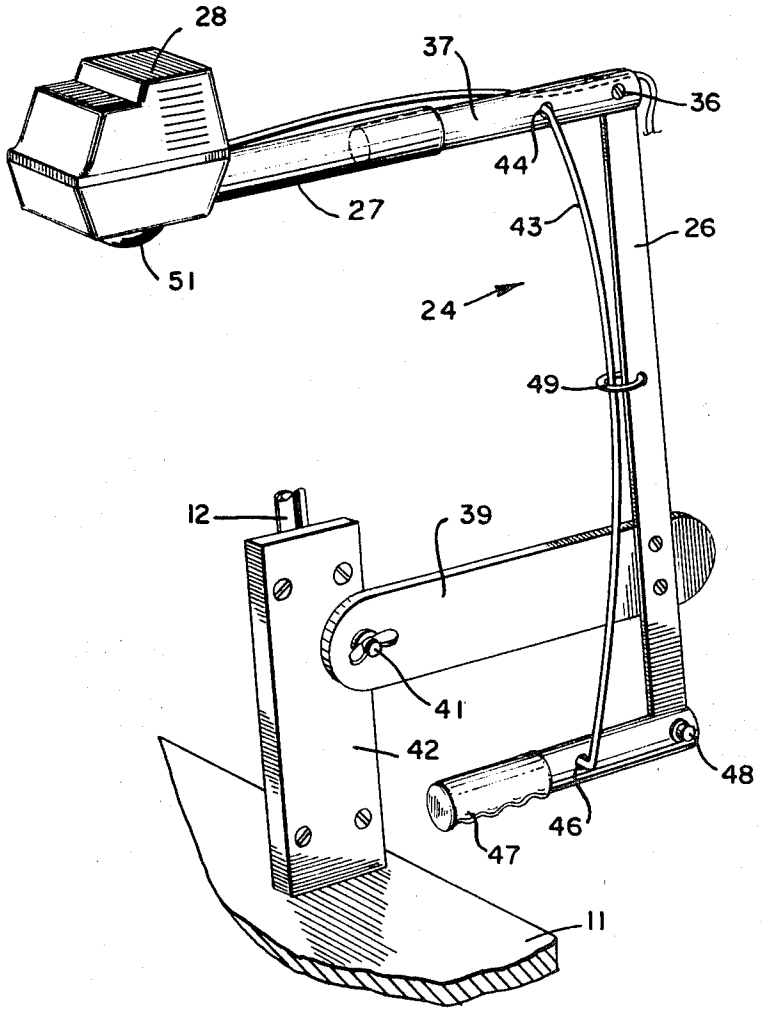

FIG. 3

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FIG. 4




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# POSTURAL DRAINAGE ASSISTER

This invention relates to support devices for use in the treatment of bronchitis, emphysema, pneumonia and similar conditions of human patients in which mucus and fluids accumulate in the patient's lungs. These support devices provide simple, comfortable adjustable support for the patient's head and shoulders in an inverted drainage position, in which mucus and fluids readily drain from the lungs and can be cleared from the patient's throat. A maneuverable vibratory percussion arm further enhances the drainage of the patient's lungs, and the device is well adapted for individual use by unassisted patients under self-treatment conditions.

## BACKGROUND OF THE INVENTION

Human patients suffering from certain diseases and conditions such as chronic bronchitis, bronchiectasis, lung abscesses and pneumonia, as well as cystic fibrosis and emphysema, all suffer from the reduced effectiveness of the lungs caused by the collection of fluid therein. Certain of these conditions are irreversible, but others can be reversed and cured if the patient can be sustained and provided with sufficient oxygen to permit testing and treatment of the etiologic condition. Up to the present time, oxygen treatment has been the only available practical technique for counteracting the reduced effectiveness of patients' lungs partially filled with fluid. In order to remove the fluid from the patient's lungs, the most common technique for management of such conditions has required the diagonal inversion of the upper portion of the patient's body, as by leaving the patient lying across a bed with his head and shoulders protruding and extending downward away from the edge of the bed toward the floor. In this position, the patient's lungs are above his windpipe and his throat, permitting gradual drainage of fluid from the lungs, removed as the patient clears his throat.

Prior to my development of the apparatus of the present invention, no adequate techniques have been available for self treatment of this condition in order to assist the patient in draining the fluid from his lungs. Weakened by breathing difficulty and lack of oxygen, such patients are physically unable to support their body weight on hands or elbows in this awkward drainage attitude, and one or more attendants or nurses have generally been required for such patients.

Accordingly, a principal object of the present invention is to provide a support device comfortably positioning the patient with his head and shoulders diagonally inverted to permit drainage of fluid from the patient's lungs.

Another object of the invention is to provide such apparatus in which simultaneous vibratory percussion of the patient's back further facilitates the drainage of fluids from his lungs.

A further object of the invention is to provide such apparatus capable of comfortably supporting the patient's body while permitting him to raise and move his head, and which is suitable for use by the patient alone, unaided by nurses or attendants.

Other and more specific objects will be apparent from the features, elements, combinations and operating procedures disclosed in the following detailed description and shown in the drawings.

## THE DRAWINGS

FIG. 1 is a perspective view of a support structure incorporating the features of the present invention.

FIG. 2 is a side elevation view partially in section illustrating a modified embodiment of the support structure shown in FIG. 1, omitting for simplicity the vibratory percussion arm shown in FIG. 1.

FIG. 3 is a front elevation view partially in section showing the support structure of FIG. 2.

FIG. 4 is a fragmentary perspective elevation view showing a modified vibratory percussion arm forming a part of the support structures of the present invention.



## HEAD AND SHOULDER SUPPORT STRUCTURES

The various embodiments of the present invention all incorporate shoulder supports, and preferably a separate adjustable head support. The shoulder supports comprise a pair of soft resiliently padded shoulder cushions **10** spaced upwardly above a supporting base **11**. Pedestal columns **12** are firmly anchored in the base **11** and extend upward to provide solid, stable support for the shoulder cushions **10**. As shown in FIG. **2**, the shoulder cushions **10** preferably slant downward from front to back at a slight angle to accommodate the top and front portion of the patient's shoulders **14** in soft, yielding, supporting relationship as indicated in FIG. **2**. The patient's body normally extends from the edge of a bed **13** so that his head and shoulders protrude diagonally downward, with his shoulders **14** firmly and comfortably supported on the shoulder cushions **10**.

A soft resilient head cushion **16** is movably positioned at a point below and forward from the shoulder cushion **10**, a short distance above the base **11**. The head cushion **16** is adjustably supported above base **11**. For example, in the embodiment illustrated in the figures, cushion **16** is mounted at the forward end of a hinged platform **17**, pivotally secured by a rear hinge **18** to a base flange **19** integrally joined to the base **11**. Adjustment of the height of head cushion **16** may be provided by a sliding ramp support **21** movably positioned in an adjustment slot **22** formed in the base **11** and thereby adapted for adjustment toward and away from the hinge **18**, providing camming adjustment raising and lowering the platform **16** to any convenient position desired by the user. In the embodiment illustrated in the figures, the ramp support **21** is formed as a short length of sturdy, lightweight tubular material transversely spanning the slot **22** to be positioned by an adjustment screw extending downward through the slot **22** for convenient adjustment by the user. A wingnut is illustrated at the lower end of the adjustment screw, but a conventional machine screw may be employed if desired, and other suitable sturdy height adjustment devices for raising and lowering the head cushion **16** may be employed in place of the ramp support **21**.

Independent positioning of the shoulder cushions **10** and the head cushion **16** permits the user to rest the weight of the upper portion of his body on the shoulder cushions **10**, with his head resting in repose on the head cushion **16**. However, the user's head may easily be raised between shoulder cushions **10** away from head cushion **16** whenever desired, since the entire weight of the upper portion of the patient's body is borne by the shoulder cushions **10**.

In the embodiment shown in FIG. **1**, support legs **23** are shown protruding downward from the underside of base **11**. Short legs of this kind are useful in adapting the support structures of FIG. **2** for use in hospital treatment of patients, where hospital beds are often considerably higher than conventional domestic beds. If the legs **23** are removable, the same support structure may be employed by the patient as his own personal support structure during hospital treatment, and after the patient is released for subsequent recuperation at home, the legs may be removed to adapt the support structure for use with the patient's lower bed at home in the same manner.

## VIBRATORY PERCUSSION ARM

As shown in FIGS. **1** and **4**, a vibratory percussion arm **24** is preferably mounted on base **11**, forming a movable L-shaped framework overlying the patient's back. This percussion arm **24** incorporates an upwardly extending shank **26** movably secured to the base **11** for manipulation by the patient and having pivotally joined to its upper end **36** a cantilever platform **27** supporting an electrical vibrator **28**, which may be a heavy-duty, low frequency vibrator suitable for producing vibratory percussive impacts in quick succession upon the patient's back.

The shank **26** is pivotally secured to a ledge **29** extending outwardly as a unitary extension of base **11** and illustrated in

FIG. 1 as an L-shaped plate clamped to one of the forward columns 12 supporting the shoulder cushion 10 by suitable pipe clamps 31. A positive stop 32 is preferably mounted on shank 26 below the pivot connection 33 joining it to ledge 29 in order to restrain shank 26 against unlimited outward pivoting movement away from the shoulder cushions 10, and preventing the lower handgrip end 34 of shank 26 beneath the pivot joint 33 from swinging inwardly at the same time to a point where it might pinch the patient's hand between itself and base 11 or ledge 29.

The cantilever platform 27 is preferably provided with a similar stop limiting its downward pivoting motion about the pivot joint 36 securing it movably to the upper end of shank 26. If desired, as indicated in FIG. 1, cantilever platform 26 may be rotatably secured for rotary movement about its own axis to a stem portion 37 which itself forms the pivotal anchor connection with the upper end of shank 26. The vibrator 28 is illustrated as a small size electrically driven hand vibrator secured by straps 38 to the outer notched end of arm 27, but other, more unitary anchor means may be employed if desired.

FIG. 4 shows a further modified embodiment in which the vibratory percussion arm is subdivided for articulating maneuvering by the user. Here the shank 26 is provided with a unitary shank plate 39 rigidly extending toward the base 11. A pivot 41 secures the shank assembly 26–39 for pivoting movement relative to base 11. Pivot 41 is shown in FIG. 4 as a bolt and wingnut securing shank plate 39 to a pedestal plate 42 secured to a column 12, and the pedestal plate may be mounted to move pivotally about the axis of column 12 if desired. The pivot 41 may be frictionally biased to hold it in such adjusted positions as that shown in FIG. 4 until it is forcibly moved by the user.

FIG. 4 also shows a trapezoid bar 43 pivotally secured at its upper end to stem 37 at a pivot point 44 spaced away from pivot 36 toward vibrator 28. The lower end of trapezoid bar 43 is joined at a pivot 46 to a movable handle 47 pivotally secured to the lower end of shank 26 at a pivot 48. The four pivot points 36–44–46–48 thus define a trapezoid which may be articulated by the patient's moving handle 47, causing vibrator 28 on arm 27 to be raised, or lowered to apply percussive pressure to the patient's own back. Bar 43 is shown curved, arching toward shank 26 and passing through a guide eye 49 secured to shank 26, and within the normal range of maneuvering of vibrator 28 across the patient's back, this arched bar 43 performs in the same manner as would a straight bar joining pivots 44 and 46.

As shown in FIGS. 4 and 1, arm 27 preferably terminates in a downward facing convex percussion knob 51 or a gently curved percussion block 52 juxtaposed with vibrator 28 to deliver percussive impacts to the patient's back. By maneuvering assembly 26–39 pivotally about pivot 41, moving handle 47 about pivot 48, and by swinging pedestal plate 42 pivotally about the axis of column 12, three degrees of freedom are provided, producing percussion treatment at an infinite variety of points across the patient's back, enhancing drainage without risk of soreness or fatigue.

In use, the patient places his shoulders on shoulder cushions 10 and then moves the shank 26 to swing its lower handgrip end 34 or handle 47 outwardly, bringing its upper portion toward the patient's back, until the knob 51 or block 52 of cantilever arm 27 rests upon the central part of the patient's back. By operation of a suitable switch 53, which may be an SCR voltage-varying switch if desired, the vibrator 28 may be actuated whenever desired by the patient, and a gentle manipulation of the handle or handgrip produces corresponding traversing movement of the vibrator percussion arm across the patient's back, moving the point of percussive impact to avoid soreness of fatigue while providing maximum percussion treatment to loosen and enhance the drainage of fluid from the patient's lungs.

While the support devices of this invention may be utilized effectively in the form shown in FIGS. 2 and 3, without a vibratory percussion arm, many physicians prefer the forms shown in FIGS. 1 and 4 to assure the availability of percussive impact treatment wherever required.

Since the foregoing description and drawings are merely illustrative, the scope of the invention has been broadly stated herein and it should be liberally interpreted so as to secure the benefit of all equivalents to which the invention is fairly entitled.

What I claim is:

1. A postural drainage assister for comfortably supporting the shoulders and the head of a patient in diagonally inverted position, with his hips, his shoulders and his head in successively lower positions, comprising:
   A. a base portion,
   B. a pair of rearwardly slanting padded shoulder cushions supported at a fixed distance upwardly spaced above the base portion,
   C. a softly padded head cushion movably secured to the base portion, and
   D. means for vertically adjusting the head cushion relative to the base portion to provide vertically adjustable cushioned support positions for the patient's head at a variety of levels beneath the padded shoulder cushions.

2. The postural drainage assister defined in claim 1, further including leg means extending downwardly beneath the base portion.

3. The device of claim 2 wherein the leg means are detachably removable.

4. The postural drainage assister defined in claim 1, further including a percussion arm movably secured to the base portion and positioned for movable contact with the patient's back, positionable to provide percussive impact at different selected positions on the patient's back near the vicinity of the patient's lungs.

5. The postural drainage assister defined in claim 4, wherein the percussion arm includes an upright shank portion pivotally secured at a point intermediate its end to the base portion and having handle means protruding at its lower end, and a cantilever arm portion movably secured to the upper end of the shank portion, permitting maneuvering movement of the arm by the patient while supported with his shoulders resting on the shoulder cushion, unaided by attendants.

6. The postural drainage assister defined in claim 5, wherein the handle means and the cantilever arm portion are pivotally joined respectively extending in the same direction from the lower end and the upper end of the shank portion, and further including a trapezoid rod having its ends respectively pivotally secured to the cantilever arm at a point near the upper end of the shank portion and to the handle means at a point near the lower end of the shank portion, with the pivotal connections between the shank portion, the handle means, the trapezoid rod and the cantilever arm demarking the apices of a trapezoid, whereby the cantilever arm is adapted to be articulatingly maneuvered by manipulation of the handle means by the patient during his use of the drainage assister.

7. The postural drainage assister defined in claim 1, further including a vibratory percussion arm movably secured to the base portion and positioned for movable contact with the patient's back, incorporating a vibrator movably positionable to provide vibratory percussive impact at different selected positions on the patient's back near the vicinity of the patient's lungs

8. The postural drainage assister defined in claim 7, wherein the vibratory percussion arm includes an upright shank portion pivotally secured at a point intermediate its end to the base portion and having handle means protruding at its lower end, and a cantilever arm portion movably secured to the upper end of the shank portion, permitting maneuvering movement of the vibrator by the patient while supported with his shoulders resting on the shoulder cushions, unaided by attendants.