This invention relates to therapeutic appliances, and more especially to appliances for redeveloping muscle or elastic tissue tone in the blood vessels, and is designed particularly for treatment of patients suffering from persistent oedema or dropsy, myocardial or valvular heart disease where strenuous exercise would prove hazardous, disabilities rendering physical exercise impossible, confinement in bed for a long period, fractures with delayed union, gastro enteritis and collitis, certain kidney diseases due to venous stasis, intermittent claudication and other troubles which may be relieved or perhaps wholly eradicated by the restoration of muscular or elastic tissue tone to the blood vessels.

More specifically our object generally is to provide an appliance for automatically effecting slow oscillation of a support, such as a bed or the like, so constructed that it is possible to utilize the force of gravity chiefly to either the head or the extremities or to both. A further object is to provide for effecting a shift in the arc of oscillation, that is, for causing the support, to assume a sharper gradient or incline when at one extremity of its oscillation.

A still further object is to provide means for confining the oscillation to a smaller range than normal without adjustment of or change in the mechanism utilized to operate the pitman through which the power is applied to rock the support.

With the objects mentioned in view, the invention consists in certain novel and useful features of construction and organization of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawings, in which:

Figure 1 is a side elevation of a therapeutic appliance embodying the invention and showing thereon a patient support in the form of the base frame or frame of a hospital bed.

Figure 2 is a top plan view of the same.

Figure 3 is a vertical section on the line III—III of Figure 2.

Figure 4 is a fragmentary diagrammatic side elevation embodying a modified mount for a bed or the like, and a modified construction for shifting the arc of oscillation.

Figure 5 is a fragmentary diagrammatic elevation embodying a toggle attachment for shortening the arc of oscillation of the support.

Figure 6 is a detail perspective of the toggle attachment coupling the base frame and support, and showing the utilization of the power mechanism for expanding and contracting the toggle.
bers are of telescopic type, corresponding members thereof being pivoted to the wrist-pins and to bolts 18 carried by upstanding lugs 19 on the foot rail of the support. The outer ends of the inner sections of the pitman, are connected by a cross-bar 20, and the other or outer sections, near their outer ends, by a similar cross-bar 21, and the cross-bars have centrally-disposed depending lugs 22 and 23. A screw rod 24 is in threaded relation to lug 23 and in swivelled, but longitudinally fixed, relation to lug 22, so that when turned in one direction the pitman 6 is shortened to effect depression of the foot end, reversed screw action effecting lengthening of the pitman and upward motion of the foot end of the support. The speed of the motor through the reducing transmission gearing will give a constant but slow oscillatory movement of the support and by means of a push button or equivalent switch, not shown, the person in charge or a patient on the support, can at an opportune moment, even break the electric circuit to retain the support stationary when horizontal or at any inclination within the range of oscillatory movement, the reestablishment of the circuit through the motor being followed by resumption of the oscillatory action.

In Figure 4, the support is mounted on and oscillates around a fixed axis 25 at the upper end of standards 26 upstanding from the sides of the base frame, and in this construction, the support is shown with depending lugs 27 having slots 28 receiving a cross-bolt 29 to which the lower ends of pitman members 30, shown as of fixed length, are pivoted, the opposite ends of the said members being pivoted to the wrist-pins 16. The cross rod has clamping nuts 31 to secure it at any desired point in the length of the slots 28, adjustment of the rod toward or from the support, effecting a shortening or lengthening of the pitman relative to the support, with the result of shifting the arc through which the support swings, as hereinbefore explained.

In the event, it is desired to impart a very limited oscillation to the support 2, a toggle attachment is provided between corresponding ends of the base frame and support, and the toggle attachment is expanded and contracted by pitman 17, which, in this instance, may be of fixed length (see Figure 5), or of the adjustable type as in Figure 6. The toggle comprises members 32 detachably pivoted or hooked to a cross bar 1a of the base frame, and toggle members 33 pivotally pendent from the support and pivoted above their lower ends to members 32. The lower ends of members 33 are connected by a cross rod 34, and between said members 33 and depending from cross-bar 21 of the pitman, is a pair of forks 35, which pivotally engage cross rod 34. The arrangement is such that the pitman 17 in its reciprocal movement, alternately expands and contracts the toggle attachment and effects both limited oscillatory movement of the support, as indicated by the dotted positions of the latter in Figure 5.

To depict more clearly how the shift of the arc is accomplished in the type of structure wherein the pitman is actually non-adjustable as to length, but is relatively changed in length, Figure 4 discloses diagrammatically the disk, the support and the connecting pitman. Let a represent the position of the support when the pitman connects with the slotted lug about midway the length of the slot, the support being shown in a horizontal position. If it is desired to shift the arc of oscillation of the support so that the connected end of the support shall start from a lower plane, but without changing the length of the arc, the nuts 31 are loosened and the adjacent end of the support is depressed as at 3, this adjustment changing the angular relation between the support and pitman. Should it be desired to raise the adjacent end of the support to a higher plane than the horizontal as at c, such adjustment can be made, the limit of such movement being the lower end of the slot.

The specialist in charge will determine the arc of oscillation which he considers the most beneficial to the patient treated, initially or at any time in the course of the treatment, and in some cases, he may deem it advisable that the arc described shall be more extended at one end of the support than at the other, and with the construction shown by Figure 1, this can be effected by simply shifting the bed longitudinally relative to the rack sector, that is, any, the support can be lifted off the sector and then replaced thereon with the end of the former destined to describe the shorter arc, nearer the center of the rack than its opposite end. This adjustment, if the actual or relative length of the pitman is not disturbed, shifts the arc as hereinbefore explained, so that if it is desirable to have one end of the support than at the other without shifting the center of the arch, there must be effective compensating actual or relative shortening or lengthening of the pitman.

In a case where it is desired to oscillate the support through a very short arc, the pitman is detached from the support, and the toggle is utilized to connect the latter with a stationary point of the supporting frame. The forks of the pitman, functionless where the latter is connected directly to the support, are engaged with the cross bar 34 of the toggle member 33. The rotation of the disks, through the pitman, alternately expands and contracts the toggle and thereby effect the desired short arc movement of the support, as will be apparent by reference to Figure 5. The length of the arc can be varied by a shortening or lengthening of the pitman of the telescopic type, or of such adjustment as shall vary the distance between the frame rod 1a and the forks 35 of the pitman if of non-extensible type as shown by Figure 6.

In practice, it is contemplated that the transmission shall be of such nature that the support shall make one complete oscillation in approximately four minutes with standard motor speed, faster or slower movement being secured by motor control or other conventional means, not shown.

The term “support” is used generically to include operating tables, chairs and cots or beds, lacking foot supports, as well as regular invalid beds, the latter, of the modern type, usually having equipment for supporting a patient in a sitting position or for holding the feet, is attached, that is bent to elevate the knees above the head and feet when the patient is in a reclining position, or above the feet when the patient is in a sitting position. As such conventional equipment forms no part of the invention, although of value in the use of the latter, it is neither detailed nor particularly described herein.

From the foregoing it will be apparent that while we have produced apparatus involving all of the features set forth as desirable, it is to be understood that we reserve the right to make all changes within the spirit of the invention and without the ambit of the prior art.
We claim:

1. In apparatus for therapeutic treatment, a base frame and an oscillatory bed frame superimposed upon the base frame for oscillatory movement thereon, a toggle connection between one end of the bed frame and the corresponding end of the base frame, the toggle comprising two arms pivotally jointed together at their adjacent ends, a motor-driven shaft, a wrist-pin actuated for circuitous travel by and around the axis of the shaft, and a pitman comprising two sections fitting telescopically together, the inner section being pivoted to the wrist pin and provided with a lug at its outer end, and the outer section having a lug and having a hook pivotally engaging the toggle section attached to the bed frame at a point of said toggle section at the opposite side of the joint of the toggle from the point of attachment of the latter to the bed frame, and a rotatable screw in threaded engagement with the lug of the outer section of the toggle and in swivelled but non-slideable engagement with the lug of the inner toggle section for respectively effecting expansion or contraction of the toggle to effect a shift in the arc of oscillation of the bed frame.

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