United States Patent

Alessi et al.

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[45] **Aug. 15, 1972**

[54] MEDICAL TRACTION DEVICE

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[21] Appl. No.: **14,127**

[52] **U.S. Cl.**.....**128/75,** 128/84 C, 242/107

[51] **Int. Cl.**.....**A61h 1/02**

[58] **Field of Search**.....128/69, 70, 75, 84; 242/107, 242/107.5, 85, 107.3; 254/135, 164, 172

[56] **References Cited**

UNITED STATES PATENTS

3,168,094	2/1965	Siltamaki	128/75
3,060,929	10/1962	Zivi	128/75
3,085,768	4/1963	Truetelaar	242/107
2,673,694	3/1954	Howell	242/107.3
2,658,698	11/1953	Leroy	242/107
3,384,321	5/1968	Becker et al.	242/107.5

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[57] **ABSTRACT**

A medical traction device incorporates a plurality of constant force spring means and means for selecting a Yasko; J. traction force from said spring means for applying to a patient.

1 Claim, 11 Drawing Figures

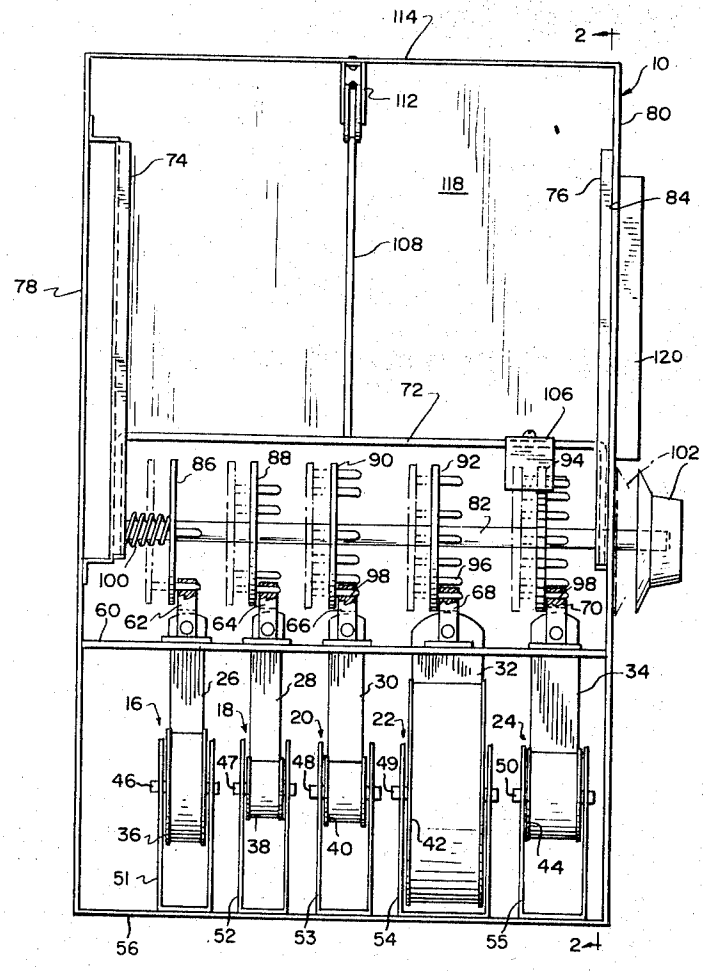
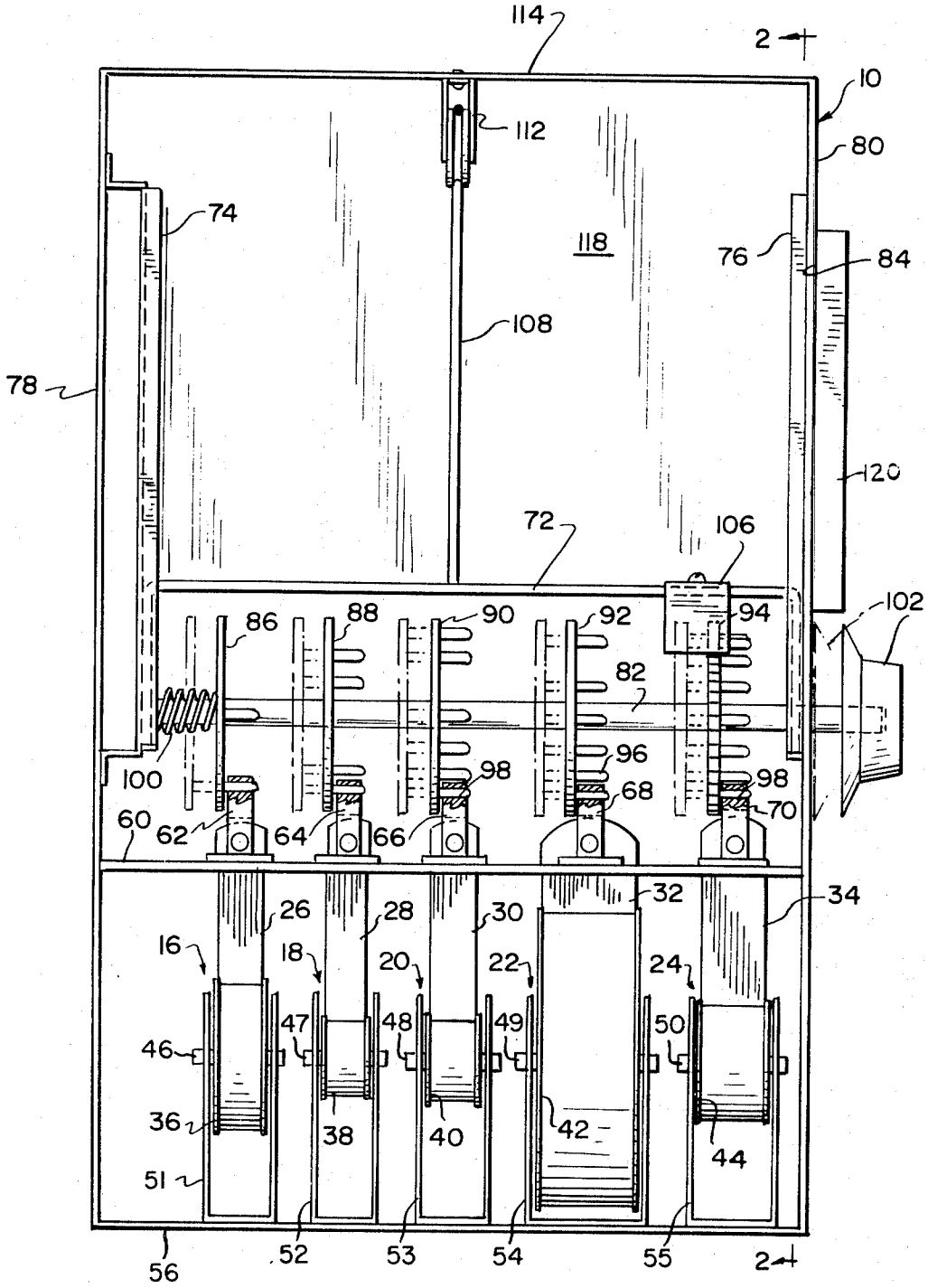


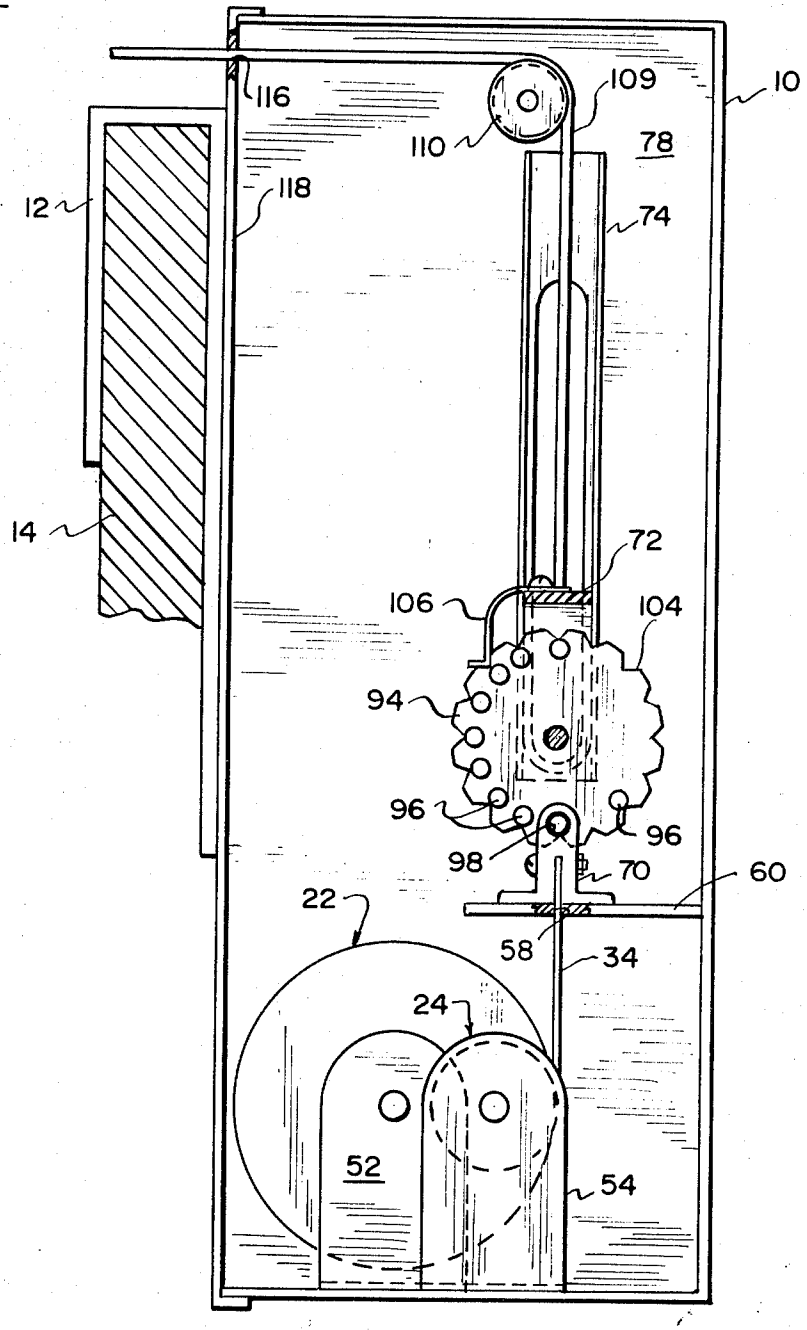
FIG. 1



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FIG.2



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FIG. 3

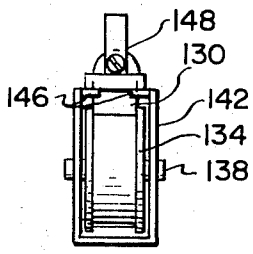


FIG. 4

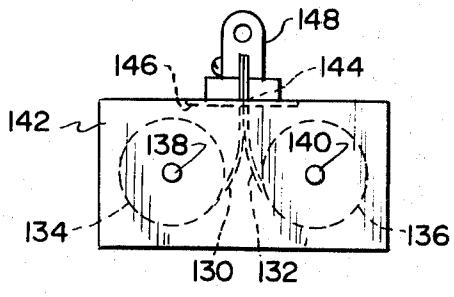


FIG. 6

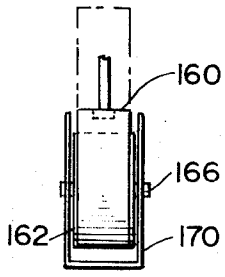


FIG. 7

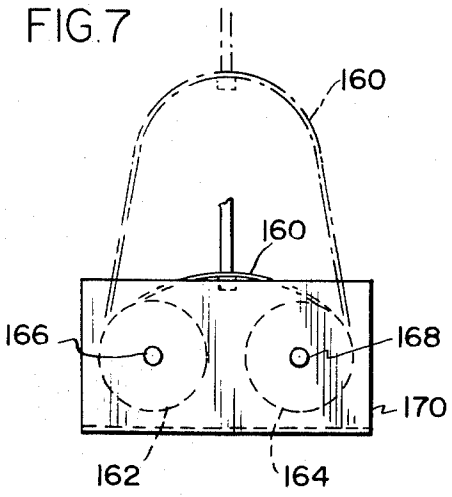


FIG. 8

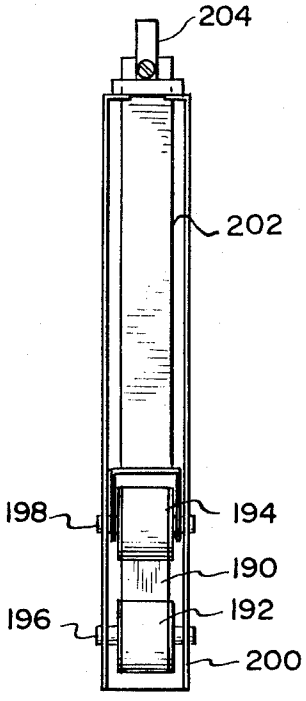
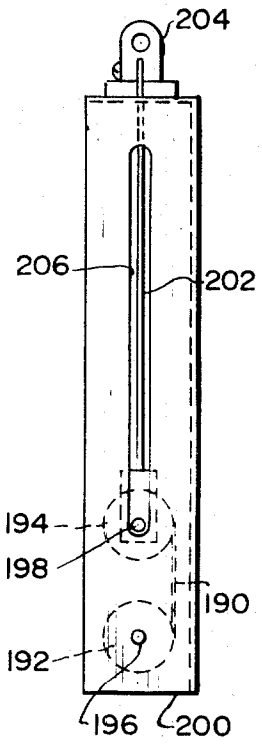


FIG. 9



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FIG.5

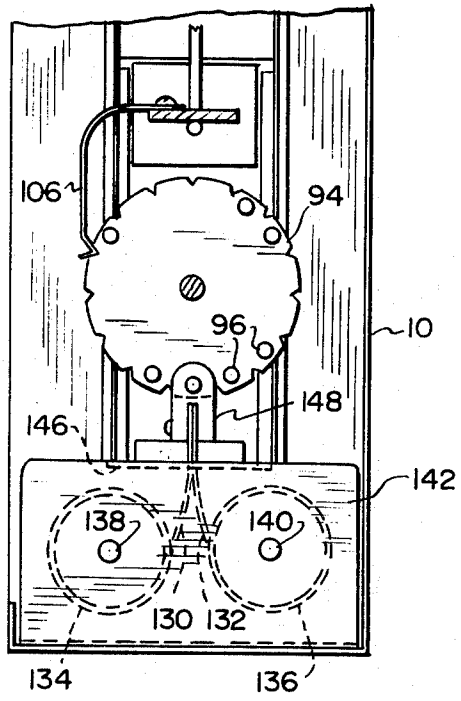


FIG.10

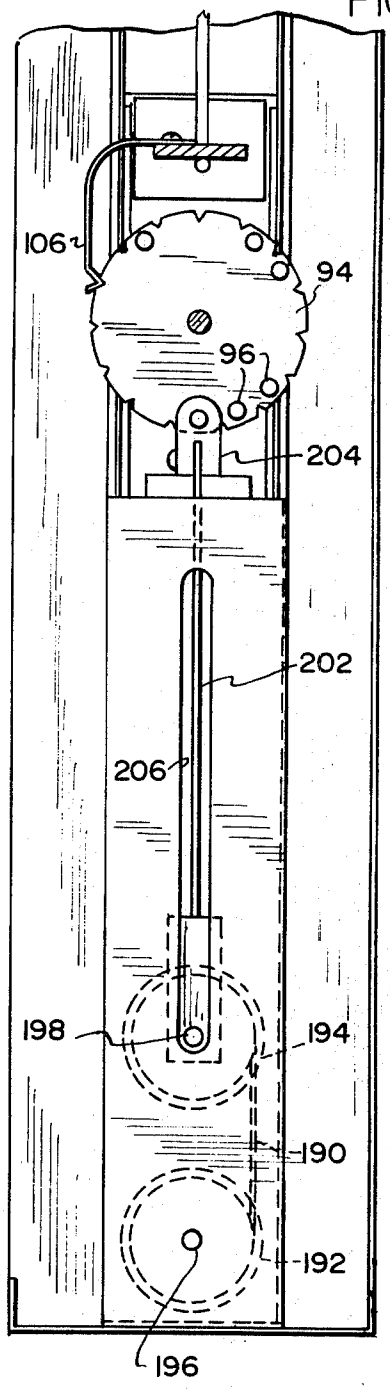
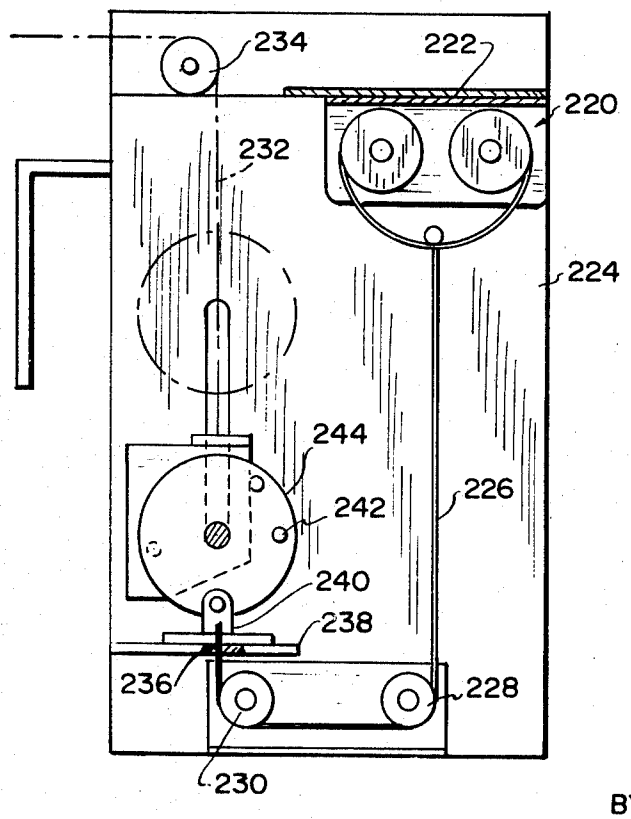


FIG.11



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MEDICAL TRACTION DEVICE

BACKGROUND OF THE INVENTION

Presently, solid weights of metal, liquid-filled bags, or sand-filled bags are used with medical traction equipment. This system of weights is cumbersome, heavy, requires individual handling in assembly, is unsightly, and at times, weights are misplaced. In the case of the liquid-filled bags, which are stored when empty, a great deal of effort is required to fill and empty the bags. Liquid-filled bags as well as sand-filled bags require computing the weight from the volume.

THE INVENTION

According to this invention, a medical traction device incorporates a plurality of constant force spring means and means are provided for selecting a desired force from the spring means for application to the patient. This selection means includes a plurality gang of pegged rotatable discs, one for each spring means, the pegs of which are engagable with an apertured fitting of each spring means. The location of the pegs on the discs is chosen to provide various combinations of force values which are derived from the spring means. The apparatus is so constructed to permit limited movement of the patient while subjected to traction without change of the traction force.

THE DRAWINGS

FIG. 1 is an elevational view of medical traction equipment according to this invention;

FIG. 2 is a view taken on line 2—2 of FIG. 1;

FIG. 3 is an end view of another embodiment of a constant force spring means;

FIG. 4 is an elevational view of the spring means of FIG. 3;

FIG. 5 is a fragmentary view of a portion of the traction apparatus using the spring means of FIGS. 3 and 4;

FIG. 6 is a partial end view of still another embodiment of a constant force spring means;

FIG. 7 is a partial elevational view of the spring means of FIG. 6;

FIG. 8 is an end view of a spring means assembly incorporating a further embodiment of a constant force spring means;

FIG. 9 is an elevational view of the assembly of FIG. 8;

FIG 10 is a fragmentary view of the traction apparatus using the spring means of FIGS. 8 and 9; and

FIG. 11 is an elevational view, similar to FIG. 1, but illustrating still a further embodiment of the invention.

THE PREFERRED EMBODIMENTS

The first embodiment of the invention, illustrated in FIGS. 1 and 2, comprises a container 10 having a bracket 12 for attachment, as for example, to a head or foot board 14 of a bed (not shown). Within the container 10 are a plurality of constant force spring means, 16, 18, 20, 22 and 24, each of which includes a coil spring 26, 28, 30, 32 and 34 on a reel 36, 38, 40, 42 and 44 rotatably supported on a shaft 46, 47, 48, 49 and 50 journalled in a bracket 51, 52, 53, 54 and 55 connected to the floor 56 of the container 10. The free end of each spring passes through a slot 58 in a guide 60 fixed within the container 10 and has an apertured fitting 62, 64, 66, 68 and 70 fixed thereto. The fitting is such shape to retain the free ends of the springs above the guide 60.

A substantially U-shaped carriage 72 is located above the guide 60 and is vertically slidable in tracks 74, 76 attached to sides 78, 80 of the container 10. A horizontal shaft 82 is rotatably journalled in the carriage 72 and is vertically movable therewith. To accomodate such movement, the side 80 of the container 10 is vertically slotted as at 84. The shaft 82 is provided with a series of discs 86, 88, 90, 92 and 94 therein corresponding in number and spacing to the apertured fittings 62, 64, 66, 68 and 70. Each disc is provided with a plurality of lugs, pegs or the like 96 normally extending there from for engaging an aperture 98 in a fitting. The arrangement of lugs, pegs or the like is such to select various spring force values upon engagement with the fittings. To engage and disengage the fittings, the shaft 82 is axially movable, as indicated by the broken lines in FIG. 1. A helical spring 100 surrounding the shaft 82 between the track 74 and the disc 86 urges the shaft 82 toward the right (as viewed in the drawings) for lug-aperture registry. A suitable knob 102 is provided outside the container 10 for rotating the shaft 82 and is provided with a suitable indicia of force. In order to rotate the shaft 82 and insure registry of at least one disc lug with a spring, the disc 94 (or any other disc in the series if desired) is provided with a series of detents 104 for engagement by a leaf spring 106 attached to the carriage 72.

A cable 108 is attached to the carriage 72, is trained around a pulley 110 journalled in a bracket 112 fixed to the top 114 of the contalner 10 and passes through an opening 116 in a side 118 of the contalner 10. This cable 108 is attached, outside the container 10 to a fitting or the like for a patient to be subjected to traction.

In operation, it is only necessary to dial the desired force, so that the proper spring or combinations thereof are selected, and attach the cable 108 to the patient. Changes in force can be made only when the carriage is returned to its neutral position by moving the knob 102 to change the selection of spring force. The carriage arrangement permits movement of the patient without force change.

A spacer 120 is attached to the side 80 of the container 10 and is a means for preventing movement of the shaft 82 and knob 102 when the carriage is moved vertically up from its neutral low position. This acts as a safety means preventing accidental release of spring members when not in relaxed positions.

FIGS. 3, 4 and 5 show a modification of the spring means in the FIGS. 1 and 2 embodiment, just described. Here the spring means includes a pair of coiled, constant force springs 130, 132 each on a reel 134, 136 supported for rotation on a shaft 138, 140 journalled in a bracket 142 for attachment to the container 10. The pair of springs 130 and 132 are joined and pass through a slot 144 of a shelf 146 supported on the bracket 142. An apertured fitting 148 corresponds to the fitting of the springs described in FIGS. 1 and 2. The remainder of the structure, i.e., the discs, carriage, detents remain the same; the basic difference is in the spring means for supplying the constant value force to the patient.

FIGS. 6 and 7 illustrate another embodiment of the spring means. Here there is a coiled spring means 160 centrally attached to an apertured fitting, such as 148 in FIGS. 3 to 5, with the two ends thereof on reels 162, 164 rotatably journalled on shafts 166, 168 supported by a bracket 170 to be affixed to the container 10. In other respects the remaining structure is the same as described for FIGS. 1 and 2.

FIGS. 8, 9 and 10 illustrate still another modification of the spring means. Here a coiled spring 190 has its ends connected to reels 192, 194 which are rotatably supported on shaft 196, 198 journalled in a bracket 200 for attachment to the container 10. In this embodiment the upper reel 194 is vertically movable and is connected by means of a rod 202 to an apertured fitting 204 for engagement by a lug of a disc as before described. To permit movement of the reel 194, the bracket 200 is vertically slotted as at 206. The remaining parts of the structure are similar to that described for FIGS. 1 and 2.

FIG. 11 is still another embodiment of the invention in which a slightly different arrangement of parts is provided. In this embodiment, the spring means 220 is supported by a bracket 222 near the top of a container 224 and the force is transmitted via a cable 226 trained over pulleys 228 and 230 to the cable 232 which is trained over a pulley 234 to the patient. The cable 226 passes through an opening 236 in a shelf 238 and is attached to an apertured fitting 240 to cooperate with lugs 242 on a rotatable disc 244 which is vertically movable, in the same manner as described with reference to FIGS. 1 and 2.

The particular spring means can be varied; the operation of the apparatus is substantially the same.

What is claimed is:

1. A medical traction device comprising:

a plurality of constant force spring means each having an apertured fitting;

a series of discs corresponding in number to said spring means;

said discs being rotatable about their centers and being provided with a plurality of pegs extending therefrom;

said pegs of a disc being adapted to engage said apertured fitting of its corresponding spring means at some position of said disc thereby permitting selection of a particular force from said plurality of spring means; and

means to apply said selected force to a patient.

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