

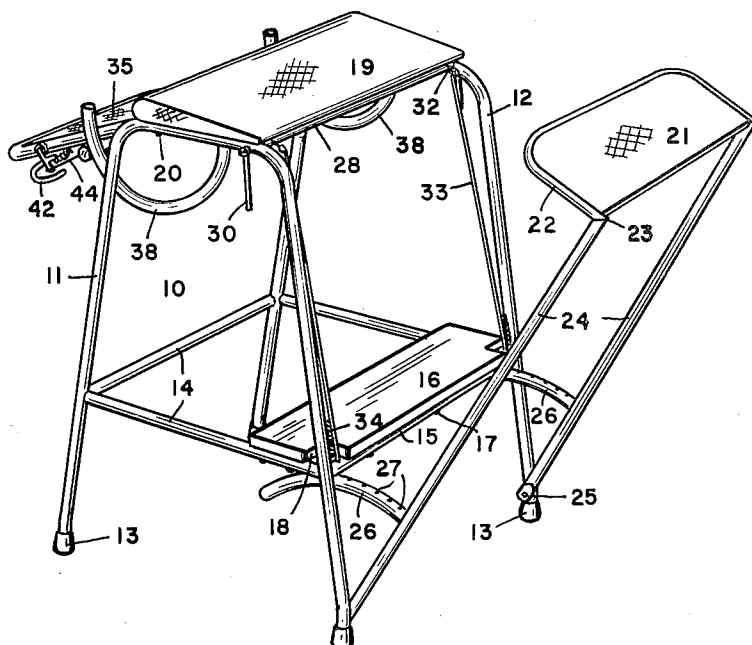
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L. G. HOTAS

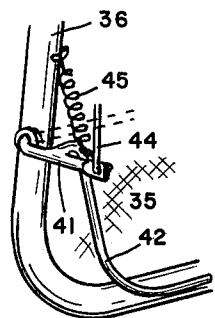
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SPINAL EXERCISE DEVICES

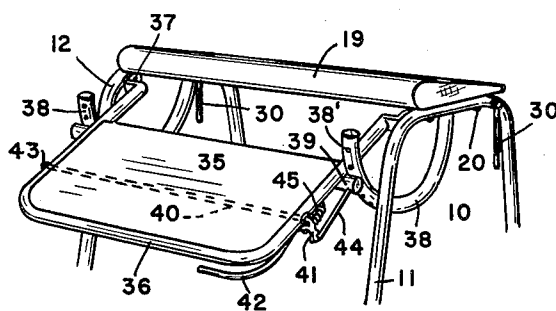
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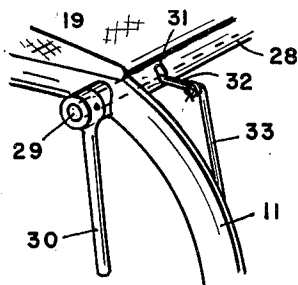
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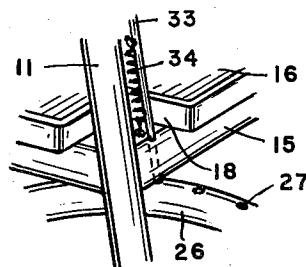
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INVENTOR
Leon G. Hotas

Walter C. Boggess
Atty.

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SPINAL EXERCISE DEVICES

Leon G. Hotas, 190 Osborne St. N., Winnipeg 1,
Manitoba, Canada

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1 Claim. (Cl. 272—57)

The invention relates to means for exercising the spinal and abdominal muscles of a patient, including the joints thereof, in rehabilitation of back injuries, post spinal surgery conditions and muscle weakness from debility; and also for general conditioning. In these particular exercises, gravitational body weight is used as the essential for resistance to the operating muscles, and accordingly, the patient must be in a state of advanced rehabilitation to perform the exercises and obtain the advantages thereof.

The principal object of the present invention is to provide a device upon which a patient may be positioned for self operation in carrying out graduated spinal flexion exercises.

A further object of the invention is to provide adjustments on the device for the various lengths or heights of patients.

A further object of the invention is to provide an adjustment on the device to regulate the degree of flexion obtainable by the patient during the exercises.

Further objects of the invention are: to construct the device in a relatively simple manner for easily understood movements, ease of mechanical operation, and economy of manufacture; designed for both a pleasing appearance and maximum efficiency in the execution of the exercises; and built for sturdy strength to stand up under years of rugged operation and satisfactory trouble free use.

With the above important objects principally in view, the invention generally consists in the design and assembled arrangement of the parts now to be described, reference being had to the accompanying drawings in which:

FIGURE 1 is a perspective view of the device opened out for use.

FIGURE 2 is a fragmentary front view of the device in perspective and showing the adjustable apron.

FIGURE 3 is an enlarged detailed perspective view of the apron adjustment control handle and associated parts.

FIGURE 4 is an enlarged perspective view of the upper part of the shelf adjustment control.

FIGURE 5 is an enlarged perspective view of the lower part of the shelf adjustment control.

In the drawings like reference characters refer to similar parts in the several figures.

The framework 10 of the spinal exercise device consists of a pair of inverted U-shaped tubings 11 and 12, which form the four legs. The bottoms of these legs are provided with rubber shoes 13. Part way up from the bottom, all these legs are connected by reinforcing cross tubings 14, one particular cross tubing or rod 15 mainly carrying a horizontal rubber covered step or stand 16, which is held thereto by screws 17. It will be noted that the outer corners of this step are notched out, as at 18. The upper central portions or bight portions of the U-shaped tubings 11 and 12 each support one end of a platform 19, which is held thereto by screws indicated at 20. This platform is suitably padded (not shown) and provided with a fabric covering.

A movable shelf or panel 21, nearly as long as the platform, is reinforced along three sides thereof by a shaped tubing 22. This shelf is preferably made from wood (not shown) and is covered with fabric similar to that on the platform. The two ends of the tubing 22 are

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both cut, bent at right angles and welded securely, as at 23, to extend downwardly in parallel arms 24. The lower extremities of these arms each pivotally connect at 25 to one of the legs of the tubings 11 and 12. Accordingly, the shelf 21 can rock about these pivots.

A pair of short arced tubings or quadrants 26 extend forwardly from the arms 24, one on each arm. These quadrants are each provided with spaced holes 27 therealong and pass under the main step supporting tubing 15, at each end. A cross tubing 28 passes under the step side of the platform 19 for support of same and connects the upper ends of the leg tubings 11 and 12. A shaft 29 rotatively passes through this latter tubing, including the leg tubings, and each projecting end carries a manually operable lever 30. A slot 31 is provided adjacent each end of the tubing 28 for a short crank 32 to pass through and connect to said shaft 29, such as by threading therein (not shown). The outer ends of these cranks each pivotally receive the upper end of a detent link 33. The lower ends of the links 33 slidably pass through passages formed in the reinforcing cross tubing 15, at the notches 18, and into one or other of the holes 27 of the quadrants 26. Coil springs 34, each between one of the leg tubings and one of the links 33, resiliently hold same in said holes. By manually operating either one of the levers 30, the links 33 can be withdrawn from the quadrants.

An apron 35, formed in the same manner as the shelf 21, also has three sides reinforced by a formed tubing 36. The two ends of this latter tubing each project past the apron, are flattened and outwardly bent in a Z-shape, and then pivotally connected at 37, each to one of the front ends of one of the leg tubings 11 and 12. A further pair of tubular quadrants 38 are invertedly mounted on the upper ends of the leg tubings 11 and 12, one on each and centered on the pivot points 37, so that the apron can swing therebetween. These latter quadrants are each provided with a series of spaced outer holes 38' therearound. The open inner side of the apron is reinforced by an under cross tube 39, each end of which is welded to one of the side members of the tubing 36, and then extended just past the quadrants 38 to ride thereover in the swinging of the apron. A shaft 40 passes centrally and longitudinally through the apron, including the side members of the tubing 36. One end of this latter shaft is formed into a crank 41, including a curved handle 42 under the apron for operation, while the opposite end is provided with a similar, but attached crank 43 (attachment not shown), minus the handle. The outer ends of both cranks 41 and 43 pivotally receive detents 44, each of which slidably pass through one of the ends of the tube 39 to enter one or other of the holes 38' of the quadrants 38. A coil spring 45, between the crank 41 and the tubing 36 resiliently holds said latter detents in said locked positions on the quadrants 38, but manual pressure upwardly on the handle 42 will withdraw same to release the apron.

In operation, the patient first stands on the step 16, facing the platform 19. The body is then bent over the platform to rest the abdomen thereon, the trunk or torso extending over and resting on the apron. The legs are lifted to contact the under side of the shelf or panel 21. At this time, the operator will release the links 33 by operating one of the levers 30 and adjust the shelf toward or away from the platform to accommodate the length of the legs. The lever 30 will then be released to again lock the shelf to the quadrants 26. The handle 42 is then pressed upward under the apron to release same from the quadrants 38. The apron can then be adjusted to the angle desired and upon release of the handle, the detents 44 will again lock the apron to the quadrants 38.

From the above it will be seen that the patient's body

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is wrapped, so to speak, around the platform, or fulcrumed thereon, with the torso supported by the apron and the feet caught under the shelf. The patient now raises the trunk or torso from the apron as far as possible, and then lowers same back to the apron. This is done as long as the exercise is to be continued. This lifting of the torso against the gravitational weight thereof places a heavy strain on and quickly develops the spinal extensor muscles. The angle at which the apron is set will regulate the range of the arc flexion, or bending. The gravitational weight can be accentuated by moving the body farther over on the abdomen, by placing the hands behind the head, or by extending the arms thereabove. By swinging the body sideways in the above lifting or lowering exercises, strains are placed on both the spinal and abdominal muscles in lateral trunk flexion for fast rejuvenation. Abdominal muscle exercises can also be executed by the patient lying on his back (supine) or sideways. As the muscles have to be fairly strong in the first place to carry the above strains, it will be appreciated that the patient must be in a very good state of rehabilitation.

What I claim as my invention is:

In a spinal exercise device, the combination of a pair of inverted substantially U-shaped frame members disposed in spaced vertical planes, said frame members including elevated bight portions and pairs of transversely spaced legs extending downwardly from opposite ends of said bight portions, a platform extending transversely between and rigidly secured to the bight portions of said frame members, a pair of transversely spaced parallel arms having their lower ends pivoted to lower end portions of one of said pairs of legs for swinging movement in planes parallel to the planes of said frame members, a transversely extending panel rigidly secured to the upper

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ends of said arms and projecting laterally therefrom toward said one pair of legs, said arms having such length relative to said one pair of legs that said panel is disposed substantially at the level of and juxtaposed to said platform when the arms are swung toward said one pair of legs, a transverse rod extending between and rigidly secured at its ends to intermediate portions of said one pair of legs, said rod being provided in its end portions with a pair of passages, a pair of arcuate quadrants secured at one end thereof to intermediate portions of said arms concentrically with the pivotal connections of the arms to said one pair of legs, said quadrants being movably disposed under the end portions of said rod and provided with rows of apertures registrable with said passages, a transverse shaft rotatably journaled in said bight portions adjacent the upper ends of said one pair of legs, a pair of cranks secured to the end portions of said shaft, a pair of links pivoted at their upper ends to the respective cranks, the lower end portions of said links extending slidably through said passages in said rod and being receivable selectively in the apertures of said quadrants whereby to lock said arms in a pre-adjusted position against swinging, resilient means for urging said links into the quadrant apertures, and a handle provided at one end of said shaft for partially rotating the same whereby to withdraw said links from the quadrant apertures against the action of said resilient means.

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