March 28, 1939. S. H. JENSEN 2,152,431

EXERCISING MACHINE

Filed Nov. 2, 1936 3 Sheets-Sheet 1

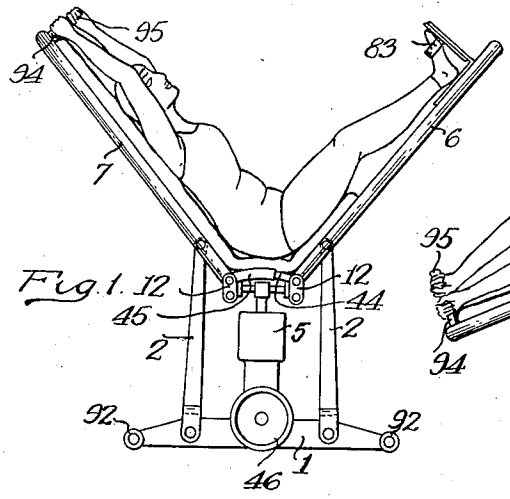


Fig. 1.

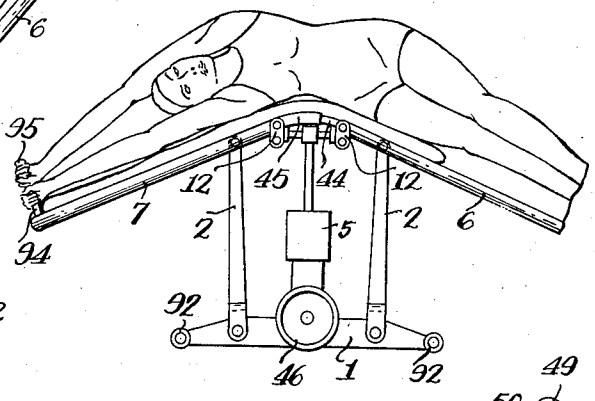


Fig. 2.

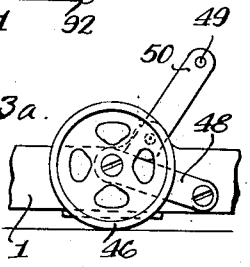


Fig. 3a.

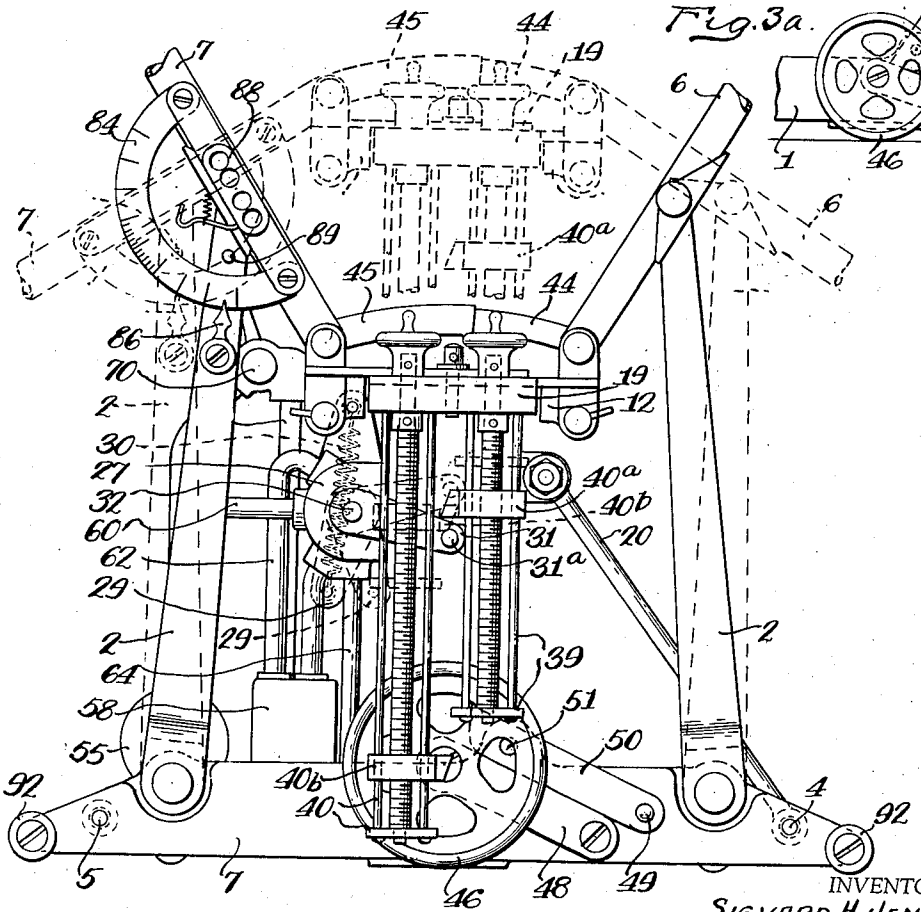


Fig. 3.

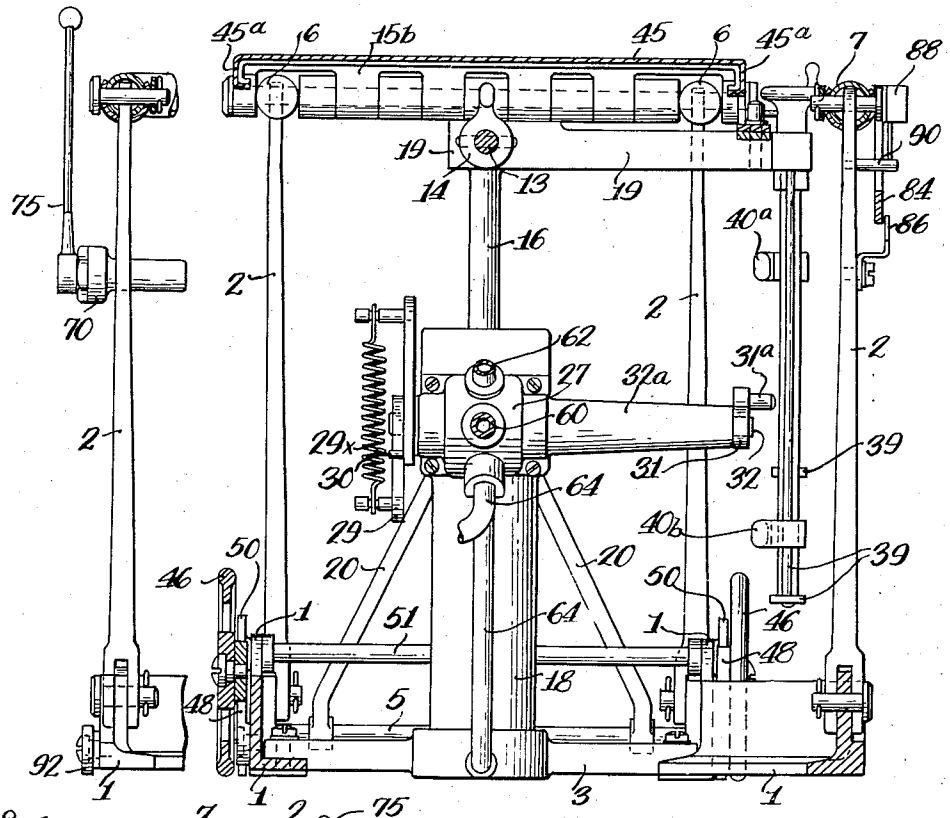
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Fig. 7.



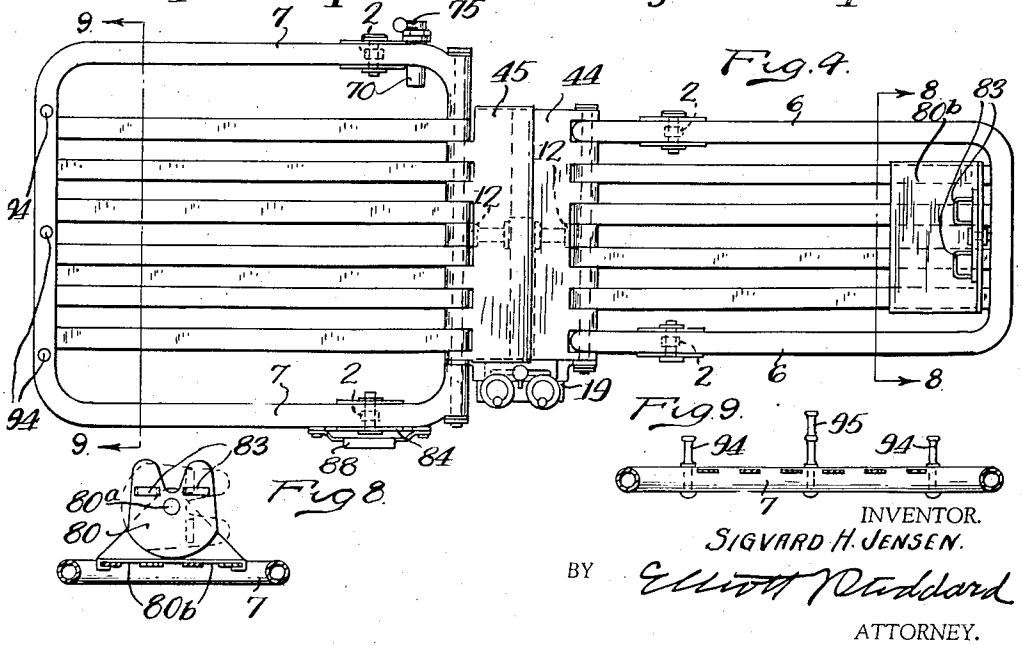


Fig. 8.

Fig. 4.

Fig. 9.

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EXERCISING MACHINE

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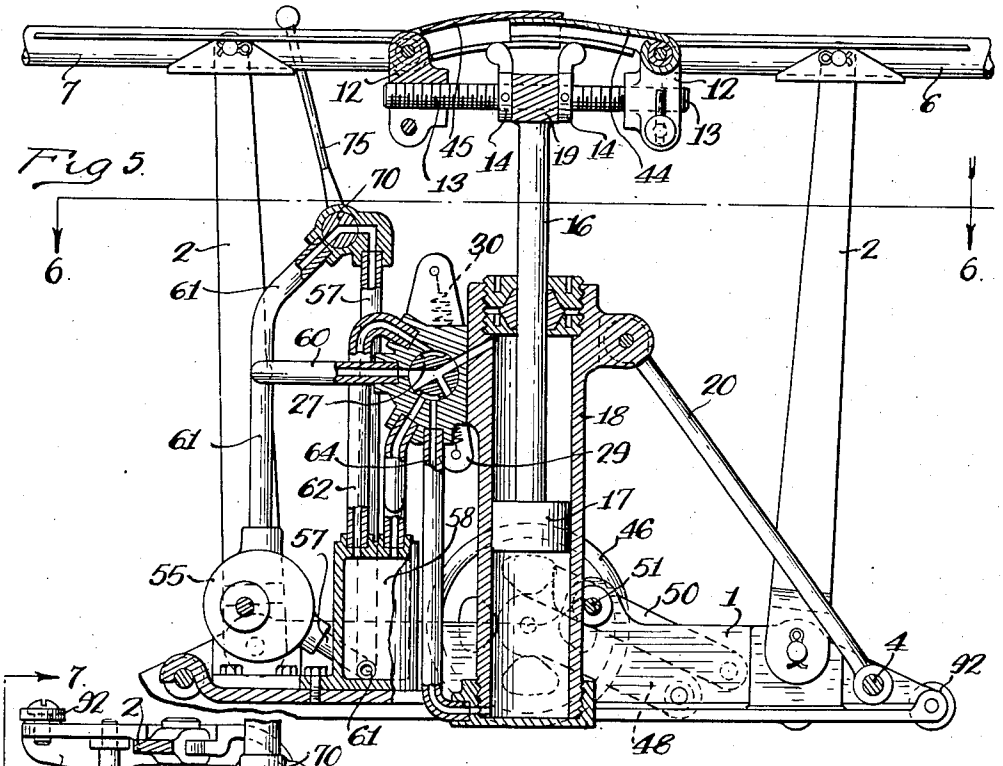


Fig. 5.

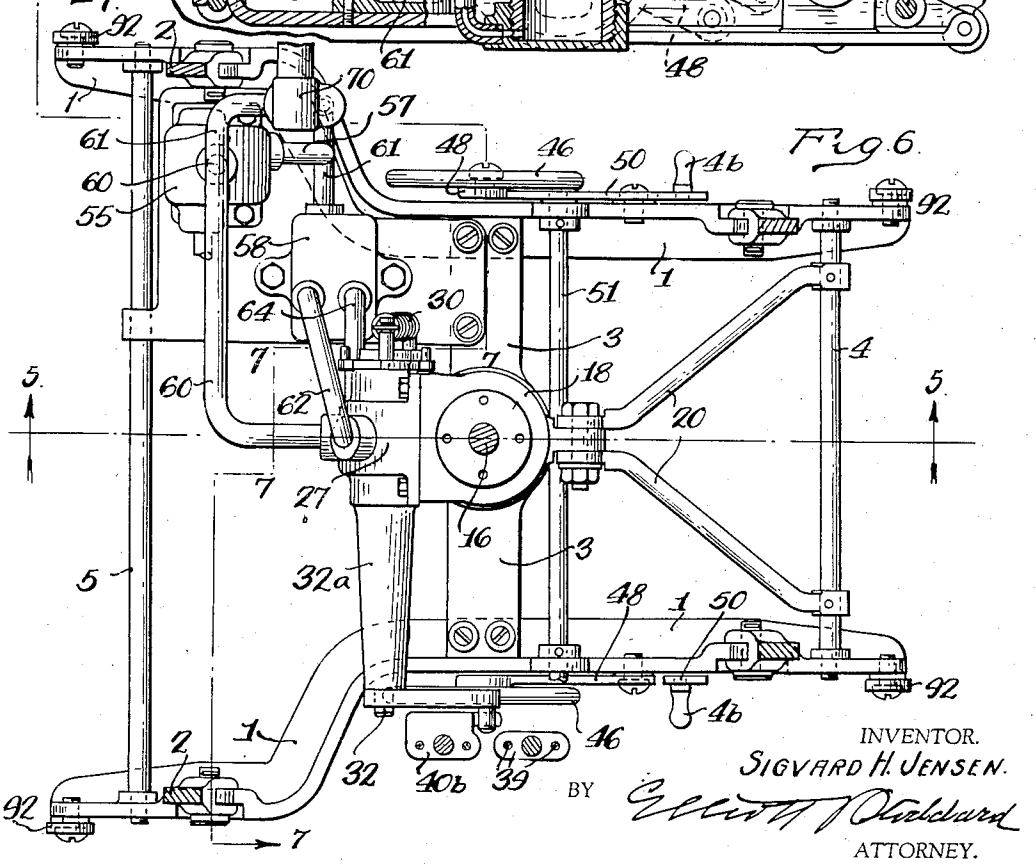


Fig. 6.

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UNITED STATES PATENT OFFICE

2,152,431

EXERCISING MACHINE

Sigvard Hjalmar Jensen, Detroit, Mich.

Application November 2, 1936, Serial No. 108,745

5 Claims. (Cl. 128—74)

My invention relates to exercising machines for the muscles and nerves of the human body.

Objects of my improvements are:

To produce a machine rugged and positive in its operation;

In which the user may accurately vary the amplitude of motion of the body support;

To provide for starting, stopping and regulating the speed;

To adjust the body support to fit the human body;

To register automatically the number of motions, thus providing a record of the amount of exercise taken;

To adjust and indicate the amplitude of motion;

To maintain a human body in a fixed yet comfortable position throughout the exercise;

To render the machine portable.

Other objects and advantages will become apparent from the following description and accompanying drawings in which;

Figure 1 is a diagrammatic view in elevation of a machine embodying my invention showing a figure thereon, the parts being in one position;

Figure 2 is a view similar to Figure 1 the parts being in a different position;

Figure 3 is an elevation of a machine embodying my invention the parts being shown in full lines in one position and indicated in another position by broken lines, the body-supporting frames being broken away;

Figure 3*a* is a detail showing parts partly broken away and in elevation;

Figure 4 is a plan;

Figure 5 is a section on the line 5—5 Figure 6, the starting, stopping and speed regulating valve and casing, back of the plane of section, being broken away and in section;

Figure 6 is a horizontal section on the line 6—6 Figure 5;

Figure 7 is a vertical section, the loci of the section planes being indicated by the broken line 7—7—7—7—7—7—7 Figure 6, and the base being partly broken away;

Figure 8 is a section on the line 8—8 Figure 4, to a reduced scale;

Figure 9 is a section on the line 9—9 Figure 4 to a reduced scale.

1—1 are the side pieces of the base, or frame, of the machine united by the various cross pieces 3—4—5 (Fig. 6). The reference numeral 92 indicates wheels pivoted on shoulder bolts at the ends of said side pieces.

48—48 are lever arms pivoted to the side pieces 1—1, toward the lower edges of the same and extending slantingly upward to a point approximately in a plane through the center of gravity of the machine. 46—46 are wheels pivoted on shoulder bolts in the free ends of the lever arms 48—48. 51 is a shaft extending transversely across the base of the machine and pivoted in bearings in the side pieces 1—1. 50—50 are levers secured to the shaft 51 at the ends thereof and having cam surfaces acting upon the upper edges of the lever arms 48—48. 4*b*—4*b* are handles on the ends of the cam levers 50 remote from the said cam surfaces. When one of the cam levers 50 is turned by means of a handle 4*b*, the shaft 51 is turned with it carrying the other of said cam levers with it. The lever arms 48—48 are thereby depressed carrying with them the wheels 46—46 thus lifting the frame and supporting it on said wheels so that it can be readily moved.

18 is a cylinder rising vertically from the center of the cross piece 3, and 20 are braces extending from the cross piece 4 to the top of the cylinder 18.

2—2—2—2 are standards swiveled at their lower ends to the side pieces 1. 6 and 7 are body supporting frames extending laterally from the center of the machine. 12 are header blocks to which the adjacent edges of the frames 6 and 7 are respectively hinged. 13 is an adjusting screw bar having right and left screw threads engaging in corresponding apertures in the blocks 12. 17 is a piston fitting and adapted to reciprocate in the cylinder 18. 16 is a piston rod rising from the piston 17, passing through a stuffing box in the upper end of the cylinder 18 and having a cross-head at its upper end indicated by the numeral 19. 14—14 are stop rings fixed on the bar 13 on each side of the cross head 19 and provided with handles by which said bar is rotated. The blocks 12 are split and provided with clamping screws to fix them in their adjusted position. 44—45 are spring plates their remote edges being hinged to the adjacent edges of the frames 6 and 7 and their adjacent portions telescoping into each other. For this purpose the side edges of the plates 44—45 are turned downward and inward so that the down-turned portions of one plate shall fit within the down turned portion at the edge of the other plate as shown at 45*a* Figure 7. The plates 44—45 are preferably arched upward and form a joining surface between the frames 6 and 7.

The swivel standards 2 rise approximately vertically from the side pieces 1 of the machine frame and are pivoted at the sides of the frames

44—45 at equal distances from the hinges of said frames to the blocks 12.

55 represents a power plant for circulating an actuating liquid to and from the cylinder 18. This may consist of an electric motor and pump. 58 is a storage tank for the liquid and 60 is a discharge pipe for the pump through which the liquid is conveyed under pressure to the distributing valve 27. 57 is the intake pipe for the pump through which the liquid is drawn from the storage tank 58. 61 is a by-pass conduit leading from the pipe 60 to the storage tank 58. 70 is a valve operated by a handle 75 by which the passage through said by-pass conduit can be opened or closed or adjusted to pass a liquid at a required rate. The handle 75 is so located that it can be manipulated by one lying on the frames 6—7. 62 is a conduit adapted to carry the liquid exhausted from the upper end of the cylinder 18 back to the storage tank 58, and 64 is a similar conduit for the liquid exhausted from the lower end of the cylinder 18. The conical plug of the valve or cock 27 is provided with transverse passages and peripherical cut away portions, in the conventional way, as shown in Figure 5, so that one end of the cylinder 18 shall be in connection with the pipe 60 and the other with one of the conduits to the storage tank 58 at one angular position of said plug, and the other end in connection with the pipe 60 and the first named end in connection with the other of said conduits at another angular position of said plug. 32 is a stem extending from the plug of the valve 27 through a supporting casing 32*a* (Fig. 6). 31 is lever arm extending laterally from the valve stem 32 and having a contact pintle 31*a* at its outer end (Fig. 3). 29 is a second lever arm extending from the stem 32 approximately vertically downward. 30 is a tension spring secured at one end to the end of the lever arm 29 and at the other end to a fixed pin vertically above the axis of the stem 32. The construction is such that when the stem 32 is turned to bring the arm 39 past the center the spring 30 will snap it over to a stop 29*x*, in position to connect the cylinder 18 with the source of actuating liquid and with the exhaust so as to move the piston 17 in one or the other direction according to the position of the arm 29 on one side or the other side of the vertical line through the axis of the stem 32.

The cross-head 19 extends horizontally (Figures 3 and 7) to a point vertically above the lever arm 31 and pintle 31*a*. 39 is a yoke consisting of two vertical rods extending downward from the outer end of the cross-head 19 on one side of the pintle 31*a*, and a cross piece connecting the lower ends of said rods, and 40 is a similar yoke extending downward from said cross-head 19, on the other side of said pintle. Each of said yokes has a screw-threaded rod extending longitudinally thereof between its said constituent rods, its lower end being pivoted in said cross-piece at the lower end of said yoke. Each of said screw-threaded rods is pivoted in the cross-head 19 at its upper end and is provided with a knob by which it may be rotated, located within reach of a person upon the frames 6 and 7. 40*a* is a tappet block on the screw threaded rod of the yoke 39 and 40*b* is a similar tappet block on the screw-threaded rod of the yoke 40. By turning the knobs at the upper ends of said screw-threaded rods the tappet block 40*a* and 40*b* can be adjusted to any height desired.

The operation of the above described device is as follows:

The person desiring to exercise lies upon the frames 6 and 7 as shown in Figures 1 and 2, grasping a handle 94 or 95 with his hands (Figures 1, 2 and 9), and placing his feet in stirrups 83 (Figures 1 and 8). Said stirrups are secured to a plate 80 which is itself pivoted upon a pin 80*a* so that it may turn to place said stirrups in a position to accommodate the person upon the frames 6 and 7 whether lying upon his back or side.

The plate 80 may be carried on a sliding cross-head 80*b*.

The pump 55 having been set in motion, the by-pass conduit 61 is either wholly or partially closed by moving the handle 75 of the valve 70 thus bringing ap ressure upon the liquid passing through the conduit 60, and actuating the piston 17, in one direction or the other according to the position of the plug of the valve 27 at one or the other limits of its travel. If the piston 17 was at the top of its stroke the plug of the valve 27 would be as shown in Figure 5 and the piston 17 would be forced down until the tappet block 40*a* hit the pintle 31*a* turning the crank arm 31 and the plug of the valve 27 until the arm 29 has passed the center when the spring 30 snaps the arm 29 over to the limit of its stroke turning the plug of the valve 27 to connect the bottom of the cylinder 18 with the source of liquid pressure and the top of said cylnder with the storage tank 58. Then the piston 17 would be driven upward.

The extent of travel of the piston 17 may be adjusted by the position of the tappet blocks 40*a*—40*b* and the speed of motion by the degree of opening of the by-pass valve 70.

Of course the motion of the piston 17 would be communicated through the rod 16 and the cross-head 19 to the frames 6 and 7 oscillating them as illustrated in Figures 1, 2 and 3.

84 (Figure 7) is a semicircular angle scale attached to the side of the frame 7 with the center at the axis of the joint pivoting a standard 2 to said side. 86 is an index pointer upon said standard adapted to cooperate with said scale to indicate the angle through which said frame has turned.

88 is a mechanical counter and 89 is a pintle. The counter is carried by the frame 7 and the pintle is on the standard 2. At each oscillation of the frame the counter is actuated by the pintle and a record is thus made.

While two body supporting frames are shown it is to be understood that relative movement of the frames could be secured by moving only one and that this construction is within the scope of my claims.

The supporting frames may be suited to a particular occupant by adjusting the header blocks 12—12 toward or away from each other.

I claim:

1. In an apparatus of the kind described, the combination of two frames adapted to support a human body, one portion upon one frame and the other portion upon the other frame, a body supporting part hinged to, and extending between, adjacent edges of said frames, means for adjusting the extent of said part between said adjacent edges, said frames being pivoted to swing relative to each other in a vertical plane about axes spaced from said adjacent edges, said axes being movable toward and away from each other and means for oscillating said frames about said pivots.

2. In an apparatus of the kind described, the combination of two frames adapted to support a human body, one portion on one frame and the

other portion upon the other frame, said frames being pivoted together at their adjacent edges, said frames being pivoted to swing relative to each other in a vertical plane about axes spaced from said adjacent edges, said axes being movable toward and away from each other, a cylinder extending vertically beneath said adjacent edges, a piston in said cylinder having a piston rod connected to actuate said frames at their adjacent eges and means for supplying a fluid under pressure to actuate said piston including a by-pass for said fluid and means for varying at will the area of the passage through said by-pass.

3. In an apparatus of the kind described, the combination of two frames adapted to support a human body, one portion on one frame and the other portion upon the other frame, said frames being pivoted together at their adjacent edges, said frames being pivoted to swing relative to each other in a vertical plane about axes spaced from said adjacent edges, said axes being movable toward and away from each other, a cylinder extending vertically beneath said adjacent edges, a piston in said cylinder having a piston rod connected to actuate said frames at their adjacent edges and means for supplying a fluid under pressure to actuate said piston including means for controlling the fluid passing to said cylinder, said means including a reversible valve, tappet blocks connected with said piston adapted to actuate said valve, said tappet blocks being adjustable to determine the travel of said piston.

4. In an apparatus of the kind described the combination of an elevated body-support, a cylinder extending vertically beneath said support, a piston in said cylinder having a piston rod connected to actuate said support, means for supplying a fluid under pressure to actuate said piston, means for controlling the fluid passing to said cylinder including a valve, tappet blocks connected to said piston to move therewith adapted to actuate said valve and screw-threaded rods engaging said tappet blocks to adjust the position thereof and means accessible from said support for rotating said rods.

5. In an apparatus of the kind described, the combination of two frames adapted to support a human body, one portion upon one frame and the other portion upon the other frame, a body supporting member between adjacent edges of said frames, said member consisting of two telescoping parts respectively hinged to said edges and means for oscillating said frames in a vertical plane about axes spaced from said adjacent edges.

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