March 26, 1968 C. P. IZZO 3,374,782

EXERCISING MACHINE FOR SKIERS

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Fig. 1.

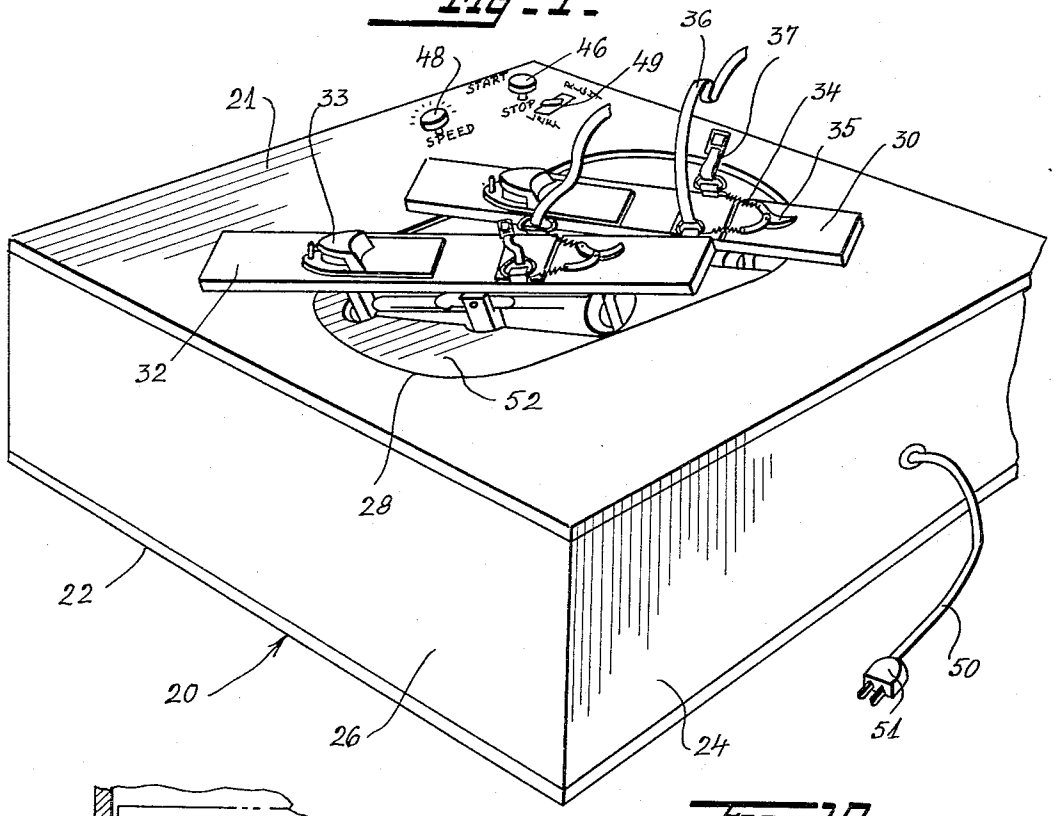


Fig. 10.

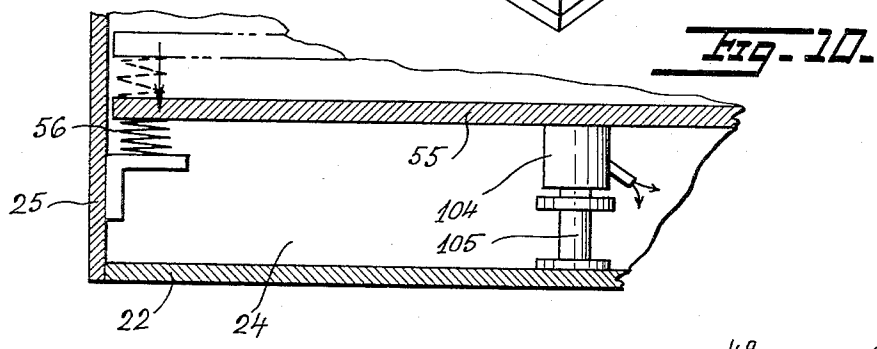
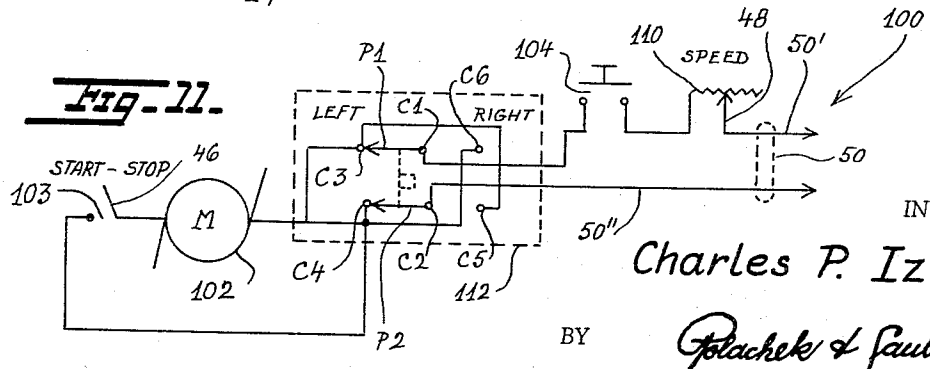


Fig. 11.



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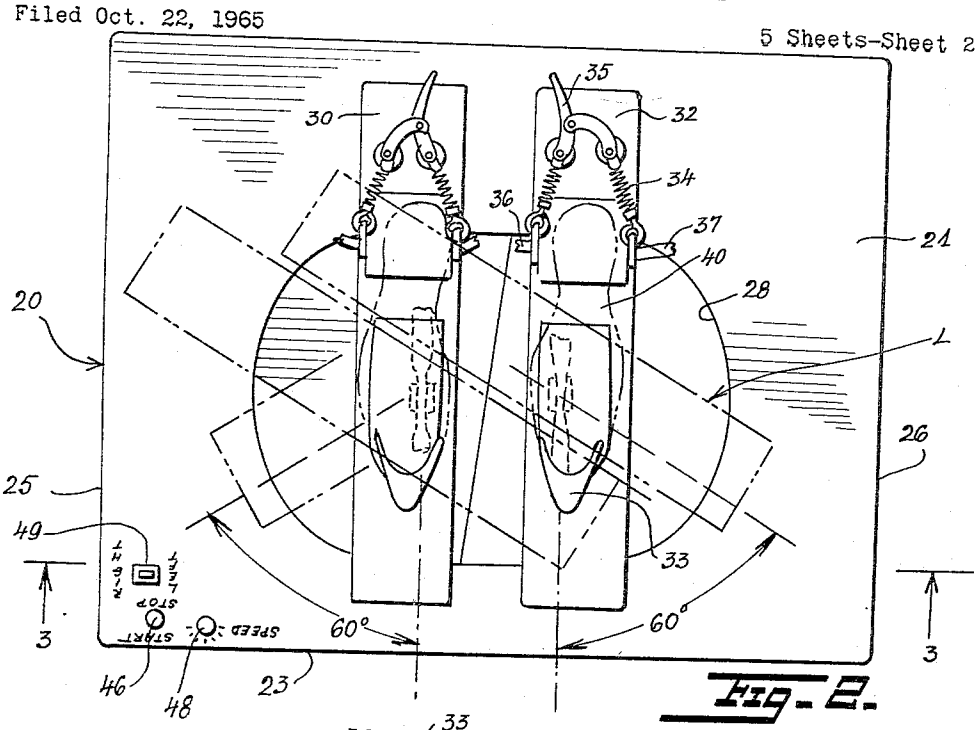


Fig. 2.

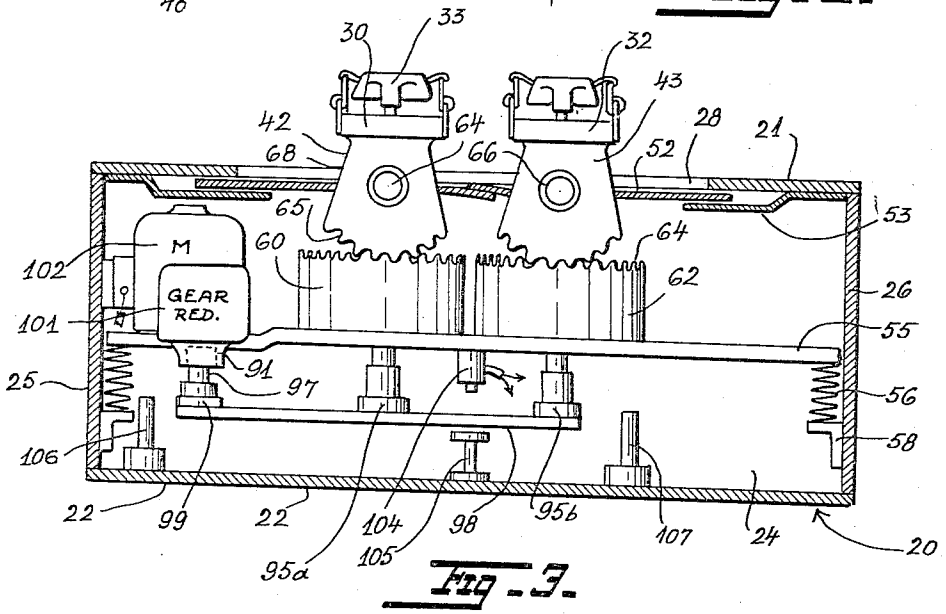


Fig. 3.

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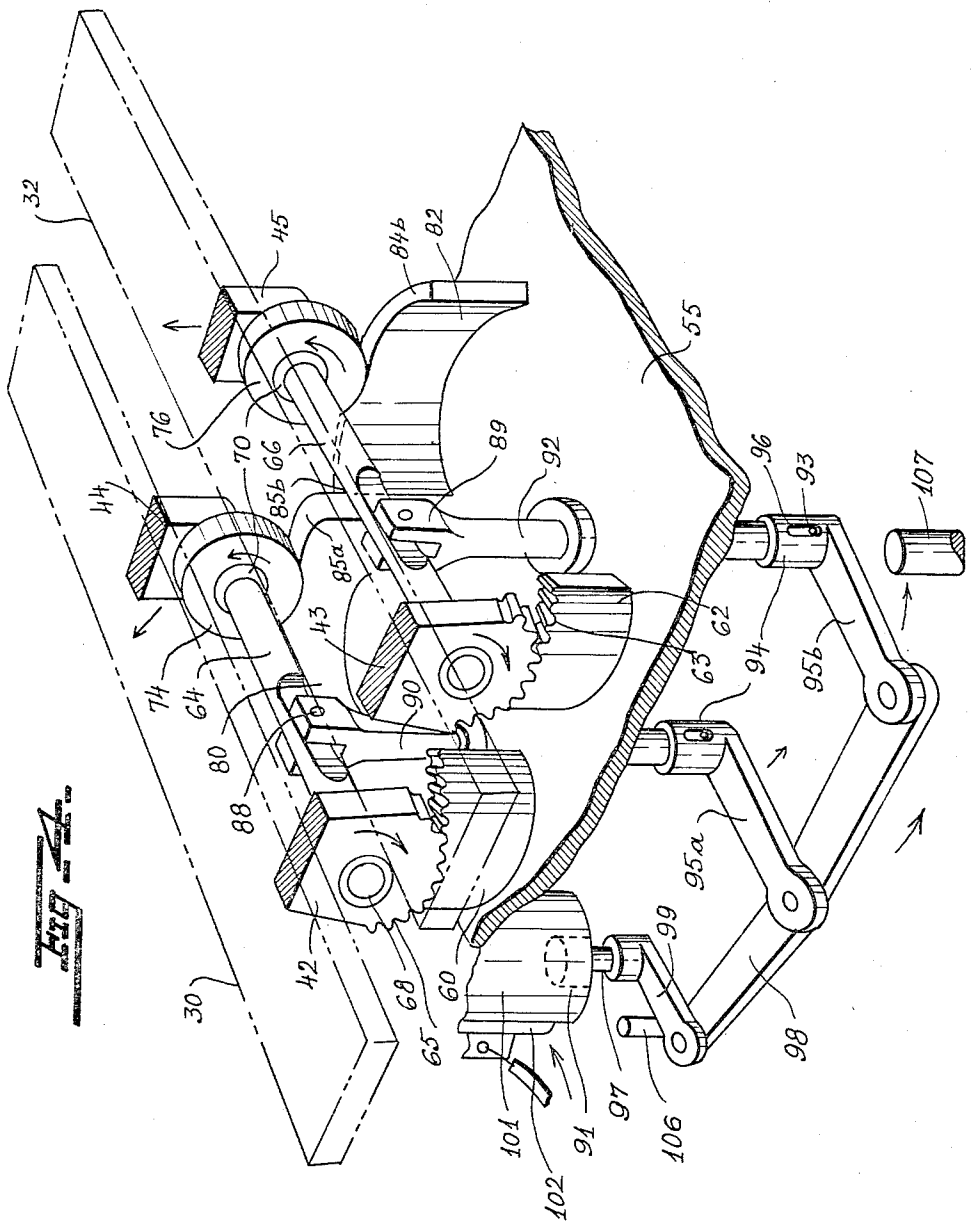
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EXERCISING MACHINE FOR SKIERS

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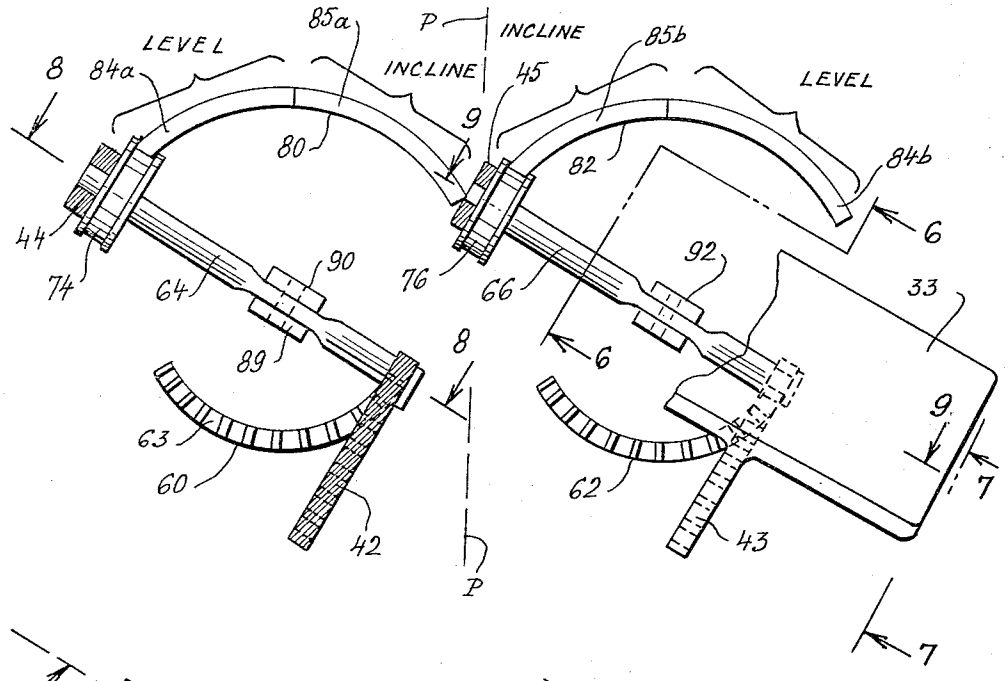
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Fig. 5.



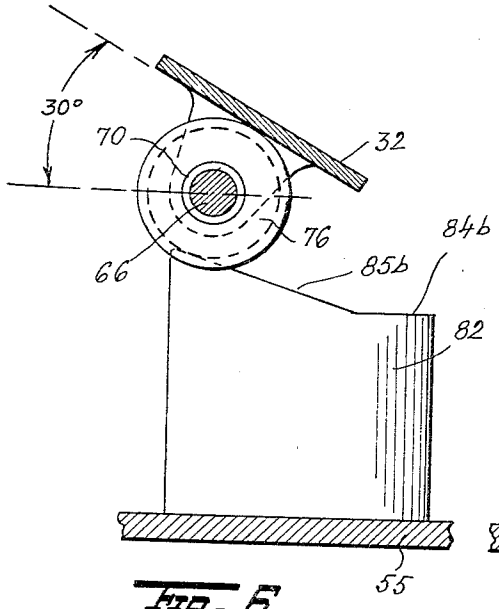


Fig. 6.

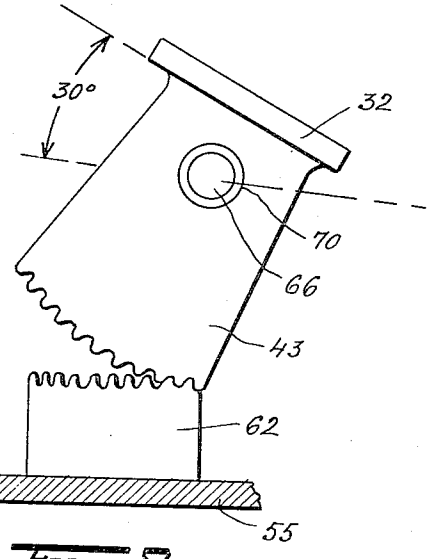


Fig. 7.

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Fig. 8.

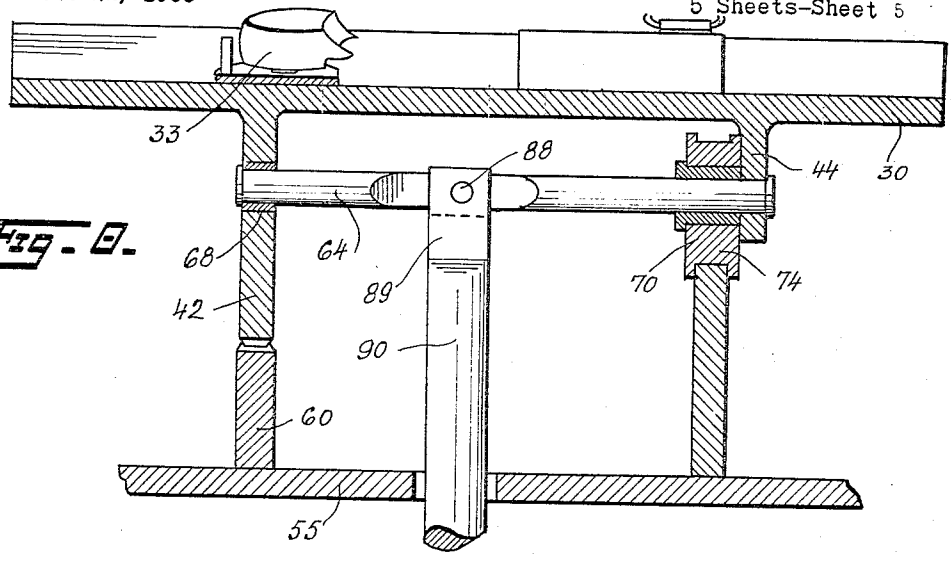
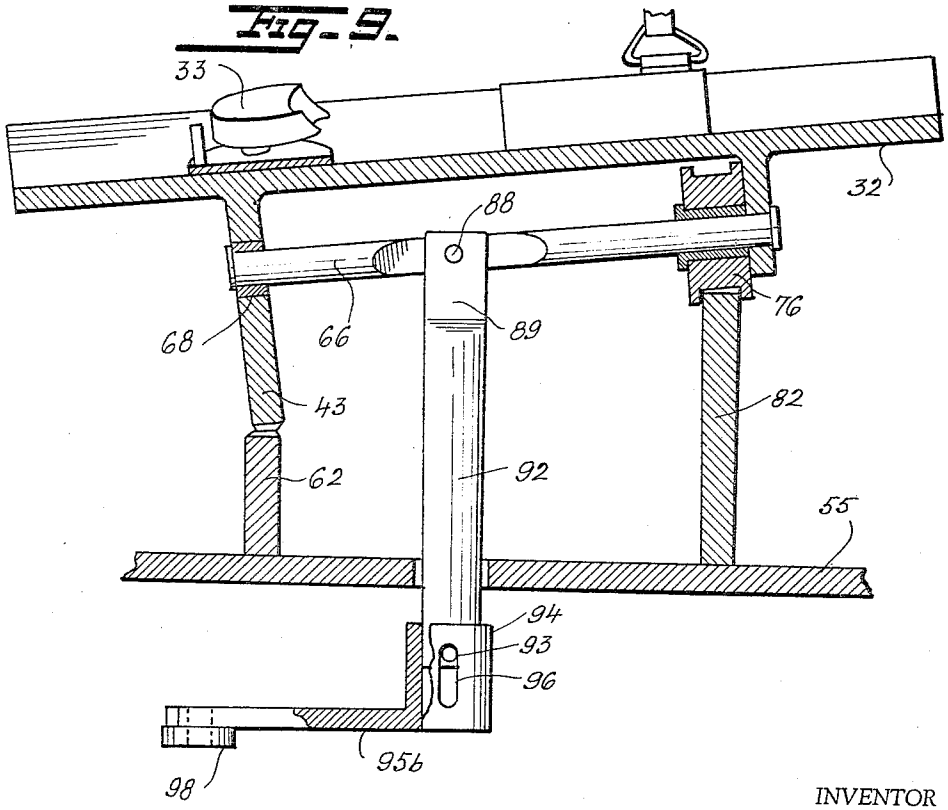


Fig. 9.



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EXERCISING MACHINE FOR SKIERS

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Filed Oct. 22, 1965, Ser. No. 501,786
10 Claims. (Cl. 128—25)

This invention relates to a machine for conditioning a person for performing skiing movements. The machine also serves as an exercising device to strengthen, tone and develop specific leg and back muscles used in skiing.

In order to ski successfully a skier must be adept at performing right and left turn movements. Skill in performing such movements heretofore could only be gained by practice on a ski run. When a skier performs a turn, the following three simultaneously basic movements must be made in perfect timing and coordination:

(1) The feet and skiis of the skier must turn together on a vertical axis while remaining parallel.

(2) The skiis must turn on a horizontal axis angularly while remaining substantially parallel.

(3) The rear of one ski approaching a central vertical plane must rise with respect to the other. Thus, in turning to the right, the rear of the right ski and right heel of the skier rises, and in turning to the left, the left ski and left heel of the skier rises.

The machine embodying the present invention is provided with two narrow platforms on which the skier stands while wearing conventional ski boots and carrying ski poles in his hands. The platforms are mechanically driven by a motor via an appropriate gear and cam mechanism. The machine rotates and turns the platforms through predetermined prescribed angles so that the skier can perform the proper movements required. In addition, specific leg muscles of the skier, arms and back are execised to strengthen them and to tone them. Thereby, the skier becomes physically able to perform the action because of the exercise.

It is therefore a principal object of the invention to provide a machine for training a skier to perform movements which will render him physically in better condition for skiing, when outdoor ski runs are not available.

A further object is to provide a machine having foot platforms which are mechanically driven to simulate ideal movements of skiis executing right and left turns, referred to as edging.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIGURE 1 is a perspective view of a machine embodying the invention;

FIG. 2 is a top plan view of the machine of FIG. 1;

FIG. 3 is a vertical sectional view taken on line 3—3 of FIG. 2;

FIG. 4 is an enlarged perspective view of the drive mechanism of the machine, parts being broken away;

FIG. 5 is a top plan view partially diagrammatic in form showing portions of the drive mechanism.

FIGS. 6, 7, 8 and 9 are enlarged sectional views taken on lines 6—6, 7—7, 8—8 and 9—9 respectively of FIG. 5;

FIG. 10 is an enlarged sectional fragmentary view similar to part of FIG. 3, showing a part of the machine in operating position;

FIG. 11 is a diagram of an electrical circuit employed in the machine.

Referring first to FIGS. 1, 2 and 3, there is shown the machine embodying the invention. The machine has a base 20 in the form of a rectangular box or casing having a top wall 21, bottom wall 22, front wall 23, rear wall 24, right side wall 25 and left side wall 26. In the top wall 21 is a generally oval opening 28. A pair of elongated rectangular platforms 30, 32 are mounted at the top of the base. These platforms extend beyond edges of the opening 28 at both ends of the platforms. Each platform has a toe block 33 near its front end and springs 34 with locking clamps 35 near its rear end. Ankle straps 36, 37 are also provided. These items are all employed to engage the ski boots 40 of a skier using the machine. The skier will stand on the platforms facing forwardly toward the front end wall 23 of the base.

The platforms 30, 32 are supported by vertical forwardly located right and left sector gear plates 42, 43 and by vertical rearwardly located right and left bracket plates 44, 45, best shown in FIGS. 3–9. At the right front corner of the top wall 21 are switch buttons and controls. Switch button 46 is a START-STOP button on a spring clamp with sufficient wire length so that the switch button may be attached to the top of the ski pole for turning the motor drive of the machine on and off. Knob 48 is a speed control member for regulating the motor drive speed. Lever 49 is a RIGHT-LEFT control member for reversing the motor drive to turn the platforms right or left as desired. An electric power supply cord 50 passes through rear wall 24 of the base. This cord terminates in a plug 51 which can be connected to a suitable power supply. A flexible protective plate or sheet 52 is movably supported in brackets 53 under the top wall 21 and serves as a dust cover for the machine under the platforms.

Referring now to FIGS. 3–10, it will be noted that an interior vertically movable rectangular platform 55 is provided inside the base. This platform is horizontal and is supported by coil springs 56 at its four corners resting on brackets 58 at inner sides of side walls 25, 26. Rigidly mounted on the platform 55 is a pair of forwardly disposed right and left arcuate rack gears 60, 62 whose teeth 64 face upwardly and are meshed with downwardly extending teeth 65 of the sector gear plates 42, 43 respectively. The sector gear plates are mounted at forward ends of pivotable horizontal right and left shafts 64, 66. The gear plates have sleeve bearings 68 rotatably engaged on shafts 64, 66 so that the sector plates are turnable on the shafts 64, 66 as horizontal axes, while the sector plates rotate on the fixed rack gears 60, 62.

At the rear ends of the shafts 64, 66 are the bracket plates 44, 45 having sleeve bearings 70 turnably engaged on shafts 64, 66. The sleeve bearings also support flanged cam follower wheels 74, 76 which rotate with respect to the shafts 64, 66 and bracket plates 44, 45.

The flange wheels 74, 76 ride on upper edges of two fixed arcuate cam plates 80, 82 rigidly mounted on platform 55. The cam plates have outer, horizontal edge sections 84*a*, 84*b* and inner inclined edge sections 85*a*, 85*b*. The edge sections 85*a*, 85*b* rise upwardly toward each other as they approach the central vertical plane P—P of base 20 and the cam and gear drive mechanism as indicated in FIG. 5.

Shafts 64, 66 are pivotally mounted at their centers by horizontal pins 88 secured in bifurcated ends 89 of axially vertical shafts 90, 92. Lower ends of the shafts have pins 93 slidably engaged in axially vertical slotted sleeve 94 of two horizontal levers 95*a*, 95*b*. The pins are movable in slots 96 in the sleeves. Forward ends of the levers 95*a*, 95*b* are pivotally engaged on a horizontal link 98. The link 98 is pivotally attached to a horizontal drive or crank lever 99 having a drive shaft 97 turnable angularly via a clutch 91, by speed reduction gearing 101 connected to and driven by an electric motor 102. The motor is mounted on right side wall 25 as shown in FIG. 3. An interlock safety switch 104 is mounted

underneath platform **55** and engages an upwardly projecting post **105** when platform **55** is lowered during operation of the machine; see FIGS. 3 and 10. Spaced stationary abutments **106**, **107** on the base bottom **22** stop turning movements of the levers **95***a*, **95***b*, **99** at extreme angular positions.

In FIG. 11 is shown the electric circuit **100** of the machine. Electric cord **50** has one wire **50'** connected to speed control **110** in series with normally open switch **104**, and contact C1 of reversing switch **112**. The other wire **50''** of cord **50** terminates at contact C2 of switch **112**. The switch has poles P1, P2 connected to contacts C1, C2. Contact C3 is connected along with contact C5 to one terminal of motor **102**. The other terminal of the motor is connected via the START-STOP switch **103** to reversing switch contacts C4, C6.

In operation of the machine, the skier wearing ski boots **40** will stand on the platforms and will attach his boots to the platforms with straps and clamps in the same manner as employed for conventional skiis. The skier will carry rubber tip pointed ski poles in his hands to balance himself. When the skier stands on the platforms **30**, **32** the lower platform **55** is pressed down and interlock switch **104** is closed by post **105**. It is preferred that the speed control knob **48** be turned by hand for adjusting the speed control **110**. The lever **49** of the reversing switch **112** will be set to ON position. When the skier is ready he will operate the switch button **46** to close switch **103** and the motor will start. Suppose the reversing switch **112** is set to LEFT position. The moving parts of the drive mechanism will turn in the directions indicated by arrows in FIG. 4. Link **98** will move to the skier's left as the skier faces forwardly (i.e. to the right as viewed in FIG. 4). Shafts **90**, **92** turn counterclockwise as viewed in FIG. 4. Sector gear plates turn clockwise while moving to the right as viewed in FIG. 4 (i.e. to the skier's left). At the same time the rear ends of shafts **64**, **66** move to the left as viewed in FIG. 4 (i.e. to the skier's right). The wheels **74**, **76** turn counterclockwise in FIG. 4. The wheel **76** which is moving toward the central plane P–P rises upwardly on its inclined inner edge section **85***b* as clearly shown in FIGS. 4, 5 and 6. At the same time wheel **74** on the skier's right remains on the horizontal outer edge section **84***a* of cam plate **80**.

The platforms thus simultaneously perform the three coordinated movements of turning on vertical axes, turning on horizontal fore and aft axes, and elevating the skier's left heel and rear ends portion of his left platform **32**.

When the platforms reach the end of their turning movements counterclockwise as viewed by the skier, the left lever **95***b* (the right lever as viewed in FIG. 4) will engage abutment **107** and the turning of the platforms will stop while shaft **97** slips in clutch **91**. The platforms will be in the START position L shown in dotted lines in FIG. 3. The skier will then either turn the START-STOP switch **103** or the switch **112** to RIGHT position. If the switch **112** is set, the mechanism will turn the platforms in a continuous left and right direction. Right platforms **30** will then rise at its rear end in the latter part of the turn while the rear end of left platform **32** will remain level. If the skier desires to practice right or left turns repeatedly, he will stop the reversing movements when the platforms reach the fore and aft central parallel position shown in solid lines in FIG. 3. The mechanism is arranged so that between extremes of right and left turn positions the platforms turn about 120° on vertical axes or 60° from the central position as indicated in FIG. 2. The platforms turn about 30° on horizontal axes; see FIGS. 6 and 7. In ratio of 1.3 the right heel or left heel at the end of a right or left turn respectively is elevated slightly with respect to the level axis of left or right platform of skier respectively. It is realized that the platforms could be pre-set at three positions, representing the grade of the slope or fall line which are 5°, 15° and 30° pitch increments.

The invention makes it possible for a skier at home, in a gymnasium or other indoor location, to acquire skill in performing turning movements which heretofore could only be acquired by practise on an actual ski run. The invention makes it possible for a skier to keep specific muscles of his legs, arms and body in good tone during times and seasons when outdoor skiing is not possible.

The machine can be designed for general use to accommodate a skier of average height and weight. It may be desirable to provide machines in different sizes for use by children and adults. In any case the machines are easy to operate, safe to use, and require no particular operating skill. At any time the machines can be stopped so that the skier can rest by depressing the START-STOP button switch on clamped top of the ski pole.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

What is claimed is:

1. A machine for training and exercising a skier to perform simulated skiing movements, comprising a base, a pair of narrow platforms on said base simulating skiis for supporting a skier while both feet of the skier wearing ski boots stand on the platforms respectively, means on the platforms for engaging the ski boots, a drive motor, and a mechanism means inside the base operatively connecting the drive motor and platforms for executing continuous simulated ski turns in right and left directions by turning the platforms simultaneously on parallel vertical axes in the same one direction while turning the platforms on parallel horizontal axes in a common angular direction, and for elevating the rear end of only one of the platforms approaching a central vertical plane of said base during the turn in said one direction.

2. A machine according to claim **1**, wherein said mechanism comprises another platform inside the base, a pair of arcuate rack gears mounted on said other platform, a pair of sector gears joined to the platforms and meshed with said rack gears respectively, horizontal shafts rotatably supporting said sector gears respectively at forward ends of the shafts, vertical shafts rotatably supported by said other platform and respectively engaged with said horizontal shafts, and coupling means operatively connecting said motor and vertical shafts, whereby rotation of said vertical shafts in said one direction by said motor turns said narrow platforms in said one direction on said vertical axes while rotating the narrow platforms in said common direction on said horizontal axes.

3. A machine according to claim **2**, wherein said mechanism further comprises two arcuate cams mounted on said other platform, rearwardly of said arcuate rack gears respectively, cam followers mounted at ends of said horizontal shafts respectively and riding on upper edges of the arcuate rack gears respectively, the edges of said cams each having an outer horizontal upper edge section and an inner upper edge section inclined upwardly from the horizontal edge section toward the center plane of the base, whereby one cam follower at rear end of one of said horizontal shafts elevates the rear end of just one narrow platform as the narrow platforms turn in said one direction.

4. A machine according to claim **3**, further comprising selectively operable controls on said base connected in circuit with said motor, whereby rotation of said narrow platforms is started and stopped and the narrow platforms are turned in right and left directions.

5. A machine according to claim **3**, said coupling means comprising speed reduction gearing driven directly by the motor, a drive shaft driven via a slip clutch

by the speed reduction gearing, a drive lever connected to the drive shaft, a link connected to and driven by the drive lever, other levers pivotally connected to said link and vertical shafts respectively, whereby the vertical shafts are turned by said motor, and fixed abutments spaced apart and respectively contacted by different one of the levers at each end of rotational right and left movement of the narrow platforms.

6. A machine according to claim **5**, further comprising selectively operable controls for regulating the speed of said motor, for turning the motor on and off and for reversing the direction of drive of the motor, and interlock means for automatically opening said circuit when the skier is off the narrow platforms.

7. A machine according to claim **2**, wherein said coupling means comprises speed reduction gearing driven directly by the motor, a drive shaft driven via a slip clutch by the speed reduction gearing, a drive lever connected to the drive shaft, a link connected to and driven by the drive lever, other levers pivotally connected to said link and vertical shafts respectively, whereby the vertical shafts are turned by said motor, and fixed abutments spaced apart and respectively contacted by a different one of the levers at each end of rotational right and left movement of the narrow platforms.

8. A machine according to claim **1**, further comprising selectively operable controls on said base connected in circuit with said motor, whereby rotation of said narrow platforms is started and stopped, and the narrow platforms are turned in said right and left directions.

9. A machine according to claim **8**, further comprising an adjustable speed control in said circuit for regulating the speed of turning of the platforms.

10. A machine according to claim **9**, further comprising an interlock switch means in said circuit for turning off said motor when the skier is off the narrow platforms.

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