

[54] **SKI-SIMULATOR TRAINING APPARATUS**

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[56] **References Cited**

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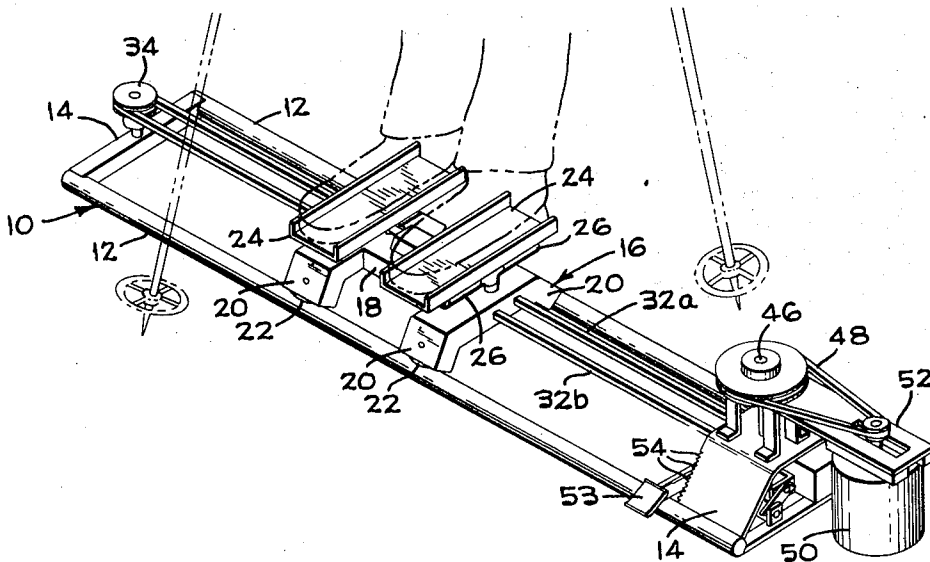
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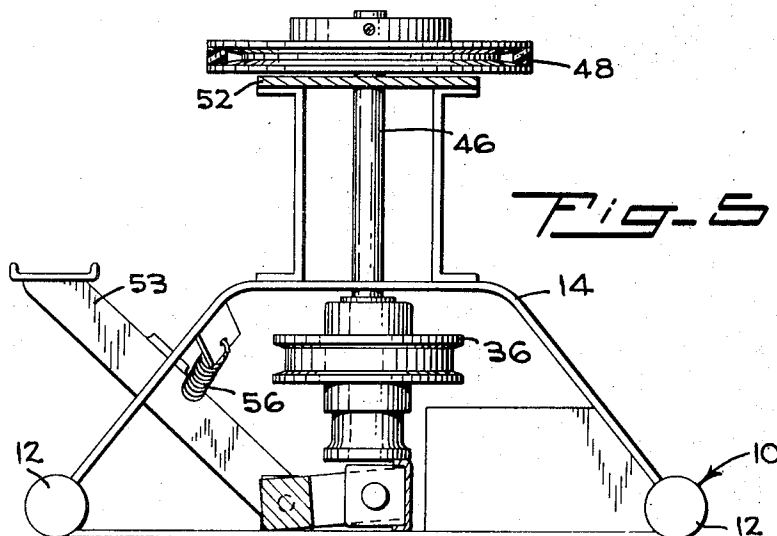
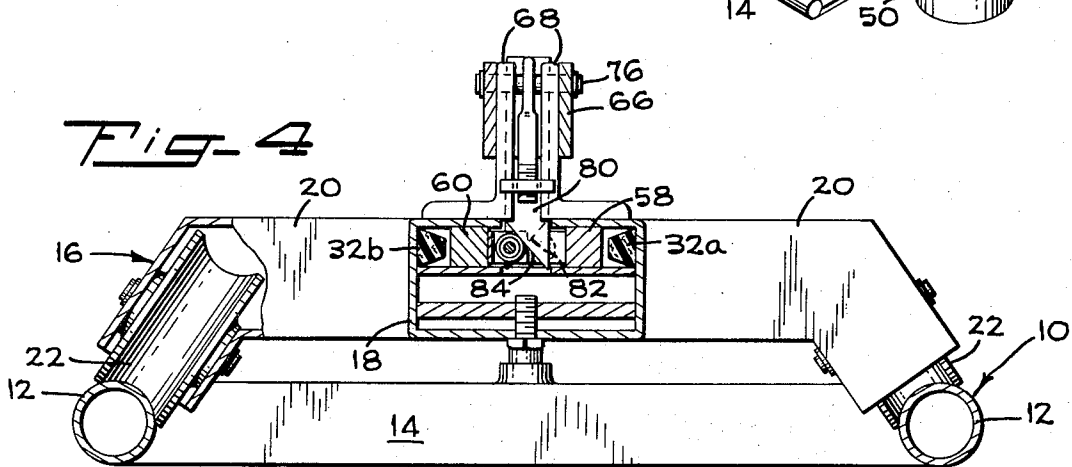
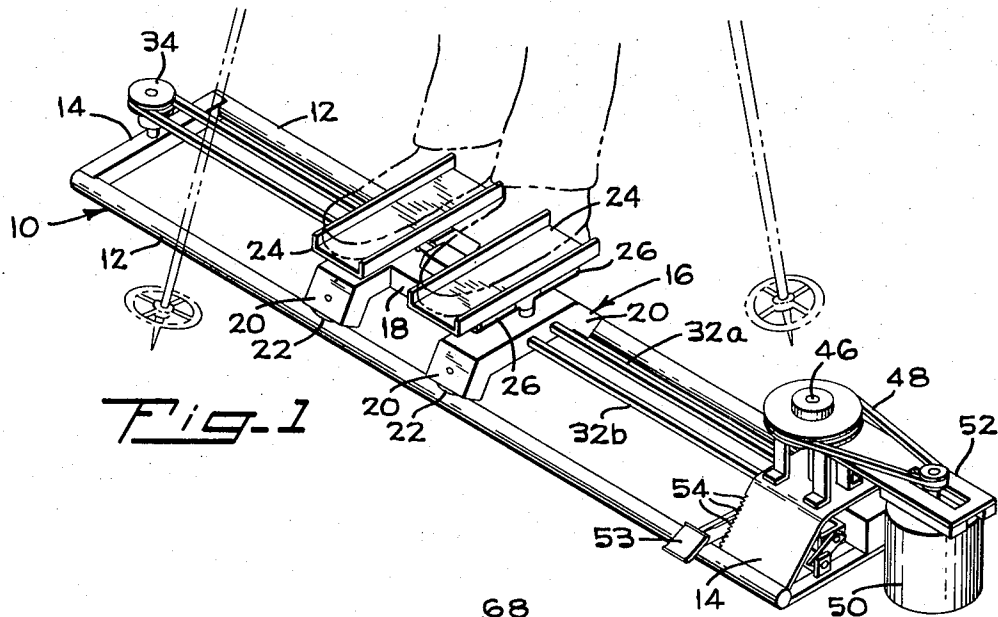
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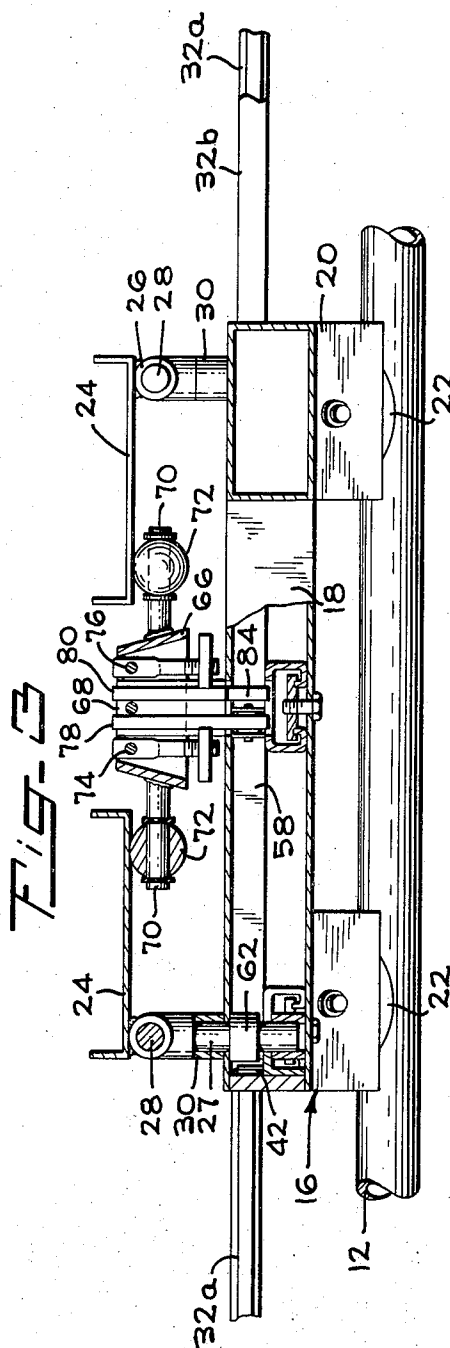
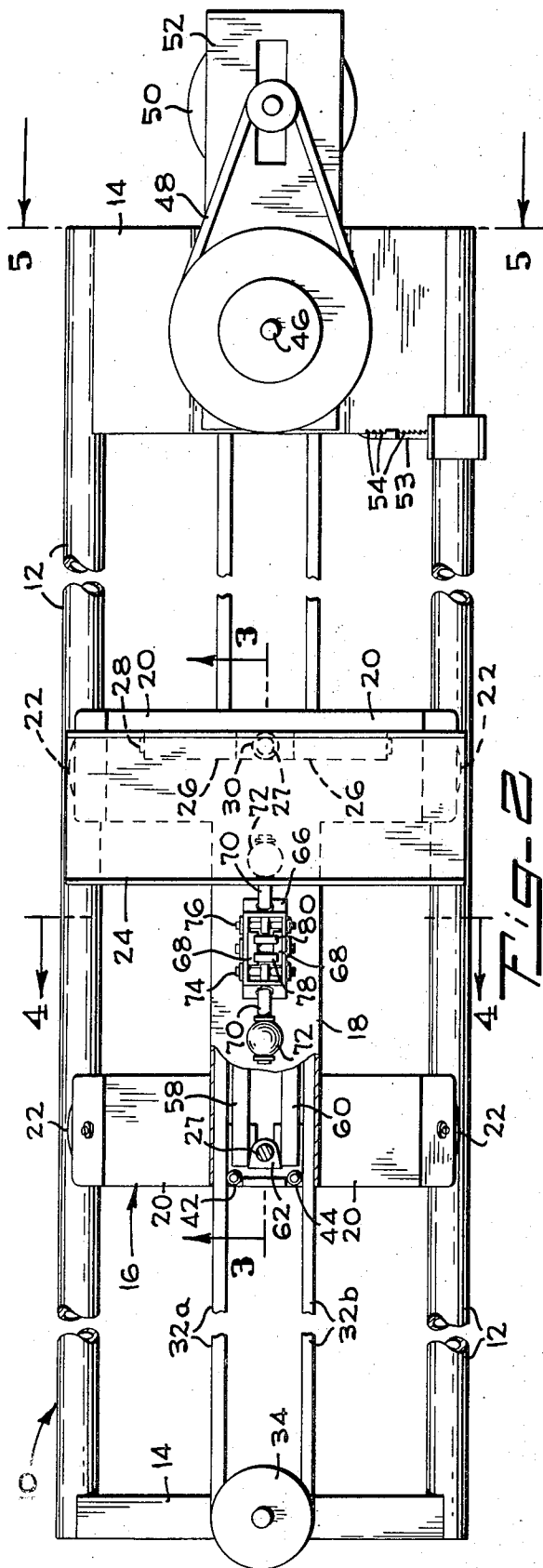
ABSTRACT

Ski-simulator training apparatus including a track supporting a carriage for to and fro powered motion resultant from frictional contact with one or the other of oppositely moving flights of a continuously moving power driven endless belt which contact is automatically established by turning or canting motion of a pair of foot pads supported on the carriage and adapted to receive the feet of a ski trainee.

5 Claims, 5 Drawing Figures







SKI-SIMULATOR TRAINING APPARATUS

FIELD OF THE INVENTION

The present invention relates generally to training apparatus for skiers and more particularly, to a ski-simulator training apparatus enabling the practice of various skiing maneuvers at home or at any other convenient location.

BACKGROUND OF THE INVENTION

The neophyte skier, even though training on a shallow slope with the supervision of an experienced professional, encounters many difficulties. Maintenance of balance and the leg and body motion requisite for execution of a turn are difficult achievements for a beginner. As a result, many falls are experienced, some with injury, and infrequently used muscles become exceedingly sore from the novel activity. Because of the seasonal nature of this sport and the practical limitations on frequent access to the ski slopes, even experienced skiers lose their touch and are subject to the noted muscle soreness and on occasion have severe falls on the steeper slopes which they traverse.

To provide training for neophyte skiers and a "warmup" exercise for those more experienced, a number of training and exercise devices have been proposed and utilized to some extent, but most are large, awkward, and expensive structures which moreover leave much to be desired in the ski-stimulating activity which they allow.

SUMMARY OF THE PRESENT INVENTION

Accordingly, it is the general objective of the present invention to provide a ski-simulator training apparatus which enables accurate reproduction of the body, feet and leg motions of a skier so as to provide an excellent training and practice device which however is relatively simple and small so that it can be used readily in any living room, and moreover, is sufficiently compact so that it can be stored in a closet or transported in the trunk of a car. Generally, to achieve this objective, the apparatus includes an elongated track that can be supported on the floor, ground or any other surface and itself supports for movement therealong a carriage which in turn carries a pair of foot pads arranged in lateral side by side disposition to simulate foot support on a pair of skis. Each of the foot pads is mounted on the carriage for pivotal motion about mutually perpendicular axes which are also perpendicular to the line defined by the mentioned track so that the skiers feet can turn or cant as requisite for the turning motions on an actual ski slope. A pair of powered members, preferably in the form of the opposite flights of an endless belt are arranged to move in opposite directions along lines that are substantially parallel to the line defined by the track and the mentioned canting or turning motion of the foot pads operate through appropriate linkage to establish frictional connection with one or the other of such powered members so that the entire carriage will move to the left or to the right along the track thus to provide the trainee with a precise simulation of the directional changes resultant from the corresponding canting or turning of actual skis. Preferably, the powered members are adjustable in their speeds so that a professional skier can make adjustments to precisely simulate the turning characteristics of skis in a particular type of snow and on a particular degree of slope,

thus accommodating the variables encountered under particular skin conditions.

BRIEF DESCRIPTION OF THE DRAWINGS

The stated objective of the invention and the manner in which it is achieved as summarized hereinabove will be more readily understood by reference to the following detailed description of the exemplary structure shown in the accompanying drawings wherein:

FIG. 1 is a perspective view of a ski simulator training apparatus embodying the present invention and indicating in phantom lines the position of a skier's feet and legs thereon during a training session,

FIG. 2 is an enlarged top plan view of the structure with portions broken away to show interior details,

FIG. 3 is a central fragmentary vertical sectional view taken along line 3—3 of FIG. 2,

FIG. 4 is a detailed cross-sectional view taken along line 4—4 of FIG. 2 to illustrate certain interior operating linkage, and

FIG. 5 is another cross-sectional view taken along line 5—5 of FIG. 2 to illustrate details of a variable drive arrangement.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENT OF THE INVENTION

As shown in the drawings, the ski simulator training apparatus includes an elongated track 10 formed by a pair of cylindrical rods 12 preferably about six feet in length and held in parallel disposition approximately one foot apart by transverse braces 14 at their extremities. The track 10 can be placed directly on a floor or other horizontal surface, or as an alternative, can be placed on a sloping surface, the longitudinal line defined by the elongated length of the track being preferably transverse to the line down such sloping surface.

A carriage 16 is supported for to and fro movement along such track 10 and preferably includes a central housing 18 which can be formed by hollow rectangular tubing from the opposite ends of which two pairs of arms 20 project outwardly and downwardly at opposed angles to mount rotatable, contoured rollers 22 dimensioned to engage the track rods 12, thus enabling the desired to and fro motion of the carriage 16 therealong. As can be best visualized by reference to FIG. 4, the opposed angular relationship of the rollers 22 will preclude lateral motion relative to the track-forming rods 12, but on the other hand, will enable, in addition to the rolling motion of the carriage 16 along the track 10, a lifting of the carriage from the track when the unit is to be disassembled for storage.

A pair of like foot pads 24 are supported above opposite ends of the carriage housing 18 so as to overlie the described roller supporting structure of the carriage, and more particularly are mounted both for pivotal turning and canting motion in response to appropriate foot manipulation by a ski trainee who stands on the foot pads in a fashion similar to a skier's upright disposition on a conventional pair of skis, such disposition being indicated in phantom lines in FIG. 1. To provide such pivotal motions, each foot pad 24 mounts at its outer edge a pair of spaced tubular members 26 that rotatably receive an elongated pin 28 that is quite closely encompassed within the tubular members so as to afford frictional resistance to lateral canting pivotal motion of the foot pads thereon. Centrally, between the tubular member 26, a shaft 27 is rigidly connected to

the pin 28 to project downwardly therefrom at substantially a right angle for rotatable support about a generally upright axis in suitable anti-thrust bearings 30 mounted in the tubular housing 18, thus allowing lateral turning motion of the foot pad 24 about this upright axis. As shown in the plan view of FIG. 2, the foot pads 24 are normally positioned in transverse relation to the line defined by the elongated track 10 and accordingly, the two pivotal axes for canting and turning motion of the foot pads constitute pivotal axes which are mutually perpendicular to one another and to the elongated line defined by the track.

When the skier, through appropriate leg and foot maneuvering, effects a canting or turning motion of the foot pads 24 in a direction which would normally instigate a left turn, automatic means provide a controlled powered movement of the carriage 16 with the foot pads thereon to the left and, in turn, opposite canting or turning motion of the foot pads by the skier will automatically provide for lateral motion of the carriage with the foot pads thereon to the right.

The motive power for this character of carriage motion is provided by powered members 32a, 32b that move in opposite directions along the described track 10 and conveniently can take the form of the opposite flights of an endless belt which is trained around pulleys 34, 36 mounted for rotation on the braces 14 at the opposite ends of track 10 so that the central elongated portions of the belt flights pass through the tubular housing 18 in contact with guide rollers 42, 44 adjacent opposite sides thereof. One of the pulleys 34 is a spring-urged variable diameter idler pulley and the other pulley 36 is mounted on a drive shaft 46 connected through an additional belt and pulley arrangement 48 to an electric motor 50 suitably mounted on a bracket 52 at that end of the track 10. As best shown in FIG. 5, the described drive pulley 36 is also a variable-diameter pulley with one side thereof being mounted for displacement along the drive shaft 46 by a foot lever 53 whose manipulation, accordingly will vary the pulley diameter and thus the speed of travel of the endless belt. A plurality of notches 54 are formed in the brace 14 adjacent the lever 53 which is urged by a spring 56 into one notch so as to retain the variable speed pulley 36 in the desired adjusted position until further manual or pedal force is applied thereto to effect variation of the speed. The diameter of the idler pulley 34 under its spring action, automatically accommodates any resultant slack of the belt.

Within the tubular housing 18 of the carriage 16, a pair of elongated rods 58, 60 are limited to lateral motion into contact with one or the other of the flights 32a, 32b of the endless belts respectively thus to establish frictional driving connection between the carriage 16 and one flight of the belt or the other. Two separate means are provided for establishing such frictional connection, one means being operative in response to the mentioned turning motion of the foot pads 24 and the other being automatically operative in response to canting motion thereof. More particularly, the first means is in the form of simple double cam structures 62, only one being shown in FIG. 2, mounted at the bottom of each upright pivot shaft 27 which support a respective foot pad 24. When the foot pad 24 is turned, as can be best visualized by reference to FIG. 2, one or the other section of the cam 62, depending upon the direction of the turning, will engage the adjacent elon-

gated rod 58, 60 to frictionally press the same against the adjacent endless belt flight 32a, 32b.

The other automatic means includes a small, open rectangular member 66 that is centrally pivoted on the two upstanding brackets 68 midway between the foot pads 24 and carries oppositely projecting arms 70 with balls 72 mounted rotatably at their outer extremities in positions which underlie the respective foot pads 24 as is best illustrated in FIG. 3. Additional pivot pins 74, 76 in the small rectangular member 66 carry pivotally supported, elongated cam members 78, 80 which project downwardly into the body member and are formed with sloping cam surfaces 82, 84 adjacent their lower extremities in positions to effect camming lateral motion of the described elongated rods 58, 60 into frictional contact with the respective flights 32a, 32b of the endless belt. Thus, if the skier manipulates the foot pads 24 to pivot about the pins 28 downwardly to the left as viewed in FIG. 3, the interior undersurface of the foot pad 24 on the right will engage and press downwardly on the ball 72 thereunder thus to cause a clockwise pivotal motion of the pivotally supported member 66 and urge the cam member 78 on the right downwardly to effect contact of the engaged, elongated rod 58 with the belt flight 32a to cause motion of the entire carriage 16 to the left.

In training use the belt may initially be set to move at a relatively slow speed and the ski trainee can then obtain the feeling resultant from canting or turning motion of the skis in a manner which will readily accommodate. As progress occurs, the belt speed can be increased and the responsiveness of the carriage motion can be made to accurately simulate any particular ski conditions. In addition to the simulation of responsiveness of the device to a variety of snow conditions, continued, use preferably with professional guidance will enable the skier to attain the proper body and leg motion corresponding to particular slope angles.

Obviously, many modifications in the structure as specifically described can be envisioned without departing from the spirit of the invention, and the foregoing description of one embodiment is accordingly to be considered as purely exemplary and not in a limiting sense, and the actual scope of the invention is to be indicated only by reference to the appended claims.

What is claimed is:

1. Ski-simulator training apparatus which comprises a track adapted for support on a floor or other surface and defining a line,

a carriage supported for movement on said track

a pair of foot pads supported on said carriage for pivotal canting and turning motion about axes which are mutually perpendicular to one another and to the line defined by said track,

powered members continuously moving in opposite directions along lines substantially parallel to the line of said track, and

means automatically operative in response to pivotal motion of said foot pads for connecting said carriage to one of said powered members to effect movement of said carriage along said track.

2. Ski-simulator training apparatus according to claim 1 wherein

said powered members are formed by parallel oppositely moving flights of an endless belt mounted on pulleys at opposite extremities of said track.

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3. Ski-simulator training apparatus according to claim 2 wherein

said automatically operative connecting means establishes frictional connection with one flight of said endless belt in response to canting, pivotal motion of said foot pads in one direction and with the other flight of said belt in response to canting pivotal motion of said foot pads in the opposite direction.

4. Ski-simulator training apparatus according to claim 2 wherein

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said automatically operative connecting means establishes frictional connection with one flight of said endless belt in response to turning motion of said foot pads in one direction and with the other flight of said belt in response to turning motion of said foot pads in the opposite direction.

5. Ski-simulator training apparatus according to claim 2 which comprises means for varying the speed of said endless belt.

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