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Thompson

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[54] **PROPULSION UNIT FOR SKIER**

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[52] **U.S. Cl.** ..... **180/6 R,** 180/10, 180/19 R, 280/24

[51] **Int. Cl.** **B62m 27/02**

[58] **Field of Search** ..... 180/5 R, 19 S, 19 H, 180/10 X, 13, 52; 280/19 R, 20, DIG. 7

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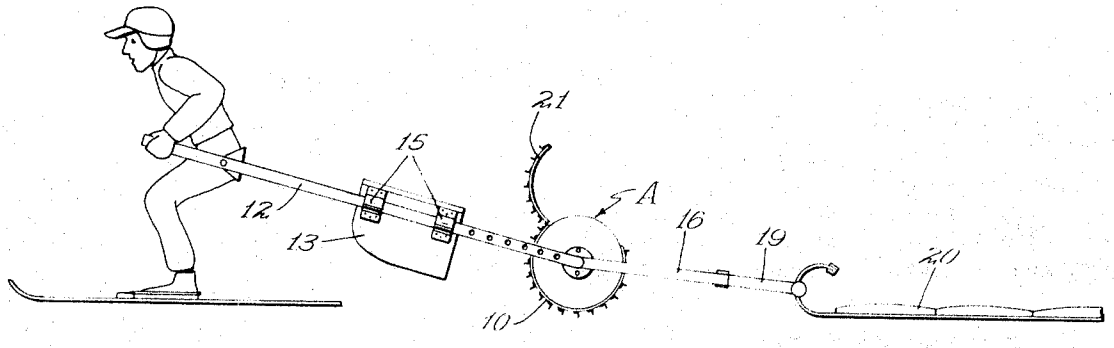
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Assistant Examiner—J. D. Rubenstein
Attorney—Robert M. Dunning

[57] **ABSTRACT**

A cleated roller is provided including an internal combustion engine mounted on a frame connected through the roller hub to one of two handles. The handles are connected in parallel relation and extend on opposite sides of the roller. Means extending between the handles near the free ends thereof are adapted to engage the posterior of a skier to push him over the snow covered surface.

11 Claims, 7 Drawing Figures



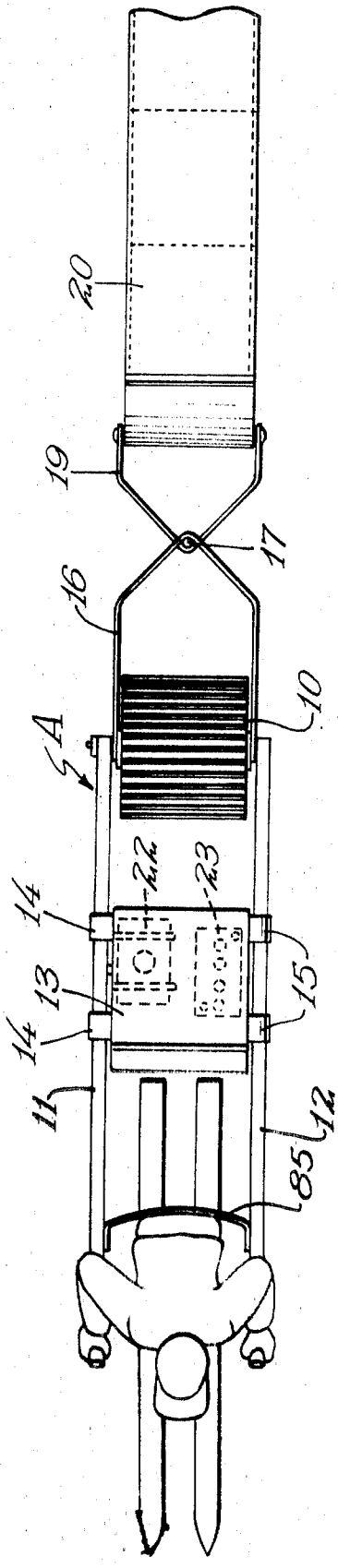


FIG. 1

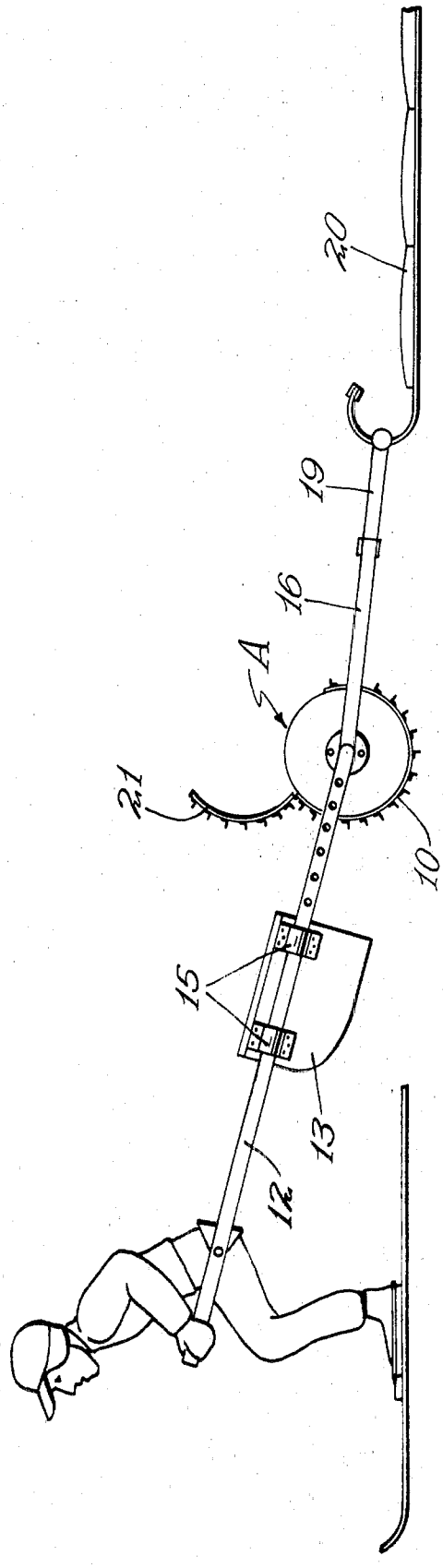


FIG. 2

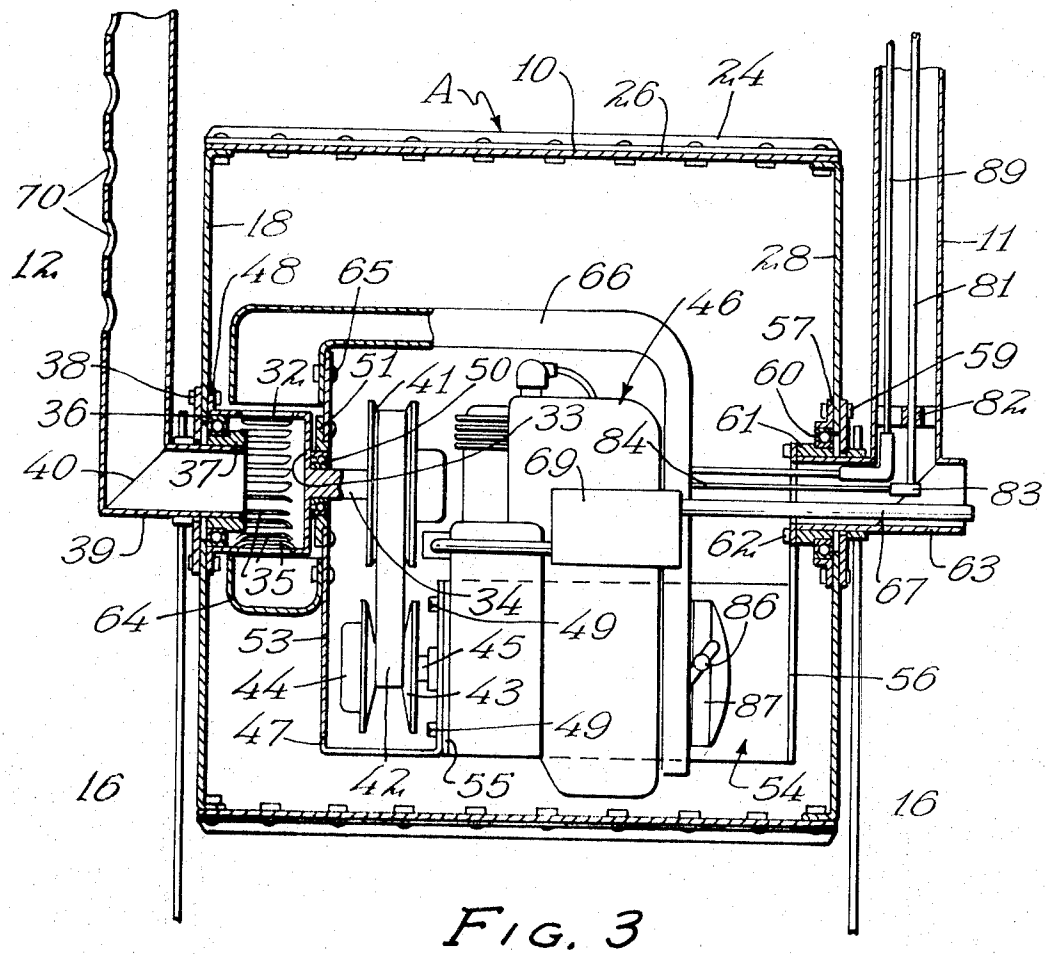


FIG. 3

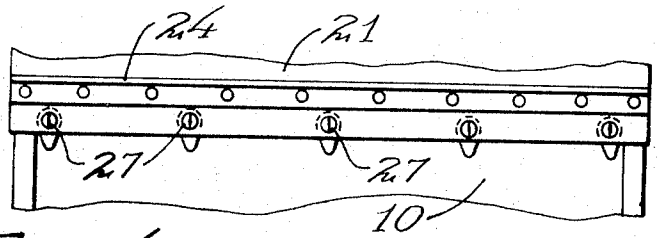


FIG. 4

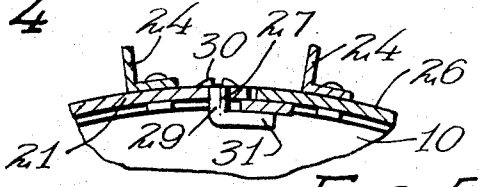


FIG. 5

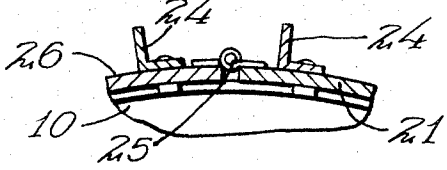


FIG. 6

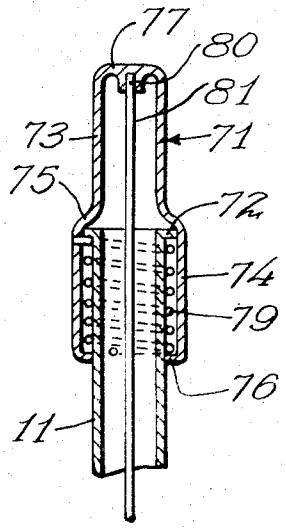


FIG. 7

PROPULSION UNIT FOR SKIER

This invention relates to an improvement in Propulsion unit for skiers and the like and deals particularly with a cleated roller driven by an internal combustion engine within the roller, and operable through handle shafts to push the skier over the surface of the ground.

BACKGROUND OF THE INVENTION

Various types of units have been used for propelling skiers over a snow covered surface. One such device comprises an engine driven propeller or fan mounted upon the back of the skier for moving the skier along the snow covered surface. Another device comprises an engine driven tractor comprising a pair of belt connected wheels connected by an endless cleated belt and driven by an internal combustion engine in a manner to pull the skier over the snow covered surface. Flexible lines are provided to pull the skier and to actuate the controls for the engine, as well as for steering the tractor.

It is recognized that garden tractors and the like have been produced which include a cleated roller enclosing an internal combustion engine and controlled by handlebars extending rearwardly from the roller, these handlebars providing means for steering the device as well as for supporting means for controlling the engine. However, no cleated roller has been found having handle means projecting forwardly therefrom for pushing the skier and including means engageable with the posterior of the skier to apply a propelling force to the skier.

U.S. Pat. No. 2,239,122 issued April 22, 1941 to C. L. Stokes discloses a device somewhat similar to a wheelbarrow having handles projecting forwardly therefrom, the device including an internal combustion engine for driving the device in a forward direction. This device is actuated by rearward pressure of the operator against a clutch actuating mechanism. The applicant's device, on the contrary, includes an engine throttle control on one of the forwardly projecting handles capable of controlling the engine speed to move the operator at a desired speed. When this control is released, the speed of the engine is immediately reduced to an idling speed, and the clutch connecting the engine to the roller is simultaneously disconnected so that the roller will stop rotation.

SUMMARY OF THE INVENTION

An object of the present invention resides in the provision of a device for propelling a skier or the like which includes a cleated roller having a pair of handles connected at the axis of the roller and projecting forwardly therefrom. The handles are securely connected together so as to pivot in unison about the hub of the roller. Means extending between the handles may function to engage the posterior of the skier and to push the skier along the snow covered surface of the ground.

A feature of the present invention resides in the fact that one of the handles is rigidly connected to a frame within the roller which supports an internal combustion engine. The output shaft of the engine is connected by suitable drive means through a centrifugal clutch which is connected to the roller to drive the same. A further feature of the present invention resides in the provision of a cleated roller having a segment of its cylindrical surface hingedly supported to provide a door providing axis to the enclosed engine.

A further feature of the present invention resides in the provision of a device of the type described including an air passage leading to the air intake of the engine extending through the hub of the drum. The exhaust and air outlet extend through the opposite hub of the roller.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top plan view of the propelling apparatus in use in pushing the skier and pulling a toboggan.

FIG. **2** is a side elevational view of the same, showing the engine access door in open position.

FIG. **3** is a vertical sectional view through the roller, the handles and the air inlet system, the engine being shown in full lines to simplify the illustration.

FIG. **4** is a plan view of a section of the cleated roller showing the manner in which the access door is normally held in closed position.

FIG. **5** is a sectional view through a portion of the cleated roller showing the access door closing means.

FIG. **6** is a sectional detail through the cleated roller showing the door hinge connecting the access door to the remainder of the roller.

FIG. **7** is a sectional detail of a throttle control handle.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The propelling unit for skiers and the like is indicated in general by the letter A. In general, as indicated in FIGS. **1** and **2** of the drawings, the propelling unit A includes a cleated roller **10** having handles **11** and **12** hingedly connected thereto at the hub thereof. A storage box such as **13** is secured to the handle **11** as indicated at **14** and is secured to the handle **12** by sleeves or brackets **15.** A generally U-shaped towing bar **16** may be provided extending rearwardly of the cleated roller **10,** and may be connected by a swivel joint **17** to a towing frame **19** hingedly connected at opposite ends to a toboggan **20** or other suitable member to be towed.

As is indicated in FIG. **4** of the drawings, the cleated roller **10** includes a hinged segment **21** which, when opened, provides an access door to the enclosed engine. The details of this construction will be later described. The storage box **13** is designed to accommodate a fuel tank **22,** a battery **23,** or other suitable means.

As is indicated, the roller **10** is provided with angularly spaced cleats. These cleats **24** are shown in the form of angle irons bolted or riveted to the cylindrical surface of the roller **10,** including the door section **21** thereof. The general arrangement of the construction of the door section is best illustrated in FIGS. **4** to **6** of the drawings. As indicated in FIG. **6,** a hinge **25** connects one end of the door **21** to the remainder of the cylindrical surface **26** of the drum **10.** As indicated in FIG. **5** of the drawings, a series of quarter turn fasteners **27** extend to the door **21** near the free edge thereon. Each fastener includes a shank **29,** a slotted head **30,** and a locking arm **31.** By engaging the slotted head **30** with a suitable tool, the shank **29** may be rotated to en-

gage or disengage the locking arm 31 from the inner surface of the cylindrical shell 26 of the drum 10.

With reference now to FIG. 3 of the drawings, it will be noted that the drum 10 has its cylindrical shell 26 supported by end closure plates 18 and 28. The end plate 18 is bolted or otherwise secured as indicated by the bolts 38 to a peripheral flange 48 at one end of a hollow torque cylinder 32. The torque cylinder 32 supports an end closure plate 33 which in turn supports an axial shaft 34. The periphery of the torque cylinder 32 is louvered as indicated at 35. The louvres are shaped to withdraw air from the interior of the cylinder and force it outwardly.

The torque cylinder 32 supports the outer race of a ball bearing 36, the inner race of which supports a short sleeve 37. A short length of tubing 39 extends through the sleeve 37 and is attached thereto. The outer end of the tube 39 is cut diagonally to fit the diagonally cut end 40 of the tubular handle 12. The tube 39 is welded or otherwise secured to the handle 12. With this arrangement, it will be seen that the torque cylinder 32 is free to rotate about the bearing 36, so that rotation of the shaft 34 will cause similar rotation of the drum 10.

An expandable pulley 41 is mounted upon the shaft 34 and is connected by a belt 42 to an expandable pulley 43 controlled by centrifugal clutch 44 mounted upon an engine output shaft 45.

The engine 46 is supported by a J-shaped bracket 47 having its shorter side bolted or otherwise secured to the end of the engine 46 from which the output 45 extends, as indicated by the bolts 49. A ball bearing 50 encircles the shaft 34, and supports a ring 51 on its outer race which is bolted or otherwise secured to the longer side 53 of the bracket 47. The engine supporting frame also includes a U-shaped member 54 having one end 55 bolted to the engine by the bolts 49, and having a parallel end 56 which extends upwardly across the axis of rotation of the roller 10.

An angular flange 57 is bolted or otherwise secured axially with respect to the end plate 28 as indicated at 59. The bracket 57 is secured to the outer race of a bearing 60. A sleeve 61 is secured to the inner face of the bearing 60, and the bracket member 56 is bolted to the engine of the sleeve 61 as indicated at 62. A short length of tubing 63 is secured to the sleeve 61 and extends through the end plate 28. The handle 11 is welded or otherwise secured to the outwardly projecting end of the tube 63. The portion of the bracket member 56 which is aligned with the interior of the tube 63 is cut away so that the tube 63 is open at both ends.

From the foregoing description it will be seen that the engine supporting bracket 54 is connected through the sleeve 61 and the tube 63 to the handle member 11 so that the engine 46 is held in proper position by the handle 11. The end plate 28 is free to rotate relative to the sleeve 61 and tube end while the handle 12 is freely rotatable within the bearing 36. The handles 11 and 12 are held from relative rotation by the storage box 13.

A collector ring or volute 64 encircles the torque cylinder 32 and is supported by bolts 65 or other suitable means extending through the longer end 53 of the brackets 47. The collector ring 64 is connected by a conduit 66 leading to the air intake of the motor 46. A fan, not illustrated in the drawings, is incorporated in the engine 46 to draw cooling air into the motor to maintain a low temperature therein. Air leaving the engine is free to leave the roller through the open ended tube 63. The exhaust pipe 67 also extends from the muffler 69 through the tubular member 63 so that the exhaust gases may be expelled exteriorally of the roller 10.

Air enters the roller through the hollow handle 12, either through the open free end thereof, or through aperatures 70 in the wall of the tubular handle. When the engine 46 is in operation, rotation of the torque cylinder 32 causes the louvres 35 to force air into the collector ring 64 and conduit 66. When the engine is idling and the torque drum 32 is stationary, air is drawn into the engine 46 by the cooling fan incorporated in the engine.

With reference now to FIG. 7 of the drawings, it will be noted that the handle 11 is provided with an outwardly extending shoulder 72 at or near its end extremity, and a pivotal handle, 71 is mounted upon the free end of the handle arm 11. The handle 11 is shown as including a relatively small diameter tubular end 73, and a larger diameter end 74, the portion of two diameters being connected by the offset 75. The lower end of the large diameter handle portion 74 is provided with an inturned shoulder 76, while the extremity of the small diameter portion 73 of the handle is provided with an end closure 77. A torsion spring 79 is anchored at one end to the handle arm 11 while the other end is anchored to the large diameter end 74 of the rotatable handle member 71 near the shoulder 72. The spring 79 is designed to hold the rotatable handle members 71 in one extreme position.

A boss 80 is provided on the inner surface of the closed end 77 of the rotatable handle member 71, and the boss 80 is anchored to a control rod 81. The control rod 81 is shown in FIG. 3 as being supported by a pilot bushing 82 and supporting a cam or eccentric 83. The cam 83 engages the end of a throttle control lever 84 connected to the throttle control lever of the engine. The spring 79 normally holds the cam 83 in position to operate the engine 46 at an idling speed. However, by rotation of the rotatable handle member 71, the cam 83 may be rotated, operating through the arm 84 to increase the speed of the engine. The engine speed may be held at a desired rate as long as the rotatable handle member 71 is held in a rotated position. However, as soon as the rotatable handle member is released the speed of the engine will be reduced to an idling speed, and the centrifugal clutch 44 will become disengaged to stop rotation of the roller 10.

The operation of the apparatus is believed obvious from the foregoing description. The engine 46 may be started by opening the access door 21 and pulling on the starter cord 86 of the engine starter 87. Fuel may flow from the fuel tank 22 to the engine through a fuel line 89 extending through the hollow handle 11 and through the tubular member 63. The access door 21 is closed, and the operator on the skis assumes position between the handles 11 and 12 and forwardly of the transverse web 85 extending between the handles. The operator then twists the rotatable handle member 71, increasing the speed of rotation of the engine 46. As the speed of the engine increases, the centrifugal clutch 44 actuates to tighten the drive belt 42, causing rotation of the pulley 41. This rotative force acts through the shaft 34 and torque cylinder 32 to the side plate or

closure plate **18**, driving the roller **10**, and pushing the skier along the surface of the snow.

If the storage box **13** contains the storage battery such as **23**, this battery may be connected to an electric starter on the engine **46**, the conductors extending from the storage box **13** through the hollow handle **11** and tube **63** to the engine starter. Furthermore, if is so desired, the storage box **13** may be moved forwardly of the handles **11** and **12** to serve as the abutment engaging the operator to push him over the snow. Obviously, the forward edge of the storage box may be padded so as to not bear directly against the body of the operator.

While the access door **21** is shown extending the full width of the drum, this is a matter of choice. In actual practice, the drum may be formed with two opposed fixed sections and two opposed readily removable sections. The access door could be located in any of the sections.

In accordance with the U.S. Pat. Office Statutes, I have described the principles of construction and operation of my improvement in Propulsion unit for skiers and the like, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A propulsion unit for skiers and the like including:

a hollow cylindrical cleated roller including end walls,

hollow hubs extending into said end walls from opposite end thereof,

handles secured to the outer ends of said hubs,

an engine frame supported by said hubs and secured from rotation relative to one of said hubs and the handle secured thereto,

the end wall encircling said one hub being rotatable relative thereto,

said engine frame being rotatable relative to the other of said hubs,

an engine having a power shaft supported within said roller upon said engine frame,

said power shaft is connected to the end wall of said roller encircling the other of said hubs to drive the same,

means connecting said power shaft to the roller.

2. The structure of claim **1** and in which said means connecting said power source includes a clutch.

3. The structure of claim **2** and in which said clutch comprises a centrifugally operable clutch.

4. The structure of claim **1** and in which at least the handle connected to said one hub is tubular and includes a passage which communicates with the interior of said one hub, and including an engine control extending through said last named handle and said one hub.

5. The structure of claim **4** and in which said engine control is connected to the engine throttle.

6. The structure of claim **1** and including means connecting said handles and adapted to engage with the posterior of a skier.

7. The structure of claim **1** and in which said connecting means includes a torque cylinder having louvers therein which act as a fan to draw air through said other hub.

8. The structure of claim **7** and including a collector ring encircling said torque cylinder and a conduit connecting said collector ring to said engine.

9. The structure of claim **1** and in which said roller includes an access door forming a segment of said cylindrical roller.

10. The structure of claim **1** and in which said connecting means includes a torque cylinder secured to the end wall encircling said other hub, a shaft connected to said torque cylinder and concentric with said roller, and expandable pulley mounted on said last named shaft, a centrifugal clutch connected to said engine power shaft, an expandable pulley on said power shaft actuated by said clutch, and a belt connecting said expandable pulleys.

11. The structure of claim **1** and including a hitch connected to said hubs and extending rearwardly from said roller.

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