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DISASSEMBLABLE AND TRANSPORTABLE SKI-TOW
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ABSTRACT OF THE DISCLOSURE

A disassemblable and transportable ski-tow device comprising as main component parts a driving station with supporting frame, internal combustion engine, safety rope-releasing means and a rope-returning station with similar supporting frame. The two stations are located at the opposite terminal of a closed circuit, stretched rope-line. The device, readily transportable by two persons, includes also a special vise-shaped handgrip element for towing skiers uphill, and can be assembled wherever desirable, in very short time, thus rendering it suitable for use by small independent groups of skiers.

The present invention concerns an easily disassemblable and transportable device for towing one or more skiers on an ascending route.

One of the objects of this invention is to provide a device of the kind referred to which possesses limited dimensions, reduced weight and may be easily erected on the site and disassembled after use for transporting, for instance, inside the luggage compartment of a car, or for carrying on one’s back, by no more than two persons.

A further object of this invention is to provide a device as aforesaid, where the weights and the encumbrance of its component parts, as well as the importance of the means anchoring it to the ground, are reduced to a minimum due to the particular structure of the device, so as to accentuate the characteristic of easy handling of the device itself.

Still another object of the invention is to enable the practical material handling of the device by simply disassembling the component parts in no more than three unit packages, each unit being containable, for instance, within an individual cloth bag.

It is known that in this kind of towing devices for skiers, the towing of passengers takes place by means of a flexible member. It is therefore another object of the present invention to provide for moving said flexible member by means of an engine placed atop the tow slope, capable of discharging directly on the driving station the reactions caused by the transported loads and having a single important anchoring point to the ground.

Another object of the present invention is to afford the skier suitable means by which he can attach himself to the aforesaid flexible member (which is without projections or fixed protrusions) without having to stop or to decrease the speed of said member and without giving to the member itself stresses, thus causing its wear, and also allowing the skier to leave the flexible member when desired.

Still a further object of the present invention is to provide for a safety arrangement, such that the towing device stops in case the skier either forgets to or does not know how to leave the flexible member at the end of the ascending route.

Other objects and advantages of this invention will become apparent from the following description and from the accompanying drawings.

The device of this invention differs from normal ski-lifts of the fixed type, which are quite large and require very long and expensive components, inasmuch as its object is substantially to provide an installation for limited performance but which is much more expeditious to use, since it is possible to choose the location and to change it at will.

Moreover, the installation or assembly, according to this invention, requires only about twenty minutes to be completed, does not require the continuous presence of an operator, and therefore even only one skier or a small group of skiers can use this device to his or their entire satisfaction.

On the other hand, compared with other known ski-lifts, this device of the invention is designed so as to result in a handler, cheaper and considerably simpler apparatus.

The device is substantially composed of three elemental units, namely, a driving station, a rope-returning station, and a closed circuit line.

The driving station is located at the top of the slope and is composed of:

A group of eight metallic pipes hooked together or inserted into one another, by suitable couplings so as to form a very quickly disassemblable frame;

An internal combustion engine of light construction and known type equipped with an automatic device for controlling the speed, and with a speed reducer;

A reducer, transmitting the movement to a pulley provided with many grooves, and parallel to the pulley an idle counter-pulley of a similar shape, said pulley and counter-pulley enabling a flexible member, such as a continuous rope to wind in many turns in their grooves;

Anchoring means effected suitably by a resistant rope fixed to the ground or to a suitable fixed point, and fastened to the motor unit from the opposite side of the continuous tow-rope, so that the pipeframe assembly on which the motor unit is placed must support only compression loads; and

A safety device, formed by a member guided on the continuous rope and provided with a boss formed by a pulley placed on the continuous rope itself, suitable to cause the forward sliding of said member and the consequent interruption of the electric circuit of the motor, stopping the device, when a skier either forgets or does not known how to free the suitable grasping member from the continuously moving rope.

The rope returning station, located at the bottom of the slope, is composed essentially of:

A return pulley which allows the rope to be continuously returned to the driving station;

A resilient member, suitable to dampen the reactions of the rope’s weak initial tension; and

A light disassemblable pipeframe, similar to that of the driving station, but simpler and provided with an anchoring means operating according to the same principle that is, causing the frame to support only compression stresses.

The closed circuit line, connecting the two stations discussed hereabove, is composed of a continuous rope, which is supported along its descending (discharging) portion by one or more stakes provided with pulleys according to the contour of the ground so as to reduce the friction of the rope on the ground or on the snow; the rope line is provided with at least one clamping device for the skier to use.

All of the aforesaid units are confinable in three packages, which can be easily transported by two persons, as stated before.

In order to better understand the invention, reference is made to the accompanying drawings, in which:

FIGURE 1 represents a side view of the driving station, placed at the top of the slope;

FIGURE 2 is a plan view of the same station;

FIGURE 3 is an enlarged detail of FIGURE 1;
FIGURE 3 is the plan view corresponding to FIGURE 3.

FIGURE 4 is the plan view corresponding to FIGURE 3.

FIGURE 5 shows the clamping device applied to the rope.

FIGURES 6 and 7 are sections of FIGURE 5 taken along lines a—a and b—b respectively.

FIGURES 8, 9 and 10 show different embodiments of the clamping device for use by the skier.

FIGURE 11 shows in detail the disassembleable metallic pipeframe of the driving station.

FIGURE 12 shows the diagram of the returning station.

FIGURE 13 shows the general diagram of the device according to the invention in working position.

FIGURE 14 is the plan view corresponding to the same diagram.

FIGURES 15 and 16 show a tensioning device for the anchoring means.

FIGURES 17 and 18 show in detail the safety device in two working conditions and FIGURE 19 shows the three packages containing all of the component parts of the disassembleable ski-tow.

As shown in the FIGURES 1 and 2, the device of the invention includes in the driving station the tubular frame 1 (which is shown more in detail in FIGURE 11), supported on the ground and composed substantially of eight tubular sections or pipes which are disassembleable as well as assembleable without any help of tools; a connecting rope 2, single or double (more clearly represented in FIGURES 13 and 14) connecting the driving station to one or more fixed points on the ground.

Another frame 3 is mounted on frame 1 and is equipped with a reducer 4 which drives a pulley 5, while an idle counter-pulley 6 is installed in parallel relation to said pulley. Each pulley has a plurality of cylindrical grooves (FIGURE 4) which allow the winding in several turns of a flexible member, particularly of a continuous rope; numeral 7 is the part of the rope under tension, that is, the ascending portion, and numeral 8 shows the return portion of the rope, that is, the descending portion.

FIGURES 1 and 2 show a guide 9 for the rope and a safety device comprising a switch 10 which acts on engine 3; the pulley 12, suitable to lean on portion 7 of the rope, is struck by a clamping device that has not been timely unhooked and pushes back the rod 11, which, by disengaging the boss placed at the end opposite to the pulley, causes the interruption of the electric circuit of the engine 3; the whole is shown in greater details and in enlarged scale in FIGURES 17 and 18.

FIGURES 3 and 4 show in enlarged scale a part of the construction shown in FIGURES 1 and 2.

The opposite end of the installation according to the invention, that is the return station, is shown in FIGURE 12 where one can see the return pulley 26, the tightening device 27, a resilient element 28, the anchoring cable 29 having two arms, and the pipe frame 30.

In FIGURES 13 and 14 the general diagram of the device according to the present invention is shown while in operation.

In the drawing, one can see the upper anchor 2 and the lower anchor 29; the driving station and the return station 30; the ascending part 7 of the rope and the descending part 8 thereof and, finally the intermediate bearing or support 31.

Referring now to FIGURES 12, 15 and 16 the tensioning member 27 should be described. This is composed of an S-shaped metallic frame the central part of which has a seat provided with two hooks 32, while the ends are shaped like a handle 33, terminating in a back 34; the tensioning member 27 is completed by a flexible rope 35 fixed at the one side to the return pulley 26 and at the other side to a resilient element 28 and at the center to the seat of the tensioning member. When the operator grips (as in FIGURE 15) the two handles 33 and impresses upon the tensioning member a suitable rotational movement, the flexible rope winding on the included hooks 32 and, being conveniently shortened, is fixed to the two hooks 34 keeping the tensioning member suspended. The shortening of the flexible rope will thus cause the desired tension. In FIGURES 17 and 18 it has been shown in greater detail the safety device formed by a metallic rod 11 supporting at one end a pulley 12 and at the opposite end a projection 36 of insulating material.

The ignition circuit of the engine is in parallel with a metallic point 37 pushed downwardly by a spring (not shown).

In FIGURES 5 to 10 the element or component member is shown by which the skier can attach himself to the rope 7. It is composed of a handgrip 13 to which the pins 14, 15 are fixed as well as the ring 21 on which is secured the cable 22 that connects the stick 23 or another gripping means. On the pin 14 the movable arm 16 is hinged which carries the guide plates 26 of the continuous rope; the farther end (from the pins of the movable arm) is curve-shaped in such a manner as not to force the rope to excessive bendings. The leaf spring 19 secured to the plates 18 presses on the pin 15 and causes a rotation of the movable arm with respect to the handgrip so as to tend to maintain open as much as possible the throat formed by the pin and the movable arm itself.

In this position, the skier can easily approach the clamping means to the rope 7 so that this rope is introduced between the guide plates 18 and being helped by the plate 38 in the foresaid throat formed by the spring 19 and the movable arm. At this moment, by rotating the handgrip 13 counterclockwise, since the movable arm is retained by the rope, the angle between the handgrip and the movable arm is caused to increase and the right end of the arm to press upon the traction rope 7 against the spring 19 supported by the pin 14.

As a consequence, a tension is produced on the cable 22, caused by the skier’s resistance to towing, the handgrip will continue to rotate until the clamping device assumes a position where the traction forces on the rope 7 (a and b) and the skier resistance (c) as well as their moments are balanced.

If the length of the movable arm 16 has been predeterminedly selected, and taking into account the friction coefficient of the materials utilized, the pressure of the arm on the rope will be sufficient to prevent any sliding of the clamping device on the rope itself. It is clear that, as the traction on the cable 22 ceases, when the skier leaves the stick, the spring 19 causes a broadening of the above-mentioned throat and releases the rope.

As it is shown in FIGURE 19 the units forming the skitow of the invention can be contained in three packages 39, 40, 41, two of which can be carried on man’s back and the other by hand, on the whole, two persons are sufficient for its transportation. Of course, the three packages may be readily placed inside the luggage compartment of a car.

What is claimed is:

1. A disassembleable and transportable ski-tow comprising:
   (A) A driving station located at the uphill receiving terminal of said ski-tow and comprising
      (1) A metallic frame composed of a plurality of tubular, interconnectable, removable members,
      (2) A light-weight, internal combustion engine, mounted on said frame and provided with automatic speed controller and a speed reducer,
      (3) A power-transmitting reducer connected to said engine and to a multi-grooved pulley,
      (4) An idle counter-pulley mounted parallel to said pulley to wind therewith a moving rope line about said grooved,
      (5) Anchoring means connected to said engine away from the moving rope line to enable said
frame to support only compression loads, and
(6) A safety device composed of a guide rod connected to said rope line and of a boss formed by a pulley located on said rope line to interrupt the electric circuit of said engine by means of a switch and to stop the motion of said rope line when said guide rod slides forwardly;
(B) A rope-returning station located at the downhill terminal of said ski-tow and comprising
(7) A substantially frictionless pulley,
(8) A metallic frame substantially identical to said first-mentioned frame,
(9) Anchoring means connected to said second-mentioned frame, and
(10) An S-shaped resilient member to prevent slackening of said rope line;
(C) A closed circuit rope line connecting said driving station to said rope-returning station and comprising
(11) A plurality of supporting stakes provided with pulleys and located along the downhill moving portion of said rope line, to reduce the friction of said rope on the ground; and
(D) A vise-shaped clamping element, operatively attached to said rope line for towing a weight from said downhill station to said driving station.

2. In a disassemblable and transportable ski-tow comprising a driving station, a rope-returning station and a closed circuit rope line connecting said two stations, the improvement consisting of a vise-shaped clamping element, operatively attachable to said rope line for towing purposes, said vise-shaped clamping element being comprised of a handgrip, a pair of pins rigidly connected to said handgrip, and a movable arm pivotally mounted on one of said pins and provided with a leaf spring, the arrangement being such that a counterclockwise rotation of said handgrip relative to said movable arm diminishes the section of the throat of said movable arm, locking the rope line between the walls of the throat to allow a towing motion, while a clockwise rotation of said handgrip relative to said movable arm causes the reopening of the throat of said movable arm to unlock the rope line and prevent a towing motion.

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