March 15, 1955 V. K. HORTON 2,704,038

SKI TOW

Filed Feb. 7, 1949 2 Sheets-Sheet 1

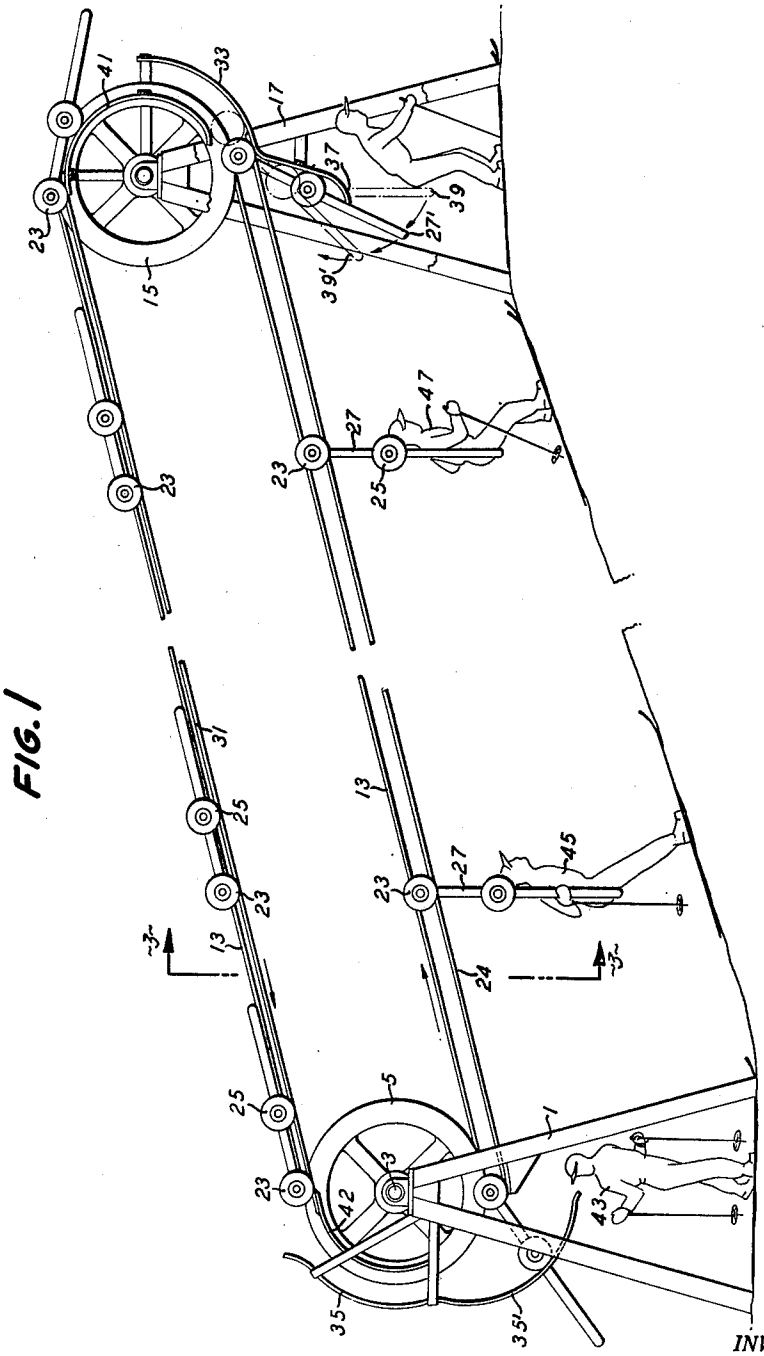


FIG. 1

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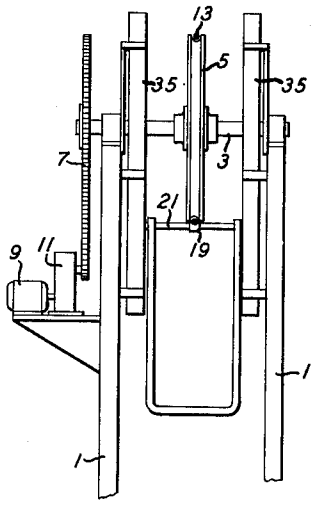
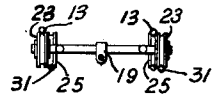


FIG. 2



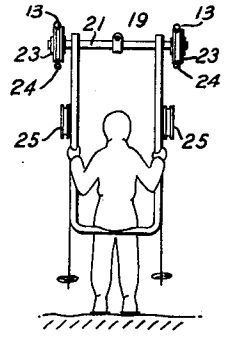


FIG. 3

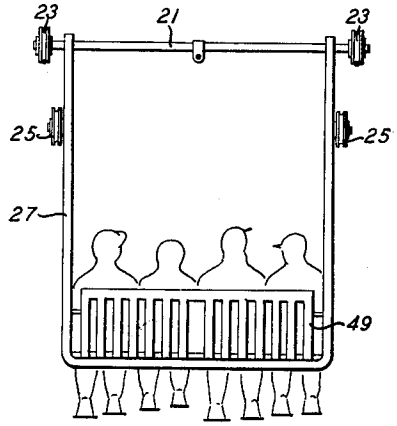


FIG. 4

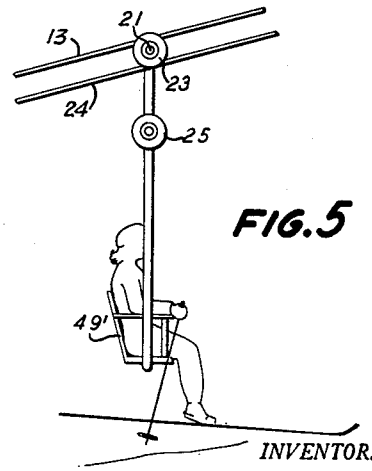


FIG. 5

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SKI TOW

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5 Claims. (Cl. 104—173)

This invention relates to ski tows, that is, to devices designed to transport skiers, wearing their skis, from the bottom to the top of a hill or ski slide.

Among the objects of this invention are to provide a ski tow which is adapted either to carry the skiers, free of the ground, and comfortably seated, or to permit the skier to stand upon his skis and merely be pushed up the hill by the action of the tow; to provide a ski tow which, used in either manner as above stated, will deposit the skier in a standing position upon his skis at the top of the slide; to provide a ski tow wherein there is no danger of the skier being struck by the seat or seat frame as he is released therefrom; to provide a ski tow which will permit more than one or two persons to be transported by each seat frame, again without the danger of any of the persons so transported being struck by the frame; and to provide a ski tow possessing the above enumerated advantages which is rugged and unlikely to get out of order, and is economical to construct and maintain.

Ski tows of a number of types have been constructed in the past. The simplest of these is a rope, which may be provided with knots or other hand grips, and which runs over pulleys at the top and bottom of the ski slide, the skiers simply clinging to the rope as they are propelled thereby up the hill. More elaborate tows are provided with dependent frames upon which the skiers can ride or can be pushed. In the past these ropes have been run around pulleys rotating in a horizontal plane, i. e., upon vertical axes. Where the frames have been of the seat type it has been necessary that the upper end of the tow be so arranged that it will deposit the skier, on his skis, upon a downward slope sufficient to permit the skier to shoot ahead of the seat and thus avoid being struck by it as it swings around the pulley. Since, traveling in a horizontal arc, the end of the seat farthest from the axis will be traveling at a considerably higher rate than that nearer to the axis, the width of the seat has had to be restricted so as to reduce the differential velocity to a minimum. The seats have therefore seldom been made wide enough to accommodate more than two riders, especially since a greater number offers more chance of the skiers fouling each other's skis. This has greatly restricted the number of people that could be handled by any single ski tow.

In the type of ski tow wherein the skier remains standing upon his own skis and is merely pushed by a bar secured to the rope or cable, danger has partially been avoided by making such bar either in the shape of a letter J, leaving one side clear so that the skier, if necessary, could throw himself sidewise to avoid being struck by the mechanism, or else, in the limit, has been made in the shape of an inverted T in order to give two skiers the opportunity to clear themselves in this fashion.

In accordance with my invention the continuous rope or cable is used, as in the past, but the pulleys which carry it are mounted on horizontal instead of vertical axes. The seat frames are preferably U shaped, and are pivotally suspended from cross shafts which are secured to the cable. The ends of these shafts engage guides, which may be rails but which are preferably themselves fixed cables, the engagement being preferably made through grooved rollers. These guides provide the actual support for the seat frames on the forward or upward going reach of the drive cable. The seat frames are hung between the rollers, and are provided with members (also preferably grooved rollers)

which engage guide rails mounted on the frames which support the drive cable pulleys, these guide rails being shaped so that upon engagement with the seat frames the latter are swung rearwardly more rapidly than the supporting shafts are being carried forward. The seat frames, whether they be actual seats or merely push bars, therefore slide the riders forward onto their own skis and swing up so as to avoid striking the heads of the skiers. The guide rails thus fold the seat frames back out of the way as the cross shafts travel around the pulleys and the guide rail engaging members on the seat frame ride back to the bottom of the slide on upper reach guides which, again, are preferably cables. On reaching the lower end of the tow the seat frames pass around the lower pulley, the guide rail engaging members being caught by a second guide rail (or pair of guide rails) which prevents the seat frames from falling freely and swinging dangerously but permit them gradually to assume a freely pendent position.

The nature of the invention will be more clearly understood from the following description, taken in connection with the accompanying drawings, wherein;

Fig. 1 is a side elevation showing the upper and lower ends of a tow constructed in accordance with my invention, a number of skiers being shown in outline to indicate the operation of the tow;

Fig. 2 is a fragmentary end elevation of the support frame and mechanism at one end of the tow;

Fig. 3 is a cross section of the tow taken on the line 3, 3 of Fig. 1;

Fig. 4 is a rear elevation of a modified form of tow, showing a seat frame carrying seats for four skiers; and

Fig. 5 is a side elevation of a single seat frame which is otherwise of the same general character as that shown in Fig. 4.

Referring to Figs. 1 and 2, the support frame at the lower or loading end of the tow comprises, in this case, a simple A frame 1, at the apex of which a horizontal shaft 3, carrying a drive pulley 5 is journaled. As shown in Fig. 2 the shaft 3 is driven by a sprocket and sprocket chain 7 actuated by a motor 9 acting through a step-down gear box 11. This mode of drive is, of course merely one example of many types which might be used.

An endless drive cable 13 passes around the drive pulley 5, and also around a driven pulley 15 mounted in the same general manner as the pulley 5 upon a similar A frame 17.

Secured to the cable 13 at intervals by means of yokes 19 are a plurality of transverse shafts 21. The outer ends of these shafts carry means, which may be shoes but which are preferably rollers 23, for engaging the lower reach of a system of guides which extends between the upper and lower support frames. As shown in Figs. 3 and 4 the rollers are preferably grooved, so that they ride safely upon the guides 24, the latter supporting a major portion of the weight which is imposed upon the shafts 21.

Pivotally suspended from the shafts 21 are seat frames 27, shown in Figs. 1, 2 and 3 as simple U shaped bars hanging from the shafts 21 between the rollers 23. Mounted on the seat frames, on the outer sides of the U, and some distance below the shafts 21, are a pair of members 25, preferably rollers similar to rollers 23. These rollers are adapted to engage the upper reach 31 of the guides or cables between the support frames. They also engage rigid guide rails 33 and 35, mounted, respectively, on the upper and lower support frames. The upper ends of both of these guide rails are arcuate in form and are generally concentric with the axes of the pulleys 15 and 5. The lower ends of the guide rails act as cams which control the attitude of the seat frames when they are engaged by the rollers or similar members 24.

The exact shape of the lower ends of these guide rails can be varied in some considerable degree, but they should be so formed as to perform the function generally shown in Fig. 1. Considering first guide rail 33 at the upper end of the tow, tip 37 extends below and generally parallel to the lower guides 24, so as to be certain to catch and engage the roller 25 when it is freely pendent as is shown by the dotted lines 39. Above the tip the

guide rail curves sharply upward, but continues to slant forward, so that as the drive rope pulls the seat frame forward to the position shown in the full lines 27′ the seat frame is moved quite quickly to the rear and is simultaneously raised as is shown by the dotted lines 39′, and by the time the roller 25 has entered the arcuate portion of the guide rail 33 the seat frame is folded back nearly parallel with the guide or cable 31. The upper guide 31 is provided with a rigid extension or guide rail 41 concentric with guide rail 33 but smaller in diameter. As the roller 25 passes a level horizontal with the shaft of the pulley 15 the weight of the roller transfers from the guide rail 33 to the guide rail 41. On the downward reach of the tow the weight of the seat frame rests on the guide cable 31, transferring thereto smoothly from the guide rail 41, and the seat lies folded back as shown in the figure.

At the lower end of the tow guide rollers 25 transfer from guide cable 31 to its arcuate extension 42, and then are caught by the upper arcuate end of the guide rail 35 as they start to swing outward. This prevents the momentum of the seat frame from swinging it on out and over as it passes around the pulley 5 until the roller 25 drops into the lower or cam end 35′, whereon it rests as it is carried forward. The end 35 is so shaped that by the time the roller is released therefrom it is hanging in a freely pendent manner and is not swinging dangerously; a skier, slightly forward of the position shown by the outline Figure 43, can be in a position to seat himself upon the U bar and half-ride, half-slide up the hill as shown by the outline Figures 45 and 47.

Because of the restraint placed upon the motion of the seat frames as it passes about the pulleys, and also because of the manner in which it is tilted and lifted as it passes about the pulley at the upper end, it is possible to make the seat frames quite wide, and to carry upon them multiple seats 49 as shown in Fig. 4. This permits the carrying capacity of a tow to be multiplied several fold, and even though the skiers may be unskilled, and their skis fouled as they are deposited at the end of the tow, there is no danger of their being struck by the seats and possibly injured. It is usual to have a considerable spacing between the seat frames on tows of any character, so that even if the riders on the tow should become temporarily fouled they will not be injured, either by each other or by the riders on a succeeding seat frame.

Where actual seats are provided, either multiple, as shown in Fig. 4, or single seats 49′ as shown in Fig. 5, it is not necessary that the tow be so constructed that its passengers can always rest upon their own skis, but they may be carried across gullies or the like suspended freely in the air.

It should be obvious that for long tows intermediate supports for the guides 25 and 31 can readily be provided. These can be made in the same general manner as is well known in the prior art, the difference in such intermediate supports being merely that those for uphill and downhill cables are spaced vertically instead of horizontally.

I claim:

1. A ski-tow comprising an upper and a lower supporting frame, a pulley journalled on a substantially horizontal axis on each of said frames, a continuous drive cable passing around said pulleys, laterally spaced guides secured to said supporting frames and extending in upper and lower reaches on each side of said drive cable, a plurality of transverse shafts secured at intervals to said drive cable, a seat frame suspended from each of said shafts and pivotally mounted for rotational movement in the plane of said drive cable, rigid guide rails mounted on said upper supporting frame, means on said transverse shafts for engaging the lower reach of said guides for support and guidance thereby, and means on said seat frames for engaging the upper reach of said guides and said guide rails for support and guidance thereby, said guide rails being so shaped that when engaged by said guide rail engaging means on said seat frames by progression of said drive cable, said guides rails will swing said seat frames rearwardly from beneath a rider thereon into a position nearly parallel with said drive cable and with continued progression of said cable will transfer said guide rail engaging means to engage on the upper reach of said guides.

2. A ski tow in accordance with claim 1 including guide rails on said lower support frame shaped to be engaged by said guide rail engaging means on said seat frames and restrain their motion in passing over said pulley to permit said seat frame gradually to assume a vertically pendent position.

3. A ski tow in accordance with claim 1 wherein said guides are cables.

4. A ski tow in accordance with claim 1 wherein the lower reach of said guides is spaced more widely than the upper reach thereof, said transverse shafts being provided with rollers spaced to engage the guides of said lower reach, and said guide engaging means on said seat frame comprising rollers spaced to engage the guides of said upper reach.

5. A ski-tow for propelling passengers from a rear to a forward terminal comprising a pair of terminal supporting frames, a pulley journaled on each of said frames, a continuous drive cable passing around said pulleys, a plurality of seat frames secured at intervals to said cable and pivotally mounted thereto for rotational movement in the plane of said cable, guide-rail engaging members mounted on each side of said seat frames, and a guide rail mounted on each side of said cable adjacent the forward end thereof positioned for engagement by said members and shaped to swing said seat frames rearwardly upon forward motion of said cable when the guide rails are so engaged.

References Cited in the file of this patent

UNITED STATES PATENTS

71,921	Towse	Dec. 10, 1867
668,219	Rock	Feb. 19, 1901
1,740,582	Farmer	Dec. 24, 1929
2,152,235	Bannerman et al.	Mar. 28, 1939