United States Patent [19]

Camp

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[54] **COMBINATION TRAIL GRADER AND CARRIER**

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[51] **Int. Cl.** **A01b 15/10,** E01h 5/06

[58] **Field of Search** 172/738, 387, 392, 393, 172/245, 247, 246, 764, 679, 776, 188, 192, 250, 251, 252, 253, 140, 360, 390, 391, 460, 698, 727, 728, 734, 736, 744, 762, 199, 683, 784; 280/19, 24; 37/122, 10, 50; 280/140, 142

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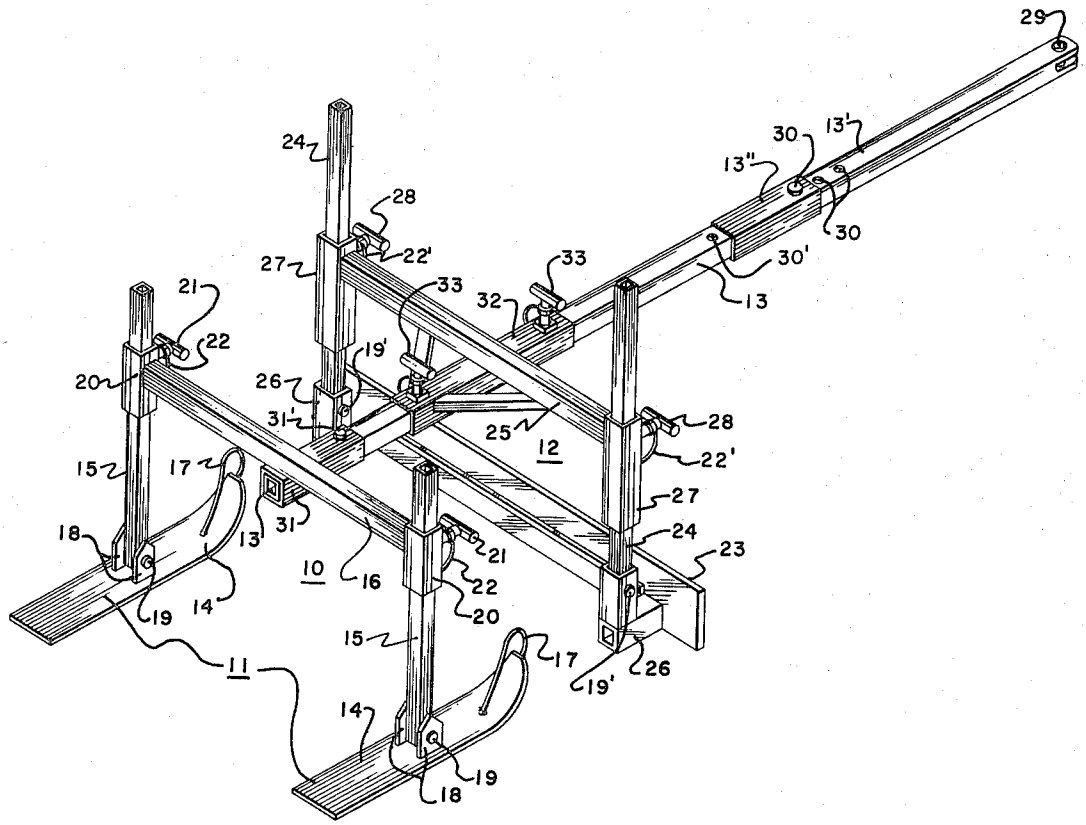
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[57] **ABSTRACT**

The trail grader comprises a runner assembly, including upstandingly disposed cornerposts and a crossbar slidably mounted at each of its terminal ends to the posts and a pair of runners each disposed at the lowermost terminal ends of the respective cornerposts, a moldboard assembly including upstandingly disposed cornerposts, a crossbar slidably mounted at each of its terminal ends to the moldboard cornerposts and a moldboard having an upstandingly horizontally disposed blade suitably mounted to the lowermost terminal ends of the moldboard cornerposts; and a tongue including a centrally substantially perpendicularly disposed bar suitably mounted to the respective crossbars of the runner assembly and moldboard assembly.

The carrier includes a pair of runner assemblies each including upstandingly disposed posts, a crossbar slidably mounted at each of its terminal ends to the cornerposts, and runners suitably fastened to the lowermost terminal ends of the cornerposts; and a platform including a plurality of rails suitably fastened to a platform frame operable to be mounted to the uppermost terminal ends of the cornerposts of the runner assemblies.

4 Claims, 3 Drawing Figures



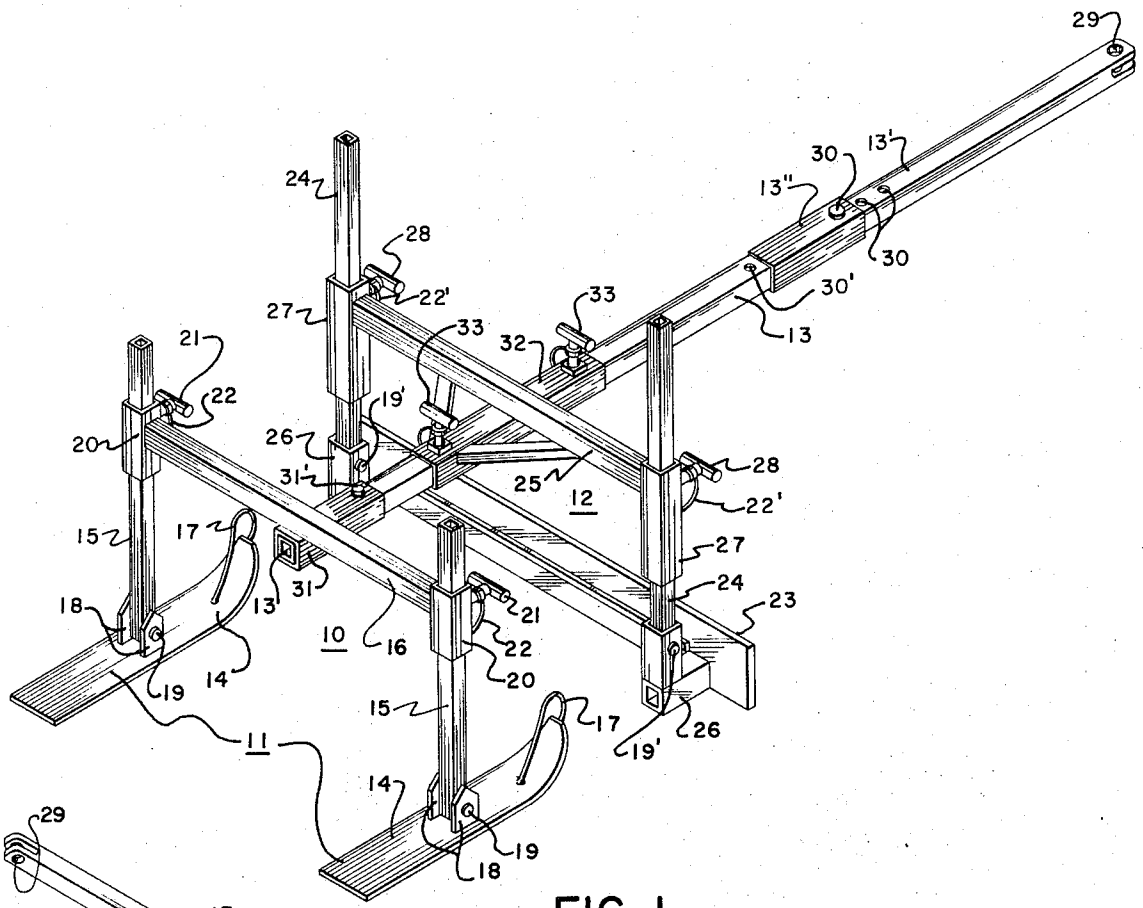

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FIG. 1

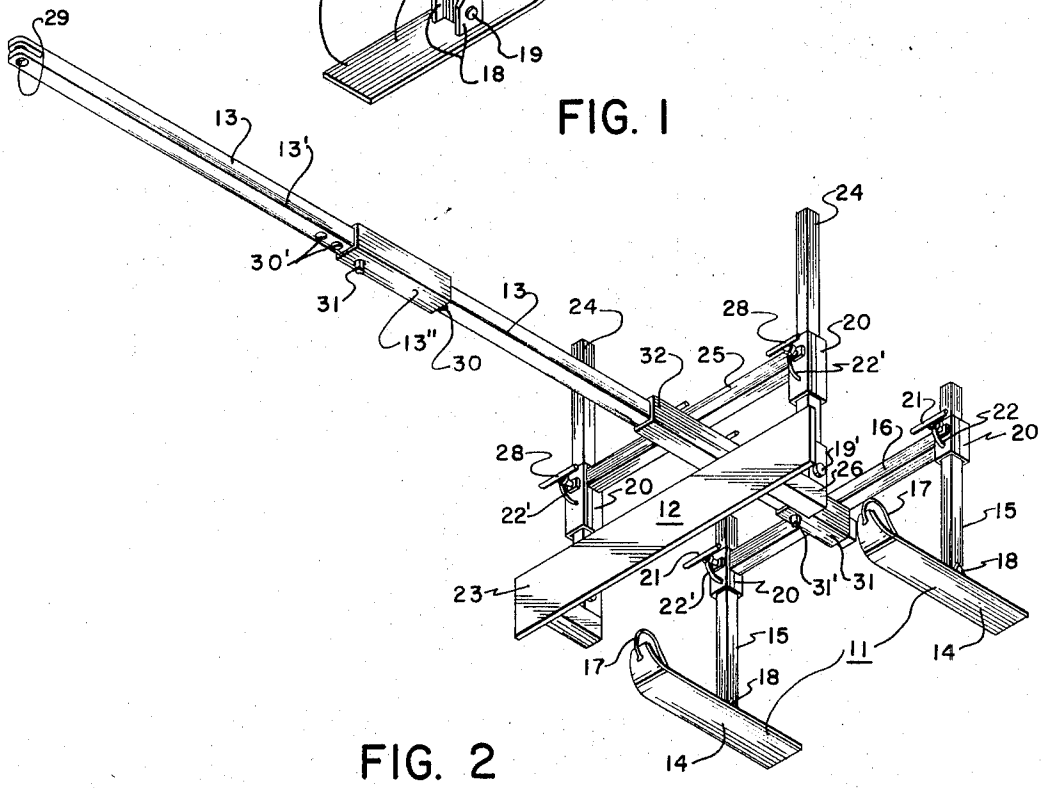

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FIG. 2

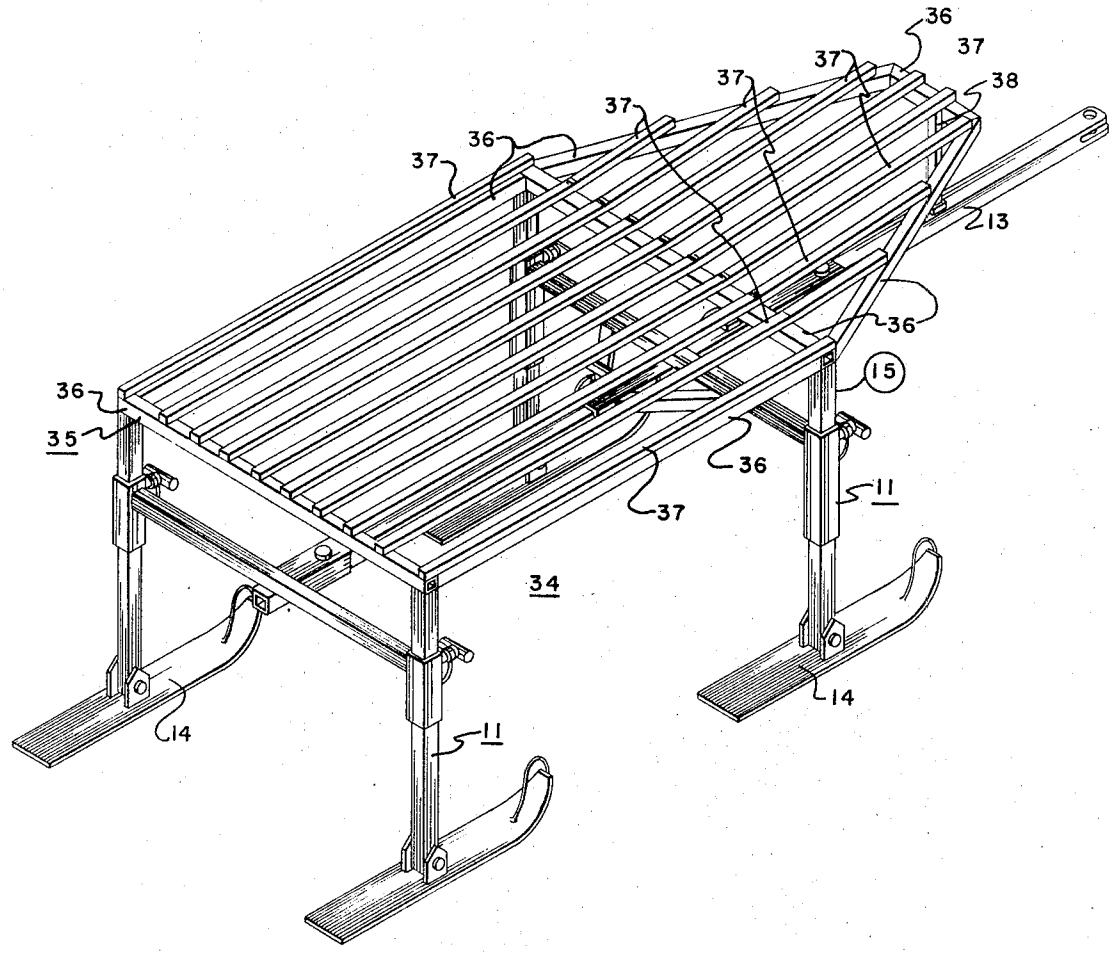


FIG. 3

COMBINATION TRAIL GRADER AND CARRIER

FIELD OF INVENTION

The present invention relates to snow transport equipment and more particularly to a combination trail grader and carrier for snow transport equipment.

DESCRIPTION OF THE PRIOR ART

This snow transport equipment such as snowmobiles and the like may be hazardous as a result of uneven snow base conditions. Snow trails have been developed to increase the safety and enjoyment of such snow transport equipment. Means used and employed to smooth and pack snow for snow trails have been largly confined to hand operating apparatus which have accordingly restricted the development of snow trails.

Accordingly, it is an object of the present invention to provide a grading means which may be towed by commonly known snow transport equipment such as snowmobiles. It is a further object of this invention that grading means towed by a snowmobile may be operable to grade and pack snow the normal course of operations.

It is another object of this invention to provide carrier means which may be mounted on structural members employed in the grading means of this invention.

It is an object of this invention to provide both grading means and carrier means which may be readily assembled and disassembled.

These and other objects shall become apparent from the description following, it being understood that modifications may be made without affecting the teachings of the invention here set out.

SUMMARY OF THE INVENTION

The trail grader comprises a runner assembly, including upstandingly disposed cornerposts and a crossbar slidably mounted at each of its terminal ends to the posts and a pair of runners each disposed at the lowermost terminal ends of the respective cornerposts, a moldboard assembly including upstandingly disposed cornerposts, a crossbar slidably mounted at each of its terminal ends to the moldboard corner-posts and a moldboard having an upstandingly horizontally disposed blade suitably mounted to the lowermost terminal ends of the moldboard cornerposts; and a tongue including a centrally substantially perpendicularly disposed bar suitably mounted to the respective crossbars of the runner assembly and moldboard assembly.

The carrier includes a pair of runner assemblies each including upstandingly disposed posts, a crossbar slidably mounted at each of its terminal ends to the cornerposts, and runners suitably fastened to the lowermost terminal ends of the cornerposts; and a platform including a plurality of rails suitably fastened to a platform frame operable to be mounted to the uppermost terminal ends of the cornerposts of the runner assemblies.

A more thorough and comprehensive understanding may be had from the detailed description of the preferred embodiment when read in connection with the drawings forming a part of this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a right rear top perspective view of the trail grader of this invention.

FIG. 2 is a bottom left front perspective view of the apparatus of the FIG. 2.

FIG. 3 is a right rear top perspective view of a carrier, a further embodiment of this invention, including a platform assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and more particularly to the FIGS. 1 and 2, the grader of this invention is shown to advantage and generally identified by the numeral 10. The grader 10 includes a runner assembly 11, and a moldboard assembly 12, and a tongue 13.

The runner assembly 11 includes a pair of parallelly disposed runners 14, a pair of upstandingly disposed posts 15 which are pivotally fastened at each of their lowermost terminal ends centrally on the respective runners 14, and a crossbar 16 slidably mounted at each of its terminal ends to the post 15. Each runner 14 has a ski-like configuration commonly used in snow transport equipment, and includes a hoop-like spring stiffening means 17 at the upperly curved, leading end of the runner to provide support. A pair of rectilinearly parallel distally fastened bracket plates 18 are disposed centrally in the rectilinear span of the uppermost terminal side of each runner. The runner 14 is pivotally fastened by a means of horizontally transversely disposed assembly pin 19 which provides an axis-retainer means. It has been found to advantage to provide a detachable assembly of pins to facilitate assembly and disassembly of the grader 10. The crossbar 16 is substantially horizontally disposed, and is slidably mounted at its terminal ends to the posts 15 by means of upstandingly disposed sleeves 20 fastened at the terminal end of the crossbar 16. The sleeves 20 are operable to slide closely about the respective posts 15, and are provided with suitable selective locking means such as threadably engageable set pins 21. Flexible tether straps 22 fastened to the respective pins 21 and the respective sleeves 20 may be used to insure that the pins may not become lost in transit of a disassembled grater 10.

The moldboard assembly 12 includes an upstandingly, substantially transversely disposed moldboard 23, upstanding posts 24 fixedly fastened at their respective lowermost terminal ends to the terminal ends of the moldboard 23 on its rearward terminal side, and a crossbar 25 slidably mounted to the posts 24. The moldboard is a plate operable to collect, move, clear and smooth material such as snow. While a horizontally transversely disposed flat moldboard configuration is described in the drawings, it is to be understood that curved angularly disposed moldboards may be used in this invention. The moldboard 23 is provided with sleeves 26 distally from the opposed terminal ends. The sleeves 26 are operable to slidably engage the lowermost terminal ends of the posts 24. The moldboard 23 is fastened by means of assembly pins 19' which may be detachable. In a manner similar to the crossbar 16, upstanding sleeves 27 are fastened to each of the terminal ends of the crossbar 25, which are selectively locked by means of set pins 28 which may include tether straps 22'.

The runner assembly 11 and the moldboard assembly 12 are held in their upstanding, selectively determined juxtaposition by a tongue 13. The tongue 13 comprises a rod-like beam having a suitable hitching means 29 at one of its terminal ends. The tongue 13 may include an

extension member 13' operable to slide within a main tubular tongue member 13'', and a suitable selective locking means such as a detachable pin 30 engageable with respective holes 30' in the member 13' and 13''. The tongue 13 is slidably engageably mounted to the runner assembly 11 by means of a horizontally, rectilinearly disposed sleeve 31 fastened centrally on the lowermost terminal side of the crossbar 16, and being fastened by a detachable pin 31' engageable with terminal end of the tongue 13 and the sleeve 31 at the end opposite the hitch 29. The moldboard assembly 12 is slidably engageably mounted to the tongue 13 by means of a horizontally, rectilinearly disposed sleeve 32 fastened centrally on the lowermost terminal side of the crossbar 25. The tongue 13 is held in its rectilinear juxtaposition within the sleeve 32 by set pins 33 similar to the set pins set out above. The grader 10 is intended to be assembled by disposing pins 19 through the brackets 18 of the runners 14, and the upstanding posts 15. The crossbar may be slidably engaged with the posts 15 and may be locked by the set pins 21. The moldboard may be engaged with the sleeve brackets 26 and be fastened to the lowermost terminal ends of the upstanding posts 24 by set assembly pins 19'. The crossbar may be slidably engaged by means of the sleeves 27 and locked as set out above to the upstanding posts 24. The tongue 13 is intended to slidably engage with the sleeve 31, and held by the pin 31' to the runner assembly 11, and also to slidably engage sleeve 32 of the moldboard assembly 12 and by set pins 33. The moldboard 23 may be selectively raised and lowered by moving the mold-board with respect to the crossbar 25 and fastening it as set out above. The rectilinear distance between the runner assembly 11 and the moldboard assembly 12 may be selectively adjusted by sliding the moldboard assembly 12 with respect to the runner assembly 11 on the tongue 13 and fastened by means of the set pins 33. The grader 10 may then be employed for grading by towing the grader 10 by means of suitable towing equipment (not shown) through the hitch 29.

Referring now to FIG. 3, further embodiment of this invention 15 operable as a carrier 34 and includes a carrier platform assembly 35 wherein like parts and assemblies of each of the embodiment are like numerically identified. The carrier 34 is provided with a pair of runner assemblies 11 identical to the runner assembly 11 described above, a tongue 13, and a platform 35. The platform assembly 35 is provided with framing rails 36 rectilinearly and transversly disposed about the perimeter of the platform 35 with respect to the direction of travel, and is operable at their respective corners, to engage the uppermost terminal ends of the assembled posts 15 of the runner assemblies 11. The platform assembly 35 includes a decking means such as a multiplicity of parallel disposed platform rails 37 with respect to the platform 35. It has been found to advantage to extend the framing rails 36 and decking rails 37 over the tongue 13 forwardly of the forward runner assembly 11 and has been found to advantage to provide an upstanding supporting block 38 disposed between the forwardmost terminal end of the platform 35 and the uppermost terminal side of the tongue 13.

Having thus described in detail a preferred apparatus which embodies the concepts and principles of the invention and which accomplishes the various objects, purposes and aims thereof, it is to be appreciated and will be apparent to those skilled in the art that many physical changes could be made in the apparatus without altering the inventive concepts and principles embodied therein. Hence, it is intended that the scope of the invention be limited only to extent indicated in the appended claims.

I claim:

1. A trail grader, comprising:

a runner assembly including a first pair of upstandingly disposed cornerposts, a first crossbar slidably mounted at each of its terminal ends to one of said posts and a runner mounted substantially perpendicularly to said crossbar at the lowermost terminal end of each of the first pair of cornerposts;

a moldboard assembly including a second pair of upstandingly disposed cornerposts, a second crossbar slidably mounted at each of its terminal ends to said moldboard assembly cornerposts and a moldboard having an upstandingly, horizontally disposed surface mounted at the lowermost terminal ends of said moldboard cornerposts;

a tongue including a bar mounted centrally and substantially perpendicularly relative to said crossbars, said tongue being mounted to said first crossbar and slidably mounted to said second crossbar, each of said slidable mountings serving as an adjustment means, and means to lock said slidable mountings in a desired adjusted position.

2. The apparatus of claim 1 wherein said tongue includes hitching means at its end opposite the runner assembly engaging end and said means mounting said runner assembly crossbar to said tongue including slidable, detachable mounting means.

3. The apparatus of claim 1 wherein said tongue includes a main tubular tongue member and an extension member operable to telescope into said main tubular tongue member and means to selectively lock said members.

4. The apparatus of claim 1 wherein said means mounting said first crossbar to said cornerposts of the runner assembly includes slidably detachable brackets having selectively locking set pins, wherein said tongue includes detachable locking means, and wherein said moldboard is detachably mounted to said cornerposts.

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