

[54] MONORAIL RAILWAY TRANSPORTATION
SYSTEM

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[51] Int. Cl. .. B61b 13/04, B61c 11/04, B61c 13/04

[58] Field of Search 105/29 R, 130, 30,
105/153; 104/120

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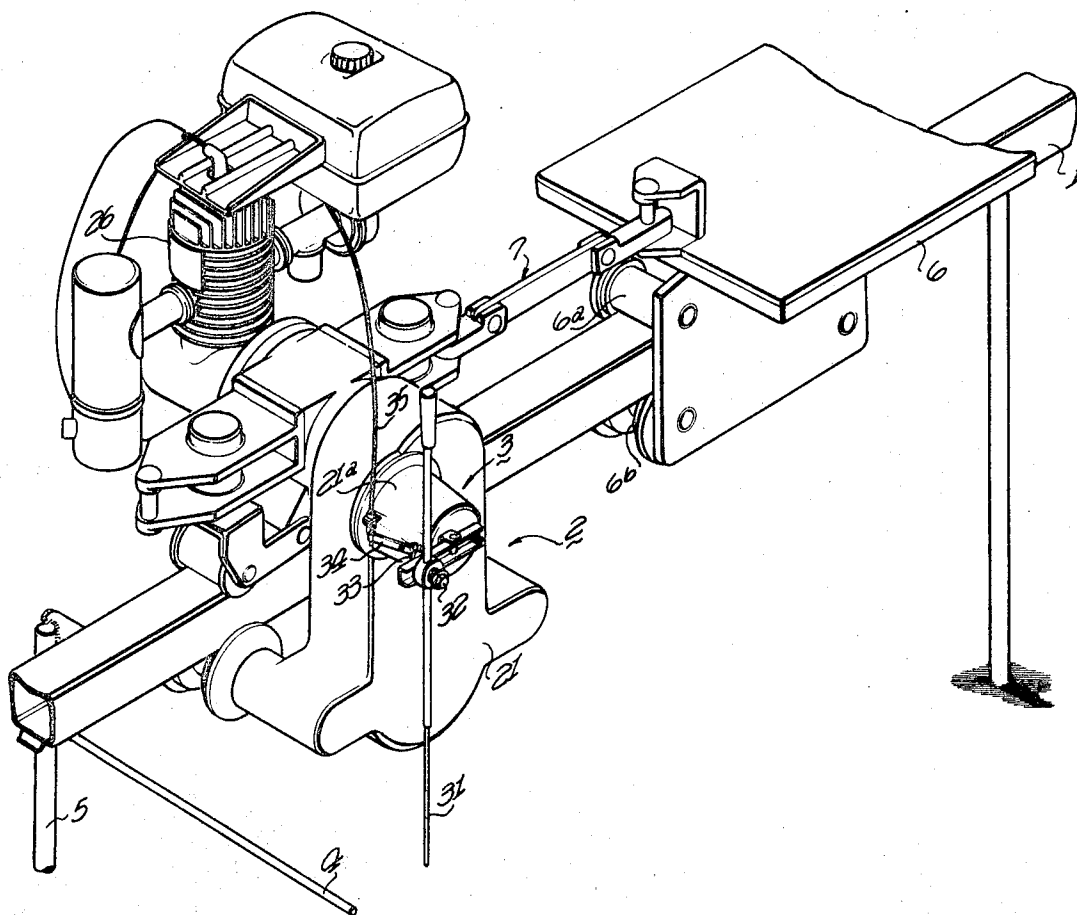
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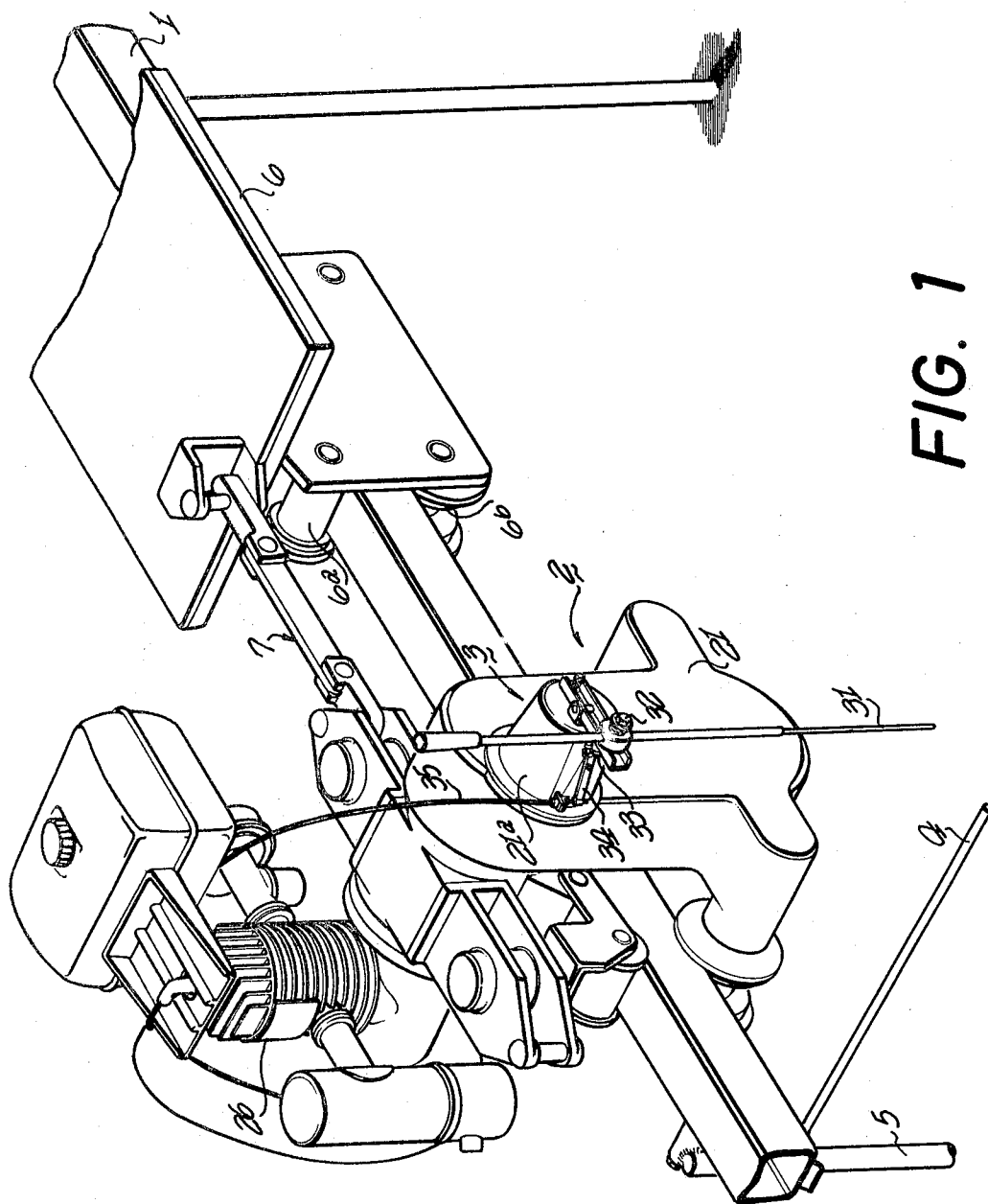
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[57] ABSTRACT

A hauling system with a monorail comprises a rail body having a rack portion disposed under said rail body, and a tractor with an automatically disengagable clutch controlling the speed of an engine having upper and lower rollers between which said rail body is pinched and a driving wheel with a plurality of engaging members circularly arranged and intermeshed with said rack portion.

2 Claims, 5 Drawing Figures





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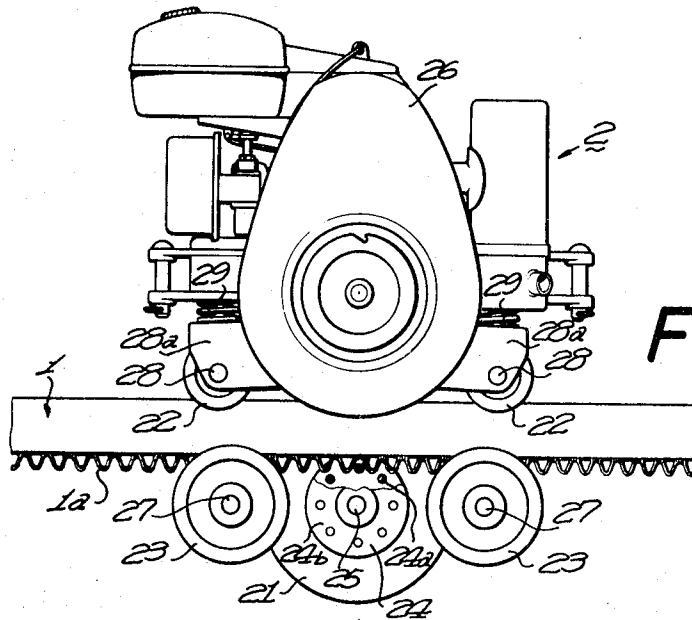


FIG. 2

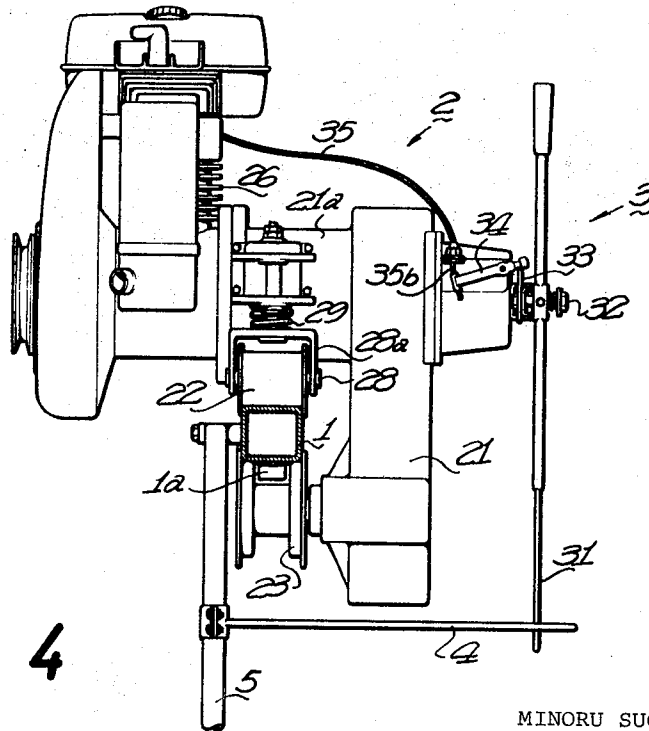


FIG. 4

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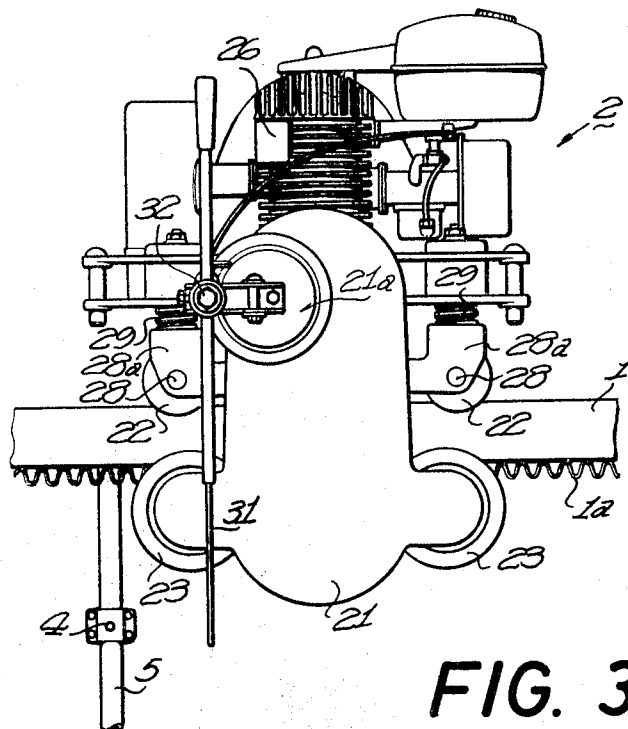


FIG. 3

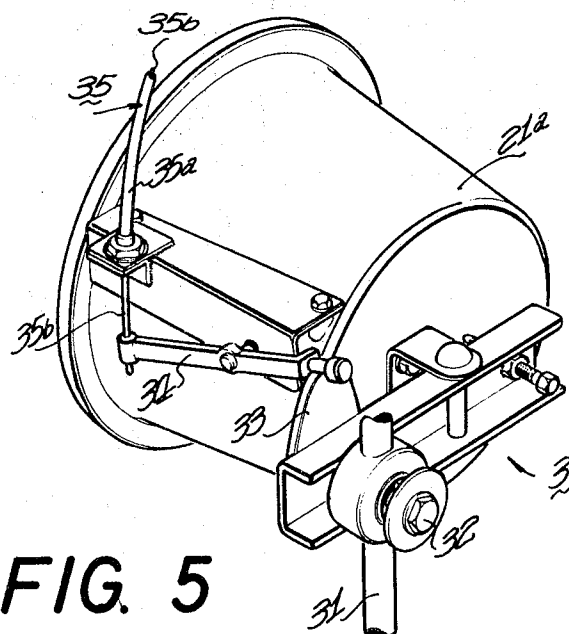


FIG. 5

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MONORAIL RAILWAY TRANSPORTATION SYSTEM

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a hauling system with a monorail mainly for use in an orchard on a hill-side for carrying fruit products and manures.

Such a hauling system, although it generally involves a tractor having upper and lower rollers between which a rail body is pinched, can not prevent the rollers from slipping on the rail when the rail is on a steep slant.

An object of this invention is to provide a hauling system with a monorail improved so that it is capable of avoiding the slip of the rollers on the rail and running the tractor and trucks smoothly on the rail.

Another object of this invention is to provide a hauling system with a monorail which is capable of automatically stopping the tractor and trucks at a position on the rail.

The structure of this invention will be understood from the following description with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of a hauling system with a monorail embodying the present invention;

FIG. 2 is a side view of the hauling system of FIG. 1;

FIG. 3 is a back side view of the hauling system of FIG. 1;

FIG. 4 is a front side view of a tractor in the hauling system; and

FIG. 5 is a perspective view of an automatic control device for returning the tractor in the hauling system.

Referring to the drawings, a rail body 1 consists of a pipe having a rectangular cross-section. Said rail body comprises a rack member 1a attached to the under surface thereof. Said rack member 1a preferably consists of a steel band bent in zigzag shape so as to form a plurality of uniform rack-teeth.

A tractor 2 comprises a tractor body 21 combined with a housing 21a for a power transmission occupying the upper portion of the body 21, upper rollers 22 in contact with the upper surface of said rail body 1, lower double-flanged rollers 23 in contact with the under surface of said rail body 1 on both sides of the rail body and out of contact with the rack portion 1a, and a double-flanged driving wheel 24.

Said driving wheel 24 has a plurality of engaging pins 24a arranged in a circle and extending between the two flanges 24b thereof, said pins being intermeshed with the rack member 1a. Said driving wheel 24 is attached to a driving shaft 25 rotatably supported on the tractor body 21 by means of bearings not shown in the drawings and extending from the side wall of the body 21 outwards. To the driving shaft 25 is transmitted a torque from an engine 26 disposed on the tractor body 21 via the power transmission.

Said lower rollers 23 are rotatably supported on counter shafts 27 attached to the side wall of the tractor body 21, and said upper rollers 22 are rotatably supported on counter shafts 28 attached to bearing blocks 28a respectively. Said bearing blocks 28a are supported on the tractor body 21 in a manner so as to be downwardly urged by means of springs 29 so that the upper rollers 22 are pressed against to the upper surface of the rail body 1.

An automatic control device 3 is provided for stopping the tractor at a position, for example, the end of the rail.

Said control device 3 comprises a touch lever 31 rotatably supported on the tractor body 21 by means of a horizontally extending pivot 32 with said lever 31 urged by means of a spring so as to be maintained in a vertical condition. To the pivot 32 is attached an oval cam plate 33 which is contacted by a swingable lever 34 which is pivoted at the middle portion to the housing 21a. Said control device 3 further has a control wire 35 for controlling the degree of opening of a throttle valve in the engine 26, said control wire 35 consisting of an outer tube 35a the end portions of which are fixed to the engine body and tractor body, and an inner wire 35b, one end of which is connected to the valve stem of said throttle valve and the other end of which is connected to the free end of said swingable lever 34 opposite to the end in contact with the cam plate 33.

An abutment 4 is disposed at the end of the rail, for example, said abutment 4 being attached to a pole 5 the top portion of which supports the rail body at a high level above the ground.

When the tractor 2 arrives at the end of the rail, the touch lever 31 is brought into contact with said abutment 4 and is rotated, so that the pivot 32 and cam plate 33 are concurrently rotated and then cause the swingable lever 34 to be turned, with the resultant pulling of the inner wire 35b. Consequently, the throttle valve is choked so as to reduce the engine speed, resulting in cutting off the rotation from the engine to the driving shaft 25, for example, by releasing the engagement of a centrifugal clutch through which the engine is associated with the power transmission device.

The control wire 35, although used in operating the throttle valve in the above-mentioned embodiment, may be used directly for changing the centrifugal clutch into the disengaged condition.

The tractor 2 is connected to a train of trucks 6 by means of a coupler 7 both end portions of which are joined by universal joints to hitches of the tractor and truck. Each of the trucks 6 has upper and lower pinching rollers 3a and 6b like the rollers of the tractor as described in the above embodiment.

Although the load on the truck is all on the upper rollers, the travel of the tractor and trucks can be smoothly accomplished, because the upper surface of the rail body in contact with the upper rollers is made flat and is lubricated.

The tractor 2, though separate from the carriage such as shown in FIGS. 1 to 5, may be combined with a carriage platform.

What is claimed is:

1. A hauling system comprising a monorail, a tractor having an engine and at least one drive roller engaged with said monorail for driving said tractor along said monorail, engine speed control means on said engine, a lever pivoted on said engine and coupled to said engine speed control means for actuating said engine speed control means to sharply reduce the speed of the engine when said lever is pivoted from a first position to a second position, and an abutment disposed along said rail in the path of said lever for moving said lever from the first position to the second position when said tractor is driven past said abutment, and speed responsive clutch means coupled between said engine and said tractor drive roller which is disengaged when the engine speed is reduced sharply.

2. A hauling system as claimed in claim 1 in which a control wire is provided which couples said lever and said engine speed control means, and said speed responsive clutch means is a centrifugal clutch.

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