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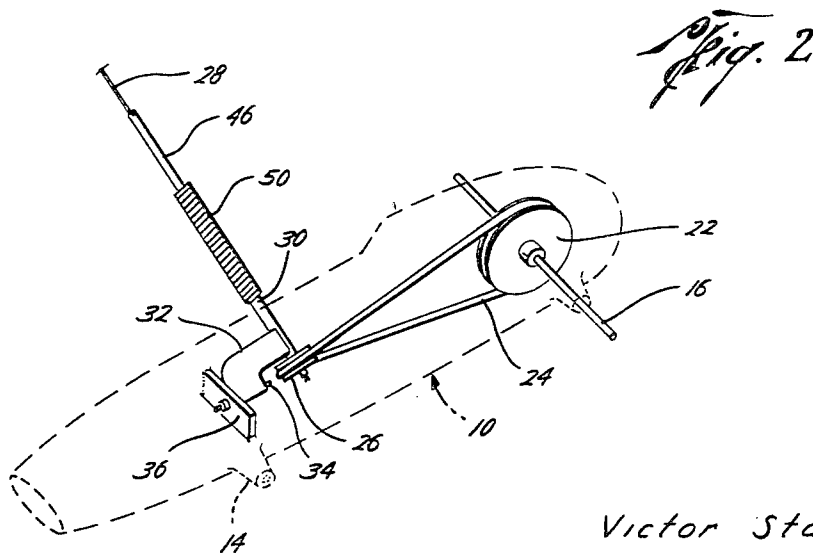
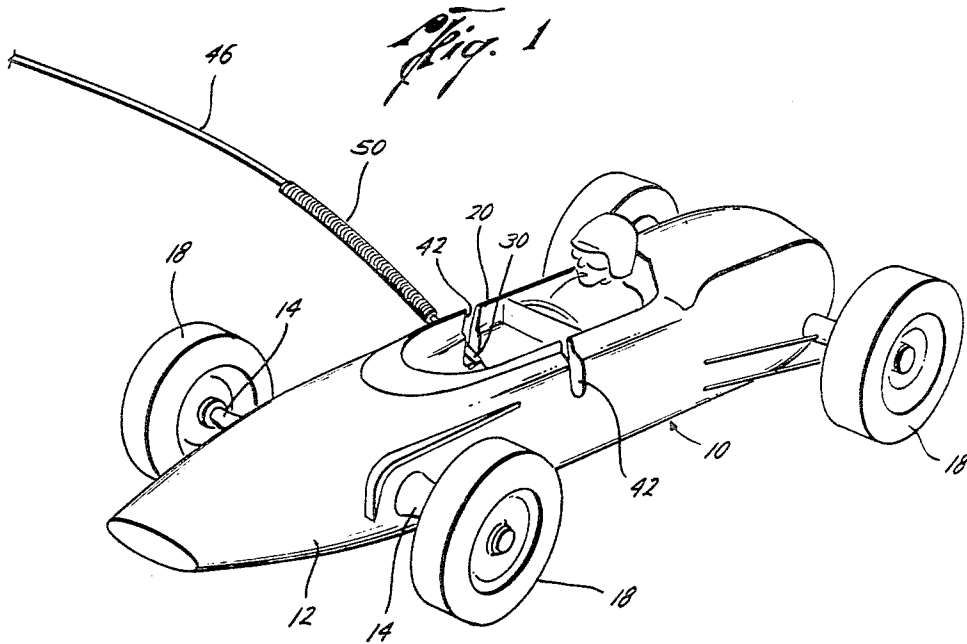
V. STANZEL

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REMOTELY CONTROLLED PROPULSION AND MANEUVERING
MECHANISM FOR MODEL VEHICLES

Filed April 4, 1966

2 Sheets-Sheet 1



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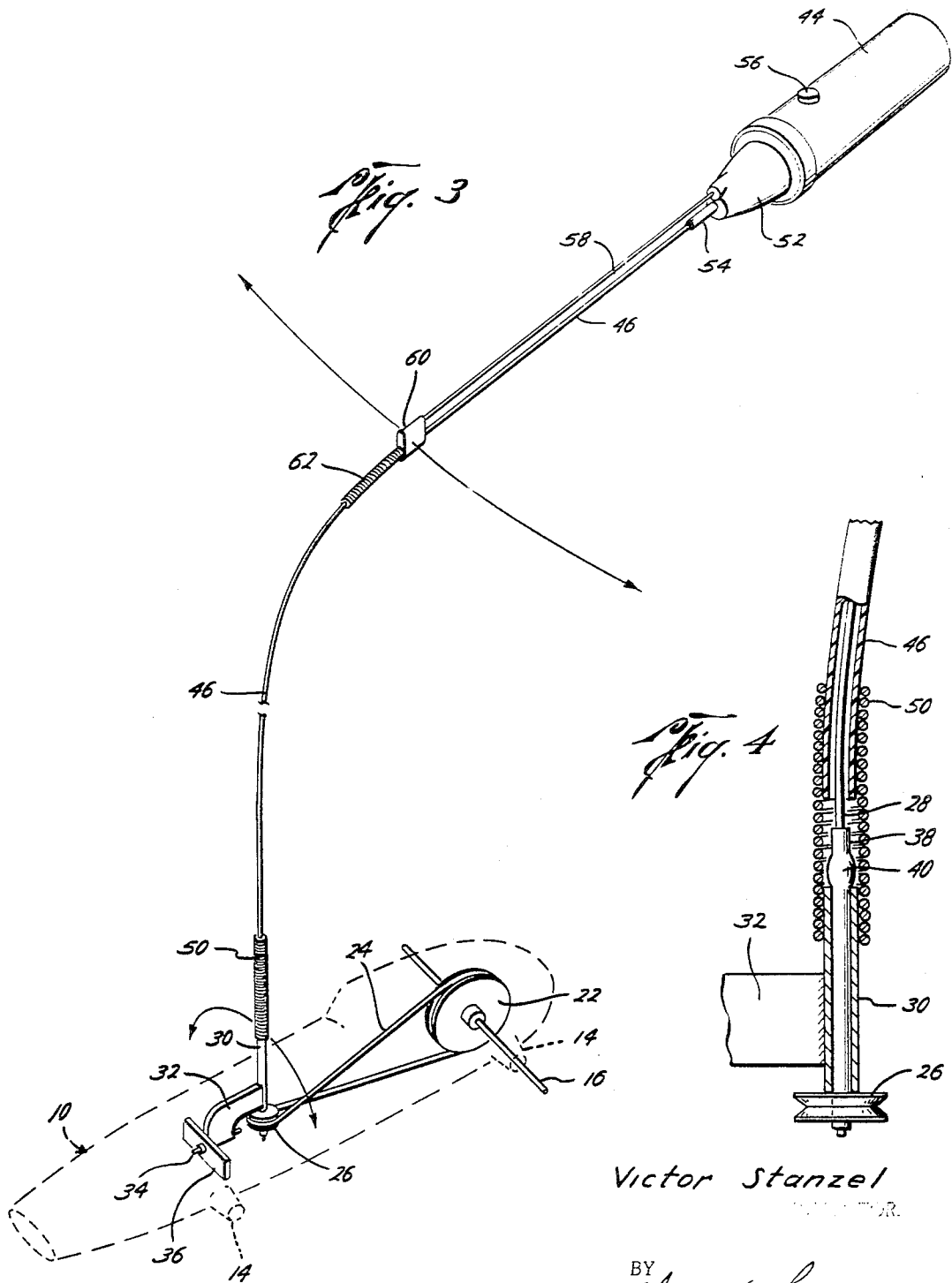
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REMOTELY CONTROLLED PROPULSION AND MANEUVERING MECHANISM FOR MODEL VEHICLES

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ABSTRACT OF THE DISCLOSURE

A remotely controlled propulsion and maneuvering mechanism is provided for model vehicles. A rotatable flexible cable, connected at one end to a power source, is connected at the other end to a rotatable element which transmits motion to the driving means of the vehicle. Said element is mounted on the vehicle for radial movement about the vehicle's longitudinal axis and for rotation about an axis extending transversely of the vehicle's longitudinal axis. The power source is held in the hand of the user whereby a pull on the power source changes vehicle direction without breaking the driving means connections.

This invention relates to model or toy vehicles and more particularly to mechanism for driving and controlling such vehicles remotely.

The invention has for an important object the provision of a model vehicle which is designed to be propelled by an electric motor located at a point remote from the vehicle and whose movements may be controlled from such location.

Another object of the invention is to provide a model vehicle which is adapted to be propelled and controlled from a location remote from the vehicle through the intermediation of a flexible cable, or elongated flexible driving element, and having means whereby the flexible element may be readily manipulated to maneuver and guide the vehicle without interference with the driving function of the element.

A further object of the invention is the provision in a model vehicle of remote control and propulsion mechanism therefor comprising a flexible cable and electric motor means for the same which is adapted to be held in the hand of the user and including means whereby the cable may be conveniently manipulated by wrist and forearm movements of the user without the necessity for holding the arm in a fully extended position.

Another object of the invention is to provide a flexible cable propulsion and maneuvering mechanism for model vehicles including means forming a driving connection between the cable and the wheels of the vehicle to rotate the wheels upon rotation of the cable and including means forming a connection between the cable and the vehicle to allow the vehicle to be maneuvered by the cable independently of the driving connection.

A further object of the invention is the provision of a model vehicle and remote propulsion and maneuvering mechanism therefor which is of simple design and rugged construction and by which the vehicle may be easily controlled and guided about over a wide area from a location remote therefrom.

The above and other obvious advantages of the invention will be apparent from the following detailed description constituting a specification of the same when con-

sidered in conjunction with the annexed drawings, wherein FIGURE 1 is a perspective view of a preferred embodiment of the model vehicle of the invention showing the driving and maneuvering mechanism in one position of its guiding movement relative to the vehicle;

FIGURE 2 is a fragmentary, perspective detail view showing details of construction of the driving and steering or maneuvering mechanism of the invention, with the mechanism in the position illustrated in FIGURE 1;

FIGURE 3 is a fragmentary perspective view of the remotely operated driving and control mechanism of the invention, showing the driving and steering or maneuvering mechanism in another position of its movement relative to the vehicle; and

FIGURE 4 is a fragmentary, detail view on an enlarged scale, showing details of construction of the cable drive connection of the invention.

Referring now to the drawings in greater detail the invention is illustrated herein in connection with its use in the propulsion and maneuvering of a model vehicle, such as a toy racing automobile, it being understood that the invention may be used for the operation of other types of vehicles, or in connection with any apparatus whose propulsion and movements it may be desired to control from a remote location.

In the present illustration the model vehicle designated generally by the numeral 10, is of a type having a hollow body 12, which may be conveniently formed of plastic material by molding or otherwise, having suitably disposed perforated projections 14 through which longitudinally spaced, parallel axles or shafts, such as that shown at 16, are extended for the attachment thereto of the wheels 18 of the vehicle. The body is formed with an opening 20 in its top wall portion to form a cockpit within which the driving mechanism of the vehicle is extended and within which the remote control and propulsion mechanism is connected to such driving mechanism.

The vehicle driving mechanism comprises a pulley 22, mounted on the rear axle 16 of the vehicle for rotation therewith and about which a driving belt 24 operates. Forwardly of the pulley 22 the belt 24 passes about a driving pulley 26, which is connected to a flexible cable 28 to be rotated thereby upon rotation of the cable. Other suitable driving mechanism serving the same purpose, such as sprocket and chain mechanism or gear transmission mechanism may, of course, be employed instead of the pulley and belt mechanism illustrated herein.

For the purpose of supporting and driving the pulley 26, an outer, elongated, tubular bearing member 30 is supported on the vehicle for tilting movement thereon in a plane substantially normal to the longitudinal axis of the vehicle, as by means of a support arm 32, pivotally mounted on a horizontal axis of the vehicle and carried on a bracket 36, or the like, attached to the vehicle. The pulley 26 is attached to the lower end of an inner tubular bearing element 38, rotatably extended through the outer bearing member 30 and into which the cable 28 is extended. The inner tubular member may be flattened or crimped, as indicated at 40 in FIGURE 4, beyond the outer tubular member 30, to connect the cable 28 to the inner tubular member for rotation therewith, and to form a stop to retain the inner member 28 in the outer member 30. The inner tubular element 38 may be flattened or crimped at its lower end beyond the pulley 26, if desired, into tight clamping engagement with the cable

to further secure the element to the cable for rotation therewith.

It will be apparent that upon rotation of the pulley 26 by rotation of the driving cable 28, the belt 24 will be operated to turn the rear wheels 18 whereby the vehicle will be propelled, and that tilting of the bearing member 30 and element 38 may take place by manipulation of the cable 28 without interfering with such propulsion.

The body 12 of the vehicle is provided with side slots 42, shown in FIGURE 1, into which the bearing member 30 may move to allow a wide amplitude of tilting movement of the connection whereby maneuvering of the vehicle by manipulation of the cable 28 may be easily accomplished without affecting the driving of the vehicle.

For purposes of enabling the vehicle to be easily and effectively guided by manipulation of the flexible cable, the above described connection mechanism is preferably located so that the cable will exert a side pull on the vehicle at some point forwardly of the midpoint between the front and rear axles of the vehicle.

The flexible cable 28 is extended to a remote location where it is connected to an electric motor contained in a hollow casing 44, adapted to be held in the hand of the user. The cable 28 is surrounded by an outer flexible tubular member 46, in which the cable is freely rotatable, and which serves to prevent kinking of the cable. At its outer end the flexible tube 46 is loosely fitted into a sleeve element, in the form of a coiled spring 50, which is in turn tightly fitted over the upper end of the outer tubular member 30, whereby sharp bending of the flexible tube and cable at the location of the connection with the vehicle, such as might be likely to cause breaking of the flexible tube or cable, is prevented.

An electric motor, not shown, is housed within the tapered nose portion 52 of the casing 44, the shaft of the motor being suitably connected to the cable 28 in any usual manner to rotate the cable. The casing 44 holds batteries for the powering of the electric motor under the control of suitable speed control means, of a usual type adapted to be operated by a switch button 56. The motor control mechanism may be of any conventional type, such that the motor may be started and stopped and its speed controlled by suitable manipulation of the button 56.

For the purpose of enabling the vehicle to be maneuvered by manipulation of the casing 44, by wrist or forearm movement by the user without the necessity for holding the casing at arm's length, the nose 52 has a central, tubular extension 54 through which the flexible tube 46 is extended, and a socket portion 56, spaced radially from the extension 54 into which a support rod 58 is inserted at one end.

At the outer end of the support rod a spacer fitting 60 is attached thereto through which the flexible tube 46 extends and which serves to hold the flexible tube in substantially parallel relation with the support rod between the fitting 60 and the nose 54. The flexible tube 46 is also surrounded by a sleeve 62 in the form of a coil spring which fits into the fitting 60 to prevent sharp bending of the flexible tube and cable at the location of the fitting.

In the operation of the vehicle by the driving and propulsion mechanism of the invention, the vehicle is positioned on a surface over which it is to be propelled, while the casing 44 is held in the user's hand at a location remote from the vehicle. By operating the push button 50, the motor may then be actuated to rotate the cable 28 to drive the vehicle through the pulleys 26 and 22 and belt 24 by which the rear wheels of the vehicle are turned. During such driving of the vehicle, the vehicle may be steered or maneuvered in any desired direction by suitably moving the casing 44 to swing the support rod 58 therewith in a direction to exert a pull on the vehicle in the direction in which it is desired to steer the vehicle. It will be apparent that in maneuvering the vehicle the connecting mechanism including the outer tubular bear-

ing member 30 will be tilted in a plane substantially normal to the longitudinal axis of the vehicle, thus causing a lateral pull to be exerted on the vehicle to steer the same, and in all positions of the pulley 26 resulting from such guiding movements of the mechanism the driving mechanism will be effective to drive the vehicle.

It will also be apparent that because of the support rod 58, which may extend a substantial distance forwardly from the casing 44, the user need not hold the casing at full arm's length in order to obtain ample lateral movement of the cable to guide the vehicle throughout a wide area of movement. Thus, by swinging the casing 44 from side to side by wrist or forearm movement the user may swing the outer end of the support rod 58 through a relatively great distance to maneuver the vehicle about over a wide area without holding the casing at full arm's length. The maneuvering mechanism thus provides a means for operating the vehicle over a wide area and with more convenience and comfort to the user than would otherwise be possible.

For purposes of packaging or storage, the rod 58 may be pulled out of the socket 56 and the cable and tube 46 rolled or looped with the rod and vehicle alongside to form a compact arrangement.

By locating the connection of the cable with the vehicle at a location to exert a pull on the vehicle at some point substantially forwardly of the midpoint between the front and rear wheels of the vehicle, it will be seen that the exertion of a lateral guiding pull on the vehicle by the cable will result in turning the vehicle to one side or the other and prevents the exertion of a backward pull on the vehicle against the forward propulsion exerted by the rear wheels. Thus, the guiding or maneuvering of the vehicle is prevented from restraining or interfering with the propulsion of the same.

It will thus be seen that the invention constructed and operated as described above provide steering and propelling mechanism for model vehicles by which the vehicle may be easily manipulated to move at a desired speed in paths of different configuration throughout a wide area.

Having thus clearly shown and described the invention, what is claimed as new and desired to secure by Letters Patent is:

1. In remotely controlled propulsion and maneuvering mechanism for model vehicles the combination with driving means including a rotatable element and means mounting said element rotatably on a vehicle to be propelled for bodily movement of said element in an arcuate path radially spaced from an axis extending longitudinally of the vehicle and for rotation about an axis extending transversely of said longitudinally extending axis, an elongated, flexible member connected at one end to said element to rotate the same upon rotation of the member, means connected to said element transmitting motion of said element to said driving means, and power means connected to the other end of said member to rotate the member, said power means adapted to be held in the hands of the user for movement to exert a pull on the vehicle in a direction to change the direction of movement of the vehicle during propulsion of the vehicle.

2. The remotely controlled propulsion and maneuvering mechanism of claim 1, wherein said member is connected at said one end to said element at a location to move said element along said arcuate path upon the exertion of a pull on the member in a direction to change the direction of movement of the vehicle during propulsion of the vehicle.

3. The remotely controlled propulsion and maneuvering mechanism of claim 1, wherein the vehicle has front and rear wheels and said driving means is mounted on the vehicle at a location such that the pull exerted on the vehicle upon movement of said power means by the user

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to exert such pull will be exerted at a point forwardly of the midpoint between said front and rear wheels.

4. The remotely controlled propulsion and maneuvering mechanism of claim 2, wherein the means mounting for rotation and for bodily movement includes an outer tubular member, means rotatably connecting said outer member to the vehicle for lateral tilting movement relative thereto and an inner tubular member rotatably carried in said outer member and connected to said flexible member for rotation therewith.

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