Aug. 7, 1951 W. R. BECK 2,562,886

CABLE GUIDE

Filed Sept. 18, 1947 2 Sheets-Sheet 1

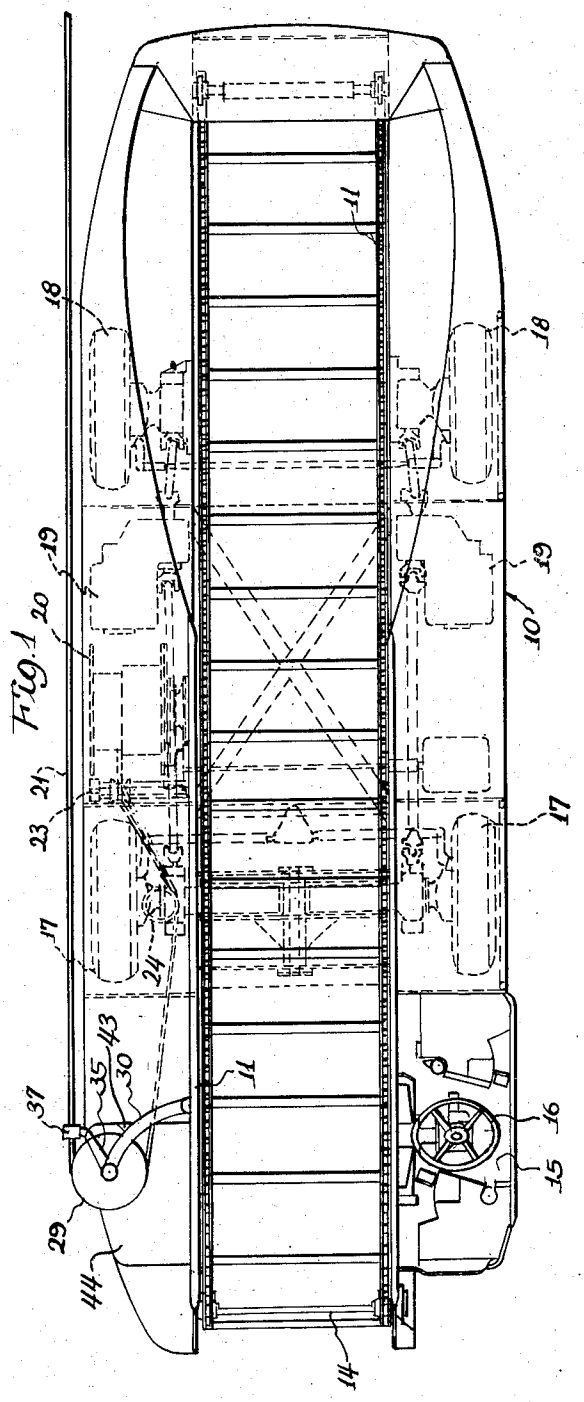


Fig. 1

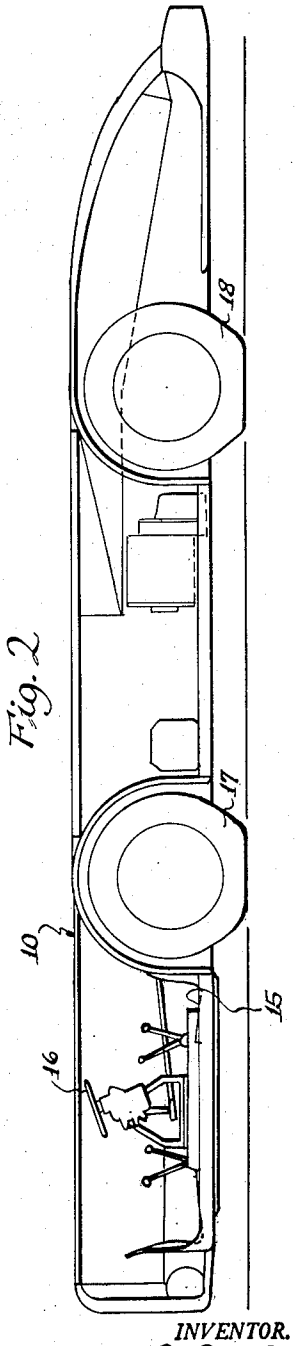


Fig. 2

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CABLE GUIDE

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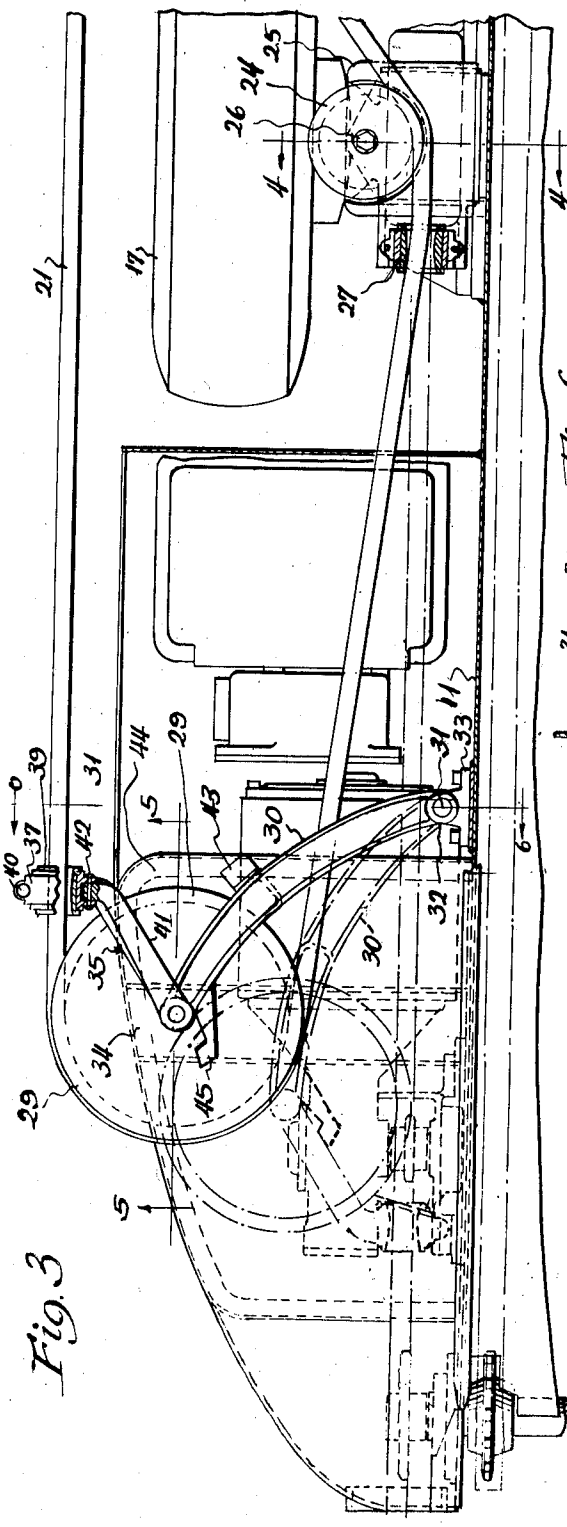


Fig. 3

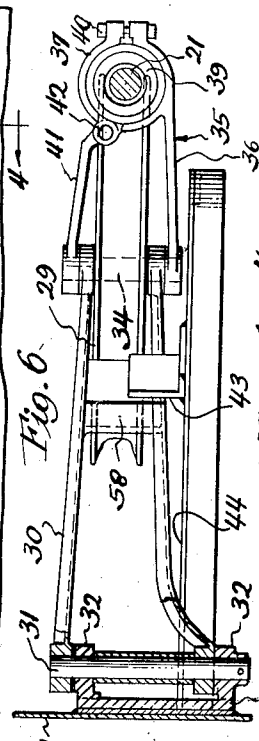


Fig. 6

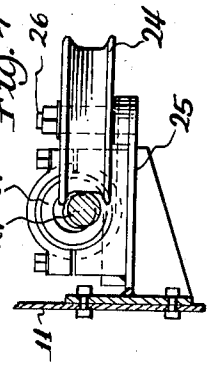


Fig. 4

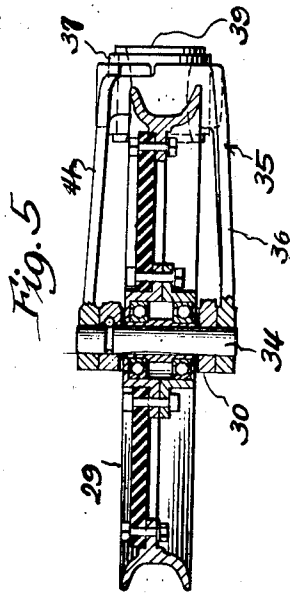


Fig. 5

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Patented Aug. 7, 1951 2,562,886

UNITED STATES PATENT OFFICE

2,562,886

CABLE GUIDE

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Application September 18, 1947, Serial No. 774,782

8 Claims. (Cl. 242—91)

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This invention relates to an improved cable guide particularly adapted to guide an electric cable for supplying electric power to a moving vehicle such as a shuttle car, operable in mines.

Heretofore shuttle cars used for transporting coal from the working place of a mine to a loading station at the entry, have been propelled by electric motors which derive their power through an electric cable connected to a source of power such as a junction box and wound on or payed off of a cable reel mounted on the shuttle car. This reel is usually driven by an electric motor during the winding operation, and the motor is driven by the reel during unwinding and maintains tension on the cable during unwinding and stalling of the vehicle. In order that the cable may not be unduly long, the junction box to which its free end is connected, is frequently placed midway between the working face and the discharge station. With this arrangement, the cable is wound on its cable reel during one half of its journey and is payed off this reel during the other half of its journey, being trained from one end of the shuttle car during half of its journey and from the other end of the shuttle car during the remainder of its journey. This has increased the difficulty in training the cable so it will properly be payed off from and drawn into the car with the resultant increase in the liability of the car fouling or running over the cable and the resultant breakage of the cable.

The principal object of my invention is to remedy the difficulties encountered in guiding the cable from a shuttle car by providing a novel and improved form of cable guide particularly adapted to hold the cable to conform to the path of travel of the car as the car moves towards and away from its source of power and prevent it from becoming caught on obstructions in the mine or from being fouled or run over by the shuttle car.

This and other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a top plan view of a shuttle car having a cable guide constructed in accordance with my invention mounted thereon;

Figure 2 is a view in side elevation of the shuttle car shown in Figure 1;

Figure 3 is an enlarged fragmentary plan view showing the cable guide in detail;

Figure 4 is a fragmentary sectional view taken substantially along line 4—4 of Figure 3;

Figure 5 is a sectional view taken substantially along line 5—5 of Figure 3; and

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Figure 6 is a sectional view taken substantially along line 6—6 of Figure 3.

Referring now to the drawings, a shuttle car 10 is shown as having a cable guide constructed in accordance with my invention mounted thereon. Said shuttle car may be of a well known form and comprises generally an elongated chassis having a pair of vertical, laterally spaced side walls 11, 11 extending for the full length of the vehicle and forming the side walls of a coal carrying compartment thereof.

An endless chain and flight conveyor indicated generally at 14 extends along the vehicle for its full length and forms the bottom of the coal carrying compartment thereof and serves to progress coal towards the discharge or front end of the vehicle during loading and to mechanically unload the vehicle from its discharge end, in the usual manner. An operator's platform 15 bearing the usual vehicle control devices including a steering wheel 16, is provided at the left-hand forward corner of the vehicle outside of one of the upright side walls 11, as shown in Figure 1.

The vehicle has two front rubber tired steering wheels 17, 17 near its front end and two rear rubber tired driving and steering wheels 18, 18 near its rear end and driven from electric motors 19, 19. The drive to said wheels from said motors and the supporting and steering mountings for the vehicle frame on said front and rear wheels are no part of my present invention so need not here be shown or described further.

A cable reel indicated generally by reference character 20 is provided at the opposite side of the vehicle from the operator's platform 15, between the front and rear wheels 17 and 18. Said cable reel has an electric cable 21, which is adapted to be wound thereon or be payed off therefrom in the usual manner and to be attached at its free end to a source of power, such as a junction box, for supplying electric power to the vehicle.

The cable 21 is trained from the reel 20 through a spooler carriage indicated generally by reference character 23 for moving the cable back and forth along the reel as it is wound thereon, to assure that the cable be wound on its reel in even layers. From said spooler carriage the cable passes along the inside of a guide sheave 24 mounted on a bracket 25 on a vertical pin 26. Said bracket 25 is secured to an outer side of the side wall 11 beneath a cover plate for said reel and extends outwardly therefrom. From said sheave said cable passes through a guide sleeve 27 mounted on said bracket in advance of said sheave and in alignment with the groove thereof.

Said cable then passes to and around a guide sheave 29 when it is trained towards the rear of the vehicle. Said guide sheave is of a relatively large diameter and is mounted on the outer end of a horizontally swingable arm 30 pivotally mounted at its inner end on the outer side of a side wall 11 of the shuttle car and extending outwardly therefrom. Said arm 30 is of a bifurcated construction and extends along the top and bottom sides of said sheave and is pivotally mounted at its inner end on a vertical shaft 31 mounted in spaced bosses 32, 32 extending outwardly from a bracket 33 secured to and extending outwardly from the side wall 11. Said arm, as herein shown, rests on the tops of said bosses. The sheave 29 is journaled on the outer end of said arm between the furcations thereof, on a pivotal pin 34.

A cable guiding arm 35 is pivotally mounted on the upper and lower ends of the pin 34 and serves to hold the cable 21 in engagement with the sheave 29 and to move the arm 30 inwardly towards the side wall 11 or outwardly therefrom, depending upon whether said cable extends from the forward or rear end of the shuttle car. Said cable guiding arm has a lower portion 36 extending beneath said sheave and having a substantially cylindrically shaped clamping member 37 formed integrally with its outer end and extending upwardly therefrom. Said clamping member is split along one of its sides to receive a guide sleeve 39 for the cable 21 and to hold said sleeve to the end of said arm when clamped thereon by nuts and bolts 40, 40. The center of the guide sleeve 39 is in alignment with the mean diameter of the sheaves 29 in all positions of said arm with respect to said sheave, to maintain the cable 21 in engagement with said sheave when extending laterally or forwardly or rearwardly from the vehicle. An upper portion 41 of said cable guiding arm is mounted on the upper end of said pin and is secured at its outer end to the upper portion of said clamping member by means of a pin 42.

An angle 43 secured to and projecting upwardly from a top cover 44 extending outwardly from the side wall 11, serves as a stop to limit movement of said arm 30 in an outward direction. A stop 45 extending forwardly and angularly inwardly from said arm is adapted to engage the cable guiding arm 35 and limit movement of said arm in a counterclockwise direction into such a position that the cable will not freely pass through the guide sleeve 39 when trained beyond the forward or discharge end of the vehicle.

It should here be understood that the junction box to which the end of the cable is connected is usually mounted on the mine wall and is spaced laterally from the path of travel of the vehicle. As the vehicle passes said junction box, and changes from being trained off the rear end of the vehicle to the forward end of the vehicle, the reaction of the cable on the cable guiding arm 35 will pivot said arm in a counterclockwise direction and will swing the arm 30 to the position shown by broken lines in Figure 3, and when in this position, the guide sleeve 39 will adapt itself to a position substantially in alignment with the guide sleeve 27 and guide the cable along the inside of the sheave 29 to be payed off of or wound in directly from the front of the vehicle. When the vehicle again passes said junction box and changes from being payed off of or wound in from the front of the vehicle to being payed off of or wound in from the rear of the vehicle,

the pull of the cable on the sheave 29 held in engagement therewith by the guide sleeve 39, will pivot the arm 30 outwardly until it engages the stop 43, to position the cable to extend along the outer side of the vehicle in a position where it will be free from obstructions on the vehicle.

It may be seen from the foregoing that a simple and efficient form of cable guide has been provided for the power cable of a shuttle car, which is readily adaptable to guide and hold said power cable away from the car and the ground in the immediate vicinity of the car as the car moves towards and from and passes the junction box to which the free end of the cable is connected, as the direction in which the cable extends from the car changes so the cable is trained from the rear instead of forward end of the car, and vice versa, and as the cable extends laterally from the car during this change in direction, and that this guide is so arranged as to avoid fouling of the cable on the car or the ground with the resultant breakage thereof.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. A cable guide particularly adapted to guide an electric cable for supplying power to a moving vehicle and attached at its end to a source of power at a fixed point and payed off or wound on a reel on the vehicle, as the vehicle moves past said fixed point, a swingable arm mounted on the vehicle for pivotal movement about a vertical axis, a sheave journaled on the end of said arm for arcuate movement about said vertical axis said sheave rotating in a substantially horizontal plane about its own axis, and a cable guiding arm mounted on the first said arm for pivotal movement about the axis of rotation of said sheave and having said cable guided therein for holding said cable in engagement with said sheave when said vehicle is moving towards or from said fixed point, said cable swinging said cable guiding arm and sheave and said first mentioned arm in an outwardly extended position with respect to said vehicle to train said cable around said sheave and for moving said sheave and said first mentioned arm inwardly towards the vehicle and guiding said cable along one side of said sheave depending on the location of the fixed point of the said cable with respect to said vehicle and said cable guiding arm holding said cable away from the vehicle in all positions of said vehicle with respect to said fixed point.

2. A cable guide particularly adapted to guide an electric cable for supplying power to a moving vehicle and attached at its end to a fixed point and payed off of or wound on a reel on the vehicle, as the vehicle moves past said fixed point, a swingable arm mounted on the vehicle for pivotal movement about a vertical axis, a sheave journaled on the end of said arm for arcuate movement about said vertical axis for rotation in a substantially horizontal plane about its own axis, a cable guiding arm mounted on the first mentioned arm for pivotal movement about the axis of rotation of said sheave and having a cable guide on its outer end for hold-

ing said cable in engagement with said sheave in all positions of said arm with respect to said sheave, said cable swinging said cable guiding arm and sheave and first mentioned arm in a horizontal plane to an outwardly extended position with respect to said vehicle, training said cable around said sheave as the vehicle moves towards said fixed point in one direction and to move said sheave and first mentioned arm inwardly towards the vehicle to train said cable along one side of the vehicle, as the vehicle moves away from said fixed point in the same direction depending on the relative location of the fixed point of said cable with respect to said vehicle, and said cable guiding arm holding said cable away from the vehicle in all positions of said vehicle with respect to said fixed point.

3. A cable guide particularly adapted to guide an electric cable for supplying power to a moving vehicle and attached at its end to a fixed point and payed off of or wound on a reel on the vehicle, as the vehicle moves past said fixed point, a swingable arm mounted on the vehicle for pivotal movement about a vertical axis, a sheave journaled on the end of said arm for arcuate movement about said vertical axis and for rotation in a substantially horiozntal plane about its own axis, a cable guiding arm mounted on the first mentioned arm for pivotal movement about the axis of rotation of said sheave and having a cable guiding sleeve on its outer end spaced from and in alignment with said sheave in all positions of said cable guiding arm with respect to said sheave, and adapted to have said cable pass therethrough and hold said cable away from obstructions on the ground and said car and maintain said cable in engagement with said sheave as said cable is trained from the front or the rear of said vehicle, and as it extends outwardly from said vehicle as it passes said fixed point.

4. A cable guide for an electric cable adapted to supply power to a self-propelled vehicle operable in mines and connected at its free end to a source of power at a fixed point in the mine, comprising in combination a cable reel mounted on the vehicle and having said cable wound thereon, a swingable arm mounted on the vehicle for pivotal movement about a vertical axis including a mounting bracket positioned near one end of the vehicle, a guide sheave mounted on the outer end of said arm for arcuate movement about said vertical axis and rotation about its own axis, a cable guiding arm pivotally mounted on said first mentioned swingable arm for movement about the axis of said sheave and having a cable guiding member on its outer end for guiding the cable around said sheave when the first mentioned arm is in an outwardly extended position and for guiding the cable along one side of said sheave when said swingable arm is in an inwardly extended position with respect to the vehicle and for holding said cable away from the vehicle in all positions of the vehicle with respect to said fixed point.

5. A cable guide for an electric cable adapted to supply power to a self-propelled vehicle operable in mines and connected at its free end to a source of power at a fixed point in the mine, comprising in combination a cable reel mounted on the vehicle and having said cable wound thereon, a guide sheave for guiding said cable from said cable reel, a swingable arm spaced from said sheave towards one end of the vehicle, a bracket for mounting the inner end of said

arm on the vehicle for pivotal movement about a vertical axis, a guide sheave mounted on the outer end of said arm for arcuate movement about said vetical axis and rotation about its own axis, a cable guiding arm pivotally mounted on the first mentioned swingable arm for movement about the axis of said sheave and having a cable guiding sleeve on its outer end positioned so its extended axis is tangent to the mean diameter of said sheave and having said cable extending therethrough, for guiding said cable around said sheave when said first mentioned arm is in an outwardly extended position and for guiding said cable along one side of said sheave and moving said first mentioned swingable arm inwardly towards the vehicle moves in an opposite direction and passes said fixed point for holding said cable away from the vehicle in all positions of the vehicle with respect to said fixed point.

6. A cable guide for an electric cable adapted to supply power to a self-propelled vehicle operable in mines and connected at its free end to a source of power at a fixed point in the mine comprising in combination a cable reel mounted on the vehicle and having said cable mounted thereon, a swinging arm near one end of the vehicle, attached to the body of said vehicle at its inner end for pivotal movement in a horizontal plane about a vertical axis, a guide sheave mounted on said swingable arm for rotational movement about its own axis and for arcuate movement about the axis of said swinging arm, a cable guiding arm mounted on said swinging arm for pivotal movement about the axis of rotation of said sheave and having a cable guiding sleeve on its outer end spaced from and in alignment with said sheave in all positions of said cable guiding arm with respect to said sheave, and adapted to have said cable pass through said sleeve so as to prevent fouling of said cable on said vehicle or other obstructions, and to maintain said cable in engagement with said sheave as said cable is trained from the front or the rear of said vehicle, a stop mounted on said swinging arm for limiting the pivotal movement of said cable guiding arm as said cable moves the swinging arm, guiding arm, and sheave inwardly toward the vehicle, and an additional stop mounted on the body of said vehicle to limit the forward arcuate movement of said swinging arm as it is moved by the cable to swing said sheave and cable guide arm outwardly from the body of said vehicle.

7. In a mine vehicle adapted to be supplied with power from a relatively fixed point and adapted to move with respect to said relatively fixed point, a power cable for supplying power to said mine vehicle, a cable reel for storing cable or paying off cable in accordance with the movement of said mine vehicle, a swingable arm mounted on said vehicle for movement about a vertical axis, a sheave, for guiding said cable, journaled on said arm for arcuate movement about said vertical axis, a cable guiding arm having a guide for said cable mounted at one end thereof for swinging movement with respect to said first arm, said cable swinging said cable guiding arm and the first said swingable arm in an outwardly extended position with respect to said vehicle to train said cable around said sheave, and said cable swinging said cable guiding arm and the first said swingable arm inwardly toward the vehicle and guiding said cable along one side of said sheave according to the location of said fixed point with respect to said

vehicle, and said cable guiding arm holding said cable away from said vehicle in all positions of said vehicle with respect to said fixed point.

8. In a mine vehicle adapted to be supplied with power from a relatively fixed point and adapted to move with respect to said relatively fixed point, a power cable for supplying power to said mine vehicle, a cable reel for storing cable or paying off cable in accordance with the movement of said mine vehicle, a swingable arm mounted on said vehicle for movement about a vertical axis, a sheave for guiding said cable journaled on said arm for arcuate movement about said vertical axis, a cable guiding arm having a guide for said cable mounted at one end thereof for swinging movement with respect to said first arm, said cable swinging said cable guiding arm and the first said swingable arm in an outwardly extended position with respect to said vehicle to train said cable around said sheave, and said cable swinging said cable guiding arm and the first said swingable arm inwardly toward the vehicle and guiding said cable along one side of said sheave according to the location of said fixed point with respect to said vehicle, and said cable guiding arm holding said cable away from said vehicle in all positions of said vehicle with respect to said fixed point, and a stop mounted on said swinging arm for limiting the swinging movement of said cable guiding arm as said cable moves said swinging arm and said guiding arm and said sheave inwardly toward the vehicle and an additional stop mounted on the body of said vehicle to limit forward arcuate movement of said swinging arm as it is moved by the cable to swing said sheave and said cable guiding arm outwardly from the body of the vehicle.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,359,123	Krapf	Sept. 26, 1944

FOREIGN PATENTS

Number	Country	Date
154,832	Germany	Sept. 26, 1904

Certificate of Correction

Patent No. 2,562,886 August 7, 1951

WILLIAM R. BECK

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 6, line 16, after "vehicle" insert *when the vehicle*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of December, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.