Aug. 24, 1965 T. R. SOWDER 3,202,110

METHOD AND MEANS FOR ADJUSTING A TRAMWAY CABLE TENSIONING DEVICE

Filed July 15, 1963 2 Sheets-Sheet 1

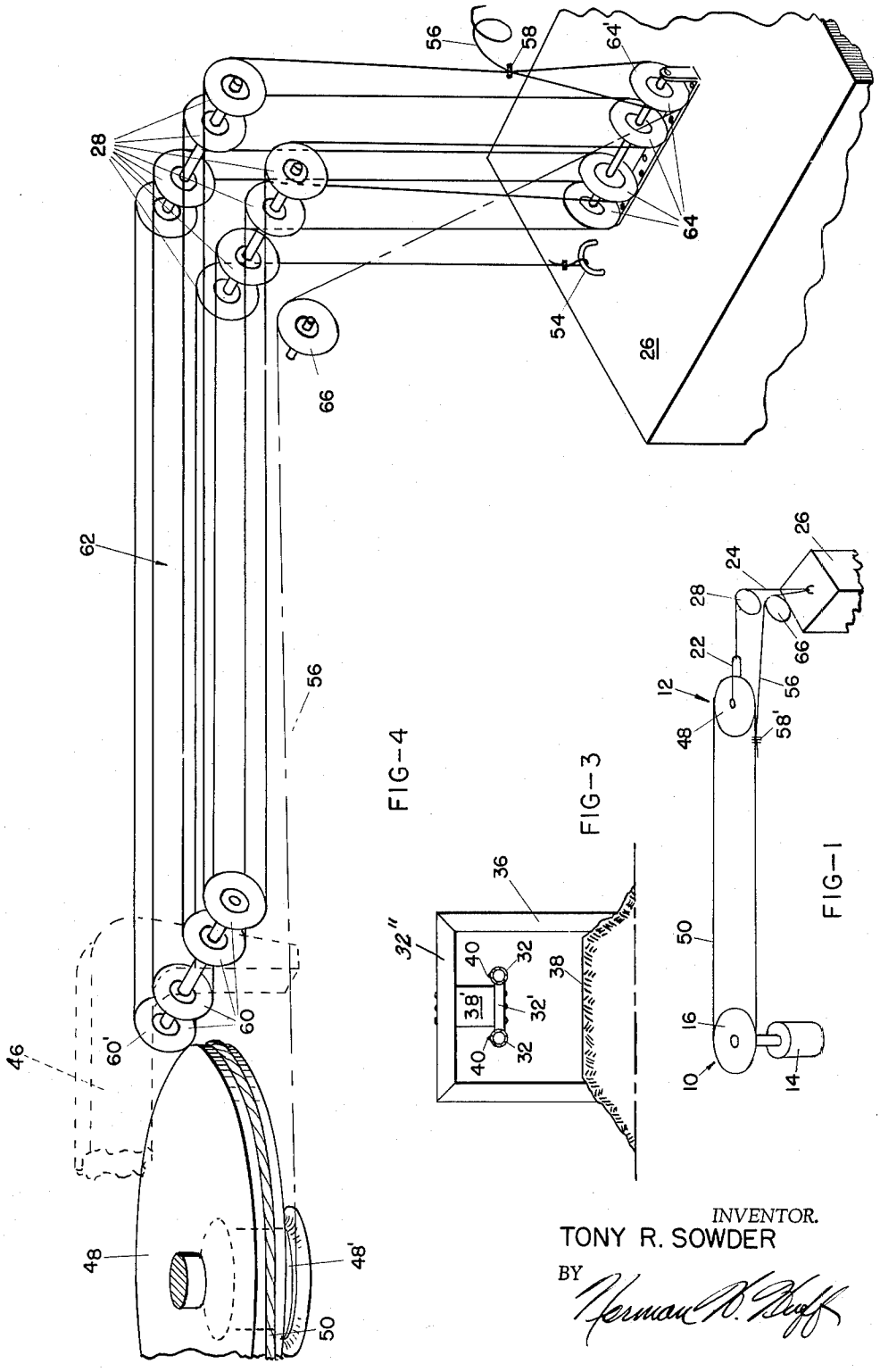


FIG-4

FIG-3

FIG-1

INVENTOR.
TONY R. SOWDER
BY Herman R. Hoff

Aug. 24, 1965 T. R. SOWDER 3,202,110

METHOD AND MEANS FOR ADJUSTING A TRAMWAY CABLE TENSIONING DEVICE

Filed July 15, 1963 2 Sheets-Sheet 2

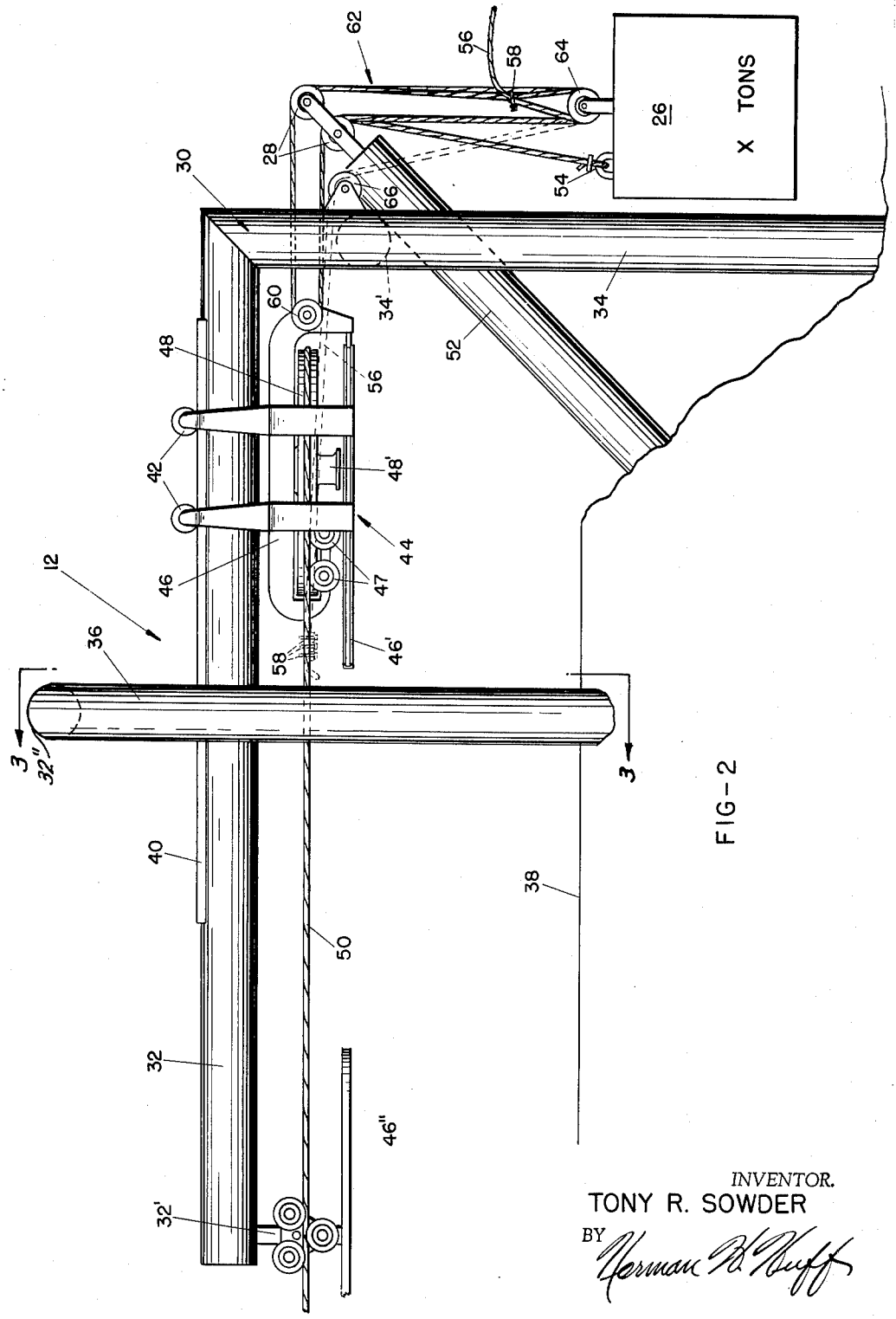


FIG-2

INVENTOR.
TONY R. SOWDER
BY Herman R. Ruff

United States Patent Office 3,202,110 Patented Aug. 24, 1965

3,202,110

METHOD AND MEANS FOR ADJUSTING A TRAMWAY CABLE TENSIONING DEVICE

Tony R. Sowder, Spokane, Wash., assignor to Riblet Tramway Company, Spokane, Wash., a corporation of Washington

Filed July 15, 1963, Ser. No. 294,950
5 Claims. (Cl. 104—196)

My present invention relates broadly to aerial tramways and more particularly to a method of and means for adjusting the effective length of a tensioning cable through which a counterweight provides force to tension a circulating tramway rope.

In aerial tramways, it is conventional to have an endless circulating cable trained about a powered drive sheave and a spaced idling tension sheave. Tension is maintained on the cable by biasing the tension sheave in a direction away from the drive sheave.

Depending on the length of the circulating tramway cable and the loads sustained thereby tension is normally provided by selecting a desired counterweight suspended upon a tensioning cable reeved to translate the weight into tension on the circulating traction rope. In this art one is concerned with relatively large weights and tensions, for example, counterweights of twenty-seven tons are known in the field. Over a period of time the circulating traction rope will elongate. This elongation is taken up by the lowering of the counterweight which applies tensioning pressure to the tension sheave by means of at least one cable which conventionally passes over a compression member sheave and is fastened at its ends to a tension carriage and the counterweight. As the circulating traction rope elongates, the counterweight lowers and when the counterweight approaches the ground or other obstruction to its free suspension, it is necessary to shorten the tensioning cable between the carriage and the counterweight.

Heretofore two methods have been employed to accomplish this function. One method has been to tie off the circulating traction rope to release the tension imparted by the weight of the rope from the tension carriage. Then bring a mobilized hoist into place to lift the counterweight thus slackening the tension cable which is shortened and reconnected between the tension carriage and the counterweight. The weight is then released from the hoist after which the circulating traction rope is released for circulating movement. Under circumstances where it is impossible to bring a mobilized crane into location for lifting the counterweight a makeshift base is constructed upon which jacks are placed to lift the counterweight instead of using the hoist. Among the principal objects of the present invention is to provide a method and means for materially simplifying the function of shortening the tensioning cable successively as it is required as a result of the stretching of the circulating traction rope.

It is another object of the present invention to provide a method and means for adjusting the effective length of the tensioning cable by employing available facilities and therefore obviating the necessity of bringing into a remate location jacks, hoists, or other equipment for lifting an extremely heavy counterweight.

It is still a further object of the present invention to

provide a method and means for adjusting the effective length of the tensioning cable which employs the existing facilities and therefore materially minimizes the time which the circulating traction rope must be immobilized to accomplish this function.

In the accompanying drawings I have shown one physical embodiment of the present invention. But it will be understood that other modifications and structures are contemplated within the scope of the invention and I do not intend that I shall be restricted only to these structures disclosed. The drawings are exemplifying only and disclose therein several structural features identified by reference numerals throughout the several views.

FIGURE 1 is a schematic view of a simple aerial tramway;

FIGURE 2 is a side elevation of a tension terminal of a monocable tramway;

FIGURE 3 is a reduced sectional view taken substantially on the plane indicated by line 3—3 of FIGURE 2; and

FIGURE 4 is a perspective line drawing partially in schematical manner and showing the tensioning cable reeving associated with the tensioning carriage and counterweight.

Referring now particularly to FIGURE 1 of the drawing the numeral **10** indicates a drive terminal and the numeral **12** indicates a tension terminal.

The drive terminal has a means of rotary motion **14** such as an electric motor which rotates a drive sheave **16** about which an endless circulating traction rope **50** is trained and extends from the drive sheave **16** to a tension sheave **48** and is trained thereabout. The tension sheave is journaled for rotation on a tension carriage **22** which is mutally connected by a tensioning cable **24** to a counterweight **26** by any well-known means. Since the tensioning movements of the carriage **22** are substantially in a horizontal plane it is necessary to translate the vertical bias of the counterweight **26** to a horizontal force and therefore the tensioning cable **24** has a running connection over a pulley or the cable sheave **28** having a fixed axis of rotation.

Referring now to FIGURE 2 of the drawing, I have shown the preferred form of the tensioning terminal **12** as including a terminal frame **30** which is constructed by welded fabrication and employs, for example, 18 inch diameter structural steel pipe. A laterally spaced parallel pair of substantially horizontal track support members **32**, have their leftward forward ends free and their rearward or rightward ends are supported by coincident laterally spaced parallel vertical support members **34** interconnected therewith as by welding. Suitable laterally extending brace members **34'** and **32''** are provided to maintain the parallel relationship of the foregoing members.

A vertically disposed inverted U-shape frame member **36** has its lower ends extending through the earth mound platform **38** and anchored in the virgin earth below as are members **34**. Member **36** straddles the track support members **32** and by means of a depending arm **38'** attached to the brace member **32''** connected between the track support members **32** supports the track support members **32**.

On the tops of each track support member **32** I provide

an angle track 40 with which the grooved carriage support wheels 42 cooperate to mobilize a tension carriage 44. The wheels 42 are journaled upon the carriage frame 46 which is suspended below the track support members 32 thereby. The carriage 44 has journaled thereon, a rubber filled grooved tension sheave 48 disposed for rotation about a vertical txis in a horizontal plane to accommodate the circulating traction rope 50.

I have shown rigidly associated with the tension sheave 48 a cable drum 48' which in some instances will be used and others will not. As a part of the carriage frame 46 I have shown chair hanger guides 46' since the species disclosed is primarily designed for aerial ski-lift operation.

At the leftward or free ends of the track support members 32 I have shown an additional chair hanger support guide 46'' and also traction rope guide sheave unit 32'. The carriage frame 46 is also provided with traction rope guide sheaves 47 to direct the circulating movement of the traction rope 50 as it approaches and leaves the tension sheave 48.

At its rearward end the carriage frame 46 is provided with a set of pulleys 60—60 which collectively form a carriage block. About these pulleys I reeve a counterweight tensioning cable 62 which preferably is formed of wire rope of sufficient capacity for the proposed function. At its opposite end, opposed to the carriage block 60, I provide for the tensioning cable 62, a block 64 which is fastened to the counterweight 26 and is also comprised of a number of cable pulleys as shown.

Since the tension of traction rope 50 applies a bending moment to the terminal frame 30 when in operation, I provide an oblique compression member 52 anchored in the earth at its lower end and secured to the terminal frame 30 by interconnection of the compression member 52 and a cross brace 34'. At its upper end, the oblique compression member supports plural counterweight rope sheaves or pulleys 28—28 over which the carriage tensioning cables 62 are trained to translate the vertical force exerted by the counterweight 26 to a substantially horizontal force on the carriage frame 46.

Inspection of the schematic drawing (FIGURE 4) will reveal that the carriage tensioning cable 62 is anchored at 54 to the counterweight 26 and is reeved to pass upwardly over a pulley 28 thence forwardly under and about the leftward end pulley 60' of the carriage block 60 thence forwardly over a counterweight rope sheave 28 downwardly under a pulley of the block 64 and successively about the several successive pulleys 60, 28, and 64 in the common and well-known manner of the cable reeving of a block and tackle as shown and lastly is reeved for a running connection of the end portion or tail rope 56 through the rightward end pulley 64' of the block 64. Also the tail rope portion 56 is releasably fixed by a number of conventional U-bolts 58, one of which is shown, to itself in a loop around the pulley 64'. It will thus be understood that the reeving of the carriage tensioning cable 62 with the blocks 60 and 64 forms a substantial block and tackle mutually connecting the counterweight 26 and the tension carriage 46.

The tail rope 56 is of sufficient length that it may be passed over the tail rope sheave 66 and forwardly to the drum 48' or the circulating rope 50 as shown respectively by broken lines in FIGURE 4 and full line in FIGURE 2 wherein it is secured at one or the other points so that tensioning force may be applied thereto by circulating movement of the traction rope. After the connection is completed at the drum 48' or at the circulating rope 50 by means of the U-bolts 58 the other U-bolts 58 connecting the tail rope to itself while looped about pulley 64' are released and then the manually controlled operation of the source of rotary motion 14 will cause circulating movement of the traction rope 50 thus, through the block and tackle arrangement, shortening the effective length of the carriage tensioning cable 62.

The tail rope 56 may be connected to the circulating traction rope 50 by any desired means as for example by the conventional U-bolt 58' (FIGURE 1) or to the drum 48' in any one of the common and well-known methods of securing cables to drums.

As shown in FIGURE 1 in the event that a carriage tensioning cable 24 is a single or plural rope but not reeved as a block and tackle, a separate tail rope 56 may be secured to the counterweight 26, trained over the tail rope sheave 66 and secured either to the traction rope 50 or the drum 48'. In this arrangement also circulating motion of the traction rope will impart lifting force to the counterweight and thus raise it to enable one to shorten the effective length of the carriage tension cable 24 prior to subsequent release of the tail rope 56 from the drum 48' or circulating traction rope 50.

Having thus described my invention I desire to secure by Letters Patent of the United States the following:

1. The herein described method of selectively adjusting the effective length of a tensioning cable which extends between and mutually connects a counterweight and a tensioning carriage having a rotatable tension sheave about which is trained a manually controlled powered circulating tramway rope,

said tensioning cable having a portion constituting a tail rope having a running connection through and also releasably fastened relative to a snatch block anchored relative to one of said counterweight or tensioning carriage,

which consists in:

securing said tail rope for movement proportional to the movement of said circulating tramway rope;

unfastening the tail rope for running movement through said snatch block; and

controlling movement of said tail rope through said snatch block by manually controlled circulating movement of said circulating tramway rope.

2. The herein described method of selectively adjusting the effective length of a tensioning cable from which is suspended a counterweight arranged to impart tension to a tensioning carriage having a rotatable tension sheave about which is trained a manually controlled powered circulating tramway rope which consists in:

employing manually controlled powered circulating movement of said tramway rope to lift said counterweight;

adjusting the effective length of said tensioning cable while the counterweight is supported by said tramway rope; and

releasing the counterweight from support by said tramway cable to be wholly suspended by said adjusted tensioning cable.

3. In an aerial tramway, a tensioning terminal comprising:

a supporting frame;

a tensioning carriage movable on said frame and having a rotable tension sheave about which is trained a manually controlled, powered circuating tramway rope;

a counterweight;

a tensioning cable reeved with respect to said frame, carriage and counterweight for translating the suspended weight to bias said carriage for tensioning said tramway rope; and

means for interconnecting said counterweight with respect to said tramway rope for effecting controlled vertical movements of said counterweight by powered circulating movements of said tramway rope.

4. The invention defined in claim 3 and further characterized by said means comprising:

said tensioning cable consisting of a block and tackle device having its blocks fixed to said tensioning carriage and counterweight and its cable terminating in

a tail rope for shortening the distance between said blocks when moved under tension; and

a releasable fastener for connecting said tail rope to said tramway rope and together with said tail rope constituting the means for interconnecting said tramway rope and counterweight.

5. The invention defined in claim 3 and further characterized by said means comprising:

said tensioning cable consisting of a block and tackle device having its blocks fixed to said tensioning carriage and counterweight and its cable terminating in a tail rope for shortening the distance between said blocks when moved under tension;

a cable drum; and

means effective to rotate said drum by circulating movement of said tramway rope,

whereby winding of said tail rope upon said drum applies tensioning movement to said tail rope.

References Cited by the Examiner

UNITED STATES PATENTS

2,582,201 1/52 Huntington ---------- 104—173

ARTHUR L. LA POINT, *Primary Examiner.*

MILTON BUCHLER, *Examiner.*