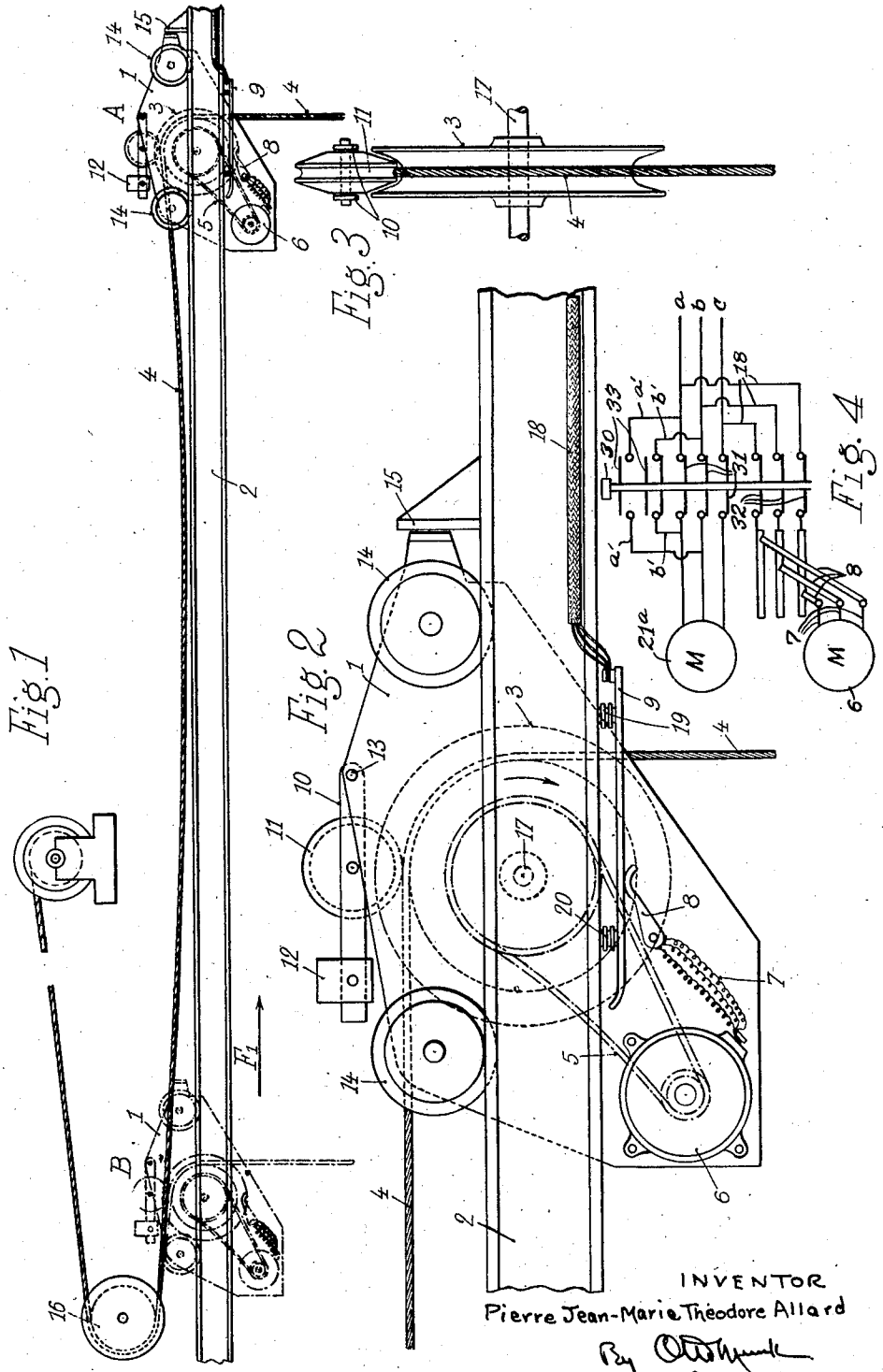
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DEVICE FOR LOWERING LOADS

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DEVICE FOR LOWERING LOADS

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The present invention relates to a device intended to facilitate the lowering of the load in hoisting and manipulating apparatus which comprise a movable carriage rolling on a horizontal or inclined rolling track or carrying cable and connected to a reversible winch by a cable. The object of the invention is to improve the operation of such manipulating apparatus and more particularly to allow the length of the rolling track or carrying cable to be greatly increased, whilst avoiding at the same time the production of an excessive sagging of the cable when it is slackened in order to lower the load.

According to the invention, the movable carriage comprises an auxiliary electric motor which is automatically set in action when the carriage reaches a position in which the load must be lowered and when at the same time the winch rotates in the direction for lowering the load, said auxiliary motor being arranged to exert on the hoisting cable an additional force in the lowering direction, owing to which the formation of the prejudicial sag of said cable is avoided, even if its horizontal span is very great, and the regular lowering of the load is always ensured.

The other features and advantages of the invention will be more clearly understood by referring to the accompanying drawing which illustrates by way of example and not in a limiting sense, a preferred form of construction.

In said drawing,

Fig. 1 diagrammatically illustrates a hoisting and manipulating apparatus to which the invention is applied;

Fig. 2 illustrates in elevation the arrangement of the movable carriage;

Fig. 3 is a detail view of the pulley of said carriage;

Fig. 4 is an electrical wiring diagram of the invention.

In Fig. 1 can be seen a movable carriage 1 which travels between the positions A and B on a rolling track 2. In the example considered, a horizontal rolling track is illustrated, constituted by a rigid beam, but the invention can also apply to apparatus the rolling tracks of which are inclined or constituted by carrying cables for instance or by other means.

The hoisting cable 4, one end of which supports the load of any kind whatever, passes over the pulley 3 of the carriage 1, shown in its extreme position A, defined by the terminal abutment 15, then reaches the fixed pulley 16, arranged near the other extreme position B, and continues towards a suitable winch 21. The successive displacements of the carriage 1 between the positions A and B are imparted by any means whatever which do not form part of the present invention and which have not been illustrated either.

Supposing the load hung from the cable 4 when the carriage is in position A, is to be lowered, the winch is caused to rotate in the direction for unwinding said cable, and it will be seen that, under certain conditions, especially if the load is not heavy, a prejudicial sagging of the horizontal part of cable 4 may be produced; the operation can then become uncertain or irregular.

To avoid these difficulties, the movable carriage is devised as illustrated in Figs. 2 and 3. Said carriage, supported by the rolling wheels 14, comprises a small auxiliary motor 6 which can drive the pulley 3 about its shaft 17 in the direction for lowering the load (as shown by the arrow) by means of the belt or chain 5 or of any other suitable transmission or reducing device. Said motor is supplied with current by the wires 7 connected to a set of brushes or rubbing parts 8 secured on the carriage and coming in contact with corresponding fixed contact bars 9, secured to the rolling track 2 through the medium of suitable insulators 19 and 20 at the place or places where the load is to be lowered; the contact bars 9 are fed by the electric line 18, connected in its turn to the corresponding contact-pieces of the controller or reversing switch which controls the operation of the winch 21 (see Fig. 4).

The winch 21 is driven by a reversible motor 21*a* supplied with current through leads *a*, *b* and *c*. Switch bars 31 of switch 30 are in closed position in leads *a*, *b* and *c* when the winch 21 unwinds. Also, at this time, switch bars 32 of switch 30 are in closed position in leads 18. Therefore, when the switch is in the position shown, current is being simultaneously supplied to carriage motor 6 and winch motor 21*a* during unwinding of cable 4. When the switch 30 is pushed downwardly, the contacts 33 connect leads *a'* and *b'* and simultaneously leads *a*, *b*, *c*, and 18 are disconnected, resulting in winch motor 21*a* being reversed and motor 6 being stopped while the cable is being wound.

The pulley 3 driven by the motor 6 can be smooth or provided with impressions allowing the utilisation of calibrated chains; it can also be devised to use a composite hoisting strand constituted by a cable or a chain; a roller 11 supported by the levers 10 pivoted at 13, exerts under the action of the weight 12 or of other means such as springs, a slight pressure on the cable 4,

at the place where the latter reaches the pulley 3 during the lowering of the load, so that the cable will show sufficient adherence and be driven by the pulley without slipping.

To illustrate the operation of the device according to the invention, it will be assumed that the carriage 1 supporting the load moves, under the action of suitable means, from position B towards position A where it is stopped by the abutment 15. It will also be assumed that it is in position A that the load must be lowered. The arrangement of the electric connections is such that the contact bars 9 are under tension only when the electric motor of the winch 21 is connected in a manner which makes it rotate in the direction for which it unwinds the cable 4. Under these conditions, as soon as the brushes 8 reach the bars 9, the motor 6 is supplied with current and it causes the pulley 3 to rotate in the direction of the arrow whilst taking up the slack of the cable 4 and ensuring the regular lowering of the load.

The speed of motor 6 and the transmission system are preferably so chosen that the circumferential speed of pulley 3 at its point of contact with cable 4 is substantially the same as the speed of unwinding the cable from the winch.

When the load is deposited and as soon as the lowering movement of the winch is stopped by cutting off the supply of current to its motor, the auxiliary motor 6 also stops.

When the winch 21 is then caused to rotate in the direction for winding up the cable, the bars 9 are no longer fed with current, and the auxiliary motor which no longer receives current, is idly driven by pulley 3; a free wheel or like device can also be provided for preventing this driving of the motor 6.

It is to be understood that the arrangement described by way of example can be modified without departing thereby from the scope of the present invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a load handling apparatus, comprising guiding means, a carriage adapted to move along same towards and away from a load-lowering position, a pulley mounted loosely on the carriage, a stationary winch, and a load carrying cable passing over said pulley and adapted to be wound and unwound by said winch, the provision of an auxiliary motor on the carriage for driving said pulley and means whereby the auxiliary motor and pulley tensions the hoisting cable in the load-lowering direction when the carriage is in its load-lowering position and when the winch is rotating in its cable-unwinding load-lowering direction.

2. In a load handling apparatus, comprising guiding means, a carriage adapted to move along same towards and away from a load-lowering position, a pulley mounted loosely on the carriage, a stationary winch, and a load carrying cable passing over said pulley and adapted to be wound and unwound by said winch, the provision of an auxiliary motor on the carriage for driving said pulley, a reversible motor for said winch, means for supplying current to both of said motors to move said cable in the load-lowering direction, and means for supplying current to said reversible motor only when the winch is rotating in its cable-unwinding load-lowering direction.

3. In a load handling apparatus, comprising guiding means, a carriage adapted to move along same towards and away from a load-lowering position, a pulley mounted loose on the carriage, a stationary winch, and a load carrying cable passing over said pulley and adapted to be wound and unwound by said winch, the provision of an auxiliary motor on the carriage for driving said pulley, a current supply, and means for automatically connecting said motor with said current supply when the carriage is moved to load-lowering position and for automatically disconnecting said motor from said supply when the carriage moves from load-lowering position.

4. In a load-handling apparatus, comprising guiding means, a carriage mounted for travel on said guiding means, a pulley mounted on the carriage, a load-carrying cable passing over said pulley, means for controlling the speed of said cable while travelling in one direction over said pulley, and an auxiliary motor on the carriage for driving said pulley substantially at the same peripheral speed as the speed of said travelling cable.

5. In a load handling apparatus, comprising guiding means, a carriage adapted to move along same towards and away from a load-lowering position, a pulley mounted loose on the carriage, a stationary winch, and a load carrying cable passing over said pulley and adapted to be wound and unwound by said winch to correspondingly cause the to and fro motion of the carriage, the provision of an auxiliary motor on the carriage, means whereby the auxiliary motor is adapted to drive the pulley in the direction urging the cable in the load-lowering direction, bars carried by the guiding means in front of the load-lowering position for the carriage and adapted to feed current to the auxiliary motor when the carriage arrives into its load-lowering position, means whereby the current is switched in or off said bars according as to whether the winch is rotating in its cable unwinding or winding direction, a roller and means for urging said roller into pressure contact with the hoisting cable at the point where said cable reaches the pulley on the winch side.

6. In a load-handling apparatus, comprising guiding means, a carriage adapted to move along same towards and away from a load-lowering position, a pulley mounted loosely on the carriage, a stationary winch, and a load-carrying cable passing over said pulley and adapted to be wound and unwound by said winch, the provision of an auxiliary motor on the carriage, means whereby the auxiliary motor is adapted to drive the pulley in the direction urging the cable in the load-lowering direction, bars carried by the guiding means in front of the load-lowering position for the carriage and adapted to feed current to the auxiliary motor when the carriage arrives into its load-lowering position, and means whereby the current is switched in or off said bars according as to whether the winch is rotating in its cable unwinding or winding direction.

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