Sept. 9, 1969 G. FOURNIER 3,465,941

CABLE HAULING AND RELEASING DEVICE

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Fig.1.

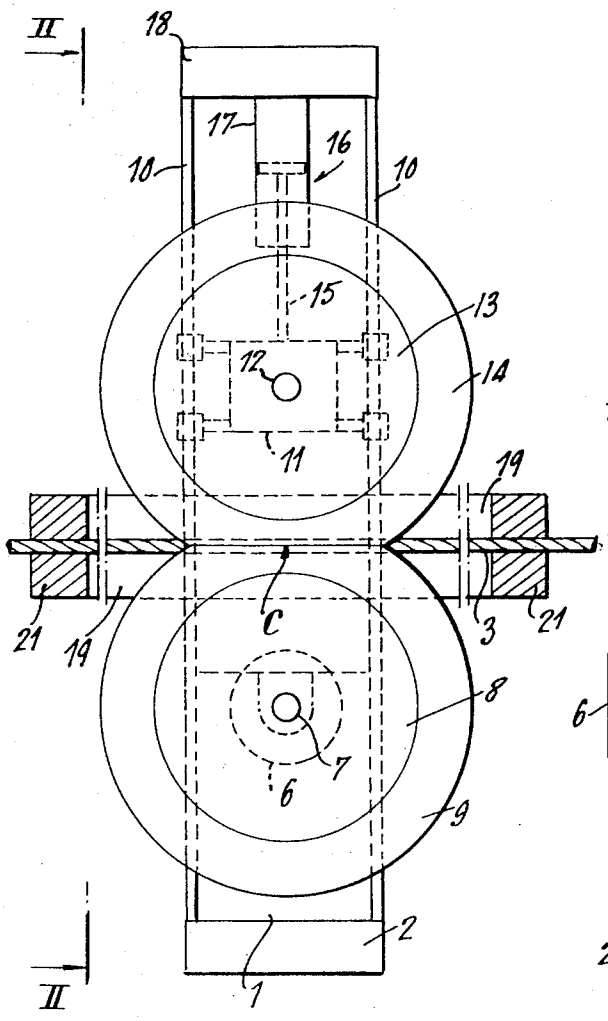
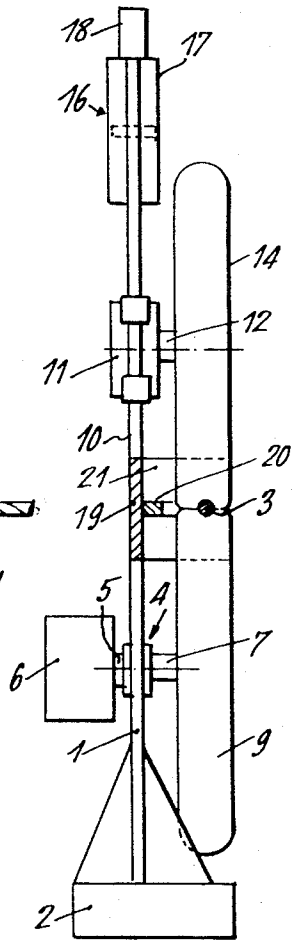


Fig.2.



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CABLE HAULING AND RELEASING DEVICE

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ABSTRACT OF THE DISCLOSURE

Apparatus for hauling and slipping of cables having a set of wheels in vertical alignment engaging the cable with a power converting means rotatively engaging one wheel and a vertical jack connected to the shaft of the other wheel to control both the speed of rotation of the one wheel and the amount of pressure exerted on the cable by the other wheel.

As it is well known, the hauling and releasing or slipping of cables of very great length and under load are carried out, either by means of a crawler type apparatus, composed of two endless chains, provided with plates of appropriate shape, urged against each other; or by means of a capstan drum around which the cable is wound a plurality of turns. In such cases, the resulting tension or stresses in the cables pass through frictional engagement, from a high outer tension to a low internal tension, under which condition the cable is stored. More often than not, stress reducing in such systems is ensured by means of a mechanical squeeze roller or pinch roller, which can be alternatively used either as a drive roller or a brake roller. In some cases, the hauling or releasing device can be constructed with a combination of the two systems, i.e., by a capstan, with a crawler taking the place of the metallic pinch roller.

Various devices known to the prior art may not always be used universally for all types of cables, as some of them have a composition which will not resist, without damage thereto, either against the passing over a metallic pinch roller and between endless chain plates, or against the stress differentials applied to their outer and inner generating lines, arising from winding around a capstan drum.

The present invention obviates this disadvantage by providing novel haulage and slipping means of simple and practical design and of economical construction which can be used indiscriminately with all traction cables connected to various loads, for hauling or retaining purposes.

According to the present invention, the apparatus comprises a structure, bearing at least one set of wheels, positioned, one above the other in the same vertical plane on opposite sides of the feed line of a cable, partly enclosed between the wheels, and guided upstream and downstream of the latter by slipways which form an integral part of the structure, and on which are mounted at least one element of power converting means, rotatively engaging at least one set of wheels and a vertical jack whose rod is connected to a sliding carrage element supporting the upper wheel's rotary shaft.

Various other objects and features of the present invention will become more fully apparent from the following detailed description.

A preferential embodiment is given for illustrative purposes only, which in no way limits the scope and spirit of the invention, in the accompanying drawings, in which:

FIGURE 1 is a view in elevation of the device according to the present invention.

FIGURE 2 is a cross-sectional view, taken substantially along line II—II of FIGURE 1.

According to the invention, the device comprises a vertical support **1** defining a bearing base **2** which permits setting and inflexible clamping thereof at the most appropriate location so that the said device may operate in a suitable manner. Although not indicated, base **2** may, with advantage, be fitted with some means to allow ensuring the transverse positioning of support structure **1** in relation to the feed line of a cable **3** which is to be subjected to the action of the device.

The upper part of support structure **1** carries a bearing **4** journalling driving shaft **5** of a power converting means **6**, which is preferably a hydraulic motor with a double direction of rotation. Although not indicated, the shaft **5** can be, in certain cases, the drive shaft of a speed reducer associated with motor **6**. The end portion **7** of shaft **5** is fitted to the hub of a wheel **8**, equipped advantageously with a tire **9**, extending, in a vertical plane parallel to support structure **1**.

Support structure **1** extends to its uppermost ends by means of columns **10** slidably supporting and guiding a carriage **11**, comprising a bearing for an idler shaft **12**. The latter is coupled to the hub of a wheel rim **13** also fitted with a tire **14** extending parallel to columns **10** in the same vertical plane as the lower tire **9**. The sliding carriage **11** is firmly fixed to the piston rod **15** of a single or double acting hydraulic jack **16** whose body **17** hangs from a bracket **18** mounted on the uppermost ends of columns **10**. Columns **10** are laterally associated to stiff plates **19**, which support, together with gussets **20**, lateral slipways **21** extending on opposite sides of tires **9** and **14** in theoretical alignment with the path of cable **3**. The elevation of this theoretical alignment is selected to correspond substantially to a mean position during which cable **3** is urged against tire **9** through action of tire **14**, which is vertically displaced by carriage **11**, subject to the extension of piston rod **15** of jack **16**. The vertical displacement controlled by jack **16** is provided for causing a mutual squashing action of tires **9** and **14** so that they pinch cable **3** the length of a predetermined chord C to create a friction factor capable of reacting against any tractive force which might be applied to cable **3**. Obviously, the friction factor can be adjusted by varying, on the one hand, the mutual squashing action of tires **9** and **14** under the action of the jack **16** and on the other hand, the torque transmitted to the lower driving wheel **8** by the power converting means **6**.

Although not indicated, means **6** comprises inlet and outlet nozzles which can be connected to a hydraulic system, designed so that said means can either supply a driving action, or a retaining action when subjected to outside forces.

When means or motor **6** are connected for driving purposes, the resulting rotation transmitted to the driving shaft **5** is transferred to shaft **7** and hence to driving wheel **8**. As friction is permanent, the rotation of wheel **8** results in like rotation of wheel **13** so that both these wheels operate simultaneously on cable **3**. The friction factor between the two wheels, whose value is proportional to the length of chord C is converted, at that portion of cable **3** corresponding to the said chord, into a pulling force tending to ensure the hauling of a load connected to the end of said cable. The friction factor which is applied by tires **9** and **14**, which is obviously adjusted according to the load to be hauled, subjects cable **3** to a constant tension, as the latter offers inside slipways **21** a strictly rectilineal portion which is never submitted to flapping or to vibration, which might reduce the efficiency of the friction created between tires **9** and **14**.

A like advantage also appears when the device is used for releasing or slipping the cable **3**, when the slipping of the latter is a consequence of the end load to which it is connected and whose operation can be ensured in a

suitable manner. Indeed, in such a case, the power converting means **6** is supplied to provide resistance means which operate, to a certain degree, against rotation of driving wheel **8** and by way of consequence of wheel **13**, to react against the releasing or the slipping of cable **3** in a direction opposite that of hauling. The resisting means and consequently the braking action are obviously conditions by the length of chord C on the one hand and by the supply of hydraulic fluid received by the power converting means **6** on the other.

Although not indicated, the aforedescribed hauling and slipping device can comprise a plurality of pairs of wheels **8** and **13**, positioned in parallel relationship and following each other to increase accordingly the friction factor applied to cable **3** during hauling or slipping operations. Also, each pair of wheels can be mounted, comprising one or two power converting means **6** to actuate both wheels of the same pair. Furthermore, these means **6** can be actuated by pneumatic or electric power and comprise independent or complementary means, for either mechanical or electrical braking action, to be used during slipping operations.

What I claim is:

1. A hauling and slipping device comprising a pair of wheels positioned one above the other in a common vertical plane each carrying a tire adapted to grip and squash against a longitudinally moving cable therebetween, supporting structure including a pair of vertical columns carrying a vertically movable carriage, said carriage supporting the upper of said two vertically positioned wheels; lateral slipways located upstream and downstream of said wheels in thoretical alignment with the path of the cable and in a rectalinear position thereto prevent any lateral or vertical flapping or vibration of the cable; a vertically positioned hydraulic jack connected to said vertically sliding carriage for pressing the upper of said wheels toward the lower of said wheels for increasing the pressure between said wheels; and a motor mounted directly on the shaft of the lower of said wheels and coaxial therewith for controlling the speed of rotation thereof.

2. A device in accordance with claim **1** wherein said slipways are supported by said supporting structure and wherein said motor shaft and said lower wheel shaft constitute a single, common shaft.

References Cited

UNITED STATES PATENTS

1,019,295	3/1912	Bazley	226—176 X
1,700,736	2/1929	Brennan	226—176 X
1,798,316	3/1931	Dreisbach	226—176 X
1,978,303	10/1934	Guett	226—176 X
2,699,195	1/1955	Weller.	
275,810	4/1883	Eaton et al.	226—176 X
3,029,991	4/1962	Von Allmen	226—176 X
3,119,536	1/1964	Berkeley	226—176 X
1,437,843	12/1922	Heinrichs.	
2,119,670	6/1938	Fitzgerald	226—29
2,658,751	11/1953	Jaeschke	226—29
3,338,493	8/1967	Schiffer	226—188
2,943,813	7/1960	Cass	242—157
3,310,210	3/1967	Reib	226—194 X

FOREIGN PATENTS

1,152,209	8/1963	Germany.

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226—186, 191, 196