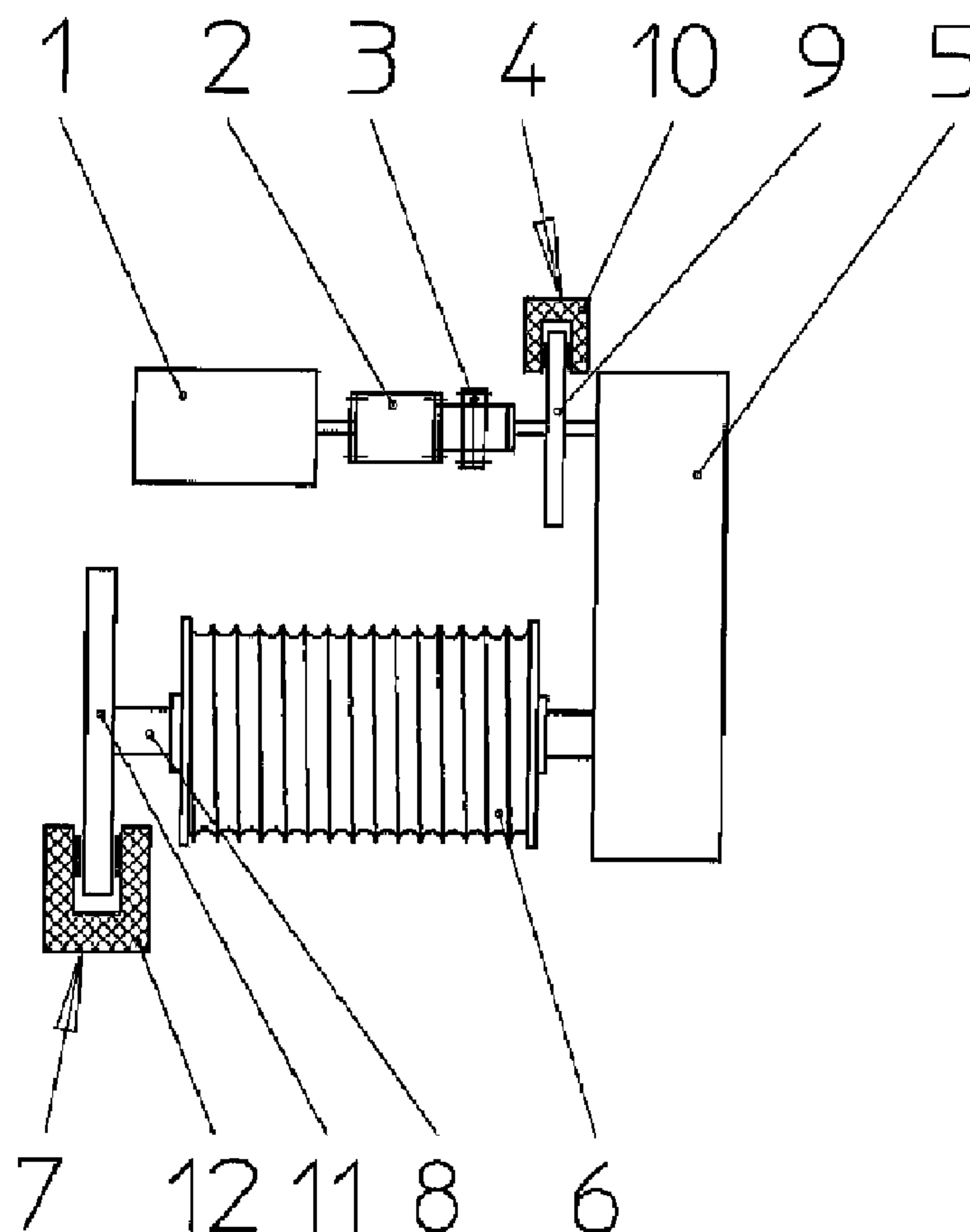




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(54) **Titre : CHAINE CINEMATIQUE DESTINEE A DES ENGINES DE LEVAGE**
 (54) **Title: DRIVE TRAIN FOR HOISTING GEAR**



(57) **Abrégé/Abstract:**

The invention concerns a drive train for hoisting gears, in particular for hazardous transports, comprising a drive motor (1), a cable drum (6) connected thereto, a reduction transmission (5) arranged between the drive motor (1) and the cable drum (6), a service

(57) Abrégé(suite)/Abstract(continued):

brake (4) provided between the drive motor (1) and the reduction transmission (5) and a safety brake (7). To prevent damage to the reduction transmission (5) in the event of an emergency stop braking an automatic overrun disconnect means can be provided between the drive motor (1) and the service brake (4). The overrun disconnect means is preferably in the form of a freewheel (2).

Abstract

The invention concerns a drive train for hoisting gears, in particular for
5 hazardous transports, comprising a drive motor (1), a cable drum (6) connected
thereto, a reduction transmission (5) arranged between the drive motor (1) and the
cable drum (6), a service brake (4) provided between the drive motor (1) and the
reduction transmission (5) and a safety brake (7). To prevent damage to the
reduction transmission (5) in the event of an emergency stop braking an automatic
10 overrun disconnect means can be provided between the drive motor (1) and the
service brake (4). The overrun disconnect means is preferably in the form of a
freewheel (2).

(Figure 1)

SUMMARY OF INVENTION

According to the invention that object is attained in that provided between the drive motor and the service brake is an automatic overrun disconnect means.

5 These features according to the invention provide that the rotating masses of the motor are separated from the drive train. Damage in the drive train and in particular in the reduction transmission are prevented by that separation. In addition that separation causes a reduction in the stopping distance of the hoisting gear and the load suspended therefrom.

10 The automatic overrun disconnect means provided between the drive motor and the service brake can be an overrun coupling which is preferably in the form of a freewheel.

15 Freewheels can be designed in accordance with different structural patterns, in which respect they are provided for example with clamping rollers, clamping members, toothed disks, wrap springs or locking pawls. A particularly advantageous freewheel structure which is suitable for the situation of use of the invention is a clamping roller freewheel which is not only highly effective but also operates completely noiselessly.

20 Alternatively the overrun disconnect means can also be in the form of a releasable coupling which is electrically switched in the event of emergency stop braking. The rotating masses of the motor can also be quickly and effectively separated from the drive train with such a structure so that the reduction transmission does not suffer any damage.

BRIEF DESCRIPTION OF THE DRAWINGS

25 The invention is illustrated by way of example in the drawing and is described hereinafter in detail with reference to the drawing.

DETAILED DESCRIPTION OF THE INVENTION

30 As shown in the drawing the drive train according to the invention for a hoisting gear comprises a drive motor 1, a freewheel 2, a coupling 3, a service

brake 4, a reduction transmission 5, a cable drum 6 and a safety brake 7 which is prescribed in particular in relation to transport for hazardous items. The safety brake 7 is carried on the same shaft 8 as the cable drum 6 and is disposed downstream of the cable drum 6 in the embodiment illustrated in the drawing.

5 The service brake 4 comprises a brake disk 9 which is surrounded at least on one side by a brake caliper 10 with corresponding brake pads.

The safety brake 7 also includes a brake disk 11 which is surrounded at at least one location by a brake caliper 12 on which suitably actuatable brake pads are provided.

10 In the embodiment illustrated in the drawing both the service brake 4 and also the safety brake 7 are designed in the manner of a disk brake.

The freewheel 2 arranged between the drive motor 1 and the coupling 3 is desirably in the form of a noiselessly operating clamping roller freewheel.

15 The coupling 3 arranged in the drawing between the freewheel 2 and the service brake 4 is in the form of a rigid coupling.

Alternatively the coupling 3 can also be in the form of an electrically switchable releasable coupling to separate the drive motor 1 from the reduction transmission 5. For that specified case it would be possible to dispense with a freewheel 2.

20 If an emergency stop is triggered when lowering the suspended load the service brake 4 and the safety brake 7 are closed. By virtue of the usual brake dimensioning the safety brake 7 which serves as the emergency off stopping brake requires a shorter application time than the service brake 4. As a result the rotary movement of the cable drum 6 is stopped before the rotary movement of the input
25 shaft of the reduction transmission has come to a halt. Thus, without the measures according to the invention, a shock torque would occur, which acts in the opposite direction to the actual load direction.

30 That torque transmitted by the inertia mass of the drive motor 1, in conventional drive trains, causes a shock-like reversal in direction of the torque in the transmission. The time process of the reversal in direction of the torque takes

place during the difference in application times between the safety brake 7 and the service brake 4.

Then, in the conventional drive trains, the inertia mass in opposite relationship to the load direction produces in the reduction transmission 5 a change in tooth flank from the load flank to the opposite flank (rearward load flank). As a result of that, a shock loading occurs at the opposite flank, which in the conventional drive trains would lead to considerable damage to the transmission. That transmission damage can range from slight surface damage to the tooth flank to tooth breakage and thus failure of the transmission.

Such damage is very effectively prevented by the arrangement of an automatic overrun disconnect means or the freewheel 2 in the drive train according to the invention. It is already the case that upon response of the safety brake 7 which has a very short application time the freewheel 2 takes effect immediately upon stoppage of the reduction transmission 5, that is to say the torque of the inertial rotating masses of the drive motor, due to the response of the freewheel 2, is no longer transmitted to the reduction transmission 5 which is connected directly to the cable drum 6. The action of the freewheel 2 takes place immediately with actuation of the safety brake 7, and more specifically still before the service brake 4 provided with a lesser application time comes into engagement.

Consequently only one torque direction is predetermined by the arrangement of the freewheel 2 in the drive train according to the invention so that, in the event of emergency stop braking, no damage to the reduction transmission can occur. The features according to the invention can thus effectively protect a corresponding drive train for hoisting gears from damage so that the service life thereof is increased.

List of references

- 1 drive motor
- 2 freewheel
- 5 3 coupling
- 4 service brake
- 5 reduction transmission
- 6 cable drum
- 7 safety brake
- 10 8 shaft of the cable drum 6
- 9 brake disk of the service brake 4
- 10 brake calliper of the service brake 4
- 11 brake disk of the safety brake 7
- 12 brake calliper of the safety brake 7

CLAIMS

1. A drive train for hoisting gears comprising:
 - 5 a drive motor;
 - a cable drum connected thereto;
 - a reduction transmission arranged between the drive motor and the cable drum;
 - a service brake provided between the drive motor and the reduction
 - 10 transmission;
 - a safety brake; and
 - disconnect means provided between the drive motor and the service brake;
 - wherein said disconnect means is an overrun disconnect means
 - 15 arranged between the drive motor and the reduction transmission which, in loading condition of lowering a suspended load, reacts when the service brake and/or the safety brake operate.
2. The drive train as set forth in claim 1 wherein the overrun disconnect
- 20 means is in the form of an overrun coupling.
3. The drive train as set forth in claim 2 wherein the overrun coupling is in the form of a freewheel.
- 25 4. The drive train as set forth in claim 3 wherein the freewheel is in the form of a clamping roller freewheel.

