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ONE WAY CLUTCH ARRANGEMENT
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Fig. 3

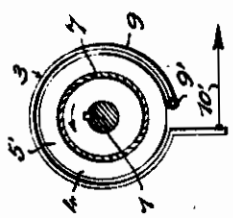

Fig. 6

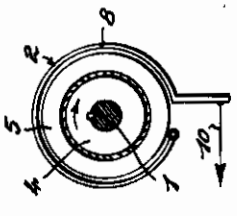

Fig. 2

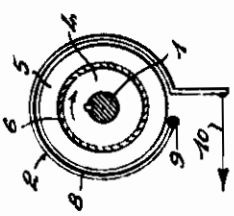

Fig. 5

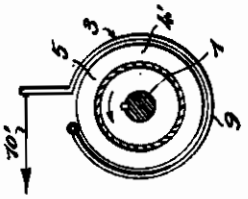

Fig. 1

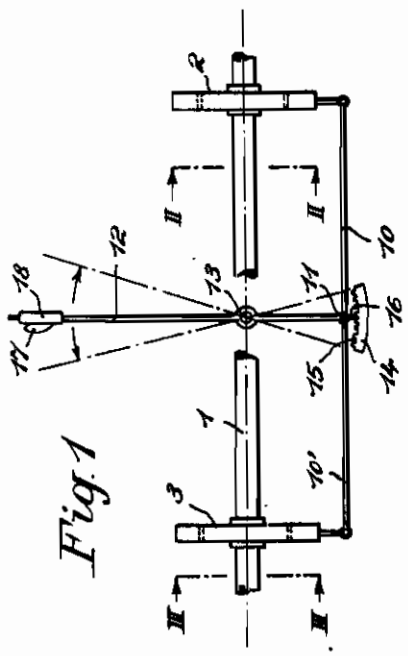

Fig. 4

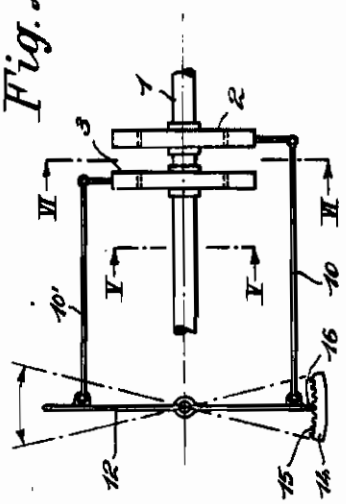

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Fig. 8

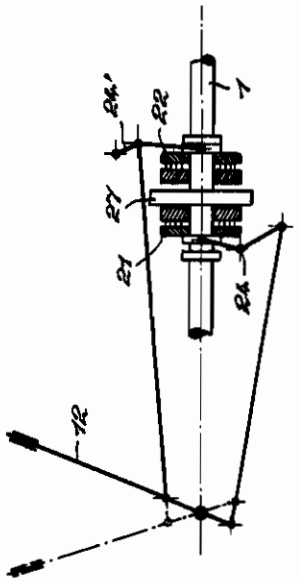
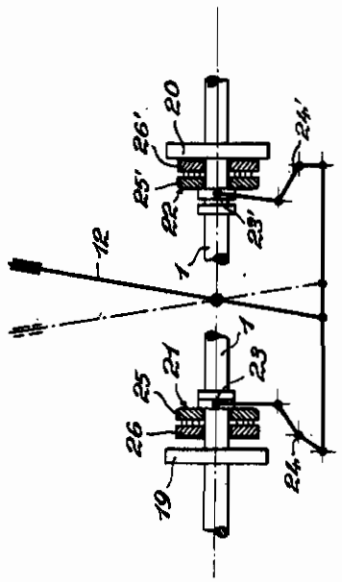


Fig. 7



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ALIEN PROPERTY CUSTODIAN

ONE WAY CLUTCH ARRANGEMENT

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The one way clutch device subject of the present invention has the object:

(*a*) Of blocking a transmission driving shaft rotating round its axis in such a way as to prevent its rotation in one direction and allow its free rotation in the other.

(*b*) Of determining at will the direction in which the shaft is to be blocked, and consequently the direction in which the shaft is allowed to rotate freely.

Ordinary brakes do not usually act directly on the shaft, but on a pulley (or sleeve, or disc, or drum) keyed to the shaft, solidary with the same, and constituting the intermediate member between shaft and braking assembly.

To attain the first object indicated in the present exposal it is sufficient to key the pulley through a freewheeling device onto the shaft in such a way as to render it solidary with the same during rotation in one direction, and to enable it to keep still if the shaft rotates in the opposite direction. Even better, the pulley may be formed of two parts: an inside member completely solidary with the shaft and an outside member consisting of a circular crown joined through a freewheeling device to the inside member. When the brake acts blocking the outside circular crown the shaft will be blocked in one direction and only able to rotate in the other.

The division surface of the pulley members, moveable relatively to one another, may be flat and at right angles to the shaft, instead of being cylindrical and coaxial to the same. In this case one may define the pulley as consisting of two members: the first being solidary with the shaft and the second, contacting the first along a flat circular surface, and being obliged to follow the former during rotation in one direction, while in the other direction the two faces may glide freely or with very slight friction on each other.

The above mentioned disposition relates to hand brakes, but it is obvious that it can also be extended to other types of brake (block brakes, centrifugal brakes, friction brakes) accordingly said disposition may be also applied when, instead of a pulley, a sleeve, disc, or drum is used.

Lastly, the freewheeling device may, instead of being inserted between pulley and shaft or between the two members constituting the pulley, be altogether an integral part of the brake system and be completely detached from the shaft when the brake is off; this system avoids the noise of the freewheeling and is better illustrated in the drawings.

One may vary the choice of the type, the extension of the braking surface, the distance between the freewheeling unit and the shaft axis (lever arm) according to the angular speed, the power transmitted, the inertia of the masses that are to be immobilised and the time within which one wishes to attain the braking.

To attain the second object indicated in the present description two pulleys (sleeves, discs or drums) must be used instead of one, both constructed in the aforesaid manner, the first being furnished with a freewheeling unit having a clockwise movement, the other being provided with a freewheeling unit having a counterclockwise movement. The braking system must be able to act at will on either pulley. The freewheeling unit may, also in this case, be inserted in the braking assembly instead of on the intermediate member; with this system a single pulley is sufficient.

The braking disposition object of the present invention is advantageously applied to transmission driving shaft of motor vehicles instead of the actual hand brakes, with the object, for instance, of allowing a vehicle to start uphill with the brakes off, as if it were on level or propped, without any danger of regression and without having to accelerate excessively, at the same time reducing to the minimum the friction and the friction lining wearing.

This disposition is particularly useful for transporting heavy loads on steep slopes or for when it is necessary to go into back gear to turn a vehicle round on a slope or on the edge of cliffs; its use is also particularly advantageous for obtaining greater safety and for military uses as it facilitates the driving of motor vehicles thus increasing the number of persons to whom one may entrust a vehicle in difficult conditions.

It is quite easy to apply this disposition as in most cases the hand brake is not used to reduce a rotating shaft to zero speed but only to prevent a shaft that is or passes through zero speed from starting rotation.

A similar disposition may be applied to expansion brakes on the wheel drums of motor vehicles or lorries when they are furnished with matched wheels, the movement of the first being clockwise and that of the second counterclockwise.

In the accompanying drawings:

Fig. 1 is a front elevation, with parts broken and omitted, showing diagrammatically a shaft provided with a one way brake arrangement according to the invention.

Fig. 2 is a cross section on line II—II of Fig. 1.

Fig. 3 is a cross section on line II—II of Fig. 1.

Fig. 4 is a modification of the arrangement disclosed in Fig. 1.

Fig. 5 is a cross section on line V—V of Fig. 4.

Fig. 6 is a cross section on line VI—VI of Fig. 4.

Fig. 7 is a further modification of the arrangement disclosed in Fig. 1.

Fig. 8 shows another embodiment of modification of Fig. 7.

With reference to Fig. 1, a shaft 1 carries two one way clutch devices 2 and 3, details of which are visible on Figs. 2 and 3. Each of said devices 2 and 3 comprises a central disc 4, 4', keyed on said shaft 1 and surrounded by a ring or annular member 5, 5'. In the annular space between disc 4 and ring 5 a one way clutch unit 6 and 7 is interposed, respectively. Unit 6, as seen in Fig. 2, allows disc 4 and shaft 1 to rotate clockwise in respect of ring 5, while unit 7, as seen in Fig. 3, allows disc 4' and shaft 1 to rotate counterclockwise in respect of ring 5'. Rings 5 and 5' are subjected to braking by hand brakes 8 and 8'. Brake 8 acts to prevent clockwise rotation of ring 5, and brake 8' acts to prevent counterclockwise rotation of ring 5'. Brakes 8 and 8' are fast on a pivot 9, 9' at one end of the brake band, and are joined through connecting rods 10, 10' to one end 11 of a lever 12 pivoted in 13, (Fig. 1). Control lever 12 is shown in its middle position wherein the two brakes 8 and 8' are released and therefor shaft 1 is free to rotate in either direction. Lever 12 may be adjusted in respect of a toothed rack 14 and cooperates with rack teeth 15 by means of a pawl 16 which is controlled by a control knob 17 lodged in lever handle 18.

When lever 12 is shifted to the left, brake 6 is set through a leverage not illustrated in the drawing, of the usual type, and consequently shaft 1 can only rotate in a clockwise direction. Whereas when lever 12 is shifted to the right brake 8' is set through another leverage, and shaft 1 is only free to rotate in a counterclockwise direction.

According to Figs. 4, 5 and 6 wherein the same parts are indicated by the same reference numerals, two one way clutch devices 2 and 3 are both mounted on the same side of shaft 1 relative to control lever 12, and operation is the same as above disclosed in respect of said first embodiment of Fig. 1. Figs. 5 and 6, showing one way clutch devices 2 and 3 does not need any particular explanation.

According to Fig. 7, shaft 1 is provided with two discs 19 and 20 keyed thereto. On shaft 1 two one way clutch devices 21 and 22 are mounted in such a manner, that they can axially slide on said shaft in order to approach and come into contact with discs 19 and 20.

One way clutch devices 21 and 22 comprise a sliding sleeve 23 and 23', operated by control lever 12 through leverages 24, 24'. On sleeves 23 and 23', which can only axially slide but not rotate, a disc member 25, 25' is fixedly mounted and bears rotary friction rings 26, 26', a one way clutch being interposed between discs 25, 25' and rings 26, 26'. Said one way clutches are adapted to let rings 26, 26' freely rotate in contrary directions. When one of the rings 26, 26' comes into contact with cooperating discs 19, 20, and a pressure is axially exerted in order to connect by friction one of said rings with one of said discs, then shaft 1 is permitted to rotate only in one direction. By shifting lever 12 from one to the other of its end positions, one way clutch devices 21 and 22 come alternatively in operation and therefore shaft 1 is alternatively allowed to rotate in either direction.

According to Fig. 8, which is a very conventional modification of the device shown in Fig. 7, only one disc 27 keyed on shaft 1 is employed instead of two discs 18 and 28 of the embodiment of Fig. 7, and one way clutch devices 21 and 22 operate on the two sides of disc 27. The remaining parts are quite similar to those of Fig. 7 and are denoted with the same numerals.

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