PUBLISHED
MAY 11, 1943.
BY A. P. C.

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TRANSMISSIONS FOR MOTOR VEHICLES

Filed Dec. 4, 1940

Serial No.
368,540

Fig. 1

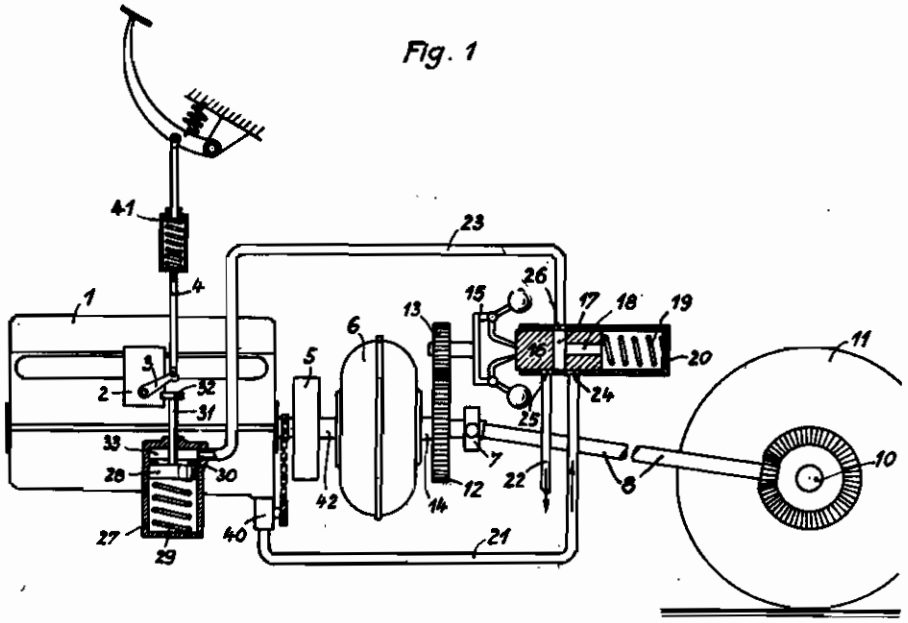
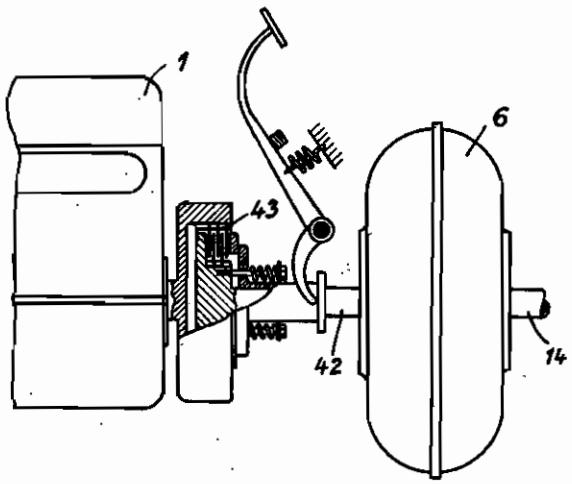


Fig. 2



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Published May 11, 1943 Serial No. 368,540

ALIEN PROPERTY CUSTODIAN

TRANSMISSIONS FOR MOTOR VEHICLES

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Application filed December 4, 1940

My invention relates to transmissions for motor vehicles and has special reference to transmissions including a hydraulic torque converter or a plurality of such converters. It is of special importance in heavy vehicles driven by internal combustion engines.

In transmissions of this kind it is aimed at to have a high secondary turning moment with low numbers of revolutions, so as to get high tractive forces when starting. Thus it is possible that extraordinary high stresses are created in the members of the transmission which may afford greater dimensions of such members and thus make them extremely heavy; and at the wheels of the vehicle the friction limit may even be exceeded.

According to my invention these disadvantages are avoided by providing means preventing increase in motor output over a certain small period when starting, for example for speeds up to three miles per hour. Consequently the value of the secondary turning moment is adequately limited and practically held constant over the aforementioned period and the stresses of the transmission elements remain within admissible limits.

For this purpose I prefer to provide a device which operates in dependence on the speed of the vehicle, that is in dependence on the revolutions of the out-going shaft of the hydraulic torque converter or of the shaft driving the wheels of the car.

All this will be understood best when having reference to the drawings which represent an example embodying my invention.

Fig. 1 is a diagrammatical side view, partly in section, of the driving machinery of a railroad motor car, some parts being shown on an enlarged scale.

Fig. 2 is a like view of a detail but different from Fig. 1.

The internal combustion engine 1 is provided with any normal fuel intake 2 adapted to be operated by means of lever 3, rod 4 and device 41, which may be made to work automatically in any well known manner (not illustrated). On the outgoing motor shaft 42 fly wheel 5 is situated. There may as well be inserted a friction clutch 43, instead or in addition, as represented in Fig. 2. Shaft 42 then leads to a hydraulic torque converter 6 which on its out-going right hand side has shaft 14. To this shaft 14 driving shaft 9 is flexibly connected by means of a universal joint 7. Shaft 9 at its right hand end is provided with bevelled gears for driving the axle 10 with wheel 11 thereon.

There is a pinion 12 rigidly connected to shaft 14 and in mesh with pinion 13 which again is in driving connection with a centrifugal governor 15 adapted to act on piston 16 inside of cylinder 20 against the pressure of compression spring 19. Piston 16 has a cross channel 17 and a longitudinal channel 18, this latter channel 18 connecting cross channel 17 to the space to the right of piston 16. An oil pump 40 driven by the engine 1 tends to press oil through tube 21 which at 24 opens into cylinder 20. Another opening 25 is situated close to opening 24, but the distance between these openings is so chosen that cross channel 17 in piston 16 may be either in connection with one or the other of these openings 24 and 25. From opening 25 the oil may escape outward by means of tube 22, as indicated by the arrow.

There is a third opening 26 in cylinder 20 situated opposite to the upper end of cross channel 17, and connected to this opening is tube 23 leading to cylinder 27 in which piston 28 is adapted to slide under the oil pressure from the space 33 above the piston and the re-action of compression spring 29. A bracket 30 or the like prevents piston 28 from being moved to the top of the cylinder 27; in the idling position, when there is no oil pressure inside of space 33 piston 28 under the pressure of spring 29 bears against this bracket 30.

A rod 31 is in rigid connection with piston 28, and at its upper end it is provided with knob 32 or the like against which the right hand end of lever 3 may bear when this lever is operated by means of rod 4 after it has travelled over a certain way.

The different parts of the device are in the positions represented in Fig. 2 when the engine 1 is not running. When it was started the fuel admission is limited because lever 3 with its right hand end after a certain way bears against knob 32. Thus the engine is prevented from developing its entire output when the car is started, but later on, when the number of revolutions of the driven shaft 14 increases which means that the car begins to move, the carburetor is allowed to be opened to a greater extent, in dependence on the speed of rotation of the driven shaft. Because of the rotation of shart 14, pinions 12 and 13 and centrifugal governor 15 cause piston 16 to be moved to the right, so that pressure oil from tube 21 may enter through cross channel 17 and longitudinal channel 18 into the space to the right of piston 16. But this increase in oil pressure causes piston 16 to be moved back again

to its middle position. Consequently, a certain increased oil pressure is maintained in channel 17 and transmitted to space 33 of cylinder 27. This increased pressure causes piston 28 to move downward so that knob 32 also moves downward allowing for further movement of lever 3 which means an increase in fuel admission and in motor output. This again may cause another increase in car speed and thus a further increase in oil pressure in space 33, so that at last full opening of the carburetor is allowed.

But up to the pre-determined speed limit, for instance 3 miles per hour, the turning moment is practically held constant, whereas it is allowed to decrease in the normal manner, in accordance with the diagram of the relation between the secondary turning moment and the numbers of revolutions, which is well known.

Instead of making use of a fluid pressure device one may as well choose a mechanical, pneumatical or electrical device for preventing the carburetor to be opened to a certain extent only when starting. As the construction of such other devices appears to be within the knowledge of those skilled in the art after they have read my foregoing specification it is not deemed necessary to give special illustrations thereof.

I do not want to be limited to the details described or shown in the drawing as many variations may occur to those skilled in the art without deviating from the scope of my invention.

KARL MAYBACH.