# PATENT SPECIFICATION

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**314,897**

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Complete Accepted: May 8, 1930.

COMPLETE SPECIFICATION.

## Improvements in or relating to Transmission Systems for Motor Vehicles.

I, VINCENZO LANCIA, Trading as LANCIA & C., of 99, Via Monginevro, Turin, Italy, an Italian Subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to transmission systems for motor vehicles and comprises a transmission system in which the back extremity of the propeller shaft is flexibly connected with a shaft section rotatably coupled but movable longitudinally with respect to a sleeve mounted in the lower half of the rear axle casing, this sleeve carrying the member transmitting the movement to the said rear axle.

On the annexed drawing,

Figure 1 shows diagrammatically in longitudinal elevation, the chassis of a motor vehicle with transmission of known type;

Figure 2 shows a longitudinal elevation and part section of the back part of a transmission according to the invention where the differential is driven by a conical pinion mounted with its axis below the axis of the differential crown;

Figure 3 is a similar view of a variation;

Figure 4 is a similar view—where the differential is driven by a worm;

Figure 5 is a cross-section through *x*—*x* of Figure 3;

Figure 6 is a cross-section through *y*—*y* of Figure 4.

It is known that in order to permit, in the transmission systems of motor vehicles, of the considerable variations in length due to the vertical displacements of the rear axle, the shaft 1 which has to transmit the rotation of the motor to the rear axle is connected (see Figure 1) either with the shaft 2 forming the driving element of the differential mechanism, or with the shaft 3 from the change speed gear box, by a sleeve and by a rod provided with longitudinal corresponding castellations which ensure the transmission of the movement of rotation whilst permitting relative displacements in the direction of the axis of the shaft.

[*Price* 1/-]

In a construction according to the invention, the back end of the shaft 1 is coupled by means of a hinged joint 4 with a section of castellated shaft 2 by the aid of which it engages in the corresponding castellations on the internal surface of the sleeve 6.

This sleeve 6 is mounted by means of a bearing 7 at each end, in the lower half of the differential casing 8.

The shaft section 2 and the sleeve 6 constitute a joint permitting axial displacements.

In the construction shown in Figure 2, the transmission gear fitted in the differential is formed by a gear of known type in which the axis of the pinion 9 is below the axis of the crown 10 in order to lower the transmission shaft. In this case, the pinion 9, fixed on the sleeve 6 or forming one piece therewith, is mounted in such a position that it engages with the crown 10 in the front and lower quadrant thereof.

The pinion 9 could also engage with the crown 10 in its lower and back quadrant as shown by Figure 3. In this case, the fitting of the pinion 9 and of the sleeve 6 may be effected under the requisite conditions of strength without producing any noticeable projection of the front part of the box 8, so that the joint 4 connecting the shaft section 2 with the shaft 1 may be kept close to the box and the said joint 4 may be brought, on account of the inclination of the shaft 1, in a lower position than in the arrangement shown by Figure 2. This also permits lowering the floor of the vehicle.

In the construction shown in Figures 4 and 6, a worm 11 is fitted on the sleeve 6 and engages with a wheel 12 attached to the gear of the differential. The transmission of movement between the sleeve 6 and the driving gear of the differential (or in general the member serving to rotate the back wheels), could also be effected in any other suitable manner.

The parts engaging together of the shaft 2 and the sleeve 6 must have sufficient length to permit the relative longitudinal displacements of these two members which remain connected during rotation by

reason of the ribs and grooves or other means adopted to effect their coupling.

The arrangement described permits of effecting a transmission under conditions which allow of lowering the floor of the vehicle.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A transmission system for motor vehicles characterised by the back extremity of the propeller shaft being flexibly connected with a shaft section rotatably coupled but movable longitudinally with respect to a sleeve mounted in the lower half of the rear axle casing, this sleeve carrying the member transmitting the movement to the said rear axle.

2. A transmission system according to Claim 1 characterised by the driving member carried by the sleeve being constituted by a conical pinion the axis of which does not intersect the axis of the crown wheel with which it engages.

3. A transmission system according to Claim 2, characterised by the pinion engaging with the crown wheel in the lower back quadrant thereof.

4. The transmission system substantially as described or substantially as illustrated.

Dated this 3rd day of July, 1929.

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Fig. 1

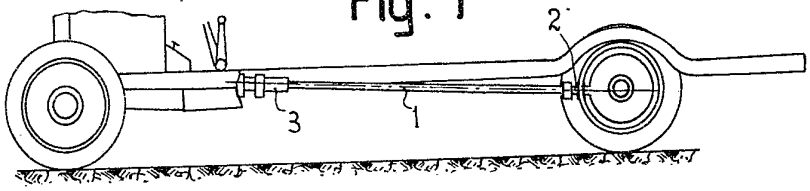



Fig. 2

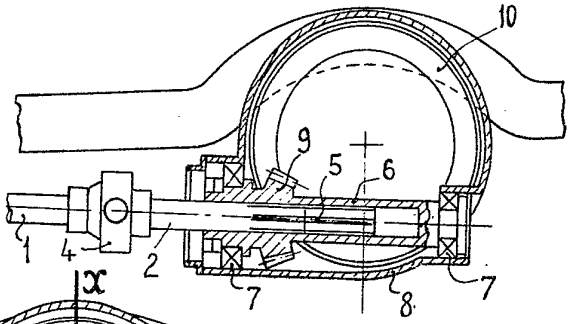



Fig. 3

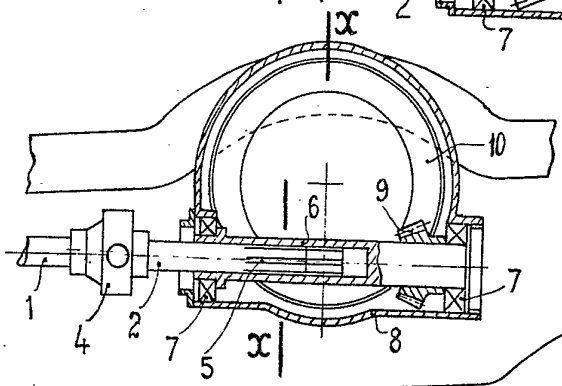



Fig. 4

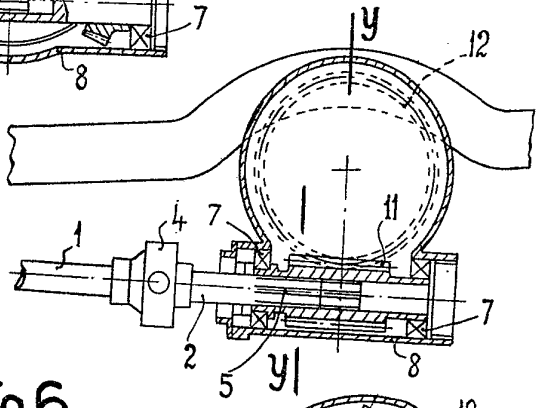



Fig. 6

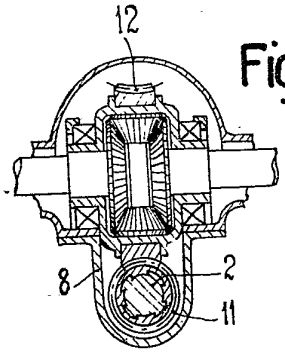
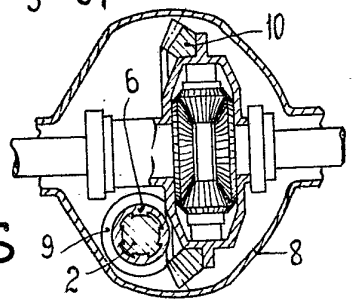



Fig. 5

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