# PATENT SPECIFICATION

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**190,458**

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Complete Accepted: March 8, 1923

COMPLETE SPECIFICATION.

## Improvements in or relating to Control Devices for Change-speed Gears.

I, LANCIA & C., 99, Via Monginevro, Turin, Italy, an Italian company, 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 present invention relates to an improved control device for the change speed gears of motor cars, which gears comprise a plurality of sets of movable pinions arranged at a distance from the operator.

The change speed gear according to the invention is of the kind in which a spindle adapted to be moved angularly and axially by the operating lever is provided with teeth adapted to engage with notches in movable forks.

According to the invention the spindle is further provided with a tooth which, when the spindle is in the neutral position, comes between two co-axial stops, and when the spindle has been angularly shifted, is adapted to slide on the sides of the said stops.

It follows that the spindle cannot be axially shifted when it is in its neutral position, while it cannot leave its operative position during its axial displacement, so that any incorrect movement is rendered impossible.

In the annexed drawings which show by way of example an embodiment of this invention,

Figure 1 is a section on the central longitudinal plane,

Figure 2 is a plan section on the line $z$—$z$ of Figure 3, which latter is a transverse section on $x$—$x$ of Figure 1, and

Figure 4 is a transverse section on the line $y$—$y$ of Figure 1.

In said figures, 1 is the change speed gear box in which are mounted to move, in longitudinal direction as usual, two toothed pinions 2 and 3 engaged respectively by the forks 4 and 5, each of which may be moved in a direction parallel with the axis of the pinion, say by being connected to sleeves 6 and 7 sliding on bars 8 and 9, and provided with locking means such as spring actuated balls $6^1$.

The sleeves 6 and 7 are located one on each side of the central vertical plane of the change speed gear, and each of them carries, on its side facing said plane, two teeth 10—$10^1$ which leave an intermediate space and are in front of the similar teeth of the other sleeve when the pinions are in inoperative position.

A spindle 11 is mounted parallel to the bars 8 and 9 and along an axis intermediate and above them, said spindle being hollow in the construction illustrated and fitting in two bushings 12 of the box 1 in such a manner as to rotate around its axis and slide longitudinally.

On the spindle 11 is fastened a sleeve 13 which on one side carries a tooth 14 adapted to enter the space between the teeth 10—$10^1$ of the sleeves 6 and 7 while on its opposite side is another tooth 15 which when the sleeve 13 is in its intermediate position, is engaged between the ends of two concentric pins 16—$16^1$ secured to the box 1 and arranged in the vertical plane lying through the axis of the spindle 11.

When the sleeve 13 is in its neutral position with its teeth 14 and 15 in a vertical plane, it is held immovable in the axial direction because its tooth 15 engages either of the pins 16—$16^1$. On the contrary it may be oscillated to either side to carry the tooth 14 into the recess between the teeth 10—$10^1$ of either of the sleeves 6, 7 and then the said sleeve 13 may be shifted longitudinally because its tooth 15 is then clear of pins 16—$16^1$ and may slide along one of them. Therefore

by oscillating the spindle 11 and then shifting it longitudinally, it is possible to move either of the forks 4 and 5 to carry the desired pinion 2 or 3 in the required position while the pins 16—16¹ prevent any undue operation because they prevent the sleeve 13 from being moved longitudinally when the tooth 14 is not engaged with either of the sleeves 6 and 7, and prevent the tooth 14 from coming out of engagement during the longitudinal shifting.

The operation of the change speed gear may be effected from any desired point by oscillating the spindle 11 and moving it longitudinally.

In the construction illustrated the spindle 11 is flexibly connected say by means of a double ball 17, with another tubular shaft whose opposite end is supported by a stationary head 19. The shaft 18 carries a seat 20 in which is engaged the ball end 21 of the actuating lever 22 mounted to float on a ball 23 provided on the stationary box 24 on which is also mounted the brake lever 25.

The operation of the gear is thus obtained by simple movements of the lever 22 which may be located at any desired distance from the gear box.

Therefore the gear can be located at any point of the transmission independent of the position of the operating lever.

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

1. A device for controlling change speed gears with sliding pinions for motor vehicles wherein a spindle is adapted to move angularly and axially, characterised by the fact that the said spindle is provided with a tooth adapted to engage with a fork when the spindle is moved angularly, and with a tooth which comes between two co-axial stops when the spindle is in its neutral position and which is adapted to slide on the sides of the said stops when the spindle occupies one of the angularly shifted positions.

2. A device according to Claim 1, in which the stops for the spindle consist of two co-axial pins secured to the gear-case and between the oppositely arranged ends of which the tooth of the movable spindle takes up its position.

3. A device for controlling change speed gears with sliding pinions for motor vehicles, substantially as decribed and illustrated.

Dated this 17th day of November, 1922.

LANCIA & C.,
Per Boult, Wade & Tennant,
111 & 112, Hatton Gardon, London, E.C. 1,
Chartered Patent Agents.

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FIG. 1

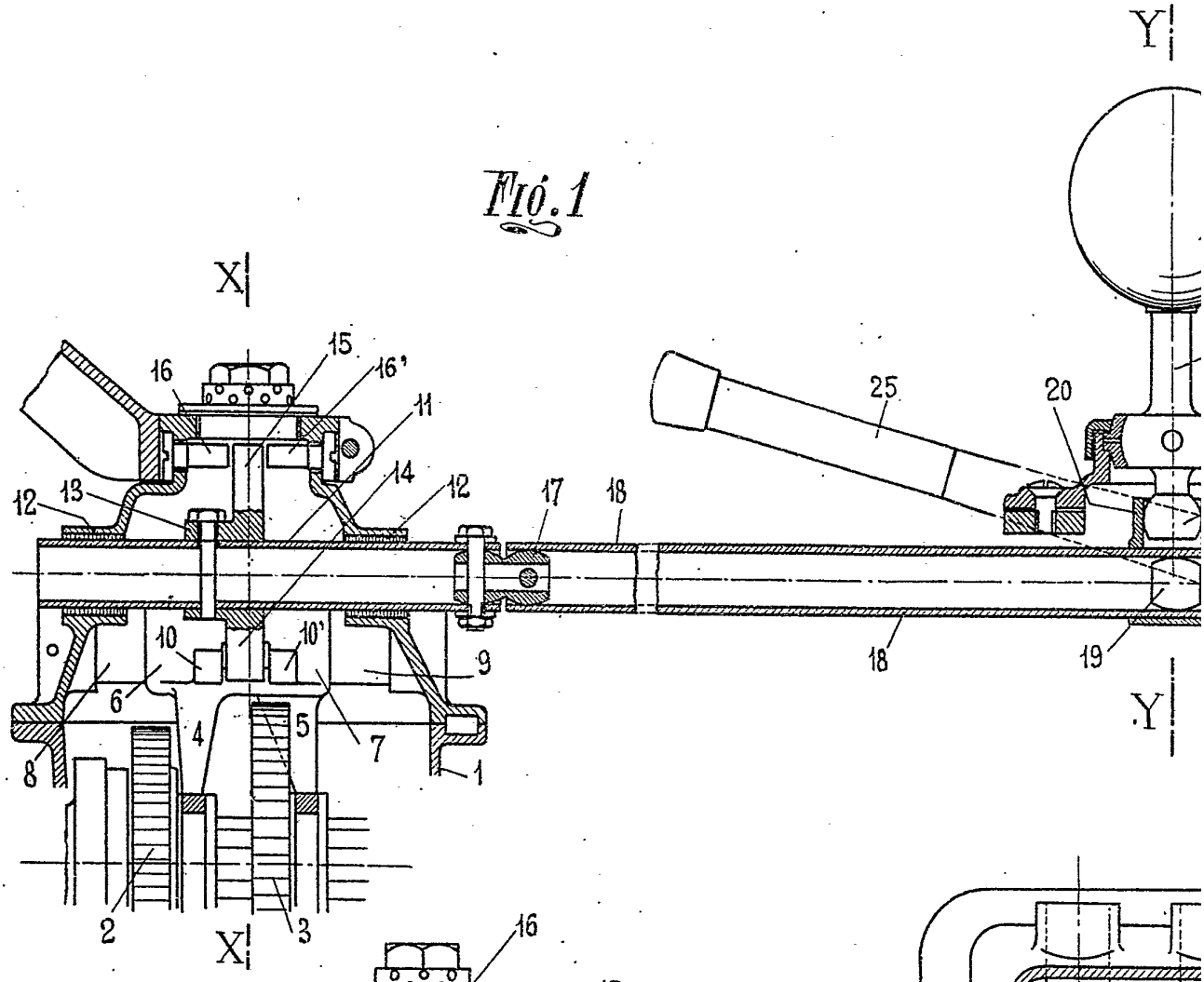
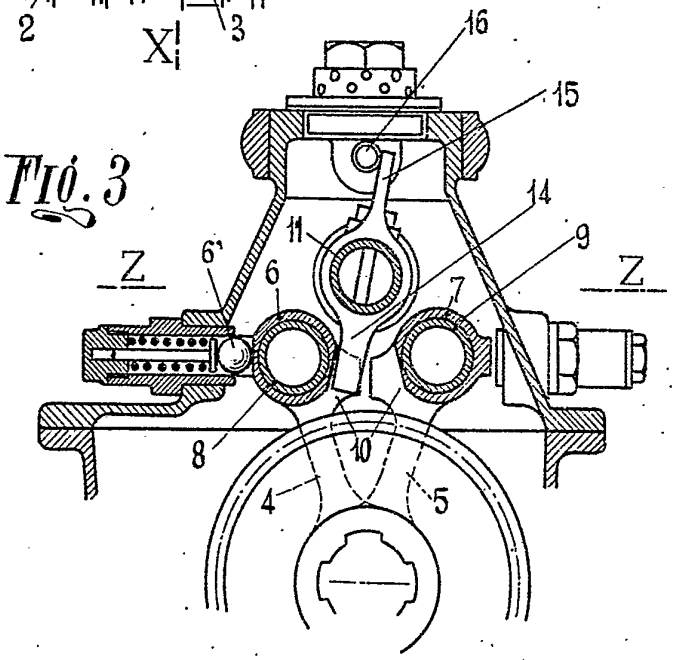



FIG. 3



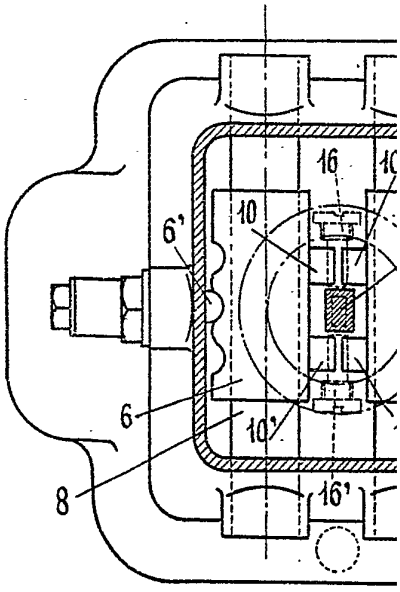




FIG. 2

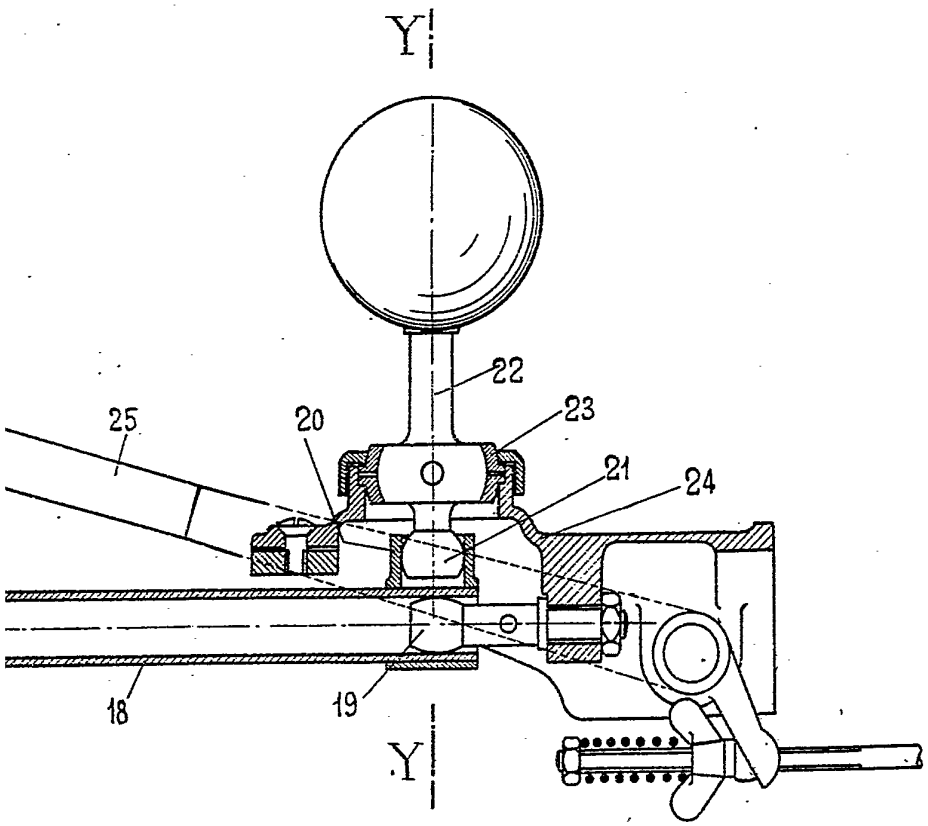



FIG. 4

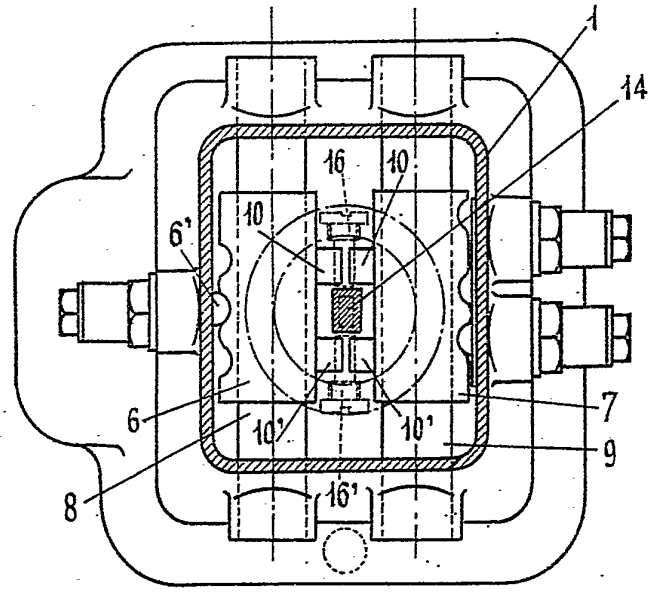
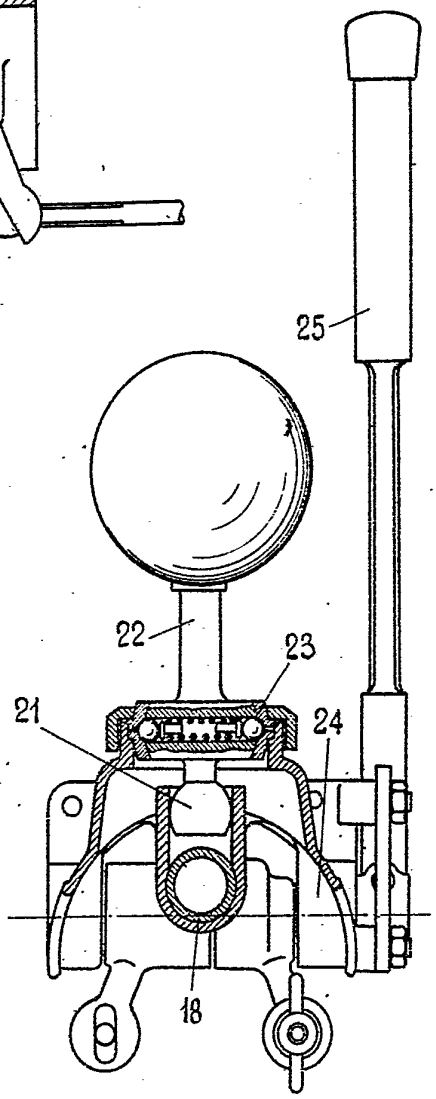



FIG. 2

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[This Drawing is a reproduction of the Original on a reduced scale]

FIG. 1

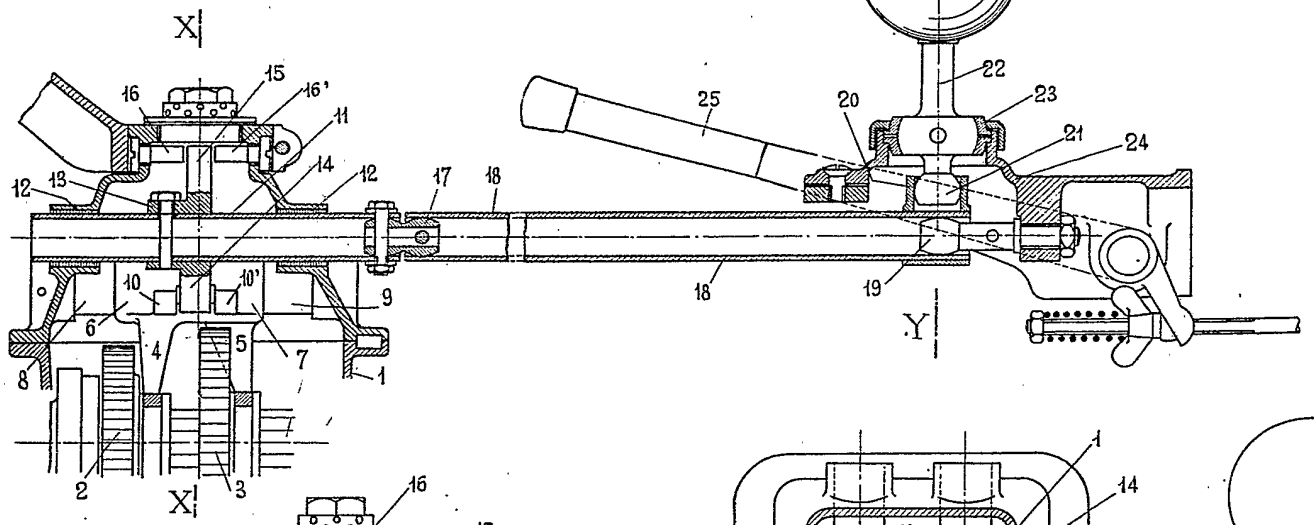



FIG. 4

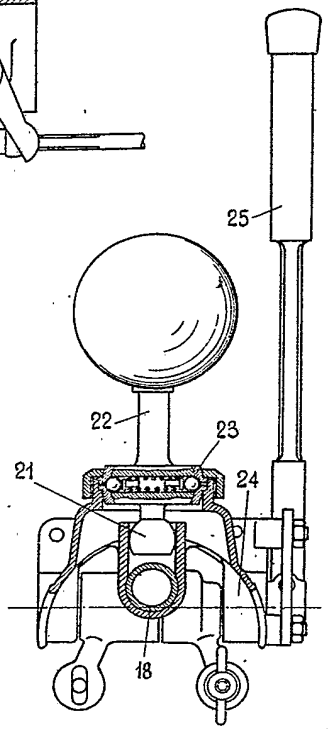



FIG. 3

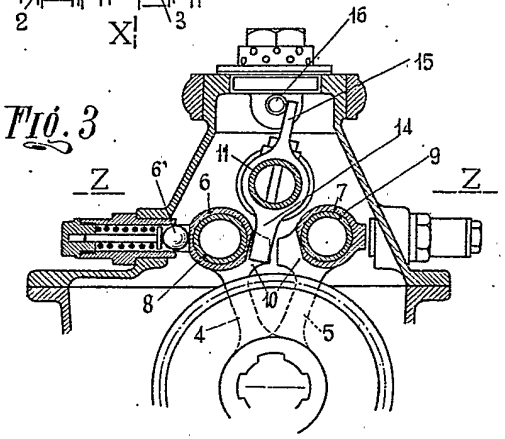
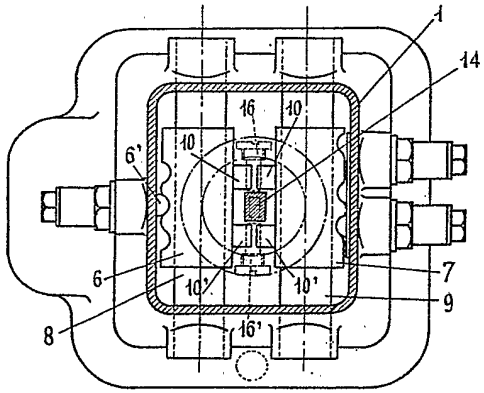



FIG. 2

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