PATENT SPECIFICATION

312,760

Application Date: April 17, 1928. No. 11,308/28.

Complete Left: Jan. 3, 1929.

Complete Accepted: June 6, 1929.

PROVISIONAL SPECIFICATION.

Front Wheel Drive for Motor Vehicles.

We, THE ALVIS CAR & ENGINEERING COMPANY LIMITED, a British Company, GEORGE THOMAS SMITH-CLARKE, a British Subject, and WILLIAM MARSHALL DUNN, a British Subject, all of Holyhead Road, Coventry, Warwickshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to the driving of front steerable wheels of a vehicle, and its principal object is to provide simple and effective means for preventing the driving effect reacting on the steering and thus rendering the latter difficult or even uncontrollable at high vehicle speeds.

According to this invention, transmission of the drive is effected through a universal joint, the acting centre of which is on the steering axis of the wheel, and means are provided for adjustment and maintenance of this condition.

Thus the driving torque cannot exert any unbalanced effect about the axis of steering.

In one method of carrying out the invention, the stub axle for the front wheel is rotatably supported in a hollow part-spherical member. The latter is supported and mounted in a corresponding cup and also is pivoted thereto on the steering axis which extends through the centre of the part-spherical member. For supporting the stub axle there may be a pair of spaced ball or roller bearings, one on each side of the steering axis. The cup is divided horizontally to receive the part-spherical member, and the latter is provided with vertical pivots which engage bearings on the cup, one of these pivots projecting beyond the bearing for attachment to it of the steering mechanism.

Adjacent the bearings for the pivots are provided, on the upper and lower side of the cup, attachment lugs for suspension springs, preferably arranged in pairs side-by side, and on the side of the cup opposite the stub axle there is an aperture by which the driving shaft enters with sufficient clearance for relative movement between the two.

The universal joint comprises on the end of the driving shaft a part-spherical portion having flats on opposite sides. A pin extends centrally through its flattened sides, and slidably and rotatably mounted upon each projecting end is a ball, the whole forming, in effect, a T-piece. In the end of the stub axle are formed three side-by-side longitudinal bores (the middle one concentric with the axle) which break into one another and receive respectively the centre part-spherical portion on the driving shaft and the two sliding and rotatable balls on each side of it. This, therefore, provides a universal joint with complete freedom for angular movement and relatively very small frictional resistance to the movements of the joint.

The essential feature of the invention is the accurate location of the centre of this universal joint on the steering axis of the wheel, and for this purpose the driving shaft is adjustably positioned so as to bring the centre of the part-spherical surface into the line of the steering axis. Preferably, therefore, the driving shaft is acted upon by a coil spring surrounding it, and thrusting it into the end of the stub axle against an adjustable stop provided therein. This stop may comprise a concave pad mounted within the central bore in the stub axle and adjustable by means of a threaded rod extending to the outer end of the stub axle. By means of this pad, therefore, the acting centre of the universal joint can be brought to coincide exactly with that of the steering axis.

As an alternative, this adjustable stop may form part of or be associated with a lubricating device such as is described in our co-pending Application Number 11,309/28.

It will be seen, therefore, that the invention provides a very simple means by which the centre of the universal joint can be accurately positioned so as to ensure a smooth drive and avoid any ill effect in the steering of the vehicle.

Dated this 16th day of April, 1928.

ERIC W. WALFORD,
Fellow of the Chartered Institute of Patent Agents,
19, Hertford Street, Coventry,
Agent for the Applicants.

[Price 1/-]

Price 3s. 6d.

COMPLETE SPECIFICATION.

Front Wheel Drive for Motor Vehicles.

We, THE ALVIS CAR & ENGINEERING COMPANY LIMITED, a British Company, GEORGE THOMAS SMITH-CLARKE, a British Subject, and WILLIAM MARSHALL DUNN, a British Subject, all of Holyhead Road, Coventry, Warwickshire, 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:—

This invention relates to the driving of the front steering wheels of a motor vehicle which includes a universal joint connecting the drive shaft with the wheel, of the kind which has a sliding connection with the wheel and is located on the steering axis and maintained in such condition by an adjustable stop against which it is held by a spring. The object of the invention is to provide an improved means for supporting and locking the stop which can be quickly and effectively actuated without necessitating its removal from the wheel.

According to this invention, the stop is engaged by a rod screw-threaded through a support such as a cap in the outer end of the stub axle where it is provided with a locking device.

In the accompanying drawings illustrating a preferred method of carrying out the invention,

Figure 1 is a fragmentary sectional elevation showing the drive to one of the steerable wheels of a vehicle, and

Figure 2 is a fragmentary plan of Figure 1.

The stub axle 2 for the front wheel is hollow and is rotatably supported in a hollow part-spherical member 3. The latter is supported and mounted in a corresponding cup 4 and also is pivoted thereto on the steering axis X, X which extends through the centre of the part-spherical member. For supporting the stub axle there may be a pair of spaced ball or roller bearings 5, one on each side of the steering axis. The cup 4 is divided horizontally (not shown) to receive the part-spherical member 3, and the latter is provided with vertical pivots 6 which engage bearings 7 on the cup, one of these pivots, preferably the lower one, projecting beyond the bearing for attachment to it of a steering arm 8.

Adjacent the bearings for the pivots there are provided, on the upper and lower side of the cup attachment lugs 9 for suspension springs 10 which are preferably arranged in pairs side-by-side as shown in Figure 2, and on the side of the cup opposite the stub axle there is an aperture 11 by which the driving shaft 12 enters with sufficient clearance for relative movement between the two.

The universal joint comprises on the end of the driving shaft a part-spherical portion 13 having flats 14 on opposite sides. A pin 15 extends centrally through its flattened sides, and slidably and rotatably mounted upon each projecting end is a slider in the form of a ball 16, the whole forming, in effect, a T-piece. In the end of the stub axle are formed three side-by-side longitudinal bores or grooves 17 (the middle one concentric with the axle) which break into one another and receive respectively the central part-spherical portion 13 and the two balls 16 on each side of it which slide in the outer pair of grooves in the known manner.

The accurate location of the centre 18 of this universal joint on the steering axis X, X of the wheel and maintaining it in this condition is essential, the driving shaft 12 for this purpose being adjustably positioned so as to bring the centre of the part-spherical surface 13 into the line of the steering axis. The driving shaft is acted upon by a coil spring 19 surrounding it, and thrusting it into the end of the stub axle against an adjustable stop provided therein. This stop may comprise a concave pad 20 mounted within the central groove 17 in the stub axle and is adjustable by means of a threaded rod 21 extending to the outer end of the stub axle and screw-threaded through a support such as a cap 22 at that point. To lock the rod after any adjustment of the pad, any suitable locking means may be provided and, as shown in Figure 1, the nut 23 effects this. By means of this pad with its adjusting and locking means, the acting centre of the universal joint can be quickly brought to coincide exactly with that of the steering axis and effectively maintained in such condition, and these operations do not necessitate removal of the device from the wheel.

As an alternative, this adjustable stop may form part of or be associated with a lubricating device such as is described in our co-pending Application Number 11,309/28.

Although the universal joint connection described is of the plunging type, it will be obvious that any other type of

joint may be used so long as it has a sliding connection with the wheel.

It will be seen, therefore, that the invention provides, in a very simple manner, for the support, adjustment and locking of the adjustable stop by which the centre of the universal joint is accurately positioned and maintained.

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. Front wheel drive of the kind referred to, in which the stop is engaged by a rod screw-threaded through a support such as a cap in the outer end of the stub axle where it is provided with a locking device.

2. Front wheel drive as claimed in Claim 1, in which the stop comprises a concave pad supported in a groove in the stub axle wherein the end of the drive shaft slides, and is adjustable in this groove by a rod attached thereto and screw-threaded through a cap closing the outer end of the stub axle where it is provided with a locking device, such as the nut 23, substantially as described.

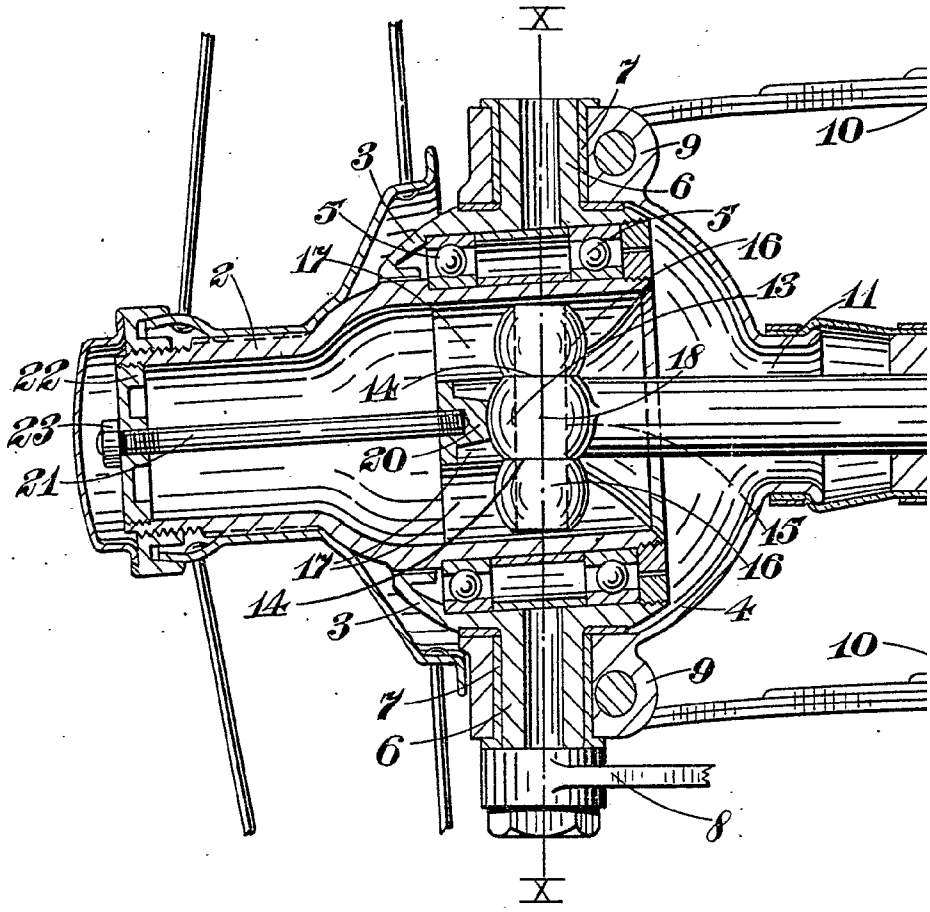
3. Front wheel drive as claimed in Claim 1 or Claim 2, wherein each wheel stub axle is rotatably supported in a hollow part-spherical member mounted in a corresponding cup and also pivoted thereto on the steering axis which extends through the centre of the part-spherical member, substantially as described.

4. The complete driving means for the front steerable wheels of a vehicle, substantially as described and as illustrated in the accompanying drawings.

Dated this 2nd day of January, 1929.

ERIC W. WALFORD,
Fellow of the Chartered Institute of Patent Agents,
19, Hertford Street, Coventry,
Agent for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1929.



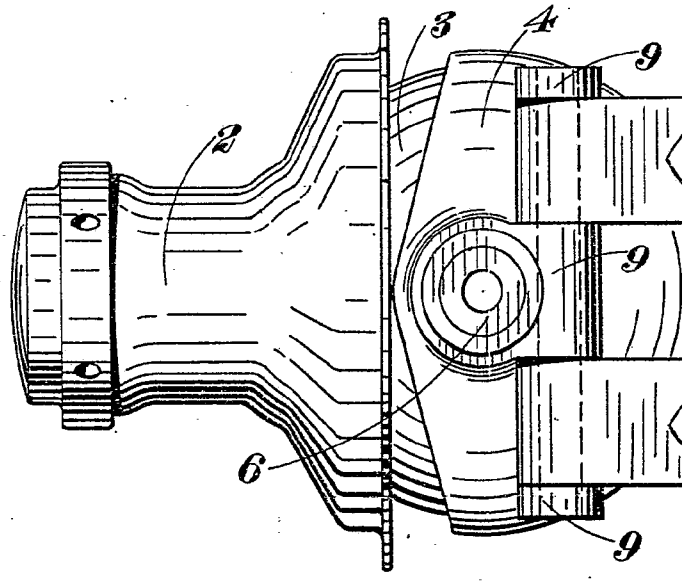


Fig.2.

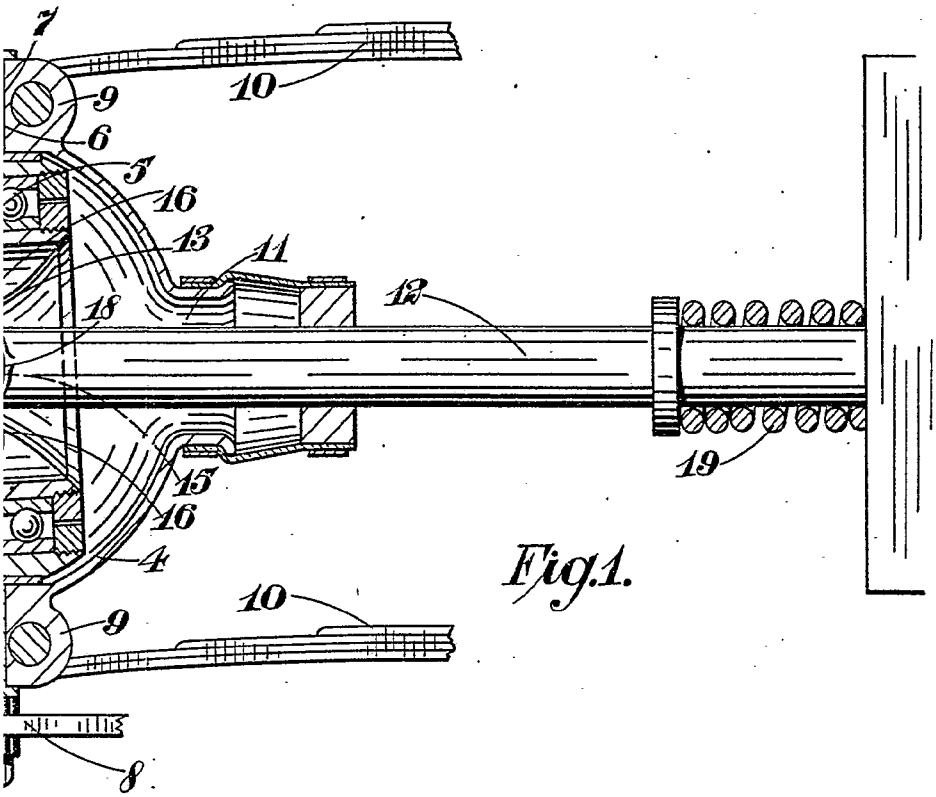


Fig.1.

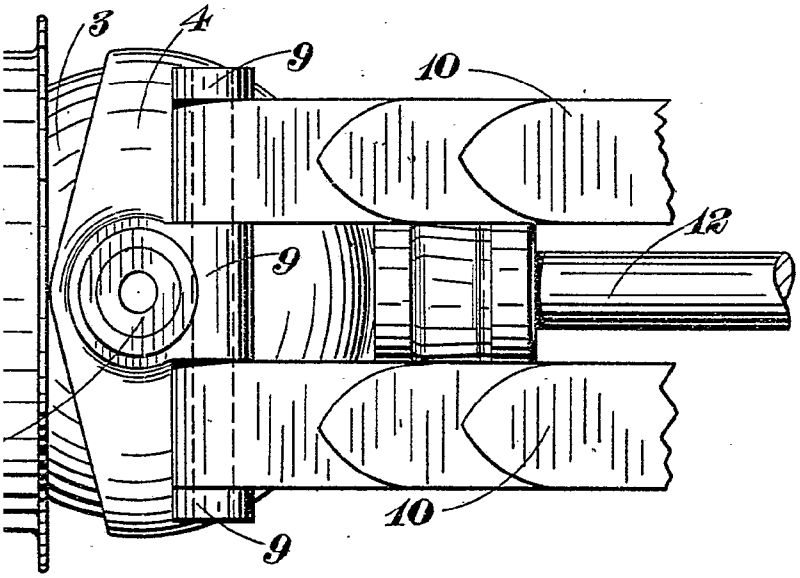


Fig.2.

Charles & Read Ltd. Photo Litho.

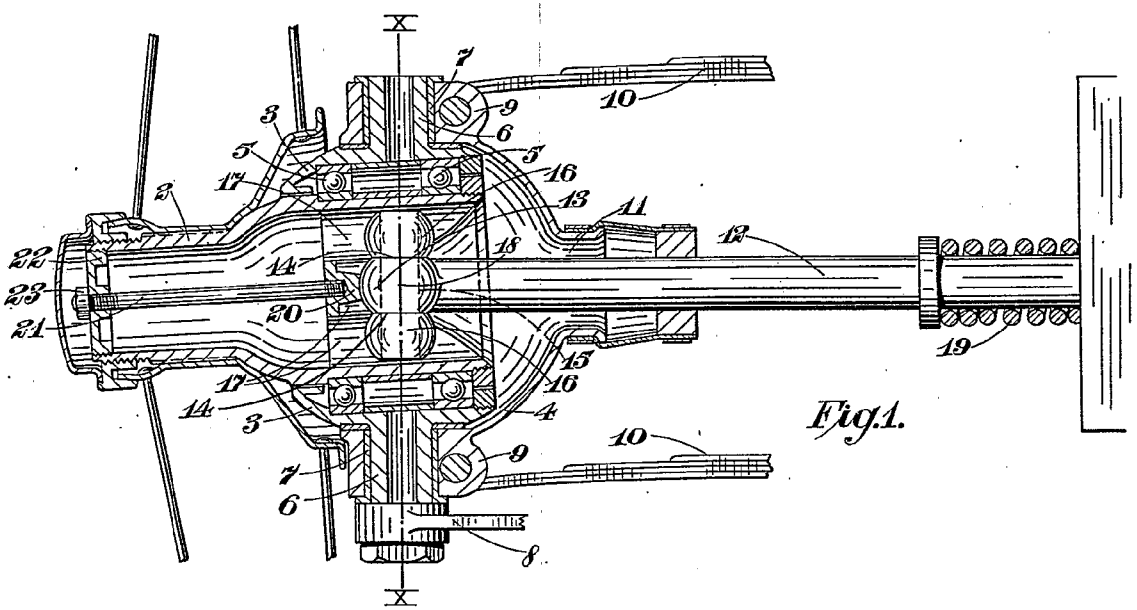


Fig.1.

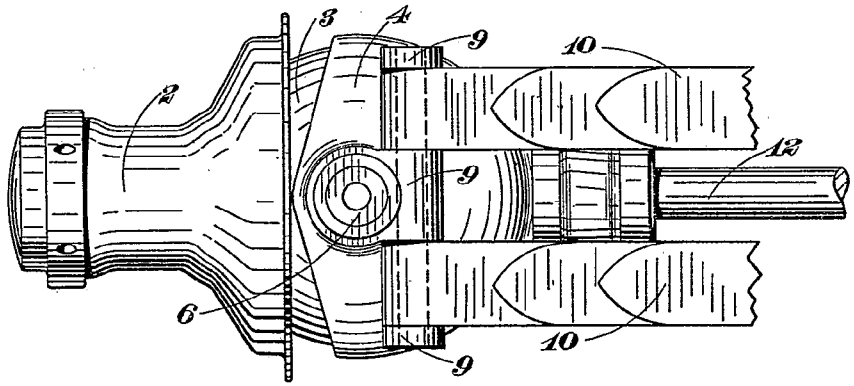


Fig.2.

Charles & Read Ltd. Photo Litho.