

Aug. 10, 1954

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2,685,873

STARTING DEVICE FOR MOTOR VEHICLE AUTOMATIC DRIVES

Filed May 16, 1952

Fig. 1.

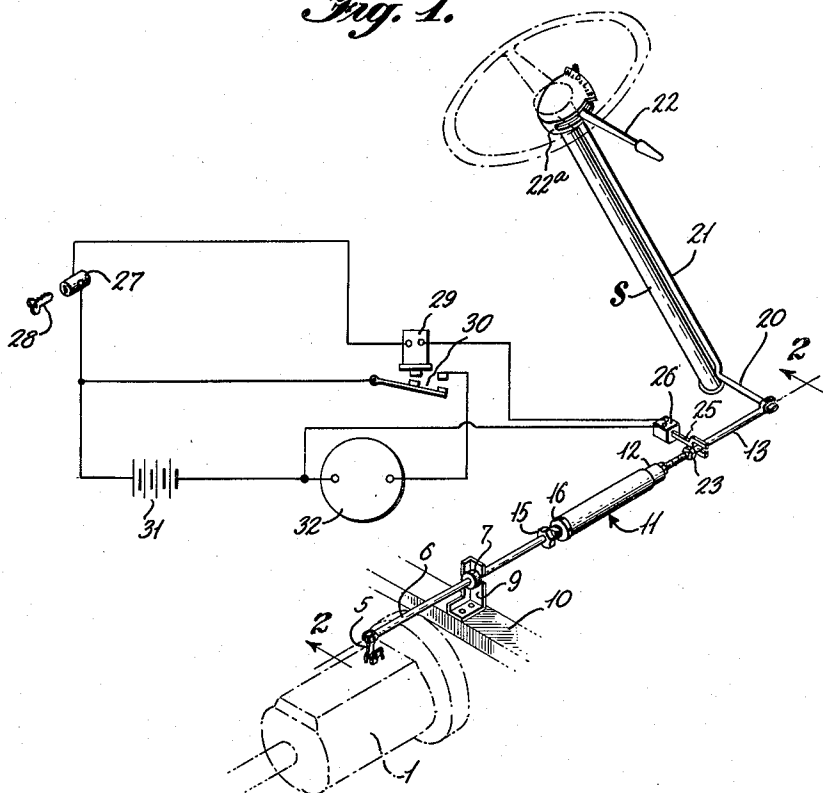


Fig. 2.

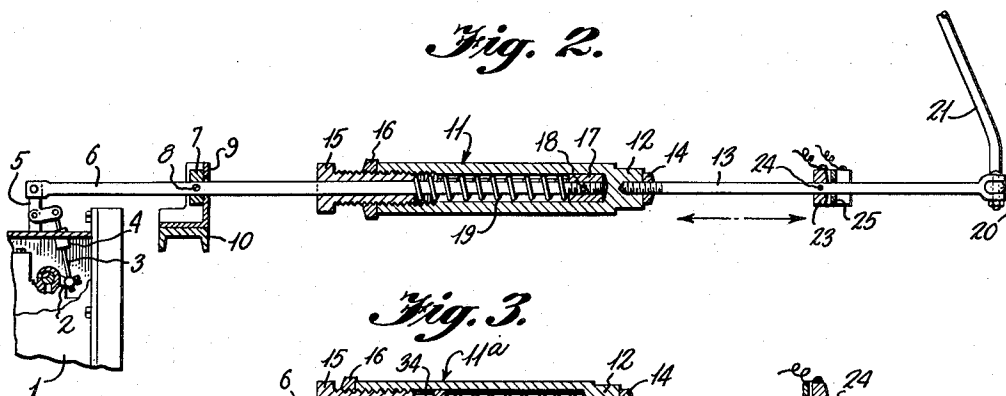
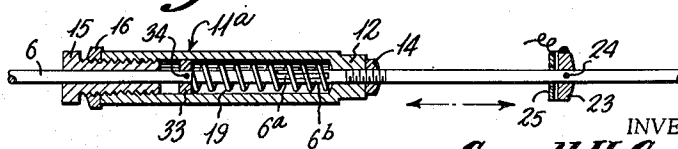


Fig. 3.



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2,685,873

STARTING DEVICE FOR MOTOR VEHICLE
AUTOMATIC DRIVES

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Application May 16, 1952, Serial No. 288,356

5 Claims. (Cl. 123—179)

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This invention relates to a starting device or system for a motor vehicle having an automatic drive, such as the so-called "hydramatic" drive, and, more particularly, to a starting device which is operable by the gear shifting quadrant lever conventionally mounted on the steering post.

In conventional starting devices for automobiles having automatic drives and variable speed transmissions, such as the so-called "hydramatic" drive, there is included in the starting circuit three serially connected switches controlling a like number of serial gaps in the relay circuit, one being the normal ignition key-operated switch, another being a limiter switch which assures that the starting circuit will not be energized by closing of the starter switch unless the quadrant lever is in the neutral position, and a third switch being the starter button or switch itself. Such starting device has the outstanding disadvantage and practical inconvenience that after the quadrant lever has been placed in neutral, the operator must reach over to the starter button, which is generally remotely situated, in order to start the motor. Also, in case the motor stalls after it has been started, it is necessary to again move the quadrant lever to the neutral position and to reach over to press the starter button which, of course, is time consuming and somewhat difficult, particularly for an excited driver.

An object of the present invention is to provide a novel starting device or system for a motor vehicle having an automatic drive which will eliminate the necessity of the above mentioned starter button, and wherein only two instead of three serially connected switches, including the ignition key switch, are necessary for starting, or for re-starting when the motor has become stalled.

A still further object of the present invention is to provide a starting device for a motor vehicle having an automatic drive, such as a so-called "hydramatic" drive, including a quadrant gear shifting lever normally mounted on the steering post, which is useful also to operate a starting switch by merely moving the quadrant lever slightly beyond the neutral position, whereby the conventional separate starting button may be eliminated and whereby both gear shifting and starting may be effected by a single lever, namely, the quadrant lever.

A more specific object of the present invention is to provide in a motor vehicle having an automatic drive and variable speed transmission, as well as a gear shifting lever, such as that

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conventionally mounted on the steering post, a novel starting circuit including a limiter switch which is operated by a sectional operating rod controlled by the lever so as to close the switch when the lever has been moved through and slightly beyond the neutral position and which sectional rod includes an extensible section which is yieldable to permit the rod to be so moved beyond the neutral position to the starting position and which will automatically restore the lever to the neutral position when it is released from the starting position.

Other and more specific objects of the invention will appear as the following description of practical embodiments thereof proceed. In its exemplary form herein shown, the invention is applied to an automobile having an automatic drive and variable speed transmission, such as the so-called "hydramatic" drive. However, it will be apparent that the invention is also applicable to drives for other vehicles or devices which incorporate an automatic drive transmission.

In the drawings which accompany the following specification and throughout the figures of which the same reference characters have been used to denote identical parts:

Figure 1 is a perspective view showing somewhat schematically a starting device or system for an automobile having an automatic drive and variable speed transmission;

Figure 2 is an enlarged fragmentary view, partly in longitudinal cross-section, taken along line 2—2 of Figure 1 and showing the sectional operating rod included in Figure 1, and

Figure 3 is a modification of the sectional operating rod shown in Figure 2.

Referring now in detail to Figures 1 and 2, numeral 1 denotes a fragmentary portion of a transmission housing which encloses a variable speed transmission of the type for providing automatic drive, such as the so-called "hydramatic" drive. The details of construction of such transmission form no part of the present invention and may be of any of the conventional types for providing an infinitely variable torque multiplying rate such as that disclosed in U. S. Patent No. 2,519,022 to E. R. Burtnett issued August 15, 1950. It should be understood that the invention is also applicable to other automatic drives including transmissions which are controlled by an operating member of some kind. Numeral 2 denotes such typical operating member to effect gear shifting and which is represented as a crank although it may have other shapes or forms. Crank 2 is operated by a rod or Bowden wire 3 which

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is slidable through a sleeve 4 extending through the outer wall of the transmission housing. A bell crank lever 5 is connected to rod 3 as well as to one end of an operating rod section 6. A collar 7 or similar stop element is rigidly secured to operating rod section 6 by means of a locking pin 8. A 90° flange or stop element 9 is rigidly fastened to a frame portion 10 or, in fact, to any other stationary portion of the automobile, and serves as a limit stop to limit the longitudinal movement of rod section 6. More specifically, the purpose of the stop comprising collar 7 and flange 9 is to permit movement of rod section 6 up to a point which corresponds to movement of rod 3 to the neutral position in the transmission. A spring loaded extensible coupling 11 is provided to serve as a yieldable element in the sectional operating rod whereby the housing portion 12 thereof may be moved together with the operating rod section 13 screw-threadedly connected thereto despite stoppage of rod section 6 by the stop element 9, as will be described more fully hereinafter. A lock nut 14 is provided to lock the connection between rod section 13 and housing 12. Into the open end of the hollow cylindrical housing 10 there is screw-threadedly connected an adjustable packing nut 15 which is locked in place to the housing by means of a lock nut 16. At the end of rod section 6, there is screw-threadedly mounted a collar 17 of bronze or other suitable metal which is fastened to rod section 6 by locking pin 18 or other suitable fastening means. A helical spring 19 surrounds a portion of the rod section 6 within the housing 12 and yieldably urges collar 17 away from the inner end of packing nut 15 against which the other end of spring 19 is supported. At the end of rod section 13, there is connected a crank portion 20 of a rod 21 which extends parallel to the steering post S. The top end of rod 21 is secured to a gear shifting or control quadrant lever 22 which includes a quadrant portion 22a encircling a portion of the steering post.

A collar 23 is fastened to operating rod section 13 by means of a locking pin 24, and the collar 23 is adapted to operate a starting limiter switch 26 through operating arm 25 only when the rod section 13 has been moved to a position beyond the neutral position, namely, the starting position, at which latter position coupling 11 is extended and resisted by the compression of spring 19.

The motor starting circuit includes in addition to the limiter switch 26, an ignition or key-operated switch 27 which is operable by a key 28, and includes a starter relay 29 including the usual solenoid for attracting an armature which is adapted to close the starter relay switch 30 upon energization thereof. A battery 31 or other suitable source of electric power is connected in series with the limiter switch 26, relay 29 and ignition switch 27 so that it will be apparent that unless both switches 26 and 27 are closed, a circuit will not be completed to the starting relay in order to close the starting switch 30 and start the starting motor 32.

In operation, when it is desired to effect starting of the motor by energization of the starting motor 32, the quadrant lever 22 must be first moved to the neutral position. Such movement will be transmitted by rod 21 and portion 20 thereof to rod section 13 which will be moved to the right, as viewed in Figure 2, carrying with it the spring loaded coupling 11 which now acts

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somewhat as a rigid unit because of the strength of spring 19 so as to move rod section 6 to the right. Such right-hand movement of rod section 6 will be arrested when collar 7 abuts the stop element or flange 9 at a position which corresponds to the neutral position in transmission housing 1, that is, the neutral position of crank 2 therein. But quadrant lever 22 must be moved to a position slightly beyond the neutral position which represents the start position. By such further movement, rod section 13 will continue its movement to the right, but since rod section 6 has been arrested by the stop flange 9, the spring loaded coupling 11 will now be extended, that is, the housing 11 thereof will be moved to the right relative to the arrested collar 17, which movement is resisted by the compression of spring 19. At the end of such movement, that is, when the start position has been reached, collar 23 will strike the operating arm 25 of the limiter switch 26 so as to partially close the starting circuit. The remainder of the circuit is closed by means of ignition switch 27. Hence, assuming that the ignition switch 27 has been previously closed, the starting circuit will now be completed through relay 29 so as to effect closing of the relay switch 30 and energization of the starting motor 32 which will effect starting of the motor.

Quadrant lever 22 may now be released from the starting position and in so doing, it will be automatically moved back to the neutral position as the result of the tension or expansion of helical spring 19 which tends to move rod section 13 to the left, as viewed in Figure 2, turning rod 21 and returning the quadrant lever to the neutral position.

The same operation as described above is employed for re-starting the motor in case it should become stalled after starting and when it is in a drive position, for example. More specifically, assuming that quadrant lever 22 is in a forward drive position when the motor stalls, to re-start the motor, lever 22 is shifted from such drive position to the neutral position, thence slightly beyond the neutral position in one sweep to the start position. Upon starting, lever 22 may then be shifted through neutral back to the same or any other desired drive (or reverse) position.

Figure 3 shows a modification of the spring loaded coupling 11 but which shows a coupling which is in the normally spread apart position rather than in a normally compacted position as shown in Figure 2. Such coupling as shown in Figure 3 is useful for certain types of cars wherein it is more convenient to move quadrant lever 22 slightly backwardly or perhaps upwardly (or downwardly) rather than forwardly beyond the neutral position in order to place it in the starting position, that is, with any motion wherein movement from the neutral to the starting position will effect movement of rod section 13 to the left instead of to the right. The coupling member may be inserted as part of rod 21 instead of rod sections 6 and 13. The coupling member shown in Figure 3 has parts which are identical to those shown in Figure 2 and are represented by the same reference numerals. However, the coupling is modified by the provision of a collar 33 secured by locking pin 34 to the left-hand end of the spring and by the provision of two longitudinally displaceable sections of rod 6, namely, 6a and 6b, which have a pin-and-slot or similar longitudinal slidable connection therebetween.

It will be apparent that quadrant lever 22 may

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be mounted in other positions or may have other movements or directions of movement beyond the neutral position in order to reach the starting position. Regardless of such modifications, the advantage may still be had of employing the quadrant lever as the sole operating means to effect either gear shifting or starting of the motor by a mere one-sweep movement thereof to the neutral position and slightly beyond to the starting position.

It will be apparent, of course, that other coupling members than those shown in Figures 2 and 3 may be employed. For example, a simple substitution would be that of a strong helical spring for coupling 11 in Figure 2, the ends of which spring are directly connected to rod sections 6 and 13, thus providing a yieldable or extensible coupling. This would still permit right-hand movement of rod section 13 by virtue of the stretch of the spring even after rod section 6 is arrested by stop 9 in its neutral position. Of course, this would enable the control quadrant to be moved beyond the neutral position to the starting position and to be automatically returned to the neutral position as the result of contraction of the helical spring.

Thus it will be seen that I have provided an efficient, relatively simple and easily operable starting device or system for motor vehicles having automatic drives, which starting system eliminates the necessity of a starting button or switch and in which system the quadrant lever has a dual function, namely, that of a gear shifting lever as well as a starting lever or switch, making it unnecessary for the operator to reach for a remotely positioned starter button as is normally necessary in conventional cars, and whereby starting of the car or re-starting of a stalled motor may be done instantaneously and with great ease by a single sweeping movement of the quadrant lever to the neutral position and slightly beyond to a starting position.

While I have in the above description disclosed what I believe to be a practical adaptation of my invention, it will be understood by those skilled in the art that the details of construction and arrangement of parts as shown and described are by way of example only rather than by way of limitation of the scope or application of the invention as covered by the following claims.

What I claim as my invention is:

1. A starting device for a conventional motor vehicle having an automatic drive and variable speed transmission, and a starting circuit for the starting motor including in series a normally open key switch, a limiter switch, and a relay switch automatically closed when said key and limiter switches are closed, and a manually operated lever for controlling said transmission and said starting circuit, comprising in combination, said transmission, said limiter switch and said operated lever, and a sectional rod connected between said transmission and operated lever including a section connected to said transmission, a section connected to said operated lever, and a spring loaded section connecting the adjacent ends of said other sections whereby the section connected to said operated lever moves independently of the section connected to said transmission under stress exceeding the spring bias of said link, means for inhibiting further movement of the section connected to the transmission when said rod has brought said transmission to neutral position, closing means for said limiter switch and means movable with the

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section connected to said operated lever positioned to move said closing means to close said limiter switch at a point within the range of independent movement of said last named section.

2. A starting device for an automobile having an automatic drive and transmission and steering post comprising, in combination, a gear-shifting operating rod controlled by a quadrant lever mounted on the steering post and connected to said transmission, said operating rod comprising two rigid sections and a spring loaded yieldable section interconnecting the two rigid sections, one of said rigid sections being connected to the transmission and including an element of stop means for arresting movement thereof after the transmission has been shifted to the neutral position, the other rigid section being connected to said quadrant lever, and an electrical motor starting circuit including a limiter switch and closing means therefor, and means movable with the section connected to said quadrant lever against the bias of said spring loaded section after arrest of movement of the section connected to said transmission, positioned to actuate said closing means to close said limiter switch at a point within the range of independent movement of said last named section, whereupon as the result of release of said quadrant lever, said yieldable section will automatically return said quadrant lever to the neutral position.

3. A starting device for a motor vehicle having an automatic drive and transmission, comprising in combination, a steering post, a gear shifting lever mounted on said post, a sectional operating rod interconnecting said lever and transmission comprising a rigid rod section connected to the transmission, a rigid rod section connected to said lever, and a spring loaded, extensible coupling member interconnecting said rigid rod sections, stop means for arresting movement of said first mentioned rigid rod section after the transmission has been shifted to the neutral position, an electrical motor starter circuit including a key controlled switch and a limiter switch in series with a starter relay, said limiter switch being operably connected to said last mentioned rigid rod section in a position so that it will be operated to close the motor starter circuit only when said last mentioned rigid rod section has been moved through and beyond the neutral position to a starting position, said coupling member being effective to automatically return said last named rigid section and gear shifting lever to the neutral position upon release of the lever when in the starting position.

4. A starting device for a motor vehicle having an automatic drive and transmission comprising, in combination, a steering post, a gear shifting lever mounted on said post in substantially the same plane as the steering wheel, a sectional operating rod interconnecting said lever and transmission comprising a rigid rod section connected to the transmission, a rigid rod section connected to the lever, and an extensible coupling member, including a helical spring, for interconnecting said rigid rod sections, a stop element rigidly mounted on the vehicle, a collar element secured to said first mentioned rigid rod section for arresting movement thereof after the transmission has been shifted to the neutral position, a limiter switch operated by movement of said last mentioned rigid rod section, an electrical motor starter circuit including a battery, a starting motor, a starter relay and an ignition

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key switch, said relay, ignition key switch and limiter switch being connected in series so as to prevent starting of the motor unless both switches are closed, said limiter switch having an operating element which is connected to said last mentioned rigid rod section so that it will not be operated to close the motor starting circuit unless the rigid rod section connected thereto is moved beyond the neutral position to the starting position, causing extension of said coupling member, the tension of said helical spring of said coupling member being effective to automatically move said last named rigid section and gear shifting lever to the neutral position upon release of the lever after it has been moved beyond the neutral position to the starting position.

5. An automobile starting device as recited in claim 4 wherein said extensible coupling member includes a hollow cylindrical housing rigidly connected to said last mentioned rigid rod section, an adjustable packing nut screw-threadedly connected to the open end of said housing and having a central bore through which said first men-

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tioned rigid rod section is adapted to slide, a collar in said bore secured to the terminal of said first mentioned rod section and against which one end of said spring is supported, the other end of the spring being supported against the inner end face of said packing nut, whereby said housing element when moved by the rigid rod section connected thereto will effect movement of the housing relative to said collar and compression of said spring and whereby upon release of the gear shifting lever from the starting position, said spring will return the lever to the neutral position.

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