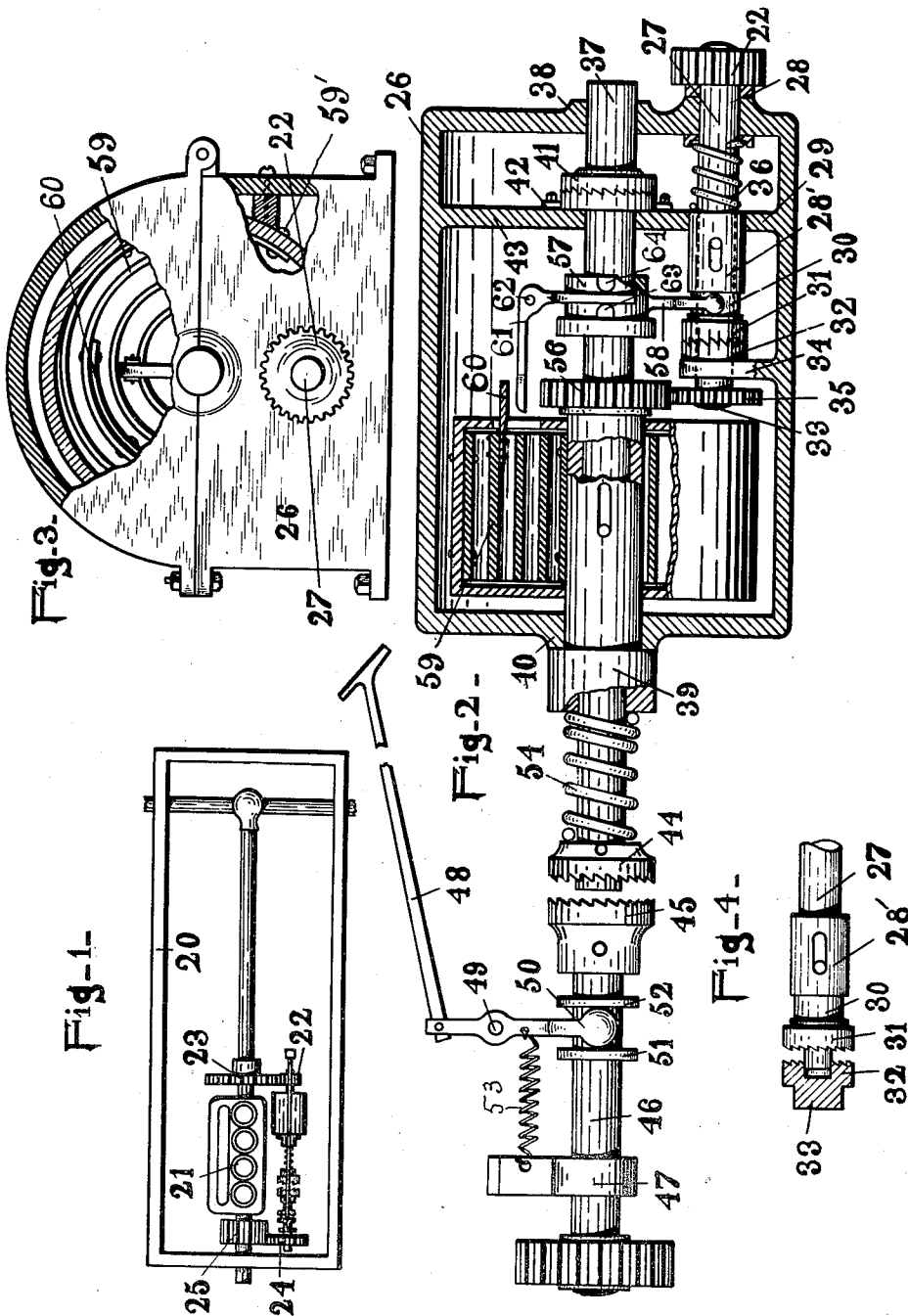


P. H. ROSENBERG.
 SELF STARTING APPARATUS FOR AUTOMOBILES.
 APPLICATION FILED MAR. 24, 1915.

1,174,183.

Patented Mar. 7, 1916.



WITNESSES:

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SELF-STARTING APPARATUS FOR AUTOMOBILES.

1,174,183.

Specification of Letters Patent.

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Application filed March 24, 1915. Serial No. 16,572.

To all whom it may concern:

Be it known that I, PETER H. ROSENBERG, a citizen of the United States, residing at Revere, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Self-Starting Apparatus for Automobiles, of which the following is a specification, reference being had to the accompanying drawings.

The object of this invention is to provide means for automatically starting internal combustion engines of the type used most commonly in motor cars, having particularly in mind starting mechanism that is reasonably cheap and simple in its construction as well as reliable and effective in its operation; said automatic mechanism being designed to take the place of the so called "cranking" devices now commonly used.

My invention is illustrated in and by the annexed drawings, Figure 1 being mainly a diagrammatic representation of the frame and engine of an automobile, showing also the relation of my present improved starting mechanism to the engine and its shaft. Fig. 2 is a relatively enlarged side view, partly in section, of said starting mechanism, and Fig. 3 is an end elevation of the starting mechanism, looking toward the right hand end of the device of Fig. 2; the casing being partly broken away to disclose a spring, which serves as an important element of my said starter. Fig. 4 is a detail view, partly in section, of the clutch members 31-32 and shaft 27.

Briefly described, my improvement comprises a spring having sufficient power, when under tension, to give two or three rotations to the engine shaft; connections between said spring and the engine shaft whereby the spring will be placed under tension whenever the engine is in action; means for automatically disconnecting the spring-winding mechanism when the spring is sufficiently wound up, and means for starting said spring into action when the engine is dead and it is desired to start it.

Referring to the annexed drawings, the numeral 20 indicates a diagrammatic representation, in plan, of the chassis of an automobile, and its engine 21, and shows also the relation to, and connection with, said engine of my newly improved starting mechanism. The said starting mechanism includes, at one end, as here shown, a gear 22 which meshes with and is driven by a

gear 23 on the engine shaft in order to obtain power for winding up the starter spring which I have incidentally referred to above. At the other end of the starter mechanism is a gear 24 which meshes with a like gear 25 on the front end of the engine shaft, the arrangement of elementary parts being such that, when the said spring is released, and seeks to unwind, it will rotate the gear 24 and said gear 24 will serve to rotate the engine shaft sufficiently to start the engine into action.

I will describe first the means provided for putting the starter spring under tension; referring particularly to the right hand portion of Fig. 2. The numeral 26 denotes a housing adapted to inclose the said spring and winding elements; the housing being, preferably, hinged as illustrated in Fig. 3 so that the said elements may be readily reached for inspection, oiling, or repairs. The gear 22 is fixed on the outer end of a shaft 27 which is mounted to revolve in a bearing 28 in the housing 26 and in a loose collar 28', which latter is supported in a bearing 29 integral with the housing, as here designed. Collar 28' is extended to provide for an annular groove 30, and its extended end is formed as a toothed clutch section which is adapted to engage with a companion clutch section 32 on the end of a short shaft 33 that is journaled in a bearing 34. The short shaft 33 is held against endwise, or thrust, movement by the clutch member 32 on one side of the bearing 34 and by a gear 35 that is fixed to said short shaft on the other side of the said bearing. The collar 28' is capable of having a limited endwise movement on shaft 27 and it may be slid on said shaft so as to move the clutch member 31 into locking engagement with the clutch member 32, by the expansive action of a spring 36 coiled around shaft 27; one end of the spring abutting the collar 28' and the other end abutting the inner face of the end wall of the housing 26.

The numeral 37 denotes a shaft that is slidably and revolubly mounted in a bearing 38 at one end and in an elongated collar 39 at the other end portion; the said collar being, in turn, revolubly mounted in a bearing 40 in the end wall of housing 26. Secured to shaft 37 within the said housing is a clutch member 41 that is normally in locking engagement with a companion clutch 42 which is secured rigidly to a web or parti-

tion 43 formed as here shown, as an integral part of the housing. The other end (left hand end as illustrated in the drawings) has secured thereto a clutch member 44 which is adapted to engage and interlock with a like clutch member 45 secured to a relatively shorter shaft 46 which is slidably mounted in a bearing 47 which may be fixedly secured to the chassis or other rigid part of the automobile. The shorter shaft 46 is controlled as to its endwise movement by a foot lever 48 which is fulcrumed at 49 and terminates in a fork 50 which straddles shaft 46 and lies between collars 51—52 formed on said shaft, the construction being such that, when the foot lever 48 is forced downward, the fork 50 will slide shaft 46 so as to cause the clutch member 45 to interlock with clutch member 44, and continued endwise movement of said shaft 46 will force shaft 37 longitudinally sufficiently to disengage the clutch members 41—42 which have already been referred to. When pressure is removed from the foot lever 48, a spring 53 (connecting said foot lever with the bearing 47), will return said foot lever and shaft 46 to their normal positions and will disengage the clutch sections 44—45. Being thus relieved, the shaft 37 is then forced back to its normal position by a spring 54 located between the clutch member 44 and the collar 39; this endwise movement of shaft 37 resulting also in moving clutch member 41 into engagement with the fixed clutch member 42.

Secured to the collar 39 within the housing 26 is a gear 56 that meshes with, and is driven, under certain conditions, by the gear 35 on the shaft 27. Loosely mounted on shaft 37 is a collar 57 which has a depending forked extension 58 which straddles the shaft 27 between annular walls of the groove 30 and so that, when the shaft 37 is slid lengthwise, it will carry the collar 57 with it, thus causing the pendent extension 58 to slide shaft 27 sufficiently to disengage the clutch members 31 and 32, leaving shaft 27 free to revolve and causing the shaft 37 to stop. Coiled upon the collar 39 is a flat spring 59, one of whose ends is secured to the said collar, the other end being secured to the housing 26 at 59'; said spring having secured to one of its coils a laterally projecting plate 60. When the spring is being coiled upon collar 39, by the rotation of said collar, the projection 60 gradually moves toward the collar and, at a predetermined point, it (the projection) engages one end of a bell-crank-lever 61 which is fulcrumed at 62 and whose other end is forked to straddle the collar 57 and lies between lugs 63 and 64. When the lever 61 is rocked by the projection 60 during the spring-winding operation, the collar 57 and pendent extension

58 operate to slide shaft 37 so as to disengage the clutch members 31—32 as I have just explained. This leaves the spring 59 under tension and ready to be utilized to start the engine; the spring being prevented from unwinding by the clutch member 41, secured to shaft 37, which interlocks with the fixed clutch member 42. When however, the shaft 37 is caused to move longitudinally by the rocking of the foot lever 48, as already described, the clutch member 41 is disengaged from the member 42 and the spring 59 is free to rotate shaft 37 and its gear 24 sufficiently to give the engine shaft two or three turns.

It will be understood that the shaft 27 is driven constantly from the engine shaft and that the other described elements are inactive excepting during the brief time when the spring 59 is being wound up and during the operation of starting the engine.

Having thus described my invention I claim as new and wish to secure by Letters Patent:—

1. In combination with an engine-shaft, means for imparting a starting action thereto, including a second shaft, means for effecting engagement between said second shaft and said engine-shaft, means for effecting a slidable endwise movement to said second shaft, a third sleeved spring tensioning shaft, the sleeve of the latter being slidable, means for effecting engagement between said second and third shafts, the spring tensioned by said third shaft being applied to said sleeve, one end of said spring being fixed, an angle lever arranged for actuation from the other end of said resilient member, said sleeved shaft being moved endwise by one arm of said angle lever, a clutch for the retention of said sleeved shaft against the tension of the spring thereof, and a fourth shaft arranged to be geared to said engine-shaft, and means between said spring tensioning shaft and said fourth shaft arranged to provide for taking the former out of operation at the end of the tensioning operation of said spring.

2. In combination with an engine-shaft, means for imparting a starting action thereto, including a second shaft, means for effecting engagement between said second shaft and said engine-shaft, means for effecting a slidable endwise movement to said second shaft, a third shaft, said second and third shafts being equipped with clutch-engaging members, said third shaft being provided with a resiliently actuated slidable sleeve, a spring applied to said sleeve and having one end fixed, the opposite end of said spring having projecting therefrom a lateral plate, an angle lever, with one arm arranged to be engaged by the projecting plate of said spring, said sleeved shaft having a collar between studs upon which is re-

ceived the other arm of said angle lever, a clutch for the retention of said sleeved shaft against the tension of said spring, a fourth shaft equipped with a slidable sleeve, said sleeve having a clutch-retaining member and arranged to be geared to the engine-shaft, said lever engaged slidable collar on the spring tensioning shaft having a pendent extension arranged to effect the unclutching

of said fourth shaft at the end of the tensioning operation of said spring, said fourth shaft being geared with said spring-tensioning shaft and with said engine-shaft. 10

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."