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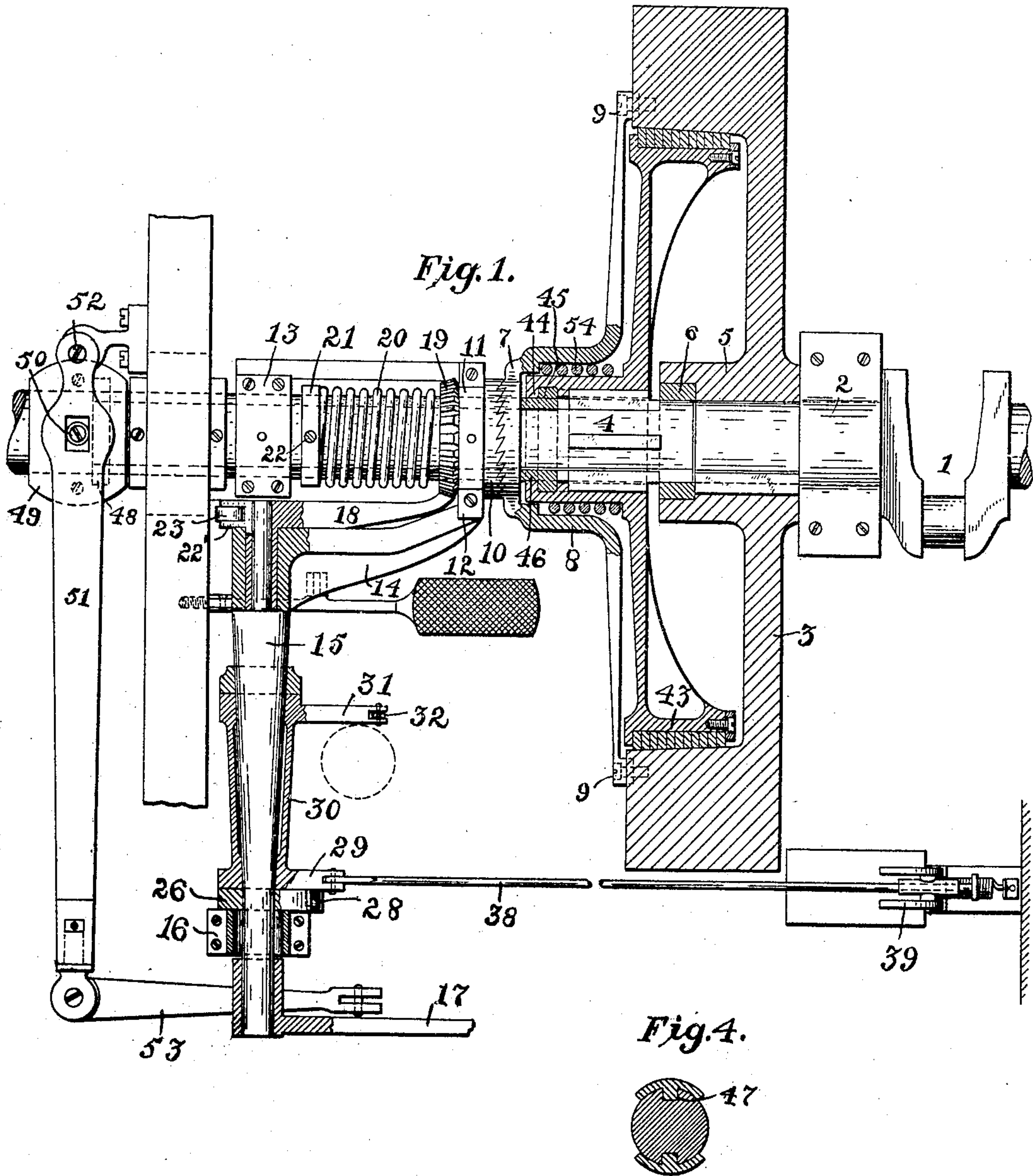
STARTING APPARATUS FOR AUTOMOBILES AND THE LIKE.

APPLICATION FILED AUG. 8, 1907.

917,572.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

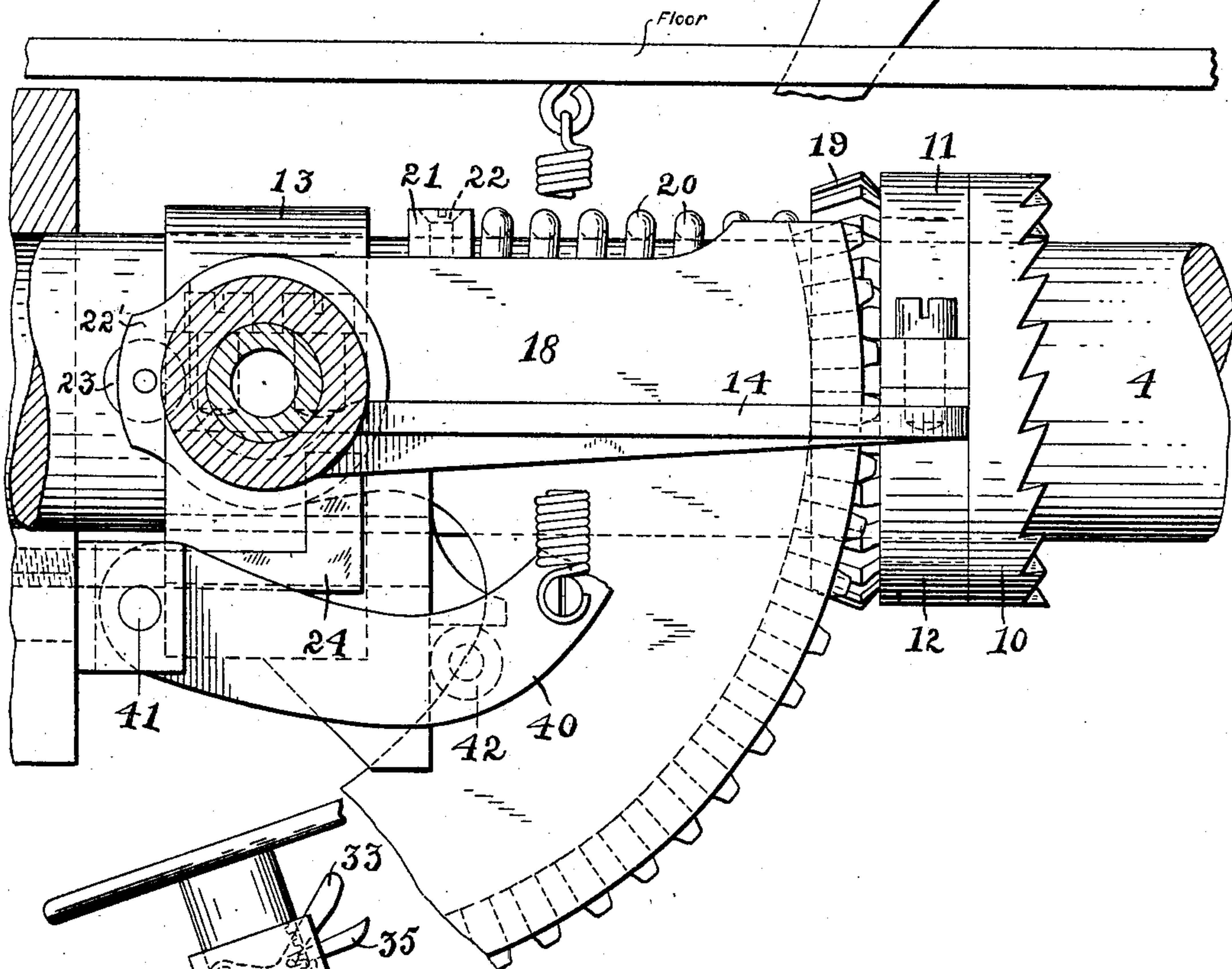
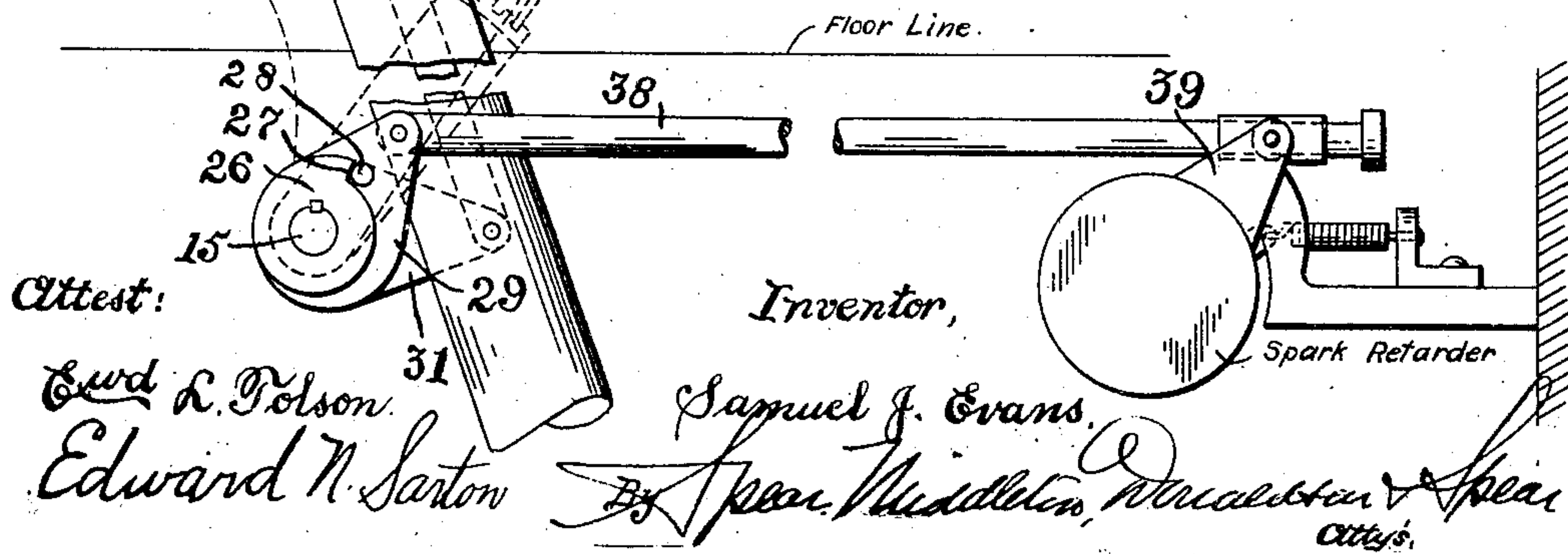


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## STARTING APPARATUS FOR AUTOMOBILES AND THE LIKE.

No. 917,572.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed August 8, 1907. Serial No. 387,731.

*To all whom it may concern:*

Be it known that I, SAMUEL J. EVANS, citizen of the United States, residing at Roanoke, Virginia, have invented certain new and useful Improvements in Starting Apparatus for Automobiles and the Like, of which the following is a specification.

My invention relates to automobiles and particularly to that class in which explosive engines are employed, and it concerns means whereby the engine may be started without requiring the operator to leave the vehicle and without danger to the operator by reason of premature sparking.

Heretofore it has been customary in starting the engine for the operator to leave the machine and perform the manipulation known as cranking. Besides the inconvenience this cranking operation is a dangerous one owing to the liability of an explosion taking place prematurely and causing the crank to fly backwardly and strike the operator. With my invention an accident of this kind is impossible and the whole operation may be conveniently and safely performed by the chauffeur.

The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawing, Figure 1 is a plan view of my invention as combined with the fly-wheel of the engine, parts being in section and some parts being omitted. Fig. 2 is an elevation of a portion of the starting shaft and the starting mechanism parts being in section. Fig. 3 is a detail view of the relation of the starting lever to the spark adjusting connections and showing means whereby the premature ignition of the charge is rendered impossible, that is, in relation to the position of the starting appliances. Fig. 4 is a detail.

In these drawings 1 is a crank shaft of the engine having its bearings in the frame, one of which bearings is indicated at 2, and this shaft carries the fly-wheel 3 as ordinarily.

A transmission shaft 4 is arranged in line with the engine shaft, the end of this starting shaft projecting into the hub 5 of the fly-wheel and finding a bearing at this point upon brass bushing 6. The fly-wheel carries a clutch member 7, attached thereto by a casing 8 on which the clutch member is

formed, said casing having its arms or rim attached by screws 9 to the fly-wheel. The companion clutch member 10 is carried by a sleeve 11 adapted to turn on the supporting shaft or rod 4, this sleeve finding a bearing in a frame 12 which is adapted to have longitudinal sliding movement along the support or shaft 4, said frame having a second bearing portion 13 on the said shaft or support and having also an extension or portion 14 in which bears the end of a shaft or rod 15, which also finds a bearing at 16 on the frame, and which latter shaft carries fixed thereto a starting lever 17. On the reduced portion of the shaft 15 at the inner end thereof is fixed a segmental gear 18 which meshes with a bevel gear 19 connected with the sleeve 11 and the clutch 10. The clutch member 10 together with its gear 19 and frame carrying these parts is under the pressure of a spring 20 surrounding the shaft or support 4 and bearing at one end against a collar 21 fixed on the said shaft by a set screw 22. This spring tends to press the clutch section 10 into engagement with the clutch section 7 and when the parts are in engagement a movement of the hand lever 17 from the position indicated in Fig. 3 in dotted lines toward the left, will, through the segment and the gear 19, operate the clutch to rotate the fly-wheel and thus start the engine.

I have provided means whereby as soon as the movement of the lever 17 is completed and the fly-wheel is set in motion the clutch member 10 will be retracted from the clutch member 7 so as to let the latter rotate freely without contact with the clutch member 10, thus avoiding the ratchet noise which would otherwise occur if the teeth of the member 7 were allowed to run over the teeth of the member 10. For this purpose the clutch member 10 together with the gear 19 and frame associated with these parts are retracted automatically as the final movement of the hand lever is completed and in order to effect this result I have provided the segment lever 18 with an extension 22' which extension carries a roller 23 arranged in the final parts of the turning movement of the segment to strike against the fixed lug 24 on the frame, which acting as a fixed fulcrum will cause the frame, together with the clutch member, the bevel gear, the shaft 15, all to be retracted and thus withdraw



the clutch member 10 from engagement with the clutch member 7 and as this movement is completed the lever 17 has arrived at the position in which it will be locked to the segment 25 and the engine may now continue its movement while the clutch members 10 and 7 are out of engagement. It will be observed that the bearing 16 is provided with an enlarged opening or slot to allow the lateral shifting movement of the shaft 15.

In order to prevent accidents due to premature sparking or rather to the fact that the sparking has not been adjusted properly before the starting manipulation is performed, I provide means to obstruct the movement of the hand lever 17 until after the sparking device has been properly adjusted to give the spark at the right moment in relation to the position of the crank and piston. For this purpose I fix upon the shaft 15 a disk 26 having a shoulder 27 adapted to contact with a pin 28 carried by an arm 29 pivotally hung on the shaft 15 by being attached to a sleeve 30 adapted to turn on the said shaft. This sleeve also carries an arm 31, to which is attached a rod 32 extending up along the steering shaft and operated by a hand lever 33 pivoted to the standard 34 of the steering shaft, said operating lever having a detent 35 adapted to engage in one of a series of notches in a sector 36 which will hold the lever in any position to which it may be adjusted. The arm 29 carries the pin 28 which is in the path of the shoulder 27 on the disk 26. The arm 29 is connected with a rod 38 extending to the sparker or timer and connected with an arm 39 belonging to this device. In order to set the sparker or timer in correct position the lever 33 is operated, and this movement will also adjust the pin 28 in relation to the shoulder of the disk 26. The relation of the parts is such that if the spark retarder is not in proper position to furnish the spark at the right period in relation to the stroke of the piston, the pin 28 will be in position to obstruct the movement of the disk 26 by the shoulder thereof coming against the pin, and under this condition it will not be possible to operate the starting lever 17 to a position where it may be effectively worked for starting the engine, but on the contrary it will first be necessary to adjust the spark retarder by the operation of the lever 33 and the described connections before the lever 17 can be used to set the fly-wheel in motion and thus start the engine. The position of the parts in Fig. 3 is that assumed by them when the spark retarder has been adjusted to proper position and the lever 17 is in position to be operated. At this time the clutch member 10 is in engagement with the clutch member 7.

I have provided means whereby when the

starting mechanism above described is out of gear at which time the lever 17 is at the extreme left hand limit of its throw, and it is desired to throw the clutch into operation for starting the engine the objectionable noise or effect which would result from throwing the clutch member 10 while in revolution into engagement with the stationary clutch member 7, is avoided. This means consists of a foot lever 40 pivoted to the fixed main frame at 41 and having a pin or roller 42 adapted to bear on a depending portion of the sliding frame above mentioned, which carries the starting sleeve, gear and clutch member. By depressing this foot lever the frame together with the starting sleeve, gear and clutch member will hold in retracted position while the lever 17 is being moved from its left hand limit to the right hand limit of the segment 25 and is thus getting in a position for the starting stroke. During this time the segment will, of course, rotate the gear and the clutch member 10, but this movement will be without effect or objectionable results as the clutch member 10 will be held in its retracted position by the foot lever while it is rotating. As soon as the lever 17 has assumed its position for a new stroke the foot lever may be released and the spring 20 will then move the frame together with the associated parts along the transmission shaft to throw the clutch member 10 into engagement with the clutch member 7 and the parts will then be ready for a starting action.

The transmission shaft 4 is driven through the friction clutch 43, the hub of which surrounds the said transmission shaft and has a flange 44 which is engaged by lugs 45 carried by rods 46 movable longitudinally of the transmission shaft in grooves 47 therein. These rods connect with a ring or lug 48 fitted within a partly spherical body 49 surrounding the transmission shaft and to which is pivoted at 50 a lever 51 which is pivoted to the main frame at 52. This lever connects with a second lever 53 and upon operating this the rods 46 will be moved longitudinally of the transmission shaft so as to throw the friction clutch member 43 into or out of engagement with the fly-wheel, said friction clutch member being partly inclosed by the said fly-wheel. A spring is preferably employed as at 54 to press the friction clutch member normally into engagement with the fly-wheel.

It will be observed that the starting gear is arranged on the rear side of the fly wheel, that is upon the same side upon which the transmission clutch 43 is located and the transmission connection. So far as I am aware I am the first to devise means whereby the engine may be started through power applied at the clutch side of the fly wheel.



This result I accomplish by the use of the shell or frame 8 which is attached to the rear side of the fly wheel which reaches over or incloses the transmission clutch and carries the starting gear clutch 7, which surrounds the transmission shaft.

It will be understood that while I have shown my invention as applied to automobiles, it is not limited in this respect as it may be used on launches and in any situations where the starting mechanism may be useful or desirable.

I claim as my invention:—

1. In combination with the engine shaft, a starting member, a clutch connection between said starting member and the engine shaft, consisting of revolving clutch members arranged coaxially, and means for automatically throwing out of engagement the members of said clutch by retracting one clutch member axially in relation to the other as the movement of the starting member, on its effective stroke in one direction, is completed.

2. In combination with an automobile or like apparatus, an engine shaft, a starting member, clutch members, one of which is slidable to disengage the other, a connection between the starting member and the slidable clutch member to rotate it and means for retracting the sliding clutch member as the movement of the starting member is completed, substantially as described.

3. In combination in apparatus of the class described, an engine shaft, a starting member, a clutch comprising a sliding member, connections between the starting member and the clutch member for rotating the same, including a segment and a gear, a fixed bearing member on the frame and means connected with the starting connections to contact with the said fixed stop and thereby retract the sliding clutch member as the starting member completes its movement, substantially as described.

4. In combination in apparatus of the class described, the engine shaft, a starting lever or member, a clutch comprising a sliding clutch member, a segment and gear for rotating the clutch member, a sliding frame carrying the gear and the sliding clutch member, a fixed stop on the frame and means connected with the segment for engaging the same to retract the sliding clutch member as the starting member completes its movement, substantially as described.

5. In combination in apparatus of the class described, an engine shaft, the clutch comprising a sliding clutch member, a starting lever, a shaft carrying the same, a gear connected with the sliding clutch member, a segment meshing with the gear and shaft upon which the starting member is supported, said shaft carrying the segment and adapted to have lateral shifting movement

with the said starting shaft, segment, gear and clutch, a fixed stop on the frame and means to contact therewith after rotary motion has been imparted to the clutch to thereby shift the sliding clutch member and the lateral movable parts, substantially as described.

6. In combination in apparatus of the class described, an engine shaft, a transmission shaft, a clutch between the transmission shaft and engine shaft, a starting lever, a clutch between said starting lever and the engine shaft, said clutch surrounding the transmission shaft and connections from the starting lever to the clutch, substantially as described.

7. In combination in apparatus of the class described, an engine shaft, a transmission shaft, a clutch between the transmission shaft and engine shaft, a starting lever, a clutch between said starting lever and the engine shaft, said clutch surrounding the transmission shaft and connections from the starting lever to the clutch, said connections including a segment and a gear, said gear encircling the transmission shaft, substantially as described.

8. In combination in apparatus of the class described, an engine shaft, a transmission shaft, a clutch connection between said shafts, starting mechanism including a clutch, a clutch member slidable on the transmission shaft, a gear also adapted to slide on the transmission shaft and connected with the sliding clutch member and connections from the starting member to the gear, substantially as described.

9. In combination in apparatus of the class described, an engine shaft, a transmission shaft, a clutch between the two, a starting clutch having a sliding member, a gear connected to the sliding clutch member, said gear and sliding clutch member surrounding the transmission shaft, a spring encircling the transmission shaft tending to force the sliding clutch member to work, a segment for operating the gear, a shaft upon which the segment is supported, a starting lever connected with the shaft, a frame in which the sliding clutch member is supported and adapted to move longitudinally of the transmission shaft, the starting shaft partaking also of said movement and means for effecting the sliding movements of the clutch member as the starting member completes its movement, substantially as described.

10. In combination in apparatus of the class described, the engine shaft, a starting clutch, a starting lever, connections between the starting lever and starting clutch, and a controlling device to hold the clutch open while the starting lever is being moved into position for the starting operation, the clutch closing upon the release of the said controlling device, substantially as described.



11. In combination with the engine shaft, a transmission shaft, a clutch between the engine shaft and transmission shaft, means extending longitudinally of the transmission shaft for operating the clutch, and starting mechanism including a starting lever, a clutch and connections from the starting lever to the clutch, said clutch surrounding the transmission shaft, substantially as described.

12. In combination in apparatus of the class described, starting mechanism including a lever and a starting shaft, a sparking device, connections for adjusting the sparking device, a pin associated with said connections and a member on the starting shaft adapted to strike said pin if the starting mechanism is operated before the sparking device is set in proper position, substantially as described.

13. In combination, an engine shaft, a fly-wheel, a transmission clutch and starting mechanism including a clutch member which reaches over the transmission clutch, substantially as described.

14. In combination, the engine shaft, the fly-wheel, the transmission clutch engaging the fly-wheel and a starting mechanism including a clutch connected with the fly-

wheel and located upon the same side thereof as the transmission clutch, substantially as described.

15. In combination in an apparatus of the class described, a frame, an engine shaft, a starting member, a clutch connection between said starting member and the engine shaft, a fixed bearing member or portion on the frame and means to contact therewith and cause the further movement of the starting member to throw out of engagement the clutch members as the said starting member completes its movement, substantially as described.

16. In combination with the engine shaft, a transmitting shaft, a fly wheel, a clutch between the transmitting shaft and the engine shaft, a starting clutch arranged axially of the transmitting shaft and having one member connected with the outer portion of the fly wheel and means for operating the other member of the clutch, substantially as described.

In testimony whereof, I affix my signature in presence of two witnesses.

SAMUEL J. EVANS.

Witnesses:

HENRY E. COOPER,  
WALTER DONALDSON.