E. F. WELLS.

ENGINE STARTER.

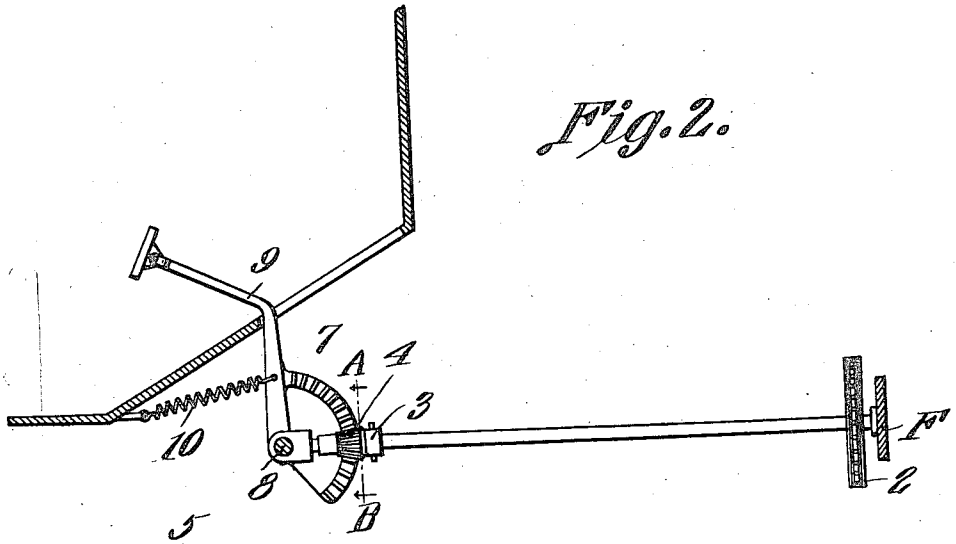
APPLICATION FILED MAY 27, 1911.

Patented Oct. 14, 1913.

1,075,525.

2 SHEETS—SHEET 1.

Fig. 2.



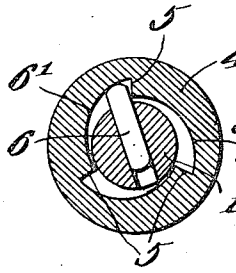
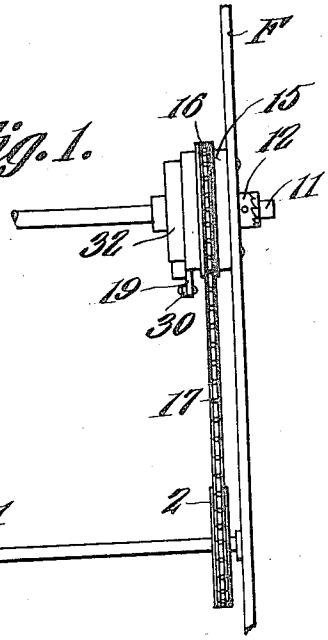
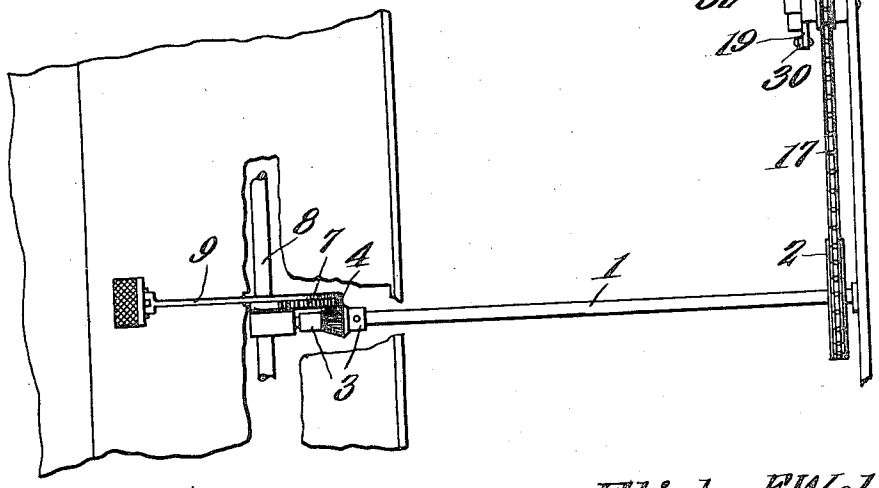


Fig. 3.

Fig. 1.





Elisha F. Wells,
Inventor

Witnesses

J. P. Lomen

L. H. Wilson

by C. A. Snow & Co.

Attorneys

E. F. WELLS.

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2 SHEETS—SHEET 2.

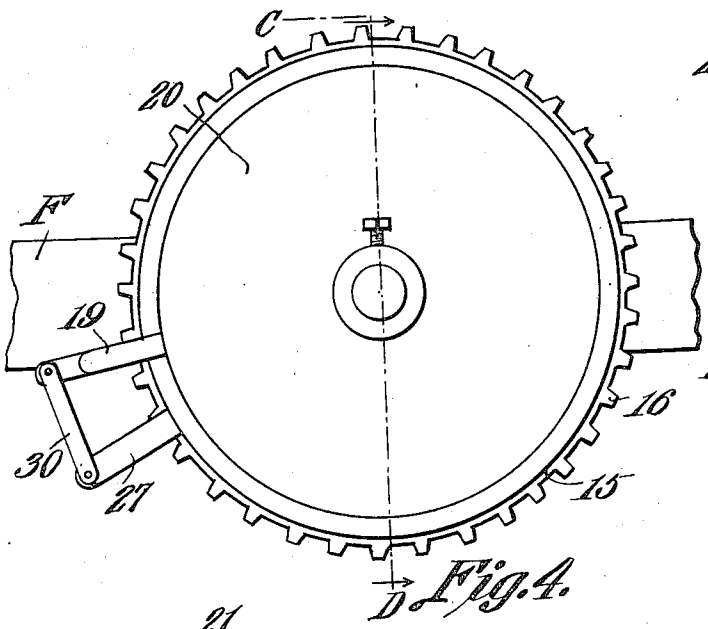


Fig. 4.

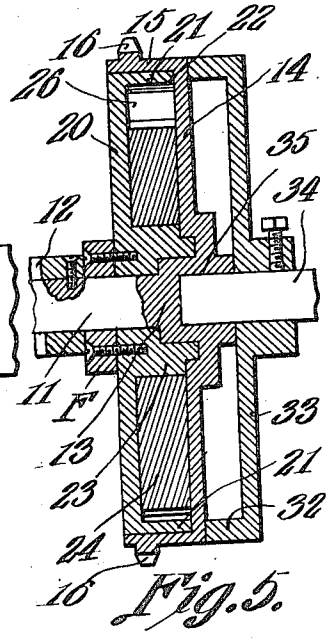


Fig. 5.

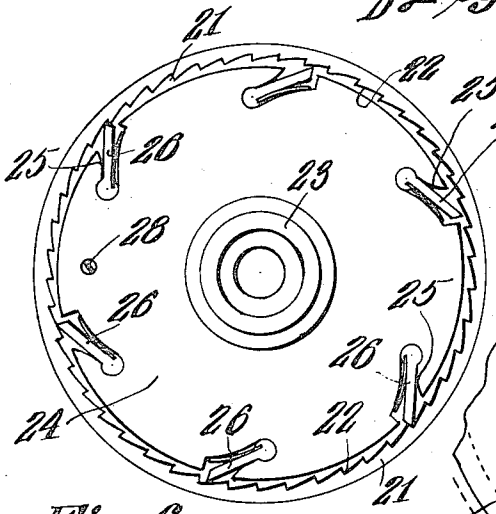


Fig. 6.

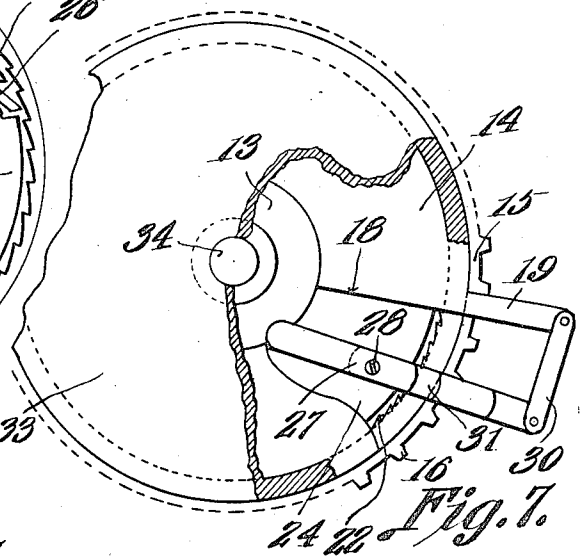


Fig. 7.

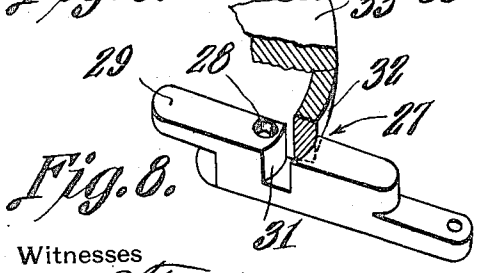


Fig. 8.

Witnesses

J. R. Lonie

L. H. Wilson

Elisha F. Wells,
Inventor

by C. A. Snow & Co.
Attorneys

UNITED STATES PATENT OFFICE.

ELISHA FORD WELLS, OF MIAMI, FLORIDA, ASSIGNOR OF ONE-THIRD TO SMILEY M. TATUM AND ONE-THIRD TO MARCUS A. MILAM, BOTH OF MIAMI, FLORIDA.

ENGINE-STARTER.

1,075,525. Specification of Letters Patent. Patented Oct. 14, 1913.

Application filed May 27, 1911. Serial No. 629,759.

To all whom it may concern:

Be it known that I, ELISHA F. WELLS, a citizen of the United States, residing at Miami, in the county of Dade and State of Florida, have invented a new and useful Engine-Starter, of which the following is a specification.

This invention relates to starters for use in connection with hydro-carbon engines, one of the objects of the invention is to provide a starting mechanism which can be operated either by a crank, as ordinarily, or by a lever located adjacent the seat of the motor vehicle to be driven, the mechanism being of such a character as to positively prevent injury to the operator as a result of back firing.

Another object is to provide a novel form of clutch whereby the driving member of the starting mechanism is coupled to the driven member of said mechanism, the two parts being held together by frictional engagement of the gripping elements so as to insure the positive actuation of the engine shaft while the starter is in use, the mechanism, however, being so disposed as to promptly release the driven member of the starter should the engine fire back.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings, the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a plan view of the starter and of the operating means which may be extended close to the seat of a motor vehicle. Fig. 2 is a side elevation of the shifting mechanism. Fig. 3 is an enlarged section on line A—B Fig. 2. Fig. 4 is an enlarged rear elevation of the starter. Fig. 5 is a section on line C—D Fig. 4. Fig. 6 is an elevation of the pawl and ratchet mechanism of the starter. Fig. 7 is a rear elevation of a portion of the starter, parts being broken away, the gripping member of the clutch being shifted to a position different from that disclosed in Fig. 4. Fig. 8 is a perspective view of the coöperating clutch members of the starter, one of said members being only partly shown.

Referring to the figures by characters of reference F designates a portion of the front of the frame or chassis of a motor vehicle, there being a shaft 1 extending rearwardly from said portion F and provided, adjacent its front end, with a sprocket 2 while its rear end portion has collars 3 fixedly connected, and constituting thrust bearings for a pinion 4. Said pinion has radially disposed shoulders 5 therein and spaced equal distances apart, there being curved bearing or cam faces 6′ leading from the outer end of each shoulder to the inner end of the next adjoining shoulder. A pin 6 is slidable diametrically within that portion of shaft 1 located within the pinion 4 and ends of the pin bear upon said arcuate faces which are so proportioned as to shift the pin longitudinally during the rotation of the pinion in one direction so as to cause the pin to successively slip over the shoulders within the pinion. When, however, the pinion is rotated in the opposite direction, one of the shoulders is moved against one end of the pin 6 and causes the shaft to rotate with the pinion. It will thus be seen that a simple form of clutch is provided which permits the gear or pinion 4 to rotate in one direction independently of the shaft 1 but to rotate with said shaft in the opposite direction. The pinion receives its motion from a toothed segment 7 journaled as at 8 and having a foot lever 9 extending therefrom and into the vehicle close to the driver's seat, there being a spring 10 connected to the lever and to the vehicle structure for holding said lever normally in a predetermined position.

The driving element of the starter includes a shaft 11 having a clutch member 12 secured thereto in any suitable manner and in front of the portion F. This shaft extends from a hub 13 formed at the center of a disk 14 provided with an annular flange 15 on which are formed the sprocket teeth 16, these teeth being adapted to be engaged by a chain 17 extending from the sprocket 2. Disk 14 is formed with an aperture 18 located at one side of the sprocket teeth 16 and an arm 19 extends radially from the disk at one side of the aperture 18.

A combined bearing and locking disk 20

is fixedly secured to the portion F of the vehicle frame, shaft 11 being adapted to rotate within the middle portion of this disk 20 and said disk having an annular flange 21 surrounded by the flange 15 on the driving disk 14 of the starter. The inner flange 21 has ratchet teeth such as indicated at 22. The hub 23 of disk 20 constitutes the bearing of a clutch shifting disk 24 which is surrounded by the toothed flange 21 and has peripheral recesses 25 in which spring pressed pawls 26 are pivotally mounted. Preferably six of these pawls are employed and they are so disposed with relation to the teeth 22 that, while all of them continually contact with the teeth, only one of the pawls abuts against a tooth at any one time. It will be apparent therefore, that the disk 24, while free to rotate in one direction independently of the disk 20, can rotate in the opposite direction independently thereof only a distance equal to only about one-sixth the length of a tooth, this movement therefore being practically *nil*.

A clutch member 27 is pivotally mounted on the disk 24, as indicated at 28 and works within the opening 18 hereinbefore referred to, and as indicated in Fig. 7. This clutch member has an offset end portion or finger 29 which works freely over the hub 13 and one end of the member 27 projects beyond the peripheries of the disks 14 and 20 and is connected, as by means of a link 30, to the arm 19. A groove 31 extends transversely of the member 27 and the walls of this groove constitute gripping faces for engaging the outer and inner faces of an annular flange 32 formed at the periphery of the driven disk 33 of the starter. This disk is keyed or otherwise secured to the shaft 34 of the engine and one end of said shaft bears within a recess 35 formed within the hub 13. The parts are so proportioned that when the member 27 is swung in one direction about its pivot 28, the walls or gripping faces of the recess 31 move out of contact with the flange 32, thus permitting said flange and the disk 33 to rotate freely with shaft 34 without correspondingly rotating the disk 14 and parts connected thereto. When, however, the member 27 is shifted on its pivot in the opposite direction, these faces of the recess 31 will frictionally engage the flange 32 and lock the disks 14 and 33 together, thus insuring simultaneous rotation of the shafts 11 and 34 in one direction.

When it is desired to operate the starter so as to start the engine, the disk 14 is rotated to the right either by means of a crank placed in engagement with the clutch member 12 or by means of the foot operated mechanism heretofore described and which has been illustrated in Figs. 1, 2 and 3. When disk 14 is thus rotated its arm 19 pulls on link 30 and, as there is no fixed connection between disk 14 and disk 24, clutch member 27 will thus be swung on its pivot 28, causing the faces of recess 31 to bind on opposed faces of the flange 32. Said flange and disk 33 which is fastened to shaft 34, will thus be rotated with the disk 14, pawls 26 slipping over the teeth 22. As soon as the engine has been started in this manner and proceeds to operate under its own power, disk 33 becomes the driving element and flange 32 pulls away from engagement with the gripping faces of recess 31 and is thus free to rotate independently of the clutch member 27 and disk 14. Should the engine back fire during the starting operation, the pawls 26 would promptly engage the teeth 22 and thus prevent the disk 24 from rotating backwardly within the flanged disk 20. At the same time flange 32 will push against the gripping faces of recess 31 and cause the gripping member 27 to swing on its pivot and thus release the flange, the backward movement of the shaft 11 and of the foot operated mechanism, being thus very slight and insufficient to produce any injury to the operator. The member 27 is held in frictional engagement with disk 24 by the pivot 28 and it is thus prevented from moving past the point to which it is shifted by the flange 32 when the engine back fires.

What is claimed is:—

1. An engine starter including a revoluble clutch member having an annular flange, a clutch carrying element, a clutch member pivotally mounted on said element and straddling and normally out of engagement with the flange, a driving element, means for rotating said driving element, and a connection between said driving element and the pivoted clutch member for shifting said member into frictional engagement with the flange to rotate the two members in unison, and means coöperating with the clutch carrying element for automatically locking said driving element against rotation in one direction.

2. An engine starter including a revoluble clutch member having an annular flange, a clutch carrying element mounted for rotation in one direction, means for locking said element against rotation in the opposite direction, a clutch member pivotally mounted on said element and straddling but normally out of engagement with the flange, a revoluble driving element at one side of said clutch carrying element, a connection between said driving element and the pivoted clutch member, and speed multiplying means under the control of the operator for actuating said driving element to shift the pivoted clutch member into frictional engagement with the annular flange.

3. The combination with an engine shaft,

of a disk secured thereto and having an annular flange, a combined bearing and locking disk held against rotation, a clutch carrying disk mounted for rotation, coöperating means upon said clutch carrying disk and the bearing and locking disk for holding the clutch carrying disk against rotation in one direction, a driving disk mounted for rotation and surrounding the bearing and locking disk, a pivoted clutch member carried by the clutch carrying disk, a link connection between said member and the driving disk, and means under the control of the operator for actuating the driving disk to shift the pivoted clutch member into frictional engagement with the flange and to rotate the clutch carrying disk relative to the bearing and locking disk.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ELISHA FORD WELLS.

Witnesses:
J. A. Downes,
B. B. Tatum.