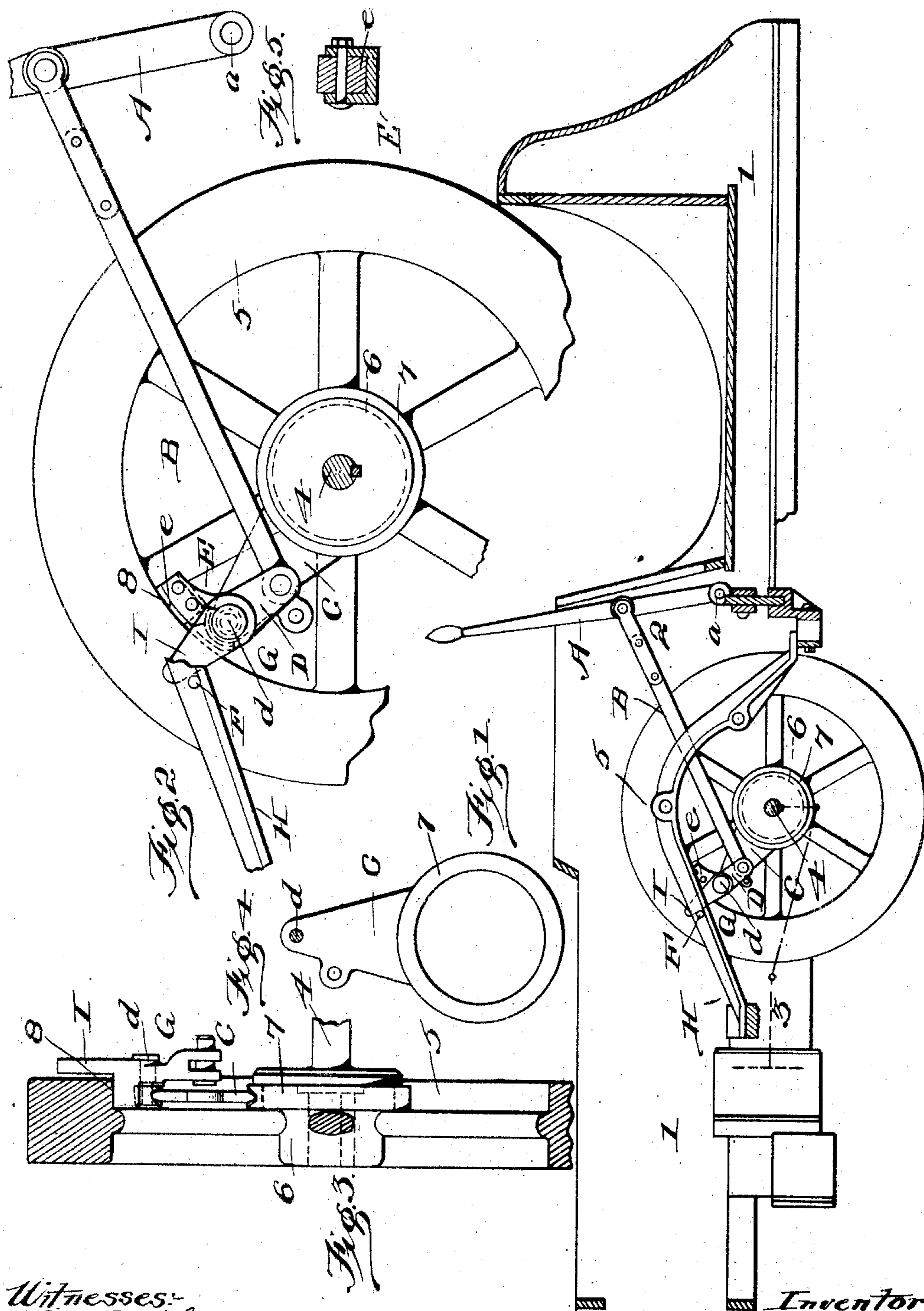


No. 864,766.

PATENTED SEPT. 3, 1907.

J. B. BARTHOLOMEW.  
STARTER FOR EXPLOSIVE ENGINES.

APPLICATION FILED SEPT. 1, 1903.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## STARTER FOR EXPLOSIVE-ENGINES.

No. 864,766.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed September 1, 1903. Serial No. 171,545.

To all whom it may concern:

Be it known that I, JOHN B. BARTHOLOMEW, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Starters for Explosive-Engines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to mechanism for starting explosive engines, it being particularly well adapted for use in connection with the engines employed in automobiles.

It consists in providing what may be regarded as a friction clutch one element of which is connected with the engine and the other element of which is adapted to be actuated by manually controlled devices. With the parts for accomplishing the starting of the engine, I also combine means for positively insuring that any reactionary movement of the engine shall not cause serious accident.

The several features of invention and advantage will be readily understood from the drawings and description following.

Figure 1 is a view of a sufficient portion of an automobile to illustrate the manner of applying the mechanism embodying my improvements. Fig. 2 is a side elevation of the fly wheel of an engine provided with one of my improved starting devices. Fig. 3 shows the fly wheel in vertical section and the starting devices in end elevation. Fig. 4 shows the rotary carrier detached. Fig. 5 is a vertical section through the shoe arm E.

It will be understood that my improved starting device can be used with gas or gasoline engines of different forms and with engines employed for different purposes than that herein illustrated.

In order to show one way of applying my improvements, I have indicated in the drawings more or less conventionally an automobile or road vehicle propelled by a gasoline engine.

The body of the vehicle is indicated by 1, 2 indicating the seat adapted to support one or more riders. 3 indicates as an entirety a gasoline engine having its cylinder toward the rear and its power transmitting devices (piston rod, pitman, etc.) directed forward. 4 is the crank shaft to which the engine is connected. From this shaft power is transmitted to the driving ground wheels through suitable devices.

In as much as each and all of the parts referred to can be constructed and arranged in any suitable manner, it is not necessary to here describe them in detail.

In an earlier application for patent which I filed on June 30, 1903, Serial No. 163,758, I have shown the full details of a mechanism such as is here generally alluded

to; and reference can be made thereto for a full understanding of one such set of parts.

The present invention relating, as aforesaid, to a starting device for bringing the parts of the engine to those positions where they will commence automatically their desired movements, the description herein will be restricted thereto.

5 indicates the fly wheel which is secured to the crank shaft 4, this wheel meeting the usual requirements of a gas or oil engine. On one side its hub 6 is made cylindrical, it being preferably trued up in a machine, if necessary, so that its periphery shall be concentric with the axis of the shaft 4. On this hub there is placed a collar 7 fitted snugly thereto and adapted to turn freely thereon. From this collar there extends outward radially an arm C. To the outer end of this arm there is pivoted a swinging lever carrying a friction shoe. The lever is indicated as a whole by G, it having an arm at E provided with a friction shoe *e* which is arranged to engage with a concave surface at 8 formed on the fly wheel. The lever G has also an arm D arranged at an angle to the shoe arm E.

*d* indicates a pivot which unites the friction lever with the rotary arm C.

B is a draft link or pitman which is pivotally connected to the arm D. It extends upward and preferably at a forward inclination to a point in front of the driver's seat at 2.

A is a lever pivoted at *a* to a suitable part of the carriage frame. It is approximately vertical in position or slightly inclined, and stands normally within easy reach of an occupant of the carriage seat. When this seat is adapted to hold two riders, this lever is preferably arranged in the vertical, longitudinal plane of the carriage at the middle part of the seat so that it can be reached by either occupant.

H indicates part of the framework of the vehicle or of the support for the engine, and I utilize this frame as one element of a safety device adapted to disconnect the hand operated parts of the starter from the engine in case the fly wheel should tend to rotate backward.

I is an arm on the friction lever extending upward beyond the pivot at *d*.

F is a stop, preferably a pin, secured to the frame, as, for instance, to the bar H. This pin is so situated that it can be struck by the arm I as the latter moves backward and when so struck it will cause the arm to swing the friction shoe out of engagement with the fly wheel.

The mode of operation, and manner of using the devices which I have described will be readily understood. When a rider occupying the seat of the vehicle desires

to start the engine, he grasps the upper end of the lever A and draws it forward. The first result of the strain is to cause the friction shoe *e* to be pressed against the surface at 8 on the fly wheel and to firmly engage therewith, and the next result, forward draft being exerted by the lever A on the link B, is to cause the forward rotation of the fly wheel. The parts are so related as to permit about one-fifth of a revolution at each forward throw of the lever. The driver repeats this reciprocating movement until the fly wheel brings the crank, and the latter brings the engine piston to the proper place in the cycle for the first explosion. When this explosion occurs, the engine commences to revolve the crank shaft and thereafter the rotation of the shaft continues automatically. After the engine has started, the driver permits the lever A and link B to move backward far enough to permit the arm I to impinge upon the stop F which thrusts and holds the friction shoe out of engagement with the wheel until it is again desired to start the wheel from rest. The wheel can revolve forward with safety even when the friction shoe is in contact therewith, as the direction of its motion is such that there will be no binding or locking. If at any time in starting the engine a premature explosion should occur tending to drive the piston suddenly backward before it completes its movement toward the larger receiving end of the cylinder, the operator is saved from accident by the parts at F and I. There may be a short back stroke of the lever A resulting from such a premature explosion, but it will only continue while the fly wheel is moved through a few degrees of its circle and then instant relief is experienced. The co-acting surfaces of the fly wheel and of the shoe *e* are smooth, with the result that, while sufficient

friction is developed between them to move the parts of the engine when the lever A is moved forward, they easily separate whenever the lever is moved backward, or when, due to a premature explosion in the engine cylinder, the parts are driven backward and the arm I is brought into engagement with the stop F.

What I claim is:

1. In a starting device for an internal combustion engine, the combination of the engine shaft, a fly wheel mounted thereon, having a friction surface, a rotary reciprocating friction shoe arranged to engage with the friction surface of the fly wheel when moved in one direction, and arranged to easily separate therefrom when moved in the opposite direction, means for moving the friction shoe bodily toward the fly wheel to engage with and turn the latter forward or for moving it bodily away from the wheel to disengage the shoe, and automatically-acting devices for disengaging the shoe from the fly wheel when it is carried backward, substantially as set forth.
2. In a starting device for an internal combustion engine, the combination with the engine shaft and a fly wheel thereon, formed with a concave friction surface, of an arm free to turn about the axis of the shaft, a lever pivoted to the outer end of the said arm, a friction shoe carried by the lever and arranged to engage with the friction surface of the fly wheel, and operating means for reciprocating the friction shoe, such means being connected with the said pivoted lever at a point between its pivot and the axis of the fly wheel, whereby the shoe is brought into engagement with the fly wheel or is disengaged therefrom in advance by a forward or backward movement of the said arm, substantially as set forth.

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

JOHN B. BARTHOLOMEW.

Witnesses:

CHAS. TJADEN,  
IRMA B. PENNOYER.