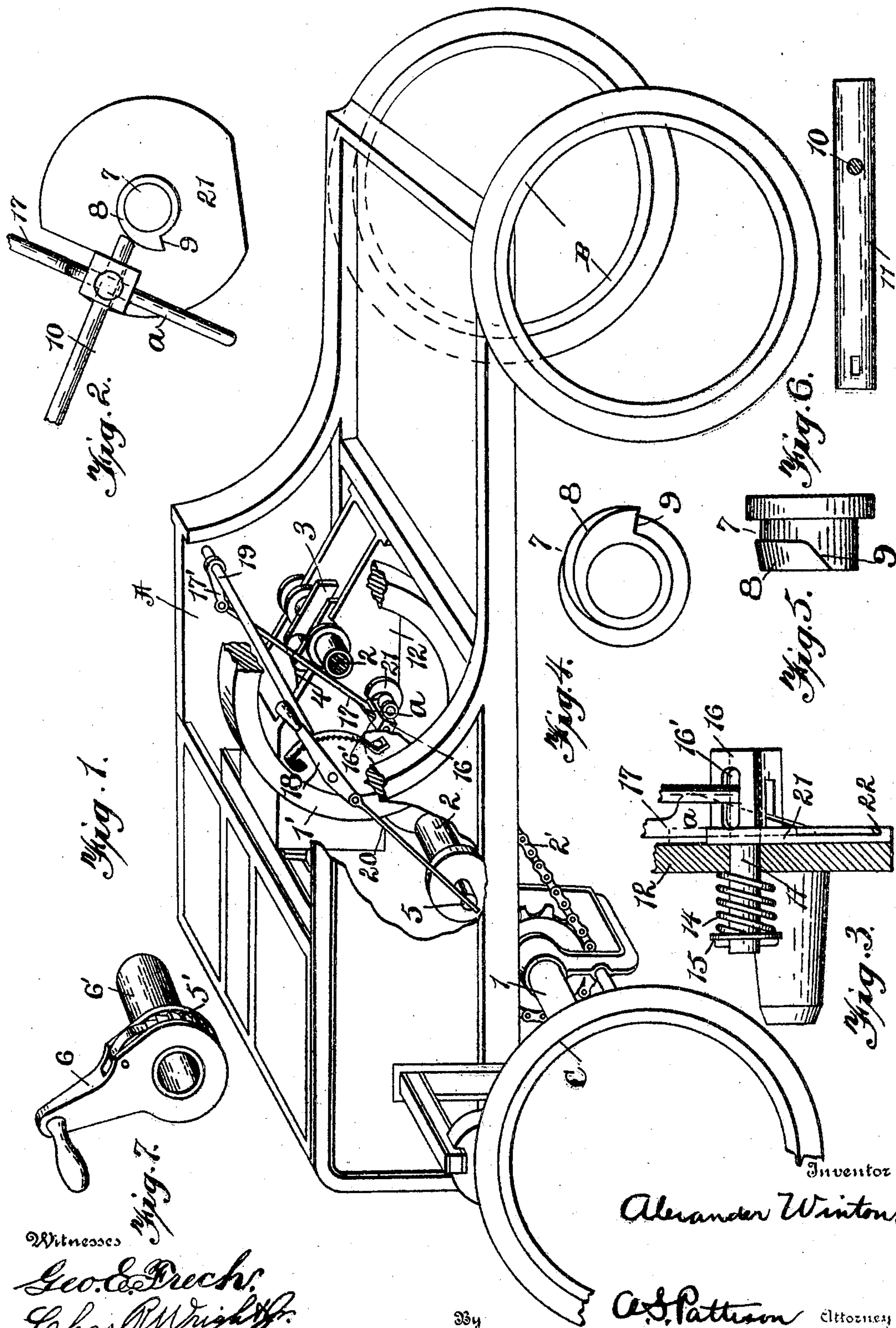


No. 798,553.

PATENTED AUG. 29, 1905.

A. WINTON.  
STARTING AND IGNITING MECHANISM FOR EXPLOSIVE ENGINES.  
APPLICATION FILED JUNE 20, 1901.





# UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF CLEVELAND, OHIO.

## STARTING AND IGNITING MECHANISM FOR EXPLOSIVE-ENGINES.

No. 798,553.

Specification of Letters Patent.

Patented Aug. 29, 1905.

Application filed June 20, 1901. Serial No. 65,352.

*To all whom it may concern:*

Be it known that I, ALEXANDER WINTON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Starting and Igniting Mechanism for Explosive-Engines, of which the following is a specification.

My invention relates to improvements in starting and igniting mechanism for explosive-engines and which is especially intended for use in connection with explosive-engines for driving vehicles.

As is well understood by those skilled in the art, explosive-engines in which the speed is varied requires also a variation of the point or period of the ignition of the explosive charge relative to the position of the piston and its driven crank. When an explosive-motor is running at high speed, the point of ignition is just in advance of the driven crank reaching its dead-center. It is also well understood that in explosive-engines it is necessary to start the engine by giving a sufficient movement thereof to cause one explosion. In explosive-engines, therefore, used for driving vehicles in which the point of ignition must vary according to the speed of the engine and in which also the engine must be started by hand it is necessary to provide means whereby the operator cannot attempt to start the engine when the sparker is set to ignite the charge at a point in advance of the crank reaching the point of dead-center, for otherwise the operator is liable to injury because of the back motion of the engine in causing the ignition of the charge before the dead-center is reached. Also in engines of the explosive type when used in connection with motor-vehicles a ratchet starting-lever is used, by means of which the engine can be moved forward and when started the ratchet will permit the engine to revolve without affecting or moving the starting mechanism. Should, however, the engine run backward, the ratchet would hold and cause injury to the operator.

Bearing the above explanation in mind, the object of my present invention is to provide a safety device whereby the operator is unable to attach the starting lever or implement when the ignition device is set to fire the charge in advance of the engine's dead-center and also starting means.

In the accompanying drawings, Figure 1 is a perspective view of a vehicle-frame broken

away, showing a portion of the engine and driving mechanism situated therein and partly in section, the steering-wheels and one of the driving-wheels being shown diagrammatically. Fig. 2 is a detached enlarged side elevation of the sparking cam, the sparking rod, and its controlling member or rod. Fig. 3 is an enlarged detached view of the guiding member for the sparking rod and its controlling rod or member, the sparking rod and controlling member having their upper portions broken away. Fig. 4 is an enlarged end view of the sparking cam. Fig. 5 is an enlarged side view of the sparking cam. Fig. 6 is a detached view of the spring-actuated guiding member for the sparking rod. Fig. 7 is a perspective view of my ratchet-lever used in starting the engine.

Though the specific mechanism and means employed for providing a safety device to prevent injury to the operator in starting the engine may vary without departing from the spirit and scope of my invention, the species here shown consists of means operatively connected with the device for varying the point of ignition so arranged as to prevent the operator from applying the starting crank or implement.

In the accompanying drawings, A indicates a part of the body of a vehicle broken away to illustrate sufficient of the mechanism therein to enable my invention to be clearly understood. B represents the steering-wheels, and C the driving-wheels, all of which are shown diagrammatically. The numeral 1 designates the driving-shaft, and 2 the engine-shaft. The driving-shaft is suitably connected in any desired manner with the engine-shaft; but, as here shown, a driving-chain 2' is a part of the said intermediate mechanism. As the driving mechanism between the driving-shaft 1 and the engine-shaft 2 forms no part of my present invention, it need not be more fully illustrated or further described herein. 1' is the balance-wheel of the engine, which is also shown diagrammatically.

3 represents the driving-cranks of the engine, and 4 the pitman.

As here shown, (though this may be varied,) the engine-shaft is provided with a suitable extension 5, to which any desired form of starting implement may be applied. As here shown, however, I use a ratchet-lever 6, which is provided with an extension 6', adapted to embrace the engine-shaft extension 5 and to be locked thereto through the medium of



locking-shoulders in any desired way. A ratchet mechanism 5' of any suitable form is arranged between the ratchet-lever 6 and the extension 6'. The extension 6' is adapted to  
 5 pass through a suitable opening in the carriage-body for the purpose of embracing the extension 5, located therein.

A sparking cam 7 is operatively connected in any desired manner with the engine-shaft  
 10 and is timed to rotate uniformly therewith. This sparking cam consists of an inclined or cam surface 8, having an angularly-arranged drop-off end 9. A sparking rod 10 has its inner end engaging with the cam 8 and to be  
 15 actuated thereby as the cam revolves. The opposite end of the sparking rod 10 is connected in any suitable manner with the sparking electrodes, which are included in any suitable electric circuit. (Not here shown.) The  
 20 sparking rod 10 passes through a suitable head 16, supported by a plate 21, attached to the inner side of one wall 12 of the engine-bed. The guiding-head 16 has elongated slots 16', through which the said sparking rod passes,  
 25 and the guiding-rod 11 passes loosely through the wall 12 of the engine and carries a suitable spring 14, the inner end of the spring engaging the inner side of the engine-bed and the outer end of the spring engaging a suitable washer or stop at the inner end of the  
 30 said rod 11. This mechanism serves to normally hold the sparking rod 10 at the inner end of the guiding-slots 16'. The position of the sparking rod 10 in the elongated slots 16' is  
 35 determined and regulated through the medium of a controlling member of any suitable form. As here shown, this controlling member consists of a cam  $\alpha$ , attached to the lower end of a suitable cam-rod 17. This cam moves and is  
 40 guided in a slot 22, formed in the said plate 21. From this description it will be seen that when the cam-rod 17 is depressed the sparking rod 10 is moved outward in the said slot 16' and when the cam-rod is elevated the sparking  
 45 rod, through the medium of the spring 14, is moved inward. This movement of the sparking rod determines its relative position upon the cam 8, and therefore, owing to the angularly-arranged drop-off 9, will determine the  
 50 point during the revolution of the cam at which the sparking lever will drop therefrom—that is to say, when the sparking rod is near the inner edge of the cam 8 it will drop off earlier relatively to the revolution of  
 55 the cam than it will when it is located near the outer edge of the said cam-surface 8. In this way the point or period of ignition relatively to the location of the piston in the engine-cylinder, and therefore relatively to the dead-center of the engine, is regulated through the  
 60 movement of the cam-rod 17. This cam-rod 17 may be operated in any desired manner, and the regulating or operating member will extend to a convenient point for the operator of  
 65 the vehicle. As here shown, however, the

means for controlling this cam-rod consists of a transversely-arranged rock-shaft 19, suitably journaled and supported in the body of the carriage, and the upper end of the cam-rod 17 is connected with a crank-arm 17', extending from the said rock-shaft. An operating-lever 18 is connected with the rock-shaft 19, and by means of which the shaft is rocked. A safety-rod 20 is suitably connected with the rock-shaft, here shown through  
 75 the medium of an extended end of the operating-lever 18. This safety-rod 20 is adapted to intervene or extend across the starting extension 5 when the cam  $\alpha$  is so set that a sparking or ignition of the explosive charge  
 80 will take place in advance of the dead-center of the engine. Therefore before the starting implement 6 can be applied to the starting extension 5 it is necessary to move the safety-rod 20 away from the starting extension 5. The only means for doing this is  
 85 through the medium of the controlling-lever 18, and the controlling-lever 18 being connected with the means for controlling the point of ignition it is necessary to vary the point of  
 90 ignition before the starting implement can be applied. As here shown, the sparking devices are so located as to cause the ignition in advance of the dead-center of the engine, and it will be noted that in this position the safety-  
 95 rod 20 intervenes between the starting extension 5 and any implement that may be applied thereto, thus absolutely preventing the operator from applying the starting implement when the sparking mechanism is at that point.  
 100 To permit the starting implement to be applied, the lever 18 is moved in the direction indicated by arrow in Fig. 1, which will carry the safety-rod 20 away from the starting extension and permit the starting implement to  
 105 be applied. When the safety-rod is so moved, then the point of ignition is varied to take place on one quarter of the stroke past the dead-center of the engine, thus making it absolutely impossible for the engine to start  
 110 backward when the starting implement is applied.

Having thus explained the nature of my invention and described one way of constructing and using the same, but without attempting to set forth all the forms in which it may be made or used, what I claim, and desire to secure by Letters Patent, is—

1. The combination with an explosive-engine having a starting-shaft fitted to receive a detachable starting member, a member normally in position to prevent the application of said starting member and movable from such position, and means connected thereto for varying the time of ignition.

2. The combination with an explosive-engine having a starting member, of a starting-handle adapted to coact therewith, a safety member in position to prevent the use of said handle, a variable ignition mechanism, and



a controlling member operatively connected with the safety member and independent of said starting-handle.

3. The combination with an explosive-engine, of a variable sparking device, and a safety member connected to and movable with the sparking device, the latter so located as to prevent the application of a starting-handle until the position of the variable sparking device has been shifted to delay the time of ignition.

4. The combination with an explosive-engine, of starting means, a variable igniting mechanism, a member obstructing the use of the starting means, and a controlling-handle movable independent of the starting means and operatively connected with the obstructing member and the variable igniting mechanism.

5. The combination with an explosive-engine, of a starting mechanism, a sparking mechanism variable when the engine is in normal operation and operating independent of the starting mechanism, an interfering member for the starting mechanism operatively connected with and movable with the variable sparking mechanism, and means for holding the variable mechanism at its adjusted point.

6. The combination with an explosive-engine adapted to receive a detachable starting member, of a variable igniting mechanism, and a member movable across the path occupied by the starting member and adapted to prevent the use thereof, the movable member operatively connected with and moved by the said variable sparking mechanism.

7. The combination with an explosive-engine, of a starting mechanism adapted to be operated by a handle, a rock-shaft, an igniting mechanism, a safety member normally in position to prevent the use of the handle and movable from such position, and operative connections between said rock-shaft said sparking mechanism and said safety mechanism.

8. The combination with an explosive-engine, of a starting mechanism adapted to be operated by a handle, a rock-shaft, an igniting mechanism, a safety member normally in position to prevent the use of the handle and movable from such position, and operative connections between said rock-shaft said sparking mechanism and said safety device.

9. The combination with a vehicle-body, of

an explosive-engine, a variable igniting mechanism, a starting member for said engine, an interfering member for the starting member; a shaft having an operative handle, and connections between the shaft said igniting mechanism and interfering member.

10. The combination with an explosive-engine, of a variable igniting mechanism including a cam having a diagonally-arranged drop, an endwise and laterally movable member co-acting with said cam, and a second cam adapted to move said member laterally in respect to said first cam.

11. The combination with a vehicle-body, of an explosive-engine, a starting means operatively connected therewith from a point outside of said body, a variable sparking mechanism for said engine and operative independent of the starting means when the engine is running normally, means whereby the sparking mechanism will operate late in respect to the revolution of the engine when the starting mechanism is in operation, and a manually-operated controlling member for said sparking mechanism after the engine is running.

12. The combination with the shaft of an explosive-engine, and a shiftable electric sparking mechanism, of a device adapted to guard said shaft by preventing application of a turning device thereto, and a link connecting said guard and the variable sparking mechanism.

13. The combination with an explosive-engine having a starting member, of a shiftable sparking mechanism, of a device adapted to guard the said engine-starting member by preventing the application of a turning device thereto, and a connection between said guard and the variable sparking mechanism.

14. The combination with a shaft of an explosive-engine and a shiftable sparking mechanism, of a device adapted to guard said shaft by preventing application of a turning device thereto, and a connection between said guard and the variable sparking mechanism.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALEXANDER WINTON.

Witnesses:

GEO. H. BROWN,  
F. W. FOX.