L. C. VAN RIPER & A. NOVICK.

STARTING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED NOV. 30, 1910.

1,045,344.

Patented Nov. 26, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

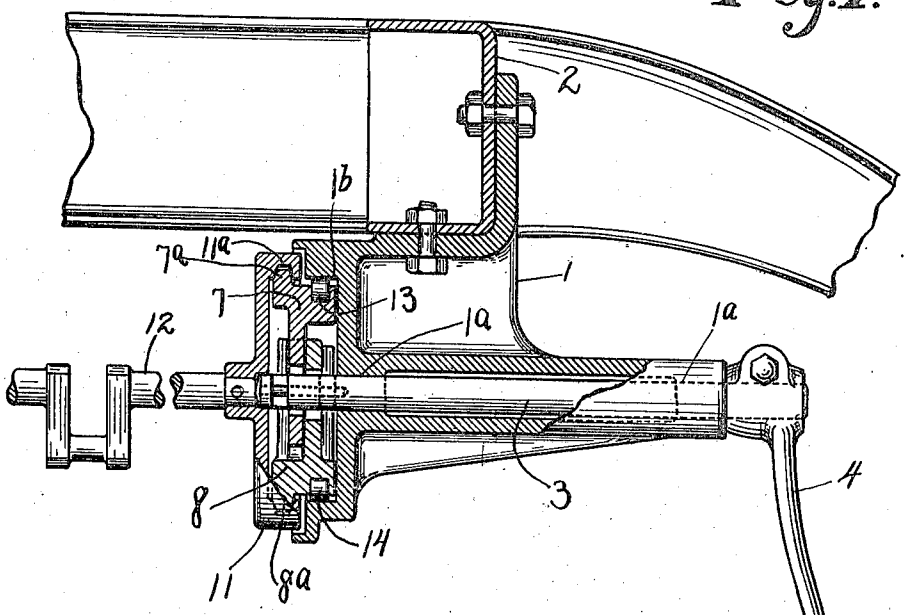

Fig. 2.

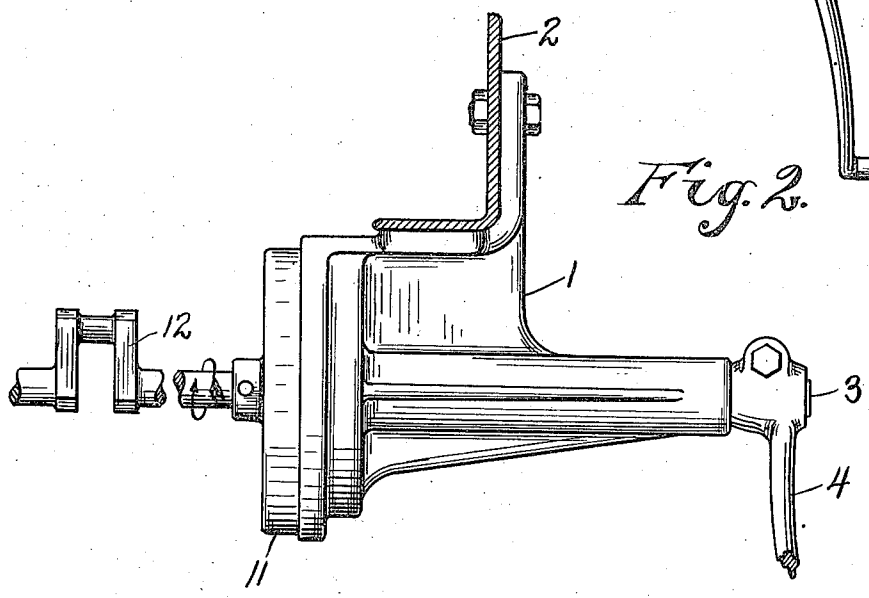

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Fig. 3.

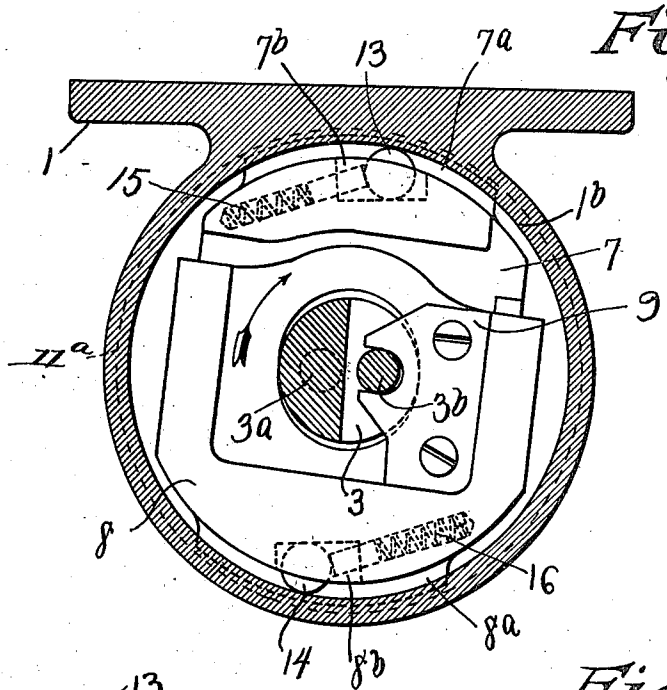
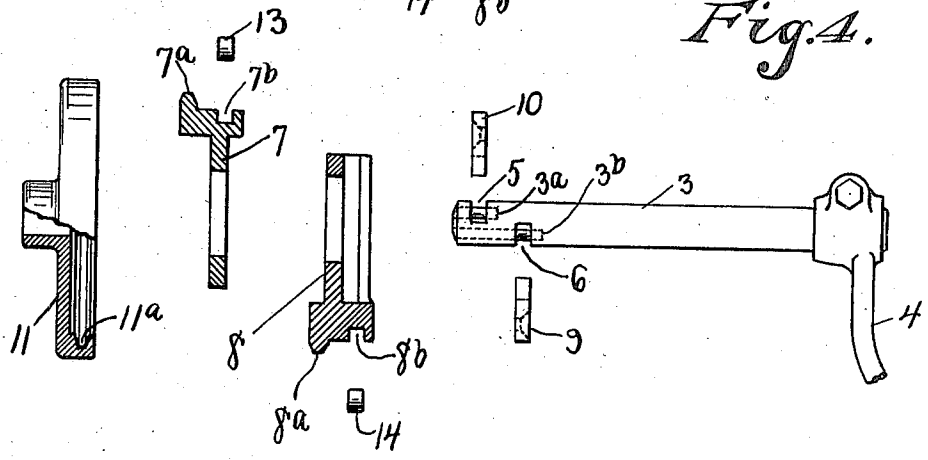


Fig. 4.



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UNITED STATES PATENT OFFICE.

LEWIS C. VAN RIPER AND ABRAHAM NOVICK, OF NEW YORK, N. Y.; SAID NOVICK ASSIGNOR TO SAID VAN RIPER.

STARTING MECHANISM FOR EXPLOSIVE-ENGINES.

1,045,344. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed November 30, 1910. Serial No. 594,834.

To all whom it may concern:

Be it known that we, LEWIS C. VAN RIPER, of the borough of Manhattan, city, county, and State of New York, and ABRAHAM NOVICK, of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Starting Mechanisms for Explosive-Engines, of which the following is a specification.

Our invention relates to certain new and useful improvements in starting mechanisms for explosive engines.

The object of our invention is to provide a starting device that will release the starting crank handle or starting mechanism, so that no backward kick is imparted to the crank handle or mechanism when premature explosion or back fire occurs, thereby preventing injury to the person or to the mechanism employed in operating the starting device and is an improvement upon two pending applications for Letters Patent filed in the United States Patent Office by one of applicants on September 12th, 1910, Serial Number 581,600 and October 6th, 1910, Serial Number 585,577.

The improvement shown herein is for the purpose of enabling the friction shoes of the starting device to grip the friction disk more firmly when it is desired to start an engine and enables the use of a smaller friction disk and cheaper construction than is possible in either of the aforesaid pending applications.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, wherein:

Figure 1 is a sectional view showing the starting device as fastened to an automobile frame, and connected to the engine shaft. Fig. 2 is a view showing the outside of the mechanism. Fig. 3 is a sectional view showing the operation of the device as will appear hereinafter. In Fig. 4 several of the parts are shown in detail.

Our improved device consists of a non-rotatable casing and suitable supporting member 1. This casing and supporting member 1 may be made of one piece as shown, or of several parts to suit the different designs of automobile frames. This casing and supporting member 1 may be fastened to any suitable stationary support, as for instance the front cross member 2 of an automobile frame as shown in Figs. 1 and 2, it being understood that it will be necessary to vary the details to suit each type of automobile this device is to be used on. The bearings 1^a which form a part of the casing 1 are for the purpose of carrying the crank handle shaft 3, on one end of which may be fastened the crank handle 4 or other suitable means to revolve the said shaft 3. The opposite end of shaft 3 is slotted as shown in Fig. 4 at 5 and 6 and the engaging pins 3^a and 3^b are provided for the purpose of engaging with the sliding members 7 and 8 by means of the engaging plates 9 and 10, which are fastened to the sliding members 7 and 8.

When the crank handle shaft 3 is revolved in the direction shown by the arrow in Fig. 3 the sliding members 7 and 8 are caused to slide in opposite directions, thereby gripping the friction cup disk 11 (see Fig. 1) by means of the wedge shaped friction shoes 7^a and 8^a being wedged into the tapered groove 11^a of friction cup disk 11, thereby providing suitable and efficient means for revolving the engine shaft 12 in a forward direction only, as shown by the arrow encircling said engine shaft 12 in Fig. 2. The above mentioned wedging takes place only after a slight forward turn of the crank handle shaft 3 has caused the friction rollers 13 and 14 to roll back to the deeper ends of the slots 7^b and 8^b against the springs 15 and 16. The said springs 15 and 16 provide substantial means for keeping the friction rollers 13 and 14 always in frictional contact between the sliding members 7 and 8 and the annular surface 1^b of the casing 1.

When a premature explosion or back fire occurs the engine shaft revolves in the opposite direction to that shown in Fig. 2 and in so doing it attempts to drag along the sliding members 7 and 8, and the crank handle shaft 3 with the crank handle 4. This backward impulse causes the friction rollers 13 and 14 to be wedged between the stationary annular surface 1^b of the casing 1 and the sliding members 7 and 8, thereby preventing the crank handle 4 or any of the other intermediate parts from revolving

connectedly backward with the engine shaft 12. The engine shaft 12 and friction disk 11 are now free to slip backward without the rest of the starting device, as the pressure applied to the crank handle 4 that previously held the friction shoes 7^a and 7^b wedged in the groove 11^a, has been transferred to the friction rollers 13 and 14 by the above mentioned backward impulse, although no backward movement has taken place. The device can only revolve backward when the crank handle shaft 3 is revolved backward by means of the crank handle 4, and not by a backward impulse of the engine. When the sliding members 7 and 8 attempt to move backward the friction rollers 13 and 14 are wedged between the sliding members 7 and 8 and the annular surface 1^b thereby producing a pressure which attempts to move together the sliding members 7 and 8 thereby reducing the pressure between the friction shoes 7^a and 8^a, and the grooved friction disk 11, sufficiently to allow the grooved friction disk 11 and the engine shaft 12 to revolve backward without the starting device following.

When the automatic action of the engine starts in a forward direction as shown by the arrow in Fig. 3 the increased speed of the engine shaft over the starting crank will automatically release the engine shaft from the starting device, but we preferably use more positive means such as the engaging pins 3^a and 3^b of the crank handle shaft 3 which act on the sliding members 7 and 8 through the engaging plates 9 and 10 so as to draw the friction shoes 7^a and 8^a (see Fig. 1) out of contact with the friction disk 11, the friction rollers 13 and 14 being then pushed forward by the springs 15 and 16 to the shallow ends of the slots 7^b and 8^b thereby holding the device in a normal position as shown in Fig. 3, and out of engagement with the engine shaft 12 and cup disk 11.

What we claim is:

1. In a starting device adapted to be used in connection with explosive engines, the combination of an annular V shaped friction surface upon or connected to an engine shaft, a friction clutch having shoes shaped to engage the said friction surface, rotating means for frictionally connecting said friction clutch to said engine shaft through said friction surface on forward rotation of said rotating means and means for disconnecting said frictional connection upon backward rotation of said engine shaft.

2. In a starting device adapted to be used in connection with explosive engines, the combination of an annular grooved friction surface upon or connected to an engine shaft, shoes shaped to engage the said grooved friction surface, slidably mounted upon each other and rotatable together, rotatable means for causing said shoes to frictionally grip said friction surface upon forward rotation and means for reducing the friction in said frictional grip upon the reverse rotation of said engine shaft.

3. In a starting device adapted to be used in connection with explosive engines, the combination of an annular grooved friction surface upon or connected to an engine shaft, shoes shaped to engage said grooved friction surface, slidably mounted upon each other and rotatable together, rotatable means for causing said shoes to frictionally grip said friction surface upon forward rotation and means for reducing said frictional grip upon the rotation of said engine shaft in either direction under power other than that imparted to it through said starting device.

4. In a starting device adapted to be used in connection with explosive engines, the combination of an annular wedge shape grooved friction surface attached or connected to an engine shaft, an expanding friction clutch having wedge shaped shoes, rotatable operating means for causing said clutch to expand and frictionally connect with said friction surface upon forward rotation of said operating means and means for causing said clutch to contract and reduce said frictional connection upon the reverse rotation of said engine shaft.

5. A starting device adapted to be used in connection with explosive engines, the combination of a rotatable friction clutch having wedge shaped friction shoes, a wedge shape grooved annular friction surface upon or connected to an engine shaft, means for rotating said frictional clutch to frictionally connect said wedge shaped friction shoes to said annular friction surface upon forward rotation of said clutch and means for reducing the friction in said frictional connection upon the reverse rotation of said engine shaft.

6. A starting device for explosive engines to be used in connection with an engine shaft, having means for connecting the starting device to the engine shaft, comprising sliding members having wedge shaped friction shoes, a crank handle shaft having means for engaging and operating said sliding members, a grooved friction disk, means for rotating said crank handle shaft, and means for disconnecting said starting device from said engine upon either forward or backward rotation of the said engine shaft by its engine.

7. In a starting device for explosive engines, the combination of a casing with an annular surface, a grooved friction disk upon or connected to an engine shaft, sliding members having friction shoes shaped to fit and engage said grooved friction disk, a crank handle, a crank handle shaft having means for engaging said sliding members,

and friction rollers to disengage said friction shoes from said friction disk upon backward rotation of said engine shaft.

8. In a starting device for explosive engines, the combination of a clutch member having a V shaped friction surface upon or connected to an engine shaft, a coöperating clutch member having a V shaped friction surface mounted rotatably at all times both forward and backward and normally held out of operative engagement with said first mentioned clutch member, means for operatively engaging said clutch members at a single operation and means for moving said coöperating clutch member out of operative engagement with said first named friction surface upon backward rotation of said engine shaft.

9. In a starting device adapted to be used in connection with explosive engines, the combination of an annular V shaped friction surface upon or connected to an engine shaft, shoes shaped to engage said friction surface, rotatable means for causing said shoes to frictionally grip said friction surface upon forward rotation of said rotating means, and means for causing said frictional grip to become inoperative upon the reverse rotation of said engine shaft, said means comprising a non-rotatable friction surface and friction rollers.

10. In a starting device adapted to be used in connection with explosive engines, the combination of an annular grooved friction surface upon or connected to an engine shaft, shoes shaped to engage said grooved friction surface, rotatable means for causing said shoes to frictionally grip said friction surface upon forward rotation of said rotating means, and means for causing said frictional grip to become inoperative upon the rotation of said engine shaft in either direction under power other than that imparted to it through said starting device.

11. In a starting device adapted to be used in connection with explosive engines, the combination of an annular wedge shaped friction surface attached or connected to an engine shaft, an expanding friction clutch having wedge shaped shoes, rotatable operating means for causing said clutch to expand and frictionally connect with said friction surface upon forward rotation of said operating means and means for causing said clutch to contract and disconnect said frictional connection upon the reverse rotation of said engine shaft.

12. In a starting device for explosive engines, the combination of a rotatable friction clutch member, having a V shaped friction surface connected to an engine, a coöperating clutch member mounted rotatably at all times both forward and backward having a friction surface to engage said first named clutch member, means for rotating said coöperating clutch member and for operatively connecting and disconnecting said coöperating clutch member and said first named clutch member as said rotating means is moved in opposite directions and means for disconnecting said clutch members on the reverse movement of said engine.

Signed by us at New York, N. Y., this 23rd day of November 1910.

LEWIS C. VAN RIPER.
ABRAHAM NOVICK.

Witnesses:
HARRY JACOBSON,
FRANCES SIEGEL.