G. H. RICE.

AUTOMATIC SAFETY ATTACHMENT FOR CRANKING DEVICES.

APPLICATION FILED DEC. 11, 1917.

1,272,101.

Patented July 9, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

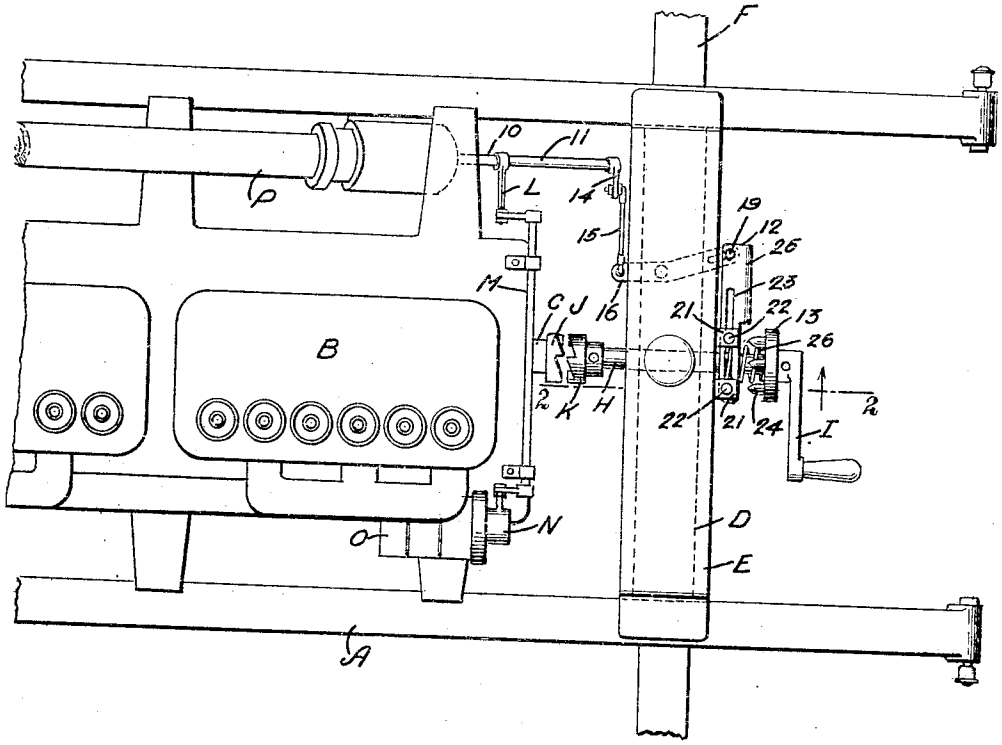
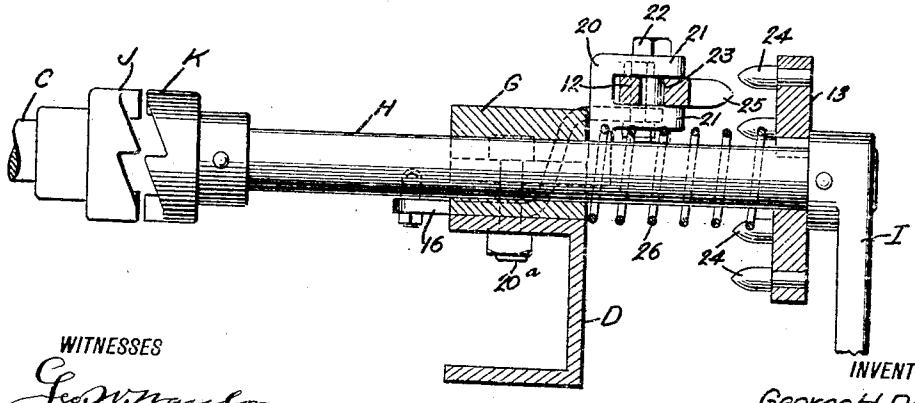



Fig. 2.




WITNESSES

Geo. W. Naylor

J. L. McAuliffe

INVENTOR

George H. Rice

BY Munn & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

G. H. RICE.

AUTOMATIC SAFETY ATTACHMENT FOR CRANKING DEVICES.

APPLICATION FILED DEC. 11, 1917.

**1,272,101.**

Patented July 9, 1918.

2 SHEETS—SHEET 2.

Fig. 3.

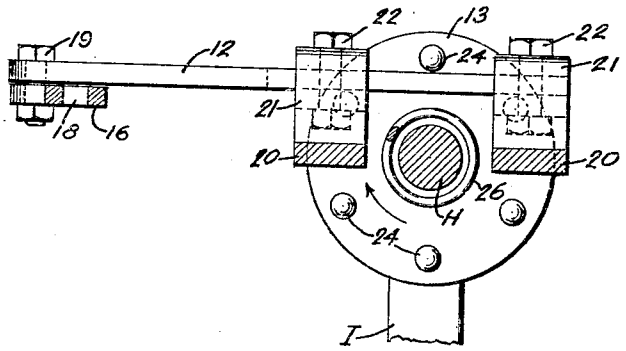
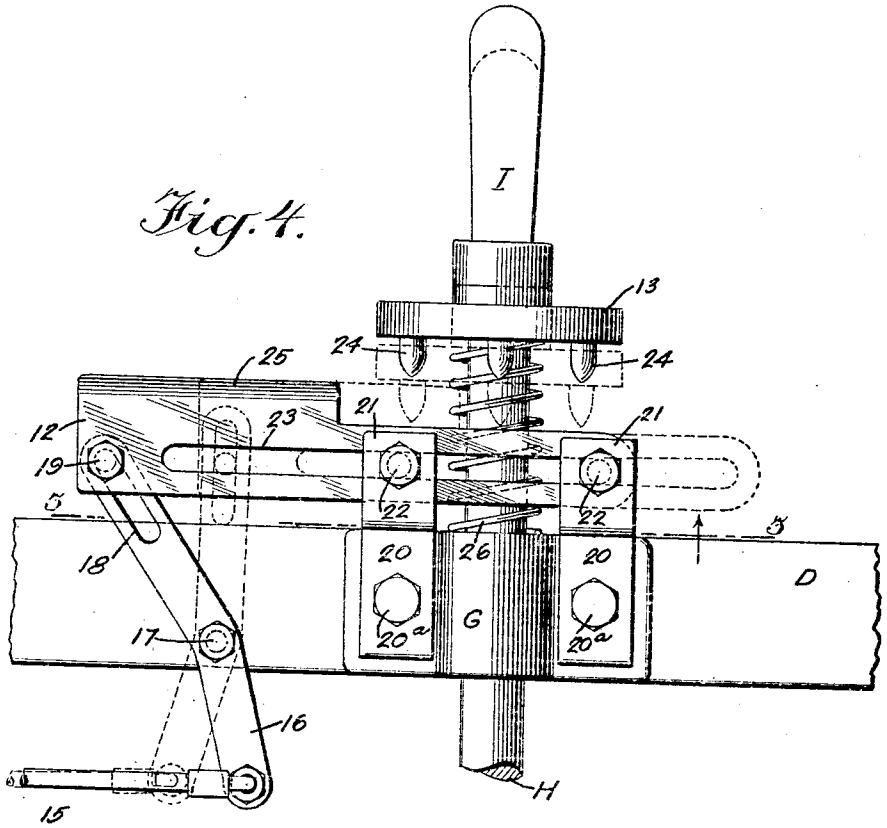



Fig. 4.




WITNESSES

Geo. W. Naylor

J. L. McCulloch

INVENTOR

George H. Rice

BY Munn & Co

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

GEORGE HENRY RICE, OF CASTNER, TERRITORY OF HAWAII.

## AUTOMATIC SAFETY ATTACHMENT FOR CRANKING DEVICES.

1,272,101. Specification of Letters Patent. Patented July 9, 1918.

Application filed December 11, 1917. Serial No. 206,602.

*To all whom it may concern:*

Be it known that I, GEORGE H. RICE, a citizen of the United States, and a resident of Castner, Territory of Hawaii, have invented a new and Improved Automatic Safety Attachment for Cranking Devices, of which the following is a full, clear, and exact description.

My invention relates to a means for use in connection with the cranking device of an internal combustion engine, more particularly the engine of an automobile or other vehicle, or motor boat, and especially the invention relates to a means for preventing injury to the person turning the crank should the engine back-fire during the cranking up of the engine.

The prime object of my invention is to provide a safety device operative upon an abnormal movement of the spark advancing means, whereby to lock the cranking device against turning when the spark has been advanced to a point to produce back-fire of the engine with a resulting kick-back of the cranking device.

In carrying out the invention use is made of coacting locking elements applicable respectively to the cranking device and to a relatively fixed part of the engine or machine together with means operable by the spark advancing rod so that the relatively movable locking element will partake of abnormal movement of the advancing rod to assume a position for interlocking with the element on the cranking device when the latter is thrown to the clutching position.

Reference is to be had to the accompanying drawings forming a part of this specification in which similar reference characters indicate corresponding parts in all the views, it being understood that the drawings are merely illustrative of one example of the invention.

Figure 1 is a plan view of my invention applied, the view including portions of an automobile and its engine;

Fig. 2 is an enlarged longitudinal vertical section on the line 2—2, Fig. 1, the radiator being omitted;

Fig. 3 is a transverse vertical section on the line 3—3, Fig. 4;

Fig. 4 is a fragmentary inverted plan view on an enlarged scale showing the interlocking features of my invention.

In the illustrated example showing one application of my invention, the letter A indicates frame parts of an automobile; B, the engine; C, the engine shaft; D, a transverse frame member; E, (Fig. 1) a radiator; F, (Fig. 1) a portion of the front axle; G, a bearing on frame member D, in which the shaft section H of the cranking device I turns; J and K represent the clutch elements on the engine shaft C and shaft section H, respectively. The numeral 10 indicates the spark advancing rod associated as usual with the steering post P; L is a lateral arm in known types of machines extending from the advancing rod 10, said arm having suitable connections M with a timing device N; the letter O indicates conventionally a magneto. The mentioned parts may be of any approved form and arrangement, the exception being that the advancing rod 10 is modified in carrying out my invention in its preferred form as will appear.

In accordance with my invention I provide relatively movable coacting elements 12, 13 to be brought to locking position to prevent turning movement of the cranking device I, and I operate the one element 12 through an extension 11 of the spark advancing rod 10 and intermediate connections. The element 13 is preferably in the form of a disk which is keyed or otherwise made fast on the shaft section H of the cranking device to partake of the longitudinal and turning movements thereof. The element 12 is secured to relatively fixed parts of the engine or machine to slide transversely in a plane parallel with the disk 13. In the example shown the extension 11 of the advancing rod has a lateral arm 14 which connects by a link 15 with one arm of a bellcrank lever 16 fulcrumed as at 17 on the frame member D or equivalent fixed part. The opposite arm of the bellcrank lever 16 is slotted longitudinally as at 18 and a bolt 19 passes through said slot and through the locking element 12. The arrangement is such that a turning movement imparted to the advance rod 10 will rock the bellcrank 16 and thereby give transverse sliding movement to the element 12. To guide the element 12 in its movements, suitable means may be provided, there being shown for the purpose guide brackets 20 secured by bolts $20^a$ or the like, said guide brackets presenting each a fork or spaced parallel arms 21 receiving the sliding element 12. Bolts 22 extend through the forks 21 and through a longitudinal slot 23 in the element 12.

Locking members 24 are provided on the disk 13 preferably in the form of an annular series of studs, said studs projecting from that side of the disk facing the coacting element 12. The element 12 is broadened for a portion of its length as at 25, the broadened portion 25 coacting with the locking elements 24. A spring 26 is provided normally tending to retract the cranking device from the clutching position, a spring for the purpose being usual, and it will be understood that the location of the spring and the location of the locking elements relatively on the cranking device will vary with the make of the automobile, the said elements in the present example being adjacent to the crank handle.

With the described construction in cranking the engine and moving the cranking device forward axially for engagement of the clutches, the sliding device 13 will be moved forwardly to bring the path of rotation of the studs 24 into the plane of movement of the locking device 12. If, therefore, the advancing rod 10 has been turned through such an angle as to advance the spark to a point where back-fire will occur, the turning of the advancing rod will also have rocked the bellcrank lever 16 sufficiently to have moved the locking device 12 transversely a sufficient distance to bring the locking edge 25 into the path of rotation of the studs 24, the spaces between the studs permitting the transverse movement of the edge 25. Obviously, it will not be possible to turn the cranking device since the studs 24 will lock with the edge 25. Therefore, the engine cannot be cranked if the spark has been advanced to an abnormal degree such as to produce back-fire and hence the danger of injuring by a kick-back of the cranking device will be practically eliminated.

The studs 24 and edge 25 are tapered to facilitate engagement thereof.

I wish to state in conclusion that although the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the mechanical details herein illustrated, since manifestly the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:

1. An automatic safety attachment for the cranking device of an internal combustion engine, including coacting elements, the one adapted to be applied to the cranking device and the other adapted to be mounted adjacent to the cranking device; together with means operative with an abnormal movement of the spark advancing means of the engine to relatively position said elements for interlocking engagement to prevent turning of the cranking device when the spark has been advanced to an extent to produce back-fire.

2. The combination with the spark advancing means and cranking device of an internal combustion engine, of means operative by an abnormal movement of the spark advancing means to prevent turning of the cranking device.

3. An automatic safety attachment for the cranking device of an internal combustion engine, including an element adapted to be secured to the cranking device to partake of its turning and sliding movements, an element adapted to be mounted adjacent to the first element for relative movement, and means to throw the second element into position for locking with the first element, the said last mentioned means being adapted to connect the second element with the actuating means of the timing device of the engine to partake of the movements of said actuating means and engage the first mentioned locking element by an abnormal movement of said actuating means.

4. The herein described safety attachment for controlling the cranking device of an internal combustion engine, comprising a disk adapted to be secured to the cranking device to partake of the movements thereof, a transversely slidable element, said disk having locking members on that face adjacent to the path of movement of the slidable element, guide means for said sliding element, and means to shift the sliding element transversely to lie in the plane of rotation of the members on the disk when the cranking device is advanced to clutching position.

5. The combination with the spark advancing means, the actuating means thereof, and the cranking device of an internal combustion engine; of a disk on the cranking device to partake of the longitudinal and turning movements thereof, an annular series of studs on a face of the disk, a transversely movable locking member having an edge portion adapted to be moved with the sliding of said device into a position to interlock with the studs on the disk, and a connection between said locking device and the said actuating means to bring said locking device and the said studs into locking engagement upon an abnormal movement of the said actuating means.

GEORGE HENRY RICE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."