Feb. 12, 1946. H. SCHMID ET AL 2,394,939

ARRESTER MEMBER FOR IMPULSE COUPLINGS

Filed May 5, 1944

Fig. 1.

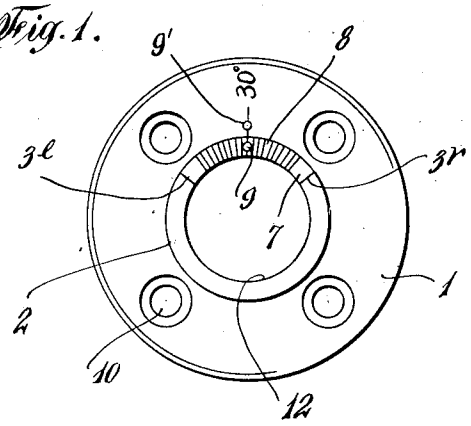


Fig. 2.

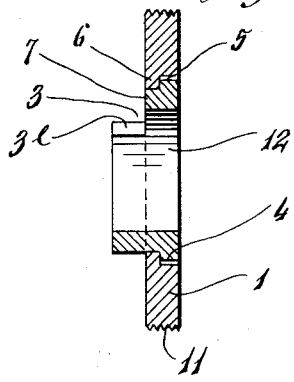


Fig. 3.

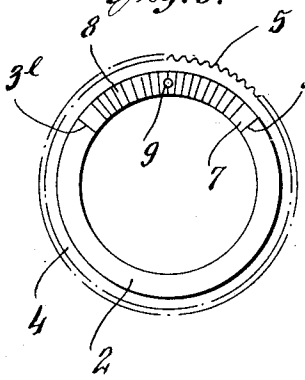


Fig. 4.

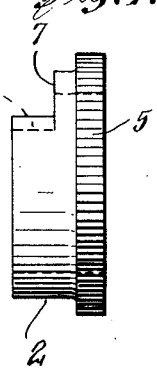


Fig. 5.

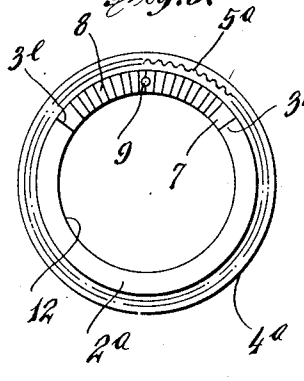


Fig. 6.

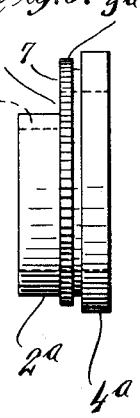


Fig. 7.

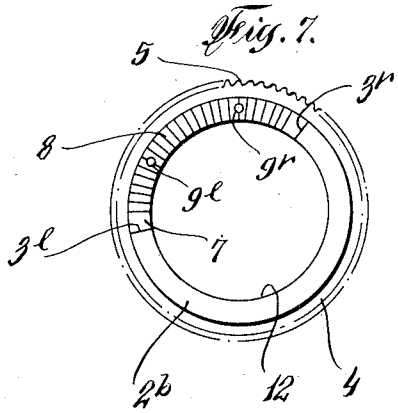
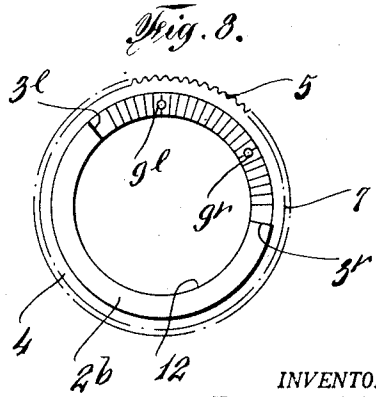


Fig. 8.



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Patented Feb. 12, 1946 2,394,939

UNITED STATES PATENT OFFICE

2,394,939

ARRESTER MEMBER FOR IMPULSE COUPLINGS

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Application May 5, 1944, Serial No. 534,387

2 Claims. (Cl. 171—209)

This invention relates to improvements in arrester members for impulse couplings of the type used upon ignition magnetos for internal combustion engines, to produce sufficient voltage and current to effect sparking at low speed, and thus cause the engine to commence running.

An object of the invention is to provide an arrester member or cam which is of simple construction, capable of being easily mounted on the framework of a magneto in position to cooperate with the impulse coupling; and readily adjustable so that the driving member of the coupling can be retarded at the required point in its rotation to enable it to throw the rotor of the magneto sharply forward when a spark is to be produced.

Another object is to provide an arrester member that can be set for rotation of the magneto in either direction, and that is also adapted to prevent damage if back-firing occurs when the power for the engine is cut off and the speed drops.

Other objects and advantages of the invention are set forth in the ensuing specification, and the novel features thereof are defined in the appended claims. But this disclosure is of course explanatory only, and we may resort to various changes in practice without deviating from the principle of the invention, or exceeding the scope and meaning of the terms in which the claims are expressed.

On the drawing, which illustrates the best forms of our invention now known to us:

Figure 1 is a front elevation of one embodiment of our invention, assembled with the holding or mounting plate.

Figure 2 is a vertical section through Figure 1.

Figure 3 is a front view of the arrester member or cam detached.

Figure 4 is a side view of same.

Figures 5 and 6 are respectively front and side elevations of a modified arrester cam; and

Figures 7 and 8 are similar views of another modification.

In the following description the same numerals identify the same parts throughout.

In Figures 1, 2, 3 and 4, the numeral 1 indicates a plate shown as circular in shape, to receive and hold the arrester member or cam 2. For this purpose the plate 1 has a central opening into which the arrester cam fits. This cam is preferably cylindrical, and at one end is a recess 3, at the two sides of which are opposed stop shoulders 3r and 3l. At the opposite end is a flange 4, on the periphery or rim of which are teeth or serrations 5. The central opening in the mounting plate 1 is counterbored, providing a shoulder 6 which the collar or flange 4 engages, and the enlarged portion of this opening has inside serrations matching the serrations 5 and meshing therewith. Hence the position of the cam in the mounting plate can be adjusted.

The bottom of the recess 3 has a flat surface 7 bearing indications 8. At the middle of these is an indication 9 which, when placed opposite a similar indication 9' on the plate 1, signifies that the cam is in central position. It can be moved to right or left by pushing it out of the plate 1 and changing its position, remeshing the teeth thereon with the teeth in the plate 1. The end of the cam 2 bearing the flange 4 is flush with one face of the plate 1, and the bottom 7 of the recess 3 is flush with the opposite face of the plate 1.

This plate is secured against the frame of a magneto with the collar 4 and adjacent face of the plate in contact with the magneto. The opposite end of the cam 2 and the shoulders 3r and 3l then project from the plate 1, and the shaft of the magneto protrudes loosely through the cam and is affixed to the impulse coupling in the usual way, as set forth in our copending application for patent on an impulse coupling, Serial Number 534,386, filed of even date herewith. This coupling carries movable dogs or pawls which, at low speed, strike against one or the other shoulder, according to the direction of rotation of the magneto. As one of these pawls engages one of the shoulders, the impulse coupling is retarded or checked till a cam release carried by it catches up with the arrested pawl or dog and pushes it radially outward till it clears the shoulder obstructing it. The spring in the coupling then snaps or throws the armature or rotor forward at greatly increased speed to generate enough current and voltage to make a hot spark in the power chambers of the engine. For right hand rotation the shoulder 3r is engaged and for the opposite rotation, the shoulder 3l. The impulse coupling is of course retarded when the rotor is about to pass through the position of maximum generation.

The plate 1 has screw holes 10 for attaching it to the magneto, and peripheral threads 11 to enable a casing or cover to be screwed thereon, to envelop the greater part of the impulse coupling, which is also attached to a drive shaft on the engine. The bore of the cam 2 is indicated at 12.

Figures 5 and 6 present a modification in which

serrations 5a encircle the arrester cam 2a between the recess 3 at one end and the flange 4a at the other. These serrations are flush with the bottom 7 of the recess.

In the arrester of Figures 7 and 8, the stop shoulders 3r and 3l are farther apart than in the previous views. The shoulder 3r serves when the magneto rotates to the right or clockwise, and the other 3l when the magneto rotates in the opposite direction. Here the indications extend over a greater range on the surface 7. Two position marks 9r and 9l are provided. For right hand rotation, the mark 9r is lined up with the mark 9'. The shoulder 3r just beyond the mark 9r will then arrest the impulse coupling till the dog thereof is released. For rotation in the opposite direction the cam 2 is shifted to bring the mark 9l into line with the mark 9', and then the other shoulder 3l adjacent the mark 9l will be in operative position.

Sometimes, when the power is cut off to stop the engine, a slight reverse movement of the main shaft will occur when the engine is about to become motionless, and then the magneto will reverse and again produce a spark. This will result in a strong back-kick and reverse rotation for one or more revolutions. Such action might result in great damage to the magneto.

For example, if the engine has been running to the right and reverses before it comes to a halt, the checking of the impulse coupling by the shoulder 3l, if this shoulder is close to the mark 9' as is shown in Figure 1, for instance, will occur when the parts of the coupling are not in proper position to be quickly released from this shoulder. The drive shaft, starter or magneto, or all of these might now be broken. But with the shoulders farther apart, as indicated in Figure 7, the shoulder 3l will now be farther from the marks 9r and 9', and before the dog of the impulse coupling on the engine back-kick reaches the shoulder 3l, the dog which would otherwise strike this shoulder and be checked by it, will be thrown out by centrifugal force and clear this shoulder. The impulse coupling and drive shaft thus cannot be jammed and no damage or breakage can occur. This is a very important and useful feature, especially with engines for airplanes.

The adjustability of the cam 2, provided by the teeth or serrations on this cam and in the plate or disk 1 is very important in practice. Internal combustion engines do not have equal "lag angles"; that is, the degree of retardation of the spark necessary at starting varies in engines of different design. One engine may start well with ignition delayed till the crank is 30° past dead center; another will require a spark a little sooner or a little later. When our arrester cam has the mark 9 registering with the mark 9' on the plate or disk 1, the spark is given at top dead center of the engine; but for use with an engine with a different angle of lag, it is only necessary to mount the cam in the plate 1 with the indication 9 to one side or the other of the mark 9' of the plate the required number of spaces or gradations on the surface 7. The meshing of the serrations holds the cam in any position more securely than any additional fastening element, such as a tightening or locking screw. Our arrester can therefore be used for all types of internal combustion engines now produced.

Having described our invention what we believe to be new is:

1. An arrester member for the impulse coupling of an ignition magneto, having a cylindrical bore therethrough and a recess at one end forming opposed stop shoulders, and having a flange bearing exterior peripheral serrations and spaced from said recess to enable its position to be adjusted in a mounting plate attached to said magneto, said plate having inside serrations to engage the serrations on said flange, the bottom of said recess bearing indications showing the position of the member with respect to the mounting plate.

2. An arrester cam member according to claim 1 wherein the indications include two which are spaced apart, one to show the position of the member for one direction of rotation of the magneto and the other to show position for the opposite direction, said indications being spaced from said shoulders, and the latter separated by a relatively great interval to prevent damage in case of back-firing.

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