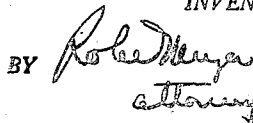


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AIR OPERATED ENGAGEMENT MEANS FOR IMPULSE COUPLED MAGNETOS

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2 Sheets-Sheet 2

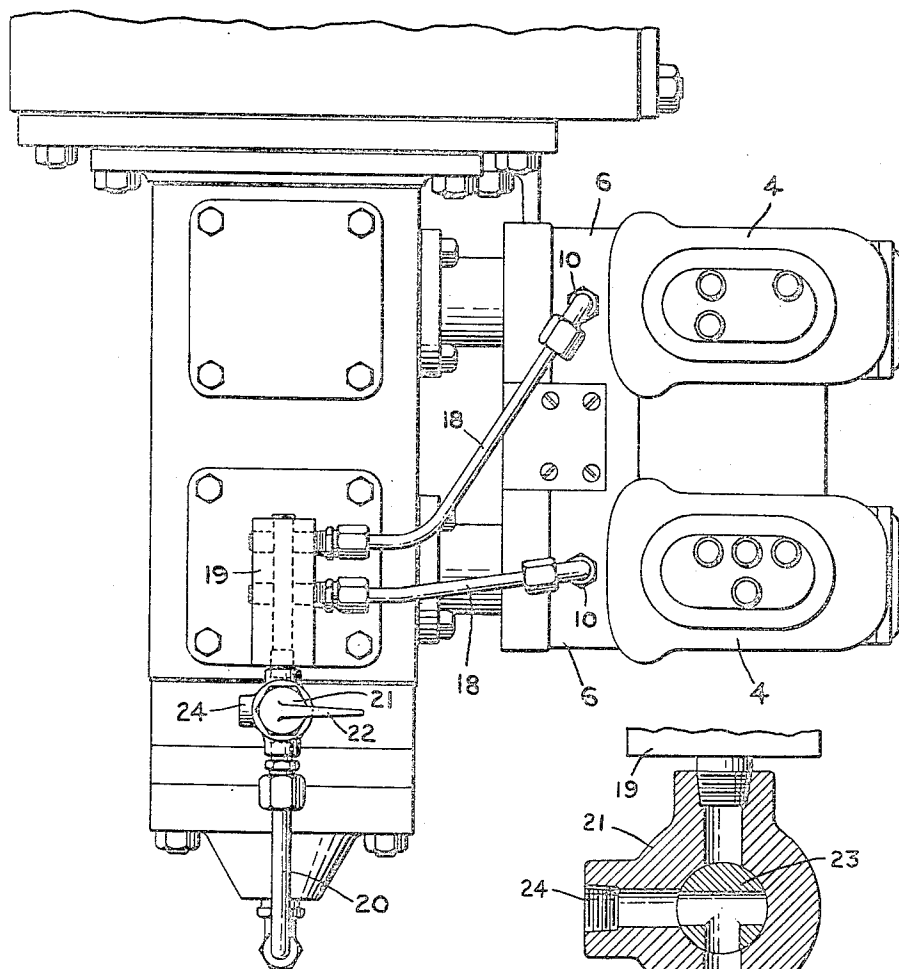


FIG. 2

FIG. 5

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AIR OPERATED ENGAGEMENT MEANS FOR IMPULSE COUPLED MAGNETOS

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5 Claims. (Cl. 123—179)

This invention relates generally to an impulse for magnetos and more particularly to an air operated means to control the operation of the impulse coupling.

Automatic impulse couplings of various types are well known in the art and generally include a rotary or centrifugal element which during starting up of an engine coacts with a releasable means so that it delivers spurts or periodic rotary motion for rotating the armature of the magneto of the engine at a speed to actuate the magneto so that it will be capable of delivering a hot enough spark to fire the engine. Such operation continues during starting up of the engine until such time as the speed of the engine increases to a point where the engine will be able to drive the magneto directly.

It has been found, however, that these releasable mechanisms coacting with centrifugal devices are unduly noisy during normal operation of the engine and wear out quite quickly.

The present invention overcomes this problem by providing an engagement means or releasable means actuated by the engine starting air which coacts with the rotary or centrifugal element of the impulse coupling for the magneto of the engine during starting up so that the magneto will deliver a spark to the respective ignition means in the cylinders of the engine in accordance with the desired timing cycle thereof, which engagement means can be rendered inoperative after the engine has attained operating speed sufficient to actuate the magneto by direct drive.

With this and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing an air operated engagement means for impulse coupled magnetos of a preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Figure 1 is an elevation of a part of an internal combustion engine showing the invention applied thereto.

Figure 2 is a top plan of the structure shown in Figure 1.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1 illustrating the impulse coupling mechanism of the magneto.

Figure 4 is an enlarged sectional view of the mechanism for operating the impulse coupling.

Figure 5 is a detail view taken on line 5—5 of Figure 1.

Referring more particularly to the drawings, the magnetic impulse coupling device includes the rotary or centrifugal element 1 having diametrically spaced peripheral notches 2 which are engaged successively by the pawl or lever 3 and during normal operation of an internal combustion engine with which the magneto 4 is associated the pawl 3 is held out of engagement with either of the notches 2 by a spring 5.

The present invention includes a cylinder 10 which,

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as shown in Figure 1 of the drawings, may be of hexagonal exterior shape having a threaded portion 11 which is threaded into the casing 6 of the impulse coupling device. A piston 12 is mounted for reciprocatory movement in the cylinder 10 and it is shown as having a head 13 and an elongated skirt 14 which extends downwardly in the reduced portion of the door of the cylinder 10 as is clearly shown in Figure 4 of the drawings. A spring 15 is mounted in the reduced portion of the door of the cylinder 10 and engages the end of the skirt 14. A plunger 16 extends through the piston 12 and is threadably carried thereby being held in adjusted positions by means of a nut 17. An air conduit 18 connects the end of the cylinder 10 facing the free end of the head 13 of the piston 12 with a distributor block 19 which is in turn connected by means of a conduit 20 to the pressure air starting system of the internal combustion engine with which the magneto is associated.

A three-way valve 21 is interposed in the conduit 20 before the distributor block 19 and is manually operated by means of a suitable handle 22. The rotatable core 23 of the three-way valve has three ports therein so that in one position of the valve pressure air from the starting system of the engine flows from the conduit 20 through the valve 21 to the distributor block 19 and from the distributor block 19 through the conduits 18 to each of the magneto structures employed on the engine. The third port in the core 23 opens out through an escape vent 24 when the valve core 23 is rotated to cut off the supply of pressure air to the distributing block 19, thus allowing the pressure air from the conduit 20 to escape to atmosphere. This construction is provided to permit prestart operation of the engine before operation of the magnetos, the three-way valve structure 21 permitting the normal prestart turning over of the engine without functioning of the impulse coupling and at the same time the bleeding of air from the vent 24 serves as a warning signal to the operator so that after completion of the prestart operation he will be advised that the magneto impulse coupling device is inoperative and that the valve must be operated to render this structure operative for starting the engine.

During the normal operation of the engine the pawl 3 will be held away from the rotating element 1 by means of the spring 5 but when starting the engine or upon application of starting air to the engine, part of the starting air will be delivered to the cylinder 10 acting upon the piston 12 and forcing the plunger 16 into contact with the pawl 3. This will engage the pawl 3 with one of the notches 2 in the rotating element 1 when rotation has developed to that point and when the impulse action on the magneto has developed the pawl 3 becomes disengaged and rides upon the perimeter of the rotor 1 dropping into the second notch when it has progressed to its proper position, causing the development of a subsequent impulse in the magneto. The compressible characteristic of the pressure air in the cylinder 10 provides for the necessary upward movement of disengagement of the pawl or latch 3 when required, but will always reposition the pin or latch 3 so long as starting air pressure is delivered to the cylinder. When the starting air is turned off or operation of the engine is discontinued under action of the starting air the delivery of starting air to the cylinder 10 will consequently be discontinued and the latch or pawl 3 will be removed from contact with the rotating element 1 and will remain in that position until further starting becomes necessary.

By adjustment of the nut 17 the impact of the plunger 16 against the pawl or latch 3 may be regulated.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified within the invention defined by the claims.

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What is claimed is:

1. In combination with an internal combustion engine including a starting air system, a magneto and an impulse coupling for said magneto, of pressure actuated means for engaging said impulse coupling in operative condition upon application of pressure thereto and disengaging said impulse coupling upon release of pressure from said pressure actuated means, and a three-way valve in said air starting system for controlling the delivery of engine starting air to said pressure actuated means.

2. In combination with an internal combustion engine including a starting air system, a magneto and an impulse coupling for said magneto, said impulse coupling including a rotary element, a pawl for engagement therewith and a spring for normally holding said pawl out of engagement with said rotating element, a plunger for engagement with said pawl for moving it into operative engagement with said rotating element, and means for delivering pressure air from the engine starting air system against said plunger to move it into pawl engaging position in accordance with the normal starting operation.

3. In combination with an internal combustion engine including a starting air system, a magneto and an impulse coupling for said magneto, said impulse coupling including a rotary element, a pawl for engagement therewith and a spring for normally holding said pawl out of engagement with said rotating element, a plunger for engagement with said pawl for moving it into operative engagement with said rotating element, and means for delivering pressure air from the engine starting air system against said

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plunger to move it into pawl-engaging position, said last-named means including a three-way valve whereby the flow of pressure air to the plunger may be shut off during timing operation of the engine and pressure air bleeding from the valve to create a signal warning

4. The combination as claimed in claim 2 wherein said plunger has a piston connected thereto, means for adjusting the relative positions of the plunger and piston to regulate the degree of impact of the plunger against said pawl, and means for moving said plunger out of pawl-engaging position upon release of pressure thereagainst.

5. In combination with an internal combustion engine including a starting air system, a magneto and an impulse coupling for said magneto, said impulse coupling including a rotating element, a pawl for engagement therewith, a housing enclosing the pawl and rotating element and a spring for normally holding said pawl out of engagement with said rotating element, a cylinder carried by said housing, a piston mounted for reciprocatory movement in said cylinder, a pawl-engaging plunger adjustably carried by said piston and movable upon application of pressure against said piston for moving the pawl into operative engagement with said rotating element, and means for delivering pressure air from the engine starting air system to said cylinder.

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