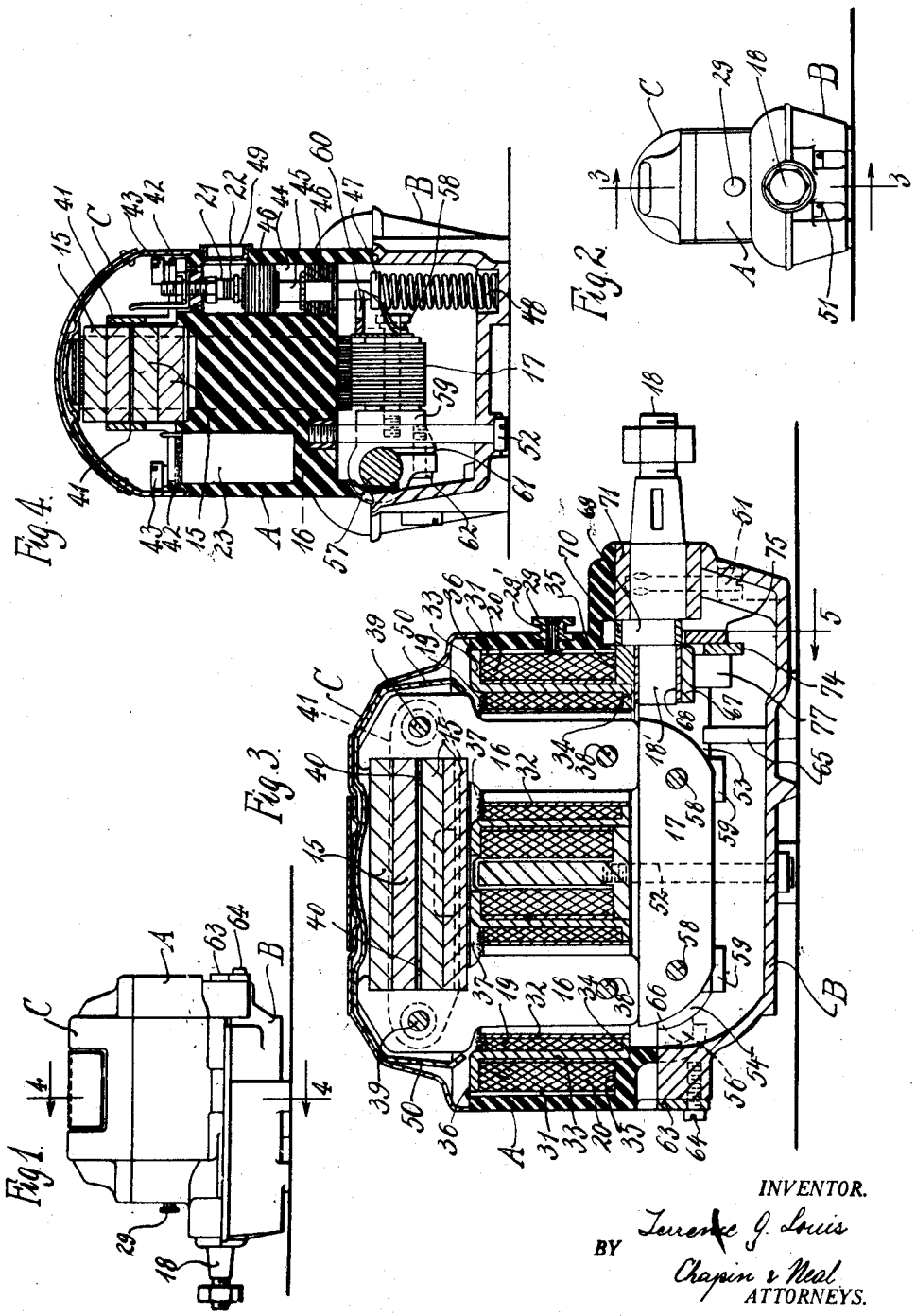
June 10, 1930. T. G. LOUIS 1,763,098

MAGNETO

Filed Nov. 14, 1928 3 Sheets-Sheet 1



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Fig. 6

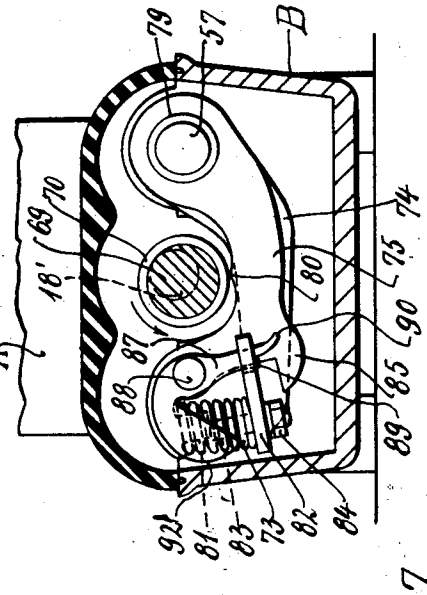


Fig. 7

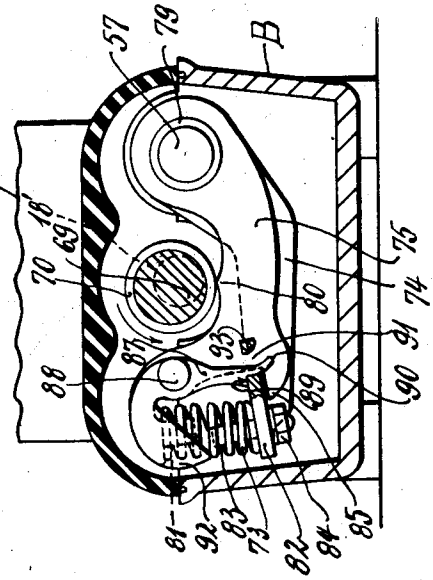
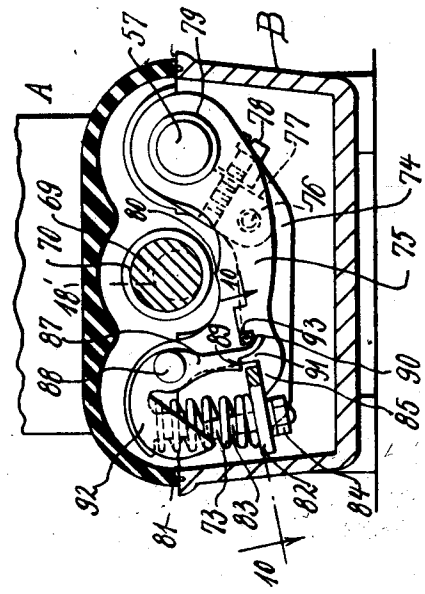


Fig. 5



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Fig. 8

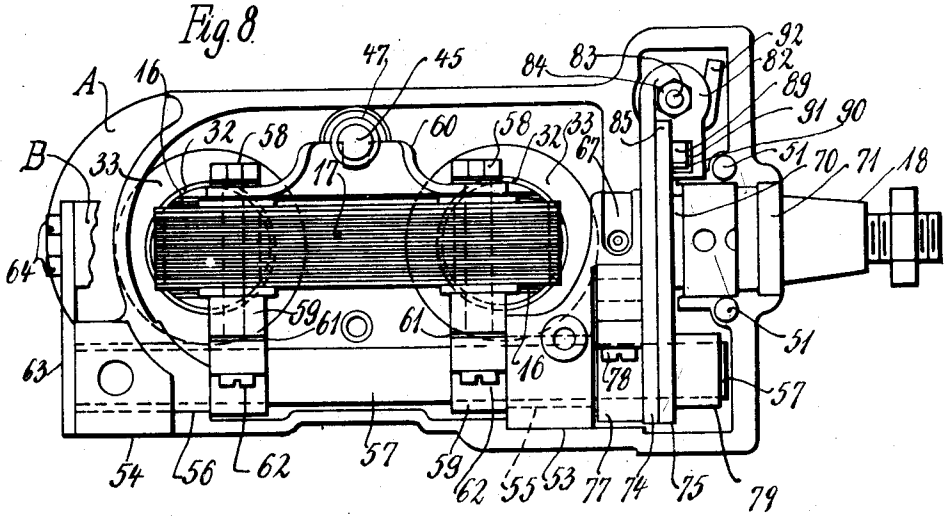


Fig. 9

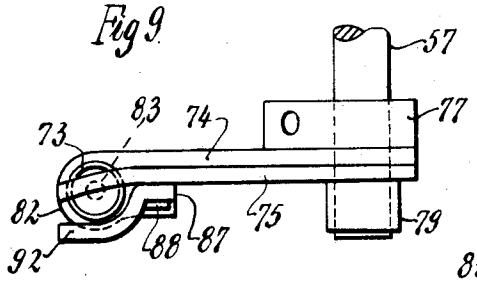


Fig. 10

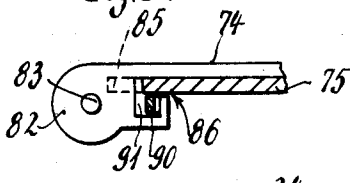


Fig. 11

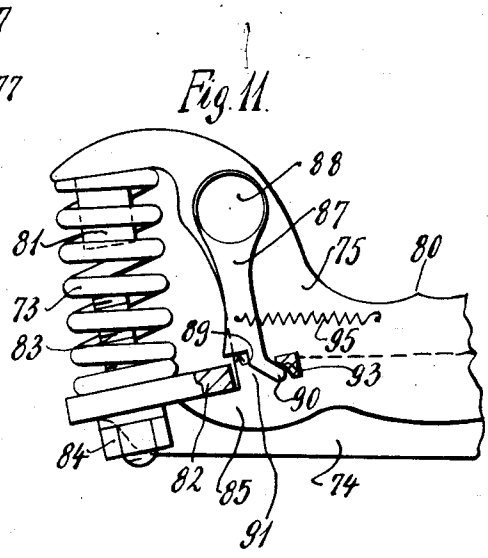
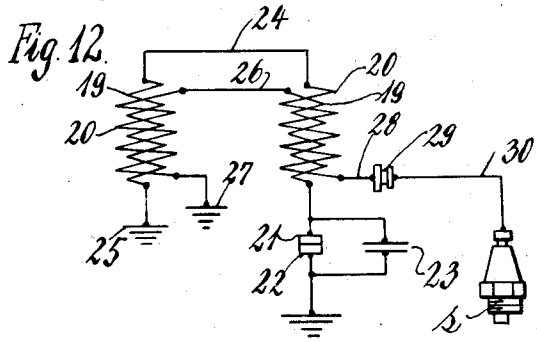


Fig. 12



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Patented June 10, 1930 1,763,098

UNITED STATES PATENT OFFICE

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MAGNETO

Application filed November 14, 1928. Serial No. 319,361.

This invention relates to an improved armature actuating mechanism for a magneto.

The invention is applicable to any magneto in which the armature or other movable element moves back and forth with relation to the pole pieces of the magnetic circuit; is periodically held in fixed position with relation to such pole pieces; and thereafter suddenly moved out of such position to create a rapid change of magnetic flux in said circuit and produce the spark. In such a magneto, it is usual to provide a spring impulse means for moving the armature independently of engine speed, for use on starting or low engine speeds. For higher engine speeds, less of the spring impulse is required and in many cases all spring impulse may be eliminated or substantially eliminated, allowing the armature to be driven directly by an inelastic transmission of force from the drive shaft of the magneto. It is usual in a magneto of this type to provide manually controlled means for varying the timing of the spark,—retarding it for starting or low engine speeds, and advancing it for higher engine speeds.

The object of this invention is to provide an armature actuating mechanism for a magneto of the class above defined, such mechanism having provisions for affording a spring impulse drive of the armature and a speed responsive means operable automatically, whenever the engine exceeds a predetermined speed, to restrict the degree of spring impulse and, if desired, to practically eliminate it, and also operable whenever the speed of the engine falls below said predetermined speed to restore spring impulse drive.

The characteristic features of this mechanism are an automatic shifting from a low speed or spring impulse drive to a high speed drive such as a direct drive, and vice versa, according to the demands of the engine as manifested by its speed, and an automatic advancing of the spark whenever a shift is made from low to high speed drive, and an automatic retarding of the spark when a shift is made from high to low speed drive.

Another object of the invention is to improve the prior types of armature actuating mechanism by avoiding the necessity for bodily shifting the mechanism from one position in which impulse drive of the armature is effected, to another position in which high speed drive of the armature is effected, and by providing for the automatic change from one form of drive to the other whenever necessary as manifested by the speed of the engine.

In carrying out this object, I provide a latching means which is effective, whenever the engine exceeds a predetermined speed, to move into position to restrict, and usually to substantially prevent, the relative movement of the two members between which the drive spring is held and by which it is stressed.

Other objects and advantages will appear from the following description and will be pointed out in the appended claims.

The invention will be disclosed with reference to the accompanying drawings, in which:

Figs. 1 and 2 are small scale side and end elevational views respectively of a magneto embodying the invention;

Fig. 3 is a sectional elevational view taken on the line 3—3 of Fig. 2 and drawn to a larger scale;

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 1 and drawn to a larger scale;

Fig. 5 is a full size fragmentary cross sectional view taken on the line 5 of Fig. 3;

Figs. 6 and 7 are views taken similarly to Fig. 5 but showing the parts in different relative positions;

Fig. 8 is a bottom plan view showing the magneto as it appears when the lower housing is removed;

Fig. 9 is a top plan view of the armature actuating mechanism;

Fig. 10 is a sectional plan view taken on the line 10—10 of Fig. 5;

Fig. 11 is an enlarged fragmentary view taken similarly to Fig. 5 and showing a modification; and

Fig. 12 is a diagrammatical view showing the electrical connections.

In these drawings, the invention is shown as embodied in one known type of magneto. The invention, however, is capable of embodiment in other magnetos, which differ materially from that herein disclosed, and is therefore largely independent of the details of construction of the particular magneto herein disclosed. The magneto, shown herein, will, however, serve as an illustrative example of one of many magnetos of the type above defined for which the invention is suitable.

Referring to Fig. 3, the magneto includes a suitable source of magnetic flux, such as the series of permanent magnets 15; two cores 16 connected one to each polar extremity of said source; and an armature 17, which is mounted to move back and forth with relation to the lower end faces of said cores and preferably (for maximum efficiency) into and out of contact with said faces. Suitable means, later to be described in detail, are provided for moving the armature from a main drive shaft 18, which is adapted to be driven from an internal combustion engine. The magneto also includes suitable electrical windings, preferably consisting of two primary coils 19, arranged one on each core 16, and two secondary coils 20, also arranged one on each core. An interrupter mechanism, comprising cooperating and relatively movable breaker points 21 and 22 (Fig. 4) is provided to open the normally closed primary circuit, in which coils 19 are included, at a predetermined point in the flight of the armature away from its magnetic pole pieces, constituted by the lower end faces of cores 16. On opening of said breaker points, an electromotive force is induced in the secondary winding which includes coils 20. A condenser 23 (Fig. 4) is provided for the usual purpose.

The electrical connections may be effected in any suitable way. For convenience, and simplicity of illustration, they are shown diagrammatically in Fig. 12. The primary coils 19 are suitably connected together, as in series, by a wire 24, and one terminal of the connected coils is grounded as at 25, and the other terminal is connected to breaker point 21. Breaker point 22 is grounded. The condenser 23 is bridged across the breaker points as indicated. The secondary coils 20 are suitably connected together, as in series, by a wire 26, and one terminal of the connected coils is grounded, as at 27, while the other terminal is connected by a wire 28 to the high tension terminal 29, which is adapted to be connected by a wire 30 to the spark plug *s* of the engine.

In addition to the more important elements of the magneto, just described, there are many details illustrated which need be described but briefly since they are already known in the art and not important to an understanding of the essentials of the present invention. The primary and secondary coils are housed in recesses 31 formed in a frame member A, which as shown is a molded block of bakelite. Each primary coil 19 is wound on a tubular core 32 and then set into a cup 33 having an opening in its base of proper diameter to receive the lower end of core 32. The cup 33 is then slipped through the secondary coil 20. Each cup, with the two coils 19 and 20 assembled thereon, is set into a recess 31. The bases of the cups rest on shoulders 34 on member A and the bases of coils 20 rest on shoulders 35 also formed on member A. The various joints between the cups 33 and member A are then sealed with suitable sealing compound as at 36 and the tops of primary coils 19 are covered with similar compound as shown at 37. The cores 16 are then passed through cores 32 with their lower ends projecting far enough below cores 32 to allow armature 17 to engage them.

The cores 16, which are made up of soft iron laminations, are suitably clamped together, as by rivets 38 near their lower ends and bolts 39 near their upper ends. The cores 16 at their upper ends are shaped to afford confronting recesses, in which the ends of the bar magnets 15 are received. Wedges 40, applied between two of the magnets of the group, force the upper and lower magnets of the group into close contact with the upper and lower walls of the core recesses. The two cores 16 are tied together by a pair of non-magnetic cross bars 41, which are held in place by the bolts 39, and each cross bar has an outwardly turned flange 42 which rests on the top of member A and is secured thereto by cap screws 43.

The member A is also recessed to receive condenser 23 (Fig. 4). The high tension terminal 29 is set into member A (Fig. 3) and held in place by a hollow rivet 29′. Opposite to the condenser receiving recess is a cylindrical hole 44 leading upwardly from the base of member A but terminating short of the top thereof. This recess receives the plunger 45 of the interrupter, which plunger carries on its upper end the movable breaker point 22. The other breaker point 21 is fixed but adjustably mounted in the closed upper wall of hole 44. The plunger 45 carrier two axially spaced bodies 46 of felt or the like, which slidably engage the bakelite wall of hole 44 and require no lubrication. The lower end of plunger 45 has a flange 47 which is engaged by the upper end of a spring 48, the lower end of which is frictionally engaged in a hole in a metallic base B, whereby breaker point 22 is grounded. Spring 48 tends to hold breaker

points 21 and 22 in engagement. An opening leading from the front wall of member A to hole 44 is provided to permit inspection of the breaker points and this opening is normally closed by a cup-like closure 49, frictionally held in place.

Those parts which project above member A are housed and concealed by a cap C, having spring clips 50, which frictionally engage cores 16 and hold the cap in place. Those parts which project below member A are housed and concealed by a hollow base B on which member A rests and to which it is attached as by bolts 51 and a cap screw 52.

The member A has formed thereon a pair of axially alined bearings 53 and 54 (Figs. 3 and 8) which depend from the lower face of the member near the rear wall thereof. These bearings are provided with metallic bushings 55 and 56 (Fig. 8), suitably fixed in place during the process of molding member A. Rotatably mounted in these bearings is a shaft 57 to which armature 17 is suitably fixed. As shown in Fig. 8, the armature is secured by cap screws 58 to a pair of blocks 59 and these screws also serve to hold a lug 60 to the armature, as well as to clamp the laminations of the armature together. Each block 59 is bored to receive shaft 57 and is slotted, as at 61 (Figs. 4 and 8), and provided with a cap screw 62, which acts to draw together those parts of the block which lie on opposite sides of slot 61 and thus bind the block securely to shaft 57. One of these blocks (Fig. 8) substantially abuts an end of bearing bushing 55 and the other substantially abuts the adjacent end of bearing bushing 56, whereby shaft 57 is held within small limits against axial displacement. The armature is normally held in contact with the lower faces of cores 16 by magnetic attraction. The breaker point return spring 48 serves to move armature 17 upwardly and sufficiently into the field of magnetic attraction so that the remainder of its upper flight may be completed by magnetic attraction. The end of bearing 54 is closed by a plate 63, secured to member A by screws 64. The lug 60 on armature 17, which overlies flange 47, is adapted to engage this flange at an intermediate point in the downward flight of the armature and move the same to separate or open the breaker points. The bearings 53 and 54 are preferably supported from base B, the former by an integral upstanding part 65 (Fig. 3) of base B and the latter by a semi-circular seat 66 in base B on which the bushing 56 rests.

The member A (Fig. 3) is provided with a bearing 67 depending from its base and provided with a metallic bushing 68. This bearing receives the small inner end 18′ of drive shaft 18. Between the end 18′ and the main body of drive shaft 18 (Fig. 3) an eccentric 69 is formed thereon, and over this eccentric is placed a loose ring 70 (see also Fig. 5), which functions as an anti-friction roll. Beyond the eccentric is a main bearing bushing 71 (see also Fig. 3), which is clamped between members A and B by the bolts 51, above described.

The problem of this invention relates more particularly to the movement of the armature away from its magnetic pole pieces, comprising the lower end faces of cores 16, by means actuated from an engine driven shaft, such as drive shaft 18. It is desired to move the armature in either of two ways, viz., through the intermediary of elastic means or directly by a transmission of force which is or may be substantially inelastic. It is also desired to secure a retarded spark during impulse drive and advance of spark during direct drive. In lieu of direct drive with substantially no spring impulse, it may in some cases be desirable to secure a restricted amount of spring impulse and advanced spark for the high speed drive and full spring impulse and retarded spark for starting or slow engine speeds. With this invention, the spring impulse may either be restricted on high speed drive or substantially eliminated, as desired. The novel and characteristic feature of the invention consists in a means responsive to the speed of the engine driven shaft to automatically select the high speed or the low speed form of drive whenever the one or the other is best adapted to operate the magneto.

The impulse drive is effected by a spring 73 which is carried between two members 74 and 75, herein shown as levers, both of which are mounted on the armature shaft 57. The lever 74 is fixed, as by rivet 76 (Fig. 5), to a block 77, which forms a split hub therefor. A cap screw 78 serves to draw the split portions of the hub 77 together to clamp it and lever 74 to shaft 57. Lever 74 thus moves with the armature and is held stationary when the armature 17 is held stationary in its uppermost position. In this case, the armature is held stationary in its upper position by magnetic attraction and also in contact with the cores 16. However, other means may be provided to hold the armature in its upper position, and such position need not necessarily be one wherein the armature contacts with its cores. However, contact of the armature with its cores is preferred for maximum efficiency and, when such arrangement is employed, no other means than the force of magnetic attraction is necessary to hold the armature stationary in its upper position.

The lever 75 and its hub 79 are free to turn on shaft 57 and this lever, at a point intermediate its ends, has a part 80 adapted to

be engaged by the roll 70 of eccentric 69. Bearing in mind that lever 74 is held stationary, it will be seen that eccentric 69 will periodically depress lever 75, move it relatively to and toward lever 74 and thereby place spring 73 under stress by compressing it. When the spring is sufficiently stressed, lever 74 will be moved and thus armature 17 will be carried away from its poles. Preferably, although not necessarily, the spring 73 is not strong enough, even when fully stressed, to move the armature out of contact with its poles and the initial movement of the armature is then effected by an inelastic transmission of force from shaft 18. To secure this result, lever 75, the free end of which is upturned to overlie the coil spring 73, has depending from such end a projection 81 which fits inside the coils of the spring. Lever 74 has an outwardly turned lug 82, which forms a seat for the base of spring 73, and threaded into this lug and upstanding therefrom is a screw 83. This screw forms an adjustable abutment which may be locked in its various positions of adjustment by a nut 84. When lever 75 moves toward lever 74, spring 73 is first compressed and after the desired degree of compression of the spring has been effected, the abutments 81 and 83 engage. Lever 75 then moves lever 74 through an inelastic transmission of force through these abutments and the armature is pried off its poles and started on its downward flight. Immediately that the armature is separated from cores 16, even by the smallest air gap, the holding force of magnetic attraction is weakened to such an extent as to be inferior to the force of the stressed spring 73, whereupon such spring relieves itself of some of its stress by expanding and the armature is given a quick impulse and moved downwardly at a speed independent of that of shaft 18.

It is, in many cases, desirable that spring 73 be under some initial stress. In such case, it is necessary to limit the degree to which the levers 74 and 75 may spread apart. Desirably, this is effected by the provision on lever 75 of a part 85 which underlies the lug 82 of lever 74 and, as shown in Fig. 5, normally abuts the same and limits the degree of relative movement of the levers under the expansive action of spring 73. It will be noted from Fig. 10 that lug 82 is slotted at 86 to receive a part of lever 75, whereby the latter, while free to turn on shaft 57, is held within the necessary limits against endwise movement thereon.

The armature actuating mechanism has been described as it functions to produce impulse drive. To secure a high speed drive, the degree of relative movement of levers 74 and 75 is restricted in the direction which causes increase in the stress of spring 73. This restriction is effected by a latch 87 which is pivotally mounted on a stud 88 fixed to the driving lever 75 or otherwise mounted for movement relatively thereto. This latch has a latch shoulder 89 adapted under certain circumstances to engage the upper face of lug 82 in the manner shown in Fig. 7. This latch has a pilot extension 90 which, in all positions in the range of relative movement of levers 74 and 75, rides in a groove 91 formed in lug 82. A weight 92, integral with latch 87, tends to throw the latch to the right into a position in which shoulder 89 will not engage lug 82, when lever 75 is moved toward lever 74 and in which it will enter and pass through groove 91, in the manner shown in Fig. 6, thereby permitting impulse drive. When, however, lever 75 is quickly moved toward lever 74, the inertia of latch 87 prevents it from being moved into the aforesaid position, whereupon shoulder 89 engages lug 82 and limits the movement of lever 75 toward lever 74 and thus limits stressing of spring 73. Also, lever 75, through latch 87, effects an inelastic transmission of force to lever 74 and thus to armature 17, whereby the latter is moved away from its poles and at an earlier time in the revolution of shaft 18 than was the case on impulse drive. Figs. 6 and 7 show the parts as they appear immediately prior to movement of the armature on low speed and high speed drive, respectively. A comparison of the positions of the eccentric 69 in these two figures will show that the armature is started on its flight much earlier in Fig. 7 than in Fig. 6.

By preference, I make the extension 90 outwardly and downwardly inclined or curved relatively to the body of latch 87 and make this part cooperate with one wall of groove 91, such as wall 93, as a guide. The arrangement is preferably such that, where the parts are positioned as in Fig. 5, the latch shoulder 89 partially overlies the lug 82 so that upon a quick downward movement of the latch this shoulder and lug will engage. If, however, the lever 75 is moved slowly downward, the weight 92 will swing latch 87 to the right as it descends and as permitted by the engagement of pilot 90 with cam 93, and the shoulder 89 will be moved into position to enter groove 91 by the time it reaches the latter which prevents the latch from passing straight through the groove and forces it to turn as it is lowered. This curve on the pilot is not necessarily essential for all purposes, but it does make it more difficult for the latch to enter groove 91 and is important because it enables me to make the latch effect the desired restriction, on the relative movement of levers 74 and 75 toward one another, at much lower engine speeds than would otherwise be possible.

The exact arrangement described, while

desirable and preferred, is not necessarily essential for all purposes and may be varied in many ways and still embody my invention, which consists essentially in the provision of some speed responsive device which will effect a restriction, or practical elimination, if desired, of the stressing of the drive spring whenever the engine exceeds a predetermined speed. For example, the weight 92 may be omitted and replaced by a suitable spring, preferably light, such as shown at 95 in Fig. 11. Here the spring tends to hold the pilot 90 against cam guide 93 and the latch shoulder 89 in position to engage lug 82. On a slow downward movement of latch 87, the spring will have time to swing the latch to the right far enough, by the time shoulder 89 reaches the level of lug 82, so that the shoulder will not engage the lug. However, on a quick downward movement of latch 87, its inertia to movement by spring 95 will prevent it from entering groove 91. The latch shoulder 89 need not do more than to just barely catch on the lug 82 when it initially engages it, because this shoulder is so shaped that, if being initially so engaged, it will readily slide into full latching engagement, such as is shown in Fig. 7.

It is to be noted that in Fig. 5, only a very small clearance is provided between the latch shoulder 89 and lug 82. Actually some clearance between these parts is necessary to enable operation of the latch as described. As a practical matter, this clearance can be reduced to the bare minimum shown in Fig. 5, in which case substantially no stressing of spring 73 occurs on downward movement of lever 75. For all practical purposes, a direct drive, by an inelastic transmission of force from shaft 18 to armature 17, is then effected and the armature moves at speeds dependent on, and proportional to, engine speeds. In Fig. 11, I have shown a greater amount of clearance between parts 89 and 82 so as to restrict but not substantially entirely eliminate spring compression on the high speed drive. This arrangement is often desirable and when it is used I prefer to have the drive spring 73 always under some initial stress.

The timing of the spark is controlled by controlling the time when the armature 17 is started in its downward flight. To vary the timing of the spark on high speed drive, the angular position of levers 74 and 75 on shaft 57 may be varied by loosening screw 78. A greater or less clearance between the eccentric (when positioned as in Fig. 5) and part 80 of lever 75 may thus be effected so that this lever will be engaged and depressed by the eccentric at a later or earlier time, respectively. The degree of retardation of the spark for impulse drive may be varied by adjustment of screw 83, whereby the abutment 81 will be caused to engage this screw earlier or later accordingly as it is moved up or down in lug 82.

In operation, when the engine, to which the magneto is attached and by which its shaft 18 is driven at appropriate relative speed, is started by cranking, the lever 75 is moved so slowly toward lever 74 that latch 87 will be guided into, and moved through groove 91, as shown in Fig. 6. The same result will be obtained on slow engine speeds, whenever such speed is less than a predetermined minimum speed. The armature will then be moved away from cores 16 in the following manner. The initial movement of the armature is effected, when abutments 81 and 83 engage, by an inelastic transmission of force from lever 75 through the engaged abutments to lever 74. Following this initial movement, which is very small, the drive spring 73, previously stressed by the movement of lever 75 toward lever 74, expands, drives lever 74 away from lever 75 and imparts a rapid downward movement to the armature. After the armature acquires sufficient speed and has been moved far enough away from cores 16, the breaker points 21 and 22 are separated, thus producing an electromotive force in the usual manner. The armature is returned by spring 48 into sufficiently close proximity to cores 16 so that the remainder of the flight may be completed by magnetic attraction. The return flight of the armature, under the forces described, is controlled by the eccentric 69, however.

High speed drive of the armature occurs whenever the engine exceeds the predetermined minimum speed,—the latch 87 either substantially preventing or restricting the relative movement of levers 74 and 75 towards one another and causing the downward flight of the armature to be initiated at an earlier time in the revolution of shaft 18. The armature is then moved by an inelastic transmission of force from lever 75 through latch 87 to lever 74. If some substantial degree of compression of spring 73 is used on high speed drive, as in Fig. 11, then the armature flight is initiated by the same inelastic transmission as before but is followed by a spring impulse which, however, cannot move the armature as far as formerly but would carry it far enough to cause opening of the breaker points. The remainder of the downward flight would then be completed by the inelastic transmission. Thus, the high speed drive may be entirely by inelastic transmission or in part by the latter and in part by elastic transmission.

In the operation of the latching means 87 of the form shown in Fig. 5, the weight 92 serves two purposes: by its weight a static tendency is created for moving the

latch out of latching position; and by its mass, and the inertia thereof, a dynamic tendency is created for moving the latch into latching position. The inertia of this mass causes it to swing clockwise when rapidly moved, while gravity tends to swing it counterclockwise. The swinging of the latch into full latching position actually occurs with the arrangement shown in Fig. 5. However, there is another way of utilizing the inertia of the latch which is also incorporated in the arrangement shown in Fig. 5 and also that shown in Fig. 11. Such way makes it unnecessary to actually move the latch into latching position. This is effected by placing the latch so that it is normally in latching position and utilizing its inertia to resist movement into unlatched position under such means as the weight 92 or spring 95. The latch is thus subjected to a constant static influence, which is opposed by a dynamic influence variable according to speed and, when this dynamic influence prevails over the static influence, the latch is arranged to change the armature drive from the slow speed to the high speed type and at the same time advance the spark.

The invention has been disclosed herein, in an embodiment at present preferred, for illustrative purposes, but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is:

1. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a drive shaft, elastic means stressed by the operation of said shaft and releasable at properly timed intervals to move the armature away from its pole pieces at a speed independent of that of said shaft, and means automatically operable when said shaft exceeds a predetermined speed to restrict the degree of stressing of said elastic means by said shaft and automatically operable whenever the speed of said shaft is less than said predetermined speed to remove the restriction imposed on the stressing of said elastic means.

2. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a drive shaft, elastic means stressed by the operation of said shaft and releasable at properly timed intervals to move the armature away from its pole pieces at a speed independent of that of said shaft, and means automatically operable when said shaft exceeds a predetermined speed to substantially prevent stressing of said elastic means and cause the armature to be moved directly from said drive shaft, said last named means automatically operable whenever the speed of said shaft is less than said predetermined speed to allow stressing of said elastic means.

3. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a drive shaft elastic means stressed by the operation of said shaft and releasable at properly timed intervals to move the armature away from its pole pieces at a speed independent of that of said shaft, and means automatically operable when said shaft exceeds a predetermined speed to restrict the degree of stressing of said elastic means by said shaft and automatically operable whenever the speed of said shaft is less than said predetermined speed to remove the restriction imposed on the stressing of said elastic means, said last named means being subjected to a constant static influence and an opposing dynamic influence which increases according to speed and predominates over the static influence when said predetermined speed is exceeded.

4. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a drive shaft, elastic means stressed by the operation of said shaft and releasable at properly timed intervals to move the armature away from its pole pieces at a speed independent of that of said shaft, and means automatically operable when said shaft exceeds a predetermined speed to substantially prevent stressing of said elastic means and cause the armature to be moved directly from said drive shaft, said last named means automatically operable whenever the speed of said shaft is less than said predetermined speed to allow stressing of said elastic means, said last named means being subjected to a constant static influence and an opposing dynamic influence which increases according to speed and predominates over the static influence when said predetermined speed is exceeded.

5. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member relatively to said part in one direction, means for applying a driving force to said member to move it relatively to said part in the opposite direction and stress said resilient means, and means automatically responsive to the speed of movement of said member to limit the degree of relative movement between it and said part in the last named direction, and effective when said member is moving slowly to permit a larger relative movement than is permitted when said member moves at higher speeds.

6. In a magneto, magnetic pole pieces, an

armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member relatively to said part in one direction, means for applying a driving force to said member to move it relatively to said part in the opposite direction and stress said resilient means, and means carried by said member and operable by its inertia when said member exceeds a predetermined speed to restrict the relative movement between said member and part in the last named direction and lessen the extent of stressing of said resilient means.

7. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member relatively to said part in one direction, means for applying a driving force to said member to move it relatively to said part in the opposite direction and stress said resilient means, latching means movably mounted on said member, means operable when said member is slowly moved by said driving means to move said latching means into a position such as to permit the aforesaid relative movement in the last named direction, said last named means being ineffective when said member is moved by said driving means at a higher speed to overcome the inertia of said latching means and carry it into said position.

8. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member relatively to said part in one direction, means for applying a driving force to said member to move it relatively to said part in the opposite direction and stress said resilient means, and latching means carried by said member, said latching means tending to move by gravity into a position such as to permit the aforesaid relative movement between said member and part caused by said driving means but being automatically movable due to its inertia when said member exceeds a predetermined speed into another position in which such relative movement is restricted.

9. In a megneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member away from said part, means for applying a driving force to said member to move it toward said part and stress said resilient means and then move said part and the armature connected thereto, a latch movably mounted on said member, said part having a groove into which said latch when properly positioned can enter and through which it can freely slide when said member is moved toward said part, whereby said member is free to move relatively to and toward said part to stress said resilient means, and means tending when said member is slowly moved toward said part to move the latch into position to enter said groove, said last named means being ineffective when said member is moved toward said part at higher speeds to overcome the inertia of said latch, whereby the latch fails to move into said position and restricts movement of said member toward said part.

10. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member away from said part, means for applying a driving force to said member to move it toward said part and stress said resilient means and then move said part and the armature connected thereto, a latch movably mounted on said member, said part having a groove into which said latch when properly positioned can enter and through which it can freely slide when said member is moved toward said part, whereby said member is free to move relatively to and toward said part to stress said resilient means, and a weight associated with said latch and tending when said member is slowly moved to move the latch into position to enter said groove, said weight due to its inertia being moved relatively to said member in an opposite direction when said member is moved at higher speeds and serving to move said latch out of the aforesaid position and into position to engage said part and restrict movement of said member relatively thereto.

11. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member away from said part, means for applying a driving force to said member to move it toward said part and stress said resilient means and then move said part and the armature connected thereto, a latch movably mounted on said member, said part having a groove into which

said latch when properly positioned can enter and through which it can freely slide when said member is moved toward said part, whereby said member is free to move relatively to and toward said part to stress said resilient means, said latch having a narrow extension which during all the range of relative movement between said member and part rides in said groove and forms a pilot for guiding the latch, and a weight for operating said latch, said weight tending to hold said pilot engaged with one side of said groove and said pilot when so engaged guiding the latch into said groove when said member is slowly moved toward said part, said weight being movable due to its inertia when said member exceeds a predetermined speed to move said pilot toward the opposite side or said groove and said latch into position to engage said part when said member is moved toward it and thereby restrict such movement of said member relatively thereto.

12. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member away from said part, means for applying a driving force to said member to move it toward said part and stress said resilient means and then move said part and the armature connected thereto, a latch movably mounted on said member, said part having a groove into which said latch when properly positioned can enter and through which it can freely slide when said member is moved toward said part whereby said member is free to move relatively to and toward said part to stress said resilient means, said latch having a narrow extension which during all the range of relative movement between said member and part rides in said groove and forms a pilot for guiding the latch, and a weight for operating said latch, said weight tending to hold said pilot engaged with one side of said groove and said pilot when so engaged guiding the latch into said groove when said member is slowly moved toward said part, said weight being movable due to its inertia when said member exceeds a predetermined speed to move said pilot toward the opposite side of said groove and said latch into position to engage said part when said member is moved toward it and thereby restrict such movement of said member relatively thereto, said pilot being inclined to the body of the latch to render it difficult for the latch to enter said groove except at very slow speeds.

13. In a magneto, magnetic pole pieces, an armature movable back and forth with respect to said pole pieces, a part connected to the armature for moving the same, a member mounted for movement back and forth relatively to said part, resilient means tending to move said member away from said part, means for applying a driving force to said member to move it toward said part and stress said resilient means and then move said part and the armature connected thereto, a latch movably mounted on said member, said part having a groove into which said latch when properly positioned can enter and through which it can freely slide when said member is moved toward said part, whereby said member is free to move relatively to and toward said part to stress said resilient means, said latch having a pilot extension cooperating over all the range of movement of said member relatively to said latch with one wall of said groove as a cam to move the latch laterally on movement of said member relatively to said part and to guide the latch into said groove when said member is moved slowly toward said part, and means tending to hold said pilot engaged with said cam wall, the inertia of said latch when quickly moved by said member preventing it from being guided into said groove, whereby it engages said part and restricts the movement of said member relatively thereto.

In testimony whereof I have affixed my signature.

TERRENCE G. LOUIS.