Nov. 18, 1924. 1,516,247

G. A RICHROATH

MAGNETO DRIVE ATTACHMENT

Filed Dec. 9, 1922 2 Sheets-Sheet 1

Fig. 4.

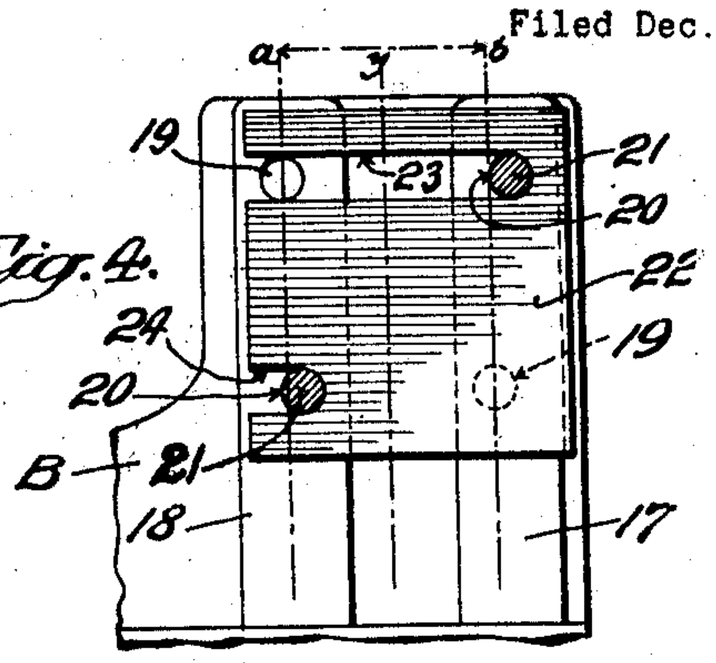

Fig. 1.

Fig. 5.

Fig. 6.

Inventor

GEORGE A. RICHROATH

By his Attorney

Adolph L. Thomas

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Fig. 2.

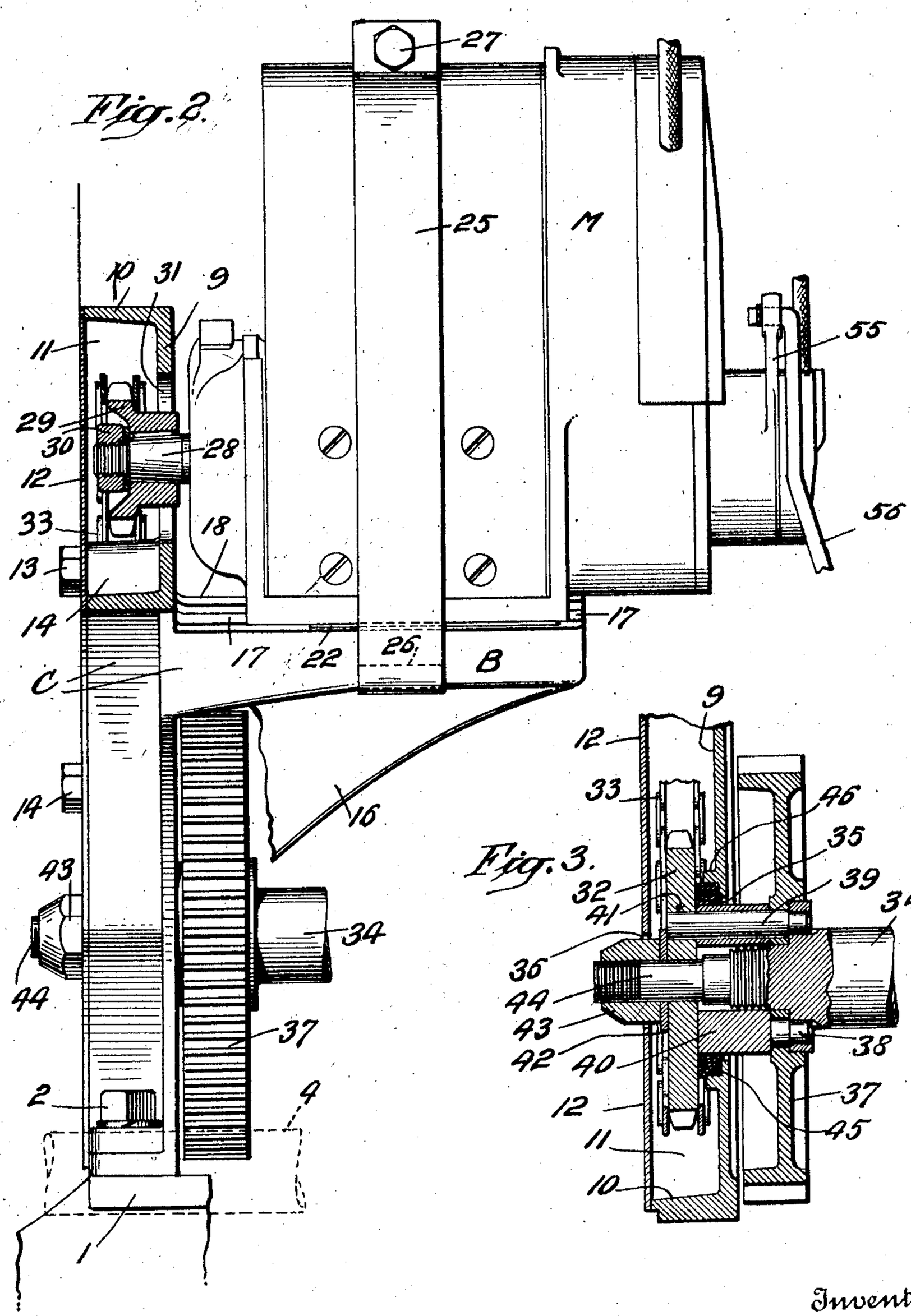

Fig. 3.

Inventor

GEORGE A. RICHROATH

By his Attorney

Adolph A. Thomas

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UNITED STATES PATENT OFFICE.

GEORGE A. RICHROATH, OF BROOKLYN, NEW YORK, ASSIGNOR TO EISEMANN MAGNETO CORPORATION, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

MAGNETO-DRIVE ATTACHMENT.

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To all whom it may concern:

Be it known that I, GEORGE A. RICHROATH, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Magneto-Drive Attachments, of which the following is a specification.

My invention relates in general to magneto ignition apparatus for use on gas engines, and its object is to provide an attachment by means of which a magneto is readily mounted in operative position on a vehicle driven by a gas engine. The magneto drive of my invention is particularly useful on Ford engines, both for stationary and vehicle service, although not limited to that particular type of engine.

In the accompanying drawings I have shown my new magneto drive attachment as applied to a Ford car, it being understood that this is merely by way of illustration. In these drawings—

Fig. 1 is a front view of my new magneto drive in a form as actually used, certain parts being broken away for clearness;

Fig. 2 is a side view of the magneto drive attachment shown in Fig. 1, certain parts being shown in section;

Fig. 3 is a fragmentary view in section, approximately on line 3—3 of Fig. 1, showing how the lower sprocket wheel of the driving connections is fixed on the camshaft of the engine;

Fig. 4 is a top plan view of the shelf on which the magneto is mounted and showing one set of centering pins for adjusting the magneto in a certain position.

Fig. 5 is a view similar to Fig. 4, showing another set of centering pins for adjusting the magneto in a slightly different position; and

Fig. 6 is a cross-section approximately on line 6—6 of Fig. 5.

The various operative parts of my new driving attachment are mounted on a casting represented as a whole by C, which is adapted to be rigidly secured on supporting brackets 1 in front of the engine by means of bolts 2. The casting is preferably formed of a non-magnetic material, like aluminum, because it also supports the magneto, as will be explained. As seen from Fig. 1, the casting C extends upwardly from its base portion toward the right side of the engine. By the right side of the engine I mean the side which is at the right hand of a person facing the front of the engine. The practical advantages of this construction and mounting of the casting C will be pointed out later on. The lower edge of the casting is formed with a semi-cylindrical recess 3 to accommodate the crank-shaft 4. When my invention is used on a Ford car, the casting C is provided with extensions 5 and 6, between which is formed an oil-passage 7 leading into the crank-case of the engine. Additional fastening bolts 8 are preferably used for securing the casting in position. Bolts 2 and 8 enter the same holes as the bolts which secured the previously removed Ford plate that covered the timing gears. Consequently, to attach the casting C to a Ford engine, it is only necessary to take off the Ford plate and then, after removing the commutator and timer, the casting C is substituted for the plate and secured in position by the same bolts.

The back wall or plate 9 of the casting C is surrounded by a forwardly projecting flange 10, which thus forms a shallow chamber or recess 11. A cover 12 closes chamber 11. The cover is secured in position by a pair of bolts 13 which enter holes in lugs 14 projecting forwardly from the back plate 9. If desired, an additional bolt 15 may be used for the cover. As seen in Fig. 1, the fastening bolts 13 and 15 are easily accessible, so that the cover is readily removed and put back.

From the upper end of the rear plate 9 of casting C projects a shelf indicated as a whole by B, this shelf being preferably integral with the casting. A supporting bracket 16 preferably extends from the back plate 9 to the rear end of shelf B to insure the rigidity thereof. The top surface of shelf B is provided with a pair of machined ribs 17 and 18 for supporting a magneto, indicated as a whole by M. I need not go into the details of construction of this magneto, because any suitable form or type of ignition magneto may be used, and magneto M is to be considered as representative of any suitable ignition magneto. In order to facilitate the correct positioning of the magneto on shelf B, I provide the top ribs with two pairs of centering holes: one pair of holes 19 and a second pair of holes 20, as

may be seen from Figs. 4 and 5. Holes 19 and 20 are slightly off-center with respect to each other. The center line of holes 19 is indicated in Fig. 4 by the dotted line *y*, and the center line of holes 20 is indicated in Fig. 5 by the dotted line *x*. As viewed in Figs. 4 and 5, center line *x* is slightly to the right of center line *y*. The distance between the centers of the holes 19, as indicated by the dotted line *a*—*b* in Fig. 4, is the same as the distance between the centers of holes 20, as indicated by the dotted line *c*—*d* in Fig. 5. To put it in another way: if we regard the longitudinal center of the shelf as a line running midway of the ribs 17 and 18 and parallel thereto, the median lines *x* and *y* are on opposite sides of that longitudinal center.

The length of sprocket chain 33 is sufficient to maintain a certain amount of slack or loose play in its operation, thereby producing no undue strain on the small ball-bearings of the magneto shaft and also causing quiet running. This length of sprocket chain is made possible by mounting the magneto on the right-hand side of the engine. In the magnetic drive attachments which I have actually used on cars, the distance between the shafts 28 and 44 is a little over nine inches. This provides for a sufficient length of drive chain.

The bottom of the magneto frame is provided with two sets of holes *m* corresponding in position to the centering holes 19 and 20, respectively, except that their center lines coincide. The location of the holes in the magneto is identical with the location of the dowel pins 21 in Figs. 4 and 5. These dowel pins are screwed in one or the other set of holes in the magneto frame, as shown in Fig. 6. Let us say that we wish to adjust the magneto on bracket B by means of the centering holes 19. For this purpose, we screw a pair of dowel pins into the bottom of the magneto frame in position to correspond with holes 19. When the magneto is then placed on the bracket, the projecting heads of the dowel pins 21 enter the holes 19, as indicated in Figs. 5 and 6. The longitudinal center line of the magneto now corresponds approximately to the center line *y* of holes 19. If it is necessary to adjust the magneto slightly to the right of center line *y* in Fig. 4, it is only necessary to remove the dowel pins 21 and screw them into the other pair of holes at the bottom of the magneto frame. The dowel pins 21 will now be in a position to enter the other pair of centering holes 20, as shown in Fig. 4. The center line of the magneto now corresponds approximately to the center line *x* of holes 20.

If necessary, I may interpose one or more thin plates 22 between the shelf and the bottom of the magneto frame for adjusting the same vertically. These plates, which shopmen commonly call shims, are provided with a long slot 23 and a short slot 24, so that they may fit in under the magneto irrespective of the position of the dowel pins 21. This is clear from Figs. 4 and 5. Usually, the first adjustment of the magneto on shelf B is vertical with shims 22, and the final adjustment, if required, is lateral by means of the cooperating dowel pins and centering holes.

After the magneto has been adjusted into the correct position, it is rigidly clamped in place by a pair of metal straps 25 which hook under the bracket, as indicated at 26 in Figs. 1 and 6. The straps, usually made of brass, are fastened at their upper ends by a screw-bolt 27, by means of which they are tightened.

On the projecting end 28 of the armature shaft of magneto M is fixed a small sprocket wheel 29 held in place by any suitable means, such as a nut 30. The sprocket wheel 29 is usually attached to the magneto before the same is fitted on the shelf B, and so I provide the back plate 9 of casting C with an opening 31, sufficiently large to permit the passage of sprocket wheel 29, as may be seen in Fig. 2. By making the hole 31 slightly larger than the sprocket wheel 29, the latter may be left on the magneto as a permanent part thereof. By this I mean that when the sprocket wheel 29 is once fixed on the magneto shaft, it need not be removed for positioning the magneto on the shelf B or removing the same therefrom. This permits a quick and easy installation or removal of the magneto.

In the lower portion of the shallow chamber 11 of casting C is a large sprocket wheel 32, which is operatively connected to the magneto sprocket wheel 29 by a suitable driving element, such as a sprocket chain 33. In Fig. 1, the intermediate covered section of the sprocket chains is diagrammatically indicated by a pair of dotted lines 33′. In the present instance, the gear ratio between the sprocket wheels 32 and 29 is two to one, it being assumed that the engine is of the four-cylinder type. The sprocket wheel 32 is fixed on the projecting end of cam-shaft 34, which extends through an opening 35 in the back plate 9 of casting C and through an aligned opening 36 in the cover 12, as shown in Fig. 3. On cam-shaft 34, just back of casting C, is fixed a timing gear 37, which is connected to a pinion on the crank-shaft of the engine. I have not deemed it necessary to show this last-mentioned connection, because it is well understood and forms no part of my invention. The timing gear 37 is held on crank-shaft 34 by short pins 38, one of which is shown in Fig. 3. In order to permit the attachment of sprocket wheel 32 to cam-shaft 34, I re-

move one of the short pins 38 and substitute a long pin 39, which passes through a spacing bushing 40. The sprocket wheel 32 has a hole 41 for receiving the outer end of the long pin 39, which thus connects the sprocket wheel 32 rigidly with the timing gear 37. I usually employ a lock washer 42 between the sprocket wheel 32 and the outer nut 43, which holds the sprocket wheel in place on the screw-threaded extension 44 of the cam-shaft. A felt washer 45 may be inserted between the sprocket wheel 32 and the opening 35 to prevent oil from getting into the driving chamber 11. The washer 45 is held in place by a circular flange or shoulder 46, formed on the back plate 9 of the casting.

As seen in Fig. 1, the extension 6 of casting C is formed with an angular rib 47 provided with a pair of holes 48 and 49. On the bolt 50 is pivoted an arm or bracket 51, on the free end of which is mounted the motor fan. The bracket 51, which is a standard part of a Ford car, is adjusted in angular position by means of a bolt 52 passing through the hole 49 and bearing against a tailpiece or extension 53 on the fan bracket 51. By simply screwing the bolt 52 in or out, the fan bracket 51 is adjusted into the correct position. The bolt 52 is used for adjusting the fan bracket in the new Ford model. To adjust the fan bracket in the old Ford model, it is necessary to use a bolt 54 passing through the hole 48 in the angular rib 47. It is for this reason that I provide the rib 47 with the angularly arranged holes 47 and 48.

Magneto M is provided with the usual timing lever 55, to which is attached one end of a rod 56. The lower end of rod 56 is connected with the spark-control rod on the car, but as this arrangement forms no part of my present invention and is easily understood, I have not considered it necessary to illustrate the same.

It will be seen from the foregoing, that my new magneto drive attachment is easily and quickly installed on automobiles, especially Ford cars. All that is necessary is to remove the plate that covers the timing gears and, after bolting the casting C in place, the sprocket wheel 32 is connected to the timing gear 37 in the manner previously described. The driving connections between the cam-shaft and the magneto shaft are entirely enclosed within the covered chamber 11 and are thus protected from dirt and dust. At the same time, the parts are readily accessible by simply removing the cover 12. By mounting the magneto on a support integral with the main casting, the proper location of sprocket wheel 29 relatively to sprocket wheel 32 is always insured. Whatever adjustment of the magneto may be necessary to tighten the sprocket chain 33 is easily accomplished by means of the thin plates or shims 22, and also, if necessary, by the centering holes 19 and 20, as already explained.

As previously explained, the casting C extends upwardly from its base toward the right side of the engine and the magneto shelf B is at the upper end of the casting. This enables me to mount the magneto in a position of greatest advantage. In the first place, the magneto is very easy to get at, being considerably above the axis of the cam-shaft. Then, since the magneto is on the right side of the engine, it is out of the way when it is necessary to make engine adjustments. It is well known that in most automobile engines, certainly in all Ford engines, the valves are on the left side. These valves require frequent adjustments or removal. In those cars where the magneto is mounted on the left side of the engine, it is necessary to take off the magneto in order to get access to the valves. That, of course, involves considerable labor and delay. In my construction, the magneto is entirely out of the way by being on the right side of the engine, thus leaving free and ready access to the parts on the left side of the engine.

Another advantage in mounting the magneto on the right side of the engine is this: In all automobiles, the timing rod, which is controlled from the steering wheel, runs along the right side of the engine. This enables me to make a direct connection between the timing rod and the timing lever 55 of the magneto by means of the rod 56.

The magneto attachment of my invention has the further advantage that it fits on all Ford models, including the latest model where a generator is mounted on the left side of the engine. In these models it would be impossible to instal those magneto attachments where the magneto is mounted on the left side of the engine.

I am aware that is has heretofore been proposed to drive ignition magnetos from the engine shaft by a series of meshing gears. However, it was found in practice that these gears make it difficult for the average person to instal the magneto on his car. For instance, it is known that on Ford cars the bolt holes on the front of the engine are not always located in precisely the same position relative to the axis of the cam-shaft. To instal a magneto gear drive on such cars, it was necessary to adjust the casting very accurately in order to obtain the correct gear mesh. That was a tedious and laborious process. In my invention this difficulty is entirely eliminated by the use of the chain connection 33. The casting C is bolted to the front of the engine without regard to any delicate adjustment; it is only necessary to insert the bolts 8. After

the magneto has been positioned on the shelf B and the chain 33 placed around the sprocket wheels 32 and 30, whatever adjustment of the magneto may be necessary to maintain the driving chain taut, is easily taken care of by the shims 22. Another advantage of the chain 33 over the prior gear drive is that the chain need not run in a bath of oil, or be packed with grease, as is necessary with gears. The chain requires only a little graphite grease, which lasts a long time. This renders it unnecessary to make the chamber of the driving connections in my attachment oil-tight or grease-tight, as must be done in the old gear drives, and so I can make the opening 31 larger than the sprocket wheel 29, as previously explained.

The construction herein illustrated has been successfully used in practice and is intended to represent a preferred embodiment. In the broader aspect of my invention, certain features may be mechanically carried out in other ways than herein set forth, without departing from the invention as defined in the appended claims.

I claim as my invention:

1. A magneto-drive attachment for gas-engines, comprising a casting secured to the front of the engine and extending upwardly toward the right side of the engine, the main body of said casting being recessed to provide a chamber open at the front, the lower or base portion of the back wall of said chamber having a hole through which extends the cam-shaft of the engine, there being a hole at the upper right end of said back wall for the magneto shaft, a shelf extending rearwardly of said back wall near the upper right end thereof considerably above the cam shaft, a magneto secured on said shelf, the magneto shaft extending into said chamber, a sprocket wheel secured to the cam-shaft within said chamber, a second sprocket wheel fixed to the magneto shaft within said chamber, a driving chain operatively connecting said sprocket wheels, and a cover for said chamber.

2. A magneto-drive attachment for gas engines, comprising a casting secured to the front of the engine and extending upwardly toward the right side of the engine, the main body of said casting being recessed to provide a chamber open at the front, the lower or base portion of the back wall of said chamber having a hole through which extends the cam-shaft of the engine, there being a hole at the upper end of said back wall for the magneto shaft, a shelf extending rearwardly of said casting near the upper end thereof, a magneto secured on said shelf, the magneto shaft extending into said chamber, a sprocket wheel secured to the cam-shaft within said chamber, a second sprocket wheel fixed to the magneto shaft within said chamber, a driving chain operatively connecting said sprocket wheels, means for adjusting said magneto on said shelf to secure proper tautness of the driving chain, and a cover for said chamber.

3. A magneto-drive attachment for gas engines, comprising a casting secured to the front of the engine and extending upwardly toward the right side of the engine, the main body of said casting being recessed to provide a chamber, the lower or base portion of the back wall of said chamber having a hole through which extends the cam-shaft of the engine, there being a hole at the upper end of said back wall for the magneto shaft, a shelf extending rearwardly of said casting near the upper end thereof, a magneto secured on said shelf, the magneto shaft extending into said chamber, a sprocket wheel secured to the cam-shaft within said chamber, a second sprocket wheel fixed to the magneto shaft within said chamber, a driving chain operatively connecting said sprocket wheels, and cooperating means on said shelf and the base of said magneto for adjusting the magneto laterally on the shelf.

4. A magneto-drive attachment for gas engines, comprising a casting secured to the front of the engine and extending upwardly toward the right side of the engine, the main body of said casting being recessed to provide a chamber, the lower or base portion of the back wall of said chamber having a hole through which extends the cam-shaft of the engine, there being a hole at the upper end of said back wall for the magneto shaft, a shelf extending rearwardly of said casting near the upper end thereof, a magneto secured on said shelf, the magneto shaft extending into said chamber, a sprocket wheel secured to the cam-shaft within said chamber, a second sprocket wheel fixed to the magneto shaft within said chamber, a driving chain operatively connecting said sprocket wheels, and means for adjusting said magneto laterally and vertically on said shelf.

5. A magneto-drive attachment for gas engines, comprising a casting secured in position adjacent the engine, the main body of said casting being recessed to provide a chamber, the back wall of said chamber having a hole through which extends the cam-shaft of the engine and another hole for the magneto shaft, a shelf extending rearwardly of said casting, a magneto secured on said shelf, the magneto shaft extending into said chamber, driving connections in said chamber between the cam-shaft and the magneto shaft, and means for adjusting said magneto laterally and vertically on said shelf.

6. A magneto-drive attachment for gas engines, comprising a casting secured to the

front of the engine, the main body of said casting being recessed to provide a chamber open at the front, the back wall of said chamber having a hole through which extends the cam-shaft of the engine and another hole for the magneto shaft, a shelf extending rearwardly of said casting, a magneto secured on said shelf, the magneto shaft extending into said chamber, a sprocket wheel secured to the cam-shaft within said chamber, a second sprocket wheel fixed to the magneto shaft within said chamber, a driving chain operatively connecting said sprocket wheels, lugs on said back plate between the upper and lower sections of said chain, a cover for said chamber, and fastening devices passing through said cover into holding engagement with said lugs.

7. In a magneto-drive attachment for gas engines, a casting formed with a recess or chamber, a shelf on said casting, said shelf having pairs of holes arranged in such position relatively to the longitudinal center of the shelf that the median lines of said pairs of holes are off-set with respect to said longitudinal center and with respect to each other, a magneto mounted on said shelf, the base of said magneto having pairs of holes so arranged that any pair may be brought into alignment with a corresponding pair of holes in said shelf, removable pins adapted to be inserted in any pair of holes in the magneto base, so that said pins enter a correspondingly aligned pair of holes in said shelf, whereby the magneto is adjustable laterally on the shelf, and driving members in said chamber for operatively connecting the magneto shaft with the cam shaft of the engine.

8. A magneto-drive attachment for gas engines, comprising a casting secured to the front of the engine and extending upwardly toward the right side of the engine, the main body of said casting being recessed to provide a chamber, the lower or base portion of the back wall of said chamber having a hole through which extends the cam-shaft of the engine, a sprocket wheel secured to said cam-shaft within said chamber, a shelf extending rearwardly from said casting near the upper end thereof, a magneto secured to said shelf, a sprocket wheel fixed on the magneto shaft within said chamber, the back wall of said casting having a hole larger than said second sprocket wheel, so that the magneto may be operatively installed on said shelf and removed therefrom without removal of said second sprocket wheel, and a driving chain operatively connecting said sprocket wheels.

9. In a magneto-drive attachment for gas engines, a magneto mounted in operative relation to the cam shaft of the engine, a shoulder on said cam-shaft near the outer end thereof, a timing gear held fixed on said shaft against said shoulder, a driving wheel mounted at the outer end of said shaft, a bushing on said shaft between said driving wheel and said timing gear, a pin passing through said driving wheel and said bushing and said gear into said shoulder, whereby said driving wheel is rigidly held on said shaft, a driven wheel fixed on the magneto shaft, and a driving connection between said wheels.

10. As a means for adjustably mounting a magneto, a base plate provided with pairs of holes arranged in such position relatively to the longitudinal center of said plate that the median lines of said pairs of holes are off-set with respect to each other, in combination with a magneto having pairs of holes in the base thereof so arranged that any pair may be brought into alignment with a corresponding pair of holes in said plate, and removable pins adapted to be inserted in any pair of holes in the magneto base, so that said pins enter a correspondingly aligned pair of holes in said plate whereby the magneto is adjusted laterally on said base plate.

11. As a new article of manufacture for use in magneto-drive attachments for gas engines, a single piece of casting comprising a main plate having a lower or base edge, said main plate extending upwardly toward the right from said base edge, there being a hole in the lower portion of said plate and another hole at the upper or right end thereof, a forwardly extending flange on said plate surrounding said holes to form a shallow recess or chamber, said plate terminating on the left side in an extension provided with an oil passage and with an angular rib having two holes at an angle to each other.

12. As a new article of manufacture for use in magneto-drive attachments for gas engines, a single piece of casting comprising a main plate having oppositely arranged openings, a forwardly extending flange surrounding said plate to form a shallow recess or chamber, and a shelf extending rearwardly from said plate, said shelf having pairs of holes arranged in such position relatively to the longitudinal center of the shelf that the median lines of said pairs of holes are off-set with respect to said longitudinal center and with respect to each other.

13. As a new article of manufacture for use in magneto-drive attachments for gas engines, a single piece of casting comprising a main plate having oppositely arranged openings, a forwardly extending flange surrounding said plate to form a shallow recess or chamber, a shelf projecting rearwardly from said plate, an extension on said plate beyond said flange, and an angular rib on said extension, said rib having two holes arranged at a predetermined angle to each other, substantially as and for the purposes specified.

14. A magneto-drive attachment for gas engines, comprising a casting secured in position adjacent the engine, the main body of said casting being recessed to provide a chamber, the back wall of said chamber having a hole through which extends the cam-shaft of the engine and another hole for the magneto shaft, a shelf extending rearwardly of said casting, a magneto secured on said shelf, driving connections between the cam-shaft and the magneto shaft, and co-operating means on said shelf and the base of said magneto for adjusting the magneto laterally on the shelf.

15. A magneto drive attachment for gas engines, comprising a casting secured in position adjacent the engine, the main body of said casting being recessed to provide a chamber, the back wall of said chamber having a hole through which extends the cam-shaft of the engine and another hole for the magneto shaft, a shelf extending rearwardly of said casting, a magneto secured on said shelf, driving connections between the cam-shaft and the magneto shaft, co-operating pins and holes on the magneto base and the shelf for positioning the magneto thereon, and means for laterally adjusting the position of said pins on said shelf to adjust the magneto laterally on the shelf.

16. A magneto-drive attachment for gas engines comprising a casting secured to the front of the engine and extending upwardly toward the right side of the engine, the lower or base portion of the back wall of said chamber having a hole through which extends the cam-shaft of the engine, a shelf extending rearwardly of said back wall near the upper right end thereof considerably above the cam shaft, a magneto secured on said shelf, a sprocket wheel secured to the cam-shaft, a second sprocket wheel fixed to the magneto shaft, and a driving chain operatively connecting said sprocket wheels.

17. A magneto-drive attachment for gas engines comprising a casting secured to the front of the engine and extending upwardly toward the right side of the engine, the lower or base portion of the back wall of said chamber having a hole through which extends the cam-shaft of the engine, a shelf extending rearwardly of said back wall near the upper end thereof, a magneto secured on said shelf, a sprocket wheel secured to the cam-shaft, a second sprocket wheel fixed to the magneto shaft, a driving chain operatively connecting said sprocket wheels, and means for adjusting said magneto on said shelf to secure proper tautness of the driving chain.

GEORGE A. RICHROATH.