April 27, 1948. G. H. MARMONT 2,440,639

ELECTRONIC DISTRIBUTOR

Filed Dec. 5, 1945 2 Sheets-Sheet 1

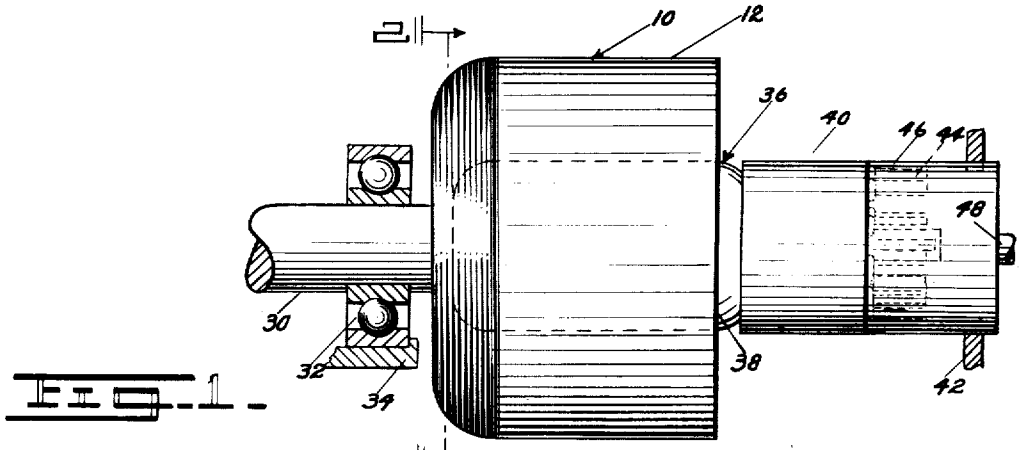


Fig. 1.

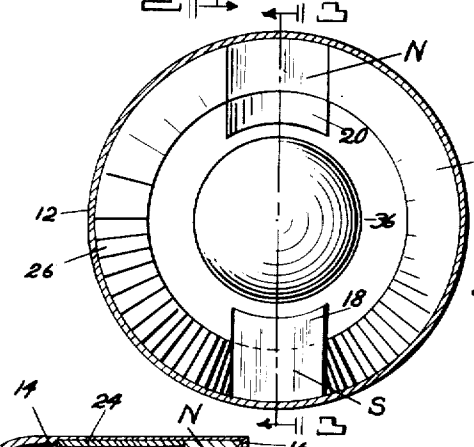


Fig. 2.

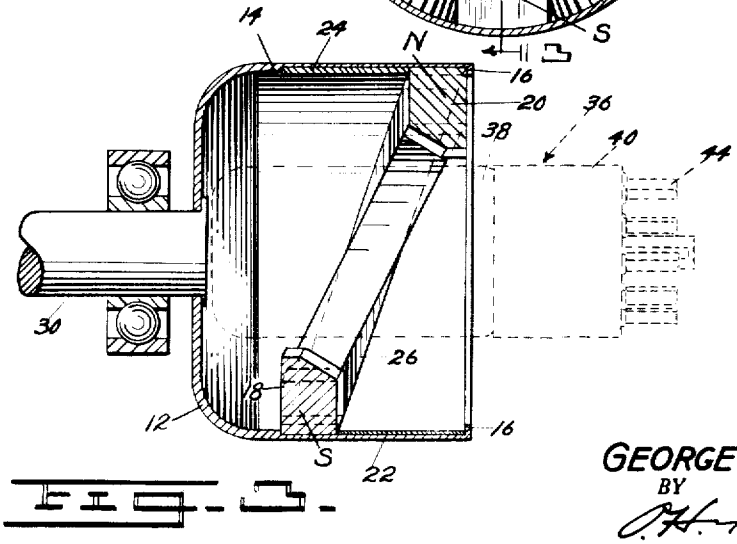


Fig. 3.

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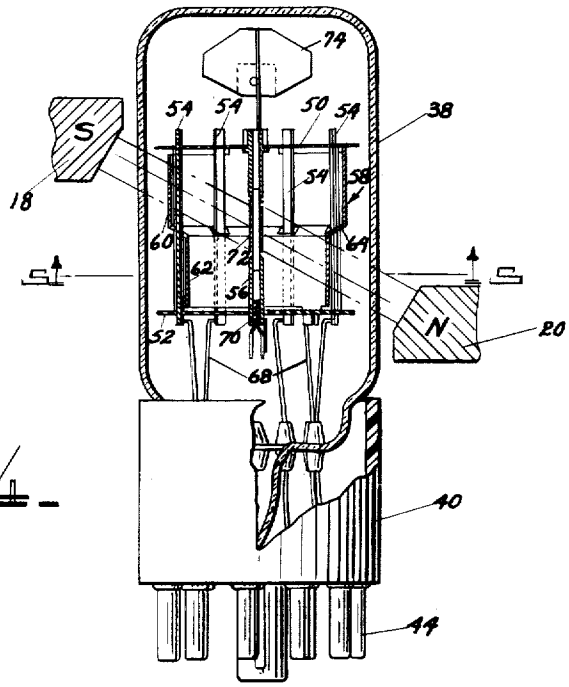


Fig. 4.

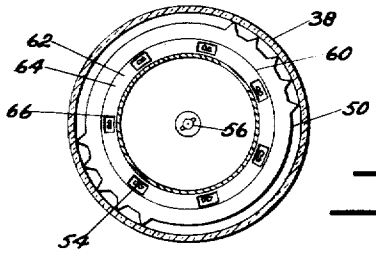


Fig. 5.

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Patented Apr. 27, 1948

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UNITED STATES PATENT OFFICE

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ELECTRONIC DISTRIBUTOR

George H. Marmont, Detroit, Mich., assignor to Bendix Aviation Corporation, Detroit, Mich., a corporation of Delaware

Application December 5, 1945, Serial No. 632,948

6 Claims. (Cl. 250—27.5)

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This invention relates to electronic distributors and more particularly to means for obtaining a single radial beam in a distributor tube.

An object of the invention is to provide a single oblique electron beam for a distributor tube.

A further object of the invention is to provide means for uniformly deflecting an electron beam in an oblique direction within a multi-plate distributor tube.

Another object of the invention is to utilize a magnetic field oblique to the axis of a distributor tube to produce an electron beam between the cathode and a plurality of plate sections within the tube.

A still further object of the invention is to straddle a distributor tube with a rotatable magnet having offset poles so that the resultant two directional oblique electron beam issuing from the cathode will impinge consecutively upon a plurality of spaced plates in single beam fashion when the magnet is rotated.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings forming part of this specification and in which:

Fig. 1 is a view in elevation of a distributor tube straddled by a magnet embodied in the invention;

Fig. 2 is a cross sectional view taken substantially on lines 2—2 of Fig. 1;

Fig. 3 is a longitudinal sectional view taken substantially on lines 3—3 of Fig. 2 showing details of the magnet;

Fig. 4 is a sectional view taken on a diametral plane of the distributor tube; and

Fig. 5 is a cross sectional view taken substantially on lines 5—5 of Fig. 4.

Referring to the drawings for more specific details of the invention, a magnet indicated generally at 10 is comprised of a cup-like cylindrical casing 12 having an internal shoulder 14 and an inturned lip 16. Two corresponding pole pieces 18 and 20, preferably of soft iron, are located in an oppositely disposed relation to each other within the casing 12, one of the pieces abutting the lip 16 and the other abutting the shoulder 14. The pole pieces are retained within the casing by shims 22 and 24, and the pole pieces are joined by two skewed C-shaped members 26 and 28 preferably made of an alloy having permanent magnetic properties.

A shaft 30 secured to the casing 12 in axial relation thereto is mounted for rotation on a bearing 32 fitted on a fixed support 34 and a

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tube, indicated generally at 36, is partially enclosed by the casing. The tube comprises a glass bulb 38 fitted in a base 40 supported on a suitable bracket 42. The base has a plurality of pins 44 adapted to be received within a socket 46 and the socket has a lead 48 connected thereto.

The bulb 38 encloses a highly evacuated space having therein two insulating spacers 50 and 52, each having perforations for the reception of a plurality of plate sections 54, a cathode 56, and a plurality of tabs on an anode cylinder 58.

The anode cylinder 58 comprises a large diametral portion 60, a smaller diametral portion 62, and an inclined portion 64 between the two portions 60 and 62. The inclined part 64 of the cylinder has a plurality of rectangular perforations 66 for free passage therethrough of the plate sections 54.

While this particular type of cylinder has been found highly desirable, it is to be understood that other suitable means for shielding the lower halves of the plate sections 54 from the electron beam may be employed with equally good effect.

A plurality of leads 68 connects the plate sections 54 and the cylinder 58 to the pins 44, and a heater 70 is connected to the cathode 56 to cause electron emission from an activated portion 72 of the cathode when a current is applied to the heater, and a conventional getter assembly 74 is attached to a tab on the larger diametral portion 60 of the cylinder 58.

The mode of operation is as follows: The anode cylinder 58 and the plate sections are held at a positive electro-static potential with respect to the cathode 56. When current is applied to the heater 70, an electron emission occurs from the activated portion 72 of the cathode 56.

The electrostatic field set up by the plate sections 54 and the cylinder 58 and the magnetic field induced by the magnet 10 straddling the tube coact to draw out a sheet of electrons from opposite sides of the cathode in oblique radial directions, as shown in Fig. 4. The beam in one direction impinges on the smaller diametral portion 62 of the cylinder 58 and is prevented from reaching the plate sections 54, while the beam in the opposite direction has an unobstructed passage to the plate sections. Thus only a single beam is utilized by the distributor tube in its operation.

When the invention is used for ignition timing and distribution for an internal combustion engine, it will be necessary to gear the magnet to the engine crankshaft, whereupon the rota-

tion of the magnet will consecutively set up signals on the plate sections 54 and these signals may be conducted to the engine cylinder spark plugs.

A single beam will allow the magnet speed to be one-half the crankshaft speed instead of one quarter as with a double beam. Since timing accuracy depends primarily on the orientation of the elements within the tube and the speed of rotation of the magnet, a single beam, since it allows a greater magnet speed, will provide for an optimum in timing accuracy.

While this invention has been described in connection with certain specific embodiments, the principle involved is susceptible of numerous other applications that will readily occur to persons skilled in the art. The invention is, therefore, to be limited only as indicated by the scope of the appended claims.

Having thus described the various features of the invention, what I claim as new and desire to secure by Letters Patent is:

1. An electronic distributor comprising a radial beam tube, a centrally located cathode therein, a plurality of plate sections surrounding the cathode, an anode cylinder having a portion surrounding the plate sections and another portion interposed between the cathode and plate sections, and a rotatable magnet straddling the tube.

2. An electronic distributor comprising a radial beam tube, a centrally located cathode therein, a plurality of spaced plate sections surrounding the cathode, a double diametral anode cylinder mounted within the tube with the smaller diametral portion between the cathode and plate sections and the larger diametral portion outside of the plate sections, and a magnet having offset pole pieces straddling the tube effective to provide a two directional electron beam oblique to the longitudinal axis of the tube upon the heating of the cathode.

3. An electronic distributor comprising a radial beam tube, a centrally located cathode therein, an anode cylinder spaced from the cathode having a lower portion of small diameter, an outwardly inclined shoulder portion at the upper end thereof having spaced apertures therein, and an upper portion of large diameter on the shoulder portion, a plurality of plate sections extended through the spaced apertures, and a magnet having offset pole pieces of permeable metal joined

by two skewed C-shaped permanent magnet members straddling the tube thereby providing an oblique two directional electron beam so disposed with reference to the axis of the tube that the beam in one direction only can impinge on the plate sections.

4. An electronic distributor for ignition timing of an internal combustion engine comprising a radial beam tube, a centrally located cathode therein, an anode cylinder spaced from the cathode, said cylinder being a unitary member having three portions; a lower portion of one diameter, an upper portion of larger diameter and an upwardly inclined transitional portion having a plurality of spaced apertures therethrough, a plurality of plate sections extended through the spaced apertures, a plurality of leads connected to each plate section for connection in the ignition system of an engine, a heater for the cathode to cause electron emission therefrom, and a magnet having offset permeable pole pieces joined by two skewed C-shaped permanent magnet members straddling the tube, the magnet parts being enclosed in a cylindrical casing adapted to be connected to the crankshaft of the engine.

5. In an electronic distributor tube having a cathode and a plurality of plate sections, means for directing the electron emission from the cathode in two oppositely disposed beams, means for rotating the beams, and means for preventing one of the beams from impinging on the plate sections.

6. In an electronic distributor tube having a cathode and a plurality of plate sections, means for directing the electron emission from the cathode in two oppositely disposed beams, means for rotating the beams in a continuous repetitious circular path, and stationary means for continually preventing one of the beams from impinging on the plate sections.

GEORGE H. MARMONT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,221,743	Wagner	Nov. 12, 1940
2,263,377	Busignies et al.	Nov. 18, 1941

Disclaimer

2,440,639.—*George H. Marmont*, Detroit, Mich. ELECTRONIC DISTRIBUTOR. Patent dated Apr. 27, 1948. Disclaimer filed Sept. 9, 1950, by the assignee, *Bendix Aviation Corporation.*

Hereby enters this disclaimer to claim 5 of said patent except where this claim is limited to a structure in which the last mentioned means in the claim prevents only one of the beams from impinging on the plate section.

[*Official Gazette October 3, 1950*]

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