

Feb. 5, 1952

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2,584,907

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2 SHEETS--SHEET 1

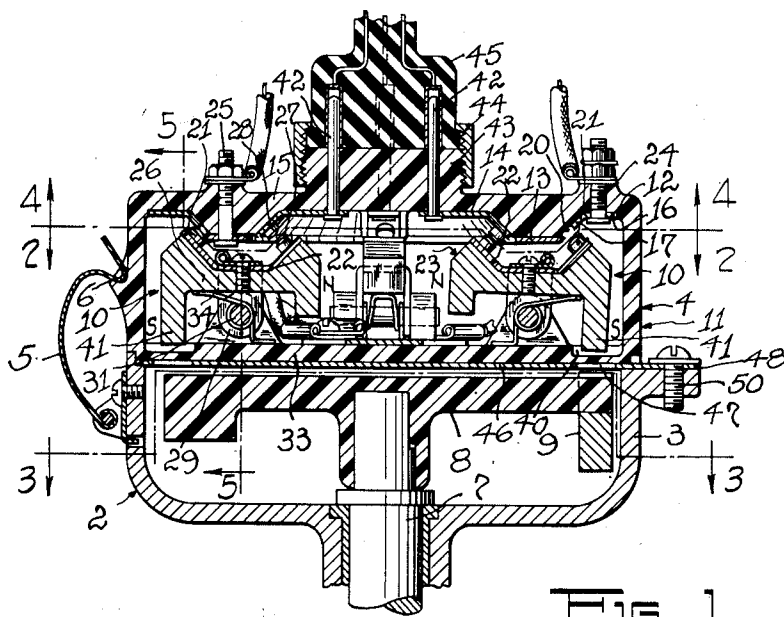


FIG. 1

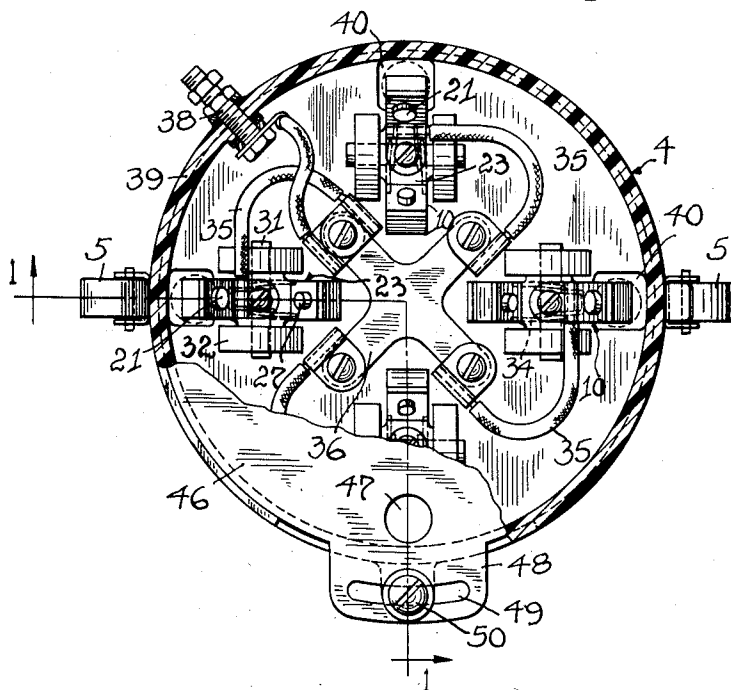


FIG. 2

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2 SHEETS—SHEET 2

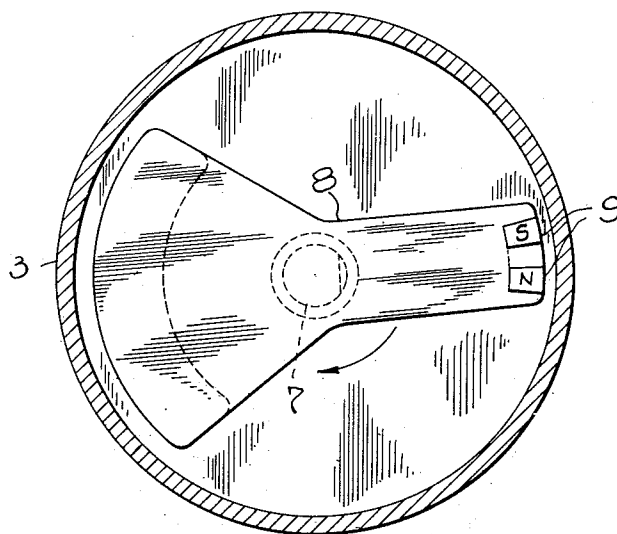


FIG. 3

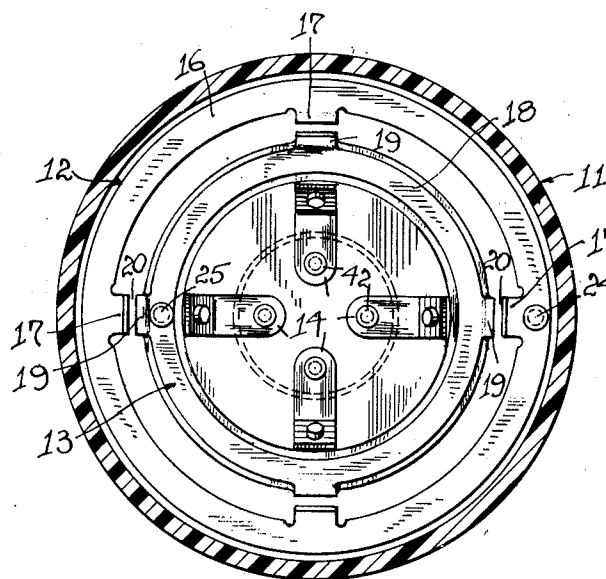


FIG. 4

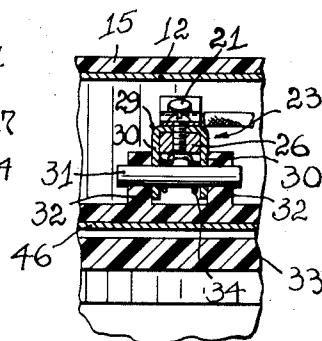


FIG. 5

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7 Claims. (Cl. 200—19)

1 This invention relates to magnetic, circuit-controlling mechanism of the type used to control the circuits of ignition distributing systems for internal combustion engines and various other forms of electrical apparatus.

The primary object of the invention is the provision of a magnetic circuit-controlling mechanism constructed to include magnetically-operable switch means arranged in a fluid-tightly sealed chamber, and shiftable, magnetic operating means for said switch means arranged outside of said chamber in proximity thereof to effect actuation of the switch means by the magnetic flux of the magnetic operating means when same are shifted to predetermined positions with respect to said switch means.

Another object of the invention is the provision of a magnetic circuit-controlling mechanism constructed to include magnetically operable switch means for controlling a plurality of circuits and arranged in a fluid-tightly sealed chamber, and shiftable, magnetic means for said switch means arranged outside of said chamber and mounted to be shifted with respect thereto in proximity thereof to effect actuation of the switch means through the wall of said chamber by the magnetic flux of the magnetic operating means when same are shifted to predetermined positions with respect to said switch means.

A further object of the invention is the provision of a magnetic, circuit-operating mechanism of the type referred to above in which the wall of the fluid-tightly sealed chamber mounting the switching means has low specific conductivity for magnetic flux but includes in proximity to said switching means a localized area of sufficient specific conductivity for magnetic flux to effect actuation of the switching means when the magnetic operating means are shifted to predetermined positions.

Still another object of the invention is the provision of a magnetic circuit-operating mechanism of the type referred to above in which there is provided below the fluid-tightly sealed chamber opposite and in proximity to the outer face of the switching means mounting wall thereof a rotatably mounted disk made of material having low specific conductivity for magnetic flux and provided with localized areas of high specific conductivity for magnetic flux to control by shifting of the disk the timing of the actuation of the shifting means when the magnetic operating means are shifted to predetermined positions.

Still further objects and novel features of

2 construction, combination and relation of parts by which the objects in view have been attained will appear and are set forth in detail in the course of the following specification. The drawings accompanying and forming part of the specification illustrate a certain practical embodiment of the invention, but it will be apparent as the specification proceeds that the structure may be modified and changed in various ways without departure from the true spirit and broad scope of the invention.

In the drawings:

Fig. 1 is a vertical sectional view through an ignition distributor for a four-cylinder internal combustion engine, which distributor embodies a magnetic circuit-controlling mechanism constructed in accordance with the invention, the section being taken on line 1—1 of Fig. 2;

Fig. 2 is a horizontal sectional view through the distributor shown in Fig. 1, the section being taken on line 2—2 of Fig. 1;

Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a horizontal sectional view taken on line 4—4 of Fig. 1; and

Fig. 5 is a vertical sectional view taken on line 5—5 of Fig. 1.

Referring now more particularly to the exemplified form of the invention shown in the drawings, reference numeral 2 denotes a distributor for a four-cylinder internal combustion engine. This distributor includes a cup-shaped base 3 and a fluid-tightly sealed head portion 4 removably seated on base 3 and securely held thereon by spring clips 5 which are pivoted to base 3 and resiliently engaged with recesses 6 on head portion 4. Cup-shaped base 3 has freely rotatably extended therethrough a timer drive shaft which has secured to its inner end a counter-balanced crank arm 8 mounting at its one end a U-shaped, preferably permanent magnet 9 adapted to be shifted by rotation of timer shaft 7 toward and away from proximity to four switches 10 arranged in head portion 4 as will be described hereinafter.

Head portion 4 is designed for use with a four-cylinder engine and includes a fluid-tightly sealed housing 11 made of material of low specific conductivity for magnetic flux. This housing mounts fluid-tightly sealed therein, in equiangular relation with respect to each other, four switches 10 which jointly include stationary contact members 12, 13 and 14 carried by the top wall 15 of housing 11.

Stationary contact member 12 consists of a

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metal ring 16 having four inwardly extended equi-angularly related short radial arms 17, and stationary contact member 13 embodies a smaller metal ring 18 having four outwardly extended equi-angularly related short radial arms 19. The contact members 12 and 13 are concentrically arranged with respect to each other and their radial arms are aligned to form therebetween gaps 20 adapted to be bridged by contact points 21 on metal strips 22 of tiltable bridge members 23, as will be later described. Stationary contact member 12 is electrically connected to a contact post 24 fluid-tightly outwardly extended through top wall 15 of housing 11 and stationary contact member 13 is electrically connected to a contact post 25 also fluid-tightly outwardly extended through said top plate.

The bridge members 23 consist each of a tiltable supported permanent bar magnet 26 which mounts metal strip 22 having contact point 21 arranged to bridge gap 20 and a second contact 27 arranged to cooperate with contact points 28 of the respective one of four stationary contact members 14. This permanent bar magnet is tiltable supported by a U-shaped bracket 29 having its flanges 30 pivotally mounted on a pin 31 supported by ear portions 32 upwardly extended from bottom wall 33 of housing 11. The bridge members 23 are normally held by wire springs 34 in such a position that gaps 20 are closed by contact points 21 and contact points 27 are separated from contact points 28 on stationary contact members 14.

The metal strips 22 with contact points 21 and 28 are connected by flexible wires 35 with a cross-shaped metal plate 36 coupled by a flexible wire 37 with a contact post 38 fluid-tightly extended through the side wall 39 of housing 11.

Head portion 4 has its bottom wall 33 recessed to form recesses 40 arranged to align with downwardly extended pole extensions 41 of bar magnets 26. These recesses decrease the thickness of the bottom plate and therewith locally increase the conductivity of the bottom wall for magnetic flux to facilitate proper tilting of the tiltable supported bar magnets 26 when the U-shaped permanent magnet 9 is rotated by timer drive shaft 7.

The stationary contact members 14 each consist of a metal strip electrically connected to the respective post of four contact posts 42 which are fluid-tightly extended outwardly from housing 11 through a boss 43 of top wall 15. This boss is outwardly threaded and mounts a clamping screw collar 44 adapted to securely hold a plug member 45 electrically coupled with the contact posts 42. The distributor is connected to an ignition circuit by connecting contact post 24 to the primary winding of the ignition coil of the circuit, contact post 25 to ground, contact post 38 to the secondary winding of the ignition coil and contact posts 42 to the grounded spark plugs (not shown), all as customary.

Rotation of timer drive shaft 7 successively places U-shaped magnet 9 opposite to the respective pole extensions 41 of bar magnets 26 to effect by outward tilting of bridge members 23 successive opening of the primary winding of the ignition coil of the ignition circuit, closing of the secondary winding of such ignition coil and finally, by action of the springs 34, inward tilting of bridge members 23 to again close the primary winding of the ignition coil, etc. Quick closing of the primary winding of the ignition

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coil, effected by springs 34, is accelerated by the U-shaped magnet 9, one pole of which attracts and the other pole of which repulses the pole extensions 41 of bar magnets 26.

Exact timing of the thus constructed distributor is controlled by a paramagnetic disk 46 axially rotatably mounted outside of head portion 4 between bottom wall 33 of housing 11 and crank arm 8 which mounts U-shaped magnet 9. This disk embodies equi-angularly spaced openings 47 arranged opposite the pole extension 41 of bar magnets 26 and when rotated effects the magnetic flux of the magnetic operating means, thus controlling the timing of the distributor, as rotation of the disk in one or the other direction shifts the openings 47 with respect to pole extensions 41 of bar magnets 26. Disk 46 includes a lateral extension 48 with an elongated slot 49 to permit securing of the disk to base 3 by a screw member 50 extended through slot 49.

Having thus described my invention, what I claim is:

1. In a magnetically operated switching device a fluid-tightly sealed housing, a double acting switching member in said housing including stationary contact members, and a tiltable, bridge-like contact member adapted to selectively electrically connect the stationary contact members with each other, said bridge-like contact member including a magnet mounting a contact strip, contact posts electrically connected with said stationary contact members and said contact strip and fluid-tightly extended through the wall of said housing outside thereof, and magnetic means shiftably arranged outside of said housing adapted to effect shifting of the magnet to selectively connect the stationary contact members with each other when the magnetic means are shifted to predetermined positions.

2. In a magnetically operated switching device a fluid-tightly sealed housing, a plurality of double acting equi-angularly related switching members within said housing including coordinated stationary contact members and tiltable, bridge-like contact members adapted to selectively electrically connect the stationary contact members with each other, said bridge-like contact members each including a magnet, and magnetic means rotatably arranged outside of said housing opposite one wall thereof and in coordinated relation with respect to the magnet of said bridge-like contact members adapted to effect shifting of said bridge-like members by their magnets when the magnetic means are rotated to predetermined positions.

3. A magnetically operated switching device as described in claim 2, including a shiftable paramagnetic plate member arranged outside of said housing between same and the magnetic means, said plate member being provided with an opening and adapted to be shifted to desired positions to permit control of the magnetic flux between the magnet and magnetic means when the latter are being shifted to predetermined positions.

4. A magnetically operated switching device as described in claim 2, wherein the magnet of said bridge-like contact members include one pole extended toward the wall of said housing opposite to the said magnetic means.

5. A magnetically operated switching device as described in claim 2, wherein the magnets of said bridge-like contact members each include one pole extended toward the wall of said housing opposite to the magnetic means, and wherein the

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magnetic means include a U-shaped magnet having poles directed toward the said wall to effect in rotation of said magnetic means, by the magnetic action on the said poles, tilting of the bridge-like contact members in opposite directions.

6. A magnetically operated switching device as described in claim 2, wherein the housing includes localized recesses in the said wall opposite to said magnets of said bridge-like contact members to effect in localized areas of the housing increased magnetic flux between the said magnets and the rotatably arranged magnetic means outside of said housing.

7. A magnetically operated switching device as described in claim 2, wherein the magnets of said bridge-like contact members each include a pole extended toward the wall of said housing opposite the said magnetic means, wherein the magnetic means has its poles directed toward the said wall, and wherein the said wall includes localized re-

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cesses opposite the said poles of said magnets to effect in localized areas of the wall increased magnetic flux between the poles of said magnets and said magnetic means and effect successive tilting of the bridge-like contact members in opposite directions.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,970,412	Bates	Aug. 14, 1934
2,522,815	Early	Sept. 19, 1950

FOREIGN PATENTS

Number	Country	Date
576,685	Germany	May 12, 1933