

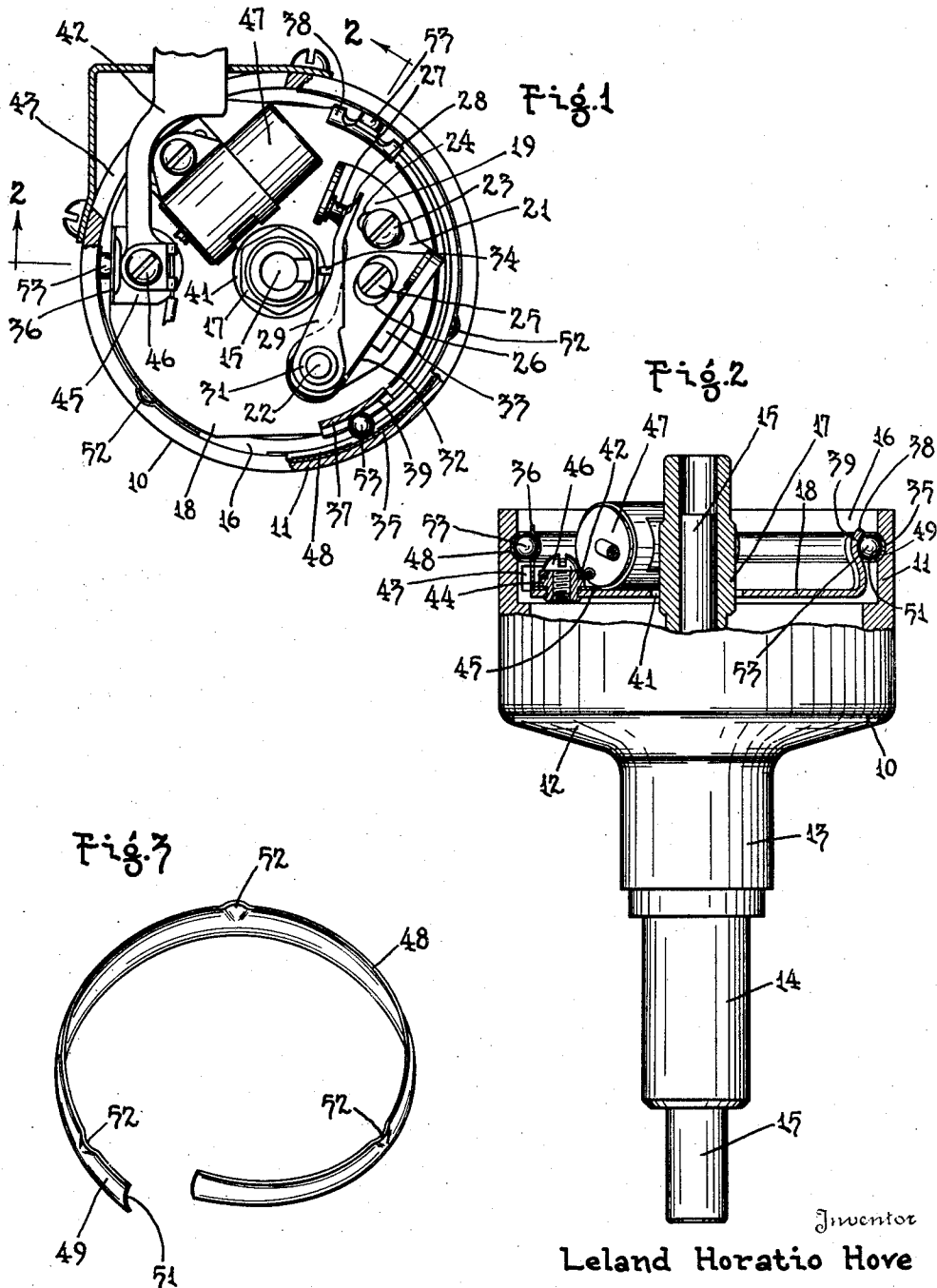
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DISTRIBUTOR FOR INTERNAL COMBUSTION ENGINES

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DISTRIBUTOR FOR INTERNAL COMBUSTION ENGINES

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7 Claims. (Cl. 200—19)

My invention relates to distributors for internal combustion engines and has for an object to provide a device by means of which the supporting plate for the circuit breaker of the distributor may be rigidly and securely mounted for oscillatory movement to permit of accurately advancing and retarding ignition in the cylinders.

Another object of the invention resides in providing a construction by means of which existing distributors may be easily and rapidly repaired or reconditioned when wear occurs.

A feature of the invention resides in providing a method by means of which worn distributors may be reconditioned.

A still further object of the invention resides in providing a liner in the form of a ring adapted to fit within a groove in the housing, said ring having a groove following the groove in the housing and receiving balls carried by ball holders mounted on the supporting plate.

A feature of the invention resides in constructing the liner in the form of an open ring constructed of resilient material and of a diameter greater than the diameter of the wall of the distributor housing at the groove therein and adapted to be sprung into the groove in said housing and held through its resiliency in position therein.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawing:

Fig. 1 is a plan view of a distributor for a 6-cylinder internal combustion engine with the cap removed.

Fig. 2 is an elevational view partly in section and taken on line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the liner used with the invention.

For the purpose of supporting the circuit breaker supporting plate of a distributor for oscillatory movement independently of the cam shaft of the distributor an annular groove is formed in the cylindrical wall of the distributor housing and ball holders mounted on the supporting plate containing balls operating within said groove. This construction supports the supporting plate for oscillation to permit of advancing and retarding the ignition within the cylinders of the engine. The present invention is especially adapted to distributor housings of cast iron or other relatively soft metal. In such housings, wear is relatively rapid with the result of looseness and play. The present invention pro-

vides a construction and a method by means of which this wear may be taken up and also by means of which new installations may be constructed so as to practically eliminate such wear.

In the drawing, I have illustrated a distributor having a housing 10 constructed of cast iron or any other suitable material. This housing has a cylindrical wall 11 and a radial wall 12 connected thereto forming a compartment 16 within the same. At the center of the housing is provided a boss 13 which is connected to the radial wall 12 and which is provided with a bearing 14. The bearing 14 has rotatably mounted in it a cam shaft 15 which projects into the compartment 16. The housing 10 is open at the top, being normally closed by means of a cap, not shown, which contains terminals connected to the spark plugs of the engine and which is attached to the housing 10 by means of clips or in any other suitable manner such as is now well known in the art. The shaft 15 has secured to it a cam 17 which also supports the distributor arm of the distributor, said distributor arm not being shown in the drawing.

Within the compartment 16 in housing 10 is disposed a supporting plate 18 on which the circuit breaker 19 of the distributor is mounted. This circuit breaker comprises a mounting 21 pivoted to the plate 18 on a pintle 22 and adjustably held attached to said plate by means of a screw 23 passing through a slot 24 in said plate and an eccentric 25 operating in a slot 26 in said plate. The mounting 21 carries a fixed contact 27 which cooperates with a movable contact 28 mounted on the circuit breaker arm 29. This arm is provided with an insulating bushing 31 pivoted on the pintle 22 and is urged toward the contact 27 by means of a spring 32 engaging an insulating lug 33 attached to mounting 21. A cam follower 34 engages the cam 17 and makes and breaks the circuit through the contacts 27 and 28.

The plate 18 is supported for oscillatory movement about the axis of the shaft 15 in the following manner: Extending about the inner surface of the wall 11 of housing 10 is a circumferentially extending groove 35 arcuate in cross section. Opposite this groove are three ball holders 36, 37 and 38. The ball holders 37 and 38 are identical in construction and consist of brackets extending upwardly from the plate 18 and integral therewith. These brackets have grooves 39 formed therein which face the groove 35 in the wall 11 of housing 10. These ball holders are relatively rigid. The ball holder 36

is constructed in much the same manner as the ball holders 37 and 38 excepting that the same is formed from resilient spring material and is attached to the plate 18 by a device to be presently described in detail. When the distributor is first used, balls are provided which act between the grooves in the ball holders 36, 37 and 38 and the groove 35 in the wall 11 of housing 10. These balls serve to guide the support 18 for oscillatory movement about the axis of the shaft 15. The plate 18 has a hole 41 of considerably greater dimension than the cam 17 and through which said cam and the shaft 15 extend, whereby the said plate may be mounted for oscillation independently of the shaft 15, its bearings or any parts attached thereto.

For the purpose of oscillating the plate 18 to advance and retard the ignition of the fuel in the cylinders of the engine linkage is employed which includes a link 42 operable through a slot 43 in the wall 11 of housing 10. This link is pivoted on a bushing 44 which is riveted to the plate 18. This bushing also extends through a flange 45 formed on the ball holder 36 and thus secures the said ball holder in position upon the supporting plate. A screw 46 threaded into the bushing 44 holds the link 42 in position. If desired, the condenser 47 of the distributor may also be mounted upon the supporting plate 18.

The invention includes a liner 48 which is constructed of a tempered spring steel having suitable wearing qualities. This liner is preferably made of strip material which is rolled transversely and longitudinally to form an open ring arcuate in cross section. By means of this construction, the outer surface 49 of the liner 48 becomes convex and is of such curvature as to snugly fit within the groove 35 of wall 11 of housing 10. At the same time a concave groove 51 is formed upon the inner surface of the liner 48 which follows along the groove 35 and which is adapted to receive the balls carried by the ball holders 36, 37 and 38. The length of the liner 48 is equal to or slightly less than the circumference of the groove 37, while the diameter of the liner 48 is somewhat greater than the diameter of the wall 11 at the groove 35. In inserting the liner 48 within the groove 35, the same is sprung into position and the resilience of the metal of which the liner 48 is constructed holds the liner firmly in position within the groove 35.

Acting between the grooves 39 of the holders 36, 37 and 38 and the groove 51 of liner 48 are a number of balls 53. These balls are of such size as to fit snugly within said grooves so that a minimum amount of play exists whereby the supporting plate 18 is properly supported for oscillatory movement when the link 42 is shifted in a longitudinal direction. To permit of assembly, three vertical grooves 52 are formed in the uppermost portion of the liner 48 which intersect the groove 51. The balls 53 are inserted into the grooves 51 and between the liner 48 and the ball holders 36, 37 and 38 through these grooves. The liner is inserted into the groove 35 in such a manner that the grooves 52 are out of the range of movement of the balls when the distributor is in operation.

When the invention is to be used for reconditioning worn distributors, the method of procedure is as follows: The balls originally acting between the ball holders and the groove 35 are first removed to permit of the removal of the plate 18 from the distributor. The liner 48

is then sprung into position with the grooves 52 at the locality of the corresponding vertical grooves formed in the wall 11 of housing 10. The plate 18 is then reassembled and new balls used which are of a diameter equal to the diameter of the original balls less the thickness of the liner 48 and plus the amount of wear. When these balls are inserted between the ball holders and the liner 48, the supporting plate 18 is again properly mounted for oscillatory movement and in this case the balls ride within the groove 51 of the liner instead of in the groove 35 of the housing. Where the device is to be used with new distributors, balls of proper diameter are furnished and the procedure is otherwise the same.

The advantages of my invention are manifest. An extremely simple and practical construction is provided whereby worn distributors may be easily and quickly reconditioned. With my invention, the supporting plate is accurately mounted for oscillation so that accurate timing of the ignition results. The liner can be constructed at a nominal expense and when installed prolongs the life of the distributor supporting plate indefinitely. By the provision of balls of various diameters the liners may be used in distributors regardless of the amount of wear present. In the use of my invention, practically all play is eliminated so that the timer functions in the intended manner.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a distributor for internal combustion engines, including a housing having a cylindrical wall and a circuit breaker supporting plate mounted therein and provided with ball holders having circumferentially disposed balls therein arranged in a common plane, said cylindrical wall having a groove on the inner surface thereof arcuate in cross section and symmetrically disposed with reference to the common medial plane of the balls and concentric with said balls, a metal liner in the form of an open ring having a curved outer surface adapted to fit the arcuate surface of said groove in the wall of the housing and an arcuate groove following along the groove in said wall and symmetrically disposed with reference to the common medial plane of the balls, said liner being constructed of resilient material and having a diameter greater than the diameter of said wall at the groove, said liner being sprung into position within the groove in said wall and being held in place therein by the resiliency of said liner, said balls being disposed in the groove in said liner and traveling along separate spaced paths, the ends of said liner being disposed between the paths of movement of two adjacent balls.

2. In a distributor for internal combustion engines, including a housing having a cylindrical wall and a revoluble support positioned within said housing and provided with ball holders having circumferentially disposed balls therein arranged in a common plane, said cylindrical wall having a groove on the inner surface thereof arcuate in cross section and symmetrically disposed with reference to the common medial plane of the balls and concentric with said balls, a metal liner in the form of an open ring having a curved outer surface adapted to fit the arcuate

surface of said groove in the wall of the housing and an arcuate groove following along the groove in said wall and symmetrically disposed with reference to the common medial plane of the balls, said liner being constructed of resilient material and having a diameter greater than the diameter of said wall at the groove, said liner being sprung into position within the groove in said wall and being held in place therein by the resiliency of said liner, said balls being disposed in the groove in said liner and traveling along separate spaced paths, the ends of said liner being disposed between the paths of movement of two adjacent balls.

3. A guide for an internal combustion engine distributor including a housing provided with a cylindrical wall having a groove on the inner surface thereof arcuate in cross section and a support within the housing provided with ball holders for carrying balls for engagement with the wall of the housing at the groove, said guide comprising a metal liner in the form of an open ring having a transversely curved outer surface adapted to be received within the groove in the wall of the housing and having an inner transversely curved groove following lengthwise along the groove in said wall and symmetrically disposed with reference to the medial plane of the groove in the wall, said liner being constructed of resilient material and having an outside diameter greater than the diameter of the wall at the groove, said liner being adapted to spring into position within the groove in said wall and to be held in place therein by the resiliency of said liner, and replacement balls applicable to said ball holders and of a diameter less than that of the balls of said distributor housing and of substantially the same curvature as the transverse curvature of the groove in the liner, said replacement balls being receivable within the groove in the liner and being adapted to guide the support for rotary movement.

4. A guide for an internal combustion engine distributor including a housing provided with a cylindrical wall having a groove on the inner surface thereof arcuate in cross section and a rockable support within the housing provided with spaced ball holders each carrying a ball for engagement with the wall of the housing at the groove and movable to and fro along a separate path spaced from the path of movement of each of the other balls, said guide comprising a metal liner in the form of an open ring having a transversely curved outer surface adapted to be received within the groove in the wall of the housing and having an inner transversely curved groove following lengthwise along the groove in said wall and symmetrically disposed with reference to the medial plane of the groove in the wall, and replacement balls applicable to said ball holders of substantially the same curvature as the transverse curvature of the groove in the liner, said replacement balls being receivable within the groove in the liner and adapted rotatably to guide the support for rocking movement, the ends of the liner being disposed between the paths of movement of two adjacent balls.

5. A guide for the rotary ball-guided support

of an internal combustion engine distributor including a housing provided with a cylindrical wall having a groove on the inner surface thereof arcuate in cross-section, said guide comprising a metal liner in the form of an open ring having a transversely curved outer surface adapted to be received within the groove in the wall of the housing and having an inner transversely curved groove following lengthwise along the groove in said wall and symmetrically disposed with reference to the medial plane of the groove in the wall, said liner being constructed of resilient material and having a diameter greater than the diameter of the wall at the groove, said liner being adapted to spring into position within the groove in said wall and to be held in place therein by the resiliency of said liner, the balls of said support being adapted to be received within the groove in said liner and to guide the support for rotary movement within the housing.

6. In a distributor for internal combustion engines including a housing having a cylindrical wall and a circuit breaker supporting plate mounted therein and provided with ball holders having circumferentially disposed balls therein arranged in a common plane, said cylindrical wall having a groove on the inner surface thereof arcuate in cross section and symmetrically disposed with reference to the common medial plane of the balls and concentric with said balls, a metal liner in the form of an open ring having a curved outer surface adapted to fit the arcuate surface of said groove in the wall of the housing and an arcuate groove following along the groove in said wall and symmetrically disposed with reference to the common medial plane of the balls, said liner being constructed of resilient material and having a diameter greater than the diameter of said wall at the groove and a length less than the circumference of the wall of said housing adjacent said groove, said liner being sprung into position within the groove in said wall and being held in place therein by the resiliency of said liner.

7. In a distributor for internal combustion engines including a housing having a cylindrical wall and a revoluble support positioned within said housing and provided with ball holders having circumferentially disposed balls therein arranged in a common plane, said cylindrical wall having a groove on the inner surface thereof arcuate in cross section and symmetrically disposed with reference to the common medial plane of the balls and concentric with said balls, a metal liner in the form of an open ring having a curved outer surface adapted to fit the arcuate surface of said groove in the wall of the housing and an arcuate groove following along the groove in said wall and symmetrically disposed with reference to the common medial plane of the balls, said liner being constructed of resilient material and having a diameter greater than the diameter of said wall at the groove and a length less than the circumference of the wall of said housing adjacent said groove, said liner being sprung into position within the groove in said wall and being held in place therein by the resiliency of said liner.

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