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PIVOTAL BRUSH MOUNTING

Original Filed June 11, 1962

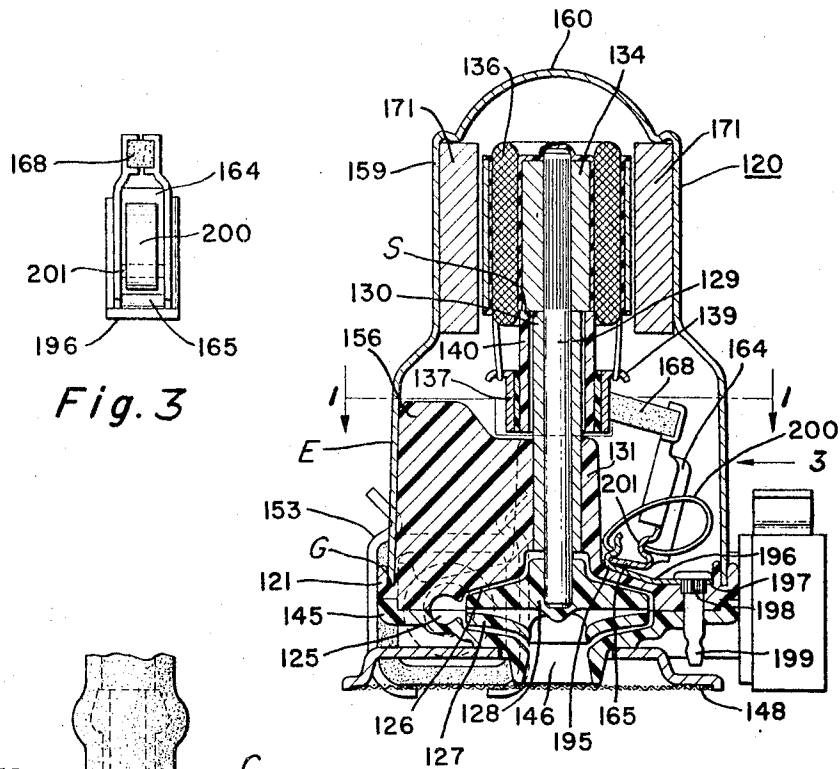


Fig. 2

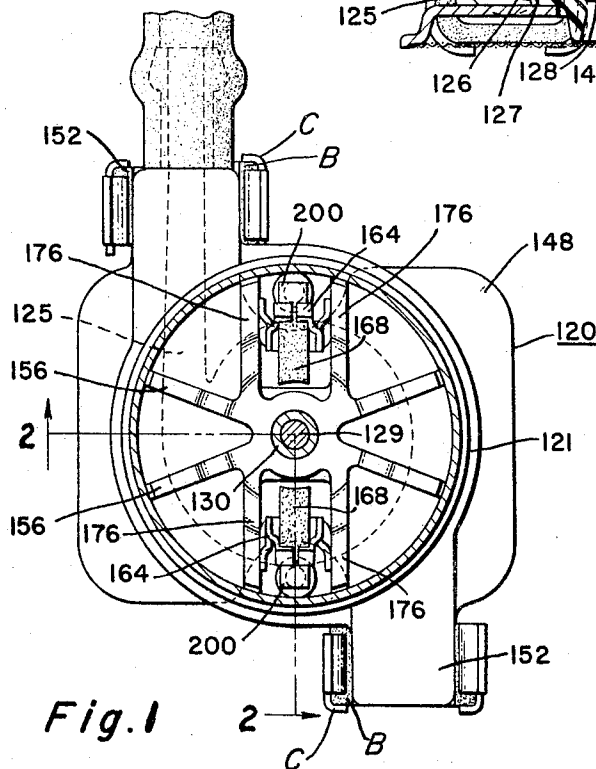


Fig. 1

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PIVOTAL BRUSH MOUNTING

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Original application June 11, 1962, Ser. No. 201,616, now Patent No. 3,168,868, dated Feb. 9, 1965. Divided and this application Feb. 27, 1964, Ser. No. 347,946
2 Claims. (Cl. 310-239)

This invention relates to a compact assembly of parts of combined electric-fluid motor means, and, more particularly, to an electric fuel pump unit.

This is a divisional application of parent disclosure S.N. 201,616, Schultz filed June 11, 1962, now Patent 3,168,868, Schultz, issued February 9, 1965 and belonging to the assignee of the present invention.

An object of this invention is to provide a new and improved structural arrangement of motor-pump components easy to assemble into a compact unit without need for screw fasteners, yet having proper alignment and concentricity between stator and rotor parts with a minimum of electrical circuitry.

A further object of this invention is to provide an electric fuel pump actuated by a direct current motor having a single bearing means for rotor support with a concentric commutator means fastened directly to an armature core and located circumferentially to the bearing means to result in optimum conditions of concentricity maintained as to a unitary body portion to which all other parts are assembled including pivotally mounted brush means to engage the concentric commutator means on a side of the body portion opposite to a side where a centrifugal pump portion with impeller is located.

Another object of this invention is to provide an electric fuel pump actuated by a direct current motor having a unitary base part of moldable plastic material centrally to receive bearing means for rotor-commutator shaft support and a concentrically mounted stationary field means on one side thereof as well as a centrifugal pump portion with impeller on an opposite side thereof, a brush assembly also carried by the unitary base part and including a brush means without pigtail through each with a holder thereof of strip-like metal having an indented generally L-shaped pivot end that engages a metal support strip one end of which has a connector pin means to hold the support strip to the unitary base and to project there-through for direct external electrical connection thereto, the pivot end of the metal brush holder having direct engagement against an elbow-like end of the support strip while a substantially U-looped or modified elliptical spring means straddles the elbow-like end of the support strip and the indented generally L-shaped pivot end of the metal brush holder biased radially inwardly thereby to urge engagement of the brush means against the commutator.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 is a sectional view of modified electric fuel pump assembly taken through line 1-1 in FIGURE 2 further in accordance with the present invention.

FIGURE 2 is a cross-sectional view taken along line 2-2 in FIGURE 1.

FIGURE 3 is a side view of the brush assembly per se taken in the direction of arrow 3 in FIGURE 2.

There is continued emphasis on improvement of components for increased durability and reliability while facilitating production at reduced costs and increasing com-

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compactness of such components including, particularly, electric motor features feasible for driving an electric fuel pump means as well as a fan, blower, or other types of impeller or pump means where close coupling of the motor and the load is desirable. It is to be noted that features in accordance with the present invention can be utilized on a motor-fuel pump means disclosed with a motor energizing circuit of a copending application Serial No. 70,506 filed November 18, 1960, now Patent 3,171,072, Adair issued February 23, 1965 and belonging to the assignee of the present invention.

FIGURE 1 provides a sectional view of electric-fluid motor means in accordance with the present invention and generally indicated by numeral 120. A unitary base portion completely of insulating material is indicated by a numeral 121 and a bottom cover plate 145 is press-fitted thereto and held together by a metal bracket means 153. The base portion together with the cover plate 145 form an outlet chamber 125 extending tangentially outwardly from a fluid pump chamber 126 formed therebetween. An impeller blade means 127 including a central hub 128 press-fitted to a unitary shaft 129 can be provided as described in Patent 3,168,868 noted earlier and this shaft 129 is centrally journaled relative to a single sleeve-like bearing means 130 press-fitted to an extension 131 of insulating material integral with the base portion 121. The bearing means 130 is press-fitted into engagement with an inner periphery of the extension 131 for at least one-half of the length of the bearing means and a magnetic rotor core 134 is press-fitted to an end of a shaft 129 remote from the end to which the impeller means is press-fitted. In the illustration of FIGURE 2 it can be seen that the upper end of the sleeve-like bearing means provides a thrust support S for a lower side of the magnetic core 134 which carries rotor windings 136 as well as an annular insulating member 140 for commutator segments 137 having projections 139 therewith. Permanent magnet stator field means 171 can be press-fitted and held to a cylindrical body 159 of a cover portion 160 of metal such as steel in a manner similar to that described for structure of FIGURE 2 in Patent 3,168,868 noted earlier. In the FIGURE 2 present embodiment there is an enlarged annular lower end E of the cylindrical body 159 and cover portion 160 though the lower edge thereof fits into a groove G of the base portion of insulating material indicated by numeral 121 and webs or laterally outwardly extending projections 156 assure proper positioning of the cover portion and cylindrical body and extension E thereof.

The plate 145 can include an inlet opening 146 centrally thereof and a filter means 148 can be provided laterally thereabout. A pair of diagonally located supports 152 can be provided by the joining of the base portion 121 and cover plate 145 of insulating material. Elastomeric bushings B together with metal clips C can fit complementary to these supports 152 for maintaining proper positioning of the assembly as submerged in a tank or container for liquid fuel, gasoline and the like.

FIGURES 1, 2 and 3 illustrate brush assembly whereby a brush means 168 best seen in FIGURE 2 can be held by metal brush holder means 164 having a generally L-shaped pivot end 165 which engages an elbow-like end 195 of a metal support strip 196 one end 197 of which is held in place by a connector pin means 198 press-fitted through the unitary base portion 121 of insulating material and cover plate 145 to leave a prong end 199 thereof projecting for direct external electrical connection thereto by suitable terminal means. A substantially U-looped or modified elliptical spring means 200 straddles the elbow-like end 195 of the support strip 196 and a recess or indent 201 of the L-shaped pivot end 165 of the metal brush holder is biased radially inwardly thereby to

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urge engagement of the brush means **169** against the commutator segments **137**. This brush assembly eliminates wiring connections thereto and provide a brush without pigtail to be held by a sheet metal stamping of suitable material such as brass, the lower end of which nests in a bend in a strip of similar material positioned and retained by the base molding of insulating material as well as a knurled connector pin **198** press-fitted thereto with a projecting prong end **199** externally accessible. A flat strip of spring material such as beryllium copper in a U-looped or elliptical configuration as indicated by reference numeral **200** is positioned into the indented portions or recesses of the L-shaped end of the brush holder and elbow-like end **195** of the support strip **196** thereby maintaining the holder in proper position relative to the supporting strip while having the spring means enhance electrical connection between the holder and strip in spite of the pivotal connection therebetween. External electrical connection to the motor portion of the assembly can be readily made to a pair of connection pins with suitable connectors. Use of the structure of FIGURES 1, 2 and 3 permits elimination of any soldering of brush pigtails while retaining functions of the unitary base portion as described earlier.

While the embodiments of the present invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

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What is claimed is as follows:

1. Brush means for use in an electric motor having a centrally located hub-like body portion of insulating material, a metal support strip with an elbow-like end and an anchored end held by a terminal pin means pressed through into engagement with said hub-like body portion and having an externally engageable prong end, a metal brush holder having an indented L-shaped end to engage said elbow-like end of said metal support strip, and a looped spring means to straddle said metal brush holder and elbow-like end of said support strip.

2. The brush means of claim 1 wherein said metal brush holder has a split recess at one end thereof, the direct electrical engagement of which to a brush element is free of any pigtail wire connection thereto.

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