E. BRETCH.

ELECTRIC MOTOR.

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Fig. 1.

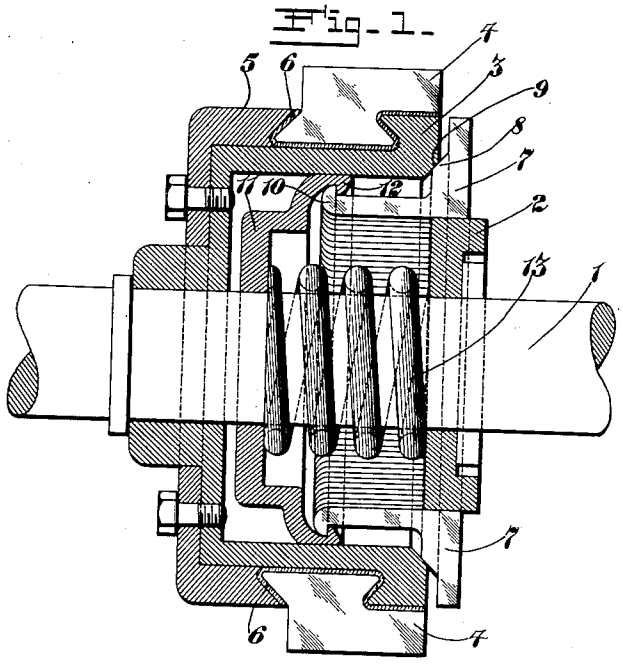
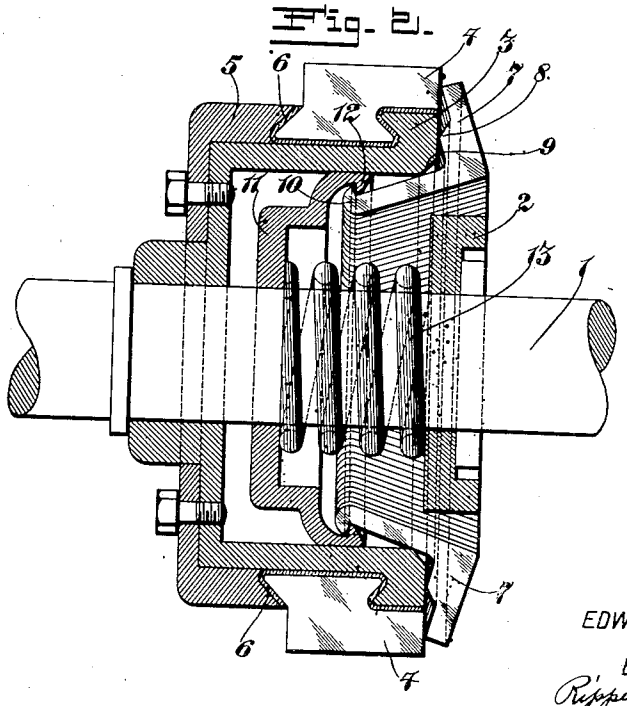


Fig. 2.



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To all whom it may concern:

Be it known that I, EDWARD BRETCH, a citizen of the United States, residing at the city of St. Louis and State of Missouri, have invented a new and useful Electric Motor, of which the following is a specification.

This invention relates to improvements in electric motors, and consists in the novel construction hereinafter described.

An object of the invention is to provide in an electric motor an improved form of contact weights adapted for embodiment in a motor either of the repulsion induction type, split phase type, or polyphase type, whereby the circuit may be closed, opened, or cut into low resistance conductors, respectively, as required in the motors of the types mentioned, automatically through action of centrifugal force.

Another object of the invention is to provide an improved form of contact weight whereby contact between the parts of the motor may be made without wear on the insulation, thus avoiding grounds or short circuits.

Additional advantages of the construction will be apparent from the following detailed description taken in connection with the accompanying drawing, in which—

Figure 1 is a vertical section through the motor showing the contact weights, in the form of plates, in initial position.

Fig. 2 is a view of the same parts in which the contact plates are moved to their contact position.

In the embodiment of the invention illustrated in the drawing the armature shaft 1 is shown as carrying a disk 2 which constitutes a support for the contact plates. The commutator of the motor is supported by a shell 3 and is arranged to support at its periphery the laminæ 4 of the commutators which are set in a recess in the shell and held in place by a retaining member 5 bolted to the end of the shell. The laminæ are separated from the shell and from each other in the usual way by insulating material 6.

The series of contact weights, in the form of plates 7, are arranged about the periphery of the support 2 within the inner periphery of the shell 3. The contact plates are of novel construction comprising substantially L-shaped bodies with an inclined shoulder 8 that fits against a beveled edge 9 extending around the shell 3 at its outer edge adjacent to the interior wall of the periphery of the shell. The contact plates are provided with hooks 10 that are retained in contact with a retaining member 11 slidable on the armature shaft, the member 11 having an overturned flange 12 that engages the hooks 10. The member 11 is actuated to its inner position by a strong expansion spring 13 that encircles the armature shaft intermediate of the member 11 and the member 2.

As the armature shaft 1 approaches its critical speed the contact plates move axially of the shaft until they clear the beveled contact between the shoulder 8 and the inclined face 9 of the shell, whereupon the point of the shoulder rides against the vertical face of the end of the shell when the plates pivot on the point of the shoulder, tilting radially so as to bring the outer extremity of the contact plates into contact with corresponding ones of the laminæ, as shown in Fig. 2. Obviously, as the speed of the shaft reduces the contact plates will retract, being drawn backwardly to the position shown in Fig. 1.

It will be observed that the action of the plates, due to their novel formation, is accomplished without contacting with the insulating material in which the laminæ are supported. It will be further observed that the contact made by the weights is a metal to metal rubbing contact effecting a most satisfactory electrical connection. Again, it will be observed that in the outward and upward movement of the contact end of the plates that there is a considerable space between the end of the shell and the back wall of the contact arm of the plates so that any foreign matter accumulating thereon will be thrown off by the centrifugal force before the contact weights reach a contacting position.

I am aware that the invention may be modified in certain particulars without departing from the spirit and scope thereof. I do not limit myself therefore to the exact construction and arrangement shown, but what I claim and desire to secure by Letters Patent, is:—

1. In a motor, the combination with an armature shaft, of a commutator shell, supported by said shaft, a commutator carried by the shell, comprising a series of laminæ, and an insulated support for the laminæ, a series of contact plates supported within the

shell, each of said plates having a shoulder contacting with the commutator shell, a retaining member slidably mounted on the armature shaft, an expansion spring in connection with said retaining member for normally holding said contact plates in normal position within the shell, said spring being yieldable to the tendency to outward movement due to centrifugal action when the armature shaft is revolved, so that the contact plates will move axially and radially, pivoting upon said shoulders, and thereby effecting contact between the laminæ and the commutator shell without contacting with the insulated support for the laminæ.

2. In an electric motor, a commutator shell, an armature shaft supporting the shell, said shell having an inclined face, a series of contact weights each provided with a shoulder having a beveled surface and contacting with the inclined face of the shell, and resilient supporting means for closely holding the contact weights within the shell, whereby the contact weights are caused to move axially and radially.

3. In an electric motor, the combination with a shaft, of a commutator shell carried by said shaft, a series of commutator laminæ supported in the periphery of the shell, a layer of insulating material extending to the end of the shell and around the base of the laminæ, contact plates arranged within the shell and having beveled contact with an edge of the shell, a resilient support normally holding the plates in said beveled contact, said support being yieldable to permit the plates to move outwardly and to pivot on the end of the shell moving radially into contact with the laminæ without making contact with the insulating material, as a result of centrifugal action due to the rotation of said shaft.

4. In an electric motor, an armature shaft, a supporting disk, an annular series of L-shaped contact weights having a beveled shoulder in connection therewith supported by said disk, a supporting member for the inner ends of the weights, a spring actuating said supporting member, and a commutator shell having an inclined face contacting with the inclined face of the shoulder of the weights, whereby the weights are first moved axially outwardly and then radially by the centrifugal action due to the rotation of the armature shaft.

5. In an electric motor, contact weights formed from substantially L-shaped plates and having the shoulder 8, a commutator shell having an inclined face contacting with the inclined face of the shoulder 8, commutator laminæ supported by the shell, an insulated support for the laminæ, and means for supporting the weights whereby they will be caused to be moved outwardly and radially to clear the insulated support for the laminæ.

6. In an apparatus of the class mentioned, the combination of a revoluble shaft, a support carried by the shaft, a terminal element in the support, insulation electrically separating said last-named element from the support, a series of terminal elements supported within the support designed so that rotation of the shaft will throw said last-named terminal elements axially and radially effecting contact with said first-named terminal element without making contact with said insulation.

7. In an electrical apparatus, the combination of a revoluble shaft, a support carried by the shaft, a contact element carried by the support, insulation electrically separating the contact element from the support, a series of contact members arranged around the axis of the shaft and making beveled contact with the support and having a pivot shoulder for contact with the support, whereby rotation of the shaft will move said last-named contact elements longitudinally of the shaft and radially on the pivot to make contact with said first-named contact element.

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