

(No Model.)

J. BUCKLEY.  
ELECTRIC MOTOR.

No. 406,874.

Patented July 16, 1889.

Fig. 1.

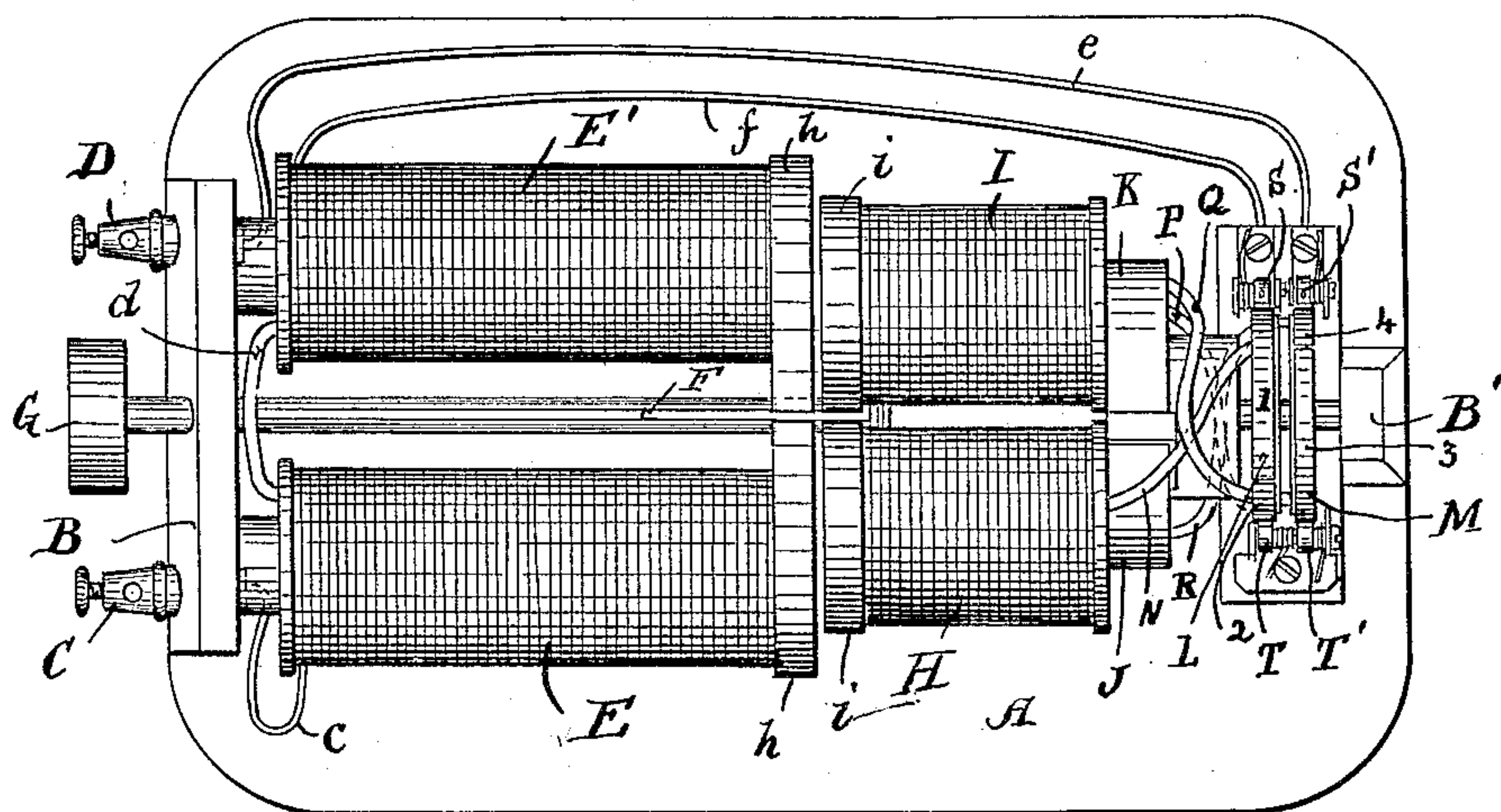


Fig. 2.

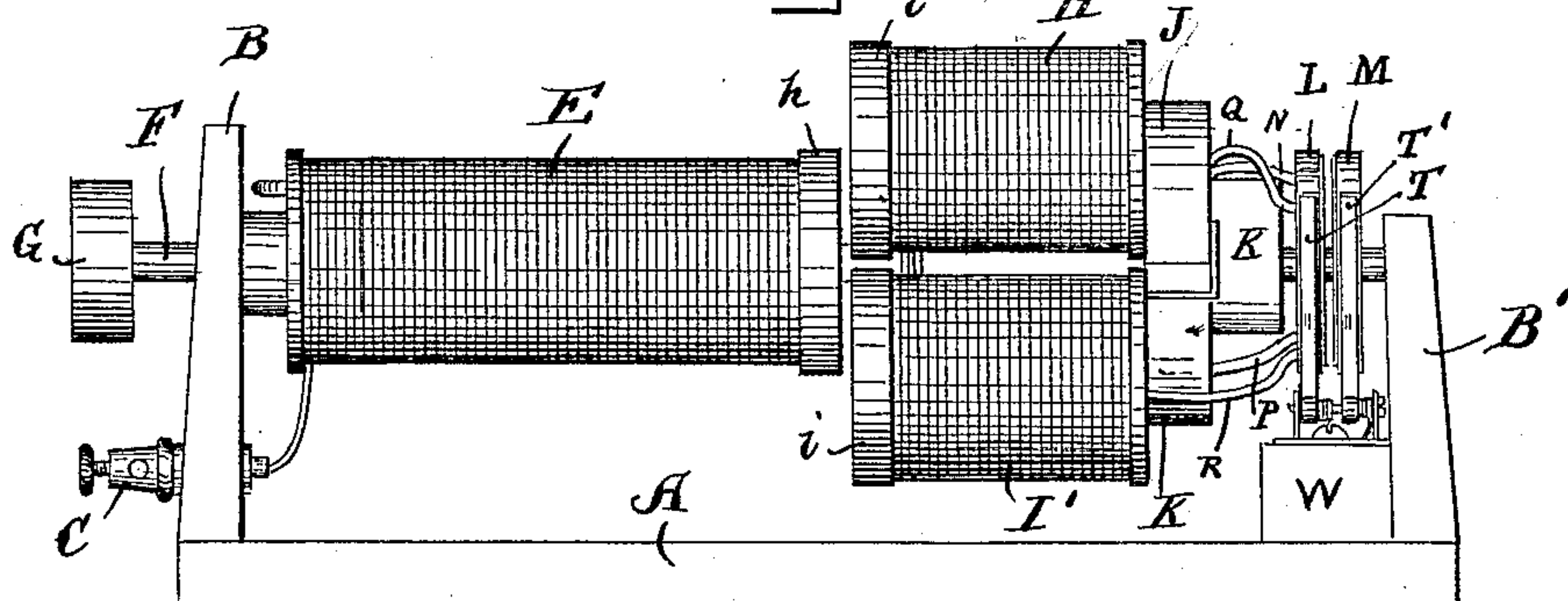


Fig. 4.

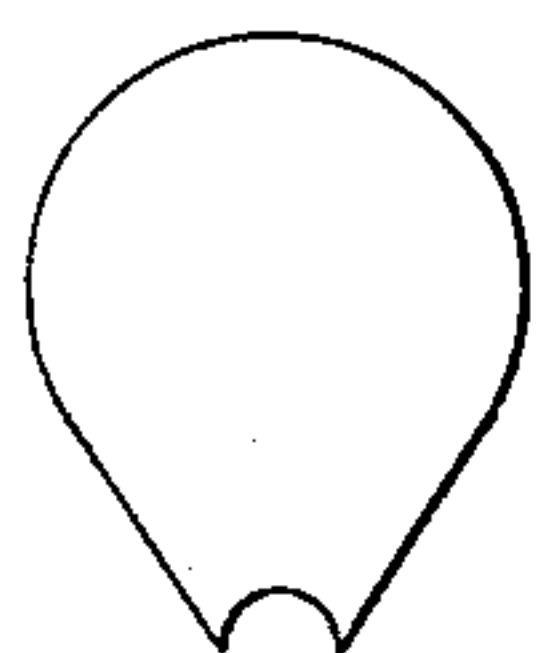


Fig. 3.

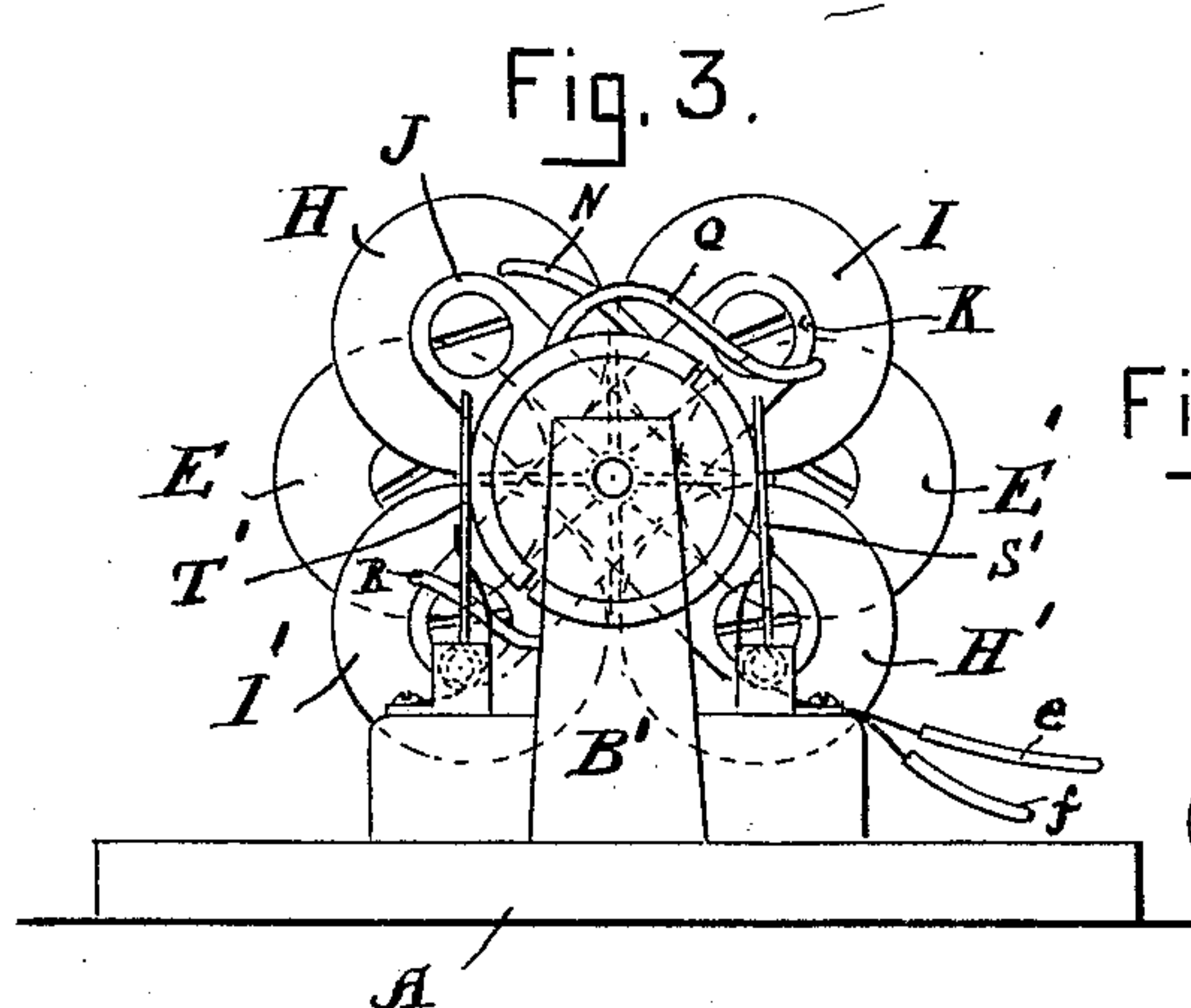
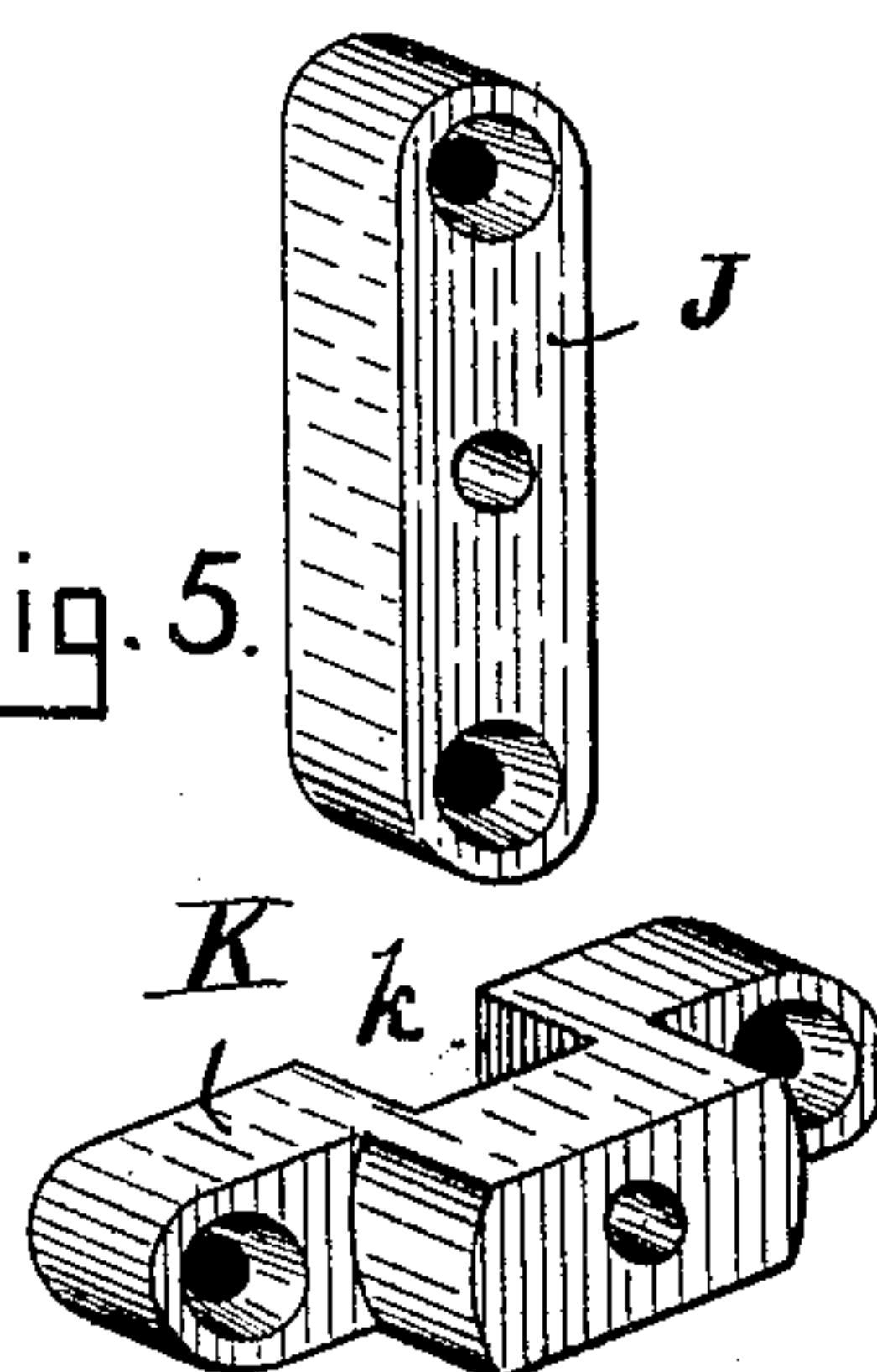


Fig. 5.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

JOHN BUCKLEY, OF BOSTON, MASSACHUSETTS.

## ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 406,874, dated July 16, 1889.

Application filed June 13, 1888. Serial No. 276,966. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN BUCKLEY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electric Motors, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to produce an electric motor that will be positive in its action and simple and cheap in its construction.

The invention consists of a permanent or field magnet and two armatures, each composed of two spools or bobbins and mounted upon a shaft, so as to appear as one armature of four spools, each armature being connected to a separate commutator, which communicate one with the other by brushes, as hereinafter fully set forth, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 represents a plan or top view of an electric motor embodying my invention. Fig. 2 is a side view of the same, and Fig. 3 is an end view. Fig. 4 is a view of a metal face of one of the field-magnets and armatures. Fig. 5 is a perspective view of the straight bar and yoke for connecting the spools of the armatures.

A is a bed-plate, provided at each end with a standard B B'. To one of these standards are secured the positive binding-post C and negative binding-post D, which are connected to a battery or circuit.

E E' are the two coils of an electro or field magnet secured to the standard B, and F is a shaft supported at each end in the standards B B', said shaft being on a level with the centers of the field-magnets E E', and upon this shaft are mounted the two armatures, one consisting of the spools H H', secured to and connected together by a straight bar J, and the other consisting of the spools I I', secured to and connected together by a yoke K. The bar J passes through the space *k* in the yoke, and the bar and yoke are insulated from each other and from the shaft F, to which they are secured. Upon the shaft F are also mounted two commutators L M, each consisting of a collar divided into two parts and secured upon a rubber disk. The portion of the collar marked 1 of the commutator L is connected by wire N to spool H, which communicates with spool H',

that is connected by wire P with the portion 2 of the collar, and the portion of the collar marked 3 of commutator M is connected by wire Q to spool I, which communicates with spool I', that is connected by wire R with the portion 4 of the collar.

S S' and T T' are brushes in contact with the commutators L M, the brushes S and S' being insulated from each other, and one of them (in this case S) being connected by wire *f* to the spool E' of the field-magnet, which communicates by a wire *d* with the other spool E of the field-magnet, that by wire *c* is connected to the positive binding-post C. The other brush S' is by wire *e* connected to the negative binding-post D. The brushes T T' are both mounted upon the same plate and connected together, so as to make connection between the two commutators L and M. All the brushes are mounted upon a block of insulating material W, secured to the bed-plate A.

Upon the end or other convenient part of the shaft F is secured a pulley, worm, or cog wheel G, to impart motion to the machine it is desired to drive by the motor.

The faces *h i* of the field-magnets and armatures I make, preferably, of a pear shape, as shown in Fig. 4, so that their inner ends rest upon a brass sleeve upon the shaft E, thereby preventing vibration and bringing the faces nearer to the center of the motor, whereby the attractive power of the field-magnet and the armatures is greatly increased.

The circuit of the current through the motor is as follows: The current enters by the binding-post C, passes through wire *c* to the spool E of the field-magnet, thence by wire *d* to the spool E' of the field-magnet, and to brush S by wire *f*. It then passes through the portion 1 of the commutator L, by wire N, to coil H, thence to coil H', and returns to the portion 2 of the commutator by wire P, from which it passes by brush T through brush T' to the portion 3 of the commutator M, and by wire Q to the coil I, thence to coil I', and returns to portion 4 of the commutator through wire R, thence by wire *e* to the negative binding-post D.

It will be seen that the current passes through both armatures, excepting when the brushes span the dividing cut in one of the



commutators, at which time the current passes by short-circuit through the commutator and exerts its full power upon the opposite armature and overcomes the dead-center. It will  
 5 also be seen that as the motor revolves the current is reversed in each armature, and the motor acts by attraction first and then repulsion.

What I claim as my invention is—

10 1. In an electric motor, two armatures, each consisting of a pair of spools or bobbins, each pair being secured to a separate bar, said bars being insulated from each other and mounted on a shaft to appear as one armature of four  
 15 spools, the cores of which lie parallel to the shaft on which they are mounted, in combination with a field-magnet and two commutators, substantially as set forth.

20 2. In an electric motor, the straight bar J and yoke K, secured together, but insulated from each other, in combination with the electro-magnets II II' I I' and shaft F, substantially as and for the purposes set forth.

25 3. The combination, substantially as set forth, of the field-magnet, the two armatures, each consisting of a pair of spools secured to a separate bar, the two commutators, and

brushes arranged to send the current successively through the two spools of one armature and then through the two spools of the  
 30 other armature, substantially as and for the purposes described.

4. In an electric motor, two armatures, each consisting of a pair of spools mounted upon a separate bar and so as to appear as one arma-  
 35 ture of four spools, and so connected that one armature shall only receive its current after its passage through the other or by a short-circuit through the commutator to the opposite armature, substantially as set forth. 40

5. In combination with an electric motor, electro-magnets having disk-faces provided with inward extensions which rest upon an insulating-sleeve surrounding the shaft, sub-  
 45 stantially as and for the purposes set forth. 45

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 7th day of June, A. D. 1888.

JOHN BUCKLEY.

Witnesses:

WM. W. BURRAGE,  
 E. PLANTA.