

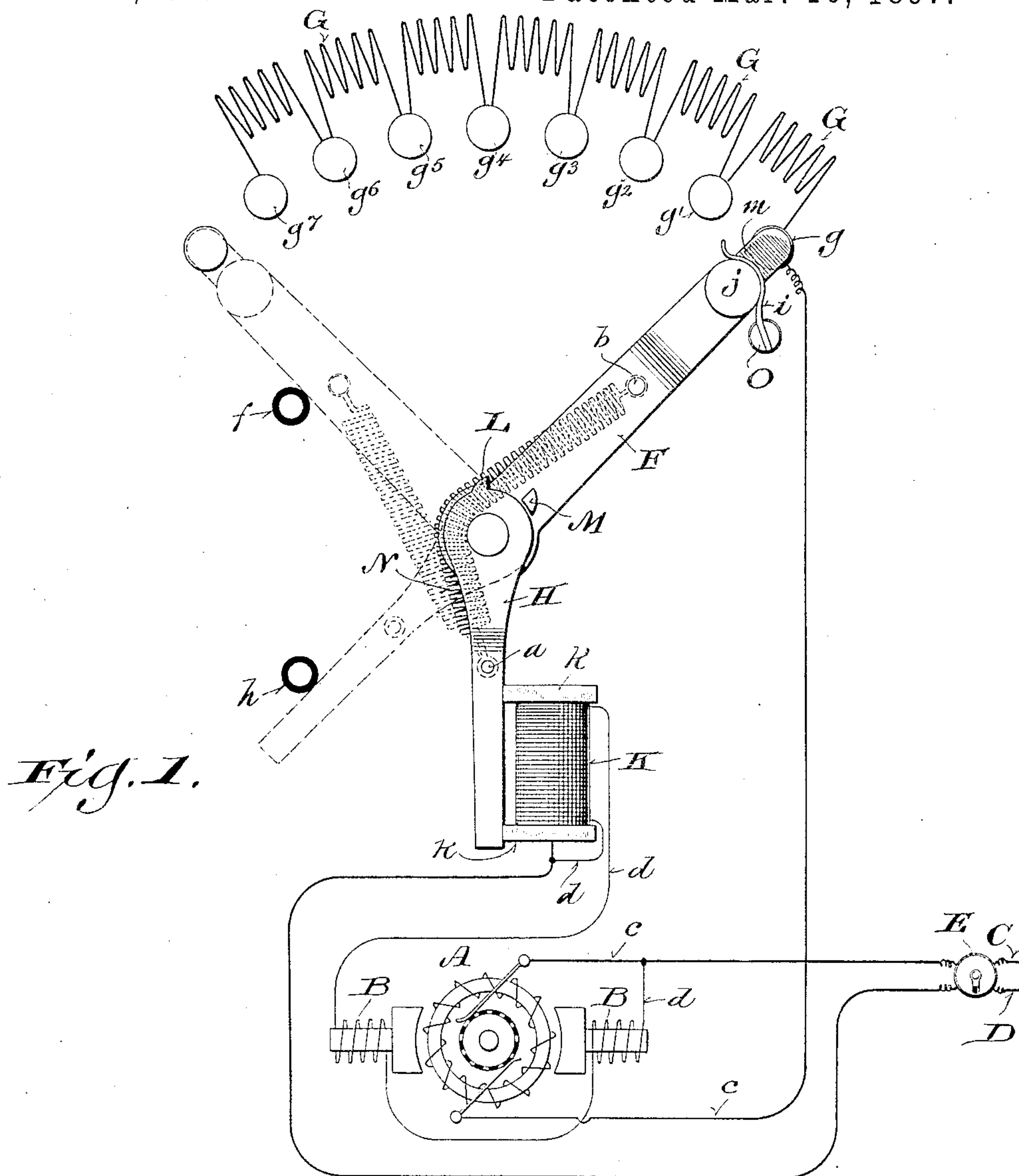
(No Model.)

F. R. BACON.

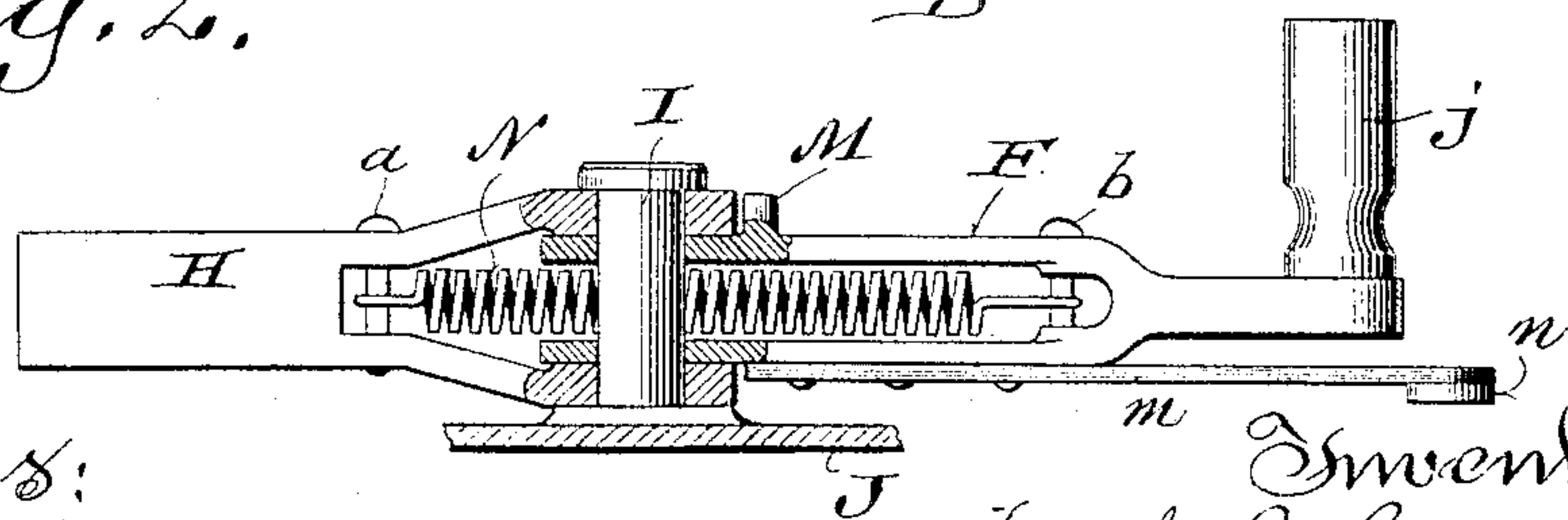
# CONTROLLING MECHANISM FOR ELECTRIC MOTORS.

No. 578,707.

Patented Mar. 16, 1897.



*Fig. 2.*



Witnesses:  
Geo. W. Young.  
B. C. Roloff.

*Inventor*  
Frank R. Bacon  
*By* H. G. Underwood  
Attorneys



# UNITED STATES PATENT OFFICE.

FRANK R. BACON, OF MILWAUKEE, WISCONSIN.

## CONTROLLING MECHANISM FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 578,707, dated March 16, 1897.

Application filed December 21, 1896. Serial No. 616,397. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK R. BACON, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Controlling Mechanism for Electric Motors; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has reference to that class of devices which are designed to control the flow of the electric current to a motor to prevent the premature passage of the full current through the armature thereof; and to that end it consists in certain peculiarities of construction in the switch-lever and switch-arm of the controlling device, constituting an improvement on the devices shown, described, and claimed in Letters Patent No. 555,503, dated March 3, 1896, as will be fully set forth hereinafter and subsequently claimed.

In the drawings, Figure 1 is a partly-diagrammatic view showing my improved switching devices in connection with a shunt-wound electric motor, and Fig. 2 is a partly-sectional view of my said improved switching devices.

As in the said prior patent on which this is an improvement, A designates the armature, and B B the fields, of an electric motor.

C and D are the main wires or conductors by which the motor is supplied with current, and E is a suitable switch for manually opening and closing the main circuit. I also show a branch *c c* of the main circuit passing through the armature and designated the "armature-circuit," and a branch *d d* of the main circuit passing through the fields of the motor and designated the "field-circuit."

G G represent the resistance-coils of a rheostat, and *g* to *g'* are contacts thereof connected to each other by said coils, and over which the switch-lever is adapted to sweep and successively engage in the operation of my device, the parts thus described being substantially the same as in said prior patent, as is also the electromagnet K, which has its winding included in the field-circuit *d* in series with the field and its core or pole-piece *k*, projecting to form a contact-stop for the switch-arm H, hereinafter described.

The novel features of my device lie in the

construction and operation of the switch-lever F and switch-arm H.

I is a pin which projects from the front casing of the rheostat, (not shown, except a small portion thereof at J, Fig. 2,) and the switch-lever F is pivoted on the pin, as is the switch-arm H, both of said parts being preferably forked at the pivotal point and the forked end of the arm H preferably straddling the forked end of the lever F, as best shown in Fig. 2.

L is a lug on the arm H and M a lug on the lever F. N is a spiral spring, one end of which is secured to a pin *a* on said arm H, and the other end of said spring is shown secured to a like pin *b* on the lever F. From the front casing of said rheostat there project two stops *f h*, of india-rubber or other non-conducting material. O is a lug on the front casing of the rheostat, from which there extends a spring-detent *i*, adapted to slip over and hold the handle *j* of the lever F. Secured to this lever is a metallic strip *m*, having a contact-plate *n* on its free end for engagement with the described contacts *g* to *g'* of the rheostat.

The spiral spring N is of such tension or strength that it will not overcome the attraction of magnet K when the latter is energized by the normal working current, but when said current is interrupted or materially weakened then the force of this spring will always draw the switch-arm H away from said magnet to and against the stop *h*.

In the prior patent already named the switch lever and arm were so connected by the spring that if the lever was brought over to its initial position then the spring attached at one end to said arm was carried beyond the pivot-pin of the lever, and necessarily the arm was brought and held against the core or pole-piece of the electromagnet K by the force of this spring, but in my device the force of the spring will always tend to draw the arm away from the magnet-core and to the stop *h*, and in order to force said arm against said core it is necessary to move the lever F until the lug M thereon engages with the lug L on the arm H, and then by further movement of said lever to thus force the arm against the core.

A disadvantage of the construction set



forth in the prior patent lay in the fact that if the lever was being moved and was at any point between the center contact of the rheostat and the "full-on" contact and should  
 5 slip from the hand of the operator (as may from time to time happen) then the force of the described spring would instantly carry the lever to the "full-on" position and the full force of the current would pass through  
 10 the armature of the motor and burn the same out. Another disadvantage lay in the fact that in said prior construction there was a "dead-center," and it sometimes happened that the lever might be left there and thus  
 15 burn out the rheostat-coils; but by my present construction both of these disadvantages are eliminated and the trouble referred to rendered absolutely impossible.

In my present invention the spring-detent  
 20 *i* is a much surer and more satisfactory means of holding the contact *n* of the lever against the "full-on" contact *g* of the rheostat than the operation of the connecting-spring shown in the prior patent, and a positive detent of  
 25 some form is necessary at this point, though it need not necessarily be of the precise form herein shown.

Inasmuch as my present invention is merely an improvement in certain details of construction on that set forth in the said prior patent,  
 30 I do not deem it necessary to further describe the operation of my device, nor to repeat herein the object and advantages of the main invention set forth in said patent.

I have shown a single spring connecting the switch-lever *F* and switch-arm *H*; but it will be understood that in place thereof separate  
 35 springs may be employed, if desired, so long as the said springs are arranged to always exert their force to draw the lever and arm  
 40 against the stops *f h*.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In electric-motor-controlling mechanism 45 of the class described, the combination with the series of contacts, back-stops and electromagnet of a rheostat, and a switch-lever pivotally connected to a pin on said rheostat, of a switch-arm independently pivoted on said 50 pin and adapted to be held against the core of said magnet when the latter is energized, and a spring connected to said switch-arm so as to always draw said arm away from said magnet when the latter is deenergized, irre- 55 spective of the position of the switch-lever.

2. In electromotor-controlling mechanism of the class described, the combination with the series of contacts, back-stops and electromagnet of a rheostat, of a switch-lever piv- 60 otally connected to a pin on said rheostat and provided with a rigid projecting lug adjacent to its pivoted end, a switch-arm independently pivoted on said pin and adapted to be held against the core of said magnet when 65 the latter is energized, and provided with a rigid projecting lug on its pivoted end in the path of travel of the lug on the switch-lever, and a retracting-spring connected to said switch-arm, and always acting against the 70 force of the magnet, whereby when the said switch-arm is away from the core of the magnet it can only be brought against the latter by the engagement of the two lugs consequent upon a movement of the said switch-lever. 75

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

FRANK R. BACON.

Witnesses:

H. G. UNDERWOOD,  
 B. C. ROLOFF.