

A. STROMBERG.
ELECTROMAGNET.

Application filed Jan. 2, 1902.

(No Model.)

Fig. 1.

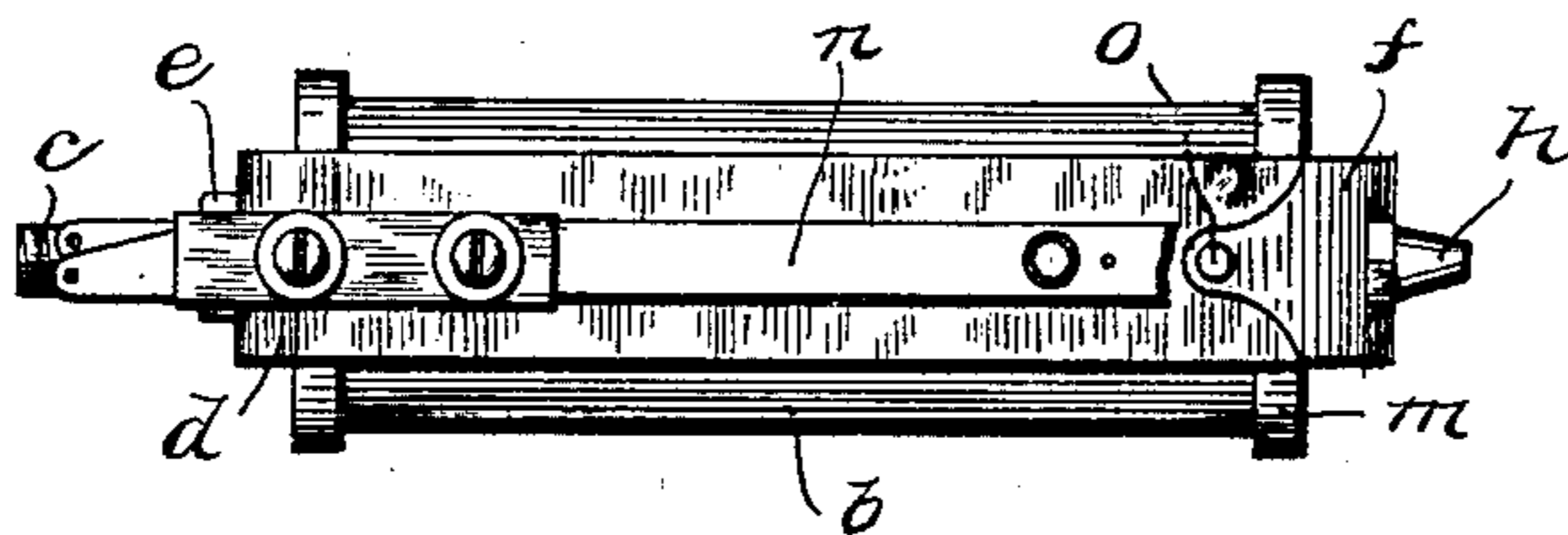


Fig. 2.

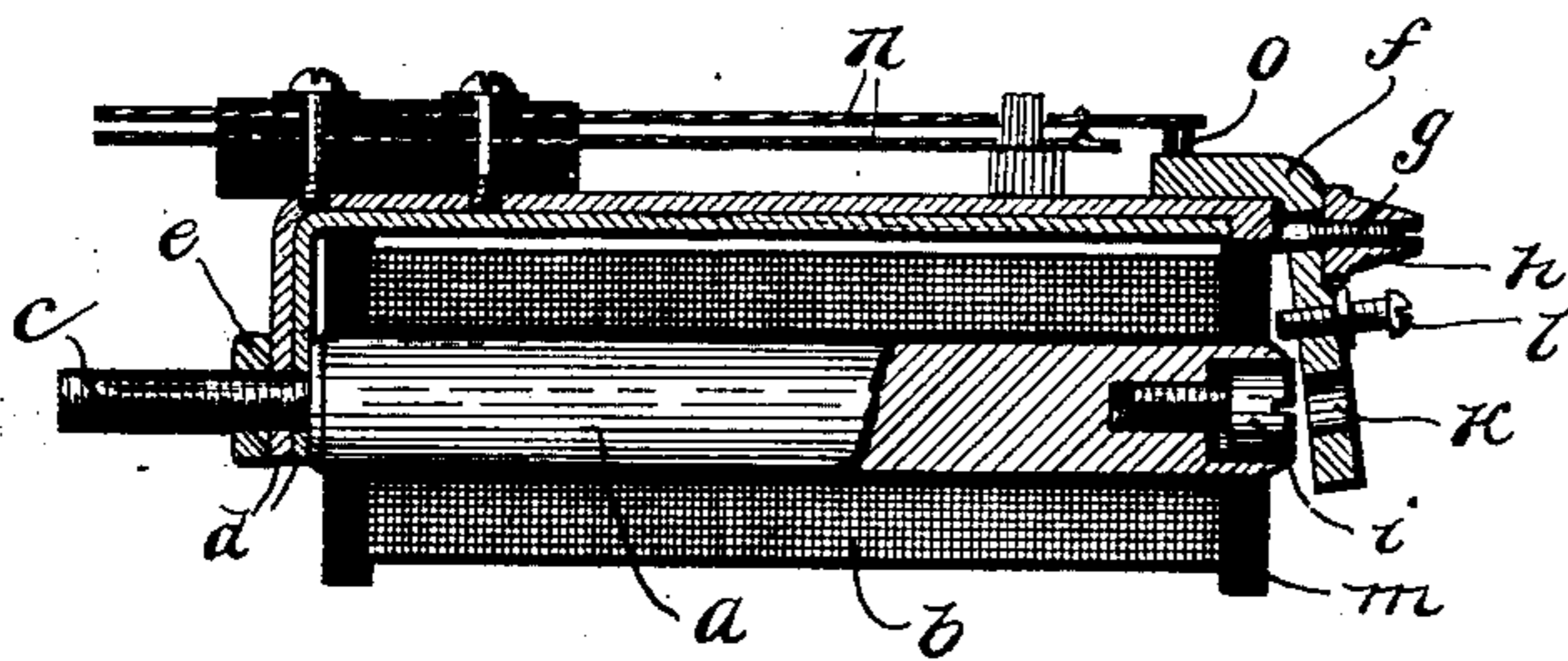
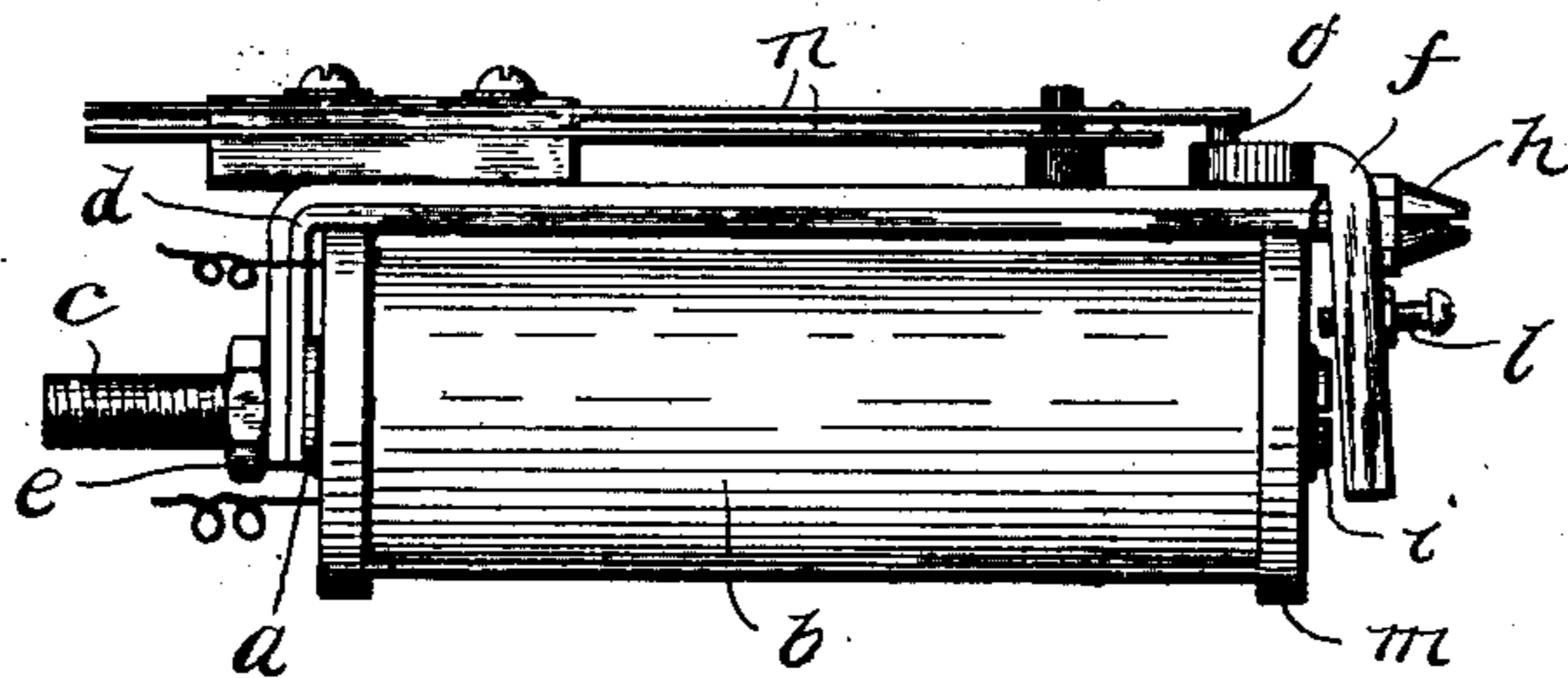


Fig. 3.

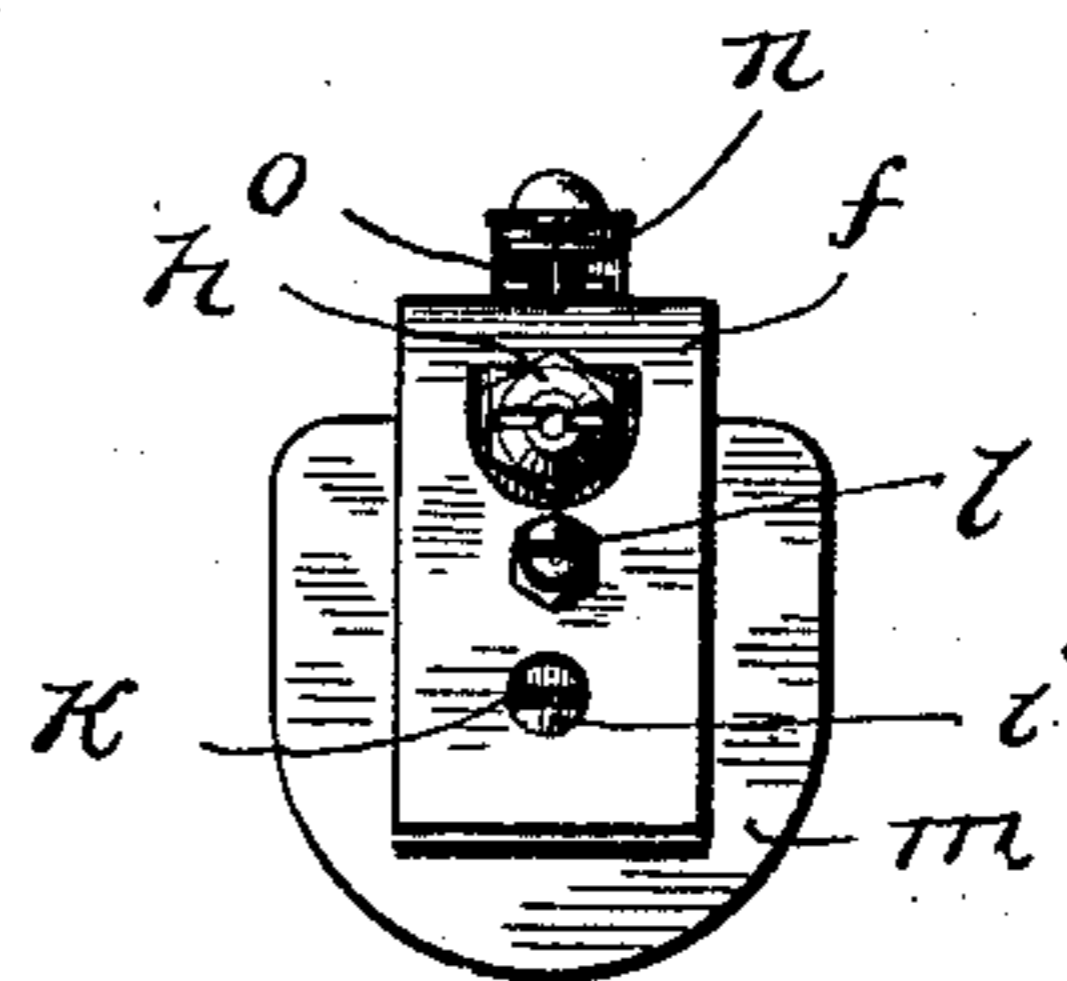


Fig. 4.

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UNITED STATES PATENT OFFICE.

ALFRED STROMBERG, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTROMAGNET.

SPECIFICATION forming part of Letters Patent No. 715,434, dated December 9, 1902.

Application filed January 2, 1902. Serial No. 88,125. (No model.)

To all whom it may concern:

Be it known that I, ALFRED STROMBERG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electromagnets, (Case No. 15,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to electromagnets, and has for its object the provision of an electromagnet wherein material of the magnet affording circuit for the magnetic flux may in itself be physically adjusted to decrease or increase the initial reluctance of the magnetic circuit to adapt the electromagnet to varying circuit conditions.

In the preferred embodiment of my invention there is provided an adjustment for the material of the magnetic circuit, whereby the initial air-gap existing between the armature and the core of the electromagnet when the said electromagnet is not in operation may be adjusted without effecting a bodily adjustment of the armature, which has hitherto been the practice, so that by means of my invention the armature may be given definite and invariable range of movement, which need not be modified through the agency, for example, of adjustable back-stops in order to adapt the electromagnet to varying circuit conditions. An integral portion of the magnetic circuit is preferably formed in relatively movable sections, so as to effect the required adjustment of the magnetic reluctance. This portion of the magnetic circuit is preferably the core of the magnet divided into two sections, that immediately adjacent to the armature being preferably adjustable with relation to the armature, so as to vary the air-gap between the core and armature.

In another aspect of my invention, therefore, it will be seen that I have provided an improved electromagnet having its core portion adjustable with respect to the movable or swinging armature, this core portion in the preferred embodiment of the invention being but a part of the complete core.

In the precise embodiment of the invention that I preferably employ the adjustable portion of the core is in the form of a machine-screw composed of the same metal as the balance of the core and which is adjustable longitudinally of the magnet by reason of its threaded engagement, whereby the said screw may be moved from or toward the armature to adjust the space between the same and the core as an entirety.

I will explain my invention more fully by reference to the accompanying drawings, in which—

Figure 1 is a plan view of an electromagnet, the portion of a switching mechanism that may be operated by its armature being removed to indicate clearly features of construction. Fig. 2 is a side elevation of the magnet illustrated in Fig. 1. Fig. 3 is a longitudinal sectional elevation of the magnet; and Fig. 4 is an end view thereof, illustrating the arrangement of the armature.

Like parts are indicated by similar characters of reference throughout the different figures.

I have illustrated a type of electromagnet in connection with which my invention is particularly applicable; but I do not wish to be limited to the embodiment illustrated, as many changes may be made without departing from the invention. The electromagnet illustrated comprises a core portion *a*, about which is placed a helix *b*. The core portion *a* is provided with a threaded extension *c*, over which are slipped the shorter ends of the L-shaped pieces of iron *d*, which are clamped in place between the contiguous end of the core *a* and the clamping-nut *e*. The forward ends of the long sides of the L-shaped pieces of iron *d* support a swinging armature *f*, bent into an L shape and having its inner corner resting upon the front edge of the upper plate *d* to afford a swinging engagement, the armature being prevented from displacement by means of a threaded stem *g*, passing through a hole in the armature and engaging a nut *h*, which may be adjusted to secure the armature in proper engagement with the plate *d* and yet permit its rotation. Of the two

sections *a* and *f* of the magnetic circuit I prefer to make the core portion adjustable, for which purpose it is preferably provided with a machine-screw *i*, having threaded engagement with the forward end of the main part of the core, which is suitably recessed, so that it may contain the entire head of the screw or permit the projection of the screw from the said recess into the desired proximity with the armature. In order that the screw *i* may be adjusted without dismembering the electromagnet, the said armature is provided with a hole *k*, located in line with the slot in the screw, through which hole the screw-driver may be passed into engagement with the screw to effect its adjustment. In order to prevent the armature from coming into contact with the screw *i* when the said armature is attracted, I provide a stop *l*, preferably in the form of a brass screw having threaded engagement with the armature, which screw may be adjusted to engage a portion of the electromagnet, as the insulating-head *m*, before the armature *f* could otherwise engage the screw *i*, whereby the armature is prevented from sticking upon the core of the magnet after circuit through the magnet-helix is opened. The particular form of electromagnet illustrated is one that is designed for the operation of circuit-changing springs *n*, the armature being provided with an insulating-button *o* for engagement with the upper spring *n* and for lifting said spring when the armature is attracted.

The advantage of my invention in connection with an electromagnet put to such service as that illustrated is that the armature thereof may always possess a given fixed position, which is very desirable, as it is obvious that any other bodily adjustment of the armature would necessitate a corresponding relative adjustment of the circuit-changing springs. For example, if the armature were moved slightly forward through the agency of an adjustable back-stop the upper spring *n* would be slightly elevated from its lower spring, and therefore in order to keep the springs normally in contact it would be necessary to effect an adjustment of the lower

spring to restore normal relation with its companion.

Many changes will occur to those skilled in the art for modifying the preferred embodiment of the electromagnet herein set forth which would not depart from the spirit of my invention, and I do not, therefore, wish to be limited to the precise details of construction herein specifically pointed out; but,

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An electromagnet, including a swinging armature and a magnetic core portion comprising a main core-body and a screw at the end of and projecting beyond the main core-body and in threaded engagement therewith and opposed to the armature, whereby the air-gap between the core portion and the armature may be adjusted, substantially as described.

2. An electromagnet, including an armature and a core portion comprising a main magnetic core-body and a screw of magnetic material at the end of the main core-body in threaded engagement therewith and opposed to the armature, whereby the air-gap between the core portion and the armature may be adjusted, the said armature being provided with a hole through which the screw may be accessible, substantially as described.

3. An electromagnet, including a swinging armature and a core portion comprising a main magnetic core-body and a screw of magnetic material at the end of the main core-body in threaded engagement therewith and opposed to the armature, whereby the air-gap between the core portion and the armature may be adjusted, the said armature being provided with a hole through which the screw may be accessible, substantially as described.

In witness whereof I hereunto subscribe my name this 24th day of December, A. D. 1901.

ALFRED STROMBERG.

Witnesses:

GEORGE L. CRAGG,
HARVEY L. HANSON.