No. 5,507. PATENTED APR. 11, 1848.

G. H. & B. H. HORN.

MAGNETO ELECTRIC MACHINE FOR GIVING SHOCKS.

Fig: 1

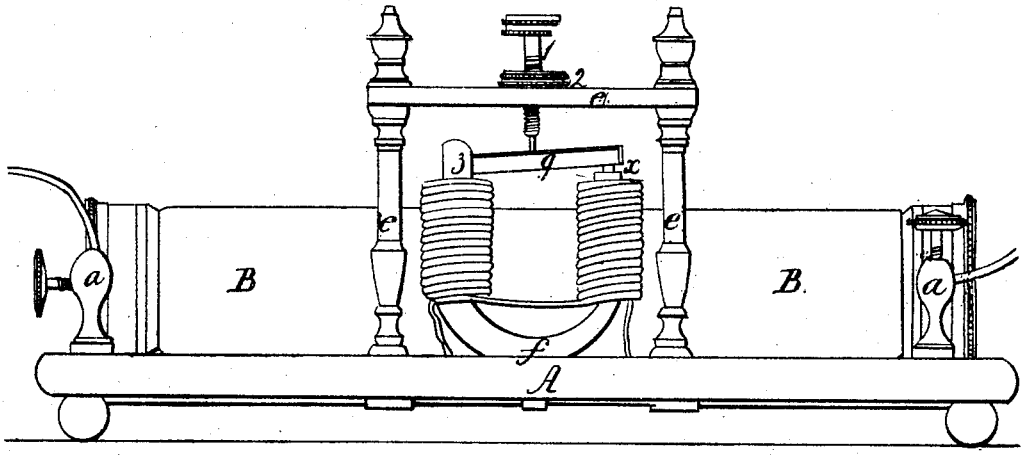


Fig: 4.

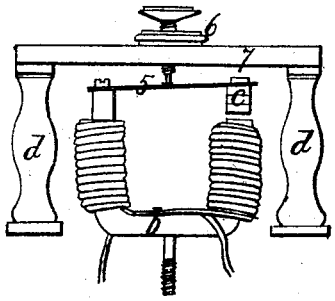


Fig: 2.

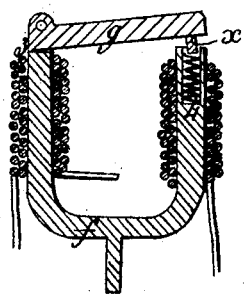
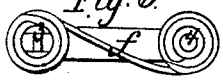


Fig: 3.



Witnesses;

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN MAGNETO-ELECTRIC MACHINES FOR GIVING SHOCKS.

Specification forming part of Letters Patent No. **5,507**, dated April 11, 1848.

To all whom it may concern:

Be it known that we, GEORGE H. HORN, of the city of Boston, Massachusetts, and BENJAMIN H. HORN, of the city of New York, N. Y., manufacturers of magneto-electric apparatus for medical and general purposes, have invented and made and applied to use certain new and useful improvements in the constructive arrangement of the parts used to form, regulate, and break the circuit of the electrical current in magneto-electric apparatus for medical or other purposes, and such improvements are intended by us to make such instruments more permanent in the parts so used and less liable to injury by inexperience or accident, for which improvements we seek Letters Patent of the United States; and we do hereby declare that the said improvements are constructively and substantially set forth and shown in contrast with the mode now mostly used for these purposes in the following description, and in the drawings annexed to and making part of this specification, wherein—

Figure 1 is an elevation representing an instrument as fitted for use with our improvements. Fig. 2 is a detached and sectional elevation of the U-formed magnet; and Fig. 3, a plan with the armature *g* removed, also of the U-formed electro-magnet, showing the changes made by us; and Fig. 4 is a representation of the electro-magnet now generally used, and this figure is so introduced and separately referred to to show the differences between that mode of construction and ours more distinctly.

The same letters and numbers as marks of reference apply to the like parts in the first three figures.

A is the base-board, with the binding screw-cup *a* at each angle, and with the double helix B and wire bar, all made as usual so far.

e e are two pillars, with *e'*, a cross-piece, through which is the adjusting-screw 1, having a set-nut, 2, above it.

f is the U-formed magnet, made externally in the usual manner, and fitted with the coils of conducting-wire leading to the helix and binding screw-cups, as now practiced.

At one upper end of the U-magnet is a brass conducting-joint, 3, receiving one end of *g*, an entire small metal bar, shown as of iron, but may be of any other metal, forming the armature. This has below the screw-point 1 a platina guard-plate, as usual, and on the opposite end to the joint an iron pin or stud, *x*, which enters the top of the portion of the U-magnet below this end of the armature. This part of the U is bored out to form a hollow cylinder, which receives a small slightly-expansive and delicately-adjusted helical spring, 4. (See Figs. 2 and 3.) This may be either insulated by winding with cotton thread, as usual, or not, but is only to have just power enough to raise the armature from the magnet when the circuit of the electric current is to act complete.

In Fig. 4 the common electro-magnet *b* is shown as having above it the armature *c* set on a small slightly retractile spring, 5, beneath the adjusting-screw and set-nut 6, which is set through the cross-piece 7 of the pillars *d d* as now made. When thus constructed the spring 5 is liable to injury or breakage by accident, inadvertence, or inexperienced hands forcing it too much by the set-screw above, and any accident from these causes renders that part useless. No such liability to injury exists in our mode of fitting the armature *g* as an entire bar, and the returning helical spring 4 is so shut up and protected within the cylinder formed in that part of the U-magnet that only willful injury can arise to that part of the apparatus.

A pin carrying an expansive helical spring, with or without an inclosing tube or cylinder, may be placed to act from below between the two parts of the U-magnet to raise the armature, or any form of spring may be so used outside the U-magnet; but all forms of exterior springs for this purpose are liable to the injury we seek to prevent by the mode of construction we have adopted and have herein described and shown.

We are aware that a contractile helical spring has been applied beneath a lever to detach the armature used in the electro-magnetic telegraph for registering or marking; but we do not know any instance in which an expansive helical spring has been employed in direct contact with the armature itself for the same pur-

pose in the magneto-electric apparatus for medical or other purposes, nor any in which the same effects are produced by a spring inclosed and protected in the manner we have described and shown.

We therefore claim as new and of our invention and desire to secure by Letters of the United States—

The application of the helical expansive spring 4, conjointly with the stud or pin *x*, acting within one part of the U-formed magnet *f*, or in any analogous or substantially similar manner, for the purposes above set forth and shown.

In witness whereof we have respectively set our signatures on the dates shown as below in the presence of the witnesses subscribing hereto.

Signed by GEORGE H. HORN, in the city of Boston, the 11th day of July, 1847.

GEO. H. HORN.

Witnesses:

R. H. EDDY,

SILAS STEVENS.

Signed by BENJAMIN H. HORN, in the city of New York, this 8th day of July, 1847.

BENJAMIN H. HORN.

Witnesses:

W. SERRELL,

LEMUEL W. SERRELL.