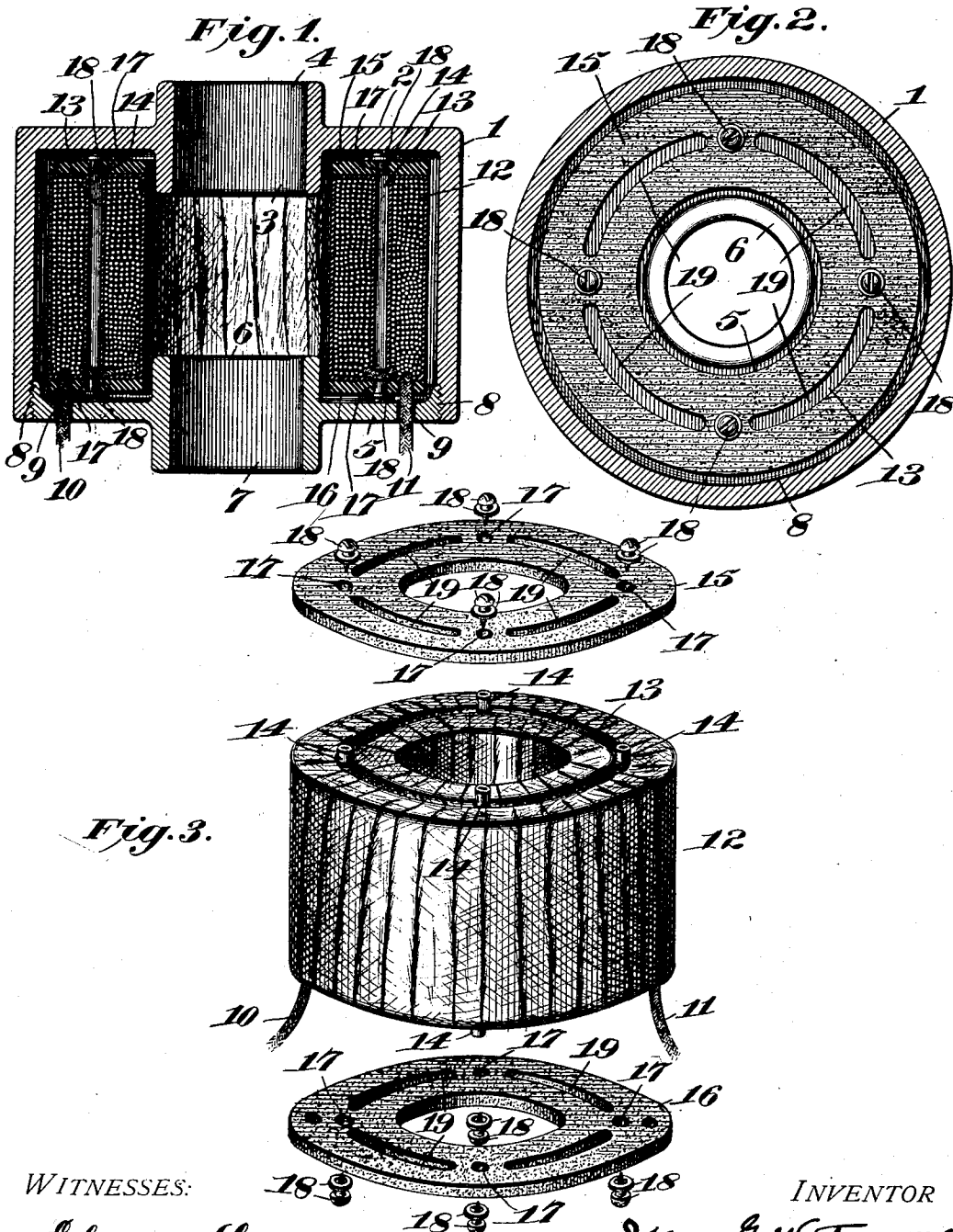


I. G. WATERMAN.
ELECTROMAGNET.

APPLICATION FILED AUG. 4, 1902.

NO MODEL.



WITNESSES:

Elmer Seavey
Geo. H. Mankin

By

INVENTOR

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UNITED STATES PATENT OFFICE.

ISAAC G. WATERMAN, OF SANTA BARBARA, CALIFORNIA.

ELECTROMAGNET.

SPECIFICATION forming part of Letters Patent No. 733,097, dated July 7, 1903.

Application filed August 4, 1902. Serial No. 113,340. (No model.)

To all whom it may concern:

Be it known that I, ISAAC G. WATERMAN, a citizen of the United States, residing at Santa Barbara, in the county of Santa Barbara and State of California, have invented certain new and useful Improvements in Electromagnets; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to electromagnets, and is an improvement on the electromagnet set forth in my application filed June 24, 1902, Serial No. 113,004.

The object of this invention is to provide for ventilation of the coil to obviate a dangerous rise in the temperature thereof owing to continued passage of the current.

To accomplish the foregoing object, I provide a coil composed of two parts or coils connected in series and in effect constituting a single coil, which are separated by an air-space and held in separated position by a novel arrangement of spacing strips or members and heads for securing said members, as set forth hereinafter, and recited in the appended claims.

In the accompanying drawings, Figure 1 is a sectional view; Fig. 2, a plan with the removable head of the magnet-case removed; and Fig. 3, a perspective detail of the coils, the separating-strips, and the rings for holding the ends of the strips in relative position for connection to the strips.

The construction of the magnetic shell is the same as shown in my application filed June 24, 1902, Serial No. 113,004, the same being shown at 1 and having integral head 2, inner and outer hollow polar extensions 3 and 4, and a removable head 5, provided with inner and outer polar extensions 6 and 7, said head 5 being screwed into the shell at 8 and having holes 9 for the exit of the coil-terminals 10 and 11 of the coil 12.

The coil forming part of the present invention is composed of inner and outer concentric coils of the same wire and wound in the same manner and connected in series. These coils are separated by an annular air-space 13 and surround the inner polar extensions 3 and 6. To keep the coils separated evenly all around, I provide a plurality (four being shown in the present instance) of strips 14,

located at regular intervals between the coils and extending lengthwise thereof. At the ends of the coils I provide rings 15 and 16, of insulating material, having openings 17, which receive the ends of the strips 14, which are secured by screws and washers 18. The heads of the screws keep the rings 15 and 16 raised from the magnet-shell and permit the air to have free access to the space 13 through the arc-shaped slots 19 provided in the rings.

I am aware that changes of construction could be resorted to in carrying out the invention, and I therefore lay claim to all modifications falling within the spirit and scope of the invention.

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

1. In an electromagnet, the combination with wire coils one within the other and separated by an air-space, of independent separating-strips interposed between the coils at intervals and extending lengthwise of the coils, and rings at the ends of the coils to which the ends of the separating-strips are separately connected.

2. In an electromagnet, the combination with wire coils one within the other separated by an air-space, of independent separating-strips interposed between the coils at intervals and extending lengthwise of the coils, rings at the ends of the coils which have air slots or openings, and headed screws connecting the rings to the ends of the strips.

3. In an electromagnet, the combination with an inclosing shell having heads and polar extensions on the heads, of wire coils one within the other separated by an air-space, independent separating-strips interposed between the wire coils at intervals and extending lengthwise of the coils, rings at the ends of the coils and within the shell which have air slots or openings, said separating-strips being secured to the rings, and projections interposed between the rings and the heads of the shell which keep the rings separated from the heads of the shell to permit circulation of the air.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC G. WATERMAN.

Witnesses:

W. H. KINCAID,
ELMER SEAVRY.