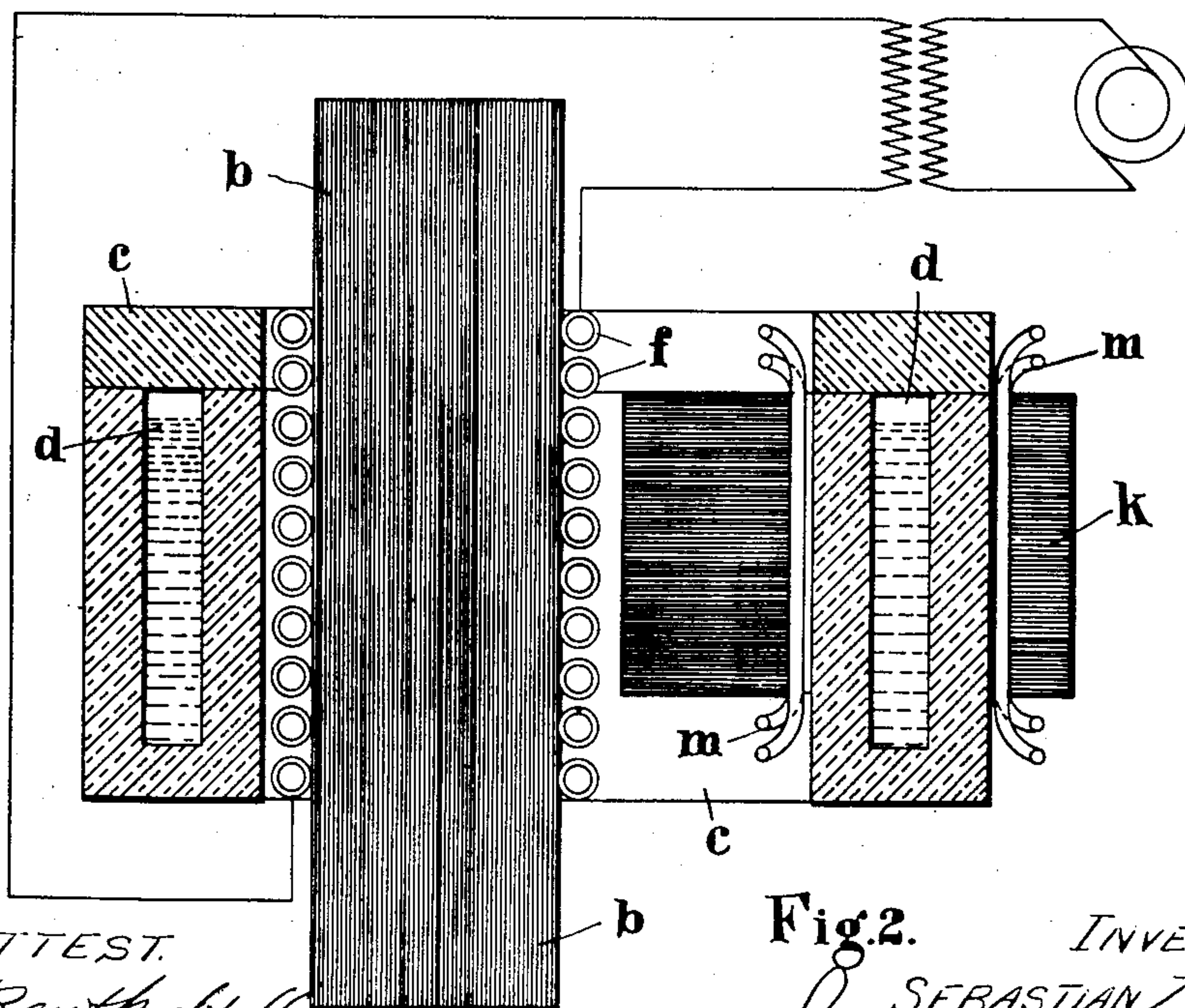
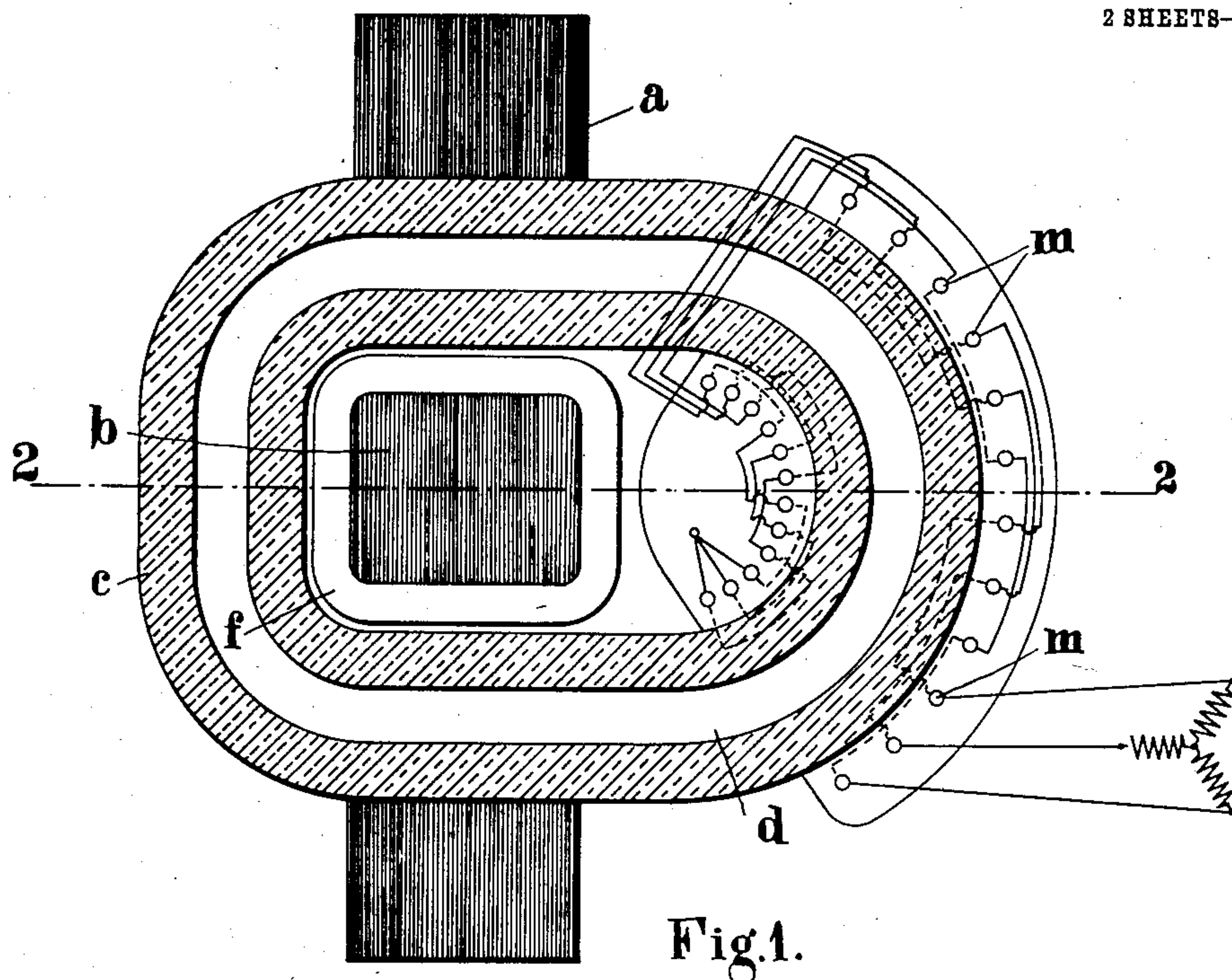


S. Z. DE FERRANTI.
METALLURGICAL FURNACE.
APPLICATION FILED JUNE 10, 1907.

962,013.

Patented June 21, 1910.

2 SHEETS—SHEET 1.



ATTEST.

Bent M. Stahl.

Ewd R. Tolson.

INVENTOR.

SEBASTIAN Z. DE FERRANTI.

By Spear, Middleton, & Associates, Attorneys.

CLITVS.

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2 SHEETS—SHEET 2.

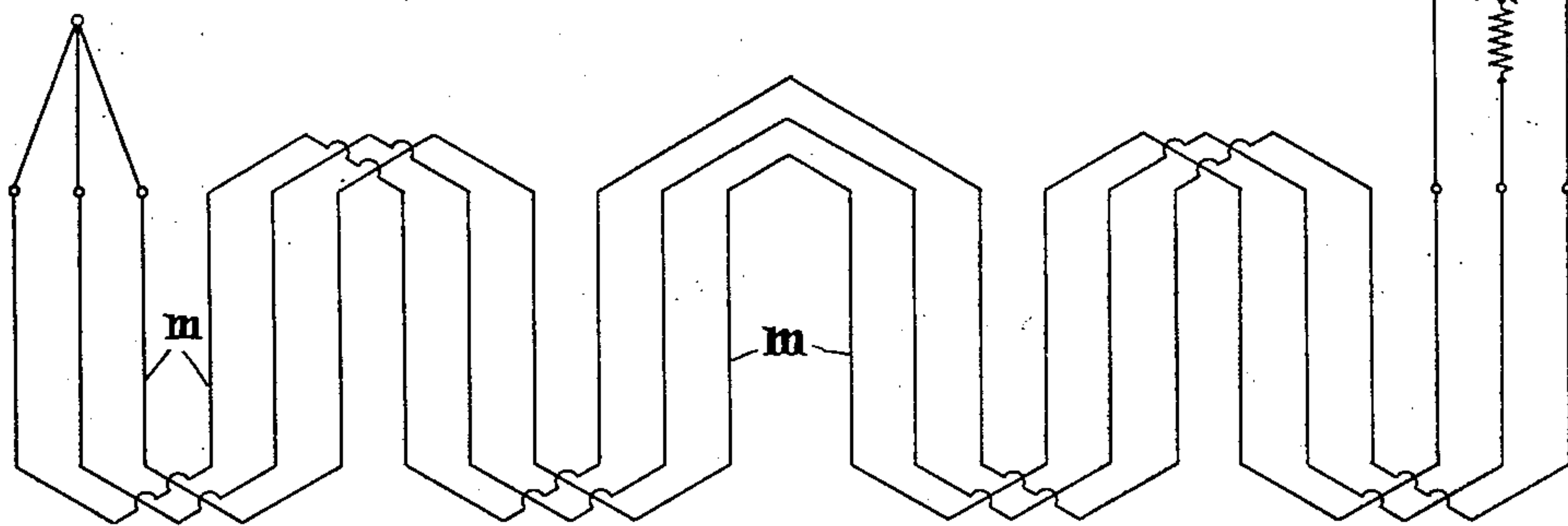


Fig. 3.

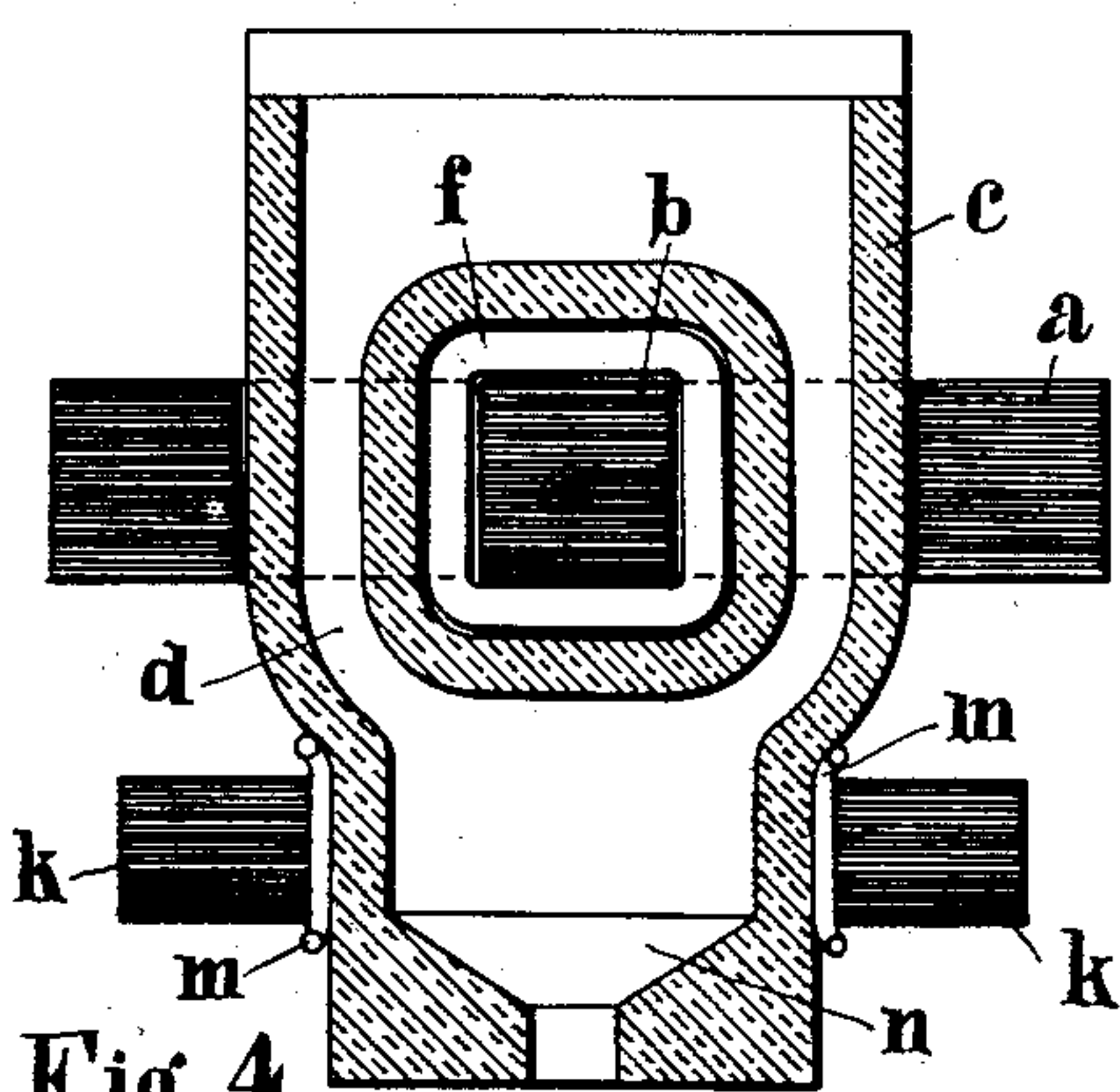


Fig. 4.

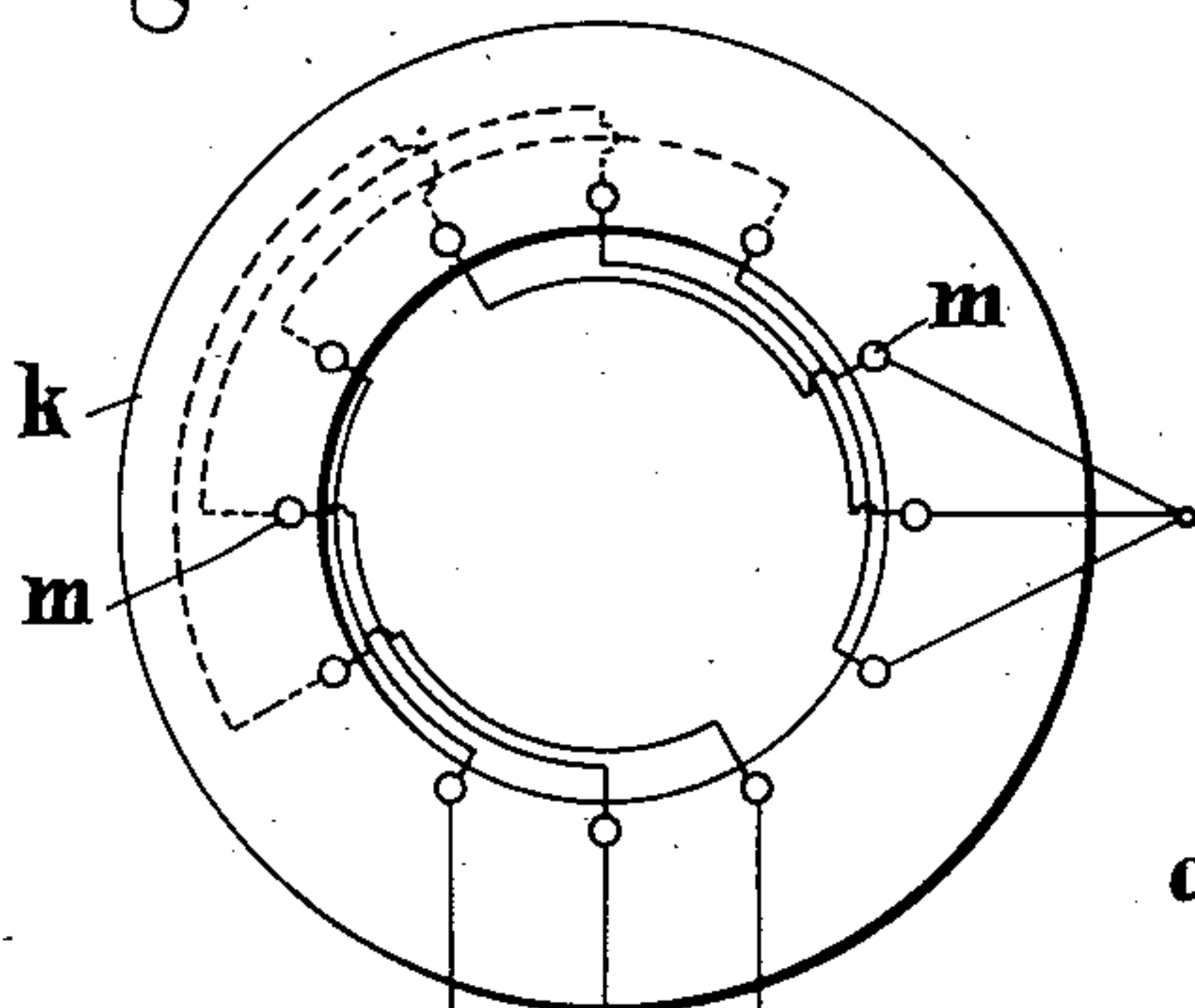


Fig. 5.

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Ewd R. Tolson.

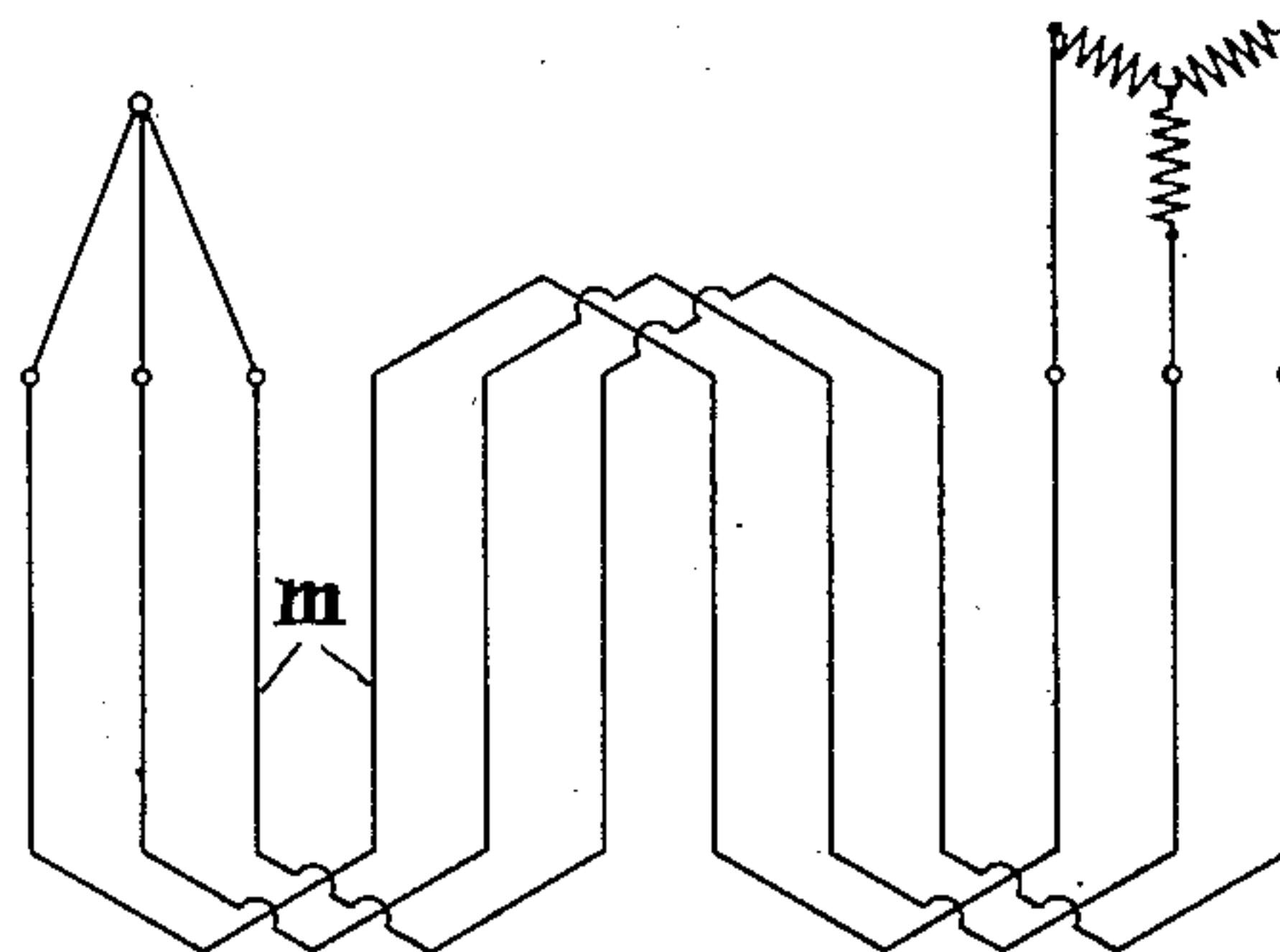


Fig. 6.

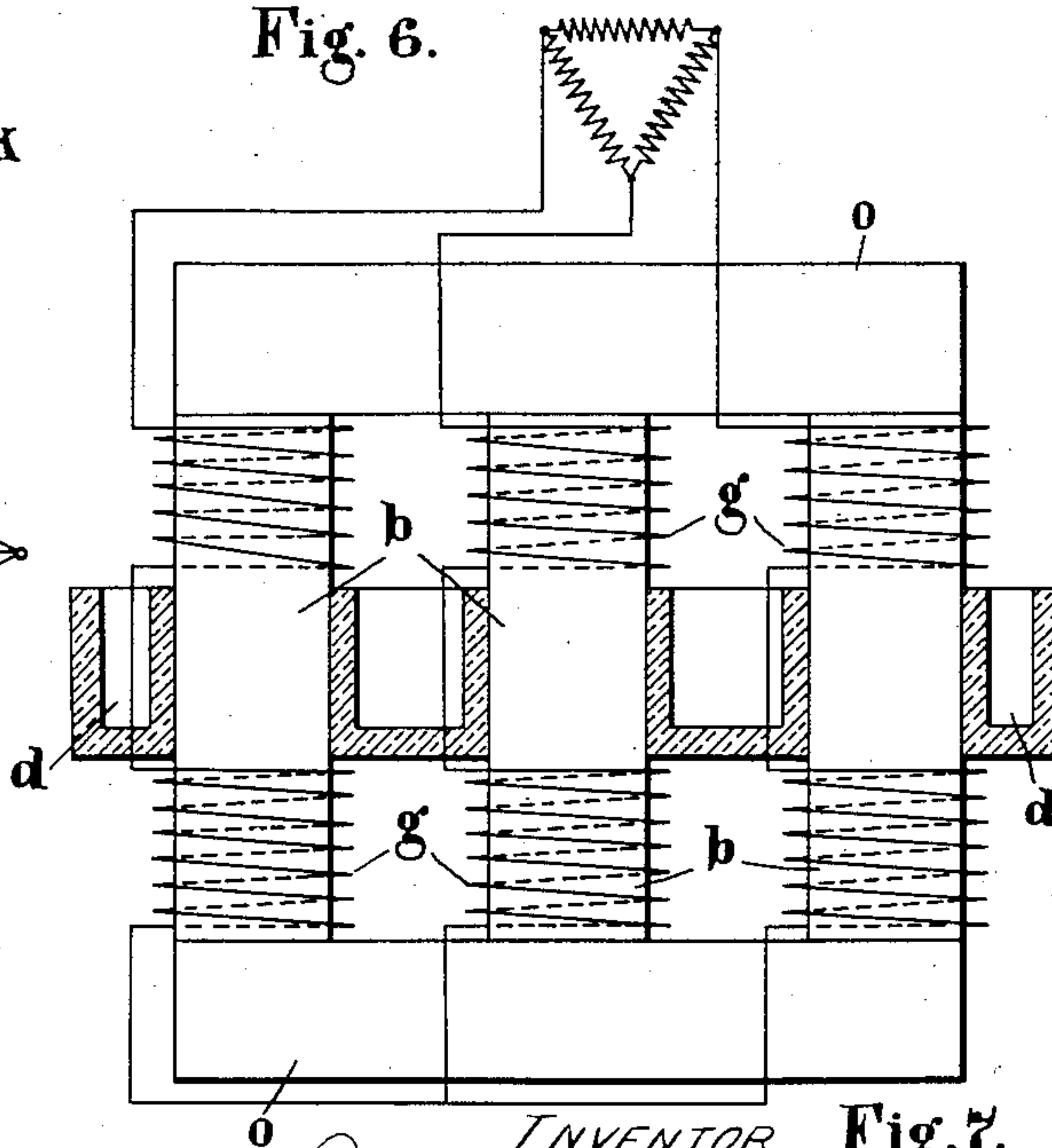


Fig. 7.

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UNITED STATES PATENT OFFICE.

SEBASTIAN ZIANI DE FERRANTI, OF GRINDLEFORD BRIDGE, NEAR SHEFFIELD,
ENGLAND.

METALLURGICAL FURNACE.

962,013.

Specification of Letters Patent. Patented June 21, 1910.

Application filed June 10, 1907. Serial No. 378,291.

To all whom it may concern:

Be it known that I, SEBASTIAN ZIANI DE FERRANTI, a subject of the King of Great Britain and Ireland, and residing at Grindleford Bridge, near Sheffield, in the county of York, England, (late of 31 Lyndhurst road, Hampstead, London, E.,) have invented a certain new and useful Metallurgical Furnace, of which the following is a specification.

The invention relates to metallurgical furnaces and has for its main object the provision of improved means for circulating or mixing the molten metal contained therein.

With this object the present invention consists in a furnace in which the molten metal is subjected to the inductive action of a moving magnetic field so as to be positively mixed or circulated thereby in a manner analogous to that in which the rotor of an asynchronous motor is driven.

By virtue of my invention I am able to provide a mixing or stirring apparatus of great simplicity while avoiding the difficulties hitherto encountered when the attempt has been made to introduce agents such as electrodes, mechanical stirrers or otherwise into the hot metal.

Referring to the accompanying drawings, Figure 1 shows a sectional plan of one form of the invention, Fig. 2 being a corresponding cross-section on the line 2—2 of Fig. 1, while Fig. 3 shows diagrammatically a developed view of the windings for producing a moving magnetic field shown in the previous figures. Fig. 4 shows another form of furnace having a special mixing chamber surrounded by windings adapted to produce a rotary magnetic field, Fig. 5 being a diagrammatic plan and Fig. 6 a diagrammatic development of the windings of Fig. 4, while finally Fig. 7 shows a view of yet another form of the invention.

In carrying my invention into effect according to one form as shown applied to an electric induction furnace in Figs. 1 to 3, a magnetic core *a*, has a central limb *b*, passing through the furnace *c*, the limb *b*, having coils *f*, wound upon it, these coils be-

ing preferably constructed of hollow form so that a cooling medium may be circulated through them. The actual bath of molten metal *d*, is in the form of an annulus, and in order to produce a circulation of this metal according to the present invention, windings *m*, with operative portions normal to the free surface of the metal are arranged in proximity to a certain part of this annulus both inside and outside, the windings being carried by the usual iron masses *k*, in a similar manner to that in an ordinary induction motor. In Fig. 3 the connections of these windings are shown to a three-phase generator.

Turning now to Figs. 4, 5 and 6, a modification of the invention is shown in which the metal melted in the upper part of the furnace by the induction coils *f*, and core *a*, as before runs down to a special chamber *n* disposed at the bottom of the furnace, which chamber is surrounded by windings *m*, carried by iron masses *k*, as before to produce a rotary magnetic field which, acting inductively upon the molten metal contained in the chamber *n*, will serve to circulate or mix it.

Yet another form of the invention is shown in the Fig. 7, according to which three magnetic cores *b*, thread through the bath *c*, and are connected top and bottom by end pieces *o*. Around the magnetic cores, windings *g*, are arranged both above and below the bath, these windings being connected as shown to a source of three-phase current. In this example separate sets of coils for heating and mixing as in Fig. 4, are dispensed with, the one set of coils serving a double function.

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

1. A furnace having in combination an upper part provided with heating means for producing metal in the molten state and a lower chamber in which said molten metal collects together with means for inductively mixing the metal in said lower chamber.

2. A furnace having in combination a receptacle for molten metal; iron masses in

proximity to said receptacle and multiphase windings having operative portions spaced around said receptacle and normal to the free surface of said metal.

- 5 3. A furnace having in combination a receptacle for molten metal; iron masses in proximity to said receptacle and multiphase windings having operative portions disposed

outside said molten metal and normal to its free surface.

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

SEBASTIAN ZIANI DE FERRANTE.

Witnesses:

HERMANN HUBER,

JOSEPH SIMON.