

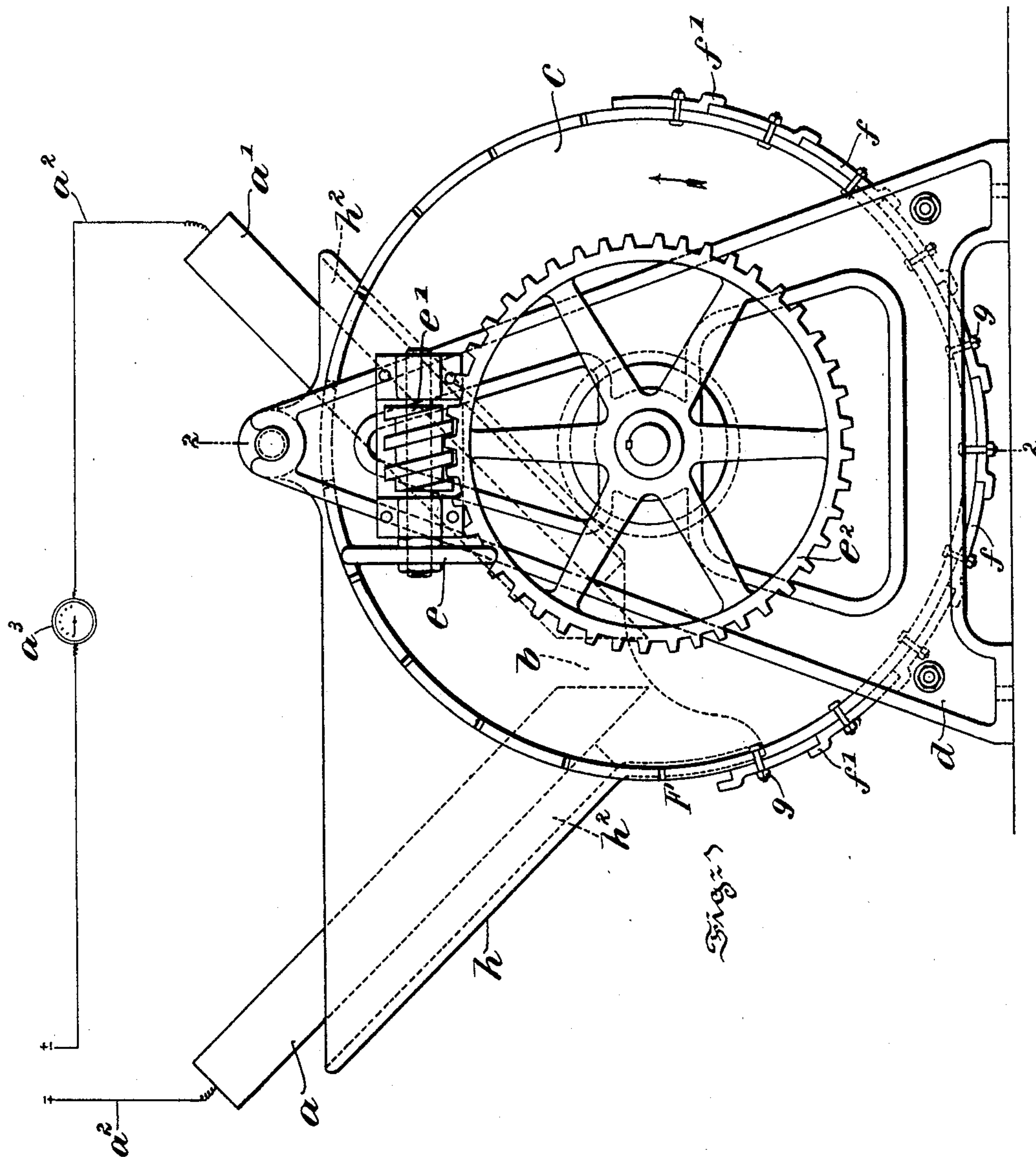
(No Model.)

2 Sheets—Sheet 1.

W. S. HARRY.
ELECTRIC FURNACE.

No. 597,880.

Patented Jan. 25, 1898.



Witnesses:

W. Jackson

K. M. Gilligan

Inventor.

William Smith Sorry.

By Augustus B Strong & Son

Attorney.

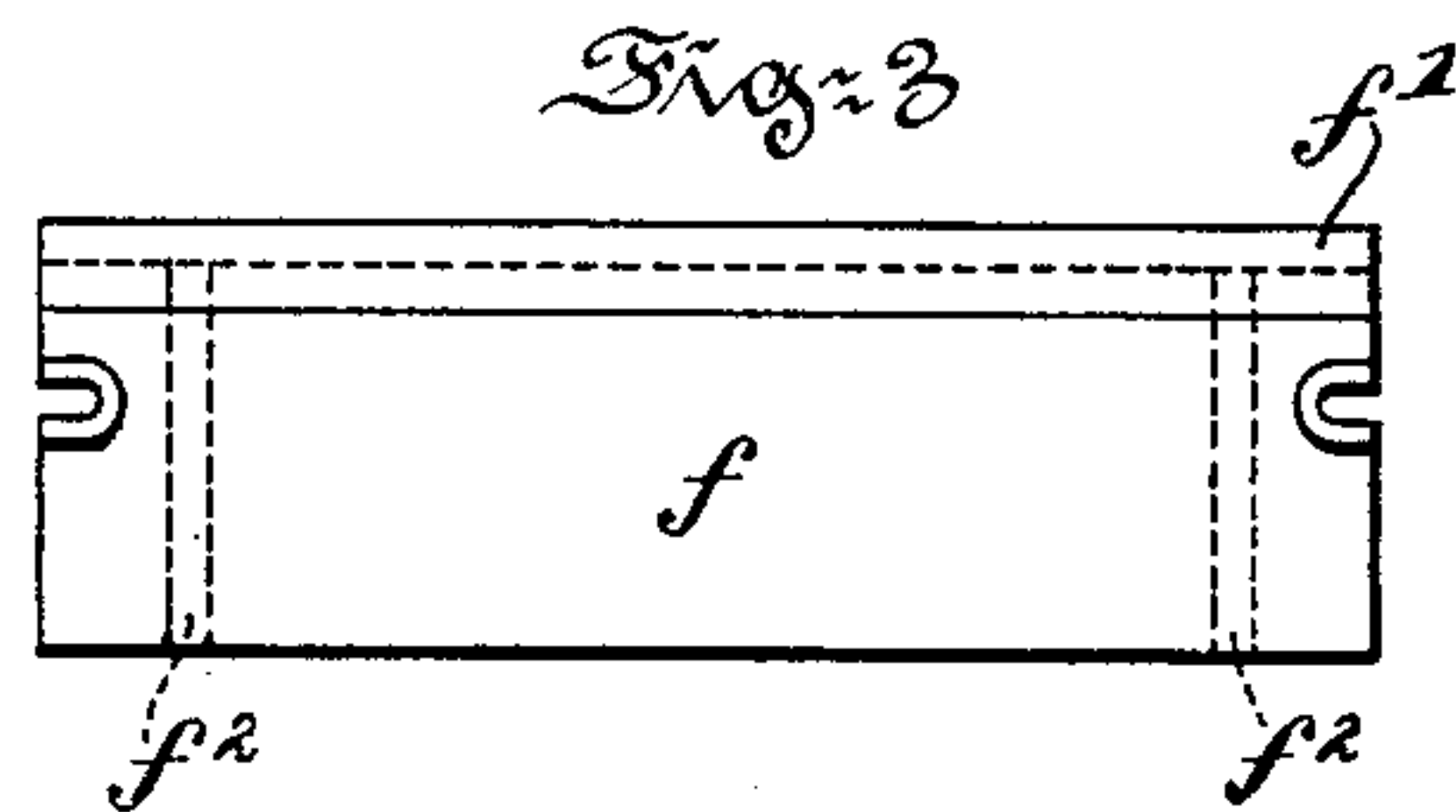
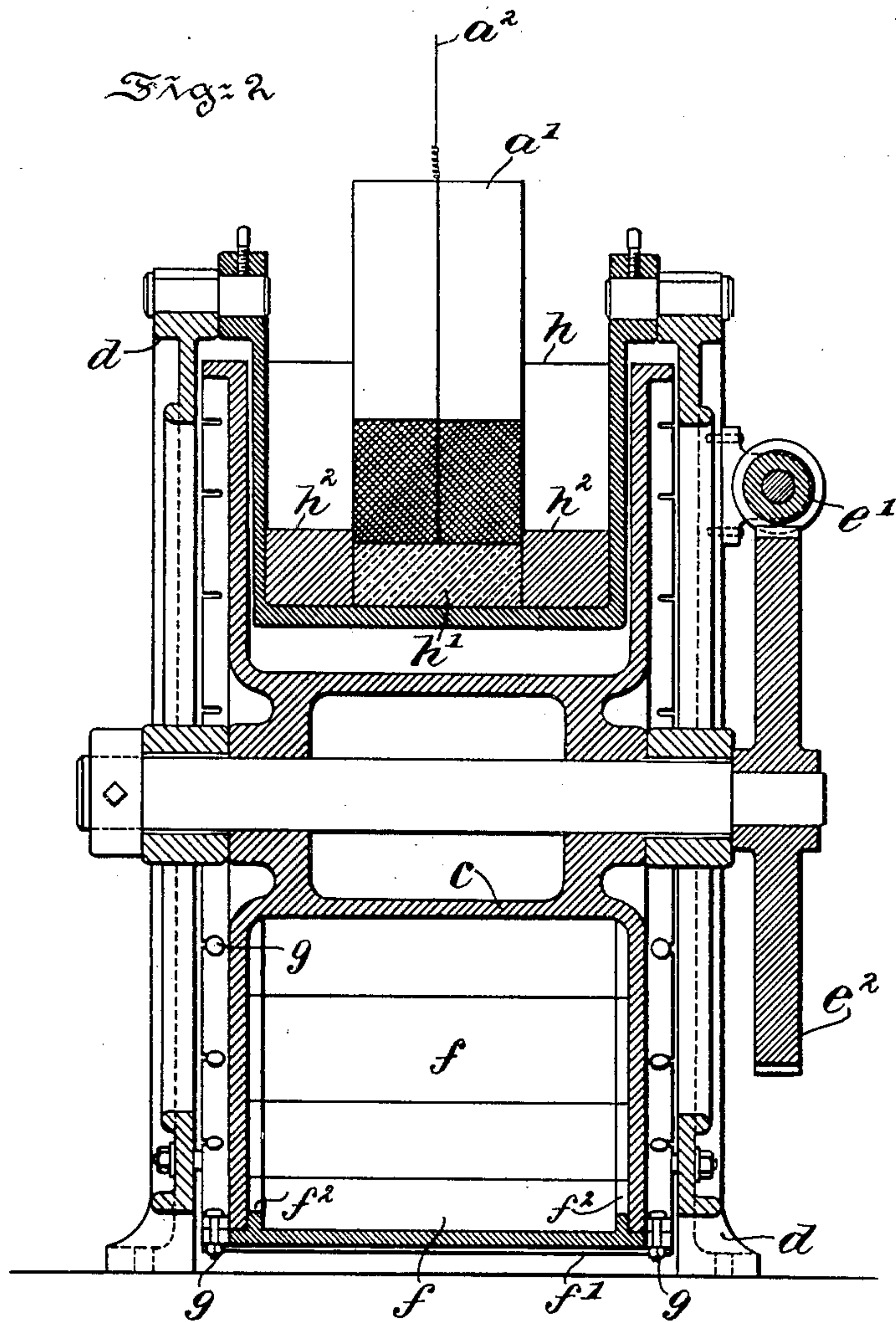
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ELECTRIC FURNACE.

No. 597,880.

Patented Jan. 25, 1898.



Witnesses:
R. Jackson
E. M. Gilligan

Inventor:
William Smith Horry
By
Augustus B. Stoughton
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM SMITH HORRY, OF SAULT STE. MARIE, MICHIGAN.

ELECTRIC FURNACE.

SPECIFICATION forming part of Letters Patent No. 597,880, dated January 25, 1898.

Application filed April 16, 1897. Serial No. 632,418. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SMITH HORRY, a subject of Her Majesty the Queen of Great Britain, residing at Sault Ste. Marie, Michigan, have invented a new and useful Electric Furnace, of which the following is a specification.

The action of a comparatively high degree of heat upon a mixture of coke and lime results in the production of carbid of calcium. Various electric furnaces have been devised for effecting such union of elements. Generally the furnace consists of an iron bed-plate, which constitutes the lower electrode or pole, and a large piece of carbon, which forms the other pole and can be raised or lowered. When the electric arc is struck between these poles, a mixture of coke and lime is fed in, and the resulting carbid of calcium piles up and becomes higher on the bed-plate, the upper carbon being raised to make room for it. After this has gone on for some time the imperfections of such a furnace become evident. The voltage between the poles decreases, because the electrical resistance of the pile of carbid differs from the electrical resistance of the ingredients which form it. There is then a mass of carbid to heat up besides the heat required for generating the arc and fusing additional material. The former is entirely wasted and positively deleterious, because it causes the carbid to liquefy and run, so as frequently to melt the iron of the bed-plate. By reason of this waste the current is turned off after a few hours, and the whole furnace has then to be cleaned out and again started, and in cleaning out the furnace all the heat, instead of being preserved, is dissipated, because the apparatus is allowed to cool down. More recently an iron crucible has been employed instead of the bed-plate. Its use effects a saving of time in cleaning out the furnace, but it adds to the weight to be removed and is not an improvement in principle.

Objects of my invention are to obviate the above-mentioned defects and disadvantages, to economize heat, to adapt the furnace to the practice of a continuous process, to produce uniform quality in the finished product, to avoid undue waste of material, to keep the

current uniform, and to obviate the necessity for special types of carbon-holders.

In my invention use is made of means for producing an electric arc which is fixed, or, in other words, not moved in respect to the furnace, of a rotatable receptacle for the fused materials, and of means for slowly shifting said movable receptacle.

My invention consists of the improvements hereinafter described and claimed.

The nature, characteristic features, and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming a part hereof, and in which—

Figure 1 is a side elevational view illustrating an electric furnace embodying what I believe to be the best means for practicing my invention. Fig. 2 is a sectional view taken on the line 2 2 of Fig. 1, and Fig. 3 is a detached view of one of the plates or covers shown in Figs. 1 and 2.

In a machine of my invention there are means for producing an arc which remains in one position and is not shifted about or drawn out. $a a'$ indicate such means and comprise, for the sake of illustration, carbons suitably connected with the terminals a^2 of an electric system. As shown, the adjacent ends of these carbons are beveled, so as to form a vertical passage, as b , between them, across which the arc is formed and through which the material to be treated is passed. There is present in a machine of my invention also a movable receptacle for the fused material. c designates such a receptacle and comprises a spool-like structure revolvably mounted in suitable supports, standards, or frames d . This receptacle c is provided with means for shifting it. The hand-wheel e , worm e' , and worm-wheel e^2 , attached to the receptacle c , are such means.

f are removable or detachable cover-plates which may be provided with lips, as f' , which the plates are made to overlap each other and have projections, as f^2 , fitted to the flanges or heads of the receptacle c .

g are means, as bolts or clips, by which the plates or covers f may be detachably applied to portions of the periphery of the receptacle c .

h is a bottomless hopper suitably supported, for example, by pivoting or otherwise attaching it to the standards d and permitting it to hang between the flanges of and within the receptacle c . As shown in the drawings, this hopper is fitted with fire-clay, as at h' , and with fire-brick, as at h^2 . Other fire-resisting material may be used, and it constitutes simple and efficient means for insulating either or both of the electrodes and for supporting either or both of them without requiring the use of special clamps or holders. Moreover, the connection between the carbon and electrical conductor may be of simple construction because it is placed away from the heated parts of the furnace.

The mode of operation of my invention may be described in connection with the foregoing apparatus as follows: Upon closing the circuit the current traverses the space b and acts upon the materials, as carbon and lime, of which a supply is placed in the hopper h , and gradually passing through the space b reaches the receptacle c . In thus traversing the furnace, or, more accurately, the portion thereof designated b , the materials become highly heated, and in the case of lime and carbon or their equivalents carbid of calcium is formed, which builds up immediately under the carbon, lowers the electrical resistance, and causes the ampere-meter a^3 , if present, to rise. The attendant upon seeing this operates the wheel e or otherwise rotates or shifts the receptacle c in the direction indicated by the arrow in Fig. 1. By this motion carbid is removed away from the arc or space designated b and fresh material sinks from the hopper into its place ready to be acted upon in like manner. After continuing the process for some time another plate f should be added to the receptacle at substantially the point designated F in Fig. 1 in order to retain the material in the receptacle, and fresh supplies must from time to time and slowly be fed into the hopper h during the operation of the furnace. The carbid is formed in the shape of a ring or part of a ring, and when it has become so long that it might interfere with the carbon a' or other part of the furnace, it being by this time cool, it can be broken off and removed, some of the plates f at the right-hand portion of the furnace being taken off, if necessary, for this purpose. The production of carbid or other op-

eration adapted to the furnace can in this manner go on indefinitely, or, at least, until the carbons are entirely consumed. This furnace affords means for producing calcium carbid in one continuous piece, and it also possesses other advantages. The carbid made by it is all the same. Any piece of it is precisely like every other piece, whereas with furnaces heretofore employed the carbid differed materially in quality, being poor at the bottom of the furnace and rich in the middle and again poor at the top; also, such old furnaces had the disadvantage of entailing a considerable waste of material, a comparatively large amount of coke and lime being caked together in such a manner that they could not again be used unless reground and remixed. Such defects are absent from the furnace of my invention. Another advantage is that in my furnace there are no heavy weights to lift.

The greatest advantage incident to the use of my furnace has relation to the electrical machinery. In the old furnaces the demands on the electrical generator were very variable for an hour or more after the furnace was started, whereas in a furnace of my invention the load on the electrical generator is constant and the advantage is very marked.

It will be obvious to those skilled in the art to which my invention appertains that modifications may be made in details without departing from the spirit thereof. Hence I do not limit myself to the precise construction and arrangement of parts hereinabove set forth, and illustrated in the accompanying drawings; but,

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

An electric furnace comprising the combination of a bottomless hopper, electrodes supported on the walls of said hopper, circuit connections for the electrodes, a rotatable receptacle arranged below said hopper, and plates removably applied to the periphery of said receptacle, substantially as described.

In testimony whereof I have hereunto signed my name.

WILLIAM SMITH HORRY.

In presence of—

JOHN MCNAUGHTON,
WILLIAM M. DANFORTH.