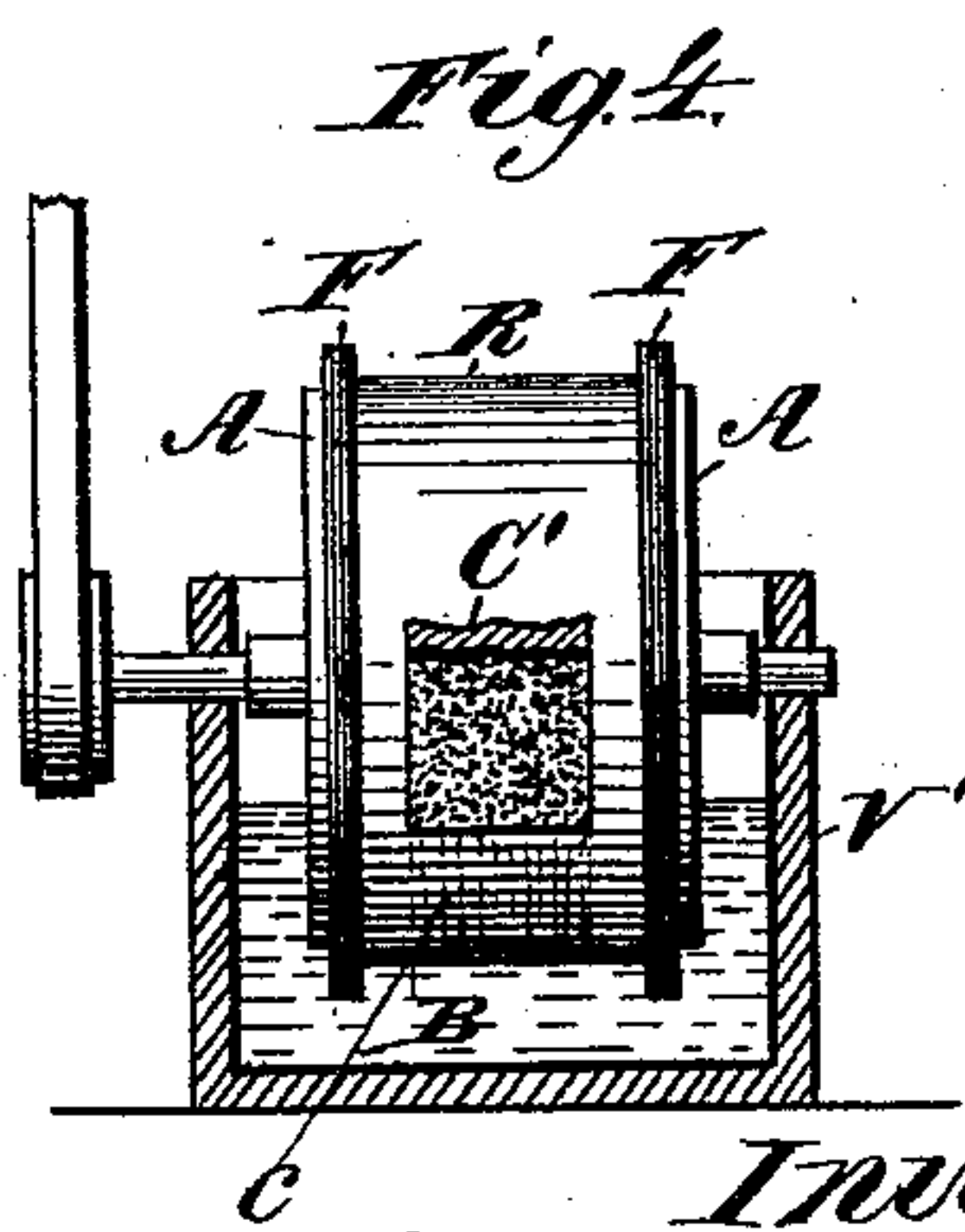
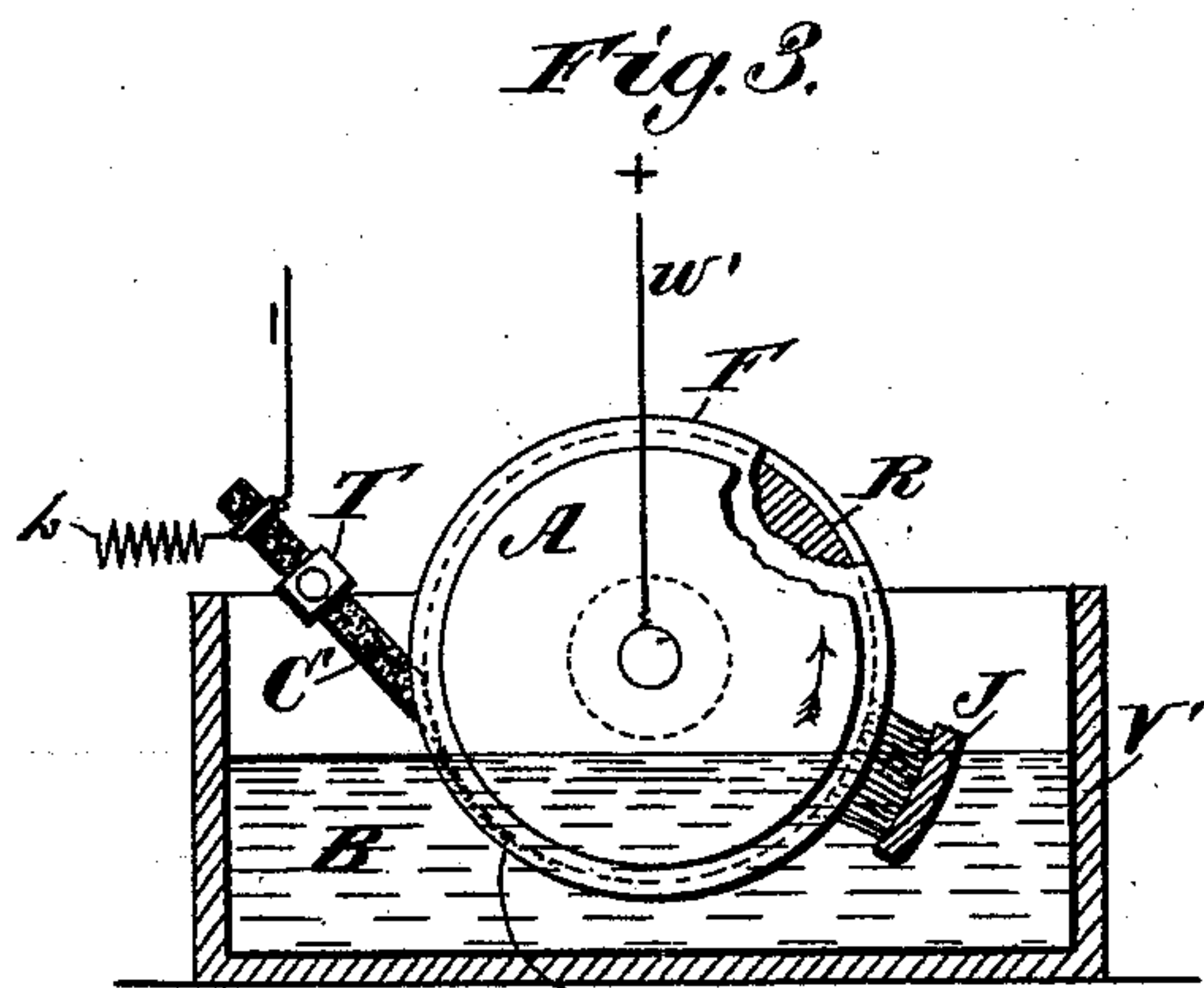
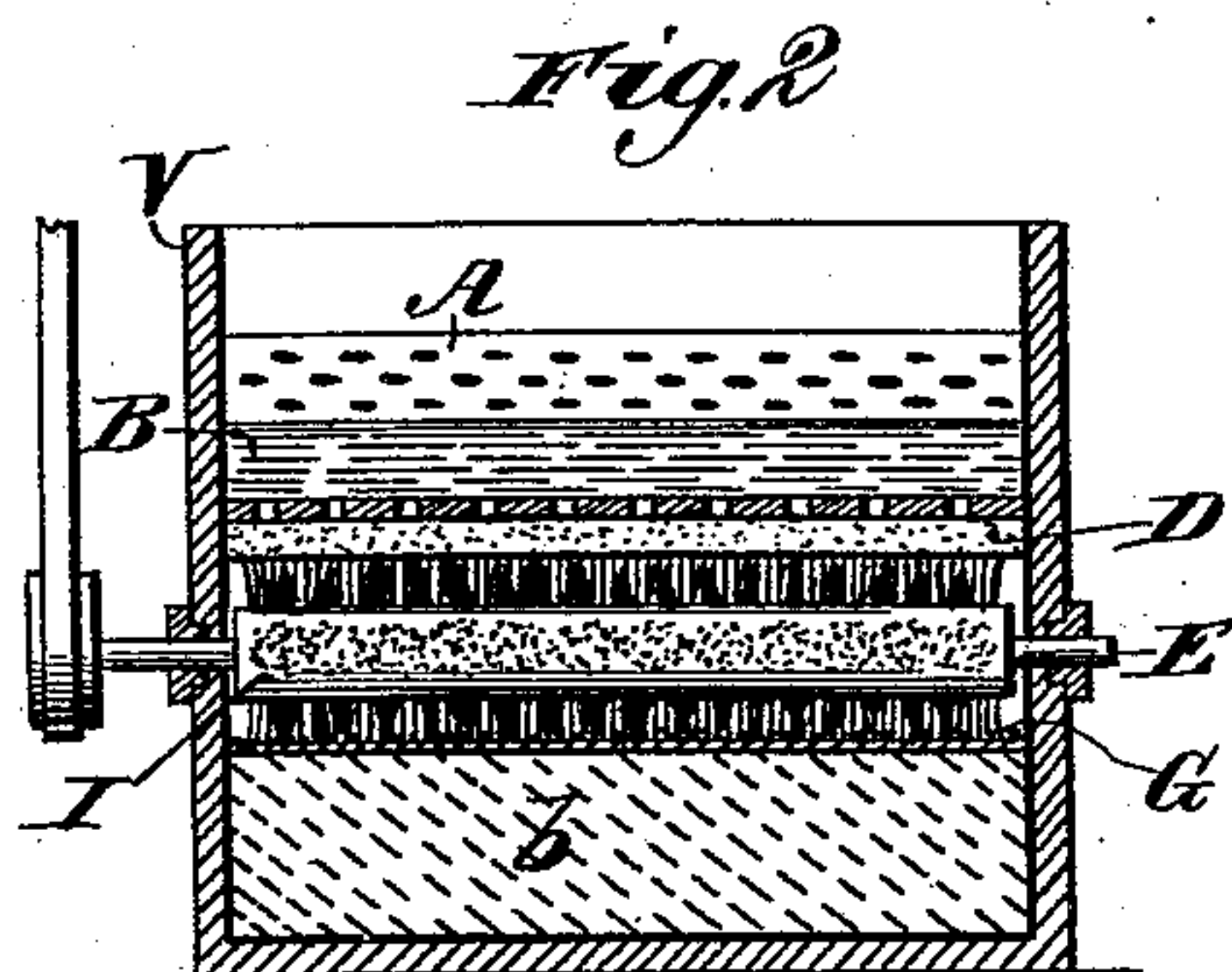
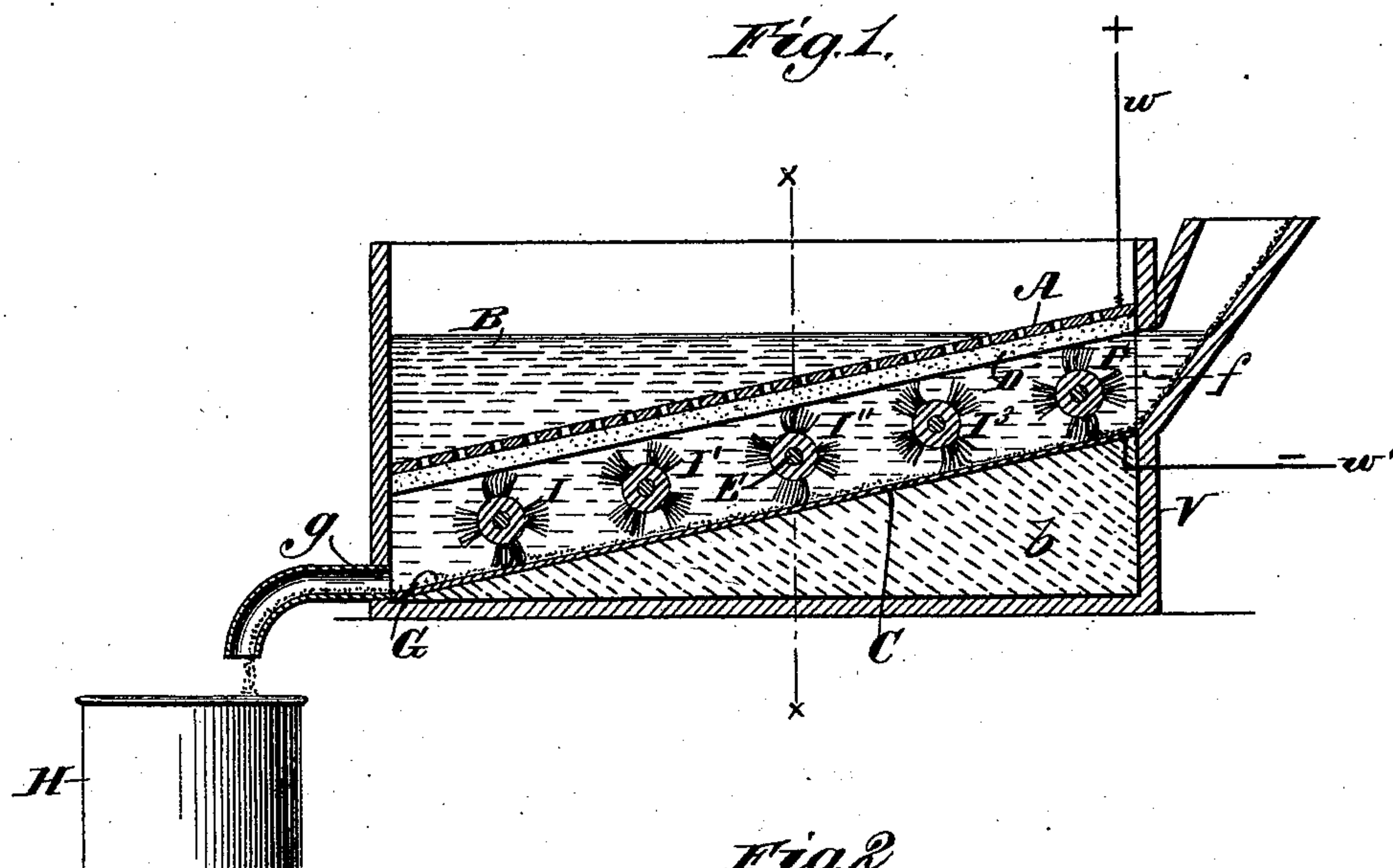


(Specimens.)

E. HUBER & J. SACHS.
METALLIC POWDERS.

No. 522,415.

Patented July 3, 1894.



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UNITED STATES PATENT OFFICE.

ERNST HUBER AND JOSEPH SACHS, OF NEW YORK, N. Y.

METALLIC POWDERS.

SPECIFICATION forming part of Letters Patent No. 522,415, dated July 3, 1894.

Application filed April 3, 1893. Serial No. 510,930. Renewed May 11, 1894. (Specimens.)

To all whom it may concern:

Be it known that we, ERNST HUBER and JOSEPH SACHS, of New York, in the county of New York and State of New York, have
5 invented certain new and useful Improvements in Metallic Powders; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as
10 it appertains to make and use the same.

Our invention relates to the process of manufacturing metallic powders and its novelty consists in the several successive steps whereby our purpose is accomplished.

15 The object of our invention is to produce a powder each grain of which shall have a suitable metallic surface and be capable of use in the relations where bronze or other metallic powders are employed and which shall at the
20 same time be cheaper and have a lower specific gravity. And, in the course of our experiments, we have discovered a process which seems to attain this object and which we believe to be new and highly useful.

25 Our discovery consists, in brief, of the fact that by interposing between certain well known electrodes during the process of electrolysis a non-metallic conductor in a finely divided state and which is kept in rapid motion so that its particles are forced upon the
30 cathode and kept from contact with the anode during the operation that these particles become covered with a shell composed of the metallic base of a salt fed between the electrodes. The amount of the deposit and its
35 precise nature is dependent upon the nature of the electrodes and of the bath employed, the strength of the current, the rapidity of motion of the non-metallic conductor and the
40 time of its exposure.

There are several ways in which our process can be carried out and the desired result accomplished but their principle is the same and they vary merely in mechanical or
45 chemical details. We will, however, explain what we deem to be the best method of carrying out our invention, in the light of our present knowledge.

50 In the drawings, Figure 1 is a vertical central longitudinal section and partial plan view of one form of the apparatus used by us and Fig. 2 is a transverse section thereof on

the plane of the line X—X in Fig. 1. Fig. 3 is a longitudinal section of a modified form of the apparatus and Fig. 4 is a side view
55 thereof looking from the left.

In Figs. 1 and 2, V is a box or receptacle made of any suitable material and provided with an inlet aperture *f* and an outlet aperture *g*. The cathode C, made for instance of
60 a sheet of copper, in the form of a flat plate, is secured in the box in an inclined position from the inlet to the outlet aperture and rests upon a solid base *b* of any suitable material, for example, cement. The anode A, made
65 of a suitable material, is also secured within the box V in a position, for instance, substantially parallel with that of the cathode C and it is separated from the anode by a dialytic partition D, for instance, a plate
70 of baked clay. It is necessary that the anode should be perforated or otherwise made permeable. Electric wires *w w'* are connected with the anode and cathode in the usual manner and supply a current from a
75 source of electricity not shown. Mounted on shafts E journaled in the side of the box V in any suitable manner and located between the anode and cathode is a series of
80 brushes I, I', I'', &c., adapted to revolve or to reciprocate across the surface of the cathode and actuated by any suitable means quite within the range of an ordinary mechanical skill to provide, for instance a belt and pulley. The brushes should be so arranged that
85 their extremities just touch the upper surface of the cathode.

The action of the apparatus is as follows:—Surrounding the anode is a bath B comprising an acid solution containing a copper salt.
90 There is then caused to be fed at the inlet aperture *f*, by any suitable means, a solution of a copper salt in which is suspended powdered graphite G, or other similar non-metallic conductor, in a finely divided state. The
95 brushes, I, I', &c., are then set in rapid motion. The powdered graphite is caught by their bristles and forced over the cathode. They are thus prevented from adhering to the cathode or to each other. It will be found
100 that in a short time each particle of graphite has been completely covered by a shell of copper deposited thereon. The covered particles are gradually fed downward by the ac-

tion of gravity and the freedom of motion caused by the agitation of the solution by the brushes, until they reach the outlet aperture and are received in a suitable vessel as H.
5 The length of the cathode and strength of the current should be so arranged that each particle of the graphite will be completely covered by the time the outlet aperture is reached. This data should in each case be
10 predetermined by experiment.

In Figs. 3 and 4, we show a modified form of our apparatus. In this view V' is a vessel, or box, of suitable material and properly lined with lead or other material not affected
15 by its contents. Suitably mounted within this vessel is a grindstone R of quartzite, emery, or other similar material, not affected by the bath and adapted to revolve, and actuated from a source of power not shown, for in-
20 stance a pulley and belt. This grindstone is immersed in the copper solution B and on each side of it is secured an anode plate A insulated by a plate F of suitable insulating material for instance, hard rubber. A rod
25 or plate of carbon C' mounted in a holder T and adapted to be automatically fed against the grindstone R by any suitable means, as for instance a spring z, serves as the cathode. Both the anode and cathode are supplied
30 with electricity by means of the wires w w' from a source of electricity not shown. At the bottom of the vessel V is secured a brush J adapted to press against the surface of the grindstone R. The operation of this form of

apparatus is readily understood. The grind- 35 stone removes particles of the carbon from the plate C' and which particles form a conducting ribbon c on the surface of the stone R and which as they pass through the bath B receive a deposit or shell of copper and are 40 brushed off by means of the brush J.

Other non-metallic bases for powders may be employed instead of carbon for instance, silicon and other metals than copper may be deposited thereon, but the principle upon 45 which the formation of the product depends will be the same in each instance.

Having described our invention, what we claim as new is—

1. The process of manufacturing metallic 50 powders which consists in interposing between suitable electrodes during the process of electrolysis a non-metallic conductor in a finely divided state maintained in motion during said process. 55

2. The process of making powders which consists in depositing a shell of metal by electrolysis upon a non-metallic conductor while in a finely divided state and under conditions 60 of constant agitation.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

ERNST HUBER.
JOSEPH SACHS.

Witnesses:

S. S. NEWTON,
WM. RAIMOND BAIRD.