

ators may be used for discharging quantitative currents while being charged.

For the purpose of conducting the currents at the proper time to the proper place and in the proper direction, and also for opening and closing the circuits when required, and in order to facilitate the regular charging and discharging, mechanical contrivances are required, which I will call "translator."

I will refer at first to the contrivances designed by Poggendorf and Mueller for the purpose of aiding them in their scientific researches, which I have improved and made to answer for practical purposes. As to Poggendorf's, I cover the board with a strap of wood containing corresponding holes. Between the board and strap I put a layer of thin india-rubber, or a similar substance, with very fine holes in it, which permit the pins or hooks to be dipped into the quicksilver. In this way the waste and evaporation of the latter is prevented. Furthermore, a key for opening and closing the circuits may be arranged in such a manner that it will not close or open the circuits until all the pins shall have been dipped into the quicksilver. In this way the oxidation of the latter by means of the electric spark is avoided. Said key may also be used to operate at the required time the balance with greater precision, and may be withdrawn by a spring or its equivalent whenever released by the finger, &c., or, vice versa, the balance may operate the key. A similar arrangement must also be added to Mueller's, with this difference, however, that either the cylinder has to be turned by it step by step, or, vice versa, the cylinder may move it, or a slide may be substituted for the cylinder operating the springs in a similar manner, &c. For double charging, a double combination of the translator is required.

Convenient contrivances operated by any desired motive power, as electro-magnetism, &c., or the combination of the translator with other arrangements, as telegraph apparatuses, magneto-electric machines, &c., will often be necessary for the purpose of causing the required changes of the course or presence or absence of the currents and for operating correspondently—as, for instance, causing either temporary or integral currents, which act for a certain and at a certain time and with a certain amount of power, for the purpose of operating electric clocks, signal apparatuses, starting, moving, or stopping mechanism, or to and fro, or strong and feeble currents, &c.—but in such cases the liquid may also help. Taking water to be one of the worst electrolytes and conductors, an addition of sulphuric, hydrochloric, nitric acid, or salts of the series of alkalies and positive metals will increase the activity in proportion. Short impulses or to and fro currents permit also the conductor to remain closed afterward, and the reaction of the induction currents or electric tensions will be prevented, because they will be counter-

balanced by the polarization on the passage of the induction-currents through the regenerator.

The next illustrated arrangement of the translator will show the possibility of charging the regenerator or polarization apparatus at any and the same time while it is discharging. Suppose some cups, Fig. 2, B' B'' B''' B'''' , to be connected with each other, forming a circuit of great intensity. To each connection F F' F'' F''' F'''' a wire, G G' G'' G''' G'''' , is attached, the end of which touches a wooden cylinder, L , surrounded spirally by two wires, H K , which run parallel with each other, but are so far apart that on turning the cylinder only one spring touches one spiral at a time. Each spiral H K is connected with a journal, M N , (isolated,) of the cylinder L , and each journal by a spring, O Q , with the corresponding pole P' Z' of the generator, Fig. 3, and on turning the cylinder L cup by cup will be charged by the translator. A circular arrangement around a vertical revolving shaft, with two isolated projections touching against the springs, or a movable slide slowly progressing or raising, will produce the same effects.

It is obvious that by the application of all such arrangements, as explained above, the polarization apparatus will likewise answer in many cases for practical purposes, especially by the application of temporary currents. Finally, it will be necessary for me to dwell a little longer yet on the manner of gathering, retaining, and transforming the short or momentary impulses of induction-currents, especially the currents of the magneto-electric machine.

All the innumerable arrangements which have been devised for the purpose of combining separate impulses in such a manner as to give them the semblance of a constant and continuous current have so far proved unsuccessful, and none of the learned and scientific men of the civilized world have yet been able to demonstrate the possibility that a perfect and continuous current, like a galvanic current, which does not vibrate in the least, can be obtained by any means. Mine, therefore, is the only method by means of which the impulses are collected by the regenerator and then united, transformed into a complete whole, and reproduced anew, as required. For this purpose, however, and in order to obtain as much electricity as possible, the following auxiliary arrangements must be observed: First, the discharge of the currents through all the helices into the general conductor must take place at the same time; second, it is necessary that the resistance of all the helices which are connected together be a little in excess over the resistance of the regenerator; third, the current-changer must be constructed in such a manner as to furnish to the electricity collected in the regenerator no way of escape through the closed circuit of the helices during the time in which they produce too little or no electricity. For instance, the ends of the helices are con-

UNITED STATES PATENT OFFICE.

B. LAUTH, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO FIRM OF JONES & LAUTH, OF SAME PLACE.

IMPROVEMENT IN POLISHING IRON BARS AND RODS.

Specification forming part of Letters Patent No. **31,546**, dated February 26, 1861.

To all whom it may concern:

Be it known that I, BERNARD LAUTH, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful improvement in the process of polishing bars, rods, sheets, or plates of iron or steel by scaling and cold-rolling under pressure; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention consists in polishing rods or bars, whether square or round, and sheets or plates of iron or steel by subjecting them first, after they have been rolled or drawn out to the proper size or dimensions, to an acid bath, for the purpose of removing the scale from them, then removing the acid and passing them through between smooth cold rollers under heavy pressure, which packs down the fiber and leaves the surfaces bright and polished.

This invention is applicable to any kind of iron or steel that is drawn out between rollers, for the polishing-rolls may have any shape that is ordinarily given to drawing-rolls. In order that the polished surfaces may be perfectly smooth, the rollers used for this purpose should be exclusively used for polishing, inasmuch as if used for drawing out hot metal there will be cracks or marks left upon them, which will be impressed upon the surfaces of the polished metal, and thus mar their otherwise smooth surface; and as in this process I polish the bars or plates when cold, the polishing-rolls need never be heated, and no cracks will appear upon their surfaces. As this process reduces the original size or thickness of the bars, rods, sheets or plates, subjected to it, it is necessary to make them of such size as will admit of this reduction, while they will have the proper dimensions for the purposes for which they are designed after they are polished. Subjecting the cold rods, bars, sheets, or plates to this polishing process

packs the fiber of the metal to such a degree as not only to make a hard smooth surface, but the bars or sheets, though reduced in size, actually become stiffer than they were before the process, so that it is polishing and compressing or hardening the surfaces at one and the same operation. If the metal to be polished were subjected to heat after coming from the bath, a scale would be again formed upon it and the polishing could not be effected. I therefore take the bars, sheets, or whatever is to be polished cold, and pass them thus through between rollers. By "cold" I mean void of artificial heat.

In the process I use chilled rollers with very carefully-prepared smooth surfaces, so that they shall not leave any marks upon the polished surfaces. The rods, bars, sheets, or plates of iron or steel, being first drawn down to near their size, are subjected to the acid bath until the scale is loosened, and then removed. This leaves the surfaces bright, but minutely honey-combed. They are then passed through once, twice, or more times, between the polishing-rolls, which packs this bright though rough surface down to a perfectly smooth hard surface or polish. It is unnecessary to mention the many uses to which such rods, bars, sheets, or plates may be applied, as it is obvious to all mechanics.

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

As a new article of manufacture, the production of polished bars, rods, plates, or sheets of iron or steel by passing them cold through between rolls after they have been subjected to the acid bath, to remove the scale, substantially as herein described.

BERNARD LAUTH.

Witnesses:

A. B. STOUGHTON,
THOS. H. UPPERMAN.

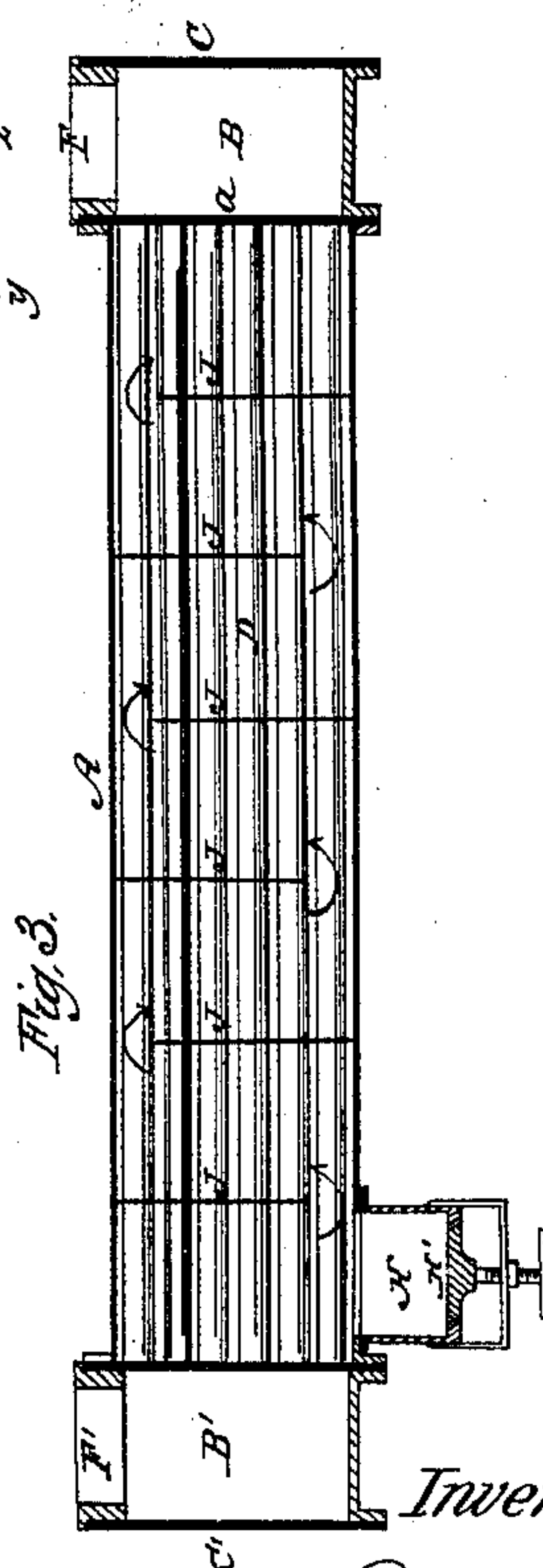
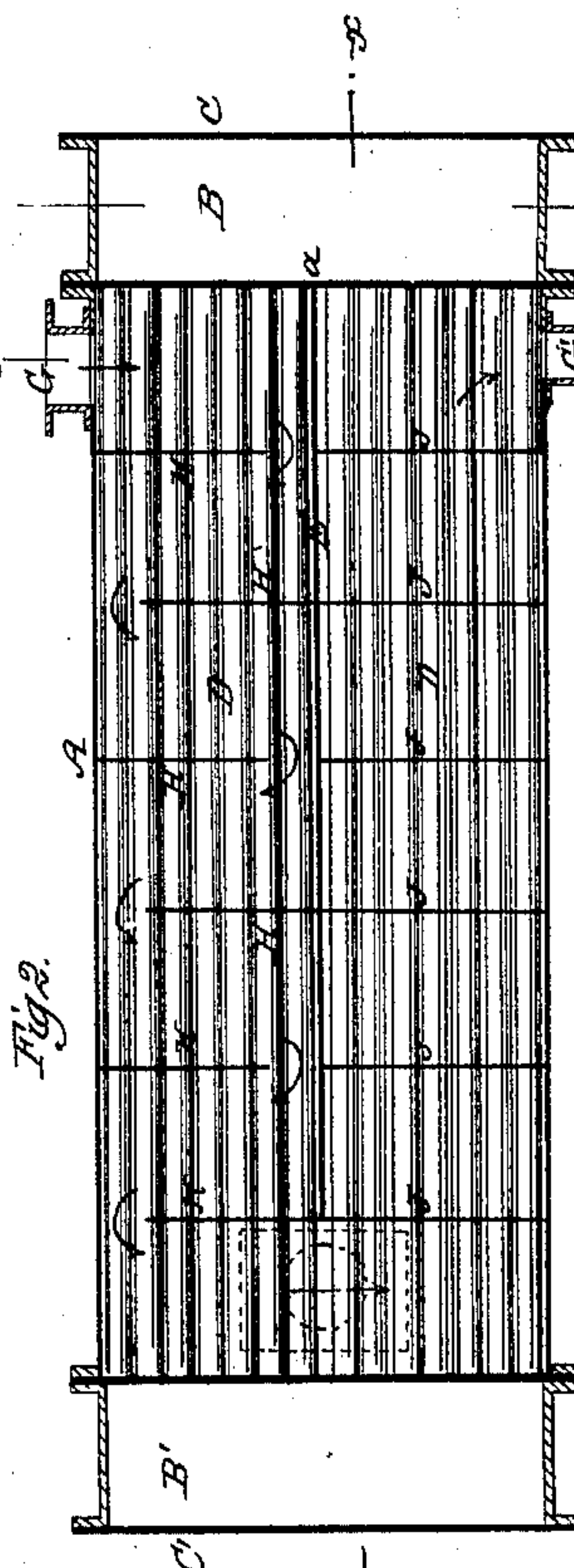
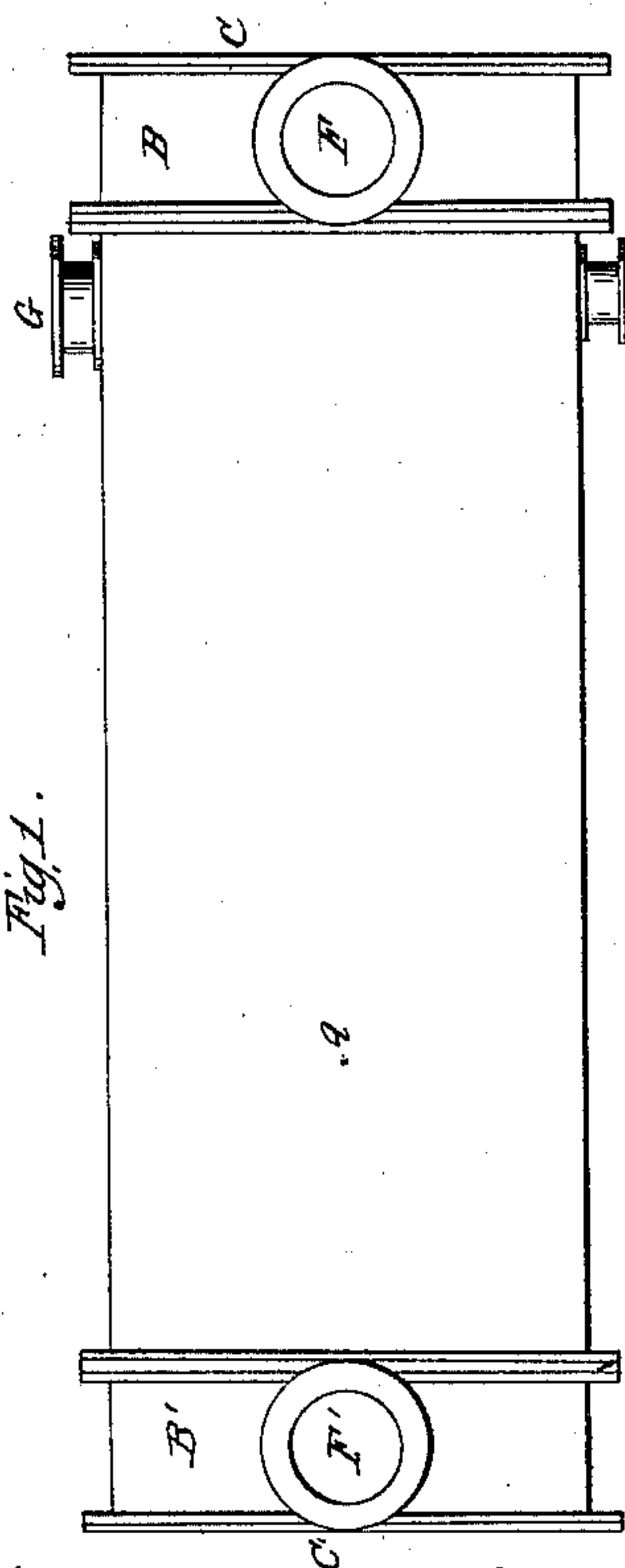
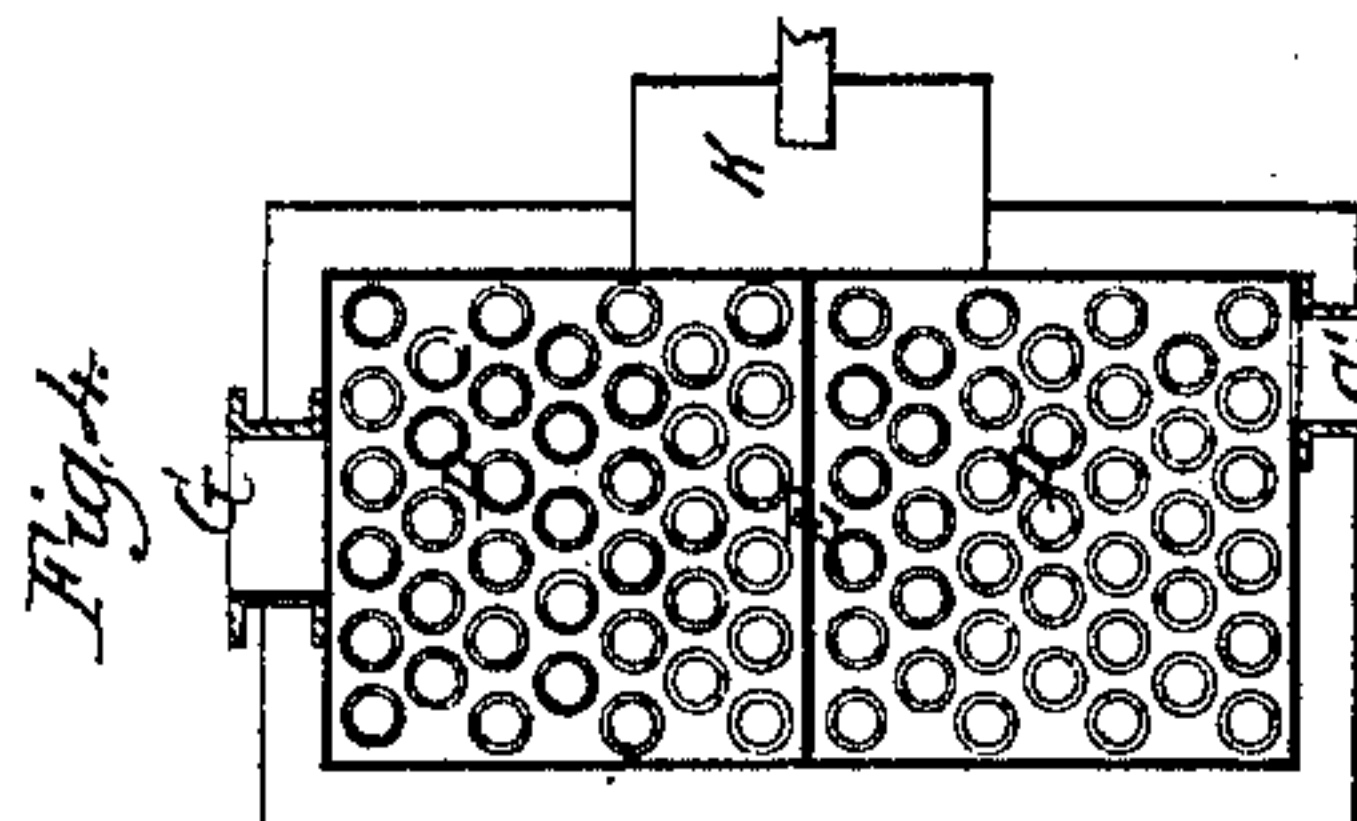
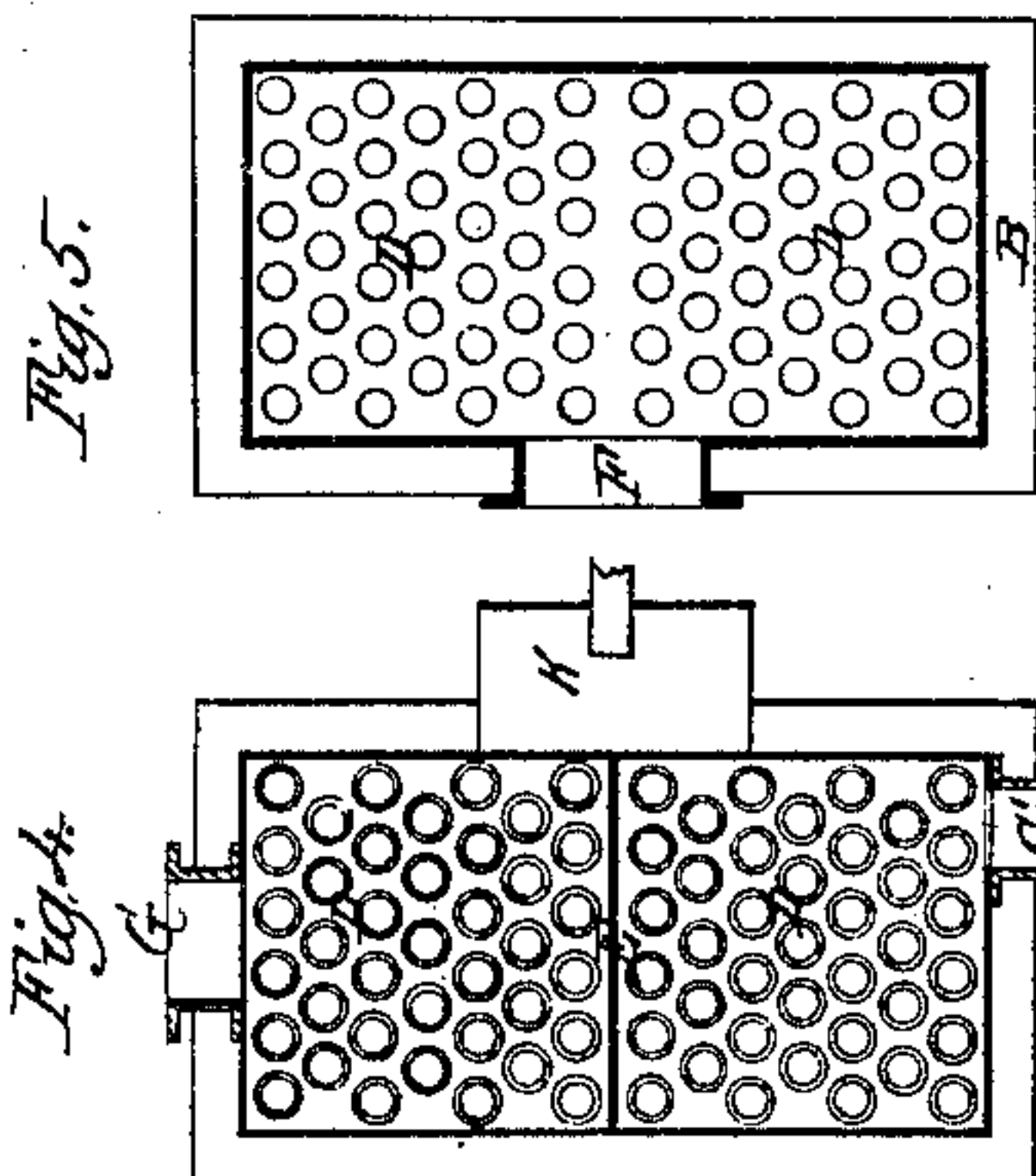


No. 31,547.

PATENTED FEB. 26, 1861.

W. A. LIGHTHALL.

REFRIGERATOR FOR COOLING THE CONDENSING WATER AND CONDENSED
STEAM OF STEAM ENGINES.



Witnesses. Francis S. Lord.
H. B. Babcock.

Inventor.
Wm A Lighthall.