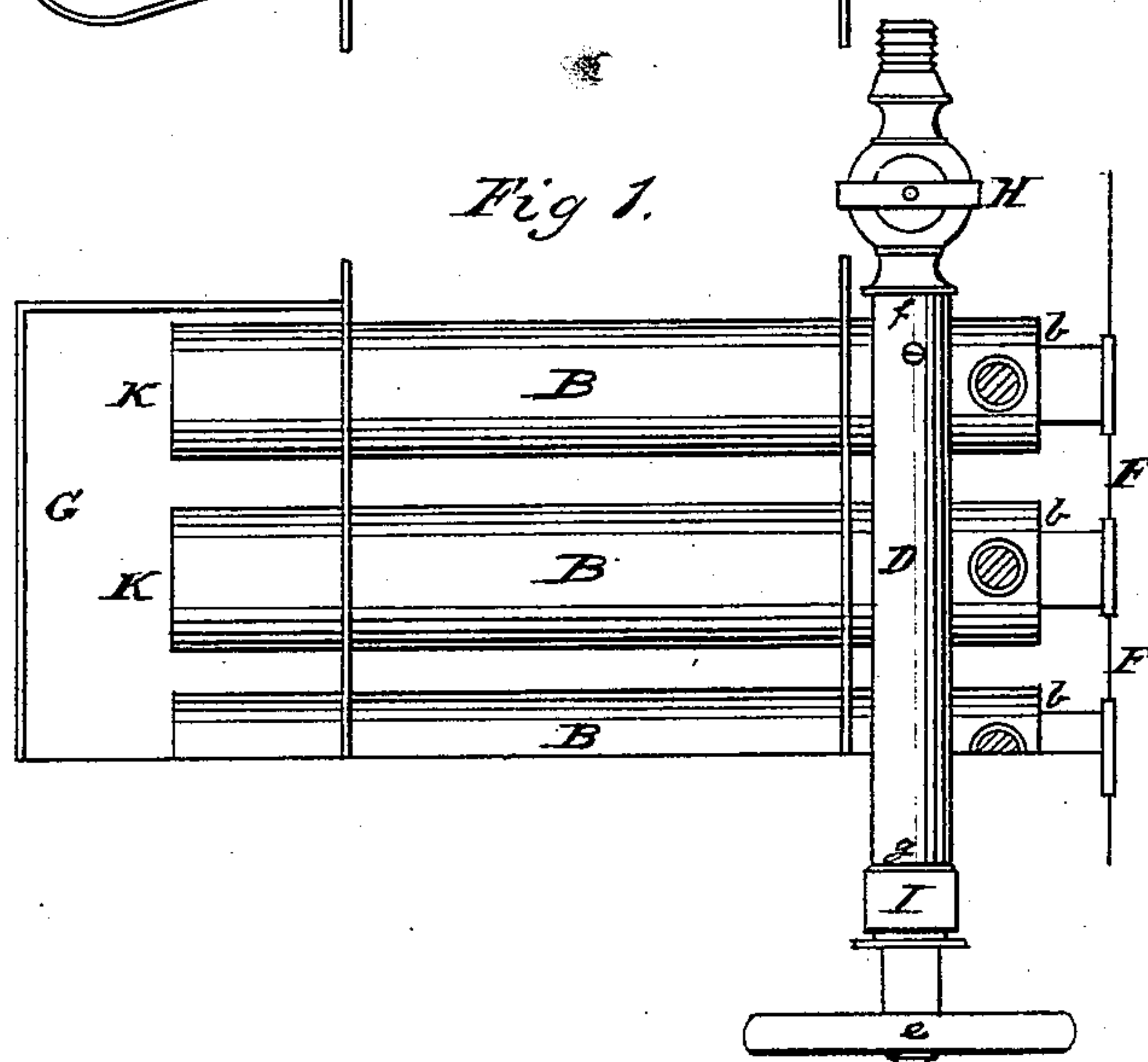
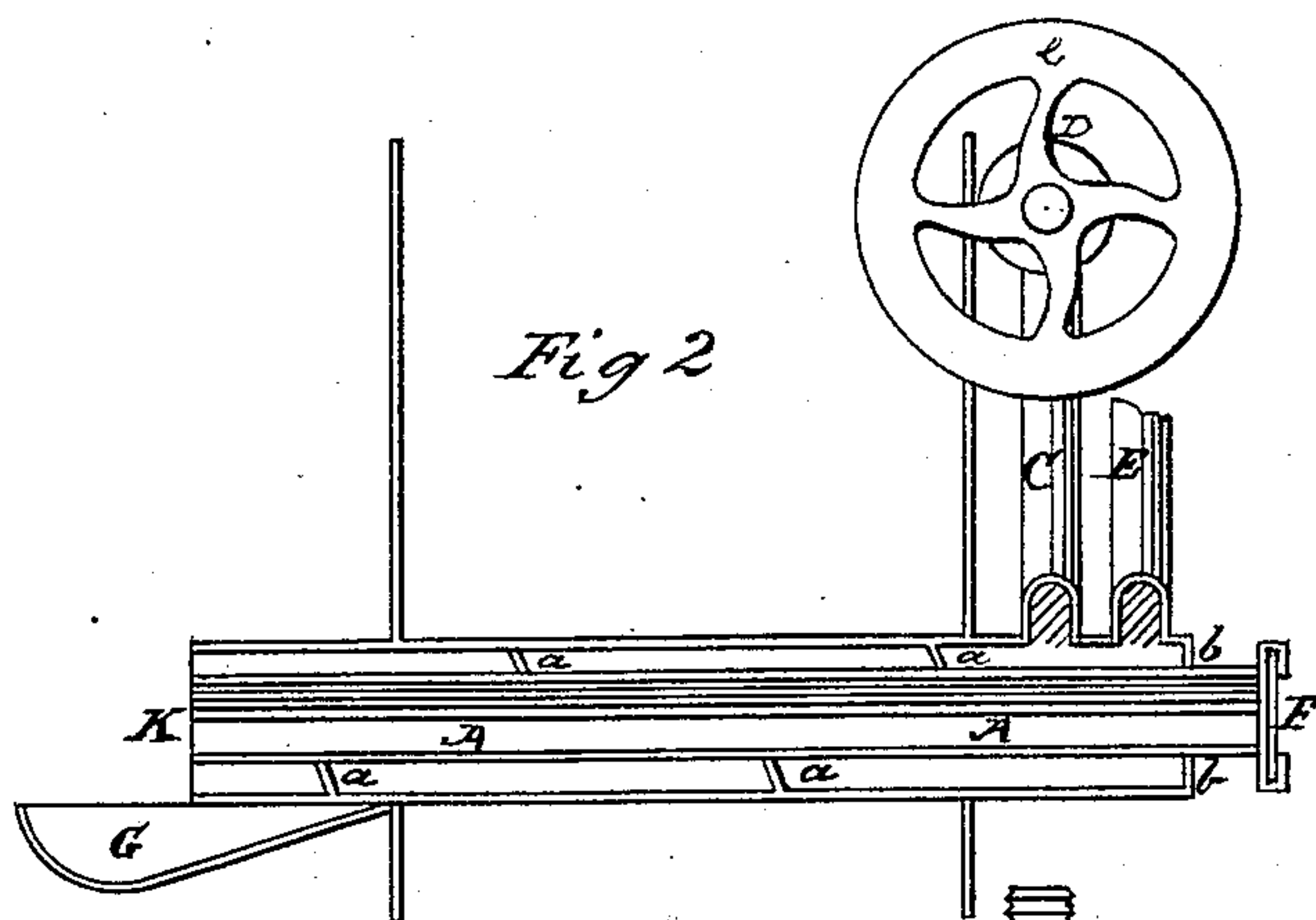
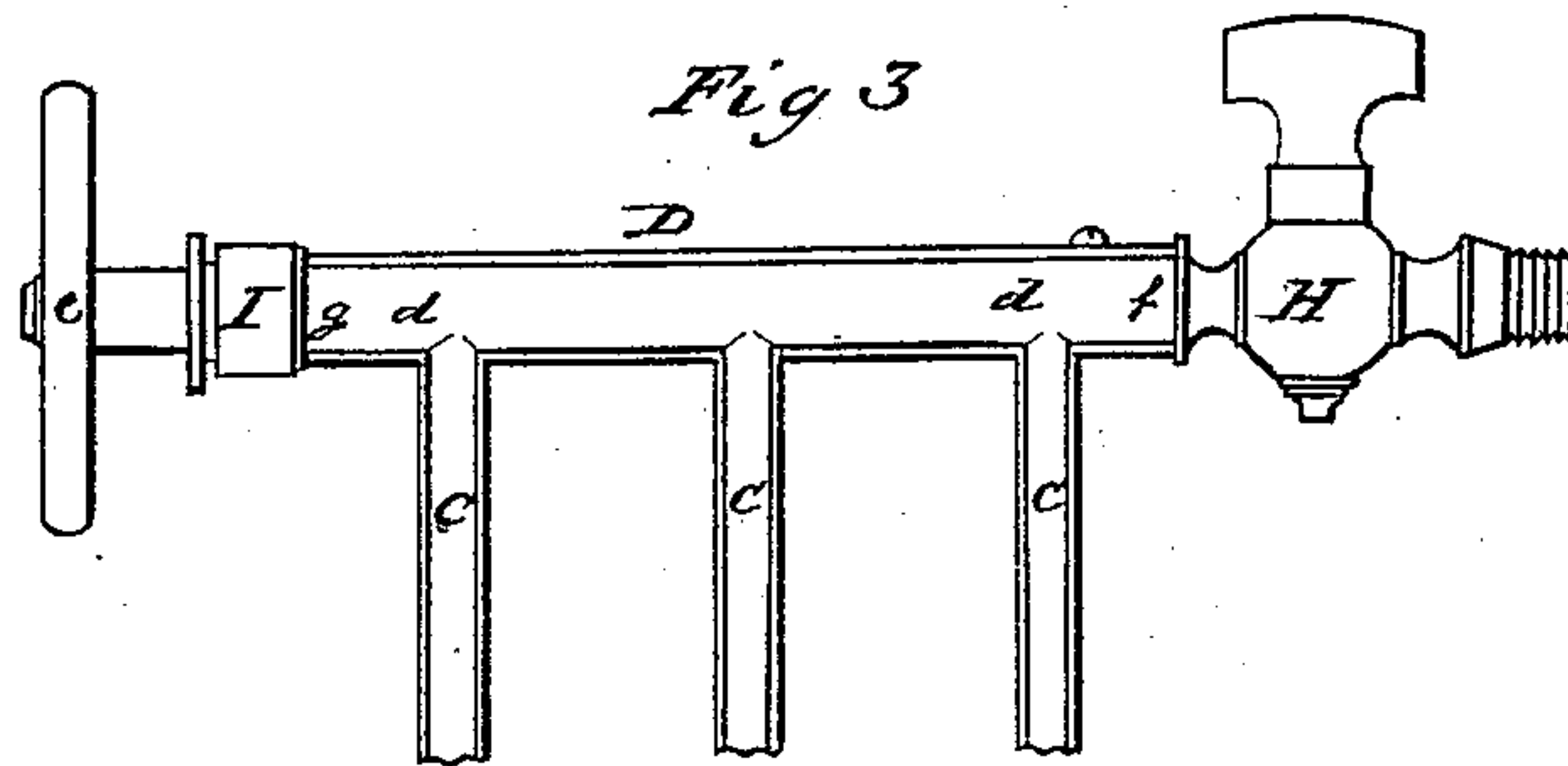


H. NAPIER.
Hydrocarbon-Furnace.

No. 160,027.

Patented Feb. 23, 1875.



Witnesses
James Napier
Jas. J. Parkins

Inventor
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UNITED STATES PATENT OFFICE.

HENRY NAPIER, OF NEW YORK, N. Y., ASSIGNOR TO JAMES NAPIER, OF
EAST ORANGE, NEW JERSEY.

IMPROVEMENT IN HYDROCARBON-FURNACES.

Specification forming part of Letters Patent No. 160,027, dated February 23, 1875; application filed
January 12, 1875.

To all whom it may concern:

Be it known that I, HENRY NAPIER, of New York, State of New York, have invented an Improved Oxyhydrocarbon-Furnace, of which the following is a specification:

The object of my invention is the construction of an improved oil or gas furnace, applicable to all purposes of generating steam for locomotive, marine, or stationary boilers, and for metallurgical and chemical operations. It consists in devices for burning the hydrocarbon in connection with steam (superheated, if desired) or air, heated, if thought fit, or both, and for regulating the supplies of oil, steam, and air, according to the necessities of the case.

The apparatus is illustrated in detail in the drawings accompanying this specification, Figure 1 being a plan view; Fig. 2, a horizontal section, and Fig. 3 a sectional view of the regulating supply-pipe.

The figures or letters in each diagram represent the same relative portions of the apparatus.

A and B are metal tubes, preferably of brass, concentric with each other, the inner tube A having cast, brazed, or turned upon it a long spiral, *a a*, fitting closely into B, leaving the interstitial space, as shown, between the tubes. B is closed at the end *b b*, while A is left open at both ends, though capable of having its rear orifice wholly or partially closed by a perforated slide-damper, F. C is an oil-tube opening into the regulating supply-tube D. E is a steam-pipe, connected with a boiler, and regulated by a tap or valve. (Not shown in the drawings.) C and E both open into the tube B, as shown. G is a cup or trough for lighting and other purposes.

The regulating-tube D is constructed with a well-fitting inner tube, *d*, having perforations corresponding to the orifices of the pipes C. The tube *d* is fitted with a lever-handle, *e*, and is open at one end, *f*, but closed at the other, *g*.

At the open end of the regulating-tube is a stop-cock, H, for the purpose of admitting the

fuel used from a tank or vessel placed above the level of the tube D, and at the closed or lever end it is secured by a stuffing-box, I, so as to prevent leakage.

The operation of my furnace is as follows, viz: A small quantity of the fuel to be used is poured into G and ignited. The oil is then admitted into the supply-tubes, and steam is also supplied through its pipes. The spiral *a a* not only causes the oil and steam to mix intimately in vapor, but compels them to envelop the whole circumference of the tubes at the combustion end.

The steam is decomposed in the act of combustion, and its gases inflame along with the hydrocarbon vapors, giving an intense heat, which can, however, be modified by means of the stop-cocks and valves attached to the oil and steam supply-tubes.

By the combined action of the heat and draft a powerful current of air is carried through the tube A, and can be regulated by the slide F; or the air-current can be cut off entirely, or the steam-blast can be shut off as the conditions of a manufacture may require.

The arrangement, as shown, of the supply-tube D insures a constant and equalized supply of fuel to the furnace-tubes under all circumstances, whether the furnace be stationary and on a level or on a moving body, having great irregularity of level, as on a locomotive or a steamship.

The capacity of my furnace may be indefinitely increased by adding to the number of combustion-tubes, and arranging them in sections, each section having its own supply-tube, stop-cock, and steam-supply, so that the whole furnace, or any sectional part of it, could be used as the nature of the work demanded.

I do not confine myself to the exact form of the tubes, nor to the particular metal of which they are constructed; nor do I desire to bind myself to their arrangement in parallel lines; but

I claim—

1. In a hydrocarbon-furnace, the combina-

tion of the tubes A, having spiral flanges *a*, with the tubes B, substantially as and for the purpose set forth.

2. The combination of the tube D, having its regulating-tube *d*, with tubes C and B, the tubes C forming a steam and oil tight connection between tubes D and B, substantially as shown and described.

3. The combination of the tube B with tubes C, E, and A, the latter provided with spiral flanges *a* and damper F, substantially as and for the purpose specified.

HENRY NAPIER.

Witnesses:

JAMES NAPIER,
OSCAR MARSH.