

(No Model.)

C. HEINZERLING.
STEAM MOTOR.

No. 311,983.

Patented Feb. 10, 1885.

Fig. 4.

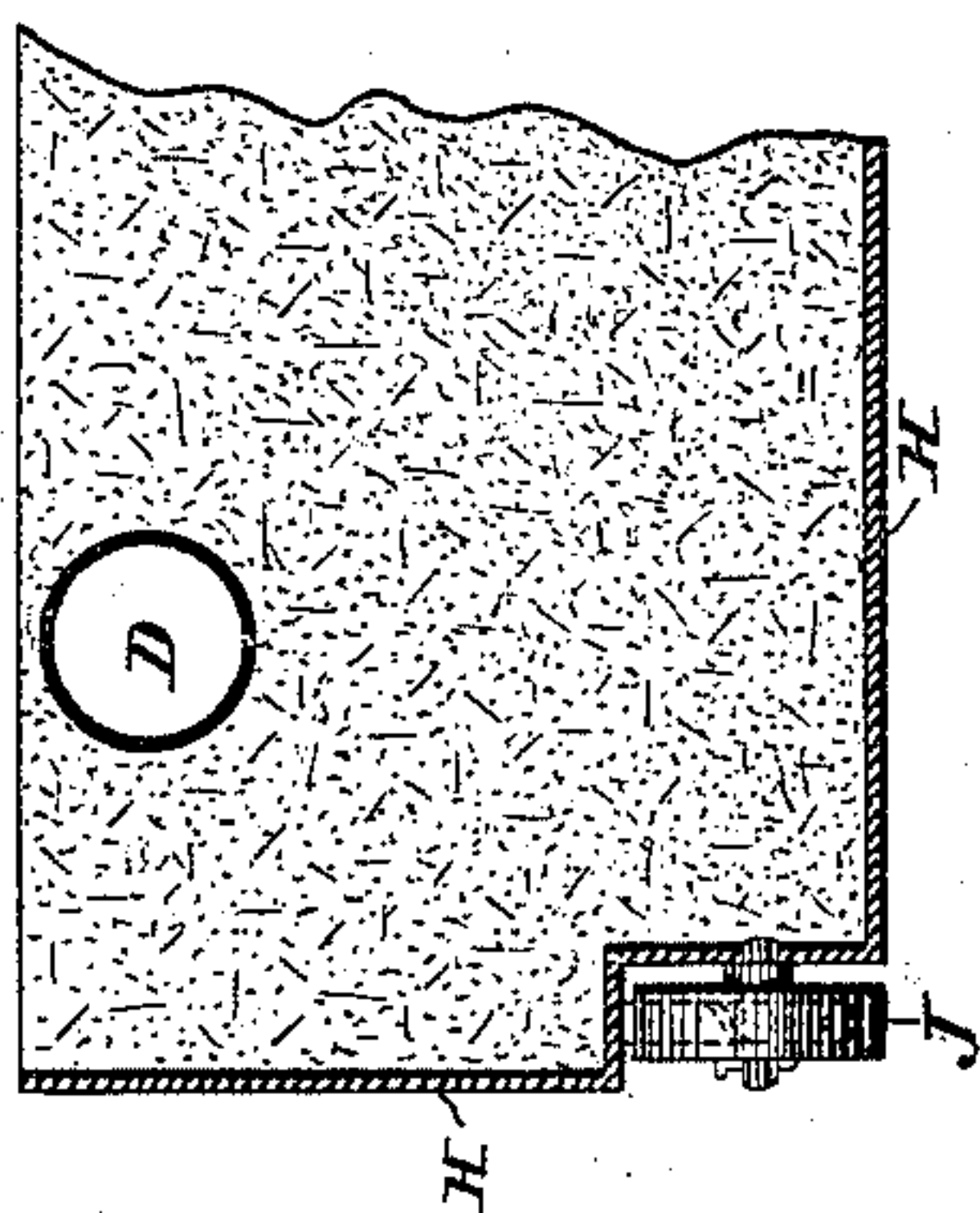


Fig. 3.

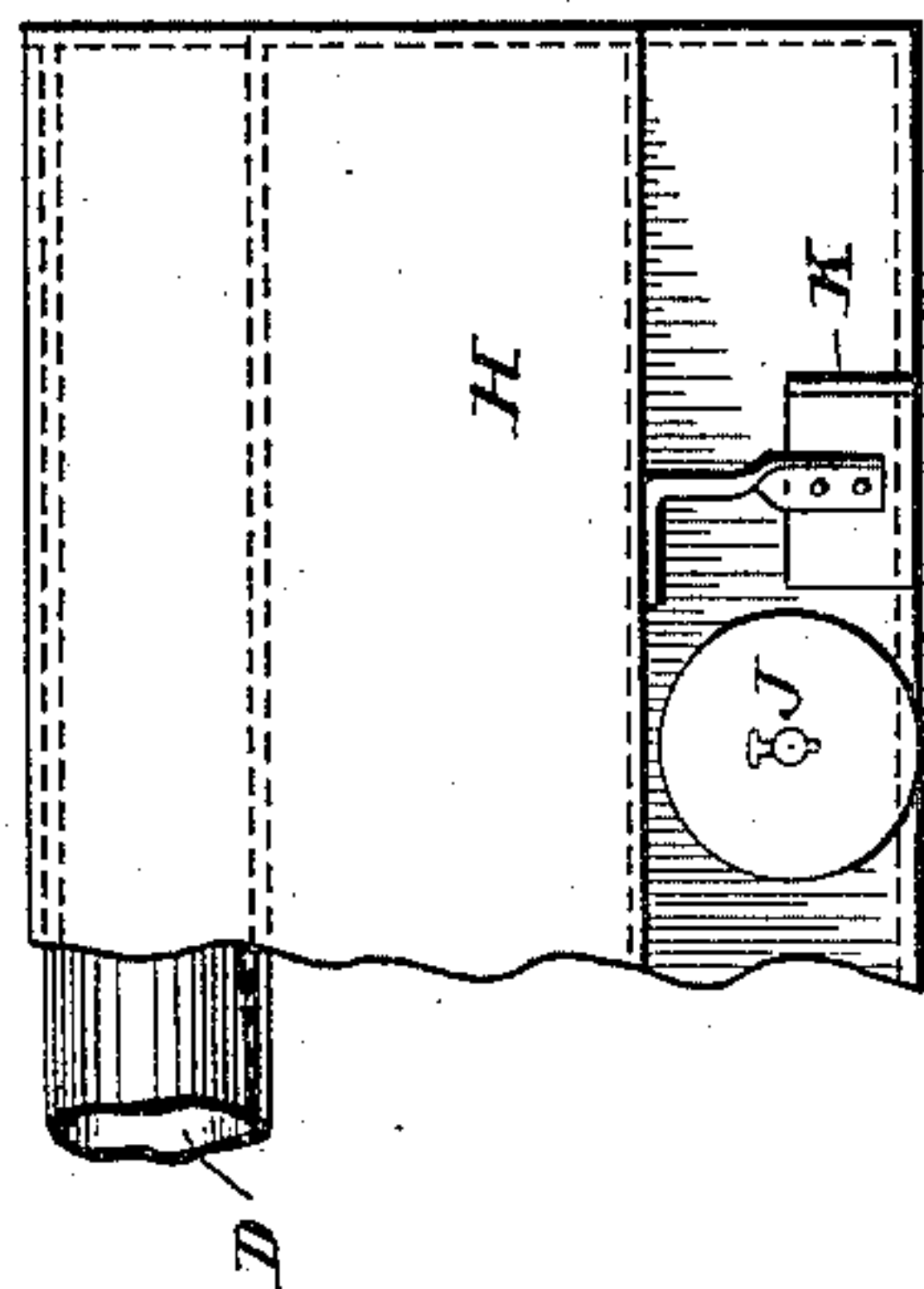


Fig. 2.

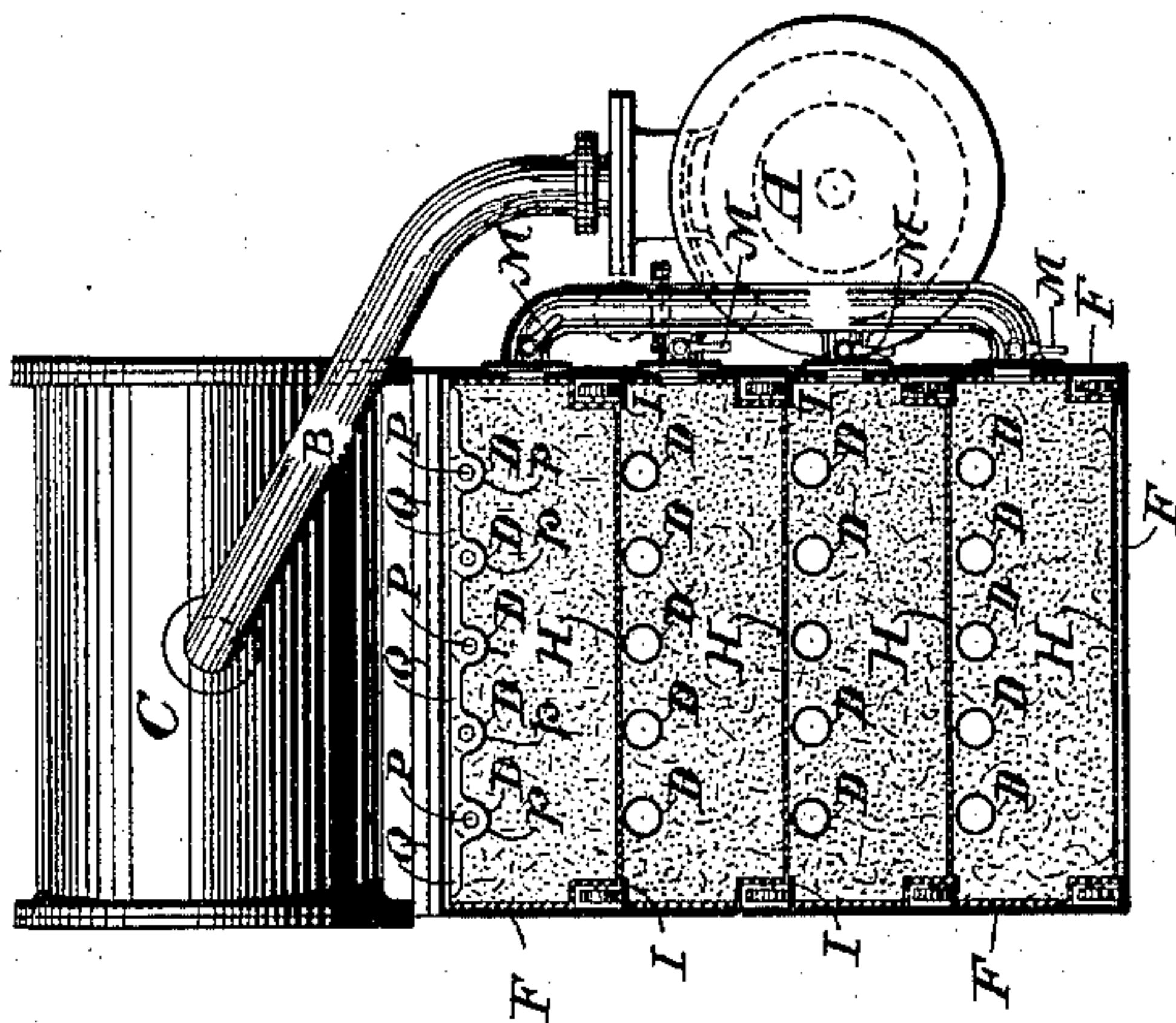
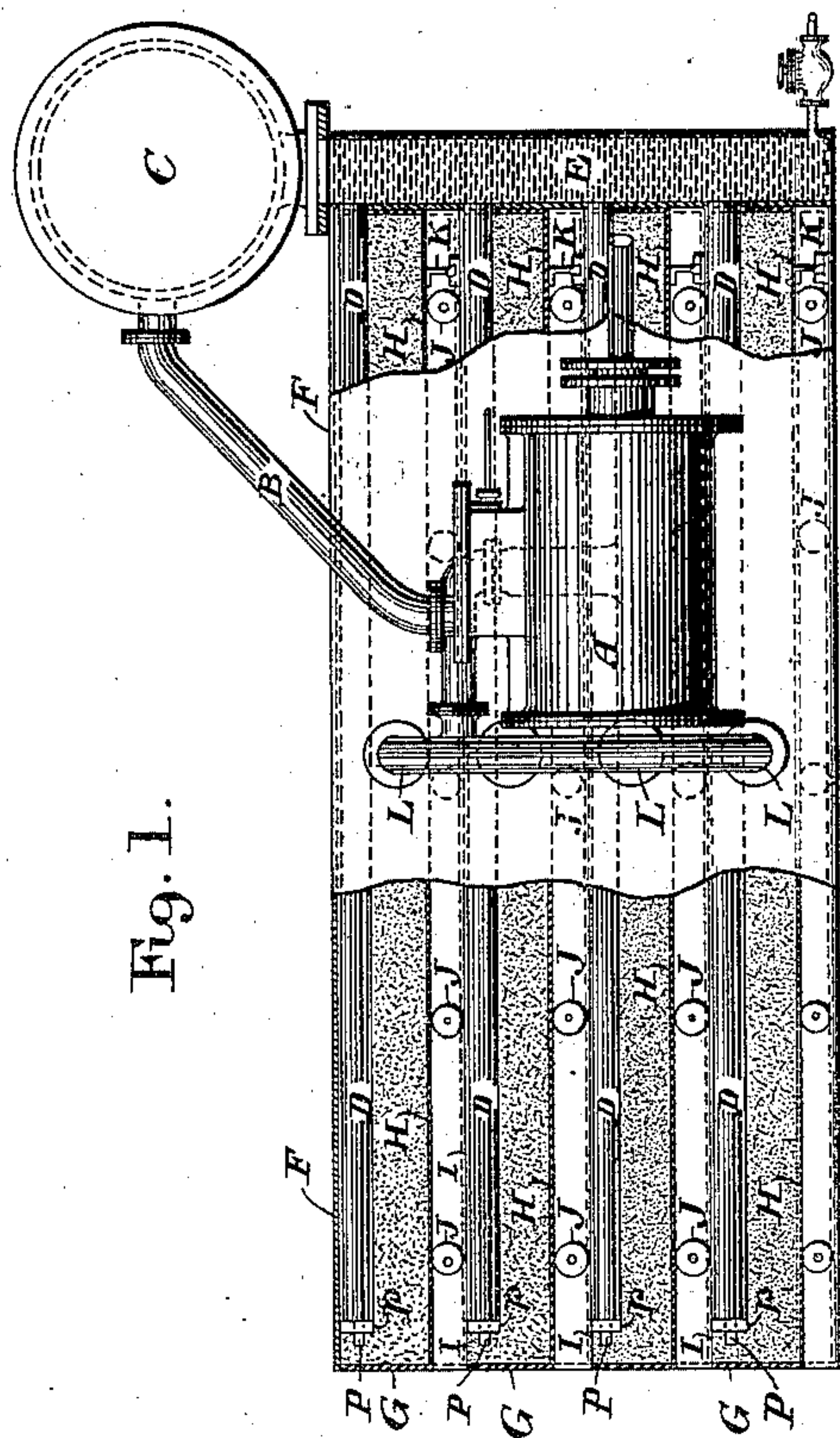


Fig. 1.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHRISTIAN HEINZERLING, OF FRANKFORT-ON-THE-MAIN, GERMANY.

STEAM-MOTOR.

SPECIFICATION forming part of Letters Patent No. 311,983, dated February 10, 1885.

Application filed April 3, 1884. (No model.) Patented in Germany March 28, 1884; in England March 31, 1884, No. 5,699, and in France March 31, 1884, No. 161,293.

To all whom it may concern:

Be it known that I, CHRISTIAN HEINZERLING, of Frankfort-on-the-Main, in the Empire of Germany, doctor of philosophy, have
5 invented certain new and useful Improvements in Steam-Motors, of which the following is a specification.

This invention is best described by aid of the accompanying drawings, in which Fig-
10 ure 1 is an elevation partly in section, and Fig. 2 a transverse section, of boiler with the cylinder of steam-engine attached; Figs. 3 and 4, enlarged details of roller and scraper and adjoining parts.

15 This invention has for its object a fireless engine applicable for running on tramways, in tunnels, in powder-magazines, in coal-mines, and in other places where fire and smoke are objectionable. I also hope that it
20 may be found a useful substitute for a steam-engine for many other cases.

Referring to the drawings, which are merely an illustration of my motor and not given as
25 binding me to this exact arrangement—

A is a cylinder of an ordinary steam-engine; B, steam-pipe leading from steam-chamber C; D, tubes of boiler opening into the water-
30 chamber; E, water-chamber, a lower continuation of steam-chamber C. This chamber can be stayed like a locomotive fire-box.

F is a tank, of sheet-iron, brick-work, or any convenient material, open at end G; P, plugs in the ends of the tubes to prevent the escape of steam and water. These plugs have pro-
35 jecting pins resting on round lugs *p* of same diameter as the tubes, but joined at top to bar Q, acting as a support for the tubes, and supported itself by the sides of the tank; H, drawers with fronts outside the tubes, fitting
40 closely against each other when closed, and running on ledges I I. In the case of drawers of large size a set of rollers, J J, are placed in a groove all along each side, to support them and run upon the ledges I. In some cases I
45 place a scraper placed askew at intervals in the line, as shown at K, to scrape from off the ledges any lime or dirt that may fall on them.

L is the exhaust-pipe from the engine, divided into as many branches as there are
50 drawers, and each branch is provided with a

stop-cock, M, and leads into the tank opposite the center of one of the drawers. The side of the drawer is perforated with numerous little holes at this point, to admit the steam into the drawer without allowing the lime, 55 hereinafter mentioned, to fall out.

The mode of action is as follows: The tubes D and chamber E being filled with water from a high-pressure boiler, and the chamber C filled with steam in consequence, and all the 60 drawers filled with quicklime or strontia and closed, the engine is set going. Lime is best and cheapest, and hereinafter I will merely speak of lime, it being understood that strontia can be substituted for it and is included in the 65 term. Baryta also absorbs steam, giving out heat; but as the caustic baryta cannot be easily regenerated, it is practically inapplicable. The exhaust-steam is let into one or more of the lime-drawers, preferably the upper ones 70 first, and the heat generated by the combination of the H_2O and the CaO , so as to form hydrate of lime combined with the latent heat of the exhaust-steam liberated when the steam changes from the gaseous to the solid state (in 75 the hydrate) passes to and heats the water in the boiler, thus raising more steam. This action goes on till all the lime is converted into hydrate, and the heat in the lime and in the water and steam is lowered to such a degree 80 as to stop the working of the engine. If, however, water from the aforesaid high-pressure boiler be let in or be pumped by the engine or by hand or other means into the boiler, and if, as one or more drawers get exhausted 85 the steam is turned into others, and these drawers are emptied and recharged with fresh quicklime, the motor can run on continuously. If, too, the drawers or their equivalent be made air-tight and an air-pump be applied in 90 the usual manner, the lime-chamber becomes a condenser, and a vacuum is formed, helping the engine greatly. The spent-lime hydrate by ignition to bright redness is again reduced to quicklime CaO and can be again used; or, 95 if preferred, it can be used for mortar, and a fresh supply of limestone used. It will be seen at once that it is not absolutely necessary that the tubes and drawers should be horizontal, or even that there should be drawers at 100

all. There could be vertical tubes or water-chambers surrounded by vertical lime-chambers, and wire or skeleton cages filled with lime could be raised or lowered, as required, into or out of the lime-chambers. The result would be the same. Similarly, if the engine had only to run for a time and not continuously, the lime could be charged into one chamber, and a single exhaust-pipe open into it.

This apparatus can be used as a stationary engine for a drilling-engine, a locomotive or tramway engine, or for almost every purpose for which a steam-engine is applicable.

I do not in this case broadly claim the method described of generating steam, as such method is claimed in another application filed by me, and designated by Serial No. 128,190.

I claim as my invention—

1. The motor formed of a boiler surrounded by quicklime or strontia, and an engine delivering its steam into that quicklime or strontia, substantially as described.

2. The combination of a tubulous boiler surrounded for the most part by quicklime or strontia, and a casing holding or boxing up said lime, whereby steam can be run into said lime without escaping and heat raised thereby for raising steam in the boiler.

3. In combination with a multitubular water-tube steam-boiler, a case holding quicklime or strontia surrounding the tubes and divided by partitions, whereby the lime is held

up to the tubes instead of settling in a dense mass at the bottom.

4. The combination, with a steam-boiler, of the drawers H, filled with quicklime or strontia, capable of being withdrawn from time to time and recharged.

5. The combination of the tubes D, plugs P, bearers Q, and lugs G, of the same or of less diameter than the tubes, whereby the drawer full of lime can be pushed in without any impediment except the actual tubes and the friction of the sides and a thin bar above, and the lime will remain close round the tubes without vacant space.

6. In combination with a series of charging devices, H, for charging lime among the tubes of the boiler, a series of exhaust-pipes with stop-valves leading into each charging device, whereby one charging device can be turned off and recharged while the others are being utilized.

7. In a lime-engine, the combination of the drawers H, filled with quicklime or strontia, and the runners and ledges for them to run upon, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHRISTIAN HEINZERLING.

Witnesses:

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A. S. HOGUE.