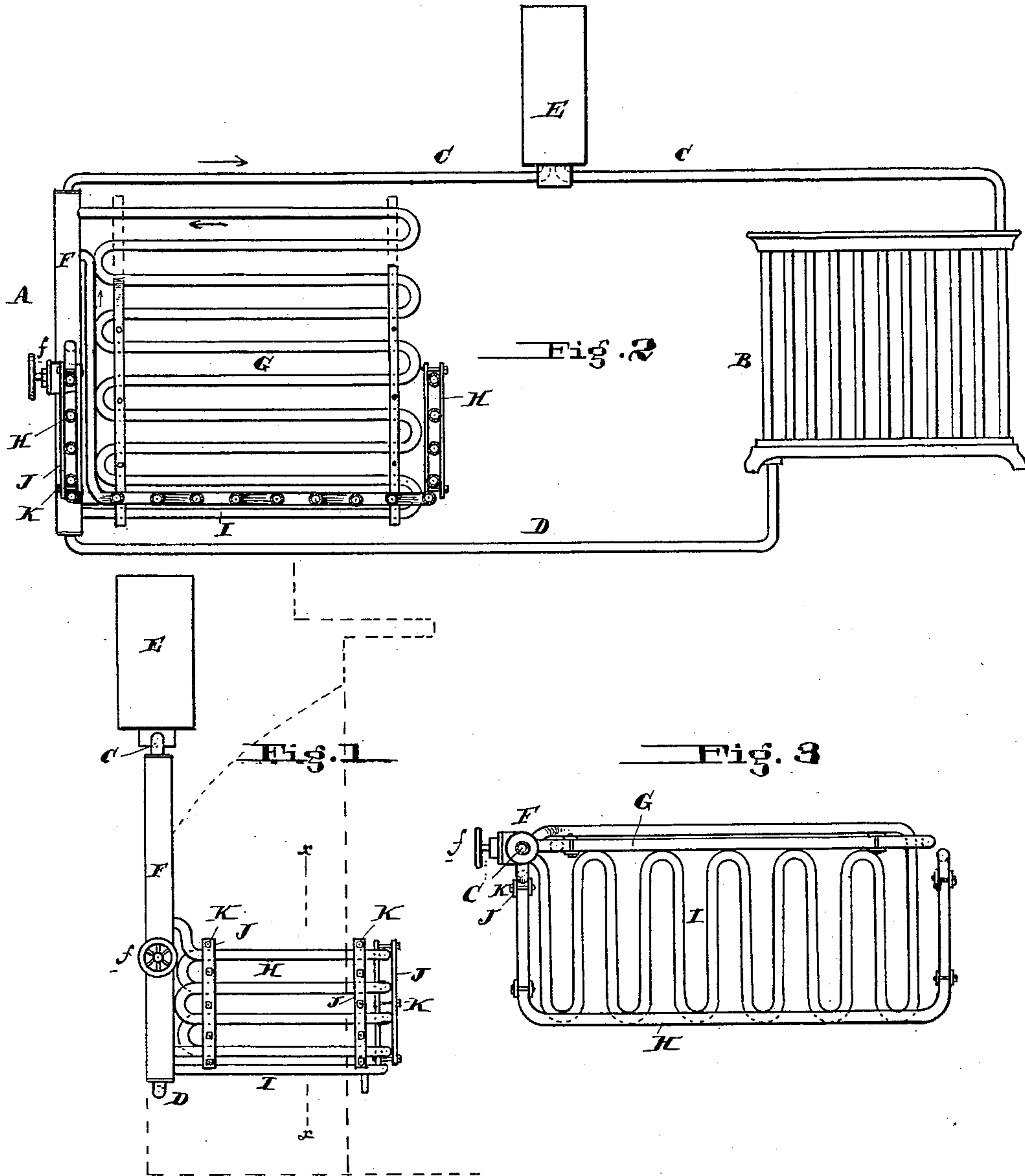


(No Model.)

G. H. REYNOLDS.
HEATING APPARATUS.

No. 366,877.

Patented July 19, 1887.



Attest
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J. Maguire.

Inventor
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By his atty.

[Signature]

UNITED STATES PATENT OFFICE.

GEORGE H. REYNOLDS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO
LUCIUS G. FISHER, JR., OF SAME PLACE.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 366,877, dated July 19, 1887.

Application filed June 22, 1885. Serial No. 169,455. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. REYNOLDS, of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and
5 useful Improvement in Heating Apparatus, of which the following is a specification.

My invention has reference to heating apparatus; and it consists in the combination of a grate the metal-work of which is made hollow,
10 and through which water is adapted to circulate, with a hot-water radiator and connecting-pipes, by which the water is caused to circulate through the system so long as a fire is kept in the grate; further, in the heating-grate for
15 said apparatus, formed of tubes preferably in sections, one end of which opens into the upper part of a main, and the other end of which opens into the lower end of the main, whereby the heated water is caused to flow through the
20 tubes of the grate as well as the main, insuring it becoming heated without danger of injurious effects due to the sudden generation of steam, as would be the case if the main were not continuous, and in details of construction, all
25 of which are fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

The object of this invention is to provide a suitable apparatus for heating dwellings
30 through the application of hot water by the open-grate fires of one or more rooms, or, if desired, the range or stove fire of the kitchen. By the employment in this manner the heat of contact now lost in grate fires the entire or
35 greater part of a house may be kept in a heated and comfortable condition without increase of expense or additional labor.

In the drawings, Figure 1 is a side elevation of heating apparatus embodying my invention.
40 Fig. 2 is a sectional elevation of same on line *x x*, and Fig. 3 is a plan view of the grate.

The grate A consists, essentially, of tubes bent or coiled and combined so as to form a cradle for the coal. As shown, there are three
45 coils of pipes, G, H, and I. The coil G forms the back, and preferably extends up considerably higher than the others. The coil H forms the sides of the basket, and the coil I forms the bottom of same. One of the ends of each coil

is connected to the lower end of a water-main, 50 F, while the other end connects with the same main higher up, as shown. From this it is seen that if cold or cool water is fed to the bottom of the main F part of it will pass through the coils G, H, and I, owing to the circulating
55 effect produced by the escaping hot water from the upper ends of these coils into the main F.

The main F may be unobstructed, so that water may pass through it as well as the coils, so in case of too rapid heating of the water in
60 the coils to allow it to be more or less diluted with cooler water passing directly up through said main; or it may be provided with a valve between the top and bottom connections with the coils G, H, and I, by which, when a small
65 fire is on or when starting up a fire, all of the water may be required to pass through the coils, and by suitably regulating the opening in the valve-passage the degree of positive circulation may be controlled. 70

The coils may be rigidly held together by suitable bracing or clamps, J, secured by bolts K, and the grate may be placed within the usual fire-place, range, or stove.

B is a hot-water radiator, of which there
75 may be any desired number, which radiators are located in the part of the building to be heated, and are connected with the grate-main F by supply-pipe C and return-pipe D, connecting, respectively, with the top and bottom
80 of said main. The supply-pipe C may be provided with an air-chamber, E, to allow for any excessive expansion due to the generation of steam, acting as a safety device.

The operation is as follows: The fire being
85 made in the grate and the valve *f* closed, the heated water circulates from the coils G, H, and I into the upper part of the main F, thence through pipe C, radiator B, main D, and again into the main F, but below the valve *f*, and
90 into the lower ends of the coils G, H, and I, as indicated by the arrows. If the water is too hot, the valve *f* may be slightly opened, and then cooler water will mix with that coming out of the coils, reducing its temperature. 95

It is evident that, if desired, the three coils G, H, and I, or any two of them, may be made in one continuous coil; but I prefer to make

them separate, as part might then be replaced when burned out without necessitating the replacing of the entire grate.

The grate A is shown as made of coils of pipe; but it is evident that it may be of cast metal or sheet-iron so formed as to insure the circulation of the heated water, the particular construction being immaterial to my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The fire-grate of an open grate, range, or stove, consisting of water-circulating flues or coils G, H, and I and a main, F, having a valve, *f*, into which said coils open above and below said valve, as set forth, in combination with a hot-water radiator and pipes connecting the inlets and outlets from said heating flues or coils with the hot-water radiator, and an air-chamber located in said connecting-pipes, substantially as and for the purpose specified.

2. The open grate A, formed of coils G, H, and I, in combination with main F, and in which the two ends of each of said coils open

into said main at relatively different heights, substantially as and for the purpose specified.

3. The open grate A, formed of coils G, H, and I, in combination with main F, in which the two ends of each of said coils open into said main at relatively different heights, and a valve in said main between the upper and lower ends of the coils, substantially as and for the purpose specified.

4. The open grate A, formed of coils G, H, and I, in combination with main F, in which the two ends of each of said coils open into said main at relatively different heights, a hot-water radiator, B, a supply-pipe, C, connecting the upper end of main F with said radiator, and a return-pipe, D, connecting the radiator with the lower part of main F, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

GEORGE H. REYNOLDS.

Witnesses:

W. C. MCARTHUR,
H. HARRISON.