(No Model.)

J. HACKER.

WATER HEATER AND STEAM COOKER.

No. 433,238. Patented July 29, 1890.

Fig. 1.

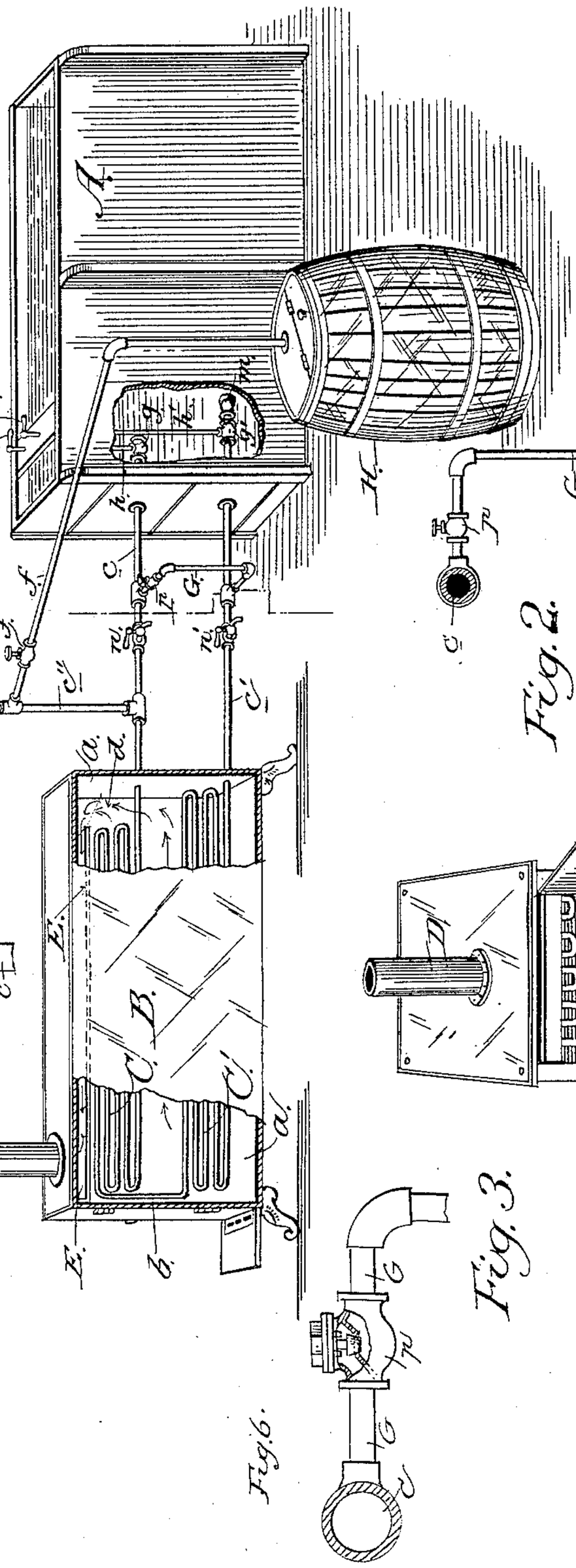

Fig. 2.

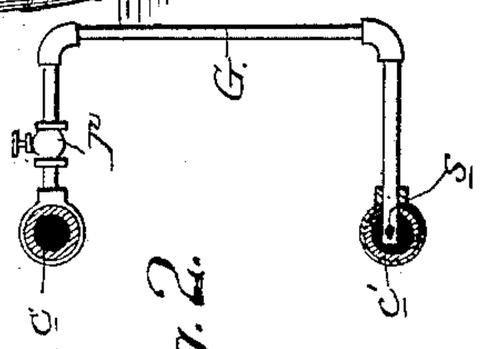

Fig. 4.

Fig. 5.

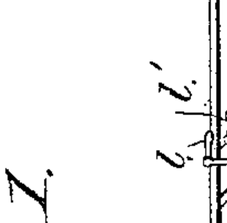

Fig. 3.

Fig. 6.

WITNESSES

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JOSEPH HACKER, OF WATERLOO, IOWA.

WATER-HEATER AND STEAM-COOKER.

SPECIFICATION forming part of Letters Patent No. 433,238, dated July 29, 1890.

Application filed February 13, 1890. Serial No. 340,243. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HACKER, a citizen of the United States, residing at Waterloo, in the county of Black Hawk and State of Iowa, have invented certain new and useful Improvements in Water-Heaters and Steam-Cookers, of which the following is a full and clear description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view showing the arrangement of my heating apparatus. Fig. 2 is a detail showing in section a portion of the pipe or connection. Fig. 3 is a perspective view of the heater looking toward the front. Figs. 4, 5, and 6 are detail views of the valves *e*, *m*, and *p*.

My invention relates to certain new and useful improvements in devices for heating water for domestic and stock purposes and for steaming food for stock. It is an improvement on the invention disclosed in a former patent granted to myself jointly with Lucius W. Colby and John W. Helton, No. 421,724, dated February 11, 1890; and it consists in the construction and combination of devices which I shall hereinafter fully describe and claim.

To enable others skilled in the art to make and use my invention, I will now describe its construction and indicate the manner in which the same is carried out.

In the accompanying drawings, A represents a tank of any suitable construction and capacity, adapted to contain water, and B is a heater or furnace having connections by which the water in the tank may be heated, the said heater comprising an exterior casing *a*, within which two connected coils C and C′ are secured, one at the top and the other at the bottom of the furnace and the two coils being connected together by a pipe *b*. The coils C and C′ are horizontally arranged and may be inclined toward opposite sides, as shown in Fig. 3, and the lower coil C′ may serve as a grate upon which the fire is built, or any well-known form of heating medium placed to effectively heat the water in the coils. The upper and lower coils C and C′ terminate in pipes *c c′*, which extend rearwardly through the rear wall of the casing *a*, and thence extend into the water-tank in substantially the manner shown.

The heater B is provided with a flue or stack D for the escape of the products of combustion, and the upper coil C is preferably somewhat shorter than the coil C′, and terminates a sufficient distance in front of the rear wall of the casing *a* to form a passage *d* for the products of combustion before they reach the flue or stack D. To form a horizontal flue above the upper coil, I employ a plate E.

As far as described the construction of my apparatus is substantially the same as that disclosed in my said former application, while the operation of the several parts is likewise substantially the same, the water being drawn from the tank through the lower pipe *c′* and into the coils, where it is heated and then caused to flow through the pipe *c* back into the tank to raise the temperature of the water therein.

In the present case I have shown several improvements which greatly facilitate the operation of the apparatus and improve the results obtained, and these improvements I will now describe. The pipe *c* is connected with a vertical pipe *c″* provided with a safety-valve *e* of any well-known form, and to the pipe *c″* is coupled another pipe *f*, which has its outer end adapted to enter a barrel or vessel H containing feed to be steamed or cooked, the said pipe *f* being provided with a globe-valve *f′* of any well-known form, and operating like similar valves in common use. The ends of the pipes *c* and *c′* within the tank A are provided with the well-known form of stop-cocks *g* and *g′*, respectively, whose plugs are connected with rods *h* and *h′* that extend upwardly and are provided with handles *l* and *l′*, by which the valves may be operated to cut off and open communication between the tank and coils. In addition to the stop-cock *g′* the pipe *c′* has its inner end provided with a check-valve *m* of the usual form, and both pipes *c* and *c′* are provided with "bib-cocks" *n* and *n′*, having handles by which they may be operated. Between the bib-cocks just mentioned and the water-tank A is a pipe or connection G, which is coupled to and unites the pipes *c* and *c′*, its upper arm being provided with a check-valve P, while its lower arm, which enters the pipe *c′*, is closed at its inner end and provided with a perforation *s*, made transversely through one side

of said arm, and opening toward the front or heater end of the apparatus.

From this description it will be seen that the operation of my apparatus is substantially as follows: To heat the water for domestic or other purposes, I introduce water into the tank A, start the furnace and open the stop-cocks *g* and *g'* to enable the water to enter the lower coil through its pipe *c'* and check-valve *m*, and finally be discharged back into the tank in a heated condition through the upper coil and its pipe *c*. If it be desired to generate steam for cooking the feed in the barrel or vessel H, the operator will close the stop-cocks *g* and *g'* to cut off the supply of water and then open the bib-cocks *n* and *n'* and draw off a portion of the water in the coils, so as to leave the higher pipes of the coils empty, and thereby practically create a steam-space therein. The bib-cocks are now closed and the stop-cock *g'* of the lower pipe *c'* is opened, likewise the globe-valve in the branch pipe *f*. Upon steam being generated in the coils its pressure will operate and open the check-valve *p* and permit steam to pass through the pipe or connection G and discharge through the perforation *s*. As the steam discharges from the perforation *s* forwardly it creates a suction in that portion of the pipe *c'* back of the connection G, and thereby automatically opens the check-valve in the inner end of said pipe *c'*, while the discharge of steam forwardly of the connection presses upon the steam and water in the coils to move the same forward. A portion of the steam passes into and through the branch pipe *f* and is discharged into the barrel or vessel to cook its contents. By inclining the coils toward the sides and providing their pipes *c* and *c'* with bib-cocks, as shown, I am enabled to draw the water from the coils, thereby overcoming the dangers incident to water freezing in the coils when the apparatus is not in use.

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

1. The combination, with a water-tank, and a heater having an upper and a lower coil provided with pipe-extensions which enter the water-tank, said extensions having their ends within the tank provided with stop-cocks, of a check-valve in one of said extensions, a pipe-connection coupled to both extensions exterior of the tank and provided with a check-valve, said pipe having one of its ends provided with a lateral perforation which discharges forwardly, substantially as and for the purpose described.

2. The combination of a water-tank, a heater having an upper and a lower connected coil, the pipes *c* and *c'*, extending from the coils and having stop-cocks *g* and *g'*, and one of said pipes *c'* having a check-valve in its end, the pipe G, connecting the pipes *c* and *c'*, and provided with a check-valve and lateral discharge-opening in line with the pipe *c'*, bib-cocks in the pipes *c* and *c'*, a vertical pipe *c''*, having a safety-valve and a pipe leading from the vertical pipe and having a globe-valve, substantially as and for the purpose described.

JOSEPH HACKER.

Witnesses:
JOSEPH SCHIEL,
J. W. HELTON.