No. 712,767. Patented Nov. 4, 1902.

H. A. CORDRAY.

OIL BURNING ATTACHMENT FOR STOVES OR FURNACES.

(Application filed Apr. 17, 1902.)

(No Model.) 3 Sheets—Sheet 1.

Fig: 1.

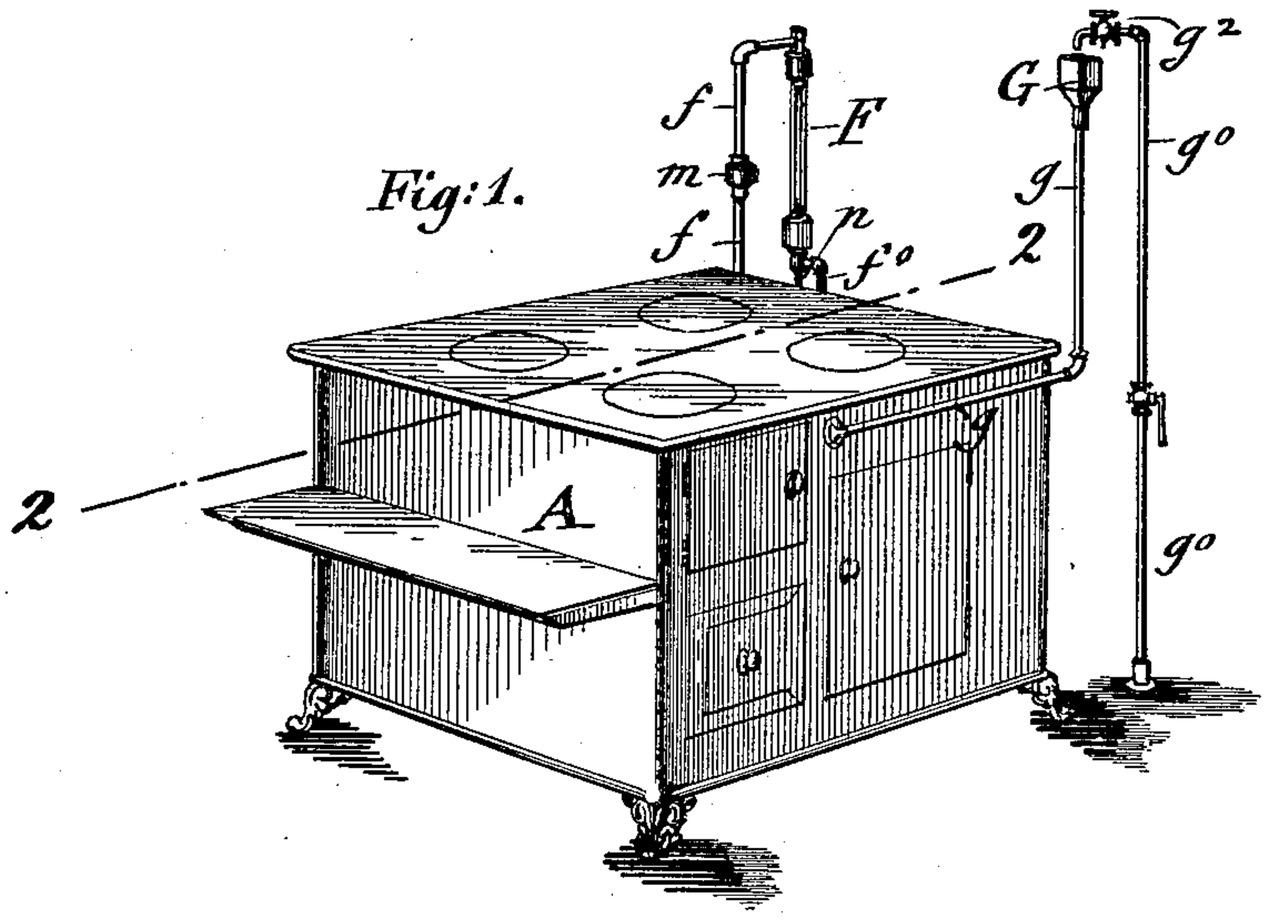
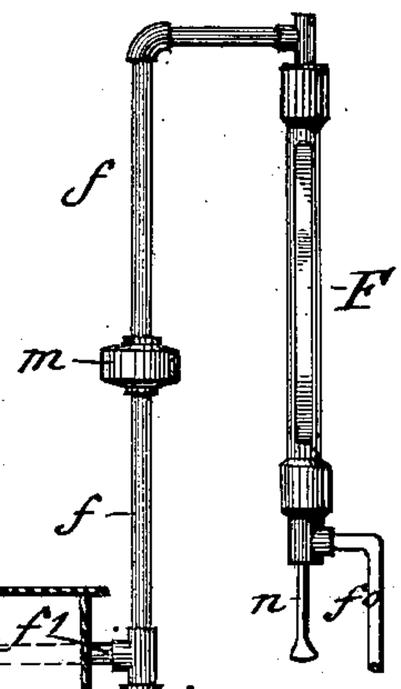


Fig: 2.



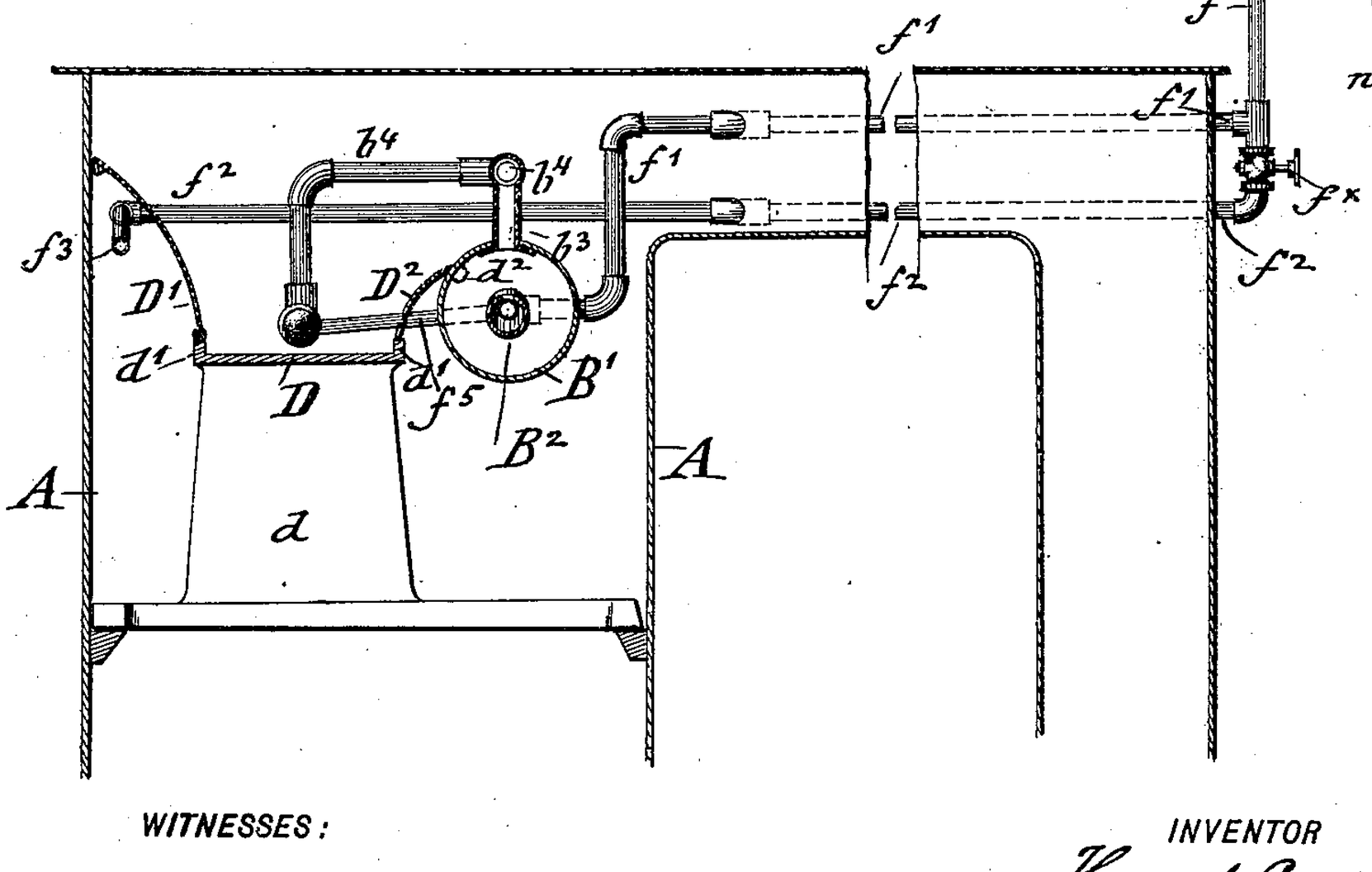


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Fig: 3.

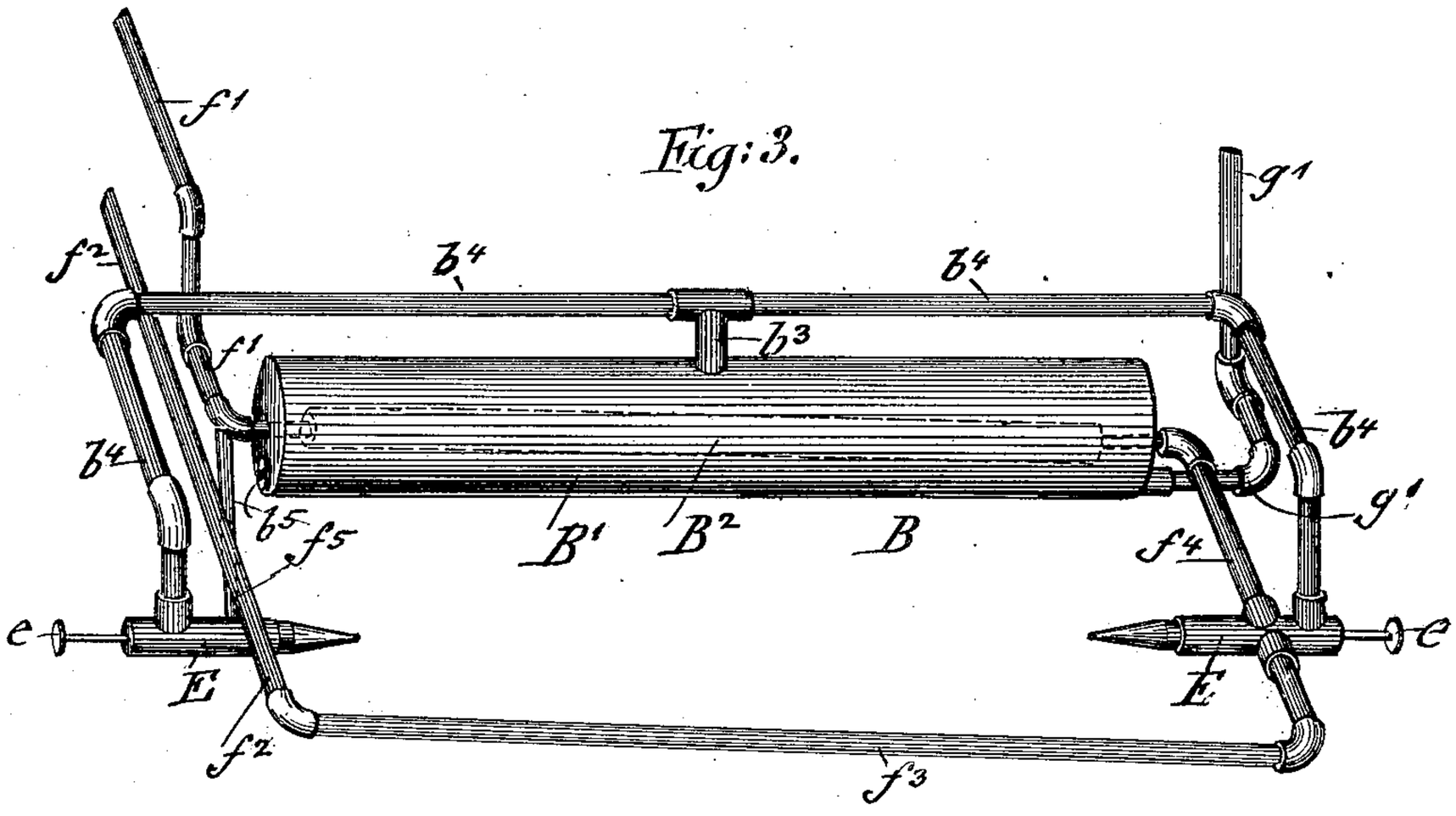

Fig: 4.

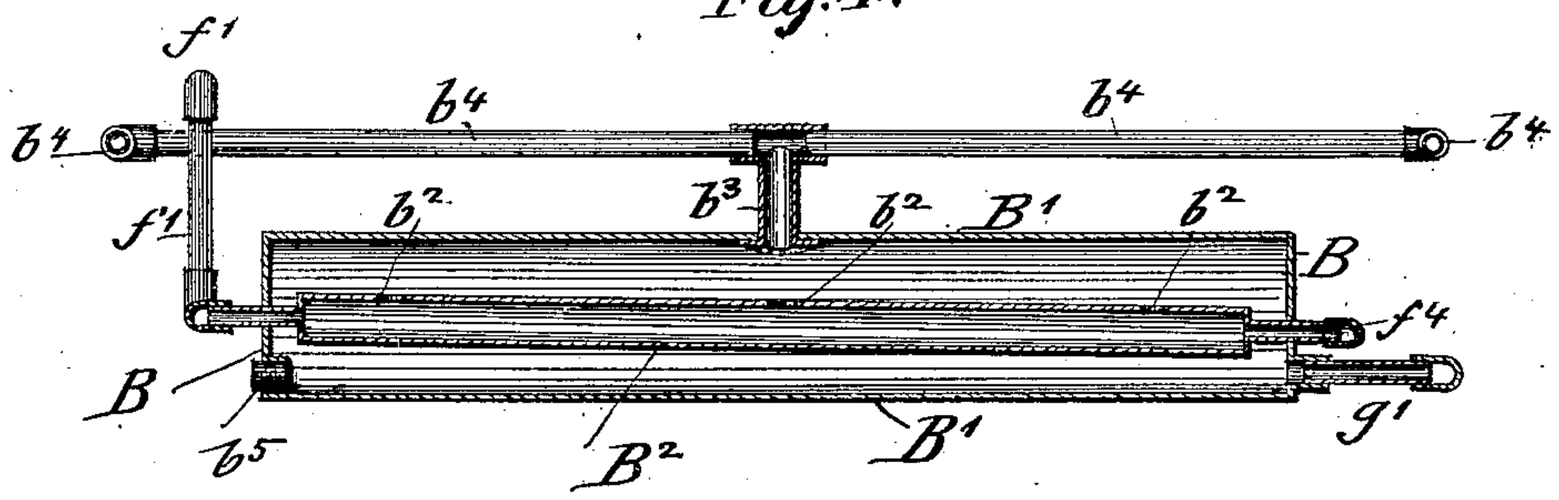

Fig: 5.

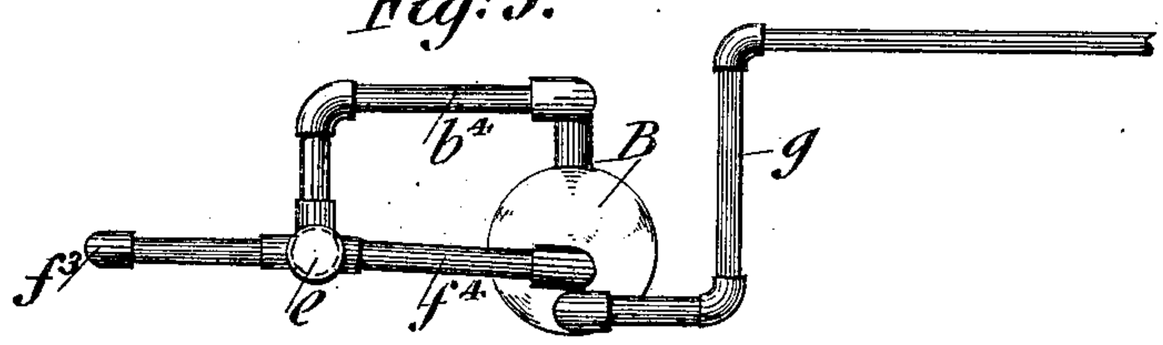

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Fig: 6.

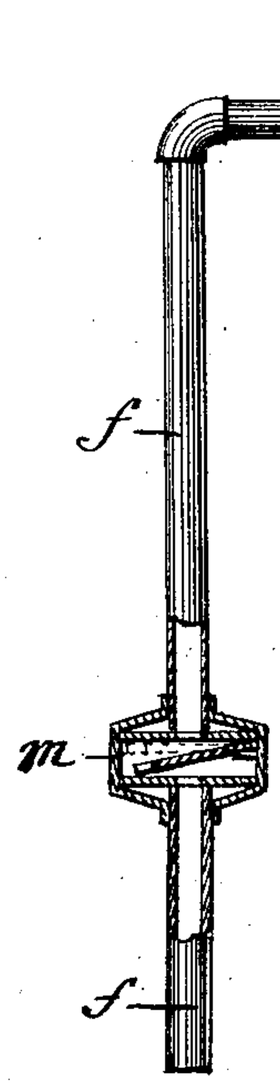


Fig: 7.

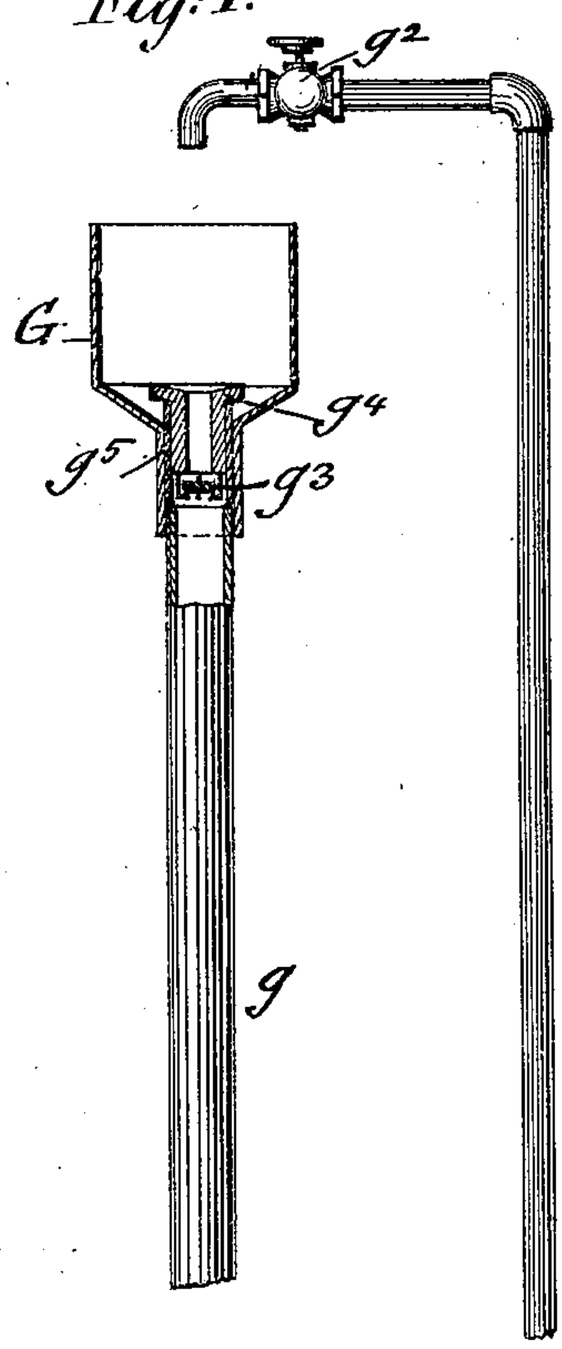


Fig: 8.

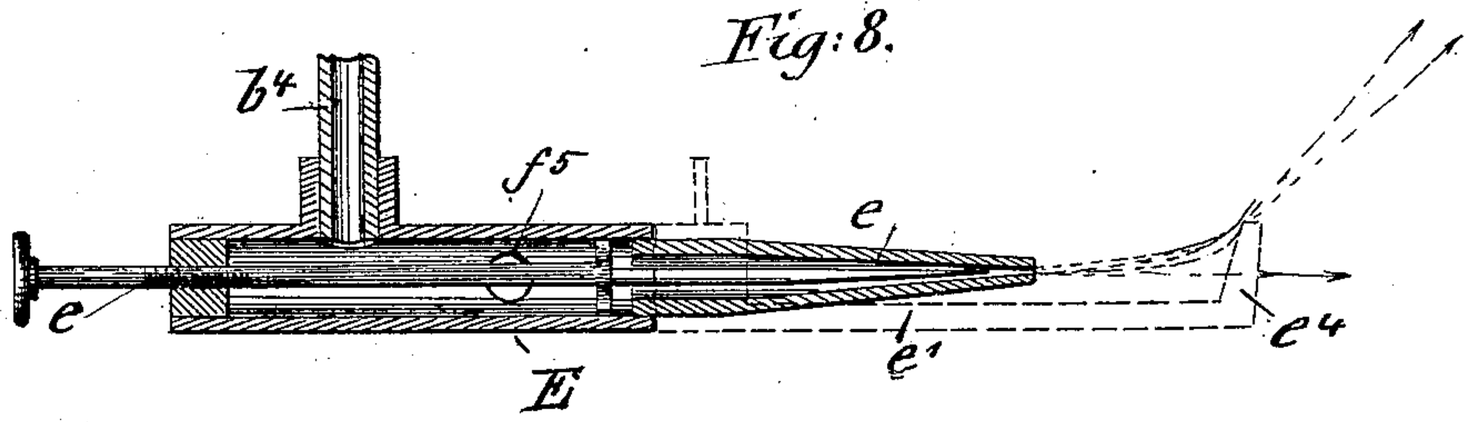
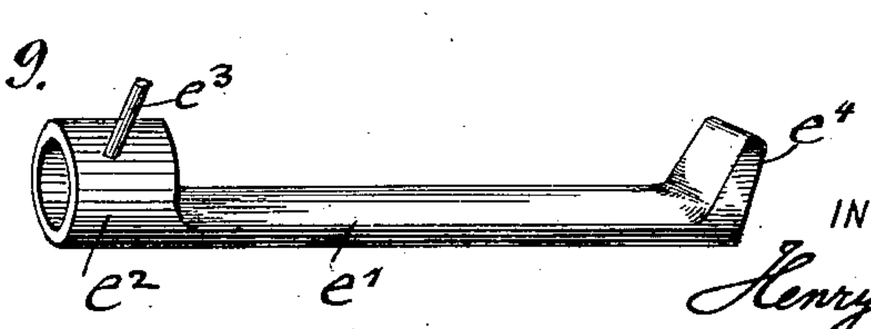


Fig: 9.



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UNITED STATES PATENT OFFICE.

HENRY A. CORDRAY, OF BRENHAM, TEXAS.

OIL-BURNING ATTACHMENT FOR STOVES OR FURNACES.

SPECIFICATION forming part of Letters Patent No. 712,767, dated November 4, 1902.

Application filed April 17, 1902. Serial No. 103,264. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. CORDRAY, a citizen of the United States, residing in Brenham, in the county of Washington and State of Texas, have invented certain new and useful Improvements in Oil-Burning Attachments for Stoves or Furnaces, of which the following is a specification.

The object of this invention is to supply an attachment for wood and coal stoves and furnaces by which hydrocarbon oils can be burned in connection with a wood or coal fire in a very effective and economical manner, the attachment being also capable of being used alone for heating and cooking; and the invention consists of an ordinary coal or wood stove or furnace provided with an oil-burning attachment in the fireplace of the same, said oil-burning attachment being composed of a generator, means for supplying oil and water to said generator, a burner or burners arranged in front of said generator, said burner or burners being connected with said generator and an independent oil-supply, and a supporting-stand in the fireplace of the stove or furnace, said stand being provided with guard-plates or shields for directing the draft and protecting the generator and oil-supply pipes.

The invention consists of additional details of construction and combinations of parts, which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a cooking-stove, showing its connection with the means for supplying oil and water to the improved oil-burning attachment located in the fireplace of the same. Fig. 2 is a vertical longitudinal section on line 2 2, Fig. 1, showing the arrangement of my improved attachment in the fireplace of the stove. Fig. 3 is a perspective view of the generator and its connection with the oil-burners, drawn on a larger scale and detached from the stove. Fig. 4 is a detail vertical longitudinal section of the generator. Fig. 5 is a side elevation of the generator and burner. Fig. 6 is a detail sectional side elevation of the visible oil-feed to the generator of the oil-burning attachment. Fig. 7 is a detail sectional side elevation of the water-supply to the generator. Fig. 8 is a detail vertical longitudinal section of the burner, drawn on a larger scale; and Fig. 9 is a detail perspective view of a flame-directing attachment to the burner, drawn on a larger scale.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a cooking-stove in the fireplace of which is located, near the rear wall thereof, a generator B, said generator taking up a comparatively small space in the fireplace and leaving ample room for a wood or coal fire on the grate, if such a one should be desired in connection with the oil-burning attachment. In front of the generator B is supported on legs *d* a false bottom D, which can be readily removed in case it should interfere with the regular fire in the fireplace. The false bottom is provided at its front and rear edges with flanges *d'*, having grooved edges which support curved shields or guard-plates D' D^2, the front plate D' extending toward the front wall of the stove and the shorter rear plate D^2 toward the front part of the generator B, being retained by means of end lugs d^2 on said generator, as shown in Fig. 2. The rear guard-plate D^2 serves for conducting the hot gases from the flames of the burners E, which are arranged in front of the generator, over the upper portion of the generator, and around the steam and vapor conducting pipes of the same, while the products of combustion from the fire below the false bottom are conducted around the lower part of the generator to the draft-flue, in which they mingle with the hot gases from the burners. The front guard-plate D' protects the front oil-feed pipe against the action of the heat of the burners E.

The generator B is supported in the fireplace by the supply-pipes for the water and oil, which pass in the draft-flue through the side walls of the stove to the interior of the same. The construction of the generator is shown in detail in Figs. 3, 4, and 5 and consists of an exterior cylinder B', which serves as the water-heater, and an interior slightly-inclined cylinder B^2, which serves as the oil-heater. The oil-heater B^2 is provided with openings b^2 in its upper part for permitting the escape of the oil-heater. The exterior cylinder B' is provided with an opening at its upper end, which is connected by a short pipe

b^3 with two branch pipes b^4, which extend laterally over the generator and are bent forward at their ends and then in downward direction, so as to connect with the burners E, as shown clearly in Fig. 3. The oil-supply pipe f is arranged at one side and the water-supply pipe g at the other side of the stove or furnace, as shown in Fig. 1. The oil-supply pipe f is connected by a branch pipe f' with one end of the generator B and by a second forwardly-extending branch pipe f^2 and a transverse front pipe f^3, near the front wall of the stove, with the burner E at the opposite side of the stove, and then by a return-pipe f^4 with the opposite end of the generator B, as shown in Fig. 3. The transverse front pipe f^3 is protected by the front guard-plate D′ against the heat of the burners, so as to prevent the vaporizing of the oil in the same. The branch pipe f' is further connected by a choked pipe f^5 with the burner E, so as to supply oil directly to the same. The burners E are arranged in line with each other and supplied by the forwardly-extending ends of the branch pipes b^4 with a mixture of steam and hydrocarbon vapors in addition to the oil fed thereto. The burners are further provided with adjustable needle-valves e, as shown in Fig. 8, and with flame-deflectors e', (shown in detail in Fig. 9,) said deflectors being placed by a sleeve e^2 on the burner-body and adjusted by a pin e^3 to the proper inclination, so as to deflect the flame in the direction required by the inclined lug e^4 at their outer ends. The deflectors e' throw the flames toward the generator and the branch pipes b^4, so as to produce by the heat of the flames the heating up of the water and hydrocarbon oil in the generator, and the superheating of the mixture of the steam and vapors in the branch pipes, so as to produce the perfect combustion of the steam by dissociation when fed with the oil to the flames of the burners.

The exterior cylinder B′ of the generator B is provided in one end with a screw-plug b^5 for permitting the cleaning of the exterior cylinder from time to time.

For starting the generator and burners cold oil is permitted to escape from one of the burners by opening the supply-pipe f' and needle-valve e, so as to drop it onto the false bottom D. The oil is ignited there and the burners heated up and started, so that by the heat of the flames the heating of the generator and the formation of steam and vapors in the same is produced. As soon as a mixture of steam and vapors is delivered to the burners and the proper size of flame obtained the generator and burners continue their work in a regular manner. The rear guard-plate D^2 can be removed, if desired, so as to expose the lower part of the generator to the flames for starting the action of the latter. When the generator is properly heated up, it is sufficient that the flames heat the upper part of the generator and the steam and vapor pipes b^4 for producing the proper generation of steam and vapors. When a wood or coal fire is burning on the grate, the fire acting on the bottom part of the generator keeps up the working of the same, so that the burner-flames are needed less for heating the generator, but mainly for the superheating of the steam in the branch pipes b^4. The oil, as well as the water, is supplied to the generator B, preferably by gravity, from suitable oil and water reservoirs at a higher level through feed-pipes f^0 and g^0, as shown in Fig. 1. The oil passes under pressure to a sight-feed glass F, the lower end of which is provided with a needle-valve n and supply-nozzle n', as shown in Fig. 6. The oil passes through the water in the sight-feed glass and out at the upper end of the same to the supply-pipe f, which is provided with a check-valve m of any approved construction. A stop-cock $f^\times$ is arranged in the supply-pipe f below the check-valve, so as to shut off the supply of oil to the branch pipe f^2 and the transverse front pipe f^3, that supplies the oil to the right-hand burner E. The check-valve m is so constructed that it prevents any back pressure from the generator on the oil-supply. The sight-feed pipe may be inclosed by a slotted metallic casing, so as to protect the glass tube of the same against breakage. The water is supplied by the pipe g^0, having a faucet g^2, as shown in Figs. 1 and 7, to a funnel-shaped receiver G. A valve g^3 is arranged in the bottom of the receiver, which acts as a safety-valve and as a check-valve for preventing back pressure from the generator. The lower end of the receiver G is connected by the water-feed pipe g' with the outer cylinder of the generator B. The valve g^3 is supported in a cage at the lower end of a centrally-perforated valve-plug g^4, of metal, of suitable size, the exterior shoulder of which is supported on a sleeve g^5 in the lower end of the receiver G, said sleeve being screwed to the upper end of the feed-pipe g, as shown in Fig. 7. The valve can be of any suitable thickness, and being light will float in case of any back pressure, so as to close the opening in the plug g^4. When the back pressure increases, the valve-plug will be lifted and the water returned into the receiver. In this manner the supply of water is controlled in a reliable manner.

The generator B may be made of iron pipe of suitable size, while the false bottom D can be made of cast metal or heavy sheet-iron. All the pipe connections are made with suitable ties and elbows in the well-known manner. The legs by which the false bottom is supported are made of light bar-iron, while the shields or guard-plates are made of cast-iron or heavy sheet-iron.

For starting a fire in the stove or furnace provided with my improved attachment it is best to start first a small wood fire under the false bottom and the generator, so as to generate vapor enough in the latter to vaporize the oil and then ignite the flames of the

burners, or oil may be supplied to the false bottom through the burners and burned on the same, so as to start thereby the generation of steam and vapors in the generators, in which case, however, the rear shield is preferably removed until the generation of steam and vapors and the flames of the burners are properly started. The rear guard-plate is then placed in position on the generator. The smoke and soot that is usually formed in oil-burning attachments is thus avoided in a great measure, so that the parts are left comparatively clean and free of deposits of soot.

The oil-burner attachment can be used as an auxiliary in connection with a wood or coal fire in the grate or furnace, or, if desired, without the same. It permits the utilization of the cheaper grades of hydrocarbon oils, especially in oil-producing sections of the country, where they can be obtained at a cheap rate. It can also be applied to the fireplaces of steam-boilers and other furnaces, and produces a considerable saving of wood and coal in stoves and furnaces used for domestic and manufacturing purposes. For ordinary cooking-stoves a single burner may be used by which the construction of the attachment is rendered simpler and less expensive.

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

1. The combination, with the fireplace of a stove or furnace, of a burning attachment consisting of a steam and vapor generator comprising an exterior cylinder and an interior cylinder having communication therewith, means for supplying water to the exterior cylinder, oil-supply pipes connected with the interior cylinder, and hydrocarbon-burners symmetrically arranged in front of said generator in communication therewith and in independent communication with the oil-supply pipes, substantially as set forth.

2. An oil-burning attachment for stoves and furnaces, consisting of a generator composed of an exterior cylinder and an interior cylinder provided with outlet-openings in its upper part, branched oil-supply pipes connected with the ends of said interior cylinder, a water-supply pipe connected with the exterior cylinder, burners located in front of said generator, steam and vapor pipes connecting said generator and burners, and said branched oil-supply pipes being connected with said burners, substantially as set forth.

3. The combination, with a fireplace of a stove or furnace having a false bottom provided therein, of an oil-burning attachment located in the upper portion of the fireplace above the false bottom, said oil-burning attachment consisting of a steam and vapor generator, means for supplying oil and water separately to the same, burners arranged adjacent to said generator and connected with the same and with the means for supplying oil to the generator, and removable guards supported at the front and rear of said false bottom, the rear guard extending over the generator and the front guard extending over the front portion of the oil-supply pipe, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HENRY A. CORDRAY.

Witnesses:
FRITZ LANGE,
SAM SCHLENKER.