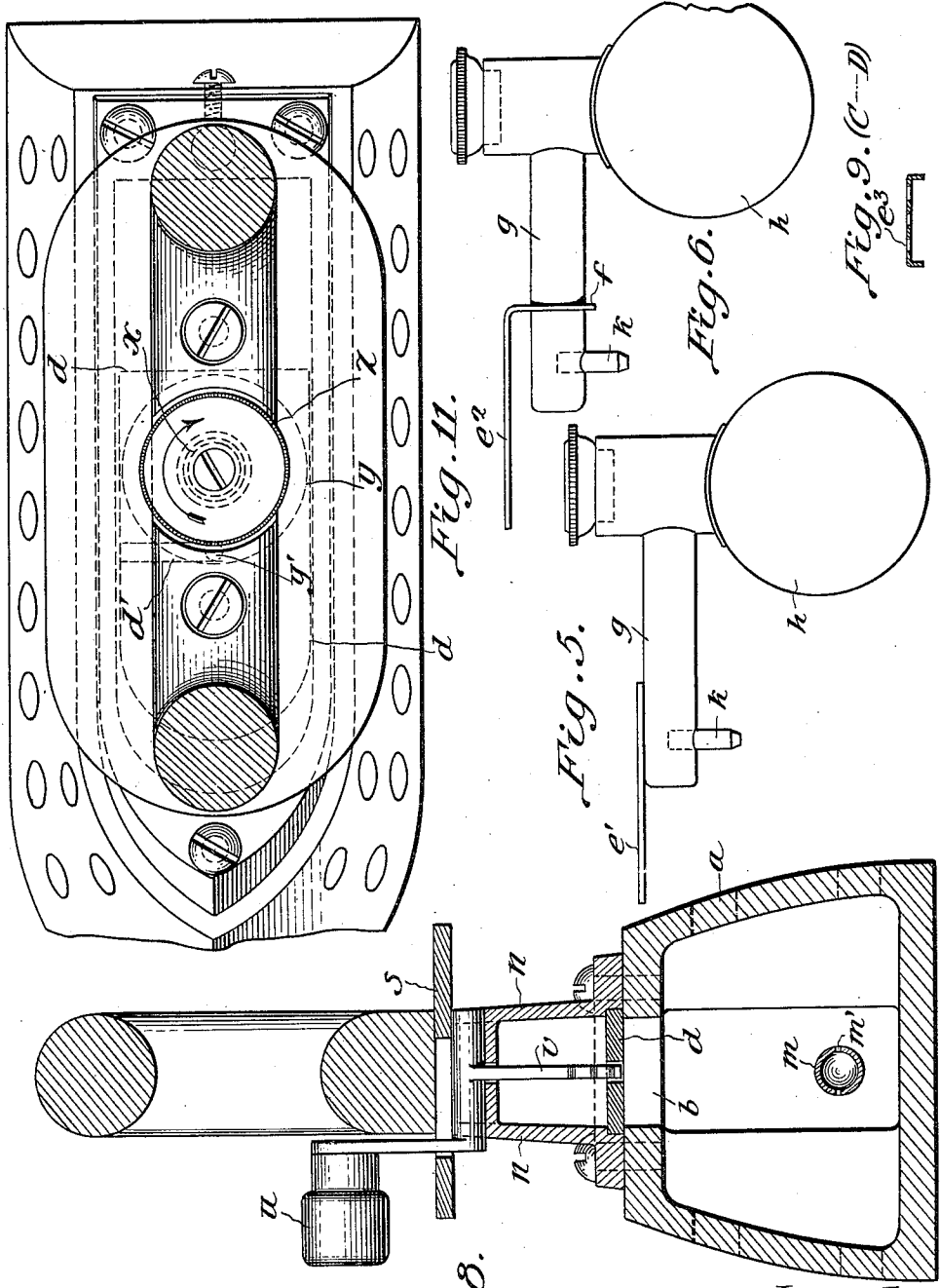


K. KALTSCHMID, JR.
 VAPORIZER FOR LIQUID FUEL FLAT IRONS.
 APPLICATION FILED JUNE 16, 1911.

Patented Feb. 11, 1913.
 4 SHEETS—SHEET 2.

1,052,925.



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 Sally C. Yudinly.

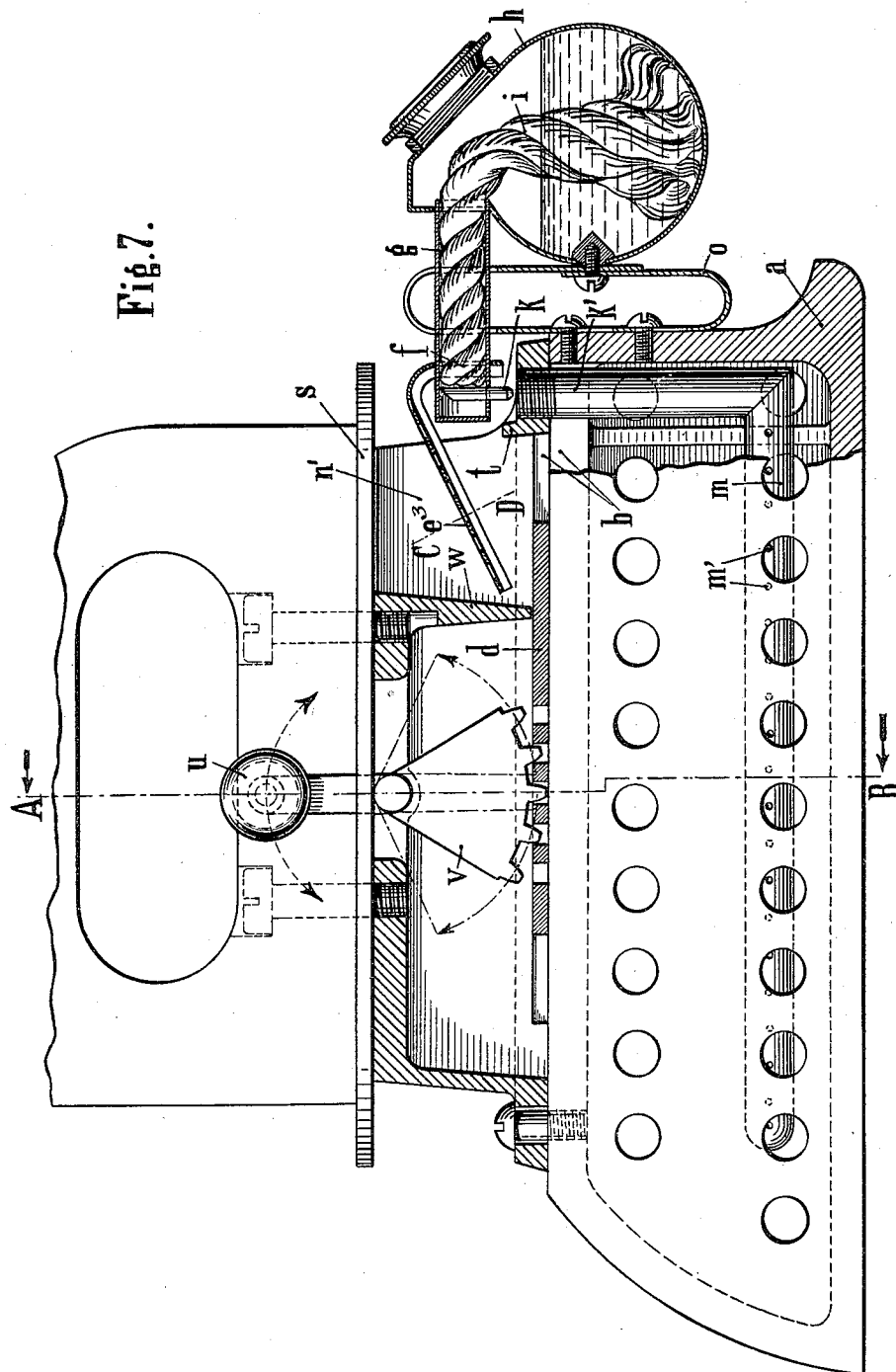
Fig. 8.
 (A-B)

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4 SHEETS—SHEET 3.

Fig. 7.



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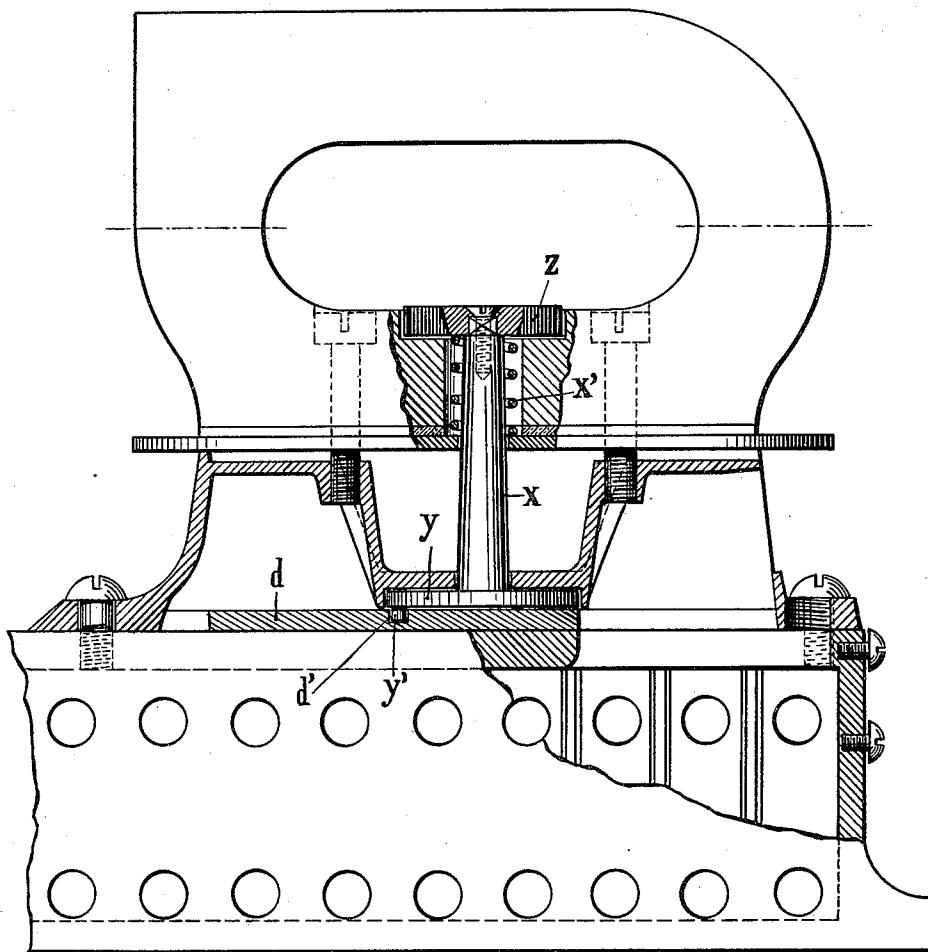
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Fig. 10.



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UNITED STATES PATENT OFFICE.

KARL KALTSCHMID, JR., OF OBERRIEXINGEN-ON-THE-ENZ, GERMANY.

VAPORIZER FOR LIQUID-FUEL FLAT-IRONS.

1,052,925.

Specification of Letters Patent. Patented Feb. 11, 1913.

Application filed June 16, 1911. Serial No. 633,603.

To all whom it may concern:

Be it known that I, KARL KALTSCHMID, Jr., a subject of the King of Wurttemberg, and resident of Oberriexingen-on-the-ENZ, in the Kingdom of Wurttemberg, German Empire, have invented new and useful Improvements in Vaporizers for Liquid-Fuel Flat-Irons, of which the following is a full, clear, and exact specification.

This invention relates to vaporizers for liquid fuel burners such as are used for heating flat irons, and consists in arranging in the path of the hot products of combustion a heat collector or conductor, preferably a metal plate of good thermal conductivity; this conductor is not heated directly by the burner flame and is for the purpose of conducting the heat of the hot products of combustion to that part of the apparatus at which the heat is useful for producing a sufficiently strong suction of the wick and for volatilizing the liquid fuel.

In known liquid fuel burners conducting plates are arranged to be heated directly by the burner flame and to conduct the heat to the vaporizer; moreover, flat irons heated directly by the flame and adapted to conduct the heat to the wick pipe are also known. All these arrangements are, however, as already mentioned, played upon directly by the flame. On the contrary according to the present invention the heat collector or conductor is arranged in the path of the hot products of combustion, without being touched directly by the flame. In this manner various advantages over the known devices are obtained. Firstly this arrangement enables the burner to be regulated with the greatest ease, since with the help of known devices such as dampers or the like, that proportion of the total combustion products can be allowed to pass to the heat-collector which corresponds with the desired temperature. Thus a very fine adjustment of the vaporizing and therefore of the size of the burner flame and the heat evolved by the whole burner, is obtained, and the desired temperature is easily developed without the danger of over heating. A further advantage is that the manufacturer of the burner has much more freedom with regard to the arrangement of the various parts than heretofore, since the hot products of combustion can be conducted to the heat collector, situated at whatever may be considered the best position in each case, quite

independently of the position of the burner. Finally there is a great saving of copper, which in the previous constructions was used in large quantities, being a good conductor of heat, to obtain the desired effect. Owing to the facility of control over the amount of heat imparted to the fuel admission and vaporizing parts of the burner, these parts can be made lighter and smaller, that is less material is used than previously, since the large mass, which is otherwise necessary for storing the heat in order to obtain a uniform effect, is dispensed with owing to the facility of control with the present arrangement. The heat conducting plate or plates can be arranged at any position in the path of the hot products of combustion.

Some examples of the invention are illustrated diagrammatically in the accompanying drawings, wherein—

Figure 1 is a longitudinal sectional elevation of a flat iron with complete vaporizer and burner, Fig. 2 is a plan of the vaporizer and reservoir and Figs. 3 and 4 are views of the preliminary heating burners. Figs. 5 and 6 show modifications respectively of the heat collector. Fig. 7 shows another modification of a complete vaporizer and burner in a longitudinal section as a side elevation. Fig. 8 shows a cross section on line A—B of Fig. 7, partly in elevation. Fig. 9 is a section of the heat-collector on line C—D of Fig. 7. Fig. 10 is a longitudinal section in elevation of a flat iron with another modification for moving the sliding plate. Fig. 11 is a view from above of the device shown in Fig. 10.

a is the casing of a flat iron of any suitable shape, which has in its upper part at *b* a suitably formed, preferably longitudinal opening which is covered, with the exception of an opening corresponding with the shape of the heat collector, by the handle plate of the iron. The plate *e* is the heat collector or conductor, which is conductively connected with the wick tube at *f*. Between the casing of the iron and the handle plate *e* is a damper or sliding plate *d*, which can be moved in the direction of the arrow to close more or less the opening beneath the plate *e* so that a smaller proportion of the products of combustion reach the plate.

h is the fuel reservoir, from which the fuel is fed by means of the wick *i* to the pipe *g*. The vapor formed issues through the nozzle of a small pipe *k* into the mixing tube *k'*,

air being drawn in at the same time and mixing with the vapor in the tube. The mixture then passes to the burner pipe *m*, which has a number of burner openings *m'* in the usual manner.

The handle plate *c* can extend in the form of two projections or cheeks *n*, which for clearness sake are shown broken off in the drawing. These projections serve, when necessary, to protect the heat collector *e* from the cold draft formed by the to and fro movement of the iron.

o is a bracket by means of which the whole vaporizer is fixed to the iron so as to be readily removed.

p is an opening on one or both sides of the iron through which the preliminary heating burner shown in Fig. 3 or 4 is inserted.

The heat collector *e* may have any desired shape and can be connected with the wick tube or a part in conductive connection therewith in various ways according to circumstances.

Figs. 5 and 6 of the accompanying drawings show two modified constructions of the heat collector *e'* (Fig. 5) and *e''* (Fig. 6). The location of the vaporizer is suited to the discharge of the gases of combustion. The burner itself is independent of the invention and can be arranged in any manner as found most suitable.

Figs. 3 and 4 show the preliminary heating burner in sectional elevation in two different positions, Fig. 3 in the charging position, Fig. 4 in the working position. *q* is a fuel reservoir into which a pipe 20 having a screw thread can be screwed, 21 being a pipe flange which prevents the over filling of the reservoir containing a wick 22. The burner is lighted in the position shown in Fig. 3, then turned into the position shown in Fig. 4 and the front end of the pipe 20 is inserted in the opening *p* of the iron body. The preliminary heating can however be effected by any other means.

The apparatus works as follows:—After the reservoir *h* has been filled with fuel, such as spirit, and attached to the iron the slide *d* is opened wide. The heater as shown in Figs. 3 and 4 is kindled and inserted horizontally through the hole *p*. The heat collector *e* is thus sufficiently heated, on the one hand to cause the wick to suck up the fuel and on the other hand to volatilize the spirit thus drawn up. The vapor issues at *k* under comparatively high pressure, carrying air with it, flows into the mixing tube *k'*, through burner tube *m* to the openings *m'* and is here ignited by the preliminary heater. The whole apparatus is now working and the heater is withdrawn through the opening *p*. The hot products of combustion from the flames burning from the openings *m'* rise in the casing of the iron and play on the heat collecting plate *e*. The heat there-

from is transferred to the wick tube at *f* in the manner already stated. By adjusting the slide *d* the flow of products of combustion over plate *e* can be adjusted and therefore the transference of heat to the wick tube *f*, the generation of vapor and the size of the flames. The vaporizer is more quickly started than in previous apparatus, because there is less metal to heat.

The modified construction shown in Fig. 7 is adapted to prevent the vapor issuing from the nozzle from igniting at the burner flames, when the vaporizer is withdrawn, and necessitating a partial alteration of the device for collecting and conducting the heat of the products of combustion.

When in the construction described above and shown in Fig. 1 the vaporizer together with the spirit reservoir is removed from the iron, it is possible that vapor issuing from nozzle *k* may be ignited by the burner flames. In order to prevent this, according to the present improvement, the mixing tube extending from the nozzle *k* to the burners is so constructed that when the vaporizer is removed the flames of the burner cannot flash to the nozzle. The construction consists in extending the mixing tube up to the upper surface of the iron casing, or even higher, and if necessary by arranging a ledge or rail, as shown at *t* in Fig. 7 of the accompanying drawings. By this arrangement a part of the vaporizer is however withdrawn from the direct path of the hot gases. In order to procure intense absorption of heat by the vaporizer, according to the present modification the heat collector *e''* is so constructed that it guides a part of the rising products of combustion to the vaporizer, so that besides the indirect supply of heat to the latter by the heat conductor there is a direct heating by the hot products of combustion. The heat collector *e''* is constructed as an inverted shovel the edges of which are bent down so that a part of the rising products of combustion striking against the underside of the collector travel along this to the vaporizer. The collector is preferably provided with a number of perforations, so that a part of the gases can pass through. Owing to these perforations the heat collector is subjected on both sides to the hot products of combustion. The latter may be caused in any other manner to pass over both sides of the heat collector. Also by varying the form of the collector, the perforations or the like, more or less of the gases can be guided to the vaporizer and therefore for every type of spirit heated iron the maximum effect can be obtained without the danger of overheating. By the present construction there is obtained a large scope for the adjustment of the heating capacity of the iron since by slight variation of easily varied parts the vaporization and

supply of the spirit can be regulated at will without having to alter the whole of the cast iron casing of the iron. By using a bent down heat collector together with the simple control of the slide *d* for throttling the hot gases of combustion, if necessary, a fine adjustment of the heating of the iron for any purpose is obtained.

It is mentioned above (Fig. 1) that the handle plate *c* has two extensions or cheeks *n*, which are shown broken off in the drawing for clearness sake and serve to keep the cold draft caused by moving the iron to and fro, from the heat collector *e*.

According to the improvement in Figs. 7-9, in connection with the bending down of the heat collector the projections *n'* can be extended upward so far that they abut against the handle plate *s* and form with this a protection chamber closed by a cross piece *w* in front but preferably open at the back, into which the heat conductor extends more or less. The slide *d* may be moved in the manner shown in the drawings (Figs. 7, 8). By means of a handle *u* a toothed segment *v* is moved. This engages with corresponding teeth cavities on the slide *d* so that by simply setting the handle *u* adjustment of the slide *d* can be effected while using the iron.

Figs. 10 and 11 show another device for moving the slide *d*. *z* is a disk or wheel connected with the vertical shaft *x* having a crank disk *y*. *y'* is a crank pin engaged in a groove *d'* in the said slide *d*. *x'* is a spring preventing the inadvertent moving of the device. By turning the disk *z* the pin *y'* moves the slide *d*. The mixing tube *k'*, Fig. 7, which is connected with the burner tube *m*, may be secured to the top plate (that part between the handle and the actual iron casing) by screwing the same therein, as shown; and the said tube may be prevented from turning in any well-known manner.

What I claim is:

1. In an iron of the character described: the combination with a suitable casing provided with an outlet for the products of combustion, a burner in said casing, and a mixing tube connected with said burner; of a vaporizer mounted on said casing without the same and in operative relation to the said mixing tube, and a heat collector in operative relation to the said outlet in the casing, located in the path of the hot products of combustion of said burner and out of contact with the flames thereof, the said heat collector being connected with the said vaporizer.

2. In an iron of the character described: the combination with a suitable casing provided with an outlet for the products of combustion, a burner in said casing, and a mixing tube connected with said burner; of

a vaporizer mounted on said casing without the same and in operative relation to the said mixing tube, a heat collector in operative relation to the said outlet in the casing, located in the path of the hot products of combustion of said burner and out of contact with the flames thereof, the said heat collector being connected with the said vaporizer, and adjustable means to intercept the products of combustion to regulate their heating action on the said heat collector.

3. In an iron of the character described: the combination with a suitable casing forming a heating chamber having an outlet for the products of combustion, a burner in said casing, and a mixing tube connected with said burner; of a vaporizer mounted on said casing in operative relation to said mixing tube, a heat collector located in proximity to said opening of the casing and connected with said vaporizer, and adjustable means to vary the size of said outlet for the products of combustion to regulate their heating action on said heat collector.

4. In an iron of the character described: the combination with a suitable casing provided with an outlet for the products of combustion, a burner in said casing, and a mixing tube extending through the top of said casing and connected with said burner; of a vaporizer mounted on said casing without the same and in operative relation to the said mixing tube, and a heat collector in operative relation to the said outlet in the casing, located in the path of the hot products of combustion of said burner and out of contact with the flames thereof, the said heat collector being connected with the said vaporizer.

5. In an iron of the character described: the combination with a suitable casing provided with an outlet for the products of combustion, a burner in said casing, and a mixing tube connected with said burner; of a vaporizer mounted on said casing without the same and in operative relation to the said mixing tube, and a downwardly directed heat collector in operative relation to the said outlet in the casing, located in the path of the hot products of combustion of said burner and out of contact with the flames thereof, the said heat collector being connected with the said vaporizer.

6. In an iron of the character described: the combination with a suitable casing provided with an outlet for the products of combustion, a burner in said casing, and a mixing tube connected with said burner; of a vaporizer mounted on said casing without the same and in operative relation to the said mixing tube, and a downwardly directed heat collector in operative relation to the said casing, located in the path of the hot products of combustion of said burner and out of contact with the flames

thereof, the said heat collector consisting of a plate with downwardly turned edges and being connected with the said vaporizer.

7. In an iron of the character described, 5 the combination, with a box-like casing having an aperture in the top thereof, and a burner therein, of a mixing-tube having one end connected with the burner and the other end projecting out of the said aperture, a 10 vaporizer mounted on the casing in operative relation to the latter end of the mixing-tube, a handle plate, a frame, carrying the latter, having vertical, longitudinally-directed cheeks and a vertical cross-piece 15 connecting the latter mounted on, and forming a chamber with the top of the casing at the aperture therein, a downwardly-directed heat collector consisting of a plate with downwardly turned edges, said heat collector being mounted on the vaporizer and 20 projecting into the chamber above the aperture, and a damper movable on the casing for regulating the size of the said aperture.

8. In an iron of the character described, 25 the combination, with a box-like casing having an aperture in the top thereof, and a burner therein, of a mixing-tube having one end connected with the burner and the other

end projecting out of the said aperture, a vaporizer mounted on the casing in operative relation to the latter end of the mixing-tube, a handle plate, a frame, carrying the latter, having vertical longitudinally-directed cheeks and a vertical cross-piece 30 connecting the latter mounted on, and forming a chamber with the top of the casing at the aperture therein, a downwardly-directed heat collector consisting of a plate with downwardly turned edges, said heat collector being mounted on the vaporizer 35 and projecting into the chamber above the aperture, a slotted damper movable on the casing for regulating the size of the said aperture, and a vertical shaft adapted to move said damper, an upper disk to move 40 said vertical shaft and a lower crank disk having a crank pin engaged in the slot in the said sliding damper.

In testimony, that I claim the foregoing as my invention, I have signed my name in 45 presence of two subscribing witnesses.

KARL KALTSCHMID, JUNIOR.

Witnesses:

PAULINE KLAIBER,
PAULINE MÜLLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."