

W. S. ROCKWELL.

FURNACE SHIELD.

APPLICATION FILED JUNE 18, 1917.

Patented Oct. 30, 1917.

2 SHEETS—SHEET 1.

1,245,030.

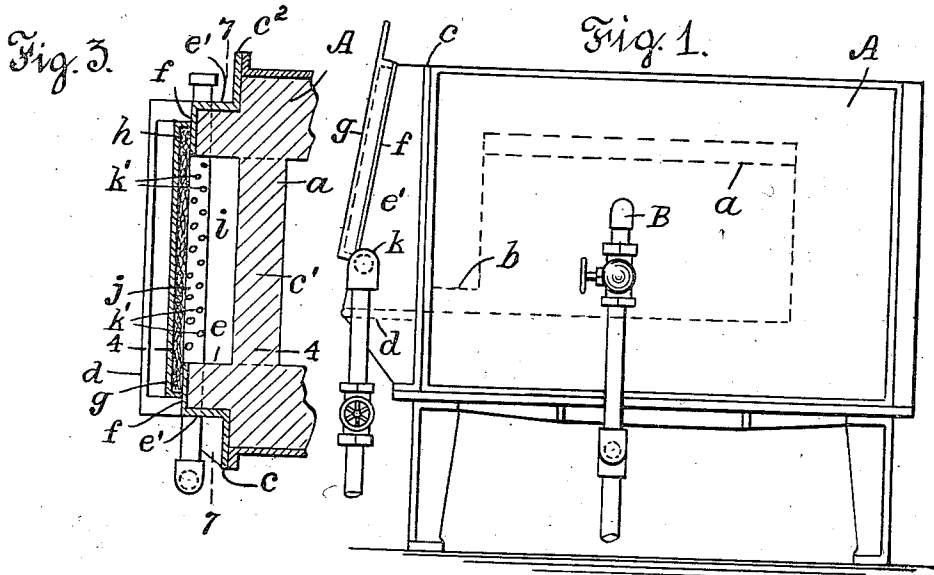
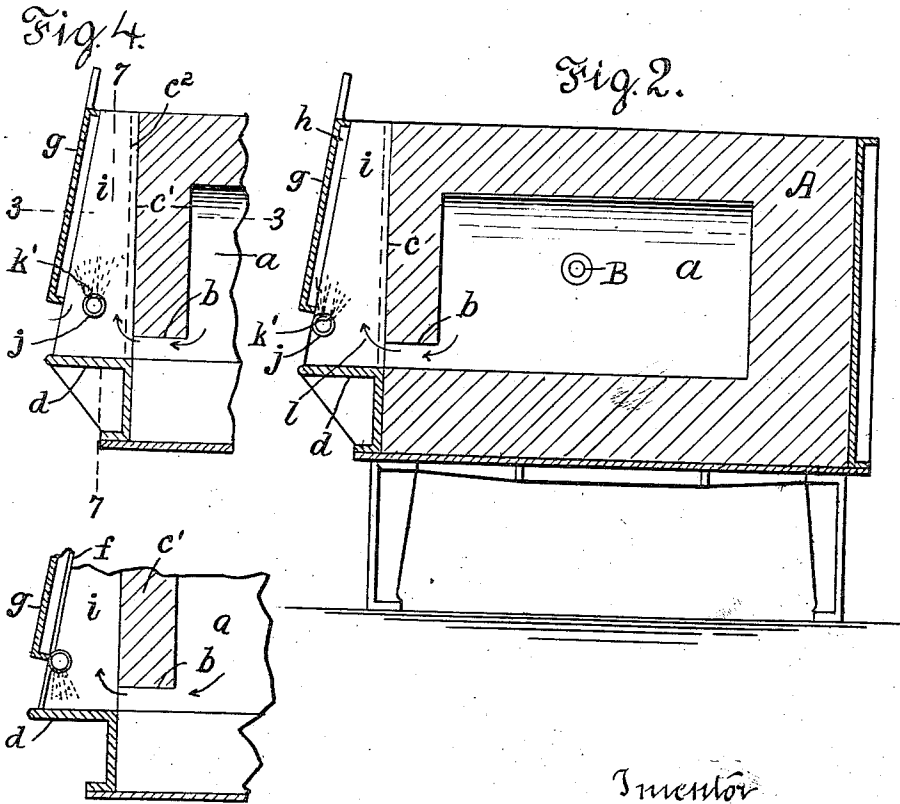


Fig. 9.

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2 SHEETS—SHEET 2.

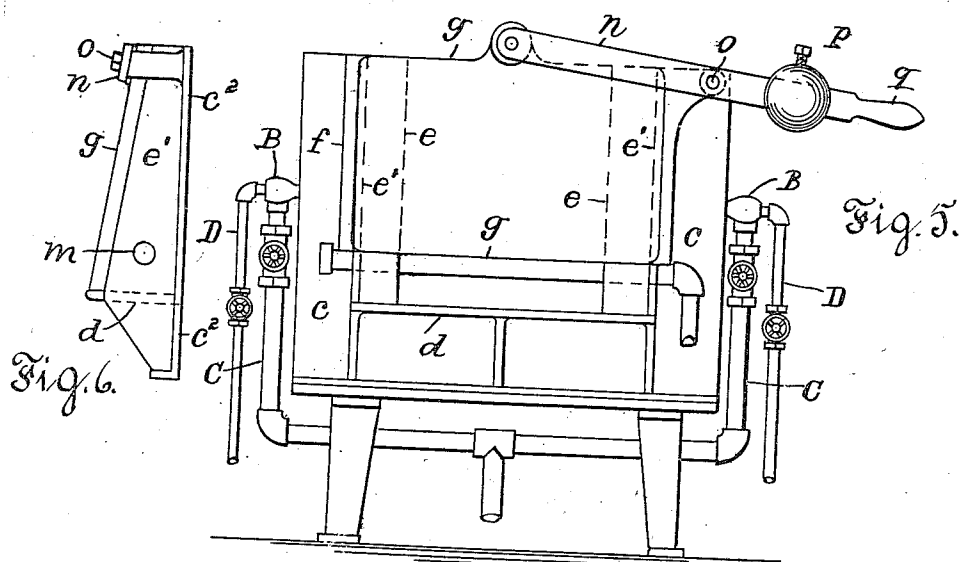


Fig. 6.

Fig. 7.

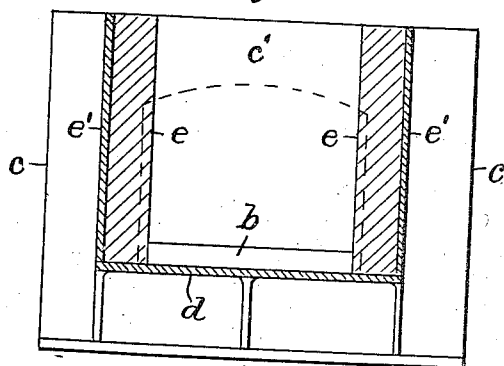
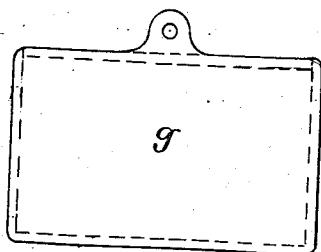


Fig. 8.



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UNITED STATES PATENT OFFICE.

WALTER S. ROCKWELL, OF NEW YORK, N. Y., ASSIGNOR TO W. S. ROCKWELL COMPANY,
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FURNACE-SHIELD.

1,245,030.

Specification of Letters Patent.

Patented Oct. 30, 1917.

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To all whom it may concern:

Be it known that I, WALTER S. ROCKWELL, a citizen of the United States, residing at 300 West 106 street, New York, county of New York, State of New York, have invented certain new and useful Improvements in Furnace-Shields, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to a means of protecting the operator of a furnace from the hot flaming gases which escape from the doorway or working-opening and is a modification of that shown in my Reissue Patent No. 13,713 dated April 14, 1914.

The operator is often much exposed to the heat of the gases when manipulating the bars or other stock inserted in the doorway for heating, and many furnaces are unprovided with any door for the working-opening.

In such furnaces the doorway forms an outlet for the continuous discharge of the hot gases, which thus cause inconvenience and suffering to the operator when standing before the doorway.

This invention is designed to protect the operator from such heat by means of a hood forming an upright flue upon the furnace-front over the doorway through which flue the heated gases may be directed positively upward instead of blowing outward upon the operator.

In the hood of the Reissue Patent No. 13,713, the flue is traversed by air-pipes in which air was heated, and such hot air delivered to the combustion-chamber of the furnace to promote combustion; but the present invention comprises certain improvements in the construction and arrangement of the hood by which it may be used without the air-heating pipes; and in such cases is protected from the fierce heat of the gases by a refractory lining to the shield, and an extension of the brick-work through the furnace-front into the sides or casing of the hood. In this invention a sill is projected from the doorway beneath the mouth of the hood, and the outer side of the hood is formed of an adjustable shield which may be raised and lowered at pleasure, and can thus be lowered to direct the hot gases wholly into the hood.

The adjustable shield in the present in-

vention furnishes the sole means of restricting or preventing the discharge of hot gases toward the operator, as the doorway itself is provided with no door but opens into the bottom of the hood so that it is in constant communication with the draft-flue in the hood.

Such disposal of the gases wholly protects the operator from the heat whether he is or is not manipulating the bars or other articles placed in the heating-chamber.

To increase the upward draft within the hood, a blast-pipe may be inserted within the mouth of the hood and a blast of air projected to propel the hot gases into the hood.

The blast may be arranged to operate in two different directions; if directed upwardly, it operates with the hood as an injector, to draw the gases by suction from the doorway, and in great part prevent their discharge toward the operator when he is manipulating articles within the furnace; or the blast may be directed obliquely downward toward the sill and doorway, as in the said reissue patent, thus intercepting the outward current of the hot gases and compelling them to escape through the hood.

In these various embodiments of the invention, the sill adds materially to the effectiveness of the device as it prevents any upward rush of cold air into the hood.

Such a hood stands upon the furnace-front above the working-opening, and to prevent radiation of heat from such hood toward the operator its outer side is formed as a shield formed of or lined with refractory material, and the opposite sides of the hood are lined with brick which may be made continuous with the brick-work of the furnace-body. Such a hood thus operates to prevent the hot gases from annoying the operator and prevents their heat, when drawn into the hood, from radiating outward in any direction. The shield is preferably adjustable on the hood.

This form of apparatus is illustrated in the annexed drawing, in which Figure 1 is a side elevation of a furnace provided with the apparatus; Fig. 2 is a longitudinal section of the same; Fig. 3 is a horizontal section of the forward end of the furnace taken on line 3—3 in Fig. 4; and Fig. 4 is a vertical section taken on line 4—4 in Fig. 3; Fig. 5 is a front elevation of the furnace;

Fig. 6 a side elevation of the furnace-front having the casing for the hood integral therewith; Fig. 7 is a front elevation of the furnace-body with the hood in section on line 7-7 in Fig. 3; and Fig. 8 is a front view of the detachable shield of the hood. Fig. 9 shows an alternative arrangement of the blast-pipe.

A designates the furnace-body formed of brick-work with a heating-chamber *a* therein, from the front end of which chamber the working-opening or doorway *b* is extended to introduce the stock to be heated. Such opening is termed the "doorway" for convenience herein.

Fluid fuel-burners *B* are shown in Figs. 1 and 5 for heating the chamber *a*, and air-pipes *C* and gas-pipes *D* are shown connected with the burners. It is immaterial how the chamber is heated.

The brick-work body is provided with a furnace front-plate *c*² attached to the brick-front *c*¹ of the body, and having a sill *d* at the floor-level of the doorway. The front-plate is shown in the drawing with cheeks *e*¹ projected therefrom to form the casing of the hood, and provided, as shown in Fig. 3, with flanges *f* upon their outer edges, upon which a shield *g* is mounted movably to form the outer side of the hood, and adapted when lowered to cut off the blast of hot gases when the doorway is not in use.

The inner side at least of the shield is formed of refractory material *h*, and the cheeks *e*¹ of the casing are lined with refractory material which is preferably formed, as shown in Figs. 3 and 7, by extensions *e* of the brick-front *c*¹. Such extensions of the brick-work require an aperture in the front-plate *c*, such aperture embracing all the space at the inner side of the hood, so that the rear of the flue and both edges are formed of the solid brick-work and no part of the metal-front or casing is exposed to the direct heat of the burning gases. The cheeks and their refractory lining are extended downward to the sill thus forming a chamber, before the doorway, wholly closed except an outlet below the bottom of the shield when the same is raised. The hood is thus formed with an upright channel *i* open at the top, with an inlet or mouth at the upper edge of the doorway *b*.

The outer edges of the flanges *f* of the casing are sloped inwardly toward the top and the shield is correspondingly inclined, which makes the upward draft more effective, and the shield is hung upon the end of a lever *n*, as shown in Fig. 5, which lever is fulcrumed upon the casing by a stud *o*. The lever has a weight *p* to balance the weight of the shield, and a handle *q* to raise and lower the shield at pleasure.

The inclination of the flanges *f* causes the shield, by its weight, to lie close to the flange,

and the shield may be lowered more or less to limit the opening above the sill which gives access to the doorway, or by contact with the sill, as shown in Fig. 6, to wholly cut off any horizontal direct escape of the hot gases and confine their escape entirely to the hood.

Such use of the shield adapts the hood, without any blast, to dispose of all hot gases and wholly prevent their escape toward the operator.

With the addition of the blast, the hood may be enabled when the shield is raised for access to the doorway, to prevent the escape of the hot gases toward the operator and direct them chiefly into the hood. The construction thus protects the operator from heat, whether he is operating through the open doorway, or the hood be closed as shown in Fig. 6.

A blast-pipe *j* is shown located near the mouth of the hood and extended across the same parallel with the top of the channel *i*. In Fig. 2, the blast-pipe is shown close to the bottom edge of the shield, and having a longitudinal opening *k* in its upper side disposed to discharge a blast upwardly into the channel *i* at such an angle as to fill the channel and drive all of its contents upwardly. This produces a partial vacuum in the lower part of the hood which forcibly draws upwardly, as indicated by the arrow *l* in Fig. 2, the gases escaping from the doorway *b*.

In Fig. 2, the sill *d* is shown extended from the front *c* into line with the outer edge of the hood, thus cutting off any direct upward draft of air into the hood which would diminish the draft upon the hot gases.

The space between the under side of the blast-pipe *j* and the sill permits the workman to reach the working-opening *b* to manipulate the stock placed in the furnace-chamber.

In Fig. 4, the blast-pipe *j* is shown disposed midway between the bottom edge of the shield and the furnace front-plate, and is shown in Figs. 3 and 4 with two rows of blast-holes *k*¹ which discharge the blast upwardly in such directions as to fill the hood and produce the upward draft desired.

In Fig. 9, the blast-pipe is shown arranged to direct the blast obliquely downward toward the sill and doorway, and thus intercept the outward current of hot gases. All these arrangements of the blast-pipe impel the gases upward into the hood. The cheeks which form the casing of the hood are shown in the drawing made integral with the furnace front-plate *c*, and are extended downward to the sill *d* and formed each with an aperture *m* for the insertion of the blast-pipe. The heat of the gases escaping from the doorway *b* is so great as to require a most refractory lining in the hood to pro-

tect its metallic casing, and the construction shown in Fig. 3 furnishes a brick-work structure on every side of the channel excepting the side which is closed by the shield, which has at least a refractory lining.

Such lining may be made of asbestos or magnesia, or similar materials adapted to protect the shield from injury by the heat, and especially to prevent the conduction of heat outward, thus protecting the operator from the radiation of heat. The whole shield may be made of refractory material. The front brick-work *c'* shown in Fig. 3 requires repairs from time to time, owing to the excessive heat to which the arch over the doorway is exposed on its inner and outer sides.

It will be obvious from inspection of Figs. 2 and 4, that the shield *g* may be readily removed by disconnecting it from the lever, or disconnecting the lever from its fulcrum *o*, thus permitting free access to the front brick-work when it is necessary to repair the same.

If the hood be made open at the top, as shown in Fig. 4, the gases are discharged above the head of the operator and are carried away by their own levity; but it is immaterial how the gases are conducted from the hood.

The construction of hood shown in the drawing is of the most practical and effective character and when combined with an adjustable shield and the sill *d* below the mouth of the hood, the draft upwardly in the hood operates most effectively to prevent the projection of the hot gases toward the operator.

Having thus set forth the nature of the invention what is claimed herein is:

1. The combination, with a furnace having a doorway continuously discharging heated gases, of a furnace-front applied to the doorway and having a sill below the doorway and a hood sustained upon the front over the sill and closed at the sides and open at the top to form a draft-flue in constant connection with the doorway, such hood having its outer side formed of a shield adjustable to and from the sill for restrict-

ing the outward flow of the gases or, when desired, directing them wholly upward into the flue.

2. The combination, with a furnace having a doorway continuously discharging heated gases, of a furnace-front applied to the doorway and having a sill below the doorway, a hood sustained upon the front over the sill and having a casing inclosing the sides, with the brick-work of the furnace extended within the said sides to protect the casing from the hot gases, and the hood having upon its outer side a shield adjustable to and from the sill, and provided with a refractory lining to reduce the radiation of heat.

3. The combination, with a furnace having a doorway continuously discharging heated gases, of a furnace-front applied to the doorway and having a sill on a level with its floor, a hood sustained upon the front over the sill and its sides lined with refractory material, a shield supported adjustably upon the front and lined with refractory material and movable to and from the sill to prevent the forward discharge of gases, when desired, and a blast-pipe sustained at the mouth of the hood, and operating with the hood as an injector to draw the hot gases from the open doorway into the said hood.

4. The combination, with a furnace having a doorway continuously discharging heated gases, of an iron furnace-front applied to the doorway and having a sill at the bottom of the doorway, a hood open at the top sustained above the said sill, the iron furnace-front having an aperture at the inner side of the hood, and the inner wall of the hood being the front brick-work of the furnace, and the sides of the hood formed of outward extensions from such brick-work, and the outer wall of the hood formed of a shield lined with refractory material, whereby the furnace-front and the casing of the hood are wholly protected from the heat of the gases passing through the hood.

In testimony whereof I have hereunto set my hand.

WALTER S. ROCKWELL.