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Door Frame and Roof Skewback for Furnaces.

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Fig. 5.

Fig. 6.

Fig. 7.

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DOOR-FRAME AND ROOF-SKEWBACK FOR FURNACES.


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To all whom it may concern:

Be it known that we, JACOB B. McKEN- 

nan, FRANK E. PARKS, and SAMUEL W. 

GILLIN, citizens of the United States, resid- 

ing at Pueblo, in the county of Pueblo and 

State of Colorado, have invented certain new 

and useful Improvements in Door-Frames 

and Roof-Skeewbacks for Furnaces, of which 

the following is a specification.

Our invention relates to metallurgical fur- 

naces, and more particularly to the door- 

frame and roof skewback for furnaces; and 

its object is to provide a construction more 

convenient of first installment, more durable, 

and more readily repaired than the corre- 

sponding parts of furnaces now generally 

used. We accomplish these objects by the 

construction shown in the accompanying 

drawings, in which:—

Figure 1 is a transverse section of an open- 

hearth furnace, taken between sets of buck-

stays, and showing our improvement applied 

thereto at both front and back of the fur-

nace; Fig. 2 is a partial front view of the 

furnace-door frame of Fig. 1; Fig. 3 is a partial 

plan view of the same, also showing the pre-

ferred modification of the skewback oppo-

site the buck-stays; Fig. 4 is a section on line 

IV—IV through the rear skewback of Fig. 

1, looking in the direction of the arrow; Fig. 

5 is a second transverse section on line X—X 

of Fig. 6, of a furnace showing a modified 

door-frame construction, and at the right-

hand thereof a construction at the back of 

the furnace corresponding to a section on 

the line V—V of Fig. 3; Fig. 6 is a front view, 

partly in section, of the water-cooled door-

frame of Fig. 5, the section being taken 

along the line VI—VI of Fig. 5; and Fig. 7 is 

a partial transverse section showing a fur-

ther modification adapted as either a sec-

tional or a continuous skewback, located 

inside the buck-stays, and forming lintel-

members wherever door-openings are de-

sired in the furnace side walls which makes 

it necessary to maintain masonry arches 

over the door openings.

The general practice in constructing fur-

naces of this type is to support the roof by 

providing special skewback brick, which 

fit into and are supported by longitudinally 

arranged steel "channels" which are fas-

tened inside the buck-stays; the channels at 

each side of the furnace being usually made 

in one, or in a few pieces, each of which is 

secured to a plurality of such buck-stays. 

This construction renders repairs to the roof 

supporting skewback and channels difficulty, 

and also necessitates a masonry arch above 

the furnace doors to protect the channels, 

whereas, by our improved construction, any 

desired front skewback, intermediate the 

buck-stays, may serve as a door lintel, and 

is readily replaceable in case of damage 

thereto. Such combined skewbacks and 

lintels are preferably water-cooled; or the 

entire door-frame may be cast integral, as 

shown in Fig. 6, and water-cooled; or the 
skeewback, door-frame, and foreplate may 

be cast integral and water-cooled.

Referring to the drawings, in which like 

reference numerals indicate like parts, 1 

represents the hearth of the furnace, 2 the 

roof, 3 the buck-stays, and 4 the tie-rods.

In Figs. 1, 2, and 3, 5 represents a water-

cooled, combined skewback and door-frame 

lintel, located between the outer vertical 

channels 3' of adjacent sets of buck-stays, 

being supported upon and transmitting the 

lateral thrust of the roof-arch to hook-plates 

7, suitably secured to the buck-stays. The 

sides or jambs of the door-frame may be 
or either hollow and water-cooled, as shown at 

6, or a solid, preferably cast-steel side, as 

shown at 6'. In the former case, suitable 

supply and discharge connections (not 

shown), are provided for the cooling fluid.

The rear skewback, intermediate the 

buck-stays, is shown at 8, Fig. 1, and in Fig. 

4. It preferably bears, across substantially 

its entire ends, against the lateral faces of 

the buck-stays and is suitably secured thereto, 

as at 9; being also provided with an inter-

mediate stiffening rib 10. As it is exposed 

throughout a large proportion of its surface 

to the atmosphere, and shielded by masonry 

from the direct heat of the furnace, it is not 

essential that it be water-cooled.

In the modification shown at 11, in Fig. 5, 

the door-frame sides or jambs, lintel, and 

skewback form an integral, water-cooled 

structure, carried by the sill or fore plate 12, 

and transmitting the lateral thrust of the 

roof to the buck-stays. In this structure, 

suitable circulating orifices 13, best shown in 

Fig. 6, permit the efficient cooling of the en-

tire frame and skewback from a single set of 

fluid supply and discharge connections, (not 

shown). This same figure shows at 14, a 

solid skewback piece lying opposite or inside
the buck-stays (see Fig. 3), to act as a continuation of the support 8, located between said stays.

In the modification shown in Fig. 7, the skewback 5' may be continuous from end to end of the furnace, or may be in sections and supported by the buck-stays, as will be readily understood; but in either case will act both to transmit the thrust of the roof arch and to replace the ordinary masonry arches herefore deemed necessary above the door openings.

In all the modifications illustrated, the skewbacks are roof-supporting, that is, they constitute the sole support for the roof-arch and transmit the thrust to the buck-stays; the side walls of the furnace are built up under the skewbacks and roof, flush with the sides of the door openings; as will be apparent to those skilled in the art.

In case of accident or failure, the skewbacks or lintels 5 of Fig. 1 can be replaced without disturbing either the hook plates or side-frames, by removing the necessary roof brick back of them so as to form an arched opening from one buck-stay to the other, on each side of the door. In this manner, the entire frame of Fig. 6 may be replaced; while obviously, the door-sides 6 or 6', of Fig. 2, may be readily replaced without disturbing any of the other members. This may become necessary, from time to time, with the form shown at 6'; but the repair cost for this item is small, while the water-cooled leg or frame 6 is permanent, unless injured by accident.

The hook-plates, being removed from the heat of the furnace and in contact with the buck stays and water-cooled bodies, will rarely, if ever, require renewal; but if, for any unforeseen reason, it becomes necessary to replace them, this can be done without any difficulty by wedging up between the skewback and the door-frame sides and temporarily carrying the lateral thrust of the skewback by jacks, while the hook-plates are replaced.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a metallurgical furnace, a roof supporting sectional metal skewback, having sections between the buck-stays removably secured thereto.

2. In a metallurgical furnace, a roof supporting sectional water cooled metal skewback having sections between the buck-stays removably secured thereto.

3. In a metallurgical furnace, a roof supporting water cooled metal skewback, combined with a door lintel.

4. In a metallurgical furnace, a sectional metal door frame, partly water cooled, comprising a roof supporting skewback unprotected by a masonry door arch.

5. In a metallurgical furnace, a water cooled metal door frame integral with a roof supporting skewback.

6. In a metallurgical furnace, a water cooled metal door frame and fore-plate constituting an integral structure with a roof supporting skewback.

7. In a metallurgical furnace, a metal skewback having removable sections laterally secured between the buck-stays of the furnace.

8. In a metallurgical furnace, a water cooled metal door-frame comprising a roof supporting skewback, unprotected by a masonry door arch.

9. In a metallurgical furnace, a roof supporting skewback comprising metal sections secured inside the buck-stays and removable water cooled sections laterally secured between said stays and constituting a portion of the furnace-door frames.

10. In a metallurgical furnace, a roof supporting structure comprising buck-stays, hook-plates secured to the lateral sides of said stays, and a combined water cooled metal door-lintel and skewback removably supported by said hook-plates.

11. In a metallurgical furnace, a roof supporting structure comprising buck-stays, hook-plates secured to the lateral sides of said stays, and a water cooled metal door-frame structure supported by said hook-plates and comprising a combined door-lintel and roof supporting device.

In testimony whereof we affix our signatures in presence of two witnesses.

JACOB BOWMAN McKENNAN.
FRANK E. PARKS.
SAMUEL W. GILLIN.

Witnesses:
T. J. BROWN,
JAMES H. ROBINSON.