

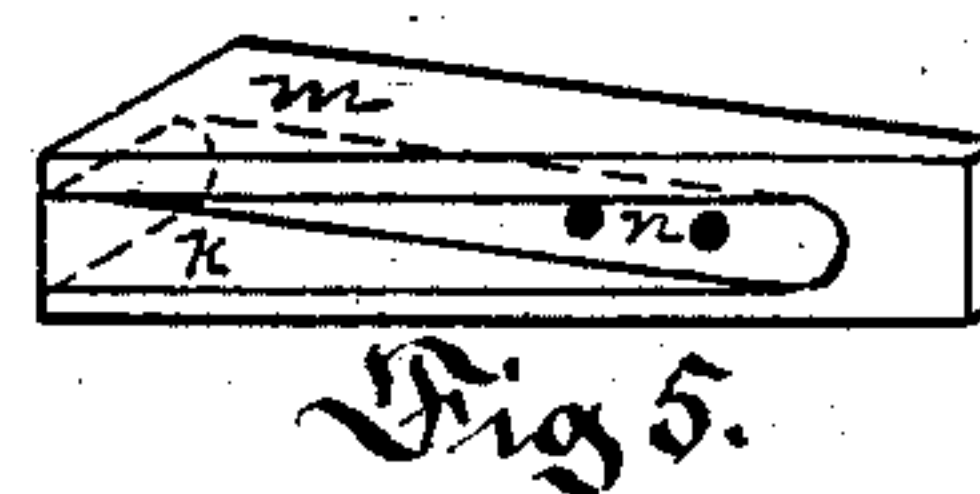
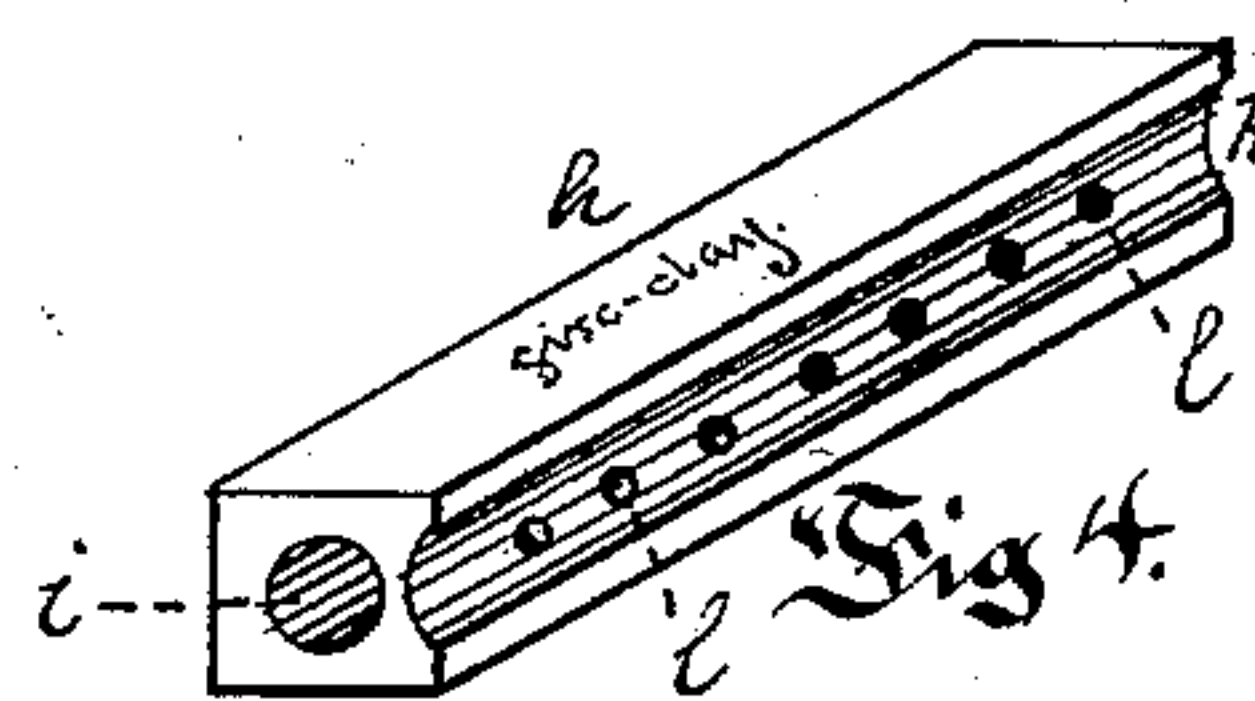
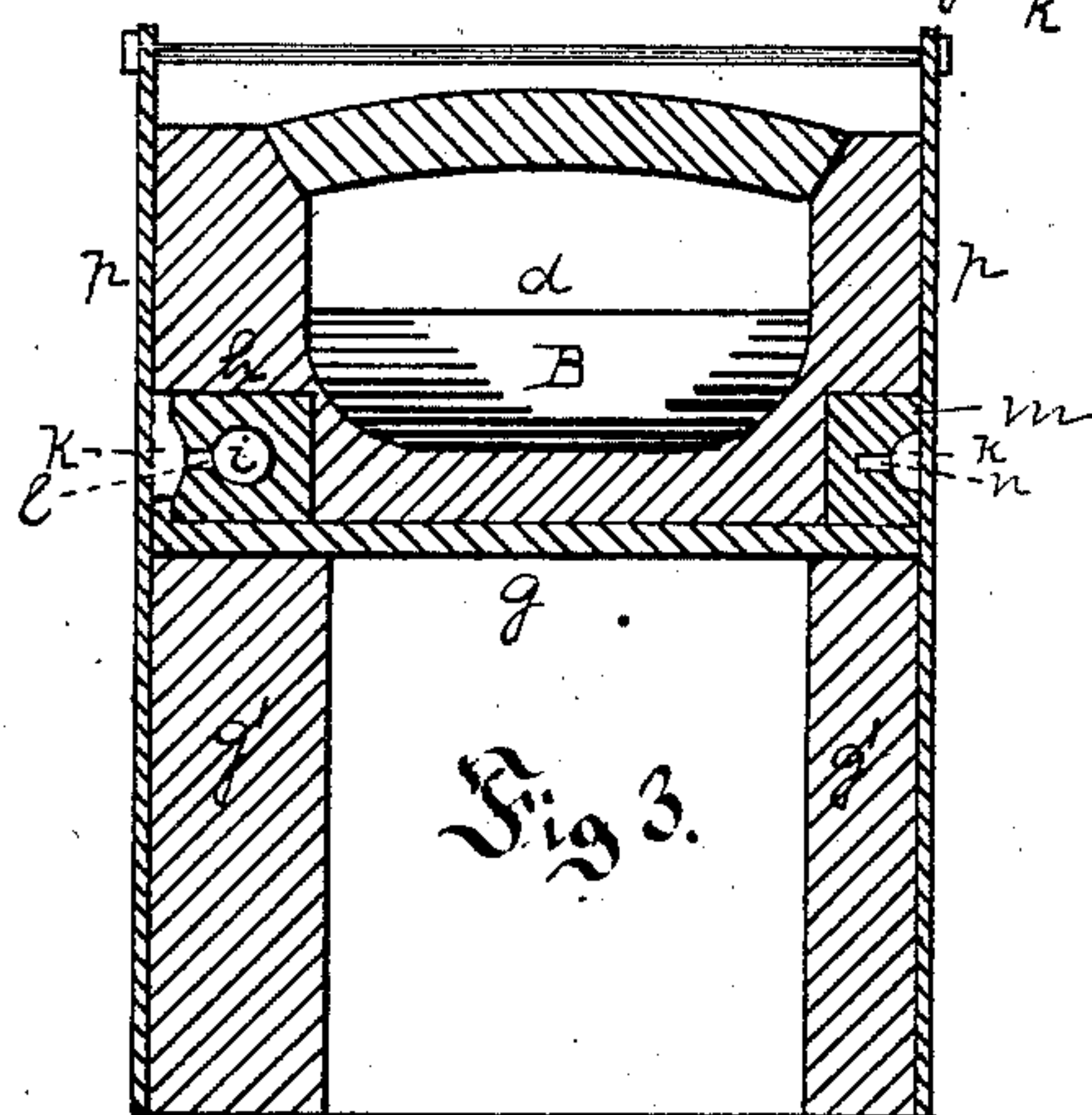
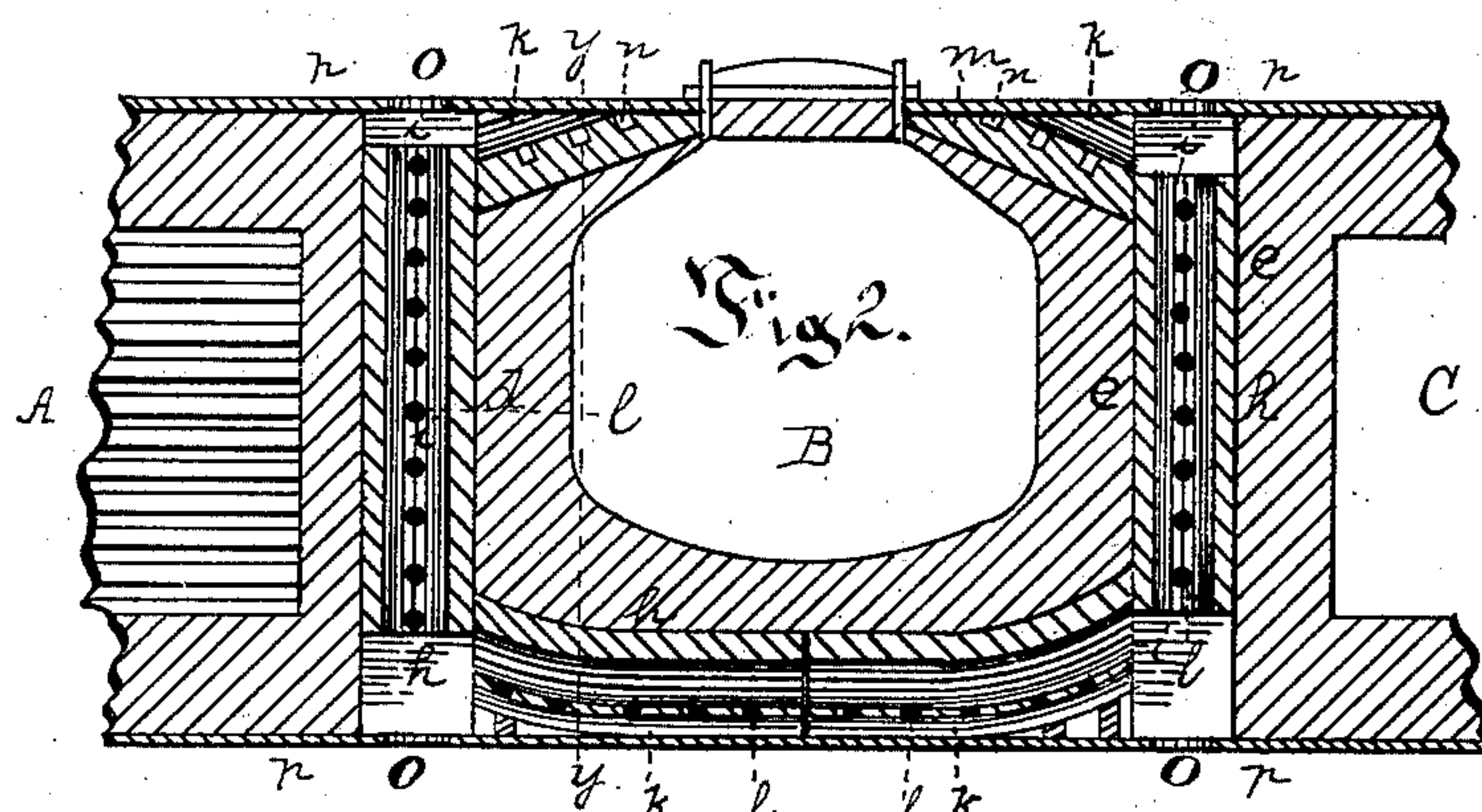
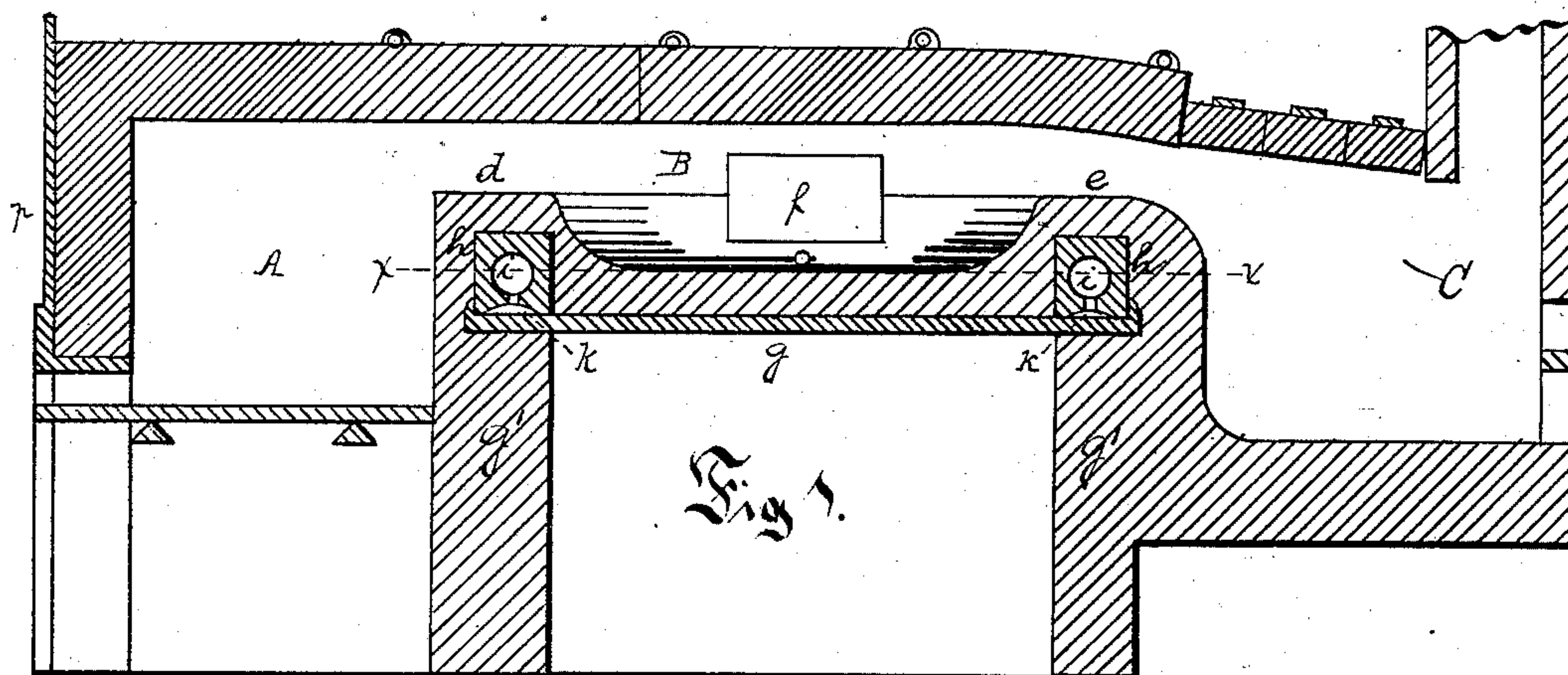
(No Model.)

J. MORRISON.

CHILL FOR METALLURGIC FURNACES.

No. 279,970.

Patented June 26, 1883.



Witnesses.
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JOHN MORRISON, OF PITTSBURG, PENNSYLVANIA.

CHILL FOR METALLURGIC FURNACES.

SPECIFICATION forming part of Letters Patent No. 279,970, dated June 26, 1883.

Application filed December 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN MORRISON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Chills for Metallurgic Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the chills employed in puddling and similar metallurgic furnaces for cooling the brick-work at the fire-bridge, neck, and sides of the furnace, to prevent its rapid burning out. In these furnaces the intense heat generated rapidly burns out these parts of the furnace unless they are in some manner cooled, and to cool these parts it has been customary to put cast-iron boxes, commonly termed "chills," in the fire-bridge, neck, and sides of the furnace, these chills being surrounded by fire-brick, clay, or fix, and water being carried through, or the chills being open to the passage of air, so that the parts of the furnace are cooled to prevent their rapid burning out or wasting away under the heat of the furnace. It has been found that the cast-iron thills were very liable to warp and crack under the changes of temperature of the furnace, and that when the brick-work wears or burns off or nearly off they will melt under the intense heat of the furnace, and the slag from the furnace will run into the chills and set, and thus close the opening through them and render them useless. The object of my invention is to form furnace-chills which are not subject to these objections.

It consists, mainly, in furnace-chills having a hole or bore extending longitudinally through them, a curved or other shaped groove along one side thereof, and openings between the bore and groove, whereby, if the main opening or bore is closed by slag the air can still pass or circulate through the chill and the chill still act to cool the walls of the furnace.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring for that purpose to the accompanying drawings, in which—

Figure 1 is a longitudinal central section of a puddling-furnace provided with my improved chills. Fig. 2 is a horizontal section of the same on the line $x x$, Fig. 1. Fig. 3 is

a cross-section of the same on the line $y y$, Fig. 2. Fig. 4 is a perspective view of the improved chill, and Fig. 5 is a like view of the chill employed on either side of the door.

Like letters of reference indicate like parts in each.

In the drawings, A represents the fire-chamber, B, the furnace-chamber, and C the stack, of a puddling or other furnace; and d is the fire-bridge, e the neck, and f the door, of the same. The bed-plate g is supported on the walls g' , and on it are supported my improved chills h . These chills h are preferably formed of fire-brick, tiles being molded to the desired shape of a clay having little shrinkage under changes of temperature, and baked in a suitable kiln. Any other suitable refractory material—such as aluminous clays, silica, and like materials—may also be employed for the formation of these tiles. The chill h has the bore or hole i extending longitudinally through it about centrally of the chill, so as to leave sufficiently thick walls to resist the thrust or blows of the workmen's tools in case the chill is uncovered. Along one side of the chill is the groove k , which is preferably formed curved, so as to weaken the chill as little as possible, but which may be angular or any other shape desired, its purpose being to provide an auxiliary passage for the circulation of air, which will act to cool the walls in case the bore i is closed. The auxiliary passage thus formed is connected with the bore i by means of a series of holes or openings, l , at suitable distances apart in the chill.

The chills or tiles are made in suitable lengths, according to the size of the furnace and position of the chills therein. The size found best adapted for the usual puddling-furnace is a chill or tile about three feet long, seven and one-half inches square, and having the bore i three inches in diameter, groove k one inch deep, and openings l about six inches apart. The chills in the fire-bridge d and furnace-neck e are built in with the auxiliary passage or groove k below the bore i , the bed-plate g forming the base of the passage, and one tile is ordinarily of sufficient length to form these chills. The chill along the side of the furnace-chamber opposite the door is formed of two of these tiles, and is preferably built in

so that the groove *k* is at the side of the chill opposite the furnace-bed, as shown in Figs. 2 and 3, as when so placed the passages of the tile will communicate more easily with the
 5 openings *o*, made in the side plate *p* of the furnace for the entrance of air to the chills. The chills on either side of the furnace-door are made of triangular tiles *m*, and have only the groove *k*, the base of the groove being sub-
 10 stantially parallel with the outer or wearing face of the tile, and tapering off at the narrow end of the tile, and the tile being provided with a series of recesses, *n*, extending from the groove into the body of the tile, to allow the circula-
 15 tion of air into the body of the chill. They are built in with the groove *k* against the side of the furnace-plates, and, as they are not so liable to the blows of the operator's tools, will be found to last as long as the regular chills,
 20 even though provided with the recesses *n*. The passages, bores, and grooves in the chills communicate with the openings in the furnace-plates *p*, so that there is a free circulation through all the walls of the furnace-chamber.
 25 The chills are built around with fire-brick in the same manner as the ordinary cast-iron chills, and are protected by this brick-work and the fix or lining of the furnace-chamber.
 It is found that these chills last much longer
 30 than the ordinary cast-iron chills, and they are not so liable to warp or break under the variations of temperature in the furnace-chamber. It is also found that these chills are not so liable to melt out under the intense heat of
 35 the furnace when exposed on account of the melting away of the fire-brick or fix-covering. Where the chill does crack or wear through and the main passage is closed by the slag, which

runs through the opening formed and sets and cools in the main passage *i* of the chill, thus
 40 closing it, the usefulness of the chill is not materially affected, as the air can then pass through the openings *k* into the auxiliary pas-
 sage *l* and back into the main passage beyond the obstruction, the circulation of air still con-
 45 tinuing in the chill. The chills can also be manufactured much more cheaply than the ordinary cast-iron chills, and for this reason can be replaced at much less cost in case of burn-
 50 ing out.

I am aware that in various classes of furnaces hollow side walls have been formed for heating air-blasts, and also that hollow perforated tuyere-blocks have been used for delivering a blast of air to the fire of furnaces
 55 and to the molten metal in the furnace, as in the pneumatic process, and do not herein claim such subject-matter.

What I claim as my invention, and desire to obtain by Letters Patent, is—
 60

1. A chill for metallurgic furnaces, having a main passage, a groove along one face to form an auxiliary passage, and openings between
 65 said passage and groove, as and for the purposes set forth.

2. A chill for metallurgic furnaces, having a groove extending longitudinally along one side and recesses or openings at the bottom of said
 groove, substantially as set forth.

In testimony whereof I, the said JOHN MOR-
 70 RISON, have hereunto set my hand.

JOHN MORRISON.

Witnesses:

M. P. CANFIELD,
 JAMES I. KAY.