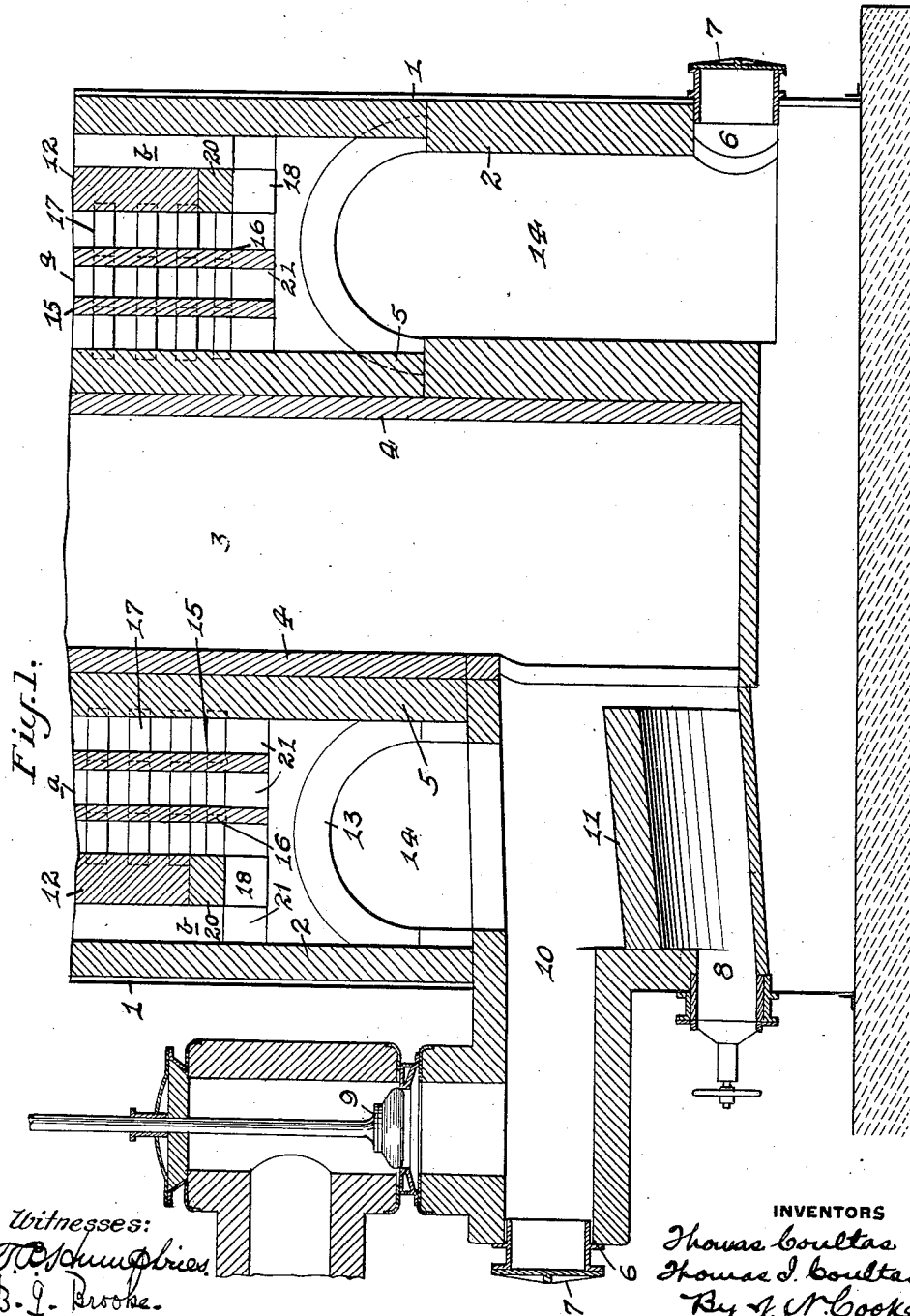


T. & T. I. COULTAS.
BLAST FURNACE STOVE.
APPLICATION FILED AUG. 24, 1912.

1,057,940.

Patented Apr. 1, 1913.

2 SHEETS—SHEET 1.



T. & T. I. COULTAS.
BLAST FURNACE STOVE.
APPLICATION FILED AUG. 24, 1912.

1,057,940.

Patented Apr. 1, 1913.

2 SHEETS—SHEET 2.

Fig. 2.

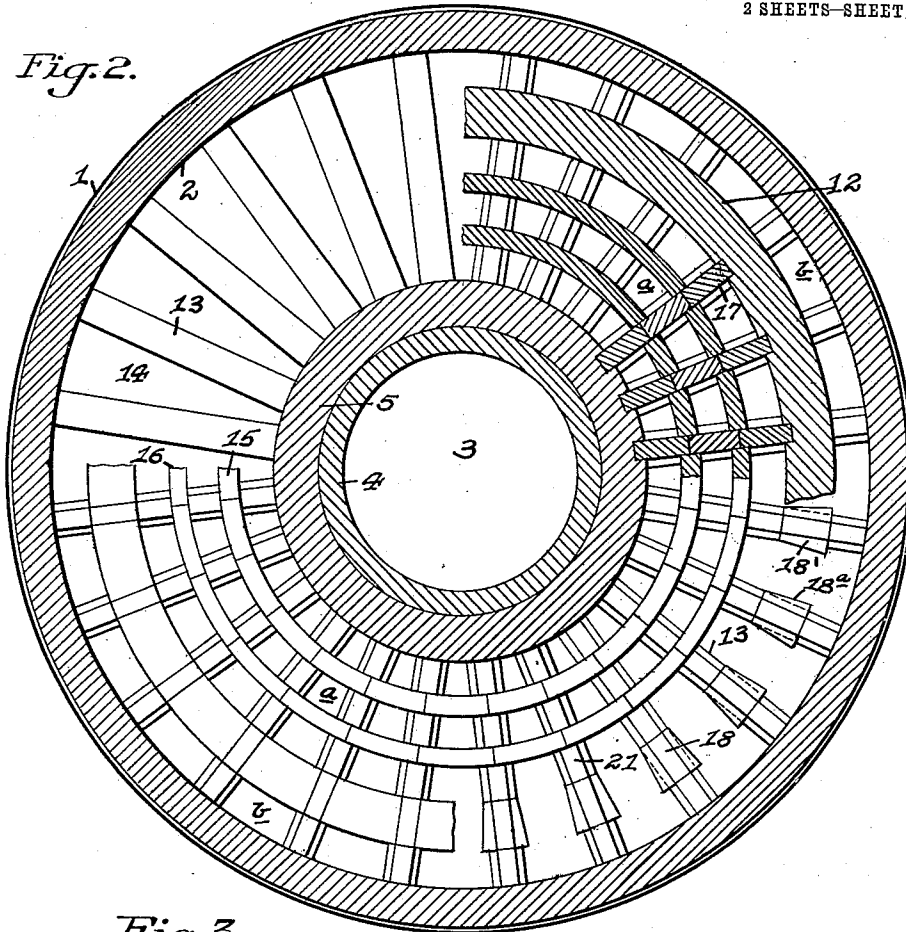
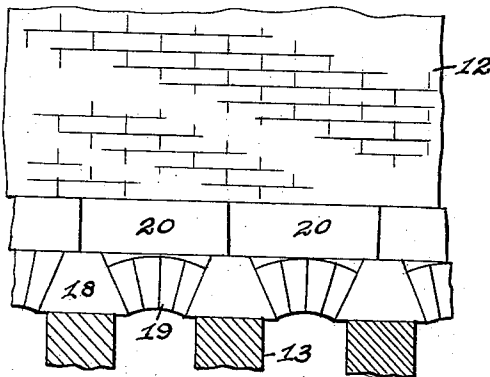


Fig. 3.



WITNESSES

T. B. Humphries
B. J. Brooke

Fig. 4.

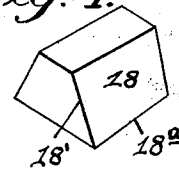
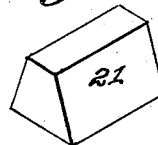


Fig. 5.



INVENTORS

Thomas Coultas
Thomas I. Coultas
By J. M. Cooke
Attorney

UNITED STATES PATENT OFFICE.

THOMAS COULTAS AND THOMAS I. COULTAS, OF PITTSBURGH, PENNSYLVANIA.

BLAST-FURNACE STOVE.

1,057,940.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed August 24, 1912. Serial No. 716,848.

To all whom it may concern:

Be it known that we, THOMAS COULTAS and THOMAS I. COULTAS, residents of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Blast-Furnace Stoves; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to stoves and has special reference to such a class as is known as blast furnace stoves for heating the blast used in the blast furnaces.

In the ordinary blast furnace stoves used in the present day the stoves have a sheet metal outer casing and are constructed on the inside of the same with a series of walls formed from brick. These walls are so constructed that the hot gases pass around the same and there are numerous passageways whereby the gases pass from between the different walls. The fire brick of which the walls are constructed must have several qualities for this class of work, viz; capacity to absorb heat rapidly from the combustion of waste furnace gases, readiness to give off heat rapidly to the air blown into the stove and strength of bond between the particles of fire clay to resist the disintegrating action of the hot gases. No matter what amount of care is taken in the selection of brick there will be more or less disintegration of the same and this, in connection with the dirt from the furnace gases will tend to clog up the passes between the walls of the stove. It is therefore necessary that sufficient room be left at the bottom of the stove to remove the dirt therefrom and this is very difficult on account of the room required for supporting the walls.

The object of our invention is to provide a cheap, simple and efficient form of stove for blast furnaces wherein the walls of the same will be amply supported and will allow for a much better circulation of the gases and air around the same while at the same time the dirt can be easily removed from all parts of the stove.

Our invention consists, generally stated, in the novel arrangement, construction and combination of parts as hereinafter more specifically set forth and described and particularly pointed out in the claim.

To enable others skilled in the art to which our invention appertains to construct and use our improved stoves for blast furnaces

we will describe the same more fully referring to the accompanying drawings in which—

Figure 1 is a vertical sectional view of the lower part of our improved stove for blast furnaces. Fig. 2 is a cross sectional view of the same on the line 2—2 of Fig. 1. Fig. 3 is a cross sectional view of two of the arches used for supporting the walls taken on the line 3—3 of Fig. 2. Fig. 4 is a perspective view of the block used on the arches, under the ring of tiles. Fig. 5 is a perspective view of the block used between the walls on the arches.

Like symbols of reference herein indicate like parts in each of the figures of the drawings.

In the ordinary stoves for blast furnaces the outer part of the same consists of a shell or casing 1 which is built up of sheet metal and has an inner wall or lining 2 formed of brick and is known as the A-wall. The interior of the stove is hollow and has a large combustion chamber 3 within the same, such chamber extending the entire height of the stove. This combustion chamber 3 is also known as the well hole and is formed by the sub-wall 4 which also extends to the bottom of the stove. Immediately without and around the sub-wall 4 is the well wall 5 which supports the sub-wall 4 and permits the same being removed and renewed without disturbing the said well wall.

The bottom of the stove is provided with the usual clean out holes 6 which are generally six in number and distributed at equal intervals throughout the circumference of the stove and such holes are provided with doors 7 for closing the same when the dirt is being removed from the interior of the stove. The stove is also provided with an air inlet 8 at the bottom of the same to help distribute the combustion of the gases throughout the stove.

The hot blast valve 9 is situated near the bottom of the stove and a passageway 10 leads therefrom to the well hole or combustion chamber 3, which passageway is located immediately above the air inlet 8 and separated from the same by a wall 11 formed of fire brick, tile or other suitable material.

Between the A-wall 2 and the well wall 5 is a heavy wall 12 called the C-wall, which is of the same height as the said well wall and is of great weight and in the ordinary

stove the said wall would extend down to the bottom of the same and be supported thereby and have openings in the bottom of the same for the passage of blast and gases to the opposite sides thereof. This C-wall 12 divides the compartment between the well wall 5 and A-wall 2 into the wide flue *a* and the narrow outer flue *b* through which the hot gases and blast pass in the ordinary manner.

In our improved stove we have a series of arches 13 extending entirely around between the A-wall 2 and the well wall 5 and spanning between the said walls which are increased in thickness at the lower end of the same to provide a support for the said arches. The arches thus located will form a chamber 14 below the same and such chamber will be of any desired height as found convenient so that any dirt from the furnace gases or from the disintegration of the brick forming the walls can be readily removed through the clean out holes 6. Between the well wall 5 and the C-wall 12 is a pair of withes walls 15 and 16 and such walls extend the same distances as the said C-wall but are not so heavy and are for the purpose of giving rigidity between the walls 5 and 12 together with the withes 17 which extend the entire distance between the A-wall 2 and the well wall 5. The arches 13 are situated some nine to twelve inches apart at the inner ends of the same so that the blast and gases may pass between the same while at the points where the C-wall passes over the same a block 18 is located on top of each arch of the shape shown in Fig. 4. This block 18 is twice as wide at its lower end as it is at its upper end so that its lower end will fit the top of the arches 13 which are of the same width as said blocks while its upper end will be exactly the width of the withes 17. Its sides 18' are thus tapered while its ends 18^a are also tapered as later explained.

Between each of the successive arches and blocks 18 is constructed a small arch 19 which spans between said blocks from their tapered ends 18^a and the top of such arches are made to coincide with the level of the tops of the blocks 18, while a tile 20 is then built upon the top of said small arches and blocks in order to form a continuous circle around the entire stove. These tiles are each just large enough to span from center to center of the blocks 18. Upon this circle of tile the C-wall 12 is then built in the ordinary manner so as to allow sufficient distances at all points for the passage of the blast and gases between the respective walls while the support of the respective walls necessitated by the distance between the successive arches toward their outer ends becoming greater will be taken care of in any convenient and suitable manner. The

withes walls 15 and 16 are built upon the tops of the blocks 21 and extend to the ordinary height.

Between the A-wall 2 and C-wall 12 and well wall 5 a block 21 is placed so as to rest upon the top of the arch 13 and such block is tapered in order to be the same size as the withes 17 at the top while the lower end of the same is just as wide as said arch and its length equal to the distance between the respective walls. This block will prevent the dirt and dust from collecting upon the flat surface of the arches between the different walls and thus causing friction to the passage of blast and gases through the walls.

It will be readily seen that in our improved form of stove for blast furnaces the chamber 14 formed below the arches 13 may be of any desired height so that the same may be of the same general height throughout the circumference of the stove and may be made high enough so that the passageway 10 to the hot blast valve will not interfere with the height of the arches. It will also be seen that the chamber 14 will eliminate all the friction caused by the clogged up passes of the ordinary stove which occurs from the crumbling and falling of the several walls and the dirt carried from the furnace with the hot gases. The blast and gas will thus have a much better circulation through the passes of the stove and the furnace. Blast engines will not need to be overworked in order to give the required pressure. The chamber 14 extending as it does from the A-wall 2 to the well wall 5 will catch all the dirt which can be removed readily from the clean out holes 6 located around the stove at suitable intervals which is impossible in stoves where the C-wall extends to the bottom of the same. The arches 13, blocks 18, small arches 19 and tiles 20 will form a foundation for the C-wall 12 and withes walls 15 just as strong as the bottom of the stove and at the same time there being no arches or passageways through the C-wall such wall will be much more substantial and less likely to be distorted.

Various modifications and changes in the design and construction of our improved stove may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What we claim as our invention and desire to secure by Letters-Patent is—

A blast furnace stove comprising a shell wall, a combustion chamber in the center of said stove formed by a well wall and forming an annular compartment between said walls, a series of arches in said compartment extending radially around said combustion chamber and spanning between said walls to form a chamber beneath the same, blocks on each of said arches having

inclined end surfaces, small arches between
said blocks, tiles supported on said blocks
and arches forming a continuous ring
around said stove, and a wall supported on
5 said tiles for dividing the annular compart-
ment into two passes.

In testimony whereof, we the said THOMAS

COULTAS and THOMAS I. COULTAS have here-
unto set our hands.

THOMAS COULTAS.
THOMAS I. COULTAS.

Witnesses:

T. B. HUMPHRIES,
J. N. COOKE.

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