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METHOD OF BUILDING TUBULAR MASONRY CONSTRUCTION

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FIG. 1

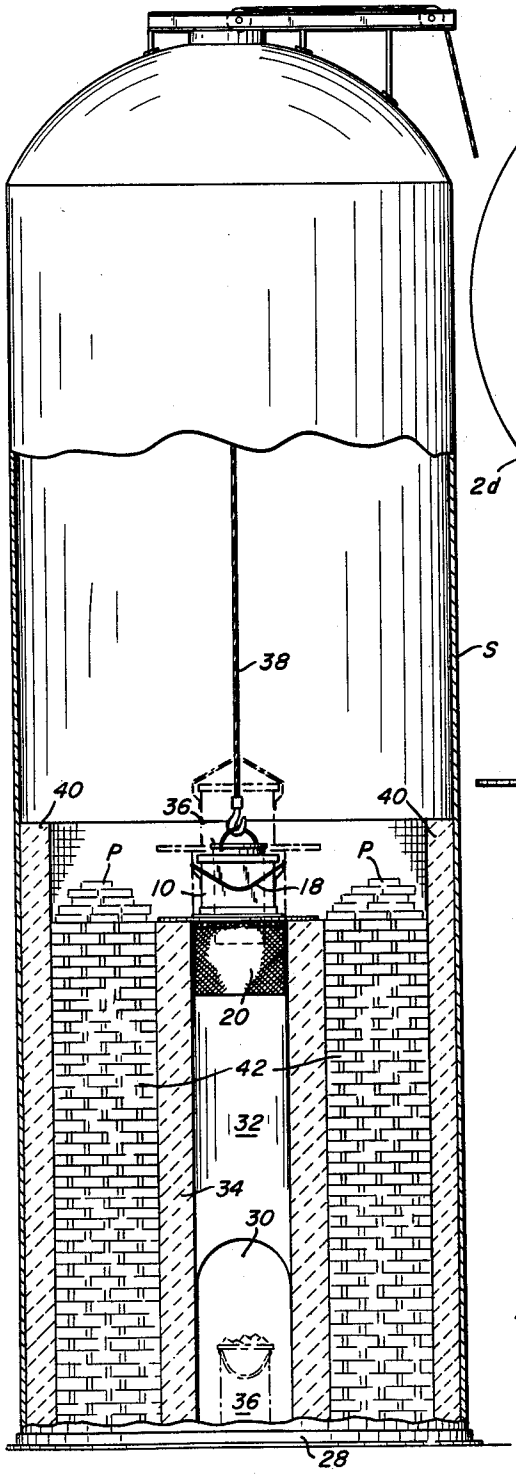


FIG. 2

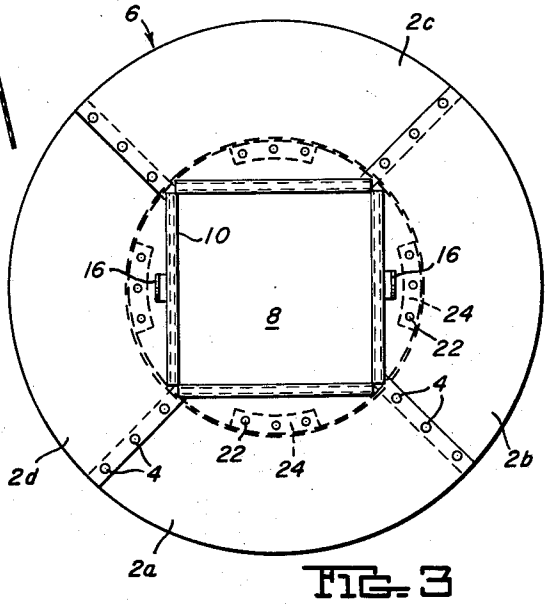


FIG. 3

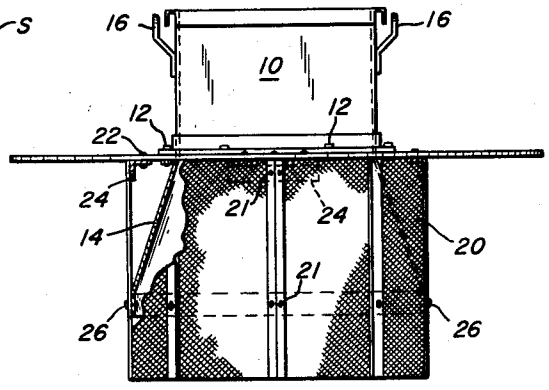
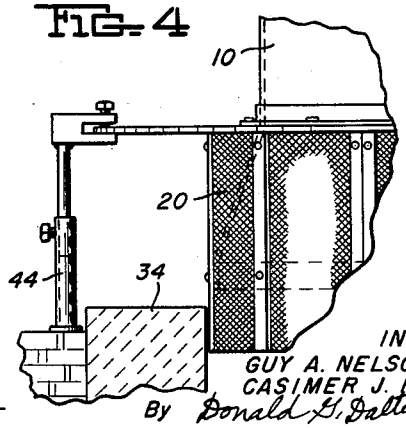


FIG. 4



INVENTORS
GUY A. NELSON and
CASIMER J. ROSIECKI
By Donald G. Dalton
Attorney

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Guy A. Nelson, Valparaiso, and Casimer J. Rosiecki, East Gary, Ind., assignors to United States Steel Corporation, a corporation of New Jersey

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1 Claim. (Cl. 50—536)

The present invention relates generally to masonry construction and more particularly to a method of building tubular masonry structures such as the interior brickwork of blast-furnace stoves and the like.

Prior to our invention it was customary to start building the interior masonry of a blast-furnace stove by laying brickwork at the bottom of the stove up to the height of the hot blast flue which was approximately seven feet above the bottom of the stove. Upon completion of the hot blast flue brickwork, a wood scaffold was erected above the hot blast flue about the center line of the combustion chamber of the stove. The scaffold was erected in sections approximately four feet high, each section being erected after the construction of each four foot increment of brickwork above the hot blast flue. Materials for constructing the brickwork were carried in through the hot blast flue and loaded in a hoist bucket which was then raised by means of a winch-operated cable through the scaffolding to the upper level of brickwork as each four foot increment of brickwork was completed. Workmen then laid up the outer wall of the stove brickwork to a height of approximately four feet above the previously laid brickwork, after which the wall of the combustion chamber was laid to the same height. Checker brick was then laid in the space between the newly-laid portions of the combustion chamber and the outer walls. Another four foot section of scaffolding was then added and the procedure just described was continued until the top of the stove was reached and all of the brickwork was completed. After the brickwork was completed, the wood scaffolding was dismantled piece by piece and removed through the hot blast flue.

This method of constructing interior brickwork of blast furnace stoves using wood scaffolding was at best inefficient, excessively time-consuming and hazardous. This method of construction required the brick masons to do much climbing and handling of materials while in precarious positions at elevated heights so that there were frequent injuries due to falling or being struck by falling objects. Further, the combustion chamber of a stove constructed by the prior art method was usually out of plumb and uneven along its length.

It is, accordingly, the primary object of our invention to provide an improved method of constructing an upright tubular masonry structure wherein brickwork is laid up around a vertically adjustable tubular guide so as to insure the formation of a dimensionally true tubular masonry construction.

This and other objects will become more apparent after referring to the following specification and attached drawings, in which:

FIGURE 1 is an elevational view partly in section of a blast-furnace stove showing apparatus in use for building the tubular masonry construction of the interior of the stove in accordance with the method of the invention;

FIGURE 2 is an enlarged plan view of the apparatus shown in FIGURE 1;

FIGURE 3 is an elevational view of FIGURE 2 with portions cut away for clarity; and

FIGURE 4 is a partial elevational view showing the apparatus of FIGURE 3 modified by the addition thereto of an auxiliary safety-holding element which may be used

to support the apparatus in elevated position while it is being used in the practice of the method of the invention.

Referring now to FIGURES 2 and 3, reference numerals 2*a*, 2*b*, 2*c* and 2*d* designate arcuate segmental plates detachably connected together by means of bolts 4 to form a circular platform 6 having a center opening 8 therethrough. An open end box structure or hoisting shaft 10 extends through the opening 8 with a substantially rectangular portion projecting above the platform 6 and a flared portion 14 depending below the platform. The hoisting shaft 10 is removably attached to the platform by means of bolts 12. A pair of bail ears or lugs 16, one on each of two opposite sides of the upper portion of the hoist shaft 10, pivotally support the ends of a bail 18 whereby the platform assembly can be raised and lowered by means of a cable, as will be more fully described hereinafter.

A circular cage or form 20, comprised of two semicircular rigid wire mesh sections spliced together by means of bolts 21, is detachably mounted concentrically on the bottom of platform 6 by means of angle brackets 24 which are welded to the cage and bolted, by means of bolts 22, to the plates of the platform. The cage 20 is secured to the lower edge of the flared portion 14 of the hoist shaft by means of bolts 26.

Referring now to FIGURE 1, in operation, to build the brickwork interior of a blast furnace stove S in accordance with the method of the present invention, brickwork is first laid starting at the stove bottom 28 and continuing to a height approximately three feet above the top of the hot blast flue 30 of the stove. Then, the disassembled sections of the platform 6 and hoist shaft 10 assembly are carried through the hot blast flue 30 above the initially laid brickwork and assembled. After assembly the platform assembly is positioned with the cage 20 fitting into the partially constructed combustion chamber 32 and the platform 6 resting on the upper level of the wall 34 of the combustion chamber. The diameter of cage 20 is slightly less than the diameter of the combustion chamber.

After the platform assembly has been positioned, brick and masonry material are carried through the hot blast flue 30 by wheelbarrow, conveyor rollers or similar means (not shown) and deposited in a hoist bucket 36. The loaded bucket 36 is then raised up into the hoist shaft 10 by means of a cable 38 which extends through the top of the stove and is operated by a mason's winch (not shown) located outside the stove.

After the hoist bucket 36 has been raised, a brick mason removes the brick and masonry material from the bucket and deposits it in a loose pile P on the previously laid brickwork circumferentially around the interior of the stove. After being emptied the hoist bucket is lowered to the bottom of the stove where it is reloaded with brick and masonry material.

The outer wall 40 is then laid circumferentially around the interior of the stove to a height of approximately four feet above the initially laid brickwork. The platform assembly is then raised approximately two to three feet so that a portion of the cage 20 remains inserted in the upper portion of the combustion chamber, as shown by broken lines in FIGURE 1 and solid lines in FIGURE 4. To raise the platform assembly, the cable 38 is detached from the lowered hoist bucket and attached to the bail 18 of the hoist shaft 10. Actuation of the mason's winch then operates the cable 38 to raise the platform assembly. After the platform assembly has thus been raised, the brick mason lays up the wall 34 of the combustion chamber using the cage 20 as a form to lay the wall brick against, whereby a concentric, smooth surface wall is provided for the combustion chamber 32. The

brick mason continues to lay the brick for the wall **34**, with the platform assembly being raised as required, until the top of wall **34** is level with the top of the previously laid outer wall **40**. The platform assembly is then lowered until the platform **6** rests upon the top of wall **34**. Then the checker brick **42** is laid between the combustion chamber wall **34** and the outer wall **40** up to the level of the tops of the combustion chamber wall and outer wall. When the increments of chamber wall, checker brick and outer wall have all been laid up to the same level, additional brick and masonry material is brought up through the hoist shaft **10** by means of the bucket **36** and the bricklaying cycle just described is repeated. This procedure is repeated until all of the interior brickwork of the stove has been built. When the brickwork is completed, the platform assembly is disassembled and the parts thereof are lowered to the bottom of the stove where they are removed through the hot blast flue **30**.

As a safety precaution, adjustable supports **44** may be attached to the platform **6** at spaced points about its circumference, as shown in FIGURE 4, while the chamber wall **34** is laid up against the cage **20**.

While one embodiment of our invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claim.

We claim:

A method of building a blast-furnace stove comprising the steps of first laying up a substantially annular inner wall up to a first predetermined level forming a tubular chamber defined by said inner wall, then laying up to said first predetermined level an outer wall spaced from and concentric with said inner wall, then filling the space between said inner and outer walls with checker brick, then supporting on top of said inner wall a platform having a center opening therethrough and an upstanding wall surrounding said center opening and a depending open end tubular form fitting inside said chamber defined by said inner wall, then hoisting brick through said form and said platform, then laying up said outer wall to a second predetermined level, then raising said platform above said first predetermined level a distance less than the height of said tubular form, then suspending said platform in said raised position, then laying up said inner wall around said form to a level short of said platform and above said first predetermined level, then lowering said platform to rest on top of said inner wall, and then laying checker brick up to said second predetermined level in the space between said walls.

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HENRY C. SUTHERLAND, *Primary Examiner.*

EARL J. WITMER, JACOB L. NACKENOFF,
Examiners.