No. 616,474. Patented Dec. 27, 1898.

# R. H. & W. LANYON.

## HOLLOW ARCH SUPPORTING STANDARD OR BUCK STAY FOR ZINC SMELTING FURNACES.

(Application filed May 24, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

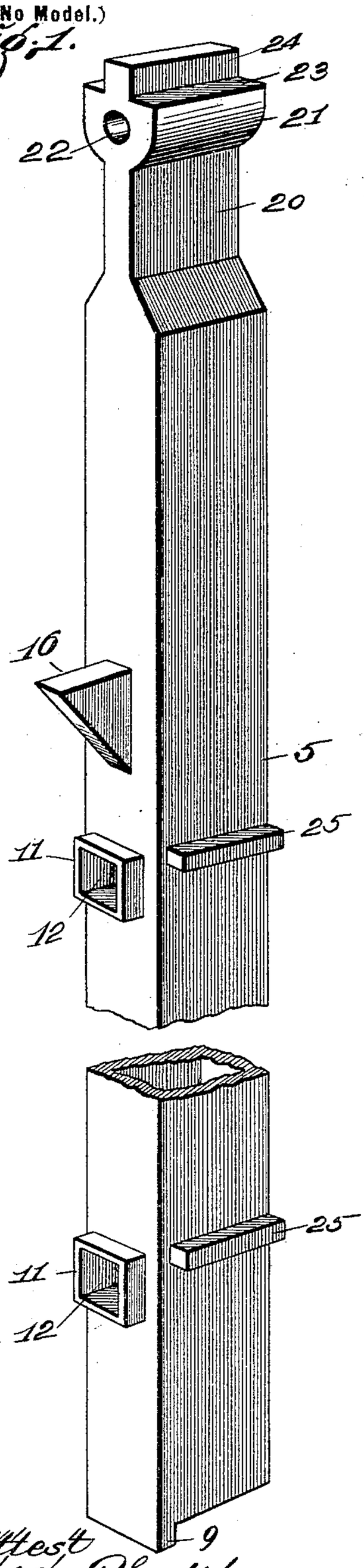


Fig. 2.

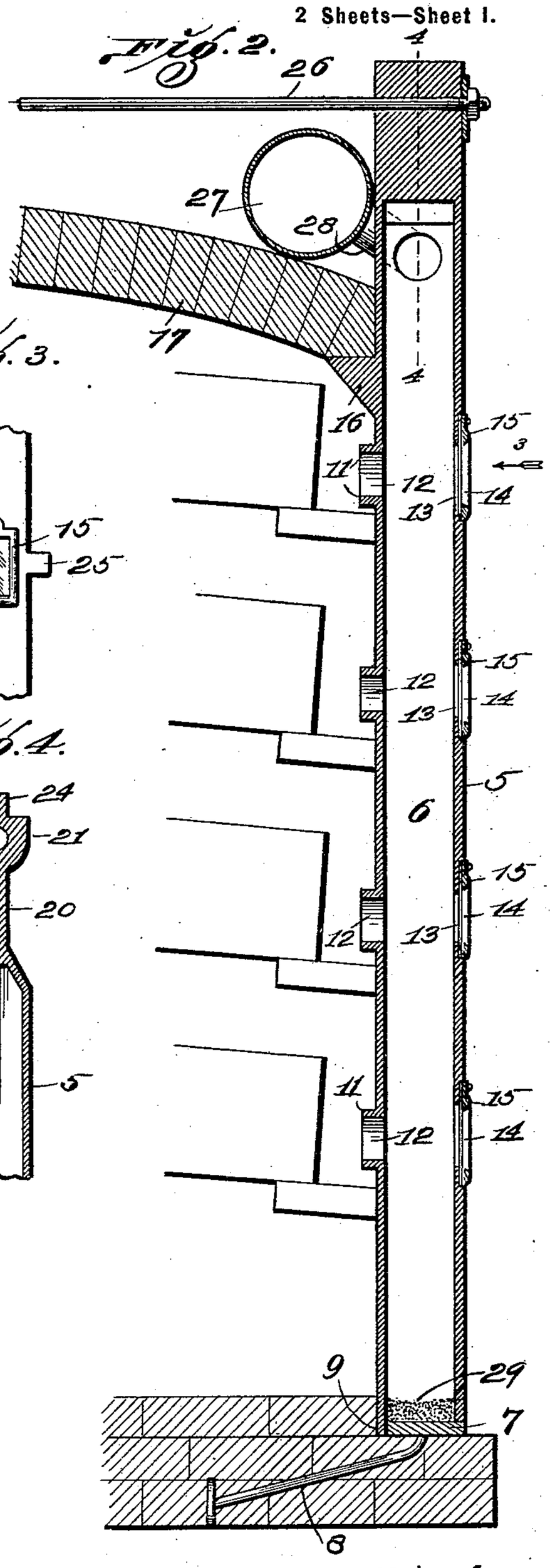


Fig. 3.

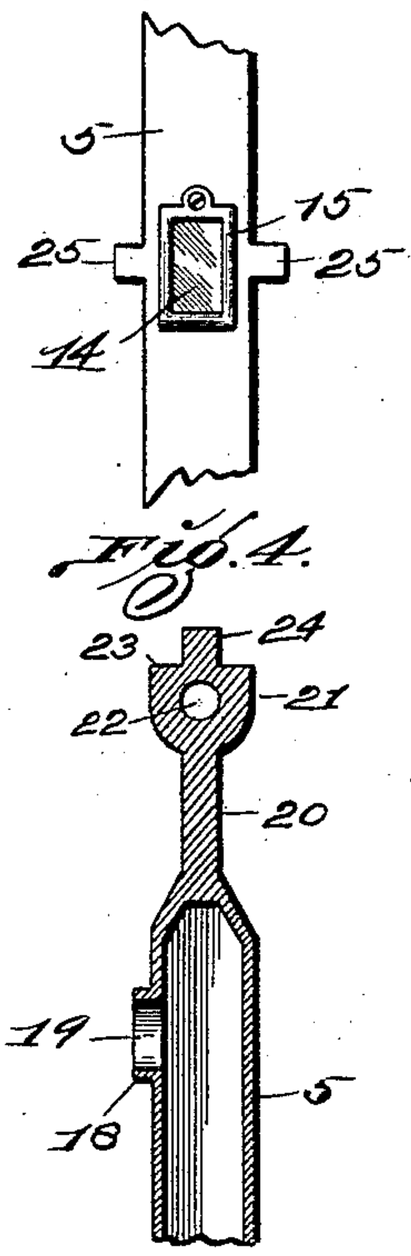


Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

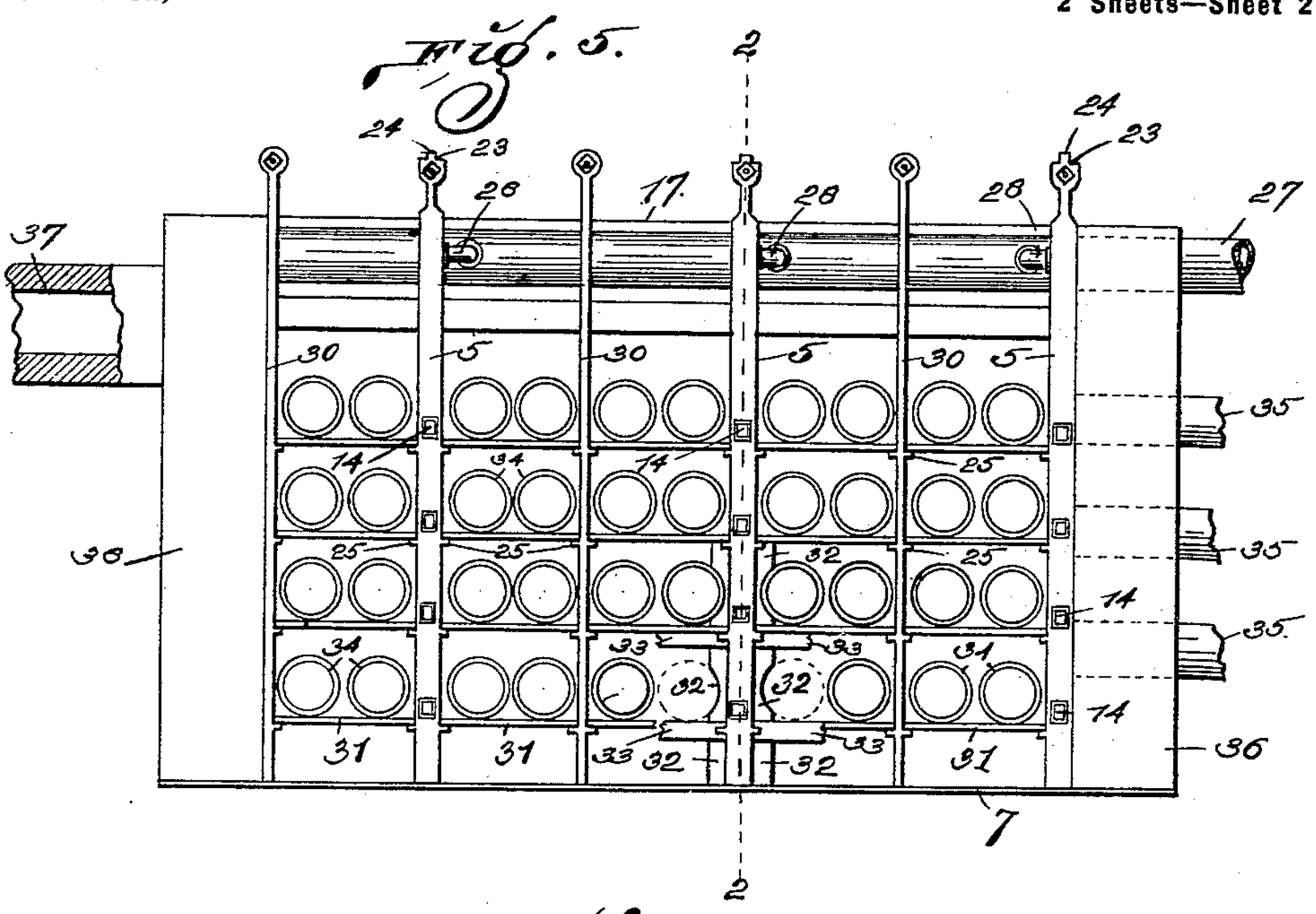
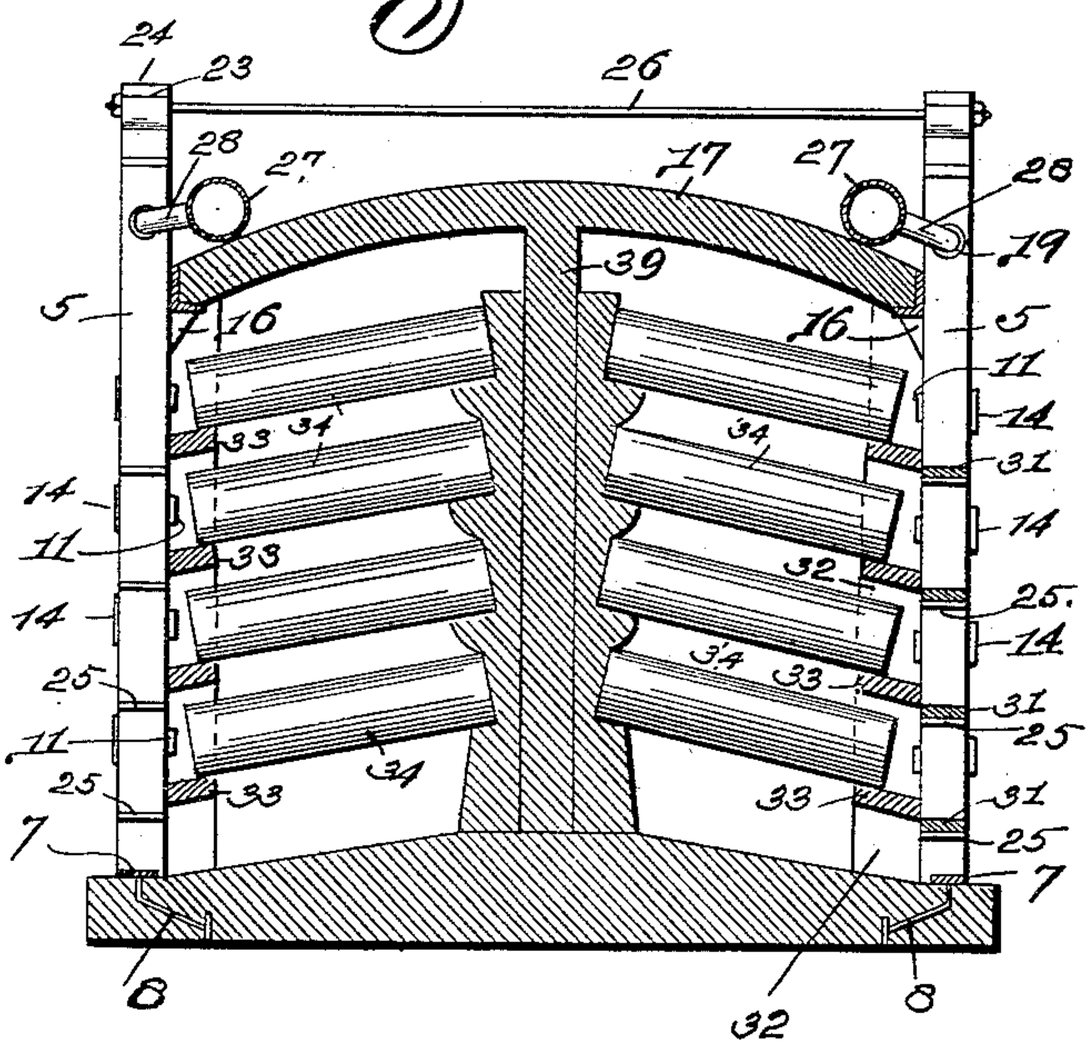



Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## HOLLOW ARCH-SUPPORTING STANDARD OR BUCKSTAY FOR ZINC-SMELTING FURNACES.

SPECIFICATION forming part of Letters Patent No. 616,474, dated December 27, 1898.

Application filed May 24, 1897. Serial No. 637,912. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT H. LANYON and WILLIAM LANYON, of the city of Iola, Allen county, State of Kansas, have invented certain new and useful Improvements in Hollow Arch-Supporting Standards or Buckstays for Zinc-Smelting Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to hollow arch-supporting columns or buckstays for zinc-smelting furnaces; and it consists of the novel construction, combination, and arrangement of parts hereinafter shown, described, and claimed.

Our present invention is an improvement upon the furnace shown in our prior United States Patent, No. 474,019, dated May 3, 1892.

Figure 1 is a view in perspective of one of our improved hollow arch-supporting columns or buckstays for zinc-smelting furnaces, partly broken away. Fig. 2 is a vertical sectional view through the wall of the smelter and taken on a line running through the center of the hollow column and taken approximately on the line 2 2 of Fig. 5. Fig. 3 is a view in elevation looking in the direction indicated by the arrow 3 in Fig. 2, partly broken away. Fig. 4 is a vertical sectional view through the hollow column and taken approximately on the line 4 4 of Fig. 2, partly broken away. Fig. 5 is a front elevation of a furnace employing our hollow arch-supporting columns or buckstays. Fig. 6 is a vertical transverse section analogous to Fig. 2 and extending entirely through the furnace.

Our improved hollow arch-supporting column or buckstay for zinc-smelting furnaces consists of the rectangular hollow column 5, having the chamber 6 extending from its lower end to near its upper end. The plate 7 closes the lower end of the chamber 6, and an anchor 8 is attached to the plate 7 and embedded in the masonry 10. The lug 9 projects downwardly from the column back of the plate 7. The rectangular hollow lugs 11 project backwardly from the rear side of the column 5, and outlet-openings 12 are formed through said lugs and communicate with the chamber 6. Rectangular openings 13 are formed through the front wall of the column in horizontal alinement with the outlet-openings 12, and sheets 14 of mica or other suitable material are placed in position over the openings 13 and held in position by means of the frames 15, thus forming sight-openings, if desired, through the sheets 14 and through the openings 12 into the smelting-furnace. A triangular lug 16 projects backwardly from near the upper end of the block 5, the upper face of said lug being horizontal and forming a bracket, which bracket supports one end of the arch 17, which arch forms the roof of the smelting-furnace. A circular lug 18 projects from the right-hand side of the block 5 near the upper end of the chamber 6, and an opening 19 is formed through said lug 18 and communicates with the chamber 6. The portion 20 closes the upper end of the chamber 6, and the upper end of the portion 20 is enlarged to form the portion 21, and the opening 22 passes horizontally through said portion 21 from front to rear. The upper face 23 of the portion 21 is flat and horizontal, and a lug 24 projects upwardly from the center of said face 23. The lugs 25 project from both of the side faces of the column 5. The hollow column thus constructed is placed in the front of the smelting-furnace, as shown in Fig. 2, the lugs 25 forming joints with the wall and the sight-openings passing through the wall. The rod 26 passes through the opening 22 and holds the upper end of the column in position. The air-pipe 27 is placed above the arch 17, and branch pipes 28 lead from the air-pipe 27 to the lugs 18 of the columns, as required to conduct air from the air-pipe 27 into the chamber 6, and said air passes out of said chamber 6 through the openings 12 into the furnace.

A small quantity of earth or similar substance 29 is thrown into the chamber 6 through one of the openings 13 and falls upon the plate 7 for the purpose of sealing the joints around the plate 7 and making the lower end of the chamber 6 substantially air-tight.

The hollow column thus constructed is substituted for the columns 10 shown in the patent above cited. In other respects the construction of the furnace may remain unchanged.

We do not herein claim the alternate arrangement of the hollow columns 5 and the solid columns 30, as such arrangement forms the subject-matter of a subsequent applica-

tion filed by us on April 5, 1898, Serial No. 676,559.

Figs. 5 and 6 illustrate the furnace which we are now using and illustrate the use which we are now making of the hollow arch-supporting columns. The hollow columns 5 are alternated with the solid columns 30. The cast-iron plates 31 are inserted horizontally between the hollow columns 5 and the solid columns 30, and the ends of said plates rest upon the lugs 25. The fire-clay pillars 32 rest upon the foundation immediately inside of the columns 5 and 30, upon opposite sides of said columns, care being taken not to obstruct the passages leading from the openings 12 into the furnace. The fire-clay brick or plates 33 are placed in horizontal positions back of the columns 5 and 30 on a level with the plates 31, the ends of said fire-clay plates resting upon the pillars 32. The lower series of retorts 34 are then placed in position, with their forward ends resting upon the fire-clay plates 33. Then the second series of pillars 32 are placed in position, resting upon the first series of the fire-clay plates 33, and a second series of the fire-clay plates 33 is placed in position, resting upon the second series of pillars 32, and so on until the furnace is filled with retorts. After the furnace has been filled with retorts 34 the spaces around the front ends of the retorts and between the pillars 32 and the retorts are filled with fire-clay, thus forming a tight solid front wall for the furnace, the front ends of the retorts projecting through said wall. The solid columns 30 are similar in construction and perform the same functions as the hollow columns, with the exception of transmitting air. This furnace is heated by gas generated outside of the furnace and injected into the furnace through the pipes 35, (indicated in dotted lines as passing through the wall 36,) and the smoke and waste gases are carried from the furnace through the pipe 37, passing through the end wall 38. The blast of air is led to the furnace through the pipe 27 and distributed to the hollow arch-supporting columns through the branch pipes 28 and by said columns distributed to the various parts of the furnace through the openings 12.

The process of combustion within the furnace and around the retort is similar to that found in a blowpipe, the heat being regulated within certain limits by the pressure of the blast of air and of course by the amount of gas supplied to the furnace.

A vertical wall 39 extends from the foundation to the center of the arch, thus dividing the furnace into two parts, and a row of the arch-supporting columns is mounted upon each side of the wall 39, the rear ends of the retorts being supported by said wall 39, as shown in Fig. 6, thus in effect producing a double furnace.

The upper faces 23 of the portion 21 of the hollow columns and the lug 24 projecting upwardly from the center of said faces serve as suitable foundations to support the superstructure of the furnace—that is, the roof and ventilators.

We claim—

1. The herein-described hollow column for zinc-smelting furnaces, consisting of the rectangular column 5 having the chamber 6, the lug 9 projecting downwardly, the lugs 11 projecting backwardly and having the outlet-openings 12 communicating with the opening 6, the sight-openings 13 formed through the front wall of said column and in horizontal alinement with the opening 12, the triangular lug 16 projecting backwardly from said column 5, the circular lug 18 projecting laterally from the upper end of said column 5 and having the opening 19 communicating with the opening 6, the portion 20 closing the upper end of the opening 6 and having the enlargement forming the portion 21 and having the opening 22 formed horizontally through the portion 21, and the lug 24 projecting upwardly from the portion 21 in alinement with the portion 20, substantially as specified.

2. In a zinc-smelting furnace or the like constructed with an open front wall to be closed with fire-clay, the combination with the arch and superstructure of the furnace, of hollow columns mounted in position to form a part of said front wall, retorts located in the furnace with their front ends supported by said lugs, supports at the upper ends of said hollow columns to support the arch and superstructure of the furnace, an air-pipe communicating with the chambers of said hollow columns, and openings through the inner walls of said hollow columns to discharge the air into the furnace, substantially as specified.

3. In a zinc-smelting furnace or the like constructed with an open front wall to be closed with fire-clay, the combination with the arch and superstructure of the furnace, of hollow columns mounted in position to form a part of said front wall, lugs formed upon said hollow columns, retorts located in the furnace with their front ends supported by said lugs, supports at the upper ends of said hollow columns to support the arch and superstructure of the furnace, and an air-pipe communicating with the chambers of said hollow columns, there being openings through the inner walls of said hollow columns to discharge the air into the furnace, and there being openings through the front walls of said hollow columns in alinement with said discharge-openings, substantially as specified.

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

ROBERT H. LANYON.
WILLIAM LANYON.

Witnesses:
L. L. NORTHRUP,
E. H. RUBLE.