

No. 711,268.

Patented Oct. 14, 1902.

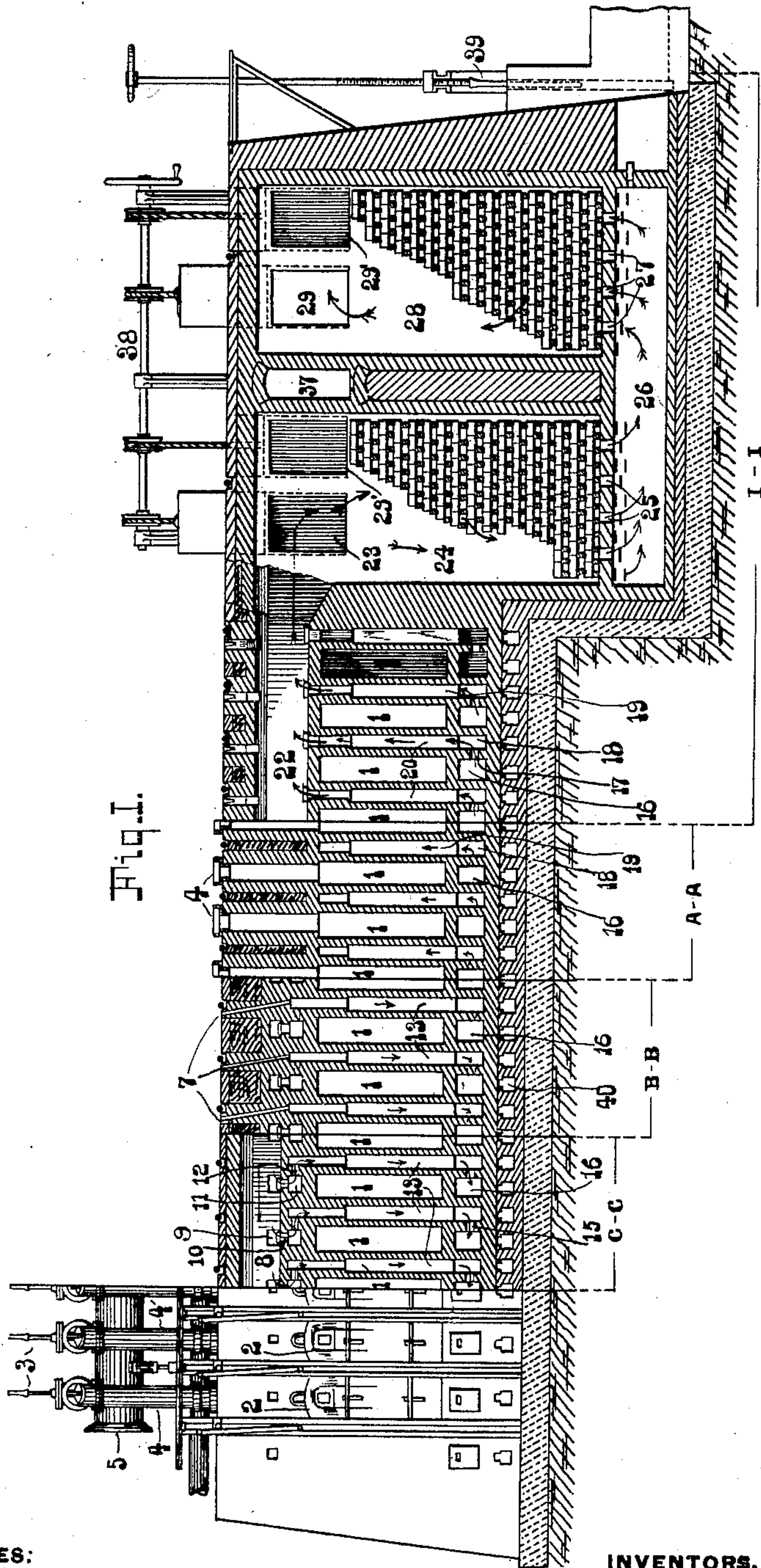
J. F. WILCOX & D. E. WAGENER.

RETORT COKE OVEN.

(Application filed Jan. 2, 1902.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Geo. H. Harvey,
M. W. Caskey.

INVENTORS.

John F. Wilcox, Dietrich E. Wagener
by *Wm. L. Pierce*
their Attorney.

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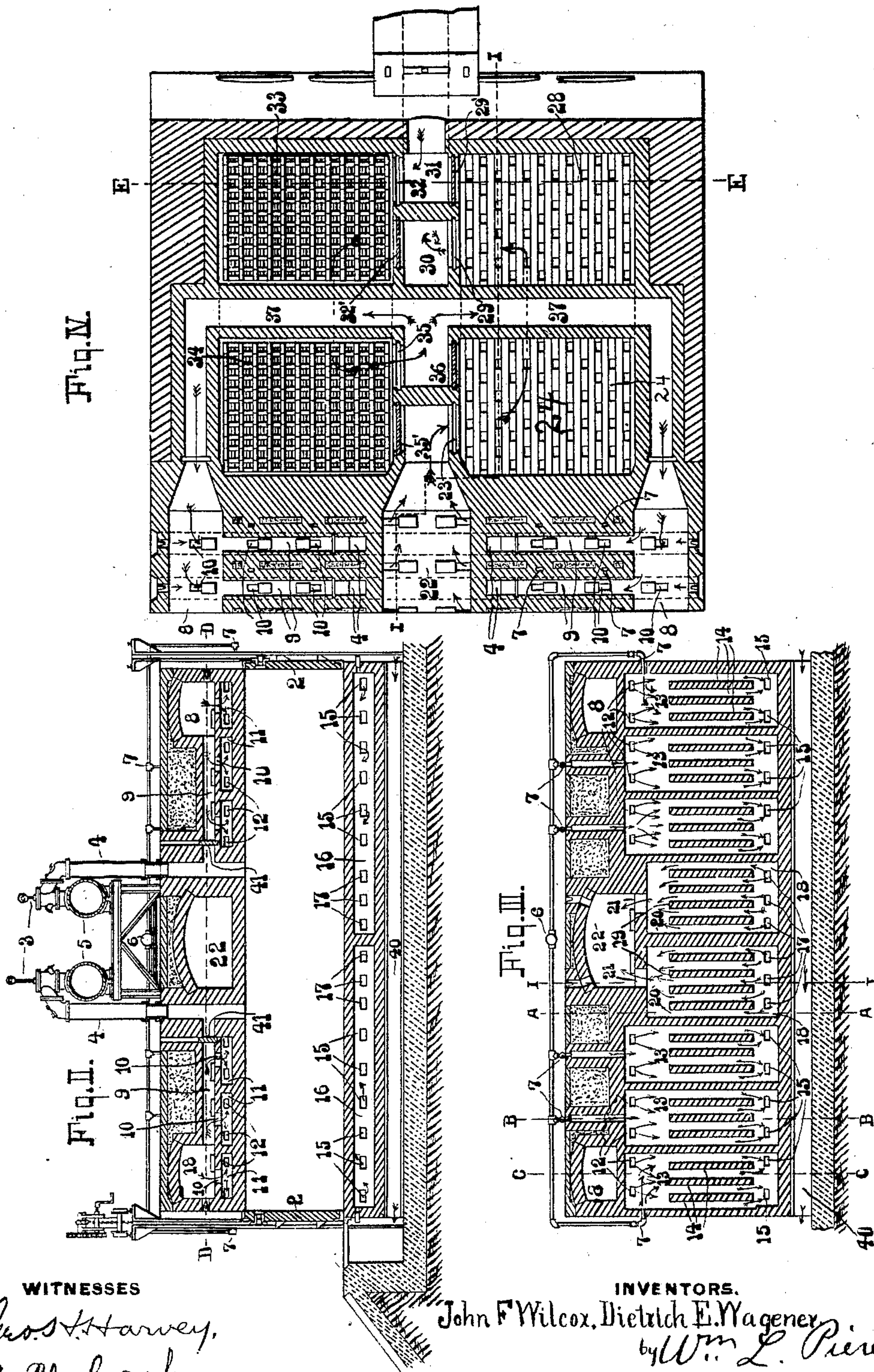
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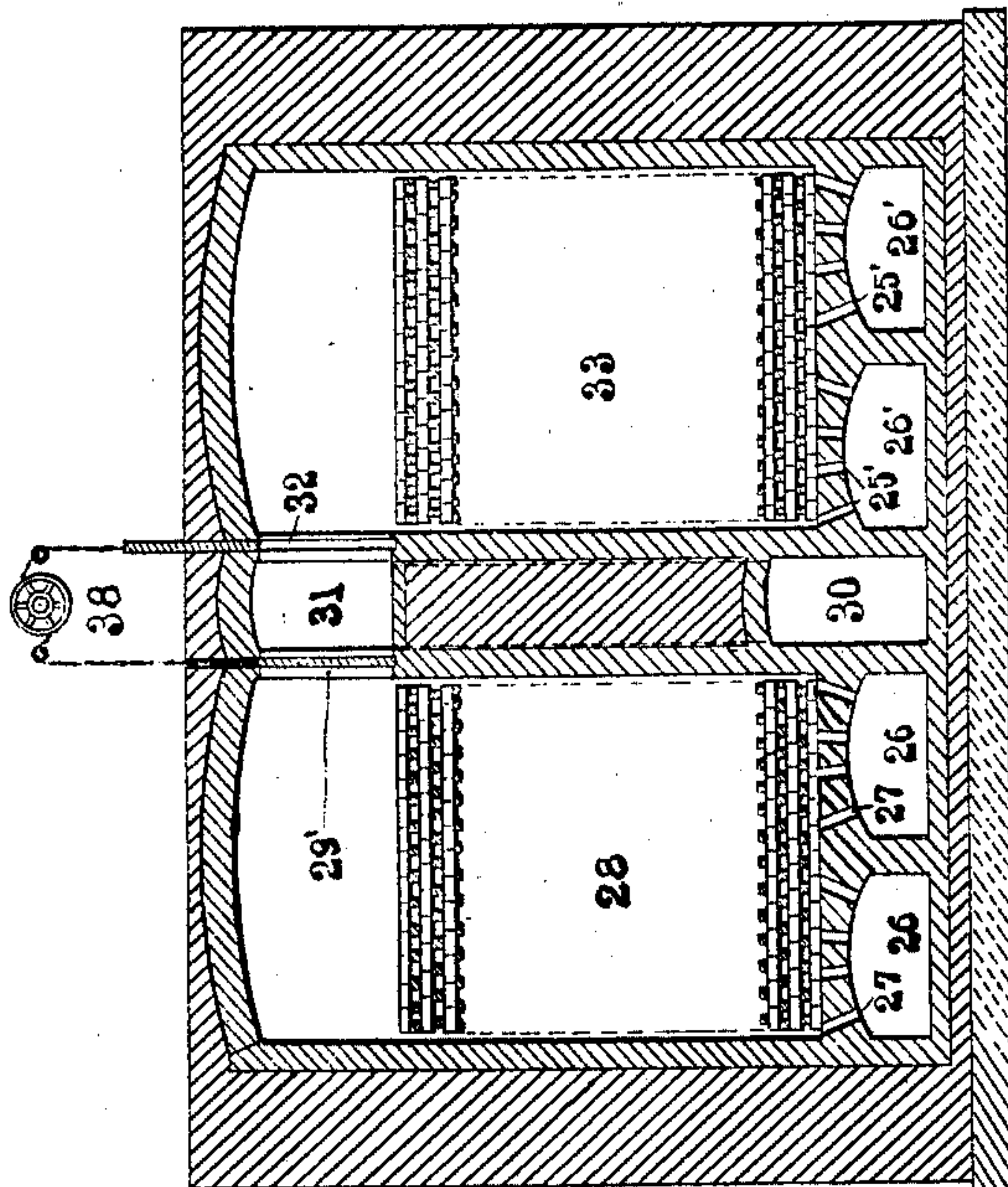
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Fig. V.



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UNITED STATES PATENT OFFICE.

JOHN F. WILCOX AND DIETRICH E. WAGENER, OF CLEVELAND, OHIO,
ASSIGNORS TO RETORT COKE OVEN COMPANY, OF CLEVELAND, OHIO,
A CORPORATION OF OHIO.

RETORT COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 711,268, dated October 14, 1902.

Application filed January 2, 1902. Serial No. 87,992. (No model.)

To all whom it may concern:

Be it known that we, JOHN F. WILCOX, a citizen of the United States, and DIETRICH E. WAGENER, a citizen of the German Empire, both residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented or discovered new and useful Improvements in Retort Coke-Ovens, of which the following is a specification.

Figure I represents a front elevation and a series of longitudinal vertical sections of our invention, the elevation and sections being taken for only a portion of the length of the structure and each section starting from the front being taken nearer the center of the structure and on the section-lines C C, B B, A A, and I I of Figs. III and IV. Fig. II is a cross-section taken on a line through a retort-chamber. Fig. III is a cross-section taken through a series of combustion-chambers, showing by arrows the course of the burning gases from the air and gas inlets to the outlet or offtake flues. Fig. IV is a horizontal section taken on a plane D D of Fig. II. Fig. V is a vertical section on line E E of Fig. IV.

Our invention relates to by-product retort coke-ovens heated by gas produced by the ovens.

The object of our invention is to provide a by-product retort coke-oven with the hot-air-intake flues and product-of-combustion or offtake flues located above the coking chamber or oven proper, removing said flues from their customary location beneath the oven structure, where by reason of the inevitable and unavoidable expansion and contraction of fire-brick these flues are a menace to the stability of the oven-walls, breaks on the walls frequently being caused by movement in the flue substructure. By superposing the flue-work the expansion takes place without liability, to the retort proper. Again, the invention affords ready and convenient access for both observing and controlling the gas and hot air supplied, a feature essential to uniformity and regularity in heating the walls of the oven. Uniform heating means uniform quality of coke in shorter space of time.

The air supplied for combustion is heated in regenerator-chambers grouped at the end of

the battery. The fact that the air-pressure seldom exceeds one-half inch of water permits the simple form of regenerator shown.

The ovens are adapted to the use of compressed coal—that is, coal mechanically compressed into the form of briquets—introduced through the doors, their construction not permitting the use of charging-holes through the roof. As soon as the charge of coal is inside the retort chamber or oven and the doors are luted air-tight valves are raised and evolved gases or by-products pass through stand-pipes into the gas-collecting mains, leading to the condensing-house, where the cooling, washing, and scrubbing of the gas takes place, which features are all well known and need no further description, as they form no part of our invention. The heating-gas, cleaned from tar, ammonia, &c., returns through the fuel-gas main and supplies for each oven the burners or jets, which are constantly burning. The highly-preheated air for combustion coming from the regenerators at one end of the oven-battery enters the hot-air flues, extending transversely of the retorts. The air passes directly or by way of flues through regulated ports downwardly into air-distributing chambers, whence it passes through side ports into combustion-chambers, each of the latter being supplied with gas from a burner. The burning gases pass downwardly through flues within the retort-walls and laterally through ports into chambers under the floor of the oven. From side ports, leading out from chambers, the gases pass into chambers and upwardly at the sides of the middle of the ovens through flues into chambers and then upwardly through regulated ports into outlet or offtake flue, leading to the regenerators. The flue extends transversely the entire length of all of the ovens. The hot products of combustion after traveling the whole length of the outlet or offtake flue enter through side ports into chamber, containing checker-work. They then pass downwardly through the checker-work and through bottom ports into flat arch-chambers below the chamber, from

thence ascending through ports 27 into chamber 28, containing checker-work. They then go through side ports 29 into stack-flue 30, Fig. IV, similar to flue 31. (Shown in Fig. V.)

5 On their way through chambers 24 and 28 and the checker-work therein the gases communicate their heat to the checker-work and pass out of the stack with a temperature high enough to create a good draft. The cold air
10 enters under pressure through flue 31 and passes through the port or opening 32 into checker-work chamber 33 and downwardly through ports 25' into flat arch-chambers 26', whence it passes through similar ports into
15 checker-work chamber 34. From chamber 34 it passes through an opening 35 into flue 36. The air in passing through the checker-work chambers 33 and 34, previously heated by the burning gases in the manner above described,
20 absorbs heat from the checker-work and then goes from flue 36 right and left by way of branch flues 37 to the hot-air flues 8, one on each side of the battery, near the front thereof.

As shown in Figs. I and IV, ports 23, 29,
25 32, and 35 are open and ports 23', 29', 32', and 35' are closed, the burning gas and waste products passing through the set of regenerators nearest the observer by way of ports 23 and 29, while the cold air is passing through
30 the previously-heated chambers 33 and 34 and ports 32 and 35. After a certain time—in general one-half to one hour—the ports 23, 29, 32, and 35 are closed and ports 23', 29', 32', and 35' are opened, the burning gases
35 pass from flue 22 through ports 35', chambers 34 and 33, and ports 32' into stack-flue 30, the cold air going from inlet-flue 31 through port 29', chambers 28 and 24, and port 23' into flues 36, 37, and 8, and thence through
40 port 10, chambers 11, and port 12 into the combustion-chamber 13, where it meets the gases from burners 7.

38 designates the mechanism for operating the valves of the regenerators, and consists
45 of hand-operated pulleys, over which pass cords attached to the valves. The mechanism 38 operates valves of openings 23, 29, 32, and 35 alternately with the valves of openings 23', 29', 32', and 35'.

39 is a valve mechanism for regulating the stack-draft.

Transverse cooling-chambers 40, open to the

air at each end, lie under the collecting-chambers 16 and 18.

In the flues 9, which extend from hot-air
55 flues 8 to stand-pipes 4 and between each of the latter and the nearest port 10, are valves 41. Normally these valves remain closed, they only being used in the preliminary heating of the ovens. 60

We do not claim the matter claimed jointly by Samuel T. Wellman and John F. Wilcox in their application for uniformly-fired retort coke-ovens with outside regenerators, filed October 29, 1901, Serial No. 80,383, said matter
65 relating to the construction of the battery, whereby the burning gases and air always pass in one and the same direction through the combustion-flues.

Having fully described our invention, what
70 we claim is—

1. The combination of retort coking-ovens, with means for heating air, combustion-flues, a main hot-air-intake flue or flues leading to the combustion-flues, and a main offtake flue
75 or flues, said main flues being above the ovens.

2. The combination of by-product retort coking-ovens heated by gas in the presence of heated air, a hot-air-intake flue extending transversely above the ovens and provided
80 with lateral branches lying over the ovens, and combustion-chambers contiguous to the upper part of the oven, whereby the expansion due to heat in the flue and chamber may take place without injury to the retorts. 85

3. The combination of retort coking-ovens heated by gas in the presence of heated air, a hot-air intake extending transversely of the ovens and above each end thereof, branches leading therefrom longitudinally toward the
90 center line of the ovens, combustion-chambers contiguous to the upper part of the oven and a central offtake flue or flues extending transversely above the ovens, whereby the expansion due to heat in the flues and cham- 95 bers may take place without injury to the retorts.

Signed at Cleveland this 26th day of December, A. D. 1901.

JOHN F. WILCOX.

DIETRICH E. WAGENER.

Witnesses:

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HERBERT T. GLIDDEN.