

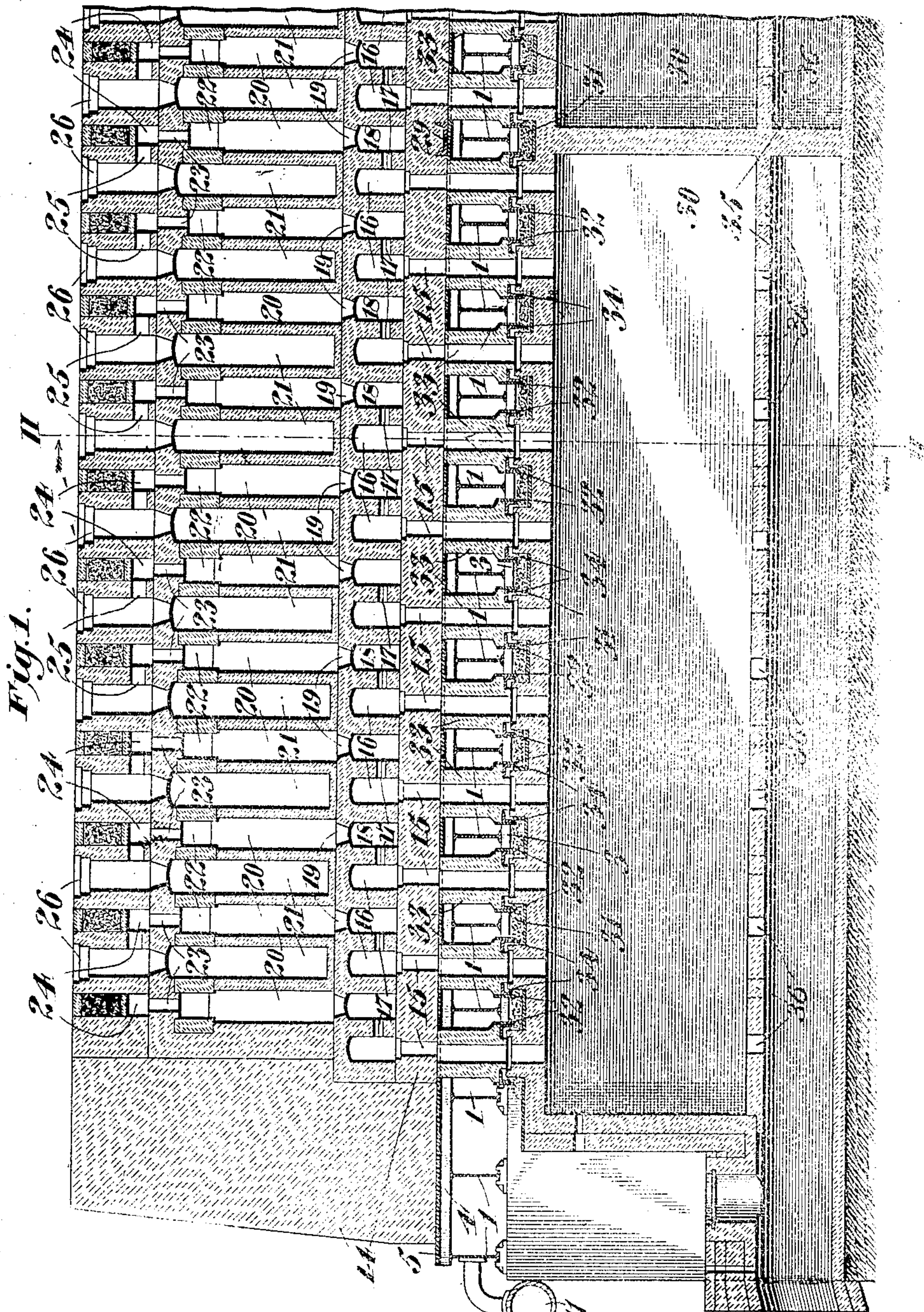
No. 885,468.

PATENTED APR. 21, 1908.

J. W. GOCHER.
COKE OVEN CONSTRUCTION.

APPLICATION FILED AUG. 21, 1907.

4 SHEETS—SHEET 1.



WITNESSES,

Wm. J. Fitzmaurice, Jr.
Cyrus E. Brown

John W. Gocher. INVENTOR.
by Geo. E. Shackray
his ATTORNEY.

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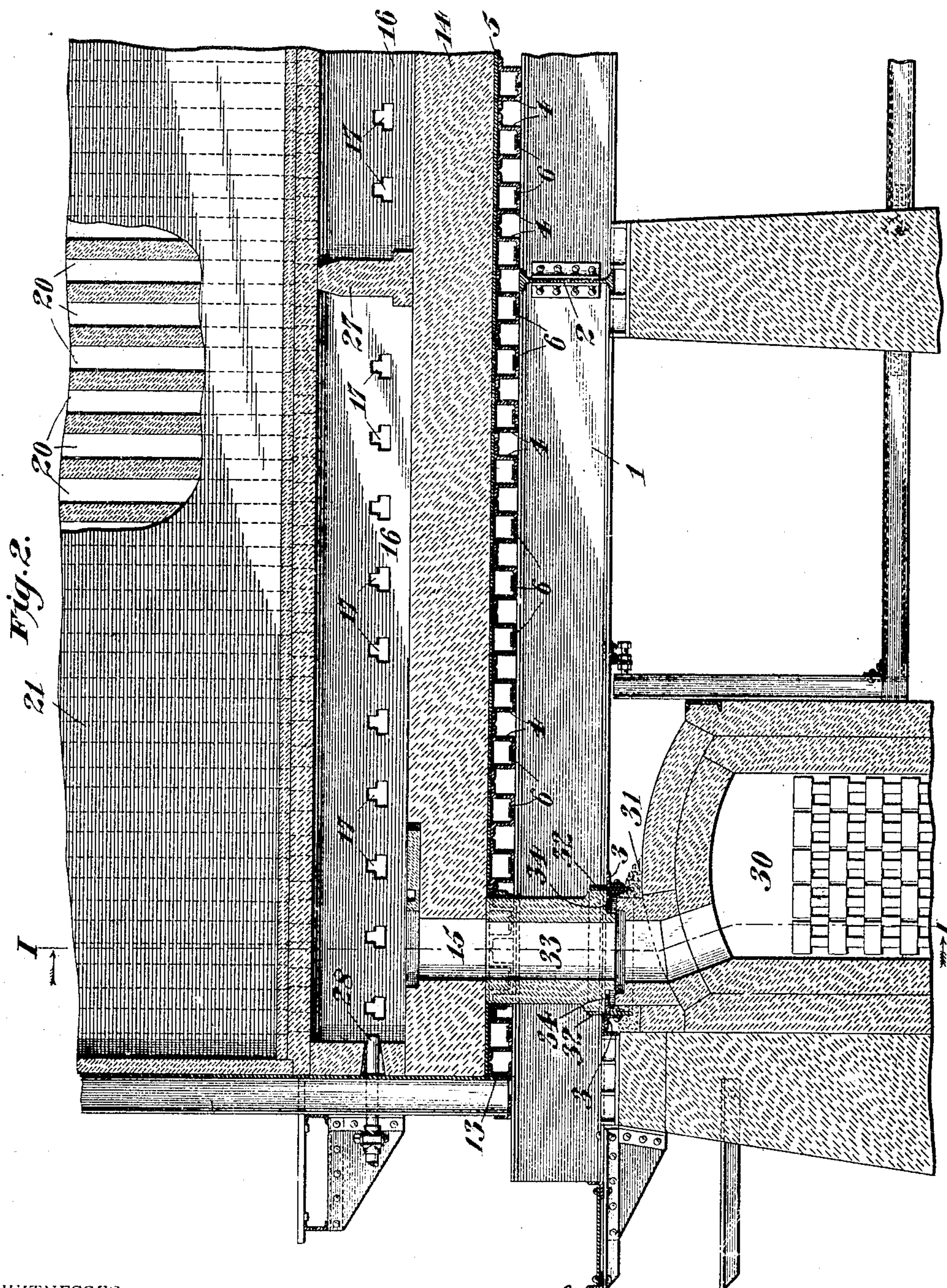
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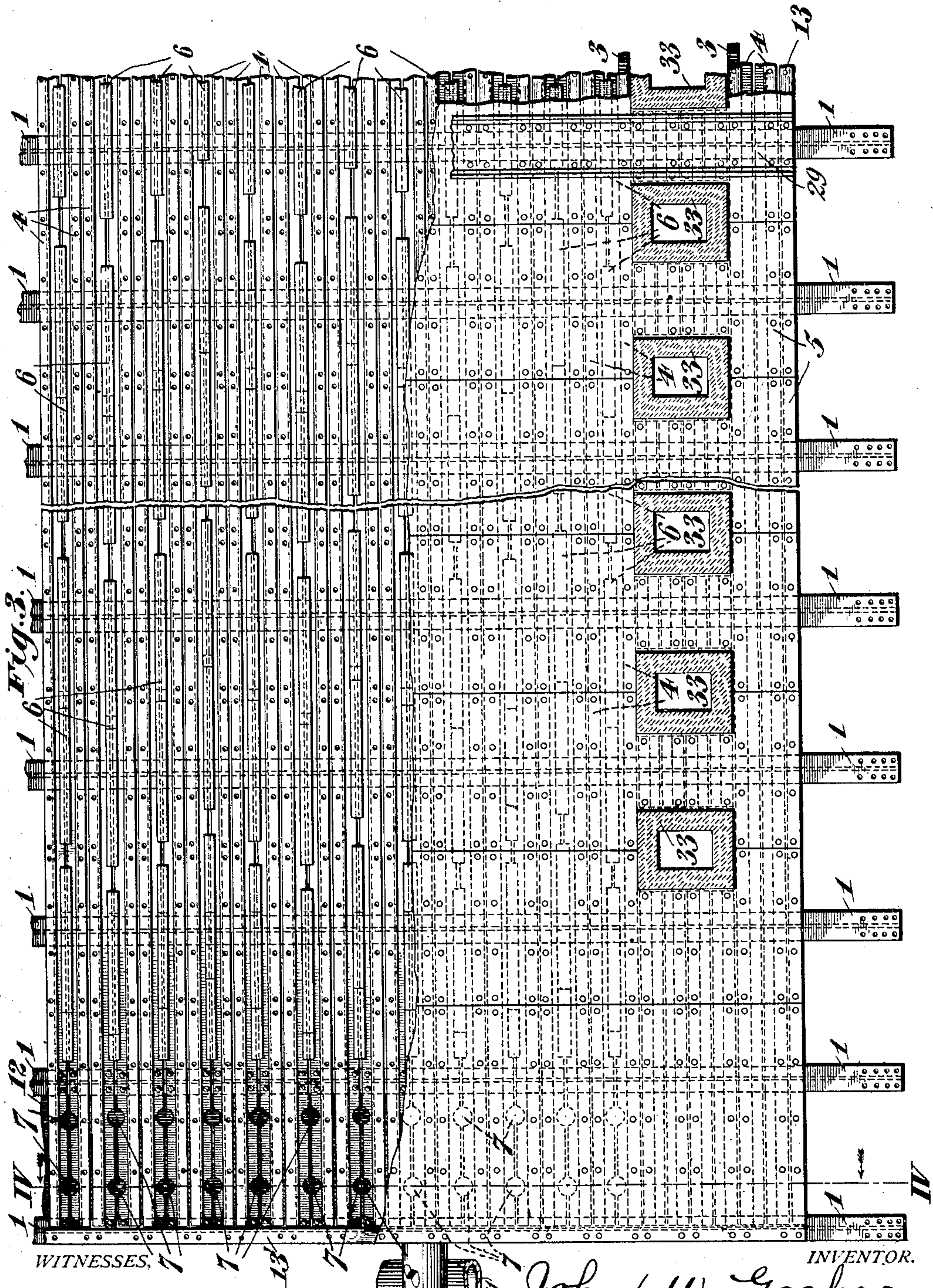
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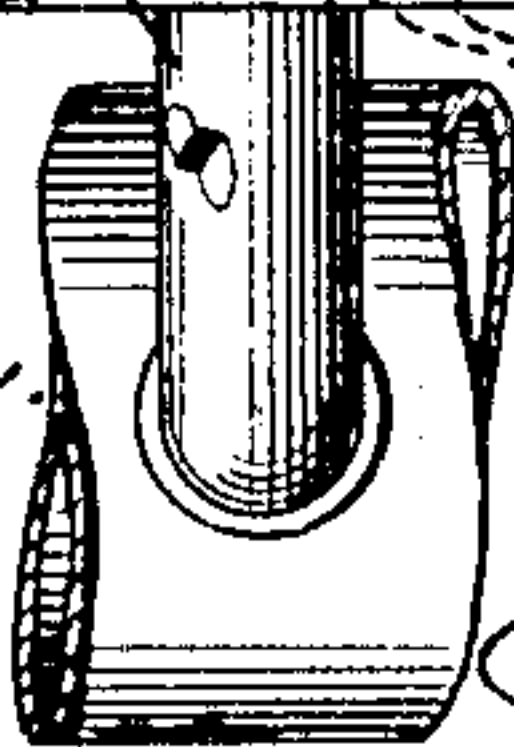
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Wm. J. Fitzmaurice, Jr.
Lynns E. Brown.



John W. Gocher,
by Geo. E. Thackray
his ATTORNEY.

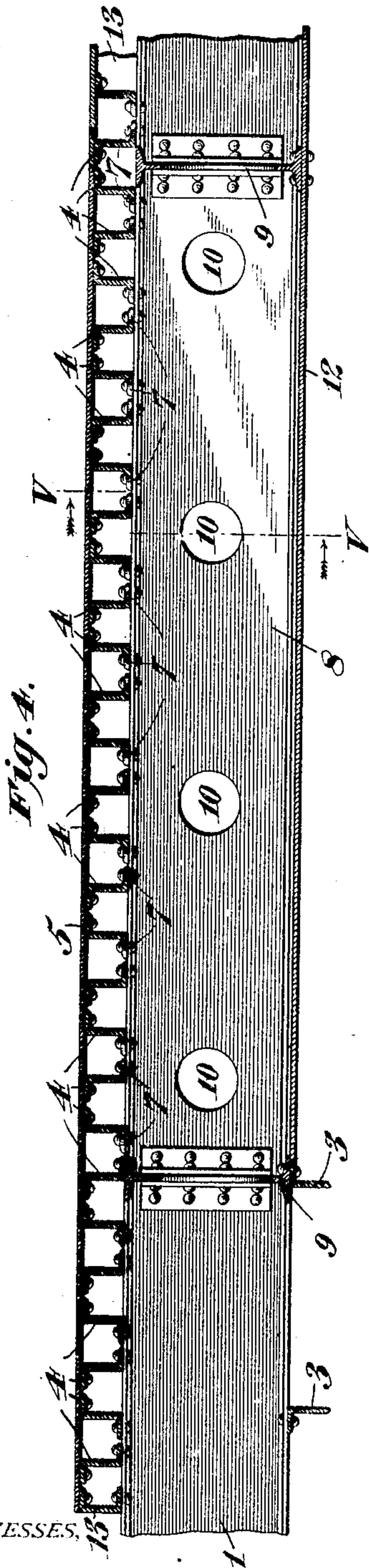
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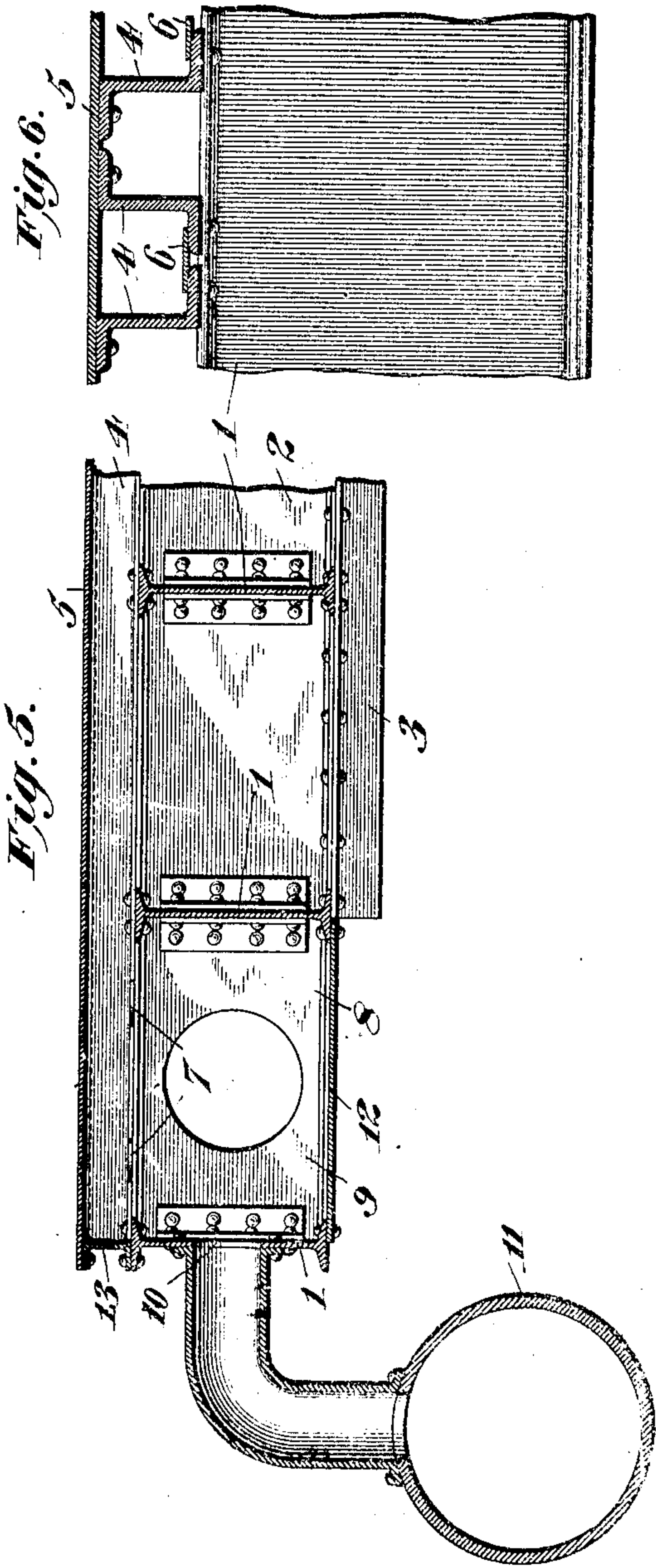
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4 SHEETS—SHEET 4.



WITNESSES,

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Cyrus E. Brown



John W. Gocher, INVENTOR.
by Geo. E. Thackray
his ATTORNEY.

UNITED STATES PATENT OFFICE

JOHN W. GOCHER, OF JOHNSTOWN, PENNSYLVANIA

COKE-OVEN CONSTRUCTION.

No. 885,468.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed August 21, 1907. Serial No. 389,425.

To all whom it may concern:

Be it known that I, JOHN W. GOCHER, a citizen of the United States, residing in the city of Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Coke-Oven Construction; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to coke-oven construction and particularly to externally fired ovens of the by-product type.

The brick or other refractory material used in the construction of ovens of the character mentioned and of the combustion chambers thereof, which for convenience of description herein I will call the superstructure, is subjected to intense heat, causing a considerable degree of expansion, and one of the objects of my invention is to provide means for allowing for the expansion of that portion of the structure mentioned, independently of the platform and the metal structure by which the latter is supported, without causing difficulties or defects in the construction, and a further object of my invention is to provide means for the free and effective circulation of air beneath the combustion chambers and adjacent parts, to prevent their deterioration by excessive internal heat.

That portion of the construction which supports the superstructure, I will for convenience of description herein, designate generally as the substructure, although I will also refer to certain parts of the substructure more specifically when necessary to make the matter clear.

With these objects in view, my invention consists of constructing a battery of coke ovens upon a platform in such manner that the expansion of the superstructure will take place thereon, and in anchoring the central part of the lower portion of the superstructure to the platform, in order that the expansion on either side thereof may be uniform.

It also consists in forming ducts or passages for the circulation of air below the coking and combustion chambers, to protect them and the oven supports by keeping them cool and preventing undue expansion or contraction.

Referring now to the four sheets of drawings forming part of this specification and in which similar characters indicate correspond

ing parts:—Figure 1 is a vertical section of a series of coke ovens taken on the line I—I of Fig. 2. Fig. 2 is a section through the combustion chamber and the coke ovens on the line II—II of Fig. 1. Fig. 3 is a top plan view of a portion of the supporting platform with parts broken away to more clearly show the manner of construction. Fig. 4 is a vertical transverse section of the supporting platform on the line IV—IV of Fig. 3. Fig. 5 is a vertical longitudinal section on the line V—V of Fig. 4. Fig. 6 is an enlarged detail view showing more clearly the manner of constructing the air ducts beneath the platform.

The base of the structure is composed of transverse I-beams 1 and longitudinal I-beams 2, the former being connected by angles 3. Above the base, Z-bars 4 extend in a transverse direction with reference to the beams 1 and serve as supports for the platform 5. The Z-bars are so placed that ventilating ducts are formed between them, and openings are left between their lower flanges for the passage of air. These openings are covered by damper-plates 6 for the greater part of their length, spaces being left however, between the ends of adjacent damper-plates to admit air from the spaces immediately beneath, between the I-beams. The air passes along these ducts between the Z-bars, through the openings 7 at the ends of the bars and into the box 8 between the I-beams at the end of the structure, said box being formed by means of short I-beams 9 connecting two of the other I-beams. The air then passes from the box through the openings 10 and out through the exhaust pipe 11. The function of the damper-plates 6 is to allow a given quantity of air to enter the ducts between the Z-bars at each of the openings between the damper-plates, the capacity of the ducts between the Z-bars being sufficient to carry off all of the air thus admitted, thereby providing an effective circulation. Plates 12 are riveted to the lower flanges of the end I-beams and serve to prevent the escape of air in that direction, and channels 13 and 13' inclose the Z-bar structure, the latter transversely across the ends of, and the former parallel with the Z-bars.

Above the platform 5 is the masonry work 14 through which pass the flues 15, connecting with the air chambers 16. In the side walls of the air chambers 16 are ports 17 to

admit air into the combustion chambers 18 to cause the combustion of the gas therein, which gas is supplied from the pipe 28. The vertical ports 19 connect the combustion chambers 18 with a series of vertical flues 20. In the regular operation the burning gases and products of combustion pass upwards through the vertical flues 20 adjoining half of the length of the oven and join in the horizontal flue 22, thence pass downward beside the other half of the oven and through the regenerator below the end. 23, 24 and 25 are passages for temporary use in discharging products of combustion into the outer air through the holes 26 when first starting the battery. 27 is a division wall between the pairs of combustion chambers.

At a point intermediate of the ends of the series of ovens is a transverse channel-bar 29, embedded in the brickwork and secured to the platform. This channel-bar serves to anchor the upper portion of the central part of the structure so that the sliding motion, due to the expansion of the brickwork, will be distributed equally on either side thereof, and the flues 15 are so located with reference to the connecting passages below that the cumulative effect of the expansion of the brickwork will cause the said flues to register substantially exactly with the connecting passages mentioned. When the ovens are new and cold, these passages bear the relation to each other shown in Fig. 1 of the drawings; in other words they are slightly out of alinement, in a cumulative manner to allow for their expansion when heated.

A regenerative chamber 30 contains a pile of brick, built up in the usual manner shown, and the air entering said chamber coming into contact with the loosely piled bricks which have been heated in the manner hereinafter described, is itself heated before it passes through the flues into the combustion chambers. A chamber similar to chamber 30 is located at the opposite side of the series of ovens, and the products of combustion passing from the combustion chambers on one side of the battery, enter the chamber at the opposite side and impart their heat to the bricks located therein. The operation is then reversed after the usual method, thereby utilizing the heat imparted to the bricks by the products of combustion for heating the incoming air as it is caused to enter the regenerating chamber, first at one side of the battery and then at the other.

In order to provide for any movement of the iron base composed of I-beams 1 and 2, sand seals 31 are employed. Owing to the effective system of cooling which I have described, there will however be but a slight sliding movement at this point. Plates 32 extend around the lower outer edge of the flue section 33, and to these are connected

angles 3 and 34. Air ducts 35 beneath the regenerating chambers are connected with the said chambers by the ports or passages 36.

Although I have shown and described my improvements in considerable detail, I do not wish to be limited to the exact construction specified, but may use such substitutions, modifications or equivalents thereof, as are embraced within the scope of my invention, as pointed out in the claims.

What I claim and desire to secure by Letters Patent is:—

1. In a battery of coke ovens, a superstructure comprising the ovens and combustion-chambers, a substructure, and means for anchoring the superstructure to the substructure at a point intermediate of the ends, whereby the sections located at either side of the anchored portion are free to expand independently of the substructure.

2. In a battery of coke ovens, a superstructure comprising the ovens and combustion chambers, a substructure for same, and a channel-bar secured to the substructure and embedded in the brick work of the superstructure at a point intermediate of its ends.

3. In a battery of coke ovens, a base, a platform thereon, a series of combustion chambers and a series of ovens above the platform, and means for anchoring that portion of the structure in which the ovens and the combustion chambers are located at a point intermediate of the ends thereof, whereby the sections of the structure located on either side are free to expand and move upon said platform.

4. In a battery of coke ovens, a base, a platform thereon, a series of combustion chambers, and a series of ovens above the platform, and a channel-bar secured to the platform and embedded in the brickwork of the central portion of the structure in which the ovens and combustion chambers are located.

5. In a battery of coke ovens, a base, a platform thereon, a series of combustion chambers and a series of ovens above the platform, regenerating chambers connecting with the combustion chambers, and an anchor secured to the platform and embedded in the brickwork of that portion of the structure in which the ovens and the combustion chambers are located.

6. In a battery of coke ovens, a base, a platform thereon, a series of combustion chambers and a series of ovens above the platform, flues between the said ovens, regenerating chambers, flues connecting the latter with the combustion chambers, and a channel-bar secured to the platform and embedded in that portion of the structure in which the ovens and combustion chambers are located.

7. In a battery of coke ovens, a base, a platform thereon, a series of combustion

chambers and a series of ovens above the platform, flues between the said ovens, regenerating chambers, flues built out of alinement with each other connecting the regenerating chambers with the combustion chambers, and means for anchoring the structure above the platform to the latter at a point intermediate of its ends.

8. In a battery of coke ovens, a base, a platform thereon, a series of combustion chambers and a series of ovens above the platform, flues between the said ovens, regenerating chambers, flues constructed out of alinement with each other connecting the regenerating chambers with the combustion chambers, and a channel-bar secured to the platform and embedded in the structure in which the ovens and combustion chambers are located.

9. In a battery of coke ovens, a base, a platform thereon, a series of combustion chambers and a series of ovens above the platform, regenerating chambers, flues constructed out of alinement with each other connecting the latter with the combustion chambers, and means for anchoring that part of the structure above the platform to the latter at a point intermediate of its ends.

10. In a battery of coke ovens, a base, a platform thereon, a series of combustion chambers and a series of ovens above the platform, regenerating chambers, flues built out of alinement with each other connecting the regenerating chambers with the combustion chambers, and a channel-bar secured to the platform and embedded in the structure in which the ovens and the combustion chambers are located.

11. In a battery of coke ovens, a superstructure comprising a series of coke ovens and combustion chambers, a substructure, ventilating ducts located between said superstructure and substructure, the superstructure being movable in order to provide for expansion, and means for anchoring said superstructure at a point intermediate of its ends.

12. In a battery of coke ovens, a superstructure comprising a series of ovens and combustion chambers, a base, a platform supported by the base, ventilating ducts formed of Z-bars with openings between the latter, said ducts being located between the base and the platform and having connection with air spaces in the base.

13. In a battery of coke ovens, a superstructure comprising a series of ovens and combustion chambers, a base for supporting said superstructure, a platform, ventilating ducts located between the base and the platform, said ducts being provided with openings having connection with open spaces in the base, and damper-plates partially covering the said openings in the ducts.

14. In a battery of coke ovens, a superstructure comprising a series of ovens and combustion chambers, a base for supporting said structure, a platform, ventilating ducts located between the base and the platform and having connection with open spaces in the base, boxes adjoining the base and having connection with the ducts and with an outlet pipe.

15. In a battery of coke ovens, a superstructure comprising a series of ovens and combustion chambers, a base for supporting said structure, a platform, ventilating ducts formed of Z-bars with elongated openings between the latter, said ducts being located between the base and the platform and having connection with open spaces in the base, boxes adjacent to the base and having connection with the openings between the Z-bars and with an outlet pipe, and damper-plates partially covering the elongated spaces between the Z-bars.

In testimony whereof I hereto affix my signature in the presence of two witnesses.

JOHN W. GOCHER.

Witnesses:

WM. J. FITZMAURICE, Jr.,

CYRUS E. BROWN.