

*Isbell & Mackenzie,
Sectional Steam Boiler.*

N^o 64,326.

Patented Apr. 30, 1867.

Fig 1.

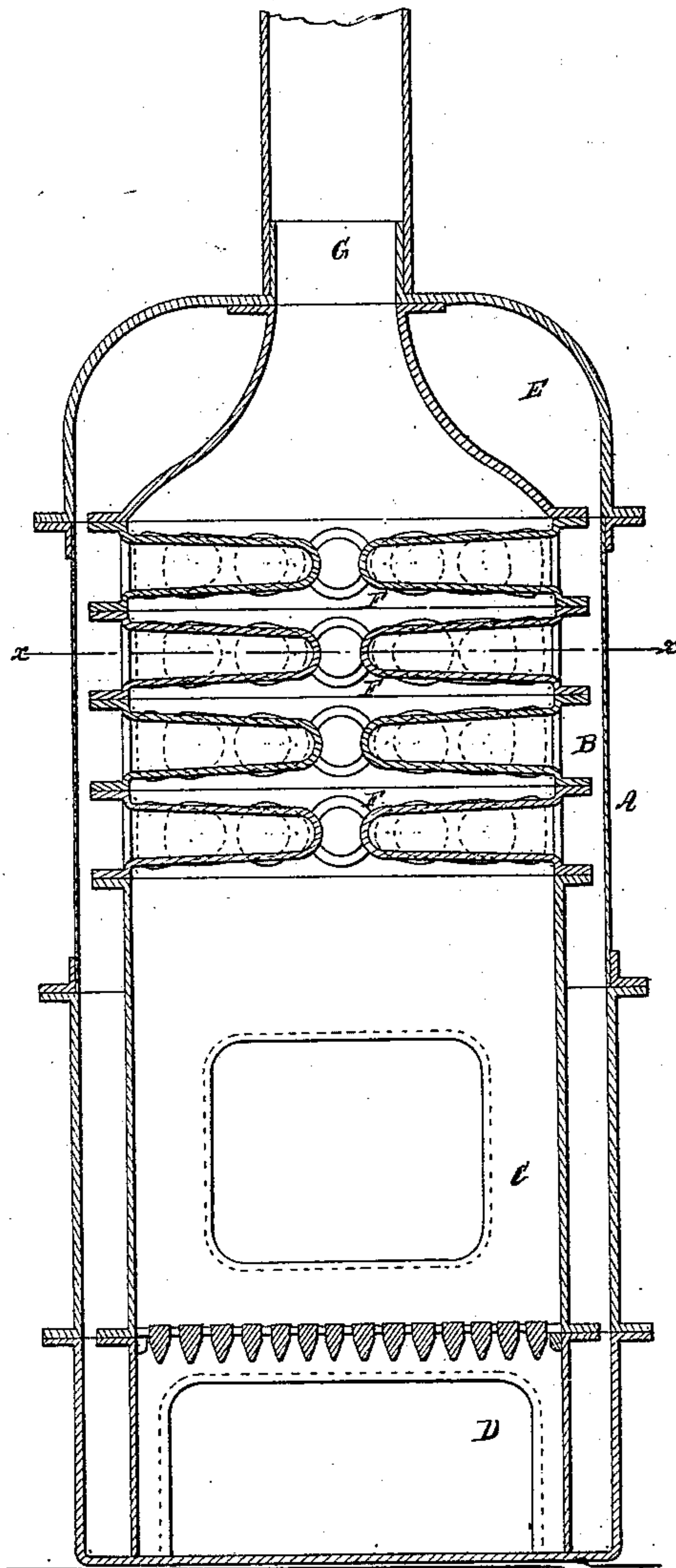
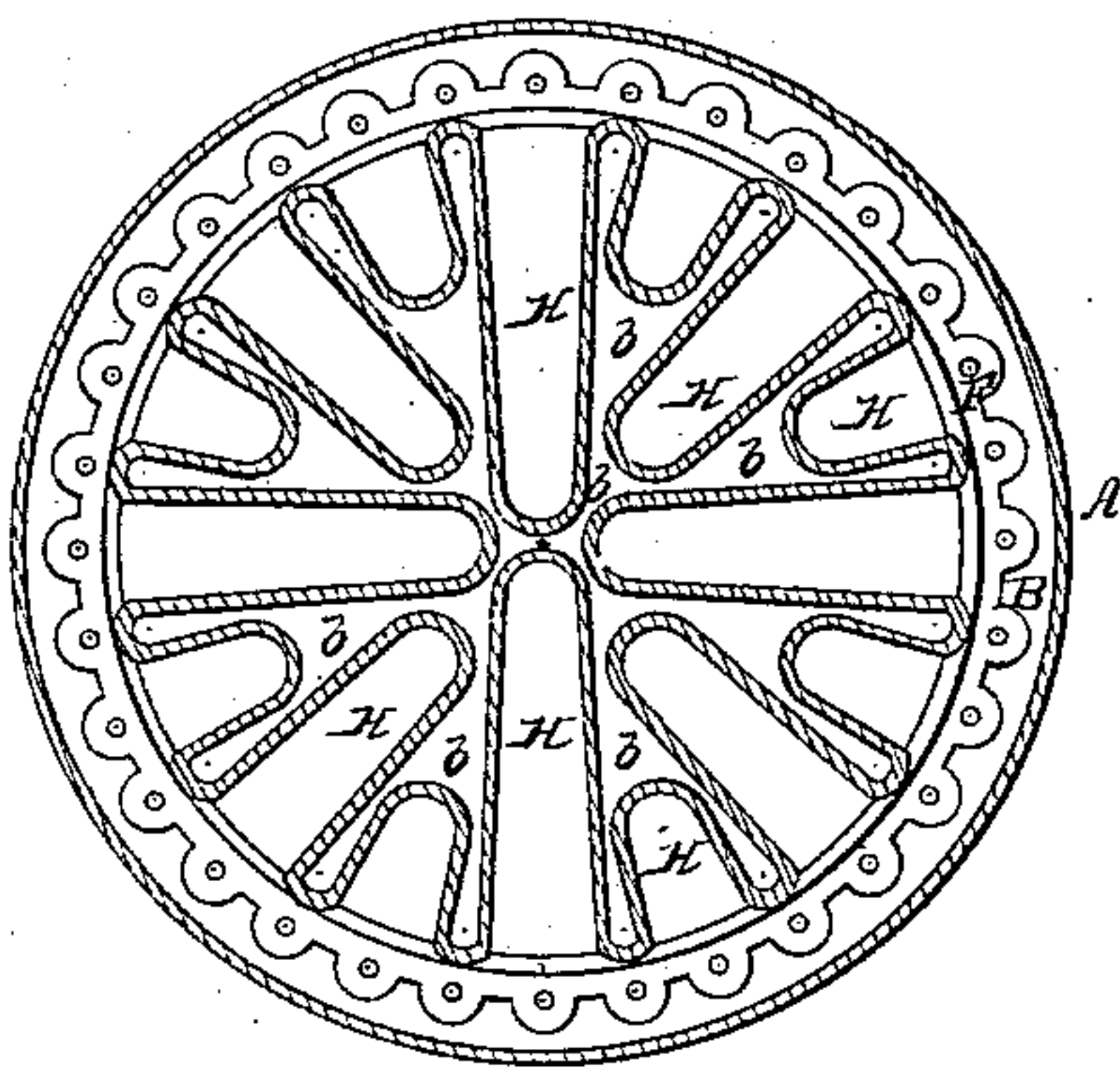


Fig 2.



Witnesses.

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JERSEY CITY, NEW JERSEY.

Letters Patent No. 64,326, dated April 30, 1867; antedated April 22, 1867.

IMPROVEMENT IN STEAM GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, CHARLES W. ISBELL, of the city, county, and State of New York, and P. W. MACKENZIE, of Jersey City, in the county of Hudson, and State of New Jersey, have invented a certain new and useful Improvement in Steam Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, which forms part of this specification, and in which—

Figure 1 represents a vertical section of a steam boiler constructed according to our improvement; and Figure 2, a horizontal section of the same taken through the line *x x* in fig. 1.

Like letters refer to like parts in both figures.

Our improvement relates to that class of steam boilers which have their steam generator or main body of it composed of cast-metal sections contiguous to each other; and our invention consists in a peculiar construction of said sections, forming a tier or tiers, or series, as the case may be, over or adjoining the fire-box, and within a shell enclosing an annular surrounding water space, said sections being formed of rings having radial tubes or finger-shaped projections running inwards, and open at their outer ends, but closed at their inner ones, and being separately in communication with the annular water space surrounding them, while the spaces between them form flues connecting the smoke-stack with the fire-box, whereby an economical generating surface is obtained, strength insured with comparative lightness, and a safe latitude given for unequal expansion; and our invention further consists, when such a construction of section or rings is employed, in forming the radial tubes, fingers, or pockets, of a gradually diminishing or tapering configuration towards their inner and closed ends, whereby a readier escape is given for the steam generated within them.

For the information of others whom our invention concerns, we will now proceed to describe it with reference to the accompanying drawing, in which—

A represents the outer case or shell of a boiler arranged vertically, and which may either be made of wrought or cast iron, leaving an annular water-space, B, around the interior flue and water-chambers or steam-generating body of the boiler; also, it may be around the fire-box C and ash-pit D, and terminating, say, in a steam dome, E, at top. The fire-box C has no crown-sheet, but instead thereof has mounted upon it any number, and which may be two, three, or more, of cast-iron rings or sections, F, constituting, when piled one upon the other, a tier. These rings are constructed internally to form fire or flue spaces up through them to the smoke-stack G, and said flues are so disposed, by the projection within the rings of radial and tubular water-chambers in communication with the annular outside space, B, as to largely utilize the escaping heat by its action on the water in the rings, which, combined, form a steam generator. It is preferable that these rings should be similar in construction, so that one pattern will suffice for all, the flue and water-spaces in each being formed by an entire casting. When put together, or mounted one upon the other in a tier, they may be packed at the joints formed by their junction, and bolted one to the other through outside snugs or flanges. United, said rings compose a deep flue and water-chamber or steam generator, but being in sections, there is nothing of an unwieldy character to make such a chamber objectionable in putting the boiler together. It is not absolutely necessary that the tier of such rings within the shell should be concentric with the latter, as it may be differently arranged, or two, three, or more tiers, side by side, may be used within the same shell. The construction of the rings F is as follows: Projecting radially into the rings, and cast with them, are finger-shaped tubes or pockets, H, alternately long and short, though where a less number is used they may be of equal length or thereabouts, but the space is more fully utilized by constructing them alternately long and short. These tubes are open at their outer ends, so as to be in direct and separate communication with the annular water-space B, but are closed at their inner ends. The spaces, *b*, between them, form the flues that connect the fire-box with the smoke-stack. It will be obvious that such an open and radial construction of the steam generator, while strong and light, gives all requisite latitude for expansion without risk of breakage. To effectually prevent steam as generated lodging in the closed ends of the pockets H, or driving back the water entering such tubes from the annular space B, we make such finger-shaped tubes or pockets of a tapering or gradually-diminishing diameter towards their inner ends, so that steam generated at those points may escape by creeping or working along the sides of the tubes, gradually enlarging towards their open ends, and especially along the upper inte-

rior portion of said tubes. A like construction is applicable to horizontal boilers, the rings or sections in such case being arranged side by side.

What we claim as new and useful herein, and desire to secure by Letters Patent, is—

1. The steam-generating rings or sections, F, constructed with radial finger-shaped tubes, H, of tapering or diminishing form from their outer and open ends towards their inner and closed extremities, substantially as specified.

2. In combination with a series of said rings or sections F, a cylindrical shell or casing enclosing an annular water-space B, forming a steam generator, with flue spaces b between and around the pockets H, essentially as herein set forth.

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Witnesses:

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G. W. REED.