

No. 706,796.

Patented Aug. 12, 1902.

F. BURGER & H. M. WILLIAMS.

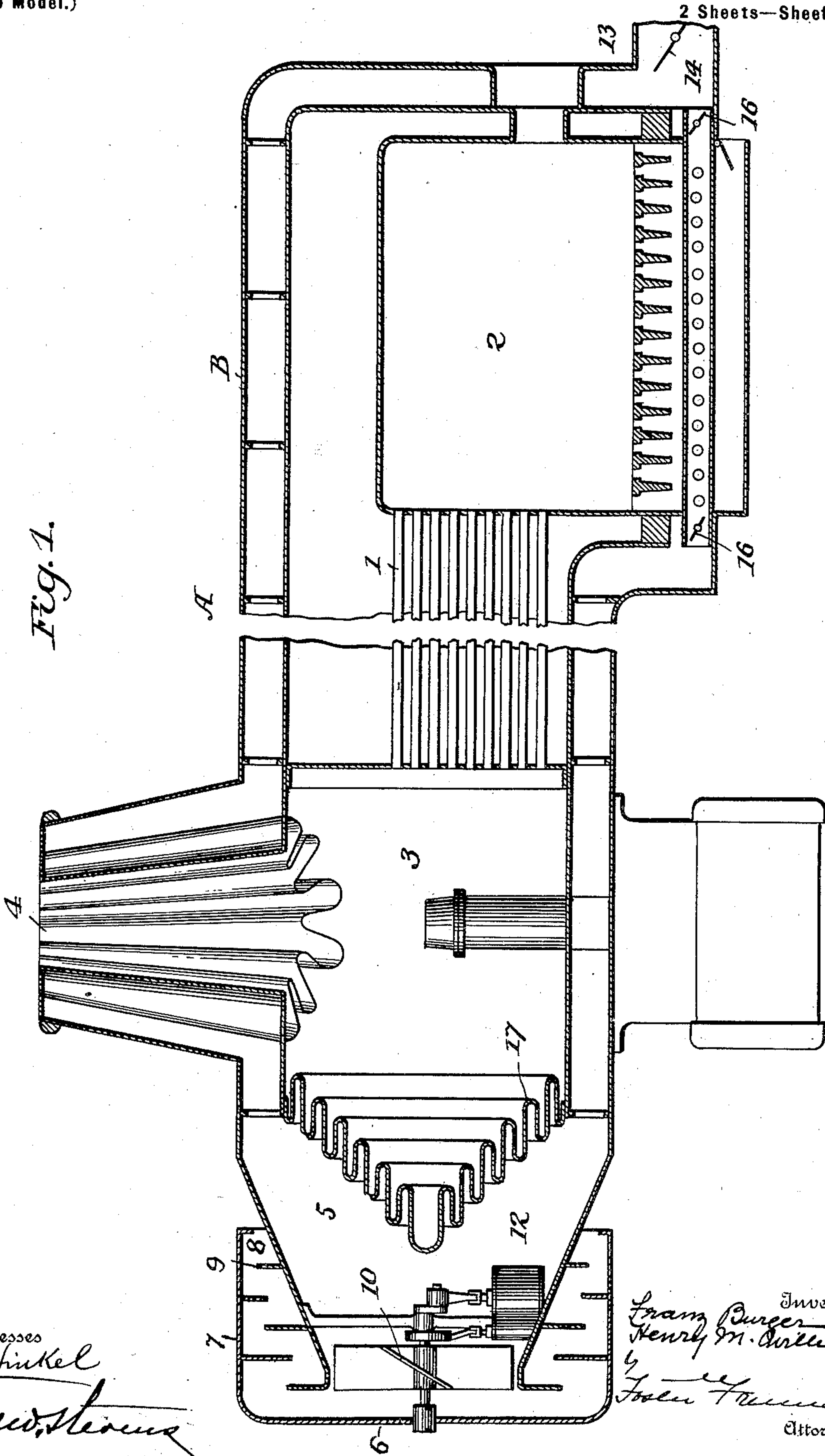
HEATING APPARATUS.

(Application filed Jan. 15, 1900.)

No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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Fig. 3.

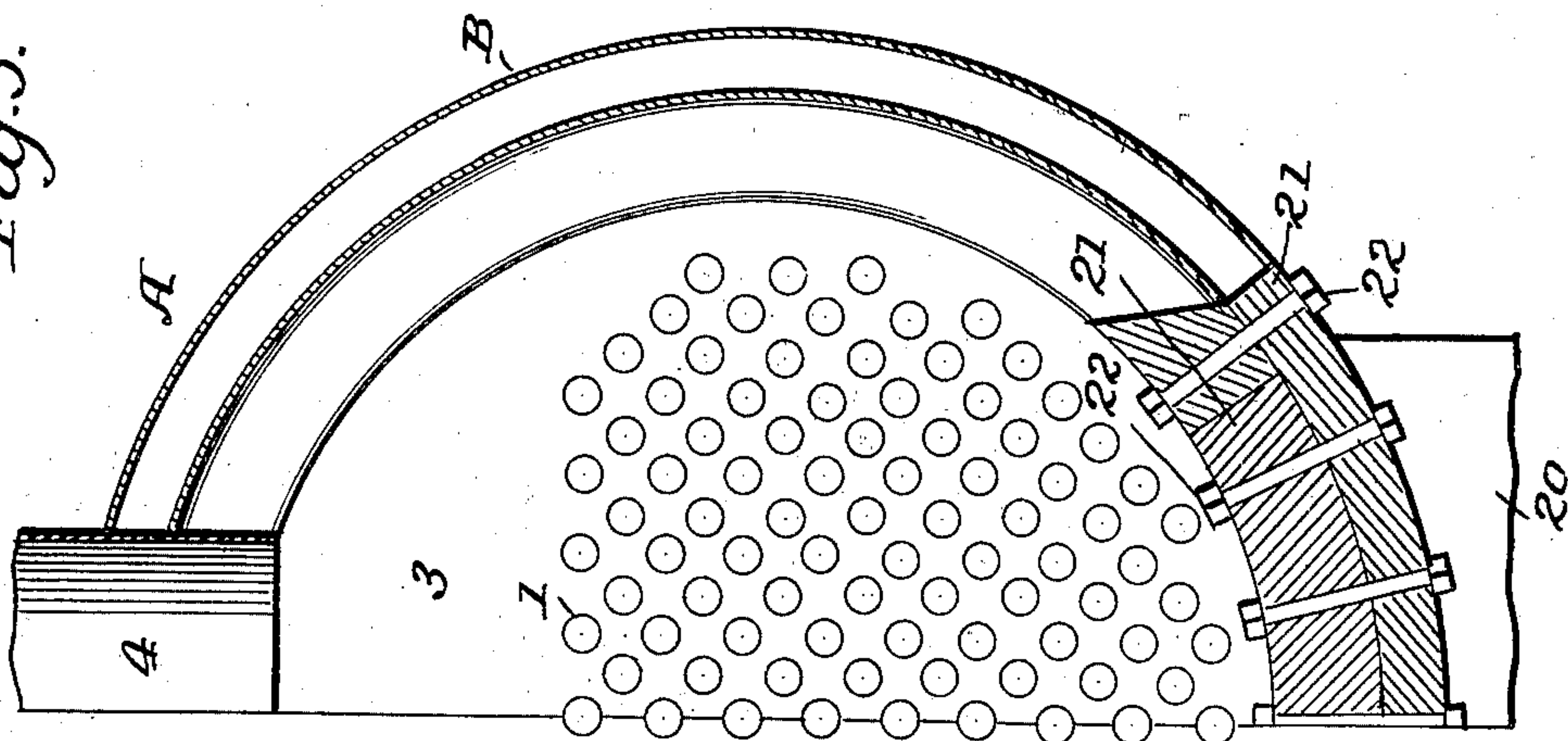
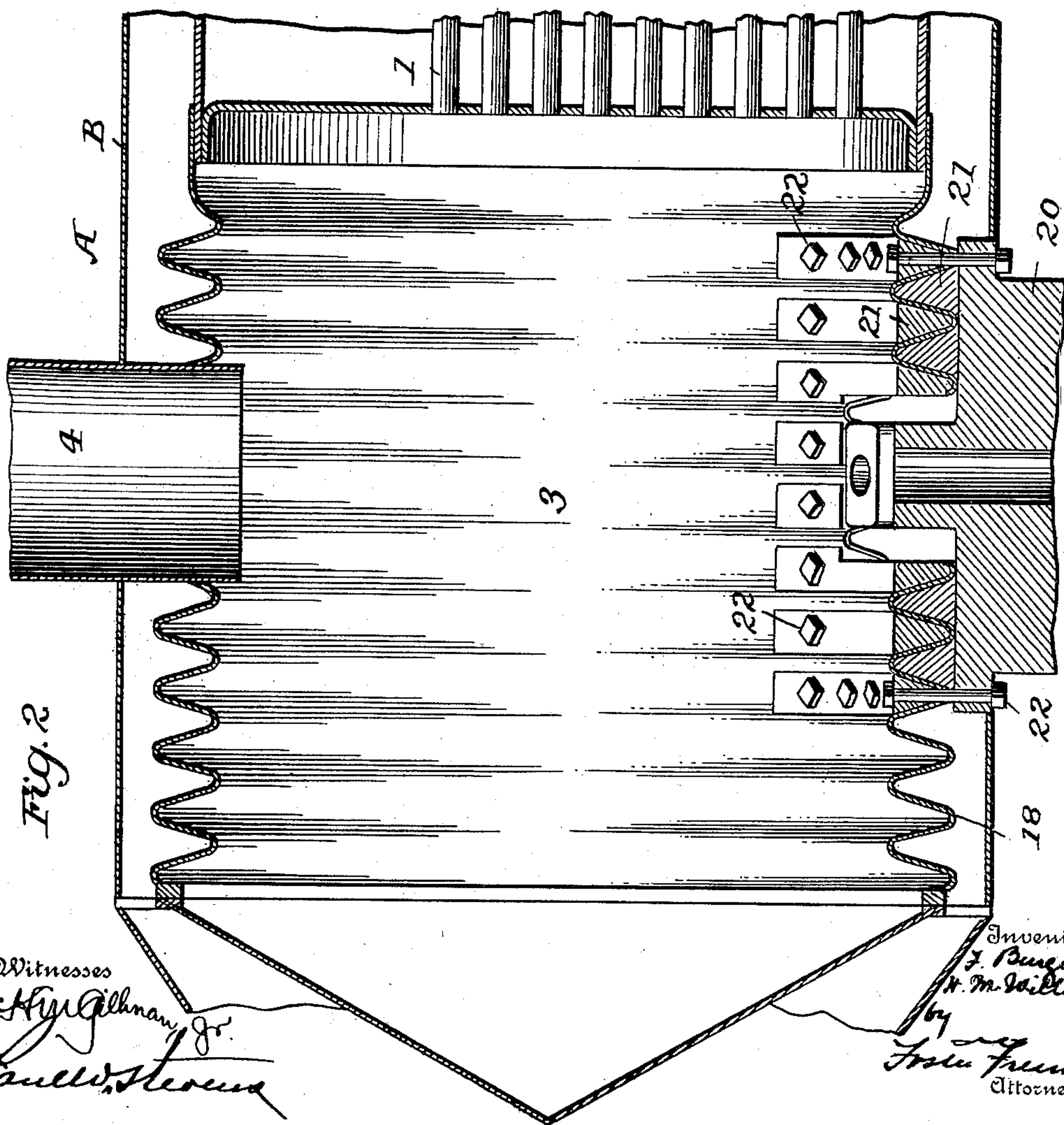


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 706,796, dated August 12, 1902.

Application filed January 15, 1900. Serial No. 1,483. (No model.)

*To all whom it may concern:*

Be it known that we, FRANZ BURGER and HENRY M. WILLIAMS, citizens of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification.

This invention relates to certain new and useful improvements in combined boilers and hot-air heaters, having for its object to generally improve the construction of such apparatus and to provide means whereby air may be quickly heated to a high degree and then conveyed to a suitable point where it may be used for heating purposes.

In the accompanying drawings, forming a part of this specification, and in which like numerals of reference designate corresponding parts, Figure 1 is a longitudinal section of a construction embodying the invention. Fig. 2 is a similar view, on an enlarged scale, of a modified form of the invention, parts being broken away; and Fig. 3 is a transverse sectional view on the line *x x* of Fig. 2.

Referring more particularly to the drawings, A designates a boiler, which may be of any suitable or desired construction, comprising the usual flues 1, combustion-chamber 2, smoke-box 3, and smoke-stack 4, leading from the smoke-box. Surrounding the boiler-casing and smoke-stack and arranged to leave a space between the two is a shell B, so constructed as to form an air-chamber 5 forwardly of the smoke-box. The front end of the shell B is open and provided with a cap 6, having a flange 7, which surrounds the same. The cap and its flange are separated from the shell to leave a space or passage 8 between the two, said passage opening outwardly in a direction toward the rear of the boiler, or rather toward the combustion-chamber thereof. Connected to the cap 6 and shell B is a series of baffle-plates 9, arranged in staggered relation to direct the indrawn air in a tortuous course through the passage 8, the said plates also serving to prevent dust and cinders being drawn into the shell.

Within the open end of the shell B is arranged a blower 10, adapted to force air against

the walls of the air-chamber 5 and through the space between the boiler casing and shell, the said blower being driven by a suitable engine 12, likewise arranged within the shell. The engine may be an ordinary steam-engine, in which case steam would be supplied thereto from the boiler through suitable connections. (Not shown.)

Leading from the space between the boiler and shell is an outlet-pipe 13, provided with a damper 14, and through the pipe and suitable connections the hot air is delivered to any desired point. Beneath the grate-bars or the fire-box there is arranged a series of tubes communicating at one end directly with the space between the boiler and shell and at the opposite end with the outlet-pipe 13. The tubes are perforated in order that air flowing therethrough from the hot-air space may be directed beneath the grate-bars, and as a convenient means of controlling the flow of the air dampers 16 are provided at the opposite ends of the tubes.

In order that the air may be subjected to the greatest possible area of heating-surface, to the end that it may be quickly raised to a high degree of heat, some or all of the walls of the smoke-box are preferably corrugated, and to the same end the walls of the smoke-stack 4 are formed with longitudinal corrugations. As shown in Fig. 1, the front wall of the hot-air chamber is conical in shape and is formed with a series of concentric corrugations 17, the said conical corrugated wall being preferably arranged in the horizontal plane of the blower 10, so that the air will be forced directly against it.

In the modified construction illustrated in Fig. 2 the side walls of the smoke-box are formed with a series of annular parallel corrugations 18, and a smoke-stack of the ordinary form is employed instead of one that is corrugated.

It may be said in general that the invention is illustrated in connection with a typical form of locomotive-boiler, although it may be used in connection with various forms of stationary boilers, and in order to secure the walls of the smoke-box (illustrated in Fig. 2) to the saddle 20 of a locomotive segmental



filling-pieces 21 are employed, which fit the interior and exterior grooves or recesses of the corrugations. Bolts 22, passing through the interior filling-pieces and through the chamber-walls and flanges 23 of the saddle, secure the parts together and hold them in their relative positions.

Without limiting ourselves to the precise construction and arrangement of the parts shown and described, what we claim is—

1. The combination of a boiler, its smoke box and stack, said smoke-box having a conical front wall concentrically corrugated and said stack being corrugated longitudinally, a shell surrounding the boiler, stack and smoke-box to leave a space between them and projecting beyond the front wall of the smoke-box, means supported in the front end of the shell to force air from the exterior directly against the front wall of the smoke-box and through the spaces between the shell and the smoke-stack and boiler, and a conduit leading from said space at the rear end of the boiler, substantially as set forth.

2. The combination of a boiler and its smoke-box, a shell surrounding the same to leave a space between the two the said shell being formed with an open end, a flanged cap surrounding said end and separated therefrom to form an inlet-passage, the flange of the cap extending rearwardly, means for directing air through the space between the shell and

boiler, and an outlet-passage leading from said space, substantially as described.

3. The combination with the boiler and its smoke-box, a shell surrounding the same to leave a space between them, the said shell being formed with an open end, a cap surrounding said end and separated therefrom to form an inlet-passage, baffle-plates within said passage, a blower likewise arranged in the passage, and an outlet-passage leading from the space between the shell and boiler, substantially as described.

4. The combination of a locomotive, its saddle and boiler resting thereon, the said boiler having a smoke-box, the wall of which is formed with a series of parallel corrugations, segmental filling-pieces within the recesses of the corrugations, bolts passing through said filling-pieces and the saddle, a shell surrounding the boiler and separated therefrom to leave a space between the two, and inlet and outlet passages leading to and from the said space respectively, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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