

No. 687,043.

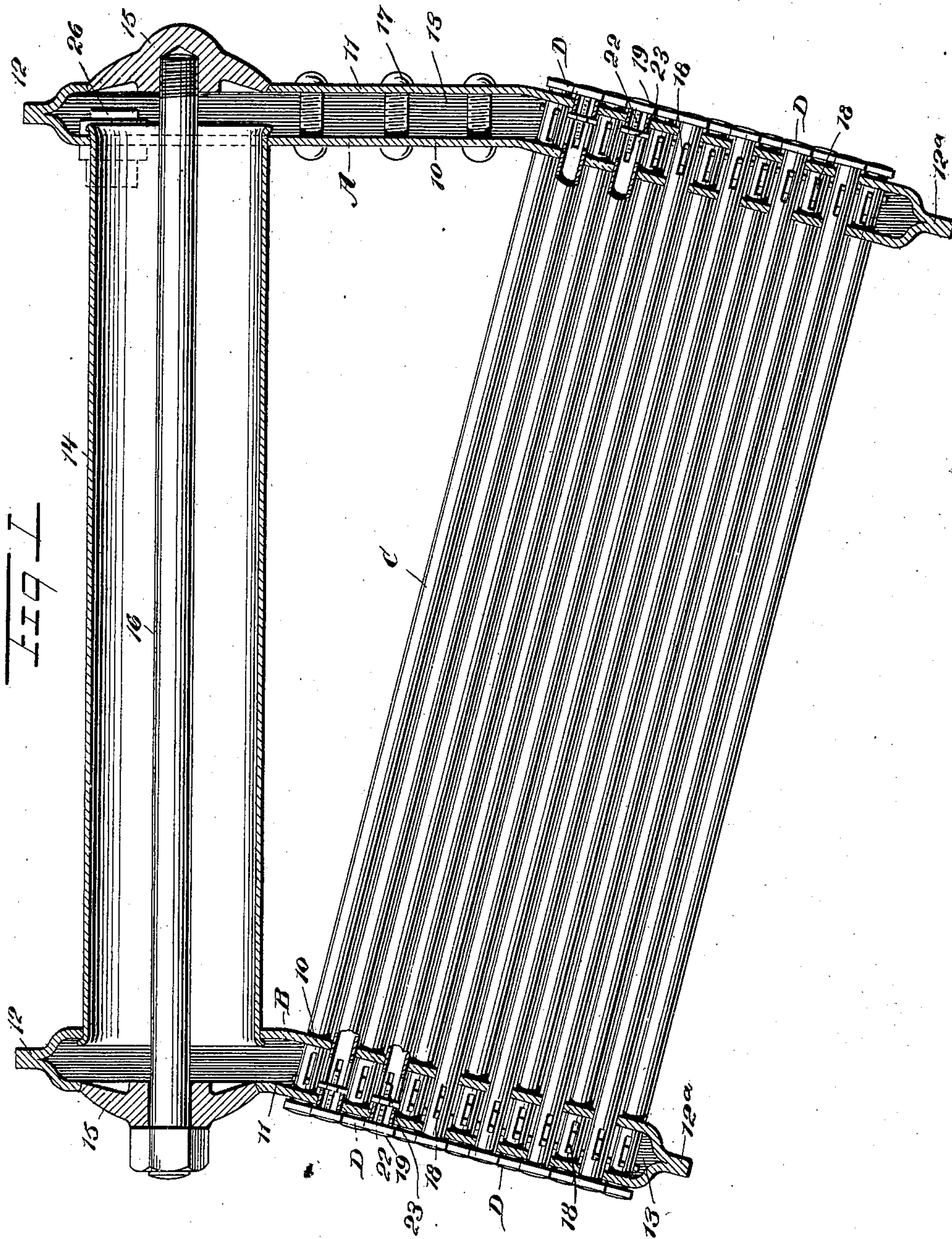
Patented Nov. 19, 1901.

A. H. MACARTHY.
BOILER.

(Application filed Dec. 6, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

H. Walker
J. H. Walker

INVENTOR

Albert H. Macarthy

BY

Mumford

ATTORNEYS

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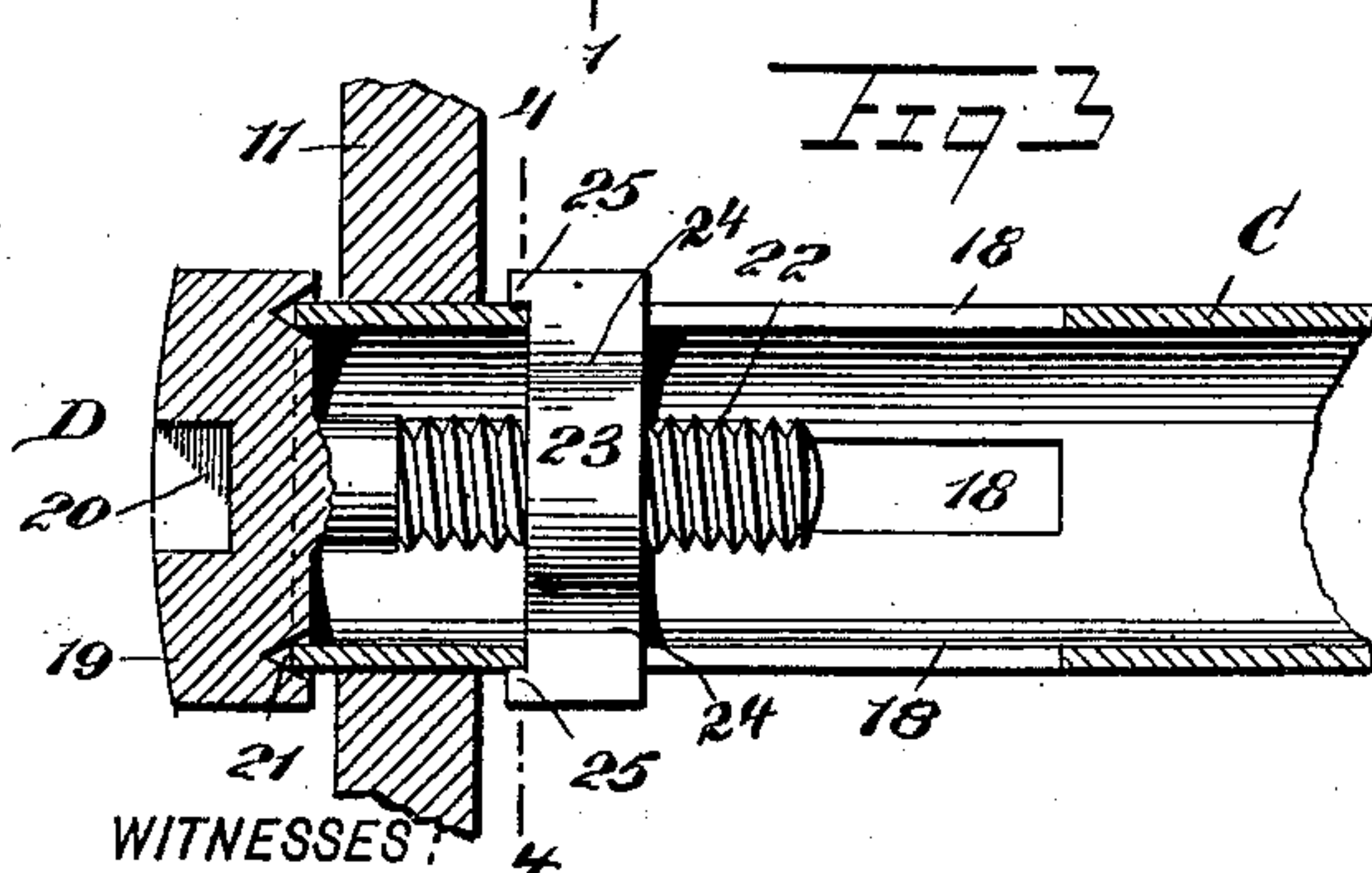
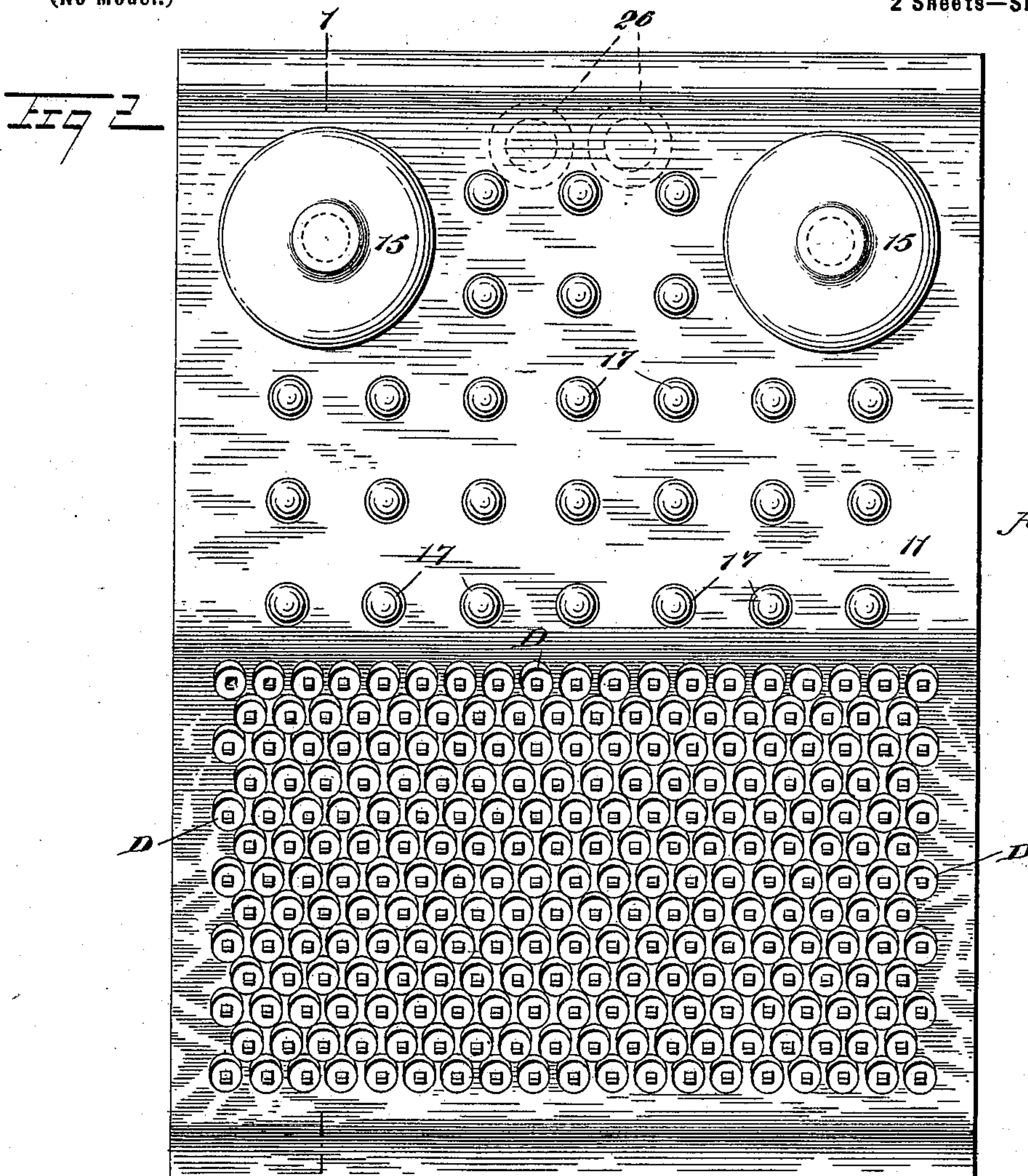
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BOILER.

(Application filed Dec. 8, 1900.)

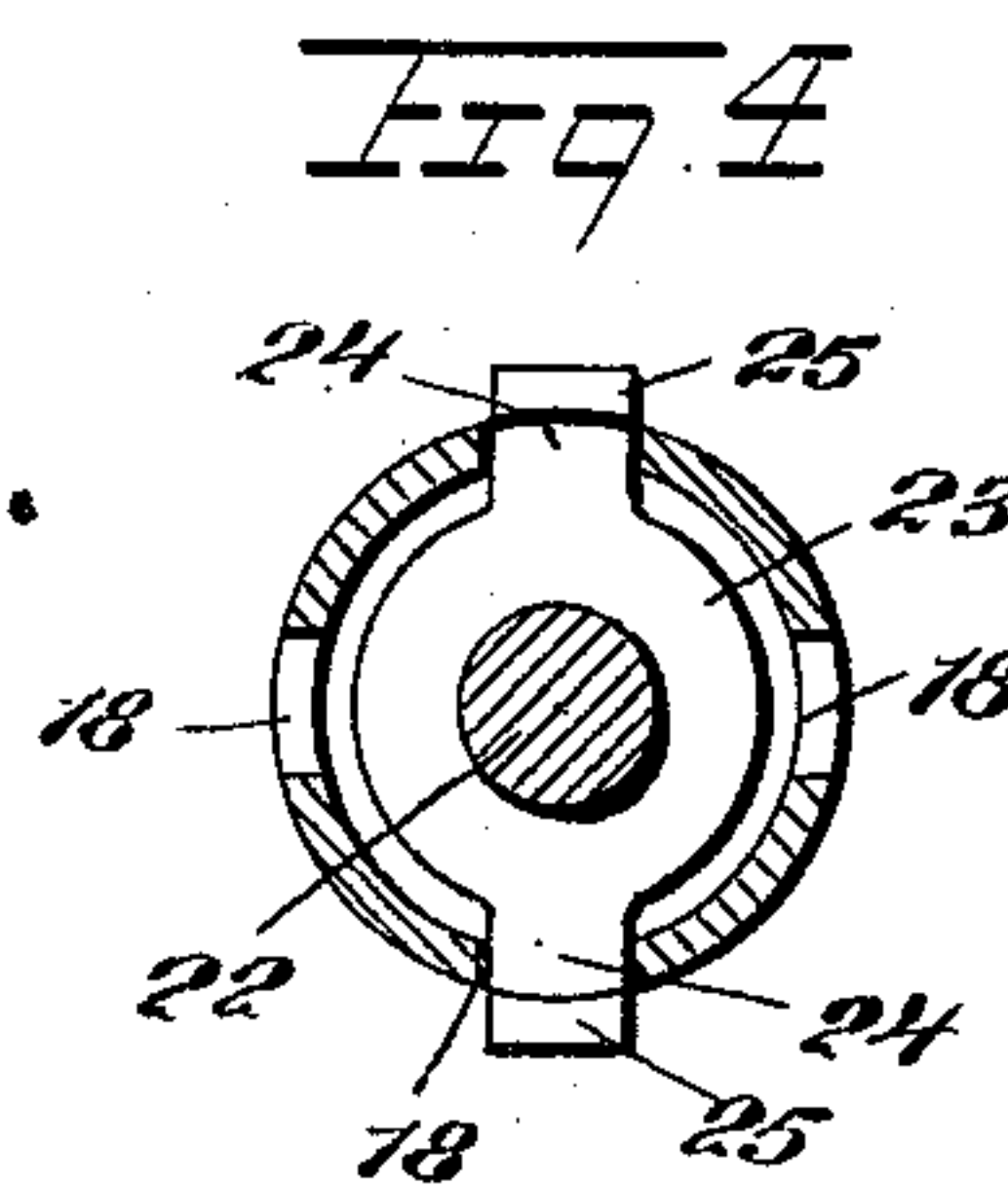
(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

H. Walker
Frederick



INVENTOR

Albert H. Macarthy

BY

Numm

ATTORNEYS

UNITED STATES PATENT OFFICE.

ALBERT H. MACARTHY, OF NEW YORK, N. Y., ASSIGNOR OF THREE-FIFTHS
TO ADAM RENZ AND WILLIAM J. SMITH, OF NEW YORK, N. Y.

BOILER.

SPECIFICATION forming part of Letters Patent No. 687,043, dated November 19, 1901.

Application filed December 6, 1900. Serial No. 38,947. (No model.)

To all whom it may concern:

Be it known that I, ALBERT H. MACARTHY, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and useful Improvement in Boilers, of which the following is a full, clear, and exact description.

The purpose of the invention is to provide a water-tube boiler in which perfect ventilation will be obtained and to so construct the boiler that the tubes will be expanded in both sheets of the heads of the boiler, the tubes being pierced or provided with openings in the water-legs formed by the head-sheets.

A further purpose of the invention is to provide devices for expeditiously and conveniently closing the tubes at the outside of the heads, which closing devices may be readily and conveniently removed, thus rendering any of the tubes accessible throughout its length.

A further purpose of the invention is to so construct the closing devices that they can be quickly removed and replaced without injury to other parts or detriment to their efficiency.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal vertical section through the improved boiler, the section being taken on the line 1 1 of Fig. 2. Fig. 2 is a front elevation of the improved boiler. Fig. 3 is an enlarged longitudinal section through one end of a tube and through parts of the closing device and a portion of the outer sheet of a head, and Fig. 4 is a transverse section taken practically on the line 4 4 of Fig. 3.

A and B represent, respectively, the front and the rear heads of the boiler, which latter may be placed in any desired setting. Each head A and B consists of an inner plate 10 and an outer plate 11, and the lower portion of each head is inclined rearwardly. The upper ends 12 and the lower ends 12^a of these plates

are closed in any suitable or approved manner. The spaces between the plates of the heads A and B constitute water legs or chambers 13, and the front head A is of greater vertical length than the rear head. Steam-drums 14 extend from one water-leg to the other at the upper portions of the heads, and these drums are usually passed through openings made in the outer plates 11 of the heads and are expanded at the walls of openings made in the inner plates of the heads, as is best shown in Fig. 1. The openings in the outer plates to accommodate the steam-drums 14 are usually a trifle larger than the corresponding openings in the inner plates, and the openings in the outer plates 11 of the heads provided for the steam-drums are closed in a steam-tight manner by caps 15 or their equivalents, connected by bolts 16, having suitable nuts applied.

A series of water-tubes C is grouped at the lower inclined portions of the heads A and B. These tubes are preferably given a downward and forward inclination, (shown in Fig. 1,) and the said tubes extend through both of the plates of the heads. The plates 10 and 11 of the front head A are usually strengthened between their upper ends and the uppermost tubes C by stay-bolts 17 or like devices. Each tube C at each end is expanded by any approved mechanism in both the inner and the outer plates of the heads A and B, and in the space between the plates of the said heads A and B or, in other words, within the water-legs or water-chambers 13 each tube or pipe C is provided with longitudinal slots 18, (shown in Figs. 1 and 3,) and these slots at each end of a tube are usually four in number, although the number of slots may be increased or decreased, as desired. Instead of slots 18 being made in the tubes, as shown and described, openings of any character may be substituted, or the said tubes where they pass through the water-legs of the heads may be simply pierced. The outer ends of the tubes C are provided with closing devices D, which closing devices may be quickly applied and readily removed and close the ends of the tubes in a steam-tight and water-tight manner. These closing devices consist of a plug 19 of greater diameter than the tube at the end which is to be closed, the

said plug being preferably provided with a recess 20 therein to receive a socket-wrench or like tool, and in the inner face of each plug 19 an annular groove 21 is made, preferably V-shaped in cross-section, and an end of a tube C is received within the groove 21 of a plug. The construction of the plug is completed by the addition of an exteriorly-threaded stem 22, which extends within the tube C. This threaded stem 22 enters a correspondingly-threaded opening produced in the central portion of a disk 23, as shown best in Figs. 3 and 4. This disk 23 is of less diameter than the interior diameter of the water-tube in which it is to be placed, and the disk 23 is provided with diametrically opposite lugs 24, which pass out through corresponding slots or openings 18 in the tube, and the lugs have free movement in said slots or openings. Each lug 24 is provided with an outwardly-extending lip 25 at its outer edge, and when a plug 19 has been screwed up tightly in a tube C the disk carried by the said plug will have reached the outer ends of the slots or openings 18, in which the disk has guided movement, and the lips 25 will extend forward in engagement with the outer face of the tube adjacent to the outer ends of the said slots or openings 18, as is clearly shown in Fig. 3. These lips serve to hold the disks stationary and also serve to guide the disk in its movement to and from the center of the tube.

When a plug 19 is screwed up tightly, the outer edge of the tube will be seated in the groove 21 in the plug in a steam-tight and water-tight manner. It is obvious that the plugs 19 may be removed quickly and conveniently, and therefore that access may be gained to each tube from end to end. Suitable steam-outlets 26 are provided at the upper portion of the front head A of the boiler.

The above construction of boiler renders it simple and rigid, and the openings in the tubes permit an uninterrupted circulation that is perfect. The tubes are strengthened and the heads are likewise strengthened by reason of the tubes being expanded in both plates or sheets of the heads A and B, and there can be no possible leakage at any point where

a tube passes into a head or passes out therefrom.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A boiler having the lower portion of its water-legs inclined rearwardly, inclined water-tubes passing through both walls of the legs and expanded therein, the tubes being slotted between the walls of the legs, nuts within the tubes and of less diameter than the tubes, said nuts being provided with oppositely-arranged lugs extending into the slots of the tubes, and plugs having annular grooves in their inner faces to receive the ends of the tubes and provided with threaded stems extending into the tubes and engaging the nuts, substantially as herein shown and described.

2. In boiler construction, the head and its water-leg, a water-tube extending through the water-leg and provided with slots at points within the water-leg, a plug having an annular V-groove adapted to receive the outer edge of the tube and a threaded stem which projects within the tube, and a nut for the same, of less diameter than the inner diameter of the tube, said nut being located within said tube and provided with oppositely-projecting lugs extending into the slots in said tube, said lugs having outwardly-extending lips, as specified.

3. In a boiler, the combination with the water-legs having oppositely-arranged openings in the walls thereof, at the upper portion, of a steam-drum extending from one leg to the other and having its ends expanded in the openings in the inner walls of the legs, caps over the openings of the outer wall, and a bolt extending through the drum and connecting the caps and holding them in position, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT H. MACARTHY.

Witnesses:

J. FRED. ACKER,
ADAM RENZ.