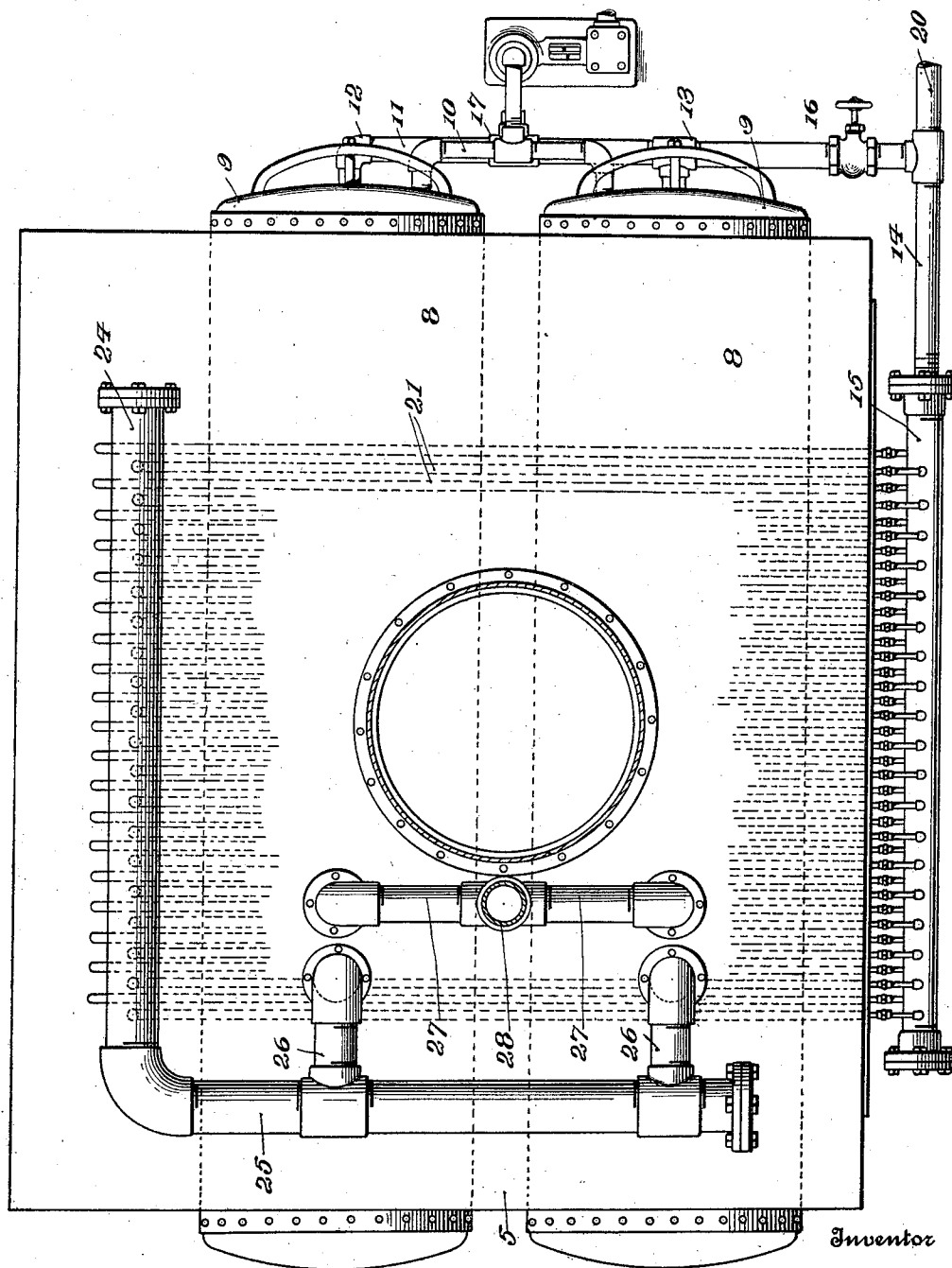


1,000,400.

J. GOODFELLOW.
STEAM GENERATOR.
APPLICATION FILED MAY 27, 1910.

Patented Aug. 15, 1911.

3 SHEETS—SHEET 1.



Witnesses
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James M. Fallon

Fig. 1.

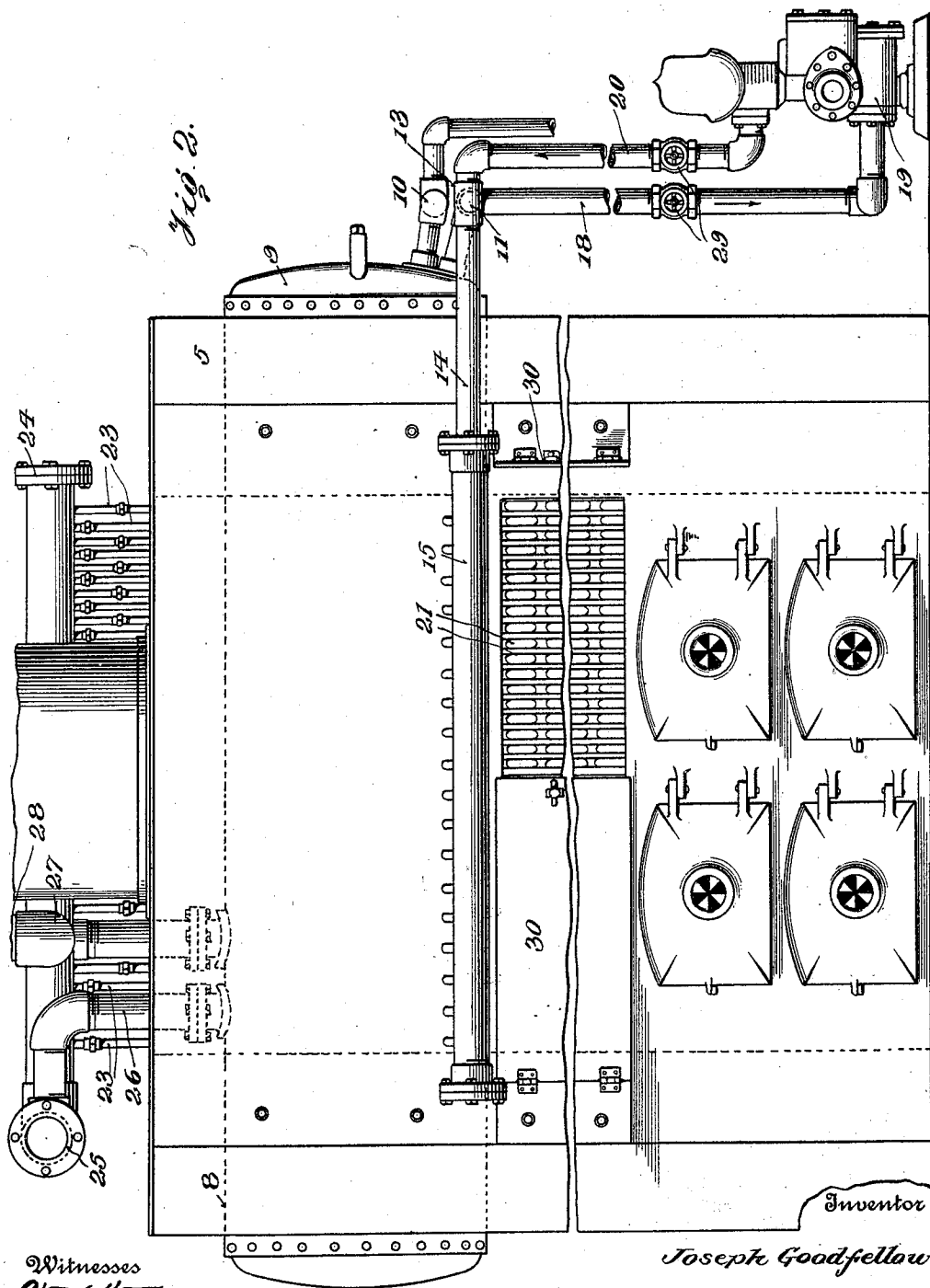
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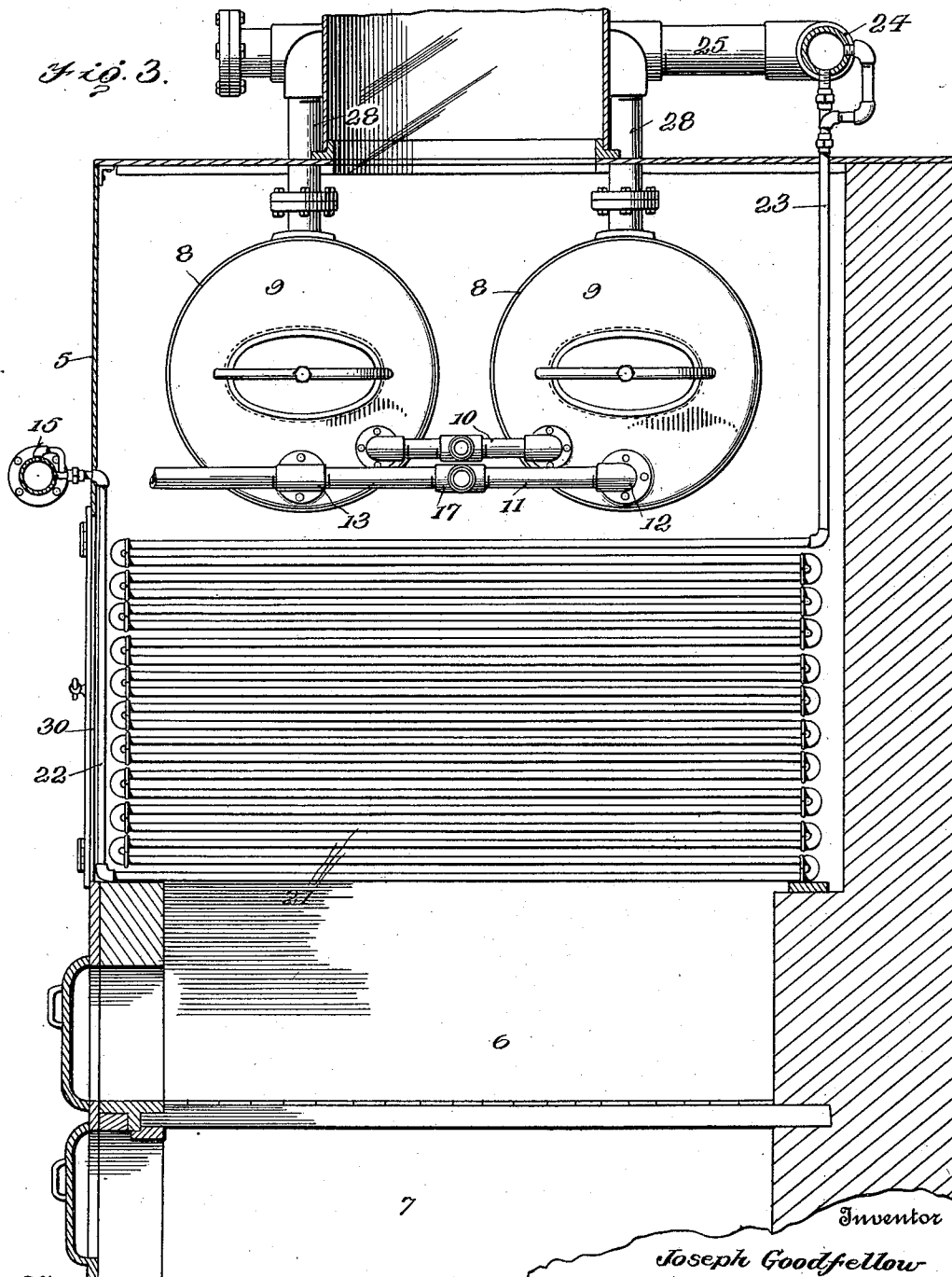
STEAM GENERATOR.

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3 SHEETS-SHEET 3.

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UNITED STATES PATENT OFFICE.

JOSEPH GOODFELLOW, OF FORT EDWARD, NEW YORK.

STEAM-GENERATOR.

1,000,400.

Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed May 27, 1910. Serial No. 563,793.

To all whom it may concern:

Be it known that I, JOSEPH GOODFELLOW, citizen of the United States, residing at Fort Edward, in the county of Washington and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

This invention relates to steam generators of the combined water tube and flash type.

The object of the invention is to provide a steam generator including a pump connected in the system for forcing water from the steam dome under pressure into the generating tubes or coils and returning the steam and water from said tubes back into the steam dome.

A further object is to provide a steam generator, in which the pressure of the water entering the generating tubes or coils serves to assist in cleaning the same.

A further object is to provide means for disconnecting the pump from the circulating system when banking the fires, or when it is desired to convert the boiler from a flash type to a water tube boiler.

A further object is to provide a combined flash and water tube boiler having an increased circulating velocity, thus to promote the generation of the steam and consequently increase the efficiency of the boiler.

A still further object of the invention is generally to improve this class of boilers so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention and the merits thereof, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a top plan view partly in section of a combined flash and water tube boiler provided with my circulating system; Fig. 2 is a front elevation partly broken away, one of the hinged doors being open to show the construction of the generating tubes or coils; Fig. 3 is a vertical sectional view.

Corresponding and like parts are referred to in the following description and indicated

in all the views of the drawings by the same reference characters.

The circulating system forming the subject matter of the present invention is shown in connection with a combined flash and water tube boiler in which 5 designates the casing, 6 the fire box and 7 the ash pit.

Disposed in the upper portion of the casing 5 are spaced steam domes 8 having their heads 9 projecting beyond the outer face of said casing and connected by a transverse pipe or conductor 10 to which is connected in any suitable manner a feed pump for supplying water to the domes. Arranged beneath the pipe 10 is a steam pipe or conductor 11, one end of which communicates with one of the domes 8 by an elbow coupling 12, while the other end thereof is connected to the mating dome by a T-coupling 13. One end of the conductor 11 is extended longitudinally beyond the T-coupling 13 for connection with a pipe 14 leading to a water header 15, there being a valve 16 connected in the conductor 11 for controlling the flow of water from the domes 8 to the header 15. The conductor 11 is provided with an intermediate T-coupling 17 to which is connected one end of an inlet pipe 18, the opposite end of which is connected with the suction of a pump 19 of any suitable construction. The pump 19 is provided with an outlet or discharge pipe 20 which extends upwardly at one side of the casing 5 and is connected in any suitable manner to the pipe 14 leading to the water header.

Arranged beneath the steam domes 8 are a plurality of sets of flasher tubes or coils 21, the lower coil or leg of each set being connected through the medium of a pipe or conductor 22 with the water header 15 and the upper coil or leg of each set connected by a vertically disposed pipe 23 with a steam header 24. The steam header 24 is preferably arranged above the top of the casing 5 and is provided with an angularly disposed conductor 25 having depending branch pipes or conductors 26, which latter communicate with the upper portions of the adjacent steam domes, as shown. The upper portions of the domes 8 are also connected by a steam pipe 27 having a centrally disposed branch pipe 28, through which the steam from the domes 8 is conducted to an engine or other source of consumption.

The pipes or conductors 18 and 20 are preferably provided with valves 29 for controlling the flow of water to and from the pump 19. Thus it will be seen that when
 5 the valve 16 is closed and the pump 19 operated, the water from the domes 8 will be drawn downwardly through the pipe or conductor 18, and thence forced upwardly under pressure through the pipe or conductor
 10 20 and pipe 14 to the header 15, the water from the header 15 being discharged through the pipes 22 into the heated coils 21, thus causing the instantaneous generation of steam. The steam generated in the bank
 15 of coils or tubes 21, together with the water, passes through the conductors 23 to the steam header 24 and thence through the pipe 25 and branch pipes 26 to the boilers or domes 8, the steam from said domes being
 20 conducted through the pipe 28 to the engine, as before stated.

When banking the fires, the valves 29 are closed and the valve 16 moved to open position, thus cutting out the pump 19 and causing
 25 the water from the domes 8 to flow by gravity through the conductors 11 and 14 to the header 15 and thence through the pipes 22 to the coils or tubes 21 and back to the domes, thereby permitting the device to be
 30 used as an ordinary water tube boiler. The pump 19 not only serves to increase the circulation of the water but also assists in cleaning the interior of the tubes or coils owing to the fact that the water is forced
 35 into said tubes under pressure. The front of the casing 5 is preferably provided with laterally swinging doors 30 so that access may be readily had to the bank of tubes or coils for the purpose of cleaning the exterior
 40 thereof, when necessary. Thus it will be seen that by manipulating the valve 16 and valves 29, the boiler may be converted from a flash type to a water tube boiler or vice versa.

45 By arranging the generating tubes and conductors in the manner described, an increased circulating velocity is obtained, thus promoting the generation of steam and consequently increasing the efficiency of the
 50 boiler.

Having thus described the invention, what is claimed as new is:

1. A steam generator of the combined flash and water tube type including a steam
 55 dome, flasher tubes operatively connected with the dome, means for feeding water to said dome, and means independent of the water feeding means connected in the system for forcing water under pressure from
 60 the lower portion of the dome into the generating tubes and returning the water and steam back into the upper portion of said dome.

2. A steam generator of the combined
 65 flash and water tube type including a steam

dome, flasher tubes operatively connected with said dome, means for feeding water to the dome, a pump operatively connected in the system for forcing water under pressure from the lower portion of the dome into the
 70 generating tubes and returning the water and steam back into the upper portion of the steam dome, and means connected with the upper portion of the steam dome for conducting steam from the dome to the place
 75 of use.

3. A steam generator of the combined flash and water tube type including a steam dome, flasher tubes operatively connected with the dome, means for feeding water to
 80 said dome, a pump independent of the water feeding means for forcing the water under pressure from the lower portion of the dome into the generating tubes and returning the water and steam back into the upper portion
 85 of said dome, and means for disconnecting the pump from the circulating system and conducting the water from the lower portion of the dome directly to the generating tubes and thence to the upper portion of said
 90 dome.

4. A steam generator of the combined flash and water tube type including a steam dome, a water header operatively connected with said dome, a steam header, flasher-tubes
 95 connected with the steam and water headers, respectively, a circulating pump connected in the system for forcing water under pressure from the lower portion of the dome into the water header and thence into the generating tubes and back into the upper portion
 100 of the dome, and means for cutting out the pump and conducting the water from the dome directly to the water header.

5. A steam generator of the combined
 105 flash and water tube type including spaced steam domes, means for feeding water to the domes, flasher tubes operatively connected with said domes, a circulating pump independent of the water feeding means connected
 110 in the system for forcing water under pressure from the lower portions of the domes into the flasher tubes for causing the instantaneous generation of steam, means for conducting the steam and water from
 115 the flasher tubes into the upper portions of the domes, means connected with both domes for conducting the steam to the place of use, and means for cutting out the pump from the circulating system and conducting
 120 the water from the lower portions of the domes direct to the flasher tubes, thus to convert the boiler from a flash type to a water tube boiler.

6. A steam generator of the combined
 125 flash and water tube type including spaced steam domes, means for feeding water to said domes, a steam header operatively connected with the upper portion of both domes, a water header, a conductor forming a
 130

source of communication between the lower portions of both domes and the water header, flasher tubes connected with the water header and steam header, respectively, a circulating pump connected with the conductor and provided with a pipe communicating with the water header for forcing water under pressure into the flasher tubes, and a valve disposed in said conductor, said valve when in closed position permitting the flow of water from the lower portions of the steam domes through the pump to the water header and when in open position permitting the water to flow from the domes directly to said water header.

7. A steam generator of the combined flash and water tube type including an elongated horizontally disposed steam dome, a single elongated steam header arranged parallel with the steam dome and disposed at an elevation above the same, oppositely disposed horizontal water headers also parallel to the steam dome and arranged at an elevation below the steam header, connecting means between the steam header and steam dome, a series of flasher tubes positioned under the steam dome and having their ends connected, respectively, with the steam header and water headers, a circulating pump having the inlet thereof in communication with the steam dome and the outlet thereof in communication with the water headers, and means for cutting out the circulating pump and producing a direct connection between the steam dome and said water headers.

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

JOSEPH GOODFELLOW. [L. S.]

Witnesses:
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SAMUEL N. ACKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."