No. 659,845. Patented Oct. 16, 1900.

# L. CHARMOIS.

## STEAM BOILER.

(Application filed July 9, 1900.)

(No Model.) 2 Sheets—Sheet 1.

*Fig. 1.*

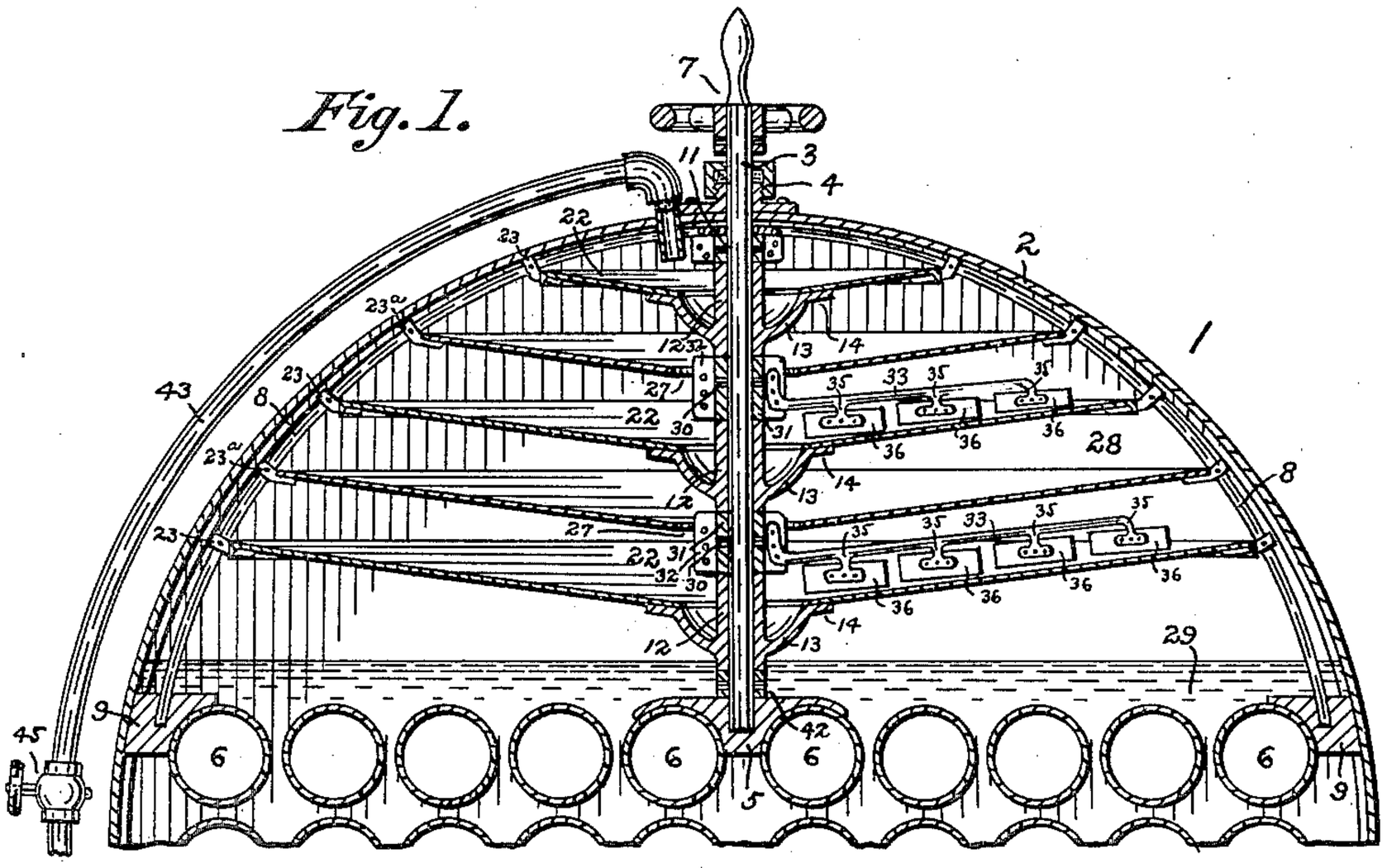
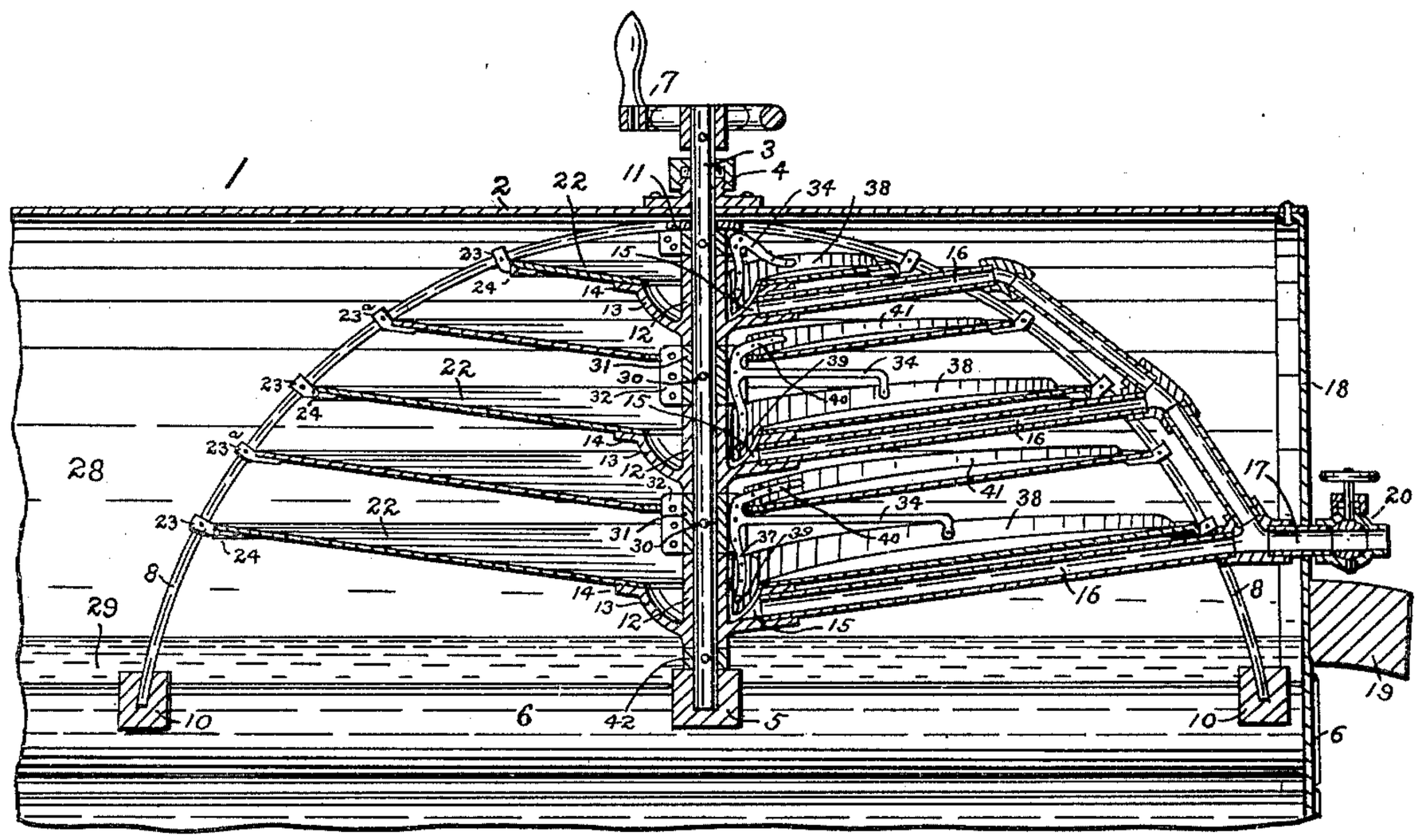



*Fig. 2.*




Witnesses:
Ralph E. Myers.
Joseph Frease.

Inventor:
Louis Charmois,
By Harry Frease. Attorney

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(No Model.) 2 Sheets—Sheet 2.

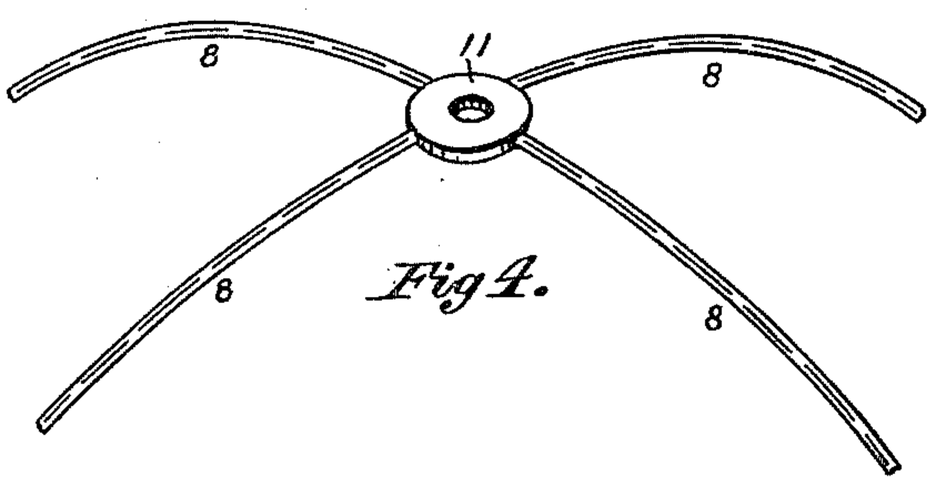
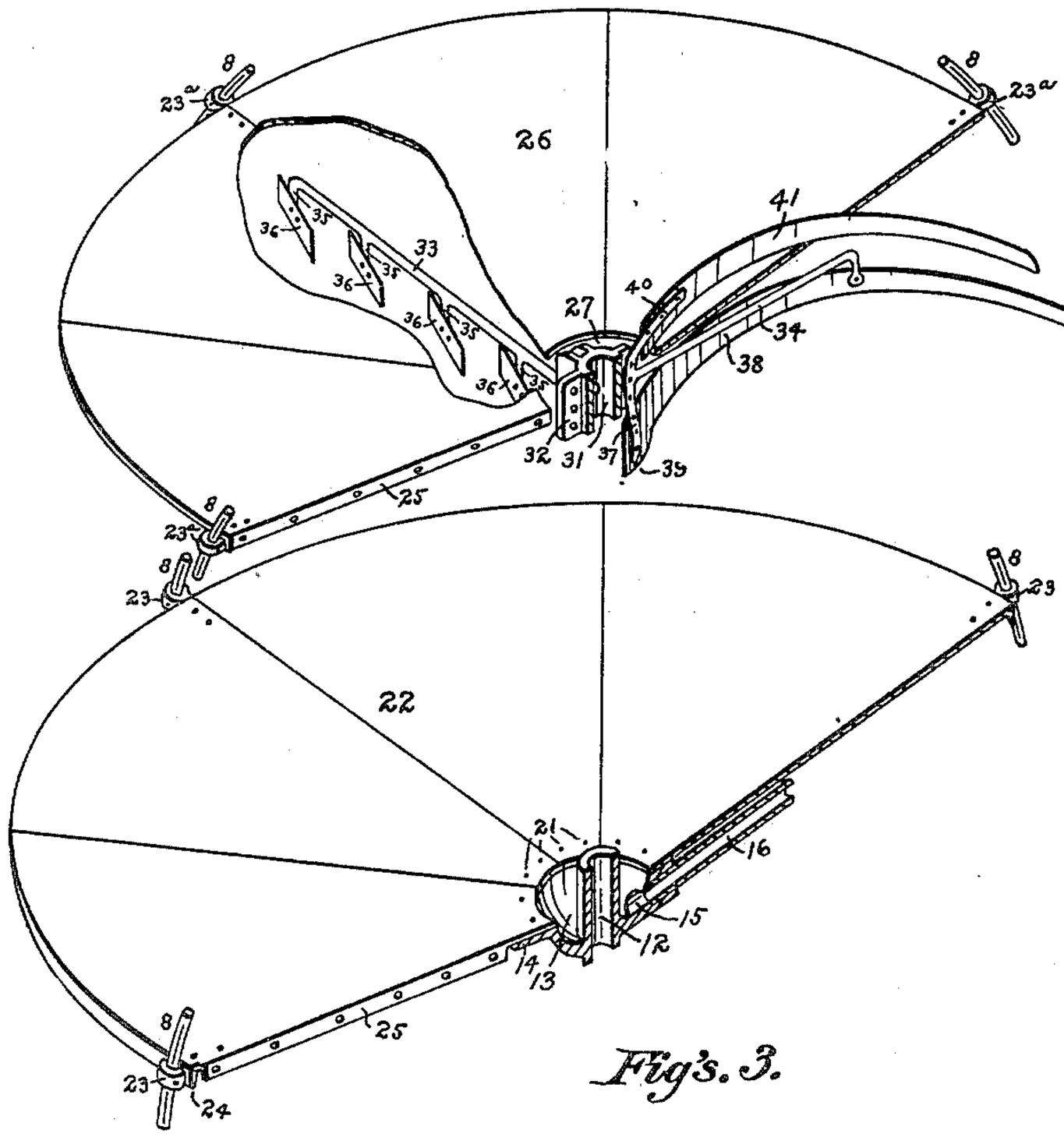



Fig 4.




Fig's. 3.

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# UNITED STATES PATENT OFFICE.

LOUIS CHARMOIS, OF CANTON, OHIO.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 659,845, dated October 16, 1900.

Application filed July 9, 1900. Serial No. 22,903. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS CHARMOIS, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

My invention relates to the manner of receiving water in steam-boilers and to the removal of the sediment therefrom, and has for its objects the heating of the incoming water to nearly or quite the point of decomposing before merging it with the superheated water in the boiler, the precipitation and accumulation of the contained foreign substances, and the removal of the same from the boiler without in any way interfering with its continuous and most efficient service. I attain these objects by the mechanism illustrated in the accompanying drawings, showing the same applied to an ordinary horizontal tubular boiler, in which—

Figure 1 is a transverse section of a boiler with the mechanism located therein; Fig. 2, a longitudinal section of the same. Fig. 3 shows detached isometric views of the precipitating and auxiliary pans and the respective collars and scrapers all in relative position for assembling, and Fig. 4 is a detached isometric view of the top of the supporting-frame or rods.

Similar numerals refer to similar parts throughout the several views.

Within the boiler 1, preferably near its rear end, and passing out through its shell 2 is located a vertical shaft 3, which is fitted at said shell with an ordinary stuffing-box 4 to prevent an escape of steam and also to act as a journal-bearing for said shaft. The shaft 3 rests and turns in a step 5, which rests on or is attached to the upper row of flues 6 in the middle line of the boiler, and at its outer end has securely attached a crank-wheel 7, by which it may be rotated. Within the boiler is also located a supporting-frame, which may be of any suitable form to properly carry the parts, and, as shown, consists of the four curved rods 8, the lower ends of which rest in the steps 9 and 10, respectively, which rest on or are attached to said flues 6. Thence said rods 8 curve upward and inward to a common center, where they are attached to a collar 11, which is located loosely around the shaft 3, immediately under the shell 2 of the boiler.

Located loosely on the shaft 3 within the boiler are the collars or thimbles 12, on which are formed the bowls or cups 13, preferably made of cast-iron and provided with the external rim-flanges 14. From one side at the bottom of the cups 13 are provided the passage-ways 15, adapted to receive the inner ends of the blow-off pipes 16, which are securely attached therein by screwing or otherwise. The blow-off pipes 16 are merged into one pipe 17, which passes out of the boiler, preferably through the rear end plate 18 above the heading or arch 19 over the ends of the flues, the outlet of said pipe 17 being controlled by an ordinary blow-off valve 20.

Attached to the flanges 14 of the cups 13 by bolts or rivets 21 or other suitable means and extending thence outward and slightly upward are the heating and precipitating pans 22, preferably made circular in shape and of sheet-brass, which pans at their outer edges are attached to or supported by the rods 8 by means of suitable collars or cleats 23. The outer edges of the pans 22 may be provided with the descending rims 24 to prevent water flowing thereover from running back along the bottom sides of said pans. For practical purposes and to permit the same to be passed in and out of the usual manhole of the boiler the pans 22 may be made in sections, the edges of which are flanged down, as at 25, by means of which flanges the sections may be bolted or riveted together and the pans are strengthened.

Between the respective heating and precipitating pans 22 are located the auxiliary pans 26, which are similar in material and form, except that they need not have a descending rim at the outer edge. Like the pans 22, the auxiliary pans 26 are attached or supported at their outer edges to the rods 8 by cleats, as $23^a$; but, unlike them, they have no support or attachment at the center, where instead is the free hole or aperture 27.

There may be any desired number of precipitating and auxiliary pans in the boiler, according to its size and the work to be done; but whatever the number each auxiliary pan is somewhat larger in diameter than the pre-

cipitating-pan next above it, so that a flow of water over the outer edge or rim of the precipitating-pan is caught by the larger auxiliary pan below it, and all the pans, as aforesaid, are located in the steam-space 28 and above the water 29 in the boiler.

Between the collars or thimbles 12 and securely and adjustably attached to the shaft 3 by means of set-screws or the pins 30 are mounted on said shaft the collars 31, which collars form a support for the thimbles, respectively, above them. The collars 31 are provided externally with vertical ears 32, to which the carrier-arms 33 and 34 are attached by means of suitable bolts or rivets.

To the projections 35, extending down from the carrier-arms 33, are securely attached the agitating-scrapers 36, which travel around on the upper surface of the precipitating-pans 22, respectively. The respective agitating-scrapers 36 are so inclined with their outer ends ahead of the inner ends in the direction of their movement that all scrapings will be carried toward the center of the precipitating-pans.

To the outer ends of the carrier-arms 34 and to downward extensions 37 at their inner ends are securely attached the centripetal scrapers 38, which also travel around on the upper surfaces of the precipitating-pans 22 and at their inner ends have downward projections 39, fitting in the cups 13, respectively. To upward extensions 40 at the inner ends of the carrying-arms 34 are securely attached the centripetal scrapers 41, which travel around on the upper surfaces of the auxiliary pans 26, respectively.

The centripetal scrapers 38 and 41 are so formed and located as to be tangent to a radius at their respective inner ends or slightly inclined outward and forward in the direction of their movement, thence curving outward and forward to the rims of the respective pans, so as to gather all the sediment which may be deposited and carry the same to the middle aperture or to the central depression of the respective pans.

The agitating-scrapers 38 and the centripetal scrapers 41 are operated through their respective attachments by turning the crank-wheel 7 on the upper outer end of the shaft 3.

The lower thimble 12 is supported by the collar 42, adjustably attached on the shaft 3.

Water is forced into the boiler 1 by an ordinary injector or pump through the pipe 43, controlled by a valve 44. The pipe 43 may enter the boiler at any desired point and may take any suitable route therein, so as to discharge the incoming water in or near the middle of the upper precipitating-pan 22 or into the cup 13 thereof. When this pan fills, the overflow at its edges is caught by the auxiliary pan 26 next below, thence running to the middle thereof, and passing through the aperture 27 it falls to about the middle of the precipitating-pan next below or into the cup 13 thereof. This course of flow is repeated successively until the water has traveled through or over all the pans, when if it is not already decomposed into steam it falls into and merges with the water 29 already in the boiler, being heated to about an equal temperature therewith. By so heating the water coming into the boiler there is avoided any checking of the currents in the contained water, which occurs when cold or materially-cooler water is injected directly therein, which inures to a saving in fuel necessary to restore the steam-making status of the same. In the flow and counter-flow of the water over and through the several pans and by its heating and approaching decomposition all or substantially all of its contained foreign matter is deposited or precipitated in said pans. The sediment so deposited either flows to the middle of the several pans or is carried there by operation of the respective centripetal scrapers 38 and 41. The sediment from the auxiliary pans 26 falls through the middle aperture 27 into the precipitating-pan 22 next below near its middle or into the cup 13 thereof, where is also accumulated the sediment in said precipitating-pan. Thence the sediment can be removed from the boiler through the passage-ways 15 and the blow-off pipes 16 and 17 by merely opening the blow-off valve 20 and, if necessary, at the same time operating the agitators and scrapers so the downward projections 39 on the centripetal scrapers 38 will carry the sediment in the respective cups 13 around to their passage-ways 15, whence it is carried out by the blowing steam. The special purpose of the agitating-scrapers 36 is to loosen up such sediment as may cake on the respective pans and to carry the same as far as they will toward the middle, and while the drawings only show them on some of the precipitating-pans in practice they may be used on all of them and also on the auxiliary pans, if necessary, and while only one agitating-scraper 36 and one centripetal scraper 38 and 41 each is shown on the respective pans as many of either may be used as are found necessary in accordance with the sediment deposited from the water used.

Under certain conditions the auxiliary pans 26 may be omitted; but I prefer to use them for the facility they offer to more quickly heat the water as it passes in thin sheets thereover.

By locating the mechanism in the rear end of the boiler the hottest place therein is utilized, and the engineer or fireman can operate the blow-off with one hand and at the same time turn the agitators and scrapers with the other hand.

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

1. In a steam-boiler, circular pans having central depressions with blow-off passages from the bottoms thereof, and means for supporting the same in the steam-space, substantially as specified.

2. In a steam-boiler, heating and precipitating pans having descending rim-flanges, and means for supporting the same, substantially as specified.

3. In a steam-boiler, circular pans having central depressions with blow-off passages from the bottoms thereof, alternating with relatively-larger similar pans having central apertures, and means for supporting the same in the steam-space, substantially as specified.

4. In a steam-boiler, circular heating and precipitating pans, with centrally-acting agitating-scrapers, and means for supporting and operating the same respectively in the steam-space, substantially as specified.

5. In a steam-boiler, circular heating and precipitating pans, with centripetal scrapers, and means for supporting and operating the same respectively in the steam-space, substantially as specified.

6. In a steam-boiler, circular pans having central depressions with blow-off passages from the bottoms thereof, and centripetal scrapers having descending parts to fit said depressions, with means for supporting and operating the same respectively in the steam-space, substantially as specified.

7. In a steam-boiler, a vertical shaft, with means for rotating the same from without, having thereon loosely-mounted thimbles for carrying heating and precipitating pans, and alternating adjustably-attached collars for supporting the same and for attaching scrapers, with means for supporting the same in the steam-space, substantially as specified.

8. In a steam-boiler, heating and precipitating pans having depressions with blow-off openings in the bottoms thereof, blow-off pipes respectively attached at one end in said openings and at the other end attached to and entering a common exit-pipe, and an exit-pipe passing out of the boiler and provided with a valve, substantially as specified.

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

LOUIS CHARMOIS.

Witnesses:

RALPH E. MYERS,

JOSEPH FREASE.