No. 656,953. Patented Aug. 28, 1900.

P. A. DOUGHTY.

BOILER CLEANER.

(Application filed June 13, 1900.)

(No Model.)

Fig. 1

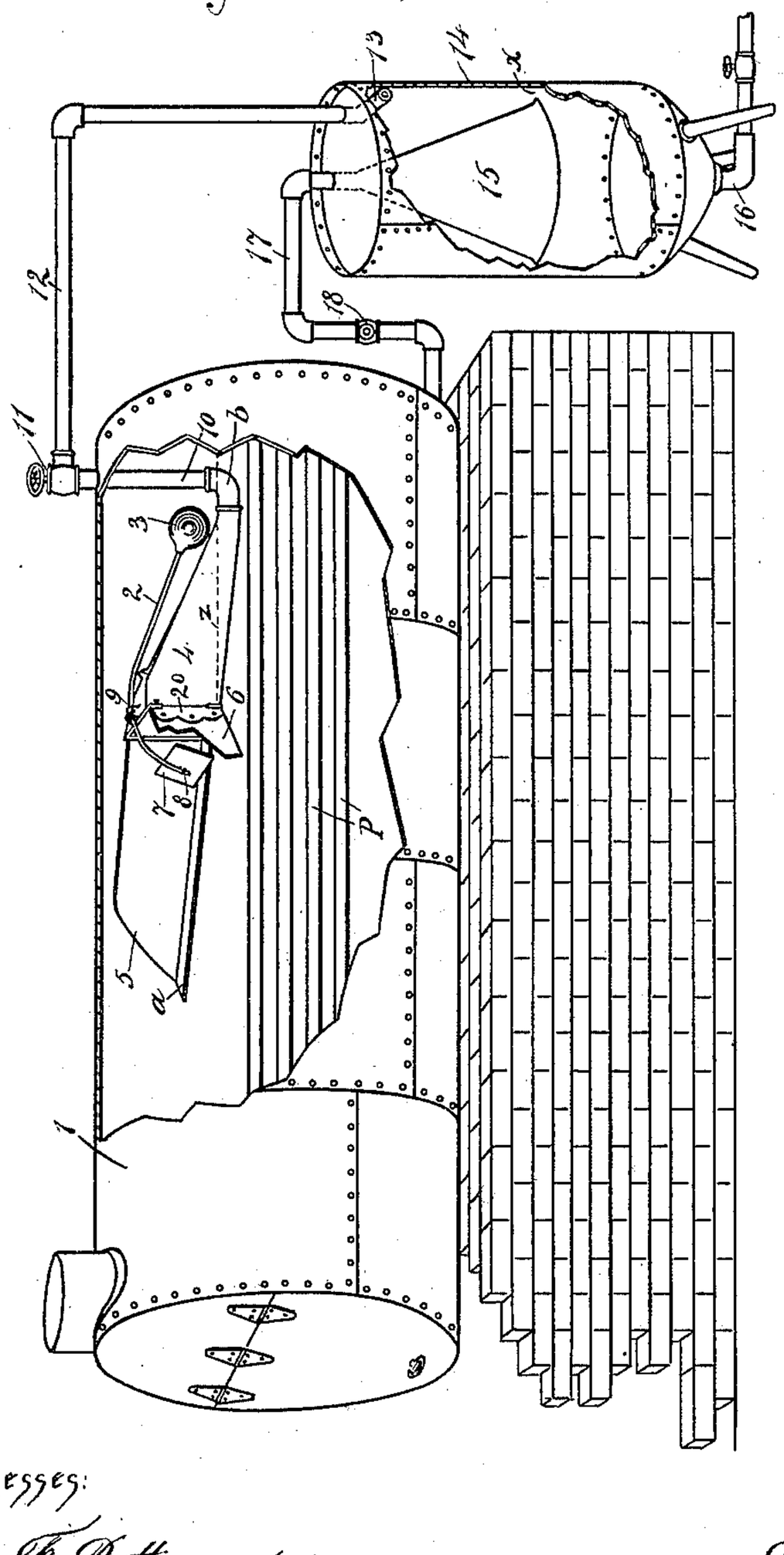
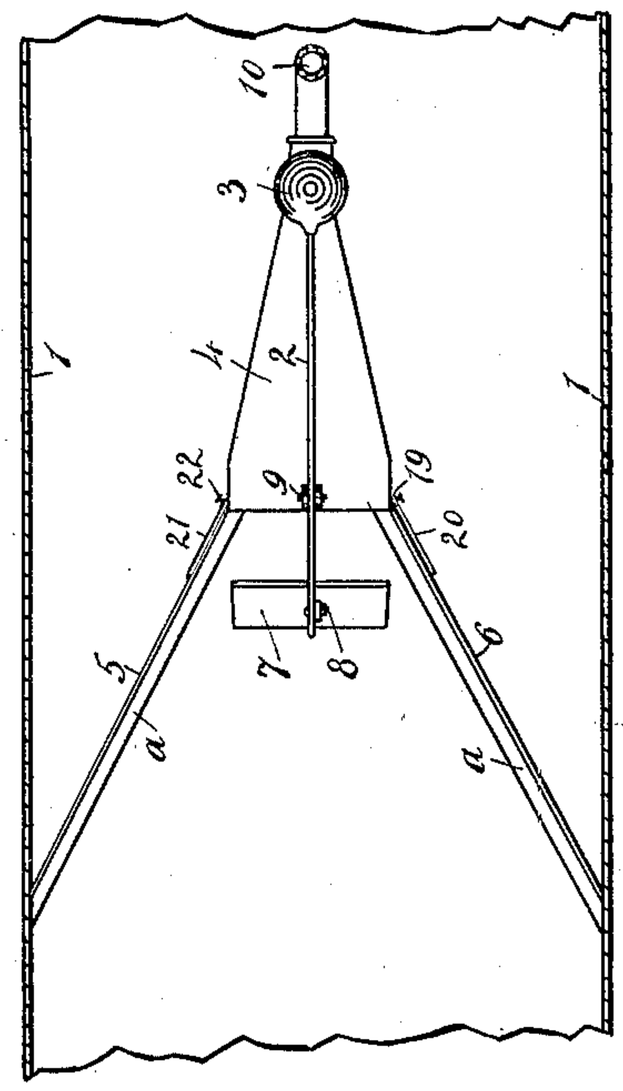


Fig. 2



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BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 656,953, dated August 28, 1900.

Application filed June 13, 1900. Serial No. 20,167. (No model.)

To all whom it may concern:

Be it known that I, PARKER ALLEN DOUGHTY, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain useful Improvements in Mechanical Boiler-Cleaners; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to a new and novel improvement in mechanical boiler-cleaners, and relates more particularly to that class of boiler-cleaners in which the scum is gathered from the surface of the water in the boiler and conveyed to a precipitator, from which the water without being cooled is returned to the boiler freed of impurities.

In the accompanying drawings I have shown in Figure 1 a broken detached view of a boiler with parts removed provided with my improved mechanical boiler-cleaner, showing the precipitator partly in sectional view, while Fig. 2 shows a detail disclosing the arrangement of the boiler-cleaner proper.

As has been set forth, my invention relates to that class of mechanical boiler-cleaners which are set at the water-line within the boiler to first collect and then remove the scum floating upon the water. As the water-line is continually changing, the collector is arranged to remove the scum at any water-line, as will be described more fully hereinafter.

In fulfilling the aim of my invention I construct an open-ended housing of decreasing capacity toward the outlet, which housing is provided with adjustable divergent wings and an automatically-operated gate to partially open and close the intake-opening of the housing.

In an ordinary boiler when the water is raised to the boiling-point the act of evolution creates a seething or agitation of the water, during which process certain substances in suspension in the water—such as mud, lime, sludge, magnesia, and the like—are carried to the surface in the form of a scum. If this foreign matter is not removed, it will precipitate in the boiler in the form of a scale when the water is permitted to cool, thereby forming a sheathing or covering of foreign matter between the water and the boiler, and as this scale is a poor heat-conductor it consequently requires a greater amount of coal to heat the water than where the boiler is free of scales. In order to remove these impurities, which during the evolution of the water are upon the surface, I construct within and near the end of the boiler farthermost from the hottest part of the furnace a hood 4, as is shown in the drawings, which hood is provided in front with an opening and which is approximately in the shape of a pyramid, at the smallest end of which I provide an elbow *b*, which threads upon a supporting-pipe 10, fixed within the boiler, as is shown in Fig. 1. This pipe 10, which offers a support for my boiler-cleaner, is provided with the valve 11, from which continues a pipe 12, emptying into the precipitator 14, as is shown. This hood, while approximately in the shape of a pyramid, is so constructed that the highest point of the exit-opening receiving the elbow *b* is lower than the lowest point of the intake-opening of the hood. Referring to Fig. 1, it will be noticed that the intake-opening is above the line *z* and the exit-opening below the same. This hood, it will further be noticed, is of decreasing capacity from its opening toward its emptying end.

Removably secured to the upper portion of the hood is a rod 2, pivoted to the ears 9 of the hood, which rod is curved and at one end is provided with a float 3 and at the other with a gate 7, having a loop 8, by means of which the gate is secured to the rod 2. The float and rod are so adjusted that the float is above the lowest point of the hood's intake-opening, as is shown in Fig. 1. Normally this float rests upon the top of the hood 4, in which position the gate 7 is open, so that the intake-opening is unobstructed. This float is further so arranged that when the water is at its normal and usual level the gate 7 is opened.

Diverging from the hood and the two opposite forward edges thereof are the wings 5 and 6, each wing being provided with an inwardly-extending flange *a*, as is shown in Figs. 1 and 2. Now my hood is so positioned that the opening will always be within the

scum-line, so that the scum may be carried off with the least amount of hot water. In this connection it will be remembered that it was stated that this skimmer was placed within the boiler at the point farthermost from the hottest part of the furnace. This was done for the reason that where the heat is greatest the water rises upward the quickest, so that a current is created within the boiler, so that the surface of the water has a natural tendency to flow from the forward and hottest point of the boiler to the rear and coolest point thereof, and as the scum-line comes at a point between the upper and lower edges of the wings, and consequently the hood-opening, there is a gradual tendency of the scum to follow the water and be carried into the hood, while the clear water of course passes around the hood, creating a continuous surface-current, emptying into the hood, and consequently carrying with it the accumulated scum which has collected between the wings and within the hood. It is understood that the wings 5 and 6, as well as the hood-opening, are always to extend above and below the water-line.

Tangentially receiving the lower end of the pipe 12 is a precipitator or a settling-chamber, positioned adjacent to the boiler, and this chamber or precipitator below is provided with a valved exit-pipe 16, so that the collected impurities may be drawn from this precipitator. Positioned within the precipitator 14 is a funnel 15, the upper end of which is secured to a pipe 17, entering at a suitable point into the boiler 1, and this pipe 17 is provided with a valve 18. In the drawings, the flues have been represented by the reference-letter P.

Now the operation of my device as far as described is as follows: The steam-pressure in the boiler and hot water on the surface or scum-line forces the scum containing the mud, sludge, and other foreign matter through the scum-receiver and out through the outlet-pipe 12 into the precipitator 14, where, striking the circular precipitator tangentially, the water is whirled around, so that the impurities are thrown peripherally outward, so that the clearest water is centrally within the precipitator, where after undergoing the purifying process, which slightly cools it, it is then returned to the boiler, to the coolest part thereof, which process constitutes a perfect system of circulation. A check-cock 18 is placed in the return-pipe, by the use of which the circulation through the precipitator or settling-chamber is regulated. Now should the water rise within the boiler, raising the scum-line in the boiler slightly above the center of the scum-receiver, the float 3 is engaged by the rising water, and in carrying it upward the gate 7 is actuated to close tightly over the lower half of the mouth or intake-opening of the scum-receiver, shutting out the water below the scum-line that would otherwise flow into the outlet-opening, filling the pipes and precipitator with water instead of scum, thus retarding but not negativing the work of the cleaner. The stratum of water containing this scum will thence continue to pass over the gate into the scum-receiver, and as the scum-line recedes the float lowers with the receding water, when the gate again opens and the scum flows in as before. From this it will be seen that my invention comprises the novel features of a floating skimmer, automatically adjusting itself to the ever-changing scum-line in the boiler.

It will be noticed that the construction is exceedingly simple and that after the cleaner has once been placed in position the operation is continuous, as no special wear or strain comes upon the one working part located at the union of the operating-bar with the hood.

I do not wish to confine myself to the exact construction of instrumentalities, as my invention may be changed without departing from the spirit of the invention.

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

In a mechanical boiler-cleaner, the combination with a housing of decreasing capacity toward its exit end, the lowest point of said intake-opening being higher than the highest point of said exit-opening, wings adjustably secured adjacent the intake-opening of said housing, and an automatically-operated gate to close and open the lower portion of said intake-opening.

PARKER ALLEN DOUGHTY.

In presence of—
GEO. W. SUES,
ETHEL SMITH.