A. A. OLSON.

BOILER SEDIMENT SEPARATOR.

APPLICATION FILED MAR. 10, 1913.

1,067,838.

Patented July 22, 1913.

2 SHEETS—SHEET 1.

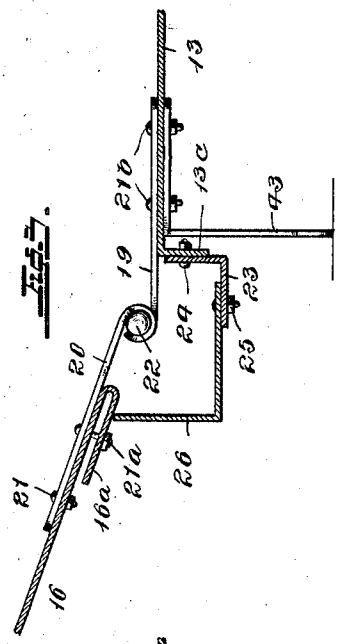


FIG. 2.

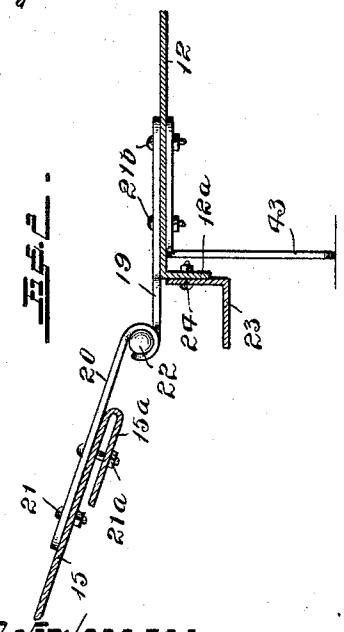


FIG. 3.

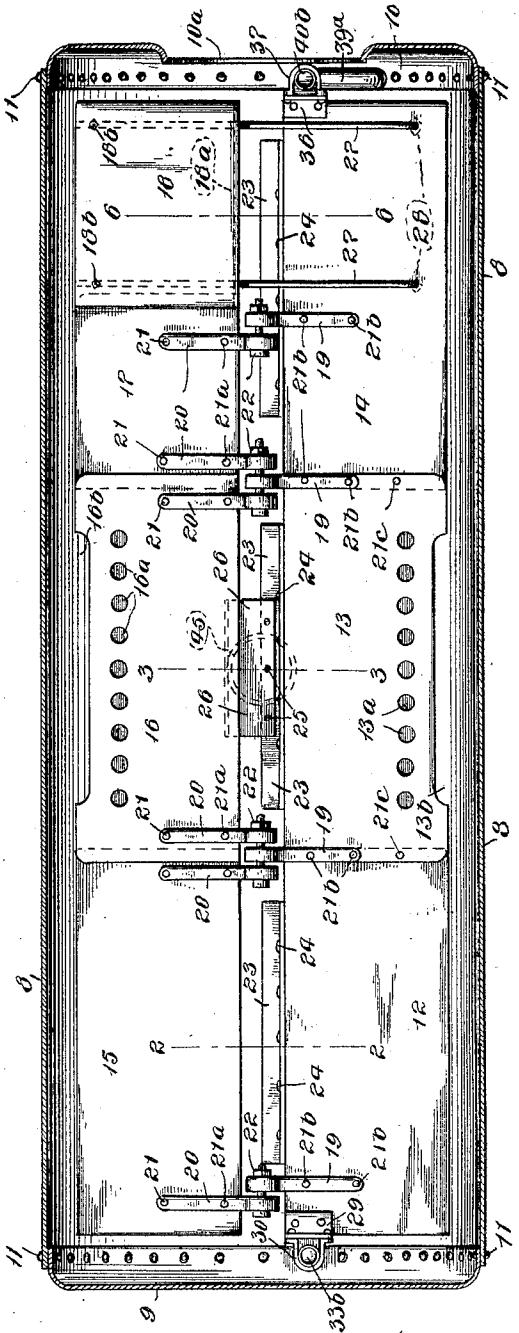


FIG. 1.

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2 SHEETS—SHEET 2.

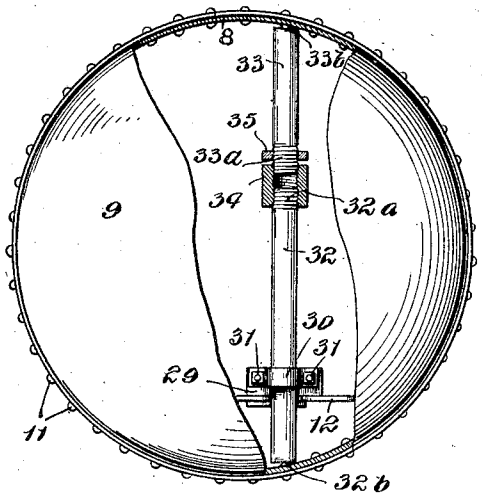


Fig. 4.

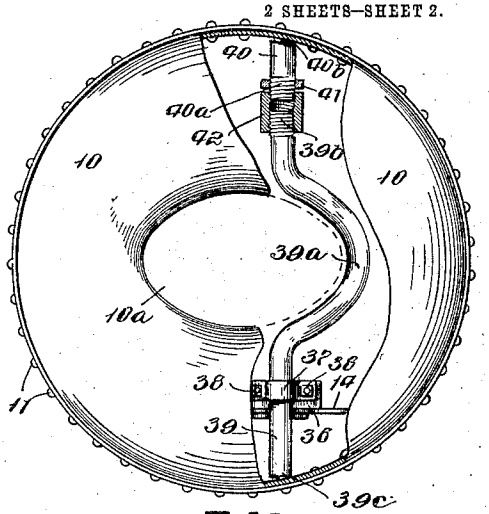


Fig. 5.

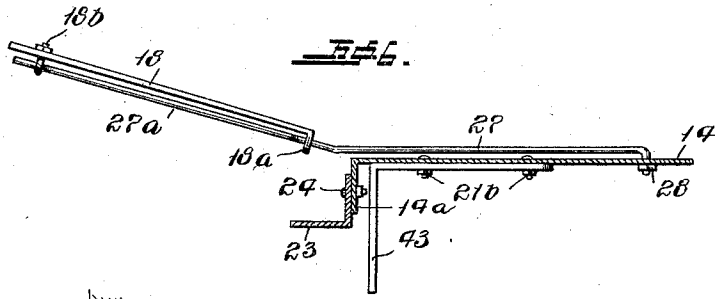


Fig. 6.

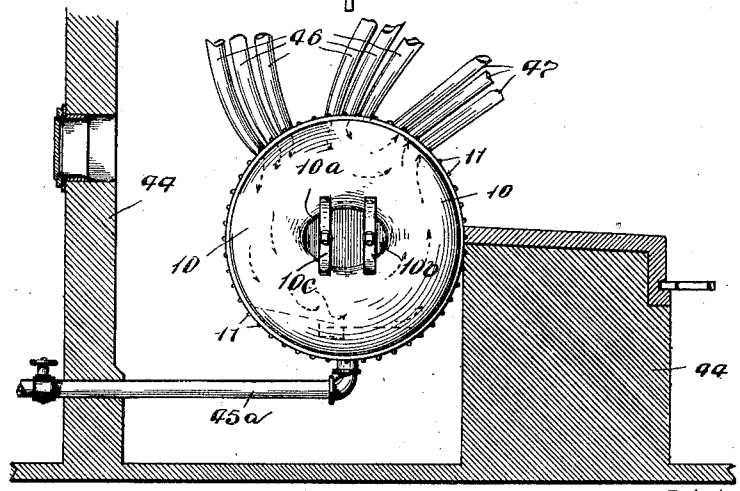


Fig. 7.

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UNITED STATES PATENT OFFICE.

ALFRED A. OLSON, OF RIVERSIDE, ILLINOIS.

BOILER SEDIMENT-SEPARATOR.

1,067,838. Specification of Letters Patent. Patented July 22, 1913.

Application filed March 10, 1913. Serial No. 753,316.

To all whom it may concern:

Be it known that I, ALFRED A. OLSON, citizen of the United States, residing at Riverside, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Boiler Sediment-Separators, of which the following is a specification.

This invention relates to improvements in means for separating scale and other solids from the water in a steam boiler, said means being adapted to facilitate the cleaning out of the separated solids.

The especial object of the improvements embodied herein is to provide baffle plates adapted to be placed in the water drum of an ordinary boiler and so constructed and arranged as to facilitate the removal or blowing out of the sediment collected in the bottom of the drum below said plates.

A further object is to provide means whereby the baffle plates may be held against accidental displacement in the drum of the boiler without requiring any holes to be made in the walls of the drum for bolts or rivets.

A further object of my invention is to provide means for holding the baffle plates in operative position which holding means may be readily detached from both drum and baffle plates to facilitate the removal of the plates for the purpose of repair or substitution.

A further object of my invention is to provide baffle plate holding means adapted to be adjusted to boiler drums of different diameters and which coöperate with the rivets used in securing the ends of the drum to the side walls thereof.

A still further object of my invention is to provide baffle plates for the purpose mentioned which are readily accessible through the manhole of the drum and which can be so manipulated as to permit a stream of water under pressure being thrown upon all parts of the surface of the drum below said plates.

Having the foregoing and other objects of general utility in view, I have designed the appliance shown in a preferred form in the accompanying drawings, in which:

Figure 1 is a longitudinal sectional view in a horizontal plane of a boiler drum of simple form; Fig. 2 is an enlarged cross-sectional view on line 2—2 of Fig. 1; Fig. 3 is an enlarged sectional view on line 3—3 of Fig. 1; Fig. 4 is a view partly in section and partly in end elevation of a boiler equipped with my appliance showing one form of holding device for the baffle plates; Fig. 5 is an end elevation partly in section taken at the manhole end of the boiler drum; Fig. 6 is an enlarged cross sectional view on the line 6—6 of Fig. 1, and Fig. 7 is a view of a boiler of well known type, indicating the general arrangement of my improved sediment collector for boilers.

Referring to the details of the various views above mentioned, the reference numeral 8 represents the side walls, 9 one end wall, and 10 the opposite end wall in which is the manhole 10^a, of a boiler drum of ordinary construction. The ends 9 and 10 are secured in place by the usual rivets 11.

The sediment separator and collector is made up chiefly of a series of plates 12, 13, 14, 15, 16, 17, and 18, respectively, which are connected together in the manner hereinafter described in detail. The plate 12, which is adjacent the inner end 9 of the drum, is bent at right angles along its inner longitudinal margin to form a downwardly extending flange 12^a (see Fig. 2), and the opposite edge of said plate rests against the inner walls of the drum 8.

Secured to the flange 12^a by bolts 24, is an angle-bar 23, the horizontal flange of which extends outwardly from the plate 12 and partially bridges the opening between said plate and the opposite plate 15. The plate 15 is bent upon itself to form a parallel flange 15^a. The plates 12 and 15 are connected near one end by a hinge made up of straps 19 and 20 and a bolt 22 which engages eyes formed on the free ends of said straps. The straps are bolted to the respective members by bolts 21, 21^b, and nuts 21^a, the said nuts being on the under side of the plates. The plate 12 is further supported near the end opposite the hinge connection with the plate 15, by a leg 43 which is connected with the plate 12 by the bolts 21^b.

The plate 13 is of the same general form and size as the plate 12, and is provided with a corresponding flange 13^c, and also with a series of holes 13^a, and has a cutaway portion 13^b, said holes and cutaway portion being located near and along the outer edge of the plate. The plate 16 which is opposite the plate 13, has the apertures 16^a, 16^b, corresponding to 13^a, 13^b, and is connected with the plate 13 by the strap hinges 19, 20, which correspond to those connecting the plates 12, 15, above described. The plate

13 has bolted thereto an angle 23, and extending for a portion of the length of this angle bar, is an angle plate 26 which is bolted to the horizontal portion of the angle 23 by bolts 25 and the other angle of the plate 26 extends upwardly and serves as a rest and support for the plate 16, as clearly shown in Fig. 3. The plate 13 is also equipped with a leg 43, and it will be noted that the ends of the plates 13 and 16 overlie the adjacent ends of the plates 12, 14, 15, and 17, respectively. The plate 14, which is arranged between the plate 13 and the manhole end of the drum, corresponds with the construction of the plate 12 above described, and is hinged to the plate 17 by the hinges 19, 20, and is also equipped with an angle plate 23 and a leg 43. It will be noted, however, that one of the hinges 19, 20, is not at the end of the plate 14, but is nearer the middle thereof, and it will be noted that the plate 17 is approximately one-half the length of the plate 15 with which it otherwise corresponds. The plate 18 which completes the baffle element opposite the plate 14 is formed with a downwardly extending flange 18^a along its inner edge in which holes are provided to receive rods 27, which at one end, are connected with the plate 14 by nuts 28 on the under side of said plate and at their opposite ends are connected with the plate 18 by eye-bolts 18^b. The rods 27 are bent upwardly as at 27^a so as to support the plates 18 at the same angle as the plates 15 and 16.

At the end of the plate 12 adjacent the end wall 9 of the drum 8, is bolted or riveted a bracket composed of a plate 29 and a yoke 30 bolted to said bracket by bolts 31. This yoke, as shown in Fig. 4, receives a pipe 32, the upper end of which is threaded as at 32^a, and the lower end of which is adapted to receive the projecting head 32^b of one of the rivets which secures the end 9 to the sides of the drum 8. Connected with the upper end of the pipe 32 by a coupling 34 is a short pipe section 33 the inner end of which is threaded as at 33^a to engage the threaded coupling 34 and to receive a lock nut 35. The upper end of the pipe section 33 is adapted to engage a projecting rivet 33^b.

As shown in Fig. 5, the end of the plate 14 adjacent the manhole 10^a, is equipped with a bracket 36 and a yoke 37 corresponding to the bracket and yoke above described, and the yoke 37 embraces a pipe section 39 which is bent as at 39^a to conform to the adjacent edge of the manhole opening 10^a, and the upper end of the pipe 39 is threaded as at 39^b and its lower end engages the projecting rivet 39^c in the bottom wall of the drum 8. A short pipe section 40 having threads 40^a on its lower portion, is connected with the pipe section 39, by a coupling 42, the threads of which are right and left hand so as to engage the correspondingly threaded portions of the sections 39, 40, whereby the turning of the coupling 42 will tend to expand or contract the sections relatively to each other, depending upon the direction in which said coupling is turned. The lock nut 41 on the pipe section 40 serves to hold the parts against accidental disengagement.

In the bottom of the boiler midway its length is the usual drainage or blow-off opening 45 from which leads exteriorly of the drum, a discharge pipe 45^a, see Fig. 7. In the type of boiler shown in Fig. 7, and in many forms of boilers having drums similar to those herein described, that is to say, having inlet pipes 46 and outlet pipes 47, the water is introduced into the drum under pressure from the usual pump or as a result of the city pressure, and falls downwardly against the baffle plates 15, 16, 17, 18, from which it is deflected upwardly, and as it is converted into steam is carried off through the pipes 47, the water being given a circulatory motion. The scale or other solids or impurities in the water will pass through the opening 16^a, 16^b, and through the openings between the inner edges of the several baffle plates, which openings extend longitudinally throughout the length of the plates except where the guard plate 26 is arranged, and will be caught or pocketed in the space below said plates and will be prevented from passing upwardly by the angle plates 23, the flanges 12^a, 13^c, and will therefore accumulate on the bottom of the drum below said plates until flushed or blown out in any of the well known ways and carried out through the opening 45 and the pipe 45^a.

When it is desired to remove the sediment and impurities from the boiler, the manhole plate 10^b will be removed by disconnecting the stirrups 10^c in the usual manner and the operator will reach in through the manhole and slide the plate 18 upon the guide rods 27 so that said plate will pass above the adjacent portion of the plate 14. The operator will then enter the drum and turn the plate 16 on its hinges over the plate 13. He will then turn the plate 17 over the plate 14 and the plate 15 over the plate 12. When in this position, a stream of water from the flushing nozzle can be directed against all portions of the bottom of the boiler drum and thus force the solids downwardly through the opening 45 and out through the pipe 45^a.

By making the baffle plates in the sectional form indicated, and coupling them together with bolts and hinges in the manner described, it will be obvious that they may be readily introduced and removed through the manhole opening 10^a. It will also be obvious that the pipes 32, 39, render

unnecessary the cutting or tapping of the walls of the drum at any point for the purpose of holding the plates in their operative position. It is also obvious that instead of having the plates 15, 16, 17, hinged as shown, they may all be of the sliding character indicated by the plate 18, and accomplish the same results that the hinged connections accomplish. By using the form of strap hinges described and bending the edges of the plates as indicated in Figs. 2 and 3, I am enabled to use lighter weight material for said plates than would otherwise be practicable. By guarding the opening 45 with the plate 26 I prevent the blow out water from discharging directly into said opening, and thereby cause it to be distributed over the entire surface of the bottom of the boiler through the end and center openings, thus effectively carrying off the sediment and scale from the boiler surface below the plates.

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

1. In combination with a water drum, sediment separating means, comprising a plurality of plates adapted to be supported above the bottom of the drum and to form a chamber therewith, said plates being adjustable relative to each other whereby they may be readily shifted to provide access to the bottom of the drum.

2. In combination with a water drum, sediment separating means comprising a plurality of plates adapted to be supported above the bottom of the drum and to form a chamber therewith, some of said plates being fixed in their position in the drum and others being adjustable relatively to the fixed plates.

3. In combination with a water drum, sediment separating means comprising a plurality of plates adapted to be supported above the bottom of the drum, and to form a chamber therewith, and means for holding said plates in operative position against accidental displacement, said means arranged entirely within the drum and readily removable therefrom.

4. In combination with a water-drum, sediment separating means comprising a plurality of plates adapted to pass through the manhole of the drum, and means detachably connecting said plates, so that when assembled the latter will form a partition extending across and throughout the length of the drum and having openings therein for the passage of sediment.

5. In combination with a water-drum, sediment separating means comprising a sectional partition extending across and throughout the length of the drum, and having openings to permit the passage of sediment below said partition, and means for preventing the return of the sediment to the upper side of the partition.

6. In combination with a water-drum, sediment separating means comprising a partition made up of fixed plates, and plates adjustable relative to the fixed plates and spaced therefrom, means for supporting said plates above the bottom of the drum, and means on said plates for deflecting the sediment toward the bottom of the drum.

7. In combination with a water-drum, sediment separating means comprising a partition made up of fixed plates and plates hinged to the fixed plates, said plates adapted to have sediment carried below same to the bottom of the drum, and having means to prevent the sediment returning above them, and adjustable means for holding the fixed plates in position.

8. In combination with a water-drum, sediment separating means comprising a plurality of plates, means detachably and adjustably connecting said plates, means supporting said plates in spaced relation with the bottom of the drum, means for holding said plates against displacement, said holding means detachably connected with the interior of the drum.

9. In combination with a water drum, sediment separating means, comprising a plurality of plates, some of said plates being detachably connected with the drum in fixed position, and the other plates being movably connected with the fixed plates and spaced therefrom, and means secured to the fixed plates projecting across the space between said movable and fixed plates and below said plates.

10. In combination with a water-drum, sediment separating means, comprising plates arranged in the lower portion of the drum and forming an open partition, and means holding said plates against displacement, said means consisting of adjustable members detachably connected with the interior of the drum.

11. In combination with a water-drum, sediment separating means, comprising plates detachably connected in spaced relation and arranged in the lower portion of the drum, and means holding said plates against displacement, said means consisting of tubular members adjustably connected with each other and detachably connected with the interior of the drum.

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

ALFRED A. OLSON.

Witnesses:
M. A. MILORD,
G. W. HILTABRAND.

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