J. C. ECKLIFF.

BLOW-OFF.

APPLICATION FILED AUG. 23, 1913.

1,127,354.

Patented Feb. 2, 1915.

3 SHEETS—SHEET 1.

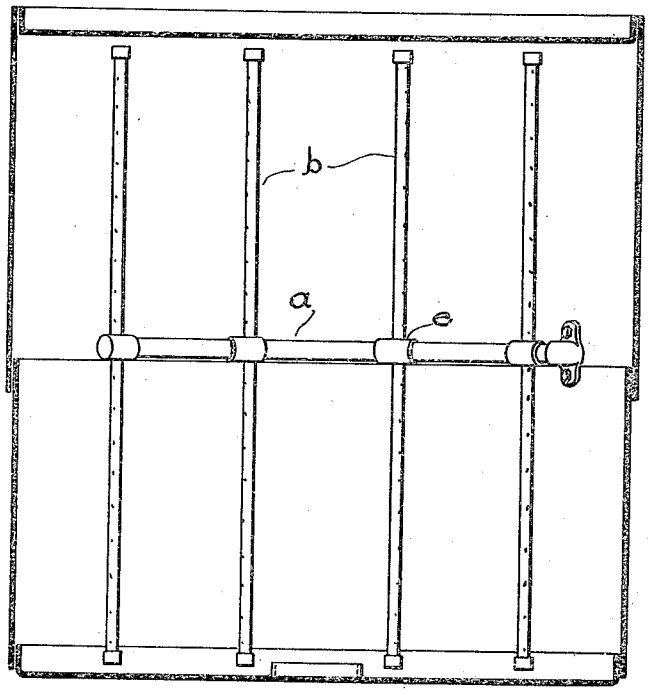


Fig. 1

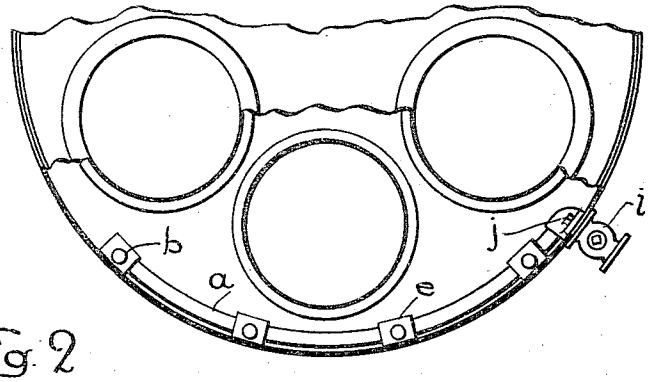


Fig. 2

WITNESSES

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3 SHEETS—SHEET 2.

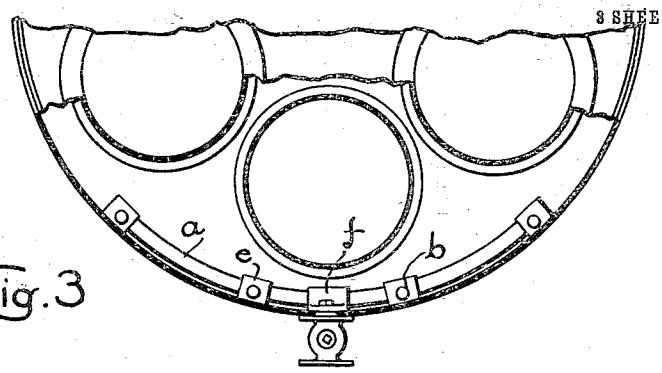


Fig. 3

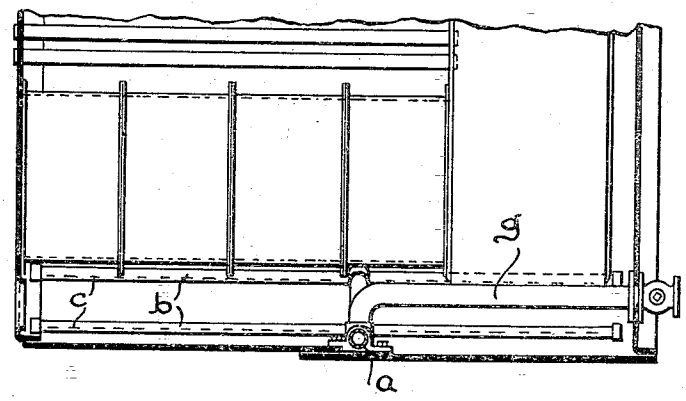


Fig. 5

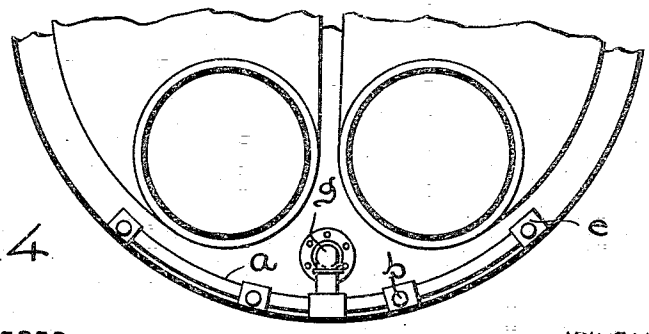


Fig. 4

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3 SHEETS—SHEET 3.

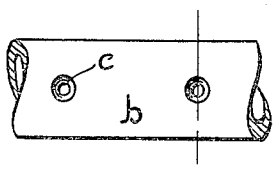


Fig. 10

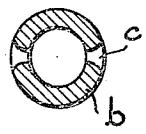


Fig. 11

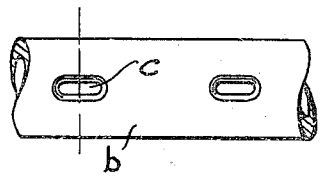


Fig. 12

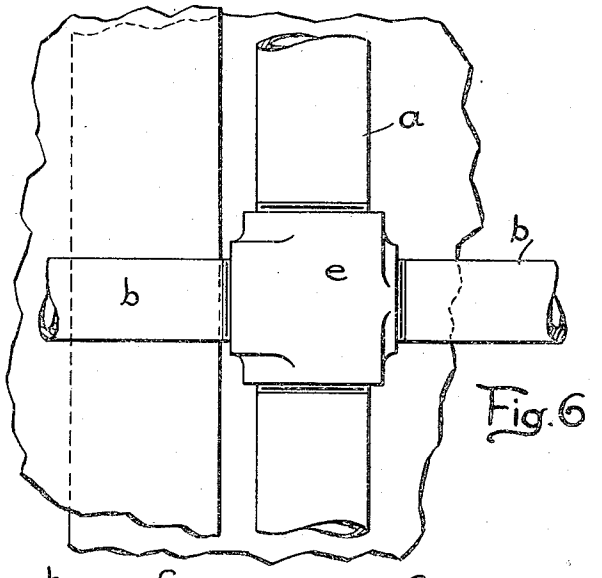


Fig. 6

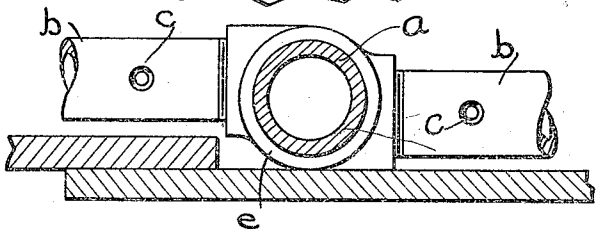


Fig. 7

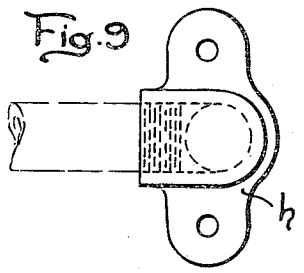


Fig. 9

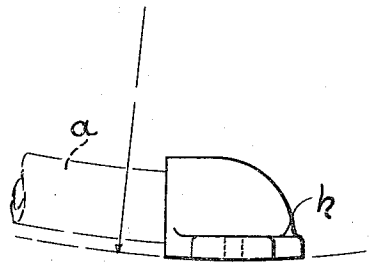


Fig. 8

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UNITED STATES PATENT OFFICE.

JAMES C. ECKLIFF, OF DETROIT, MICHIGAN, ASSIGNOR TO ECKLIFF AUTOMATIC BOILER CIRCULATOR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

BLOW-OFF.

1,127,354. Specification of Letters Patent. Patented Feb. 2, 1915.

Application filed August 23, 1913. Serial No. 786,243.

To all whom it may concern:

Be it known that I, JAMES C. ECKLIFF, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Blow-Offs, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to blow-offs for steam boilers and has for its object a blow-off that is so arranged that its arms reach to all the boiler surface upon which deposits of mud, sand and other foreign material are made. The arrangement of the main blow-off pipe and its arms are such that all points on the surface of the boiler subject to deposits have practically equal facilities for the conveyance away of the deposits when the blow-off valve is opened.

Another feature is the use of a main pipe which extends along the inside periphery of the boiler and is provided with arms extending lengthwise the boiler. These arms are connected with the main pipe by offset pipe couplings, to make the arms of the blow-off lie contiguous to the bottom of the boiler notwithstanding the shoulder formed by the partial telescoping of the two boiler sections. This will more fully appear in the specification herein following.

In the drawing Figure 1 is a horizontal section of the boiler and a plan view of the blow-off. Fig. 2 is a fragmentary end view of the boiler, partly broken away to show a side elevation of the blow-off. The blow-off valve is at the side in this view. Fig. 3 is a similar view showing the blow-off valve at the bottom of the boiler. Fig. 4 is a fragmentary cross section of the boiler showing a side elevation of the blow-off that has the blow-off valve in the end of the boiler. Fig. 5 is a fragmentary vertical longitudinal section of the boiler, showing an end elevation of the blow-off that has the blow-off valve at the end of the boiler. Fig. 6 is a plan view of a part of the main pipe, two of the arms and of the offset coupling. Fig. 7 is a sectional side view of substantially what is shown in Fig. 6. Fig. 8 is a detail in side elevation of the casting or coupling used where the main pipe issues out of the boiler at the side. Fig. 9 is a detail in top elevation of the same coupling. Fig. 10 is a detail of one of the blow-off arms. Fig. 11 is a sectional detail of the same. Fig. 12 is a detail of one of the arms taken at a part of the arm different from that at which Fig. 10 was taken.

Blow-offs have been used heretofore but they have been placed at the center of the bottom of the boiler and what ramifications from the main blow-off pipe have been used are but short ones that have made no pretense to cover the entire territory of deposits.

It is the purpose of this invention not only to secure to each part of the territory of deposit substantially equal facility of exit when the valve is opened, but also to have the exits as near as possible to the bottom of the boiler so as not to leave any residuum in the boiler after the blow-off operation has finished. To this end a main pipe *a* is provided and at equally spaced points along the pipe *a*, arms *b* are coupled to the main pipe. These arms *b* are located sufficiently high on the inner periphery of the boiler so as to afford to all territory of deposit a substantially equally short distance to a vent hole. The vent holes *c* are shown in Figs. 10, 11, and 12. In parts of the pipe the cross section of a hole is circular (Fig. 10). In other parts, as near the ends of the arms, the cross section of the hole is in the form of a slot (Fig. 12). This affords more freedom for entry at the ends to compensate for the location farther away from the final discharge opening into the atmosphere. These larger openings therefore tend to equalize the outflowing streams at all points, regardless of the tendency of the out-flowing streams nearer the blow-off valve to choke the path of the out-flowing streams farther away from the blow-off valve. It will also be noticed that the vent-holes *c* narrow toward the inside of the pipe so as to provide a funnel-like opening to accelerate the water and other matter passing into the pipe.

The boiler that I have shown in the drawings is composed of two sections that partially telescope at their meeting ends and that are fastened together by riveting the lapping portions. The blow-off illustrated in the drawings is peculiarly adapted for this form of boiler. The main pipe *a* fol-

lows the curvature of the boiler and runs directly along the seam within the limits of the territory of deposits. The arms *b* are arranged in pairs, the members of which are directly opposite from each other but offset from each other at the entrance into the main pipe *a*. This offset is effected by the offset couplings *e*. The main pipe *a* is made up of sections that screw into two of the openings of the offset coupling which are in axial alinement. The arms *b* screw into openings of the coupling that are offset with respect to each other and with respect to the main pipe *a*. This offsetting throws each arm as near in contact with its boiler section as can be and hence avoids a residuum in the bottom of the boiler after the blow-off operation.

The discharge valve can be located in various positions on this blow-off to accommodate the environment of the boiler. In Fig. 3, it is shown at the bottom of the boiler and leading directly from the main pipe *a* by a special casting *f*. In Figs. 4 and 5 it is shown at one end of the boiler and this requires an additional pipe *g* leading from the middle of the main pipe to the end of the boiler. In Figs. 1 and 2 the blow-off valve is located at one side of the boiler and at one end of the main pipe. A special casting is used at each place where the blow-out line issues from the boiler, whether it be at the center, or at the side.

The casting used for the side is shown in Figs. 8 and 9. A description of the side casting will suffice for an understanding of the others. It comprises an elbow threaded at one end and flanged at *h*. The flange is curved to coincide with the curvature of the inside of the boiler. Hence the flange may lie tightly against the boiler. The valve casing *i* (Fig. 2) is also flanged so that bolts may be passed through appropriate holes in the boiler shell, and the two flanges, and by tightening the nuts *j* the valve and the casting may be coupled together and to the boiler. The couplings, where the discharge is located elsewhere, are substantially the same.

What I claim is:

1. The combination with a cylindrical boiler, of a blow-off having in combination a main pipe located near the middle of the boiler and following the curvature of the boiler, a plurality of substantially equally spaced arms set at approximately the perpendicular with respect to the main pipe and running approximately longitudinally of the boiler, the said arms running substantially an equal distance and practically to each end of the boiler, said arms being provided with intake openings and means connecting with the main pipe for leading to the outside of the boiler.

2. The combination with a boiler formed of two or more telescoping sections, of a blow-off comprising a main pipe following the curvature of the inside of the boiler and at the juncture of two telescoping sections lying against the section of larger diameter and at the end of the section of smaller diameter, a plurality of off-set couplings on said main pipe and a plurality of arms attached to the main pipe by said off-set couplings and caused to lie closely adjacent to the shell of the boiler by reason of the off-set of the coupling openings, said arms extending longitudinally of the boilers toward the ends thereof, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses.

JAMES C. ECKLIFF.

Witnesses:
DAISY C. FITZ GERALD,
AGNES L. FRENCH.

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