Jan. 21, 1936. A. RÖSSNER 2,028,250

SOOT BLOWER

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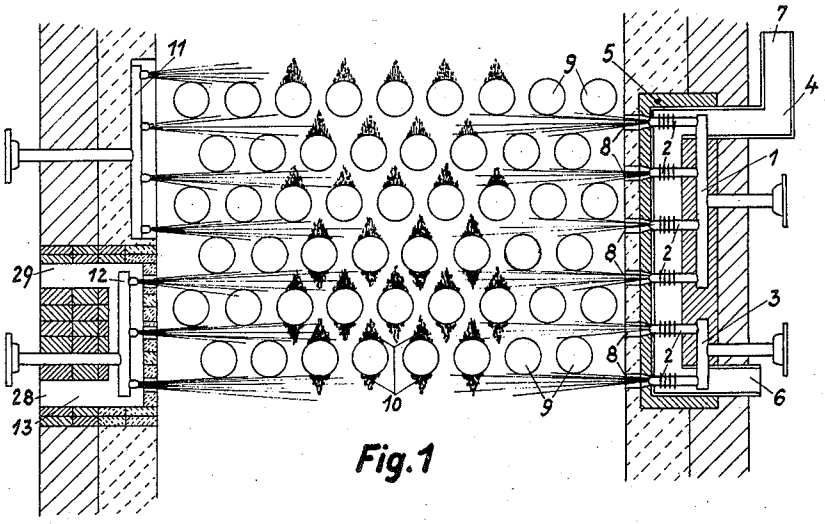


Fig.1

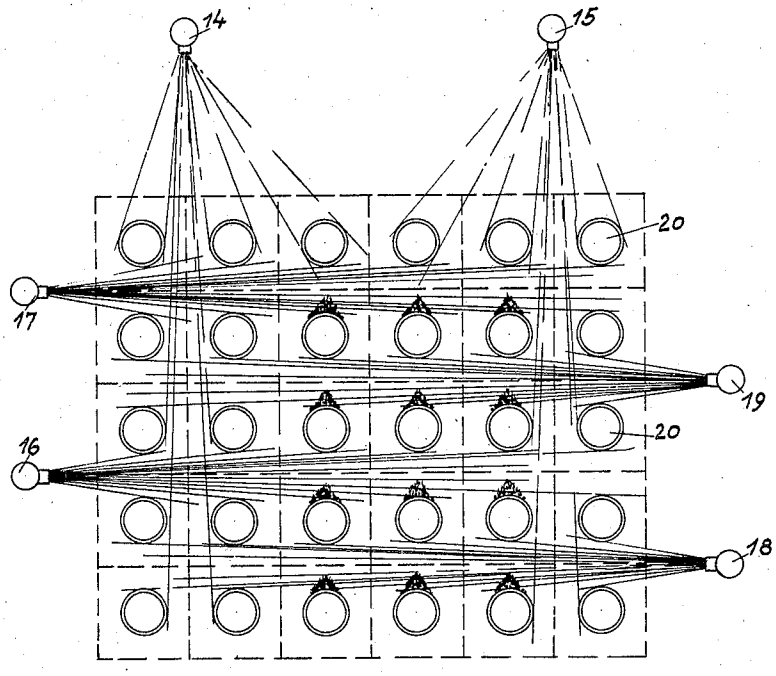


Fig.2

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SOOT BLOWER

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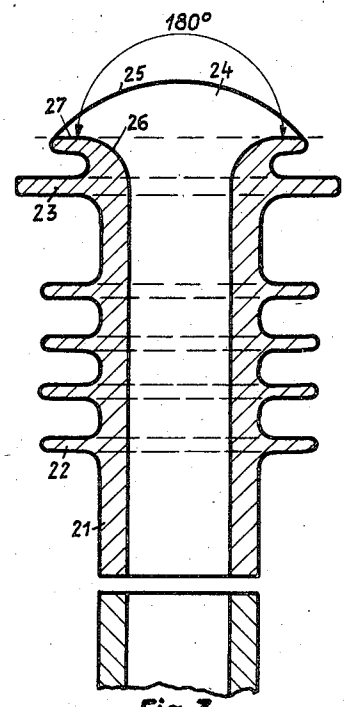


Fig. 3

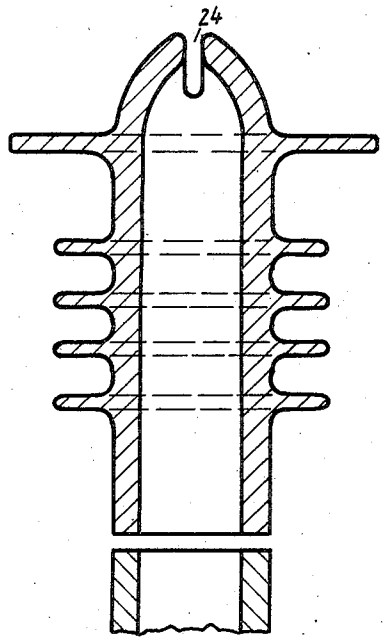


Fig. 4

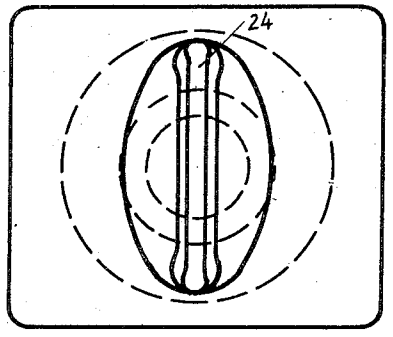


Fig. 5

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Fig. 9.

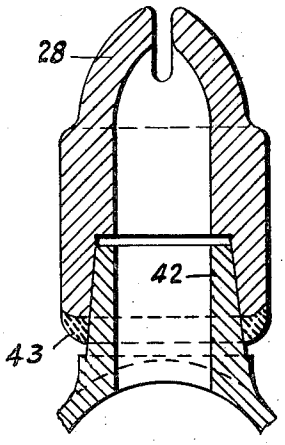


Fig. 6

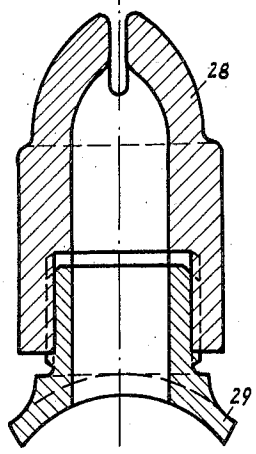


Fig. 10.

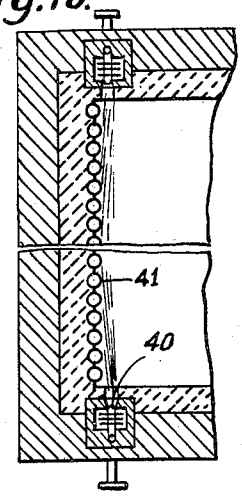


Fig. 7

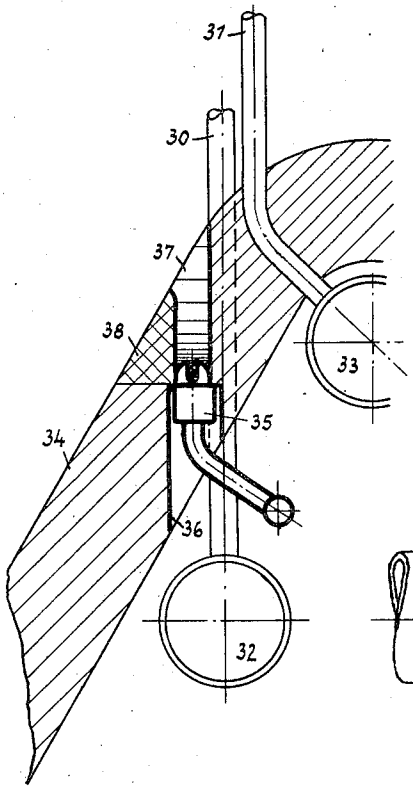
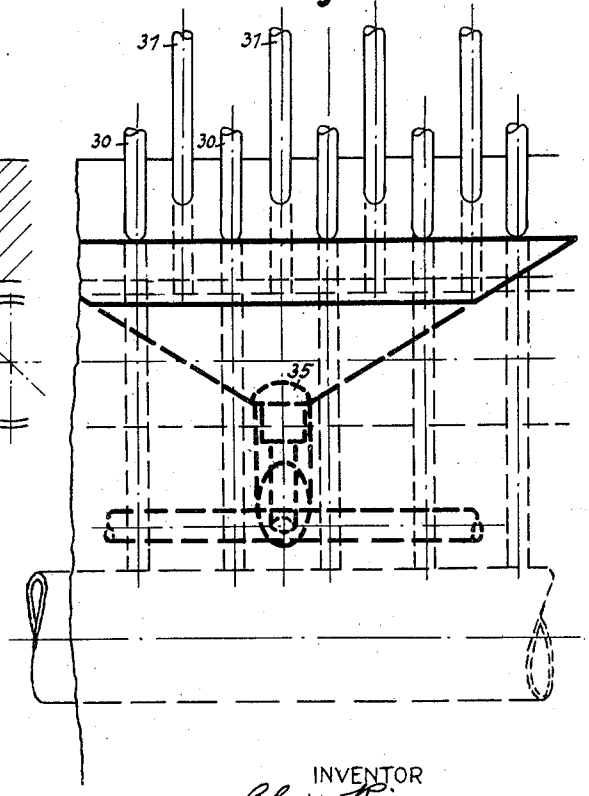


Fig. 8



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UNITED STATES PATENT OFFICE

2,028,250

SOOT BLOWER

Alois Rössner, Brunn, Czechoslovakia, assignor to Ruths International Accumulators Limited, London, England, a corporation of Great Britain

Application May 1, 1933, Serial No. 668,679½
In Germany December 1, 1932

4 Claims. (Cl. 122—392)

My invention relates to a sootblower-apparatus for the cleaning of the heating surfaces of boilers, superheaters, economizers and the like. Its efficiency is superior to that of the well-known systems of this kind, because the nozzles are arranged in a fixed position and create a plane-shaped jet which blows parallel to the surface which is cleaned.

With the known sootblower-systems the jet of steam, air or the like is blown towards the heating surface in such a way that the soot which has been deposited on the foremost row of tubes is whirled off, whereas the jet, broken and reflected by the first tubes, does not reach the soot on the tubes situated behind the first row. Furthermore, the known sootblower-systems are equipped with movable or turnable parts, which are complicated, expensive and exposed to destruction by the high temperature of the flue gases.

According to the invention the nozzles may be installed entirely inside the brickwork of the boilers and slits may be arranged in the brickwork, through which the jet is blown into the furnace.

With boilers, economizers and the like it is advisable to install the nozzles in the vertical brickwork of the side walls so that they blow at right angles to the direction of the flue gases.

A remarkably simple means to cool the nozzles can be obtained by natural draught if the nozzles are arranged inside a channel or tube, the open ends of which lie at different heights, so that the cooling air can enter at the lower end and leave the channel or tube at the upper end.

It is advisable to divide the nozzles into groups, each of which is connected to a separate distribution pipe, to which the steam or the air is supplied by a pipe-line with a separate stop-valve. In this way the pressure in the supply pipe is better utilized and the jets better reach the different parts of the surfaces. The distribution pipes may be arranged inside the air-cooling tubes, so that they will be cooled also.

Fig. 1 is a vertical sectional view of a portion of a boiler embodying my invention;

Fig. 2 is a more or less diagrammatic illustration of my invention embodied in an economizer;

Fig. 3 is a cross-sectional view of a preferred form of nozzle;

Fig. 4 is a cross-sectional view of the nozzle shown in Fig. 3 and taken at right angles thereto;

Fig. 5 is a top view of the nozzle shown in Figs. 3 and 4;

Fig. 6 is a cross-sectional view of a modified form of nozzle;

Fig. 7 is a sectional view of a portion of a boiler having water cooled walls and embodying my invention;

Fig. 8 is a view of the boiler shown in Fig. 7 looking from the left;

Fig. 9 is a cross-sectional view of a further modified form of nozzle; and

Fig. 10 is a sectional view of my invention embodied in a furnace having water cooled walls.

Referring to the drawings, Fig. 1 represents a vertical section through a part of a boiler in which different forms of nozzles are shown. It is to be assumed that the direction of flow of the flue-gases in the drawings is from the top to the bottom. In the vertical side wall at the right is installed the blower element 1 with four nozzles 2 and another blower element 3 with two nozzles 2. The nozzles are arranged inside a cooling tube or conduit 4, which is surrounded by heat insulating material 5, which protects as well the distribution pipes 1 and 3. The conduit 4 and the pipes 1 and 3 are embedded in the insulating material. The cooling air enters the tube at the lower opening 6 and leaves it at its upper end 7. At the outlets of the nozzles 2 slits are arranged in the brickwork through which the jets are directed along the boiler tubes 9 to clean these from the soot deposits 10. Due to the fact that the nozzles are set back in the furnace walls, they are removed a certain distance from even the closest tubes. Consequently the jets have an opportunity to spread out before reaching the closest tubes and hence the nozzles may be spread further apart.

In the vertical side wall on the left an uncooled blower element 11 with 4 nozzles is installed in the upper part. In the lower part a blower element 12 with three nozzles is arranged inside a channel of the brickwork. This channel is arranged so that the air enters at 28 and leaves the channel at 29. With this arrangement the distribution pipe 12 is cooled also.

Fig. 1 shows especially the effectiveness of the soot-blower-system. The soot is deposited chiefly on those parts of the tubes 10 which are not tangent to the flue gas stream, that is, as seen in the direction of the flue gas stream, the front and the back sides of the boiler tubes. As the blowers project the jets from the side walls at right angles to the flue gas stream into the space between the different rows of tubes, the

jets chiefly touch those parts of the tubes on which the soot is most likely to be deposited.

Fig. 2 represents the arrangement of the nozzles for an economizer. In these drawings the flue gas stream is again assumed to flow downwards. Nozzles 16 and 17 are staggered with respect to nozzles 18 and 19. The soot deposited on the tubes 20 is blown off by the nozzles 16 and 17 on the one side and nozzles 18 and 19 on the other side, which are arranged in alignment with the spaces between the tubes. These nozzles thus blow at right angles to the flue gas stream. The soot which is thus removed from the tubes is then carried downwardly through the vertical spaces of the economizer into the ash pit. This is done by the jets from nozzles 14 and 15 which are so arranged that they blow in the direction of the flue gas stream.

Figures 3 to 5 show an example of the design of a nozzle. Figures 3 and 4 are vertical sections, Fig. 5 shows the nozzle seen from above. The nozzle body 21 is equipped with cooling ribs 22 and near the outlet with a flange 23 having a larger diameter than that of the cooling ribs. This flange rests on the brickwork and thus prevents air leakage. The nozzle ends in a curved slit 24. The walls of the nozzle adjacent to slit 24 on both sides are flared outwardly as is shown at 26. In this way contraction of the jet is prevented and a flat fanlike jet is produced.

Fig. 6 shows another example of the design in which nozzle 28 is screwed on to a socket 29 fitted with a thread in order that the nozzle can be adjusted. Socket 29 is welded to the distribution pipe which is not shown on the drawings. During the erection the nozzle can thus be so adjusted that the jet assumes the desired position relatively to the heating surface to be cleaned. As is shown in Figure 9, instead of connection by a thread the nozzle 28 can be slipped on to the socket, for instance on a cone-shaped nipple 42, and then welded to the socket, as at 43, after being adjusted to the right position.

Figs. 7 and 8 show the arrangement of a soot-blower for the water tubes of a boiler having water cooled walls. The water tubes 30 and 31 are connected to the lower headers 32 and 33.

In the lower brickwork 34 the nozzle 35 is so installed in a tube 36 that it blows through the slit 37 along the rows of tubes 30 and 31. That wall of the slit 37 which is situated toward the furnace is formed by a specially shaped fire brick 38.

As is shown in Fig. 10, the nozzles 40 may be installed in the corners of a side wall of the boiler so that they project jets along the tubes 41 of an adjacent water cooled side wall in the diagonal direction of the side wall.

I wish it to be understood that I do not wish to be limited to the exact details of my invention as shown and described for obvious modifications will occur to a person skilled in the art.

What I claim is:—

1. In a device of the class described, means comprising a wall of heat-resisting material forming a heating chamber, tubes within said chamber, a conduit extending within said wall and having its open ends in communication with the atmosphere outside said chamber at different elevations, said wall and said conduit being formed with narrow aligned slits extending from said conduit to said chamber and directed toward said tubes, nozzles located within said conduit in alignment with said slits so as to project jets of fluid therethrough and against said tubes, a distributing pipe for supplying fluid under pressure to said nozzles, and heat insulating material surrounding and embedding said conduit and said distributing pipe, said insulating material being formed with narrow slits in alignment with the slits in said wall and said conduit.

2. In a device of the class described, means comprising a wall of heat-resisting material forming a heating chamber, tubes within said chamber, said wall being formed with a substantially closed hollow portion and with narrow slits communicating with said hollow portion and with said chamber and directed toward said tubes, nozzles located within said hollow portion so as to be protected from heat within said chamber, said wall being formed with passageways extending from said hollow portion to the outside of the wall whereby atmospheric air circulates through said hollow portion to cool said nozzles, and means for supplying fluid under pressure to said nozzles, said nozzles being in alignment with said slits so as to project a jet of fluid therethrough and against said tubes and the ends of said nozzles being in contact with the wall adjacent to the ends of said slits to prevent the flow of air into said heating chamber.

3. In a device of the class described, means comprising a wall of heat-resisting material forming a heating chamber, tubes within said chamber, a conduit extending within said wall and having its open ends in communication with the atmosphere outside said chamber, said wall and said conduit being formed with narrow aligned slits extending from said conduit to said chamber and directed toward said tubes, nozzles located within said conduit in alignment with said slits so as to project jets of fluid therethrough and against said tubes, a distributing pipe for supplying fluid under pressure to said nozzles, and heat insulating material surrounding and embedding said conduit and said distributing pipe, said insulating material being formed with narrow slits in alignment with the slits in said wall and said conduit, and the ends of said nozzles being in contact with said conduit adjacent to the inner ends of the slits therethrough to prevent the flow of air into said heating chamber.

4. In a device of the class described, means comprising a wall of heat-resisting material forming a heating chamber, tubes within said chamber, a conduit extending within said wall and having its open ends in communication with the atmosphere outside said chamber, said wall and said conduit being formed with narrow aligned slits extending from said conduit to said chamber and directed toward said tubes, nozzles located within said conduit in alignment with said slits so as to project jets of fluid therethrough and against said tubes, a distributing pipe for supplying fluid under pressure to said nozzles, and heat insulating material surrounding and embedding said conduit and said distributing pipe, said insulating material being formed with narrow slits in alignment with the slits in said wall and said conduit.

ALOIS RÖSSNER.