March 15, 1927. 1,620,952

F. A. DAVIES

BITUMEN BOILER

Filed Nov. 19, 1925

Fig. 1

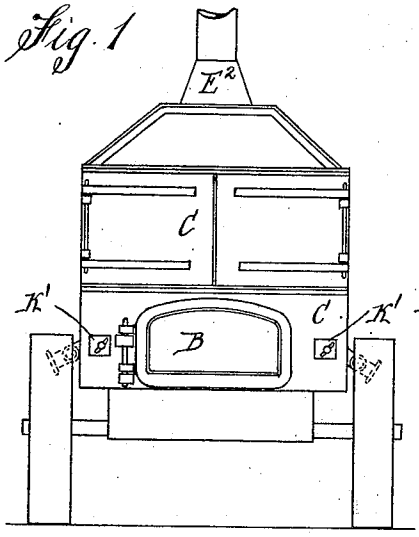


Fig. 2

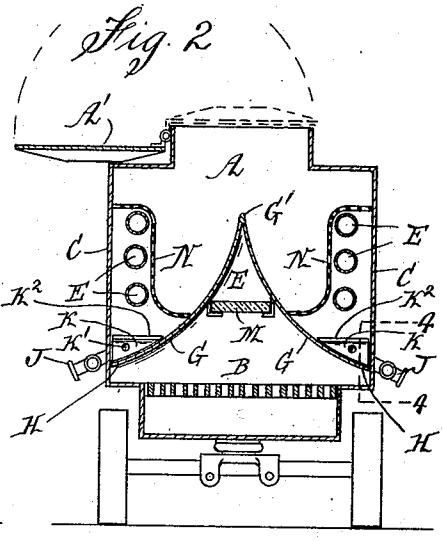


Fig. 3

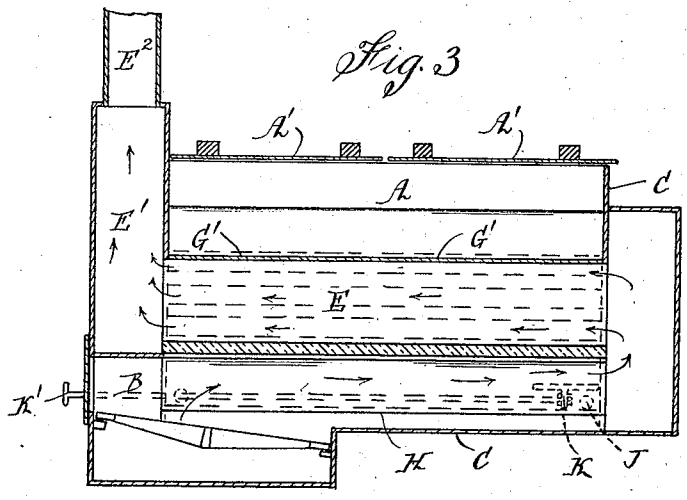
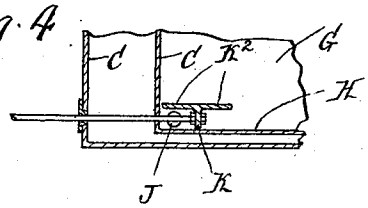


Fig. 4



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UNITED STATES PATENT OFFICE.

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BITUMEN BOILER.

Application filed November 19, 1925. Serial No. 70,106.

This invention relates to the boilers used in the heating and melting of bitumen for use in road or other structural work or maintenance. The invention is concerned with the common and well known types of boilers in which a bitumen containing chamber is provided within a furnace casing and is heated by heat from the furnace applied directly to the bottom of the chamber and also caused to pass through return flues extending through such chamber. The said chamber is charged through door covered openings contained in the top thereof and discharged by draw off pipes leading from its bottom.

The invention has been devised with the object of providing improvements in the structural details of such a boiler, by the use of which the general operations of the boiler are carried out more effectively and at a quicker rate and also with less liability of damage to the boiler through the accumulation of dross or solid matters upon the heating surfaces.

The improvements also provide for the collection of sediment within the boiler bottom and for the removal of such sediment from time to time without having to stop the general operations of the boiler.

These several improvements are illustrated in the accompanying drawings and will be hereinafter fully described in relation thereto.

In such drawings:—

Figure 1 is an end elevation of the boiler.

Figure 2 is a cross section thereof.

Figure 3 is a longitudinal section thereof, the undercarriage being removed.

Figure 4 is a longitudinal section, on the line 4—4 of Figure 2, of a small detail portion of the boiler.

In carrying out the invention the boiler in its general features of construction, follows known lines in that it comprises a bitumen holder or chamber A disposed over a furnace B within a main casing C that is mounted on transporting wheels. The furnace space B extends to the rear end of the casing and return flue tubes E pass through the bitumen chamber A to a smoke box E′ at the front end from which an escape flue E^2 leads away, in a manner well known in boiler construction.

The upper end of the bitumen chamber A opens through the top of the casing C and is covered by a door covering A′, hinged along one side edge of the opening, and if desired, made up of a number of sections extending end to end. This door is of flat form and it is so hinged that it may be turned out to uncover the top of the chamber and to be supported horizontally as shown in Figure 2, or may be turned in to extend across the opening, as shown by the dotted lines in Figure 2 and the full lines in Figure 3. When turned out, it forms a platform upon which the bitumen to be fed to the boiler may be stacked, and then such bitumen may be transferred to the boiler by turning the door over into its closing position.

In this invention the bottom G of the chamber A forms the crown of the furnace B and is shaped, as shown in Figure 2, in cross-section so that it extends from each side of the casing upward in a curve to the centre line and thereby forms a peak G′ of narrow or acute angular section extending right along the middle of the chamber at a short distance below the top opening thereof. This shape is designed with the object of effecting two purposes, the first being to form a hot peak on the sharp edge of which lumps of bitumen fed into the boiler may rest and be supported until they are melted and pass down into the lower halves of the chamber. This will allow of large lumps being placed in the boiler and being cut by the said hot, sharp edge of the peak. The second purpose is to form a sump or gutter H along within each side of the boiler and at the bottom thereof, into which sumps the sediment or foreign matters contained in the bitumen will gravitate or be precipitated.

The invention embodies means whereby this sediment may be drained off from time to time, whenever required, and without stopping the boiler's operations. These means consist of drain cocks J arranged at each end of each sump and a specially constructed scraper K that is fitted into each sump and is fastened to a push bar K′ extending out through the front of the boiler casing so that by pushing on the bar, or drawing it, the scraper may be moved along within the sump to gather the sediment from the sump bottom and collect it at either end for draining out through the cock. The scraper is also formed so that it shuts off

the space at the end of the sump from the main part of the boiler so that the collected sediment may be drained away without any bitumen escaping at the same time. It is therefore constructed as shown in Figures 2 and 4 with flanges K^2 extending horizontally for a distance upon both sides of its top and across its full length. These flanges therefore extend between the bottom G and the boiler side at a distance above the bottom; and when the scraper is moved to one end, the flange on that side will engage the boiler end and thereby close in the space surrounding the outlet to the cock J at that end.

This provision for the periodical withdrawal of the sediment will serve to prevent the liability of the boiler bottom being burnt through the collection of sediment thereon.

The construction shown also provides for the protection of the apex G′ of the furnace crown G from the direct action of the furnace heat in order to lessen the liability of burning, and for this purpose a line of fire tiles M is disposed horizontally across between the sides of the crown at a suitable distance down and these are supported by any approved means. This arrangement in effect forms an extra return flue E^2 for the passage of heat from the furnace rear along to the smoke box E′, the heat acting on the crown to heat the bitumen above it.

The return tubes E are disposed in the holder A in any approved positions but preferably are arranged along each side thereof in lines one above the other, as shown in Figure 2. A grid covering or basket N is provided to extend from the crown G on each side and then upwards and outwards over the tubes E on that side. This grid or basket will serve to retain any lumps of bitumen within the liquid contents of the holder so that in its circulation the heat will flow freely around such lumps and melt them, thus obtaining a better effect in the melting of the bitumen than if the lumps were allowed to settle on the boiler bottom. This prevention of the lumps from settling will also obviate the possibility of the furnace crown being burnt.

I claim:—

1. In a bitumen boiler, a casing providing a bitumen holder and a furnace having a common wall which constitutes the bottom of the holder and the crown of the furnace; said wall being shaped to form a single central peak of narrow or acute angular section extending longitudinally thereof from end to end and a sediment-collecting sump or gutter at each side of such peak, said peak projecting upward into the central portion of the holder for a considerable distance and terminating in a sharp upper edge which is disposed a slight distance below the top of the holder so as to support temporarily on its said sharp edge large lumps of bitumen introduced into the holder and to cut said lumps while so supported.

2. In a bitumen boiler, a casing providing a bitumen holder and a furnace having a common wall which constitutes the bottom of the holder and the crown of the furnace, sets of superposed heating flues disposed horizontally within the holder at opposite sides thereof and communicating at one end with the furnace, a smoke-box with which the flues communicate at the other end, and a grid in said holder directly adjacent to and parallel with each set of flues to retain lumps of bitumen within the liquid contents of the holder.

3. In a bitumen boiler, a casing providing a bitumen holder and a furnace having a common wall which constitutes the bottom of the holder and the crown of the furnace; said wall being shaped to form a sharp peak extending longitudinally thereof from end to end and a sediment-collecting sump or gutter at each side of such peak, said peak adapted to support temporarily and to cut lumps of bitumen introduced into the holder; a set of superposed flues disposed horizontally within the holder directly above each sump and communicating at one end with the furnace, a smoke-box with which the flues communicate at the other end, and a grid in said holder directly adjacent to and parallel with each set of flues and having a bottom portion which extends laterally to the adjacent side wall of said peak to retain lumps of bitumen within the liquid contents of the holder.

4. A bitumen boiler, according to claim 3, in which a horizontal partition is disposed between the side walls of the peak for its entire length to provide an additional heating flue which communicates at opposite ends with the smoke-box and the furnace.

5. In a bitumen boiler, a casing providing a bitumen holder and a furnace, the bottom of the bitumen holder being made to form a sump or gutter along each side edge thereof, drain cocks opening from each of such sumps or gutters, at each end thereof, and a scraper fitting transversely across each sump or gutter and secured to a rod passing out through one end of the said casing, each scraper being formed with a horizontally extending flange projecting from each side of its upper edge.

In testimony whereof, I affix my signature.

FREDERICK ALBERT DAVIES.