

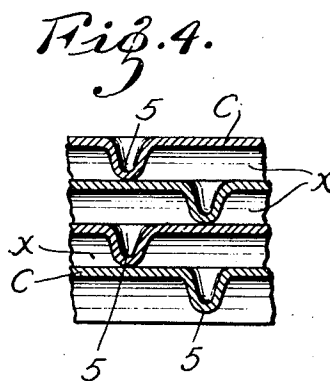
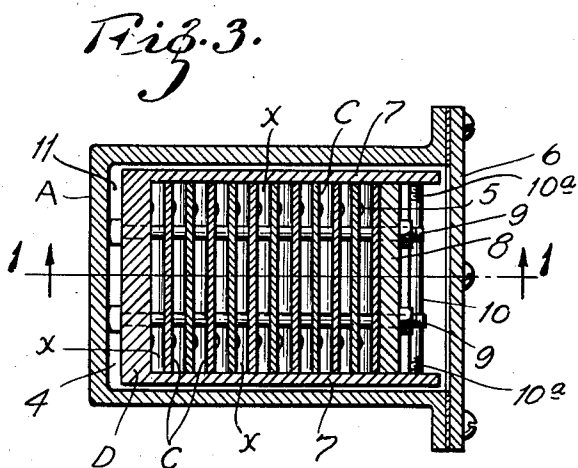
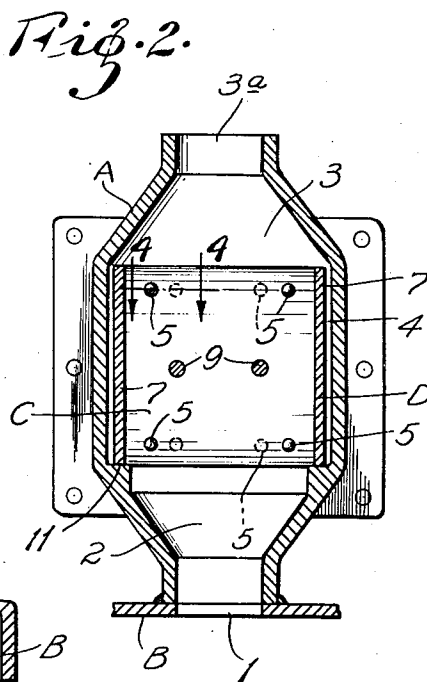
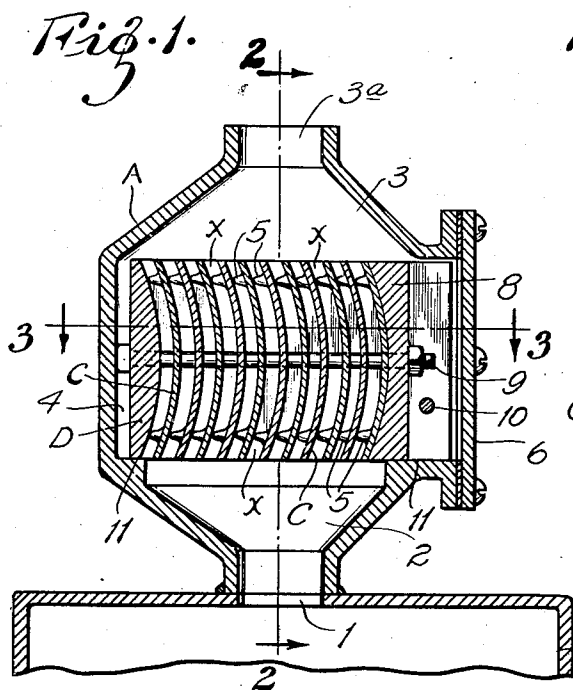
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FLAME ARRESTER

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FLAME ARRESTER

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This invention relates to devices of the kind commonly termed "flame arresters," that are used on oil storage tanks and similar structures to prevent a flame on the exterior of the structure from penetrating into same through a gas outlet leading from the interior of the structure.

The main object of my invention is to provide an efficient flame arrester of the general type mentioned, that is inexpensive to manufacture, and easy to disassemble and assemble when cleaning of the device becomes necessary.

Figure 1 of the drawings is a vertical sectional view of a flame arrester; constructed in accordance with my invention, taken on the line 1—1 of Figure 3.

Figure 2 is a vertical sectional view, taken on the line 2—2 of Figure 1, looking in the direction indicated by the arrows.

Figure 3 is a horizontal sectional view, taken on the line 3—3 of Figure 1; and

Figure 4 is an enlarged horizontal sectional view, illustrating the integral protuberances on the plates which hold them in spaced relation.

In the accompanying drawings which illustrate the preferred form of my invention, A designates a metal housing which is adapted to be mounted upon and connected by means of a gas-tight joint to an oil tank or similar structure B in such a position that gases which escape from the interior of said structure through a gas outlet 1 in same will enter the lower end of the housing A and circulate upwardly through the same to an exit at the upper end of the housing. The shape of the housing A is immaterial, but I prefer to provide it with an intake portion 2 which increases gradually in diameter in the direction of travel of the gases flowing through the housing, a discharge portion 3 which decreases gradually in diameter towards an exit 3^a, and an intermediate portion 4 that is adapted to receive a bundle of plates C that are of novel construction and arrangement, which are disposed edgewise so as to form restricted passageways α for gases which escape through the outlet 1 of the structure B. These plates C are of such de-

sign and construction that the gas passageways formed by said plates are of sufficient skin area to cool the gases in case they are ignited on the outside of the device, thereby preventing the flame from penetrating into the structure B through the gas passageways α .

The plates C are preferably duplicates of each other and are combined in such a way as to produce a bundle or pack composed of a plurality of loose plates that are held in spaced relation so as to form the gas passageways α , by means of projections 5 on one plate that bear against an adjacent plate, as shown in Figure 4. These projections 5 are preferably produced by forming integral protuberances on each plate by a bending or die-shaping operation, and the protuberances on the plates are preferably disposed so that when the plates are combined to form a pack or bundle the protuberances on adjacent plates will be arranged in staggered or offset relationship so as to cause the terminal ends of the protuberances on one plate to bear against a flat surface on the adjacent plate. The plates C may be of any preferred shape or outline and provided with any desired number of integral protuberances 5 arranged in any preferred manner. In the form of my invention herein shown the plates C are rectangular-shaped, and as previously stated, are duplicates of each other, so as to reduce the cost of manufacturing the device; facilitate the operation of assembling the parts of same, and also permit the plates C to be nested together and confined in a small space when being shipped from their point of manufacture to their point of use.

In order that the device may be cleaned easily, the bundle or pack composed of the plates C is mounted in the housing A in such a way that said bundle can be readily removed from said housing, disassembled, cleaned and thereafter re-assembled without the aid of special tools and without liability of said plates being assembled improperly. Preferably, the bundle of plates C are combined with a carrier D, so as to form a unit that can be slipped into or withdrawn from the housing A through an opening at one side

of the intermediate portion 4 of the housing that is normally covered by a removable cover or closure plate 6. The carrier D is herein illustrated as consisting of a horizontally-disposed member of substantially yoke shape in outline whose head piece or end wall is disposed vertically and provided with two parallel side pieces 7 that extend transversely across the ends of the plates C, as shown in Figure 3. A clamping plate 8 that is arranged edgewise between the side pieces 7 of the carrier co-operates with the head piece of the carrier to clamp the bundle of plates C securely together and hold them in nested relationship. Any suitable means can be used to draw the clamping plate 8 towards the head piece of the carrier D, such, for example, as a plurality of bolts 9 that extend longitudinally of the carrier through aligned holes in the plates C, in the head piece of the carrier, and in the clamping plate 8. If desired, a horizontally-disposed tie rod 10 can be used to draw the side pieces 7 of the carrier D towards each other, so as to line up the bolt holes in the plates C and cause the carrier to be clamped against the ends of said plates, the tie rod being herein illustrated as provided with threaded ends 10^a that are screwed into the side pieces 7 of the carrier D. When the removable unit, consisting of the bundle of plates C and carrier D, is in operative position in the housing A, the lower end of said unit rests upon a horizontally-disposed flame-proof seat 11 in said housing, which is of such shape and construction that gases cannot easily escape through the joint between said seat and the unit that rests upon the seat.

In order to permit the plates C to be arranged with relatively wide spaces between the same, and at the same time obtain turbulence in the gases flowing through the housing A, I prefer to make the plates C of such shape or form that the gases will be sure to sweep over the walls of the passageways α , or come into direct contact with said walls while flowing through said passageways. I accomplish this highly desirable result in a simple and inexpensive manner, by making the plates C slightly curved in vertical cross section, thus forming a flame arrester that is provided with upright gas passageways that are curved slightly in the direction of travel of the gases flowing through the same. As shown in Figure 1, the inner face of the head piece of the carrier D and the inner face of the clamping plate 8 are shaped so as to conform to the curvature of the plates C, thereby insuring said plates being clamped tightly together and also clamped tightly to the carrier when the nuts on the bolts 9 are tightened. Notwithstanding the fact that the plates C are spaced relatively far apart, the effect obtained by curving said plates is the same as the effect that would be obtained with straight plates, spaced relatively close to-

gether, because the curvature of said plates sets up eddies which give more contact of the gases with the plates, which feature, coupled with the fact that the gas passageways are wide enough to prevent easy clogging, makes my flame arrester a decided improvement on the flame arresters now in general use.

The main advantage of a flame arrester of the construction above described is the ease with which it can be taken apart, and subsequently re-assembled when cleaning of the device becomes necessary. This is due

(1) To the fact that the means used to hold the plates C in spaced relation consists of integral protuberances 5 on said plates;

(2) To the fact that the plates C are of such shape or form that in the operation of assembling the same the only care that must be exercised is to see that the protuberances 5 on adjacent plates are staggered; and

(3) To the fact that the plates C with the carrier D form a unit which can be easily slipped into or withdrawn from the housing A when the cover 6 of said housing is removed. In addition to the desirable characteristics above pointed out, my improved flame arrester is inexpensive to manufacture, and it is of sufficiently rugged design to eliminate the possibility of its wearing out rapidly or becoming inoperative when in use, due to breaking down of any of the parts of same. Such a flame arrester also has the added advantage of being highly efficient without being liable to become easily clogged, due to the curved form of the plates C which permit them to be spaced farther apart than straight plates. As the plates C are duplicates of each other and are of such design that they can be produced quickly and easily on a punch press or similar machine, my improved flame arrester can be manufactured and sold at a low cost, and still another novel feature of same that adds greatly to its commercial utility is that the plates C can be nested together or confined in a small space while they are being shipped from their point of manufacture to their point of use. In assembling the plates C in the operation of converting them into the unit that is arranged in the housing A, every other plate of the bundle is rotated 180° so as to insure the protuberance on adjacent plates being arranged in staggered relation, as previously described.

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

1. A flame arrester, consisting of a housing having an inlet and an outlet, and a bundle of duplicate plates in said housing arranged edgewise in spaced relation and being curved so as to form parallel arc-shaped gas passageways for the gases traveling from the inlet to the outlet of the housing.

2. A flame arrester, comprising a housing

provided with an inlet and an outlet, and a bundle of duplicate plates in said housing arranged edgewise and provided with integral protuberances disposed in staggered relation so as to hold said plates spaced apart to produce gas passageways between the plates, said plates being curved in the direction of flow of the gases passing from the inlet to the outlet of the housing so as to produce arc-shaped gas passageways and cause eddies to be set up in the flowing gases, with the result that the gases will be sure to sweep over the walls of the arc-shaped gas passageways in traveling from the inlet to the outlet of the housing.

3. A flame arrester for oil tanks and similar structures, comprising a housing having an inlet and an outlet, and arc-shaped gas passageways in said housing arranged intermediate said inlet and outlet and formed by a bundle of duplicate plates arranged parallel in spaced relation and disposed edgewise to the passage of the gases through the housing.

4. A flame arrester, comprising a housing having an inlet and an outlet, a substantially yoke-shaped carrier removably mounted in said housing intermediate said inlet and outlet, and a bundle of duplicate plates in said carrier arranged parallel in spaced relation with the opposed edges of the plates in contact with the side pieces of the carrier, said plates being curved slightly so as to form arc-shaped passageways for the gases traveling from the inlet to the outlet.

JOHN H. WIGGINS.