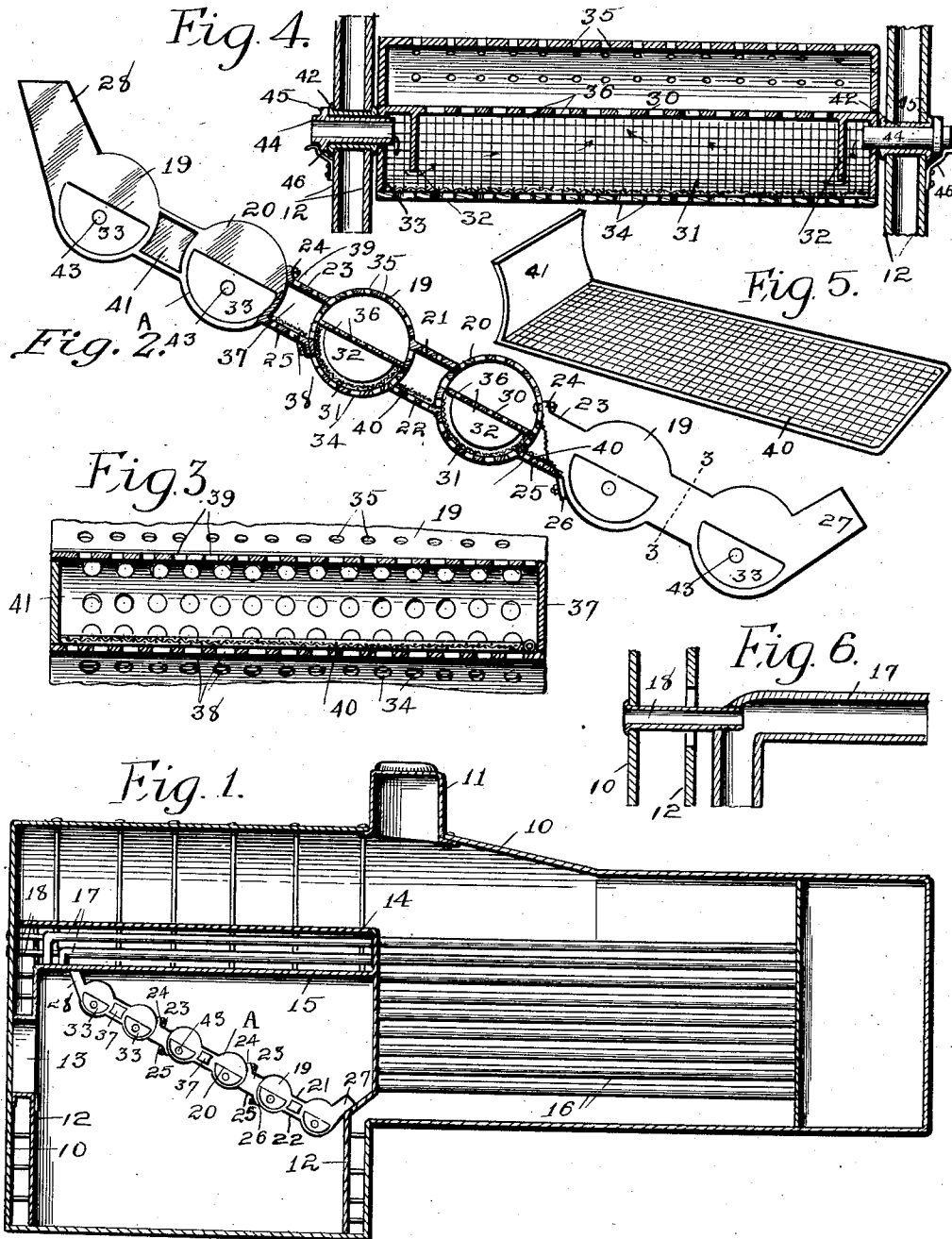


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SMOKE CONSUMER.  
APPLICATION FILED MAY 13, 1912.

1,063,130.

Patented May 27, 1913.



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# UNITED STATES PATENT OFFICE.

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## SMOKE-CONSUMER.

1,063,130.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed May 13, 1912. Serial No. 697,070.

*To all whom it may concern:*

Be it known that I, EDMON LESLIE, a citizen of the United States, residing at Marshalltown, in the county of Marshall and State of Iowa, have invented a new and useful Smoke-Consumer, of which the following is a specification.

The object of my invention is to provide a smoke consumer of simple, durable, and inexpensive construction, designed to be placed in a fire box.

A further object of my invention is to provide a smoke consumer so constructed and arranged that it may be detachably mounted in a fire box and having parts which may be readily and easily removed or taken apart.

A further object is to provide a smoke consumer arranged in a fire box so that the products of combustion pass through a series of openings so arranged as to somewhat retard such passage and provided with parts which are heated so that the smoke and heavier products of combustion passing through the consumer are burned before being discharged through the smoke stack.

A further object is to provide a smoke consumer provided with means whereby fresh air is admitted to the consumer and mingled with the products of combustion passing therethrough.

My invention consists in certain details, in the construction, combination, and arrangement of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical, longitudinal, sectional view through a boiler and a fire box equipped with a smoke consumer embodying my invention. Fig. 2 shows an end elevation partly in section, of my improved smoke consumer on a larger scale than in Fig. 1. Fig. 3 shows a sectional view on the line 3—3 of Fig. 2. Fig. 4 shows a central, vertical, sectional view through one of the cylinders of my improved smoke consumer. Fig. 5 shows a perspective view of the detachable slide which is received in the portion of the smoke consumer between two sections. Fig. 6 shows a sectional view of one of the flues over the fire box, showing the means for admitting fresh air thereto.

In the accompanying drawings, I have

shown my smoke consumer installed in a steam boiler in which the boiler is indicated by the reference numeral 10. On the boiler is a steam dome 11. Below the rear end of the boiler is a water jacketed fire box 12 in which is a door opening 13. Above the fire box is what I will call a main crown sheet 14 and below that is a second crown sheet 15. Extending forwardly through the boiler from the fire box 12, are a plurality of flues 16. Two of the flues are indicated by the reference numeral 17 and extend rearwardly from the fire box between the crown sheets 14 and 15 and at their rear ends communicate with the other rear end of the fire box. Communicating with the flues 17 near their rear ends are small tubes 18 which extend through the walls of the boiler and through which air may be drawn into the flues 17. Mounted in the fire box is my improved smoke consumer which I have indicated generally by the reference numeral A in Fig. 1.

The smoke consumer A is constructed as follows: I provide detachable sections of which there may be as many as necessary. Each section is preferably composed of two cylinders 19 and 20 which are spaced apart from each other and are connected by flat upper and lower walls 21 and 22. Extending laterally from the cylinder 19, on the opposite side from and in line with the wall 21, is a wall 23 having at its end a flange 24 extending upwardly and away from the cylinder 19 when the smoke consumer is installed. On the cylinder 20, on the side opposite and in line with the wall 22, is a flat wall 25 having at its end, a flange 26 extending downwardly and away from the cylinder 20. The sections are detachably secured together in series by securing the flange 24 of one section to the cylinder 20 of the next adjacent cylinder, and securing the flange 26 of the adjacent section to the cylinder 19 of the first section, by bolts or other suitable means, as shown in Fig. 2.

As many of the smoke consumer sections may be used as desired and placed together.

My smoke consumer is designed to be installed in position to extend from a point near the upper rear end of the fire box to a point near the forward end thereof spaced above the grate. On the outer ends of the sections adjacent to the top and to the forward end of the fire box, I provide, instead of the flanges 24 and 26 extensions 27 and 28

which are substantially rectangular in cross section and are designed to rest against the top and forward walls respectively of the fire box. The lower half of the ends of each cylinder 19 and 20 is open as shown in Fig. 2 and I provide a detachable half cylinder designed to be received in the lower half of each cylinder 19 and 20, each half cylinder being provided with a perforated flat top 30 and with a wire wall 31.

Near each end of the top 30 of each half cylinder, is a downwardly extending transverse plate 32. At each end the half cylinders are provided with semi-circular ends 33 designed to fill the openings in the cylinders 19 and 20. In the upper and lower halves of the cylinders 19 and 20 are openings 34 and 35 and in the top 30 of the half cylinders, are openings 36. The openings 34, 36 and 35 are graded in size, the openings 34 being larger than the openings 36, and the openings 36 being larger than the openings 35, as clearly shown in Fig. 4. The walls 21 and 22 are connected at one end by a wall 37. In the walls 22 and 21 are openings 38 and 39, the openings 38 being larger than the openings 39. I provide a tray 40 of wire or other meshed material, designed to be received above the wall 22, between each adjacent pair of cylinders. Upon one end of the tray 40 is an upwardly extending plate 41 designed to close the opening between the walls 21 and 22 opposite the wall 37 when the tray is installed in position. The purpose of the tray 40 and of the half cylinder above described, is largely to prevent the discharge of sparks into the flues 16.

The cylinders above described are mounted in the fire box in the following manner: At suitable intervals, openings are provided in the double walls of the sides of the fire box and in the openings are mounted water tight cylinders 42 which are in communication with the interior of the fire box and with the air outside. In the ends 33 of the half cylinders are openings 43. Mounted in the cylinders 42, I provide cylinders 44, the inner ends of which are designed to be received in the openings 43, as shown in Fig. 4. By means of the cylinders 44, the half cylinders and the cylinders 19 and 20, are supported within the fire box. Near the outer ends of the cylinders 44, are circumferential, annular flanges 45, designed to limit the inward movement of the cylinders 44. On the walls of the fire box are spring clips 46 designed to engage the flanges 45 and to hold the cylinders 44 in position.

In the practical installation of my improved smoke consumer, the section thereof on which the portion 28 is formed is placed in the fire box with the end of the portion 28 placed against the top of the fire box just rearwardly from the openings into the flues 17. Before being placed in the fire box,

the half cylinders are placed within the cylinders and the trays 40 are placed in position between the cylinders. The cylinders 45 are placed in position with their inner ends received in the openings 43 and the upper section of the smoke consumer is thereby held in position. The next adjacent section is then placed in position with the flange 26 resting adjacent to the cylinder 19, and the flange 24 resting adjacent to the cylinder 20. The third section is then placed in position with the portion 20 resting against the forward wall of the fire box.

As shown in Fig. 1, the smoke consumer consists of three sections. It is understood that as many sections as are necessary may be used. It will also be understood that many variations may be made in details of the construction of my smoke consumer without departing from its essential purpose.

In the practical operation of my improved smoke consumer, the fire box is filled with fuel and air is admitted thereto in any suitable way. The products of combustion passing upwardly in the fire box, pass through the smoke consumer. A small part of the products of combustion pass into the flues 17, wherein they are mingled with air admitted through the tubes 18 and are largely consumed before being discharged from said flues. The larger part of the product of combustion passes through the smoke consumer. The passage of cinders or chunks is prevented by the screen 40 and the screen composing the lower portion of the half cylinders. Smoke and the like pass through the openings 34 into the half cylinder where they are mingled with air admitted through the tubes 45. The air is first directed downwardly by the plates 32 and is thoroughly mingled with the products of combustion. The air and products of combustion pass upwardly through the openings 36, being somewhat retarded by the fact that the openings 36 are smaller than the openings 34. The products of combustion mingled with air then pass through the openings 35 into the flues 16. It will be understood that the products of combustion are somewhat retarded before passing through the openings 35. The upper portions of the cylinders are thoroughly heated and the products of combustion are almost entirely consumed before passing into the flues 16.

The advantages of my improved smoke consumer are seen from the foregoing description.

The passage of burning sparks or cinders from the engine is prevented by the screens hereinbefore described. Products of combustion are thoroughly consumed in passing through the smoke consumer, as set forth in

the foregoing paragraph describing the operation thereof. The construction of the consumer is such that the parts thereof may be readily taken out for cleaning, repairing or replacing them. The parts may be taken out in sections so that the operation is not difficult.

I claim as my invention:

1. In a device of the class described, a fire box, a cylinder having openings in its upper and lower halves, and having the lower half of each end open, a half cylinder having openings in its upper part and having its lower part made of perforated material, received in the lower half of said cylinder, said half cylinder being provided with openings in each end, cylinders detachably received in the walls of the fire box and having their ends inserted in the openings in said half cylinder and being designed to supply air to said first described cylinder from outside the fire box.

2. In a device of the class described, a fire box, a cylinder having openings in its upper and lower halves, and having the lower half of each end open, a half cylinder having openings in its upper part and having its lower part made of perforated material, received in the lower half of said cylinder, said half cylinder being provided with openings in each end, cylinders detachably received in the walls of the fire box and having their ends inserted in the openings in said half cylinder and being designed to supply fresh air to said first mentioned cylinder, said half cylinders being provided with downwardly extending plates near the inner ends of said last described cylinders.

3. In a device of the class described, a fire box, a cylinder having openings in its upper and lower halves, and having the lower half of each end open, a half cylinder having openings in its upper part and having its lower part made of perforated material, received in the lower half of said cylinder, said half cylinder being provided with openings in each end, cylinders detachably received in the walls of the fire box and having their ends inserted in the openings in said half cylinder for supporting and for supplying fresh air to said first mentioned cylinder, said half cylinders being provided with downwardly extending plates near the inner ends of said last described cylinders, and means for yieldingly locking said last mentioned cylinders in position.

4. In a device of the class described, a smoke consumer section, comprising two cylinders spaced apart from each other, parallel upper and lower walls connecting said cylinders, a wall extending from the outer side of one of said cylinders from a point near the upper portion thereof, a wall extending from the outer portion of the other of said portions from a point near the lower

portion thereof, said last described walls being designed to coact with cylinders of other smoke consumer sections, said cylinders being provided with large perforations in their lower portions and with smaller perforations in their upper portions, and being open in the lower half of each end, half cylinders detachably received in said cylinders, said half cylinders having perforated tops, and body portions made of perforated material and being constructed with openings in their ends, said walls being perforated, and screens resting upon the lower walls.

5. In a device of the class described, a fire box, a plurality of smoke consumer sections, each comprising two cylinders spaced apart from each other, parallel upper and lower walls connecting said cylinders, a wall extending from the outer side of one of said cylinders from a point near the upper portion thereof, a wall extending from the outer portion of the other of said portions from a point near the lower portion thereof, said last described walls, being designed to coact with cylinders of other smoke consumer sections, said cylinders being provided with large perforations in their lower portions and with smaller perforations in their upper portions, and being open in the lower half of each end, half cylinders detachably received in said cylinders, said half cylinders having perforated tops, and body portions made of perforated material and being constructed with openings in their ends, said walls being perforated, screens resting upon the lower walls, cylinders detachably received in the side walls of said fire box and extending into the openings in the ends of said half cylinders, for the purpose of supporting said smoke consumer sections and of admitting air thereto.

6. In a device of the class described, a fire box, a boiler adjacent thereto, flues in said boiler communicating with said fire box near the forward end thereof, flues in said boiler communicating with said fire box at the top of the rear end thereof, a smoke consumer in said fire box extending across the same transversely and extending from the top thereof at a point in front of the place where said last named flues communicate with the fire box, to a point at the front of the fire box below the opening into the first named flues, said smoke consumer comprising a plurality of sections, each comprising two cylinders spaced apart from each other, parallel upper and lower walls connecting said cylinders, a wall extending from the outer side of one of said cylinders from a point near the upper portion thereof, a wall extending from the outer portion of the other of said portions from a point near the lower portion thereof, said last described walls being designed

to coact with cylinders of other smoke consumer sections, said cylinders being provided with large perforations in their lower portions and with smaller perforations in  
5 their upper portions, and being open in the lower half of each end, half cylinders detachably received in said cylinders, said half cylinders having perforated tops, and  
10 body portions made of perforated material and constructed with openings in their ends, said walls being perforated, screens resting upon the lower walls, cylinders detachably

received in the side walls of said fire box and extending into the openings in the ends of said half cylinders, for the purpose 15 of supporting said smoke consumer sections and of admitting air thereto, and means for admitting air to the flues which communicate with the rear of the fire box.

Des Moines, Iowa, April 22, 1912.

EDMON LESLIE.

Witnesses:

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

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