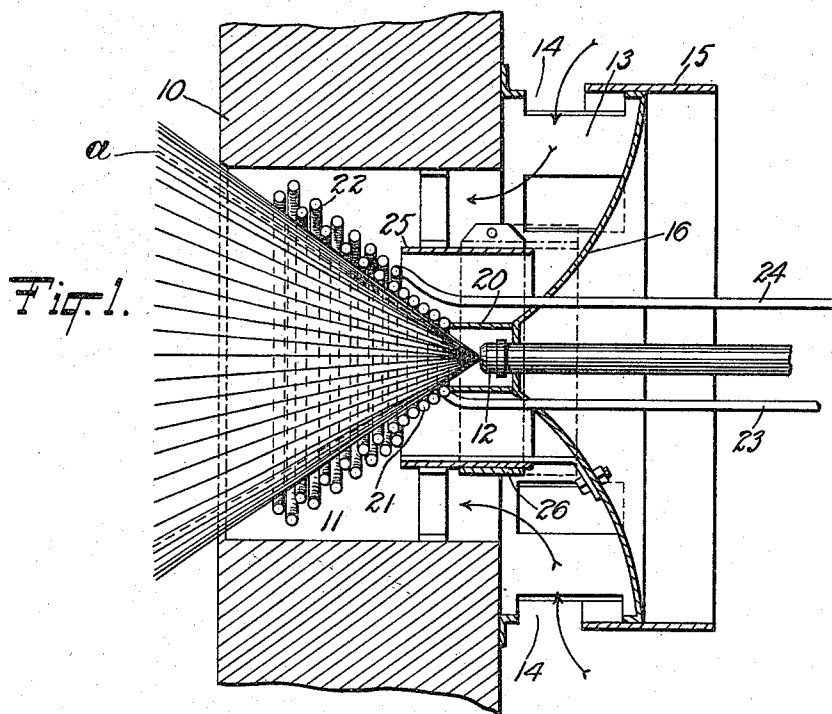
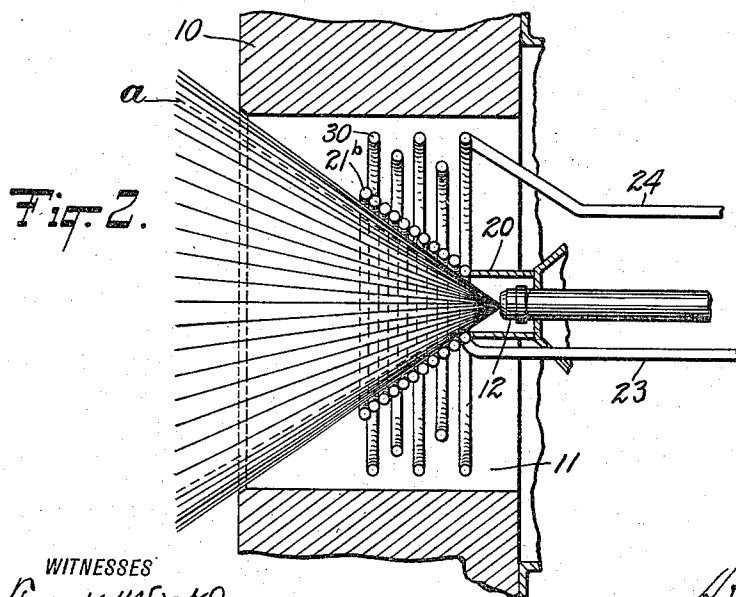


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 APPARATUS FOR BURNING OIL.  
 APPLICATION FILED JUNE 24, 1912.

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Patented Mar. 28, 1916.

2 SHEETS—SHEET 1.



WITNESSES  
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Fig. 3

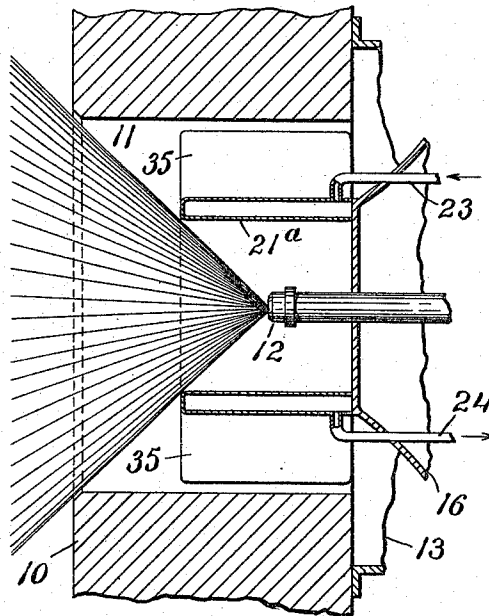
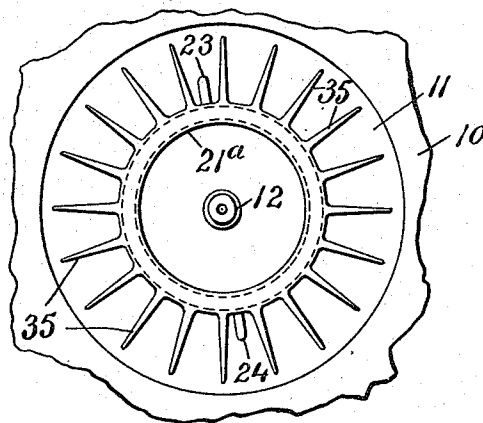


Fig. 4



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# UNITED STATES PATENT OFFICE.

ADALBERT FISCHER, OF PHILADELPHIA, PENNSYLVANIA.

## APPARATUS FOR BURNING OIL.

1,177,028.

Specification of Letters Patent.

Patented Mar. 28, 1916.

Application filed June 24, 1912. Serial No. 705,404.

*To all whom it may concern:*

Be it known that I, ADALBERT FISCHER, a subject of the German Emperor, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Burning Oil, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to apparatus for burning oil which is sprayed or atomized by being discharged from a spray nozzle or other spraying device, and more particularly to apparatus of this kind having a spray nozzle by which the oil is discharged in the form of a hollow cone.

The object of the invention is to improve the combustion of the sprayed oil in apparatus of this kind by providing means for heating the oil spray and the combustion supporting air as it advances toward the spray, and for controlling the flow of air to the spray to secure the most advantageous mixture of the air with the oil.

A full understanding of the invention can best be given by a detailed description of a construction embodying various features of the invention in an approved form, and of modified constructions, and such a description will now be given in connection with the accompanying drawings, in which:—

Figure 1 is a central sectional view of an oil burning apparatus constructed in accordance with the invention. Fig. 2 is a similar view of a modified construction with parts omitted. Fig. 3 is a similar view of another modified construction. Fig. 4 is a view in elevation of the apparatus shown in Fig. 3 looking from the left.

Referring to the drawings, and first to Fig. 1, 10 represents a masonry or other fire wall of a furnace provided with a spray opening 11 to receive the sprayed oil from a spray nozzle 12 of suitable form, but which is preferably a centrifugal or other spray nozzle adapted to discharge the spray in the form of a hollow cone, as indicated in the drawings by the dotted lines *a*. A casing 13 mounted in position to register with the spray opening 11 is provided with air inlet openings 14, which are controlled to regulate the air admission by means of a cylindrical slide or register 15. The rear wall 16 of the casing 13 is shown as sloping inwardly toward the center so as to act as a deflecting

surface for directing the air which enters through the openings 14 inward through the spray opening 11. Surrounding the nozzle is a cylindrical shield 20 closed at its rear end as by the rear wall of the casing 13, and extending forward of the nozzle sufficiently so that its front edge will stand close to or near the surface of the spray when the apparatus is in operation; and extending from the forward edge of this shield 20 is a conical or flaring shield 21 which with the shield 20 serves to prevent access of the air to an inner zone of the spray cone where the spray is of the greatest density. The shield 21 is constructed to provide a heating surface adjacent to the inclosed portion of the spray cone, being for this purpose in the construction shown formed by a close coiled pipe through which steam or other heating fluid may be circulated. Instead of being of conical or flaring shape and formed by a coiled pipe, the heating shield might be of cylindrical or other suitable shape and might be otherwise formed for circulation of a heating fluid or otherwise constructed to provide a heating surface adjacent to the oil spray. Extending beyond the close coiled pipe forming the shield 21 as shown in this figure, is an open coil, shown as a double coil, of steam pipes 22 which provides heating surfaces adjacent to the spray cone beyond the shield 21 with openings through which the air may have access to the spray, thus serving to heat both the spray and the air flowing to the spray. Steam may be supplied to and caused to circulate through the pipe coils in any suitable manner, as through inlet and return pipes 23 and 24. An outer shield 25 is mounted to extend about the shields 20 and 21 and is best of cylindrical form and of a diameter somewhat greater than the greatest diameter of the conical shield 21. This outer shield 25 extends rearwardly only such a distance as to leave an open air passage between its rear edge and the rear wall of the casing 13, and is provided with a cylindrical slide or damper 26 which may be adjusted to the forward position shown, or to the rearward position indicated by dotted lines to cut off admission of air to the space between the shield 25 and the shields 20 and 21, or to intermediate positions for varying the quantity of air admitted within the shield 25 for access to the portion or zone of the spray cone just beyond the

shield 21. When the damper 26 is in its open position as shown, air entering the casing 13 will flow through the space within the shield 25, as well as through the space outside or about the shield 25, and will have access to the portion or zone of the spray cone immediately beyond the heating shield 21 as well as the outer less dense portions of the spray cone; but when the damper 26 is in its closed position the air will have access only to such outer part of the spray cone and access of the air to the portion of the cone just beyond the shield 21 will be prevented. This apparatus shown in Fig. 1, therefore, provides means for heating the sprayed oil and for heating the combustion supporting air as it advances to mix with the oil spray, means for preventing access of the air to the inner, denser portion or zone of the spray cone, adjustable means for controlling access of the air to the spray cone whereby the air may be shut off from a greater or less portion of the inner denser part of the cone, and adjustable means for regulating the amount of air admitted.

In the apparatus as shown in Fig. 2, the outer shield 25 with its adjustable damper is omitted and the conical or flaring heating shield 21<sup>b</sup> formed by the close coiled pipe is extended outward for a distance somewhat greater than as shown in Fig. 1, and instead of the pipe coils 22 located adjacent to the path of the spray, heating coils 30 are arranged in the space about the shield 21<sup>b</sup> in position to heat the air as it passes through the opening 11 to strike the spray cone beyond the shield 21<sup>b</sup>. This arrangement provides no means for regulating or varying the access of air to the spray cone other than such regulation as is secured by adjusting the air register 15 of the casing 13 with which the apparatus may be provided as shown in Fig. 1; but, as in the arrangement of Fig. 1, the shields 20 and 21<sup>b</sup> will prevent access of the air to the inner, denser zone or portion of the spray cone, and the air flowing to mingle with the oil spray beyond the shield 21<sup>b</sup> will be heated by contact with the shield 21 and also by contact with the pipe coils 30, and the spray will be heated by the shield 21<sup>b</sup>.

Figs. 3 and 4 show a construction accomplishing the same purpose as the construction of Fig. 2, but in place of the conical or flaring heating shield 21 formed of a close coiled pipe as shown in Fig. 2, the apparatus shown in these figures has a hollow or chambered shield 21<sup>a</sup> extending about the nozzle and the inner portion or denser zone of the spray cone and which is preferably of cylindrical form as shown, but may be of other suitable form. The forward edge of this hollow heating shield best extends close to the path of the spray cone, as shown, and the shield is provided with a number of

radial or other heat radiating blades 35 extending from the outer side of the shield into the surrounding air passage way. Steam or other heating fluid may be caused to circulate through the chamber of the shield 21<sup>a</sup> as by means of inlet and return pipes 23 and 24. With this apparatus, as with the apparatus shown in Fig. 2, the access of the air to the inner denser portion of the spray cone will be prevented by the shield 21<sup>a</sup>, the sprayed oil will be heated by the shield, and the air flowing through the passage way about the shield to mingle with the oil spray will be heated by contact with the shield and with the heating blades 35. The supply of air may be controlled by an adjustable register as in Fig. 1, or by other suitable means.

It will be understood that the invention is not to be limited to the exact construction and arrangement of parts shown in the drawings and to which the foregoing description has been largely confined, but that it includes changes and modifications thereof within the claims.

What is claimed is:—

1. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil, and means for supplying air to the oil spray, of a heating shield mounted to be adjacent to the oil spray and in the path of the air and shaped to conform substantially to the outer surface of the spray, and means for applying heat to said shield.

2. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil in the form of a hollow cone, and means for supplying air to the oil spray, of a heating shield mounted to be adjacent to an inner, denser portion of the spray cone and to prevent access of the air to such inner, denser portion of the spray cone, and means for applying heat to said shield.

3. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil in the form of a cone, and means for supplying air to the oil spray, of a conical heating shield mounted to be adjacent to an inner, denser portion of the spray cone and to prevent access of the air to such inner, denser portion of the spray cone, and means for applying heat to said shield.

4. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil, and means for supplying air to the oil spray, of a heating shield mounted to be adjacent to an inner, denser portion of the spray and to prevent access of the air to such inner, denser portion of the spray, means for applying heat to said shield, and additional means for heating the air as it flows toward the unshielded portion of the spray.

5. In an apparatus for burning oil, the combination with a spray nozzle for spray-

ing the oil in the form of a cone, and means for supplying air to the oil spray, of a conical heating shield mounted to be adjacent to an inner, denser portion of the spray cone and to prevent access of the air to such inner, denser portion of the spray cone, said shield being formed by a close coiled heating pipe.

6. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil, and means for supplying air to the oil spray, of a heating shield mounted to be adjacent to an inner denser portion of the spray, means for applying heat to said shield, an outer shield extending about said heating shield, adjustable means for controlling the admission of air within said outer shield for access to a portion of the spray beyond the heating shield, and heating means mounted to be adjacent to the spray beyond said inner and outer shields formed with openings for the passage of air therethrough to the spray.

7. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil, and means for supplying air to the oil spray, of a heating shield mounted to be adjacent to an inner, denser portion of the spray, means for applying heat to said shield, an outer shield extending about said heating shield, and adjustable means for controlling the admission of air within said outer shield for access to a portion of the spray beyond the heating shield.

8. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil in the form of a hollow cone, and means for supplying air to the oil spray, of adjustable means for controlling the air supply, an inner shield for preventing access of air to an inner, denser zone of the spray cone, an outer shield extending about said inner shield, and adjustable means for

controlling the admission of air between the inner shield and the outer shield for access to the zone of the spray cone between said shields.

9. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil, and means for supplying air to the oil spray, of a heating shield mounted to be adjacent to an inner denser portion of the spray, and adjustable means for admitting air to or cutting air off from a portion of the spray next beyond the heating shield.

10. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil, and means for supplying air to the oil spray, of adjustable means for controlling the air supply, a shield in position to extend adjacent an inner denser portion of the spray, adjustable means for controlling the admission of air within said shield for access to said inner denser portion of the spray, and a passage for access of air to the portion of the spray beyond said inner denser portion.

11. In an apparatus for burning oil, the combination with a spray nozzle for spraying the oil in the form of a hollow cone, and means for supplying air to the oil spray, of a shield extending about an inner denser zone of the spray cone, adjustable means for controlling the admission of air within said shield for access to said inner denser zone of the spray cone, and a passage for access of air to a zone of the spray cone beyond said inner denser zone.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

ADALBERT FISCHER.

Witnesses:

D. W. HILDRETH,  
THOS. W. MURPHY.