W. C. BLACKMOND & G. E. STOY.

OIL BURNER.

APPLICATION FILED MAR. 25, 1909.

962,301. Patented June 21, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

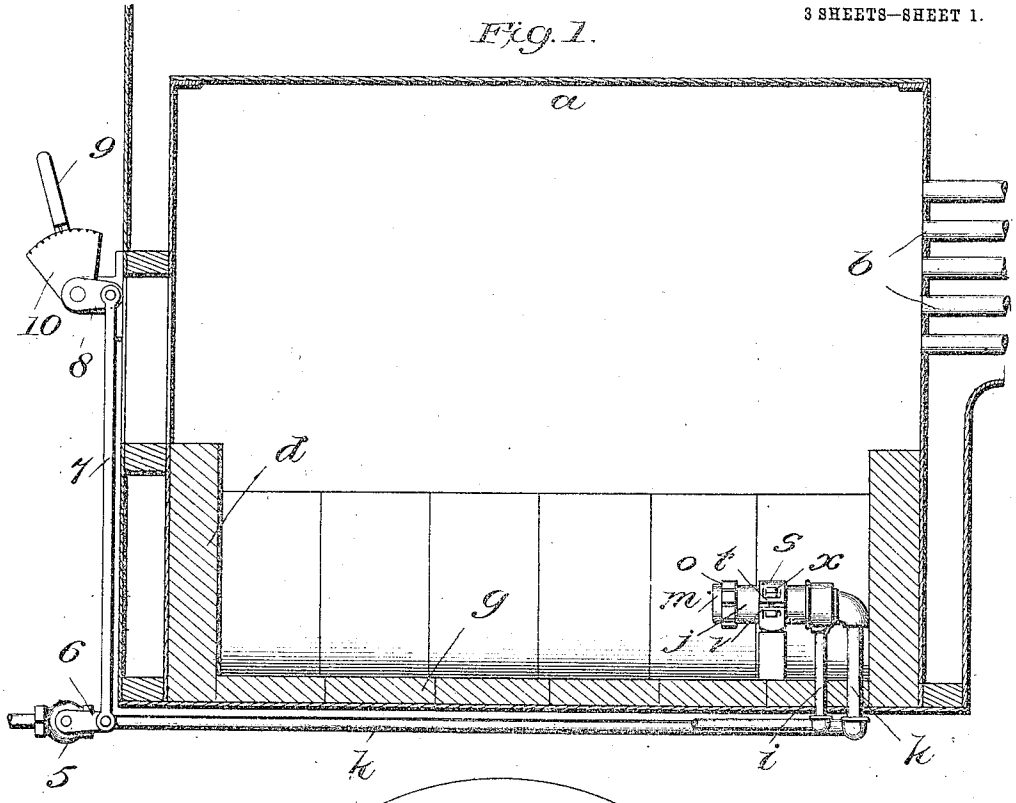
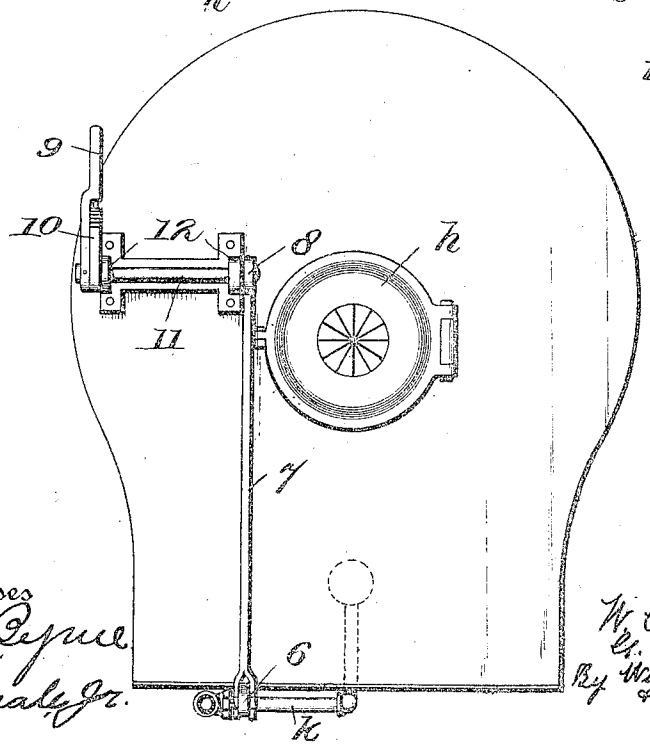


Fig. 2.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 3.

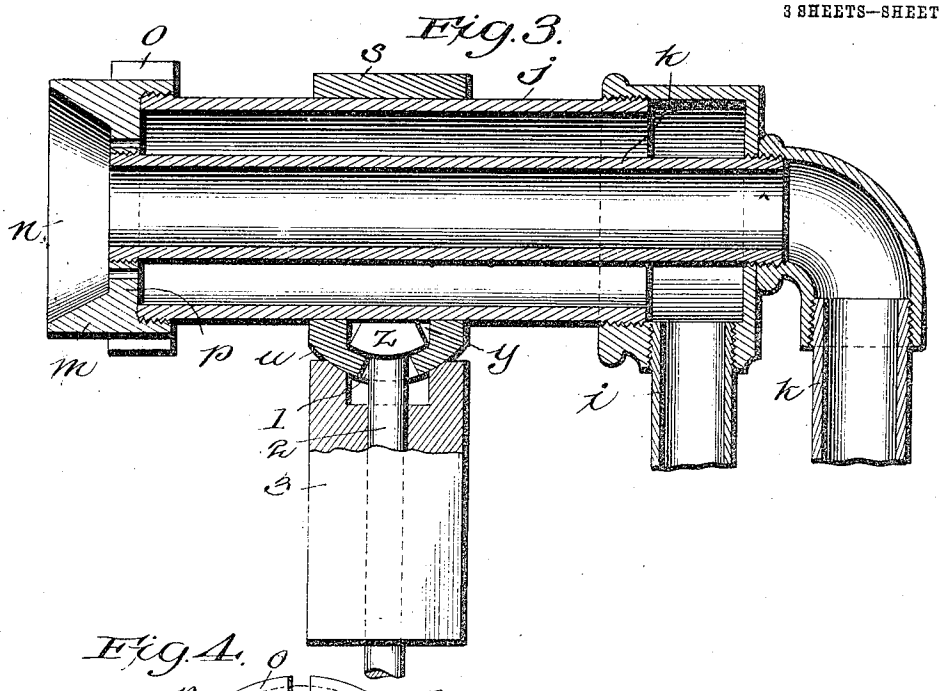


Fig. 4.

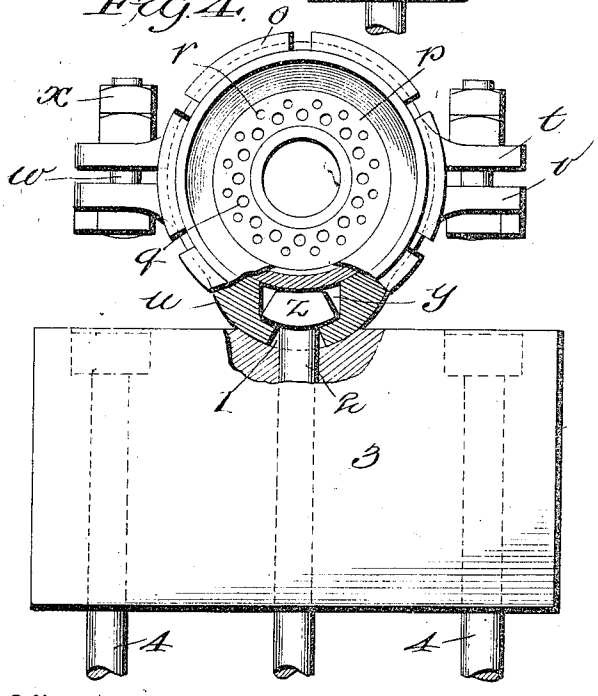
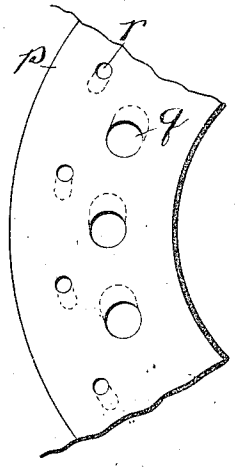


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

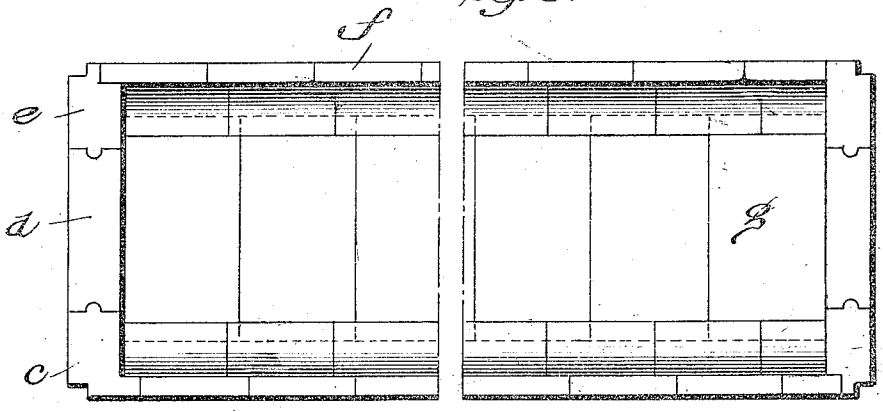


Fig. 7.

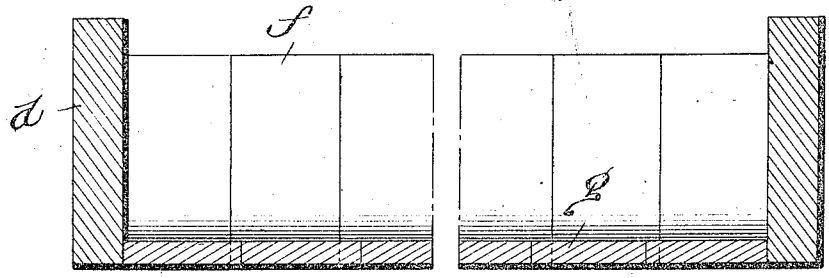


Fig. 8.

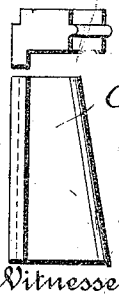


Fig. 9.

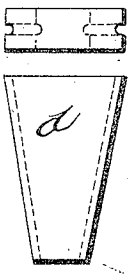


Fig. 10.

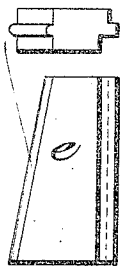
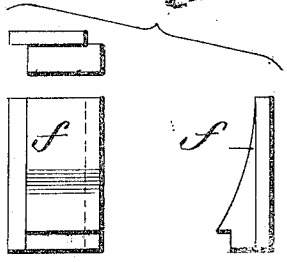


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM C. BLACKMOND, OF TOMBALL, AND GUY EVERETT STOY, OF TEAGUE, TEXAS.

OIL-BURNER.

962,301. Specification of Letters Patent. Patented June 21, 1910.

Application filed March 25, 1909. Serial No. 485,824.

To all whom it may concern:

Be it known that we, WILLIAM C. BLACKMOND and GUY EVERETT STOY, citizens of the United States, residing at Tomball and Teague, respectively, in the counties of Norris and Freestone, respectively, State of Texas, have invented certain new and useful Improvements in Oil-Burners; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in oil burners more especially designed for locomotives, although not restricted to this use.

The object of our invention is to provide a burner and brickwork therefor, which burner may be attached to any locomotive and is adjustably supported so that it will not be disturbed by the vibration of the locomotive, and which is simple, cheap and economical.

With these objects in view, the invention consists in the construction and combinations of parts as hereinafter described and claimed.

In the accompanying drawings—Figure 1 is a cross section of one end of part of a locomotive, showing the invention applied thereto. Fig. 2 is an end view thereof. Fig. 3 is a longitudinal section of the burner and its support. Fig. 4 is an end view of the same, partly in section. Fig. 5 is a partial view on a larger scale, showing the means for distributing the supply of steam in the nozzle of the burner. Fig. 6 is a top plan view of the brickwork. Fig. 7 is a cross section of the same, and Figs. 8, 9, 10, and 11 show the different shapes of the brick used in making the brickwork.

a represents part of the fire box end of an ordinary locomotive provided with the usual tubes *b* and a dampered door *h*. In the bottom of the fire box is located the brick structure shown in Figs. 6 to 11. This structure is so arranged, the parts being interlocked, that it will not be shaken apart by the vibration of the locomotive. The end walls are composed of bricks *c*, *d*, *e*, interlocking with each other. The corner bricks *c* and *e* are made largest at the bottom, and the middle bricks *d* are made wedge-shaped. The side walls are made of bricks *f* so arranged that their ends overlap each other and overlap part of the corner bricks, and the bottom is composed of ordinary flat bricks, the whole being secured in any suitable way in the fire box. If, for any reason, one or more of the bricks should become broken, the other bricks will hold the broken one in position, which is of great advantage in a locomotive. The bottom bricks are held in position by the bricks of the end and side walls, which prevents them from shifting or sliding.

The whole structure forms a sort of a tray, as shown in Figs. 1, 6 and 7, which is firmly held together notwithstanding the vibration due to the motion of the locomotive.

Referring to Figs. 3 to 5, *i* represents the steam supply pipe, which connects with a larger pipe *j*, through which passes the oil pipe *k*. The part *j* is made long enough so that the oil will become heated before it is discharged into the fire box.

The oil pipe *k*, see Fig. 1, is provided with an enlargement 5, containing a valve, which valve is operated by a lever 6, this lever being connected to one end of a link 7. The other end of the link is attached to a lever 8, which is fixed to a rod 11 carried in bearings 12 on the end of the locomotive. To the outer end of the rod 11 is fixed an operating handle 9 carrying a pointer which moves over a graduated scale 10. By this means the quantity of oil passing through the pipe *k* can be accurately regulated.

m represents the nozzle, preferably made of brass, and adapted to screw on one end of the pipe *j*. It is provided with a flaring opening *n* and with projections *o*, separated from each other for convenience in setting the burner in position. This nozzle is provided with a central partition *p*, perforated at its center for the passage of the inner end of the pipe *k*, and provided with a series of holes *q* and another series of holes *r*. The holes *q* are arranged at an angle with the face of the partition *p*. The holes *r* are also arranged at an angle with the face of the partition *p*, but inclined in the opposite direction, the holes *r* being smaller than the holes *q*. These holes are so arranged that the jets of steam issuing therefrom form two oppositely rotating whirls, which do not strike each other as the steam issues from the holes, but only as the jets expand. This arrangement has been found in practice to be most effective in thoroughly atomizing the oil and mixing it with the steam. The oil is of course drawn out through the pipe

k by the suction of the steam jets coming out of the holes *r* and *q*, and especially the latter.

The burner is supported upon a swivel joint. *s* represents a band passing over the top of the burner, provided with perforated ears *t*. *u* represents a band passing under the burner and provided with perforated ears *v*, said ears being bound together by bolts *w* and nuts *x*. The lower end of the band *u* is enlarged and is provided with a recessed portion *y* and a tapering hole 1, and through this hole passes a supporting rod 2, terminating in a head *z*, the sides of said head being inclined toward each other and the bottom rounded, fitting in a correspondingly shaped portion of the recess *y*. The rod 2 passes through a suitable support 3, which is supported by bolts 4 on any suitable part of the locomotive. It will be seen that by this arrangement the position of the burner can be readily adjusted in a horizontal plane, as desired, even though subjected to the strong vibrations incident to the travel of the locomotive.

This burner is of simple construction and its cost is very small. The pipe *k* being of substantially the same diameter throughout and being a comparatively large pipe, there is no chance for the burner to become clogged up and this does away with the necessity of placing strainers in the oil pipe, which strainers are continually becoming clogged, causing trouble and delay. The openings for the passage of steam through the nozzle are double the size of those ordinarily employed, and these openings are arranged at an angle and in concentric circles, so that the steam issuing therethrough causes a vortex, and when coming in contact with the oil creates a whirling spray, thereby thoroughly mixing the oil and steam with the air and bringing about perfect combustion. The size of the spray may be increased or decreased, as desired, by changing the angles of the atomizer ports.

The burner is mounted on a swivel joint, so that it may be easily and accurately adjusted to the desired position. The fact that the oil is delivered flush with the steam jets and in the center of a steam vortex through an unobstructed pipe, renders it possible for the oil to be conveyed from any reasonable distance, so that it is not necessary that the oil tanks should be located near the fire box, and the spray is delivered practically to all parts of the fire box alike. Furthermore, the burner is so arranged that it heats the oil before spraying it, thus delivering it through the nozzle at a high temperature.

All parts of the burner and equipment are made interchangeable, and any particular piece may be removed for cleaning, or repairs or replacement.

We claim:

1. A burner composed of a nozzle, steam and oil pipes connected thereto, the steam pipe surrounding the oil pipe, said oil pipe having a non obstructed opening, and said nozzle fitting around said opening, said nozzle being provided with an outwardly flaring opening and a flat face having a perforation in which the end of said oil pipe engages, the flat face of said nozzle being provided with a plurality of rows of holes arranged in circles, the holes in each circle being arranged at an angle to the face of the nozzle, the angle for one circle being different from that of the other circle, substantially as described.

2. The combination of a nozzle having a flat face, a steam pipe connected thereto, and an oil pipe passing through said steam pipe and nozzle, and having its delivery end unobstructed, said nozzle being provided with two circular rows of holes for the discharge of the steam, the holes in each circle being inclined to the face of the nozzle, and the holes in one circle being arranged at reverse angles from the holes in the other row, substantially as described.

3. The combination of a nozzle having a flat face, a steam pipe connected to said nozzle, an oil pipe passing through said steam pipe and said nozzle, and having its delivery end unobstructed, said nozzle having at its discharge end a flaring opening, and the face of said nozzle being provided with two rows of holes arranged in concentric circles, the holes in one circle being arranged at an angle to the face of the nozzle, but at a reverse angle to the holes in the other circle, and a swivel joint supporting said steam pipe, substantially as described.

In testimony whereof, we affix our signatures, in presence of two witnesses.

WILLIAM C. BLACKMOND.
GUY EVERETT STOY.

Witnesses:
W. R. Boyd, Jr.,
L. R. Boyd, Sr.