(No Model.)

J. HEILBRON.

HYDROCARBON VAPORIZER AND BURNER.

No. 562,961. Patented June 30, 1896.

Fig. 1.

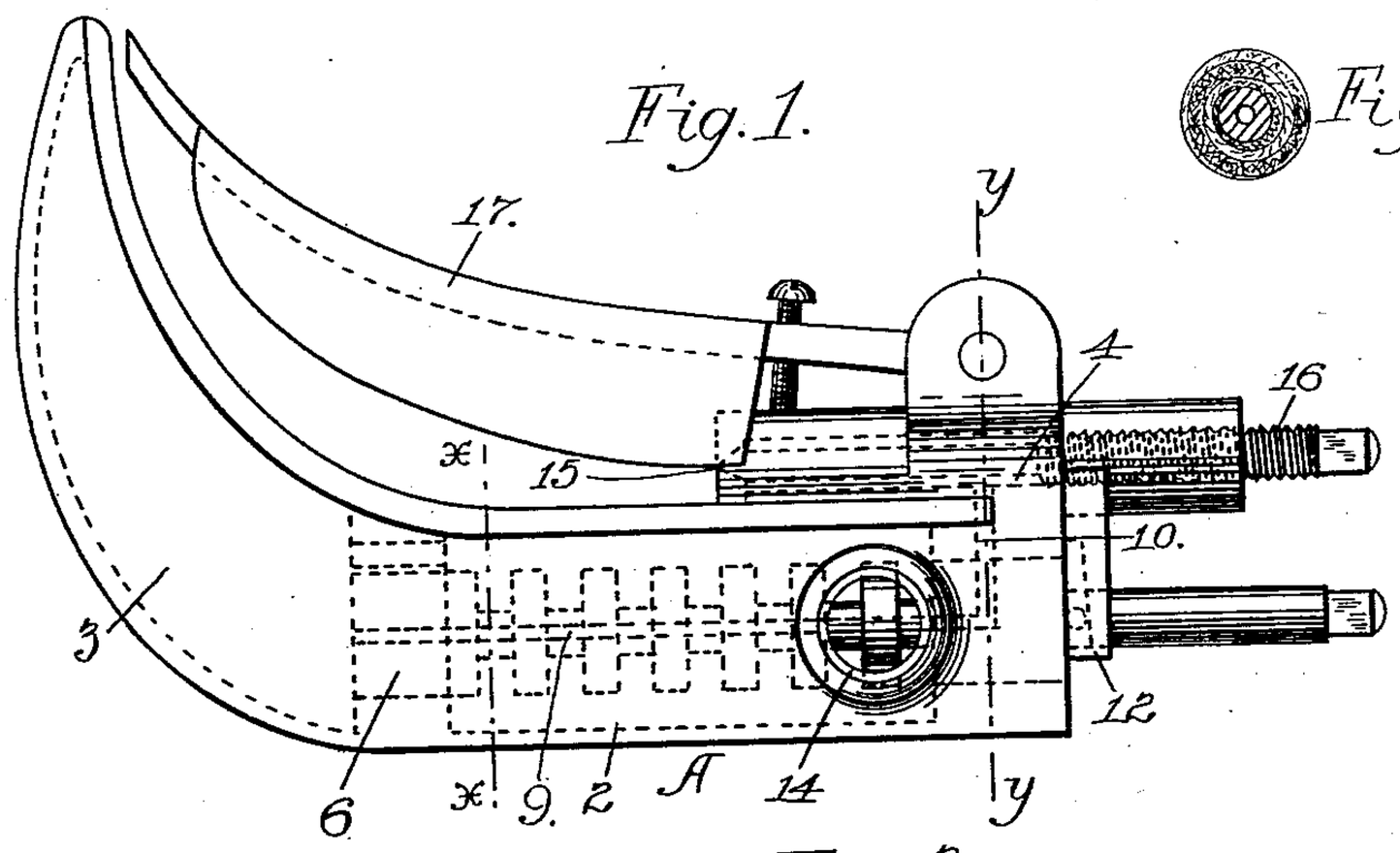


Fig. 7.

Fig. 3.

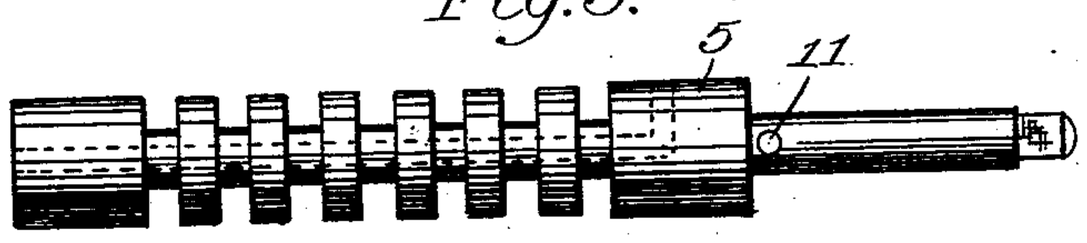


Fig. 5.

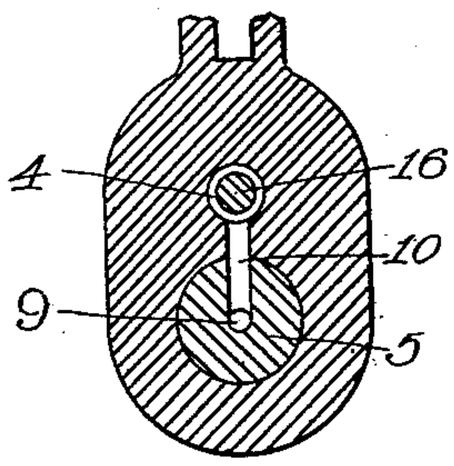


Fig. 6.

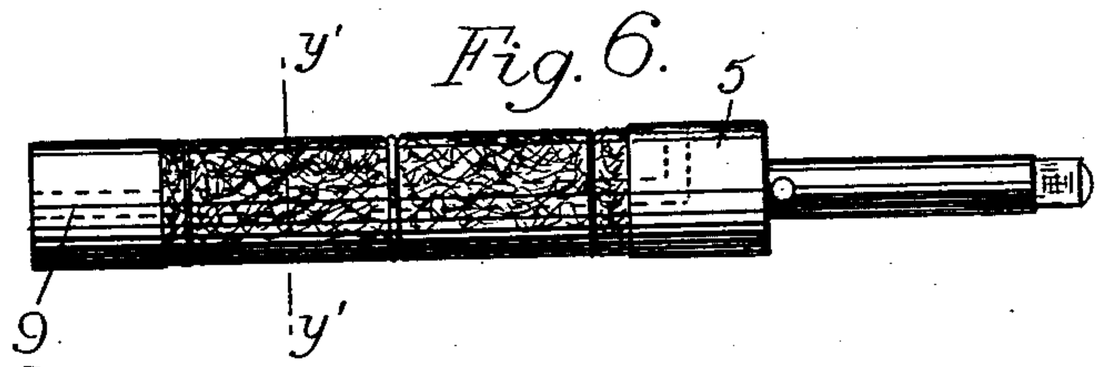


Fig. 4.

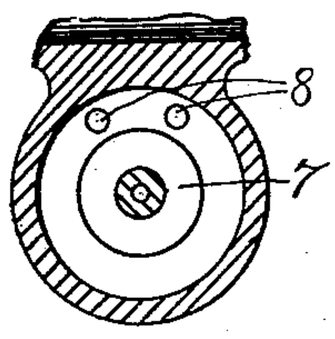
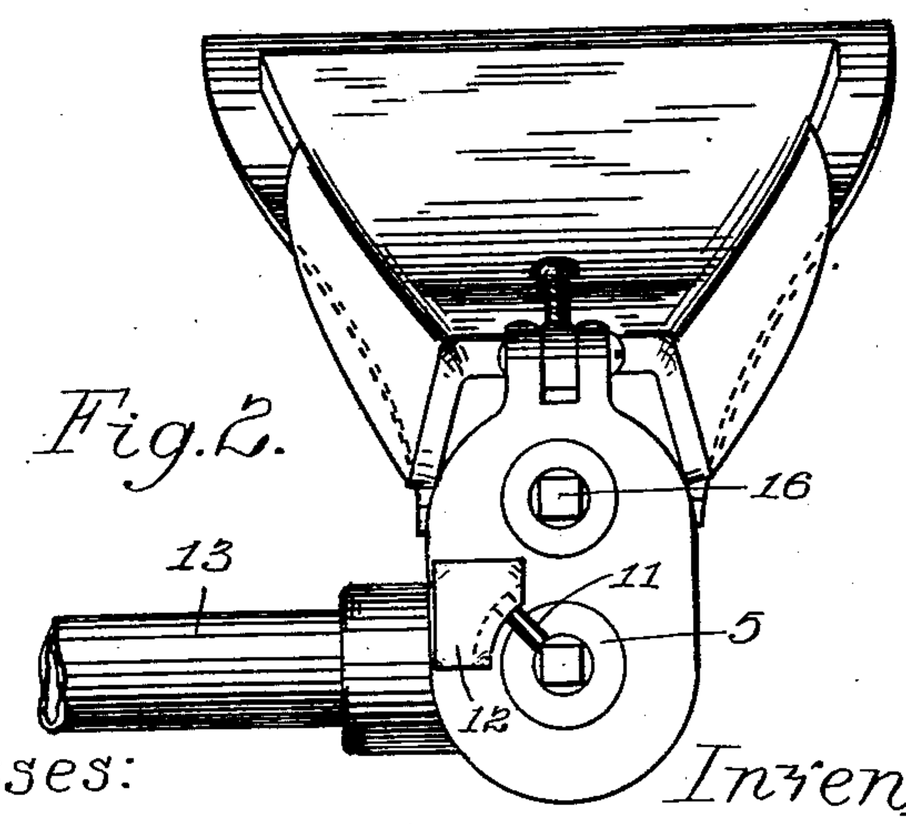


Fig. 2.



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UNITED STATES PATENT OFFICE.

JACOB HEILBRON, OF ST. PAUL, MINNESOTA.

HYDROCARBON VAPORIZER AND BURNER.

SPECIFICATION forming part of Letters Patent No. 562,961, dated June 30, 1896.

Application filed July 31, 1894. Serial No. 519,107. (No model.)

To all whom it may concern:

Be it known that I, JACOB HEILBRON, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Hydrocarbon Vaporizers and Burners, of which the following is a specification.

My invention relates to improvements in vapor-burners of that class wherein a curved metallic plate is arranged in front of the jet-opening to serve as a deflector, and to produce a better illuminating-flame; its object being to provide simple and efficient means for the thorough vaporizing of low-grade oils from the heat of the burner-flame.

To this end my invention consists in forming within the walls of the deflecting-body, underneath the flame-jet, a substantially cylindrical chamber communicating with the source of fuel supply and serving as a generating-chamber. Within the curved portion of the deflecting-body, or that directly in front of the jet-opening and where the heat from the flame is most intense, I arrange a second chamber to serve as a retort or superheating-chamber, which is separated from the generating-chamber by a wall or partition. This partition is perforated with one or more small openings near the top of the generating-chamber, thus furnishing communication between it and the retort. A larger centrally-arranged opening through the partition receives the end of a plug or core which is arranged in the generating-chamber, and which has an axial opening connecting the retort with the jet-opening. By this means the oil admitted to the generating-chamber has its more volatile portions near the top first and more completely vaporized, the vapors being forced by expansion through the small openings into the retort, where the vaporizing process is perfected. Thence the vapor is passed through the opening in the core or plug in the generating-chamber to the jet. The heavier parts and impurities of the fuel are thus retained in the bottom of the generating-chamber and cannot pass at all to the retort nor serve to clog the jet-opening.

My invention further consists in the specific features of construction hereinafter more particularly described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of my improved burner, the interior construction being indicated by dotted lines. Fig. 2 is a rear elevation of the same. Fig. 3 is a detail view of the plug or core arranged in the generating-chamber. Fig. 4 is a cross-section of the burner on line *x x* of Fig. 1. Fig. 5 is a cross-section of the same on line *y y* of Fig. 1. Fig. 6 is a side elevation of the core or plug shown with its circumferential grooves filled with asbestos packing; and Fig. 7 is a cross-section of the same, showing the packing.

In the drawings, A represents the body of the burner; 2, the generating-chamber, substantially cylindrical in form; 3, the superheating-chamber or retort, the upper wall of these chambers forming the flame deflector and spreader; and 4 is the vapor-passage to the burner.

The generating-chamber and retort are separated by the partition or wall 6. This has a centrally-arranged opening 7, into which the end of the core or plug 5, arranged in the generating-chamber, fits. It is also provided near the top with the small perforations 8, through which the gas generated in the chamber 2 passes into the retort. The plug 5 has an axial opening 9 from the end toward the retort to near its other end, where it turns laterally and registers with the small passage 10, which leads to the vapor-passage 4, when the core is turned and secured in place by the pin 11 being brought within the inner bevel of the lug 12. By this means the gas from the retort is carried to the vapor-passage 4 only when the plug is properly secured in place. The liquid hydrocarbon is introduced into the generating-chamber 2 by means of the pipe 13, screwed into the threaded opening 14 in the side of the chamber. At the end of the vapor-passage 4 is the jet 15, controlled by the pointed valve 16 in the ordinary manner. Both the plug 5 and valve 16 have preferably squared projecting ends, by means of which they may be fitted or adjusted by the use of a key or wrench. The plug 5 is preferably circumferentially grooved to increase its heat-radiating capacity, and also to serve to retard the passage of the oil and gas in the generating-chamber and furnish surfaces on which the impurities are deposited. In some cases I prefer to fill the grooves in the plug with

asbestos or some other absorbent material to serve as a cleansing agent for the oil.

Pivoted upon the top of the burner A, over the jet 15, is the air-mixer 17, extending over the deflector and having depending flanges or side wings to partially inclose the intermediate space and furnish means for the admixture of air with the gas as it issues through the jet, there being a narrow opening between the end of the air-mixer plate and the wall of the deflector, through which the flame issues in flattened form. It will thus be seen that the heat from the flame conducted through the wall beneath serves to partially vaporize the oil in the generating-chamber. The vapors are forced by the expansion through the narrow perforations into the superheating-chamber—where they are raised to a very high temperature—from which chamber the only means of escape is the axial opening through the plug in the generating-chamber, thence to the flame-jet. I thus secure a vapor in the best possible condition for combustion, nothing but vapors being admitted to the retort, and avoid the carrying to the jet-opening of any imperfectly-vaporized fuel.

I claim—

1. In a vapor-burner of the class described having a horizontally-arranged jet-opening, the combination of the deflector arranged in front of said jet-opening and chambered to form a superheating-retort, a vaporizing-chamber arranged within the wall of the burner and subject to the direct heat of the flame from the jet-opening, the communicating passage between said chamber and retort at their highest adjacent points, the vapor-conduit connecting said retort through said vaporizing-chamber with the jet-opening and the oil-conduit connecting said vaporizing-chamber with the source of supply.

2. In a vapor-burner having a flame-deflector and a horizontally-arranged jet-opening, the combination of the vaporizing-chamber arranged within the wall of the burner underneath the jet-opening and communicating with the source of fuel supply, the superheating-retort arranged within the deflector-wall in front of said jet-opening, the communicating passage between said chamber and retort at their highest adjacent points, and the vapor-conduit connecting said retort with said jet-opening extending through said vaporizing-chamber.

3. In a vapor-burner having a flame-deflector, the combination of the generating-chamber communicating with the source of fuel supply, the superheating-chamber communicating with the jet-opening, both said chambers being arranged within the walls of the deflector, and the connecting passages between said chambers at their highest adjacent points.

4. In a vapor-burner having a flame-deflector and a horizontally-arranged jet-opening, of the generating-chamber communicating with the source of fuel supply arranged in the walls of the deflector underneath the jet-opening, the superheating-chamber arranged within the walls of the deflector in front of the jet-opening, the partition between said chambers having small perforations near its top connecting said chambers, and the hollow core arranged in said generating-chamber and connecting said superheating-chamber with the jet-opening.

5. In a vapor-burner of the class described, the combination of the cylindrical generating-chamber arranged underneath the jet-opening and connected with the source of fuel supply, the superheating chamber or retort arranged within the deflector in front of the jet-opening, the narrow passage connecting said chambers at or near their top, and the hollow circumferentially-grooved core or plug arranged in said generating-chamber and connecting said superheating-chamber with said jet-opening.

6. In a vapor-burner of the class described, the combination with the jet-opening, of the retort arranged within the walls of the deflector in front of said jet-opening, the vapor-conduit connecting said retort with said jet-opening, the vaporizing-chamber interposed between said retort and the source of fuel supply in which the liquid fuel is thoroughly vaporized by direct heat from the burner-flame, and the conduit for conducting the vapor from the vaporizing-chamber to the retort.

7. In a vapor-burner of the class described, a retort or superheating-chamber arranged within the deflecting-walls at the point of highest heat, a generating-chamber interposed between the same and the source of fuel supply, also arranged within the walls of the deflector and heated by the burner-flame, the constricted elevated passage for conducting the vapor from the generating-chamber to the retort, and the conduit communicating with said retort and extending centrally through said generating-chamber and communicating with the jet-opening.

8. In a deflector vapor-burner, the combination with the jet-opening and the source of fuel supply, of a vapor-generating chamber arranged in the deflector-walls, subject to the heat of the burner-flame and connected with the source of fuel supply, the retort arranged within the deflector-walls at the point of highest heat, the conduits for conducting the vapor from the generating-chamber to the retort, and the conduit connecting said retort with the jet-opening and extending through the generating-chamber.

9. In a vapor-burner of the class described, the combination with the jet-opening and the source of fuel supply, of the vaporizing-chamber arranged within the walls of the deflector underneath the flame from the jet-opening and subject to the direct heat therefrom, the conduit connecting said vaporizing-chamber with the source of fuel supply, the superheating-retort arranged within the walls of the deflector at the point of highest heat, the con-

duit for conducting the vapor from the vaporizing-chamber to the retort and the conducting-passage between said retort and the jet-opening.

10. In a hydrocarbon-burner, having a horizontal jet-opening, the combination of the concave flame-deflector arranged in front thereof, the generating-chamber in communication with a source of fuel supply, the superheating-chamber in communication with said generating-chamber, the partition-wall between said chambers having relatively large and small openings connecting said chambers, the hollow stopper extending through said generating-chamber and closing said larger opening and serving as a conduit for the vapor in the superheating-chamber to the burner, substantially as described.

11. In a deflector burner of the class described, the combination of a vaporizing-chamber arranged in the wall of the deflector and directly subject to the laterally-radiated heat from the burner-flame, the superheating-chamber also arranged in the body of the deflector and directly in the path of the flame, the vapor-conduit connecting said chambers at their highest adjacent points and the conduit connecting said superheating-chamber at a point above its bottom with the jet-opening.

12. In a vapor-burner of the class described, the combination of the two chambers arranged within the walls of the burner and directly subject to the heat of its flame, the first being connected with the source of fuel supply, and so arranged with reference to the burner that said fuel is therein vaporized and the solid matter carried by the fuel deposited, and the second chamber being connected to the first by a passage near the top of the first chamber, so as to receive only the vapor therefrom, and being subject to a much more intense heat than the first chamber, and the conduit for conveying the most highly volatilized vapor from the second chamber to the jet-opening.

13. In a vapor-burner of the class described provided with a horizontal jet-opening and flame-deflector, the combination of the vaporizing-chamber in the body of the burner underneath the flame, and the superheating-chamber in the body of the deflector and above the level of the first chamber, the vapor-conduit connecting the top of the vaporizing-chamber with the superheating-chamber, and the conduit for conveying the vapor from the superheating-chamber to the burner.

14. In a deflector vapor-burner, the combination of the superheating-retort arranged in the walls of the deflector, the vaporizing-chamber arranged in communication with said retort and subject to the heat of the burner-flame and to the heat of the vapor as conveyed from said retort, the connection between said vaporizing-chamber and the source of fuel supply, the conduit connecting said chamber with said retort above the level of the fuel therein and the conduit connecting said retort with the jet-opening.

15. In a vapor-burner of the class described having a horizontally-arranged jet-opening, the combination of the deflector arranged in front of said jet-opening and chambered to form a superheating-retort, a vaporizing-chamber adjacent to said retort, and subject to the heat of the flame from said jet-opening, and to the heat of the vapor in its passage from the retort to the jet-opening, the vapor-conduit between said chamber and retort and the conduit extending through said chamber and connecting said retort and jet-opening.

In testimony whereof I affix my signature in presence of two witnesses.

JACOB HEILBRON.

Witnesses:
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