

(No Model.)

E. KELLS.  
VAPOR BURNER.

No. 523,641.

Patented July 24, 1894.

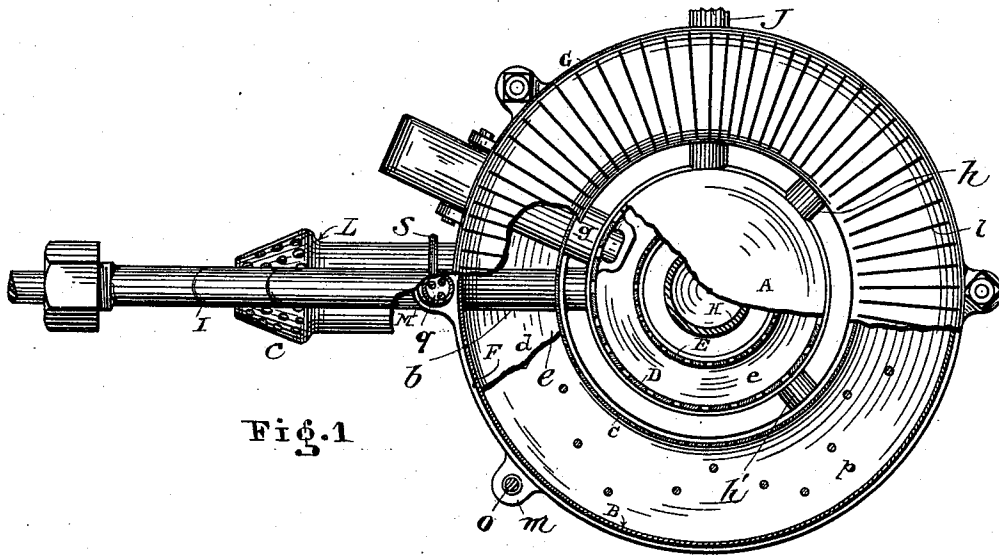


Fig. 1

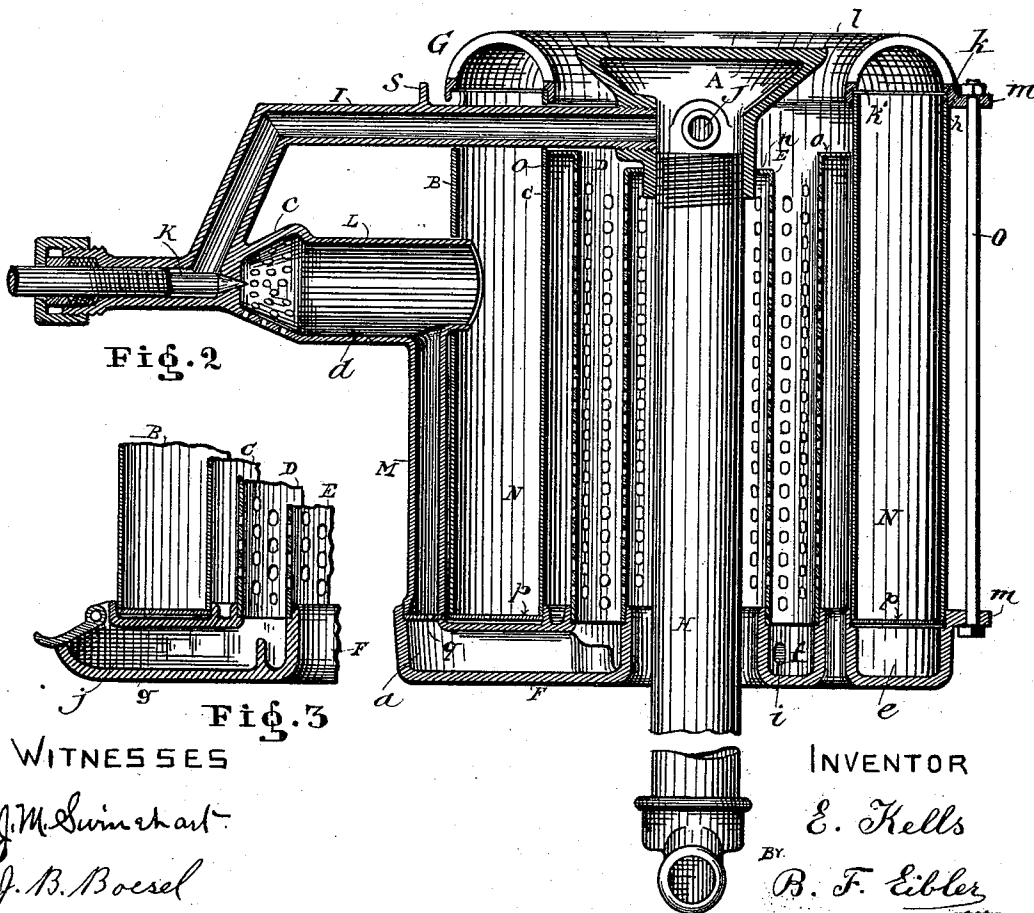


Fig. 2

Fig. 3

WITNESSES

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Att'y.

# UNITED STATES PATENT OFFICE.

EDWARD KELLS, OF CLEVELAND, OHIO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE DANGLER STOVE AND MANUFACTURING COMPANY, OF SAME PLACE.

## VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 523,641, dated July 24, 1894.

Application filed April 11, 1893. Serial No. 469,904. (No model.)

To all whom it may concern:

Be it known that I, EDWARD KELLS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Vapor-Burner; and I do hereby declare that the following is a full, true, and complete description thereof.

My invention relates to hydrocarbon burners and the improvement consists in the peculiar construction of a vapor generating burner, the object of which is to render said burner simple in operation, powerful, and efficient for even less refined hydrocarbon fuels.

That the invention may be fully understood and seen reference will be had to the following specification and the accompanying drawings in which—

Figure 1 illustrates a partial plan and horizontal sectional view of said burner. Fig. 2 is a vertical section of the same, and Fig. 3 a detached section hereinafter referred to.

Like letters denote like parts in the drawings and specification.

The above said burner substantially consists of the following parts viz: the generator A, the cylinders B. C. D and E, the base F and the cap G.

The generator A is formed or constructed for suitable connection with the stand pipe H and the vapor tubes I and J see Figs. 1 and 2, of the latter species one or more may be applied for conveyance of vapor to branch or non generating burners. The stand pipe as well as the vapor tubes are thereby arranged in open relation with the interior or chamber of said generator.

Connected with the tube I, is the needle valve K and the mixing flue L from which the spout M is leading to the port *a* of the arm *b* in the base F. At or near the intersection of the tube I and valve K said flue L is enlarged as shown at *c* and perforated for admission of air, and established by means of the groove *d* is a drip connection between the needle valve and the spout M. The base F comprises the annular cups *e* and *f*, which are held united by means of the port arms *b*, *g* and *h* *h'*. The port *a* of the arm *b* leads from the spout to the interior cup *f*, whereas the ports *i* of the

arms *h* *h'* establish communication between the said interior cup *f* and the exterior cup *e*. The port *j* of the arm *g* extends from the interior cup *f* to the outside of the cup *e* see Figs. 1 and 3 and serves as igniting tube for said cup *f*. On top the rims of the cups *e* and *f* are recessed to receive the cylinders B. C. D. and E. The cylinders B. C extend up from the exterior cup *e* and form an annular chamber therewith bounded on top by the cap G which is similarly recessed as seen at *k* *k*.

Into the outer cylinder B penetrates the mixing flue L as seen in Figs. 1 and 2, vapor and air is thereby admitted to the combustion chamber N attained by the parts above described. The profile of the cap G is semi-circular and radially arranged slits *l* therein permit of the escape of the flames in a more concentrated state nearest the generator A. By means of the rods O and the lugs *m* the above mentioned parts are held in position as seen in Figs. 1 and 2.

The cylinders D and E which are perforated extend up from the recessed rims of the inner cup *f* in close proximity to the generator A as seen in Fig. 2. A termination of the spaces between the cylinders C and D and the cylinder E and the generator A is attained by means of the flanges *n* and *o*, which is essential for an efficient draft within said cylinders.

Diaphragms *p* *q* are interposed between the base F and the upper parts as seen in Figs. 1 and 2, the purpose of which will be hereinafter explained.

The above described burner is manipulated and operates as follows: First the needle valve K is partially opened in which instance the gasoline flows freely into the cup *f* and the port *j* to be ignited, the valve K remaining opened while the oil is burning from out the cup *f*, the combustion thereof being supported by a vigorous draft of air through the perforated cylinders D and E. The generator as well as the standpipe, being completely enveloped by a forced fire, become readily heated for generation of vapor therein. The expansive force of the vapor then gradually depresses the gasoline in said standpipe, and it is vapor which now is ejected through the

orifice of the valve K. The swift current of vapor in passing through the flue L, here draws in the necessary amount of air before entering the combustion chamber N. Vapor being once formed it passes directly into the chamber N and ignites through the slits *l*, but if, owing to fluctuations in the stand pipe some gasoline may again flow through the needle orifice it will take its course through the spout M, to be burned between the cylinders D, E, which parts initially serve as a medium for generation of vapor, but subsequently become auxiliary means for maintaining perfect combustion or a blue smokeless flame.

Depending upon the grade of fuel which is used in connection with this burner, the openings of the diaphragms *p* and *q* may be limited to a few in number, it is the object to prevent explosions, that said diaphragms are placed in the positions as shown.

An enlarged heating surface of the pipe I is attained by means of the shield *s* see Figs. 1 and 2, the vapor in passing from the generator is thus less liable to lose in pressure before reaching the needle valve K.

What I claim, and desire to secure by Letters Patent, is—

1. A vapor generating burner, consisting of the stand pipe H, the generator A with tube I, needle valve K, flue L and spout M attached thereto, the base F comprising annular communicating cups *e f*, inlet port *a* and ignition port *j*; cylinders B C mounted upon the rims of the outer cup *e*, and inclosed by the annular slotted cap G, the perforated flanged cylinders D and E extending from the inner cup *f* in close proximity to the gener-

ator A; the said flue L being in communication with the combustion chamber N formed by the cylinders B C, and the spout M connected with the inlet port *a* and cup *f* all constructed and arranged substantially as and for the purpose set forth.

2. In combination the cylinders B C, cup F, cap G and spout M the diaphragms *p q* interposed between said parts as shown, perforated cylinders D, E; stand pipe H and generator A arranged within the interior thereof, tube I with needle valve K extending to the exterior for communication with the mixing flue L and combustion chamber N, constructed and arranged substantially as and for the purpose set forth.

3. In a vapor generating burner the combination of a series of cylinders B C and D E, a base F and cap G, the stand pipe and generator arranged in central position thereto and provided with a vapor tube, needle valve, mixing flue and spout M, an internal combustion chamber being formed by the perforated cylinders D, E for the initial formation of vapor, and the actual combustion chamber being attained by the cylinders B C in open relation with the mixing flue and needle valve and the spout M forming auxiliary communication with the interior compartment of the base F and initial combustion chamber constructed and arranged substantially as and for the purpose described.

EDWARD KELLS.

Witnesses:

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