B. F. Coston.
Gas Generator.
No. 3,894. Patented Jan. 31, 1845
B. F. Costo.

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To all whom it may concern:  
Be it known that I, Benjamin F. Coston,  
of the city of Washington and District of  
Columbia, have invented a new and im-  
proved apparatus for generating, condens-  
ing, and burning gas from oil, resin, or coal  
and in applying the gas in light-houses; and  
I hereby declare that the following is a full,  
clear, and exact description thereof, refer-  
ence being had to the accompanying draw-  
ings, in which—  

No. 1, a vertical section through the appar-  
atus for generating and condensing the gas.  
No. 2, is a section through the mercurial  
pivot joint that connects the gas pipe with  
the revolving or other burners. No. 3 is a  
section of the gas burner. No. 4, is a sec-  
tion of a light house lantern showing the ar-  
angement for the gas apparatus.  

In drawing No. 1 is represented a portable  
cast iron furnace of an oblong form similar  
to a common box stove and lettered A the  
inside of this furnace is lined with fire  
brick; on the top of this furnace there is a  
circular opening surrounded by a flue that  
projects upward and in one side of which is  
an opening (c) for the smoke pipe; on this  
flue above named a kettle B is situated  
which contains the material from which the  
gas is to be made which is melted by the  
heat from the flue below. Below the kettle  
B, a cylindrical retort I is situated that ex-  
tends through the furnace horizontally from  
one end to the other and below it the fire  
chamber E is situated having a grate a,  
doors and ash pit of ordinary construction  
requiring no particular description. D rep-  
presents the flue leading from the fire cham-  
ber around the retort to the exit pipe G,  
one end of the retort is closed in the usual  
way the other has a semi-circular head Y  
that extends half way up from the lower  
side and prevents the coke or other substance  
with which the retort is charged from fall-  
ing into the condenser O, with which it com-  
municates by a pipe J that inclines down-  
ward a little from the retort to the base of  
the condenser as shown in the drawing  
under the tar contained therein as shown by  
the dotted line P. The condenser is com-  
posed of two annular chambers o, o, one  
above the other which are connected by a se-  
ries of small vertical pipes O' the lower  
chamber is divided into two equal parts by  
two partitions one of which is shown at Q  
in dotted lines the gas ascends by one half  
the pipes which are situated on the side of  
the partition next the retort into which the  
pipe J above named enters and descends by  
the pipes on the other side to the opposite  
chamber in the bottom of the condenser from  
whence it passes through a pipe R into the  
gasometer of usual construction; the tar as  
it accumulates in the lower part of the con-  
denser is conveyed into a cast iron cistern T  
on which the condenser rests through a  
siphon S that projects from one side of the  
chamber and curves upward and then down  
into the cistern. The cistern is a plain short  
cylinder of common construction and has a  
stop cock U, in it near the bottom by which  
the tar is drawn from it.  

In the top of the retort there is an open-  
ning which has a pipe connected with it let-  
tered H the upper end of which projects  
above the furnace and is closed with a head  
through which a small tube H' leads, that  
descends nearly into the retort, and extends  
up into a small cylindrical vessel G situated  
over the pipe H which I denominate the  
feeder nearly to the top thereof another  
small tube G' is connected with this feeder  
that extends from near the bottom thereof  
up through its cover and has a broad cup on  
it's upper end, into which a stop cock F from  
the kettle B leads; by this arrangement the  
melted resin or fat passes by the stop cock  
F through the feeder G and pipe H into the  
retort I when it is nearly all converted into  
gas by falling immediately upon the red hot  
coke or other substance with which the re-  
tort is charged and thence passes through the  
exit pipe J, into the condenser as above  
named. The pipe J is surrounded by a  
jacket K through which cold water passes in  
a continuous current; it is conveyed from  
the gasometer through a pipe M (a part of  
which only is shown in the drawing) and as  
it is heated by the pipe J it rises through  
the pipe N and circulates back into the cistern  
of the gasometer with which said pipes com-  
municate as shown by the dotted lines.  

Drawing No. 2 represents a vertical sec-  
tion of a joint for connecting the pipe from  
the gasometer with that from which the  
burners branch in light houses. It is of the  
following construction; the upper end of a  
vertical pipe A which leads from the gasometer  
is closed with a pin of steel J, which  
serves as a socket for a pivot I to turn in it,  
also has a screw cut on its outside on to  
which a cup F screws, this cup is formed of
two concentric cylinders C and G connected by the bottom in which a female screw is cut that screws onto the pipe above named leaving a space all around between the pipe and cylinder C. The pivot I above named forms the bottom of an upright tube D that connects with the burners in the light house lantern, on its lower part near the end there is an inverted cup H which fits into the space between the cylinders C and G which form the lower cap the space between them being filled with mercury this forms a perfectly tight joint between the pipes together with the greatest freedom of motion, the ends of the two pipes within the chamber C’ thus formed are pierced with holes so as to give a free circulation of gas from one to the other. K in this figure is the section of a whirl attached to the upper pipe D, by which said pipe is made to revolve in the ordinary manner of revolving light apparatus.

Drawing No. 3 is a section of the burner; it consists of two concentric pipes or tubes A and B, which are attached at their lower ends to the nozzle C of the pipe leading from the main. The upper end of the external pipe is about one and a half inch shorter than the inner one and has a flange D projecting from its top from which rises the frustum of a cone the base of which is of larger diameter than the tube B. The top of this frustum is on a level with that of the inside tube A with which it is connected by a flat ring F which is perforated like a common argand gas burner thus leaving a larger space for reservoir for the gas near the flame than it has while ascending through the space between the tubes bringing a body of the gas up near the flame so as to heat it by its contact with the metal which is near the flame, and having a long tube for the gas to pass through, as is clearly shown in the sectional drawing. A flat ring G which serves as a glass holder is fitted on to the flange D above named on which rests a frustum of a cone H that serves to deflect the air into the flame as in many burners now in use. The cone is perforated around the base with holes and inside said frustum the ring G is also perforated in the same way.

Drawing No. 4, represents a vertical section of a light house lantern of ordinary construction; the center shaft A around which the burners are arranged on arms F projecting from the said shaft is hollow for the purpose of conveying the gas from the gasometer; the lower end of this shaft forms the upper half of the mercurial joint above described and represented in No. 2, 60 and smaller at C in No. 4. The pipes F which form the arms above named, convey the gas from the center shaft A to the burners constructed on the plan shown in drawing No. 3. The reflectors are also attached to the same arms by means of an upright standard D placed directly behind the burner on which the reflector can slide up and down and is fastened by a set screw G.

The shaft is revolved by the ordinary light apparatus.

Having thus fully described my inventions what I claim therein as new and for which I desire to secure Letters Patent is—

1. I claim the method of introducing the resin or fat into the retort by means of the feeder G and pipe H and tube H’ as above described directly onto the coke or other charge in the retort, whereby the disadvantages arising from the collection of sediment in the ordinary siphon tube are obviated, and the resin or oil is introduced into the hottest part of the retort without any portion coming in contact with the sides.

2. I claim the jacket around the pipe J, 85 that conveys the gas to the condenser in combination with the cistern of the gasometer in the manner and for the purpose described, thus keeping the pipe J cool and preventing the tar from baking onto said pipe.

3. I claim the combination of a condenser constructed and arranged as above made known with the retort and gasometer for the purposes herein specified to condense the gas that passes through it and having a cistern below to draw the tar into.

4. I claim constructing the gas burner in the manner described having a long double tube with a conical chamber above it as 100 herein specified so as to heat the gas to a high temperature before burning.

5. Lastly, I claim the mercurial joint constructed and arranged substantially as set forth for passing gas from a stationary to a 105 revolving pipe as herein before explained.

BEN F. CUSTON.

Witnesses:
J. J. GREENOUGH,
T. C. DONN.