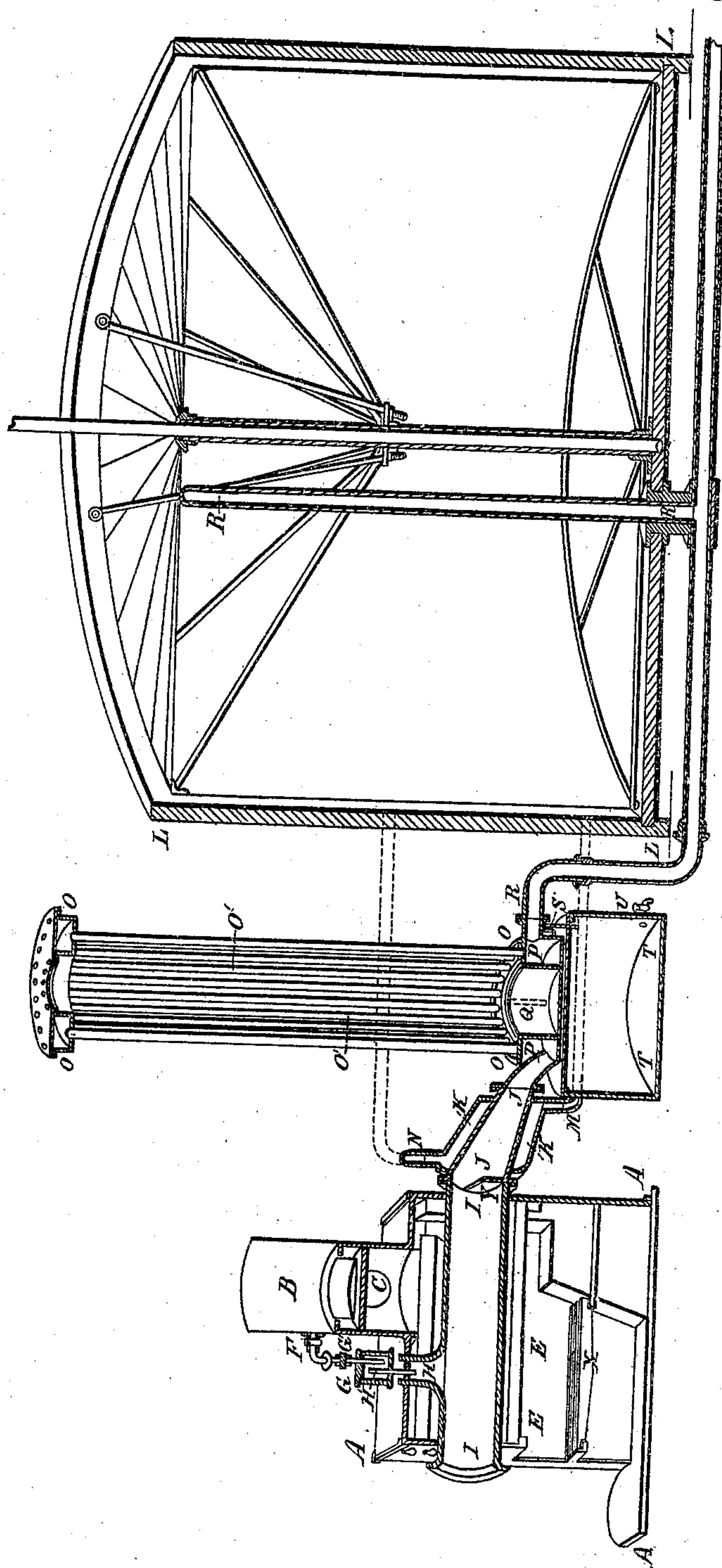


Sheet 1,  
3 Sheets.

B. F. Coston.  
Gas Generator.  
N<sup>o</sup> 3,894. Patented Jan. 31, 1845

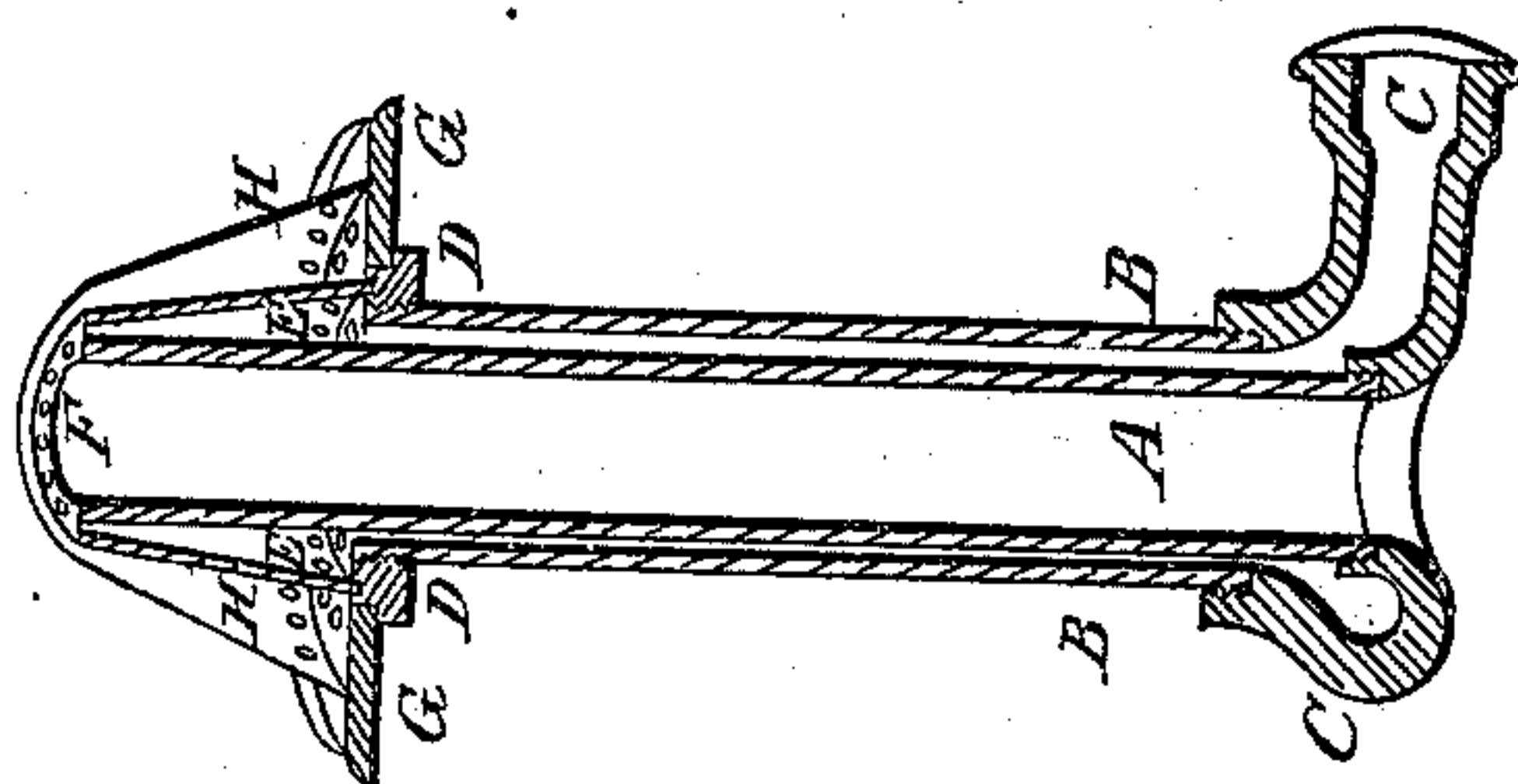
Fig. 1.



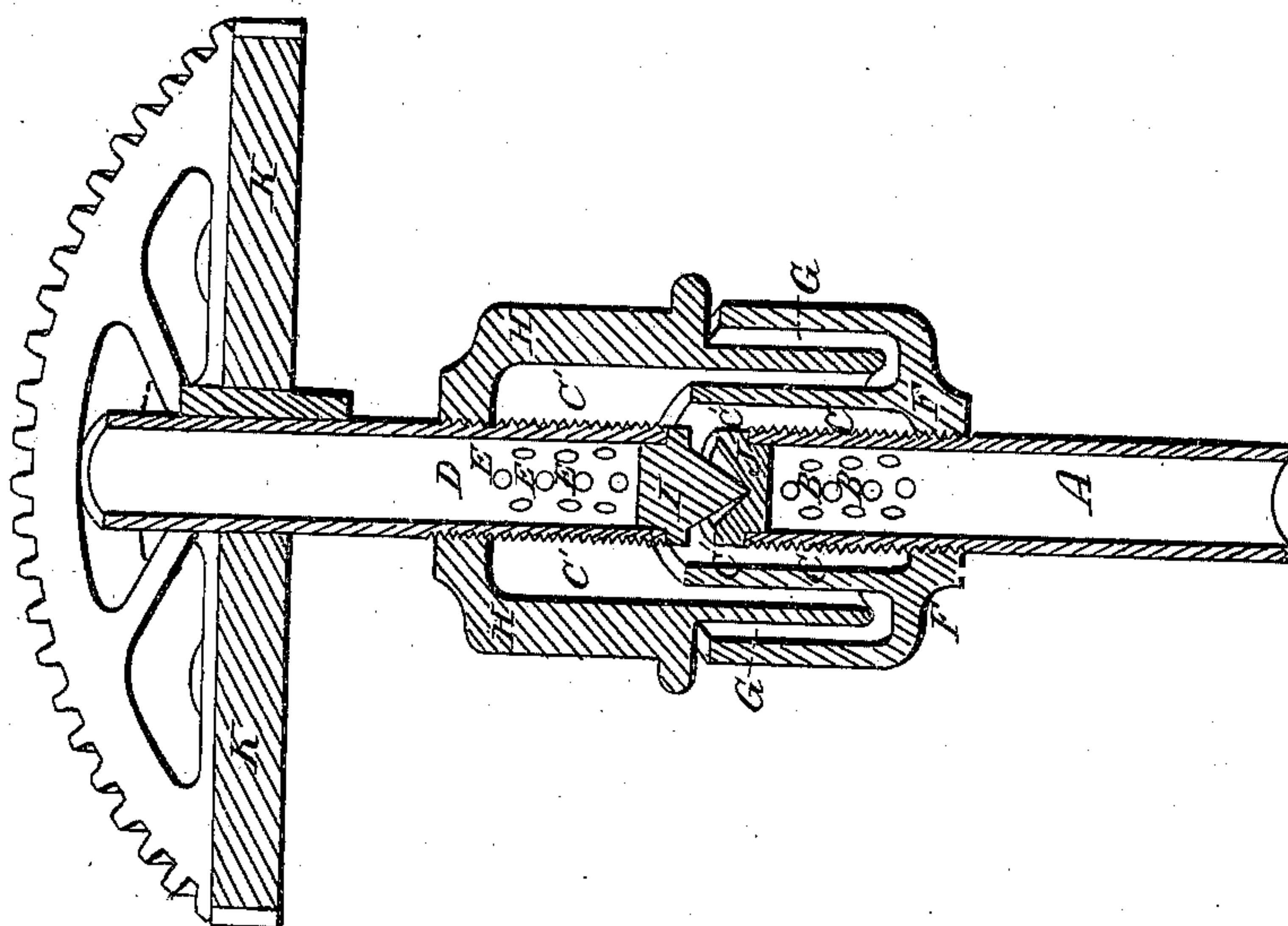
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*B. F. Coston.*  
*Gas Generator.*  
*N<sup>o</sup> 3,894.* *Patented Jan. 31, 1845.*

*Fig. 3.*



*Fig. 2.*

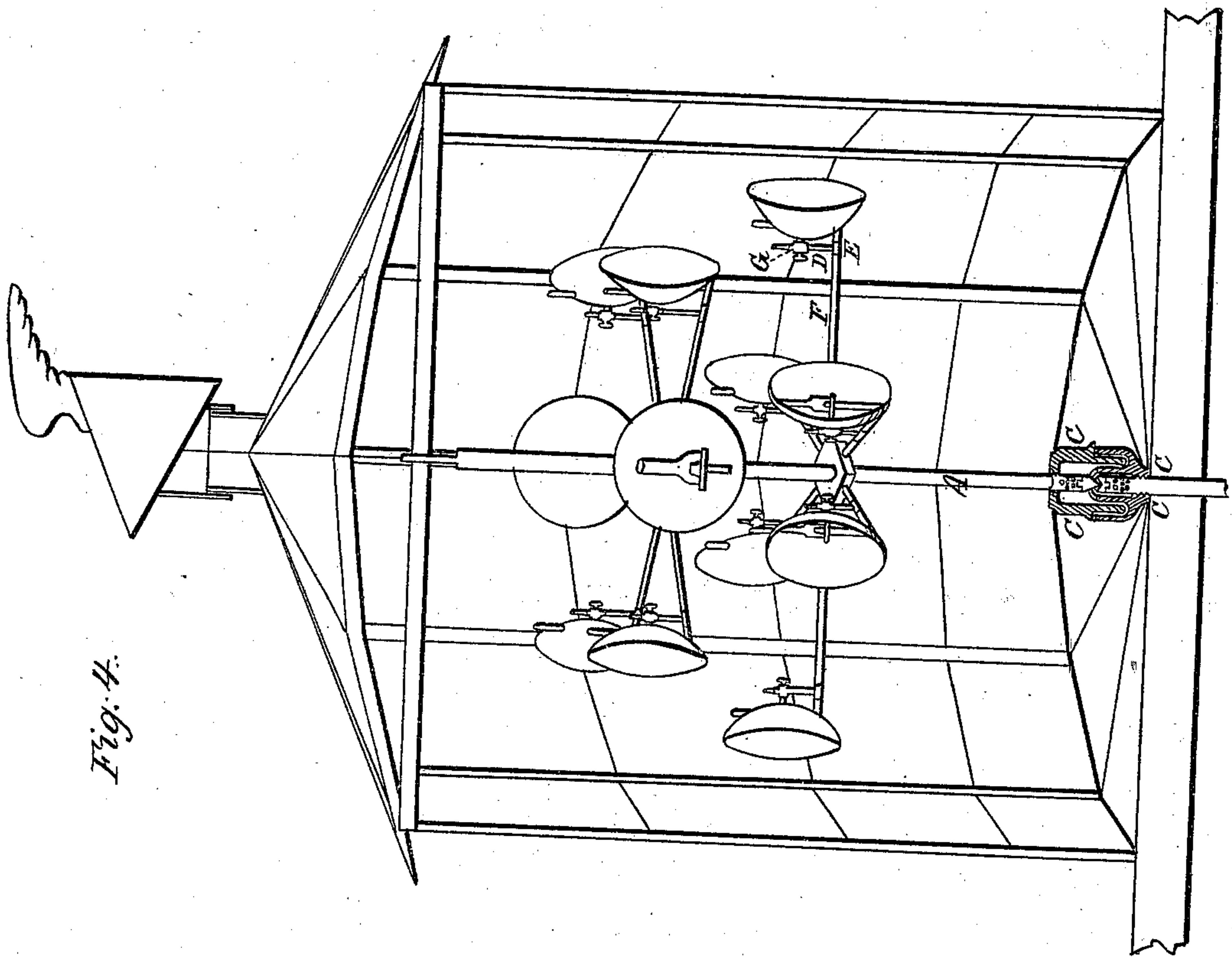


Sheet 3,  
3 Sheets

*B. F. Coston.*  
*Gas Generator.*

*N<sup>o</sup> 3,894.*

*Patented Jan. 31, 1845*





# UNITED STATES PATENT OFFICE.

BENJAMIN F. COSTON, OF WASHINGTON, DISTRICT OF COLUMBIA.

## GENERATING AND BURNING GAS FOR LIGHT-HOUSES.

Specification of Letters Patent No. 3,894, dated January 31, 1845.

*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 improved apparatus for generating, condensing, 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, reference being had to the accompanying drawings, in which—

No. 1 is a vertical section through the apparatus 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 section of a light house lantern showing the arrangement 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 flanch that projects upward and in one side of which is an opening (c) for the smoke pipe; on this flanch 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 extends through the furnace horizontally from one end to the other and below it the fire chamber E is situated having a grate  $\alpha$ , doors and ash pit of ordinary construction requiring no particular description. D represents the flue leading from the fire chamber around the retort to the exit pipe C, 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 falling into the condenser O, with which it communicates by a pipe J that inclines downward 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 composed of two annular chambers  $o, o$ , one above the other which are connected by a series 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 condenser 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 opening which has a pipe connected with it lettered 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 its 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 retort 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 communicate as shown by the dotted lines.

Drawing No. 2 represents a vertical section 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 flanch 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 or 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 flanch 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, 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 house 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, 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 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 revolving pipe as herein before explained.

BEN F. COSTON.

Witnesses:

J. J. GREENOUGH,  
T. C. DONN.