

FIRST AVAILABLE COPY

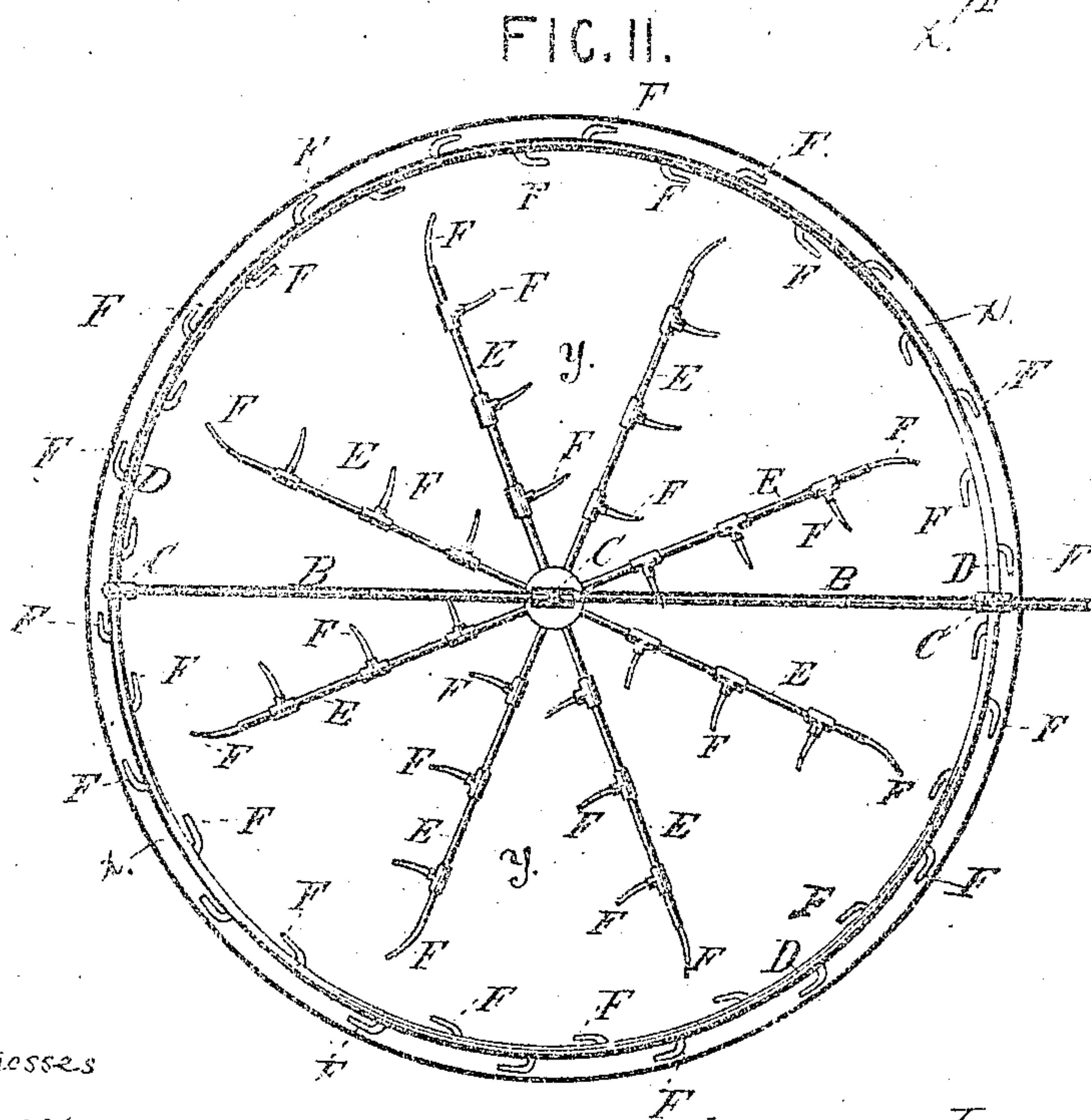
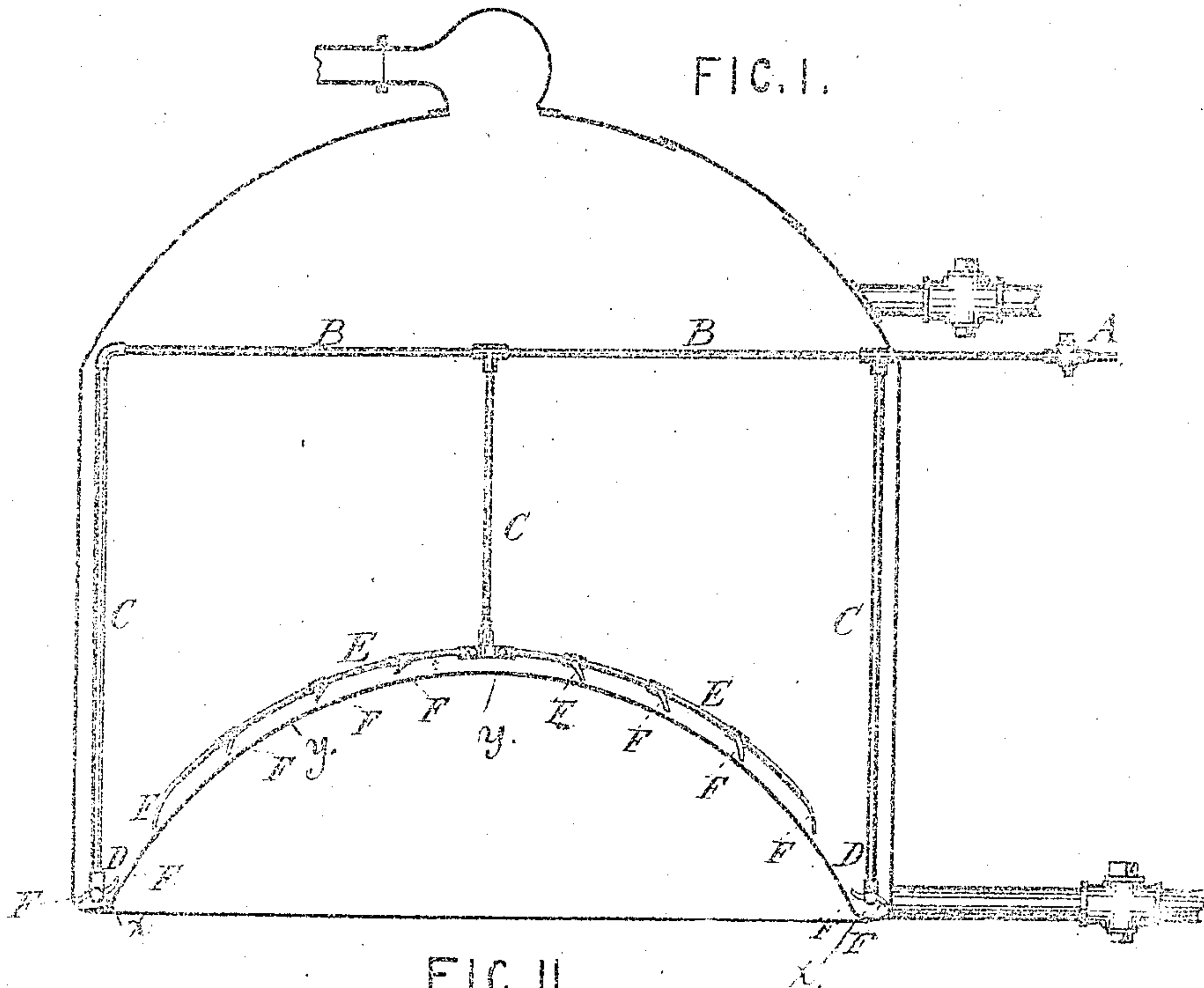
(No Model.)

G. C. TREWBY & H. W. FENNER.

DISTILLATION OF COAL TAR.

No. 252,981.

Patented Jan. 31, 1882.



Witnesses

M. Morris
R. S. Pearce

Inventors

George Charles Trewby
Henry William Fenner
by John J. Halsted, atty

UNITED STATES PATENT OFFICE.

GEORGE C. TREWBY AND HENRY W. FENNER, OF BECKTON, COUNTY OF ESSEX, ENGLAND.

DISTILLATION OF COAL-TAR.

SPECIFICATION forming part of Letters Patent No. 252,981, dated January 31, 1882.

Application filed April 6, 1881. (No model.) Patented in England September 9, 1879.

To all whom it may concern:

Be it known that we, GEORGE CARELESS TREWBY, civil engineer, and HENRY WILLIAM FENNER, manufacturing chemist, both of Beckton, in the county of Essex, England, have invented new and useful Improvements in the Distillation of Coal-Tar, (for which we have obtained a patent in Great Britain, No. 3,613, bearing date September 9, 1879,) which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

In the distillation of coal-tar as it has been ordinarily carried on prior to our invention the heating means to the stills employed has been that of the products of combustion applied externally of such stills, and it has been found necessary to employ such fire-heat at a much higher temperature, in order to eliminate the heavier oils or products, than their true distilling-points should demand. This necessity for undue heat has arisen from two causes—first, the resistance to the escape of the vapors offered by the viscosity and depth of the residual products contained in the still; second, the bad heat-conducting properties of those residual matters, preventing the diffusion of the heat applied to the still-bottoms, and which equable diffusion of heat is essential to the attainment of the best results. The application to still-bottoms in this way of excessive fire-heat has resulted in the decomposition and loss of valuable products, while the stagnation or want of diffusion of heat throughout the mass gives rise to carbonization of the pitch and an accumulation of coked matter on the interior surfaces of the stills more immediately exposed to the fire-heat, deadening same and obstructing the action of the fire. Hence it has been requisite periodically to suspend the working of the still in order to remove the coke that has thus accumulated, while the neglect of this precaution has been attended with loss and danger. When heavy oils or coal-tar have had to be worked this decomposition and coking of matters adjacent to the sides and bottoms of the stills has necessitated frequent renewals of still-bottoms, the cost of which, together with the resulting loss of working capacity during the standstill, has been found a serious drawback and a great

loss of profit to tar-distillers. It has been found, moreover, by tar-distillers, under systems in general use prior to our improvements, impossible to burn coke and other highly-heating fuels, although such fuels were otherwise very accessible and economical in cost. This unsuitableness arose from the concentration of the heat at the bottom of the still which resulted. On the contrary, when working under our improvements, we find that any such objection to the use of such fuels does not arise, and coke, or, in fact, fuel of any kind that is most accessible, may be employed with safety and success.

We have discovered that by arranging and applying numerous jets of steam, in conjunction with a suitable form of still-bottom, in such a manner that a film or sheet of steam is, during working, constantly maintained, spreading all over the interior surface of the still-bottom, (and sides in part,) being interposed between such bottom and the matters distilling, we prevent injurious contact of the pitch with the surface of the still-bottom, enabling the operation of boiling the tar to be rendered continuous and safe, and using less external heat and a more economical fuel. It would not effect the purpose we have in view and produce the beneficial results we have attained merely to pass steam through pipes or pipes and jets into the mass of the tar under distillation in the still, although some benefit might follow possibly from the incomplete stirring resulting, if boiling over were avoided, but sooner or later stagnation of a portion of the contents results, followed by loss of diffusion of heat, resultant carbonization, and coking of some of the pitch on the still-bottoms, and the mischief is done, eventually necessitating stoppages of working and loss.

We attain the objects set forth by the employment of mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical section, and Fig. 2 a horizontal section, of a still and its steam-supplying parts.

Similar letters refer to similar parts in both views.

The steam supplied may be of any convenient pressure.

Until the lighter products have been worked off by fire-heat, in the usual way, it is not nec-

5 necessary to employ the steam. These products
 having passed over, and it becoming requisite
 to operate on the heavy oils, steam is turned
 in by the steam-cock A, traversing through the
 10 main pipe B, which pipe is connected with the
 smaller branch pipes C C C, of which pipes the
 two outside lead the steam into the ring D, the
 center one leads it into the lesser branch pipes
 E, and these again lead the steam into numer-
 15 ous smaller outlet-pipes or distributing-pas-
 sages F. There are provided as many of these
 outlet-passages as may be found necessary to
 the proper maintenance and disposition of the
 film or interposing sheet of steam. The steam
 20 thus conveyed, subdivided, and spread out by
 jets ultimately strikes the gutter and crown of
 the still-bottom, diffusing itself in a constantly-
 renewing film or sheet, which acts upon the
 nearest surface or stratum of the mass of tar
 25 matters being acted upon, causing it to be con-
 stantly renewed. This steam, which, as stated,
 enters through the steam-cock A, is, in fact,
 split up and so divided and subdivided that in
 its passage through the tubes it becomes, by
 30 contact with the vapors and the boiling tar or
 pitch, superheated to about the temperature
 of that tar or pitch, which renders all risk of
 the tar boiling over, being caused by any sud-
 den expansion of the steam, impossible, while
 35 the increased pressure resulting from that
 superheating and expansion while the steam is
 still in transit gives increased force to cause in-
 tense agitation of the coal-tar within the still,
 with its resulting diffusion of heat; and, fur-
 40 ther, it greatly accelerates the liberation from
 the tar and expulsion from the still of the con-
 tained vapors.

Another great advantage and economy that
 results from our improvements is that from the
 40 time when the admission of steam through the
 pipe B and its distributaries has once fairly set
 up proper circulation in the mass of contained
 matter it is no longer requisite to increase the

fire which supplies the heat under the still, but
 it is merely desirable to maintain it just suffi- 45
 ciently to keep the contents of the still, aided
 by the steam, at an even temperature sufficient
 for the working, which may from time to time
 be ascertained by readings from a thermometer
 placed within a tube which passes from the top 50
 to within the still, the end of this tube within
 the still being closed, whereby the contents of
 the still are prevented escaping.

We are aware that prior to our invention it
 has been proposed to introduce various gases 55
 and also steam into tar-stills to stir the con-
 tents during distillation, but we do not claim
 the use of steam broadly for such purpose; but

What we do claim is—

1. The within-described apparatus for dis- 60
 tilling coal-tar, consisting of the main steam-
 pipe B, with its controlling-cock A, small
 branch pipes C, ring D, lesser branches E,
 and outlets or jets F, in conjunction with a
 suitable form of still-bottom, substantially as 65
 shown and described.

2. The still for distilling coal-tar, constructed
 with the outer surface of its bottom concave,
 and provided with a steam-pipe having the
 ring D and central pipe with branches E, this 70
 ring and the branches having numerous small
 outlet-pipes inclined respectively to the gutter
 and to the convex inner surface of the bottom
 of the still, for minutely subdividing the steam
 and causing it to strike the crown of the still- 75
 bottom and its gutter, as and for the purposes
 set forth.

In testimony whereof we, GEORGE CARE-
 LESS TREWBY and HENRY WILLIAM FENNER,
 have signed our names to this specification in 80
 the presence of two subscribing witnesses.

GEORGE CARELESS TREWBY.
 HENRY WILLIAM FENNER.

Witnesses:

F. J. NAYLOR,
 J. E. COVENTON.