(No Model.)

# E. R. TAYLOR.

## APPARATUS FOR THE MANUFACTURE OF CARBON BISULPHIDE.

No. 321,662. Patented July 7, 1885.

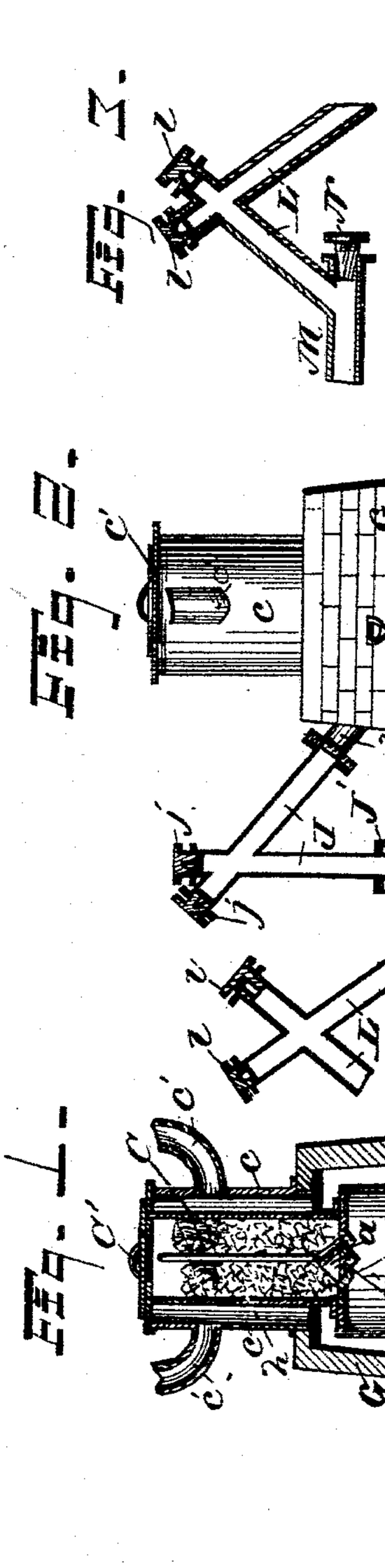
FIG. 1.


FIG. 2.


FIG. 3.


FIG. 4.

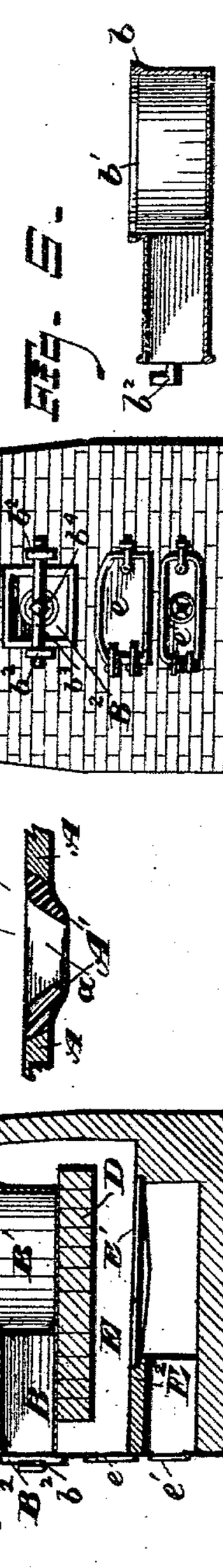
FIG. 5.

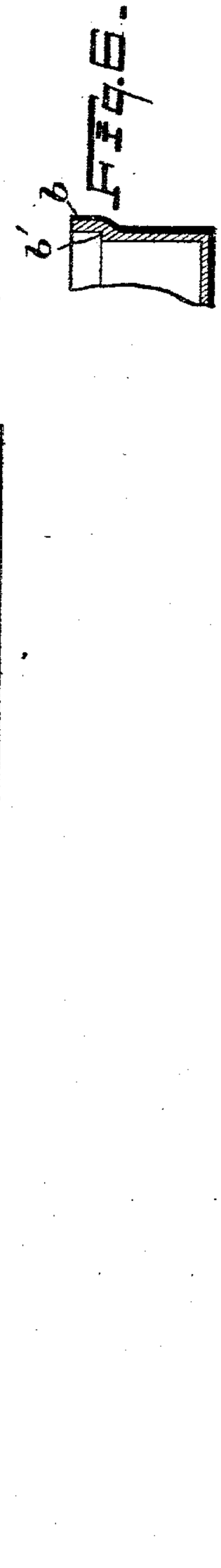
FIG. 6.


FIG. 7.

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR THE MANUFACTURE OF CARBON BISULPHIDE.

SPECIFICATION forming part of Letters Patent No. 321,662, dated July 7, 1885.

Application filed July 19, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD R. TAYLOR, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for the Manufacture of Bisulphide of Carbon; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in apparatus for the manufacture of bisulphide of carbon; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section of my improved apparatus through the center of the retorts and longitudinal with the furnace. Fig. 2 is a front elevation of the same, with the attached pipes and condensing apparatus shown in section. Fig. 3 is a vertical section of condensing-tubes that are a continuation of those shown in Fig. 2. Fig. 4 is a view in perspective of the lower retort. Fig. 5 is a longitudinal vertical section of the same. Fig. 6 is an enlarged vertical section of a portion of the said lower retort. Fig. 7 is an enlarged vertical section of the man-hole plate.

A represents the main retort, and consists of a hollow cast-iron cylinder provided with an upper head and man-hole plate, A′, that has an opening, *a*, of considerable size, that is closed by the stopper *a′*. This stopper is preferably in the form of two cones united at their base and provided with a long handle. By means of this peculiar shape the stopper is easily drawn up through the charcoal and as easily returned to its seat. The part A is also provided with the flanged nozzle $A^2$, for the attachment of pipes, as hereinafter shown. The part A is open at the lower end and rests upon a sub-retort that is also of cast-iron, and has a hollow rectangular part, B, and an upright hollow cylindrical part, B′, that are integral and their respective inclosed chambers in open relation with each other. The part B′ is closed at the bottom and open at the top, as shown in Figs. 1, 4, and 5, and has an offset upwardly-projecting flange, *b*, leaving a shoulder, *b′*, on which the part A rests, and a tight joint is made by packing clay or other refractory material between the flange *b* and the part A. The front end of the part B extends through the furnace-front, and is provided with hook-lugs $b^2$, that hold the cross-bar $b^3$. This bar has a set-screw, $b^4$, in the central part that holds the head or cover $B^2$ against the end of the part B, as shown in Fig. 2, the joint between the parts B and $B^2$ being also packed with clay or other suitable material. The sub-retort rests upon the arch D, that spans the fire-box laterally, but is less in length than the fire-box, leaving a space at either end of the arch for the upward passage of the products of combustion, as shown in Fig. 1. On top of the retort A is secured the cylindrical charcoal-container C, provided with a removable cover, C′, and is inclosed by the jacket *c*, that is provided with the smoke-pipes *c′*, and extends to near the bottom of the part C, where it joins the brick-work, as shown in Fig. 1.

E is the fire-box, E′, the grates, and $E^2$ a plate covered on top with brick-work, over which the fuel is passed to the grates. The grates, as shown, are located some distance from the furnace-front, so that more heat will pass up the rear passage-way and around the retort A, where the greatest heat is required. The furnace is provided in the usual manner with the furnace-door *e* and the ash-pit door *e′*.

F is a pot for melting sulphur, and has a removable cover, F′, and has a hole at the bottom closed by the stopper *f*. A flaring tube, *f′*, conducts the melting sulphur to the sub-retort. This tube is liable to become clogged with the sediment from the sulphur, to prevent which the tube is considerably larger than the hole leading to it from the sulphur-pot, and increases in size toward the sub-retort, as shown. This tube is usually located near one side of the pot, so that the handle of the stopper *f* is more out of the way. The brick setting G inclosing the retort is, above the furnace, preferably pyramidal, so that the hot-air chamber H around the retort A is contracted about the upper end of the retort, and the heat thereby more or less confined in the chamber. The walls extend above the retort A, as shown, so that the chamber H is in open

relation with the chamber *h* that surrounds the container C. The front wall is breasted out at G′ and made to inclose the chamber H′ around the sulphur-pot. A flue, I, connects the chambers H and H′, and may be provided with a damper, *i*, to control the amount of heat admitted to the chamber H′. The tubes that conduct the vaporized products from the retort A to the condenser have usually been the source of much annoyance. The expansion and contraction of the parts rendered it extremely difficult to keep tight joints at the ends of these tubes; also, these tubes are liable to become clogged with free sulphur that is carried over with the volatilized products. To remedy these difficulties, I have devised the following-described mechanism: To the flanged nozzle $A^2$, I bolt the flanged end of the angular pipe J, one leg of which is vertical, as shown in Fig. 2, and has near the bottom attached the vertical cup J′, the depending rim of which extends into the annular recess or cup *k* of the sulphur-box K. The cup *k* is filled with glycerine or other liquid that will retain the vapor in the box and exclude the air. The tube J may, therefore, be raised or lowered a trifle by the expansion or contraction of the retort without injury. The upper ends of the part J are provided, respectively, with the removable stoppers *j*′. These stoppers may at any time be removed, and the free sulphur that is lodged in either leg of the pipe may be removed by a scraper, the straight legs in line with the respective stoppers rendering all parts of the tube accessible. The volatilized products that pass through the pipe are heavier than air and will not pass out at the upper end of the pipe when the plugs are removed. A pipe, L, provided with the stoppers *l*, arranged similar to those just described, and for the same purpose, leads from the box K to the condensing-tubes M. The latter is a long tube of considerable size, provided at either end with a stopper, N, and is submerged in a tank of water.

In operating the device the pot F is charged with sulphur and the retort A with charcoal, and a quantity of the latter is had in reserve in the container C. After the charcoal has become sufficiently heated in the retort and the sulphur is melted in the pot F, the stopper *f* is raised, and a quantity of the sulphur is discharged through the tube *f*′ into the sub-retort and at the part that is directly over the front passage-way from the furnace. The heat at this part of the sub-retort is sufficient to volatilize the sulphur, which, passing through and combining with the heated charcoal in the retort A, forms the bisulphide of carbon, that passes off through the tube J to the box K, and from thence through the tube L to the condensing-tube M. Any excess of volatilized sulphur that does not thus combine with the charcoal, and that is carried off with the other vapor, will be condensed and collected as free sulphur in the box K, from which, from time to time, it may be removed. As the charcoal in the retort A becomes exhausted of carbon, by raising the stopper *a*′ a fresh supply may be introduced from the charger C, and the charger may in turn be replenished by raising the cover C′. The charcoal in the charger becomes heated by what would otherwise be wasted heat, that passes from the chamber H through the chamber *h*, and when introduced into the retort does not retard the chemical union there taking place. Sulphur may from time to time be added to the contents of the pot F, so that there will always be a supply of melted sulphur, and the process of manufacturing the bisulphide of carbon is thus made continuous.

What I claim is—

1. In an apparatus for the manufacture of bisulphide of carbon, the combination, with a furnace, a vertical retort located therein, and a container located above the retort, of a sulphur-box, pipes connecting the retort and sulphur-box, and condensing-tubes connected with the sulphur-box.

2. In an apparatus for the manufacture of bisulphide of carbon, the combination, with a furnace, a vertical retort located therein, and a charcoal-container located above the retort, of the sulphur-box having a flanged opening, a cup surrounding said flanged opening, pipes connecting the retort and sulphur-box, and provided with an inverted cup the lower edge of which rests between the flange and the cup of the sulphur-box, and a pipe leading from said sulphur-box, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 19th day of June, 1884.

EDWARD R. TAYLOR.

Witnesses:
CHAS. H. DORER,
ALBERT E. LYNCH.