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PRODUCTION OF CARBON DISULPHIDE

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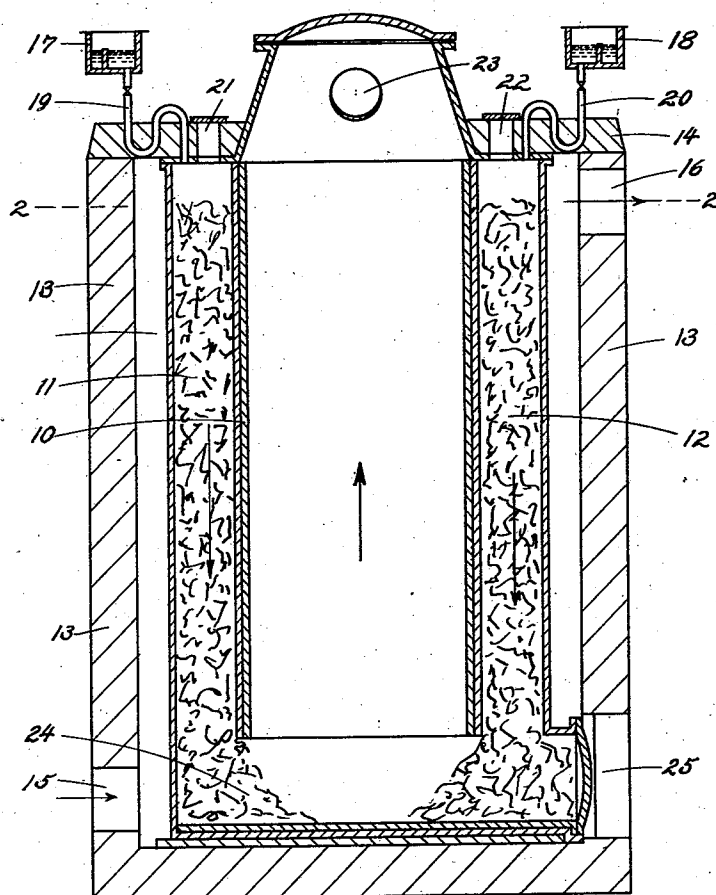


Fig. 1

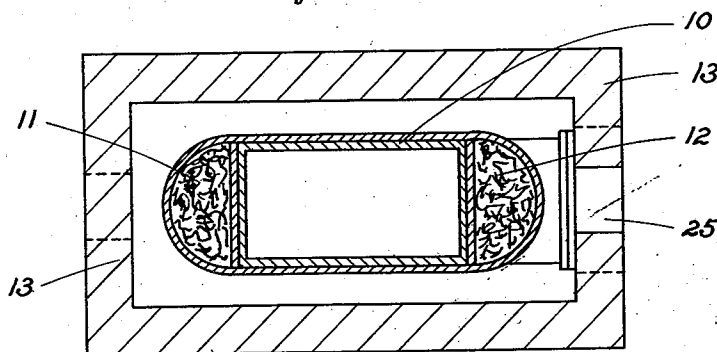


Fig. 2

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PRODUCTION OF CARBON DISULPHIDE

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1 Claim. (Cl. 23—206)

This invention relates to a process of and apparatus for the production of carbon disulphide.

Among the processes at present employed for the production of carbon disulphide from sulphur and charcoal, those in which the sulphur is not brought into reaction with the highly heated charcoal, until the former has been vaporized and superheated, are distinguished by the highest output per unit of utilizable retort capacity. A process of this kind is known in which the retort is provided with at least one attachment, which extends over the entire length of the retort and is bounded by the reaction chamber, and into which the sulphur is charged from above and is vaporized and superheated during its descent before passing from the lower end into the charge of wood charcoal in the reaction chamber. Said attachment is fitted with a ceramic substance which serves to increase its superficial area, and may also be in the form of pans with relatively offset bottom openings. If a pure commercial sulphur be employed for the process, the furnace can be run continuously for a very long period before the fittings of the attachment will need cleaning.

This condition is however, substantially altered when grades of sulphur are employed which, by reason of their origin, contain appreciable quantities of such inorganic and organic impurities as are not volatile at the vaporizing temperature of the sulphur. In such cases the necessity for stopping work for cleaning purposes, will become more frequent, approximately in proportion to the degree of contamination, if the clogging of the vaporizing chamber is to be avoided.

In view of this, the problem arises of devising a process which is not attended with such stoppages of work, but on the contrary, enables the plant to be operated, as continuously as possible, with any grade of sulphur.

It has been ascertained that the continuity of working may be maintained if care be taken to arrange that in the case of the process with separate feed, vaporization and (if desired) superheating of the sulphur, the non-vaporizable residues automatically ensure their discharge from the furnace by being deposited on charcoal which is mixed with the charge of sulphur and, in accordance with the progressive consumption of the charcoal, take part in the descent of the sulphur pari passu with the movement of the charcoal in the reaction chamber. Thus, the impurities carried onward by the sulphur pass with the residual ash of the charcoal into the

slag chamber at the foot of the reaction chamber, from which they are cleared or ejected at intervals.

The herein described process may be carried out in an apparatus similar to that shown by way of example in the accompanying drawing wherein:

Fig. 1 is a cross-sectional view and

Fig. 2 is a cross-sectional plan view of the apparatus shown in Fig. 1 of line 2—2.

The apparatus comprises a reaction chamber 10 at either side of which vaporizing chambers 11 and 12 are located. Said chambers are placed in the path of hot gases entering the apparatus comprising walls 13 and cover 14 through opening 15 and leaving by way of opening 16. Liquid sulphur is fed into the vaporizing chambers 11 and 12 from containers 17 and 18 by way of pipes 19 and 20 respectively. Coke and/or charcoal is intermittently fed into the vaporizing chambers 11 and 12 by way of openings 21 and 22 respectively. As the liquid sulphur and the coke or charcoal pass down vaporizing chambers 11 and 12, the sulphur becomes vaporized and the non-vaporizable constituents of the sulphur are deposited upon the downward moving charcoal. The vaporized sulphur then passes out of vaporizing chambers 11 and 12 and enters reaction chamber 10 to react with other downwardly moving coke or charcoal in said reaction chamber to form carbon disulphide which is removed by way of opening 23 at top of reaction chamber 10. The coke and/or charcoal in the lower portion of vaporizing chambers 11 and 12 are, by reason of the higher temperature and their contact with the vaporized sulphur, gradually used up to form carbon disulphide with the sulphur. The entire mass of coke and/or charcoal, therefore, gradually moves in a downward direction as the lower portions are used up so that eventually the solid material at the bottom 24 of the chambers consists mostly of the ash of the coke and/or charcoal and the non-vaporizable materials deposited by the vaporized sulphur. This solid material is removed by way of opening 25 at suitable intervals.

It is, however, not intended to limit the carrying out of applicant's process to only the apparatus shown in the drawing. The process may be carried out in any furnace which is operated on the principle that both the coke and/or charcoal of the reaction chamber and that serving to carry away the impurities in the vaporizing chamber or chambers travel downwards pari passu while being consumed, the sulphur in a

vaporizing chamber (separated from the reaction chamber) moving downwards and the sulphur vapors having entered the reaction chamber moving upwards with the generated carbon disulphide vapor.

5 The vaporizing chamber or chambers may be arranged in known manner for example, in the form of tubes, inside or outside the retort surrounding the reaction chamber, in the heating
10 chamber of the carbon disulphide furnace. For example, a wide, elliptical cast steel retort can be divided into a central reaction chamber and two lateral vaporizing chambers by separating the two highly curved spaces situated near the
15 foci of the ellipse, by means of built-in partitions extending nearly to the bottom.

The process may also, for example be carried out in an apparatus of the kind described in U. S. specification No. 1,793,181 by replacing the
20 ceramic fillers of the retort attachment by coke and/or wood charcoal. The consumption of the carbon is smaller in this attachment than in the reaction chamber, and it is easy to ascertain by experiments as to the requisite adjustment of
25 temperature, what amounts of charcoal must be

introduced per unit period, for each kind of sulphur used, in accordance with the amount and kind of impurities in the sulphur, in order to ensure continuity of working during a sufficient period of time.

5 The retort and vaporizing chambers can be heated in known manner by gas, or internal (or external) electric heating systems.

What I claim is:

In a process of making carbon disulphide, 10 maintaining a number of separate masses consisting of a substance of the class comprising coke and charcoal in separate zones, introducing sulphur in non-vapor form into one of said
15 zones and conducting it through the charcoal or coke therein to vaporize and superheat the sulphur, conducting the sulphur vapor to another of said zones to react therein to form carbon
20 disulphide, replenishing the said substance in the first of said zones independently of said second zone and removing the ash and slag containing impurities present in said sulphur from below the first said zone.

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