April 27, 1943. F. J. WEST ET AL 2,317,838

RETORT DISCHARGE MECHANISM

Filed Aug. 30, 1941 3 Sheets-Sheet 1

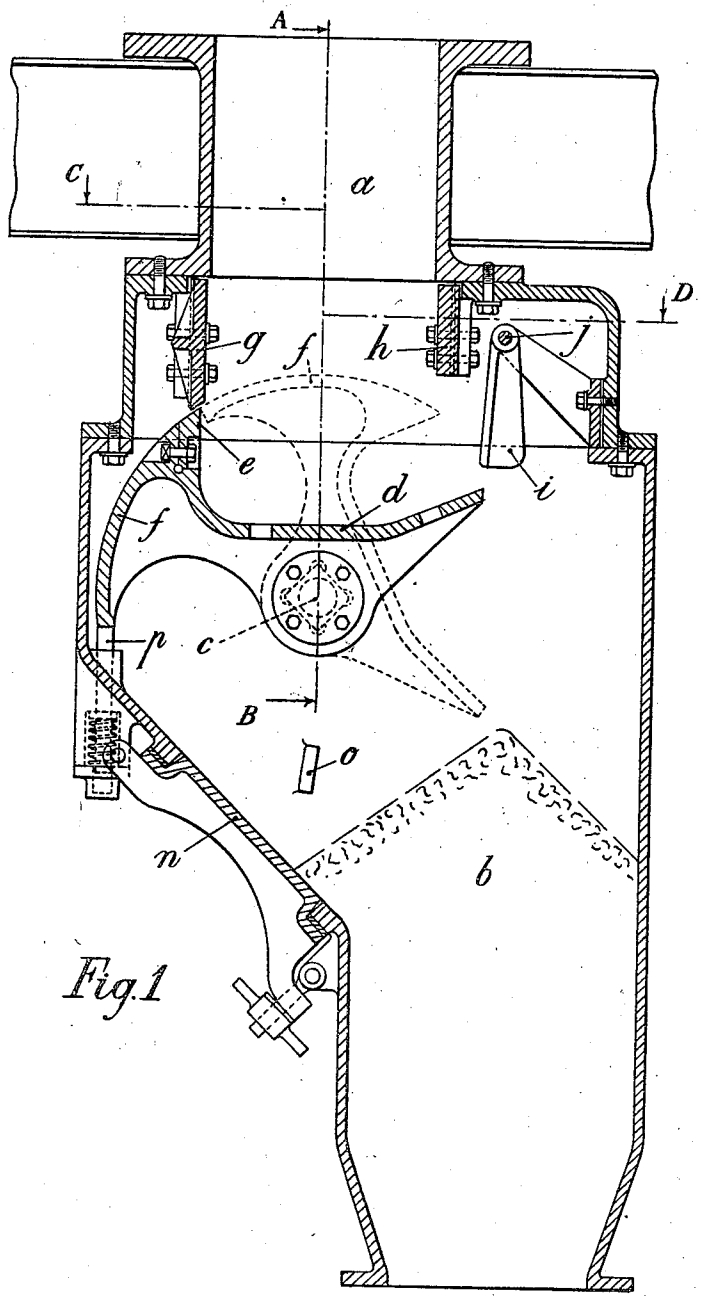


Fig. 1

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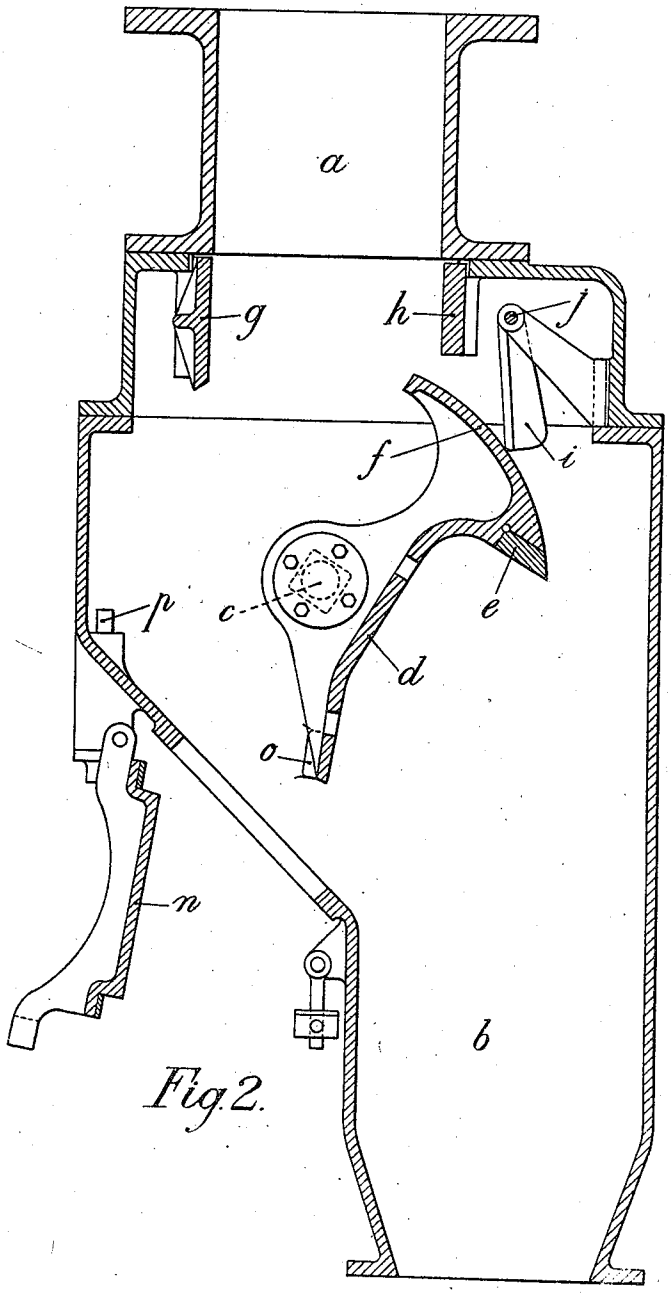


Fig. 2.

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Filed Aug. 30, 1941 3 Sheets-Sheet 3

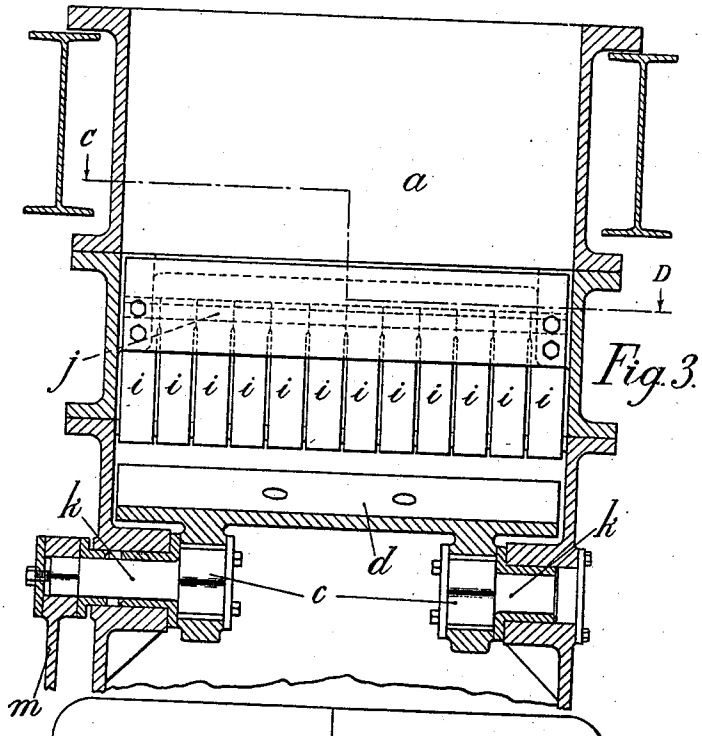


Fig. 3.

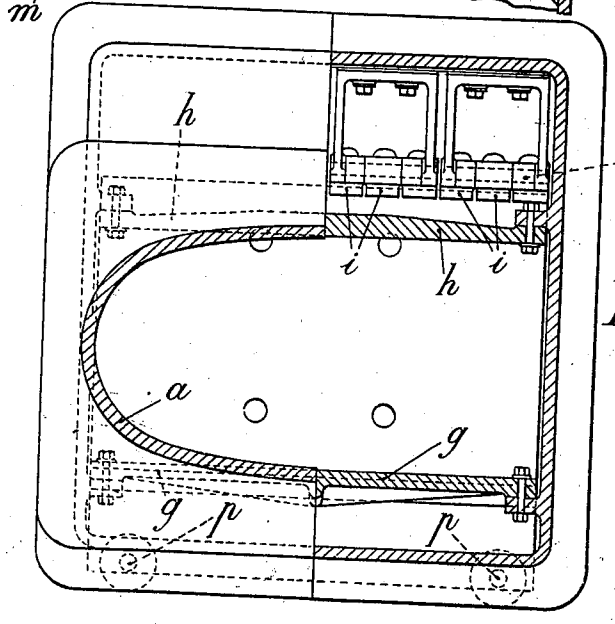


Fig. 4.

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Patented Apr. 27, 1943

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UNITED STATES PATENT OFFICE

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RETORT DISCHARGE MECHANISM

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Application August 30, 1941, Serial No. 409,082
In Great Britain September 14, 1940

2 Claims. (Cl. 214—18)

This invention relates to vertical retorts for the continuous carbonisation of coal and the like and is concerned with the extractor by which the coke is withdrawn from the base of the retort as carbonisation proceeds.

The object of the invention is to provide an improved extractor of the oscillatory type which effects extraction uniformly over the whole length of the retort.

The invention consists in a coke extractor for a vertical retort for the continuous carbonisation of coal and the like comprising (1) a base or step upon which the coke at the base of the retort rests when the extractor is in its service position, (2) a riser or vertical side which when the extractor is in its service position constitutes a continuation downwards to the base or step of a wall of the retort and (3) a cut-off plate extending rearward from the top of the riser in the form of part of a cylinder, with its axis at the extractor axis, with means for moving the extractor from its service position in which the base or step supports the charge in the retort, to the coke discharge position in which the cut-off plate supports such charge whilst the coke upon the base and within the volume swept by the cut-off plate is discharged to a chamber below, and to a third position which gives access to the retort from below.

Referring to the accompanying explanatory drawings:

Figure 1 is a sectional elevation of the base of a retort and the coke chamber, with a coke extractor constructed and arranged in one convenient form in accordance with this invention.

Figure 2 is a view similar to Figure 1 but with the extractor in a position to permit inspection and repair of the retort.

Figure 3 is a sectional elevation on the line A B of Figure 1.

Figure 4 is a sectional plan view on the irregular line C D of Figures 1 and 3.

a indicates the base of the retort and *b* the coke chamber. The coke extractor which turns about the horizontal axis *c* comprises (1) a base or step *d* upon which the coke rests when the extractor is in its service position as shown in full lines in Figure 1, (2) a riser or vertical side *e* which with the extractor in its service position constitutes a continuation of a wall of the retort and (3) a cut-off plate *f* which is part of a cylinder having its axis at *c*.

The retort side walls have renewable continuation pieces *g* and *h* at opposite sides, the piece *g* coming substantially into line with the riser or vertical side *e* of the extractor. The length of the piece *h* is such as to provide a clearance between itself and the leading edge of the cut-off plate *f* so that when the extractor is turned from the full line to the dotted line position in Figure 1 in order to effect coke discharge, trapping of the coke between such leading edge and the piece *h* will not prevent the full movement of the extractor.

We also provide a series of plates *i* freely suspended at their upper ends from a spindle or spindles *j* at the side of the extractor at which coke discharge takes place, such plates serving to limit or prevent flow of coke off the extractor from the retort when the extractor is returned to its service position beneath the retort after a coke discharge operation. It will be appreciated that when the extractor returns to its service position there is a vertical drop of coke from the retort on to the stop or base *d*.

The extractor is carried by two trunnion like spindles *k* to one of which may be secured a crank arm *m* (see Figure 3) by which oscillatory movements are imparted to the extractor with the aid of any suitable reciprocatory mechanism not shown.

There is a door *n* upon the coke chamber which when opened as shown in Figure 2, and with the extractor also as shown in Figure 2 against any suitable stop such as *o*, permits rods or the like to be passed up into the retort for inspection and repair or other purposes.

There is a resilient stop at *p* to limit the movement of the extractor when it is being returned to its service position after a coke discharge operation.

When the retort is in normal operation, the charge in the retort is supported by the base or step *d* of the extractor. When coke discharge is to be effected, the extractor cuts off from the charge above it, the coke which comes within the volume swept out by the cut off plate *f* of the extractor in moving from the full to the dotted line position in Figure 1. Such cut-off plate then supports the charge in the retort. After coke discharge, the extractor is returned to its full line position, and there is a fall or drop of the charge in the retort through a vertical height corresponding to that of the step *e*. This vertical drop of the charge as a whole in the retort is important in securing satisfactory working. It will be noted that the movement of the extractor from the service to the coke discharge position, that is from the full line to the dotted line position in Figure 1, does not

involve any appreciable amount of lifting of the charge in the retort which is also of great importance in securing satisfactory operation of the retort. From Figure 4 it will be seen that the coke extractor operates over the entire length and width of the base of the retort.

The extractor is operated at intervals. For example, a complete forward and return stroke may be made at intervals of from 30 to 45 minutes, this period depending upon the rate at which carbonization proceeds in the retort. The forward and return speeds may be different. The volume of coke tipped into the coke chamber is approximately equal to the volume swept out by the extractor between its vertical side or riser and the bottom or step upon which the coke rests.

What we claim is:

1. Coke discharging means for a vertical retort for the continuous carbonisation of coal and the like comprising, in combination, a fixed coke chamber beneath the retort, an oscillatory extractor located in said coke chamber, extending the full length of the retort, and moved about an axis extending across such chamber beneath the open bottom of the retort, the said extractor comprising a base or step upon which the coke dropping from the retort rests and which is horizontal when coke discharge is being prevented, a riser or vertical side which constitutes a continuation of a side of the retort when coke discharge is being prevented, and a cut-off plate constituting a part of a cylinder with its axis coincident with the axis about which the extractor oscillates, the said plate being clear of the retort bottom when coke discharge is not taking place but moving across the bottom of the retort to support the charge in the latter when coke discharge is taking place, the volume of coke discharged into the coke chamber at each extraction being approximately equal to the volume swept out by the extractor between its riser or vertical side and the base or step upon which the coke rests.

2. Coke discharging means as claimed in claim 1, having in the coke chamber a series of plates freely suspended from a spindle extending the length of the retort at the side of the latter at which coke discharge takes place, the said plates extending below the retort to limit or prevent flow of coke off the extractor when the latter returns to its service position to prevent coke discharge, after a coke discharge operation.

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