March 18, 1930. G. CANTIENY 1,751,127

ROTARY RETORT, KILN, OR DRUM

Filed March 8, 1924 2 Sheets-Sheet 1

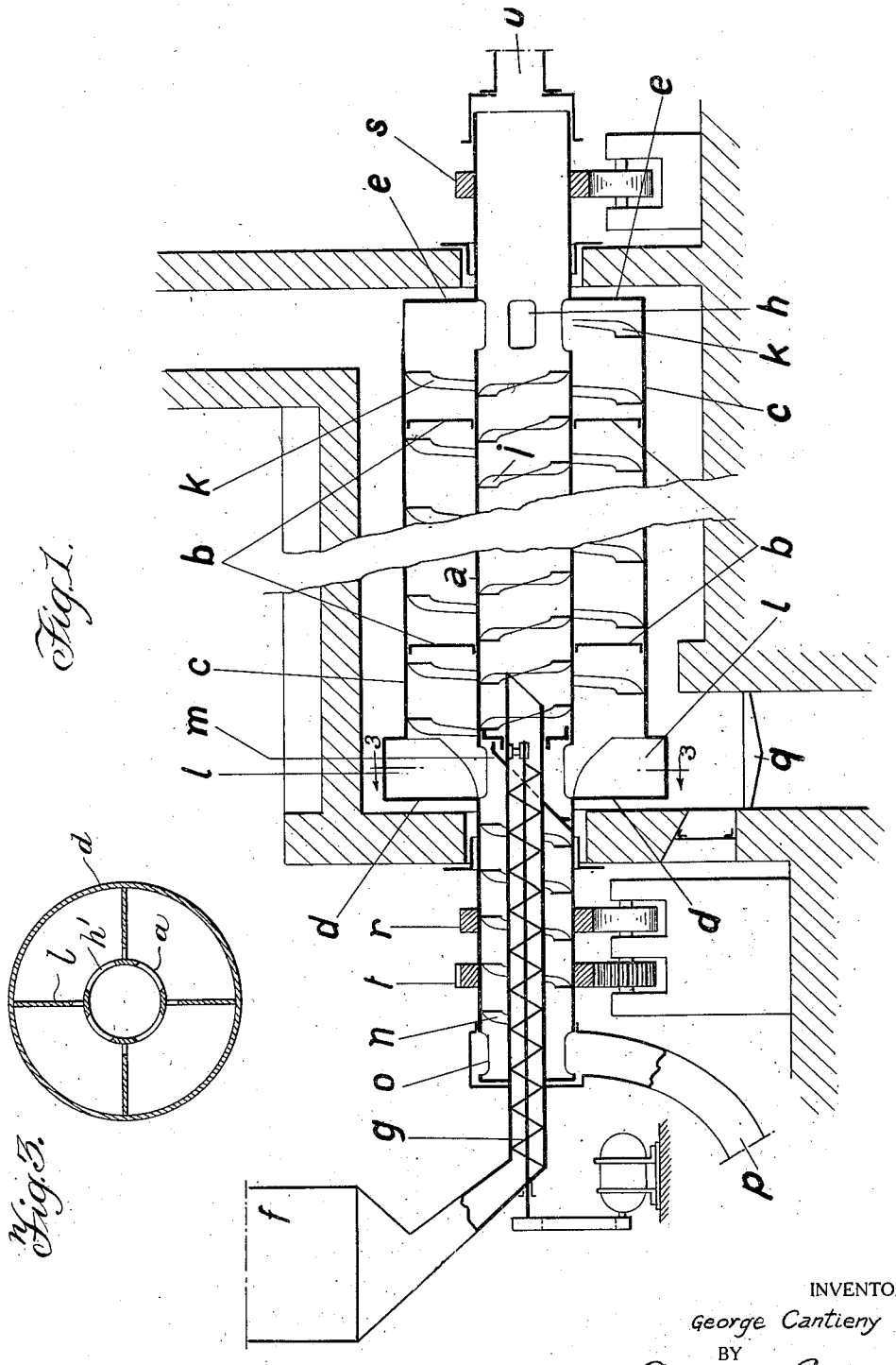


Fig. 1.

Fig. 3.

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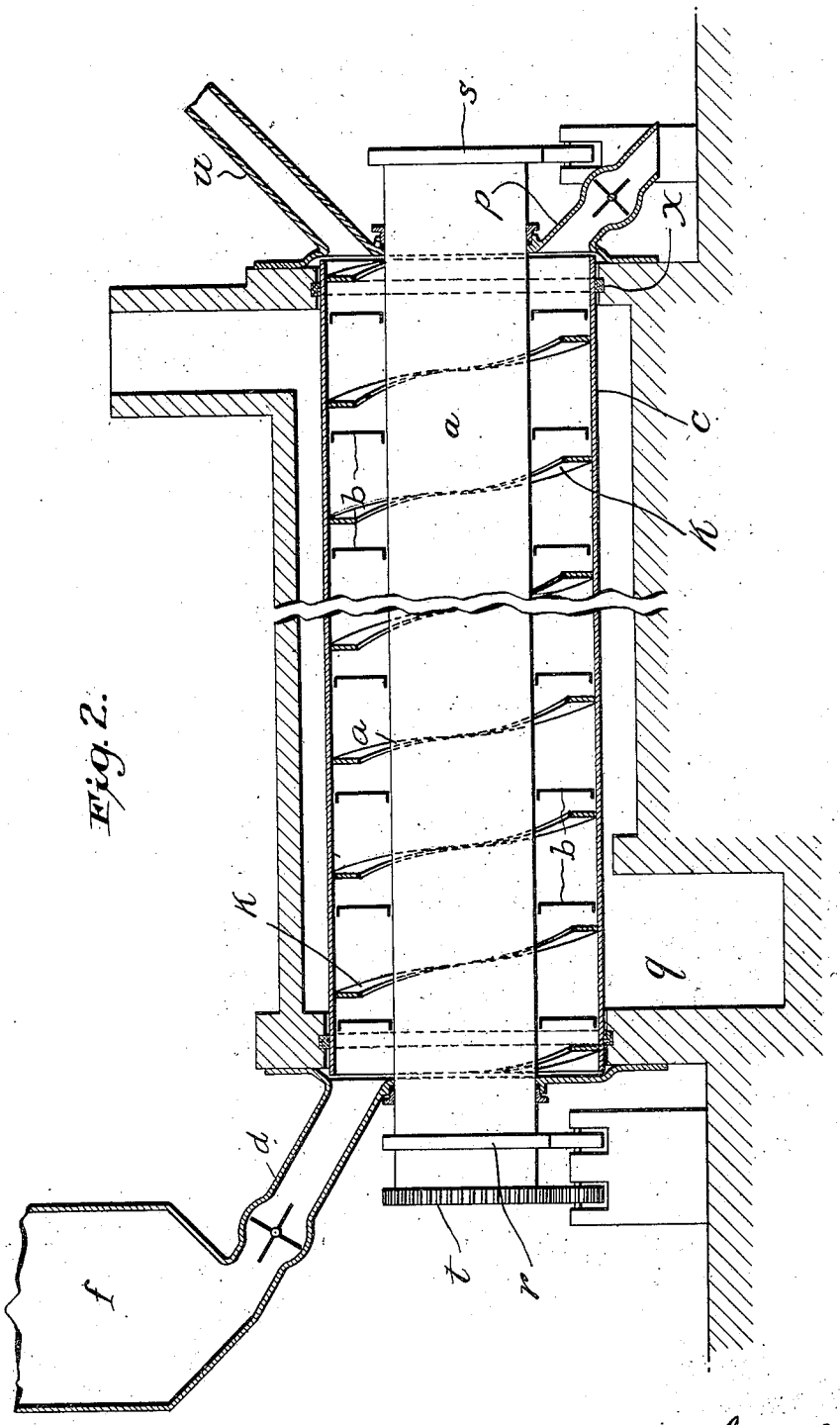


Fig. 2.

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Patented Mar. 18, 1930 1,751,127

UNITED STATES PATENT OFFICE

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ROTARY RETORT, KILN, OR DRUM

Application filed March 8, 1924, Serial No. 697,694, and in Germany March 24, 1923.

Some difficulty has always been experienced with regard to the construction of the ends of rotary retorts, kilns or drums for the distillation of coal and the like, as by means of these ends the drum is supported, while at the same time through one of them the drive is effected. The ends must therefore be built particularly strongly and above all very rigidly so that the running rings mounted thereon cannot bend or become otherwise disfigured. It is very difficult to avoid this, as in consequence of the walls of the drum becoming heated any warping or disfigurement thereof will be easily transmitted to the drum ends. In case of distillation drums comprising an inner frame for supporting the outer and heated cover the drum ends must also house this supporting frame whereby further complications in the design are caused.

According to the present invention these difficulties are overcome by extending the supporting frame beyond both ends of the drum and by mounting the running rings and the driving device for the drum on the projecting parts of the supporting frame. The actual drum ends may then be made simple and comparatively weak as no external forces are acting upon them. In most cases it will suffice if they consist of a thin wall which if necessary may be flexible even with regard to heat expansions of the exterior drum wall. The stiffening of the latter against the inner supporting frame is effected by means of supporting members of a known construction.

The invention is clearly illustrated in the accompanying drawings in which—

Figure 1 shows one form of construction according to which the coal to be treated is fed into the same end of the structure from which the treated or partially distilled coal leaves; and Figure 2 shows a form of construction according to which the coal to be treated enters at one end and the treated or partially distilled coal leaves from the other end.

Figure 1 is a longitudinal section of the construction embodied therein. According to this figure there is a rotary retort, kiln or drum with the secondary or associated apparatus belonging or pertaining thereto.

Figure 3 is a section taken on the line 3—3 of Figure 1 with the conveyor, conveyor casing and associated parts omitted for the sake of clarity.

The inner supporting frame *a* by means of the supporting members *b* carries the actual distillation drum *c* which is closed at the ends by means of comparatively weak walls *d* and *e*, so that if necessary the drum ends may flex with regard to the heat expansion of the exterior drum wall. The heating of the drum is effected in a known manner by means of a furnace *q*. The material is suitably fed as from a hopper *f* onto the screw conveyer *g*, by means of which it is brought into the cylindrical supporting frame *a*. The interior of this frame is fitted with left hand screwed blades *i* which move the material forward until it reaches the openings *h* through which it drops into the drum *c*. The interior of this drum carries right hand screwed blades *k*. These blades *k* move the material until it reaches the lifters *l* which lift the material or partially distilled coal until it slides therefrom and falls through openings *h'* in the cylindrical frame *a* (see Fig. 3) onto the deflecting plate *m* which is supported by the casing which surrounds the screw conveyor *g*. The deflecting plate *m* throws the material into the rear portion of the cylindrical supporting frame *a* which is fitted with right hand screwed blades *n*. The material is continued to be moved till it reaches the openings *o* of the cylindrical supporting frame *a* through which it drops into the outlet tube *p*.

The supporting frame *a* extends on both ends thereof beyond the ends of the drum *c* and carries here the running rings *r* and *s* which rest on supporting rollers. The driving wheel *t* is the medium through which the rotary movement is imparted.

Referring now to the structure of Figure 2, it will be noted that there is an inner frame *a* by means of which the supporting members *b* carry the actual distillation retort or drum *c* and supports the same throughout its length. The packing rings *x* are interposed

between the drums *c* and masonry of the furnace. The raw material is suitably introduced as through feed tube *d* connected to a hopper *f* and the distilled material, to wit, the partially distilled coal, is discharged at the opposite end of the apparatus, as though the discharge tube *p*. The retort or drum *c* is externally heated by means of furnace *q*. The inner or supporting frame *a* extends at both ends thereof beyond the retort or drum ends and carries here the running rings *t* and *s* which rest upon supporting rollers, and the driving wheel *r* is the medium through which the rotary movement is imparted. The actual retort or drum *c* is thus completely free from any strains incident to the driving or support of any other parts and any eventual disfiguring due to the heat or the weight of the material within the retort or drum can have no detrimental effect on the running rings or on the driving wheel, or on the proper working of either of them.

The retort is also provided with any suitable means indicated as *u* for withdrawing from the distillation chamber vapors and hydro-carbons given off during the distillation process. In the form of apparatus illustrated in either Figures 1 or 2, it will be noted that the distillation drum *c* is in fact an exterior drum of the distillation chamber and that this distillation drum *c* is properly and sometimes referred to as the rotatable heat interchanging drum of the distillation chamber while the inner supporting frame *a* for the distillation chamber is properly referred to as the main carrying member or main supporting member for the distillation chamber. In each form of the apparatus illustrated as in Figures 1 and 2 there is of course suitable means comprising screw conveyor *g* of Figure 1 or feed tube *d* of Figure 2, for feeding the material to the interior of the distillation chamber, suitable members as offtakes *u* for withdrawing from the distillation chamber vapors and hydrocarbons given off during the distillation process, and suitable members as *p*, whereby the solid residuals are suitably removed from the apparatus.

What I claim and desire to secure by Letters Patent is:

1. In an apparatus for distilling coal or analogous materials, the combination of a distillation chamber comprising a rotatable heat interchanging drum which constitutes an exterior drum of the distillation chamber, means for feeding the material to the interior of the distillation chamber, means for withdrawing from the distillation chamber vapors and hydro-carbons given off during the distillation process, means whereby the solid residuals may be removed from the apparatus, and an inner supporting frame for the distillation chamber, the construction being characterized in that said inner supporting frame projects beyond each end of the exterior drum ends and is provided with carrying running rings and also a driving wheel arranged for effecting the turning of the distillation chamber through the medium of the inner supporting frame and without the exertion of external force on the exterior drum for effecting the turning, and supporting members extending from the inner supporting frame to the exterior drum.

2. In an apparatus for distilling coal or analogous materials, the combination of a distillation chamber comprising a rotatable heat interchnging drum which constitutes an exterior drum of the distillation chamber, means for feeding the material to the exterior of the distillation chamber, means for withdrawing from the distillation chamber vapors and hydro-carbons given off during the distillation process, means whereby the solid residuals may be removed from the apparatus, and an inner supporting frame for the distillation chamber, the construction being characterized in that said inner supporting frame projects beyond each end of the exterior drum and is provided with carrying running rings and also a driving wheel arranged for effecting the turning of the distillation chamber through the medium of the inner supporting frame and without the exertion of external force on the exterior drum for effecting the turning, and supporting members extending from the inner supporting frame to the exterior drum, the construction being further characterized by having comparatively weak and relatively thin drum ends extending from the inner supporting frame to the exterior drum so that if necessary the drum ends may flex with regard to the heat expansion of the exterior drum wall.

3. Apparatus for the distillation of coal or analogous materials including in combination a furnace chamber, a supporting frame extending through and projecting beyond the walls of said chamber at each end thereof, a distillation drum surrounding and supported on said frame within the chamber, means outside of the chamber for revolubly supporting said supporting frame, driving means outside of the chamber associated with said supporting frame, means for supplying material to be distilled to said distillation drum and means for removing the solid residues and the gaseous products of distillation from said distillation drum.

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