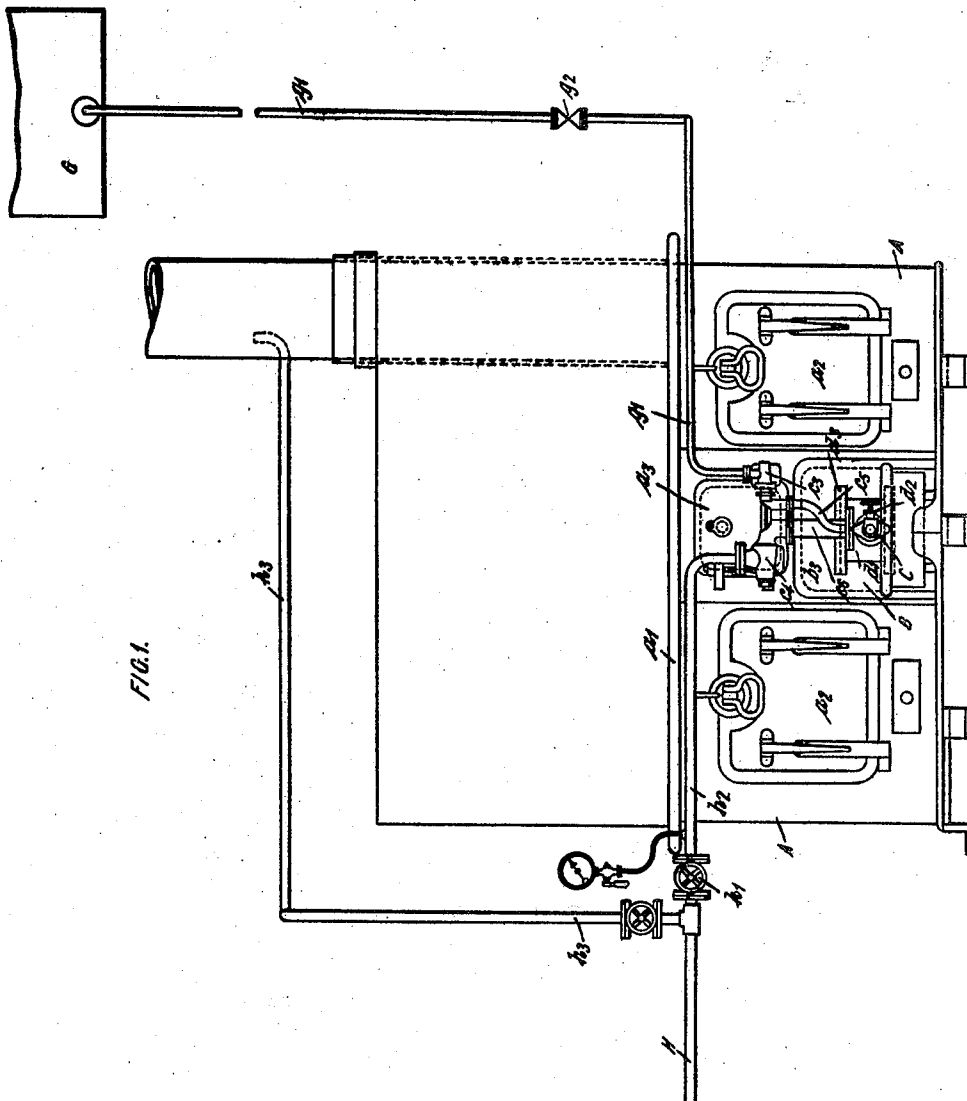


COOKING RANGE AND THE LIKE ADAPTED TO BURN HEAVY OIL AS FUEL.

Patented Dec. 9, 1919.

1,324,314.



John J. Kermode,

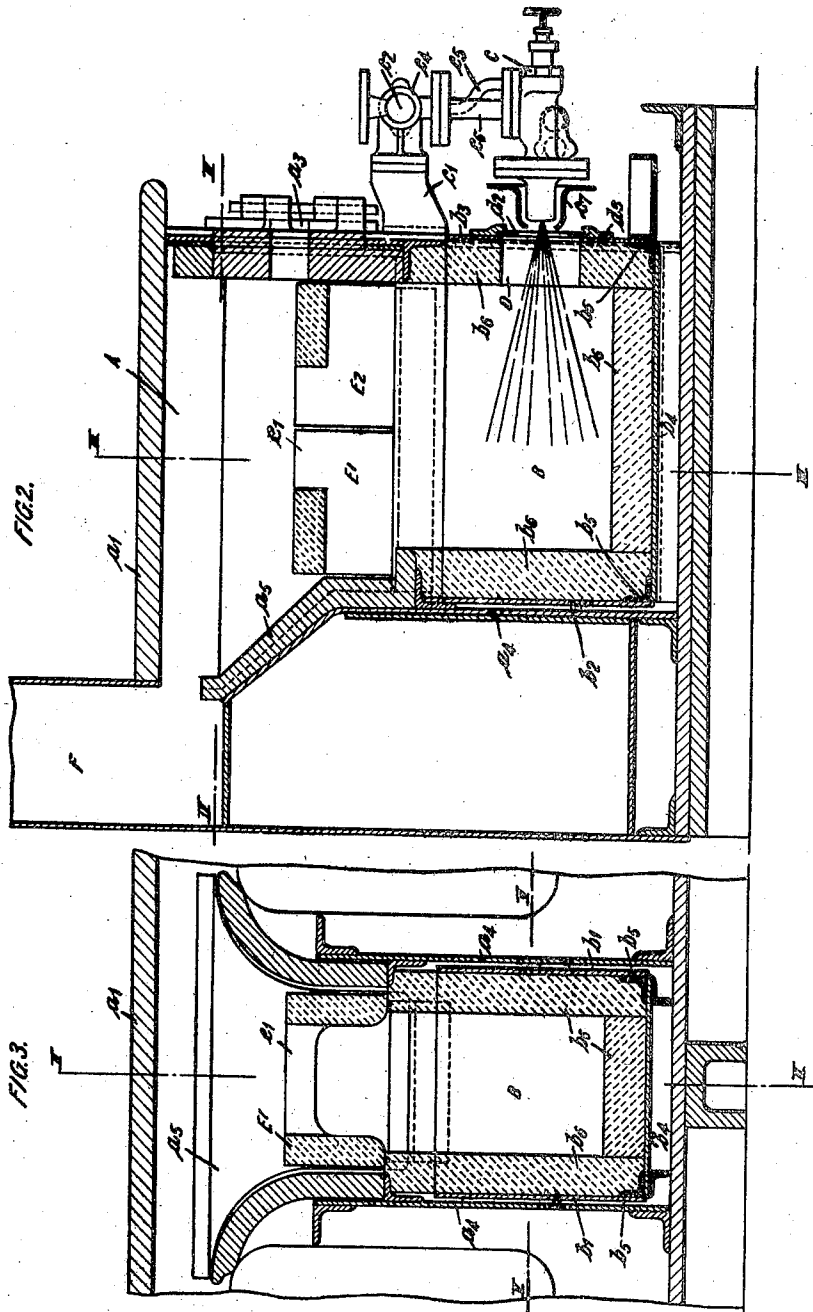
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J. J. KERMODE.
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5 SHEETS—SHEET 2.



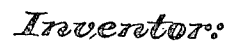
Inventor:

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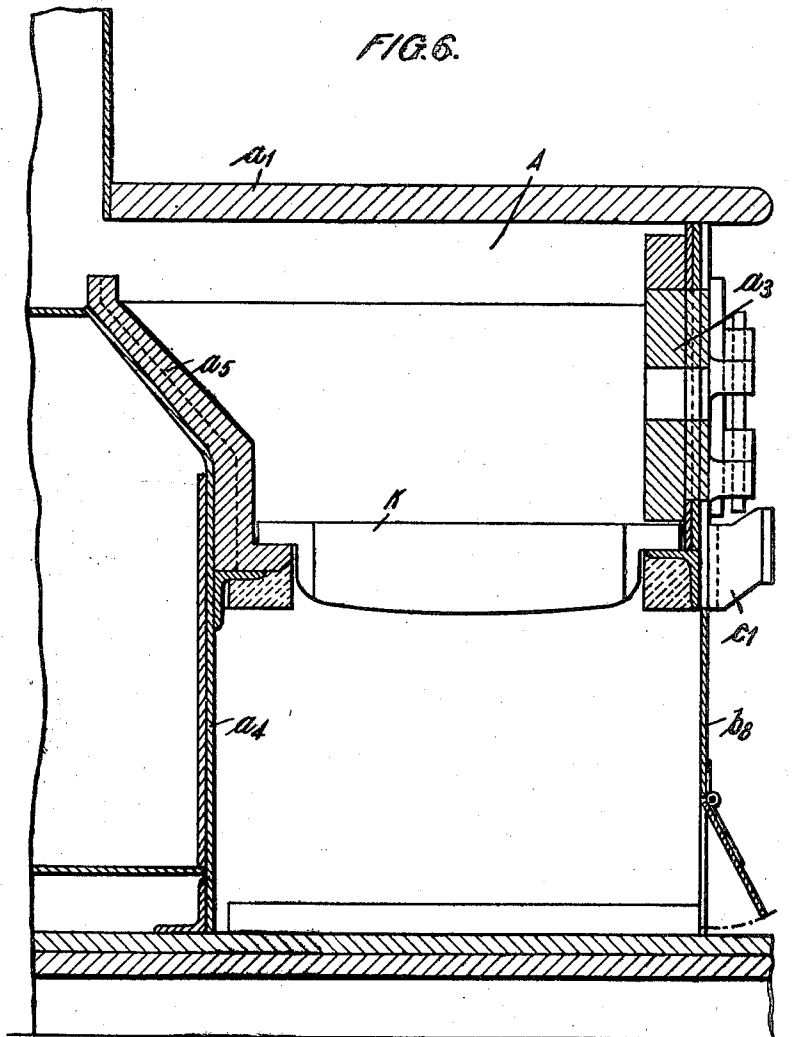
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5 SHEETS—SHEET 4.



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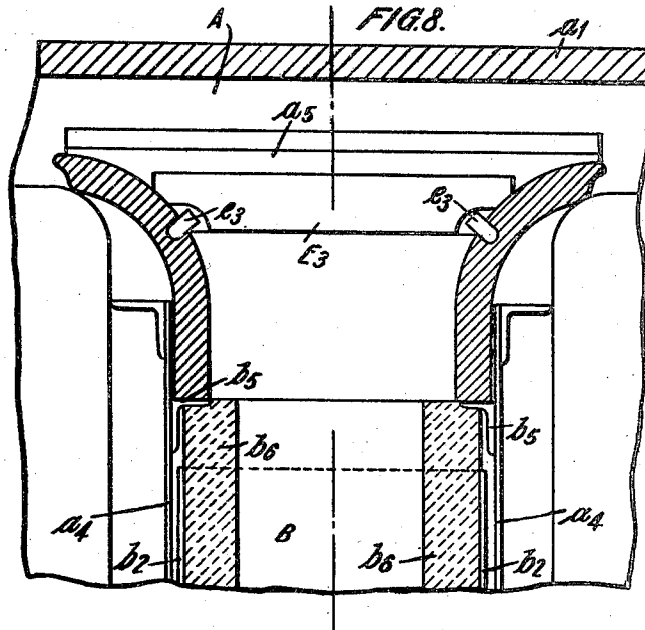
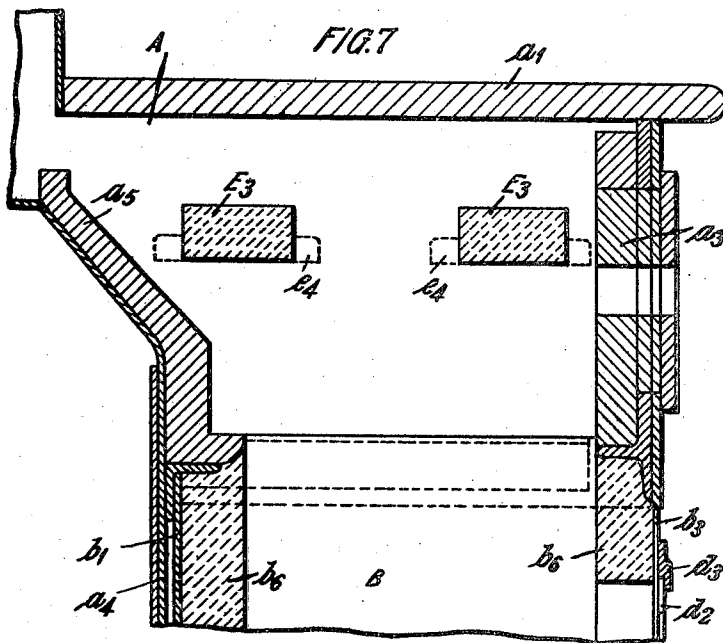
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5 SHEETS—SHEET 5.



Inventor:

John J. Kermode,

by *Spears Knudsen* *Donaldson* *Attys.*

UNITED STATES PATENT OFFICE.

JOHN JONATHAN KERMODE, OF LIVERPOOL, ENGLAND.

COOKING-RANGE AND THE LIKE ADAPTED TO BURN HEAVY OIL AS FUEL.

1,324,314.

Specification of Letters Patent.

Patented Dec. 9, 1919.

Application filed November 12, 1918. Serial No. 262,208.

To all whom it may concern:

Be it known that I, JOHN JONATHAN KERMODE, a subject of the King of Great Britain, residing in Liverpool, in the county of Lancaster, England, have invented certain new and useful Improvements in Cooking-Ranges and the like Adapted to Burn Heavy Oils as Fuel, of which the following is a specification.

10 This invention relates to cooking ranges, and particularly to cooking ranges for ships' galleys, and the object is to improve the construction of such ranges so that they may be adapted to burn heavy oils as fuels. The invention is applicable to existing models of ranges as well as to new designs, and the arrangement is preferably such that the range is adapted to be readily converted from an oil-burning to a coal-burning range, and vice versa.

20 According to the invention, a liquid fuel burning range is constructed as follows:—The fire bars, in cases where coal burning ranges are converted, are removed and the ash pit space is added to the space above the fire bars to provide the cubical contents necessary for the proper combustion of heavy oil; the front, back, sides and bottom of the space so provided are lined with fire-brick or other suitable refractory material, to protect the iron work and to form the necessary reservoir for heat, the refractory material being fitted in sections adapted to be removed easily.

35 Where the rectangular space thus formed does not give the desired cubic contents, the front of the grate is extended forwardly to give increased volume.

40 The space so provided forms in effect a rectangular box or combustion chamber with an open top, and the burners are fitted to the front side of the box, which side is also provided with the air inlets and the means for controlling the air supply. The top of the box thus formed may be fitted with a perforated top through which the hot gases pass on their way to the flues which serve the hot plate and surround the ovens and lead to the outlet flue; the perforated top serves to insure complete combustion and to prevent fluctuations of the heating effect;

the top may be a saddle-shaped perforated plate of refractory material or of metal protected by refractory material located over the combustion chamber, and above this plate may be fitted a second perforated plate or grid adapted to extract heat from the gases and in turn to heat a griller.

The remaining ordinary parts of the range are utilized in the usual manner.

60 The burner may be of the jet type supplied with air under pressure from a rotary or reciprocating pump driven in any convenient manner, and the oil supply may be from a tank located at a height sufficient to give the necessary head, or, if this is not practicable, from a closed tank under the necessary air pressure obtained by means of a hand pump to provide the desired head.

70 The application of the invention to a typical construction of ship's galley stove is illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation of the general arrangement.

75 Fig. 2 is an elevation in longitudinal section on the line II, II, of Fig. 3.

Fig. 3 is an elevation in section on the line III, III, of Fig. 2:

80 Fig. 4 is a plan in section on the line IV, IV, of Fig. 2:

Fig. 5 is a plan in section on the line V, V, of Fig. 3:

85 Fig. 6 is a view similar to Fig. 1 and shows the stove converted so as to adapt it for coal burning:

Fig. 7 is a sectional elevation—corresponding with the upper portion of Fig. 2, and showing a modification, and

90 Fig. 8 is a transverse section corresponding with the upper portion of Fig. 3, also illustrating this modification.

A is the stove, a^1 the hot plate, a^2 the ovens, a^3 the door which serves for coal firing, a^4 the bounding walls of what in the ordinary construction would be the ash pit, and a^5 the usual arrangement of refractory lining used to protect what in the ordinary construction would be the combustion chamber above the fire bars (see Fig. 6). In order to adapt the stove for liquid fuel burning, the fire bars would be removed should

these have been originally fitted; the combustion chamber is enlarged by the addition of the ash pit space, the latter, as a detachable unit B, is fitted for this purpose.

5 The unit B consists of a casing built up of side plates b^1 , a back plate b^2 , a bottom plate b^4 and a front plate b^3 connected by suitable angles b^5 and lined with suitable refractory material b^6 , this unit B being
10 adapted to be slid into position in the ash pit space from the front, as shown in Figs. 1, 2, 3, 4 and 5; in Fig. 6 a stove is shown from which the unit B has been removed, and an interchangeable front b^8 takes the place of
15 the front plate b^3 .

The burner C, which may be of any usual type, is carried from a fixed bracket c^1 bolted to the front of the stove below the coal firing door a^3 .

20 The burner is pivotally carried about the axis c^2 two co-axial plugs fitting the taper bores of the shells of oil and air connections c^3 and c^4 carried by the fixed bracket c^1 (see Figs. 1 and 2). The interiors of the plugs
25 communicate by an oil pipe c^5 and air pipe c^6 with the burner, which latter is fitted with the usual means for obtaining the necessary adjustments of air and oil.

The burner usually has an air inducing casing c^7 and the flame from the burner enters the space of the combustion chamber B through an opening D in the refractory material with laterally sliding doors d^1 and d^2
30 carried in a frame d^3 , and by movement of which the extent of the opening may be regulated.

E^1 , E^2 are the halves of a perforated top plate each half of which in the construction shown is in the form of a saddle-shaped
40 plate of fire-brick or the like refractory material; these plates serve to insure complete combustion and act as a heat reservoir to prevent fluctuations of the heating effect.

The bottom edges of these plates may rest
45 on the ledge usually provided to take the fire-bars and the hot gases pass up through the central opening e^1 , under the hot plate, around the ovens and thence to the flue F.

g^1 is the oil supply pipe leading from the
50 oil tank G through the control valve to the burner; H is the air supply pipe, h^1 the control valve therefor, h^2 a branch pipe controlled by the valve and h^3 the pipe for discharging surplus air into the flue.

55 When it is desired to convert the stove into a coal burning stove, the burner C with its connections may be removed or turned up about the axis c^2 so as to leave a clear way for the withdrawal of the unit B; the
60 blocks E^1 and E^2 are removed and replaced by fire-bars K as shown in Fig. 6.

In converting the stove from one use to the other any refractory material needed to

make joint between the replaceable and the fixed portions is applied in a plastic condition.

The shape of the replaceable combustion chamber unit will vary in stoves of different types and in like manner the top plate E^1 , E^2 may be constructed to suit the type
70 of flue.

A modified form of top plate E^3 is shown in Figs. 7 and 8; in this case two or more bridges E^3 of firebrick extend across the combustion chamber, studs e^3 tapped into the
75 cast iron portion of the stove being fitted to retain the fire brick in position; or projection e^4 shown by dotted lines Fig. 7 may be fitted on each side of the fire brick bridge for the same purpose.

80 Both the air and the oil may be heated in any suitable manner from the otherwise waste heat in the flue gases; the location of the oil tank adjacent to the flues insures the necessary pre-heating of the oil.

In some cases a pressure burner may be employed in which case oil supplied at the necessary pressure from a tank or pump is atomized by means of a suitable atomizer fitted in the burner; or the oil may be atomized by steam, where, as on board ship, a supply of auxiliary steam is usually available.

Natural or forced draft may be employed.

In new types of stoves constructed specially for the purpose, the parts peculiar to the oil-burning and the parts peculiar to the coal burning, are made in the form of interchangeable parts adapted to be inserted in or to be withdrawn from the stove as
100 units, so that the conversion from the one system to the other can be effected readily by interchange of the units.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A coal burning range having a combustion chamber extending the full height thereof and comprising a metal casing, a refractory lining permanently carried in the upper portion of the casing, a refractory lining formed as a complete unit removably carried in the lower portion of said casing and having an opening in one wall, and an injector burner adapted to project its flame through said opening, said burner being movable to allow removal of said unit.

2. A coal burning range having a combustion chamber extending the full height thereof and comprising a metal casing having a permanent lining of refractory material in the upper part thereof and inwardly projecting supporting ledges at the lower part of said permanent lining, refractory material removably supported upon
125

said ledges, a removable refractory lining comprising a bottom and side walls connected together by angle iron and removable as a complete unit from the lower part
5 of said casing, said unit having an opening in one wall, and an injector burner for discharging flame through said opening, and a bracket carried by the casing to which said burner is pivotally connected.
10 3. A coal burning range having the ash

pit thereof provided with a removable lining of refractory material having an opening in one wall and an injector burner for discharging flame through said opening.

In witness whereof I have set my hand in 15
presence of two witnesses.

JOHN JONATHAN KERMODE.

Witnesses:

JOSEPH E. HIRST,

MARGUERITA JONES.