

No. 729,909.

PATENTED JUNE 2, 1903.

J. VICARS, THE ELDER, T. VICARS & J. VICARS, THE YOUNGER.

FORCED DRAFT APPLIANCE FOR FURNACES.

APPLICATION FILED OCT. 11, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

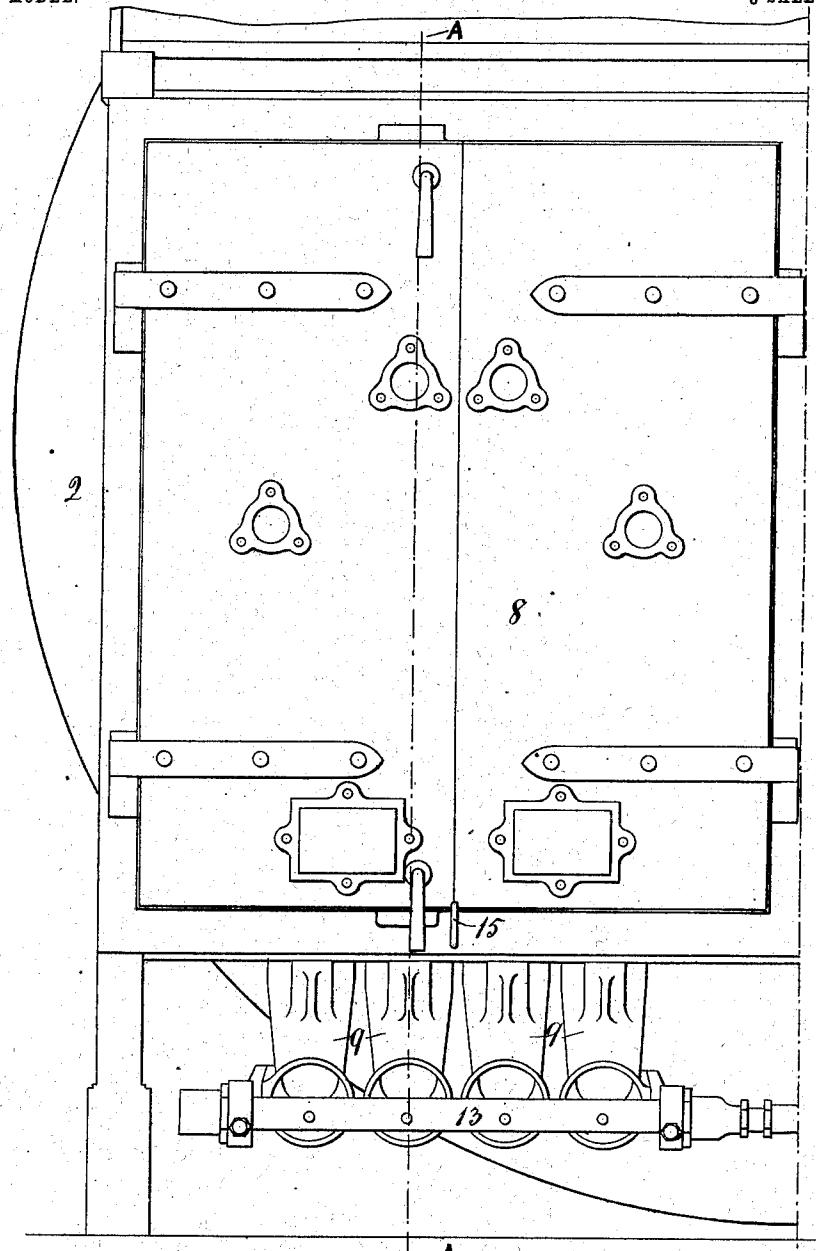


Fig 1

Witnesses to the signature of John Vicars the Elder

William Bygott
William Frederick Connors

Witnesses to the signatures of Thomas Vicars
and John Vicars the Younger

John Barnes
Joshua Johnson

Inventors

John Vicars the Elder
Thomas Vicars
John Vicars the Younger

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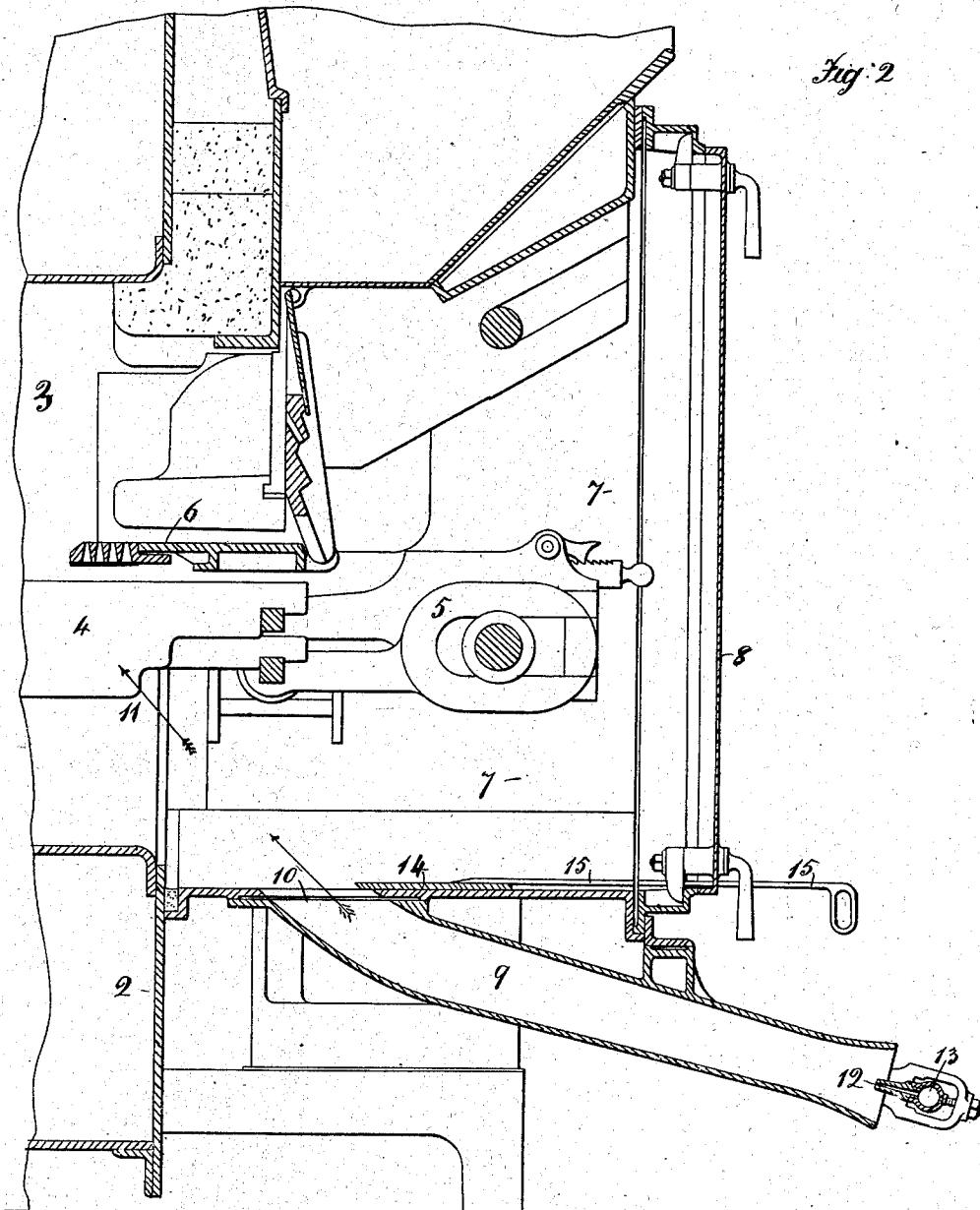
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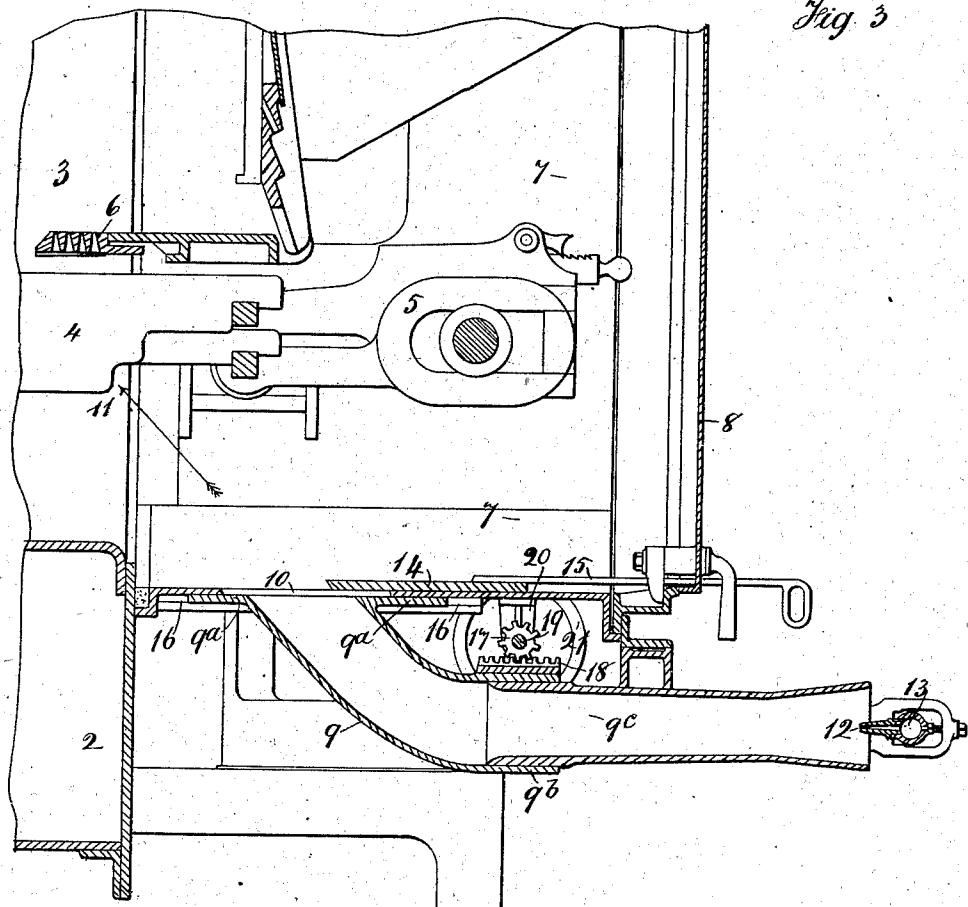
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NO MODEL.

3 SHEETS—SHEET 3.



Witnesses to the signature of John Vicars the Elder

William Bygott

William Frederick Conner

Witnesses to the signatures of Thomas Vicars
and John Vicars the Younger

John Barnes
Julia Johnson

Inventors

John Vicars the Elder
Thomas Vicars
John Vicars the Younger

UNITED STATES PATENT OFFICE

JOHN VICARS, THE ELDER, THOMAS VICARS, AND JOHN VICARS, THE YOUNGER, OF EARLESTOWN, ENGLAND.

FORCED-DRAFT APPLIANCE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 729,909, dated June 2, 1903.

Application filed October 11, 1901. Serial No. 78,345. (No model.)

To all whom it may concern:

Be it known that we, JOHN VICARS, the elder, THOMAS VICARS, and JOHN VICARS, the younger, subjects of the King of Great Britain, residing at Earlestown, in the county of Lancaster, England, have invented new and useful Improvements in Forced-Draft Appliances for Furnaces, of which the following is a specification.

10 This invention relates to closed-in furnaces in which air is forced by a jet of steam or by other means under the fire-bars, so as to increase the rapidity of combustion of the fuel thereon, and is particularly applicable to furnaces used with mechanical stokers of the type known as "coking-stokers," although it may be applied to other furnaces. In coking-stokers there is generally a mass of fuel on the fire-bars near the feeding-point which requires a considerable amount of air for proper combustion.

In ordinary forced-draft furnaces the air is supplied in such manner that the greatest quantity is forced to the back end of the furnace, where so much is not required, and at the front end, where most air is needed, there is not sufficient supply, and consequently fuel is wasted through imperfect combustion.

The objects of our invention are to provide appliances whereby air may be supplied under the fire-bars of a furnace at any pressure desired and at a point and in a direction that will insure thorough combustion of the fuel at all parts of the furnace. We attain these objects by appliances such as are illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of our appliances combined with the well-known Vicars coking-stoker applied to one of the furnaces of an ordinary Lancashire boiler. Fig. 2 is a longitudinal section on the line A A on Fig. 1. Fig. 3 is a longitudinal section of a modification with movable air tubes or jets.

Referring to Figs. 1 and 2, 2 is the body of the boiler. 3 is the flue or furnace. 4 represents the fire-bars, operated by the usual tappet mechanism 5. 6 is the dead-plate, onto which the fuel is fed by any usual feed mechanism. 7 is a casing provided with doors 8 and inclosing the whole of the fire-bar and feed-plunger-operating mechanism and the

ash-pit, so that a pressure of air may be maintained in the furnace. Underneath the casing 7 we arrange one or more pipes, trunks, or passages 9, opening through the bottom plate of the casing at 10. The mouths of the pipes 9 are arranged at 10 at such an angle that air issuing therefrom will be directed against the under side of the fire-bars at about the point 11, as shown by the arrow, near the end of the dead-plate, where the mass of fuel on the bars is thickest and where the greatest quantity of air is needed for combustion. The pipes 9 extend forward and air is forced into and along the pipes by steam-jets 12, disposed opposite the end of each pipe and supplied with steam from a common pipe 13. Instead of steam-jets being used the pipes 9 might be connected to a trunk leading from a fan or other air-forcing apparatus. Some of the air from the pipes 9 is deflected from the point 11 and passes to the rear part of the furnace to sustain combustion there, so that by the above method the fuel at all parts of the furnace receives a proper quantity of air. 14 is a sliding-plate extending on the bottom of the casing the width of all the pipes, by means of which the mouths of the pipes at 10 may be either partially closed to regulate the inflow of air or wholly closed to shut off the supply of air. The plate 14 also serves when in closed position to prevent ashes entering the mouths of the pipes when the ash-pit is being cleaned out. 15 is a rod for moving the sliding-plate 14 to and fro.

Referring to Fig. 3, the general arrangement in this modification is the same as in Figs. 1 and 2, but the pipes 9 are provided with long flanges 9^a, movable in guides 16, so that such flange while always covering the openings 10 through the casing, allows of the pipes 9 being moved backward or forward, the other ends of the pipes at 9^b being arranged as sleeves fitting over the fixed pipes 9^c and free to slide thereon. 17 represents toothed wheels gearing into racks 18, secured to the pipes 9. The wheels 17 are secured on a shaft 19, carried in bearings 20, attached to the casing. 21 is a hand-wheel for turning the shaft 19 and wheels 17 so as to move the pipes 9 backward or forward. By this means we are enabled to vary the

point at which the air from the pipes 9 strikes against the fire-bars, so as to ascertain the point of greatest efficiency. By making the pipes 9 with sleeves 9^b it is possible to use 5 fixed steam-jets 12 for forcing in air, thus avoiding the use of movable joints in the steam-supply, such movable joints being very liable to leak and give trouble.

What we claim is—

- 10 1. In forced - draft furnaces, the combination of an inclosing ash-pit, and an air-pipe opening therein and arranged to allow the air-current to be directed mainly upwardly and rearwardly in inclined position
- 15 15 toward the under side of the fire-bars along their front ends, and partly upward to the fire-door above the fire-bars; substantially as described.

2. The combination with a mechanical 20 stoker, of a casing inclosing the ash-pit, mechanism for moving the fire-bars, and an air-pipe opening therein and arranged to allow the air-current to be directed mainly upwardly and rearwardly in inclined position

25 25 toward the under side of fire-bars along their front ends and partly upward to the fire-door, above the fire-bars substantially as described.

3. In forced - draft furnaces the combination of a casing inclosing the ash-pit, and 30 an air-jet pipe entering the casing at the bottom and directed toward the front ends of the fire-bars at about the point where the fuel is fed thereon, said air-jet pipe being adjustable longitudinally substantially as de-

35 scribed.

4. In forced - draft furnaces the combination of a casing inclosing the ash-pit, an air-jet pipe entering the casing at the bottom and directed toward the front ends of the fire-bars at about the point where the fuel is fed 40 thereon, said air-jet pipe being adjustable longitudinally and being provided with a sleeve surrounding a fixed air-supply pipe substantially as described.

5. In forced - draft furnaces the combination of a casing inclosing the ash-pit, an air-jet pipe entering the casing at the bottom and directed toward the front ends of the fire-bars at about the point where the fuel is fed 45 thereon, and a sliding plate adapted to 50 close the mouth of the air-jet pipe substantially as described.

In testimony whereof I, the said JOHN VICARS, the elder, have signed my name to this specification in the presence of two sub- 55 scribing witnesses.

JOHN VICARS, THE ELDER.

Witnesses:

WILLIAM BYGOTT,

WILLIAM FREDERICK CONNOR.

In testimony whereof we, the said THOMAS VICARS and JOHN VICARS, the younger, have signed our names to this specification in the presence of two subscribing witnesses.

THOMAS VICARS.

JOHN VICARS, THE YOUNGER.

Witnesses:

JOHN BARNES,

JOSHUA JOHNSON.