

(No Model.)

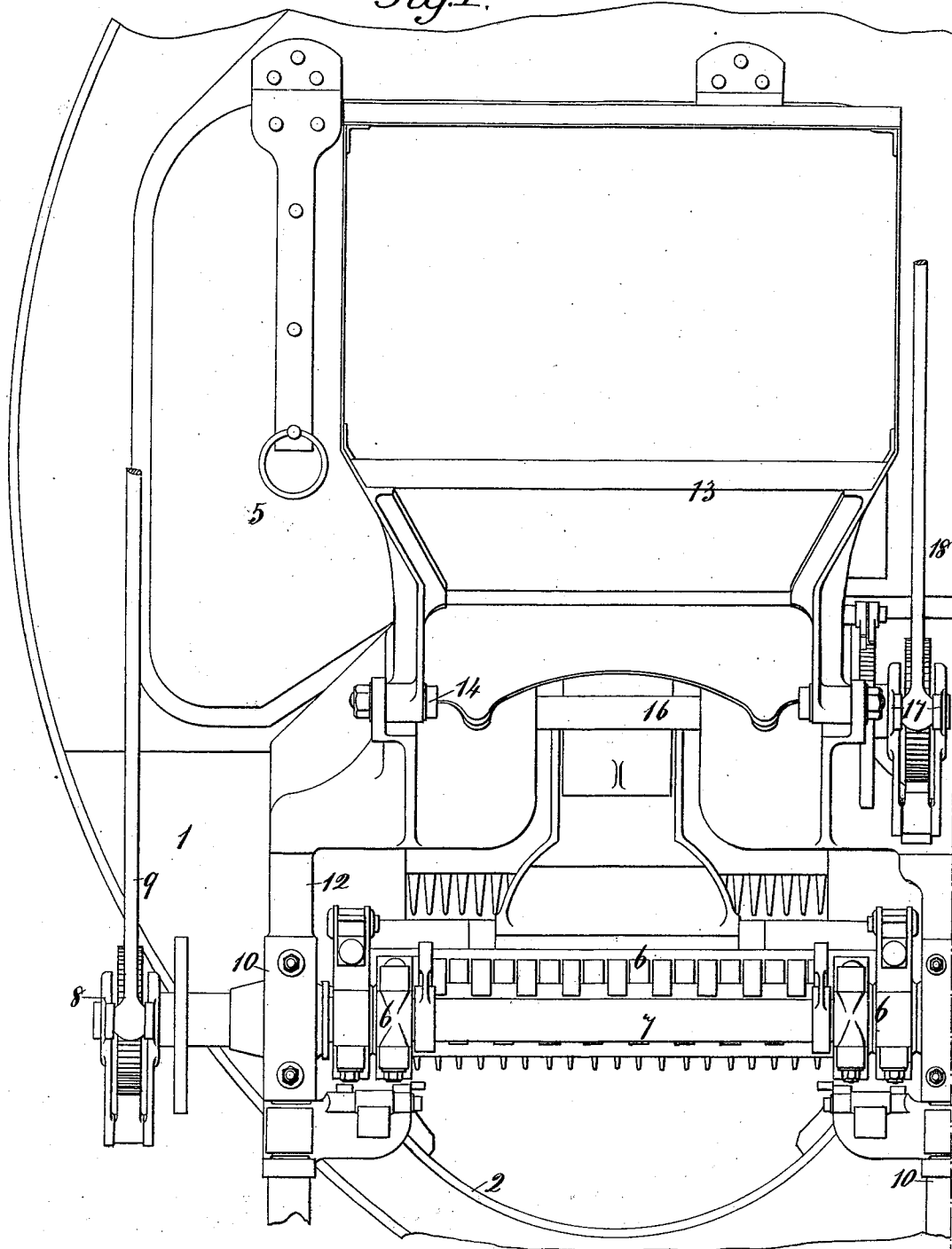
4 Sheets—Sheet 1.

J. VICARS, T. VICARS & J. VICARS THE YOUNGER.
APPARATUS FOR FEEDING FUEL TO STEAM GENERATOR FURNACES.

No. 510,737.

Patented Dec. 12, 1893.

Fig. 1.



Witnesses

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(No Model.)

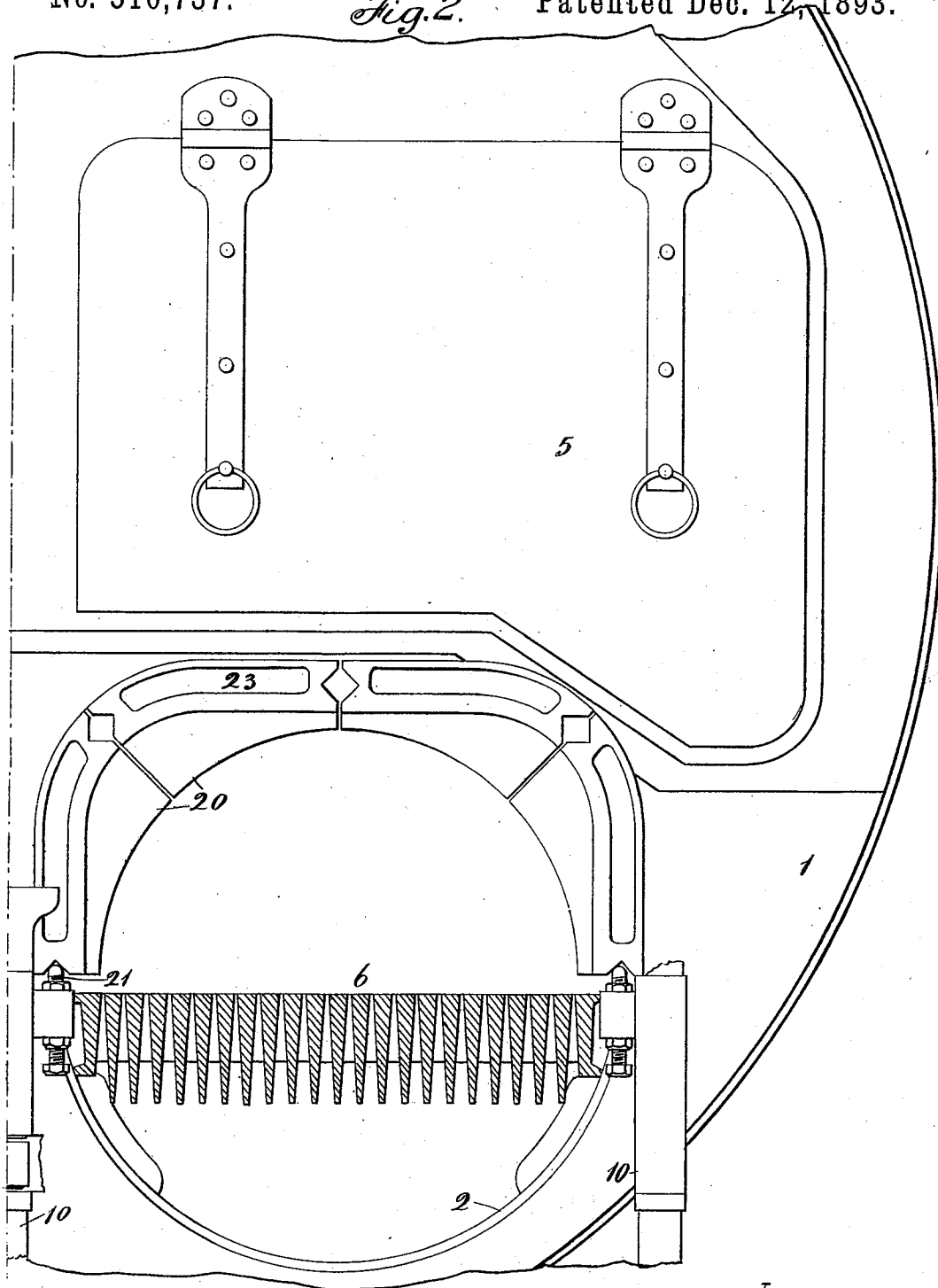
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Fig. 2.

Patented Dec. 12, 1893.



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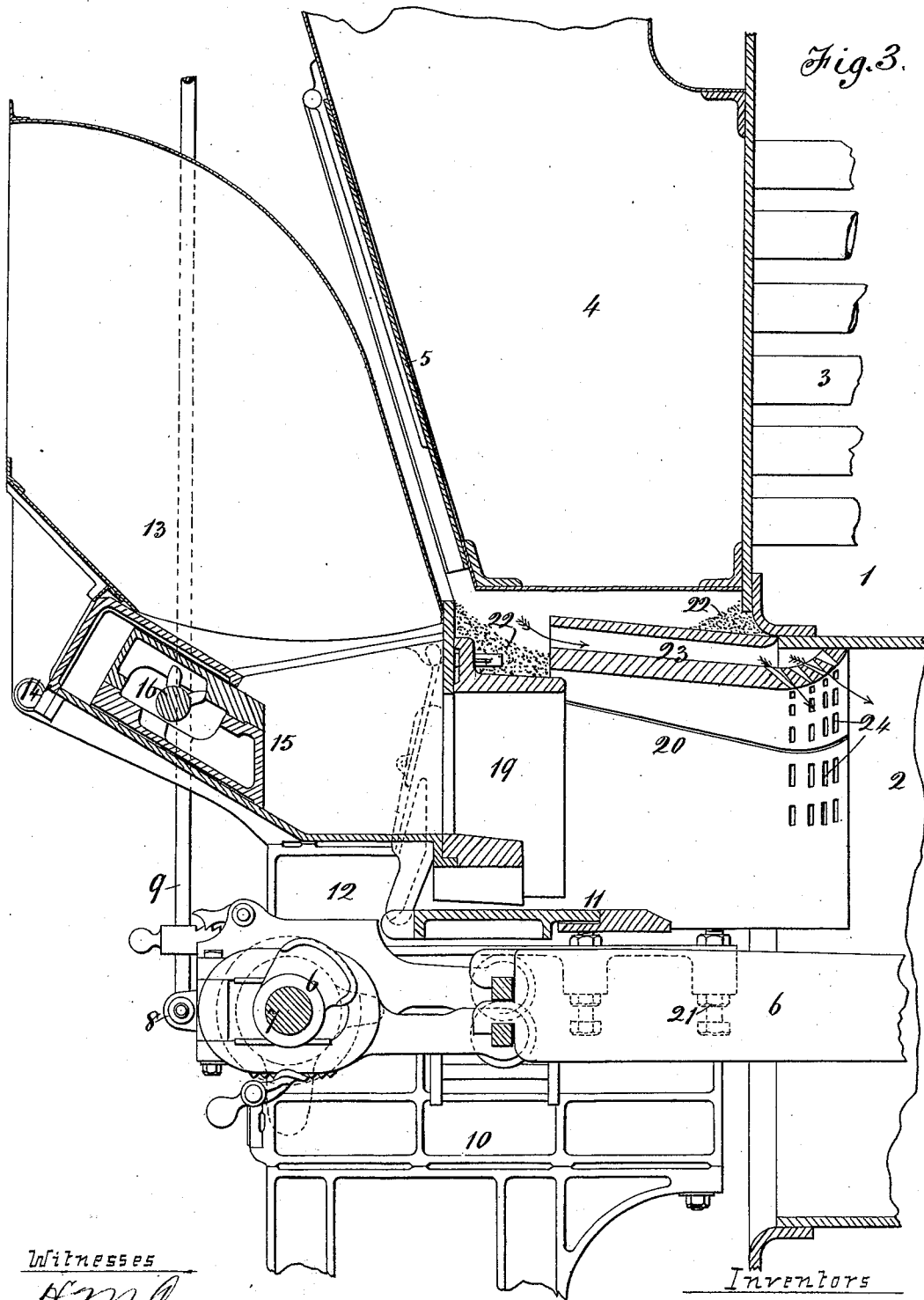
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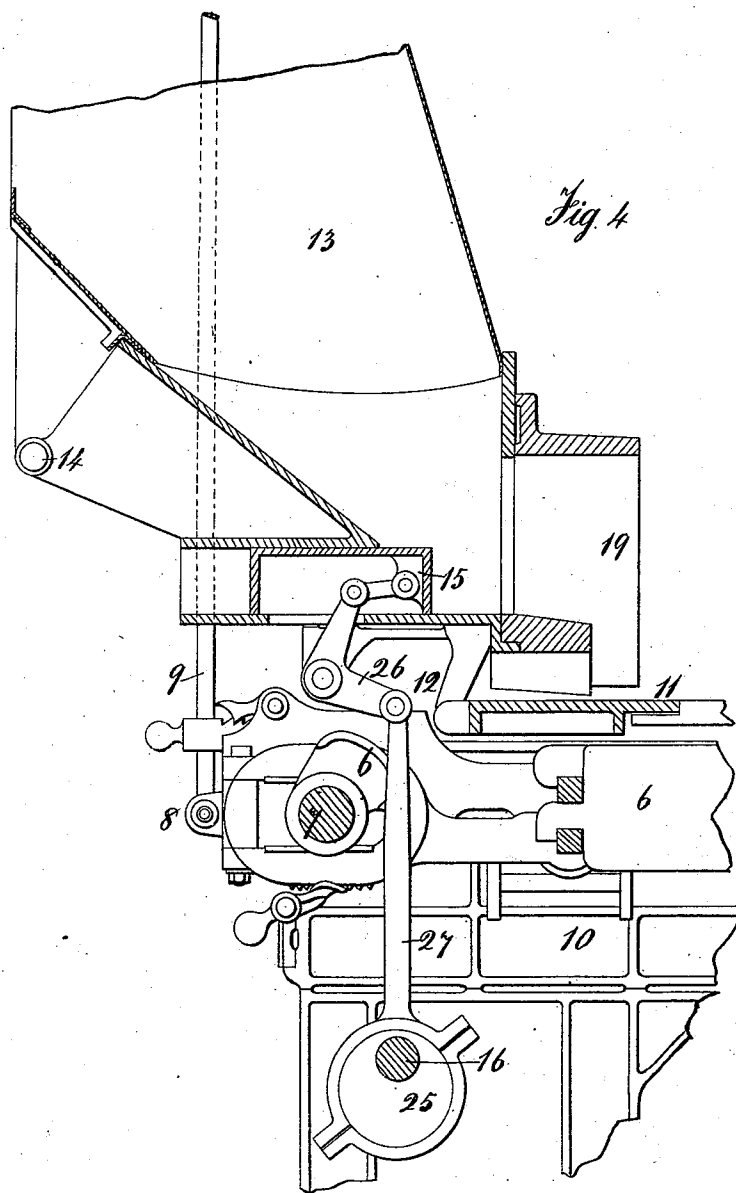
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UNITED STATES PATENT OFFICE.

JOHN VICARS, THOMAS VICARS, AND JOHN VICARS THE YOUNGER, OF
LIVERPOOL, ENGLAND.

APPARATUS FOR FEEDING FUEL TO STEAM-GENERATOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 510,737, dated December 12, 1893.

Application filed June 16, 1893. Serial No. 477,842. (No model.) Patented in England July 8, 1889, No. 10,945, and March 18, 1890, No. 4,203.

To all whom it may concern:

Be it known that we, JOHN VICARS, THOMAS VICARS, and JOHN VICARS the Younger, subjects of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster, England, have invented a new and useful Improvement in Machinery or Apparatus for Feeding Fuel to Steam-Generator Furnaces, (for which we have obtained Letters Patent of Great Britain, No. 10,945, dated July 8, 1889, and No. 4,203, dated March 18, 1890, and nowhere else;) and we do hereby declare that the following is a full, clear, and exact description thereof.

Figure 1, Sheet 1, is a front view of a half of a two fluid steam generator, showing our improved apparatus attached thereto. Fig. 2, Sheet 2, is a view of the other half of the same generator with part of the apparatus removed, and Fig. 3 is a longitudinal section through the feeding end of one flue of the generator and through our improved apparatus. Fig. 4 is a similar view of a modification.

The invention relates to apparatus for feeding fuel to internally fired steam generators where the fuel is pushed from hoppers by plungers onto bars which move in a body from the front toward the rear of the furnace and return singly or in series, that is, apparatus similar to that for which United States Letters Patent were granted to ourselves and the late Thomas Vicars the Elder, No. 296,301. Hitherto such apparatus has been constructed to form one united whole with the consequence that the furnaces and fire tubes were only reached with difficulty and parts of the apparatus at the furnace mouth were comparatively readily damaged by heat.

Now the objects of our invention are (a) to overcome the above objections by constructing the plunger apparatus and the fire bar actuating mechanisms separate from each other so that the plunger apparatus may be readily moved to expose the flame tubes and furnaces, and (b) to protect the parts near the mouth of the furnace by means of air currents.

1, is the generator.

2, are the furnace flues.

3, are the flame tubes.

4, is the smoke stack.

5, is the smoke box door.

6, are the fire bars and driving mechanism.

7 is the driving shaft for the fire bar operating mechanism.

8, is the usual ratchet arm for giving motion to the shaft 7.

9, is a rod connected to the ratchet arm 8 and to any suitable moving part capable of giving reciprocating motion, 10 a framing for carrying the above mechanism and the dead plate 11.

The above parts are constructed and operate in the well known manner above mentioned, and are complete of themselves without any novel feature except the omission of a connection to give motion to the plunger feed apparatus.

The plunger feed apparatus instead of as heretofore forming part of the abovedescribed apparatus is made independent thereof and is itself again subdivided in order to obtain the desired results. The frame 12 which carries the plunger feed apparatus rests on and is secured to the frame 10, while the hopper 13 instead of forming part thereof is made separate therefrom and is hinged thereto at 14 so that the said hopper can be swung back out of the way of the fire tube door 5. The plunger 15 and actuating mechanism is of the usual construction, that is, tappets on the driving shaft 16 act against projections on the plunger, the novelty being that the shaft, 16, is operated by an independent ratchet lever, 17, and connecting rod 18, instead of by being coupled directly to the shaft, 6, of the fire bar operating mechanism. The connecting rod 18 may be actuated by the same motor that actuates the rod 9.

The delivery mouth 19, of the plunger feed apparatus instead of extending into the furnace as heretofore terminates some distance in front of the furnace mouth, and is continued therefrom to the furnace mouth by an independent casting 20 which is held in position by set screws 21 which pass through snugs in the frame 10.

By making the front portion of the plunger feed apparatus which is secured to the fur-

nace mouth independent thereof the said apparatus may be readily removed by disconnecting it from the frame 10 and at the same time the said independent piece can be readily and cheaply renewed if damaged by heat without interfering with the rest of the apparatus.

Air tight connection is obtained between the independent piece 20 and the furnace flue 2, and between the delivery mouth, 19, and the said independent piece by means of heat resisting material 22. The independent piece is made for convenience in four pieces bolted together, and for the purpose of protecting it from the action of heat, and for admitting heated air advantageously into the furnace the said piece is made with air ways 23 there-through, and with apertures 24 leading from the said air ways into the furnace. The furnace end of the piece 20 is flared out so that one end of the air ways 23 are closed by the walls of the furnace when the said piece is in position and so that the apertures 24 are readily accessible for cleaning. It also enables the apertures 24 to be so disposed as to direct the issuing air over the surface of the fuel.

In the modification of Fig. 4 the driving shaft, 16, is located beneath the frame 10 and operates the plunger 15 by means of an eccentric 25 bell crank lever 26 and connecting rod 27 instead of by tappets. This arrangement frees the upper part of the boiler from any cross shafts so as to allow more freedom of access.

We claim—

1. In apparatus for feeding fuel to steam generators, the combination of plunger feed devices with a hinged or pivoted hopper for the purpose set forth.

2. In furnace-feeding apparatus, the combination with automatic means for reciprocating the fire bars endwise, of plunger feed mechanism which is easily removable to expose the fire tubes, and automatic means for actuating said feeding mechanism independently of the fire-bars; substantially as described.

3. In furnace-feeding apparatus, the combination of a feed tube extending into the furnace and having an inner separate portion supported independently thereof, and a plunger arranged to reciprocate in the outer portion; substantially as described.

4. In furnace-feeding apparatus, a feed-tube extending into the furnace, a plunger within the tube, air passages in the sides of the tube, and inlets from said passages to the furnace; substantially as described.

In testimony whereof we have hereunto set our hands this 9th day of May, A. D. 1893.

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