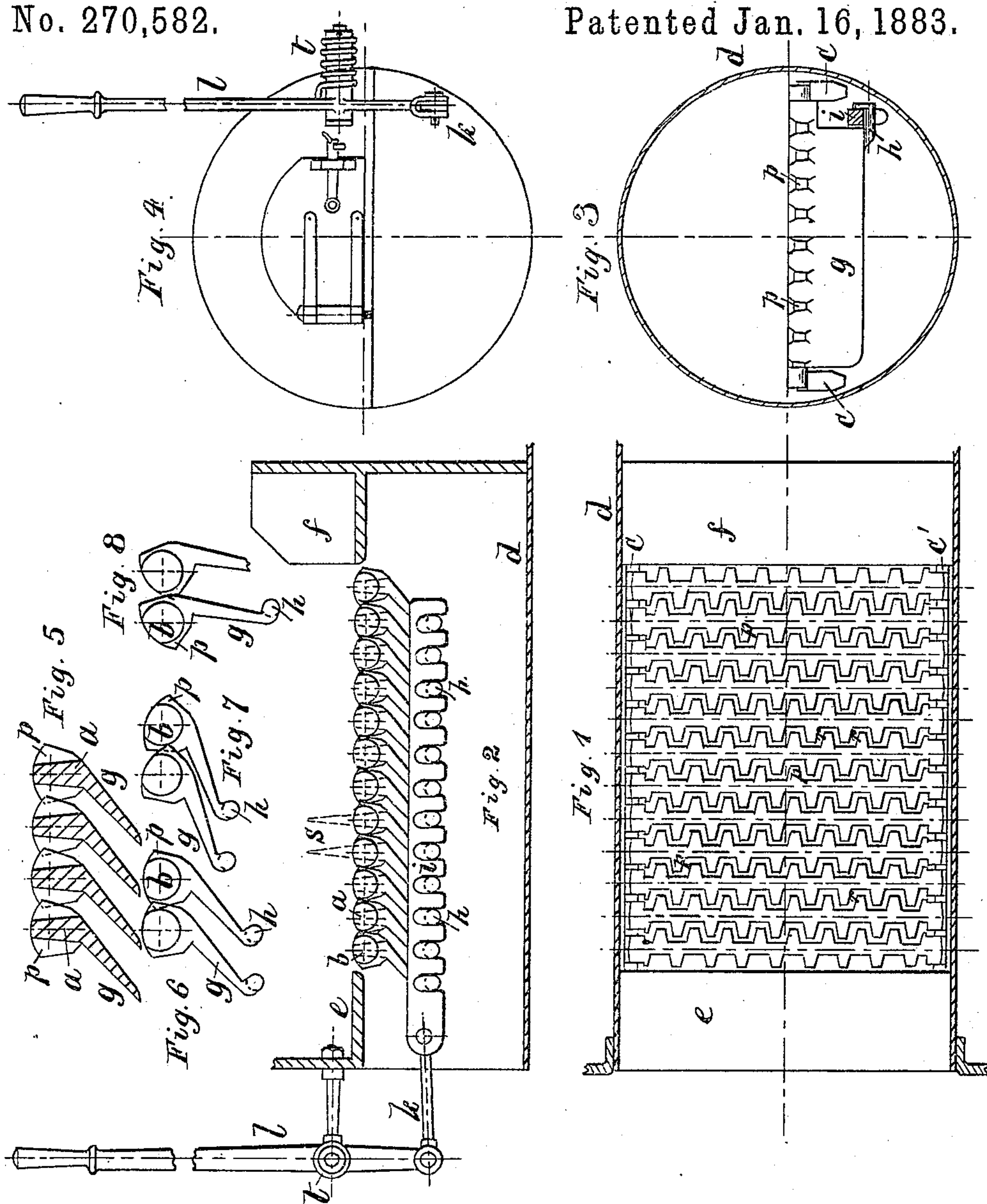


(No Model.)

J. G. GALLEY.
FURNACE FIRE BARS

No. 270,582.

Patented Jan. 16, 1883.



Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES G. GALLEY, OF FOREST GATE, COUNTY OF ESSEX, ENGLAND.

FURNACE FIRE-BARS.

SPECIFICATION forming part of Letters Patent No. 270,582, dated January 16, 1883.

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To all whom it may concern :

Be it known that I, JAMES GEORGE GALLEY, of Forest Gate, in the county of Essex, England, have invented certain new and useful Improvements in Movable Angled Feather Furnace Fire-Bars; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in movable fire-bars used in the furnaces of steam-boilers or for other purposes; and the objects of my improvements are, first, to effect the complete combustion of the fuel by the admission of a large quantity of oxygen without waste of fuel; second, to afford facility for damping or checking the furnace-fire and preventing smoke by regulating the admission of air; third, to allow the ready and effectual removal of clinkers or other obstruction; fourth, to obtain economy of space and durability of the fire-bars.

The accompanying drawings are illustrations of my invention, in which Figure 1 is a sectional plan of a furnace fitted with my improved fire-bars. Fig. 2 is a longitudinal section of the same, showing the ends of the fire-bars and the method by which their movable action is obtained. Fig. 3 is a transverse section through the furnace. Fig. 4 is an end view of the front of the furnace. Fig. 5 shows on a larger scale a transverse section of some of the fire-bars. Fig. 6 is an end view of some of the same fire-bars in proper position for firing. Fig. 7 is an end view of the same, showing the extent of their movable action and their position when used to damp the fire by stopping the admission of air; and Fig. 8 shows the same fire-bars turned into the proper position for discharging clinkers or other obstructions and the extent of their movable action in the other direction.

Similar letters refer to similar parts in the several drawings.

a is the body of the fire-bars, wider in transverse section at the lower edge than at the upper edge.

b b b are pivots at the ends of the bars, fit-

ting into corresponding notches in the longitudinal bars *c c'*, fixed in the flue *d* of the boiler and extending from the dead-plate *e* to the bridge *f* of the furnace.

g is a plate extending at an angle forward and downward from the lower edge of each bar *a*, each plate *g* being provided at one end with a pin or stud, *h*, which fits freely into a corresponding notch in a movable bar, *i*, the front end of which is jointed by a link, *k*, to the handle *l*, by moving which, therefore, the whole of the bars can be turned as desired into either of the positions shown in Figs. 2, 5, 6, 7, and 8. Projections *p*, of the shape shown, are formed upon the front and back of the bars *a*, those upon each bar entering the spaces between those upon the adjoining bars, as shown in Fig. 1.

The action of the fire-bars with their connected appliances, as shown, is as follows: When the bars *a a a*, &c., are in the positions shown in Figs. 2, 5, and 6 fuel is supplied upon them and burns freely, air entering between the plates *g* and passing up into the fire through the spaces between the bars at *r*, Fig. 1, the narrow form of the bars *a* above allowing additional space for the expanding air as it rises and becomes hot, and at the same time causing the ascending currents to meet at a short distance above the bars (as shown at *s*, Fig. 2) much more readily than if the sides of the bars were parallel or thicker at their upper edge, as in ordinary fire-bars, and thus promoting the perfect combustion of the fuel immediately above the bars.

When it is desired to damp the fire the whole of the bars are turned more or less to the position shown in Fig. 7 by means of the handle *l* actuating the bar *i*, the admission of air being thus reduced until, if desired, the several plates *g* meet each other. When, on the other hand, it is desired to remove clinkers or other obstructions, the bars *a* and plate *g* are turned in the opposite direction to the position shown in Fig. 8, and the fuel can be agitated by moving the handle *l* backward and forward, and the clinker is removed and drops between the bars. The handle *l* is provided with a spiral or other spring at *t*, by which, after agitating the bars *a*, as described, they

are brought back to their original position and no points are left presented and liable to destruction by the fire.

A screw or detent may be provided for the purpose of retaining the handle in any desired position.

It will be seen in Figs. 2 and 5 that the shape of the projections *p* is such that the spaces between them and the adjacent bars and projections are wider below than above, so that ashes readily fall through.

The movement of the bars may be effected either by hand, as shown, or automatically by apparatus arranged to operate at regular intervals, and the movement may be varied according to the nature of the fuel used. The additional air-space between the bars, which is provided by my invention without incurring waste of fuel, enables the fire-grate to be of less length than is ordinarily the case, and the fire can thus be more readily and properly attended to.

The invention may be applied to all kinds of furnaces.

I am aware that prior to my invention fire-

bars have been made to rock in bearings, and I do not therefore claim such a combination; but—

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the body of the movable fire-bar *a* with the angled feather *g*, substantially as and for the purpose described and shown.

2. The combination, with the movable fire-bars *a* and angled feathers *g*, of the pins *h*, the notched bar *i*, and the handle *l*, connected to the bar *i*, substantially as described and shown.

3. The combination, with the fire-bars *a*, the notched bar *i*, and handle *l*, of the spring *t*, substantially as and for the purpose described and shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES GEORGE GALLEY.

Witnesses:

EDMOND EDWARDS.

ARTHUR E. EDWARDS.