(No Model.)

# W. COULSON.

## SMOKE CONSUMING FURNACE.

No. 475,205. Patented May 17, 1892.

Fig. 1.

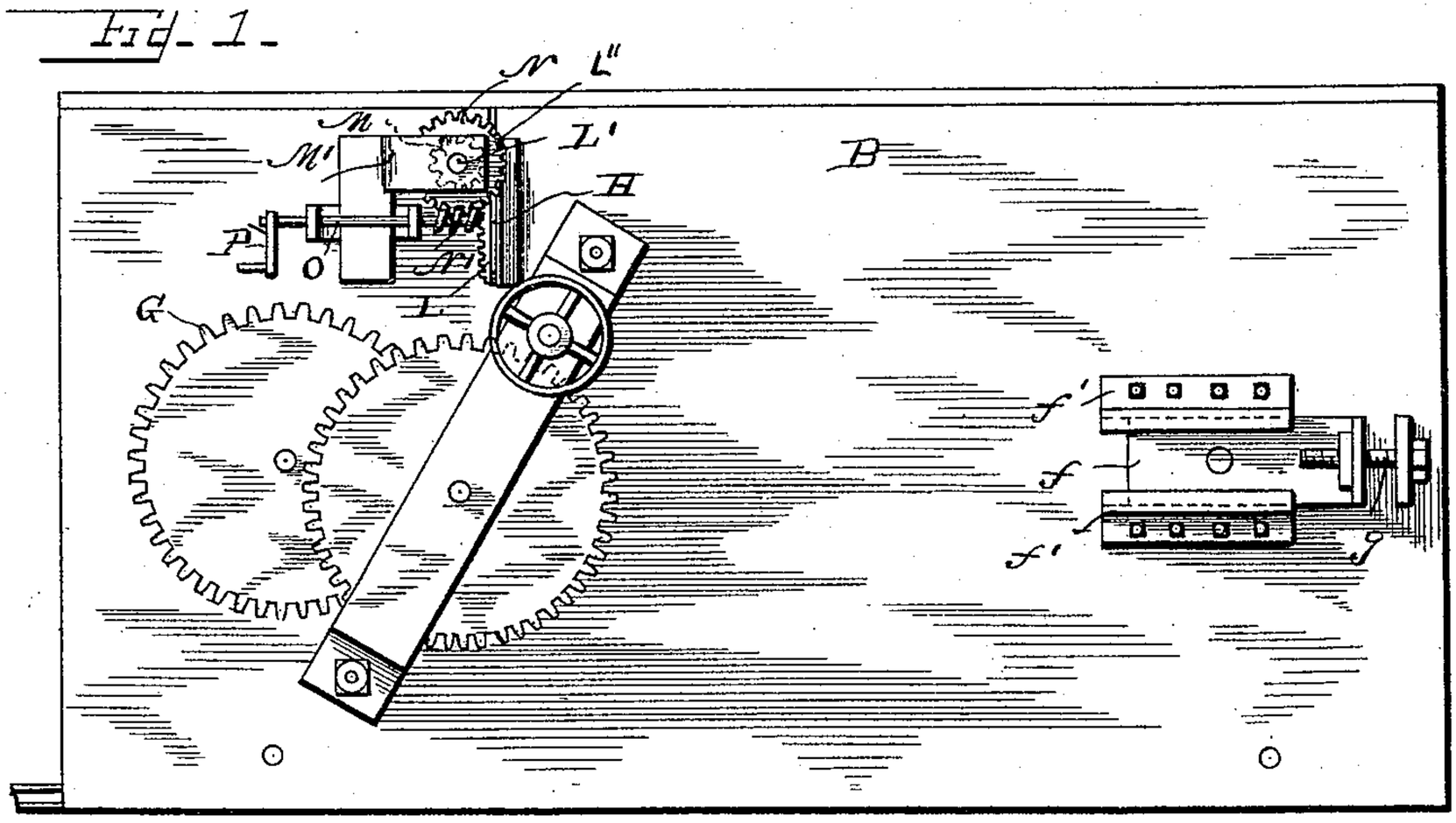



Fig. 3.

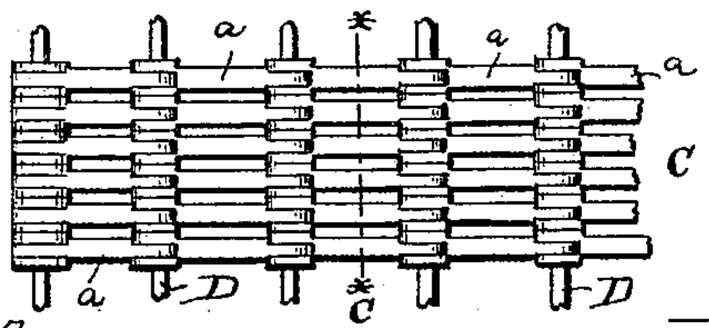



Fig. 5.

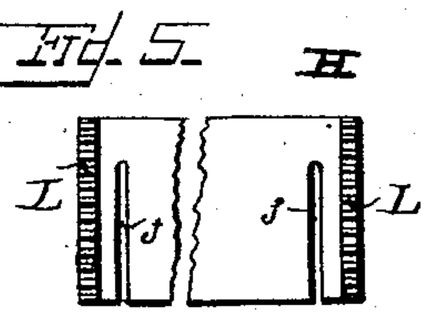
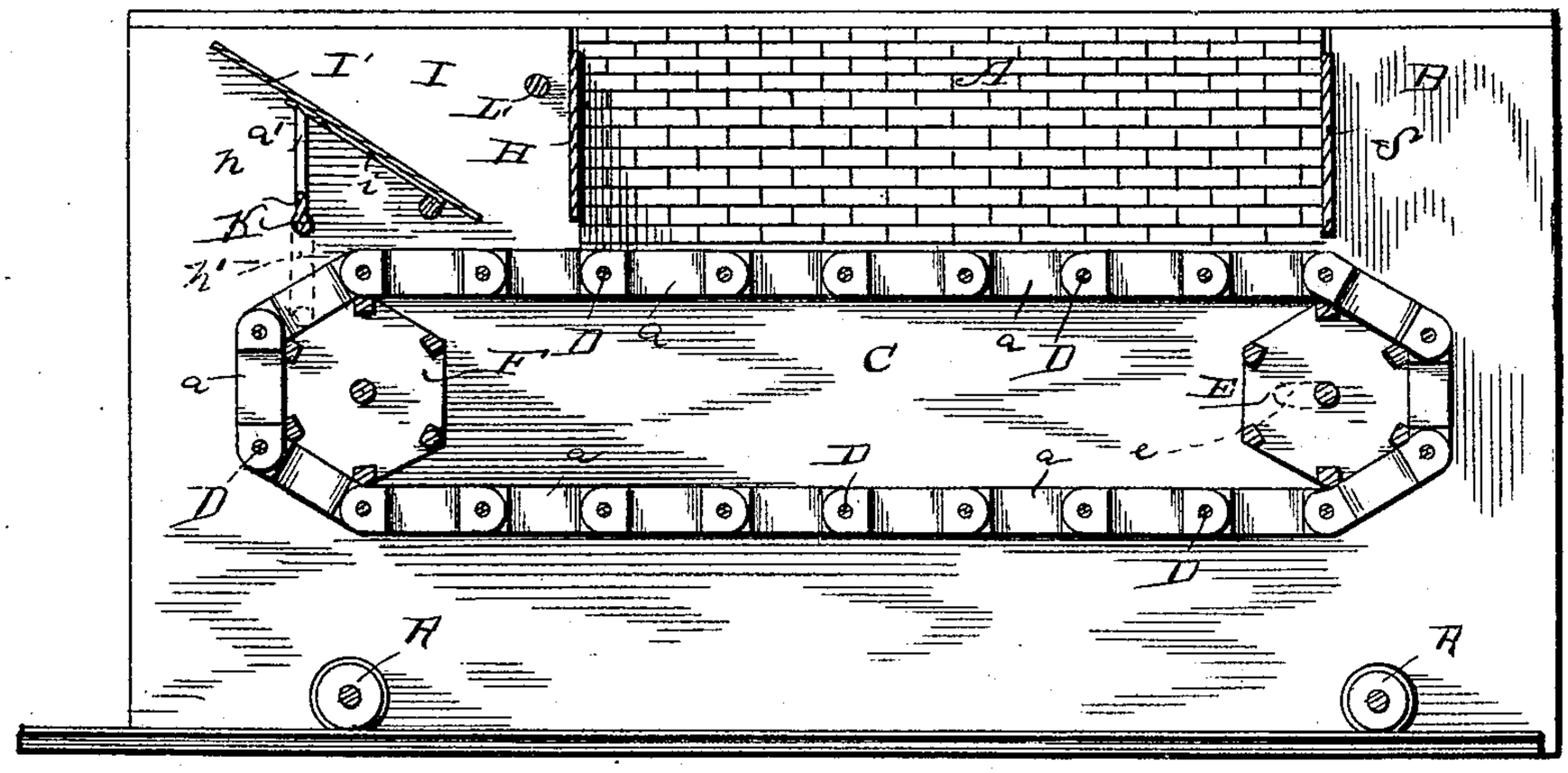



Fig. 4.


Fig. 2.




Witnesses
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# UNITED STATES PATENT OFFICE.

WILLIAM COULSON, OF SPRING VALLEY, ILLINOIS.

## SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 475,205, dated May 17, 1892.

Application filed December 28, 1891. Serial No. 416,315. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM COULSON, a citizen of the United States, and a resident of Spring Valley, in the county of Bureau and State of Illinois, have invented certain new and useful Improvements in Smoke-Consuming Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a side elevation of the furnace. Fig. 2 is a vertical longitudinal section of same. Fig. 3 is a plan view in detail of the top of grate. Fig. 4 is a transverse section of same, and Fig. 5 is a face view of the door partly broken away.

This invention has relation to certain new and useful improvements in furnaces, the object being to insure the combustion of the material usually carried off by the smoke and gases of combustion; and it consists in the novel construction and combination of parts, as hereinafter specified.

In the accompanying drawings, the letter A designates the furnace, which usually consists of a metallic frame B, lined with fire-brick or other similar material.

C designates an endless flexible grate comprising a series of grate-sections *a*, composed each of the short longitudinal fire-bars *a'*, jointed together or pivoted at their ends to transverse connecting bars or rods D. Said grate is carried by drums or spools E and F, one preferably near each end of the furnace in the frame B. The shaft of the spool E projects through elongated slots *e* in the walls of the frame, said projected portions having bearings in slides *f*, held in guides *f'* and adjustable by means of screws *g* to take up any slack which may occur as the grate wears. The bars *a* are shown as of considerable vertical thickness and reduced laterally in crosstion in the usual manner. The drum F is designed to be turned by steam or other power, reducing-gear G being provided to give it a slow movement and a corresponding movement to the grate.

H designates the furnace-door near the front end, and I is a coal-hopper, below the discharge of which the grate is carried as it is revolved by the drums. The door H forms the rear wall of the hopper, the forward portion being formed by the inclined plate I'. This plate is pivotally hung at its lower end, and its angle is adjusted by means of the support *h*, the arms *a'* of which engage a series of teeth or projections *i* on the rear surface thereof. The support *h* is hung on a shaft K', having loose bearings in the side walls of the frame, one end of said shaft having a crank *h'*, by means of which the support may be turned to hold the plate at a greater or less angle.

The door H comprises a plate having slots *j* therein, which engage the walls of the furnace, and is made vertically adjustable to regulate the amount of coal that shall be carried thereunder by the grate. This adjustment is effected by means of racks L thereon, which are engaged by pinions M on a shaft L', having bearings in brackets L'', said brackets also serving as guides for the door. On the shaft M' is a gear-wheel N, which is actuated by a worm N' on a shaft O at right angles to the shaft M' and carrying at its end an operating wheel or crank P. When said shaft O is turned, it will be apparent that the door will be raised or lowered by means of the engagement therewith of said pinions.

The furnace is usually supported on wheels R, which are designed to run on a suitable track, in order that the furnace may be run thereon out from and in under a boiler when repairs are necessary or for other purposes.

The grate is kept in constant motion and the coal is carried gradually in under the furnace-door. Consequently the smoke arising is caused to pass through the entire length of the furnace before it can escape into the stack at the rear end, which will cause the combustible material therein to be consumed. The grate is designed to move sufficiently slow, so that the coal will be consumed entirely before it reaches the rear end; but should this not be the case a door or check S is provided, which will prevent the unconsumed coal from passing thereunder.

Should the operating mechanism for the frame become broken, the furnace may be used in the manner of an ordinary furnace

until it can be repaired, no stoppage being necessary.

When a donkey-pump is used to supply water to the boiler, the furnace may be operated from the same engine.

Having described this invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace having a revolving flexible endless grate, the hopper, the rear wall of which is formed by the furnace-door and the forward wall by an inclined plate I, pivotally hung at its lower portion and having an adjustable support *h*, carried by a shaft K′, having loose bearings and provided with an operating-handle, substantially as specified.

2. In a furnace having a flexible endless grate, the hopper having its rear wall angularly adjustable and its forward wall formed by the furnace-door, said door having slots therein receiving the sides of the frame, the racks L thereon, the pinions in engagement with said racks, and the worm-gear actuating said pinions, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM COULSON.

Witnesses:
EDWARD MORGAN,
JAMES CRAVEN.