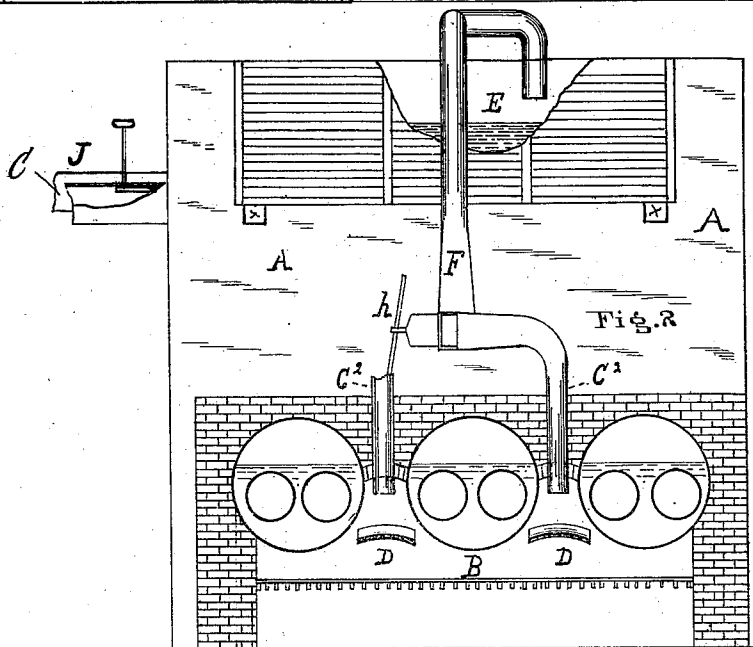
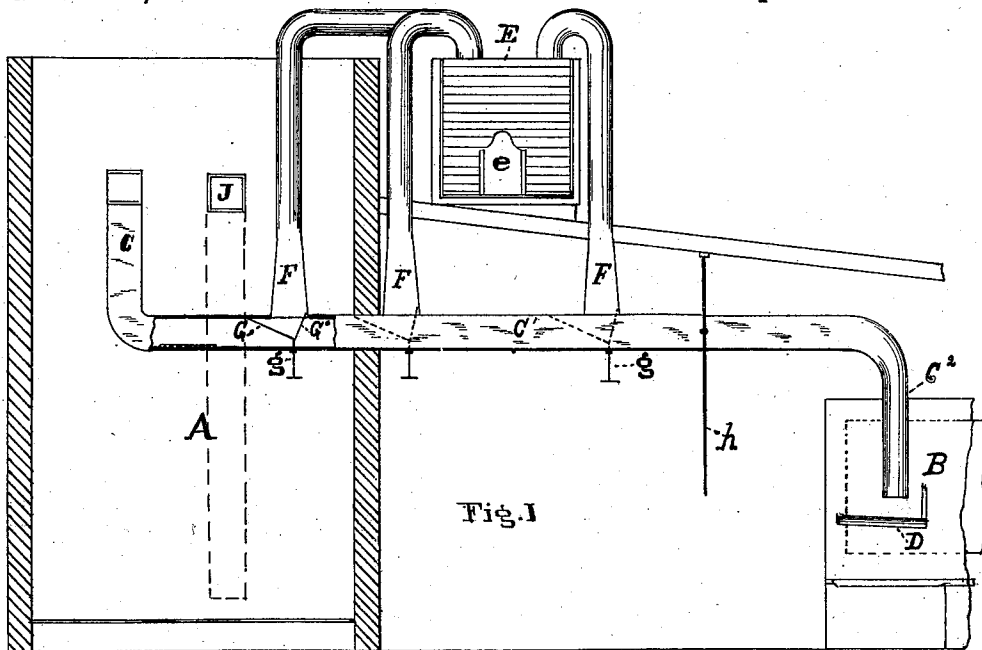


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AUTOMATIC FURNACE FEEDER.

No. 256,522.

Patented Apr. 18, 1882.



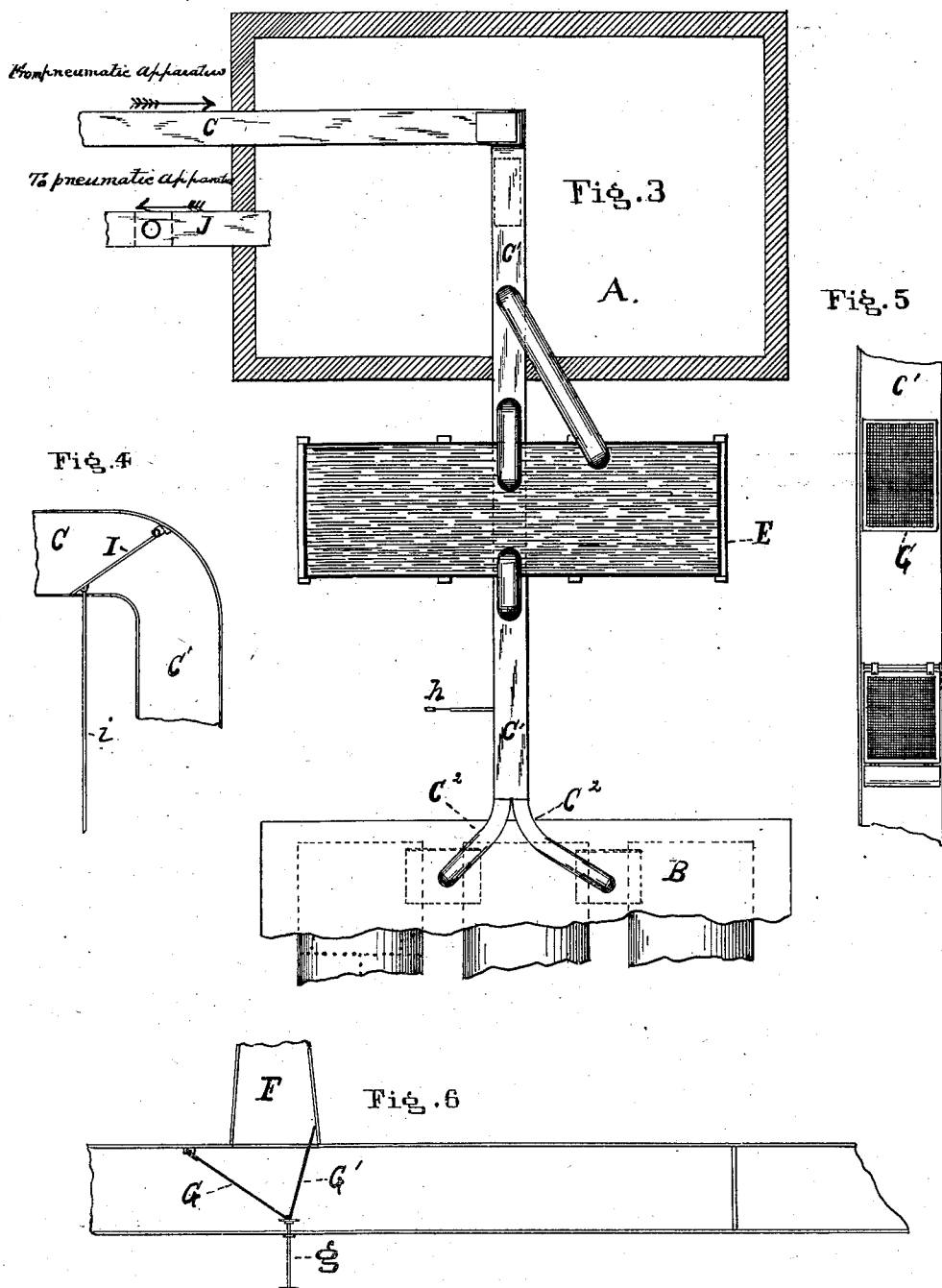
Attest  
E. G. Dewald  
Notary Public

Inventor  
Arthur Waters  
By Geo. J. Mumma  
Att'y

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# UNITED STATES PATENT OFFICE.

ARTHUR WATERS, OF CINCINNATI, OHIO.

## AUTOMATIC FURNACE-FEEDER.

SPECIFICATION forming part of Letters Patent No. 256,522, dated April 18, 1882.

Application filed September 12, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR WATERS, of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Automatic Furnace-Feeders, of which the following is a specification.

This invention relates to means for feeding chips, sawdust, &c., to furnaces. Its object is to automatically feed the chips, sawdust, shavings, and other small cuttings produced in furniture factories and other wood-working mills to the boiler-furnace, and to insure their perfect combustion. Its object is also to separate the combustible from the non-combustible refuse and to collect the dust so separated, and thus prevent the annoyance usually occasioned by it. A further object is to insure a regular supply of the light fuel. Its object is, finally, to evenly distribute the fuel over the fire-bed. These objects are attained by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved device, showing the shaving-receptacle and furnace in a vertical section; a portion of the feeding-tube is broken away to expose the dust-screen. Fig. 2 is a view, taken in a plane at right angles to the view shown in Fig. 1, showing the furnace in vertical transverse section and the shaving-house in the background. Fig. 3 is top plan view of the same, the shaving-receptacle being shown in horizontal section. Fig. 4 is a sectional view of the feed-pipe, showing the valve or gate for turning the cuttings either into the furnace or shaving-house, as desired. Fig. 5 is a longitudinal horizontal view of the feeding-tube, and Fig. 6 is a longitudinal vertical section of the same.

Like parts, wherever they occur in the different views, are indicated by similar reference-letters.

A represents the shaving-house, and B the boiler-furnace. These are, as usual, located just outside of the factory-building.

C represents the shaving-tube leading from the factory into the shaving-house. Through this the shavings, sawdust, &c., are discharged from the factory into the shaving-house in the usual manner by a fan or blower, the exhaust-tubes of which open contiguous to the machines and collect the cuttings as they are produced and convey them to the shaving-house,

to be afterward shoveled into the furnace by the attendants. This part of the apparatus is well understood, and hence is not illustrated here.

To the discharge end of tube C, I attach an extension, C', which passes out through the wall of the shaving-house to a position above the boilers and terminates in branch pipes C<sup>2</sup>, which pass down between the boilers and discharge upon curved plates D, which are attached to the front of the furnace, and have at their inner edge upwardly-projecting flanges to prevent the cuttings from being carried back with the draft and distribute them evenly over the fire-bed.

Located above the tube C' is a water-tank, E, provided with suitable pipes to supply it with water, and having a grated opening at one end closed by a slide, e, to discharge the water when desired. From tube C' branch pipes F extend up and are curved over to discharge into tank E. One of these pipes F connects with tube C' within the shaving-house. The openings from tube C' into the tubes F are guarded by wire screens G. These are hinged to the top of tube C' and have hinged to their free ends blank leaves G', which extend up into the tubes F. The screens G are raised or lowered within tube C' by screw-rods g, which pass through the under side of the tube and are linked to the screens. The tube C' is also provided with a slide-valve between the last screen and the furnace to partially or entirely close the tube when desired. The lever h, for operating the slide, extends down in a convenient position to be reached by the attendant.

Near the elbow of pipe C is a hinged gate, I, (see Fig. 4,) and above it an opening from tube C into the house A. The gate I is opened and closed by a rod, i. When the gate is in the position shown in Fig. 4 the communication between tube C' is cut off and the cuttings are discharged into house A. When the gate is pushed against the top of tube C it closes the opening to the house and opens the communication to the furnace through tubes C' C<sup>2</sup>.

J is a tube leading from the shaving-house A back into the factory, where it connects with the exhaust-tube in advance of the fan. The tube J is also provided with a valve (not shown) to open or close communication between house A and the exhaust-tube within the factory.

The purpose of this tube and the cut-off gate I in tube C is to insure a regular supply of cuttings to the furnace. In all factories the supply of chips, shavings, &c., is irregular, depending upon the kind of work being done by the machines and the number of machines employed at the time. If the whole amount produced in a large factory were supplied to the furnace as produced, the supply would be so large at times as to choke the furnace, while at other times it would be insufficient to raise the necessary amount of steam. My device overcomes this difficulty. When the supply from the machines is too large the gate I is thrown down in the position seen in Fig. 4, and the surplus is thrown into the shaving-house. When the supply is insufficient the valve in pipe J is opened, when the surplus of cuttings previously stored in house A are drawn into the exhaust and discharged through tube C' into the furnace.

In the process of dressing lumber for use there is a considerable quantity of incombustible material produced, especially in planing lumber that has been rafted down our rivers, or that has been seasoned in the open air. This, (as dust,) when conveyed to the furnace, impedes combustion, and when carried to the shaving-house in the usual way is discharged through the vent-openings to the great annoyance of the workmen. By my apparatus the dust is separated from the cuttings and collected in tank E. As the cuttings are forced by the blast through tube C', the larger portions are deflected and pass under the screens G to the furnace, while the dust is blown through the screens up through branch pipes F and discharged into the water in tank E, from which it is removed after raising the slide *e* and drawing off the water. One of the branch pipes F, with its screen G, would collect most of the dust; but in order to thoroughly clean the cuttings before entering the furnace I have provided three of them.

In furnaces fired with small cuttings, sawdust, &c., there is usually great waste, as the fuel and ashes compact upon the bars and pre-

vent a sufficient amount of oxygen from passing through the fuel to unite with the carbonaceous gases liberated in the furnace. In my furnace the blast that carries the cuttings into the furnace also furnishes a full supply of oxygen to the gases. The results are complete combustion, a practically smokeless furnace, and a great saving of fuel.

The screens, branch pipes F, and tank E may all be omitted, as may also the tube J and valve I, and yet good results attained by the remaining elements of my invention; and the screens, branch pipes, and tank attached to the ordinary devices for collecting cuttings and discharging them in the customary shaving-house, to be fed by hand to the furnace, will also give good results.

What I claim is—

1. The combination, substantially as specified, of the tube C', attached to the discharge end of an apparatus constructed to collect and discharge cuttings, sawdust, &c., by pneumatic force, the branch pipes C<sup>2</sup>, furnace B, and curved flanged plate D, arranged within the furnace beneath the discharge end of pipes C<sup>2</sup>.

2. The combination, substantially as specified, of the discharge-tube of a pneumatic apparatus, as C, house A, tubes C', C<sup>2</sup>, and J, with the valve I and its operating-rod *i*, and furnace B, said parts being arranged to discharge either into house A or furnace B, as desired, and tube J, communicating with the exhaust end of tube C, so that the cuttings stored in house A may be drawn into tube C and discharged into the furnace when the valve in tube J is opened.

3. The combination of tube C', screen G, hinged wings G', and branch pipe F, arranged to operate as specified.

4. The combination, substantially as specified, of tubes C, C', C<sup>2</sup>, and F, with screens G, wings G', and tank E, for the purpose set forth.

ARTHUR WATERS.

Witnesses:

GEO. J. MURRAY,  
MARY MURRAY.