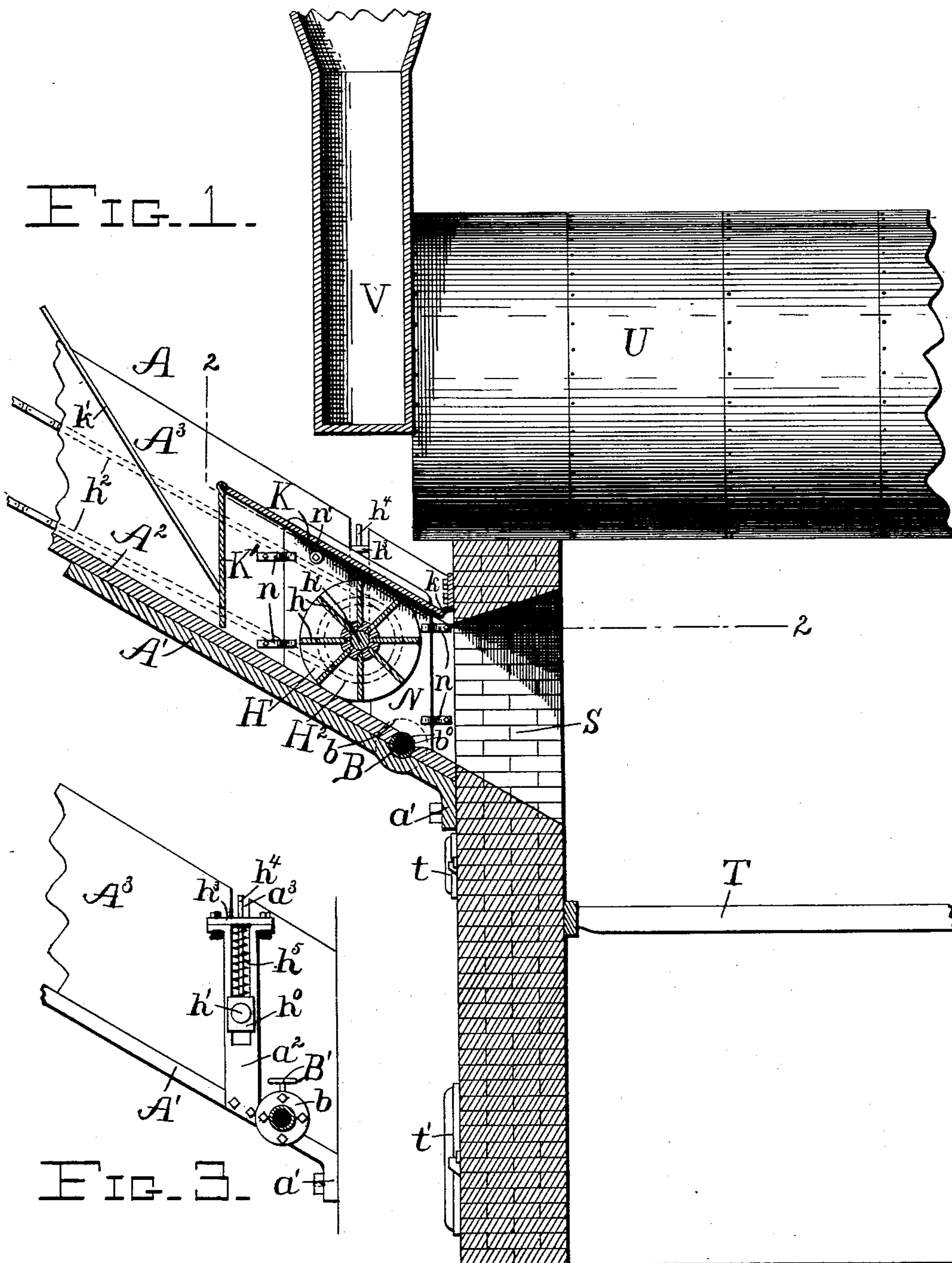


2 Sheets—Sheet 1.

APPARATUS FOR FEEDING BAGASSE, SAWDUST, &c., TO FURNACES.

Patented Oct. 12, 1897.



Witnesses  
L. H. Blakelock.  
John E. Wilson

Inventor  
James Fisher,  
by Whitman & Wilkinson,  
Attorneys.

(No Model.)

2 Sheets—Sheet 2.

J. FISHER.

APPARATUS FOR FEEDING BAGASSE, SAWDUST, &c., TO FURNACES.

No. 591,752.

Patented Oct. 12, 1897.

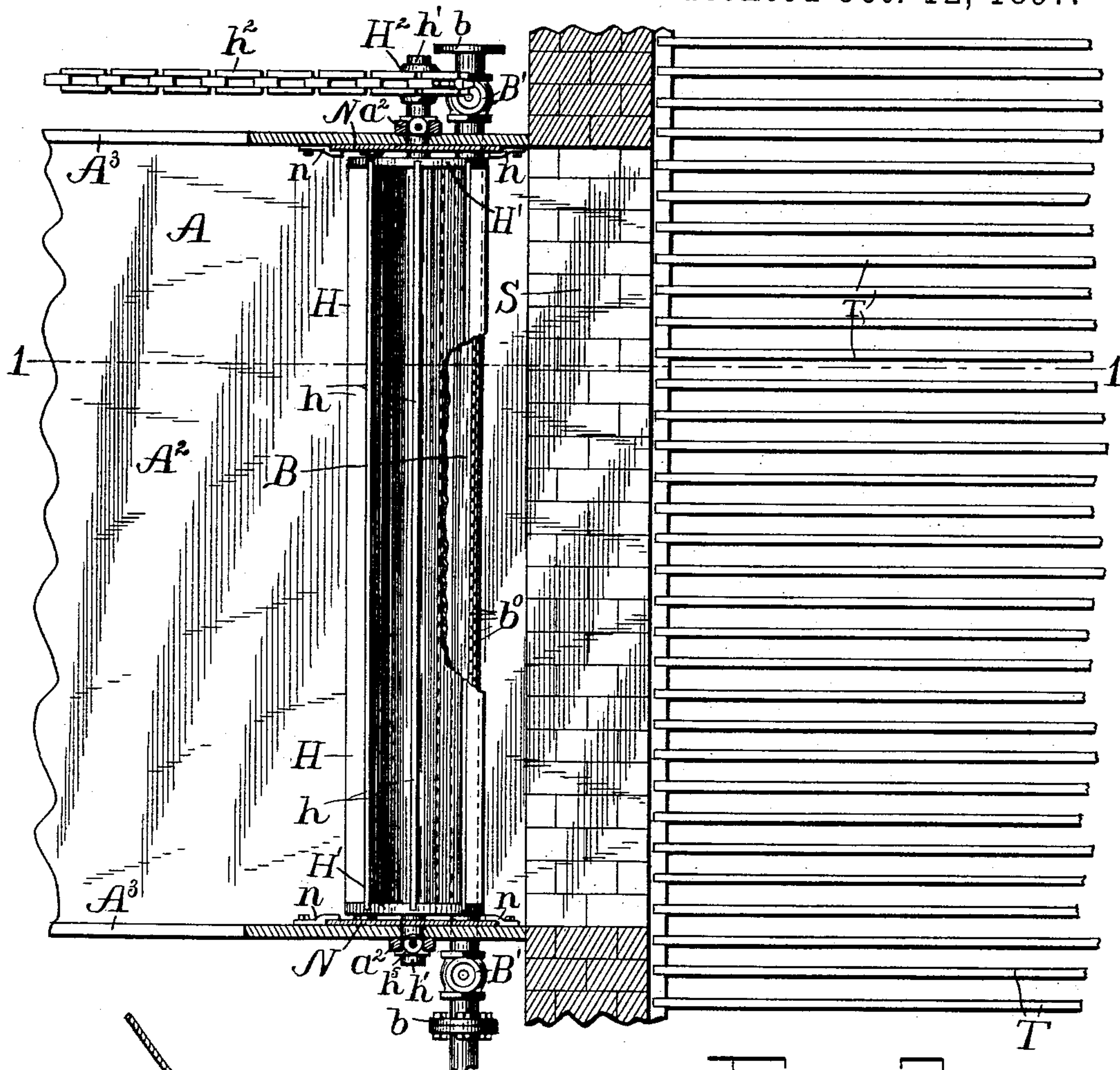


FIG. 2.

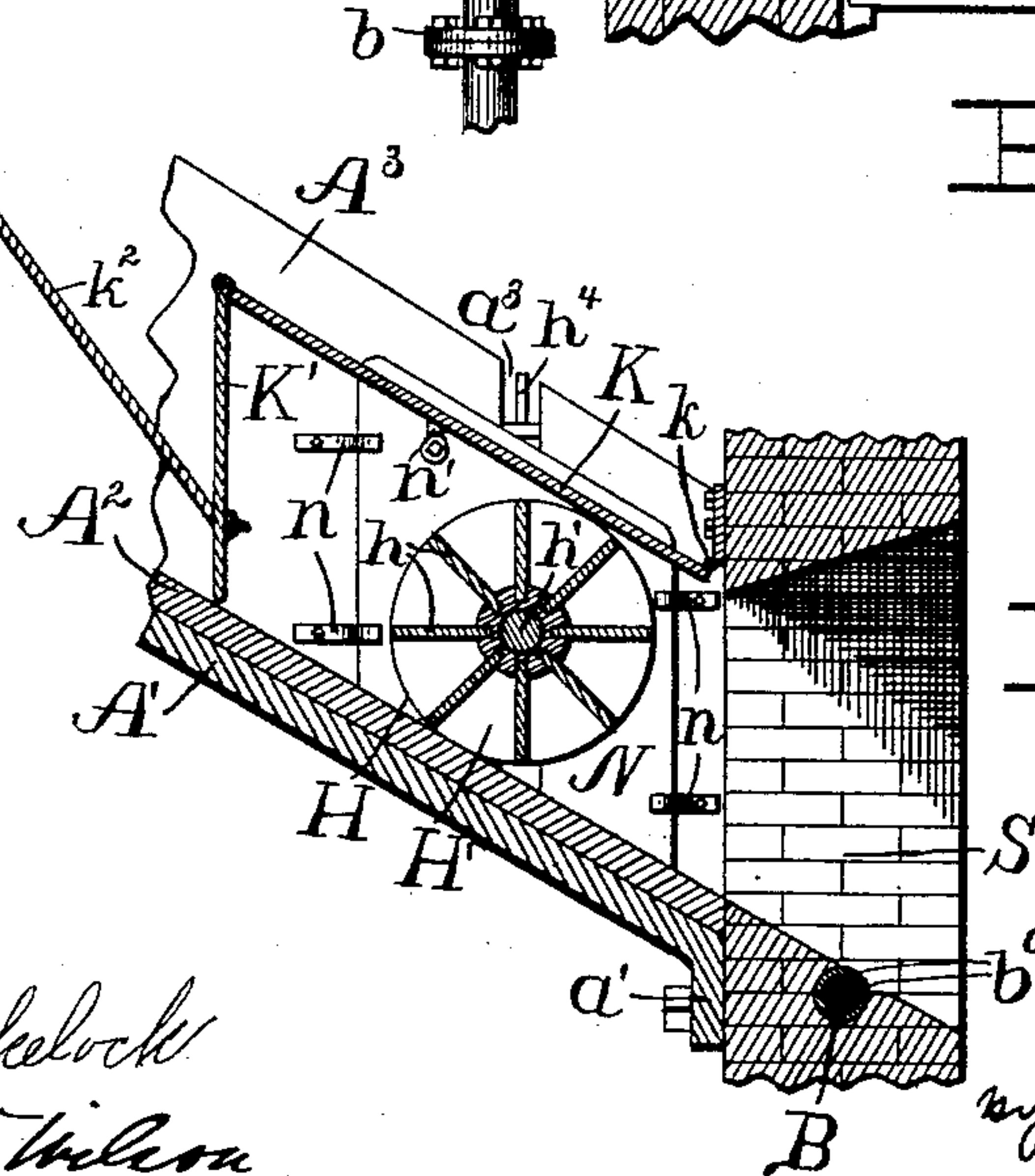


FIG. 4.

Witnesses  
W. H. Blakelock  
John L. Wilson.

Inventor  
James Fisher,  
by Whitman & Wilkinson,  
Attorneys.



# UNITED STATES PATENT OFFICE.

JAMES FISHER, OF NEW ORLEANS, LOUISIANA.

APPARATUS FOR FEEDING BAGASSE, SAWDUST, &c., TO FURNACES.

SPECIFICATION forming part of Letters Patent No. 591,752, dated October 12, 1897.

Application filed February 13, 1897. Serial No. 623,293. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES FISHER, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Apparatus for Feeding Bagasse, Sawdust, or other Light Fibrous Material to Furnaces; and I do hereby 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.

My invention relates to improvements in apparatus for feeding fine fuel—such as bagasse, sawdust, and other fibrous material—to furnaces, and has for its object to provide certain improvements upon the apparatus shown and described in my Patent No. 564,918, dated July 28, 1896, for improvements in apparatus for feeding bagasse to furnaces; and my present invention consists in the novel features and combinations of parts hereinafter described and claimed.

Reference is had to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a vertical sectional view through the front of the furnace and my feeding apparatus, taken on the line 1 1 of Fig. 2. Fig. 2 is a horizontal sectional view taken on the line 2 2 of Fig. 1, part of the bladed roller being broken away to show the perforated blast-pipe beneath. Fig. 3 is a side view of the lower end of the feeding-chute, showing the roller-bearings; and Fig. 4 is a vertical sectional view similar to that shown in Fig. 1, showing a modification of my invention, in which the perforated blast-pipe is embedded in the front wall of the furnace across the fuel-opening.

A represents an inclined chute, upon which the bagasse is received from any convenient elevated carrier or other source. (Not shown.) The upper end of this chute is not shown, but it may be supported in any suitable or convenient manner—such, for instance, as shown in my patent aforesaid. The lower end of this chute is supported by means of metallic brackets A', which are secured, as at a', to the front wall of the furnace, as shown in Fig. 1. This chute has raised side pieces A<sup>3</sup> and a bottom A<sup>2</sup>.

S represents the fuel-opening of the furnace, through which the bagasse, sawdust, or other fuel is fed. There may be one opening for each furnace, if preferred, or there may be one continuous opening for all, as shown.

T represents the grate-bars of the furnace, and t represents one or more doors through which the mass of fuel upon the grate T may be stirred.

t' represents one or more ash-doors, which allow access beneath the furnace-grate.

U represents one or more boilers communicating with the smoke-box V, which latter is surmounted with a suitable smoke-stack. (Not shown.)

The brackets A', one being upon each side of the lower end of the chute A, have each a vertical bifurcated standard a<sup>2</sup> bolted thereto, as shown, or formed integral therewith, if preferred, and a journal-block h<sup>0</sup> fits between the bifurcations of each of these standards a<sup>2</sup>, as shown most clearly in Fig. 3. A shaft h' is journaled in the blocks h<sup>0</sup>, held in the said bifurcated standards, and works in slots a<sup>3</sup> in the sides A<sup>3</sup> of the chute, and a roller H, having radial ribs or blades h and circular end disks H', is fixed upon this shaft and adapted to rotate therewith. A sprocket-wheel H<sup>2</sup> is mounted upon one end of the shaft h', and a sprocket-chain h<sup>2</sup>, driven from any suitable source of power, passes over said sprocket-wheel and drives the roller H. A plate h<sup>3</sup> is bolted across the tops of the bifurcations of each of the standards a<sup>2</sup>, and a guide rod or spindle h<sup>4</sup>, is mounted upon the block h<sup>0</sup> at one end and passes through an opening in the plate h<sup>3</sup>, as shown most clearly in Fig. 3. A coil-spring h<sup>5</sup> surrounds this guide rod or spindle h<sup>4</sup> and bears at its ends upon the plate h<sup>3</sup> and the journal-block h<sup>0</sup> and tends to hold the latter down, thus keeping a constant pressure upon the shaft h' of the roller H and preventing its rising too far when a large bulk of bagasse passes beneath the said roller.

B represents a metallic pipe or tube provided along one side with a row or rows of openings b<sup>0</sup>. This pipe or tube is mounted either transversely of the floor of the chute A at or near its lower end, as shown in Figs. 1, 2, and 3, or it may, if preferred, be embedded in the front wall of the furnace trans-



versely of the fuel-opening, as shown in Fig. 4. This pipe is so arranged that the openings  $b^0$  therein will point upward and inward toward the furnace, so that a blast of air or steam therethrough will lift the bagasse, sawdust, or other light fibrous material being fed to the furnace and will carry the said material over into the furnace and scatter it over the grate-bars, as will hereinafter more fully appear. It will be seen that the lightweight bagasse will be blown upward and scattered all over the grate and at the same time mixed with the necessary air to support combustion. In the former patent, No. 564,918, the bagasse was fed directly to the furnace by a toothed roller Q, which threw the bagasse tangentially at an inclination downward into the furnace, piling the same up in a mass without properly distributing the same through the furnace, as is accomplished by the blast through the pipe G in my present invention. Referring to Figs. 2 and 3, it will be seen that the ends of the pipe B extend outwardly through the sides of the chute, and at either end is provided with a flange  $b$ , by means of which it may be connected to a pipe or pipes leading from an air or a steam blast at any convenient point. (Not shown.)

The pipe B may be closed at one end, but I prefer to have it open at both ends and provided with a flange, as above described, or other suitable connection at either end, and I also provide a valve  $B'$  in each end of this pipe, so that steam or air may be admitted at either end without escaping through the other end, or may be admitted at both ends at the same time from either two separate pipes or a forked pipe, as will be obvious.

The bagasse after being discharged upon the chute A slides down to the bladed roller H, which is constantly rotating and which feeds the bagasse along over the perforated pipe B, from which latter let it be supposed there is escaping a blast of air or steam under pressure. As the material passes over this perforated pipe B the blast of air or steam escaping therefrom lifts the material and tears it to pieces and scatters the fragments in all directions over the furnace-grate, thus rendering it impossible for any large mass of the material to fall in one spot and there retard combustion. Besides the function of scattering the finely-divided particles of the fuel over the grate-bars the blast of steam or air will create a better draft in the furnace, and thus materially assist combustion.

Where the furnace is fed through more than one opening, or where several furnaces are used with a separate opening for each furnace, partitions may be formed on the chute, and the roller and tube may be divided into sections and intermediate brackets and bearings be provided. The sides  $A^3$  of the chute extend sufficiently high above the roller H to prevent the material from falling over from the chute, and plates N, held in

position by means of cleats or guides  $n$ , secured to the sides  $A^3$  and slotted to fit over the shaft of the roller H, are arranged to rest upon the said shaft and to rise and fall therewith, in order to close the slots in the sides  $A^3$  above the said shaft  $h'$  and beneath the edges of the door K when lifted. A door K, preferably of metal, is hinged, as at  $k$ , above the fuel-opening and projects forward and upward therefrom and rests upon lugs  $n'$ , projecting inwardly from the vertically-sliding plates N. This door just fits in between the sides of the chute, and thus being practically air-tight prevents the escape of any sparks which might otherwise fly out from the mouth of the furnace. As the roller H rises and falls, lifting with it the plates N, the door K will swing up or down upon its hinges, its forward end at all times resting upon the lugs  $n'$  on the plates N immediately above the blades of the said roller. Upon the outer end of the door K is hinged a pendent door  $K'$ , which latter may have an operating-rod  $k'$  connected thereto, as shown in Fig. 1, or simply a rope or chain  $k^2$  connected to it, as shown in Fig. 4, by means of which the opening between the said pendent door and the floor of the chute may be varied, and thus the feed may be regulated. It will be seen that when the front end of the door K lifts up it will lower the lower edge of the door  $K'$ , and thus when there is an excess of fuel at the roller H the supply of feed passing beneath the door  $K'$  will be checked or wholly cut off by the automatic lowering door  $K'$ .

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus of the character described, the combination with a furnace having an opening in the front wall thereof for the admission of fuel; of an inclined chute adapted to receive the fuel at its upper end and supported at said end in any suitable manner; brackets secured to the front of the furnace and supporting the lower end of said chute; a roller having radial blades mounted across said chute near its lower end in bearings in said brackets; means for driving said roller; a pipe having perforations along one side thereof mounted across the floor of said chute at its lower end; means for connecting said perforated pipe with a pipe leading from an air or a steam blast; a door pivoted in front of the furnace and adapted to extend over said perforated blast-pipe and said bladed roller, a second door hinged to the outer end of said pivoted door, and pendent therefrom, and adapted to close said chute; and means connected to said pendent door for operating the same, substantially as described.

2. In an apparatus of the character described, the combination with a furnace having an opening in the front wall thereof for the admission of fuel; of an elevated chute adapted to receive the fuel at its upper end and supported at said end by any suitable



means; brackets secured to the front of the furnace and supporting the lower end of said chute; a roller having radial blades thereon mounted across the said chute near its lower end in bearings mounted in said brackets and capable of vertical movement therein; means for driving said bladed roller; a pipe provided with perforations along one side thereof, mounted across the floor of said chute, at its lower end; means for connecting either end of said perforated pipe with a pipe leading from an air or a steam blast; a pivoted door extending over said perforated pipe and said roller, a second door hinged to the outer end of said pivoted door, and pendent therefrom, and adapted to close said chute; and means connected to said pendent door for operating the same, substantially as described.

3. In an apparatus of the character described, the combination with a furnace, having an opening in its front wall above the fire-grate; of an inclined chute having its upper end supported in any suitable manner; brackets secured to the front wall of the furnace and supporting the lower end of said chute in front of the fuel-opening therein; vertical bifurcated standards on said brackets; vertically-movable journal-blocks mounted in said bifurcated standards; a bladed roller mounted across said chute near its lower end in said journal-blocks, and having a sprocket-gear on the shaft thereof; a pipe provided with perforations along one side thereof and open at both ends, mounted across the fuel-opening of the furnace; a valve in each end of said pipe; means for connecting either end of said pipe with a pipe leading from an air or a steam blast; a metallic door pivoted in the front of the furnace and extending above the fuel-opening, and extending over said perforated blast-pipe and said bladed roller, and adapted to rise and fall with said bladed roller, a second metallic door hinged to the outer end of said pivoted door, and pendent therefrom, and adapted to close said chute; and means connected to said pendent door for operating the same, substantially as described.

4. In an apparatus of the character described, the combination with a furnace, having an opening in its front wall above the fire-grate; of an inclined chute having its upper end supported in any suitable manner; brackets secured to the front wall of the furnace and supporting the lower end of said chute in front of the fuel-opening therein; vertical bifurcated standards on said brackets; vertically-movable journal-blocks mounted in said bifurcated standards; coil-springs mounted between the bifurcations of said standards and bearing upon said journal-blocks; a bladed roller mounted across said chute near its lower end in said journal-blocks, and means for driving said roller; a pipe having perforations along one side thereof mounted across the fuel-opening of the furnace; valves in the ends of said perfo-

rated pipe; means for connecting either end of said pipe to a pipe leading from an air or a steam blast; a metallic door pivoted to the front of the furnace above the fuel-opening, extending entirely across said chute between the sides thereof above said perforated pipe and said roller, and adapted to rise and fall with said bladed roller, a second metallic door hinged to the outer end of said pivoted door, and pendent therefrom, and adapted to close said chute; and means connected to said pendent door for operating the same, substantially as described.

5. In an apparatus for feeding fine fuel to furnaces, the combination with an inclined chute provided with raised sides and supported at its lower end by brackets secured to the wall of the furnace; perforated blast-pipes mounted across the lower end of said chute, and provided with valves in its ends; a bladed roller for feeding the bagasse down said chute mounted in vertically-movable bearings across the lower end of said chute; means for driving said roller; a metallic door hinged in front of the furnace and extending above the fire-door and between the sides of said chute and extending over said rollers; supports for the outer end of said hinged door adapted to be raised or lowered by said bladed roller, a second metallic door hinged to the outer end of said pivoted door, and pendent therefrom, and adapted to close said chute; and an operating-rod connected to said pendent door, substantially as described.

6. In an apparatus for feeding fine fuel to furnaces, the combination with an inclined chute provided with raised sides and supported at its lower end by brackets secured to the wall of the furnace; a perforated blast-pipe mounted across the lower end of said chute and adapted to direct currents of air or steam inwardly toward the furnace to scatter the fuel over the grate-bars of the furnace; a bladed roller mounted in vertically-movable bearings across the lower end of said chute; means for driving said roller; slotted plates mounted in guides upon the sides of said chute and fitting over the shaft of said roller, and adapted to rise and fall therewith; lugs extending inwardly from said plates; a pivoted metallic door, fitting between the sides of said chute and extending over said rollers and resting at its outer end upon said lugs, a second metallic door hinged to the outer end of said pivoted door, and pendent therefrom, and adapted to close said chute; and an operating-rod connected to said pendent door, substantially as described.

7. In a bagasse-burner, the combination with a furnace, having an opening in the front wall thereof for the admission of fuel above the grate; of a chute adapted to receive the fuel near its upper end; a roller having radial blades mounted across said chute near its lower end; means for driving said roller; a pipe having perforations inclined upward toward the furnace and mounted near the lower



end of said chute, and means for connecting said perforated pipe with a blast of air or steam or both, substantially as described.

5 8. In a bagasse-burner, the combination with a furnace, having an opening in the front wall thereof for the admission of fuel, of an inclined chute adapted to receive the fuel at its upper end and opening into the furnace at its lower end, a roller having radial blades  
10 mounted across said chute near its lower end, vertical, movable bearings for the shaft of said roller, means for driving said roller, a metallic door pivoted to the said roller and adapted to be pressed up thereby, and a second  
15 door hinged to the outer end of said pivoted door and pendent therefrom and normally in close contact with said chute, with means for limiting the inward swing of the bottom of said door, substantially as described.  
20

9. In a bagasse-burner, the combination with a furnace, having an opening in the front wall thereof for the admission of fuel, of an inclined chute adapted to receive the fuel at

its upper end and opening into the furnace 25 at its lower end, a roller having radial blades mounted across said chute near its lower end, vertical, movable bearings for the shaft of said roller, means for driving said roller, a metallic door pivoted to the said roller and 30 adapted to be pressed up thereby, and a second door hinged to the outer end of said pivoted door and pendent therefrom and normally in close contact with said chute, with means for limiting the inward swing of the bottom of 35 said door, a pipe having perforations inclined upward and inward toward the furnace and mounted across the lower end of said chute, at the mouth of the furnace, and means for connecting said perforated pipe with a pipe 40 leading from a blast of air or steam, or both, substantially as described.

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

JAMES FISHER.

Witnesses:

ROBERT J. PERKINS,  
JOHN J. SAUCIER.