

No. 765,657.

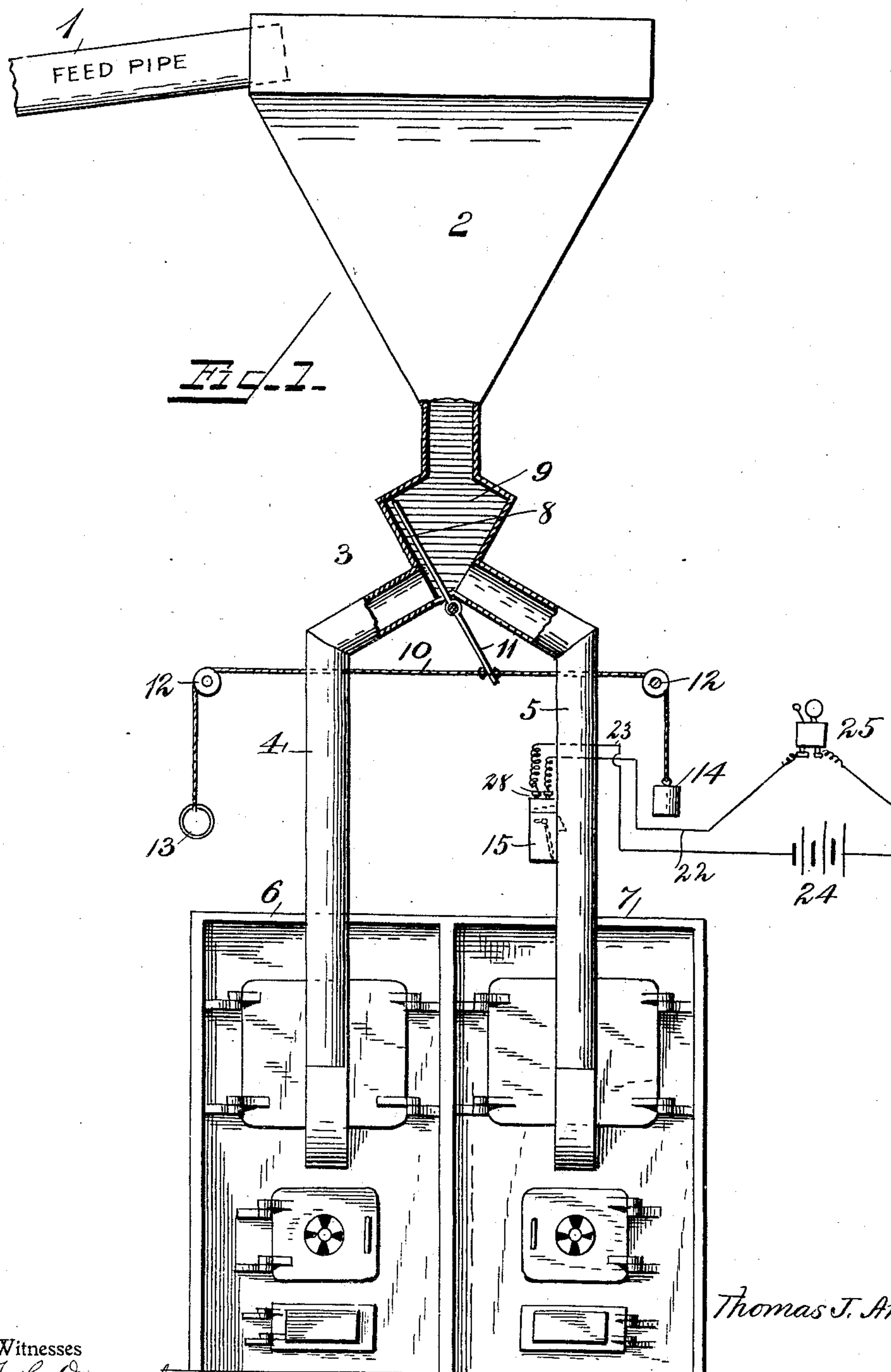
PATENTED JULY 26, 1904.

T. J. ARNAULT.
ALARM FOR PNEUMATIC FEEDERS.

APPLICATION FILED OCT. 22, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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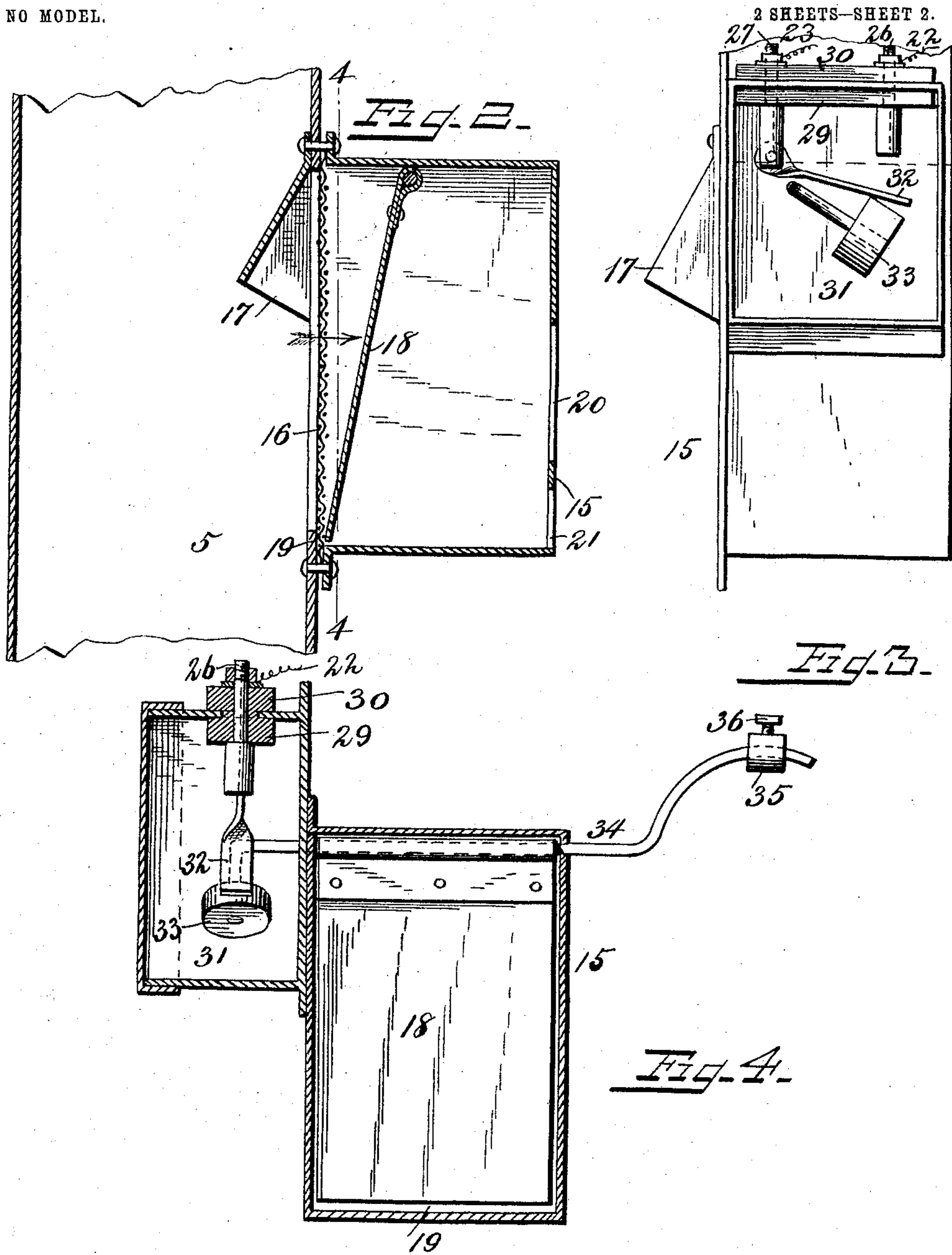
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UNITED STATES PATENT OFFICE.

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ALARM FOR PNEUMATIC FEEDERS.

SPECIFICATION forming part of Letters Patent No. 765,657, dated July 26, 1904.

Application filed October 22, 1903. Serial No. 178,083. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. ARNAULT, a citizen of the United States, residing at Everett, in the county of Snohomish and State of Washington, have invented certain new and useful Improvements in Alarms for Pneumatic Feeders; 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.

This invention relates to an alarm for pneumatic feeders of the kind employed in connection with woodworking-machines in lumber-mills and other woodworking establishments for feeding shavings, sawdust, and other refuse to the furnaces of the mill plant, to be employed as fuel for generating steam in the boilers of said furnaces for driving said plant, and particularly to means for indicating when the refuse-conduit becomes choked, so that said conduit may be cleared and the fuel prevented from accumulating and taking fire in the conduit.

The object of the invention is to provide simple and effective alarm or indicating mechanism which is not liable to be rendered inactive by particles of the fuel and which shall be of requisite sensitiveness and efficiency under all conditions of use.

With this and other objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 shows in front elevation two boiler-furnaces, together with elements of the refuse-feeder, and my improved alarm or indicator, showing a portion of the conduit broken away at the junction of the valve-chamber and branch pipes to expose the cut-off apparatus. Fig 2 is a section, on an enlarged scale, through one of the branch pipes of the conduit and the casing of the indicator or alarm. Fig. 3 is an elevation of the same looking toward the switch-chamber, showing the closure of the same removed; and Fig. 4 is a transverse section through the alarm-cas-

ing and alarm mechanism, taken substantially on the line 4 4 of Fig. 2.

Referring to the drawings, 1 designates a feed-pipe leading from the point of discharge of the shavings and sawdust or of the refuse, 2 a hopper into which the same discharges, and 3 a conduit extending from the hopper to the point where the refuse is to be used as fuel or stored for future use. In the present instance I have shown this conduit 3 bifurcated to provide branch pipes 4 and 5, leading to feed-openings communicating with the fire-boxes of boiler-furnaces 6 and 7 to supply the same with the refuse to be used as fuel. Instead of connecting with the furnaces the conduit may connect with a storage house or vault in which the shavings or refuse may be stored for future use, or, if desired, an additional branch pipe may lead to a storage vault or house of this character, and the number of branch pipes may be increased according to the number of furnaces and storage-houses to be kept supplied with fuel. I do not limit myself in this particular to the application of the invention to the specific construction of feed device shown nor to a feed device of the character specified, as the invention may be employed in connection with feed devices of any kind in which the feed of material is effected by pneumatic or other fluid-pressure. The supply of fuel to the furnaces is governed by a cut-off or regulating valve 8, disposed in a valve-chamber 9 at the point of junction of the hopper with the branch pipes 4 and 5, said valve controlling the supply of fuel to either or both branch pipes at will and being operated through the instrumentality of a loop, chain, or other flexible connection 10, attached to an arm 11, connected to said valve, passing through suitable guide-pulleys 12 and having at one end a hand-grip 13 for manually operating it in one direction and at the opposite end a counterweight 14 for automatically operating it in the reverse direction. Air-pressure from a fan or blower of any preferred type (not shown) is employed in practice and may be connected at some suitable point along the line of feed of the device.

In systems of this character it frequently happens that the conduit becomes choked with

the refuse, owing to obstructions in the conduit or to the too rapid feed of the refuse to the furnaces or storage-houses, resulting in the shutting down of the plant to allow the conduit to be cleared. In order to obviate this difficulty, I provide means for automatically sounding an alarm for indicating when the conduit is becoming choked or the refuse is feeding too rapidly or conditions are such that the feed of the refuse should be arrested in order to prevent the conduit from choking up. The means shown in the present instance for effecting this result comprises a pneumatic electric alarm governed by the pressure of the air within the conduit. In the present embodiment it consists of a casing 15, secured at some suitable point along the line of the conduit, said casing being shown in the present instance as connected to the branch pipe 5. The front or inner side of the casing is suitably secured to said pipe and is provided with an opening in line with an opening in the pipe, the opening in the casing being provided with a screen 16 to prevent any other than the very smallest particles of the fuel and dust from passing into said casing and interfering with the operation of the switch of the alarm mechanism. The pipe 5 is provided above the opening therein with a shield or deflector 17, which prevents the particles of refuse from coming in direct contact with and hanging in the meshes of the screen 16. The bottom of the casing 15 is secured to the pipe 5 a little below the opening therein, leaving a portion of the pipe extending upward to form a flange or ledge 19, and in the casing 15 is a movable switch-controlling element consisting of a plate or diaphragm 18, which normally contacts with or closes against said flange or ledge 19. The rear wall of the casing 15 has an opening 20, which permits air to enter to compensate for the movement of the said valve or diaphragm 18, and it is also provided below said opening 20 with an opening 21, through which the dust and other fine particles which find their way into the casing 15 and become deposited upon the bottom thereof will be blown out by the blast when the member 18 is operated, thus clearing the casing 15 of all foreign matter liable to interfere with the operation of the member 18. The opening 20 is primarily intended, however, as a discharge-opening to allow the air to pass out when the pipe 5 becomes choked with refuse.

The alarm mechanism actuated by the member 18 comprises an alarm-circuit including conductors 22 and 23, a battery 24 or other source of electric supply, and a bell or other suitable alarm or indicating device 25. In practice this indicating device may be either an aural or a visual signal, and I do not limit myself in this particular. The wires 22 and 23 are connected to binding-posts 26 and 27,

which are in the form of bolts, each having a securing-nut 28. These bolts pass through openings in the top of a chamber 31 on one side of the casing 15 and through heads or disks 29 and 30, of rubber or other insulating material, said disks being arranged above and below the said top of the chamber. The openings in the top of the chamber 31, through which the bolts pass, are of such relative size that the bolts do not contact with the same, but are electrically insulated from each other and from the casing and chamber by the said disks 29 and 30. To the head of the post 27 is pivoted a switch-arm 32, which is adapted to engage the head of the binding-post 26, and thereby close the said electric circuit to sound or operate the alarm device 25.

The switch-arm 32 is adapted to be operated by a contact head or knob 33, of rubber or other insulating material, arranged upon one end of a shaft 34, journaled in the walls of the casing and chamber. This shaft also carries the movable element 18, which is thus mounted to vibrate toward and from the screen-diaphragm 16. In this movement of the element 18 the contact-knob 33 is operated to move the switch-arm 32 into contact with the post 26 and permit it to be retracted by gravity. In the normal operation of the parts the element 18 closes air-tight against the frame 19 and the refuse under pressure of the blast feeds through the pipe 5 to the furnace or storage-house. When the furnace requires fuel or the storage-house is unfilled, there is no impediment to the free feed of the material and flow of air through the pipe 5; but when either the furnace or the storage-house becomes filled with fuel or the pipe becomes choked there is a consequent resistance to the flow of the air and the further feed of the fuel or refuse, and this causes an augmentation of pressure in the pipes, whereby the member 18, which under normal conditions is unaffected or but little affected by the blast, is forced outwardly and the air having no other vent escapes through the openings 21 and 22. In so doing whatever sediment or refuse has found its way into the casing 15 will be blown out, and the actuation of the part 18 will effect the closing of the switch 32, thereby closing the electric circuit to sound the alarm, as hereinbefore described. Upon the sounding of the alarm, which will be located in the furnace-room or at some point where it may be readily heard by the engineer or fireman, notice will be given of the choking of the conduit, so that the further feed of refuse may be arrested until the conduit is again cleared out.

In the feed of the refuse to a storage-house it may happen that there will be an augmentation of pressure in the pipe or conduit, especially when there is a resistance from any cause to free exhaust of the air from the storage-house. Under such conditions unless this pressure is relieved it will of course be under-

stood that the alarm mechanism would be operated. In order to prevent the operation of the alarm mechanism from such a cause unless the resistance to the exhaust of air is so great as to cause a considerable augmentation of pressure in the conduit and interfere with the free feed of the refuse, I provide means for regulating the resistance to the movement of the part 18, to which end I apply upon the opposite end of the shaft 34 from the contact-knob 33 a weight 35, which is adjustable by means of a set-screw 36, to vary its resistance to the turning of said shaft. Thus the alarm mechanism will remain unaffected until the pressure in the pipe or conduit reaches a certain predetermined point, thus preventing any unnecessary sounding of the alarm.

From the foregoing description, taken in connection with the accompanying drawings, the construction, operation, and advantages of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

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

1. A device for feeding material under air-pressure, comprising, in combination, a feed-conduit provided with an opening in its side, a screen guarding said opening, a shield arranged upon the interior of the conductor and overhanging the near end of the screen in the path of the feeding material to prevent direct contact of the body of the latter with said screen, a box or chamber arranged upon the exterior of the conduit and in open communication with the same through said screen, a valve in said box or chamber adapted to swing

outwardly upon a determined augmentation of air-pressure in the conduit, the said box or chamber being provided in rear of said valve with upper and lower openings for the admission and discharge of air and the discharge of any dust or fine particles of material which may enter the box or chamber through the screen, and an alarm actuated by the outward swinging movement of the valve, substantially as described.

2. A device for feeding material under air-pressure, comprising, in combination, a feed-conduit provided with an opening in its side, a screen guarding said opening, a shield arranged upon the interior of the conductor and overhanging the near end of the screen in the path of the feeding material to prevent direct contact of the body of the latter with said screen, a box or chamber arranged upon the exterior of the conduit and in open communication with the same through said screen, a valve in said box or chamber adapted to swing outwardly upon a determined augmentation of air-pressure in the conduit, the said box or chamber being provided in rear of said valve with upper and lower openings for the admission and discharge of air and the discharge of any dust or fine particles of material which may enter the box or chamber through the screen, a shaft actuated by said valve, an electric alarm, a circuit therefor including conductors, a switch-arm hinged or pivoted to one conductor and adapted to engage the other conductor, and a contact actuated by said shaft and adapted to engage and move said switch-arm, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THOMAS J. ARNAULT.

Witnesses:

E. W. BUNDY,
J. Y. KENNEDY.