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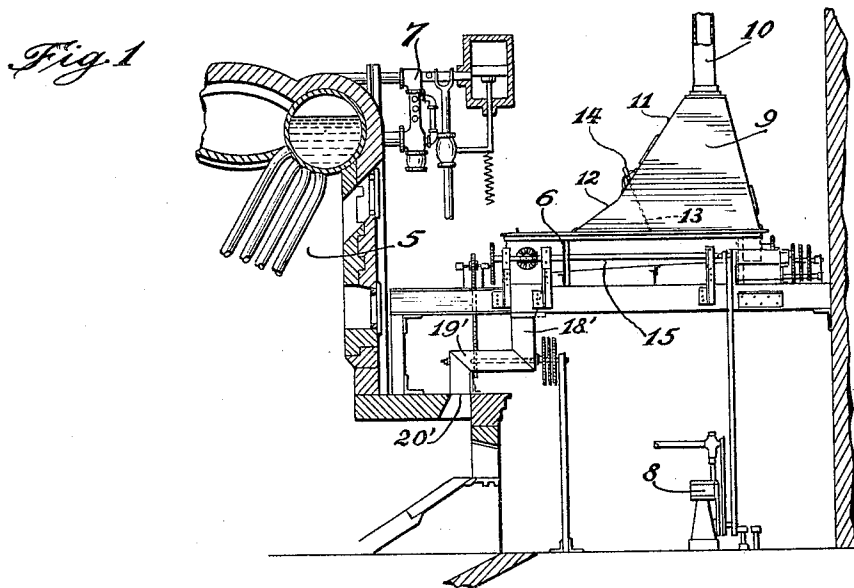
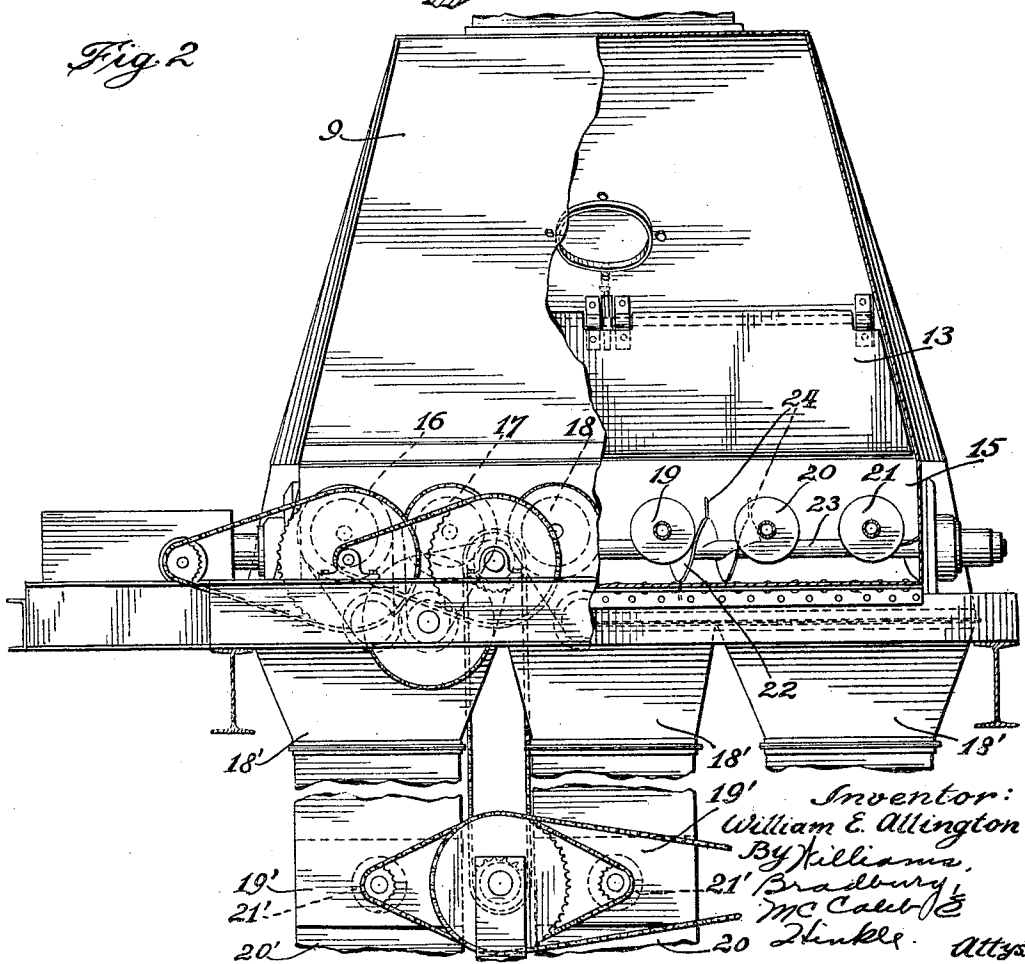
W. E. ALLINGTON

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WOOD WASTE FEEDING SYSTEM

Filed Sept. 8, 1931

3 Sheets-Sheet 1



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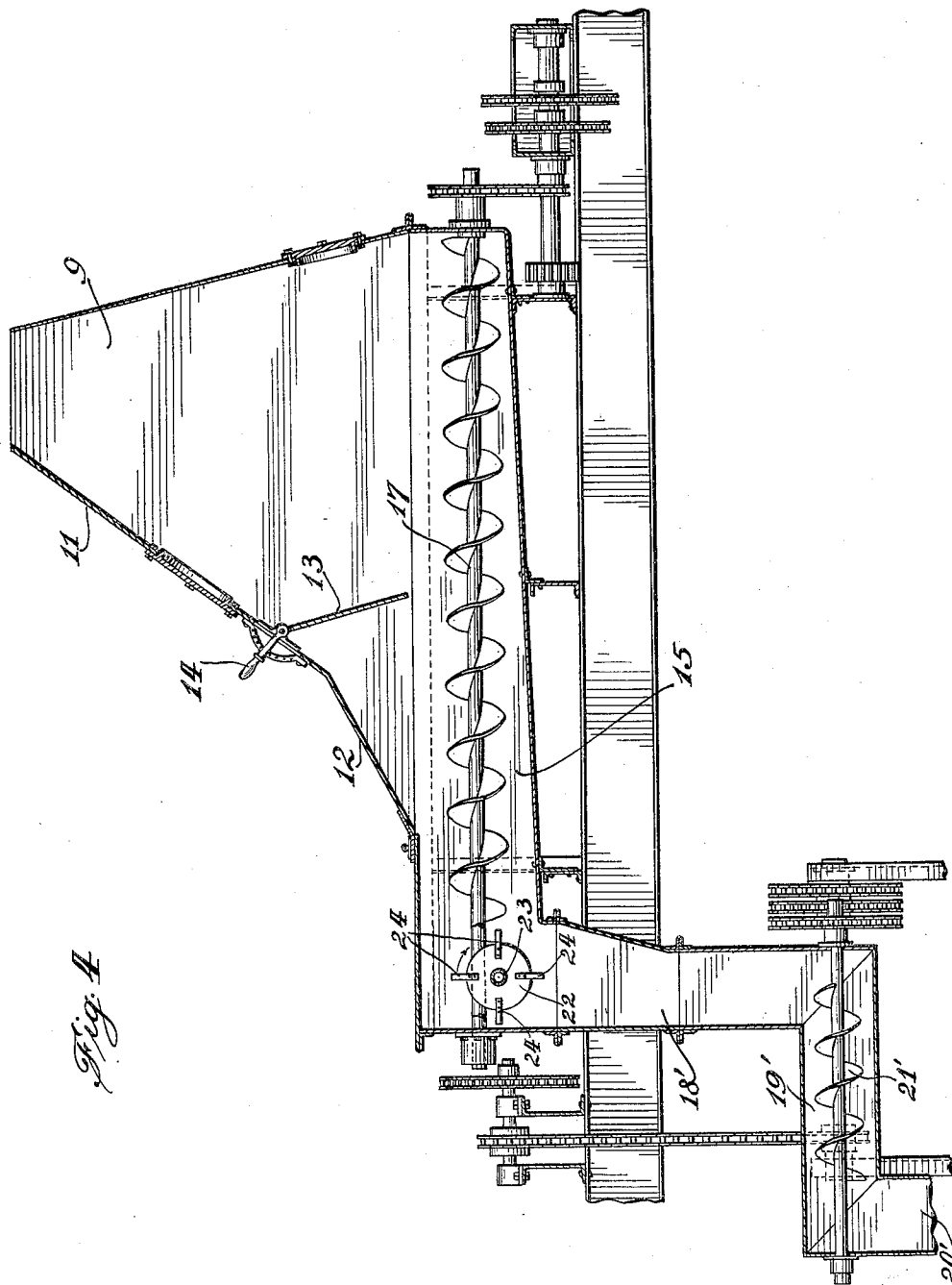


Fig. 4

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UNITED STATES PATENT OFFICE

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WOOD-WASTE FEEDING SYSTEM

Application filed September 8, 1931. Serial No. 561,590.

My invention relates to wood-waste feeding systems; particularly to such systems adapted for feeding to furnaces the waste of wood working machines. It is in the nature of an improvement upon the system set forth in my prior U. S. Patent No. 1,746,456 of February 11, 1930 to insure an equally satisfactory feeding of damp as well as of dry waste materials.

One of the objects of my invention is to provide a feeding system which is particularly effective with damp waste materials.

Another object is to provide a system which readily lends itself to the feeding of either damp or dry wood-waste.

Other objects and advantages will hereinafter appear.

An embodiment of the invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a side elevation of the feeding equipment, the furnace being partially shown in section;

Fig. 2 is an enlarged rear elevation and partial section;

Fig. 3 is a top plan of the material distributing part of the equipment; and

Fig. 4 is a section on the line 4-4 of Fig. 3.

The complete waste-feeding system, which is illustrated somewhat diagrammatically in Fig. 1, comprises, as does the system set forth in my aforesaid patent, a steam generating boiler and furnace 5, material storage and delivery mechanism 6, and delivery control mechanism, including a pressure responsive device 7 and a suitable motor, such as a small steam engine 8, which is governed by the steam pressure in the boiler to vary the feed of the material to the furnace in accordance with slight variations in steam pressure. The boiler, furnace, and control mechanism may be of any appropriate and approved type and, since they are fully explained in my aforesaid patent, they will not be elaborated upon herein.

The material storage and delivery mechanism includes a storage reservoir 9, in which the waste material is deposited in any desired manner through an inlet 10 and there

stored until it is required by the furnace. This hopper is of generally rectangular cross section in any horizontal plane and tapers or flares downwardly and outwardly so that it is substantially larger at the bottom or delivery end than at the top or receiving end. The front or furnace-facing side 11 of hopper 9 is tapered or flared considerably more than the other sides and adjacent the bottom is still further spread to form a forwardly and downwardly opening apron 12. An adjustable damper or gate 13, pivotally mounted along its upper edge to the hopper wall lies in the hopper. This gate is operable from the outside of the hopper by a handle 14 and may be held in any adjusted position by a suitable latch and segment as shown.

The additional flare given to the front wall of the hopper is of great advantage in the feeding therefrom of damp material. Such heterogeneous material as saw and planing mill waste has a great tendency, even when relatively dry, to arch and clog and this tendency is greatly increased when the material is damp or wet. The adjustable damper permits the delivery or bottom end of the hopper to be enlarged or made smaller, depending upon the condition of the material being handled. Thus if the material happens to be relatively dry the gate may be swung toward the right as viewed in Fig. 4 to prevent the material from flowing downwardly too fast. With wetter material the gate may be swung more toward the left with the result that the obstruction to downward flow is decreased and the wetter material can be satisfactorily delivered.

The bottom of the reservoir is closed by a hopper 15 which extends laterally of the hopper and flares or enlarges downwardly and laterally in the direction of the movement of material therethrough, as best illustrated in Figs. 3 and 4. A series of horizontally disposed screw conveyors 16, 17, 18, 19, 20 and 21, journaled in the front and rear walls of hopper 15 serve to convey or push the material toward the furnace and to break up incipient clogs and arches. The number of such conveyors may be varied to best ac-

commodate different conditions as to size of installation, etc., but for a hopper of a breadth of about eleven feet at the front or delivery end I have found six screw conveyors of a diameter of about twelve inches give good results. The outermost conveyors, that is the two next to the side walls of the hopper, should rotate in such a direction that their outer edges move upwardly and away from the side hopper walls. In other words the screw conveyor adjacent the left hand hopper wall as viewed in Fig. 3 should rotate in a clockwise direction while the screw conveyor adjacent the right hand wall should rotate in a counter-clockwise direction. The intermediate conveyors should rotate in a direction opposite to that of the adjacent conveyors.

The front of the hopper opens into a series of downwardly directed boots 18', three being shown in the system chosen for illustration. Each boot terminates in a supplemental boot 19' which ends in an outlet 20' terminating in the furnace. A screw conveyor 21', one in each supplemental boot, feeds the material therealong into the furnace. The boots, in effect, form a series of spouts between the hopper and the furnace. An agitator, in the form of a series of screw sections 22, mounted on a transverse shaft 23, at the delivery ends of the hopper screw conveyors and between the hopper and the spouts therefrom, serves to break up the material as it is delivered by the hopper conveyors, helps to free them from the load and prevents clogging where the material passes from the generally horizontal hopper into the generally vertical upper boot of the spout. The action of these agitator screws may be improved by providing them with several small projecting shredder blades 24.

Suitable gearing and sprocket and chain drives serve to communicate motion from the steam engine motor 8 to the various screw conveyors and to the agitator.

In operation the material is stored in reservoir 9 where it rests upon and around the screw conveyors in the hopper. The rotation of these screw conveyors serves not only to move the material through the hopper but to break up incipient arches and clogs by their agitating effect upon the material thereabove in the bin and also in the hopper. The tapering enlargement of the reservoir and hopper in the direction of the movement of material therethrough is of great advantage in the feeding of damp waste material. For dryer material the gate may be adjusted so as to decrease the size of the opening from the reservoir into the hopper and thereby so obstruct the gravity flow of material that the screw conveyors will not become overloaded. As the material reaches the discharge end of the hopper the agitator loosens the same from the hopper conveyors and

throws the same into the vertical boots of the feeding spouts. In the supplemental boots of the spouts the conveyor screws force the material forward and into the furnace. As steam pressure increases the pressure responsive mechanism reduces the amount of steam to the engine, which slows down and thereby decreases the speed of the screw conveyors and the rate of feed. A decrease in steam pressure brings about the opposite result, viz., a speeding up of the engine and screw conveyors and of the rate of feed.

Having thus illustrated and described the nature and one embodiment of my invention, what I claim and desire to secure by United States Letters Patent is as follows:

1. A heterogeneous material feeder having a downwardly and outwardly tapered material storage reservoir, an adjustable gate for varying the effective taper of one of the walls of the reservoir to obstruct to a greater or lesser degree the flow of material downwardly therethrough, a hopper closing the bottom of the reservoir and having a forwardly enlarging taper laterally of the reservoir, a series of screw conveyors arranged in the hopper below the reservoir to carry material through the hopper, and a series of delivery spouts communicating with the hopper at the delivery end of the screw conveyors thereof.

2. A heterogeneous material feeder having a storage reservoir with downwardly and outwardly sloping side walls, a gate adjustably related to one of the side walls to vary the effective taper of the reservoir, a hopper lying laterally of and below the reservoir and tapering to enlarge in the direction of movement of material therethrough, a series of screw conveyors for carrying material through the hopper in the direction of its enlargement, a series of agitators adjacent the delivery ends of the screw conveyors, and a series of spouts opening into the hopper below the agitators to receive the material fed through the hopper.

3. A heterogeneous material feeder comprising a storage reservoir having a downward and outward taper, a hopper lying laterally of and below the reservoir and tapering in the direction of movement of material therethrough, a screw conveyor in the hopper for carrying material therethrough, and a screw agitator rotatable on an axis at an angle to the axis of the screw conveyor and projecting above the plane of the bottom of the screw conveyor.

4. A heterogeneous material feeder comprising a storage reservoir open at the bottom, a hopper lying below the reservoir, a screw conveyor in the hopper for carrying material in a generally horizontal direction therethrough, and an agitator lying beyond the delivery end of the screw conveyor and movable across the horizontal path of discharge thereof.

5. A heterogeneous material feeder comprising an open bottom storage reservoir having a downward and outward taper, a hopper communicating with the bottom of the reservoir, a screw conveyor in the hopper for carrying material therethrough in a generally horizontal direction, and a screw agitator rotatable on an axis transverse to the axis of the screw conveyor and projecting into the horizontal path of discharge thereof.

6. A heterogeneous material feeder comprising a downwardly and outwardly tapering storage reservoir, a pivotally adjustable gate to vary the taper of the front wall of the reservoir, a forwardly and outwardly tapering hopper lying laterally of and below and in communication with the reservoir, a series of screw conveyors for carrying material forward through the hopper, a series of rotary agitators projecting into the horizontal path of the material in advance of the screw conveyors and rotatable on axes transverse to the axes of the screw conveyors, and a series of spouts opening into the hopper below the agitators.

In witness whereof, I hereunto subscribe my name this 2nd day of September, 1931.

WILLIAM E. ALLINGTON.

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