

July 19, 1932.

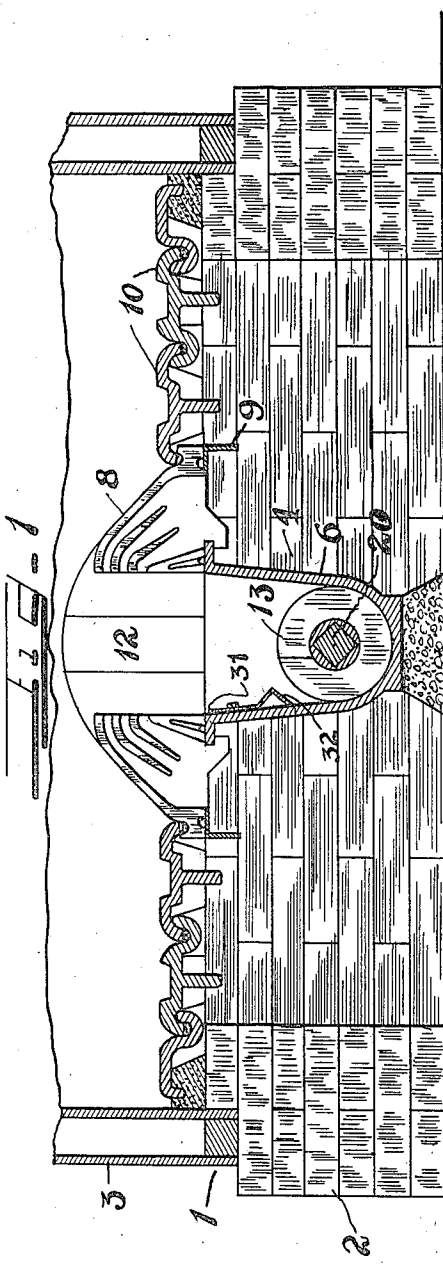
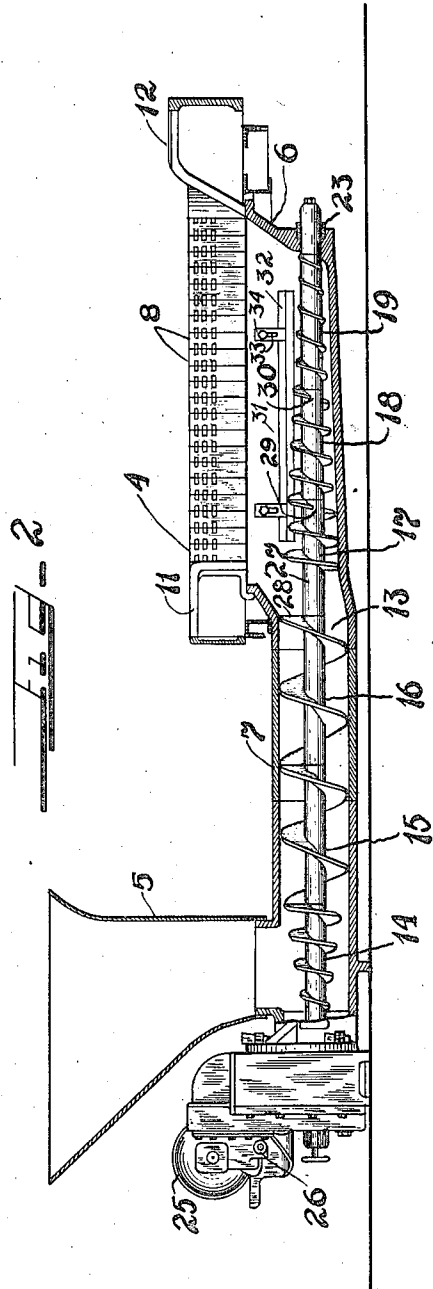
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MECHANICAL UNDERFEED STOKER

Filed Aug. 24, 1929

2 Sheets-Sheet 1



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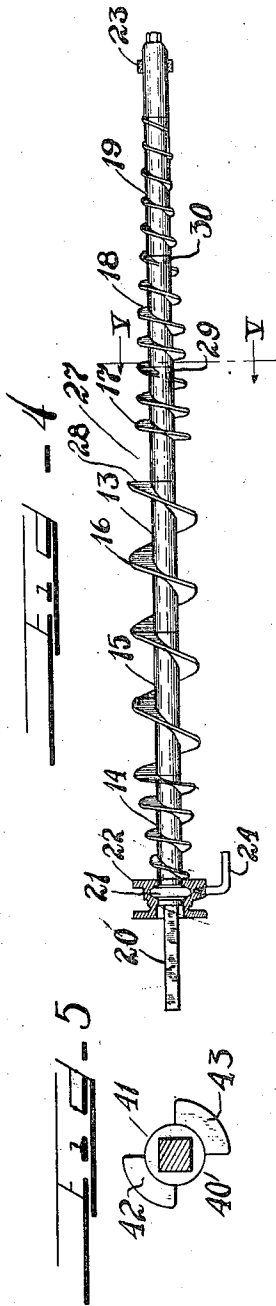
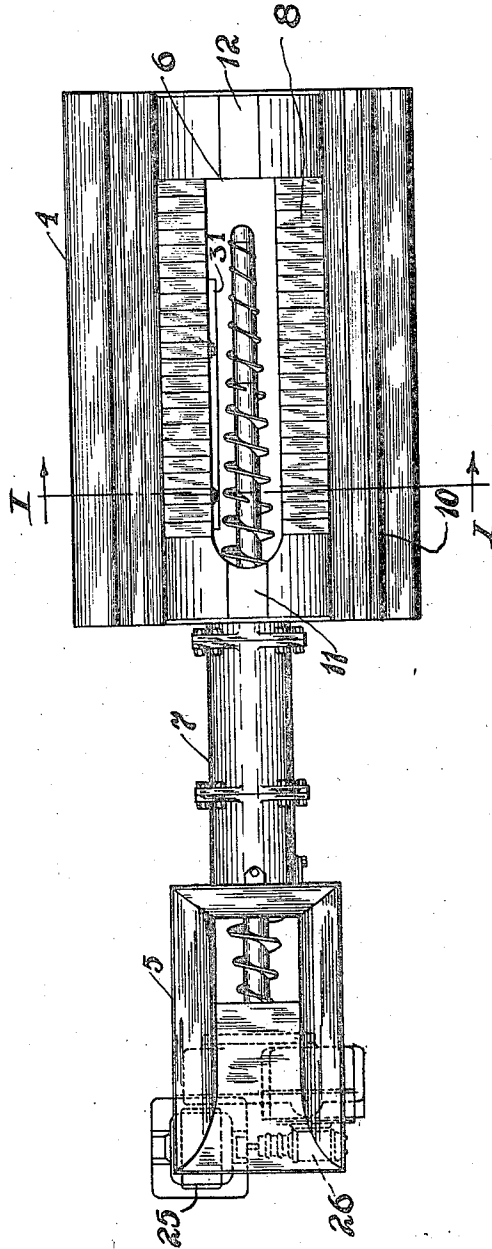


Fig. 3



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UNITED STATES PATENT OFFICE

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MECHANICAL UNDERFEED STOKER

Application filed August 24, 1929. Serial No. 388,064.

This invention relates to a mechanical underfeed stoker and more particularly to means including a screw conveyor for feeding coal and the like to a retort of a mechanical underfeed stoker and there distributing the coal.

The present invention constitutes an improvement on my invention disclosed in an application entitled "Material feeder," Serial No. 229,056, filed October 27, 1927.

It is an object of the present invention to provide means for feeding fuel to the retort of an underfeed stoker with a minimum consumption of power and minimum tendency for the fuel to become clogged or rammed while it is being fed into the retort.

It is a further important object of this invention to provide a screw conveyor for mechanical underfeed stokers of such construction that fuel can be fed by said conveyor into the retort of the stoker without jamming and packing and can be equally distributed in said retort or the distribution of said fuel varied to suit conditions.

Other and further important objects of this invention will become apparent from the following description and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a transverse sectional view through a mechanical underfeed stoker of my invention.

Figure 2 is a longitudinal elevational view of the mechanical underfeed stoker.

Figure 3 is a top plan view of the same, and

Figure 4 is an elevational view of the screw conveyor.

Figure 5 is an enlarged sectional view taken on line V—V of Figure 4.

As shown on the drawings:

The reference numeral 1 indicates a furnace wall comprising a lower wall of masonry 2 and upper side walls 3 of suitable construction. Within the furnace housing there is mounted a mechanical underfeed stoker, in-

dicated as a whole by the reference numeral 4, of my invention.

Said mechanical stoker 4 comprises a hopper 5 and a retort 6 joined thereto by means of a sectional conduit 7. Tuyère blocks 8 are mounted along the upper edges of the side walls of said retort 4 and partially supported thereby and by angle irons 9. Dead plates 10 are positioned between said tuyère blocks 8 and the walls of said housing 1, being supported in part upon the masonry walls 2. Front and rear plow plates 11 and 12 are mounted at the respective ends of said retort 6.

A screw conveyor indicated as a whole by the reference numeral 13 extends from the bottom of said hopper 5 through said conduit 7 the full length of said retort bottom 6. Said screw conveyor 13 comprises a plurality of helical vanes cast in separate sections, as for instance the sections 14 to 19 inclusive, and mounted upon a square shaft 20. Said shaft 20 is provided at its front end with a collar 21 journalled in a thrust bearing 22 and at its rear end in a simple sleeve bearing 23 mounted in the rear wall of said retort 6. Said thrust bearing 22 is adapted to be supplied with a lubricant by means of a pipe connection 24.

Means for driving the screw conveyor 13 may suitably comprise a motor 25 and a reducing mechanism 26 gear connected to the square shaft 20 of said screw conveyor 13. Inasmuch as the collar 21 is slidably mounted upon the square shaft 20, there is no thrust upon said shaft but all of the thrust is taken up in the thrust bearing 22.

In order to prevent packing and jamming of the fuel, the flights of the screw conveyor 13 are made of varying pitch and diameter. For instance, in the section 14 in the bottom of the hopper 5, the helical flights are of constant pitch but of increasing diameters as they approach the conduit 7 and the sections 15 and 16 within said conduit 7 have flights of substantially the same diameter as the inside diameter of said conduit with a pitch greater than that of the flights on section 14.

At approximately the junction between the conduit 7 and the retort 6, a portion of the

flights is removed to provide a gap 27, the end 28 of the helical flights serving as a propeller to push the fuel across said gap to be again taken up by the flights on the section 17.

5 The purpose of providing the gap 27 is to prevent excessive jamming and packing of the fuel at the point at which it is fed into the retort to the smaller pitch screw. The removal of a segment or segments of the flight
10 has the same effect as a local reduction in the diameter of the screw.

In a similar manner, smaller gaps 29 and 30 are provided for a fraction of the turn of the flights on the sections 17 and 18 so as to
15 enable the screw conveyor to effectively distribute the fuel within the retort 6. Practically, it is sufficient to knock off portions of the flight at opposite sides thereof, as at 40 and 41 (Figure 5) to provide propeller-like
20 blades 42 and 43.

If after the stoker is installed, the fuel bed is found to be improperly formed, a low spot in the fuel bed may be built up by making a propeller in that portion of the distributing screw which affects the low area of the
25 fuel bed. A propeller locally reduces the carrying capacity of the distributing screw and gives substantially the same effect as reducing its diameter at that point. Also, it offers a quick and inexpensive method of controlling the amount of fuel rejected from any
30 portion of the distributing screw.

Experience has indicated that it is impossible to calculate for all types of fuel the
35 proper pitch and diameter for the flights on a screw conveyor of this type for each portion of the length of said conveyor. It has been found, however, that by removing a portion of the helical flights at certain points
40 along the length of the screw conveyor, very satisfactory distribution of the fuel in the retort can be obtained without the necessity of providing specially constructed screw conveyors for every condition of fuel feeding
45 that may obtain due to different types of fuels used.

In addition to the provision of gaps along the length of the screw conveyor to provide
50 propeller-like action on the part of the ends of the flights so formed, it has also been found preferable to provide a deflector member, indicated as a whole by the reference numeral 31. Said deflector member 31 is adjustably
55 positioned along one wall of the retort 6 adjacent the side of the screw conveyor 13 having an upward movement. Said deflector member 31 may suitably comprise an angle iron 32 having slotted legs 33 for adjustable
60 mounting upon pins 34. The angle iron 32 may thus be adjusted vertically to suit the particular requirement and when in the correct position will cause an equal distribution of the fuel to either side of the fuel bed retort. Without a deflector member 31, it has
65 been found that the fuel in general builds up

more on one side of the fuel bed than the other.

It is to be understood that the gaps 29, and 30 in the flights of the screw conveyor 13 need not necessarily be positioned at any
70 particular point or points along the length of said conveyor but the positioning of these gaps will to some extent depend upon the conditions under which the mechanical underfeed stoker is operating, the nature of the fuel and like variables. In conjunction with
75 the construction of flights of varying pitch and diameter, the provision of these gaps, whereby the flights act at points along the length of the conveyor as propellers, insures an even and satisfactory distribution of the fuel in the fuel bed.
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I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.
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I claim as my invention:

In an underfeed stoker including a hopper, a retort casing, and a conduit connecting said hopper and said retort casing, a screw conveyor having a plurality of helical flights, said conveyor having a portion thereof extending in the retort casing, said portion of the conveyor being substantially continuous and having segmental portions of certain
90 flights thereof entirely cut away on opposite sides of the longitudinal axis of the conveyor to provide propeller-like blades.
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In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

VERNON G. LEACH.
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