

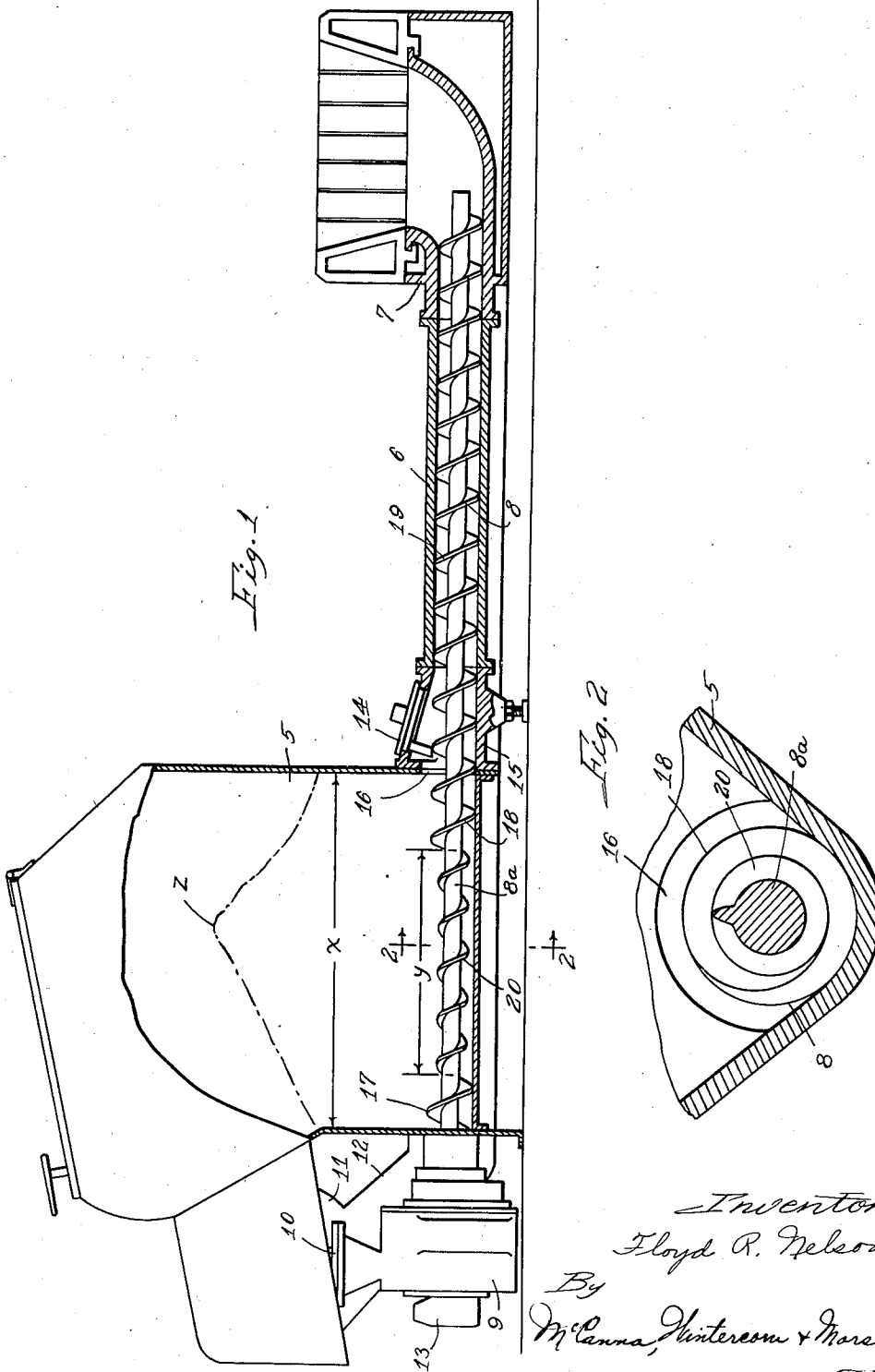
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STOKER COAL FEED SCREW

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STOKER COAL FEED SCREW

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1 Claim. (Cl. 198—64)

This invention relates to stokers, and is particularly concerned with an improved coal feed screw for use in the conduit extending from the hopper to the retort.

Stoker manufacturers have long been aware of the difficulty in operating stokers when the coal hopper is charged with screenings for the reason that the "fines" segregate and collect in the bottom of the hopper, usually in the corners, instead of moving along with the rest of the coal, with the result that there is a tendency to clog the screw and thus interfere with good feeding, and when the fines ultimately reach the fire bed in bulk, which inevitably occurs, there is interference with the uniform passage of air through the bed and faulty combustion occurs, or the fire may even go out. Various things have been done in an effort to correct this difficulty, but so far as I am aware they have not been successful. It is the principal object of my invention to provide an improved form of coal feed screw which practical experience has shown positively eliminates the difficulty mentioned by conveying the fine coal along with the rest so that there is no opportunity for segregation thereof in the bottom of the hopper.

The coal feed screw of my invention, briefly stated, involves only the reduction in diameter of the intermediate or middle flights or convolutions on that portion of the screw operating in the bottom of the hopper, the remaining flights or convolutions of said portion being left of the same diameter as the rest of the screw which operates in the conduit leading to the retort.

The invention is illustrated in the accompanying drawing, in which—

Fig. 1 is a longitudinal section through a stoker equipped with a feed screw made in accordance with my invention, and

Fig. 2 is a cross-section on an enlarged scale taken on the line 2—2 of Fig. 1.

The same reference numerals are applied to corresponding parts in these two views.

The stoker shown is of the underfeed type illustrated in my application Serial No. 253,631, filed January 30, 1939, and has the conventional hopper 5 to store the coal which is fed through a conduit 6 into the bottom of the retort 7. The coal is fed by means of a screw 8 driven through reduction gearing in the housing 9 by an electric motor, a portion of which is indicated at 10, the same being disposed alongside the blower housing 11. Simultaneously with the feeding of coal to the retort, air is discharged tangentially from housing 11 into the air conduit 12 and conducted

to the retort 7 to supply sufficient air to the fire bed for good combustion. The motor 10, of course, drives the impeller operating in the housing 11. The joint drive by the motor 10 of the coal feed screw 8 and the air impeller is more fully disclosed in my copending application Serial No. 262,343, filed March 17, 1939. As stated in that application, 13 is a shear pin switch housing in which a shear pin is provided connecting the feed screw 8 with the motor-driven gear, the pin being arranged to shear when any overload occurs on the drive motor, as, for example, in case a stone or spike gets jammed in the coal conduit, whereupon the shear pin operated switch opens the motor circuit. At 14 is indicated a removable cover on the discharge neck or obstruction clean-out section 15 that is interposed directly between the discharge opening 16 in the front wall of the hopper 5 at the bottom and the inlet end of the coal conduit 6, as shown. The stone or spike causing the jam is usually found upon removal of the cover 14.

As previously stated, stokers of this kind are usually operated with the hopper charged with screenings and considerable difficulty has been experienced due to the segregation and collection of the "fines" in the bottom of the hopper 5 when a coal feed screw of uniform diameter is used throughout the length of the bottom of the hopper. It is highly important to keep the fines feeding with the rest of the coal so that they will be scattered in the fire bed and will not interfere with uniform passage of air through the bed. It is also important to keep the fines feeding regularly with the rest of the coal so that there will be no tendency to cake and clog the screw and thus interfere with good feeding. I have found that if the cylindrical core 8a is made of uniform diameter throughout but the flights or convolutions 17 and 18 at the opposite ends of that portion of the screw disposed in the bottom of the hopper 5 are made of the same diameter as the flights or convolutions 19 on the rest of the screw 8, whereas the intermediate or middle flights or convolutions 20 are made of appreciably smaller diameter, the fines will feed regularly with the rest of the coal and there is no segregation and accumulation of fines in the bottom of the hopper as heretofore. Without, of course, implying any limitation by the giving of these figures, I might state that in one construction where the dimension x was 25" the dimension y for the reduced portion of the feed screw was 18", the portion 17 being 3" and the portion 18 being 4" in length. That was in a case where

the diameter of the portions 17, 18, and 19 was $3\frac{1}{4}$ ", and the portion 20 was 2" in diameter. Figure 1 is approximately on that scale.

I have observed that with the present construction the heap of coal in the hopper maintains a more natural form—highest at the center, as indicated at z, due undoubtedly to the fact that the coal from beneath opposite sides of the heap is removed at a higher rate than from beneath the center. When screws of a uniform diameter were used, the fines collected in the corners of the bottom of the hopper, and it is evidently because of the fact that with the present construction there is increased movement of coal at those points, that the difficulty previously experienced has been eliminated.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claim has been drawn to cover all legitimate modifications and adaptations.

I claim:

The combination in an underfeed stoker of a hopper adapted to communicate with a discharge conduit to conduct coal to a retort, the hopper having an elongated generally trough-shaped substantially horizontal bottom, level with the lower side of the conduit for free movement of

coal from the bottom of the hopper into said conduit, and a coal feed screw in said conduit extending into the hopper and extending lengthwise of the trough-shaped bottom of said hopper from one end wall of said hopper adjacent the conduit through an opening provided in the opposite end wall of said hopper for connection with drive means outside the hopper, that portion of the coal feed screw within the hopper being fully exposed for contact with the coal therein so as to move coal from the hopper toward and into the conduit along the trough-shaped bottom of the hopper, said screw comprising a helix body formed to provide a helical coal-moving thread around a cylindrical core that is of substantially uniform diameter from end to end of the screw, the thread within the conduit being of a uniform diameter nearly equal to the inside diameter of said conduit, and said thread continuing of undiminished diameter into the hopper for an appreciable portion of the length of the hopper bottom and being then reduced in diameter appreciably for the major portion of the length of said hopper and finally enlarged again to the first diameter for the balance of the length of said hopper.

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