Oct. 17, 1939. J. F. MEDUNA 2,176,092

COAL STOKER

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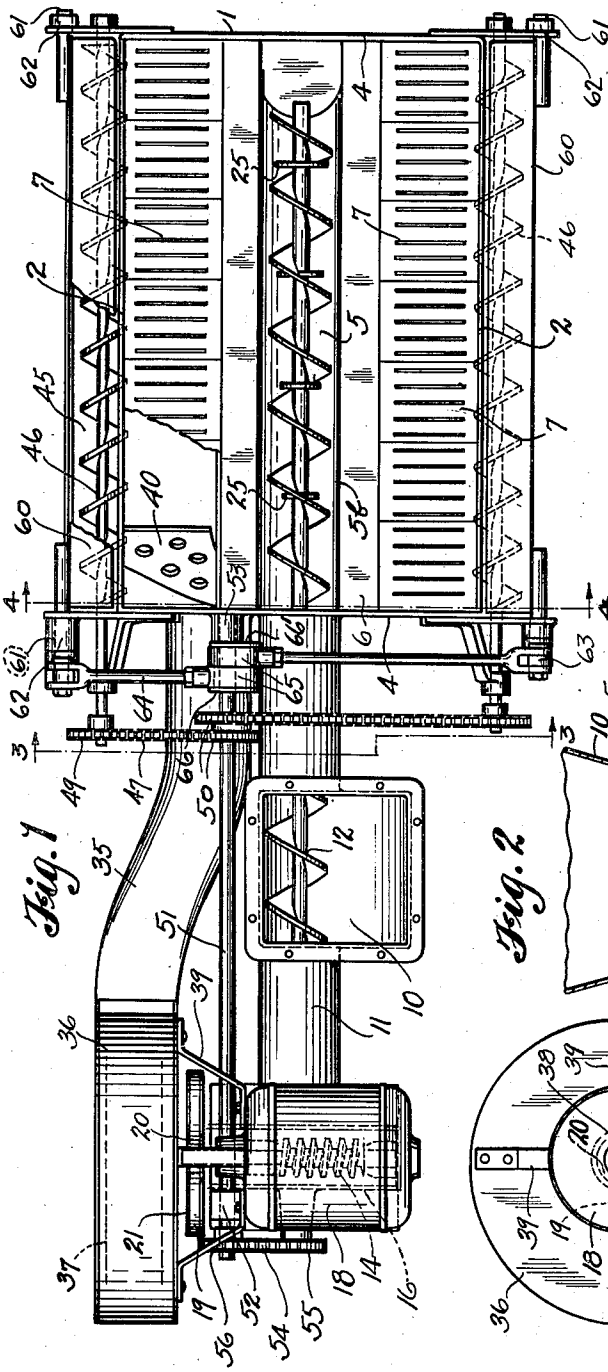


Fig. 1

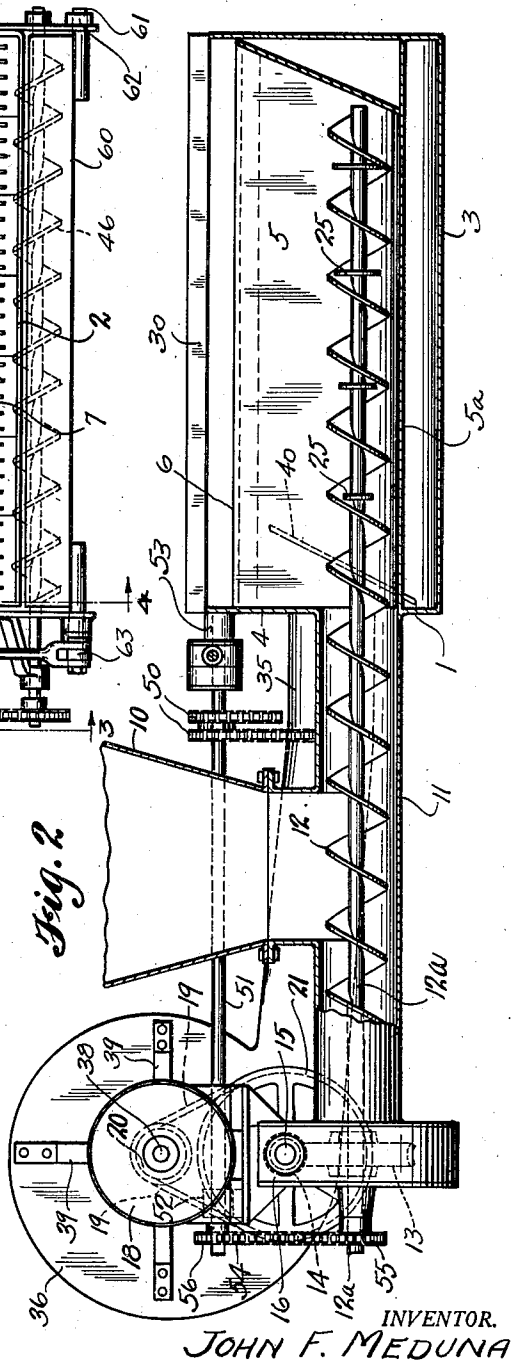


Fig. 2

INVENTOR.
JOHN F. MEDUNA
BY
Cook & Robinson ATTORNEYS.

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Fig. 4

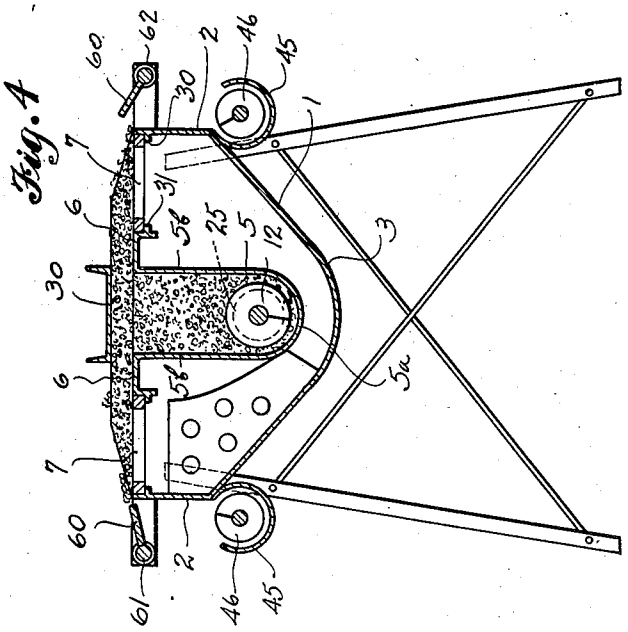



Fig. 3

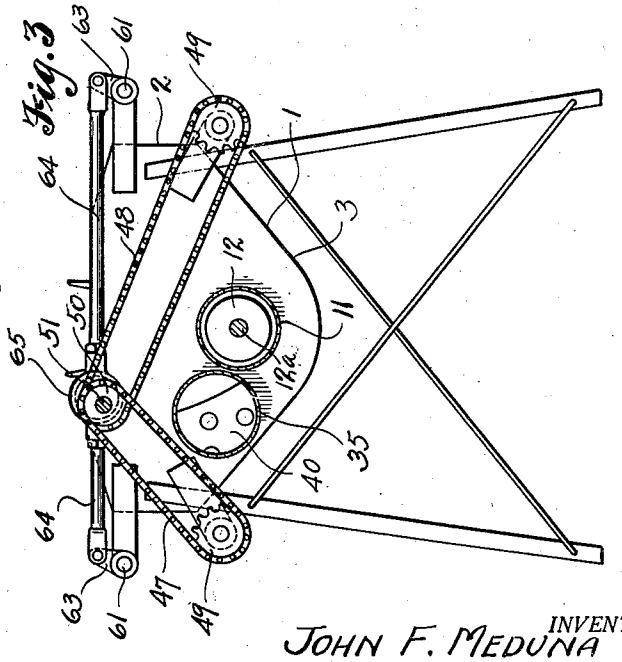
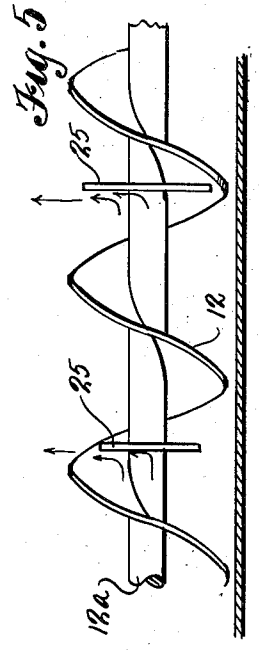



Fig. 5




JOHN F. MEDUNA INVENTOR.

BY

Cook & Robinson ATTORNEYS.

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# UNITED STATES PATENT OFFICE

2,176,092

## COAL STOKER

John F. Meduna, Seattle, Wash.

Application August 22, 1936, Serial No. 97,435

2 Claims. (Cl. 198—213)

This invention relates to improvements in coal stokers and has reference more particularly to stokers of that kind designed to feed the larger types of furnaces, as distinguished from the ordinary residence types; it being the principal object of this invention to provide a stoker including means for feeding the coal uniformly over grate surfaces of extended length.

It is also an object of this invention to provide a stoker for uniformly feeding coal over grate surfaces of extended length by means of a feed screw disposed lengthwise thereof and on which screw, stops or dams are fixed at such intervals of spacing, and which are so graduated in size, as to cause a uniform distribution of the coal onto the grates throughout the entire length of the grate bed.

Still further objects reside in the details of construction and in the combination of parts and in their mode of operation, as will hereinafter be described.

It is also a particular object of the invention to provide a feed screw that is applicable to the present requirements as well as to others.

In accomplishing these objects, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a top, or plan view, of a coal stoker embodied by the present invention, a part of the separator plate being broken away for better illustration.

Fig. 2 is a central, longitudinal section of the same, particularly illustrating the novel feed screw and the dams fixed thereto.

Fig. 3 is a cross section on the line 3—3 in Fig. 1.

Fig. 4 is a cross section on the line 4—4 in Fig. 1.

Fig. 5 is a detail of the feed screw arrangement.

Referring more in detail to the drawings—

In its present preferred form of construction, the stoker comprises a grate supporting housing 1, having opposite side walls 2—2, a bottom wall 3 of trough-like form, as shown best in Fig. 4, and opposite end walls 4—4, as seen in Fig. 2. Medially of, and extending the length of, this housing is a coal delivery trough 5 having a bottom wall 5a of semi-cylindrical form from which extend the opposite side walls 5b—5b, which are outwardly and horizontally flanged along their top edges, as at 6, to form supports cooperating with the side walls 2—2 of the housing to mount the grate plates 7.

By reference to Fig. 4, it will be observed that the housing 1, together with the trough 5 and the grates 7, forms an enclosure. The top surface of this enclosure is horizontal and forms the fire bed, and is centrally divided by the longitudinal trough 5 from which coal is discharged in opposite directions over the fire bed. Coal is fed to the stoker from a storage hopper 10 which, at its lower end, opens into a horizontally disposed feed tube 11 which tube, in turn, opens at one end directly into the trough 5 coaxial of its cylindrically curved base portion, as seen in Fig. 2. A coal feed screw 12 extends the length of tube 11 and continues the length of trough 5.

At its outer end the feed screw shaft 12a is provided with a driving worm gear 13, driven by a worm 14 on a supporting shaft 15 revolubly mounted in a gear housing 16 that is fixed in the outer end of the tube 11. The shaft 15 is rotatably driven by an electric motor 18 that is mounted upon the housing 16; the driving connection comprising a belt 19 extended about belt pulleys 20 and 21 fixed, respectively, on the motor shaft and worm shaft, as shown in Fig. 2. The direction of rotation of the feed screw 12 is such as to cause the coal to be advanced from hopper 10, along tube 11, into trough 5 and along the length of the latter.

Fixed on the feed screw within the trough, at spaced intervals therealong and in planes perpendicular to its axis are disks, or dams 25, increasingly graduated in diameter in the direction of travel of the coal; the first of these dams is relatively small, permitting passage of most of the coal, and from there on they are of increased diameter so that each will check a certain percentage of the advanced coal and will cause it to be delivered directly upward in the trough. Thus, by the proper proportioning of the dams with reference to diameter and by properly spacing them, coal may be caused to progress the entire length of the trough and to be fed upwardly and to spread laterally to uniformly cover the grates or fire bed at both sides of the trough.

To insure the lateral spread of the coal delivered from the trough, a horizontally disposed baffle plate 30 is fixed directly over the open top of trough 5 and spaced therefrom, as seen in Fig. 4; this plate being supported from the opposite end walls 4—4 of the housing 1.

The grate plates 7 are disposed side by side as seen in Fig. 1 and rest at their ends upon supporting ribs 30 and 31, formed, respectively, on the walls 2 and flanges 6. Each grate plate is formed with a plurality of parallel slits 33

through which air is discharged from the housing to feed the fire.

Air is forcibly delivered into the housing 1 through a supply tube 35 that leads from a fan housing 36. The tube enters the housing at one end as shown in Fig. 3. A fan 37 is contained in housing 36 and is driven by its mounting shaft 38 which is alined with and directly connected with the shaft of motor 10. The fan housing is supported by brackets 39 from the motor.

Fixed within the housing 1, and in the line of delivery of air into housing 1, is a baffle plate 40 whereby swirling is overcome and an equalized pressure and flow of air upwardly through all plates in the grate area is effected.

Supported longitudinally of, and at opposite sides of the grate area, are ash troughs 45—45, adapted to receive therein the ashes discharged from the grates. Each trough contains a feed screw 46 and these are revolubly driven, respectively, by sprocket chain belts 47 and 48, operating over sprocket wheels 49 on the feed screw shafts and sprockets 50 on a driven shaft 51. This latter shaft is revolubly supported at its ends in bearings 52 and 53 and is driven by a sprocket chain belt 54 operating about a sprocket wheel 55 keyed on worm shaft 12*a* and about a sprocket 56 on the shaft 51.

In order that all clinkers may be broken up, and also as a means of reducing the ashes to fine condition for easy removal, there is provided along the longitudinal outer edge of each grate, an oscillating plate 60 supported at its ends by pivots 61 revoluble in bearings 62. At one end of each plate 60 is an arm 63 and these arms are connected by links 64 with collars 65, fitted revolubly about eccentrics 66 and 66' on the shaft 51. Thus, incident to rotation of shaft 51, there will be an oscillating action of the plates causing them to sweep across the outer edges of the fire bed to break off all projecting ash and deliver it into the corresponding trough.

Operation of the feed screws in the troughs causes the ashes to be advanced and discharged from one end thereof into suitable receptacles, not herein shown.

While the present invention resides primarily in the combination of parts, comprising the coal stoker, there is also the novel features of construction in the feed screw 12, which make it applicable to various uses other than in coal stokers. For instance, a feed screw similar to that utilized in feeding the coal into the stoker could be used to great advantage to deliver materials along a trough or tube and to deliver the material from the trough at designated intervals. One example of use might be in connection with grain conveying apparatus, for it should be quite evident that by a proper spacing of the dams on the shaft, and by properly graduating them in diameter, a lateral delivery of grain, or other similar substance, from the screw could be obtained in desired amounts.

The use of the present feed screw makes possible a practical and satisfactory discharge of coal along the extent of the screw, so that an even and uniform feeding of coal to the entire grate area results.

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

1. A feeding device comprising a trough and a feed screw of uniform diameter throughout its length revolubly contained therein, and dams fixed on the screw at spaced intervals and progressively increased in size in the direction of delivery along the trough by the screw.

2. A feeding device comprising a trough and a feed screw of uniform diameter throughout its length, revolubly contained in the trough and dams lesser in diameter than the screw and fixed on the screw at spaced intervals and progressively increased in size in the direction of delivery along the trough by the screw.

JOHN F. MEDUNA.