Jan. 2, 1923.

R. S. RILEY.

FURNACE STOKER MECHANISM.

FILED MAY 14, 1919.

1,441,026.

2 SHEETS—SHEET 1.




Fig. 4.

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 5.

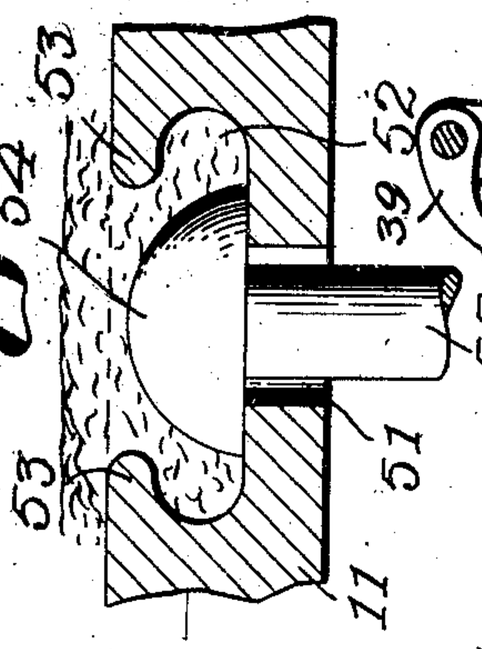


Fig. 6.

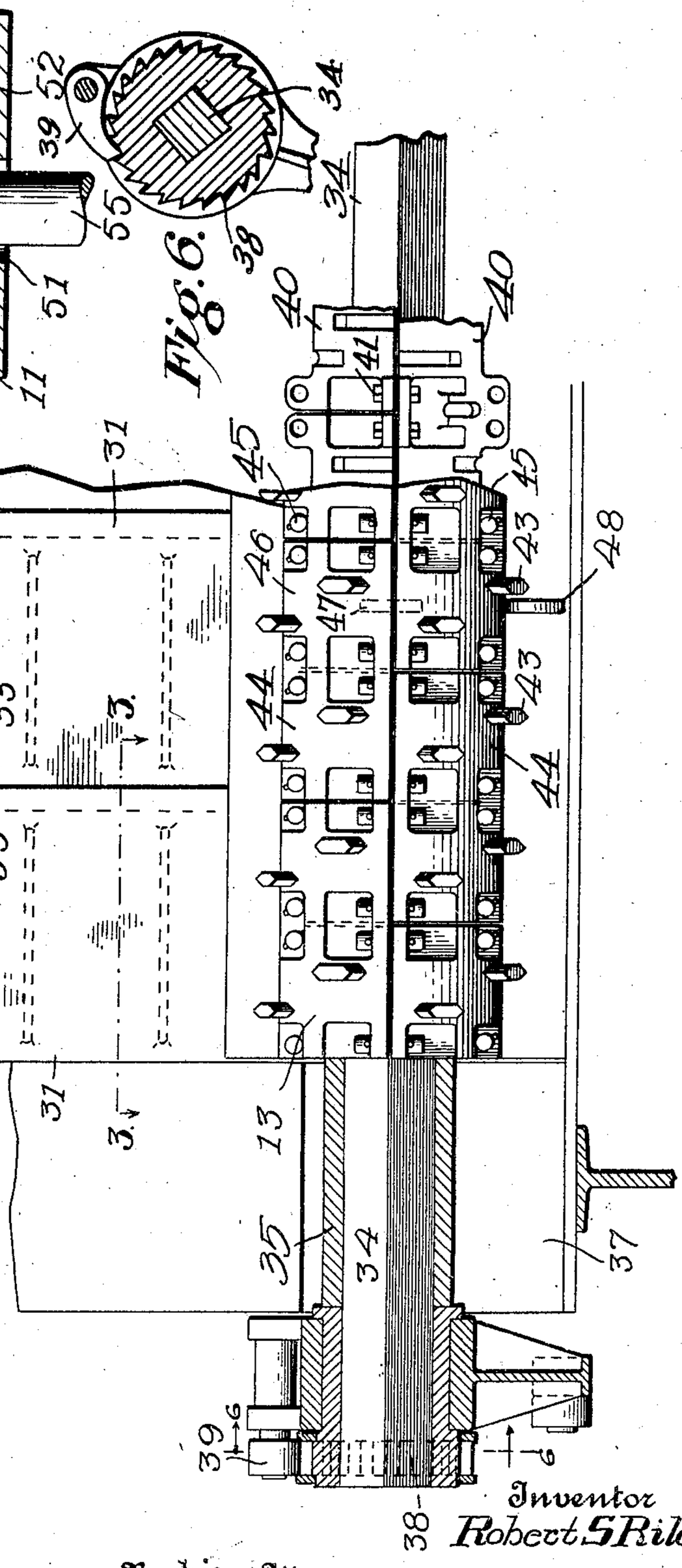


Fig. 2.

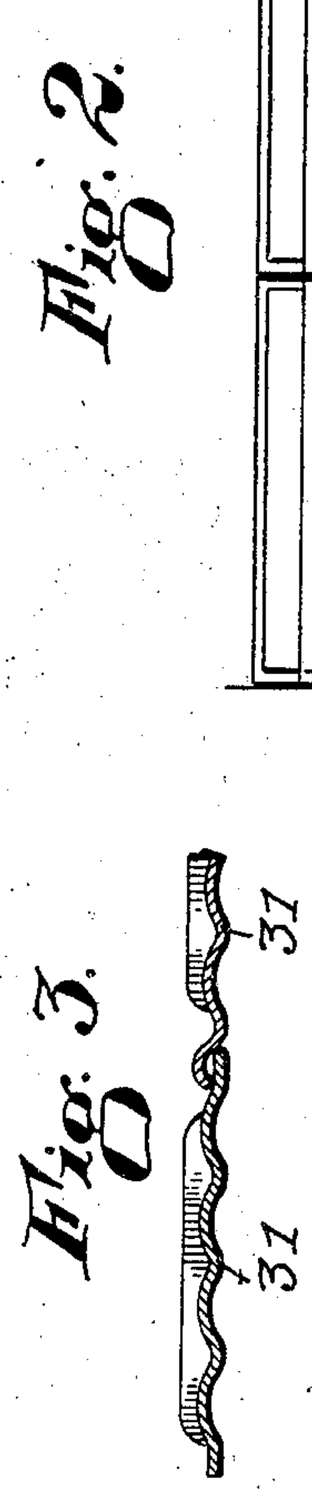


Fig. 3.

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Patented Jan. 2, 1923. 1,441,026

# UNITED STATES PATENT OFFICE.

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## FURNACE STOKER MECHANISM.

Application filed May 14, 1919. Serial No. 297,069.

*To all whom it may concern:*

Be it known that I, ROBERT SANFORD RILEY, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Furnace Stoker Mechanism, of which the following is a specification.

This invention relates to stoker mechanism, particularly of the automatic underfeed type.

One object of my invention is to provide an improved clinker grinder for such a stoker, embodying features of construction resulting in economy of manufacture and in efficient operation, together with greatly increased strength.

Another object of my invention is to provide an improved water cooling device for protecting the bridge wall of the stoker, with special provision for convenient removal and replacement.

A third object of my invention is to provide a yielding adjustable support for the lower ends of the dumping plates adjacent the clinker grinder, to relieve any excessive pressure which may be caused by engagement of the clinker grinder with stone or other foreign substance.

A feature of my invention also relates to improved devices for securing the overfeed grates in operative position. My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of my invention is shown in the drawings in which

Fig. 1 is a sectional side elevation of a portion of a stoker mechanism;

Fig. 2 is a front elevation of parts of the mechanism, taken along the line 2—2 in Fig. 1;

Fig. 3 is a detail sectional plan view taken along the line 3—3 in Fig. 2;

Fig. 4 is an enlarged sectional side elevation of portions of the overfeed grates,

Fig. 5 is a sectional elevation taken along the line 5—5 in Fig. 4, and

Fig. 6 is a sectional elevation taken along the lines 6—6 in Fig. 2.

Referring to the drawings, I have shown parts of an underfeed stoker having retort side walls 10, movable overfeed grates 11, and dumping plates 12 extending rearward and downward adjacent a clinker grinder indicated generally by the numeral 13.

At their upper ends the plates 12 are pivotally connected to move forward and rearward with the overfeed grates 11 and at their lower ends they are supported for rocking movement on rolls 14 mounted on rack bars 15 which may be adjusted longitudinally by a hand wheel 16 connected to the rack bars by means of a worm 17, a worm wheel 18, a shaft 19 extending from side to side of the stoker, and pinions 20 fixed to the shaft 19 and engaging the rack bars 15.

The worm 17 is keyed or otherwise slidably secured to a worm shaft 21 rotatable in a fixed bearing 22, the worm engaging the lower surface of the bearing, and a collar 23 fixed on the shaft 21 engaging the upper surface thereof. A heavy coil spring 24 is mounted on the lower end of the shaft 21 and is held in engagement with the worm 21 by an adjustable nut 25.

Under ordinary conditions the rack bar 15 stands in the adjusted position determined by the hand wheel 16 and worm 17. If, however, a foreign substance is interposed between the clinker grinder 13 and the dumping plates 12, the rack bar 15 may be forced to the right (Fig. 1) rotating the shaft 19 and depressing the worm 17 against the tension of the spring 24.

A bridge wall 26 is provided at the rear of the stoker and a spray pipe 27 extends longitudinally through a recess 28 formed in the front face of the bridge wall 26. Castings 29 are secured in the recess 28 by bolts 30, and protecting plates 31 are secured to the castings 29 by suitable fastening devices such as bolts or rivets 32. The plates 31 are preferably made in relatively short sections corrugated and overlapping as shown in Fig. 3, and are provided with openings 33 through which the water from the spray pipe 27 trickles down over the protecting plates and may drip therefrom on the clinker grinder 13. The castings 29 are recessed in their upper rear portions so that they may be slipped in past the pipe 27 or may be removed from position without disturbing the spray pipe, the pipe preferably yielding slightly to permit such movement.

The clinker grinder 13 is mounted below the bridge wall and in the preferred form comprises a heavy square shaft 34 provided at each end with a cylindrical sleeve 35

(Fig. 2) rotatable in fixed bearings in the furnace side walls 37. Any suitable provision may be made for slowly rotating the clinker grinder, such as a ratchet wheel 38 fixed to the end of the shaft 34 and engaged by a feed pawl 39 intermittently actuated by driving means not shown.

The shaft 34 is surrounded by a casing formed in section 40 (Fig. 1) clamped about the shaft 34 by bolts 41. The sections 40 are of relatively short length, being preferably equal to the width of a retort, and are assembled about the shaft 34 in such a way that the different sections extend beyond each other endwise, thus breaking joints and materially stiffening the structure. Special short sections are necessarily provided to fill out the casing at the extreme ends thereof.

The actual grinding operation is performed by a plurality of grinding plugs 42 each having an enlarged head 43 at its inner end and extending outwardly through retaining plates 44. The plates 44 preferably each extend around one-quarter of the circumference of the clinker grinder, and are secured to each other and to the casing members 40 by fastening devices 45 extending through openings in said plates. The plates 44 are also preferably of retort length, and are secured in place with their ends extending beyond each other as in the case of the casing sections 40.

This feature of breaking joints, both with the casing sections and with the retaining plates, is very important and permits the use of a much lighter shaft 34 than would be otherwise feasible, or the entire omission of the shaft.

The plates 44 are so constructed that they will provide smooth cylindrical portions 46 (Fig. 2) between the rows of grinding plugs. Fixed supporting rolls 47 and 48 (Fig. 1) are provided below and to the rear of the clinker grinder 13 at points intermediate the end bearings of the shaft 34. The rolls 47 resist the grinding pressure of the clinker grinder, and the rolls 48 support the weight thereof at intermediate points. The rolls 47 and 48 are provided with fixed bearings on the stoker framework.

In Fig. 4 I have shown improved devices for securing the overfeed grates 11 in position. These grates are slipped into position from the rear, and it is desirable that they should be readily removed as they require frequent replacement. If they are secured by bolts and nuts or other similar fastening devices, it is very difficult to remove them as it is impossible to separate the fastening devices after they have been exposed to furnace conditions for any length of time. I have therefore provided the improved securing means shown herein.

Holes 50 are provided in the intermediate and forward portions of each grate, and holes 51 extend downward from recesses 52 in the rear portion of each grate, the holes 50 and 51 of overlying grates being aligned when the parts are in operative position. The recesses 52 are provided with overhanging side walls 53 (Fig. 5) forming pockets around the heads 54 of the fastening devices 55. These devices 55 are preferably short rods having enlarged rounded heads, as shown in the drawing. As the grates are merely rough castings, it is desirable that the holes 50 and 51 be somewhat larger than the rods 55 to accommodate variations in the castings.

In assembling the parts it is merely necessary to drop the headed fastening members 55 through the holes 50 and 51, the heads being received in the recesses 52. As soon as the stoker is placed in operation the recesses 52 immediately fill up with slag or other refuse, which effectually prevents dislodgment of the fastening members, but which permits them to be driven out when a grate is to be replaced. This form of fastening is extremely simple and economical, and is found very advantageous for my purposes.

Having thus described my invention and the details of construction thereof, it will be seen that changes and modifications can be made therein by those skilled in the art without departing from the spirit and scope thereof as set forth in the claims, and I do not wish to be otherwise limited to the details herein disclosed, but what I claim is:—

1. In a stoker mechanism, a dumping plate, means to rock said plate, a support for the lower end of said plate, means to adjust said support forwardly and rearwardly, and means acting through said support to permit yielding movement of said support and plate under excessive pressure.

2. In a stoker mechanism, a dumping plate, means to rock said plate, a support for the lower end of said plate, adjusting means for said support including a worm and worm wheel, and a spring positioning said worm and permitting yielding axial movement thereof by said worm wheel to relieve excessive pressure on said plate.

In testimony whereof I have hereunto affixed my signature.

ROBERT SANFORD RILEY.