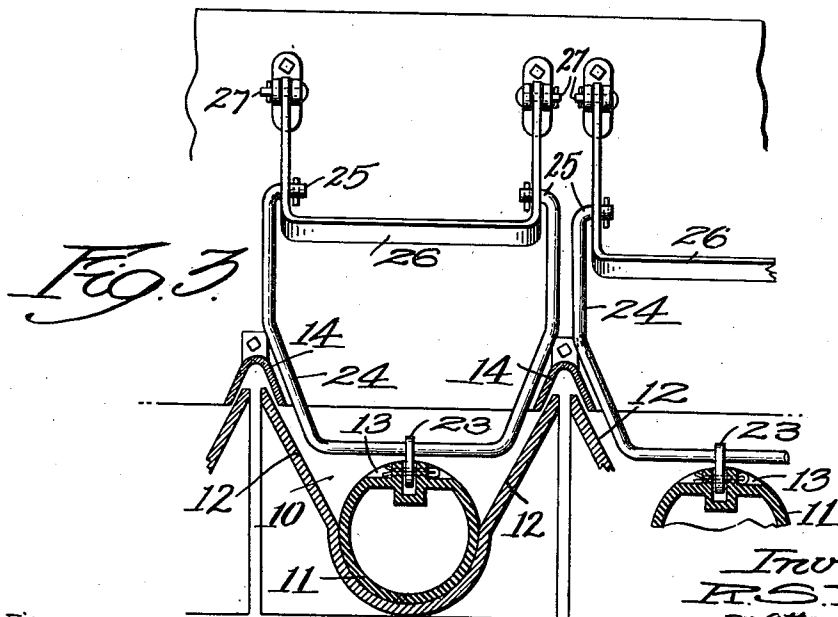
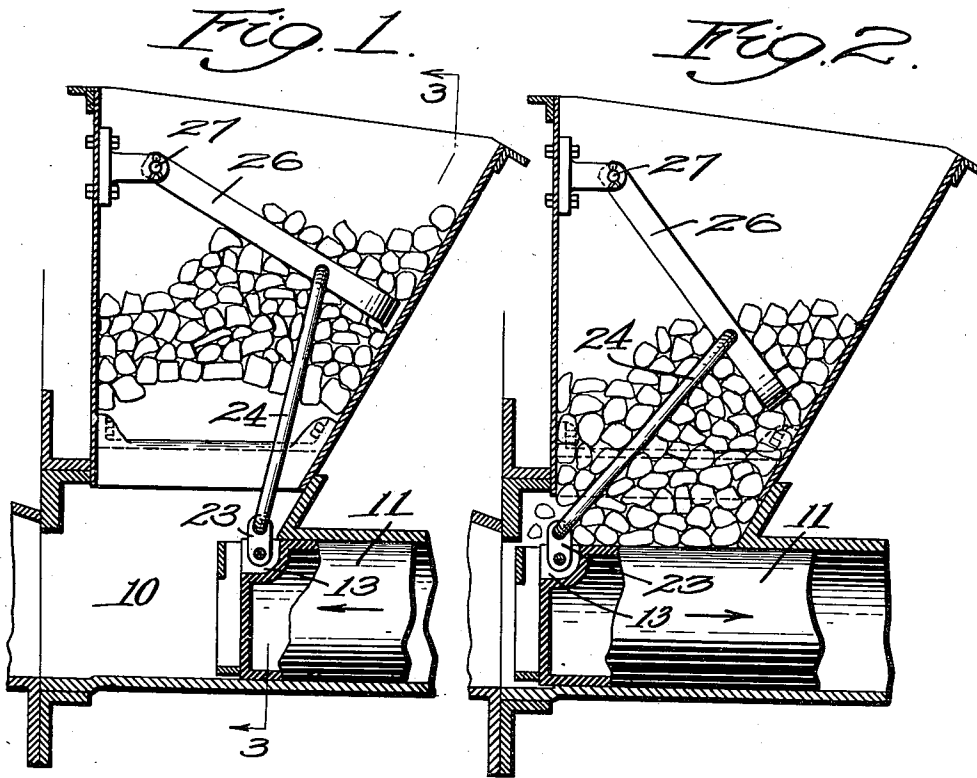


R. S. RILEY.
 COAL AGITATOR FOR MECHANICAL STOKERS.
 APPLICATION FILED OCT. 28, 1919.

1,413,428.

Patented Apr. 18, 1922.



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COAL AGITATOR FOR MECHANICAL STOKERS.

1,413,428.

Specification of Letters Patent. Patented Apr. 18, 1922.

Application filed October 28, 1919. Serial No. 333,917.

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 Coal Agitator for Mechanical Stokers, of which the following is a specification.

This invention constitutes an improvement over my Patent No. 1,208,011, patented December 12, 1916, and has similar objects in view.

The principal object of this invention is to provide a more efficient and positive device for the general purposes set forth in said patent, and especially to provide a construction which will certainly break up any longitudinal or transverse arch formed in the hopper without the use of any projecting cross rods or blades that are likely to become broken or bent.

Although I preferably construct the agitator in two parts movable in different directions, each part has its own function to perform. One breaks up a longitudinal arch of coal and the other a transverse arch.

I preferably pivot these two parts together and connect one of them with the coal discharging plunger so that this part of the agitator will have its lower portion arranged to move with the plunger which will move its upper end and the free end of the other part of the agitator, up and down in the hopper near one wall thereof. In the form shown in the drawings, I use two loop-shaped parts, one of them having its two legs pivoted to the top of the hopper near the rear or discharge side and having the bottom portion extending down into the coal near the slanting front side of the hopper, and having a range of motion up and down said front side. To this are pivoted near its free end or bow portion, the legs of the other part which extend down from it to the plunger to which it is connected. In this way, the free loop end of the upper part of the agitator moves up and down near the inclined front wall of the hopper so as to break up the end of an arch formed longitudinally with respect to the plunger.

The lower part moves with the plunger, its two legs cutting through and breaking up the ends of any arch extending trans-

versely over the top of the plunger. I connect this lower part loosely with the plunger instead of positively pivoting it at a definite point so that it can have some play at that end. This lessens the danger of breakage. I also make this part of the agitator so that it will be capable of yielding to get past an especially rigid obstruction. This I do by making it of spring steel which has the additional advantage that when it yields to pass an obstruction, it will then spring back quickly and thus tend to jar the coal down. Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which,

Fig. 1 is a central sectional view of one section or trough of a hopper of a mechanical stoker with a preferred embodiment of this invention applied thereto;

Fig. 2 is a similar view showing the parts in the other extreme position, and

Fig. 3 is a sectional view on the line 3-3 of Fig. 1 of two sections of the hopper.

The invention is shown as applied to the type of hopper having a series of troughs or sections 10 along the bottom of which the coal is forced by reciprocating plungers 11. These troughs have near their places of discharge interior slanting surfaces 12. Coal in a hopper section of the shape indicated tends to arch therein when the plunger 11 is drawn back as shown in Fig. 1. These arches rest at their opposite ends on the surfaces 12 and extend to the guard plates 14 which are shown as covering the upper ends of the surfaces 12. A longitudinal arch also tends to form over each trough. By this invention, I preferably do not depend on breaking up one arch but positively breaking up both.

Referring to the drawings it will be seen that each plunger has a notch 13 in the top. In this notch is loosely connected by a link 23, the lower end of one part 24 of an agitator shown in the general form of a yoke. This yoke-shaped part is made of spring steel and reaches across the trough in which it is located over the plunger. Its two legs diverge in directions approximately parallel with the slanting surfaces 12 so that as the plunger moves forward and back, the two legs of this part of the agitator will cut

through the sides of any arch formed across the top of the trough. The ends of the legs extend upward and are bent inwardly at 25 to constitute two pivots by which this part 5 24 is connected with a second yoke-shaped part 26. This is pivoted by stationary pivots 27 on the rear vertical wall of the hopper and controls the motion of the part 24 at its upper end. The straight end of the part 26 10 also swings up and down near the opposite front wall of the hopper about the pivots 27 to break up one end of any arch that may form in the hopper longitudinally with respect to the direction of motion of the plunger.

Although the entire agitator is operated by the horizontal reciprocation of the plunger at the bottom of the trough and the top of it is pivoted in stationary position, 20 the path of the agitator part 26 is limited as above specified and it is forced to perform the functions required of it. It necessarily loosens the coal at one end of the arch at every stroke of the hopper. This does away 25 with the necessity of using cross rods mentioned in my above specified patent and yet the breaking up of both the transverse and longitudinal arches is insured.

The agitator, it will be seen, comprises two 30 parts, each serving its own purpose, but co-operating so as to move together. Either part can be used alone and operated by itself, but their co-action is an important feature of this invention.

It is to be observed that I have departed 35 from the usual ideas in use in this art by modifying the extreme rigidity of construction heretofore thought necessary. This I do in two ways. Instead of pivoting the yoke 40 24 to a fixed point on the plunger, I connect it loosely, as by the link 23. This gives some play so that if a lump of coal is caught between the discharge side of the hopper and the yoke 24, the latter will not have to crush 45 its way clear through it but can lag behind a little.

I also make this yoke 24 of spring steel so that instead of shearing directly through any obstruction, it can give slightly to one 50 side or the other. Thus, it can find an easy path although it has to go through the arch just as positively as if it were rigid. As it passes a lump of coal, instead of crushing through it, it will spring back to normal 55 position again. This causes it to vibrate slightly and adds to its efficiency for the purpose of dislodging the end of the arch through which it is passing.

Although I have illustrated and described 60 only a single form of my invention, I am aware of the fact that modifications can be made therein without departing from the scope of the invention as expressed in the claims.

Therefore I do not wish to be limited to

all the details of construction herein shown and described, but what I do claim is:—

1. In a feeding mechanism, the combination of a hopper and means for positively forcing material out of the bottom thereof, 70 with an agitator in the hopper comprising two parts connected in the hopper with said means and movable thereby in different directions substantially at right angles to each other.

2. In a coal-feeding mechanism, the combination with a hopper and means for feeding the coal out of the bottom of the hopper, with an agitator in the hopper comprising two parts movable in different directions, 80 one of said parts comprising a bar movable up and down on one side of the hopper and arranged to break up the end of an arch of coal extending in a transverse direction, the other movable transversely 85 near the bottom of the hopper and extending up and down therein to break up an arch extending in a longitudinal direction.

3. In a coal-feeding mechanism, the combination of a hopper and a plunger positioned to feed the coal from the bottom thereof, with an agitator located in the hopper and comprising two parts connected 90 together, one movable with the coal feeding plunger and the other movable transversely 95 to the direction of motion thereof.

4. In a feeding mechanism, the combination with a hopper, of an agitator therein comprising two parts pivotally connected 100 together, one of said parts being pivoted at a fixed point near one wall of the hopper, and the other on a movable pivot near the bottom of the hopper.

5. An agitator for a hopper comprising 105 two parts pivotally connected together, one of said parts being pivoted to swing about a stationary axis, and means connected with the other end of the other part for moving both parts. 110

6. An agitator for a hopper comprising two parts pivotally connected together, one of said parts being pivoted to swing about a stationary axis, and means connected with the other end of the other part for moving 115 it in a straight line and thereby swinging the other part about its pivot.

7. The combination with a hopper, of a yoke-shaped agitator part located therein, reciprocating means for moving the lower 120 end of said part, the two legs of the yoke extending upwardly, and a second part pivotally connected with the hopper and also pivotally connected with said agitator part.

8. In a coal-feeding mechanism, the combination with a plunger for feeding coal, of a spring steel yoke-shaped agitator part 125 loosely connected with the plunger at one end and having its other end pivotally supported above, and a pivoted yoke part for 130

supporting said upper end of the first-named part and guiding said end to move up and down in the hopper as the lower end moves longitudinally at the bottom thereof.

5 9. The combination of a hopper, a yoke-shaped agitator part pivoted near one side of said hopper and extending substantially across the hopper, an agitator part of yoke-shaped form pivoted to the first-named part, its ends depending therefrom, and a reciprocating plunger to which the lower end of the last-named part is connected.

10 10. The combination with a hopper and a reciprocating plunger for feeding coal therefrom, of an agitator part connected with the plunger and operated thereby, and having means for breaking up both ends of any arch across the trough of the hopper transverse to the axis of the plunger, and
20 a second agitator part operated by the first in position for breaking up one end of any arch formed in the hopper and extending longitudinally with respect to the axis of the plunger.

25 11. The combination with a hopper having a trough at the bottom with slanting sides, and a discharging plunger movable along the trough, of an agitator part extending substantially across the trough over the
30 plunger and connected therewith to be moved thereby and extending up near the sides of the trough substantially parallel with the sides and then above them, and means for controlling the motion of the
35 upper end thereof.

12. In a feeding mechanism, the combi-

nation with a hopper and means at the bottom thereof for feeding material out of the hopper in a transverse direction, of an agitator part extending longitudinally therein, 40 an agitator part connected therewith and connected to be operated by said means to move transversely in the hopper and to move the first named agitator part up and down near a longitudinal wall of the hopper. 45

13. The combination with a hopper, and a discharging plunger, of a spring steel agitator having one end loosely pivoted to the plunger and the other end located above it and movable freely, and means for guiding 50 said freely movable end to move up and down near one end of the hopper, but in the arc of a circle.

14. The combination with a hopper, of an agitator pivoted to one side thereof and extending across it, said agitator being of 55 yoke shape with its closed end at the opposite side from the pivot, and means for swinging said closed end up and down in the hopper along said opposite side. 60

15. The combination with a hopper and a discharging plunger therefor, of a yielding agitator connected with the plunger by a relatively movable connection.

16. The combination with a hopper and a 65 discharging plunger therefor, of a yielding agitator connected with the plunger to be operated thereby.

In testimony whereof I have hereunto affixed my signature.

ROBERT SANFORD RILEY.