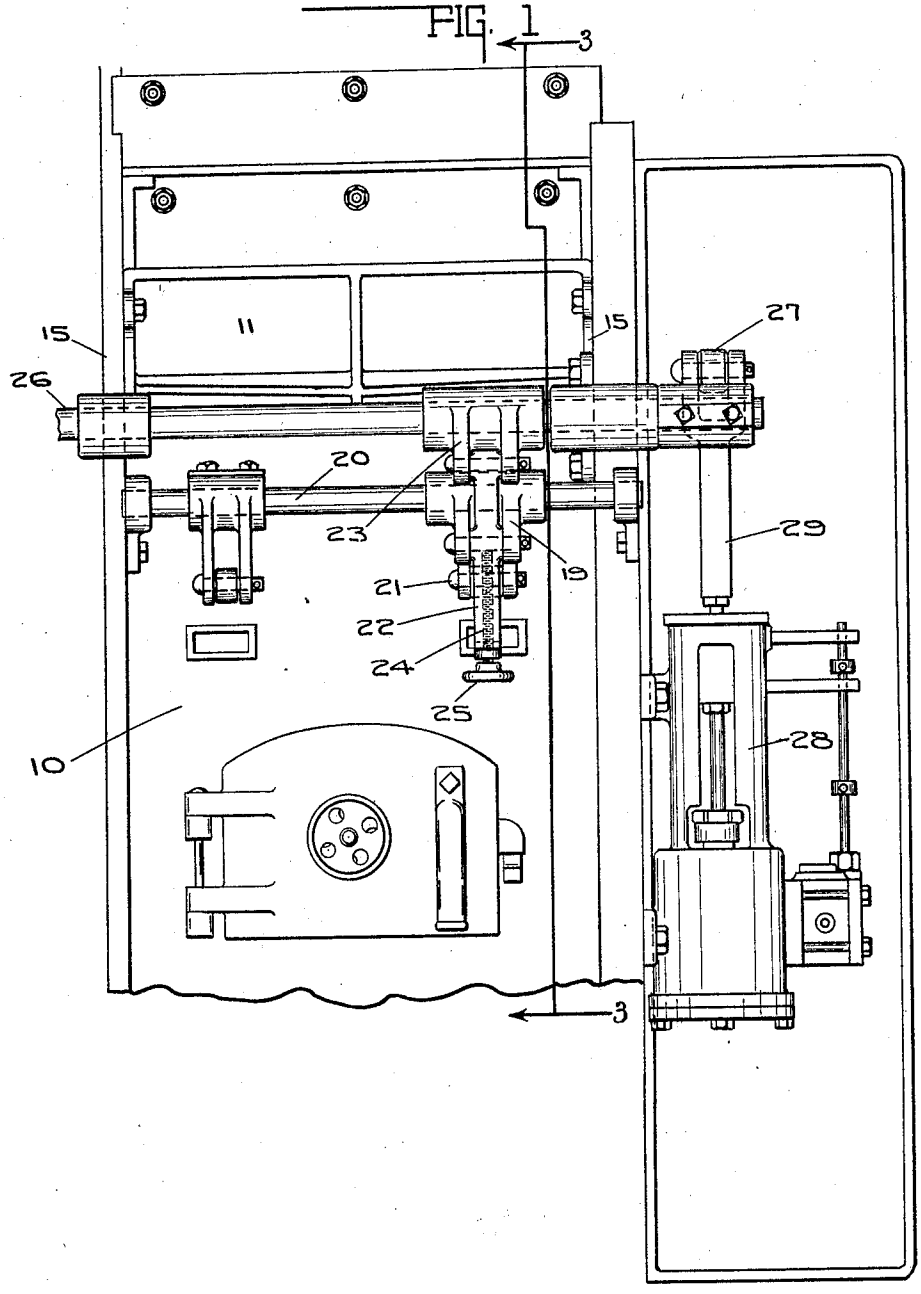
March 19, 1929. J. S. S. FULTON 1,706,286

HOPPER FEED FOR FURNACES

Filed Oct. 10, 1925 4 Sheets-Sheet 1

FIG. 1



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HOPPER FEED FOR FURNACES

Filed Oct. 10, 1925 4 Sheets-Sheet 2

FIG. 2

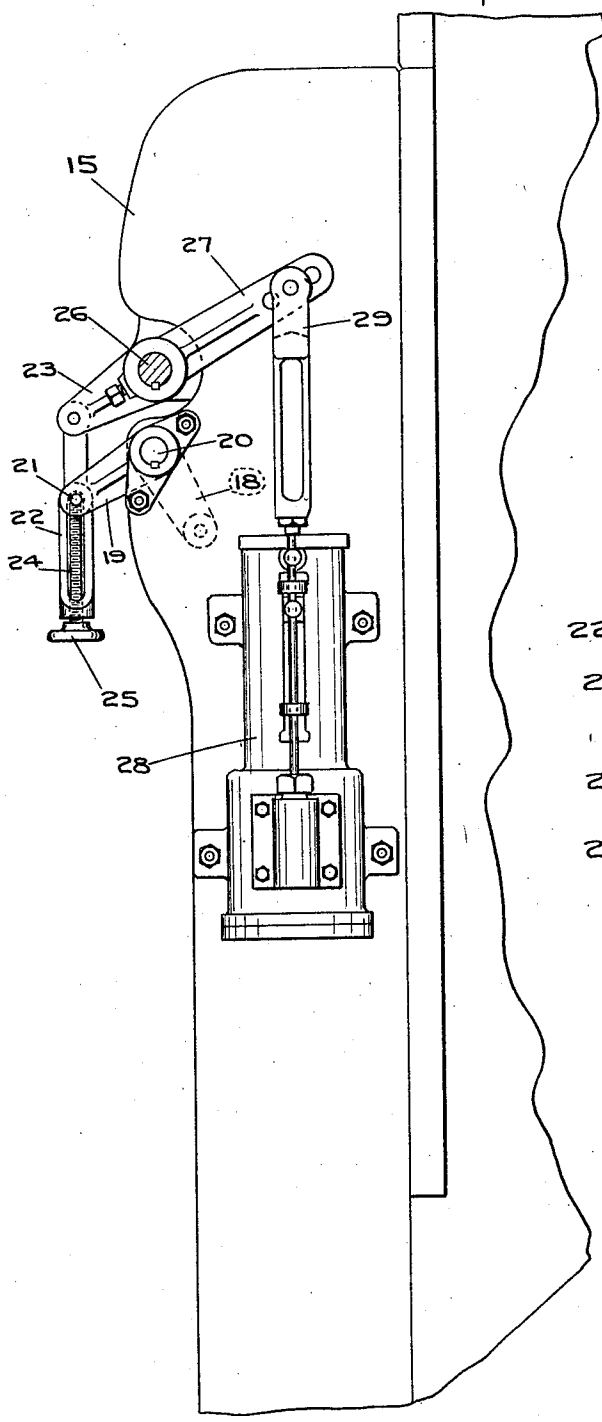
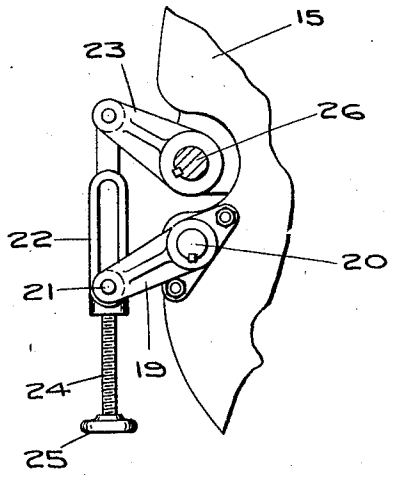


Fig. 4.



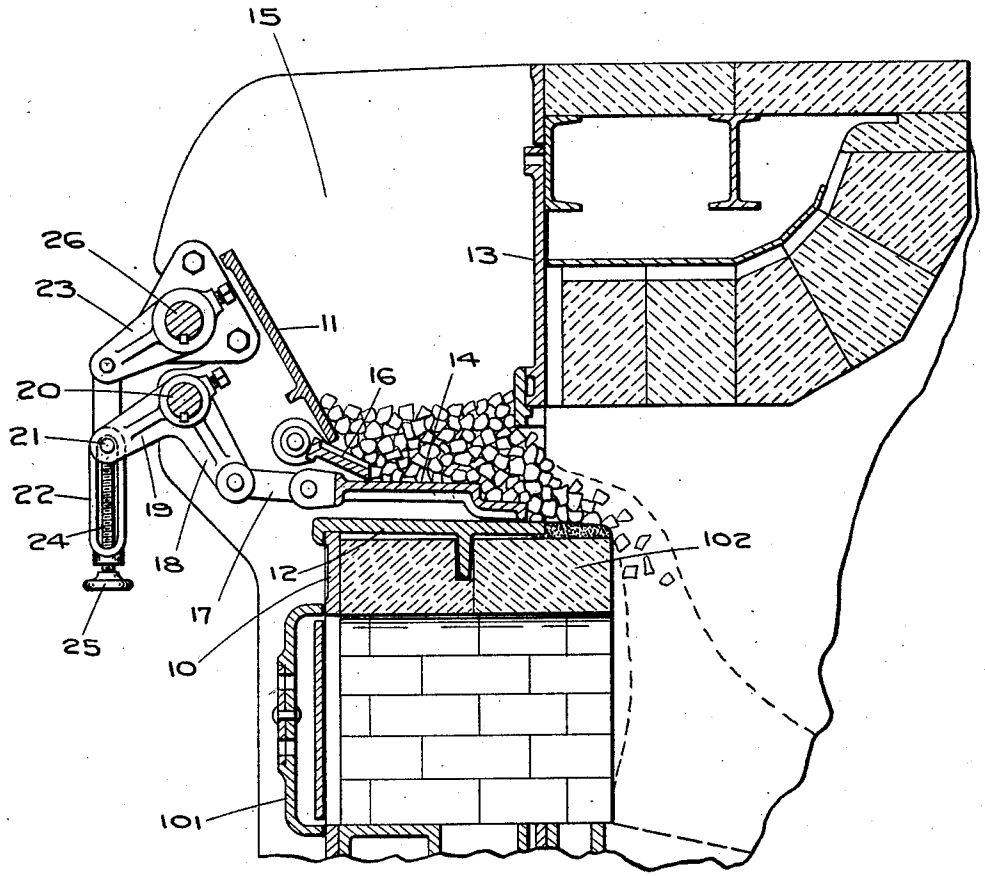
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Filed Oct. 10, 1925 4 Sheets-Sheet 3

Fig. 3



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HOPPER FEED FOR FURNACES

Filed Oct. 10, 1925 4 Sheets-Sheet 4

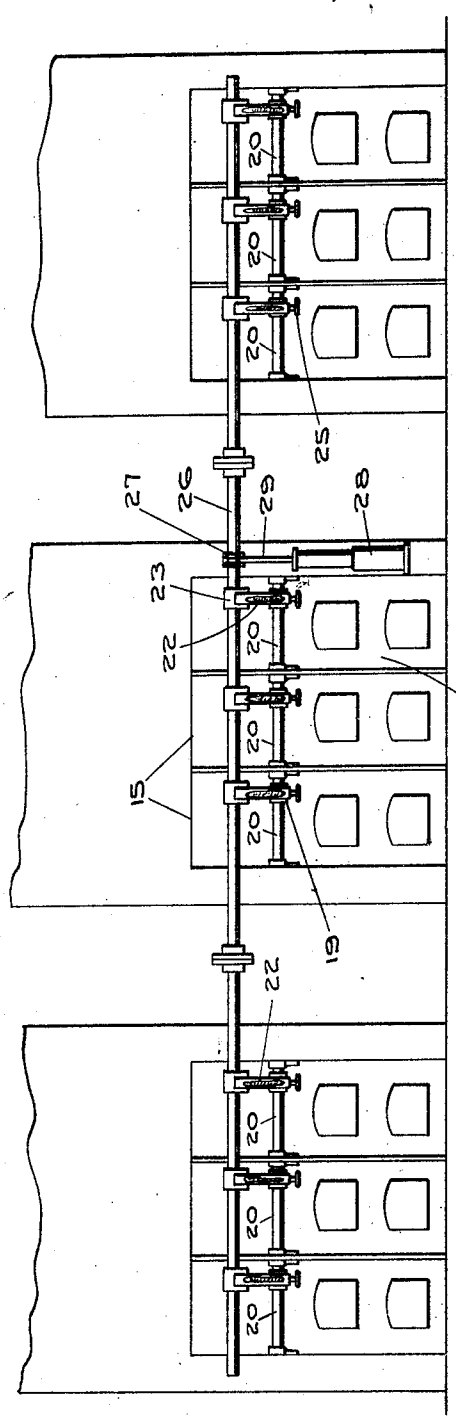


Fig. 5.

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UNITED STATES PATENT OFFICE.

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HOPPER FEED FOR FURNACES.

Application filed October 10, 1925. Serial No. 61,772.

This invention pertains to a mechanical fuel hopper feed for furnaces, wherein the fuel is periodically pushed into a furnace or onto the grate bars from a filled hopper in the usual manner.

The object of this invention is to provide a means for mechanically actuating the coal pusher for feeding the coal from the hopper into the furnace, and particularly a means for controlling or regulating the action of the pusher whereby the extent of its movement may be varied for controlling the quantity of coal fed at each operation. The regulating mechanism further permits the pusher to be readily connected with and disconnected from the power operated line shaft whereby it will feed the coal only at such times as desired by the operator.

One feature of this invention resides in the arrangement of the power driven line shaft which may extend clear across the face of a number of furnace or hopper units and which may be employed to furnish power to other mechanisms as well as hopper pushers, said line shaft being adjustably connected to individual shafts by such means as to permit the individual pushers to be actuated, idled or their movement adjusted independently of each other while at the same time being driven by the main line shaft, as will hereinafter more fully appear.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

Fig. 1 is a front elevation of a furnace showing the stoker mechanism and the fuel hopper of one unit. Fig. 2 is a side elevation thereof showing a specially constructed quick return stroke power generating motor and line shaft. Fig. 3 is a vertical section taken on the line 3—3 of Fig. 1. Fig. 4 is a side elevation of the regulator bar showing the arrangement for permitting free play. Fig. 5 is a diagrammatic sketch showing a plurality of sections.

There is shown herein the front face 10 of a furnace having a hopper 11 in which a supply of coal is constantly maintained. The hopper is provided with the bottom plate 12 which projects to the edge of or slightly into the furnace opening at a point spaced below the bottom edge of the rear side 13 of the hopper. The coal is fed from the hopper through the discharge opening by the pusher plate 14, said pusher plate being adapted to slide back and forth upon the plate 12, the coal in the hopper normally resting on the top surfaces thereof and being pushed into the furnace by the rearward movement of the vertical surfaces. The rearward end of the pusher may be constructed in step-like formation as illustrated in Fig. 3, as this construction feeds the coal from the hopper 11 in a more uniform manner than a single faced pusher. Pivotally mounted between the side walls 15 of each individual hopper unit, there is a deflecting plate 16 extending the full width of the hopper, the pivoted end of which is positioned outside of the hopper, and the forward end rests freely by gravity upon the top surface of the pusher 14 so as to prevent the coal from escaping between the pusher and the lower portion of the hopper in which it operates, while freely permitting the sliding movement thereof.

The pusher is pivotally connected by the link 17 to the arm 18 of a bell crank lever, the other arm thereof being designated as 19. The bell crank lever is keyed to a shaft 20 rotatably mounted between the hopper plates 15 of the furnace so as to freely turn therein. The arm 19 of the bell crank lever is provided with the pin 21 which extends into slot formed in the regulator bar 22. The regulator bar has one end pivoted to the crank arm 23 and is provided with a screw 24 in the other end which is adapted to screw therethrough the full length of the slot, representing the full arc travel of the crank arm 23, said screw being provided with an operating handle 25. The crank arm 23 is keyed to the power driven line shaft 26 which is pivotally mounted in bearings attached on the hopper plates 15 immediately above the shaft 20, and adapted to extend across a number of hopper units, and which may be of any length to furnish power for practically any number of stokers desired. Said line shaft is keyed to the crank arm 27 as shown in Fig. 2.

In operation, the power motor 28, which may be of any suitable quick return movement construction, is caused to drive the connecting rod 29, which is pivoted to the free end of the crank arm 27 so as to cause the line shaft 26 to reciprocate through an arc of about 60 degrees. This movement is continuous and may be timed by suitable adjustment of the power motor 28. The rocking movement of the shaft 26 will impart a movement to the crank arm 23 which will cause it to swing back and forth imparting a similar movement to the arm 19 when the screw 24 is

screwed into the slot of the regulator bar 22 to a position adjacent the pin 21. This makes a substantially close connection between the arms 23 and 19 so that the movement of the shaft 26 will impart a like movement to the shaft 20 such as to cause the coal pusher 14 to slide back and forth upon the plate or shelf 12 the full extent of its movement.

It will be noted that the extent of movement of any one of the pushers may be regulated independently of the others by adjustment of their respective hand wheels 25 and screw 24. When said screw is in the position shown in Fig. 3, the maximum movement will be imparted to the coal pusher, said maximum movement depending upon the relative positions and lengths of the various crank arms. By unscrewing the screw 24 slightly, the pin 21 will have a certain amount of free play within the regulator bar so that only a portion of the movement imparted thereto by the crank arm 23 will be transmitted to the coal pusher through the shaft 20. If the screw 24 is screwed out of the regulator bar a sufficient distance to prevent its engagement by the pin 21, no further movement will be imparted to that particular coal pusher by reason of the fact that the regulator bar 22 will be freely moved by the shaft 26 without imparting movement to the shaft 20, the pin 21 passing freely back and forth within the slot of said bar.

Thus while the line shaft 26 is constantly driven by the motor, the actuation of the coal pusher may be stopped at any time by unscrewing the screw 24, or by properly adjusting its position, the extent of movement may be reduced so as to reduce the amount of coal pushed into the furnace at each operation.

The invention claimed is:

1. A hopper feed for furnaces comprising a reciprocating fuel pusher, a power driven rockable shaft, an arm on said shaft, a second shaft parallel with the first shaft, a bell crank on the second shaft, a regulator bar having one end pivotally connected directly to the arm on the first shaft and having at the other end a long longitudinal slot, a pin on one arm of the bell crank adapted for movement in the said slot, a screw in one end of the bar extending into said slot and adjustable to provide means for varying lost motion of the pin in the slot, and means forming pivotal connection between the other arm of the bell crank and the fuel pusher, substantially as set forth.

2. A hopper feed for furnaces comprising a reciprocating fuel pusher, a power driven rockable shaft for imparting a reciprocating motion to said pusher, a crank arm keyed to the said power shaft, a regulator bar pivotally connected to the outer end of said crank arm, a second shaft, a bell crank lever keyed to the second shaft the fuel pusher being connected to an arm of the said bell crank lever, means for pivotally connecting the other arm of the said lever to the said regulator bar, means for providing lost motion between the last named arm and the regulator bar, and means for varying the amount of lost motion to vary the extent of movement imparted through the power shaft to the said second shaft to vary the range of movement of the fuel pusher.

In witness whereof, I have hereunto affixed my signature.

JOHN S. S. FULTON.