

E. F. BEAUMONT.
FURNACE.

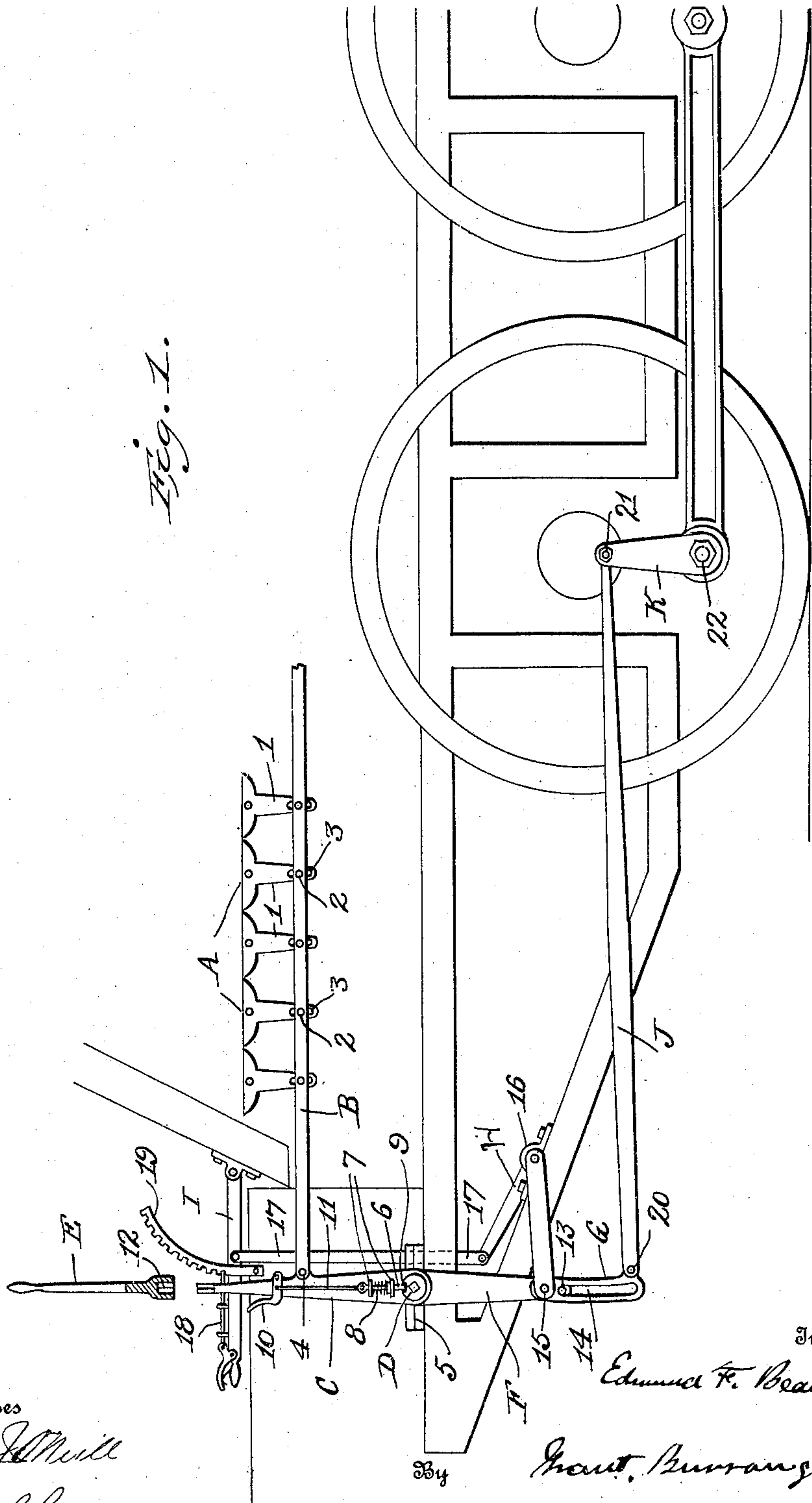
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3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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To all whom it may concern:

Be it known that I, EDMUND F. BEAUMONT, a citizen of the United States, and resident of San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

The invention relates to automatic grate-shaking mechanism and it has for its object the provision of means for transmitting motion from a movable member of the engine connected with the furnace to the grate-bars to agitate the latter, which means will be under control of the engineer so that he can regulate the operation of the same to meet the requirements of the fuel and combustion conditions of the fire in the furnace.

It consists in the novel construction, combination and arrangement of parts hereinafter fully set forth, pointed out in the appended claims, and illustrated in the accompanying drawings.

While the mechanism will be described as applied to the furnace and engine of a locomotive, yet it can be applied to a stationary furnace provided with a suitable source of power.

In the drawings Figure 1 is a side elevation of mechanism embodying the invention. Figs. 2 and 3 are similar views respectively showing different modifications of the same.

Referring to Fig. 1 of the drawings, A designates the pivoted grate-bars having at their ends the arms 1 to which is loosely hinged the connecting-rod B by pins 2 passing through the rod and the slots 3 in the arms. The outer end of the connecting-rod, as at 4, is pivoted to the upper end of the lever C journaled at its lower end on the shaft D mounted in bearings 5 suitably placed in the frame of the engine. By means of a clutch-mechanism the lever can be locked on the shaft. This clutch-mechanism comprises the pin 6 slidable in guides 7 on the lever. The pin is normally pressed by the spring 8 toward the shaft to engage the hole 9 in the latter. By means of the hand-lever 10 pivoted to the main lever C and connected by the rod 11 with the pin 6, the latter can be moved against the action of the spring 8 to free the main lever from the shaft. A removable hand-bar E is provided, having at an end the socket 12 to fit the upper end of the lever C. On the shaft

D is the crank-arm F having at its outer end the pin 13 slidable in the slot 14 in the link G. The upper end of the link, as at 15, is fulcrumed to the outer end of one of the members of the bell-crank H mounted in bearing 16 on the engine-frame. The outer end of the other member of the bell-crank is connected by the rod 17 with the controlling-lever I hinged to the engine-frame. By means of this lever and the intermediate connections the link G can be adjusted on the pin 13. The lever is held in its adjustments by the hand-operated pawl 18 engaging the segmental rack 19. The lower end of the link G, as at 20, is hinged to the outer end of the reach-bar J, which is pivoted at its inner end, as at 21, to the arm K fast on the pin 22 of the rear driving wheel of the engine.

The operation of the mechanism shown in Fig. 1 is as follows: While the locomotive is traveling in either direction, the arm K oscillates the reach-arm J, which has a movement back and forth equal to the diameter of the circle described by the pin 21 around the axis of the driving-wheel. The oscillation of the reach-arm vibrates the link G on its fulcrum 15. As the pin 13 on the lower end of the crank-arm F is in the upper end of the slot 14 of the link opposite to the fulcrum 15, the link is in a neutral position so that no motion is imparted to the crank-arm. Should it be desired to shake the grate, by operating the hand-lever 10 the pin 6 is permitted by the action of its spring to engage the hole 9 in the shaft D to lock the lever C fast on the latter, and by means of the controlling-lever I, the rod 17 and the bell-crank H the link G is raised on the pin 13. This adjustment of the link, which may be more or less, separates the pin 13 from the fulcrum 15, so that the vibration of the link will be transmitted to the crank-arm, which rocks the shaft D. As the lever C has been locked on the shaft the former is vibrated and oscillates the connecting-rod B, which rocks or shakes the grate-bars A. The sliding pivotal connections between the grate-bars and the connecting-rod permit the latter to move up and down slightly to accommodate the movement of the lever C. By adjusting the link G on the pin 13 by means of the controlling-arm I the desired degree of agitation of the grate can be secured. When the grate has been sufficiently shaken, the link G is dropped on the pin

13 to its neutral position and, if need be, the pin 6 of the clutch-mechanism is disengaged from the hole 9 of the shaft D, which unlocks the arm C from the latter. Should it
 5 be desired to shake the grate by hand, when the locomotive is at rest for an instant, the clutch-mechanism is actuated to unlock the lever C from the shaft D. The hand-bar E is then placed on the upper end of the lever
 10 C and by the increased leverage thereby secured the connecting-rod B can be moved back and forth to rock the grate-bars by manual power.

In the construction shown in Fig. 2 the
 15 grate-bars A' are pivoted to the connecting-rod B' and the latter is hinged to the hand-lever C'. In this instance the connecting-rod is connected with the upper end of the arm C' separate and distinct from the hand-
 20 lever C'. The arm C' is journaled on the shaft D' mounted in bearing on the engine-frame. A clutch 6^a is provided for locking the arm C' fast on the shaft. On the shaft is the crank-arm F' having at its lower end
 25 a pin slidable in the slot of the link G' fulcrumed at its upper end to one of the members of the bell-crank H'. The other member of the bell-crank is connected by a rod with the controlling lever I', which is
 30 provided with a hand-pawl mechanism to hold it in its adjustments. The lower end of the link is connected by the reach-rod J' with the arm K' fast on the pin of the drive-wheel. The operation of this modified con-
 35 struction is as follows: Through its connection with the arm K' the link G' is oscillated while the locomotive moves in either direction. By raising the link, by moving
 40 the bell-crank H' through the operation of the controlling lever I' and the intermediate connections, an oscillation is given to the crank-arm F', which rocks the shaft D'. The lever C' having been locked on the shaft
 45 D' by the clutch 6^a, the lever is vibrated by the rocking of the shaft and oscillates the connecting-rod B', which in turn rocks the grate-bars A'. The extent to which the grate-bars will be agitated can be regulated
 50 by adjusting the link G' on the pin at the lower end of the crank-arm F'. When it is desired to stop the shaking of the grate the link G' is dropped to its neutral position by operating the controlling lever I' and the clutch 6^a is operated to unlock the lever C'
 55 from the shaft D'. When it is desired to shake the grate in this instance when the locomotive is at rest, it can be done by applying manual power to the lever C', the clutch 6^a having been operated to release the
 60 lever C' from the shaft D'.

It is to be observed that in the constructions shown in Figs. 1 and 2 the operative mechanism is located on the side of the loco-
 65 motive and the motion is derived from the rear drive-wheel.

In the construction shown in Fig. 3 the grate-bars A² are pivoted to the connecting-rod B² hinged at its forward end to the hand-lever C³. The connecting-rod is con-
 70 nected to the arm C⁴ journaled on the shaft D² mounted in bearing on the frame of the locomotive. A clutch 6^b operates to lock the arm C⁴ fast on the shaft D². On the latter is the crank-arm F² having at its lower end
 75 a pin engaging the slot in the link G². The latter at its upper end is fulcrumed to one of the members of the bell-crank H², the other member of which is connected by a rod with the controlling lever I² provided
 80 with a hand-pawl mechanism to hold it in its adjustments. The lower end of the link is connected by the reach-rod J² with the strap K² on the eccentric K³ fast on the axle of the driving wheels beneath the
 85 boiler. The operation of the modification in this last instance is as follows: When the locomotive is traveling in either di-
 90 rection, by the rotation of the eccentric K³ an oscillatory motion is imparted to the strap K², which in turn oscillates the reach-rod J² and thereby vibrates the link G². As shown in the drawing, the link is
 95 in its neutral position. By raising the link through the operation of the controlling lever I² on the pin at the lower end of the crank-arm F² the latter is vibrated and a
 100 rocking motion is imparted to the shaft D². The lever C⁴ having been locked on the shaft D² by the clutch 6^b it will also be rocked and will impart through the con-
 105 necting-rod B² a rocking movement to the grate-bars A². By adjusting the link on the pin at the lower end of the crank-arm any desired degree of agitation of the grate can
 110 be secured. When the lever C⁴ is unlocked from the shaft D² the grate can be agitated by applying manual power to the lever C³. In this last modification the operative
 115 mechanism is mounted beneath the boiler instead of at its side as in the first two in-
 120 stances.

While three different embodiments of the invention have been described, yet others might be devised involving the principles
 125 employed; also, the mechanism can be used with stationary furnaces as well as with those of a locomotive, a suitable source of power being provided.

Having thus described my invention, what I claim and desire to secure by Let-
 130 ters-Patent is,

1. In grate-bar shaking mechanism, pivoted grate-bars, an oscillative arm, means for transmitting motion from said arm to
 135 said grate-bars, a link fulcrumed at one end having a sliding connection with said arm, means for vibrating said link on its fulcrum, and means for adjusting said link relative to said arm while said link is being
 140 vibrated.

2. In grate-shaking mechanism, pivoted grate-bars, a shaft, a lever journaled on said shaft connected with said grate-bars, clutch-mechanism for locking said lever on said shaft, a crank-arm on said shaft, a pin on said crank arm, a link fulcrumed at one end having a slot engaged by said pin, means for adjusting said link on said pin, and means for vibrating said link.

3. In grate-shaking mechanism, pivoted grate-bars, a shaft, a lever journaled on said shaft, a connecting-rod joining said lever with said grate-bars, clutch-mechanism for locking said lever on said shaft, a crank-arm on said shaft, a pin on said crank-arm, a pivoted bell-crank, a controlling lever connected with one of the members of said bell-crank, a slotted link engaging said pin and fulcrumed on the other member of said bell-crank to be adjusted on said pin relative to said crank-arm, a reach-bar connected with said link to vibrate the same, and means for oscillating said reach-bar.

4. In grate-bar shaking mechanism, pivoted grate-bars, an oscillative arm connected with said grate-bars to rock the same, a movable pivot, a link fulcrumed at one

end on said movable pivot and having a sliding connection with said oscillative arm, means for vibrating said link on said movable pivot, and means for raising and lowering said movable pivot to adjust said link relative to said oscillative arm during the vibration of said link.

5. In grate-shaking mechanism, pivoted grate-bars, means for rocking said grate-bars, a movable member of an engine, means for transmitting motion from said movable member to said means for rocking the grate-bars, link-and-pin mechanism interposed in said means for transmitting motion, means for adjusting said link-and-pin mechanism to regulate the transmission of motion while said means for transmitting motion are in operation, and clutch-mechanism interposed in said means for transmitting motion to control the same.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

EDMUND F. BEAUMONT.

Witnesses:

JOHN T. COATES,
FLORENCE SIMMS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."