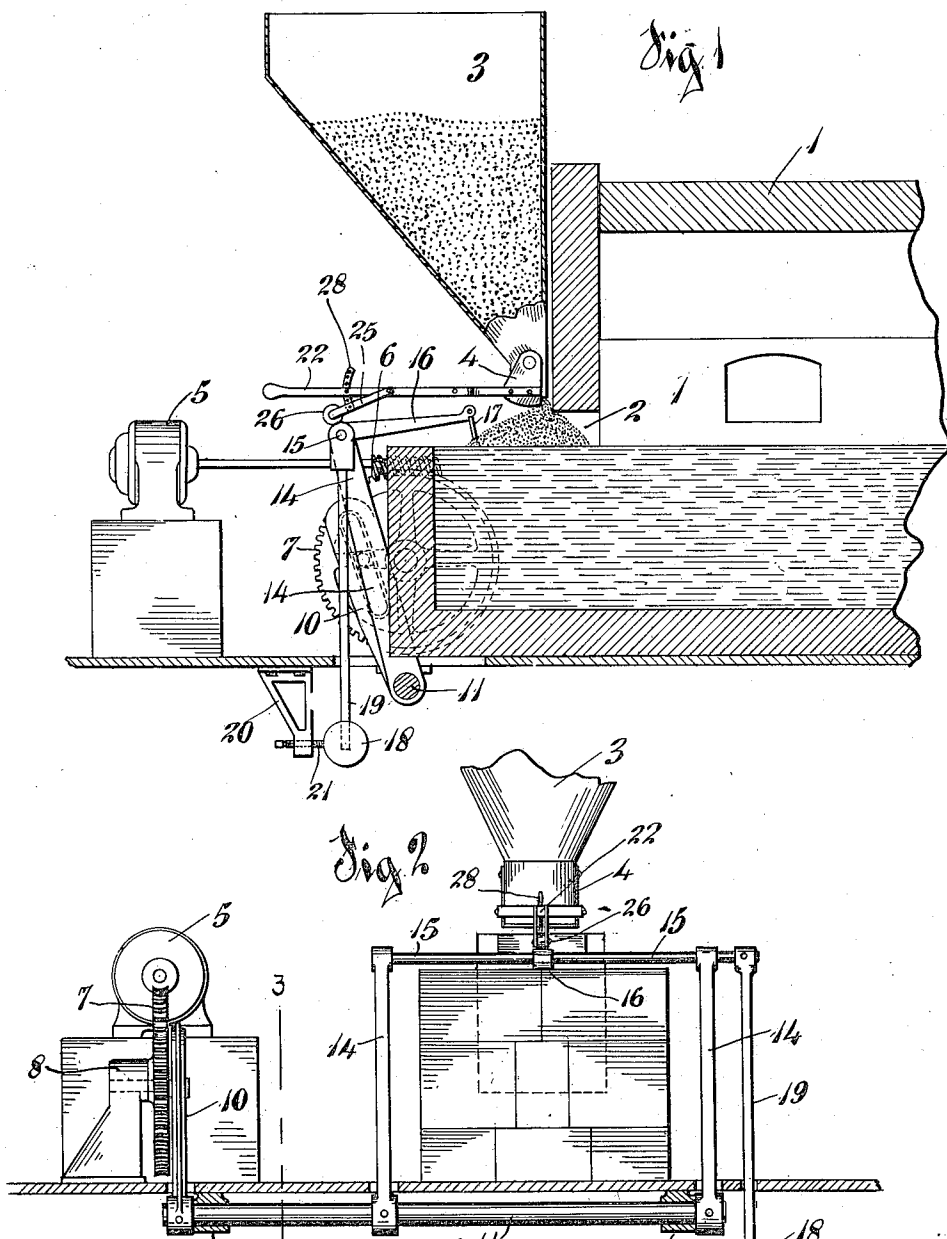


P. Q. WILLIAMS.
 AUTOMATIC FEEDING DEVICE FOR FURNACES.
 APPLICATION FILED OCT. 23, 1913.

1,201,664.

Patented Oct. 17, 1916.
 2 SHEETS—SHEET 1.



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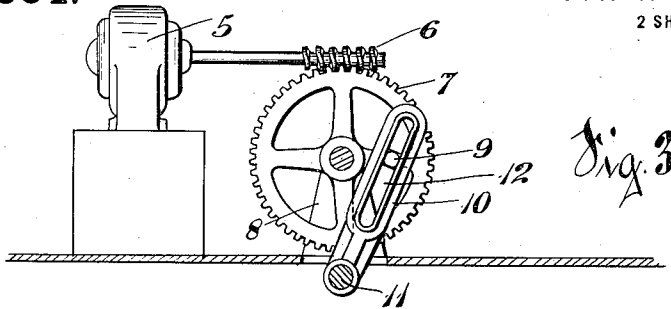


Fig. 3

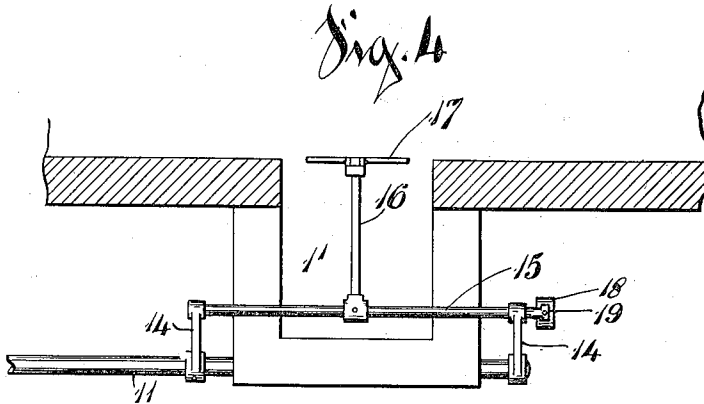


Fig. 4

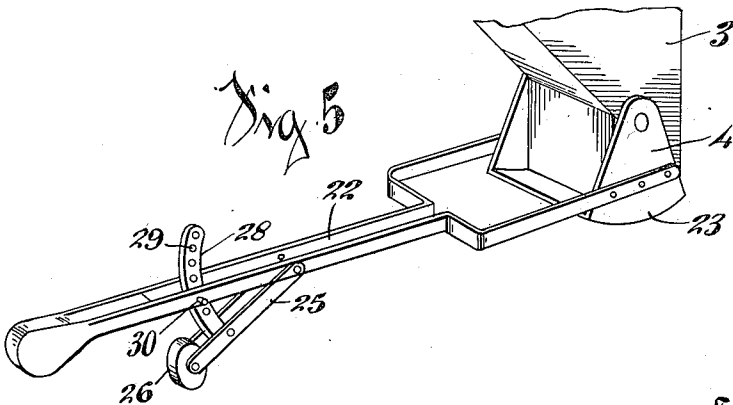


Fig. 5

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UNITED STATES PATENT OFFICE.

PERCY Q. WILLIAMS, OF CINCINNATI, OHIO, ASSIGNOR TO THE CHARLES BOLDT COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

AUTOMATIC FEEDING DEVICE FOR FURNACES.

1,201,664.

Specification of Letters Patent.

Patented Oct. 17, 1916.

Application filed October 23, 1913. Serial No. 796,809.

To all whom it may concern:

Be it known that I, PERCY Q. WILLIAMS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Automatic Feeding Devices for Furnaces, of which the following is a specification.

My invention relates to automatic feeding devices for feeding raw material to furnaces adapted for the fusion of substances; and more particularly to automatic feeding devices for feeding raw material to furnaces for the production of molten glass.

It is well known that furnaces for the fusion of glass must be continually fed at certain determined intervals with the proper raw materials inasmuch as the furnaces are never allowed to cool down after once being heated properly. It is the custom to provide an attendant at each furnace whose duty it is to keep the furnace properly supplied with the raw materials. This attendant often becomes careless and irregular in feeding the furnace.

The object of my invention is to provide an automatic feeding means for glass furnaces which can be operated at the proper speed to feed the furnace the proper amount of raw material, at certain predetermined intervals thereby decreasing the expense of maintaining a furnace and increasing its efficiency by insuring a steady uniform feed.

My invention consists in certain parts, combinations of parts and details of construction which will be described in the following specification and pointed out in the appended claims.

In the accompanying sheet of drawings: Figure 1 is a side elevation of my improved device operatively mounted on a furnace, the furnace being shown in section. Fig. 2 is a front elevation of same. Fig. 3 is a cross section taken on the line 3—3 of Fig. 2. Fig. 4 is a plan view showing the dog house of the furnace and the ram in its innermost position. Fig. 5 is a detail perspective view of the valve and adjustable means thereon for regulating the throw of same.

Referring more particularly to my invention, 1 illustrates a portion of a tank furnace commonly used in the fusion of glass and 2 the filling hole of same. A hopper 3 commonly called the batch hopper contains the proper mixture of sand or silica, alkalis, lime, etc., and the heterogeneous substances

such as broken and partly melted glass. This mixture is adapted to be fed into the dog house 1' of the furnace through the valve 4 at the bottom of the batch hopper 3, which valve is automatically opened and closed at certain determined intervals by mechanism which will be described hereinafter.

My device for feeding the furnace is preferably driven by the motor 5 which drives a worm 6. The worm 6 meshes with a worm wheel 7 suitably journaled at 8. The worm wheel 7 is provided with a crank or wrist pin 9 which is adapted to operate an oscillating pitman or crank arm 10 mounted on the rock shaft 11. It will be noted that the oscillating pitman is provided with an elongated slot 12 in which the wrist pin 9 operates, and that it is tightly mounted on the rock shaft 11 directly below the driving gear 7. By means of the position of the wrist pin on the worm wheel 7 and the elongated slot 12 in the oscillating pitman the rock shaft 11 is given a slow forward motion and a comparatively quick return which is desired in order to draw the ram out of the furnace quickly.

The oscillating shaft 11 is suitably journaled in journal boxes 13 just beneath the floor level and has mounted thereon two oscillating connecting arms 14 rigidly mounted thereon and vertically disposed extending from the rock shaft 11 upwardly to a point above the level of the dog house 1' and the filling hole 2 of the furnace. A connecting bar or shaft 15 is loosely mounted in the ends of the oscillating rocker arms 14 and carries the ram 16 which is rigidly mounted on the connecting bar 15. The ram 16 is provided with a hinged head plate 17 which is adapted to act as the head of the ram during its forward motion but upon its return motion the head plate drags over the top of the molten glass.

The connecting bar 15 which extends across the front of the furnace is provided with a ram balance weight 18. This balance weight is mounted on the end of an arm 19 which is rigidly mounted on the connecting bar 15 and tends to keep the ram 16 in proper horizontal position and in contact with the raw material for ramming same into the furnace. A bracket 20 is provided which carries a set screw 21 which set screw the balance weight 18 is adapted to engage when reaching the limit of its return stroke. The

set screw is adjustable to regulate the distance the ram is lifted out of the molten glass upon the return of the ram as clearly shown in Fig. 1 of the drawings.

5 The cut off gate valve 4 on the batch hopper is provided with the usual operating handle 22 which is heavy enough to cause the valve to normally close, it being rigidly mounted on the swinging valve gate 23.
 10 Pivoted at a suitable point on the handle 22 is an arm 25 carrying a contact roller 26 at the end thereof. Intermediate the pivotal point and the roller on said arm I attach an adjusting arc shaped arm 28 which is provided with a series of holes 29 through
 15 which a pin 30 in the handle 22 is adapted to enter. Thus the adjusting arm 28 regulates the distance the pivoted arm is allowed to swing away from the operating handle.
 20 The roller 26 is adjusted so as to be in the path of the hub of the ram on its return stroke, which hub, when it engages with the roller, raises same, thereby raising the operating handle and opening the valve, letting
 25 a suitable amount of raw material into the furnace just in front of the ram. As the ram is pushed forward the valve automatically closes again and this operation is continually repeated while the device is being
 30 operated.

It will be noted that the device may be mounted on a furnace without interfering with the construction of the valve or valve handle, thereby enabling one to feed the
 35 furnace by hand if desired.

The worm 6 and worm wheel 7 may be properly proportioned so as to give the proper speed to the ram. Thus it is seen that an automatic and absolutely uniform
 40 feed is gained by employing my invention on furnaces of this type.

Many modifications of my invention might be made without departing from its spirit and scope and I do not wish to be
 45 confined to the exact details shown.

What I claim as new and desire to secure by Letters Patent is:

1. In combination with a furnace for the fusion of substances, of a hopper, a valve
 50 thereon, an operating handle for said valve, a ram, an operating shaft, arms on said shaft, means whereby said ram is operated to and fro by the movement of said arms, means for balancing said ram, and means
 55 whereby said ram engages the operating handle of said valve to open said valve.

2. In combination with a furnace for the fusion of substances, of a hopper, a valve
 60 thereon, a handle for controlling the movement of said valve, a reciprocating ram, said ram arranged to engage the handle to operate said valve, and means for operating said ram.

3. In a device of the character described, the combination with a furnace for the
 65 fusion of substances, a hopper, a valve thereon, a reciprocating ram, and a handle for manually operating said valve, said ram arranged to engage the handle to operate said
 70 valve at a predetermined point in its reciprocating path.

4. In an automatic feeding device for furnaces the combination with a valve regulating the supply of the material to be fed
 75 therein, of a rock shaft, a reciprocating ram, operatively connected to said rock shaft, means for rocking said shaft quickly in a forward direction and slowly in a backward direction to vary the forward and backward
 80 travel of said ram, and means for automatically operating said valve.

5. In an automatic feeding device for furnaces the combination with a valve controlling the supply of material to be fed there-
 85 into, of a reciprocating ram, a hinged head plate on the front end of same, a rock shaft rocker arms mounted thereon, a bar supported by said rock shaft, said ram being
 90 mounted on said bar, and means for rocking said shaft substantially as set forth.

6. In an automatic feeding device for furnaces the combination with a valve controlling the supply of material to be fed there-
 95 into, of a rock shaft, means for continuously operating said rock shaft, a reciprocating ram operatively connected with said rock shaft, means for balancing said ram, and means for operating said valve dependent
 100 upon the operation of said ram.

7. In an automatic feeding device for furnaces, the combination with a valve for controlling the supply of raw material there-
 105 into, of a reciprocating ram, a rock shaft, rocker arms on said shaft, said rocker arms carrying said ram, means for maintaining said ram in its horizontal position, means for automatically imparting a slow forward
 110 movement to said ram and a quick return movement and means for operating said valve dependent upon the return of said ram.

8. In an automatic feeding device for furnaces the combination with a valve having
 115 a handle thereon for manually operating same, of a ram independent automatic operating means dependent upon the to and fro movement of said ram, a rock shaft operatively connected to said ram, and means for operating said rock shaft substantially as set forth.

PERCY Q. WILLIAMS.

Witnesses:

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