May 8, 1928. 1,668,968

J. LAMBOT

CHARGING DEVICE FOR GAS PRODUCERS, SHAFT FURNACES, AND THE LIKE

Filed Dec. 10, 1926

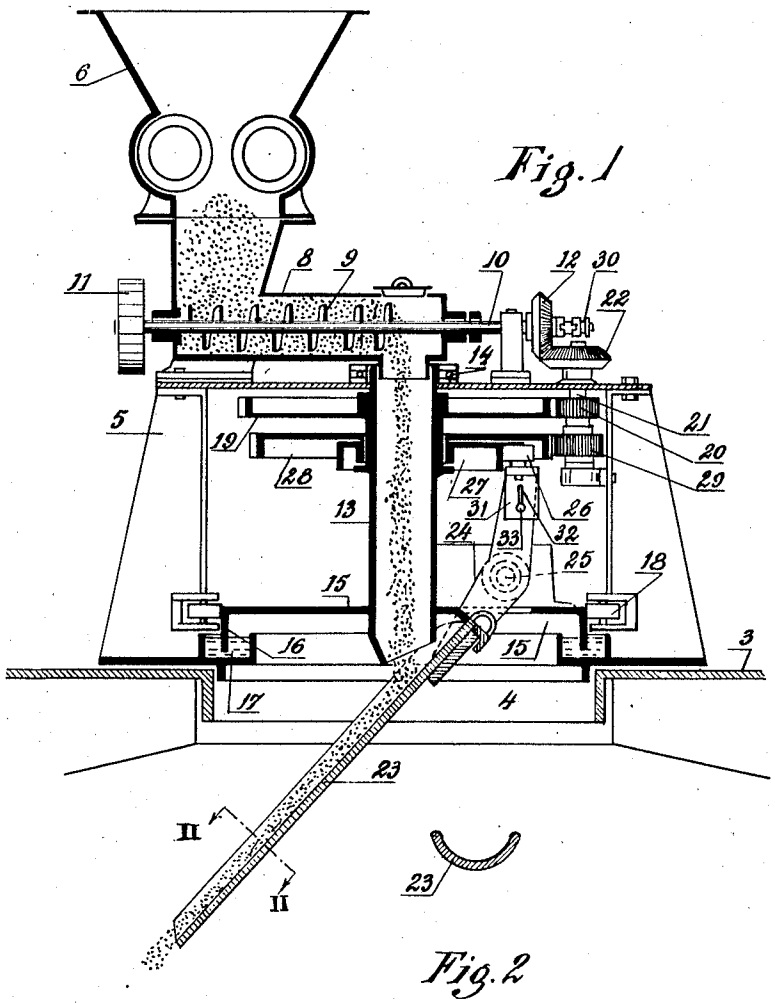


Fig. 1

Fig. 2

Fig. 3

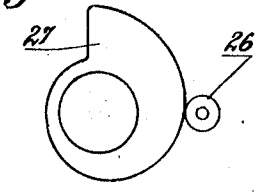
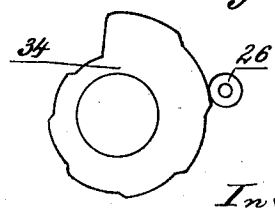


Fig 4



Inventor.

Joseph Lambot

By Lucien Tourelle

Attorney.

Patented May 8, 1928. 1,668,968

UNITED STATES PATENT OFFICE.

JOSEPH LAMBOT, OF BRUSSELS, BELGIUM.

CHARGING DEVICE FOR GAS PRODUCERS, SHAFT FURNACES, AND THE LIKE.

Application filed December 10, 1926, Serial No. 153,988, and in Germany December 18, 1925.

My invention relates to a charging device for gas producers, shaft furnaces and the like, wherein most of the parts of the mechanism are mounted at the exterior where they are readily accessible and will in all cases be out of contact with the burning gases of the furnace.

The device essentially comprises a movable inclined trough which is situated at the upper part of the furnace and receives in a continuous manner the material to be charged. By means of suitable mechanism, the said trough is given a uniform movement of rotation about a vertical axis in line with the axis of the furnace while at the same time it is subject to continuous or periodic variations of inclination in a vertical plane. Since these two movements have different periods, all points of the surface of the furnace will thus successively receive the same amount of material.

The appended drawings show by way of example an embodiment of the invention.

Fig. 1 is a sectional view of the device; Fig. 2 is a section of the trough on the line II—II of Fig. 1; Figs. 3 and 4 show two forms of cams which may be employed for controlling the inclination of the trough.

In Fig. 1, 3 represents the upper part of a gas producer or of a shaft furnace, upon whose orifice 4 is disposed a frame 5 supporting the mechanism of the charging device. The hopper 6 communicates with the horizontal tube 8 containing the screw conveyor 9 whose shaft 10 carries at one end a fixed driving pulley 11 and at the other end a loose bevel pinion 12 which may be connected to rotate with said shaft by means of a suitable clutch 30.

The output end of the tube 8 opens into a vertical feeding conduit 13 which is situated in line with the axis of the furnace and which is suspended from the frame 5 by means of a ball bearing 14 whereby it will rotate with facility. This conduit carries at its lower part a large horizontal closing disc 15 having a flanged edge 16 which depends into an annular liquid containing trough 17 which forms part of the frame 5, thus forming a liquid seal. The disc 15 is engaged at its periphery by the rollers 18 which are mounted on the frame 5.

At its upper part, the conduit 13 carries a gear wheel 19 meshing with and driven by a pinion 20 which is keyed to a vertical shaft 21 upon whose end is mounted a bevel pinion 22 in mesh with the bevel pinion 12.

The lower end of the conduit 13 opens above an inclined trough 23 which is disposed in the upper part of the furnace and whose cross-sectional shape is illustrated in Fig. 2. The said trough is mounted on one arm of a bell-crank lever 24 which is pivoted at its apex at 25 to the disc 15 which it also traverses; at the end of the other arm of the bell-crank lever is mounted a roller 26 coacting with a cam 27 of suitable shape secured to a gear wheel 28 which revolves loosely on the conduit 13.

The said gear wheel 28 meshes with and is driven by a pinion 29 mounted on the shaft 21. The gear ratios of the gears 19—20 and 28—29 are given different values. The roller 26 is not mounted directly upon the arm of the lever 24 but is secured thereto by means of a plate 31 slotted at 32 for the insertion of a bolt 33, whereby the plate 31 can be set at different heights so as to adjust the position of the said roller.

Fig. 3 shows the preferred form for the cam 27, but I may employ the form shown in Fig. 4 to advantage in certain cases. The outline of the cam 34 is obtained by means of concentric arcs of the same value decreasing radius.

The operation of the device is as follows:—

The shaft 10 being in constant rotation by means of the pulley 11, the material is placed in the hopper 6, from which it falls into the tube 8. The conveyor 9 delivers it to the conduit 13 which supplies it to the trough 23, it being delivered thence to any suitable point of the furnace.

The said trough is given two simultaneous movements. It is firstly actuated according to the circular motion of the conduit 13 and the disc 15, due to the gearing 19—20; secondly, it is rocked or tilted about the pivot 25 of its carrier lever 24 by means of the cam 27 coacting with the roller 26 on the end of the lever 24; the said cam rotates at a different speed from that of the said conduit and hence from that of the lever 24.

It will result that the lower end of the trough will virtually describe a circular path before it returns to the starting point, so

that I obtain a uniform distribution of the material at all points throughout such movement.

When the said cam has the outline shown in Fig. 3, the end of the trough 23 will describe a succession of spirals, but with the profile of the cam as shown at 34 in Fig. 4, and if the difference in the angular speeds of the cam and the conduit 13 is small, the end of the trough will describe concentric circles with progressively varying radii.

If by reason of irregular combustion it becomes necessary to fill up a hole which is formed in the loading surface, it is simply required to stop the motion of the conduit 13 and of the cam 27 when the trough 23 coincides with this point; the device can be readily stopped for this purpose by uncoupling the clutch 30 while allowing the conveyor 9 to operate.

Obviously, the invention is not limited to the form of construction herein specified, and it is susceptible of various modifications in detail, for instance the apparatus may be provided with a change-speed box by which the rate of rotation of the shaft 21 may be modified according to the amount of the load.

I claim as my invention:

A charging device, comprising a rotary support, a vertical conduit rigidly secured thereto, a bell-crank lever fulcrumed on said support, a trough fixed to one arm of said lever and extending beneath and close to the outlet of the conduit to receive the material fed therethrough, a roller attached to the other arm of the lever, fixed and loose gears on said conduit, a driving shaft for rotating both gears simultaneously, the fixed gear acting to rotate the conduit and support, and a cam secured directly to the loose gear to rotate therewith and itself directly engaging said roller for continuously rocking the trough about its pivot during its rotation with the support.

In testimony whereof I affix my signature.

JOSEPH LAMBOT.