F. WATTEBLED.

FEEDING MECHANISM FOR KILNS.

APPLICATION FILED MAY 18, 1912.

1,052,393.

Patented Feb. 4, 1913.

3 SHEETS—SHEET 1.

Fig. 1.

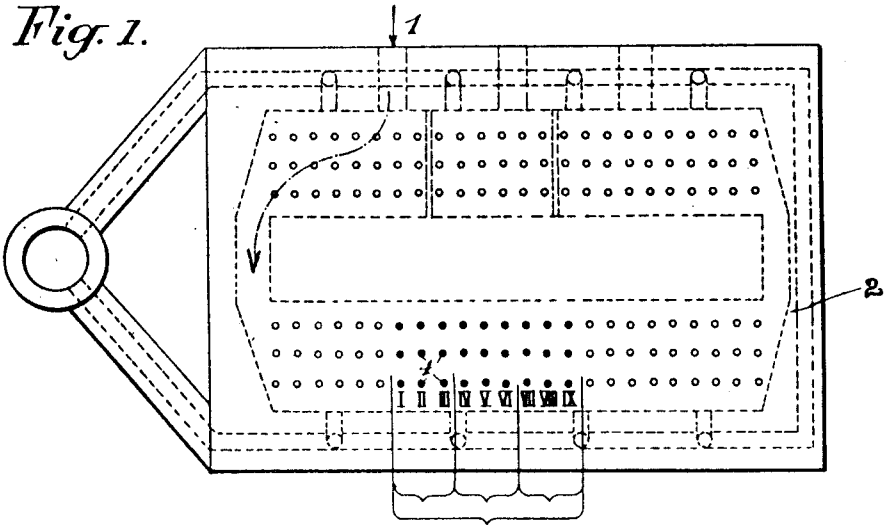
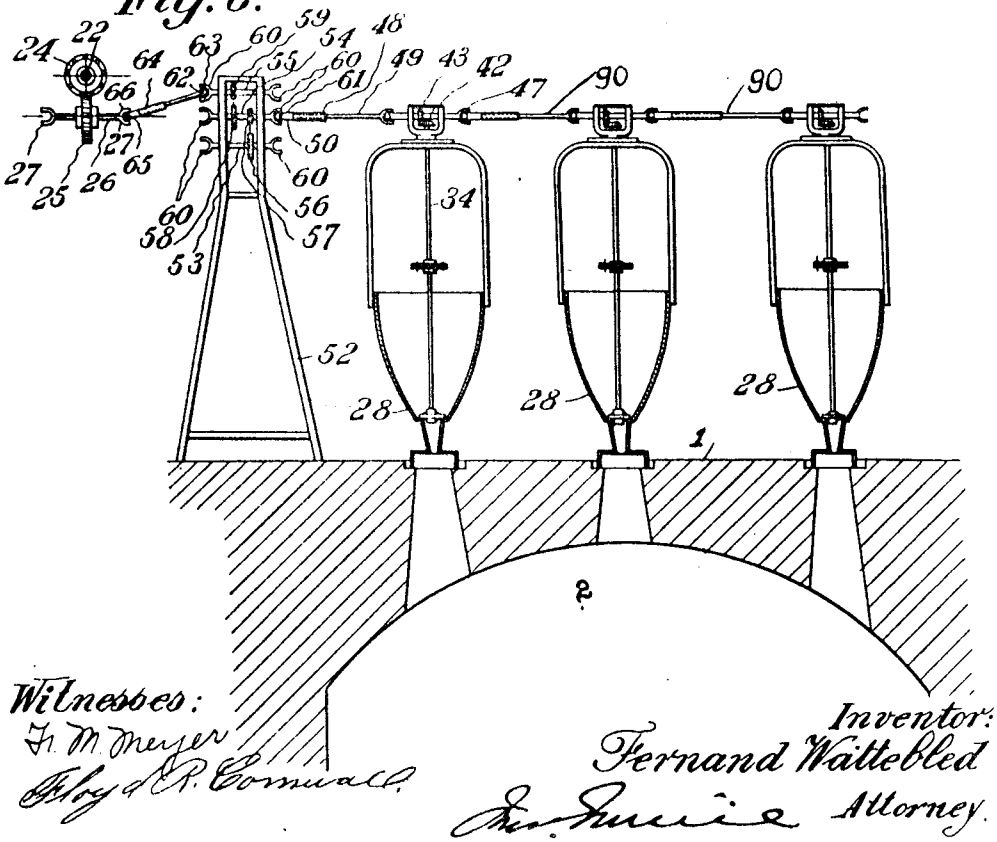


Fig. 6.



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3 SHEETS—SHEET 2.

Fig. 2.

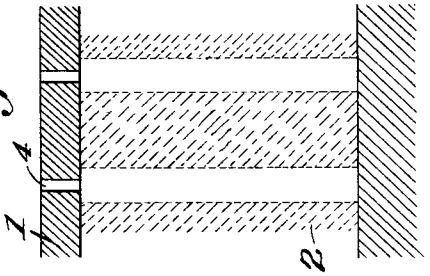


Fig. 3.

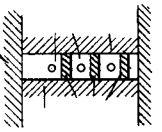


Fig. 4.

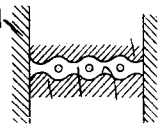


Fig. 7.

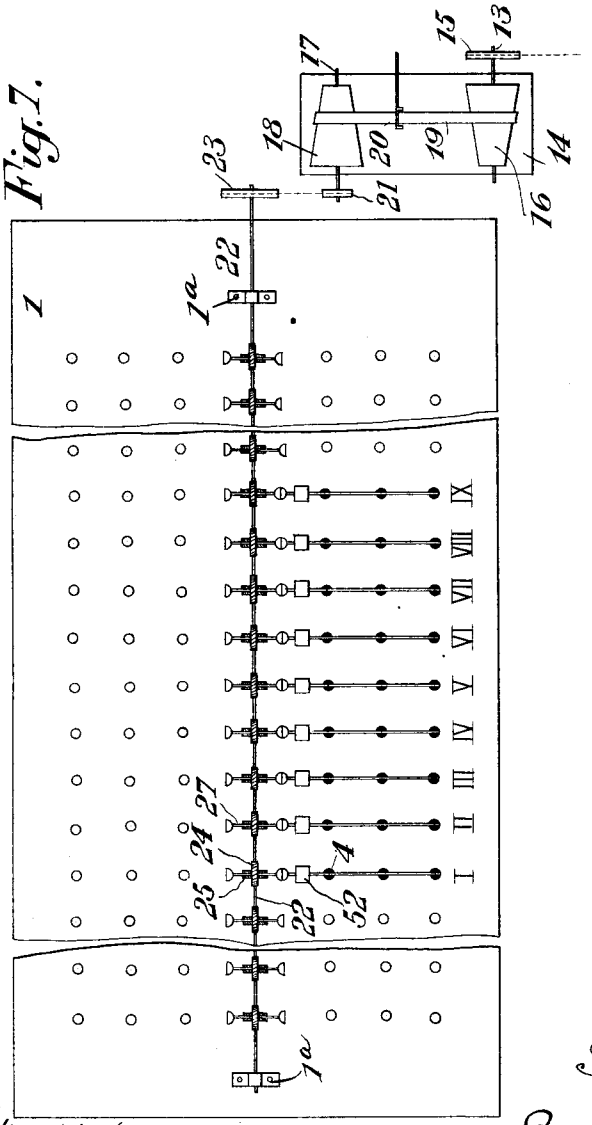
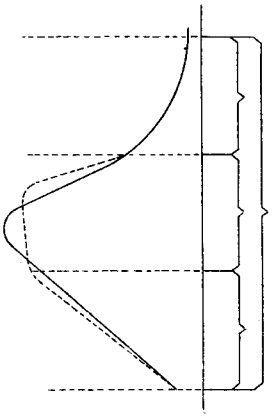


Fig. 5.



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3 SHEETS—SHEET 3.

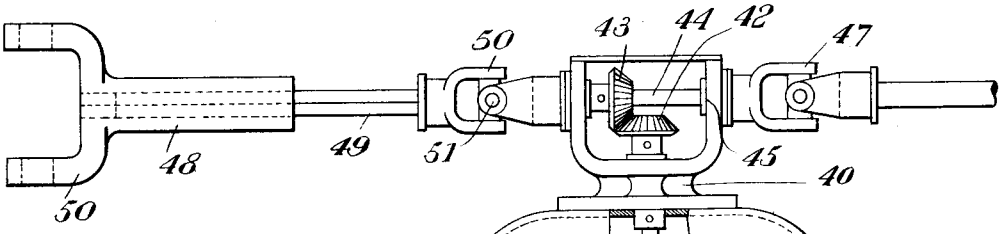


Fig. 8.

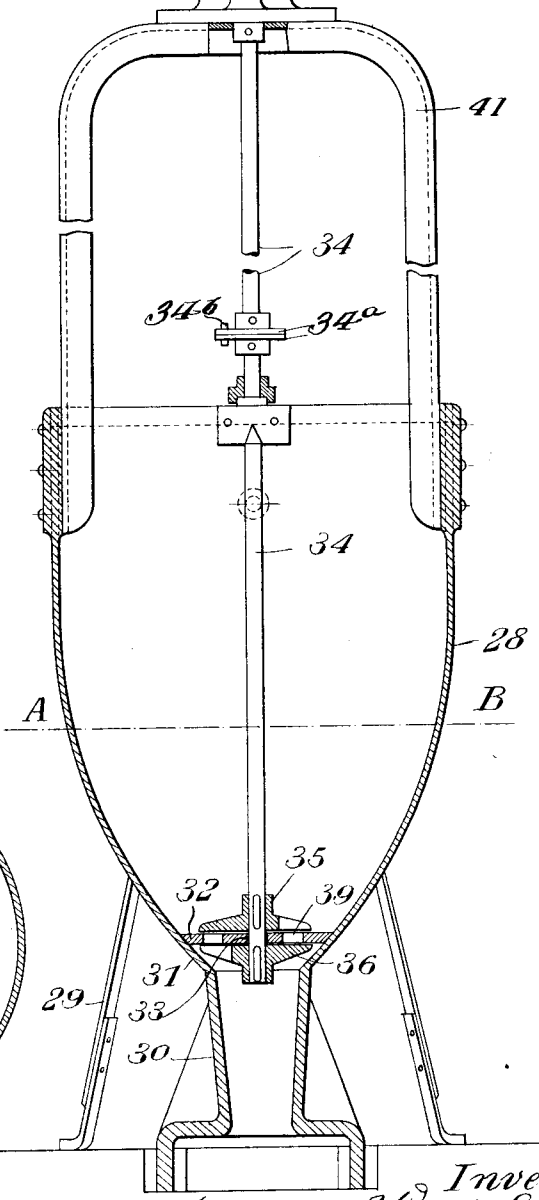
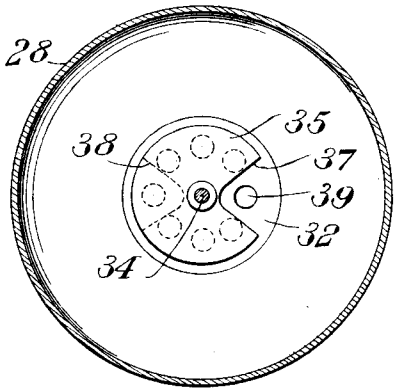


Fig. 9.



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UNITED STATES PATENT OFFICE.

FERNAND WATTEBLED, OF HERSIN-COUPIGNY, FRANCE.

FEEDING MECHANISM FOR KILNS.

1,052,393. Specification of Letters Patent. Patented Feb. 4, 1913.

Application filed May 18, 1912. Serial No. 698,211.

To all whom it may concern:

Be it known that I, FERNAND WATTEBLED, a citizen of the French Republic, and resident of Hersin-Coupigny, Pas de Calais, France, have invented certain new and useful Improvements in Feeding Mechanisms for Kilns, of which the following is a specification.

This invention relates to improvements in mechanism for feeding fuel to continuously burning kilns.

The object of the invention is to provide means for distributing fine fuel to a kiln in uniform charges.

A further object of the invention is to provide means for regulating the speed of the charging means.

The invention also relates to the details of construction and arrangement of parts which will be hereinafter described and particularly pointed out in the claims.

In the drawings:—Figure 1 is a diagrammatic plan view of a furnace, on which my improvement is designed to operate; Fig. 2 is a detail vertical section of the furnace, through the plane of the fuel inlet openings. Fig. 3 is a horizontal section taken through Fig. 2; Fig. 4 is a view similar to Fig. 3, but showing a slightly modified construction. Fig. 5 is a diagram illustrating a chart of the temperature curves. Fig. 6 is a transverse sectional view through the top of the furnace and illustrating the arrangement of the fuel mechanism in operative position; Fig. 7 is a plan view of the same. Fig. 8 is an enlarged detail section of one of the fuel feeding devices. Fig. 9 is a horizontal section of the same on the line A—B of Fig. 8.

1 indicates a furnace of the usual Hoffman type and is provided with a combustion chamber 2. The top of the furnace is formed with a plurality of groups of fuel inlet openings 4, which communicate with the combustion chamber 2. Communicating with each fuel inlet opening 4, is a hopper 28, which will be hereinafter referred to.

Extending longitudinally over the furnace 1 and mounted in suitable bearings 1^a is a shaft 22 provided with a series of worm gears 24. Meshing with each of the worm gears 24, is a worm gear 25 supported on a short transverse shaft 26, arranged in alinement with a group of fuel inlet openings 4. Each end of the shaft 26, is provided with a member of a universal joint, as indicated at 27.

In alinement with each shaft 26, is a frame 52, in the upper end of which are preferably three short transverse shafts 53, 54 and 55. On the shaft 53, is a sprocket wheel 56, connected by a sprocket chain with a smaller sprocket wheel 57, on the shaft 54. On shaft 54 is a sprocket wheel 58, which is larger than the sprocket wheel 57 and is connected by a chain with a smaller sprocket wheel on the shaft 55.

The ends of the shafts 53, 54 and 55 are each provided with members 60, of universal joints as clearly shown in the drawings. Power is communicated from the transverse shaft 26, to either of the shafts 53, 54 or 55, by means of a telescopic shaft 64, the latter comprising a male member 62, provided with a member of a universal joint 63, and a female member 65, which receives the male member, and is provided with a member of a universal joint 66. The telescopic members and the universal joints 27—66—60 and 63, will permit of the necessary adjustment and transmission of power from shaft 26 to a shaft 54.

Each of the fuel hoppers 28, taper at the bottom as at 31, and below same is a spout 30, which registers with one of the fuel inlets 4.

A stationary partition 32, is seated in the tapered bottom 31, of the hopper and in this partition are openings 39 and a central bearing 33. A shaft 34, is mounted in the bearing 33 and fastened to said shaft and bearing snugly against the underside of the partition 32, is a valve disk 36, formed with a cut away portion 38. Also secured to the shaft 34, is a valve disk 35, which bears on the upper surface of the partition 32, and is formed with a cut away portion 37. The cut away portions 37 and 38 are disposed diametrical to each other and are positioned so as to uncover the openings 39.

The shaft 34 is made in sections, each section having a disk 34^a which abut and are connected by a pin 34^b. The upper shaft section is supported in a head 40, on a frame 41, secured to the hopper 28. The upper end of the shaft has a beveled pinion 42, which meshes with a similar pinion 43, on a shaft 44, mounted in bearings 45, in the head 40. One end of the shaft 44, is provided with a member 51, of a universal

joint while the opposite end of said shaft has a similar member 47.

The shaft 44, is coupled to any one of the shafts 53, 54 or 55, by a telescopic connection, comprising male and female members 49 and 48, respectively. The male member 49 is provided with a member 50, of a universal joint, and is designed to couple with the universal member 51 on the shaft 44 while the female member 48 is provided with a member 50 of a universal joint which may be coupled with any of the members 60 on the shafts 53, 54, or 55.

As has been previously stated, the fuel openings 4, are arranged in groups or rows, consequently the power to operate the feeding devices is transmitted to the first of such adjacent the frame 52. To transmit the power to the other feeders in the series, telescopic connections 90, are coupled between the shafts 44. By providing these connections, any irregularity in the positioning of the parts, or if they should be slightly out of alinement, a uniform motion will be imparted.

Supported on a base 14 at one end of the furnace are two oppositely disposed conical drums 16 and 18, mounted on shafts 13 and 17. Around these drums pass a belt 19, which may be shifted by a belt shifting device 20, to change the speed of the shaft 17. On the shaft 13, is a sprocket wheel 15, around which passes a sprocket chain for transmitting power to the mechanism. On the shaft 17, is a sprocket wheel 21 around which and a sprocket wheel 23, passes a sprocket chain, whereby to transmit motion to the shaft 22.

In operation powdered fuel is placed in the hoppers 28, and the power is transmitted to the shaft 22. Power from this shaft is transmitted to the shafts 44, and through the gears the shafts 34 are rotated. The powdered fuel falls through the various cut out portions 37, and into the exposed openings 39, in the partitions 32. As the cut out portions 38 on the lower valve disk 36, are diametrical to the cut out portions 37, in the upper disks the fuel will be supported in the openings registering with said cut out portions 37. As the disks 35 and 36 are rotated, the fuel in the openings 39, will be successively dropped through the cut out portions 38, in measured and uniform charges. And by reason of the arrangement of the cut out portions and the openings in the partitions, the products of combustion cannot escape through the fuel inlet openings 4, during the period fuel is fed to the furnace.

It is important in feeding a furnace of the type for which this invention is designed that the mechanism be so that certain of the groups of arranged fuel inlet openings be supplied with a greater or a less charge of fuel than others. It is due to this condition that the intermediate shafts 53, 54 and 55 are geared as described. For instance, if because of the position of a group of openings 4, be at a certain place in the furnace, a different charge of fuel is necessary than would be required in another group of openings, the telescopic shaft 64, would be coupled to either of the intermediate shafts 53, 54 or 55, desired. Hence, while the shaft 22, may be constantly rotated at a given speed, the various groups of hoppers geared thereto, may be depositing charges at different intervals. It is to be understood however, that by moving the belt shifter 20, the speed of the shaft 22, may be either increased or decreased.

If a lump of fuel or if for any other reason the valve in any of the hoppers should become choked, the pin 34^b, would break, consequently this particular valve would be thrown out of operation without in any way affecting the operation of any of the valves in the remainder of the group.

Having thus described my invention, what I claim is:

1. In combination, a furnace formed with a plurality of groups of fuel inlet openings, a hopper communicating with each opening, a partition in each hopper, said partition having openings, a shaft mounted in each hopper, a valve on the shaft having a cut out portion and bearing on the underside of the partition, a second valve on the shaft having a cut out portion and fitting on top of the partition, the cut out portions in the valves being out of alinement with each other, a transverse shaft extending across each group of hoppers, gears on the shaft, gears on the shaft in the hopper, said gears meshing with the gears on the transverse shaft, intermediate transverse shafts, means between the intermediate transverse shafts and the aforesaid transverse shaft to cause each to rotate at a different speed, a power shaft, and a detachable coupling shaft between the power shaft and the intermediate and transverse shafts.

2. In combination, a furnace formed with a series of fuel inlet openings, a hopper communicating with each opening, a partition in each hopper, said partition having a series of openings, a shaft in each hopper, a disk on the shaft having a cut away portion and fitting against the underside of the partition, a second disk on the shaft having a cut away portion and fitting against the top side of the partition, a transverse shaft above each hopper, gearing between each transverse shaft and the shaft in each hopper, frames located in line with the hoppers, a series of intermediate shafts mounted in each frame, each intermediate shaft at its opposite end members of a universal con-

nection, sprockets of different sizes on the intermediate shafts, chains connecting the sprockets on one intermediate transverse shaft with the sprockets on an adjacent intermediate transverse shaft, a detachable adjustable shaft section between the transverse shaft over the hopper and one of the universal members of one of the intermediate transverse shafts, a power shaft, a stub shaft adjacent each frame gearing between the latter shaft and the power shaft, a coupling shaft between each stub shaft and one of the intermediate transverse shafts adjacent thereto, the coupling shaft having a universal coupling member coöperating with the similar member on any one of the intermediate transverse shafts, and a universal connection between the stub shaft and the coupling shaft.

3. In combination, a furnace formed with a fuel inlet opening, a hopper communicating with each opening, a partition in the hopper, said partition having a series of openings, a shaft mounted in the hopper, a disk secured on the shaft and having a cut out portion to expose one of the openings in the partition, said disk bearing on one side of the partition, a second disk secured on the shaft and having a cut away portion disposed out of vertical alinement with the cut away portion in the first mentioned disk, the second mentioned disk bearing on the face of the partition opposite to that the first mentioned disk contacts with, and means for rotating the shaft.

4. In combination a furnace formed with a plurality of groups of fuel inlet openings, a hopper communicating with each opening, a valve including two elements in each hopper, one element admitting a measured charge of fuel and the other elements releasing the charge of fuel when the first mentioned element covers the charge, a power shaft, operating means between the power shaft and the valves in each group of hoppers including an interchangeable device for altering the period of charging of fuel by the valves in any particular group.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

FERNAND WATTEBLED.

Witnesses:
A. GELZELSKY,
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