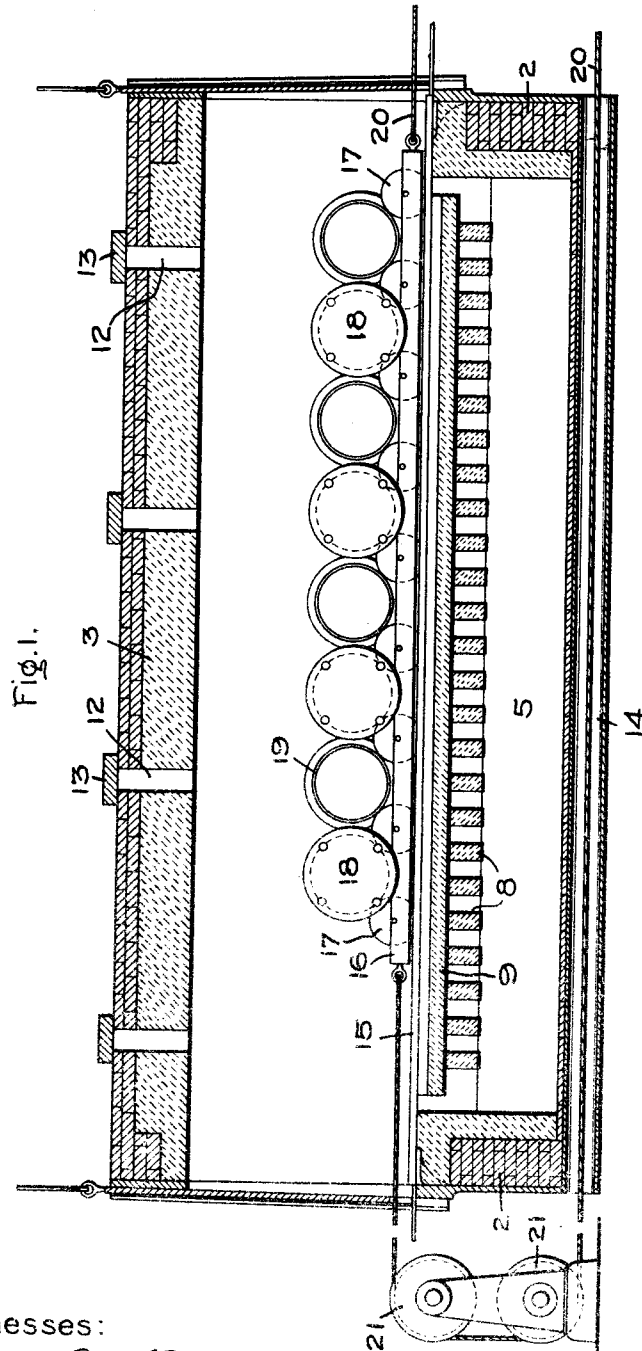


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 SHERARDIZING FURNACE.
 APPLICATION FILED JUNE 2, 1910.

1,034,930.

Patented Aug. 6, 1912.

3 SHEETS—SHEET 1.



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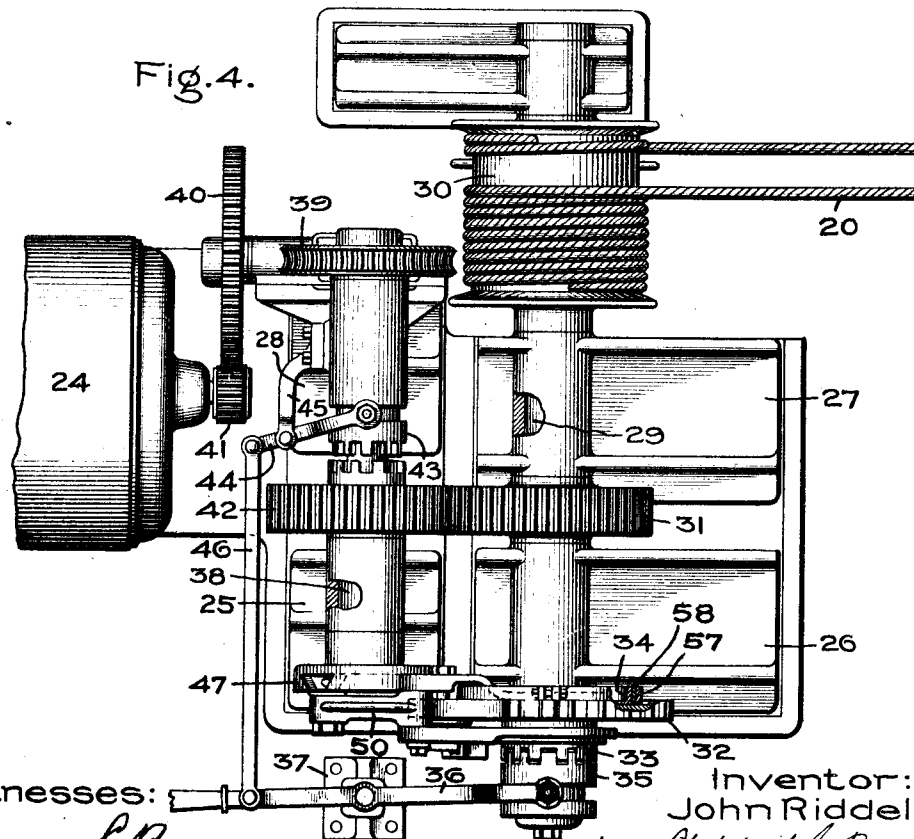
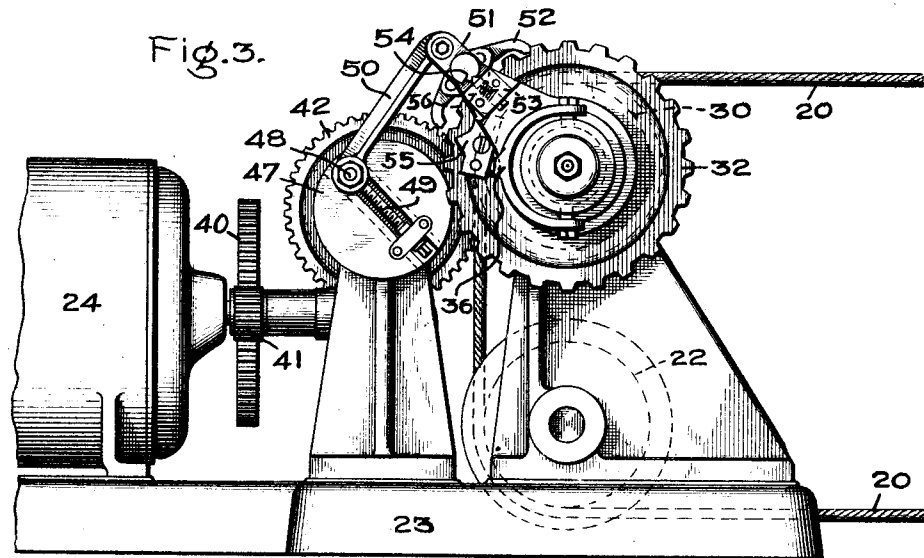
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UNITED STATES PATENT OFFICE.

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SHERARDIZING-FURNACE.

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Specification of Letters Patent.

Patented Aug. 6, 1912.

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To all whom it may concern.

Be it known that I, JOHN RIDDELL, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Sherardizing-Furnaces, of which the following is a specification.

The present invention relates to the art of metal working, and more especially to apparatus for carrying out the method known as sherardizing and consisting of heating metal parts in the presence of zinc dust to form upon the metal parts a non-oxidizable surface or coating of alloyed zinc.

In applying the sherardizing process, it is necessary throughout the heat to continually stir the zinc dust to insure contact with all surfaces of the metal part treated, since by this process the zinc does not actually fuse or flux; the process being known as a dry one in contradistinction to the ordinary wet processes such as galvanizing. The period of treatment under heat extends from four to ten hours, and as a consequence it is necessary, when the sherardizing process is employed on a large scale, to provide automatic means for producing the stirring effect.

The object of my invention is to provide means for effectively and economically accomplishing the stirring operation in a sherardizing furnace which shall consist of simple and substantial parts not readily warped or otherwise injured by the high heat of the furnace.

One form of my invention is shown in the accompanying drawings forming a part of this specification, in which—

Figure 1 is a longitudinal vertical section of a sherardizing furnace with my invention applied thereto; Fig. 2 is a transverse section of the furnace; Fig. 3 is a side elevation of the actuating means; and Fig. 4 is a plan of the same.

The furnace consists of plain side walls 1, end walls 2 with openings the full size of the interior dimensions of the furnace, vaulted top 3 and a base 4 having a longitudinal central passage 5 with one or more side openings 6 leading thereto through one of the outer walls for the reception of a burner or burners 7. On the base of the furnace is set a series of spaced fireproof tile 8 on which is placed a fireproof floor

9 extending nearly the entire length and width of the furnace with passages all around for the gases of combustion, and rising from the upper longitudinal edges of the floor 9 are side barriers or baffle plates 10 which extend somewhat more than half way to the vaulted roof and operate to deflect the flame from direct contact with the charge containers. The sides of the furnace are provided with explosion doors 11 and the roof with flues 12 for the escape of the spent gases and having suitable closures 13. Extending longitudinally through the base of the furnace is a conduit 14 for a purpose hereinafter referred to.

On the floor of the furnace and extending entirely therethrough are two channel iron tracks 15 on which is adapted to travel a heavy iron carriage 16 having pairs of massive rollers 17 which engage the respective tracks. On these rollers are placed charge containers in the form of drums 18. The drums have each a pair of bands 19 near its removable end so arranged as to permit a pair of rollers to engage the periphery of the drum, and at the same time prevent the latter from working endwise on the carriage while the latter is moved back and forth during the firing operation. As the detachable ends are of larger diameter than the rest of the drum, they are disposed on the carriage in alternate positions, as shown in Fig. 1, to conserve space. By reason of the frictional contact between the rollers and drums, all of the drums will be caused to roll upon their axes whenever the carriage is moved longitudinally, thereby accomplishing the stirring effect of the zinc dust and metal parts contained in the drums.

The means for moving the carriage back and forth upon its track consists of a chain or wire cable 20 connected to the opposite ends of the carriage and passing out through the end openings of the furnace. The cable end passing out of the rear or left-hand end, as shown in Fig. 1, is carried over sheaves 21 and returned to the forward end through the conduit 14 to a sheave 22 carried by the housings of the actuating mechanism.

The actuating mechanism consists of a base plate 23 on which a suitable power motor 24 and housings 25, 26, 27 and 28 are mounted. The housings 26 and 27 carry at their upper ends a horizontal shaft 29 hav-

ing at one end a winch 30 about which the ends of the cable 20 are adapted to be wound and unwound in whichever direction it is rotated. At the center of the shaft a spur gear 31 is keyed fast, and at the front end of the shaft is a loose ratchet wheel 32 having a clutch member 33 formed on one side thereof and a friction flange 34 on the other side, and adjacent the wheel 32 is a clutch collar 35 keyed to the shaft and capable of longitudinal movement thereon. The clutch member 35 is movable into and out of engagement by a hand lever 36 pivoted on a support 37.

The housings 25 and 28 carry a countershaft 38 having at its rear end a worm gear 39 driven by a worm actuated by a train of gears 40, 41 from the power motor. In the middle of the countershaft is a loose spur gear 42 having a clutch member formed on the rear side thereof and adapted to be engaged by a movable clutch member 43 keyed to the shaft and actuated by a lever 44 pivoted on a bracket 45 and controlled from the hand lever 36 by a link 46. On the front end of the countershaft is fixed a crank plate 47 having a crank pin 48 mounted in a dovetail groove therein and radially adjustable by a screw 49. A link 50 connects the crank pin 48 with the double ratchet arm 51, one member of the ratchet arm being fulcrumed upon the shaft 29 inside of the ratchet wheel 32 and the other member on the periphery of the ratchet member 33 thereof. The ratchet arm carries a double-ended pawl 52 adapted to be yieldingly held with either end in engagement with the ratchet wheel by a spring latch 53 engaging spaced notches 54. The ratchet wheel 32 carries a trip finger 55 adapted to engage a projection 56 on the double-ended pawl and throw it to one position or the other upon completion of a single revolution of the wheel 32, so that the motion of the latter will be automatically reversed.

On account of the recoil of the cable, it is necessary to provide the ratchet wheel 32 with friction means to prevent back action thereof, and in the construction shown a brake band 57 having a friction surface 58 is arranged about the friction flange 34 of the ratchet wheel.

The carriage 16 is loaded with the drums 18 while it is entirely outside of the furnace, and, in order to move it and its charge expeditiously into the furnace, the hand lever 36 is thrown inwardly, as shown in Fig. 4, throwing the clutch member 43 into engagement with the wheel 42 so that the power motor is directly applied to the winch shaft 29, and upon the carriage reaching the desired position in the furnace the clutch lever 36 is thrown outwardly, disengaging the gear 42 and coupling the ratchet wheel 32 direct to the shaft 29, whereupon the car-

riage is actuated in one direction by a series of sharp pulls imparted thereto by the crank and ratchet mechanism until the trip finger 55 engages the projection 56 on the pawl 52 and throwing it so that the opposite end comes into engagement with the ratchet wheel, whereupon the carriage is moved in the opposite direction by a like series of intermittent pulls. After the charge has been subjected to the heat of the furnace for the required period of time, the power motor is reversed, the clutch lever 36 again thrown inwardly, the winch shaft direct connected and the carriage withdrawn from the furnace.

I do not desire to restrict myself to the particular form or arrangement of parts herein shown and described, since it is apparent that they may be changed and modified without departing from my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination with a furnace, of a carriage, circular charge containers mounted on said carriage, and means for reciprocating said carriage and revolving said containers.

2. The combination with a furnace, of a carriage having wheels movable upon the floor of said furnace, circular charge containers disposed transversely upon said wheels, and means for reciprocating said carriage.

3. The combination with a furnace, of a carriage having wheels movable upon the floor of said furnace, cylindrical charge containers having peripheral guide bands and disposed transversely upon said wheels, and means for reciprocating said carriage.

4. The combination with a furnace, of tracks extending longitudinally thereof, a carriage having wheels in engagement with said tracks, circular charge containers disposed transversely upon said wheels, and means for reciprocating said carriage.

5. The combination with a furnace, of a carriage having wheels movable upon the floor of said furnace, circular charge containers disposed transversely upon said wheels, and means to move said carriage back and forth by a succession of intermittent impulses.

6. The combination with a furnace, of a carriage movable therein, a cable connected at both ends to said carriage, a winch for simultaneously winding and unwinding said cable, and ratchet means for intermittently actuating said winch.

7. The combination with a furnace, of a carriage movable therein, a cable connected at both ends of said carriage, a winch and shaft for simultaneously winding and unwinding said cable, a gear fixed to said shaft, a ratchet wheel coupled to said shaft, a countershaft having a crank fixed thereon,

5 a gear coupled to said crank shaft and engaging the gear on the winch shaft, a ratchet arm actuated by said crank and provided with a double-acting pawl adapted to actuate said ratchet wheel, and trip means carried by said ratchet wheel for periodically reversing the action of said pawl.

In witness whereof, I have hereunto set my hand this first day of June, 1910.

JOHN RIDDELL.

Witnesses:

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HELEN ORFORD.