Nov. 11, 1924. 1,515,178

J. M. SELLERS

CHARGING APPARATUS

Filed April 24, 1922 2 Sheets-Sheet 1

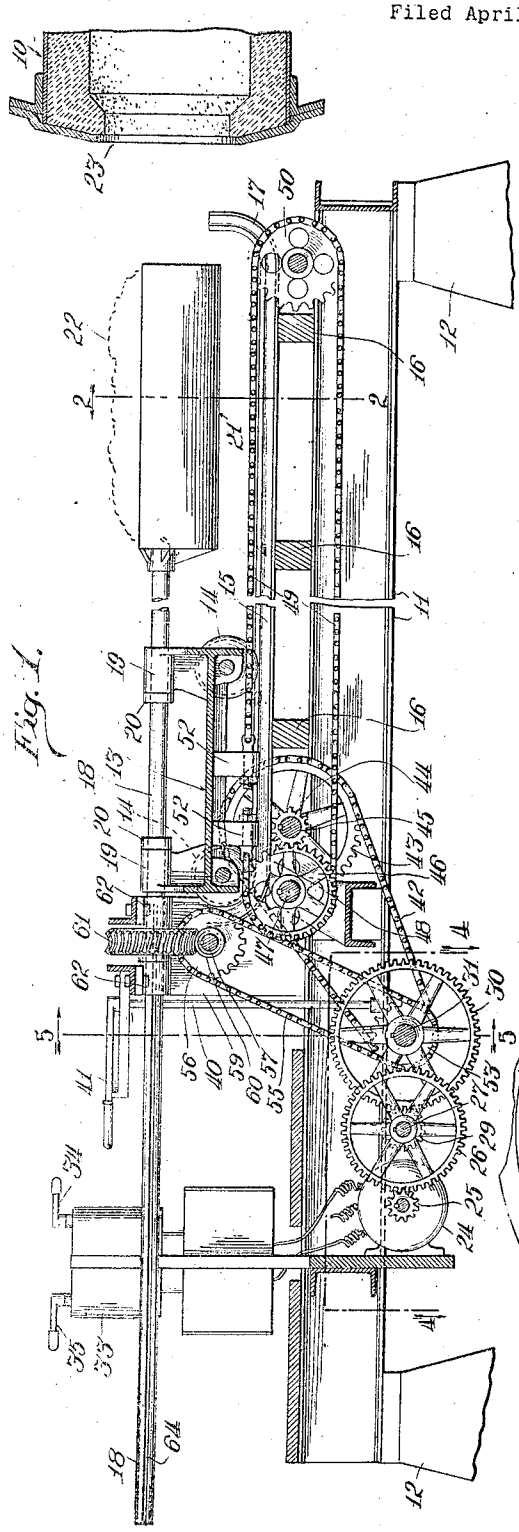


Fig. 1.

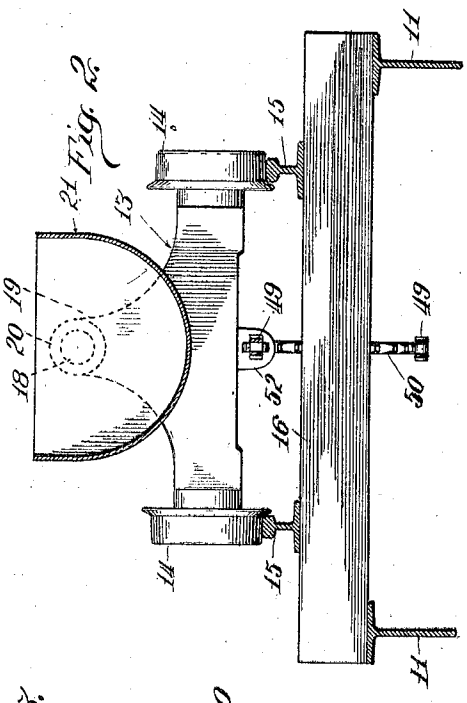


Fig. 2.

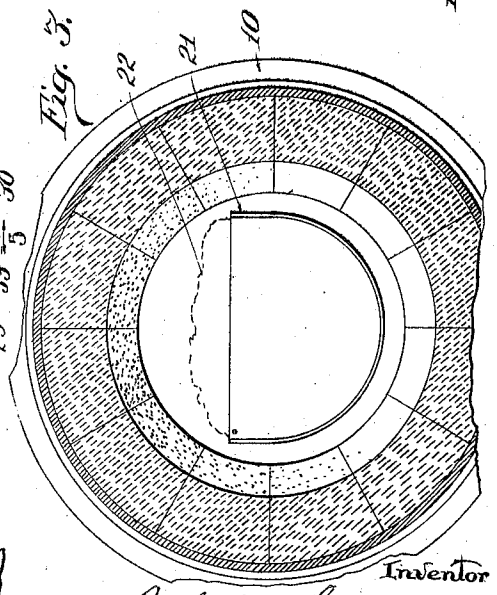


Fig. 3.

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Fig. 5.

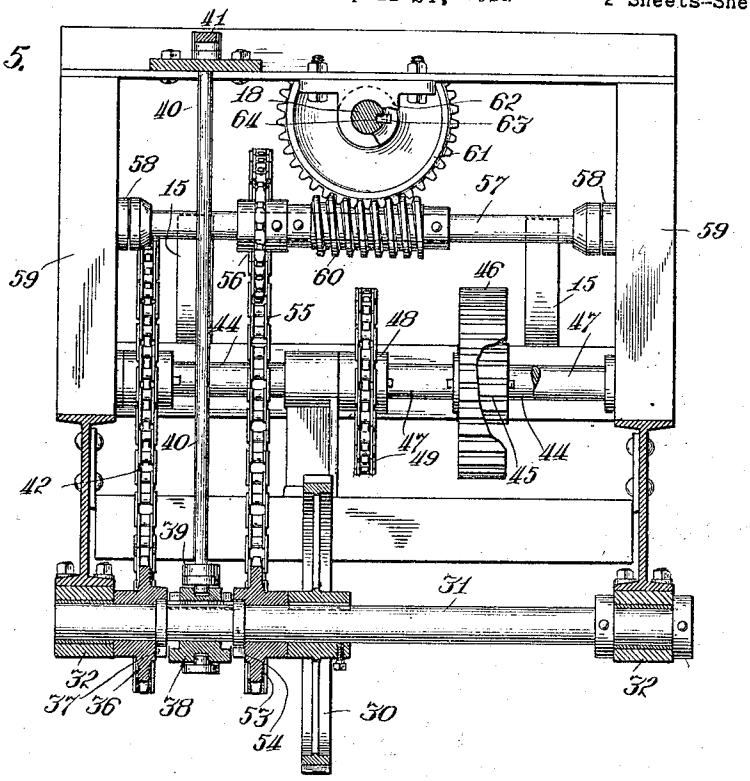
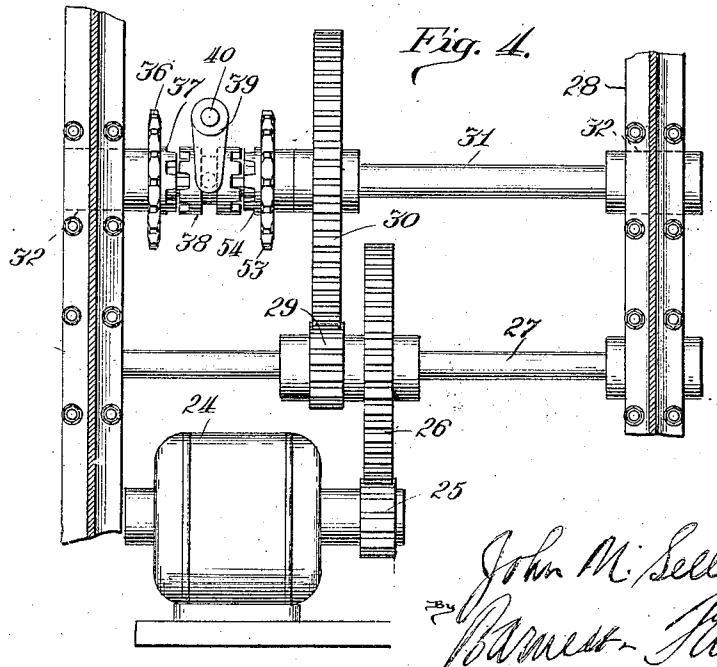


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN M. SELLERS, OF DOWNERS GROVE, ILLINOIS, ASSIGNOR TO SELLERS MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CHARGING APPARATUS.

Application filed April 24, 1922. Serial No. 556,288.

To all whom it may concern:

Be it known that I, JOHN M. SELLERS, a citizen of the United States, residing at Downers Grove, in the county of Du Page and State of Illinois, have invented certain new and useful Improvements in Charging Apparatus, of which the following is a specification.

My invention relates to charging apparatus, and more particularly to apparatus for charging material into a furnace or other receptacle through a relatively small orifice arranged in a substantially vertical plane.

A specific object of the invention is to provide suitable apparatus for introducing batches of scrap metal into the end of a cylindrical balling furnace of the type shown in the patent to D. H. Lentz, No. 1,012,872, dated December 26, 1911, for apparatus for balling scrap metal, the invention seeking to supply an apparatus by means of which this operation may be performed expeditiously and with the greatest possible saving in labor.

The invention consists in the new and improved constructions, arrangements and devices to be hereinafter described and claimed for carrying out the above stated object and such other incidental objects as will be adverted to in the following description of the preferred embodiment of the invention shown in the accompanying drawings.

In the drawings,

Fig. 1 is a longitudinal sectional view of the apparatus showing also the end of the balling furnace.

Fig. 2 is a sectional view, on a larger scale, on line 2—2 of Fig. 1.

Fig. 3 is a sectional view through the end of the balling furnace showing the charging receptacle in position in the furnace ready for dumping the charge.

Fig. 4 is a sectional plan on line 4—4 of Fig. 1, and

Fig. 5 is a vertical sectional view on line 5—5 of Fig. 1.

Referring to the drawings, 10 designates the balling furnace which is shown as rotated away from its inlet and discharge flues into alignment with the charging apparatus which forms the subject matter of the present invention.

The charging apparatus is shown as supported upon the I-beams 11 carried on piers 12. 13 is a carriage having wheels 14 which support the carriage on rails 15 laid upon cross ties 16 on the I-beams 11. The ends of the rails adjacent the balling furnace are preferably bent up, as indicated at 17, to provide emergency stops for the carriage wheels. 18 is a shaft rotatably mounted on bearings 19 on the carriage, the shaft being held against endwise movement, with respect to the carriage, by collars 20. Secured to the forward end of shaft 18 is a charging receptacle 21, the shaft and charging receptacle being arranged at such level that when the receptacle is filled with its charge (indicated at 22) the receptacle can enter the charging orifice 23 of the furnace.

The charging apparatus is designed so that the carriage is moved forward on its track to thrust the receptacle 21 into the furnace, whereupon the forward movement of the carriage is stopped and shaft 18 rotated so as to invert the charging receptacle and dump the material therein into the furnace. After this the carriage is moved back to its initial position, shaft 18 turned so as to bring the receptacle right side up, and the receptacle filled with another charge. The driving arrangements provided contemplate a control of the apparatus whereby shaft 18 cannot be rotated while the carriage is in motion or the movement of the carriage initiated while shaft 18 is in rotation. In other words, these movements can be effected in sequence and not simultaneously. Preferably the driving trains for the movements of the carriage and the rotary movements of the shaft 18 are actuated by means of a single motor, this motor being preferably an electric motor of the reversing type indicated at 24 in the drawings. To the armature shaft of motor 24 is fixed a spur gear 25 of small diameter which meshes with a gear 26 of large diameter rotatable on a shaft fixed to the side frame members 28 of the apparatus. Rigidly connected with the gear 26 and rotating on shaft 27 is a small gear 29 meshing with a large gear 30 fixed to a shaft 31 which rotates in bearings 32 on the frame members 28. Shaft 31 is driven whenever the motor is in operation and associated with the shaft is a clutch whereby either one of the driving trains for propel-

ling the carriage or for rotating shaft 18 may be operatively connected with driven shaft 31. 33 is a controller for motor 24 having two control levers 34, 35 for operating the motor in the forward and reverse directions, respectively.

The mechanism for propelling the carriage 13 is as follows: 36 is a sprocket wheel loose on shaft 31 having rigid therewith a clutch member 37 adapted to be engaged by the shifting clutch member 38 which is splined to shaft 31 and is shifted by the usual fork 39 on the end of a shift rod 40 provided with an operating lever 41. 42 is a chain extending around sprocket 36 and around a large sprocket wheel 43 and shaft 44 journaled in fixed bearings on the I-beams 11. Shaft 44 has keyed thereto a pinion 45 adapted to mesh with a pinion 46 of larger diameter on a shaft 47. This shaft has fixed thereto a sprocket wheel 48 over which extends a chain 49 which also passes around a sprocket wheel 50 on a shaft 51 located near the forward end of track 15, the ends of chain 49 being anchored to carriage 13 at 52, 52.

The mechanism for rotating shaft 18 carrying the charging receptacle 21 is as follows: 53 is a sprocket wheel loose on shaft 31 and provided with a clutch member 54 adapted to be engaged by the shifting clutch member 38, above referred to. Sprocket 53 drives a chain 55 which extends around a sprocket wheel 56 on a shaft 57 rotating in bearings 58 on the frame structure 59. Shaft 57 is provided with a worm 60 which meshes with a worm gear 61 on the shaft 18, the gear 61 being arranged between bearings 62, 62 for the shaft, which latter can slide lengthwise through the worm gear but is non-rotatably engaged therewith by means of a feather 63 on the gear wheel cooperating with a long slot or key-way 64 formed in the shaft.

Operation: Motor 24 is set in operation in the forward direction (having reference to the movement of the carriage toward the furnace) with shifting clutch member 38 in engagement with a clutch member 37. Sprocket wheel 48 is driven in the direction to move carriage 13 at the right (Fig. 1) to thrust receptacle 21, which has been previously loaded, into the charging orifice 23 of furnace 10. The operator then shifts clutch member 38 out of engagement with clutch member 37 and into engagement with clutch member 54 and gear 61 to which shaft 18 is splined, is rotated so as to turn shaft 18 in its bearings, thereby inverting the receptacle 21 which dumps its charge. Clutch member 38 is then shifted to neutral position between clutch members 54 and 37 and the motor is reversed. Clutch member 38 is then engaged with clutch member 37 and the carriage moved backwardly on its track to withdraw the receptacle 21 from the furnace. At the end of the rearward travel of the carriage clutch member 38 is shifted into engagement with the clutch member 54 to turn the receptacle 21 right side up, after which the clutch is moved to neutral and the receptacle filled with another charge.

I have shown the invention as embodied in a preferred construction, but it is realized that changes might be made in the apparatus without departure from the general principles of operation which I have in contemplation. I wish it to be understood, therefore, that the invention embraces all modifications within the scope of the appended claims.

I claim:

1. In apparatus for charging materials into a furnace, the combination of a charging receptacle, means for moving the same into and out of the furnace orifice, means for rotating the receptacle in the furnace to dump its charge, and controlling mechanism associated with said means for moving the said receptacle into and out of the furnce orifice and with said mechanism for imparting rotary movement to said receptacle whereby said translatory and rotary movements of the receptacle are each of them interrupted before the other of said movements is initiated.

2. In apparatus for charging materials into a furnace, the combination of a charging receptacle supported so as to be movable into and out of the furnace and rotatable to dump the charge, and means for effecting said movements of the receptacle comprising a single motor, a shaft driven by said motor, and a clutch member on said shaft which is shifted, through a neutral position, into positions which, in one case, effect one of said movements and, in the other, the other of said movements.

3. In apparatus for charging materials into a furnace, the combination of a carriage movable to and from the furnace, a shaft rotatable on said carriage, a receptacle for the charges supported on the end of said shaft, sprocket and link belt mechanism for imparting reciprocating movements to said carriage, mechanism for rotating said shaft, and controlling means associated with said mechanisms whereby one of said mechanisms is made inactive when the other is set in operation.

4. In apparatus for charging materials into a furnace, the combination of a carriage movable to and from the furnace, a shaft rotatable on said carriage, a receptacle for the charges supported on the end of said shaft, a gear wheel with which said shaft has a sliding, non-rotative engagement, mechanism for imparting reciprocating movements to the carriage, mechanism for driving said gear wheel, and controlling means

common to both of said mechanisms whereby said mechanisms can be made effective only one at a time.

5. In apparatus for charging materials into a furnace, the combination of a carriage movable to and from the furance, a shaft rotatable on said carriage, a receptacle for the charges supported on the end of said shaft, a motor, a shaft driven by said motor, sprockets rotatable on said driven shaft having operative connections with said receptacle supporting shaft and carriage and provided with clutch faces, and a clutch member non-rotatable but slidable on said driven shaft between the clutch faces of said sprockets.

6. In apparatus for charging materials into a furnace, the combination of a track, a carriage on said track, a shaft rotatably mounted on said carriage, a charging receptacle on the end of said shaft, a reversing motor, a shaft driven thereby, sprockets and link belt mechanism for propelling said carriage adapted to be clutched to said driven shaft, and mechanism for rotating the shaft carrying the charging receptacle which is adapted to be clutched to said driven shaft but only when the mechanism for propelling the carriage is disengaged from said driven shaft.

7. In apparatus for charging materials into a furnace, the combination of a track, a carriage on said track, a shaft rotatably mounted on said carriage, a charging receptacle on the end of said shaft, a reversing motor, a shaft driven thereby, mechanism for propelling said carriage comprising sprockets at opposite ends of said track, a link belt extending over said sprockets and attached to said carriage, a second sprocket and a chain for connecting the same with a sprocket loose on said driven shaft, a train of reducing gears between the said second sprocket and one of the sprockets at the end of said rack, and a clutch for connecting said loose sprocket to the said driven shaft, and mechanism for rotating the shaft carrying the charging receptacle which is adapted to be clutched to said driven shaft, comprising a worm wheel with which said receptacle shaft has a splined connection, a worm to drive the same, and a driving train adapted to be clutched to said driven shaft for rotating said worm.

JOHN M. SELLERS.