H. TOMLINSON.

BILLET CHARGING APPARATUS.

APPLICATION FILED JULY 8, 1920.

1,390,845.

Patented Sept. 13, 1921.

2 SHEETS—SHEET 1.

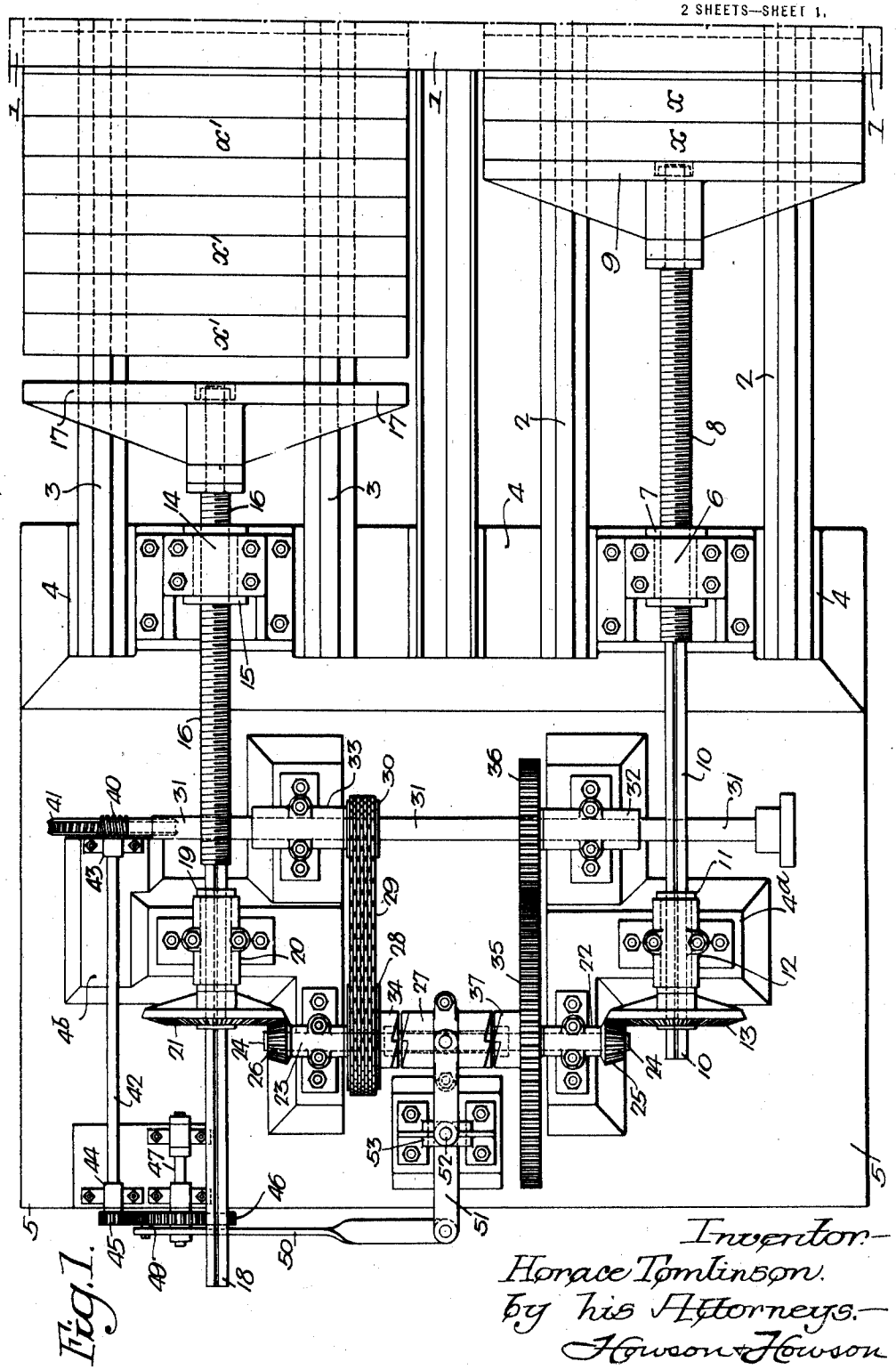


Fig. 1.

Inventor—
Horace Tomlinson.
by his Attorneys—
Howson & Howson

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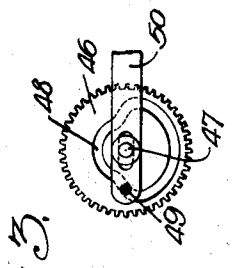


Fig. 3.

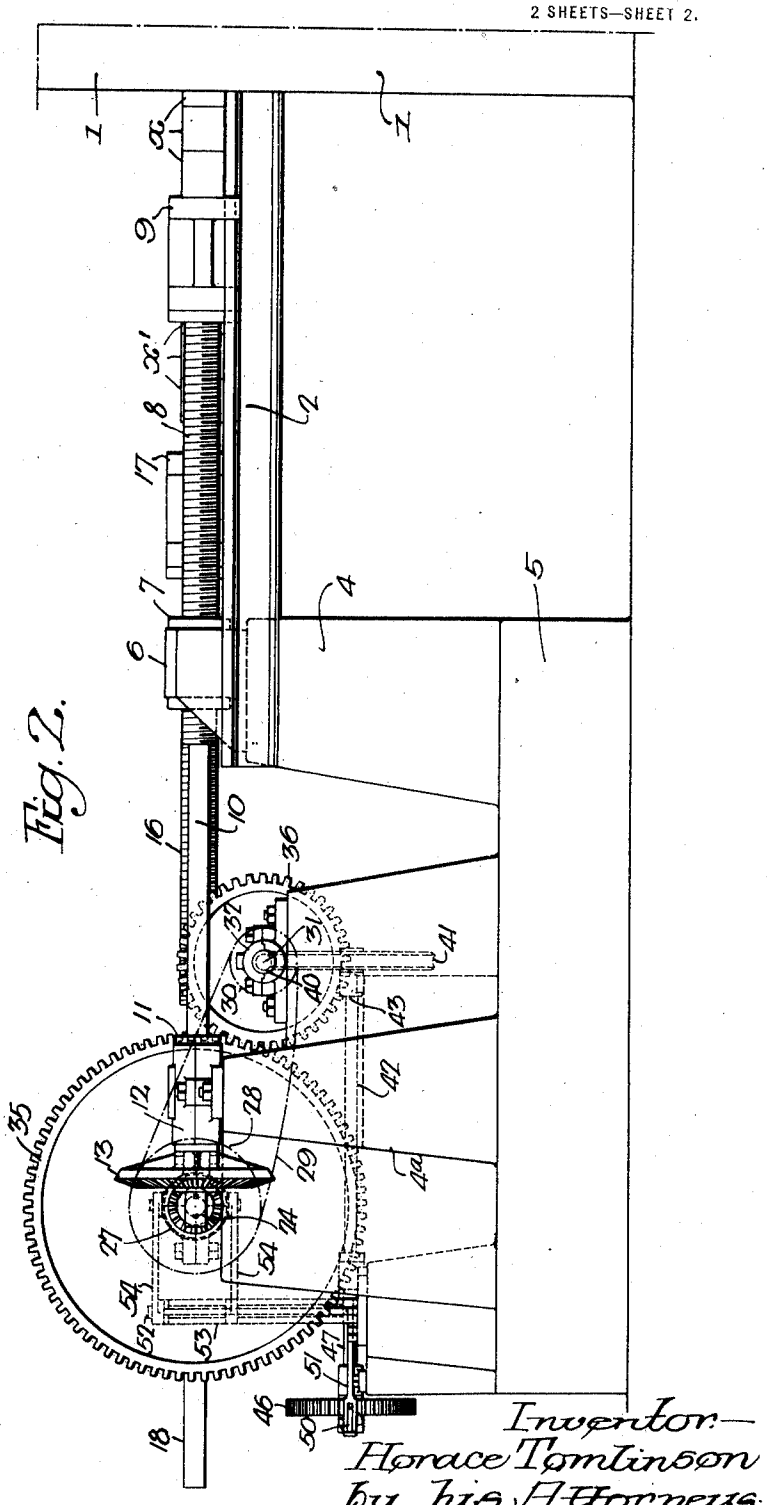


Fig. 2.

Inventor—
Horace Tomlinson
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

HORACE TOMLINSON, OF PHILADELPHIA, PENNSYLVANIA.

BILLET-CHARGING APPARATUS.

1,390,845. Specification of Letters Patent. Patented Sept. 13, 1921.

Application filed July 8, 1920. Serial No. 394,853.

To all whom it may concern:

Be it known that I, HORACE TOMLINSON, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented the Billet-Charging Apparatus, of which the following is a specification.

One object of my invention is to provide a relatively simple, substantial machine particularly designed for feeding a succession of objects such as billets into and through a furnace; the invention more especially contemplating novel means whereby power is applied alternately to two series of properly supported billets so that one series is fed into the furnace while the other temporarily remains motionless to permit of additional billets being delivered to the charging tracks in positions to permit of their being fed into the furnace.

A further object of the invention is to provide a novel combination of parts whereby a pair of pushers is alternately actuated from the same source of power; the invention especially contemplating simple, substantial and automatic mechanism for controlling the connection of the pushers to and their disconnection from a driving shaft or equivalent operating member.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figure 1 is a plan of a charging apparatus constructed in accordance with my invention;

Fig. 2 is a side elevation of the apparatus shown in Fig. 1; and

Fig 3 is a side elevation of the controlling cam forming part of the invention.

In the above drawings, 1 represents the front portion of a heating or other furnace into which billets or other objects are to be charged, and for this purpose said furnace is provided with two inlet doors or charging openings through which extend parallel pairs of tracks 2—2 and 3—3, respectively,—one end of these tracks being carried upon a suitable pedestal or supporting wall 4 mounted on a foundation 5. It is to be understood that said tracks 2—2 and 3—3 or their equivalents extend completely through the furnace and their rear ends are supported outside of the same in any suitable manner forming no part of this invention.

Between the tracks 2—2 and mounted upon the pedestal 4 is a bearing structure 6 in which is mounted a fixed nut 7. Operative through this latter is an elongated screw 8 having at its forward end a pusher 9 slidable upon and supported by the tracks 2—2 in such a manner as to engage and cause to move a series of objects such as the billets x, also carried by said tracks. The outer end of the screw 8 has formed as part of or connected to it, a shaft 10 is supported in and longitudinally slidable through a sleeve 11 rotably mounted in a bearing 12 carried by a pedestal 4^a on the base 5 and the outer end of said shaft is splined to the sleeve 11, which has fixed to its outer end a beveled gear 13.

Similarly, the wall or pedestal 4 between the tracks 3—3 supports a bearing structure 14 in which is fixed a nut 15 for an elongated screw 16. This has fixed to its end adjacent the furnace a second pusher 17 slidable on and carried by the tracks 3—3 so as to be capable of operating on the billets x^1 of a second series, after these have been deposited by suitable means upon said tracks so as to extend transversely thereof. This second screw 16 is extended outwardly in the form of a shaft 18 supported by and longitudinally movable through a sleeve 19 rotably mounted in a bearing 20 on a pedestal structure 4^b and has splined to it a beveled gear wheel 21.

The two pedestal structures 4^a and 4^b respectively support two bearings 22 and 23 which support a shaft 24 having fixed to its ends a pair of beveled pinions 25 and 26 respectively meshing with the beveled gears 13 and 21,—there being mounted on the central part of this shaft a double-faced clutch member 27, which however is slidable longitudinally thereof, although rotatably fixed thereto.

Loosely mounted on the shaft 24 between the clutch member 27 and the beveled pinion 26, is a sprocket or gear wheel 28 connected through a suitable belt or chain 29 with a second toothed wheel 30, fixed to a main driving shaft 31 carried in bearings 32 and 33 on the foundations or pedestals 4^a and 4^b. The sprocket wheel 28 has fixed to it a clutch member 34 designed to coact with the adjacent portion of the clutch member 27. Between the latter and the bearing 23 there is also fixed to said shaft 24 a spur gear 35 meshing with a pinion or second spur gear

36 fixed to the main shaft 31 and said gear 35 has fixed to it a clutch member 37, toothed or otherwise formed to coact with the similarly formed adjacent clutch face of the movable member 27.

For automatically shifting this movable clutch member 27 I extend the main driving shaft beyond the outer side of the screw 16 and mount on its end a worm 40 operatively engaging a worm wheel 41 fixed to a shaft 42, which is supported in suitable bearings 43 and 44. Said shaft has fixed to it a gear 45 meshing with a second gear 46 carried by a shaft 47 and its face is formed with a cam groove 48 for the reception of a pin 49 on a longitudinally movable bar 50. The latter is slotted so that its pin-carrying end receives and is supported by the shaft 47 while its second end is connected to an arm 51 fixed to the lower end of a vertical shaft 52 carried in a bearing 53. The upper end of said shaft carries a pair of arms 54—54, respectively pivoted to the top and bottom portions of the clutch member 27.

With the above described arrangement of parts, if power be applied to the shaft 31 from any suitable source so that it turns in a clockwise direction for example, the gear wheel 46 is so actuated that its cam groove shortly moves the bar 50 in such a direction that through the arms 51 and 54, the clutch member 27 is thrown into engagement with the clutch member 34. Power is thereupon transmitted from the driving shaft 31 through the chain belt 29 and toothed wheel 28 to the clutch 34—27 so that the shaft 24 is turned together with the pinion 26 and beveled gear 21. The resulting rotation of the shaft 18 and its screw 16 causes the latter to coöperate with the nut 15 to move the pusher against the billets x^1 and force the series of these into the furnace.

At the same time rotation of said shaft 24 through the pinion 25 and beveled gear 13 so turns the shaft 10 and screw 8 that the pusher 9 is moved outwardly on the tracks 2, and when it has traveled to its outward limit of motion and the pusher 17 has likewise traveled to the inner end of its allowable path of movement, the cam groove 48 so acts on the pin 49 that through the bar 50 and arms 51 and 54, the clutch member 37 is disengaged from the member 34 and is thrown into engagement with the member 37. Since the gears 36 and 35 turn said member 37 in a direction opposite that in which the member 28 is turned by the chain belt 29, the direction of rotation of the shaft 24 is reversed.

At a suitable time before such reversal occurs a body of billets to be heated or otherwise treated in the furnace is placed on the tracks 2—2, between the outermost billet x and the pusher 9, so that as the latter through the shaft 10 and screw is moved toward the furnace, said billets will be delivered thereto. At the same time the pusher 17 is moved outwardly on its tracks 3—3 and when it has reached or approached its outward limit of movement, another mass of billets is placed on said tracks 3—3 between it and the nearest one of the billets x^1. Thereafter the machine automatically continues operation as above described, the two pushers being alternately moved in and out so that they alternately engage and force into the furnace the masses of billets placed on their respective sets of tracks 2—2 and 3—3.

It is especially to be noted that by reason of the relatively simple and substantial arrangement of the automatic clutch controlling mechanism, the apparatus will run for an indefinite period of time practically without attention and without likelihood of getting out of order.

I claim:

1. The combination in a billet charging apparatus of two pushers; a continuously actuated main shaft; an intermediate shaft connected to both pushers; two members driven in opposite directions from said main shaft; and automatic mechanism for alternately connecting said members to the intermediate shaft.

2. The combination in a billet charging apparatus of two pushers; a continuously actuated main shaft; and automatic reversing mechanism connected between said main shaft and the pushers to cause the latter to alternately move in opposite directions.

3. The combination in a billet charging apparatus of two pushers; a continuously actuated main shaft; and automatic reversing mechanism connected between said main shaft and the pushers to cause the latter to alternately move in opposite directions, the same including an intermediate shaft and automatic clutch mechanism for periodically reversing the direction of rotation of the intermediate shaft.

4. The combination in a billet charging apparatus of two reciprocating pushers; a continuously driven main shaft; an intermediate shaft connected to both pushers; two independent trains of mechanism actuated from the main shaft and including elements respectively driven in opposite directions; with automatic mechanism driven from the main shaft for alternately connecting said members to the intermediate shaft.

5. The combination in a billet charging apparatus of two reciprocating pushers; a shaft connected to both of said pushers; a movable clutch member rotatively fixed to the intermediate shaft; two oppositely driven elements loose on the shaft and each having a clutch member; with automatic means for shifting said first clutch member alternately into engagement with said latter clutch members.

6. The combination in a billet charging apparatus of two reciprocating pushers; a shaft connected to both of said pushers; a movable clutch member rotatively fixed to the intermediate shaft; two oppositely driven elements loose on the shaft and each having a clutch member; with automatic means for shifting said first clutch member alternately into engagement with said latter clutch members, the same including a cam and a member actuated thereby for intermittently shifting the first clutch member.

7. The combination in a billet charging apparatus of two reciprocating pushers; a reversible shaft for actuating said pushers; and means for driving said shaft alternately in opposite directions, including a double clutch, a cam for controlling said clutch, and means for driving the cam.

8. The combination in a billet charging apparatus of two reciprocating pushers; a continuously driven main shaft; an intermediate shaft; two elements on the intermediate shaft respectively driven in opposite directions from said main shaft and each including a clutch member; a double clutch member movably mounted on the shaft for connecting either of said first clutch members thereto; a cam continuously driven from the main shaft; and means actuated by the cam for intermittently shifting the position of the movable clutch member.

9. The combination in a billet charging apparatus of a continuously driven main shaft; an intermediate shaft; a train of spur gearing between the main shaft and the intermediate shaft; sprocket-and-chain gearing also connected between the main shaft and the intermediate shaft; two reciprocating pushers actuated from the intermediate shaft; and means for causing said intermediate shaft to be alternately driven by said two sets of gearing.

HORACE TOMLINSON.