E. D. HALLOCK.

MUFFLE CHARGER.

APPLICATION FILED JULY 3, 1918.

1,308,013.

Patented June 24, 1919.

2 SHEETS—SHEET 1.

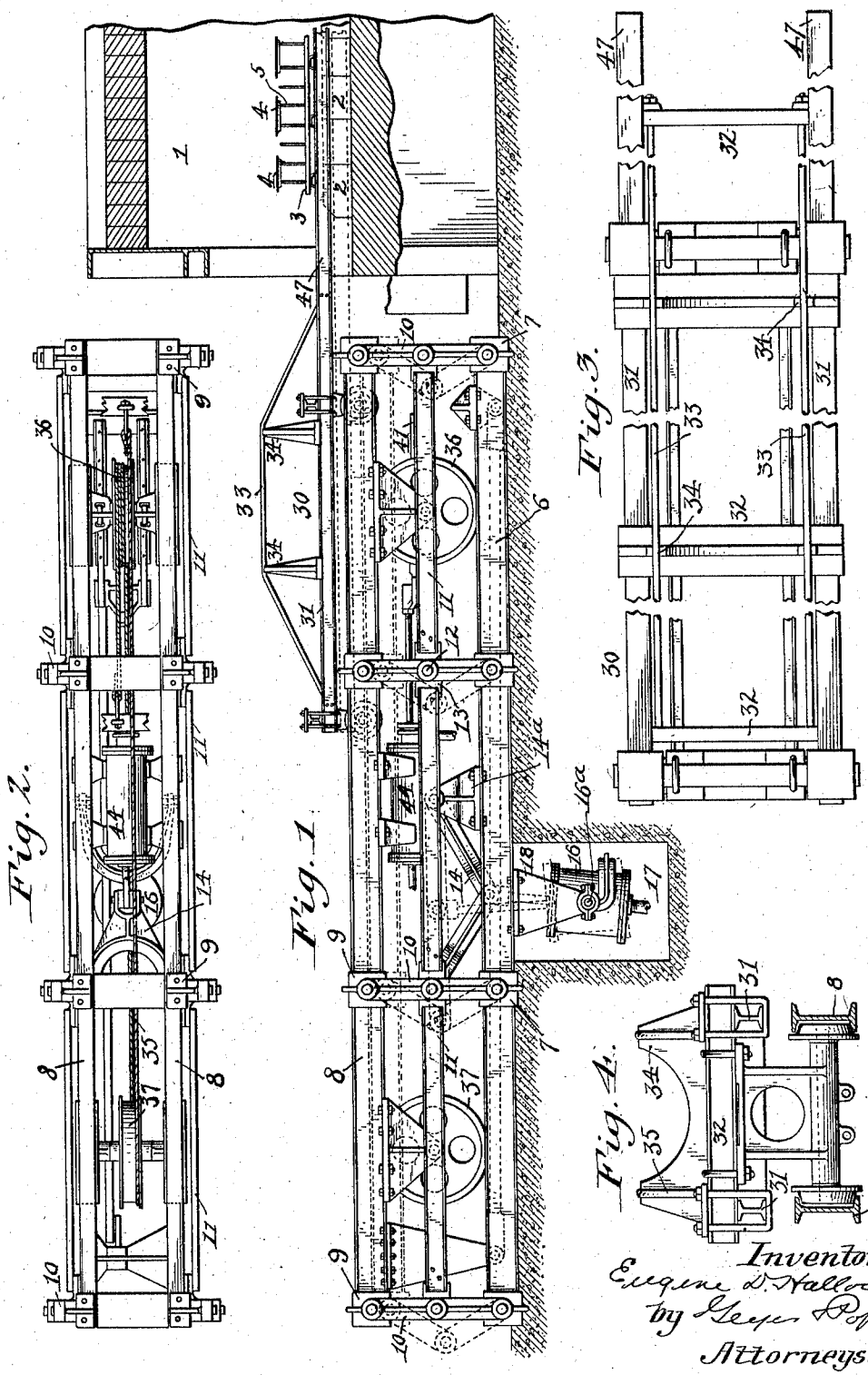


Fig. 2.

Fig. 1.

Fig. 3.

Fig. 4.

Inventor,
Eugene D. Hallock
by Geyer Popp
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

E. D. HALLOCK.

MUFFLE CHARGER.

APPLICATION FILED JULY 3, 1918.

1,308,013.

Patented June 24, 1919.

2 SHEETS—SHEET 2.

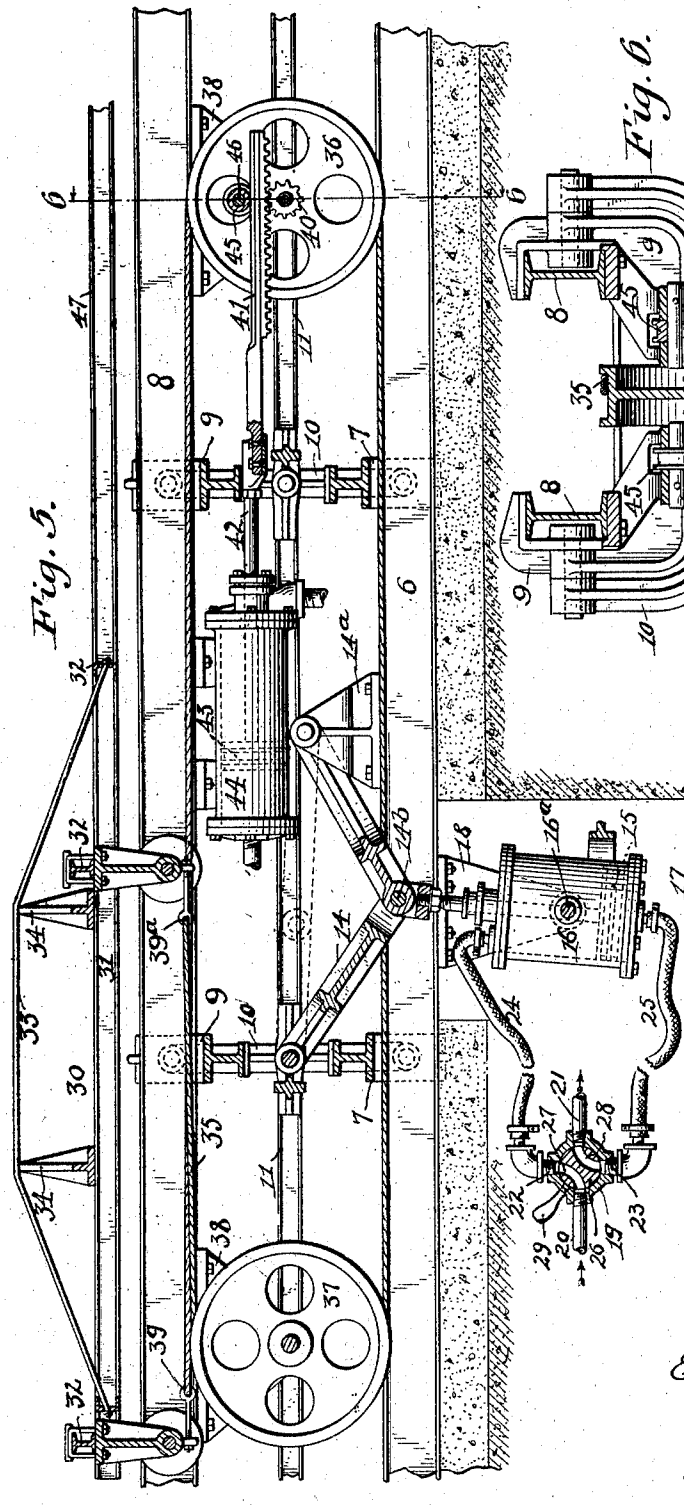


Fig. 5.

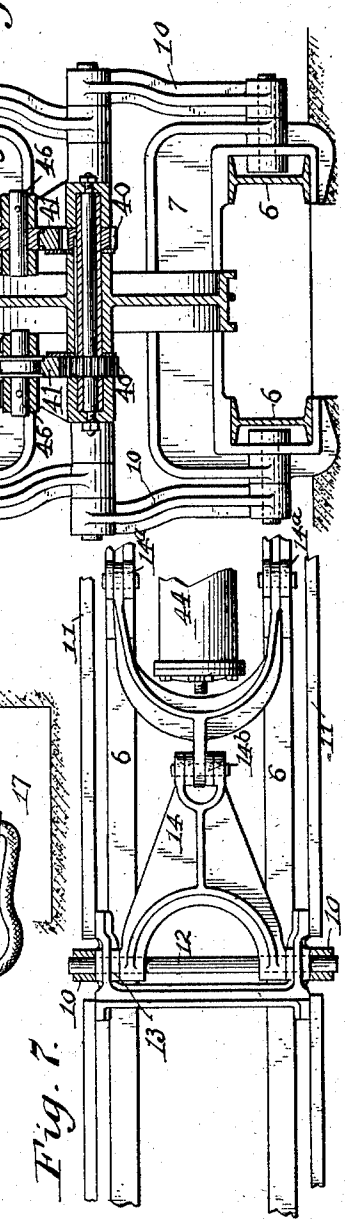


Fig. 6.

Fig. 7.

Inventor,
Eugene D. Hallock
by Geyer & Popp
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EUGENE D. HALLOCK, OF BUFFALO, NEW YORK, ASSIGNOR TO THE REPUBLIC METAL-WARE COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

MUFFLE-CHARGER.

1,308,013. Specification of Letters Patent. Patented June 24, 1919.

Application filed July 3, 1918. Serial No. 243,173.

To all whom it may concern:

Be it known that I, EUGENE D. HALLOCK, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Muffle-Chargers, of which the following is a specification.

This invention relates to a loader or charger for muffle-furnaces and more particularly furnaces for burning enameled ware.

Heretofore the articles to be enameled have been introduced into and removed from the furnace manually by means of a long bar or handle carrying a rack for the goods and balanced on a suitable support. This method is unsatisfactory as an attendant can carry but a limited number of articles with the necessary care and steadiness to avoid jarring them, any displacement of the ware on the usual rack-pins being liable to damage the goods, necessitating their sale as seconds at a reduced price.

The object of my invention is the production of a power-operated and controlled muffle-charger which has a comparatively large capacity and effectually prevents jarring of the articles, thus not only saving considerable time by utilizing the full capacity of the furnace, but also reducing the percentage of damaged goods or seconds to a minimum.

In the accompanying drawings:

Figure 1 is a sectional side elevation of the charger in connection with a muffle-furnace. Fig. 2 is a top plan view thereof, omitting some parts for clearness. Fig. 3 is an enlarged top plan view of the carriage. Fig. 4 is an end view thereof with its tracks shown in cross section. Fig. 5 is a fragmentary longitudinal section of the apparatus, on an enlarged scale. Fig. 6 is an enlarged cross section on line 6—6, Fig. 5. Fig. 7 is a top plan view of a part of the toggle-mechanism for raising and lowering the carriage-tracks.

Similar characters of reference indicate corresponding parts throughout the several views.

1 indicates the muffle-furnace which may be of any suitable or well known construction and which contains the customary spaced fire-brick supports 2 for the rack or tray 3 which carries the articles 4 to be enameled. This rack is provided with the usual upwardly-projecting pins 5 upon which the articles rest.

Resting on the ground or floor and extending from a point near the front of the furnace to a suitable distance from it, is a fixed base frame preferably composed of parallel I-beams 6 tied together at intervals by yokes 7. Located above and in line with this base-frame is a vertically-movable track or frame preferably composed of similar parallel I-beams 8 and connecting yokes 9. This frame is co-extensive with the base-frame and supported at opposite sides by substantially upright toggles 10 pivoted at their upper and lower ends to said frames, respectively, so that upon straightening or deflecting the toggles, the track-frame is raised or lowered accordingly. The several toggles at the same side of the charger are connected by longitudinal bars 11, so as to be operated simultaneously, the connecting pins 12 of the toggle-links carrying bearing blocks 13 to which the ends of said rods are secured. These toggles are operated by any suitable mechanism but I prefer to employ for this purpose a substantially horizontal toggle 14 pivoted at one end to standards 14^a fixed to the base frame 6 and at its other end to one of the upright toggles 10. The central joint 14^b of the toggle 14 is connected with the piston 15 of a pressure-cylinder 16, to opposite ends of which water or other pressure fluid is alternately admitted to actuate the toggle 14 in an obvious manner. In the construction shown in the drawings, this pressure-cylinder is located in a pit 17 below the base-frame 6 and suspended by trunnions 16^a from hangers 18 carried by said frame to allow the cylinder to oscillate in following the movements of the toggle 14. The entrance and exhaust of the pressure fluid to and from the cylinder 16 is controlled by a suitable valve which may be operated either manually or automatically but is preferably controlled by the attendant. That shown in the drawings comprises a casing 19 provided at one side with a fluid inlet pipe 20, at the opposite side with a fluid exhaust pipe 21, and in a plane at an angle to said pipes with fluid outlets 22, 23, connected with opposite ends of the pressure cylinder by conduits 24, 25, respectively. Within the casing is an oscillating valve 26 having ports 27, 28, so arranged that in one position of the valve one end of the pres-

sure cylinder is connected with the fluid inlet 20 and its other end with the exhaust 21, while in the opposite position of the valve these connections are reversed, driving the piston in one direction or the other accordingly and straightening or deflecting the upright toggles 10. The valve 26 is operated by a suitable handle 29.

Running upon the upper movable track-frame 8 toward and from the muffle-furnace is a truck or carriage 30 of any suitable construction adapted to carry the article-rack 3 into and out of the furnace. In the example shown in the drawings, this carriage comprises longitudinal sills or beams 31 connected by transverse beams 32 and stiffened by truss rods 33 passing over struts 34. The wheels of the carriage run upon tracks, preferably formed by the inner flanges of the I-beams 8. Any suitable mechanism may be employed for propelling the carriage back and forth on the movable frame 8. That shown in the drawings consists of a cable 35 running around horizontal drums 36, 37, suspended from said frame by hangers 38, and having its ends connected to the front and rear portions of the carriage, as shown at 39 and 39a. Secured to the shaft of one of these drums are pinions 40 with which mesh longitudinally movable rack bars 41 secured to the rod 42 of a piston 43 operating in a second pressure cylinder 44. The latter is arranged horizontally between the upper and lower frames 6 and 8 and suspended from the upper frame. Pressure fluid is alternately admitted to and exhausted from the ends of this cylinder to reciprocate the piston and the rack bars 41, thereby rotating the drums 36, 37 alternately in opposite directions and propelling the carriage 30 accordingly. The valve for controlling the flow of the fluid to and from the pressure cylinder 44 is not shown in the drawings, but may be similar to the valve 26.

Grooved guide rollers 45 serve to hold the rack bars 41 in engagement with the pinions 40. These rollers are mounted on a transverse journal 46 carried by the adjacent hanger 38. At its front end the body of the carriage 30 is provided with horizontal arms or forward extensions 47 adapted to sustain the article rack 3 and made of sufficient length to fully enter the heating chamber of the furnace when the carriage is propelled to the front terminal of its track. These carriage arms are spaced to enter between the fire brick supports and the elevation and range of vertical movement of the track-frame 8 relative to said supports is such that when the frame is raised to its limit, as shown by full lines in Fig. 1, the carriage arms support the rack above and clear of the supports, while when said frame is lowered to its limit, as shown by dotted lines in said figure, the arms descend far enough to deposit the rack upon the supports and still clear the bottom of the heating chamber, permitting the free withdrawal of the arms therefrom.

In the operation of the charger, assuming the carriage to be withdrawn to the rear end of its track, the track-frame 8 is raised to its full height by admitting fluid to the proper end of the pressure-cylinder 16 by means of the valve 26. After placing a filled article-rack 3 upon the carriage arms 47, the carriage is propelled to the front end of the elevated track-frame by admitting fluid to the rear end of the upper pressure cylinder 44, thereby introducing the rack into the heating chamber of the furnace, as shown in Fig. 1. The track-frame and the carriage are next lowered to the dotted position shown in said figure to deposit the rack upon the refractory supports 2. The carriage is then returned to its former position and the furnace door is closed. When the articles have been properly burned, the door is opened, the carriage, while still in its lowered position, is again advanced to bring its arms under the rack, and the track-frame is elevated to lift the rack from the supports 3, after which the carriage is withdrawn, another batch of articles is substituted for the burned one and the above operations are repeated.

By the use of this apparatus, the furnace can be charged with a larger batch of articles than by the manual method hitherto employed, utilizing the furnace to its full capacity and effecting an important saving in time. As the carriage is firmly supported and reliably and positively guided at all times, and its movements are under full control, jarring of the articles and their displacement on the rack-pins is practically eliminated, avoiding scratching or marring of the goods. The power or leverage of the horizontal toggle 14 gradually diminishes as its deflection increases, exerting correspondingly decreasing power on the upright toggles 10. The track 8 and the carriage mounted thereon thus gradually come to rest without jar or jolt, whereby the burned ware is gently lifted from the pins 5 and the production of unmarred goods is insured. The carriage can, moreover, be controlled at a distance from the furnace, rendering the work of attendants more comfortable than that of hand-charging which requires a closer approach to the furnace.

I claim as my invention:

1. A muffle charger, comprising a vertically-movable frame, substantially upright toggles for raising and lowering said frame, a second substantially horizontal toggle connected with the first-named toggles, means for actuating said horizontal toggle, and an article-carriage running upon said frame.

2. A muffle charger, comprising a base-

frame, a vertically-movable frame arranged above said base-frame, toggles connecting said upper and lower frames, means connecting the several toggles to operate them simultaneously, actuating mechanism for said toggles, including a pressure cylinder and a piston and a second toggle-connection between said piston and the first-mentioned toggles, and an article-carriage running upon said upper frame.

3. A muffle charger, comprising a base-frame, a vertically-movable frame arranged above said base-frame, substantially upright toggles connecting said upper frame with the base frame, a second substantially horizontal toggle connected with the first-mentioned toggles, a pressure cylinder and piston for actuating said second toggle, and an article carriage running upon said upper frame.

4. A muffle charger, comprising a base-frame, a vertically-movable frame arranged above said base-frame, substantially upright toggles connecting said upper frame with the base frame, a second substantially horizontal toggle connected with the first-mentioned toggles and located between said upper and lower frames, a pressure cylinder located below said lower frame, a piston operatively connected with said second toggle, and an article carriage running upon said upper frame.

5. A charging apparatus for muffle-furnaces, comprising a vertically-movable frame facing the furnace, means for raising and lowering said frame, an article-carriage running on said frame, cable-drums carried by said frame, a cable running around said drums and connected to the carriage, a gear rack and pinion for rotating said drums, and a pressure cylinder and piston for reciprocating said gear rack.

6. A muffle charger, comprising a base-frame, a vertically movable frame arranged above said base-frame, toggles connecting said upper and lower frames, a pressure cylinder and piston for actuating said toggles, an article carriage running upon said movable frame, cable-drums carried by the movable frame, a cable running around said drums and connected to the carriage, a gear rack and pinion for rotating said drums, and a pressure cylinder and piston for reciprocating said gear rack, the last-mentioned cylinder being mounted on said movable frame.

EUGENE D. HALLOCK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."