

March 31, 1925.

1,531,407

L. JOHNSON

CHARGING MACHINE FOR ANNEALING FURNACES

Filed Aug. 12, 1924

3 Sheets-Sheet 1

Fig.1.

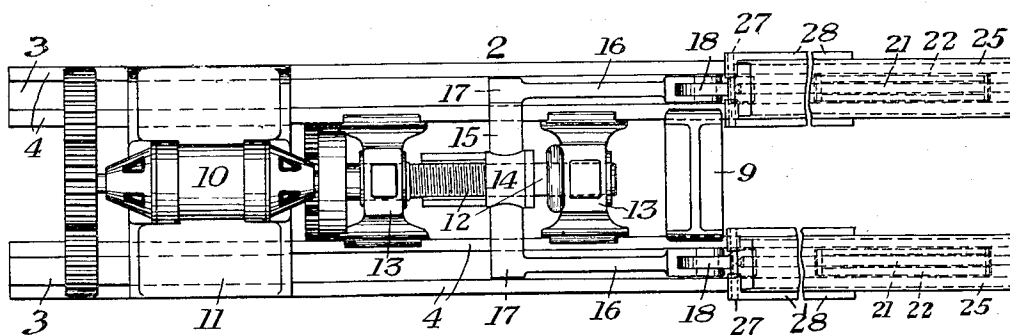


Fig.2.

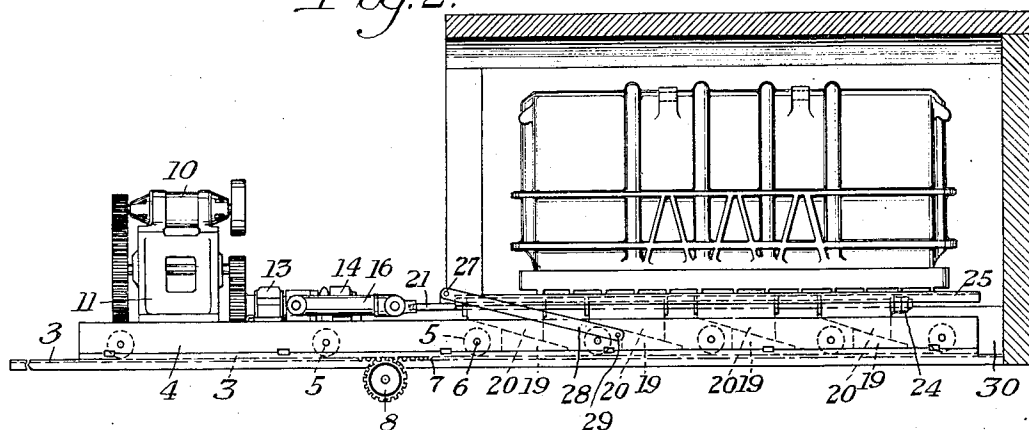
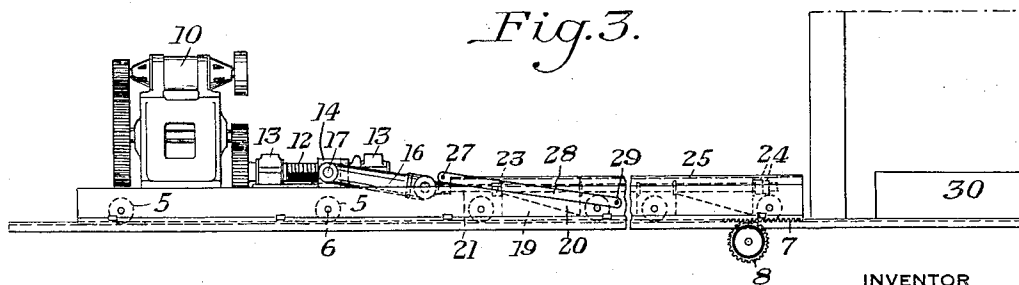


Fig.3.



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Fig. 5.

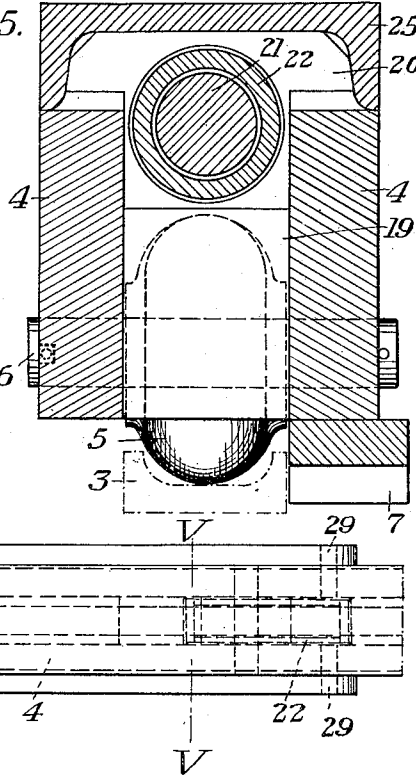


Fig. 4.

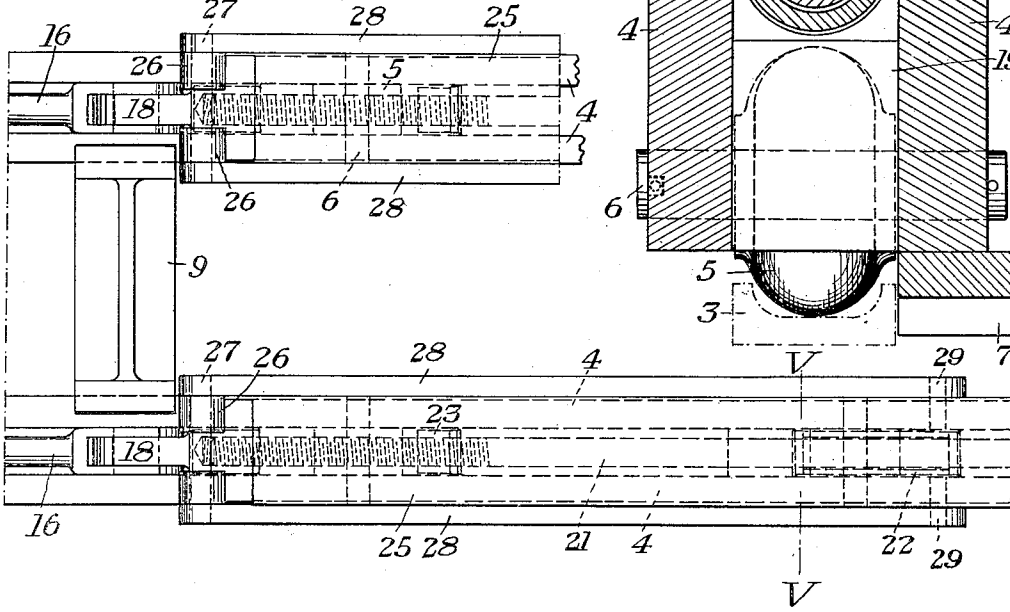


Fig. 6.

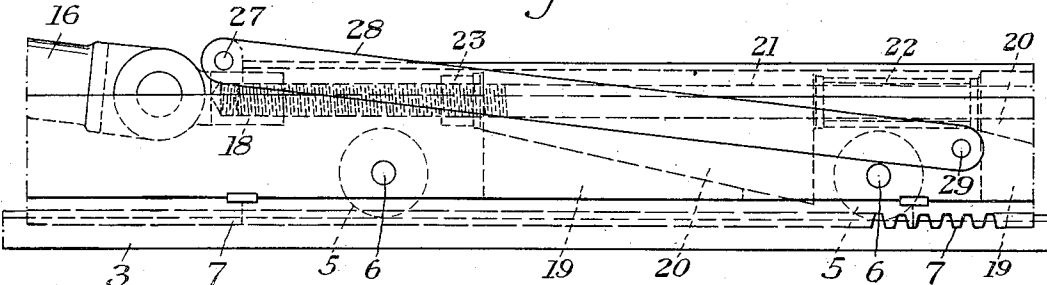
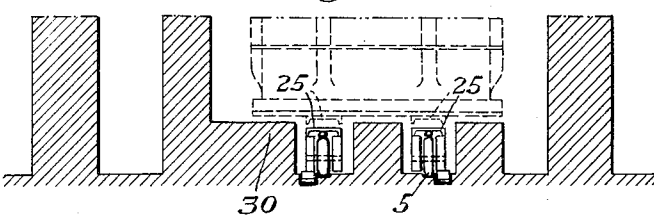


Fig. 7.



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Fig. 8.

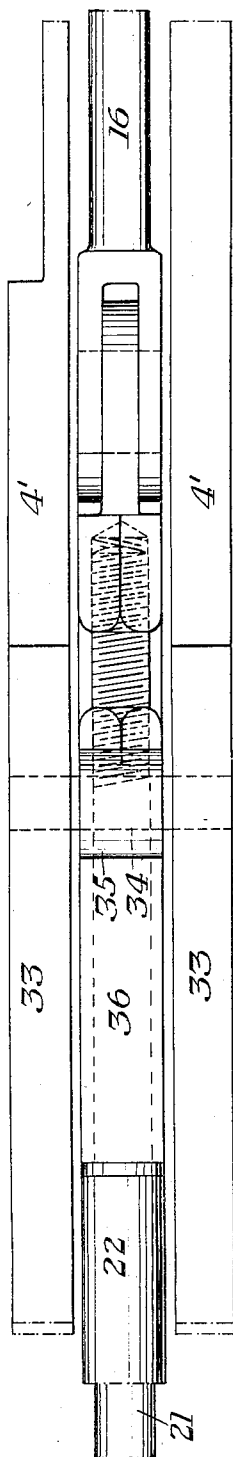
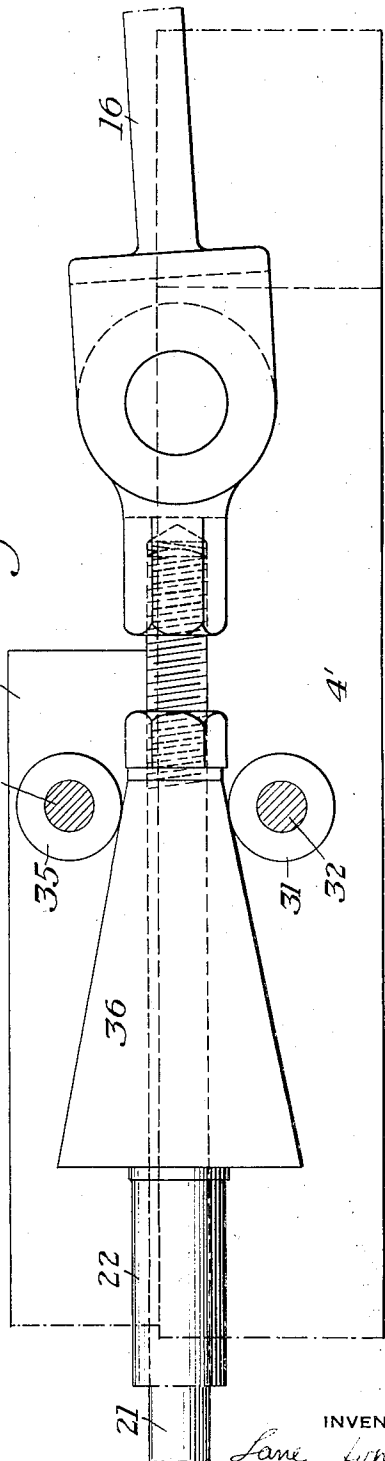


Fig. 9.



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UNITED STATES PATENT OFFICE.

LANE JOHNSON, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO UNITED ENGINEERING AND FOUNDRY COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CHARGING MACHINE FOR ANNEALING FURNACES.

Application filed August 12, 1924. Serial No. 731,544.

To all whom it may concern:

Be it known that I, LANE JOHNSON, a citizen of the United States, residing at Pittsburgh, county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Charging Machines for Annealing Furnaces, of which the following is a full, clear, and exact description.

The present invention relates to furnace charging devices, and more particularly to means for placing annealing boxes in and removing them from annealing furnaces.

Annealing furnace charging machines as heretofore constructed have been objectionable because of their liability in operation to either push the annealing box against the end of the furnace wall and knock a hole in the latter or cause a longitudinal shifting of the annealing box in contact with the supporting base portion of the furnace chamber and thereby damage such base portion.

By the present invention I have provided an annealing furnace charging machine which is adapted to raise the annealing box from and lower it on to the supporting base portion of the furnace chamber without any appreciable longitudinal movement of the box, thereby avoiding any liability of knocking out the end wall of the furnace chamber or of damaging the supporting base portion of the chamber.

In the accompanying drawings,

Figure 1 is a plan view of a preferred form of charging machine embodying my invention;

Figure 2 is a view showing the charging machine in side elevation and in operative position beneath an annealing box, the furnace chamber in which the annealing box is placed being shown in section;

Figure 3 is a broken away view showing the charging machine in elevation and positioned in front of the furnace chamber;

Figure 4 is a plan view, on a larger scale, of a portion of the charging machine;

Figure 5 is a section on the line V—V of Figure 4, but on a larger scale;

Figure 6 is a side elevation corresponding to Figure 4;

Figure 7 is a cross section of the lower portion of the furnace chamber, showing in dotted lines the annealing box being held in raised position off of the supporting base

portion of the chamber by the charging machine, and

Figures 8 and 9 are respectively a plan view and a side elevation showing a slight modification of the means for raising and lowering the annealing box.

In the embodiment of the invention illustrated in Figures 1 to 7 inclusive, the charging machine comprises a supporting carriage 2 adapted to be moved into and out of a furnace chamber on rails 3, said rails as shown being in the form of channels. The carriage comprises two longitudinally extending parallel members, each of which consists of two parallel bars 4 having track engaging rollers 5 journaled therebetween on pins 6 extending through the bars. The outer bar 4 of each of said longitudinally extending members is provided along its lower edge with a rack 7 engaged by pinion 8, whereby the carriage is adapted to be moved into and out of the furnace chamber, the pinions 8 being driven by any suitable means.

The longitudinal members of the carriage are connected towards the front thereof by a transverse brace 9. Mounted on the carriage adjacent its rear end is an electric motor 10, the base 11 of which is secured to the longitudinally extending members. The motor drives a screw 12 which is journaled in bearings 13 mounted on the carriage. This screw engages a nut 14 carried by a cross head 15. Links 16 are pivoted at one end upon pins 17 projecting from the ends of the cross head. Each link has its opposite end bifurcated and pivoted to a screw clevis 18.

Held between each pair of bars 4 is a series of lower wedges 19 and cooperating with each series of lower wedges is a series of upper wedges 20. Each series of upper wedges is mounted on a rod 21, the wedges being held in spaced relation thereon by sleeves 22. Each rod 21 has its rear end portion screw threaded for engagement with a clevis 18 and mounted on such screw threaded portion is a nut 23. The forward end of each rod is also screw threaded and has mounted thereon a nut 24. It will be seen that the nuts 23 and 24 serve to clamp the upper wedges against the spacer sleeves 22.

Supported upon the upper edges of each pair of bars 4 is an inverted channel 25. The upper wedges 20 are T-shaped in cross section to fit in the space between the bars 4 and also in the space between the flanges of the channel members, whereby the latter are prevented from shifting laterally on the bars 4, as will be apparent by reference to Figure 5.

Each channel member has a pair of bearings 26 at its rear end which support a pivot pin 27. Links 28 are pivoted at one end upon each pin 27. These links extend forwardly and are pivoted at their forward ends upon pins 29 projecting from the bars 4.

When an annealing box is to be placed in a furnace chamber, the motor 10 will be operated to move the cross head 15 rearwardly, thereby effecting the raising of the supporting channel members 25 through the cooperation of the upper wedges 20 with the lower wedges 19. The annealing box will then be placed on the supporting members 25, the charging machine of course being in front of the furnace chamber, as illustrated in Figure 3. The pinions 8 will then be rotated to move the charging machine and annealing box into the furnace chamber, as illustrated in Figure 2. The position of the annealing box with respect to the supporting base portion 30 of the furnace chamber when the box is thus moved into the furnace chamber is illustrated in Figure 7. It will be seen that the box has been raised by the charging machine to a position in which it clears the base portion 30 as the box is moved into the chamber. When the box is in proper position in the chamber, the motor 10 is operated in a direction to move the cross head 15 forwardly and allow the annealing box to descend and rest on the supporting base portion 30 of the furnace chamber. The channel members 25 assume the position shown in full lines in Figure 7 in which position they are slightly below the bottom of the annealing box, which is now resting on the base portion 30. The charging machine may now be withdrawn from the furnace chamber. When it is desired to remove the annealing box from the furnace chamber the charging machine will be moved into position beneath the box, as illustrated in Figure 2, and the motor 10 operated in a direction to move the cross head 15 rearwardly and effect the raising of the box off of the supporting base portion 30 of the furnace chamber. During this raising movement of the box the links 28 prevent the supporting members 25 from having any appreciable longitudinal movement relative to the carriage. Therefore there is no tendency to drag the annealing box in contact with the supporting base 30 and cause consequent damage to the latter.

Since the supporting members 25 are held against longitudinal movement during the raising and lowering of the annealing box, there is also no danger of the latter being pushed against the end wall of the furnace chamber.

In Figures 8 and 9 I have shown a slight modification of the means for raising and lowering the annealing box. In this modified form of the invention anti-friction rollers 31 are substituted for the lower wedges 19, these rollers being journaled upon pins 32 supported in the bars 4'. Positioned above each pair of bars 4' is a similar pair of bars 33 for supporting the annealing box. These bars 33 are connected by pins 34 which form the journals for anti-friction rollers 35. Mounted on the rods 21 are double wedges 36 which are reciprocated in the spaces between the bars 4' and 33 and cooperate with the rollers 31 and 35 for raising and lowering the supporting members 33.

While I have shown and described certain preferred embodiments of my invention, it will be understood that the invention is not limited to these precise embodiments but that it may be otherwise embodied within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A charging machine for furnaces, comprising a carriage adapted to be moved into and out of a furnace chamber and embodying longitudinally extending parallel members, each of the said members comprising a pair of spaced bars having track-engaging rollers journaled therebetween, supporting members for a container mounted on said carriage members, means interposed between each carriage member and the overlying supporting member and movable relatively thereto for raising and lowering said supporting members, and means for substantially preventing longitudinal movement of said supporting members relatively to said carriage members during the raising and lowering of said supporting members, substantially as described.

2. A charging machine for furnaces, comprising a carriage adapted to be moved into and out of a furnace chamber, supporting means for a container mounted on said carriage, means interposed between said carriage and supporting means and movable longitudinally of the carriage for effecting the raising and lowering of said supporting means, and means comprising a link pivotally connected to the carriage and supporting means for substantially preventing longitudinal movement of said supporting means relative to said carriage during the raising and lowering of said supporting means, substantially as described.

3. A charging machine for furnaces, comprising a carriage adapted to be moved into and out of a furnace chamber and embodying longitudinally extending parallel members, a motor mounted on said carriage adjacent its rear end, supporting members for a container mounted on said carriage members at the forward end of said carriage, wedge means interposed between said carriage members and supporting members, means operatively connecting said wedge means with said motor whereby to shift said wedge means longitudinally of the carriage for effecting the raising and lowering of said supporting members, and link means connecting each of said carriage members with the corresponding supporting member for substantially preventing longitudinal movement of said supporting members relative to the carriage during the raising and lowering thereof, substantially as described.

4. A charging machine for furnaces, comprising a carriage adapted to be moved into

and out of a furnace chamber and embodying longitudinally extending parallel members, each of said members comprising a pair of spaced bars having track engaging rollers journaled therebetween, supporting members for a container mounted on said carriage members, wedge means interposed between said supporting members and carriage members and holding said supporting members from shifting laterally on said carriage members, a motor mounted on said carriage, means operatively connecting said motor with said wedge means for shifting the latter to effect the raising and lowering of said supporting members; and means connected to said carriage members and supporting members for substantially preventing longitudinal movement of said supporting members during the raising and lowering thereof, substantially as described.

In testimony whereof I have hereunto set my hand.

LANE JOHNSON.