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HEAT TREATING FURNACE
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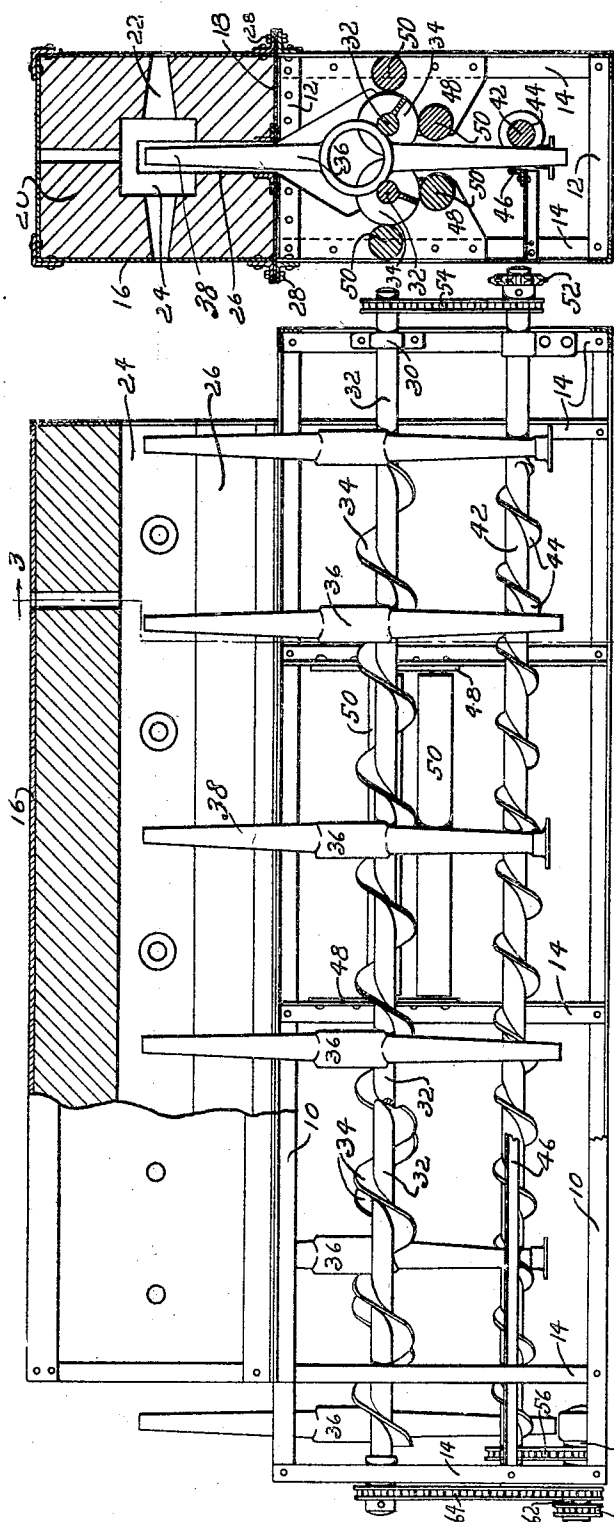


Fig. 1.

Fig. 2.

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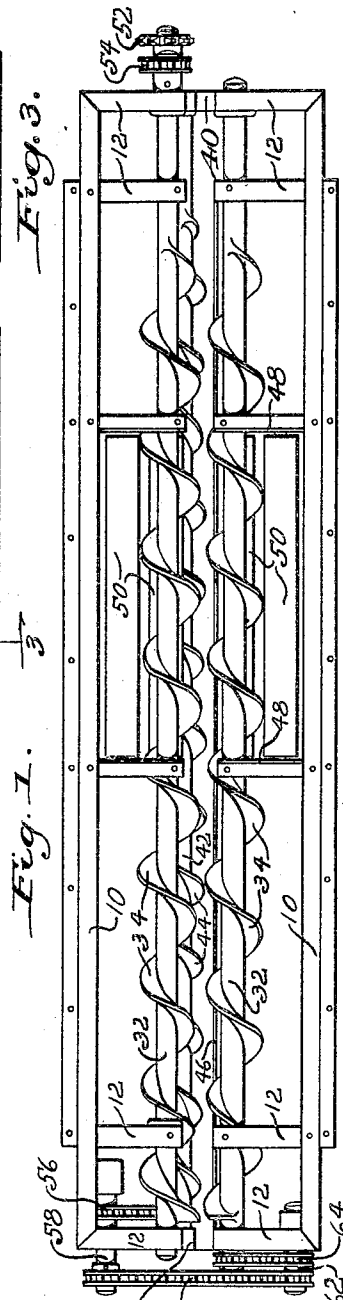


Fig. 3.

UNITED STATES PATENT OFFICE

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HEAT TREATING FURNACE

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This invention relates to a heat treating furnace and has for one of its objects the provision of certain features which permit the work to be fed through the furnace in a vertical position. The work is continuously fed through the furnace and certain portions of the work are outside of the furnace during the heat of other portions of the work.

Another object of the invention is to support the work on rotating spirals which continuously feed the work through the furnace.

More specifically stated the invention consists in arranging a feed and supporting mechanism below the oven portion of the furnace and providing a longitudinal opening in the lower surface of the oven portion through which the work travels from one end of the oven to the other; the portion of the work extending through the opening and into the furnace being the only portion of the work exposed to the heat in the oven portion of the furnace.

Other objects and advantages of the invention will more fully appear from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a longitudinal view of the furnace, parts being shown in side elevation and parts being broken away and in section.

Fig. 2 is a plan view of the supporting and feed mechanism with the oven portion of the furnace removed.

Fig. 3 is a transverse vertical section taken on line 3—3 of Fig. 1.

Referring to the drawings wherein I have illustrated a preferred embodiment of my invention, a frame work, consisting of longitudinal members 10, transverse members 12 and vertical members 14 riveted or otherwise secured together, is adapted to support the oven portion of the furnace.

The oven comprises an outer shell 16 in the form of a rectangular box having a slotted bottom plate 18. The shell encloses and forms a casing for the lining 20 of the oven which may be of suitable material such as fire brick. Openings 22 are provided for the reception of suitable burners, not shown. The oven illustrated has been designed to heat the outer end of an axle housing and in

such a design the heating chamber 24 has been shown relatively small. A longitudinal opening 26 is provided in the bottom wall extending the entire length of the oven and through the end walls thereof.

The oven portion of the furnace is detachably secured to the upper portion of the frame work, bolts 28 securing the two units together with the bottom plate 18 between them.

Mounted in suitable bearings 30 on the vertical members 14 are parallel rotatable shafts 32 each provided with a spiral flange 34 forming screw leads. The axle housing, which is the work selected for illustrating the invention, has a central drum portion 36 and tubular end portions 38. The housing is placed in the oven and frame work in a vertical position through one end of the opening 26 and the drum portion 36 rests on the shafts 32 with one of the tubular end portions 38 extending downwardly between the shafts 32. It will be understood that as the shafts 32 are rotated the spiral flanges 34 continuously move the axle housing longitudinally through the furnace.

The right end of the shafts 32 are without the spiral flanges so that as the work reaches the outer end of the oven portion it stops its longitudinal movement and seats on the shafts 32 until the operator removes it from the furnace through a space 40 in the transverse members 12.

As the axle housing is supported adjacent its center there is a tendency for it to swing. To prevent this another shaft 42 provided with a spiral flange 44 is positioned at one side of the lower end of the axle housing. At the opposite side of the housing a longitudinal guide 46 has been provided. The lower end of the housing moves between the shaft 42 and guide 46 longitudinally through the furnace.

In furnaces of considerable length it is desirable to support the central portion of the shafts, particularly the upper shafts 32. In the form shown a pair of spaced plates 48 adjacent the center of the frame work each support a pair of rollers 50 in engagement with the outer edge of the flanges 34. These

rollers support the central portion of the shafts 32.

The drive for the mechanism is taken from a sprocket 52 connected to a suitable source of power, not shown. The sprocket 52 is
 5 keyed to the shaft 42 and a chain 54 forms a driving connection between the shaft 42 and one of the shafts 32. At the opposite end of the shaft 42, another chain 56 forms
 10 a driving connection between the shaft 42 and a stub shaft 58 at the lower corner of the frame work. A cross chain 60 forms a driving connection between the stub shaft 58 on
 15 the far side and another stub shaft 62 on the near side. A chain 64 forms a driving connection between the stub shaft 62 and the end of the other shaft 32. The purpose of these cross chains and stub shafts is to transfer the drive from one shaft to another without crossing or obstructing the entrance
 20 space 66 through which the housings are inserted to the furnace.

It will be understood that by such a construction the mechanism for continuously
 25 carrying the work through the furnace is outside the oven portion away from the heat and that a portion of the work is continuously carried through the furnace in the oven while another portion of the same work is
 30 outside the oven not exposed to the heat.

It will be obvious that various changes including the size and arrangement of parts may be made without departing from the spirit of my invention and it is not my intention to limit its scope other than by the terms
 35 of the appended claims.

What I claim is:

1. A furnace of the class described comprising an oven portion having a free longitudinal passage in its lower surface, a supporting structure for and below said oven portion having a free longitudinal passage therethrough, and conveyors at the opposite
 40 sides of said last named longitudinal passage extending beyond the opposite ends of said oven portion for conveying articles to be heated through both of said passages simultaneously, said conveyers comprising shafts having spiral flanges thereon, the spiral
 45 flanges on one end of said conveyers terminating within the limits of said oven portion so that work conveyed through the furnace ceases its travel within said oven.

2. A furnace of the class described comprising an oven portion having a free longitudinal passage in its lower surface, a supporting structure for and below said oven portion having a free longitudinal passage therethrough, screws at the opposite sides of
 55 said last named longitudinal passage for supporting and conveying each of said articles to be heated through both of said passages simultaneously, and guiding means for said
 60 articles below said screws, said screws being

constructed to feed the article through only the major portion of said oven.

3. A furnace of the class described comprising an oven portion having an opening in its lower wall extending longitudinally
 70 thereof from end to end, a pair of horizontally spaced shafts below said opening, spiral flanges on said shafts, a shaft below said pair of shafts, a guide member adjacent said last mentioned shaft, and a spiral flange on said
 75 last named shaft.

4. A furnace of the class described comprising an oven portion having an opening in its lower wall extending longitudinally thereof from one end of the oven to the other
 80 end, a pair of spaced shafts below said opening, a spiral flange on said shafts extending beyond the one end of said oven portion and terminating within the limits of the other end of said oven portion.

5. A furnace including an oven portion having a passage in one wall extending from one end to the other end thereof, a pair of shafts spaced from said wall, one located in
 85 close proximity to the plane of each longitudinal side of said passage, and a spiral flange on at least one of said shafts extending beyond one end of said oven portion and terminating within the limits of the other end of said oven portion.

6. A furnace including an oven portion having a passage in one wall extending from one end to the other end thereof, a pair of shafts spaced from said wall, one located in
 90 close proximity to the plane of each longitudinal side of said passage, a pair of spiral flanges, one on each of said shafts, a guide member spaced from said shafts and located on the opposite sides thereof with respect to said oven portion, a shaft extending parallel
 95 to said guide member, and a spiral flange on the latter shaft.

7. A furnace of the class described comprising an oven portion having an opening in its lower wall extending longitudinally thereof from one end of the oven to the other
 100 end, a pair of spaced shafts below said opening, a pair of spiral flanges, one on each of said shafts, at least one pair of corresponding ends of said shafts terminating within the limits of an end of said oven portion.

8. A furnace including an oven portion having a passage in its lower wall extending longitudinally from end to end thereof, a pair of spaced shafts below said passage, a pair of spiral flanges, one on each of said shafts, and a pair of members, one extending axially of each shaft having rolling engagement with the peripheries of the spiral flanges thereof
 105 for supporting the intermediate portions of said shafts, one pair of corresponding ends of said flanges terminating within said oven portion.

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