April 9, 1940. W. T. DEAN 2,196,789

SOAKING PIT

Filed May 6, 1939

FIG. 1.

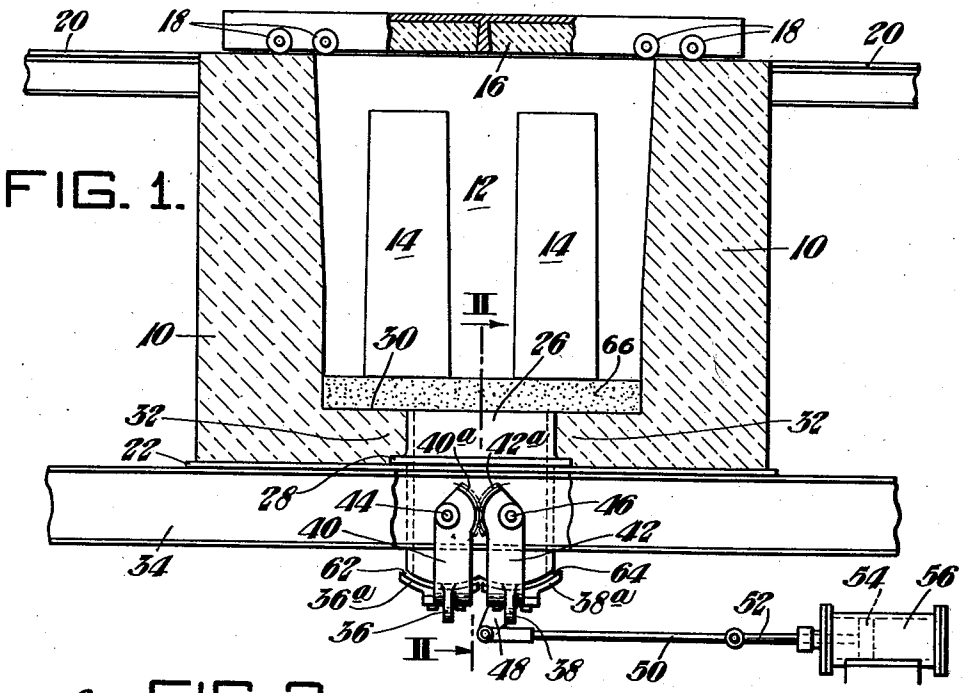


FIG. 2.

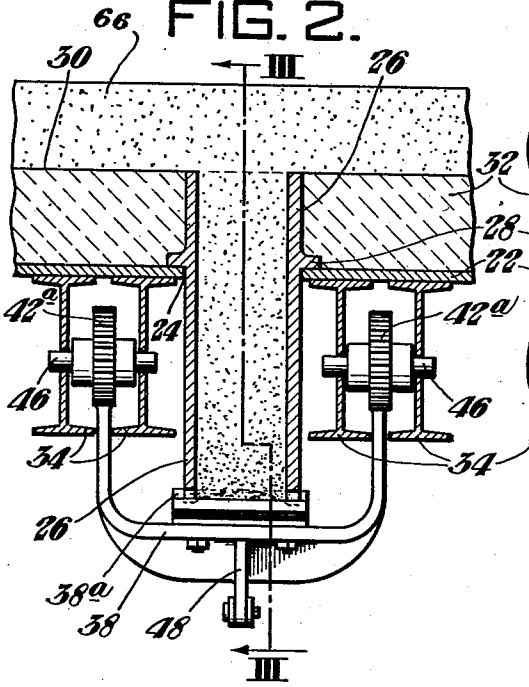
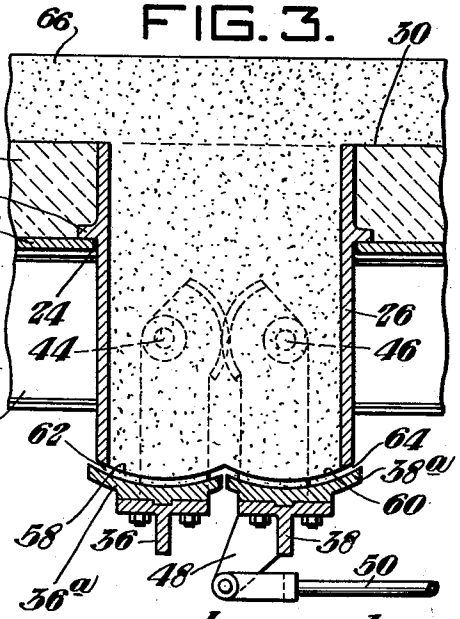


FIG. 3.



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SOAKING PIT

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9 Claims. (Cl. 266—38)

This invention relates to soaking pits and, more particularly, to improved means for closing the bottom portion thereof through which the scale from the ingot heated therein is usually removed.

In conventional pits used prior to my invention the openings for the discharge of ingot scale were usually closed by means of small cars whose wheels ran on flanges of supporting beams or, alternatively, by means of sliding dampers or plates. Prior devices were unsatisfactory, the roller type frequently failing from bending or distortion of the axles or wheels or by spreading of the beams. The sliding type frequently failed quickly because of the abnormal friction superinduced by warpage thereof or by distortion of the plates occasioned by dropping ingots thereon.

When the closures of the prior art fail, it becomes necessary to close the pit bottoms with metal sheets thrown over the holes from above and to cover them with suitable refractory material. This practice is a haphazard one and presents a serious risk to workmen who, of necessity, must enter the space underneath the pit.

The problem of effecting a satisfactory bottom closure for soaking pits has been before the art for many years, yet prior to my invention an undesirable practice has persisted.

The present invention aims to eliminate the shortcomings such as those above enumerated and it provides a combination of coacting structural instrumentalities which are so coordinated as to make available a pit furnace with the discharge opening in the bottom thereof provided with movable closure members which can be readily and safely opened from a remote point. These and more detailed features of the invention will be apparent from the following disclosure, the accompanying drawing and the appended claims.

In the drawing:

Figure 1 illustrates a transverse section through a soaking pit embodying the present invention;

Figure 2 is an enlarged section on line II—II of Figure 1; and

Figure 3 is a view on line III—III of Figure 2.

Referring in detail to the drawing, the numeral 10 represents conventionally the upright walls of the soaking pit which enclose the pit or chamber 12 adapted to receive ingots 14. The pit chamber is normally closed by a conventional type of removable sliding cover 16 mounted on wheels 18 traveling on a suitable conventional type of track 20.

The present invention is concerned chiefly with the bottom structure of the pit. This includes a bottom plate 22 preferably in the form of a rolled steel plate. This plate is apertured at 24 and is pierced by a thimble, indicated as a whole at 26. This thimble is provided on its exterior with a laterally extending supporting flange or lug 28, the under surface of which engages the upper surface of the plate 22. The thimble is preferably formed of cast steel. The upper portion of the thimble extends substantially or approximately to the level of the upper surface 30 of the layer of fire brick 32.

The rolled steel bottom plate 22 is mounted on a plurality of horizontally disposed rolled steel members, such as the I-beams indicated at 34.

Gates or closure members 36 and 38 are supported by respective hangers 40 and 42 which in turn are pivotally suspended from trunnion pins 44 and 46, the latter, in the embodiment of the invention illustrated, being supported in suitable openings formed in the webs of the I-beams.

The gates or closure members 36 and 38 are preferably provided with removable or replaceable shoes 36a and 38a which can be replaced as they become badly burned or worn in practice. This does away with the necessity of discarding the main gate members 36 and 38 due to normal wear and tear occasioned by the destructive action of the hot scale handled.

The structural arrangement and disposition of the parts is such that the respective centers of gravity of the gates or closure members 36 and 38 are located substantially or approximately in vertical alignment with the centers of rotation of the hangers; that is, in vertical alignment with the centers of the pins 44 and 46. As thus arranged, any load on the gate members will tend to hold them in closed position. In other words, they will be biased against an opening movement because the weight of material on the shoes will not be effective to exert a turning moment on the hangers.

Preferably the hangers are provided with means whereby movement imparted to one will be transmitted to the other so as to cause them to move in opposite directions. In the embodiment of the invention illustrated this means involves the utilization of segmental gear-like members 40a and 42a which are integrally formed with or otherwise secured to the hanger arms 40 and 42.

Preferably means are provided whereby the closure gates may be opened from a point remote from the discharge end of the thimble. In the embodiment of the invention illustrated, this means takes the form of an extension arm 48 on the hanger 42 which is connected by an ex-

tension link 50 with a piston rod 52 in turn connected with a piston 54 operating within a suitable fluid pressure cylinder 56. If desired, the fluid operating means may be dispensed with and the link 50 operated manually. Thus the gates are operable at a safe distance from the stream of hot scale discharged from the furnace.

As illustrated in Figure 3, the lower extremity of the thimble is provided with two arcuate portions 58 and 60 concentric with the pins 44 and 46, respectively. The shoes 36a and 38a are correspondingly arcuated, and clearance spaces 62 and 64 are provided between the lower arcuate extremities of the thimble and the opposed surfaces of the shoes. This is to allow for freedom of expansion and contraction and to prevent binding or wedging of the parts. In operation the brick bottom 32 of the pit is covered with a fairly thick layer of coke breeze, as indicated at 66. The coke breeze fills the thimble 26 and normally closes the clearance spaces 62 and 64. Such filling serves to insulate the hanger operating and supporting elements from intense internal heat of the pit chamber 12 and also serves the added function of cushioning shocks incident to disposing ingots on the bottom. Obviously this is an important function in the event the ingot is too quickly dropped or lowered when loading the pit from the usual overhead crane.

In the described structural arrangement of the present invention it is apparent that the thimble closure elements are supported independently of the thimble, thus any damage to the latter will have no effect on the former. Moreover, if the thimble itself becomes damaged or badly worn in use, it can be readily replaced by merely removing it from the apertured bottom plate; likewise the arcuate gate shoes can be readily removed without occasioning any serious dismantling of the parts or without occasioning the shut down of the soaking pit for any appreciable length of time. Thus the present invention overcomes inherent disadvantages in the soaking pits heretofore available to those skilled in the art.

While I have described quite specifically the embodiment of the invention illustrated, it is not to be construed that I am strictly limited thereto, since various modifications and substitutions of equivalents may be made, without departure from the invention as defined in the appended claims.

I claim:

1. A pit furnace having a bottom plate of steel supporting a brick bottom, a separate steel thimble supported by said plate, said thimble having arcuate portions at its lower extremity, a pair of arcuate closure members spaced to clear said lower extremity of said thimble, and means for simultaneously moving said members from and to closed position.

2. A pit furnace having a metal bottom plate, a separate metal thimble piercing said plate and having a supporting lug resting on said plate, pivotally mounted closure means for the bottom of the thimble, and means operable at a safe distance from the discharge end of the thimble for imparting an opening movement to said closure means.

3. A pit furnace having a bottom plate of steel supporting a brick bottom, a separate steel thimble piercing both said bottom and said plate, said thimble having a lateral extension whereby it is supported by said plate, a pair of closure members, and pivot means for supporting the latter located above the central portions thereof.

4. A pit furnace having a bottom plate of steel supporting a brick bottom, a separate steel thimble supported by said plate, a pair of closure members, and pivotal supports for the latter carried by structural means independent of said thimble and located in the median zone between said plate and said closure members.

5. A pit furnace having a bottom plate of steel supporting a brick bottom, a separate steel thimble supported by said plate, a pair of closure members, pivotal supports for the latter carried by structural means independent of said thimble and located in the median zone between said plate and said closure members, coacting means for compelling the closure members to move simultaneously, and actuating means therefor remote from the thimble.

6. A soaking pit furnace of the character described having a rolled steel bottom plate, a cast steel thimble piercing the latter and having an outwardly projecting portion making a bearing engagement with the plate, closure gates for the bottom of the thimble, respective pivotal supports for the gates located in the median zone between said plate and said gates, hangers for the gates depending from the pivotal supports, and coacting gear segments secured to said hangers.

7. A soaking pit furnace of the character described having a rolled steel bottom plate, a cast steel thimble piercing the latter and supported thereby, a beam disposed above the bottom of, and extending transversely of said thimble, and a pair of closure gates geared together and pivotally hung from said beam.

8. A soaking pit furnace of the character described having a rolled steel bottom plate, a cast steel thimble piercing the latter and supported thereby, a beam disposed above the bottom of and extending transversely of said thimble, a pair of closure gates geared together and pivotally hung from said beam, and means for actuating said gates from a point remote from said thimble.

9. A soaking pit furnace of the character described having a rolled steel bottom plate, a cast steel thimble piercing the latter and supported thereby, a beam disposed above the bottom of and extending transversely of said thimble, a pair of hangers geared together and pivotally hung from said beam, and closure gate shoes removably attached to said hangers.

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