This invention relates to furnace charging machines, and more particularly to the peel employed to move charging boxes into and out of open hearth furnaces.

In the charging of such furnaces, the peel head and the charging box are subjected to high temperatures for considerable periods of time, so much so that a certain amount of distortion takes place. Therefore, to allow the peel head to enter the slot in the box, ample clearance must be provided to compensate for the subsequent distortion, and heretofore, this clearance, with the existing means of securing the box to the peel, has provided an unstable connection of the box to the peel. Consequently, the primary object of the present invention is to provide means for clamping the box securely to the peel, regardless of distortion, the connection being such as to firmly join the box to the peel, that both react to the various operations as one member, or as a unitary structure.

Another object of the invention is to provide auxiliary means cooperating with the clamping device to bolt the box to the peel.

A further object is to supply the head portion of the peel with a replaceable protective hood or shield, capable of withstanding the high temperatures to which the peel head is subjected.

The invention consists in mechanism capable of carrying out the foregoing objects, which can be economically made, will add to the life of the peel, and which is satisfactory in operation and is readily to get out of order.

More particularly, the invention resides in the features and details of construction, which will be hereinafter more fully set forth in the specification and claims.

In the drawings:

Fig. 1 is a top view of the rear half of the peel.
Fig. 2 is a side elevation of the same.
Fig. 3 is a longitudinal vertical sectional view, taken on the line 3—3 of Fig. 1.
Fig. 4 is a longitudinal vertical sectional view of the head portion of the peel, and a portion of a charging box, and illustrating the means for clamping and bolting an end of the box to the head of the peel.
Fig. 5 is an enlarged vertical sectional view of the rear end portion of the peel, and illustrating details of construction.
Fig. 6 is a transverse vertical sectional view on line 6—6 of Fig. 4 and on a reduced scale.

Referring first to Figs. 1 to 3, inclusive, I designates a cradle carried by a trolley (not shown), which may be of the type disclosed in my application, Serial No. 37,483, filed July 7, 1948, issued as Patent No. 2,508,088, granted May 16, 1950. As shown in Figs. 1 and 2, the front end portion of the cradle and the medial portion of the peel are suspended by a bracket or brackets 8 from the trolley (not shown), to allow the peel to rock vertically upon a horizontal fulcrum 9, supported by bracket 8.

As shown in Fig. 3, a peel casing or tubular member 10 is journaled in the front and rear end portions of the cradle, as indicated at 11 and 12, to allow said casing to turn about the axis of a reciprocating rod 13, which extends through the central portion of the peel. The casing 10 may be turned by any suitable means. For example, a gear 14 may be fixed to, and surround, the rear end portion of the casing, and may mesh with a worm gear 15, positioned in a housing 16, forming part of the cradle. As shown in Figs. 1 and 2, the worm gear may be driven by any suitable type of prime mover, such as an electric motor 17, mounted on the cradle, and driving a shaft 18, which actuates the worm gear 15.

At 19, I have shown links which are operatively connected to a suitable mechanism (not shown) of the trolley, for raising and lowering the ends of the peel as it swings about the fulcrum 9.

Referring now to Fig. 4, it will be noted that the reciprocating rod 13 is fixedly connected at its front end 20, to the end of a stem 21 which is rectangular in cross-section (Fig. 5) and slidable in a rectangular bore in the front end portion of the peel. The stem terminates in a head 22, of the type designed to enter the slot 23 in an end wall 24 of a charging box 25, only a fragment of which is shown. Such box may be of conventional construction, or be specially shaped at one end, to accommodate a peel head 22 of any desired shape. As is usual, the end wall of the box has a vertical notch 26, communicating with the slot 23, and in accordance with the present invention, such notch accommodates a neck portion 27 of the peel head 22. At this point, it will be evident from Fig. 4, that if stem 21 is moved by the rod 13 in the direction of the arrow 28, while the head is in the slot 23 of the charging box, the head will function to clamp the extreme end 29 of the box against the outer end of the peel.

Pursuant to the present invention, a key 30 fixes a bolt 31 to the tubular casing 10 of the peel, and as this bolt is arranged axially of the peel, and is positioned at the front end thereof, when the clamping head 22 is moved in the direction of the arrow 28, the end 32 of the bolt will
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In order to protect the front end portion of the peel, I fix thereto, a removable tubular shield 35, and end plate 36, each made of a metal having a high resistance to heat. Such metals are known, but I believe for the first time to use them in protective shields for the front end portion of the peel of a furnacing machine.

As mentioned heretofore, the rod 13 reciprocates within the tubular casing of the peel, and as it must also rotate with said casing, special mounting means is arranged at the rear end of the peel. As shown in Fig. 5, the rod 13 extends through a removable plate 37 of the reciprocating housing 38. Within the housing, the rear end of the rod is keyed at 39 to a collar 40, which is in threaded engagement with the rod and cooperates with a thrust bearing 41, and a radial bearing 42. This construction steadies the rod, while permitting the same to move with the housing 38, or rotate relatively thereto.

Referring to the operating mechanism, it will be understood that while the trolley which supports the peel, cradle, and associated parts, is moving toward a car (not shown), carrying a filled charging box 25, the head end of the peel will be in elevated position. When the peel head arrives at the desired location, the operator of the trolley will operate the links 19, at the rear end of the peel, to lower the free end of the peel, and cause the head 22 to enter the slot 23 of the box. As the head descends into the slot, the notch 25 will accommodate the neck 27. At this time, the hydraulic motor 49 will be actuated to swing the lever 44 about the axis of the pin 45, to cause the rod 13 and the head of the peel to move in the direction of the arrow 28 (Fig. 4), so as to clamp the extreme end 29 of the box 25 against the plate 36 of the peel. As the bolt 31 cannot move during such operation, it will enter the cavity 33 in the end of the box, and the peel head will be rigidly secured to the box. At this time, the links 18, at the rear end of the peel, can be depressed so as to lift the charging box from the car which supported it, and the trolley which carries the peel can be moved forward to introduce the box and the head end of the peel into the furnacing. When entry into the furnacing is sufficient, the motor 17 can be energized, to rotate the casing 10 of the peel, and as the stem 27 turns with such casing, it is evident that the head 22 of the peel and the bolt 31 will also turn in dumping the contents of the box into the furnacing. Of course, the return of the box to upright position, withdrawal thereof from the furnacing, depositing of the box on a car, and the release of the box from the peel, may be accomplished by reversing the procedure heretofore outlined.
including a rod extending through the peel casing for moving the stem and the peel head relative to the peel casing, a bolt extending through the stem and the peel head terminating beyond the free end of the peel casing, and means securing the bolt to the peel casing.

6. In a furnace charging machine for open-hearth furnaces, an elongated hollow peel casing, a peel head at the free end of the peel casing, a stem carried by the peel head extending into the hollow peel casing at the free end thereof and slidably relative thereto, means preventing rotation of the stem relative to the peel casing, a rod connected to said stem and extending through the peel casing, a swingable lever pivotally connected to said rod, power operated means for swinging said lever, a bolt extending through the stem and the peel head and terminating beyond the free end of the peel casing, and means extending through a slot in the stem securing the bolt to the peel casing.

7. In a furnace charging machine, an elongated tubular peel casing, a peel head, a stem carried by the peel head rectangular shaped in cross section, said peel casing having a rectangular shaped opening in a free end portion for slidably receiving said stem, means including a rod extending through the peel casing and connected to said stem for moving the stem and the peel head axially of the peel casing, and a transverse butt end surface on the free end of said peel casing.

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The following references are of record in the file of this patent:

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