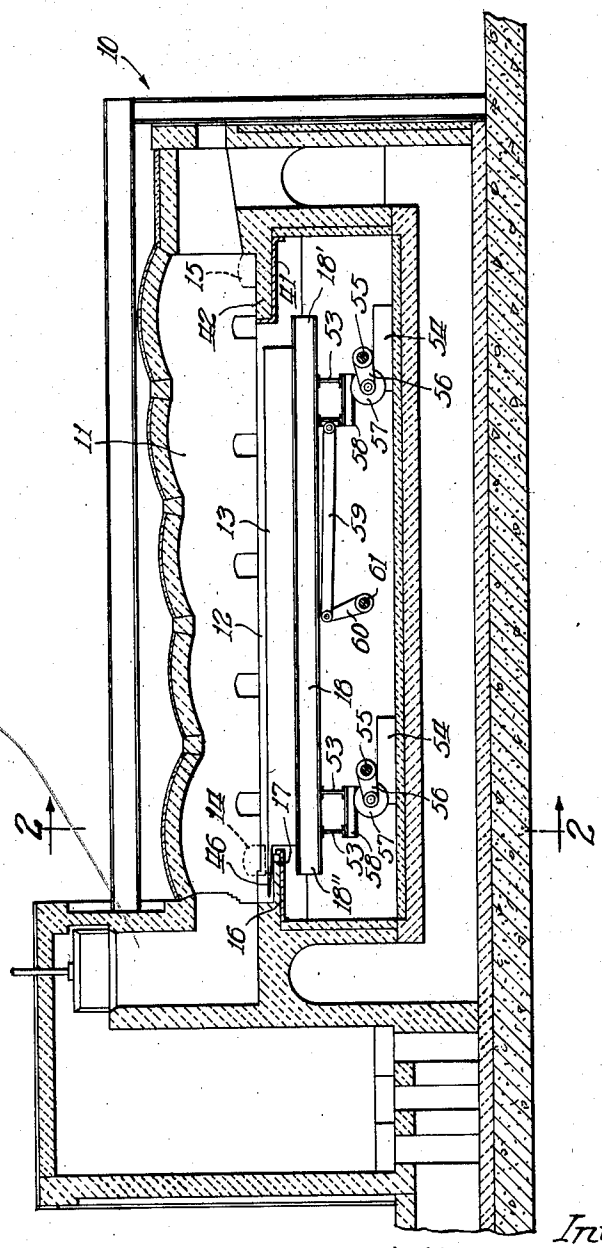
Sept. 18, 1934. A. L. STEVENS 1,973,934

HEAT TREATING FURNACE

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Fig. 1




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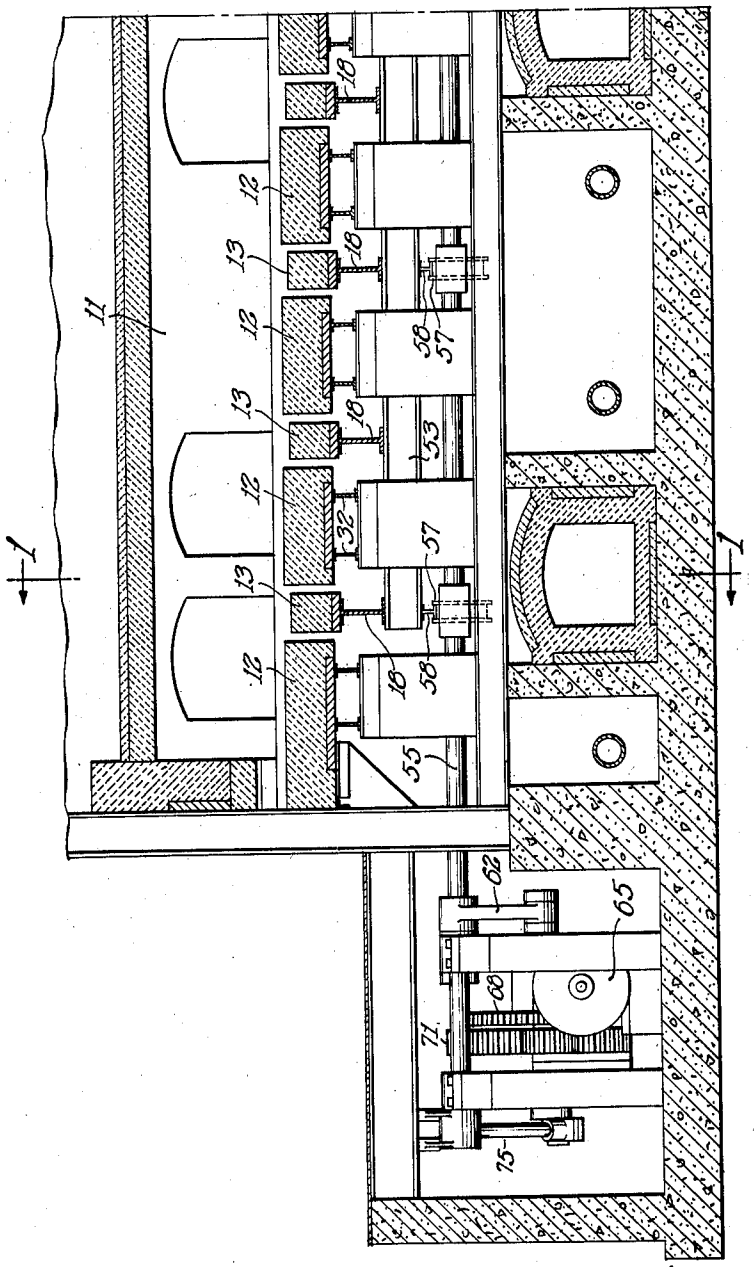
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HEAT TREATING FURNACE

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Fig. 2




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HEAT TREATING FURNACE

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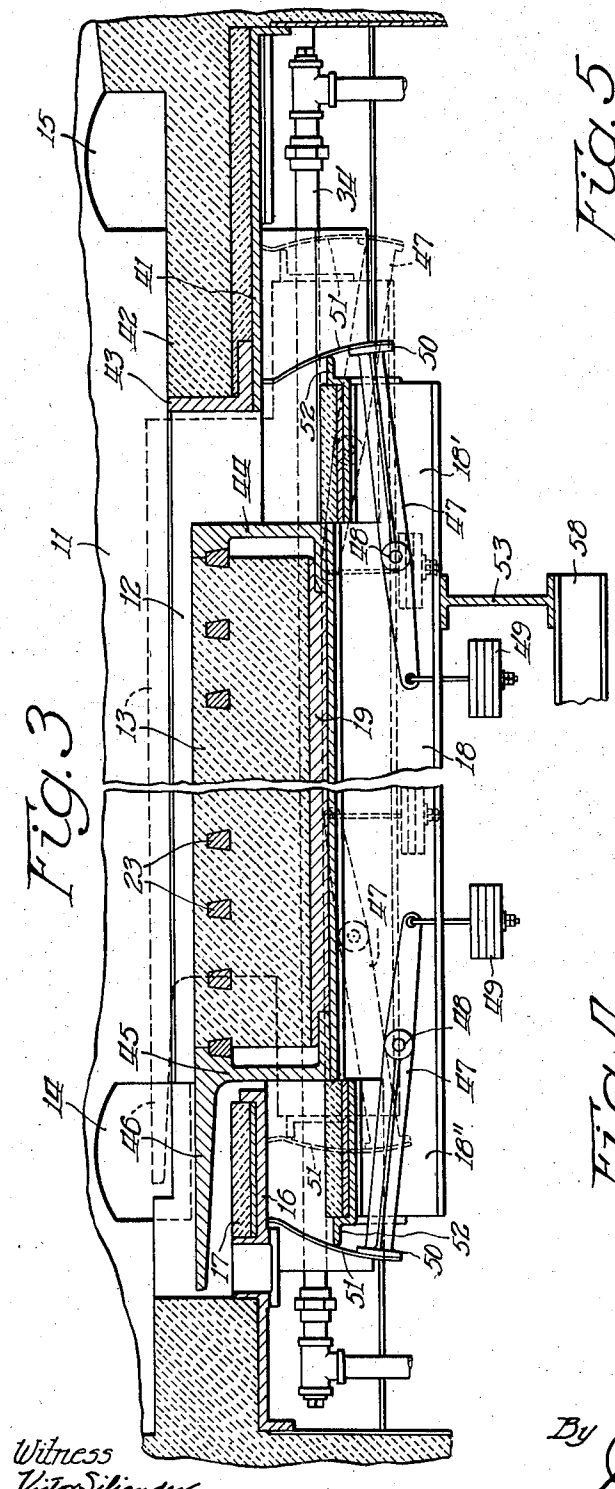


Fig. 3

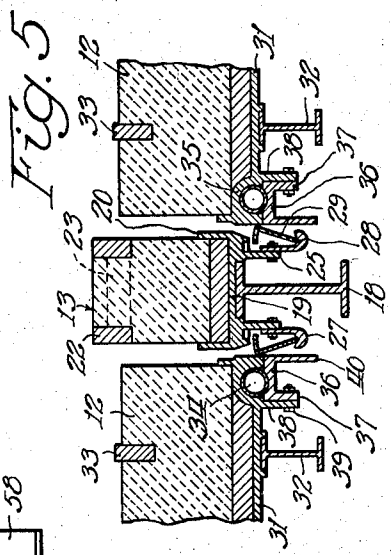


Fig. 5

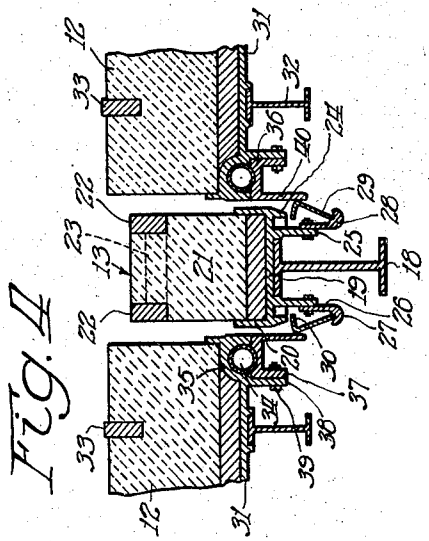


Fig. 4

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HEAT TREATING FURNACE

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Fig. 6

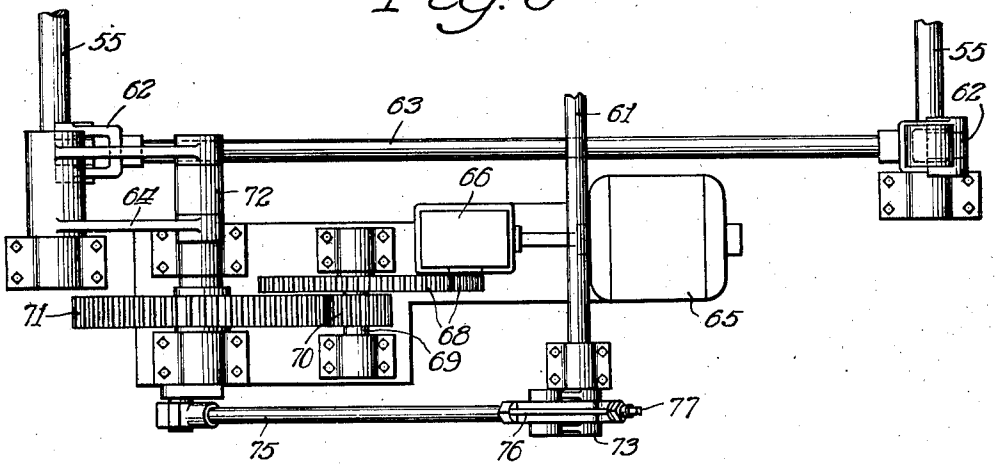



Fig. 7

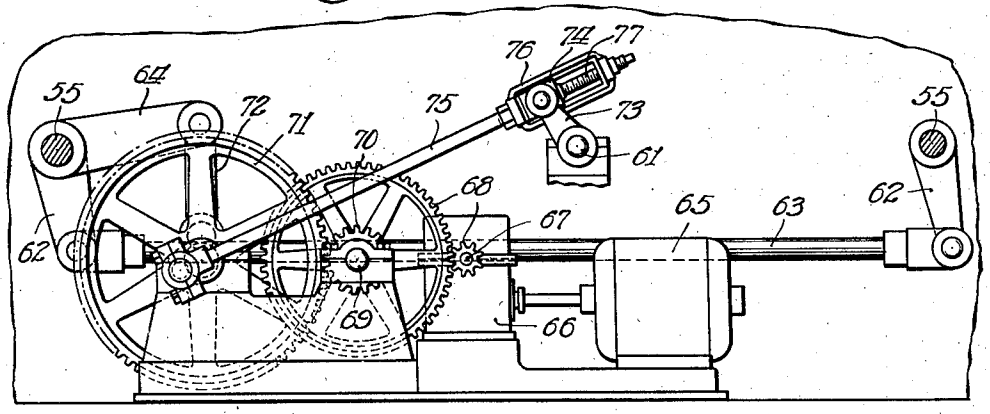
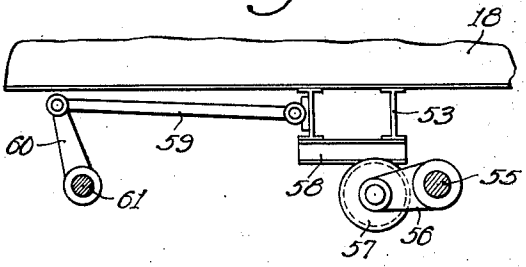



Fig. 8




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Patented Sept. 18, 1934 1,973,934

# UNITED STATES PATENT OFFICE

1,973,934

## HEAT TREATING FURNACE

Arthur L. Stevens, Evanston, Ill., assignor, by mesne assignments, to Arthur L. Stevens Corporation, Chicago, Ill., a corporation of Delaware

Application September 2, 1931, Serial No. 560,736

15 Claims. (Cl. 263—6)

This invention relates to heat treating furnaces of the type wherein a portion of the hearth is movable to feed the material treated therethrough and is designed to provide for the sealing of the apertures and openings around the movable parts to prevent the infiltration of cold air and the exhaust of heated air and the products of combustion.

This invention is furthermore designed to provide a simple and competent means of operating the movable hearth sections.

With the above and other objects in view, as will be apparent, this invention consists in the construction, combination and arrangements of parts, all as hereinafter more fully described, claimed and illustrated in the accompanying drawings, wherein:

Fig. 1 is a vertical section, taken along lines 1—1 of Fig. 2, and illustrates one of the movable hearth sections and the mechanism for accomplishing the movement thereof.

Fig. 2 is a transverse vertical section taken along lines 2—2 of Fig. 1 with parts eliminated to illustrate the relative positions of the movable hearth sections as well as the fixed hearth sections coacting therewith and the means by which the movable sections are operated in unison.

Fig. 3 is an enlarged vertical, longitudinal section through one of the movable hearth sections showing the mechanism for sealing the end of the movable hearth section during the movement thereof;

Fig. 4 is a transverse section taken through a part of the hearth illustrating one of the movable hearth sections and the seal between that section and the coacting stationary or fixed sections;

Fig. 5 is a similar view illustrating the movable hearth section elevated and the position of the seal which moves with the hearth section;

Fig. 6 is a plan view of the mechanism whereby the movable hearth sections are operated;

Fig. 7 is an elevation thereof; and

Fig. 8 is a fragmentary elevation illustrating the connection between one of the movable hearth sections and the mechanism for reciprocating and operating the same.

The present furnace, while it is primarily designed for the heat treating of billets may be readily adapted for use in conjunction with the heat treatment of other material and articles. The furnace is generally of a type wherein the major portion of the hearth is fixed from movement while one or more sections thereof are arranged to move upwardly, forwardly, downwardly and rearwardly, thereby in the upward and forward movement lifting the material treated from the stationary sections of the hearth and advancing it through the furnace so that when the movable hearth sections are lowered the material treated will again be placed upon the stationary or fixed sections of the hearth, but in an advanced position and the movable sections will then return to their original positions below the level of the fixed hearth sections to repeat the operation.

Of necessity there will be spaces at the ends of such movable hearth sections, and between the sides of said movable hearth sections and the stationary or fixed hearth sections which, if not closed, will permit the infiltration of cold air or under some circumstances the outward passage of the products of combustion and heated air from within the furnace.

The present invention is designed to provide a seal between the longitudinal sides of the movable hearth sections and the fixed hearth sections coacting therewith so that irrespective of the position of the movable hearth sections, whether above or below the fixed hearth sections, these spaces will always be substantially closed. The present invention is furthermore designed to effectively close the open spaces which may occur at the ends of the movable hearth sections during the movement thereof. In this manner the present invention contemplates the very material reduction in the infiltration of cold air or the exhausting of the products of combustion or heated air about the sides and ends of the movable hearth sections.

Furthermore, the present invention has in view an improved construction in the movable hearth sections whereby the life thereof is increased, and the feeding of billets to and the removing of billets from the furnace will be greatly facilitated.

Among its other objects the present invention also provides an improved mechanism for operating the movable hearth sections as above described which will be simple and efficient and at the same time may be capable of adjustment to vary the stroke and operation of such sections.

Reference being had more particularly to the drawings, 10 designates a generally continuous heat treating furnace provided with a hearth chamber 11, the hearth of which constitutes a series of stationary sections 12 and alternate movable hearth sections 13 coacting therewith. At one end of the furnace and in the side wall thereof is a charging aperture 14 while at the opposite end is an outlet or delivery opening 15.

The billets or other material to be heat treated are inserted through the charging aperture 14 and after being passed through the chamber 11 by the movement of the movable hearth sections 13, as above and hereinafter described, may be removed through the delivery opening 15 in the side of the furnace.

A loading platform 16 is provided adjoining the charging aperture 14 and below the level of the bottom thereof and has a suitable refractory surface 17.

Each movable hearth section comprises an I-beam 18 normally positioned somewhat below the lower surface of the adjoining fixed hearth sections 12 and in vertical alignment with the space between said fixed hearth sections 12. A channel 19 is mounted upon the upper side of the I-beam 18 and is provided along its outer edges with the vertical sides 20. Mounted upon the channel 19 and positioned between the sides 20 thereof is the refractory brick work 21 of the movable hearth sections. The upper longitudinal edges of this brick work 21 are provided with heat resisting metallic bars 22 which protect the brick work of the movable hearth sections 13 from damage at the edges thereof. These longitudinal metallic bars 22 are connected by transverse bars 23 which are embedded in the brick work and strengthen the same as well as hold the bars 22 in place.

Forming continuations of the sides 20 of the channel 19 below the plane of the channel 19 are lips 24, the outer surfaces of which are beveled inwardly towards the edges thereof. Secured to the sides of the channel 19 are arranged parallel to the lips 24 and resting against the edges of the upper side of the flange of the I-beam 18 are a pair of flanges 25 one of said flanges adjoining each lip 24 of the channel 19.

Bolted or otherwise secured to the lower edges of the flanges 25 are hangers 26 which terminate at their lower edges in lateral hooked portions 27, the upper surfaces of which are grooved as indicated at 28. Mounted in the grooves 28 of the hooked portions 27 are sealing plates 29 which move about the juncture between said plates 29 and the hooked portions 27 of the hangers 26, to-wit, at the grooves 28. The upper edges of these plates 29 are provided with inwardly positioned slightly curved extensions 30 that are adapted to operate below the lower edges of the lips 24 of the channel 19.

The stationary hearth sections 12 are mounted on plates 31, which in turn are supported by suitable I-beams 32, arranged longitudinally of the furnace. The refractory brick work of the fixed hearth sections is mounted upon these plates 31 and has imbedded therein armor bars 33 which extend above the level or plane of the refractory brick work and constitute supports for the material being treated when the same rests upon the stationary or fixed hearth sections 12. Adjoining each movable hearth section 13, the stationary hearth sections 12 are provided with longitudinal cooling pipes 34, through which water passes and which are mounted in seats 35 formed adjoining the edges of the plates 31 adjoining the movable hearth sections. These seats 35 encircle the upper portions of the cooling pipes 34 while the lower portion of the pipes 34 are engaged by clamping plates 36 which plates bear against and partly embrace the pipes 34 and are provided along their inner edges with flanges 37 that rest flush against similar flanges 38 formed upon the plates 31 where the flanges 37 are secured by suitable bolts or other fastening means 39. The outer sides or edges of the clamping plates 36 are provided with vertical flanges 40 which rest parallel to the flanges 37 and 38 and to the hangers 26 and flanges 25 of the adjoining movable hearth sections 13.

In operation, the spaces at the sides of the movable hearth section and between the movable hearth section 13 and the coacting stationary sections 12 are closed by the plates 29 and the extensions 30 thereof. When the entire structure is assembled, as illustrated in Figs. 4 and 5, the lower edges of the plates 29 rest upon and pivot about the curved or hooked portions 27 of the hangers 26, while the upper edges of these plates rest against the flanges 40 of the clamping plates 36 and slide over said flanges 40 as well as the outer walls of the seats 35 which are coplaner and coextensive with the flanges 40. As the plates 29 occupy these positions the extensions 30 thereof operate below the lips 24 and extend from the seats 35 and flanges 40 to a point adjoining the flanges 25 of the channel 19. Thus the spaces along the longitudinal sides of the movable hearth sections and between said hearth sections and stationary hearth sections 12 are effectively closed against the major portion of the air flow which would normally occur through such spaces.

The ends of the movable hearth sections 13 are at all times spaced from the adjoining portions of the fixed hearth or furnace construction as, for instance, the loading or charging platform 16 and the delivery platform 41 adjoining the delivery opening 15. The delivery platform 41 is surfaced with suitable refractory material 42 and along its inner edge is provided with a protecting plate 43. The delivery opening 15 opens on to the surface of the delivery platform 41 which in turn lies in the hearth line and is substantially co-planer with the upper surfaces of the stationary or fixed hearth sections 12. That end of each movable hearth section 13, adjoining the delivery platform 41 is provided with a metallic end piece 44 which is supported by the I-beam 18 and terminates at the upper surface of the movable hearth section. The I-beam 18 extends beyond the end piece 44 as at 18', as illustrated in Fig. 3, and during the reciprocation of the movable hearth section 12, this extension 18' operates or reciprocates under the delivery platform 41.

At the opposite or charging end of each movable hearth section 13, there is an end piece 45 similar to the end piece 44 and secured to the movable hearth section 13 or to the I-beam 18 thereof. This end piece 45 is provided with a peel 46 the lower surface of which is tapered from the extremity of the peel to the end piece. This peel 46 during the reciprocation of the movable hearth section 13 operates over the loading or charging platform 16 and is designed to receive the billets from the charging opening 14. The end 18'' of the I-beam 18 extends beyond the end piece 45, as does the end 18' of the I-beam, and during the reciprocation of either section operates beneath the loading platform 16.

The operation of the movable hearth section is substantially as follows:

A billet or other article to be heat treated is inserted through the charging aperture 14 and is thereby placed upon the peel 46 when the peel is aligned with the opening 14. The movement of the movable hearth section 13 toward the delivery platform 41 occurs when the hearth section 13 has been elevated and is above the plane of the

stationary hearth sections 12. This elevates and carries the billet, which has been placed upon the peel 46, toward the delivery platform 41 until the movable hearth section 13 has reached the limit of its path of movement toward said delivery platform 41, at which time the hearth section 13 moves downwardly placing the billet upon the bars 33 of the stationary hearth sections 12. The movable hearth section 13 then is below the level or plane of the stationary hearth sections 12 and may be moved toward the charging end of the furnace without affecting the position of the billets resting on said stationary or fixed hearth sections 12.

When the movable hearth section 13 has reached the limit of its movement toward the charging end of the furnace below the level of the fixed hearth sections 12, it moves upwardly to receive another billet upon the peel 46 and simultaneously elevates all of the billets which rest upon the stationary or fixed hearth sections 12. In again moving toward the delivery end of furnace, the movable section 13 carries all of the billets toward that end of the furnace in a series of steps until they are eventually successively delivered to and rest upon the delivery platform 41 whence they may be removed through the delivery opening 15. This operation is repeated so that the billets pass through the furnace in spaced relation and when resting upon the fixed hearth sections 12 are supported elevated by the bars 33 above the surface of the sections so that the heat may completely pass around the billets.

As each movable hearth section 13 reciprocates as above described, the ends thereof are alternately spaced from the respective platforms 16 and 41 which spaces, if unobstructed, would permit the infiltration of cold air or the exhaust of heated air and products of combustion. In order to close these spaces a rocker arm 47 is pivoted, as at 48, adjoining each end of the I-beam 18, one of the pivots 48 being positioned approximately below the end piece 44, while the other pivot 48 is positioned approximately below the remaining end piece 45. The inner ends of these rocker arms are provided with weights 49 which tend to throw the outer ends 50 of the rocker arms 47 upwardly toward the platforms 16 and 41.

The outer terminal 50 of each rocker arm 47 is provided with a vertical plate 51, the upper edge of which bears against the coacting platform 16 or 41 and which is maintained in this position by the weights 49.

The pivoting of the rocker arms 47 permits the upper edges of the plates 51 to bear against the lower surfaces of the platforms 16 and 41 at all times during the vertical movement of the movable hearth section 13. As the movable hearth section 13 reciprocates, these plates 51 move therewith and slide over the lower surfaces of the platforms 16 and 41 as illustrated in Fig. 3. Thus at all times the edges of the plates 51 have an intimate and close contact with the platforms 16 and 41, irrespective of the position of the movable hearth section 13 in its path of travel.

To prevent the passage of air or products of combustion between the ends 18' ad 18'' of the I-beam 18 and the plates 51, the ends of the I-beam are provided with outstanding flanges 52 which constantly bear against the inner faces of the plates 51 and the latter are curved toward the I-beam to insure the constant engagement or contact between the plates 51 and the flanges 52. Thus the spaces at the ends of the I-beam of the movable hearth section are substantially closed and sealed at all times.

One or more of the movable hearth sections 13 may be provided, dependent upon the size of the heat treating furnaces. In the present case a plurality of movable hearth sections 13 are provided and, in order that they may operate in unison, the I-beams 18 thereof rest upon transverse I-beams 53 which are positioned adjoining the ends 18' and 18'' of the I-beam 18 and, being secured to the I-beams 18, create a rigid unitary structure consisting of the I-beams 18 and I-beams 53.

Bearing blocks 54 are mounted on the bottom of the furnace adjoining the ends of the I-beam 18 and provide mountings for the transverse shafts 55 which extend beneath all of the I-beams 18 and project beyond the wall of the furnace. There are two or more of these transverse shafts 55 one at each end of the furnace and it is these shafts that raise and lower the I-beams 18 and consequently all of the movable hearth sections 13. At points throughout the length of the shafts 55 and in alignment with the movable hearth sections 13 are arms 56 fixed to the shafts for movement therewith. At their ends these arms 56 are provided with grooved rollers 57. At points on the I-beams 53, corresponding to the rollers 57, are small I-beams 58 secured transversely to the I-beams 53. These small I-beams 58 are received in the rollers 57 and may slide therein as hereinafter described. Through mechanism to be described, the shafts 55 are rocked or oscillated in unison and as they operate in one direction the arms 56 will be elevated and in so doing the rollers 57 contacting with the small I-beams 58 will elevate these I-beams together with the movable hearth structure consisting of I-beams 53 and 18. The reverse movement of the shafts 55 lower the arms 56 and rollers 57 and permit the movable hearth structure to be lowered. As heretofore described when the movable hearth structure is elevated or is lowered and has reached the limits of its vertical movement it moves horizontally and this horizontal movement is accommodated in the lifting structure by the length of I-beams 58 and their sliding co-action with the rollers 57.

In order to reciprocate the movable hearth structure, consisting of the movable hearth sections 13 and the I-beams 18 and 53, a pitman 59 is pivoted to one of the I-beams 53 and is connected to a crank arm 60 secured to a shaft 61 centrally and transversely located with respect to the length of the hearth. This shaft 61 is mounted for oscillation and as it oscillates it will, through the medium of the crank arm 60 and pitman 59, reciprocate the movable hearth structure.

For the operation of the shafts 55 and the ends thereof which project beyond the furnace walls are provided with crank arms 62 which are fixed to the shafts 55 and the ends of which are connected by a link 63. Thus the shafts 55 are connected together for operation in unison. One of the shafts 55 has an operating crank arm 64 fixed thereto which, as will be hereinafter more fully described, is swung through a predetermined arc to oscillate the shaft 55 to which it is attached, thereby imparting the same movement to the companion shaft 55 by means of the crank arms 62 and link 63.

The movement and control of the operating crank arm 64 is accomplished by a motor 65 through the medium of a gear reduction mecha-

nism 66 operating a drive shaft 67. This drive shaft 67 through a suitable gear train 68 drives an intermediate shaft 69 to which is keyed a gear 70. This gear 70 in turn operates the driving gear 71 to which a pitman 72 is eccentrically pivoted at one end and is pivoted to the terminal of the operating crank arm 64 at its other end. Thus as the driving gear 71 is rotated, the crank pitman 72 will be reciprocated and cause an oscillation of the operating crank arm 64 which in turn will cause the oscillation of the shafts 55 in unison as described.

In order to oscillate the shaft 61 for the reciprocation of the movable hearth structure the end of said shaft projecting beyond the furnace wall is provided with a crank arm 73 which is provided with a block 74 pivoted to the end thereof. The driving gear 71 is provided with a second pitman 75 pivoted eccentrically thereto, which at its outer end is provided with a rectangular hollow frame 76. The block 74 is received within the frame 76 and is designed to reciprocate therein under certain conditions. An adjusting screw 77 is threaded into one end of the frame 76 and bears against the block 74 so that the position of this adjusting screw 77 determines the extent of the movement of the crank pitman 75 relatively to the block 74. The movement of the block 74 and consequently the crank arm 73 in one direction is determined by the contact of the lower end of the frame 76 with the adjoining end of the block 74, while the movement of the block 74 in the opposite direction is determined by the contact between the screw 77 and the opposite end of said block. Manifestly therefore the degree of oscillation of the shaft 61 is determined by the position of the screw 77, which regulates and determines the movement of the pitman 75 independently of the block 74, prior to the operation thereof in unison.

From the foregoing it is clear that a heat treating furnace is provided in the present invention whereby, one or more movable hearth sections operate to pass the material or articles treated through the furnace in spaced relation and in a step by step progression. Furthermore this invention provides for the closing of the openings which occur between the movable and stationary hearth sections, irrespective of the position and path of movement of the hearth sections. Likewise, it will be noted that a strong, substantial hearth structure is created which is moved by a positive driving mechanism, capable of an adjustment whereby the stroke of the movable hearth structure may be regulated.

What is claimed is:—

1. In a furnace, the combination with spaced fixed hearth sections, of a movable hearth section operating therebetween, and plates hinged to the side of the movable hearth section for coaction with the fixed sections to close spaces occurring between the fixed and movable sections irrespective of the position of the movable section.

2. In a furnace, the combination with fixed portions thereof, of a movable hearth operating in conjunction with said fixed portions, and hinged means coacting with the sides and ends of said movable hearth for cooperation with the fixed portions of the furnace to close spaces occurring between the movable hearth and said fixed portions.

3. In a furnace, the combination with a movable hearth section, of fixed portions of the furnace structure coacting with the sides and ends thereof, longitudinal plates pivoted to the sides of the movable hearth section and having sliding contact with the adjoining fixed portions of the furnace structure throughout the length thereof, and plates hinged to the ends of said movable hearth section and having sliding contact with the adjoining fixed portions of the furnace structure.

4. In a furnace, the combination with a movable hearth section, of fixed portions of the furnace structure coacting with the sides and ends thereof, longitudinal plates pivoted to the sides of the hearth section and having sliding contact with the adjoining fixed portions of the furnace structure throughout the length thereof, rocker arms pivoted to the under side of the movable hearth sections adjoining the ends thereof, and plates secured to the ends of said rocker arms and adapted to have sliding contact with the lower faces of the adjoining fixed portions of the furnace structure.

5. In a furnace, the combination with a movable hearth section, of fixed portions of the furnace structure coacting with the sides and end thereof, longitudinal plates pivoted to the sides of the movable hearth section and having sliding contact with the adjoining fixed portions of the furnace structure throughout the length thereof, rocker arms pivoted to the under side of the movable hearth section adjoining the ends thereof, plates secured to the ends of said rocker arms and cooperating with the lower faces of the adjoining fixed portions of the furnace structure, and means for insuring constant contact between the fixed portions of the furnace and the plates of the rocker arms.

6. In a furnace, the combination with a movable hearth section, of fixed portions of the furnace coacting with the ends of said hearth section, rocker arms pivoted to said movable hearth section, and plates fixed to said arms for movement relative to the movable hearth sections by contact with the adjacent fixed portions of the furnace.

7. In a furnace, the combination with a movable hearth section, of fixed portions of the furnace coacting with the ends of said hearth section, rocker arms pivoted to said movable hearth section, plates fixed to said rocker arms and cooperating with the coacting fixed portions of the furnace, to maintain a constant contact between said plates and said fixed portions of the furnace.

8. In a furnace, the combination with a movable hearth section, of fixed portions of the furnace coacting with the ends of said hearth section, rocker arms pivoted to said movable hearth section, transverse plates fixed to said rocker arms and having sliding contact with the coacting fixed portions of the furance, and counter weights coacting with the ends of the rocker arms opposed to said plates to insure constant sliding contact between the plates and the coacting fixed portions of the furnace.

9. In a furnace, the combination with a plurality of spaced, fixed hearth sections, of movable hearth sections, positioned in the spaces between said fixed hearth sections, means whereby said movable hearth sections may be simultaneously moved in vertical and horizontal planes, comprising means for securing said movable hearth sections one to the other for operation in unison, a shaft, a crank arm on said shaft, a link connecting the terminal of said crank arm with said movable hearth sections, means for oscillating said shaft whereby said hearth sections may be reciprocated, means for periodically elevating said

movable hearth sections, and means for closing the spaces between the fixed and movable hearth irrespective of the position of the movable hearth.

10. In a furnace, the combination with a plurality of spaced, fixed hearth sections, of movable hearth sections, positioned in the spaces between said fixed hearth sections, means whereby said movable hearth sections may be simultaneously moved in vertical and horizontal planes, comprising means for securing said movable hearth sections one to the other for operation in unison, a shaft, a crank arm on said shaft, a link connecting the terminal of said crank arm with said movable hearth sections, means for oscillating said shaft whereby said hearth sections may be reciprocated, other shafts positioned adjoining the ends of the movable hearth sections, crank arms on said shafts, coonnections between said crank arms and said movable hearth sections, means for oscillating said last said shafts whereby said movable hearth sections may be periodically moved in a vertical plane, of plates adjoining the edges of the fixed hearth sections, hangers on the movable hearth sections, and means carried by said hangers and coacting with the plates aforesaid to close the spaces between the fixed and movable hearth sections irrespective of the position of the latter.

11. In a furnace, the combination with a plurality of spaced, fixed hearth sections, of movable hearth sections, positioned in the spaces between said fixed hearth sections, means whereby said movable hearth sections may be simultaneously moved in vertical and horizontal planes, comprising means for securing said movable hearth sections one to the other for operation in unison, a shaft, a crank arm on said shaft, a link connecting the terminal of said crank arm with said movable hearth sections, means for oscillating said shaft whereby said hearth sections may be reciprocated, other shafts positioned adjoining the ends of the movable hearth sections, crank arms on said shafts, slidable connections between said crank arms and said movable hearth sections, a motor, a driven gear operated from said motor, a bell crank lever oscillated by said driven gear a connection between said bell crank lever and last said shafts whereby said shafts may be oscillated in unison, and a plate hinged to the movable section for intimate contact with the fixed section for closing the space between said sections.

12. In a furnace, the combination with a plurality of spaced, fixed hearth sections, of movable hearth sections, positioned in the spaces between said fixed hearth sections, means whereby said movable hearth sections may be simultaneously moved in vertical and horizontal planes, comprising means for securing said movable hearth sections one to the other for operation in unison, a shaft, a crank arm on said shaft, a link connecting the terminal of said crank arm with said movable hearth sections, means for oscillating said shaft whereby said hearth sections may be reciprocated, other shafts positioned adjoining the ends of the movable hearth sections, crank arms on said shafts, slidable connections between said crank arms and said movable hearth sections, a motor, a driven gear operated from said motor, a bell crank lever oscillated by said driven gear, a connection between said bell crank lever and last said shafts whereby said shafts may be oscillated in unison, a rod reciprocated by said driven gear, an adjustable connection between said rod and the shaft whereby the hearth sections are reciprocated, longitudinal plates pivoted to the sides of the movable hearth section and having sliding contact with the adjoining fixed portions of the furnace structure throughout the length thereof, and plates hinged to the ends of said movable hearth section and having sliding contact with the adjoining fixed portions of the furnace structure.

13. In a furnace, the combination with fixed portions thereof, of a hearth movable in two planes operating in conjunction with said fixed portions, and means mounted on the sides and ends of said movable hearth and movable with respect to said movable hearth to close spaces occurring between the movable hearth and said fixed portion during movement of said movable hearth.

14. In a furnace, the combination with a hearth section movable in two planes, of fixed portions of the furnace structure adjoining the ends and sides of said movable hearth section, and plates carried by said movable hearth section at the ends and sides thereof movable in accordance with the contour of the fixed portions defining the space between the movable hearth and said fixed portions during movement of said movable hearth section.

15. In a furnace, the combination with fixed portions thereof, of a movable hearth operating in conjunction with said fixed portions, mechanism coacting with the sides and ends of said movable hearth for cooperation with the fixed portions of the furnace to close spaces occurring between the movable hearth and said fixed portions, and means for controlling the temperature of said mechanism.

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