Mar. 20, 1923. 1,448,879.

W. C. STRIPE.

SUSPENDED FURNACE ROOF.

FILED AUG. 9, 1921.

Fig. 1.

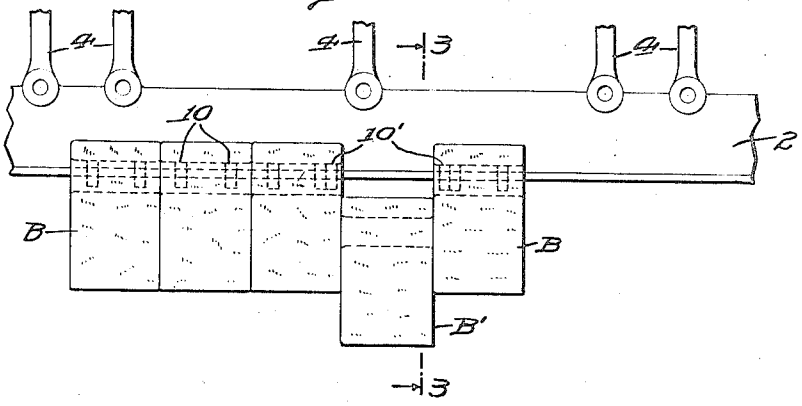


Fig. 2.

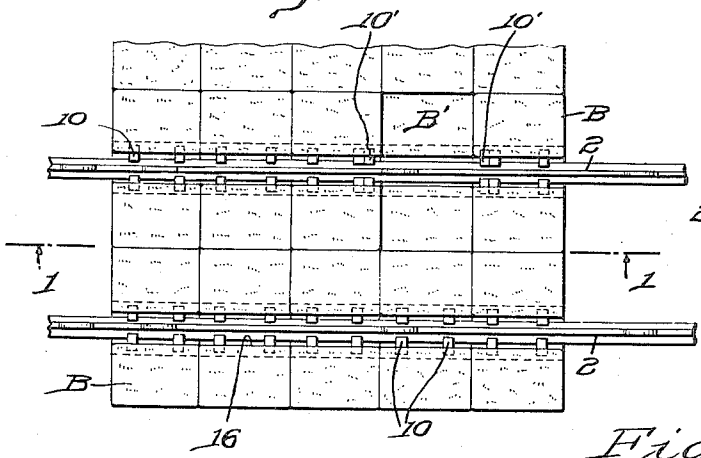


Fig. 6.

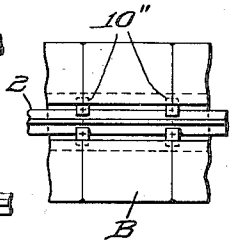


Fig. 3.

Fig. 4.

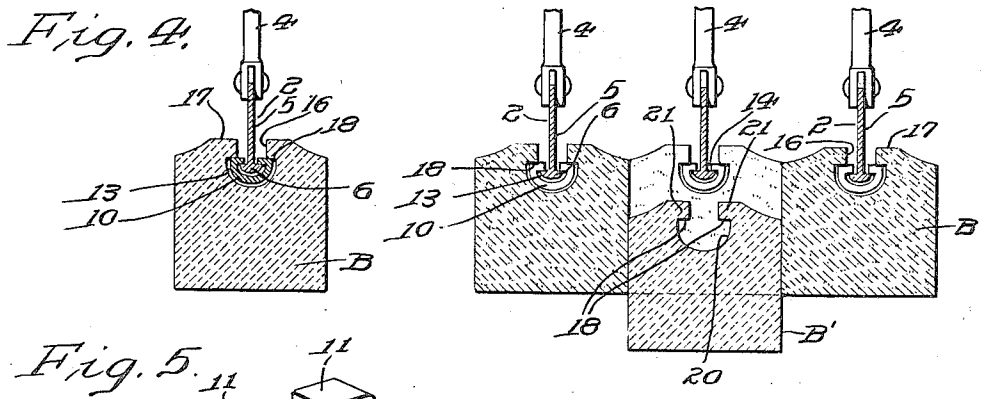
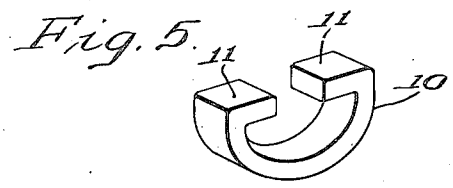


Fig. 5.



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Patented Mar. 20, 1923. 1,448,879

UNITED STATES PATENT OFFICE.

WILLIAM C. STRIPE, OF UPPER DARBY, PENNSYLVANIA.

SUSPENDED FURNACE ROOF.

Application filed August 9, 1921. Serial No. 490,823.

To all whom it may concern:

Be it known that I, WILLIAM C. STRIPE, a citizen of the United States, and a resident of Upper Darby, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Suspended Furnace Roofs, of which the following is a specification, reference being had to the accompanying drawing.

The invention relates to the roofs or arches of heating furnaces, boiler furnaces and the like of various types and more particularly to means for suspending the individual bricks of which the arch or roof is composed, a principal object of the invention being to provide means whereby any of the bricks may be readily removed or replaced without disturbing the other bricks adjacent thereto.

Further objects of the invention are to provide means for suspending individual bricks to form a furnace roof or arch which are simple in construction, of relatively low cost and which may be conveniently utilized in suspending the bricks during the initial construction of the arch or roof and readily operated when it is desired to move one or more bricks therefrom for renewal or replacement.

A still further object of the invention is to so arrange and construct the means which are cooperative with the individual bricks in effecting suspension thereof, that a brick of very simple design and form may be employed, thereby facilitating the manufacture of the bricks and reducing the cost thereof to a point not materially in excess of ordinary bricks of similar material hitherto utilized for the construction of furnace arches and roofs, while by reason of the particular construction and arrangement of the several elements employed, an efficient ventilation of the brick or tile suspending means is provided, thereby lessening the injurious effects thereon of the high temperatures in the subjacent fuel bed.

The invention further includes all of the other various objects and novel features of construction and arrangement hereinafter more particularly described or shown in the accompanying drawing.

Since my invention is capable of use in many types of furnaces and generally similar apparatus, I have not shown the same in the accompanying drawing as embodied in any completed or specific furnace or the like, but only in connection with a fragmentary portion of the roof or arch of such a structure which may be of any suitable form or design. In the said drawing, Fig. 1 is a fragmentary side elevation on line 1—1 in Fig. 2 of such portion of a roof, one of the individual bricks comprising the same being partially lowered from its operative adjusted position in the roof to illustrate the manner of inserting or removing individual bricks, and Fig. 2 is a top plan view of the portion of the roof shown in Fig. 1. Fig. 3 is a section on line 3—3 in Fig. 1 looking in the direction of the arrows; Fig. 4 is a vertical section through one of the bricks and supporting means; Fig. 5 is an enlarged perspective view of one of the supporting slides removed from the hanger beam, and Fig. 6 a fragmentary top plan view showing a slightly modified form of the invention. Like numerals are used to designate similar parts in the several figures.

In the practice of my invention, a plurality of hanger beams 2 are arranged in parallel relation either transversely or longitudinally above the space to be roofed or arched, these beams being supported in position in any suitable way as by locating their ends on suitable supporting walls or abutments or by suspending the beams in any convenient manner by hanger rods 4 or in any other way as will be readily understood by those familiar with the art. Each of these beams comprises a vertical web 5 which adjacent its lower edge is provided with a flange projecting outwardly from each of its side faces thus forming a T, 6, at the bottom edge of the beam, the under face of the T being preferably formed on a suitable arc. A plurality of slides 10, best shown in Fig. 5, are provided and positioned on each of the hanger beams preferably prior to the latter being placed in position, each of these slides comprising a pair of inwardly directed oppositely disposed spaced ends 11 separated for a somewhat greater distance than the thickness of the vertical web 5 of the hanger beam, the metal of which the slide is composed depending between the ends in a curved or other form approximating the curved or

other surface of the under side of the T 6, the radius of curvature of the inner face of the curved portion of the slide however, being preferably slightly greater than that of the under side of the T, so that when the ends 11 of the slide are engaged over the upper surface of the T, the slide will be supported vertically on the hanger beam with a slight clearance 13 between the under side of the T and the adjacent surface of the slide and a substantially similar clearance 14 between the inner faces of each of the ends 11 and the adjacent side of the vertical web of the beam.

Preferably the number of slides positioned on each beam in the manner described is double the number of bricks which are to be supported to form the portion of the roof adjacent that particular beam, although a greater or less number of slides in proportion to the number of bricks employed may be utilized if desired. Thus in the preferred construction, if ten bricks are to be supported from any given hanger beam, preferably twenty slides will be positioned on the beam with a view to utilizing two slides for effecting the support of each of the bricks.

The particular form of the bricks B employed in the roof or arch may be varied as desired, but ordinarily and as shown in the drawing each brick will be of generally rectangular form, the sides and bottom being substantially plane. Extending transversely across the top of each brick and preferably formed therein when the brick is made, is a slot 16 which, at a suitable distance below the upper surface 17 of the brick is under-cut horizontally as at 18 in opposite directions, the outer extremities of the under-cut portions being connected by a surface 20 preferably of generally similar contour to the under surface of the slides 10. Each brick is thus provided with a pair of inwardly directed lips 21, the adjacent surfaces of which are spaced apart for a considerably greater distance than the web of the hanger beam but less than the overall width of the slides, the portion of the slot beneath the lips being sufficiently large to loosely contain the slides when disposed therein as hereinafter described.

In the operation of assembling a roof or arch with the various parts adapted to form the same constructed in substantially the manner aforesaid, the hanger beams carrying a suitable number of slides as hitherto described, are first positioned in the parallel relation, the distance between the respective centers of the adjacent beams being substantially equal to the width of the bricks to be employed. Beginning conveniently at one side of the roof or arch, the individual bricks are next consecutively raised into a position in which the T at the lower end of the adjacent hanger beam will extend into the larger portion of the slot in the brick when two or more slides may then slide along the beam into the slot to assume substantially the position as shown in Fig. 2; in other words, so that when two slides are employed for each brick they will occupy a position in which each of them is substantially equidistant from the adjacent side of the brick and from the other slide. Under these conditions the individual brick will thus be supported in proper relation with the hanger beam through the engagement of the overhanging lips 21 of the brick with the upper surface of the slides which, in turn, are supported on the hanger beam through engagement of the under sides of their respective overhanging lips 11 with the upper surface of the T on the beam. Thus by consecutively raising the bricks into proper side by side position and moving the slides along the beam to engage them as aforesaid, the entire roof or arch may be readily built up, the ends of each brick contacting with the adjacent ends of the corresponding brick supported from the adjacent hanger by reason of the spacing of the hanger beams, and the sides of the various bricks of course contacting with the sides of the adjacent bricks as best shown in Fig. 2. Of course if desired suitable cement may be introduced between the adjacent surfaces of the several bricks during the construction of the arch or roof should the same be deemed necessary.

In case at any time it becomes desirable to replace any of the individual bricks in the roof or arch, the removal of the old brick and the substitution of a new one may be readily accomplished without disturbing the adjacent bricks in any way, which is a very desirable feature, since in the operation of furnaces frequently one or more of the bricks burns out or becomes damaged in some other way while the adjacent bricks remain in perfect condition. Under these circumstances the damaged brick or bricks may be readily removed by sliding the clips which suspend the same in opposite directions along the particular hanger beam on which the damaged brick is supported until the clips respectively pass beyond the sides of the brick which is to be removed and enter the slots in the adjacent bricks, thereby leaving the damaged brick entirely unsupported save for its possible adherence to the adjacent bricks, through fusion or by reason of the cement which may have been employed. More specifically assuming that brick B′ is to be removed without disturbing the adjacent bricks, the slides 10′ which have been employed for supporting it are slid in opposite directions until they assume the position shown in Figs. 1 and 2, which operation can readily be accomplished by introducing a rod or other suitable instru-

ment between the surface of the web of the hanger beam and the inner face of the overhanging lip of the brick.

The brick being thus unsupported is now in condition to be lowered from its suspended position or chiseled out in case its adherence to the adjacent bricks is considerable and a new brick may then be raised into the cavity left by the old brick until the T of the hanger beam enters the slot in the brick for a sufficient distance to permit the slides 10′ to be again pushed along the hanger beam toward each other to proper position for supporting the brick in place.

In Fig. 6 I have shown a slightly modified form of the invention in which each of the slides 10″ is utilized to partially support two adjacent bricks, the slides being positioned on the hanger beams so as to extend into the slots in the adjacent bricks. Under these circumstances it may be deemed advisable to make the slides of relatively greater width than as shown in Fig. 5 in order that they shall extend sufficiently beyond the face of each brick so as to afford proper support thereto. It is thought that the arrangement of the various other parts and method of assembling or disassembling the arch under these circumstances will be obvious and that detailed description thereof is therefore unnecessary.

From the foregoing it will be observed that I have provided a simple, inexpensive and satisfactory means for individually supporting the bricks composing a furnace arch or roof and which are adapted to readily permit the withdrawal or insertion of new bricks from time to time as may be required without disturbing the adjacent bricks and without the employment of special tools or the necessity of skilled labor.

Furthermore, it will be apparent that as the individual bricks or tiles are entirely out of contact with the hanger beams and are only supported therefrom at spaced points through the medium of the slides, a free circulation of air is at all times possible between the bricks and the webs of the hanger beams as well as in and about the slides and slots in the bricks, so that while the end faces of the bricks which form the under surface of the arch are exposed to direct action of the heat from the fuel bed, the upper parts of the bricks and the supporting means are maintained at a relatively low temperature thereby materially prolonging the life thereof.

While I have herein described with some particularity a preferred embodiment of the invention, it will be understood that I do not thereby desire or intend to limit myself to any precise details of construction or arrangement; that the invention may be readily adapted for use in furnaces and arches of different types as may be desired and that any suitable means other than disclosed may be employed for effecting the support of the hanger beams without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. In a structure of the class described, the combination of a hanger beam having an enlarged lower portion, means slidable on said beam and adapted to engage said portion to receive support therefrom and a brick having an under-cut slot adapted to receive said slidable means when moved into said slot from either end thereof, the overhanging portions of the brick adjacent the slot operating to retain said means from vertical displacement therein.

2. In a structure of the class described, the combination of a hanger beam having outwardly directed flanges adjacent its lower extremity, a plurality of clips slidable on said hanger beam and having overhanging lips adapted to engage said flanges, and a brick comprising a transversely extending under-cut slot and overhanging lips adjacent thereto adapted to engage the upper surfaces of said clips when the clips are moved into said slot from the ends thereof.

3. In a structure of the class described, the combination with a hanger beam having a vertical web and outwardly directed flanges forming a T at the lower end thereof, a plurality of clips longitudinally slidable on said flanges each clip having inwardly directed lips spaced apart for a distance greater than the thickness of said web, and a brick having a transversely extending under-cut slot in its upper surface adapted to receive said clips when inserted in said slot from the ends thereof, the overhanging portions of the brick adjacent the upper edge of the slot being operative to rest on said clips to afford vertical support to the brick.

4. In a structure of the class described, the combination of a plurality of transversely extending, parallel spaced hanger beams each beam having a vertical web and outwardly oppositely directed flanges adjacent the lower edge thereof, arranged to form a T, a plurality of clips having overhanging lips engaging said flanges and longitudinally slidable on each beam and a plurality of individual bricks, each having a transversely extending under-cut slot in its upper surface adapted to receive said clips when moved end-wise into the slot whereby each brick is individually supported in adjusted relation in the structure through the engagement of a plurality of said clips with each brick and with the T on the adjacent hanger beam.

5. In a structure of the class described,

the combination of a plurality of parallel spaced hanger beams each beam having a vertical web and an enlarged lower portion, a plurality of slides independently movable longitudinally of each beam and adapted to over engage said enlarged portion thereof, and a plurality of bricks, each having an under-cut slot in its upper surface adapted to receive a plurality of said slides and overhanging lips adjacent the slot, whereby when the enlarged portion of said beam is introduced into said slot below said lips and a plurality of the slides moved into the ends of the slot, each brick will be vertically and independently supported from said beam by engagement of said lips with said slides and said slides with the enlarged portion of said beam.

6. In a structure of the class described, a hanger beam having an enlarged lower portion and a vertically extending web, a plurality of slides engaging said enlarged lower portion and longitudinally slidable on the beam and a brick having a transversely extending under-cut slot in its upper surface and a pair of inwardly directed lips overhanging the slot, the space between the lips being of sufficient width to permit the enlarged portion of the beam to be introduced into the under-cut portion of the slot when said slides are moved outwardly on the beam beyond the sides of the brick, said slides being operative when moved along the beam in the opposite directions and into the ends of said slot to support the brick from the beam through engagement of said overhanging lips with the slides.

In witness whereof, I have hereunto set my hand this 4th day of August A. D. 1921.

WILLIAM C. STRIPE.