M. LIPTAK.

FURNACE ARCH FOR BOILERS.

APPLICATION FILED JUNE 17, 1918. RENEWED SEPT. 11, 1919.

1,326,753.

Patented Dec. 30, 1919.

3 SHEETS—SHEET 1.

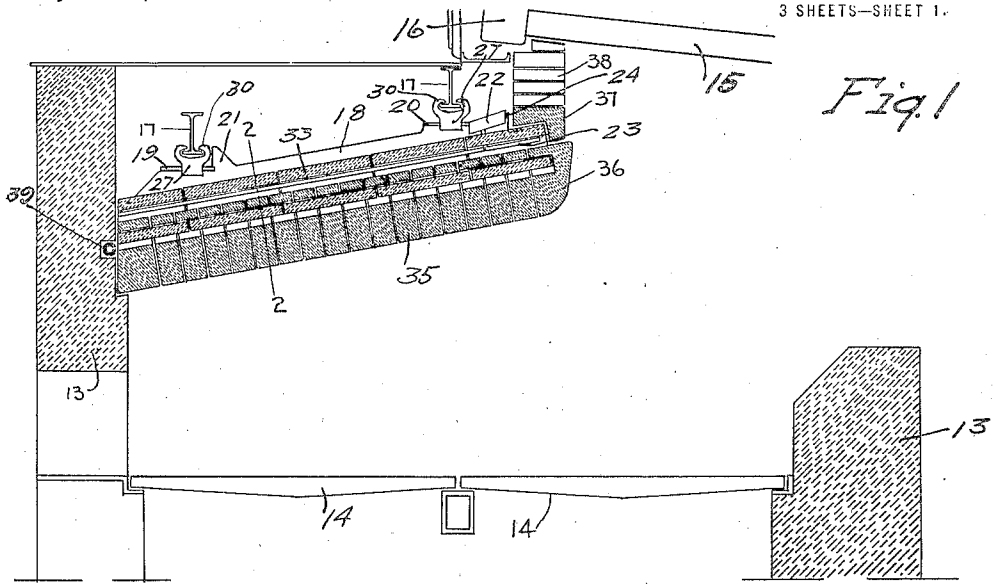
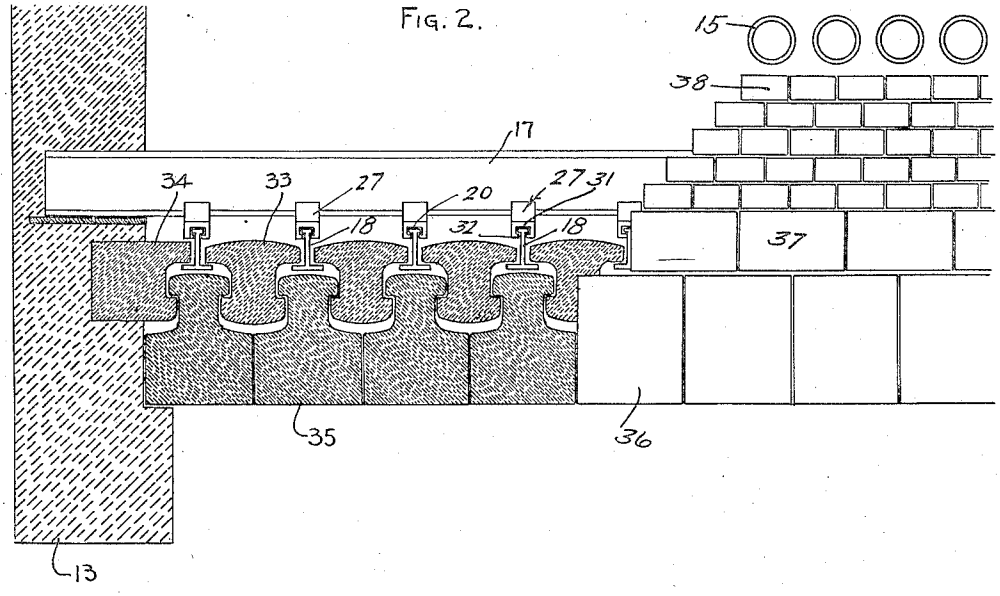


Fig. 1

Fig. 2.



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FIG. 3.

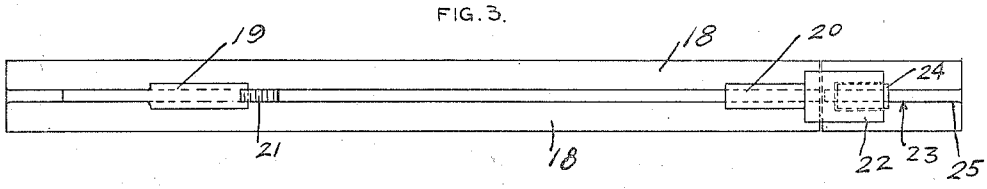


FIG. 5.

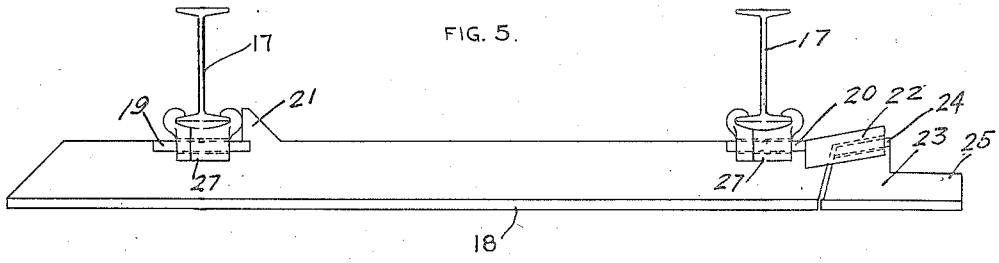


FIG. 4.

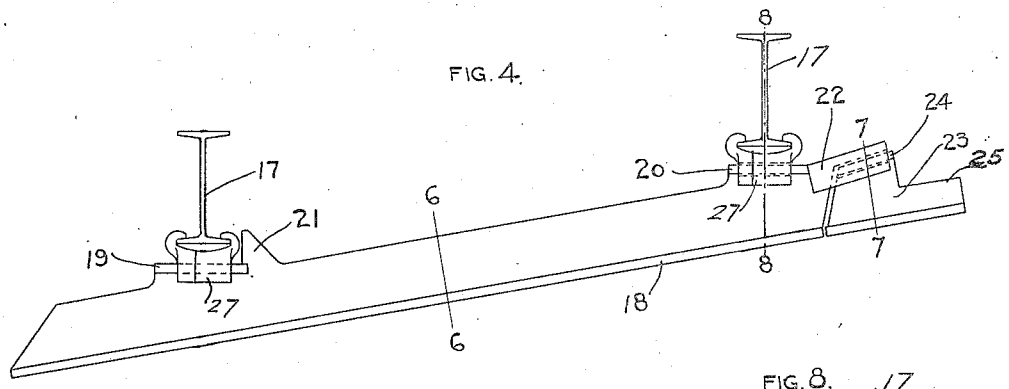


FIG. 6.

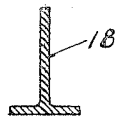


FIG. 7.

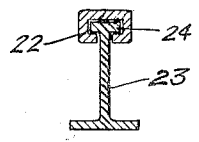
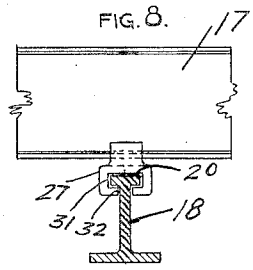


FIG. 8.



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3 SHEETS—SHEET 3.

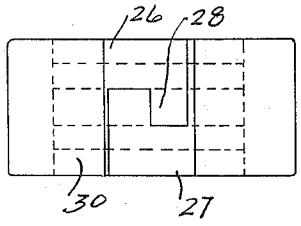


FIG. 11.

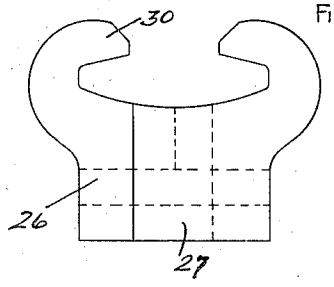


FIG. 10.

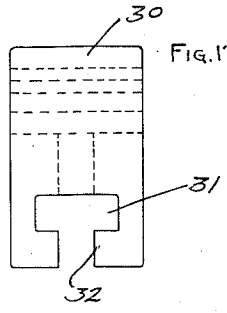
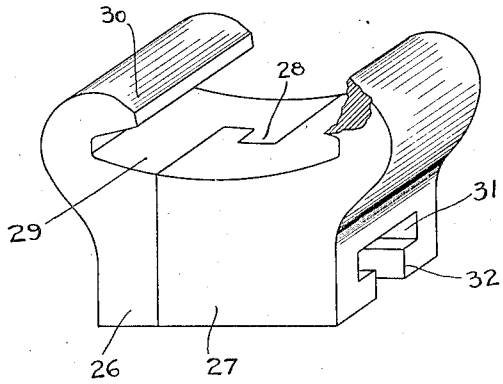


FIG. 12.

FIG. 9.



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UNITED STATES PATENT OFFICE.

MICHAEL LIPTAK, OF ST. PAUL, MINNESOTA.

FURNACE-ARCH FOR BOILERS.

1,326,753. Specification of Letters Patent. Patented Dec. 30, 1919.

Application filed June 17, 1918, Serial No. 240,292. Renewed September 11, 1919. Serial No. 323,130.

To all whom it may concern:

Be it known that I, MICHAEL LIPTAK, having taken out my first papers to become a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Furnace-Arches for Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to furnace arches for boilers, and is in the nature of an improvement on or refinement of the furnace arch disclosed and claimed in my pending application S. N. 216,152, filed of date February 9th, 1918.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views. Referring to the drawings:

Figure 1 is a view chiefly in vertical longitudinal section, but partly in diagrammatic elevation, showing my improved fire arch applied in the furnace of a boiler;

Fig. 2 is a view partly in transverse section on the line 2—2 of Fig. 1 and partly in full elevation, showing the fire arch on a larger scale than in Fig. 1, some parts being removed;

Fig. 3 is a plan view of one of the so-called supplemental beams;

Fig. 4 is a side elevation of the beam shown in Fig. 3, and showing also in end elevation, the transverse main beams and beam hangers;

Fig. 5 is a view corresponding to Fig. 4 but showing a horizontal arrangement of the supplemental beam;

Fig. 6 is a section on the line 6—6 of Fig. 4;

Fig. 7 is a section on the line 7—7 of Fig. 4;

Fig. 8 is a view partly in elevation and with some parts sectioned on the line 8—8 of Fig. 4;

Fig. 9 is a perspective view of one of the beam hangers; and

Figs. 10, 11 and 12 are views, respectively, in side elevation, plan and end elevation, of the beam hanger shown in Fig. 9.

The customary masonry of the furnace is indicated by the numeral 13 and the by the numeral 14. The numeral 15 indicates the flue and the numeral 16 the head of an ordinary water tube boiler.

The furnace arch comprises the usual position and may be either inclined or horizontal, and it closes the space between the sides and front wall of the masonry and the lower portion of the boiler head. It is hung from the customary transverse main arch beam 17, the ends of which are embedded in the masonry. Preferably, and as shown, these main beams are I-beams set with their webs in parallel vertical planes. A multiplicity of laterally spaced supplemental beams are hung from the lower flanges of these main beams and these supplemental beams 18 are preferably cast structures flanged at the lower edges of their webs. At places where the supplemental beams 18 underlie the main beams 17, they are formed with horizontal laterally projecting flanges 19 and 20. At the rear end extremities of the flanges 19, the webs of the beams 18 are upwardly projected to afford stop lugs 21, and at their extreme rear ends, extending obliquely upward from the webs 20, said supplemental beams are formed with integrally cast sockets or coupling brackets 22. These sockets 22 have T-shaped longitudinal slots that are open at the bottom and extend rearward from the extreme ends of the bars 18 proper.

The supplemental beams 18 are provided with detachable beam tips 23 that are flanged at their lower edges like the said supplemental beams, and hence form extensions of the block supporting surface thereof. These beam tips 23, at the upper edges of the webs, are formed with T-flanges 24 that fit loosely in the T-shaped slots of the sockets 22. Also, for a purpose which will presently appear the webs of said beam tips are notched at 25.

The laterally spaced supplemental beams 18 are hung from the main beams 17 by beam hangers of a novel construction. Each such beam hanger, as preferably designed, is made up of two sections 26 and 27 that are detachably united by vertically extended overlapping and underlapping flanges 28. The complete beam hanger made up of the two sections is formed with a top channel 29 having overlying flanges 30 that adapt the said hangers to be slidably interlocked with the lower flanges of the respective main beam 17. The complete hanger made

up of sections 26 and 27, at its underside, is formed with a channel 31 that has underlying flanges 32. The said channels 31 adapt the hangers to be slid onto the flanges 19 and 20 of the supplemental beam 18. Here it will be noted that the channels 29 extend across the upper ends of both hanger sections and that the channels 31 extend through the lower portions of both hanger sections at an angle of ninety degrees to the said channels 29.

The divided hangers described are adapted to be applied to the lower flanges of the main beams 17, by engaging their flanges 30 over the lower flanges of said beams while the two hangers are separated and then the two hanger sections may be slid laterally together and interlocked by the flanges 28. This brings the channels 31 of the two hanger sections into alinement and the flanges 19 and 20 of the supplemental beam may then be slid into the said channels 31. Obviously, when the flanges 19 and 20 of the supplemental beams are thus inserted, the two hanger sections 26 and 27 cannot be given that lateral sliding movement on the main beam which is necessary to effect the separation of the interlocking flanges 28. The hanger sections are therefore held interlocked to the main beam by the supplemental beam, and before they can be separated, the supplemental beam must first be slid endwise far enough to move their flanges 19 and 20 out of the slots 31. In some instances, the beam hangers may be made integral, but in such an arrangement, said hangers must be applied on the main beams before the ends of the main beams are set into the masonry. The split or divided hangers described, however, may be applied to or removed from the main beams at any time and after the ends of the main beams have been set into the masonry.

It is important to note that the slots in the so-called sockets 22 and the flanges 24 on the detachable beam tips 23 incline toward the adjacent ends of the supplemental beam, so that the said beam tips, under the action of gravity, will be kept seated against the adjacent ends of the corresponding supplemental beams.

The brick work of the improved arch is made up preferably of so-called "hanger blocks" 33 and 34, under facing blocks 35, corner blocks 36, crowning blocks 37, and usually more or less filling blocks 38, all of which are preferably made of clay baked and treated in the manner of fire bricks, so that they will stand very intense heat. The hanger blocks 33 have upper flanges that fit the channels formed by the adjacent supplemental beams 18 and they are formed with lower edge flanges that engage and interlock with flanges formed on the reduced upper portions of the so-called underfacing blocks 35. Otherwise stated, the underfacing blocks 35 are formed with T-shaped flanges that telescope into the channels formed by the sides of the hanger blocks 33. The side members 34 of the hanger blocks are channeled only in one side and are set into the masonry.

The innermost members of the hanger blocks 33 are slid onto and held either entirely or chiefly by the detachable beam tips 23 and the corner facing blocks 36 are formed with T-shaped notches that adapt them to telescope onto the T-shaped lower flanges of the said innermost hanger blocks. The so-called crowning blocks 37 are L-shaped, so that they fit over and rest upon the projecting portions of the inner hanger blocks, and overlie the corner blocks 36. Here, however, it is important to note that the said corner blocks project considerably inward of the innermost ends of the said crowning blocks 37 and hence deflect the flame and thus protect the said crowning blocks from the most intense heat.

Under the intense heat to which these blocks will be subjected, the corner facing blocks and crowning blocks will be burned away more rapidly than certain of the other blocks, but may, of course, be very readily replaced.

By reference particularly to Fig. 2, it will be noted that air spaces of considerable size are formed between the blocks 33, 34 and 35, and between the corner blocks 36 and crowning blocks 37. To assist in keeping the temperature of these blocks below the fusing point thereof, I preferably arrange for the blowing of air through the said channels formed between the said blocks. This may be done by inserting an air pipe 39 in the front wall of the masonry and providing the said pipe with perforations that will direct the air through the channels formed between the blocks 33 and 35. The air thus blown between the blocks, will be delivered into the combustion chamber of the furnace chiefly through the passages left between the blocks 36 and 37, and the air thus delivered will, of course, support combustion and, in fact, insure more complete combustion by the supply of the required oxygen over the top of the fuel. If desired, to prevent upward escape of the air between the blocks 33, the joints between the latter may be covered or closed.

The detachable beam tips 23 in some instances, will be burned away more or less, and these, as is obvious, may be very quickly and easily replaced without disturbing the supplemental or main beams.

What I claim is:

1. In a furnace arch, the combination with main beams, of supplemental beams extended below said main beams at approximately a right angle thereto, said main

beams having flanged lower edges and said supplemental beams having longitudinally spaced flanges at their upper edges, and beam hangers having channels in their upper and lower portions extended at right angles but in different vertical planes, said upper channels slidably engaging the flanges of said main beams, and the said lower channels slidably engaging the longitudinally spaced flanges of said supplemental beams.

2. In a furnace arch, the combination with flanged main beams and flanged supplemental beams extended transversely of said main beams, of beam hangers having channels in their upper and lower portions extended at a right angle but in different vertical planes, the upper channels engaging and interlocking with the flanges of said main beams and the lower channels engaging and interlocking with the flanges of said supplemental beams, the said hangers each comprising two sections, the said sections being normally connected by an interlocking joint that is held interlocked when the hangers are applied to the beams.

3. In a furnace, the combination with flanged main cross beams and laterally spaced underlying supplemental arch supporting beams, said supplemental beams having longitudinally spaced flanges on their upper edges, and beam hangers having upper channels interlocking with the flanges of said main beams and having lower channels interlocking with the longitudinally spaced flanges of said supplemental beams, the said supplemental beams having stops engageable with said beam hangers to limit the endwise movement of the said supplemental beams in one direction.

4. In a furnace, the combination with flanged main cross beams and laterally spaced underlying supplemental arch supporting beams, said supplemental beams having longitudinally spaced flanges on their upper edges, and beam hangers having upper channels interlocking with the flanges of said main beams and having lower channels interlocking with the longitudinally spaced flanges of said supplemental beams, the said beam hangers each comprising two sections having interlocking engagement and held interlocked by said supplemental beams.

5. In a furnace, the combination with flanged main cross beams and laterally spaced underlying supplemental arch supporting beams, said supplemental beams having longitudinally spaced flanges on their upper edges, and beam hangers having upper channels interlocking with the flanges of said main beams and having lower channels interlocking with the longitudinally spaced flanges of said supplemental beams, the said beam hangers being split vertically, and the upper and lower channels thereof being each formed in part with each of the sections, whereby the said supplemental beams will hold the said sections interlocked with each other and with said main beams.

6. In a furnace, the combination with main arch supporting beams, of supplemental arch supporting beams hung from said main beams and provided with integral projecting end sockets, of beam extensions having flanges endwise slidable into channels of said sockets and interlocking therewith, and arch blocks supplied to and supported by said supplemental beams and their beam tips.

7. In a furnace, the combination with main arch supporting beams, of supplemental arch supporting beams hung from said main beams and provided with integral projecting end sockets, of beam extensions having flanges endwise slidable into channels of said sockets and interlocking therewith, and arch blocks applied to and supported by said supplemental beams and their beam tips, the channels in said sockets having an inclination toward the ends of the respective supplemental beams.

In testimony whereof I affix my signature in presence of two witnesses.

MICHAEL LIPTAK.

Witnesses:
CLARA DEMAREST,
BERNICE G. BAUMANN.