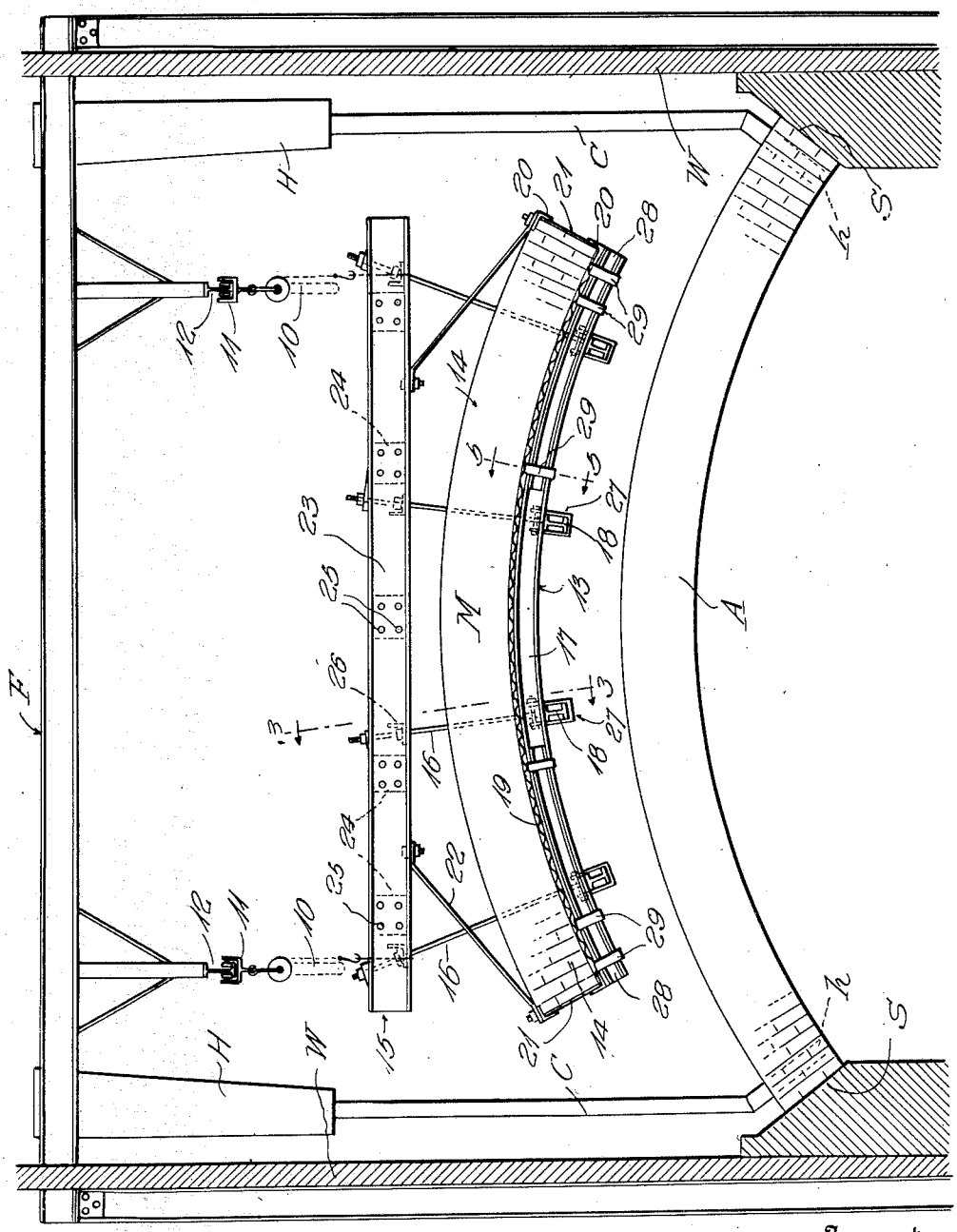
July 10, 1928. 1,677,002

O. E. OLSON ET AL

REPAIRING MEANS FOR FURNACE ARCHES

Filed Sept. 8, 1927 3 Sheets-Sheet 1



Inventors

Witness

Otto E. Olson,
Leopold Cooper.

By H. B. Williamson & Co.

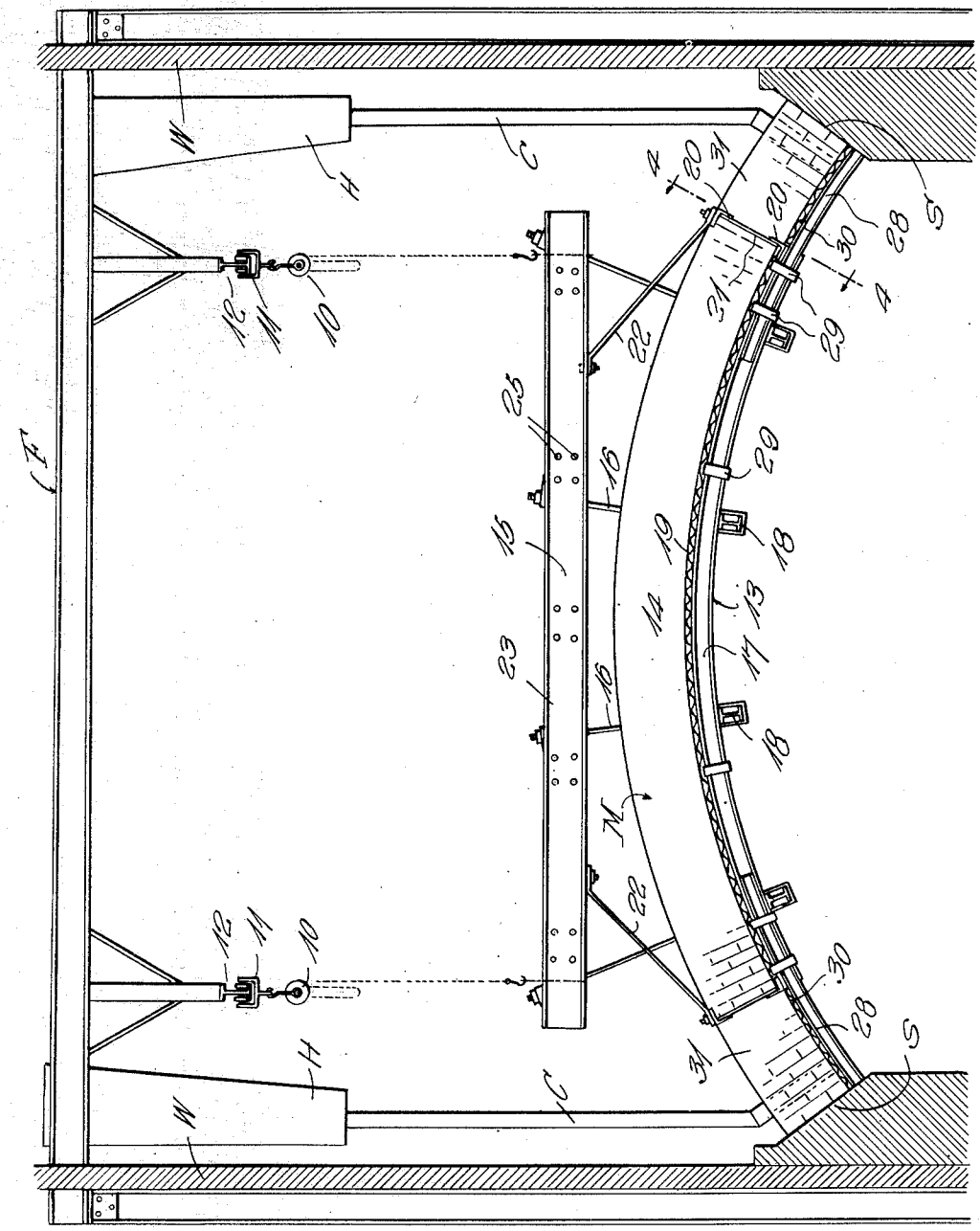
Attorneys

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O. E. C' SON ET AL

REPAIRING MEANS FOR FURNACE ARCHES

Filed Sept. 8, 1927 3 Sheets-Sheet 2



Witness

Inventors

Otto E. Olson,
Leopold Cooper;
By A. B. Williamson & Co
Attorneys

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O. E. OLSON ET AL

REPAIRING MEANS FOR FURNACE ARCHES

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Fig. 3

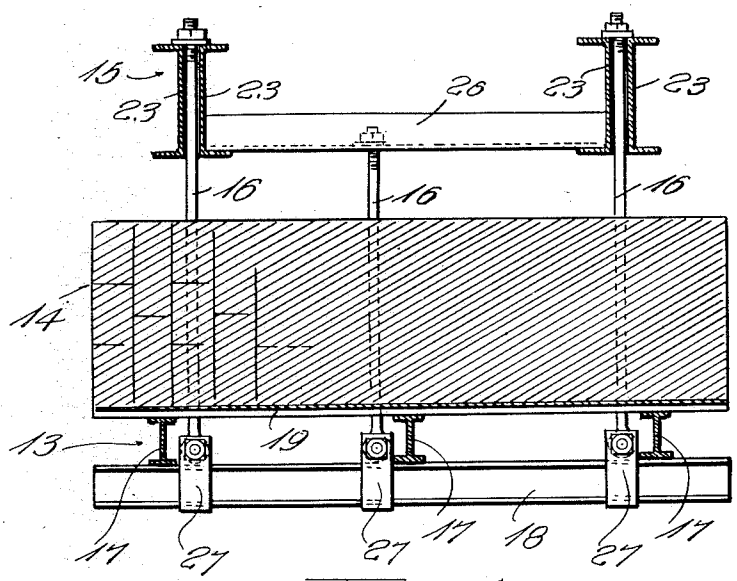


Fig. 4

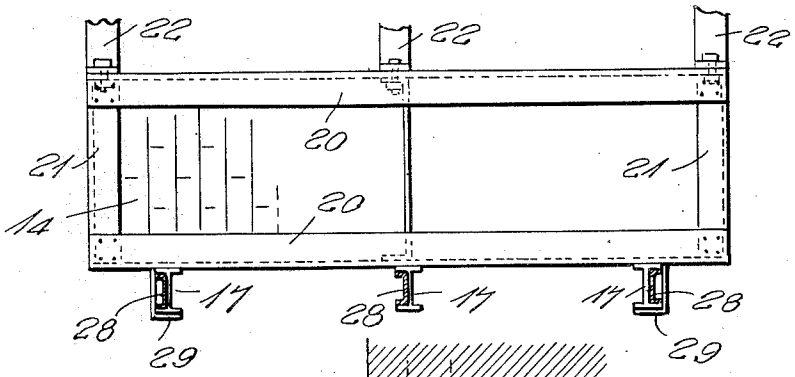
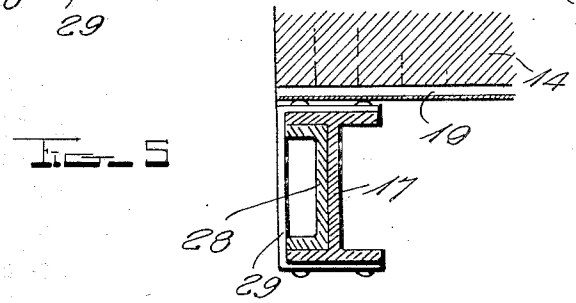


Fig. 5



Witness

Inventors

Otto E. Olson,

Leopold Cooper,

By A. B. Williamson

Attorneys

Patented July 10, 1928. 1,677,002

UNITED STATES PATENT OFFICE.

OTTO ELIS OLSON AND LEOPOLD COOPER, OF DOUGLAS, ARIZONA.

REPAIRING MEANS FOR FURNACE ARCHES.

Application filed September 8, 1927. Serial No. 218,278.

The invention has reference primarily to open hearth furnaces and reverboratories. In furnaces and the like of these types, the furnace arches are subjected to such intense heat, that it is impossible to prevent them from burning out where the heat is most intense. It is then necessary to throw the furnace or the like out of operation, to have a gang of men enter the same, construct wooden forms, and upon these forms rebuild the burnt out portions of the arch. This is consequently a long and arduous task and requires that the furnace or the like be out of operation for such a period of time that in addition to the cost of making the repairs, a further loss is encountered.

It is the primary object of our invention to provide an arch member which is normally supported above the usual furnace arch, preferably at the cool end of the furnace, said arch member being always in readiness to be substituted for a portion of the main arch which may burn out. While a plurality of such arch members of any desired proportions, may be mounted above the furnace arch, the present application will illustrate only one of such members, for illustrative purposes.

The arch member, in order to be properly lowered into position for use, must be of less width than the width of the furnace arch and hence one or both ends of said member must be added to by brick work or the like. It is a further object to the invention to provide the arch member with novel means extensible therefrom to assist in supporting the brick work or the like during the operation of adding to said arch member, as explained.

It is a still further object of the invention to provide an arch member which embodies an arched sub structure, a super structure, a fire resisting body lying upon said sub structure, and connecting means between said sub and super structures, said sub structure and the lower portions of said connecting means, being adapted to melt away or to be otherwise disintegrated under the action of the furnace heat, so that they may pass out with the slag, and the super structure may be raised from the arch and conditioned for further use.

It is a still further object of the invention to provide an arch member of the class set forth which may be readily moved to different positions above the furnace arch and then lowered into position for use, wherever such use is needed, after first clearing out a portion of the furnace arch sufficiently large to receive said member.

With the foregoing in view, the invention resides in the novel subject matter herein described and claimed, the description being supplemented by the accompanying drawings.

Figure 1 is a transverse sectional view through a portion of an open hearth furnace showing the arch member supported above the furnace arch in readiness to be lowered into position for use when necessary.

Fig. 2 is a view similar to Fig. 1 but showing the arch member lowered into position for use and illustrating the manner in which the ends of said member are elongated to abut the usual arch supporting shoulders of the furnace walls.

Fig. 3 is a transverse sectional view on line 3—3 of Fig. 1.

Fig. 4 is a transverse sectional view on line 4—4 of Fig. 2; and

Fig. 5 is a detail transverse section on line 5—5 of Fig. 1.

In the drawings above briefly described, W denotes the side walls of the furnace having the usual shoulders S abutted by the ends of the arch A. Above this arch is the usual feed floor F from which the material to be treated in the furnace, is discharged into the hoppers H. From these hoppers, the usual chutes C extend downwardly to the feed holes *h* at the longitudinal edge portions of the arch A.

Supported above the arch A, we have disclosed an arch member M so that when a portion of said arch burns out, an opening the width of the arch may be cleared and the member M lowered into said opening and secured in place for the purpose of repairing the arch in a much shorter time and with less expense than is now necessary. Preferably, the member M is supported by chain hoists or the like 10 and carriages 11, from elevated tracks 12 which extend longitudinally above the arch A. Thus, said member may be moved longitudinally of this arch to the required location and then lowered into position for use.

The arch member M embodies a sub structure 13 of metal, a fire resisting body 14 supported on said sub structure, a metal super structure 15 connected with the hoists 10, and connecting means 16 between said sub

structure 13 and said super structure 15. After the member M has been mounted in position for use as seen in Fig. 2 and the furnace is again placed in operation, the entire sub structure 13 melts away, together with the lower ends of the connecting means 16. Then, by means of the hoists 10, the super structure 15 may be raised from said member and used in constructing another member of the same form as member M.

In the present showing, the sub structure 13 comprises a plurality of longitudinally arched I beams 17, transverse I beams 18 underlying and secured to said longitudinal I beams and a corrugated or other metal plate 19 resting on the I beams 17 and supporting the fire resisting body 14 of brick or the like. The ends of this body 14 abut appropriate frames consisting of upper and lower horizontal bars 20 and vertical bars 21 secured thereto, the lowermost of said bars 20 being secured to the bars 17, while the uppermost of said bars 20 are tied by braces or the like 22, to the super structure 15. This super structure preferably consists of two pairs of channel bars 23 held in spaced relation by plates 24 and relatively secured by rivets 25, the innermost of the bars 23 being secured at intervals to transverse angle metal bars 26. The connecting means 16, above mentioned, preferably consist of tie bolts, some of which pass between the bars 23 and some of which extend through openings of the bars 26, the lower ends of said tie bolts being secured to the transverse bars 18 of the sub structure 13, by appropriate shackles 27.

The arch member M is of a length greatly less than the length of the arch A and is of a width less than the width of said arch. At the ends of the bars 17 however we provide extensible slide bars 28 which are preferably of channel form, appropriate guides 29 being provided for slidably connecting said bars 28—17. Normally, the bars 28 are retracted as seen in Fig. 1. When the member M is lowered into position for use however, the bars 28 are extended until they abut or substantially abut the shoulders S. Then corrugated plates or the like 30 are supported by these extended bars and brick work or the like 31 is added to the ends of the member M, being supported by the plates 30. While adding this brick work or the like 31, suitable provision is of course made to provide feed holes at the ends of the chutes C. After the injured arch has been fully repaired by lowering of the member M, adding the brick work or the like 31 and suitably sealing all spaces between said member and adjacent portions of the arch, the furnace is in condition for operation. Incident to such operation, the entire sub structure of the member M is melted or otherwise disintegrated by the action of the heat, thus freeing the super structure 15 and permitting use of the latter in construction of another substitute arch member.

By the use of the invention, repairs in furnace arches may be effected with a tremendous saving in time and expense, over the methods now commonly used, and the cost of constructing the member M, even considering the loss of material used in melting of the sub structure, is considerably less than the cost of repairing a burnt out arch under the present day method.

Excellent results are obtainable from the general construction shown and described and it is therefore preferably followed. However, within the scope of the invention as claimed, numerous variations may be made.

We claim:

1. An arch member to be substituted for a portion of a furnace arch, comprising a fire-resisting body, a fire-disintegrable supporting structure upon which said body lies, and supporting and lowering means for said arch member secured to said fire-disintegrable supporting structure.

2. An arch member to be substituted for a portion of a furnace arch, comprising a fire resisting body, a supporting structure therefor embodying longitudinally arched bars underlying said body, slide bars at ends of said arched bars and extensible therefrom to assist in adding to said body when positioning it for use, means slidably connecting the two sets of bars and supporting means for said body and said arched bars free of attachment to said slide bars.

3. An arch member to be substituted for a portion of a furnace arch, comprising a sub structure to burn away when the arch member is in use, a super structure, a fire resisting body between the sub and super structures, and connecting means between said sub and super structures adapted to be freed by burning away of said sub structure, permitting raising of the super structure for further use.

In testimony whereof we have hereunto affixed our signatures.

OTTO ELIS OLSON.
LEOPOLD COOPER.