Jan. 12, 1926. 1,569,444

E. WIRZ

ANNEALING FURNACE

Filed Sept. 17, 1925

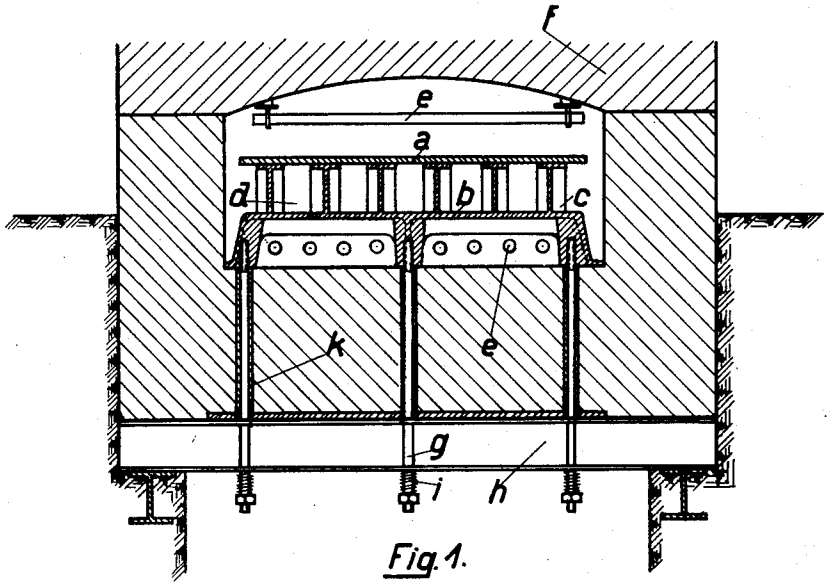


Fig. 1.

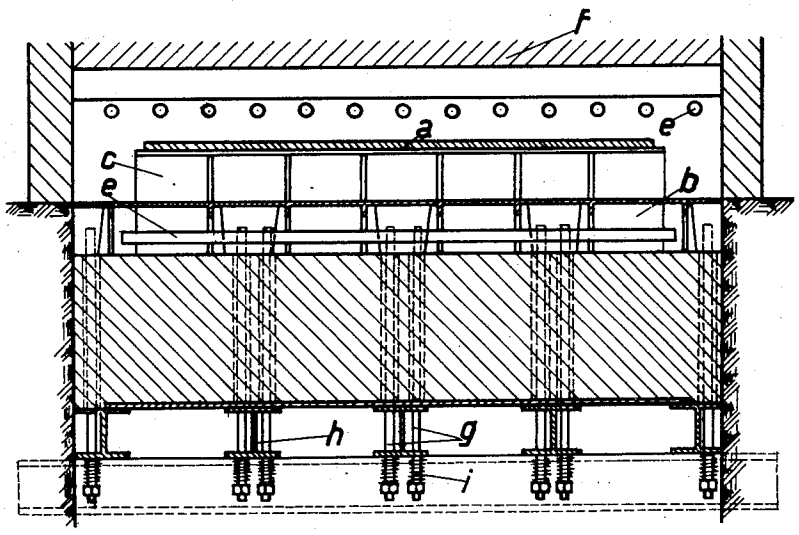


Fig. 2.

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ANNEALING FURNACE.

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To all whom it may concern:

Be it known that I, ERNST WIRZ, a citizen of the Swiss Confederation, and resident of Baden, Switzerland, have invented new and useful Improvements in Annealing Furnaces, of which the following is a specification.

This invention relates to annealing furnaces particularly intended for metal plates and sheets.

In order to prevent metal plates and sheets from warping during treatment in an annealing furnace it is essential that the plate or sheet should lie perfectly flat on the hearth or grate bars. This is easily attained so long as the furnace is at a constant temperature, that is to say during the actual period of annealing and when the furnace is cold. But during the heating and the cooling of the furnace unequal expansion and consequent alteration of the shape of the grate bars on which the plate to be annealed is carried may easily occur, and such variations are of course transmitted to the plate. These disadvantages become accentuated the larger the dimensions of the furnace and of the metal plates to be annealed.

By means of the present invention it is possible to construct annealing furnaces for metal plates and sheets of the largest dimensions and to operate them in a manner free from objection. The heating is carried out electrically by means of resistance heaters. In accordance with the invention the supporting means for the plate which is located in the furnace chamber and is exposed to the full heat of the furnace, has a level surface, is constructed of fireproof, non-oxidizable metal, and is attached in a yielding manner to a separate carrying structure arranged outside the hot zone of the furnace.

One form of construction of an annealing furnace according to the invention is illustrated by way of example in the accompanying drawing wherein:

Fig. 1 shows a cross section, and

Fig. 2 a longitudinal section.

The plate *a* to be heated rests upon the upwardly extending beams *c* which are arranged in the form of a grate on the hearth *b* which is closed overhead. The spaces *d* between the beams accommodate conveyor means for feeding the plate into the furnace. The electrical heating elements *e* consisting of fireproof and non-oxidizable resistance wire wound on quartz tubes are arranged above the beams *c* on the crown of the furnace *f* and underneath the hearth *b* at the bottom of the furnace. In order to prevent the hearth plate *b* and the beams *c*, which are cast integral therewith, from warping it is secured by strong bolts *g*, which are of a fireproof and non-oxidizable alloy at least where they are exposed to the heat, to the carrying structure which consists of beams *h* arranged as a grate like structure disposed underneath the brickwork at the bottom of the furnace so that they are protected from the heat of the furnace. Strong springs *i* are inserted between the nuts on the bolts and the carrying structure beams *h* and tubes *k*, of which the upper part must also be of a fireproof and non-oxidizable alloy, surround the bolts and act as distance pieces. These yielding connecting members enable unequal expansion which occurs in spite of the great stability and carrying capacity of the foundation, and is caused by the large differences in temperature to be counteracted.

What I claim is:—

1. An annealing furnace having supporting means with a level surface for a plate to be annealed located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure disposed without the hot zone of the furnace and yielding connecting members connecting the supporting means and the carrying structure.

2. An annealing furnace having supporting means with a level surface for a plate to be annealed located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure disposed without the hot zone of the furnace, spacing members between the supporting means and the carrying structure, and yielding connecting members connecting the supporting means and the carrying structure.

3. An annealing furnace having supporting means with a level surface for a plate to be annealed located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure disposed without the hot zone of the furnace, tubular spacing members between the supporting means and the carrying structure,

bolts passing through the tubular members and connecting the supporting means and the carrying structure, and springs interposed between the bolts and the carrying structure.

4. An annealing furnace having supporting means with a level surface for a plate to be annealed located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure consisting of a plurality of beams disposed without the hot zone of the furnace and yielding connecting members connecting the supporting means and the carrying structure beams.

5. An annealing furnace having supporting means with a level surface for a plate to be annealed located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure consisting of a plurality of beams disposed without the hot zone of the furnace, tubular spacing members between the supporting means and the carrying structure beams, bolts passing through the tubular members and connecting the supporting means and the carrying structure beams, and springs interposed between the bolts and the carrying structure beams.

6. An annealing furnace having supporting means for a plate to be annealed consisting of a plurality of parallel beams mounted on a hearth member and forming a level surface located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure disposed without the hot zone of the furnace and yielding connecting members connecting the supporting means and the carrying structure.

7. An annealing furnace having supporting means for a plate to be annealed consisting of a plurality of parallel beams mounted on a hearth member and forming a level surface located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure disposed without the hot zone of the furnace, tubular spacing members between the supporting means and the carrying structure, bolts passing through the tubular members and connecting the supporting means and the carrying structure and springs interposed between the bolts and the carrying structure.

8. An annealing furnace having supporting means for a plate to be annealed consisting of a plurality of parallel beams mounted on a hearth member and forming a level surface located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure consisting of a plurality of beams disposed without the hot zone of the furnace and yielding connecting members connecting the supporting means and the carrying structure beams.

9. An annealing furnace having supporting means for a plate to be annealed consisting of a plurality of parallel beams mounted on a hearth member and forming a level surface located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure consisting of a plurality of beams disposed without the hot zone of the furnace, tubular spacing members between the hearth member and the carrying structure beams, bolts passing through the tubular members and connecting the hearth member and the carrying structure beams and springs interposed between the bolts and the carrying structure beams.

10. An annealing furnace having supporting means for a plate to be annealed consisting of a plurality of parallel beams mounted on a hearth member and forming a level surface located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure consisting of a plurality of beams disposed without the hot zone of the furnace and arranged at right angles to the plate supporting beams, tubular spacing members between the hearth member and the carrying structure beams, bolts passing through the tubular members and connecting the hearth member and the carrying structure beams, and springs interposed between the bolts and the carrying structure beams.

11. An annealing furnace having supporting means for a plate to be annealed consisting of a plurality of parallel beams mounted on a hearth member and forming a level surface located within the furnace chamber and formed of fireproof non-oxidizable metal, a carrying structure consisting of a plurality of beams disposed without the hot zone of the furnace and arranged at right angles to the plate supporting beams, tubular spacing members of fireproof non-oxidizable metal between the hearth member and the carrying structure beams, bolts of fireproof non-oxidizable metal passing through the tubular members and connecting the hearth member and the carrying structure beams, and springs interposed between the bolts and the carrying structure beams.

Dated this 2nd day of September, 1925.

ERNST WIRZ.