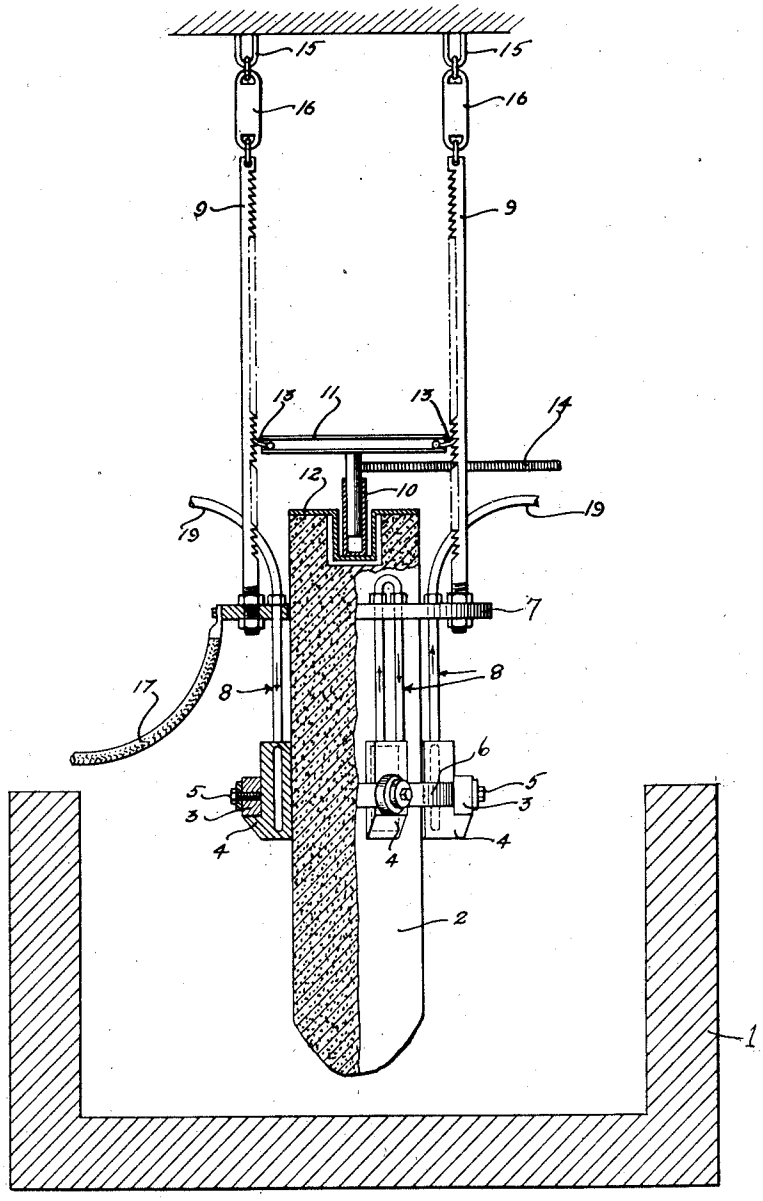
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APPARATUS FOR FEEDING ELECTRIC FURNACE ELECTRODES

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APPARATUS FOR FEEDING ELECTRIC FURNACE ELECTRODES

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This invention relates to apparatus for feeding electrodes into an electric furnace without interrupting the furnace operation or diminishing the electrical input.

In electric furnaces as heretofore operated the electrodes are usually held in position by means of releasable clamps which are shifted from time to time as the electrode is consumed in the furnace. The shifting is done, if the clamp is of the stationary type, by releasing the pressure on the clamping members and allowing the electrode to slip by gravity. Or when the clamp is made to travel with the electrode it must be raised occasionally as it approaches too near the furnace. When either method is employed it is obvious that the electrical input is diminished or must be cut off entirely whenever the clamps are shifted in order to avoid destroying them by the electrical arc which results if they are too far released.

Moreover under the former practice the feeding of the electrode was necessarily made at intervals and the distance between the electrode and the furnace charge varied more or less depending on the rate of electrode consumption and the intervals between feeding. This is objectionable where uniform furnace conditions and electrical input are desired.

By means of my invention the electrodes may be shifted without disturbing furnace operation and without varying or lessening the pressure of the contact clamps upon the electrodes, and the electrodes may be controllably shifted by any desired amount. A further object of my invention is to allow an approximately constant separation to be maintained between the electrodes and the charge. A still further object of my invention is to provide remote control for electrode adjustment obviating the necessity of the furnace operators going onto the furnace to loosen clamps, etc. in order to feed the electrodes.

In the accompanying drawing, the single figure is a vertical view partly in section of an apparatus embodying one modification of my invention.

The electrode 2, suspended in the furnace 1, by means of a clamp 3 comprising contact plates 4 held against the electrode 2 by means of the threaded bolts 5 and the band 6. The clamping mechanism is suspended from the annular frame 7 by means of the bolts 8, which may be in the form of tubes to allow water cooling of contact plates 4 by means of the water connections 19. The annular frame 7 is supported by the structural members 9.

A hydraulic or pneumatic cylinder 10 is attached to the horizontal beam 11 and exerts pressure on the bearing plate 12. Ratchets 13 on the horizontal beam 11 engage teeth on the structural members 9. Hydraulic or pneumatic pressure is exerted through the pipe or flexible tube 14. The apparatus may be conveniently suspended by means of chains 15 insulated at 16.

In operation, the electric current is supplied to the electrodes 2 by means of cables 17 attached to the annular frame 7. To slip the electrode, hydraulic or pneumatic pressure is applied to the cylinder 10. After sufficient pressure has been applied to bring the ratchets and teeth in immovable relation further pressure causes the electrode to slip on the contact plates 4 without in any way diminishing the pressure of the plates on the electrode or causing an interruption in the flow of electrical energy. After the cylinder 10 is expanded to its full length a release of the hydraulic or pneumatic pressure will allow the horizontal beam 11 to drop by gravity and the ratchets 13 will reengage teeth on the structural number 9 at a lower level. Reapplication of pressure to the hydraulic cylinder 10 will cause a repetition of the process and the electrode may be slipped any requisite amount.

In using my invention with electrodes which are made continuous by screwing one section of electrode into another as by means of a threaded connecting pin, the horizontal beam 11, the hydraulic cylinder 10 and the bearing plate 12 are removed to allow the placing of the new electrode section and connecting pin. After the insertion of a new section, the parts 10, 11 and 12 are replaced above it. Structural members 9 may be made of such length as to allow the use of

any convenient electrode section. By means of my invention the slipping of electrodes and the introduction of new electrode sections need in no way interfere with the continuous operation of the furnace.

It will be evident that various modifications in the assembly as shown can be made without departing from the spirit of my invention as defined in the appended claims.

I claim:

1. In an electric furnace an apparatus for feeding an electrode comprising in combination a clamp yieldingly holding said electrode, means for supporting said clamp in a stationary position with respect to the furnace, an abutment adjustably attachable to said clamp-supporting means, and means between said abutment and the end of the electrode operative to slide the electrode through said clamp.

2. In an electric furnace an apparatus for feeding an electrode comprising in combination a clamp yieldingly holding said electrode, means for supporting said clamp in a stationary position with respect to the furnace, an abutment adjustably attachable to said clamp-supporting means, and fluid pressure means cooperating with said abutment to slide the electrode through said clamp.

3. In an electric furnace an apparatus for feeding an electrode comprising in combination a clamp yieldingly holding said electrode, a stationary support for said clamp, a member cooperating with said clamp support to form an adjustable abutment, and a fluid pressure cylinder cooperating with said abutment member and the end of the electrode to slide said electrode through said clamp.

4. In an electric furnace an apparatus for vertically feeding an electrode comprising in combination a clamp yieldingly holding said electrode, vertical stationary support members for said clamp having teeth on their inner opposed surfaces, a horizontal member having ratchets thereon adapted to engage with the teeth on said support members and form an adjustable abutment, and a fluid pressure cylinder adapted in cooperation with said abutment member to exert sufficient pressure on the end of the electrode to slide the same through said clamp.

In testimony whereof, I affix my signature.

JAMES G. MARSHALL.