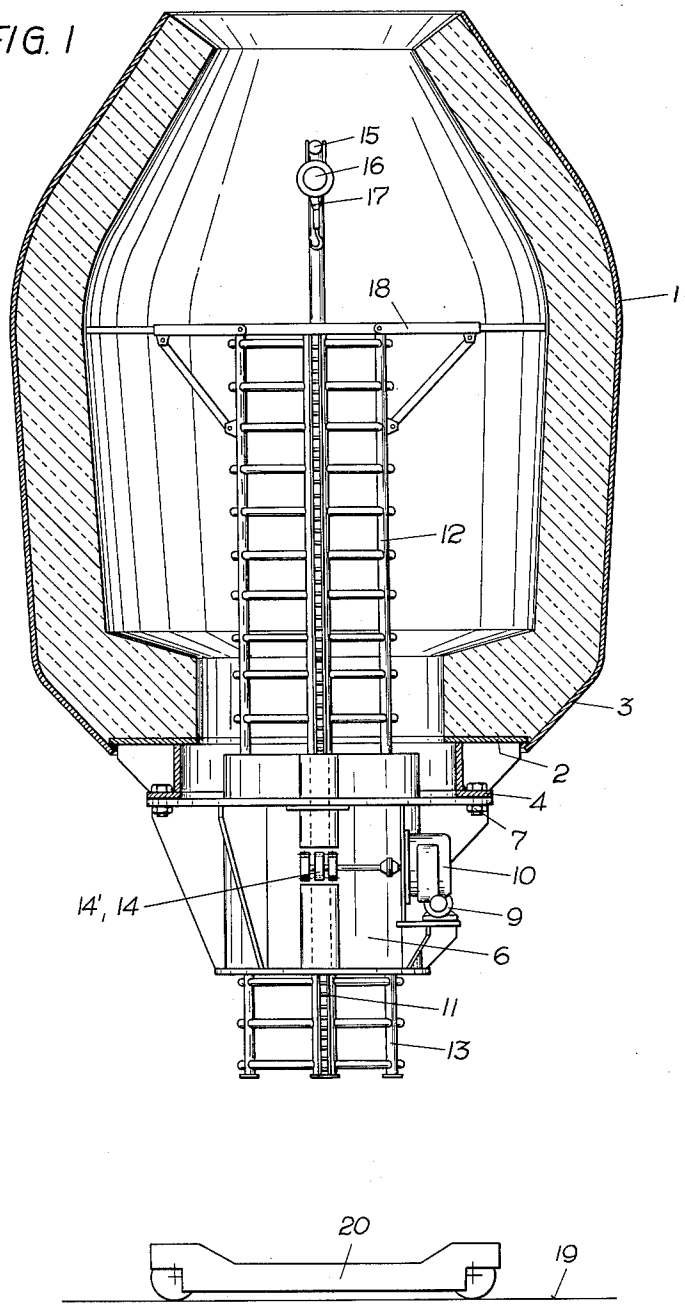
June 21, 1966 O. PÜHRINGER 3,256,956

DEVICE FOR RE-LINING CRUCIBLES OR CONVERTERS

Filed Jan. 29, 1964 3 Sheets-Sheet 1

FIG. 1

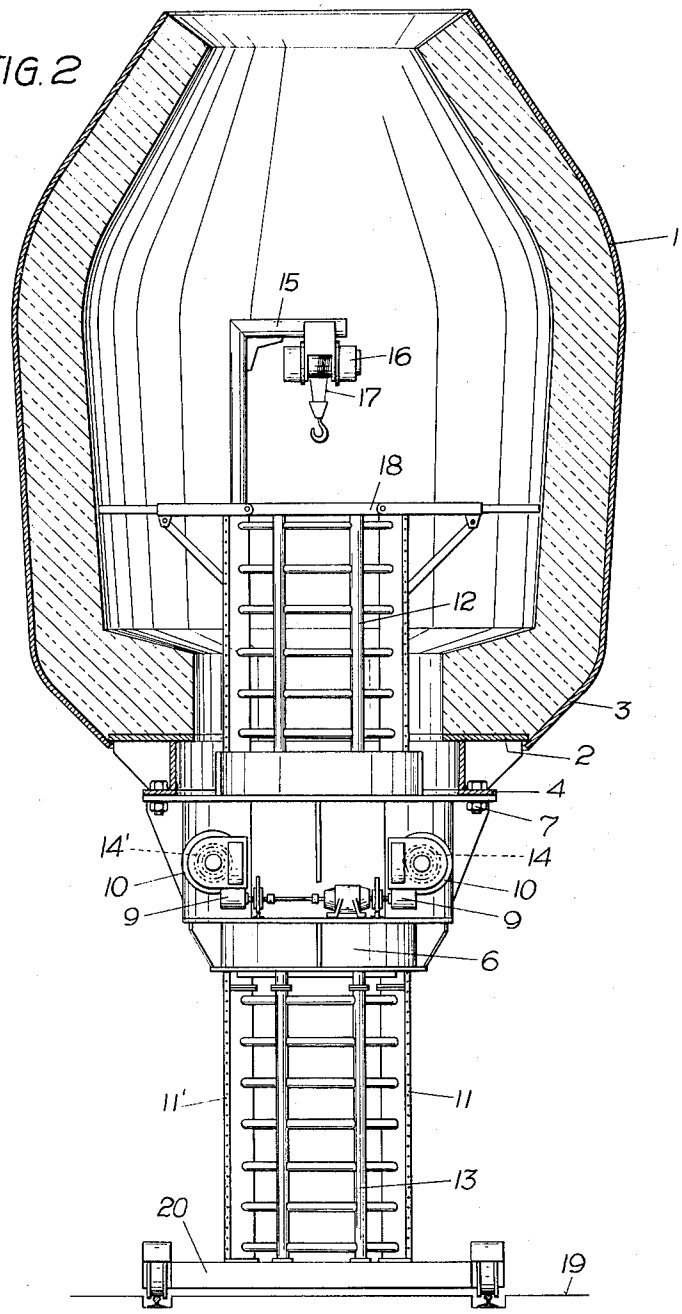


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DEVICE FOR RE-LINING CRUCIBLES OR CONVERTERS

Filed Jan. 29, 1964 3 Sheets-Sheet 2

FIG. 2



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Filed Jan. 29, 1964 3 Sheets-Sheet 3

FIG. 3

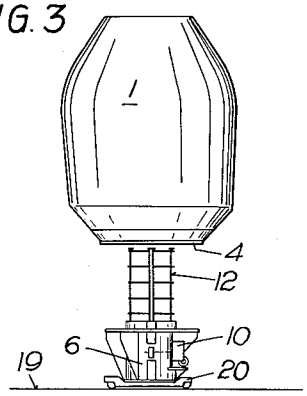


FIG. 4

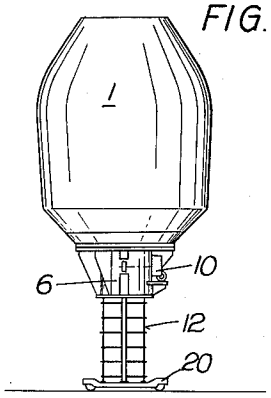


FIG. 5

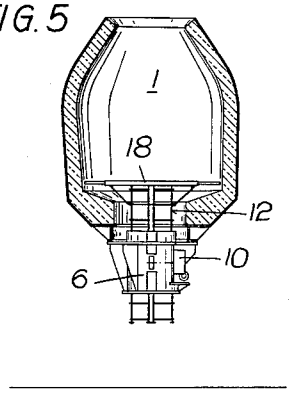


FIG. 6

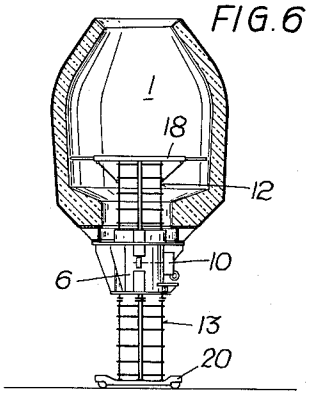
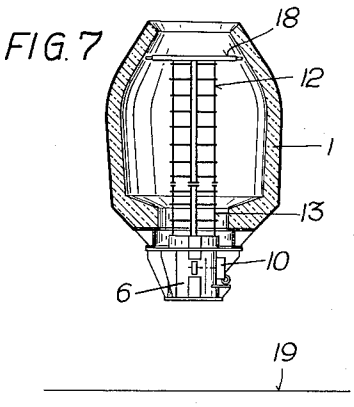


FIG. 7



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DEVICE FOR RE-LINING CRUCIBLES OR CONVERTERS

Othmar Pühringer, Linz, Austria, assignor to Vereinigte Österreichische Eisen- und Stahlwerke Aktiengesellschaft, Linz, Austria, a company of Austria

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Claims priority, application Austria, Jan. 31, 1963, A 801/63
1 Claim. (Cl. 182—128)

The re-lining of crucibles or converters, particularly of those destined for the top-blowing process, was generally effected from above. For this purpose either the chimney hood had to be displaceable or an inlet door had to be provided in the chimney; apart from that, an auxiliary craneway had to be provided in the vicinity of these apertures, wherefrom a platform with operating personnel could be moved into the openings. Also the transportation of the bricks had to be effected in the same manner.

Essential disadvantages and difficulties of the mentioned known technique reside in that the design of the chimney became complicated and that undue expenditures resulted from the provision of a crane. When the crane was not in use, it was necessary to remove the craneway from the range of the crucible, which mostly could be accomplished only by bringing it into the vertical position with the aid of additional swivel means. Another considerable drawback of the known construction is that the workmen had to operate predominantly in the sphere of suspended loads.

The invention provides a device for re-lining crucibles or converters, by which the disadvantages and difficulties described are avoided. The device comprises a supporting frame adapted to be secured to an opening provided in the bottom of the converter, on which frame a lifting means is arranged which moves in upward or downward direction a vertically adjustable scaffold extending into the interior of the crucible, said scaffold carrying an operating platform and an elevator.

The scaffold may consist of one or several tube elements which engage with each other at the joints by means of key and slot.

Advantageously tooth racks are secured to the tubular elements of which the scaffold is made, preferably on opposite sides thereof, which racks are driven by pinions of the lifting means. The platform may be a hinged platform. The elevator may comprise a rope winch, the rope of which extends through the interior of the tubular scaffold to mill floor level, wherefrom the lining material is supplied.

The lining device according to the invention enables to effect the entire re-lining from mill floor level underneath the crucible. Thus, the chimney hood need not be displaceable, and the whole construction above the crucible may be of a considerably simpler design than has previously been possible.

The invention is explained more fully in the drawing by way of an exemplary embodiment. FIG. 1 is a vertical sectional view of a crucible with the lining device moved in; FIG. 2 shows a view turned by 90° relative to the plane of section of FIG. 1. FIG. 3 to 7 illustrate diagrammatically the individual steps of moving in and positioning the lining device according to the invention.

The refractory-lined crucible **1** has an annular bottom

plate **2**, which is inserted into the collar-shaped, arched lower part **3** of the crucible shell. This lower part **3** of the crucible shell has an annular flange **4**. The lining device itself comprises the supporting frame **6**, which is connected to the annular flange **4** by means of screws **7**, a lifting device with a motor **9**, a gear **10**, and a vertically adjustable scaffold consisting of the tube members **12**, **13** provided with tooth racks **11**, **11'** arranged on opposite sides thereof and driven by pinions **14**, **14'** (FIG. 2).

Mounted on a crosshead **15** at the upper end of the scaffold there is the elevator, which comprises the rope winch **16** and the rope **17** extending through the interior of the tubular scaffold to the mill floor level **19**. A platform **18**, which is hingeable, is arranged a distance below the crosshead **15**.

The function of the device according to the invention is diagrammatically illustrated in FIGS. 3 to 7. At first, the lining device with the frame **6** and the first scaffold element **12** are moved under the crucible **1** by means of a carriage **20** (FIG. 3). Then the frame **6** is lifted and secured to the bottom flange **4** (FIG. 4), whereupon the tubular scaffold element **12** is lifted up to the lower stage position and the platform **18** is swung out (FIG. 5). Now, the lining of the crucible is effected from the bottom to the top, the supply and removal being effected from mill floor level. FIG. 6 shows the position in which the first tube element **12** of the scaffold has to be lengthened by a second element **13**. This is done in such a manner that the first element is maintained in mesh with the pinion by a gear brake or another holding means, until the extension element **13** is moved underneath. The joints between the elements **12** and **13** engage by a key and a slot.

The extension element **13** is lifted until it meshes with the pinion, and then the middle and upper parts of the crucible can be lined. If desired, a larger number of extension elements may, of course, be used so that the described device is suitable for large and very large crucible sizes. FIG. 7 shows the platform in the topmost position, corresponding to the representation in FIG. 1.

What I claim is:

A device for relining a metallurgical vessel having an opening in its bottom and a detachable bottom for closing said opening, comprising a supporting frame, means for securing said frame to said bottom in alignment with said opening, a scaffold movably mounted in said frame and extending into the interior of the vessel, an operating platform at the upper end of said scaffold, said scaffold comprising an upper length of lattice work and a lower length of lattice work, said length of lattice work being detachably connected to each other in end to end relation, each length of lattice work having substantially the same cross-section and an unobstructed central area and comprising a plurality of longitudinal tubular struts around said central area, means for detachably connecting the struts of one length of lattice work to the struts of the other length of lattice work, toothed racks on and extending lengthwise of each of said lengths of lattice work and in alignment lengthwise of said scaffold, a lifting means on said frame including driven pinions for engaging said racks on said upper length of lattice work and to lift it in said frame to enable the lower length of lattice work to be connected to said upper length and for moving said scaffold in upward and downward directions, and a winch on said platform substantially in alignment with the axis

of said scaffold for lifting lining material through said scaffold from below.

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