

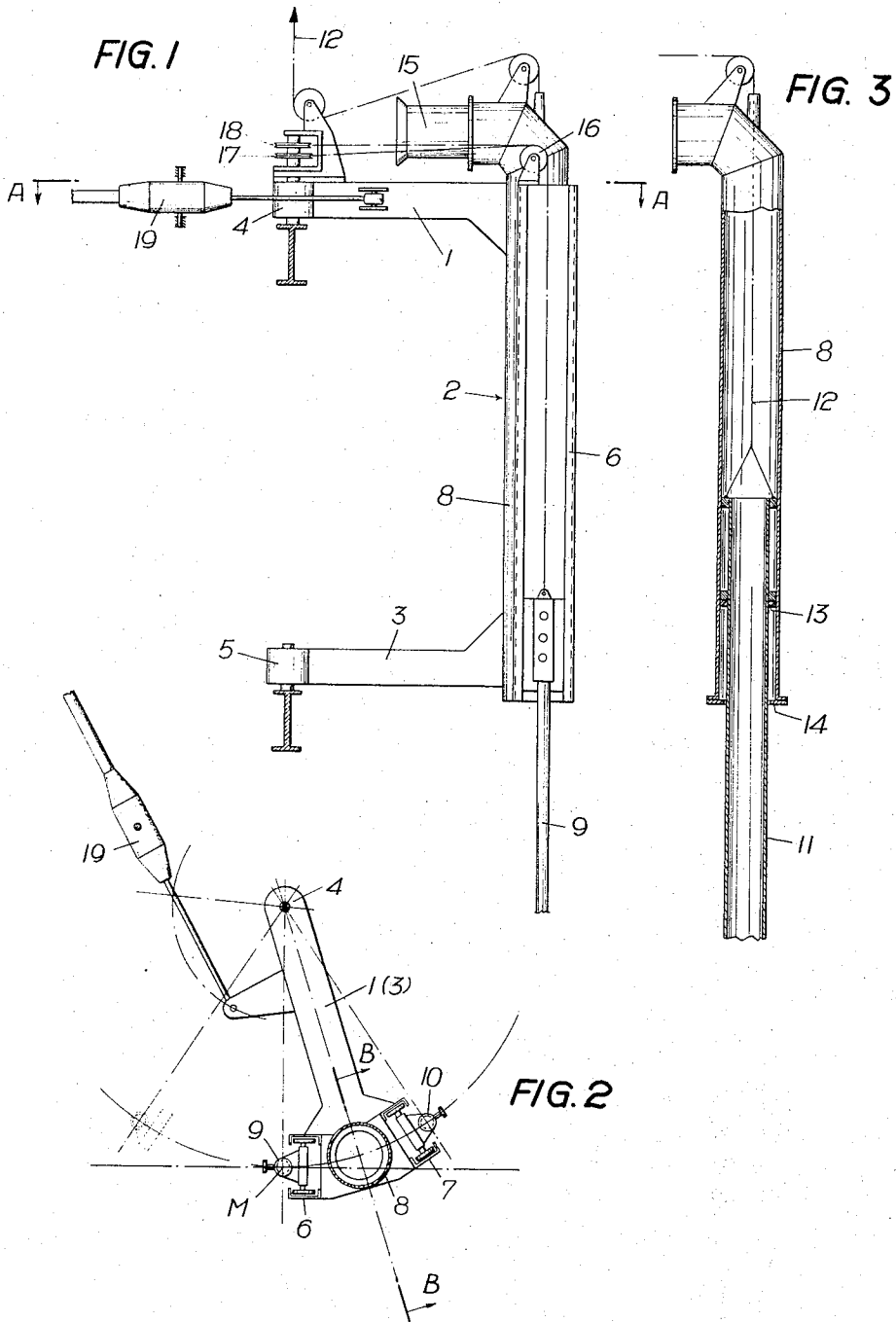
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BLOWING DEVICE FOR CARRYING OUT TOP BLOWING PROCESSES

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1

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**BLOWING DEVICE FOR CARRYING OUT TOP BLOWING PROCESSES**

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1 Claim. (Cl. 266—34)

**ABSTRACT OF THE DISCLOSURE**

The invention relates to a blowing device for use in top blowing oxygen steel equipment which includes a frame mounted for pivoting or swinging movement in a circular path above a steel-making converter, the frame carrying an outer tube having a telescopically related tube therein which can be extended and retracted and through which an air blast can be directed into the converter, and two lance guides mounted on opposite sides of the outer tube to enable oxygen-blowing lances mounted on the guides to be projected selectively into and withdrawn from the mouth of the steel-making converter, one of the lances being disposed outside of the converter in a neutral position while the other lance is in use.

This invention relates to a blowing device for carrying out top blowing processes, wherein the blowing agent, particularly oxygen, is blown from above onto the surface of the charge in a crucible-type refining vessel. In recently developed modifications of the top blowing technique, e.g. in blowing high-phosphorus pig iron or in processing a charge consisting partly of solid and partly of liquid charging materials, it is of considerable importance that the exchange of the lances, e.g. the substitution of an oxygen lance for a heating lance or a lime-dust supply lance, or vice versa, can be accomplished as quickly as possible and without assembling expenditure. Apart from that, it is required for safety reasons that a lance which is in operation can be replaced within a minimum of time by a fully connected reserve lance, without having to interrupt the refining process.

A further problem in the operation of top-blowing crucibles, which has not been solved satisfactorily up to now, resides in that due to the constructions above the crucible mouth the space available is very restricted. Difficulties are always encountered, for instance, in accommodating at the end of a crucible campaign the cooling tube from which cooling air is blown into the interior of the crucible in order to cool the lining.

The present invention avoids the previous difficulties and solves the existing problem. The blowing device according to the invention, having a frame-like lance carrier which is slewable along a circular path, is characterized in that the lance carrier comprises two lance guides connected by a tubular reinforcing member and arranged with such a distance on a circular arc that one lance is in the operating position and the other lance is in the reserve (neutral) position.

According to a preferred embodiment, a tubular extension piece is provided to be telescopically drawn out of

2

the reinforcing tube, the tube being adapted to be connected to a coolant supply, e.g. an air blast.

Suitably, a stop is provided for preventing a lifting or lowering of the lance when pivoting the lance carrier.

In the drawing the invention is illustrated in more detail by way of an embodiment. FIG. 1 is a lateral view of the device, FIG. 2 is a sectional view along line A—A of FIG. 1, and FIG. 3 is a partial sectional view along line B—B of FIG. 2.

The lance carrier consists of an upper cantilever arm 1, a vertical lance guiding part 2 and a lower cantilever arm 3, which form together an angular frame. The cantilever arm 1 is carried in the neck bearing 4, and the lower cantilever arm 3 is pivotally carried in the foot-step bearing 5, so that the lance guiding part 2 is slewable along a circular path. The lance guiding part consists of three portions, viz. lance guide 6, lance guide 7 and the interposed reinforcing tube 8 which is rigidly connected to the two lance guides. On each of the lance guides 6, 7 a lance 9 and 10, respectively, is mounted and guided to be vertically displaceable, lances 9 and 10 being arranged on the circular arc with such a distance that one lance is in the operative (working) position in the longitudinal axis of the crucible and the other is in the reserve (neutral) position outside the crucible. The centers of the two lances 9 and 10 must be situated on the common arc, the radius of which is determined by the length of the cantilever arms. The reinforcing tube 8 which is arranged between the two lance guides is intended to increase the rigidity of the lance guiding part 2. The center of the tube may likewise lie on the circular arc determined by the radius of the cantilever arms, together with the lances; however, this is not essential. The reinforcing tube 8 may also be a little offset in the direction of the axis of rotation.

According to the representation of FIG. 2, the lance 9 is in the blowing position in the center of the crucible M. After lifting lance 9, the other lance 10 or the tube 8 may selectively be positioned above the crucible center M by altering the slewing angle.

As is evident from FIG. 3 of the drawing, a tubular extension piece 11 is concentrically arranged in the tube 8 and adapted to be telescopically moved in and out by means of a rope hoist 12. In the drawn-out position the inner tube 11 is sealed against the outer tube 8 by a packing 13 which is pressed by the proper weight of the tube 11 against the annular flange 14. Flange 14 simultaneously serves as the lower stop of the tube 11.

Flanged on the upper end of tube 8 is an axial blast 15, by which cooling air may be blown through the tubes 8 and 11. This cooling device will be operated at the end of a crucible campaign, when the lining is worn out and has to be renewed. As has already been mentioned, this manner of cooling of the lining involved considerable difficulties, because it was impossible or complicated to install the tubes for feeding the coolant in the construction above the crucible. In the device according to the invention the cooling tube is combined with the lance guides and the lances to form a functional unit. During the crucible campaign the tube serves as a structural reinforcing element, and at the end of a crucible campaign as part of the cooling equipment.

A useful design of the invention is indicated by the return pulleys 16, 17, 18. The latter serve to prevent a vertical displacement of the lances during the slewing process.

3

3 dure. Slewing of the lance carrier may be effected by any suitable auxiliary device. In the drawing, an electric shifting motor which is designated by numeral 19 is provided for this purpose.

What I claim is:

A blowing device for carrying out top blowing processes comprising a frame having a first substantially vertical tube and laterally extending arms adjacent to opposite ends of said tube, means pivotally supporting said tube for slewing of said frame in a circular path above a steelmaking converter having a mouth at its top, two lance guides mounted on opposite sides of said tube, two lances slidably mounted in said lance guides for vertical movement, said lance guides being spaced apart a distance such that when one lance is aligned with the axis of the converter the other lance is disposed outside of said converter, a second vertical tube arranged coaxially within said first tube and telescopically displaceable rel-

4

4 ative to said first tube, a hoist for displacing said second tube in said first tube, annular sealing members sealing said second tube to said first tube, and means for connecting said first tube to an air blast source.

#### References Cited

##### UNITED STATES PATENTS

3,007,691 11/1961 Rinesch et al. ----- 266—34  
 3,170,977 2/1965 Obenchain ----- 75—60

##### FOREIGN PATENTS

222,677 8/1962 Austria.  
 572,731 11/1958 Belgium.

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