

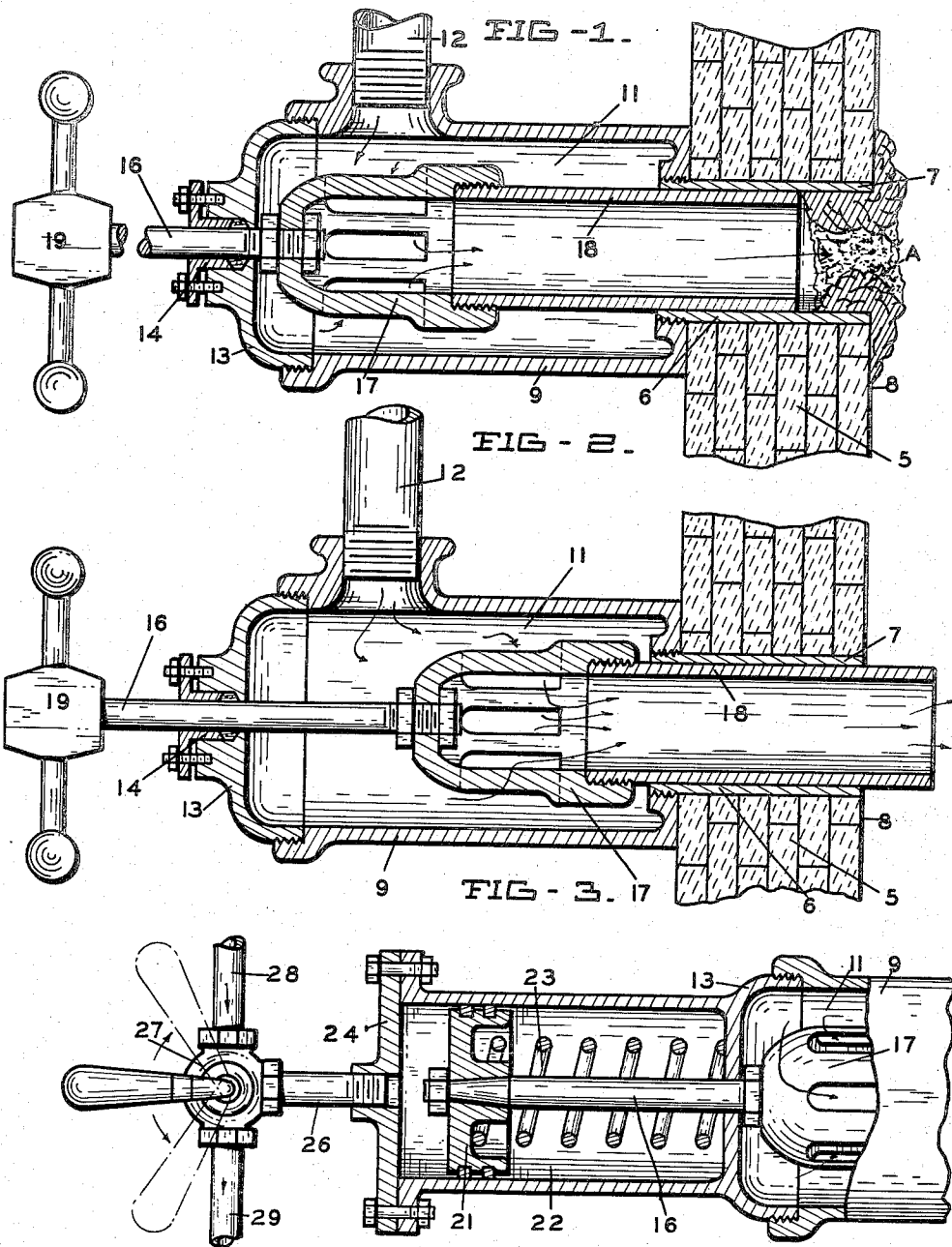
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PUNCHING DEVICE

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2,244,079

PUNCHING DEVICE

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3 Claims. (Cl. 266-42)

This invention relates to improvements in punching devices for furnaces, converters, and the like.

The principal object of this invention is to produce a punching device whereby incrustations forming about the mouth of an air vent may be broken away from the mouth to permit the full flow of air into the furnace.

A further object of this invention is to produce a device which may be used with the ordinary equipment now common on furnaces of this type and may be applied thereto without materially altering the construction of the furnace.

A further object of the invention is to produce a device of this character which is economical to manufacture and install.

A further object of the invention is to produce a device which may be manually or automatically actuated.

A further object is to produce a device of this character which will eliminate the hazard of breaking away the incrustations, thus avoiding the danger of burns being inflicted upon the operator.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawing forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a cross sectional view of my device as the same would appear when attached to a furnace, a portion of the wall of which is shown in cross section;

Fig. 2 is a similar view, showing my device with the punch in extended position; and

Fig. 3 is a modified form, showing the mechanically operated mechanism.

In the refining of copper and other ores, a furnace is employed having a wall structure within which the products are heated. It is common to introduce at several points through this wall structure a blast of air to support combustion within the furnace. This is accomplished by having tubes extend through the wall structure with their inner ends flush with the inner surface of the wall; and it is at this point that slag or other incrustations form which, if not broken away, rapidly cut down the air supply entering the furnace. It has been common practice to disconnect the air supply and to break away this incrustation with a solid iron bar. The operator performing this function is often burned even though wearing protective gloves, aprons, etc.

Applicant has, therefore, devised means whereby this slag may be broken away without danger to the operator or without interrupting the flow of air to the furnace.

In the accompanying drawing wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates a portion of a furnace wall through which extends a pipe 6 having its end 7 flush with the inner surface of the wall, as shown at 8. Secured to the outer end of the pipe 6 is a casting 9 within which is formed an air chamber 11. An air pipe is shown at 12, which communicates with the chamber 11. A removable head 13 is secured to the casting 9 and is provided with a packing gland 14 through which an operating member 16 passes. This operating member connects to a spider 17, which is in turn threadedly connected to a tubular punch 18. An operating handle is shown at 19.

In the modified form shown in Fig. 3, the only difference in construction is that the operating member 16 is connected to a piston 21 movable in a cylinder 22 and normally held in the position shown by a spring 23, the cylinder being formed upon the head 13 so that the spring is positioned between the piston and the head. The cylinder head 24 has a bore therethrough which communicates with a pipe 26 connected to a valve 27. This valve is a three-way valve and connects to an air supply 28 and an exhaust pipe 29.

The result of the construction thus far described is that when the device is installed upon a furnace, as illustrated in Figs. 1 and 2 (and it might be herein mentioned in an installation there are often as many as fifty devices on a single furnace), and the furnace is in operation, incrustations will form, as shown at A, and it then becomes necessary to remove the same. This may be accomplished by grasping the handle 19 and forcibly pushing the operating member 16 toward the furnace, which will in turn move the spider 17 and the punch 18 from the position of Fig. 1 to that of Fig. 2; and as the punch moves forward, the incrustations will be broken away from their engagement with the mouth of the pipe 6. After this has been accomplished, the parts will return to the position of Fig. 1.

With the arrangement shown in Fig. 3 it is only necessary for the operator to turn the valve 27 to such a position that the air from the pipe 28 will act upon the piston 21 and force the same against the tension of the spring 23 to move the

parts as before mentioned. As soon as the air is bled away from the piston, the spring 23 will return the parts to their normal position.

It will be apparent from the above that my device will accomplish all the objects set forth without shutting down the air, without danger to the operator, and with a minimum of effort.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes relative to the material, size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a device of the character described, the combination with a furnace having a wall structure, a pipe extending through said wall structure and having its inner end flush with the inner surface of the wall structure, an air chamber connected to said pipe, means for supplying air to said chamber, an open ended tubular punch slidably mounted in said pipe and extending into said air chamber, and means for reciprocating said punch in said pipe to remove deposits which may form therein said air supply prevent-

ing molten metal from entering the open end of said punch.

2. In a device of the character described, the combination with a furnace wall structure, a pipe extending through said wall structure and having its inner end flush with the inner surface of said wall structure, an open ended tubular punch slidably in said pipe, means for moving said punch, and means for supplying air into and through said punch whereby said air will prevent molten metal from said furnace from entering the open end of said punch.

3. In combination with a furnace wall structure, a pipe extending therethrough and having its inner surface flush with the inner surface of said wall structure, a casting secured to said pipe, means for supplying air to said casting, a head secured to said casting, a tubular punch slidably in said pipe, said tubular punch having a spider connected thereto, an operating member connected to said spider and extending through said head, to reciprocate said operating member to effect a reciprocation of said tubular punch to a point beyond the inner end of said pipe and to withdraw said tubular punch whereby its free end will be housed within said pipe.

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