Aug. 14, 1962 W. S. LEEPER 3,049,165

BRICK HANGER TAB BENDING APPARATUS

Filed June 22, 1960 2 Sheets-Sheet 1

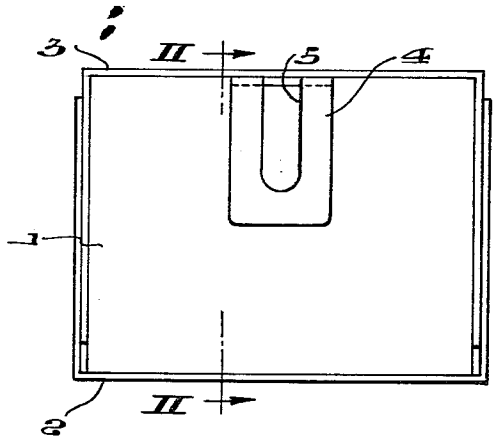


Fig. 1.

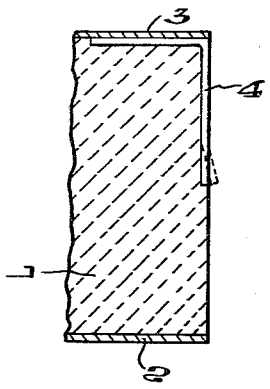


Fig. 2.

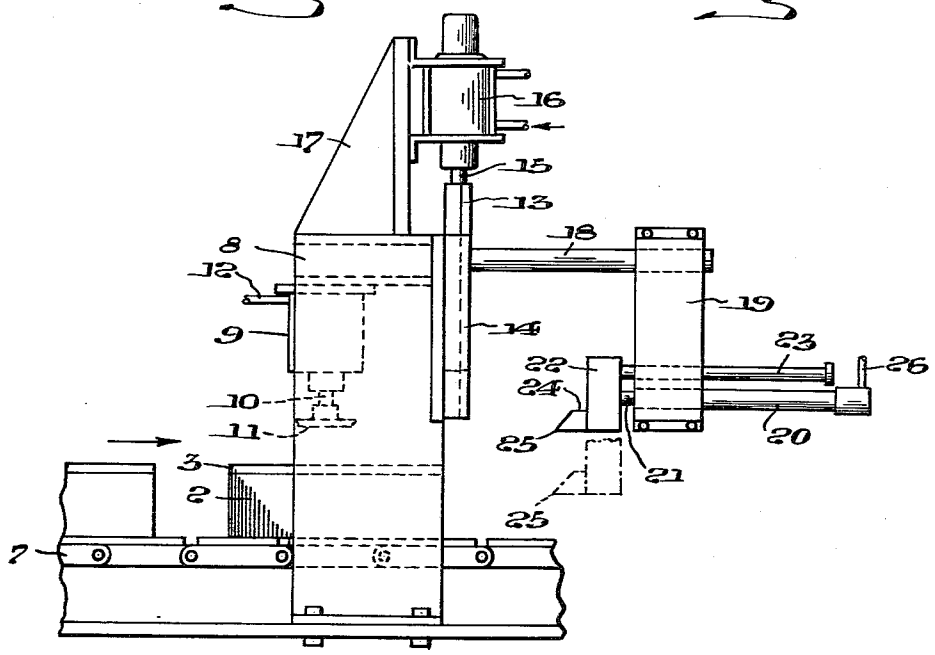


Fig. 3.

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BRICK HANGER TAB BENDING APPARATUS

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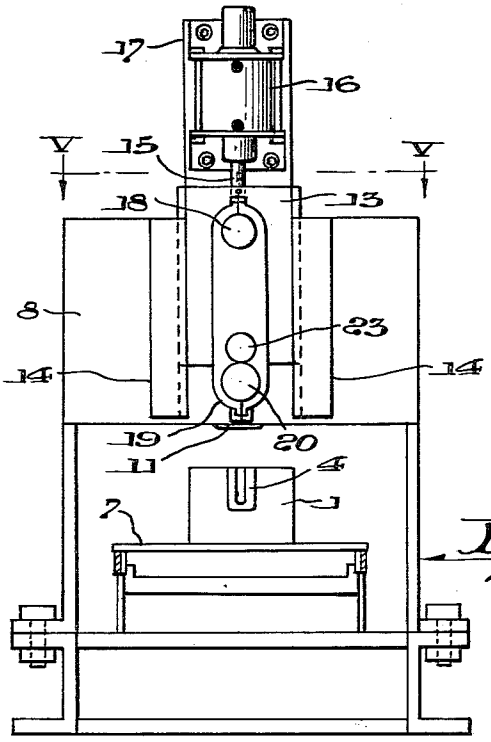


Fig: 4.

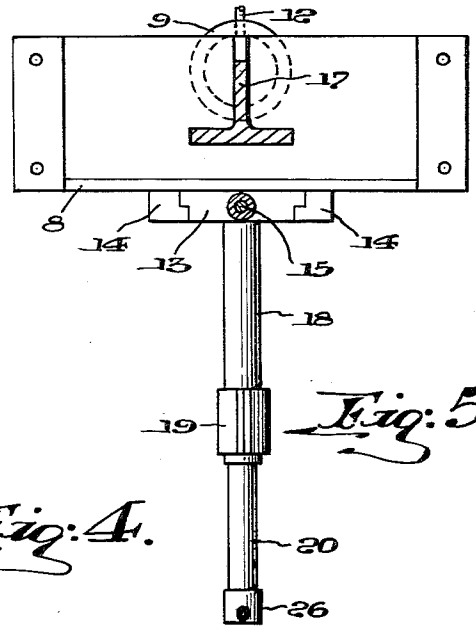


Fig: 5.

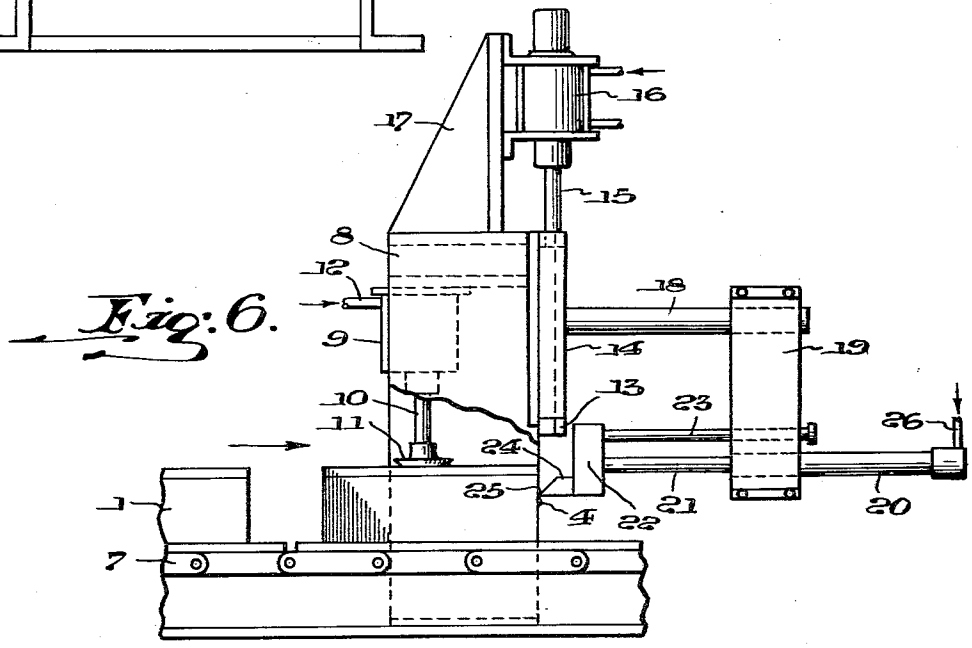


Fig: 6.

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BRICK HANGER TAB BENDING APPARATUS

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This invention relates to refractory bricks for furnace roofs, and more particularly to apparatus for bending metal hanger tabs attached to such bricks.

Various ways of suspending refractory bricks in furnace roofs are known. In many instances the bricks themselves are provided with recesses for receiving hangers. In other cases perforated sheet metal hanger tabs are attached to the upper ends of the bricks for suspending them from hooks. An objection to such tabs has been that it is not feasible for them to project from the ends of the bricks during manufacture, storage and shipping of the bricks. Therefore, it has been the practice to mold the bricks with the tabs extending part way across their ends, whereby the refractory material tightly encloses all but the outer side of each tab. When it is desired to hang such a brick in a furnace roof, the tab must first be pried away from the brick and then bent up into upright position. The initial separation of the tab from the surrounding refractory material is difficult and takes entirely too much time, especially when thousands of bricks are being used.

It is among the objects of this invention to provide apparatus which will automatically separate the ends of hanger tabs from refractory bricks, and which is simple in construction and rapid in operation.

In accordance with this invention, provision is made for temporarily clamping in fixed position each successive metal-cased refractory brick being carried forward on a conveyor with metal hanger tabs extending part way across their front ends. A hammer is disposed in front of the clamping means in a location out of the path of any bricks on the conveyor, but means are provided for periodically moving the hammer into a position directly in front of the position occupied by a clamped brick. After the hammer has been moved into that position, it is automatically driven rearwardly to strike the central portion of a hanger tab on a clamped brick. The hammer is shaped to strike the tab along a transverse line so that the free end of the tab will bend forward slightly to free it from the refractory material.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

FIG. 1 is an end view of a metal-cased refractory brick showing the position of the hanger tab just after block has been manufactured;

FIG. 2 is a fragmentary longitudinal section of the brick taken on the line II—II of FIG. 1 and indicating in dotted lines the position to which the tab is to be bent by the apparatus disclosed herein;

FIG. 3 is a side view of tab-bending apparatus;

FIG. 4 is a front view thereof;

FIG. 5 is a horizontal section on the line V—V of FIG. 4; and

FIG. 6 is a view similar to FIG. 3, but partly broken away and showing the hammer just after it has struck a hanger tab.

Referring to FIGS. 1 and 2 of the drawings, a refractory brick **1** is molded in a sheet metal case that may be formed from two telescoping channels **2** and **3** that are spot welded together. When the brick is molded, a hanger tab **4** is molded in one end. The tab extends part way across the brick and is provided with a slot **5** or other opening. At the edge of the brick the tab may be secured to a reinforcing plate inside the brick, or it may be welded to the adjoining side of the case as shown. It will

be seen that the outer face of the tab is flush with the end of the brick and is the only part that is not engaged by the refractory material. It is the purpose of this invention to provide apparatus for bending the free end of the tab just far enough away from the brick to permit a screwdriver or the like to be inserted between them so that the tab then can be bent out substantially at right angles to the end of the brick.

The apparatus for this purpose is shown in FIGS. 3, 4 and 5. It includes an intermittently operating endless conveyor **7** that may carry blocks away from the apparatus in which the two parts of each case are welded together. Straddling the conveyor is an inverted U-shape frame **8**, the bottom of which can be bolted to the conveyor support or the like. Inside the frame above the conveyor a fluid pressure cylinder **9** is suspended, from which projects a piston rod **10** that has a pad **11** at its lower end. The pad normally is held in its upper position by a spring (not shown) inside the cylinder. The conveyor is timed to stop every time a cased brick reaches a predetermined position in the frame directly beneath the pad, whereupon fluid under pressure is delivered to the upper end of cylinder **9** through a pipe **12** to cause the pad to descend and clamp the brick tightly against the conveyor.

A supporting member or slide **13** is held against the front of the frame by means of vertical guide bars **14** secured to the frame. The upper end of the slide is connected to a piston rod **15** extending up into a fluid pressure cylinder **16** mounted on a bracket **17** on top of the frame. Projecting forward from the slide is a heavy rod **18**, on the outer end of which a clamp **19** is adjustably mounted. The clamp extends down in front of the frame and rigidly supports the rear end of a forwardly projecting horizontal fluid pressure cylinder **20**. A plunger **21** in this cylinder projects from its rear end and carries a block **22** that is also attached to the rear end of a guide rod **23** extending slidably forward through the clamp to keep the block from turning relative to the rest of the apparatus. The plunger normally is held in its forward position in the cylinder by a spring therein (not shown). Projecting from the back of the lower part of the block is a hammer head **24**, the exposed end of which is inclined downward and rearward to its lower surface to form a transverse impact edge **25**.

While the conveyor is carrying metal-cased bricks forward, the slide **13** and the elements carried by it are supported in an upper position by piston rod **15**, as shown in FIG. 3, where they will be above the path of travel of the bricks. However, as soon as the conveyor stops and a cased brick is clamped against it by pad **11**, fluid under pressure is delivered to the upper end of upper cylinder **16** to lower the slide so that the hammer will descend to the position indicated in dotted lines in FIG. 3. Immediately thereafter, fluid under pressure is delivered to the front end of the hammer cylinder **20** through a tube **26**, and the hammer is therefore driven backward rapidly to cause its impact edge **25** to strike the central portion of the hanger tab **4** on the clamped brick as shown in FIG. 6. The impact along a narrow line across the tab will cause the free end of the tab below the hammer to bend forward slightly, so that a pointed tool can be inserted between it and the brick later to bend the entire tab up away from the end of the brick. The hammer then is reversed to move it forward and the slide and clamping pad are raised. The conveyor then is operated to move the bricks ahead another step and the front brick is removed from the conveyor.

With this apparatus the hanger tabs can be prepared at a rapid rate for bending away from the bricks, all without the exertion of any manual effort.

According to the provisions of the patent statutes, I have explained the principle of my invention and have

illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. Apparatus for bending sheet metal hanger tabs away from the ends of metal-cased refractory brick movable forward through the apparatus, comprising means for supporting each successive cased brick on its side with its tab at its front end, means for temporarily clamping each successive cased brick in fixed position, a hammer disposed in front of said clamping means and normally out of the path of any bricks movable forward through said apparatus, means for moving the hammer into a position directly in front of the position occupied by a clamped brick, and means for driving the hammer rearwardly to strike the central portion of a hanger tab on a clamped brick, the hammer being shaped to cause the free end of such a tab to bend forward toward the hammer when the tab is struck by the hammer.

2. Apparatus for bending sheet metal hanger tabs away from the ends of metal-cased refractory brick movable forward through the apparatus, comprising means for supporting each successive cased brick on its side with its tab at its front end, means for temporarily clamping each successive cased brick in fixed position, a hammer disposed in front of said clamping means and normally out of the path of any bricks movable forward through said apparatus, means for moving the hammer into a position directly in front of the position occupied by a clamped brick, and fluid pressure actuated means for driving the hammer rearwardly to strike the central portion of a hanger tab on a clamped brick, the hammer having a transverse impact edge to cause the free end of such a tab to bend forward toward the hammer when the tab is struck by the hammer.

3. Apparatus for bending sheet metal hanger tabs away from the ends of metal-cased refractory brick movable forward through the apparatus, comprising means for supporting each successive cased brick on its side with its tab at its front end, a rigid support above the said supporting means, means mounted on said support for temporarily clamping each successive cased brick in fixed position, a vertically movable supporting member carried by said support, a hammer disposed in front of said member and normally above the level of any bricks movable forward through said apparatus, means supporting the hammer from said member, means for moving said member downward to locate the hammer in a position directly in front of the position occupied by a clamped brick, and means carried by said hammer supporting means for driving the hammer rearwardly to strike the central portion of a hanger tab on a clamped brick, the hammer being shaped to cause the free end of such a tab to bend forward when the tab is struck by the hammer.

4. Apparatus for bending sheet metal hanger tabs away from the ends of metal-cased refractory bricks, comprising a support for the cased bricks that are movable forward with their tabs at their front ends, an inverted U-shape frame straddling the support and extending above it, fluid pressure actuated clamping means mounted in said frame for temporarily clamping each successive cased brick in fixed position on the support, a vertically movable slide attached to said frame, a hammer disposed in front of the slide and normally above the level of any bricks on said support, means projecting forward from said slide supporting the hammer, fluid pressure actuated means mounted on the frame for moving the slide downward to locate the hammer in a position directly in front of the position occupied by a clamped brick, and fluid pressure actuated means carried by said projecting means for driving the hammer rearwardly to strike the central portion of a hanger tab on a clamped brick, the hammer having a transverse impact edge to cause the free end of such a tab to bend forward toward the hammer when the tab is struck by the hammer.

References Cited in the file of this patent

UNITED STATES PATENTS

802,820	Nicholson	Oct. 24, 1905
1,148,131	Thompson	July 27, 1915
2,282,111	Beckwith et al.	May 5, 1942
2,398,550	Nelson	Apr. 16, 1946
2,734,550	Glenn	Feb. 14, 1956

FOREIGN PATENTS

1,176,660	France	Nov. 24, 1958