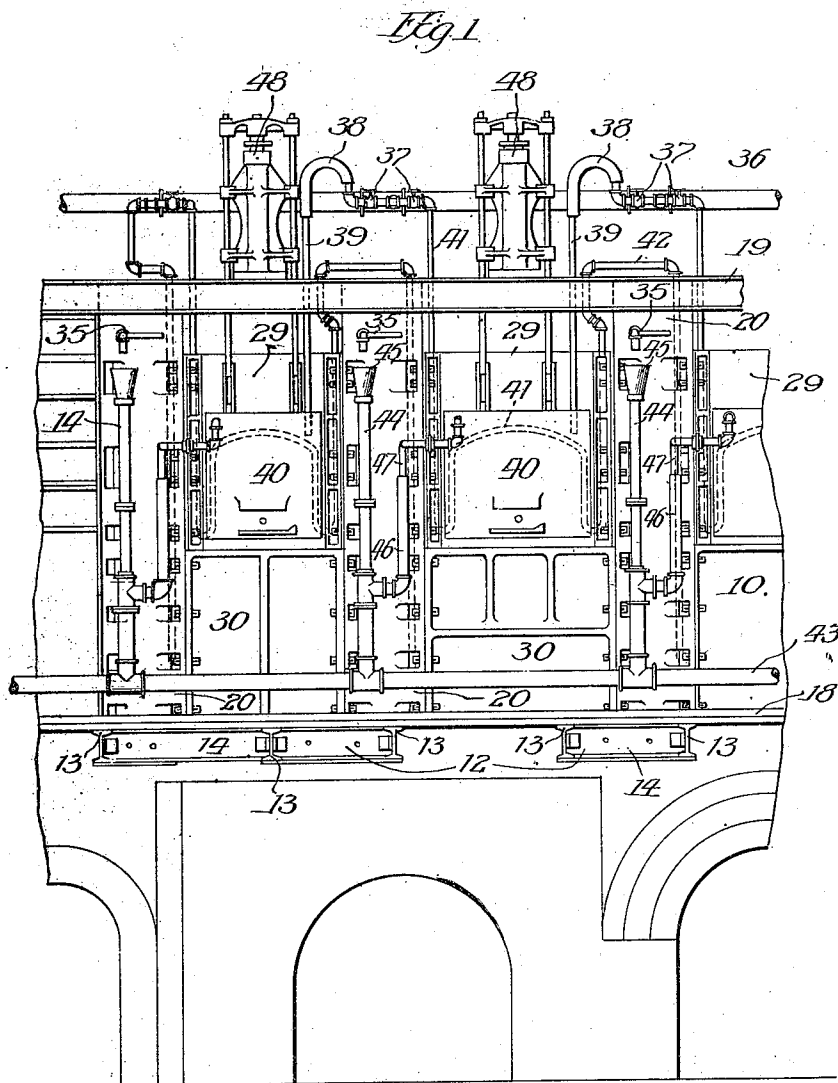


W. P. GLEASON.
WATER COOLED BUCKSTAY.
APPLICATION FILED JAN. 8, 1912.

1,052,477.

Patented Feb. 11, 1913.

2 SHEETS-SHEET 1.



Witnesses:

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Inventor:
William P. Gleason

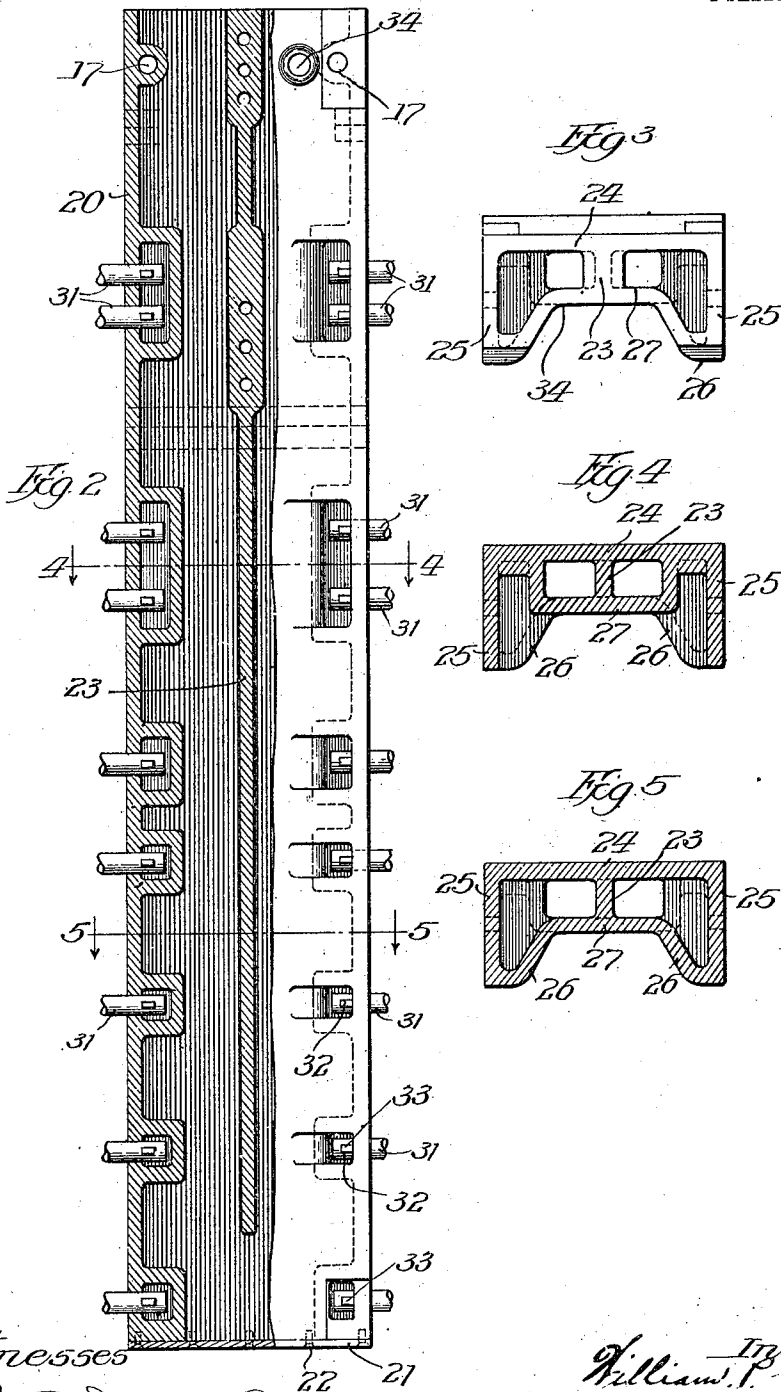
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UNITED STATES PATENT OFFICE.

WILLIAM P. GLEASON, OF GARY, INDIANA.

WATER-COOLED BUCKSTAY.

1,052,477.

Specification of Letters Patent.

Patented Feb. 11, 1913.

Application filed January 8, 1912. Serial No. 669,963.

To all whom it may concern:

Be it known that I, WILLIAM P. GLEASON, a citizen of the United States, residing at Gary, in the county of Lake and State of Indiana, have invented certain new and useful Improvements in Water-Cooled Buckstays, of which the following is a specification.

My invention relates to buckstays, and aims to produce a device of that class which will be cooled by a continuous circulation of water within its interior whereby it will be prevented from becoming heated sufficiently to effect its resilient and elastic properties.

As is well known to those skilled in the art, the buckstays in use at present are each formed of a plurality of channel-irons or other standard forms of appropriate metal, such as angle-irons, Z-bars, I-beams and the like, assembled in a variety of combinations. Buckstays however constructed are positioned in pairs at opposite sides of a furnace having their bottoms securely fastened to the concrete floor, or retained within the sub-structure and having the tops of each pair joined together across and above the furnace by means of heavy iron tie rods. As the furnaces are usually made of brick which will transmit heat readily, and as the buckstays are frequently positioned adjacent the doors of the furnace where they are exposed to the direct heat of the interior when the doors are open, they have heretofore become heated to a high temperature, and upon the expansion of the furnace have become permanently bent and distorted, their temperature at such times being so high that they readily bend and afford little restraint and support to the walls of the furnace. It is therefore evident that the buckstays commonly in use become more and more inefficient as the temperature of the furnace is raised. In other words it may be stated that the more the supporting and restraining powers of the buckstays are needed the less able are those heretofore in use to perform these functions; and frequently when the furnace is operating at its highest temperature the buckstays become so hot that they furnish no resistance to the expansion of the furnace, bending readily, and upon the cooling of the furnace permanently remaining in the shapes they have been forced to assume.

One of the objects of my invention is to

produce a buckstay that will at all times remain cool, and by so doing will retain its elastic and resilient powers without danger of its becoming bent or distorted through the heat of the furnace, or becoming too flexible and permitting too free expansion of the brickwork.

A further aim of my invention is to produce a buckstay that will be cooled by a continuous flow of water through its interior, and to provide means for utilizing the water for this purpose which has been used to cool the doors of the furnace.

Further aims and advantages of my invention will be apparent as the device is better understood from the following description, which, taken in connection with the accompanying drawings, illustrates one preferred embodiment thereof.

Figure 1 is a side elevation of a part of a furnace supplied with buckstays in pursuance of my invention, Fig. 2 is an enlarged side elevation of a buckstay shown in Fig. 1, being shown partially in section, Fig. 3 is the top plan view of the buckstay shown in Fig. 2, Fig. 4 is a sectional view along the line 4-4 of Fig. 2, and Fig. 5 is a sectional view along the line 5-5 of Fig. 2.

On the drawings, like characters of reference refer to similar parts throughout the various figures.

For the purpose of my invention I have shown a portion of a furnace 10 which may be of any desired type or construction, but which I have shown as constituting the main body portion 11 mounted upon the sub-structure 12, which may of any preferred form, but which for the purposes of illustration is shown as composed of the 1-beams 13 connected at intervals throughout their length by the transverse members 14, said sub-structure being located over the regenerators which are connected to the furnace by appropriate flues (not shown). Positioned on each side of the furnace 10 are a plurality of buckstays 20, said buckstays being positioned in pairs on opposite sides of a furnace, each pair being connected by tie-rods (not shown) disposed across the top of the main body 11 of the furnace, said rods being engaged with the apertures 17 of the buckstays. The buckstays 20 are fastened to the floor 18 in any suitable manner or may be retained within the sub-structure 12. Positioned above the furnace on each side throughout the length of the furnace is

the channel-iron 19, behind which the tops of the buckstays are disposed, the said channel-irons serving to prevent endwise expansion of the furnace, being properly attached to suitable members at each end for this purpose. The tie-rods connecting the buckstays may be fastened to the channel-irons as well where desired, being shown in the present instance, however, as terminating behind them.

Inasmuch as the buckstays made in pursuance of my invention and shown in connection with this furnace are all of similar construction and of similar form, I shall merely describe one of them, referring particularly to Figs. 2, 3, 4 and 5. The buckstay is formed of the casting 20, made hollow throughout its length, and the plate 21, adapted to close and be permanently attached to the lower end thereof by means of suitable bolts or screws 22 to make a water-tight fit. The casting 20 has the back-wall 24 and both side-walls 25 provided on the outside with plane surfaces, and the front-wall depressed inwardly from its edges adjacent the side-walls to form the plane 27 parallel to the rear wall and connected thereto by means of the central vertical partition 23, preferably cast integrally with the outer walls, the said central partition extending from the top of the casting to a point adjacent the bottom. The inclined portions of the front wall 26 are depressed to meet the rear wall 24 at intervals throughout the length of the buckstay to permit the side walls 25 to receive the fastening means which attach the door-frame 29 and the plates 30, which form the bottom of the side wall of the furnace, to the buckstay. These fastening means consist of the rods 31 of suitable length provided at each end with the rectangular slots 32 adapted to receive the wedge-like pins 33, which upon being driven into the slots at each end of the rod 31 draw the buckstay and the member to which it is affixed into a tight and enduring fit. At the top of the plane surface 27 at the front 26 of the buckstay is provided the threaded holes 34 to which are fastened when the buckstay is in use the outlet pipes 35.

To supply water to the buckstay I have provided the supply pipe 36 disposed above the top of the furnace and parallel to the side thereof, said supply pipe being adapted to carry the water to cool not only the buckstays but the door-frames as well. The said supply pipe is provided with the valves 37 located in pairs, one of said valves being connected by means of suitable elbows and a flexible connection 38 to the pipe 39, which is adapted to supply water to the open cavity within the top of the door 40, and the other valve 37 being connected by means of the pipe 41 with the cored interior of the

door-frame (shown in dotted lines in Fig. 1), said interior having connected thereto the outlet pipe 42 which extends and transmits water from the interior to or adjacent the bottom of the buckstay 20. To carry off the water after it has performed its function of cooling the hereinbefore described members, I have provided the discharge pipe 43 which has connected to it in front and opposite one side of each buckstay a plurality of pipes 44 terminating at their tops in the funnel-shaped receiving member 45 into which the pipes 35 discharge the water from the top of the buckstay. To remove the water from the open cavity of the door I have provided the telescopically connected pipes 46 and 47, the pipe 46 having slidably mounted within it throughout a part of its length the pipe 47, which is connected at its other end to the top of the door, and adapted to receive the water delivered thereto by the pipe 39. As the door is raised by means of the lifters 48 the pipe 47 will move in the pipe 46, retaining connection therewith, thus enabling an uninterrupted flow of water between the supply pipe 36 and the discharge pipe 43 through the cavity above the door.

While I have shown the buckstay as composed of the main casing and the plate fastened to and closing the bottom thereof, it will be obvious that the bottom may be made integral therewith, a plate being provided in the present embodiment merely to permit the core which forms the cavities to be supported at both ends while the casting is being made.

It will be manifest that a buckstay constructed as hereinbefore described may be positioned in any desired way, it being necessary only for the purpose of this invention that proper water connections to permit a continuous flow of water through the inner compartments be provided.

A buckstay made in pursuance with my invention will, due to the circulation of water throughout its interior, be at all times of a temperature sufficiently low to prevent the permanent distortion heretofore occasioned in the buckstays in use, and it will be apparent moreover that a buckstay made in pursuance with my invention will, regardless of the application of heat to the buckstay, be adapted to supply at all times the restraining and supporting force that is necessary to the at times extremely hot body of the furnace.

It will be obvious that various changes in the construction, details of construction, design and method of attaching the buckstays to the furnace and its members, as well as the means for supplying and discharging the water may be resorted to without departing from the spirit or scope of my invention, and sacrificing any of its advantages here-

inbefore disclosed, the device being merely one embodiment thereof.

I claim:—

1. A water-cooled buckstay comprising a
5 hollow casting having therein a central vertically disposed partition extending from the top to a point adjacent the bottom thereof, and having the rear and side faces
10 formed in plane surfaces and adapted to be attached to the parts of the furnace adjacent the buckstay, and having the front surface depressed at its center, means located
15 adjacent the bottom of the buckstay to admit water within the buckstay, and means located near the top to remove the water.

2. A water-cooled buckstay comprising a
hollow casting closed at its bottom, having
the outer surfaces of the side walls adapted
to engage with the adjacent members of the
20 furnace and having its front wall depressed at intervals throughout its length to permit the side walls to be fastened to the said
members, and means adapted to extend
25 through the side walls to attach the said members to the buckstay.

3. A water-cooled buckstay comprising a
hollow casting closed at its bottom, having
a central partition extending from the top
of the buckstay to a point adjacent its bot-

tom, said casting having the side walls pro- 30
vided with smooth outer plane surfaces and having the front wall depressed where it joins the central partition, and further depressed adjacent the side walls to the back
35 wall at intervals throughout its length to form pockets to accommodate fastening means, substantially as described.

4. A side member for furnaces comprising a hollow casting provided with a vertical baffle and arranged as a water-container, 40
said casting being provided with continuous rear and side walls the front wall being interrupted at intervals to provide recesses within which fastening means may be located, substantially as described. 45

5. A side member for furnaces comprising a hollow casting divided into communicating water passages by means of a vertical baffle, the side walls of the member being apertured to accommodate fastening 50
means, said apertures registering with recesses formed in the front wall of the casting, substantially as described.

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Witnesses:

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