

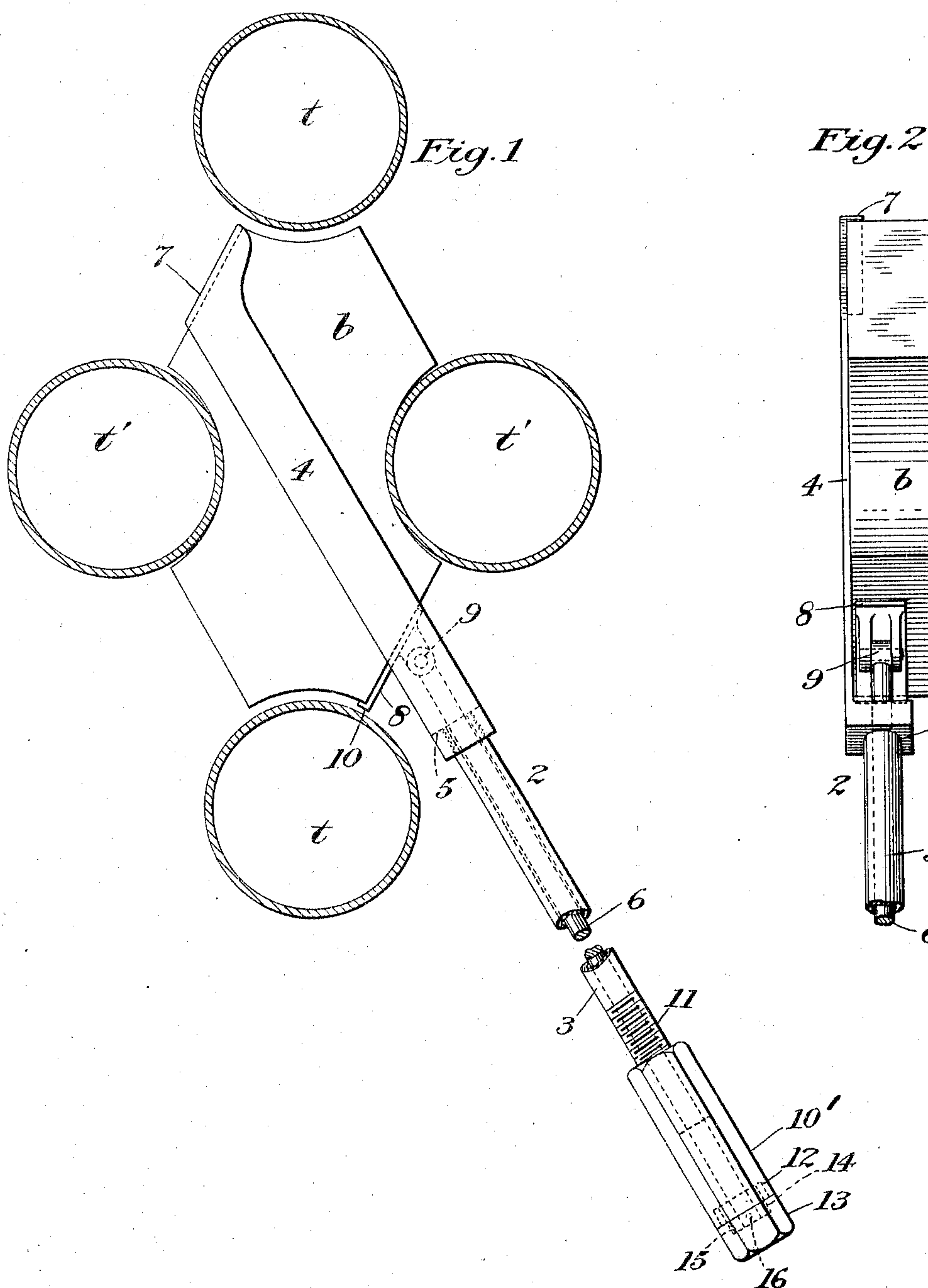
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TOOL FOR HOLDING FIRE BRICKS OF WATER TUBE BOILERS.

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UNITED STATES PATENT OFFICE.

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TOOL FOR HOLDING FIRE-BRICKS OF WATER-TUBE BOILERS.

No. 811,844.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, PATRICK HEELY and JOHN KEERS, citizens of the United States, and residents of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Tools for Holding Fire-Bricks of Water-Tube Boilers, of which the following is a specification.

This invention relates to a tool for holding and inserting or removing fire-bricks of water-tube boilers; and its main object is to provide a tool by means of which such fire-bricks may be readily inserted and removed.

As is well known, the tubes of water-tube boilers pass through baffle-plates which are protected from the direct action of the intense heat of the furnace by fire-bricks of very refractory material, these fire-bricks being so shaped as to fill the spaces between the water-tubes and being generally identical in contour and constructed to fill a substantially diamond-shaped space between four adjacent water-tubes and lying in close contact with adjacent fire-bricks filling other similar spaces. In water-tube boilers there is a large number of such fire-bricks, and it is a difficult matter to locate them in position or remove them after they are once in place, and, so far as we are aware, no special tool has been heretofore devised for this purpose and there is no means in use for accomplishing this result. In order to insert or remove a fire-brick, it is necessary first to expand the water-tubes at a point somewhat in advance of the position occupied or to be occupied by the fire-brick and afterward so to manipulate the fire-brick as to enter it between the tubes at the point where they are spread and then move it into contact with the baffle-plate by forcing it along between the water-tubes, or, in case it is partly broken, to destroy it or break it out or to move it along toward the point where the tubes are spread and then withdraw it at the point where the tubes are so spread. In a companion application, filed of even date herewith, we have disclosed a tool especially adapted for spreading water-tubes at a suitable point in advance of the baffle-plate through which they pass, such tool being designed to spread the water-tubes and then hold them in their spread positions while a fire-brick is being inserted or removed.

Our present invention relates to a tool by

means of which such fire-bricks are inserted or removed after the water-tubes have been properly spread, as by means of the tool described in said companion application.

In inserting fire-bricks in the ordinary manner without the use of a special tool for spreading the water-tubes it has been found extremely difficult to spread the tubes to a sufficient extent and maintain them in their spread positions. Because of this it has usually been necessary to cut away portions of the edges of the fire-bricks in order to reduce their size sufficiently to permit the insertion of the same edgewise between the water-tubes and subsequent turning of the fire-bricks into their proper positions in parallelism with the baffle-plate. This cutting operation is always a difficult one to perform without spoiling or breaking the fire-brick. It always weakens the brick, which is then more liable to be broken, and the removal of the portions of the edges results in leaving portions of the baffle-plate uncovered, and hence unprotected from the intense heat of the furnace.

When the water-tubes between which fire-bricks are to be inserted or from which said fire-bricks are to be removed are spread by means of the tool disclosed in our companion application, the insertion of fire-bricks of full size is permitted, and the tool constituting the subject-matter of this invention is an important auxiliary to such spreading-tool, the two when used together being effective for inserting fire-bricks of full size without breaking or weakening the same and without leaving any portion of the baffle-plate unprotected.

In the drawings accompanying this specification and forming part of the present application, Figure 1 is an elevation of our tool for holding and inserting or removing fire-bricks in operative relation with a fire-brick and a plurality of tubes between which such brick is to be inserted, said tool being broken near the middle. Fig. 2 is an edge elevation of the brick-holding end of the same in operative relation with a fire-brick.

Similar characters designate like parts in all the figures of the drawings.

The principal elements of our tool for holding and inserting or removing the fire-bricks of water-tube boilers are a carrier, which is preferably in the form of a rod, and means thereon for clamping and releasing a fire-

brick, said means being preferably a pair of clamps projecting from the rod and adapted to engage two of the edges of the fire-brick, one of these clamps being adjustable with respect to the other to engage or release the fire-brick. The carrier which supports these clamps will preferably consist of two main parts, one of which carries one of the clamps and the other of which carries the other clamp and is movable relatively to the first part of the carrier and its clamp. The particular construction of the two parts of the carrier may be varied considerably. In the construction shown the main or fixed member of the carrier is designated generally by 2, and consists of a tube 3 and a bracket 4, into which said tube is screwed, said tube being externally threaded at its inner end and engaging corresponding screw-threads of a bore in the rectangular shelf 5 of the bracket 4. The fixed member of the carrier constitutes a guide on which the movable member will preferably slide, the part 3 being the guide proper.

In the construction shown the movable member of the tool is a rod 6, slightly smaller in diameter than the diameter of the bore of the tube 3, said rod constituting a slide which works in said bore in the tube.

The means for holding and releasing the fire-brick, such as *b*, will preferably be a pair of clamps, one of which is in fixed relation with one main part of the carrier and the other of which is preferably carried by and movable relatively to the other main part of said carrier. Here the bracket 4 constitutes a flattened support for a fire-brick and has at its outer end an integral lip 7 projecting therefrom and constituting the fixed clamp of the tool. This clamp in the line of its base is disposed at an obtuse angle to the part 4 and in the line of its height at substantially a right angle thereto. The other clamp preferably projects from the opposite side of the carrier and is connected to the rod 6, so as to be movable therewith lengthwise of the tool. This movable clamp may be of the type shown at 8, it being a hinged clamp pivoted at 9 to the inner end of the rod 6 and adapted to swing about its pivot in order to vary its angular relation with respect to the carrier and accommodate itself to fire-bricks of different contours. This clamp also preferably has a lip 10 projecting therefrom substantially at a right angle thereto for the purpose of supporting one of the lower corners of the fire-brick.

In order to adjust the position of the clamp 8 lengthwise of the carrier, I prefer to connect the two main parts of the carrier by screw-threads, the tube 3 being externally screw-threaded at its outer end for a considerable distance, and a long adjusting-nut, such as 10', cooperating with the screw-threads 11 of said tube and having a swiveled

connection with the rod 6, constituting the other main element of the carrier. Here the nut 10' is recessed at its outer end, as indicated in dotted lines at 12, and a cap-nut 13, preferably of similar contour, is screwed into the end of the nut 10' and is itself recessed at its inner side, as indicated by the dotted line 14. A stop-collar, such as 15, which may be fastened to the outer end of the rod 6 by means of a pin, such as 16, limits the movement of the rod 6 lengthwise of the nuts 10' and 13, while permitting said nuts to turn freely on the tube 3 without turning said rod. When the nuts are turned in unison in the one direction or the other, it will move along the screw-threads 11, and the rod 6 will be similarly shifted without turning, and will effect a corresponding change in the longitudinal position of the adjustable clamp 8. It will be apparent also that the screw-threads will serve to hold said clamp positively in any position to which it may be adjusted. Hence when a fire-brick, such as *b*, is placed between the clamping-jaws and the movable clamp 8 is closed onto the same the fire-brick will be firmly gripped and held in place until it is released by turning the nuts 10' and 13 in unison in the opposite direction.

As before stated, the tool shown herein is intended for use in connection with a tube-spreading tool of the type shown in our companion application. When the water-tubes *t* and *t'* have been spread to the proper extent by the tool described in said companion application and while they are held in such spread positions, a fire-brick clamped in place, as shown in Fig 1, is inserted edgewise by the tool illustrated herein, and the tool and brick are then turned to the position shown in said figure, after which the fire-brick is moved along parallel with the tubes until it is in contact with the baffle-plate, when both the tube-spreading tool of our companion application and the clamping-tool of the present application may be removed. By means of this tool fire-bricks may be inserted or removed either from below or from above the bank of tubes.

It will be noted that the fire-brick shown is of full size and has not been cut away at the ends or rounded off at the sides in order to enter it between the tubes of the boiler, such cutting being unnecessary when the tubes are spread by means of the tool disclosed in our companion application, and the full strength of the approximately diamond-shaped fire-brick being therefore retained.

What we claim is—

1. A tool for holding fire-bricks at diagonally opposite corners of the bricks and for inserting said bricks in or removing them from water-tube boilers, embodying a rod-like carrier, and means on said carrier for clamping and releasing a fire-brick at diagonally opposite corners thereof.

2. A tool for holding and inserting or removing the fire-bricks of water-tube boilers, embodying a rod-like carrier, a pair of clamps projecting respectively from and engaging a
5 brick at opposite sides of the longitudinal axis of said carrier, and means for adjusting one of said clamps relatively to the other.

3. A tool for holding and inserting or removing the fire-bricks of water-tube boilers,
10 embodying a rod-like carrier, a pair of clamps projecting respectively from and engaging a brick at opposite sides of the longitudinal axis of said carrier at obtuse angles thereto, and means for adjusting one of said clamps
15 relatively to the other.

4. A tool for holding and inserting or removing the fire-bricks of water-tube boilers, embodying a rod-like carrier, a pair of clamps projecting respectively from and engaging a
20 brick at opposite sides of the longitudinal axis of said carrier each clamp being with respect to the carrier substantially at a right angle in the line of its height and at an obtuse angle in the line of its base.

25 5. A tool for holding and inserting or removing the fire-bricks of water-tube boilers, embodying a rod-like carrier, a pair of clamps projecting respectively from and engaging a brick at opposite sides of the longitudinal
30 axis of said carrier one of said clamps being movable lengthwise of said carrier and also mounted to swing on said carrier to change its angular position.

35 6. A tool for holding and inserting or removing the fire-bricks of water-tube boilers, embodying a rod-like carrier, a pair of clamps projecting respectively from and engaging a brick at opposite sides of the longitudinal
40 axis of said carrier one of said clamps having an angular brick-supporting lip, and means

for adjusting one of said clamps relatively to the other.

7. A tool for holding and inserting or removing the fire-bricks of water-tube boilers, embodying a two-part rod-like carrier, a pair
45 of clamps projecting respectively from and engaging a brick at opposite sides of the longitudinal axis of the two parts of said carrier, and means for moving one part of the carrier relatively to the other.

8. A tool for holding and inserting or removing the fire-bricks of water-tube boilers, embodying a two-part rod-like carrier the two parts of which are connected by screw-
50 threads and are adjustable thereby relatively to each other, and a pair of clamps projecting respectively from and engaging a brick at opposite sides of the longitudinal axis of the two parts of said carrier.

9. A tool for holding fire-bricks at diagonally opposite corners of the bricks and for
60 inserting said bricks in or removing them from water-tube boilers, embodying a two-part rod-like carrier one part of which constitutes a guide and the other part a slide movable along said guide, a pair of clamps projecting respectively from said guide and slide
65 for clamping and releasing a fire-brick at diagonally opposite corners thereof, and means for adjusting the slide along said guide and for holding the same in its adjusted position.

Signed at Brooklyn, in the county of Kings and State of New York, this 23d day of June, A. D. 1905.

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Witnesses:

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