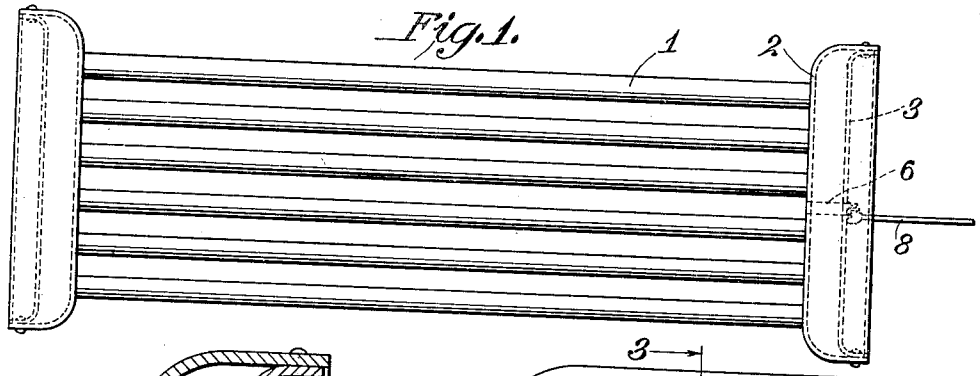
Aug. 22, 1933. J. F. L. BAKER 1,923,770

MEANS FOR MANIPULATING THE DUST BLOWER PLUGS OF WATER TUBE BOILERS

Filed Oct. 16, 1930

Fig. 1.



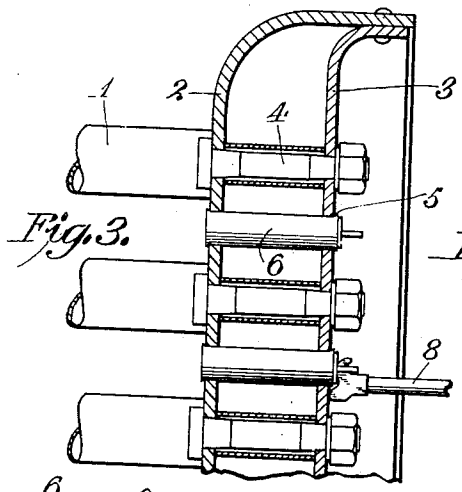


Fig. 3.

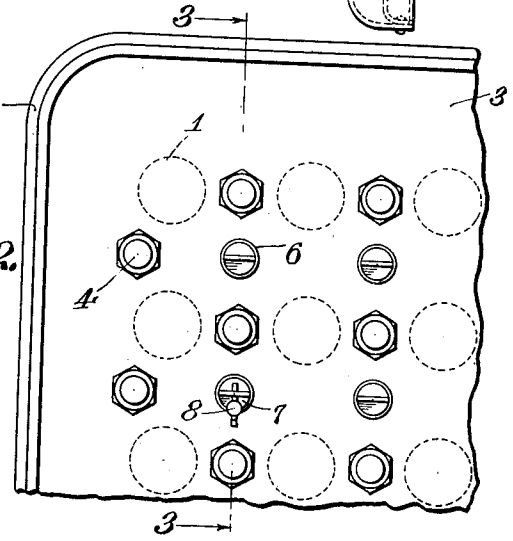


Fig. 2.

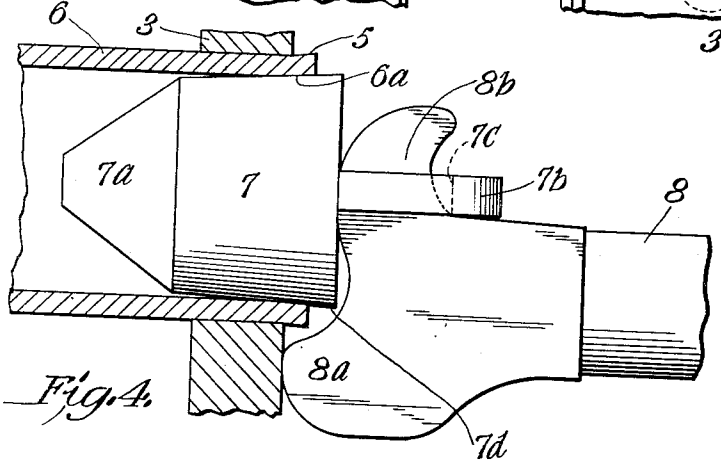


Fig. 4.

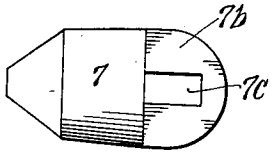


Fig. 5.

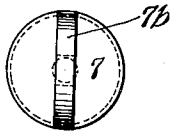


Fig. 6.

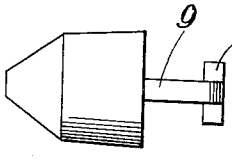


Fig. 7.

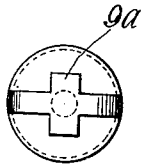


Fig. 8.

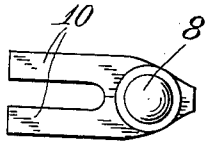


Fig. 9.

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1,923,770

MEANS FOR MANIPULATING THE DUST-BLOWER PLUGS OF WATER TUBE BOILERS

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Application October 16, 1930. Serial No. 489,042

1 Claim. (Cl. 254—131)

This invention relates to water tube boilers and is particularly applicable to boilers in which waste gases from cement burning kilns are utilized for generation of steam. In such boilers cement dust, carried by the kiln gases, settles on the water tubes and must be blown away periodically because it would become solidified and permanently set if exposed to the atmosphere for any considerable time.

A number of tubular thimbles extend clear through the water header. They are expanded into the tube sheet and into the hand hole sheet and are in staggered relation to the water tubes in the tube sheet. The thimbles are of appropriate diameter to permit the lance or tubular nozzle of a pneumatic dust blower to pass through them and be moved back and forth and variously directed so as to remove dust from the boiler tubes throughout their length. While the boiler is in service the thimbles are usually kept stoppered by means of removable plugs so as to at least partly prevent air leakage into the combustion chamber. The plugs have heretofore been taken out and re-inserted manually, one at a time in consecutive order, by the attendant while he was engaged in cleaning the boiler tubes. Necessarily the plugs have been inserted into the thimbles somewhat loosely with the result that they were more or less ineffective in preventing air leakage into the combustion chamber.

A boiler of the size usually installed in the waste gas flue of a cement kiln will have about seventeen hundred of these cleanout thimbles and plugs, and since the cement dust should be blown from the tubes once every day it is obvious that speed is necessary in the several operations of removing the plugs, inserting the blower, manipulating the dusting blast, withdrawing the blower and finally reinserting the plug with sufficient care and accuracy to cause it to form an effective air-tight joint.

The present invention has to do with a thimble which is internally tapered and a tapered plug adapted to make an air-tight fit therein, also a plug handling device. This device comprises a lever arranged and adapted for quickly loosening the plug from its tight fitting seat, extracting it from the thimble and thereafter holding the plug grasped in such a way that the attendant can quickly and accurately aline it with any thimble and force it fairly into place. The operations of removing many plugs and replacing them are thus performed easily and speedily, and each plug is inserted to make an air-tight fit.

More specifically, the invention comprises a plug that is tapered and has also an end formed to present a lug or bail, in conjunction with a plug manipulating handle co-operating with the bail and comprising a lever having a head, appropriately hook-shaped, arranged to be quickly and easily engaged with the bail. The head is also provided with a heel or fulcrum adapted to take its seat upon the hand-hole sheet, adjacent a thimble, the hook and heel serving to forcibly draw the plug free from its seat and remove it from the thimble. Furthermore, the plug and its bail are so shaped that when the plug has been extracted it will stand straight out from the end of the lever, in substantial axial parallelism therewith, after the manner of a spear head on a staff. The purpose of holding the plug in such longitudinal alinement on the handle is to enable the operator to more certainly guide the plug by holding the handle with both hands, to enter it into a thimble and to push it accurately and tightly to its seat with rapidity and with minimum effort. After the plug is tightly seated, the hook-shaped end of the lever detaches itself from the bail of the plug, being formed suitably for that purpose.

My invention accomplishes all of the stated results by simple and effective means and in a novel manner.

In the drawing Fig. 1 is a diagrammatic side view of a water tube boiler, showing the application of my invention thereto.

Fig. 2 is a fragmentary end view, showing part of the header of a water tube boiler employing my invention.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a part sectional detail, showing the tool or lever attached to the plug ready to dislodge it.

Figs. 5 and 6 are respectively a side view and an end view of a preferred form of bail for the plug.

Figs. 7 and 8 are respectively a side view and an end view of a plug with a modified form of bail.

Fig. 9 is an end view of a modified form of the lever head, adapted for handling a plug having the bail shown in Figs. 7 and 8.

A boiler structure to which my invention is applicable is shown in Fig. 1 and consists of water tubes 1 expanded into tube sheet 2, and a hand-hole sheet 3 spaced from the tube sheet

by the usual stay-bolts 4 and sleeves. Arranged in staggered relation with the tubes 1 and stay-bolts are the thimbles 6 whose outer ends 5 are expanded into the hand-hole sheet 3, as shown in Fig. 4. The outer end of thimble 6 is formed to a tapered bore 6*a*. A correspondingly tapered plug 7 is provided having a pointed nose 7*a* and a bail 7*b*, which may be perforated at 7*c*, as shown in Fig. 5, or alternatively, as shown in Figs. 7 and 8 the bail 9 may be formed with lugs 9*a*.

A removable handle is used for manipulating the plug comprising the bar 8 having a head formed to present a fulcrum 8*a* adapted to seat on the hand-hole sheet 3 adjacent the thimble 6. The head is also shaped to present a hook-like member 8*b* located on the opposite side of the head from the fulcrum 8*a* and remote from it.

The hook 8*b* is preferably shaped to be inserted in the perforation 7*c*, as shown in Fig. 4, or if the modified form of plug illustrated in Figs. 7 and 8 is used the hook may be bifurcated, as shown at 10 in Fig. 9, to engage the laterally projecting lugs 9*a*.

When the plug is free from the thimble the head of bar 8 and the bail 7*b* of the plug cooperate in supporting the plug in substantial axial parallelism with the handle. The lower edge 7*d* of the plug 7 rests on the head near its fulcrum part 8*a*, and bail 7*b* engages hook 8*b*. In that way the plug is supported in alinement with the handle 6 and is prevented from falling off from the head under any conditions of ordinary handling.

In operation, assuming plug 7 to be tightly driven into the tapered bore 6*a* of the thimble 6, the plug can be dislodged and removed by inserting the hook 8*b* into the aperture 7*c* of the bail as shown in Fig. 4, with the heel 8a resting upon the plate 3. A downward pull on the bar 8 extracts the plug. The plug, however, remains on the head and the handle and its attached plug can be laid aside during the operation of blowing the tubes. After the blowing operation is finished the plug can be reinserted in the thimble 6 much more accurately and quickly than could be done if the operator were to pick up the plug in his hand and force it into the thimble, because the handle holds the plug in position so it can be pointed directly at the thimble and then driven forward to tightly fit the plug into the thimble. The operator can use both hands and exert as much force as he desires, the result being an air-tight joint at 6*a*.

The hook 8*b* thereupon detaches itself from the bail and the operator applies the tool to the next plug to be removed. As has been pointed out, the bail 7*b*, the head with its fulcrum 8*a* and hook 8*b*, and the bar 8, together constitute an effective combination of devices for extracting the plug 7. The handle thereafter holds the plug in position so it can be easily and quickly inserted in a thimble and can be forcibly driven in to make an air-tight joint.

The operator after a short period of practice is able to remove the plugs and insert them at a much faster rate of speed than has heretofore been possible by mere hand manipulation of the plugs.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

A device for removing and replacing tapered plugs in the tubular thimbles of a boiler hand-hole sheet, each plug having a bail on its end, said device comprising a bar having a head formed to present a heel-like fulcrum member which is adapted to seat on said sheet adjacent a thimble, said head also shaped to present an oppositely extending hook-like member positioned to releasably engage the bail of said plug and adapted to serve also as a ram for driving the plug into tight seating engagement with a thimble, and a portion of said head intermediate said fulcrum, said fulcrum and said hook-like member being shaped to engage an edge of the plug and provide a support for the same whereby the plug is held in substantial axial parallelism with the said bar when the plug is freed from the thimble.

JOHN F. L. BAKER.