J. MAGEE.

BLOWER FOR WATER TUBE BOILERS.

APPLICATION FILED JUNE 20, 1912.

1,068,438.

Patented July 29, 1913.

2 SHEETS—SHEET 1.

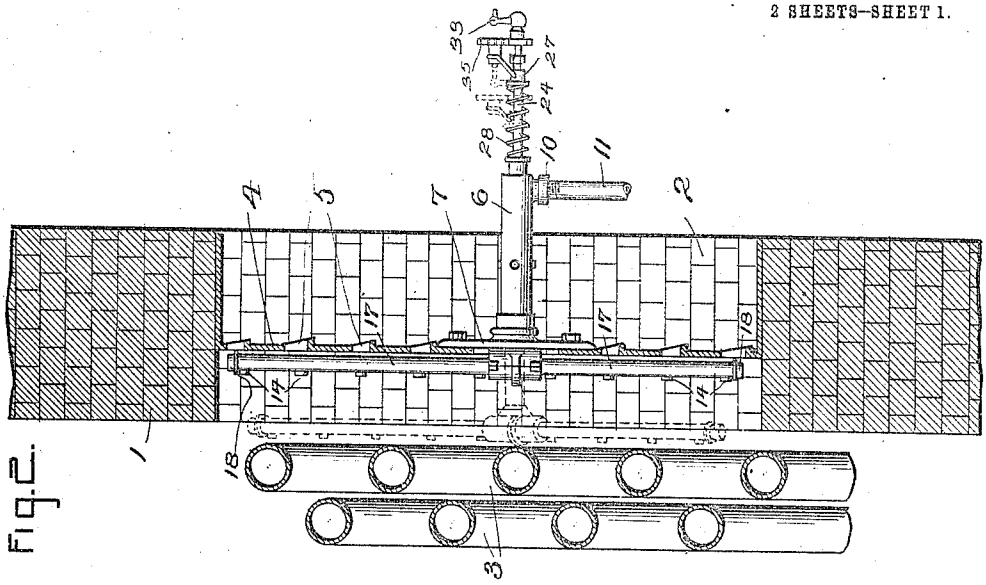


Fig. 2.

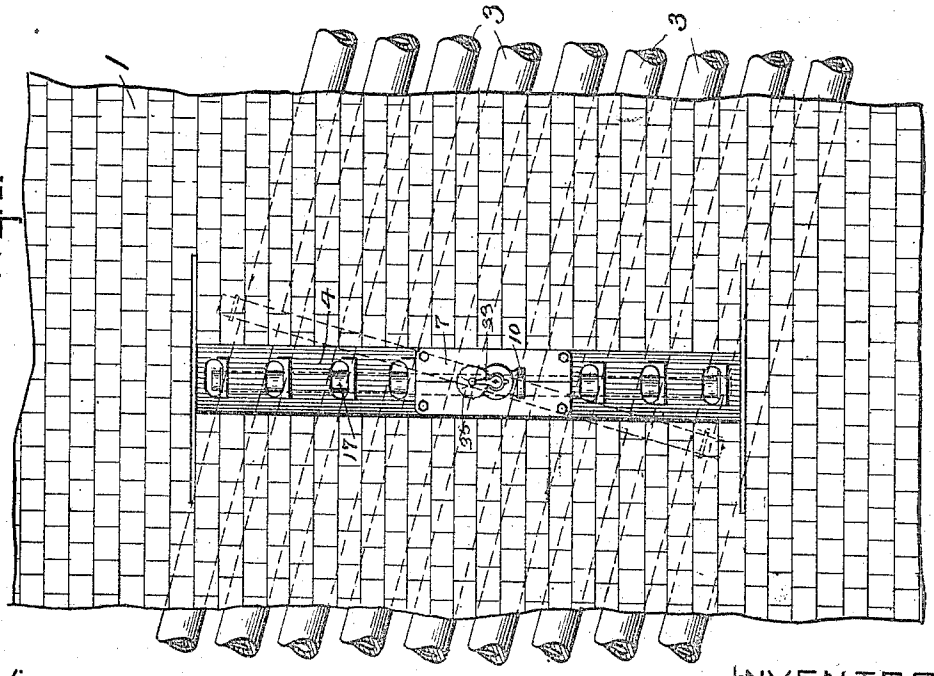


Fig. 1.

WITNESSES

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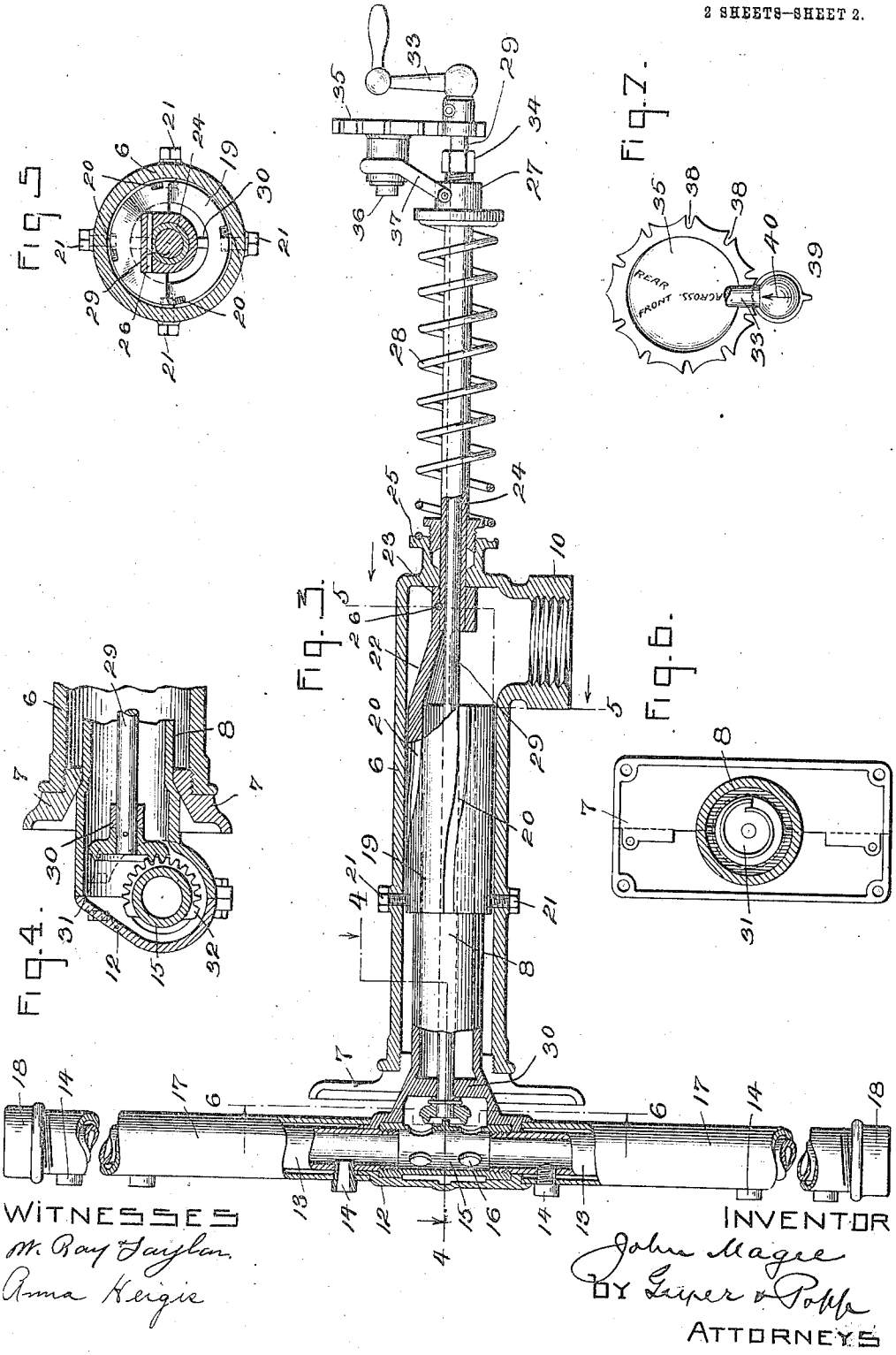
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BLOWER FOR WATER-TUBE BOILERS.

1,068,438. Specification of Letters Patent. Patented July 29, 1913.

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To all whom it may concern:

Be it known that I, JOHN MAGEE, a citizen of Canada, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Blowers for Water-Tube Boilers, of which the following is a specification.

This invention relates to a blower or cleaner of the kind employed for removing soot from the tubes of water tube boilers, and more particularly to boilers having inclined tubes, such, for example, as the well known Babcock & Wilcox type. Such boilers are commonly provided with narrow upright cleaning doors or openings, and the present invention has more especial reference to a blower comprising a jet-pipe or header adapted to be retracted into the cleaning opening or equivalent recess of the boiler-setting when not in use, to protect it from the heat of the combustion chamber. To obtain the best results, it is necessary to dispose the header when in use, substantially at right angles to the inclined boiler tubes, and at the same time render it adjustable in such manner that the steam jets may be moved lengthwise of the tubes or parallel therewith rather than obliquely thereto. The cleaning openings or doors of such boilers are however too narrow to permit the header to be permanently disposed in the necessary angular or tilted position for this purpose.

The object of my invention is the provision of an effective and comparatively simple blower of this kind capable of being moved into the combustion chamber and placed in the desired angular position when in use and to be turned in line with the cleaning opening or recess and withdrawn into it, when not in use.

A further object of the invention is to so construct the blower that it is automatically projected toward the boiler tubes and positioned substantially at right angles thereto upon admitting steam to the blower, and is automatically withdrawn into said cleaning opening or recess upon turning the steam off.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a fragmentary side elevation of a boiler equipped with the blower. Fig. 2 is a transverse section thereof. Fig. 3 is an enlarged sectional elevation of the blower detached from the boiler. Fig. 4 is a fragmentary horizontal section on line 4—4, Fig. 3. Figs. 5 and 6 are transverse sections on the correspondingly numbered lines in Fig. 3. Fig. 7 is a face view of the indicator disk and its actuating device.

Similar characters of reference indicate corresponding parts throughout the several views.

4 indicates the customary boiler setting, 2 one of the usual upright rectangular cleaning doors or openings, and 3 the inclined water tubes.

4 indicates the metallic door or door-plate secured in said cleaning opening and having the usual upright series of cleaning openings 5 through which the ordinary cleaning-nozzle (not shown) is inserted, but which openings are not utilized in connection with the present invention. The cleaning door or opening forms a pocket or recess which receives the header or blower-tube, hereinafter described, when in its retracted or inoperative position.

6 indicates the shell or casing of the blower which is preferably of tubular form and arranged horizontally in the cleaning opening 5, the same being suitably secured at its inner end to a divided base plate 7 which in turn is fastened to the outer side of the door plate 4. Arranged lengthwise and concentrically within the shell is a steam tube or conduit 8 capable of sliding and rotating therein. This tube opens at its rear end into the rear portion of the shell which is provided with an inlet connection 10 to which the steam supply pipe 11 is connected. This tube passes through openings in the base plate 7 and the door plate 4 and terminates in a hollow T-head or enlargement 12 which carries a transverse jet pipe or header 13 communicating with said tube and provided on its front side with a series of suitably-spaced jet openings or nozzles 14 from which jets of steam issue among or between the boiler tubes for detaching the soot therefrom. This header may be of any suitable construction, but preferably consists of upper and lower pipe-sections screwed into opposite ends of a rotary coupling or sleeve 15 journaled in the T-head 12 and having steam apertures or passages 16 by which said jet pipes communicate with the steam tube 8. By this construction the header may be rocked or partly rotated on its axis to deliver the steam jets directly across the combustion chamber or toward the front and rear ends thereof. The header-pipes are

preferably inclosed within jackets or tubes 17 to protect them from the heat of the combustion chamber. The jackets are closed at their outer ends by caps 18 and seated at their inner ends in the T-head 12, as shown in Fig. 3. The jet nozzles 14 pass through the jackets and header pipes, firmly securing them together.

The steam tube 8 is provided with a piston or cylindrical enlargement 19 adapted to receive the pressure of the steam admitted to the blower, so as to push said tube forwardly and project the header into its operative position within the combustion chamber, as shown by dotted lines in Fig. 2.

Suitable means are provided for automatically turning the header at right angles to the boiler tubes, or substantially so, simultaneously with its advancing movement. For this purpose the piston 19 is provided in its periphery with one or more spiral or cam grooves 20 with which engage stationary radial bolts or pins 21 carried by the shell. Obviously, when the steam tube 8 is pushed forward by the entering steam, the tube and header carried thereby are partially turned relatively to the shell. These spiral grooves are of such length and pitch as to turn or tilt the header from its upright position to a position substantially at right angles to the boiler tube, as shown by dotted lines in Fig. 1.

The sliding tube 8 is provided at its rear end with an extension 22, preferably of semi-circular form, terminating in a collar 23 to which is rigidly secured a tube or hollow stem 24, which extends through a stuffing box 25 in the rear end of the shell. In the construction shown in the drawings, this hollow stem is secured to said collar by a transverse pin 26. To the outer portion of the hollow stem, a flanged collar 27 is secured and between this collar and the stuffing box 25 is interposed a spiral spring 28 which is compressed when the header is projected into the combustion chamber by the steam pressure, and which reacts and withdraws the header into the recess or cleaning opening 2 when the steam supply is shut off from the blower.

The devices for rocking or rotating the header in the T-head of the sliding tube 8 may be of any suitable construction. The preferred mechanism shown in the drawings comprises a rotary longitudinal shaft 29 passing through the hollow stem 24 and the tube 8 and journaled near its front end in a bridge piece 30 carried by the latter. Fixed to the front end of this shaft is a spiral gear 31 which meshes with a gear segment 32 carried by the rotary coupling sleeve 15, by which construction said sleeve and the header pipes 13 secured thereto are turned the distance of one tooth for each complete rotation of said shaft. The latter is provided at its outer end with a crank 33 or other suitable means for turning it, and its outer portion passes through a packing-nut 34 secured to the adjacent end of the hollow stem 24.

An indicator of any appropriate construction is preferably combined with the blower for indicating to the operator the position or direction of the jet nozzles 14. The preferred indicator shown in the drawings consists of an upright rotary wheel or disk 35 secured to a horizontal shaft 36 supported in a bracket 37 carried by the collar 27 which in turn is pinned or otherwise rigidly secured to the hollow stem 24. This indicating wheel is provided with peripheral notches 38 adapted to be engaged successively by a tooth or projection 39 carried by the shaft 29, so that said wheel is turned the distance of one notch for every complete rotation of said shaft. This wheel is provided on its face with suitable markings or words, such as "Front", "Rear" and "Across" which coöperate with an arrow 40 upon the hub of the crank 33. The arrangement of these indications is such that when any one of them is brought in line with said arrow, the position of the header 13 will correspond to that indicated by said word. In the example shown in the drawings, Fig. 7, the word "Across" stands in line with the arrow, indicating to the operator that the header-nozzles are adjusted to direct the cleaning jets squarely across the boiler tubes. To direct the jets toward the front of the boiler, the crank is turned until the word "Front" coincides with the arrow, while to direct them toward the rear of the boiler, the crank is turned to bring the corresponding indication in line with the arrow, intermediate adjustments of the nozzles being indicated in an obvious manner.

The operation of the blower is as follows: The parts normally occupy the position indicated by full lines in Fig. 2, the header being retracted into the recess or cleaner opening 2, close to the door-plate 4 by the spring 29, and standing in a substantially upright position. When it is desired to clean the boiler tubes, steam is admitted to the shell, whereupon the steam tube 8 is pushed forwardly by the steam pressure against its piston, thrusting the header 13 into the combustion chamber closely to the boiler tubes and at the same time tilting the header at right angles to the boiler tubes, as hereinbefore described. By this action the spring 28 is compressed. The steam admitted to the shell passes through the steam tube 8 and the apertured sleeve 15 into the header and thence issues from the jet-nozzles among and against the boiler tubes, dislodging the soot therefrom. By means of the crank 33, the header may be adjusted

or turned about its axis to deliver the steam jets directly across the banks of boiler tubes, and it may then be turned toward the front and the rear ends of the boiler to cause the jets to sweep lengthwise over the inclined tubes, thus giving the blower a considerable range and insuring a thorough cleaning of the tubes throughout their length. This wide adjusting range of the blower permits the use of jet-nozzles each having a single discharge passage or aperture, thus concentrating the steam jets upon the boiler tubes in all adjustments of the header and obtaining a superior cleaning action. This construction has the further advantage that it does not interfere with the draft. Upon shutting off the steam supply, the compressed spring 28 by its tendency to withdraw the tube 8 to its former position, causes the same to be rotated by its spiral grooves 20 until the header is righted or swung back to its upright position after which it is withdrawn into the door opening or recess 4 by the continued drawing action of the spring. As these tilting and righting movements of the header as well as its advancing and retreating movements are all effected automatically, the blower is very convenient in use, the operator being only required to adjust the header by means of the crank 33 after turning on the steam.

I claim as my invention:

1. The combination with a wall of a boiler-setting having a recess in its inner side and boiler-tubes extending obliquely across said recess, of a blower comprising a header or jet-pipe arranged crosswise of the boiler-tubes and movable in said recess toward and from the tubes, the header being arranged on the inner side of said wall and mounted to swing lengthwise of the boiler tubes, whereby it may be disposed substantially at right angles thereto when projected.

2. The combination with a wall of a boiler setting having a substantially upright recess which opens into the combustion chamber and inclined boiler-tubes extending across said recess, of a blower comprising a header or jet-pipe arranged crosswise of the boiler tubes and movable in said recess toward and from the tubes, the header being arranged on the inner side of said wall and mounted to swing lengthwise of the tubes, whereby it may be disposed substantially at right angles thereto when projected, and means for actuating the header.

3. The combination with a wall of a boiler-setting having a recess in its inner side and boiler-tubes extending obliquely across said recess, of a blower comprising a header or jet-pipe arranged crosswise of the boiler-tubes and movable in said recess toward and from the tubes, the header being arranged on the inner side of said wall and tiltable lengthwise of the tubes and rotatable on its axis, and means for actuating the header.

4. The combination with a wall of a boiler-setting having a recess in its inner side and boiler-tubes extending obliquely across said recess, of a blower comprising a header or jet-pipe arranged crosswise of the boiler-tubes and movable in said recess toward and from the tubes, the header being arranged on the inner side of said wall and tiltable lengthwise of the tubes and rotatable on its axis, means for tilting the header, and independent means for rotating the header.

5. A tube-blower comprising a casing having a steam inlet, a steam tube slidably and rotatably arranged in said casing and adapted to be moved forward by the steam pressure, a header or jet pipe mounted transversely on the front end of said tube to turn therewith and communicating with the same, and means for automatically rotating said tube when moved forward.

6. A tube-blower comprising a casing having a steam inlet, a steam tube arranged in said casing, a header mounted transversely on the front end of said tube and communicating therewith, the header being rotatable on its axis to deliver the steam jets in different directions, and means for rotating the header on said tube.

7. A blower comprising a casing having a pin extending into its interior, a steam tube slidably and rotatably arranged in said casing and provided with a spiral groove engaging said pin, and a header or jet-pipe mounted on the front end of said steam tube.

8. A tube-blower comprising a casing having a steam inlet, a steam tube slidably and rotatably arranged therein and adapted to be moved forward by the steam pressure, a header or jet pipe mounted transversely on the front end of said tube and communicating therewith, a spring arranged to retract said tube when relieved from the steam pressure, and means for automatically rotating said tube when shifted by said spring or the steam pressure.

9. A tube blower comprising a casing having a steam inlet, a steam tube rotatably arranged therein, a header arranged transversely on the end of said tube and mounted to rotate on its axis to deliver the steam jets in different directions, an actuating shaft extending through the casing, and gearing for transmitting motion from said shaft to the rotary header.

10. A tube blower comprising a casing having a steam inlet, a steam tube rotatably arranged therein, a header or jet pipe arranged transversely on the end of said tube and mounted to rotate on its axis, the header having a gear segment, and an actuating shaft extending through said casing and having a spiral gear meshing with said segment.

11. A tube blower comprising a casing having a steam inlet, a steam tube rotatably arranged therein, a header or jet pipe arranged transversely on the end of said tube and mounted to rotate on its axis, a rotary adjusting member for said header, and an indicator operatively connected with said member.

12. A tube blower comprising a casing having a steam inlet, a steam tube rotatably arranged therein, a header or jet pipe arranged transversely on the end of said tube and mounted to rotate on its axis, a rotary adjusting shaft operatively connected with said header and carrying a projection, and an indicator wheel arranged to be engaged by said projection and having indications corresponding to different adjustments of the header.

13. A tube blower comprising a casing having a steam inlet, a steam tube rotatably arranged therein, a header or jet pipe arranged transversely on the end of said tube and mounted to rotate on its axis, the header having a gear segment, a rotary adjusting shaft extending lengthwise through said casing and having a spiral gear engaging said segment and provided outside of the casing with a projection, and an indicator-wheel arranged to be engaged by said shaft-projection.

Witness my hand this eleventh day of June, 1912.

JOHN MAGEE.

Witnesses:
E. C. HABEL,
AILEEN KINNEY.