

T. S. WALLER & E. B. BARNHILL.
 BLOWER FOR WATER TUBE BOILERS.
 APPLICATION FILED OCT. 27, 1909.

969,316.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

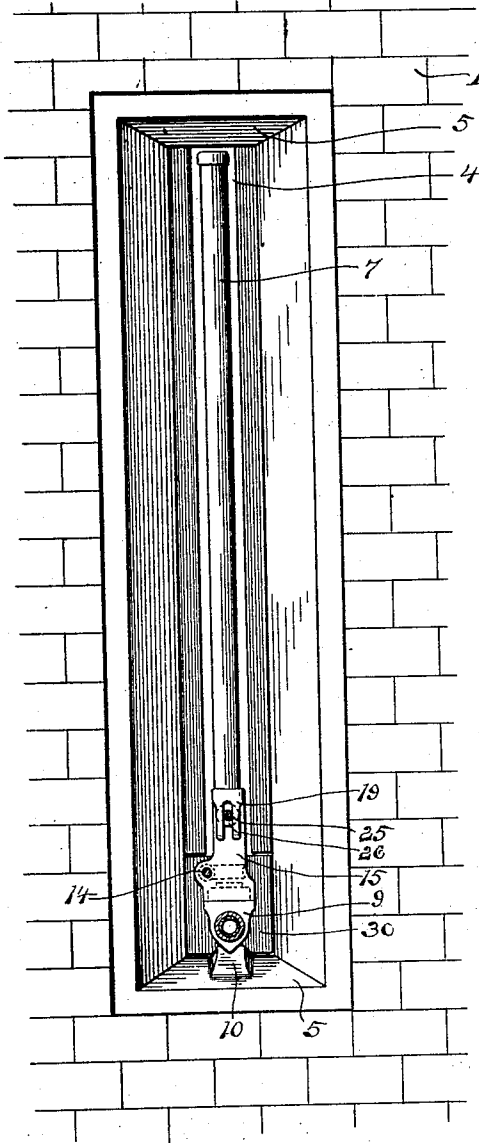


Fig. 5.

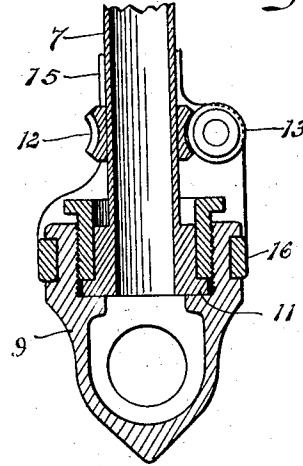
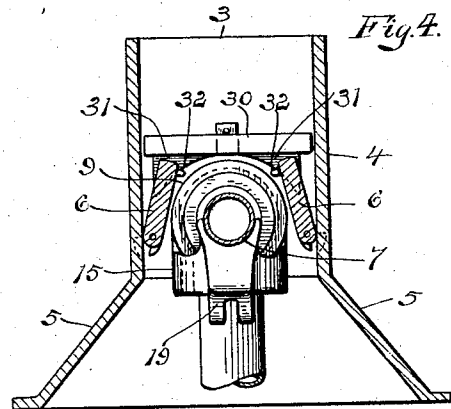


Fig. 4.



Witnesses
 A. M. Shannon.
 A. M. Dorr.

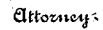
Inventors

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APPLICATION FILED OCT. 27, 1909.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

THOMAS S. WALLER AND EDWARD B. BARNHILL, OF DETROIT, MICHIGAN, ASSIGNORS
TO DIAMOND POWER SPECIALTY COMPANY, OF DETROIT, MICHIGAN, A COPART-
NERSHIP.

BLOWER FOR WATER-TUBE BOILERS.

669,316.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed October 27, 1909. Serial No. 524,977.

To all whom it may concern:

Be it known that we, THOMAS S. WALLER, a subject of King Edward VII of Great Britain; and EDWARD B. BARNHILL, a citizen of the United States of America, both residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Blowers for Water-Tube Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to blowers for boilers and more particularly to an arrangement thereof that is especially adapted for cleaning boilers of the water tube type, provision being made for simultaneously blowing all of the tubes in the boiler in any one section without fear of injury to the operator, the apparatus being shielded from heat except when in operation.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

Referring to the drawings, Figure 1 is a view in front elevation of a blower embodying features of the invention together with the surrounding portion of a furnace wall, the controlling hand wheels of the blower being omitted; Fig. 2 is a view in side elevation of the blower with parts in section, together with the adjacent portions of a boiler; Fig. 3 is a view in transverse section on or about line $x-x$ of Fig. 2; Fig. 4 is a view in transverse section showing means for closing the fire doors; and Fig. 5 is a view in detail of a portion of the blower.

In the drawings, 1 indicates the wall of a boiler parallel to the water tubes 2 which are disposed in the usual staggered relation in horizontal tiers. A substantially rectangular casing 3 is set in a recess in the masonry wall at right angles to the longitudinal axes of the tubes which as herein illustrated, are disposed horizontally, an inner or contracted portion or throat 4 of the casing being flush with the inner face of the wall and the outer part of the casing having flaring side and end wings 5. An off-set in each wall adjacent the throat is arranged to receive doors 6 which close the casing throat when the apparatus is not being used. An

upright tubular header 7 with inwardly projecting jet pipes 8 spaced to alternate with the water tubes 2 is rotatably stepped in a base 9 that slides in a suitable guideway 10 formed on the lower end wing of the casing. The header is retained in position by a ring screwthreaded in the base against an end flange 11 on the header. A segmental worm gear 12 on the header is engaged by a worm 13 on a spindle 14 that is journaled in an upright arm 15 of a collar 16 that embraces the base 9 and is held in the peripheral groove of the base. The spindle is jointed in any preferred manner as at 17 to fold upwardly and is provided with a hand wheel 18 for manipulating the screw.

The arm 15 of the collar conforms to and partially embraces the lower portion of the header 7. A depending fork 19 upon the outturned upper portion of the arm 15 is in alinement with a yoke 20 that spans the front of the casing 3. The ends of the yoke are pivotally secured as by bolts 21 through lugs 22 on the casing or are otherwise arranged so that the yoke may be folded upwardly against the casing. An interiorly screwthreaded bushing 23 is swiveled between pintle bolts 24 in an aperture in the yoke in alinement with the fork 19 and a screwthreaded shaft 25 passes through this bushing. The inner end 26 of the shaft is enlarged or otherwise arranged to engage the fork 19 when the yoke is down turned and to clear the fork when the yoke is tilted up, the arms of the fork having an outward radius of curvature whose center is coincident with the center of motion of the yoke. The shaft 25 is turned by a hand wheel 27. Steam connection with the base is made through a sliding joint of any preferred construction indicated at 28, the outer member having an elbow 29 for receiving a pipe. The lower portion of the throat 4 of the casing is enlarged to clear the base and the latter has a shield 30 on its inner end which closes the opening in the casing when the apparatus is not in use. Inwardly projecting ears 31 on the shield 30 are adapted to engage stops 32 on the doors 6 and draw them into closed position when the shield is moved outwardly.

In equipping a boiler with a blower the casing is set in the wall with the header substantially at right angles to the plane of the water tubes and with the jet nozzles in staggered relation to the outer tiers of tubes. The casing is proportioned so as to stand in a recess in a furnace wall which houses the upturned yoke and operating handles when the device is not in use, the header standing outside the closed doors and therefore being shielded from the boiler fire. When it is desired to clean the tubes the yoke is dropped and the header moved in through the throat of the casing so that the nozzles have a clear supply. By admitting steam to the header and swinging it by manipulation of the worm wheel a considerable length of tube is reached by the jets. After the tubes have been thoroughly cleaned the header is retracted to its initial position. By this means the boiler is readily cleaned without danger or even inconvenience to the operator and the apparatus is thoroughly shielded from heat and owing to its simplicity is readily maintained in operative condition.

Obviously, changes in the details of construction may be made without departing from the spirit of the invention and we do not limit ourselves to any particular form or arrangement of parts.

What we claim as our invention is:

1. The combination of the tubes and wall of a boiler, said wall having a recess therein opening through the inner face of the wall, of a blower comprising a header in said recess adapted to be moved toward and from said tubes, and means adapted to be closed between the header and tubes when the header is moved from the tubes into the recess.

2. The combination of a wall of a boiler setting having a recess therein opening through the inner side of the wall, a header adapted to be projected from the recess and retracted into the same, and means adapted to be moved across the recess to close the same when the header is retracted.

3. The combination of a wall of a boiler setting having a recess therein opening through the inner side of the wall, a header adapted to be projected from and retracted into the recess, and a member pivotally supported at one side of the recess and adapted to be turned across the inner open end of the same when the header is retracted.

4. The combination of a wall of a boiler setting having a recess therein opening through the inner side of the wall, a header reciprocable within the recess, and a member adapted to close across the recess operated by the reciprocation of the header.

5. The combination of a wall of a boiler setting having a recess therein opening

through the inner side of the wall, a door to close the opening into the recess at the inner side of the wall, a header within the recess adapted to be reciprocated to project the same through the opening in the inner side of the wall and retract the same into the recess, said door being adapted to be closed to close the recess when the header is retracted, and means for reciprocating the header.

6. The combination of a wall of a boiler setting having a recess extending through the wall and provided with a throat opening through the inner face of the wall, an upwardly extending header movable within the recess and adapted to be projected through the throat, a door pivotally supported within the throat and adapted to be turned to close the same when the header is retracted into the recess, and means for operating the header extending outward in the recess.

7. The combination of a wall of a boiler setting having a recess therein formed with a throat opening at its inner end through the inner face of the wall, a header within the recess movable through the throat, and a closure member pivotally supported within the throat at one side thereof and at a distance from the inner end of the throat to turn laterally within said throat across the same and close its inner end when the header is withdrawn into the recess.

8. The combination of the tubes and wall of a boiler, of a casing set in the wall opening through the outer side thereof and provided with a throat opening transversely to the tubes through the inner side of said wall, a header movably supported in the housing transverse to the tubes and provided with jet nozzles in spaced relation to the tubes, means for moving the header through the throat toward the tubes, means for turning the header on its axis when projected through the throat toward the tubes, and members adapted to close the throat of the casing when the header is retracted.

9. The combination of the tubes and wall of a boiler with a substantially rectangular casing set in the wall opening through outer side thereof provided with a contracted throat transverse to the tubes and opening through the inner side of said wall, a hollow base reciprocable in guides through the lower end of the throat, a tubular header rotatably stepped in the base provided with jet nozzles in spaced relation to the boiler tubes, means secured to the casing and detachably connected to the base for moving the base and header through the throat, and means on the base for turning the header.

10. The combination of the tubes and wall of a boiler, a substantially rectangular cas-

ing set in the wall and opening through the outer side thereof provided with a contracted throat opening through the inner side of the wall transverse to the tubes, a hollow base reciprocable in guides through the lower end of the throat, a tubular header rotatably stepped in the base provided with jet nozzles in spaced relation to the boiler tubes, means secured to the casing and detachably connected to the base for moving the base and header through the throat, means on the base for turning the header, a shield on the base adapted to close the lower portion of the casing when the base is retracted, and doors adapted to close the throat of the casing when the header is retracted.

11. The combination of the tubes and wall of a boiler, with a substantially rectangular casing opening through the outer side of the wall with an inner contracted throat opening through the inner side of the wall adjacent and transverse to the boiler tubes, a hollow base reciprocable in a guide way at the lower end of the casing through the throat, a header rotatably stepped in the base and provided with nozzles in spaced relation to the boiler tubes, a ring on the base having an arm conforming to and supporting the header above the base, a worm gear on the base, a worm and shaft journaled on the ring in mesh with the gear, a yoke spanning the outer side of the casing, a shaft having screw threaded engagement with the yoke and detachably interlocking with the ring arm at its inner end, and hand wheels for manipulating the worm shaft and yoke shaft.

12. The combination of the tubes and wall of a boiler, of a substantially rectangular casing opening through the outer side of the wall with an inner contracted throat opening through the inner side of the wall adjacent and transverse to the boiler tubes, a hollow base reciprocable in a guideway at the lower end of the casing through the throat, a header rotatably stepped in the base and provided with nozzles in spaced relation to the boiler tubes, a ring on the base having an arm conforming to and supporting the header above the base, a worm gear on the base, a worm and shaft journaled on the ring in mesh with the gear, a yoke spanning the outer side of the casing, a shaft having screwthreaded engagement with the yoke and detachably interlocking with the ring arm at its inner end, and hand wheels for manipulating the worm shaft and yoke shaft, said shafts and yoke being adapted to fold into the casing.

13. The combination of the tubes and wall of a boiler, of a substantially rectangular casing with an inner contracted throat adjacent and transverse to the boiler tubes, a

hollow base reciprocable in a guideway at the lower end of the casing through the throat, a header rotatably stepped in the base and provided with jet nozzles in spaced relation to the boiler tubes, a ring on the base having an arm conforming to and supporting the header above the base, a worm gear on the base, a worm and shaft journaled on the ring in mesh with the gear, a yoke spanning the outer side of the casing, a shaft having screwthreaded engagement with the yoke and detachably interlocking with the ring arm at its inner end, hand wheels for manipulating the worm shaft and yoke shaft, a shield on the base adapted to close the lower portion of the casing when the base is retracted, and doors adapted to be moved into closed position across the casing throat by the base when the header and base are retracted.

14. The combination of the tubes and wall of a boiler, of a substantially rectangular casing having a contracted inner throat and outwardly flaring wings set in the wall with the throat transverse to the boiler tubes, a base reciprocable on a guideway through the lower end of the casing, provided with a telescoping joint steam connection, a tubular header rotatably stepped in the base and provided with jet nozzles in spaced relation to the boiler tubes, a ring on the base provided with an arm embracing and supporting the header above the base, a fork depending from the end of the arm, a yoke spanning the outer face of the casing in horizontal alinement with the fork, a shaft in screwthreaded engagement with the yoke whose inner end detachably interlocks with the fork, a worm gear on the header, a worm and shaft journaled in the ring in mesh with the gear, and hand wheels for turning the worm and yoke shaft, said shafts and yoke being adapted to fold into the casing.

15. The combination of the tubes and wall of a boiler, of a substantially rectangular casing having a contracted inner throat and upwardly flaring wings set in the wall with the throat transverse to the boiler tubes, a base reciprocable on a guideway through the lower end of the casing, provided with a telescoping joint steam connection, a tubular header rotatably stepped in the base and provided with nozzles in spaced relation to the boiler tubes, a ring on the base provided with an arm embracing and supporting the header above the base, a fork depending from the end of the arm, a yoke spanning the outer face of the casing in horizontal alinement with the fork, a shaft in screwthreaded engagement with the yoke whose inner end detachably interlocks with the fork, a worm gear on the header, a worm and shaft journaled in the ring in mesh with the gear, hand wheels for turning the

worm, a yoke shaft, said shafts and yoke being adapted to fold into the casing, a shield on the inner side of the base adapted to close the lower part of the casing when the base is retracted, and doors for the casing throat adapted to be closed by the base when the header and base are retracted.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS S. WALLER.

EDWARD B. BARNHILL.

Witnesses:

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M. P. LOWES.