

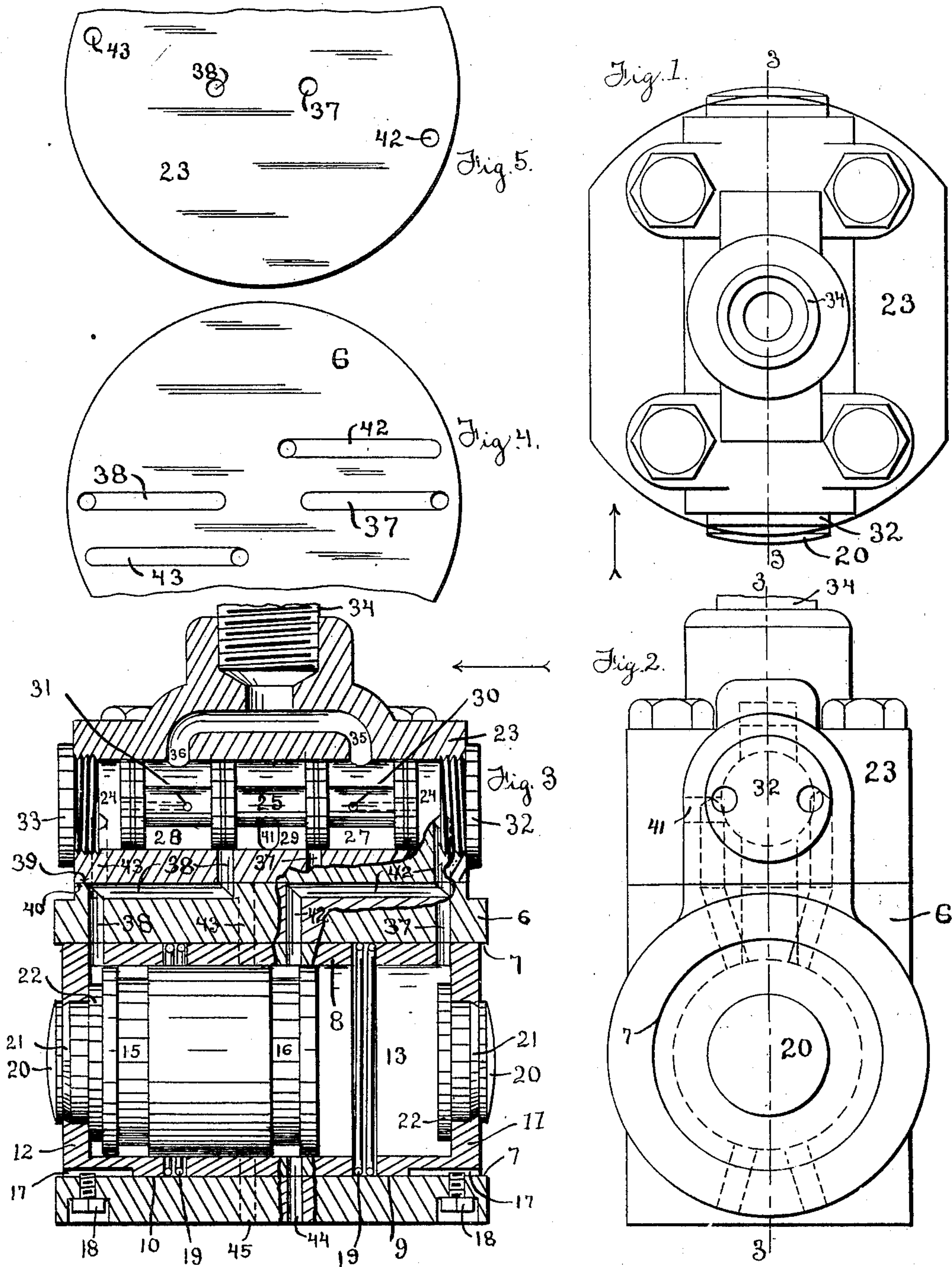
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G. C. QUASEBARTH.
BOILER TUBE CLEANER.

(Application filed Mar. 24, 1902.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

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BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 706,200, dated August 5, 1902.

Application filed March 24, 1902. Serial No. 99,764. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV C. QUASEBARTH, a citizen of the United States, and a resident of St. Louis, Missouri, have invented
5 certain new and useful Improvements in Boiler-Tube Cleaners, of which the following is a specification.

My object is to construct a boiler-tube cleaner; and my invention consists of a piston-casing adapted to slide back and forth in the boiler-tubes and having a transverse bore forming a hammer-piston chamber, the ends of said chamber being enlarged to form die-holder seats; a hammer-piston slidably mounted in said chamber, said piston having valve-releasing-port-connecting grooves in its periphery; die-holders slidably mounted in said die-holder seats; dies carried by said die-holders; a valve-casing attached to the piston-casing and having a transverse bore parallel with the piston-chamber and forming a valve-chamber; a valve slidably mounted in said valve-chamber and having pressure-port-connecting grooves in its periphery, and having an exhaust-port-connecting groove in its periphery, and having valve-shifting ports connecting the pressure to each end of the valve; plugs closing the ends of said valve-chamber and a steam-supply pipe connected to said valve-casing, there being pressure-ports leading from the supply-pipe to the valve-chamber and there being pressure-ports leading from the valve-chamber to the piston-chamber, so that the reciprocation of the valve admits pressure first to one end of the valve and then to the other, and there being an exhaust-port, so that the reciprocation of the valve will release the exhaust from one end of the valve while the pressure is being admitted to the other end, and there being valve-releasing ports leading from said valve-chamber to the piston-chamber, and there being second valve-releasing ports leading from the piston-chamber, so that the reciprocation of the piston will connect said first and second valve-releasing ports to release the pressure first from one end of the valve and then from the other end, as required to reciprocate the valve.

50 Figure 1 is an elevation of the outer end of a boiler-tube cleaner embodying the principles of my invention.

Fig. 2 is a side elevation as seen looking in the direction indicated by the arrows in Figs. 1 and 3. Fig. 3 is a central section on the lines 3-3 of Figs. 1 and 2. Figs. 4 and 5 are plans of the meeting faces of the piston-casing and valve-casing, Fig. 4 showing the piston-casing and Fig. 5 showing the valve-casing.

Referring to the drawings in detail, the piston-casing 6 is substantially circular in end elevation, as shown in Fig. 1, and is adapted to slide back and forth in the boiler-tubes, the largest diameter of the casing being slightly less than the inside diameter of the boiler-tube. The transverse bore 7 is formed through the casing, and the bushing 8 is inserted into said bore, the enlarged openings at the ends of the bushing forming the die-carrier seats 9 and 10, in which the die-holders 11 and 12 operate, and the space between the die-carriers and through the bushing forming the piston-chamber 13, in which the hammer-piston operates, said piston having the valve-releasing-port-connecting grooves 15 and 16 in its periphery. Key-slots 17 are formed in the die-holders, and set-screws 18 are inserted through the casing into said slots to hold the die-holders from being blown out of their seats. Springs 19 may be inserted between the ends of the bushing and the die-holders to yieldingly press the dies against the inner face of the boiler-tube; but the springs are not essential, because the exhaust-pressure will accomplish the same purpose. The dies 20 have peripheral grooves 21 and heads 22, and the dies are driven into the die-holders from the inside, and then the metal of the die-holders is riveted or hammered into the grooves 21 to hold the dies from rattling or backing out, while the heads 22 hold the dies from being driven through the holders. The dies are hard and the holders are soft.

The valve-casing 23 has a transverse bore parallel with the piston-chamber and forming the valve-chamber 24, in which the valve 25 is slidably mounted, said valve having the pressure-port-connecting grooves 27 and 28 in its periphery and said valve also having the exhaust-port-connecting groove 29 in its periphery and also having the valve-shifting ports 30 and 31, connecting the

grooves 27 and 28 to the ends of the valve. The plugs 32 and 33 close the ends of the valve-chamber, and a steam-supply pipe 34 is tapped into the valve-casing, and there being pressure-ports 35 and 36 leading from the steam-pipe to the valve-casing at points to connect with the grooves 27 and 28. The pressure-ports 37 and 38 lead from the valve-chamber to the face 39 of the valve-casing, then along the face 40 of the piston-casing, then through the piston-casing, and through the die-holders to the ends of the piston-chamber, so that the reciprocation of the valve admits pressure first to one end of the piston-chamber and then the other, as required, to reciprocate the hammer-piston and cause it to strike the dies. The exhaust-port 41 leads from the valve-casing to the open air at a point to be in connection with the groove 29, so that as the valve reciprocates the exhaust is released first from one end of the piston and then from the other end, the pressure being admitted to the opposite end from that which is exhausting. The valve-releasing ports 42 and 43 lead from the ends of the valve-chamber through the valve-casing, then along the face of the piston-casing, then through the piston-casing to the piston-chamber to communicate alternately with the grooves 15 and 16 in the hammer-piston, and the second valve-releasing ports 44 and 45 lead from the piston-chamber to the open air, so that said ports 42 and 43 are connected to the ports 44 and 45 by the grooves 15 and 16 as the piston reciprocates, thereby releasing the pressure from first one end and then the other end of the valve and reciprocating the valve.

In the practical operation the dies are held against the inner face of the boiler-tube and the hammer-piston reciprocates, striking first one die and then the other and jars the scale off the outer surface of the tube.

The machines are made to accurately fit the boiler-tubes in which they are to be used, allowing only for a slight movement of the die-holders, and the machines will not operate except in tubes of the proper size, because the die-holders will move and close the ports. In practical use one size has been made for four-inch tubes and another size has been made for six-inch tubes. The variation in boiler-tubes is very slight.

I claim—

1. A boiler-tube cleaner comprising a piston-casing adapted to slide back and forth in

the boiler-tubes and having a transverse bore forming a hammer-piston chamber; the ends of said chamber being enlarged to form die-holder seats; a hammer-piston slidably mounted in said chamber; said piston having valve-releasing-port-connecting grooves in its periphery; die-holders slidably mounted in said die-holder seats, dies carried by said die-holders, a valve-casing attached to the piston-casing and having a transverse bore parallel with the piston-chamber and forming a valve-chamber; a valve slidably mounted in said valve-chamber and having pressure-port-connecting grooves in its periphery, and having an exhaust-port-connecting groove in its periphery and having valve-shifting ports connecting the pressure to each end of the valve, plugs closing the ends of said valve-chamber and a steam-supply pipe connected to said valve-casing; there being pressure-ports leading from the supply-pipe to the valve-chamber; and there being pressure-ports leading from the valve-chamber to the piston-chamber so that the reciprocation of the valve admits pressure first to one end of the valve and then to the other; and there being an exhaust-port so that the reciprocation of the valve will release the exhaust from one end of the valve, while the pressure is being admitted to the other end, and there being valve-releasing ports leading from said valve-chamber to the piston-chamber and there being second valve-releasing ports leading from the piston-chamber so that the reciprocation of the piston will connect said first and second valve-releasing ports to release the pressure first from one end of the valve and then from the other end, as required to reciprocate the valve.

2. In a boiler-tube cleaner, a suitable frame having a transverse bore forming a hammer-piston chamber, die-holders mounted in the ends of said chamber, a hammer-piston mounted in said chamber, dies carried by said die-holders, steam-ports leading to said piston-chamber, and an automatic valve for admitting the steam first to one end of the piston and then the other, as required to reciprocate the hammer-piston, and cause it to strike the dies, said dies being held outwardly against the inner surface of the boiler-tube by the steam-pressure.

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Witnesses:

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