

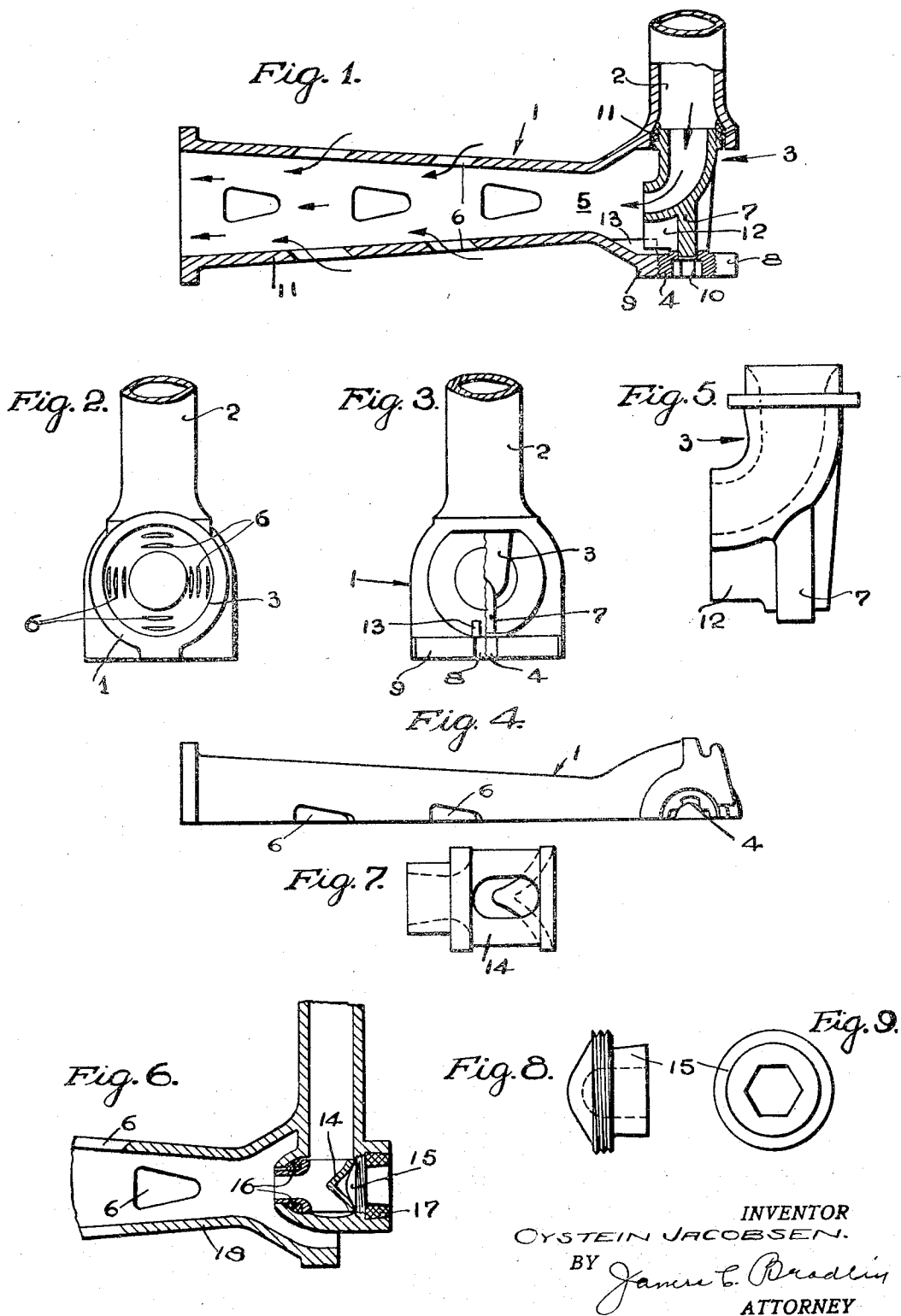
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O. JACOBSEN

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CIRCULATING STEAM JET

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INVENTOR
OYSTEIN JACOBSEN.
BY *James C. Bradley*
ATTORNEY

UNITED STATES PATENT OFFICE

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CIRCULATING STEAM JET

Oystein Jacobsen, Dayton, Ohio, assignor to The
Duriron Company, Inc., a corporation of New
York

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5 Claims. (Cl. 261—77)

The invention relates to circulating steam jets for introducing live steam into a liquid solution, such as acid and the like, the purpose being to provide agitation, circulation and heating. The invention constitutes an improvement over the construction of my Patent No. 1,819,979, dated August 18, 1931, and has for its principal objects the provision of an improved construction, (1) which is highly efficient; (2) which functions without destructive hammering or vibration which is harmful to the tanks in which the devices are used; and (3) which permits the ready replacement of the steam jet element which is the part of the device subject to the greatest wear due to the erosive action of the steam. Two of the preferred embodiments of the invention are illustrated in the accompanying drawing, wherein:

Figure 1 is a vertical section through one form of apparatus. Figs. 2 and 3 are end elevations, the steam jet element in Fig. 3 being partially broken away. Fig. 4 is a partial bottom plan view. Fig. 5 is a side elevation of the steam jet element. Fig. 6 is a side elevation, partly in section of a modification. Fig. 7 is a side elevation of the steam jet element of the Fig. 6 construction. And Figs. 8 and 9 are detail views of the retaining plug for the steam jet element of such construction, Fig. 8 being a side elevation, and Fig. 9 an end elevation.

Referring first to the construction of Figs. 1 to 5, 1 is the jet casing member to which steam is supplied through the pipe 2; 3 is the jet or nozzle member; and 4 is a retaining nut for holding the jet member in position. The jet member discharges into the casing member just back of the throat 5, and from this point outward, the casing member expands in diameter. The casing member is made relatively long as compared with devices of this general character heretofore used such as the one shown in my patent, and its walls are provided with a plurality of perforations 6, preferably of the triangular shape illustrated, and inclined forwardly so that the liquid flowing through the perforations has a component of movement in the direction of the travel of the body of liquid through the casing.

The provision of the perforations 6 permits liquid to flow freely into the casing so as to condense the steam supplied through the jet member before it escapes from the end of the relatively long casing member. As a result, the hammering, which often accompanies the use of apparatus of this kind, is entirely eliminated

and the fluid in the tank is circulated and agitated more effectively.

The jet member 3 is provided with a flange 7, which in the assembling operation, is slid along the slot 8 in the circular plate 9 forming part of the casting 1. The plate 9 is also provided with a threaded opening into which the nut 4 is threaded to lock the jet member in position after the parts are in assembled relation, such nut being provided with an angular opening 10 to receive a wrench. Suitable packing 11 is provided to make the joint with the pipe 2 tight. The jet member is provided with a forwardly projecting wing 12 fitting between a pair of lugs 13 formed as a part of the casting 1, the purpose being to center the jet member and hold it against twisting about its vertical axis.

The construction of Figs. 6 to 9 employs a modified form of jet member 14 held in place by a nut 15. Packing is employed at 16 and 17, the latter serving as a lock for the nut. The member 14 is cored out as illustrated. The flared portion 18 of the casing member is the same as in the Fig. 1 construction, being provided with similar perforations 6.

In both forms of device, the jet member is readily removable from its socket (when replacement due to wear is required) by unscrewing the lock nuts or plugs 4 or 15 as the case may be. Both jet members are of light, cheap construction, and use a type of packing which is inexpensive and will remain tight and serviceable throughout the life of the jet member.

What I claim is:

1. In combination in a circulating steam jet construction for heating a body of liquid, a casing member open at its rear end and of increasing diameter forwardly from its rear portion, a jet member opening forwardly into the rear end of the casing member, and means for supplying steam through the jet member, said casing member having its side walls throughout in direct contact with said body of liquid and perforated to permit a free flow of liquid therethrough.

2. In combination in a circulating steam jet construction for heating a body of liquid, a casing member open at its rear end and of increasing diameter forwardly from its rear portion, a jet member opening forwardly into the rear end of the casing member, and means for supplying steam through the jet member, said casing member having its side walls throughout in direct contact with said body of liquid and

provided with forwardly directed perforations to permit a free flow of liquid into the casing toward the forward end thereof.

3. In combination in a circulating steam jet construction, a casing member open at its rear end and of increasing diameter forwardly from its rear portion and having an integral steam inlet pipe extending laterally from such rear portion, said casing member having a receiving socket at its rear end, a jet member adapted to be inserted through the rear end of the casing into said socket, and having an inlet communicating with said steam pipe when the jet member is in position, said jet member also being provided with an outlet opening directed longitudinally of the casing toward the outlet end thereof, and a lock nut screwed into the casing member for releasably securing the jet member in said socket.

4. In combination in a circulating steam jet construction, a casing member open at its rear end and of increasing diameter forwardly from its rear portion, and having an integral steam inlet pipe extending laterally from such rear portion with a socket at its inner end, said

casing member being provided with a slotted plate in opposition to said socket, an angular jet member adapted to be inserted through the rear end of the casing having its inlet end fitting into said socket and having a projection lying in the slot in said plate, and a lock nut threaded into said plate and encircling said projection to lock the jet member in position.

5. In combination in a circulating steam jet construction, a casing member open at its rear end and of increasing diameter forwardly from its rear portion, and having an integral steam inlet pipe extending laterally from such rear portion, said casing member also having in its open rear end an integral annular receiving socket open at both ends and communicating through its side wall with the end of the steam pipe, a steam jet member fitting removably in the socket, with its outlet in alignment with the axis of the casing member and having an opening through its side wall communicating with the steam pipe, and a locknut screwed into the socket behind the steam jet member.

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