

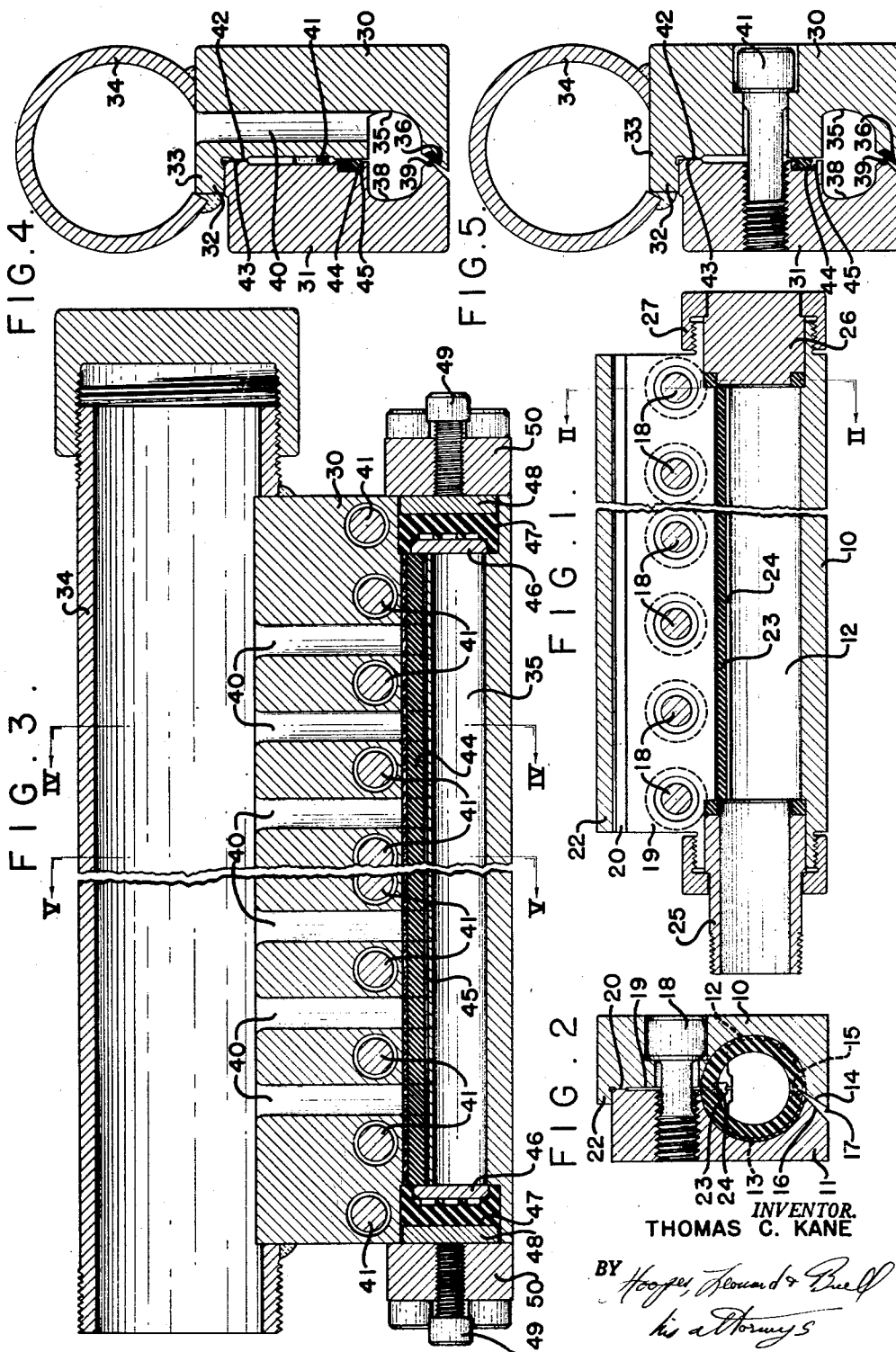
**Jan. 19, 1960**

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**2,921,748**

JET BAR

Filed Nov. 30, 1956



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2,921,748

JET BAR

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Application November 30, 1956, Serial No. 625,305

4 Claims. (Cl. 239—534)

This invention relates to a jet bar and particularly to a jet bar for delivering a high pressure film of liquid in a sheet in a straight line. This application is a continuation-in-part of my copending application Serial No. 471,679, filed November 29, 1954, now Patent No. 2,785,924.

There are many machines and industrial installations which require a high pressure application of water in a sheet along a straight line. For example, in the descaling of plates and billets it is the practice to pass a heated plate or billet through between two rows of spray nozzles which spray cold water onto the plate to break up scale thereon and wash it away from the plate or billet. The spray produced by ordinary spray nozzles is only partially effective since the pattern of impingement of necessity (to get coverage) is divergent, producing a wide and uneven cooling band whereas most effective descaling is accomplished when the scale is suddenly chilled by a very narrow cooling band. In order to offset the ineffectiveness of these prior art nozzle sprays, large quantities of water are employed. This is very wasteful of spray liquid since a large amount of the spray by-passes the article being sprayed and there is a great deal of unevenness in the spray. As a necessary corollary, an excessive amount of spray liquid must be handled both before the spray and after the spray. This means larger pumps, lines and sumps than would be necessary in a more efficient liquid delivery system.

I have invented a jet bar which overcomes these defects of the prior art spray systems and which is capable of delivering a very thin sheet of liquid, all of which is used in descaling and all of which impinges on the article being treated in an extremely narrow band to suddenly chill the scale. I shall describe my invention as applied to a descaling operation in which a plate is heated and passed through a descaling spray of liquid.

I provide a jet bar having a pair of straight members forming a chamber between them, a line or narrow band contact between said members, holding means holding said straight members together resiliently at the contact zone, directional means on one of said members adjacent the contact zone directing liquid from the contact zone in a flat straight line sheet away from the members and means delivering high pressure liquid to the channel between the two straight members. Preferably, the members are rectangular in shape. One of said members is preferably provided with a groove in one face thereof and the other member is provided with a corresponding mating recess, each member is preferably provided with a hardened facing forming a line contact between the two members adjacent one of their adjoining facing edges. One of the facings is preferably in the form of a flat deflecting or directing face or directional means. The other face is preferably in the form of a V-shaped annular ridge, the bottom of which forms the line contact with the directing face. The two annular members are preferably held together by spaced bolts under equal tension. The high pressure liquid is introduced into the chamber formed by the mating groove and recess in the two mem-

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bers and causes sufficient distortion of the members and bolts to permit fluid to spray out through the line contact toward the axis of the members. In this preferred form the operation depends upon the inherent resilience of the metal in the members and bolts to permit separation at the line contact between the members.

I have described certain salient features, advantages and objects of my invention in the foregoing general description, however, other features, objects and advantages will become apparent from a consideration of the following description and the accompanying drawings in which:

Figure 1 is a longitudinal section of a preferred jet bar construction according to my invention;

Figure 2 is a section on the line II—II of Figure 1;

Figure 3 is a longitudinal section of a second embodiment of my invention;

Figure 4 is a section on the line IV—IV of Figure 3.

Figure 5 is a section on the line V—V of Figure 3.

Referring to the drawings, I have illustrated a jet bar made up of two elongated members 10 and 11. One of these members 10 is provided with a groove 12 in one face thereof. The other member 11 is provided with a mating groove or recess 13 which forms with the groove 12 an elongated chamber between the members 10 and 11. The member 10 carrying the groove 12 is provided with a sloping, preferably hardened face 14 beginning at the groove 12 and extending to its outer peripheral edge. This sloping face acts as a directing means as will be hereafter more fully described. The other member 11 is provided with a projecting, preferably hardened, ridge 15 which forms a line contact with the face 14 of the member 10. Preferably the ridge 15 is formed by cutting away a corner portion of the member 11 to form a face 16 sloping away from the face 14 to form an elongated triangular-shaped nozzle 17. The two members 10 and 11 are held together by bolts 18 which pass through both members on the side of the grooves 12 and 13 opposite the face 14. Preferably the member 10 has a relieved portion 19 spaced from the groove 12 so as to form a shoulder 20 spaced from the groove 12 and in contact with member 11 on the side of the bolts 18 opposite groove 12. A flange 22 may be provided on member 10 to overlap the edge of member 11. A rubber gasket 23 is fitted in a groove 24 between the two members adjacent the mating grooves 12 and 13 to prevent leakage of liquid. An inlet tube 25 is provided at one end of the members connecting the chamber formed by the grooves 12 and 13 with a source of high pressure liquid. The opposite end of the chamber is closed by a plug 26 and holding sleeve 27.

In operation the plate being descaled or other member being treated is passed beneath the elongated opening 17 in the two members. High pressure liquid is brought in through line 25 into the chamber formed by the grooves 12 and 13. As the pressure builds up in the chamber the two members and their holding bolts distort slightly along the line contact between the face 14 and the ridge 15 permitting a thin sheet or film of water to jet outwardly between the two faces 14 and 16 and to impinge upon the member being treated, in this case, the plate being descaled. The distortion is regulated by the tightness of the bolts 18 so that the pressure required to be built up before the spray begins and the pressure of the jet spray may be regulated.

In Figures 3, 4 and 5, I have illustrated a second embodiment of my invention. In this embodiment, I provide a pair of elongated members 30 and 31. One of the members 30 is provided with an elongated flange 32 along one edge forming a base 33 receiving a cut-away portion of a delivery pipe 34. A groove 35 is formed in the member 30 adjacent the other edge adjoining a slop-

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ing face 36 preferably hardened. The other member 31 is fitted against the member 30 and is provided with a recessed portion or groove 38 forming a chamber with the groove 35 of the member 30. A ridge 39 adjacent the recessed portion 38 makes line contact with the face portion 36 which acts as a directional means for the jet of liquid issuing from the line contact as will hereafter be more fully described. Spaced passages 40 connect the chamber formed by grooves 35 and 38 with the delivery pipe 34. The two members 30 and 31 are held together by spaced bolts 41 passing through the two members. The members 30 and 31 are provided with a relieved portion forming mating shoulders 42 and 43 on the side of the bolts 41 opposite the face 36. A rubber gasket 44 is provided in a groove 45 between the two members 30 and 31. High pressure liquid is introduced into the chamber formed by the two members 30 and 31 through the pipe 34 and passages 40. The ends of the passage between the members are sealed by a plate 46, gasket 47 and pressure plate 48 acted on by a screw 49 in a closure plate 50 bolted to the ends of members 30 and 31.

The operation of this second embodiment is essentially the same as that of the embodiment of Figures 1 and 2. High pressure liquid is introduced into the chamber formed between the members 30 and 31 from the inlet pipe 34 and passages 40. When sufficient pressure has built up there will be some distortion of the members 30 and 31. This permits a slight break at the line contact between the ridge 39 and face 36 (about 2.5 thousandths of an inch) through which the liquid passes as a flat carefully directed thin film or sheet. The pressure at which this occurs is regulated by the tension on bolts 41.

While I have illustrated and described certain preferred embodiments of my invention it will be understood that it may be otherwise embodied within the scope of the following claims.

I claim:

1. A jet bar for delivering a high pressure sheet of liquid in a straight line comprising a pair of side by side elongated members, at least one of said members having a recess therein facing toward the other member and forming a chamber between said members, a relatively sharp edge on one of said members in contact with a surface of the other member forming a line contact between said members along one side of the chamber normally sealing the chamber, sloping external directional means on each member adjacent said contact, holding means engaging said members and holding said elongated members resiliently together, and means connected to one of said members and communicating with the recess

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therein for introducing a liquid at high pressure into the chamber between the members whereby the elongated members are caused to flex apart along the line contact to form an elongated straight nozzle.

2. A jet bar for delivering a high pressure film of liquid in a straight line comprising a pair of side by side elongated members, a groove in one of said members, facing toward the other member and closed thereby a sloping deflecting face beginning at said groove and extending angularly outwardly toward the edge of the member, a mating recess in the other member forming a chamber with the groove, a V-shaped ridge on the said other member adjacent the recess and forming line contact with the sloping deflecting face normally sealing the chamber, holding means engaging said members and holding said annular members resiliently together, and means connected to one of said members and communicating therethrough with the recess therein for introducing a high pressure liquid into the chamber between the members whereby the elongated members are caused to flex apart along the line of contact to form an elongated straight line nozzle.

3. A jet bar as claimed in claim 2 wherein the sloping face and V-shaped ridge are made of hardened abrasion resisting material.

4. A jet bar for delivering a high pressure sheet of liquid in a straight line comprising a pair of side by side elongated members, at least one of said members having a recess therein facing toward the other member and closed thereby to form a chamber between said members, a relatively sharp edge on one of said members in contact with a surface of the other member forming a line contact between said members along one side of the chamber, spaced bolts passing through the elongated members holding said elongated members resiliently together to normally seal the chamber, and means connected to one of said members and communicating therethrough with the chamber for introducing a liquid at high pressure into the chamber between the members whereby the elongated members are caused to flex apart along the line of contact to form an elongated straight line nozzle.

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