

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 0 763 619 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:

**19.03.1997 Bulletin 1997/12**(51) Int Cl.<sup>6</sup>: **D06F 75/18**(21) Application number: **96306431.6**(22) Date of filing: **05.09.1996**

(84) Designated Contracting States:

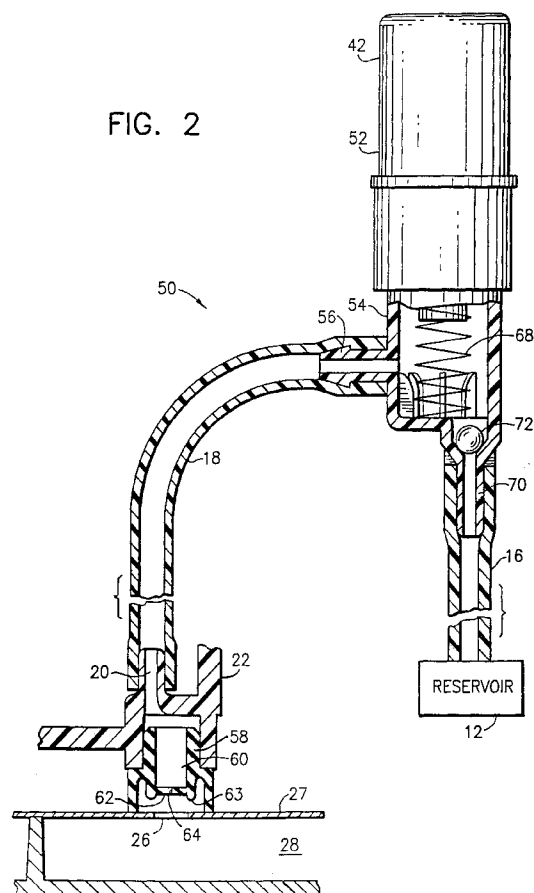
**BE DE DK ES FR GB GR IT NL PT SE**• **Chasen, James E.****West Haven, Connecticut 06516 (US)**(30) Priority: **18.09.1995 US 529939**(74) Representative: **Stagg, Diana Christine****Emhart Patents Department****Emhart International Ltd.****177 Walsall Road****Birmingham B42 1BP (GB)**(71) Applicant: **Black & Decker Inc.****Newark Delaware 19711 (US)**

(72) Inventors:

• **Farrington, Richard I.****Seymour, Connecticut 06483 (US)**(54) **Steam surge system for an iron**

(57) An iron steam surge system (50) comprises a pump (52) connected to a reservoir (12) and a seal (58) connected between an outlet (56) of the pump (52) and an entrance (26) to a steam chamber (28) of the iron. The seal (58) has a slit (64) therein, and substantially prevents steam from exiting the entrance (26) and substantially prevents water from the pump (52) from entering the entrance (26) unless the pump (52) is being actuated.

FIG. 2

**EP 0 763 619 A1**

## Description

The present invention relates to a steam surge system for an iron.

US Patent No. 4,115,935 describes an iron having a button for a spray feature or an extra surge capacity. US Patent No. 5,105,525 describes an iron with a button for delivering an extra surge of steam from its steam vents. Other US patents that relate to irons and/or steam production include US Patent No. 5,279,055; US Patent No. 5,376,799; US Patent No. 5,380,983 and US Patent No. 5,094,021.

Known steam surge systems for irons are provided with a check valve assembly and it is a disadvantage of such known systems that the valve assembly adds cost to the iron and its manufacture. The check valve assembly can also create quality problems during manufacture, because it contains small sized components.

It is an object of the present invention to provide a steam surge system for an iron, in which the above disadvantages are reduced or substantially obviated.

The present invention provides an iron steam surge system which comprises a pump connected to a reservoir; and a seal connected between an outlet of the pump and an entrance to a steam chamber of the iron, the seal having slit therein, characterised in that the seal substantially prevents steam from existing the entrance and substantially prevents water from the pump from entering the entrance unless the pump is being actuated.

The present invention further provides an iron steam surge system having a pump connected to a reservoir, a conduit connected to an outlet of the pump, and a seal connecting the conduit to an entrance to a steam chamber of the iron, characterised in that the seal has a slit therethrough, wherein the slit allows passage of water from the conduit to the steam chamber entrance when the pump is actuated, the seal substantially preventing water in the conduit from passing through the seal except when the pump is being actuated and substantially preventing steam from exiting through the seal.

The invention will now be further described with reference to the accompanying drawings, in which:

Figure 1 is a schematic partial cross-sectional view of a prior art steam surge system used in an iron; and

Figure 2 is a schematic partial cross-sectional view of a steam surge system incorporating features of the present invention.

Referring to Figure 1, there is shown a schematic partial cross-sectional view of a steam surge system 10 used in a prior art steam iron. The system 10 includes a water reservoir 12, a pump 14, two conduits 16, 18, an aperture 20 through a skirt 22, and a seal 24 located at the entrance 26 to the steam chamber 28 at the steam chamber cover 27. The first conduit 16 connects the res-

ervoir 12 to the inlet of the pump 14. The second conduit 18 connects the outlet 30 of the pump 14 to the skirt 22, and a seal 24 located at the entrance 26 to the steam chamber 28 at the steam chamber cover 27. The first conduit 16 connects the reservoir 12 to the inlet of the pump 14. The second conduit 18 connects the outlet 30 of the pump 14 to the skirt 22 at a mounting post 32 that has the aperture 20 therein. Located at the pump outlet 30 is a check valve assembly 31 comprising a ball 34, a spring 36 and a cap 38 attached to a frame 40 of the pump 14. The cap 38 is typically ultrasonically welded or press-fit to the pump frame 40. When the pump button 42 is pressed down, as indicated by arrow A, water in the pump 14 is pressed against the ball 34. The water pressure causes the spring 36 to compress and the ball 34 to back off of its seat on the frame 40. This allows the water from the pump 14 to enter the second conduit and travel to the aperture 20. The water passes through the aperture 20, through the open hole 44 in the seal 24, through the entrance 26 and into the steam chamber 28 where it is turned into steam. When the pump button 42 reaches the end of its downward actuation or the user stops pressing the button 42 down, pressure on both sides of the ball 34 equalises and the spring 36 biases the ball back to its sealing position on the frame 40. When the charge of water is delivered via the pump to the steam chamber, the system 10 produces a blast or surge of steam from the iron.

Although the prior art design shown in Figure 1 works well, it has two problems. First, the check valve assembly 31 adds cost to the iron and its manufacture. Second, the check valve assembly 31 can encounter quality problems during manufacture, such as inadvertently omitting the ball 34 or inadvertently inserting two springs 36 that become tangled. The ball 34 and spring 36 are small, as can be seen in comparing their size in Figure 1 to the size of the pump button 42 intended to be actuated by a user's thumb. Thus, because of their small size, these problems can occur during manufacture. The present invention is intended to overcome these problems by eliminating the check valve assembly 31.

Referring now to Figure 2, a steam surge system 50 is shown that incorporates features of the present invention where the same numbers are used to represent similar parts shown in Figure 1. In the embodiment shown, the pump 42 is very similar to the pump 14 with the exceptions that the frame 54 has an outlet 56 without a seat for a check valve ball and, there is no check valve assembly at the outlet 56. In an alternate embodiment, the frame 40 could be used, but merely without the check valve assembly 31. Similar to the system 10, the system 50 has its pump 52 connected between the reservoir 12 and skirt 22 by the two conduits 16, 18. The seal 58 is different from the seal 24. In particular, the seal 58 has a centre channel 60 with a web or blocking portion 62 thereacross. The blocking portion 62 is located in a path of the water from the pump 52 to the en-

trance 26. The blocking portion 62 has a slit 64 there-through. The blocking portion 62 is suitably configured to keep the slit 64 closed except during actuation of the pump 52. Because the blocking portion 62 usually keeps the slit 64 closed and the seal 58 surrounds the entrance 26 to the steam chamber 28, the seal 58 substantially prevents steam from exiting through the entrance 26. As noted above, the blocking portion 62 is stiff enough to keep the slit 64 closed unless the pump 52 is being actuated. This includes the situation where there is a volume of water located in the conduit 18, skirt aperture 20 and centre channel 60 above the blocking portion 62. During pump inactivity, the blocking portion 62 is thus adapted to hold back the head height of water above the seal. The blocking portion 62 is also preferably stiff enough to keep the slit 64 closed during priming of the pump; the intake stroke of the pump button 42 when the steel ball 72 at the inlet 70 lifts off of its seat. In the embodiment shown, the blocking portion 62 is surrounded by a downwardly extending raised ridge 63. This raised ridge 63 acts as a barrier to prevent undesired propagation of the slit 64. In other words, the raised ridge 63 prevents tearing of the seal 58 as the blocking portion is moved during opening of the slit 65.

When the pump 52 is actuated by a user pressing down on the pump button 42, the pressure against the top of the blocking portion 62 increases. This increase in pressure causes the blocking portion 62 to deform thereby opening an aperture at the slit 64. Water is thus pushed through the slit 64 and into the steam chamber entrance 26. At the end of the downward stroke of the pump button 42 or when the user stops pressing the button down, the blocking portion resiliently deflects back to its usual position with the slit 64 closed. During the upward stroke of the pump button 42, caused by the spring 68, the slit 64 is kept closed while the pump 62 sucks water through its inlet 70 from the first conduit 16 and reservoir 12. Because the seal 58 is preferably made of a moulded polymer or silicon material, it is relatively simple to manufacture and the slit 64 can merely be cut into the seal. Thus, the present invention eliminates the costs and problems associated with the prior art check valve assembly 31 by using a part already in the iron and merely moulding it slightly differently and cutting a slit. This both reduces manufacturing and assembly costs as well as increasing overall manufacturing quality control. Of course, any suitable type of shape of slit or slits could be used in the seal and any suitable method for forming the slit could be used. A seal having multiple blocking portions in series could also be used. Any suitable pump or conduiting system could also be used.

a pump (52) connected to a reservoir (12); and a seal (58) connected between an outlet (56) of the pump (52) and an entrance (26) to a steam chamber (28) of the iron, the seal (58) having a slit (64) therein, characterised in that the seal substantially prevents steam from exiting the entrance (26) and substantially prevents water from the pump (52) from entering the entrance (26) unless the pump (52) is being actuated.

2. A system according to Claim 1 characterised in that conduit (18) is located between an outlet (56) of the pump (52) and the seal (58).
3. A system according to Claim 2 characterised in that the conduit (18) is being connected to a skirt (22) with an aperture (20) therethrough, the seal (58) being located directly between the skirt (22) at the aperture (20) and a steam chamber cover (27) at the entrance (26).
4. A system according to any of claims 1 to 3 characterised in that the sole means of preventing water from the pump (52) from entering the entrance (26) unless the pump (52) is actuated.
5. An iron steam surge system having a pump (52) connected to a reservoir (12), a conduit (18) connected to an outlet (56) of the pump (52), and a seal (58) connecting the conduit (18) to an entrance (26) to a steam chamber (28) of the iron, characterised in that the seal (58) has a slit (64) therethrough, wherein the slit (64) allows passage of water from the conduit (18) to the steam chamber entrance (26) when the pump (52) is actuated, the seal (58) substantially preventing water in the conduit (18) from passing through the seal (58) except when the pump (52) is being actuated and substantially preventing steam from exiting through the seal (58).
6. A system as claimed in Claim 5 characterised in that the conduit (18) is connected to a skirt (22) with an aperture (20) therethrough, the seal (58) being located directly between the skirt (22) at the aperture (20) and a steam chamber cover (27) at the entrance (26).
7. A system as claimed in Claim 6 characterised in that the seal (58) is the sole means of preventing water from the pump (52) from entering the entrance (26) unless the pump (52) is being actuated.

## Claims

1. An iron steam surge system (50) which comprises

FIG. 1  
PRIOR ART

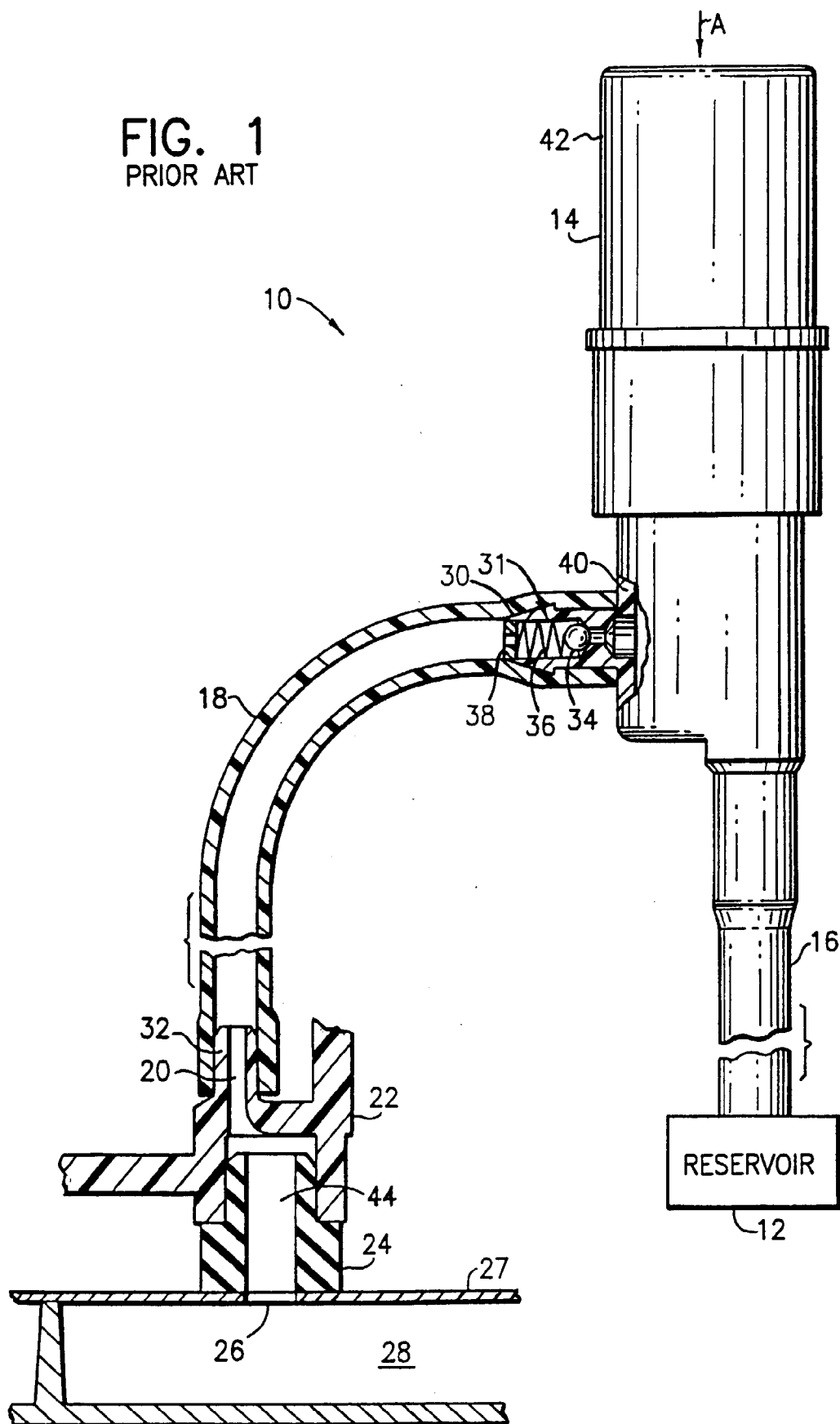
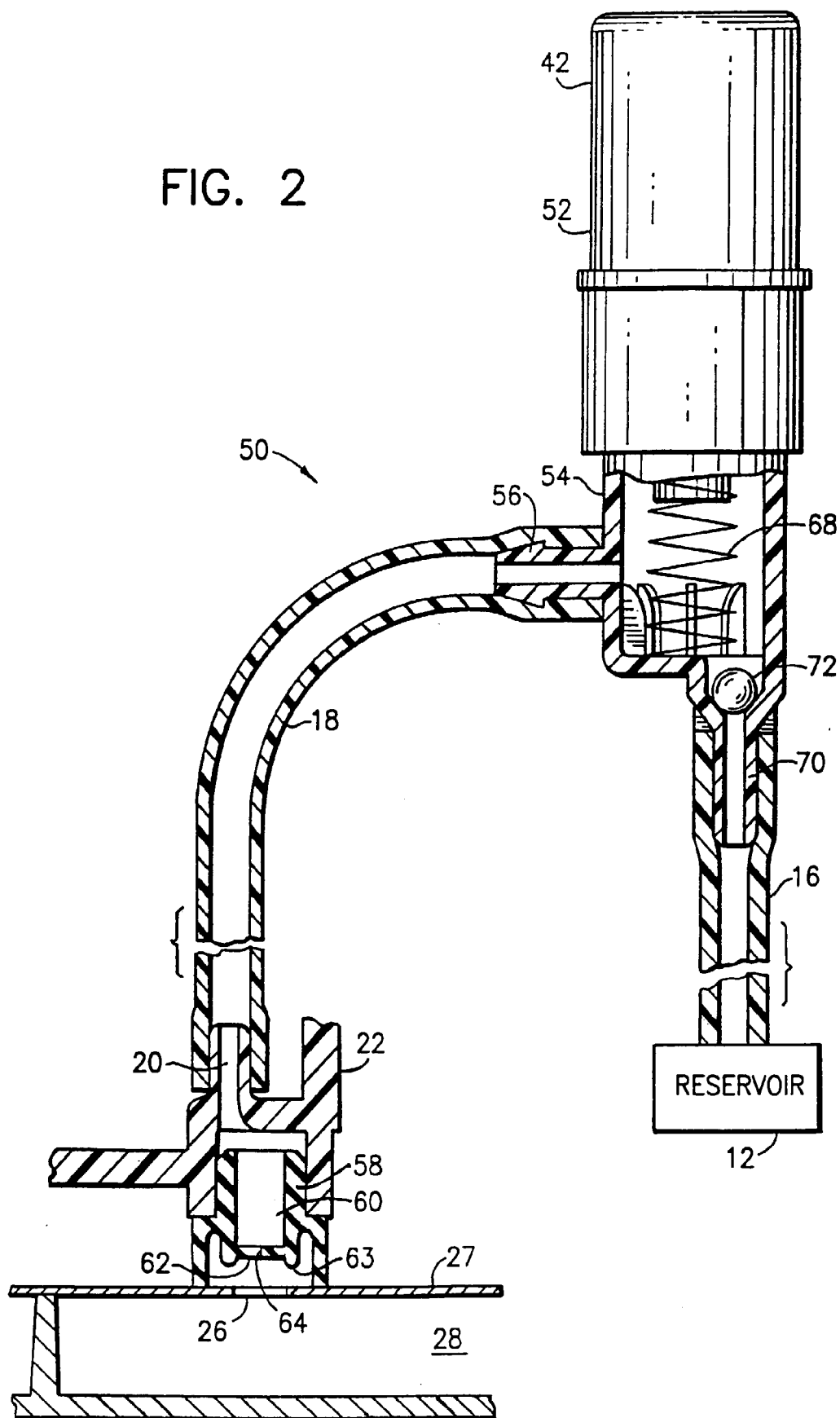


FIG. 2





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 96 30 6431.6

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR-A-2 205 595 (SUNBEAM CORPORATION) * page 9, line 35 - page 11, line 5; figures 4,11 *	1-7	D06F75/18
A	US-A-4 107 860 (GENERAL ELECTRIC COMPANY) * column 3, line 24 - column 4, line 19; figures *	1,5	
A	DE-U-88 14 503 (N.V. PHILIPS GLOEILAMPENFABRIEKEN) * claims; figures *	1,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D06F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 December 1996	Examiner Courrier, G
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/92 (P4/C01)