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STEAMING IRON

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2 Sheets-Sheet 2

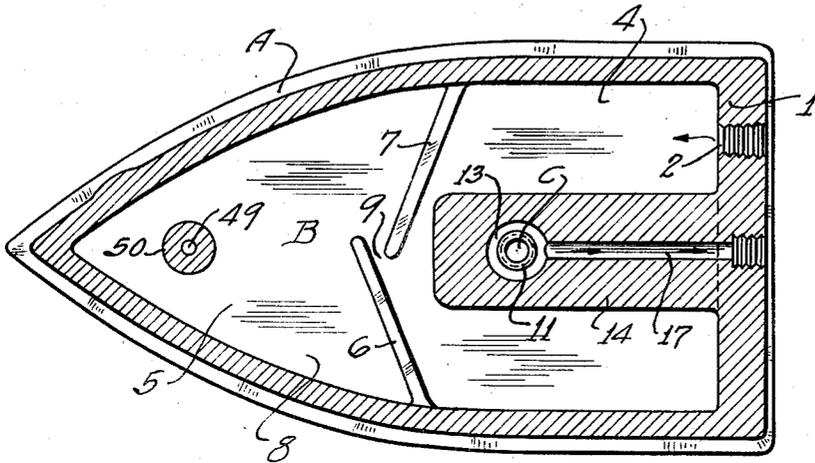


Fig. 3.

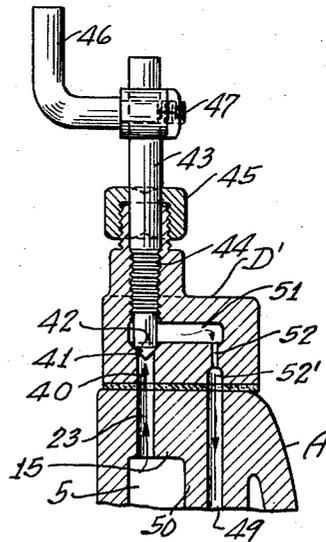
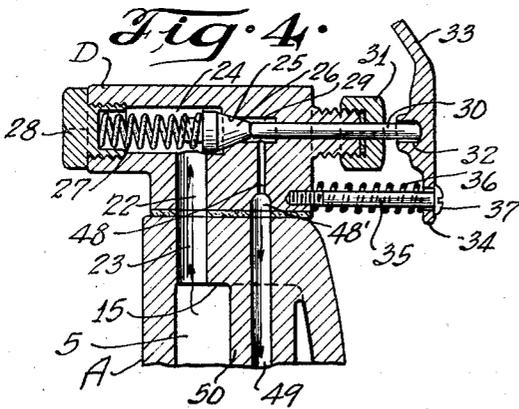


Fig. 6.

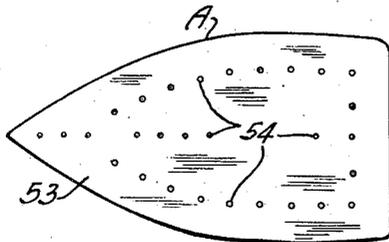


Fig. 5.

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STEAMING IRON

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10 Claims. (Cl. 38—77)

This invention relates generally to pressing irons and has more particular reference to a combined steaming and pressing iron adapted especially, though not exclusively, for the steaming and ironing of silks and other similar textile goods and fabrics.

Silk goods are most successfully pressed and ironed with moist heat, which may be obtained either by moistening the goods with the aid of a damp cloth and heat, or the goods may be pressed while being moistened with live steam.

The latter method, which is the more practicable for a tailor-shop, may best be accomplished by means of a so-called steaming-iron, that is to say, an iron heated by steam, a portion of the steam being bled from the steam-heating chamber of the iron and applied to the goods through suitable apertures provided in the sole-plate of the iron.

In practice, however, so far as I am aware, it has been found that such bled steam, or so-called "steaming", commonly contains moisture not only as vapor, which is desirable, but also as water droplets, which latter is ruinous to silk fabrics. In other words, the steam is "wet", while what is wanted is dry steam containing no water as such, in either the dry, saturated, condition or, preferably, in the superheated state.

The inability of appliances, as at present in use, to provide a supply of dry steam to the vents in the sole of the iron has, to my present knowledge, greatly militated against the successful commercial use of such so-called steaming-irons, notwithstanding that the tailoring and pressing trade has long felt the need of such an appliance.

My invention has hence for its prime object the provision, in a pressing iron of the character described, of means for supplying dry steam to the vent-apertures in the sole plate of the iron for facilitating and improving the ironing and pressing of silk fabrics and the like.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (two sheets)—

Figure 1 is a top plan view of a pressing iron embodying my invention, merely a portion of the steam-supply and condensate-drain pipes being shown;

Figure 2 is a longitudinal sectional view of the iron, a portion of the condensate-drain pipe being also shown;

Figure 3 is a top plan sectional view of the iron taken approximately along line 3—3, Figure 2, the condensate-drain pipe being omitted;

Figure 4 is a sectional view through the expansion valve of the iron, taken approximately along the line 4—4, Figure 2;

Figure 5 is a bottom plan view of the iron, showing the steam-vent-apertures in the sole-plate; and

Figure 6 is a view similar to Figure 4, showing a modified form of expansion valve.

Briefly, it may be said that my present steaming and pressing iron comprises a metallic, preferably iron, body having, in the first instance, a steam pressure-chamber to which live steam, that is to say, steam under a suitable pressure above atmosphere, is admitted for providing by the condensing, and giving up of the latent heat in the admitted steam, the requisite pressing heat to the iron proper. This pressure-chamber is provided with a baffle arrangement for catching and impounding, as condensate, the water of condensation, which latter is then, in a simple and highly effective manner, automatically evacuated or removed from the pressure-chamber substantially as it is formed, for, in such manner, maintaining the steam in the pressure-chamber substantially in its dry, saturated state.

From the upper portion of the pressure-chamber, the dry, saturated steam is bled and allowed to expand through a suitable throttling and regulating valve of preferably the finger-tip control variety. In passing through the expansion-valve, the steam is throttled down to a lower pressure without loss of heat, and thereby becomes superheated, which so superheated steam is conducted through a suitable passage, sealed from the pressure-chamber, to a plenum steam distributing chamber provided between the sole plate of the iron and the bottom wall of the pressure chamber, the heat from the latter serving to maintain the expanded steam in its dry condition.

The expanded dry steam then escapes from the distributing chamber through a series of suitable vent-apertures provided in the sole-plate for effecting moistening of the silk or other similar goods being worked upon.

Referring now more in detail and by reference characters to the drawings, which illustrate a preferred embodiment of my invention, A designates the "iron-body" or iron proper, and I may at this time state that it is to be understood that the term "iron" or "iron-body" is employed in the commonly accepted connotation thereof as applied to a pressing iron or the like, and does not

necessarily imply that such "iron" is composed of iron-metal, but rather that the "iron" is composed of a body of suitable heat-conducting material, as cast-iron, aluminum, or the like.

5 The iron body A is hollow or shell-like and within its walls is provided, in the first instance, a steam- or pressure-chamber B having in its rear wall 1 a steam supply port 2, into which is preferably threaded a suitable assembly of pipe fittings, as at 3, for attachment thereto of a steam-supply hose or the like, not shown, for supply of heating steam under a suitable pressure above the atmosphere, as may best serve the intended purpose.

15 The pressure-chamber B is interiorly partially divided into a wet-steam or heel-portion 4 and a dry-steam or toe-portion 5 by a pair of baffle or wing walls 6, 7, which, rising from the floor 8 of the chamber B for substantially half the height thereof, extend laterally from the corresponding side walls of the chamber B in oblique relationship to the longitudinal axis of the iron A and suitably overlap one another, so as to provide a gap or drainage slot 9 between their free ends, as best seen in Figure 3.

25 These baffle walls 6, 7, serve to most effectively catch or entrain the droplets of water which may, and commonly do, enter into the chamber B with the steam flowing through the port 2, and collect the same in the heel-portion 4 of the chamber B.

30 Moreover, the condensate or water of condensed steam made or occurring in the toe-portion 5 of the chamber B during the operation of the iron, drains also into the heel-portion of the chamber B through the slot or gap 9 between the baffles 6, 7, so that the steam which passes forwardly into the toe-portion 5 of the chamber B is deprived substantially of its entrained water and is hence approximately in its dry, saturated, state.

40 For effecting removal of such drainage water, a trap structure C is built into the iron-body A and comprises a well or recess 10 provided in the floor 8 of the heel-portion 4 of the chamber B, into which the drainage water may readily flow.

45 Rising from the well 10, is a vertical pipe or trap-leg 11, which, resting on the bottom of the well 10, is there provided with a plurality of ports 12 communicating the pipe 11 with the well 10 in such manner as to permit the escape of drainage water from the well 10 into the pipe 11.

50 The openings or ports 12 are of sufficient size that the outflowing steam will pass downwardly through the condensate well through the ports 12 and thence through the chamber 13 and the passage 17 to the outlet pipe 19. As the outflowing steam passes through the condensate well and the port 12 it will entrain any moisture or condensate which happens to be in its path, thereby effectively removing such condensate.

55 At its upper end, the pipe 11 extends through and opens into a recess 13 cored in a partition wall 14 extending forwardly from the rear wall 1 and depending from the top wall 15 of the chamber B, which divides the chamber 4 longitudinally but so as to leave a suitable water-passage space between the partition 14 and the bottom wall 8 of the chamber B, as best seen in Figure 2.

60 The recess 13 is preferably closed by a removable plug 16 for permitting access to the recess 13 for effecting repairs to the pipe 11, and has communication with a passage 17 leading through the rear wall 1 of the iron A, the outer

end of the passage 17 being preferably threaded to receive a suitable fitting or assembly of fittings, as 18, to which a hose, as 19, may be connected to a conventional form of steam trap (not shown) for maintaining a predetermined back pressure in the steam chamber B.

65 Mounted exteriorly upon the upper wall 15 of the iron A, as by suitably provided lugs 20 and bolts 21, and disposed preferably over the nose-chamber 5, is an expansion valve D, best seen in Figure 4, which comprises a suitable, preferably metallic, body having a vertical port 22 located for registration with a port 23 provided in the top wall 15 in communication with the nose-chamber 5.

70 The port 22, in turn, communicates with a valve chamber 24 disposed preferably in a horizontal plane and having at its inner end a conical seat 25 for co-operation with a conical valve head 26 biased normally upon the seat 25 by means of a suitable tensional member in the form of a coil spring 27, the latter bearing at its opposite ends upon the valve 26 and a plug 28 threaded into the outer end of the valve chamber 24.

75 Through the valve seat 25, the chamber 24 is communicated with a recess 29, into which also extends the small end of the valve 26. A spindle 30, slidably mounted through a stuffing box 31 provided on the valve body D, at its inner end impinges the end of the valve 26, the spindle 30 at its outer end being seated in a socket 32 provided intermediate the ends of a manipulative member in the form of a vertically disposed lever 33.

80 The lever 33 at its lower end is provided with an eye 34 slidably mounted on a stud 35 projecting from the body D, and a suitable tensional member in the form of a coil spring 36, mounted on the stud 35, serves to normally bias the eye 34 on the head 37 of the stud 35, so as to form the pivot, as it may be said, for the lever 33.

85 The lever 33 extends obliquely rearwardly and upwardly and at its free end is provided with a finger-pad 38 disposed in suitably close adjacency to the customarily provided handle 39 of the iron A, as best seen in Figure 1.

90 The expansion valve D provides, as will be seen, a most convenient and effective regulatory control of the flow of steam from the pressure-chamber B for expansion through the valve D and is peculiarly adapted for intermittent or exacting work requiring precise control of the time of application and duration of supply of moistening steam to the goods being worked upon, as shortly more fully appearing.

95 Where, however, the work to be done is of a continuous nature, it may be desirable to provide for continuous flow of expanded steam for cloth-moistening purposes, and, in such case, the valve D may be removed from the iron A and in its place may be substituted a modified form of expansion valve D', best seen in Figure 6.

100 The valve D' comprises a valve-body to be mounted, similarly to the valve D, on the nose of the iron A and is provided with a port 40 having communication with the port 23 which leads into the pressure-chamber B.

105 At its upper end, the port 40 is provided with a conical seat 41 having co-operation with the conical head of a needle-valve 42, whose stem 43 is threaded, as at 44, into the body D' and, extending upwardly through a stuffing-box 45 provided thereon, is at its free end equipped with a suitable handle 46. As shown, the handle 46 is preferably slidably mounted on the stem 43 and provided with a set-screw 47, whereby the handle

46 may be adjustably locked on the stem 43 in the most convenient position for its intended purpose.

Reverting now to the valve D, in Figure 4, the recess 29 has communication through an orifice-aperture 48 with a port 48' disposed in registration with a port or passageway 49, which extends downwardly through a pipe-like pillar 50 connecting the upper wall 15 with the lower wall 8 for sealing the passageway 49 from the chamber B.

Similarly, in the valve D', in Figure 6, the port 40, through the seat 41, has communication with a recess 51 which, in turn, through an orifice-aperture 52 and port 52', leads also to the passageway 49 of the iron A.

In either case, the orifice 48, or 52, limits the maximum amount of steam supplied to the passageway 49 and also serves to provide a throttling expansion to the steam when the valve D, or D', is widely opened, the valve D, or D', thus providing an adjustable expansion orifice, while the aperture 48, or 52, provides a fixed orifice.

Either of the valves D, or D', when opened, will permit the flow of steam therepast from the chamber B, where the steam is under a certain pressure above atmosphere, into the passageway 49, wherein the steam will be at a lower or approximately atmospheric pressure, for reasons soon to appear.

In such flow through the valve D, or D', the steam is subjected to a throttling expansion, wherein its total heat content is unaltered, so that the expanded steam acquires a certain degree of superheat, highly beneficial to the present purpose of insuring a supply of dry steam to and in the passageway 49.

The passageway 49, at its lower end, has communication with a plenum or distribution chamber E, best seen in Figure 2, provided in the iron-body A between the sole-plate 53 of the iron A and the bottom wall 8 of the pressure-chamber B, as best seen in Figure 2.

The dry steam in the passageway 49 flows into the chamber E, which is of sufficient volume to equalize the flow of steam throughout its extent so that the steam escapes or is evacuated from the chamber E to atmosphere, or substantially so, in even volume through each of a plurality of vent-apertures 54 provided in the sole-plate 53, a preferred arrangement of such vent-apertures 54 being shown in Figure 5.

In use and operation, steam at a suitable pressure is supplied to the pressure chamber B, so as to heat the iron-body A to the desired degree of temperature, and, the so-heated iron being applied to the goods to be pressed, the operator manipulates the valve D, or adjusts the valve D', to supply dry, saturated steam to the goods through the vents 54 in the sole-plate of the iron in just the right amount and proper time for effecting the intended purpose.

It will be seen that, by my new steaming iron, a supply of dry, saturated steam for pressing and ironing silks and other goods with moist heat, is at all times assured, whether the pressing operation be of an intermittent or a continuous nature.

The iron fulfills in every respect the objects stated, and it will be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the iron may be made and substituted for those herein shown and described without departing from the nature and principles of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a steaming iron, a body-member having a steam chamber and inlet and outlet ports to and from said chamber, a pair of non-parallel opposed baffles disposed in the body-member transversely across said chamber in overlapping relationship, said baffle-means being laterally spaced at their overlapping portions to provide a passage therebetween for permitting condensate to flow along the floor of said chamber toward the heel of the iron, and means operatively connected with the steam chamber for passing steam to the ironing face of the iron.

2. In a steaming iron, a body-member having a steam chamber and inlet and outlet ports to and from said chamber, a pair of non-parallel opposed, vertical baffles disposed in the body-member transversely across, and obliquely to the longitudinal axis of, the chamber for separating the flow of incoming dry steam from the flow of returning moist steam and condensate, and means operatively connected with the steam chamber for passing steam to the ironing face of the iron.

3. In a steaming iron, a body-member having a steam chamber and inlet and outlet ports to and from said chamber, a pair of non-parallel opposed, vertical baffles disposed in said chamber obliquely to the longitudinal axis of the iron for separating the flow of incoming dry steam from the flow of returning moist steam and condensate, and means operatively connected with the steam chamber for passing steam to the ironing face of the iron.

4. In a steaming iron, a body-member having a steam chamber and inlet and outlet ports to and from said chamber, a pair of non-parallel opposed steam baffles disposed in the body-member transversely across said chamber in overlapping relationship and extending vertically upwardly from the bottom of the chamber, said baffle-means being at their upper extremities spaced downwardly from the top of the chamber and further being laterally spaced at their overlapping portions to provide a passage therebetween for permitting condensate to flow along the floor of said chamber toward the heel of the iron, and means operatively connected with the steam chamber for passing steam to the ironing face of the iron.

5. In a steaming iron, a body-member having a steam chamber and inlet and outlet ports to and from said chamber, a pair of non-parallel baffle plates disposed in said chamber, one of said plates extending obliquely partially across said chamber and the other of said plates extending obliquely also partially across said chamber in opposed relation to the first plate, said plates being in closely spaced overlapping relation at their inner ends, said baffle plates also extending perpendicularly upwardly from the bottom of the chamber a substantial distance toward, and being spaced at their upper ends from, the top wall of said chamber, and means operatively connected with the steam chamber for passing steam to the ironing face of the iron.

6. In a steaming iron, a body-member having a steam chamber, baffle-means extending transversely across the chamber from the bottom upwardly to a point adjacent the top of the chamber whereby to divide the chamber into forward and rearward compartments connected in the region of the top across the upper margin of the baffle-means, said baffle-means further being provided with a passage in the region of the bottom of the chamber connecting the forward and rearward

compartments for permitting uninterrupted flow of condensate therebetween, a steam inlet disposed in the heel of the iron at a point above the plane of the top-margin of the baffle-means, a condensate well disposed centrally of the floor of the rear compartment, an outlet port formed in the heel of the iron, conduit means connecting the bottom of the condensate well with the outlet port for causing the condensate to be entrained in the outflowing steam and removed therewith, and means operatively connected with the steam chamber for passing steam to the ironing face of the iron.

7. In a steaming iron, a body-member having a steam chamber, baffle means extending transversely across the chamber from the bottom upwardly to a point adjacent the top of the chamber whereby to divide the chamber into forward and rearward compartments connected in the region of the top across the upper margin of the baffle-means, said baffle-means further being provided with a passage in the region of the bottom of the chamber connecting the forward and rearward compartments for permitting uninterrupted flow of condensate therebetween, a steam inlet disposed in the heel of the iron at a point above the plane of the top-margin of the baffle-means, a condensate well disposed centrally of the floor of the rear compartment, an outlet port formed in the heel of the iron, a vertical conduit, diametrically smaller than the condensate well and extending downwardly to a point adjacent the bottom thereof and being at its upper end connected to the outlet port, whereby the outflowing steam will pass through the condensate well into the conduit and by entraining the condensate in the well remove such condensate, and means operatively connected with the steam chamber for passing steam to the ironing face of the iron.

8. In a steaming iron, a body-member having a steam chamber and a distributing chamber positioned above the sole of the iron, means for continuously supplying live steam to the steam chamber, a valve chamber having an inlet passage opening into the steam chamber and an outlet passage of substantially smaller diametrical size than the diametrical size of the inlet passage, a tube of substantially larger diametrical size than the diametrical size of the outlet passage connecting the outlet passage of the valve with the distributing chamber, said tube extending bodily through the steam chamber in the path of the incoming steam whereby to be maintained at substantially the same temperature as the incoming steam so that any moisture carried by the steam issuing into the tube from the outlet passage will be re-vaporized, and means in the valve chamber for controlling the flow there-through.

9. In a steaming iron, a body-member having a steam chamber and inlet and outlet ports to and from said chamber, a pair of non-parallel

opposed baffles disposed in the body-member transversely across said chamber in overlapping relationship, said baffle-means being laterally spaced at their overlapping portions to provide a passage therebetween for permitting condensate to flow along the floor of said chamber toward the heel of the iron, a distributing chamber positioned above the sole of the iron, means for continuously supplying live steam to the steam chamber, a valve chamber having an inlet passage opening into the steam chamber and an outlet passage of substantially smaller diametrical size than the diametrical size of the inlet passage, a tube of substantially larger diametrical size than the diametrical size of the outlet passage connecting the outlet passage of the valve with the distributing chamber, said tube extending bodily through the steam chamber in the path of the incoming steam whereby to be maintained at substantially the same temperature as the incoming steam so that any moisture carried by the steam issuing into the tube from the outlet passage will be re-vaporized, and means in the valve chamber for controlling the flow therethrough.

10. In a steaming iron, a body-member having a steam chamber, baffle-means extending transversely across the chamber from the bottom upwardly to a point adjacent the top of the chamber whereby to divide the chamber into forward and rearward compartments connected in the region of the top across the upper margin of the baffle-means, said baffle-means further being provided with a passage in the region of the bottom of the chamber connecting the forward and rearward compartments for permitting uninterrupted flow of condensate therebetween, a steam inlet disposed in the heel of the iron at a point above the plane of the top-margin of the baffle-means, a condensate well disposed centrally of the floor of the rear compartment, an outlet port formed in the heel of the iron, conduit means connecting the bottom of the condensate well with the outlet port for causing the condensate to be entrained in the outflowing steam and removed therewith, a distributing chamber positioned above the sole of the iron, means for continuously supplying live steam to the steam chamber, a valve chamber having an inlet passage opening into the steam chamber and an outlet passage of substantially smaller diametrical size than the diametrical size of the inlet passage, a tube of substantially larger diametrical size than the diametrical size of the outlet passage connecting the outlet passage of the valve with the distributing chamber, said tube extending bodily through the steam chamber in the path of the incoming steam whereby to be maintained at substantially the same temperature as the incoming steam so that any moisture carried by the steam issuing into the tube from the outlet passage will be re-vaporized, and means in the valve chamber for controlling the flow therethrough.

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