April 27, 1965 E. E. FOSTER 3,180,041

IRON LIFTER

Filed Jan. 7, 1963 2 Sheets-Sheet 1

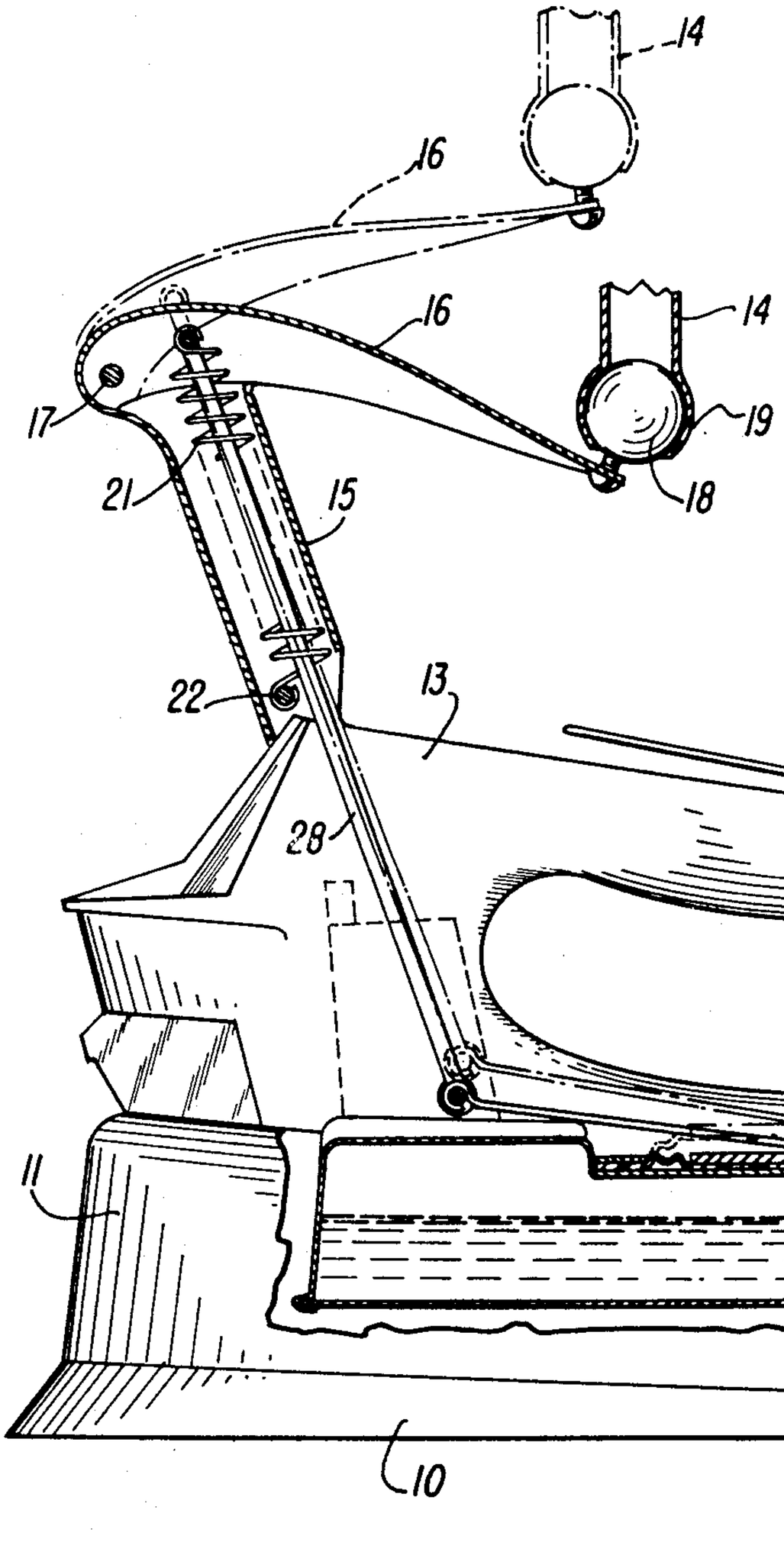

FIG. 1

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FIG. 2

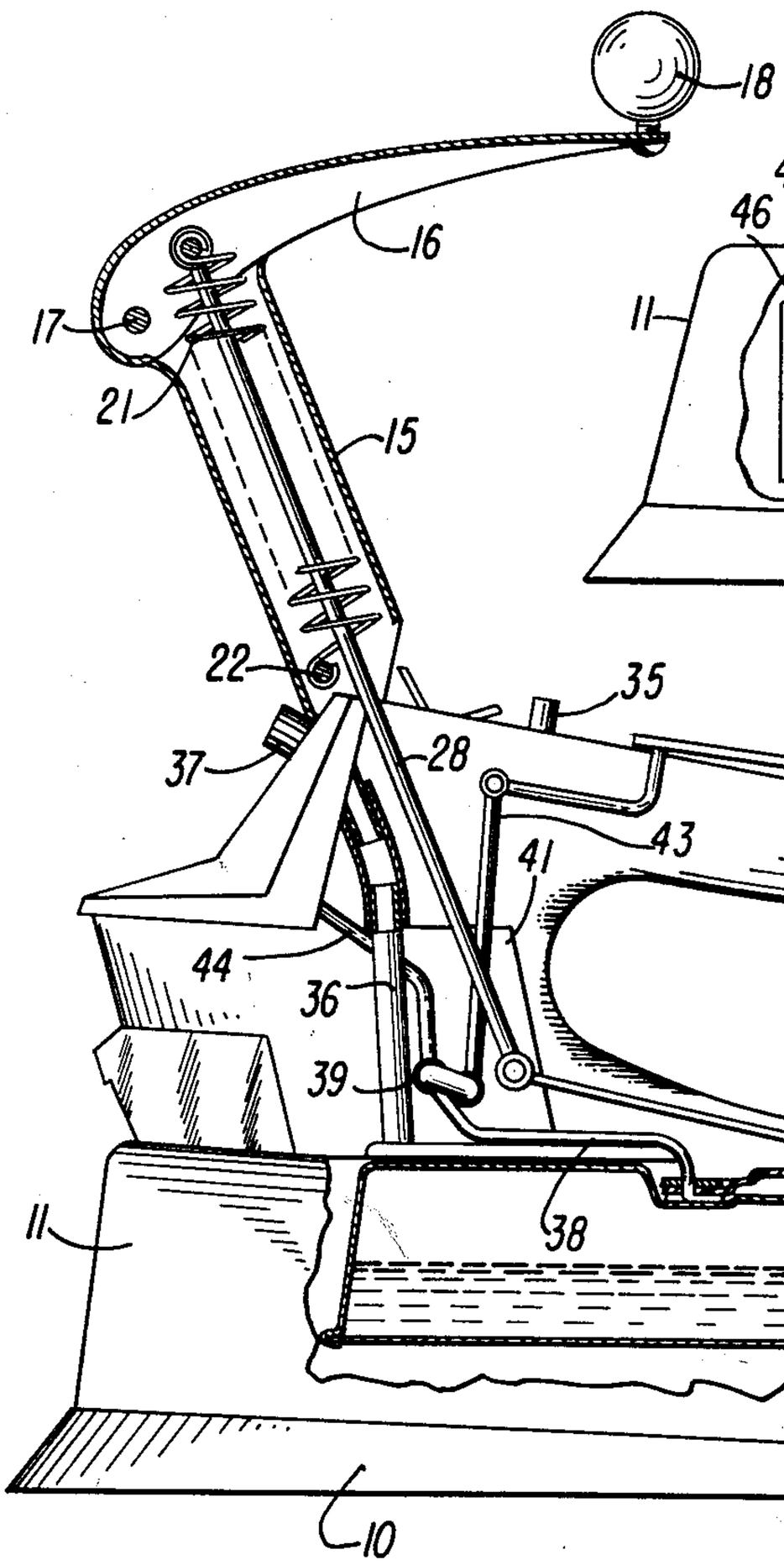
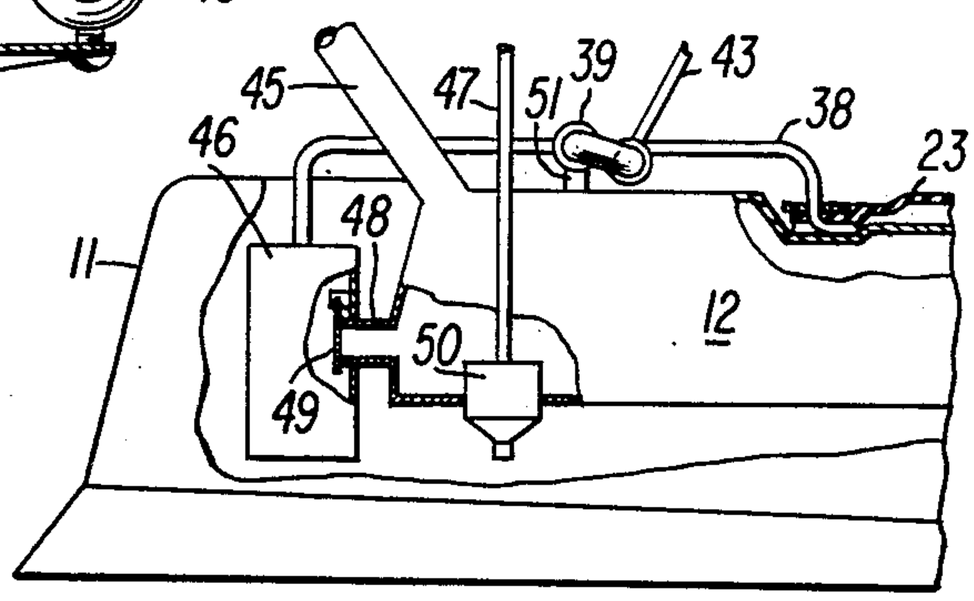


FIG. 3



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IRON LIFTER

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This invention relates to an iron lifter and more particularly to apparatus for supporting a hand iron above an ironing board for vertical movement toward and away from the board.

Ironing apparatus has heretofore been proposed in which an iron is supported above an ironing board and can be moved downwardly onto material on the board for ironing with the full weight of the iron being effective during ironing, but which will lift the iron when the handle thereof is released. Apparatus of this type is more particularly disclosed and claimed for example in my prior Patents Nos. 2,644,255, 2,688,812, 2,939,229 and 2,954,619.

Such apparatus relies either upon movable linkage utilizing springs to raise the iron and which are made ineffective when the iron is held down on material on the ironing board or on electric motor means to control operation of the lifting apparatus so that the full weight of the iron is effective when the iron is lowered onto the material. While both types of apparatus function very satisfactorily, it becomes desirable to provide ironing apparatus which is less complicated structurally than the types heretofore known and which is consequently less expensive.

It is accordingly an object of the present invention to provide an iron lifter which retains all of the operating advantages of the prior types mentioned above, which is less complicated and therefore less expensive.

Another object is to provide ironing apparatus which utilizes a fluid pressure responsive device to counterbalance the iron lifting spring and a simple control valve to control fluid pressure acting on the device.

In one desirable construction air is trapped in a pressure responsive device under control of a valve and when trapped is heated by the iron to expand and produce a pressure counteracting the spring effect to allow the full weight of the iron to be effective on the material. In another desirable construction steam generated in a tank on the iron is supplied to the pressure responsive device under control of a three-way valve to actuate the device.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings, in which:

FIG. 1 is a side elevation with parts in section of one form of iron embodying the invention;

FIG. 2 is a view similar to FIG. 1 of an alternative construction; and

FIG. 3 is a partial view similar to FIG. 2 of still another alternative construction.

As shown in FIG. 1 the invention is applied to a conventional steam iron although it could equally well be employed with a dry iron. The iron, as shown, comprises the usual sole plate **10** to which a hood or shell **11** is secured and with a water tank **12** enclosed within the shell. A handle **13** is mounted on the shell and is shaped to be easily grasped by an operator. In this construction, the water tank becomes heated from the heated sole plate and may generate steam used in a steam ironing operation in the usual manner.

According to the present invention, the iron is suspended from a support **14** which may take the form of the linkage shown in my patents referred to above or which may be any desired type of supporting structure whose end moves in a plane generally parallel to and above the ironing surface. As shown, the iron handle is provided

with an upward extension **15** at its forward end to the top of which a lever **16** is pivoted on a horizontal pivot **17**. The free end of the lever carries a spherical ball **18** which is slidably received in a socket **19** on the supporting member **14** so that the iron may be turned and pivoted in a universal manner.

The iron is normally raised relative to the support **14** for which purpose a spring **21** is provided in the extension **15** connected at its upper end to the lever **16** and at its lower end to a fastening pin **22** in the extension. The spring is formed with sufficient strength normally to move the lever **16** to the full line position shown to raise the iron relative to the support to hold the iron spaced above the ironing board. The spring will yield when the iron is moved downwardly to move the lever **16** to the dotted line position shown to move the iron sole plate into ironing contact with material on the ironing board.

In order to overcome the effect of the spring so that the full weight of the iron will be effective during ironing, fluid pressure means are provided to counteract the spring. The fluid pressure means, as shown, comprises a diaphragm **23** mounted above the tank **12** and sealed around its edges to the tank. Air is admitted to the space below the diaphragm through a tubular passage **24** which carries at its upper end a check valve **25** opening inwardly toward the space beneath the diaphragm. The diaphragm is connected to the midpoint of a lever **26** pivoted at **27** to the heel end of the iron handle. The forward end of the lever **26** is pivotally connected to a link **28** whose upper end is connected to the handle **16**, preferably at the same point of connection as the spring **21**.

The check valve **25** is normally held open to vent the space below the diaphragm by an operating member including a lever arm **29** pivoted at **31** to the rear end of the handle and overlying the handle. An extension **32** of the lever arm carries a small pin **33** which engages and opens the check valve. The lever is urged in a clockwise direction, as shown, by a spring **34** so that it will normally hold the check valve open. When the lever **29** is engaged by the hand of an operator and pressed toward the handle the pin **33** will swing away from the check valve and allow it to close.

In use the parts will normally occupy the position shown in full lines in FIG. 1 with the iron being held spaced above the ironing board. For ironing, the operator will grasp the iron handle and press the iron downwardly onto material on the board against the tension of the spring **21**. It will be noted that very little effort is involved in this action since the spring may be made strong enough just to raise the iron. As the iron moves downwardly air at atmospheric pressure and temperature will be drawn past the check valve **25** into the space beneath the diaphragm **23** and will be trapped in the space by closing of the check valve. This air will be heated very rapidly by the heated parts surrounding the diaphragm chamber and will expand to exert an upward force on the lever **26** and link **28** tending to overcome the effect of the spring **21**. The spring therefore becomes ineffective and the full weight of the iron rests on the material so that it may be ironed properly. When the operator releases the iron handle the pin **33** will open the check valve allowing the air trapped beneath the diaphragm to escape so that the spring will raise the iron away from the material.

It may be noted in this connection that the average steam iron weighs approximately four to five pounds when filled with water. The coefficient of expansion of air is about .002 per degree Fahrenheit so that with air at fifteen pounds pressure a temperature rise of 100° will produce a pressure increase of about three pounds per square inch. Therefore, a diaphragm having approximately two

square inches of area will be sufficient to counteract the effect of the spring to permit the full weight of the iron to be effective on the material during the ironing operation. Even with the leverage in the construction, as shown in FIG. 1, a force of nine or ten pounds on the links 28 will be sufficient completely to cancel the effect of the spring and this can be achieved with a diaphragm having an area of four to five square inches which is completely practical.

FIG. 2 illustrates an alternative construction in which the parts of the iron are the same as shown in FIG. 1 and are indicated by the same reference numerals. In this construction, steam generated in the iron is utilized as the pressure fluid for energizing the pressure responsive diaphragm 23 rather than air, the operation and construction being otherwise substantially identical to that of FIG. 1. The steam iron, as shown in FIG. 2, is of the type in which the filling opening to the tank **12** is closed and steam pressure is generated in the tank itself. The steam is released under the control of a valve, not shown, actuated by a finger button 35 on the iron handle when steam is desired to be released onto the material being ironed. The tank may be filled with water through a filling tube 36 which is closed by a closure 37 at the front end of the handle so that pressure may build up in the tank.

In this construction, the space below the diaphragm **23** is connected through a tube 38 to a three-way valve 39 which opens into a steam chamber 41 above and communicating with the tank **12**. In one position of the valve it connects the space below the diaphragm to the steam chamber so that steam pressure will be exerted on the diaphragm to urge it upwardly and in another position thereof the space below the diaphragm will be connected to a vent tube 42 which may discharge steam at any desired location. The valve 39 is controlled by the lever 29 through a link 43 in such a way that when the lever 29 is raised by the spring 34 the space below the diaphragm will be vented to atmosphere and when the lever 29 is moved downwardly against the handle, as shown in FIG. 2, the valve will be turned to connect the steam chamber to the space below the diaphragm.

This embodiment of the invention functions in substantially the same manner as that of FIG. 1 except for the use of steam under pressure instead of heated air. With the iron heated and with steam on the order of five pounds per square inch in the tank and steam chamber whenever the lever 29 is depressed by an operator gripping the handle the steam under pressure will be admitted beneath the diaphragm **23** and will raise it to exert an upward thrust on the link **28** to counteract the effect of the spring 21. At this time, with the spring being ineffective the iron will lower onto the material on the board and the full weight of the iron will be effective for ironing. When the iron handle is released, the lever 29 will move upwardly turning the valve 39 to its vent position thereby releasing the pressure beneath the diaphragm 23 and allowing the spring to raise the iron above the board.

FIG. 3 illustrates application of the invention to a different type of steam iron in which the water tank is at atmospheric pressure at all times and water is discharged therefrom under control of a valve into steaming chambers in the sole plate. Parts in this construction corresponding to like parts in FIGS. 1 and 2 have been indicated by the same reference numerals.

As shown in FIG. 3, the tank **12** is provided with a filling opening 45 which opens at the forward end of the iron and which is at all times open to atmosphere. Water in the tank is discharged in controlled small quantities to the sole plate through a valve 50 which is normally closed and is opened by a control rod **47** which may be operated by a button such as the button **35** shown in FIG. 2. Since the tank **12** is always at atmospheric pressure in this construction a separate steam tank **46** is provided

in the hood 11 and positioned closely adjacent to the sole plate to be heated thereby. The lower part of the tank **12** is connected to the tank 46 through a connection 48 and a check valve shown as a flapper type valve 49 to supply water from the tank **12** to the tank **46** but to prevent steam in the tank **46** from blowing back in the tank **12**. The upper end of the tank **12** is connected to the three way valve 39, as shown.

In operation of this construction when the tank **12** is filled, water will flow therefrom into the tank **46** to the same level. As the iron is heated the water in the tank 46 will be heated to produce steam at a relatively low pressure for example on the order of about five pounds per square inch and the valve 49 will close to prevent this steam from escaping back into the tank **12**. When the valve 39 is in its normal position with the lever **29** released and elevated the space below the diaphragm **23** will be connected through a vent passage **51** to the top of the water tank **12** so that any steam discharged from the space beneath the diaphragm will tend to condense in the tank **12**. When the lever **29** is pressed downwardly against the handle the valve will be turned to a position to connect the upper part of steam tank **46** to the space beneath the diaphragm to exert an upward pressure on the diaphragm tending to lower the iron.

While several embodiments of the invention have been shown and described in detail, it will be understood that they are illustrative only and are not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. An iron lifter comprising, in combination with an iron and a support, means suspending the iron from the support for vertical movement of the iron relative to the support, a spring acting on the suspending means tending to raise the iron relative to the support and exerting a lifting force greater than the weight of the iron, fluid pressure responsive means carried by the iron and connected to the suspending means to oppose the spring in response to fluid pressure, a valve connected to the fluid pressure responsive means to control the pressure therein, and an operating member for the valve mounted on the iron for manipulation by a user of the iron.

2. An iron lifter in combination with a support and an iron having a heated sole plate and a handle connected to the sole plate, the iron lifter comprising means connecting the iron and the support for relative vertical movement, a spring acting on the connecting means urging the iron upward relative to the support and exerting a lifting force greater than the weight of the iron, fluid pressure responsive means mounted adjacent to the sole plate to be heated thereby, the pressure responsive means being adapted to contain an expansible fluid to exert a force when heated, a connection from the connecting means to the pressure responsive means to exert force opposing the spring, a valve connected to the pressure responsive means to control the pressure therein, and an operating member for the valve movably mounted on the handle to be operated by gripping of the handle.

3. An iron lifter in combination with a support and an iron, said iron lifter comprising a lever pivoted at one end on the iron and having means at its other end pivotally to connect it to the support, a spring connected to the lever urging it in a direction to raise the iron with a force greater than the weight of the iron, pressure responsive means mounted on the iron, means connecting the pressure responsive means to the lever to urge the lever in a direction to lower the iron, a valve connected to the pressure responsive means to control the pressure therein, and an operating member for the valve movably mounted on the iron to be operated when the iron is grasped.

4. An iron lifter in combination with a support and an iron having a heated sole plate and a handle connected to the sole plate, the iron lifter comprising means connect-

ing the iron and the support for relative vertical movement, a spring acting on the connecting means urging the iron upward relative to the support and exerting a lifting force greater than the weight of the iron, fluid pressure responsive means mounted adjacent to the sole plate to be heated thereby, means including an inwardly opening check valve connecting the pressure responsive means at atmosphere, a connection from the connecting means to the pressure responsive means to exert a force on the connecting means opposing the spring in response to pressure on the pressure responsive means, and an operating member movably mounted on the handle to open the check valve when the handle is released and to release the check valve when the handle is gripped.

5. An iron lifter in combination with a support and an iron having a heated sole plate and a handle connected to the sole plate, the iron lifter comprising means connecting the iron and the support for relative vertical movement, a spring acting on the connecting means urging the iron upward relative to the support and exerting a lifting force greater than the weight of the iron, fluid pressure responsive means mounted adjacent to the sole plate to be heated thereby, a connection from the pressure responsive means to the connecting means to exert a force thereon opposing the spring in response to pressure on the pressure responsive means, a tank carried by the sole plate to contain steam under pressure, means including a valve to connect the pressure responsive means selectively to the tank or to a point of substantially atmospheric pressure, and operating means for the valve movably mounted on the handle to be operated when the handle is gripped.

6. An iron lifter in combination with a support and an iron having a heated sole plate and a handle connected to the sole plate, the iron lifter comprising a lever pivoted at one end on the iron and formed at its other end for connection to the support, a spring connected to the lever urging it downwardly with a force sufficient to raise the iron, a link connected to the lever, fluid pressure responsive means mounted on the iron adjacent to the sole plate to be heated thereby, means connecting the pressure responsive means to the link to exert a force thereon urging the lever upward, the pressure responsive means being

adapted to contain an expansible fluid to exert a force when heated, a valve connected to the pressure responsive means to control the pressure therein, and an operating member for the valve movably mounted on the handle

7. An iron lifter in combination with a support and an iron having a heated sole plate and a handle connected to the sole plate, the iron lifter comprising a lever pivoted at one end on the iron and formed at its other end for connection to the support, a spring connected to the lever urging it downwardly with a force sufficient to raise the iron, a link connected to the lever, fluid pressure responsive means mounted on the iron adjacent to the sole plate to be heated thereby, means connecting the pressure responsive means to the link to exert a force thereon urging the lever upward, means including an inwardly opening check valve connecting the pressure responsive means to atmosphere, and an operating member movably mounted on the handle and engageable with the check valve to open it.

8. An iron lifter in combination with a support and an iron having a heated sole plate and a handle connected to the sole plate, the iron lifter comprising a lever pivoted at one end on the iron and formed at its other end for connection to the support, a spring connected to the lever urging it downwardly with a force sufficient to raise the iron, a link connected to the lever, fluid pressure responsive means mounted on the iron adjacent to the sole plate to be heated thereby, means connecting the pressure responsive means to the link to exert a force thereon urging the lever upward, a tank carried by the sole plate to contain steam under pressure, means including a valve to connect the pressure responsive means selectively to the tank or to a point of substantially atmospheric pressure, and an operating member for the valve movably mounted on the handle.

References Cited by the Examiner

UNITED STATES PATENTS

2,589,939 3/52 Haver-Kate ---------- 38—30

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