Jan. 23, 1945. E. K. CLARK ET AL 2,367,996

FLATIRON CORD ASSEMBLY

Filed July 10, 1941 2 Sheets-Sheet 1

Fig. 1.

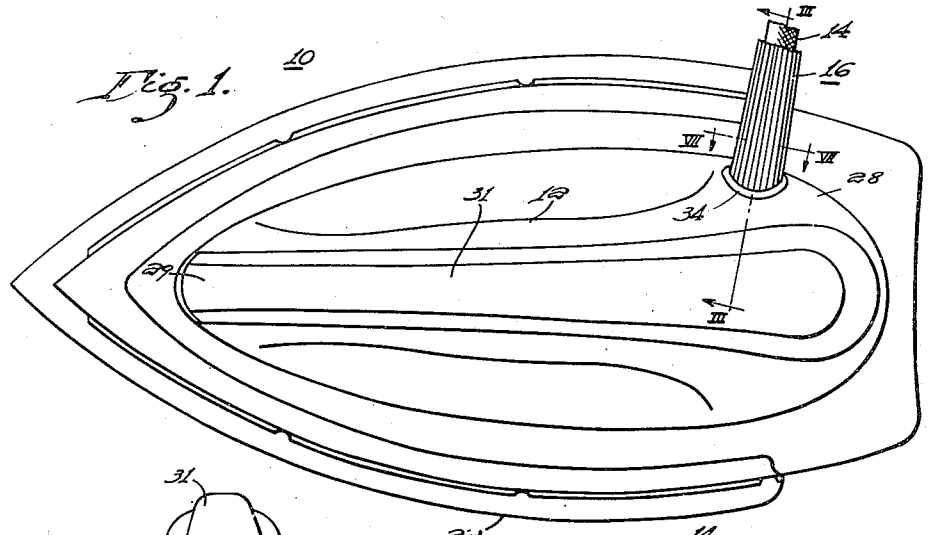
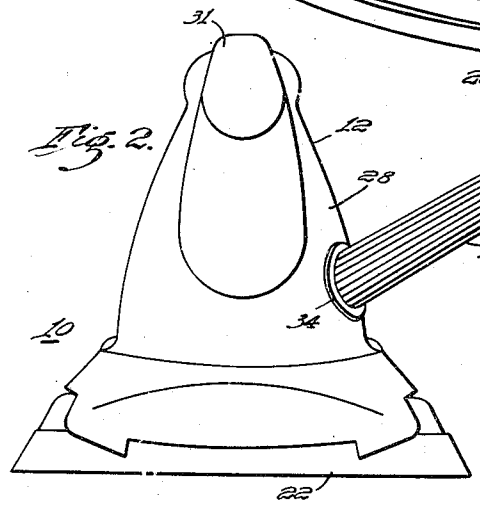


Fig. 2.



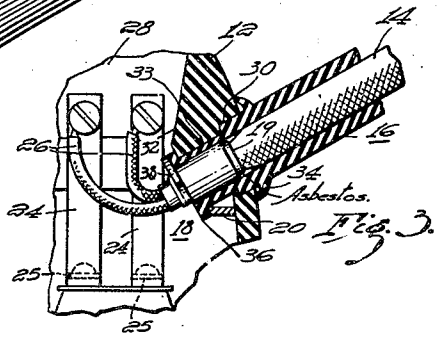


Fig. 3.

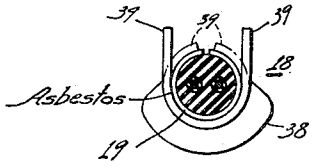


Fig. 4.

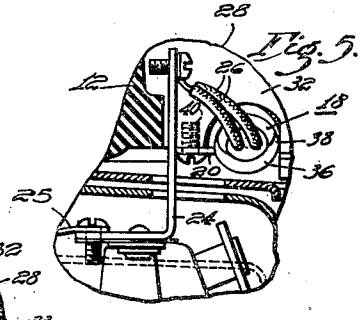


Fig. 5.

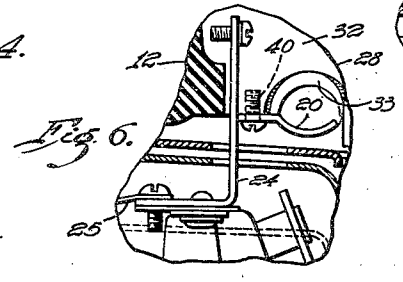


Fig. 6.

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Jan. 23, 1945. E. K. CLARK ET AL 2,367,996

FLATIRON CORD ASSEMBLY

Filed July 10, 1941 2 Sheets-Sheet 2

Fig. 7.

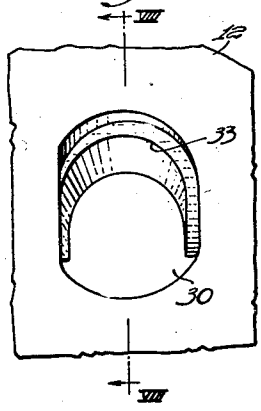
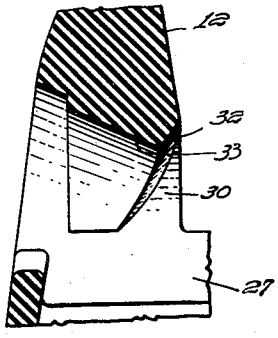


Fig. 8.



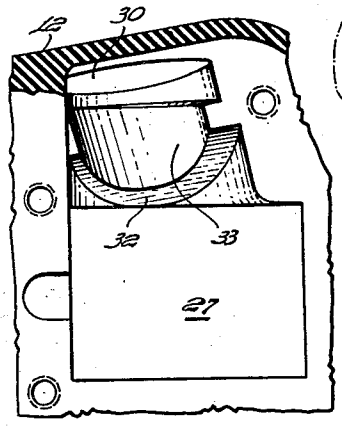


Fig. 9.

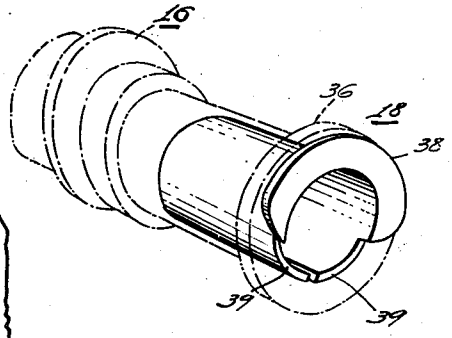


Fig. 10.

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UNITED STATES PATENT OFFICE

2,367,996

FLATIRON CORD ASSEMBLY

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Application July 10, 1941, Serial No. 401,792

5 Claims. (Cl. 173—322)

Our invention relates to flatirons and more particularly to the assembly or attachment of an electrical cord to the handle of flatirons.

With most iron structures now known to the art in which the electrical cord is attached to the handle structure, a strain relief or clamping device is located within the handle for gripping or retaining the cord in engagement with the handle. However, such strain reliefs or clamping devices are usually fixed to the handle in such a way that a workman has great difficulty in assembling them. In addition, most of such devices do not uniformly retain the cord, resulting in concentrated pressures being placed upon the handle, which will normally withstand only a low limit of pressure without injuring either the cord or the handle.

In contrast with such structures, which will withstand only a relatively small strain by the cord without damaging either the cord or the handle, we disclose a strain relief arrangement which will permit a definite large amount of strain or pull by the cord without damaging either the cord or the handle.

It is therefore an object of our invention to provide a strain relief mechanism for a flatiron electrical conductor which is simple and dependable, easily assembled, and which withstands a relatively large pressure or pull by the conductor without injuring said conductor or handle.

A further object of our invention is to provide a flexible sleeve which fits over the conductor and which engages the inner surface of the handle structure for preventing the removal of said sleeve and electric cord from said handle.

Another object of our invention is to provide a strain relief mechanism embodying a clamping device which is attached to the inner end of the electric cord and which cooperates with the inner surface of the handle to limit the outward movement of the cord and evenly distribute the pull on the cord so as to prevent any injury to the cord or handle.

Still a further object of our invention is to provide a strain relief mechanism for an electric iron cord which utilizes the inner end of a flexible sleeve, through the cooperation of a clamping device attached to the cord and a retaining clamp attached to the handle, for preventing the withdrawal of the cord without injuring the cord or handle.

Other objects of our invention will either be pointed out specifically in the course of the following description of a device embodying our invention, or will be apparent from such description.

In the accompanying drawings:

Figures 1 and 2 are, respectively, a top view and a rear elevational view of a flatiron embodying our invention;

Fig. 3 is a fragmentary sectional view taken along the lines III—III of Fig. 1;

Fig. 4 is an end view of the clamping device shown in Fig. 3;

Fig. 5 is a partial longitudinal sectional view illustrating the mechanism shown in Fig. 3;

Fig. 6 is a view similar to Fig. 5 with a portion of the mechanism removed;

Fig. 7 is a fragmentary side view of the iron handle illustrating the aperture passing therethrough, the plane being indicated by the line VIII—VIII in Fig. 1;

Fig. 8 is a sectional view taken along the line VIII—VIII of Fig. 7;

Fig. 9 is a fragmentary bottom view of the iron handle illustrating the depending boss which extends into the aperture passing through the handle; and

Fig. 10 is a perspective view of the member shown in Fig. 4 associated with the flexible cord sleeve.

Referring to the accompanying drawings, in which like reference characters indicate like parts in the several figures, we show a flatiron 10 having a handle structure 12 into which an electrical cord 14 and a flexible sleeve 16 extend. A clamping device 18 is attached to an inner portion of cord 14 for cooperating with the sleeve 16 to prevent the removal of the cord from said sleeve, while a strap-like clamp 20 is rigidly attached to the handle 12 to attach the sleeve 16 and cord 14 thereto.

The iron structure 10 comprises, in this instance, a sole-plate 22, a handle structure 12 rigidly attached thereto, a heating element 25 (Figs. 5 and 6) thermally associated with the sole plate 22 having suitable upstanding terminal straps 24 associated therewith for receiving the inner ends of conductors 26 which, in turn, are located within the electric cord 14 in a well known manner. A detailed description and operation of the iron structure 10 are not given herein, inasmuch as any suitable iron may be used in lieu thereof. However, the specific iron illustrated in Figs. 1 and 2 is more fully described in copending applications Serial No. 384,918, filed March 24, 1941, and Serial No. 384,919, filed March 24, 1941, issued as Patent No. 2,333,521 on November 2, 1943, assigned to the assignee of this application.

The handle 12 has a symmetrically curved depending rear portion 28, and front portion 29, with a horizontally gripping section 31 joining the upper ends of said portions, although any desired shape of handle may be employed. The rear depending portion 28 of the handle structure 12 has an opening therein for receiving the terminal straps 24 of the heating element 25 and to permit the electrical conductors 26 of cord 14 and the clamping mechanism therefor, hereinafter described, to be located therein. A suitable cord and sleeve receiving aperture 30 passes through the side of the depending portion 28 and handle 12 into a centrally located opening 27 therein to permit the conductor 14 and flexible sleeve 16 to pass therethrough. The axis of this aperture determines the slope and position of cord 14 with respect to the handle 12. The aperture 30 is substantially circular in shape, and is completely circumscribed by integral portions of the wall formed by the depending portion 28. A downwardly projecting substantially semicircular cord and sleeve locating boss 33 extends into the aperture 30. The boss 33 is increasingly wider from each end to the central portion thereof. Said boss 33 provides an inner shoulder 32 which, in combination with the boss itself, receives the sleeve 16 and clamping device 18 for retaining them in a fixed position, as hereinafter described.

The electrical cord 14 is an ordinary insulated two-conductor flexible cord generally used with an electric iron, or the like. Located within the cord are two suitable insulated conductors 26 which, as hereinabove described, are attached to suitable heating element terminals 24 to convey electric power to the iron heating element 25, a portion of which is shown in Figs. 5 and 6. The electric cord in this instance is adapted to pass through the aperture 30 in handle 12 into the opening 27 in the depending portion 28 thereof.

The flexible sleeve 16 is an elongated member for retaining the electric cord 14 as it passes through the handle 12. The sleeve 16 is preferably formed of fluted rubber and has an outwardly extending dish-shaped flange 34 located intermediate the ends thereof, and a suitable end finishing flange 35 at the outer end thereof. The flange 34 has a shape so as to fit tightly against the outer surface of the depending portion 28 of handle 12 when the sleeve is retained in its normal position with respect thereto, as illustrated in Figs. 1, 2 and 3. A radially extending flange or lip 36, thinner and more flexible than flange 34, is located at substantially the inner end of the sleeve 16 for cooperating with the shoulder 32 of boss 33 which extends into aperture 30.

If it be desired, the sleeve 16 may be formed in a composite manner, the outer end portion including flange 34, being formed of rubber, for example, which has a greater degree of flexibility than the inner end portion of the sleeve 16. The inner end portion of the sleeve 16 may be formed of a less flexible material such as rubber impregnated fabric, if it be desired. Such inner portion of lower flexibility than the outer portion of sleeve 16 may extend into the outer portion for the purpose set forth. However, it is to be understood that the sleeve 16 may be formed of any suitable material and may be of uniform flexibility.

The sleeve 16 has an elongated aperture passing therethrough which is of such character as to permit the cord 14 to easily fit therethrough. The inner end of the sleeve 16 has substantially the same exterior diameter as the aperture 30 in handle 12, whereby the sleeve 16 may be easily positioned within said aperture, it being understood that the relatively thin flange or lip 36 on the inner end of the sleeve 16 must be momentarily flattened out or partially distorted to permit the sleeve to be positioned within the aperture 30. The clamping device 18 is not within the sleeve 16 during such insertion of the thin flange 36 through the aperture 30. Said flange 36 will then be in contact with the shoulder 32 of boss 33 to act as a resilient buffer intermediate the clamping device 18 and handle 12. The intermediate flange 34 will then engage and fit tightly against the outer surface of the handle 12.

The clamping device 18 initially comprises, in this instance, a U-shaped channel-like member having upper ends 39 and an outwardly extending substantially semicircular flange or shoulder portion 38 located at one end. The clamping member being initially U-shaped, may then be positioned about the cord 14 permitting the upper ends 39 of the U-shaped structure to be bent or formed about the cord 14 and pressed tightly thereagainst so as to rigidly attach the clamping device 18 thereto. When the device is rigidly attached to the cord 14, said device becomes substantially cylindrical in shape with a radially extending substantially semicircular flange 38 located at the inner end thereof. The clamping device 18 may be insulated from the cord 14 by means of an asbestos-like sleeve 19 which functions as a cushion preventing any injury to the cord as the clamping device is rigidly attached thereto (see Figs. 3 and 5).

A strap-like clamp 20 is rigidly attached to the handle 12 by means of, say, a suitable screw 40. The clamp 20, when rigidly attached to the handle 12, engages the lower portion of the inner end of sleeve 16 and, in this instance, rests against the inner surface of the handle 12 (see Fig. 3) so as to rigidly attach the sleeve 16 and cord 14 to the handle and prevent any outward movement of the cord or sleeve.

When assembling the strain relief mechanism embodying our invention with an iron structure, the cord 14 is first passed through the sleeve 16 and the clamping device 18 is placed on the inner end of the cord, it being understood that these are independent operations which may be done away from the handle structure. It will be understood that the clamping device 18 is not within the sleeve 16 at this time but is separated therefrom. The end portion of the cord 14, having the clamping device 18 attached thereto, is then passed inwardly through the aperture 30 in the iron handle 12, it being understood that the semicircular flange 38 of clamping device 18, when rotated out of registry with the boss 33, may be passed through the aperture. The inner end portion of the sleeve 16 is then inserted, the relatively thin flange or lip 36 on the inner end of the sleeve being momentarily flattened out or partially distorted to permit the same to pass through the aperture 30. The sleeve 16 is then positioned so that the inner flange 36 will rest against shoulder 32 of the boss 33. The inner end of the cord 14 is then pulled in an outwardly direction the cylindrical portion of the clamping device 18 is inserted within the sleeve and the flange 38 of clamping device 18 is tightly drawn against the inner flange or lip 36 of sleeve 16 and in line with the shoulder 32 of boss 33,

as shown in Fig. 3. The rigid clamping device 18 now inserted within the sleeve prevents collapsing of the inner end portion of the sleeve and thereby makes it possible for the shoulder 32 and the clamp 20 to retain the flange 36 and prevent withdrawal of the sleeve 16 from the aperture.

Inasmuch as flange 36 of sleeve 16 is in juxtaposition with the shoulder 32 of handle 12 and intermediate the flange 38 of clamping device 18 and said surface, it follows that the outward movement of the cord 14 is limited and any and all pull or force exerted by the cord 14 upon the handle 12 is transmitted through the resilient flexible flange 36 of sleeve 16. It is, therefore, obvious that the resilient action of flange 36 prevents any harmful or injurious results to the handle 12 during the normal operation thereof.

The strap-like clamp 20 is then rigidly attached to the handle 12 by means of screw 40 retaining the sleeve 16 and clamping device 18 in a fixed position. The clamp 20 also engages the lower portion of the resilient flange 36 of sleeve 16. The clamp 20 thus holds the cord 14 and sleeve 16 in place and prevents any longitudinal movements thereof relative to the handle 12. In addition, the clamp 20 being attached to the handle 12 and engaging, in this instance, both the resilient flange 36 and the inner surface of the handle 12 provides a strain-receiving structure which further distributes any jerk or pull on the cord 14 to the handle 12, thus further preventing the formation of any concentrated pressure point that receives the entire force upon the cord 14. This structure thus provides means for uniformly distributing the force upon the cord 14 to the handle structure 12, preventing any injurious action to either the cord 14 or handle 12.

Various modifications may be made in the device embodying our invention without departing from the spirit and scope thereof, and we desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and the appended claims.

We claim as our invention:

1. In combination, a handle having an aperture therein, an electrical cord passing into said handle through said aperture, a flexible sleeve for fitting about the cord and passing into said aperture, a dish-shaped flange located intermediate the ends of the sleeve extending outwardly therefrom and inwardly toward the handle for fitting tightly against the handle, an outwardly extending flange positioned at the inner end of the sleeve, said sleeve having a portion located at the inner end thereof of less thickness than that portion of the sleeve positioned just outside the handle for enabling said portion and inner flange to be easily passed through the aperture in the handle, a clamping device having an exterior diameter of such size that it will fit into the inner portion of the sleeve, said device having an outwardly extending flange about its inner end which normally engages the inner flange of the sleeve which provides a resilient buffer-like member intermediate the clamping device and handle for preventing injury of the handle, and a strap-like clamp rigidly attached to the handle and engaging the inner portion of the sleeve radially in line with the cord clamping device for rigidly attaching the sleeve and electrical cord to the handle structure.

2. In a strain relief construction, the combination of a wall having an aperture extending therethrough, a sleeve of flexible material extending through said aperture and having a flange at its inner end, said wall having a shoulder along one side of said aperture engaging said flange for a portion only of its circumference to prevent withdrawal of said sleeve through said aperture, an electrical cord comprising one or more conductors and extending through said sleeve, a clamping device including a tubular part clamped to said cord and a flange extending only partially about said cord, said sleeve, said conductor and said clamping device being adapted to be inserted through said aperture in said wall, the clamping device being rotated to bring its flange out of registry with said shoulder while it passes through said aperture and being then rotated into registry with said aperture, and means retaining said sleeve against the side of said aperture having said shoulder to retain the assembly in such position that strain or tension imposed on the cord is transmitted through the flange of said clamping device and the flange of said sleeve to said shoulder.

3. In a strain relief construction, the combination of a wall having an aperture extending therethrough, a sleeve of flexible material extending through said aperture and having a flange at its inner end, an electrical cord comprising one or more conductors extending through said sleeve, a clamping device including a tubular part clamped to said cord and a flange extending only partially about said cord, said conductor and said clamping device being adapted to be inserted through said aperture in said wall, the inner end portion of said sleeve being adapted to be inserted through said aperture by temporarily flattening or partially distorting said flange, the flange of said clamping device bearing against an adjacent portion of the flange of said sleeve, and said adjacent portion of the flange of said sleeve bearing against said wall on one side of said aperture, and means retaining said sleeve against said one side of said aperture to retain the assembly in such position that tension imposed on the cord is transmitted through the flange of said clamping device and the flange of said sleeve to said wall.

4. In a strain relief construction, the combination of a wall adapted to form part of the enclosure of an interior space, said wall having an opening extending therethrough and completely circumscribed by integral portions of the wall, an electrical cord passing through said opening and having its inner end within said space, a flexible sleeve fitting about the cord and having its inner end portion passing through said opening, said sleeve having a flange at its inner end extending radially outwardly, opposed parts engaging said flange and the adjacent portion of the sleeve for preventing withdrawal of the inner end portion of the sleeve from the opening, and a clamping device including a tubular part clamped to the cord and a flange extending radially outwardly at least partly about the tubular part of its inner end, said tubular part of the clamping device being inserted within said inner end portion of the sleeve to pevent collapsing thereof and said flange of the clamping device bearing against the flange of the sleeve, said clamping device and the inner end portion of said sleeve being adapted to be inserted through said opening while separated from each other and the tubular part of said clamping device being then insertable into the inner end portion of said sleeve by drawing the cord outwardly.

5. In a strain relief construction, the combination of a wall adapted to form part of the en-

closure of an interior space, said wall having an opening extending therethrough and completely circumscribed by integral portions of the wall, an electrical cord passing through said opening and having its inner end within said space, a flexible sleeve fitting about the cord and having its inner end portion passing through said opening, said sleeve having a flange at its inner end extending radially outwardly, opposed parts engaging said flange and the adjacent portion of the sleeve for preventing withdrawal of the inner end portion of the sleeve from the opening, and a clamping device including a tubular part clamped to the cord and a flange extending radially outwardly at least partly about the tubular part at its inner end, said tubular part of the clamping device being inserted within said inner end portion of the sleeve; said flange of the clamping device and the inner end portion of said electrical cord being adapted to be inserted through said opening, and said inner end portion of said sleeve being adapted to be inserted by temporarily flattening or partially distorting the flange at the inner end of the sleeve.

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JOSEPH R. HEILMAN.

CERTIFICATE OF CORRECTION.

Patent No. 2,367,996. January 23, 1945.

EARL K. CLARK, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 71, after the word "direction" insert --whereby--; page 3, second column, line 62, claim 4, for "part of" read --part at--; line 65, same claim, for "pevent" read --prevent--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of May, A. D. 1945.

Leslie Frazer

(Seal) Acting Commissioner of Patents.