

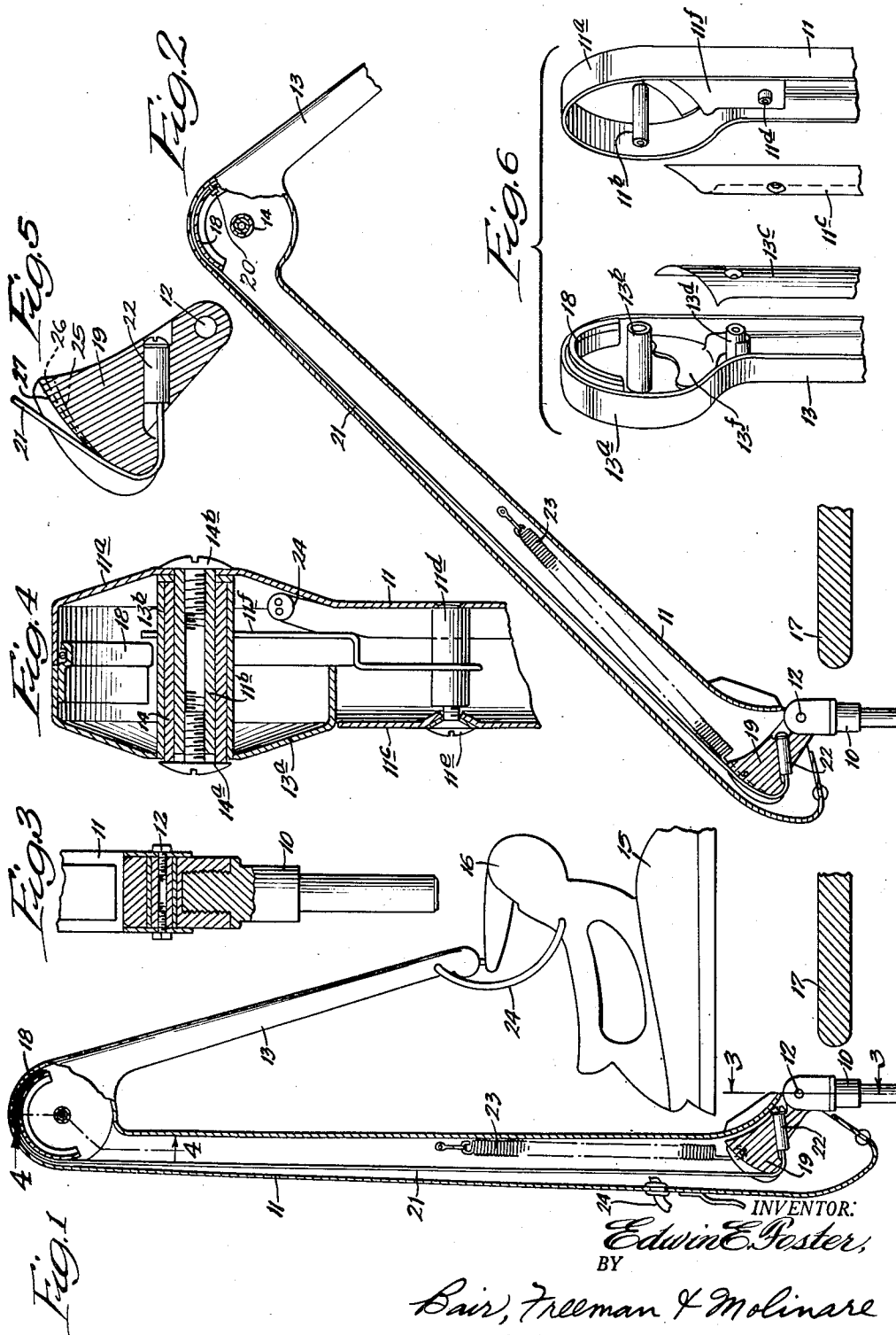
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JOINTED SUPPORTING ARMS FOR FLATIRONS

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JOINTED SUPPORTING ARMS FOR FLATIRONS

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This invention relates to jointed supporting arms for flatirons and more particularly to a linkage from which a flatiron may be supported for movement in a horizontal plane parallel to an ironing board.

In my copending application Serial No. 220,956 filed April 13, 1951, now Patent No. 2,648,146, issued Aug. 11, 1953, there is disclosed and claimed a supporting linkage of the type to which the present invention relates in which movement of the free end of the second or forearm in a horizontal plane is controlled by a tension element passing over cam members secured to the primary support and to the forearm. As disclosed in said application, the cam surfaces should theoretically be shaped according to certain mathematical functions, although for many relative lengths of the arms, arcuate cams may be employed as a practical matter.

Practical experience has demonstrated that arcuate cams are not fully satisfactory in all cases, particularly where a relatively heavy iron is employed with relatively long arms to provide a large extent of movement. This is due in part to emphasizing the theoretical error when long arms movable through large angles are employed and in large part to yielding of the arms and tension elements when the arms are extended. It is further desirable to avoid complex cam shapes as much as possible to simplify formation of the cams and to minimize errors which might arise to slight inaccuracies in mounting.

It is one of the objects of the present invention to provide jointed supporting arms for flatirons in which the error due to yielding of the arms and tension element is fully compensated so that the iron travels in a true horizontal plane.

According to one feature of the invention, at least one of the cam surfaces is a spiral whose rate of rise is greater than that theoretically required to guide the iron in a horizontal plane thereby to compensate for yielding of the arms and tension elements.

Another object is to provide jointed supporting arms in which one cam member is formed with an arcuate surface which is easy and inexpensive to mount and the other cam member is formed with a spiral surface. In the preferred construction, a relatively small cam having an arcuate surface is carried by the forearm and a larger cam having a spiral surface is carried by the main support.

A further object is to provide a simplified construction of the arms and the pivotal connection between them and to guard the electric cord against pinching or damage in the joint.

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

Figure 1 is a side elevation with parts in section of jointed supporting arms embodying the invention;

Figure 2 is a figure similar to Figure 1, showing the arms in an extended position;

Figure 3 is a partial section on the line 3—3 of Figure 1;

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Figure 4 is a section on the line 4—4 of Figure 1;

Figure 5 is a section through the lower cam member showing development of the spiral surface; and

Figure 6 is a partial disassembled view showing the pivot joint between the arms.

The supporting arms as shown are adapted to be carried by a main supporting post 10 which may be mounted in a vertical socket for turning movement about a vertical axis. At its upper end the post 10 has pivoted thereto a main arm 11 which is preferably a hollow tube formed of sheet metal. The arm 11 is adapted to swing about a horizontal axis 12 at the top of the support 10.

As best seen in Figure 6, the arm 11 is of channel section with an enlarged end 11a circular in outline. A tubular pin 11b is rigidly secured to the end portion 11a and extends axially therefrom to form a part of a pivot connection between the arms. The arm is completed by a cover portion 11c secured to the main arm 11 by means of a tapped stud 11d welded or riveted to the main arm and receiving a screw 11e which extends through an opening in the cover portion. The stud 11d also carries a wire guard plate 11f which extends up into the enlarged end 11a. The upper end of the cover portion 11c terminates in an arc forming a continuation of the circular outline of the enlarged end 11a.

A forearm 13 is similarly channel shaped with an enlarged circular end 13a of the same diameter as the end 11a. A sleeve 13b projects axially from the end 13a and is of a size to fit over the pin 11b with a tubular bearing element 14 between them. The arm 13 is completed by a cover portion 13c secured to the main arm by a tapped stud 13d welded or riveted to the main arm and receiving a screw similar to the screw 11e. The stud 13d supports a wire guard plate 13f which extends up into the enlarged end 13a.

The two arms are pivotally connected by placing them face to face, as shown in Figure 4, with the sleeve 13b fitting over the pin 11b. A screw 14a may be threaded into the pin 11b with its head engaging the sleeve 13b to hold the parts assembled and a screw 14b may be threaded into the other end of the pin for symmetry.

When the parts are so assembled, the edges of the enlarged end portions 11a and 13a will fit closely together and the upper edge of each cover portion 11c or 13c will lie closely against the enlarged end portion of the other arm. Thus a smooth external surface will be provided and the arms will be connected for free pivoting about the common axes of pin 11b and sleeve 13b.

At its outer end the arm 13 is adapted to support a flatiron 15 through a linkage indicated generally at 16. The linkage 16 may be constructed as more particularly described and claimed in my Patent No. 2,555,639 for movement vertically into and out of engagement with articles on an ironing board shown at 17. As explained in my said patent, the upper end of the linkage 17 may be connected to the free end of the arm 13 through a ball and socket joint so that the iron may be turned freely to any desired position and may be moved downward to engage articles on the ironing board or released to be raised above the ironing board, as shown.

To guide the arms so that the free end of the arm 13 will move in a plane above and parallel to the ironing board, cam members connected by a tension element are provided. As shown, the forearm 13 carries a cam segment 18 in the form of a partially cylindrical sheet metal strip secured in the enlarged end 13a and formed with a groove to receive the tension element. A second cam segment 19 is fixed to the supporting post 10 and extends therefrom, as shown. A tension element 21 which may be a cable or the like extends over and in engagement with the outer curved surface of the cam segment.

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and the groove in member 18 and is secured against longitudinal movement relative thereto. For this purpose one end of the cable may be directly secured to the cam member 18 by any desired type of fastening such as a screw 20, while the opposite end of the cable is connected to an adjustable anchor member 22 carried by the cam member 19 so that the length of the cable can be adjusted as required.

The weight of the arms is counterbalanced by a tension spring 23 mounted in the hollow arm 11 anchored at one end to the arm and at its other end to the cam member 19. This spring will counterbalance the weight of the arms so that they will tend to remain in any position in which they are placed or it may actually have sufficient tension to urge the arms to an upright position, as shown in Figure 1, if desired. Heating current is supplied to the iron through a cord 24 which extends through the hollow arms 11 and 13 and is connected to the iron.

The cord 24 at the joint between the arms passes up the arm 11 between the surface of the main part of the arm and the guard plate 11f, as shown in Figure 4. Within the enlarged end portions of the arms the cord may loop loosely around the sleeve 13b and may enter the arm 13 between the main part of the arm and the guard plate 13f. The guard plates prevent any tangling or pinching of the cord during pivoting of the arms and looping of the cord around the pivotal connection enables it to follow pivoting of the arms without binding.

The surfaces of the cam members 18 and 19 must be so shaped that when the arms are swung to an extended position, as shown in Figure 2, the free end of the forearm 13 from which the iron is suspended will move in a horizontal plane parallel to the ironing board. As explained in my copending application No. 220,956, this theoretically requires a complex cam surface although for many proportions of the arm lengths arcuate cam surfaces may serve satisfactorily. It has been found however, that even when the cam surfaces are formed according to theoretically correct configuration, the arms and the iron tend to sag as the arms are extended due to yielding of the arms themselves and of the tension element due to the relatively heavy load placed thereon. It has also been found that cams having a complex configuration are undesirable due partially to the difficulty of forming the cams and partially to the fact that unless the cams are accurately mounted, errors in the movement will be introduced.

According to the present invention, these difficulties are overcome by making the cam member 18 with an arcuate surface concentric with the axis of the pin 11b and sleeve 13b. This cam member can thus be easily and inexpensively formed and can be easily and accurately mounted on the enlarged end 13a of the arm 13.

The cam member 19 on the other hand, is formed with a spiral surface to provide an increasing radius between the pivot axis 12 and the point of tangency of the cable 21 with the cam surface as the arms are extended. As shown in Figure 5, a true arcuate line about the pivot axis 12 is indicated at 25. A theoretically correct spiral surface for cooperation with the circular cam member 18 is indicated by the dotted line 26, which coincides with the arcuate line 25 at the point of tangency when the arms are in their contracted or vertical position as shown in Figure 1 and increases beyond the arcuate line towards its opposite end. If the cam 19 were given a surface such as shown at 26, the iron would theoretically move in a true horizontal plane but in practice would sag as the arms are extended due to yielding of the parts. The actual surface of the cam member 19 is therefore further built up as shown at 27 to a spiral having a greater rate of rise than the spiral 26. This spiral surface 27 not only provides the correct theoretical movement of the arms, but further compensates fully for sagging of the arms and the iron due to yielding of

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the arms and tension element. Therefore, with the cam member 19 formed as shown, the free end of the arm 13 will travel in a true horizontal plane parallel to the ironing board 17.

Since the cam member 19 can be given a true spiral surface, it is relatively simple to manufacture and can be mounted on the fixed supporting post 10 easily and with sufficient accuracy to produce the desired horizontal movement. Therefore, with a relatively simple and inexpensive construction a true horizontal movement of the iron is produced to produce the desired operating effects under all conditions.

While one embodiment of the invention has been shown and described in detail it will be understood that this is for the purpose of illustration only and is 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. Jointed supporting arms for a flatiron comprising a support fixed against vertical movement, a first arm pivoted on the support on a horizontal axis, a second arm pivoted to the free end of the first arm on a horizontal axis, a first cam member fixed to the support adjacent to the pivot for the first arm and having a curved outer surface, a second cam member fixed to the second arm adjacent to its pivotal connection to the first arm and having a curved outer surface, and a flexible tension element passing over and engaging the curved outer surfaces and secured at its ends in the support and the second arm against longitudinal movement relative thereto, there being a theoretical shape for the cams which would cause the free end of the second arm to move in a horizontal plane as the arms pivot relative to each other if the parts were weightless, the arms and tension elements yielding in response to their own weight and the weight of an iron suspended on the second arm and at least one of the cam surfaces being non-circular and having a greater rate of rise than the theoretical cam shape thereby to compensate for yielding of the arms and the tension element.

2. Jointed supporting arms for a flatiron comprising a support fixed against vertical movement, a first arm pivoted on the support on a horizontal axis, a second arm pivoted to the free end of the first arm on a horizontal axis, a first cam member fixed to the support adjacent to the pivot for the first arm and having a curved outer surface, a second cam member fixed to the second arm adjacent to its pivotal connection to the first arm and having a curved outer surface, and a flexible tension element passing over and engaging the curved outer surfaces and secured at its ends in the support and the second arm against longitudinal movement relative thereto, the arms and tension elements yielding in response to their own weight and the weight of an iron suspended on the second arm, one of the cam surfaces curving arcuately about the adjacent pivotal connection and the other curving spirally about its adjacent pivotal connection to provide an increasing radius to the point of tangency of the tension element therewith as the arms swing away from each other to guide the free end of the second arm in a horizontal plane, there being a theoretical rate of rise for said other cam surface which would guide the free end of the second arm in a horizontal plane if the parts were weightless, and the actual rate of rise of the spiral of said other cam surface being greater than the theoretical rate of rise thereby to compensate for yielding of the arms and tension element.

3. Jointed supporting arms for a flatiron comprising a support fixed against vertical movement, a first tubular arm pivoted on the support on a horizontal axis and terminating at its free end in an enlarged open cup-shaped end, a second tubular arm having an enlarged cup-shaped end fitting in face-to-face relationship with the enlarged end of the first arm to define therewith a hollow joint housing, telescopically interfitting pin and sleeve members within the joint housing secured to the enlarged ends re-

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spectively and forming a pivot connection between the arms, a partially cylindrical cam element of sheet material secured to the inner peripheral wall of the enlarged end of the second arm, a cam member fixedly secured to the support, and a tension element passing over and engaging the cam members and secured at its ends to the support and the second arm against longitudinal movement relative thereto.

4. Jointed supporting arms for a flatiron comprising a support fixed against vertical movement, a first tubular arm pivoted on the support on a horizontal axis and terminating at its free end in an enlarged open cup-shaped end, a second tubular arm having an enlarged cup-shaped end having an end wall and an axially extending side wall fitting in face-to-face relationship with the enlarged end of the first arm to define therewith a hollow joint housing, telescopically interfitting pin and sleeve members within the joint housing secured to the enlarged ends respectively and forming a pivot connection between the arms, a cam member secured to the support and having a curved outer surface, a cam member in the joint housing secured to the second arm and having a curved outer surface, a flexible tension element passing over and engaging the outer surfaces of the cam members and secured in the second arm and the support against longitudinal movement relative thereto, and a guard plate in each of the arms spaced from the end wall thereof and extending into the joint housing to provide space for an electric cord between the end walls of the arms and the respective guard plates.

5. Jointed supporting arms for a flatiron comprising a support fixed against vertical movement, a first arm pivoted on the support on a horizontal axis, a second arm pivoted to the free end of the first arm on a horizontal axis, each of the arms being formed of a channel shaped strip of sheet material with an enlarged end of circular outline and a cover strip fitting over the channel shaped strip and terminating in a continuation of the circular outline of the end, the ends of the strips fitting together face-to-face with the end of the cover strip of each arm lying adjacent to the enlarged end of the other arm, telescopically interfitting pin and sleeve members secured to the arms respectively within the enlarged ends thereof defining the pivotal connection between the arms, cam members having curved outer surfaces secured in the enlarged end of the second arm and to the support respectively, and a tension element passing over and engaging the curved outer surfaces of the cam members and secured in the second arm and the support against longitudinal movement relative thereto.

6. Jointed supporting arms for a flatiron comprising a support fixed against vertical movement, a first arm pivoted on the support on a horizontal axis, a second arm

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pivoted to the free end of the first arm on a horizontal axis, each of the arms being formed of a channel shaped strip of sheet material with an enlarged end of circular outline and a cover strip fitting over the channel shaped strip and terminating in a continuation of the circular outline of the end, the ends of the strips fitting together face-to-face with the end of the cover strip of each arm lying adjacent to the enlarged end of the other arm, telescopically interfitting pin and sleeve members secured to the arms respectively within the enlarged ends thereof defining the pivotal connection between the arms, a partially cylindrical strip of sheet material secured in the enlarged end of the second arm and having a curved cam groove therein, a cam secured to the support and having a curved outer surface, and a tension element engaging the cam groove and surface and secured in the second arm and the support against longitudinal movement relative thereto.

7. Jointed supporting arms for a flatiron comprising a support fixed against vertical movement, a first arm pivoted on the support on a horizontal axis, a second arm pivoted to the free end of the first arm on a horizontal axis, each of the arms being formed of a channel shaped strip of sheet material with an enlarged end of circular outline and a cover strip fitting over the channel shaped strip and terminating in a continuation of the circular outline of the end, the ends of the strips fitting together face-to-face with the end of the cover strip of each arm lying adjacent to the enlarged end of the other arm, telescopically interfitting pin and sleeve members secured to the arms respectively within the enlarged ends thereof defining the pivotal connection between the arms, a partially cylindrical strip of sheet material secured in the enlarged end of the second arm and having a curved cam groove therein, a cam secured to the support and having a curved outer surface, a tension element engaging the cam groove and surface and secured in the second arm and the support against longitudinal movement relative thereto, a guard plate in each of the arms spaced from the base of the channel shaped strip and extending into the enlarged end to provide space for an electric cord between the bases of the channel shaped strips and the respective guard plates.

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