Oct. 3, 1933. J. BODA 1,929,012

HAIR CURLER

Filed Aug. 27, 1930 2 Sheets-Sheet 1

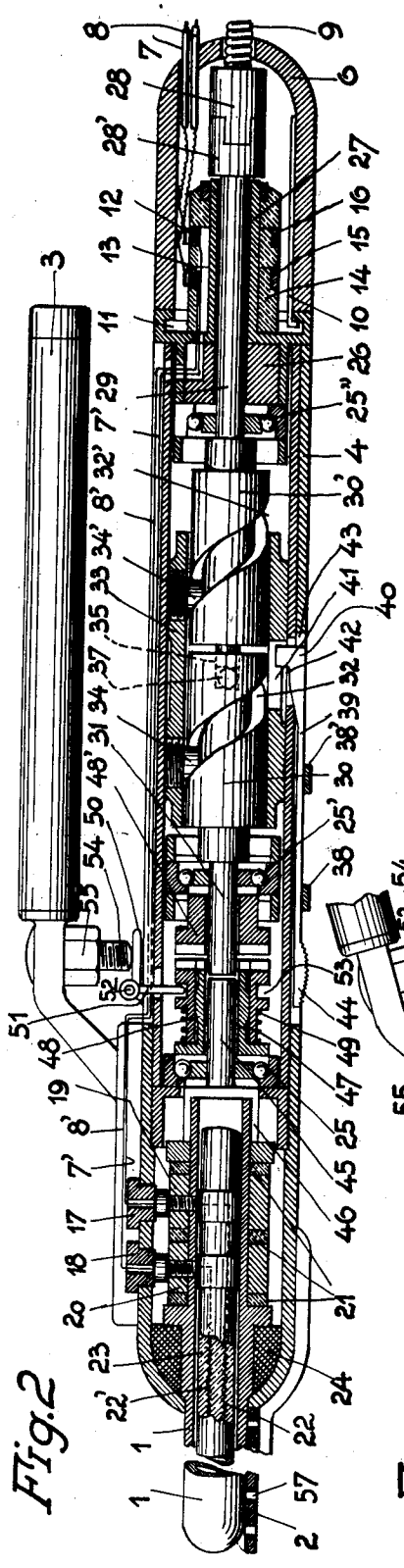


Fig. 2

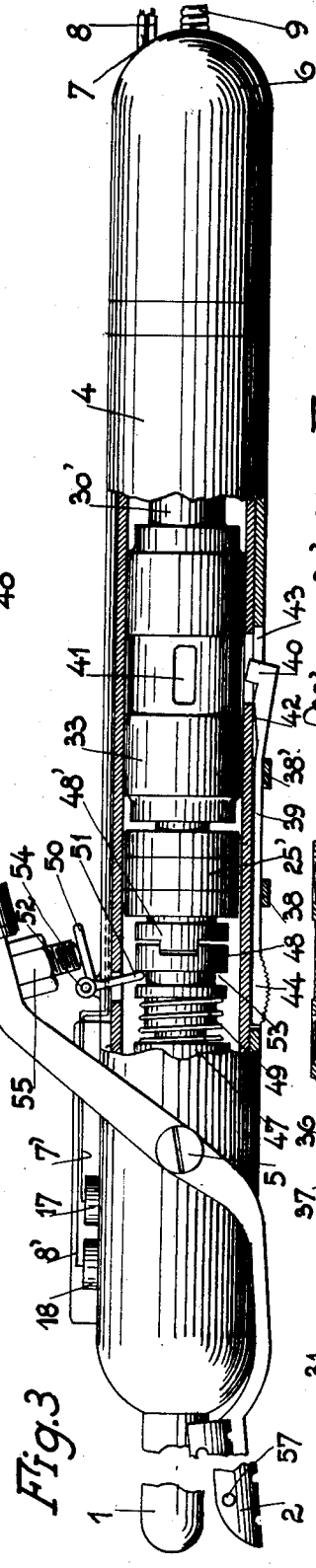


Fig. 3

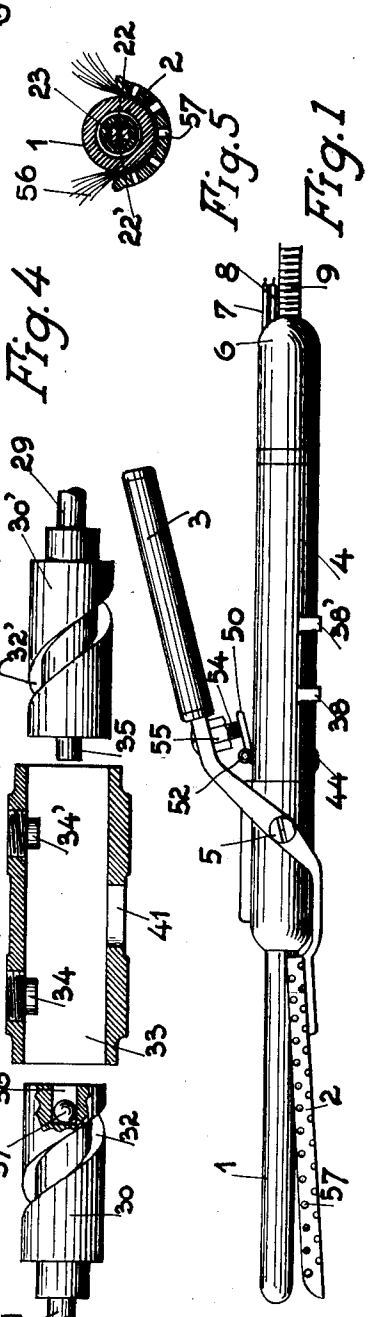


Fig. 4

Fig. 5

Fig. 1

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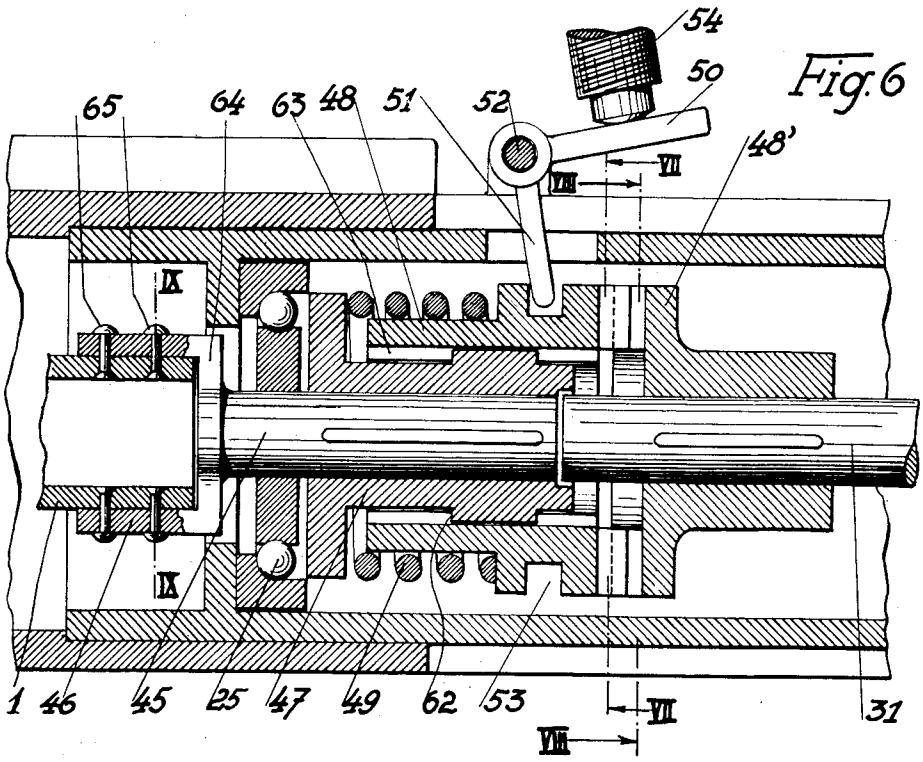


Fig. 6

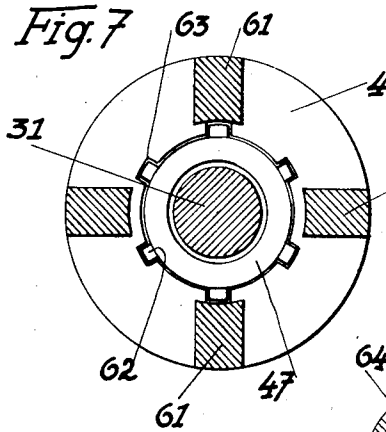


Fig. 7

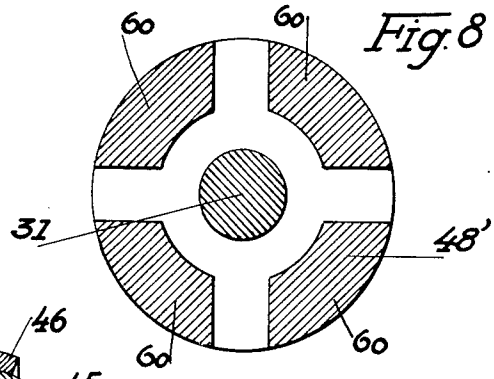


Fig. 8

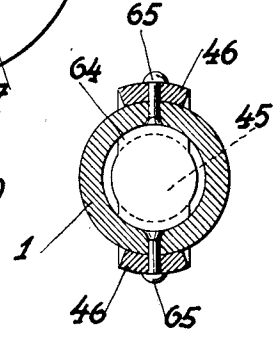


Fig. 9

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UNITED STATES PATENT OFFICE

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HAIR CURLER

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14 Claims. (Cl. 132—32)

My invention relates to hair-curlers having a rotary heated casing and a fixed shield for applying the hair to the casing.

It is an object of my invention to provide a curler in which the hair may be treated by a continuous rotating or rolling motion of the heated casing, and also by an oscillatory rotative motion of the casing about its axis of rotation.

To this end I provide means for rotating the casing in combination with a control by which the rotary motion of the casing is changed into oscillatory rotative motion.

Continuous rotation of the heated casing exerts rolling action on the hair while its oscillatory rotative motion resembles the action of ironing.

The adaptability of my novel curler is evidently much increased by the two motions it affords. Human hair, but also the hair of furs, may be treated with my novel curler, for undulating or curling the hair, or for smoothing curly hair, as desired.

The normal, readily handled form of the curler is preserved. In my novel curler, therefore, just as in a curler of the old type, the operator is able to hold the curler freely in any suitable position and to regulate it without interrupting its action.

It is another object of my invention to so design the control for changing the rotary into oscillatory rotative motion that it is operated by the hand holding the curler so that the other hand of the operator is free to arrange the hair.

To this end I provide a slide for operating the control which is fitted to move on the handle in which the casing is mounted to rotate.

My novel curler is light and therefore does not fatigue the operator, and the operations of hair dressing and treating of furs are performed rapidly, by simple means and in a scientific manner.

In the drawings affixed to this specification and forming part thereof a hair curler embodying my invention is illustrated diagrammatically by way of example.

In the drawings

Fig. 1 is an elevation of the complete curler,

Figs. 2 and 3 are partly sectional elevations of the curler, drawn to a larger scale, and showing two distinct positions of its members,

Fig. 4 is an elevation showing the parts of the changing control taken apart,

Fig. 5 is a section on the line V—V in Fig. 2,

Fig. 6 is a detail of Fig. 2, drawn to a larger scale,

Figs. 7, 8 and 9 are sections on the lines VII—VII, VIII—VIII and IX—IX, respectively, in Fig. 6.

Referring now to the drawings, 1 is the casing, 4 is the handle in which it is mounted to rotate, 2 is a shield having perforations 57 and adapted to be applied to the casing, 5 is a pivot on the handle 3 about which the shield 2 is fitted to rock, and 3 is a handle on the shield by which it is applied to the casing as shown in Fig. 2.

9 is a flexible shaft or cable to which rotation is imparted by any suitable means, preferably by a motor, not shown, and which in turn imparts rotation to the casing 1, in the handle 4. 39 is the slide by which the rotation of the shaft 9 is transmitted to the casing 1 as rotation or as oscillatory rotative motion; 33 is a control sleeve which is operated by the slide 39; 48, 48′ are clutching means under the control of the handle 3 for making and breaking the connection of the casing 1 with the shaft 9; 7, 8 are heating wires for conducting current to the casing 1; 22, 22′ are heating coils in an insulating core 23 of the casing 1; 17, 18 are brushes in the front end of the handle 4 to which the wires 7 and 8 are connected, and 19, 20 are slip rings on the casing 1 which conduct the current to the heating coils 22, 22′.

6 is a cap or support which is placed on the rear end of the handle 4 and receives the flexible shaft 9 and the wires 7, 8, and 10 is a spring catch in the cap 6 which engages a groove 11 in the handle 4. 12 and 13 are contact springs on the inner wall of the cap 6 to which the wires 7 and 8 are connected, and 15, 16 are contacting rings on an insulating sleeve 14 which is secured on the end of the handle 4. From the rings 15, 16, wires 7′, 8′ are taken to the brushes 17 and 18 near the front end of the handle. The slip rings 19 and 20 are held on the casing 1 by insulating rings 21. By these means the heating coils 22, 22′ of the casing are supplied with current during the rotation of the casing.

24 is a bearing, of heat insulating material, in which the front end of the casing 1 is mounted to rotate. The rearward extension of the casing on which the slip rings 20 and the insulating rings 21 are secured is connected with one of the clutch shafts 45 by means of a sleeve 46. 25 is a ball bearing for this clutch shaft and 25′ is a ball bearing for the other clutch shaft 31. 29 is a shaft extending from a clutch 28, 28′ to the first unit 30′ of the change-control. This shaft, together with the unit, is mounted to rotate in a ball bearing 25″, extends through a block 26, and is mounted in a bearing sleeve 27 in the insulating sleeve 14.

The two units 30 and 30' of the control are grooved cylinders. The unit 30' is connected with the shaft 29 and therefore rotates with the flexible shaft 9. The other unit 30 is connected with the clutch shaft 31. 35 is a pin projecting from the front end of the unit 30', 36, Fig. 4, is a bore in the unit 30 for the reception of the pin 35, and 37 is a ball which is inserted in the bore 36. 32' is a groove in the cylinder 30' which is helical and endless. 32 is a similar groove in the cylinder 30. 34 is a pin on the control sleeve 33 which engages in the groove 32 of the cylinder 30, and 34' is a pin, also on the control sleeve, which engages in the groove 32' of the cylinder 30'.

The two cylinders are aligned by the pin 35.

41 is a slot in the control sleeve 33 which is adapted to be engaged by a hook 40 at the rear end of the slide 39, as shown in Fig. 2. When the slide is in its normal or forward position, as shown in Fig. 3, a cam 42 on its hook 40 raises on a check in a slot 43 of the handle 4 so that the hook 40 is inactive with respect to the slot 41. The control sleeve 33 is free to rotate with the shaft 29 which in turn is rotated from the flexible shaft 9 through the clutch 28, 28', and its rotation is transmitted to the cylinder 30 and the shaft 31, the two cylinders being positively connected by the pins 34 and 34'. This is true for either direction of rotation of the flexible shaft 9.

The clutching means are best seen in Figs. 6 to 9, inclusive. The clutching member 48' is equipped with claws 60 and is keyed on the shaft 31 of the cylinder 30. The mating clutching member 48 is equipped with blocks 61 for engaging in the spaces between the claws 60 of the member 48', as shown in Fig. 7. The mating clutching member 48 is a sleeve and fitted to slide on a bushing 47 of the clutch shaft 45 which shaft, as mentioned, is connected to the casing 1 by a member 46. This member, which may be a sleeve, is here shown as a fork with its body 64 integral with the free end of the shaft 45 and its arms engaging the casing 1 to which they are connected by rivets 65. The bushing 47 is keyed on the clutch shaft 45 and equipped with serrations 62 engaging in flutes 63 in the sleeve 48, as best seen in Fig. 7, so that the member 48, the sleeve 47, the shaft 45 and the casing 1 rotate in unison but the sliding clutching member 48 is free to slide on the sleeve 47 for throwing in and out the clutch. 49 is a spring on the sliding clutching member 48 which tends to throw in the clutch but is under the control of a bellcrank lever 50, 51. The bell-crank lever is pivoted on the handle 4 at 52 and engages in a groove 53 on the member 48. 54 is a threaded and adjustable dog in a sleeve 55 near the handle 3 of the shield 2 which is adapted to depress the arm 50 of the bellcrank lever so as to throw out the clutch when the shield 2 is applied to the casing 1 by depressing the handle 3, as shown in Fig. 2. Normally, that is, when the handle 3 is released as shown in Figs. 1 and 3, the spring 49 throws in the clutch. When the slide 39 is in its forward end position, Fig. 3, the sleeve 33 is free to rotate and rotation is transmitted to the casing 1 from the flexible shaft 9 by the mechanism described.

When the slide which is preferably knurled at 44 and guided in brackets 38, 38' on the handle 4, is pushed to the rear as shown in Fig. 2, the hook 40 engages in the slot 41 of the sleeve 33 by the resiliency of the slide and the sleeve 33 is abruptly arrested. It will appear that the knurled end of the slide may be engaged by the thumb of the operator so that the slide is advanced and retracted without interrupting the operation of the curler and without releasing the handle 3 if it had been depressed. When the sleeve 33 has been arrested the cylinder 30' continues its rotation with the shaft 29 but its rotation is translated into oscillatory rotative motion of the cylinder 30 by the endless groove 32' in the cylinder 30' into operation with the groove 32 in the cylinder 30. The angle through which the cylinder 30, and consequently the casing 1, is oscillatorily rotated, is a function of the relative lead of the two helical grooves 32, 32'. Interference of the relative motion of the two cylinders is prevented by the ball 37 at the end of the aligning pin 35.

The clutch 48, 48' operates not only as a clutch but also as a safety appliance with a view to preventing damage to the hair. By means of the threaded dog 54 the relative position of the shield 2 and the casing 1 at which the clutch 48, 48' is thrown out, may be varied. The sleeve 55 may be hexagonal as shown, and in this case acts like a nut for holding the dog 54 in position.

Fig. 5 shows a hank 56 of hair engaged between the casing 1 and the shield 2. The hank is heated very intensely and uniformly by the rotating and heated casing 1 and the steam which forms is immediately discharged through the holes 57 in the shield 2.

In operation the wires 7 and 8 are connected to any suitable system, and rotation is imparted to the flexible shaft 9 which may be helically wound Bowden cable, preferably from a small motor. In view of the facility of changing from rotation to rocking motion of the casing 1, and in view of the continuous heating of the hank for either motion, the output of my novel curler is much superior to that of any other apparatus for all methods of treating the hair. As mentioned, the hair is rolled when the casing rotates continuously, and subjected to a sort of ironing action when the casing is rocked. In both cases the hair is bent and stretched, in one word, molded, by the aforesaid treatment. Obviously the intensity of the heat and the speed of the casing 1 may be regulated.

The operation will now be more fully described.

The hair is clamped between the casing 1 and the shield 2 by moving the handles 3 and 4 nearer together manually. The clamping pressure is transformed into resistance against the rotation of the casing 1 by the flexible shaft 9. The resistance reacts on the cylinder 30 so that the cylinder tends to lag with respect to the shaft 9 and the cylinder 30'. It is understood that the clutch 48, 48' is thrown in during the rotation, or oscillation, of the casing 1. Only when the handles 3 and 4 are moved together beyond a certain limit the bellcrank lever 50, 51 is turned so far about its pin 52 that the clutch 48, 48' is thrown out. Fig. 2 shows the final relative position of the handles 3 and 4 in which they are parallel to each other and the shield 2 directly engages the casing 1. It is obvious that the relative distance of the handles 3 and 4 must not overstep a certain limit as otherwise the hair would be crushed by the excessive pressure. The moment at which the clutch 48, 48' is thrown out, is determined by adjusting the threaded dog 54.

a. Rotation of the casing 1.—The slide 39 is shifted toward the casing 1 and by this movement the hook 40 is moved out of the slot 41 in the sleeve 33, as shown in Fig. 3. The sleeve 33 is now free to rotate. The flexible shaft 9 which

may rotate clockwise or anti-clockwise, rotates the cylinder 30' and, through the pin 34' and the sleeve 33 which is free to rotate after the hook 40 has been thrown out, tends to transmit its rotation to the cylinder 30. However, the resistance of the hair which has been clamped between the casing 1 and the shield 2, exerts a braking action on the cylinder 30 so that the cylinder 30 lags while the cylinder 30' leads. The consequence of the relative rotation of the two cylinders is a slight axial displacement of the sleeve 33 to the right or to the left under the cooperative action of the helical grooves 32 and 32' and the pins 34 and 34'. The sleeve 33 moves to the right for a given direction of rotation of the shaft 9, and to the left for the opposite direction. The axial displacement of the sleeve 33 causes the end faces of the cylinders 30 and 30' to bear on each other, while the pin 35 of the cylinder 30' bears against the ball 37 in the cylinder 30. The two cylinders 30 and 30', the sleeve 33 and the two pins 34 and 34' now rotate as a single unit at the same velocity and in the same direction as the flexible shaft 9.

b. Oscillation of the casing 1.—The slide 39 is in its final position at the rear, as shown in Fig. 2. The hook 40 engages in the slot 41 of the sleeve 33, holding the sleeve 33 against rotation but not interfering with its reciprocation in axial direction. The cylinder 30' is still rotated clockwise or anti-clockwise by the sleeve 9, as the case may be, and by the cooperation of the pin 34' on the sleeve 33 with the helical groove 32' in the cylinder 30' the sleeve 33 is reciprocated axially. The groove 32' in the cylinder 30' is endless and therefore the sleeve 33 performs a complete reciprocation per revolution of the cylinder 30'. The reciprocation of the sleeve 33 is transmitted to the cylinder 30 through the pin 34 and the helical groove 32 in the cylinder 30. This causes the cylinder 30 to oscillate and in this manner each reciprocation of the sleeve 33 corresponds to an oscillation of the cylinder 30 and the casing 1.

While the groove 32' in the cylinder 30' must be endless in order to transform into axial displacement of the sleeve 33 the continuous rotation of the cylinder 30' with the flexible shaft 9, it is not necessary that the groove 32 in the cylinder 30 should also be endless. Normally, it is enough if the groove 32 extends through three quarters of the perimeter of the cylinder 30 because the relative rotation performed by the cylinder 30 with respect to the cylinder 31 when the casing 1 is rotated as described under (*a*), is quite small. Another distinction between the grooves 32 and 32' is that their leads are different for determining the angle through which the casing 1 is oscillated per revolution of the cylinder 30'. The lead of the groove 32' in the cylinder 30' determines the axial displacement of the sleeve 33 while the angle of oscillation of the shaft 31, and the casing 1, is the resultant from the axial displacement of the sleeve 33 and the lead of the groove 32 in the cylinder 30.

My novel curler is self-contained, its mechanism being completely enclosed by the handle 4 and the cap 6, without unduly increasing the diameter of the handle 4. The operation of the curler and the regulation of the pressure at which the shield 2 is applied to the hair, are the same as in a normal curler. In view of the rapid rotation of the driving shaft 9 the hook 40 of the slide 39 attains the slot 41 in the sleeve 33 practically immediately, and the clutch 48, 48' is thrown in and out as rapidly.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

In the claims affixed to this specification no selection of any particular modification of the invention is intended to the exclusion of other modifications thereof and the right to subsequently make claim to any modification not covered by these claims is expressly reserved.

I claim:

1. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, and control means for changing its rotation into oscillatory rotative motion.

2. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means, a rotary member operatively connected to said casing, and control means operatively connecting said rotary members and so designed as to connect said members for rotation and to translate the rotating motion of said first-mentioned member into oscillatory rotative motion of said second-mentioned member.

3. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield pivoted to said handle and adapted to be applied to said casing, motor driven means for heating said casing, means in said handle for admitting heating energy to said casing as it rotates, means for rotating said casing, and control means in said handle for changing the rotation of said casing into oscillatory rotative motion.

4. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means and having a helical groove, a rotary member operatively connected to said casing and also having a helical groove, control means including members engaging in said helical grooves, and means for holding said control means against rotation with respect to said rotary members.

5. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means, a rotary member operatively connected to said casing, an aligning pin on one of said rotary members engaging a bore in the other member, and control means operatively connecting said rotary members and so designed as to connect said members for rotation and to translate the rotating motion of said first-mentioned member into oscillatory rotative motion of said second-mentioned member.

6. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means, a rotary member operatively connected to said casing, an aligning pin on one of said rotary members engaging a bore in the

other member, control means operatively connecting said rotary members and so designed as to connect said members for rotation and to translate the rotating motion of said first-mentioned member into oscillatory rotative motion of said second-mentioned member, and antifriction means at the end of said aligning pin.

7. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means, a rotary member operatively connected to said casing, a sleeve surrounding said rotary members, said sleeve and said members being so designed that the sleeve either rotates with the members or, upon being arrested, translates the rotation of one of said members into oscillatory rotative motion of the other member, and means on said handle for arresting said sleeve.

8. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means, a rotary member operatively connected to said casing, a sleeve surrounding said rotary members, said sleeve and said members being so designed that the sleeve either rotates with the members or, upon being arrested, translates the rotation of one of said members into oscillatory rotative motion of the other member, and a slide mounted to be displaced on said handle and adapted to arrest said sleeve.

9. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means, a rotary member operatively connected to said casing, a sleeve surrounding said rotary members, said sleeve and said members being so designed that the sleeve either rotates with the members or, upon being arrested, translates the rotation of one of said members into oscillatory rotative motion of the other member, and a slide mounted to be displaced on said handle within reach of the operator's thumb for arresting said sleeve.

10. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, a rotary member operatively connected to said rotating means, a rotary member operatively connected to said casing, a slotted sleeve surrounding said rotary members, said sleeve and said members being so designed that the sleeve either rotates with the members or, upon being arrested, translates the rotation of one of said members into oscillatory rotative motion of the other member, a hook applied to said sleeve under resilient pressure and adapted to enter the slot in said sleeve, and a fixed cam adapted to cooperate with said hook so as to move it out of active position with respect to said slot when it is displaced.

11. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means including a clutch for rotating said casing, and control means for changing its rotation into oscillatory rotative motion.

12. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield adapted to be applied to said casing, means for heating said casing, motor driven means including a clutch for rotating said casing, means operatively connected to said shield for controlling said clutch, and control means for changing the rotation of said casing into oscillatory rotative motion.

13. A hair curler comprising a handle, a casing mounted to rotate in said handle, a shield, a handle on said shield for applying it to said casing, means for heating said casing, motor driven means including a clutch for rotating said casing, a bellcrank lever engaging said clutch with one of its arms, resilient means tending to throw in said clutch, adjustable means on the handle of said shield for engaging the other arm of said bellcrank lever, and control means for changing the rotation of said casing into oscillatory rotative motion.

14. A hair curler comprising a handle, a casing mounted to rotate in said handle, a perforated shield adapted to be applied to said casing, means for heating said casing, motor driven means for rotating said casing, and control means for changing its rotation into oscillatory rotative motion.

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