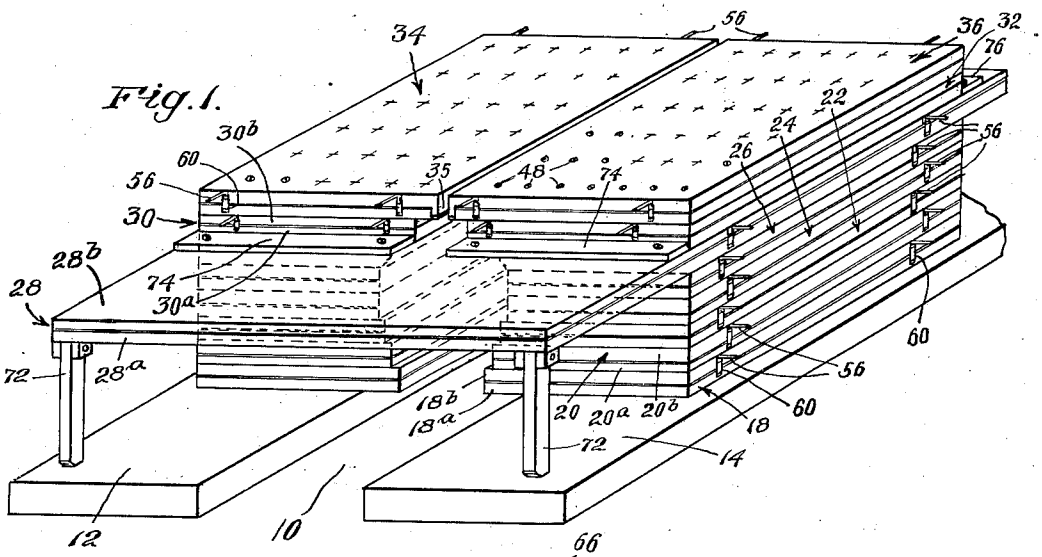
April 20, 1948. A. E. STROLL 2,440,188

PERMANENT WAVING APPARATUS

Filed Dec. 31, 1946 4 Sheets-Sheet 1

Fig. 1.



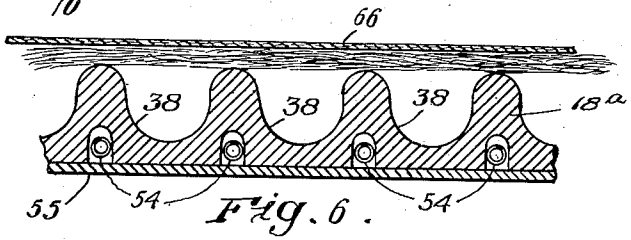


Fig. 6.

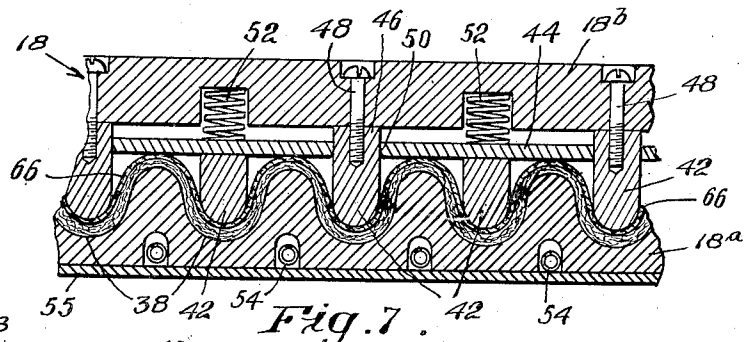


Fig. 7.

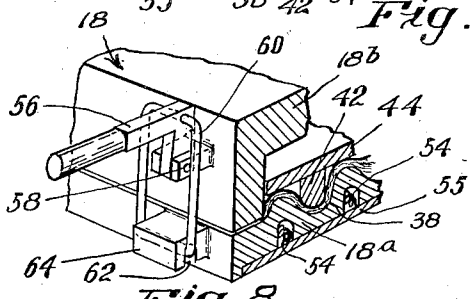


Fig. 8.

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PERMANENT WAVING APPARATUS

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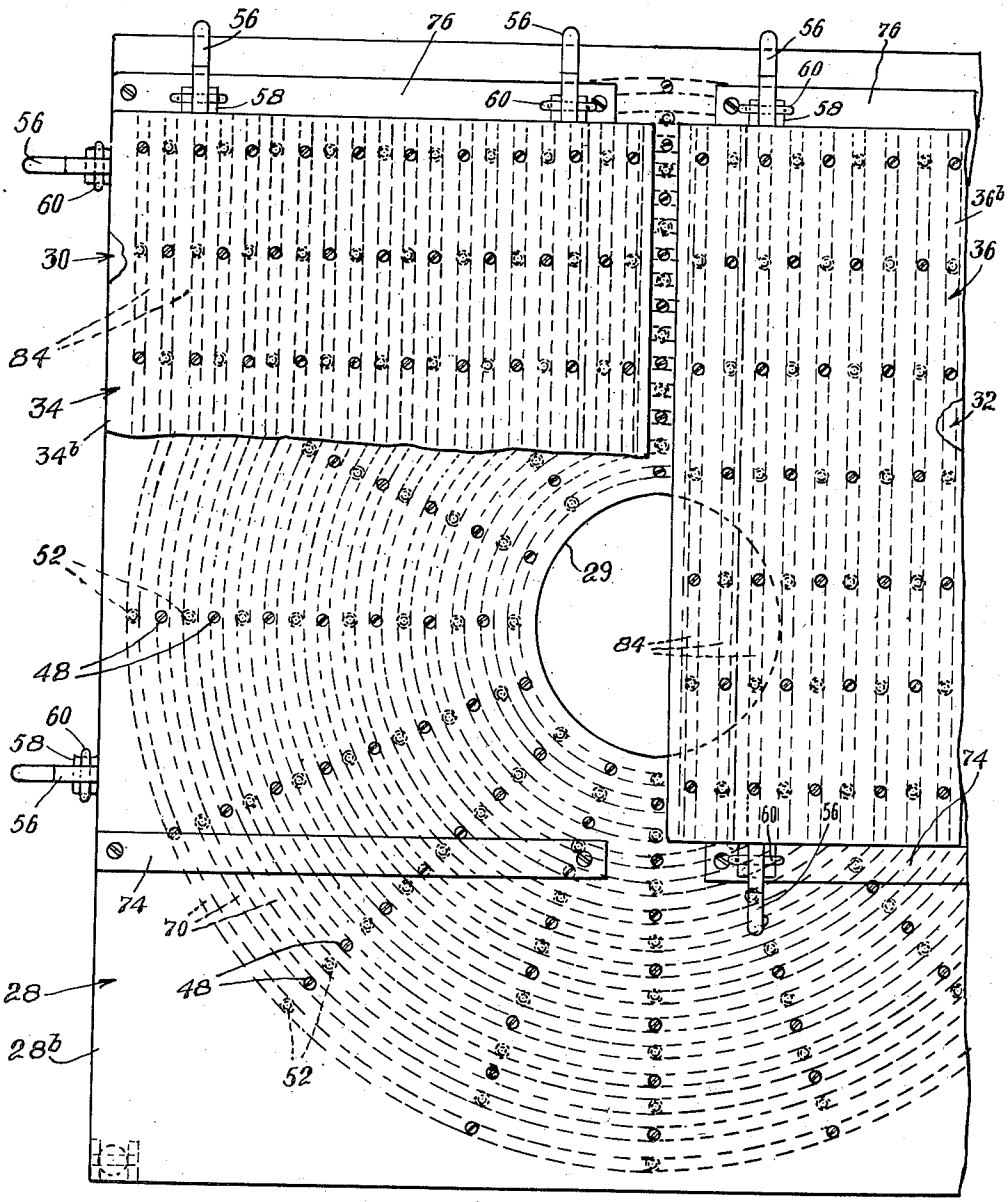


Fig. 2.

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PERMANENT WAVING APPARATUS

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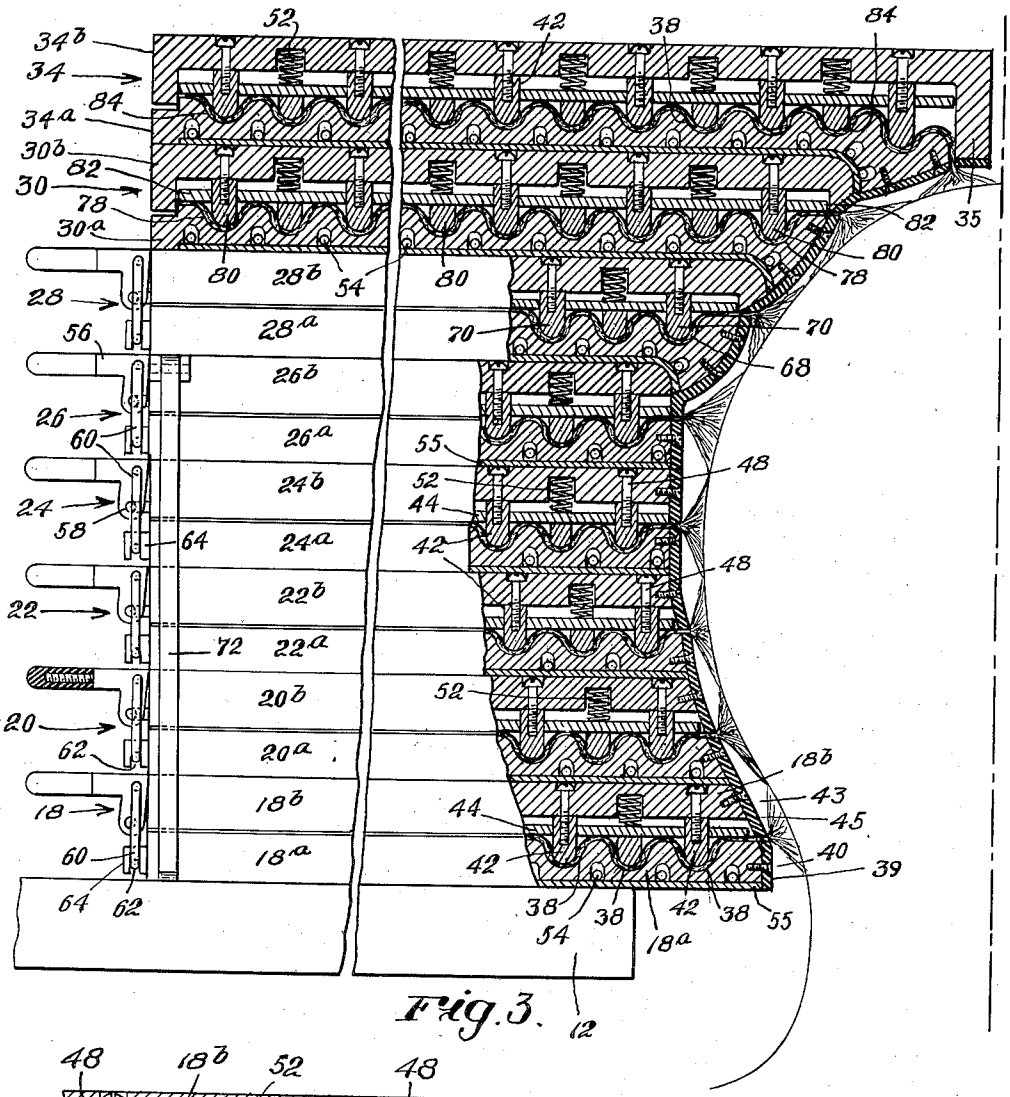


Fig. 3.

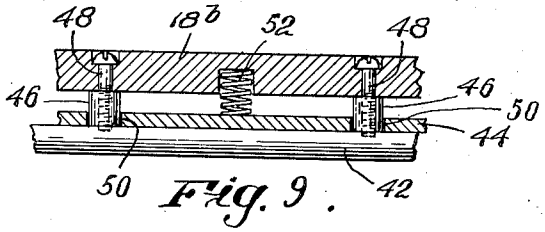


Fig. 9.

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PERMANENT WAVING APPARATUS

Filed Dec. 31, 1946 4 Sheets-Sheet 4

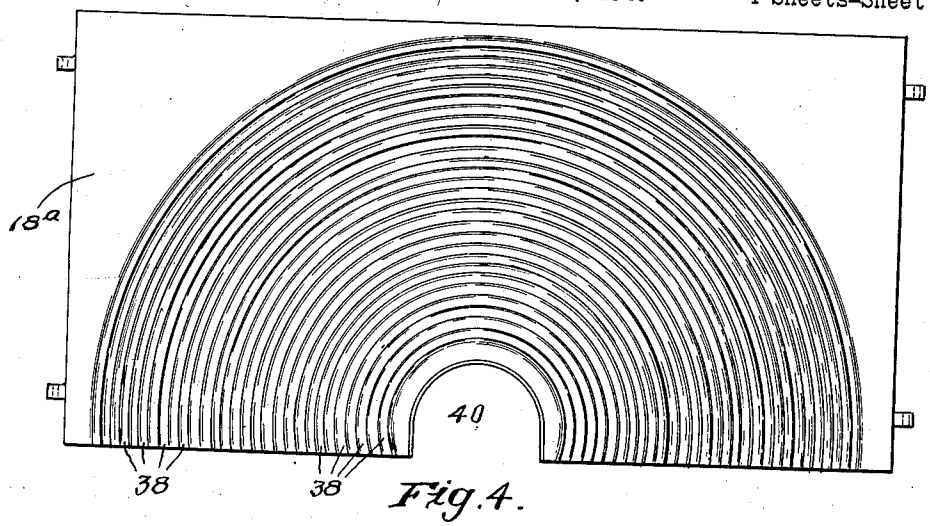


Fig. 4.

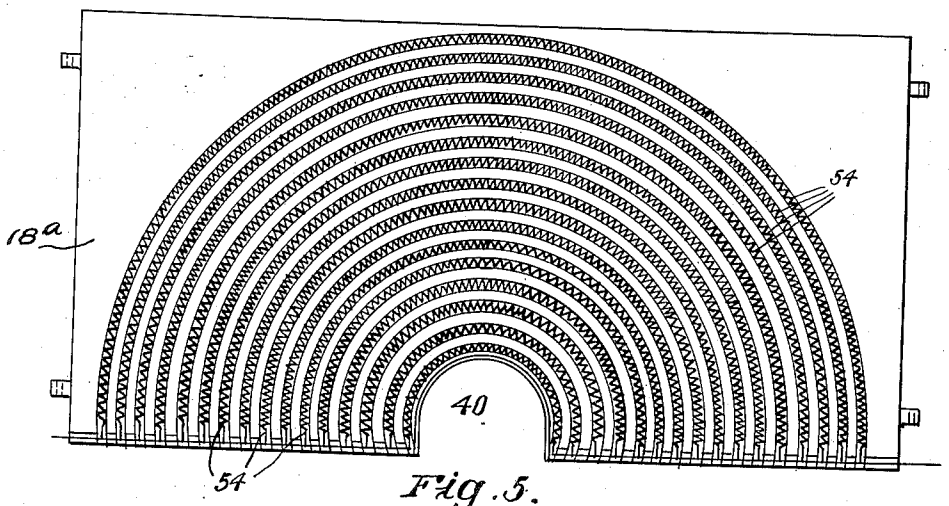


Fig. 5.

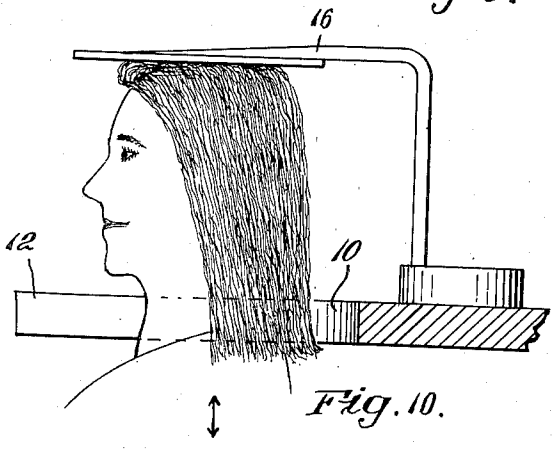


Fig. 10.

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2,440,188

UNITED STATES PATENT OFFICE

2,440,188

PERMANENT WAVING APPARATUS

Alfred E. Stroll, Brookline, Mass.

Application December 31, 1946, Serial No. 719,362

9 Claims. (Cl. 132—31)

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This invention relates to improvements in apparatus for imparting a permanent wave to hair. More particularly it provides a procedure and apparatus whereby an entire head of hair may be permanently waved, all at one time, and in a relatively short time, after being arranged in the apparatus of the invention in conformity with the method and procedures of the invention.

It is among the objects of the invention to provide a permanent waving apparatus comprising a series of stacked individual permanent waving units every portion of which is supported off the head, and out of contact with the head, of the person whose hair is being waved.

Another object is to provide a permanent waving apparatus wherein a lower permanent waving unit is supported in hair-waving relation to a head and out of contact with the head for receiving and waving hair at its elevation all around the head, and wherein other permanent waving units are progressively stacked on the lower unit, with each receiving the hair at its particular elevation all around the head.

A further object is to provide a permanent waving apparatus comprising individual permanent waving units adapted to be assembled into a stack of units, with each unit comprising a grooved member and a co-acting member with ridges generally complementary to said grooves, and each unit having a heating means therein, and an interior clamping means for co-action with said grooves and ridges for causing stretching of hair sinuously disposed across said grooves.

Yet another object is to provide a stack of permanent waving units of which each unit includes an upper ridged section and a lower grooved section between which hair is adapted to be arranged crossing the grooves, each unit also including interior means for clamping the hair at opposite sides of each groove and exterior means for depressing the ridges and engaged hair into the grooves with stretching of the hair between its said interiorly clamped regions.

Still another object is to provide a permanent waving unit which is adapted to be assembled with similar units in a stack and which includes means therein for imparting a sinuous wave to hair placed in the unit, and means for permanently setting the wave in the hair, each said unit of a stack being adapted to accommodate hair at its particular elevation all around the head.

It is, moreover, my purpose and object generally to improve upon prior permanent waving devices and prior hair waving procedures.

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In the accompanying drawings:

Fig. 1 is an isometric view of a completely assembled permanent waving apparatus embodying features of the invention;

Fig. 2 is a top plan view of the apparatus of Fig. 1, with a portion of each of two superimposed upper units of the stack broken away;

Fig. 3 is a view partly in front elevation and partly in vertical cross-section of only the left side portion of the apparatus, on a larger scale;

Fig. 4 is a top plan view of the lower plate section of the lowermost unit of the stack;

Fig. 5 is a bottom plan view of the same plate section with its heater-covering plate removed to show the heating means;

Fig. 6 is a fragmentary vertical cross-sectional view across the grooves in the lower plate section of the lowermost unit of the stack, showing hair laid across the grooves and a solution-carrying sheet laid on the hair;

Fig. 7 is a fragmentary vertical cross-sectional view, on the same scale as Fig. 6, showing the lower and upper plate sections of a unit assembled but prior to clamping and securing of the sections together;

Fig. 8 is a detailed perspective view of one of the exterior clamping devices for securing the unit sections together;

Fig. 9 is a fragmentary view along one of the ridges of an upper plate section of a unit, the ridge being shown in elevation, and the upper plate section and interior spring-backed clamping plate being in vertical cross-section; and

Fig. 10 is a vertical cross-sectional view through the supporting means for the apparatus, medially of its forward edge notch, with a person's head represented in contact with a head-positioning means removably resting on the support.

Referring to the drawings, the embodiment of the invention which is shown in Fig. 1, completely assembled, rests on any suitable generally horizontal support which may be a table top deeply notched as at 10 to provide the two table portions 12, 14 below which the person whose hair is to be waved may be seated in an adjustable chair or the like with her neck in the notch 10 and with her head above the top surfaces of the table portions 12, 14, both of which will be in the same plane. If desired the supports 12, 14 may be separate tables, or the like, suitably spaced apart so that a person's neck can extend freely between them. Referring briefly to Fig. 10, any suitable means, such as is indicated at 16, may be em-

ployed to ensure that the top of each head may be set at a predetermined elevation above the supports 12, 14, it being understood that the chair in which the person sits is vertically adjustable to bring the top of the head against the member 16, after which the member 16 is moved out of the way to make room for my improved hair waving apparatus, now to be described.

The apparatus as seen in Fig. 1 comprises a stack of hair waving units of which the five lower units, indicated generally at 18, 20, 22, 24 and 26, each has its forward margin deeply notched for extending at both sides of and around the back of the person's neck and head. The next higher unit, indicated generally at 28, may be rectangular in shape with a slightly oval-shaped hole 29 through which the upper portion of the head protrudes, as best seen in Fig. 3. Above and resting on unit 28 is a left side unit, indicated generally at 30, and a similar right side unit, indicated generally at 32, while above and resting on unit 30 is a top left side unit, indicated generally at 34, and above and resting on unit 32 is a top right side unit, indicated generally at 36.

As best seen in Fig. 3, where the portion of the apparatus at the left side of the head is shown, each of the waving units 18, 20, 22, 24, 26, 28, 30, 32, 34 and 36 comprises an upper plate section and a lower plate section and, since all of the lower units 18, 20, 22, 24 and 26 are substantially the same, the following detailed description of the lowermost unit 18 may be considered equally applicable to the units 20, 22, 24 and 26.

The lower plate section 18*a* of unit 18 (see Figs. 3, 4, 6–8) has a series of arcuate grooves 38 in its upper face extending around the neck notch 40, with progressively larger radii of arcs from the innermost groove to the outermost groove, as clearly shown in the top plan of this plate as represented in Fig. 4. Obviously the number and spacing of grooves 38 may be varied as desired in any particular apparatus, but they should be distributed so that the entire length of strands of hair which are to be laid in the unit will come into position to be waved by the unit. The inner edge of the plate section 18*a* is covered by a strip 39 which stands next to the lower portion of the head all around the notch 40. Strip 39 may be secured in place by any suitable means and may be of any suitable durable material, preferably stiff and stable insulation material for resisting heat and for withstanding any rough treatment to which the section may be subjected.

The upper plate section 18*b* of unit 18 has a complementary series of arcuate ridges 42 carried on its under face and has an interior relatively thin plate 44 which is movably mounted relative to the upper plate section 18*b* and relative to the ridges 42. For this purpose, each ridge 42 is substantially spaced from the under face of the upper plate section 18*b* and is secured to said under face only at intervals along its extent through the medium of upstanding bosses 46 on the ridges 42 and screws 48 extending through the upper plate section 18*b* and threaded into the bosses 46, as best seen in Fig. 9. The interior thin plate 44 is above the ridges 42 and has holes 50 through which the bosses 46 loosely extend, so that plate 44 is movable toward and from the ridges and is biased toward them by springs 52 suitably distributed over the unit between plate 44 and the upper plate section 18*b*. If desired, instead of the bosses 46 on ridges 42, the spacing of the ridges may be attained by spacing cylinders at the location of the bosses with the screws extending loosely through the spacing cylinders and threaded into the ridges 42.

The inner edge of this section 18*b* is inclined into general parallelism with the head at this elevation, as best seen in Fig. 3, and the edge is covered all around the neck notch 43 of the section by a strip 45 comparable to the strip 39 on lower section 18*a*. Preferably, the strip 45 extends down so that hair extending into unit 18 between sections 18*a*, 18*b* thereof, will be engaged between the strips 45 and 39.

Any suitable heating means, preferably an electric heating means, is embodied in the lower plate section of the unit as indicated at 54, the heating means being preferably mounted on a plate 55 for convenient removal when necessary. The upper and lower plate sections 18*a*, 18*b* may be drawn together and secured together by securing devices, forwardly and rearwardly at each side of the unit, each securing device as herein represented, and as best seen in Figs. 3 and 8, comprising a generally L-shaped lever 56 pivoted at 58 on the upper plate section 18*b*, and having the loop 60 pivotally suspended therefrom for engaging in a notch 62 at the under side of a projection 64 on the lower plate section 18*a*.

Assuming that a patron whose hair is to be permanently waved is properly seated with the top of her head at the predetermined elevation above the supports 12, 14, as suggested in Fig. 10, the lower plate section 18*a* of unit 18 first is positioned on the supports so that the patron's neck and lower head portion is within the notch 40 and spaced from the walls of the notch. Then the hair at the lowermost portions of the head and neck is combed out and spread over the plate section 18*a*, with each strand of hair crossing the arcuate grooves 38. However, before spreading the hair on the grooved plate section, each strand of hair has a suitable permanent waving preparation applied thereto. The hair may be dipped into the preparation, which may be a solution of ammonia, for example, or the solution may be applied with a saturated cloth or pad, or in any other convenient manner. After the hair has been thus treated and laid across the grooves 38 of plate section 18*a*, I prefer to supply additional solution by means of a relatively thin sheet 66 of cotton felt or the like (Figs. 6 and 7). This sheet 66, of say one thirty-second of an inch in thickness, may be dipped in the solution and then is laid on the hair which has been spread out on the grooved plate section 18*a*. At this time, the hair will be in engagement with the crests between the grooves 38, as represented in Fig. 6, and the felted sheet 66 will be generally a plane sheet resting on and covering all of the hair on plate section 18*a*.

Next, the upper plate section 18*b* is placed above the section 18*a* with the ridges 42 engaging the felt sheet 66 and depressing it and the hair into the grooves 38 of section 18*a* until the spring-backed interior plate 44 resiliently stops the descent of the upper section 18*b*. Hence, before the ridges 42 depress the hair into grooves 38 to a maximum extent, the spring-backed interior plate 44 engages and pinches the felt sheet 66 and the hair at the crests between grooves, as best seen in Fig. 7, so that each strand of hair is held in a resilient clamp at opposite sides of each groove 38. Any subsequent movement of section 18*b* toward section 18*a* increases this clamping action and the further depression of the hair into the grooves 38 by the ridges 42

causes stretching of the hair which involves also a rubbing action at the region of stretching which tends to give the hair a sheen or luster. Actually, the mentioned stretching of the hair introduces a permanent structural change in each stretched hair due to relative slip of the fibrous components of each hair.

As herein represented, the hair-stretching further movement of ridges **42** into the grooves **38**, after the spring-backed interior plate has clamped the hair, may be accomplished by operation of the levers **56** heretofore referred to as provided forwardly and rearwardly at each side of unit **18**. Referring to Figs. 3 and 8, when each of these levers **56** is depressed about its pivot **58**, the loops **60** are lowered so that each can be engaged in the associated notch **62**, after which an upward movement of the levers, each to a position as shown in Fig. 3, causes the plate sections to be drawn together. Preferably, each lever **56** in its securing position of Fig. 3, carries its loop **60** slightly past center with respect to pivot **58**, so that the lever has a slight snap action and is maintained in its securing position until forcibly depressed.

As previously explained, the waving units **20**, **22**, **24** and **26** are substantially the same as the unit **18**, the only material difference being in the size of their notches within which the head is positioned. The notch for each unit section is adapted to fairly nicely fit around the head contour at its elevation as represented in Fig. 3.

Hence, after unit **18** has been closed and clamped on the hair laid therein, the lower plate section **20***a* of unit **20** is arranged upon the upper plate section **18***b* of unit **18**, and the procedure as explained in connection with unit **18** is repeated for unit **30**, which receives hair at its elevation all around the head. Similarly, the units **22**, **24** and **26** in turn are added to the stack, each receiving hair at its particular elevation in the stack.

The waving unit **28**, as best seen in Figs. 1 and 2, differs from the lower units in that it has a round or slightly oval hole through which the upper portion of the head protrudes, and has circular grooves **68** and circular ridges **70** corresponding to the arcuate grooves **38** and ridges **42** of the unit **18**. Also, the unit **28** has substantial extent forwardly, as seen in Fig. 1, and this forward portion is provided with hinged legs **72** for resting on the supports **12**, **14**, as shown in Fig. 1. The upper surface of the forwardly projecting portion of unit **28** is provided with the transverse guide means **74**, for a purpose which later will appear, and similar guide means **76** are provided on the upper surface of a rearwardly projecting portion of unit **28**. Otherwise unit **28** is generally the same as the lower units, with its lower plate section **28***a* and upper plate section **28***b* assembled and clamped together in the same manner as described in connection with unit **18**. However, since unit **28** comes in the region of the forehead, the hair at the front of the head extends within the forwardly projecting portion of the unit **28** as well as within the side and rear portions.

Above the unit **28**, the units **30**, **32**, **34** and **36** are right and left side units whose grooves and ridges are straight and in parallelism, running from front to back of the units, as best seen in Fig. 2. The units **30**, **32**, rest on the unit **28**, unit **30** extending at the left side and unit **32** at the right side, of the center of the head, these units being spaced substantially apart as can be seen

from the locations of their forward edges in Fig. 1. Units **34** and **36** are the top units and are spaced only slightly apart, with unit **34** resting on unit **30** and unit **36** resting on unit **32**. Their proper positioning relative to unit **28** is determined by the guide means **70**, **72** on unit **28** in conjunction with a proper alignment of the side edges of units **28**, **30**, **32**, **34** and **36**.

Assuming that the left side unit **30** is to be assembled first, above the unit **28**, its lower plate **30***a* is arranged on unit **28** extending from front to rear along and spaced from the center-line of the head, and its straight grooves **78** all extend in parallelism in the same directions. All of the hair at its elevation on the left side of the center-line of the head is treated as previously described and is laid across the grooves **78**, with all of the strands of this hair arranged generally in parallelism extending to the left. A sheet **66** saturated with the permanent waving solution is laid upon the hair as in the lower units, and then the upper plate section **30***b*, with its straight ridges **80** and spring-backed interior plate **82**, is put in place and clamped in a manner comparable to that described for the placing and clamping of the upper plate section **18***b* of unit **18**. However, the clamping or securing means for unit **30** preferably are located, for convenience, at the forward and rear edges of the unit rather than at the side edges.

The right side unit **32** next is assembled on unit **28** the same as the unit **30** at the left side.

The top and final units **34**, **36** of the stack are then assembled upon the units **30**, **32**, respectively, these units **34** and **36** being generally similar to units **30**, **32**, but having width so that their inner side edges are only slightly spaced apart when their outer side edges are aligned with the outer side edges of the lower units of the stack. Also, the upper plate section **34***b* of unit **34** has the depending flange **35** along its inner side edge so that, when the unit is assembled with the hair extending sinuously across the straight grooves **84** of lower plate section **34***a*, the hair extends generally upward from the head into the unit between the depending flange **35** of section **34***b* and the inner side edge of section **34***a*. A similar depending flange (not shown) extends along the inner side edge of the upper plate section **36***b* of the right side unit **36**, and this right side unit is assembled the same as the unit **34**. All of these upper units, **30**, **32**, **34** and **36** have their clamping or securing means at the forward and rearward edges of the units, and the said means on adjacent units preferably are staggered with respect to each other. The similar clamping and securing means at the side edges of the lower units also preferably have a staggered arrangement.

After all of the units are assembled and clamped in the stack, heat may be applied simultaneously to all of the units through their individual heating means **54** in the lower plate section of each unit. The electric heating means herein indicated for each unit all may be connected together and plugged into the building electrical system with any suitable automatic timing device (not shown) included in the circuit to cut off the current after a predetermined period of operation of the heating means. Also, a suitable temperature controlling means (not shown) may be included in the circuit, as is well known.

It will be apparent from the foregoing description, in connection with the drawings, that I

have provided an improved permanent waving apparatus every part of which is supported off the head of the person whose hair is being waved. Hence, the person may sit comfortably through the permanent waving operation with none of the burden of supporting mechanisms on her head and with none of the customary hair-pulling discomforts. An operator quickly may be trained in the efficient application and use of my mechanism, which effectively permanently waves the entire head of hair at one time and in a shorter period of time than is practicably feasible with the prior permanent waving devices and procedures of which I am aware.

When assembling the units, the notched lower units may be selectively positioned for accommodating varying shapes of heads and each unit, when assembled with a sheet 66 between its sections and with the flexible insulating material 39 along the edges of sections adjacent to the neck and head, constitutes a substantially gas-tight unit from which no harmful quantity of gas can escape to come in contact with the person. However, it should be understood that the sheets 66 are not essential to a satisfactory operation of the apparatus. Also, if desired, the clamping levers 56 at each side of individual units may be connected together by connecting bars (not shown) which may extend between them for simultaneous operation of the connected levers.

While I have illustrated my apparatus with a heater embodied in each unit, it should be understood that the apparatus may be used without application of heat to provide a cold wave by employing one of the available cold wave solutions. In this connection, it is mentioned that it is no objection that the hair in the lower units may be subjected to the effects of the solution for longer periods of time than the hair in the later assembled upper units, it being only necessary to be sure that the hair last clamped in the apparatus is subjected to the effects of the solution for a predetermined period of time.

It will be apparent that the hair may be provided with crests or curls or combinations of both anywhere on the head regardless of whether the permanent wave is set by application of heat or is effected by means of a cold wave solution.

I claim as my invention:

1. A permanent waving apparatus comprising a unit adapted to be supported out of contact with a head, said unit comprising coacting sections of which one section has spaced apart grooves in its upper surface across a plurality of which grooves each strand of hair to be waved is laid, and another section is adapted to be superimposed on the first section and has ridges on its under surface for fitting in said grooves of the first section, thereby to depress each strand of hair into each of the said plurality of grooves across which each strand extends, resilient means operative between the two said sections for clamping the hair at opposite sides of each said groove and for yieldably restraining the descent of the said ridges into the said grooves, and means for moving the two sections relatively toward each other after the said clamping of the hair, thereby to depress said ridges further into the grooves with stretching of the hair of each strand in each of the plurality of grooves across which the strand extends while the strand is clamped at opposite sides of each of said plurality of grooves.

2. A permanent waving apparatus comprising a unit adapted to be supported adjacent to the head of a person whose hair is to be waved, said unit comprising a lower section having spaced grooves in its top surface across a plurality of which grooves a strand of the hair is laid, and a coacting upper section having spaced ridges on its bottom surface for registering with said grooves, means operative between said sections for clamping the strand of hair at opposite sides of each of said plurality of grooves, across which the strand extends, when the upper section is arranged on the lower section, said clamping means resiliently opposing movement of the upper section toward the lower section, means operative following said clamping of the hair for moving the sections relatively toward each other thereby to depress the said ridges and hair into the grooves with stretching of the hair in each groove between the said clamped portions thereof and with a forceful rubbing of the hair by the ridges to produce a sheen on the rubbed portions of hair.

3. In a permanent waving apparatus, a series of hair waving units adapted to be stacked with a head of hair therein, said units being assembled in succession in the stack with each unit accommodating hair at its general elevation in the stack, means in each unit for providing sinuosity of extent of the hair therein, means in each unit for stretching portions of the hair during assembly of the unit, and means whereby all of the units of the stack may be heated simultaneously to set the sinuous wave in the hair in each unit.

4. In a permanent waving apparatus, a stack of hair waving units of which each unit comprises a grooved lower section, across whose grooves hair to be waved is laid, and a ridged upper section adapted to rest on the lower section with the ridges partially filling the grooves for depressing portions of the hair into the grooves, means operative between the sections for clamping the hair at opposite sides of each groove, resilient means yieldably maintaining the ridges at a substantial distance from the bottoms of the grooves, and means for clamping the sections together, after the said clamping of the hair, thereby to force the ridges deeper into the grooves with stretching of the portions of hair between the clamped regions thereof.

5. In a permanent waving apparatus, a stack of hair waving units of which each unit comprises a grooved lower section, across whose grooves hair to be waved is laid, and a ridged upper section adapted to rest on the lower section with the ridges partially filling the grooves for depressing portions of the hair into the grooves, a clamping plate resiliently mounted within the upper section and constantly biased toward the lower section, a flexible sheet intervening between the hair and said clamping plate and adapted to carry a permanent wave solution, said clamping plate clamping said sheet and hair against the lower section at opposite sides of each said groove, and means exteriorly of the unit for forcing said sections relatively toward each other thereby to depress said ridges and hair deeper into the grooves with stretching of the hair between the said clamped regions of hair.

6. In a permanent waving apparatus, a stack of hair waving units of which each unit comprises a grooved lower section, across whose grooves hair to be waved is laid, and a ridged upper section adapted to rest on the lower section with the ridges partially filling the grooves for depressing portions of the hair into the grooves, a clamping plate resiliently mounted within the upper sec-

tion and constantly biased toward the lower section, a flexible sheet intervening between the hair and said clamping plate and adapted to carry a permanent wave solution, said clamping plate clamping said sheet and hair against the lower section at opposite sides of each said groove, and said sheet coacting with said sections to make the unit approximately tight against escape of gas that may be developed therein, and means exteriorly of the unit for drawing the sections relatively toward each other after the said clamping of the hair by said plate thereby to depress said ridges and hair deeper into the grooves with stretching of the hair at portions thereof between the said clamped portions of hair.

7. In a permanent waving apparatus, a stack of hair waving units of which each unit comprises a grooved lower section, across whose grooves hair to be waved is laid, and a ridged upper section adapted to rest on the lower section with the ridges partially filling the grooves for depressing portions of the hair into the grooves, means extending along that edge of each section which is adjacent to the head, said means on the two sections coacting in the assembled unit to approximately seal said edge, a clamping plate resiliently mounted within the upper section and biased toward the lower section, a flexible sheet intervening between the hair and said plate and adapted to carry a permanent wave solution, said plate clamping said sheet and hair against the lower section at opposite sides of each said groove thereby to approximately seal each groove against escape of gases that may develop therein, and exterior means for forcing said sections together after said clamping of the hair by said plate, thereby to depress the ridges and hair further into the grooves with stretching of the hair between the clamped portions thereof.

8. A permanent waving apparatus comprising a plurality of generally collar-shaped lower units stacked one upon the other, a support for the lowermost unit, a plurality of upper units stacked upon the lower units at least one of said upper units projecting outward all around a head position of the apparatus, and at least one other of said upper units extending over the said head position of the apparatus, each said unit comprising a lower section and an upper section adapted to be assembled with hair extending sinuously therein, and each unit including heating means whereby all of the stacked units may be heated simultaneously to set the sinuous wave in the hair in all of the units simultaneously.

9. A permanent waving apparatus comprising a plurality of stacked lower units each having a deep notch in one edge whereby the units are adapted to fit around the neck and lower head of a person whose hair is to be waved, a support for the lowermost unit, each said lower unit comprising two coacting sections of which one has spaced arcuate grooves extending around the said notch of the unit, across which grooves hair is to be laid, and the other has spaced arcuate ridges extending around the notch and adapted to fit in said grooves when the sections are assembled, to depress the said hair into the grooves, said apparatus including also an upper unit having two coacting hair-engaging sections with a central head opening therein and with coacting spaced circular grooves and ridges extending around said opening, and at least one top unit extending across said head opening in said upper unit, with coacting hair engaging sections including generally straight coacting grooves and ridges, all of said units being out of contact with the head whose hair is being waved.

ALFRED E. STROLL.

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