Oct. 10, 1944. C. HUSSMAN ET AL 2,359,916

HAIR CURLING APPARATUS

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Fig. 1.

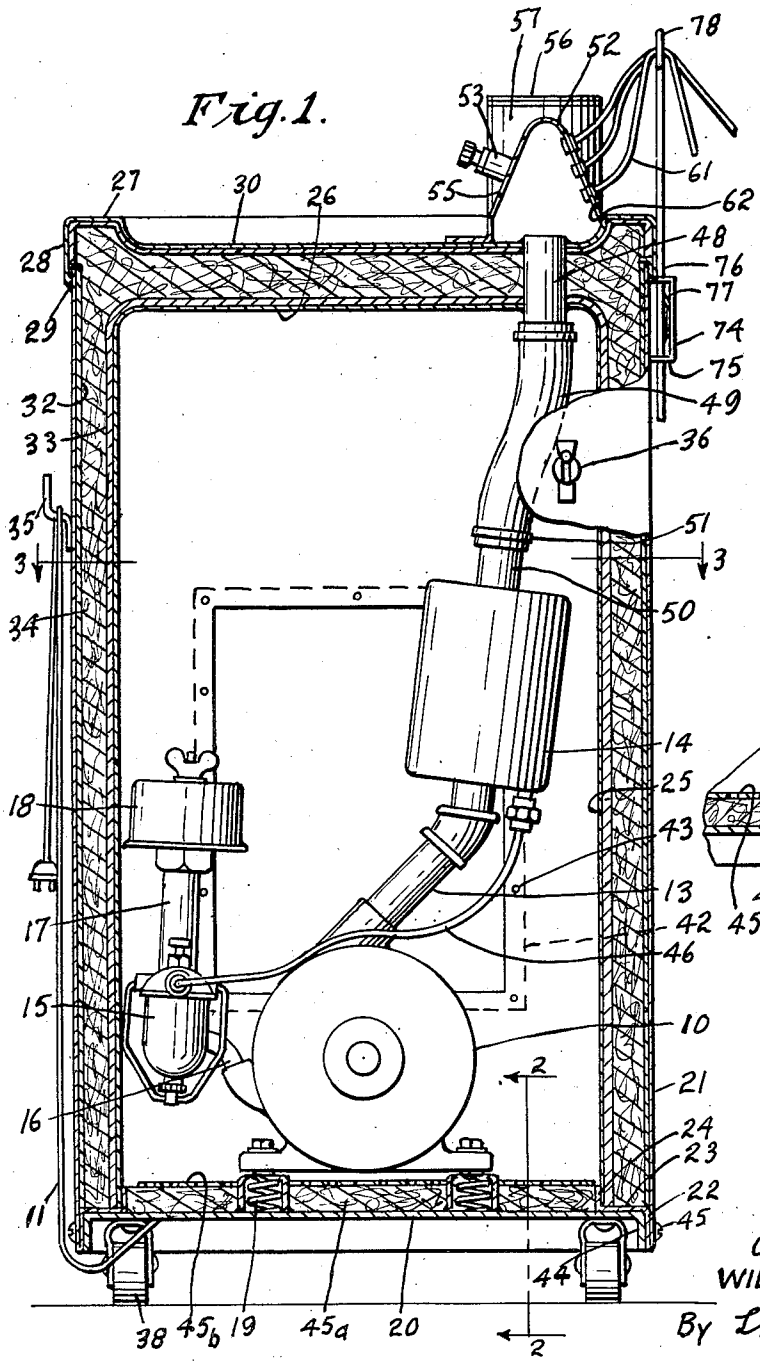
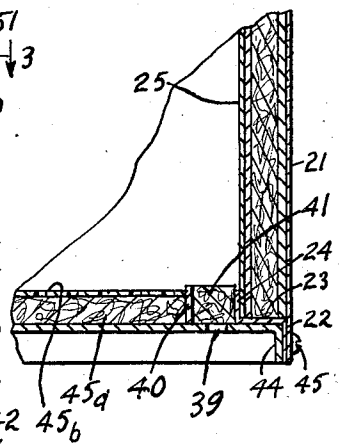


Fig. 2.



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Fig. 4.

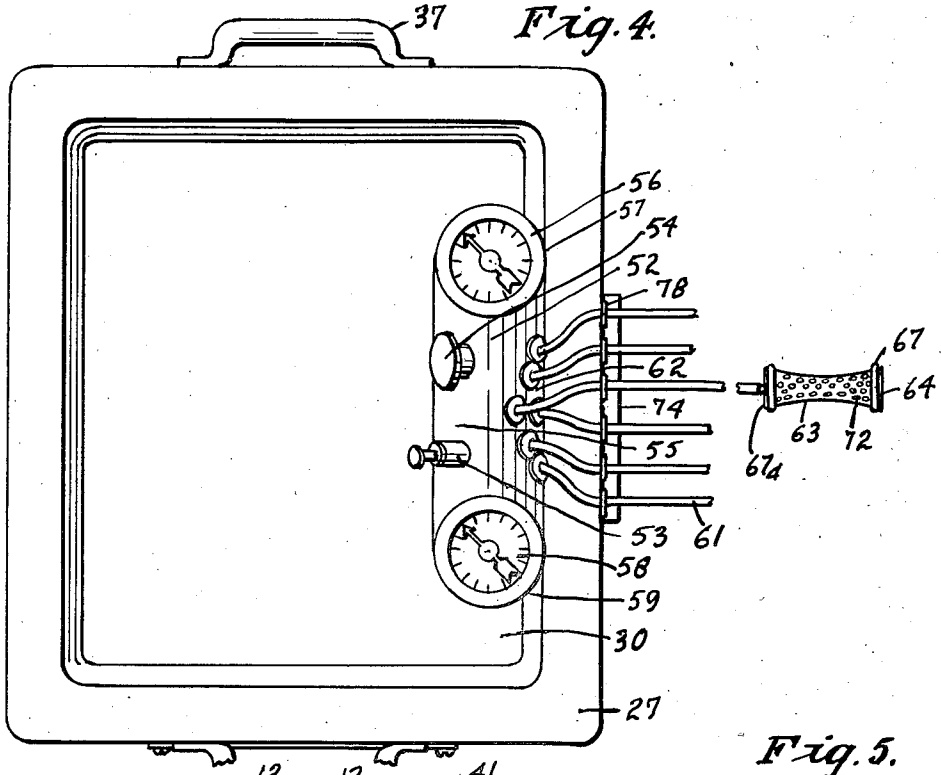


Fig. 5.

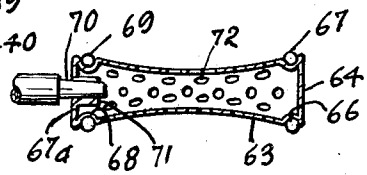
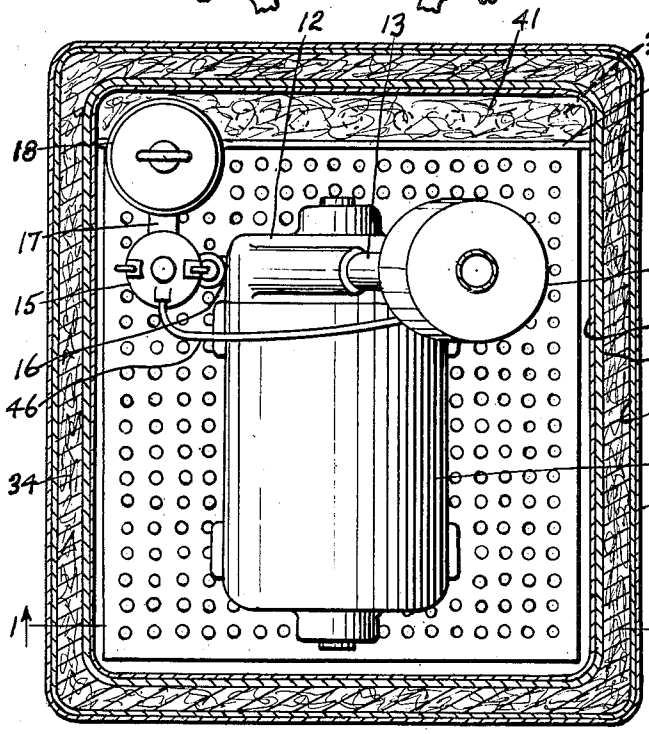


Fig. 3.



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HAIR CURLING APPARATUS

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Application January 5, 1942, Serial No. 425,654

13 Claims. (Cl. 132—33)

This invention relates to apparatus for producing warm compressed air, and has reference more particularly to a hair curling apparatus in which a strand of hair is wet and wound on a perforated curler, a current of warm air then being forced through the curler and wound strand of hair to dry and set the latter.

In the curling machines heretofore proposed, it has been customary to compress the air by means of an exposed motor driven compressor or pump which makes considerable noise so as to be objectionable to feminine customers. If the compressor pump and motor are located in a distant room to isolate the noise, the air is cooled down before it is delivered to the operator, so that it is then necessary to reheat the air before it passes through the perforated curler. This reheating is usually accomplished by means of an electrical heating element. As the operator usually works with wet hands, he is apt to become shocked electrically by short circuit between his wet hands and the electrical heating element. Furthermore, in the apparatus heretofore proposed, no way was provided for accurately controlling the temperature of the air, so that the temperature of the air was so high as to cause discomfort to the scalp of the customer, or it was so low that drying of the hair was unduly retarded.

An object of this invention therefore, is to provide a method of curling hair in which the air for hair drying is heated jointly by the heat from the pump motor and the heat generated in the pump due to the compression of the air.

Another object of the invention is to provide an apparatus for carrying out the method in which the temperature of the air is readily controlled by varying the pressure of the air through the adjustment of a pressure relief valve.

Another object of the invention is to provide an apparatus consisting of a motor and air compressor which is totally enclosed in a sound insulated chamber so that noise produced thereby is completely isolated.

A further object of the invention is to provide an apparatus for delivering warm compressed air which is completely freed from lubricating oil used in the lubrication of the compressor.

A still further object of the invention is to provide a substantially noiseless apparatus which produces warm compressed air near the operator; also to improve methods of and apparatus for producing warm compressed air in other respects hereinafter specified and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification in which

Fig. 1 is a sectional elevation through the apparatus taken on line 1—1 of Fig. 3,

Fig. 2 is a fragmentary sectional elevation through the apparatus taken on line 2—2 of Fig. 1,

Fig. 3 is a sectional plan view through the apparatus taken on line 3—3 of Fig. 1,

Fig. 4 is a plan view of the apparatus, and

Fig. 5 is a central sectional view through one of our improved curlers.

Referring to the drawings by numerals, an electric motor 10 is connected by a wire 11 to a source of electric power. An air pump 12 is mounted on the end of motor 10 and is connected by a pipe 13 to an oil separator 14. This pump is preferably but not necessarily of the rotary vane type in which sliding vanes engage an eccentric cylinder. Lubricating oil is supplied from an oil feeder 15 through a pipe 16 to the pump 12. An air intake pipe 17 connects an air intake filter 18 to the pipe 16. Springs 19 resiliently support the motor 10 on a cabinet bottom plate 20.

Cabinet outer walls 21 are folded upwardly at their lower ends to form flanges 22 which are bent inwardly to form flanges 23 and then upwardly to form flanges 24. Cabinet inner walls 25 extend inside the flanges 24, and a ceiling plate 26 connects the side walls 25. A top plate 27 has downwardly extending peripheral flanges 28 which fit over the side walls 21 and are connected thereto by solder 29. The top plate 27 has a depression 30 which forms a tray for supporting the implements and tools of the operator. The outer cabinet walls 21 and top plate 27 are lined on the inside with a layer 32 of a sound deadening mixture of cork granules adhered together with asphalt emulsion. The inside surface of side plates 25 and ceiling plate 26 is coated with a layer 33 of sound deadening asphalt. Mineral wool 34 is packed between the layers 25 and 32 to further aid in preventing the transmission of sound through the cabinet walls. A hook 35 is provided on the cabinet plate 21 to support the electric cord 11, and an electric switch 36 is also mounted on the cabinet wall 21 to start and stop the motor 10. Handles 37 are also mounted on the side walls 21 and casters 38 are secured to the bottom plate 20 so that the cabinet may be easily moved from place to place. Air intake holes 39 are formed in the bottom plate 20 and an upstanding flange 40 is secured to the top of plate 20 adjacent said holes 39 to form a re-

ceptacle for the reception of bronze wool 41, said wool serving to filter out the dust from the air entering the cabinet and passing to the secondary air filter 18. A door 42 is secured to one of the side walls 21 by screws 43 so as to provide accessibility to the inside of the cabinet for repair or adjustment of the working parts. A downstanding flange 44 is formed around the periphery of bottom plate and is secured by screws 45 to the bottom of side walls 21. A layer of mineral wool 45a extends across the top of plate 20 and a perforated plate 45b covers said wool. An oil line 46 connects the bottom of oil filter 14 to the top of oil feeder 15 to return the oil separated from the air to the system.

A pipe 48 extends through the ceiling plate 26 and top tray plate 30, and is connected by a flexible hose 49 to a pipe 50 on the top of the oil separator 14, said hose being secured in place by conventional clamps 51. A manifold 52 of inverted V-shape is secured, as by soldering, to the top of tray 30 above the pipe 48. A safety blow-off valve 53 and a pressure adjusting valve 54 are mounted on one wall 55 of the manifold 52. A thermometer 56 is mounted on the top of a cylindrical well 57 formed on one end of manifold 52 for indicating the temperature of the air delivered into the manifold 52. A pressure gauge 58 is mounted on a cylindrical well 59 which is formed on the other end of manifold 52.

A plurality of flexible tubes 61 lead from a manifold wall 62, each of said tubes being connected to a tubular curler 63 having curved walls for receiving a strand of wet hair for drying and setting to form a curl. The end 64 of curler 63 is provided with an annular groove 66 for receiving a rubber or other flexible band 67. The opposite end 67a of curler 63 is provided with an annular groove 68 for receiving a flexible band 69. A tapered nipple 70 on the end of each tube 61 engages a tapered friction socket 71 formed on the inside curler end 67. Holes 72 are formed evenly in the walls of curler 63 to permit the passage of the warm compressed air through said holes and through the strand of hair to dry and curl the same. A U-shaped bracket 74 is secured to the cabinet wall 21 near the top thereof, and each of the legs 75 of said bracket has a series of holes to receive upstanding standards or rods 76. A U-shaped friction spring 77 is mounted on the inside of bracket 74 so that the ends of said spring 77 engage the rods 76 to adjustably maintain said rods in any desired axial position. An eye 78 is formed at the top of each rod 76 and each tube 61 passes through an eye 78. By adjusting the rods axially the weight of the tubes 61 can be largely taken off the customer's scalp.

In operation, air is drawn into the sound insulated cabinet through holes 39 and bronze wool 41, the latter serving to filter out any dust in the air. The air in the cabinet is then drawn into secondary air filter 18 where any remaining dust is filtered out. The clean air is then drawn through pipes 17 and 16 into compressed air pump 12 which is operated by motor 10. Oil for the lubrication of the pump 12 is introduced by oil feeder 15 through pipe 16. The air compressed by pump 12 passes up through pipe 13 and oil filter or separator 14 where all oil in the air is separated. Oil from separator 14 runs down through tube 46 to the oil feeder 15. The oil-free clean, warm air passes up through pipe 50, hose 49 and pipe 48 into manifold 52. A strand of wet hair is wound around each of the perforated curlers 63 and the warm air passes through the tubes 61 to the curlers 63 and through the strand of wet hair to dry and set the same. If the pressure of air in manifold 52 becomes excessive, safety valve 53 relieves the pressure. We have made the surprising observation that the heat generated by the motor and the heat incident to the compression of the air is sufficient to provide compressed air of the desired operating temperature of about 120° F. without the use of supplemental heating means. In fact the temperature may become so high for certain people as to cause discomfort to the scalp. If the temperature is too high as indicated by thermometer 56, valve 54 is opened slightly to reduce the air pressure in manifold 52 and bleed off some air with its accompanying heat. We have found that the desirable operating pressure is three pounds per squire inch, as indicated on pressure gauge 56 but this pressure may be varied considerably with satisfactory results. In the claims to follow, the words "air compressor" will be used to include any device for delivering air under low pressure of approximately 3 lbs./sq. in. The sound insulating cabinet also serves as heat insulation so that all heat generated in the cabinet is conserved. Varying the air pressure is a convenient and satisfactory method of varying the temperature of the air passing to curlers 72. In starting the machine, all tubes 61 are pinched off for about a minute to build up air temperature and pressure. The strands of wet hair are then wound on the curlers and dried in place to set the same. The tubes 61 are given a slight reverse twist so that the torque of the tubes maintains the strands of hair tight on the curlers.

We would state in conclusion that while the example illustrated and described constitutes a practical embodiment of our invention, we do not wish to limit ourselves precisely to these details, since manifestly, the same may be considerably varied without departing from the spirit of the invention as defined in the appended claims.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In an apparatus for curling hair, means consisting of a motor driven air compressor, a sound and heat insulating container enclosing said motor and compressor whereby during compression the air is raised to a hair drying temperature, a manifold for receiving heated compressed air from said compressor, means for delivering air from said manifold in a multiplicity of jets, and means for bleeding air from said compressor-manifold system so as to maintain the temperature of said air therein below a predetermined point.

2. In an apparatus for curling hair, a cabinet having an air inlet port, means adjacent said port for filtering dust from the air entering said cabinet, means for heating and compressing air consisting of a motor driven air compressor mounted within said cabinet, insulation for the cabinet whereby the heat generated by said motor and compressor is effective in raising the temperature of the air to a hair drying temperature, a secondary air filter associated with said compressor arranged to filter the dust from air entering said compressor, hair curling means and means for discharging dust-free warm compressed air from said cabinet to said hair curling means.

3. In an apparatus for producing warm compressed air, a cabinet having an air inlet port, a motor driven air compressor mounted within said cabinet for compressing and heating the air, said air compressor being arranged to draw air into said cabinet through said port, said cabinet being insulated whereby heat generated by said motor driven compressor is effective in raising the temperature of the air to a hair drying temperature and means for discharging warm compressed air from said cabinet.

4. An apparatus as described in claim 3 characterized by means for reducing the pressure of said discharged air so as to reduce the temperature of said compressed air below a predetermined point.

5. In an apparatus for producing warm compressed air, a heat and sound insulated cabinet having an air inlet port, a motor driven air compressor mounted within said cabinet, said air compressor being arranged to draw air into said cabinet through said port and to heat the air, means for supplying lubricating oil to said air compressor, means for filtering oil from the air delivered from said compressor, and means for discharging oil-free, warm compressed air from said cabinet.

6. In an apparatus for producing warm compressed air, a heat and sound insulating cabinet having an inlet port, a motor driven air compressor mounted within said cabinet, said air compressor being arranged to draw air into said cabinet through said port and to compress and heat the air, means for filtering dust from the air entering said cabinet, means for supplying lubricating oil to said compressor, means for removing lubricating oil from the warm air delivered from said compressor, and means for discharging warm filtered compressed air from said cabinet.

7. In an apparatus for producing warm compressed air, a heat and sound insulated cabinet, means consisting of a compressor in said cabinet for drawing air into said cabinet and compressing and heating said air, a manifold associated with said cabinet, a pressure blow-off valve and a manually operated pressure reducing valve associated with said manifold, and a plurality of tubes leading from said manifold for discharging warm compressed air from said manifold in a plurality of jets.

8. In an apparatus for producing warm compressed air, a heat and sound insulated cabinet, means in said cabinet for drawing air into said cabinet and compressing and heating said air, a manifold associated with said cabinet for receiving warm compressed air from said compressor, a plurality of flexible tubes connected to said manifold for discharging warm compressed air from said manifold in a plurality of jets, an axially movable standard supporting one of said tubes, and means for adjustably securing said standard in position to support the weight of said tube.

9. In a hair curling apparatus, a sound insulated cabinet, a motor driven air compressor mounted within said cabinet for drawing air into said cabinet and compressing and heating the same and discharging warm compressed air from said cabinet, a plurality of flexible tubes for receiving discharged air, and a perforated curling device secured to the end of each tube for drying a strand of wet hair wound about said device.

10. In a hair curling apparatus, a heat and sound insulating cabinet having an inlet port, a dust filtering medium in said port, a motor driven air compressor within said cabinet for drawing air through said filtering medium into said cabinet and heating the air, and means for discharging the heated compressed air from said cabinet to a hair curling device.

11. In a device of the class described, a heat and sound insulating cabinet having an air inlet port, a motor driven compressor within said cabinet for drawing air through said port into said cabinet, a filtering medium in said port for filtering dust from the air passing through said port, the heat from said motor and compressor being adapted to raise the temperature of said air, and means for delivering warm compressed air from said cabinet.

12. In an apparatus for generating warm compressed air for use in hair curling devices, a sound and heat insulating chamber, means in said chamber for drawing air into said chamber and compressing said air, the heat incident to the compression of said air being conserved by said insulated chamber and utilized for raising the temperature of said air to the desired operating temperature, and means for discharging said warm air from said chamber to the center of a tightly wound coil of wet hair for drying the same.

13. In an apparatus of the class described, a heat and sound insulating chamber, electrically driven compressing means in said chamber for drawing air into said chamber and compressing said air, the heat incident to the compression of said air and to the operation of said electrical means being conserved by said insulated chamber and utilized for raising the temperature of said air to the desired operating temperature, said sound insulated chamber serving further to prevent the substantial emission of audible sound from said chamber, and means for discharging said warm air from said chamber to the center of a tightly wound coil of wet hair for drying said coil from the inside out.

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