

May 21, 1940.

C. G. GROSS

2,201,229

HAIR DRIER

Filed Oct. 20, 1936

2 Sheets-Sheet 1

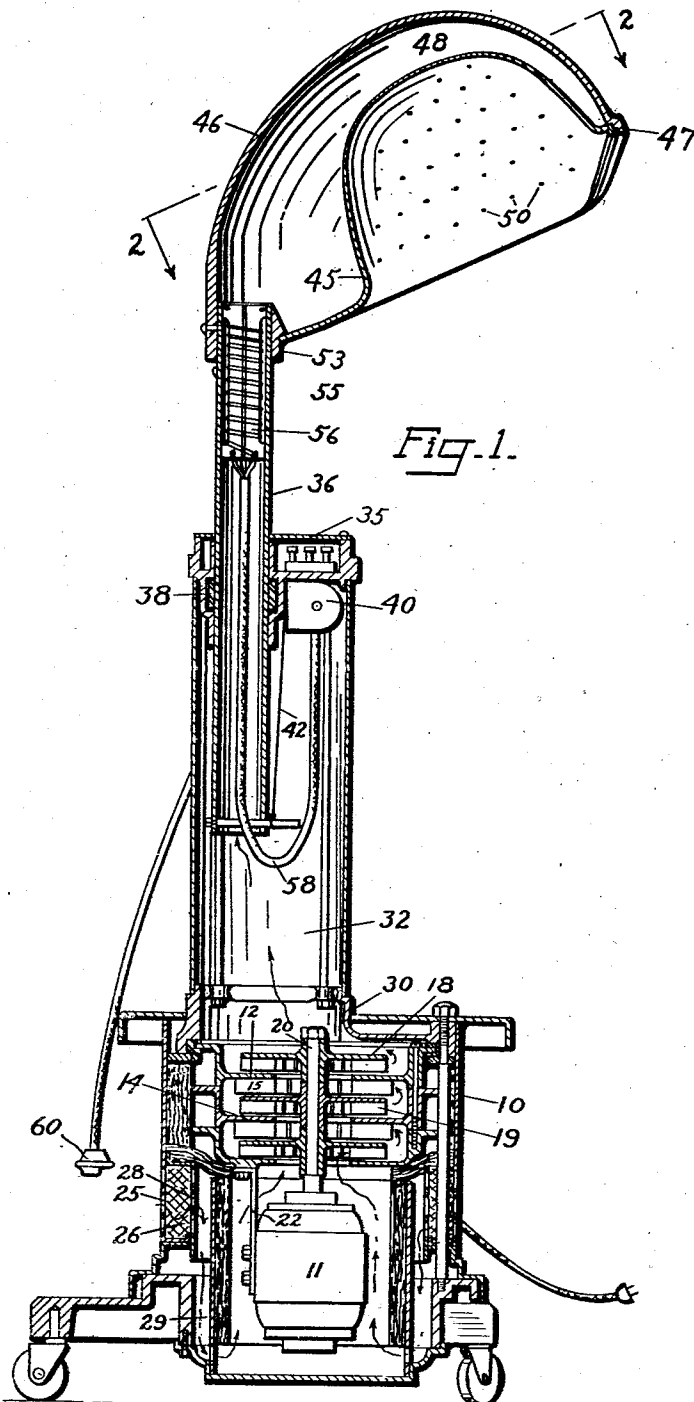


Fig. 1.

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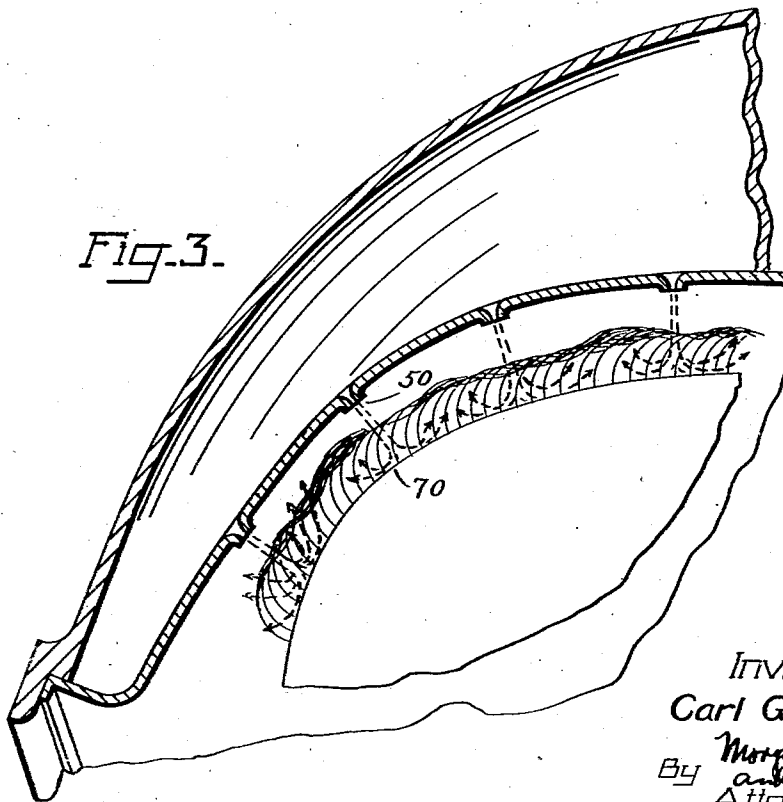
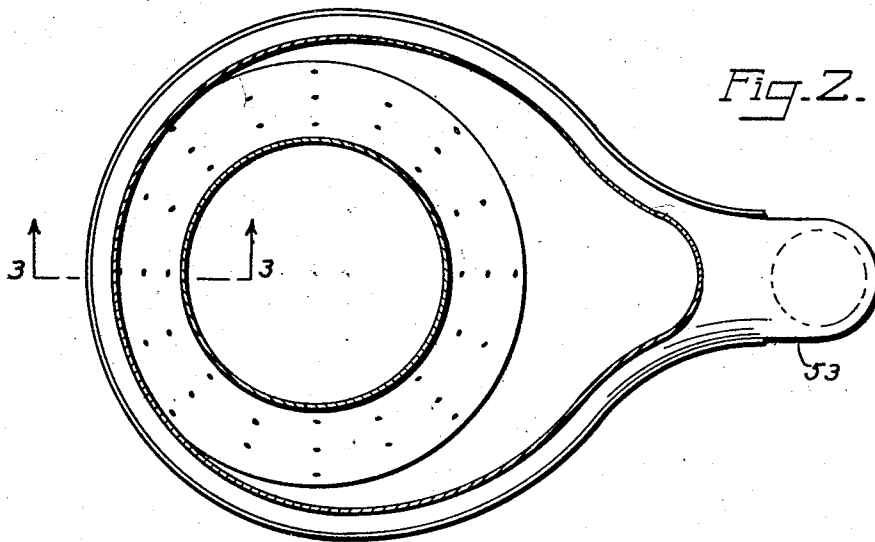
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HAIR DRIER

Filed Oct. 20, 1936

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,201,229

HAIR DRIER

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Application October 20, 1936, Serial No. 106,511

2 Claims. (Cl. 34—26)

The present invention relates to hair driers and more particularly to a novel and improved hair drier in which air under relatively high pressure is used.

5 Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

15 The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

20 Of the drawings:

Figure 1 is a vertical section through a typical and illustrative embodiment of the invention;

Figure 2 is a cross section taken on the line 2—2 of Figure 1; and

25 Figure 3 is a fragmentary section taken on the line 3—3 of Figure 2 and showing the drier in proper relation to the hair and scalp to be dried.

The present invention has for its object the provision of a novel and improved hair drier which will complete the drying operation in much shorter time than usual and with greater current economy. A further object is the provision of a novel and improved hair drier using relatively high pressure air which will penetrate through the thick layer of hair to the scalp, thereby drying the hair from the scalp outwardly, rather than from the outside inwardly as has heretofore usually been the case. Another object of the invention is the provision of a novel and improved method of drying the hair in which the air is projected through the hair to the scalp without disarranging the "setting" of the hair, and is thereafter allowed to expand and escape, drying the inner portions of the hair first and thereafter the outer layers of the hair.

30 In accordance with the illustrative embodiment of the invention, there is provided a hair drier including a motor-driven multi-stage fan for delivering air at relatively high pressures, and this fan is preferably located within the base of the drier. Connected to the fan is a chamber of relatively large cross section which acts as an expansion or plenum chamber to prevent the circulation of dust and other foreign matter, and connecting with the chamber is a conduit

which is counterbalanced and telescopically inserted into the chamber, also serving to support the drier hood on the chamber and base. The air supply for the fan is preferably drawn in from near the bottom of the base, through an air filter, and passes over the motor, transferring the motor heat from the motor to the air and thereby economizing on the heating of the air. The drier hood comprises a hollow chamber shaped to conform on its interior to the general contour of the customer's head, and provided with a large number of relatively small openings or jets through which air is forced from the chamber onto the customer's hair and scalp. Near the hood and located in the conduit is the heating coil for heating the hair to the desired temperature, and as is usually the case, these coils are supplied with electric current and are capable of being variously connected to control the amount of heat delivered by them.

The air delivered by the fan is preferably so related in volume and pressure to the size of the jet openings that these jets of air are of relatively high velocity, and a pressure of four to six inches of water is generally sufficient for this purpose. With this pressure and relatively small jets, the air is forced at high velocity through the outer layers of the hair and onto the scalp where it spreads out, expands and escapes through the outer layers of hair, thereby drying first the root portion of the hair and the scalp and then drying the outer layers of the hair with the lower velocity air which has absorbed some moisture. In this way, the outer layers of the hair not being exposed to the extremely dry air are not dried fast enough to prevent passage of the low velocity air as has heretofore been the case, but they retain their moisture until the scalp and root portions are thoroughly dry.

When using the method and apparatus of the present invention, it has been found, contrary to expectation, that the setting of the hair is not disarranged, and the hair is dried in from fifty per cent to sixty per cent of the usual drying time, and with a considerable economy of power. Thus the drier of the present invention not only reduces the cost per customer, but also is advantageous in that less of the customer's time is spent in drying, and a busy shop will require fewer driers to handle a given number of customers.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the illustrative em-

bodiment of the invention as shown in the accompanying drawings, there is provided a hollow base portion 10 within which is supported the motor 11 and the multistage fan 12 mounted on and directly above the motor. The multistage fan 12 comprises a plurality of centrally apertured stationary plates 14 provided with radial fins 15 projecting from one side thereof, and a similar number of rotor members 18, provided with radial vanes 19, which are assembled on the upwardly extending motor shaft 20. The motor 11 may be supported from the lower plate 14 by means of straps 22. In the outer side of the casing of the base portion 10 are formed a plurality of air inlets 25 and filtering material, such as matted fibre 26 is packed between the inlets 25 and an inner apertured shell 28 which communicates with the lower portion of the motor by means of passageways 29. Thus the air drawn in by the fan passes over the entire motor casing and maintains the motor cool at the same time warming the air.

At the upper portion of the fan, there is provided a casting 30 which is apertured to receive the lower end of the relatively large expansion or plenum chamber 32, and the air discharged from the fan at relatively high pressure and velocity is fed directly into the lower end of the chamber 32 where its velocity is greatly diminished and an opportunity is given for the settling of any particles of dust or other foreign matter which may have passed through the filter. In the plenum chamber the air is permitted to lose some of its extreme velocity, thus giving greater uniformity of flow and pressure to the air discharged, reducing pulsations and also helping to reduce noises.

At its upper end, the chamber 32 is provided with an apertured closure plate 35 which snugly fits the air tube 36 by which the drier hood is supported and supplied with air. This tube 36 extends downwardly into the chamber 32 and is guided therein by means of the collar 38, as well as being counterbalanced by means of the coiled spring device 40. The coiled spring device 40 is fixed to the inner portion of the chamber 32 and is connected to the lower end of the tube 36 by means of the flexible cable 42 so as to hold the tube 36 and attached hood at any position to which it may be moved.

The drier hood comprises an inner shell 45 and an outer shell 46, joined together at their adjacent edges 47 so as to form a hollow chamber between the shells. The inner shell is formed to the general contour of the human head while the outer shell 46 is shaped to provide a space 48 between the shells which space is of gradually diminishing size forwardly of the hood.

The portion of the inner shell 45 which is adapted to fit over the human head is provided with a relatively large number of substantially uniformly distributed small orifices 50 which diminish in size from the inner to the outer side of the inner shell wall, as shown in Figure 3, and thus greatly increase the velocity of the relatively high pressure air issuing therefrom. By properly shaping the air chamber 48 between the shells 45 and 46, substantially a uniform pressure may be maintained at all points within the chamber, and consequently the air issuing from all of the orifices 50 has a substantially equal velocity.

At the rear of the hood there is provided a neck 53 by which the hood is tightly fitted to the tube 36 to place the hood and tube in com-

munication. Heating means for the air are provided, and these means preferably comprise an electrical resistance 55 wound on an insulating block 56 which is supported at the upper end of and within the tube 36 and is connected to a source of power through flexible cable 58. Any suitable circuit may be used in connection with this heating means, but as is usual some means are preferably provided for permitting the customer to control the degree of heat. As embodied, there is provided in the heating circuit, an external switch 60 which serves to regulate the resistance of the heating circuit.

The method of the present invention may be conveniently explained in connection with the operation of the described embodiment. As the motor 11 drives the fan 12, the air is drawn into the base 10 of the machine through the apertures 25 and filtering means 26, passes over the motor where it is warmed and prevents overheating of the motor and is then delivered to the lowermost rotor 18. This discharges the air at its periphery and the air passes through the fins 15 and the central aperture of the second plate 14 to the next rotor where the pressure and velocity of the air are considerably increased. This action is repeated with the third rotor 14 and the air is then discharged at a relatively high pressure and velocity, the pressure being from four to six inches of water, into the lower portion of the chamber 32 which is of relatively large cross section. Here the velocity of the air is greatly reduced, permitting the foreign particles to settle out, and the air then passes to the relatively small tube 36 which conducts the air over the heating resistance 55 and into the chamber 48 of the hood. The air is delivered by the chamber to the orifices 50 and issues from them at a high velocity in the direction of the customer's head 60.

Due to the relatively high pressure of the air used, the resultant velocity is very high and is sufficient to penetrate the outer layers of the customer's hair without excessive spreading of the air jets, as shown in Fig. 3, thus reaching to the scalp 70 of the customer before coming in contact with a large amount of hair. On reaching the scalp, the jets of air spread and the air is expanded so that its velocity is greatly reduced and the slowly moving air passes out away from the scalp through the outer layers of hair, absorbing moisture from them and drying the inner layers before drying the outer layers. The expanded air, which has absorbed the moisture of the hair, then escapes around the edges of the hood.

Due to the small amount of air required by this drier, the customer is much more comfortable as there is no large quantity of hot air which must pass over the forehead and face, and the parching of the skin generally noticed is absent.

The quantity of power expended in drying a head with the present invention is greatly less than with the driers of the prior art, and in many cases by using the apparatus and method of the present invention and a current consumption of fifteen per cent more than is customary with the prior art driers, the drying time is reduced to fifty or sixty per cent of the former time required, thereby resulting in a power saving of more than thirty per cent to say nothing of the greater comfort to the customer by reason of the shorter drying time.

The invention in its broader aspects is not limited to the specific mechanisms shown and de-

scribed but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. A portable high pressure hair drier, including in combination a base, a vertically arranged motor-driven multistage fan placed in the base to secure a low center of gravity, an air filter extending around the motor to secure a large filtration area and a low inflow velocity, a labyrinth of passages from the filter to the fan to reduce noise carried back out of the drier, a plenum chamber surmounting the base, forming a column, a balanced vertical adjustable conduit of a smaller cross-sectional area than said plenum chamber extending through the top of the plenum chamber and communicating therewith to form an outlet, a hood, shaped to fit the head and containing an air chamber which partially covers the head supported by said conduit and communicating therewith, nozzles in the air chamber of the hood directed towards the head, the multistage fan and nozzles in the hood being so constructed and arranged as to create a pres-

sure in said hood air chamber amounting to at least four inches of water pressure.

2. A portable high pressure hair drier including, in combination, a compact base, a motor-driven, high pressure fan in said base with its shaft vertically disposed, to secure a low center of gravity, an air filter in said base having a relatively large air inlet area to provide filtration with low inflow velocity, means disposed between the inlet and the fan to reverse the flow of air therebetween, thus providing sound dampening effects, a plenum chamber adjacent said fan forming a column, a balanced, vertical, adjustable conduit of a substantially smaller cross-sectional area than said plenum chamber communicating with said chamber to form an outlet, an air distributor supported by said conduit, said distributor being shaped to fit a human head and provided with a plurality of relatively small openings to direct air toward a head when surrounded by said distributor, the high pressure fan and air openings being of adequate size to create an air pressure within said air distributor amounting to at least four inches of water pressure.

CARL G. GROSS.