April 22, 1941. G. R. TREMOLADA 2,239,279

PNEUMATIC RAZOR

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Fig. 5

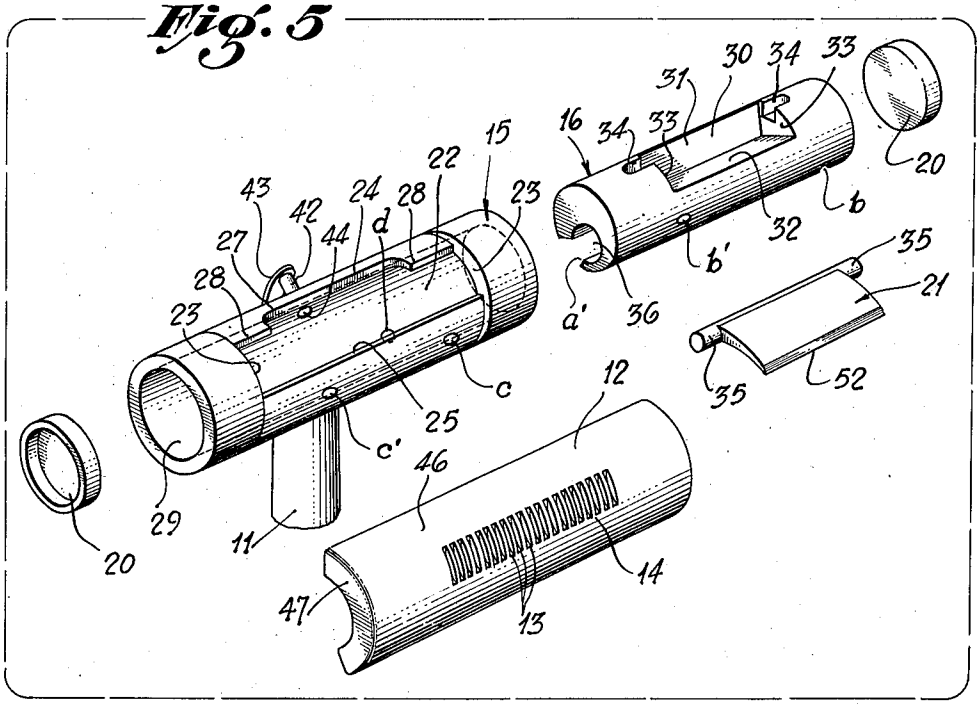


Fig. 6

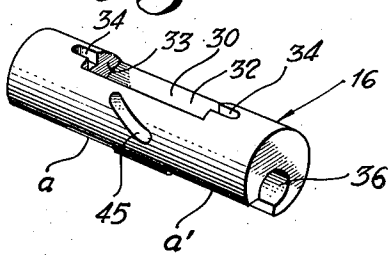
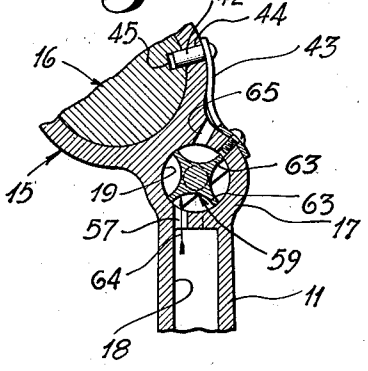


Fig. 7



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PNEUMATIC RAZOR

Guglielmo R. Tremolada, Los Angeles, Calif.

Application August 18, 1939, Serial No. 290,833

5 Claims. (Cl. 30—43)

My invention relates in general to razors of the type having moving blades and relates in particular to a razor having a blade which is operated pneumatically.

It is an object of the present invention to provide a razor having a keen cutting blade which is reciprocated in cutting position and in such manner as to have a slicing action in severing the hair.

It is a further object of the invention to provide a blade which is reciprocated at relatively high velocity on a substantially helical path within a cylindric guard providing a comb through which the hair to be cut may pass.

It is a further object of the invention to provide a razor having a blade carried by a body which is given a longitudinal reciprocating movement accompanied by a partial rotation, and it is a further object of the invention to provide a device of this character wherein the body is reciprocated within a shell or head by the controlled application of fluid pressure, such fluid being preferably air supplied from a continuous source of air under pressure or from a hand operated bulb.

It is a further object of the invention to provide a razor wherein the blade is moved by use of a piston which may be of double acting or single acting type. The piston may be moved in both of its directions of movement by fluid pressure or may be moved in one direction by spring and in the other direction by the application of fluid pressure.

A further object of the invention is to provide a razor having only two moving parts, namely, a blade and a piston of such simple form that they may be cheaply made; and it is a further object of the invention to provide a razor in which all of the parts are simple and relatively inexpensive. The head in which the piston operates is of such simple form that it may be readily die cast, and the guard or comb is readily formed by use of a simple stamping operation. The razor blade, being made of steel requires machine operation in its making, but due to its simple form it may be made from rolled stock.

It is a further object of the invention to provide a razor of fluid operated type wherein the control for the fluid comprises valve parts of simple form operating to deliver the motivating fluid alternately to the opposite ends of the piston.

It is a further object of the invention to provide a razor with a reciprocating blade held in position relative to a guard or comb by centrifugal force, by air pressure, and by the direction in which the inertia of the blade reacts against the motivating force applied thereto.

It is also an object of the invention to provide a razor having means for directing a flow of air in such direction as to carry off the hair cuttings and also to cool the frictionally engaging parts, for example, the blade and the guard.

It is a further object of the invention to provide a razor of the type having a mechanically moved blade, wherein the guard is movable from operating to inoperative position, the razor likewise having means for removably supporting the blade so that it may be taken out and replaced when the guard is moved into inoperative position.

A further object of the invention is to provide a razor having a shell in which a body is reciprocated in axial direction, and wherein the body has such inner engagement with the shell as to cause a partial rotation of the body as it is reciprocated, the movement of the body being transmitted to a blade which moves relative to a comb.

Further objects and advantages of the invention will be brought out in the following part of the specification.

Referring to the drawings which are for illustrative purposes only:

Fig. 1 is a perspective view of a preferred embodiment of the invention drawn to enlarged scale.

Fig. 2 is an enlarged partly sectioned fragmentary view of the upper part of the razor shown in Fig. 1.

Fig. 3 is a cross-section taken substantially as indicated by the line 3—3 of Fig. 2.

Fig. 4 is a section similar to Fig. 3, but showing the blade in raised position.

Fig. 5 is a panel showing in perspective and to enlarged scale all of the parts comprising the preferred embodiment of my invention.

Fig. 6 is a perspective view looking toward the back of the piston body of the preferred form of the razor.

Fig. 7 is a fragmentary section taken substantially on a plane represented by the line 7—7 of Fig. 2.

As shown in Fig. 1, the razor comprises a head 10 and a downward extending handle 11, the head 10 having a guard 12 with side-by-side openings or preferably milled slots 13 forming a comb 14 through which the hair to be cut may pass. As

the position thereof shown in Figs. 2 and 3, the port 70 will communicate with the port *d* which in turn communicates through the slot *a* and the opening 37 with the space 39 at the right end of the piston 16. At this time the exhaust ports *b'* and *c'* will be aligned so as to connect the openings 36 at the left end of the piston 16 with the lower portion of the crescent-shaped face 26 within the guard 12. Air under pressure will pass from the right-hand annular space 67 through the ports 70 and *d*, with the result that an air pressure will be quickly built up at the right end of the piston to impel the same in leftward direction.

As the body 16 moves leftward from its position of Fig. 2 the slot 45 will travel along the pin 42 and the body 16 will be rotated in clockwise direction so that when it reaches its position at the left end of the cylinder 15 it will be in the position in which it is shown in full lines in Fig. 4. When the piston 16 reaches the leftward end of its travel, the exhaust port *b* will have rotated helically from its position in Fig. 2 to its position in Fig. 4 to communicate with the exhaust port *c*. Likewise, the valve means 59 will have rotated so as to carry the valve port 70 away from the port *d* and so as to rotate the port 71 at the left end of the member 59 upward from its position of Fig. 2 into communication with the port *d'* so that air will then be delivered through the left-hand opening 58 of Fig. 2, the annular channel 67 communicating therewith, the port 71, the port *d'*, and the slot *a'* into the opening 36 at the leftward end of the piston 16, from which the air will pass into the air chamber 38 abutting the left end of the piston 16. The pressure of air in the chamber 38 will force the cylinder in rightward direction so that it will be returned to its position shown in Fig. 3. As long as the pressure of air or other suitable gaseous fluid is applied, rotation of the valve means 59 will direct the same alternately through the port *d* and *d'* so that reciprocation of the body 16 will be continued and the cutting 52 of the blade 21 will be caused to traverse the opening 13 of the comb 14 with a slicing action due to the fact that each point of the edge of the blade must follow an approximately helical path.

Air from the exhaust ports *c* and *c'* will pass upward in the space 26 and will be brought against the lower face of the blade 21. Part of this air will pass into the pocket 30, and as the blade moves upward from the position in which it is shown in Fig. 3 air will pass out through the openings 13 to clean the comb and also cool the frictionally engaging surfaces. As the blade 21 is moved downward from its position of Fig. 4 an air pressure will be built up against the lower face thereof to assist centrifugal force in holding the blade out against the inner face of the guard 12.

When it is desired to remove the blade for the purpose of sharpening, or to be replaced by a new blade, the spring 43 may be lifted and the pin 42 disengaged from the slot 45, after which the guard 12 is rotated into the dotted line position 49 thereof. The body 16 may then be rotated in anti-clockwise direction from its position of Fig. 3 so that the trunnions 35 will lie in a position to the left of the shoulders 28 and accordingly may be lifted out of the recesses 34, whereupon the blade may be removed from the head 10 through the opening 50 exposed when the guard is rotated into its retracted position.

I claim as my invention:

1. In a razor, the combination of: a cylindrical shell having an opening in the side wall thereof; a cylindrical body movable in said shell, said body having a depression in a side thereof with walls at the ends of said depression forming bearing recesses; means for delivering a fluid under pressure to reciprocate said body; a razor blade having trunnions seated in said bearing recesses and a cutter portion extending out through said opening of said shell, said cutter portion having a cutting edge; and a wall outside said opening forming a guard for the cutting edge of said blade.

2. In a razor, the combination of: a cylindrical shell having an opening in the side wall thereof; a cylindrical body movable in said shell, said body having a depression in a side thereof with walls at the ends of said depression forming bearing recesses; means to reciprocate said body; a razor blade having trunnions seated in said bearing recesses and a cutter portion extending out through said opening of said shell, said cutter portion having a cutting edge; and a guard mounted on said shell so as to be moved from an operating position over said opening to a retracted position exposing a portion of said opening in said shell so that said blade may be passed therethrough.

3. In a razor, the combination of: a cylindrical shell having an opening in the side wall thereof and fluid inlet and exhaust port means; a cylindrical body movable in said shell; fluid inlet and exhaust valve means cooperating with said port means of said shell so as to apply fluid pressure to said body so as to move the same in said shell; and a blade positioned in cooperative relation to said opening and having connection to said body so as to receive reciprocating movement therefrom.

4. In a razor, the combination of: a cylindrical shell having an opening in the side wall thereof; a cylindrical body movable in said shell, said body having a depression in a side thereof with walls at the ends of said depression forming bearing recesses; means for delivering a fluid under pressure to reciprocate said body in axial direction; a razor blade having trunnions seated in said bearing recesses and a cutter portion extending out through said opening of said shell, said cutter portion having a cutting edge; a guard mounted on said shell so as to be moved from an operating position over said opening to a retracted position exposing a portion of said opening in said shell so that said blade may be passed therethrough; and means of interengagement between said shell and said body to impart a rotary movement thereto as the same is moved in axial direction by said fluid.

5. In a razor, the combination of: a cylindrical shell having an opening in the side wall thereof and fluid inlet and exhaust port means; a cylindrical body movable in said shell having fluid inlet and exhaust port means cooperating with said port means of said shell so as to apply fluid pressure to said body so as to move the same axially in said shell, there being means for imparting rotation to said body as the same is axially moved in said shell; and a blade positioned in cooperative relation to said opening and having connection to said body so as to receive reciprocating movement therefrom.

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April 22, 1941. M. J. WOZNACK 2,239,280

MACHINE FOR PICKING UP ROCKS FROM A HIGHWAY

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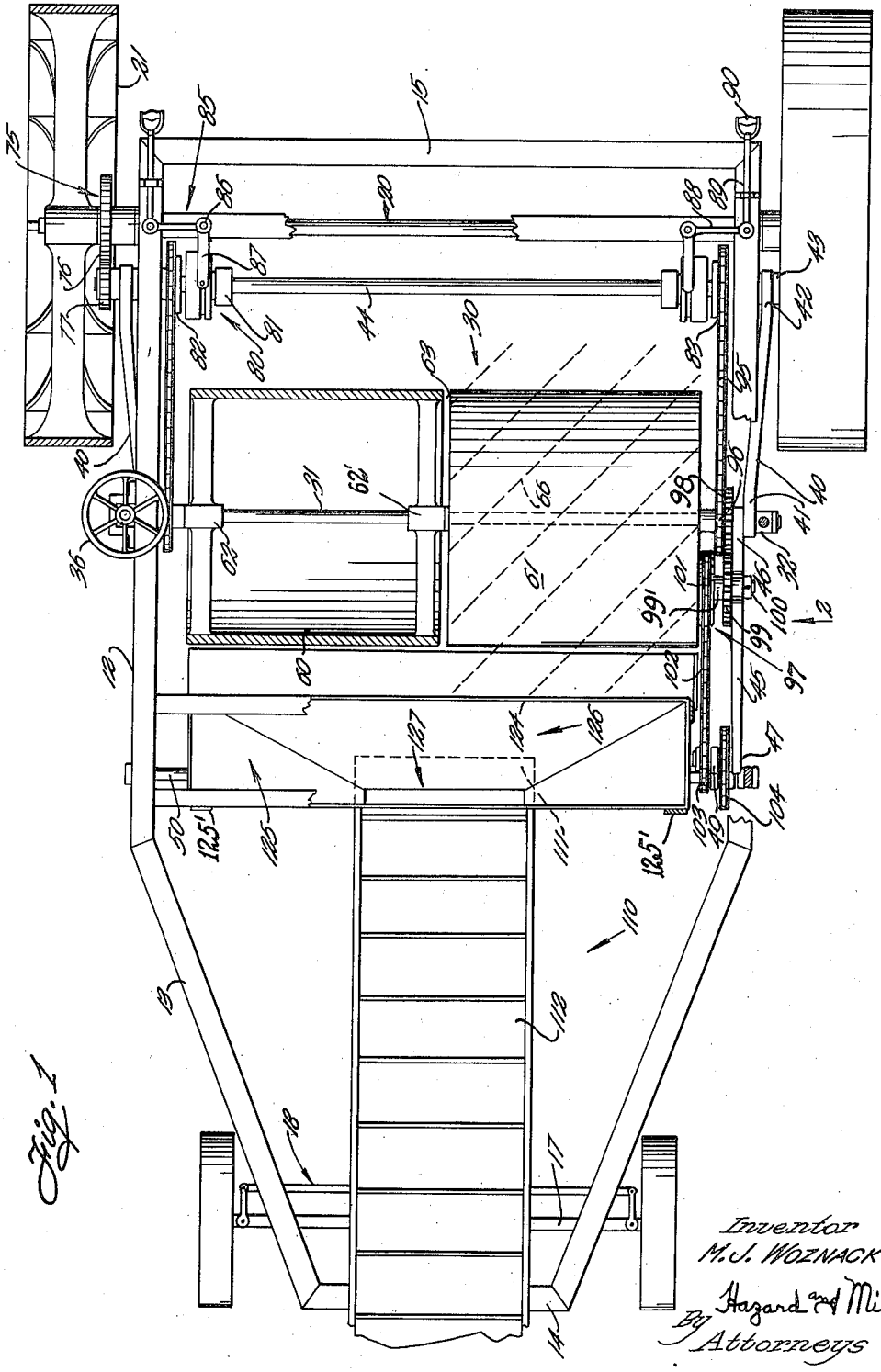


Fig. 1

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