Jan. 28, 1941. G. DALKOWITZ 2,229,960

MANUALLY OPERATED DRY SHAVER

Filed June 8, 1938 2 Sheets-Sheet 1

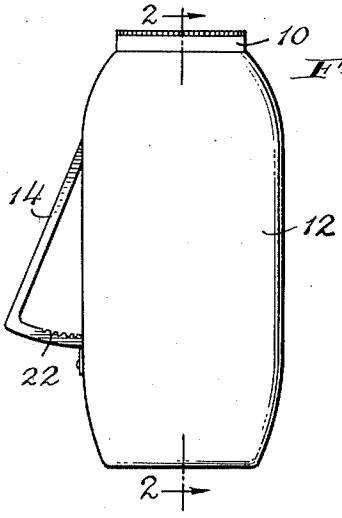


Fig. 1.

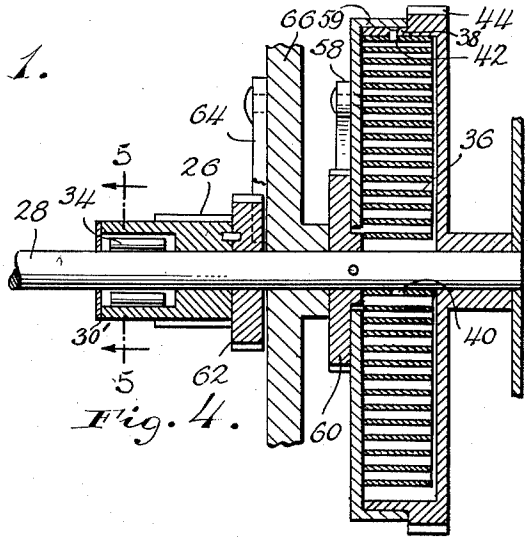


Fig. 4.

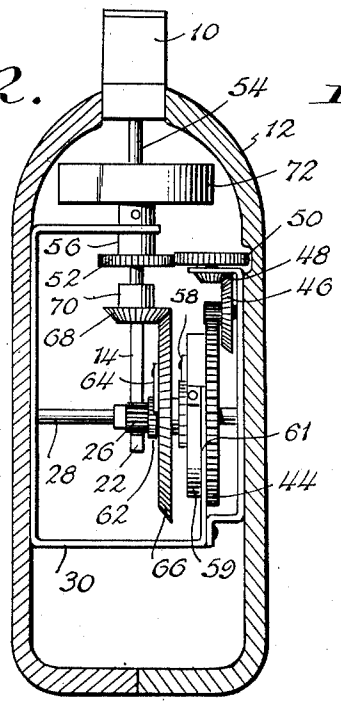


Fig. 2.

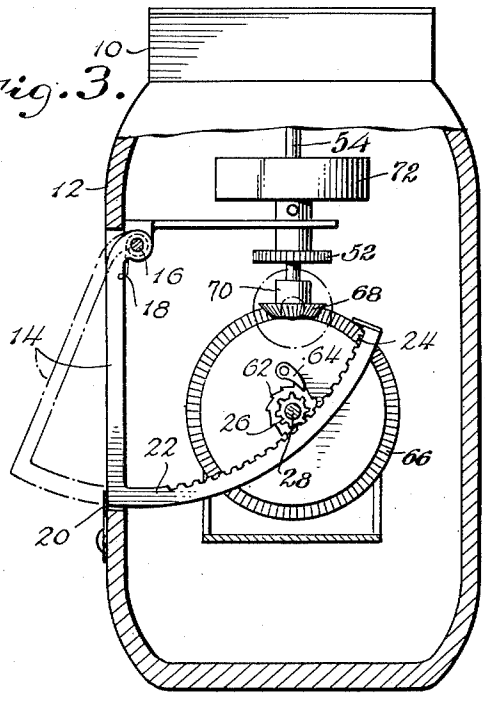


Fig. 3.

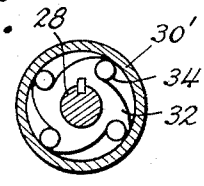


Fig. 5.

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Fig. 6.

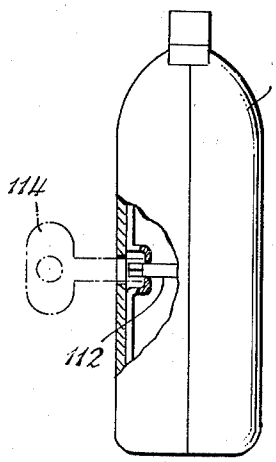


Fig. 7.

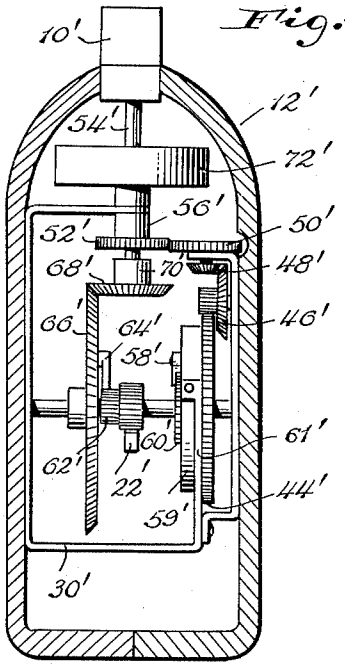


Fig. 8.

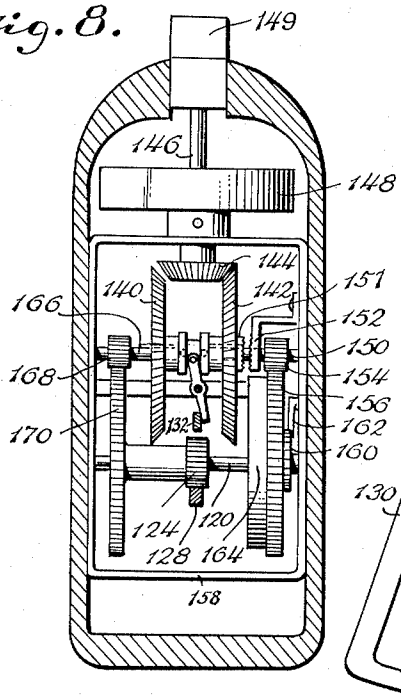
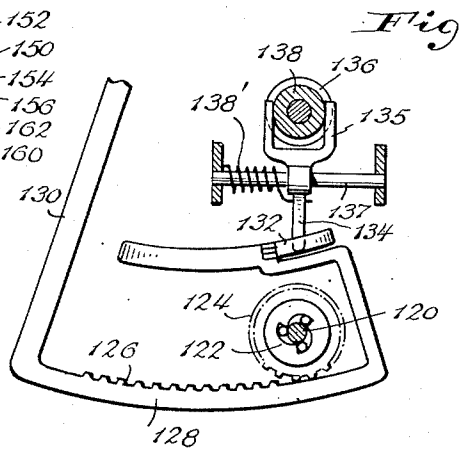


Fig. 9.



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UNITED STATES PATENT OFFICE

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MANUALLY OPERATED DRY SHAVER

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Application June 8, 1938, Serial No. 212,436

15 Claims. (Cl. 185—11)

This invention relates in general to shaving apparatus or implements of the type known as dry shavers which operate upon the principles of hair clippers and in which the so-called shaving operation is effected by bringing each hair between two relatively movable members so as to result in a hair clipping operation, as in a conventional clipper.

More particularly, this invention relates to an arrangement by which the relative movement of the movable members is effected.

Devices of this type are generally operated by a motive source developed by a source of energy within the shaver such as an electric motor or from an outside source of motive power delivered to it as by a flexible shafting.

One of the general objects of my invention is the provision of an arrangement whereby the motive force for operating the dry shaver is manually developed and applied for such operation, and from one aspect, my invention contemplates that the arrangement be such that the manually developed motor force be discharged at such a rate as to give a relatively steady flow of energy of sufficient intensity and duration to effect the shaving operation, and from another aspect, my invention contemplates that a portion of the developed motive force be stored for discharge at a time when additional energy is required in order to maintain the flow of energy steady and at the required rate for a further period to permit of the completion of the shaving operation.

In the specific embodiments illustrated in the drawings, I disclose an apparatus whereby the application of energy thereto manually, will cause one portion of my apparatus to start the operation of the razor at the desired rate of speed, and another portion of my apparatus to store a portion of the manually developed energy and to discharge said stored energy to the first mentioned portion when said portion fails to operate the shaver parts at the rate predetermined for effective shaving.

These objects and such other objects as will hereinafter appear or be pointed out are attained by the illustrative embodiments of my invention disclosed in the drawings, wherein:

Figure 1 is a plan view of a dry shaver;

Figure 2 is a longitudinal sectional view substantially on the line 2—2 of Figure 1 looking in the direction of the arrows;

Figure 3 is a view similar to Figure 1 with the portion of the casing removed so as to disclose the interior of the dry shaver casing;

Figure 4 is an enlarged detail view of a portion of the power mechanism;

Figure 5 is a sectional view of a detail substantially on the line 5—5 of Figure 4, looking in the direction of the arrows;

Figure 6 is a side elevational view of a dry shaver featuring a second embodiment of my invention, portions being broken away to disclose the interior construction;

Figure 7 is a view similar to Figure 2 of another embodiment of my invention;

Figure 8 is a view similar to Figure 2 showing still another embodiment of my invention; and

Figure 9 is an enlarged detail view of a portion of the mechanism of Figure 8.

Referring first of all to Figures 1 to 5 inclusive for a detailed description of the embodiment of my invention disclosed therein, it will be observed that I have shown a dry shaver comprising a shaver head 10 mounted on a casing 12, which latter houses the mechanism for actuating the shaver.

Before describing my invention in detail, I will premise that it comprises generally the following elements: (*a*) a mechanism comprising means such as a fly wheel for operating the dry shaver parts; (*b*) a mechanism for storing power manually applied thereto such as a coil spring; (*c*) a device for applying power manually to either or both of said mechanisms and (*d*) an arrangement by which said two mechanisms are caused to interact and one to supplement the other.

The manually operated actuating mechanism is shown as comprising a lever 14 pivoted to the casing as at 16, and urged by means such as a spring 18 to normally assume a position shown in Figure 1 and in dot and dash lines in Figure 3, in which it protrudes out of the casing. The lever 14 may be pushed into the casing in Figure 3 in which it is positioned close to or even within the contours of the casing, and when it is in this position it may be prevented from moving outward by any suitable or preferred locking means, such as the slidably mounted plate 20 that may be slid into the position shown in Figure 3 in which it overlies the lever 14 and keeps it from moving outward. When the plate 20 is retracted into the position shown in Figure 1, it will permit the lever 14 to move outside of the casing.

At its free end the lever 14 is shown as carrying an arcuate extension 22 provided with rack teeth 24 adapted to mesh with the teeth of a pinion 26 mounted on a main shaft 28 journalled within the casing 12, as for example, in a frame 30, and

serving to carry the actuating mechanism for the shaving head 10.

Operatively positioned intermediate the pinion 26 and the shaft 28 is an arrangement whereby the shaft may be locked to the pinion on the inward movement of the lever 14, but the pinion will be released from the shaft on the outward movement of the lever 14. For this purpose I may use mechanism of the one way clutch or "free wheel clutch" type, such as shown in the drawings in Figures 4 and 5, and that may comprise a hollow member 30', which is shown as an extension of the pinion 26 within which is positioned a cam member 32 and rollers 34. As is well understood, when the shaft 28, as shown in Figure 5, rotates counterclockwise in relation to the casing 30' the rollers 34 will ride up on the cam surfaces and interlock the member 32 and the casing 30'. If relative rotation in the reverse direction takes place the rollers enter pockets into which they fit freely and have no interlocking effect. If the casing 30' outruns the shaft 28 in a counterclockwise direction, there will be no interlocking.

As the shaft 28 is rotated by the lever 14 it will serve to wind up a coil spring 36 located within a hollow gear 44 and having its inner end fastened to the shaft 28 as indicated at 40 in Figure 4 while its outer end is fastened to the flange 38 of the gear 44 as indicated at 42 in Figure 4. The flange 38 is journalled within a casing 59 that is held in fixed relation to the frame 30 in any suitable or preferred manner, as by a member 61. The gear 44 is shown as meshing with a train of gears including members 46, 48, 50 and 52, the last named being coupled to a shaft 54, that serves to actuate the shaver head, through a one way clutch mechanism designated by the numeral 56, which may be of the type shown in Figure 5.

The casing 59 carries a pawl 58 adapted to engage the teeth of the ratchet 60 fixedly related to the shaft 28. It will be observed that when the shaft 28 is rotated in the proper direction and the gear 44 is fixed the spring 36 will be wound up, while if the gear is released the spring 36 will uncoil since the shaft 28 and the inner end of the spring are held against rotation in one direction by the pawl 58 which is mounted on the fixed casing 59.

Fixedly associated with the pinion 26 is shown a ratchet 62 adapted to be engaged by a pawl 64 carried by a bevel wheel 66 meshing with a bevel wheel 68, which latter is connected to the shaft 54 by one way clutch 70. When lever 14 is pushed inward the wheel 66 is rotated, while when it moves outward the pawl 64 is free to ride over the teeth of ratchet 62 and the wheel 66 is free.

Shaft 54 which constitutes the actuating shaft for the dry shaver head is shown as carrying thereon an inertia member in the form of a fly wheel 72. The fly wheel serves the two-fold function of making more smooth the action of the shaver head and of storing energy, so that after it is set in motion the energy stored therein will serve to operate the shaver head for a considerable time after manual actuation of the fly wheel is stopped.

With the aid of the foregoing description of the construction the operation will now be described.

A person desiring to use a dry shaver will actuate the lever 14 by alternately pushing it toward the case and releasing it. This will cause one-way rotation of the shaft 28, which will rotate the fly wheel 72 through the train of gearing. At the same time the spring 36 will be wound.

As long as the rotational speed of the fly wheel is less than that of the beveled gear 68 it will be driven by the said gear due to the action of the one-way clutch. However when gear 68 slows down the fly wheel is free to outrun the gear 68. The same holds true of the fly wheel shaft 54 in relation to the gear 52 driven by the clock mechanism. It will further be observed that of the gears 52 and 68, that one will drive the shaft 54 which has the greater speed, while the other one will run idle. The result is that while the lever 14 is being pushed inward the fly wheel will ordinarily be driven by said movement and when the lever moves outward under the action of the spring 18, the shaft 54 will outrun the gear 68. During the outward movement of the lever the spring 36 will unwind and will commence to drive the fly wheel.

After the fly wheel has been sufficiently speeded up, manipulation of the handle may be stopped, and the shaving operation commenced. It is not, however, necessary to commence the shaving operation immediately after the manipulation, as the shaver will be kept in motion for a considerable time after the manipulation has stopped, because of the energy stored in the fly wheel and the spring.

If desired an arrangement may be provided to control the speed of unwinding of the spring 36. It may, for instance, be in the form of an escapement such as is used in clocks and mechanical toys. As I have found that my invention will work satisfactorily without such an arrangement, I have not illustrated it.

In the embodiment of Figure 6 I have shown a manually operated dry shaver in which the operations of spinning the fly wheel and winding the spring are effected by a handle instead of by a pivoted lever as in the first described embodiment. In that figure, 110 designates the casing of the shaver, 112 designates an input shaft through which the mechanism may be energized, and 114 designates a handle that may be applied to the shaft 112 when it is desired to apply and to store energy, and which may be removed prior to using the shaver, or when it is desired to store it.

While the handle has been shown as of a type commonly used on clocks, it is to be understood that it may be of any suitable or preferred type, such as a crank, for example.

The embodiment of Figure 7 is similar in many respects to the first described embodiment and for that reason the description thereof may be abridged by stating that similar parts have been numbered similarly but the numbers have been primed.

On comparing Figures 2 and 7 it will be observed that each part of Figure 2 has its counterpart in Figure 7. The point of distinction lies in the location of the bevel wheel 68' which, together with the pawl 64' and ratchet 62', is shown as located to the left of the pinion 26' and the meshing bevel wheel 68', whereas the corresponding parts in Figure 2 are located to the right.

The result of this arrangement of the parts will be observed to be that on the inward movement of the arm 22' the spring will be wound, as in the embodiment of Figure 2, but the bevel wheel 66' will run idle, while when the arm 22' moves outwardly the bevel wheel 66' will be actuated while the spring will be discharging its

energy and cooperating with the bevel wheel 66' to actuate the fly wheel 72'.

In the embodiment of Figures 8 and 9 I have shown an arrangement in which instead of the automatically acting one-way clutches on the fly wheel shaft, positively operated clutches are shown, and these are operated by the movement of the operating lever to alternately connect the clock work or the direct drive to the fly wheel.

In these figures 120 designates the main shaft on which is mounted a one way clutch 122 having gear teeth 124 in its periphery that are adapted to mesh with the teeth 26' of the arm 128 carried by the operating lever 130. Movable with the lever 130 is a cam arrangement 132, which, as the lever 130 moves in, moves a pivoted clutch arm 134 to the right, as shown in Figure 8, whereby the forked end 135 of the lever, that engages the groove 136 in the clutch collar 138 rotatably connected to bevel gears 140 and 142, moves the collar 138 to the left. Thereby the gear 142 is caused to move to the left and to mesh with gear 144 on the actuating shaft 146 that carries the fly wheel 148, while at the same time the gear 140 is thrown out of mesh with gear 144.

The gear 142 is slidably mounted on the shaft 150 but rotates therewith. Consequently, in the position shown in Figure 8, the gear 142 is driven by the clockwork arrangement shown as comprising a gear 154 fixedly mounted on shaft 150 and driven by the gear 153 that is actuated by a clock spring (not shown) similar to the spring 36 of the first embodiment.

A ratchet 160 is fixedly related to the shaft 120, and is engaged by the pawl 162 carried by the frame 158, so that the shaft 120 can only rotate in one direction.

It will be understood that the spring and its mounting function like the corresponding parts of the previously described embodiments.

The gear 140 is driven from the pinion 124 through the intermediate gears 170 and 168, fixedly related respectively to the pinion 124 and to the shaft 166, the latter carrying the gear 140.

It will now be clear that while the lever 130 and its arm 128 are being pushed inward, the pinion 124 runs idle, while the shaft 120 is locked against rotation by the pawl and ratchet arrangement 160 and 162, and the coil spring in the housing 164 will unwind and through its teeth 156 will actuate the train of gears 154, 142 and 144 and will turn the fly wheel 148 and actuate the dry shaver head.

As the lever 130 nears the end of its inward movement the cam 132 releases the arm 134 which is moved to the left by the spring 138' and the member 136 is moved to the right so that gear 142 is disengaged from the gear 144, while the gear 140 is moved into engagement with the gear 144. As the gear 142 moves to the right the clutch teeth 151 on its hub engage the fixed set of teeth 152 and the frame, so that the spring cannot unwind; on the contrary it is wound up due to the turning of the shaft 120 by the outward movement of lever 130.

As the pinion 124 turns, the fly wheel 148 is caused to turn and the shaver head 149 is actuated by the train of gears already described, which is in mesh with the gear 144 on the actuating shaft 146.

As the end of the outward movement is reached the cam 132 again acts to throw the lever 134 so as to disconnect the gear 140 from gear 144 and to connect gear 142 to gear 144, whereby the direct drive of the fly wheel 148 is stopped and driving thereof by the clockwork mechanism commences.

While I have herein disclosed several illustrative embodiments of my invention, it will be understood that the same may be embodied in many other forms without departing from the spirit thereof, as will be obvious to those skilled in the art, and that the disclosure herein is by way of illustration merely and is not to be interpreted in a limiting sense, and that I do not limit myself other than as called for by the prior art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is:

1. Motor mechanism for a dry shaver comprising a member in the form of a rotating mass for storing and giving out energy, a second energy storing member of a different type, manual means for applying energy to said members, mechanism for connecting said members to said manual means, and mechanism to cause said second energy storing member to actuate said rotating mass when the speed of rotation of the mass drops below a predetermined speed of rotation.

2. Motor mechanism for a dry shaver, said mechanism comprising means manually movable from a normal position in one direction, means energized by said movement to return said manually movable means to its normal position, a shaver head, actuating means for said shaver head including a fly wheel, a power storage device, mechanism for causing movement of said manually movable means in one direction to store power in said device, mechanism for causing said manually movable means on its return movement into its normal position to actuate said fly wheel, and mechanism for discharging power from said device into said fly wheel.

3. Motor mechanism for a dry shaver provided with an actuating shaft for the shaver head, said mechanism comprising a mass carried by the actuating shaft, a resilient power device, means for transferring energy from said power device to said actuating shaft, and manually operated mechanism for simultaneously actuating said actuating shaft and charging said device.

4. Motor mechanism for a dry shaver having a shaver head comprising means manually movable from a normal position in one direction, means energized by said movement to return said manually movable means to its normal position, actuating means for said shaver head including a fly wheel, a power storage device, mechanism for causing movement of said manually movable means in one direction to store power in said device, and a clutch operated by the movement of said manually movable means in one direction to cause said device to discharge power into said fly wheel and by movement in the opposite direction to cause said manually movable means to actuate said fly wheel.

5. Actuating mechanism for a dry shaver, said mechanism comprising an actuating shaft, a fly wheel on said shaft, a spring motor, a manually operable oscillatable member, mechanism for winding said spring motor by movement of said member, mechanism for rotating said actuating shaft, by movement of said member, and mechanism for transmitting power from said spring motor to said actuating shaft, said two last named mechanisms including automatic one-way clutches, permitting said actuating shaft to outrun either of said mechanisms.

6. Actuating mechanism for a dry shaver, said mechanism comprising an actuating shaft, a fly wheel on said actuating shaft, a main shaft, a member manually movable in one direction for rotating said main shaft in one direction, means for bringing said manually movable member back into a normal position whenever it is displaced therefrom manually, mechanism for driving said actuating shaft whenever said manually movable member moves in one direction, a spring motor adapted to be wound when said main shaft is moved, and mechanism for driving said actuating shaft from said spring motor.

7. Actuating mechanism for a dry shaver, said mechanism comprising an actuating shaft, a main shaft, a member manually movable in one direction for rotating said main shaft in one direction, means for bringing said manually movable member back into a normal position whenever it is displaced therefrom manually, mechanism for driving said actuating shaft whenever said manually movable member moves in one direction, a spring motor adapted to be wound when said main shaft is moved, and mechanism for driving said actuating shaft from said spring motor.

8. Actuating mechanism for a dry shaver, said mechanism comprising an actuating shaft, a fly wheel on said actuating shaft, a main shaft, a member manually movable in one direction for rotating said main shaft in one direction, means for bringing said manually movable member back into a normal position whenever it is displaced therefrom manually, mechanism for driving said actuating shaft whenever said manually movable member moves in one direction, a spring motor adapted to be wound when said main shaft is moved, and mechanism for driving said actuating shaft from said spring motor, said mechanisms each including automatic one-way clutches permitting said actuating shaft to outrun either of said mechanisms.

9. Motor mechanism for a dry shaver head, said mechanism comprising an actuating shaft, a fly wheel on said actuating shaft, a coil spring, manually operated mechanism for driving said actuating shaft and winding said coil spring, and means independent of said manually operated mechanism for transferring energy from said coil spring to said actuating shaft.

10. Motor mechanism for a dry shaver head, said mechanism comprising an actuating shaft, a coil spring, manually operated mechanism for driving said actuating shaft and winding said coil spring, and means independent of said manually operated mechanism for transferring energy from said coil spring to said actuating shaft.

11. Motor mechanism for a dry shaver having a shaver head, said mechanism comprising an actuating shaft for said shaver head, a fly-wheel on said actuating shaft, a spring motor, manually operable means for rotating said shaft and for winding said spring motor, and clutch means operated by said manual means for alternately connecting said actuating shaft to said manually operable means and to said resilient means.

12. Motor mechanism for a dry shaver having a shaver head, said mechanism comprising an actuating shaft for said shaver head, a spring motor, manually operable means for rotating said shaft and for winding said spring motor, and clutch means operated by said manual means for alternately connecting said actuating shaft to the said manually operable means and to said resilient means.

13. Motor mechanism for a dry shaver comprising a fly-wheel for storing and giving out energy, a coil spring, manual means for driving said fly-wheel or winding the coil spring, and mechanism operated by said manual means for causing said coil spring to drive said fly-wheel.

14. Motor mechanism for a dry shaver head, said mechanism comprising an actuating shaft, a fly wheel on said actuating shaft, a coil spring, a manually operated mechanism for alternately driving said actuating shaft and winding said coil spring, and means independent of said manually operated mechanism for transferring energy from said coil spring to said actuating shaft.

15. Actuating mechanism for a dry shaver, said mechanism comprising an actuating shaft, a fly wheel on said shaft, a spring motor, a manually operable oscillatable member, mechanism for winding said spring motor by movement of said member in one direction, mechanism for rotating said actuating shaft by movement of said member in the opposite direction, and mechanism for transmitting power from said spring motor to said actuating shaft, said two last named mechanisms including automatic one-way clutches permitting said actuating shaft to outrun either of said mechanisms.

GODFREY DALKOWITZ.