

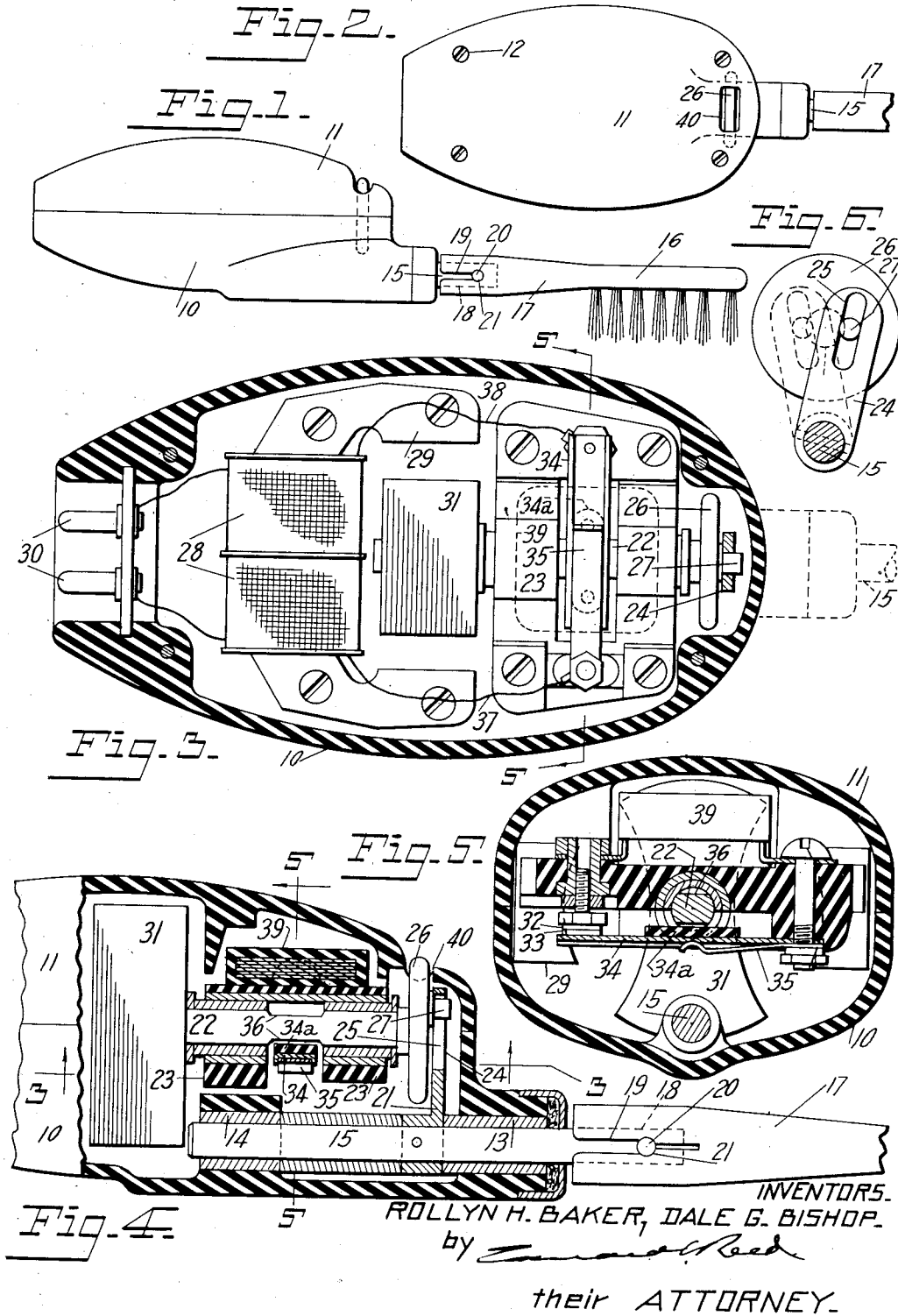
May 16, 1939.

R. H. BAKER ET AL

2,158,738

MOTOR OPERATED TOOTH BRUSH

Filed Dec. 21, 1936



## UNITED STATES PATENT OFFICE

2,158,738

## MOTOR OPERATED TOOTH BRUSH

Rollyn H. Baker, Dayton, Ohio, and Dale G.  
Bishop, Chicago, Ill.

Application December 21, 1936, Serial No. 116,982

## 1 Claim. (Cl. 15—22)

This invention relates to a motor operated tooth brush and one object of the invention is to provide a tooth brush with power operated means for imparting operative movement thereto.

5 A further object of the invention is to provide simple efficient mechanism for imparting operative movement to the brush and which will be of such a character and so arranged that it will not interfere with the application of the brush to the teeth.

10 A further object of the invention is to provide such a device in which the operating mechanism will be compact in form and enclosed in a housing adapted to form a hand grip by means of which the brush may be manipulated while in operation.

15 A further object of the invention is to provide such a device in which the brush may be quickly and easily attached to and detached from the operating mechanism.

20 A further object of the invention is to provide such a device with an electrically driven operating mechanism which will operate on either direct or alternating current.

25 Other objects of the invention may appear as the device is described in detail.

In the accompanying drawing Fig. 1 is a side elevation of a motor operated tooth brush embodying our invention; Fig. 2 is a plan view of the same with the brush broken away; Fig. 3 is a section taken on the line 3—3 of Fig. 4, looking in the direction of the arrows; Fig. 4 is a longitudinal section with the brush and part of the housing broken away; Fig. 5 is a transverse section taken on the line 5—5 of Fig. 4; and Fig. 6 is a detail view of the device for imparting oscillatory movement to the brush supporting shaft.

In this drawing we have illustrated one embodiment of our invention and have shown the same as comprising a supporting structure in the form of a housing in which the operating mechanism is supported and this housing is of such a size and shape that it is well adapted to form a hand grip by means of which the brush may be manipulated while in operation. In the particular construction illustrated the housing is oblong in shape and relatively shallow and comprises a body portion 10 on which the operating mechanism is mounted and a closure portion or cap 11 rigidly secured to the body portion, as by means of screws 12. The forward portion of the housing is provided with longitudinally aligned bearings 13 and 14 in which is journaled a brush actuating shaft 15. This shaft has its forward

end projecting beyond the front bearing 13 to permit the brush to be connected therewith. Preferably the brush is mounted directly upon the shaft and, in the construction here illustrated, the front bearing 13 is in the form of a forwardly projecting boss and the shaft projects beyond this boss. The brush comprises a brush head 16, which may be of the usual or any suitable construction, and a shank 17 having at its rear end a hollow portion forming a socket 18 adapted to receive and embrace the projecting end of the actuating shaft 15. The brush may be held against accidental displacement on the shaft in any suitable manner but as here shown the socket 18 is formed of yieldable material, such as Celluloid, and is provided at its rear end with a longitudinal slot 19 adapted to receive a stud 20 projecting laterally from the shaft 15. In the present arrangement the slot is of a width slightly less than the diameter of the stud and the socket is provided at the forward end of the slot with a recess 21 of greater width than the slot and adapted to receive the stud 20 when the end of the shaft has been fully inserted in the socket. Thus as the socket is placed on the shaft it will yield to permit the stud to pass through the slot and when the stud is seated in the recess 21 the socket will return to its normal position, thus confining the stud within the recess and preventing the withdrawal of the brush until positive force is applied thereto. Preferably there is a slot 19 in each side of the socket and a stud 20 on each side of the shaft.

Mounted in the housing parallel with the actuating shaft 15 is a power operated shaft 22 which, as here shown, is mounted in bearings 23 and extends to a point adjacent the front wall of the housing. This power operated shaft may be connected with the brush actuating shaft in any suitable manner to impart operative movement to the latter. The present apparatus is designed to impart oscillatory movement to the brush and for that purpose the actuating shaft 15 has rigidly secured thereto a rock arm 24 provided near its free end with a longitudinal slot 25. Rigidly secured to the adjacent end of the power operated shaft 22 is a disk 26 having on its forward side an eccentric stud 27 which extends into the slot 25 of the rock arm and thereby causes the rotary movement of the shaft 22 to impart oscillatory movement to the shaft 15.

The power mechanism, or prime mover, may take various forms but preferably consists of an electric motor and suitable controlling devices, and it is here shown as an induction motor com-

prising field windings 28 arranged in the rear portion of the housing and pole pieces 29 extending forwardly from the windings and arranged in opposed relation in the respective sides of the housing. The windings 28 are connected with contact pins 30 adapted to receive an electrical connector whereby the windings may be connected with a suitable source of current, such as an ordinary electrical outlet. Arranged between the pole pieces 29 and in the magnetic field thereof is an armature or rotor 31 which is connected with the shaft 22 and is preferably mounted on and supported by that shaft, so that the shaft 22 in the present instance constitutes a rotor shaft. The circuit through the field windings is intermittently opened and closed to alternately energize and deenergize pole pieces. The means for so opening and closing the circuit is preferably controlled by the rotor shaft 22 and, as here shown, a circuit breaker and closer, connected with the field circuit, is arranged adjacent to and adapted to be actuated by the rotor shaft. In the preferred construction this circuit breaker and closer comprises a stationary contact 32 connected with one side of the field circuit and a movable contact 33 connected with the other side of the field circuit and biased toward the stationary contact. The movable contact is carried by a yieldable arm 34 which extends across the rotor shaft and is supported at that end remote from the contact member on a fixed support. A leaf spring 35 acts on this arm to press the same into engagement with the stationary contact. That part of the rotor shaft 22 adjacent the contact arm 34 is flattened on its opposite sides, at 36, to provide the same with portions constituting cams, the flattened portions being of such length that the contact arm 34 may enter the same. The contact arm 34 may also be provided with a wear plate 34a arranged to be engaged by the cam portions of the shaft and insulated from the contact arm 34. The contact arm is of conducting material and the field winding is connected thereto by a lead 37 at that end of the arm remote from the contact member. The stationary contact is connected with the other end of the field winding by a lead 38 and, if desired, a condenser, such as a mica condenser 39, may be interposed between the two leads. The cams on the shaft are so arranged that the circuit through the field windings will be closed and the field energized when the rotor is in a position transverse to the lines of force between the pole pieces and the magnetic force will then rotate the rotor. As the rotor approaches alignment with the lines of force the circuit will be opened by the cams to deenergize the field and

the rotor will move by momentum to its transverse position.

Means are provided for imparting initial movement to the rotor shaft and hence to the rotor to start the apparatus into operation when this is necessary, as when the motor has come to a stop with the field circuit open. In the present arrangement the housing is provided with an opening 40 through which the peripheral edge of the disk 26 extends and is thus exposed for manual operation.

It will be apparent from the foregoing description that the continuous rotation of the rotor shaft 22 is caused to impart rapid oscillatory movement to the brush supporting shaft 15 and to the brush. The motor and its associated mechanism are very compact in form, the parts being of such size and character that the whole mechanism can be enclosed within a small housing which is adapted to be gripped in the hand of the user. The brush projects well beyond the end of the housing so that the latter does not in any way interfere with the user's manipulation of the brush or its application to the teeth while it is in operation. The brush is readily removable from its supporting shaft so that it may be cleaned or replaced, and when the brush is removed it may be placed alongside the housing and the whole apparatus packed in a small container.

While we have shown and described one embodiment of our invention we wish it to be understood that we do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

In a motor driven tooth brush comprising a housing adapted to form a hand grip, a brush supporting shaft journaled in said housing and projecting slightly beyond the front end thereof, and means within said housing for oscillating said shaft about its longitudinal axis, a laterally extending stud carried by the projecting end of said brush supporting shaft, and a brush head provided with a socket adapted to receive the end of said brush supporting shaft, said socket having a longitudinal slot of a width less than the thickness of said stud and said slot having an enlarged portion spaced from the end thereof and adapted to receive said stud, said socket being resilient to permit said stud to move through said slot and to retain the same in the enlarged portion of said slot.

ROLLYN H. BAKER.  
DALE G. BISHOP.