

June 12, 1951

G. VELKAS ET AL

2,556,304

DOLL HEAD WITH SIMULATED GROWING TEETH

Filed Feb. 23, 1949

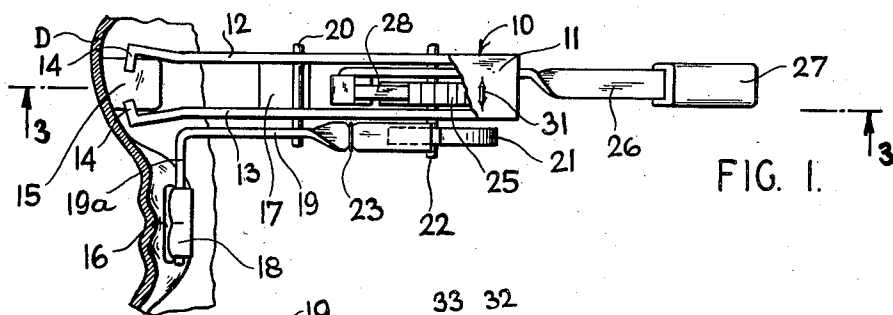


FIG. 1.

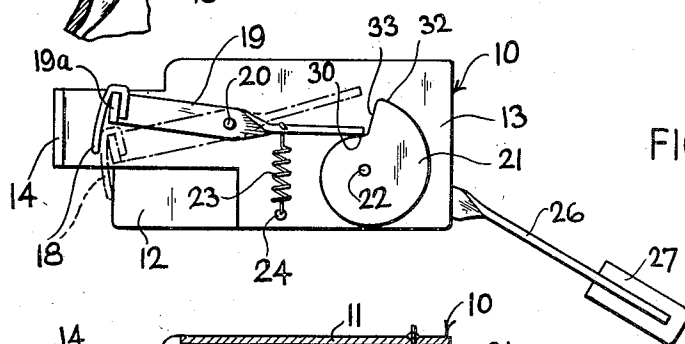


FIG. 2.

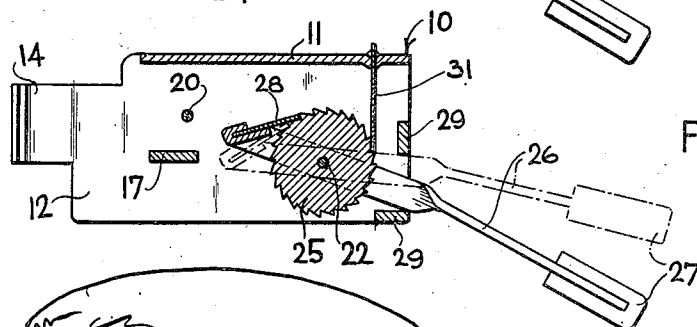


FIG. 3.

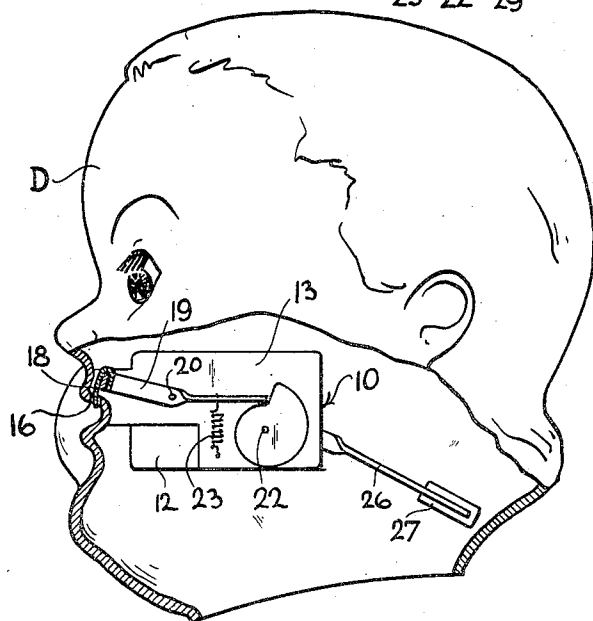


FIG. 4.

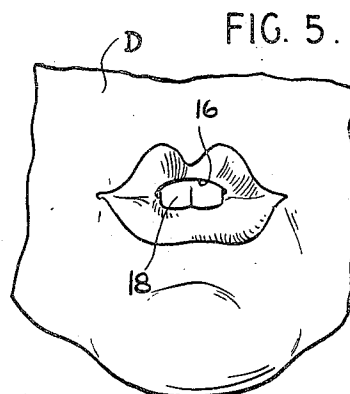


FIG. 5.

INVENTOR.
GEORGE VELKAS and
NORMAN SCOTT GARDNER
BY

Mock & Blum
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,556,304

DOLL HEAD WITH SIMULATED GROWING
TEETHGeorge Velkas and Norman Scott Gardner,
New York, N. Y.

Application February 23, 1949, Serial No. 77,784

4 Claims. (Cl. 46—171)

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This invention relates to improved doll head construction and has as its general object the provision of novel mechanism including a teeth-simulating member operative upon repeated tilting of the doll to progressively protrude through the mouth opening of the doll head in simulation of the growing of teeth.

Another object of the invention is the provision of novel mechanism including a teeth-simulating member of the character indicated, which is protrudable a fixed distance outwardly of the mouth opening of the doll head and automatically retractable at the limit of its protrusion for a repetition of the simulated teeth-growing operation.

A further object of the invention is the provision of a compact mounting element upon which the teeth-simulating member and associated mechanism may be readily supported, the mounting element being easily attachable in fixed relation to the interior of the wall of the doll head adjacent the mouth opening thereof and the entire assembly being designed and arranged in such a manner as not to interfere with the operation of separate actuating mechanism for additional movable members which may be disposed within the doll head, such as movable eye members and the like.

An additional object of the invention is the provision of a mounting element, a teeth-simulating member and associated mechanism therefor which may be readily fabricated from sheet metal by simple stamping operations, the components being easily assemblable to a durable unit at low cost and on a mass production scale.

The foregoing objects as well as additional objects and advantages of the invention will be readily apparent in the course of the following detailed description taken in connection with the accompanying drawing which illustrates a preferred embodiment of the invention, and wherein:

Fig. 1 is a top plan view, partly broken away to show internal arrangement and relation of component elements, of a device embodying the features of the invention; the device being shown in operative position fixed to an integral interior lug of the doll head wall with the teeth-simulating member projecting through the mouth opening thereof;

Fig. 2 is a side elevation of the device illustrating the actuating cam element and supporting lever for the teeth-simulating member;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1 showing the ratchet means for turning

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the cam element progressively in a stepwise manner under the influence of a weighted arm actuated by the repeated tilting of the doll;

Fig. 4 is an elevational view, partly in section, of the doll head with the device in installed position and illustrates the teeth-simulating member in substantially completely retracted position; and

Fig. 5 is a fragmentary front elevation showing the teeth-simulating member in substantially completely protruded position.

Referring now to the drawing in greater detail, the device includes a mounting frame 10 which may be conveniently formed from a blank of sheet metal to define a stop wall 11 and a pair of side walls 12 and 13. While a variety of means may be employed for affixing the mounting frame 10 to the interior of the doll head D, we have herein shown for this purpose a pair of opposed, inwardly turned gripping jaws or lugs 14 formed as integral forward extensions of side walls 12 and 13. Gripping jaws 14 may be securely clamped to an integral mounting lug or projection 15 extending from the inner wall of the doll head D laterally of the mouth opening 16, as clearly shown in Fig. 1. In order to impart greater rigidity to mounting frame 10, side wall 13 may be provided with an inwardly struck lug 17 suitably secured to its free end to opposite side wall 12.

A teeth-simulating member 18 is supported at the free end of a lever 19 for alternate protrusion and retraction through mouth opening 16 in a manner to be fully described hereinafter. Lever 19 is pivoted intermediate its ends on a horizontal shaft 20 supported by the side walls 12 and 13 of mounting frame 10. The rearward end of lever 19 is constantly maintained in engagement against the periphery of a cam element 21, carried at the end of a shaft 22 parallel to shaft 20, as by means of a spring 23 secured to side wall 13 at 24 and secured to the rearward portion of said lever, as shown in Figs. 1 and 2. A ratchet wheel 25 is mounted fixedly on shaft 22 inwardly of side wall 13.

An important feature of the invention resides in the provision of progressive, stepwise rotation of cam element 21 as a result of the stepwise concurrent rotation of ratchet wheel 25 under the influence of gravity as the doll is repeatedly tilted or repeatedly raised to an upright position from a prone position. Thus, if ratchet wheel 25 and cam element 21 are caused to rotate stepwise in a clockwise direction, lever 19 will gradually turn in a counterclockwise direc-

tion while its rearward end follows the peripheral surface of said cam element 21 having a gradually increasing radius, the resultant effect being the gradual protrusion of teeth-simulating member 18 outwardly of mouth opening 16 in simulation of the growing of teeth.

In order to achieve the latter effect an arm 26 is pivoted on shaft 22 adjacent ratchet wheel 25 and carries a weighted element 27 at its lower end. The upper end of weighted arm 26 carries a pawl 28 for successively engaging consecutive teeth of ratchet wheel 25. Stop members 29 are preferably formed integrally with one of the side walls of mounting frame 10 and serve to limit the swinging movement of arm 26.

The operation of the device will be readily understood with particular reference to Figs. 2, 3 and 4 of the drawing. Thus, assuming that the rearward end of lever 19 is engaged against the low point of the cam at 30, the forward end of said lever will be in the elevated position of Figs. 2 and 3 corresponding to the substantially completely retracted position of teeth-simulating member 18. Now, if the doll head is kept in upright position the gravity-responsive weighted actuating arm 26 will be maintained in its downward limiting position indicated in full lines in Fig. 3. However, when the doll head is tilted rearwardly from its upright position or when the doll is placed on its back in reclining or prone position, the weighted arm 26 will swing to the broken line position of Fig. 3 responsive to the effect of gravity on the weight 27, in which position the pawl 28 will engage a successive tooth of ratchet wheel 25. When the doll head is again moved to upright position weighted arm 26 will reassume the full line position of Fig. 3 to cause rotation of ratchet wheel 25 a single step corresponding to the pitch of the ratchet teeth. Cam element 21 rotates concurrently with ratchet wheel 25 to gradually turn lever 19 in a stepwise manner and in a counterclockwise direction about its pivot 20 with resultant stepwise protrusion of teeth-simulating member 18 outwardly of mouth opening 16. Backward rotation of ratchet wheel 25 and cam element 21 during the tilting of the doll head and the return stroke of pawl 28 is prevented by means of a preferably resilient detent 31 which may be fixed to and depend from top wall 11 of mounting frame 10.

As the doll head is repeatedly tilted the teeth-simulating member 18 will gradually be protruded outwardly of mouth opening 16 in a stepwise manner, the extent of each step of protrusion depending upon the number and pitch of the teeth of ratchet wheel 25 and on the form of the cam element 21. In any event the position of maximum protrusion of teeth member 18 will correspond to the engagement of the rearward end of lever 19 against the high point of the cam designated 32. The cam element 21 is also provided with a resetting portion 33 interconnecting the high point 32 and the low point 30 thereof so that after said cam element completes one revolution the lever 19 will automatically rotate in a clockwise direction, or from the broken line to the full line position of Fig. 2 with resultant retraction of the teeth-simulating member 18, after which the cycle of operations may be repeated by subsequent tilting of the doll head.

It will be noted that in the preferred embodiment of the invention illustrated in the drawing the lever 19 is provided with a laterally offset

portion 19a to which the teeth-simulating member 18 is attached. The presence of offset portion 19a allows the disposition of the mounting frame 10 at a point removed from the mouth opening 16, at which removed point the wall of the doll head is generally thicker and more rigid and affords better support for said mounting frame than in the immediate vicinity of the mouth opening. Further, the offset portion 19a prevents the interference of mounting frame 10 and its associated mechanism with independent actuating mechanism for additional movable members which might project into the doll head cavity, such as movable eye members and the like.

As will be understood, the described assembly is designed in such manner as to produce the illusion effect of growing teeth, itself an action of slow development and of a time-consuming character under actual life conditions. Hence, in practice, the doll would not be expected to produce the tooth development rapidly, thus being in contrast with the conditions present when the effect being produced is that of making a bite where the action of the tooth simulation must provide a continuous visible movement both in closing the teeth and opening them, with the cycle completed within a moment or two. Where the simulation is that of growing teeth, not only is a long period assumed to be present, but the visible movement must be that of very small increments of distance travel of the tooth simulation hardly noticeable during an individual cycle of the weighted lever usually employed in producing these doll illusions. In other words, in this particular illusion the noticeable effect is presented at the end of an accumulation of cycles at which time the increased projection of the teeth is clearly apparent.

And, unlike the biting effect referred to, the resetting time is not equal to the time length of the growing development, since the fully grown teeth are assumed to remain permanently, so that an actual re-setting operation is required, and must take place within a minimum time period. With the biting action the re-setting is actually a part of the cycle, since the opening of the lower jaw at the close of the bite is itself a part of the visible illusion cycle and at the same time serves to restore the parts to the normal re-set position.

In the present invention, the snail cam 21 produces the desired effect. This cam is directly movable with the ratchet wheel 25 with both advancing only in one direction and at equal speeds. Hence, the step-by-step advance of the ratchet wheel, with the advance limited to a single tooth, provides an equal arcuate length of advance of the cam, both requiring the same time to complete the revolution. Obviously, the length of advance of the wheel and cam during a single actuating cycle of the weighted lever 26 is determined by the individual teeth, so that the large number of teeth on the wheel, as shown, provides for a large succession of individual advances in completing a revolution of wheel 25, with each increment of advance of small angular distance.

The latter, however, does not indicate the length of the tooth projection increase during the individual cycle, although it has an effect in the control of such distance length. The tooth projection distance increment length is provided by the shape of the contour of the snail cam.

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With the contour symmetrically spiral, as shown, the actual tooth projection distance is represented by the difference in length of the two radii of the cam active with the end of lever 19 in contact with the cam at the opposite ends of the crown face of a tooth, the length of the tooth face arcuate representing the distance between the radii on the face of the cam. As will be understood the distance between the active radii will be substantially equal for each tooth crown face, and since the cam contour is symmetrical, the increment of projection increase will also be substantially uniform in successive cycles. However, each increment is very small since its length is indicated by the difference in the length of the two active radii together with the leverage values which may be present, the projecting advance of the teeth from housed to fully-projected position, being divided into a number of incremental increases substantially equal to the number of teeth carried by the ratchet wheel 25. Since the face 33 of the cam is approximately radial, the resetting movement of the teeth simulation will be provided during the movement of detent 28 over a single tooth of wheel 25, the resetting movement source being spring 23 which draws the end of lever 19 over the face 33 while the detent is traversing the wheel tooth crown face, this action not affecting the advancing travel of the cam during the period.

It will be clearly understood that the device of the present invention is adapted for use with a large variety of toy and animal figures and is not to be construed as being limited solely to a doll simulating an infant human. Accordingly, the terms "doll" and "doll's head" as employed in the foregoing specification and the appended claims are to be interpreted in the broad and inclusive sense.

Since certain additional modifications may be made in the device of the present invention without departing from the scope thereof, it is intended that all matter contained in the foregoing specification and shown in the accompanying drawing be interpreted merely as illustrative and not in a limiting sense.

We claim:

1. The combination with a doll head having a mouth opening, of means internal of the head for moving a tooth simulation relative to such mouth opening between a hidden position and a position in which the tooth simulation is fully exposed by doll head movements between erect and prone positions with the projecting movements progressive intermittently by a succession of similar doll head movements in one direction to thereby simulate the appearance of growing teeth, and with the movement of the tooth simulation from the fully projected to the hidden position continuous by completion during a single doll head movement to thereby prepare the head for a repetition of the cycle, said

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means including a spring-resisted pivoted carrier for the tooth simulation, a snail cam for moving the carrier in the progression direction and increased spring tension, said cam including an approximately radial face for permitting continuous carrier return by spring tension activity, and ratcheting mechanism associated with said cam and rendered active by doll-head movement for providing the step-by-step movements of the cam during the progression advance of the tooth simulation toward projected position and for completing carrier travel movement over the radial face during a single movement of the doll-head between the erect and prone positions.

2. A combination as in claim 1 characterized in that the snail cam is symmetrical in type to provide progression at uniform rate, and further characterized in that the ratcheting mechanism is operative to provide step advances during the progression, the step advance being limited to periods when the head is moving from the same position, each step being of small extent and for equal distance.

3. A combination as in claim 1 characterized in that the tooth simulation carrier is formed L-shaped in plan view with the end zone of the shorter leg carrying the simulation and with the longer leg carrying the pivot to thereby locate the actuating elements of the assembly, in asymmetric position relative to the mouth opening and laterally of a plane extending axially of the head and intersecting the mouth opening.

4. A combination as in claim 1 characterized in that the actuating elements are positioned within a housing internally carried by the face zone of the doll head, and further characterized in that the ratcheting mechanism includes a ratchet wheel, an arm pivoted on the wheel axle, said arm carrying a detent at one end cooperative with the wheel teeth and weighted at its other end and with the weighted end projected through a housing wall, said housing having a pair of spaced stops for limiting the stroke of the arm to a length sufficient to provide a tooth by tooth movement of the arm during movement of the doll-head to its erect position an equal angular length of movement of the wheel and cam during movement of the head to its prone position, said housing carrying a ratcheting detent to prevent retrograde movement of the ratchet wheel.

GEORGE VELKAS.

NORMAN SCOTT GARDNER.

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