Sept. 29, 1953 H. WOLFE 2,653,412

SOUND PRODUCING DOLL

Filed July 30, 1949 2 Sheets-Sheet 1

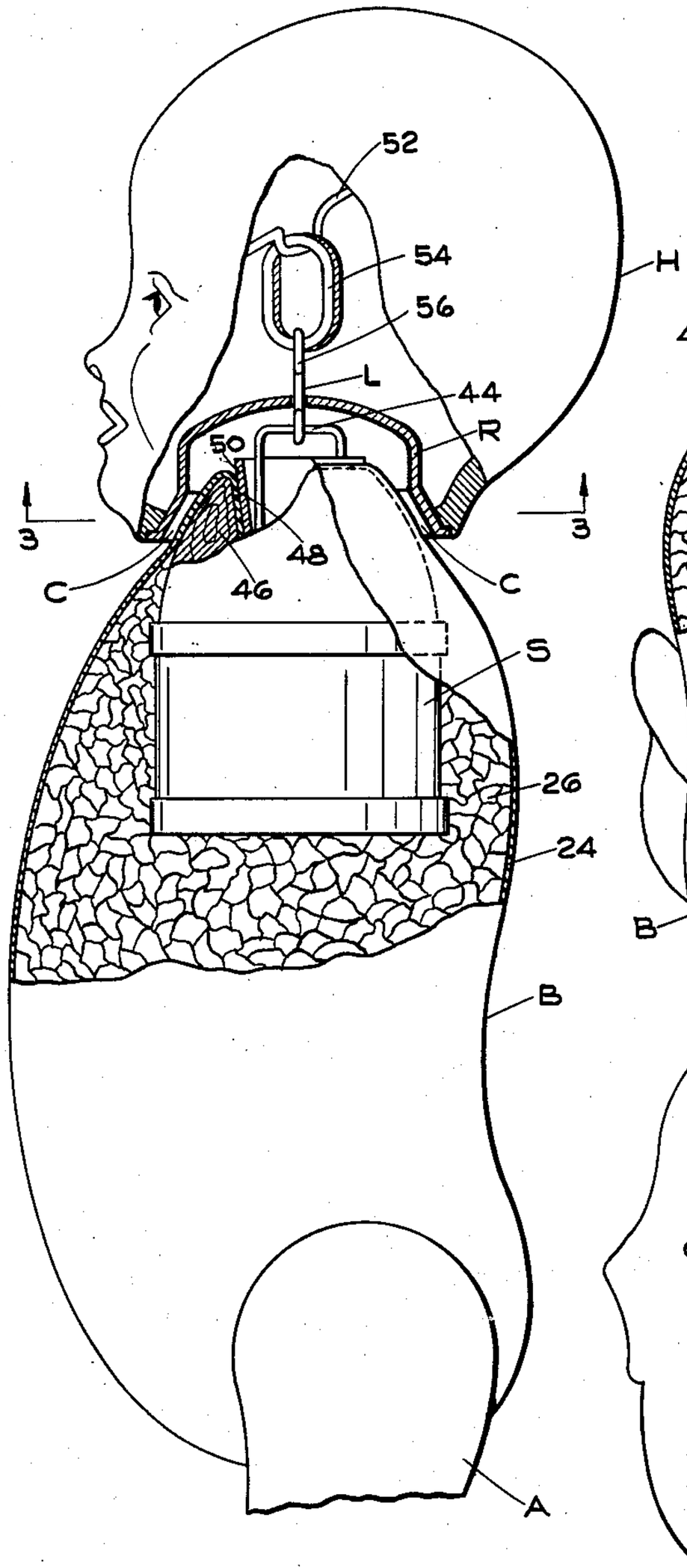

FIG. 1

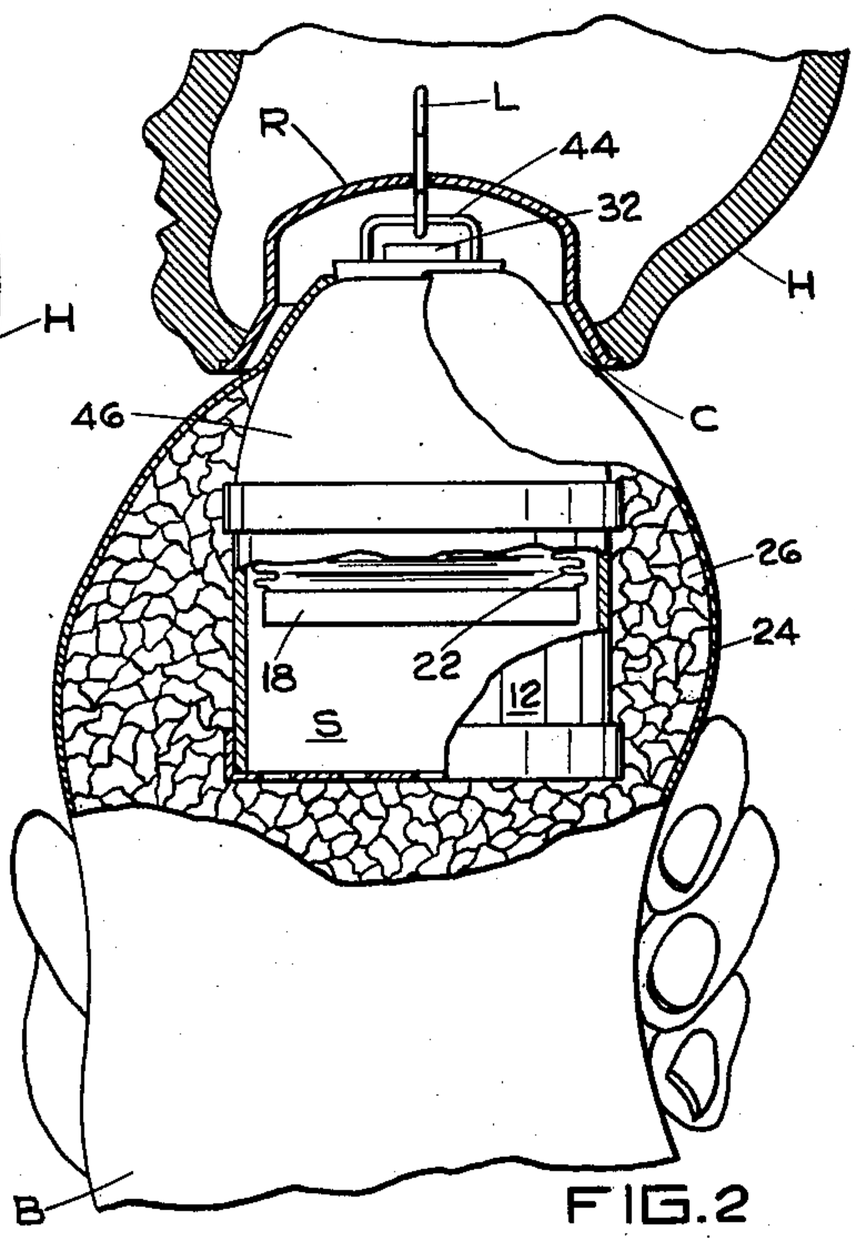

FIG. 2

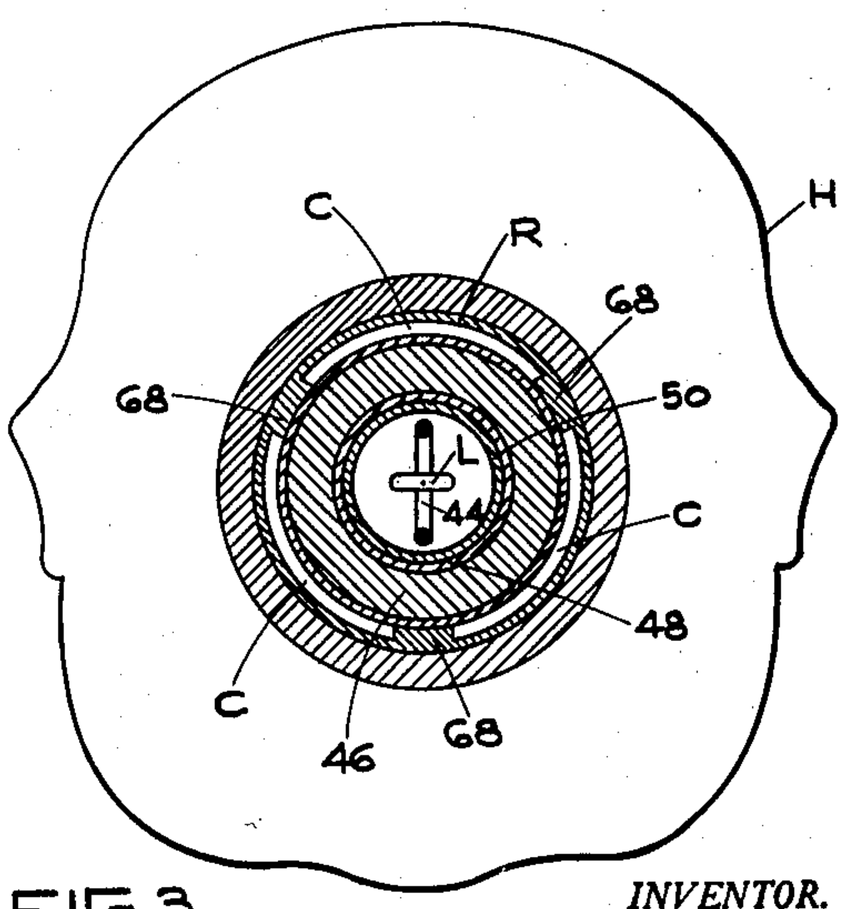

FIG. 3

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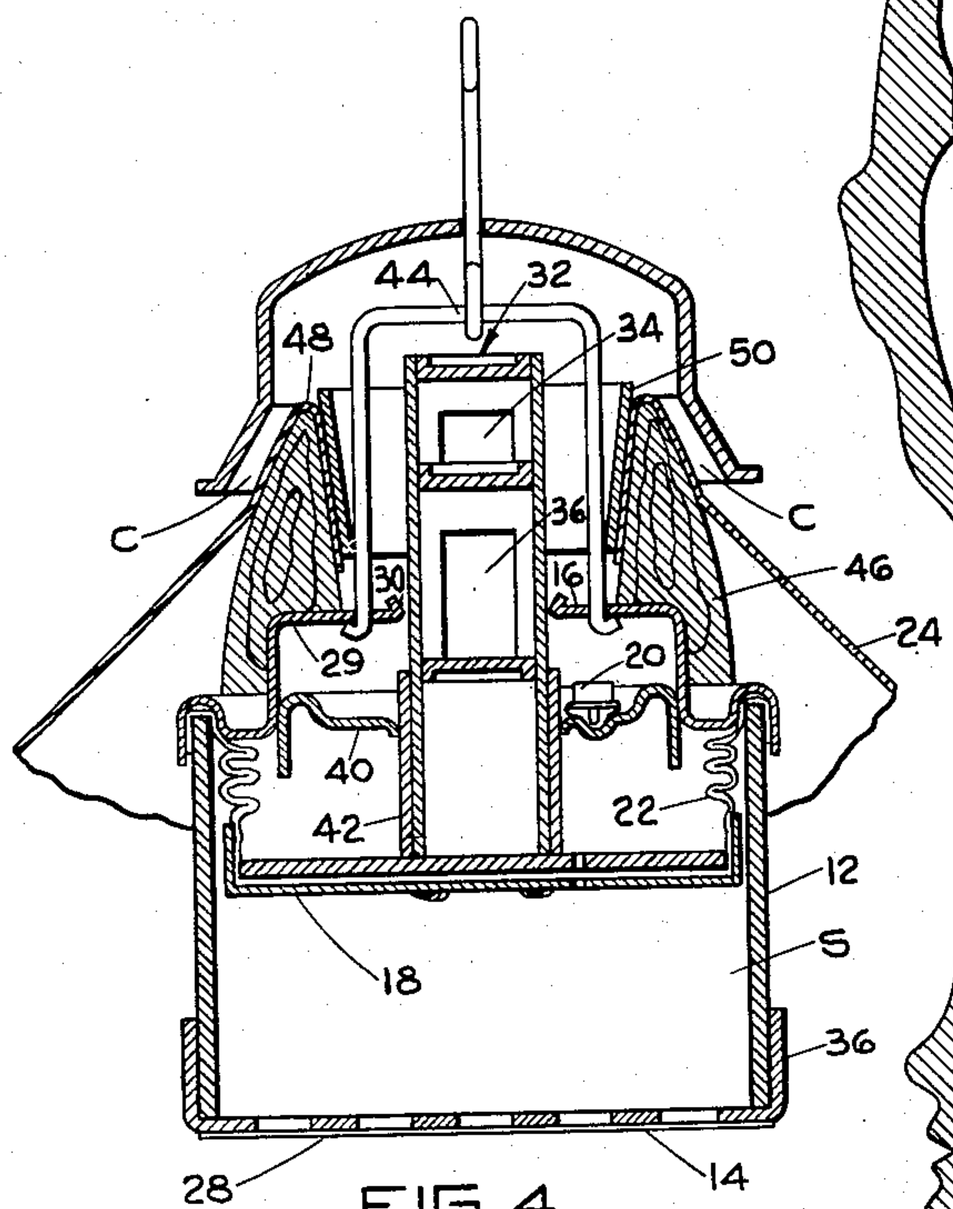

FIG. 4

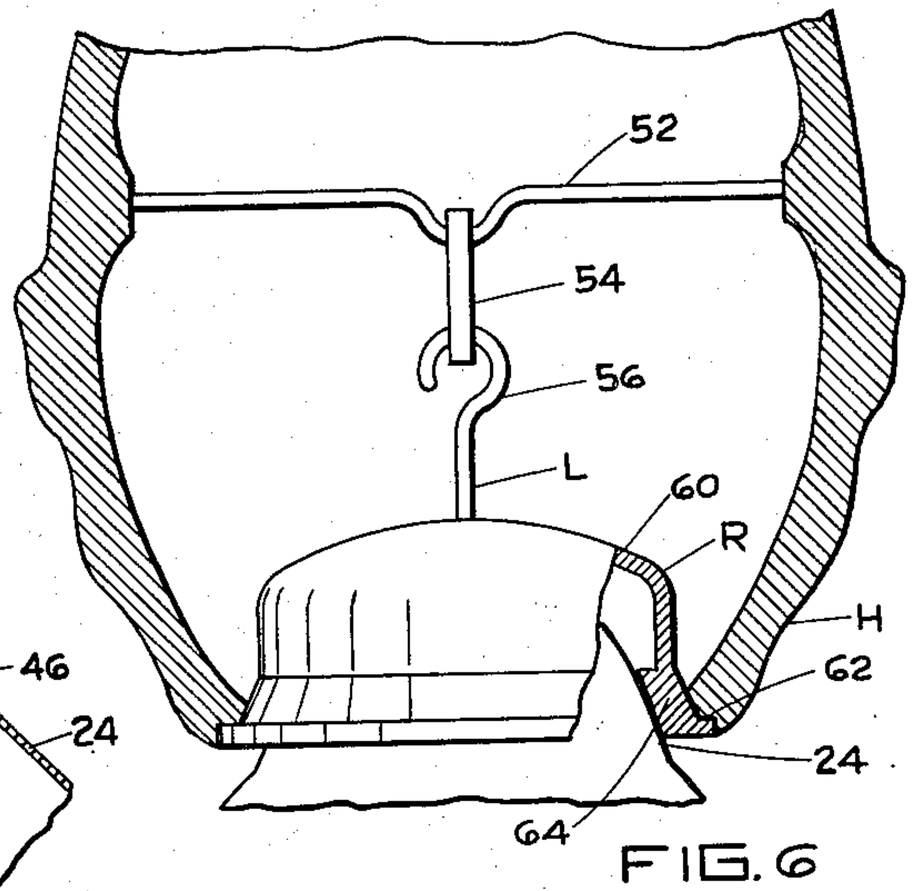

FIG. 6

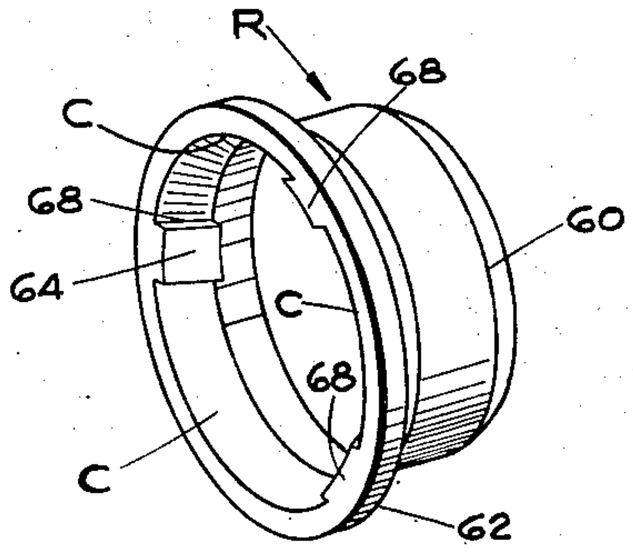

FIG. 5

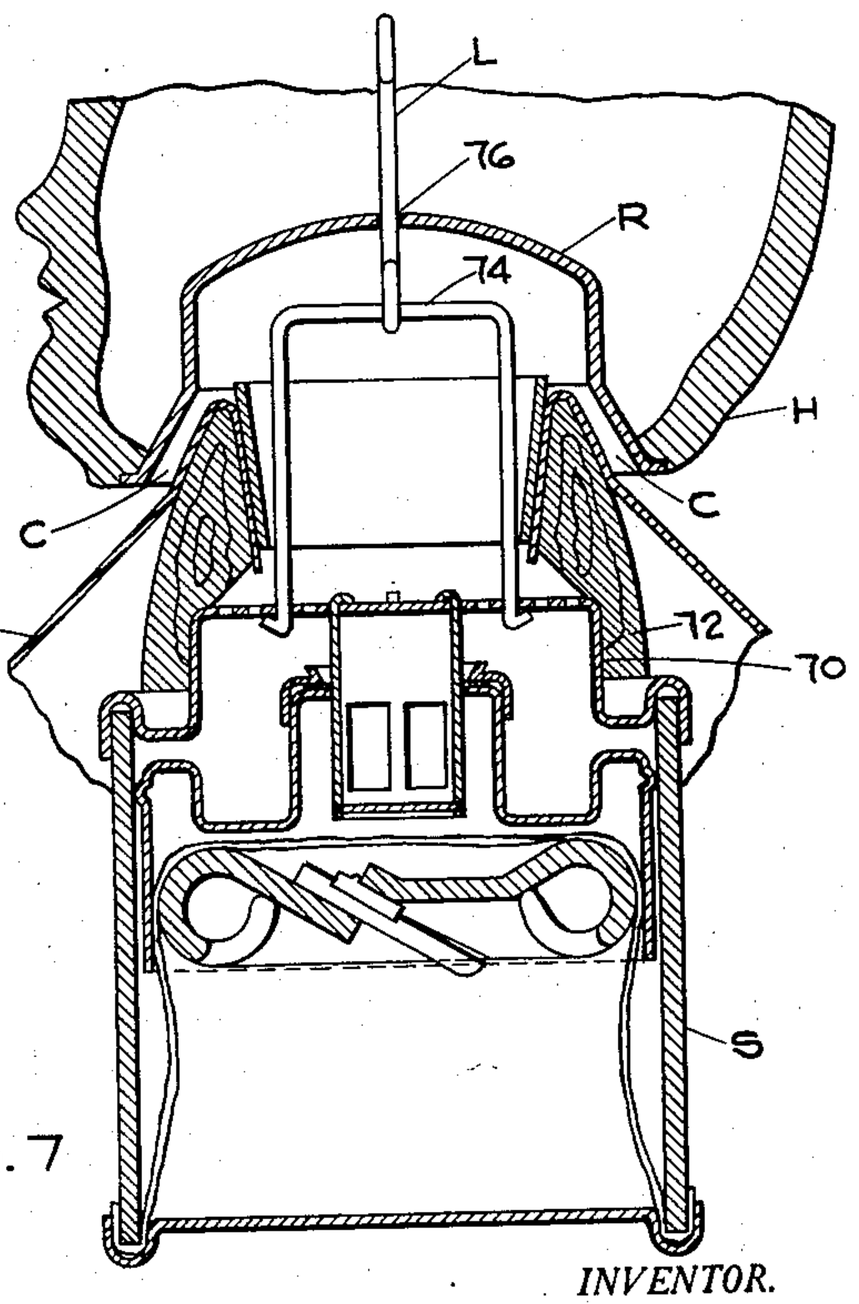

FIG. 7

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UNITED STATES PATENT OFFICE

2,653,412

SOUND PRODUCING DOLL

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Application July 30, 1949, Serial No. 107,679

18 Claims. (Cl. 46—117)

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This invention relates to sound producing toys, especially dolls, and more particularly to improved means for conducting sound produced within the toy to the outside air, where it can be heard with a maximum of sound intensity.

Known sound producing devices for dolls include "criers," articulative "voices" which enunciate "mama" or "papa," and small phonographs. Various means have been used to conduct the sound to the outside air. One is to form an opening in the back of the doll adjacent the sound producing device. Another is to provide openings at the mouth and ears of the doll's head. In the latter case attempts have been made to improve the sound intensity by providing tubes which run from the sound producing device to such openings. However, the use of these tubes affords little improvement, complicates the process of manufacture, and considerably increases its cost.

Most recently a doll's head has been formed with a series of passages or channels on the inside surface of the neck opening to conduct the sound downward around the outside of the neck. This combines a large area of sound passage with a desired unobtrusiveness, and does not detract from the life-like appearance of the doll, and has therefore proved successful. However, I have found that the hollow doll's head, instead of amplifying the sound, absorbs and muffles the sound to a considerable degree, with a substantial loss of volume by the time the sound reaches the outside air.

By means of my invention, sound produced within the doll body is conducted to the outside air through a comparatively short and direct path, with a maximum of volume. This is accomplished by providing a plate for reflecting the sound within the doll's head in the immediate vicinity of the neck, and conducting the sound so reflected to the outside air through the aforesaid passages or channels around the neck. The reflector plate itself may be shaped to provide the sound conducting channels. The natural, life-like appearance of the doll is maintained, the necessity for mutilating the body of the doll is obviated, and the sound produced within the doll's body is heard with maximum intensity.

Considered in terms of objects, the primary object of the invention is to generally improve sound producing toys. A more specific object is to discharge at maximum volume the sound produced within a toy or doll. Still another object is to provide a sound producing doll with means to conduct the sound from within the body at maximum intensity without impairing the appearance of the doll. A further object is to provide, by simple inexpensive means, a short direct path for conducting the sound produced within the doll's body to the outside air where it can be heard with maximum audibility.

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To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the doll body, head, sound producing means, and sound conducting means, and their relation one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings, in which:

Fig. 1 is a partially sectioned side elevation of a doll embodying features of my invention;

Fig. 2 shows the relation of the parts when the doll is squeezed to produce sound;

Fig. 3 is a bottom, plan view of the doll's head, with some of the parts in section taken approximately along the line 3—3 of Fig. 1;

Fig. 4 is an enlarged section taken in elevation through the sound producing device of Fig. 2;

Fig. 5 is a perspective view of a reflecting plate which constitutes a main part of the invention;

Fig. 6 is a front elevation, partly in section, showing how the sound reflector is mounted within a doll's head; and

Fig. 7 is a section illustrating how the invention may be applied to a doll having a different type of sound producing device.

Referring to the drawings, the toy is ordinarily and preferably a doll, having a body B, limbs A, and a head H. A sound producing device S of any suitable type is disposed within the body B. The sound producing device S may be a "crier," an articulative "voice" which enunciates "mama" or "papa," or a small phonograph. It is here illustrated as an articulative "voice."

The sound is discharged through passages or channels C, and in accordance with the present invention, the head H is provided with a reflector R which reflects and guides the sound downward directly through the channels C. The channels may be formed in the reflector itself, and for that purpose the peripheral portion of the reflector is secured at its outside to the neck opening of the head, and is dimensioned at its inside to fit the neck, but the inside is formed with the channels C. As is best shown in Fig. 3, the channels may occupy most of the periphery of the neck, thus providing a very large though inconspicuous sound discharge area.

In the preferred form shown in the drawing the peripheral portion of the reflector bears up-

wardly against the neck opening of the head, and a resilient linkage passes through a small central opening in the reflector. Specifically the linkage includes a hook L the lower end of which is connected to the doll body, and the upper end is connected to the head by means of a heavy elastic band, so that the body B, the reflector R, and the head H are all resiliently held in assembled relation. The head is capable of the usual angular adjustment relative to the body.

In Figs. 1 through 6 the invention is shown applied to a doll of the type described in greater detail in a copending application of John H. Wilhelm, Serial No. 55,886, filed October 22, 1948, and assigned to the assignee of the present application. The sound producing device responds to a flow of air caused by compression or squeezing of a portion of the doll body, as shown in Fig. 2. Fig. 7 shows the invention applied to a doll voice which is gravity operated.

Considering the "squeeze" voice in detail, and referring first to Fig. 4 of the drawing, the sound producing device S comprises a casing **12** having an air input end **14** and a sound discharge end **16**. There is a lightweight piston or cap **18** slidable in the casing, and a sound producing means, usually a reed unit **20**, which is actuated by air forced therethrough on movement of the cap **18** within the casing. The arrangement is such that air pressure, produced by squeezing the doll, when applied through the apertured input end **14** of the casing, moves the cap **18** and produces sound. The cap **18** is sealed to the casing by means of a thin flexible bellows **22** which extends from the cap to the sound discharge end of the casing.

In the present case the skin **24** of the doll body is air tight, and is made of latex. It is stuffed as indicated at **26** in Figs. 1 and 2, the stuffing being granules or pellets of foam rubber. Fibrous stuffing may be used, such as cotton, kapok, or hair, but must be loose enough for good air displacement. There is no danger of the stuffing reaching the reed unit, because the slidable cap separates the doll body from the reed unit, and if the end **14** has large apertures a porous fabric is preferably cemented over the end, as indicated at **28** (Fig. 4). This freely passes the air, but holds back the stuffing.

The main advantage of the slidable cap **18** is that its motion may be employed to operate valve mechanism for articulating the sound produced by the reed unit. The valve mechanism comprises a stationary member **29** providing a valve ring **30** and a movable member **32** slidably related thereto, with appropriate ports **34** and **36** to alternately constrict and free the passage of sound, said movable member **32** being connected to and moved by the cap **18**. Such a valve arrangement may be used to articulate the word "mama."

The reed unit **20** is carried by a wall **40** which extends across and seals the casing within the sound discharge end thereof. The top wall or end **16** of the casing is spaced outwardly from the wall **40**, providing a space therebetween which receives the unmodulated sound. The top wall **29** is imperforate, except for the valve ring **30**, hence the only sound discharged through the top wall is the modulated sound. To prevent the ports **34** and **36** of the valve tube from releasing air from the bellows, the wall **40** carries a stationary sleeve **42** in which the valve tube is slidable. Inasmuch as the sleeve **42** is longer than the longer port **36**, the sleeve closes the

ports at the wall **40**, and they function solely at the valve ring **30**.

To mount the voice in the doll, the top **16** is provided with a connector, here shown as a bent wire yoke **44**, preferably made small enough to pass through the neck opening of the doll body. The body may be sealed to the voice. When dealing with a thin skinned doll body as here shown, a neck shaping ring **46** is preferably provided. This may be turned out of wood, or molded out of plastic. It is shaped on the outside to act as the neck portion of the doll body, and may conform to a portion of a sphere. It is suitably stepped at the bottom to receive the top end of the voice, and may be made, sold, and shipped as a part of the voice. The skin **24** of the doll is folded inwardly and downwardly around the ring **46**, as is indicated at **48**, and is there sealed in position, as by means of a frusto-conical or tapered ring **50** which is passed downwardly around the yoke **44** and then driven into position. No such ring would be necessary when dealing with an unstuffed or hollow doll having a thick rubber wall.

Referring now to Figs. 1 and 6 the head H has a conventional crossbar **52** with a heavy elastic or rubber band **54** thereover, the latter being pulled downwardly and looped into a hook **56**. Thus the head is held downwardly on the body in somewhat conventional fashion, and the pull of the elastic band **54** serves also to pull the voice S upward and to hold the same in desired position. The yoke **44** is so shaped as to provide adequate clearance for upward movement of the valve tube **32**, the latter being shown in raised position within the yoke in Figs. 2 and 4. The shaping ring **46** and clamping ring **48** are merely one way to effectuate a connection between the neck portion of the doll body, and the casing of the sound producing device. With a thick molded hollow rubber doll body, the sealing action between the body and the voice may be made quite different, and may rely on the circumferential elasticity of the neck portion of the body, the latter being stretched to receive or pass the voice.

The reflector R is best shown in Figs. 5 and 6. It comprises a generally convex shell or dome **60** with an outwardly flared peripheral portion **62**. This is preferably flanged or stepped as indicated in Fig. 6 so that downward pressure on the head tends to hold the head and the reflector in assembled relation. The inside surface **64** of the peripheral portion is curved to conform to the neck **66** of the body, thereby affording the usual universal angular adjustment of the head relative to the body. However, the inside portion is largely cut away to form wide channels clearly shown at C in Figs. 3 and 5, leaving in this case only the three raised portions **68** which bear against the neck of the doll body. The resulting sound discharge passage is very large in cross-sectional area, it extending substantially entirely around the periphery of the neck, yet because of the configuration of the usual doll which simulates a baby with its undeveloped neck, the sound discharge passage is inconspicuous and unnoticeable unless looked for.

The reflector may be molded out of a suitable moldable plastic, or it may be die cast out of a lightweight metal, or it may even be stamped or drawn out of sheet metal. In the latter case the projections **68** which leave the sound discharge channels therebetween around the neck, may be formed by indenting the sheet metal inward.

However, it will be understood that it is not essential to form the channels in the reflector itself. The channels may be formed in the neck opening of the head, and the reflector may be located immediately above the same. In such case it is somewhat more difficult to insert and secure the reflector in position in the head. In the illustrated preferred form of the invention the neck opening of the head is enlarged somewhat, and the reflector is extended downward to the outside of the neck opening, and therefore the body of the reflector may be inserted upwardly through the neck opening. It then becomes convenient and preferable to form channels in the reflector. This has the added benefit of guiding the sound most efficiently and smoothly to the channels. In effect, the peripheral portion of the reflector acts as the neck opening of the head, and in that sense, the channels are in the neck opening. The maximum height of the reflector should not interfere with the swinging of the weight of the movable doll eyes. This weight is not shown in the drawings but is conventional. The minimum height of the reflector should clear the hook and yoke, which in turn clears the valve in uppermost position. There should be adequate sound passage area leading to the channels.

It will be observed that with my invention the pull of the elastic band **54** which holds the head snugly and frictionally against the neck **66** of the body serves also to hold the reflector in properly assembled relation, for the head bears downwardly against the peripheral flange **62** of the reflector, and the reflector in turn bears against the neck **66** of the doll body. This would be true with the link or hook L connected to the doll body in any desired fashion, but in the present case where it is connected to the voice, it serves the additional function of holding the voice upwardly in proper position at the neck.

It will be appreciated that the total area of the resulting sound passages extending entirely around the neck opening is far greater than any openings which might be obtained at the mouth or ears. These large passages combined with the reflector which guides the sound closely and directly to the passages provides for free egress of sound and consequent loud volume.

The modification shown in Fig. 7 is generally similar to that already described, except that the voice is a gravity operated voice instead of a "squeeze" voice. The particular articulative voice shown is not in itself novel, it being described and claimed in U. S. Patent 2,299,023, issued October 13, 1942, to the assignee of the present application. It is therefore believed unnecessary to describe the voice in detail. For the present purpose it has been slightly modified by stepping the top wall **70** to be received within the neck shaping piece **72**. The top wall receives the legs of a yoke **74** corresponding to the yoke **44** previously mentioned. The reflector R is substantially the same as previously described, and is similarly related to the head of the doll. It has a similar central hole at **76** to receive the hook or link L.

It will be understood that the sound producing device employed may be a "crier" instead of an articulative "voice." A "crier" is simpler in construction because it requires no valve mechanism. The sound producing device may be more complex, as in the case of a miniature doll phonograph, one example being that shown in Grubman Patent 1,970,452 issued August 14, 1934, to the assignee of the present case. Any other doll

phonograph or other kind of sound producing device of suitable dimension and adapted to discharge its sound through the hollow neck portion of a toy body may be used.

It is believed that the construction, the method of assembly, and the operation of my improved sound producing toy, as well as the advantages thereof, will be apparent from the foregoing detailed description. It will also be apparent that while I have shown and described my invention in several preferred forms, changes may be made in the structures shown without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A toy comprising a body having a neck portion, a head having a neck opening conforming to the neck portion, a sound producing device disposed in the body near the neck portion and arranged to discharge sound through the neck portion, the opening of the head being provided with channels for sound discharge, and a reflector plate disposed in the head over the neck portion to reflect the sound discharged from the sound producing device, and to guide the same through the aforesaid channels.

2. A doll comprising a doll body having a neck portion conforming to a part of the surface of a sphere, a head having a neck opening conforming to the neck portion, a sound producing device disposed in the body of the doll beneath the neck portion and arranged to discharge sound upwardly through the neck portion, the opening of the head being provided with channels for sound discharge, and an upwardly convex reflector plate disposed in the head over the neck portion to reflect the sound discharged upwardly from the sound producing device, and to guide the same downward through the aforesaid channels.

3. A toy comprising a body having a neck, a head having a neck opening, a reflector plate having a peripheral portion secured at its outside to the opening of the head and dimensioned at its inside to fit the neck, the inside being provided with channels for sound discharge, a sound producing device disposed in the body near the neck and arranged to discharge sound through the neck, said reflector plate serving to reflect and guide the sound reversely through the aforesaid channels around the outside of the neck.

4. A doll comprising a doll body having a neck, a head having a neck opening, an upwardly convex reflector plate having a peripheral portion secured at its outside to the opening of the head, and dimensioned at its inside to fit the neck of the doll, the said inside being provided with channels for sound discharge, a sound producing device disposed in the body of the doll beneath the neck and arranged to discharge sound upwardly through the neck, said reflector plate serving to reflect and guide the sound downwardly through the aforesaid channels around the outside of the neck.

5. A toy comprising a body having a neck, a head having a neck opening, a reflector plate having a peripheral portion bearing at its outside upwardly against the opening of the head, and dimensioned at its inside to fit the neck, the said inside being provided with channels for sound discharge, a sound producing device disposed in the body at the neck and arranged to discharge sound through the neck, said reflector plate serving to reflect and guide the sound reversely through the aforesaid channels around the outside of the neck, said reflector plate hav-

ing a small central opening, and resilient link means passing through said opening and connecting the head to the body, whereby said body, reflector plate and head are all resiliently held in assembled relation.

6. A doll comprising a doll body having a neck, a head having a neck opening, a reflector plate having a peripheral portion secured at its outside to the neck opening of the head, and dimensioned at its inside to fit the neck of the doll, the said inside being provided with channels for sound discharge, a sound producing device disposed in the body of the doll beneath the neck and arranged to discharge sound upwardly through the neck, said reflector plate serving to reflect and guide the sound downwardly through the aforesaid channels around the outside of the neck, said reflector plate having a small central opening, a hook passing through said opening, means connecting the lower end of the hook to the doll body, and means including a heavy elastic band connecting the upper end of the hook to the head, whereby said body and head are resiliently held in assembled relation.

7. A doll comprising a doll body having a neck conforming to a part of a sphere, a head having a neck opening, an upwardly convex reflector plate having a peripheral portion bearing at its outside upwardly against the neck opening of the head, and dimensioned at its inside to fit the neck of the doll, the said inside being provided with channels for sound discharge, a sound producing device disposed in the body of the doll beneath the neck and arranged to discharge sound upwardly through the neck, said reflector plate serving to reflect and guide the sound downwardly through the aforesaid channels around the outside of the neck, said reflector plate having a small central opening, a hook passing through said opening, means connecting the lower end of the hook to the sound producing device within the doll body, and means including a heavy elastic band connecting the upper end of the hook to the head, whereby said body, reflector plate and head are all resiliently held in assembled relation.

8. A doll comprising a body, a neck, and a hollow head, said doll having sound passages leading downwardly from the head around the outside of the neck, a sound producing device located in the body near the neck for discharging sound upwardly through the neck toward the head, and a reflector or baffle disposed in the head immediately over the neck to guide the sound downwardly directly to the passages and to thus prevent the sound from becoming muffled in the hollow head.

9. A doll comprising a body, a neck and a hollow head having a neck opening surrounding the neck, said doll having sound passages leading downwardly from the head around the outside of the neck, a sound producing device located in the body near the neck for discharging sound upwardly through the neck toward the head, and a reflector or baffle disposed in the head immediately over the neck to guide the sound downwardly directly to the passages and to thus prevent the sound from becoming muffled in the hollow head, said baffle extending downward and outward through the neck opening.

10. A doll comprising a body, a neck, and a hollow head having a neck opening surrounding the neck, said doll having sound passages leading from the head around the outside of the neck, a sound producing device located in the body near the neck for discharging sound upwardly

toward the head, and a reflector or baffle disposed in the head immediately over the neck to guide the sound directly to the passages and to thus prevent the sound from becoming muffled in the hollow head, said baffle extending downward to surround the neck, and having the aforesaid sound passages formed therein.

11. A doll comprising a body and a head having neck regions with a sound passage therethrough, means connecting said body and head at said neck regions, a sound producing device located within said body and communicating with said sound passage, a plate for reflecting the sound produced by said sound producing device, said plate being located within the head over the neck region thereof, and means for laterally spacing said head from said body at said neck regions, said spacing means forming channels therebetween for conducting the sound reflected by the plate to the outside air.

12. A doll comprising a body and a hollow head, means connecting said body and head, a sound producing device located within said body, a plate for reflecting a sound produced by said sound producing device, said plate being located within the head over the neck area thereof blocking the passage of sound into the head, a small aperture in said plate to permit said body and head connecting means to pass therethrough, and means at the neck area for spacing said head from said body, said spacing means providing channels therebetween for conducting the sound to the outside air.

13. A doll comprising a body and a hollow head, means connecting said body and said head, a sound producing device located within said body, and a unitary plate located within said head over the neck area thereof blocking the passage of sound into the head, said plate being formed to reflect the sound produced by said sound producing device, to space said body from said head, and to provide channels for conducting the sound to the outside air.

14. A doll comprising a body and a hollow head, means connecting said body and said head, a sound producing device located within said body, a unitary plate located within said head over the neck area thereof blocking the passage of sound into the head, said plate being formed to reflect the sound produced by said sound producing device, to space said body from said head, and to provide channels for conducting the sound to the outside air, said plate having a small aperture, said body and head connecting means passing through said aperture, and said connecting means also maintaining said plate in position.

15. A toy comprising a compressible body having a neck portion, a head having a neck opening conforming to the neck portion, a sound producing device disposed in the body near the neck portion and arranged to discharge sound through the neck portion, the opening of the head being provided with channels for sound discharge, said sound producing device comprising a casing having an input end and a sound discharge end both open for the passage of air, a light weight cap slidable in said casing, a sound producing means actuated by air forced therethrough by movement of the cap from the input end toward the sound discharge end, the arrangement being such that a relatively light air pressure such as that produced by squeezing the compressible body moves the cap and produces sound, and a reflector plate disposed in the head over the neck to reflect the sound discharged from the sound

producing device, and to guide the same through the aforesaid channels.

16. A doll comprising a compressible, imperforate body having a neck portion conforming to a part of the surface of a sphere, a head having a neck opening conforming to the neck portion, a sound producing device disposed in the body of the doll beneath the neck portion and arranged to discharge the sound upwardly through the neck portion, the opening of the head being provided with channels for sound discharge, said sound producing device comprising a casing having an input end and a sound discharge end both open for the passage of air, a light weight cap slidable in said casing, a sound producing means actuated by air forced therethrough by movement of the cap from the input end toward the sound discharge end, the arrangement being such that a relatively light air pressure such as that produced by squeezing the compressible body moves the cap and produces sound, and an upwardly convex reflector plate disposed in the head over the neck to reflect the sound discharged upwardly from the sound producing device, and to guide the same downward through the aforesaid channels.

17. A doll comprising a compressible, imperforate body having a neck conforming to a part of a sphere, a head having a neck opening, an upwardly convex reflector plate having a peripheral portion secured at its outside to the opening of the head, and dimensioned at its inside to fit the neck of the doll, said inside being provided with channels for sound discharge, and a sound producing device disposed in the body of the doll beneath the neck and arranged to discharge sound upwardly through the neck, said sound producing device comprising a casing having an input end and a sound discharge end both open for the passage of air, a light weight cap slidable in said casing, a sound producing means actuated by air forced therethrough by movement of the

cap from the input end toward the sound discharge end, the arrangement being such that a relatively light air pressure such as that produced by squeezing the compressible body moves the cap and produces sound, said reflector plate serving to reflect and guide the sound downwardly through the aforesaid channels around the outside of the neck.

18. A doll comprising a compressible, imperforate body and a hollow head, means connecting said body and said head, a sound producing device located within said body, said sound producing device comprising a casing having an input end and a sound discharge end both open for the passage of air, a light weight cap slidable in said casing, a sound producing means actuated by air forced therethrough by movement of the cap from the input end toward the sound discharge end, the arrangement being such that a relatively light air pressure such as that produced by squeezing the compressible body moves the cap and produces sound, a unitary plate located within said head over the neck area thereof, said plate being formed to block and to reflect the sound produced by said sound producing device, to space said body from said head, and to provide channels for conducting the sound to the outside air, said plate having a small aperture, said body and head connecting means passing through said aperture, and said connecting means also maintaining said plate in position.

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