March 18, 1958 W. J. SHAPIRO 2,826,862

TOY WITH SOUND EMITTER

Filed Feb. 20, 1951

Fig. 1

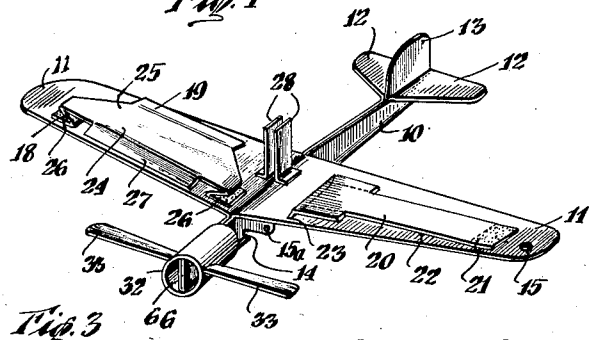


Fig. 2

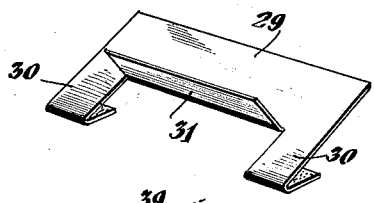


Fig. 3

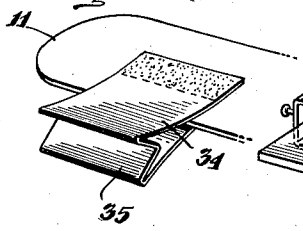


Fig. 4

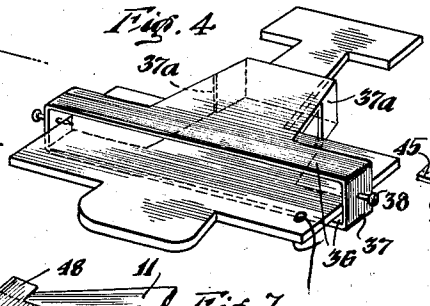


Fig. 5

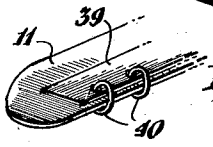


Fig. 6

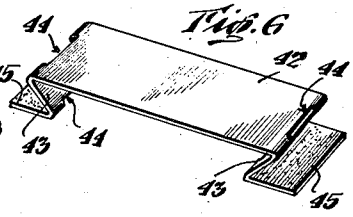


Fig. 7

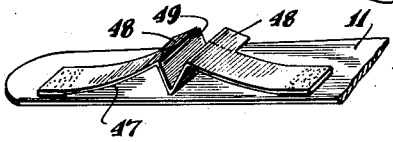


Fig. 8

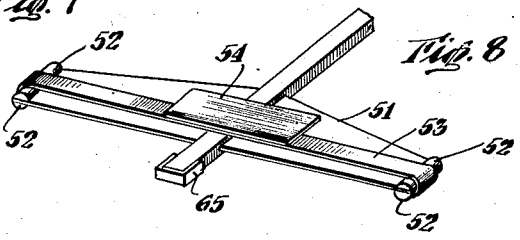


Fig. 9

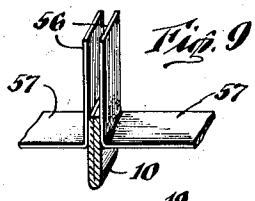


Fig. 10

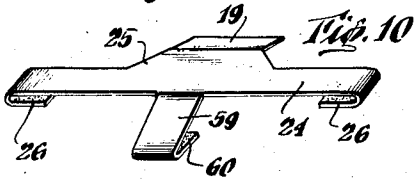


Fig. 11

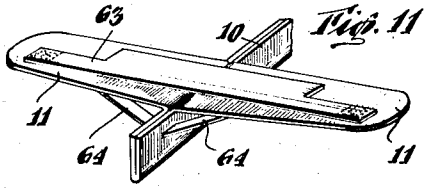


Fig. 12

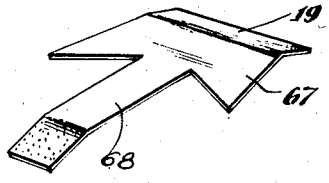
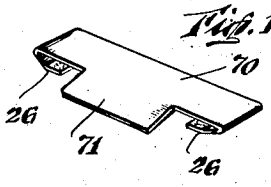


Fig. 13



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TOY WITH SOUND EMITTER

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Application February 20, 1951, Serial No. 211,837

16 Claims. (Cl. 46—52)

The invention relates to a toy for making a sound and may take many different forms, such as a bird, insect, glider and the like. The toy may be one which is propelled or projected through the air either as a free flying toy such as by being thrown or shot with a rubber band or spring or as a captive toy swung on a stick, string, cord or the like. The toy may simulate any desired object. In the case of a glider the noise simulates the purr of a motor. The invention relates to the sound emitter also.

It is an object of the invention to construct a toy which emits a sound, the vibrator for emitting the sound being of non-elastic sheet material or partially of inelastic sheet material.

Another object of the invention is to construct a toy with a sound device or vibrator which emits a sound greater than and differing in sound from that produced by devices heretofore known.

A still further object is to construct a glider having a sound emitter or vibrator which does not interfere with the flight of the glider.

Another object is to construct a glider having sound emitting means which also functions to improve the upward flight characteristic and stability of the glider.

Again the sound emitting means may be also a part of the functional toy structure such as the wing or stabilizer of a glider or the wings or tail of a simulated bird, insect or the like or also serve as a brace or a steering means.

A still further object is to provide a new and novel vibrator or sound emitter entirely of non-elastic material such as paper or partially of elastic and non-elastic material.

Other objects of the invention will be more apparent from the following description when taken in connection with the accompanying drawings illustrating some preferred embodiments of many forms tested in which:

Figure 1 shows a toy particularly in glider form with various forms of sound emitting means carried thereby including a sound emitter which also serves as a steering means;

Figure 2 is a perspective view of another form of sound emitter having rearwardly trailing connectors;

Figure 3 is a perspective view of a sound emitter and a portion of a wing, the emitter extending forwardly from its point of attachment;

Figure 4 is a perspective view of a double sound emitter;

Figure 5 is a perspective view of a loose connector for a sound vibrator or emitter;

Figure 6 illustrates in perspective another form of sound emitter;

Figure 7 is a perspective view of a fold sound emitter having a fold intermediate of its ends.

Figure 8 shows a sound emitter utilizing an elastic material in the form of an elastic band with a non-elastic tail;

Figure 9 shows a sound emitting means serving also as the tail element or elements of a glider;

Figure 10 shows a sound emitter having a central anchorage as well as lateral anchorages;

Figure 11 shows a sound emitter which spans the wings and serves also as a wing brace;

Figure 12 is a trailing type of sound emitter; and

Figure 13 shows a sound emitter extending forwardly from the points of attachment.

The toy with a sound emitting means may simulate any desired object; however, it is illustrated particularly as a toy glider. The sound created by the emitter simulates in miniature the staccato roar of an airplane in flight, the buzzing of an insect or the whirring of a bird's wings. These changes are accomplished by varying the shape, size, thickness of paper used and tension of the flutter. Such sound emitters should not affect the flight or not materially affect the same if it is a free flight glider as distinguished from a captive glider or toy which is swung on a string. The glider may be constructed in any suitable fashion, that illustrated being a sheet of heavy paper or cardboard folded to form a fuselage 10 of double thickness, a wind 11 projecting from each side thereof and a stabilizer or tail means including horizontal stabilizers 12 and a vertical rudder 13. The fuselage may have a notch 14 to receive some projecting means for free flight such as a rubber band or spring. The wing or the fuselage may carry a hole 15 or 15*a* to which a string may be secured for a captive toy and the glider or toy may be projected by swinging the same around on the string. The wings are preferably braced.

The sound emitter or vibrator may take many forms but it is constructed at least in part of a non-elastic sheet material such as paper. A bond paper having a thickness approximately of .010 of an inch has been used. Jute paper having a thickness of .024 of an inch has also been successfully used. Tissue paper also may be used. It has been found, however, that as the thickness of the sound emitter material is increased the dimensions should also be increased for best results for the emission of sound. A sound emitter of tracing paper emitted good sound having a length of 1 3/16 inches by ½ inch wide, and excellent volume of sound is secured with the use of bond or ledger paper approximately 2¾ inches by 1½ inches.

The sound emitter 20 is a paper strip secured at one end such as by adhesive 21 to the wing 11 of the glider. The longitudinal edge 22 is a free edge and faces generally in the direction of the flight or direction of motion. It may have either a forward extension or rearward extension or both. Also the end 23 may be bent upwardly or downwardly to form a wind vane.

The sound emitter 24 of non-resilient material gives an excellent sound effect which emitter is secured at each end thereof and has an extension 25 forming a tail extending rearwardly of a narrow portion of the emitter which narrow portion in the construction particularly illustrated is the attaching or securing means or the point of attachment with the wing. The narrow portion need not be the attaching means. The tail materially increases the volume of sound emitted by the vibrator. The vibrator may be secured to the wing of the glider such as by folds 18 formed by the folded ends 26 which are attached to the glider wing such as by adhesive. It is immaterial whether the sound emitter is attached to the upper or the under side of the wing or fuselage. The leading edge 27 may be bent down or up and the trailing edge 19 may be bent upwardly or downwardly with improved results.

Sound emitting means of one or more bands of vibrators 28, a pair being illustrated, are attached to a

glider at their ends and extending generally vertically and spaced a short distance from each other. They may be at a considerable angle from their vertical position without affecting the results and better sound effect is secured if there are two or more. Excellent sound emission is secured but in addition a glider with one or more of these vertical emitters at or adjacent the wing, i. e. in the region of the wing, gave, when vibrating, a substantial increased lift and stability to the flight of the glider. At a distance of about fifteen feet from the point of projection, a glider with the vertical sound emitting means had an increased lift of about two to three feet over the lift of the same glider without the sound emitting means.

The sound emitting means may also serve as a steering means as shown in Figure 1 in which a tubular member **32** such as a rubber is mounted on the nose of the fuselage and carries tilted vanes **33**. The tubular member may be turned on the nose to change the position of the vanes and the member remains in turned position. By changing the position of the vanes the glider flies to the left or right, upwardly or downwardly, with respect to a flight without the steering vanes. The vanes vibrate and emit a sound as explained above.

Figure 2 shows a sound emitter **29** which is merely attached to the glider by forward extensions **30**. The leading edge **31** of the sound emitter is preferably bent upwardly for better results.

The sound emitter **34** of Figure 3 is a forwardly extending one, shown as a double construction with a V fold **35** at the forward position thereof. The ends are attached to the glider or wing. Sound emitters extending forwardly of the point of attachment cannot extend too far forwardly from the point of attachment and secure a sound effect.

Figure 4 shows a double sound emitter in that spaced emitters **36** are connected together by connecting means **37** and **37***a* so that they vibrate together and one sound emitter being located above a glider wing and the other below. For a toy of another form the supporting structure is between the two sound emitters. The attachment to the toy may take any suitable form, that shown being bearing holes **38** in the connecting means **37** to receive a pin or nail which is driven into the top such as the glider wing.

In Figure 5 the sound emitter **39** which may be such as **24** or **20** of Figure 1 or that of Figures 2, 6, 7, 10, 12 and 13, is shown having a loose connection rather than an adhesive connection such as a hole through the wing and sound emitter through which a cord or loop **40** is passed, the cord being loosely tied so that the sound emitter or vibrator may oscillate freely. Many other forms of loose connectors have been devised and found satisfactory.

Figure 6 shows a modified form of sound emitter **42** which is a relatively broad band having end folds **43**. When the sound emitter is a relatively wide strip of material, the sound emitted is increased by cutting away a slot or part **44** of the width such as at the creases forming the fold. This emitter is secured in any suitable fashion to a toy such as by adhesive tabs **45**.

Figure 7 shows sound emitter **47** having a fold **49** between the ends thereof, the fold shown being a single fold and of V form. Also the V is directed so that the ridge is towards the wing although this is not essential. The sound emitter may have a tail **48**.

A resilient type of emitter is illustrated in Figure 8 in which a glider or toy **51** of any construction has a spacer **52** secured at each end of the wings and on both sides thereof to support a rubber band **53** spaced from the surface of the wing. The volume of sound emitted by the rubber band is substantially increased by providing a tail **54** adhesively secured to the rubber band. The tail is of non-resilient sheet material, such as bond paper.

It is evident that the manner of attachment of the sound emitter is unimportant. The best results have been secured where the attachment has been spaced from the carrier so as to allow some freedom of movement of the emitter or vibrator. The place of attachment of the sound vibrator is unimportant in order to function and cause the emission of sound. The vibrator has been attached to a wing, across both wings, to the stabilizer, to the fuselage in the form shown in the sound emitter **28**, and may even form part of the functional structure of a glider. For a toy whirling on a string, best results are obtained, when using a single end attachment form, when the point of attachment is at the inward end of the sound emitted nearest the center of rotation or the end of the string held by the user because at high speeds the sound emitter tends to raise up excessively which may silence it. To maintain the equilibrium of the glider in free flight, as when it is projected into the air, the sound emitter must be mounted in the center of the glider. Or a pair of identical emitters can be mounted in positions symmetrical of this center.

The sound emitting means or vibrator need not be a separate element carried by the toy. It may actually be any part of the structure of the toy such as the wing or tail structure of a glider, or a simulated bird. Figure 9 shows sound emitting means which not only vibrates to emit a distinct motor sound but serves as the tail structure for the glider. This tail structure in the form illustrated is of inelastic material secured to the rear of the fuselage of the glider **10**. Upwardly extending portions **56** form the vertical fin or rudder of the tail structure. The portions **57** extend laterally to form horizontal stabilizers or elevators. Each portion vibrates to emit sound and it is understood that either part alone may be the vibrating sound emitter. A like structure may be used to simulate the tail or wings of a toy which simulates a bird or insect.

In Figure 10 there is shown a construction which is generally similar to the sound emitter **24** shown in Figure 1. This sound emitter is relatively long and in order to prevent the center thereof from rising too far above a wing surface, a central attachment in the form of an extension **59** projects forwardly and is secured to the toy in any suitable fashion such as by a fold **60** bent underneath the extension and adhesively secured in place. The trailing edge **19** may be bent downwardly or upwardly.

Figure 11 shows a sound emitter **63** which spans both wings **11** of the toy or glider. The wings of this glider are given a dihedral so that the sound emitter **63** not only serves its sound emitting function but also serves as a brace giving support to the wings and retaining the dihedral from becoming flat or in line. The sound emitter **63** may take any form of the forms described hereinbefore or hereinafter and illustrated in the figures of the drawing. With this construction, a brace **64** should also extend from underneath the wing to the fuselage.

There is shown in Figure 12 a sound emitter or sound emitting means **67** which has one connection with the toy. A forwardly extending connecting means **68** has its forward end connected with the toy. This sound emitter may also have the bent trailing vane or edge.

A forwardly extending sound emitter **70** is shown in Figure 13. The forward portion **71** or leading edge of the emitter extends forwardly of the point of attachment **26**, that is, it projects into the wind. It cannot extend too far forwardly from the point of attachment in order to emit sound. If too long it rises excessively and does not vibrate. Should it be too long a portion can be cut off until it vibrates.

Various forms of connections, mounts or spacers with the toy or other sound emitter are shown. The folded mounts **18** of Figure 1 and **43** of Figure 6 and that of Figure 13 provide ample play or looseness which increases the loudness of the sound. The folds shown extend longitudinally of the toy or glider as distinguished from a laterally extending fold or crease of Figure 2, although they need not extend in this direction; however, less wind

resistance is offered thereby. Or a rigid connection or spacer **37** may be used as shown in Figure 4. The single attachment such as of the emitters **20** and **28** of Figure 1 is inherently loosely mounted.

The sound emitters affect the attachment between the wing and the fuselage; therefore bracing of the wings is essential where the connection is not rigid or such as produced by bending the wings with respect to the fuselage. Braces **64** are shown particularly with the glider of Figure 11.

In all of the sound emitters, the volume of sound as well as the nature or character of the sound is improved by a bent up or bent down vane at the leading edge or trailing edge or both. The vanes **19, 23, 27, 31** are illustrative of the vanes which may be provided for any of the sound emitters.

Of the papers tested best sound effects have been secured with a #32 stock ledger paper which is about .005 inch thick. For a loose connection between the sound emitter and the carrier or toy using a rubber band, string and the like as shown in Figure 5, cardboard having a thickness of about .016 has been used which gave good sound emission. As the thickness increased the frequency of the sound decreased. For sound emitters with tails it was found that when sound emission was secured the fore and aft dimension was about twice the lateral or side to side free dimension or less.

Means are provided to keep the toy headed into the direction of movement so that the edge of the sound emitter is presented in the direction of movement. This usually takes the form of a weight **65** at the nose of the toy or glider or it may be merely an extension of the toy itself; for example the extension **66** of the fuselage may be sufficient to keep the toy nose forward or in the direction of movement.

The emitters may be mounted upon the upper side of the wings or fuselage or on the underside with equal results. Improved volume of sound is produced in all emitters when the sound emitter strikes the supporting structure such as the glider wing or when the sound emitters strike each other as in sound emitters **28** and **56**. It was mentioned that markedly higher flight is secured with the sound emitters **28** of Figure 1. Some of the other sound emitters such as **24** also cause increased height of flight.

The invention is presented to fill a need for improvements in a toy with sound emitter. It is understood that various modifications in structure, as well as changes in mode of operation, assembly and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. Hence it will be understood that this disclosure is illustrative of preferred means of embodying the invention in useful form by explaining the construction, operation and advantages thereof.

What is claimed is:

1. A toy or the like for producing a sound when propelled through the air comprising a body, a sound emitter at least a portion of which is of inelastic and relatively thin sheet material which is set into vibration upon propelling the body through the air, means attaching the sound emitter to the body at least at one end thereof solely for vibratory movement and at a position exposed to the airstream passing over the body, the means to attach the sound emitter to the body mounting the unattached portion loosely, and means to retain the body when projected with an edge of the sound emitter towards the direction of movement, the sound emitter being positioned adjacent one other part to strike the same as it vibrates.

2. A toy or the like for producing a sound when propelled through the air comprising a body, a sound emitter at least a portion of which is of inelastic and relatively thin sheet material which is set into vibration upon propelling the body through the air, means attaching the sound emitter to the body at least at one end thereof solely for vibratory movement and at a position exposed to the airstream passing over the body, means to retain the body when projected with an edge of the sound emitter towards the direction of movement, and an extension projecting rearwardly from the emitter to form a tail therefor.

3. A toy or the like for producing a sound when propelled through the air comprising a body, a sound emitter at least a portion of which is of inelastic and relatively thin sheet material which is set into vibration upon propelling the body through the air, said sheet material having a length greater than 1¼ inches and a width greater than ½ inch, means securing at least one end of the sound emitter to the body solely for vibratory movement and at a position exposed to the airstream around the body and with an unsecured leading edge thereof extending in a generally lateral direction of the body, the means to secure the sound emitter to the body mounting the unattached portion loosely, and means to retain the body when projected with the leading edge of the sound emitter towards the direction of movement, the sound emitter being positioned adjacent one other part to strike the same as it vibrates.

4. A toy or the like for producing a sound when propelled through the air comprising a body, a sound emitter of inelastic and relatively thin sheet material which is set into sound vibration upon propelling the body through the air, said sheet material having a length greater than 1¼ inches and a width greater than ½ inch, means securing the sound emitter to the body solely for vibratory movement and at a position exposed to the airstream around the body and at least at each end thereof with an unsecured leading edge extending in a generally lateral direction of the body, means to retain the body when projected with the unsecured leading edge of the sound emitter being towards the direction of movement, and a tail of inelastic sheet material carried by the sound emitter and having a length of less than four inches.

5. A toy or the like as in claim 4 including at least one fold extending from the front edge to the rear edge of the sound emitter and between the ends thereof.

6. A toy or the like as in claim 1 in which the sound emitting means is secured solely at one end thereof.

7. A toy or the like for producing a sound when propelled through the air comprising a body, a sound emitter at least a portion of which is of inelastic and relatively thin sheet material which is set into vibration upon propelling the body through the air and having a length greater than 1¼ inches and a width greater than ½ inch, means securing at least each end of the sound emitter to the body with an unsecured leading edge and trailing edge thereof extending in a generally lateral direction of the body, an extension projecting at least from one edge of the sound emitter, and means to retain the body when projected with the leading edge of the sound emitter towards the direction of movement.

8. A toy or the like as in claim 7 in which the extension projects forwardly and is bent at an angle to form a vane.

9. A toy or the like as in claim 7 in which the extension projects rearwardly and including a vane bent at an angle with respect to the extension at the trailing edge of the sound emitter.

10. A toy or the like as in claim 7 in which the extension projects both forwardly and rearwardly and including a vane bent at an angle with respect to the extension at the trailing edge and the extension at the leading edge of the sound emitter being bent to form a vane.

11. A sound emitter adapted to be attached to a toy and the like to be projected through the air comprising a sound emitting member of relatively thin sheet material which will vibrate when projected through the air, means carried thereby to attach the member to a toy and the like, an extension of non-resilient sheet material carried by the sound emitting member and projecting beyond the attaching means, and a vane carried by the member bent angularly with respect to the member.

12. A sound emitter adapted to be attached to a toy

and the like and to be projected through the air comprising a sound emitting member of relatively thin sheet material which will vibrate when projected through the air, means carried at least at the ends thereof to attach the same to a toy and the like, at least one integral extension carried by the sound emitting member extending beyond the attaching means, and a vane carried at the end of the extension and angularly directed with respect thereto.

13. A toy or the like as in claim 4 in which the sound emitter is positioned adjacent one other part to strike the same as it vibrates.

14. A toy or the like as in claim 7 in which the sound emitter is positioned adjacent one other part to strike the same as it vibrates.

15. A toy or the like as in claim 10 in which the sound emitter is positioned adjacent one other part to strike the same as it vibrates.

16. A toy or the like as in claim 1 including a vane carried by the sound emitter bent angularly with respect to the emitter.

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