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(54) **Animated annunciator apparatus**

(57) An animated telephone annunciator apparatus provides realistic movements so that a user of the apparatus appears to converse with a part (4) of the apparatus. The apparatus receives telephone signals, and in response to these received signals moves portions of the apparatus (6, 7) in synchronism with the signals. As a result, the apparatus appears to realistically speak the words of a calling party.

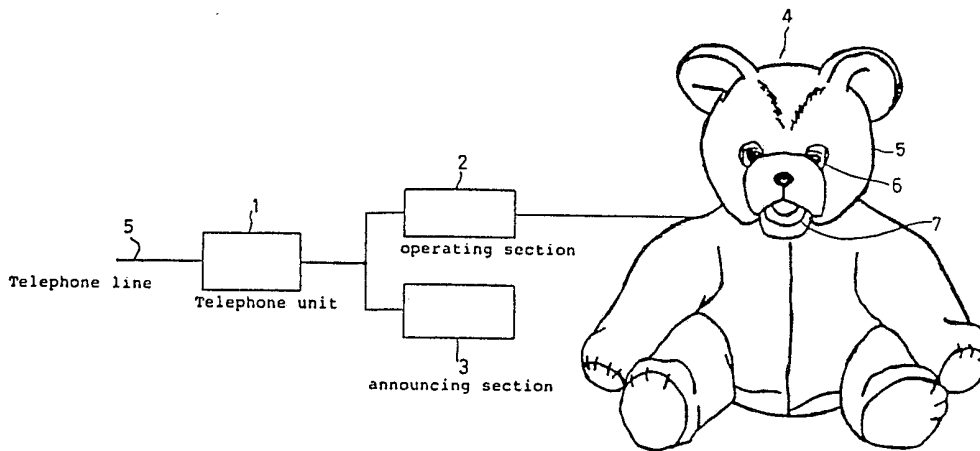


Fig 1

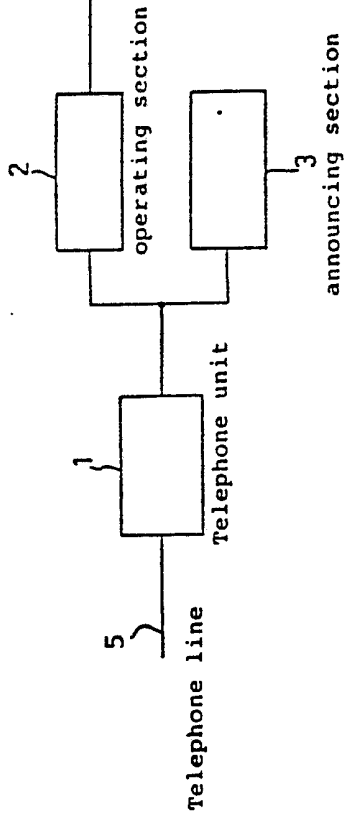
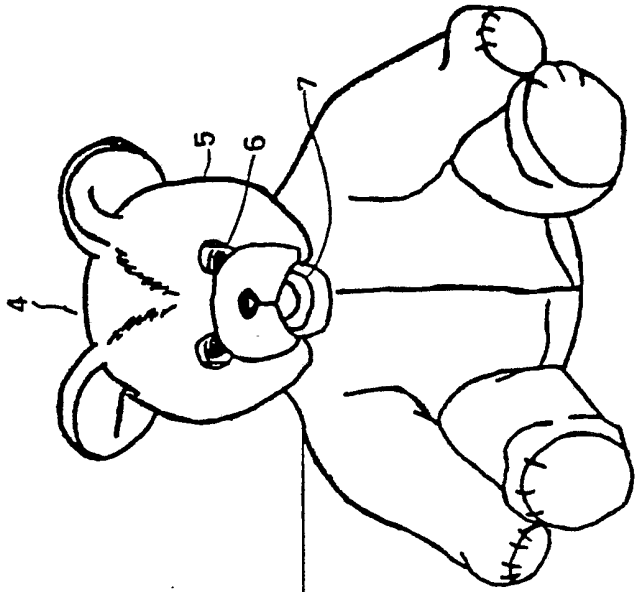


Fig. 1.

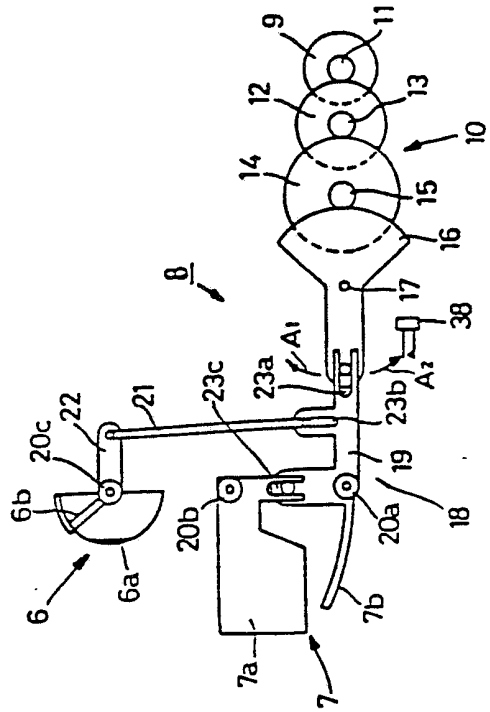


Fig. 2.

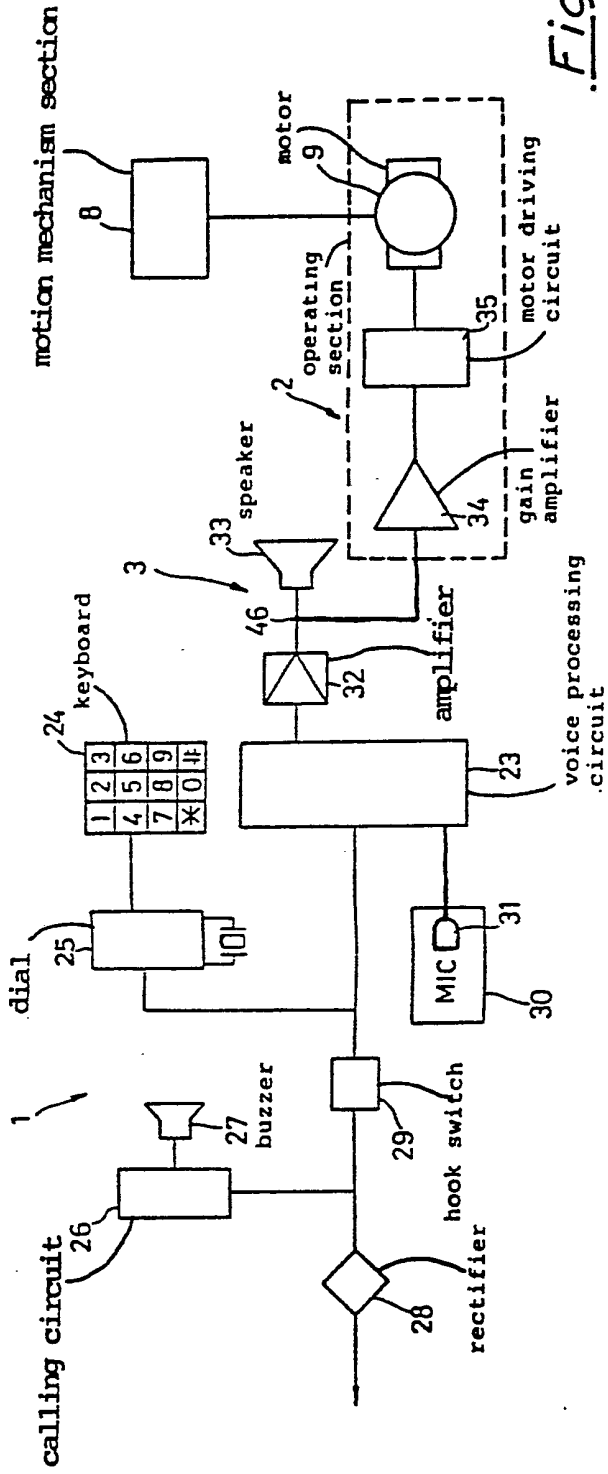


Fig 3.

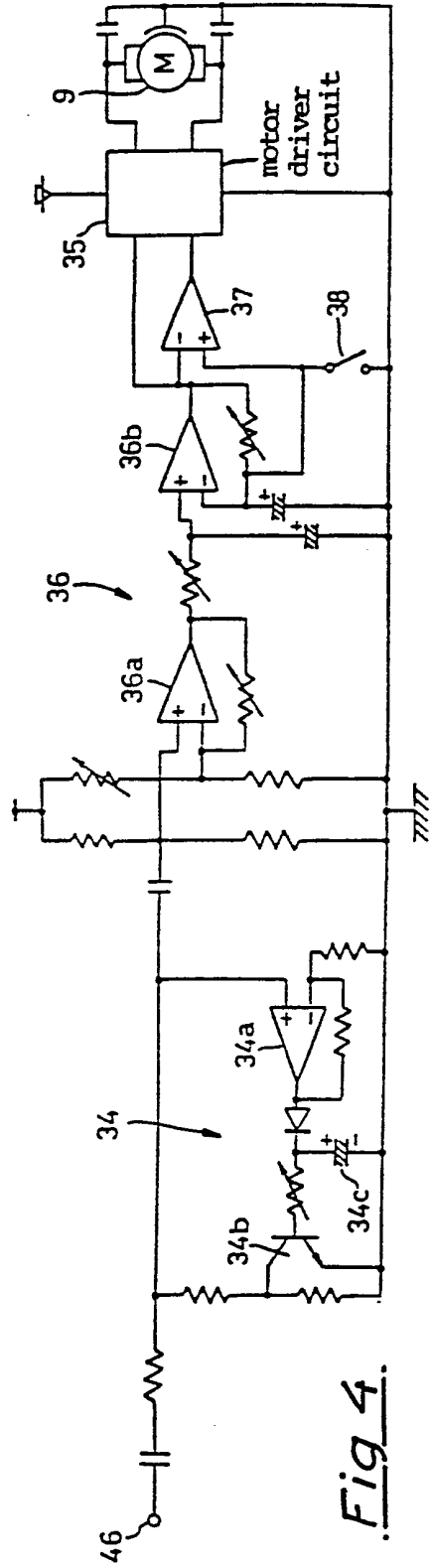


Fig 4.

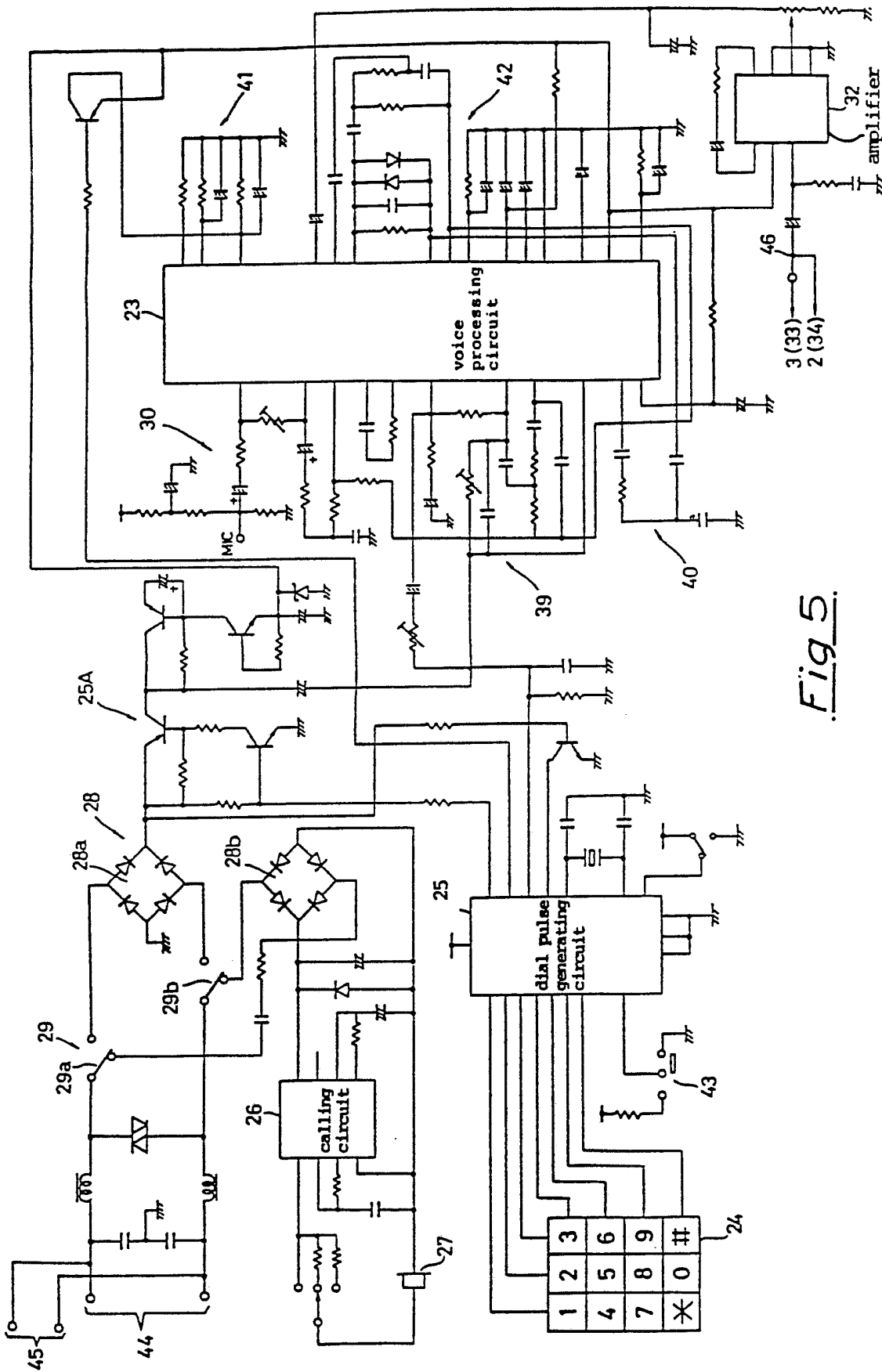


Fig. 5.

DESCRIPTIONANIMATED ANNUNCIATOR APPARATUS

The present invention relates to an annunciator apparatus and in particular but not exclusively to
5 an animated telephone apparatus in which a movable object moves in synchronism with the conversation of one party to a telephone conversation.

Typically, telephone annunciator apparatus records a telephone communication (i.e., the speech
10 of a calling party) on one channel of a recording tape, together with control signals on another channel of the recording tape. Subsequently, the recording tape is played back and a movable object is moved in response to the control signals and the voice
15 signals recorded on the recording tape. The structure of such an apparatus is, however, complicated and it is impossible to move the movable object in synchronism with the speech of the calling party. As a result, the movable object does not realistically simulate
20 conversation between the calling party and a user of the apparatus.

It would be advantageous if a telephone apparatus could be provided in which a telephone conversation appears to be taking place with a movable object which
25 moves in synchronism with the speech of a calling party.

It would also be advantageous if a simple and

inexpensive telephone apparatus could be provided in which a user appears to converse with a movable object which moves in synchronism with the speech of a calling party.

5 In accordance with one aspect of the present invention an animated annunciator apparatus comprises a telephonic means for transmitting and receiving telephone signals; an announcing means for receiving at least a first one of said telephone signals and
10 for generating a voice control signal varying in accordance with the at least one of the telephone signals; and an animation means, having movable elements, for receiving the voice control signal, and for moving the movable element in synchronism with the voiced
15 control signal.

 Preferably, the telephonic means comprises a circuit for receiving telephone signals (e.g., on hook, off hook and speech signals) and placing the apparatus in an active state so as to enable a calling party
20 to converse with a user of the apparatus, and a circuit for transmitting dial signals to enable a user of the apparatus to place a call to another person.

 Advantageously, the announcing means includes a circuit for enabling a user of the apparatus to place
25 the apparatus in an active state so as to receive and convert speech signals of a calling party into sound.

Preferably, the animation means includes an amplifier for generating a motion signal which varies in synchronism with the speech of a calling party, a motor rotating in response to the motion signal, a gear train mechanism which rotates in response to movement of the motor, and linkage elements movably connected to the gear train mechanism so as to selectively move the movable elements in a first direction and in a second direction in accordance with and in synchronism with the speech of the calling party.

In accordance with another aspect of the present invention an animated annunciator apparatus having an active state and an inactive state comprises activate means for receiving telephone signals and for selectively placing said apparatus in said active state and in said inactive state in response to at least one of said telephone signals; means for receiving a speech signal corresponding to one of said telephone signals and for transmitting dial signals; means for converting said speech signal into a voice control signal and for generating sound in accordance with said voice control signal; means for enabling said activate means to place said apparatus in said active state; amplifier means for generating a motion control signal varying in accordance with said voice control signal; movable element means, having movable elements, for providing animated movement in response to the motion control

signal; motor means for providing a motion force, for
moving said movable elements in response to said
motion control signal so that said movable elements
move in synchronism with said speech signal; a gear
5 train mechanism operatively connected to said motor
means and rotated in response to said motion force; and
linkage elements movably connected to said gear train
mechanism so that said movable elements selectively
move in a first direction and in a second direction
10 in response to said motion control signal.

The invention is described further hereinafter,
by way of example only, with reference to the accompany-
ing drawings in which:

Fig. 1 is a schematic diagram of one embodiment
15 of the present invention;

Fig. 2 shows the details of a gear train mechan-
ism employed in the embodiment illustrated in Fig. 1;

Fig. 3 is a block diagram of the embodiment of
Fig. 1;

20 Fig. 4 is a schematic diagram of a portion of
the embodiment illustrated in Fig. 3; and

Fig. 5 is a schematic diagram of another portion
of the embodiment illustrated in Fig. 3.

In the present application, the terms calling
25 party and user of the apparatus are used to denote two
possible parties to a conversation, regardless of which

party initiated the conversation. That is, regardless of whether or not the user of the apparatus initiated the telephone conversation, the person at the other end of the conversation is referred to as the calling party.

5 In Fig. 1 a telephone unit 1 is provided which transmits and receives telephone signals, for example on hook, off hook, speech signals and dial (pulse or tone) signals. Also, an operating circuit 2 is included, which operates in response to a telephone
10 signal received by the telephone unit 1. An announcing circuit 3 converts a speech signal received by the telephone unit 1 into sound so that a user of the apparatus can hear the speech of a calling party. A movable object 4 having movable elements such as
15 two eyes 6 and a mouth 7 is also provided in which the movable elements 6, 7 move in synchronism with the speech of the calling party, and thus move in synchronism with the sound generated by the announcing circuit
3.

20 In operation, telephone signals are applied to a telephone line 5 which is connected to the telephone unit 1. Of the telephone signals, the telephone unit 1 converts speech signals, which correspond to the speech of a calling party, into a voice control signal which
25 is then applied to the operating circuit 2 and to the announcing circuit 3. The operating circuit 2 actuates the movable object 4 in response to the voice control

signal, and the announcing circuit produces sound responsive to the voice control signal.

Fig. 1 illustrates the movable object 4 as a teddy bear, but the movable object 4 can be any type of doll, stuffed toy or robot mechanism. The teddy bear 4 shown in Fig. 1 houses a motor and gear train mechanism such as illustrated in Fig. 2 so that the eyes 6 and mouth 7 move in synchronism with the speech of the calling party. Thus, to the user of the apparatus of the present invention, a conversation appears to be taking place with the teddy bear 4.

Referring to Fig. 2, each eye 6 comprises an eyeball 6a, and an eyelid 6b which is slidably mounted on the fixed eyeball 6a. Either one or both of these elements could be movable. The mouth 7 has an upper jaw 7a and a lower jaw 7b. The movable elements, or eyes 6 and mouth 7 in the illustrated embodiment, are moved by a motion section 8. The motion section 8 comprises a motor 9; a gear train mechanism 10 and linkage elements 18. The gear train mechanism 10 comprises a first gear 11 fixed to a rotation shaft of the motor 9; a second gear 12 having a larger diameter than the first gear 11 and positioned so as to engage the first gear 11; a third gear 13 rotatable with the second gear 12 and having a smaller diameter than the second gear 12; a fourth gear 14 having a larger diameter than the third gear 13 and positioned so as to engage

the third gear 13; a fifth gear 15 having a smaller diameter than the fourth gear and rotatable with the fourth gear; and a sixth gear 16 having sector shape positioned so as to engage the fifth gear 15.

5 The sixth gear 16 pivots about a pivot point 17.

The linkage elements 18 engage the tip portion of the sixth gear 16 as shown in Fig. 2. The linkage elements 18 comprise an oscillating lever 19 pivotably supported by a pivot 20a; a first link 21 connected
10 to the oscillating lever 19; and a second link 22 connecting the first link 21 and the eyelid 6b. The oscillating lever 19 has formed therein elongated openings 23a and 23b. These openings respectively engage pins on the sixth gear 16 and the first link 21. The
15 oscillating lever 19 has formed thereon a pivot which engages a slot 23c of the mouth 7. As the oscillating lever 19 pivots about the pivot point 20a, the upper jaw 7a pivots about a pivot point 20b and the eyelid 6b pivots about pivot point 20c. A limit switch
20 38 stops motion of the sixth gear 16 at the end of this gear's travel so as to preferably keep the sixth gear 16 engaged with the fifth gear 15.

Referring to Fig. 3, a telephone unit 1 includes a voice processing circuit 23, a keyboard 24, a dial
25 pulse generating circuit 25, a calling circuit 26, a buzzer 27, a rectifier 28 and a hook switch 29. An announcing section 3 includes the voice processing

circuit 23, a microphone 30, amplifier 32 and a speaker 33 which generates sound in response to the output of the amplifier 32. The operating circuit 2 includes a gain amplifier 34 driven by the output of the amplifier 32, a motor driving circuit 35 and a motor 9.

Fig. 4 is a schematic diagram of a portion of the embodiment of the operating circuit 2. As illustrated in Fig. 4 the gain amplifier 34 includes an inverting amplifier 34a, transistor 34b, and the associated circuit components connected as shown in Fig. 4. Fig. 4 also illustrates a waveform shaping circuit 36 including operational amplifiers 36a and 36b, comparator 37, a limit switch 38 (as shown in Fig. 2). A terminal 46 shown in Fig. 4 corresponds to the terminal 46 shown in Fig. 3.

Referring to Fig. 5, a telephone line connecting terminal 44 is included for connection to the telephone line 5 shown in Fig. 1, and a connecting terminal 45 is provided for connection to another telephone line. The hook switch 29 shown in Fig. 5 includes hook switches 29a and 29b; and a rectifier 28 includes a first rectifier 28a and a second rectifier 28b. A dial pulse generating circuit 25A, a transmission signal amplifier 3a for amplifying the signal to be transmitted, and a network circuit 40 are also included. A transmitting-

receiving switching comparator 41 switches operation
of the annunciator apparatus between transmitting
and receiving. A receiving signal amplifier 42
amplifies a telephone signal received at terminals
5 44, and a pulse/tone selection switch 42, permits
either dial pulses or tones to be applied to the line
5.

When telephone signals are applied on line 5
to the telephone unit 1, the input signal current is
10 rectified by rectifier 28 (Fig. 5) and then is input
to the calling circuit 26 which causes the buzzer 27 to
operate. When a user of the apparatus hears the
buzzer 27, the user can, for example, speak a predeter-
mined term into the microphone 30. This predetermined
15 speech enables the voice processing circuit 23 to
place the apparatus in an active state. By placing
the telephone unit in an active state, the hook switch
29 operates hook switches 29a and 29b to connect the
telephone line 5 to the calling circuit 26 through the
20 second rectifier 28b. Fig. 5 shows the hook switch
29 positioned to connect the telephone line to the
voice processing circuit 23 via the rectifier 28b.
With this connection, a signal corresponding to the
speech of a calling party received on telephone line
25 5 can be supplied to the voice processing circuit 23
via signal amplifier circuit 42. The voice processing

circuit outputs a voice control signal to the amplifier 32, which then provides a voice control signal to the point 46 shown in Figs. 3-5. The voice control signal drives the speaker 33 so that the user of the apparatus
5 can hear the speech of the calling party. The voice control signal also drives the operating circuit 2.

Referring to Figs. 3 and 5, when the user of the apparatus speaks into the microphone 30, the
10 microphone generates a sound signal which is applied to the voice processing circuit 23. This causes the voice processing circuit 23 to transmit the sound signal to the telephone line 5 through the transmission signal amplifier 39. Therefore, when a sound signal
15 is being applied to the voice processing circuit 23 via the microphone 30, this sound signal is not applied to either the speaker 33 or the operating section 2.

In the announcing circuit 3 shown in Fig. 3, the speaker 33 converts the voice control signal to
20 sound so that the user of the apparatus can hear the calling party. As shown in Figs. 1 and 3, the voice control signal is also applied to the operating circuit 2. Within the operating means 2, the amplifier 34 amplifies and shapes the voice control signal and applies
25 the shaped signal to a motor driving circuit 35, which provides a motion control signal to control the motor 9. The motor 9 provides a rotative motion force for

moving the motion mechanism 8 shown in Fig. 2. In
the embodiment of the apparatus of the present
invention shown in the drawings, voice processing
circuit 23 comprises, for example, part number BA6571A
5 manufactured by Rohm Co., dial pulse generating circuit
25 comprises, for example, part number BU8302A
manufactured by Rohm Co., calling circuit 26 comprises,
for example, part number BA6564A manufactured by
Rohm Co., amplifier 32 comprises, for example, part
10 number BA546 manufactured by Rohm Co., and the motor
driving circuit 35 comprises, for example, part number
LB1630 manufactured by Sanyo Co.

Whenever a voice control signal is supplied by
the amplifier 32 to the gain amplifier 34, the motor
15 drive circuit 35 causes the motor 9 to rotate.
Referring to Fig. 2, rotation of the motor 9 causes
the first gear 11 to rotate, causing the gear train
mechanism 10 to rotate. The rotational direction of
the motor 29 changes between forward and reverse in
20 accordance with the presence of absence of the voice
control signal 46. For example, when the calling party
speaks, the voice control signal causes the sixth gear
16 to rotate in the direction of the arrow A1 shown in
Fig. 2. This rotation is transmitted to the eyelid
25 6b through the links 21 and 22 causing the eyelid 6b
to close. This motion also causes the upper jaw 7a

and the lower 7b of the mouth 7 to open. When
the calling party is not speaking, the sixth gear 16
rotates in the direction of an arrow A2 so as to
open the eyelid 6a and to close the mouth 7. The above
5 motions continue until the limit switch 28 is operated,
causing the motor 9 to stop rotating. Because the voice
control signal varies in synchronism with the speech
of the calling party, the motions of the motion
section 8 shown in Fig. 2 are performed in synchronism
10 with the voice of the calling party. The movable object
4 or teddy bear shown in Fig. 2, therefore, appears
to speak the words of the calling party as they are
heard by the user of the apparatus from the speaker 33.

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CLAIMS

1. An animated annunciator apparatus comprising:
telephonic means for transmitting and receiving
telephone signals;

announcing means for receiving at least a first
one of said telephone signals and for generating a
voice control signal varying in accordance with said
at least a first one of said telephone signals; and

animation means, having movable elements, for
receiving said voice control signal and for moving
said movable elements in synchronism with said voice
control signal.

2. An animated annunciator apparatus as claimed
in claim 1, wherein said apparatus has an active state
and an inactive state, and wherein said telephonic
means includes:

activation means for selectively placing said
apparatus in said active state and said inactive state
in response to at least a second one of said telephone
signals; and

means for receiving a speech signal and for
transmitting dial signals.

3. An animated annunciator apparatus as claimed
in claim 2, wherein said announcing means includes:

means for converting said speech signal into said
voice control signal and for generating sound in
accordance with said voice control signal; and

means for enabling said activate means to place said apparatus in said active state.

4. An animated annunciator apparatus as claimed in any of claims 1 to 3, wherein said animation means includes:

amplifier means for generating a motion control signal varying in accordance with said voice control signal.

5. An animated annunciator apparatus as claimed in claim 4, wherein said animation means further includes:

motor means for providing a motion force, for moving said movable elements in response to said motion control signal so that said movable elements move in synchronism with said speech signal;

a gear train mechanism operatively connected to said motor means and being rotated in response to said motion force; and

linkage elements movably connected to said gear train mechanism so that said movable elements selectively move in a first direction and in a second direction in response to said motion control signal.

6. An animated annunciator apparatus having an active state and an inactive state, comprising:

activate means for receiving telephone signals and for selectively placing said apparatus in said active

state and in said inactive state in response to at least one of said telephone signals;

means for receiving a speech signal corresponding to one of said telephone signals and for transmitting dial signals;

means for converting said speech signal into a voice control signal and for generating sound in accordance with said voice control signal;

means for enabling said activate means to place said apparatus in said active state;

amplifier means for generating a motion control signal varying in accordance with said voice control signal;

movable element means, having movable elements movable, for providing animated movement in response to the motion control signal;

motor means for providing a motion force, for moving said movable elements in response to said motion control signal so that said movable elements move in synchronism with said speech signal;

a gear train mechanism operatively connected to said motor means and rotated in response to said motion force; and

linkage elements movably connected to said gear train mechanism so that said movable elements selectively move in a first direction and in a second direction in response to said motion control signal.

7. An animated annunciator apparatus as claimed in any of claims 1 to 6, wherein said animation means includes:

motor means for providing a rotative force varying in response to said voice control signal;

a gear train mechanism operatively connected to said motor means and being rotated in response to said rotative force; and

linkage elements movably connected to said gear train mechanism so that said movable elements selectively move in at least a first direction and a second direction in response to said motion control signal and so that said movable elements move in synchronism with said at least a first one of said telephone signals.

8. An animated annunciator apparatus substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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