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(54) Title: METHOD, APPARATUS AND PROGRAMS FOR TEACHING AND COMPOSING MUSIC

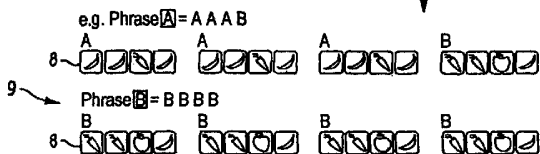
Stage 1: Select from a limited number of 'Notes' and build Ideas.

Notes are ordered into sequences of a specific number of notes, referred to as Ideas.



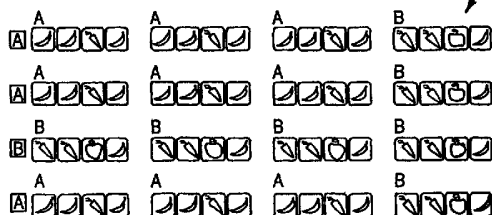
Stage 2: Select from a limited number of 'Ideas' and build Phrases.

Create a small number of short sequences of Ideas creating what is termed Phrases.



Stage 3: Select from a limited number of 'Phrases' and build Song Form.

e.g. A Song Form of sequence A A B A



(57) Abstract: A method and apparatus for the construction and teaching of music is described. The method involves a user following a supported sequence of tasks that guide their creativity in order to construct a musical Arrangement. The musical Arrangement constructed from building blocks comprising notes, Ideas, Phrases and a Song Form Template. The described method allows for the concepts such as rhythm, chords, harmony, pitch, repetition, variation, resolution, and phrase structure, that are normally hidden within a final composition to the systematically introduced to a user. Development of keyboard apparatus, a mobile phone environment and related computer software allows for automation of the process for constructing and teaching of music.



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Method, apparatus and programs for teaching and composing music.

1

2

3 The present invention relates to the field of musical
4 teaching aids. More specifically it relates to a method
5 and apparatus for constructing and teaching music
6 specifically tailored to a user's musical ability.

7

8 The composing of a piece of music at first sight appears
9 a most daunting task especially to a person who is new to
10 the art. Concepts such as rhythm, chords, harmony,
11 pitch, repetition, variation, resolution, and phrase
12 structure etc., can be hidden within the final
13 composition and so can be difficult for a person new to
14 the art to grasp. If the process of composing music can
15 be simplified a student would gain a better appreciation
16 of these concepts so enhancing their understanding, skill
17 and enjoyment of music and composition.

18

19 Musical instruments generally comprise a plurality of
20 note playing means. Common note playing means are the
21 keys found on keyboard instruments such as clavichords,
22 harpsichords, organs, pianos and synthesisers. Keyboard
23 instruments are an ideal way of introducing music to a

1 person who is new to the art and so provide an ideal
2 forum for teaching about the structure of music.
3 Typically a piano keyboard comprises a plurality of white
4 and black keys. Each key, when pressed, produces a
5 corresponding tone or note. The white keys correspond to
6 what is commonly known as diatonic tones or notes while
7 the black keys correspond to what are known as the
8 chromatic tones or notes. These keys are arranged in
9 octaves such that each octave contains the same set of
10 tones or notes. Their pitch distinguishes the same tones
11 or notes of different octaves from each other.

12

13 Various keyboard interfaces have been employed in an
14 attempt to teach students about the composition of music.
15 For example US Patent No. US 5,011,412 teaches of a
16 keyboard with removable keys, wherein musical tone
17 generation for a given key is provided in response to the
18 correct placement of the key in its corresponding key
19 slot.

20

21 An ideal interface for the teaching of music with
22 keyboards is a computer. US Patent No. US 4,655,117
23 teaches of a method whereby a standard computer keyboard
24 is converted via computer software to act as a musical
25 keyboard. However, standard computer keyboards are
26 designed to aid typing so the key arrangement as taught
27 in this Patent is undesirable for developing a user's
28 ability to play music.

29

30 Alternatively, the US Patent No. US 4,352,313 teaches of
31 a piano-type keyboard unit, that is adapted to fasten
32 onto a standard keyboard, and software that converts a
33 computer keyboard to be a musical keyboard. Such

1 keyboards tend to be cumbersome still being restricted by
2 the keyboard designed to aid typing. Additionally such
3 add on keyboard designs require knowledge of the layout
4 of the computer keyboards. An obvious problem in these
5 teachings is the fact that although keyboards are
6 standard in terms of their content, they are not of
7 standard dimensions. For instance ergonomic keyboards
8 are becoming popular alternatives for use with computer.

9

10 Further musical instrument and computer interface
11 technology is known in the art whereby instruments are
12 attached directly to the computer. Such systems require
13 additional hardware in the form of a Musical Instrument
14 Digital Interface (MIDI) and software in order to provide
15 a working interface.

16

17 As an initial point to note reference to a computer
18 herein include computers commonly known in the art as
19 personal computers, laptop computers and hand-held
20 computers.

21

22 It is an object of at least one aspect of the present
23 invention to provide a method for constructing music that
24 requires a user to construct a musical Arrangement, from
25 user defined units, by following a supported sequence of
26 tasks.

27

28 It is a further object of at least one aspect of the
29 present invention to provide a medium within which the
30 method of constructing music is automated.

31

32 It is a further object of at least one aspect of the
33 present invention to provide a musical instrument that

1 can be connected directly to a computer via its normal
2 keyboard connection means so as to aid in the method of
3 constructing music.

4

5 According to a first aspect of the present invention
6 there is provided a method for constructing a musical
7 Arrangement, the method comprising the steps of:

- 8 1) Constructing an Idea Set from a note set;
- 9 2) Constructing a Phrase Set from the Idea Set;
- 10 3) Constructing a Song Form Template from the Phrase
11 Set; and
- 12 4) Choosing a number of repetitions of the Song Form
13 Template.

14

15 Most preferably the note set comprises a predetermined
16 number of notes chosen from a group comprising
17 conventional musical notes with a rhythmic and pitch
18 component, purely rhythmic sub-units, words, animal
19 noises, a rest and harmonic structures.

20

21 Preferably the Idea Set comprises a number of Ideas
22 wherein each Idea comprises an ordered sequences of notes
23 selected from the note set.

24

25 Preferably the Phrase Set comprises a number of Phrases
26 wherein each Phrase comprises an ordered sequences of
27 Ideas selected from the Idea Set.

28

29 Preferably the Song Form Template comprises an ordered
30 sequences of Phrases selected from the Phrase Set.

31

1 Preferably the Song Form Template further comprises a
2 background harmonic structure onto which the Ideas and
3 Phrases are mapped.

4

5 Optionally the concept of Variation can be introduced to
6 the Song Form Template by changing the pitch of part or
7 all of an Idea, by changing the rhythm of part or all of
8 an Idea, or by changing both the rhythm and pitch of part
9 of an Idea and substituting the altered Idea within the
10 Song Form Template.

11

12 Alternatively the concept of Variation can be introduced
13 to the Song Form Template by substituting the altered
14 Idea at the end of a Phrase which termed is Resolution.

15

16 Optionally the concept of pitch can be introduced to the
17 Song Form Template by allocating relative pitch to the
18 musical notes or harmonic structures within the note set
19 wherein on mapping the Phrases onto the background
20 harmonic structure the relative pitch is converted to
21 actual pitch.

22

23 Alternatively the concept of pitch can be introduced to
24 the Song Form Template by allocating relative pitch to
25 the Ideas within the Idea Set wherein on mapping the
26 Phrases onto the background harmonic structure the
27 relative pitch is converted to actual pitch.

28

29 Alternatively the concept of pitch can be introduced to
30 the Song Form Template by allocating relative pitch to
31 the Phrases within the Phrase Set wherein on mapping the
32 Phrases onto the background harmonic structure the
33 relative pitch is converted to actual pitch.

1

2 Optionally the musical Arrangement further comprises a
3 melodic composition for use as a bass line, a counter
4 point line, or a harmony part, or a drum part wherein the
5 melodic composition comprises a second Song Form
6 Template.

7

8 Optionally the Song Form Template further comprises an
9 introduction.

10

11 Optionally the Song Form Template further comprises an
12 interlude.

13

14 According to a second aspect of the present invention
15 there is provided an input means comprising a plurality
16 of segments, an electric signal generating means and a
17 plug, wherein the plug allows the input means to be
18 connected to a computer via a standard keyboard port,
19 such that each segment produces an electrical output that
20 corresponds to an individual musical note.

21

22 Preferably the input means is a musical keyboard,
23 although any adapted musical instrument may be employed.

24

25 Most preferably each segment corresponds to a key on the
26 musical keyboard.

27

28 Optionally the musical keyboard comprises one or more
29 dividers that divide the keys into one or more user
30 sections.

31

32 Preferably each user section comprises keys that can play
33 at the same pitch.

1

2 Optionally each user section comprises a plurality of
3 keys selected from the group comprising parallelograms,
4 triangles, circles, stars or any other suitable
5 geometrical shape.

6

7 According to a third aspect of the present invention
8 there is provided a computer program for a musical input
9 means comprising program instructions for:

10 1) Mapping the output signals of the input means so
11 as to replicate those of a standard computer
12 keyboard.

13 2) Converting the output signals to produce a set of
14 musical scale of notes or sounds

15

16 According to a fourth aspect of the present invention
17 there is provided apparatus comprising an input means, a
18 recording and processing means, and an output means,
19 wherein a predetermined information template is stored
20 within the recording and processing means and displayed
21 on the output means, such that it may be compared against
22 data entered into the recording and processing means from
23 the input means.

24

25 Preferably information is entered into the recording and
26 processing means from the input means in accordance with
27 the computer program of the third aspect of the present
28 invention.

29

30 Preferably the input means is a musical instrument. Most
31 preferably the musical instrument is a keyboard as
32 defined in the second aspect of the present invention.

33

1 Preferably the recording and processing means is a
2 computer. Preferably the output means is a computer
3 monitor.

4

5 Most preferably the predetermined information template is
6 a musical Arrangement formed in accordance with the
7 method as described in the first aspect of the present
8 invention.

9

10 Preferably the data entered into the recording and
11 processing means by a user via the keyboard is
12 analytically compared to the musical Arrangement for
13 accuracy and timing thereby providing a measure of the
14 skill of reproduction of the musical Arrangement by the
15 user.

16

17 Preferably the measurement of a users skill is displayed
18 at the end of the reproduction of the musical
19 Arrangement.

20

21 According to a fifth aspect of the present invention
22 there is provided a computer program, when loaded into a
23 computer, constitutes the processing means for creating
24 and analysing the reproduction of a musical Arrangement
25 by one or more users, comprising the program instructions
26 of:

- 27 1) Selecting a number of users.
- 28 2) Selecting a number of notes to be employed within
29 a note set.
- 30 3) Constructing a musical Arrangement from the method
31 as defined in the first aspect of the present
32 invention.
- 33 4) Requesting the user to play the Arrangement.

1 5) Calculating the accuracy with which the user
2 performed the Arrangement.

3 6) Displaying an indication of user's accuracy.

4

5 Preferably the user chooses whether to construct the
6 musical Arrangement manually or automatically.

7

8 Preferably the accuracy with which a user reproduces the
9 information template comprises a measure of replication
10 and timing.

11

12 According to a sixth aspect of the present invention
13 there is provided a mobile phone comprising an input
14 means, a recording and processing means, and an output
15 means, wherein a predetermined information template is
16 stored within the recording and processing means and
17 displayed on the output means, such that it may be
18 employed as a ring tone for the mobile phone.

19

20 Most preferably the predetermined information template is
21 a musical Arrangement formed in accordance with the
22 method as described in the first aspect of the present
23 invention.

24

25 Preferably the input means comprises a keypad and a
26 plurality of function keys employed to aid the
27 construction of a particular musical Arrangement.

28

29 Preferably the output means comprises a display screen
30 associated with the mobile phone.

31

1 Embodiments of the present invention will now be
2 described, by way of example only, with reference to the
3 accompanying drawings, in which:

4

5 Figure 1 illustrates a method for constructing a
6 Song Form Template;

7

8 Figure 2 illustrates an alternative Song Form
9 Template constructed using the method of Figure 1;

10

11 Figure 3 illustrates a more complex Song Form
12 Template that employs the concept of pitch;

13

14 Figure 4 illustrates an alternative method for
15 introducing the concept of pitch to a Song Form
16 Template;

17

18 Figure 5 illustrates a musical keyboard suitable for
19 connection to a computer via a standard keyboard
20 port;

21

22 Figure 6 illustrates an alternative embodiment of
23 the musical keyboard of Figure 5;

24

25 Figure 7 illustrates a flow chart representation of
26 the method for creating, and analysing the
27 reproduction of, a Song Form Template; and

28

29 Figure 8 illustrates a mobile phone suitable for
30 automating the construction of a Song Form Template.

31

32 Figure 1 presents an illustration of the method for
33 constructing and teaching of music in accordance with an

1 aspect of the present invention. This method involves
2 the development of a Song Form Template generally
3 depicted at 1. The Song Form Template 1 comprises a
4 sonic or musical composition that is built up through a
5 series of stages of note selection where the notes are
6 selected from a restricted note set 2.

7

8 Notes in this context refer to sonic building blocks
9 usually lasting one or two beats. These sonic building
10 blocks are grouped into note sets 2 of usually 3-5 notes,
11 and can comprise: conventional musical notes, defined as
12 a rhythmic value e.g. a crotchet, two quavers, a quaver
13 rest followed by a quaver; a pitch e.g. D natural and in
14 some cases a timbral quality e.g. a piano sound, a
15 saxophone etc. Alternatively, the note set may comprise
16 other types of sonic building blocks such as an animal
17 noise e.g. Woof or a Miaow, or indeed may comprise a
18 silent building block, relating to a rest in conventional
19 musical notation. In other cases the said notes may also
20 contain a relative measure of pitch by referring to the
21 degree of a scale, defined by a number e.g. 1st degree,
22 2nd degree of the scale, or the interval of a chord, e.g.
23 the root, third, fifth or seventh or ninth.

24

25 Alternatively, when the compositional process aims to
26 construct a harmonic sequence, the note set in this
27 context may refer to a set of harmonic structures, each
28 built on a specific pitch, such as a triad, a chord or a
29 scale e.g. C major triad, or harmonic structures, each
30 built on a relative pitch, e.g. Dominant Seventh Chords
31 built on the 1st 4th or 5th degree of a major scale- with
32 the specific pitch being expressed when a parent key for
33 that section of music is chosen. In this context, the

1 Notes usually last for one bar or for half a bar,
2 relative to the underlying background rhythmic structure.

3

4 In the example described in Figure 1, Stage 1 comprises
5 the selection of notes from a group of fruit and
6 vegetable sounds, namely apple 3, banana 4 or carrot 5.
7 These notes are then ordered into sequences of a specific
8 number of notes. The length of such sequences may be
9 selected by the user, or predetermined, and are typically
10 2, 3, 4, or 5 notes long. In this particular example the
11 sequence level length is 4.

12

13 This level of structure is referred to as an Idea 6, and
14 these Ideas 6 relate closely to the musical term the
15 'bar'. However, in an alternative embodiment an Idea 6
16 may be constructed to be smaller or larger than the
17 underlying rhythmic structure of the music (the bar).
18 Therefore, it may be that more than one Idea 6 may be
19 positioned within one bar (where the Idea 6 is smaller
20 than a bar), or an Idea 6 may be positioned in a way that
21 it extends over more than one bar (where an Idea 6 is
22 larger than a bar). The Ideas 6 may also be positioned
23 so as to start at points in the bar other than on the
24 first beat e.g. on the second beat.

25

26 Typically, a small number of Ideas 6 need to be
27 constructed in order to form an Idea Set 7. Figure 1
28 shows an Idea Set 7 comprising two different Ideas 6,
29 labelled Idea A and Idea B, respectively.

30

31 Stage 2 of the method involves a selection being made
32 from the Idea Set 7 in order to create a small number of
33 short sequences of Ideas 6, each being termed a Phrase 8.

1 Such sequences may be constructed by the individual, or
2 alternatively selected from a range of pre-composed
3 Phrase sequences e.g. AABA, ABAB, where A refers to Idea
4 A, and B refers to Idea B etc.

5

6 As with the Idea Set 7 a small number of Phrases 8 need
7 to be constructed in order to form a Phrase Set 9.
8 Figure 1 shows a Phrase Set 9 comprising two different
9 Phrases 8, labelled Phrase A and Phrase B, respectively.

10

11 In the present example the Ideas 6 relate identically to
12 a music bar and a Phrase 8 is chosen to comprise four
13 Ideas 6. However, in alternative embodiments where the
14 Ideas 6 are not identical to bars, the Ideas 6 are
15 sequenced such that they fit into a background rhythmic
16 structure of typically four or eight bars. There is no
17 requirement that the Ideas 6 are located so as to fill up
18 the entire 4 or 8 bar structures, i.e. there may be
19 spaces between the Ideas 6.

20

21 Stage 3 of the described method requires a user to select
22 Phrases 8 from the Phrase Set 9 so as to create a small
23 sequence of Phrases 8 referred to as the Song Form
24 Template 1. As with Ideas 6, the user may construct
25 their own sequences or select from an array of
26 predetermined sequences.

27

28 By constructing the Song Form Template 1 in stages
29 through the building of Ideas 6 from notes 3, 4, 5, the
30 Phrases 8 from Ideas 6, and the Song Form Template 1
31 itself from Phrases 8 the user is able to define the
32 length of the finished composition. The user may then
33 specify how many times the Song Form Template 1 is to be

1 repeated so creating a musical Arrangement 10. The user
2 then attempts to perform Arrangement 10 on their musical
3 instrument, for example on their keyboard instrument.

4

5 As the user becomes more skilled in the construction and
6 performance of an Arrangement 10 more technically
7 challenging features can be included within the Song Form
8 Template 1. For example introductions, interludes
9 constructed from sections of the Arrangement 10 or
10 Variations.

11

12 Figure 2 presents the incorporation of Variation into the
13 Song Form Template 1 of Figure 1. In general Variation
14 involve taking the initial Song Form Template 1 structure
15 or sequence, and changing certain parts in a limited way
16 such that they remains similar to the original sequence
17 or structure but exhibit a distinct character. As is
18 known to those skilled in the art where a Variation is
19 effected at the end of a Phrase 8 this Variation is
20 termed a Resolution 11. A Resolution 11 serves to mark
21 the end of the Phrase 8, as shown in the last Ideas 6 of
22 some of the Phrases 8 within Figure 2. Variations may
23 however occur at any stage of the aforementioned process,
24 but usually involve varying the structure at the level of
25 Ideas 6.

26

27 Alternative forms of Variation known to those skilled in
28 the art may also be readily incorporated into the
29 aforementioned method for teaching and constructing
30 music. In particular when the notes contain rhythmic and
31 pitch information, Variation can relate to changing just
32 the pitch of part or all of an Idea 6, or changing the
33 rhythm of part or all of an Idea 6, or changing both the

1 rhythm and pitch of part of an Idea 6. In this case,
2 Resolution can involve adjusting the pitch of the last
3 note in a Phrase 8 to the root of the underlying chord or
4 scale. When the composition process involves
5 constructing a harmonic sequence from notes that
6 represent harmonic structures, Resolution can refer to
7 returning to the chord built on the root of the parent
8 key of that section of the music, at the end of a Phrase
9 8.

10

11 Figure 3 illustrates how the concept of pitch can be
12 introduced to a Song Form Template 1 constructed from a
13 note set 2 comprising basic rhythmic sub-units 12. In
14 this particular embodiment Stage 1 comprises the
15 construction of Ideas 6 and Phrases 8 as previously
16 described. Stage 2 then comprises allocating relative
17 pitch information to the individual rhythmic sub-units 12
18 e.g. root, third, fifth or seventh as depicted by the
19 corresponding numerals. Stage 3 then comprises the
20 defining of a particular harmonic background sequence 13
21 suitable for mapping onto a particular Phrase 8. This
22 harmonic background sequence 13 may itself be constructed
23 by the earlier compositional method described above.
24 Therefore, the mapping of the sub-units containing
25 rhythmic and relative pitch information 12 into Ideas 6
26 and the Ideas 6 into the Phrases 8 results in the
27 production of a Phrase 8 that illustrates both the
28 concepts of rhythm and specific pitch. By repeating this
29 process a Phrase Set 9 can be constructed from which a
30 Song Form Template 1 can be produced as previously
31 described.

32

1 In an alternative embodiment shown in Figure 4 the
2 concept of relative pitch is introduced at the level of
3 the Ideas 6 rather than at the level of rhythmic sub-
4 units 12. As with the method outlined in Figure 3 a
5 Phrase 8 is again constructed at Stage 1. However, Stage
6 2 now comprises the allocation of relative pitch
7 information to an individual Idea 6. Therefore,
8 repeating Stage 3 as before, results in a Phrase 8 that
9 differs to that formed from following the method of
10 Figure 3 because of the alternative method of allocating
11 pitch.

12

13 The effect of pitch variation can be further illustrated
14 to a user by the allocation of relative pitch to the
15 individual components within a particular rhythmic sub-
16 unit 12. Carrying out the aforementioned mapping process
17 would result in a third alternative Phrase 8 constructed
18 from the same initial rhythmic sub-units 12.

19

20 In order to add a further level of complexity to the
21 construction of a musical Arrangement 10 a user a can
22 repeat the above processes in order to write a separate
23 melodic composition. This separate melodic composition
24 can then be employed as a bass line or as a counterpoint,
25 therefore allowing for the user to create more
26 sophisticated Arrangements 10 or harmony parts, either by
27 adapting the original compositional process (harmony
28 parts) or following new compositional processes.

29

30 Following the above method allows a user to construct and
31 alter a Song Form Template 1 and hence a musical
32 Arrangement 10 on more than one level, with all the
33 levels thereafter being combined. Thus, a user may
34 follow one compositional process to compose a harmonic

17

1 background sequence, a second to compose a rhythmic
2 structure and a third to assign relative pitch values to
3 the rhythmic structure. All three levels can then be
4 combined to produce the end result.

5

6 It should be noted that the processes of Variation and
7 Resolution 11 could occur independently or simultaneously
8 in all of these processes. Furthermore, once this
9 process has been completed, one individual element can be
10 independently altered. Therefore, a composition
11 comprising combined rhythmic and relative pitch can be
12 mapped with a series of different underlying harmonic
13 background sequences 13 so as to achieve different end
14 results.

15

16 It should be noted that the use of sets usually
17 containing a small number of choices at each level of the
18 compositional process encourages a sense of unity
19 throughout the whole composition, through the repetition
20 of elements. This is a key educational principle for new
21 composer to grasp. The process of introducing Variation
22 allows the composer to create variety and interest in
23 their composition while retaining unity.

24

25 The method for constructing and teaching music may be
26 readily automated by processing the method as a computer
27 program run on a computer. In order to aid the
28 automation of this method a musical keyboard 14 has also
29 been developed, as depicted in Figure 5.

30

31 The musical keyboard 14 can be seen to comprise a main
32 body 15, keys 16 covering three octaves of notes of a
33 musical scale, and a keyboard plug 17. The keyboard plug

18

1 17 is designed so as to be compatible with a standard
2 keyboard port on a computer (not shown).

3

4 Software employed by the computer results in each key 16
5 on the musical keyboard 14 being mapped to the standard
6 output signal generated by a single key, or combination
7 of keys, on a conventional keyboard. Therefore, when a
8 key 16 is pressed on the musical keyboard 14 it generates
9 a standard output that can then be processed by the
10 computer software to generate a corresponding note.

11

12 In accordance with the method of constructing and
13 teaching of music, described above, the given note could
14 relate to a specific conventional musical note.
15 Alternatively, it may relate to other specific sounds,
16 such as an animal noises (e.g. Woof, Miaow), words, other
17 more abstract sounds (e.g. Scat sounds such as diddley-
18 bop), or a harmonic structure such as a triad, chord,
19 scale or a mode.

20

21 With reference to Figure 6, an alternative embodiment of
22 the musical keyboard is presented in the form of a dual
23 keyboard 18. Here the keys 16 are divided into two
24 sections by a divider 19 so as to allow two users to use
25 the dual keyboard 18 simultaneously.

26

27 In a further alternative embodiment (not shown) the
28 keyboard is divided into a multi-keyboard comprising
29 groups of four or five coloured buttons, each of a
30 different shape (e.g. a blue square, a red circle, a
31 yellow triangle and a green star). Both the dual 18 and
32 multi-keyboards increase the facility for two or more

1 users to compete against each other while improving their
2 musical skills using the method outlined below.

3

4 For the musical keyboard 14 to be used as an aid to
5 improve a user's musical skills, software is employed for
6 receiving information from the keyboards 14 and 18 and
7 for processing this information. Figure 7 presents a
8 flow chart of the instructions employed by the computer
9 software. These instructions include:

10

- 11 1) Selecting the number of users.
- 12 2) Selecting the number of block units to be
13 employed.
- 14 3) Constructing the Ideas from the notes within the
15 notes set.
- 16 4) Constructing the Phrases from the Ideas within the
17 Ideas Set.
- 18 5) Composing a Song Form Template from the Phrases
19 within the Phrase Set.
- 20 6) Requesting the user to play an Arrangement as
21 defined by the number of repetitions of the Song
22 Form Template.
- 23 7) Calculating the accuracy with which the user
24 performed the composition.
- 25 8) Displaying an indication of user's accuracy.

26

27 Step one of the above method further comprises selecting
28 the number of notes within a notes set 2, the number of
29 Ideas 6 within an Ideas Set 7 and the number of Phrases 8
30 within a Phrase Set 9 to be used.

31

32 Typically, steps one to four could be carried out
33 automatically, particularly when the user is a musical

1 novice employing simple sound building blocks. However
2 as the user becomes more adept in their performance and
3 skill these steps may be user generated allowing them to
4 select from rhythmic sub-units, chords etc.

5

6 The user could then progress to selecting the relative
7 pitch at which particular notes or Ideas 6 should be
8 performed and to defining particular harmonic background
9 sequences 13 for particular Phrases 8.

10

11 As previously described the note set 2 could be
12 restricted to particular rhythms or underlying harmonic
13 sequences. Typically these could comprise rhythms or
14 underlying harmonic sequences found in particular styles
15 of music. This would allow the user to develop their
16 knowledge and skill of that style of music, for example
17 Jazz and Blues, or a Jig and Reel in Traditional Celtic
18 Music.

19

20 A further alternative would be that instead of performing
21 musical notes the components of the individual bars could
22 comprise animal sounds, thus making the invention more
23 appealing to a younger user. Initially, younger users
24 could learn to perform sequences using the multi
25 keyboard, before progressing onto the musical keyboard.
26 A yet further alternative would be to allow users to
27 select fragments from well-known melodies, and use them
28 as the notes or Ideas 6 for the compositional process.
29 More abstract sounds can also be employed so creating
30 atmospheric, thematic, or idiomatic compositions.

31

32 Once an Arrangement 10 has been created the user is then
33 prompted to perform the piece of music on the musical

21

1 keyboard 14. The accuracy with which a user is able to
2 reproduce the Arrangement 10 is calculated as a function
3 of expressing the correct sequence of notes or as a
4 function of rhythmic accuracy of a user's expression of
5 the Arrangement 10, or as a function of both. When non-
6 conventional sounds are being used as sonic building
7 blocks, the accuracy of the expression of the sequence of
8 sounds and/or the rhythmic accuracy of the timing of
9 expression of this sequence may be used to measure the
10 accuracy of the user's performance.

11

12 By employing the dual keyboard 18, or the multi-keyboard,
13 two or more users can simultaneously attempt to perform
14 the same composition, or in sequence perform alternating
15 sections of the same composition. Each user then
16 receives an accuracy score, so adding an element of
17 competition to their performance. Alternatively a second
18 user may attempt to reproduce a musical Arrangement 10 as
19 performed by the first user.

20

21 The computer software can also provide predetermined Song
22 Form Templates 1 or that allow the various keyboards 14
23 and 18 to act as a forum for any array of other
24 instruction methods. The software can perform a
25 composition requiring the users to respond in turn by
26 activating the appropriate keys on the keyboard 14 and
27 18. As the users progress, the Song Form Templates 1
28 become increasingly more complicated. When a user misses
29 a note or rhythm, or plays a note at the wrong time, an
30 error message or sound is activated. At the end of a
31 composition an accuracy score for each user is again
32 displayed.

33

1 A second environment where the method for constructing
2 and teaching music may be readily automated is within
3 mobile phones, and in particular within the field of
4 creating personalised ring tones.

5

6 Figure 8 presents an illustration of a mobile phone 20
7 suitable for automating the construction of a musical
8 Arrangement 10 from user defined Song Form Templates 1.
9 The mobile phone 20 comprises a standard screen 21 and
10 keypad 22 but further incorporates additional function
11 keys 23 to aid the construction of a particular
12 Arrangement 10.

13

14 Therefore, instead of the various segments of the keypad
15 22 being mapped onto specific notes by the software in
16 the CPU of the mobile phone 20, the function keys 23 on
17 the phone handset will be mapped onto specific sounds,
18 notes or objects stored within the mobile phone. Again a
19 range of sounds may be used, from conventional musical
20 sounds with information relating to the pitch rhythmic
21 value and timbre of the note, to fragments of drum
22 grooves, or other non-musical sounds. Indeed as above,
23 the notes may refer to harmonic structures, such as
24 triads, chords, scales or modes, whereby the user can
25 create a sequence of such structures in relation to a
26 background rhythmic structure.

27

28 Within the mobile phone environment the priority would be
29 for ease-of-use for a particular user. Therefore, the
30 standard process for mobile phone compositions would be
31 for the user to enter the compositional process at the
32 Ideas 6 to Phrases 8 stage. Therefore the note set 2,
33 Ideas 6 and Song Form Templates 1 are typically preset by

23

1 the software into certain musical styles e.g. Drum 'n'
2 Bass Drum Groove Generator, Jig and Reel Generator.
3 Thus, once the user has employed the function keys 23 to
4 order a sequence of Ideas 6 into a Phrase 8, they can
5 hear the end result at a Song Form Template 1 stage, as
6 the Notes, Ideas 6, and Song Form Templates 1 are pre-
7 set.

8

9 However, within a particular a power-user mode, the user
10 could gain access to pre-set menus in order to select a
11 particular note set 2 to choose from. As previously
12 described the user can then build Ideas 6 from the note
13 set 2, Phrases 8 from the Ideas 6 and thereafter order
14 the Phrases 8 into a Song Form Template 1. Within this
15 power-user mode the user has control over the whole
16 creative process.

17

18 In an alternative embodiment (not shown) the mobile
19 phones could be physically connected, or via infra red
20 signals, so as to permit the concept of competition
21 between two users performing the same Arrangement to be
22 carried out within the mobile phone environment.

23

24 Employing the methods outlined above offer the
25 significant advantages that they allow a user to see how
26 a musical piece is constructed out of its component
27 parts. Employing either the keyboards 14 and 18 or
28 the mobile phone 20 with their related software allows
29 the user to learn about music and improve their ability
30 to play a keyboard instruments.

31

32 A further advantage of aspects of the present invention
33 is that it provides a method that allows a user to

1 construct musical Arrangement from fundamental building
2 blocks. As the user's experience grows the concepts of pitch,
3 rhythm and harmonies can be introduced to increase the users
4 understanding and skill. Such increases in skill and
5 understanding helps in the creation of a sense of achievement
6 and ownership associated with composing your own music. In
7 addition, by composing their own Arrangements a user can also
8 produce a wide range of material with which they can enhance
9 their ability to perform a composition. Users can also learn
10 as they create. Therefore, the described methods provides an
11 environment that allows supported creativity, whereby a user
12 follows a supported sequence of tasks which guide their
13 creativity. At all times users are genuinely involved in the
14 decision-making process, so they can learn to understand
15 musical and compositional principles demonstrated in
16 compositions they themselves have written.

17

18 A yet further advantage of an aspect of the present
19 invention is that it provides a musical keyboard that
20 connects directly to a computer via a standard keyboard
21 connection means.

22

23 Another advantage of the present invention is that it
24 provides a means for quantifying a user's ability to
25 reproduce a predetermined musical Arrangement.

26

27 Aspects of the present invention have the further
28 advantage that they offers a facility for more than one
29 user to try and reproduce a predetermined information
30 template.

31

32 Further modifications and improvements may be added
33 without departing from the scope of the invention as
34 defined by the accompanying Claims.

1 **Claims**

2

3 1) A method for constructing a musical Arrangement, the
4 method comprising the steps of:

5 1) Constructing an Idea Set from a note set;

6 2) Constructing a Phrase Set from the Idea Set;

7 3) Constructing a Song Form Template from the Phrase
8 Set; and

9 4) Choosing a number of repetitions of the Song Form
10 Template.

11

12 2) A method for constructing a musical Arrangement
13 according to Claim 1 wherein the note set comprises a
14 predetermined number of notes chosen from a group
15 comprising conventional musical notes with a rhythmic
16 and pitch component, purely rhythmic sub-units,
17 words, animal noises, a rest and harmonic structures

18

19 3) A method for constructing a musical Arrangement
20 according to Claim 1 or Claim 2 wherein the Idea Set
21 comprises a number of Ideas, each Idea comprising an
22 ordered sequences of notes selected from the note
23 set.

24

25 4) A method for constructing a musical Arrangement
26 according to any of the preceding Claims wherein the
27 Phrase Set comprises a number of Phrases, each Phrase
28 comprising an ordered sequences of Ideas selected
29 from the Idea Set.

30

31 5) A method for constructing a musical Arrangement
32 according to any of the preceding Claims wherein the

- 1 Song Form Template comprises an ordered sequences of
2 Phrases selected from the Phrase Set.
3
- 4 6) A method for constructing a musical Arrangement
5 according to any of the preceding Claims wherein the
6 Song Form Template further comprises a background
7 harmonic structure onto which the Ideas and Phrases
8 are mapped.
9
- 10 7) A method for constructing a musical Arrangement
11 according to any of the preceding Claims wherein the
12 concept of Variation is introduced to the Song Form
13 Template by changing the pitch of part or all of an
14 Idea and thereafter substituting the altered Idea
15 within the Song Form Template.
16
- 17 8) A method for constructing a musical Arrangement
18 according to any of the preceding Claims wherein the
19 concept of Variation is introduced to the Song Form
20 Template by changing the rhythm of part or all of an
21 Idea and thereafter substituting the altered Idea
22 within the Song Form Template.
23
- 24 9) A method for constructing a musical Arrangement
25 according to any of the preceding Claims wherein the
26 concept of Variation is introduced to the Song Form
27 Template by changing both the rhythm and pitch of
28 part or all of an Idea and thereafter substituting
29 the altered Idea within the Song Form Template.
30
- 31 10) A method for constructing a musical Arrangement
32 according to any of the preceding Claims wherein the
33 concept of Variation is introduced to the Song Form

- 1 Template in the form of Resolution by substituting
2 the altered Idea at the end of a Phrase.
3
- 4 11) A method for constructing a musical Arrangement
5 according to any of the preceding Claims wherein the
6 concept of pitch is introduced to the Song Form
7 Template by allocating relative pitch to the musical
8 notes or harmonic structures within the note set
9 whereby on mapping the Phrases onto the background
10 harmonic structure the relative pitch is converted to
11 actual pitch.
12
- 13 12) A method for constructing a musical Arrangement
14 according to any of the preceding Claims wherein the
15 concept of pitch is introduced to the Song Form
16 Template by allocating relative pitch to the Ideas
17 within the Idea Set whereby on mapping the Phrases
18 onto the background harmonic structure the relative
19 pitch is converted to actual pitch.
20
- 21 13) A method for constructing a musical Arrangement
22 according to any of the preceding Claims wherein the
23 concept of pitch is introduced to the Song Form
24 Template by allocating relative pitch to the Phrases
25 within the Phrase Set wherein on mapping the Phrases
26 onto the background harmonic structure the relative
27 pitch is converted to actual pitch.
28
- 29 14) A method for constructing a musical Arrangement
30 according to any of the preceding Claims wherein the
31 musical Arrangement further comprises a melodic
32 composition for use as a bass line.
33

- 1 15) A method for constructing a musical Arrangement
2 according to any of the preceding Claims wherein the
3 musical Arrangement further comprises a melodic
4 composition for use as a counter point.
5
- 6 16) A method for constructing a musical Arrangement
7 according to any of the preceding Claims wherein the
8 musical Arrangement further comprises a melodic
9 composition for use as a harmony part.
10
- 11 17) A method for constructing a musical Arrangement
12 according to any of the preceding Claims wherein the
13 musical Arrangement further comprises a melodic
14 composition for use as a drum part.
15
- 16 18) A method for constructing a musical Arrangement
17 according to Claims 14 to 16 wherein the melodic
18 composition comprises a separate Song Form Template.
19
- 20 19) A method for constructing a musical Arrangement
21 according to any of the preceding Claims wherein the
22 Song Form Template further comprises an introduction.
23
- 24 20) A method for constructing a musical Arrangement
25 according to any of the preceding Claims wherein the
26 Song Form Template further comprises an interlude.
27
- 28 21) An input means comprising a plurality of segments, an
29 electric signal generating means and a connecting
30 means, wherein the connecting means allows the input
31 means to be connected to a computer via a standard
32 keyboard port, such that each segment produces an

1 electrical output that corresponds to an individual
2 musical note.

3

4 22) An input means according to Claim 20 wherein the
5 input means comprises a musical keyboard.

6

7 23) An input means according to Claim 20 or Claim 21
8 wherein each segment corresponds to a key on the
9 musical keyboard.

10

11 24) An input means according to Claim 21 to Claim 22
12 wherein the musical keyboard comprises one or more
13 dividers that divide the keys into one or more user
14 sections.

15

16 25) An input means according to Claim 23 wherein each
17 user section comprises keys that can play at the same
18 pitch.

19

20 26) An input means according to Claim 23 wherein each
21 user section comprises a plurality of keys selected
22 from the group comprising parallelograms, triangles,
23 circles, stars or any other suitable geometrical
24 shape.

25

26 27) A computer program for a musical input means
27 comprising program instructions for:

28 1) Mapping the output signals of the input means so
29 as to replicate those of a standard computer
30 keyboard.

31 2) Converting the output signals to produce a set of
32 musical scale of notes or sounds.

33

1 28) Music apparatus comprising an input means, a
2 recording and processing means, and an output means,
3 wherein a predetermined information template is
4 stored within the recording and processing means and
5 displayed on the output means, such that it may be
6 compared against data entered into the recording and
7 processing means from the input means.

8

9 29) Music apparatus according to Claim 27 wherein
10 information is entered into the recording and
11 processing means by the input means in accordance
12 with the computer program of Claims 26.

13

14 30) Music apparatus according to Claim 27 or Claim 28
15 wherein the input means comprises a musical
16 instrument as defined by Claims 20 to 25.

17

18 31) Music apparatus according to Claims 27 to 29 wherein
19 the recording and processing means comprises a
20 computer.

21

22 32) Music apparatus according to Claims 27 to 30 wherein
23 the output means comprises a computer monitor.

24

25 33) Music apparatus according to Claims 27 to 31 wherein
26 the predetermined information template comprises a
27 musical Arrangement as constructed by the method as
28 defined in Claims 1 to 19.

29

30 34) Music apparatus according to Claims 27 to 32 wherein
31 the data entered into the recording and processing
32 means by a user via the keyboard is analytically
33 compared to the musical Arrangement for accuracy and

- 1 timing thereby providing a measure of the skill of
2 reproduction of the musical Arrangement by the user.
3
- 4 35) Music apparatus according to Claims 34 wherein the
5 measurement of a users skill is displayed at the end
6 of the reproduction of the musical Arrangement.
7
- 8 36) A computer program, when loaded into a computer,
9 constitutes the processing means for creating and
10 analysing the reproduction of a musical Arrangement
11 by one or more users, comprising the program
12 instructions of:
- 13 1) Selecting a number of users.
 - 14 2) Selecting a number of notes to be employed within
15 a note set.
 - 16 3) Constructing a musical Arrangement from the
17 method as defined by Claims 1 to 19.
 - 18 4) Requesting the user to play the Arrangement.
 - 19 5) Calculating the accuracy with which the user
20 performed the Arrangement.
 - 21 6) Displaying an indication of user's accuracy.
22
- 23 37) A computer program according to Claim 36 wherein the
24 user chooses whether to construct the musical
25 Arrangement manually or automatically.
26
- 27 38) A computer program according to Claim 36 or Claim 37
28 wherein the accuracy with which a user reproduces
29 the information template comprises a measure of
30 replication and timing.
31
- 32 39) A mobile phone comprising an input means, a
33 recording and processing means, and an output means,

1 wherein a predetermined information template is
2 stored within the recording and processing means and
3 displayed on the output means, such that it may be
4 employed as a ring tone for the mobile phone.

5

6 40) A mobile phone according to Claim 39 wherein the
7 predetermined information template is a musical
8 Arrangement formed in accordance with Claims 1 to
9 19.

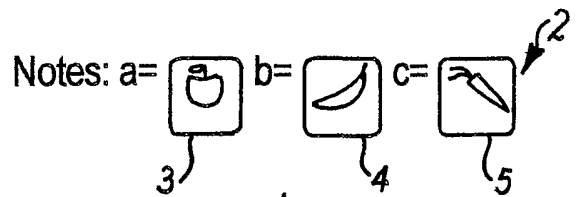
10

11 41) A mobile phone according to Claim 39 or Claim 40
12 wherein the input means comprises a keypad and a
13 plurality of function keys employed to aid the
14 construction of a particular musical Arrangement.

15

16 42) A mobile phone according to any of Claims 39 to 41
17 wherein the output means comprises a display screen
18 associated with the mobile phone.

Stage 1: Select from a limited number of 'Notes' and build Ideas.

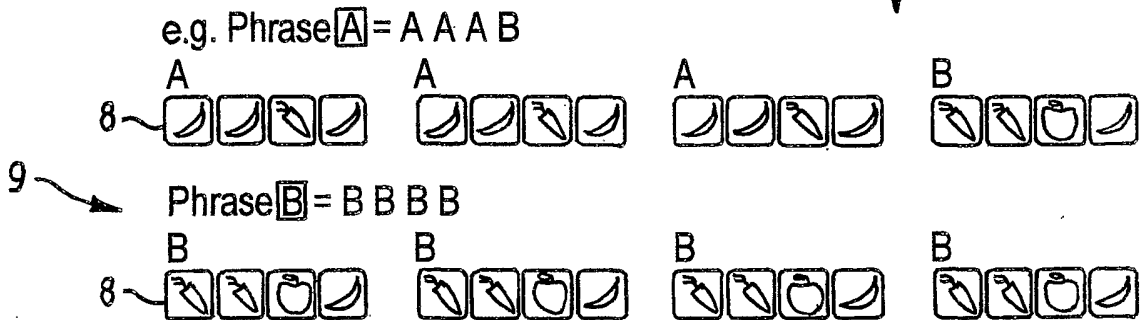


Notes are ordered into sequences of a specific number of notes, referred to as Ideas.



Stage 2: Select from a limited number of 'Ideas' and build Phrases.

Create a small number of short sequences of Ideas creating what is termed Phrases.



Stage 3: Select from a limited number of 'Phrases' and build Song Form.

e.g. A Song Form of sequence **A A B A**

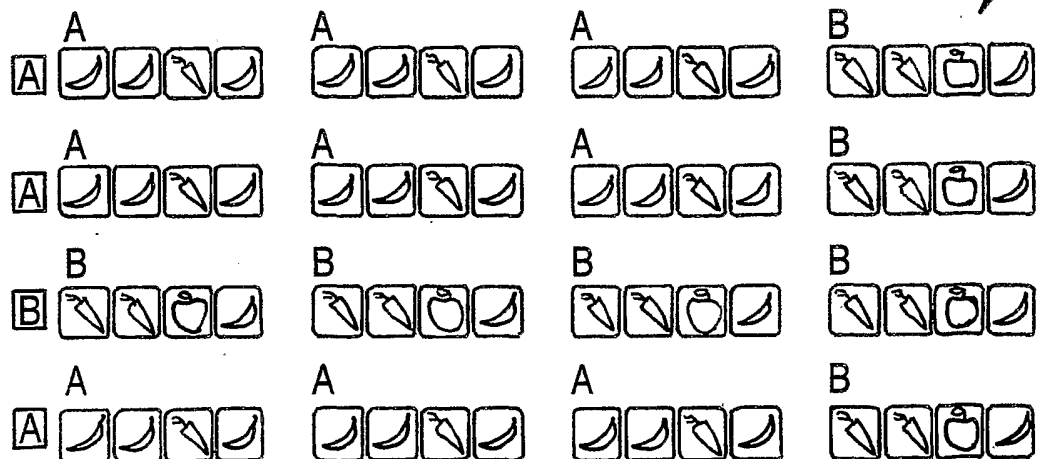
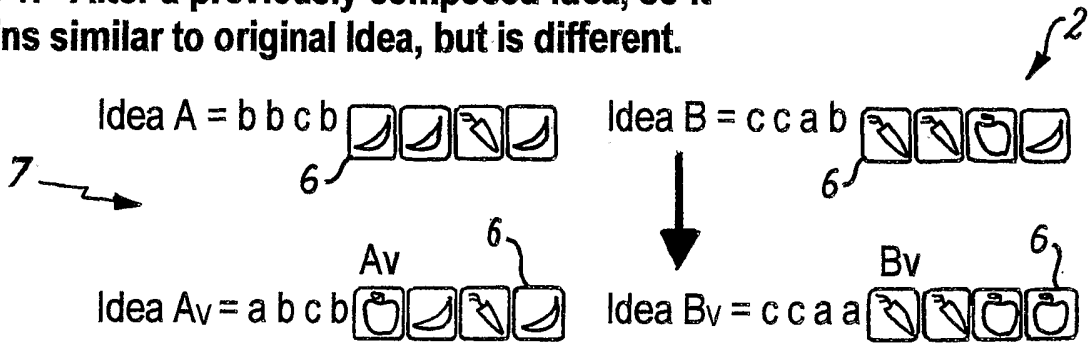
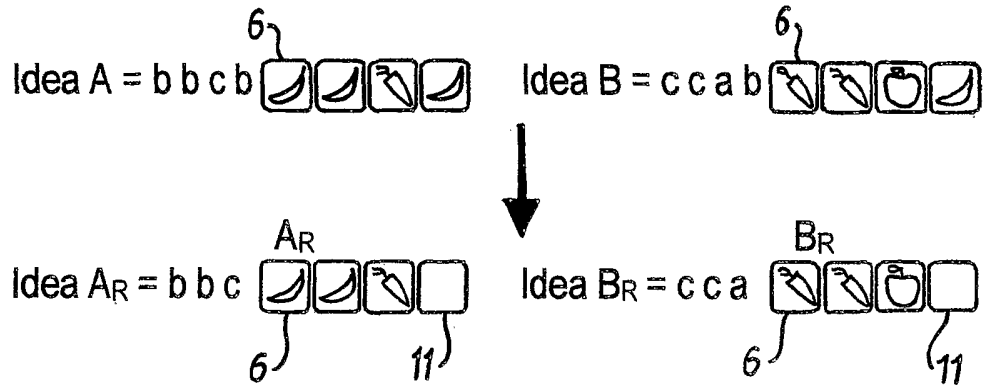


FIG. 1

Stage 1: Alter a previously composed Idea, so it remains similar to original Idea, but is different.



Stage 2: Compose Resolution Ideas, whereby the Idea is shortened, to produce a sense of punctuation. Always used as the last Idea in a Phrase.



Stage 3: Select where to use Variation and Resolution Ideas in Song Form already composed.

e.g.

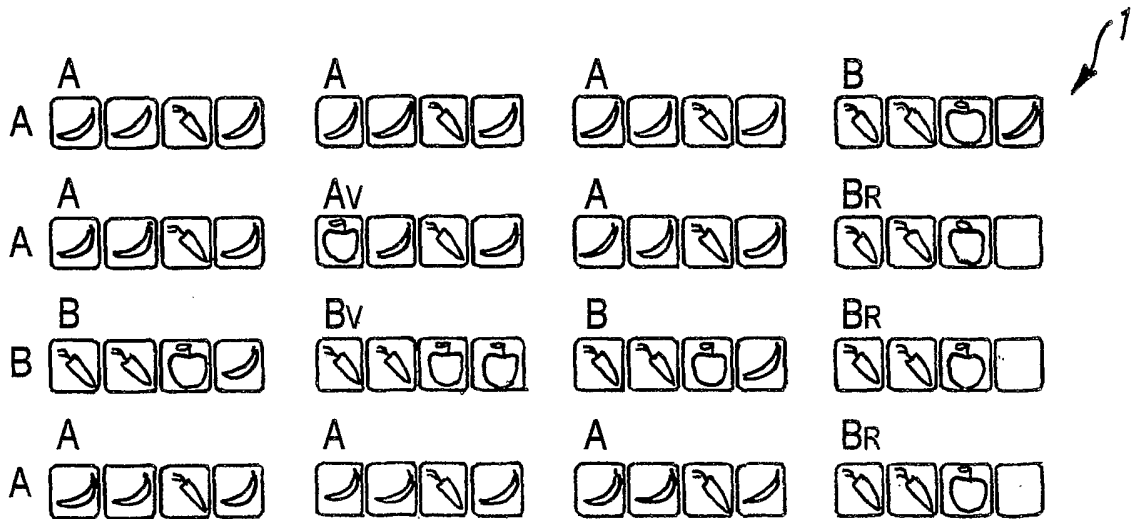


FIG. 2

Stage 1: Idea and Phrase structure preset, or decided by previous compositional activities, with purely rhythmic sub-units.

Idea A = b b a c Idea B = a d c a

e.g. Phrase **A** = B B A B

Stage 2: Choose relative pitch information for each 'Note'.

For chords- Choose either Root- 1, Third- 3, Fifth- 5, or Seventh- 7.

For Scales choose degree of scale e.g. 1-7 for C major scale.

Stage 3: Relate relative pitch information to preset or pre-composed harmonic background sequence.

e.g. Phrase **A**

Stage 4: Do stages 1-3 for a small number of phrases e.g. 2-3.

Construct Song Form from sequencing Phrases- as Compositional Model #1.

Fit 3

Stage 1: Idea and Phrase structure preset, or decided by previous compositional activities, with purely rhythmic sub-units.

Idea A = b b a c Idea B = a d c a

e.g. Phrase **A** = B B A B

Stage 2: Choose relative pitch information for each 'Idea'.

For chords- Choose either Root- 1, Third- 3, Fifth- 5, or Seventh- 7.

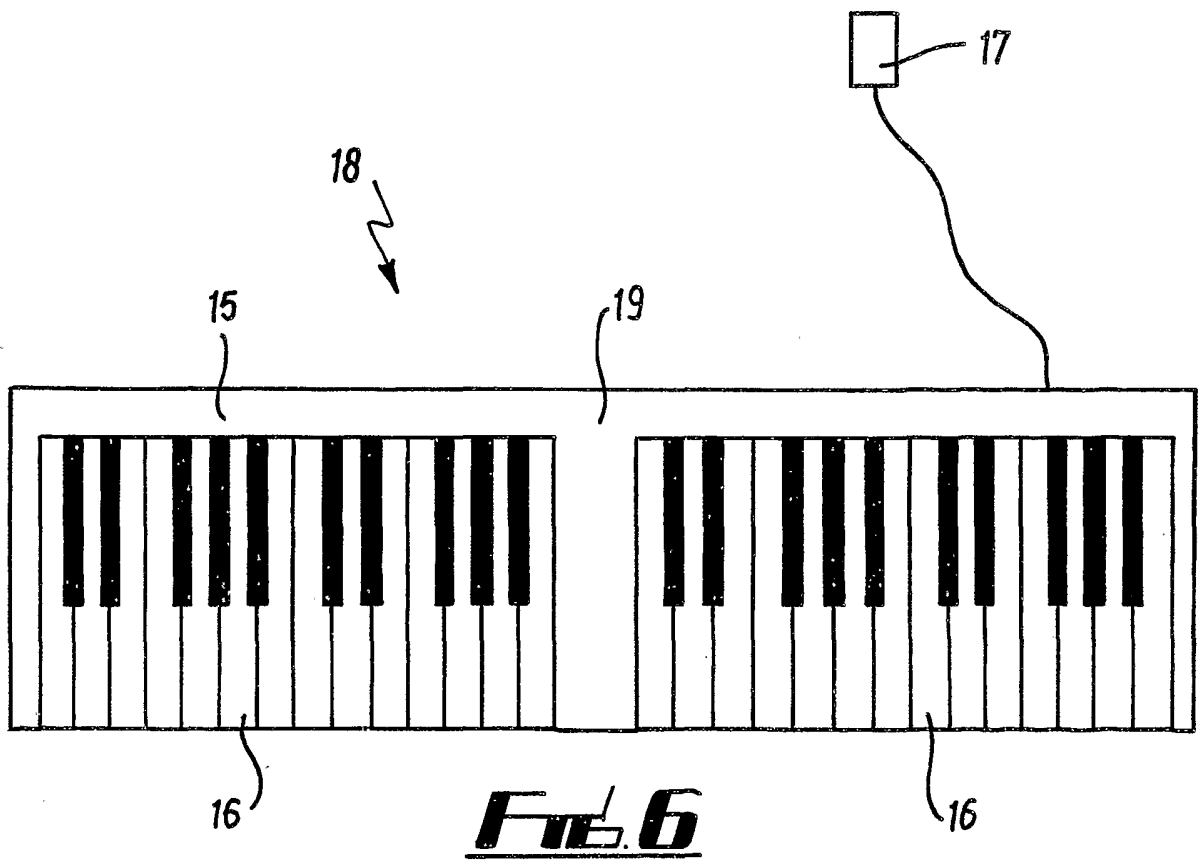
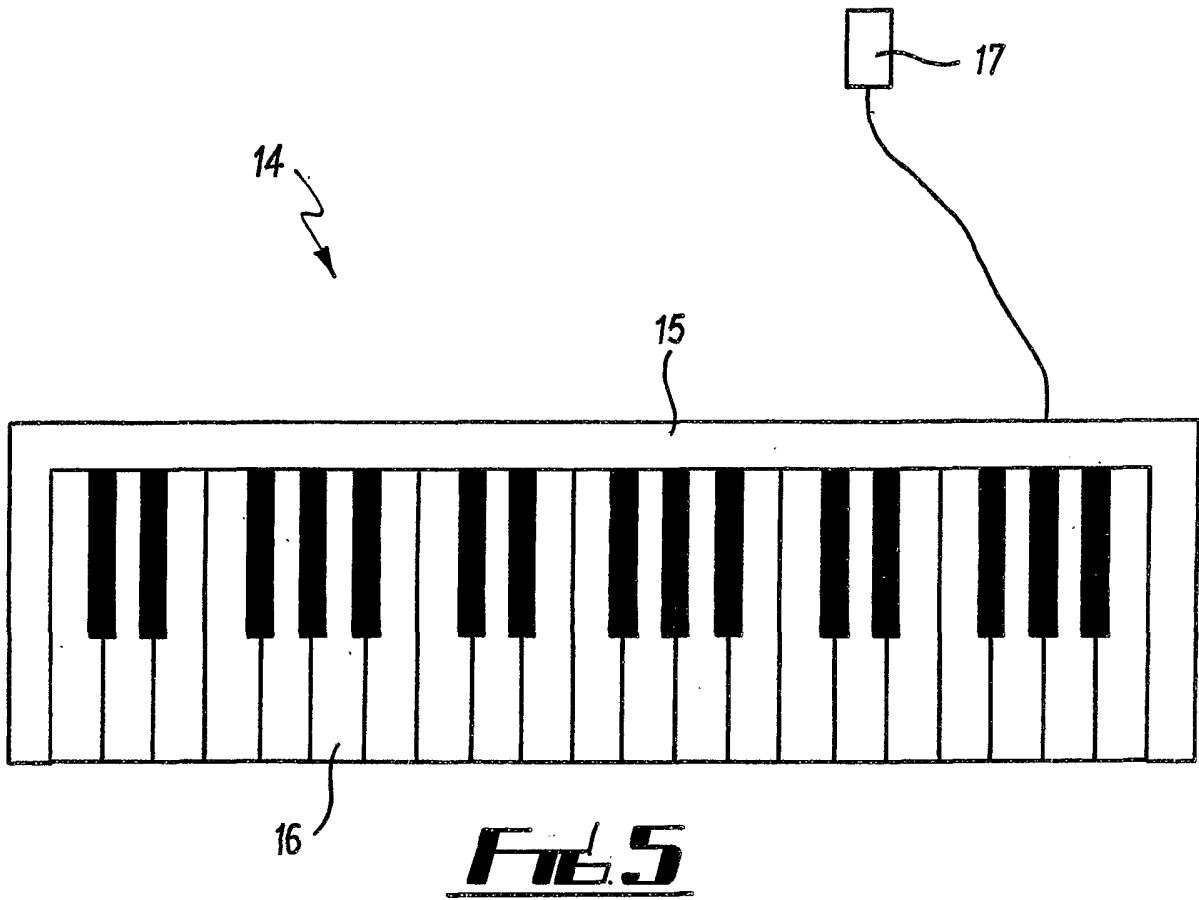
For Scales choose degree of scale e.g. 1-7 for C major scale.

Stage 3: Relate relative pitch information to preset or pre-composed harmonic background sequence.

e.g. Phrase **A**

Stage 4: Do stages 1-3 for a small number of phrases e.g. 2-3.

Construct Song Form from sequencing Phrases- as Compositional Model #1.



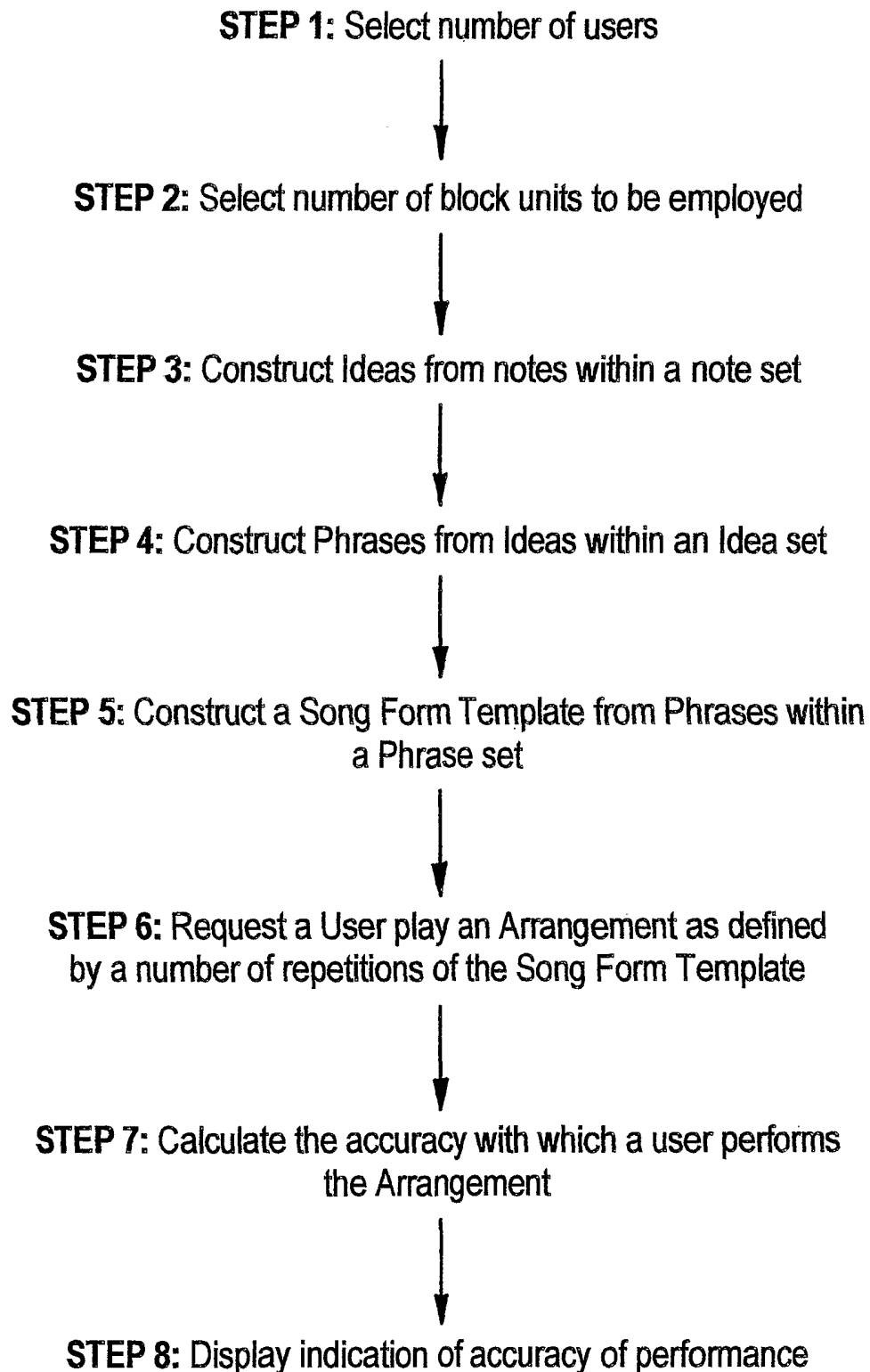
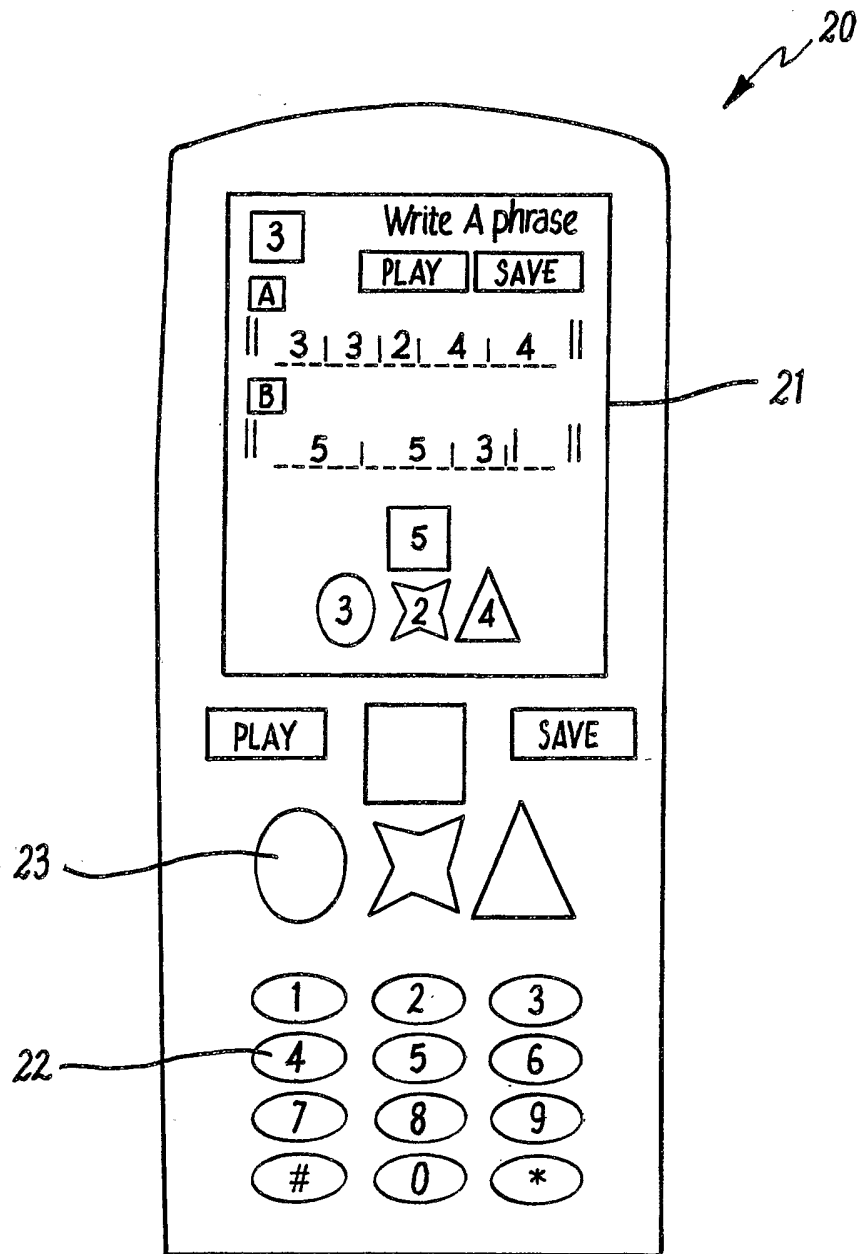


FIG. 7



FTE 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 02/02052

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G09B 15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G09B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI DATA


C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4307645 A (F. RAUCHI), 29 December 1981 (29.12.81), figures 1-3, abstract --	1,21,27,28, 36,38
Y	US 5252772 A (M.J. WRIGHT), 12 October 1993 (12.10.93), figures 1,5, abstract --	1,21,27,28, 36,38
A	US 5394784 A (F.S. PIERCE ET AL), 7 March 1995 (07.03.95), figure 1, abstract --	1-41
A	US 5544562 A (I.B. JEON), 13 August 1996 (13.08.96), figure 8, abstract --	1-41

 Further documents are listed in the continuation of Box C.
 See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search	Date of mailing of the international search report
30 August 2002	19. 09. 2002

Name and mailing address of the International Searching Authority	Authorized officer
 European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Vilho Juvonen / MRo Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 02/02052

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5827071 A (S.M. SORENSEN ET AL), 27 October 1998 (27.10.98), figure 2, abstract --	1-41
A	US 6066791 A (P.S. RENARD ET AL), 23 May 2000 (23.05.00), figure 1, abstract -- -----	1-41

INTERNATIONAL SEARCH REPORT

Information on patent family members

06/07/02

International application No.

PCT/GB 02/02052

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US 5252772 A	12/10/93	NONE	
US 5394784 A	07/03/95	NONE	
US 5544562 A	13/08/96	CN 1106949 A DE 4424199 A,C JP 7146640 A KR 141818 B KR 9704166 B	16/08/95 19/01/95 06/06/95 15/07/98 25/03/97
US 5827071 A	27/10/98	US 6210170 B	03/04/01
US 6066791 A	23/05/00	AU 2340599 A GB 2337066 A,B GB 9910415 D US 6205851 B WO 9939316 A	16/08/99 10/11/99 00/00/00 27/03/01 05/08/99