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Urry et al.

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(54) **PROGRAMMABLE MUSICAL INSTRUMENT PEDALBOARD**

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G10H 1/34	(2006.01)

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USPC **84/721**; 84/744

(58) **Field of Classification Search**

USPC 84/721, 744, 746, 225

See application file for complete search history.

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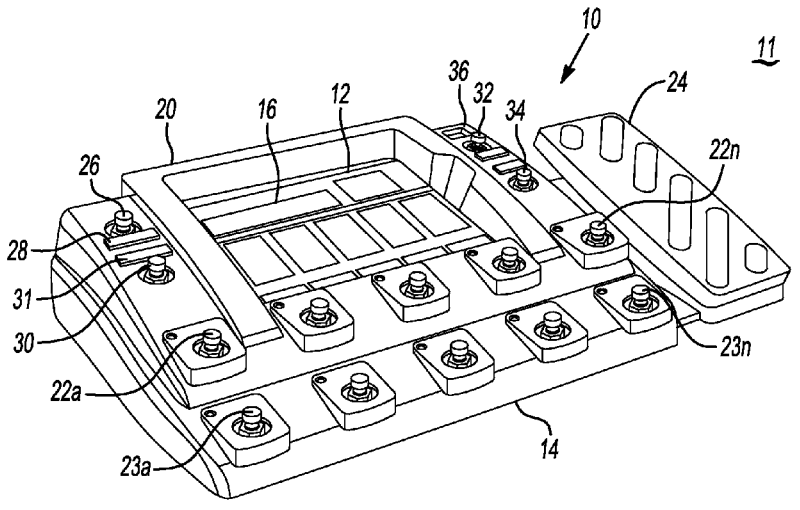
(57) **ABSTRACT**

In one embodiment, a programmable pedalboard for a musical instrument is provided. The pedalboard includes a docking station for receiving a removable portable computer that provides a plurality of instrument effects. The docking station is configured to receive an audio signal from a musical instrument and to modify the audio signal from the musical instrument based on at least one instrument effect from the plurality of instrument effects.

19 Claims, 8 Drawing Sheets



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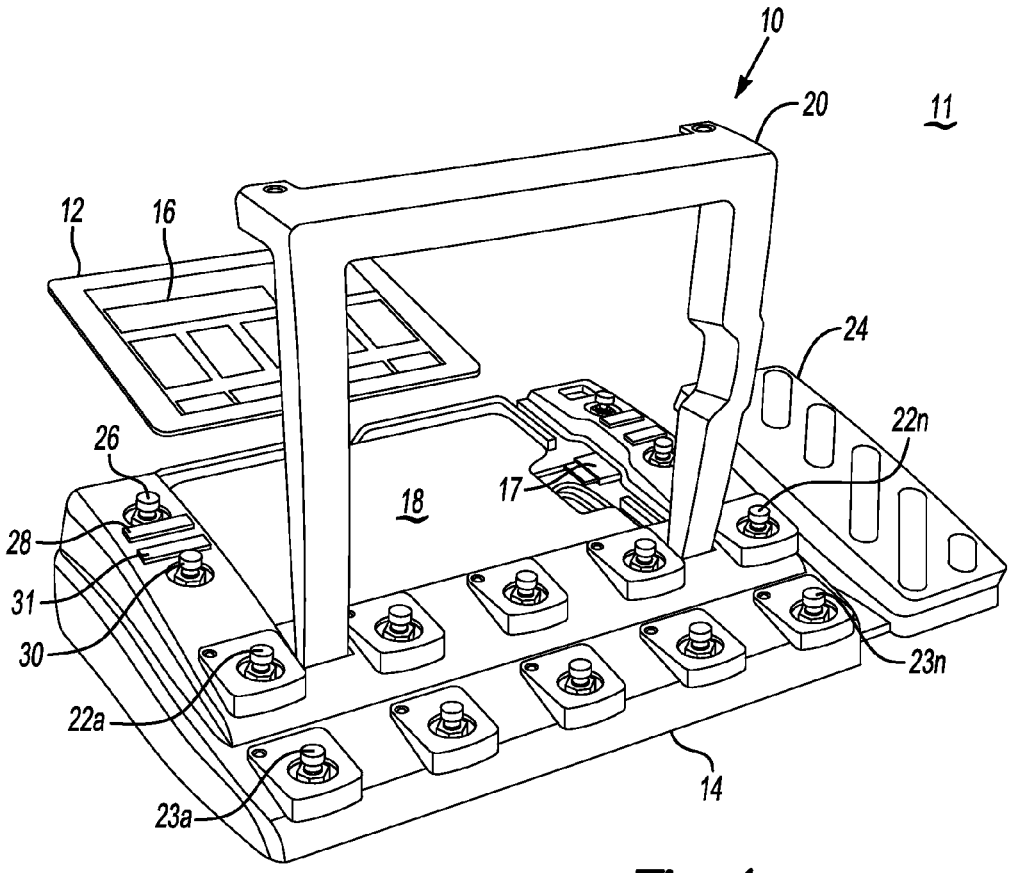
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11
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12
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22n
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18
17
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31
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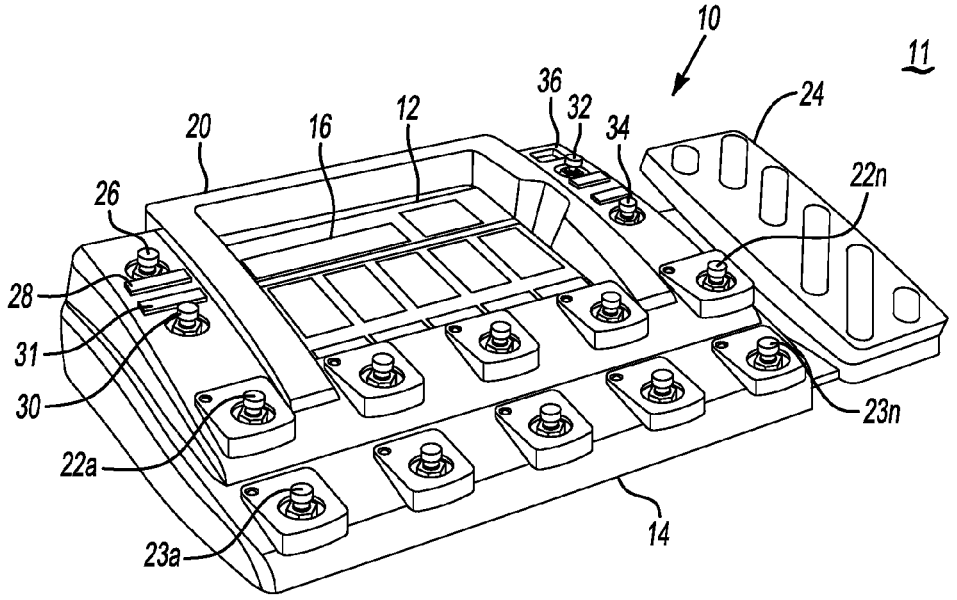
23n
22a
14
23a

Fig-1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11
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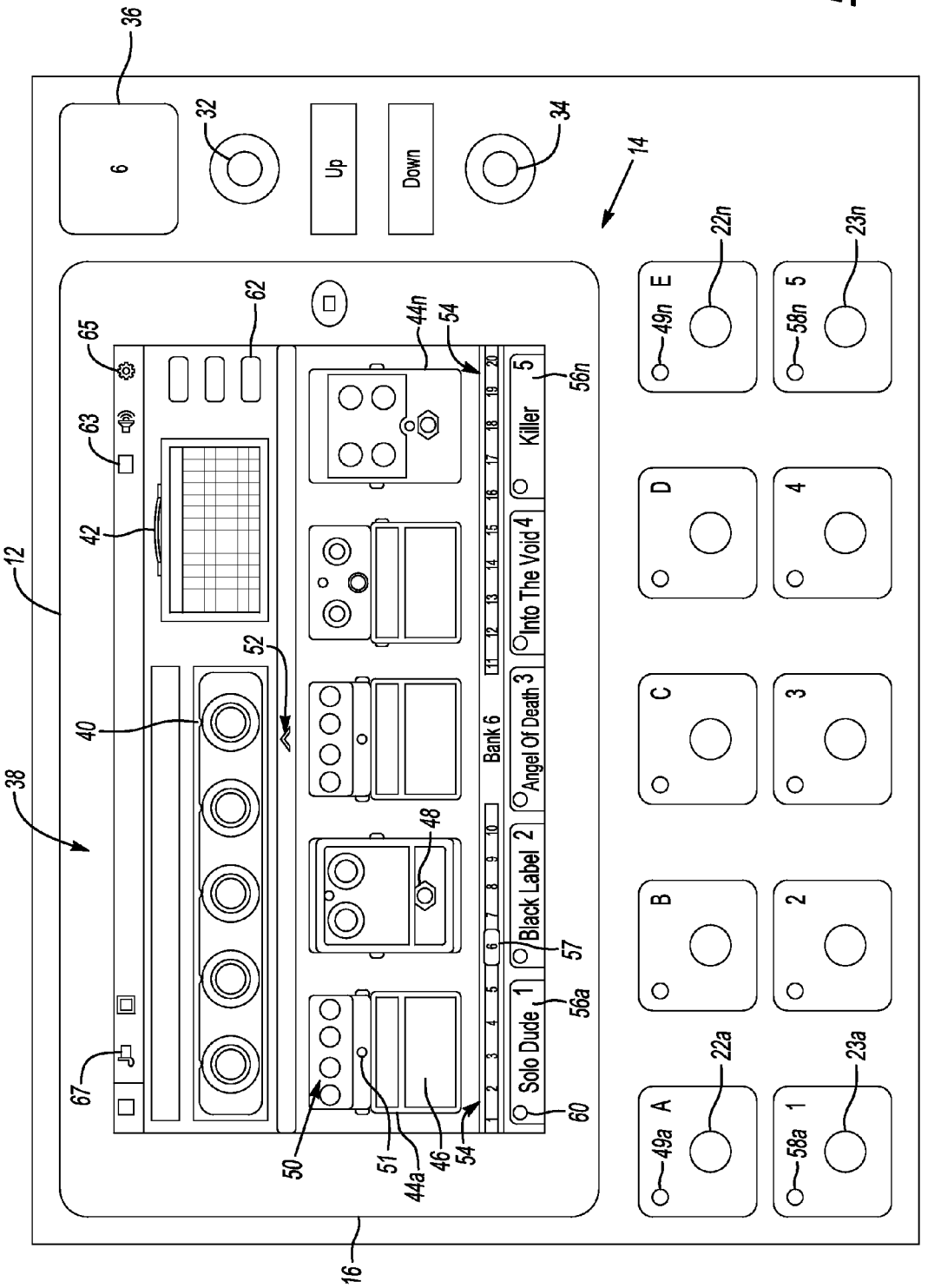
23n
22a
14
23a

Fig-2

Fig-3


36
6
32
Up
Down
34
14
22n
23n
49n E
58n 5
62
44n
54
65
63
42
12
52
40
38
48
Bank 6
Killer 5
Into The Void 4
Angel Of Death 3
Black Label 2
Solo Dude 1
56n
57
56a
60
67
50
51
44a
46
54
49a A
58a 1
22a
23a
D
4
C
3
B
2
16

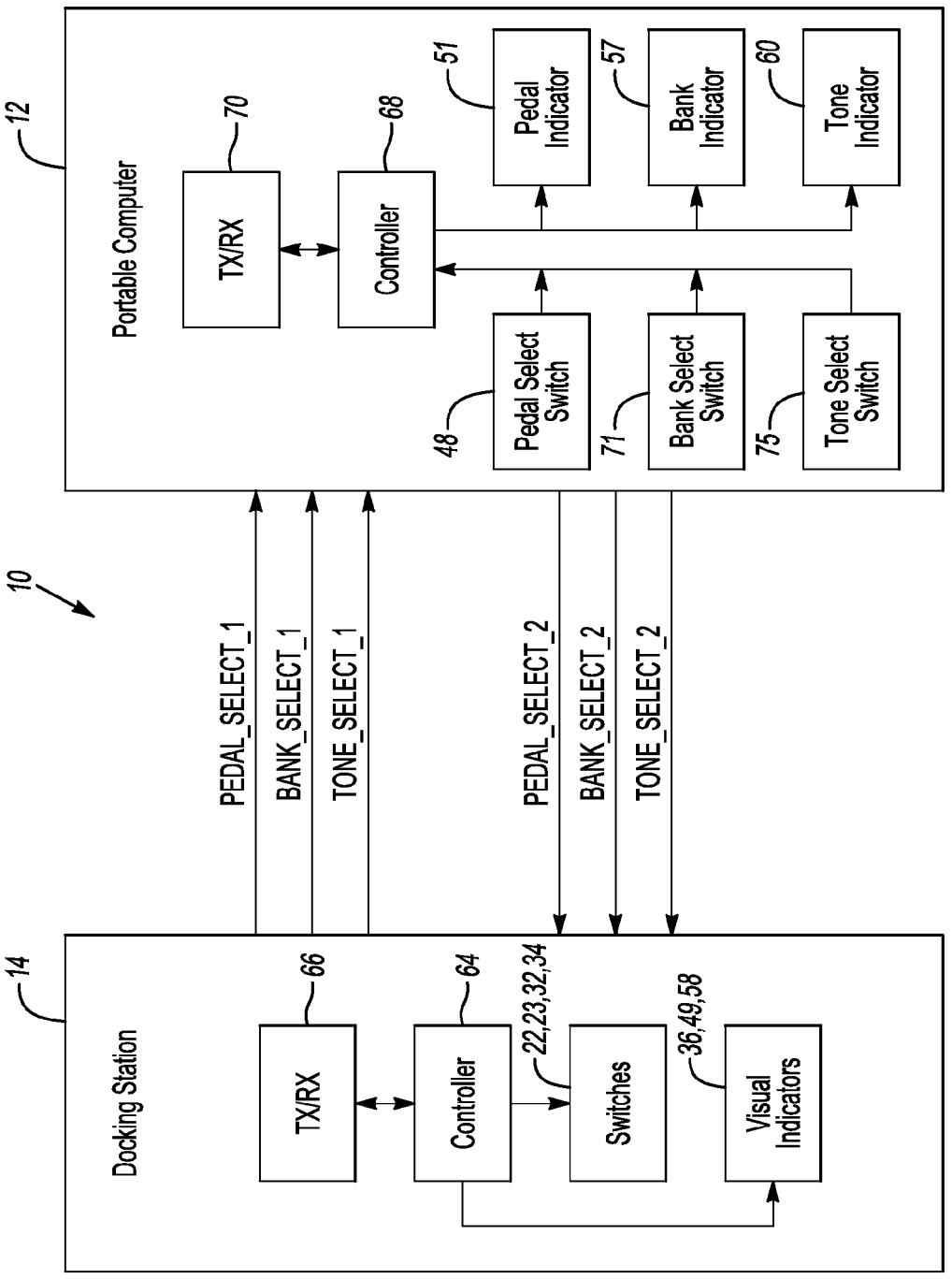

10
12
Portable Computer
TX/RX
70
Controller
68
Pedal Indicator
51
Bank Indicator
57
Tone Indicator
60
Pedal Select Switch
48
Bank Select Switch
71
Tone Select Switch
75
PEDAL_SELECT_1
BANK_SELECT_1
TONE_SELECT_1
PEDAL_SELECT_2
BANK_SELECT_2
TONE_SELECT_2
14
Docking Station
TX/RX
66
Controller
64
Switches
22,23,32,34
Visual Indicators
36,49,58

Fig-4

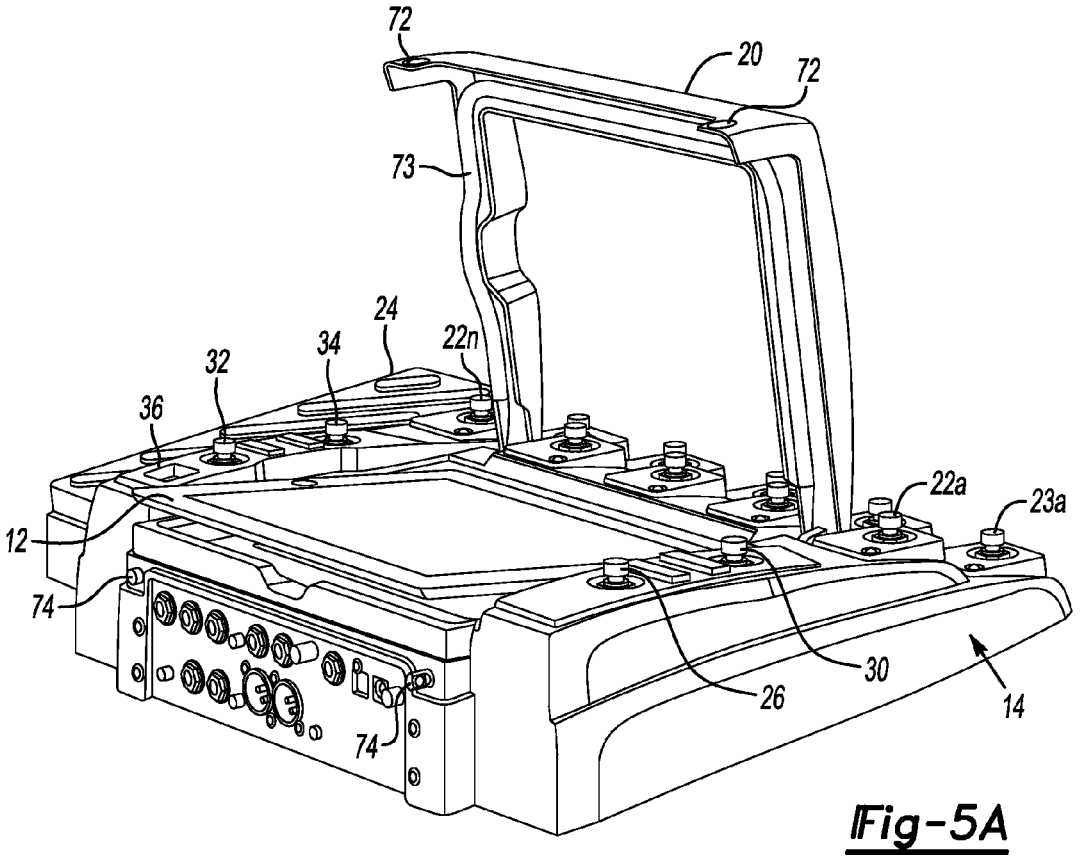


Fig-5A

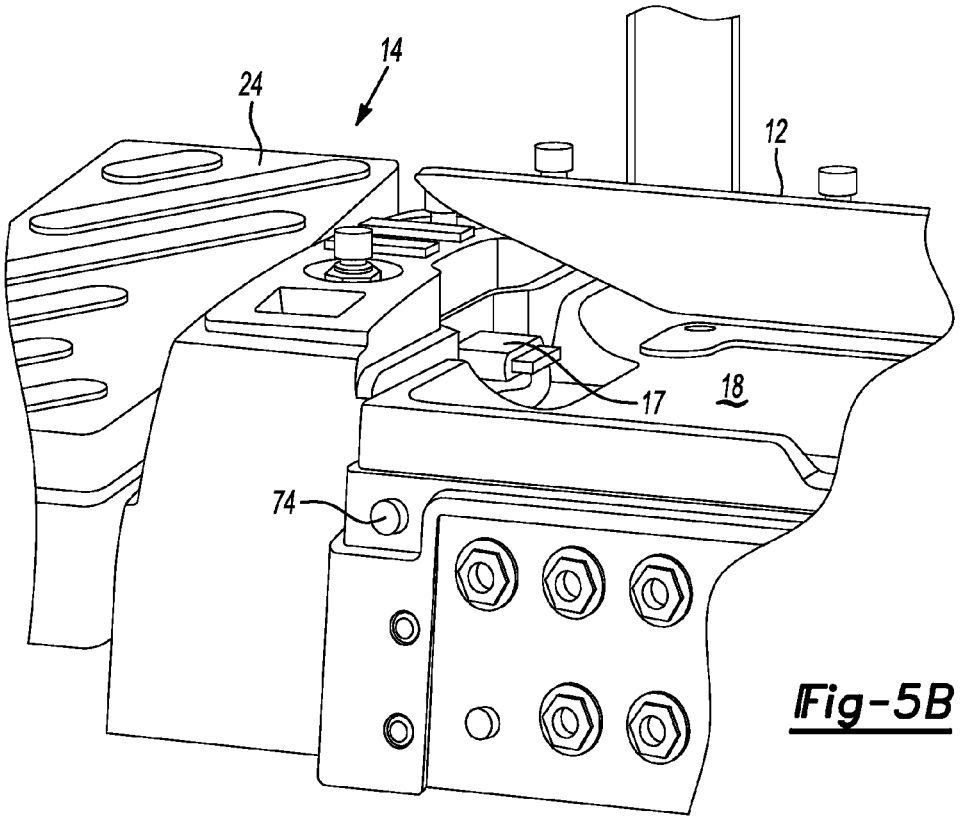


Fig-5B

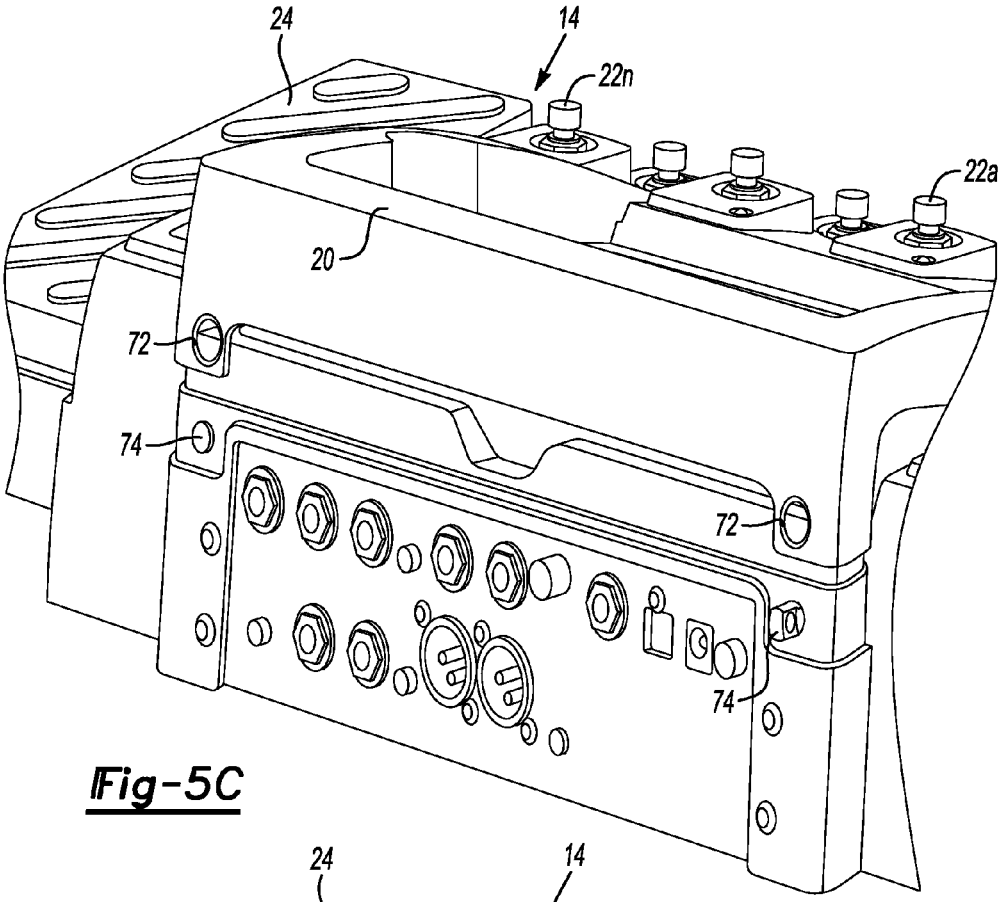


Fig-5C

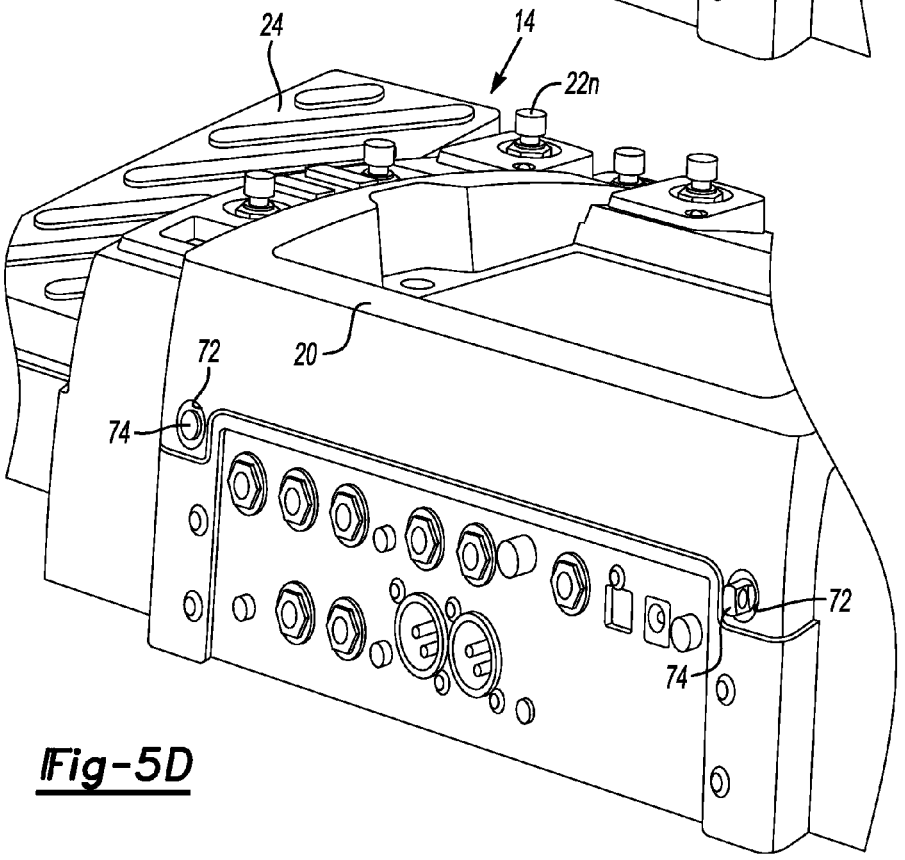


Fig-5D

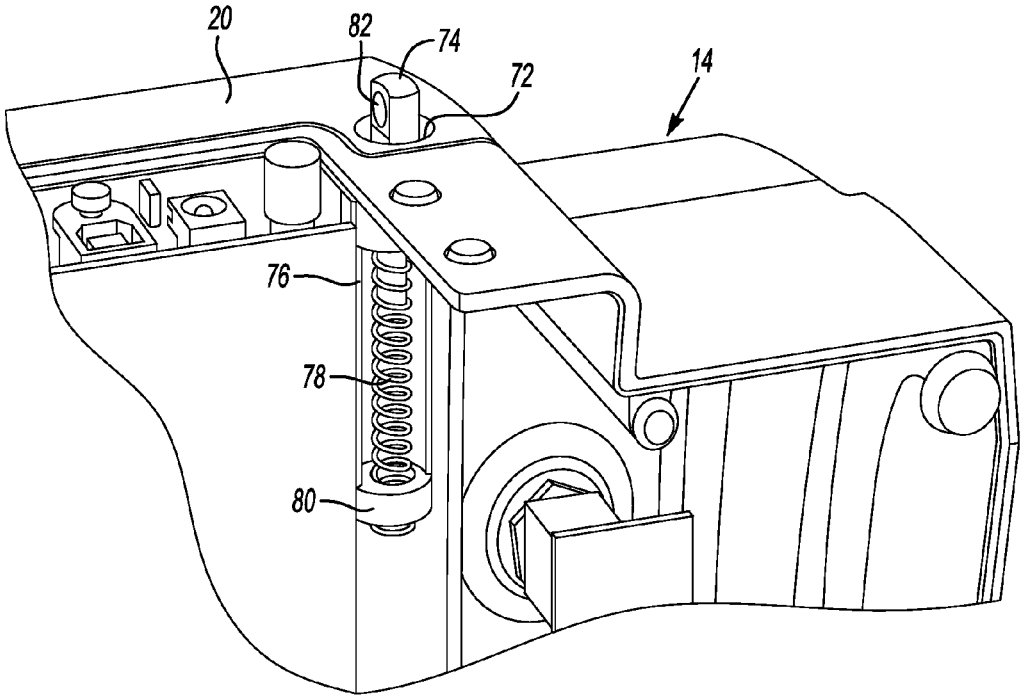


Fig-5E

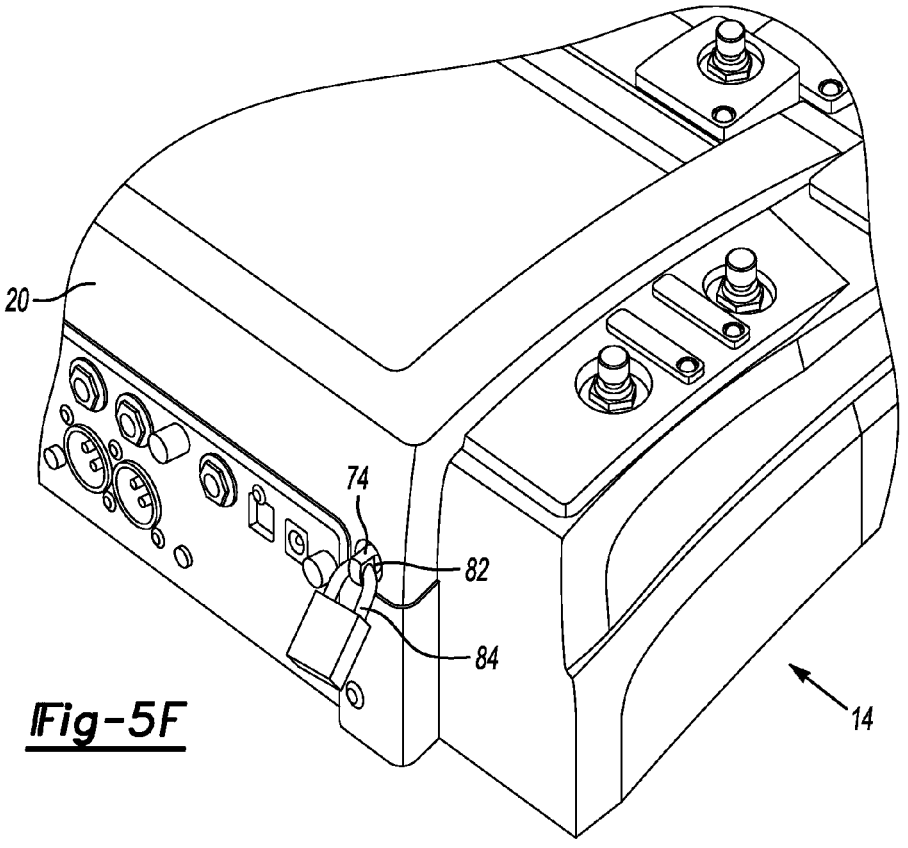


Fig-5F

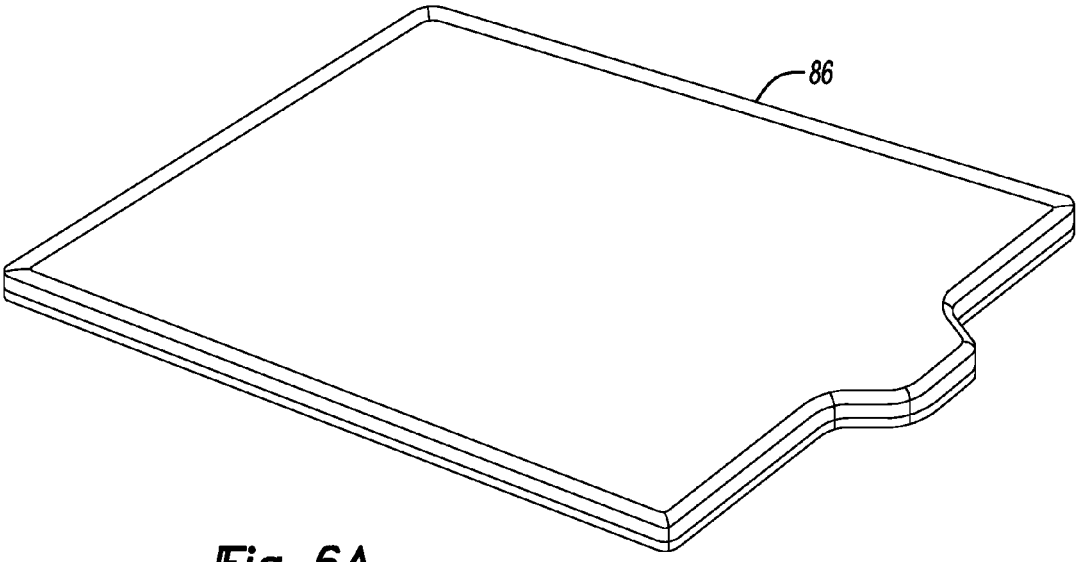


Fig-6A

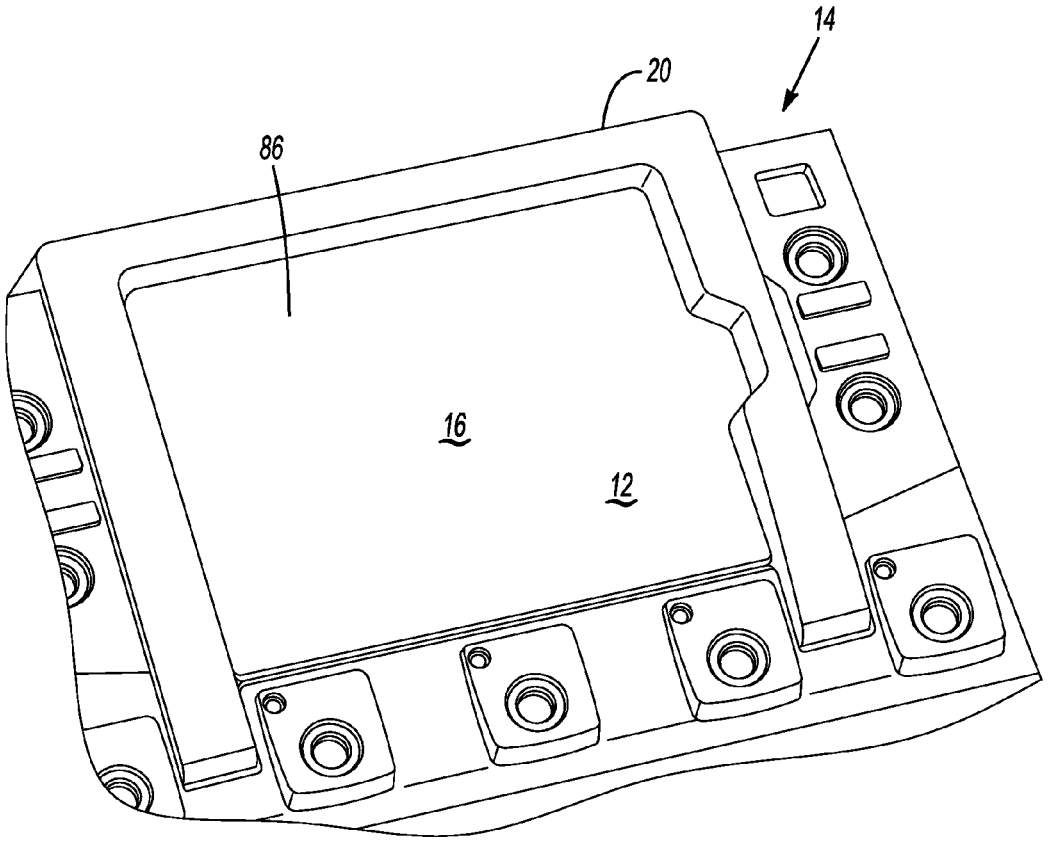


Fig-6B

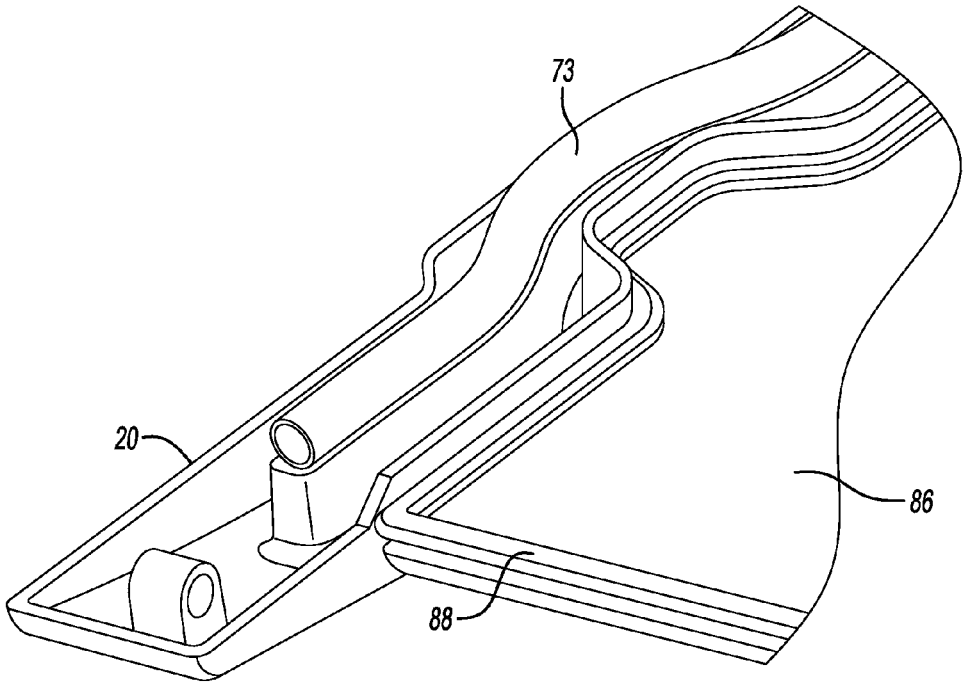


Fig-6C

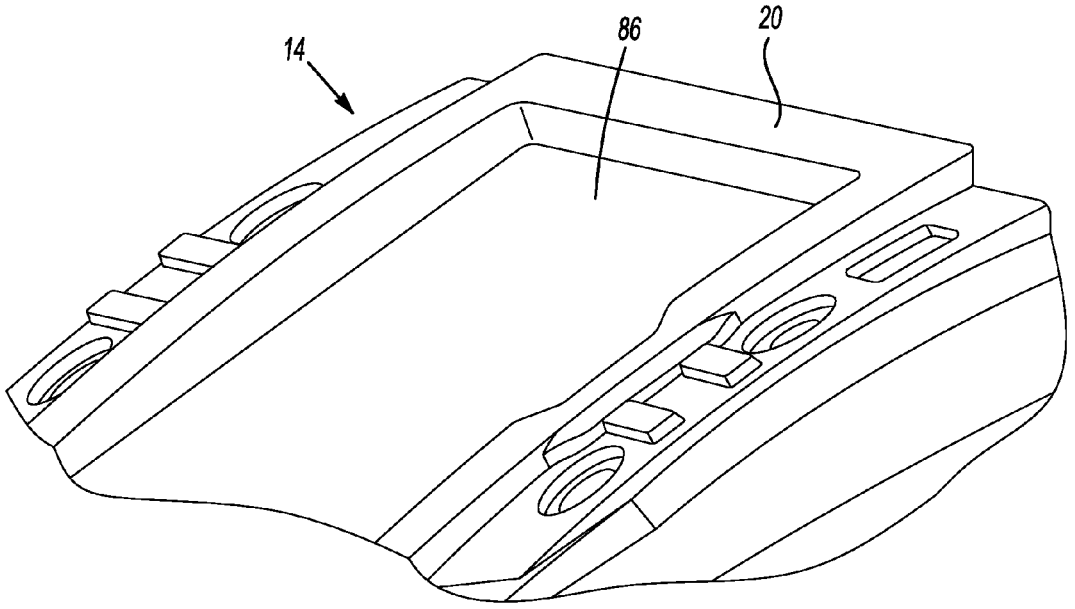


Fig-6D

PROGRAMMABLE MUSICAL INSTRUMENT PEDALBOARD

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. provisional Application No. 61/658,707 filed on Jun. 12, 2012, the disclosure of which is incorporated in its entirety by reference herein.

TECHNICAL FIELD

Various embodiments as disclosed herein generally relate to a programmable pedalboard for a musical instrument.

BACKGROUND

Guitarists, including bass players, are known to utilize various effects while playing a guitar or bass. Such effects may include distortion, chorus, compressor, delay, etc. A discrete pedal may be designed to provide a single effect. For example, a guitarist may include any number of discrete pedals that are daisy chained together via a number of electrical cables such that each pedal provides a particular guitar effect. One of such discrete pedals may be configured to provide distortion, while another discrete pedal may provide chorus and so on. The types of effects used may vary based on the genre of music that is performed by the guitarist. Each pedal box is generally rectangular in nature and generally enclosed in a durable housing to withstand some degree of wear and tear. Each pedal box may be selectively turned on/off via a switch by the foot or hand of the guitarist. For example, guitarists may selectively turn on/off a pedal depending on the whether the desired effect is needed for a particular song that is being played. In most cases, the pedal is switched on/off by the guitarist through the use of their feet in order to avoid bending down with the guitar in their hands. This allows the guitarist the ability to play the song uninterrupted while turning on/off a various pedal.

Each pedal box is arranged to have a distinctive personality, such as for example a particular look/color so that they differ from one another to allow the guitarist the ability to distinguish between the same while playing on the stage. As one would expect, guitarists typically play in clubs, bars, etc. where lighting may be an issue. While these discrete effect pedals are commonly used by guitarists, one drawback is that they may be cumbersome for the guitarist to travel with while traveling to various gigs, rehearsals or studio sessions, particularly if the guitarist employs a large number of discrete pedals in his/her gear. In addition, "on the fly" re-configurability of effects chains may be difficult with these hardware based discrete pedals in a particular series/parallel sequence, unless the pedalboard incorporates a professional effects switching control system that is connected to all connected pedals.

Integrated multi-effects units are also available for a guitarist. Such units generally include a fixed number of effects that are integrated into a single unit that includes two or more pedals. These units may be less cumbersome to travel with since each unit incorporates a fixed number of effects within a single housing. The various fixed number of effects included within the integrated pedalboard may be selected via a combination of foot pedal switches and knob/buttons. One drawback of the integrated multi-effects unit is that additional effects cannot be added to the unit. The guitarist is generally stuck with the effects originally provided by the manufacturer. To add a new effect, the guitarist is required to either purchase a new multi-effects unit with additional effects or purchase one or more discrete pedals to daisy chain with the existing multi-effects unit. In addition, the fixed effects in the multi-effects unit may typically have fixed signal chain configurations.

The user interface to such multi-effects units are generally small and cryptic, often utilizing an array of light emitting diodes (LEDs), or other a limited number of alpha-numeric characters to indicate preset names, numbers, parameter types and values. In addition, these multi-effects units may utilize one or more small liquid crystal display (LCD) screens, such as a graphical LCD screen to attempt to provide a visual representation of effects chains. There may be cost a disadvantage in attempting to incorporate larger color LCD screens into a multi-effects unit.

SUMMARY

In one embodiment, a programmable pedalboard for a musical instrument is provided. The pedalboard includes a docking station for receiving a removable portable computer that provides a plurality of instrument effects. The docking station is configured to receive an audio signal from a musical instrument and to modify the audio signal from the musical instrument based on at least one instrument effect from the plurality of instrument effects.

In another embodiment, a programmable pedalboard for a guitar is provided. The pedalboard includes a docking station for receiving a removable portable computer that provides a plurality of guitar effects. The docking station is configured to receive an audio signal from a guitar and to modify the audio signal from the guitar based on at least one guitar effect from the plurality of guitar effects.

In another embodiment, a programmable pedalboard for a musical instrument is provided. The pedalboard includes an interface for providing a plurality of instrument effects that is operably coupled to a docking station. The docking station receives an audio signal from a musical instrument and modifies the audio signal from the musical instrument based on one or more of the plurality of instrument effects. The interface is configured to enable a user to drag and drop any one or more of the plurality of instrument effects in any order thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

The embodiments of the present disclosure are pointed out with particularity in the appended claims. However, other features of the various embodiments will become more apparent and will be best understood by referring to the following detailed description in conjunction with the accompany drawings in which:

FIG. **1** depicts a programmable guitar pedalboard in accordance to one embodiment;

FIG. **2** depicts another view of the programmable guitar pedalboard in accordance to one embodiment;

FIG. **3** depicts a more detailed diagram of a portable computer and various switches;

FIG. **4** depicts a block diagram of the docking station and the portable computer for transmitting data therebetween;

FIGS. **5**A-**5**F depict various views of one end of a door in various states in accordance to one embodiment; and

FIGS. **6**A-**6**D depict various views of a protective visor to cover a display of the portable computer.

DETAILED DESCRIPTION

As required, detailed embodiments are disclosed herein; however, it is to be understood that the disclosed embodi-

ments are merely examples of the present disclosure that may be embodied in various and alternative forms. The figures are not necessarily to scale; some features may be exaggerated or minimized to show details of particular components. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ the present disclosure.

Embodiments of the present disclosure generally provide a portable computer and a guitar docking station ("docking station") for receiving the same as used in connection with a programmable pedal board. While the embodiments disclosed herein note that the portable computer and or the docking station may be used in connection with a guitar, it is recognized that the portable computer and the docking station may be used in connection with any musical instrument, such as but not limited to, bass guitar, vocals, keyboards, etc. The portable computer may be carried and function independent of the docking station when not coupled to the docking station. In one example, the portable computer may perform any task performed by a desktop or laptop. A user may download an application onto the portable computer from a server to enable the portable computer to communicate bi-directionally with the docking station. A guitarist may select various guitar effects via the portable computer itself or through switches positioned on the docking station. The portable computer is generally configured to provide a visual indication of separate guitar pedals which represent visible and functional characteristics of discrete pedals generally used by guitarists. Such visual indicators may match the discrete pedals in color, size, the number of switches, and control parameters as selected via knobs known to the specific discrete pedals. In addition, the portable computer may also provide amplifier and speaker cabinet representations.

The portable computer enables the guitarist the ability to select from a number of pedals. Such pedals can be added or removed as desired. Further, the application itself can be modified to include new pedal effects that are being introduced into the public for consumption and subsequently downloaded into the portable computer for use with the docking station. For example, software code (e.g., digital signal processor (DSP) and operating system (OS) components) is downloaded into the docking station and software code (e.g., user interface (UI) and OS components) is downloaded into the portable computer. The portable computer may also enable the guitarist the ability to select various control parameters via the knobs or switches of the discrete pedals as provided on a display of the portable computer to enable the guitarist to simulate use of an actual pedal box. The portable computer may enable the guitarist the ability to select from any number of amp and speaker configurations. The docking station may also engage in bi-directional communication with the portable computer such that functionality presented on a display of the portable computer can be controlled via switches positioned on the docking station, or vice versa. In addition, various bank presets as displayed on the portable computer may be transmitted therefrom and to the docking station to notify the guitarist of the selected bank preset. These features and other aspects will be set forth in more detail herein.

As noted above, there may be a cost disadvantage in attempting to incorporate larger color LCD screens into conventional multi-effects units. However, by adding a portable computer that is multi-functional to the docking station, cost attributed with larger color LCD screens or displays in general may be mitigated. For example, a display associated with the portable computer may be configured to serve as a user interface (and also provide visual indication) for purposes of playing guitar. Further, the display and the portable computer may be used in connection with home/office consumption for non-guitar applications. In short, the cost attributed to the display and the portable computer is already accounted for due to the use of the portable computer for home/office consumption. As such, the portable computer becomes dual purpose and the guitarist is less bothered by the cost of the display for the multi-effects device because it was already paid for. Another advantage of using a portable computer as a display is that cost attributed to various communications and networking hardware are negligible. In addition, the docking station, as disclosed herein, is able to realize through its connection with the portable computer various advantages such as access to various apps, internet capability, online store infrastructure, firmware updatability over a network, etc.

The embodiments of the present disclosure generally provide for a plurality of circuits or other electrical devices. All references to the circuits and other electrical devices and the functionality provided by each, are not intended to be limited to encompassing only what is illustrated and described herein. While particular labels may be assigned to the various circuits or other electrical devices disclosed, such labels are not intended to limit the scope of operation for the circuits and the other electrical devices. Such circuits and other electrical devices may be combined with each other and/or separated in any manner based on the particular type of electrical implementation that is desired. It is recognized that any circuit or other electrical device disclosed herein may include any number of microprocessors, integrated circuits, memory devices (e.g., FLASH, RAM, ROM, EPROM, EEPROM, or other suitable variants thereof) and software which co-act with one another to perform operation(s) disclosed herein.

FIG. **1** depicts a programmable pedalboard ("pedalboard") **10** in accordance to one embodiment. The pedalboard **10** receives an input from a musical instrument **11** (e.g., an electric guitar, bass, etc.) via a cable (e.g., guitar cable (not shown)) and the pedalboard **10** further transmits an audio guitar signal to an amplifier ("amp") to amplify the audio signal. In general, the pedalboard **10** is configured to provide any number of audio guitar effects (or other musical instrument effects if used for another type of musical instrument) to the input received from the guitar (or other instrument) to provide a variety of sounds for use by a musician. Such sounds may be specific to particular genres of music played by the musician.

The pedalboard **10** generally comprises a portable computer **12** and a docking station **14**. In one example, the portable computer **12** may be implemented as any tablet, such as for example, and Apple® iPad® or other suitable device. The portable computer **12** includes a display **16** for presenting guitar effects, amplifiers, and speaker cabinets to a guitarist. In addition, the display **16** of the computer **12** may also function as a touch screen (e.g., switching device) to enable the guitarist to select desired effects thereon. These features will be discussed in more detail below. The docking station **14** further includes a connector **17** for electrically coupling electrical devices (not shown) therein to the portable computer **12** to enable bi-directional communication between the docking station **14** and the portable computer **12**.

The docking station **14** includes any number of portable computer trays **18** for receiving an underside of the portable computer **12**. It is contemplated that the tray **18** may be interchangeable with other trays to receive a particular profile of the underside of the portable computer **12**. In one example, screws or other suitable fastening mechanism (not shown) may be used to attach the tray **18** to the docking station **14**. In

the event a different tray **18** is needed to receive a portable computer **12** that may have a different underside profile, a user may remove the fastening mechanism and the currently installed tray **18** and replace with another tray **18** that is formed to receive the different underside of portable computer **12** with the fastening mechanism.

The docking station **14** further includes a door **20** that is pivotally coupled thereto to secure the portable computer **12** to the docking station **14**. To secure the portable computer **12** to the docking station **14**, the door **20** is moved downward and applies a force against portable computer **12**. FIG. **2** depicts the manner in which the door **20** is moved to a fully downward position to secure the portable computer **12** to the docking station **14**. The manner in which the door **20** secures the portable computer **12** to the docking station **14** will be discussed in more detail in connection with FIGS. **5**A-**5**F.

Referring generally to FIGS. **1**-**2**, the docking station **14** further includes a first plurality of switches **22***a*-**22***n* ("22") (also labeled A, B, C, D, E, etc.). The first plurality of switches **22** may be used by the guitarist to select different pedal effects (or pedals). Such pedal effects may also be selected through the display **16** of the portable computer **12** or through the first plurality of switches **22** on the docking station **14**. A second of plurality of switches **23***a*-**23***n* ("23") may be used by the guitarist to select various tones (or guitar tones) (e.g., meaning reconfigured pedalboards) which correspond to a particular bank of effects. Such tones may also be selected via touch screen selection on the display **16** of the portable computer **12**. The pedalboard **10** is generally positioned on the floor or other flat surface to enable the guitarist to select the switches **22** and/or **23** through his/her feet so that the guitarist can continue to play a song uninterrupted. The docking station **14** further includes a foot switch (or expression pedal) **24** that is configured to control volume, Wah effect, or other assigned "continuously variable" effect/parameter.

The docking station **14** further includes a first switch **26** that enables and disables a mono stompbox effects loop. A first light emitting device (LED) **28** or other suitable device is turned on when the stomp loop is active. The docking station **14** further includes a second switch **30** that enables an amp loop. A second LED **31** or other suitable device is turned on when the amp loop is enabled.

The docking station **14** further includes a third switch **32** (see FIG. **2**) and a fourth switch **34**. The third switch **32** acts to move up from a current selected bank of effects into another selected bank of effects. The fourth switch **34** (see FIG. **2**) acts to move down from a current selected bank of effects into another selected bank of effects. The third switch **32**, the fourth switch **34**, and the bank of effects will be discussed in more detail in connection with FIG. **3**. A visual indicator **36** is provided on the docking station **14** to provide a number that corresponds to the current selected bank to the guitarist. The docking station **14** may also be used to enable play even if the portable computer **12** is not connected thereto. For example, the visual indicator **36** may be used to identify which bank is currently selected even if the portable computer **12** is not connected to the docketing station **14**.

FIG. **3** depicts a more detailed diagram of the portable computer **12** and various aspects of the docking station **14**. In general, the portable computer **12** may be configured to execute an application that includes a user interface **38** as shown. A guitarist may download the application onto the portable computer **12**. Once the application is download onto the portable computer **12**, the guitarist may electrically couple (e.g., either through the connector **17** or via wireless connection) the portable computer **12** to the docking station **14** such that various aspects as shown in the user interface **38** can be selected via the switches (e.g., **22**, **23**, **32**, **34**) of the docking station **14**. It is recognized that the portable computer **12** does not need to be docked (or inserted) into the docking station **14** to utilize the features of the pedalboard **10**.

As shown, the user interface **38** generally includes an amp selection field **40** and an amp cabinet selection field **42**. The amp selection field **40** can be selected by the guitarist via user interface **38** (e.g., touch selection) of the portable computer **12** to select a particular amp for simulating a particular sound typically provided by such an amp. For example, the guitarist may select various amps such as Marshall®, Mesa Boogie®, Fender®, Vox®, etc. In one example, the guitarist may select from up to 54 amps. The guitarist may also select the various knobs via touch screen capability as shown in the amp selection field **40** to control the gain, bass, middle, treble, etc. for a given selected amp.

The amp cabinet selection field **42** can be selected by the guitarist via the user interface **38** (e.g., touch selection) of the portable computer **12** to select a particular cabinet for simulating a particular sound typically provided by a speaker used in such a cabinet. For example, the guitarist may select various cabinets such as DigiTech Bright®, JBL®, Vox®, etc. In one example, the guitarist may select from up to 26 cabinets.

The user interface **38** also provides a visual indication of various pedal effects **44***a*-**44***n* ("44"), each being represented with visible and functional characteristic of discrete pedals as used by guitarists. The pedals **44** generally provide a similar effect to its hardware based discrete pedal equivalent. For various representations of the pedals **44**, there may not be a hardware-based equivalent pedal. The appearance of the pedal effects **44** as shown in the user interface **38** may match the appearance of it corresponding hardware based discrete pedal in name (i.e., Distortion, Overdrive, Flanger, Chorus, etc.), color, number of switches, and control parameters as selected via the knob known to the specific discrete pedals. The guitarist may activate a particular effect **44** via the user interface **38** by simply touching a black padded portion **46** or switch **48** (or pedal select circuit **48**). Also, the guitarist may simply select any one of the switches **22** to activate or deactivate a particular pedal **44**. As shown in FIG. **3**, switch **22***a* enables the pedal **44***a* to be activated or deactivated, switch **22***b* enables the pedal **44***b* to be activated or deactivate, and so on down the row. The docking station **14** further includes a plurality of visual indicators **49***a*-**49***n* ("49"), each being positioned proximate to the switch **22** for indicating whether a particular pedal **44** is active or not. In the event the guitarist selects the black padded portion **46** or switch **48** as shown in the user interface **38**, or alternatively selects the switch **22** to activate a given pedal **44**, the visual indicator **49** for that pedal **44** may be turned on to indicate that the pedal **44** is active. In addition, a visual indicator **51** as located directly on the pedal **44** may be turned on to indicate that a particular pedal **44** is active (this is representative of the manner in which a hardware based discrete pedal **44** may also indicate to the guitarist that it is active). All of the pedals **44** may be active or disabled at one time. In addition, any combination of the pedals **44** may be activated or disabled.

If the guitarist uses the user interface **38** to activate a particular pedal **44**, then the portable computer **12** transmits data indicative of which pedal **44** is active to the docking station **14** so that the corresponding visual indicator **49** thereon can be activated. Likewise, if the guitarist uses the switches **22** to activate a particular pedal **44**, then the docking station **14** transmits data indicative of which pedal **44** is activated to the portable computer **12** such that the pedal **44** is activated and to turn on the visual indicator **51** for that corresponding pedal **44**. The portable computer **12** is also config-

ured to zoom in on a particular pedal **44** to enable the guitarist to easily select an input parameter via the knobs **50** or to simply activate or deactivate the pedal **44**. For example, the guitarist may simply double tap the pedal **44** as shown in the user interface **38** to zoom into the pedal **44**.

The user interface **38** may also enable the guitarist the ability to select various control parameters via the knobs or switches **50** of the discrete pedals (or effects) **44** as provided on a display **16** via touch selection of such knobs or switches **50** to enable the guitarist to simulate use of an actual pedal box. While only five pedal effects **44** are shown in the user interface **38**, it is contemplated that any number of additional pedal effects **44** may be added. In one example, an expansion bar **52** is provided in the user interface **38** to enable the guitarist to control additional pedal effects **44** that may be present for a particular bank.

The user interface **38** also includes a plurality of banks **54**. The guitarist may select a corresponding bank via touch selection on the display **16** (by touching the bank **54** directly) or through the docking station **14** via the switches **32**, **34**. Each bank **54** generally comprises five custom tones **56**. As shown in FIG. **3**, bank **6** (see **57** for bank number) includes the following tones **56**: "Solo Dude," "Black Label," "Angel of Death," "Into the Void," and "Killer." The user interface **38** depicts that there are twenty banks that are generally offered. However, it is contemplated that the portable computer **12** and the docking station **14** may be configured to provide any number of banks **54**. The portable computer **12** selects the pedal **44** for display in the user interface **38** based on the particular tone **56** that is selected by the guitarist. However, any pedal **44** may be selected or used by the guitarist for a given tone **56**. The guitarist may simply double tap the pedal **44** to replace it with another pedal **44**. For example, the guitarist may elect to replace pedal **44** corresponding to a "Screamer Tube Overdrive" and replace it with pedal **44** corresponding to an "DOD® Overdrive/250."

As exhibited above, the portable computer **12** and the docking station **14** each transmit information corresponding to the selected bank **54** and tone **56** to one another. For example, in the event the guitarist selects "bank 6" via the user interface **38**, such data is transmitted to the docking station **14** so that the visual indicator **36** as positioned thereon displays the selected bank (i.e., "6"). Likewise, in the event the guitarist selects "bank 6" via the switches **32** and **34**, the docking station **14** transmits information corresponding to the selected bank to the portable computer **12** so that the portable computer **12** selects "bank 6" and so that "bank 6" (e.g., the bank indicator **57**) is visually presented in the user interface **38**.

The user interface **38** also enables the guitarist to select a particular tone **56** via touch selection. In addition, the guitarist has the option of selecting the particular tone via the switch **23**. For example, in the event guitarist elects to activate tone "Solo Dude" via the user interface **38**, the guitarist may simply touch such a tone **56**. The portable computer **12** then transmits data indicative of the selected tone to the docking station **14**. The docking station **14** includes a plurality of visual indicators **58***a*-**58***n* ("58"). The visual indicator **58***a* positioned proximate to the switch **23***a* may be activated in response to the guitarist selecting the tone "Solo Dude" via the user interface **38** (e.g., see numeral; "1" on switch **23***a*, this corresponds to numeral "1" as illustrated on tone "Solo Dude'). Accordingly, the switches **23** are numbered to correspond with the numbered tones **56** in the user interface **38**.

In the event the guitarist elects to select the corresponding tone **56** via the switch **23**, then the docking station **14** transmits data indicative of the selected tone to the portable computer **12** such that the portable computer **12** activates the selected tone **56**. Further, a visual indicator **60** (or tone indicator) positioned proximate to the tone label or title on the user interface **38** may then be activated as well.

It is contemplated that the portable computer **12** may enable the guitarist to assign a pedal **44** to a corresponding switch **22** in a customized fashion. For example as described above, the pedals **44** assigned to the various switches **22** may be preset based on the bank **54** and particular tone **56** that is selected. However, the portable computer **12** may allow the guitarist to customize the assignment of a particular pedal **44** to particular switch **22**. This may be accomplished by selecting an edit field **62**. In this arrangement, the guitarist may simply select the desired pedal **44** and place in an Edit screen (e.g., drop and drag of pedal(s) **44**). At that point, the corresponding switch **22** that is desired to be assigned to the selected pedal **44** may be selected to assign the pedal **44** to the corresponding switch **22**. Programming capabilities and other aspects related to the programmable guitar pedalboard are disclosed, inter alia, in "iPB-10 Programmable Pedalboard Owner's Manual," 2011, ("Owner's Manual") which is hereby incorporated by reference in its entirety.

A tuner field **63** in the user interface **38** may be selected on the user interface **38** to allow the guitarist the ability to tune his/her guitar. When the tuner field **63** is selected, the docking station **14** recognizes the particular string of the guitar that is picked (or played) and provides a visual indicator per the string that was picked by the guitarist as whether such a string is flat, sharp or in tune. A setting field **65** in the user interface **38** may be selected which provides a setting for the tuner feature. For example, the guitarist can select the manner in which the strings can be tuned to. Specifically, the guitarist may desire to tune the guitar to 440 Hz or any suitable frequency thereof. The setting field **65** may also enable the guitarist to calibrate the sensitivity of the expression pedal **24**. Further, the expression pedal **24** can be calibrated to behave like an analog volume pedal. Additional features that may be selectable via the setting field **65** may include, but not limited to, a screen saver disable, USB level and USB Mix, Factory Reset, Global Amp/Cabinet Bypass (e.g., remove or turn off the amp and cabinet modeling in all bank or tone presets). These features may be described in more detail in connection with the Owner's Manual as noted above. A "My Tones" field is selectable via the user interface **38** to access a main preset library where all presets (e.g., banks **54** and tone **56**) used by the pedalboard **10**. From the My Tones screen, the guitarist can copy up to 100 presets to an internal memory (not shown) in the docking station **14** such that the docking station **14** can be used even if the portable computer **12** is not electrically connected thereto.

The programmable computer **12** may also have the capability of storing and scrolling lyrics for various songs and corresponding tablature notation (or sheet music) for display to the guitarist so that the guitarist can sing the lyrics or play his/her instrument according to the tablature.

FIG. **4** depicts a block diagram of the portable computer **12** and docking station **14** for transmitting data therebetween. As noted above, the pedalboard **10** allows the use of, but not limited to, (1) activating/deactivating the pedal **44**, (2) selecting a corresponding bank **54**, and (3) selecting a particular tone **56**. Accordingly, one or more the various switches **22**, **23**, **32**, **34** positioned on the docking station **14** are used in connection with activating/deactivating the pedal **44**, selecting a corresponding bank **54**, and selecting a particular tone.

The docking station **14** includes a controller **64**, the switches **22**, **23**, **32**, **34** and the visual indicators **36**, **49**, **58**. The controller **64** monitors the state of the switches **22**, **23**, **32**,

and **34** and transmits the same to the portable computer **12**. For example, the controller **64** monitors whether a particular pedal **44** is activated or deactivated via the switch **22**. The controller **64** transmits a signal PEDAL_SELECT_1 to the portable computer **12**, which indicates whether a particular pedal **44** is activated or deactivated. In addition, the controller **64** monitors whether a particular bank **54** has been selected via the switches **32** and **34** (see FIG. **3** and up/down switches **32** and **34**). The controller **64** transmits a signal BANK_SELECT_1 to the portable computer **12**, which indicates which bank **54** has been selected. The controller **64** also monitors which tone **56** has been selected via the switch **23**. The controller **64** transmits a signal TONE_SELECT_1 to the portable computer **12**, which indicates which tone **56** has been selected. It is recognized that the signals PEDAL_SELECT_1, BANK_SELECT_1, and TONE_SELECT_1 may be transmitted by the docking station **14** via a hardwired connection via the connector (see FIG. **1**) or may be wirelessly transmitted via a transmitter **66** to the portable computer **12**. The docking station **14** also includes a receiver **66** for wirelessly receiving data.

The portable computer **12** includes a controller **68** that receives the signals PEDAL_SELECT_1, BANK_SELECT_1, and TONE_SELECT_1. The portable computer **12** may then activate/deactivate the pedal indicator **51** (see FIG. **3**) based on the data included on the signal PEDAL_SELECT_1. In addition, the portable computer **12** may then provide an indication as to which bank **54** via the bank indicator **57** (see FIG. **3**) has been selected based on data included on the signal BANK_SELECT_1. The portable computer **12** may then also provide an indication as to which tone **56** via the tone indicator **60** (see FIG. **3**) has been selected based on the data include on the signal BANK_SELECT_1.

The controller **68** monitors which pedal **44** has been activated/deactivated, which bank **54** has been selected, and which tone has been selected on the user interface **38**. As noted above in connection with FIG. **3**, each pedal **44** as shown in the user interface **38** can be activated or deactivated via a black padded portion **46** or knob **48**. The black padded portion **46** or knob **48** may be generally defined collectively as a pedal select switch **48** and is illustrated in FIG. **4** as the same. As further noted above, the user interface **38** enables touch selection of the bank **54** and tone **56**. The touch selection of the bank **54** and the tone **56** are generally defined as the bank select switch **71** and tone select switch **75**, respectively, and are each illustrated in FIG. **4**. Each of the pedal select switch **48**, the bank select circuit **71**, and the tone select circuit **75** may be implemented via any combination of hardware and software.

The controller **68** is operably coupled to the switches **48**, **71**, and **75** and monitors the state thereof. For example, the controller **68** monitors whether a particular pedal **44** is activated or deactivated via the switch **48**. The controller **68** transmits a signal PEDAL_SELECT_2 to the docking station **14**, which indicates whether a particular pedal **44** is activated or deactivated via the switch **48**. In addition, the controller **68** monitors whether a particular bank **54** has been selected via the switch **71**. The controller **68** transmits a signal BANK_SELECT_2 to the docking station **14**, which indicates which bank **54** has been selected. The controller **68** also monitors which tone **56** has been selected via the switch **75**. The controller **68** transmits a signal TONE_SELECT_2 to the docking station **14**, which indicates which tone **56** has been selected. It is recognized that the signals PEDAL_SELECT_2, BANK_SELECT_2, and TONE_SELECT_2 may also be transmitted through a hardwired connection via the connector **17** (see FIG. **1**) or may be wirelessly transmitted to the docking station **14** via a transmitter **70**. The portable computer **12** also includes a receiver **70** for wireless receiving the signals PEDAL_SELECT_1, BANK_SELECT_1, and TONE_SELECT_1. Conversely, the receiver **66** of the docking station **14** may also wirelessly receive the signals PEDAL_SELECT_2, BANK_SELECT_2, and TONE_SELECT_2.

The docking station **14** may then activate/deactivate the pedal indicator **36** (see FIGS. **2** and **3**) based on the signal PEDAL_SELECT_2. In addition, the docking station **14** may then provide an indication as to which bank **54** via the bank indicator **36** has been selected based on the signal BANK_SELECT_2. The docking station **14** may then also provide an indication as to which tone **56** via the tone indicator **58** has been selected based on the signal BANK_SELECT_2. It is recognized that the bi-directional information exchange as illustrated in FIG. **4** is not intended to a complete listing of data that is transmitted between the portable computer **12** and the docking station **14**.

FIGS. **5**A-**5**F depict various views of one end of the door **20** in various states in accordance to one embodiment. In reference to FIG. **5**A, the door **20** is shown in a fully open position to enable the guitarist to insert the portable computer **12** into the tray **18** and to allow the electrical connection between the portable computer **12** and the docking station **14** to be made with the connector **17** (see also FIG. **5**B for additional reference). The door **20** includes at least one receiving hole **72** and a damping gasket **73** positioned on an underside thereof for contacting the display **16** of the portable computer **12**. The damping gasket **73** extends over the entire portion of the door **20** that is arranged to contact the display **16** when the door **20** is in the fully closed position to secure the portable computer **12** to the docking station.

At least one retractable male pin **74** is positioned on a rear side of the docking station **14**. FIG. **5**C depicts the door **20** translating (or pivoting) from the fully open position to semi-closed position. As shown, the receiving hole **72** is aligned to receive the retractable pin **74** in order to secure the portable computer **12** to the docking station **14**.

FIG. **5**D depicts the door **20** being in a fully closed position. As shown, the receiving hole **72** has received the retractable male pin **74** such that the pin **74** protrudes outwardly from the hole **72**. Prior to the door **20** reaching its fully closed position, a portion of the door **20** positioned below the receiving hole **72** contacts the retractable pin **74** causing the same to retract inward into the docking station **14** such that the door **20** continues to move downward toward the fully closed position. As the receiving hole **72** passes over the pin **74**, the pin **74** retracts outwardly away from the docking station **14** and into the receiving hole **72** to secure the portable computer **12**.

FIG. **5**E depicts the manner in which the retractable pin **74** is configured to retract inwardly and outwardly. For example, the docking station **14** defines a channel **76** for housing a spring **78**. One end of the pin **74** is fixed to one end of the spring **78**. A backstop **80** is provided in the docking station **14** and is coupled to the other end of the spring **78**. As shown, the pin **74** is spring loaded into the channel **76**. As the door contacts the pin **74**, the spring **78** compresses in response to the contact. Once the receiving hole **72** is aligned over the pin **74**, the spring releases causing the pin **74** to insert itself into the receiving hole **72**. The pin **74** defines a cavity **82** that protrudes outside of the docking station **14**. As shown in FIG. **5**F, the cavity **82** is configured to receive a lock **84** to prevent unauthorized access to the portable computer **12** positioned within the docking station **14**.

FIGS. **6**A-**6**D depict various view of a visor **86** to cover the display **16** of the portable computer **12**. The visor **86** may

serve as a protective barrier to the display **16** of the portable computer **12**. The visor **86** may still enable touch selection via the user interface **38**. In one example, a portion of the perimeter of the visor **86** may be arranged to interlock with a partial inner portion of the door **20** to secure the visor **86** to the door **20** (see FIGS. **6**B and **6**D). The visor **86** may include a protective gasket **88** positioned on an inner portion thereof for contacting the portable computer **12** (see FIG. **6**C).

In general the portable computer **12** and/or the docking station include any combination of hardware and software for performing a number of features. Such features will be described in more detail hereafter. The portable computer **12** may be arranged to enable WiFi, cell network, Bluetooth®, or wired internet access. Such internet access enables on-going app updates to be downloaded to the portable computer **12** and to the docking station **14**. In addition, the guitarist may be able to download e-pedals onto the portable computer **12**. For example, the guitarist may be able to download a new pedal or an update to a previously stored pedal onto the portable computer **12**. The internet capability associated with the programmable multi-effects unit (or programmable pedalboard) also provides for an on-line community where a guitarist may share presets (e.g., banks **54** and/or tones **56**), loops, and song recordings with other guitarists. In one example, this may be advantageous for the guitarist who develops a new rhythm (e.g., "guitar lick") using a particular custom user preset and would like to share the preset or a recorded version of the new rhythm to a band mate who is geographically separated from the guitarist. The internet capability may also enable a teacher and student to engage in a guitar lesson even if the teacher is physically located at a different location than the student. The lesson may be performed in real-time. Or, a musician may submit a section of recorded guitar (e.g., a "loop"), for example, and other remotely-located musicians may listen to the loop, play on top of it, and submit his/her loop or the composite loop for others to which they can then listen or contribute, and so forth. The loop originator, or other designee, may be in control of edits to the composite loop, either accepting or rejecting subsequent contributions to the loop. The portable computer may be configured with software to utilize online loop sharing with a community of musicians. Furthermore, sheet music (or tablature) may be downloaded onto the portable computer **12**. While the guitarist plays a song based on the sheet music or tablature, the portable computer **12** may critique how well such a song is played. For example, the portable computer **12** may record the guitar while the tablature scrolls across the screen and compare the notes selected by the guitarist against the tablature to provide a score (or to critique) on how well the guitarist is playing the guitar in comparison to the tablature.

Various lyrics can be downloaded to the portable computer **12** to enable the guitarist to sing the correct lyrics as the lyrics scroll across the display **16**. In addition, the portable computer **12** may enable a minus track feature in which various instruments or vocals may be stripped from a song. For example, the portable computer **12** may enable the guitarist to remove a guitar track from a song via the user interface **38** so that the guitarist plays or fills in the guitar track while vocals, drums, and bass tracks for the particular song are played back. A forward facing camera may be positioned on the docking station **14** to record video of the guitarist playing. The video (in real time or delay) may be uploaded onto YouTube® or other suitable playback mechanism to provide a personal feed of the guitarist playing. Various switches (e.g., foot switches) positioned on the docking station **14** may be used to start/stop recording as needed by toggling the foot switch on the docking station **14** as the guitarist plays a song. In addition, the portable computer **12** may execute videos for lessons, learning a new "lick of the day", etc.

The portable computer **12** may have a set list downloaded in advance to a gig or it may be wirelessly transmitted during the gig to capture any changes made to the set list while the show is on-going. The guitarist can view any updates to the set list on the display **16** as they occur in real-time. In addition, the guitarist may assign various pedals **44**, banks **54**, and tones **56** via the portable computer **12** to a particular song in the set list such that during a live show, these presets are automatically turned on for each song in the set list. The portable computer **12** may also enable the guitarist to pre-load backing tracks and to assign each backing track to a particular song. Further, the portable computer **12** may also enable the guitarist to control other affects such as a siren or lights to be turned on for a particular song. For example, the portable computer **12** may transmit a wired or wireless command to another device to initiate a particular lighting sequence or turn on a siren at the beginning of the song for a particular song in the set list.

The portable computer **12** may also receive firmware updates and provide such updates for the docking station **14**. The portable computer **12** may also support various integrated controls of various apps. For example, the portable computer **12** may launch various software applications such as, but not limited to, Apple® Garage Band® with a single switch (or button). In this case, the guitarist may automate a number of the steps needed to record a guitar track as provided by such software application and simply press a single button (either on the portable computer **12** (for hand selection) and/or on the docking station **14** (for foot selection)) to immediately start recording a guitar track. In many cases, a guitarist may just start playing a guitar lick and realize that he/she wants to record this lick on the fly. However, some of the software packages may require multiple steps to be performed prior to recording. In this case, the portable computer **12** may enable the guitarist to run a macro so that such operations are instantaneously performed via the push of a button on the user interface **38** or on the docking station **14** to record a particular lick. This can be performed dynamically or as needed so that the guitarist is not interrupted in setting up the recording feature when he/she comes across a particular rhythm while playing the guitar that is found appealing for recording purposes. Further, such recorded tracks can be sent via the software application (e.g., Garage Band®) directly through the portable computer **12** to a server or other device, such as for example, a teacher or band mate of the guitarist.

The portable computer **12** may also receive push notifications for notifying the guitarist of opportunities to purchase various apps (e.g., a particular effect) for a limited time offer, or to notify the guitarist of available firmware updates. The portable computer **12** may also include an integrated user manual or help manual for the docking station **14** and computer application. The portable computer **12** and/or the docking station **14** may also support hands free selection of one or more of the features disclosed herein via voice recognition.

While exemplary embodiments are described above, it is not intended that these embodiments describe all possible forms of the present disclosure. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the present disclosure. Additionally, the features of various implementing embodiments may be combined to form further embodiments of the present disclosure.

What is claimed is:

1. A programmable pedalboard for a musical instrument, the pedalboard comprising:

a docking station for receiving a removable portable computer that provides a plurality of instrument effects, the docking station being configured to:

receive an audio signal from a musical instrument; and

modify the audio signal from the musical instrument based on at least one instrument effect from the plurality of instrument effects;

wherein the docking station includes a plurality of first switches positioned thereon, each first switch being configured to one of activate and deactivate the at least one instrument effect from the plurality of instrument effects;

wherein the docking station further includes a plurality of second switches positioned thereon, each second switch being configured to one of activate and deactivate a particular musical tone that is associated with one of a plurality of banks included on the portable computer; and

wherein the docking station is further configured to modify the audio signal from the musical instrument based on the particular musical tone.

2. The programmable pedalboard of claim 1 wherein the docking station is further configured to wirelessly transmit data indicative of the at least one instrument effect being one of activated and deactivated to the portable computer.

3. The programmable pedalboard of claim 1 wherein the docking station further includes a first switch for controlling a recording operation while a user plays the musical instrument, the first switch being arranged to one of start and stop the recording operation in response to an input from the user.

4. The programmable pedalboard of claim 1 wherein the portable computer includes a plurality of first switches positioned thereon, each first switch being configured to one of activate and deactivate the at least one instrument effect from the plurality of instrument effects.

5. The programmable pedalboard of claim 3 wherein the docking station is further configured to wirelessly receive data of the at least one instrument effect being one of activated and deactivated from the portable computer.

6. The programmable pedalboard of claim 1 wherein the portable computer includes a plurality of first switches positioned thereon, each first switch being configured to one of activate and deactivate a musical tone associated with one of a plurality of banks

7. The programmable pedalboard of claim 1 wherein the portable computer includes an interface configured to enable a user to drag and drop any one or more of the plurality of instrument effects in any order thereof.

8. The programmable pedalboard of claim 1 wherein the portable computer includes an interface configured to enable a user to remove one or more musical instrument tracks from a song such that the user provides a first audio signal for the one or more removed musical instrument tracks with the musical instrument.

9. A programmable pedalboard for a guitar, the pedalboard comprising:

a docking station for receiving a removable portable computer that provides a plurality of guitar effects, the docking station being configured to:

receive an audio signal from a guitar; and

modify the audio signal from the guitar based on at least one guitar effect from the plurality of guitar effects;

wherein the docking station includes a plurality of first switches positioned thereon, each first switch being configured to one of activate and deactivate the at least one guitar effect from the plurality of guitar effects; and

wherein the docking station is further configured to wirelessly transmit data indicative of the at least one guitar effect being one of activated and deactivated to the removable portable computer.

10. The programmable pedalboard of claim 9 wherein the docking station further includes a plurality of second switches positioned thereon, each second switch being configured to one of activate and deactivate a guitar tone associated with one of a plurality of banks included on the portable computer.

11. The programmable pedalboard of claim 10 wherein the docking station is further configured to modify the audio signal from the guitar based on the guitar tone.

12. The programmable pedalboard of claim 9 wherein the docking station further includes a second switch for controlling a recording operation while a user plays the guitar, the first switch being arranged to one of start and stop the recording operation in response to an input from the user.

13. The programmable pedalboard of claim 9 wherein the portable computer includes a plurality of first switches positioned thereon, each first switch being configured to one of activate and deactivate the at least one guitar effect from the plurality of guitar effects.

14. The programmable pedalboard of claim 13 wherein the docking station is further configured to wirelessly receive data of the at least one guitar effect being one of activated and deactivated from the portable computer.

15. The programmable pedalboard of claim 9 wherein the portable computer includes a plurality of second switches positioned thereon, each second switch being configured to one of activate and deactivate a guitar tone associated with one of a plurality of banks

16. The programmable pedalboard of claim 9 wherein the portable computer includes an interface configured to enable a user to drag and drop any one or more of the plurality of guitar effects in any order thereof.

17. The programmable pedalboard of claim 9 wherein the portable computer includes an interface configured to enable a user to remove one or more guitar tracks from a song such that the user provides a first audio signal for the one or more removed guitar tracks with the guitar.

18. A programmable pedalboard for a musical instrument, the pedalboard comprising:

a docking station being arranged to receive a removable portable computer that provides a plurality of instrument effects, the docking station being configured to:

receive an audio signal from a musical instrument; and

modify the audio signal from the musical instrument based on at least one instrument effect from the plurality of instrument effects,

wherein the docking station further includes a first switch for controlling a recording operation while a user plays the musical instrument, the first switch being arranged to one of start and stop the recording operation in response to an input from the user.

19. A programmable apparatus for a guitar, the apparatus comprising:

a docking station being arranged to communicate with a portable computer that provides a plurality of guitar effects, the docking station being configured to:

receive an audio signal from a guitar; and

modify the audio signal from the guitar based on at least one guitar effect from the plurality of guitar effects;

wherein the docking station includes a plurality of first switches positioned thereon, each first switch being con-

figured to one of activate and deactivate the at least one guitar effect from the plurality of guitar effects; and

wherein the docking station is further configured to wirelessly transmit data indicative of the at least one guitar effect being one of activated and deactivated to the portable computer.

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