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Mechanical controller for a smartphone

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ABSTRACT

This disclosure describes a mechanically operated controller for a mobile device. The controller includes a grid of black and white squares whose pattern can be mechanically changed. Particular patterns are read by a mobile device, e.g., via its camera, and interpreted as different commands. The mechanical controller can be used as an interface between a mechanical device, e.g., a musical instrument, and the mobile device.

KEYWORDS

- mechanical controller
- input device
- smartphone
- electro-mechanical communication

BACKGROUND

In situations where a mobile device communicates with other devices, such communication typically takes place over electronic channels, e.g., Bluetooth, cable, WiFi, etc. However, there are devices that lack the capabilities needed to communicate electronically with a mobile device.

DESCRIPTION

This disclosure describes a mechanical controller that can transmit information between a mechanical device and a smartphone. The mechanical controller is made without electronic components and transmits information visually, e.g., to be read with the smartphone camera.

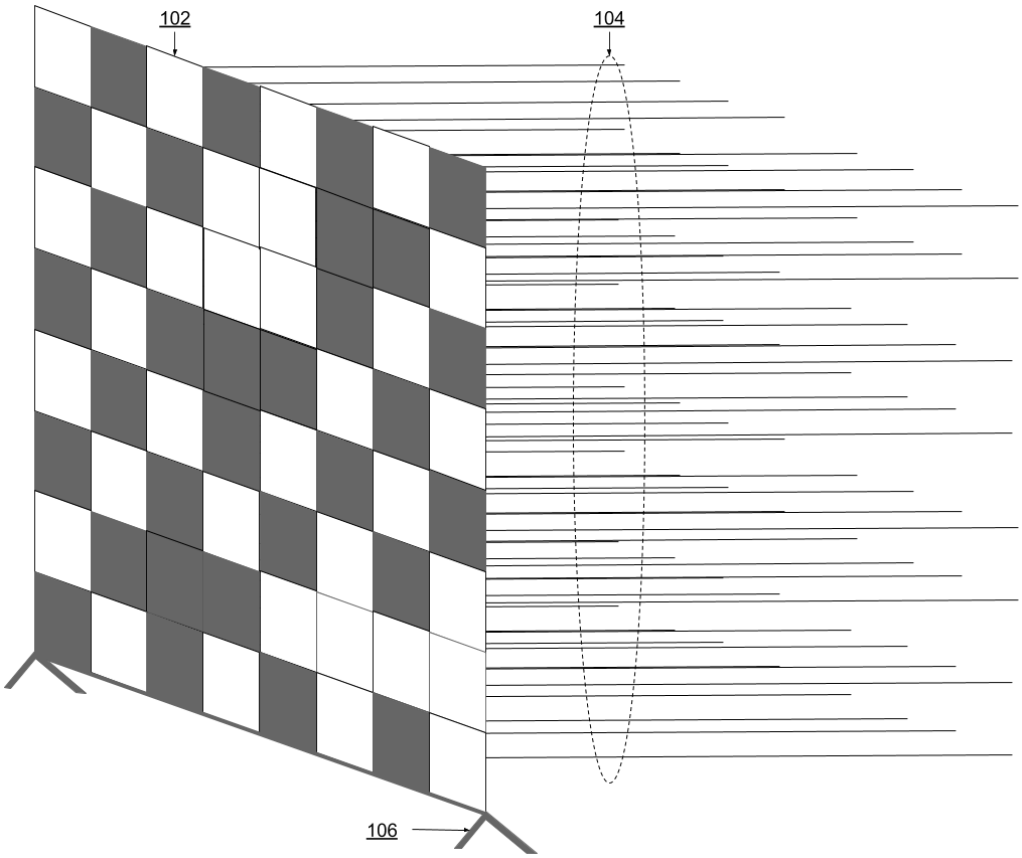

Fig. 1: A mechanical controller for a mobile device

Fig. 1 illustrates a mechanical controller for a mobile device, per techniques of this disclosure. The mechanical controller includes a grid of rotatable, or flippable, tiles (102). The two faces of each tile are of different colors, e.g., black and white. Each tile is controlled by a string (104) such that when the string is pulled, the corresponding tile flips. In an initial state, e.g., when strings are not pulled, the tiles have the white face facing outward. When a string is not pulled, the corresponding tile reverts to its initial state. The reversion mechanism can be based, e.g., on springs, elastic strings, magnets, etc.

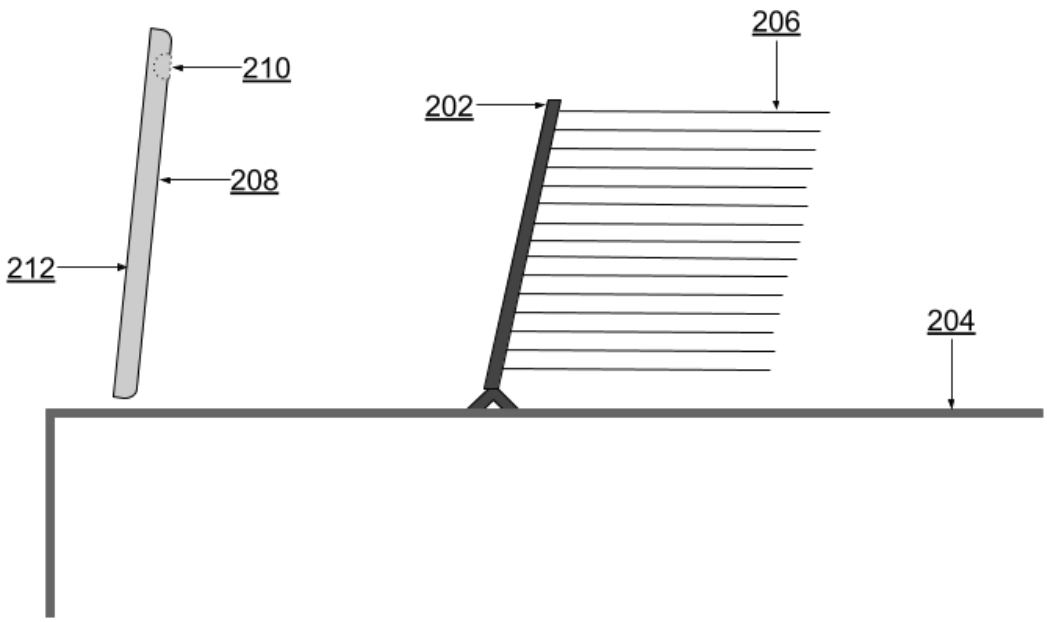

Fig. 2: Communication between the mechanical controller and a mobile device

Fig. 2 illustrates communication between the mechanical controller (202) and a mobile device (208). The controller is placed on a flat surface (204), and strings (206) are pulled so that a particular pattern is formed on its face. The mobile device reads the pattern using camera (210) and interprets the pattern as a command. The mobile device may optionally reflect the pattern on its screen (212). The mobile device may further optionally reflect the pattern in the form of an audio signal. An API (e.g., a visual recognition API) or app may be built for the purpose of capturing, analyzing, and interpreting the pattern of the mechanical controller.

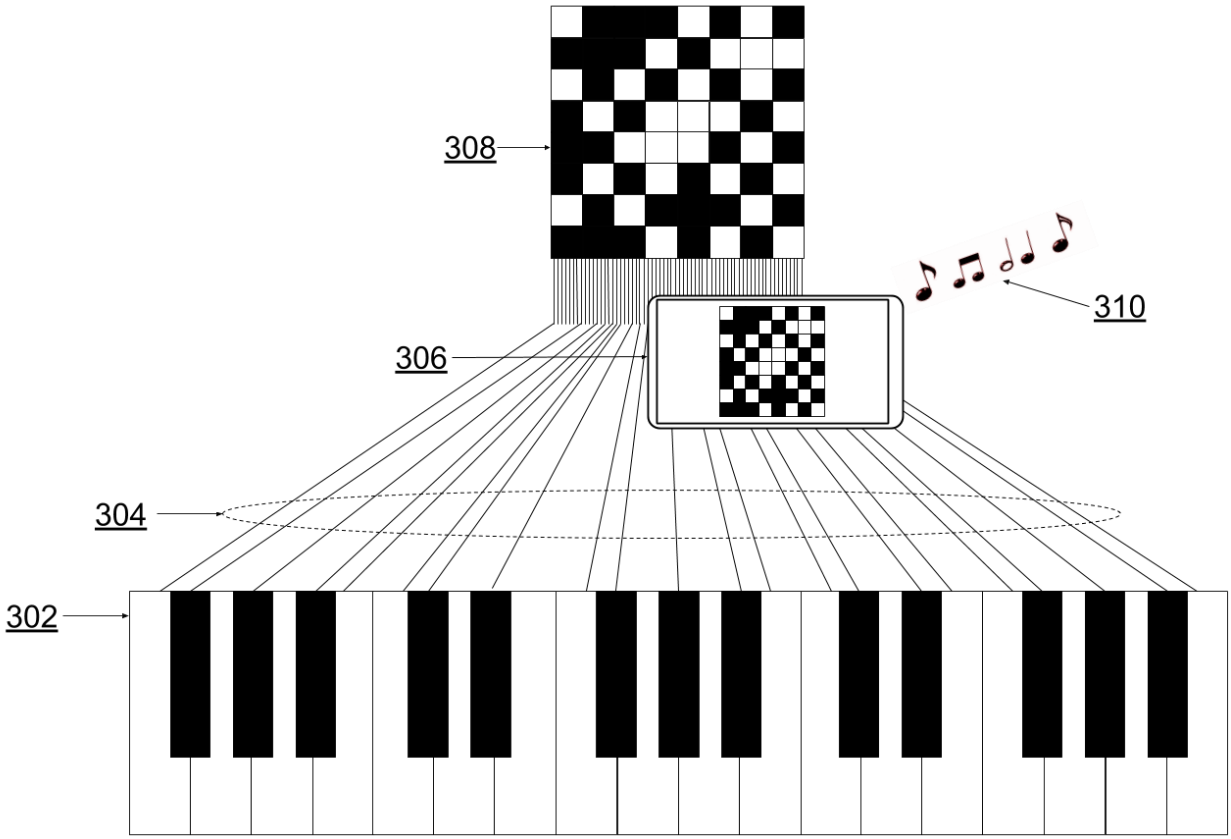

Fig. 3: An example communication between a mechanical device and the mobile device via the mechanical controller

Fig. 3 illustrates an example of communication between a mechanical device (302) and the mobile device (306) via the mechanical controller (308). In this example, the mechanical device is a mock piano, e.g., 3D-printed keys of a piano that does not natively produce sound. Other types of mechanical devices can be constructed with different materials, e.g., out of cardboard, plastic, etc.

The mechanical device is coupled to the strings (304) of the mechanical controller. As the keys of the mechanical device (mock piano, in this case) are struck, the grid pattern on the mechanical controller changes. The mobile device produces musical notes (310) based on the pattern it reads from the mechanical controller. The mobile device can optionally display on its

screen the state of the mechanical device. In the mock piano example, the mobile device can display the musical score or partition.

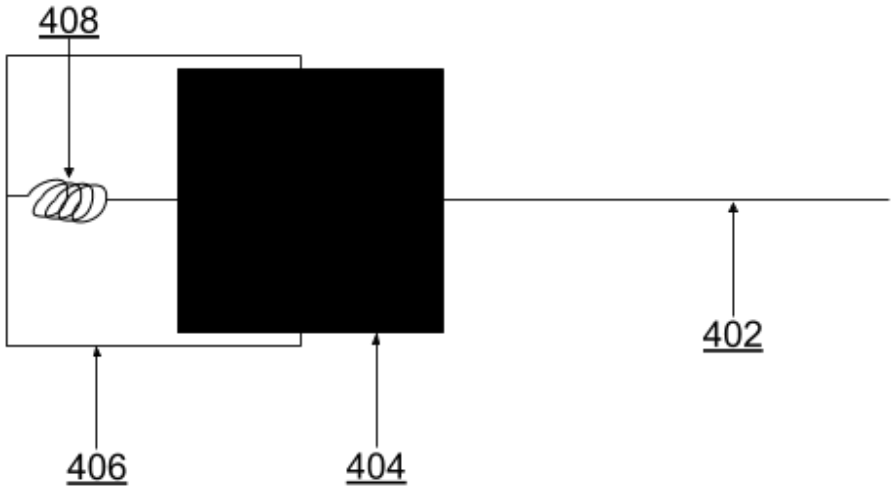

Fig. 4: An analog mechanical controller

Alternative to the binary, e.g., either fully black or fully white, tiles of Fig. 1, the mechanical controller can be analog, as illustrated in Fig. 4. In an analog mechanical controller, a black rectangular tile (404) is pulled by a string (402) to reveal in continuous increments a background white tile (406). The intensity of the pull is given by the ratio of the white area to the black area, which is sensed by the camera of the mobile device. A spring (408) reverts the tile to its initial state when the string is relaxed.

CONCLUSION

This disclosure describes a mechanically operated controller for a mobile device. The controller includes a grid of black and white squares whose pattern can be mechanically changed. Particular patterns are read by a mobile device, e.g., via its camera, and interpreted as different commands. The mechanical controller can be used as an interface between a mechanical device, e.g., a musical instrument, and the mobile device.