PHANTOM KEYBOARD PULL-OUT OPERATION FORCE PROFILE

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Phantom Keyboard Pull-out Operation Force Profile

Abstract: A technique is disclosed that uses "ramp" and "follower" features for a stowable keyboard to maintain a smooth industrial design of an electronic product, provide a quality feel to the user during keyboard positioning, and provide a high quality fit and finish.
This disclosure relates to the field of electronic devices.

A technique is disclosed that uses "ramp" and "follower" features for a stowable (or "phantom") keyboard to maintain a smooth industrial design, provide a quality feel to the user during keyboard positioning, and provide a high quality fit and finish.

Many electronic devices, such as for example digital sending multifunction printers MFP's and digital scanners, have (or have the option of having) a physical keyboard. The physical keyboard is to improve user data entry, relative to a soft keyboard that may be implemented on a display and control panel of a device.

In many such devices, it is advantageous to stow the keyboard within the device when it is not needed by the user, and then easily brought out when needed. It is also desirable, from an industrial design perspective, to omit a handle from the keyboard so as to give it a flush surface when stowed, and to have a smooth feel when retrieving the keyboard for use and when returning it for stowing (i.e. from open to close, and vise versa), without impeding the open and closing force profiles.

Damping of moving objects is desirable for good fit and finish. Proper damping provides a heavy (expensive) or silky, quality feel, throughout the whole range of motion. If a push-push latch is used for the keyboard, it requires low force / low damping to operate acceptably, and this sacrifices a quality feeling during operation.

According to the present disclosure, and as understood with reference to the Figure, a phantom handle-less keyboard 10 is stored within the product 20 in a stowage position 2. The keyboard 10 is popped open by pushing in on the keyboard 10, which releases a push-push latch. The keyboard 10 is ejected an acceptable distance for the user to grasp the keyboard. The ejection distance is optimized by having low frictional forces during the kick-out portion of the force profile. A ramp 40 of the product serves as a cam. The cam shape in region 42 is such that no interference (and hence no damping) is applied to a spring-loaded follower 30 during the push-push operation to eject the keyboard.

Once the user grasps the keyboard 10, the user experiences an increase in the positional force. In intermediate position 4, the spring-loaded follower 30 tracks a profile of the cam, ramp 40. The cam shape in region 44 is such that interference and damping are added while moving the keyboard 10 towards the operational position 6.

Near the operational position 6, the cam shape in region 46 is flat (no changing of the force), such that the user experiences a constant damped pull force. The conclusion of the cam shape allows the follower to drop into a pocket 48 for tactile and audible feedback of the operational position. Due to the flat profile in region 46 prior to the pocket 46, it automatically drops into the operational position 6, and is retained there during keyboard use.
Returning the keyboard for stowage is an analogous process. The keyboard 10 is effectively stopped in the operational position 6 until the user chooses to return the keyboard 10 to the stowage position 6. The user has a quality feel, due to the same force profile when returning, and has lowest force again when activating the push-push latch.

The disclosed technique advantageous combines three desired features: no visible keyboard handle, push-push latch requirements of a low positioning force, and a higher positioning force during slide-in or slide-out which provides good damping.

*Disclosed by Steven M. Frane, Cameron Hutchings, Alan Williamson, and Clinton Troy Jensen, HP Inc.*