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Tool for installing and removing dual in-line memory modules

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ABSTRACT

Installing or removing dual in-line memory modules (DIMMs) from their sockets is conventionally done with bare or gloved hands. People who do this regularly, e.g., workers at a factory assembly line, maintenance personnel at a data center, etc., can experience cuts or soft tissue compression on their fingers. These occur when a worker presses down repeatedly on a PCB or while they unlatch the DIMM. This disclosure presents a hand tool to safely install or unlatch DIMMs.

KEYWORDS

dual in-line memory module (DIMM); PCB socket; unlatching DIMMs; occupational safety' ergonomics; 3D printing; fused deposition modeling (FDM)

BACKGROUND

Installing or removing dual in-line memory modules (DIMMs) from their sockets is conventionally done with bare or gloved hands. People who do this regularly, e.g. workers at a factory assembly line, maintenance personnel at a data center, etc., can experience cuts or soft tissue compression on their fingers. These occur when a worker presses down repeatedly on a PCB, or while they unlatch the DIMM.

DESCRIPTION

This disclosure describes a simple hand tool to safely and ergonomically install or unlatch DIMMs or other PCBs. The tool accomplishes two actions within one tool, e.g., it is a multi-tool, to simplify the operation for the user. The tool is designed to reduce or eliminate soft tissue compression and skin-to-PCB contact.

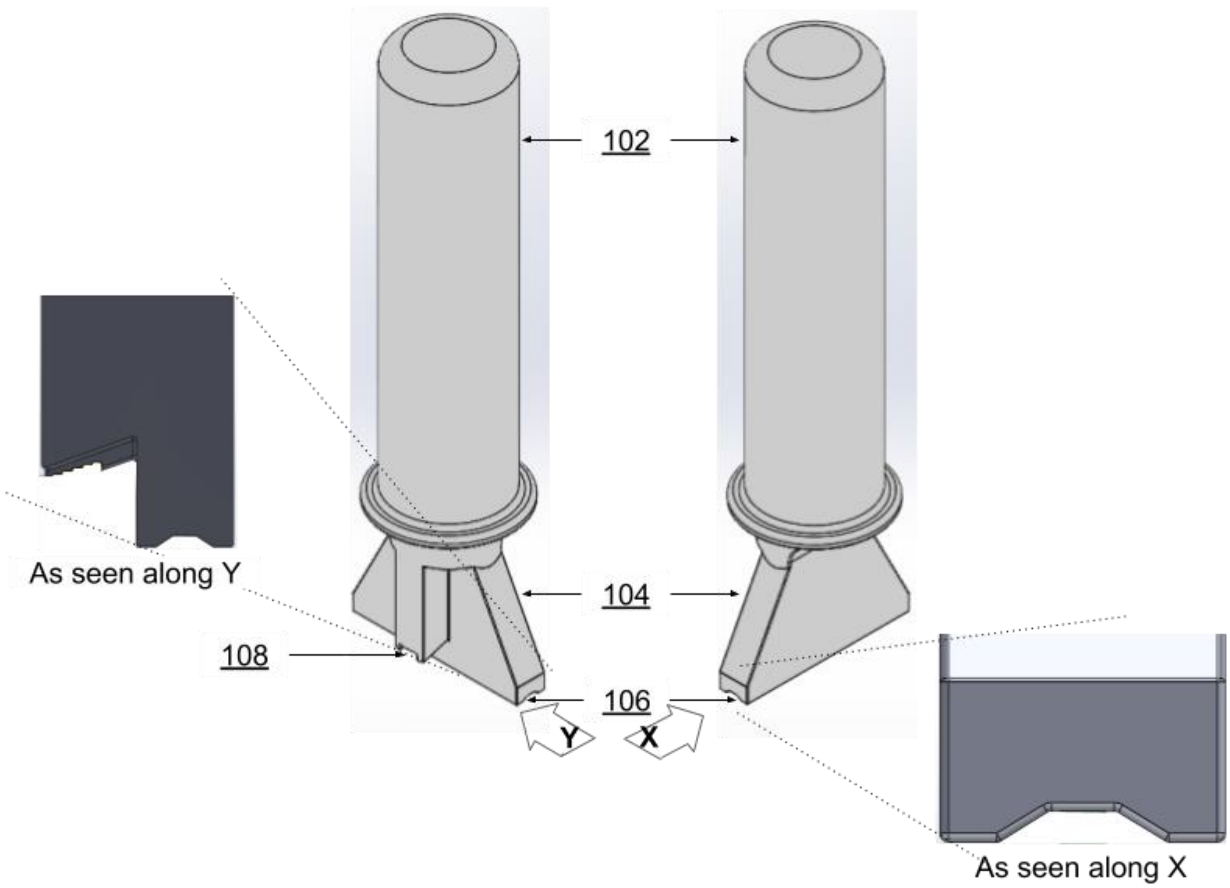

Fig. 1: Views of the tool

Fig. 1 illustrates views of an example of the tool, per techniques of this disclosure. The tool comprises a hand grip (102), a head (104), and a DIMM-delatcher (108). The lower edge of the head, which is at the end of the tool opposite to the hand grip, has a groove feature (106).

The hand grip (or handle) is designed for ergonomic holding by the human hand, with a suitable diameter. For slip-free handling, it can be wrapped with a padding or a fabric grip, e.g., a tennis replacement grip.

The handgrip is coupled to the head, which has width thin enough to sufficiently clear closely-spaced electronics componentry that the tool may come in contact with. At the top, the head is nearly of the same length as the diameter of the hand grip, while at the bottom is as long as needed to supply effective pressure to install a DIMM. Similar to webbing, the head supports and provides strength to the DIMM-delatcher element.

The lower edge of the head, which is at the end of the tool opposite to the handle, has a groove feature. The groove feature enables distributed pressure to be applied on the sensitive DIMM-to-socket connection. This feature of the tool is for seating or inserting DIMMs into the socket. The groove of the head can be tapered, as shown in the “seen along X” part of Fig. 1. The lower edge of the head that seats the groove is thin enough to meet the spacing typically found between DIMMs on PCBs, and wide enough to distribute pressure evenly along the PCB during the DIMM-insertion process.

One edge of the head is flush, while the other edge is coupled to the DIMM-delatcher. The DIMM-delatcher is similar to a short tip, and comprises a sloped, grooved surface with dimensions slightly greater than the dimensions of a typical DIMM latch. The DIMM-delatcher is designed to unlatch socket latches during the removal of the DIMM. The groove on the DIMM-delatcher helps the user align the tool to the DIMM latch and prevent it from slipping. For additional grip, the DIMM-delatcher surface may be serrated.

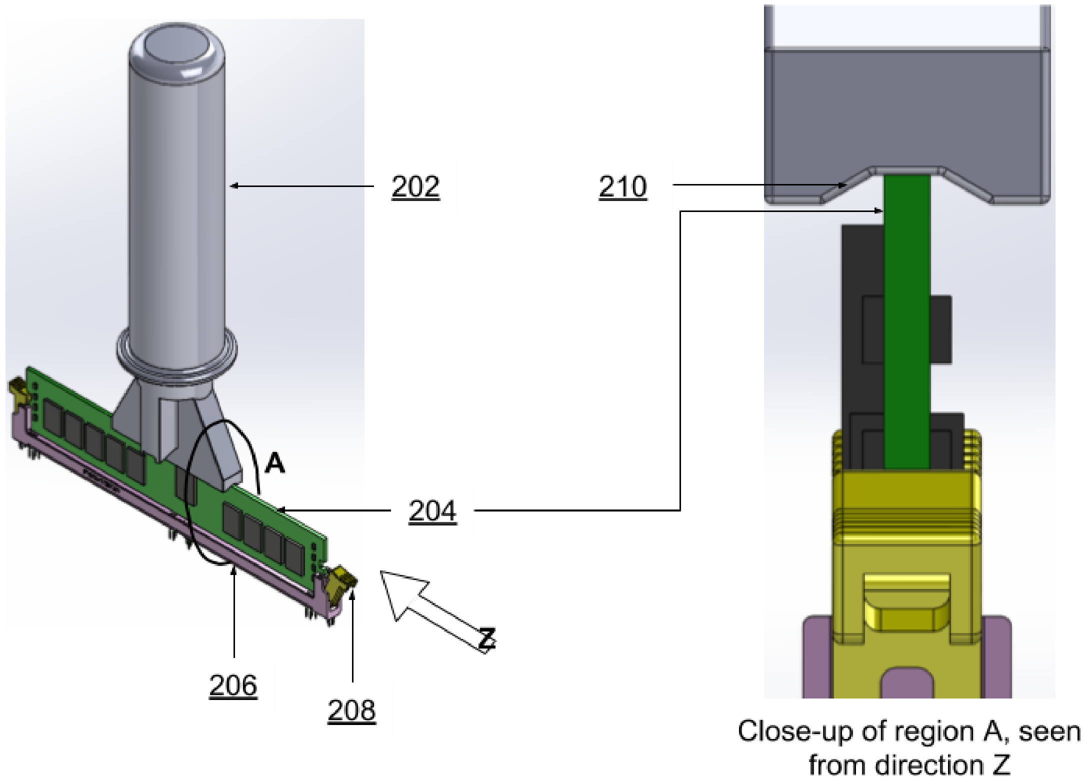

Fig. 2: Inserting a DIMM using the tool

Fig. 2 illustrates inserting a DIMM using the tool, per techniques of this disclosure. The tool (202) is used to press against a DIMM (204) to insert the DIMM into its socket (206). The latches (208) of the socket are unlocked such that the DIMM slides in. A close-up of the point of contact of the tool with the DIMM (region A) is shown as seen from direction Z. It is seen that the groove (210) presses against the DIMM to drive it into the socket.

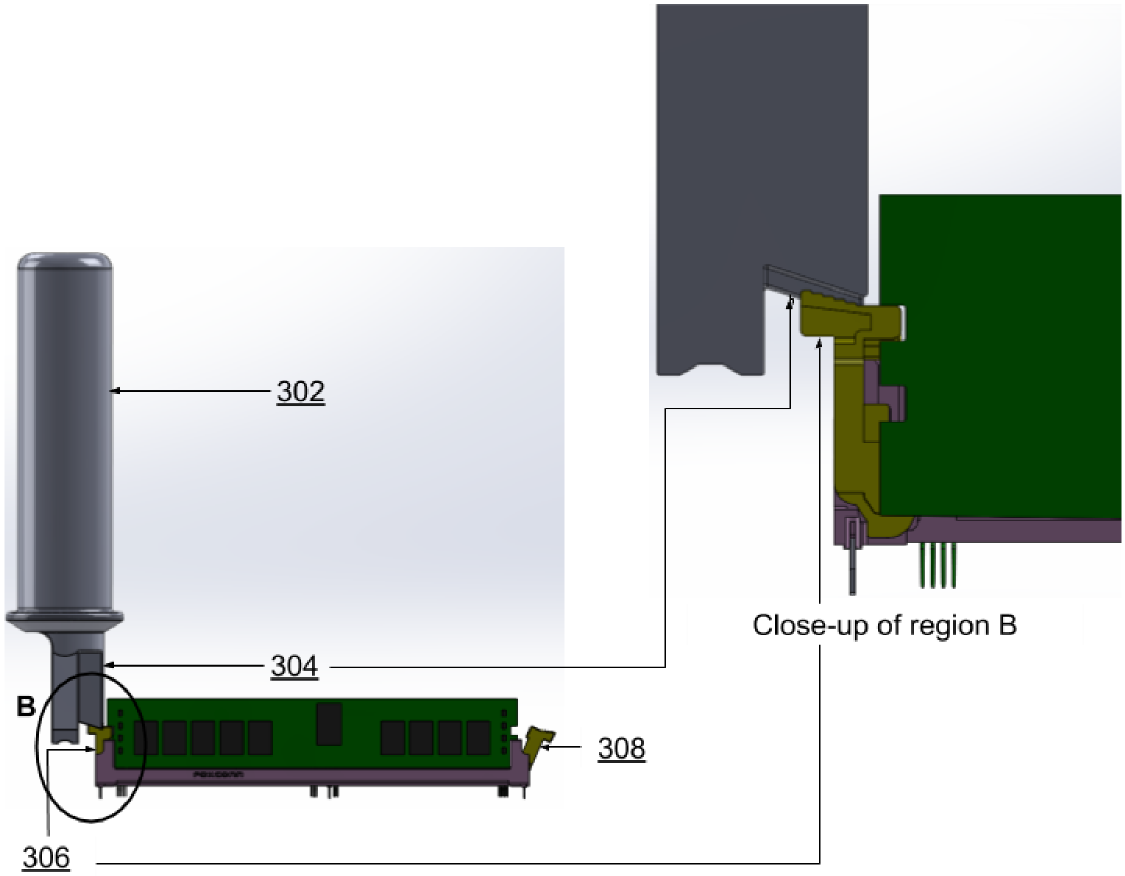

Fig. 3: Unlatching a DIMM using the tool

Fig. 3 illustrates unlatching a DIMM using the tool, per techniques of this disclosure. The DIMM-delatcher element (304) of tool (302) is used to press against locked latch (306). The pressure causes the unlatching of the latch; an unlocked latch is as shown in element 308.

The dimensions of the tool and its components, e.g., head, groove, DIMM-delatcher element, etc., are chosen such that the tool is able to unlatch even densely packed DIMMs without clearance problems. However, if there isn't sufficient physical clearance, the edge of the wide, grooved feature can be used to unlatch as well.

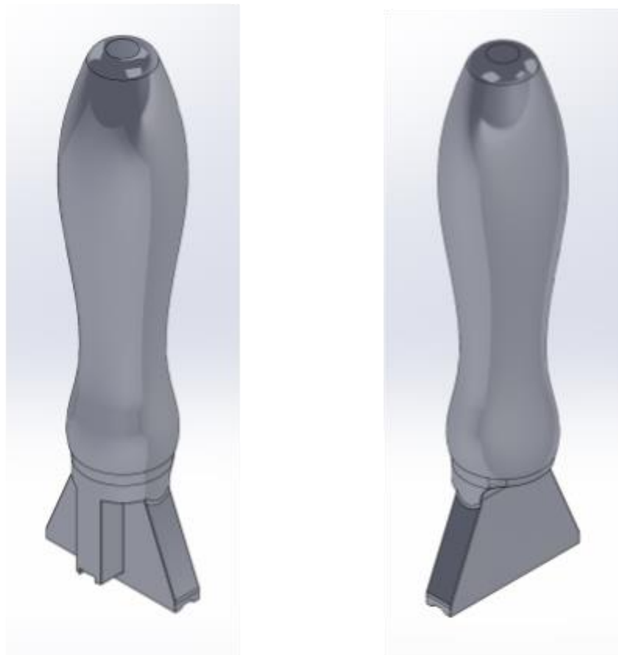

Fig. 4: Variations in design of the tool

Fig. 4 illustrates variations of the tool to accomplish certain design goals; in this case, a handle grip that is contoured to the human hand. The contoured handle shown in Fig. 5 enables users to exert a power grip and minimize slip without the use of an add-on grip, e.g., a wrap-on tennis replacement grip. The handle in cylindrical or contoured shape allows for the use of large muscle groups (e.g., back, arms) vs. using just fingers for a more ergonomic operation. Further, contouring the handle can allow for a more secure grip without an add-on grip.

In a similar manner, dimensions, tapers, serrations, contours, textures, chamfers, angles, groove-widths, etc. of the components of the tool can be modified to achieve other design goals, e.g., to better fit DIMMs or DIMM-latches of various widths; to apply greater or lesser pressure on the DIMM or DIMM-latch; to achieve better clearances; to match a new DIMM-socket (or surrounding hardware) layout; etc. Further, modifications like adding high-friction, cushioning, or other elastomeric materials (either after manufacturing, or along with the 3D printing process) can be used to enhance the operation.

The tool can be made of different materials, e.g., wood, plastic, PVC, etc. For example, the tool can be manufactured easily with 3D printing using, e.g., fused deposition modeling (FDM), which is an affordable way to easily distribute the final product to end users, especially at low volumes. Manufacturing via 3D printing also enables quick modifications to be made to the tool, for example, to match new layouts of DIMM-socket and surrounding hardware. Alternately, the tool can be manufactured using injection molding or machined design. For most materials listed above, the tool is non-toxic (clean) and ESD compliant.

CONCLUSION

This disclosure describes a simple hand tool to safely and ergonomically install or unlatch DIMMs or other PCBs. The tool is designed to reduce or eliminate soft tissue compression, finger cuts, and skin-to-PCB contact.