

# (19) United States

## (12) Patent Application Publication (10) Pub. No.: US 2024/0224432 A1 Desalvo et al.

Jul. 4, 2024 (43) **Pub. Date:** 

#### (54) SINGLE STEP ELECTROLYTIC METHOD OF FILLING THROUGH-HOLES IN PRINTED CIRCUIT BOARDS AND OTHER **SUBSTRATES**

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(21) Appl. No.: 18/289,075

(22) PCT Filed: May 10, 2022

(86) PCT No.: PCT/US2022/028462

§ 371 (c)(1),

(2) Date: Oct. 31, 2023

### Related U.S. Application Data

Provisional application No. 63/189,640, filed on May 17, 2021.

#### **Publication Classification**

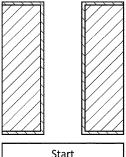
(51) Int. Cl. H05K 3/42 (2006.01)C25D 3/38 (2006.01)C25D 5/18 (2006.01)C25D 7/00 (2006.01) H05K 1/11 (2006.01)

(52) U.S. Cl.

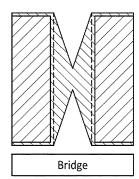
CPC ...... H05K 3/424 (2013.01); C25D 3/38 (2013.01); C25D 5/18 (2013.01); C25D 7/00 (2013.01); *H05K 1/115* (2013.01); *H05K* 2201/09563 (2013.01); H05K 2203/0723 (2013.01)

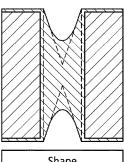
#### (57)ABSTRACT

A method of copper electroplating in the manufacture of printed circuit boards. The method is used for filling through-holes and micro-vias with copper. The method includes the steps of: (1) preparing an electronic substrate to receive copper electroplating thereon; (2) forming at least one of one or more through-holes and/or one or more micro-vias in the electronic substrate; and (3) electroplating copper in the at least one or more through-holes and/or one or more blind micro-vias by contacting the electronic substrate with an acid copper electrolyte. The acid copper electrolyte is used to plate the one or more through-holes and/or the one or more blind micro-vias. A first pulse reverse plating waveform sequence is used to create a copper bridge in the center of the through-holes followed by direct plating until metallization is complete.

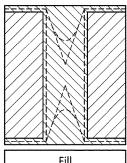








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