

Title (en)  
PUNCHING DEVICE FOR THIN PLATE-SHAPED WORKPIECES

Publication  
**EP 0013327 B1 19830216 (DE)**

Application  
**EP 79104719 A 19791127**

Priority  
US 97457878 A 19781229

Abstract (en)  
[origin: US4209129A] In a high density solenoid operated multiple punch apparatus, having a punch head provided with the plurality of closely-spaced large bores arranged in column and rows that extend partially through the punch head from the top side, solenoid elements mounted in the large bores, a plurality of holes with a diameter smaller than the large bores aligned with the large bores and extending the remaining distance through the punch head to the bottom side, push rod elements slidably disposed in the holes actuated by the solenoid elements, the improvement being A cooling system for the punch head which includes a plurality of small bores arranged in rows in the bottom of the punch head terminating short of the top surface and positioned in the area between the plurality of large bores, a plurality of elongated grooves in the bottom surface of the head located between rows of the plurality of holes and forming a recessed chamber connecting a row of the small bores, a plate seated in each of the elongated grooves with each plate separating the associated groove into a first manifold chamber located between the plate and the bottom of the groove and a second manifold chamber on the opposite side of the plate, tubes disposed in and extending through each of the plates with each tube concentrically located in one of the small bores, and openings to introduce liquid in one of the manifold chambers and remove liquid from the other manifold chamber.

IPC 1-7  
**B26F 1/24**; **B21D 37/16**

IPC 8 full level  
**B26D 5/08** (2006.01); **B26D 7/00** (2006.01); **B26F 1/24** (2006.01); **B28B 11/12** (2006.01); **B28D 5/04** (2006.01); **H05K 3/00** (2006.01)

CPC (source: EP US)  
**B26D 5/08** (2013.01 - EP US); **B26D 5/086** (2013.01 - EP US); **B26D 7/00** (2013.01 - EP US); **B26F 1/24** (2013.01 - EP US); **B28D 5/04** (2013.01 - EP US); **B26F 2210/08** (2013.01 - EP US); **Y10T 83/293** (2015.04 - EP US)

Cited by  
EP0456393A1

Designated contracting state (EPC)  
DE FR GB

DOCDB simple family (publication)  
**EP 0013327 A1 19800723**; **EP 0013327 B1 19830216**; CA 1107152 A 19810818; DE 2964862 D1 19830324; IT 1165431 B 19870422; IT 7928127 A0 19791218; JP S5591617 A 19800711; JP S5733717 B2 19820719; US 4209129 A 19800624

DOCDB simple family (application)  
**EP 79104719 A 19791127**; CA 338176 A 19791023; DE 2964862 T 19791127; IT 2812779 A 19791218; JP 12692879 A 19791003; US 97457878 A 19781229