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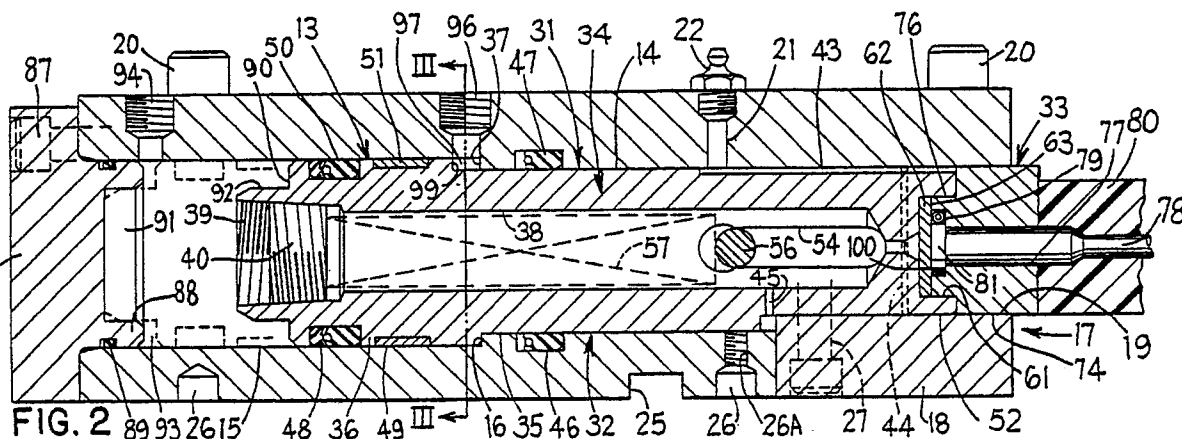
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54 **Fluid-pressure operated punch.**

57 A fluid-pressure operated punching apparatus (10) includes an elongated substantially cylindrical punch support assembly (31) slidably disposed for reciprocatory, lengthwise sliding movement in a cylindrical opening (13) in a body (11). The punch support assembly (31) has a piston head (36) at the rearward end thereof and a piston rod (35) extending lengthwise forwardly from the piston head (34). A punch retainer (33) is mounted on the forward end of

the piston rod (35) and carries a punch (78). Annular sealing means (50) are provided on the piston head for sealingly engaging the internal surface defining the cylindrical opening (13) of the elongated body. A fluid pressure supply port (94) is formed in the body (11) for supplying pressure fluid to move the punch support (31) assembly toward the forward end of the body (11).

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# EUROPEAN SEARCH REPORT

Application Number

EP 89 30 7512

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                     |                                                                               |                                                                                                                                                                                                                                                                                       |                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Category                                                                                                                                                                                                                | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim                                                                                                                                                                                                                                                                     | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| D,A                                                                                                                                                                                                                     | US-A-4 471 680 (GERHARDT)<br>* claims 1-4; figure 2 *<br>---                  | 1,2                                                                                                                                                                                                                                                                                   | B 21 D 28/00                                  |
| X                                                                                                                                                                                                                       | GB-A-1 091 586 (DI-DRO)<br>* claim 1; figure 1 *<br>---                       | 1-5                                                                                                                                                                                                                                                                                   |                                               |
| A                                                                                                                                                                                                                       | FR-A- 822 223 (MID-WEST PROD. ENGIN.)<br>* figure 3 *<br>---                  | 1                                                                                                                                                                                                                                                                                     |                                               |
| A                                                                                                                                                                                                                       | GB-A-1 594 258 (DOBSON)<br>* claims 1-3; figure 1 *<br>-----                  | 1                                                                                                                                                                                                                                                                                     |                                               |
| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                               |                                                                                                                                                                                                                                                                                       | TECHNICAL FIELDS SEARCHED (Int. Cl.5)         |
|                                                                                                                                                                                                                         |                                                                               |                                                                                                                                                                                                                                                                                       | B 21 D                                        |
| Place of search<br>BERLIN                                                                                                                                                                                               |                                                                               | Date of completion of the search<br>30-07-1990                                                                                                                                                                                                                                        | Examiner<br>SCHLAITZ J                        |
| <b>CATEGORY OF CITED DOCUMENTS</b>                                                                                                                                                                                      |                                                                               |                                                                                                                                                                                                                                                                                       |                                               |
| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                               | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                               |