



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 136 155 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
06.02.2002 Bulletin 2002/06

(51) Int Cl.7: **B21J 15/50, B21J 15/02**

(43) Date of publication A2:
26.09.2001 Bulletin 2001/39

(21) Application number: **01302304.9**

(22) Date of filing: **13.03.2001**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Opper, Reinhold**
35418 Alten-Buseck (DE)
• **Mauer, Dieter**
35457 Lollar (DE)

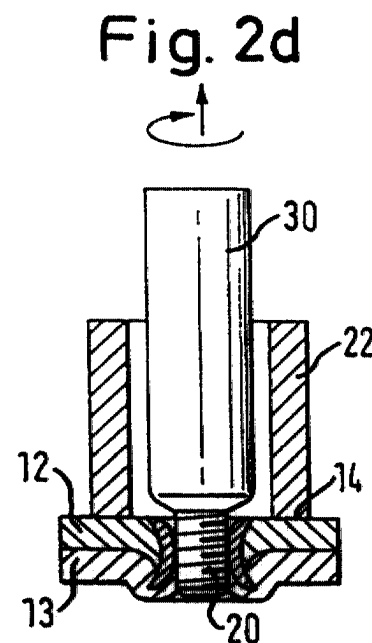
(30) Priority: **16.03.2000 DE 10012845**

(74) Representative: **Harries, Simon George et al**
**Black & Decker Patent Department 210 Bath
Road**
Slough, Berkshire SL1 3YD (GB)

(71) Applicant: **EMHART INC.**
Newark, Delaware 19711 (US)

(54) **Process and device for removing punch rivets from a workpiece**

(57) The invention relates to a process and a device for removing punch rivets (23) set in a workpiece (12,13), which are tubular and axisymmetric in design. Upon setting of the punch rivet (23) a punched-out piece (21) remaining therein is removed by a tool (18) and thereafter a threaded mandrel (20) is screwed into the punch rivet (23) with simultaneous formation of a substantially continuous distinctive thread. Upon its subsequent withdrawal counter to the pressure of an abutment (22) resting on the workpiece (12,13) the threaded mandrel (20) withdraws the punch rivet (23) from the workpiece (12,13).



EP 1 136 155 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 2304

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.7)
A,P	DE 200 10 941 U (THIELE HARTMUT) 28 September 2000 (2000-09-28) * page 4, paragraph 2; figure 2 *	1,4	B21J15/50 B21J15/02
A,D	EP 0 885 672 A (EMHART INC) 23 December 1998 (1998-12-23) * claims 1,10; figures 3-5 *	1,4	
A	US 5 722 144 A (BORA VIOREL) 3 March 1998 (1998-03-03) * column 2, line 59 - column 3, line 3 * * column 3, line 28-45; figures 1,2,7 *	1,4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B21J B23P B25B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		13 December 2001	Marc Augé
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1603 03/02 (P/04/001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 2304

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-12-2001

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 20010941	U	28-09-2000	DE 20010941 U1	28-09-2000
EP 0885672	A	23-12-1998	DE 19726104 A1	24-12-1998
			EP 1114683 A2	11-07-2001
			EP 0885672 A2	23-12-1998
			JP 11090853 A	06-04-1999
			JP 2001293535 A	23-10-2001
			US 6108890 A	29-08-2000
US 5722144	A	03-03-1998	DE 4320068 C1	15-12-1994
			DE 59401092 D1	02-01-1997
			WO 9500269 A1	05-01-1995
			EP 0702607 A1	27-03-1996
			ES 2097055 T3	16-03-1997
			JP 9500059 T	07-01-1997