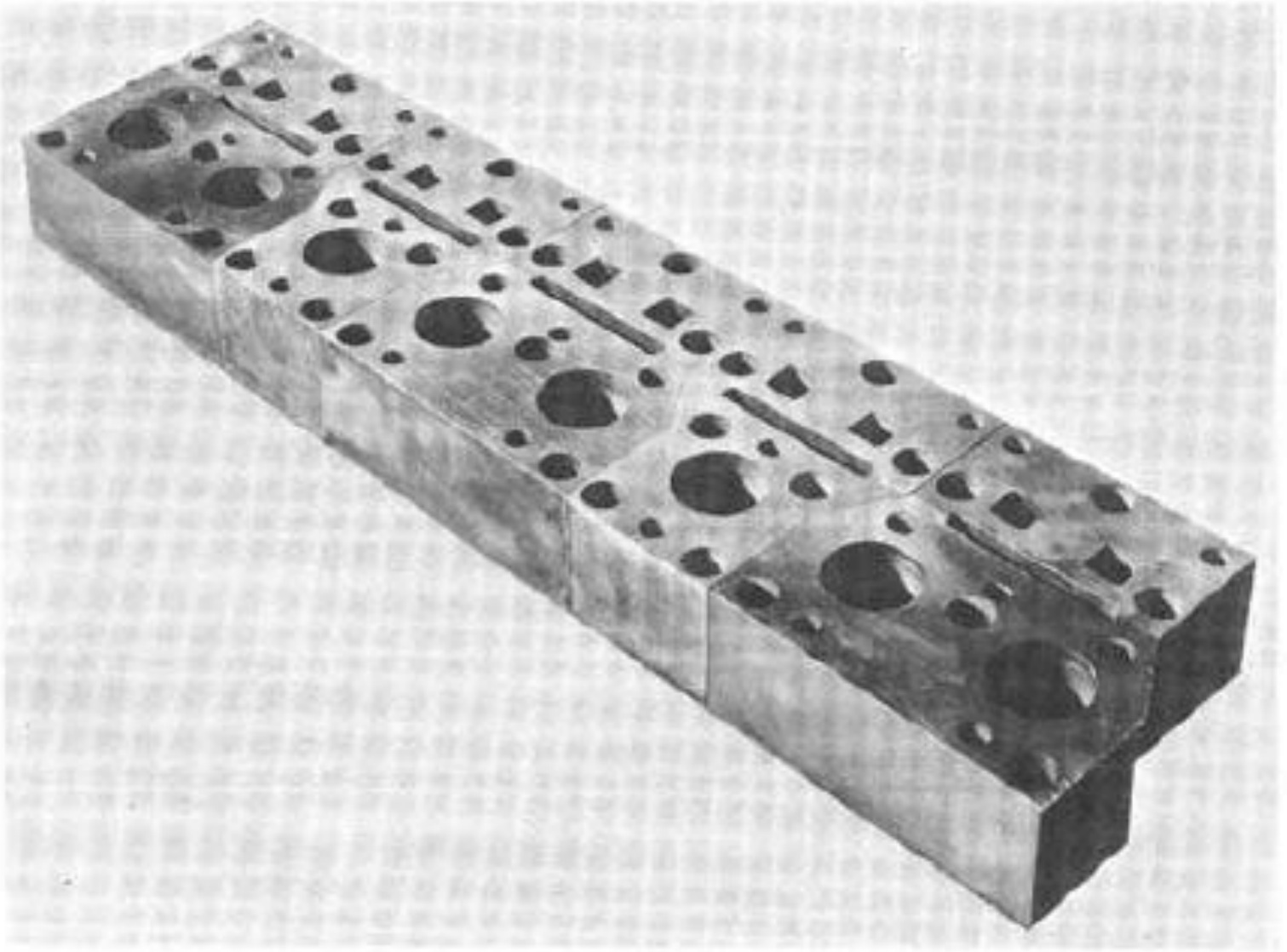
قالب های برش
گام به گام طراحی و ساخت

فصل هفتم: روش طراحی ماتریس

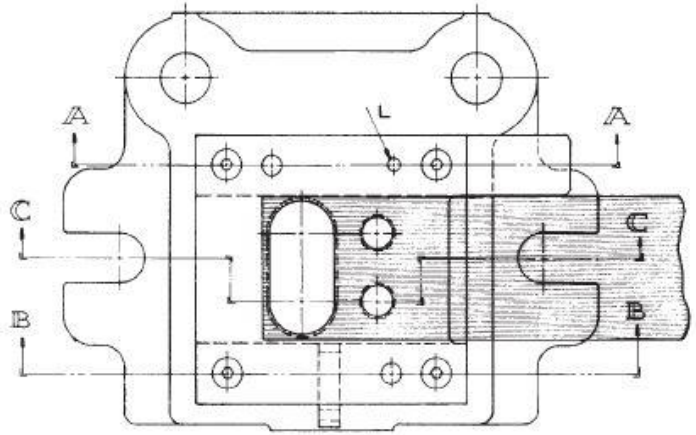
ویرایش اول

زمستان ۹۳

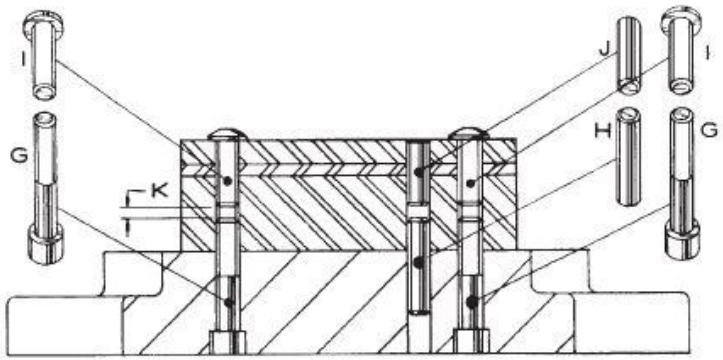


Courtesy of Bethlehem Steel Co.

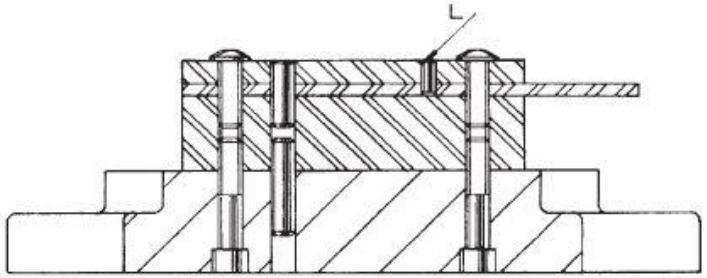
Figure 7.1 Die block for a large piercing die.



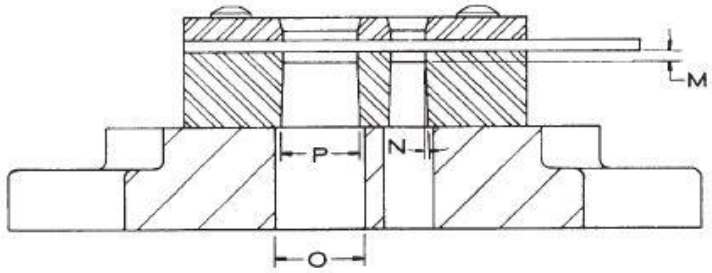
A Complete Die Member



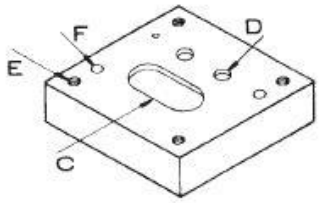
SECTION IB - IB



SECTION A - A



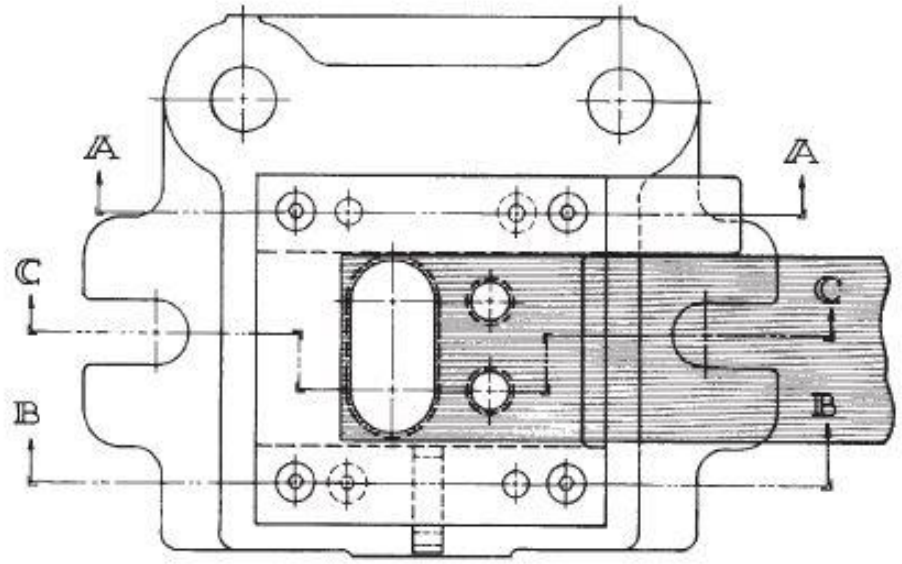
SECTION C - C

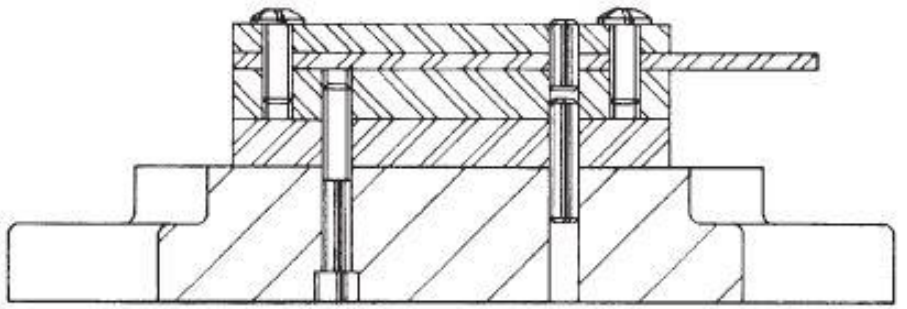


Die Block

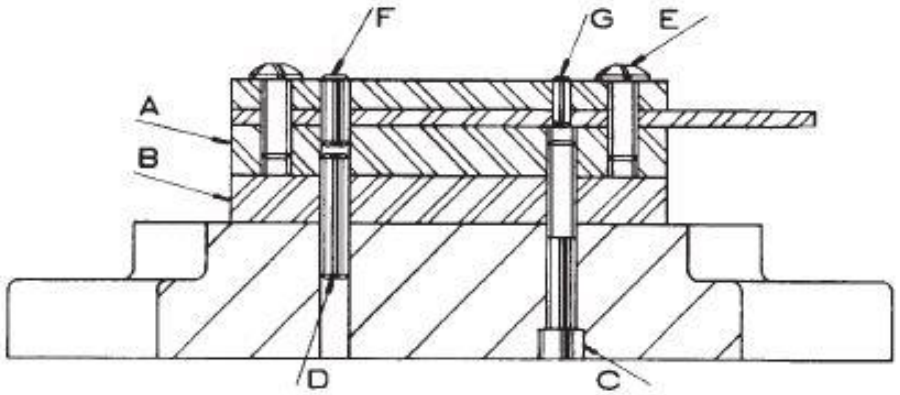
STRIP THICKNESS	ANGULAR RELIEF N
0 to 1/16	1/4°
1/16 to 3/16	1/2°
3/16 to 5/16	3/4°
Over 5/16	1°

Figure 7.2 Method of applying a die block to a die.

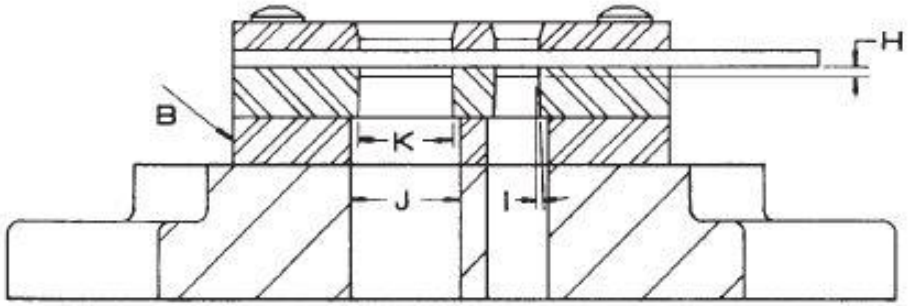




SECTION B-B

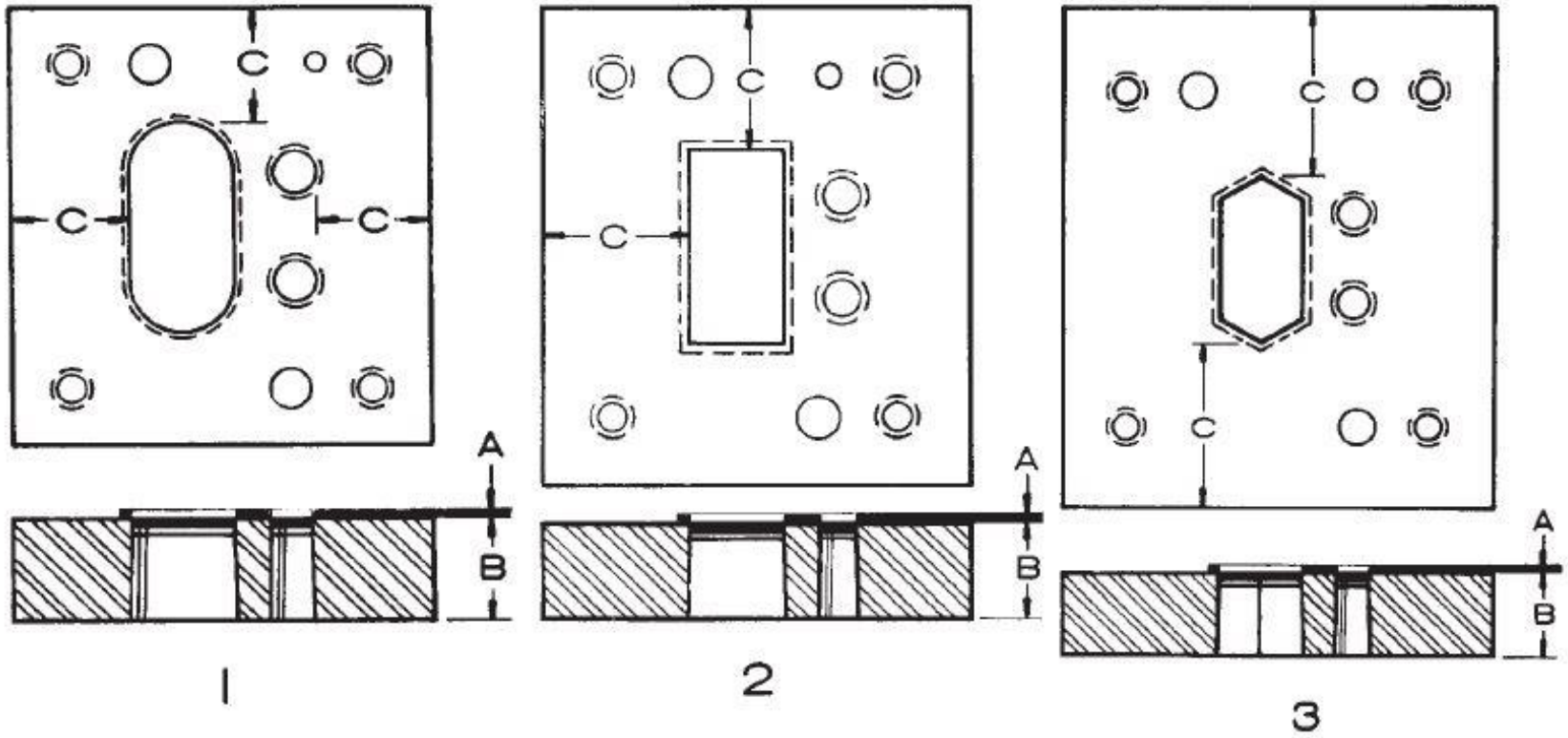


SECTION A-A



SECTION C-C

Figure 7.3 Alternate method of applying a die block to a die.



A	B	C		
		MINIMUM DISTANCE - DIE HOLE TO OUTSIDE EDGE		
STRIP THICKNESS	DIE BLOCK HEIGHT	1 SMOOTH DIE HOLE CONTOUR (1 1/8 B)	2 INSIDE CORNERS (1 1/2 B)	3 SHARP INSIDE CORNERS (2 B)
0 to 1/16	15/16	1.0547	1.4062	1.875
1/16 to 1/8	1 1/8	1.2656	1.6875	2.250
1/8 to 3/16	1 3/8	1.5469	2.0625	2.750
3/16 to 1/4	1 5/8	1.8281	2.4375	3.250
over 1/4	1 7/8	2.1094	2.8125	3.750

Figure 7.4 Recommended minimum **C** distances for various die hole contours and die block heights **B**.

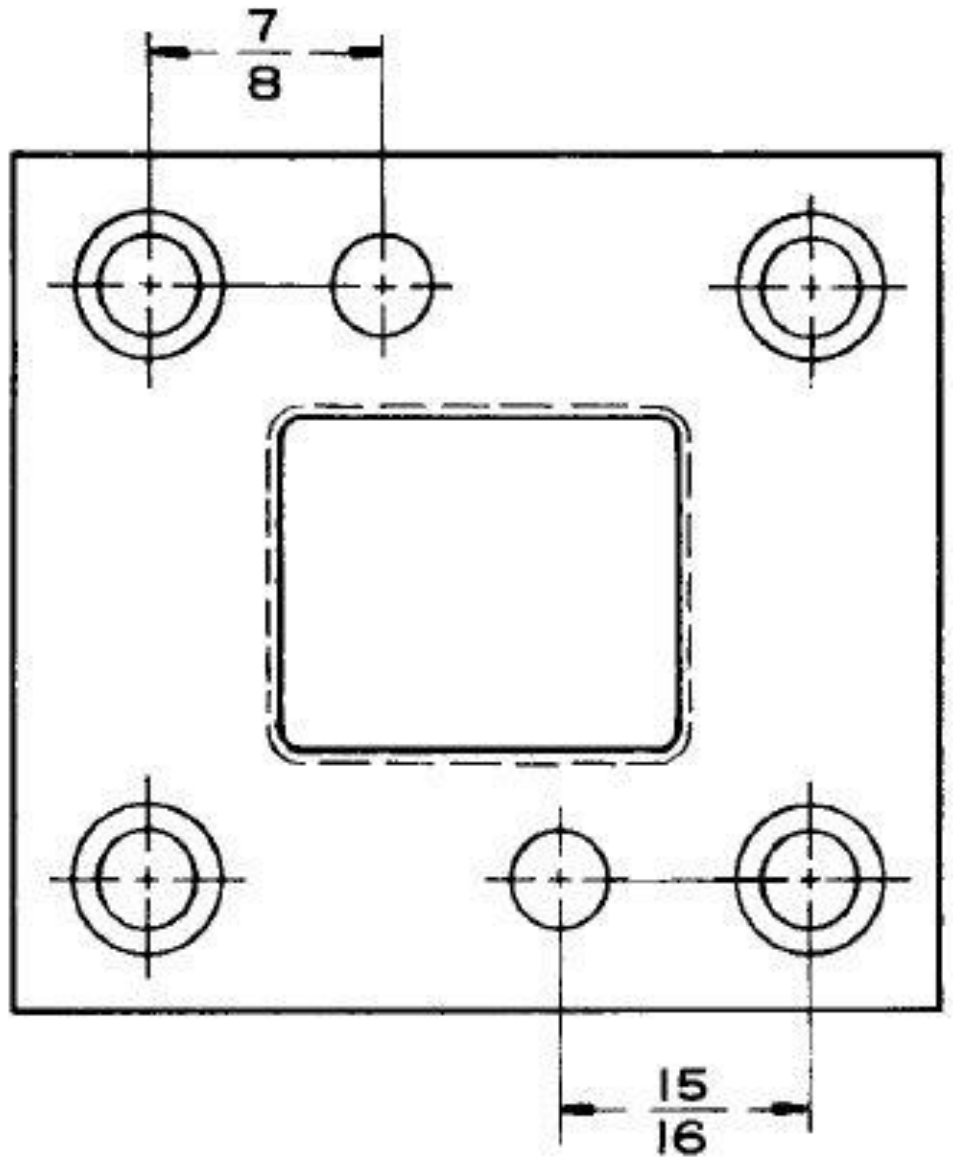
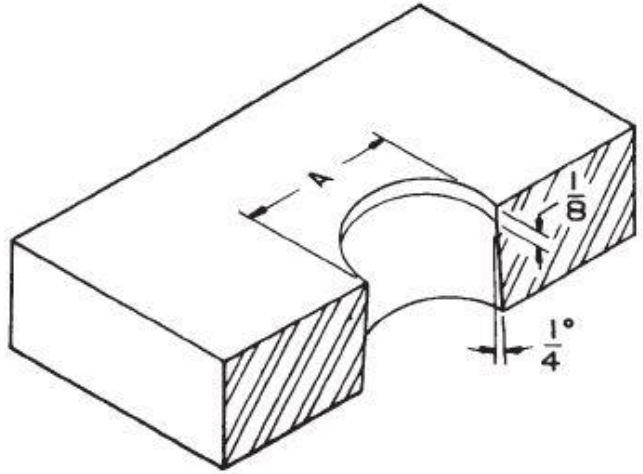
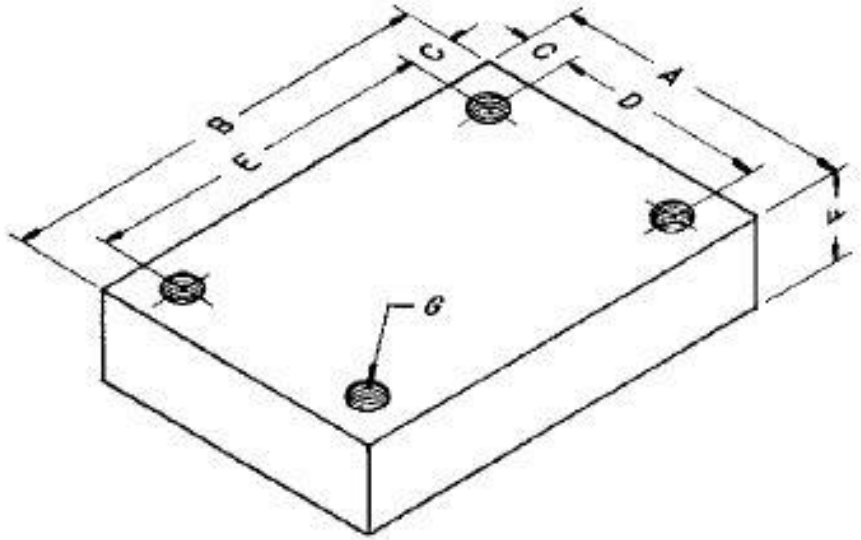


Figure 7.5 Mismatching of fastener holes called "fool-proofing."



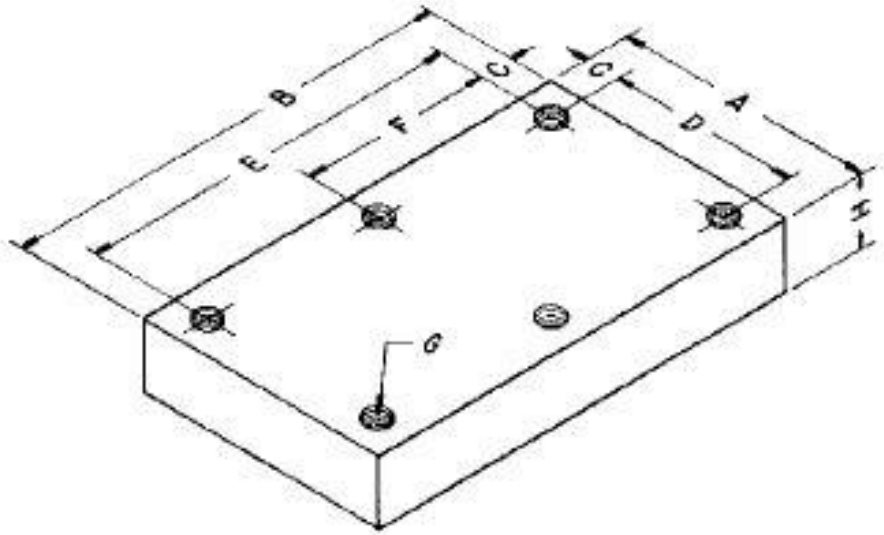
Removed from face of die in sharpening	Blank opening A will increase by this amount
0.005	0.000043
0.010	0.000087
0.015	0.000130
0.020	0.000174
0.025	0.000218
0.030	0.000261
0.035	0.000305
0.040	0.000348
0.045	0.000392
0.050	0.000436
0.055	0.000479
0.060	0.000523
0.065	0.000566
0.070	0.000610
0.075	0.000654
0.080	0.000697
0.085	0.000741
0.090	0.000784
0.095	0.000828
0.100	0.000872
0.105	0.000915
0.110	0.000959
0.115	0.001002
0.120	0.001046
0.125	0.001090

Figure 7.6 Table for determining hole size when a die is sharpened past the straight land.



A	B	C	D	E	F	G
3	3 1/2	5/8	1 3/4	2 1/4	15/16	#I (.272) Drill, 5/16-24 Tap Thru
3	5	5/8	1 3/4	3 3/4	15/16	#I (.272) Drill, 5/16-24 Tap Thru
4	4	5/8	2 3/4	2 3/4	15/16	#I (.272) Drill, 5/16-24 Tap Thru
4	5	5/8	2 3/4	3 3/4	15/16	#I (.272) Drill, 5/16-24 Tap Thru
4	6	5/8	2 3/4	4 3/4	15/16	#Q (.332) Drill, 3/8-24 Tap Thru
5	5	3/4	3 1/2	3 1/2	15/16	#Q (.332) Drill, 3/8-24 Tap Thru
5	6	3/4	3 1/2	4 1/2	15/16	#Q (.332) Drill, 3/8-24 Tap Thru

Figure 7.7 Tabulation of suggested standard die block sizes.



A	B	C	D	E	F	G	H
4	7	3/4	2 1/2	5 1/2	2 3/4	#Q (.332) Drill, 3/8-24 Tap Thru	1 1/8
4	8	3/4	2 1/2	6 1/2	3 1/4	#Q (.332) Drill, 3/8-24 Tap Thru	1 1/8
5	8	3/4	3 1/2	6 1/2	3 1/4	#Q (.332) Drill, 3/8-24 Tap Thru	1 1/8
5	10	3/4	3 1/2	8 1/2	4 1/4	#Q (.332) Drill, 3/8-24 Tap Thru	1 1/8
6	8	3/4	4 1/2	6 1/2	3 1/4	#Q (.332) Drill, 3/8-24 Tap Thru	1 1/8
6	10	3/4	4 1/2	8 1/2	4 1/4	#Q (.332) Drill, 3/8-24 Tap Thru	1 1/8
7	11	3/4	5 1/2	9 1/2	4 3/4	#Q (.332) Drill, 3/8-24 Tap Thru	1 1/8

Figure 7.8 Tabulation of suggested standard medium-size die block sizes.

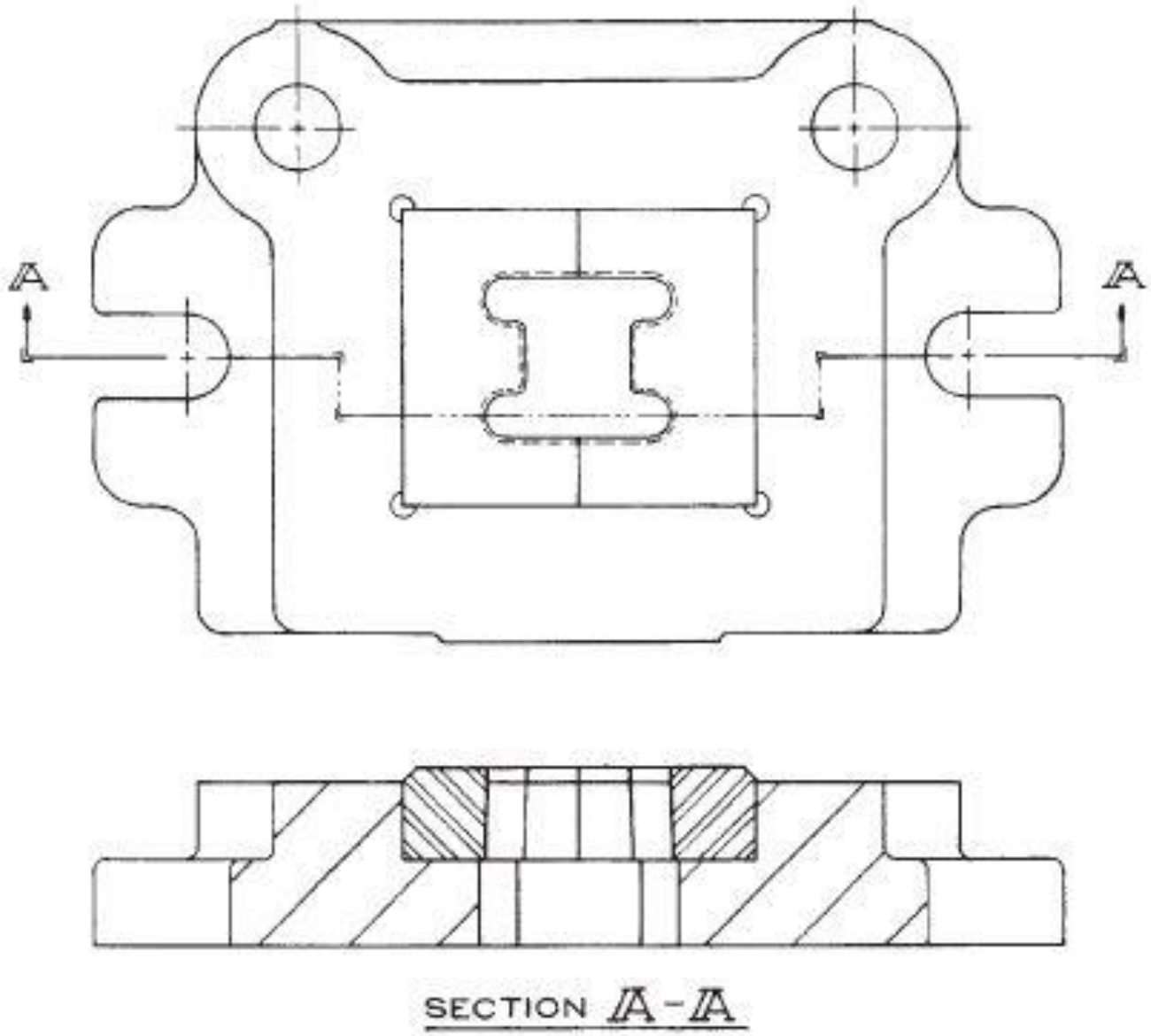


Figure 7.9 This die block is split for easier machining.

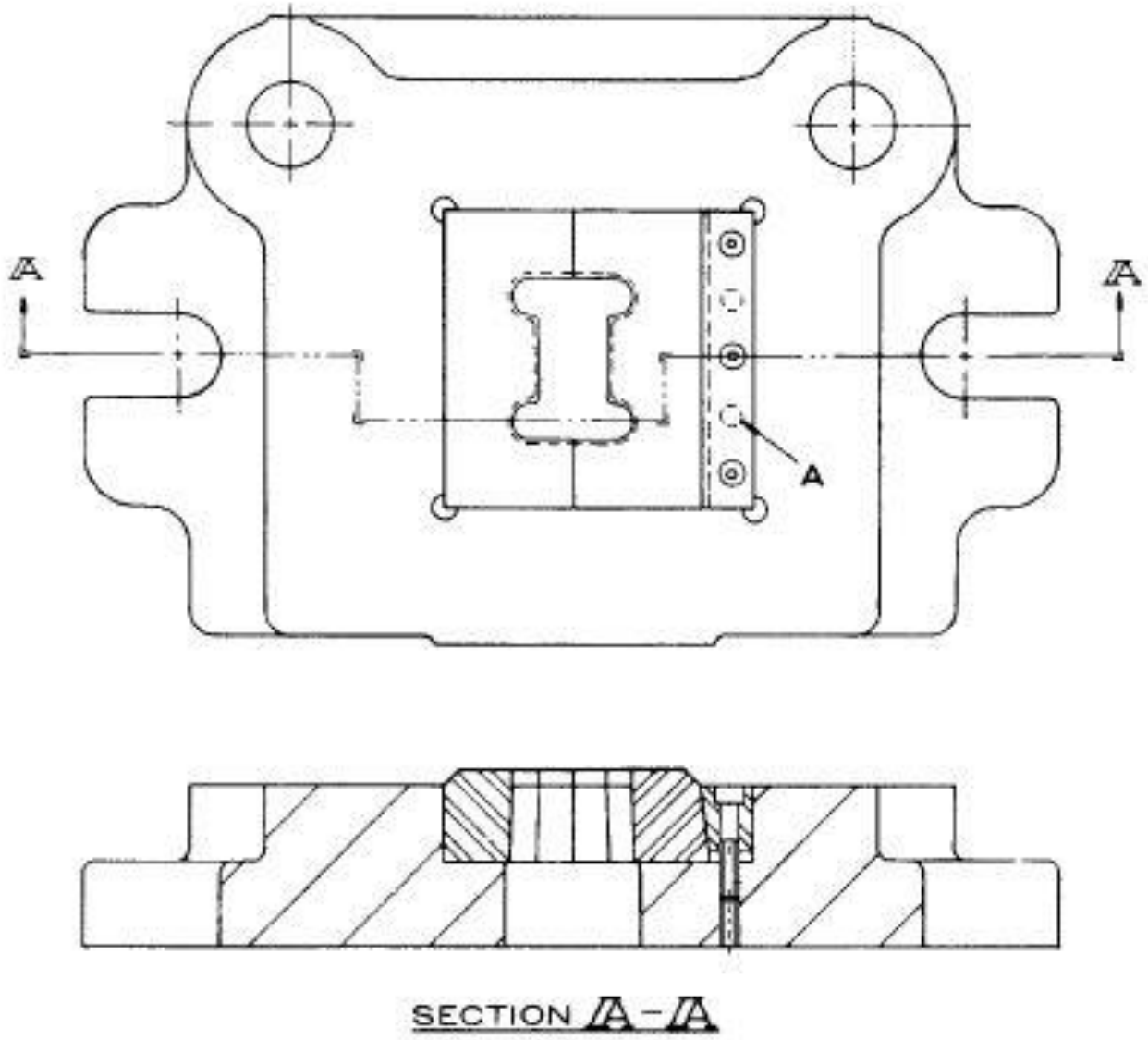


Figure 7.10 The split die block is held in place by a tapered wedge.

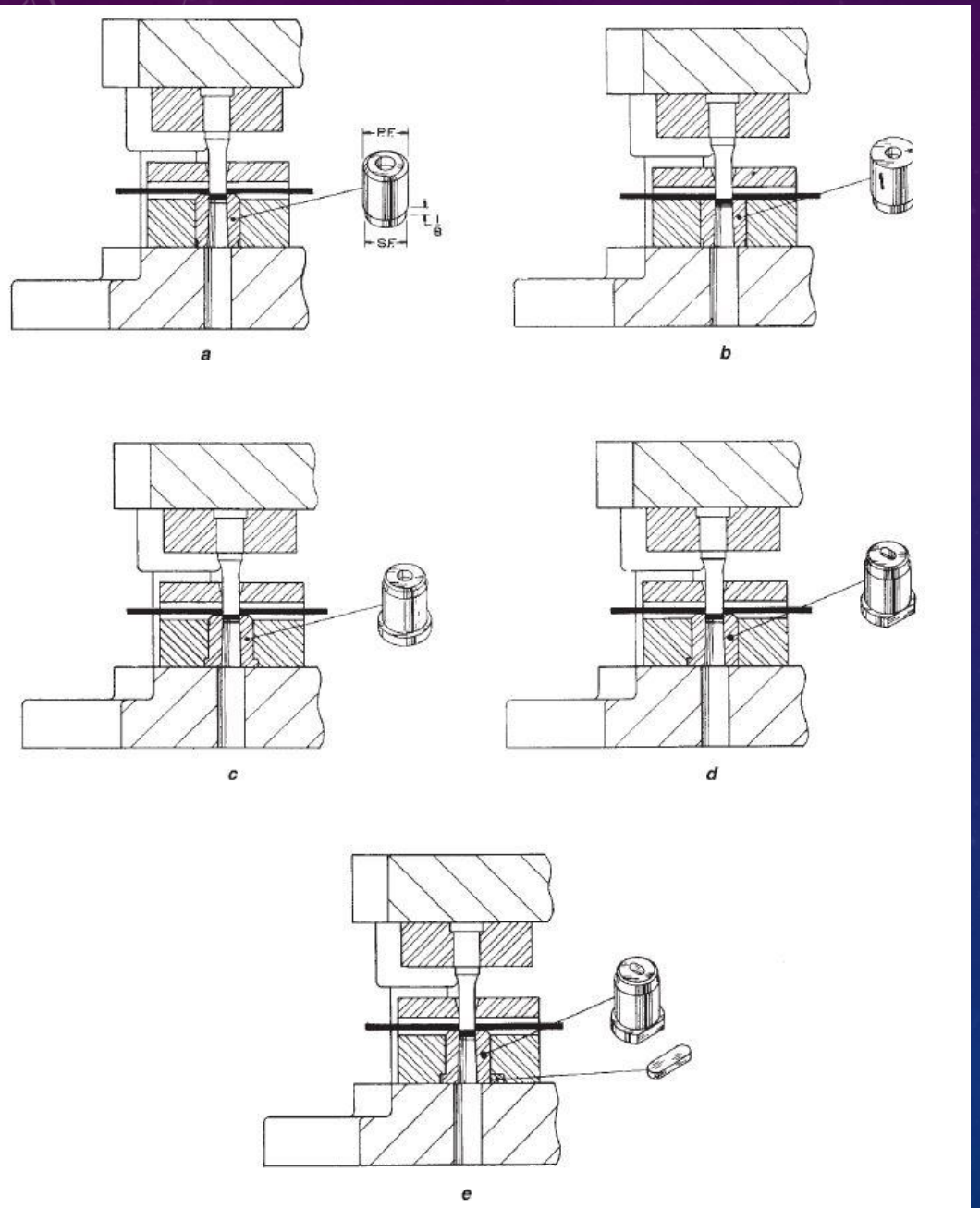


Figure 7.11 Several versions of hardened die bushings used for piercing.

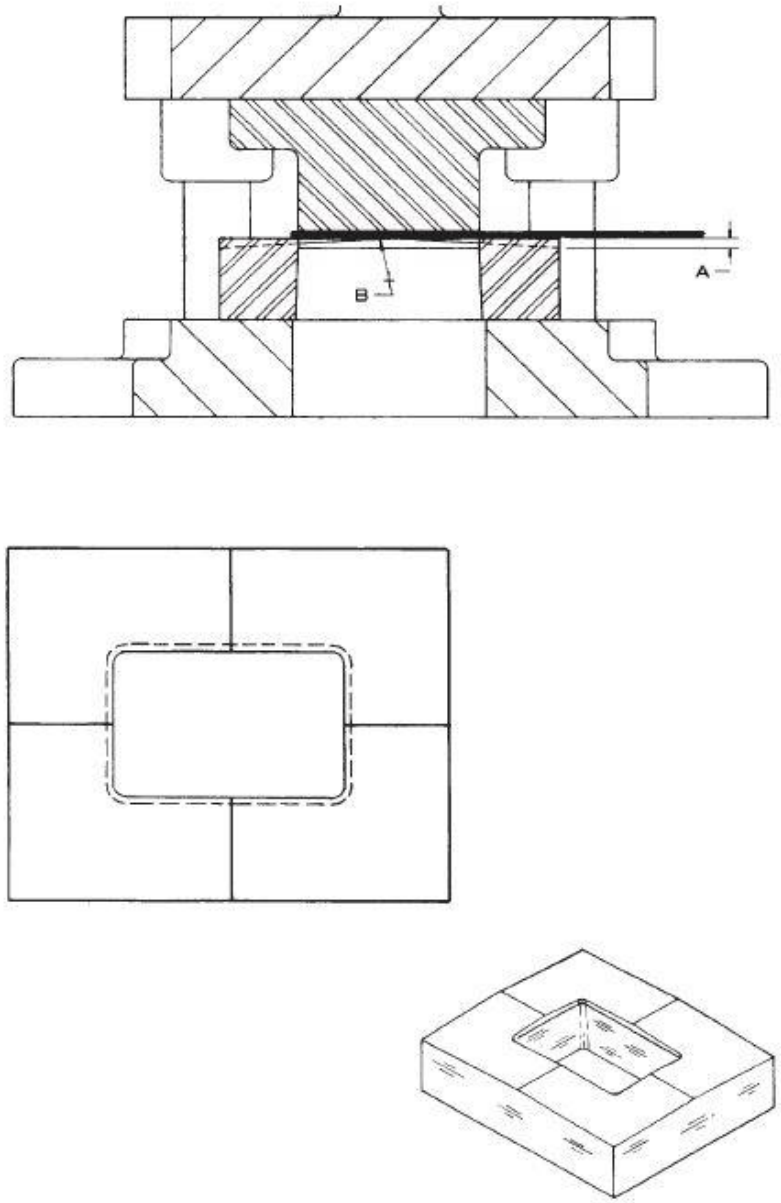


Figure 7.12 Die block configuration for employing shear in producing large blanks.

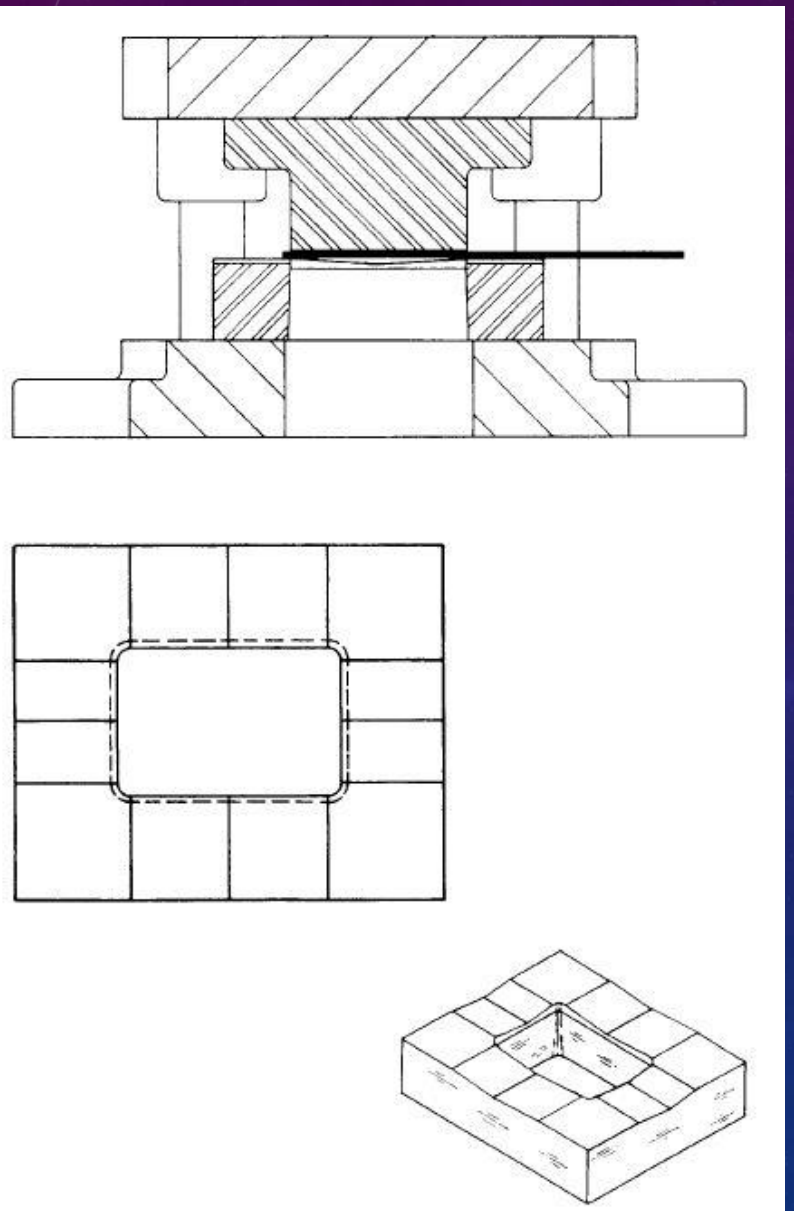


Figure 7.13 Alternate die block configuration for employing shear in producing large blanks.

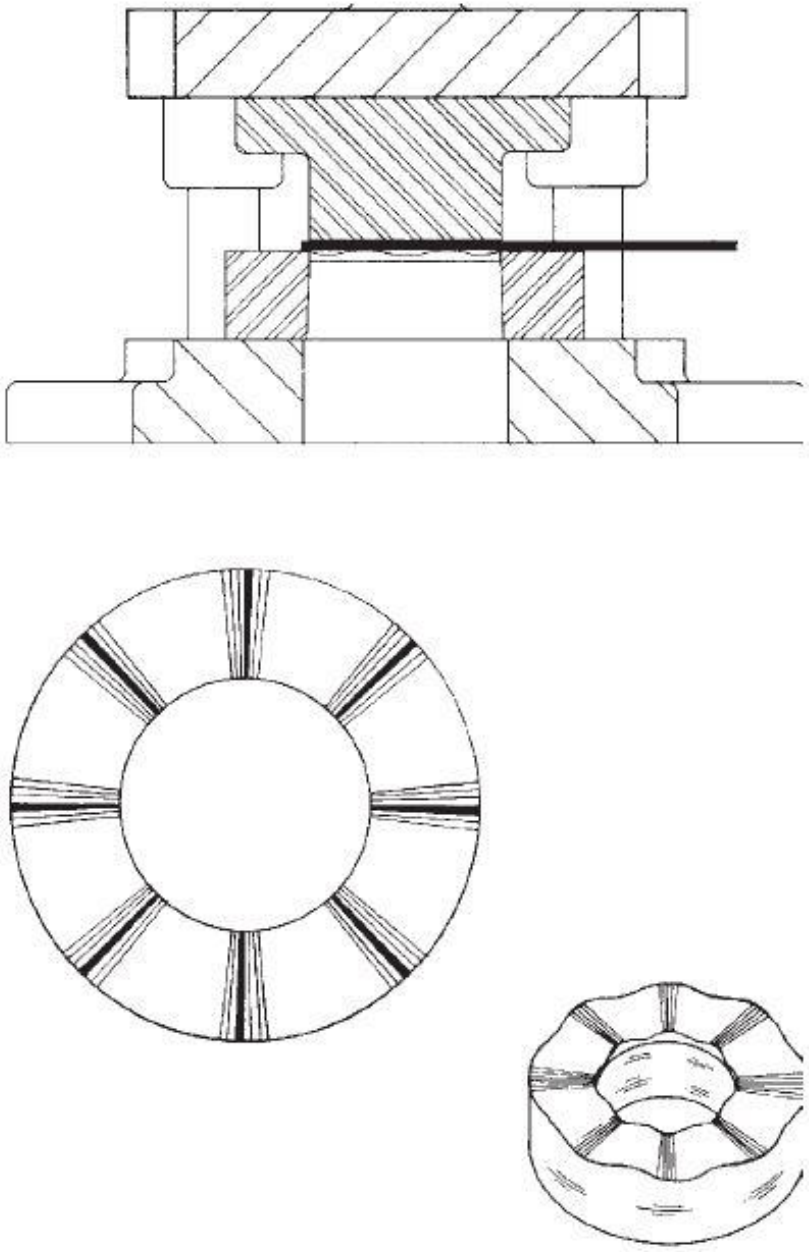


Figure 7.14 Scalloped round die block for employing shear.

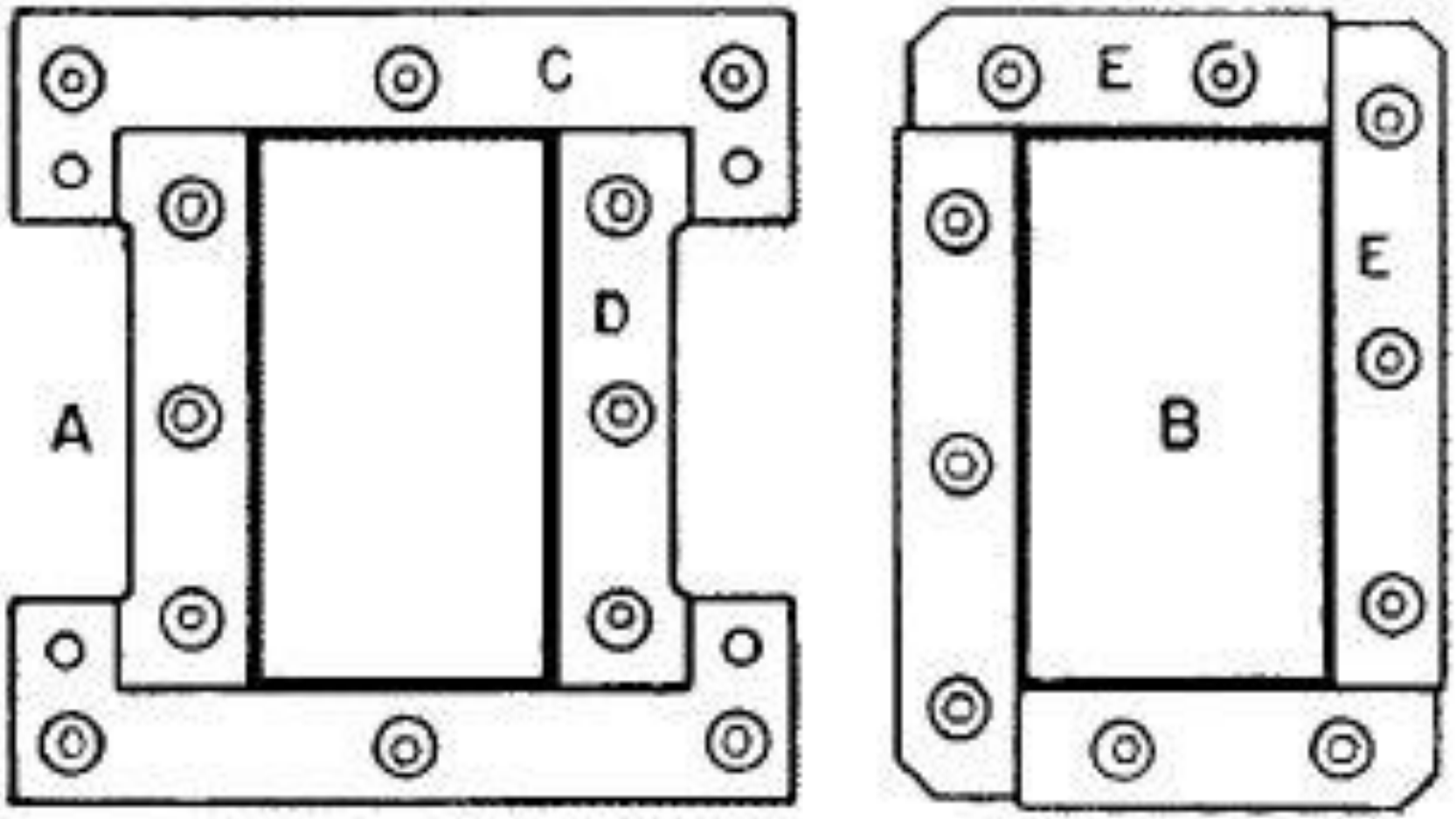


Figure 7.15 Methods of fastening die steels.

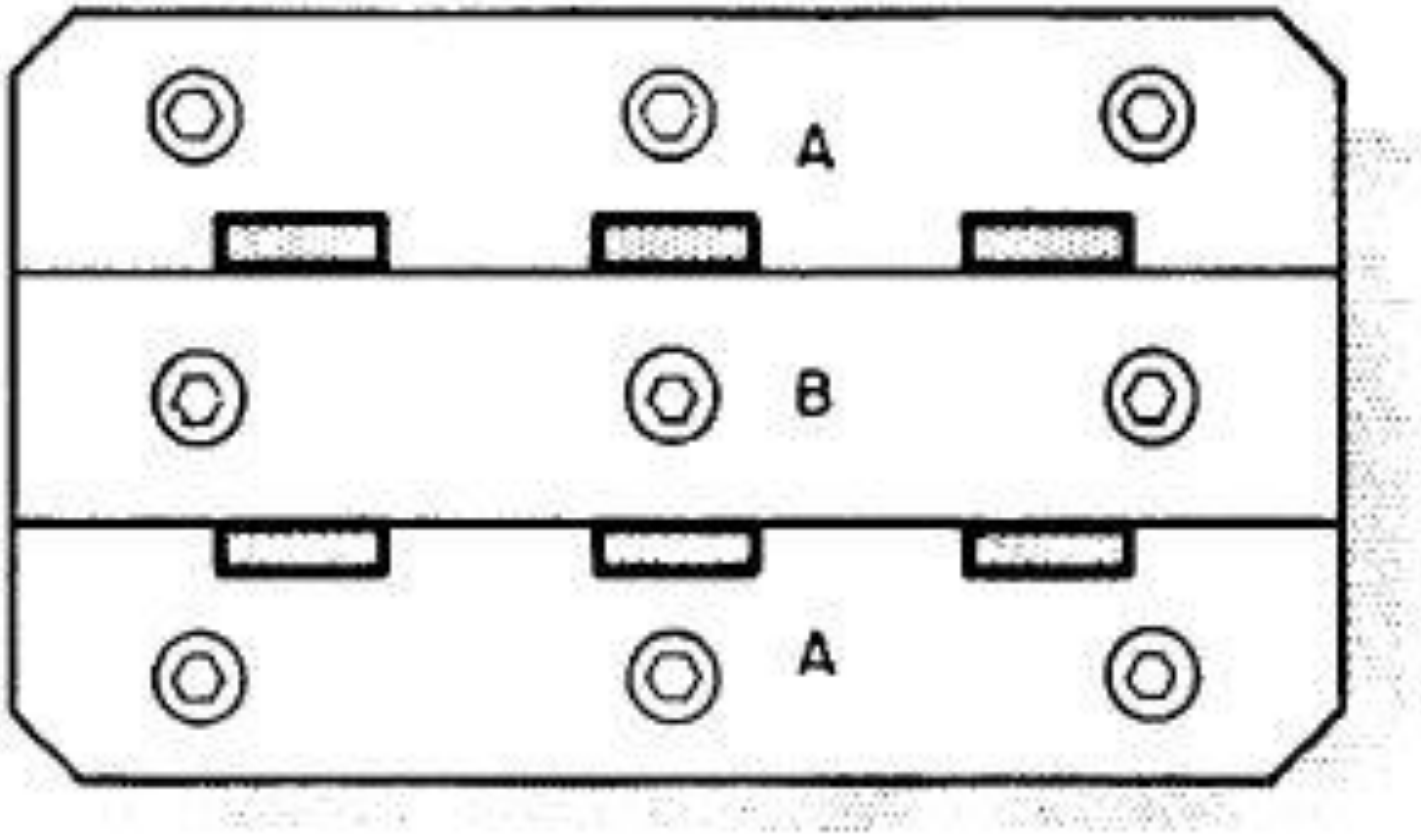
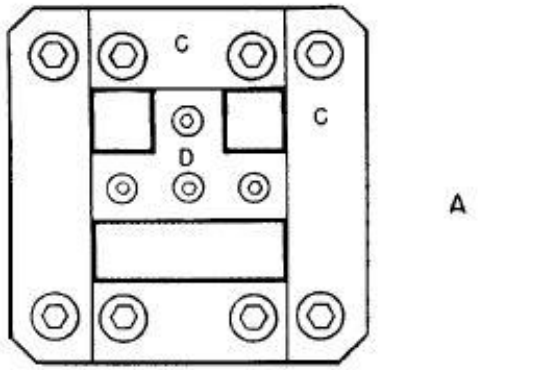
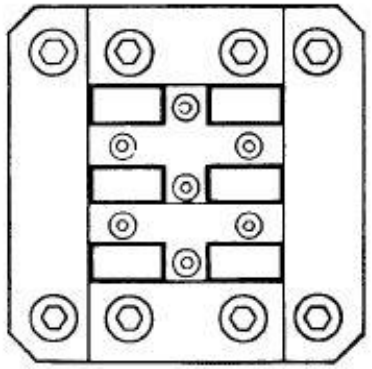


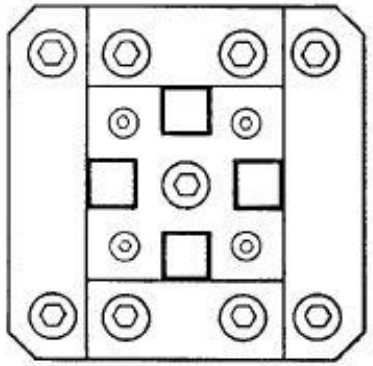
Figure 7.16 Die block sectioned for piercing two rows of rectangular slots.



A



B



C

Figure 7.17 Various sectioned die blocks with center inserts for punching different arrays of square and rectangular holes.

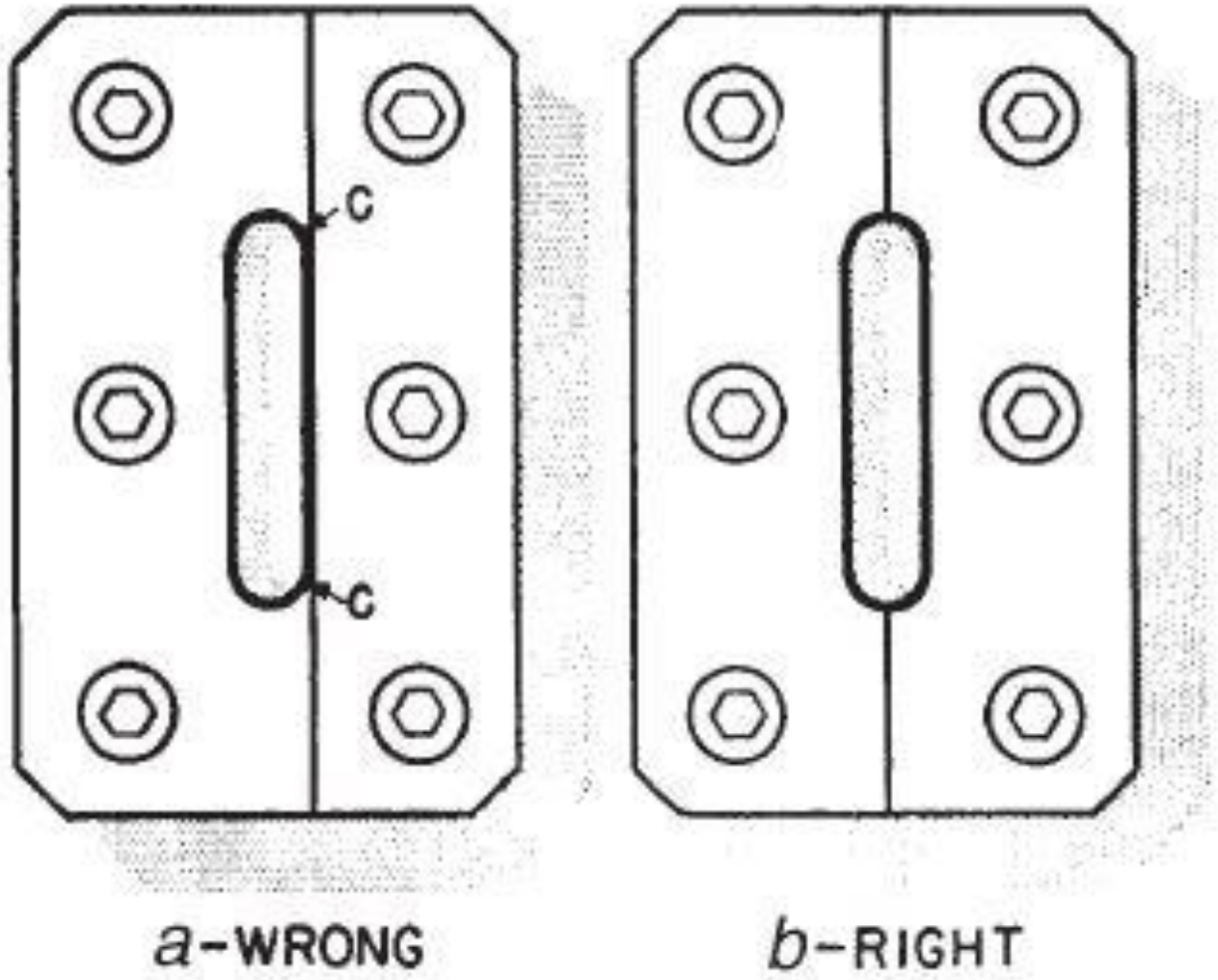


Figure 7.18 Correct and incorrect ways of applying break lines in sectioned die blocks.

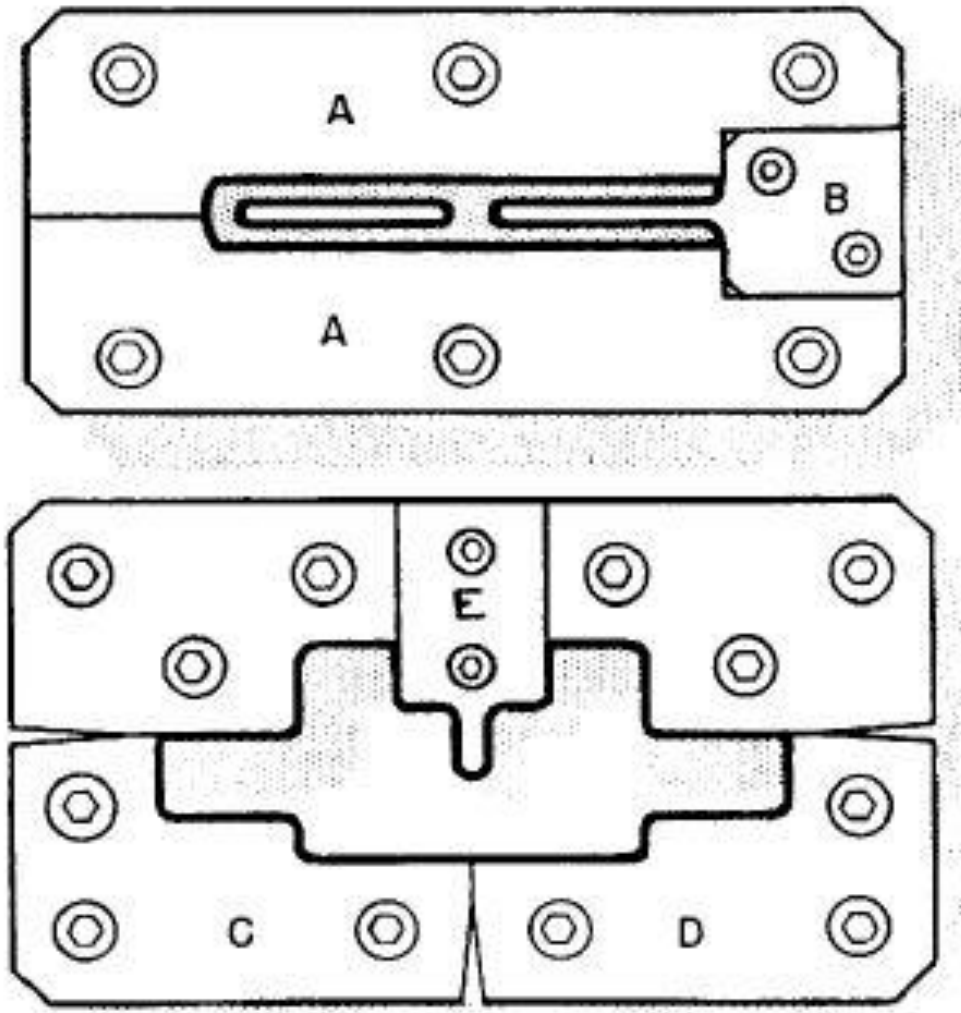


Figure 7.19 Use of inserts in providing for frail projections.

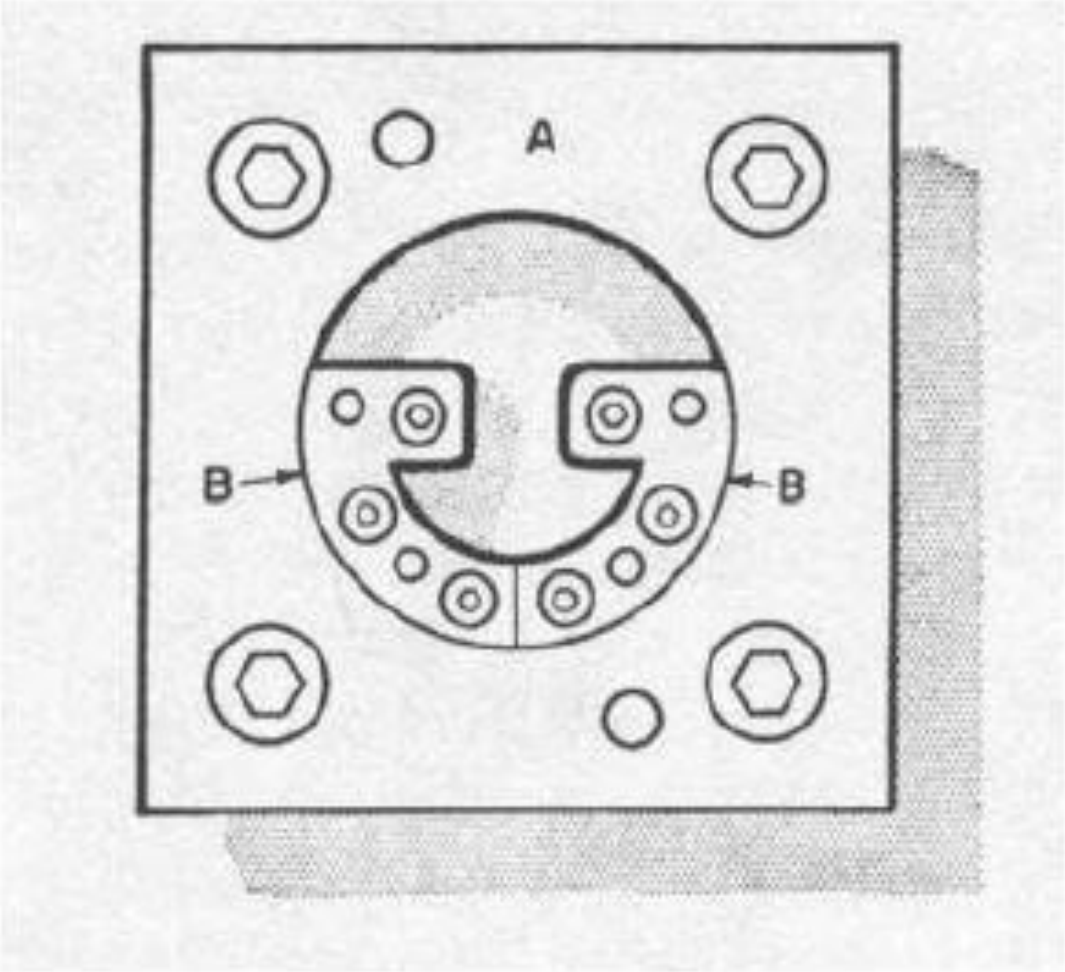


Figure 7.20 Use of inserts in a die block when a portion of the blank is circular in shape.

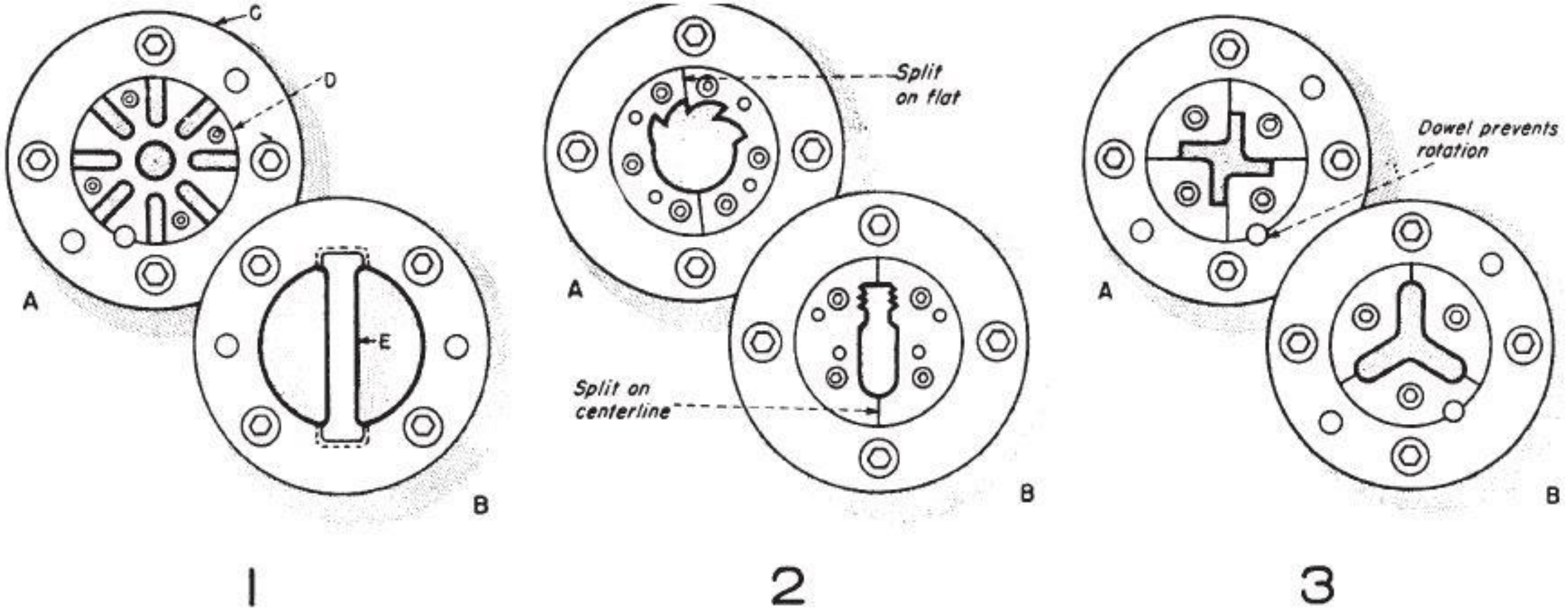


Figure 7.21 Six representative examples showing the use of round sectional die blocks in retaining inserts or segments.

پایان فصل هفتم

با سپاس از توجه شما...