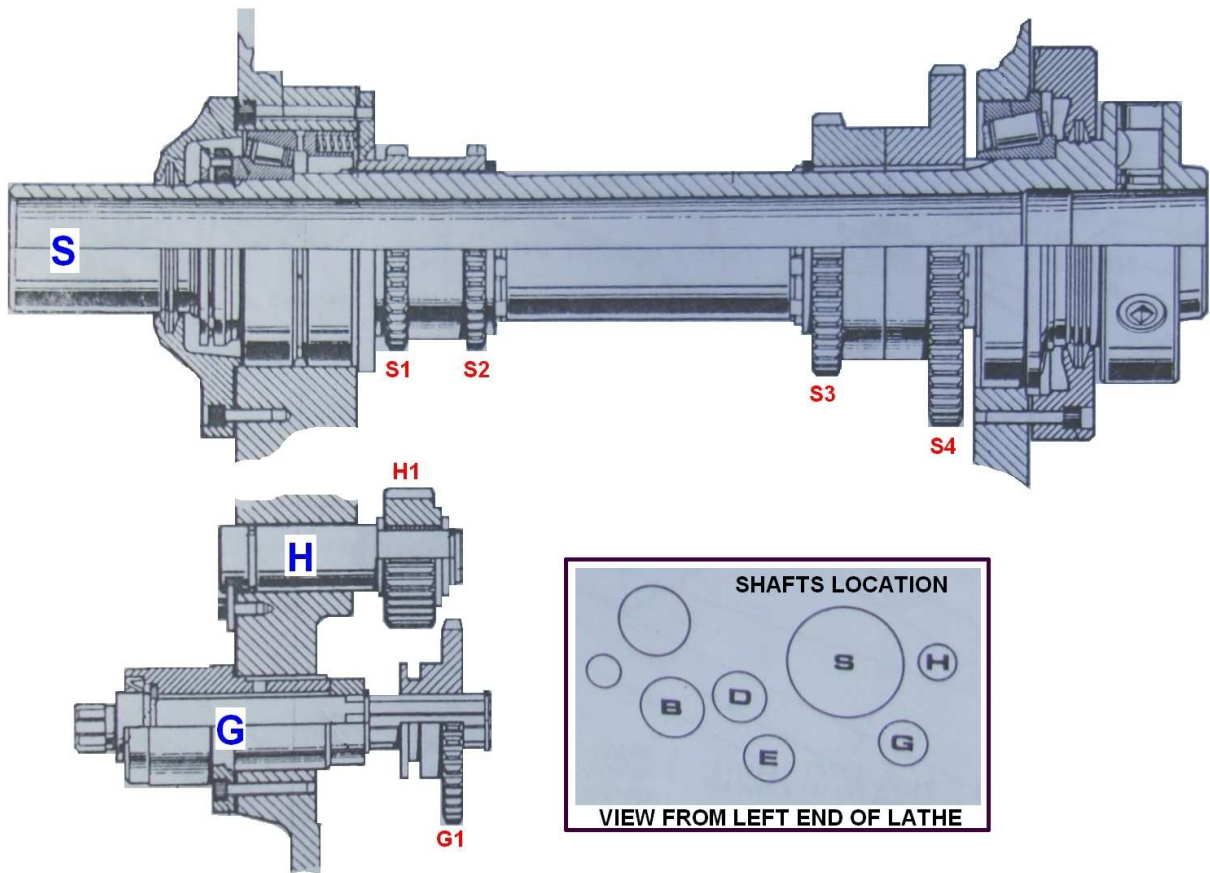


# Colchester Student 1800 headstock

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## Figure 1

### Warning

The figures (taken from the parts section of the Colchester manual) can be misleading as the shafts all appear to be in a plane which is not the case; the true layout can be seen in the "Shafts location" area of figure 1.

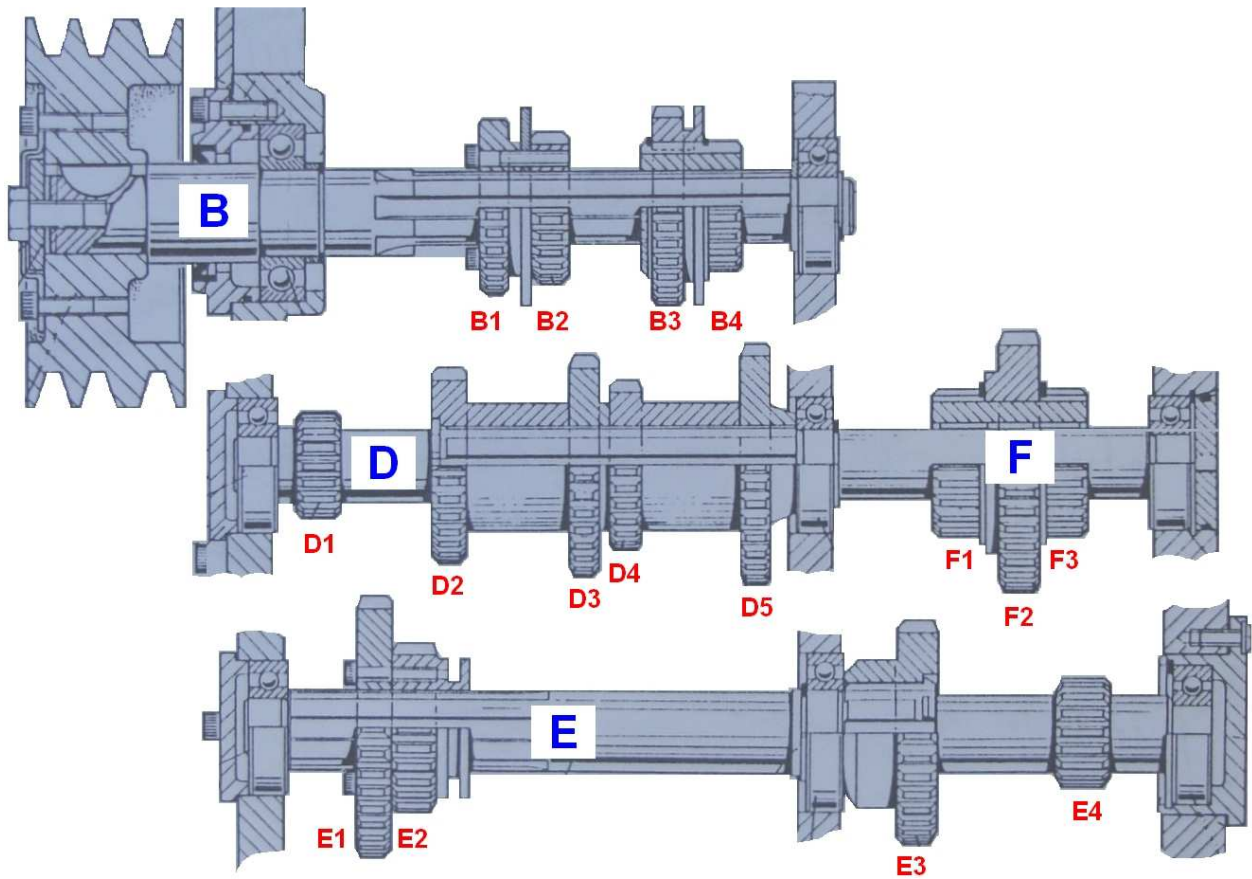


Figure 2

	Number of teeth on gears				
Gear prefix	1	2	3	4	5
S	43	43	64	74	
H	35				
G	43				
B	29	24	33	20	
D	16	33	37	28	41
E	44	28	43	16	
F	24	44	24		

Gear H1 on shaft H and cluster F, comprising gears F1, F2 & F3, are free to run on their shafts. All other gears are splined, keywayed or machined on their respective shafts.

**Drive from main spindle, S, to swing frame gear mounted on left end of shaft G.**

The thread direction control lever on the headstock slides gear G1 on splined shaft G. In the right hand thread and feed position of the control lever, gear G1 is driven by S2 but. in the left hand thread position, G1 is driven by S1 via the intermediate gear H1.

Shaft G always rotates at the same speed as the main spindle..

**Drive from motor to the main spindle**

Stage 1 – from motor to pulley on shaft B

The motor pulley is sized to suit the motor’s speed so that shaft B runs at about 1040 rpm.

Stage 2 – from pulley and shaft B to shaft D

The inner ring of the speed selector shifts splined clusters B1(29t)-B2(24t) and B3(33t)-B4(20t) on shaft B so that one gear on shaft B meshes with one on shaft D.

Range speeds	Driver/Driven	Ratio
22, 70, 230, 745	B4/D5	0.4878
30, 94, 305, 1000	B2/D3	0.6486
40, 127, 410, 1340	B1/D2	0.8788
53, 170, 555, 1800	B3/D4	1.1923

Stage 3 – from shaft D to the main spindle

The outer ring of the speed selector shifts cluster E1-E2 on shaft E and free running cluster F on shaft D.

Shaft E is driven from shaft D by D1/E1 or D2/E2

Cluster F is driven from shaft E and drives shaft S (the main spindle)

In the left position of cluster F the train is E3/F1 and F2/S3. In the right it is E4/F2 and F3/S4

Range speeds	Gears	Ratio	Gears	Ratio	Gears	Ratio	Overall ratio for stage 3
22 30 40 53	D1/E1	0.3636	E4/F2	0.3636	F3/S4	0.3243	0.0429
70 94 127 170	D2/E2	1.1786	E4/F2	0.3636	F3/S4	0.3243	0.1390
230 305 410 555	D1/E1	0.3636	E3/F1	1.7917	F2/S3	0.6875	0.4479
745 1000 1340 1800	D2/E2	1.1786	E3/F1	1.7917	F2/S3	0.6875	1.4518

The overall ratio between the pulley and the spindle is the stage 2 ratio multiplied by the overall ratio for stage 3.

**Overall speeds**

Nominal speed	Stage 2 ratio	Stage 3 ratio	Overall ratio	Overall ratio x 1040
22	0.4878	0.0429	0.0209	21.8
30	0.6486	0.0429	0.0278	28.9
40	0.8788	0.0429	0.0377	39.2
53	1.1923	0.0429	0.0511	53.2
70	0.4878	0.1390	0.0678	70.5
94	0.6486	0.1390	0.0902	93.7
127	0.8788	0.1390	0.1222	127.0
170	1.1923	0.1390	0.1657	172.3
230	0.4878	0.4479	0.2185	227.2
305	0.6486	0.4479	0.2906	302.1
410	0.8788	0.4479	0.3936	409.4
555	1.1923	0.4479	0.5340	555.4
745	0.4878	1.4518	0.7802	736.5
1000	0.6486	1.4518	0.9416	979.3
1340	0.8788	1.4518	1.2758	1327.8
1800	1.1923	1.4518	1.7310	1800.2