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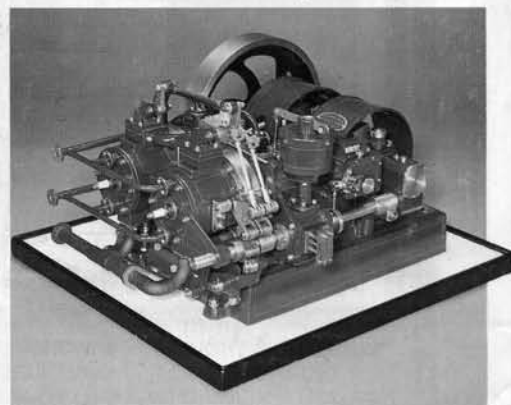
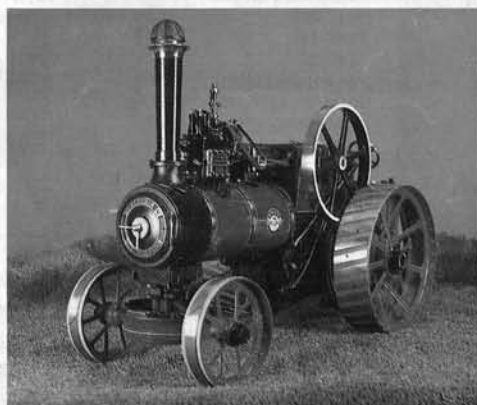
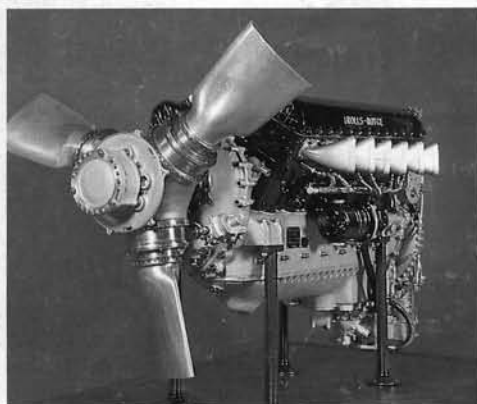
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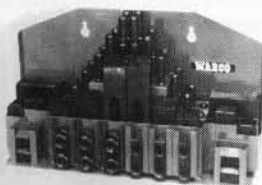
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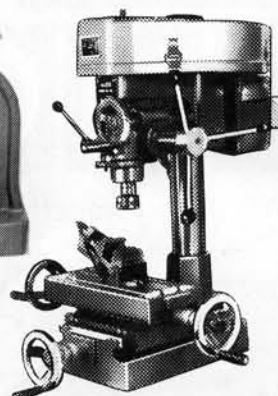
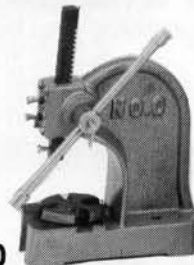


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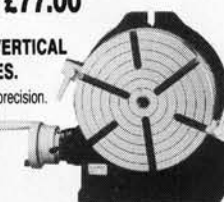


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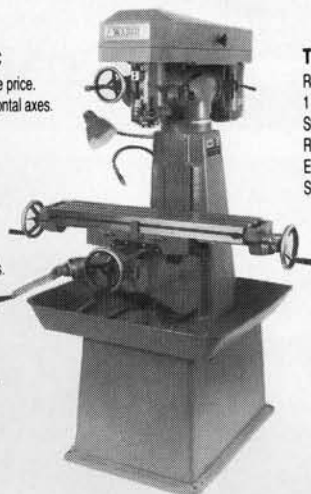
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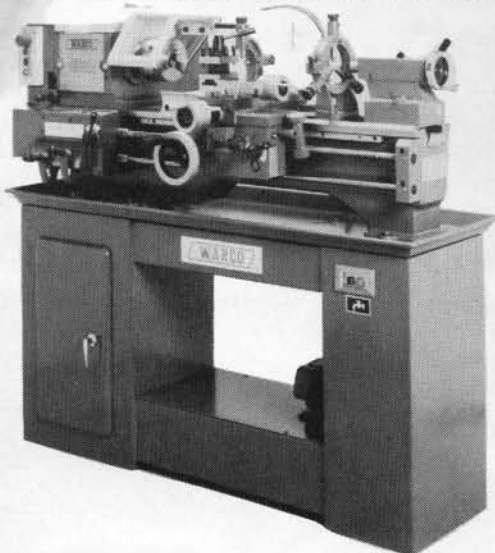


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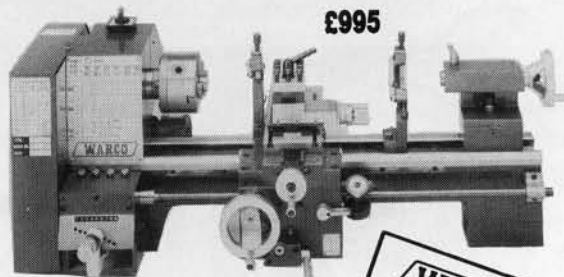
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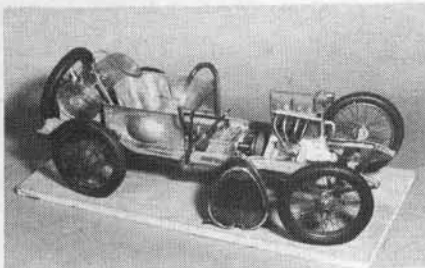
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World of MODEL ENGINEERING

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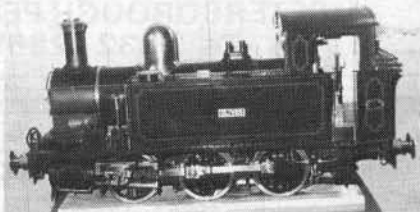
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INTRODUCTION

Model engineering is an old-established hobby and has been practised in some form or another since pre-Roman days. At present, it is very much a growth hobby. It is mainly, and always has been, practised by older members of the community which is, I think, rather surprising these days as the cost of one of the smaller lathes is no greater than that of a home computer. Many young men and women can manage the purchase price of a home computer, so why not, I wonder, the lathe?

A lathe is always the main basis of model engineering. With this equipment almost any machining operations can be carried out, providing of course that it is not too large for the size of the lathe. It is understandable that younger people do not want to make models of steam engines which they can hardly remember, but there are many more modern counterparts in transport engineering such as cranes, fork-lift trucks, excavators or the very large range of motor vehicles that are part of everyday life.

A major problem with any hobby is knowing *what* to start with, or indeed, having started, *what* to make for the next project. This volume should assist in resolving any such problems.

If it encourages newcomers I will be specifically satisfied, but I am hoping that what follows will help many established modellers to understand more of their hobby and so resolve those little difficulties for which it is not always easy to find an answer.

Stan Bray

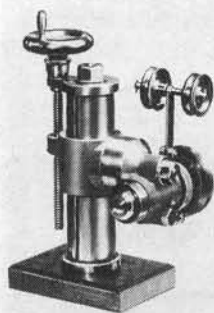
Author: Stan Bray; Editorial Director: R. G. Moulton; Art Editor: Ron Cunningham

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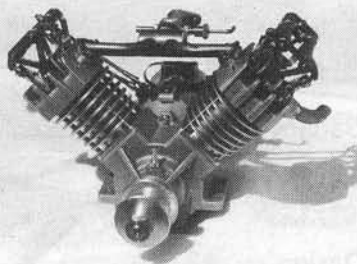


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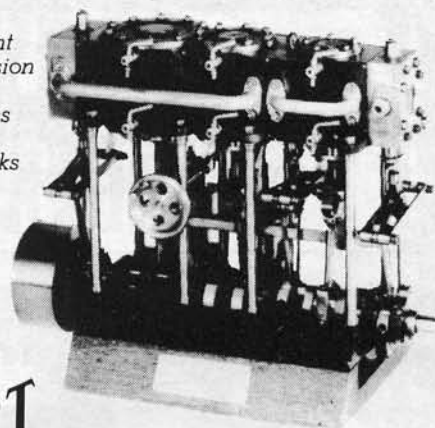
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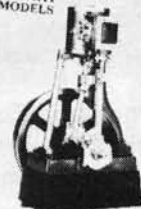
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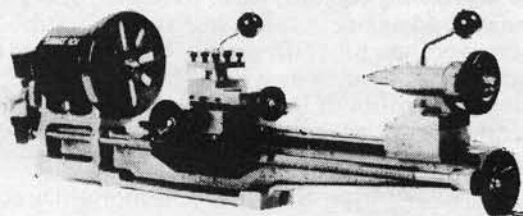
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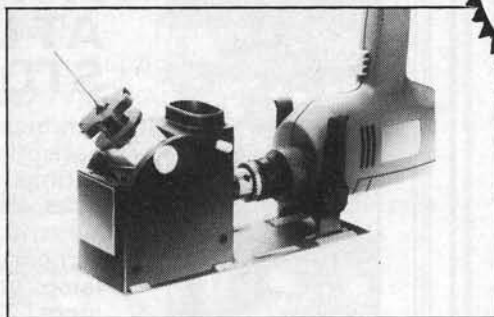
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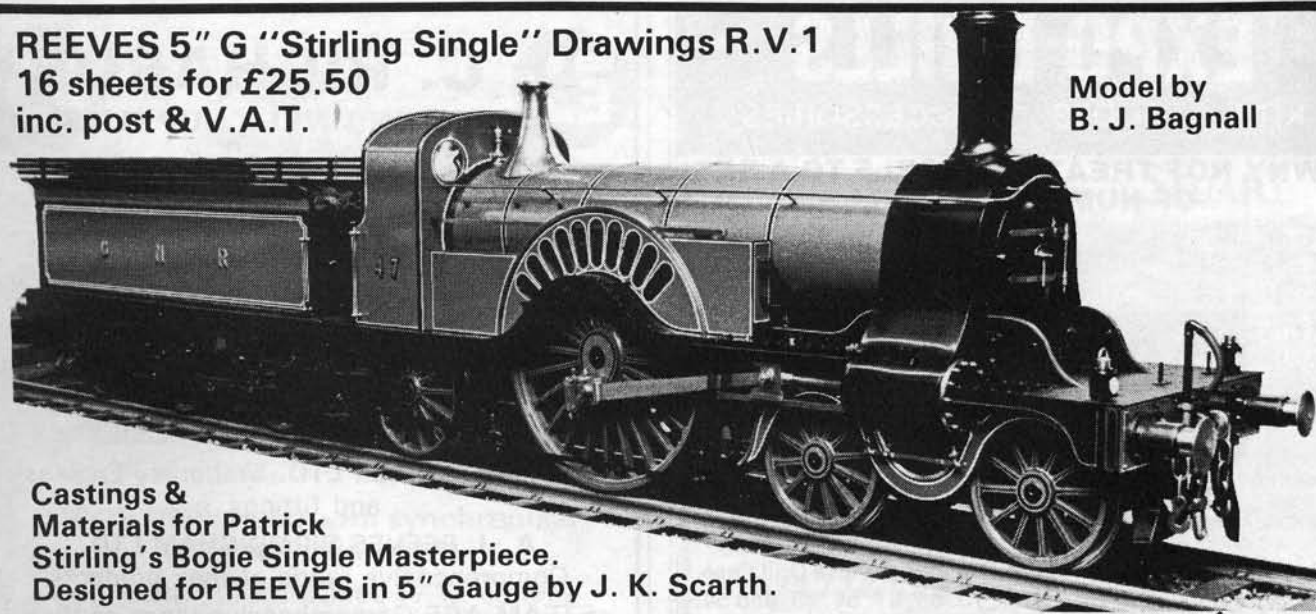
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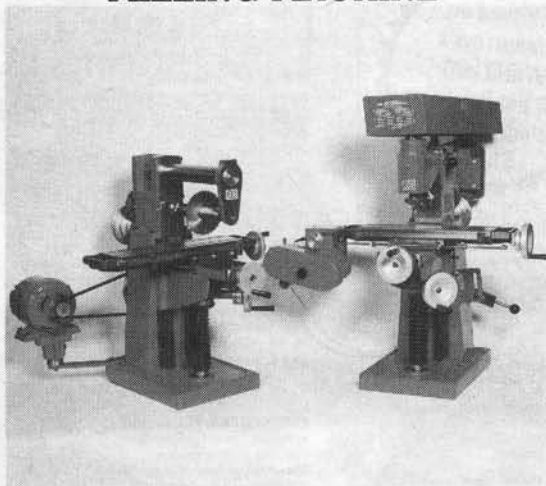


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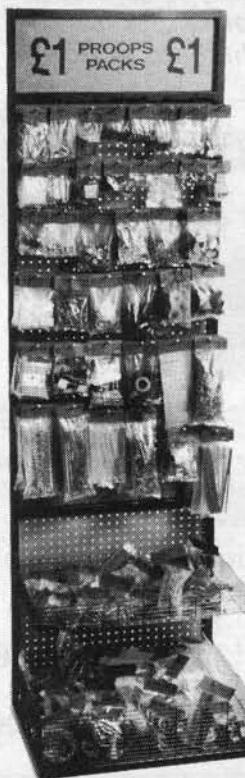
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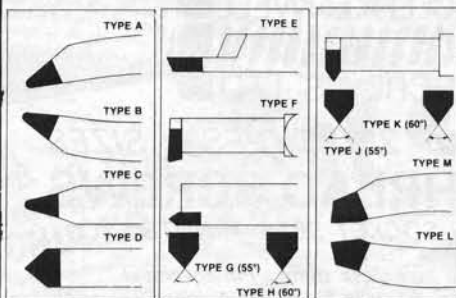
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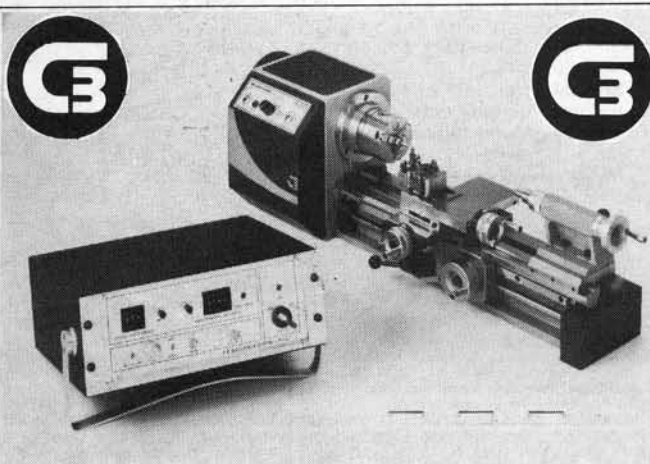
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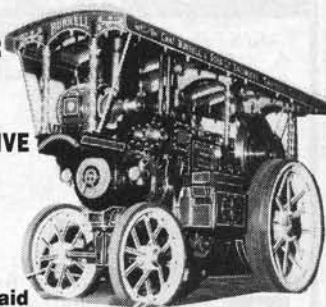
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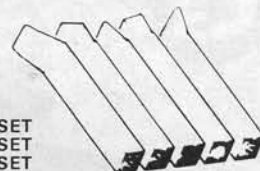
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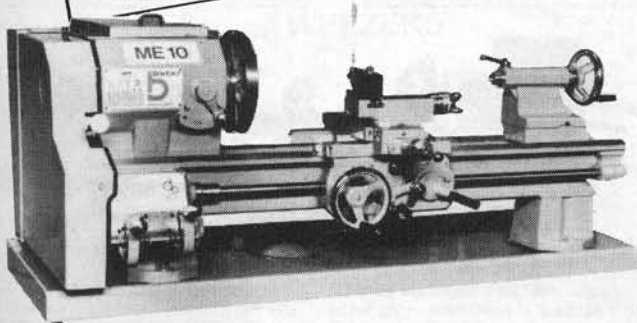
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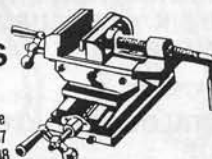


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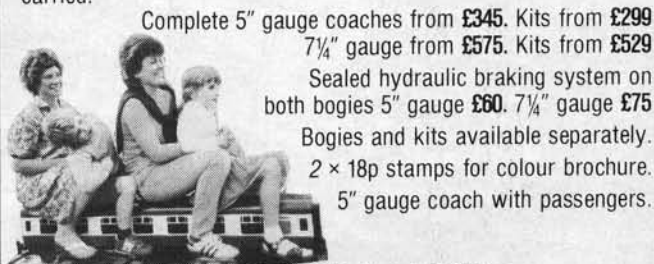


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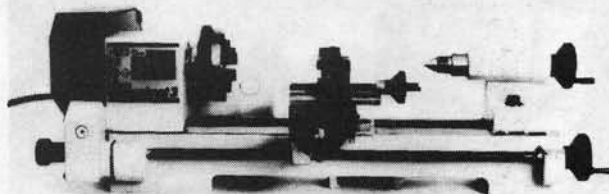
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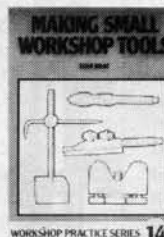
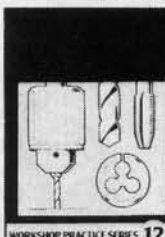
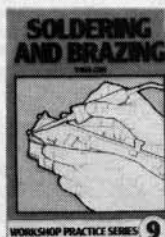
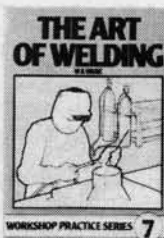
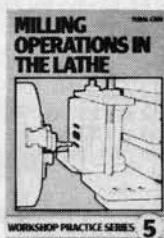
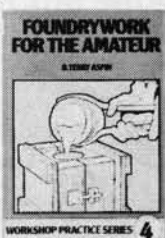
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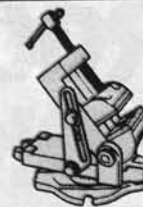
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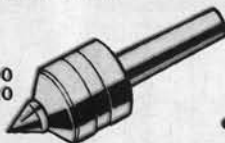


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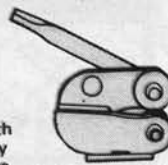
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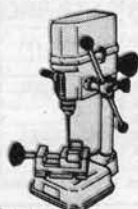


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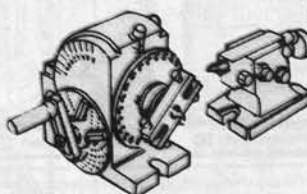
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New EMCO - FB2 Milling Machine.
New NAEROK Mills and Drills.
New FOBCO Drills.
- Export always welcome (we are the specialists)

Send us a S.A.E.
and we'll send you our
full stock list

Now buy the
easy way



**WHITING
Machine Tools**

Whiting - First for quality, first for service

Plans, Plans, Plans!

O.K., so where do we start? The answer has got to be, with a plan or drawing of the subject to be modelled

Whenver any form of modelling is contemplated then some form of plan or drawing will be required. In the case of most model engineering subjects we need not only an outline plan, but also plans of the various components that will go to make up the model.

There are hundreds of plans available that will enable us to construct most types of model and *Model Engineer* magazine has a very comprehensive Plans Service which is constantly being added to. The various model engineering suppliers also stock plans, and if they offer any particularly special model then they will hold plans for that. Don Young and T.E.E. Publishing can also supply some plans of model engineering subjects.

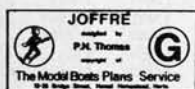
Another useful source of plans of model locomotives is Michael Breeze of Northborough, Peterborough who can

supply quite a number of sets of drawings for a variety of locomotives, particularly those of the old London North Eastern Railway. Model boats are well taken care of both by ASP Ltd., and several other firms who, between them, supply highly detailed drawings of a very large number of ships.

So far I have only dealt with drawings to the required scale, but what if no such plans are available? In most instances a drawing of some sort can be obtained. The National Maritime Museum at Greenwich, for example, has plenty of plans of ships while the Science Museum in London has a whole range of drawings of stationary engines, cars, locomotives and a great number of other scientific items. Most of the industrial museums, particularly those in the larger towns, have drawings that they will be happy to supply. Frequently, when a firm closes

down in their area, the museums often take the drawings over and a polite letter with a large stamped addressed envelope will usually obtain the required information. However, the museum is doing a favour in supplying what it can, so do not expect anything as a right...

The drawings of the old British Railway Companies have been taken over by the Oxford Publishing Company who can supply lists of the drawings available of which there are many hundreds. However, the drawings will not, of course, be to the scale you require. Some firms will be prepared to supply drawings of their products, but, again, asking them for copies is asking a favour and your approach should always bear this in mind. As far as locomotives are concerned there are numerous drawings available that have been prepared for small scale railways.

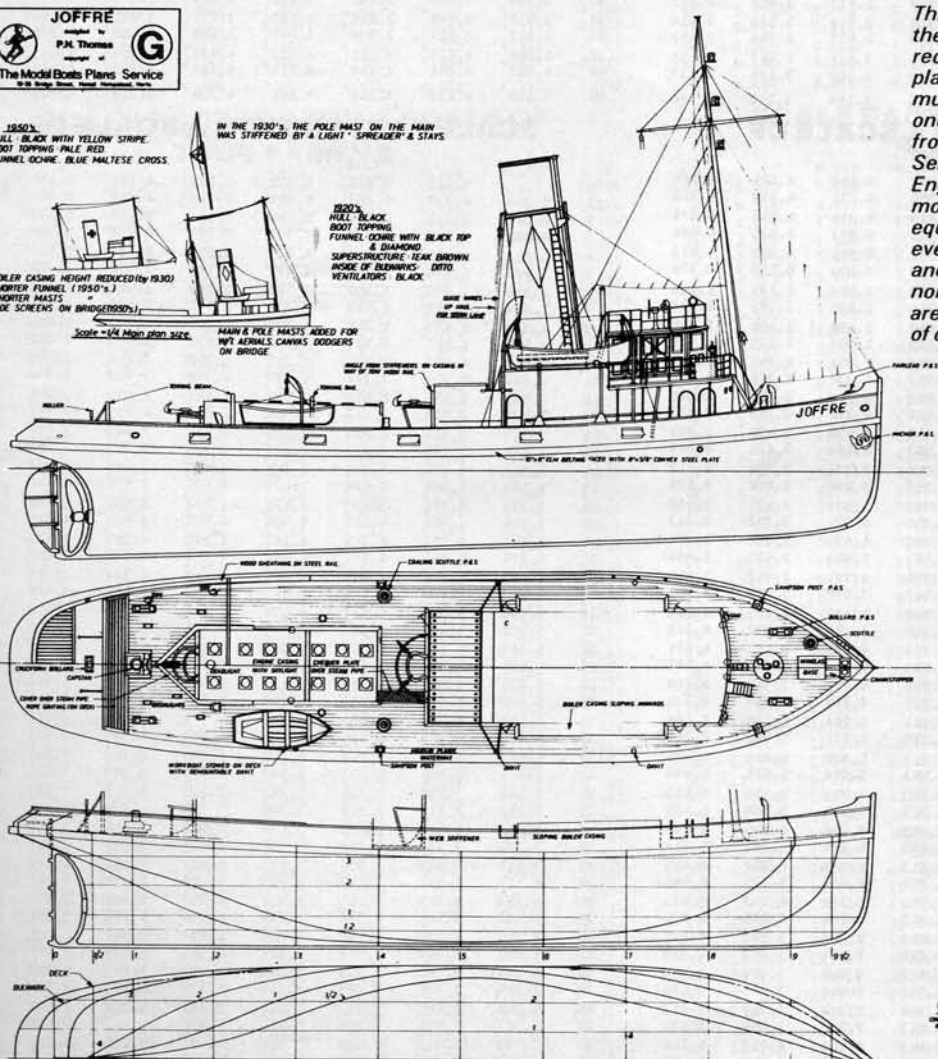


1950's
HULL BLACK WITH YELLOW STRIPE
BOOT TOPPING PALE RED
FUNNEL COCHRAN BLUE MALTESE CROSS

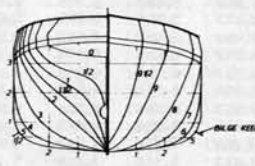
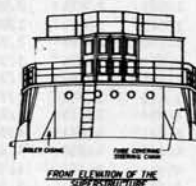
IN THE 1930's THE POLE MAST ON THE MAIN
WAS STIFFENED BY A LIGHT 'SPREADER' & STAYS

1920's
HULL BLACK
BOOT TOPPING
FUNNEL COCHRAN WITH BLACK TOP
& DIAMOND
SUPERSTRUCTURE REAR BROWN
INSIDE OF DECKWAYS - WHITE
VENTILATORS - BLACK

Scale - 1/4" Main plan size



This plan for the tug "Joffre" is typical of the sort of drawing one can expect to receive from any of the commercial model plans suppliers; obviously shown here at much reduced scale, this example is just one from literally hundreds of model plans from the massive range of ASP Plans Service subjects which includes the Model Engineer series covering live steam models of all types and workshop equipment. Plans catalogues listing everything on offer (including model boats and aircraft designs) are available at nominal cost and most mail order plans are despatched within 24 hours of receipt of order.



MM 1240

SCALE FACTOR TABLES — BY MODEL E

SCALE FACTORS FOR A SCALE OF

$\frac{3}{4}$ in. = 1 FOOT

0	0.008	0.016	0.023	0.031	0.039	0.047	0.055
1	0.063	0.070	0.078	0.086	0.094	0.102	0.110
2	0.125	0.133	0.141	0.148	0.156	0.164	0.172
3	0.188	0.195	0.203	0.211	0.219	0.227	0.234
4	0.250	0.258	0.266	0.273	0.281	0.289	0.297
5	0.313	0.320	0.328	0.336	0.344	0.352	0.360
6	0.375	0.383	0.391	0.398	0.406	0.414	0.422
7	0.438	0.445	0.453	0.461	0.469	0.477	0.484
8	0.500	0.508	0.516	0.523	0.531	0.539	0.547
9	0.563	0.570	0.578	0.586	0.594	0.602	0.610
10	0.625	0.633	0.641	0.648	0.656	0.664	0.672
11	0.688	0.695	0.703	0.711	0.719	0.727	0.734
12	0.750	0.758	0.766	0.773	0.781	0.789	0.797
13	0.813	0.820	0.828	0.836	0.844	0.852	0.860
14	0.875	0.883	0.891	0.898	0.906	0.914	0.922
15	0.938	0.945	0.953	0.961	0.969	0.977	0.984
16	1.000	1.008	1.016	1.023	1.031	1.039	1.047
17	1.063	1.070	1.078	1.086	1.094	1.102	1.110
18	1.125	1.133	1.141	1.148	1.156	1.164	1.172
19	1.188	1.195	1.203	1.211	1.219	1.227	1.234
20	1.250	1.258	1.266	1.273	1.281	1.289	1.297
21	1.313	1.320	1.328	1.336	1.344	1.352	1.360
22	1.375	1.383	1.391	1.398	1.406	1.414	1.422
23	1.438	1.445	1.453	1.461	1.469	1.477	1.484
24	1.500	1.508	1.516	1.523	1.531	1.539	1.547
25	1.563	1.570	1.578	1.586	1.594	1.602	1.610
26	1.625	1.633	1.641	1.648	1.656	1.664	1.672
27	1.688	1.695	1.703	1.711	1.719	1.727	1.734
28	1.750	1.758	1.766	1.773	1.781	1.789	1.797
29	1.813	1.820	1.828	1.836	1.844	1.852	1.860
30	1.875	1.883	1.891	1.898	1.906	1.914	1.922
31	1.938	1.945	1.953	1.961	1.969	1.977	1.984
32	2.000	2.008	2.016	2.023	2.031	2.039	2.047
33	2.063	2.070	2.078	2.086	2.094	2.102	2.110
34	2.125	2.133	2.141	2.148	2.156	2.164	2.172
35	2.188	2.195	2.203	2.211	2.219	2.227	2.234
36	2.250	2.258	2.266	2.273	2.281	2.289	2.297
37	2.313	2.320	2.328	2.336	2.344	2.352	2.360
38	2.375	2.383	2.391	2.398	2.406	2.414	2.422
39	2.438	2.445	2.453	2.461	2.469	2.477	2.484
40	2.500	2.508	2.516	2.523	2.531	2.539	2.547
41	2.563	2.570	2.578	2.586	2.594	2.602	2.610
42	2.625	2.633	2.641	2.648	2.656	2.664	2.672
43	2.688	2.695	2.703	2.711	2.719	2.727	2.734
44	2.750	2.758	2.766	2.773	2.781	2.789	2.797
45	2.813	2.820	2.828	2.836	2.844	2.852	2.860
46	2.875	2.883	2.891	2.898	2.906	2.914	2.922
47	2.938	2.945	2.953	2.961	2.969	2.977	2.984
48	3.000	3.008	3.016	3.023	3.031	3.039	3.047
49	3.063	3.070	3.078	3.086	3.094	3.102	3.110
50	3.125	3.133	3.141	3.148	3.156	3.164	3.172

SCALE FACTORS FOR A SCALE OF

1 in. = 1 FOOT

0	0.010	0.021	0.031	0.042	0.052	0.063	0.073
1	0.083	0.094	0.104	0.115	0.125	0.135	0.146
2	0.167	0.177	0.188	0.198	0.208	0.219	0.229
3	0.250	0.260	0.271	0.281	0.292	0.302	0.313
4	0.333	0.344	0.354	0.365	0.375	0.385	0.396
5	0.417	0.427	0.438	0.448	0.458	0.469	0.479
6	0.500	0.510	0.521	0.531	0.542	0.552	0.563
7	0.583	0.594	0.604	0.615	0.625	0.635	0.646
8	0.667	0.677	0.688	0.698	0.708	0.719	0.729
9	0.750	0.760	0.771	0.781	0.792	0.802	0.813
10	0.833	0.844	0.854	0.865	0.875	0.885	0.896
11	0.917	0.927	0.938	0.948	0.958	0.969	0.979
12	1.000	1.010	1.021	1.031	1.042	1.052	1.063
13	1.083	1.094	1.104	1.115	1.125	1.135	1.146
14	1.167	1.177	1.188	1.198	1.208	1.219	1.229
15	1.250	1.260	1.271	1.281	1.292	1.302	1.313
16	1.333	1.344	1.354	1.365	1.375	1.385	1.396
17	1.417	1.427	1.438	1.448	1.458	1.469	1.479
18	1.500	1.510	1.521	1.531	1.542	1.552	1.563
19	1.583	1.594	1.604	1.615	1.625	1.635	1.646
20	1.667	1.677	1.688	1.698	1.708	1.719	1.729
21	1.750	1.760	1.771	1.781	1.792	1.802	1.813
22	1.833	1.844	1.854	1.865	1.875	1.885	1.896
23	1.917	1.927	1.938	1.948	1.958	1.969	1.979
24	2.000	2.010	2.021	2.031	2.042	2.052	2.063
25	2.083	2.094	2.104	2.115	2.125	2.135	2.146
26	2.167	2.177	2.188	2.198	2.208	2.219	2.229
27	2.250	2.260	2.271	2.281	2.292	2.302	2.313
28	2.333	2.344	2.354	2.365	2.375	2.385	2.396
29	2.417	2.427	2.438	2.448	2.458	2.469	2.479
30	2.500	2.510	2.521	2.531	2.542	2.552	2.563
31	2.583	2.594	2.604	2.615	2.625	2.635	2.646
32	2.667	2.677	2.688	2.698	2.708	2.719	2.729
33	2.750	2.760	2.771	2.781	2.792	2.802	2.813
34	2.833	2.844	2.854	2.865	2.875	2.885	2.896
35	2.917	2.927	2.938	2.948	2.958	2.969	2.979
36	3.000	3.010	3.021	3.031	3.042	3.052	3.063
37	3.083	3.094	3.104	3.115	3.125	3.135	3.146
38	3.167	3.177	3.188	3.198	3.208	3.219	3.229
39	3.250	3.260	3.271	3.281	3.292	3.302	3.313
40	3.333	3.344	3.354	3.365	3.375	3.385	3.396
41	3.417	3.427	3.438	3.448	3.458	3.469	3.479
42	3.500	3.510	3.521	3.531	3.542	3.552	3.563
43	3.583	3.594	3.604	3.615	3.625	3.635	3.646
44	3.667	3.677	3.688	3.698	3.708	3.719	3.729
45	3.750	3.760	3.771	3.781	3.792	3.802	3.813
46	3.833	3.844	3.854	3.865	3.875	3.885	3.896
47	3.917	3.927	3.938	3.948	3.958	3.969	3.979
48	4.000	4.010	4.021	4.031	4.042	4.052	4.063
49	4.083	4.094	4.104	4.115	4.125	4.135	4.146
50	4.167	4.177	4.188	4.198	4.208	4.219	4.229

SCALE FACTORS FOR A SCALE OF

2 in. = 1 FOOT

		0.021	0.042	0.063	0.083	0.104	0.125	0.146
1	0.167	0.188	0.208	0.229	0.250	0.271	0.292	0.313
2	0.333	0.354	0.375	0.396	0.417	0.438	0.458	0.479
3	0.500	0.521	0.542	0.563	0.583	0.604	0.625	0.646
4	0.667	0.688	0.708	0.729	0.750	0.771	0.792	0.813
5	0.833	0.854	0.875	0.896	0.917	0.938	0.958	0.979
6	1.000	1.021	1.042	1.063	1.083	1.104	1.125	1.146
7	1.167	1.188	1.208	1.229	1.250	1.271	1.292	1.313
8	1.333	1.354	1.375	1.396	1.417	1.438	1.458	1.479
9	1.500	1.521	1.542	1.563	1.583	1.604	1.625	1.646
10	1.667	1.688	1.708	1.729	1.750	1.771	1.792	1.813
11	1.833	1.854	1.875	1.896	1.917	1.938	1.958	1.979
12	2.000	2.021	2.042	2.063	2.083	2.104	2.125	2.146
13	2.167	2.188	2.208	2.229	2.250	2.271	2.292	2.313
14	2.333	2.354	2.375	2.396	2.417	2.438	2.458	2.479
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16	2.667	2.688	2.708	2.729	2.750	2.771	2.792	2.813
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18	3.000	3.021	3.042	3.063	3.083	3.104	3.125	3.146
19	3.167	3.188	3.208	3.229	3.250	3.271	3.292	3.313
20	3.333	3.354	3.375	3.396	3.417	3.438	3.458	3.479
21	3.500	3.521	3.542	3.563	3.583	3.604	3.625	3.646
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25	4.167	4.188	4.208	4.229	4.250	4.271	4.292	4.313
26	4.333	4.354	4.375	4.396	4.417	4.438	4.458	4.479
27	4.500	4.521	4.542	4.563	4.583	4.604	4.625	4.646
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30	5.000	5.021	5.042	5.063	5.083	5.104	5.125	5.146
31	5.167	5.188	5.208	5.229	5.250	5.271	5.292	5.313
32	5.333	5.354	5.375	5.396	5.417	5.438	5.458	5.479
33	5.500	5.521	5.542	5.563	5.583	5.604	5.625	5.646
34	5.667	5.688	5.708	5.729	5.750	5.771	5.792	5.813
35	5.833	5.854	5.875	5.896	5.917	5.938	5.958	5.979
36	6.000	6.021	6.042	6.063	6.083	6.104	6.125	6.146
37	6.167	6.188	6.208	6.229	6.250	6.271	6.292	6.313
38	6.333	6.354	6.375	6.396	6.417	6.438	6.458	6.479
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42	7.000	7.021	7.042	7.063	7.083	7.104	7.125	7.146
43	7.167	7.188	7.208	7.229	7.250	7.271	7.292	7.313
44	7.333	7.354	7.375	7.396	7.417	7.438	7.458	7.479
45	7.500	7.521	7.542	7.563	7.583	7.604	7.625	7.646
46	7.667	7.688	7.708	7.729	7.750	7.771	7.792	7.813
47	7.833	7.854	7.875	7.896	7.917	7.938	7.958	7.979
48	8.000	8.021	8.042	8.063	8.083	8.104	8.125	8.146
49	8.167	8.188	8.208	8.229	8.250	8.271	8.292	8.313
50	8.333	8.354	8.375	8.396	8.417	8.438	8.458	8.479

SCALE FACTORS FOR A SCALE OF 1 1/16 in. = 1 FOOT

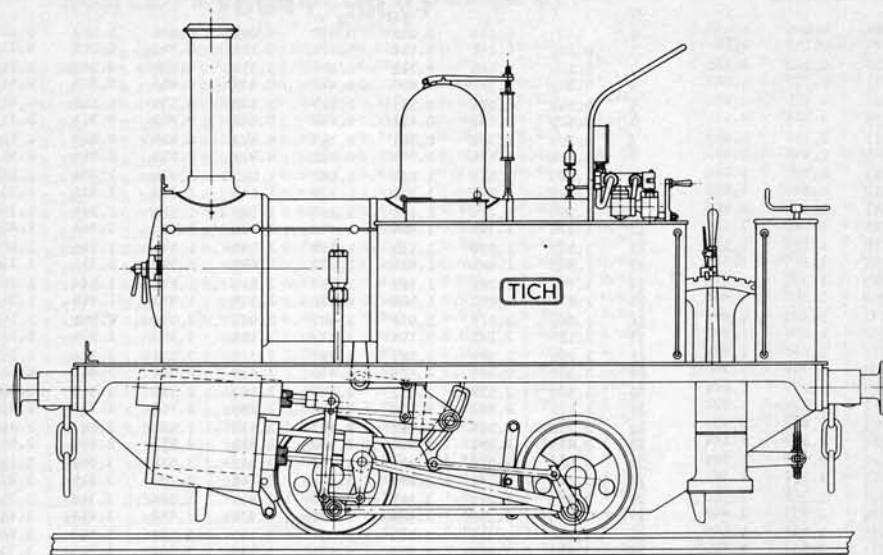
0		0.011	0.022	0.033	0.044	0.055	0.066	0.077
1	0.089	0.100	0.111	0.122	0.133	0.144	0.155	0.166
2	0.177	0.188	0.199	0.210	0.221	0.232	0.243	0.255
3	0.266	0.277	0.288	0.299	0.310	0.321	0.332	0.343
4	0.354	0.365	0.376	0.387	0.398	0.410	0.421	0.432
5	0.443	0.454	0.465	0.476	0.487	0.498	0.509	0.520
6	0.531	0.542	0.553	0.564	0.575	0.587	0.598	0.609
7	0.620	0.631	0.642	0.653	0.664	0.675	0.686	0.697
8	0.708	0.719	0.730	0.742	0.753	0.764	0.775	0.786
9	0.797	0.808	0.819	0.830	0.841	0.852	0.863	0.874
10	0.885	0.896	0.908	0.919	0.930	0.941	0.952	0.963
11	0.974	0.985	0.996	1.007	1.018	1.029	1.040	1.051
12	1.063	1.074	1.085	1.096	1.107	1.118	1.129	1.140
13	1.151	1.162	1.173	1.184	1.195	1.206	1.217	1.229
14	1.240	1.251	1.262	1.273	1.284	1.295	1.306	1.317
15	1.328	1.339	1.350	1.361	1.372	1.383	1.395	1.406
16	1.417	1.428	1.439	1.450	1.461	1.472	1.483	1.494
17	1.505	1.516	1.527	1.538	1.549	1.561	1.572	1.583
18	1.594	1.605	1.616	1.627	1.638	1.649	1.660	1.671
19	1.682	1.693	1.704	1.715	1.727	1.738	1.749	1.760
20	1.771	1.782	1.793	1.804	1.815	1.826	1.837	1.848
21	1.859	1.870	1.882	1.893	1.904	1.915	1.926	1.937
22	1.948	1.959	1.970	1.981	1.992	2.003	2.014	2.025
23	2.036	2.048	2.059	2.070	2.081	2.092	2.103	2.114
24	2.125	2.136	2.147	2.158	2.169	2.180	2.191	2.202
25	2.214	2.225	2.236	2.247	2.258	2.269	2.280	2.291
26	2.302	2.313	2.324	2.335	2.346	2.357	2.368	2.380
27	2.391	2.402	2.413	2.424	2.435	2.446	2.457	2.468
28	2.479	2.490	2.501	2.512	2.523	2.535	2.546	2.557
29	2.568	2.579	2.590	2.601	2.612	2.623	2.634	2.645
30	2.656	2.667	2.678	2.689	2.701	2.712	2.723	2.734
31	2.745	2.756	2.767	2.778	2.789	2.800	2.811	2.822
32	2.833	2.844	2.855	2.867	2.878	2.889	2.900	2.911
33	2.922	2.933	2.944	2.955	2.966	2.977	2.988	2.999
34	3.010	3.021	3.033	3.044	3.055	3.066	3.077	3.088
35	3.099	3.110	3.121	3.132	3.143	3.154	3.165	3.176
36	3.188	3.199	3.210	3.221	3.232	3.243	3.254	3.265
37	3.276	3.287	3.298	3.309	3.320	3.331	3.342	3.354
38	3.365	3.376	3.387	3.398	3.409	3.420	3.431	3.442
39	3.453	3.464	3.475	3.486	3.497	3.508	3.520	3.531
40	3.542	3.553	3.564	3.575	3.586	3.597	3.608	3.619
41	3.630	3.641	3.652	3.663	3.674	3.686	3.697	3.708
42	3.719	3.730	3.741	3.752	3.763	3.774	3.785	3.796
43	3.807	3.818	3.829	3.840	3.852	3.863	3.874	3.885
44	3.896	3.907	3.918	3.929	3.940	3.951	3.962	3.973
45	3.984	3.995	4.007	4.018	4.029	4.040	4.051	4.062
46	4.073	4.084	4.095	4.106	4.117	4.128	4.139	4.150
47	4.161	4.173	4.184	4.195	4.206	4.217	4.228	4.239
48	4.250	4.261	4.272	4.283	4.294	4.305	4.316	4.327
49	4.339	4.350	4.361	4.372	4.383	4.394	4.405	4.416
50	4.427	4.438	4.449	4.460	4.471	4.482	4.493	4.505

SCALE FACTORS FOR A SCALE OF 3in. = 1 FOOT

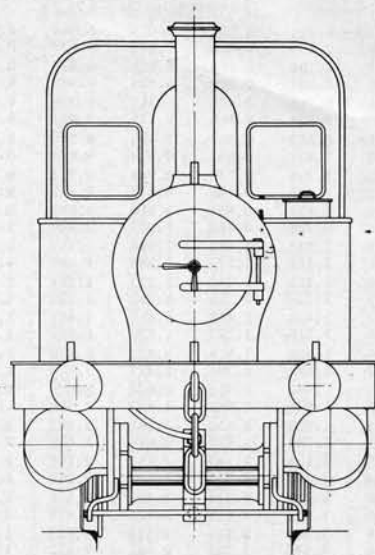
0		0.031	0.063	0.094	0.125	0.156	0.188	0.219
1	0.250	0.281	0.313	0.344	0.375	0.406	0.438	0.469
2	0.500	0.531	0.563	0.594	0.625	0.656	0.688	0.719
3	0.750	0.781	0.813	0.844	0.875	0.906	0.938	0.969
4	1.000	1.031	1.063	1.094	1.125	1.156	1.188	1.219
5	1.250	1.281	1.313	1.344	1.375	1.406	1.438	1.469
6	1.500	1.531	1.563	1.594	1.625	1.656	1.688	1.719
7	1.750	1.781	1.813	1.844	1.875	1.906	1.938	1.969
8	2.000	2.031	2.063	2.094	2.125	2.156	2.188	2.219
9	2.250	2.281	2.313	2.344	2.375	2.406	2.438	2.469
10	2.500	2.531	2.563	2.594	2.625	2.656	2.688	2.719
11	2.750	2.781	2.813	2.844	2.875	2.906	2.938	2.969
12	3.000	3.031	3.063	3.094	3.125	3.156	3.188	3.219
13	3.250	3.281	3.313	3.344	3.375	3.406	3.438	3.469
14	3.500	3.531	3.563	3.594	3.625	3.656	3.688	3.719
15	3.750	3.781	3.813	3.844	3.875	3.906	3.938	3.969
16	4.000	4.031	4.063	4.094	4.125	4.156	4.188	4.219
17	4.250	4.281	4.313	4.344	4.375	4.406	4.438	4.469
18	4.500	4.531	4.563	4.594	4.625	4.656	4.688	4.719
19	4.750	4.781	4.813	4.844	4.875	4.906	4.938	4.969
20	5.000	5.031	5.063	5.094	5.125	5.156	5.188	5.219
21	5.250	5.281	5.313	5.344	5.375	5.406	5.438	5.469
22	5.500	5.531	5.563	5.594	5.625	5.656	5.688	5.719
23	5.750	5.781	5.813	5.844	5.875	5.906	5.938	5.969
24	6.000	6.031	6.063	6.094	6.125	6.156	6.188	6.219
25	6.250	6.281	6.313	6.344	6.375	6.406	6.438	6.469
26	6.500	6.531	6.563	6.594	6.625	6.656	6.688	6.719
27	6.750	6.781	6.813	6.844	6.875	6.906	6.938	6.969
28	7.000	7.031	7.063	7.094	7.125	7.156	7.188	7.219
29	7.250	7.281	7.313	7.344	7.375	7.406	7.438	7.469
30	7.500	7.531	7.563	7.594	7.625	7.656	7.688	7.719
31	7.750	7.781	7.813	7.844	7.875	7.906	7.938	7.969
32	8.000	8.031	8.063	8.094	8.125	8.156	8.188	8.219
33	8.250	8.281	8.313	8.344	8.375	8.406	8.438	8.469
34	8.500	8.531	8.563	8.594	8.625	8.656	8.688	8.719
35	8.750	8.781	8.813	8.844	8.875	8.906	8.938	8.969
36	9.000	9.031	9.063	9.094	9.125	9.156	9.188	9.219
37	9.250	9.281	9.313	9.344	9.375	9.406	9.438	9.469
38	9.500	9.531	9.563	9.594	9.625	9.656	9.688	9.719
39	9.750	9.781	9.813	9.844	9.875	9.906	9.938	9.969
40	10.000	10.031	10.063	10.094	10.125	10.156	10.188	10.219
41	10.250	10.281	10.313	10.344	10.375	10.406	10.438	10.469
42	10.500	10.531	10.563	10.594	10.625	10.656	10.688	10.719
43	10.750	10.781	10.813	10.844	10.875	10.906	10.938	10.969
44	11.000	11.031	11.063	11.094	11.125	11.156	11.188	11.219
45	11.250	11.281	11.313	11.344	11.375	11.406	11.438	11.469
46	11.500	11.531	11.563	11.594	11.625	11.656	11.688	11.719
47	11.750	11.781	11.813	11.844	11.875	11.906	11.938	11.969
48	12.000	12.031	12.063	12.094	12.125	12.156	12.188	12.219
49	12.250	12.281	12.313	12.344	12.375	12.406	12.438	12.469
50	12.500	12.531	12.563	12.594	12.625	12.656	12.688	12.719

SCALE FACTORS FOR A SCALE OF 1 1/2 in. = 1 FOOT

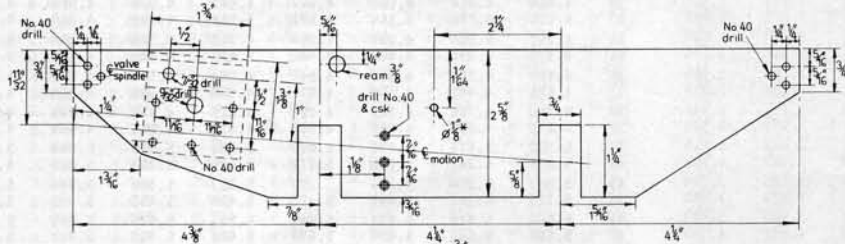
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1	0.125	0.141	0.156	0.172	0.188	0.203	0.219	0.234
2	0.250	0.266	0.281	0.297	0.313	0.328	0.344	0.359
3	0.375	0.391	0.406	0.422	0.438	0.453	0.469	0.484
4	0.500	0.516	0.531	0.547	0.563	0.578	0.594	0.609
5	0.625	0.641	0.656	0.672	0.688	0.703	0.719	0.734
6	0.750	0.766	0.781	0.797	0.813	0.828	0.844	0.859
7	0.875	0.891	0.906	0.922	0.938	0.953	0.969	0.984
8	1.000	1.016	1.031	1.047	1.063	1.078	1.094	1.109
9	1.125	1.141	1.156	1.172	1.188	1.203	1.219	1.234
10	1.250	1.266	1.281	1.297	1.313	1.328	1.344	1.359
11	1.375	1.391	1.406	1.422	1.438	1.453	1.469	1.484
12	1.500	1.516	1.531	1.547	1.563	1.578	1.594	1.609
13	1.625	1.641	1.656	1.672	1.688	1.703	1.719	1.734
14	1.750	1.766	1.781	1.797	1.813	1.828	1.844	1.859
15	1.875	1.891	1.906	1.922	1.938	1.953	1.969	1.984
16	2.000	2.016	2.031	2.047	2.063	2.078	2.094	2.109
17	2.125	2.141	2.156	2.172	2.188	2.203	2.219	2.234
18	2.250	2.266	2.281	2.297	2.313	2.328	2.344	2.359
19	2.375	2.391	2.406	2.422	2.438	2.453	2.469	2.484
20	2.500	2.516	2.531	2.547	2.563	2.578	2.594	2.609
21	2.625	2.641	2.656	2.672	2.688	2.703	2.719	2.734
22	2.750	2.766	2.781	2.797	2.813	2.828	2.844	2.859
23	2.875	2.891	2.906	2.922	2.938	2.953	2.969	2.984
24	3.000	3.016	3.031	3.047	3.063	3.078	3.094	3.109
25	3.125	3.141	3.156	3.172	3.188	3.203	3.219	3.234
26	3.250	3.266	3.281	3.297	3.313	3.328	3.344	3.359
27	3.375	3.391	3.406	3.422	3.438	3.453	3.469	3.484
28	3.500	3.516	3.531	3.547	3.563	3.578	3.594	3.609
29	3.625	3.641	3.656	3.672	3.688	3.703	3.719	3.734
30	3.750	3.766	3.781	3.797	3.813	3.828	3.844	3.859
31	3.875	3.891	3.906	3.922	3.938	3.953	3.969	3.984
32	4.000	4.016	4.031	4.047	4.063	4.078	4.094	4.109
33	4.125	4.141	4.156	4.172	4.188	4.203	4.219	4.234
34	4.250	4.266	4.281	4.297	4.313	4.328	4.344	4.359
35	4.375	4.391	4.406	4.422	4.438	4.453	4.469	4.484
36	4.500	4.516	4.531	4.547	4.563	4.578	4.594	4.609
37	4.625	4.641	4.656	4.672	4.688	4.703	4.719	4.734
38	4.750	4.766	4.781	4.797	4.813	4.828	4.844	4.859
39	4.875	4.891	4.906	4.922	4.938	4.953	4.969	4.984
40	5.000	5.016	5.031	5.047	5.063	5.078	5.094	5.109
41	5.125	5.141	5.156	5.172	5.188	5.203	5.219	5.234
42	5.250	5.266	5.281	5.297	5.313	5.328	5.344	5.359
43	5.375	5.391	5.406	5.422	5.438	5.453	5.469	5.484
44	5.500	5.516	5.531	5.547	5.563	5.578	5.594	5.609
45	5.625	5.641	5.656	5.672	5.688	5.703	5.719	5.734
46	5.750	5.766	5.781	5.797	5.813	5.828	5.844	5.859
47	5.875	5.891	5.906	5.922	5.938	5.953	5.969	5.984
48	6.000	6.016	6.031	6.047	6.063	6.078	6.094	6.109
49	6.125	6.141	6.156	6.172	6.188	6.203	6.219	6.234
50	6.250	6.266	6.281	6.297	6.313	6.328	6.344	6.359



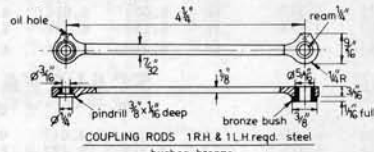
ELEVATION



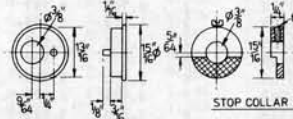
FRONT VIEW



MAIN FRAME: $\frac{3}{32}$ steel plate 1 RH & 1 LH reqd
($\frac{1}{8}$ Lining up hole for expansion link)

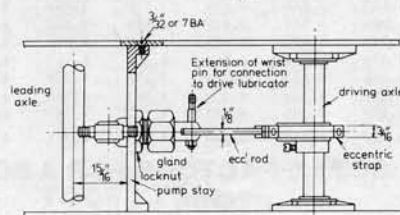
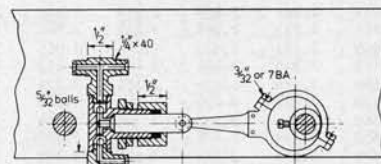


COUPLING RODS 1 RH & 1 LH reqd: steel
bushes bronze



STOP COLLAR

VALVE GEAR ECCENTRIC & STOP COLLAR (for inside motion only)



"Tich" is one of Model Engineer magazine's most popular designs; the plans, of which this much reduced sample is only a small part, have sold in their thousands and there must be hundreds of examples of the finished loco in existence. To the popular $3\frac{1}{2}$ inch gauge, "Tich" represents a small contractors' loco and was designed by the legendary LBSC in association with L. Clarke; it is a fine beginners' model and would make an ideal introduction to the hobby for the novice. ASP market the plans.

These drawings, although only of the general arrangement kind, are usually very well drawn and highly detailed and can be extremely useful.

Suppose we have a drawing that is not to the required scale; what can we do? Fortunately there are several alternatives available. Firstly we can laboriously sit down with our calculator, and re-draw the thing to the required scale. We could also work direct from the drawing and just scale the parts as we make them. Some specialist firms have equipment available that will print the drawing for us to the scale required — Variscale, for example, specialise in doing this with model drawings.

It is also possible to scale the drawings without a lot of figure-work, one way being to make a pair of proportional dividers. These are double-ended dividers with the pivot at a set distance from each end. One end has the point at the known drawing scale from the pivot and the other at the scale required, or a multiple of both.

Suppose we know our drawing is to $\frac{1}{4}$ in. to the foot scale and we want to convert it to 1 in. to the foot. If we made our dividers with the points at one end two inches from the pivot and, at the other, eight inches from the pivot, we could now convert our known measurement (using the short points) to our new drawing using the long points which will be set automatically to the correct measurement.

When the drawings have been obtained, whether to scale or not, always check thoroughly each measurement before committing yourself. Most drawings contain mistakes of one form or another, and this really cannot be helped. Anyone who has done a lot of drawing will realise how easy it is to get a couple of measurements wrong! When you realise that the drawings are probably drawn in the first instance by the designer and then go to be traced, it's easy to understand the possibility of error. Likewise, someone building a model first and producing a drawing

later can easily slip up and the error pass unnoticed. So be prepared for errors and check for accuracy regularly. Such errors occur in full-size practice as well as in modelling and, in fact, when batches of locomotives were made, frequently specifications were changed on the shop floor after discussion with the designer and the drawings never up-dated. Plenty of full-size locomotive drawings are not correct for this reason. It is also a good idea to obtain photographs of the subject to be modelled as well and compare your drawings with these before finally committing yourself.

Mark Phillips, one of the Model Engineer magazine panel of consultants, has very kindly prepared a set of tables which give scale sizes in relation to full-size. They will help readers to build not only the main model, but also the desirable sundries such as lamps and shovels, etc., to the correct scale.



Model Engineer PLANS SERVICE

Precision drawings for model constructors

IMPROVE YOUR FACILITIES — BUILD SOME EXTRA WORKSHOP EQUIPMENT

W.E. 1 Power Driven 6 in. Bench Grinder. By Edgar T. Westbury. (Vol. 83). For belt drive, with ring oiled bush bearings. Two sheets giving general arrangement and details. Price £4.00

W.E. 2 High Speed Sensitive Drilling Machine. By Edgar T. Westbury. (Vols. 84-85, 94-95). A most useful machine, taking drills up to 1/4 in., with sensitive lever feed for fine drilling. Price £3.25

W.E. 3 "M.E." 1 1/2 in. Universal Swivelling Bench Vice. By Edgar T. Westbury. (Vol. 100). Rotates to any position and tilts up to 90°. Ideal for filing and fitting small intricate parts. Price £1.80

W.E. 4 Sawing and Filing Attachment for the Lathe. By Edgar T. Westbury. (Vol. 102). For cross slide mounting, with drive from the headstock. Price £3.25

W.E. 5 Power Driven Hacksaw Machine. By "Duplex". Has motorised drive with belt and spur reduction gear, and takes high speed machine or hand-saw blades. Price £4.75

W.E. 6 Tailstock Turret. By "Exactus". (Vols. 117-118). Improved form of this handy appliance, with six tool positions for drills, taps, or form tools. With clamp holder for 3 in. shanks, with No. 2 Morse taper shank. Price £1.80

W.E. 7 "M.E." Spray Gun Mark II. By Edgar T. Westbury. (Vol. 69). Operating from compressor on 10-35 p.s.i. at about 1 cu. ft. per minute, this is an injector type spray gun, controlled by thumb valve in pistol grip. Jet sizes can be varied. Price £2.50

W.E. 8 Boring and Facing Head. By Edgar T. Westbury. Has radial slide and automatic feed in both inward and outward directions, and converts a 3 1/2 in. lathe into an efficient horizontal boring machine. Price £1.80

W.E. 9 Bending Rolls. By Martin Evans. Especially designed for model boiler work, with capacity 12 in. x 1/8 in. annealed copper sheet. No castings are required for construction. Price £1.80

W.E. 10 Workshop Hints and Tips. By "LBSC". (Formerly numbered L.O. 87). Sixteen sketches which show how to perform various machining and assembly operations, with designs for small accessories. Price £2.50

W.E. 11 Light Vertical Milling Machine. 1/2 in. capacity. By Edgar T. Westbury. Two sheets. Price £5.50

W.E. 12 Milling Attachment for Valve Gear Links. By Martin Evans. Price £1.00

W.E. 13 A Small Centre Lathe. By J. K. Mold. Two sheets. Price £4.00

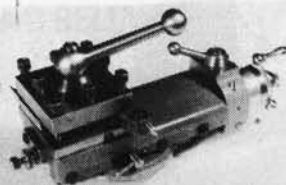
W.E. 15 Pillar Drilling Machine. 1/2 in. capacity. By B. Hatfield. Price £3.25

W.E. 16 1/2 in. capacity Fabricated Drill Press. By Martin Cleave. Price £5.50

W.E. 18 Horizontal-Pivot Spherical Turning Attachment. By Cohen and E. T. Westbury. Price £2.50

W.E. 19 Twist Drill Grinding Jig. By Ian Bradley. Drawing gives full details of jig and the grinding jig and instructions for use. Price £4.00

W.E. 23 Retracting Top Slide by George Thomas. A retracting Top-Slide for screw cutting suitable for the Myford Super 7 lathe. Price £3.25



W.E. 20 A versatile dividing head.

Sheet 1 General arrangement drawings. Price £3.25

Sheet 2 Further details of individual components for general arrangement. Price £3.25

M.M. 121 Miniature Blowlamp. A small and compact blowlamp for operation with lighter fuel. Excellent for small brazing and silver soldering jobs. With instructions. Price £2.50

M.M. 126 Four-Way Toolpost. A quickly made and invaluable accessory that requires no castings. Easily assembled. Price £1.80

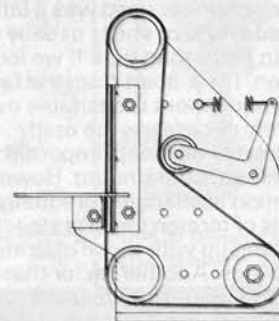
M.M. 127 Tailstock Turret Toolholder. No castings are needed for this useful accessory which holds six tools and greatly eases repetition work. Price £1.80

M.M. 136 Collet Set. This set features an adaptor screwing on the lathe mandrel accepting collets (or split chucks) in any size up to 1/2 in. Full details on one sheet. Price £1.00

M.M. 146 Saw Bench. A neat bench for a 6 in. circular saw, includes a lathe sawtable. No castings are available, but fabrication is possible. Price £3.25

YOU'LL WONDER HOW YOU EVER DID WITHOUT IT ONCE YOU'VE BUILT ONE!
W.E. 21 Small Linishing Machine

With vertical run belt capacity up to 50mm by Alan Aldridge. Price £3.25



M.M. 147 Dividing Head. A simple device to employ the lathe changewheels for dividing. Two castings are desirable but the accessory can be made without castings. Price £2.50

M.M. 155 Micrometer Boring Head. Easily made without castings on a 3 1/2 in. lathe, this accessory allows advancement of the tool in a positively controlled manner in steps of .001 in. Price £1.00

M.M. 161 Motorised Conversion for Hand Shaper. Primarily intended for the Adept No. 2, this conversion by L. H. Sparey can be adapted to similar small self-acting hand shapers. Price £1.80

M.M. 173 Screw Cutting Gearbox. This design was withdrawn due to absence of castings, but is re-introduced by popular demand. Puts the ordinary lathe into the de-luxe class, but should only be tackled by the expert. Price £4.00

M.M. 203 Screw-Cutting Centre-Lathe. Designed to be built from scrap and easily available materials, with 3 1/2 in. centre. Needs a lathe etc. to make it, and also needs sound knowledge of lathe features, i.e. it is suitable for experienced engineers only. Price £7.20

M.M. 226 Gear Wheel Pump. The simplest form of pump for coolant or oil. Price 80p

M.M. 223 Countershaft. For use with the above lathe, but adaptable to others. Price £1.80

M.M. 279 Sensitive Drilling Machine. Simple home-made aluminium castings and easily available materials are all that are needed for this 1/8 in. capacity drill. Two sheets of drawings. Price £4.75

M.M. 343 Blanking-out Press. Adaptable to a wide range of dies, this tool is most useful, especially for repetition work. Safety guards incorporated. Price £3.25

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