MODELLING STEAM LOCOMOTIVES

Bob Alderman ©2010

WHAT WE SEE

- MAINLY A COAT OF PAINT.

But what is underneath?
Understanding some of this should help build a better model.

What is actually happening with the pipework, the valve gear and those other bits and pieces?

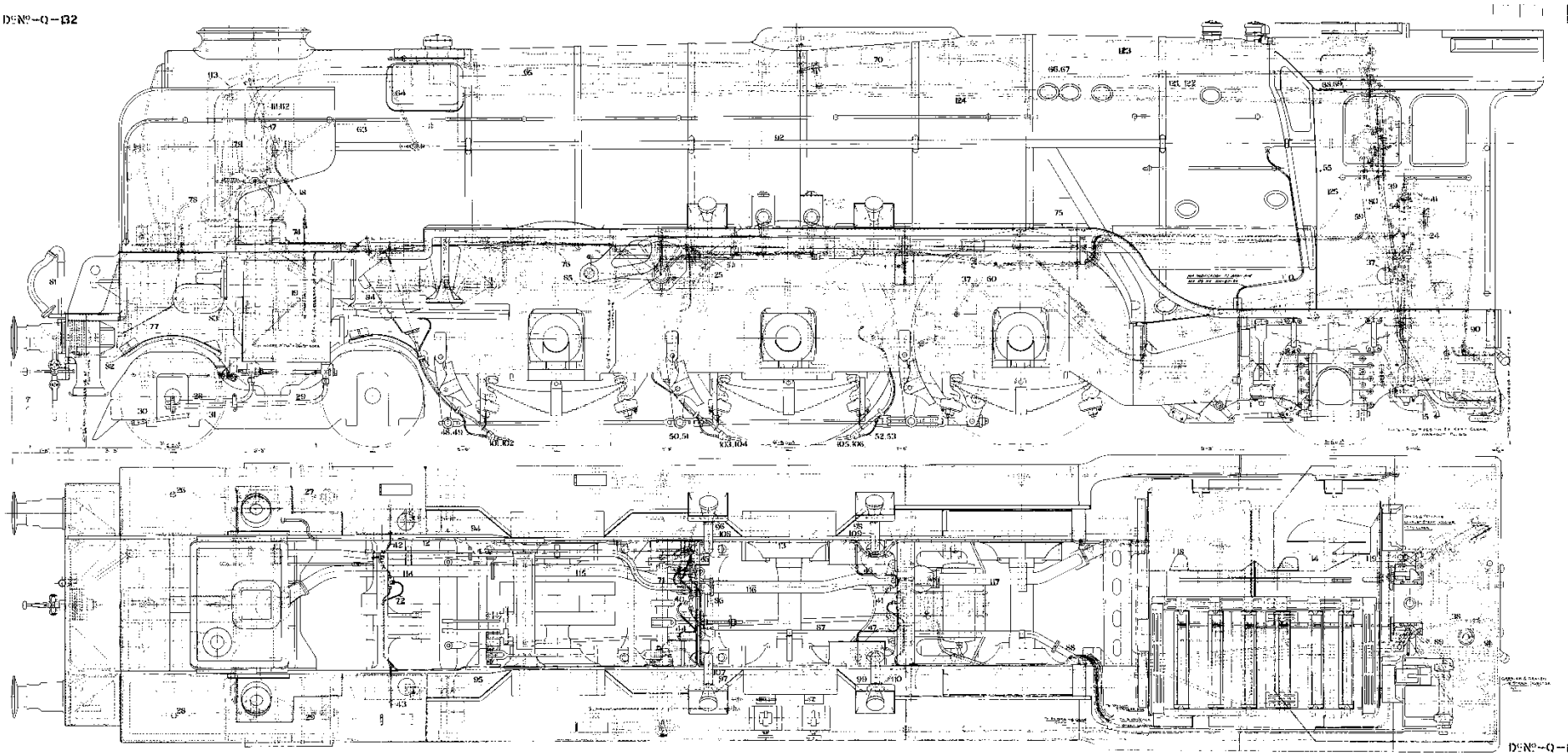
Utilising features in the model to help the model perform.

The boiler

- ***Actually on the model it is just the cladding!***

It only looks like a boiler.

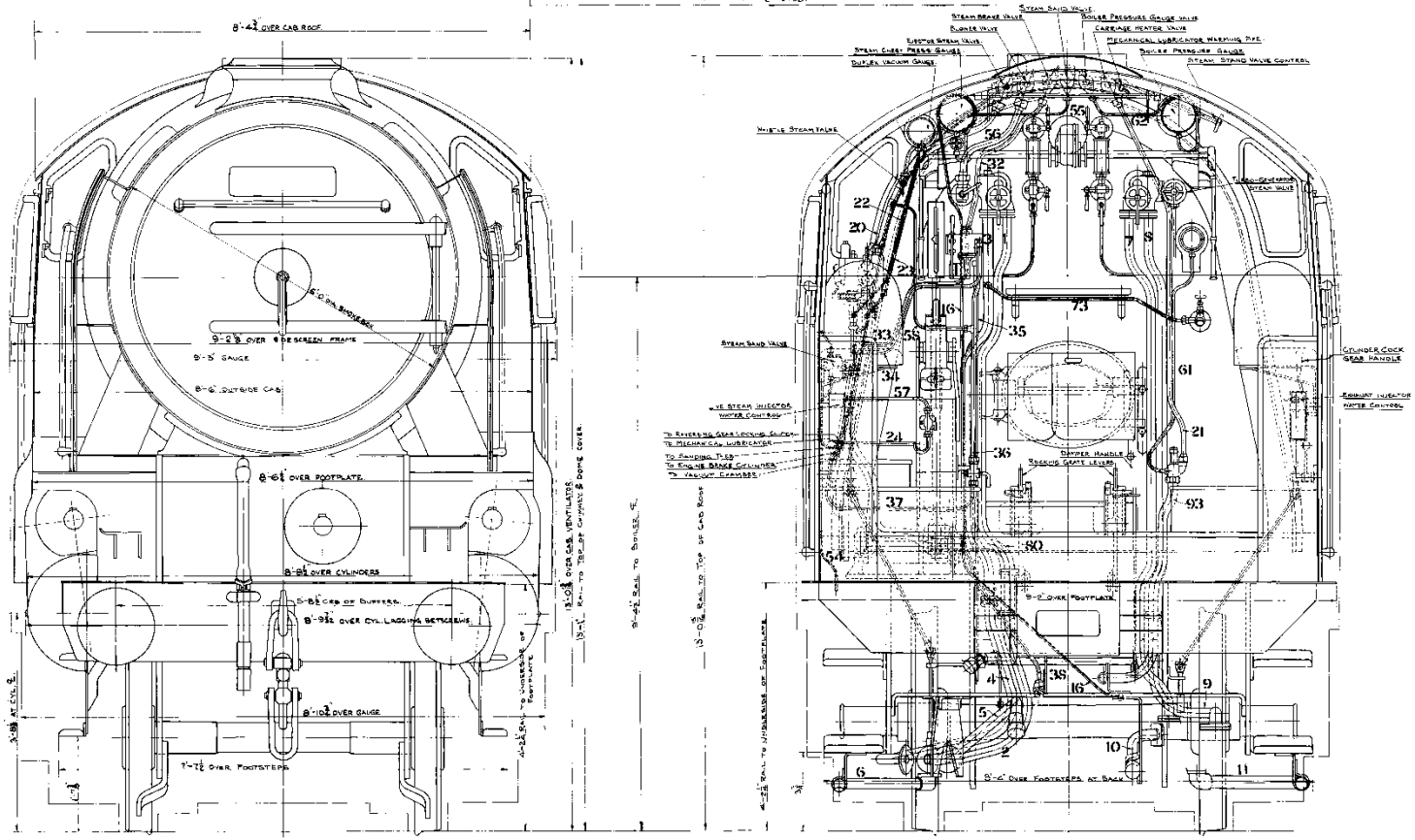
A Pipe & Rod drawing shows all the plumbing – and more.



DG No.-Q-133

BRITISH RAILWAYS — DONCASTER DRAWING OFFICE
PIPE & ROD ARRANGEMENT — END VIEWS
SCALE - 1" = 1 FOOT

ENGINE ORDER	CLASS	YEAR BUILT
382	A-1	
383		
DTON	A-1	
388	A-1	



List of Copper Pipes.

Ref No	Description.	Ext. Dia.	W.G.	No. of Pipes
1, 2	Live Steam Injector. Steam	1⅜	10	2
3, 4	" " Delivery	2	10	2
5	" " Feed	2⅜	8	1
6	" " Overflow	2¾	8	1
7	Exhaust Steam Injector Steam	1⅜	10	1
8, 9	" " Delivery	2	10	1
10	" " Feed	2⅜	8	1
11	" " Overflow	2¾	8	1
12 to 15	Automatic Control	⅜	⅜ Bore	3
16	Auto Control Pipe to Steam Chest Press Gauge	¼	16	1
17	Ejector Exhaust Pipe in Smokebox	3½	8	1
18, 19	" " Drain	½	½ Bore	2
20	Steam Pipe	1¼	10	1
21	Train Heating Pipe in Cab	1	10	1
22	Vac. Chamber Pipe to Gauge	⅜	16	1
23	" " Train "	⅜	16	1
24, 25	Reverse to Gear Cock to Locking Catch	⅜	⅜ Bore	2
26 to 29	Exhaust from Duplex Cylinder Cocks	1½	½ Bore	4
30, 31	" " " "	1¼	½ Bore	2
32	Steam to Driver's Brake Valve	1	10	1
33	Vac. Train Pipe to Driver's Brake Valve	⅜	10	1
34	" Chamber Pipe " " "	⅜	10	1
35	Exhaust from " " "	1	10	1
36	Driver's Brake Valve to Sway Cock	1	10	1
37	Sway Cock to Engine Brake Cylinders	½	10	1
38	" " Tender "	½	10	1
39, 40	Steam Sand Valve to T.E. Pieces Low Delivery	½	½ Bore	2
41	" " " Trailing	½	½ Bore	1
42, 43	T.E. Piece to Sandboxes Leading	½	½ Bore	2
44, 45	" " " Driving	½	½ Bore	2
46, 47	" " " Trailing	½	½ Bore	2
48, 49	Sandbox to Sand Ejector Leading	½	½ Bore	2
50, 51	" " " Driving	½	½ Bore	2
52, 53	" " " Trailing	½	½ Bore	2
54	Drain for Steam Sand Valve	½	½ Bore	1
55	Manifold to	½	½ Bore	1
56	" " to Blower Valve	⅝	10	1
57	Reversing Gear Cock to Vac Ejector	⅜	⅜ Bore	1
58	Brake Cylinders Warming Pipe	¼	16	1
59, 60	Vac. Ejector to Vac Chamber	1	10	2
61	Reducing Valve to Case Hyd. Gauge	¼	16	1
62	Manifold to Boiler Press. Gauge	½	½ Bore	1
63	Blower Pipe in Smokebox	1¼	½ Bore	1
64	Steam to Anti-Carbonizer Cock	1¼	½ Bore	1
65	Main Steam Pipe	2¾	7 Bore	1
66, 67, 68	Injector Steam Pipe	⅝	8	4
70	Anti-Carbonizer Pipe	1¼	10	1
71	T.E. Piece to T.E. Piece (Sanding)	½	½ Bore	1
72	Sanding Sand T.E. to Loco. Sand T.E.	½	½ Bore	1
73	Inj. Delivery Pipe to Coal Blanking Cock	½	½ Bore	1
74 to 76	Steam to Turbo-Generator	1	10	3
77	Constant Drain from Generator	⅜	16	1
78 to 79	Exhaust from Generator	1¼	10	2
80	Vac. Ejector to Train Pipe	2¾	0	1
120	Ejector Exhaust Pipe Drain	⅝	⅜ Bore	1
121, 122	Injector Delivery Pipe	¾	10	2
123	Steam to Steam Value Stand	2¾	8	1
124	Blower Pipe	1	10	1
125	Steam to Generator in Cab	1	10	1

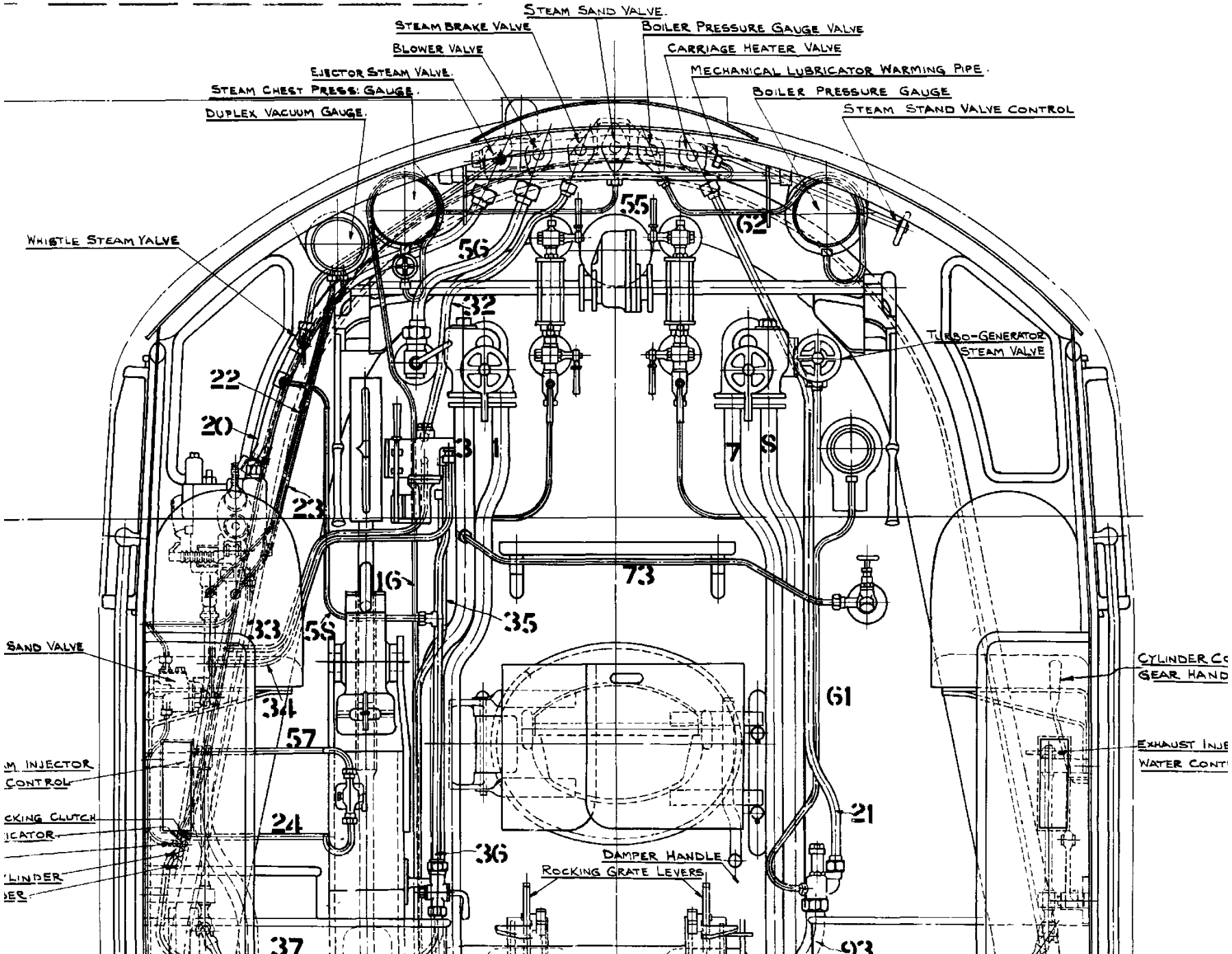
List of Steel Pipes.

Ref No	Description.	Ext. Dia.	W.G.	No. of Pipes
81	Vacuum Train Pipe	2¾	7 Bore	10
82	Ejector Exhaust Pipe	3	0	1
83	Train Heating Pipe	1¾	12	1
84, 85	Leading Sandpipe	1¼	½ Bore	2
86, 87	Driving "	1¼	½ Bore	2
88, 89	Trailing "	1¼	½ Bore	2
90, 91	Pipe from Sand Ejector to Rail	1	½ Bore	6
92 to 95	Sandbox Filler Pipe. Driving	¾ Bore	0	2
96, 97	" " Trailing	¾ Bore	0	2
98, 99	Steel Steam Pipes	5½	5	2
100 to 118	Exhaust Injector Steam "	2¾ Bore	9	8

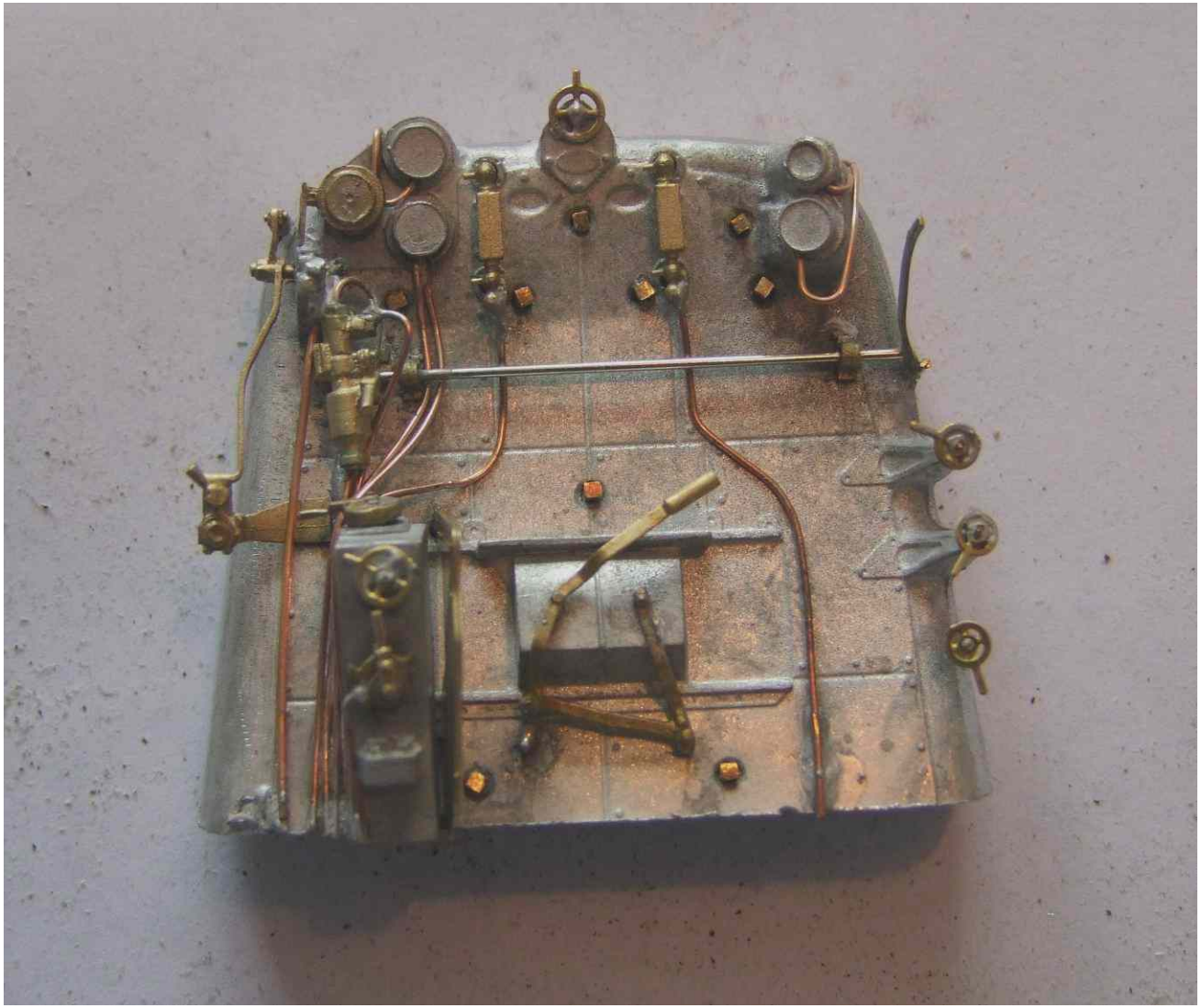
ARRANGEMENT OF CAB FITTINGS C-6418
" PIPES BETWEEN ENGINE & TENDER E-501
" MECHANICAL LUBRICATOR DRIVE H-174
" CYLINDER LUBRICATION H-178
" AXLEBOX " H-178
" SMOKEBOX " X-1018
" LIVE STEAM INJECTOR J-915
" EXHAUST STEAM INJECTOR J-925
" CYLINDER COCK GEAR X-1008
" SAND GEAR X-1004
" VACUUM TRAIN PIPE Y-735
" TRAIN HEATING PIPE Y-1236
" INTERNAL PIPES N-192
" ELEVATION & PLAN VIEWS Q-132
" STONES ELECTRIC LIGHTING E-515

DG No.-Q-133

$-1\frac{1}{2}" = 1$ FOOT

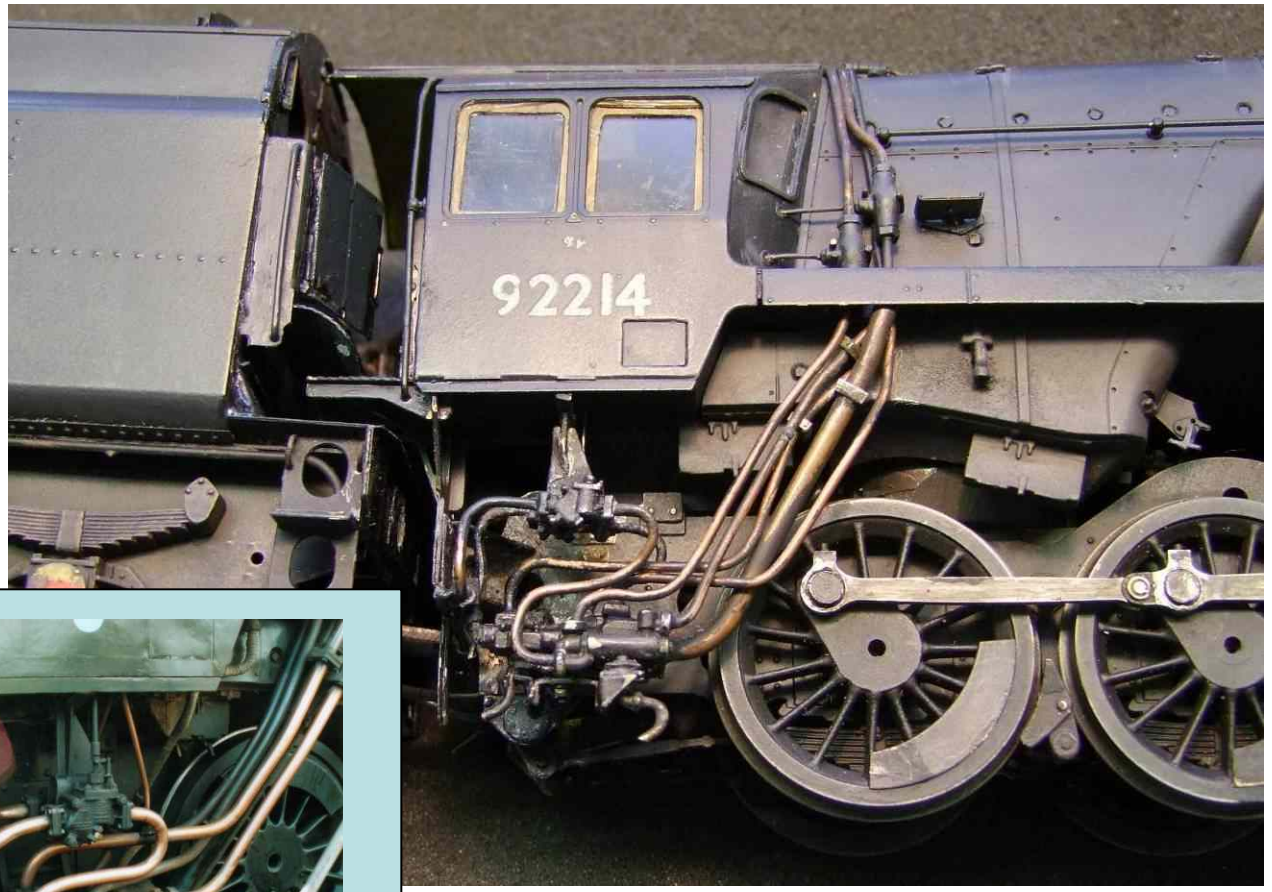


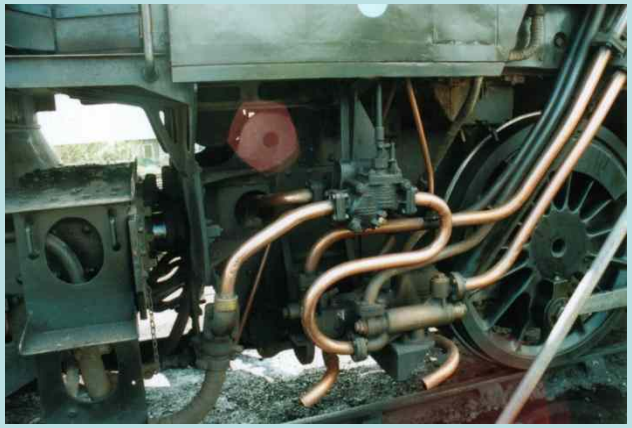
There’s the more difficult plumbing.



… and there are the easy ones.

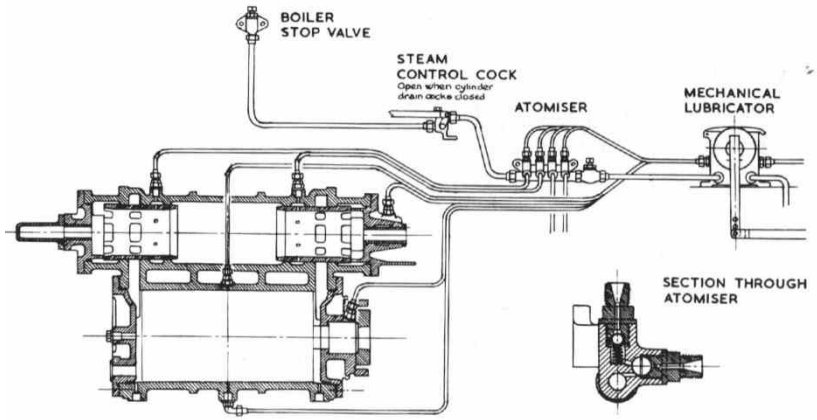
Some you don’t need the drawing.

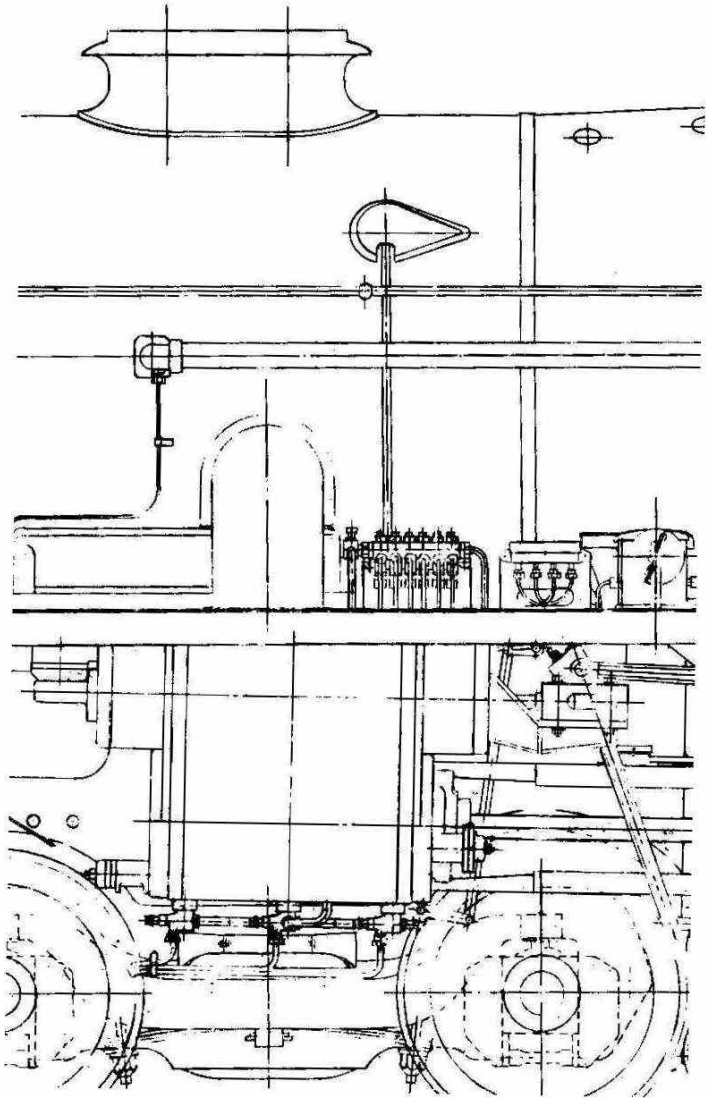




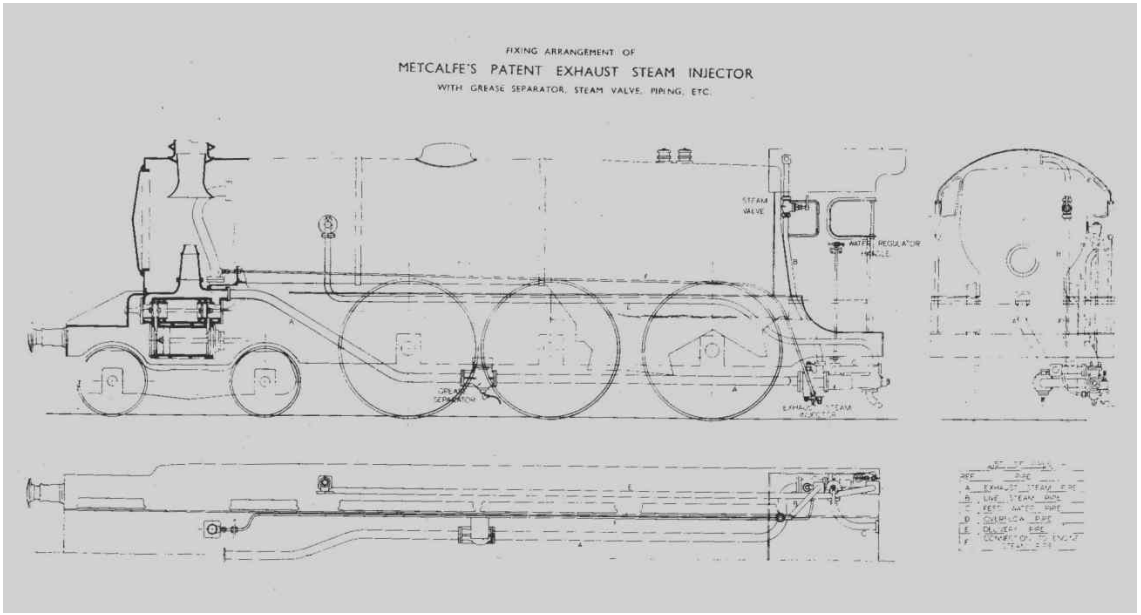
Some of the smaller plumbing.

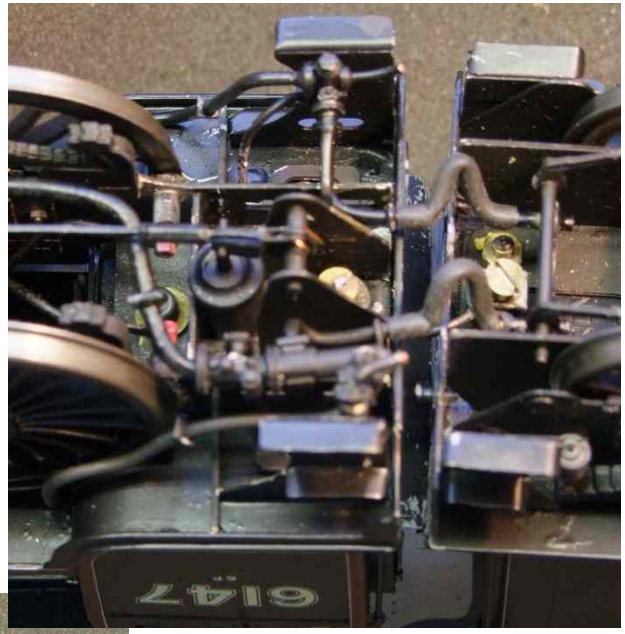
Fig 5
Arrangement of atomised cylinder lubrication.

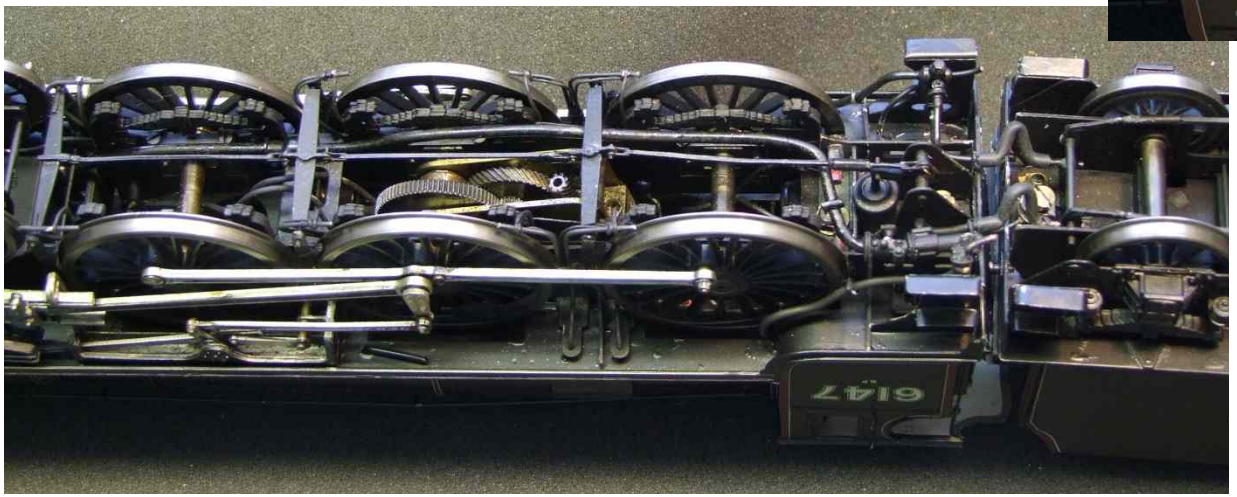




...and the larger.



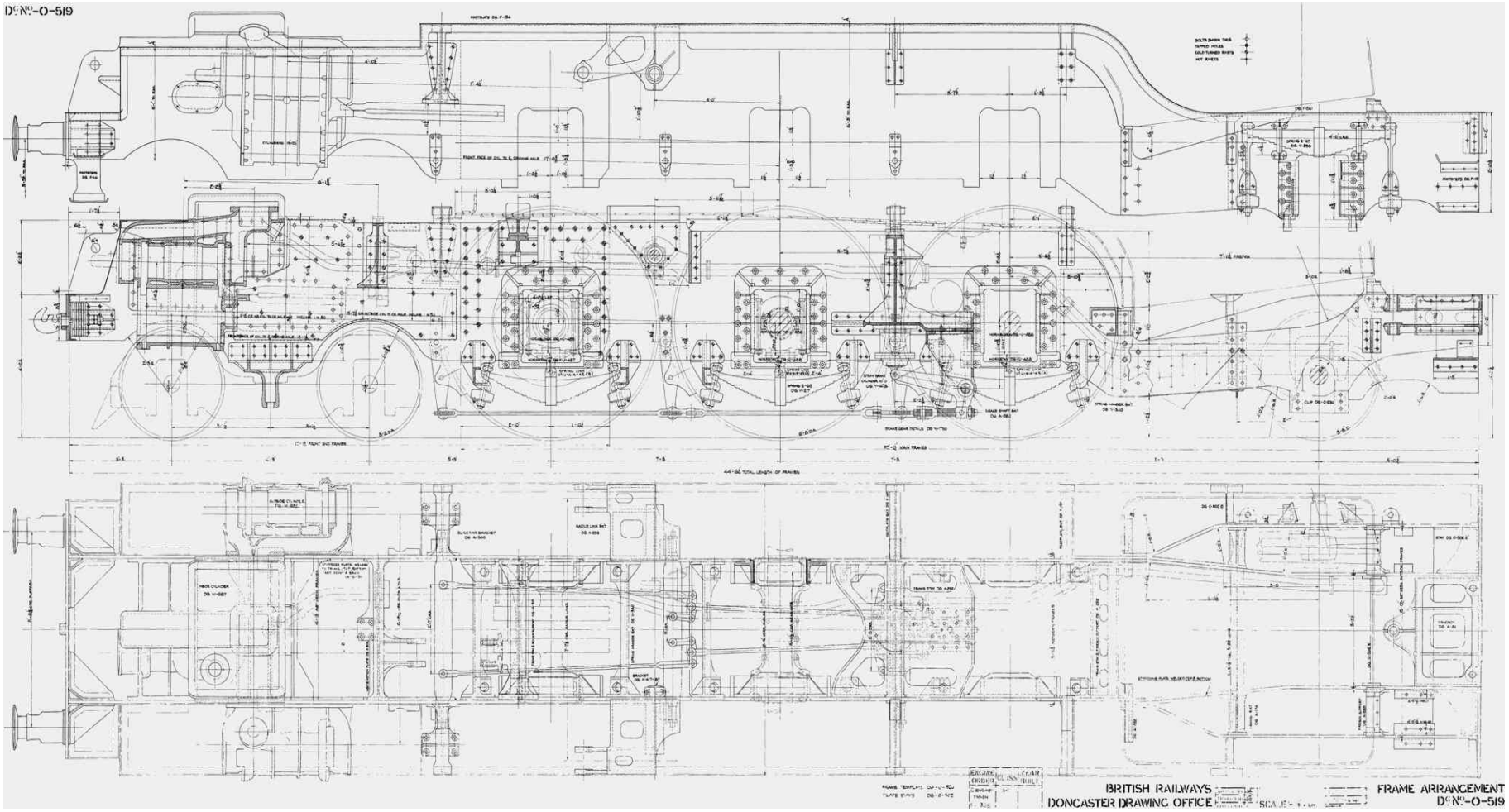




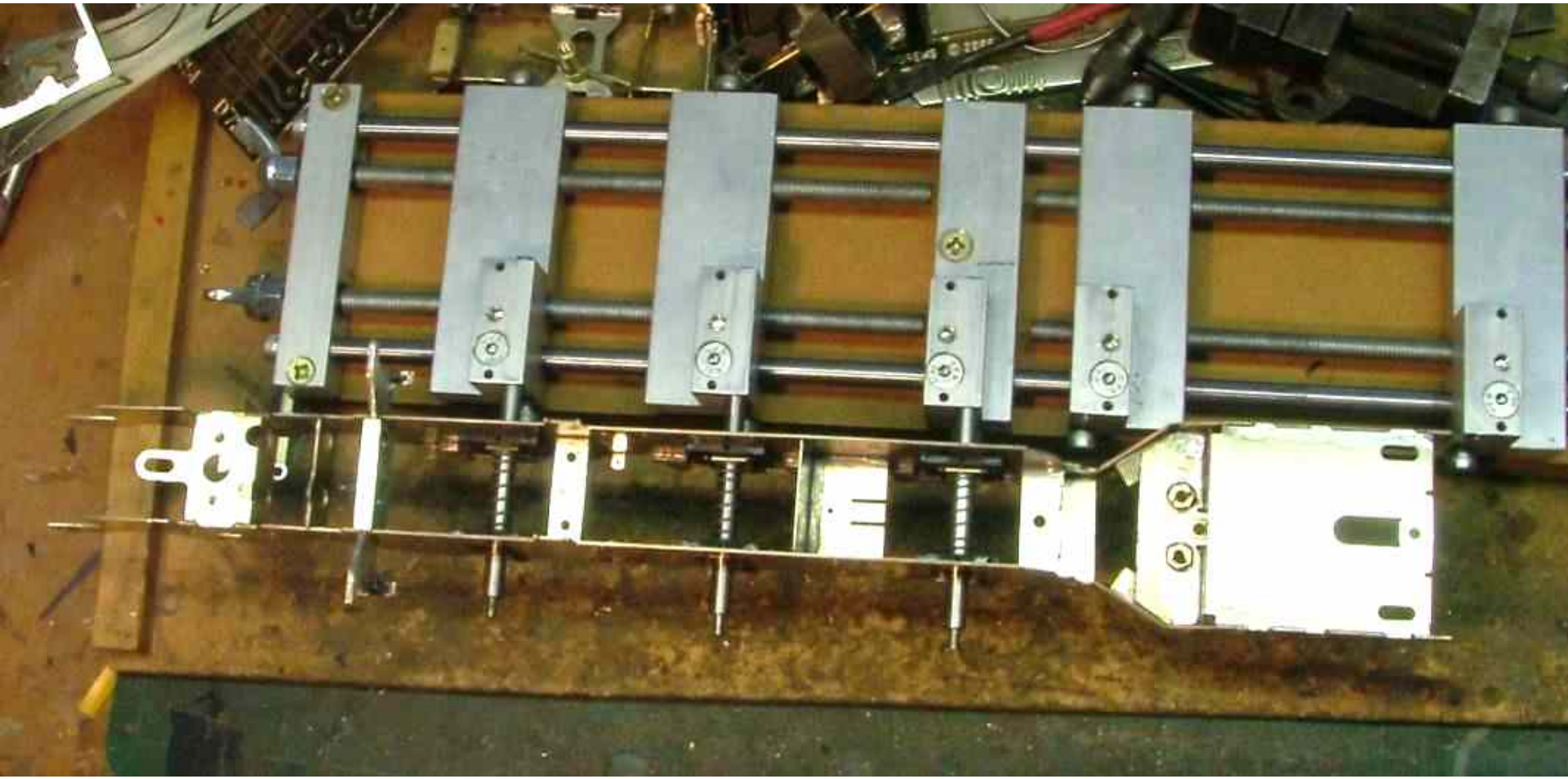
The chassis

On both the model and the real loco this is the keel or foundation upon which the locomotive is assembled.

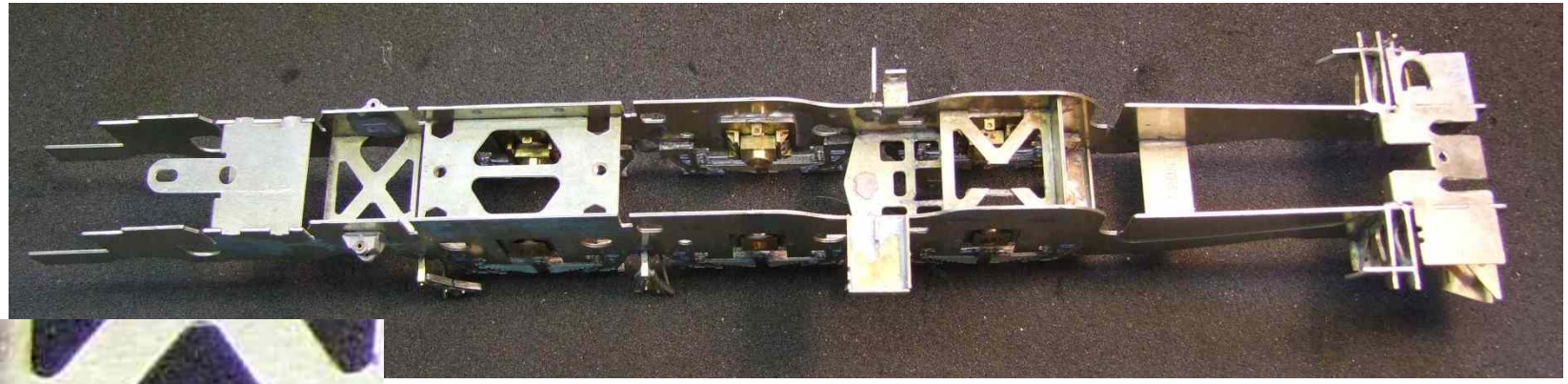
The chassis with all its spacers.

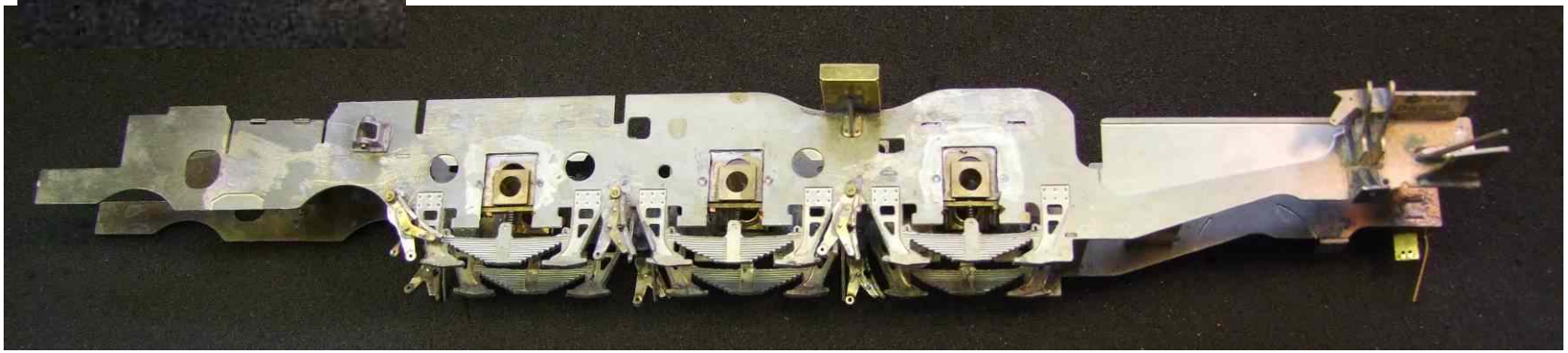


Rather simpler on the model.

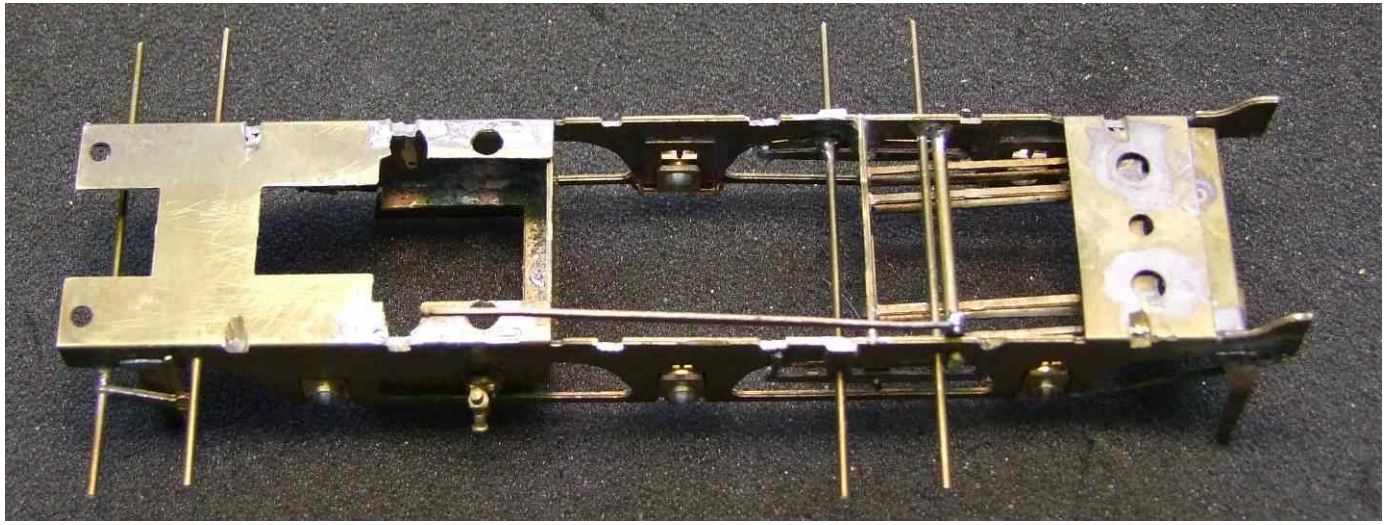


This chassis follows the prototype more closely.

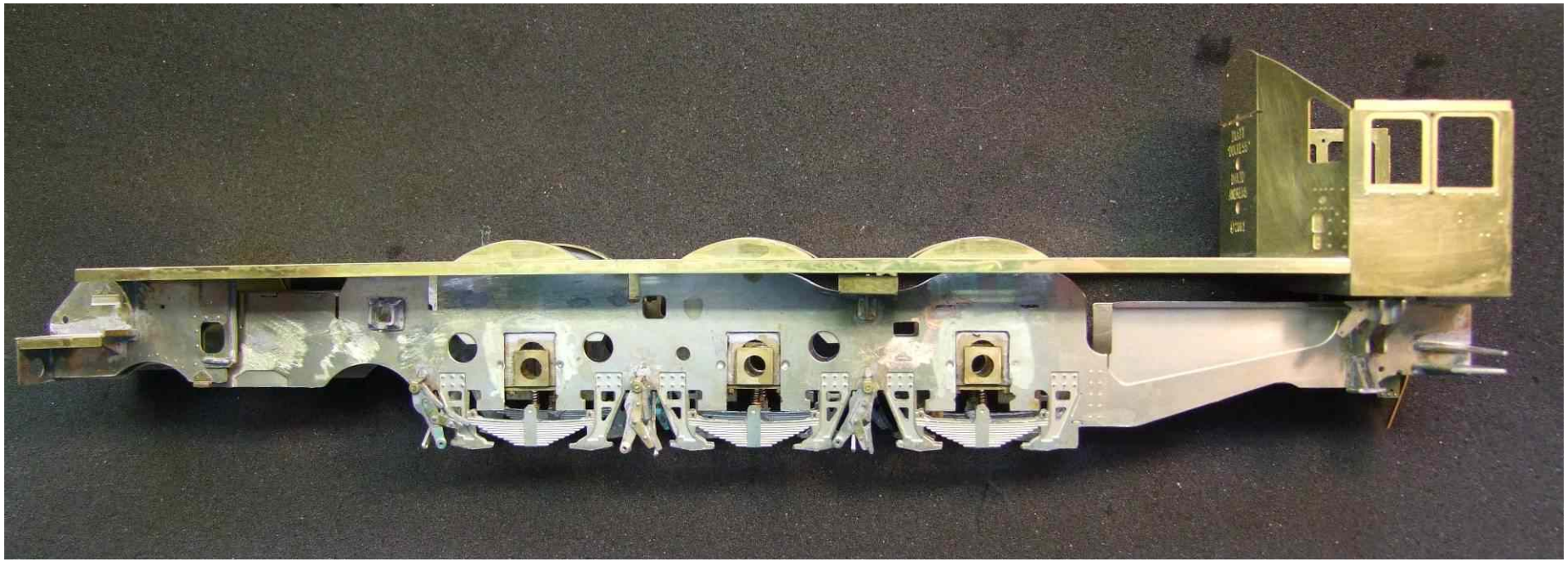




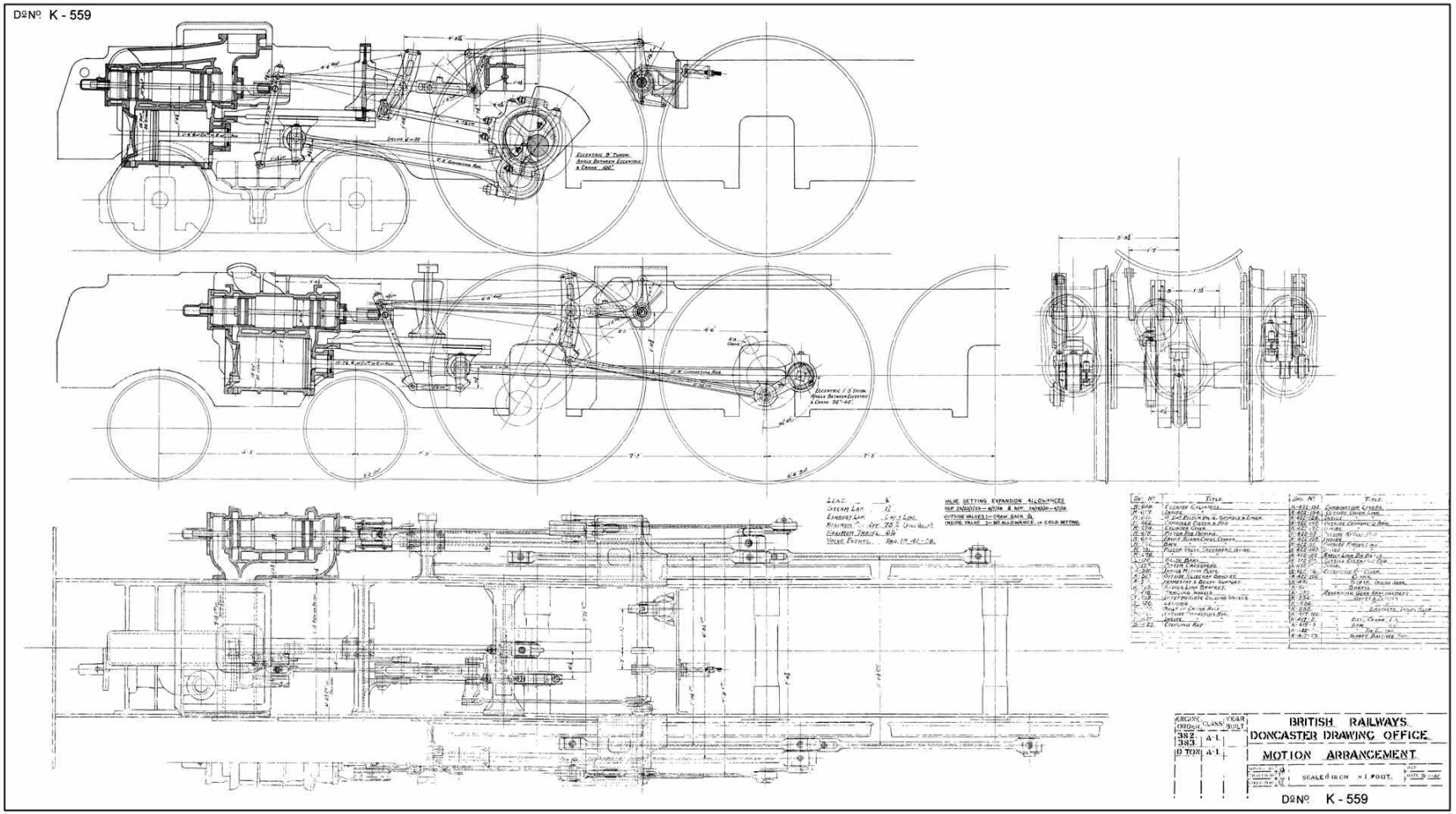
…and there are the apparently simpler chassis’.



The chassis becomes the support upon which to build the superstructure.



The vexed question of valve gear.



Naming the parts.

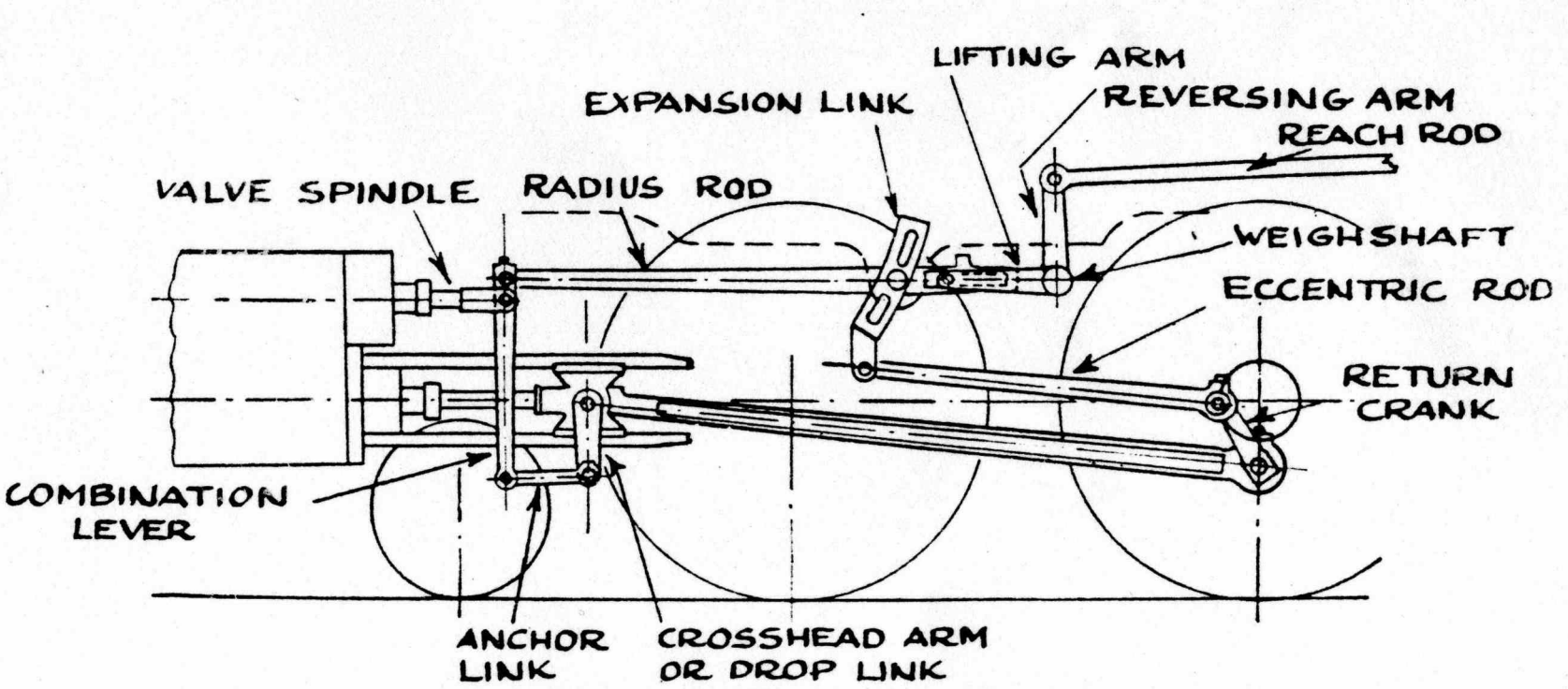
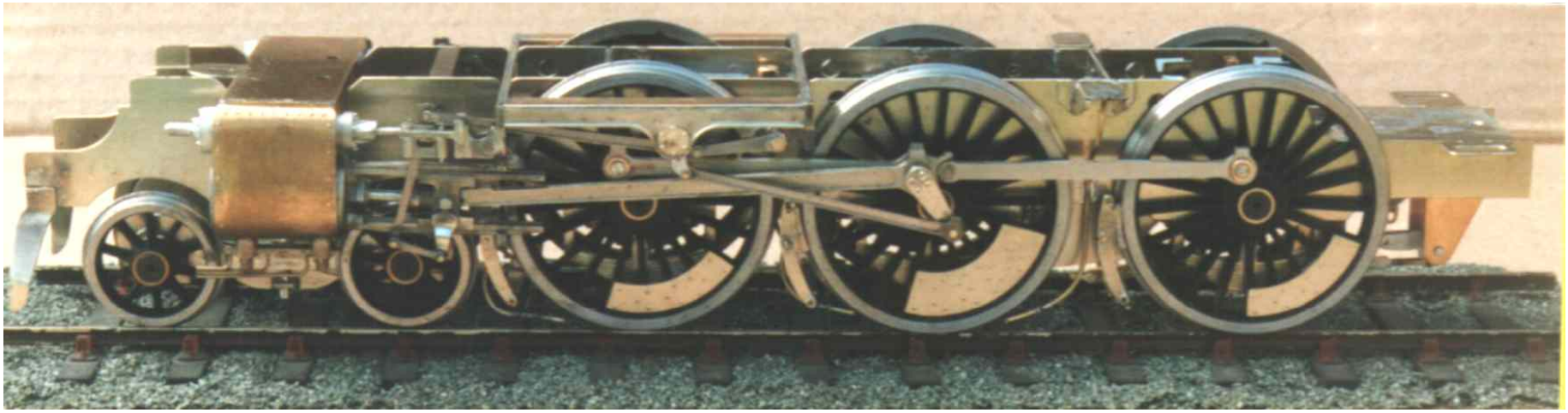
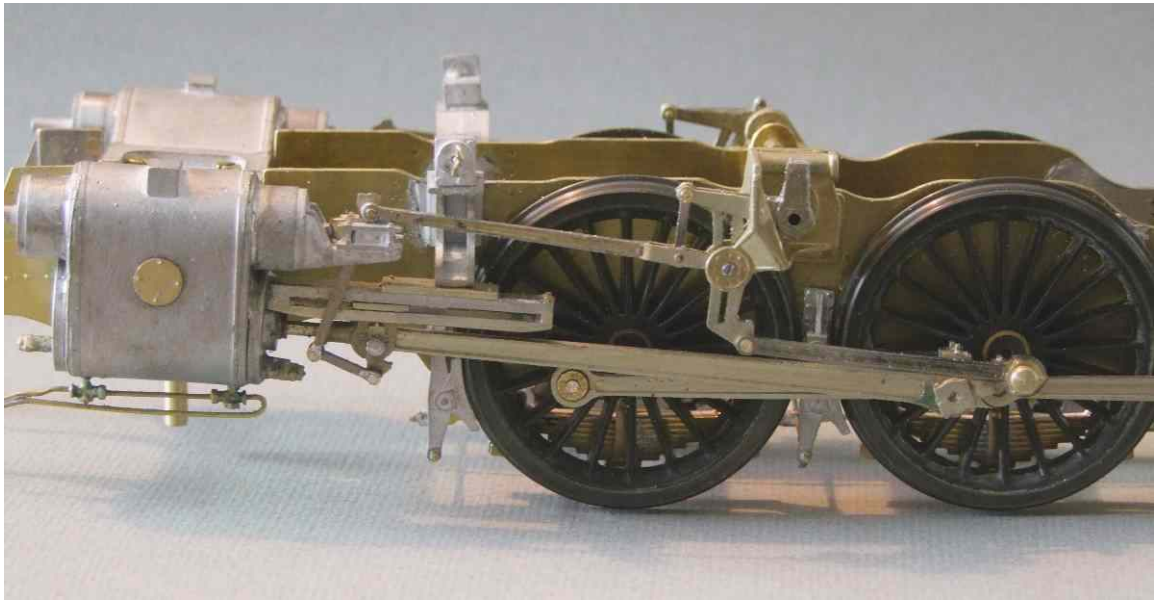


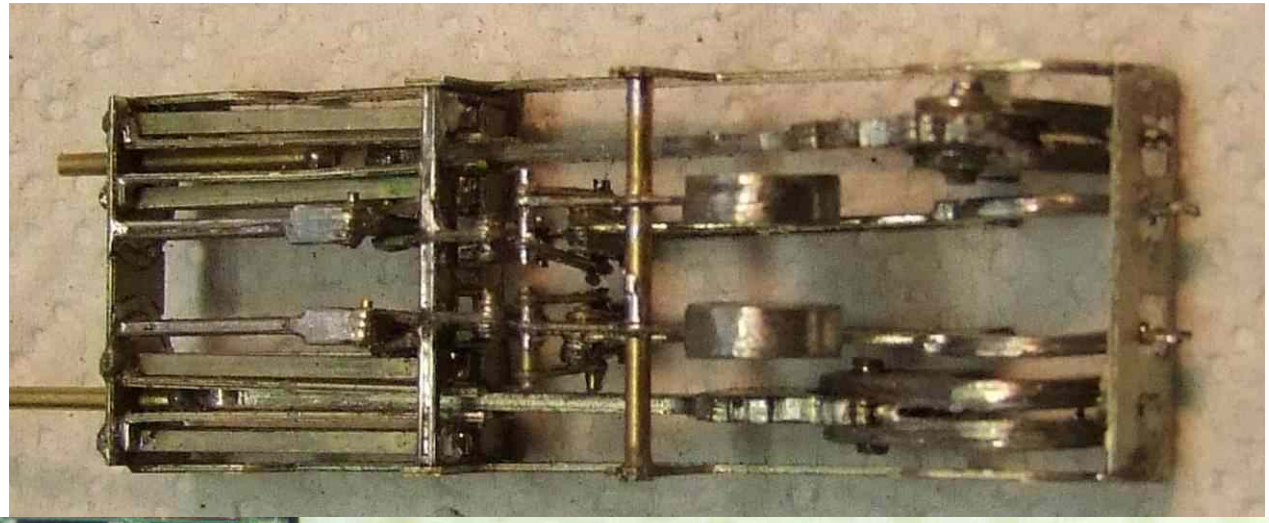
Fig. 63. Walschaerts' Valve Gear for Piston Valve Cylinders

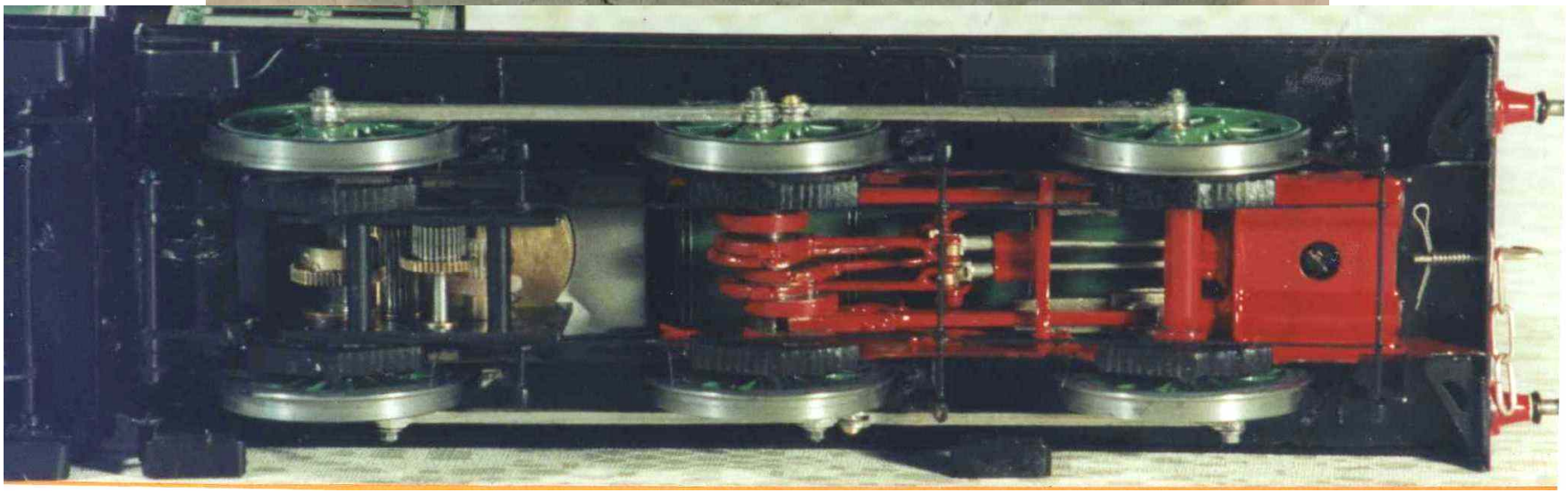




Stephenson’s valve gear.

A drop in unit for a 7mm 4F and components for either a working or cosmetic set.

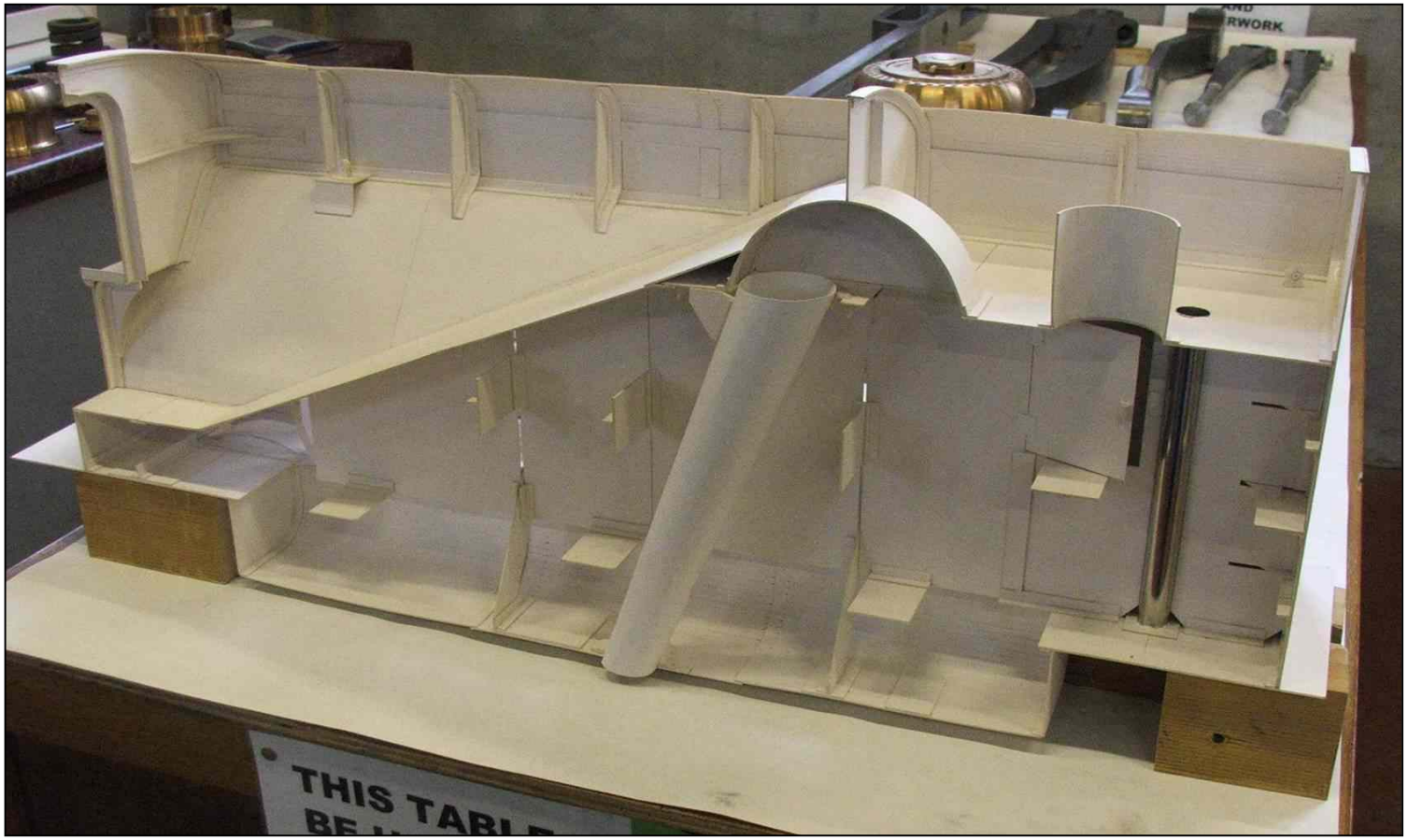


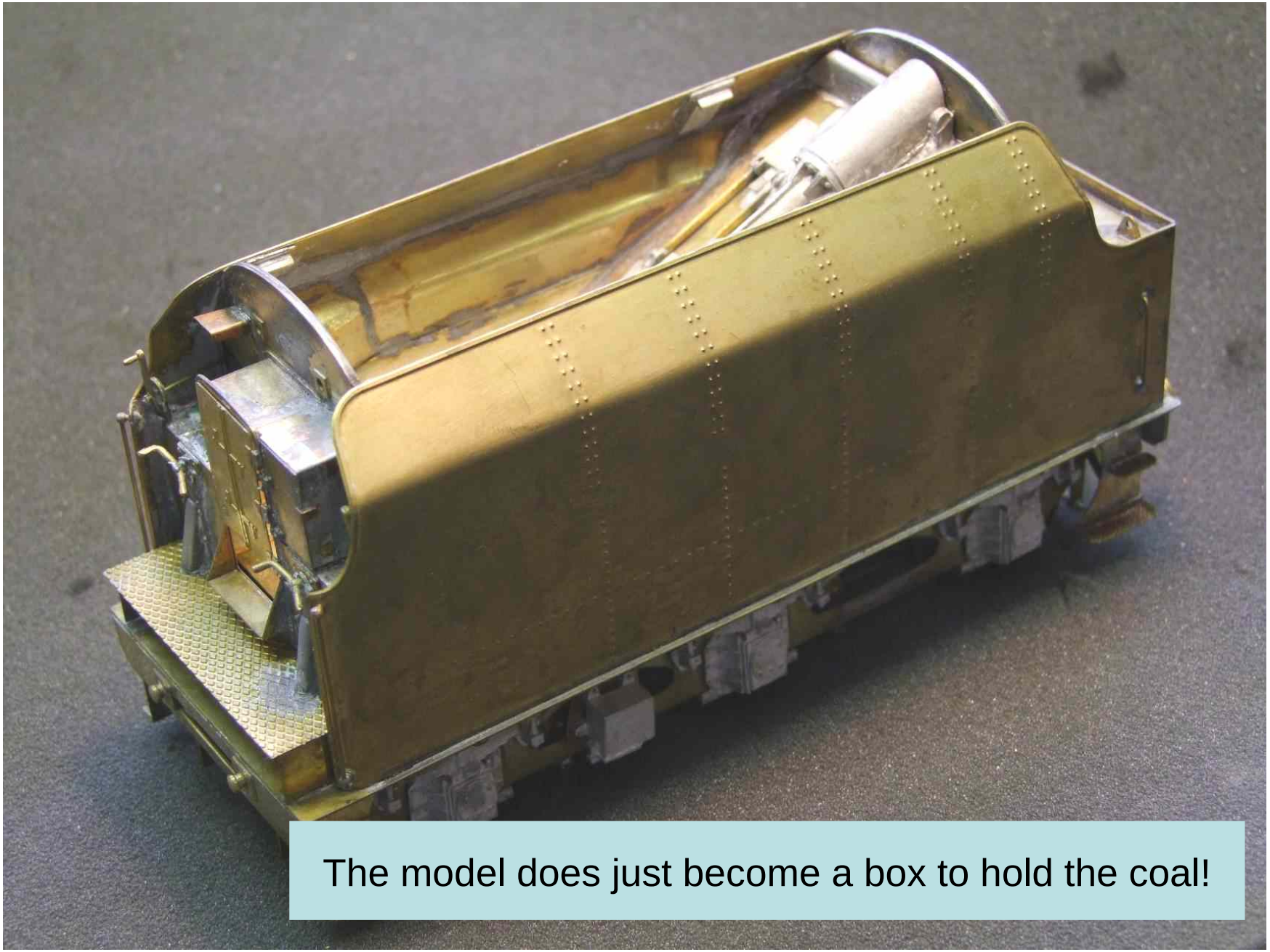


Tenders

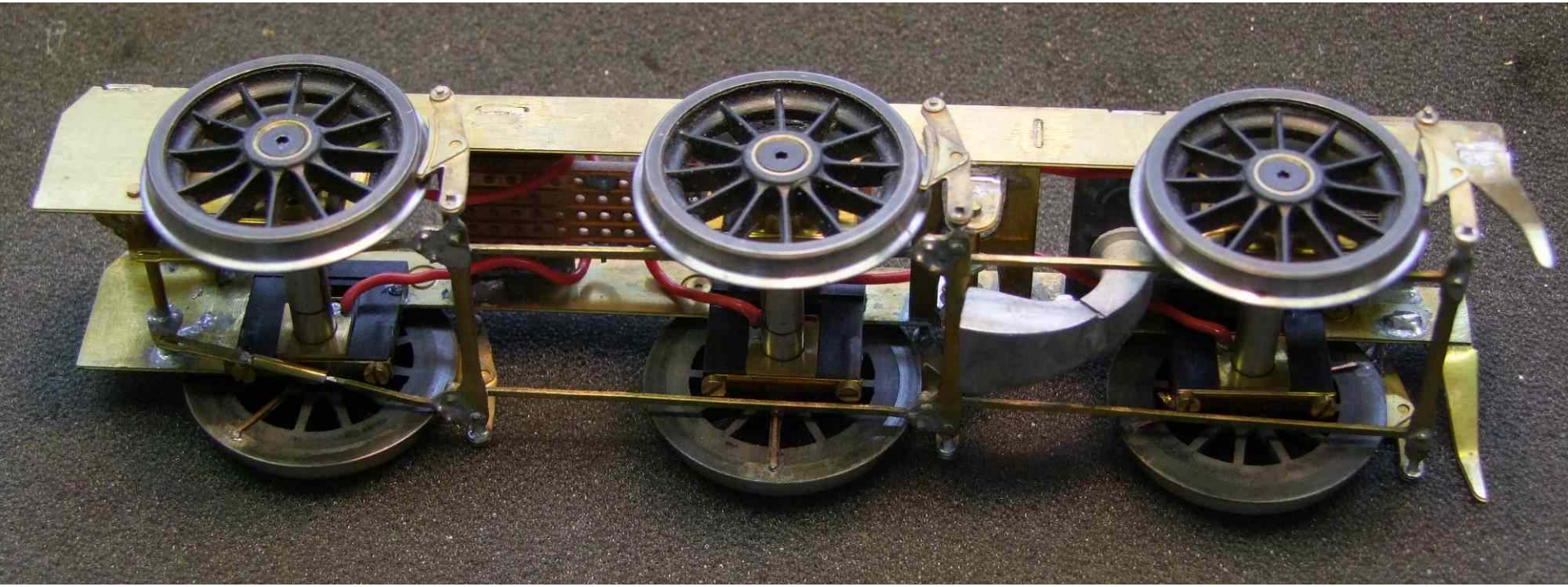
More than a box that just holds water and coal.

Baffles and water scoop.

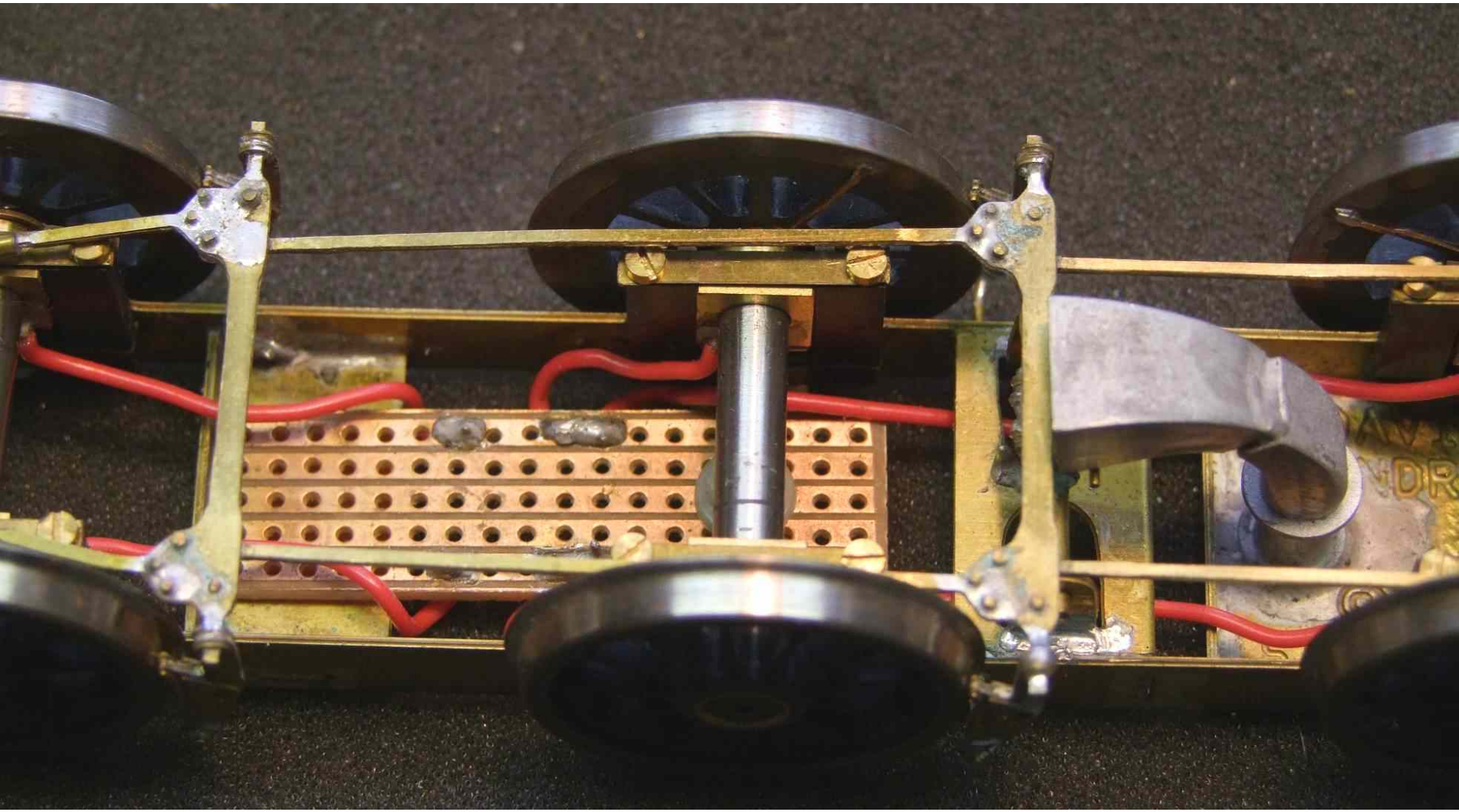



The model does just become a box to hold the coal!

But it can also provide the means for the loco pick up; alone or in conjunction with ones on the loco chassis.



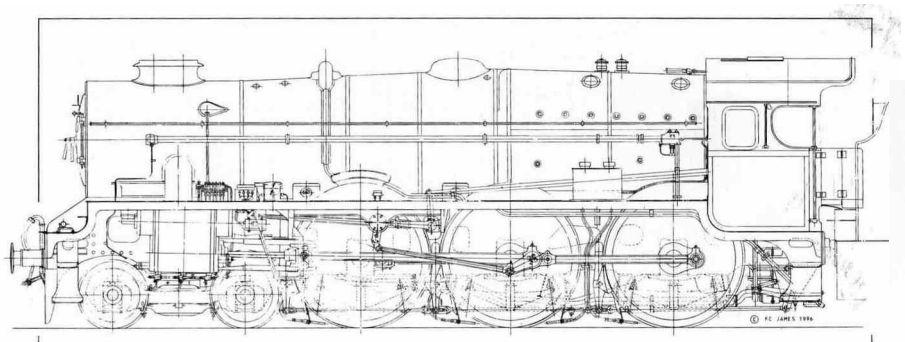
Here it is split axle but could be simple wipers.



Sources of information

Many publications, photos and plans, your own photos.

Drawings can be found in many publications.



This side view, prepared a few years ago by Fred James, shows the external appearance of a typical engine as rebuilt after being fitted with trailing wheel steam sanding but before receiving smoke deflectors or rocking grate. The locomotive has early-type expansion link brackets, indicating that it was one of the North British-built engines, early-style valve spindle crosshead guides, pre-1930 top feed and rectangular-ended coupling rods. As far as we can ascertain, therefore, it represents Nos. 6108, 6112, 6116, 6117, 6119, 6120, 6124, 6144 and 6146 as running in 1944 to 1946 and possibly 6103 and 6109 during the same period after removal of the BTH speedometers and the latter's Stanier pattern coupling rods. Although, as shown in the text, there were so many detail variations in the 'Scots' that it sometimes appears as though no two engines were the same, this drawing plus the other, detailed ones and the photographs reproduced in this work should enable any of them to be modelled or illustrated with a fair degree of accuracy. The front and rear elevations have been drawn by Fred James with reference to a copy of D43-16501, pipe and rod end views, which is in too poor a state to reproduce. Once again, the locomotive depicted is without smoke deflectors and has an early-pattern top feed and rear sanding, whilst the rear view shows it to be without a rocking grat
gun (the sand gun controls are in the centre, half'w
fire doors and regulator). It could be any of the en
between mid-1944 and late 1946 as running in the
worth noting that the blower controls on the rebu
'Patriots' and the first '8F's' were of the old Midlan
they were the only Stanier boilered engines so equ

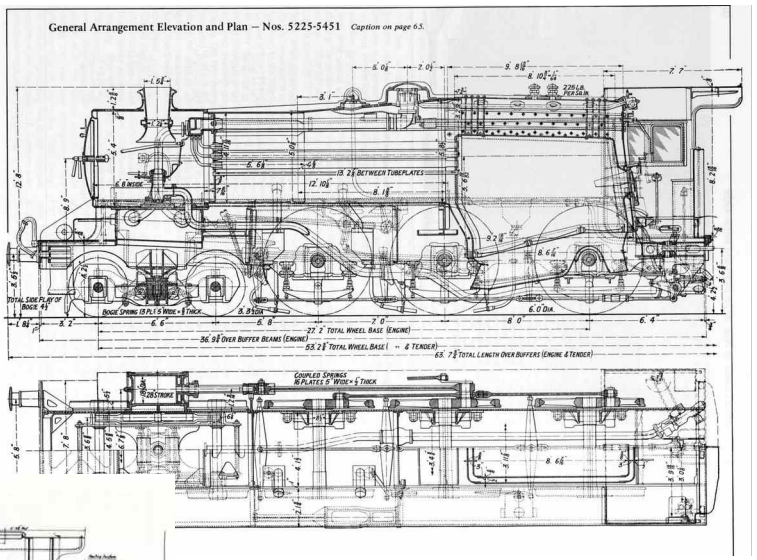
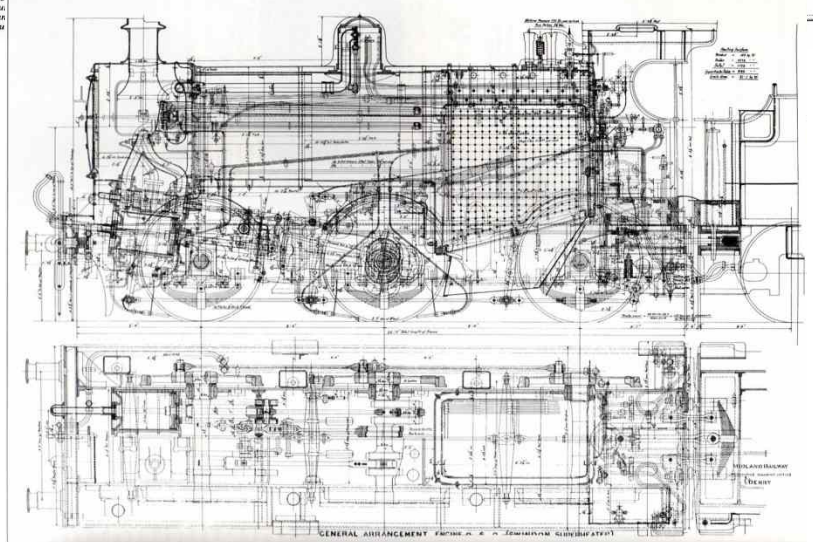
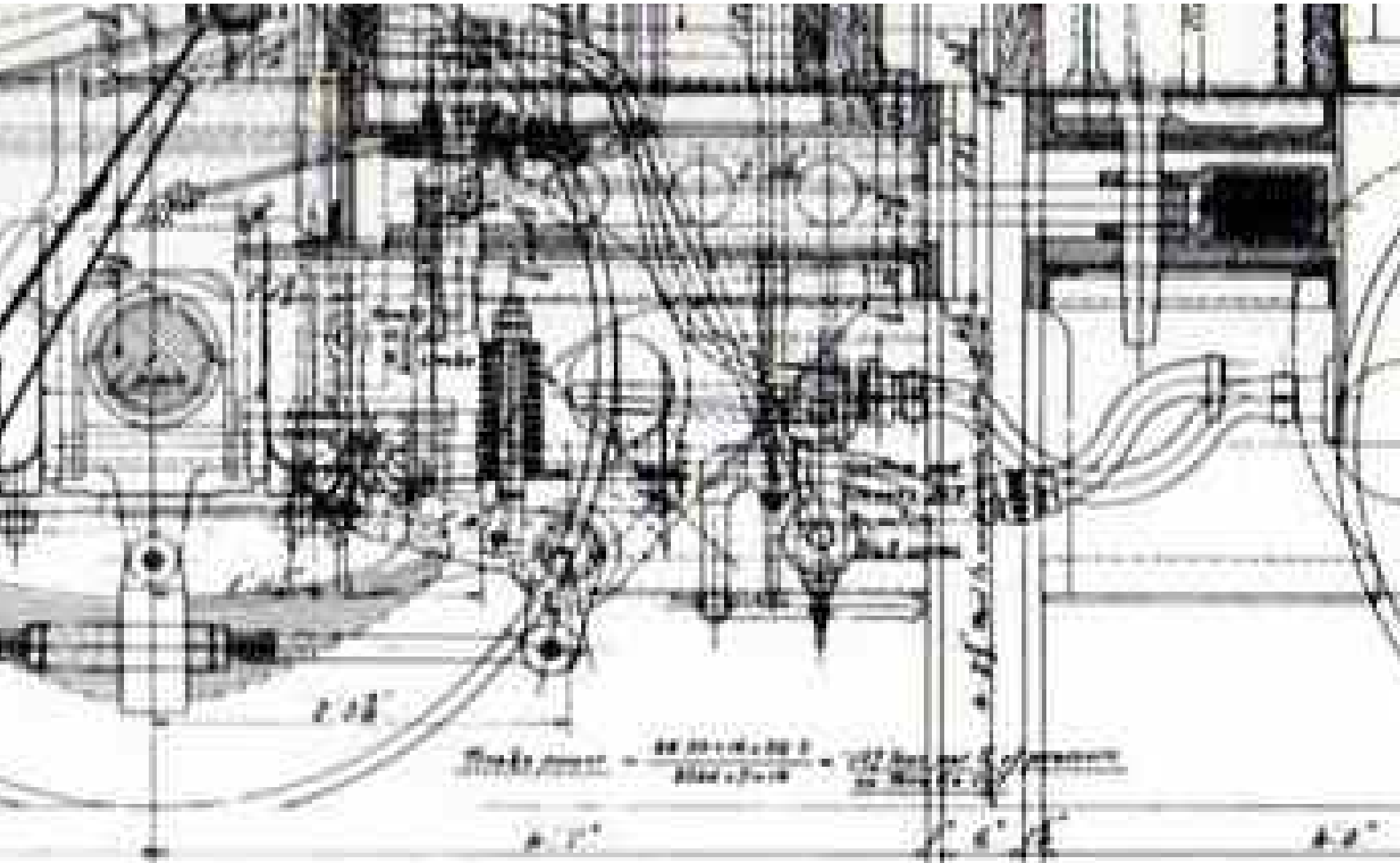


Fig. 24. General Arrangement Drawing for 0–6–0 Goods Engine No. 3836.



Scanned images can be enlarged to see detail more clearly.



Pictures gathered from publications and some taken when visiting preserved railways.