



*Cornwall*

*The Shortest and Best Route*

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# Scratch building Ore Cars Wooden Gondolas and Hoppers

HO Scale 1:87.1



Maps: Google Earth





# Color of Cornwall Iron Ore



These modern ore cars were purchased much later, but are future scratch building projects

Scratch building a model is like cooking your grandma's chicken pot pie. You're going to need a recipe to figure out how it's made.



# PENNSYLVANIA RAILROAD

## CONDOLAS

Step 1 – Go to the source.

REVENUE & WORK EQUIPMENT, 1869 to 1968



By  
**AL  
BUCHAN**  
and  
**ELDEN  
GATWOOD**



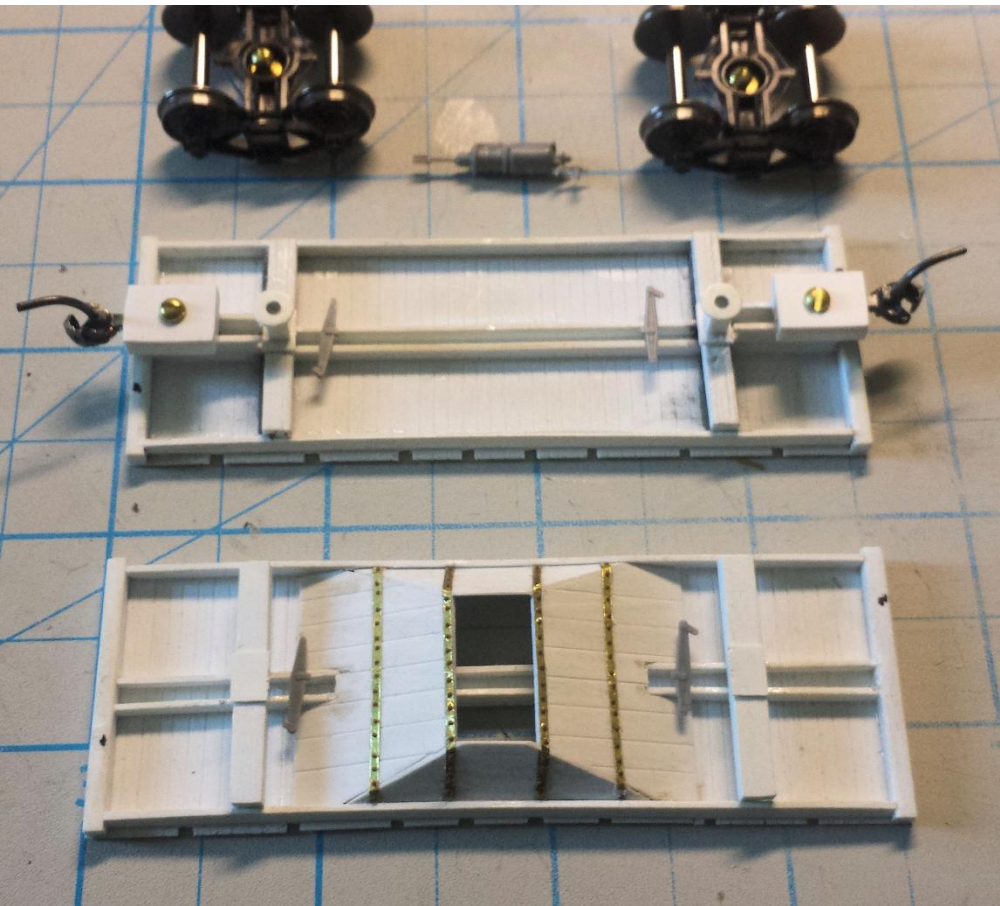
A Publication of the Pennsylvania Railroad Technical & Historical Society

# Combining Data for Drawing

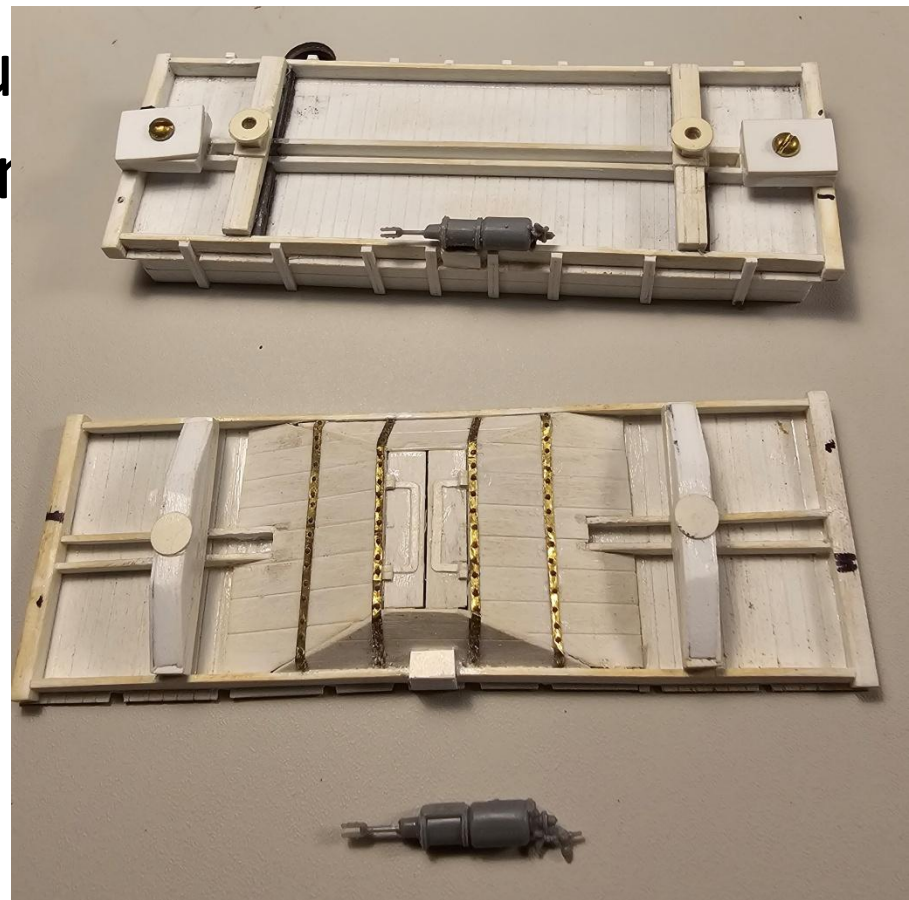
- Mark Cain drew the original drawing. I have made corrections and added details since the original.

Please standby while I open the...

# Construction



5/24/2018



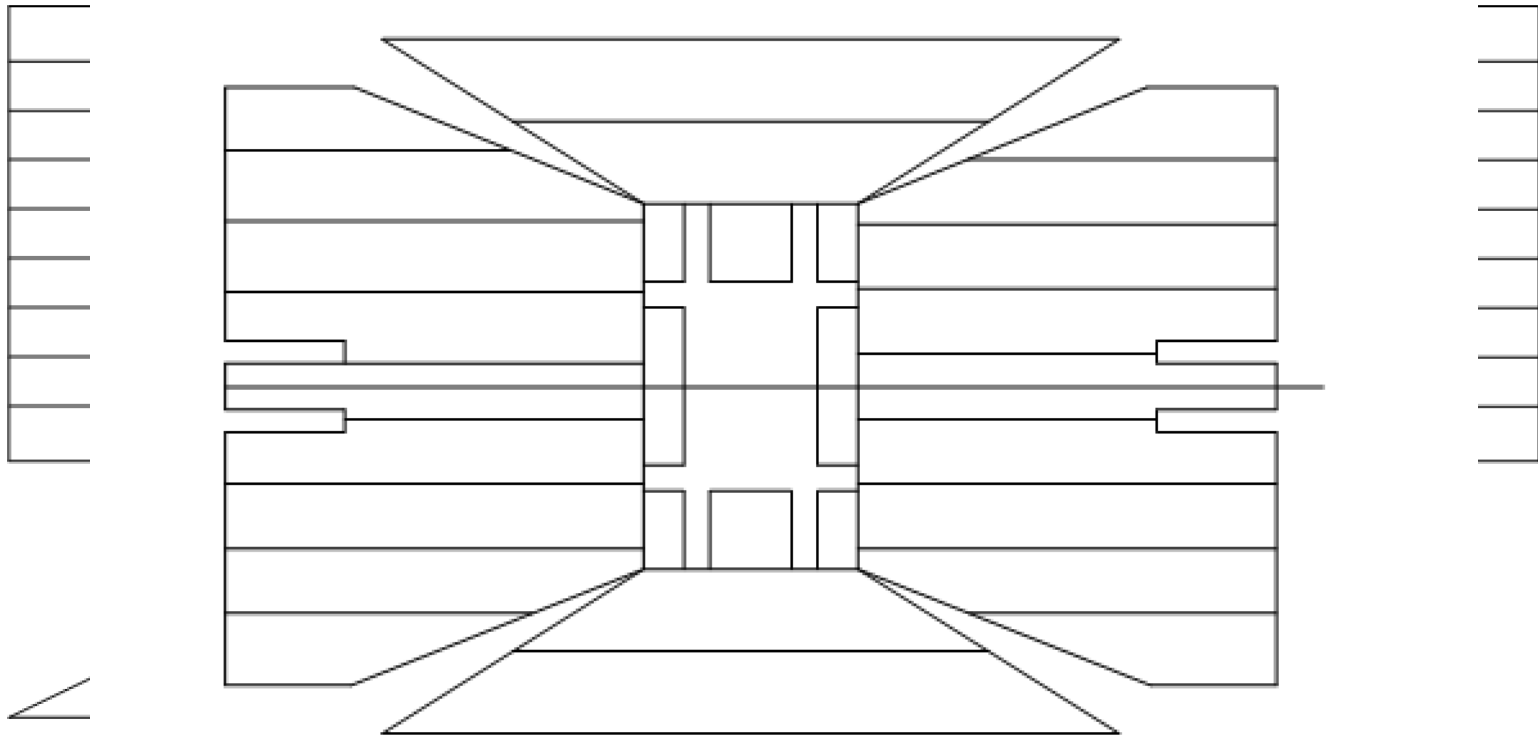
1/7/2026

# Wood Simulation

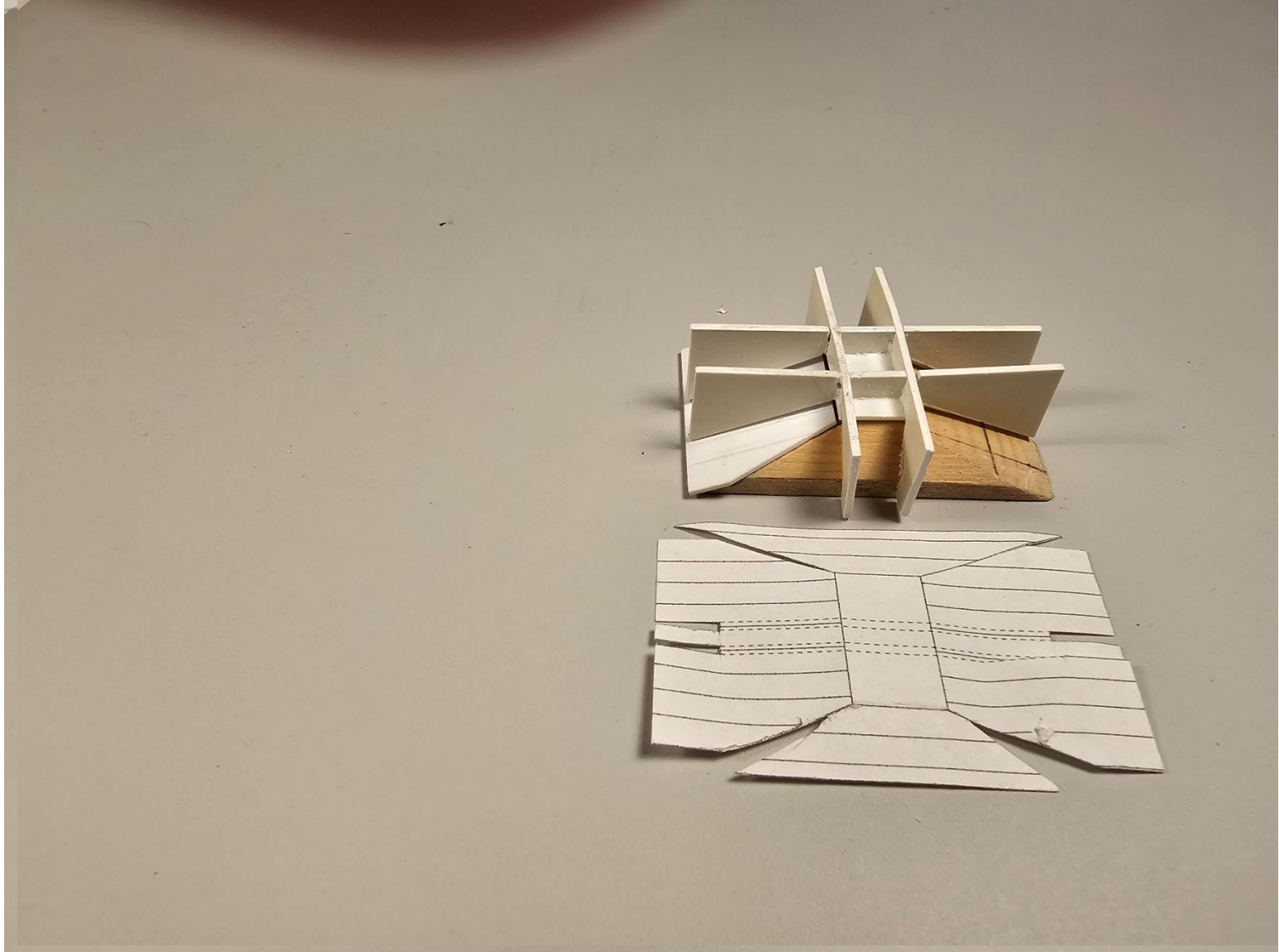
- I scribe the wood joint lines
- Wood grain simulated with either of the following:
  - Atlas track saw for heavily worn wood.
    - 80 grit sand paper works well too.
  - 100 grit sand paper most used.

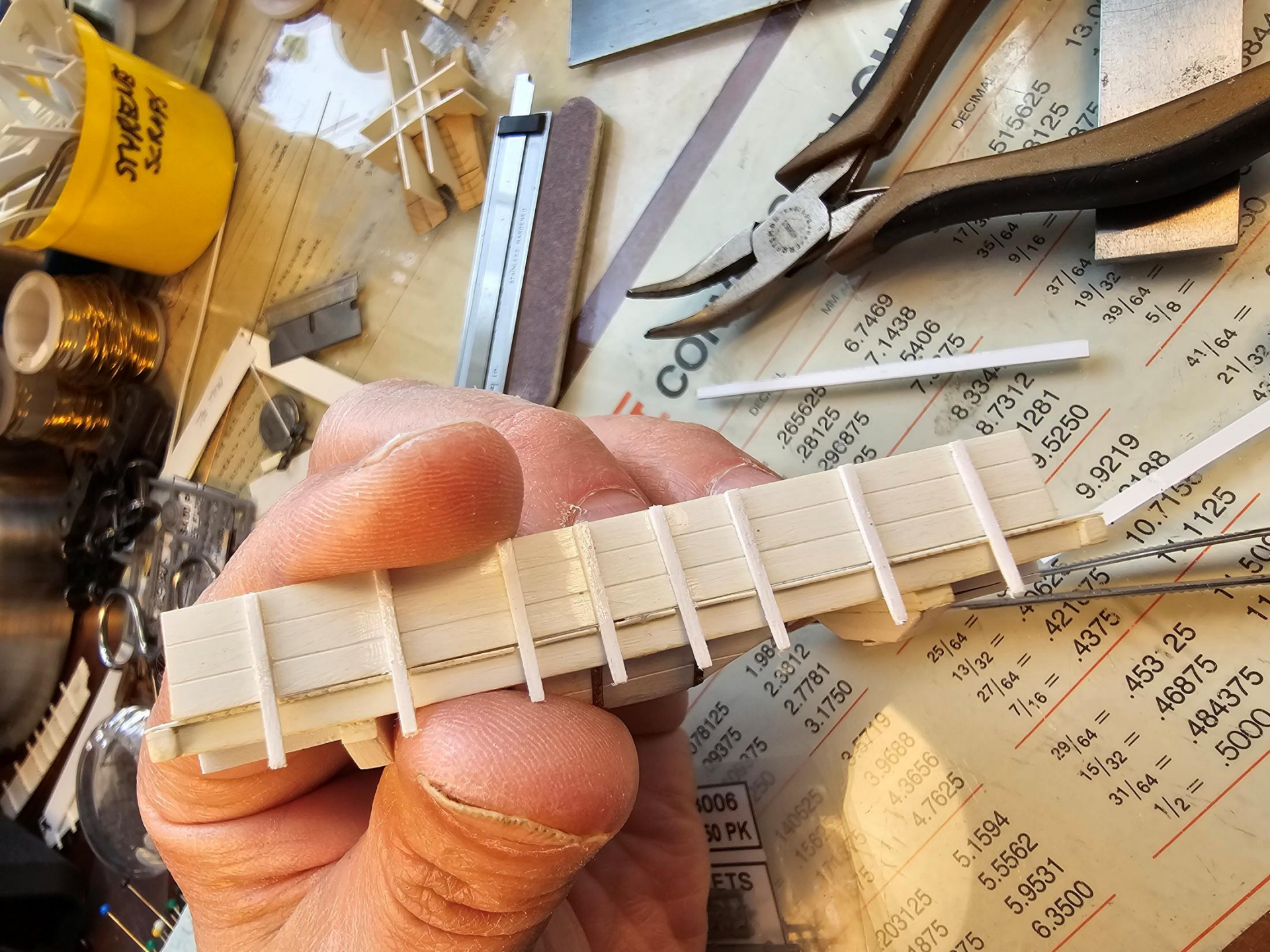


# The Hopper Challenge



# Hopper Construction





DECIMAL

1/2 =	.5000
1/4 =	.2500
3/4 =	.7500
1/8 =	.1250
3/8 =	.3750
5/8 =	.6250
7/8 =	.8750
1/16 =	.0625
3/16 =	.1875
5/16 =	.3125
7/16 =	.4375
9/16 =	.5625
11/16 =	.6875
13/16 =	.8125
15/16 =	.9375
1/32 =	.03125
3/32 =	.09375
5/32 =	.15625
7/32 =	.21875
9/32 =	.28125
11/32 =	.34375
13/32 =	.40625
15/32 =	.46875
17/32 =	.53125
19/32 =	.59375
21/32 =	.65625
23/32 =	.71875
25/32 =	.78125
27/32 =	.84375
29/32 =	.90625
31/32 =	.96875

Multiplication Table

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	84	87	90	93	96
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108	112	116	120	124	128
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147	154	161	168	175	182	189	196	203	210	217	224
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224	232	240	248	256
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216	225	234	243	252	261	270	279	288
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220	231	242	253	264	275	286	297	308	319	330	341	352
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384
13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	364	377	390	403	416
14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336	350	364	378	392	406	420	434	448
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435	450	465	480
16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320	336	352	368	384	400	416	432	448	464	480	496	512
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391	408	425	442	459	476	493	510	527	544
18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360	378	396	414	432	450	468	486	504	522	540	558	576
19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380	399	418	437	456	475	494	513	532	551	570	589	608
20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640
21	42	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357	378	399	420	441	462	483	504	525	546	567	588	609	630	651	672
22	44	66	88	110	132	154	176	198	220	242	264	286	308	330	352	374	396	418	440	462	484	506	528	550	572	594	616	638	660	682	704
23	46	69	92	115	138	161	184	207	230	253	276	299	322	345	368	391	414	437	460	483	506	529	552	575	598	621	644	667	690	713	736
24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	528	552	576	600	624	648	672	696	720	744	768
25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	700	725	750	775	800
26	52	78	104	130	156	182	208	234	260	286	312	338	364	390	416	442	468	494	520	546	572	598	624	650	676	702	728	754	780	806	832
27	54	81	108	136	164	192	220	248	276	304	332	360	388	416	444	472	500	528	556	584	612	640	668	696	724	752	780	808	836	864	892
28	56	84	112	140	170	198	228	256	284	312	340	368	396	424	452	480	508	536	564	592	620	648	676	704	732	760	788	816	844	872	900
29	58	87	116	145	176	206	236	266	296	326	356	386	416	446	476	506	536	566	596	626	656	686	716	746	776	806	836	866	896	926	956
30	60	90	120	150	180	210	240	270	300	330	360	390	420	450	480	510	540	570	600	630	660	690	720	750	780	810	840	870	900	930	960
31	62	93	124	156	188	220	252	284	316	348	380	412	444	476	508	540	572	604	636	668	700	732	764	796	828	860	892	924	956	988	1020
32	64	96	128	160	192	224	256	288	320	352	384	416	448	480	512	544	576	608	640	672	704	736	768	800	832	864	896	928	960	992	1024

# Details

- Brake system
- Hand Holds and Side steps (not there yet)
- Stake pockets (working on it)
- Hopper door mechanism

# Early Brake systems

Fig. 1356—Piping Diagram of Universal Common Standard Brake Equipment, Schedule UC.

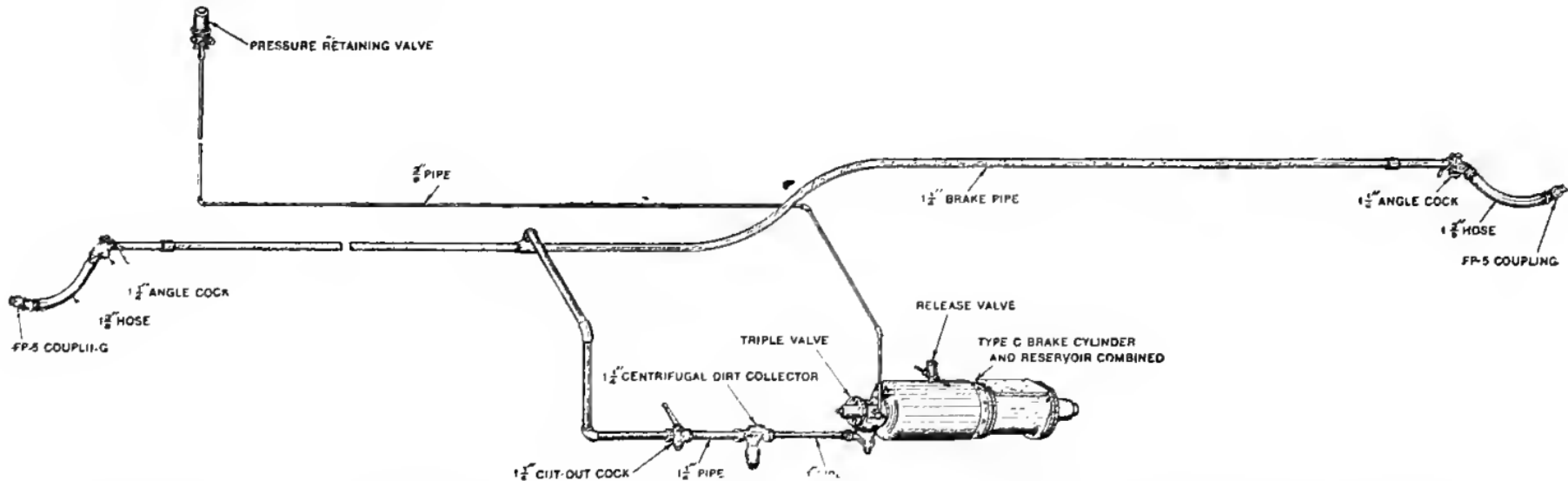
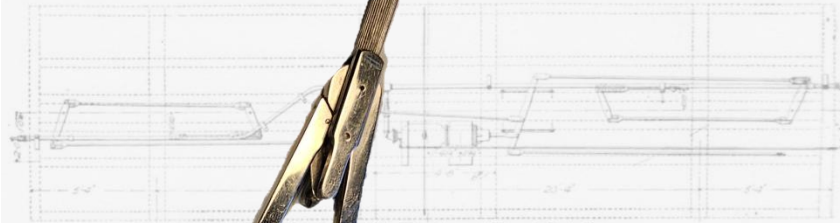


Fig. 1357—Piping Diagram of Standard Single Cylinder Freight Brake Equipment, Schedule KC.

Figures from book: 1916 Car Builder's Dictionary



Fig. 1464. Side Elevation of Brake Gear.



Figs. 1464 and 1465. Side Elevation and Plan of Brake Gear.

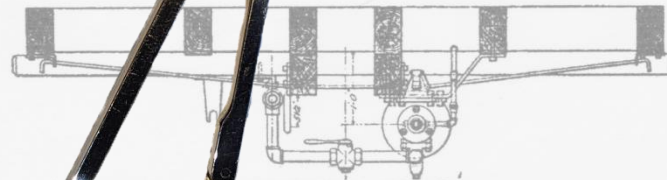
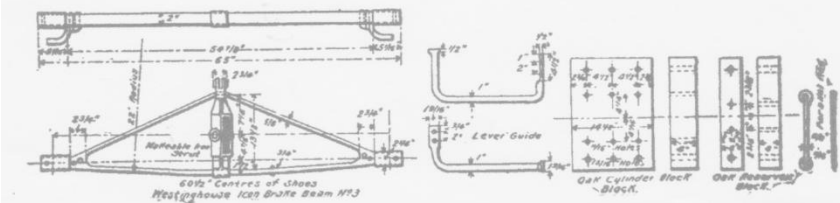
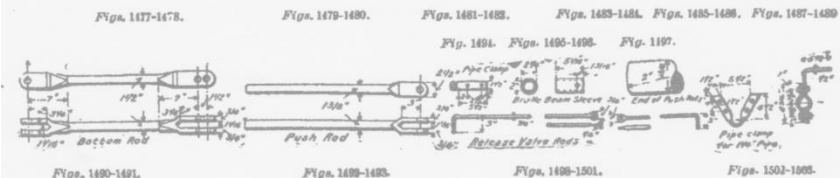
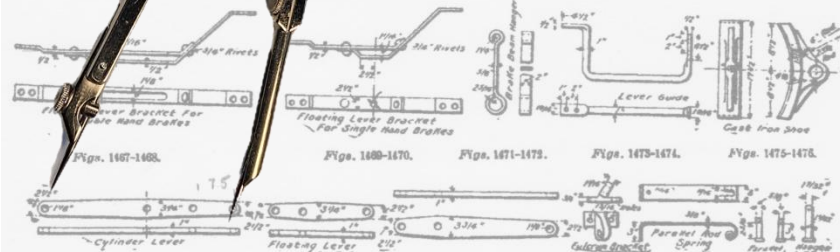
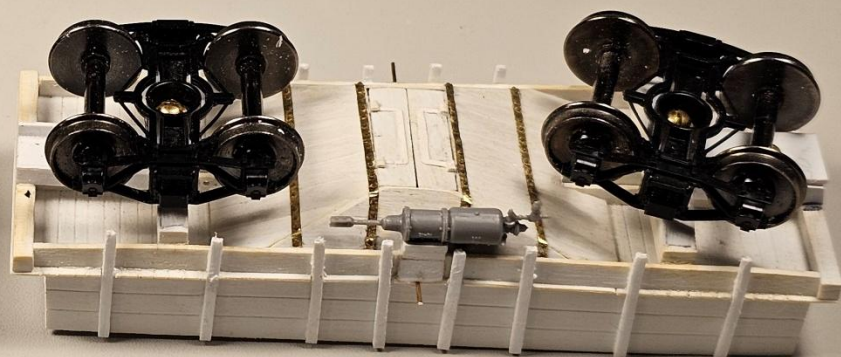
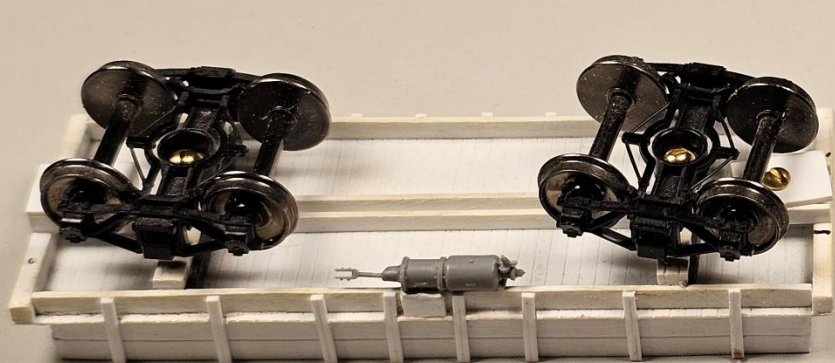


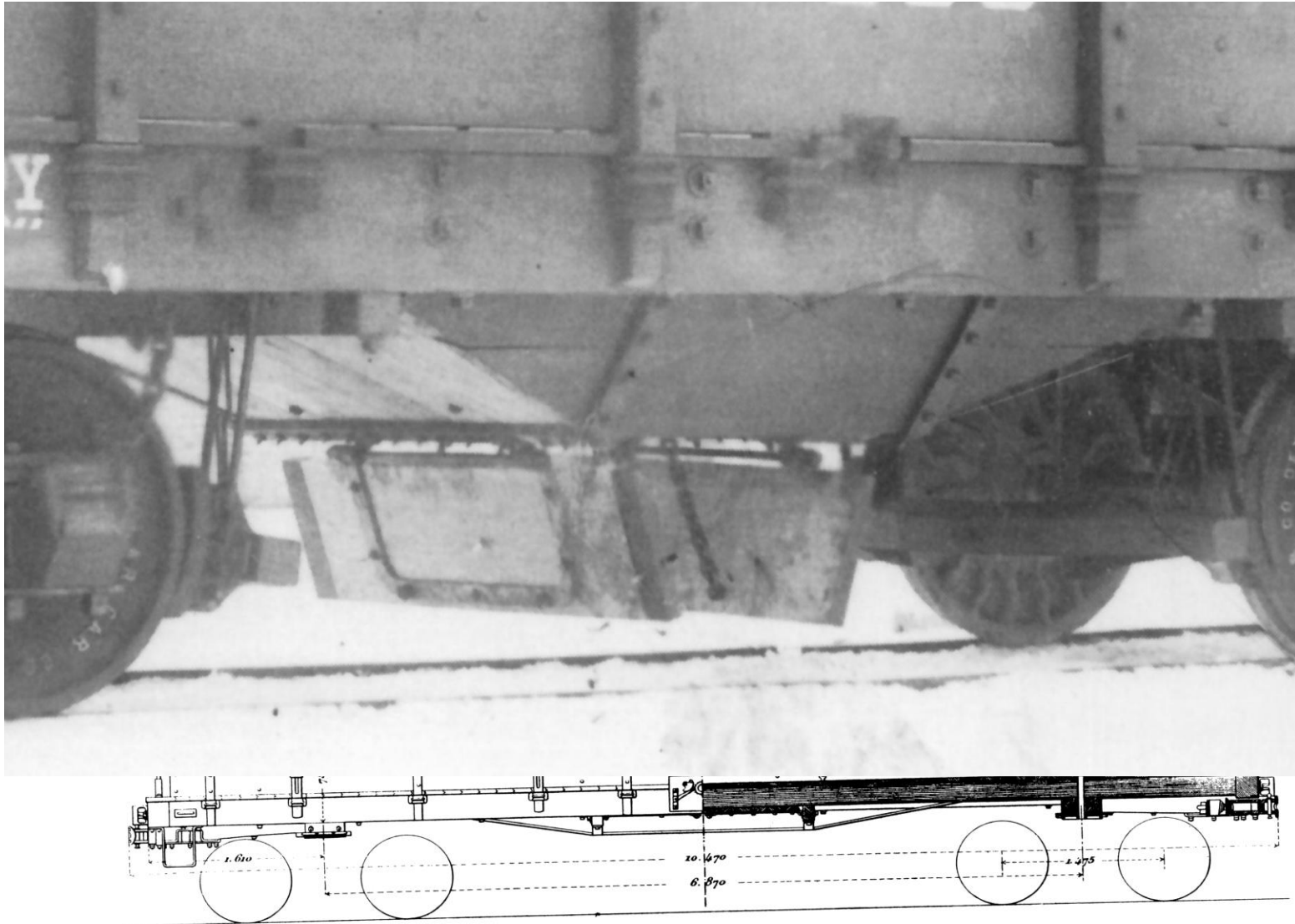
Fig. 1466. End Elevation of Brake Gear.  
FREIGHT BRAKE GEAR FOR INSIDE HUNG BRAKES. CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.  
(Plan of adjustment for inside hung brakes is shown in Figs. 1095-1098.)



James  
M. Brown



# Hopper Door Mechanism

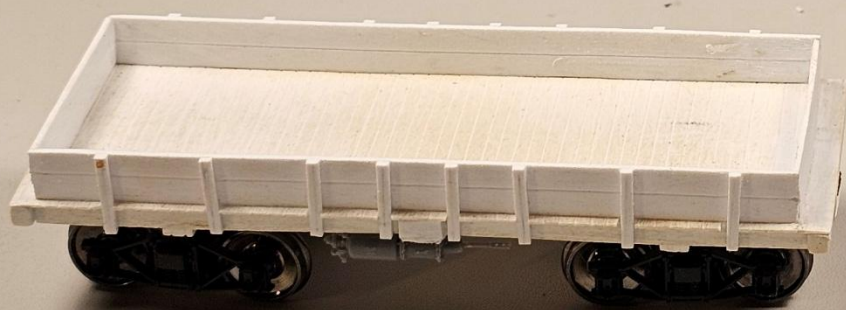


# Modeled hopper door mechanism

- .020" Rod working on other details,



# Models as of 1/12/2026



# Valley Forge RPM in Malvern, PA

- March 19 to 22, 2026
- [www.rpmvalleyforge.com](http://www.rpmvalleyforge.com)

These models will be displayed @ this RPM meet. I hope to see you there.

# Cornwall Railroad INFO

- [www.cornwallrailroad.com](http://www.cornwallrailroad.com)
- <https://cornwallrailroad.blogspot.com>
- Cornwall Iron Furnace (presentation by Mark Cain)
  - [youtube.com/watch?v=F9E7d2HqAuQ](https://www.youtube.com/watch?v=F9E7d2HqAuQ)
- Home Video of the Cornwall RR (est. taken in 1962)
  - [youtube.com/watch?v=mzbpmacxs](https://www.youtube.com/watch?v=mzbpmacxs)