

# Elmer's Engines

by Elmer Verburg

# Contents

1 Wood Beam Engine . . . . .	1
2 Twin Vertical Wobbler . . . . .	9
3 Open Column with Reverse . . . . .	11
4 Four Square . . . . .	14
5 Geared Steam Engine . . . . .	17
6 Slider . . . . .	24
7 Square . . . . .	27
8 Scotty . . . . .	29
9 H Twin . . . . .	31
10 Wooden Grasshopper Engine . . . . .	33
11 Radial Engine . . . . .	44
12 Turbine and Centrifugal Pump . . . . .	49
13 Open Column Twin with Poppet Valves . . . . .	53
14 Wobble Plate Engine . . . . .	60
15 Fancy . . . . .	65
16 Baldy . . . . .	67
17 Pumping Engine . . . . .	69
18 Fancy II . . . . .	80
19 Standby . . . . .	85
20 Kimble Engine . . . . .	87
21 Kimble Engine Rotary Valve . . . . .	95
22 V Twin . . . . .	97
23 Tiny . . . . .	99
24 Beam . . . . .	101
25 Wobbler . . . . .	105
26 Live Steam Boiler and Engine . . . . .	107
27 V4 Wobbler . . . . .	111
28 H-Quad Engine . . . . .	116
29 Mine Engine . . . . .	123
30 Opposed Piston Steam Engine . . . . .	129
31 The Engine Showcase . . . . .	133
32 Tall Vertical Open Column . . . . .	135
33 Mill Engine . . . . .	141
34 Cross Twin Engine . . . . .	147
35 Steam Pump . . . . .	155
36 Vertical Reversing Wobbler . . . . .	160
37 Grasshopper Engine . . . . .	165

38 VR 75 . . . . .	171
39 Rope Drive . . . . .	179
40 Generator . . . . .	189
41 Factory Engine . . . . .	193
42 Oscillating-Cylinder Engine . . . . .	198
43 Horizontal Mill Engine . . . . .	203
44 Open Column Twin . . . . .	207
45 Single Cylinder Compound . . . . .	212
46 Comber Rotary Engine . . . . .	217
47 Model Boat Engine . . . . .	222
48 Una-Flow Engine . . . . .	225
49 Vauxhall Donkey Pump . . . . .	230
50 Educational Model . . . . .	235
51 V3R . . . . .	242
52 Reversible Vertical Twin Wobbler . . . . .	247
Appendix . . . . .	252
Create Your Own Designs . . . . .	253
Odds & Ends for Beginners . . . . .	258
Cutting a Tapered Keyway . . . . .	261
Modelmaker's Depth Gauge . . . . .	263
Modelmaker's Thickness Gauge . . . . .	264
Sheet Metal Punch . . . . .	265
Beam Compass . . . . .	267
Simple Turning and Machining Hints . . . . .	269
Adapting . . . . .	270
Hardening . . . . .	270
Ball Turning Tool . . . . .	271
Close Tolerance Holes . . . . .	273
Carriage Stop . . . . .	274
Cross-Slide Milling Attachment . . . . .	275
Scribing Bolt Circles . . . . .	276
Parallel Clamp Vise . . . . .	277
Offset Tailstock Center . . . . .	279
Handy Scale . . . . .	281
This is just the beginning! . . . . .	281
Index . . . . .	282

# Index

- A**
- Adapting . . . . . 270
  - Appendix . . . . . 252
- B**
- Baldy . . . . . 67
  - Ball Turning Tool . . . . . 271
  - Basic Cylinder
    - Type F . . . . . 255
    - Type M . . . . . 254
  - Beam Compass . . . . . 267
  - Beam Engine (Metal) . . . . . 101
  - Beam Engines
    - Beam Engine (Metal) . . . . . 101
    - Wood Beam Engine . . . . . 1
  - Boat Engines
    - Educational Model . . . . . 235
    - Model Boat Engine . . . . . 222
  - Boiler
    - Live Steam Boiler & Engine . . . 107
  - Bolt Circles
    - Scribing Bolt Circles . . . . . 276
  - Box Base for Modelmaker's Lathe . 260
- C**
- Carriage Stop . . . . . 274
  - Catalogs
    - Suppliers' Catalogs . . . . . 260
  - China Pencil . . . . . 259
  - Clamp Vise
    - Parallel Clamp Vise . . . . . 277
  - Clean Shop . . . . . 260
  - Close Tolerance Holes . . . . . 273
  - Comber Rotary Engine . . . . . 217
  - Compass
    - Beam Compass . . . . . 267
  - Compound Engines
    - Single Cylinder Compound . . . 212
  - Create Your Own Designs . . . . . 253
  - Cross-Slide Milling Attachment . . 275
  - Cross Twin Engine . . . . . 147
  - Cutting a Tapered Keyway . . . . . 261
  - Cutting Compound . . . . . 259
  - Cutting Oil Brush . . . . . 259
  - Cylinder
    - Basic — Type F . . . . . 255
    - Basic — Type M . . . . . 254
- D**
- Depth Gauge
    - Modelmaker's Depth Gauge . . . 263
- E**
- Donkey Pump
    - Vauxhall Donkey Pump . . . . . 230
- F**
- Eccentric MF8 . . . . . 257
  - Educational Model . . . . . 235
  - Engine Showcase . . . . . 133
- G**
- Factory Engine . . . . . 193
  - Fancy . . . . . 65
  - Fancy II . . . . . 80
  - Flywheel MF11 . . . . . 257
  - Four Cylinder Engines
    - Four Square . . . . . 14
    - H Quad Engine . . . . . 116
    - V4 Wobbler . . . . . 111
  - Four Square . . . . . 14
- H**
- H Quad Engine . . . . . 116
  - H Twin . . . . . 31
  - Handy Scale . . . . . 281
  - Hardening . . . . . 270
  - Head Band Magnifier . . . . . 258
  - Heads
    - Inboard Head MF6 . . . . . 256
    - Outboard Head MF7 . . . . . 256
  - Horizontal Mill Engine . . . . . 203
- I**
- Inboard Head . . . . . 256
- J**
- Just The Beginning . . . . . 281
- K**
- Keyway
    - Cutting a Tapered Keyway . . . 261
  - Kimble Engine . . . . . 87
  - Kimble Engine Rotary Valve . . . . 95
  - Kimble Story . . . . . 89
- L**
- Layout Hint . . . . . 259
  - Live Steam Boiler & Engine . . . . 107
- M**
- Magnifier
    - Head Band Magnifier . . . . . 258
  - Marking Pencil . . . . . 259
  - Measuring . . . . . 258
  - Mill Engine . . . . . 141
  - Milling Attachment
    - Cross-Slide Milling Attachment . 275
  - Mine Engine . . . . . 123
  - Model Boat Engine . . . . . 222
  - Modelmaker's Depth Gauge . . . . . 263
  - Modelmaker's Lathe
    - Box Base for Modelmaker's Lathe . 260
    - Modelmaker's Thickness Gauge . 264
- O**
- Odds & Ends for Beginners
    - Cutting Compound . . . . . 259
    - Cutting oil Brush . . . . . 259
    - Head Band Magnifier . . . . . 258
    - Layout Hint . . . . . 259
    - Measuring . . . . . 258
    - Pipe Cleaners . . . . . 258
    - Pre-Jigging . . . . . 258
    - Simple Storage System . . . . . 258
  - Offset Tailstock Center . . . . . 279
  - One-Cylinder Engines
    - Baldy . . . . . 67
    - Beam Engine (Metal) . . . . . 101
    - Comber Rotary Engine . . . . . 217
    - Educational Model . . . . . 235
    - Factory Engine . . . . . 193
    - Fancy . . . . . 65
    - Fancy II . . . . . 80
    - Geared Steam Engine . . . . . 17
    - Grasshopper Engine (Metal) . . . 165
    - Horizontal Mill Engine . . . . . 203
    - Live Steam Boiler & Engine . . . 107
    - Mill Engine . . . . . 141

**One Cylinder Engines (Continued)**

Mine Engine . . . . . 123  
 Open Column with Reverse . . . . . 11  
 Oscillating Cylinder Engine . . . . . 198  
 Scotty . . . . . 29  
 Single Cylinder Compound . . . . . 212  
 Slider . . . . . 24  
 Square . . . . . 27  
 Standby . . . . . 85  
 Steam Pump . . . . . 155  
 Tall Vertical Open Column . . . . . 135  
 Tiny . . . . . 99  
 Una-Flow Engine . . . . . 225  
 Vauxhall Donkey Pump . . . . . 230  
 Vertical Reversing Wobbler . . . . . 160  
 VR75 . . . . . 171  
 Wobble Plate Engine . . . . . 60  
 Wobbler . . . . . 105  
 Wood Beam Engine . . . . . 1  
 Wooden Grasshopper . . . . . 33  
 Open Column with Reverse . . . . . 11  
 Open Column Twin . . . . . 207  
 Open Column Twin with Poppet Valves . . . . . 53  
 Opposed Piston Steam Engine . . . . . 129  
 Oscillating-Cylinder Engine . . . . . 198  
 Outboard Head MF7 . . . . . 256

**P**

Pack Nut MF9 . . . . . 257  
 Pack Nut MF10 . . . . . 257  
 Parallel Clamp Vise . . . . . 277  
 Pipe Cleaners . . . . . 258  
 Pistonless Engines  
 Kimble Engine . . . . . 87  
 Poppet Valves  
 Open Column Twin with  
 Poppet Valves . . . . . 53  
 Pre-Jigging . . . . . 258  
 Pumps  
 Pumping Engine . . . . . 69  
 Steam Pump . . . . . 155  
 Turbine and Centrifugal Pump . . . . . 49  
 Vauxhall Donkey Pump . . . . . 230  
 Pumping Engine . . . . . 69  
 Punch  
 Sheet Metal Punch . . . . . 265

**R**

Radial Engine . . . . . 44  
 Reversible Vertical Twin Wobbler . . . . . 247  
 Rocking Chair . . . . . 259

Rods  
 Source for Round Rods . . . . . 259  
 Rope Drive . . . . . 179  
 Rotary Engines  
 Comber Rotary Engine . . . . . 217  
 Rotary Valve  
 Kimble Engine Rotary Valve . . . . . 95

**S**

Scale  
 Handy Scale . . . . . 281  
 Scotch Yoke . . . . . 29  
 Scotty . . . . . 29  
 Scribing Bolt Circles . . . . . 276  
 Sheet Metal Punch . . . . . 265  
 Showcase . . . . . 133  
 Simple Storage System . . . . . 258  
 Simple Turning and Machining Hints . . . . . 269  
 Single Cylinder Compound . . . . . 212  
 Sketching  
 Starting a Job . . . . . 259  
 Slider . . . . . 24  
 Source for Round Rods . . . . . 259  
 Source for Springs . . . . . 260  
 Springs  
 Source for Springs . . . . . 260  
 Square . . . . . 27  
 Standby . . . . . 85  
 Starting a Job . . . . . 259  
 Steam Chest MF1 . . . . . 255  
 Steam Chest Cover MF2 . . . . . 255  
 Steam Pump . . . . . 155  
 Steel  
 Tin Plated Steel . . . . . 259  
 Storage  
 Simple Storage System . . . . . 258  
 Suppliers' Catalogs . . . . . 260  
 Symbols . . . . . 253

**T**

Tailstock Center  
 Offset Tailstock Center . . . . . 279  
 Tall Vertical Open Column . . . . . 135  
 Tapered Keyway  
 Cutting a Tapered Keyway . . . . . 261  
 Thickness Gauge  
 Modelmaker's Thickness Gauge . . . . . 264  
 This Is Just The Beginning . . . . . 281  
 Three-Cylinder Engines  
 Radial Engine . . . . . 44  
 V3R . . . . . 242

Tin Plated Steel . . . . . 259  
 Tiny . . . . . 99  
 Turbine and Centrifugal Pump . . . . . 49  
 Twin Vertical Wobbler . . . . . 9  
 Two-Cylinder Engines  
 Cross Twin Engine . . . . . 147  
 H Twin . . . . . 31  
 Open Column Twin . . . . . 207  
 Open Column Twin with  
 Poppet Valves . . . . . 53  
 Opposed Piston Steam Engine . . . . . 129  
 Reversible Vertical Twin Wobbler . . . . . 247  
 Rope Drive . . . . . 179  
 Twin Vertical Wobbler . . . . . 9  
 V Twin . . . . . 97

**U**

Una-Flow Engine . . . . . 225

**V**

Valve MF4 . . . . . 256  
 Valve Nut MF5 . . . . . 256  
 Valve Plate MF3 . . . . . 256  
 Vauxhall Donkey Pump . . . . . 230  
 Vertical Reversing Wobbler . . . . . 160  
 Vise  
 Parallel Clamp Vise . . . . . 277  
 V3R . . . . . 242  
 V4 Wobbler . . . . . 111  
 VR75 . . . . . 171  
 V Twin . . . . . 97

**W**

Wobble Plate Engine . . . . . 60  
 Wobbler . . . . . 105  
 Wobbler Engines  
 Four Square . . . . . 14  
 H Quad Engine . . . . . 116  
 Oscillating Cylinder Engine . . . . . 198  
 Live Steam Boiler & Engine . . . . . 107  
 Reversible Vertical Twin Wobbler . . . . . 247  
 Tiny . . . . . 99  
 Twin Vertical Wobbler . . . . . 9  
 Vertical Reversing Wobbler . . . . . 160  
 V3R . . . . . 242  
 V4 Wobbler . . . . . 111  
 V Twin . . . . . 97  
 Wobbler . . . . . 105  
 Wood Beam Engine . . . . . 1  
 Wooden Grasshopper . . . . . 33

**DRAWING CREDITS**

William C. Fitt — Pages 9, 10, 266  
 Connie Lovell — Pages 11, 12, 13, 19, 20, 21, 22, 45, 46, 47, 91, 92, 93, 94, 96, 108, 109, 110, 112, 113, 114, 124, 124, 125, 126, 127, 128, 136, 137, 138, 139, 142, 143, 144, 145, 161, 162, 163, 180, 181, 182, 183, 184, 185, 186, 187, 190, 191, 194, 195, 196, 197, 261, 262, 271, 272  
 R. Bruce Owens — Pages 35, 36, 37, 38, 39, 40, 41, 42, 43, 60, 62, 63, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 82, 117, 118, 119, 120, 121, 149, 150, 151, 152, 166, 167, 168, 169, 170, 172, 173, 174, 175, 176, 274, 280  
 Elmer Verburg — Pages 3, 4, 5, 6, 7, 8, 15, 16, 25, 26, 28, 30, 32, 51, 52, 66, 68, 86, 98, 100, 102, 103, 104, 106, 131, 132, 133, 198, 199, 200, 201, 203, 204, 205, 206, 208, 209, 210, 213, 214, 215, 216, 219, 220, 223, 224, 226, 227, 228, 230, 231, 232, 233, 236, 237, 238, 239, 240, 243, 244, 245, 248, 249, 250, 251, 254, 255, 256, 257, 259, 263, 264, 276, 281  
 Jerry Williams — Pages 55, 56, 57, 58, 156, 157, 158, 159, 267, 268, 269, 270, 278

**PHOTO CREDITS**

William C. Fitt — Pages i, xi, 1, 2, 4, 9, 11, 13, 14, 17, 23 center, 24, 27, 29, 31, 33, 34, 41 top, 44, 49, 50, 53, 54, 59, 61, 65, 67, 69, 70, 79, 83, 85, 87, 89, 90, 97, 98, 99, 101, 104, 105, 107, 111, 114, 116, 122 bottom, 123, 129, 130, 134, 135, 140, 141, 147, 148, 154 top, 157, 160, 193, 201, 202, 204, 207, 212, 217, 218, 220, 222, 233, 234, 235, 241, 246, 250, 263, 264  
 Kim House — Pages 18, 23 top bottom, 165, 170, 177, 179, 187, 189 bottom, 192 bottom,  
 Elmer Verburg — Pages 39, 40, 41 bottom, 43, 48, 64, 84, 88, 95, 115, 118, 122 top, 153, 154 bottom, 164, 171, 178, 188, 189 top, 192 top, 225, 229, 242, 246, 262, 265, 267, 269, 270, 273, 274, 275, 277, 279

# APPENDIX

A collection of shop projects and tools by the author that can make your hobby shop work more convenient and enjoyable.