



FIRE ENGINE

Memories of fire crews hanging onto the sides as the engine rushed past with its bell ringing were the inspiration for this action toy.

THE sight and sound of the fire engine rushing to an emergency always sets the nerves on edge, and halts all other activities in the street. Indeed these fire-fighting appliances with blue flashing lights and strident electronic horns weaving their way between cars and buses, rushing to the scene of the accident, always command attention.

When designing the engine, I purposely avoided all traditional woodworking joints and kept the construction as problem-free as possible. By carefully studying all the illustrations, you will see that the model is constructed mainly from strips of wood fastened together with glue and screws.

Power Tools

All of the Makita power tools will come in useful and help to speed up the job.

Chassis first

First build the main chassis. This consists of a board onto which are screwed two battens. These battens have holes drilled to take the axles – the cut-out at the front of the chassis is for the bumper.

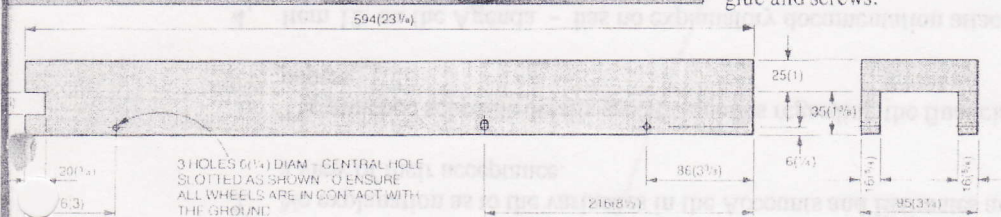
Cut out the front mudguard and running board assembly. Shape up the bumper and glue this onto the chassis. The front mudguard can then be glued onto the bumper and the chassis side. Before gluing the mudguard in place, drill the holes to take the headlamps. These are made from pieces of dowel rod.

Now cut and fix the rear mudguard assembly onto the chassis. The mudguard is glued and screwed onto the top of the chassis.

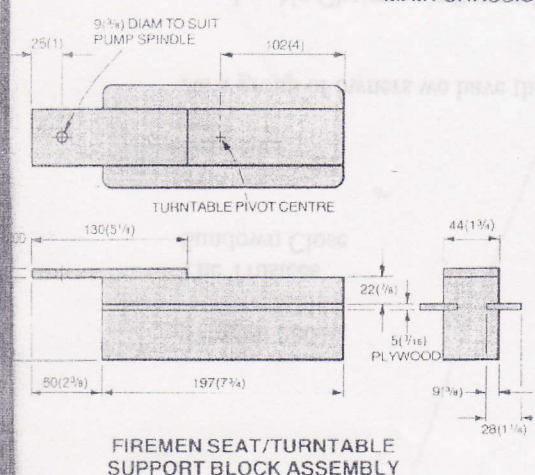
Shape up the radiator. Grooves or slots are cut in the front. This can be done with a sharp chisel. Mark carefully where you want the grooves to be before cutting. A short length of dowel rod is shaped up and stuck onto the top of the radiator to represent a filler cap.

The engine block is made from a solid chunk of wood. Before shaping anything, cut out the driver's compartment. This is done by cutting down both sides with a tenon saw. Mark the bottom line with a knife. Now using a firmer chisel start chopping out the recess. Be patient – work from both sides taking a little out at a time, working down to the gauge line. This is the hardest part of building this engine.

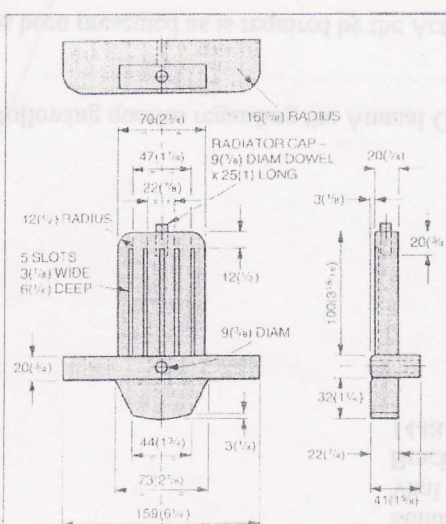
Now plane the engine block sides down to fit the radiator.



MAIN CHASSIS



FIREMEN SEAT/TURNTABLE SUPPORT BLOCK ASSEMBLY

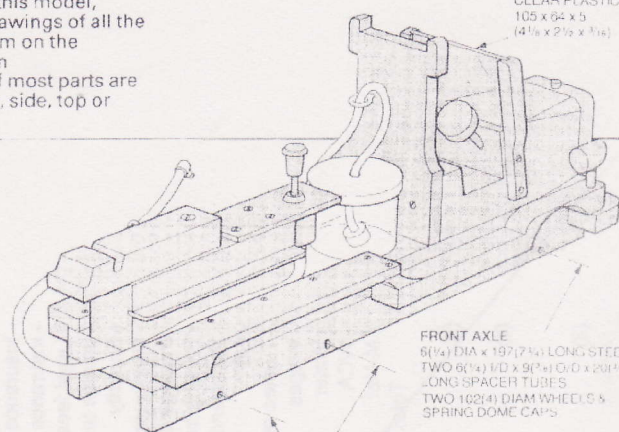


RADIATOR/FRONT BUMPER ASSEMBLY

FIRE ENGINE

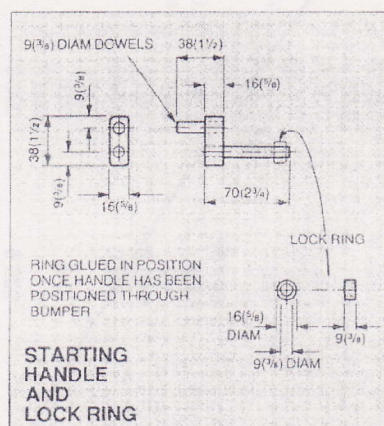
NOTE:
Before commencing this model, carefully study the drawings of all the parts and identify them on the assembled illustration. Two or more views of most parts are shown, i.e. front, rear, side, top or bottom.

CLAR PLASTIC
105 x 64 x 5
(4 1/8 x 2 1/2 x 3/16)



FRONT AXLE
6 1/4" DIA x 197 (7 3/4") LONG STEEL ROD
TWO 6 1/4" I/D x 9 (3 3/4") O/D x 20 (1 1/2") LONG SPACER TUBES
TWO 102 (4") DIA WHEELS & SPRING DOME CAPS

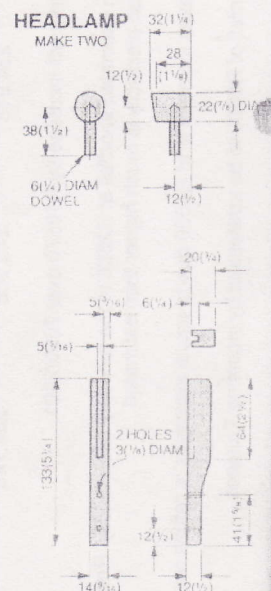
REAR AXLES
TWO 6 1/4" DIA x 166 (6 5/8") LONG STEEL RODS
FOUR 6 1/4" I/D x 9 (3 3/4") O/D x 3 (1/4") LONG SPACER TUBES
FOUR 102 (4") DIA WHEELS & SPRING DOME CAPS



STARTING HANDLE AND LOCK RING

PUMP SET
Smiths windscreen washer, manual pump set with intake valve, nozzle and piping. Two lengths are required, approx 457 (18") for the intake pipe and approx 762 (30") for the delivery hose

RESERVOIR
A reservoir with a screwed lid 76 (3") diam x 76 (3") high with a centre hole through the lid for the water supply hose.



WINDSCREEN SIDE FRAME

the head. The turntable can be swivelled around allowing the ladder to reach in different directions.

The ladders

Ladder-making is not as difficult as it may look if you adopt the following method. Both sides should be taped together and the rung holes marked. Now drill all the holes while the sides of the ladder are still fixed together. Make up a small 'block jig' to help you cut dowel rods then lightly 'round off' all dowel rod ends - a fiddly task. Take the ladder sides apart and put a spot of glue in all the holes on one side. Now push the dowel rods into all the holes, tapping them lightly with a small hammer if necessary. Now put a spot of glue on all the dowel rod ends and starting at one end of the ladder position the dowels into the holes - a good deal of patience is required at this point. When this is done it is easiest if the ladder is squeezed gently together in a vice. Without a vice, a long block of wood and a hammer will do.

Both ladders are constructed in this way. The only difference with the extending ladder is that it is not as wide, and slides inside the big ladder.

To stop the small ladder sliding out at the top, two small dowel rods are glued into the

Probably the best tool for this is the spokeshave.

Cut out the ladder support and screw this onto the end of the engine block.

The windscreen side frames come next. The piece of perspex is best found first before the grooves to take it are made. The side frames are screwed onto the sides of the engine block.

Now drill a hole in the engine block to take the steering column.

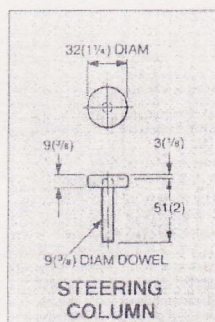
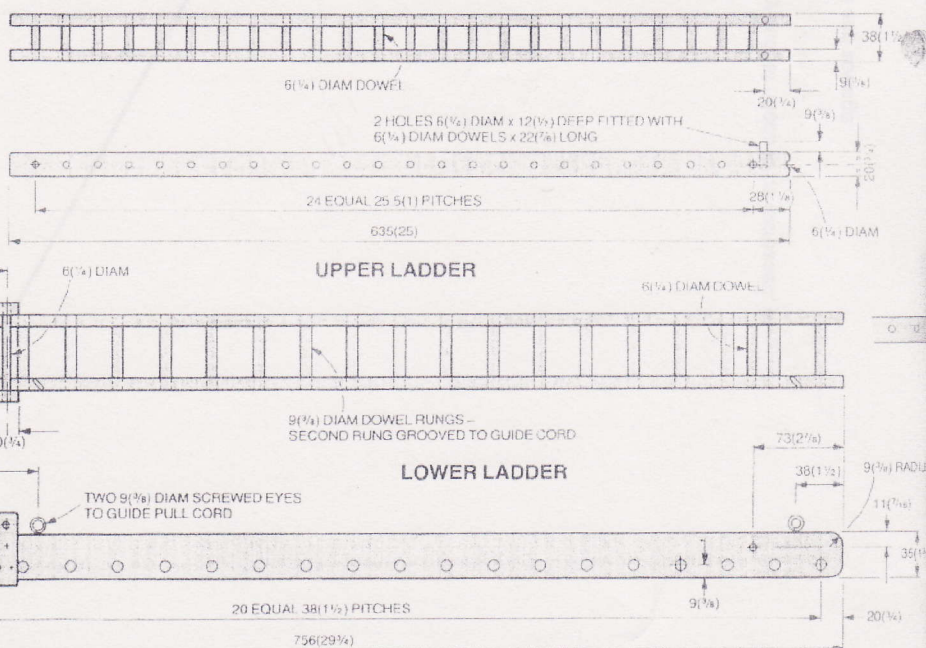
Make the starting handle and fit through the bumper, gluing the locking wooden ring on after the handle is fitted.

The seating for the crew and the ladders is attached to the chassis by one large block. The side of the block is grooved to take strips of plywood which act as seats.

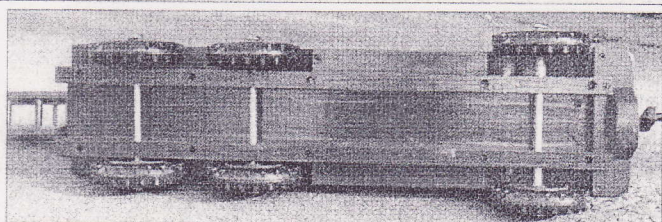
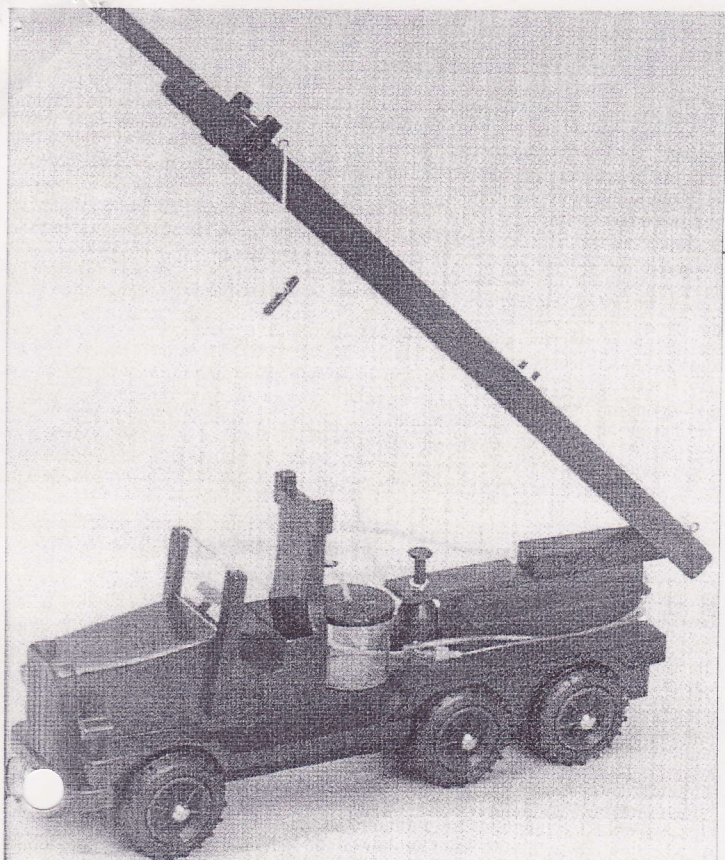
Water pump

The water pump unit is fixed to the front of the block by a strip of plywood. It is essential to use plywood for this attachment otherwise the threaded portion of the barrel is not sufficiently long to allow the 'keeper nut' to be attached on the top side. Drill the hole to take the pump unit and screw the plywood to the top of the block.

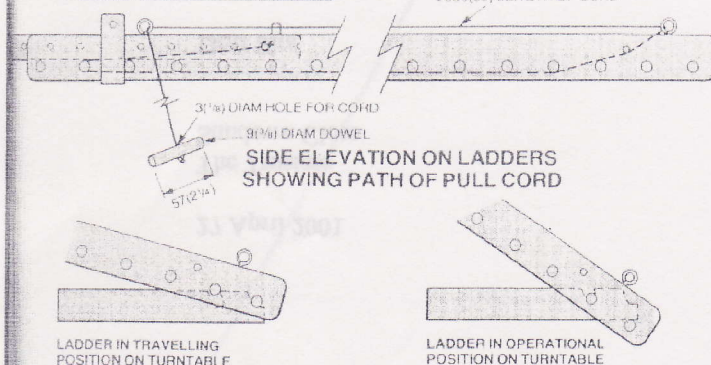
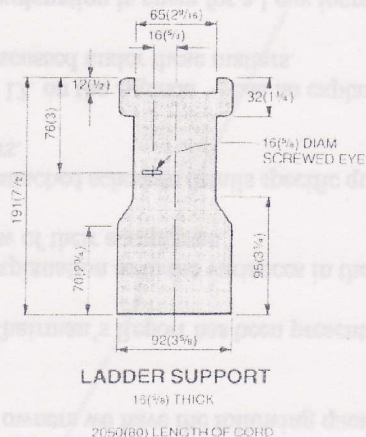
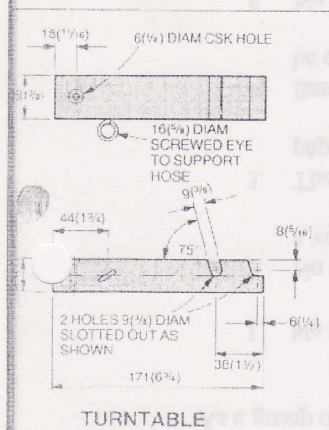
Fitted on the other end of the block is the turntable. This is shaped up to take the rungs of the ladder and allows the ladder to be fitted without using hinges (see illustrations of ladder in operational position and travelling position). When the ladders are fully extended (over 4ft) there is need for good anchorage of the turntable onto the block. Use a long, strong screw with a cup washer under



STEERING COLUMN



The main chassis consists of a central board and two battens with all other parts fixing onto these.



back of the small ladder. When the small ladder is fully extended these two dowel rods locate on the cross bar of the big ladder. Candle wax on the sides of the ladders will make them slide smoothly.

'Rigging' the ladders is quite simple and the illustration clearly shows how this is done. Use nylon cord which slips easily over the rungs.

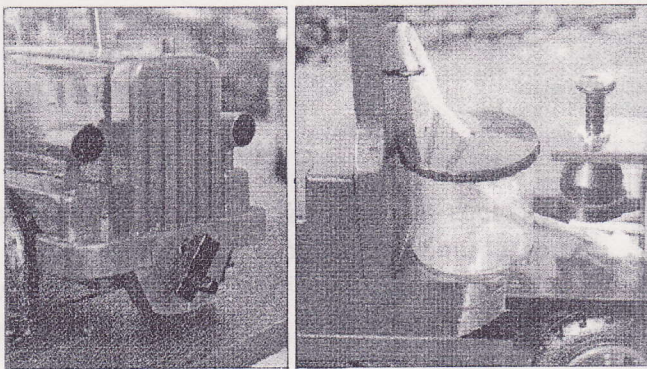
The illustration shows the pump mechanism assembled on the fire engine. There are many varieties of plastic container available that will fit the engine.

The return valve is between the outlet of the pump and the water container. I mounted mine in the container. Onto the other outlet of the pump is fitted the hose. Into the end of the hose is fitted the jet. Look carefully at the jet to discover which direction the tiny pinhole is pointing and use a screwdriver to point it in the correct direction i.e. in line with the supply pipe - nozzle jets do vary.

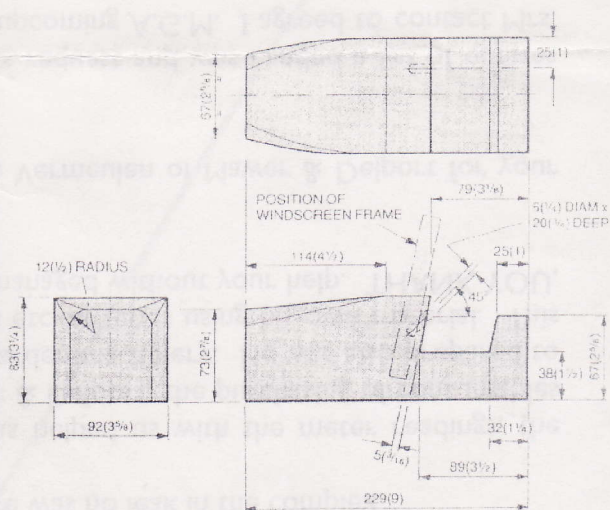
Paint or varnish the engine but check that the finishes are non-toxic.

FIRE ENGINE

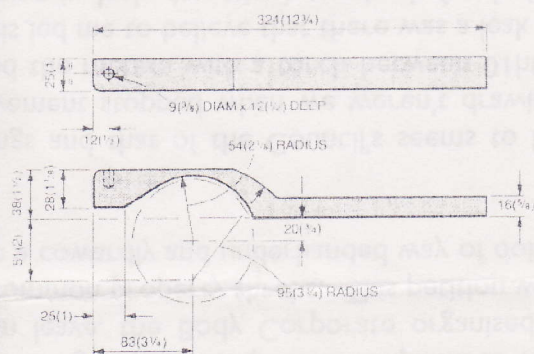
Main chassis	2 off	594 by 35 by 16mm (23 3/8 by 1 3/8 by 5/16 in.)	
	1 off	594 by 95 by 25mm (23 3/8 by 3 3/4 by 1 in.)	
Engine block	1 off	229 by 92 by 83mm (9 by 3 3/8 by 3 1/4 in.)	
Front mudguard	2 off	324 by 38 by 25mm (12 3/4 by 1 1/2 by 1 in.)	
Rear mudguard assembly	2 off	279 by 41 by 12mm (11 by 1 5/8 by 1/2 in.)	
	1 off	254 by 25 by 22mm (10 by 1 by 7/8 in.)	
Turntable support block assembly	1 off	197 by 67 by 44mm (7 3/4 by 2 5/8 by 1 3/4 in.)	
	2 off	197 by 28 by 5mm (7 3/4 by 1 1/8 by 3/16 in.)	
	1 off	130 by 44 by 6mm (5 1/8 by 1 3/4 by 1/4 in.)	
Ladder support	1 off	191 by 92 by 16mm (7 1/2 by 3 5/8 by 5/16 in.)	
Turntable	1 off	171 by 35 by 25mm (6 3/4 by 1 3/8 by 1 in.)	
Windscreen side frame	2 off	133 by 26 by 14mm (5 1/4 by 3/4 by 1/2 in.)	
Radiator/front bumper assembly	1 off	159 by 41 by 20mm (6 1/4 by 1 5/8 by 3/4 in.)	
	1 off	73 by 32 by 22mm (2 7/8 by 1 1/4 by 7/8 in.)	
	1 off	100 by 70 by 20mm (3 15/16 by 2 3/4 by 3/4 in.)	
	1 off	25mm (1 in.) by 9mm (3/8 in.) dia.	dowel
Starting handle	1 off	38 by 16 by 16mm (1 1/2 by 5/8 by 5/8 in.)	
	from	108 (4 1/4 in.) by 9mm (3/8 in.) dia. by 9mm (3/8 in.)	tube
	1 off	16mm (5/8 in.) dia. by 9mm (3/8 in.) by 9mm (3/8 in.)	tube
Headlamp	from	64mm (2 1/2 in.) by 22 (7/8 in.) dia.	dowel
	from	76mm (3 in.) by 9mm (3/8 in.) dia.	dowel
Steering column	from	25mm (1 in.) by 32mm (1 1/4 in.) dia.	dowel
	1 off	51mm (2 in.) by 6mm (1/4 in.) dia.	dowel
Ladder extension cord handle	1 off	57mm (2 1/4 in.) by 9mm (3/8 in.) dia.	dowel
Lower ladder	2 off	756 by 35 by 9mm (29 3/4 by 1 3/8 by 3/16 in.)	
	2 off	57 by 20 by 9mm (2 1/4 by 3/4 by 3/16 in.)	
	from	1270mm (50 in.) by 9mm (3/8 in.) dia.	dowel
	from	140mm (5 1/2 in.) by 6mm (1/4 in.) dia.	dowel
Upper ladder	2 off	635 by 20 by 9mm (25 by 3/4 by 3/16 in.)	
	from	1050mm (41 in.) by 6mm (1/4 in.) dia.	dowel
Ancillaries:			
Screwed eyes	2 off	16mm (5/8 in.) dia.	
Screwed eyes	2 off	9mm (3/8 in.) dia.	clear plastic
	1 off	105 by 64 by 5mm (4 1/8 by 2 1/2 by 3/16 in.)	
Load wheels	6 off	102mm (4 in.) dia.	
Front axle	1 off	197mm (7 3/4 in.) long by 6mm (1/4 in.) dia.	steel
Long spacers	2 off	9mm (3/8 in.) dia. by 6mm (1/4 in.) dia. by 20mm (3/4 in.)	
Axle	2 off	Spring dome caps to suit 6mm (1/4 in.) dia.	
Rear axles	2 off	168mm (6 5/8 in.) long by 6mm (1/4 in.) dia.	steel
Thick spacers	4 off	9mm (3/8 in.) dia. by 6mm (1/4 in.) dia. by 3mm (1/8 in.)	
Axle	4 off	Spring dome caps to suit 6mm (1/4 in.) dia.	
Pump set	1 off	Smiths windscreen washer manual pump set with intake valve, nozzle and piping	
Hoses	2 off	Lengths of piping - intake 457mm (18 in.) long delivery hose 762mm (30 in.) long	
Water supply	1 off	Reservoir with screwed lid - 76mm (3 in.) dia. by 76mm (3 in.) high with central hole through lid	
Hoist cord	1 off	2050mm (80 in.) long	



Details of the fire engine with working pump and extending ladder on pivoted turntable

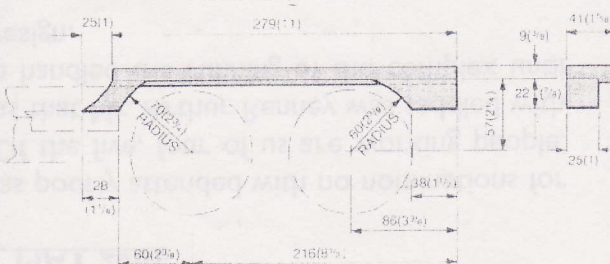


ENGINE BLOCK



FRONT MUDGUARD AND RUNNING BOARD

MAKE ONE OF EACH HAND



REAR MUDGUARD ASSEMBLY

MAKE ONE OF EACH HAND