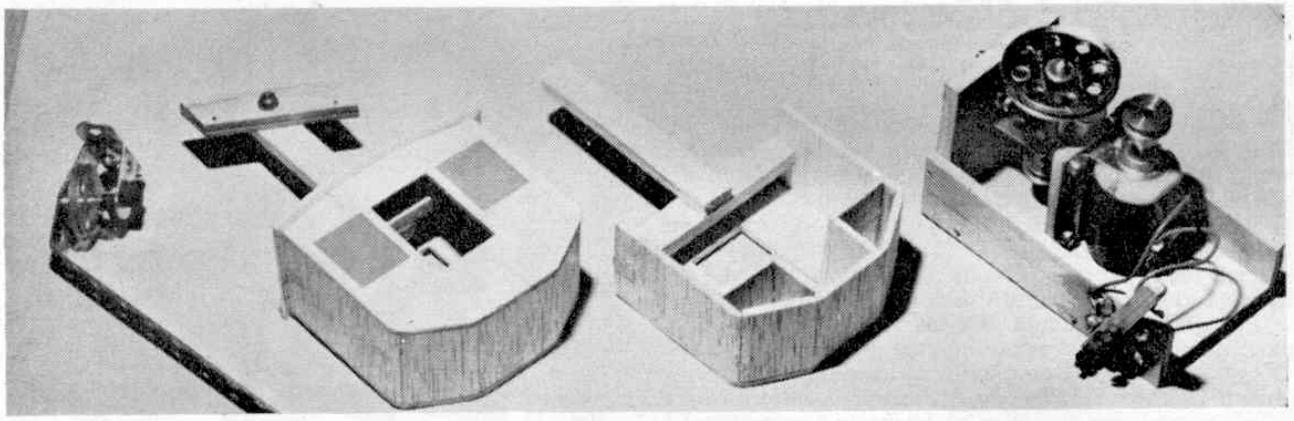


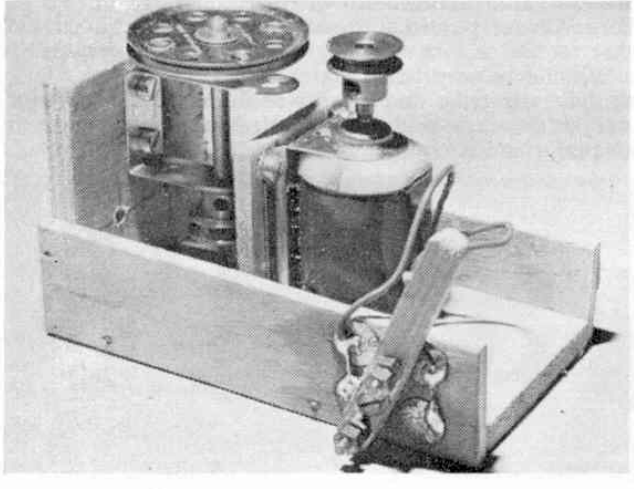
## YOUR FULL SIZE PLANS!

# A COMPLETE WORKING CABLE CAR SYSTEM

**Above, the component parts of the cable car, with one car having a side removed to show the internal construction. Note the different motor fixing and the use of Meccano strip, the plans show alloy strip instead of Meccano if you don't want to bend your parts.**

THIS IS a model of a complete cable car system which can be erected on a permanent or semi-permanent basis. That is to say the cable run and upper 'winch house' are both normally left in position once installed, although the cable cars themselves can be removed, if preferred. A typical run can be from a bedroom window down to a post or tree at the bottom of the garden; or any other two points which can be traversed by an uninterrupted run of cable. The run can also be horizontal rather than inclined, if preferred. In fact, there is plenty of scope for using your imagination as to how and where the cable car system can be set up to suit the space available.

The cable system itself will be described first. All details are shown on the full size plan, but these do not necessarily have to be followed exactly. You could, for example, use a hand operated winch instead of a motor-driven system, although a powered system is much more satisfactory. You can also alter the details of the motor drive and switch control, if you wish, as long as the working features basically the same.



The upper winch house is constructed around a base of $\frac{1}{4}$ in. ply. A ply base 4 in. × 2 in. will be large enough to accommodate a suitable size of electric motor. A front panel, also in $\frac{1}{4}$ in. ply, is cut to a size of 2 in. × $1\frac{3}{4}$ in. and screwed to the end of the base with woodscrews. Two side pieces are then cut from $\frac{1}{8}$ in. ply to a size of $4\frac{1}{4}$ in. × 1 in. and again *screwed* in place, as shown.

A bracket is bent from 16 or 18 gauge metal strip about $\frac{1}{2}$ in. wide to carry the pulleys. This bracket should be bolted to the front ply piece. A large pulley (about $1\frac{1}{2}$ in. diameter) and a small pulley (about $\frac{1}{2}$ in. diameter) are then mounted on a common spindle, as shown. The motor is mounted vertically with a small pulley on its shaft, connected to the large pulley with a drive belt (e.g. a rubber band). These two pulleys must be in line.

At the same height as the bottom (small) pulley, drill two $\frac{1}{8}$ in. diameter holes through the front ply piece $\frac{3}{4}$ in. apart. These holes are bushed with $\frac{1}{2}$ in. lengths of plastic fuel tubing pushed in place. This completes the winch house apart from connecting up the motor and incorporating a switch in the wiring.

A suggested switching system is shown. A lever is cut from $\frac{1}{4}$ in. × $\frac{1}{8}$ in. hardwood. This is drilled to take a bolt to act as a pivot, and also two 6 BA screws A and B. A and B are roundhead screws, mounted with the heads on the inside. The mounting bolt is assembled with washers and a small spring, as shown in the plan view, so that the lever assembly is spring loaded to press against the side.

Contact points C, D, E and F are now fitted in position, as shown. These are simply large drawing pins, with the points passed through holes drilled in the ply side.

Wiring up is shown in a separate diagram. Drawing pins C and D are connected together with a short length of wire, which is then taken to one side of the electric motor. Drawing pins E and F are also connected together and this wire taken to the other side of the electric motor. Finally, wires attached to screws A and B on the lever are connected to the battery. With the lever in the vertical position the motor is switched off. Moving the lever one way then connects the motor to run in one direction. Moving the lever the other way makes the motor run in the opposite direction.

The bottom end of the cable system is, basically, a return pulley. A 1 in. diameter pulley will be suitable and this should be mounted in a bent metal strip carrier, as shown. This carrier is screwed to some strong point, such as a fence post. A guide must be fitted to the carrier. This can again be metal strip, or bent from wire, fitted by bolting to the carrier.

Now position the winch house in some suitable position, such as on a bedroom windowsill. This must also be firmly anchored in place, either by clamping or screwing. Make sure that it lines up properly with the bottom pulley, regardless of the length of run, and you are then ready to install the cables.

The 'cable' is a length of Dacron or prestretched terrylene line (the sort of non-metallic line used for control line models is excellent); or you can use fishing line or stout thread (but not nylon line which stretches too much). The cable is fitted as a continuous loop running round the bottom pulley, through the plastic tubes and taken *twice* round the small pulley. Stretch as tight as possible without overstraining the system, so that the two lines of cable run parallel to each other down to the bottom pulley. The knot to complete the loop of cable should come outside the ply front of the winch house. One of the cable cars should eventually be positioned over this knot.

The cable cars are constructed entirely from balsa. All parts required are shown full size. Assembly is quite straightforward, as shown in the detail sketches. They should be painted silver when completed, with the side windows painted on in black. Make two identical cable cars.

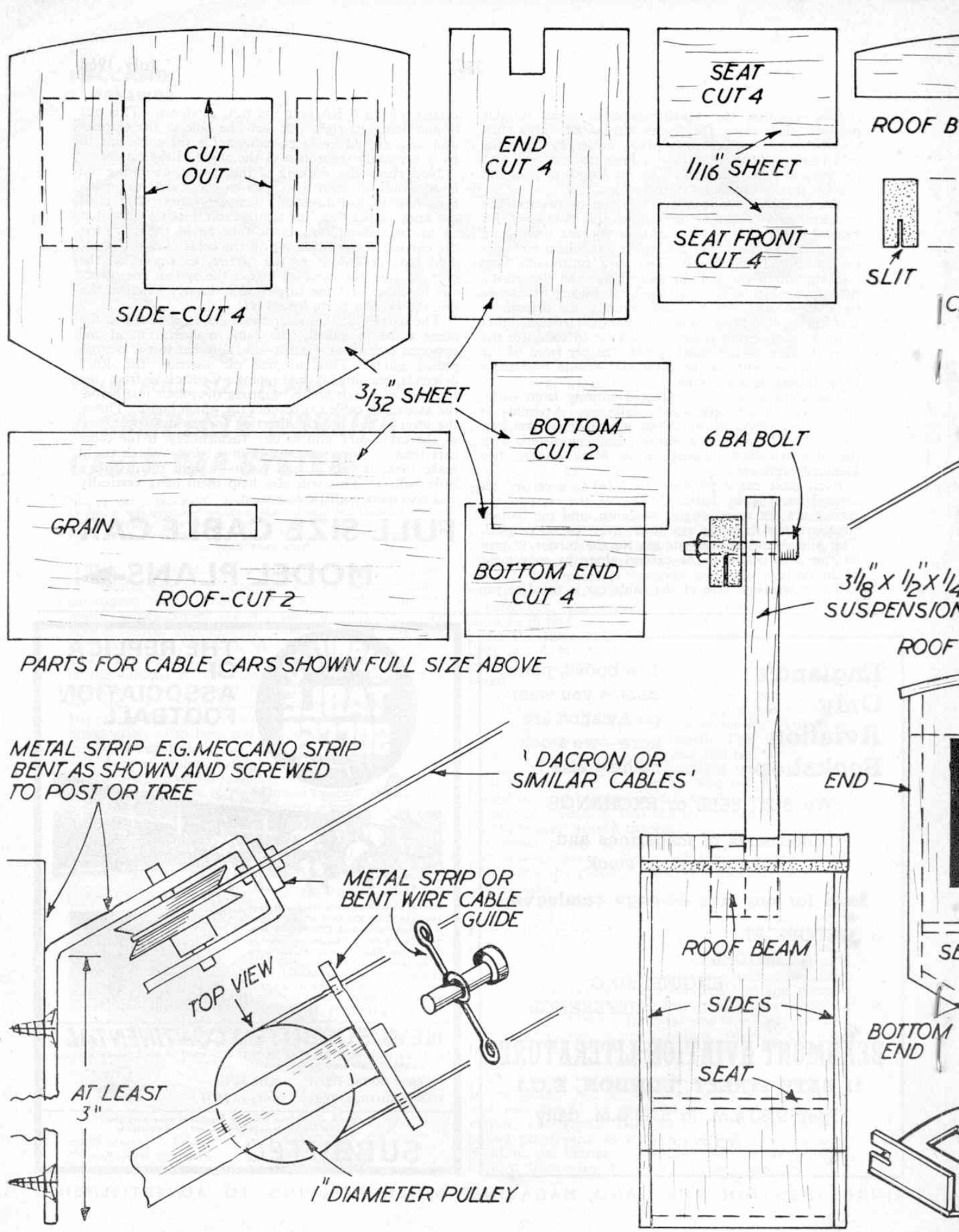
Each cable car is pivotally mounted to a carrier cut from $\frac{1}{2}$ in. $\times$ $\frac{1}{4}$ in. balsa. Note that the ends of the carrier are cut at an angle, as shown, and the bottom edge is slit with a fine saw to fit over the cable itself. This slit should be fine enough for the carrier to grip on the cable and thus be carried along by movement of the cable.

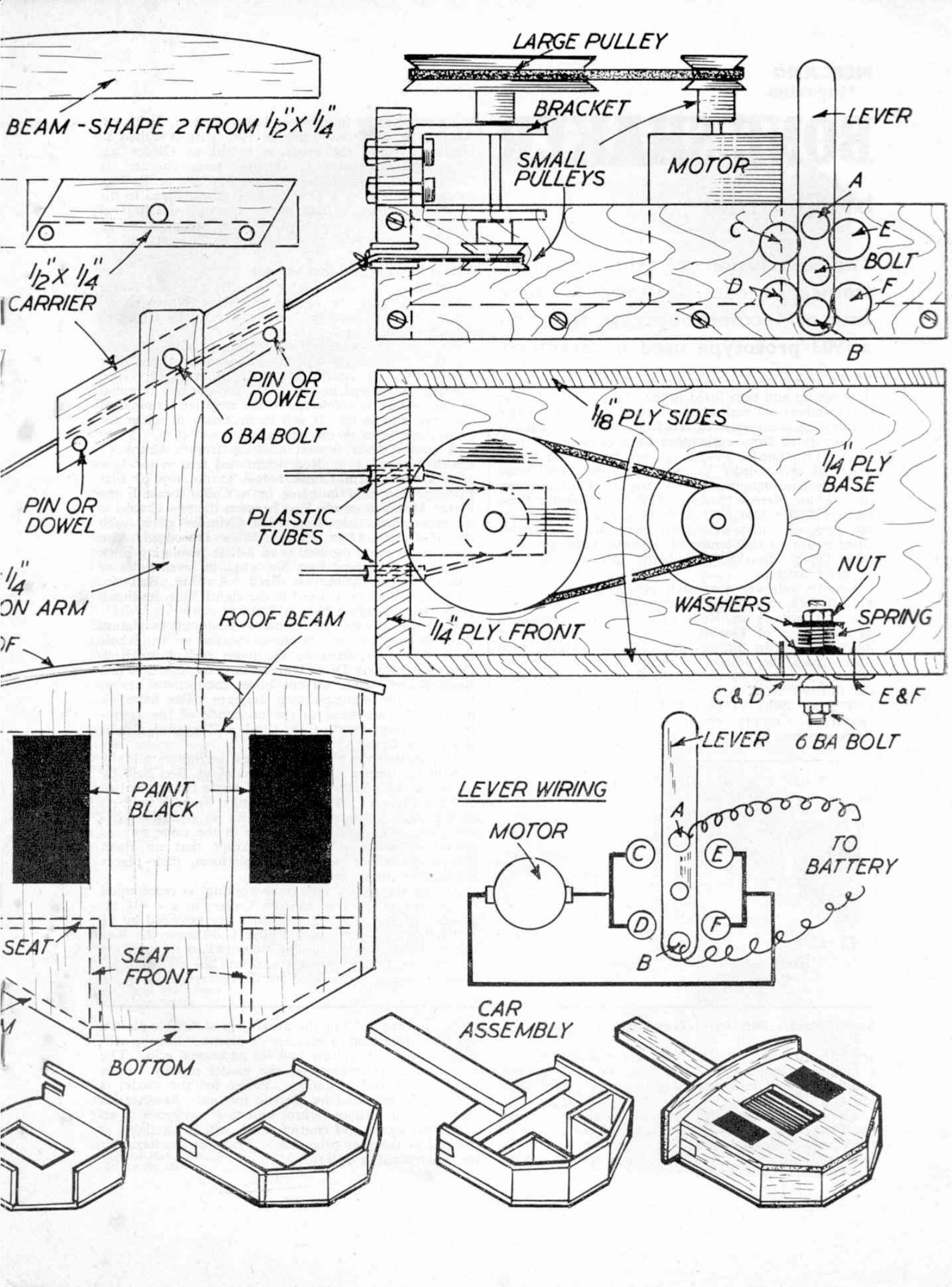
The suspension arm of the cable car is fitted to the carrier with a 6 BA bolt and nut, as shown. This nut is not tightened right up; also the hole in the suspension arm should be large enough for the cable car to hang vertically regardless of the angle of the carrier.

Now check the working of the system, operating the lever switch in both directions to check that the cable runs first in one direction, then the other. Run until the knot in the 'up' or rising cable reaches to within $1\frac{1}{2}$ in. to 2 in. of the plastic tube guide, then position the carrier of one cable car on the cable over this knot. Add pins or dowels to the carrier, as shown on the plan, to trap the cable so that if the system does overrun at either end the carrier will simply 'slip' on the line rather than being forced off.

The carrier of the other cable car is attached to the other cable in exactly the same manner, but at the opposite end of the system—i.e. adjacent to the bottom pulley guide. Thus as one car ascends, the other descends, passing at mid point. Control is from the top end, or winch house, stopping the motor just before the ascending cable car reaches the winch house. Throw the lever in the reverse direction for the next operation of the cable cars, and so on. Incidentally, if the cable cars tend to swing excessively in a wind—which could make them collide at mid point—weight them with a little ballast. This will also help them hang vertically and give more realistic operation.

## FULL SIZE CABLE CAR MODEL PLANS-➤


CUT OUT
SIDE-CUT 4
END CUT 4
SEAT CUT 4
1/16" SHEET
SEAT FRONT CUT 4
ROOF B
SLIT
3 1/32" SHEET
BOTTOM CUT 2
6 BA BOLT
GRAIN
ROOF-CUT 2
BOTTOM END CUT 4
3 1/8" X 1 1/2" X 1/4
SUSPENSION
ROOF
PARTS FOR CABLE CARS SHOWN FULL SIZE ABOVE
METAL STRIP E.G. MECCANO STRIP BENT AS SHOWN AND SCREWED TO POST OR TREE
'DACRON OR SIMILAR CABLES'
END
METAL STRIP OR BENT WIRE CABLE GUIDE
TOP VIEW
ROOF BEAM
SIDES
SEAT
BOTTOM END
AT LEAST 3"
1" DIAMETER PULLEY


BEAM - SHAPE 2 FROM 1/2" X 1/4"
LARGE PULLEY
BRACKET
LEVER
SMALL PULLEYS
MOTOR
A
C
E
BOLT
D
F
B
1/2" X 1/4" CARRIER
PIN OR DOWEL
6 BA BOLT
PIN OR DOWEL
1/8" PLY SIDES
1/4" PLY BASE
PLASTIC TUBES
NUT
WASHERS
SPRING
1/4" PLY FRONT
C & D
E & F
6 BA BOLT
LEVER
ROOF BEAM
PAINT BLACK
LEVER WIRING
MOTOR
A
C
E
TO BATTERY
D
F
B
SEAT
SEAT FRONT
BOTTOM
CAR ASSEMBLY