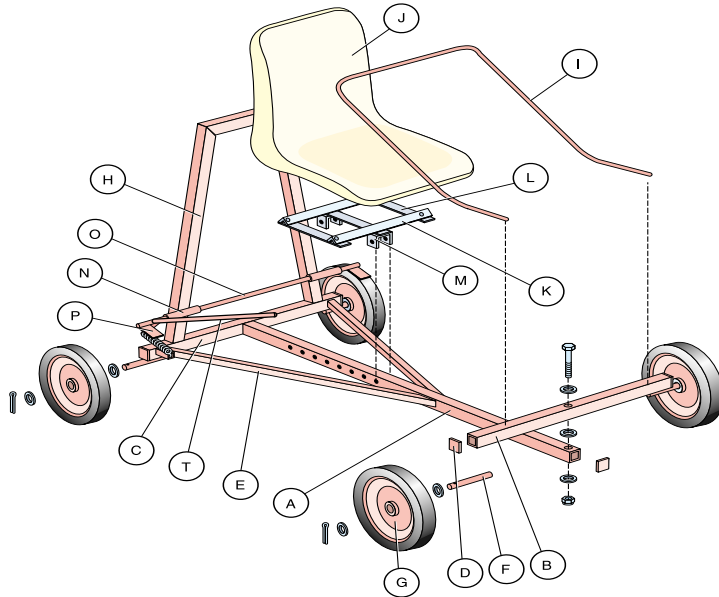


New-fashioned billycart

Your children will love this modern take on the old-fashioned billycart

Remember the fun you had as a child, whacking some wheels on a couple of bits of wood, adding an old fruit box, and pointing the contraption down the nearest slope you could find? Well here's the billycart of the new millennium and it's guaranteed to be just as much fun.



Here's how

Step 1 From rear of chassis beam (A), measure 200mm along one side. Measure seven further intervals of 50mm. Draw a line down centre of this side and mark hole centres with a centre punch. Drill 10mm holes through both sides of the chassis. On top surface, drill a 10mm hole through the beam, 17mm from the front.

Step 2 Drill a 10mm hole in the centre of the front axle bar (B), midway along its length.

Step 3 Mark the centre of the back axle bar (C) and the centre of the end of the chassis beam. Align the two marks and check the parts are square. Tack-weld in place. If the metal is galvanised, set up a fan to blow fumes away from you and wear a fume mask. Check the angle again, then fully weld in place. Weld the end caps (D) to the open ends of the bars and beam.

Step 4 Mark 30mm in from the ends of the rear axle bar. Hold a brace (E) with its outside edge on the mark and so it just crosses the chassis beam. Mark the angles, cut, then weld between bar and beam. Clean up all welds using an angle grinder.

Step 5 On the underside, draw a line along the centre of the rear and front axle beams. Round the ends of the stub axles (F) slightly and drill a 3mm hole through the axle, 8mm from the outer end. Slip through a split pin, add a washer, a wheel (G), then another washer. Align axle beams with the line and tack-weld at end. Check alignment of wheels. Tap axle with hammer to adjust. Remove wheels or cover with several layers of aluminium foil or leather to protect against welding spatter. Weld axles in place.

What you'll need

| Item | Part | Size | Material |
|------|-----------------------|------------------------|----------------------|
| A | Chassis beam | 35 x 35 x 2.5 x 1250mm | Steel square section |
| B | Front axle bar | 35 x 35 x 2.5 x 600mm | Steel square section |
| C | Back axle bar | 35 x 35 x 2.5 x 650mm | Steel square section |
| D | End caps (5) | 35 x 35 x 2mm | Steel bar |
| E | Braces (2) | 20 x 20 x 2 x 800mm | Steel square section |
| F | Stub axles (4) | 19mm dia x 130mm | Steel rod |
| G | Wheels (4) | 10 x 1.75 (250mm dia) | Solid steel/rubber |
| H | Push/roll bar | 35 x 35 x 1.5 x 1660mm | Steel square section |
| I | Steering arm | 10mm dia x 1900mm | Steel rod |
| J | Chair | | Recycled plastic |
| K | Seat carrier (2) | 20 x 20 x 2 x 320mm | Steel angle |
| L | Seat spacer (3) | 35 x 2 x 240mm | Steel bar |
| M | U-bracket (6 makes 2) | 35 x 2 x 40mm | Steel bar |
| N | Sleeve (2) | 12mm id x 100mm | Steel tube |
| O | Brake rod | 12mm dia x 720mm | Steel rod |
| P | Brake pad (2) | 35 x 2 x 65mm | Steel bar |
| Q | Spring bracket | 20 x 20 x 2 x 50mm | Steel square section |
| R | Spring lever | 12mm dia x 100mm | Steel rod |
| S | Spring | 75mm | Steel |
| T | Brake handle | 12mm dia x 520mm | Steel rod |

Note: id = inside diameter, dia = diameter

You'll also need: eight 19mm washers; four 3 x 50mm split pins; 100mm x 10mm bolt with three washers and nylon locknut; plastic seat without legs; two 50mm bolts and nuts; paint

Step 6 Join the front axle beam to the chassis with a 10mm bolt. Slip a washer under the bolt head, between the bar and the beam, and under the nylon locknut.

Step 7 Set a sliding bevel to 50° and draw a 'V' 700mm from each end of the push-cum-roll bar (H). Cut out the Vs with an angle grinder, without cutting through the fourth side. Bend the bar to two angles of 100° and weld along the seams. Trim off bottoms to a 10° angle. Centre the bar on the back axle and weld.

Step 8 To bend the steering arm (I), measure 175mm from the centre of the rod and start a 50mm radius right-angle bend by wrapping around a 100mm pole. Repeat on other side. When bent, the two sides should be about 450mm apart. From the bends, measure down 470mm and bend both sides to about 150°. Trim off ends to about 125mm long. Centre and weld to the front axle bar. Lengthen or shorten the steering bar as needed. If you find the steering bar awkward to use, replace with two eye bolts welded to the axle bar and use traditional rope to steer the cart.

Step 9 Seat assembly construction depends on the chair (J). Cut the two seat carriers (K) and drill holes to coincide with the screw holes in the seat base. Note the distance they are to be apart, and weld them to the three spacers (L). Drill a 10mm hole, centred 19mm from the bottom edge on four of the pieces that form the sides of the



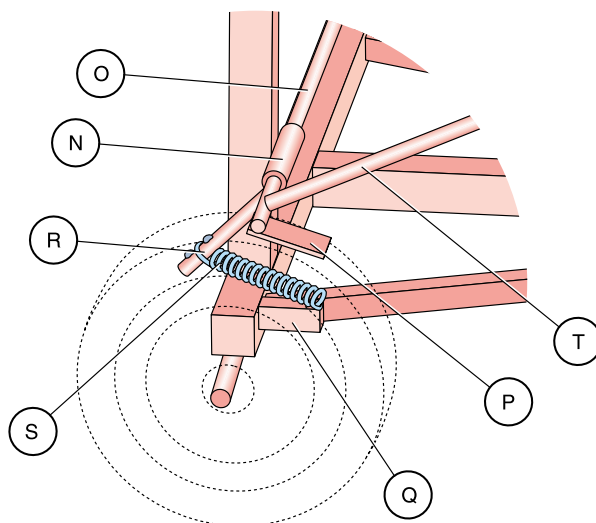
U-bracket (M). Weld the sides to the base, then weld to the seat assembly, spacing the brackets so their holes are 200mm apart and so they coincide with the holes in the chassis beam. The U-bracket gives four positions of adjustment on the beam. Secure with bolts.

Step 10 Slide the sleeves (N) onto the brake rod (O). Cover the back wheels with foil, and place the brake pad (P) on the wheel. Weld the sleeves to the push bar, allowing about 3mm clearance for the brake pad. The left sleeve is fixed flush with the inside of the push bar, and the right one sits 20mm inside the push bar. Weld on the brake pads.

Step 11 Weld the spring bracket (Q) to the axle bar. Add the spring lever (R) to the brake rod, sloping back a little

to allow for a few millimetres of travel before it hits the axle bar. Add two little blobs of weld near the bottom of the spring lever to contain the spring. Add another two blobs of weld to the brake bar, just inside the sleeves, to stop lateral movement. Add the spring (S) by hooking it into the opening of the spring bracket and between the blobs on the spring lever. Let the spring hold the brake pad in the off position, and weld the brake handle (T) to the brake bar at a comfortable height. Check that the brake pad clears the wheels by a few millimetres when the spring holds the brake off, yet is effective when the brake handle is pulled upwards.

Step 12 Remove seat and wheels, then paint the frame, either by brush or by applying several coats of spray paint. Reassemble all of the components, bending the ends of split pins so they don't fall out. Tape some padding to the steering bar, brake handle and push bar (pipe lagging is ideal) and you're ready to let her rip.



Brake detail