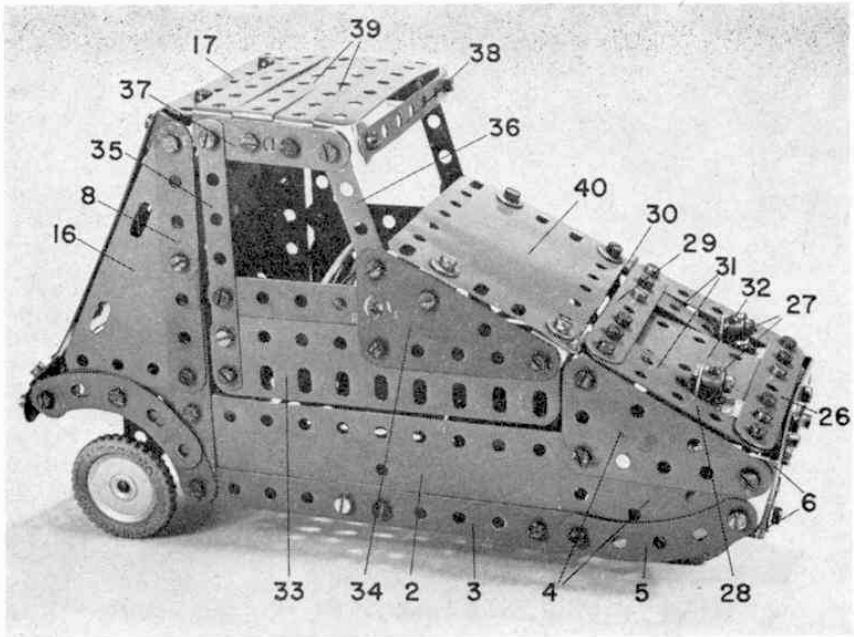


MECCANO THREE WHEELER

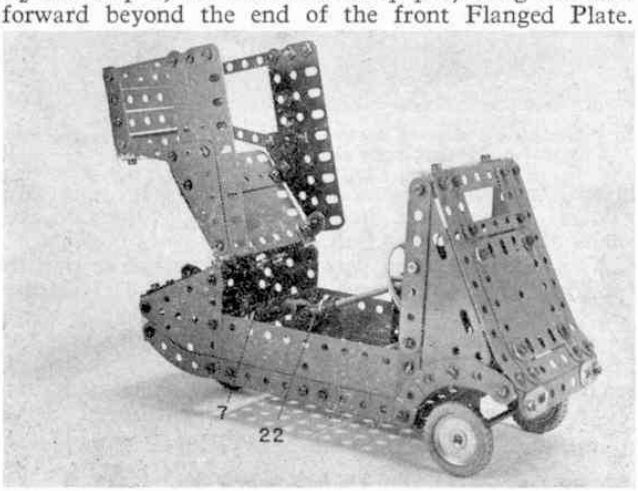
A simple model described by 'SPANNER'

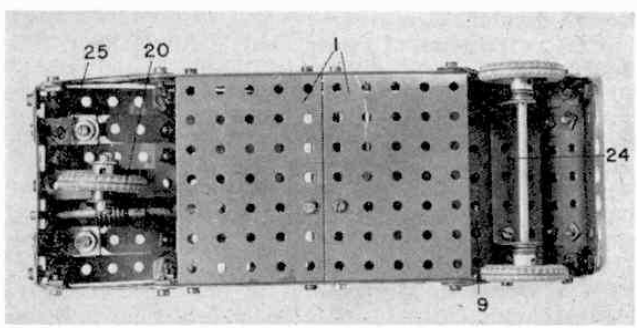
WITH THE TREMENDOUSLY HIGH ROAD and petrol taxes in operation today, plus the cost of insurance permiums, the average British motorist is more than a little interested in cheaper forms of private road transport and one of the cheapest types of motorised transport is undoubtedly the 3-wheeler.

While having most of the attributes of a motor car, the typical 3-wheeler has a much lower petrol consumption, pays a fraction of the road tax and, at the same time, does not suffer any higher insurance premiums. Obviously, therefore, 3-wheelers are of interest and, as we on the M.M. like to reflect current interest whenever possible, we felt it was time to present another Meccano 3-wheeler for readers to build. Although not intended as a direct copy, inspiration for the model came from the recently introduced Bond Bug—that futuristic and utterly unique vehicle from Bond-Reliant which we reviewed in the October M.M.—and a glance at the accompanying pictures will show the unmistakable similarity.

Construction should present no problems, even for younger readers. A base is built up from two $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plates 1 connected together at each side by a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 2, overlayed by a $5\frac{1}{2}$ in. Strip 3, the Plate and Strip projecting one hole forward beyond the end of the front Flanged Plate. Bolted to the forward end of the Plate are two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plates 4 and a $2\frac{1}{2}$ in. Curved Strip 5, arranged as shown, the end of the Curved Strip being connected to the overlapping apexes of the Triangular Plates by a Fishplate, the securing Bolts also fixing two $3\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips 6 between the sides of the model. The Bolts fixing the Triangular Plates to the upper forward corners of Plates 2 also secure another $3\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 7 between the sides.

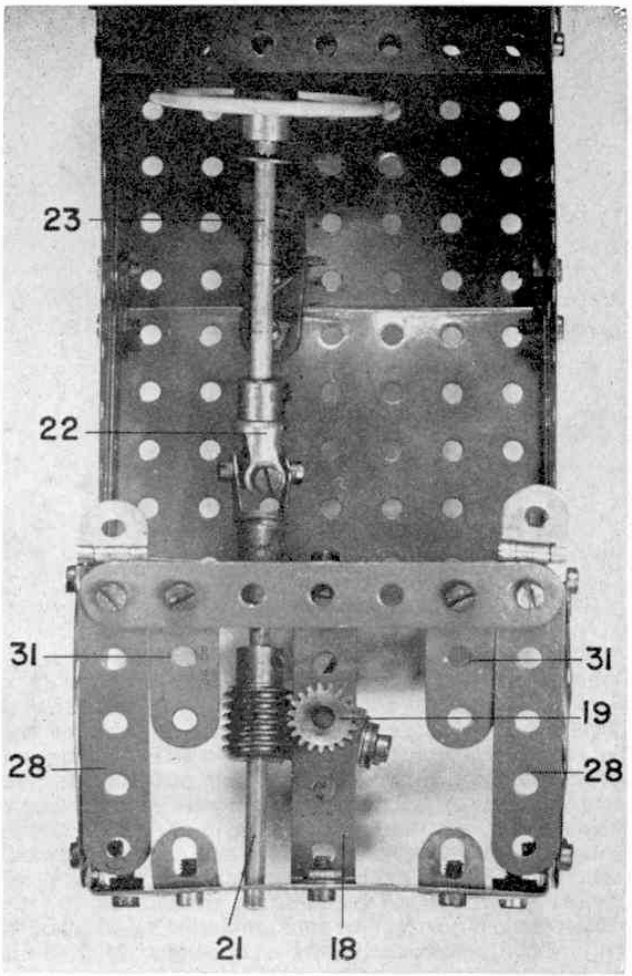
Now bolted to the rear end of Strip 3 and Plate 2 is a vertically-positioned 5 in. compound strip 8 (built up from two $3\frac{1}{2}$ in. Strips) and a $2\frac{1}{2}$ in. Stepped Curved Strip, the latter extended one hole rearwards by a second similar Curved Strip. The securing Bolts help to fix another $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate 9 between the sides, while the rear ends of the Curved Strips at each side of the model are connected by a $3\frac{1}{2}$ in. Strip 10, attached by Angle Brackets. The Bolt fixing the Strip to each Angle Bracket also holds an Obtuse Angle Bracket 11 and a $4\frac{1}{2}$ in. Strip 12 in place, the Brackets at each side in turn being connected by a $3\frac{1}{2}$ in. Strip, the securing Bolts also holding two Fishplates 13 in place. Flanged Plate 9, incidentally, serves as the seat, the back of which is provided by a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate, attached to Plate 9 by Angle Brackets.





Above: An underside view of the 3-wheeler showing the simple, but strong chassis construction.

Left: Like the real Bond Bug, access to the Meccano 3-wheeler is by hinging forward the entire cab section of the body.



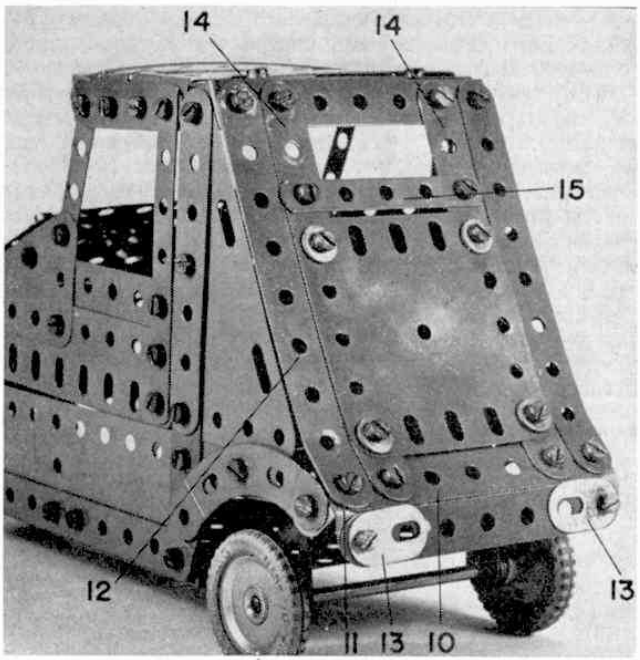
A close-up top view of the model, partially dismantled to show the Pinion-and-Worm steering linkage.

Two further 4½ in. Strips 14 are secured through the second and sixth holes of Strip 10, a 2½ × 2½ in. Flexible Plate and a 2½ in. Narrow Strip 15, being bolted to these Strips to enclose the back of the model. At the sides, a 3½ × 2 in. Triangular Flexible Plate 16 is bolted to each compound strip 7, in the position shown, the upper securing Bolt fixing a 3½ × ½in. Double Angle Strip between the top ends of the compound strips at each side. A 3½ in. Strip 17 is secured to this Double Angle Strip by Angle Brackets, the lower securing Bolts also fixing the top ends of Strips 14 to the Double Angle Strip. Note that the Angle Brackets are opened out slightly to coincide with the sloping back of the model.

The centre-point of upper Double Angle Strip 6 is next connected to the centre of Double Angle Strip 7 by a 2½ × ½ in. Double Angle Strip 18, in the centre hole of which a 1 in. Rod is journalled, held in place by a ½ in. Pinion 19 above the Double Angle Strip and by a Large Fork Piece below the Double Angle Strip. The lugs of the Fork Piece are extended by Fishplates, in the ends of which a 1 in. Rod is mounted, secured by a Collar and a 1 in. Pulley with Motor Tyre 20 between the Fishplates. In mesh with Pinion 19 is a Worm on a 3 in. Rod 21 journalled in upper Double Angle Strip 6 and Double Angle Strip 7 and held in place by a Collar and a Universal Coupling 22. Fixed in the other end of this Universal Coupling is a 2½ in. Rod 23, journalled in an Obtuse Angle Bracket bolted to a 2 in. Strip which is, in turn, bolted to the lug of a 1 × 1 in. Angle Bracket secured to Flanged Plates 1. A 1¾ in. Steering Wheel is mounted on the end of the Rod.

Like the front wheel, the rear wheels are also supplied by 1 in. Pulleys with Motor Tyres mounted on a 3½ in. Rod journalled in the end holes in the lugs of a 2½ × 1½ in. Double Angle Strip 24 secured to the underside of Flanged Plate 9. Note that the Double Angle Strip is spaced from the Flanged Plate by a Collar on the shank of each securing Bolt, while each Pulley is spaced from the lug of the Double Angle Strip by three Washers.

Returning to the front of the model, two Obtuse Angle Brackets are secured through the second and sixth holes of upper Double Angle Strip 6, these Brackets each being extended by a further Obtuse Angle Bracket 25, the securing Bolts also fixing a 3½ in. Strip 26 between the former Brackets. Bolted to the free lug of each of the latter Brackets is an ordinary Angle Bracket, to the free vertical lug of which a Collar 27 is attached by a ⅜ in. Bolt to represent the headlamps. Bolted to each end of Strip 26, but spaced from it by a Washer, is a 2½ in. Strip 28, the upper end of which is bolted, along with a 3½ in. Strip 29 and a Hinge 30, to an Angle Bracket secured to the top rear corner of upper Triangular Flexible Plate 4. Two 1½ in. Strips 31 are bolted, in the positions shown, to Strip 29, while the remaining space is enclosed by a 2½ × 1½ in. Flexible Plate 32

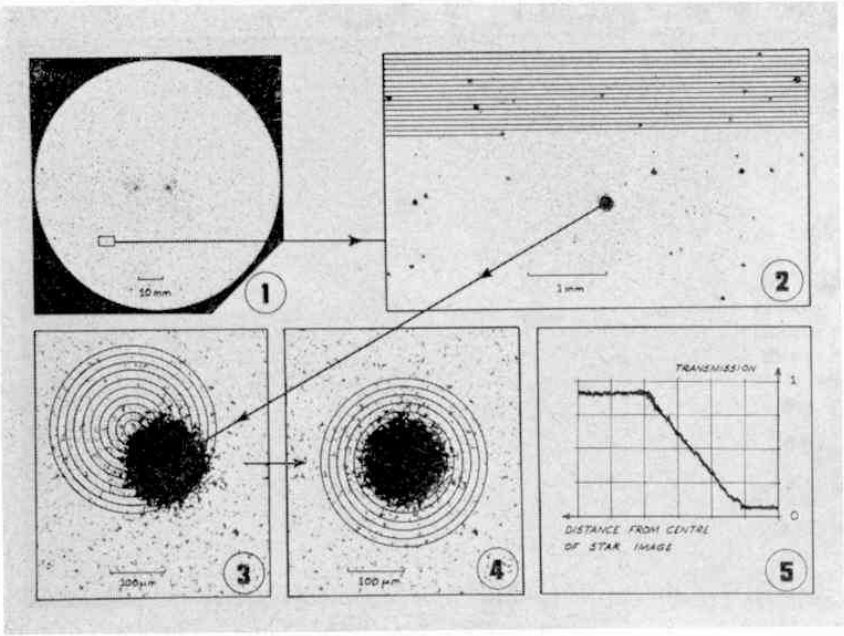


In this close-up view of the rear of the model, the construction of the back body section is clearly shown.

bolted between Strips 26 and 29. Note that this Plate is spaced from Strip 29 by two Washers on the shank of each securing Bolt.

This leaves us only with the opening cab section to complete. Each side consists of a 4½ in. Flat Girder 33, to which a 2½ × 1½ in. Triangular Flexible Plate 34 and a 3½ in. Narrow Strip 35 are bolted. A 2½ in. Narrow Strip 36, projecting upwards three holes, is secured to the upper rear corner of the Triangular Plate, while a 2½ in. Strip is bolted to Narrow Strip 35. The upper ends of Narrow Strips 35 and 36 are

Continued at foot of page 84.



Part 1 shows a photograph taken with the Schmidt telescope. The stars have produced black images on the negative. A typical photograph contains 40,000 images. An area of the negative is selected for measurement.

Part 2 shows the selected area of the negative enlarged. GALAXY searches the selected area for the star images, using linear scanning.

Part 3 shows a single star image greatly enlarged. GALAXY scans the star image, using concentric circle scanning.

Part 4 shows the same star image.

Part 5 shows a drawing of the ascilloscope display on GALAXY. GALAXY measures the profile of the star image to a quarter of a micrometre.

of astronomical data can be taken from the telescope by the 'Galaxy' machine and fed into the computer for their results to be analysed in a fraction of the time that it has taken in the past. In designing the machine, four main features were decided upon: (1) A cathode ray tube to scan the photograph with a spot of light, for finding the star images and measuring their sizes and densities, (2) a precise mechanical carriage to hold and position the plate with an accuracy better than a 'micron', (3) A system developed for measuring the carriage position to a 'micron', and (4) an electronic system similar to a computer to control the operations.

The invention of the Schmidt telescope more than 30 years ago provided astronomers with the means of recording information about the stars at an unprecedented rate. A single photograph of an area of the sky a few times the size of the Moon, taken in a few minutes on a clear, dark night by a Schmidt telescope of even moderate size, records images of tens of thousands of stars. Such photographs contain a wealth of information. The light from a single star is focused by the telescope to form a spot of light only a few tens of microns across. The light is scattered and absorbed by the photographic emulsion; the brighter the star, the further the light spreads out in the emulsion, so that when the photograph (a negative) is developed, the images of bright stars are larger and more dense grey spots than those of faint stars. The measurement of the strength of a star image is consequently a matter of measuring its size and density, sizes typically lying in the range from tens to hundreds of microns.

With 'Galaxy', images of the stars are found on the photograph, and their positions, sizes and densities are measured with precision and at high speed. The requirements laid down were that the precision of measurement should be one micron in the position of a star image, and a quarter of a micron in the size, and that the machine should find and measure a 1,000 star images an hour, entirely automatically. The machine works as follows: To find the star images the photograph is scanned by a small spot of light, produced by a cathode ray tube and projected down to a chosen size, 16 microns across being typical. The light passes through the photograph and is measured by a photoelectric cell. The passage of the spot of light over a star image is then detected by the cell as a reduction in brightness, and the position at which the event occurred is recorded. With this resolution of 16 microns, the plates currently being measured are searched at a rate of 30 square millimetres per minute, 10,000 stars being found and recorded per hour.

When the star images have been found, the carriage carrying the photographic plate is moved to put each star in turn beneath a scanning system working at high magnification, for a more detailed examination of each image.

3 WHEELER *Continued from page 86*

connected by a 2 in. Strip 37, the securing Bolts fixing two $3\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips between the sides, the front securing Bolt also holding an Angle Bracket in place. These Angle Brackets at each side are connected by a $3\frac{1}{2}$ in. Narrow Strip 38. Two further $3\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips 39 are bolted between Strips 37 to complete the roof, then a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 40 is attached to Triangular Flexible Plates 34 by Angle Brackets, the forward securing Bolts also fixing the completed assembly to Hinges 30.

Last of all, two Fishplates are bolted, as shown, to lower Double Angle Strip 6 to finally complete the entire model.

PARTS REQUIRED

2—2	1—16a	9—48b	3—142c
4—2a	1—16b	3—53	1—185
9—3	1—18b	9—59	1—188
4—5	3—22	2—90	2—189
3—6	1—26	4—90a	1—190
2—6a	1—32	2—103c	2—190a
8—10	110—37a	2—111a	6—221
10—12	105—37b	4—111c	2—225
1—12a	24—38	2—114	3—235
4—12c	1—47	1—116	3—235b
1—16	1—48a	1—140	