

Meccano Suggestions Section

By "Spanner"

(388) Automatic Reversing for E6 Electric Motor

(E. Pringle, Edinburgh)

Fig. 388 shows a novel type of automatic reversing movement that can be fitted to the reversing lever of an E6 Electric Motor.

Pringle used the mechanism in a demonstration model of a transporter bridge, which he required to operate without attention for long periods. The mechanism will be found useful also in many instances where a model is required to perform a definite sequence of operations, and has the advantage that the period between each reversal of the mechanism can be adjusted as desired.

The Motor is suitably mounted on a base-plate and a Worm on the armature shaft meshes with a 57-teeth Gear fixed on a 3" Rod journalled in a 2½"×1" Double Angle Strip. A ¾" Bevel Gear on the 3" Rod meshes with a similar Gear on a horizontal 2½" Rod, which carries also a ½" Pinion. The ½" Pinion meshes with a 57-teeth Gear on a 3" Rod, which carries also a ¾" Sprocket Wheel that is connected by Chain to a ¾" Sprocket Wheel fastened on a 3½" Screwed Rod. Bearings for the Screwed Rod are provided by two Threaded Couplings fixed to the base-plate, and an End Bearing on it is connected by Springs to a Pivot Bolt lock-nutted to a 1½" Strip that is bolted to the reversing lever of the Motor. The drive to the model can be taken from any of the intermediate shafts journalled in the Motor side-plates.

When the Motor is set in operation the End Bearing traverses the Screwed Rod and extends the Springs. As the End Bearing nears the end of its travel the pull of the Springs overcomes the friction of the reverse lever and it snaps over, the Motor being immediately reversed. The End Bearing then travels to the opposite end of the Screwed Rod.

For efficient operation all the rotating shafts and screw mechanism should be well lubricated.

(389)

A Meccano Humming Top

(A. Peters, Bristol)

A. Peters, Bristol, has made a good "humming top" from a few parts left over after completing a model. He fastened a Flywheel (Part No. 132) near the pointed end of a Drift (Part No. 1083). He then dismantled an old mouth organ and extracted four of the reeds. These were partly enclosed in metal sleeves, which were then clipped around the rim of the Flywheel, on which they were fixed at equal intervals.

A 12½" Strip fitted with a Double Bent Strip at one end holds the top upright. The top is spun by the usual method, the string being wound around the upper end of the Drift.

With this arrangement of the reeds, the top can be spun only in one direction. A better effect can be obtained by fitting a second set of reeds with their free ends pointing in the opposite direction. The top can then be spun in either direction at will.

(390) Independent Front Wheel Suspension

(P. Johnson, Leicester)

Good spring suspension in a large model motor chassis usually is necessary in order to obtain smooth reaction to uneven surfaces, and to absorb any shocks to which the model may be subjected. A simple type of suspension that can be fitted to almost any type of chassis is shown in Fig. 390.

The front tie-bar of the chassis is formed by a U-section girder, and it can be attached to the side members of the chassis in which it is to be incorporated by a 1" Corner Bracket. The 4½" Screwed Rod 1 passing through the centre transverse bore of a Coupling 3 is also screwed into the tapped hole of a Collar. A 1" Rod 2 is then passed through the Collar, and through holes in two 1" Corner Brackets bolted to the U-section girder. Coupling 3 has a 1" Rod carrying a Compression Spring locked in its longitudinal bore, and the Rod is journalled in the end hole of the girder.

Two 2½" Strips 4 are lock-nutted to a Double Bracket bolted to the U-section girder,

and serve to support the steering mechanism. At their outer ends the Strips are lock-nutted to a Double Bracket and two 1½" Strips, one at each side of the Double Bracket. A second Double Bracket is bolted below the first, and bolts that carry two washers on their shanks for spacing purposes pass through the Double Brackets, and are screwed into the end transverse tapped bores of a Coupling 5. This Coupling forms the pivot for the front wheel.

The end of Screwed Rod 1 is gripped in a Collar, from which the grub screws have been removed and replaced by 7/32" bolts. The bolts pass through the end holes of the 1½" Strips. The road wheel, a 3" Pulley, is carried on a ½" Bolt that is screwed into a Collar. This Collar is held on a 1" Screwed Rod that carries two washers above, and nine Washers below the Collar.

A Flat Bracket is slipped on the upper end of the Screwed Rod and a 1" Corner Bracket, and a 2" Strip on the lower end, all being held in place by nuts. Bolts are passed through the unoccupied holes of the Corner Bracket and Flat Bracket into the longitudinal bore of Coupling 5, and are held in place by its grub screws. The tie rod 6 is lock-nutted to the end of the 2" Strip. When the lorry travels over an uneven surface, or when a heavy load is imposed on the chassis, the Compression Spring absorbs the shock.

The suspension may be fitted to the rear wheels of a model, in which case the road wheel axle should be journalled direct in Coupling 5. The rear wheel should be free on the axle and a 57-teeth Gear should be bolted to it. This Gear can be driven by a ½" Pinion fastened on the end of a Flexible Coupling Unit journalled in the boss of a Crank. The other end of the Coupling Unit can then be coupled up to the drive from the differential. Alternatively, Universal Couplings could be used, but these are not so compact.

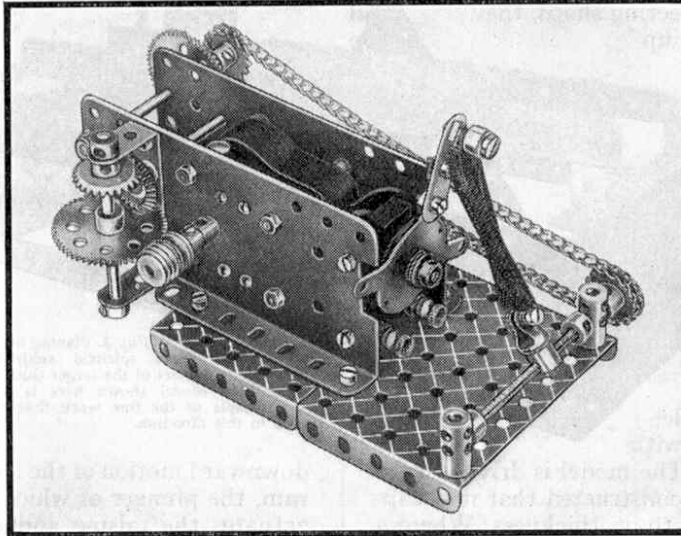


Fig. 388.

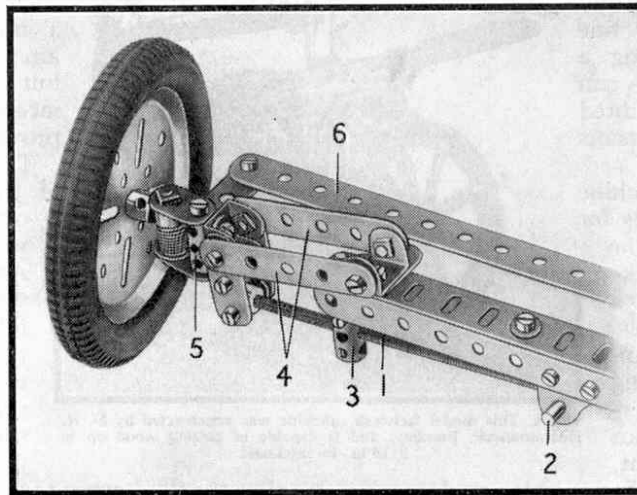


Fig. 390.

(391) An Electric Motor built from Meccano Parts

(S. Pander, Kendal)

A novel type of electric motor submitted by S. Pander, Kendal, is shown in Fig. 391. The motor is very compact and the simplicity of its construction is an outstanding feature. It is not very powerful, but it provides an excellent example of the interesting use that can be made of Elektron parts in conjunction with Meccano parts.

The complete motor is carried on a base-plate formed by a 3½" x 2½" Flanged Plate. Two Elektron Magnet Coils are fitted with Cores, and mounted on a yoke consisting of five 2½" Strips. The 2½" Strips are in turn supported from the base by 1½" Strips. The armature shaft is a 3" Rod 2 that carries the armature and commutator. The armature is built up on a "spider" taken from a Universal Coupling. Four Pivot Bolts, each carrying 11 washers on its shank, are screwed into the tapped holes of the "spider." The commutator also is a "spider" but it carries four bolts in its tapped holes.

The armature shaft is journalled in bearings formed by Threaded Couplings held on the base-plate by ⅜" Bolts. Each Bolt carries five washers on its shank in order to raise the armature shaft in line with the Magnet Cores. Before tightening up the Bolts, the upper transverse plain bores of the Threaded Couplings should be carefully aligned. The armature is carried between the Threaded Couplings, lateral movement in the shaft being prevented by two Collars. The position of the armature should be adjusted so that it is as near as possible to the ends of the Magnet Cores. The commutator should be so arranged that the bolts are half-way between the poles of the armature. The brush is a Pendulum Connection mounted on a 6BA Bolt, which is insulated from the base by means of an Insulating Bush and Washer. A second 6BA Bolt similarly insulated is fastened next to the Brush Terminal 4.

The electrical connections are made as follows. The outer terminal of the rear Magnet Coil is earthed to the base-plate by fastening the end of the wire to a nut and bolt. The inner terminal of the same Coil is then connected to the outer terminal of the second Coil, and the remaining terminal is connected to Terminal 5 underneath the base by a short length of wire.

The electric circuit to the Magnet Coils is completed when one of the bolts of the commutator makes contact with the brush. The Cores become magnetised and attract the poles of the armature. Just as the poles are almost opposite the Cores the bolt breaks contact with the brush, and the armature continues to revolve until the next bolt makes contact.

The bearings of the armature shaft should be well lubricated with Meccano oil, and the brush should be adjusted very carefully so that the bolts make and break contact at the right moment. If the brush is not adjusted properly the armature will vibrate, but slight alterations in the position of the brush will eliminate most of this. The addition of a small flywheel, such as a 1" Gear or a 1½" Flanged Wheel, also will be found helpful.

The Motor can be operated from a type T6 Transformer, but the control switch of the Transformer should not be moved beyond the fourth stud from the "off" position, otherwise the Magnet Coils will become hot and considerable vibration will be set up.

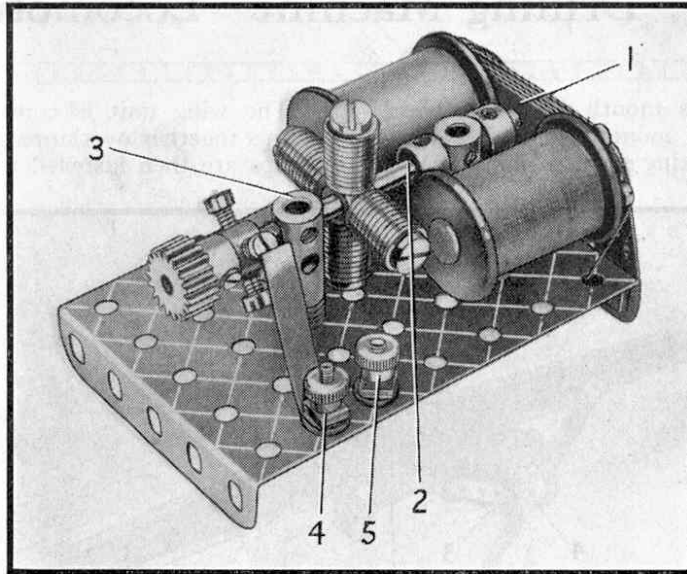


Fig. 391.

(392) Reversing Movement for No. 1 Clockwork Motor

(W. Raybold, Walsall)

Model-builders who do not possess a reversing Clockwork Motor will find the simple mechanism submitted by W. Raybold, Walsall, a very useful addition to working models such as cranes, in which a reversal of operations is required. It is illustrated in Fig. 392. The mechanism is carried on a base formed by a 2½" x 1½" Flanged Plate. Two Trunnions spaced from the Flanged Plate by washers form bearings for 2" Rod 1, which carries between the Trunnions a 1" Pulley and a 57-teeth Gear. Bearings for a second 2" Rod are provided by two 1" x 1" Angle Brackets. The rear Bracket carries also a Flat Bracket fitted with two Threaded Pins that act as stops. The 2" Rod carries a Double Arm Crank 2, fitted with a 1" Triangular Plate and a 1½" Strip. A ⅜" Bolt 3 is lock-nutted to the Triangular Plate and carries also a ½" Pinion, which meshes with a second ½" Pinion locked on another ½" Rod journaled in the remaining hole in the Triangular Plate. This Rod carries also a 1" Pulley 4. The Driving Band 5 serves to keep the Pinion in mesh with the 57-teeth Gear when the mechanism is in its normal

position, and when it is required to reverse the drive the 1½" Strip is moved over until the Double Arm Crank comes into contact with one of the Threaded Pins.

The drive from the Clockwork Motor is taken to the 1" Pulley 4 through a Driving Band, which stretches or contracts when the 1" Pulley moves to and fro. The drive to the model is taken from the 1" Pulley on Rod 1.

An alternative method of constructing the reverse gear, if this is to be incorporated in a model crane, is to mount the 57-teeth Gear on the end of the Rod forming the winch barrel. A Strip of convenient length can then be used for the reversing lever, and the Pinions should be mounted as follows. The upper Pinion is carried on a ⅜" Bolt lock-nutted to the Strip forming the reversing lever, the lock-nuts holding also a Flat Bracket and a Reversed Angle Bracket at right angles to the Strip. These provide bearings for a 1½" Rod that carries a second ½" Pinion and a 1" Pulley. The reverse lever is pivoted in the fourth hole from the end carrying the Pinions, so that by moving the lever up or down, each of the Pinions in turn can be brought into mesh with the 57-teeth Gear.

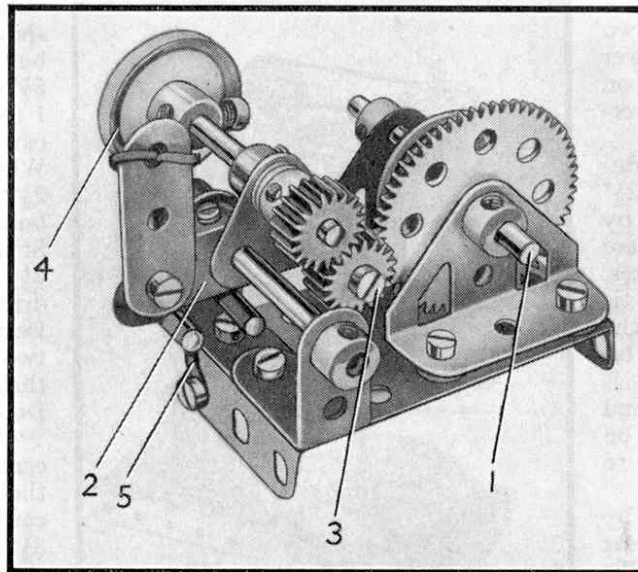


Fig. 392.

of the small Fork Piece, and the end transverse bore of the Coupling provide a pivoted joint. A Coupling, in which a gramophone needle is firmly gripped, is fastened to one 3½" Rod. A second Coupling fitted with 1½" Strips is fastened to the other Rod, the ends of the 1½" Strips being drawn together by a ⅜" Bolt and a Threaded Boss. This device is used to grip the pencil.

For more accurate work a screw adjustment can be fitted for opening the arms of the compasses to the correct distance. This can be done with the aid of a Screwed Rod pivoted to one arm and screwed through a Handrail Support fastened to the other arm.

(393) Meccano Compasses

(D. Eaton, Coventry)

D. Eaton, Coventry, finding himself short of a pair of compasses, made a pair with the aid of a few Meccano parts. The arms of the compasses are 3½" Rods, one of which is fitted with a Coupling and the other with a small Fork Piece. A ⅜" Bolt passed through the arms

that carries the $1\frac{1}{2}$ " Strip supporting Rod 4.

The 2" Rod 3 is journaled in a Double Bracket secured to the rear Flat Trunnion by a Flat Bracket, and it carries a 1" fast Pulley and a 1" loose Pulley. The 1" loose Pulley is fastened on the Rod by a Spring Clip.

Bearings for the 3" Rod 6 are provided by a Cranked Bent Strip bolted to Bush Wheel 2, and on it are fixed a 1" Pulley and a 3" Pulley. The 1" Pulley is connected to the upper Pulley on the driving shaft by a Driving Band, which passes also over the two 1" Pulleys on Rod 3. The 3" Pulley on Rod 6 is driven by a Driving Band from the small pulley of a *Magic Motor*, which is bolted to the rear of the Flanged Plate that forms the base.

Parts required to build the model drilling machine: 1 of No. 5; 1 of No. 6a; 1 of No. 10; 1 of No. 11; 2 of No. 12; 2 of No. 16; 2 of No. 17; 2 of No. 19b; 2 of No. 22; 1 of No. 22a; 1 of No. 24; 16 of No. 37; 1 of No. 37a; 1 of No. 44; 1 of No. 48; 2 of No. 48a; 1 of No. 52; 2 of No. 126a; 1 of No. 190; 1 *Magic Motor*.

Fig. 3 shows a neat, compact model of a locomotive. The chassis for the locomotive consists of two $9\frac{1}{2}$ " Angle Girders, joined at each end by a $2\frac{1}{2}$ " Angle Girder, and the front part is filled in by a $2\frac{1}{2} \times 2\frac{1}{2}$ " Flat Plate. A further two $9\frac{1}{2}$ " Angle Girders 1 are bolted along the centre of the chassis, and on top of them is fastened a Boiler 2. The Boiler is held by a $\frac{3}{4}$ " Bolt that passes through the $2\frac{1}{2} \times 2\frac{1}{2}$ " Flat Plate of the chassis. Two Chimney Adaptors are secured to the top of the Boiler to represent the steam dome and chimney, and it is fitted at each end with a Boiler End.

Two pairs of Trunnions are bolted underneath the Angle Girders 1, and in them are journaled the axles 5 and 6, each of which carries two $1\frac{1}{2}$ " Pulleys forming the driving wheels. Each bogie is formed by a $2\frac{1}{2} \times 1\frac{1}{2}$ " Flanged Plate, to the flanges of which are bolted two $1\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strips that provide bearings for the axles. A Pivot Bolt is pushed through the centre hole of the Plate and is lock-nutted through a Double Bent Strip bolted to the Angle Girders 1 supporting the Boiler 2.

The locomotive is driven by two *Magic Motors*, one of which is bolted to each Angle Girder 2. The Pulleys of the Motors are connected by Driving Bands to two 1" Pulleys 3 on a common axle 7, which is journaled in two $2\frac{1}{2} \times 1\frac{1}{2}$ " Flexible Plates bolted to the side of the chassis. The Rod 7 carries also a $\frac{3}{4}$ " Sprocket Wheel 3,

which is connected by Sprocket Chain to a 1" Sprocket on the rear axle 5.

The rear of the Boiler is covered by a $4\frac{1}{2} \times 2\frac{1}{2}$ " Flexible

Plate 8, which is supported from the chassis by two $2\frac{1}{2} \times 2\frac{1}{2}$ " Strip Plates. The roof of the cab consists of four $2\frac{1}{2} \times 1\frac{1}{2}$ " Flexible Plates arranged as shown, and along its sides two $3\frac{1}{2}$ " Strips are fastened by Obtuse Angle Brackets. The roof is supported from the chassis by the $3\frac{1}{2}$ " Strips 9, and by the $2\frac{1}{2}$ " Strips 10 from the two $2\frac{1}{2} \times 1\frac{1}{2}$ " Flexible Plates bolted to the chassis. The rear of the cab is filled in by a $2\frac{1}{2} \times 2\frac{1}{2}$ " Flexible Plate.

The $2\frac{1}{2}$ " Angle Girders

at the ends of the chassis are each provided with two Buffers and an End Bearing, the last-mentioned representing the coupling unit.

Parts required to build model locomotive: 4 of No. 3; 3 of No. 5; 1 of No. 6a; 4 of No. 8a; 2 of No. 9d; 1 of No. 11; 1 of No. 12; 8 of No. 12c; 4 of No. 16a; 1 of No. 16b; 2 of No. 17; 4 of No. 21; 2 of No. 22; 8 of No. 22a; 8 of No. 35; 72 of No. 37; 5 of No. 37a; 46 of No. 38; 2 of No. 45; 1 of No. 47; 4 of No. 48a; 1 of No. 48a; 2 of No. 51; 4 of No. 59; 2 of No. 69a; 1 of No. 72; 1 of No. 80a; 1 of No. 90; 1 of No. 94; 1 of No. 96; 1 of No. 96a; 1 of No. 111; 2 of No. 111c; 4 of No. 120a; 4 of No. 126; 1 of No. 126a; 2 of No. 147b; 1 of No. 162; 2 of No. 164; 2 of No. 166; 2 of No. 186; 7 of No. 188; 3 of No. 190; 1 of No. 191; 2 *Magic Motors*.

The column for the balance shown in Fig. 4 is formed by two $9\frac{1}{2}$ " Angle Girders 2, fastened to the base by two Flanged Brackets and joined together at their upper ends by a $1\frac{1}{2}$ " Strip. The Bolts fixing the $1\frac{1}{2}$ " Strip also carry two Reversed Angle Brackets 3, to each of which a 3" Strip 4 is attached by an Obtuse Angle Bracket. Two $1\frac{1}{2}$ " Strips 5 bolted across the upper ends of the Strips 4 form supports on which the beam rests.

The beam is made with two $12\frac{1}{2}$ " Strips joined at their ends by Double Brackets, a Coupling 6 being fastened between the Strips at their centres.

This Coupling is connected by a 1" Rod to a second Coupling pivoting on Rod 7, supported in two Couplings 8. Two $1\frac{1}{2}$ " Rods are locked in the lower ends of the Couplings, and their inner ends are joined by Coupling 9. The latter is locked on Rod 11, which carries at its lower end a 1" Pulley. A Flat Bracket, fixed

by a Collar to the Rod of Crank 12, bears against the Pulley, so that by depressing the Crank the beam is lifted off its supports.

Parts required to build the chemical balance: 2 of No. 1; 2 of No. 2; 2 of No. 4; 6 of No. 6a; 2 of No. 8; 2 of No. 9; 2 of No. 10; 5 of No. 11; 2 of No. 12; 1 of No. 12a; 2 of No. 12c; 1 of No. 13a; 2 of No. 14; 1 of No. 15; 2 of No. 15b; 2 of No. 16a; 2 of No. 17; 1 of No. 18a; 3 of No. 18b; 1 of No. 22; 7 of No. 37; 6 of No. 37a; 3 of No. 38; 2 of No. 53; 4 of No. 53a; 10 of No. 59; 1 of No. 62; 2 of No. 62b; 9 of No. 63; 4 of No. 63c; 2 of No. 70; 3 of No. 81; 4 of No. 125; 1 of No. 147b.

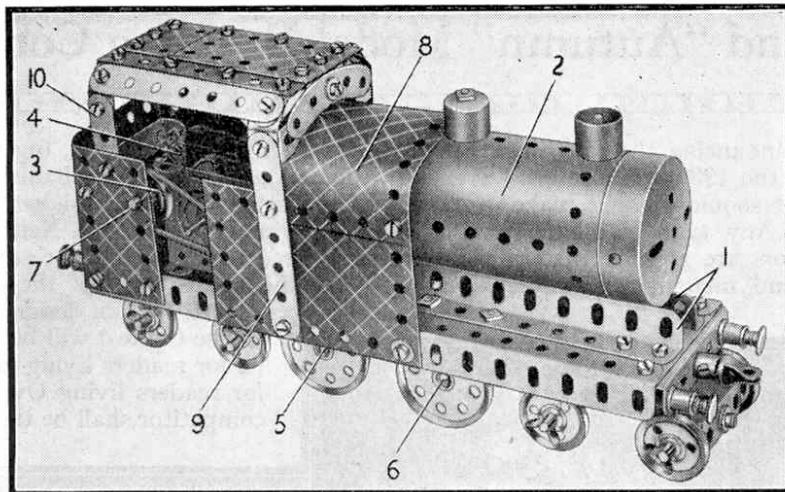


Fig. 3. The driving power for this simple locomotive is provided by two *Magic Motors* in the cab.

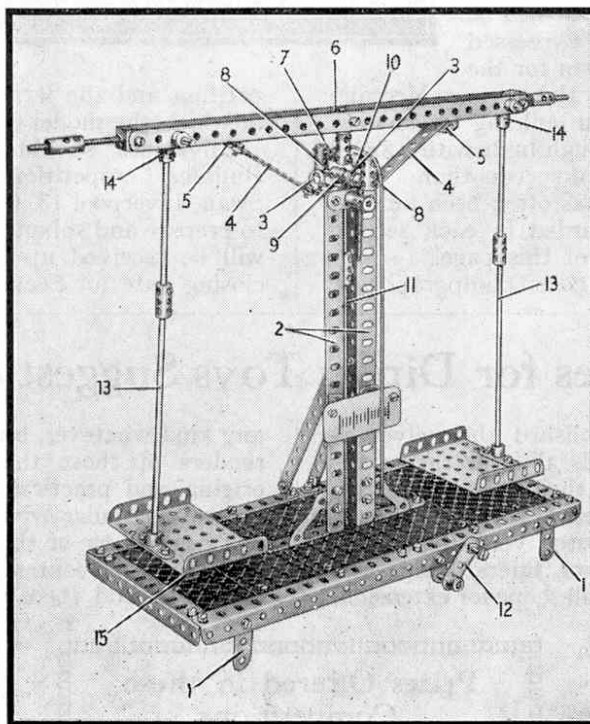


Fig. 4. This balance is simple to build, and if carefully adjusted can be used to weigh light articles of many kinds.