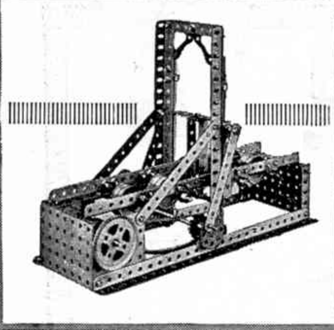


Suggestions Section

Edited by "Spanner"

(86)—Automatic Reversing Gear

A REVERSING GEAR that at regular intervals will automatically change the direction of rotation of a driven rod should prove of great value in a very large number of models. The device shown in Fig. 86 will not only do this but in addition it provides a means whereby the frequency at which the reversing movement is effected may be varied to almost any extent. Thus a model in which it is incorporated will operate in a certain direction for a period ranging from, say, 20 seconds to three or four minutes or longer, and will then reverse and work in the opposite direction for a similar period. Another advantage of the gear lies in the fact that the movable components are held in engagement by means of a spring until the moment of actual changing.

The power from the Motor may be led through any convenient gearing to the driven shaft 1 via the intermediate shaft 2. This shaft 2 carries a $\frac{3}{4}''$ Pinion 3 and a section of a Dog Clutch 4. The Pinion is in constant engagement with a $1\frac{1}{2}''$ Contrate Wheel 5.

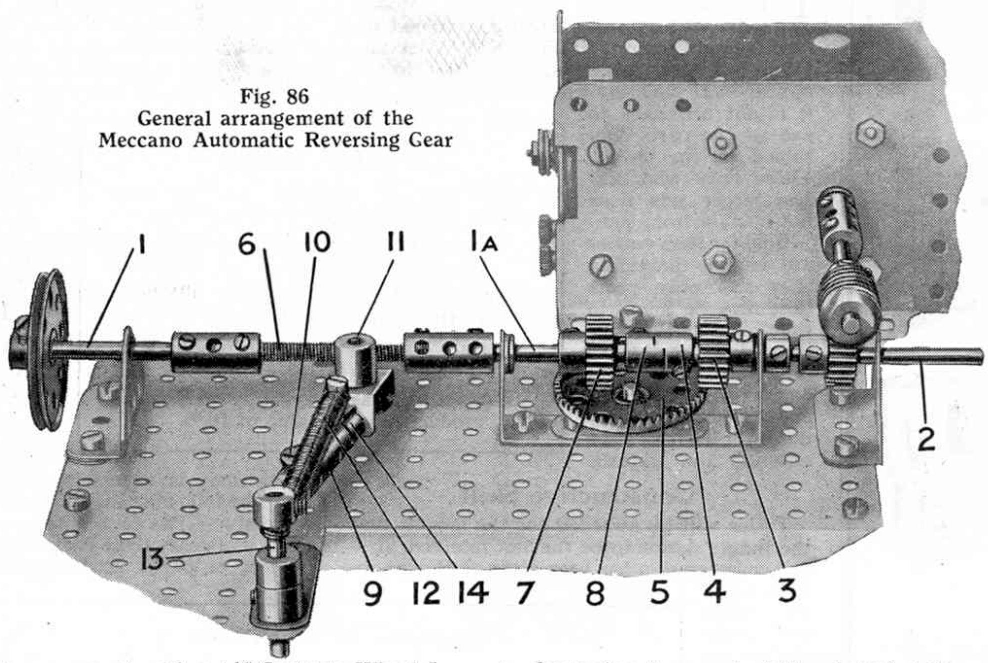


Fig. 86
General arrangement of the Meccano Automatic Reversing Gear

A short Threaded Rod 6 is inserted in the centre of the driven shaft and is secured between Couplings mounted on the short Rods 1 and 1a. The whole driven unit 1, 6, 1a is slidable in its bearings and carries a $\frac{3}{4}''$ Pinion 7 and a Dog Clutch section 8 corresponding to 4. These are so arranged that when the clutch segments 8 and 4 are in engagement the Pinion 7 is out of mesh with the Contrate Wheel 5. In this position the shafts 1 and 2 rotate as one unit and the Contrate Wheel revolves idly. In the second position of the driven shaft the clutch is disengaged and the Pinion 7 engages the Contrate Wheel 5, with the result that Rod 1 is driven in a direction opposite to that of Rod 2, the drive now being transmitted by way of the Contrate 5. It may be noted that the principle of this reverse gear is similar to Suggestion No. 47 (see "*M.M.*" for July 1926). The total longitudinal movement of the driven unit in its bearings should be about $\frac{1}{2}''$.

How the Automatic Mechanism Works

The automatic reverse motion is effected as follows: A coupling 9 is free to turn about the Pivot Bolt 10 secured to the base of the model and carries a 2″ Rod that is free to slide in a Double Bracket pivotally attached to a Threaded Boss 11 mounted on the Rod 6. A Spring 12 is connected to a point 13, $2\frac{1}{2}''$ from the bolt 10, and its other end is attached to a $\frac{3}{8}''$ Bolt that serves in place of a set-screw to secure the Collar 14 on the 2″ Rod. The Collar 14 is placed from the end of the Coupling 9.

The motor must be started in a certain direction so that when the clutch segments 8 and 4 are engaged the Threaded Boss 11 advances towards the Rod 1. The clutch is held in engagement meanwhile by the Spring 12, but the Boss 11, moving slowly along the Rod 6, presently carries the Spring over the bolt 10. The Spring now tends to pull the Threaded Boss in the opposite direction and the driven unit slides over to the reverse position, wherein the Pinion 7 is engaged by the Contrate Wheel 5. But the motion of the driven shaft is now reversed; hence the Boss 11 returns towards the Rod 1a until it again passes the centre point, when the driven shaft is pulled back to its original position. The Dog Clutch is then re-engaged and the cycle of operations is repeated.

Adjusting the Change-over

The frequency at which the change-over movement occurs may be varied by (a) decreasing the speed of the shaft 2 in proportion to that of the Motor or (b) increasing the longitudinal sliding movement of the driven shaft and thereby increasing the length of time required for the Threaded Boss 11 to reach the central position.

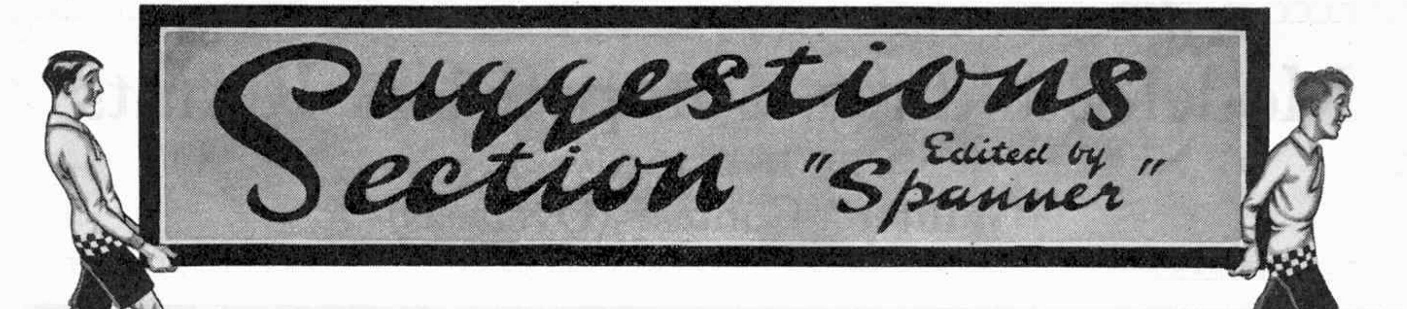
Little difficulty should be experienced in incorporating the mechanism in a large number of Meccano models.

WANTED—An Idea!

We reprint, with acknowledgments to the Editor of the "*Sunday Times*," an extract from a correspondent's letter to that paper. We believe it contains the kind of problem with which most Meccano boys delight to wrestle.

> "I read myself to sleep, and usually fall off with the electric light on. I have tried holding the book over the edge of the bed, so that when it falls from my unconscious fingers the resulting thump on the floor shall wake me. Unfortunately, I have got used to the thump, and no longer wake. Have any of your readers successfully surmounted this problem that nightly confronts me?"

"*M.M.*" readers are invited to send along any suggestions they may have to offer. Ideas should be addressed to "Spanner" and those showing particular merit will be suitably rewarded and published in the "Suggestions Section."



The ideas printed in the "Suggestions Section" should prove a real help to thousands of Meccano enthusiasts. Often we receive letters from readers who describe how they have solved some knotty problem or evolved an interesting model after studying some of the ideas that have appeared. We shall always be pleased to receive further contributions for the "Suggestions Section." Cash payments are made for all Suggestions published (excluding those mentioned in the "Miscellaneous" Suggestions column). Contributions should be accompanied by clear photographs or drawings and should be addressed to "Spanner," c/o The "Meccano Magazine."

(312)—Automatic Reversing Gear (J. R. Simpson, Nottingham)

The gear-box illustrated in Fig. 312 will be of particular interest to Meccano Club leaders, as it can be applied successfully to working models at club exhibitions. It is specially suitable for models that employ an automatic reversing hoist and are required to work continuously without attention. For instance, by means of it, a model crane may be kept working all day raising and lowering its load in a most efficient manner without any attention whatever. It could be applied also to such models as elevators, pithead gears, etc., with equal success. The gearing can be adapted for use on almost any model where an automatic reversing mechanism is required, even if the hoist is not necessary.

The drive is supplied to the 8″ Axle Rod 1 that carries a Worm and a ½″×¾″ Pinion. The Worm engages a ½″ Pinion on a vertical Rod 2 journalled in 2″ Strips secured in place by means of Angle Brackets. The Rod 2 carries a Worm that meshes with a ½″ Pinion on the Rod carrying the Pinion 3, and another Rod is journalled below this and carries a 57-teeth Gear Wheel 4.

It will be observed that there is a considerable reduction ratio between the Rod 1 and the Gear 4. It is this ratio that governs the time of rotation of the driven shaft in each direction. By increasing the reduction ratio the time of rotation of the driven shaft in forward and reverse directions would be increased accordingly, and by fitting a lower gear reduction the time would be decreased.

The Rod 5 is slidable in its bearings and carries two ½″×½″ Pinions, one of which is in constant mesh with the ½″ Pinion on the Rod 1. A loose Collar 6 on the Rod is retained in place between two fixed Collars. Two Compression Springs are fitted on the Rod on each side of the Flat Plate on the right-hand side of the frame. Washers are placed between the pairs of Springs and also at each end, and Collars retain them in position. It is important that Washers should be fitted between the Springs, otherwise there will be a tendency for the Compression Springs to work one into the other. The purpose of the Springs is to retain the Rod normally in the neutral position with the Pinions out of engagement with their Contrate.

The sliding movement of the Rod is controlled by a lever consisting of a 2″ Strip pivoted at the base of the model and extended by means of a 2″ Slotted Strip. A bolt is passed through the slot in the Strip and fitted with a nut before being screwed into the bore of the Collar 6. The nut is tightened against the Collar to prevent the shank of the bolt gripping the Axle Rod 5. At the lower end of the lever a bolt is inserted in a similar manner into the bore of the Collar 9 that is fixed to a sliding 5″ Rod. The Collar 7 is loose on the Rod, and the 2″ Slotted Strip 10 is pivotally attached to it. This Strip is firmly secured to a 3½″ Strip that is pivoted to the Gear 4. As the Gear rotates the Collar 7 slides between the Collars 8 and 9, and as soon as it strikes either of these Collars it causes the lever to slide the Rod 5 in a corresponding direction. Owing to the arrangement of the lever the Rod 5 slides much quicker than the Collars 8 or 9 and throws one of the ½″ Pinions into engagement with the ¾″ Contrate Wheel on the Rod 11.

By adjusting the position of the Collar 8 it is possible to vary the amount of right-hand movement of the Rod 5. To adjust the amount of movement to the left, the bolt securing the Slotted Strip 10 to the connecting link should be slackened off to allow the length of the link to be increased or decreased as required. When setting the gear for operation the connecting rod should be adjusted first, as any alteration in its length affects the position of the Collar 8.

The Rod 11 is journalled between two 4½″×½″ Double Angle Strips that are bolted between the 4½″×2½″ Flat Plates forming the sides of the gear box. The Rod carries a Contrate and a Worm that engages a ½″ Pinion that is free on the Rod 13. The boss of the Pinion is fitted with a Socket Coupling carrying a Bush Wheel. A second Bush Wheel is secured on the Rod, and a 1″ loose Pulley fitted with Dunlop Tyre 12 is placed between the two. A Compression Spring bearing against a Collar on the left-hand side of the Pinion tends to slide the Socket Coupling unit over to the right, so that the free Bush Wheel is kept tightly pressed against the Tyre 12 which, in turn, engages the fixed Bush Wheel. The purpose of this arrangement is to provide a friction drive between the Rods 11 and 13, so that when the latter becomes overloaded, the clutch slips, and no drive is transmitted. The winding drum 14 is made up from a ¾″ Flanged Wheel and Bush Wheel.

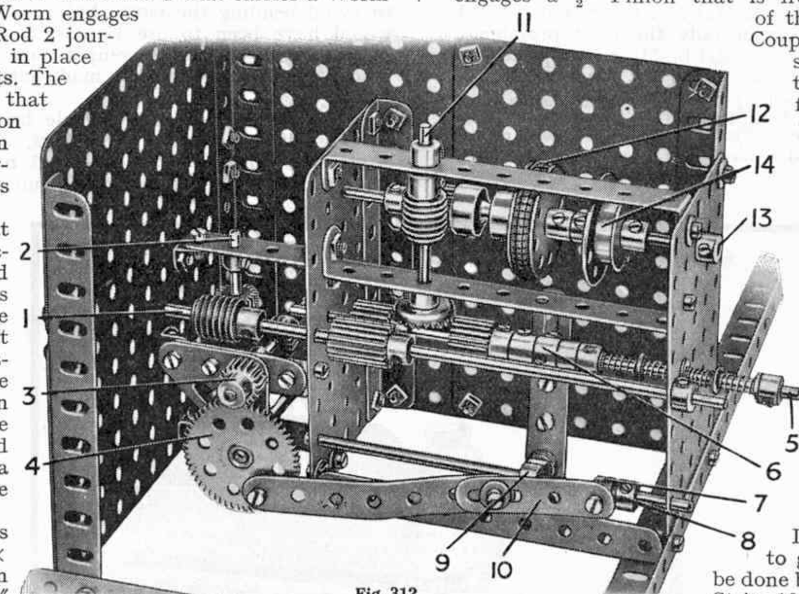


Fig. 312

In operation the gear should be set to give a slight overwind. This can be done by adjusting the Collar 8 and the Strip 10 so that the Gears remain in engagement a little longer than is actually required. When the load or lift cage reaches its maximum height a stop should be arranged to prevent it from being raised above the limit, and as soon as this stop is reached the slip clutch 12 comes into operation until the Gears are thrown out of engagement. This arrangement allows for slight irregularities in the operation of the reversing gear and ensures that the load is raised to a definite height each time.

The effect of operating without the slip clutch can be quite easily imagined. Supposing for instance that the Pinion for hoisting were to remain in mesh with the Contrate for a very short period longer than the lowering Pinion. The load would be raised a little higher than normal and later would not be lowered to its full extent. On the next operation it would be raised a little higher again and lowered to a level above the previous one. Eventually when the load could go no higher the hoisting cord would be broken or some part of the mechanism would slip.

A good plan is to use a hoisting cord of the exact length required to lower the load to the requisite depth, and arrange the Pinions so that the load is unwound from its drum, which continues rotating and thus winding in the cord again. On reaching the top, the load strikes the stop, and the slip clutch operates until the Pinion disengages with the Contrate. When the second Pinion engages, the direction of rotation of the drum is reversed and the load is lowered and raised again. Various applications for this mechanism will suggest themselves to the enthusiast.

Meccano Suggestions Section

Edited by "Spanner"

(347)—Bendix Pinion for Self-Starter (E. Jones, Cardiff)

It is not very long since motor car engines had to be started by the laborious process of turning a crank handle, and some of the old cars required a great deal of manual effort in order to set the engine going. The practice of fitting self-starters to cars is now almost universal. The engine starts almost instantaneously at the touch of a button, and the driver of a present-day vehicle does not require the reserves of strength and patience once called for!

A small electric motor is generally employed for driving the engine until it fires and starts running under its own power. The usual practice is to arrange the motor so that a small pinion on the armature shaft can be brought into engagement with teeth cut in the flywheel of the engine. Reduction gear provides a powerful drive for turning the engine crankshaft, which is rotated at a comparatively slow speed. The starter motor therefore would be driven at very high speed when the engine comes to life, and would soon be ruined, if some automatic device were not fitted to disengage the driving pinion.

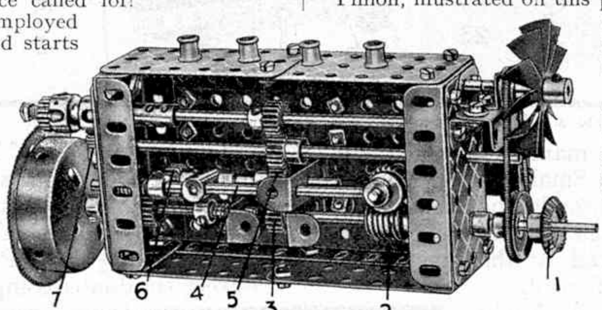


Fig. 347

The mechanism that is used for this purpose is known as the Bendix Pinion, and automatically uncouples the motor as soon as the Pinion is driven faster than the armature shaft. The principle of operation of the Bendix drive will be understood from the model illustrated in Fig. 347, in which the Bendix Pinion and the flywheel are driven alternately to show the automatic disengaging of the Pinion.

The Bevel Gear 1 is driven from a Clockwork or Electric Motor, and the Worm 2 and Pinion 3 are carried on the same Rod as the Bevel. The Worm drives a Pinion on a transverse Rod that carries a cam formed from the Kemex Universal Stand Clamp (Part No. K31). The end of the Rod 4 bears against the cam, the Rod being slidable in its bearings and fitted with a Compression Spring to keep it in constant engagement with the cam. A Coupling on this Rod controls the sliding movement of the Rod fitted with Pinions 5 and 6. The Pinion 5 is shown in engagement with another Pinion driving a further similar Pinion on the Rod of the Bendix Pinion. When the cam slides the Rod 4 to the left, the Pinion 5 is disengaged, and Pinion 6 is brought into mesh with a Pinion on the Rod of the flywheel.

A 2″ Screwed Rod carries the Bendix Pinion and is attached to a 5″ Rod by means of a Threaded Coupling. Locknuts are fixed on the end of the Screwed Rod to serve as a stop for the Pinion, which is fitted in a Socket Coupling. The other end of the Coupling carries a Threaded Boss, and a weight 7, consisting of a Collar and four Washers, is fixed to the Socket Coupling by a ½″ Bolt.

This weight prevents the Pinion from rotating on its rod, and it will be clear that as the Screwed Rod is rotated in the Bendix Pinion unit it causes the Pinion to move into engagement with the 2½″ Gear of the flywheel. This drives the flywheel, and in actual practice starts up the engine. The starting of the "engine" is achieved in the model when the Pinion 6 engages the Pinion on the flywheel shaft. When the flywheel spins round it causes the Bendix Pinion to rotate faster than the Screwed Rod carrying it, thus screwing it along the Rod until it disengages the gear. At this stage the Pinion 5 no longer drives the Shaft of the Bendix Pinion, which remains out of engagement until the flywheel stops after the withdrawal of Pinion 6. The drive is then once more transferred to the uppermost Rod.

In the illustration one of the side Plates is removed from the mechanism casing. When the Plate is in position the casing somewhat resembles a motor car engine, and a Fan is fitted and driven by Spring Cord from the driving shaft to improve the effect.

(348)—Automatic Reversing Gear (L. Keith, Edinburgh)

In constructing models of lifts, cranes, cable railways, etc., it is often desirable to incorporate a mechanism that will give a periodic reversal of the movement of the model. A drive that is reversed automatically is necessary also in many models demonstrating mechanical movements. A neat automatic gear change device is incorporated in the demonstration model of the Bendix Pinion, illustrated on this page, and in Fig. 348 is shown another type of automatic gear change, in this case for producing reversing movement.

The framework in this example consists of 7½″ Angle Girders built up in the form of a square, with two additional Angle Girders of similar length inserted between opposite sides. The latter Girders support two 2½″ Angle Girders bolted in the fifth and the eighth holes from the upper ends of the 7½″ Girders. They are bolted beneath the longer Girders and the upper one has a Flat Trunnion bolted to it to serve as a bearing for a 4½″ Rod. A 2½″×½″ Double Angle Strip is placed parallel to the upper 2½″ Angle Girder and directly above it, being fixed in position by a Flat Trunnion at each end.

A 2″ Rod is journalled between the 2½″ Angle Girder and the Double Angle Strip, and carries a ½″ Pinion secured on the Rod between its two bearings. Above the Double Angle Strip is a ¼″ throw Eccentric, the purpose of which will be described later.

The 4½″ Rod already mentioned is carried at one end in a Flat Trunnion and at the other end in a Trunnion bolted to the outer edge of the frame of the mechanism. It should be noted that at all points where a Rod is journalled in a hole, a Crank or Double Arm Crank is fitted to form a reinforced bearing. The 4½″ Rod carries a Worm that is in constant engagement with the ½″ Pinion on the Rod of the Eccentric. A ½″ Pinion on the 4½″ Rod engages with a 1½″ Contrate Wheel on a Rod journalled in the second 2½″ Angle Girder, and driven from the source of power, an Electric Motor or similar unit.

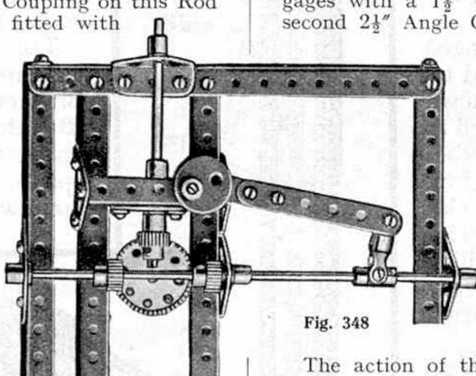


Fig. 348

Across the face of the Contrate Wheel is another Rod so arranged that it is free to slide in bearings built up from Flat Trunnions and Cranks. This Rod is provided with two ½″ Pinions that are brought alternately into engagement with the 1½″ Contrate Wheel by means of the Eccentric, that is coupled to the Rod by a 3″ Strip and Swivel Bearing. The Strip is connected rigidly to the Swivel Bearing by a Pivot Bolt and Collar, the "spider" of the Swivel Bearing being free on the Rod. It is prevented from moving laterally by means of two Collars.

The action of the model will now be seen. As the Contrate is driven from the Motor, it rotates one of the Pinions on the sliding shaft, and also slowly rotates the Eccentric through the third Pinion engaging with it, and through the Worm and Pinion. The Eccentric causes alternate Pinions on the sliding Rod to engage with the Contrate, thus reversing the direction of rotation of the Rod.

The positions of the Pinions on the Sliding Rod determine the period of rotation in each direction and the amount of dwell before reversal takes place. By varying these positions the driven Rod can be made to rotate for equal periods in each direction, or it can be caused to rotate for a very brief period in one direction and then to run in the reverse direction for a comparatively long period. The rotation also can be reversed instantly or after a pause.

It will be clear that if a Pinion of ½″ face is substituted for one of the ¼″ face Pinions the period of rotation for one direction can be considerably increased. With this arrangement the reverse movement would have to be very brief unless a large Eccentric is used to give a longer throw.

Among the Model-Builders

By "Spanner"

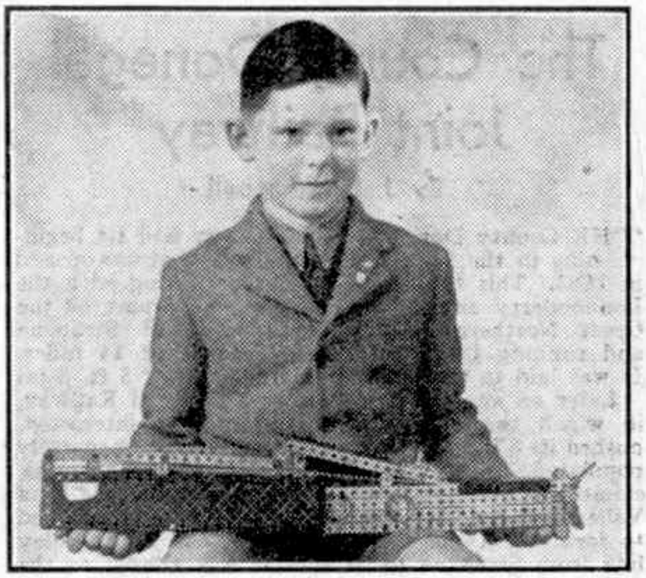
A USEFUL VICE

Model-builders who are also keen handymen will be interested in the model shown in Fig. 2. This is a simple screw vice that can be used for many purposes in the home. It will be found particularly useful for holding small metal parts in position for soldering or drilling.

The jaws of the vice consist of 3½"×2½" Flanged Plates strengthened by 3½" Angle Girders. The fixed Plate is secured to a 5½"×2½" Flanged Plate by a 3½" Angle Girder 1 and two Angle Brackets. The guide Rods 2 for the sliding jaw are locked in Double Arm Cranks attached to the flanges of the moving Plate by Angle Brackets, and they pass through further Double Arm Cranks on the fixed Plate.

A Threaded Crank is bolted to the Angle Girder 1, and a Screwed Rod passes through the jaws of the vice into this Threaded Crank. The Threaded Coupling that supports the handle is locked on the Screwed Rod by a nut. A Collar is secured to the Screwed Rod between the Angle Girder 3 and the Flanged Plate.

Before the vice is used the 5½"×2½" Flanged Plate should be screwed firmly to the worktable or bench by means of wood screws of suitable length.



John S. Davies, an enthusiastic Meccano model-builder, who lives at Lyndhurst, Hants.

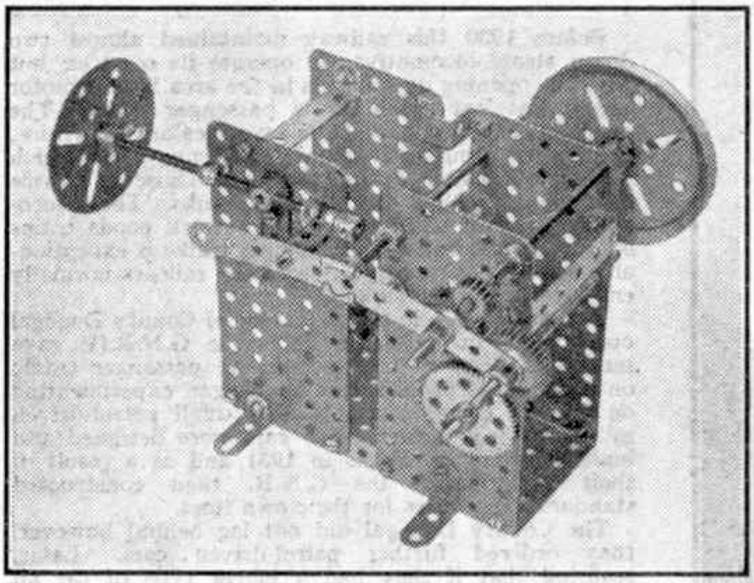


Fig. 1. The marine type gear-box designed by Mr. W. R. H. Temple, Upminster.

AN AUTOMATIC REVERSING MECHANISM

The device shown in Fig. 3 will be found extremely useful in models used for display and exhibition. It enables models such as Pit Head Gears and Elevators to operate for considerable periods without any attention, as the reversing of the winding drum controlling the hoisting and lowering of the cage is carried out automatically.

The Rod 1 is driven by the Motor, and is fitted with a ½" Pinion 2, a Worm Gear and a 1" Gear. The Rod 3 is free to slide in its bearings, and it carries a ½" Pinion and a 1" Gear fitted to a Socket Coupling. A third ½" Pinion 4 is loose on a ¾" Bolt secured to the side Plate of the mechanism.

The Worm on the Rod 1 meshes with a 57-teeth Gear locked on a short Rod 5. This Rod is journalled in two 2½"×½" Double Angle Strips. A Coupling is secured by its centre hole to the upper end of this Rod.

The required gears are selected by a simple mechanism that consists of a 2½" Strip passed through a Slide Piece that is free to turn in the centre hole of a Double Angle Strip. One end of the 2½" Strip carries a small Fork Piece, and the other end is pivotally attached to the Coupling on the Rod 5. A Coupling is secured in the jaws of the Fork Piece by a ½" Bolt, and two 1" Rods held in this Coupling engage the groove on the Socket Coupling on the Rod 3.

The drive to the winding drum is taken from a ½"×½" Pinion on the Rod 3 to a 2½" Gear on the winding shaft.

Before a model is set in motion care should be taken to ensure that there is no excessive play in the selector mechanism and that the positions of the gears allow a brief period in neutral.

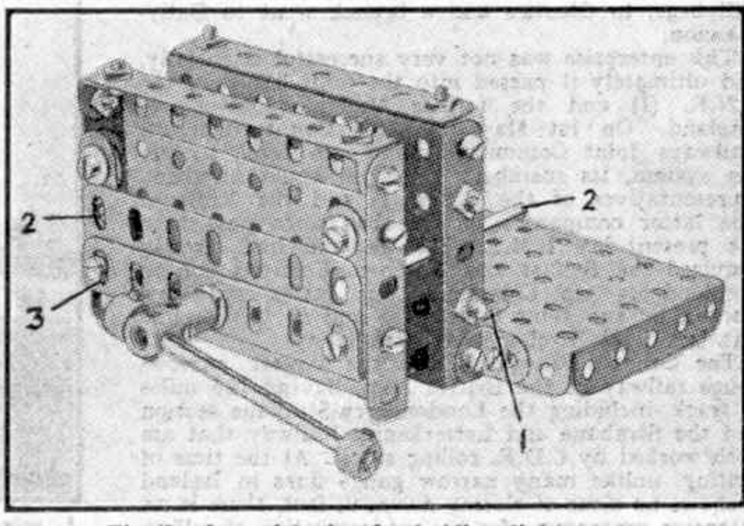


Fig. 2. A useful vice for holding light work.

A MARINE TYPE GEAR-BOX

Mr. W. R. H. Temple, Upminster, has been a keen model-builder for some years, and recently he sent me the interesting suggestion that is illustrated in Fig. 1. This is a gear-box of the type often used in small power boats, and is designed to provide ahead, neutral and astern motions. Although it is intended primarily for marine purposes, no doubt model-builders will be able to find other useful applications for a gear-box of this kind.

A Crank Handle fitted with a 3" Pulley representing the fly-wheel is driven by the power unit, and a ½" Pinion locked on the Crank Handle transmits the drive to either one of two 1" Gears. These Gears are fixed on short Rods journalled in a 5½" Curved Strip. The final drive is taken from the forward or reverse gears to a 57-teeth Gear Wheel on the output shaft.

The 5½" Curved Strip is mounted in a Slide Piece that is locked on a Rod held by the framework of the model. Movement of the Curved Strip is controlled by a screw mechanism, but if desired this may be replaced by a lever mechanism so that a more rapid change from forward to reverse directions is possible.

A stouter bearing for the two 1" Gears can be provided by using two 5½" Curved Strips connected to each other by Double Brackets.

One of the advantages possessed by this type of gear-box is that all movement is confined to the intermediate gears, thus simplifying the connections to both the power unit and the model.

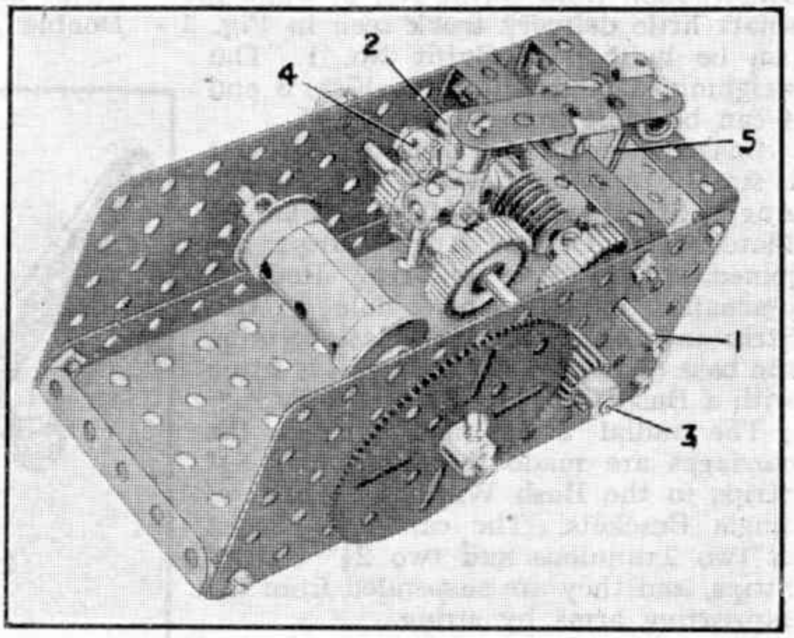


Fig. 3. This mechanism automatically reverses the direction of a drive.

This Month's Meccano Competition

NOVEL SHORT STORY CONTEST

Here is a fascinating competition in which every reader of the "*M.M.*" can participate, as it is not necessary to possess a Meccano Outfit to be eligible for the Contest and there is no model-building to do. A range of fine prizes is offered and boys and girls of any age and living in any part of the world are invited to take part.

All that competitors are asked to do is to take a pencil and a sheet of paper and write a short story incorporating the names of as many Meccano parts as possible, or terms used in connection with Meccano model-building. The following short story is given as an example: "Pawl was playing with a Ball near a Motor Tyre store, when the Boss, who was a Crank by nature, Loomed up in front of him. 'Hook it, or I'll Collar you,' growled the old Buffer. Just then a Dog Clutched the Ball and tried to Bolt with it. Pawl wheeled round to Grab the dog, but only pinioned the Boss, who tore himself out of Pawl's Clutch and stepped on a Curved Strip of banana skin. He fell, waving his arms like Windmill Sails. 'You Worm!' he shouted, but this ended the Ball Race, for the startled dog Coupled itself to his leg, and tore a Circular Strip from his trousers."

There are dozens of other Meccano part names that can easily be incorporated in short stories of this kind, and it is great fun to weave a story round them. Stories submitted in this contest must not be less than 50 nor more than 150 words in length, and it should be the competitor's aim to make his entry as humorous as possible. The more amusing a story is the better will be its chance of winning a prize.

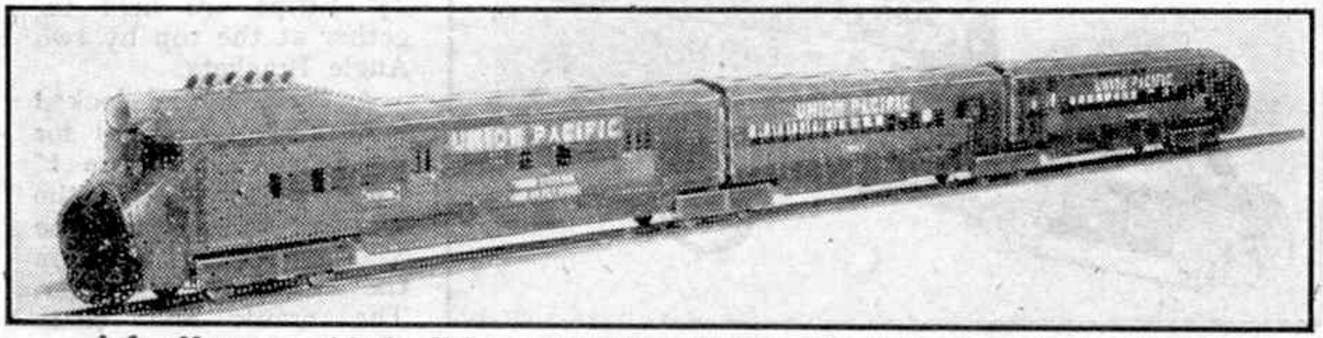
The prizes will be awarded for the story that the judges think the most humorous and which contains the greatest number of part names and model-building terms.

Competitors may send in as many different stories as they wish, provided that each story does not contain more than 150 words. No competitor will be awarded more than one prize.

There will be two Sections only, Home and Overseas, and prizes will be awarded in each Section as follows: 1st, Cheque for £2/2/–; 2nd, Cheque for £1/1/–; 3rd, P.O. for 10/6. There will be also five prizes each consisting of a P.O. for 5/–.

Entries should be written on one side of the paper only, and on the reverse side must appear the competitor's name, age and address.

Envelopes containing entries must be addressed to "*Meccano Short Story Competition, Meccano Limited, Binns Road, Liverpool 13.*" Entries for the Home Section must be posted in time to reach Liverpool before 30th August next, but entries from Overseas readers will be accepted until 29th November.



A fine Meccano model of a Union Pacific Train, designed by H. G. Shorten, Winnipeg, Canada.

Among the Model-Builders

By "Spanner"

A MECCANO DISPLAY BRIDGE

One of the collection of Meccano models to be seen at the Stand of Meccano Ltd., at the British Industries Fair in London this year, was the fine arch bridge illustrated on this page. This realistic model is roughly 5 feet in length and is very heavily built, the main bridge girders being compounded and solidly bolted together. The dignified design of the towers, built mainly from red enamelled parts, and the contrasting green of the sturdy arch itself, combined to present a very striking and realistic effect. At the B.I.F. the size of the bridge was emphasised by streams of Dinky Toys vehicles displayed on the roadway.

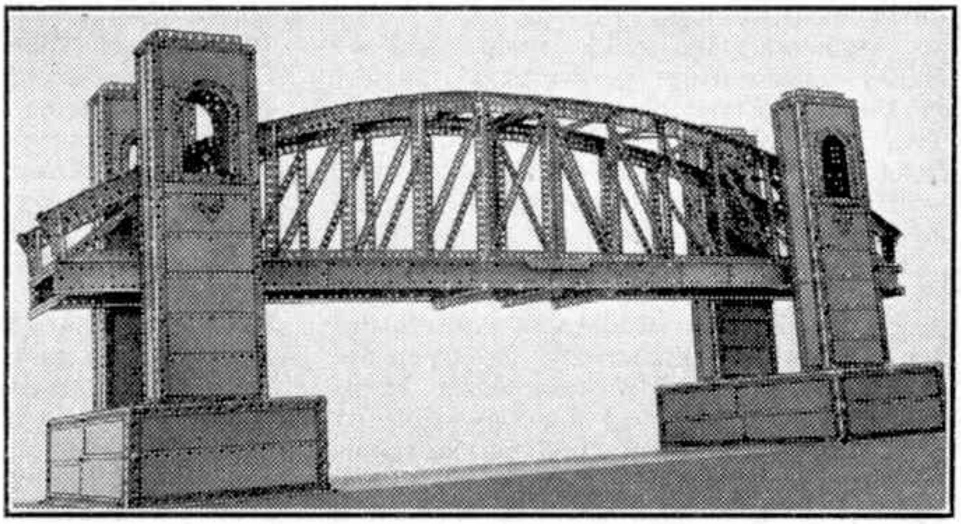


Fig. 1. This sturdy arch bridge was one of several large models exhibited at the British Industries Fair in London, last May.

HOW TO USE MECCANO PARTS

Circular Strip (Part No. 145)

The Circular Strip is a very useful part. It is 7½" in diameter overall, and is a great help in the making of large circular structures, such as fly-wheels and in assembling built up roller bearings. In the latter it forms a means of supporting the rollers and is shown used in this way in Fig. 2. It will be seen from the illustration that the Circular Strip is in the form of a ring, and it carries four Double Brackets which provide bearings for 1½" Rods, each of which is fitted with a ½" Pulley. Each Pulley is spaced from its Double Bracket by four Washers, so that it runs between the rims of two Hub Discs. In a model such as a crane, one of the Hub Discs would be bolted rigidly to the top of the tower, and the other would be fixed to the underside of the jib.

It will be noticed that the Circular Strip has four slots cut in it in addition to the circular equidistant holes. These slots often are of great value in allowing for the sideways adjustment of Strips, Brackets or other parts bolted to the Circular Strip in the assembly of various structures.

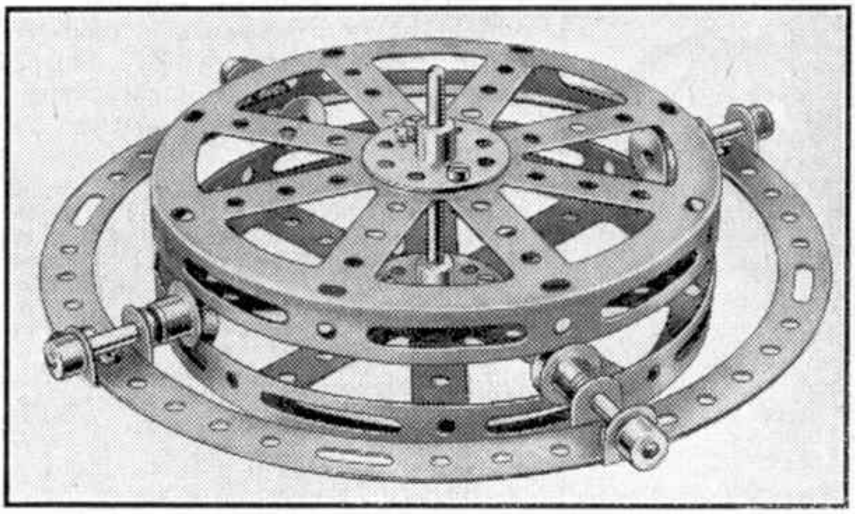


Fig. 2. Hub Discs and a Circular Strip form the main parts of this useful roller bearing.

CORD DRIVING BELTS

R. Roberts, Birmingham, who is an enthusiastic builder of small models that he drives by means of belts made from Meccano Cord, says that he finds this method quite satisfactory if the tension of the belt is carefully adjusted, but that sometimes it is difficult to obtain just the right tension and the belt is apt to slip. Roberts says that he overcomes this by rubbing the Cord with a piece of resin, or by powdering a little resin and then sprinkling it on the Cord after it is tied around the Pulleys, or in the case of hoisting Cords, attached to the winding drums.

In some cases where the belt does not have to make a complete revolution, as for example in hauling the trolley along the boom of a gantry or hammer-head crane, tension can be given to the Cord by tying its ends to the ends of a Tension Spring (part No. 43). The length of the endless belt made in this way should be such that when it is in position over the driving Pulleys the Spring is extended slightly. This arrangement will keep the belt in satisfactory tension and no slipping will occur.

AUTOMATIC REVERSING MECHANISM

In the May issue of the "*M.M.*" I described an automatic reversing mechanism designed to operate the control lever of the E20R Electric Motor. This device was designed to reverse the drive by automatically changing the direction of rotation of the Motor armature, and it could therefore be used only with a reversible Motor. I have received since then enquiries from readers for details of an automatic mechanism that can be used with a non-reversing Motor, and this month I am glad to illustrate an efficient arrangement in which the

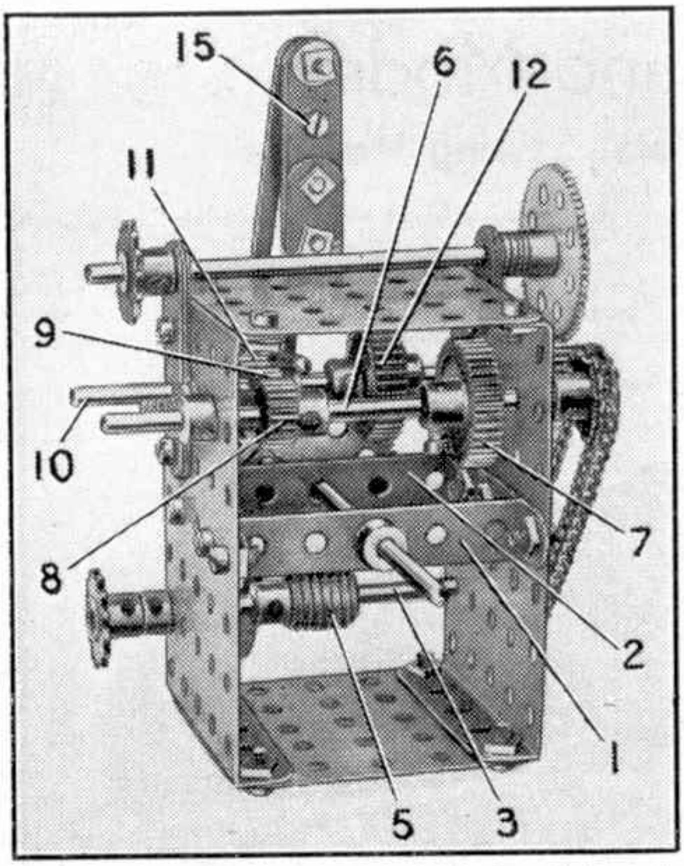


Fig. 3. An automatic reversing mechanism that can be applied to many different models. With its aid models such as transporter bridges can be operated continuously without attention.

reverse drive is obtained through a separate gear-box. This mechanism is shown in Figs. 3 and 4.

Many Meccano models can be adapted for continuous unattended working by including an automatic reversing device in the driving arrangements, and readers will therefore find wide scope for using the mechanism illustrated in Fig. 3 in their own models. For example, cranes can be made to carry out a definite sequence of movements, and the carriages of models such as transporter bridges and coaling plants, can be arranged to travel backwards and forwards, with a pause at each end of the travel for "loading" purposes.

The mechanism is housed in a framework across the centre of which two 2½" × ½" Double Angle Strips 1 and 2 are bolted.

The input shaft 3 is fitted with a ¾" Sprocket to take the drive from the Motor, and it carries at its other end a second ¾" Sprocket 4. A Worm 5 is fixed on shaft 3 inside the housing. Sprocket 4 is linked by Chain to a ¾" Sprocket fixed on Rod 6. This Rod carries a 1" Gear 7 and a ½" Pinion 8, and is held in position by Collars. A ½" Pinion 9 is free to turn on a 1⅛" Bolt fixed to the housing by two nuts.

A sliding shaft 10 carries inside the housing a ½" Pinion 11 and a 1" Gear 12, and outside the housing a ½" diameter, ¾" face Pinion 13. Pinion 13 meshes with a 57-tooth Gear on the output shaft 14, which is mounted in 2" Strips bolted to the housing. Forward drive is obtained by sliding shaft 10 to the right, Fig. 3, so that Gears 7 and 12 engage. Reverse direction is provided by sliding shaft 10 to the left so that Pinions 8, 9 and 11 are in mesh.

Movement of shaft 10 is controlled by a 1⅛" Bolt 17 fixed in the centre hole of a 5½" Slotted Strip. The Bolt engages between the boss of Pinion 11 and a Collar fixed on shaft 10. The Slotted Strip is pivoted on a lock-nutted bolt attached to three 2" Strips 15.

A 57-tooth Gear 16 is fixed on a Rod mounted in Double Angle Strips 1 and 2, so that it is in mesh with the Worm 5. The Gear 16 is fitted with a Threaded Pin that engages in the slot of the Slotted Strip.

The Pinion 11 and the Gear 12 should be adjusted on their shaft so that they just clear Pinion 9 and Gear 7 respectively when the Slotted Strip is in a vertical position. The Gear 16 is driven constantly by the Motor, and the Slotted Strip is therefore moved from side to side by the Threaded Pin engaging the slot. The Bolt 17 transfers this movement to the shaft 10.

The number of revolutions made in each direction by shaft 14 can be varied by altering the positions of Pinion 11 and Gear 12 on their shaft. To obtain an even drive the Pinion and Gear must be adjusted so that each remains in mesh for the same period.

SUMMER HOLIDAY SIMPLICITY COMPETITION

The special Holiday "Simplicity" Competition announced in last month's "*M.M.*" is still open for entries in both the Home and the Overseas section, and we urge every reader who has not yet done so to send in an entry. *The contest is for simplicity models of subjects associated with summer holiday activities and pastimes,* and prizes will be awarded to model-builders who construct the most ingenious and attractive models *using the smallest number of parts consistent with a realistic appearance.*

Suitable subjects for the competition are to be found at almost every holiday centre, either at the seaside or in the country, while fairgrounds, with their many amusement machines, offer a very wide choice for displaying originality and novelty.

Competitors should send in either photographs or sketches of their models to "*Summer Simplicity Contest, Meccano Ltd., Binns Road, Liverpool 13.*" The sender's age, name and address must be written clearly on each illustration submitted.

There will be separate sections for Home and Overseas readers, and the following prizes will be awarded in each section. First, Cheque for £3 3s. 0d. Second, Cheque for £2 2s. 0d. Third, Cheque for £1 1s. 0d. Five prizes of Postal Orders for 10/6 and five of Postal Orders for 5/-. The closing dates are, Home, 30th September; Overseas, 31st December.

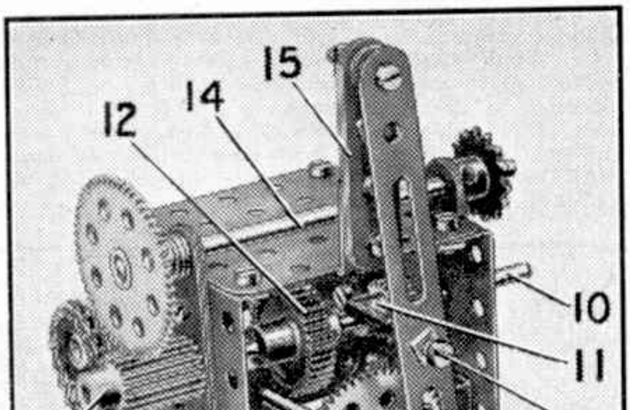


Fig. 4. An opposite view of the automatic reversing mechanism to that shown in Fig. 3.

Among the Model-Builders

By "Spanner"

Brian Fraser, Palmerston North, New Zealand, builder of the six-wheeled lorry shown in Fig. 1.

A Young Reader's Successful Model

The six-wheeled motor lorry shown in Fig. 1 on this page won a prize for Brian Fraser, Palmerston North, New Zealand, in a recent model-building competition. The lorry is powered by a No. 1 Clockwork Motor mounted in the chassis, and this drives a two-speed gear-box that can be controlled from the cab. The final drive to the twin rear axles is by Sprocket Wheels and Chain. The model is fitted with working steering mechanism also operated through Chain and Sprockets.

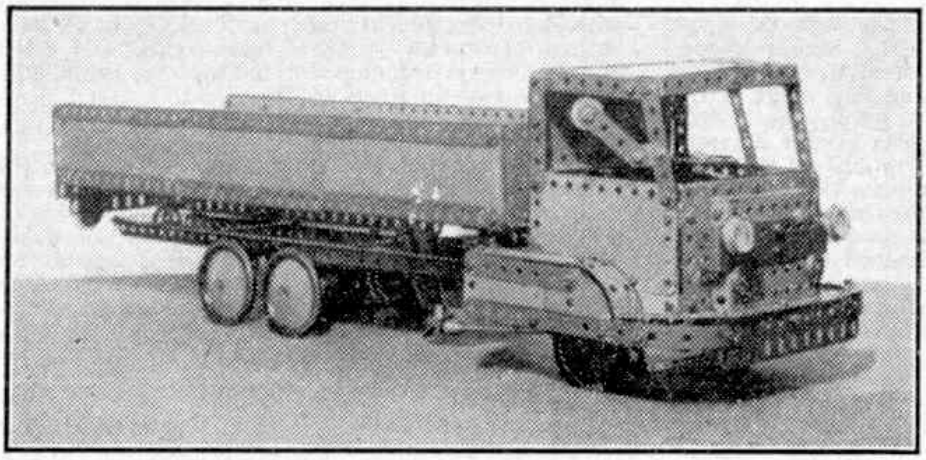


Fig. 1. The neat lorry built by Brian Fraser, who was awarded a prize in a recent "M.M." Competition.

The model is illustrated here in order to give younger model-builders encouragement to enter the "*M.M.*" Competitions and to show them that it is not always the largest and most complicated models that win the prizes. The judges always give special consideration to neatness, sturdy construction and realism, and provided that a subject well within the scope of the Outfit the builder possesses is chosen, it is possible for even a quite simple model to possess all these features.

A Meccano Roundabout

Mr. J. W. Palmer, Johannesburg, South Africa, recently sent us details of several large Meccano models he has designed, and among these is the interesting roundabout illustrated in Fig. 2. In this ingenious model the riders are carried on the backs of swans mounted on a framework that revolves on an undulating track, which provides a rise and fall of approximately 3 in. on each side. The model can be operated either by a steam engine or an Electric Motor, or manually by turning a Crank Handle.

Automatic Reversing Mechanism

From time to time I have included in these pages descriptions of mechanisms designed to operate models automatically by reversing the direction of the drive at predetermined intervals. Another of these mechanisms is shown in

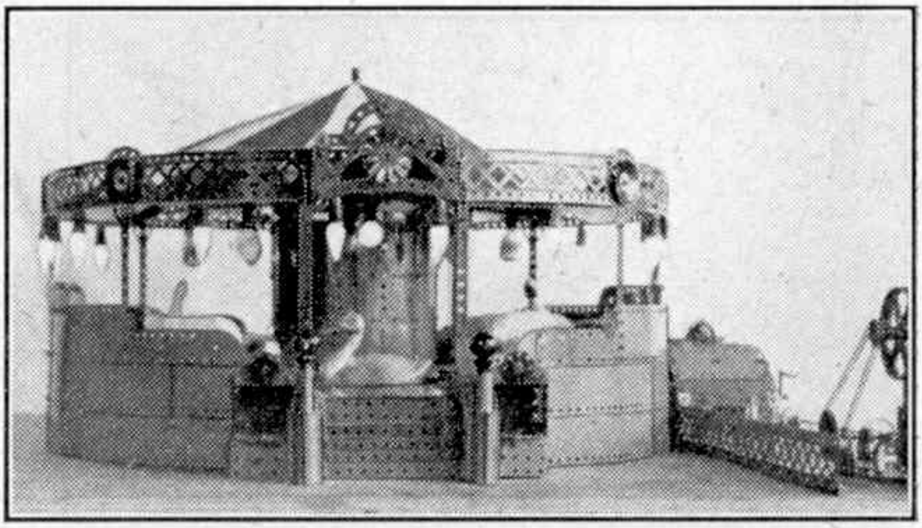


Fig. 2. This attractive roundabout is the work of J. W. Palmer, Johannesburg.

Fig. 3, and this example has two output shafts, either of which can be engaged, reversed or left in neutral, as desired. The mechanism will therefore set in motion an entire sequence of automatic operations. The output shafts are separately controlled and completely independent of each other.

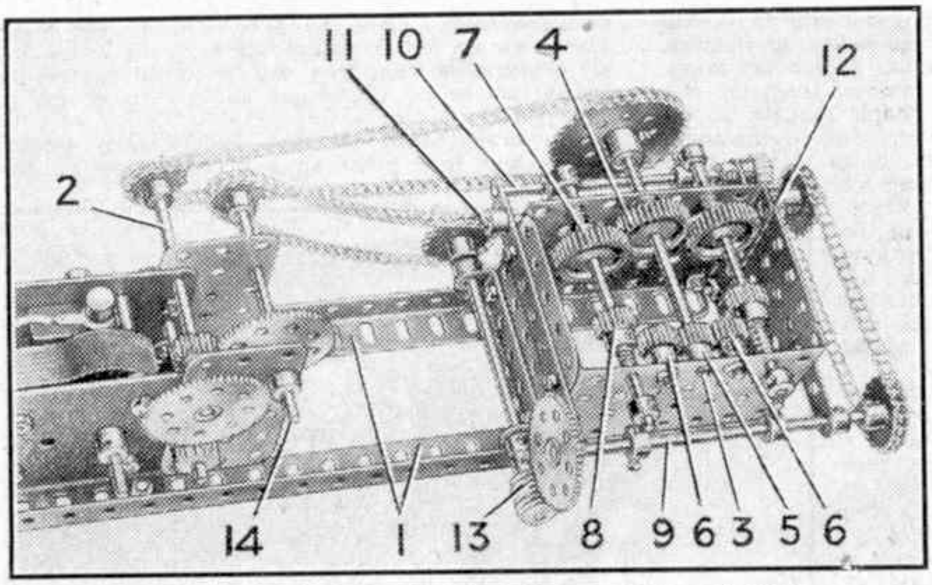


Fig. 3. An unusual type of automatic reversing mechanism.

The mechanism is housed between two $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates connected by $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates and bolted to a base formed by $12\frac{1}{2}''$ Angle Girders 1. An E20R Electric Motor is fixed to the base, and reduction gears are mounted in $3'' \times 1\frac{1}{2}''$ Flat Plates bolted to the Motor side-plates. A $\frac{3}{4}''$ Sprocket on Rod 2 transmits the drive by Chain to a 2″ Sprocket on the input shaft 3.

Shaft 3 is fitted with a 1″ Gear 4 and a $\frac{1}{2}''$ Pinion 5. Pinion 5 meshes with two $\frac{1}{2}''$ Pinions 6, each free to turn on $\frac{3}{4}''$ Bolts attached by nuts to the housing. The output shafts are similar, and each consists of a Rod slideable in its bearings, but controlled by Compression Springs, fitted between the 1″ Gear 7 and the $\frac{1}{2}''$ Pinion 8 and the sides of the housing. These Springs ensure that normally the shafts are in the neutral position.

The drive to each output shaft is engaged by sliding the shaft against the pressure of the Compression Springs so that either the Gear 7 is engaged with the Gear 4, or the Pinion 8 is meshed with the Pinion 6. Movement of the shaft is controlled by two cams, placed one at each end of the shaft, and by altering the setting of these the period and direction of the drive can be varied as desired.

Each cam consists of a Collar fitted with a $\frac{7}{32}''$ Bolt that bears against the end of the output shaft. The Collars are carried on Rods 9 and 10 mounted in $4\frac{1}{2}''$ Strips bolted across the housing. Rod 9 is linked by 1″ Sprockets and Chain to a Rod 11, which is fitted with a $\frac{1}{2}''$ Pinion 12 that meshes with a similar Pinion on Rod 10.

The drive to the camshafts is transmitted by a Worm 13 to a 57-tooth Gear on Rod 9, and a 1″ Sprocket on the Rod carrying the Worm is connected by Chain to a $\frac{3}{4}''$ Sprocket on Rod 14.

A Giant Block-Setting Crane

Most model-builders will be familiar with the magnificent model of a giant block-setting crane that is illustrated on the cover of the Meccano Instructions Books, and no doubt many of them would like to build it if they had the necessary parts. The illustration on the cover is reproduced from an artist's drawing of an actual model built in (*Continued on page 142*)

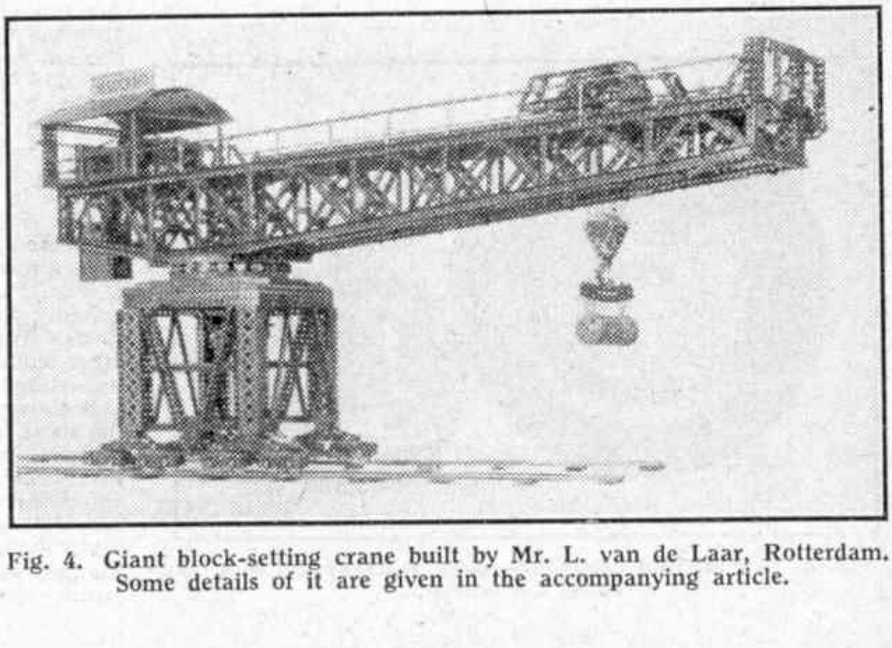


Fig. 4. Giant block-setting crane built by Mr. L. van de Laar, Rotterdam. Some details of it are given in the accompanying article.

Among the Model-Builders

By "Spanner"

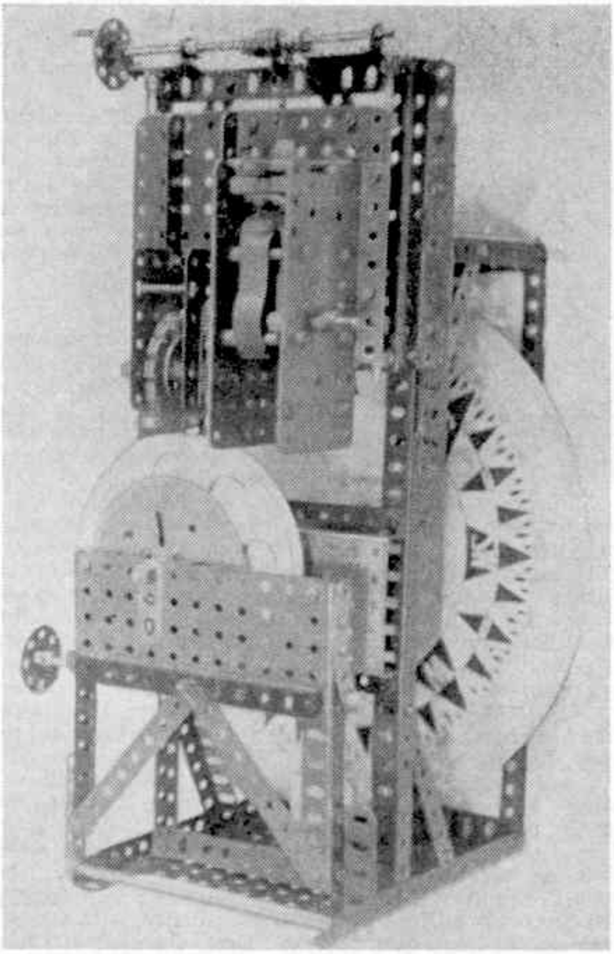


Fig. 1. The gear-cutting machine designed and built in Meccano by John Nowlan, Dagenham.

A GEAR-CUTTING MACHINE BUILT IN MECCANO

The illustration above shows a novel gear-cutting machine built in Meccano by John Nowlan, Dagenham. He designed the machine in order to be able to cut a special gear-wheel that he required for use in an astronomical clock, and apart from the actual cutting tool it is made from standard Meccano parts.

One of the problems he had to overcome in designing the machine was the method of dividing or setting the gear blank so as to produce the correct number of teeth.

The usual method of making use of a dividing plate with rows of concentric holes meant accurately making several such plates to cover the ranges Nowlan had in mind, namely 45 to 257 teeth, so he adopted a simpler idea. He purchased a nautical compass fly-sheet which has degrees marked around its edge and glued this to a steel circular plate which was then mounted on the same rod as the gear blank. To facilitate accurate setting he made a vernier and with this he can set directly to 1/10 degree and estimate to 1/100 degree.

A Screwed Rod in a crank at the top served as a clamp for small gears, and for large ones, he bolted a 133-teeth Gear to the blank and drove this with a Worm Wheel.

The Motor and cutter are mounted on a frame, which can be moved to and fro by rotating a Screwed Rod in a Threaded Boss secured under the frame. The Screwed Rod carries a ½" Pinion driven by a Worm to give a fine feed to the cutter.

A CAM-OPERATED AUTOMATIC REVERSING MECHANISM

Recently I received a most interesting letter from G. Goddick, a Danish Meccano enthusiast from Vadbaek, who was on holiday in England when he wrote to me. Mr. Goddick is a very keen model-builder, and with his letter he sent details of several mechanisms he has found useful in many of his models. One of these was a reversing mechanism operated by a special cam that Mr. Goddick suggests would make a useful addition to the range of Meccano parts. Several other readers have made similar suggestions, but as shown in Figs. 2 and 3 it is possible to make a suitable cam with parts already available. The built-up cam is shown fitted to an automatic reversing mechanism on the lines of that put forward by Mr. Goddick, but it should have many other uses in Meccano mechanisms.

The automatic reversing mechanism is assembled on a 5½"×2½" Flanged Plate. The driving shaft is supported in the Flanged Plate and in a Double Bent Strip bolted to it, and the shaft carries a 1½" Contrate 1, a Worm 2 and a Bush Wheel 3 fitted with a Threaded Pin as a handle. The driven shaft is a 5" Rod 4 mounted in two Trunnions bolted to the Flanged Plate. The Rod 4 is fitted with two ¾" Pinions 5, a Collar 6 and a Compression Spring 7. The Compression Spring is spaced from one of the Pinions 5 by ten Washers.

The Rod carrying the cam 8 is mounted in the Flanged Plate and in a Double Bent Strip. A ½" Pinion on the Rod is driven by a Worm 14, and a ½" Pinion on the same Rod as the Worm engages the Worm 2. The Rod is supported as shown in 1½" Flat Girders bolted to the ends of the Flanged Plate. The cam 8 consists of a Face Plate fitted with eight ¾" Bolts. Three of these, indicated at 9,

Young Miss Arnold, daughter of Mr. H. Arnold, Dublin, playing happily with her Dinky Builder Outfit.

are fixed in the outer holes of the Face Plate. The Bolts 10 are positioned centrally in two of the slotted holes and the three Bolts 11 are arranged in the inner holes of the Face Plate.

The cam is connected to the Rod 4 by a lever 12, made from a 2" Slotted Strip bolted to a Crank that pivots on a 1½" Rod held in a Double Arm Crank. The lever is connected to the Rod 4 by a Collar spaced from the Collar 6 by three Washers. A Bolt 13 is passed through the Crank and the Slotted Strip and is fitted with a nut and then screwed into the Collar. The nut is tightened against the Collar, but the Bolt 13 must not grip the Rod 4.

The mechanism is set so that when the lever 12 bears against one of the Bolts 10 the ¾" Pinions 5 are equally spaced inside the Contrate just clear of its teeth. This gives the neutral position of the mechanism. As the cam turns the Bolts 9 move the lever 12 and the Rod 4 to the right, Fig. 3, and bring one of the Pinions into mesh with the Contrate. As the movement of the cam continues the Compression Spring returns the Rod 4 to the left until when the lever 12 bears against the Bolts 11 the other Pinion engages the Contrate to reverse the direction of the drive.

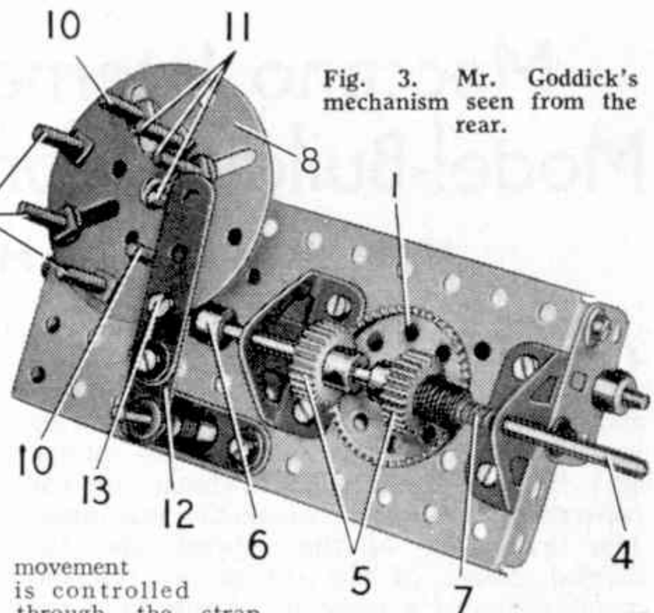


Fig. 3. Mr. Goddick's mechanism seen from the rear.

A DIFFERENTIAL CRANE WINDING DRUM

It is not always convenient to provide a forward and reverse drive to each winding drum of a model crane, to enable both the hoisting and lowering movements to be power-operated. The usual system is to disengage the drive from the Motor, while the load is lowered under the control of a brake. Mr. N. Gottlob, Hjortekaer, Denmark, has designed an interesting variation of this arrangement, incorporating a simple differential fitted inside the winding drum. It is shown in diagrammatic form in Fig. 4. One of the differential half-shafts is connected to the Motor, and the other is fitted with a strap brake. When the Motor is set working, with the brake applied, the drum is driven at half the speed of its driving shaft. This built-in reduction ratio results in a saving in the number of gears needed between the Motor and the drum. When the Motor is stopped and the brake is released, the drum turns freely under the weight of the load, and the lowering movement is controlled through the strap brake. The brake shaft turns at twice the speed of the drum.

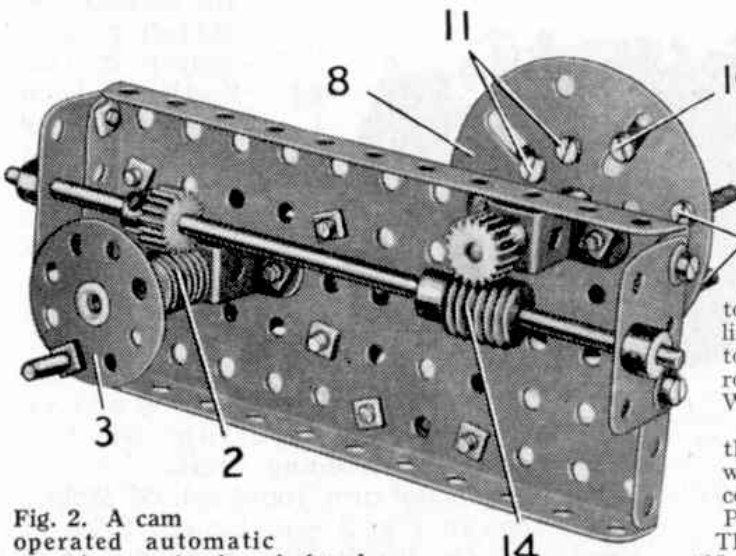


Fig. 2. A cam operated automatic reversing mechanism designed by Mr. G. Goddick, Vadbaek, Denmark.

The drum is a Cylinder 10 fitted at its centre with a Rod 2. The Rod is held in place by two Collars 8, and a ½" Pinion 5 is freely mounted on the Rod but is spaced from the Cylinder by two Washers. The half-shafts are 2½" Rods, each fitted with a ¾" Contrate 6 and a Collar. A 1⅛" Flanged Wheel 3 is pressed into each end of the Cylinder, and the positions of the Collars on the half-shafts are adjusted so that the Contrates 6 engage the Pinion 5.

The bosses of the Flanged Wheels 3 are free to turn in Socket Couplings 9, which are fixed to Bush Wheels 4 bolted to the mechanism framework. The parts must be lined up very carefully so that the drum is free to turn in the Socket Couplings, and the half-shafts rotate freely in the Bush Wheels and the Flanged Wheels.

One of the half-shafts is connected to the Motor through suitable gearing and the other is fitted with a Pulley to form the brake drum. The brake consists simply of a belt of Cord passed round the Pulley and connected to a lever.

The Pinion 5 and the Collars 8 are mounted on a 1½" Rod, and Mr. Gottlob suggests that it may be preferable to shorten the Rod slightly so that its ends flush with the walls of the Cylinder. This will ensure that the Cord winds evenly on the drum, but it is not really essential, as the Rod 2 does not rotate, and if the Cord winds over the end of the Rod it will not affect the working of the mechanism.

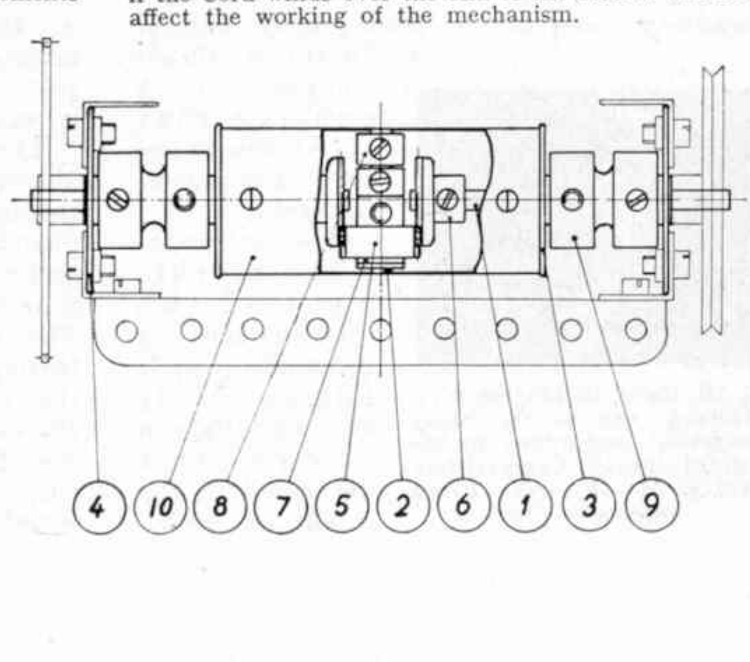


Fig. 4. A novel differential winding drum for cranes. It was designed by Mr. N. Gottlob, Hjortekaer, Denmark.

A Useful Reversing Mechanism

Designed for Continuous Operation

By "Spanner"

I EXPECT most Meccano enthusiasts are familiar with the colourful display models that are centres of attraction at the premises of many Meccano Dealers. One of the most popular of these is a replica of Blackpool Tower, which is shown in Fig. 2 on this page.

The construction of the Tower itself presents no great difficulty. The main feature of the model is the automatic mechanism that operates the two lifts, which rise and descend alternately, although they are driven by a Motor that runs continually in *one* direction. It is the automatic reversing movement that intrigues most of the model-builders who write to me.

I must first make clear one point, in regard to the motor. Display models have to work continuously day after day for long periods and to meet the heavy strain involved they are fitted with high-voltage motors. The automatic mechanism used is just as suitable for use with an E20R Motor, however, which is the type most model-builders will have available. This should be fitted with three stage reduction gearing, however, as shown in Fig. 1. The bearings for the shafts are provided by bolting 1½" Corner Brackets 1 to the side-plates of the Motor. The gearing gives a total reduction ratio of 27:1, and the final shaft in the gear train is fitted with a 1" Sprocket 2.

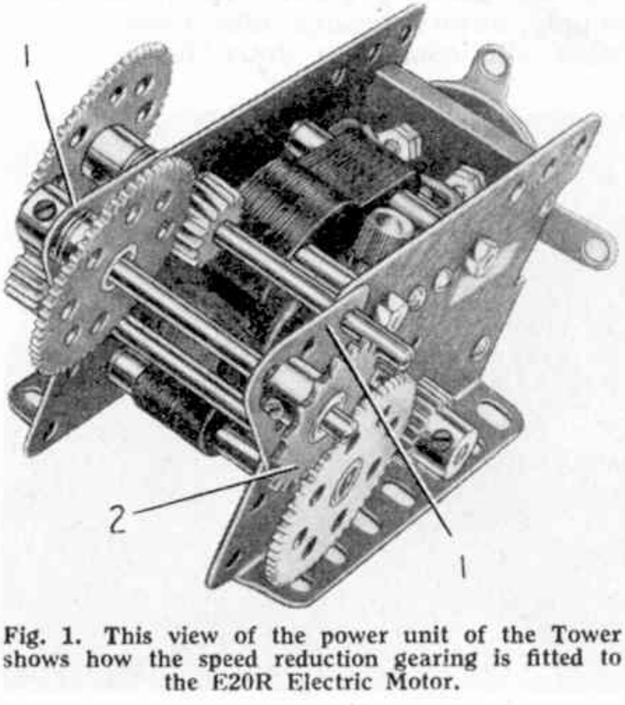


Fig. 1. This view of the power unit of the Tower shows how the speed reduction gearing is fitted to the E20R Electric Motor.

The automatic reversing mechanism that controls the movement of the lifts is shown removed from the model in Fig. 4. The housing consists of two 3½"×2½" Flanged Plates, connected at their ends by two 2½"×2½" Flat Plates. Bolted to one end of the housing are four face-to-face 3" Strips, three clear holes of which project above the Flat Plate. To these Strips is fixed a Crank 3.

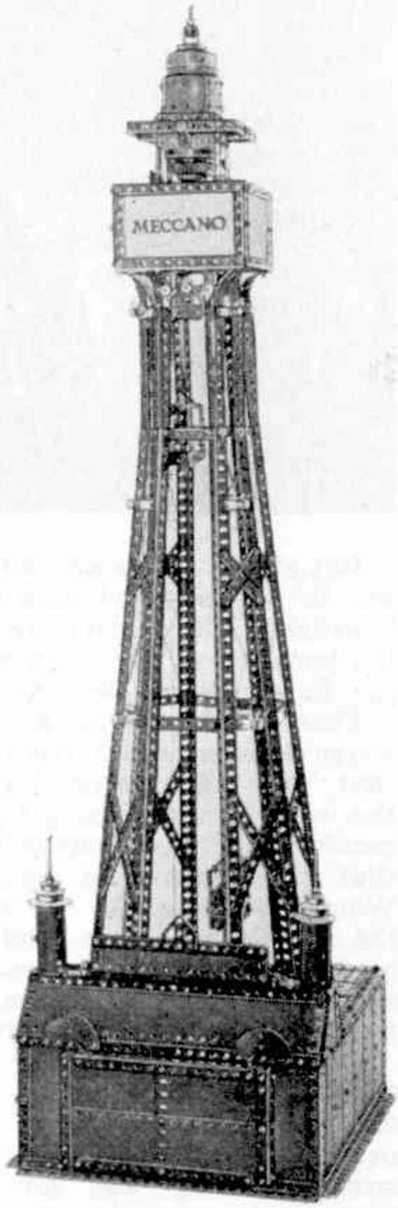


Fig. 2. The lifts in this effective model of Blackpool Tower are operated by the automatic reversing mechanism that forms the subject of this article.

The input shaft is a 4" Rod fitted with a 2" Sprocket 4, a ½" Pinion 5, a Worm 6 and a 1" Gear 7. An intermediate shaft 8, which is free to slide endways in its bearings, is a 4½" Rod. It carries a ½" Pinion 9, a Collar and a 1" Gear 10. A ½" Pinion 11 is free to rotate on a 1⅛" Bolt attached to one side of the housing

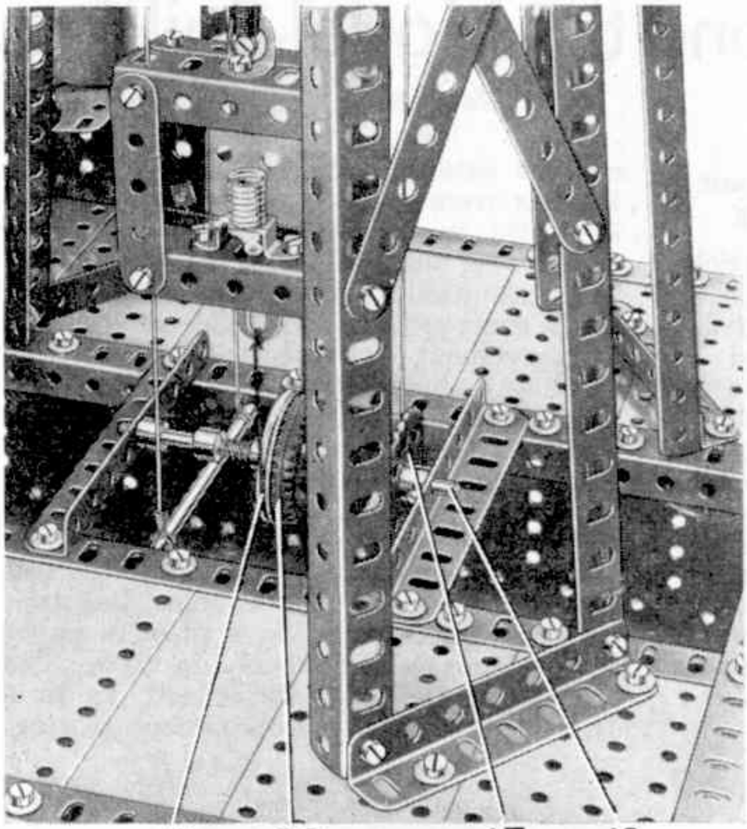


Fig. 3. A close-up of the friction drive arrangement fitted to the lift driving shaft.

by nuts, and the Pinions 5 and 11 are in constant mesh. The drive between the sliding shaft 8 and the output shaft 12 is transmitted by a ½" diameter, ¾ face Pinion and a 57-tooth Gear, arranged as shown in Fig. 4. A 1" Sprocket 13 is fixed on the output shaft.

It will be seen that when Rod 8 is moved to the left (Fig. 4), the Gears 7 and 10 are brought into mesh and complete the drive to the output shaft. When Rod 8 is moved to the right Gears 7 and 10 disengage, and Pinion 9 is meshed with the Pinion 11. This also completes the drive to the output shaft, but in the opposite direction to that when the 1" Gears are in mesh. Thus by sliding Rod 8 alternately from side to side the direction of the drive is reversed with each movement of the Rod.

The side-to-side movement of Rod 8 is controlled quite simply by a lever 14. This is a 3½" Strip that pivots between two Collars on a 2" Rod, which is fixed in the Crank 3. A ⅜" Bolt 15 held in the Strip by two nuts is arranged so that its head is located between the 1" Gear and the Collar on Rod 8. The side-to-side movement of lever 14 is operated by a 57-tooth Gear that is in constant mesh with the Worm 6. The Gear is fixed on a 1½" Rod mounted in the end of the housing and in a Double Bent Strip bolted to it, immediately below the 3" Strips that support the Crank 3. A Slide Piece 16 is passed over the end of Strip 14 and is fixed on a ⅜" Bolt located in one of the holes in the 57-tooth Gear.

When the Motor unit and the reversing mechanism are completed they are bolted to Angle Girders fixed across the base of the tower. The Sprockets 2 and 4 are connected by Chain, and another length of Chain transmits the drive from Sprocket 13 to a 2" Sprocket 17 (Fig. 3). Sprocket 17 is fixed on a Rod 18 supported in the base of the tower, and this Rod is the driving shaft for the (*Continued on page 284*)

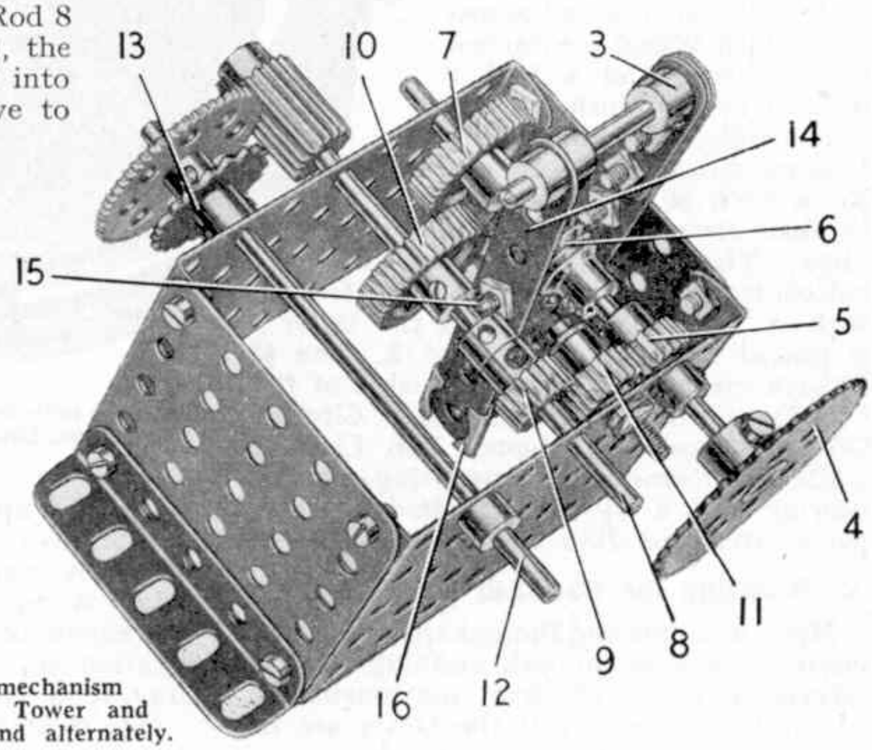


Fig. 4. This automatic reversing mechanism is concealed in the base of the Tower and causes the lifts to rise and descend alternately.

Blondins of Industry—(*Continued from page 229*)

also can be given by means of telephones connecting the operator with a signaller on the site.

Two Henderson aerial cableways were used during the construction of the Loch Sloy dam, in the north of Scotland, which is 1,200 ft. long and provides a reservoir storing 1,200 million cu. ft. of water. Thousands of tons of concrete were transported into position during the building of the dam by means of the cableways. These had a span of 1,350 ft., and the tail carriage of each machine could be travelled over a distance of 150 ft., by electric power. The two fixed headmasts were 125 ft. high, and the tail carriage 36 ft. The maximum load on the hook of each cableway was 10 tons, this including the weight of the skip and the slings, together with the contents. The skip contained four cubic yards of concrete, which could be placed at any point over an area of 8,700 square feet.

Other great engineering schemes on which these cableways have been employed include the building of the Otto Beit bridge in South Africa, the Conisborough Viaduct near Doncaster and the reconstruction of the Menai Bridge. Besides the building of innumerable dams in all parts of the world, cableways have been used in causeway construction, notably at Scapa Flow, the famous Fleet anchorage in the Orkneys.

Road and Track—(*Continued from page 247*)

the four-speed gearbox is developed from the three-speed Vanguard box, while the rear axle and front suspension are Triumph Mayflower units. With a maximum speed of 107 m.p.h., nearly 80 m.p.h. in third gear, a petrol consumption figure of 34 m.p.g., when driven hard, and a 0-60 acceleration figure of 12 sec., the TR2 is remarkable value at £900 including Purchase Tax. A special high speed version of the car attained a mean speed of 124 over the measured mile at Jabbeke in Belgium during the development period. Having seen Edgar Wadworth's privately owned TR2 average 74.71 for 1,793 miles at Le Mans last year, I expect great things from the Coventry pair this year.

There are two other major races in June, both World Championship events. Round 4, the Belgian Grand Prix, is on 5th June; Round 5, the Dutch Grand Prix, is on 19th June.

On the W.R. "Inter-City"—(*Continued from page 250*)

80 m.p.h. again approaching Denham Golf Club halt. Then came a gentle easing of the regulator and after the troughs at Ruislip the engine was opened up again to bring us rapidly to yet another flying junction.

This was Northolt, where the joint line that we had followed from Ashendon Junction comes to an end, the Marylebone line cutting across to Neasden and the Paddington line heading for its junction with the main Western line at Old Oak Common. So we came through Greenford and with brakes slightly on at Park Royal Signal Box we were already slowing when the A.T.C. warning siren once more gave its message. There is a restriction between Old Oak Lane and Old Oak Common West Junction, but green lights ushered us on to the real main line again and we cruised in past Westbourne Park, and on to Paddington.

There No. 11 platform was our berth and the brakes eased us before we whistled twice, and then applied the brakes again after the regulator had been opened and shut once more to bring us alongside the platform. Engineman Roden had more than kept his promise; the time was just 7.1 p.m.—we were four minutes early!

Stamp Collectors' Corner—(*Continued from page 281*)

"First Day" covers were prepared by the Australian Post Office, and these were postmarked at Macquarie Island, Heard Island and Mawson. The three covers are quite inexpensive, and they will set off a collection. The 3½d. stamp itself, with its map of the Antarctic and its frame of marine creatures, is very interesting. So if you cannot get the covers, a stamp will be available for a copper or two.

A Useful Reversing Mechanism—(*Continued from page 267*)

lifts. A 1½" Pulley 19 is placed on Rod 18 and round it is passed a length of Cord, with each end tied to the base of one of the lifts. A second Cord is fastened at each end to a Spring bolted to the top of each lift, and is passed round a Pulley at the top of the tower.

It is preferable to allow a slight over-run so that the lifts reach the limits of their travel slightly before the reversing mechanism changes the direction of the drive. This is accomplished by a simple friction drive, which 'slips' when the lifts reach stops that prevent further movement. Instead of the Pulley 19 being fixed on Rod 18, it is mounted freely, and is pressed by a Compression Spring against a Motor Tyre 20 on a 1" Pulley fixed on the Rod.

The following is a list of the parts required to build the Motor unit and the automatic reversing mechanism: 1 of No. 3; 4 of No. 4; 2 of No. 9d; 2 of No. 15a; 1 of No. 15b; 3 of No. 16a; 1 of No. 17; 1 of No. 18a; 6 of No. 26; 1 of No. 26b; 5 of No. 27a; 2 of No. 31; 1 of No. 32; 21 of No. 37a; 12 of No. 37b; 10 of No. 38; 1 of No. 50; 2 of No. 53; 7 of No. 59; 1 of No. 62; 2 of No. 72; 1 of No. 94; 1 of No. 95; 2 of No. 96; 5 of No. 111c; 2 of No. 133; 1 E20R Electric Motor.

Among the Model-Builders—(*Continued from page 269*)

of 1" Triangular Plates 16 using Washers for spacing purposes. Now place the rocking member horizontally on a table with the Wheel Flange uppermost, and insert into the Wheel Flange a 1½" Pulley 8, with 22 steel balls ¼" dia. between the groove of the Pulley and the inner face of the Wheel Flange.

The assembly consisting of the rocking arm and the ball bearing is slipped on to the Rod 6 and held in place by a Collar; the Pulley 8 is clamped to the Rod. The rocking arm is guided at its upper end by two 2½" Strips bent as shown in the inset illustration in Fig. 3. Pivot Bolts connect these Strips to the rocking arm and the frame; the one at the top of the rocking arm has its threaded end outward.

The walking shoe is constructed from 9½" Angle Girders 24 and Strips 22, held together by 2" Angle Girders 27. The sides are 5½" Flat Girders 29, and the bottom is shaped from four 2½" Angle Girders 26 and two 4½" Angle Girders 25. The shoe pivot is a 1" Rod 7 held in Collars fixed to the Strips 22. A 2" Strip 23 strengthens the assembly.

A Meccano Fork Lift Truck—(*Continued from page 271*)

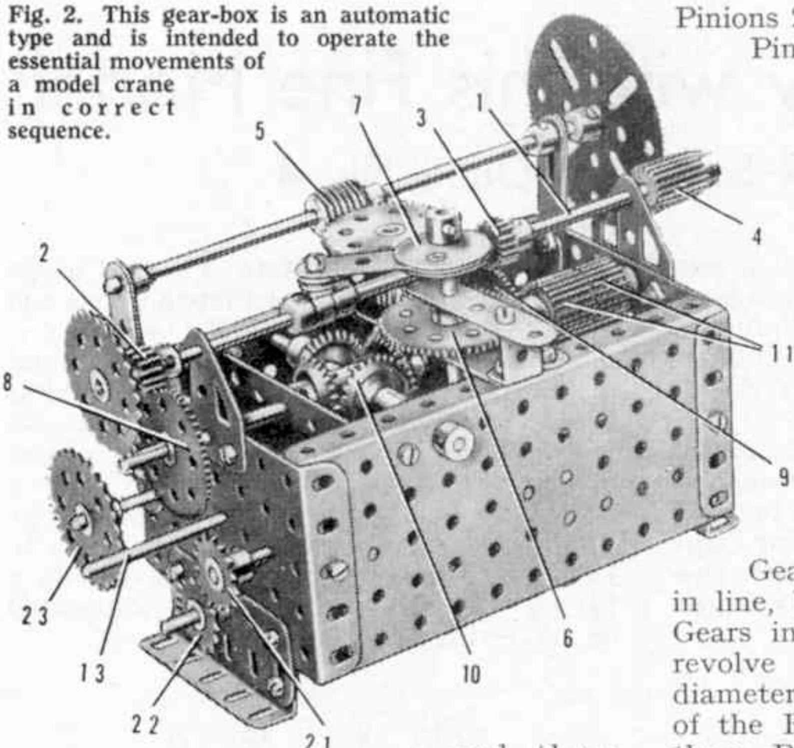
Plate a Semi-Circular Plate 24 is fixed to Angle Brackets bolted to the sides and the back of the body. A 2½" Stepped Curved Strip and a 2½" Strip are bolted together and are supported by Angle Brackets fixed to each Semi-Circular Plate. A 1" Corner Bracket 25 on each side also is supported by an Angle Bracket.

Attach the body to the chassis by bolting the Flanged Plate 22 to the top ends of two slightly curved 1" Triangular Plates 26. At the rear two ½" Bolts 27 are fixed by nuts in the body, and each Bolt is held by two nuts in a Fishplate 28 bolted to the chassis.

A 3½" × 2½" Flanged Plate can be used as a pallet for the model as shown in Fig. 1.

Parts required to build the Fork Lift Truck: 2 of No. 1a; 1 of No. 2; 5 of No. 3; 6 of No. 4; 6 of No. 5; 5 of No. 6; 5 of No. 6a; 2 of No. 8b; 1 of No. 9c; 2 of No. 9d; 6 of No. 10; 4 of No. 11; 15 of No. 12; 4 of No. 12a; 2 of No. 12b; 1 of No. 15b; 4 of No. 16; 2 of No. 16a; 2 of No. 17; 2 of No. 20b; 2 of No. 21; 3 of No. 22; 1 of No. 24; 1 of No. 25; 2 of No. 26; 2 of No. 27a; 1 of No. 28; 9 of No. 35; 177 of No. 37a; 160 of No. 37b; 40 of No. 38; 2 of No. 38d; 1 of No. 40; 1 of No. 48b; 2 of No. 50; 1 of No. 103d; 2 of No. 111a; 4 of No. 111c; 1 of No. 124; 2 of No. 125; 1 of No. 126; 2 of No. 126a; 4 of No. 133a; 2 of No. 142d; 2 of No. 155; 1 of No. 160; 1 of No. 185; 1 of No. 186a; 3 of No. 188; 1 of No. 189; 3 of No. 191; 2 of No. 214; 4 of No. 215; 1 No. 1 Clockwork Motor.

Fig. 2. This gear-box is an automatic type and is intended to operate the essential movements of a model crane in correct sequence.



and these are fixed on the driving shaft. A Slide Piece 3 is passed over one of the Strips, and is fixed on a ⅜″ Bolt inserted in the third hole from the Eccentric end of the other 3½″ Strip.

The driven member of the mechanism is a 2½″ Gear fixed on the output shaft. The positions of the Angle Brackets should be adjusted carefully so that they engage the Gear alternately as the Eccentrics rotate.

An Automatic Crane Gear-Box

The gear-box shown in Figs. 2 and 3 was designed by Mr. K. C. Bennett for use in an automatic block-setting crane displayed by our dealers, Righton and Bennett Ltd., Gosport. The model is driven by an electric motor and the gear-box distributes the drive to the hoisting, slewing and trolley traversing movements of the crane. The movements are arranged to operate in a definite sequence, and the model operated over the Christmas period for eight hours a day for three weeks without trouble of any kind.

The drive to the gear-box is transmitted by Chain to a Sprocket on a Rod 1. This Rod carries two ½″ diameter, ¼″ face Pinions 2 and 3 and a ½″ diameter, ¾″ face Pinion 4. Pinion 4 drives a 2½″ Gear on a Rod carrying a Worm 5, and the Worm meshes with a 57-tooth Gear on a short vertical Rod that carries also a ½″ Pinion. The Pinion engages a 57-tooth Gear 6 on the same shaft as a Single Throw Eccentric 7, which is connected by a bolt to a Collar free to turn between two fixed Collars on Rod 1.

The Rod 1 slides from side to side under the action of the Eccentric, and Pinions 2 and 3 are meshed alternately with 57-tooth Gears 8 and 9. These Gears are on separate Rods mounted in line, but connected by the four Bevel Gears indicated at 10 so that the Rods revolve in opposite directions. Two ¾″ diameter, ½″ face Pinions 11 are fixed on one of the Rods, and the direction in which these Pinions rotate is determined by whether the Pinion 2 or the Pinion 3 is in mesh with its Gear.

Pinions 11 engage a 50-tooth Gear 12 on a Rod 13, which is moved from side to side by the action of a Triple Throw Eccentric 14 on the same Rod as the Eccentric 7. Rod 13 carries also a 50-tooth Gear 15, and sliding the Rod brings the Gears 12 and 15 into mesh intermittently with ¾″ Pinions 16, 17, 18 and 19 on the three output shafts. Pinions 18 and 19 are fixed on separate shafts connected by four Bevel Gears 20 to provide a reverse drive.

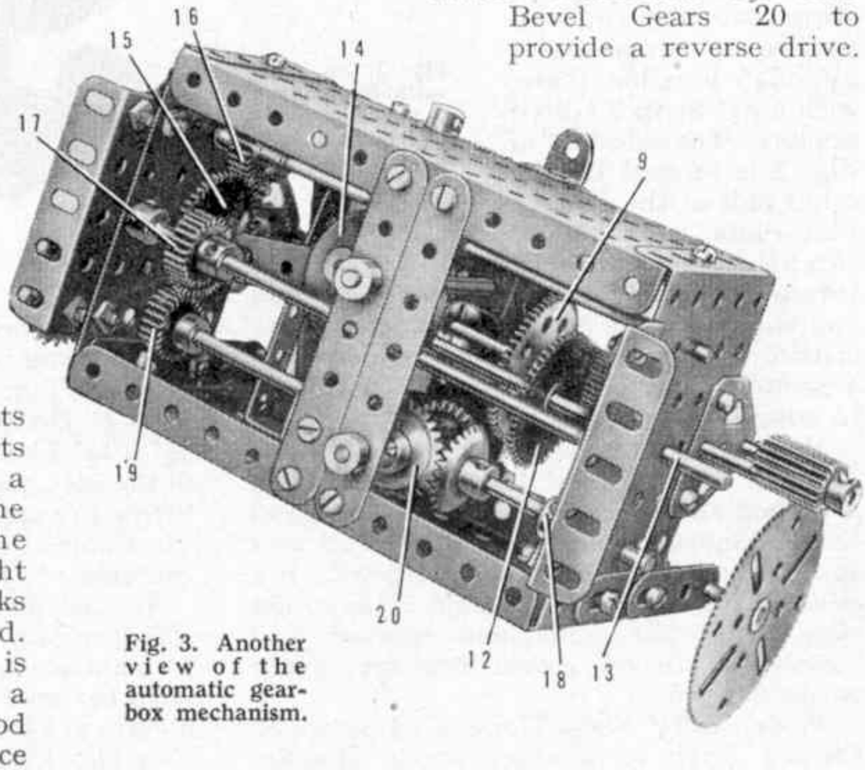
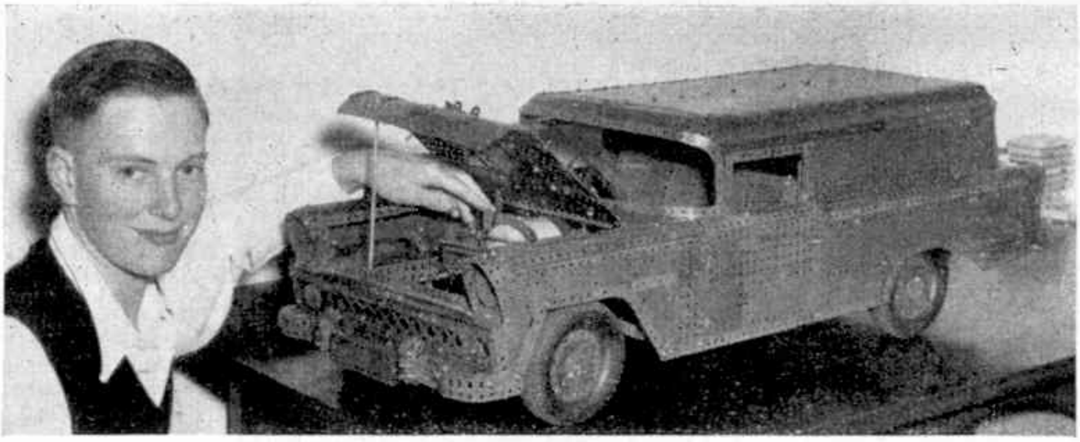


Fig. 3. Another view of the automatic gear-box mechanism.



Mr. P. Hatty, Bulawayo, S. Rhodesia, shows the "under the bonnet" secrets of a fine model Chevrolet Panel Van he built recently. The model is 1/5th of the actual size of the real vehicle and has a fully equipped chassis.

Among the Model-Builders

By "Spanner"

Automatic Reversing Mechanism

Automatic reversing mechanisms seem to have occupied the attentions of many model-builders since I mentioned them in the *M.M.* last year, and several have sent along details of arrangements they have found useful. One of these readers is Mr. A. T. C. Burlinson, Bristol, who sent me sketches of two mechanisms he has used in his models. I have built up one of these mechanisms and a picture of it is reproduced as Fig. 1

The arrangement is very simple but it has certain limitations, chief of which is that the output shaft makes approximately only one revolution before the drive is reversed. This should be sufficient for models of many kinds, however, and of course by using step-up gearing from the output shaft the number of revolutions can be increased.

The driving member of the mechanism is a 1½" Contrate, which is attached by a ½" and a ¾" Bolt to a 57-tooth Gear or Bush Wheel 1 on the input shaft 2. The Contrate is spaced from the Bush Wheel by four Washers on the ½" Bolt and by nuts on the ¾" Bolt, so that it is set at an angle to the output shaft 3. The output shaft carries two Pinions, arranged so that each in turn is engaged by the inclined Contrate as it rotates. The transfer of the drive between the upper and the lower Pinion results in the direction of rotation of the output shaft being reversed.

An Interesting Meccano Novelty

One of my regular correspondents, Mr. H. Taylor, Huddersfield, sent me details of the unusual Meccano model shown in Figs. 2 and 3. The principle of the device is that two rotating members, mounted on a common shaft, are driven slowly and steadily in opposite directions by an Electric Motor. Each rotating member consists of a series of curved arms, and as these rotate they produce patterns of constantly changing design. The effect is increased by illuminating the model, as shown in the pictures, so that the light shines through a screen of white paper

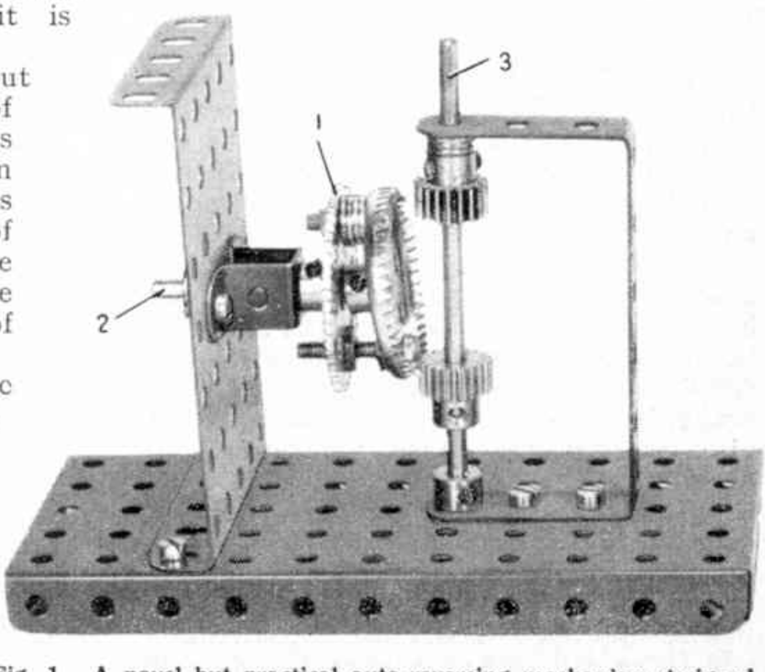


Fig. 1. A novel but practical auto-reversing mechanism designed by Mr. A. T. C. Burlinson, Bristol.

Among the Model-Builders

By "Spanner"

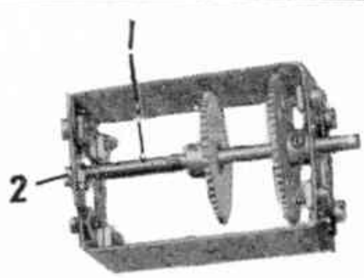


Fig. 1. The novel bearing suggested by C. Cohen, Cape Peninsula Meccano Club, South Africa.

An Internal Bearing for Mechanisms

In many mechanisms, it is an advantage to mount the shafts within the framework of the housing. Mr. C. Cohen, Secretary of the Cape Peninsula Meccano Club, suggests the neat and effective arrangement using a Rod Connector reproduced in Fig. 1.

A Rod Connector 1 is slipped over the end of the Rod to be supported and is passed over a Bolt 2 fixed by a nut in the housing. If the Bolt is adequately lubricated it will be found to provide a smooth and free-running bearing. A similar bearing for a sliding shaft can be arranged by using $\frac{1}{2}''$ or $\frac{3}{4}''$ Bolts, but of course the sliding movement is limited as approximately half of the Rod Connector must be passed over the Rod to obtain sufficient strength and grip. I am sure that readers will find this novel suggestion a quite useful one.

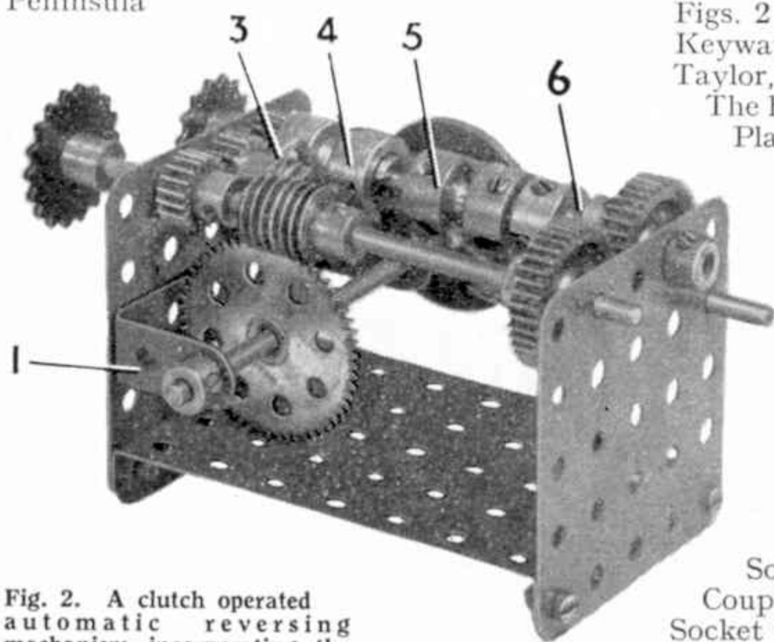


Fig. 2. A clutch operated automatic reversing mechanism incorporating the Rod with Keyway. It was designed by H. H. Taylor, Huddersfield.

A Clutch Operated Automatic Reversing Mechanism

The automatic reversing mechanism shown in Figs. 2 and 3, makes use of a 4″ Rod with Keyway, and was suggested by Mr. H. Taylor, Huddersfield.

The housing consists of two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates bolted to the flanges of a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. A $2\frac{1}{2}'' \times 1''$ Double Angle Strip 1 is bolted to one of the Flat Plates. The input shaft 2 is fitted with a $\frac{1}{2}''$ Pinion, a Worm Gear and a 1″ Gear. An idler $\frac{1}{2}''$ Pinion is mounted on a $\frac{3}{4}''$ Bolt fixed in one of the Flat Plates by a nut, with a Fishplate 3 clamped between two nuts at the inner end of the Bolt.

The output shaft is a 4″ Rod with Keyway that carries a $\frac{1}{2}''$ Pinion held in a Socket Coupling 4, a Socket Coupling 5, and a Socket Coupling 6 fitted with a 1″ Gear. The Socket Coupling 5 carries at each end the male section of a Dog Clutch, the other sections of these Dog Clutches being fitted in the Socket Couplings 4 and 6. Socket

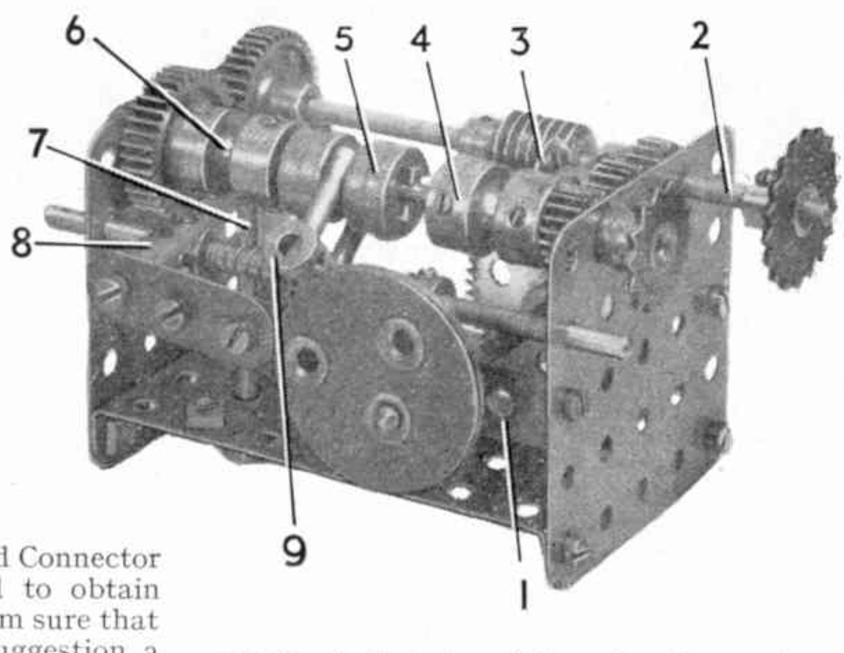


Fig. 3. Another view of the automatic reversing gear-box.

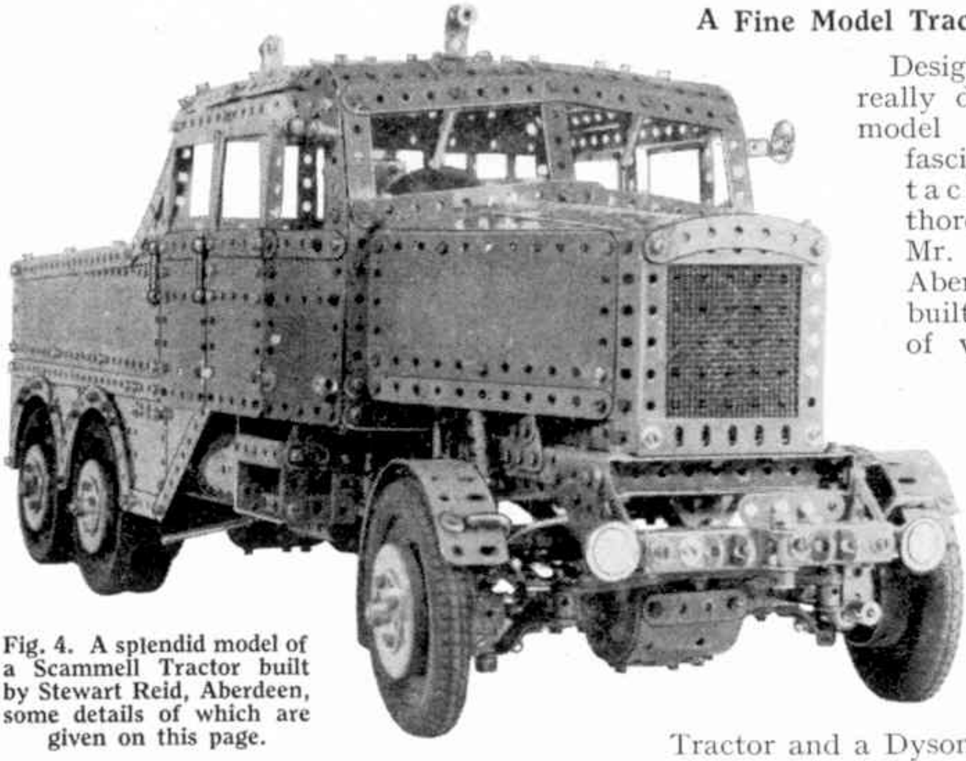


Fig. 4. A splendid model of a Scammell Tractor built by Stewart Reid, Aberdeen, some details of which are given on this page.

Coupling 5 is made to turn with the output shaft by Key Bolts screwed into the male sections of the Dog Clutches. The Fishplate 3 engages the groove of Socket Coupling 4 and a Rod 7 similarly engages the Socket Coupling 6. The Fishplate 3 and Rod 7 prevent the Socket Couplings 4 and 6 from sliding along the output shaft.

The Worm Gear on the input shaft drives a 57-tooth Gear on a Rod mounted in the Double Angle Strip 1. The Rod carries a Triple Throw Eccentric extended by a $1\frac{1}{2}''$ Strip. A $\frac{3}{8}''$ Bolt is passed through the Strip and is fixed by a nut in a Threaded Coupling 8, which is locked on a $4\frac{1}{2}''$ Rod. The Rod carries a Coupling 9, mounted freely between Compression Springs. One of the Compression Springs bears against the Threaded Coupling 8 and the other presses against a Collar fixed on the $4\frac{1}{2}''$ Rod. Two 1″ Rods held in the Coupling 9 are located in the groove of Socket Coupling 5.

The mechanism is adaptable to many types of models.

A Fine Model Tractor and Trailer

Designing and building a really detailed and accurate model vehicle can be a fascinating job if it is tackled in the very thorough way adopted by Mr. Stewart Reid of Aberdeen. Mr. Reid has built many fine models of various kinds in his career as a Meccano enthusiast, and one of his latest and best, or perhaps I should say, two of his latest and best, are the attractive reproductions of a Scammell Tractor and a Dyson Trailer shown in the two illustrations on this page.

Before commencing construction of these detailed models, Mr. Reid searched through transport magazines and other publications to get his data and details accurate, and spent quite a lot of time examining the actual vehicles on such odd occasions as fell to him. With the knowledge gathered in these ways, coupled with his expert knowledge of the use of Meccano parts, he was able to produce very fascinating miniatures. Unfortunately, I am unable to show the whole of the Dyson Trailer, but a picture of its rear end and bogie is reproduced below.

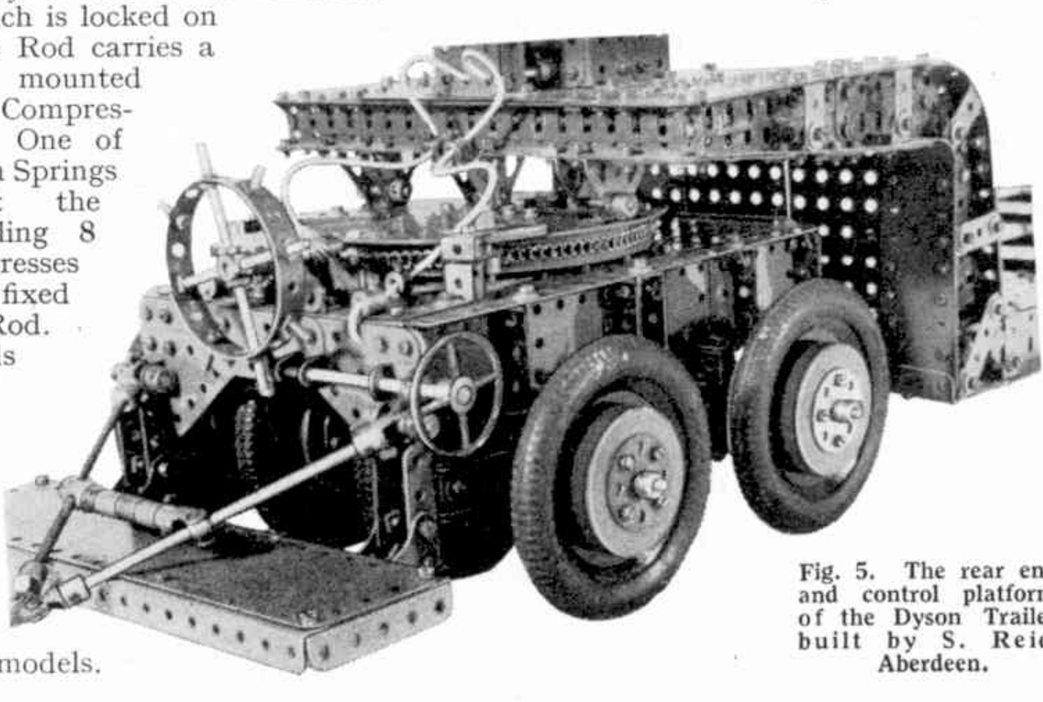


Fig. 5. The rear end and control platform of the Dyson Trailer built by S. Reid, Aberdeen.

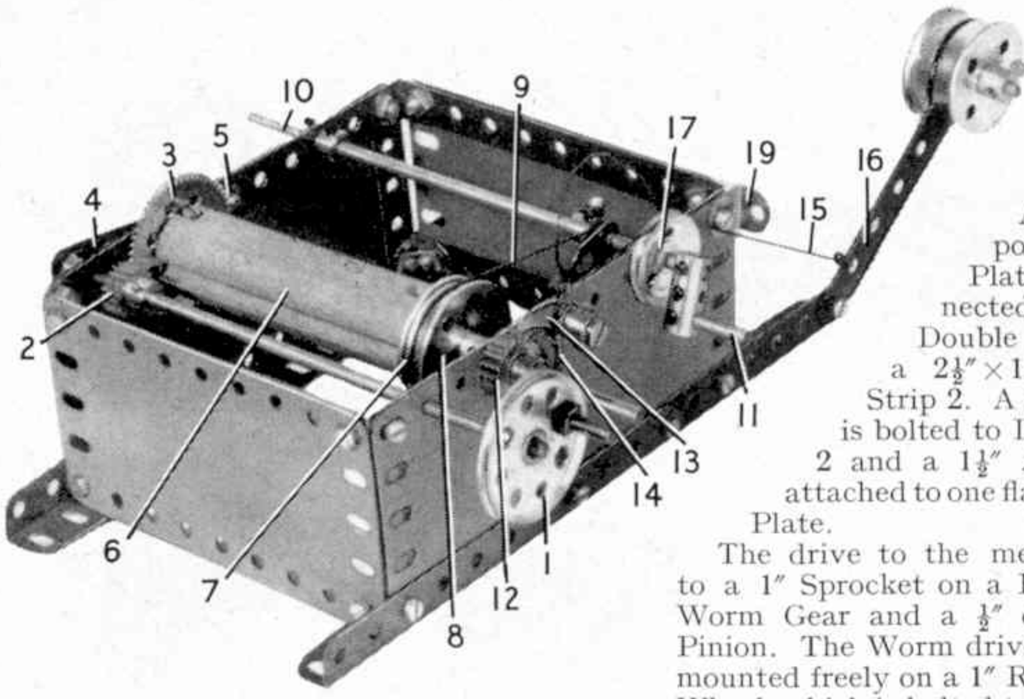


Fig. 1. A winding mechanism for cranes.

braking effect on the winding drum. A Ratchet Wheel 12 is fixed to the shaft of the latter and is engaged by a Pawl 13. The necessary pressure is imparted to the Pawl by a piece of Spring Cord 14. The Cord 15 tied to the Pawl is connected to a weighted lever 16, and is guided over a 1″ loose Pulley 17 that rotates freely on Rod 10.

Normally the weighted lever 16 rests against a stop 19 and in this position allows the Pawl to engage the Ratchet Wheel 12. If the arm 16 is released from the stop and moved backwards however, the Cord pulls the Pawl clear of the teeth of the Ratchet and so leaves the winding drum free to rotate.

An Automatic Reversing Mechanism

Details of the automatic reversing device shown in Fig. 2 were sent to me some time ago by Mr. G. Bowker, Bolton. The mechanism base plate is a 3½″ × 2½″ Flanged Plate with a 3½″ Angle Girder bolted to each of its longer edges. The Angle Girders support 3″ × 1½″ Flat Plates, which are connected by a 2½″ × ½″ Double Angle Strip 1 and a 2½″ × 1½″ Double Angle Strip 2. A Double Bent Strip is bolted to Double Angle Strip 2 and a 1½″ Angle Girder 3 is attached to one flange of the Flanged Plate.

The drive to the mechanism is taken to a 1″ Sprocket on a Rod that carries a Worm Gear and a ½″ diameter, ½″ Face Pinion. The Worm drives a 57-tooth Gear mounted freely on a 1″ Rod fixed in a Bush Wheel, which is bolted to the Double Angle Strip 1. The Gear is supported on the Rod by a Collar. A ¾″ Bolt passed through one of the holes in the Gear is fitted with a Collar and two Washers and then its shank is fixed in the boss of a Slide Piece. A 4½″ Strip 4 is passed through the Slide Piece and is lock-nutted to the Angle Girder 3.

A 57-tooth Gear on a Rod 5 is arranged to mesh with the ½″ diameter, ½″ Face Pinion. Rod 5 carries a ½″ Pinion, a Collar, a Coupling 6, a Collar and a second ½″ Pinion. A 1″ Rod in Coupling 6 engages a hole in the Strip 4. (*Cont. on page 305*)

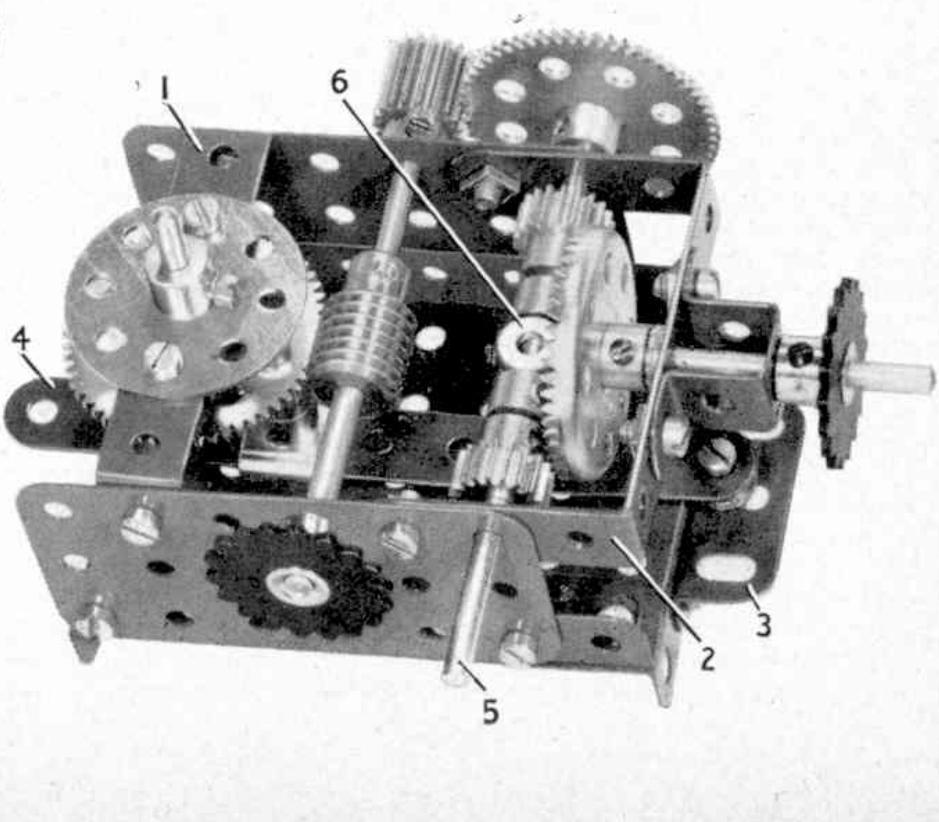
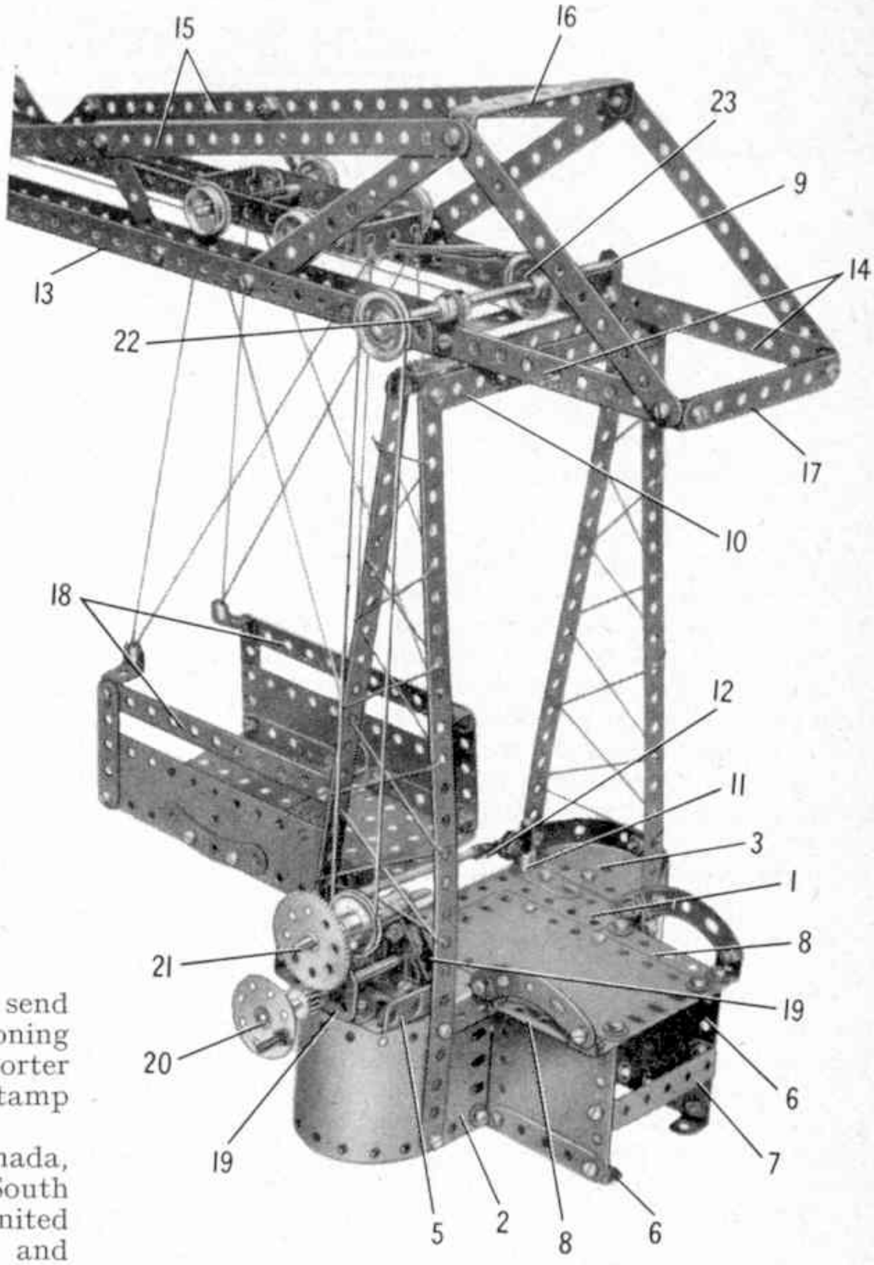


Fig. 2. An automatic reversing mechanism designed by Mr. G. Bowker, Bolton.

Fig. 2. The right-hand tower, showing the winding mechanism that controls the movement of the carriage.



can be built from parts in Outfit No. 7.

If the construction is neatly carried out the finished effect is most attractive, and for those model-builders who like experimenting on their own there is plenty of scope for them to modify, or elaborate on, the construction as much as they desire and the parts available to them will allow. It is also possible to fit a Clockwork or Electric Motor to drive the model in place of the manual operation for which the model illustrated is designed.

Many readers will no doubt want to build this Transporter Bridge and full constructional details and a list of the parts required are available free of charge on request. Readers living in Great Britain should send a letter to the Editor mentioning "Model of the Month—Transporter Bridge" and enclosing a 2d. stamp to cover postage.

Readers living in Canada, Australia, New Zealand, South Africa, Rhodesia, Ceylon, United States of America, Holland and Italy can obtain the instructions by writing to our main agents for these countries, also, of course, enclosing appropriate stamps for postage.

Please make your application early, otherwise you may find that supplies of the instruction sheets have run out. We have prepared sufficient copies of the instructions to cover an estimate of the number of requests we will receive from model-builders, but in the event of an unprecedented demand it is possible that supplies may prove inadequate. So send in your application as quickly as possible and avoid disappointment. This applies equally to readers in this country and overseas.

Easy Model-Building—*(Continued from page 295)*

Axle Rod also carries a 25-teeth Pinion 22, which meshes with a 50-teeth Gear Wheel 23. This Gear Wheel is carried on a 1½" Axle Rod 24 journalled in the Flanged Plate 2 and a 3½" Perforated Strip bolted to two 1½" Angle Girders attached to the Flanged Plate, which also carries a 19-teeth Pinion meshing with a 57-teeth Gear Wheel. The Pinion is fixed on a 1½" Rod 25 held in the 3½" Strip and the Flanged Plate. A 15-teeth Pinion 26 also secured to this Rod, meshes with a 25-teeth Contrate Wheel 27 mounted on the rear Axle. Two 1" Sprocket Wheels are fixed on this axle. Two ¾" Flanged Wheels 28 are secured to each of the Rods 8 and Wheel Discs and 1½" Flanged Wheels 29 are fixed to the front axle. Sprocket Chain is arranged as shown to form the tracks.

News and Ideas for Meccano Model-Builders—

(Continued from page 303)

The output shaft is mounted in the Double Angle Strip 2 and in the Double Bent Strip. It is fitted with a 1½" Contrate spaced from Double Angle Strip 2 by two Washers.

As the Worm Gear drives its 57-tooth Gear, the Strip 4 is moved from side to side, and carries with it the Rod 5. The sliding movement of Rod 5 brings the ½" Pinions into mesh alternately with the 1½" Contrate, and thus the direction of rotation of the output shaft is reversed periodically.

To adjust the mechanism the Rod 5 should be arranged with its 57-tooth Gear in the centre of the ½" face Pinion, while each ½" diameter Pinion should be just out of mesh with the 1½" Contrate.

Among the Model-Builders

By "Spanner"

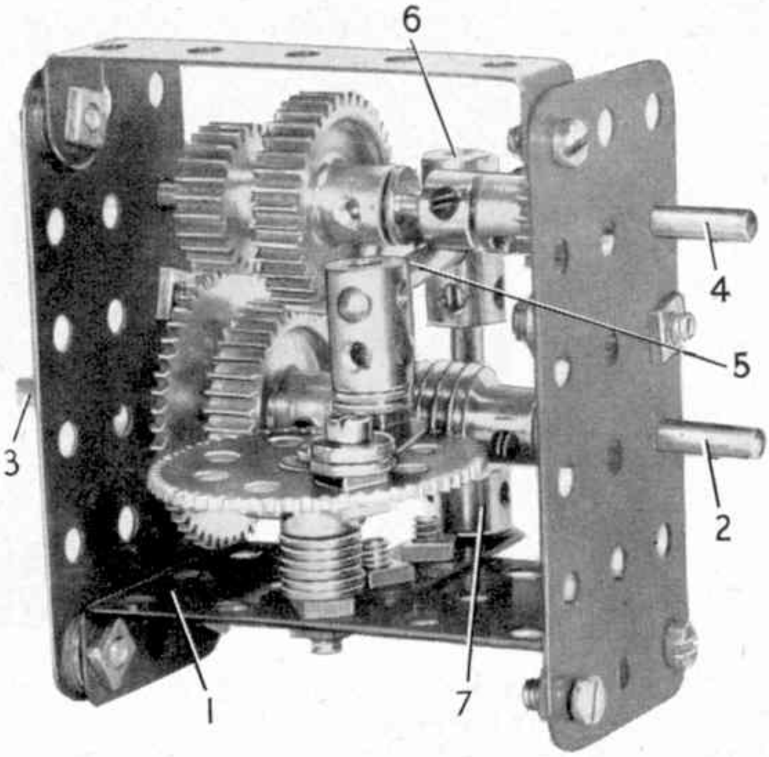


Fig. 1. The Compact Automatic Reversing Mechanism described on this page. It was designed by L. J. Pattison, Sheerness.

A Compact Automatic Reversing Mechanism

Mr. L. J. Pattison, of Sheerness, has sent me details of a compact, automatically-operated reversing mechanism which is illustrated in Figs. 1 and 2 on this page. A useful feature of the arrangement shown is that the input and the output shafts are mounted directly in line.

The framework for the mechanism consists of two $3'' \times 1\frac{1}{2}''$ Flat Plates connected by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate 1 and a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. One of the Flat Plates is spaced from the Flanged Plate and Double Angle Strip by two Washers on each bolt. The input shaft 2 carries a $\frac{1}{2}''$ Pinion, a Worm Gear and a 1" Gear, but it projects only half-way into the boss of the 1" Gear. The remaining portion of the boss of this Gear supports the inner end of the output shaft 3, which is mounted in a Double Arm Crank bolted to one of the Flat Plates and carries a 50-tooth Gear in the position indicated. An idler $\frac{1}{2}''$ Pinion, free to turn on a $\frac{3}{4}''$ Bolt, is in constant mesh with the $\frac{1}{2}''$ Pinion on the input shaft. The $\frac{3}{4}''$ Bolt is held by two nuts in one of the Flat Plates.

The sliding shaft 4 carries a $\frac{1}{2}''$ Pinion, a Collar, a Washer, a 1" Gear and a $\frac{3}{4}''$ Pinion. The $\frac{3}{4}''$ Pinion must remain in mesh with the 50-tooth Gear irrespective of the position of the sliding shaft.

The Worm Gear drives a 57-tooth Gear that is mounted freely on a Threaded Pin attached to the Flanged Plate. The Gear is spaced by six Washers on the Threaded Pin, and a Fishplate is fixed tightly to the Gear by a $\frac{3}{8}''$ Bolt, with a Washer and a nut to space the Fishplate from the Gear. A $\frac{1}{2}''$ Bolt is fixed by a nut in the Fishplate, and is arranged so that it is slightly inside the circle formed by the holes in the Gear. Two Washers and a Short Coupling are placed on the Bolt and a $2\frac{1}{2}''$ Rod 5 is fixed in the Short Coupling. The Rod slides freely in the centre hole of a Coupling 6, which is free to turn on a $1\frac{1}{2}''$ Rod held in a Crank 7 bolted to the Flanged Plate. A $\frac{3}{4}''$ Bolt held by a nut in the Coupling 6 engages between

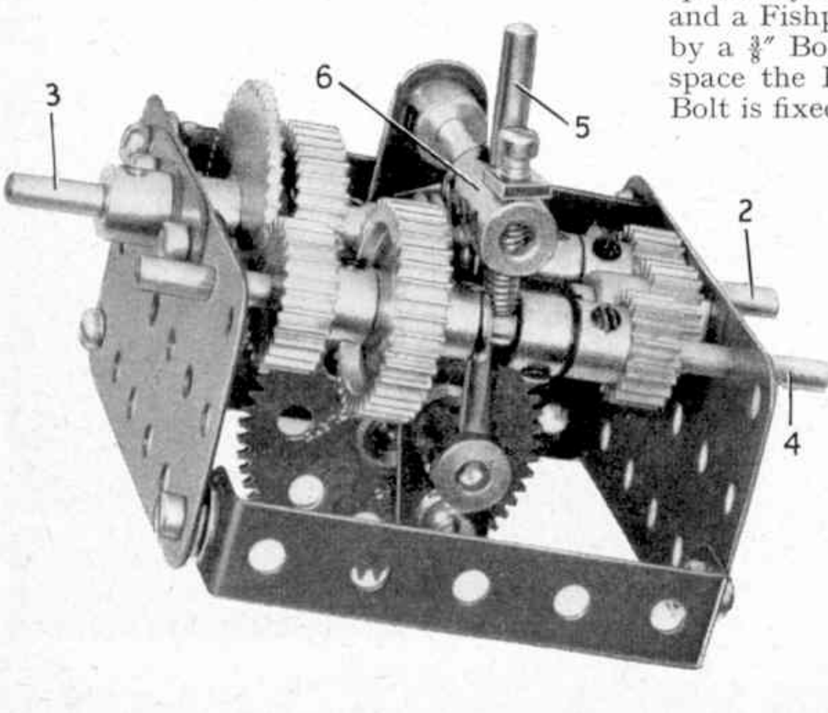


Fig. 2. Another view of the Automatic Reversing Mechanism.

the Collar and the Washer on the sliding shaft 4.

Torsion Bar Suspension for Vehicles

Practically all modern cars are now fitted with independent front wheel suspension. This system allows one road wheel to be deflected by irregularities of the road surface without affecting the other wheel. The general use of independent suspension has resulted in almost complete disappearance from the fronts of modern cars of the once familiar axle beams and leaf springs, and their replacement by coil springs or torsion bars. Coil spring suspension units have been described in the *Meccano Magazine* from time to time, and their construction is quite simple. The torsion bar system is rather more difficult, however, as this arrangement depends for its springing effect on the resistance to twisting set up in a steel bar. Therefore, in response to many requests, I am illustrating in Figs. 3 and 4 a method of constructing such a unit that was sent to me some time ago by W. A. Johnstone, of Liverpool.

An 8″ Screwed Rod 1 is fixed firmly to each side of the chassis by two Threaded Bosses 2, which are attached to the chassis by Bolts spaced by Washers. The Rod must be held tight enough to prevent it from turning.

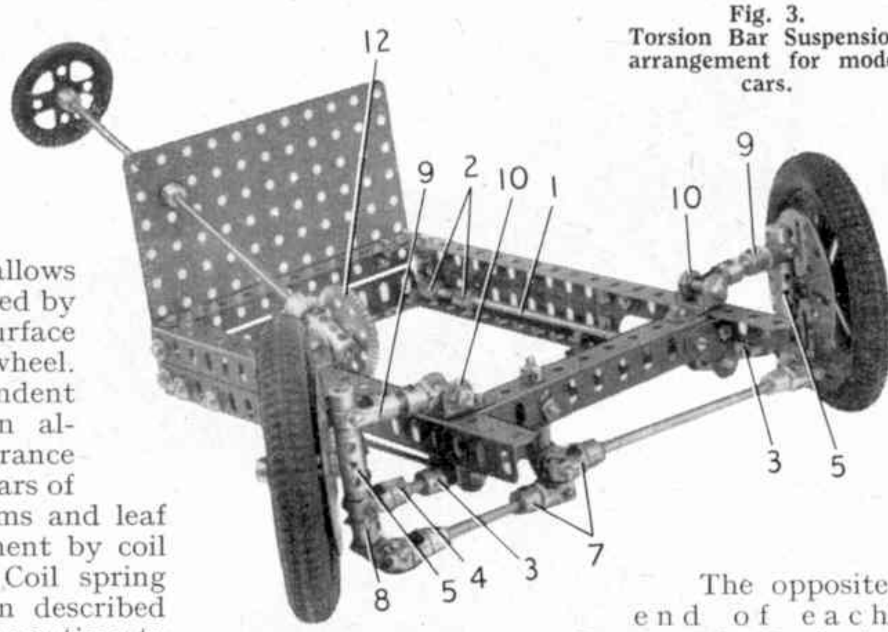


Fig. 3. Torsion Bar Suspension arrangement for model cars.

The opposite end of each Screwed Rod is mounted in two 1″ Corner Brackets and carries a Coupling 3. The Coupling is also fixed on the Screwed Rod by nuts, and it carries a 1″ Rod fitted with a Swivel Bearing 4. A second 1″ Rod fixed in a Coupling 5 is free to turn in the "spider" of the Swivel Bearing, and is fitted with a Crank 8. The Coupling 5 carries also a further 1″ Rod that is free to turn in the "spider" of a Swivel Bearing 9. The Rod is held in position by a Collar, and the Swivel Bearing is connected by a 1″ Rod and a small Fork Piece to a Double Bracket 10. The stub axles are $1\frac{1}{2}''$ Rods fixed in the Coupling 5. The links on each side are braced by radius Rods 11.

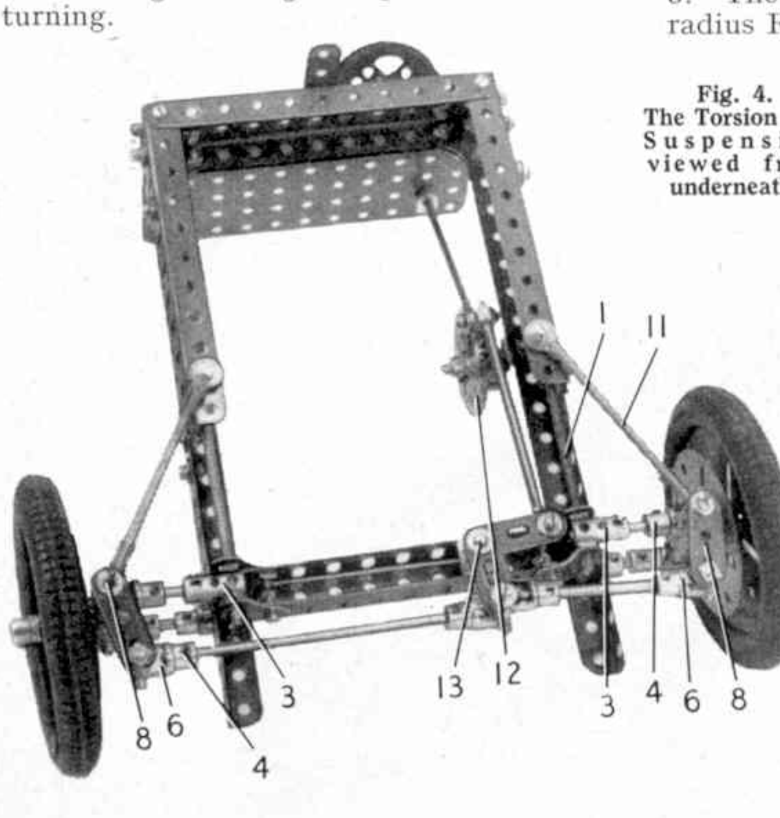


Fig. 4. The Torsion Bar Suspension viewed from underneath.

Movement of the road wheel is controlled by a drop arm consisting of a Fishplate bolted to a $1\frac{1}{2}''$ Bevel Gear 12. The Fishplate is connected by a Rod and Collars to one arm of a Bell Crank with boss 13. The other arm is linked to the Cranks 8 by Rods and Swivel Bearings 6 and 7.

Invitation to Model-Builders

Many model-builders during the course of their experiments design and develop novel mechanisms of one kind or another. Probably you have had some success in this direction. If so, why not send me details of your mechanism so that I can include it, if suitable, in a future *Among the Model-Builders?* All contributions used will be paid for at our usual rates.

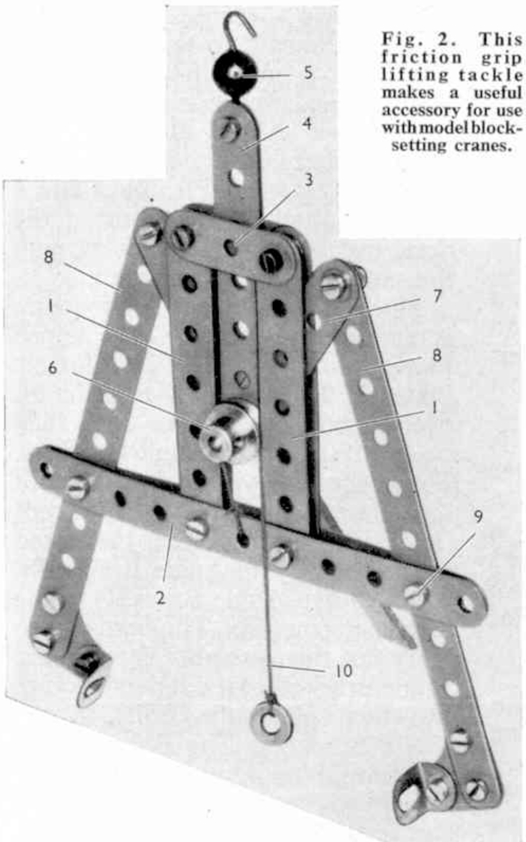


Fig. 2. This friction grip lifting tackle makes a useful accessory for use with model block-setting cranes.

Upon pulling the cord, the jaws of the grip are opened so that they fall on either side of the block that is to be raised; it is then released and the pull of the hoisting cord attached to the Hook 5 acts through the levers 7 and 8 and causes the jaws of the grip to close very tightly on the block. The actual dimensions of the blocks that may be picked up are confined within certain limits, but these limits may be varied to some extent by moving the pivots of the $5\frac{1}{2}''$ Strips 8 to some other position in the transverse Strips 2.

AN AUTOMATIC REVERSING MECHANISM

The device shown in Fig. 3 will be found extremely useful in models used for display and exhibition. It enables models such as Pit Head Gears and Elevators to operate for considerable periods without any attention, as the reversing of the winding drum controlling the hoisting and lowering of the cage is carried out automatically.

The Rod 1 is driven by the Motor, and is fitted with a $\frac{1}{2}''$ Pinion 2, a Worm Gear and a $1''$ Gear. The Rod 3 is free to slide in its bearings, and it carries a $\frac{1}{2}'' \times \frac{1}{2}''$ Pinion and a $\frac{1}{2}'' \times \frac{1}{4}''$ Pinion and a $1''$ Gear fitted at each end of a Socket Coupling. A third $\frac{1}{2}''$ Pinion 4 is loose on a $\frac{3}{4}''$ Bolt secured to the side Plate of the mechanism.

The Worm on the Rod 1 meshes with a 57-teeth Gear locked on a short Rod 5. This Rod is journalled in two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. A Coupling is secured by its centre hole to the upper end of this Rod.

The required gears are selected by a simple mechanism that consists of a $2\frac{1}{2}''$ Strip passed through a Slide Piece that is free to turn in the centre hole of a Double Angle Strip. One end of the $2\frac{1}{2}''$ Strip carries a small Fork Piece and the other end is pivotally attached to the Coupling on the Rod 5. A Coupling is secured in the jaws of the Fork Piece by a $\frac{1}{2}''$ Bolt, and two $1''$ Rods held in this Coupling engage the groove on the Socket Coupling on the Rod 3.

The drive to the winding drum is taken from the $\frac{1}{2}'' \times \frac{1}{2}''$ Pinion on the Rod 3 to a $2\frac{1}{2}''$ Gear on the winding shaft.

Before a model is set in motion care should be taken to ensure that there is no excessive play in the selector mechanism and that the positions of the gears on Rod 3 allow a brief period in neutral, otherwise the mechanism will be jammed.

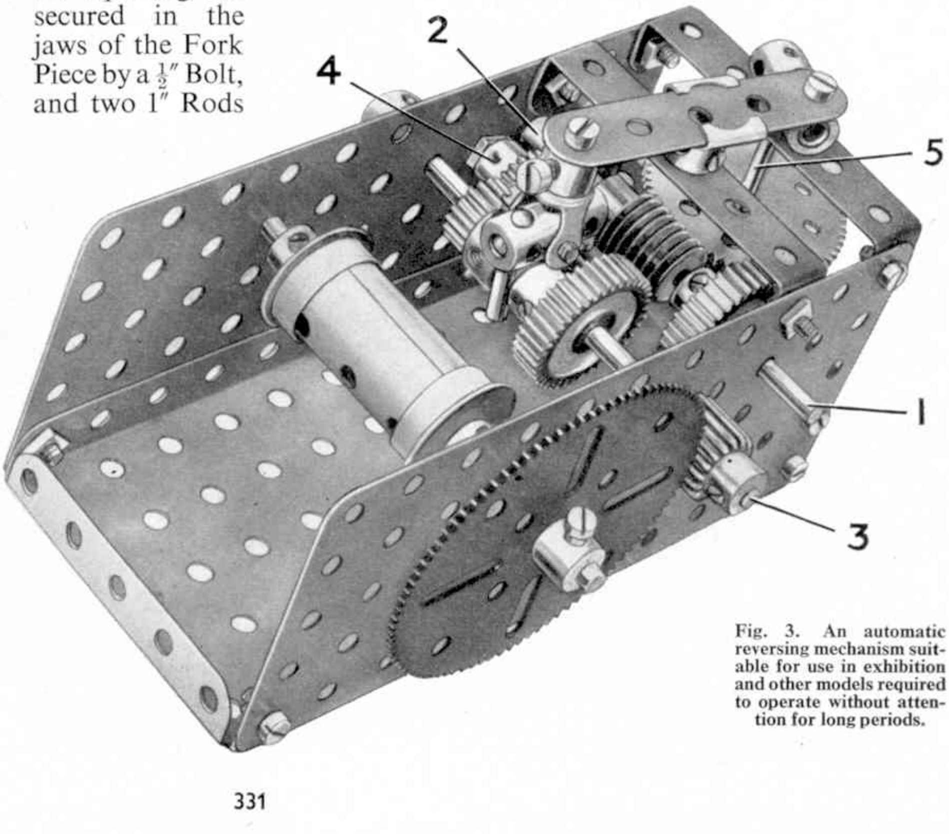
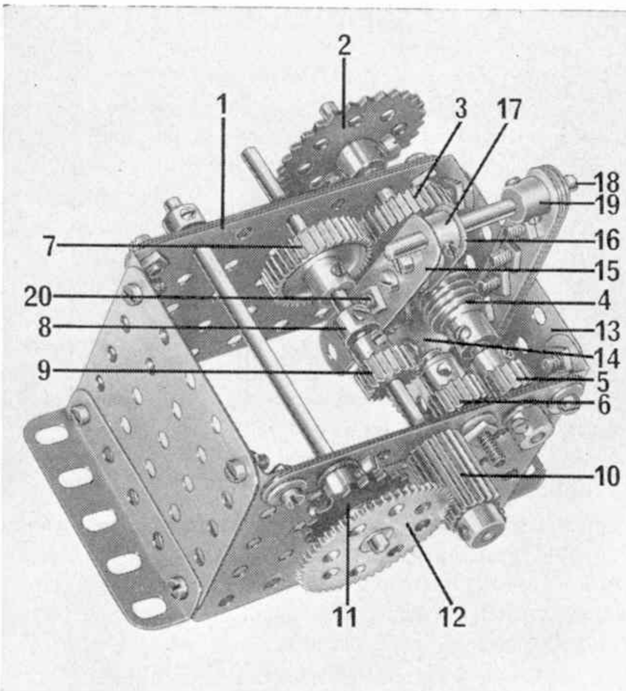


Fig. 3. An automatic reversing mechanism suitable for use in exhibition and other models required to operate without attention for long periods.

by **Spanner**

Wedding cake on the move



The Meccano automatic forward and reverse gearbox.

MECCANO HAS many uses over and above its primary function as a miniature-engineering hobby, but only recently did I hear of one really imaginative use to which an enterprising businessman in Kingsbridge, Devon has put it.

Mr. F. R. Turner runs a confectionery business in Kingsbridge, and, as an attraction, features animated displays in his shop window. Not only does he himself build machinery, mainly from Meccano, to operate the display, but he also makes out of sugar and chocolate, the actual moving figures and objects which appear in the displays. For example, his last Christmas 'show' consisted of a large, imitation iced cake with a revolving stage inside. This stage was partitioned in five sections with a different scene portrayed in each. Doors in the side of the cake opened when a button was pushed, automatically switching on the stage lighting as they did so. At the same time, the stage began to revolve slowly, and this continued until the doors automatically closed at the end of the cycle.

Forward and reverse gearbox

Moving on to the illustration on this page, here you see a very useful Automatic Forward and Reverse Gearbox, which is constructed as follows:—

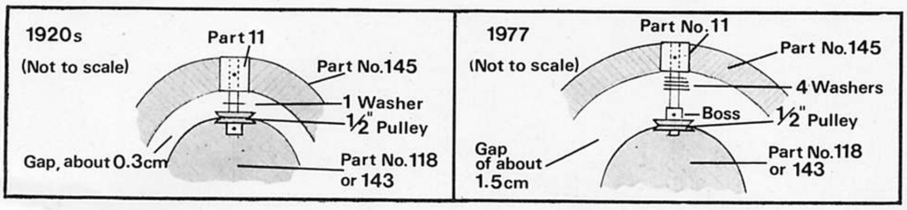
A casing is built up from two 3½ in by 2½ in Flanged Plates connected by two 2½ in by 2½ in Flat Plates, the upper edge of each Flanged Plate having two 3½ in Strips 1 bolted to it. The input shaft is a 4 in Rod, fitted with a 1½ in Sprocket Wheel 2, a Gear 3, a Worm 4 and a ½ in Pinion 5, all fixed tightly to the Rod. In mesh with Pinion 5 is another ½ in Pinion 6 on a 1½ in Bolt held in the Flanged Plate by nuts. This Pinion is free to turn on the Bolt.

The layshaft is a 4½ in Rod which carries a 1 in Gear 7, a Collar 8 and yet another ½ in Pinion 9, between the Flanged Plates, and a ½ in Pinion with ¾ in face 10 outside the Plates. The gears are so placed that when Pinion 9 is fully in mesh with Pinion 6, the gears 3 and 7 are out of mesh. When the shaft is moved to the left, there must be a very short neutral, where neither the Pinions 6 and 9 nor the Gears 3 and 7 are in mesh, before the two latter gears come into mesh.

A second 4 in Rod forms the output shaft and this carries a ¾ in Sprocket Wheel 11 and a 57-teeth Gear 12, both outside the Flanged Plates. No matter how far the layshaft moves, this Gear must be in constant mesh with ½ in Pinion 10.

To the inside of Flat Plate 13 a Double Arm Crank is fixed in such a way that its boss is in line with the centre hole of the Plate. The bolts which hold the Crank in position also hold two 1½ in Strips in place on the outside of the Plate. A 1½ in Rod is journalled in the boss of the Crank by two Washers, and is held in place at its other end by a Collar. The Gear is meshed with the Worm on the input shaft. A Sleeve Piece is pivotally connected to Gear 14 by a ⅜ in Bolt which passes through one of the holes in the Gear and is held in the boss of the Sleeve Piece by a Grub Screw.

A 3½ in Strip 15, held in the Sleeve Piece, is connected to a 1½ in Strip 16 by ⅜ in Bolts, but is spaced from it by Collars. Another Collar 17 is held between the Strips and the whole arrangement is slipped on to a 2 in Rod 18. Collar 17 is fixed to the Rod. Four 2½ in Strips, to which a Crank 19 is bolted, are attached to Flat Plate 13 by ⅜ in Bolts and Rod 18 is fixed in the boss of this Crank. Finally, a ⅜ in Bolt is held in the centre hole of 3½ in Strip 15 by nuts, so that its head is located between the boss of Gear 7 and the Collar 8. This is instrumental in changing gear.



Sketches illustrating the result of a change in design of Part No. 145. See "Part Modification".

ago by Mike Nicholls, is now unfortunately out of print, but the Meccanoman's Club publication "The Development of the Meccano System", and its Supplement, currently available from M.W. Models in Henley-on-Thames, is a good reference work for identifying obsolete parts – amongst many other things, of course! I have also heard a whisper that a much-improved replacement for the Meccano Parts Handbook is currently in the course of preparation and will be published some time in the future. Watch M.W. Model's future advertisements for details.

AUTOMATIC REVERSING GEARBOX

Despite the danger of being accused of editorial favouritism, I am again moved to featured the work of Mr. Dave Penney of New Whittington, Chesterfield. Dave writes to say that, although many automatic reversing gearboxes have been included in the MM in the past, they have all had one fault which makes them unsuitable for constant-running models that have a set pattern of movements to perform: namely, the respective number of forward and reverse revolutions has never been absolutely precise. There has always tended to be some discrepancy, even if only part of a revolution caused by different gear wheel teeth engaging on different runs.

"The problem is to engage and disengage the same pair of teeth each time the direction is changed" writes Dave, "and in my gearbox I have achieved this by making up 'gears' with only one tooth so that it is impossible for the teeth to be engaged incorrectly. Each gear consists of two sections, one built up from a Short Coupling which is screwed onto the threaded end of a Rod Socket where it is locked in position with a Grub Screw in the same bore. A Short Pivot Rod, Electrical Part No. 550, is fixed in the opposite transverse smooth bore of the Coupling. The other section consists simply of a 1" Bush Wheel, to the face of which an Angle Bracket is fixed by its shorter lug. If the two sections are mounted on separate Rods in line with each other, then the Pivot Rod engages with the long lug of the Angle Bracket to act as single-teeth gearing."

In the case of the gearbox itself, the side frames are produced from two 5½" x 2½" flat plates to which two 2½" x 2½" Flat Plates are attached by 2½" Angle Girders to form a box section at one end. At the other end, two 2½" x 1½" Flanged Plates, with two 2" Flat Girders extending the flanges one hole downwards, are bolted to the 5½" Flat Plates, the 2½" x 1½" Flanged Plates being spaced one hole apart to form the bearings for the output shaft. This is a 3" Rod A to which is fastened a Worm which meshes with a ½" x ¼" Pinion on Rod C. From Rod C, the drive is passed to Rod D by a 50-teeth Gear Wheel meshing with a ¾" x ½" Pinion on Rod D. Mounted on the outer end of Rod D is a second Worm which meshes with a ½" x ¾" Pinion on Rod G. This Rod carries two Cams and is supported in two Trunnions which are spaced from the gearbox by two Washers."

"A second drive from Rod A is taken through a 57-teeth Gear to a ½" x ¼" Pinion on a 3" Rod B which also carries a Worm. This Worm is in constant mesh with two ¾" x ½" Pinions on Rods E and F which are themselves held in continuous contact with the Cams on Rod G by the action of Compression Springs positioned between the Pinions and the nearby Flat Plate of the gearbox framework. As the Cams revolve, Rods E and F are pushed down to engage with the Gears on the output shafts, the Springs bringing the Rods out of gear as the peak of the Cam is passed."

"It will be seen that by turning Rod A, the drive is passed to Rods E, F and G. As G rotates, Rod E moves down and so brings the point of the Short Pivot Rod into contact with the Angle Bracket bolted to the 1" Bush Wheel. The drive out of the gearbox will continue to run only for as long as the Cam holds Rod E in gear. As the Cam turns and reaches its peak, the Spring will bring the Rod out of gear and so the drive will stop. As the Cams are set in opposition to each other, Rod S will now start to move into gear with the output shaft and reverse the drive for the same amount of turns. Thus a precise number of revolutions is achieved."

PART MODIFICATION

Finally, with this issue, I close with another piece of historical information. Michael Stoodley of Palmerston North, New Zealand, writes: "I have a query to make with regard to the size/diameter of part No. 145, the Circular Strip. In the original Supermodel (1920's) of the Meccano Steam Shovel, this part is used in conjunction with No. 118 (or 143) as a "spider" with four (or eight) ½" Pulleys arranged as in my diagram (see accompanying diagram A). However, now in 1978 I find that Parts 145 and 118 or 143 necessitate arranging the Pulleys as in diagram . What I would like to know is, has Part 145, now 19 cm (7½"), been made wider than it was way back in the 1920–30's?".

Well, Mr. Stoodley, again consulting my copy of the "Meccano Parts Handbook" I see that Part No. 145 Circular Strip was originally 7" in diameter, but the part was modified in the mid-1930's when the diameter was increased to 7½". I must confess that, after all this time, I do not know the *official* company reason for the modification, but I have been discussing the problem with Mr. Geoff Wright of M.W. Models and we feel that the reason would almost certainly have been that, because of the standard Meccano half-inch spacing, it was not possible to bridge the 7" Circular Strip with a standard Strip or similar part to give a hole in the centre of the ring. Also, all Meccano Strips and Girders – the components likely to be used for bridging purposes – have a length terminating at a half-inch distance rather than a round inch distance. Thus, when bridging the Circular Strip, it would either be necessary to use shorter parts bolted together – not always desirable – or have a length of bridging Strip projecting outside the Circular Strip. All in all, in Meccano terms, a 7" diameter circle is not a desirable dimension.

Referring to the Steam Shovel mentioned by Mr. Stoodley, incidentally, it is interesting to note that the Circular Strip illustrated in the original Supermodel Leaflet has already been the subject of some discussion within the Meccano fraternity. A close study of the Leaflet gives the very distinct impression that the Circular Strip used is noticeably *less* even than 7" in diameter. It would appear to be nearer to 6½" or 6¾". Something of a mystery!

Diagrams of an Automatic Reversing Gearbox by Mr. Dave Penney of New Whittington, Chesterfield.