Meccano Suggestions Section

By "Spanner"

(413) Variable Speed Drive (L. Linder, Stockholm)

One of the simplest methods of constructing variable speed gears for use in models is to employ the well-known friction disc principle. A neat unit of this type that will find many uses in Meccano models was built by L. Linder, Stockholm, Sweden, and is shown in Fig. 413. It can be used in the Meccanograph, Model No. 8.22, described in the Manual of Instructions for Outfits Nos. 7 and 8, for varying the speed of the Designing Table while the model is in operation. Alternatively it can be used as a reversing gear by sliding the 1" Pulley across the Face Plate.

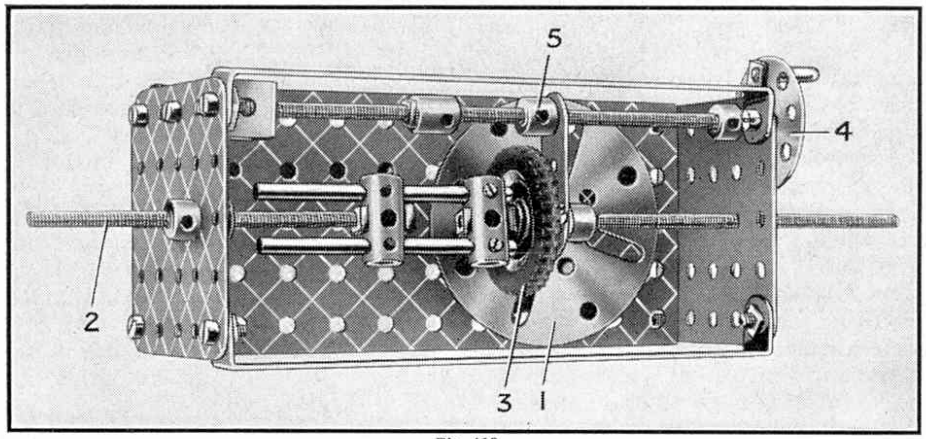

Fig. 413

The mechanism is contained between two 2½"×2½" Flat Plates bolted one at each end of a 5½"×2½" Flanged Plate. The Face Plate 1 forms the friction disc and is coupled to the shaft it is required to drive. The Rod locked in its boss carries a Compression Spring between the Face Plate and Flanged Plate, and serves to hold the former in contact with the 1" Pulley 3 fitted with Rubber Tyre.

The 1" Pulley is fastened on a 5" Screwed Rod, which is lock-nutted in the centre tapped hole of a Coupling. Two 3" Rods are gripped in the end plain bores of this Coupling. The end of a Threaded Crank is slipped on the 5" Screwed Rod, and a Collar keeps it in contact with the boss of the 1" Pulley. The 3" Rods are free to slide in the end plain holes of a second Coupling, which is lock-nutted on the end of a 3½" Screwed Rod that is prevented from moving endways in its bearings by two Collars. The last-mentioned Screwed Rod is connected to the driving unit.

In order to vary the speed of the drive it is necessary to move the 1" Pulley across the surface of the Face Plate, and to facilitate this a 6" Screwed Rod is journalled above the shafts already fitted. The Threaded Crank 5 is screwed on to the Screwed Rod, and a stop formed by a Threaded Boss is held in place by a lock-nut in order to prevent the Rubber Tyre leaving the Face Plate. When the hand-wheel 4, formed by a Bush Wheel fitted with a Threaded Pin, is rotated, the Threaded Crank moves along the Screwed Rod and carries with it the 1" Pulley. A disc of emery cloth can be glued to the Face Plate to provide a good friction surface, but if only a light drive is being transmitted this is not necessary.

When the variable speed drive is incorporated in a model it is not necessary to use the framework shown in Fig. 413. For example, in building it into the Meccanograph mentioned above, the friction disc would be secured on the lower end of the designing table shaft, and the 1" Pulley with Tyre would be coupled to the end of the driving shaft. The controlling mechanism could then be journalled horizontally with the handwheel in an easily accessible position outside the framework of the model.

(414) Positive Front Wheel Steering (W. Lee, Bristol)

There are many different ways of building up steering mechanisms for motor cars and other wheeled vehicles in Meccano. The more usual types are those based on the Ackermann system, whereby all four wheels of the car turn about the same centre. In these systems only one of the front wheels is steered directly from the steering column, the second wheel being connected to the first by tie-rods so that it also is turned. One type of steering gear, however, is so designed that positive steering is obtained for both front wheels. An advantage of this method is that there is little likelihood of faults developing in the mechanism, whereas when only one wheel is positively steered the vehicle may get out of control if anything happens to the connections while it is in motion.

It is not difficult to assemble the two-wheel type of mechanism in Meccano and it is an interesting variation from the steering systems usually employed in models. A Meccano example of the mechanism is shown in detail in Fig. 414.

The front wheels are mounted on stub axles in the usual manner, the king pins being 1½" Rods free to rotate in the bosses of Cranks bolted to the front axle. The stub axles are fixed to the king pins, to the upper ends of which are fastened ½" Pinions as shown. The shaft 1, which is operated by the steering wheel, is journalled in Trunnions and carries a Worm 2 at each end. The Worms mesh with the ½" Pinions on the king pins. When the steering wheel is rotated, the motion is transmitted through the 1½" Contrate to the ¾" Pinion on the shaft 1. The rotation of the Worms then operates the front wheels.

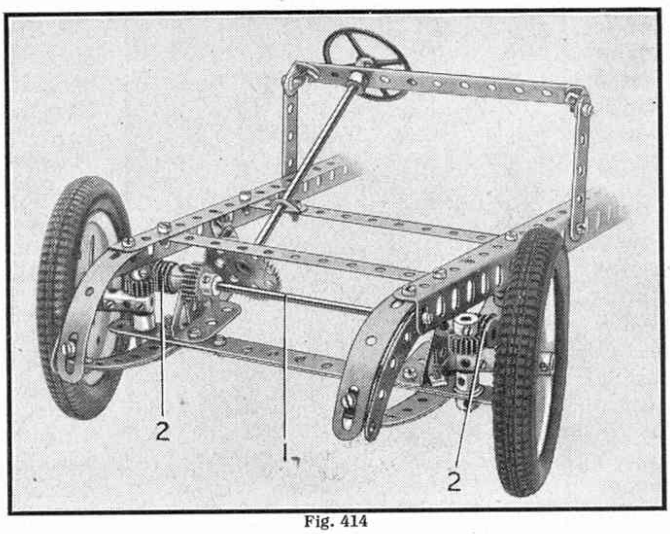

Fig. 414

It will be seen from the illustration that the system is very simple. When once adjusted it needs no further attention.

(415) Free Wheel Clutch

A free wheel movement has been the subject of previous suggestions that have appeared from time to time in the "*M.M.*" This month, however, we are describing a simple free wheel clutch built on rather different lines.

It comprises two 3" pulleys joined together by means of two 2" Screwed Rods. Four nuts on each of the Rods serve to hold the Pulleys in place on the Rods the correct distance apart, which should be such that the two 1⅛" Flanged Wheels may be accommodated in the space between. The Flanged Wheels are bolted together on a 3½" Rod that is free to turn the bosses of the 3" Pulleys.

A short length of Meccano Cord is doubled and wrapped round the Wheels. The free ends are then passed through the loop and secured to one of the Screwed Rods. It will be found that when the 3½" Rod is prevented from rotating it is possible to turn the 3" Pulleys easily in one direction, but in the reverse direction considerably greater effort is required.

(416) A Novel Motion Converter

(K. Keene, Carlisle)

The mechanism shown in Fig. 416 is a novel device for converting reciprocating motion into circular motion, and is the work of K. Keene, Carlisle.

A framework consisting of Angle Girders of various sizes fastened together in the manner shown in Fig. 416 is used to carry the mechanism. The upper Angle Girders carry 5″ Rods, which are locked in Collars carried on bolts, and along them slide 1½″×½″ Double Angle Strips. Angle Brackets are bolted to the last-mentioned parts and they carry between them two 4½″ Strips bent to the shape shown. The ends of the Strips are held by ½″ Bolts and are spaced apart by four Washers. A 3″ Pulley fitted with a Threaded Pin is fastened on a Rod journalled in 4½″ Strips, the Threaded Pin being arranged to engage between the bent 4½″ Strips. It will be seen that when the slide is moved to and fro the 3″ Pulley is made to revolve.

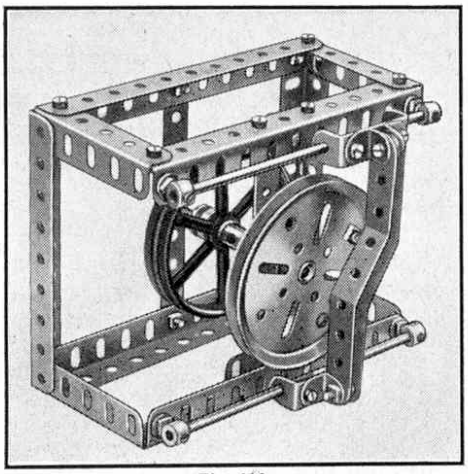

Fig. 416

The device can also be used to convert circular motion into reciprocating motion by using the shaft of the 3″ Pulley as the power input shaft. For instance the slide can be used for operating a table on a model planing machine.

(417) Independent Front Wheel Suspension (W. Burgess, Brentwood)

One of the most interesting points in connection with model motor car construction is the equipment of the chassis with a complete suspension system such as that used on actual cars. The interest lies not only in operating the completed model, but in designing an efficient system in a neat and compact manner. Several types of suspension are in use to-day, and modifications are introduced each year, so that a model-builder need never lack opportunities for experiment.

Various types of suspension systems have been described in *"Suggestions Section"* on previous occasions, and all of them are particularly suitable for use on Meccano car models. Yet another addition to the list is shown in Fig. 417. It is based on the Dubonnet independent front wheel suspension, and was designed by W. Burgess, Brentwood, Essex. A Face Plate 1 carries the mechanism. A Crank 2 is pivotally attached to the Face Plate by means of a Pivot Bolt. A Coupling 3 is then bolted to the Crank by screwing a bolt into one of its end tapped holes, and a 7/32″ Grub Screw into its other tapped hole. A nut is screwed on to the Grub Screw as shown. The Grub Screw grips also a 1″ Rod, which is passed through the end plain bore of the Coupling, and is fitted with two Washers, a second Coupling carrying Rod 4, and a Collar fitted with a Threaded Pin. Rod 4 forms the front axle of the car and the Coupling is free to swivel on the 1″ Rod.

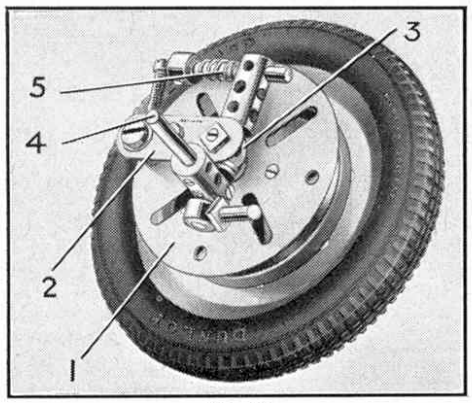

Fig. 417

A further Coupling is fastened to the Face Plate by a 7/32″ Grub Screw and a Bolt, and in its upper hole is a 1½″ Rod carrying a Collar and a Compression Spring 5, the Rod being free to slide to and fro. A ¾″ Bolt, held by a lock-nut in the boss of Crank 2, bears against the Collar on the sliding Rod. The road wheel is free to rotate on its stub axle, which is locked in the boss of the Face Plate. The Threaded Pin is coupled to the tie-rod of the steering mechanism.

It will be seen that when the mechanism is mounted on a chassis the road wheel is free to rise against the pressure of the Compression Spring, the tension of which must be adjusted according to the weight of the model.

A Boiler End is bolted to the 3″ Pulley forming the road wheel, so that a hub brake can be incorporated in the unit if desired. The Boiler End and the Face Plate are spaced apart by means of a Collar and Washers. The Threaded Pin secured in position below the front axle is coupled to the tie-rod of the steering mechanism, but if the steering gear described in Suggestion No. 414 is used, the Threaded Pin is replaced by a ½″ Pinion.

(418) Automatic Reverse for Clockwork Motor (M. Dobson, St. Bees, Cumberland)

An ingenious idea for automatically reversing a No. 1a or No. 2 Clockwork Motor when it is used for driving a model vehicle, is submitted by M. Dobson, St. Bees. It consists of tying one end of a length of cord to the rear axle of the model, and the other end to the reversing lever of the Motor. When the model runs along the ground, the Cord winds around the axle and pulls the reversing lever over. If it is required to operate the model first in one direction and then the other, the second Cord is fastened between the front axle and the reversing lever, so that the latter is pulled alternately in each direction.

The device can also be arranged to work effectively in a demonstration model of a crane, so that the load is alternately raised and lowered.

(419) Delayed Action Release for Camera Shutter (N. Jones, Lincoln)

Owners of cameras that do not incorporate a delayed-action shutter release can build an efficient substitute from Meccano parts that will enable them to include themselves in the pictures they take. An example of such a release is shown in Fig. 419. It was designed by N. Jones, Lincoln. When using the mechanism the camera shutter is first set at the required speed and then the flexible cable is clipped in the Angle Brackets on the side plate of the mechanism. The release mechanism is then set in operation, and after a period of about 15 seconds a rotating cam 3 presses on the cable plunger and releases the shutter.

The mechanism is operated by a *Magic* Motor, to which are bolted two 2½″×2½″ Flat Plates as shown. A ¾″ Contrate is fastened by two grub screws, and a ½″ Pinion 1 fastened on a 1″ Rod is arranged to mesh with it. A bearing for the 1″ Rod is provided by the boss of a Double Arm Crank. A 2″ Rod 2 is then journalled in the Flat Plates and is held in position by Collars. It carries a 1″ Pulley, which is connected by a Driving Band to the boss of the ½″ Pinion as shown. A second Driving Band passes around the 2″ Rod and also around a ½″ Pulley on a 2½″ Rod that carries the cam 3. This cam is formed by fitting a Collar on the Rod and pressing over it a Kemex Stand Clamp (Kemex part No. K.31). A 1″ Rod 4 bears against this cam and is held in a Double Bracket by a Collar and Spring Clip. Two Angle Brackets are now cut away in the manner shown in order to receive the flexible cable.

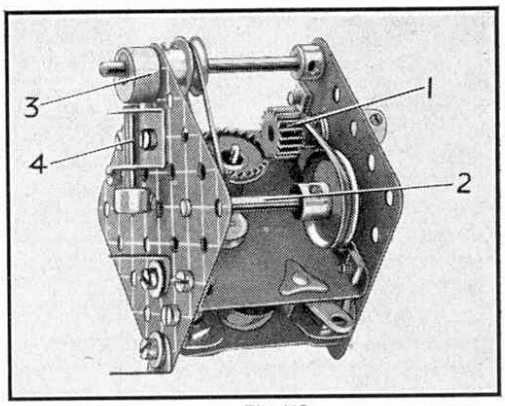

Fig. 419

Care should be taken to remove the cable from the Angle Brackets immediately the shutter has been released. If this is not done the plate will be exposed again when another 15 seconds have elapsed! In order to make absolutely sure that this will not happen, it is a good plan to wind the *Magic* Motor only partially, so that it will not run long enough to release the shutter twice.

Miscellaneous Suggestions

M.205. With Meccano Gears and Pinions almost any gear ratio required in model-building can be obtained. Most of these ratios can be arranged with only one stage of gearing, but there are a few instances, such as a 4 : 1 ratio, that require two or more stages if the standard gears are used. M. Burgess, Dublin, points out that a ratio of 4 : 1 can be obtained in a single stage by using a 1½″ Bevel Gear and a driving pinion from a No. 2 Clockwork Motor. The Bevel Gear has 48 teeth and the pinion has 12 teeth and they give a right angle drive.