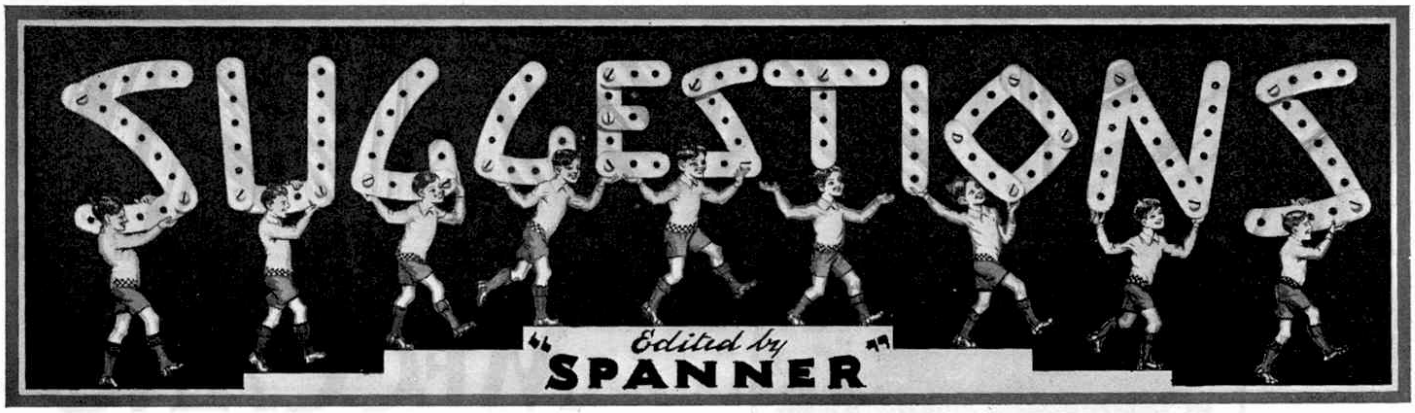

(196)—New Quick-return Motion

(R. Blick, Southland, New Zealand)

In order to speed up production, planing and shaping machines are fitted with quick return mechanisms that enable the return stroke (during which the tool does no useful work) to be accomplished in much less time than the actual cutting stroke.

It is an easy matter to make such a mechanism in Meccano. For example, the Planing Machine (see Special Instruction Leaflet No. 17) contains a simple form of quick-return motion that forms the subject of Standard Mechanism No. 218.

The working principle of the device shown in Fig. 196 is similar to the standard one, but it imparts a rapid reverse motion to a rotating shaft instead of an oscillating table. A very few words should make clear both its construction and operation.

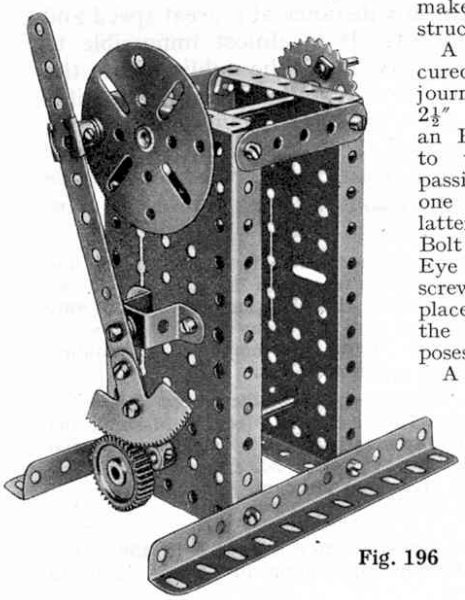

Fig. 196

A Face Plate is secured to a Rod that is journalled in vertical 5½″ × 2½″ Flanged Plates, and an Eye Piece is attached to the Face Plate by passing a ⅜″ Bolt through one of the holes in the latter and securing the Bolt in the boss of the Eye Piece by the Grub-screws. Two Washers are placed on the shank of the Bolt for spacing purposes.

A 5½″ Strip is mounted pivotally on a ⅜″ Bolt that is double-nutted to a Double Bent Strip, and the Eye Piece slides on the longer arm of the lever so formed, whilst the short arm carries a Rack Segment that engages with a 1″ Gear. The latter is secured on a Rod that is journalled in the Flanged Plates and connected by any suitable means to the model that it is intended to operate.

It will be realised that when the device is set in motion the 5½″ Strip moves from side to side at a speed that varies according to the distance of the Eye Piece from the fulcrum of the Strip, and this causes the 1″ Gear to rotate slowly in one direction and rapidly in the reverse.

(197)—A Speed-recording Device

(E. Thomson, St. Leonards, Sussex)

E. Thomson suggests an interesting device by means of which "graphs" showing fluctuation in speed may be obtained easily. It consists of a centrifugal governor, which is built on the lines of that used in the automatic infinitely-variable speed gear described in last month's "*M.M.*," and is driven by means of a Meccano Clockwork Motor. A Strip that is mounted pivotally on a bolt passed through its centre hole, carries at one end a pencil and at the other end a Threaded Pin, which engages with the groove of the Socket Coupling 5 (see Suggestion No. 192). Variations in the speed of the governor cause the Socket Coupling to slide up or down the Rod, thus imparting movement to the Strip carrying the pencil.

The pencil presses lightly against a sheet of paper that is secured round a Boiler (part No. 162) by rubber bands. The Boiler is rotated extremely slowly by an independent Motor through worm reduction gearing, with the result that the pencil draws a line on the paper, and any kinks in the line denote a variation in speed of the Motor driving the governor.

As the speed of the Motor drops owing to the spring unwinding, so will the line commence to curve, and if graph paper be used on the Boiler, interesting time-performance graphs may be obtained of the Motor under varying conditions.

(198)—Novel Electric Engine

Solenoids prove extremely valuable in the construction of Meccano electrical apparatus, just as they do in real electrical machinery. In the "*Meccano Magazine*" for March, 1928, for example, we described an electrically-operated railway signal, the mechanism of which consisted essentially of a solenoid, whilst electrical beam and horizontal engines driven by the same method were dealt with in the "*M.M.*" for September, 1928.

Another very interesting example of the use of the solenoid is provided by the tiny vertical engine illustrated in Fig. 198. This engine, although only 4″ high, runs at a considerable speed and when in operation looks exactly like a steam engine.

A solenoid, as most Meccano boys will know, is actually an electro-magnet with a hollow core, into which iron or mild steel rods are drawn when current flows through the coils of the magnet.

The construction of the model should be commenced by winding a Meccano Bobbin to capacity with No. 26 S.C.C. Wire. The completed solenoid may be covered with brown paper to protect the windings and to enhance its appearance. It is retained in position by 1½″ Flat Girders, which are attached by bolts to 3½″ Strips forming the vertical members of the engine. Each Flat Girder is spaced away from the 3½″ Strip by two 1½″ Strips, and the lower ends of the 3½″ Strips are secured to ½″ × ½″ Angle Brackets 4. The top ends of the Strips are joined together by Double Brackets. The bolts securing the Angle Brackets 4 to the 3½″ × 2½″ Flanged Plate forming the base plate of the model also serve to retain in place a Channel Bearing, which forms the bearing for the crankshaft.

The crankshaft consists of a short Rod, to one end of which a Coupling is attached, while on the other end the flywheel is mounted. The Coupling is connected pivotally by a 1½″ Strip to the plunger sliding in the core of the solenoid. One end of this Strip is mounted loosely on a set-screw inserted in the grub-screw hole of a Collar on the plunger (a 1½″ Rod) and the other end is carried on a bolt held in the Coupling. The flywheel comprises a 2″ Pulley that fits inside a Wheel Flange, the two being bolted together to obtain additional weight.

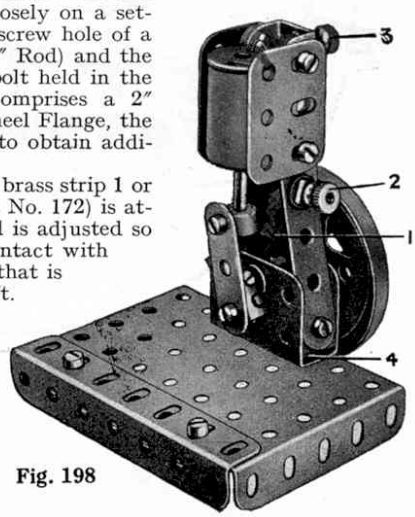

Fig. 198

A short length of springy brass strip 1 or Pendulum Connection (part No. 172) is attached to a Terminal 2 and is adjusted so that its free end makes contact with the grub-screw of a Collar that is secured to the crankshaft. Contact must take place on the commencement of the upward stroke of the plunger. One end of the solenoid is connected to the frame of the model and the other to the insulated Terminal 2. Terminal 3 is "not insulated."