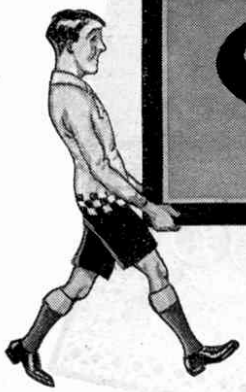

Suggestions Section

Edited by "Spanner"

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."

(208)—Four-Cylinder Electric Engine

(L. Hoydon, York)

In the "Suggestions Section" for June, 1930, we described the construction of a novel electric engine that resembled closely both in operation and appearance a single-cylinder steam engine of the inverted vertical type. Fig. 208 shows a general view, and Fig. 208a a sectional view of an interesting development of this model, in the shape of a four-cylinder engine. The basic principle of both models is the same, but in the case of the one about to be described the employment of four cylinders in line necessitates the use of a four-throw crankshaft and a more complicated form of switchgear. The latter is necessary on account of the fact that each solenoid must be energised at the correct moment when the respective plungers are on the upstroke. The crankshaft, connecting rods, and cylinders are contained in a common casing, which lends to the model an exceptionally neat and business-like appearance.

The engine should prove very handy as a power unit for large Meccano models of single and multi-engine aeroplanes on account of its compact nature. It develops sufficient power to drive a propeller composed of Meccano Propeller Blades, provided that the pitch angle of the latter be made not too great.

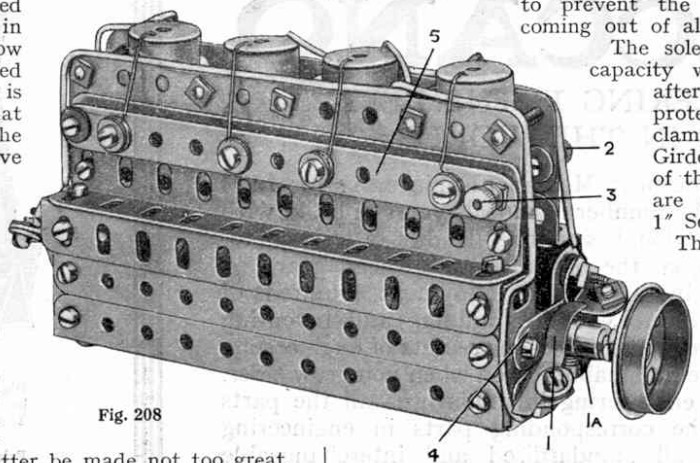

Fig. 208

The base of the crankcase consists of a 5½" Flat Girder to the sides of which are bolted 5½" Angle Girders; and to its ends 1½" Angle Girders are secured. Four 1½" Angle Girders are then secured in a vertical position to the four corners of the crankcase base. Each side portion of the crankcase (one of which is shown detached in Fig. 208a) is composed of two 5½" Flat Girders and two 5½" Angle Girders, the latter being bolted together so that their flanges form a Z. Both sides may be completed, but only one should be secured in place, so that the assembly of the internal mechanism may be accomplished with greater ease.

The crankshaft, as mentioned above, is of the four-throw type, each crank consisting of two Couplings that are secured by their centre holes to the ends of short Rods 9 that form the straight portions of the crankshaft. The crankpins, on which the lower ends of the connecting rods 8 are mounted, each consist of a 1" Screwed Rod that is secured by lock-nuts 10 in the transverse end tapped holes of each pair of Couplings, the upper extremities of the connecting rods being carried on Setscrews inserted in Collars on the ends of the piston rods. The complete crankshaft is journalled in 1½" Strips 4, and care should be taken to see that all Grub Screws and lock-nuts are tightened very securely in order to prevent the possibility of the crankshaft coming out of alignment.

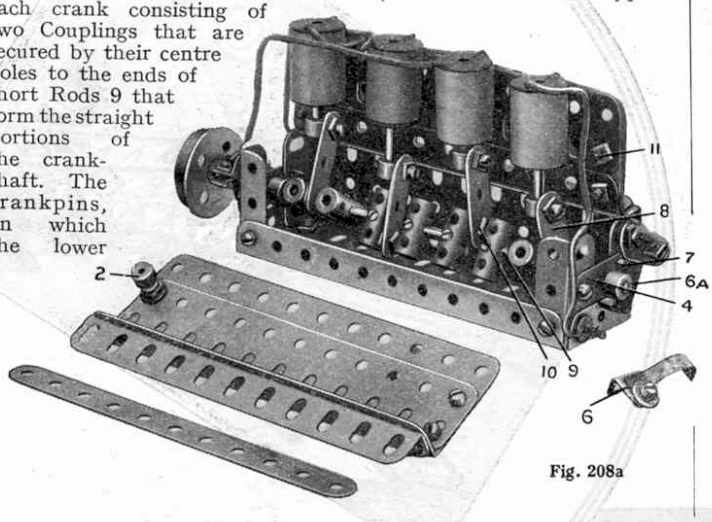

Fig. 208a

The solenoids are wound to their full capacity with No. 26 gauge wire, and after being covered with paper to protect their windings, they are clamped in position between the Flat Girders that form the top portion of the crankcase. The Flat Girders are drawn together by means of 1" Screwed Rods.

The next item to claim our attention is the rotary switchgear. Two similar switches are required, one on each end of the crankshaft; and each takes the form of two brushes (Pendulum Connections, part No. 172) 1, 1a, which are bent carefully to the shapes shown so that they make contact alternately with a Setscrew inserted in a Collar on the crankshaft, as the latter rotates. The brushes are attached rigidly to ½" × ½" Angle Brackets that are secured by 6 B.A. Bolts to the end of the crankcase, and are insulated from it by Insulating Bushes and Washers.

A similar arrangement is followed at the other end of the crankshaft, and from Fig. 208a it will be seen that the brush 6 has been removed in order to show the Setscrew 7.

Electrical Connections of the Model

The brush 1 is connected by rubber-covered wire to the second solenoid, and the brush 1a to the third solenoid (counting from the right-hand end of the model in Fig. 208); and the remaining two solenoids are connected to the brushes 6 and 6a. The other ends of the windings of the solenoids are all connected to a common "busbar" 5, which is composed of a 5½" Strip that is attached to, and insulated from, the Flat Girders by means of 6 B.A. Bolts and Insulated Bushes and Washers. A Terminal 3 is mounted on the shank of one of the 6 B.A. Bolts that serve to secure the busbar in place, and a second terminal 2 is secured in metallic contact with the frame of the model.

The path of the current may be assumed to be from the accumulator to the terminal 3 on the busbar, and from there through the particular solenoid, the switch of which happens to be making contact. The closing of the switch allows the current to pass through the frame of the model to the terminal 2 and to the other pole of the accumulator, thus completing the circuit.

A careful examination of Fig. 208a will reveal the fact that Nuts are used instead of Washers on the shanks of the Set-screws that attach the connecting rods to the piston rods. This is due to the nuts being slightly thicker, thereby taking up the play that would be present were Washers used.

It will readily be realised that as the power of the solenoids is strictly limited, it is of the greatest importance to ensure satisfactory working of the model, that friction be reduced to the lowest by careful adjustments to the moving parts and by judicious lubrication.