2 of No. 25; 1 of No. 27b; 1 of No. 31; 1 of No. 32; 30 of No. 37; 12 of No. 38; 1 of No. 48a; 9 of No. 59; 1 of No. 63; 2 of No. 72; 2 of No. 77; 9″ of No. 94; 2 of No. 96a; 6 of No. 111; 1 of No. 115; 2 of No. 142a; 2 of No. 142b; 2 of No. 147b; 1 of No. 166; 1 Clockwork Motor.

A Simple Model Submarine

The submarine shown in Fig. 3 employs only a few simple parts in its construction, and it will therefore appeal to the owner of a small Outfit.

The hull of the submarine is composed of four 12½″ Strips whose ends are bolted to a 1½″×½″ and a 2½″×½″ Double Strip at the prow and stern respectively. Trunnions are bolted to the side 12½″ Strips, and a bolt passed through their inner extremities secures a ½″ Reversed Angle Bracket and an Angle Bracket. The former is attached to the upper 12½″ Strip while the Angle Bracket is connected by means of a Flat Bracket and a further Angle Bracket to the lower Strip.

The "propeller" is merely two Flat Brackets mounted on a ⅜″ Bolt by means of nuts. To complete the model it is only necessary to attach the "stabiliser fins" and "depth rudders" to the sides of the hull, these consisting of Angle Brackets and Flat Brackets.

The following parts are used in the model Submarine: 4 of No. 1; 5 of No. 10; 2 of No. 11; 8 of No. 12; 2 of No. 17; 3 of No. 22; 1 of No. 24; 2 of No. 35; 25 of No. 37; 2 of No. 37a; 1 of No. 47; 1 of No. 48; 1 of No. 111c; 2 of No. 125.

Twin-Engined Flying Boat

One of the most interesting of the many types of modern aircraft is the flying boat. Strangely enough this type of craft has received comparatively little attention from model-builders and the example of a twin-engined flying boat shown in Fig. 4 should therefore be of particular interest.

The hull of this fine model is built up from Angle Girders and Curved Strips, the arrangement of these being shown clearly in the illustration. The Flat Plates of the main plane are secured to a composite girder, which consists of one 12½″ Angle Girder extended at each end by 9½″ Girders and is bolted along the leading edge of the plane with the projecting flange toward the tail of the model. A 2½″ Angle Girder is bolted to the centre of the girder so formed and is secured, in turn, across the fuselage. The wings are held rigid by the ¾″ Bolt 1, which is passed through the 12½″ Strip in the centre of the fuselage but is spaced therefrom by a Collar.

The Electric Motor is fixed to the lower pair of Angle Girders of the fuselage. The armature spindle of the Motor carries a ½″ Pinion meshing with a 57-teeth Gear on the 2½″ Rod 2, which also carries a ¾″ Contrate Wheel that engages with a Pinion on the Rod on which the 1½″ Pulley 3 is mounted. Bearings for the Rod are formed by a 1½″ Strip and Double Bent Strip which are bolted by Angle Brackets to the side plates of the Motor.

An endless length of cord passes around the 1″ fast Pulley of each engine nacelle and the groove of the Pulley 3, so that when the Electric Motor is set in motion the propellers are rotated rapidly.

In the construction of the Flying Boat the following parts are necessary: 3 of No. 1; 20 of No. 2; 2 of No. 2a; 5 of No. 3; 4 of No. 4; 6 of No. 5; 2 of No. 6; 5 of No. 6a; 5 of No. 8; 4 of No. 8a; 4 of No. 9; 1 of No. 9d; 2 of No. 10; 8 of No. 11; 8 of No. 12; 2 of No. 15a; 2 of No. 16a; 1 of No. 21; 2 of No. 22; 1 of No. 26; 1 of No. 27a; 1 of No. 29; 154 of No. 37; 5 of No. 37a; 12 of No. 38; 1 of No. 45; 2 of No. 46; 1 of No. 48, 4 of No. 52a; 2 of No. 53a; 5 of No. 59; 2 of No. 62b; 4 of No. 90; 2 of No. 90a; 4 of No. 103f; 3 of No. 111; 2 of No. 111c; 1 Electric Motor.

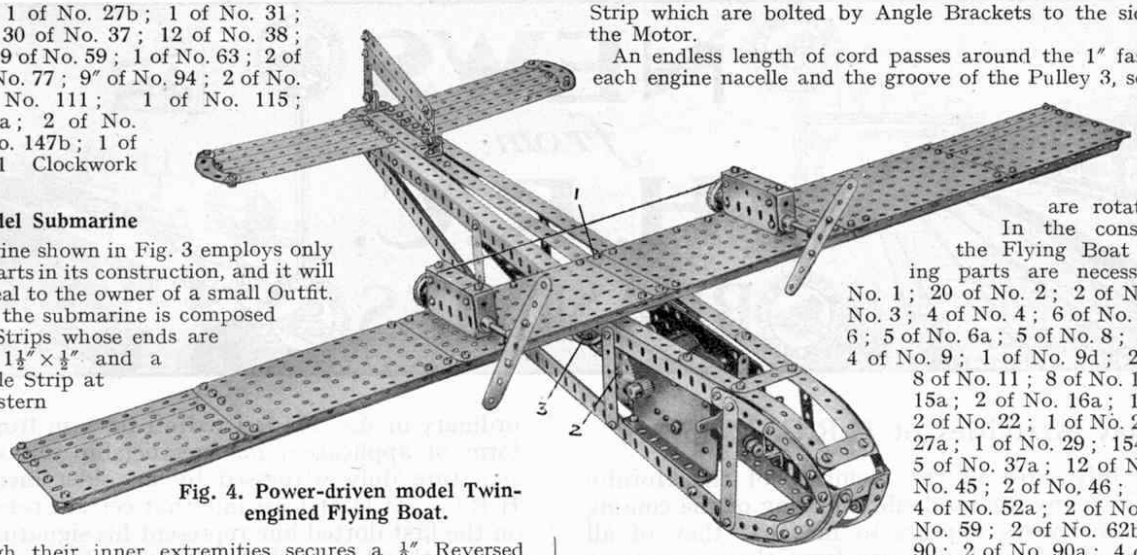

Fig. 4. Power-driven model Twin-engined Flying Boat.

Motor Breakdown Crane

The term "breakdown crane" generally is associated with a massive steam driven machine capable of lifting railway engines, but this monster of the railways now has its counterpart on the road in the form of a motor lorry fitted with a crane, the model shown in Fig. 6 being typical of a vehicle of this type.

The superstructure of the lorry (see Fig. 6) is quite simple and calls for no special comment. The chassis frame consists essentially of two 12½″ Angle Girders spaced apart at their ends by 3½″ Strips. A 5½″×2½″ Flanged Plate is secured to the rear of the frame by means of Angle Brackets and serves as a platform upon which the crane swivels.

The arrangement of the steering gear and front axle can be followed from Fig. 5, which shows the underside of the lorry. The bearings for the steering column 1 are formed by a Flat Bracket and a Coupling 2. A 2½″ Rod passes through the centre transverse hole of the latter and carries a 1½″ Contrate Wheel that is spaced by means of three Washers from the Coupling. The teeth of the Contrate are engaged by a ½″ Pinion on the Rod 1. The Crank 3 also is secured to this Rod and carries a Flat Bracket bolted so that its round hole is over the elongated perforation of the Crank, and a bolt is passed through both Crank and Flat Bracket and then screwed into the tapped bore of a Collar on a 2″ Rod. This Rod is attached pivotally to the inner end of one of the stub axles by means of a Swivel Bearing.

The front road wheels rotate freely on the 1½″ Rods forming the stub axles, and are held in position by Collars. The 1½″ Rods are secured in Couplings 4 which are pivoted by means of ⅜″

Continued on page 580

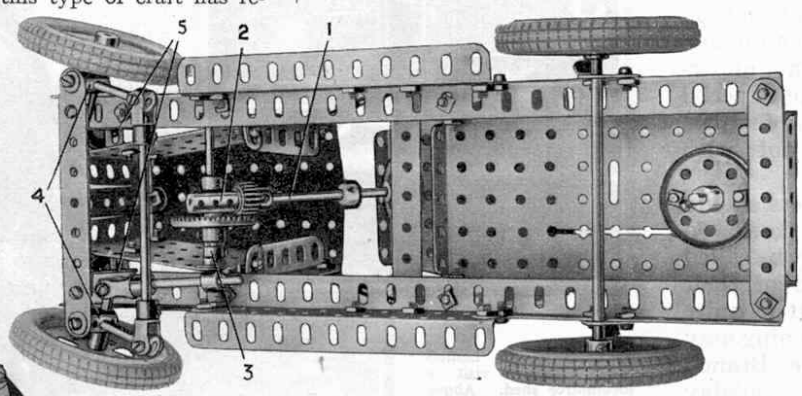

Fig. 5. View of underside of Motor Breakdown Crane, showing the Steering Gear assembly.

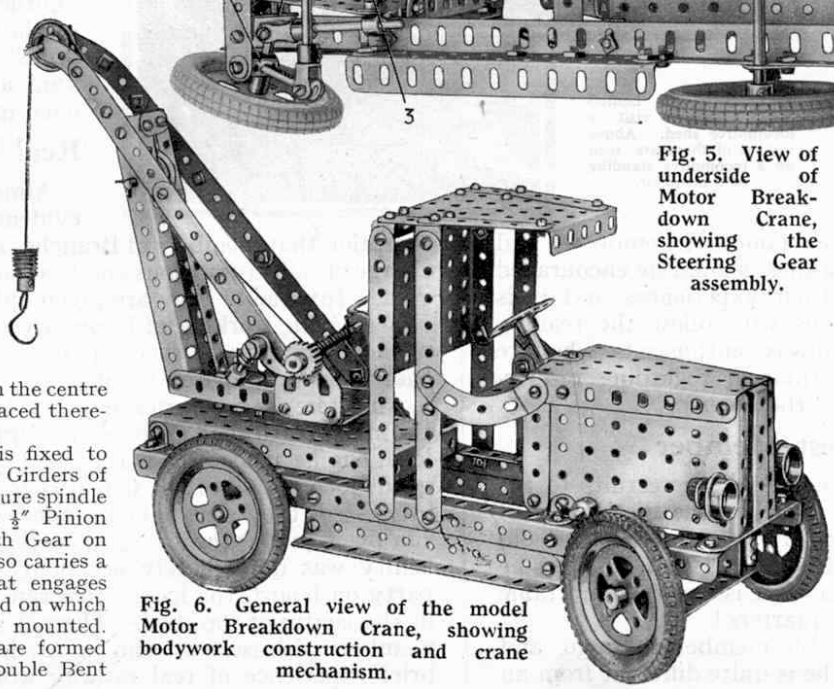

Fig. 6. General view of the model Motor Breakdown Crane, showing bodywork construction and crane mechanism.

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Warehouse with Elevators—

(*Continued from page 553*)

be varied considerably by altering the length of the rotating arms—adding to the length to increase the travel and vice versa—or by using additional Pulleys.

In the model, as in an actual lift, means are provided by which it is possible to start or stop the Motor and thus control the movement of the cages from any of the landing floors. This is accomplished by means of the control handles 10 (Fig. 2, see last month's article) which are secured to the Rod 9. A slight movement of any one of these handles either stops or starts the Electric Motor according to the direction in which the handle is turned. Threaded Pins 10 screwed into Collars form the handles.

The Rod 9 consists of two 11½" and one 5½" Rods connected together by means of Couplings. At its lower end it is journalled in a Double Arm Crank that is bolted to one of the transverse Angle Girders in the base as shown in Fig. 2. The Rod 9 extends from top to bottom of the Warehouse and is connected at its upper end with the Motor switch in the following manner.

The upper end of the Rod is journalled in a 1½" Strip bolted to the Angle Girder 47a (Fig. 5) and is held in position by means of a Collar placed on the Rod against the face of the Strip. A Crank 46 secured to the end of the Rod is connected pivotally to one end of a 4½" Strip 45 and the other end of this Strip is attached to an Angle Bracket that, in turn, is pivoted to the central arm of the Motor switch. It will readily be seen that movement of the control Rod is transmitted via the Crank 46 and Strip 45 to the Motor switch, with the result that the Motor may be either started, stopped or reversed as desired.

After the mechanism has been adjusted finally the roof may be placed in position and bolted to the Angle Girders 14.

Complete instructions for building the Meccano model Warehouse with Elevators are contained in Special Instruction Leaflet No. 31. Each unit of the Warehouse structure and elevator gear is described clearly, and the construction is further simplified by the inclusion of a number of half-tone illustrations of the various portions of the model. The leaflet may be obtained from any Meccano dealer, price 3d., or direct from Meccano Ltd., Old Swan, Liverpool, price 3d. post free. Remember to ask for Leaflet No. 31.

Flashlight Photographic Contest

Those of our readers who took part will be interested to see the results of Messrs. Johnson's Flashlight Photographic Competition that closed on 30th April:

First Prize, D. Allen (Leamington Spa); Second Prize, W. A. Wallis (Lenton, Nottingham). Six Prizes each of 10/6: H. Taylor (Chelmsford); E. J. Bull (London, S.E.16); H. W. Hillier (Maidstone); R. W. Barnes (Ilkeston); J. S. Spence (Edinburgh); G. C. Backhouse (Harehills, Leeds). Six Consolation Prizes: L. Mitchell (Sunderland); E. Mooney (Burton-on-Trent); R. L. Plowman (Enfield); A. E. Harding (Leek); C. Newberry (Hornsey, N.8); Miss A. Darbyshire (Leeds).

Messrs. Johnson have two Daylight Paper Competitions running now, to close respectively on 31st July and 31st October. Any subject is eligible for the July competition but entries for the October competition must be Holiday snapshots.

A leaflet giving full details of the arrangements and prizes to be won will be forwarded, post free, to any reader who applies, mentioning the "*M.M.*," to Johnson & Sons (Manufacturing Chemists) Ltd., Hendon Way, Hendon, London, N.W.4.

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New Meccano Models—(*Continued from page 559*)

Bolts to the extremities of two 4½" Strips that are bolted together face to face to form the front axle. Two 1½" × ½" Double Angle Strips 5 secure the 4½" Strips to the side Girders of the model.

The constructional details of the crane proper will be made clear from the general view of the model (Fig. 6). The load is raised or lowered by turning a Crank Handle that is journalled in Flat Trunnions which, in turn, are bolted to the flanges of the Sector Plate that forms the base of the crane. The load is prevented from falling when the handle is released by means of a Pawl engaging a Ratchet Wheel mounted on the end of the Crank Handle; a Collar secured on the shanks of a Threaded Pin that is screwed into the boss of the Pawl, acts as a weight and keeps that Pawl in engagement with the teeth of the Ratchet Wheel.

The parts required to build the Breakdown Crane are as follows:—8 of No. 2; 2 of No. 2a; 2 of No. 3; 4 of No. 5; 2 of No. 6a; 2 of No. 8; 4 of No. 9; 7 of No. 10; 10 of No. 12; 1 of No. 15; 3 of No. 16; 3 of No. 17; 4 of No. 18a; 1 of No. 19s; 4 of No. 20a; 2 of No. 20b; 1 of No. 21; 1 of No. 22; 2 of No. 22a; 2 of No. 24; 1 of No. 26; 1 of No. 28; 1 of No. 32; 8 of No. 35; 94 of No. 37; 7 of No. 38; 2 of No. 48; 1 of No. 48a; 3 of No. 48b; 1 of No. 52; 4 of No. 53; 2 of No. 54; 1 of No. 57; 10 of No. 59; 1 of No. 62; 3 of No. 63; 2 of No. 77; 2 of No. 90; 2 of No. 90a; 4 of No. 111c; 1 of No. 115; 1 of No. 116a; 2 of No. 126a; 4 of No. 142a; 1 of No. 147a; 1 of No. 147b; 1 of No. 148; 2 of No. 165.

Famous Inventions—(*Continued from page 527*)

composition of clays. He was not in any sense an expert chemist, but he had acquired a considerable chemical knowledge as a result of incessant experiments. One of his favourite expressions was "everything yields to experiment," and he repeatedly proved the truth of his words.

About the year 1790 he began a gradual retirement from business. His health at that time was not good, and it slowly became worse. Towards the end of 1794 he became seriously ill, and died on 3rd January of the following year at the age of 64.

Wedgwood was a great man in the true sense of the word. The manner in which he worked his way from apprentice to master potter proves that he was possessed of ambition and tremendous energy. He was a great business man, but his aim in life was to achieve success in his work rather than to amass money. He started out with high ideals and never lost them; and nothing would ever induce him to produce work of inferior quality for the sake of a bigger profit. He has been well described as a man of "great heart, great mind, and great purpose."

It is interesting to note that the Wedgwood factory still remains at Etruria and is carried on by direct descendants of its founder. Its history has been singularly peaceful and prosperous, and in the 160 years of its existence there has never been a strike. Among its 900 employees there are very many whose fathers, grandfathers and great grandfathers spent their working lives in maintaining the high traditions set up by Josiah Wedgwood.

We are indebted to the courtesy of Josiah Wedgwood & Sons Ltd., for illustrations and for assistance in the preparation of this article.