A NEW MECCANO MODEL

Model No. 709. Stiff-Leg Derrick

MOST of our readers will probably recognise an old friend in the Meccano Stiff-Leg Derrick, but this model has been recently revised to such an extent, and consequently greatly improved in both appearance and operation, that we have decided to include it in these pages, under the "New Meccano Model" heading.

The Stiff-Leg Derrick is one of the most interesting models to build and is constructed on simple but carefully-planned lines. We venture to say that when completed the model will repay the study of anyone interested in engineering.

Scores of Derricks of this type may be seen every week in various districts in London and almost every other city and town in the country where reconstruction work is in progress. At any hour of the day people will be found gazing at these cranes, which are often perched aloft on great triangular wooden structures. The spectators are fascinated in watching the jib of the Derrick swing busily to and fro, hoisting girders or huge blocks of stone, and adding every few minutes to the strength of the building that is rising around it. Perhaps one of the causes that hold the little crowd on the pavement spellbound is their admiration for the builders who nonchalantly proceed with their tasks around the crane, as though quite unaware that at times nothing but a plank of wood is between them and the ground, hundreds of feet below.

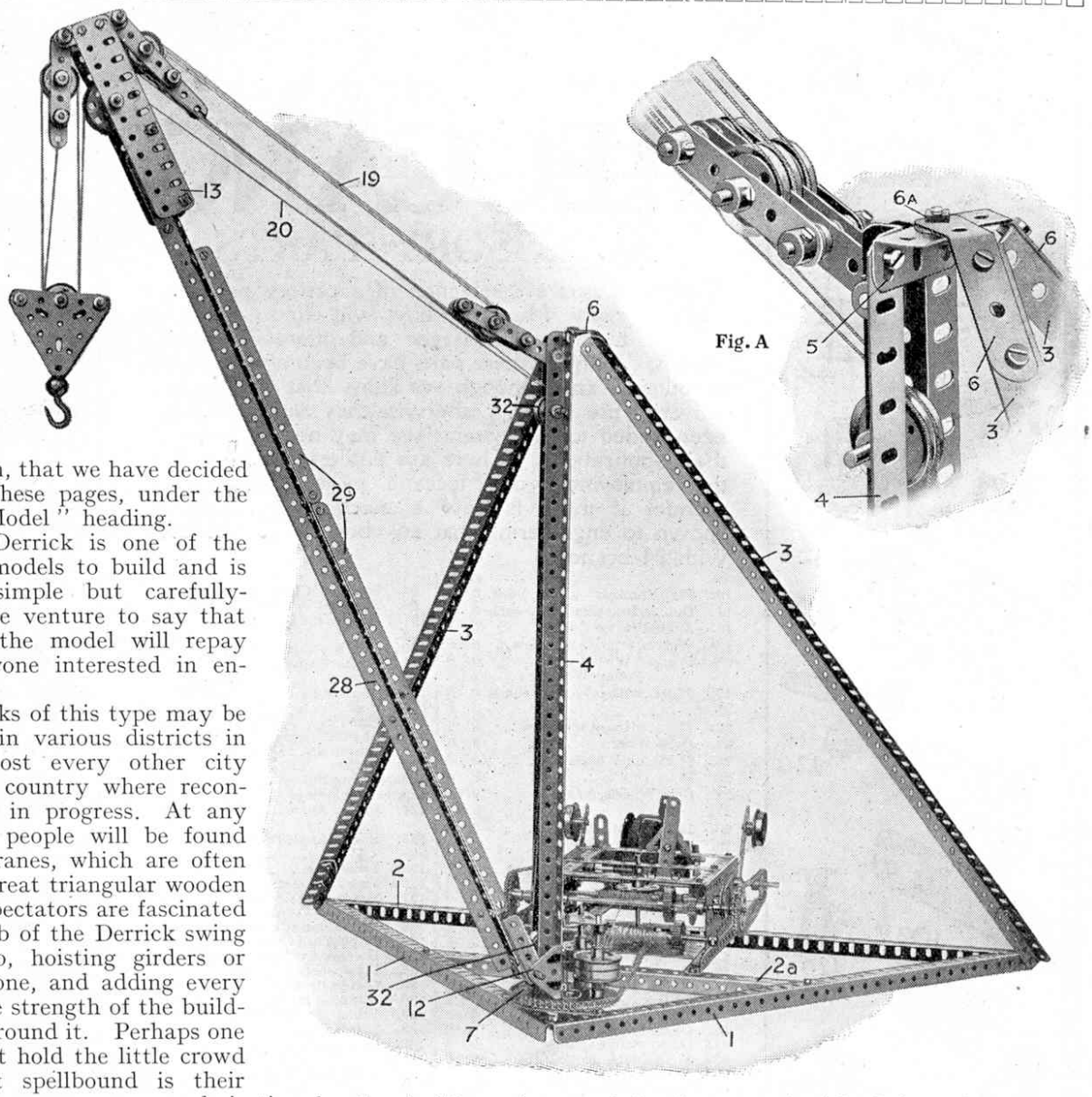

Fig. A

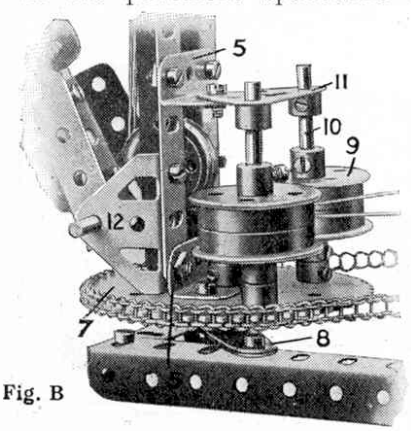

Fig. B

A close inspection of a Stiff-Leg Derrick shows that the strongest parts of the supporting structure are at the base of the jib—where it must withstand the compressive force exerted by the weight, or thrust, of the jib—and at the outer ends of the tie-members supporting the upper pivot of the rotating jib frame. In the latter case the force to be overcome is that of tension, exerted by the pull of the jib and its load.

Construction of the Model

The base of the Meccano Model is formed of 18½" Angle Girders (1) bolted to a 24½" Girder (2) and held rigid by a 12½" Girder (2A). The side members (3) are constructed from 24½" Angle Girders extended at their lower ends by 2½" Girders overlapped three holes. 2½" Strips (6, Fig. A) bolted to the tops of the Girders (3)

are slightly bent, as shown, and meeting together form a bearing for the bolt (6A), about which the upright member (4) pivots. The latter consists of 18½" Angle Girders, bolted together at each extremity by 1½" Girders (5), while a third 1½" Girder is bolted in the fifth holes from their lower ends (Fig. B). The lowest of these 1½" Girders is secured to a 3" Sprocket Wheel (7), which forms the swivelling base of the jib. The pivot is a 1½" Rod passed through the centre hole of the 1½" Girder and through the boss of the Sprocket Wheel and carried in a bearing (8) built up from two 2½" Strips bolted across the base Girders (1). Two Collars should be placed on this Rod, one above the Sprocket (7) and one below the Strips (8).

Two Flanged Wheels butted together forming guide pulleys (9) are carried on 2½" Rods (10), the upper ends of which are journalled in a Corner Bracket (11), secured to the 1½" Girder (5), while their lower ends engage holes in the Sprocket (7).

The jib is built up from two 24½" Angle Girders (28) bolted together in the form of a T and strengthened by pairs of 12½" and 7½" Angle Girders (29) similarly bolted together and secured along the upper sides of the Girders (28). A 2½" Rod, about which the jib pivots, is journalled through Trunnions (12, Fig. B) and through the end holes of 2" Girders bolted in the first and third holes from the end of the 24½" Girders (28). The head of the jib (Fig. D) is formed by two 5½" Flat Girders (13) secured to 2½" Angle Girders, bolted in the first and fourth holes of the Girders (28).

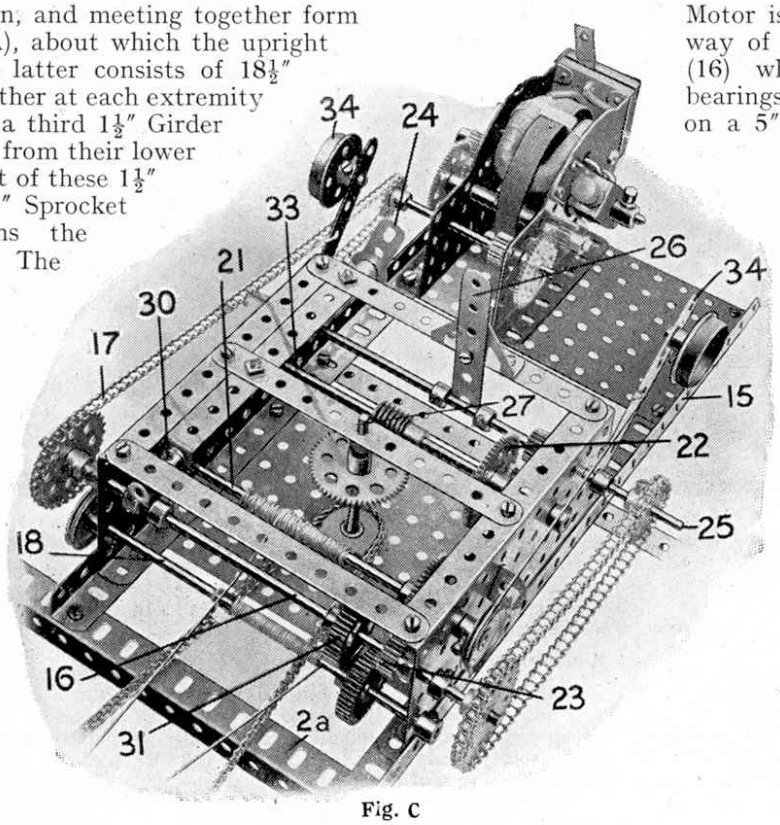

Fig. C

The Three Motions

The construction of the various pulley-blocks (Figs. A & D) may be followed from the illustrations, but care should be taken in spacing the strips with Washers in order to allow for free-running of the pulleys, or "sheaves."

The Motor and Gear-box are carried on 12½" Angle Girders (15, Fig. C) secured to the base Girder (2) and the cross stay Girder (2A); a 5½" × 3½" Flat Plate forms a base for the Motor and large Flanged Plates form the sides of the Gear-box.

There are three motions in the Crane, namely, swinging and luffing the jib, and hoisting—all of which are driven from the motor and controlled by suitable levers.

The jib is raised or lowered by means of the cord (19) winding on the Rod (18, Fig. C). The drive from the Motor is led to this Rod (18) by way of chain gear (17) and Rod (16) which is slideable in its bearings. A Crank (24) is mounted on a 5" Rod journalled in a 4½" Double Angle Strip and carrying a Coupling (30); a 1" Rod secured to the latter engages between two Collars on the Rod (16). On pulling the Crank (24) over to the right, the Rod (16) slides in its bearings, so bringing the 1" Gear Wheel (31) into engagement with a similar Gear secured to the shaft (18). This operates the cord (19), which, after passing round 1" guide pulleys (32) in the vertical member (4), is led round one of the sheaves of the pulley block pivoted at the rear of the jib-head, thence back again round one of the three pulleys situated at the head of the upright (4, Fig. A), and so on round all the six pulleys; finally its end is secured to the "tail" of the pulley block at the jib-head.

Rotating and Hoisting

The hoisting-block is operated by the cord (20) winding on a rod (21, Fig. C) which also carries a 57-toothed Gear Wheel. On moving the lever (24) over to the right, a ½" Pinion (23) is brought into mesh with this Gear Wheel, so connecting the hoisting mechanism with the drive from the Motor. The cord (20) is led over the pulleys in the vertical member in a similar manner to the cord (19) before passing over a 1½" Pulley in the jib-head; it next engages alternately the sheaves of the hoisting-block and of the second fixed block in the jib-head, being finally secured to the latter.

When the lever (24) is in a central position both the gears (31 and 23) are out of engagement; the Motor therefore is allowed to run freely.

The rotation of the jib is effected as follows: a Rod (25) driven by Sprocket Chain from the Rod (16) may be moved to and fro in its bearings on operation of a lever (26), and this movement is employed to engage or disengage a ½" Pinion with a 57-toothed Gear Wheel (22) on a secondary shaft (33). The latter carries a Worm Wheel gearing with another 57-toothed Gear Wheel on a vertical Rod (27) and a 1" Sprocket Wheel on this Rod rotates by means of a Sprocket Chain the 3" Sprocket

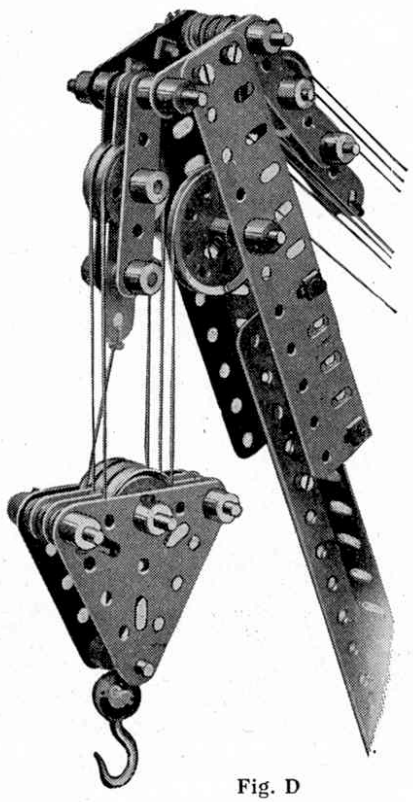
Fig. D

(Continued on page 320)

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New Meccano Model—(*Continued from page* 275)

Wheel (7) forming the base of the jib.

The cords (19 and 20) are prevented from fouling the uprights as the jib rotates by the guide-pulleys (9).

Brakes are provided in the form of weighted levers (34), applying tension to the cords engaging 1″ Pulleys secured to the Rods (18 and 21). This method prevents falling-back of the jib or hoisting-block when the gears are released.

Parts required:

2 of No.	2	3 of No.	16A	1 of No.	48c
6 „ „	3	4 „ „	17	2 „ „	52
2 „ „	4	9 „ „	18A	2 „ „	52A
12 „ „	5	5 „ „	18B	1 „ „	57B
2 „ „	6	6 „ „	20	50 „ „	59
5 „ „	7	1 „ „	21	1 „ „	62
4 „ „	7A	2 „ „	22	1 „ „	63
5 „ „	8	15 „ „	22A	2 „ „	76
2 „ „	8B	2 „ „	26	1 „ „	94
6 „ „	9B	3 „ „	27A	2 „ „	95A
2 „ „	9E	2 „ „	31	1 „ „	95B
3 „ „	9F	1 „ „	32	2 „ „	96
2 „ „	12	3 „ „	35	2 „ „	103
2 „ „	13A	79 „ „	37	3 „ „	126
4 „ „	14	88 „ „	38	1 „ „	133
1 „ „	16	2 „ „	40		

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