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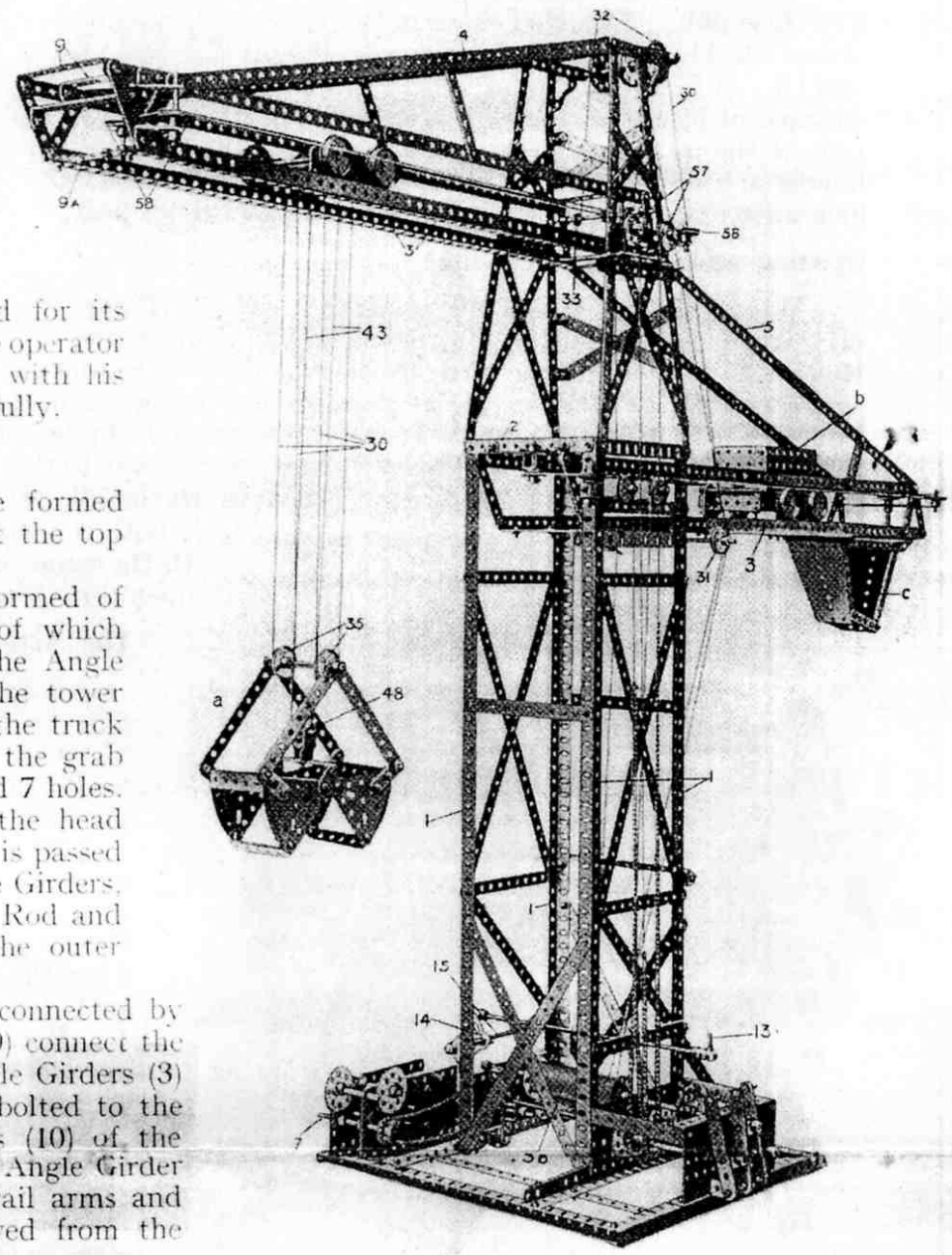
Price 3d.

High-Speed Ship-Coaler

Model No. 734

THE High-Speed Ship-Coaler is one of the most interesting of Meccano models, and if carefully constructed operates with wonderful precision and accuracy. All the movements for coaling a miniature ship are controlled from a central gear-box, and are performed most realistically. The model will appeal to every Meccano boy, because when it has been built it affords endless fun, and no little dexterity is required for its operation. There are so many movements that the operator has to use his intelligence and has to be quick with his fingers in order to carry out all of them successfully.



The Main Tower

The chief supports of the main tower are formed by four 24½″ vertical Angle Girders (1) braced at the top by three 5½″ Angle Girders (2).

The runways for the grab and truck are formed of 24½″ Angle Girders (3) upon the upper edges of which run the travelling wheels. The outer ends of the Angle Girders (3) of the grab runway are braced to the tower by two 12½″ Strips (4), overlapped 7 holes, and the truck runway Girders are secured to the inner ends of the grab runway rails (3) by two 12½″ Strips (5), overlapped 7 holes.

The grab rails (3) are spaced centrally in the head of the tower by means of a Rod (6, Fig. A) which is passed through the second hole from the end of the Angle Girders, and fixed by Collars (7) on the outer ends of the Rod and by other Collars (8) which fit closely against the outer sides of the rails.

The extreme ends of the Angle Girders are connected by 3½″ Strips (9a) and 3½″ × ½″ Double Angle Strips (9) connect the upper 12½″ Strips (10). The lower truck rail Angle Girders (3) are maintained centrally in the tower by being bolted to the transverse 5½″ Angle Girder (11) and the Strips (10) of the truck runway by means of Angle Brackets to the Angle Girder (2). The other details of construction of these rail arms and the tower and tower-head can be clearly followed from the illustrations.

Having constructed the main tower and the runways for the grab, the Electric Motor (12, Fig. B) may now be placed in position. The Motor is started, stopped or reversed by the handle (13). This is connected to a Bell Crank (14) pivotally mounted on a Rod (15) journalled in Trunnions and coupled by a 2½″ Strip (16) to the control handle of the Motor. The drive from the Motor shaft is led through a chain of reduction gears consisting of three ½″ Pinions and three 57-toothed Gear Wheels, the final Gear Wheel also meshing with a fourth ½″ Pinion on the Axle Rod (17).

From a ¾″ Sprocket Wheel on this Rod (17) the Motor drives a 1½″ Sprocket (18) on the 11½″ Rod (19, Fig. B), which carries two ½″ Pinions (20 and 21, Figs. B and C) on its further end. On the ends of the two Rods (22 and 23), which are slideably mounted in the Perforated Plates (42), are Double Brackets enclosed by Collars (24), the Brackets being connected to 3½″ Strips (25 and 26). These Strips (25 and 26) form operating levers for pushing the Rods (22 and 23) in or out.

The Double Brackets are lock-nutted to the bolts pivotally connecting them to the Strips (25 and 26), so as to enable the Strips to move freely on the bolts without disturbing their connection with the Double Brackets. Similarly, the pivotal bolts of the Strips (25 and 26) are lock-nutted to the 1″ × 1″ Angle Brackets (27), leaving the pivotal ends of the Strips (25 and 26) free on these Bolts.

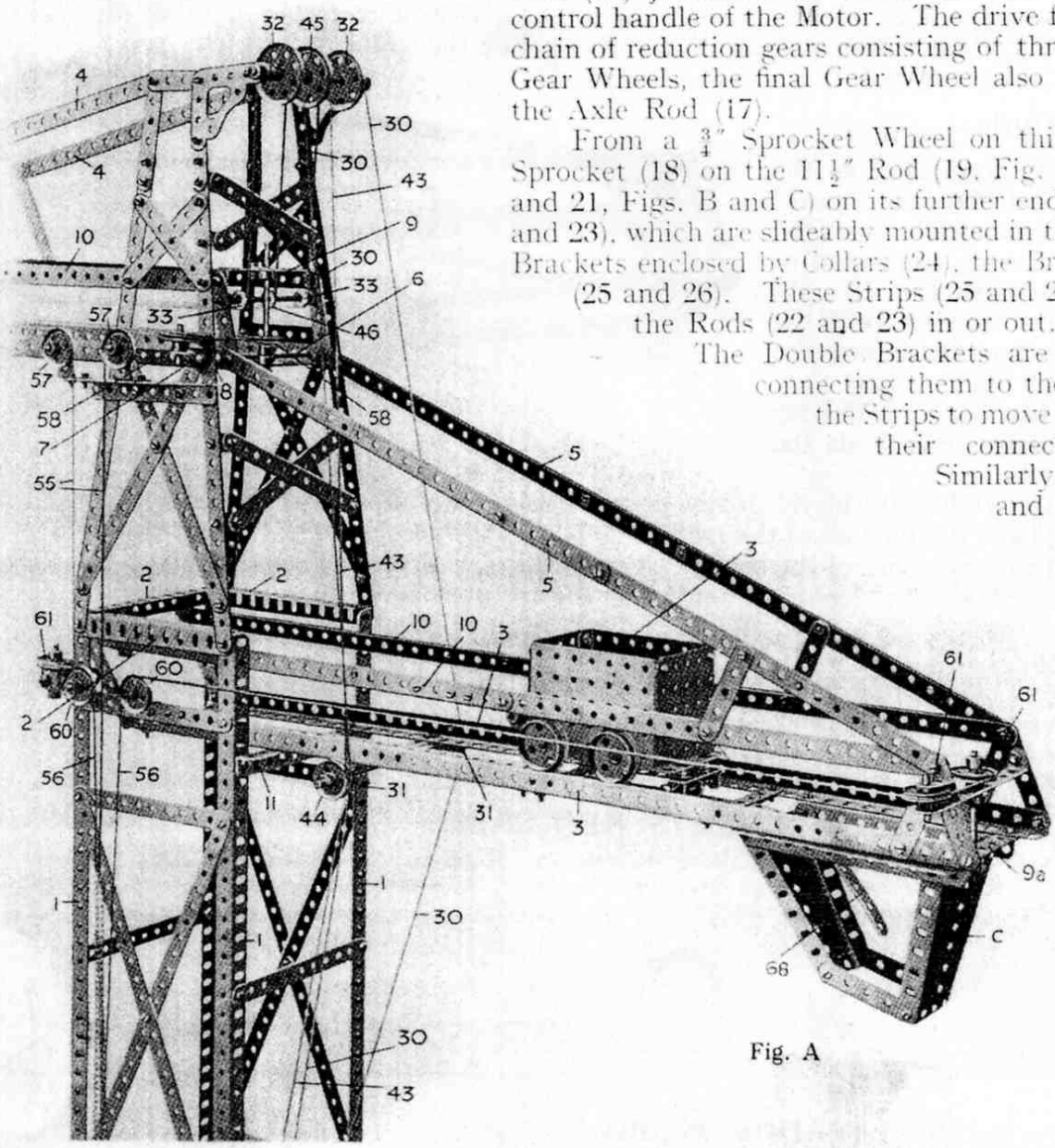


Fig. A

The Gear-Operating Mechanism

A 57-toothed Gear Wheel (28) on the Rod (22) is adapted, on operation of the lever (25), to engage or disengage with the Pinion (20) on the Rod (19). This drives the Roller (29) on which are wound the cords (30). These raise or lower the grab, details of which are shown clearly in the illustration of the complete model.

The cords (30) pass from the Roller (29, Fig. B) over the Pulleys (31) and over the outer

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top Pulleys (32, Fig. A), returning down and passing around ½" Pulleys (33) on to other ½" Pulleys (34) on the trolley (Fig. D). From thence the cords pass down and around 1" Pulleys (35) on the grab, and returning up around ½" Pulleys (36) on the trolley, are made fast in the 3½" × ½" Double Angle Strip (37). As the Roller (29) is caused to rotate by the Motor in one or other direction, the grab will be raised or lowered.

Another Roller (38, Figs. B and C) is mounted on the 11½" Rod (39). This Rod slides in the Plates (42) directly above the 11½" Rod (19) carrying the Pinion (21, Figs. B and C). A 57-toothed Gear Wheel (40) on the Rod (39) is engaged or disengaged with the Pinion (21) by the operation of the 3½" Strip (41). This Strip acts as a control handle in a similar manner to the Strips (25 and 26) and is lock-nutted to the pivotal bolts as previously described.

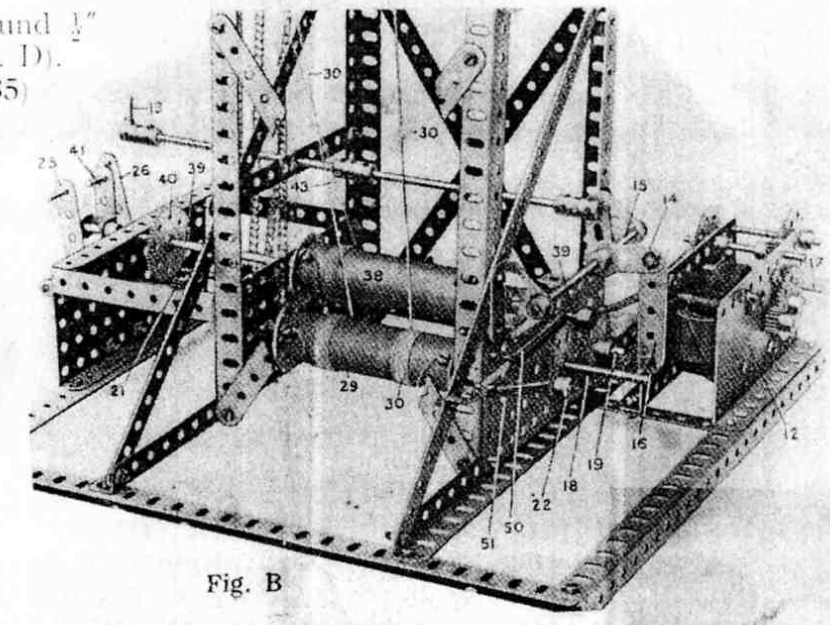

Fig. B

Opening and Closing the Grab

When the Gear Wheel (40) is engaged with the Pinion (21), which is on the Rod (19) driven by the Motor, the Roller (38) rotates and the cord (43) on that Roller is wound up. This cord passes over an outer 1" Pulley (44, Fig. A), over a central 1½" Pulley (45) at the extreme top, down and around a ½" Pulley (46) to the trolley and over a ½" Pulley (47) thereon, (Fig. D). It passes around a 1" Pulley (48) on the grab below, returning up to and over a ½" Pulley (49) on the trolley, and from there it is made fast to the Double Angle Strip (37). Consequently by manipulating the handle (41) the grab may be opened or closed if it is stationary.

When both the handles (41 and 25) throw the Rods (39 and 22) in gear with the main driving Rod (19), the grab is hoisted or lowered in an open or closed condition.

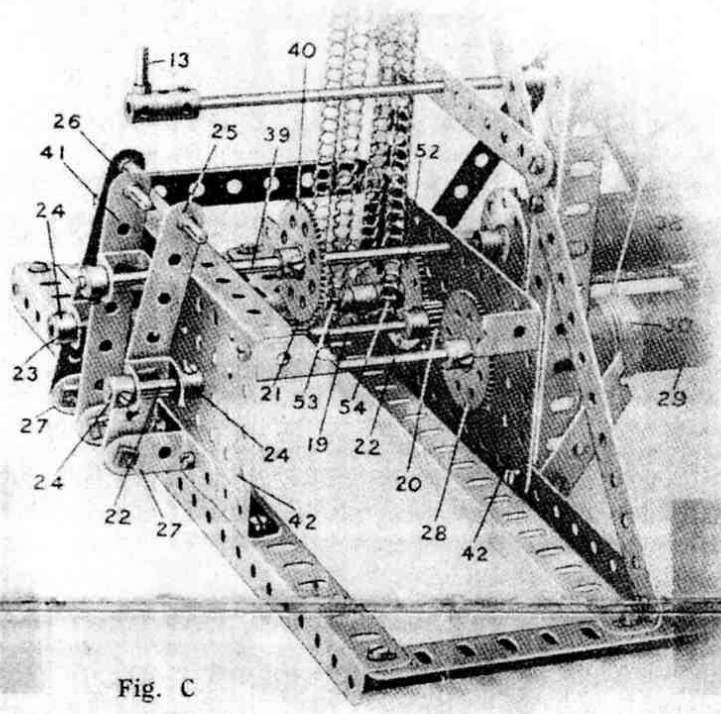

Fig. C

The Action of the Model

A Spring (50, Fig. B) is engaged over the end of the Rod (39) carrying the Roller (38) and another Spring (51) on the end of the Rod (22). These act as frictional drags or brakes on these Rods, preventing the load in the grab running away when the gears are out of mesh.

The mechanism is designed so that a load may be picked up by the grab at the outer end of the trolley arm. The load is then raised and the grab travels inwards on the rails (3). Meanwhile, the truck simultaneously travels inwards until, when the grab is over the truck, it (the grab) is opened and the load deposited in the truck.

Both the truck and the grab then travel outwards, the movement being completed by the truck depositing its load down the chute.

The Travelling Grab

This inward and outward travelling action of the grab and the truck is effected from the third handle (26, Fig. C). This controls the Rod (23) on which a 57-toothed Gear Wheel (52), when engaged with the Pinion (20), causes the Rod (23) to be rotated.

The Rod (23) carries two ¾" Sprocket Wheels (53 and 54) which are engaged by Sprocket Chains connected to cords (55 and 56, Fig. A). The cords (55) pass over 1" Pulley Wheels (57) and end Pulley Wheels (58, Figs. A and D) disposed horizontally at either extremity of the grab runway, being finally connected to the Flat Brackets (59) on the trolley of the grab. Consequently as the Chain on the Sprocket Wheel (53) is wound in one or other direction, according to the direction of rotation of the main driving Rod (19), so will the grab and its trolley be caused to travel in or out along the rails (3).

Simultaneous Action of Grab and Truck

Similarly the cords (56, Fig. A) connected to the Chain meshing with the other Sprocket (54) pass over 1" Pulleys (60, Fig. A), around the horizontally-arranged 1" Pulleys (61), the ends of the cord being connected to Brackets (62) at each end of the truck (61, Fig. E). As the Sprocket Chains (53 and 54) rotate together, both the grab and the truck travel at the same time, but in order to ensure that they travel in opposite directions, so that they both move inwards or outwards together, the cords (56) are crossed before they pass over the Pulleys (60), while the cords (55) are left open.

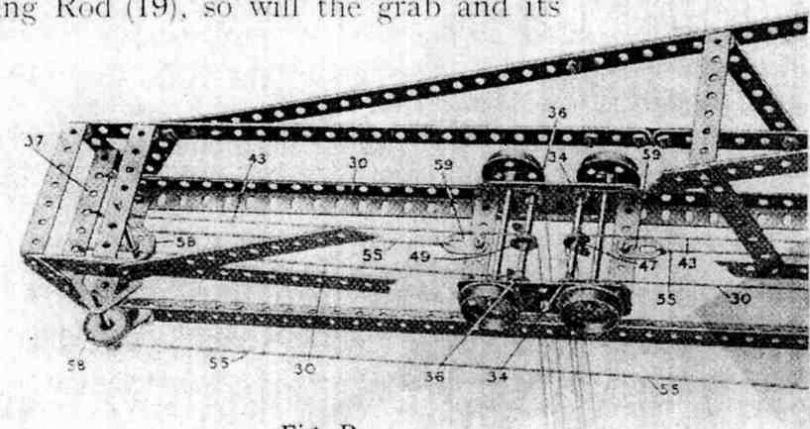

Fig. D

As the truck approaches the outer end of its travel, it discharges its contents down the chute as previously mentioned. To enable this to take place, the bottom of the truck (63) is pivoted (as shown in Fig. E) on a 3" Rod (64). At the other end of the bottom Plate (63) is a ½" Pulley (65), carried on a 1½" Rod (66) mounted in a 1½" Double Angle Strip (67) secured to the base and spaced by five Washers (69).

In the centre of the rails (3) on the truck runway a central Strip (68) is provided on which the ½" Pulley (65) runs. This Strip (68) is bent downward at the mouth of the chute. Consequently, as the base of the truck reaches the chute, the wheel (65) rides down the bent end (68) and permits the bottom of the truck to open and the load to be discharged.

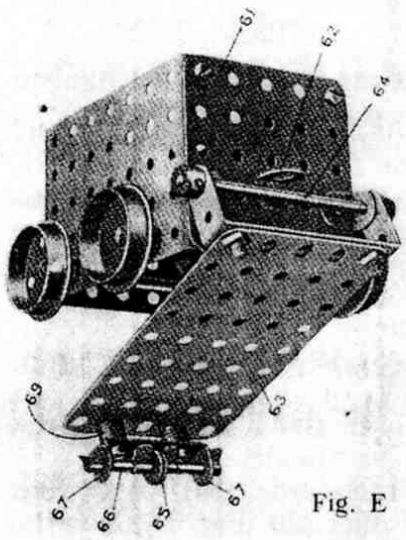

Fig. E

PARTS REQUIRED:

28 of No.	1	6 of No.	9	6 of No.	16	10 of No.	23	3 of No.	44	1 of No.	53A	1 of No.	95A
5 " "	1A	1 " "	9A	2 " "	16A	4 " "	24	2 " "	45	1 " "	54	2 " "	96A
14 " "	2	4 " "	10	2 " "	16B	3 " "	26	1 " "	46	50 " "	59	2 " "	103D
6 " "	2A	6 " "	11	2 " "	17	4 " "	27A	1 " "	48	3 " "	63	2 " "	106
24 " "	3	18 " "	12	2 " "	18A	12 " "	35	7 " "	48A	2 " "	70	2 " "	111
10 " "	4	5 " "	12A	3 " "	18B	280 " "	37	11 " "	48B	2 " "	72	8 " "	115
18 " "	5	3 " "	13	3 " "	20	16 " "	37A	1 " "	48C	4 " "	76	1 " "	124
2 " "	6	3 " "	14	3 " "	21	30 " "	38	1 " "	48D	2 " "	77	2 " "	125
4 " "	6A	2 " "	15	5 " "	22	1 " "	40	1 " "	52	4 " "	90	4 " "	126
8 " "	7	3 " "	15A	14 " "	22A	2 " "	43	2 " "	53	48" " "	94	1 " "	128