

# Railway Breakdown Crane

The main side girders 1 (Fig. 3) are channel in section, each being built up from one  $18\frac{1}{2}$ "", one  $7\frac{1}{2}$ " and two  $5\frac{1}{2}$ " Angle Girders. (The  $7\frac{1}{2}$ " and  $5\frac{1}{2}$ " Girders are used in order that the model may be built with a No. 7 Outfit; it would be preferable, of course, to use two  $18\frac{1}{2}$ " Girders for each side member). The girders so formed are connected together at each end and at various other points by  $4\frac{1}{2}$ " Angle Girders

2. The buffer beams are formed by  $4\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flat Plates, which are attached to the  $4\frac{1}{2}$ " Angle Girders at each end of the girders 1. Two  $2\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flat Plates 5 and  $3\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flanged Plates 6 are bolted to each girder 1, a gap being left between each Plate. The end Plates adjoining the buffer beam are connected to the latter by means of  $2\frac{1}{2}$ " Angle Girders, while the buffer beam at the other end of the truck is reinforced by  $2\frac{1}{2}$ " Angle Girders and Corner Brackets, the

latter forming a rigid connection between the  $2\frac{1}{2}$ " Girders and the side members 1. A  $9\frac{1}{2}$ " Flat Girder 7 is bolted along the lower edges of the Plates on each side of the truck, and as there is a gap of one hole between the Plates, the slotted holes of the Flat Girder are unobstructed at this point. The purpose of this will be explained later.

The two  $4\frac{1}{2}$ " Angle Girders 3 form a rigid means of attaching to the truck the  $3\frac{1}{2}$ " Gear Wheel 4 (Fig. 2) which forms the lower portion of the ball race on which the model slews. It is attached to the truck by means of four  $\frac{1}{4}$ " Bolts, Collars being used for spacing purposes.

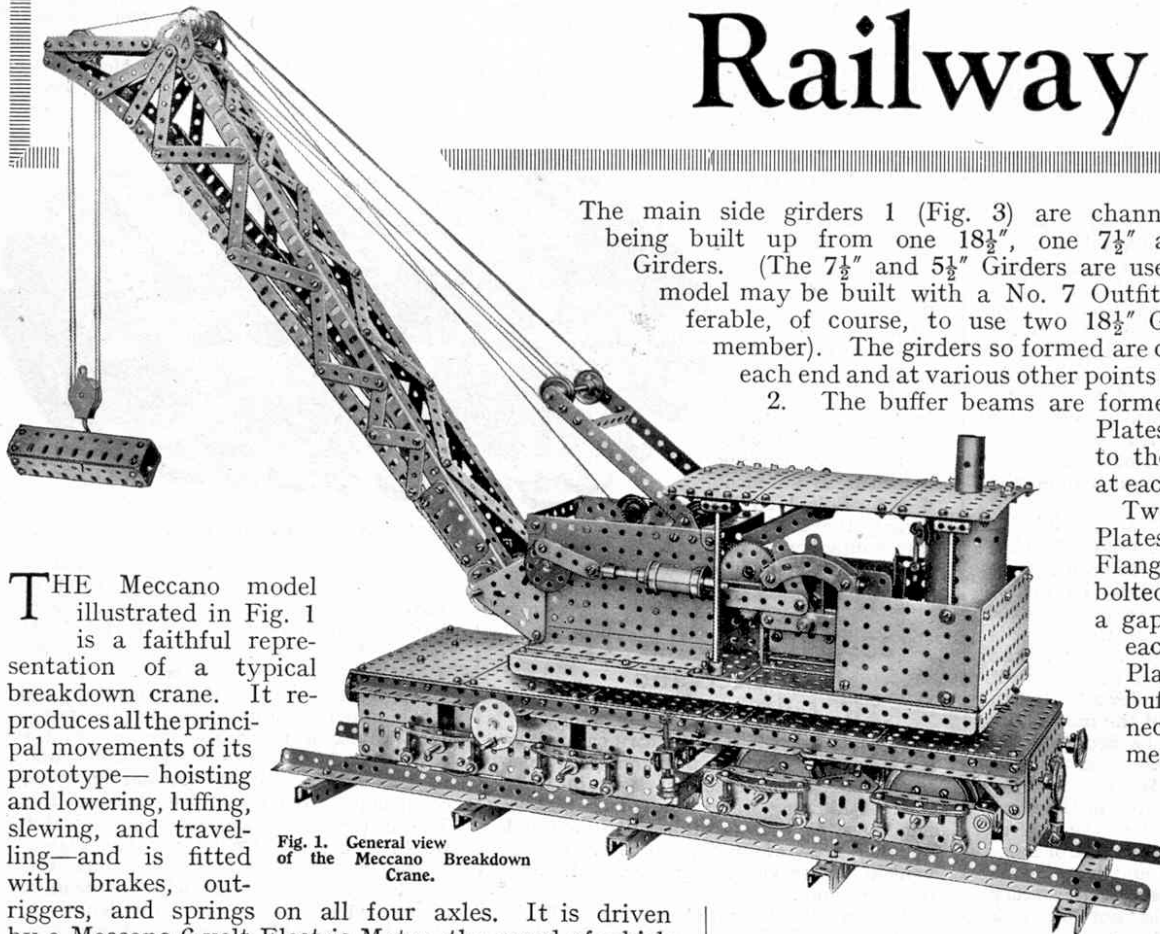


Fig. 1. General view of the Meccano Breakdown Crane.

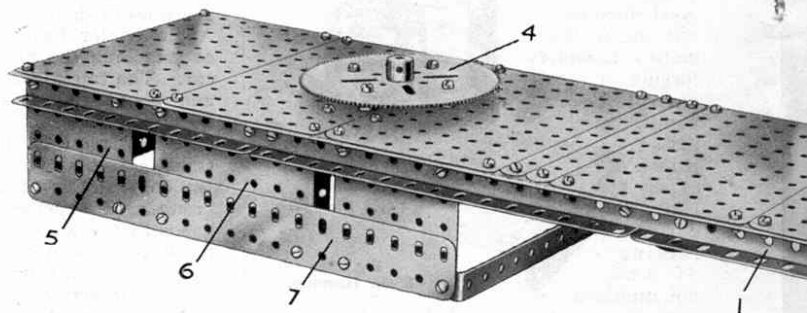
THE Meccano model illustrated in Fig. 1 is a faithful representation of a typical breakdown crane. It reproduces all the principal movements of its prototype—hoisting and lowering, luffing, slewing, and travelling—and is fitted with brakes, outriggers, and springs on all four axles. It is driven by a Meccano 6-volt Electric Motor, the speed of which may be regulated by a built-up Meccano controller. As the actual crane is steam-operated, a dummy boiler and engine are incorporated in the model. The crane truck is about 20" in overall length and is designed to run on 3" gauge rails, which may of course be built up from Meccano Angle Girders, etc.

The constructional details of the model will be dealt with fully in two special articles, of which this is the first. The second article will appear next month. This article includes full details for building the crane truck, bogie, and wheel mechanism; and in the August issue we shall describe the swivelling superstructure, jib, gear-box mechanism, and a special type of resistance controller for regulating the Motor.

There are many Meccano boys who will want to build this model, not only for the pleasure to be had from its construction, but for the fun of working it when completed. By the touch of a lever the model may be made to roll slowly forward, or slew, luff, and hoist just like a real crane. With the aid of the numerous illustrations accompanying the articles, no difficulty should be experienced in building a successful model.

## Construction of the Crane Truck

The construction of the model should be commenced by building the crane truck. As will be seen from Fig. 1 and the various sectional views (Figs. 2, 3 and 5), the truck is very solidly built and is complete down to the smallest detail.



A reinforced bearing 3a (Figs. 3 and 5), composed of a  $1\frac{1}{2}$ " Strip bolted to two  $1\frac{1}{2}$ " Angle Girders, is then attached to the Girders 3. Care should be taken to ensure that a Rod, when passed through the boss of

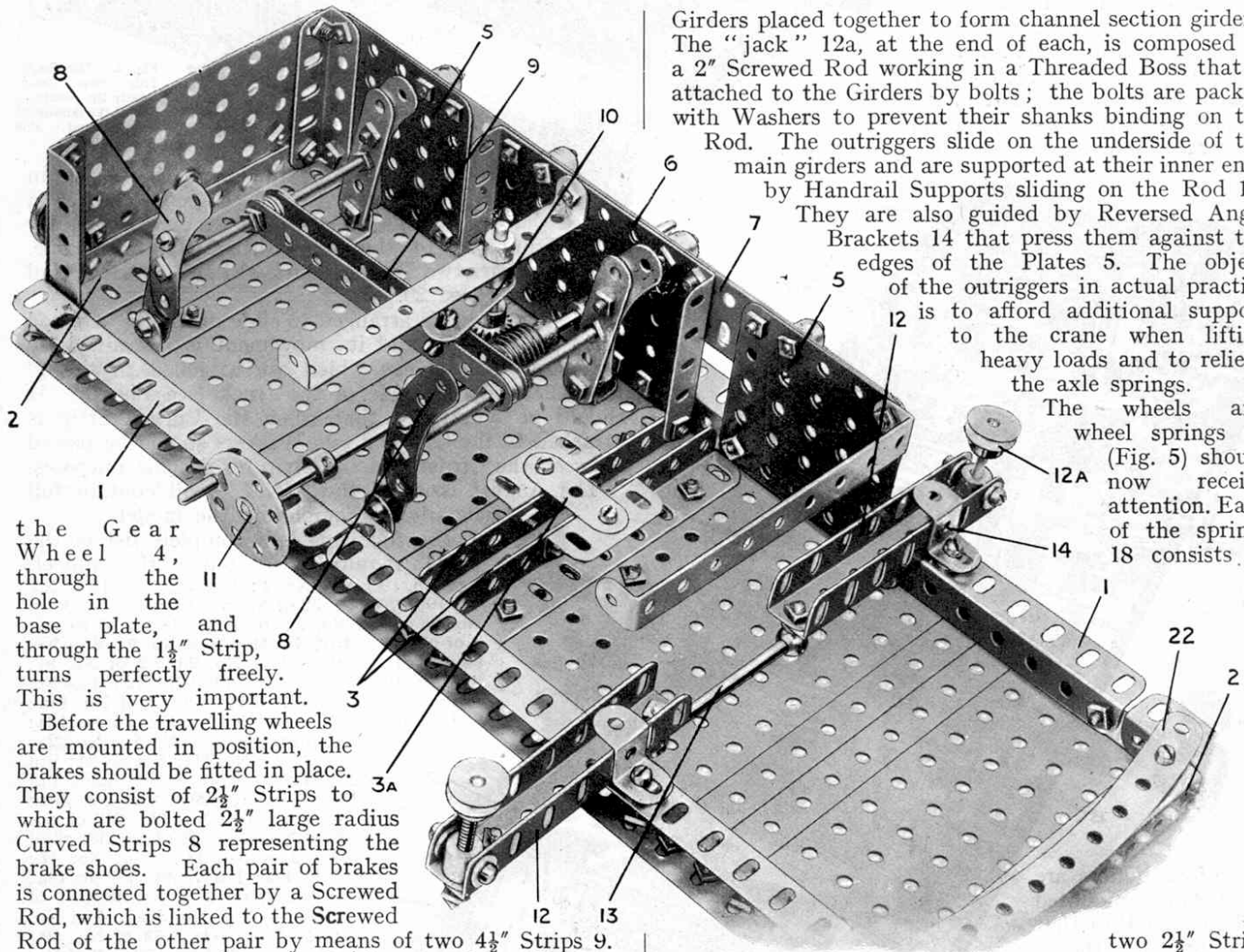
Fig. 2. The Truck from the Meccano Breakdown Crane. The Gear Wheel 4 forms the lower portion of the ball race.

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# akdown Crane

### SPECIAL FEATURES

The various movements of the model, hoisting and lowering, slewing, luffing, and travelling, are all driven by a 6-volt Motor through a gear box of unique design. The crane truck is mounted on eight sprung wheels, four of which are carried in a swivelling bogie. Other details include brakes on the travelling wheels and outriggers.



the Gear Wheel 4, through the hole in the base plate, and through the  $1\frac{1}{2}$ " Strip, turns perfectly freely. This is very important.

Before the travelling wheels are mounted in position, the brakes should be fitted in place. They consist of  $2\frac{1}{2}$ " Strips to which are bolted  $2\frac{1}{2}$ " large radius Curved Strips 8 representing the brake shoes. Each pair of brakes is connected together by a Screwed Rod, which is linked to the Screwed Rod of the other pair by means of two  $4\frac{1}{2}$ " Strips 9. The Strips are spaced apart the distance of five Washers and retained in position on the Rods by lock-nuts. A Crank 10 is secured on a short Rod journalled in a hole of the base plate and also in a  $4\frac{1}{2}$ " Double Angle Strip as shown in Figs. 3 and 5. The Rod carries a  $\frac{1}{2}$ " Pinion that is arranged to mesh with a Worm on a  $6\frac{1}{2}$ " Rod on which the hand wheels 11 are secured. The Crank is attached pivotally to the links 9 by means of a bolt inserted in the set-screw hole of a Collar, which is held in place between the links by a  $\frac{1}{2}$ " Bolt. By turning the handwheels 11, the Crank swings slowly and presses the brake shoes on to the wheels.

Each of the "outriggers" 12 (Fig. 3) consists of two  $3\frac{1}{2}$ " Angle

Girders placed together to form channel section girders. The "jack" 12a, at the end of each, is composed of a 2" Screwed Rod working in a Threaded Boss that is attached to the Girders by bolts; the bolts are packed with Washers to prevent their shanks binding on the Rod. The outriggers slide on the underside of the main girders and are supported at their inner ends by Handrail Supports sliding on the Rod 13. They are also guided by Reversed Angle Brackets 14 that press them against the edges of the Plates 5. The object of the outriggers in actual practice is to afford additional support to the crane when lifting heavy loads and to relieve the axle springs.

The wheels and wheel springs 18 (Fig. 5) should now receive attention. Each of the springs 18 consists of

two  $2\frac{1}{2}$ " Strips and one  $1\frac{1}{2}$ " Strip. A Bolt with a Washer

Fig. 3. Underneath view of Crane Truck, with one side and wheel mechanism removed to show the Brake rigging and Outriggers.

on its shank is passed through the centre hole of all three Strips and inserted in a Collar. The "spring hangers" 19 are  $\frac{3}{4}$ " Bolts inserted in Collars that are attached pivotally to the frame by  $\frac{1}{2}$ " lock-nutted Bolts. Fig. 4 shows the springs very clearly. The wheels themselves consist of Face Plates bolted to Wheel Flanges; eight in all are required.

The driving axle 15a (Fig. 5) has secured to it a  $1\frac{1}{2}$ " Contrate that meshes with a  $\frac{1}{2}$ " Pinion 17 on the Rod that forms the central pivot about which the crane turns and which also transmits the drive from the gear box. The end of this Rod is journalled in the bore of a Coupling mounted loosely on the Rod 15a. Couplings 16 are employed in the place of Collars to prevent end play in the Rods 15 and 15a; if Collars

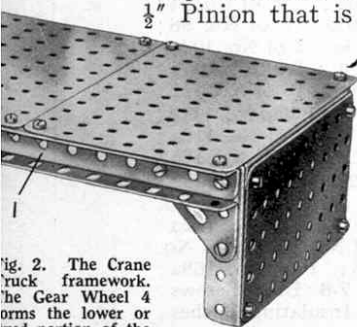


Fig. 2. The Crane Truck framework. The Gear Wheel 4 turns the lower or fixed portion of the Tail Bearing unit.



were employed here their grub screws would foul the flanges of the Plates 6.

The two axles 15, 15a are connected together by means of a length of Sprocket Chain passing over 2" Sprocket Wheels secured to the axles. This arrangement ensures that the drive is distributed over all four wheels, thus obviating the possibility of wheel slip.

It will be noticed that the ends of the axles 15 and 15a are passed through the slotted holes of the Flat Girders 7 and are journalled in the Collars secured to the springs. The slots thus form guides which, while permitting the free vertical movement of the axles under the action of the springs, prevent any adverse side strain being applied to the springs.

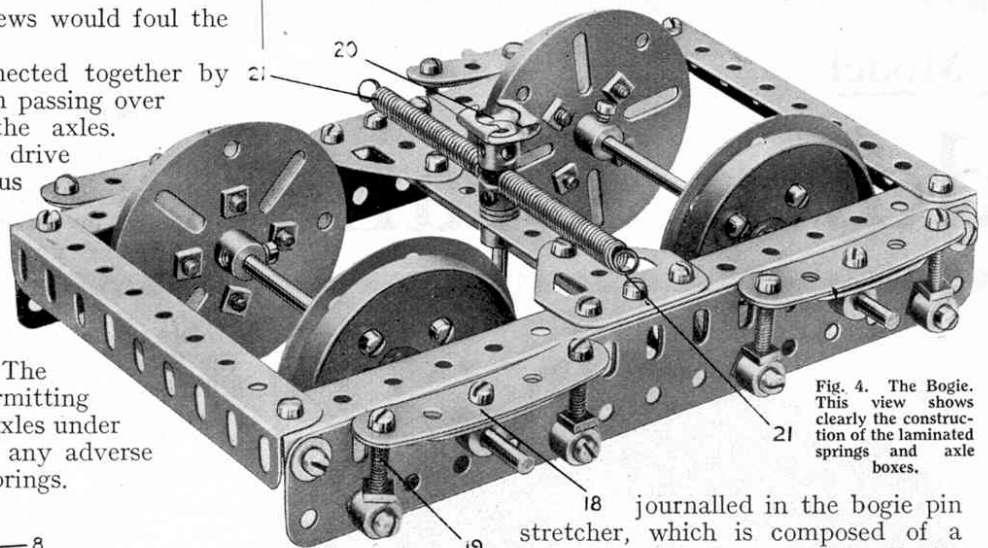
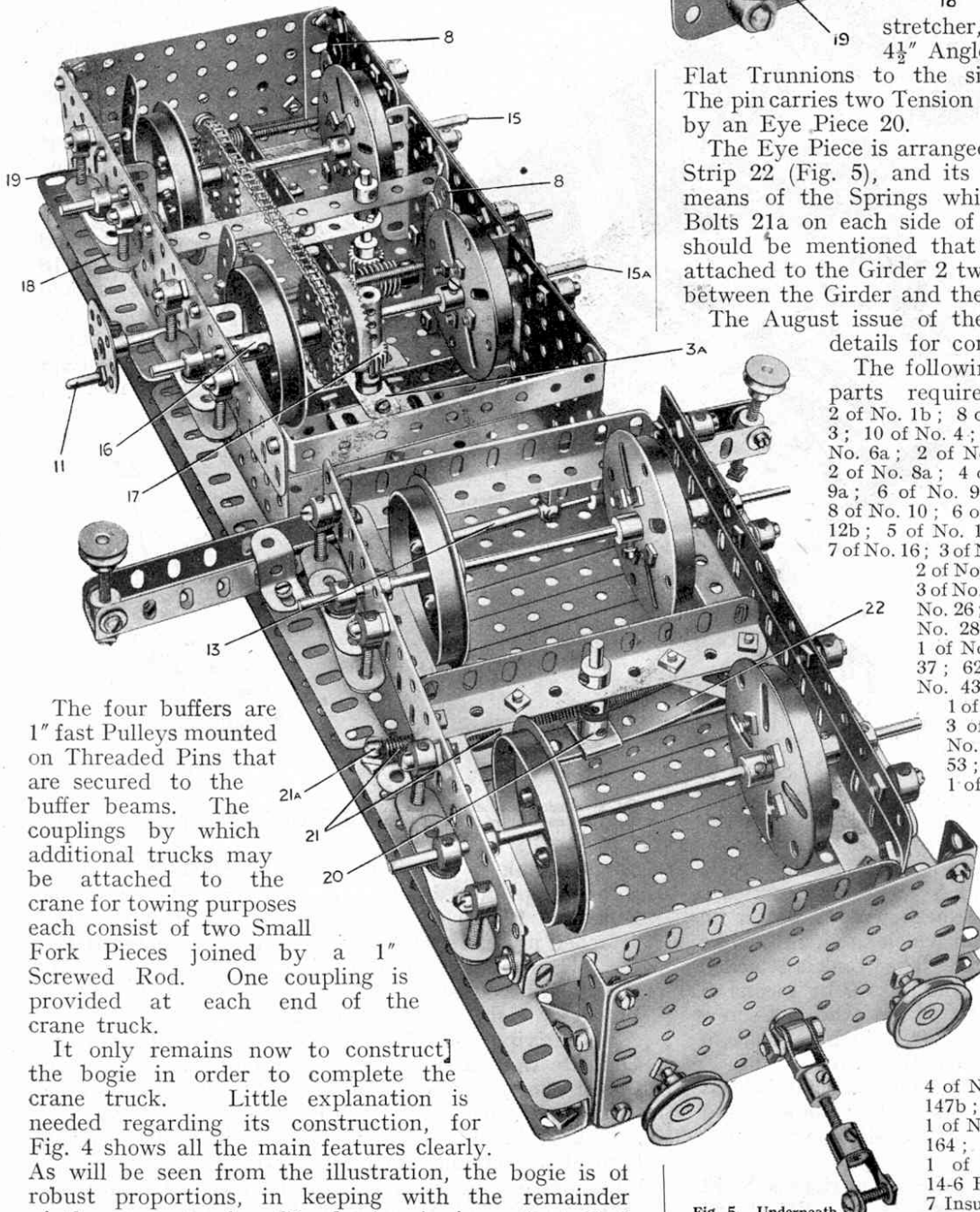


Fig. 4. The Bogie. This view shows clearly the construction of the laminated springs and axle boxes.



18 journalled in the bogie pin stretcher, which is composed of a 4½" Angle Girder secured rigidly by Flat Trunnions to the side Girders of the frame. The pin carries two Tension Springs 21 and is surmounted by an Eye Piece 20.

The Eye Piece is arranged to slide on the 5½" Curved Strip 22 (Fig. 5), and its movement is restrained by means of the Springs which are attached to the ¾" Bolts 21a on each side of the truck (see Fig. 5). It should be mentioned that when the Curved Strip is attached to the Girder 2 two Washers should be placed between the Girder and the Strip for spacing purposes.

The August issue of the "M.M." will contain full details for completing the model.

- The following is a complete list of the parts required to build the model.
- 2 of No. 1b; 8 of No. 2; 6 of No. 2a; 12 of No. 3; 10 of No. 4; 32 of No. 5; 15 of No. 6; 11 of No. 6a; 2 of No. 7; 6 of No. 7a; 2 of No. 8; 2 of No. 8a; 4 of No. 8b; 8 of No. 9; 8 of No. 9a; 6 of No. 9b; 4 of No. 9d; 2 of No. 9f; 8 of No. 10; 6 of No. 11; 10 of No. 12; 1 of No. 12b; 5 of No. 14; 1 of No. 15; 5 of No. 15a; 7 of No. 16; 3 of No. 16a; 3 of No. 17; 2 of No. 18a; 2 of No. 20b; 10 of No. 22; 5 of No. 22a; 3 of No. 23; 2 of No. 23a; 5 of No. 24; 9 of No. 26; 6 of No. 27a; 1 of No. 27b; 1 of No. 28; 1 of No. 29; 1 of No. 30a; 1 of No. 30c; 1 of No. 32; 342 of No. 37; 62 of No. 37a; 82 of No. 38; 2 of No. 43; 2 of No. 45; 1 of No. 47; 1 of No. 47a; 1 of No. 48; 1 of No. 48a; 3 of No. 48b; 2 of No. 48c; 1 of No. 50a; 11 of No. 52a; 4 of No. 53; 2 of No. 53a; 63 of No. 59; 1 of No. 62; 6 of No. 62b; 9 of No. 63; 2 of No. 64; 4 of No. 70; 4 of No. 72; 2 of No. 76; 2 of No. 77; 2 of No. 80a; 2 of No. 81; 2 of No. 82; 3 of No. 89; 6 of No. 90; 2 of No. 90a; 2 ft. of No. 94; 2 of No. 95a; 2 of No. 96; 2 of No. 96a; 2 of No. 103a; 2 of No. 103f; 2 of No. 103k; 8 of No. 109; 18 of No. 111; 24 of No. 111a; 6 of No. 111c; 9 of No. 115; 4 of No. 116a; 1 of No. 120a; 2 of No. 125; 4 of No. 126a; 2 of No. 133; 4 of No. 136; 8 of No. 137; 2 of No. 147b; 1 of No. 152; 1 of No. 162a; 1 of No. 162b; 2 of No. 163; 1 of No. 164; 1 of No. 166; 1 of No. 168a; 1 of No. 168b; 7-6 B.A. Screws; 14-6 B.A. Nuts; 7 Insulating Bushes; 7 Insulating Washers; 1 Terminal; 1 Electric Motor.

Fig. 5. Underneath view of Crane Truck.

The four buffers are 1" fast Pulleys mounted on Threaded Pins that are secured to the buffer beams. The couplings by which additional trucks may be attached to the crane for towing purposes each consist of two Small Fork Pieces joined by a 1" Screwed Rod. One coupling is provided at each end of the crane truck.

It only remains now to construct] the bogie in order to complete the crane truck. Little explanation is needed regarding its construction, for Fig. 4 shows all the main features clearly. As will be seen from the illustration, the bogie is of robust proportions, in keeping with the remainder of the crane truck. The bogie pin is a short Rod