MECCANO

Automatic Snow Loader

(MODEL No. 10.11)

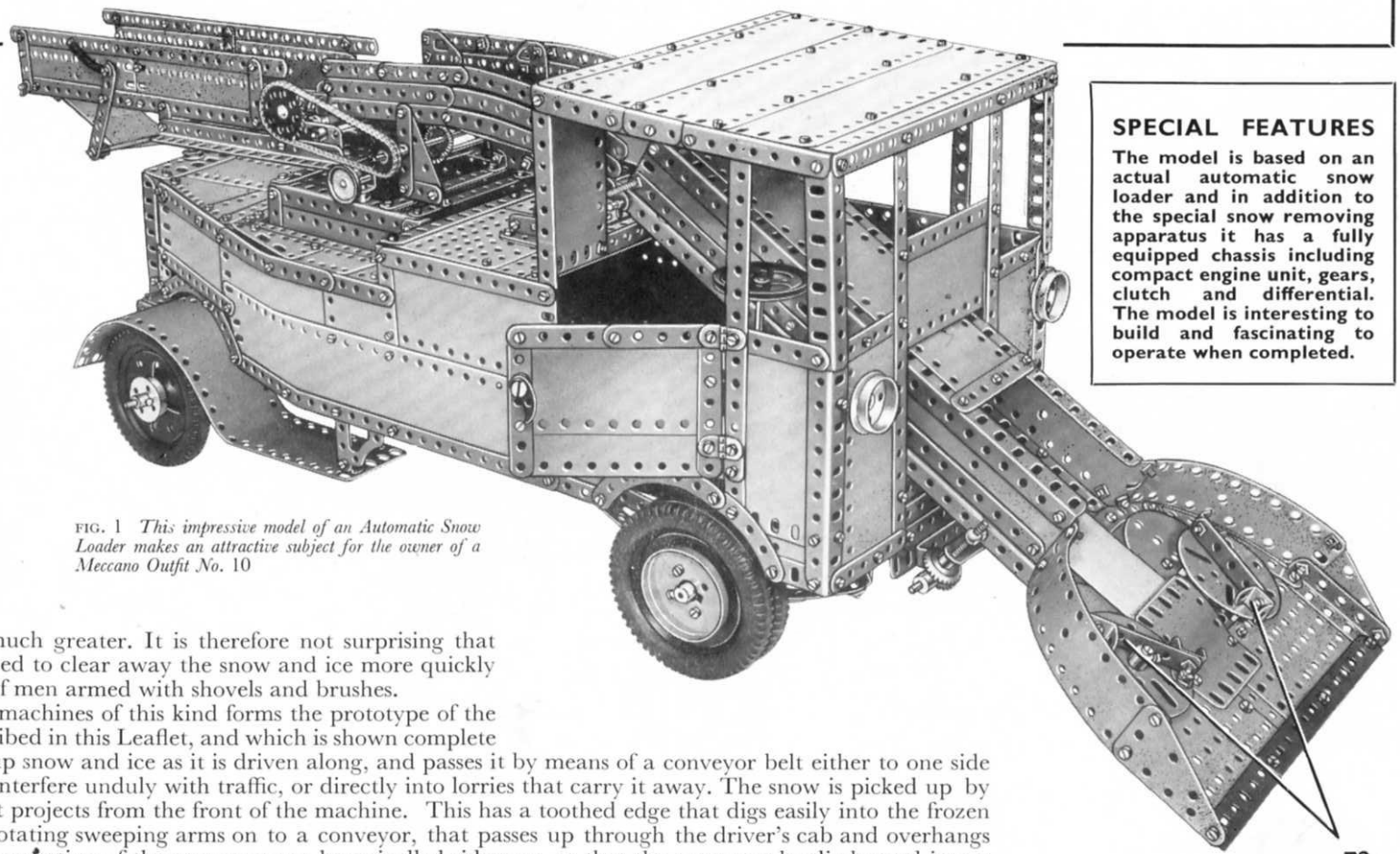


FIG. 1 *This impressive model of an Automatic Snow Loader makes an attractive subject for the owner of a Meccano Outfit No.* 10

SPECIAL FEATURES

The model is based on an actual automatic snow loader and in addition to the special snow removing apparatus it has a fully equipped chassis including compact engine unit, gears, clutch and differential. The model is interesting to build and fascinating to operate when completed.

In severe winters, when heavy and sometimes quite unexpected falls of snow often occur, one of the most urgent necessities is to maintain the roads and highways open for traffic. In large cities especially this is a gigantic task, and until comparatively recent years it had to be tackled manually by large numbers of men working with shovels. The problem is not so serious perhaps in Great Britain as in Canada and some parts of the United States, where the winters are more severe and the areas to be covered are much greater. It is therefore not surprising that machines have now been devised to clear away the snow and ice more quickly than it can be done by gangs of men armed with shovels and brushes.

One of the most interesting machines of this kind forms the prototype of the attractive working model described in this Leaflet, and which is shown complete in Fig. 1. This machine picks up snow and ice as it is driven along, and passes it by means of a conveyor belt either to one side of the road, where it does not interfere unduly with traffic, or directly into lorries that carry it away. The snow is picked up by means of a gathering head that projects from the front of the machine. This has a toothed edge that digs easily into the frozen snow, which is then swept by rotating sweeping arms on to a conveyor, that passes up through the driver's cab and overhangs the rear of the vehicle. The rear section of the conveyor can be swivelled sideways, so that the snow can be discharged into a lorry standing alongside or dumped at either side or rear of the vehicle. Some machines of this kind can clear as much as 15 to 20 cubic yards of snow and ice per minute.

The Meccano model shows all the main working features of the real machine and is a most interesting one to build and operate. It is driven by a Meccano E15R Electric Motor, and has a fully equipped chassis, including clutch, gear-box and differential.

Building the Model: The Chassis (Fig. 4)

Each side-member of the chassis consists of two 24½″ Angle Girders joined at their ends by Fishplates to form a channel section girder. The side-members are connected at each end by two 5½″ Angle Girders with the top corners braced by 1½″ Corner Brackets. At one end a 9½″ Angle Girder (1) (Fig. 3) is bolted across the chassis and a second 9½″ Angle Girder (2) is fixed in position as shown.

The box-like structure that supports the conveyors consists of two 4½″ Angle Girders on each side, connected at their lower ends by a 5½″ Strip, and at the top by a 5½″ Angle Girder (3) (Fig. 7). On one side a 5½″×3½″ Flat Plate is fixed between the vertical 4½″ Angle Girders, and on the other side a 5½″×2½″ Flat Plate is used. The Girders (3) are connected by a 5½″×2½″ Flat Plate (4), strengthened by a 5½″ Angle Girder and a 5½″ Strip. Two 5½″ Strips (5) placed face-to-face, and a single 5½″ Strip (6), are bolted also to the Girders (3) (Fig. 7). The structure is attached to the chassis side-members by two 1″×1″ Angle Brackets on each side.

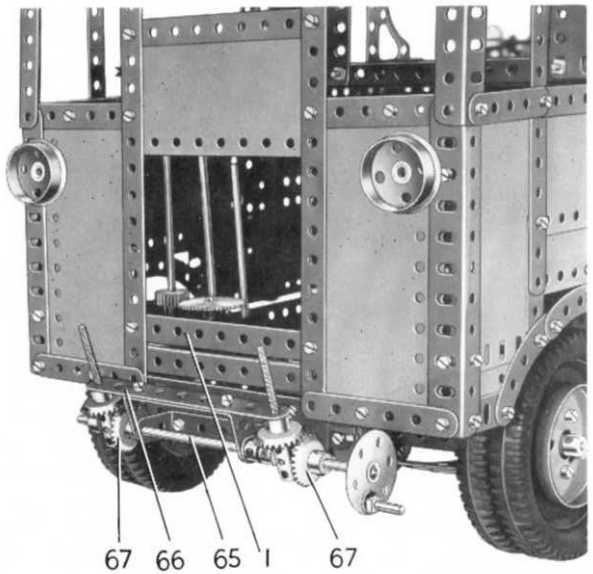


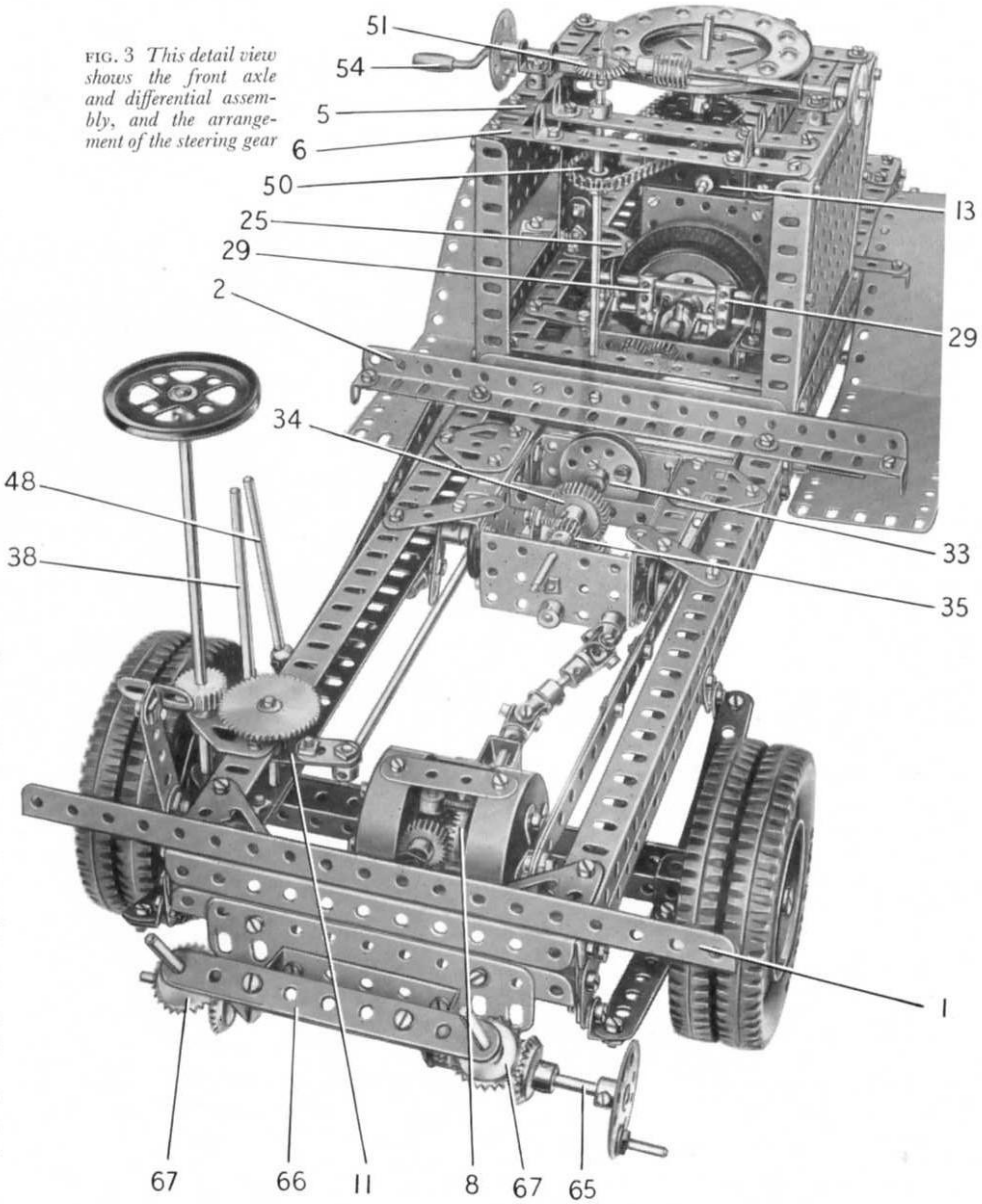
FIG. 2 *A close-up of the Snow Loader cab, showing the screw mechanism provided for adjusting the height of the conveyor gathering head*

Details of the Driving Axle (Figs. 3 and 4)

The axle casing is built in two sections, each of which is made by bolting four 2½″ × ½″ Double Angle Strips between a Boiler End and a Face Plate. At a later stage when the differential unit is assembled, the sections are connected by fixing four 2″ Strips between the Boiler Ends. One of these Strips is spaced from each Boiler End by two Washers, and a Double Bent Strip is bolted to this Strip. A ½″ Pinion (7) (Fig. 4) is fixed on a 1½″ Rod, mounted in the Strip and the Double Bent Strip.

To assemble the differential a 5″ Rod is passed through one section of the axle casing and on it a 1½″ Contrate is freely mounted. This Contrate is spaced from the Boiler End by Washers so that it meshes with the Pinion (7). A ¾″

FIG. 3 *This detail view shows the front axle and differential assembly, and the arrangement of the steering gear*



Contrate (8) is fixed on the 5″ Rod, but is spaced from the 1½″ Contrate by two Washers. The end of the Rod is inserted in a Coupling, through the centre cross hole of which a 1½″ Rod is passed. This Rod is gripped in two Collars, each of which is screwed on to the end of a 1″ Screwed Rod fixed in a hole in the 1½″ Contrate by two nuts. Two ¾″ Pinions are freely mounted on Pivot Bolts and these are screwed tightly into the Coupling so that the Pinions mesh with the Contrate (8). A second ¾″ Contrate is fixed on a 4½″ Rod supported in the other half of the axle casing. This Contrate is spaced from its Boiler End by Washers, so that it meshes with the ¾″ Pinions.

The axle is supported by leaf springs, each of which consists of a 7½″, a 5½″, a 4½″, a 3½″ and a 2½″ Strip. The axle is clamped by the lug of a ½″ Reversed Angle Bracket bolted to each spring, and is prevented from sliding by an Angle Bracket also secured to the spring.

Angle Brackets are bolted to the ends of each 7½″ Strip, and one of them is *lock-nutted* to a 1″ Corner Bracket fastened to the front of the chassis. The other Angle Bracket is *lock-nutted* to a Fishplate bolted to the chassis.

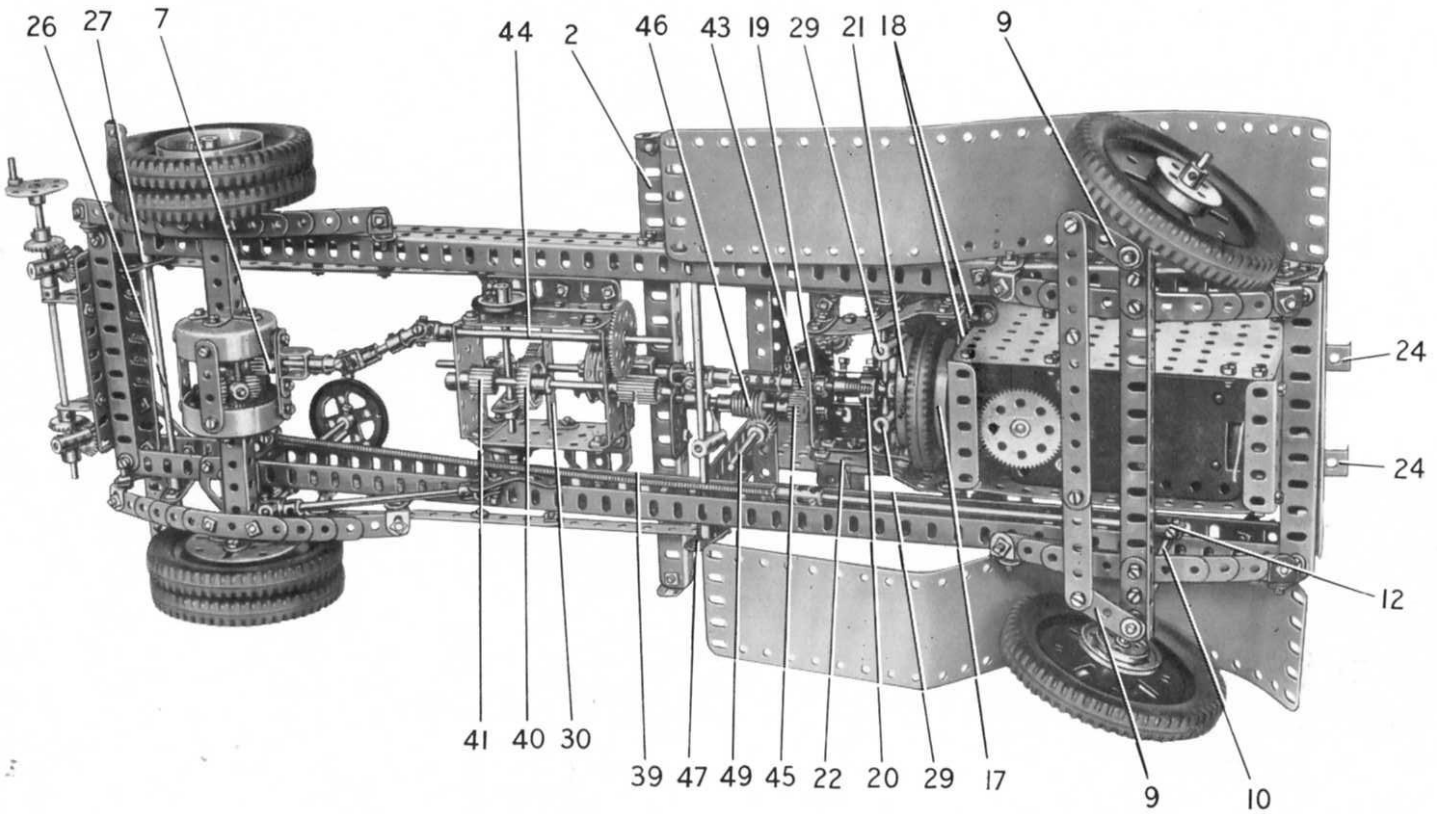


FIG. 4 *This underneath view of the Snow Loader chassis reveals the arrangement of the drive to the front wheels*

The rear axle beam is a 7½″ Angle Girder bolted to the springs, with a 1½″ Strip covering the slotted holes at each end of the Girder. A 1½″ Rod on each side is mounted in the end hole of the Strip and in a ½″ Reversed Angle Bracket bolted to the Angle Girder. Each of these Rods carries a Crank (9) at its lower end, and the two Cranks are connected by a built-up strip made from two 5½″ Strips overlapped seven holes. The strip is attached to the Cranks by *lock-nutted* bolts.

One of the 1½″ Rods is fitted with a Handrail Coupling placed between the Angle Girder and the Reversed Angle Bracket. A 2″ Rod is fixed in the Handrail Coupling, and the road wheel is free to turn on it. The wheel is spaced from the Handrail Coupling by a 1½″ Pulley and a 1″ loose Pulley, and is held in position by a 1⅛″ Flanged Wheel. A second Handrail Coupling is fixed to the top end of the vertical 1½″ Rod and another 1½″ Rod (10) is gripped in it (Fig. 4).

The vertical 1½″ Rod at the other end of the axle beam carries a Coupling placed between the Girder and the ½″ Reversed Angle Bracket. The road wheel is free on a 2″ Rod held in the Coupling but is spaced from it by a 1½″ Pulley and is held in place by a 1⅛″ Flanged Wheel.

The steering column is a 6½″ Rod supported in Flat Trunnions bolted to the chassis (Fig. 3). A ¾″ Pinion on the steering column engages a 50-tooth Gear on a 2″ Rod that carries also a Crank (11). An 11½″ Screwed Rod is fixed by a nut on a Collar, which pivots freely on a ½″ Bolt held by two nuts in the Crank (11).

The Screwed Rod is connected by a Threaded Coupling to a 6½″ Rod fitted

Rear Axle and Steering Mechanism (Fig. 4)

The vehicle steers by the rear wheels. Each of the rear springs consists of a 5½″, a 4½″, a 3½″ and a 2½″ Strip. The 5½″ Strip is fitted at its ends with Angle Brackets, one of which is *lock-nutted* to a 1″ Triangular Plate bolted to the chassis.

The other Angle Bracket is *lock-nutted* to a Fishplate also bolted to the chassis.

with a Swivel Bearing (12) (Fig. 4). The spider of the Swivel Bearing is fixed on the end of the Rod (10).

The Engine Unit and Clutch (Figs. 4, 5 and 6)

The sides of the engine unit are $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plates, and the ends are $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates connected to the former by $3\frac{1}{2}''$ Angle Girders. An E15R Electric Motor is fixed through its flanges to one side of the unit (Fig. 5). A Girder Bracket (13) (Fig. 5) is fixed to each of the $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates and a 2" Angle Girder is bolted to it.

A $\frac{1}{2}''$ Pinion on the lower end of the Motor shaft drives a 57-tooth Gear on a $2\frac{1}{2}''$ Rod supported in the Motor side-plates. The top end of this Rod carries a $\frac{1}{2}''$ Pinion (14) (Fig. 5), and this engages a $1\frac{1}{2}''$ Contrate on a $2\frac{1}{2}''$ Rod mounted in one end of the engine unit and in a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip (15) bolted across it. A $\frac{1}{2}''$ Pinion (16) is fixed on the $2\frac{1}{2}''$ Rod and engages a 57-tooth Gear on the clutch driving shaft, which is a 2" Rod supported in the end of the engine unit and in a Double Bent Strip bolted to the inside of the Flanged Plate that forms the end. A Wheel Flange (17) (Fig. 6) bolted to a Bush Wheel forms the fixed clutch plate.

The clutch housing is made by fixing two $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips (18)

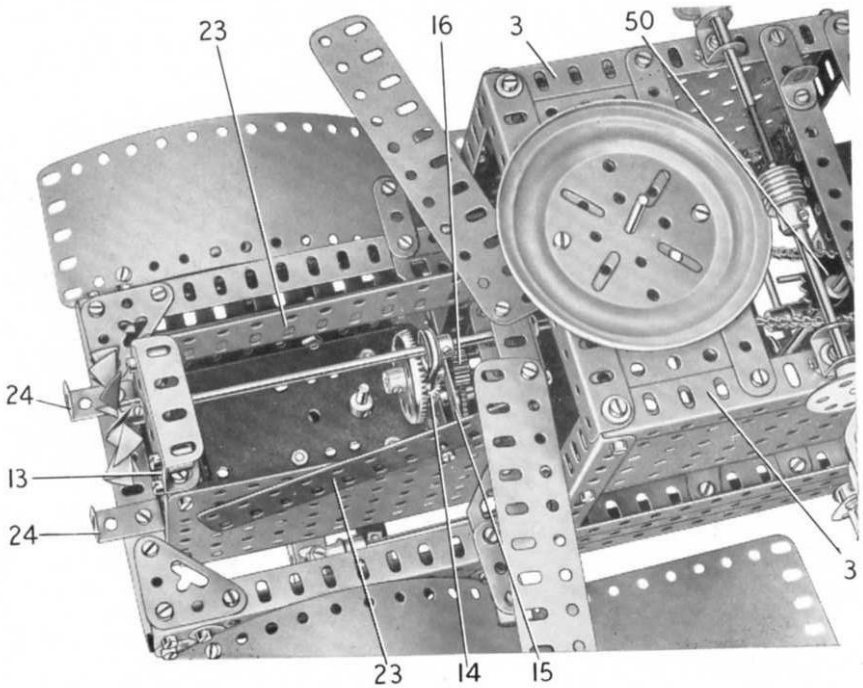


FIG. 5 *The cover plates of the engine unit are swung aside here to reveal details of the speed reduction gearing and the drive to the cooling fan*

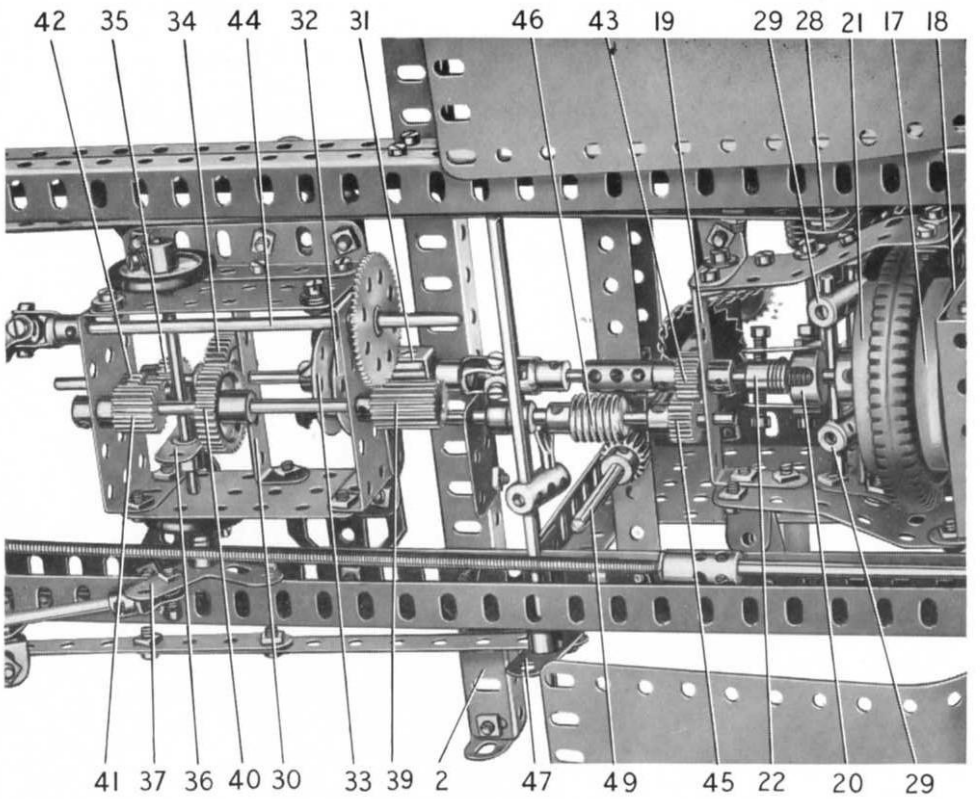


FIG. 6 *A close-up of the clutch and gear-box mechanisms of the Snow Loader*

across one end of the engine unit. Two 3" Flat Girders, shaped as shown, are bolted to the lugs of the Double Angle Strips (18) and are connected by a $2\frac{1}{2}'' \times 1''$ Double Angle Strip (19).

A Bush Wheel (8-holes) is gripped in a Socket Coupling (20) and is connected to a Wheel Flange (21) by two $\frac{3}{8}''$ Bolts, but is spaced from the Wheel Flange by nuts on the Bolts. *The ends of the Bolts must not project beyond the nuts that fix them to the Wheel Flange.* This arrangement is used so that the boss of a 2" Pulley can be supported in the large centre hole of the Wheel Flange (21). The 2" Pulley is fitted with a Motor Tyre and is free to turn on the clutch driving shaft.

The Bush Wheel and the Socket Coupling (20) are freely mounted on the clutch output shaft, but are made to turn with the shaft by two Fishplates, each of which is fixed by a nut and a bolt in the Socket Coupling. A $\frac{3}{8}''$ Bolt passed through the slotted hole of each Fishplate is screwed into a Collar (22) (Fig. 6) on the clutch output shaft. This shaft is a $2\frac{1}{2}''$ Rod, and a Compression Spring and four Washers are placed on it between the Collar (22) and the Socket Coupling. A second Collar is fixed on the shaft next to the Double Angle Strip (19). The Compression Spring presses the Wheel Flange (21) and the Tyre on the 2" Pulley into contact with the Wheel

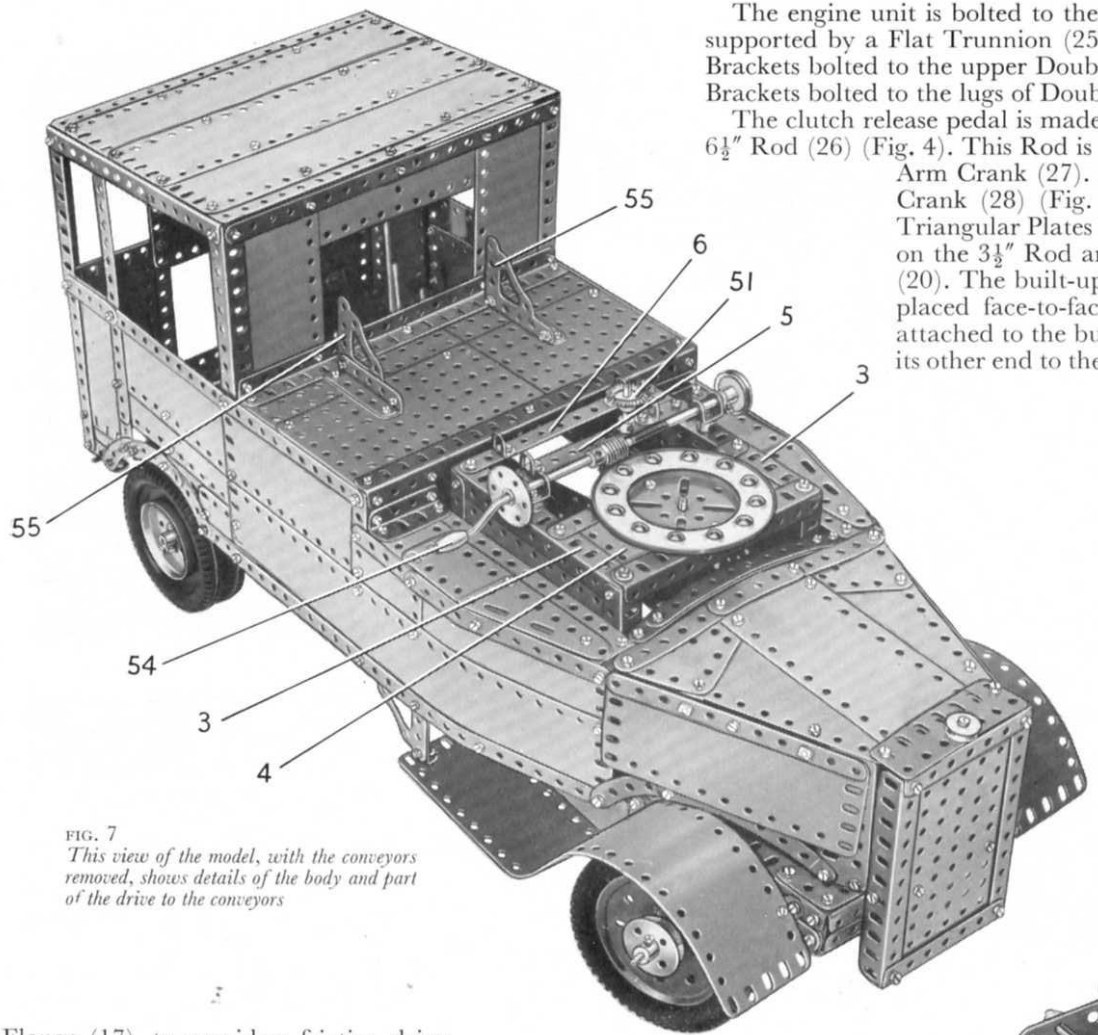


FIG. 7
This view of the model, with the conveyors removed, shows details of the body and part of the drive to the conveyors

Flange (17), to provide a friction drive to the output shaft.

A Fan is fixed on a 6½" Rod mounted in the Girder Brackets (13). This Rod is driven by a Driving Band passed round the Rod that carries the Pinion (16) (Fig. 5) and round a ½" Pulley on the 6½" Rod.

The top of the engine unit is completed by bolting two 5½" Flat Girders to the 2" Angle Girders, and by fixing on one side a 5½" Strip to the top flanges of the 3½" × 2½" Flanged Plates. Two 5½" Flat Girders (23) (Fig. 5) are connected to one of the Girder Brackets by Angle Brackets. Bolts passed through the other ends of the Flat Girders (23) are screwed into Threaded Bosses, which are fixed by nuts to the second Girder Bracket.

The engine unit is bolted to the lugs of two 1" Reversed Angle Brackets (24) (Fig. 5), and is further supported by a Flat Trunnion (25) on each side (Fig. 3). These Flat Trunnions are attached to Angle Brackets bolted to the upper Double Angle Strip (18). The clutch housing is supported by 1" × 1" Angle Brackets bolted to the lugs of Double Angle Strip (19) and fixed to 1½" Strips secured to the chassis.

The clutch release pedal is made by bolting a 3½" Strip to a Double Arm Crank fixed on one end of a 6½" Rod (26) (Fig. 4). This Rod is mounted across the front of the chassis, and it carries another Double Arm Crank (27). A built-up strip is *lock-nutted* to the Double Arm Crank (27) and to a Crank (28) (Fig. 6), which is fixed on a 3½" Rod. The 3½" Rod is supported in 1" Triangular Plates bolted to the 3" Flat Girders of the clutch housing. Two Couplings (29) on the 3½" Rod are fitted with 1" Rods that engage the groove of the Socket Coupling (20). The built-up strip consists of a 12½" Strip, extended at one end by two 5½" Strips placed face-to-face. The 5½" Strips overlap the 12½" Strip by four holes. A Spring attached to the built-up strip at a point two holes in front of the Crank (28), is bolted at its other end to the chassis to provide a return spring for the clutch release mechanism.

Details of the Gear-Box (Figs. 4 and 6)

The gear-box provides forward and reverse drives to the front axle. The housing consists of two 2½" × 1½" Flanged Plates bolted to two 3" × 1½" Flat Plates. A 2½" × ½" Double Angle Strip (30) is bolted across the housing, and a Double Bent Strip (31) is fixed at one end to the Flanged Plate. The input shaft is a 1½" Rod mounted in the Flanged Plate and the Double Bent Strip, and it carries a Bush Wheel (8-holes) (32). Two Pivot Bolts are passed through a Bush Wheel (8-holes) (33) and are fixed by their nuts in the Bush Wheel (32). The Bush Wheel (33), is fixed on the end of a 3½" Rod that carries a 1" Gear (34) and a ½" Pinion (35), and is mounted in the end of the housing and in the Double Angle Strip (30).

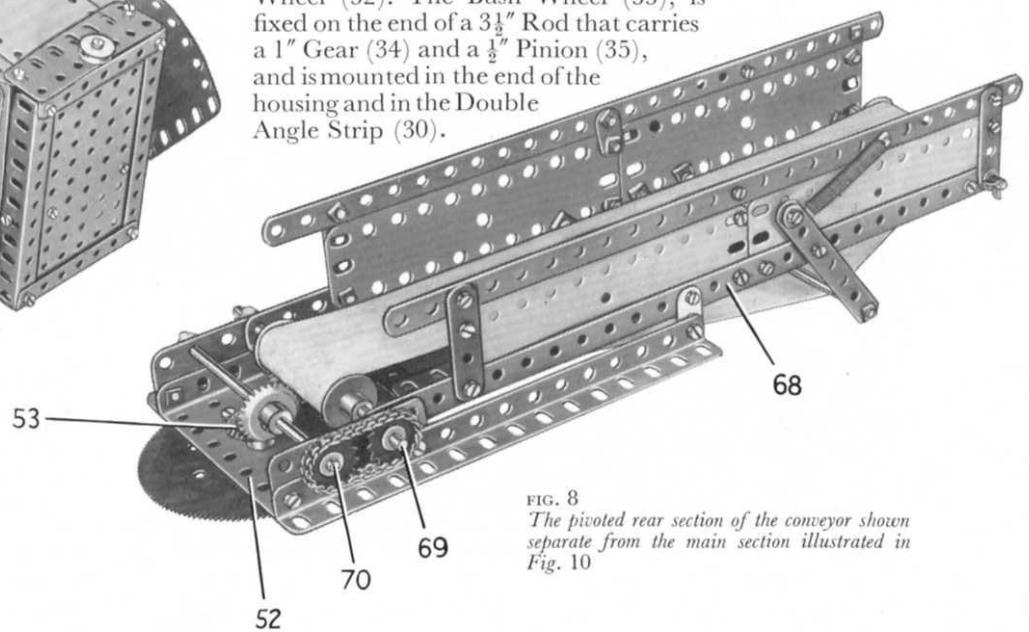


FIG. 8
The pivoted rear section of the conveyor shown separate from the main section illustrated in Fig. 10

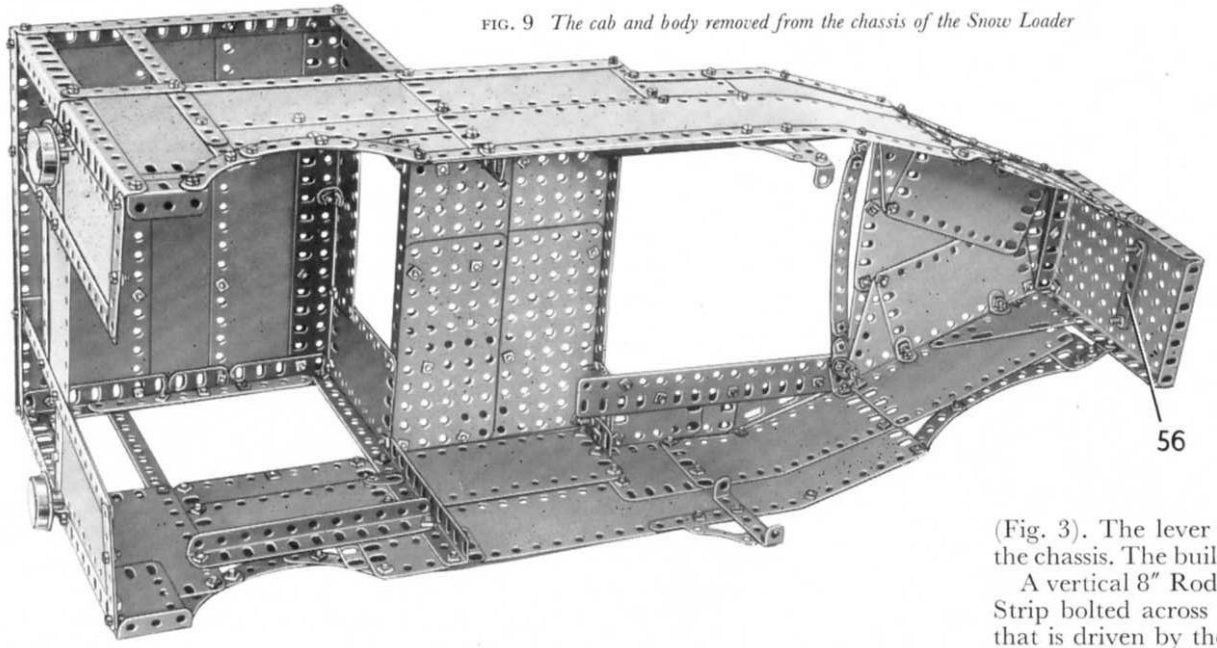


FIG. 9 *The cab and body removed from the chassis of the Snow Loader*

The Pinion (39) drives a 57-tooth Gear on a 5″ Rod (44) mounted as shown in Fig. 4. This Rod is connected to the front axle driving shaft by a 1″ Rod and two Universal Couplings.

The Drive to the Conveyors (Figs. 3, 6, 7 and 8)

A 3½″ Rod is supported in the Double Angle Strip (19) (Fig. 6) and in a 1½″ Flat Girder bolted to the Girder (2). This Rod carries a ½″ Pinion (45) and a Worm (46), and by sliding the Rod the Pinion can be engaged with the Pinion (43) on the clutch shaft. The movement of the Rod is controlled by a Centre Fork that engages between the Worm (46) and a Collar. The Centre Fork is held in a Coupling on an 8″ Rod mounted across the chassis, and a Double Arm Crank (47) is fixed on this Rod also. A built-up strip is *lock-nutted* to the Double Arm Crank and to a Rod and Strip Connector on a lever (48) (Fig. 3). The lever is 4″ Rod fixed in a Handrail Support that is *lock-nutted* to the chassis. The built-up strip is made from two 5½″ Strips overlapped four holes.

A vertical 8″ Rod (49) (Fig. 6) is mounted in Strips (5) (Fig. 3) and in a 5½″ Strip bolted across the chassis. The Rod carries at its lower end a ½″ Pinion that is driven by the Worm (46), at its centre a 1″ Sprocket (50) (Fig. 3) and at its upper end a ⅞″ Bevel (51).

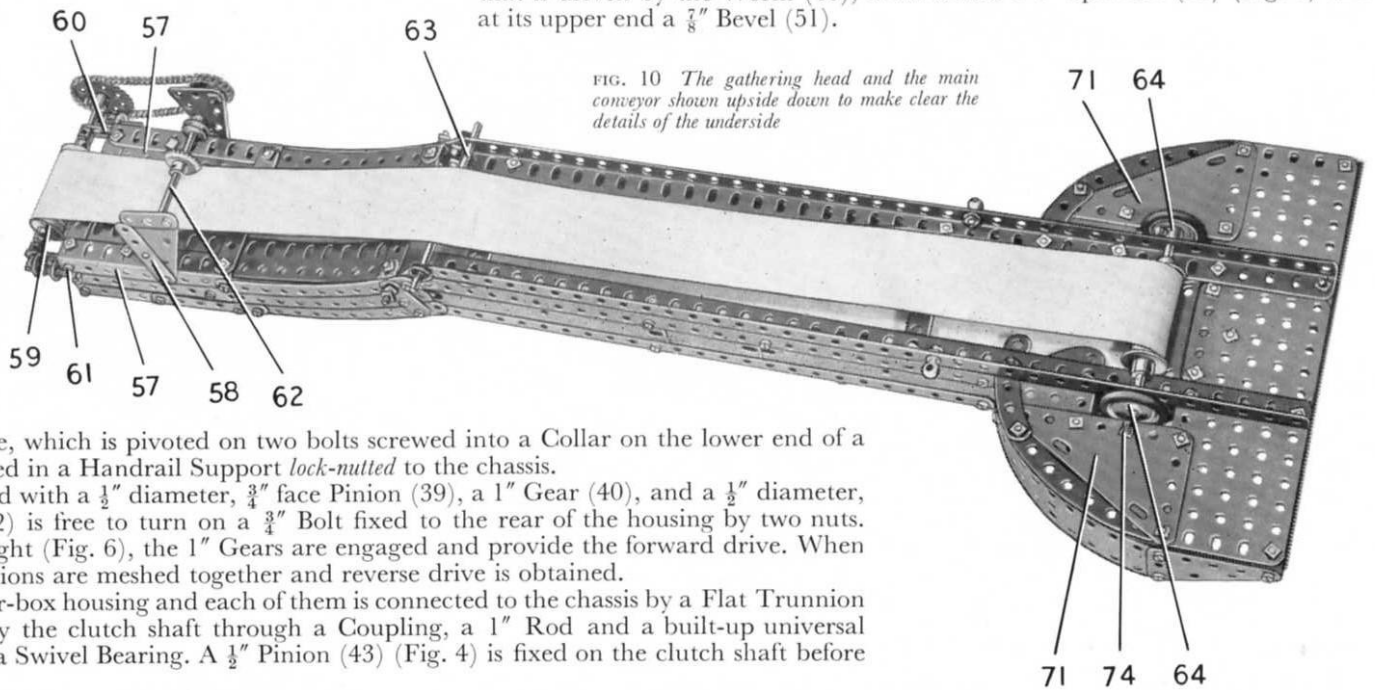


FIG. 10 *The gathering head and the main conveyor shown upside down to make clear the details of the underside*

The 3½″ Rod is free to slide in its bearings, but it is driven by the input shaft through the Bush Wheels and the Pivot Bolts. The movement of the Rod is controlled by a ½″ Bolt in a Double Arm Crank (36) (Fig. 6). The Bolt engages between the Gear (34) and the Pinion (35), and the Double Arm Crank is fixed on a 4½″ Rod mounted across the housing. The Rod is held in place by two 1″ Pulleys with Rubber Rings, which bear against the housing and prevent the Rod from turning too easily. A Bell Crank (37) is also fixed on the 4″ Rod, and an End Bearing is pivoted on a ½″ Bolt held in one arm of the Bell Crank by two nuts. The End Bearing is connected by a 5″ Rod to a small Fork Piece, which is pivoted on two bolts screwed into a Collar on the lower end of a lever (38) (Fig. 3). This lever is a 5″ Rod fixed in a Handrail Support *lock-nutted* to the chassis.

The gear-box output shaft is a 4″ Rod fitted with a ½″ diameter, ¾″ face Pinion (39), a 1″ Gear (40), and a ½″ diameter, ½″ face Pinion (41). A ½″ reverse Pinion (42) is free to turn on a ¾″ Bolt fixed to the rear of the housing by two nuts. When the sliding 3½″ Rod is moved to the right (Fig. 6), the 1″ Gears are engaged and provide the forward drive. When the Rod is moved to the left the three ½″ Pinions are meshed together and reverse drive is obtained.

Two 3″ Angle Girders are bolted to the gear-box housing and each of them is connected to the chassis by a Flat Trunnion and a 2″ Strip. The input shaft is driven by the clutch shaft through a Coupling, a 1″ Rod and a built-up universal coupling made from a small Fork Piece and a Swivel Bearing. A ½″ Pinion (43) (Fig. 4) is fixed on the clutch shaft before the Coupling is locked in position.

The Sprocket (50) is connected by Chain to a 1½" Sprocket on a vertical 2" Rod that passes through the Flanged Disc of a Ball Thrust Race bolted to the Flat Plate (4) (Fig. 7). A 3½" Gear rests on the Ball Cage, and to the Gear is bolted the 3½" × 2½" Flanged Plate (52) of the conveyor (Fig. 8). The assembly is held on the 2" Rod by a ⅞" Bevel (53) (Fig. 8), leaving the Rod free to turn.

The 3½" Gear can be rotated by turning a Crank Handle (54) (Fig. 7) extended by a Rod joined to it by a Rod Connector. This assembly is mounted in the lugs of two large Fork Pieces, which are attached to the Girders (3) by ½" Bolts. A Worm on the Crank Handle engages the 3½" Gear.

Construction of the Body (Figs. 7 and 9)

The arrangement of the parts used to assemble the body is shown quite clearly in Fig. 9, and very little description is needed. The platform behind the cab is formed by two 5½" × 3½" Flat Plates and two 5½" × 2½" Flat Plates, and two Corner Gussets (55) (Fig. 7) are bolted to 2½" Angle Girders fixed to the platform. The radiator is a 5½" × 3½" Flat Plate edged by Angle Girders, and inside the Flat Plate three 2½" Strips (56) placed face-to-face are held by ½" Bolts. These Bolts are used to attach the radiator to the lugs of the Reversed Angle Brackets (24) (Fig. 5). The body is bolted to the Girder (1) (Fig. 2) at the front and to Angle Brackets fixed to the ends of the Girder (2) (Fig. 3).

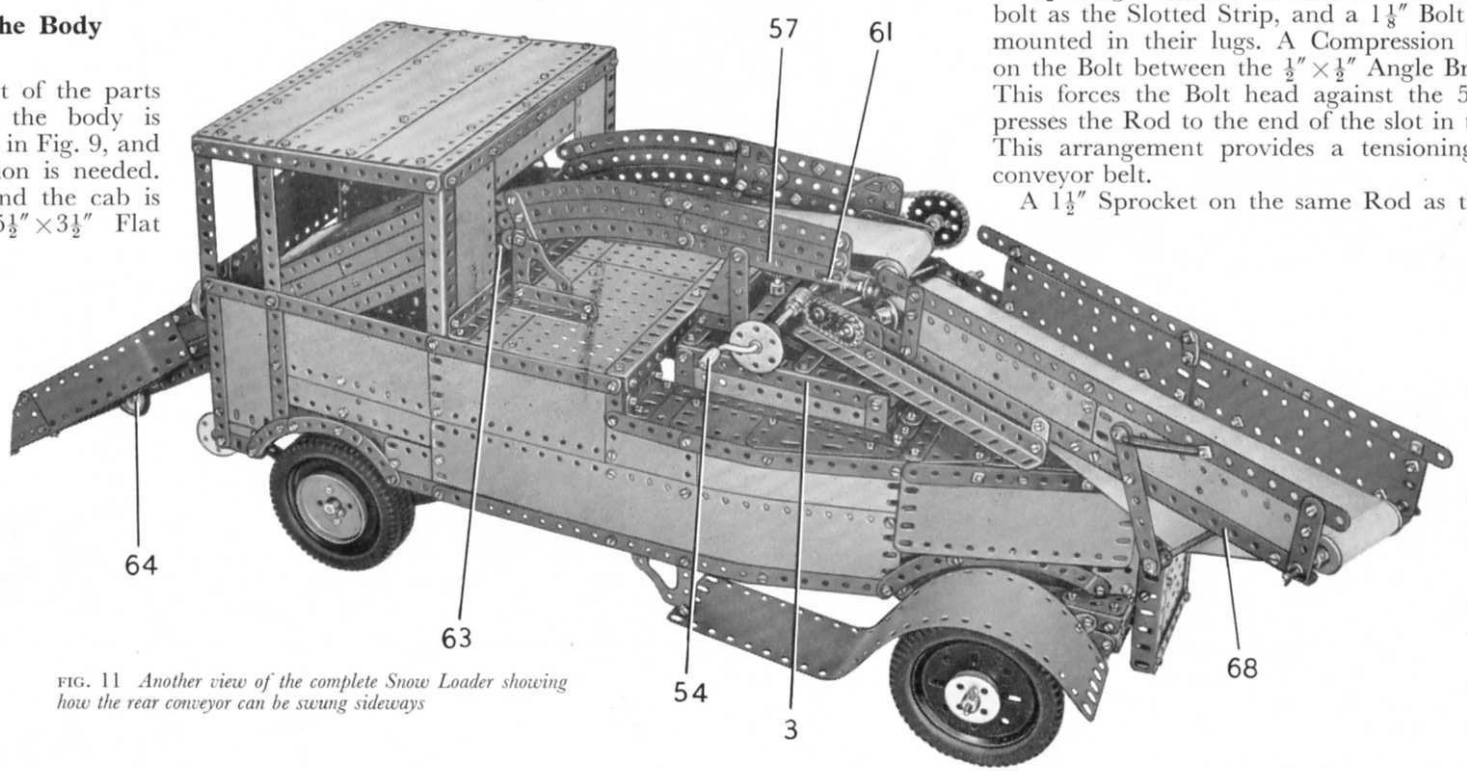


FIG. 11 *Another view of the complete Snow Loader showing how the rear conveyor can be swung sideways*

The door catch is made by fixing a Pawl on a Pivot Bolt, which is passed through the door. A Fishplate is then fixed on the Pivot Bolt by two nuts.

Assembly of the Conveyors (Figs. 8 and 10)

The fixed section of the main conveyor (Fig. 10) consists of a 7½" Flat Girder and a 2" Flat Girder on each side, connected by three 3½" Strips. The sides are each formed by a 4½" Angle Girder (57), a 4½" Strip, a 2½" Strip, a 3" Strip and three 5½" Curved Strips joined by two Flat Trunnions and a 1½" Strip. The fixed section is attached by ⅜" Bolts to the Corner Gussets (55) (Fig. 7), and is supported by two 2½" × 1½" Triangular Flexible Plates, which are strengthened by 2½" Strips (58) and 1½" Strips, and are attached by Angle Brackets to the Strips (5) and (6) (Fig. 7).

The driving roller (59) is formed by two ¾" Flanged Wheels pressed over a Sleeve Piece. The roller is fixed on a 5" Rod mounted in the slotted holes of 2" Slotted Strips (60) (Fig. 10). A ½" × ½" Angle Bracket and a 1" × ½" Angle Bracket on each side are fixed by the same bolt as the Slotted Strip, and a 1⅛" Bolt (61) (Fig. 10) is mounted in their lugs. A Compression Spring is placed on the Bolt between the ½" × ½" Angle Bracket and a nut. This forces the Bolt head against the 5" Rod and thus presses the Rod to the end of the slot in the Slotted Strip. This arrangement provides a tensioning device for the conveyor belt.

A 1½" Sprocket on the same Rod as the Roller (59) is connected by Chain to a 1" Sprocket on a 5" Rod (62), mounted in the Strips (58). A ⅞" Bevel on Rod (62) engages the Bevel (51) (Fig. 7).

The pivoted end section of the main conveyor consists of two 18½" Angle Girders connected by two 3½" Strips. The covered-in section is made by bolting a 12½" Angle Girder to each side. A 2½" × 1½" and two 5½" × 1½" Flexible Plates are bolted to each 12½" Angle Girder, and a further 12½" Angle Girder is bolted to their upper edges. The latter Girders on each side are connected by 3½" Strips, to which a 9½" × 2½" Strip Plate is bolted. The pivoted section is mounted on a 4½" Rod (63) (Fig. 10), which is supported in Fishplates bolted to the fixed section of the conveyor. The lower roller is formed by two ¾" Flanged Wheels spaced apart the width of the conveyor belt on a 4½" Rod that carries two 1" Pulleys (64), each fitted with a Rubber Ring.

The pivoted section can be raised or lowered by turning a 6½" Rod (65) (Fig. 3). This is mounted in a 2½" × 1" Double Angle Strip bolted to a 4½" Flat

Girder fixed to the chassis, and on the Rod is pivoted a second 2½" × 1" Double Angle Strip, that supports a 4½" Strip (66). A 2" Screwed Rod is passed through each end of the Strip (66), is fitted with a ⅞" Bevel (67) and is passed into a Coupling on Rod (65). The Bevels (67) are driven by further Bevels as shown in Fig. 3, and the Screwed Rods are threaded into Handrail Supports *lock-nutted* to the conveyor as shown.

The rear section of the conveyor shown in Fig. 8 is made by bolting a 7½" Angle Girder to each flange of the Flanged Plate (52). A 2½" Flat Girder is also fixed to each flange, and a 12½" Angle Girder (68) is supported by the Flat Girder and by a Fishplate bolted to the 7½" Angle Girder. The Girders (68) are connected three holes from their outer ends by a 3½" Strip, and a 9½" and a 1½" Flat Girder are bolted to the slotted flanges of each of the Girders (68). The conveyor sides are 5½" × 1½" Flexible Plates attached to a framework of 2" and 12½" Strips.

The driving roller consists of two ¾" Flanged Wheels spaced apart the width of the conveyor belt on a 4½" Rod (69). A ¾" Sprocket on this Rod is driven by Chain from a similar Sprocket on a 4½" Rod (70), and a ⅞" Bevel on Rod (70) engages the Bevel (53). The roller at the rear end of the conveyor is formed by a Sleeve Piece and two ¾" Flanged Wheels on a 4½" Rod. The device for tensioning this conveyor is made by *lock-nutting* a 3½" Strip to each of the Girders (68). A 3½" Rod is held in Rod Sockets fixed to the lower ends of the Strips, and Springs are bolted to the top ends of the Strips and to the conveyor sides as shown.

The conveyor belts are strips of cloth or strong paper passed round the rollers as shown, and their ends joined to make endless belts.

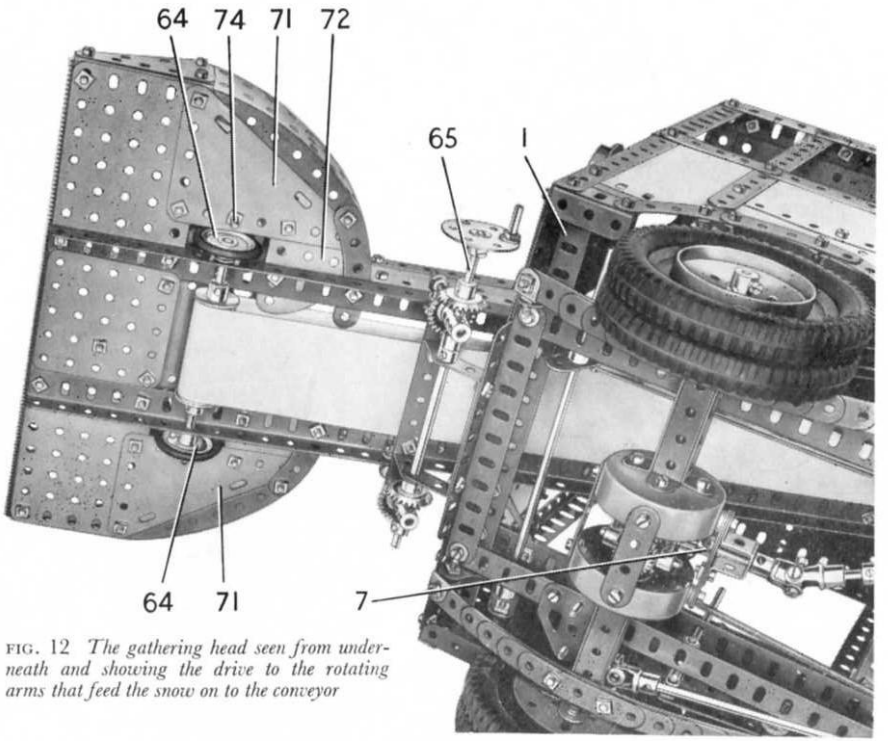


FIG. 12 *The gathering head seen from underneath and showing the drive to the rotating arms that feed the snow on to the conveyor*

The Gathering Head (Figs. 1, 10 and 12)

The snow gathering head is made by bolting two 4½" × 2½" Flat Plates and a 2½" × 2½" Flat Plate to the 18½" Angle Girders of the main conveyor (see Fig. 10). A 2½" Angle Girder is fixed to the outer end of each 4½" × 2½" Flat Plate, and each of these Plates is connected to one of the 18½" Angle Girders by a 4" Stepped Curved Strip and a 2½" Curved Strip. The space between the Girder and the Curved Strip on each side is filled by a 3½" × 2" Triangular Flexible Plate (71) and a Semi-Circular Plate (72) (Fig. 12). A 2½" Strip is bolted between the 4½" × 2½" Flat Plate and the Semi-Circular Plate, along the edge of the Triangular Flexible Plate.

The gathering arms (73) (Fig. 1) are Double Brackets bolted to 2½" Strips, each of which is attached by an Angle Bracket to a Face Plate. The Face Plate turns freely on a 1⅛" Bolt (74) (Fig. 12) which is held by two nuts in one of the Triangular Flexible Plates. The Face Plate rests on the Rubber Ring of one of the Pulleys (64) (Fig. 12) and is driven by this Pulley through the friction of the Rubber Ring.

Parts Required to Build the Meccano Automatic Snow Loader

5 of No.	1	7 of No.	9b	6 of No.	16a	8 of No.	26	3 of No.	46	2 of No.	73	2 of No.	103e	2 of No.	124	2 of No.	161	4 of No.	197
4 " "	1a	2 " "	9c	5 " "	17	1 " "	26a	12 " "	48a	4 " "	77	2 " "	103f	4 " "	125	2 " "	162a	1 " "	212
4 " "	1b	5 " "	9d	6 " "	18a	1 " "	26b	2 " "	48b	1 " "	78	2 " "	103g	10 " "	126a	2 " "	163	2 " "	213
31 " "	2	4 " "	9e	4 " "	18b	1 " "	27	2 " "	51	1 " "	79a	4 " "	103h	1 " "	128	4 " "	164	2 " "	214
48 " "	2a	5 " "	9f	6 " "	19b	3 " "	27a	6 " "	52a	2 " "	81	4 " "	103k	4 " "	133	2 " "	165	4 " "	221
18 " "	3	24 " "	10	1 " "	19g	1 " "	27b	3 " "	53	2 " "	82	4 " "	108	2 " "	133a	1 " "	166	2 " "	222
8 " "	4	4 " "	11	4 " "	20	2 " "	28	2 " "	53a	6 " "	89	4 " "	109	4 " "	136	1 " "	168a	1 " "	223
31 " "	5	39 " "	12	2 " "	20a	2 " "	29	2 " "	55a	4 " "	89b	2 " "	110a	2 " "	136a	1 " "	168c	2 " "	224
11 " "	6	6 " "	12a	8 " "	20b	8 " "	30	24 " "	59	10 " "	90	1 " "	111	4 " "	137	1 " "	171	2 " "	225
10 " "	6a	6 " "	12b	2 " "	21	2 " "	31	4 " "	62	1 " "	94	17 " "	111a	2 " "	140	2 " "	179	2 " "	226
4 " "	7	4 " "	12c	5 " "	22	2 " "	32	4 " "	62b	2 " "	95a	23 " "	111c	1 " "	142a	3 " "	186		
2 " "	7a	3 " "	13a	1 " "	22a	6 " "	35	8 " "	63	2 " "	96	4 " "	111d	6 " "	142b	11 " "	188		
6 " "	8	4 " "	14	1 " "	23	657 " "	37a	1 " "	63c	2 " "	96a	2 " "	114	1 " "	144	12 " "	189		
6 " "	8a	6 " "	15	2 " "	23a	575 " "	37b	2 " "	64	4 " "	103	1 " "	115	1 " "	147a	3 " "	190	1 E15R	
4 " "	8b	6 " "	15a	4 " "	24	84 " "	38	1 " "	65	4 " "	103a	2 " "	116	5 " "	147b	9 " "	191	Electric Motor	
12 " "	9	2 " "	15b	2 " "	24b	3 " "	43	4 " "	70	1 " "	103c	2 " "	116a	4 " "	155	12 " "	192	(not included	
8 " "	9a	4 " "	16	3 " "	25	3 " "	45	1 " "	72	2 " "	103d	3 " "	120b	1 " "	157	4 " "	196	in Outfit)	

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