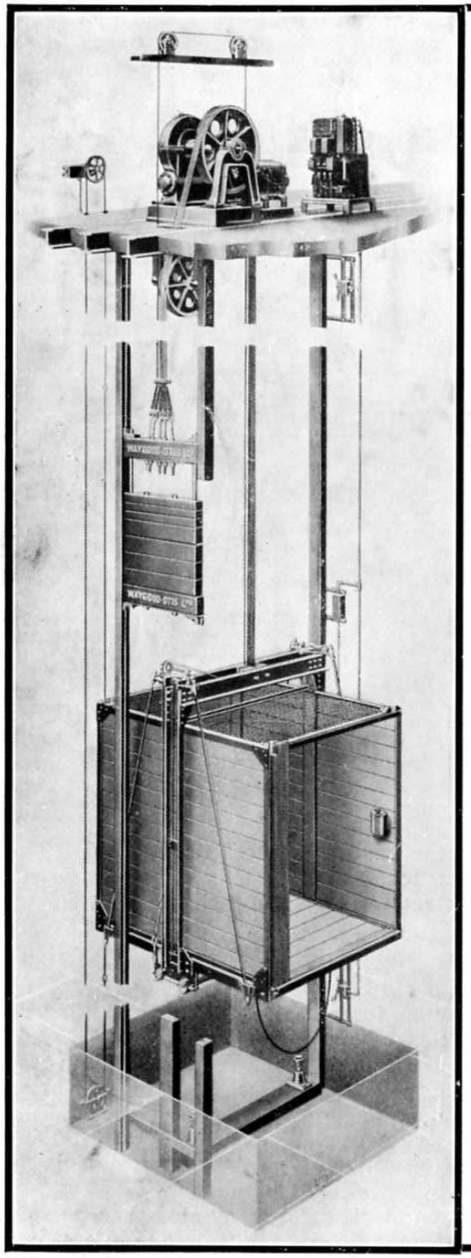

Goods Warehouse with Electric Elevators

An L Outfit Model

SPECIAL FEATURES.

The Warehouse is equipped with two Electric Elevators that are operated simultaneously. The mechanism is entirely automatic in action, the lift cages working alternatively and rising, pausing and descending without supervision. The Motor can be controlled from any floor of the Warehouse. Each cage is fitted with an ingenious safety catch which prevents the cage from falling should the lifting rope fail.

WITH the rapid development of our large cities and the corresponding rise in the value of building sites, economy in ground area has resulted in the erection of increasingly high buildings having a great number of floors. In such buildings the installation of passenger or goods lifts is necessary in order to render the upper floors easily accessible. These modern lifts are usually operated by electric motors, although there are some engineers who prefer to drive their lifts by hydraulic power or other means.

The hydraulically-operated lift is not met with so frequently, but in places where water under high pressure is readily obtainable it still holds its own against the electric type, especially if heavy loads have to be handled, because it is comparatively cheap in initial cost and upkeep. It is particularly suited for use where a lift is required to rise and fall through a short distance only.

In such cases it is usual to install the direct-ram machine, a device that consists essentially of a long cylinder containing a piston or ram, the whole being sunk into the ground beneath the lift well. The ram is attached directly to the underside of the lift cage, and the cylinder is fitted with valves so that water may be admitted at great pressure into the cylinder beneath the piston. The incoming water forces the ram and cage upward. To lower the lift it is only necessary to open the exhaust water valve on the cylinder and, the pressure being released gradually, the ram and cage descend by their own weight. The chief disadvantage of this system is, of course, the great length of cylinder and ram which would be required for a high building, and this is one of the reasons why the type is now but seldom employed. Other dis-

The illustration on this page shows a modern Electrically-operated Goods Elevator made by Waygood-Otis, Ltd. It provides an interesting comparison with the Meccano Model.

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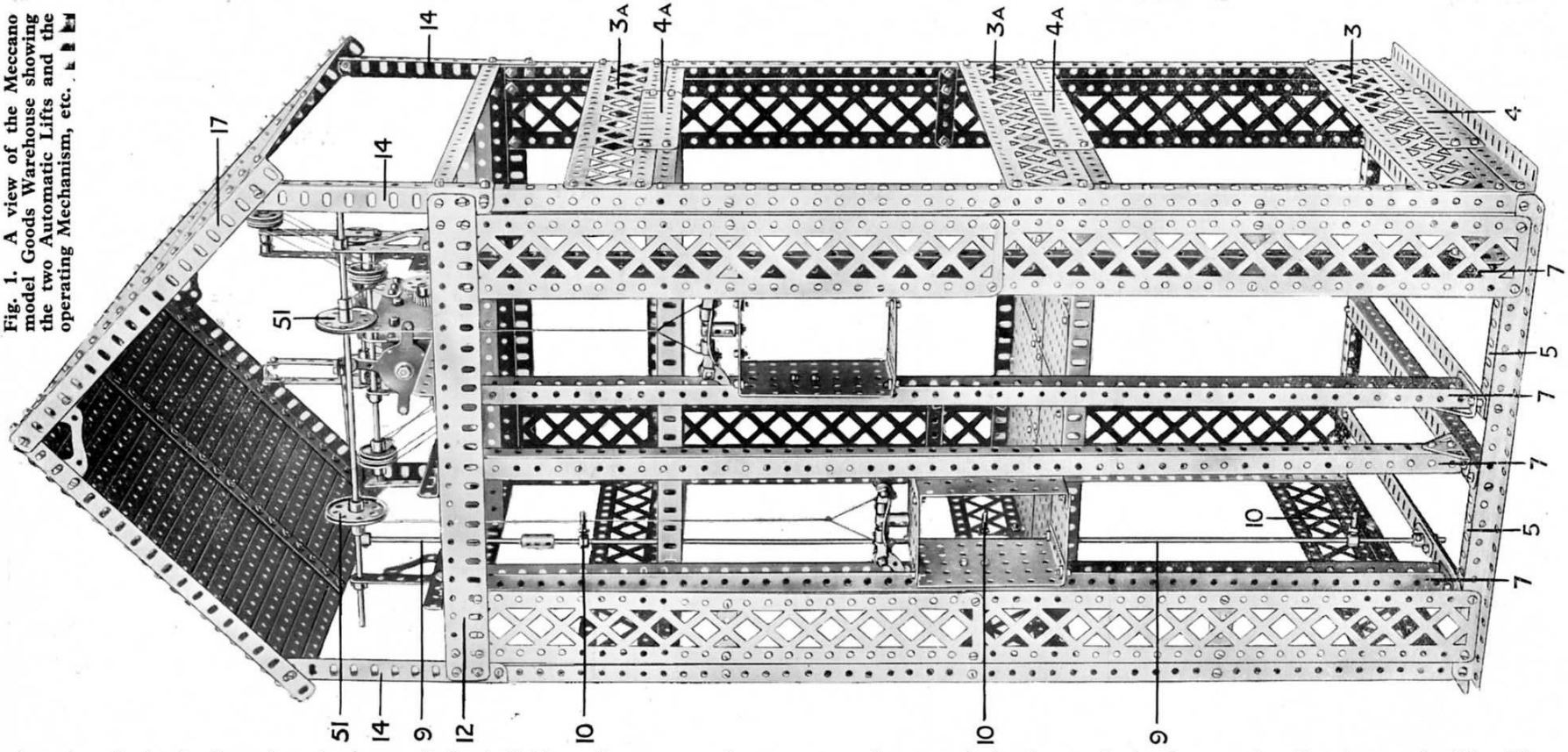


Fig. 1. A view of the Meccano model Goods Warehouse showing the two Automatic Lifts and the operating Mechanism, etc.

advantages lie in the fact that the long cylinder is liable to fracture or the pipes may burst under the great pressure.

In a few cases the hydraulic power is transmitted to the lift cage through a chain or rope passing over an overhead pulley, and the hydraulic cylinder is laid horizontally. This method, of course, facilitates erection and periodical inspection of the apparatus, but at the same time the frictional resistance of the movement is increased.

In hotels, hospitals and large mansions, lifts are sometimes installed that can be operated entirely by hand power. This type is extremely simple in operation, as it is only necessary to enter the cage and pull lightly on a rope, which passes through the cage. The rope is attached at one end to the roof of the cage and thence is passed over a series of pulleys placed at the top of the well and finally round a hauling wheel three or four feet in diameter. The free end of the rope is brought down through the interior of the cage itself.

This arrangement, which is really an adaptation of the pulley block, enables loads to be raised quite easily by pulling on the control rope. The weight of the cage itself is usually counterbalanced by means of a heavy weight arranged to travel simultaneously in the opposite direction to the lift. The cage moves between guides, and automatic brakes are fitted so that in the event of the rope breaking, the brakes act instantly and prevent the cage from falling.

Modern High-speed Lifts

Lifts hauling goods traffic usually travel at the comparatively slow speed of 120 feet per minute, but it is the practice to provide variable speed gears in order that, if required, the lift may be operated at a higher speed. In restaurants, large shops and offices, etc., where there are several lifts, they are usually arranged in batteries, some of the lifts running "express" or non-stop to certain of the higher floors and others running "local," or stopping at all floors. The express lifts will obviously be high speed machines; they usually travel at speeds up to 300 or 400 feet per minute. A speed of 150 to 180 feet per minute is usually chosen for the "local" lifts in order to avoid violent acceleration and deceleration.

In designing any type of lift there are naturally many factors to be considered, one of the most important being the necessity for absolute safety. Also, when stopping at each floor, it is very desirable to be able to bring the

lift from full speed to rest without jar or shock, and much attention has been given to this point during recent years.

Another important consideration is reliability, and it is principally on account of their proved reliability that electrically-operated lifts have gradually superseded other types and are now employed for all kinds of work and in all classes of buildings, including offices, hotels and hospitals.

A typical electric lift consists of several distinct parts, the most important of which are the lifting motor, the "cage" and its fitments, electric controls and, of course, the well and guides. In addition to the above, a modern passenger lift is fitted with automatic gate locks and various other refinements.

Hauling-Gear Safety Devices

In most modern lifts the cars are suspended by multiple-strand steel ropes, as past experience has proved that chains are unsatisfactory for the purpose. One of the great disadvantages of chain suspension is that a chain is liable to fail suddenly without giving any previous warning.

To prevent the cage from falling in the event of failure of the hauling ropes, a safety gear is fitted. It is usually arranged either above or immediately beneath the cage. Different makers, of course, fit different types of safety gear, and there are very many of these ingenious mechanisms in everyday use.

One of the foremost British firms has designed a type of gear which consists essentially of four cams, mounted on steel shafts and suitably supported under the floor of the cage. The apparatus is operated by a separate "safety" rope that is directly attached to the camshafts, and so designed that in the event of failure of the suspension ropes (which are attached to the body of the cage) the four cams will be drawn in and will grip simultaneously on the steel guides between which the cage travels. This type of gear is fitted to the lift shown on the cover page of this leaflet. It is manufactured by Waygood-Otis, Ltd., of London, one of the pioneer firms in the lift building industry.

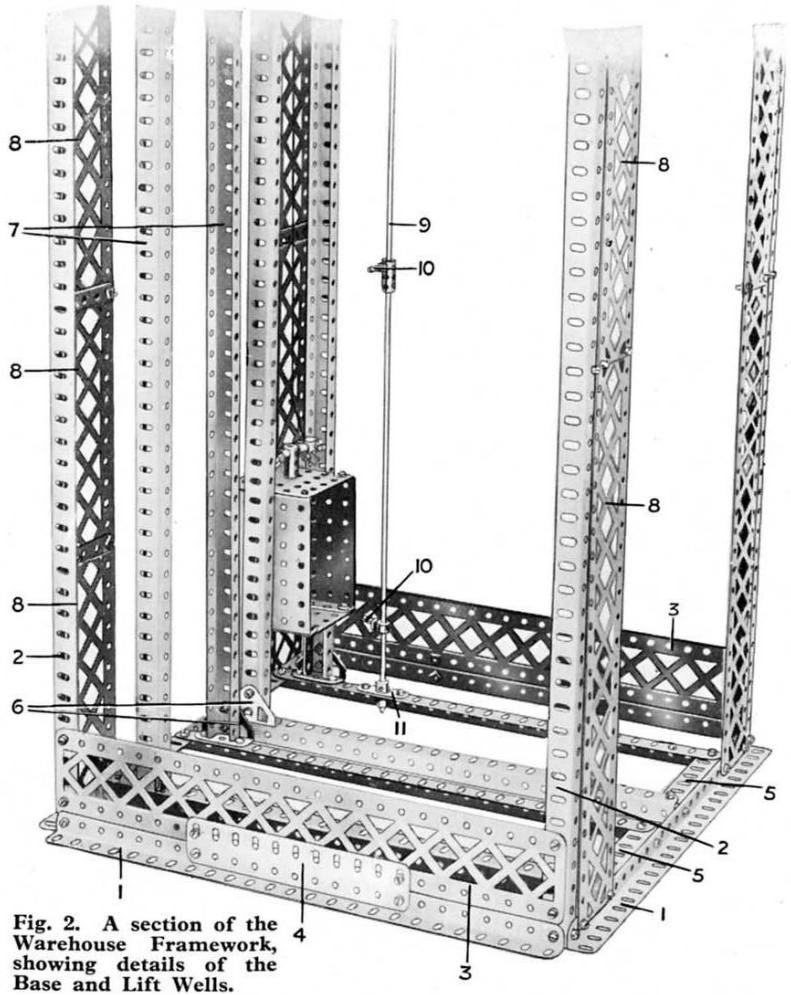


Fig. 2. A section of the Warehouse Framework, showing details of the Base and Lift Wells.

This safety apparatus, while being quite efficient and reliable, has a disadvantage in that it acts rather suddenly and brings the cage to a standstill with a jerk. In view of this it is hardly suitable for use with high-speed "express" passenger lifts and for such lifts a special type of gear has been devised by the same makers. It is brought into operation by a speed governor immediately the lift cage attains an excessive speed due to any failure in the brake machinery or of the wire lifting ropes. This form of safety device is arranged to come into operation gradually and stop the car without sudden shock or jerk—a feature which, as will be easily recognised, is absolutely essential in the case of a lift travelling at high speed.

The Lifting Machinery

The following are a few particulars of the mechanism supplied by Waygood-Otis, Ltd., with their electric goods and passenger lifts.

The winding motor is directly coupled to a worm and wheel reduction gear. The worm, which is placed immediately below the wheel and arranged so that it will always be running in a bath of oil, is made of solid cut steel, while the wheel is of phosphor-bronze. They are enclosed in a special type of gear-box.

To reduce wear and tear on the gear teeth, ball thrust-bearings are fitted to take the thrust of the worm shaft. The main driven shaft is fitted with a hoisting drum of large diameter that has four grooves turned in its surface to take four stranded steel wire lifting ropes which are connected at one end to the "cage" and at the other end to a heavy counterbalance.

A powerful automatic magnetic brake is fitted and is arranged to engage with a drum that forms the outer portion of the coupling between the motor and the worm gearing. In the event of the electric current failing the brake instantly comes into operation and brings the cage to a standstill. In large lifts, two such brakes are fitted so as to ensure absolute safety.

How the Controls are Arranged

The older types of lift or those intended for goods handling are often controlled by a hand rope led through the "cage" in a suitable position and connected to the switch or valve gear. In the case of the more elaborate lifts,

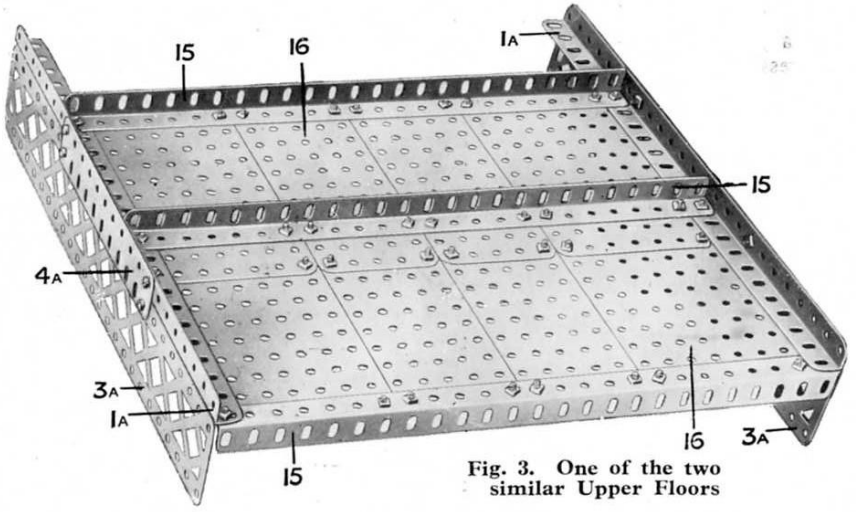


Fig. 3. One of the two similar Upper Floors

however, where it is usual to employ a special attendant, the control is by means of a switch placed in the cage and fitted with a "self-centring" handle, the idea being that should the attendant release the handle inadvertently it will automatically take the "off" position.

In some cases, however, it is not possible to employ a special attendant to operate the lift, and this fact has necessitated the invention of an automatic system, so that anyone can operate the lift as required. The automatic control system is used largely in lifts installed in warships and ocean liners, etc., as well as in office and hotel passenger lifts.

The system as fitted by Smith, Major and Stevens Ltd., of Northampton, consists of a series of electric "push" buttons provided at each floor of the building. By pressing one of the buttons for an instant, the cage is brought to the particular floor at which the button is situated, where it stops automatically and unlocks the entrance door which, by the way, cannot be opened until the cage arrives. The intending passenger can now enter the cage, but to avoid accidents the electric circuit is so arranged that he cannot move the cage away until he has closed the lift and entrance doors.

The passenger finds in the cage several buttons which are marked with numbers to correspond to the various floors in the building. The required button is selected and pressed for a moment, and the cage starts away upward or downward as the case may be. Immediately the cage moves away it relocks the entrance door it is leaving, and continues to travel until it reaches the selected floor, when it again stops automatically and unlocks both doors, when the passenger is at liberty to leave. The "cage" is then at the disposal of the next comer.

It is usual to fix an additional button in the cage to enable the lift to be stopped at will in case the wrong button has been pressed. This type of control renders lift working extremely safe as a door cannot possibly be opened either from the inside or outside unless the cage is present at the floor level, and the cage cannot be moved away from a floor unless all the doors are closed. In the older lifts the cage sometimes "over-ran" the limits of its travel, with consequent danger of damage not only to the cage itself but also to the winding gear. Nowadays, however, emergency electric switches operated by the ascending or descending lift are fitted at certain definite points in the cage pit and these render over-running impossible by switching off the electric supply to the motor.

The Meccano Model

The Meccano model represents a type of lift to be found in large goods warehouses and industrial buildings of all kinds. The model is entirely automatic in action and the two cages will continue to ascend and descend alternately just as long as the electric supply is maintained. As in a real warehouse lift, a special type of safety device is fitted to each cage.

The lifting mechanism is operated by a 6-volt Meccano Electric Motor mounted at the top of the warehouse. It can be stopped or started from any of the floors in the warehouse. The lifting mechanism employed is particularly novel. The model is quite simple to build and when completed will afford hours of enjoyment, especially if the cages are made to carry various small articles such as Meccano Loaded Sacks, etc. Each part of the model is dealt with in detail and the various parts should be built in the order described.

Construction should be commenced by building the framework. Referring to Figs. 1 and 2 it will be seen that this comprises four vertical 24½" Angle Girders 2 that are bolted at their lower ends to four 12½" Angle Girders 1. The method of securing the latter to the vertical girders will be quite clear from the illustrations. To the Angle Girders 1 are attached 12½" Braced Girders 8 that are further supported by means of 2½" Strips bolted across the Braced Girders and secured to the Angle Girders 2. The sides of the base are enclosed by means of two 12½" Braced Girders 3 bolted in the positions shown and secured by means of a 5½" Flat Girder 4, the latter being bolted to the Braced Girders and to the side Angle Girders 1 in the base.

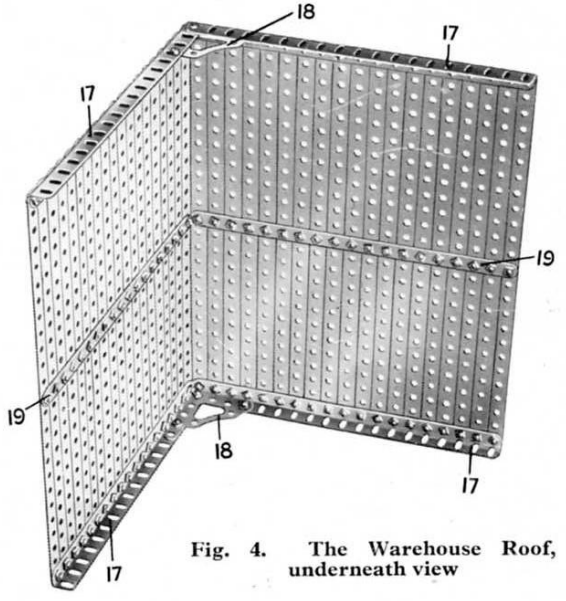


Fig. 4. The Warehouse Roof, underneath view

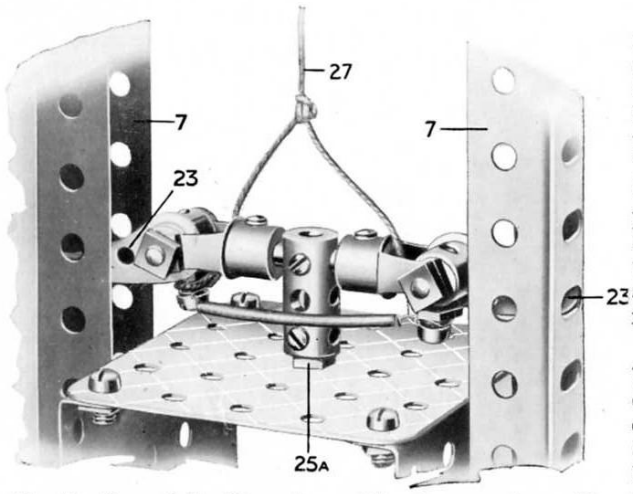


Fig. 5. One of the Cages in position between its guides. The hoisting cord is slack, hence the Pawls of the Safety Device engage holes in the Guides.

The front and rear Girders 1 each carry two 3½" Angle Girders 5 that are bolted back to back to the Girders 1. These 3½" Angle Girders form supports for four 12½" Angle Girders which are bolted across the base frame as shown.

The four guides 7 for the two lift cages are composed of eight 24½" Angle Girders that are bolted together in pairs to form channel section girders, and they are secured in position with the channels facing each other. To secure them, Trunnions 6 are bolted to the lower ends of the guides and to the transverse 12½" Angle Girders in the base. It will be noted that the flanges of the Trunnions are turned inwards, that is, underneath the ends of the Angle Girders 7.

Details of the Upper Floors

The warehouse contains two floors above the base and each of these is constructed as shown in Fig. 3, which is an underneath view of one of them.

Two 12½" Angle Girders 1a are bolted to three further 12½" Angle Girders 15, one of the latter being bolted across the ends of the Girders 1a, while the other two are bolted in the eleventh and nineteenth holes from those ends respectively.

As in the base, the sides of the first and second floors are enclosed with 12½" Braced Girders 3a that are bolted to the Girders 1a by means of 5½" Flat Girders 4a. The floor proper 16 comprises four 5½"×3½" and four 5½"×2½" Flat Plates that overlap and are bolted to the Angle Girders 15. The floors are secured in position by bolts passed through the Girders 2 (Figs. 1 and 2) of the main framework and also through the Angle Girders 1a (Fig. 3).

When the floors are in position the projecting ends of the Angle Girders 1a (Fig. 3) must of course be at the front of the model. This arrangement will leave a recess between the front edge of the floor and the frame of the warehouse, so as to allow room for the cage guides and for movement of the cages.

The next step is to bolt the 5½" Angle Girders 14 (Fig. 1) to the upper ends of the four vertical Angle Girders 2. After this, four 12½" Angle Girders 49 (Fig. 7) are bolted to the 5½" Girders 14 (see also Fig. 1).

Four 12½" Angle Girders 47 and 48 (Fig. 7) are now bolted to the Angle Girders 49 and two 5½" Angle Girders 47a are fitted in the positions shown. These Girders serve to support the lifting mechanism, as will be described later.

The construction of the warehouse proper is now complete with the exception of the roof. This is shown in Fig. 4 and consists of a number of 12½" Strips placed side by side and bolted at their ends to 9½" Angle Girders 17. Two equal sides each comprising nineteen Strips are constructed, and these are bolted together at an angle of 90 degrees by means of two Architraves 18. Two 9½" Strips 19, bolted across the Strips forming each side of the roof, help to brace the whole firmly together. The roof should not be secured in position until the lifting mechanism has been assembled.

Construction of Cages and Safety Devices

One of the two similar cages is shown in Fig. 6. It consists of two 3½"×2½" Flanged Plates 20 to the flanges of which are bolted 2½"×2½" Flat Plates 22. Single Bent Strips 21 are bolted to the sides of each cage in such positions that when the cages are placed between the guides 7 (Fig. 1) the Single Bent Strips 21 will slide in the channels of the guides and so form guide blocks for the cages.

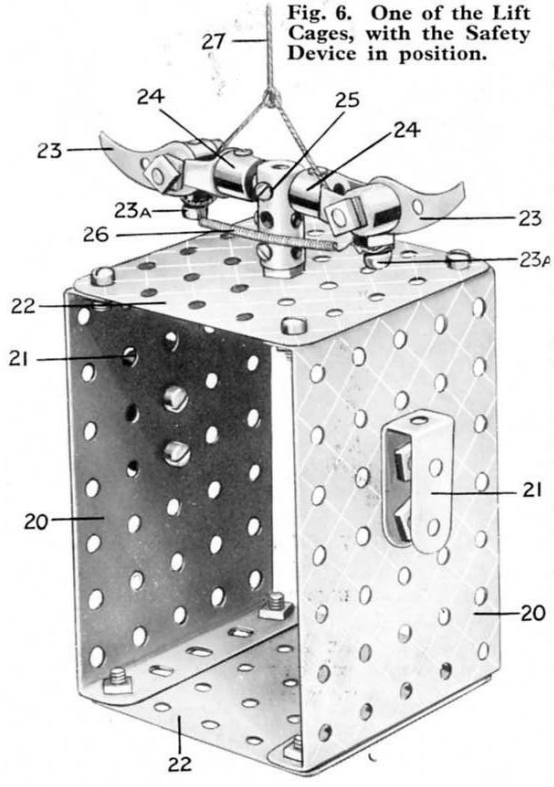


Fig. 6. One of the Lift Cages, with the Safety Device in position.

The safety devices employed in the model are of a simple yet very interesting type. They are fitted to the top of each cage and one is shown clearly in Figs. 5 and 6; it is constructed as follows. A Coupling 25 is secured to the roof of the cage by means of a ⅜" Bolt that is locked in position by a nut 25a. In its upper transverse hole, this Coupling carries a 1½" Rod that is secured centrally in the Coupling. The Rod carries two Fork Pieces 24 that are secured one on each side of the Coupling. Two Pawls 23 are held pivotally on bolts lock-nutted in the Fork Pieces as shown, and each Pawl has a ⅜" Bolt 23a instead of the usual grub screw, the bolt being held firmly by means of a nut locked against the boss of the Pawl. The Bolts 23a must not grip the pivots on which the Pawls are mounted.

A length of Meccano

Cord is attached to each of the bolts 23a and the ends of the cord are brought through the Fork Pieces behind the Pawl bosses in the manner shown in the photographs. (The two pieces of cord are later attached to the lifting cord 27). The ends of a length of Spring Cord 26 are also looped round the Bolts 23a.

When the lift cord 27 is in tension—that is, as soon as the cage is raised from the ground—the Pawls 23 are rotated slightly on their pivots and their projecting ends pulled downward clear of the lift guides. This movement bends the Spring Cord 26 so that one side of it is in tension. Now, should the cord 27 break or fail for any reason, the Pawls are no longer held down and owing to the action of the Spring Cord, which tends always to straighten out, the ends of the Pawls rise and engage with the elongated holes of the guides 7. The cage is consequently locked safely in position in the shaft, and cannot be moved until the Pawls are pulled downward and clear of the guides.

This most interesting feature of the model is closely allied in principle to the safety device usually employed on the actual lift. A demonstration of its action on the Meccano lift should enable even the most timid old lady to overcome any fears that she may entertain as to the safety of travelling in lifts!

The Operating Mechanism

The mechanism incorporated in the model for lifting and lowering the two cages is of special interest as it enables the model to be worked for an indefinite period without attention. It is entirely automatic in action, and the arrangement is such that one cage is raised while the other is being lowered.

In operation, as soon as the Electric Motor is set in motion one of the cages ascends and the other descends until both cages have reached the top or bottom positions of their respective guides, when they come to rest as though to allow for loading and unloading. Then after a short pause the upper cage descends while the lower ascends, and the process is repeated each time the limit of travel is reached.

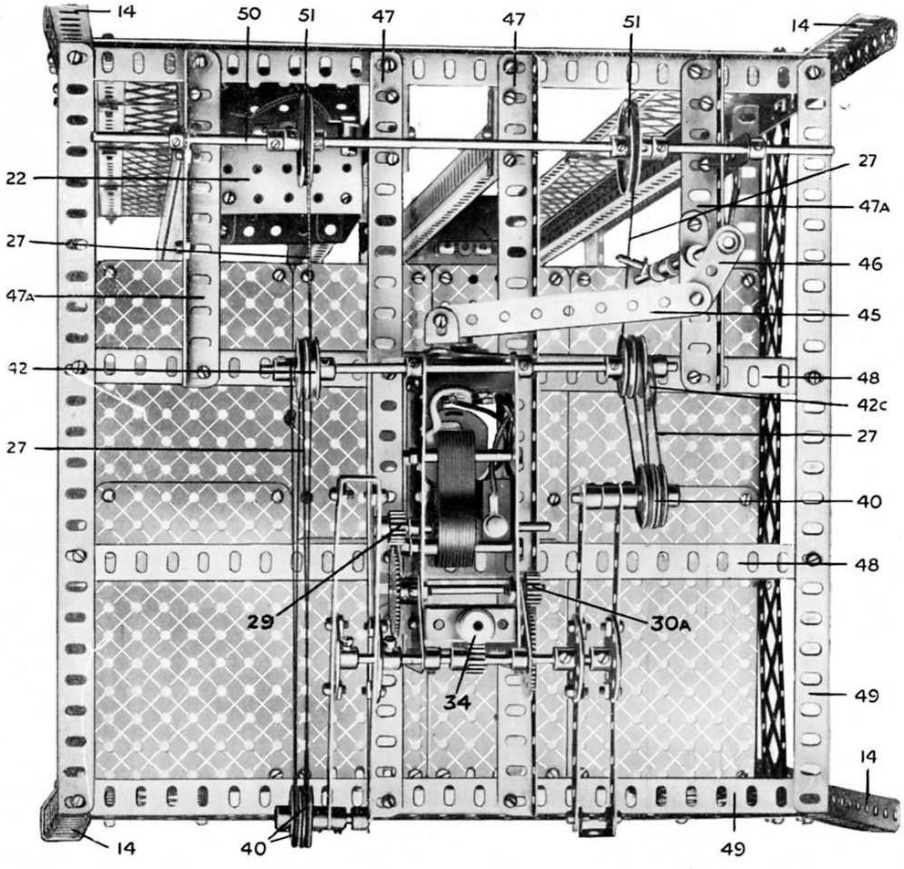


Fig. 7. Plan view of Top Floor of Warehouse, with Roof removed to show the arrangement of the Electric Motor and the Lifting Mechanism.

The 6-volt Meccano Motor is secured in position by bolting its flanges to the transverse Angle Girders 47 (Fig. 7). The drive is taken from the Motor armature via a ½″ Pinion 29, the 57-teeth Gear Wheel 30, and a ½″ Pinion 30a on the opposite end of the Rod carrying Gear 30 that meshes with another 57-teeth Gear Wheel 31 on a 2″ Rod (see also Fig. 8).

On the latter Rod is a Worm 32 meshing with a ½″ Pinion secured to a vertical 3″ Rod 33, which is journalled in bearings consisting of a 2½″ Strip 43 bolted across the Girders 47 beneath the Motor (Figs. 7 and 8) and a 1½″×½″ Double Angle Strip 33a secured between the Motor side plates. The Rod 33 carries at its upper extremity a second Worm 34 meshing with a ½″ Pinion on the 3½″ Rod 35.

This Rod 35 is journalled in Corner Brackets, as shown, and carries at its ends the device whereby the automatic reversing hoist motion is obtained. It will be seen that it consists essentially of two rotating arms each of which is built up from 5½″ Strips 31, secured rigidly to the Rod 35 by means of Bush Wheels 38, and a system of 1″ loose Pulleys 40 and 42. The Pulleys 40 are free to run on a 2″ Rod 39 journalled in each arm and the Pulleys 42 are mounted on a 4½″ Rod attached to the Motor. A Washer is placed between the Pulleys to minimise friction and allow freedom of movement.

The spindle of the Pulleys 40 follows the circular path traced out by the end of the arm, while the spindle of the Pulleys 42 is fixed. The cord 27, which is attached to the cage, passes over the Pulleys 51 at the top of the lift shaft. It is then led under one of the 1″ loose Pulleys 42, round one of the Pulleys 40, back to the remaining Pulley 42 and thence to the second 1″ Pulley 40. After passing round the latter, it is secured to the Flat Bracket 42c.

On examining the illustration, it will be observed that the system is similar in effect to a two-sheave pulley block, in which the free end of the cord, where the power is applied, moves through four inches for every inch the load is raised. In the model, however, the load (*i.e.*, the lift cage) is attached to the cord at a point corresponding to the free end in the ordinary

pulley block, and the power is applied to the movable pulley block. Consequently the reverse effect is obtained, the lift cage moving through four inches for every inch of movement of the Pulleys 40 relative to the Pulleys 42.

When the Pulleys 40 advance towards the Pulleys 42, the hoisting rope is paid out, but as the distance between the two sets of Pulleys decreases, the relative motion between them also decreases, with the result that the movement of the cage becomes gradually slower until finally, when the Pulleys 40 and 42 and the moving arm are all directly in line, all movement of the cord ceases. At this point the cage is at rest at the ground floor.

The rotating arm, continuing its motion, now commences to withdraw the Pulleys 40, with the result that the hoisting cord is hauled in and the cage begins to rise, gradually gathering speed as the increasing angle of the rotating arm increases the relative movement between the Pulleys 40 and 42.

In view of the fact that a slight movement of the rotating arm results in a greatly magnified movement of the cages, it will be apparent that the arms must rotate very slowly. This explains the use of the double worm drive from the Motor.

Owing to the considerable strains imposed upon the mechanism, the Pinion and Bush Wheels mounted on the shaft 35 should be secured very rigidly in position and, if possible, new style parts should be employed so that two set-screws can be inserted in each boss.

The extent of the travel of the cages may 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 a larger number of Pulleys. Such alteration will be necessary, for example, if it is decided to add further floors to the model, thus increasing the extent of the lift shafts.

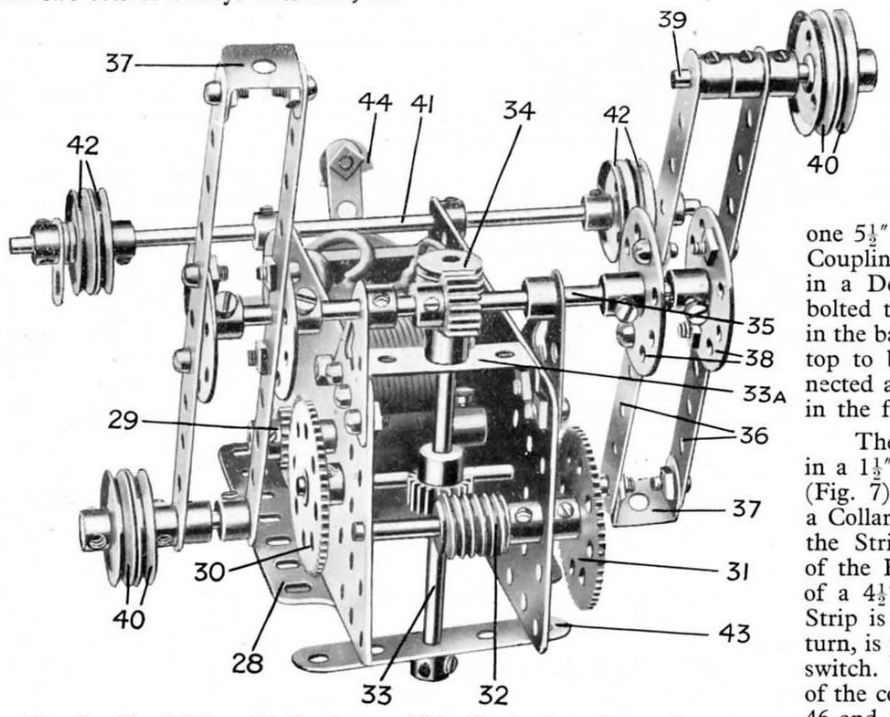


Fig. 8. The Lifting Mechanism. This illustration shows the construction of the Rotating Arms and arrangement of the gears.

The Motor Control Gear

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. 1) 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 11 (Fig. 2) that is bolted to one of the transverse Angle Girders in the base as shown. 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. 7) 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 can be either started, stopped or reversed as desired.

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

The terminals of the Electric Motor should be connected to the terminals of a 6-volt accumulator or to a Transformer, whichever source is employed for the current supply.

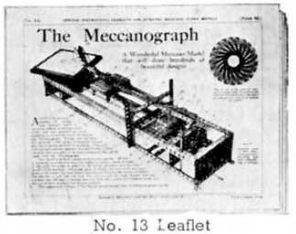
Parts required to build the Meccano Warehouse:

38	of No. 1	4	of No. 8a	1	of No. 14	2	of No. 32	2	of No. 53a	6	of No. 103
2	„ 1a	6	„ 9	2	„ 15a	424	„ 37	28	„ 59	2	„ 103b
4	„ 2	4	„ 9b	2	„ 17	2	„ 37a	1	„ 62	4	„ 108
1	„ 2a	4	„ 9f	2	„ 21	8	„ 38	2	„ 63	5	„ 115
9	„ 6	2	„ 10	8	„ 22a	1	„ 40	6	„ 70	4	„ 126
2	„ 6a	2	„ 11	4	„ 24	1	„ 48	4	„ 72	2	„ 136
12	„ 7	1	„ 12	4	„ 26	8	„ 52a	14	„ 99	1	Electric Motor
26	„ 8	3	„ 12a	2	„ 27a	4	„ 53	4	„ 102		

To construct the Safety Devices the following parts are required:—

2	of No. 18a	2	of No. 140
6″	„ 58	4	„ 147a
2	„ 63	4	„ 147b

MECCANO SUPER MODELS



No. 13 Leaflet

Our expert designers have produced for us 23 super models that reach the highest pinnacle ever attained in Meccano construction. Each model in this series is a masterpiece and there is not a boy who will not be eager to build them all.

These models are so important that we have engaged expert engineers to describe them and a special leaflet with beautiful half-tone illustrations has been written for each of them. A selection of the leaflets is illustrated on this page.

A brief description of each model in the series is given below and the number and price of the special Instruction Leaflet are indicated. Copies of the leaflets may be obtained from any Meccano dealer or direct from us, post free, at the prices stated.

No. 6 Leaflet

No. 1a Motor Chassis. This model runs perfectly under its own power. It has Ackermann Steering, Differential, Gear-Box and Clutch, etc.

No 2 Ship Coaler. All the movements of a real ship coaler are reproduced in this model.

No. 5 Travelling Bucket Dredger In this model trucks and wagons can run underneath the shute through which falls the material raised by the dredger buckets.

No. 6 Stiff-Leg Derrick. This model has many interesting movements, including hoisting, luffing and swivelling, which are controlled by suitable levers.

No. 7 Platform Scales. This model will weigh articles up to 4½lb. with remarkable accuracy.

No. 9 Bagatelle Table. This is an interesting model that will give hours of fun to the players.

No. 10 Log Saw. In this model the saw is driven rapidly to and fro while the work table travels beneath it.

No. 11a Single-Cylinder Horizontal Steam Engine. Fitted with balanced crankshaft, crosshead, and centrifugal governor.

No. 12 Stone Sawing Machine. The model is equipped with adjustable work table and overhead trolley with self-sustaining chain hoist.

No. 13 Meccanograph. This wonderful model will draw hundreds of beautiful designs.

No. 14a Grandfather Clock A practical example of Meccano model-building. The model keeps accurate time.

No. 18 Revolving Crane. This model is fitted with screw-operated luffing gear.

No. 19 Steam Shovel. This model embodies travelling and rotating mechanisms and jib hoisting and lowering gear.

No. 20 Mobile Crane. This model has hoisting, luffing, travelling and slewing movements. It is fitted with an automatic brake.

No. 21 Transporter Bridge. The carriage automatically travels to and fro as long as the motor is driven, pausing for a few seconds at each end of its travel.

No. 22 Traction Engine. A remarkably realistic model that will pull a boy of average weight. Fitted with two speeds.

No. 24 Travelling Gantry Crane. The movements of this model, comprise the traversing of the entire gantry, hoisting and lowering, and the traversing of the crane trolley.

No. 25 Hydraulic Crane. The hydraulic ram is represented realistically by a powerful screw mechanism.

No. 28 Pontoon Crane. The movements of this model include the operation of the three hoisting blocks, slewing of the entire crane, and luffing.

No. 29 Hammerhead Crane. This is a very realistic and powerful model, comprising traversing, hoisting and slewing motions.

No. 30 Breakdown Crane. This model is equipped with travelling, slewing, luffing, and hoisting motions, and also is fitted with laminated springs, brakes, out-riggers, etc.

No. 31 Warehouse with Elevators. The two cages are driven automatically and work alternately, pausing at top and bottom positions.

No. 35 Level-Luffing Crane. The model is provided with level-luffing gear, and an important feature is a grab that can be opened and closed automatically.

No. 25 Leaflet

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