A NEW MECCANO MODEL

Model No. 623. Platform Weighing Machine

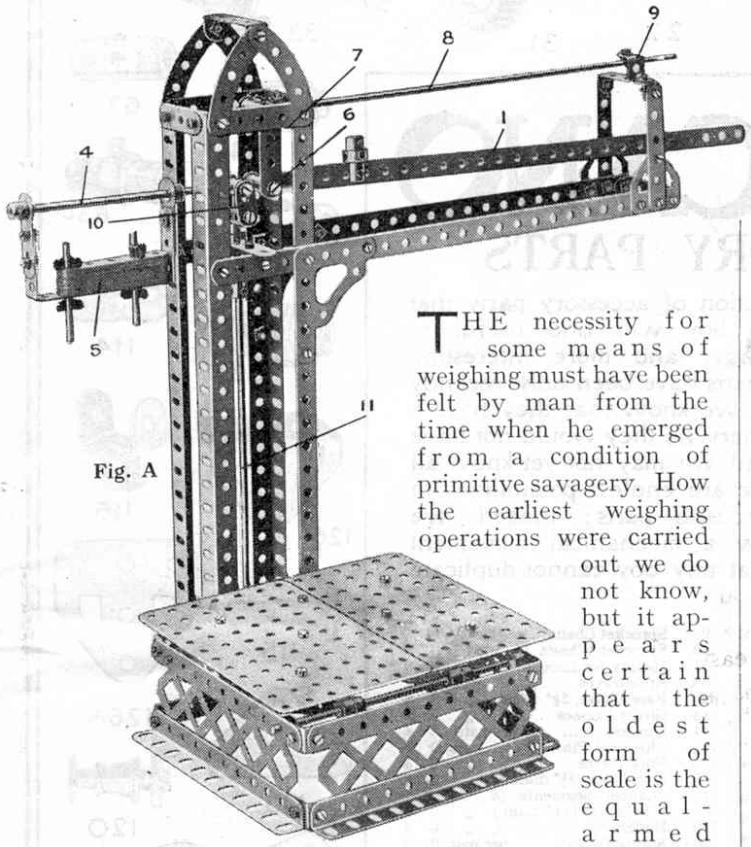

Fig. A

THE necessity for some means of weighing must have been felt by man from the time when he emerged from a condition of primitive savagery. How the earliest weighing operations were carried out we do not know, but it appears certain that the oldest form of scale is the equal-armed balance. From drawings still in existence it is clear that this form of balance was used by the ancient Egyptians, and no doubt the balance referred to frequently in the Bible was of the same type.

Importance of the "Knife-Edge"

The ordinary balance consists of a lever of the first order called the beam, supported at its centre on a fulcrum. At each end of the beam is hung a scale pan, one of these pans being for the weights and the other for the object that is to be weighed.

It is necessary that the beam should be able to swing quite freely on its support and in order to ensure this, the fulcrum consists of a steel or agate prism or "knife-edge," with its sharp edge at right angles to the direction of the beam and resting upon a plane of polished steel or agate. This construction reduces friction to the minimum. A pointer fixed to the centre of the beam indicates—by coming to rest in the line of direction from the fulcrum to the centre of gravity of the beam, or by swinging evenly on each side of that line—when the balance is horizontal, which occurs when the weights in one scale pan exactly balance the object in the other.

The Roman Balance

A very important modification of the equal-armed balance is the steelyard or Roman balance. This consists essentially of a bar of steel suspended near one of its ends from which hangs the object to be weighed. A weight used as a counterpoise moves along the longer arm of the bar. The result of placing the counterpoise on the longer arm is to enable a small weight to balance a very heavy object, thus doing away with the necessity for using heavy weights.

A simple model of a Roman Balance may be constructed with an 0 Outfit, as shown in Fig. E. For the construction of this little model the following parts are required:

1 No. 2	2 No. 10	3 No. 22	1 No. 44
1 No. 5	1 No. 17	3 No. 37	1 No. 57

Roman Balance in its Modern Form

From the simple steelyard has developed the modern commercial platform weighing machine, which is so familiar an object in the warehouses of our industrial towns.

In this type of balance the object to be weighed is not hung directly from the steelyard, but rests upon a low platform. This arrangement enables heavy and bulky objects, such as sacks full of various materials, to be weighed quickly and with the greatest ease. The whole machine is mounted on wheels and thus can be moved about a warehouse as required.

A typical high-class platform weighing machine is shown in the accompanying photograph. Such machines are made in various sizes having capacities of from 3 cwt. to 20 cwt. For weighing certain kinds of material the back rail of the platform shown in the photograph is apt to be inconvenient, and therefore machines may be obtained without this rail.

The same type of machine is used in railway stations, and in other places, without the wheels. Sometimes the machine is mounted in position on a low platform but generally the weighing platform is sunk until level with the station platform. It is generally used in the parcel offices,

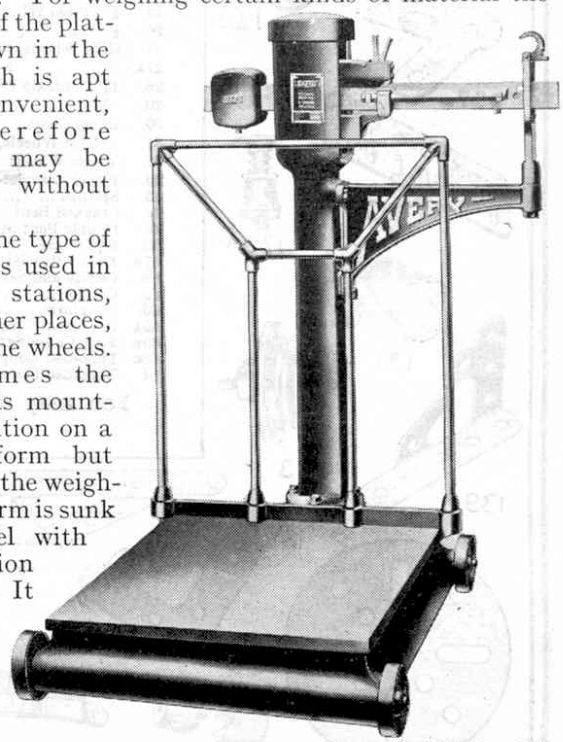

Photo courtesy [*Messrs. W. & T. Avery Ltd*

Portable Platform Weigher

(*Cont. on page* 219).

and machines of larger but similar type are employed in the goods yards and in the yards of mills and factories also.

The Meccano Model

The construction of the three principal sections of this model—namely, the main upright column, which supports the steelyard and balance lever, the base, and the weighing-platform—may be followed by referring to the general view of the model and Figs. C and D. The last two illustrations detail the base and weighing-platform respectively.

The steelyard (1 Fig. A), consisting of a 12½" Strip, is bolted to two Couplings, one at either end at the rear, as shown at (2 Fig. B), by means of bolts passing through the Strip and entering the threaded borings of the Couplings. Washers placed on the bolts between the Strip (1) and the Couplings ensure that the former is held firmly in position.

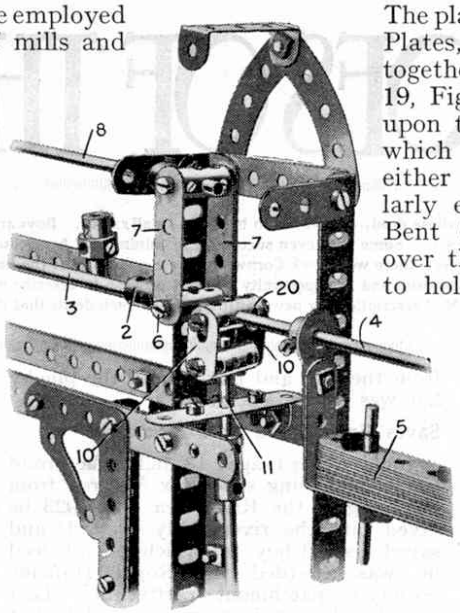

Fig. B

A 6" Rod (4) also enters the Coupling (2 Fig. B.) and carries the balance weight (5) made of 2½" Strips carried in a Double-angle Strip secured between two Cranks. The fulcrum (6), through which the Rod (4) passes, consists of a Coupling suspended from two 2" Strips (7) carried from another Coupling at the end of the 11½" Rod (8). The latter is journalled through the centre hole of a 1½" Strip secured to the top of the frame, and its outer end must be engaged beneath the Reversed Angle-Bracket (9) when weighing.

A Coupling (20), secured to the Rod (4) is loosely connected by means of Flat Brackets (10) to a further Coupling mounted on a vertical member (11) which consists of a 1½" Rod and an 8" Rod coupled together.

Constructing the Platform

This vertical Rod (11) carries at its lower end a 2" Rod (21), a Coupling secured to which carries two further 2" Rods journalled through the end holes of the Strips (13). The latter in turn are pivotly mounted on a 6" Rod (14) carried in the base of the model. Two 2½" Strips (15), connected in a similar manner to a further 6" Rod (16) and held in place by Collars and Spring Clips, carry a 5" Rod (17) resting upon the Strips (13).

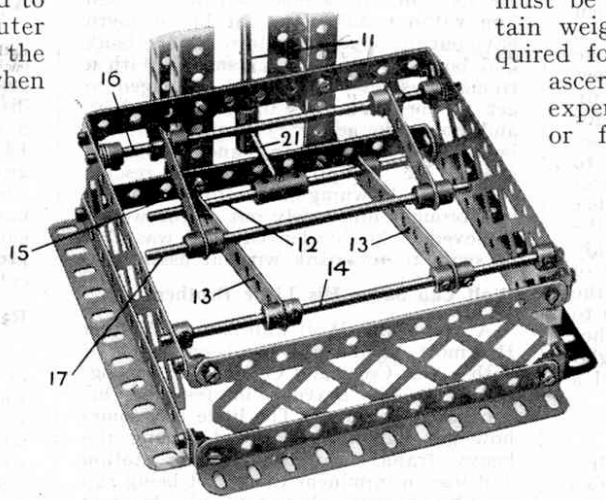

Fig. C

The platform is composed of two 5½" × 3½" Flat Plates, overlapped one hole and secured together by 4½" Angle Girders (18 and 19, Fig. D). The angle Girder (18) rests upon the Strips (15), while the Girder (19), which is mounted upon two Washers at either end to ensure proper contact, similarly engages the Strips (13). Two Single Bent Strips (20) bolted to the plates fit over the centre rod (17), so forming guides to hold the plates in position. The platform is suspended in order to weigh when the Rod (8) is passed beneath the Bracket (19).

Graduating the Scales

In constructing the model care should be taken that the weight (5) is sufficient to exactly balance the lever (1) when the adjusting piece—a Strip Coupling sliding along the Strip (1)—is placed against the Coupling (2 Fig. B) at the fulcrum end of the steelyard.

If a weight is placed on the platform, the outer end of the steelyard will rise, and its horizontal position can only be regained by sliding the Strip Coupling away from the fulcrum through a distance proportional to the load being weighed. A piece of plain cardboard may be attached to the steelyard, and on this points should be marked at which the Strip Coupling must be placed in order to balance certain weights. The various positions required for this purpose may be readily ascertained in the first place by experimenting with weights of two or four ounces, or other known amounts.

The efficiency of the scales is improved by carefully oiling all the moveable parts.

Prizes for Suggestions

In actual use a little difficulty may be found in weighing very small amounts, such as an ounce or half an ounce, owing to the amount of friction existing in the model. We have ourselves improved the model in this respect, since the accompanying photographs were taken. This provides an excellent test of ingenuity and resourcefulness, and in order to encourage our readers to solve the problem of reducing the friction to the absolute minimum, we have decided to award a prize of one guinea and a second prize of half a guinea for the two best suggestions received. Models should not be sent in, but photographs or sketches. Entries must be sent in before 30th June (Overseas : 30th September).

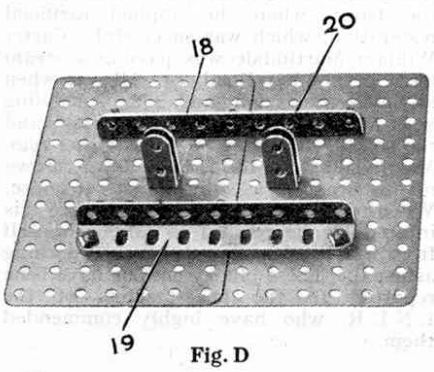

Fig. D

Parts required :

3	No.	1	2	No.	13	4	No. 48D
2	„	2A	1	„	13A	18	„ 59
2	„	4	3	„	14	2	„ 62
21	„	5	1	„	15	9	„ 63
2	„	6	3	„	17	2	„ 63B
4	„	6A	3	„	18A	2	„ 70
4	„	8	6	„	35	4	„ 90
3	„	9	74	„	37	3	„ 100
2	„	9A	10	„	38	2	„ 102
2	„	10	1	„	47A	2	„ 108
6	„	12	3	„	48	1	„ 125

2 No. 126A

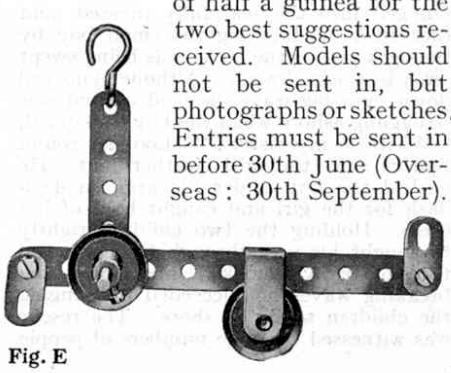
Fig. E