

THE MECCANO CLOCK

Full Instructions for Building this Interesting Model

WE have pleasure in publishing the first instalment of the instructions for building a "grandfather's clock" with Meccano.

This clock stands well over 6 ft. in height and keeps perfect time. With the exception of the 17 lb. weight, the wire by which it hangs, the cardboard-face and the light spring (80 Fig. B), the model is made entirely of Meccano. The clock keeps perfect time, and is the outcome of experiments conducted over the last twelve months in the Meccano model-building department. A large number of these clocks have been constructed, and have been tested out very thoroughly. With careful adjustment every clock has been made to keep perfect time. The construction of the clock is not difficult, and we hope that many of our readers will set to work and build this interesting and instructive model right away!

Constructing the Frame

Begin by making the frame to carry the gear trains. This frame (shown in Fig. A) consists of vertical $12\frac{1}{2}$ " angle girders (1), connected by $5\frac{1}{2}$ " angle girders (2) and $5\frac{1}{2}$ " strips (3). Bolt three $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " flat plates (4) to the $5\frac{1}{2}$ " strips (5) above and below, and two $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " flat plates (6) to the plates (4) but on the other sides of the lower strips (5) and overlapped two holes with the larger plates (4). Cranks (7) bolted to trunnions (8) on the top of the frame form the pivotal bearings for the pendulum. A 12" strip (9) is bolted vertically to one of the trunnions and to the $5\frac{1}{2}$ " strips (10) to form bearings for the main gear train. A double bent strip (11) is bolted on the left side of the frame to form a bearing for the

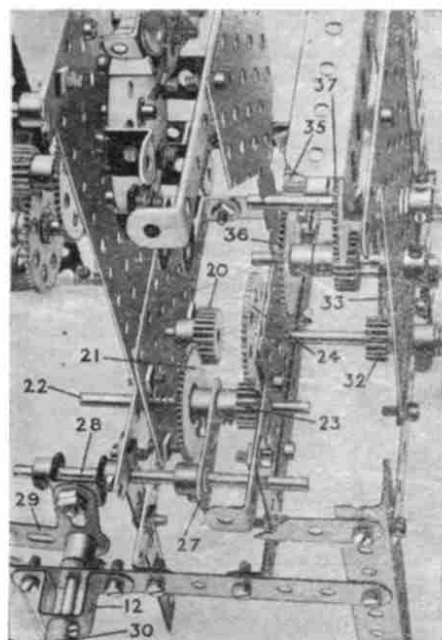


Fig. C

winding handle (65 Fig. B). A second double bent strip (12) is provided, to form a bearing for the gear that disconnects the driving train from the gearing of the hands, when the clock is being wound up.

A flat trunnion (13 Fig. A) is bolted below the left perforated plate (6) to form a bearing for the lowest $3\frac{1}{2}$ " rod of the clock train (18 Fig. B). The position of the other perforated strips will be easily seen from Fig. A.

The Main Gear Train

When the frame has been constructed, proceed to build the main driving gear train, as shown in Fig. B. This consists of three $\frac{1}{2}$ " pinions (14) connected with 57-toothed gear wheels (16) and three $\frac{3}{4}$ " pinions (16) connected with 50-toothed gear wheels (17). These are secured on the rods 18, the top rod

being $3\frac{1}{2}$ " long and the remainder 3" long. They pass through holes in the left-hand plates (4 and 6) and the strip 9, collars (102) being fitted on each rod on each side of the strip 9. No collars are necessary at the other ends of the rods.

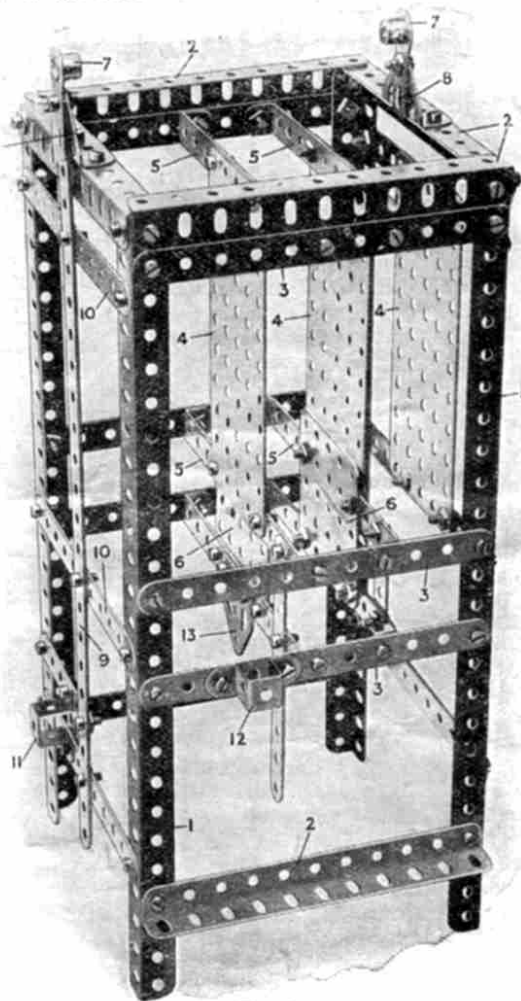


Fig. A

On the end of the $3\frac{1}{2}$ " rod (19) is a $\frac{3}{4}$ " pinion (20), which is seen more clearly in Fig. C. This pinion gears with a 50-toothed gear wheel (21) fixed on a 2" rod (22) which is able to slide in the plates (6). On this rod also is a $\frac{1}{2}$ " pinion (23) geared with a 57-toothed wheel (24) on a $4\frac{1}{2}$ " rod (25) carrying the minute hand (26 Fig. B). The web of a crank (27 Fig. C) engages the 2" rod (22), the crank being bolted to a $3\frac{1}{2}$ " rod (28) carrying

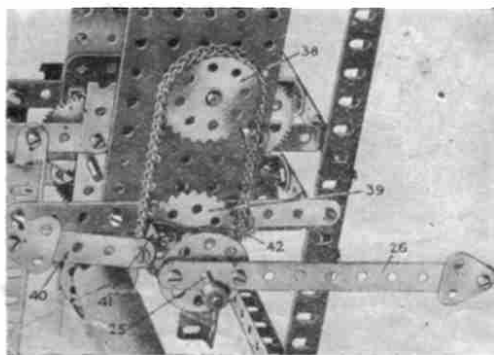


Fig. D

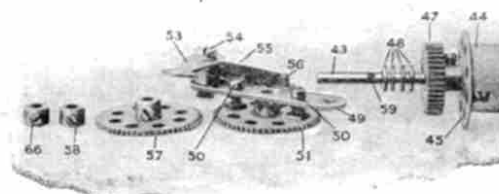


Fig. E

a double bracket bolted to a bell crank (29) and pivoted on a rod (30) in the double bent strip (12).

Adjusting the Hands

A cord (31) is connected to the bell crank (29), and by pulling on this cord, the rod (28) is caused to slide and move the gear (21) in or out of engagement with the pinion (20). This releases the driving train from the clock hands and enables the hands to be freely adjusted.

In order to drive the hour hand from the minute hand rod (25), a $\frac{1}{2}$ " pinion (32) on this rod drives a 57-toothed gear (33) mounted on a 2" rod. This engages a second 57-toothed gear (34) (Fig. B), the $\frac{1}{2}$ " pinion (35) on the same 2" rod driving a 50-toothed gear (36). Another $\frac{1}{2}$ " pinion (see Fig. B) on this rod drives a 50-toothed gear (37). On the $2\frac{1}{2}$ " rod of this last wheel is a $1\frac{1}{2}$ " sprocket wheel (38) (Fig. B and Fig. D) which is coupled to a similar sprocket (39) loose on the rod 25. The hour hand (40) (Fig. D), consists of a $2\frac{1}{2}$ " strip and is connected by a $\frac{1}{2}$ " reversed angle bracket (41) to a $1\frac{1}{2}$ " strip (42). This is bolted to the sprocket wheel (39) and spaced by two washers to give clearance for the sprocket chain. The reversed angle bracket (41) is necessary to enable the hour hand 40 to be brought clear of the dial plate.

Ratchet Winding Mechanism

The ratchet mechanism permitting the winding of the weight is built up as shown in Figs. E, F and G. As will be seen from the two first-mentioned, the complete ratchet element is made by passing a 6" rod (43) through a wood roller (44), the ends of which are clamped between two bush wheels (45) secured on the rod. The bosses of the bush wheels are entered into the ends of the wood roller and the bolts (46) engage in the end notches of the wood roller to key the roller to the bush wheel (45).

A 1" gear wheel (47) is then bolted on the rod (43) with its boss close against the end bush wheel (45). Four washers (48) are then threaded on the rod.

The element shown in the centre of Fig. E is next passed over the rod. This element is made as follows:—

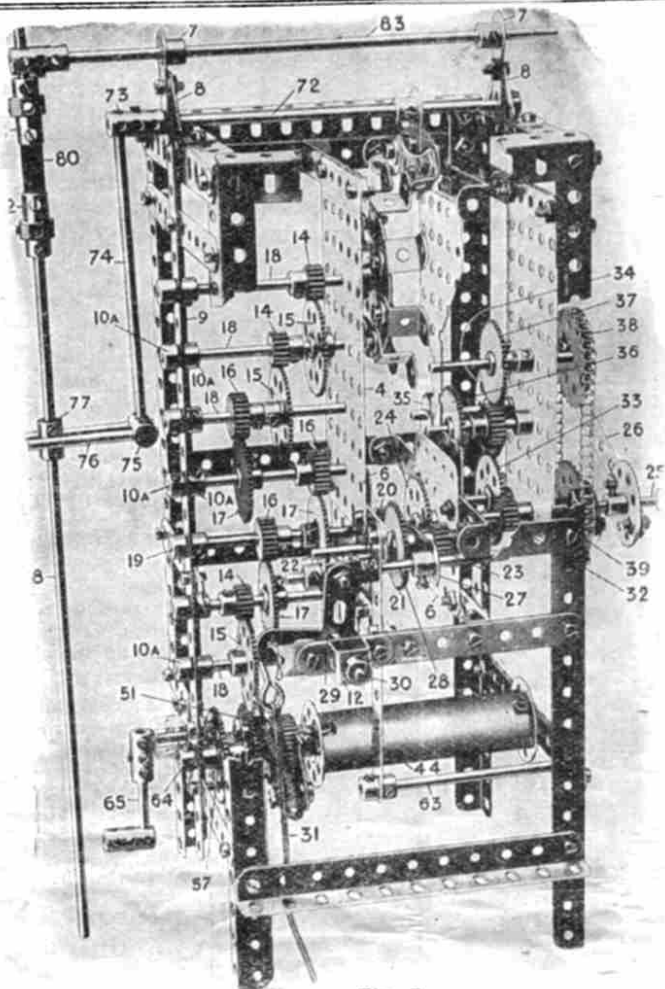


Fig. B

Two $2\frac{1}{2}$ " strips (49) are bolted by $\frac{1}{2}$ " bolts (50) to a 57-toothed gear wheel (51), lock-nuts (52) (Fig. F) being fitted on the bolts on each side of the gear wheel (51) and also beneath the strips (49). A pawl (53) is pivoted at (54) in the end hole of the strips (49) and a spring (55) is connected to the pawl boss by a screw, and also to a $\frac{1}{2}$ " bolt (56) on the gear wheel (51) and lock-nutted. The element so built up is passed over the rod (43), being loose thereon, and the pawl engaged with the gear wheel (47) (see Fig. F).

(To be continued)

NEXT MONTH:

We shall print the Final Instalment of this article on the Meccano Clock.

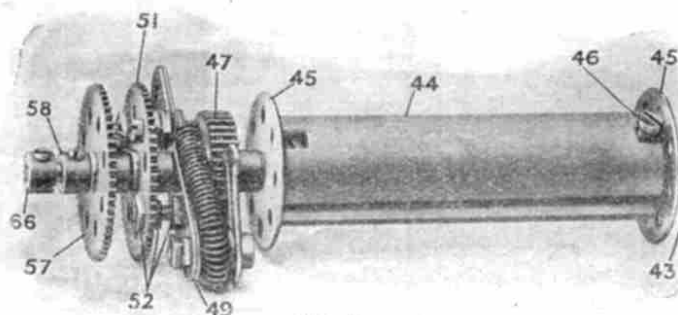


Fig. F

OUR MAIL BAG



In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here. Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

Ian MacDonald (?).—We have received your letter enclosing 1/8 subscription for the "M.M." You have not sent us your address, however, and we shall be glad if you will kindly do so in order to enable us to trace.

H. Dewhurst (Nelson).—You are indeed fortunate in having secured a Club Leader who has given his members the use of his Art Gallery, Library, Billiard Table and Lathe. No wonder you enjoy the club nights so much. Your club magazine is very creditable.

M. J. Rowlands (Trawsfynydd).—"Meccano Encourages Concentration, Carefulness, Alertness, Neatness, Originality." Very neatly put and quite true.

W. G. Ford (West Croydon).—"Your articles are always so ripping that it makes us emulate Oliver Twist." It is through having so many Oliver Twists amongst our readers that we have been compelled to increase the size of the "M.M." so many times. We think our Christmas Number will satisfy even your own voracious appetite.

L. C. Denis (London).—Your solution to J. Miller's puzzle in the October Magazine is quite correct: "J. Miller first had 7 strips and his chum had 5. The chum divided his strips with his brother and then they all had 4 each." We were interested to hear that you solved the problem by Algebra. We have happy memories of trying to make $x=0$.

S. Whitehead (King's Heath).—You also have solved the puzzle. We see that we shall have to think of something really difficult for our new Puzzle Column.

D. O. Boyd (Calestick).—A Competition for the best photograph of the nest and eggs of a British bird would, we fear, scarcely bring sufficient entries. We are, however, always glad to receive and pay for any such photographs that are suitable for reproduction.

L. B. Perkins (Bradford).—We appreciate your praise for the "M.M." Sorry we said "Photographic." Our printers try to explain it by saying that the compositor had the hump when he set the word.

W. Tomsett (Saundersfoot).—If you order the "M.M." from Messrs. W. H. Smith & Sons they will supply it to you regularly. We shall reprint "Dick's visit to Meccanoland" later, possibly in the "M.M."

H. E. Huile (Paddington).—"A fine way of keeping the muscles strong is to get on all-fours so that the soles and heels of your boots touch a wall. Now, walk up it by moving the hands towards the wall and the feet up it." Excellent for light-weights, Herbert, but not for the poor Editor. He must just jog along with flabby muscles!

A. J. Lewis (Wynberg, S.A.).—Your letters are always welcome, and we are particularly pleased to hear of your early promotion. We hope the Wynberg Meccano Club and its fifty members will have a successful winter.

E. R. Whiting (Claremont, W.A.).—Your cryptogram "How I snazco 2 todemansrig" is ingenious, but we fear it is a little too difficult for most people. Don't waste too much time on perpetual motion. Mr. Hornby once tried it, but he failed, just as everyone must. We hope you will write to us often.

F. A. Neilson (Buenos Aires).—We are very glad to hear of your safe arrival home, and to know that you retain such pleasant memories of your visit to the Meccano factory and of your talk with Mr. Hornby. We hope to deal with your suggestions in a later issue.

E. Shipley (Walsall).—"W211 Ni S4imv6 e slev q52 ko21h512 3m h163mt qslq s4imv6 q113mh 2cx20 100 4qseih." Mr. Hornby thanks you for the message in your cryptogram, and for all the good things you say in your letter.

W. S. Lee (Clinton, B.C.).—We are sorry your club broke up on account of counter attractions. Now is the time to start it again. By all means send us particulars of the radio set that is giving such good results. We are pleased Meccano helped you so much.

S. Johnson (Bedford).—"The poor benighted Hindoo, He does the best he kindoo, From first to last He keeps his caste, And for clothes he makes his skindoo."

You have a well-developed sense of humour, Sidney, and we are sorry we are only able to find room for one of your little poems. If you ever write similar little stories of other native tribes we will try to make room for them.

Full Instructions for Building the MECCANO CLOCK

PART II.

IN the first instalment of this article, which appeared in our November issue, instructions were given for the assembly of the Frame, Main Gear-Train, etc. The following details complete the instructions for building this remarkable model, which stands well over 6 ft. in height and keeps perfect time.

The Meccano clock is a triumph of model building, and with the exception of the 17 lb. weight, the wire by which it hangs (60 Fig. M), the cardboard face, and the light spring (80 Fig. B), it is made entirely from Meccano.

Non-Slipping Device

Having assembled the Ratchet-Winding Mechanism and the element shown in Fig. F*, a 57-toothed gear wheel (57 Fig. M) is passed over the rod and bolted thereon, and a collar (58) is bolted outside the gear wheel (57). In order that the gear wheel (57) may not slip on the rod (43) when taking the whole of the strain in winding the heavy clock weight, a flat (59 Fig. E*) is filed on the rod in the correct position for being engaged by the screw of the gear wheel (57). This gives the wheel a secure grip on the rod.

Winding the Clock

A stranded wire cord (60) is wound on the wood roller (44) and passes round a pulley (61) in the pulley block (62). This is made up of two 2½" triangular plates bolted together with double brackets, and carries the 1½" pulley wheel (61). The other end of the cord (60) is hooked (at 64) over the rod (63).

After the wood roller (44) has been inserted in place, another collar (66) is secured on the extreme end of rod (43). The clock is wound by a crank handle (65) provided with a ½" pinion (not visible in the photograph), which engages the gear wheel (57). The roller (44) drives the main gear train, by reason of its gear wheel (51) engaging the first gear (15) of the train.

The Escapement Wheel and Pallet

Next, proceed to construct the escapement, which consists of an escapement wheel and a pallet mechanism. The former (Fig. H) consists of a face plate (66a) to which are attached eight reversed angle brackets (67). In order that these shall not move, they are pressed

hard against the circular edge of the plate, and then bolted in position with washers (68) beneath the bolt-heads.

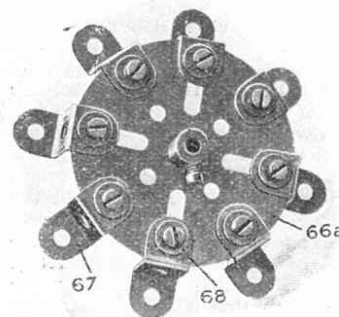


Fig. H. Escapement Wheel

The pallet mechanism (Fig. J) consists of two 2½" reversed curved strips (69) with the web of a crank (70) bolted between. Angle brackets (71) are bolted in the end holes of the curved strips which form the pallets. The crank (70) is bolted on a 6" rod (72, see Fig. B*) and a 5" rod (74) is secured to a coupling (73) on the end of the rod (72). At the lower end of this is a coupling (75) carrying two 2" rods (76) which engage on each side of a bush (77) on the pendulum rod (78).

The Pendulum

As shown in Fig. K, the pendulum consists of four 11½" (78, 78a, 78c, and 78d) and a 5" rod (78b) connected by couplings. As also shown in Fig. K, the pendulum is connected to the lower end of the 11½" rod (78) (see Fig. B).

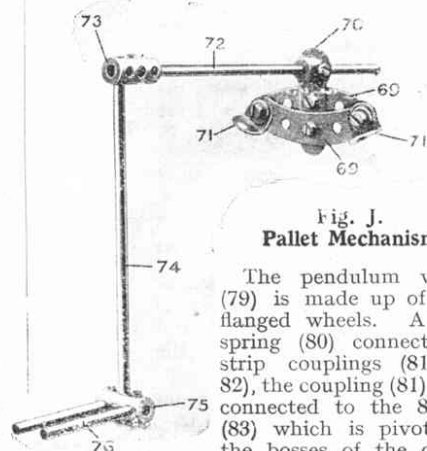


Fig. J.
Pallet Mechanism

The pendulum weight (79) is made up of eight flanged wheels. A light spring (80) connects the strip couplings (81 and 82), the coupling (81) being connected to the 8" rod (83) which is pivoted in the bosses of the cranks (7). The spring (80) is

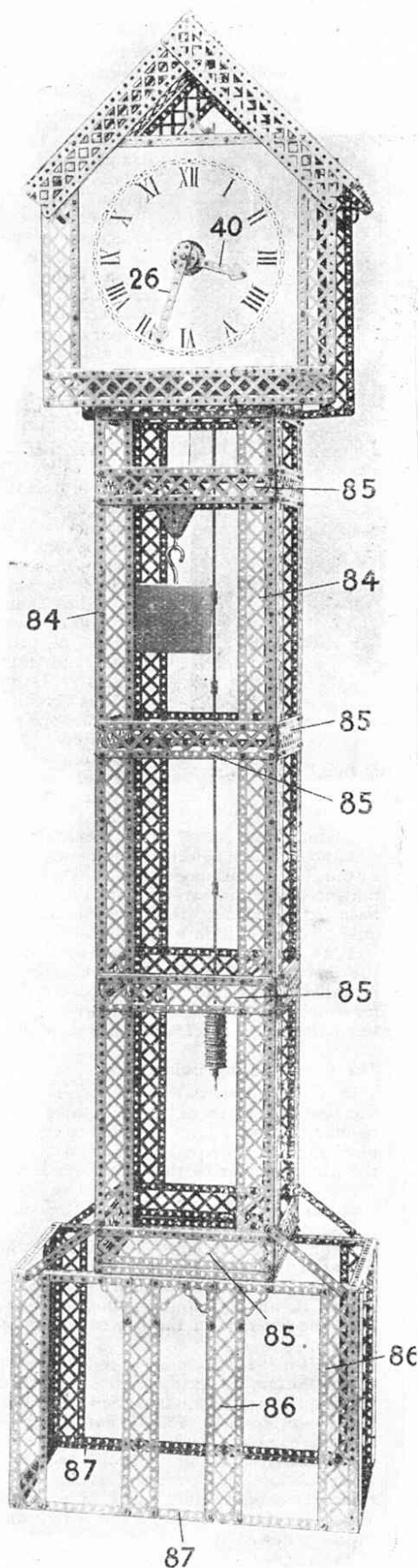


Fig. G. The Meccano Clock

necessary in order to provide for an easy escapement movement of the pendulum.

Constructing the Main Frame

The main frame may now be built. This consists of two $24\frac{1}{2}$ " angle girders at each vertical corner, overlapped three holes. To these are secured $12\frac{1}{2}$ " braced girders (84) connected by $9\frac{1}{2}$ " horizontal braced girders (85). The base consists of $12\frac{1}{2}$ " vertical braced girders (86) and horizontal $18\frac{1}{2}$ " angle girders (87), at the front and back.

The construction of the head of the clock will be clearly seen from Fig. L. It is built up of $12\frac{1}{2}$ " angle girders (88) front and back, while $9\frac{1}{2}$ " angle girders (89) connect the front and back girders. The feet of the vertical angle girders (Fig. A*) of the works casing are bolted by the bolts (91) to the $12\frac{1}{2}$ " angle girders (90). These rest on the top of the side angle girders of the main frame (Fig. A*).

The dial should be attached and then the works casing placed in position from the rear. The hour and minute hands are then secured in place at the front of the dial and the model is complete.

The Complete Instructions

The Meccano clock is a very interesting model to build and one that will always command admiration. During the past twelve months a large number of these clocks have been constructed in the Meccano model-building department and have been tested-out very thoroughly. With careful adjustment every clock has been made to keep perfect time. The construction of the clock is not difficult, and we hope that our readers will set to work and build this instructive model right away.

Complete instructions are being prepared in the form of a beautifully-printed and fully-illustrated leaflet, full particulars of which will be announced in the "M.M." when ready. In the meantime if any readers wish a copy of this leaflet to be sent them, they should send their names and addresses, together with 4d. in stamps. Their names will be placed on a waiting list, and they will receive copies of the leaflet immediately it is ready, which we anticipate will be in about two months' time.

THE END.

* Illustrated last month.

Parts required for Clockwork Movement

- 1 Perf. Strip, $12\frac{1}{2}$ "
- 14 " " $5\frac{1}{2}$ "
- 1 " " $4\frac{1}{2}$ "
- 2 " " $3\frac{1}{2}$ "
- 1 " " $2\frac{1}{2}$ "
- 1 " " $2\frac{1}{2}$ "
- 2 " " $1\frac{1}{2}$ "
- 4 Angle Girders, $12\frac{1}{2}$ "
- 6 " " $5\frac{1}{2}$ "
- 3 Double Brackets
- 2 Angle " "
- 4 Axle Rods, $11\frac{1}{2}$ "
- 1 " " $8\frac{1}{2}$ "
- 2 " " $6\frac{1}{2}$ "
- 3 " " $4\frac{1}{2}$ "
- 9 " " $3\frac{1}{2}$ "
- 1 " " $3\frac{1}{2}$ "
- 1 " " $2\frac{1}{2}$ "
- 8 " " $2\frac{1}{2}$ "
- 2 " " $1\frac{1}{2}$ "
- 2 " " $1\frac{1}{2}$ "
- 10 Flanged Wheels
- 1 Pulley Wheel, $1\frac{1}{2}$ "
- 3 Bush Wheels
- 5 Pinion Wheels, $\frac{3}{4}$ "
- 6 " " $\frac{1}{2}$ "
- 8 Gear Wheels, 57 Teeth
- 5 " " 50 "
- 1 " " 38 "
- 1 Pawl
- 106 Nuts and Bolts
- 20 Washers
- 1 Spring
- 2 Double Bent Strips
- 3 Hooks
- 35 Collars
- 6 Double Angle Strips $5\frac{1}{2} \times \frac{1}{2}$ "
- 4 Cranks
- 9 Couplings
- 2 Strip Couplings
- 3 Flat Plates, $5\frac{1}{2} \times 2\frac{1}{2}$ "
- 2 " " $2\frac{1}{2} \times 2\frac{1}{2}$ "
- 2 Triangular Plates, $2\frac{1}{2}$ "
- 2 " " 1"
- 2 Curved Strips, $2\frac{1}{2}$ "
- 10" Sprocket Chain
- 2 Sprocket Wheels, $1\frac{1}{2}$ "
- 1 Wood Roller
- 1 Face Plate
- 2 Bolts, $\frac{3}{4}$ "
- 9 Reversed Angle Brackets, $\frac{1}{2} \times \frac{1}{2}$ "
- 2 Trunnions
- 1 Flat Trunnion
- 1 Boss Bell Crank
- 10 ft. Flexible Steel Wire
- 1 Face

Parts required for Clock Case and Frame

- 51 Braced Girders, $12\frac{1}{2}$ "
- 24 " " $9\frac{1}{2}$ "
- 8 " " $3\frac{1}{2}$ "
- 8 Angle Girders, $24\frac{1}{2}$ "
- 4 " " $18\frac{1}{2}$ "
- 14 " " $12\frac{1}{2}$ "
- 14 " " $9\frac{1}{2}$ "
- 4 Perforated Strips, $5\frac{1}{2}$ "
- 2 " " $3\frac{1}{2}$ "
- 4 Architraves
- 329 Nuts and Bolts
- 8 Washers
- 10 Angle Brackets
- 1 17lb. Weight

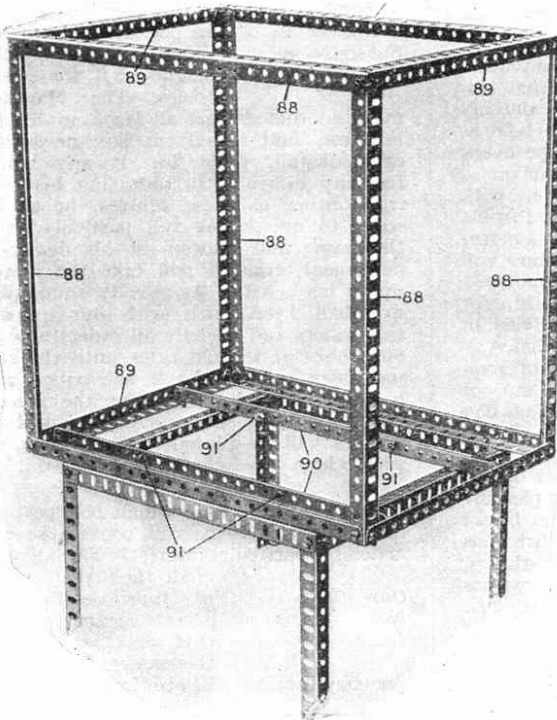


Fig. L. Clock Head

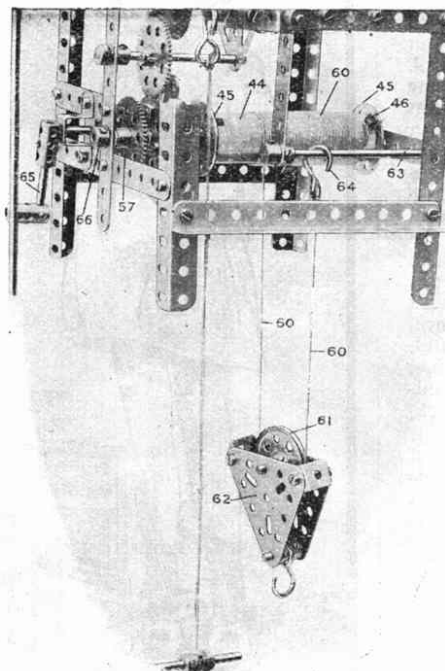


Fig. M. Winding Mechanism

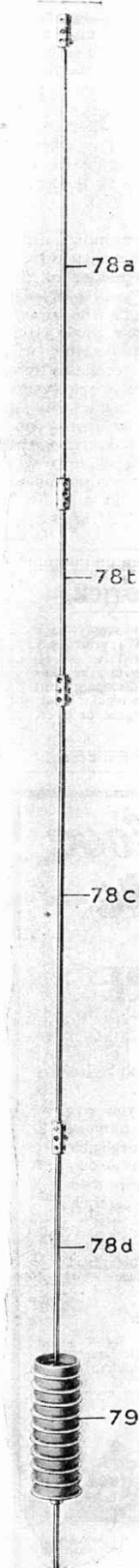


Fig. K. Pendulum