SEIKO CRYSTAL CHRONOMETER
QC-951- II

HANDLING MANUAL

HATTORI TRADING CO., LTD.

SEIKO CRYSTAL CHRONOMETER
QC-951-II

Standard oscillating source of the Seiko Crystal Chronometer QC-951-II type is made of carefully selected natural crystal, its vibrator maintaining extremely high accuracy over a long period.

This instrument is designed especially for portable use, therefore, size, weight and power consumed are quite rational. Furthermore, the precision of this chronometer surpasses conventional large-sized crystal clocks, its design created by Seiko's technical staff after taking the role of a world leader in chronometer studies.

Prior to using the chronometer

Prior to using this device, carefully read the nomenclature of each part (see folded page) and the method of operation (pages 2～6).

Information on handling the chronometer

Refer to description on handling procedures (pages 7～8).

Information on chronometer features

Read the characteristics (page 9) and specifications (page 11) of this dependable crystal chronometer.

[Method of Operating]

To avoid discharge from the dry cells during transportation, the chronometer is kept in a nonoperating condition by a dry cell insulation board. Remove this disc-shaped insulation board prior to using the clock, after unscrewing the dry cell screw-in lid by turning it with a coin.

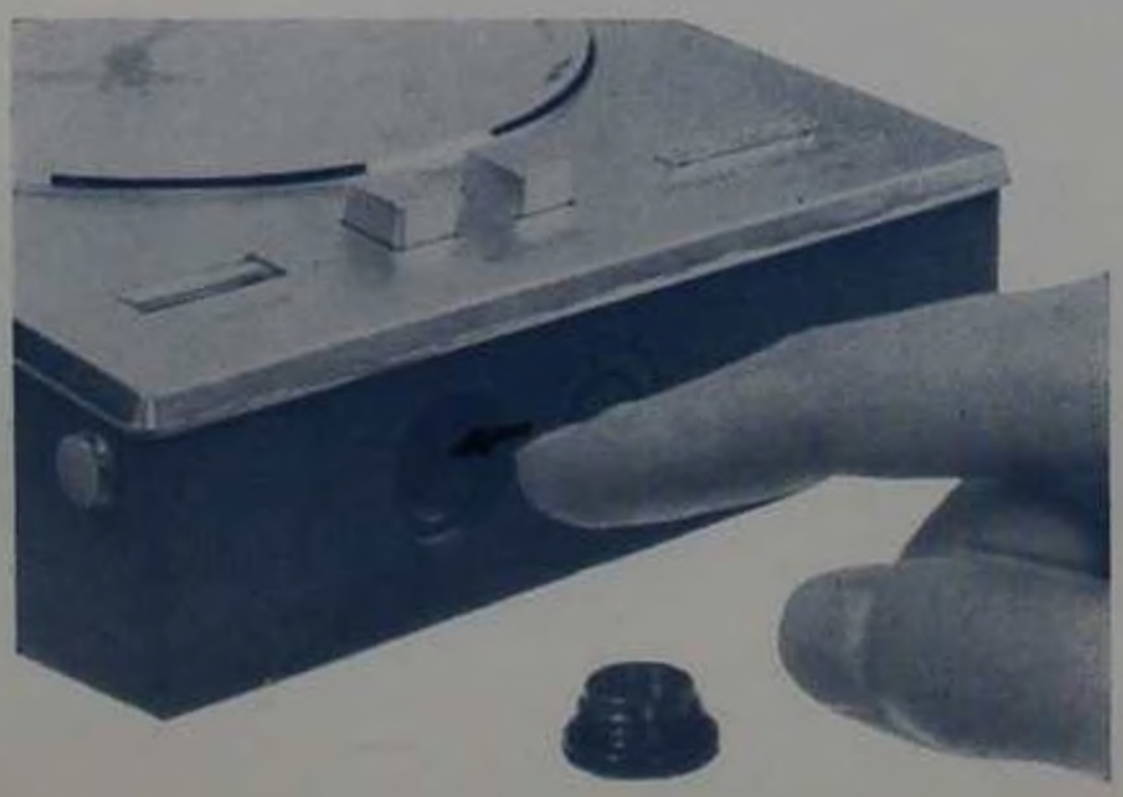
After removing the insulation board, reinsert and tighten the screw-in lid.

Starting the chronometer

Upon removing the insulation board, sometimes the instrument will start spontaneously ; however, if it does not start, follow the procedures below :

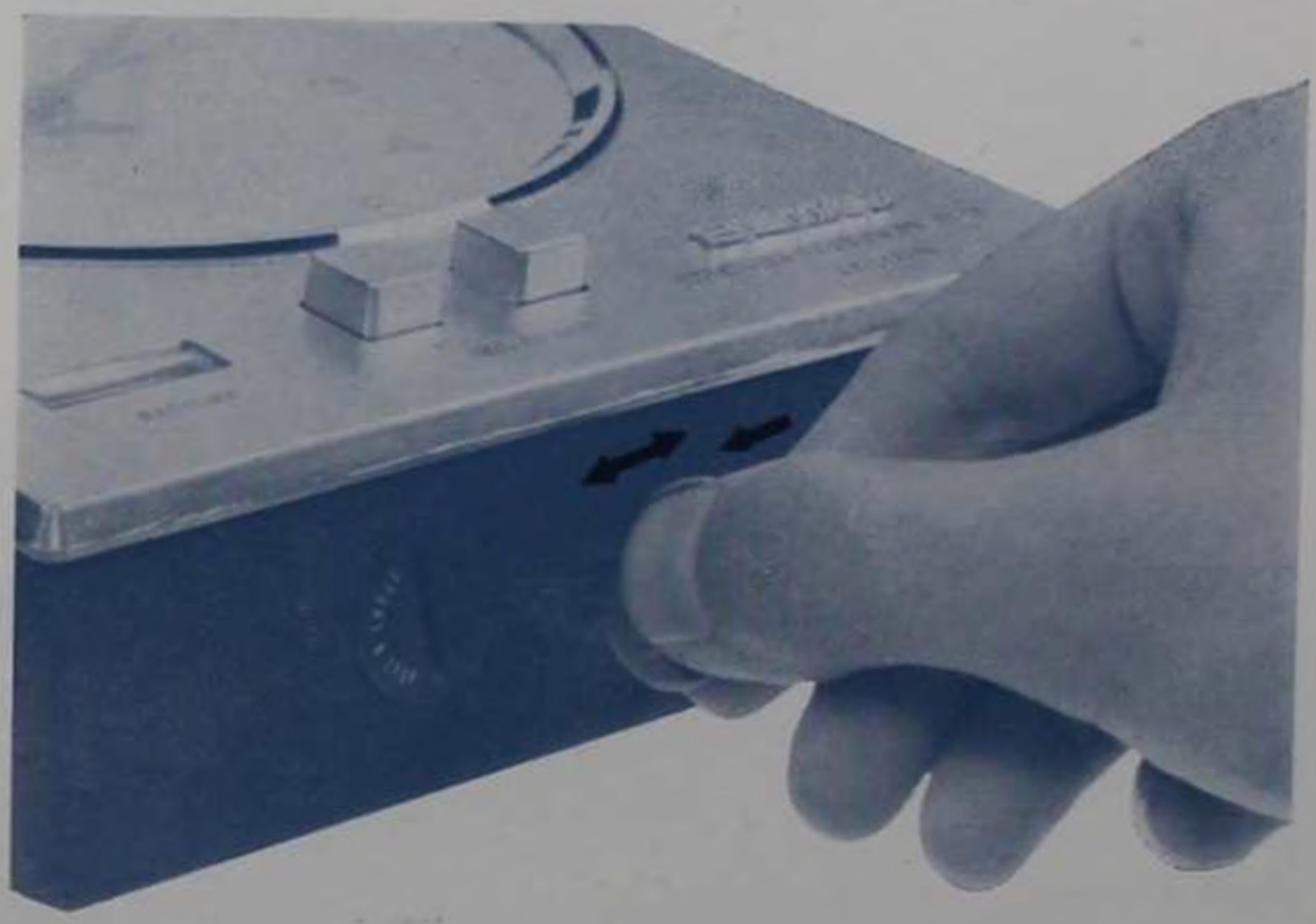
1. Using a coin, remove the start-stop screw-in plug located on the lower side of the chronometer body.
2. Push the start-stop button inside the opening (in this condition the clock remains stopped), then release it, and movement will begin.
3. When performing the above operations, allow sufficient time in completing them. If the button is released before the second hand comes to a full stop, for instance, the instrument will not start satisfactorily.

Coin in slot



Setting the hour and minute hands

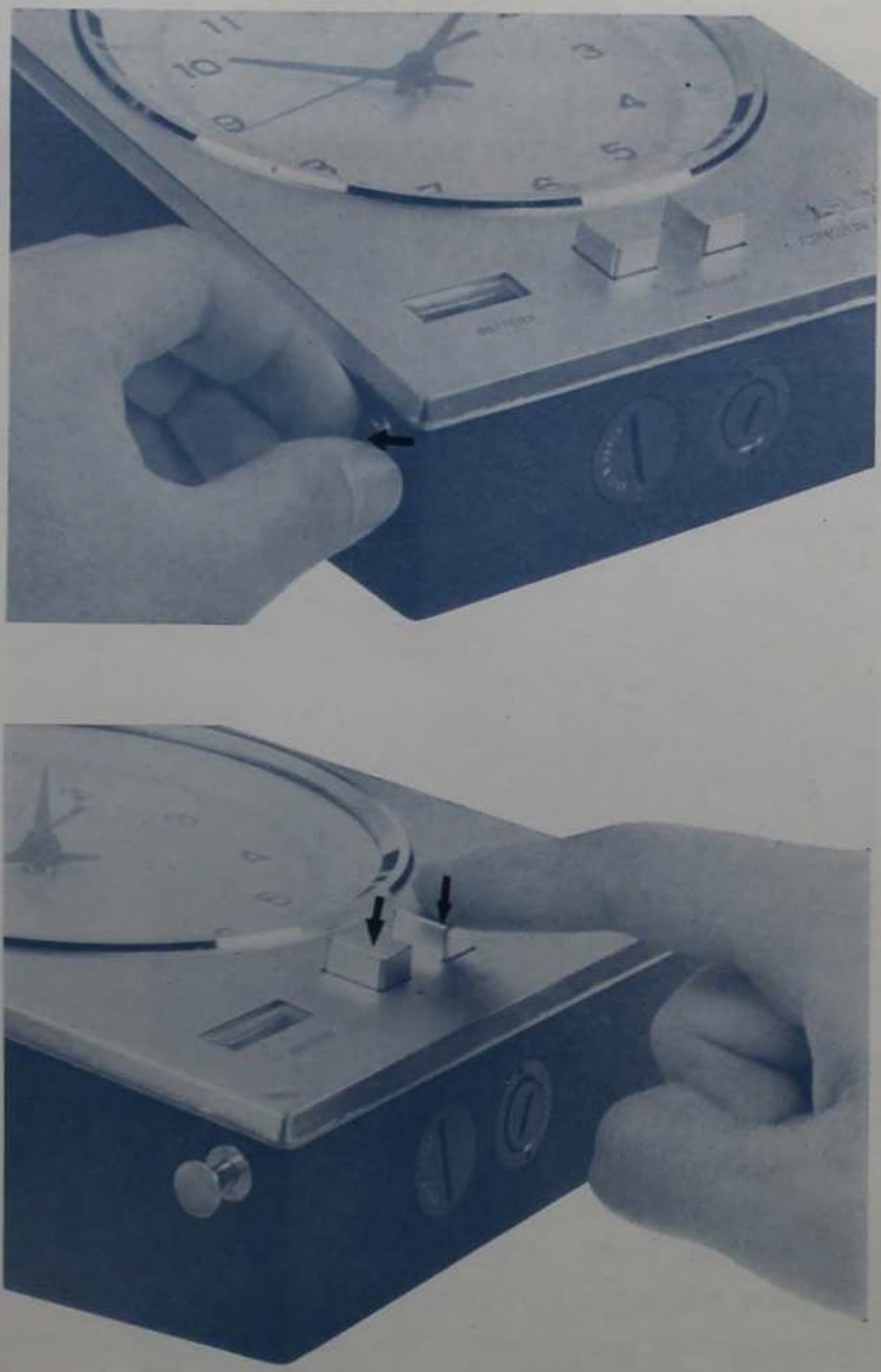
Set the hands by depressing the hour-and-minute-setting button with a coin, turning it to the right or left. At this time, when setting the hands by turning in reverse hand, setting can be accomplished without slippage between the second and minute hands.



Setting the second hand

Correction of the second hand is performed by push button. The method is as follows :

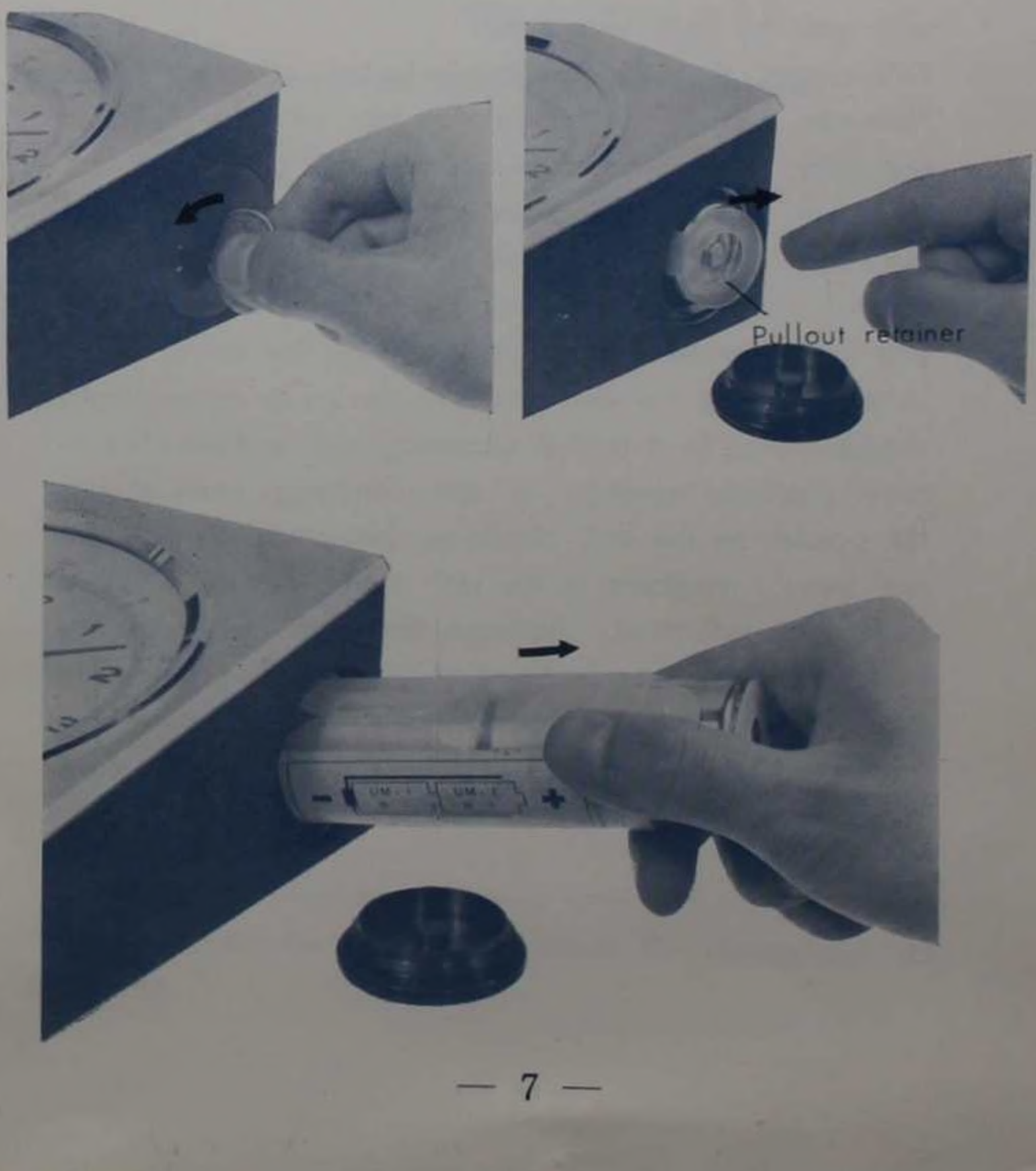
1. Pull out the safety knob located on the left side of the chronometer body.
2. Depress the minus (—) button when the second hand is traveling too fast ; depress the plus (+) button when the second hand is traveling too slow. In both cases, 0. 2 second can be corrected with one button depression. Confirm the error first, then depress the button the appropriate number of times corresponding to the error.
3. Always depress the safety knob firmly after perfroming second hand correction.



Replacing dry cells

When position of the pointer on the dry cell discharge indication meter borders between the red and blue areas, replace the dry cell by the following method :

1. Using a coin, open the dry cell screw-in lid located on the right side of chronometer body.
2. Pull out the plastic retainer, then remove the cylindrical dry cell case.
3. Insert new dry cells into the case following the instructions printed thereon.
4. Reinsert the dry cell case in its former condition and screw the lid shut tightly.



[Hints on Handling Your Chronometer]

- This crystal timepiece is provided with an adequate vibrationproof device, however, care must be paid to handling in order to maintain high accuracy.
- When replacing dry cells, pay strict attention to the plus (+) and minus (—) makings when inserting them. Inverse insertion of the cells will inevitably cause trouble.
- When leaving old cells in the clock over a long period, occasionally electrolyte leaks out. Consequently, when the pointer on the dry cell discharge indication meter moves outside the blue range and into the red, replace with new dry cells immediately.
- This crystal clock is precision-adjusted at the factory. However, when an adjustment for gain or loss becomes necessary, rather than tampering with the gain-loss adjusting screw, contact the store where the instrument was purchased. Since fine adjustment cannot be performed without using a special measuring device, the retailer will ship the chronometer back to the maker for correction.
- When removing the dry cells, this device is automatically changed over to a built-in secondary cell, and the chronometer continues running. In this condition, even though the pointer on the cell discharge indication meter does not move, remaining in the red range, this is NOT a malfunction indication. Although the clock will continue to run approximately 24 hours in this condition, new cells should be inserted as soon as practicable. Upon inserting the cells, the pointer will dart back to the blue zone immediately.

When the hands move incorrectly, check the following items.

When the hands do not move

1. Confirm position of the pointer on the dry cell discharge indication meter.
   a. When the pointer is in the blue zone—
   - Depress the start-stop button again

   b When the pointer is in the red zone—
   - Are the dry cells inserted or not ?
   - Is the insulation board removed or not ?
   - Is there any defective connection on the dry cell case ?
   - Is the dry cell voltage extremely low ?

When the hands are extremely inaccurate

- Is voltage under 2. 2 V when using two cells ?
- Is ambient temperature within −10°C～+50°C ?

If the hands do not move properly after performing the above checkups, consult the retail outlet where the chronometer was purchased.

【Special Features】

This extremely accurate chronometer is unaffected over a wide range of ambient temperatures (see specifications).

The standard oscillator, which determines the precision, is a natural crystal element which correctly oscillates approximately 6, 300 per second. This crystal element continues oscillation under a more stabilized condition than does a transistor electronic circuit. Moreover, a built-in automatic temperature-compensating device is uninfluenced by ambient temperature.

System is all-transistorized.

The electronic circuit, composed of silicon type transistors and diodes, is operatable under low voltage and displays extremely high reliability against temperature changes.

No noise results from adoption of a special synchronous motor.

Due to development of a transistorized, low-voltage synchronous motor, smooth movement of the second hand generates no noise such as the ticktock audible in conventional clocks.

Operates one year on two dry cells thanks to a low-voltage electronic circuit.

Life of the dry cells is constantly confirmed by a special meter.

Movement does not halt while changing dry cells.

When changing cells, the power is automatically changed over to a built-in secondary cell, therefore the chronometer never stops. This instrument will continue to register correct time for approximately 24 hours, powered by only a built-in secondary cell.

Facile handling operations.

Time correction is performed exclusively by pushbuttons, and dry cells are replaced merely by using a coin.

Watertight construction.

Case, glass, push buttons and screws are supplied with waterproof packing, thus, construction conforms to JIS, Class 2, Water Spray Test.

Usable as accurate wall clock.

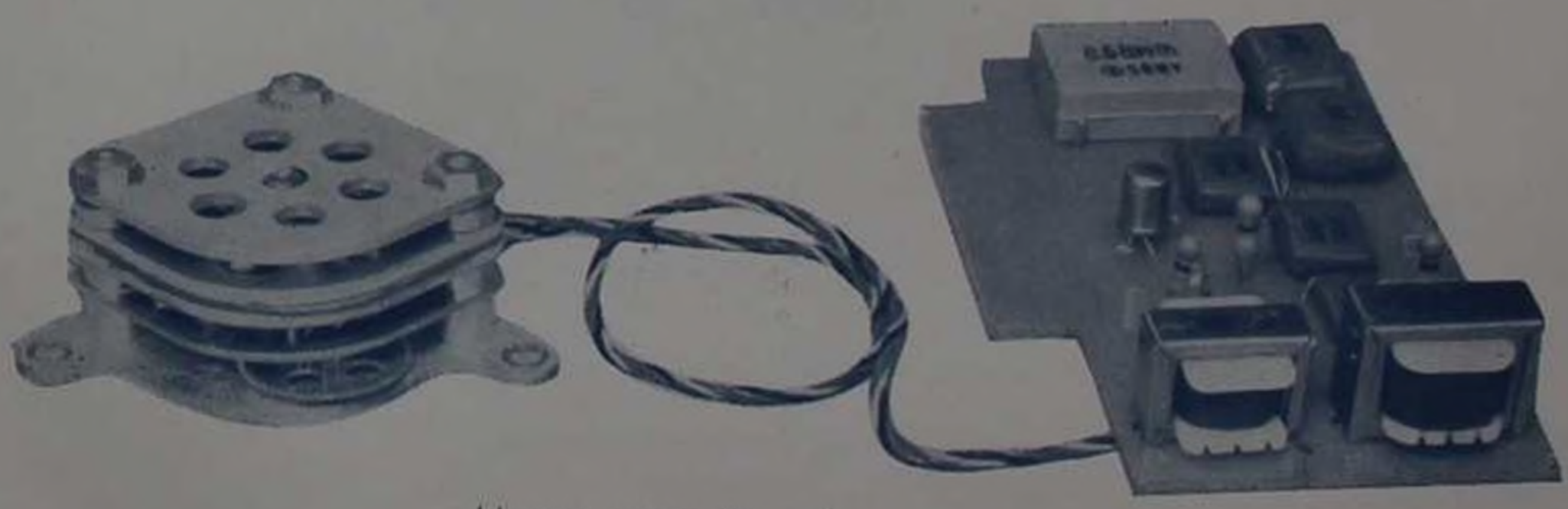
By utilizing a suspension metal, the clock is easily hung on the wall.

Unit system for easy maintenance.

The clock mechanism, divided into three units (oscillating circuit, frequency divider circuit, and motor circuit), permits each unit to be independently replaced for easy, perfect repair and adjustment.

Oscillating circuit unit

Frequency divider circuit

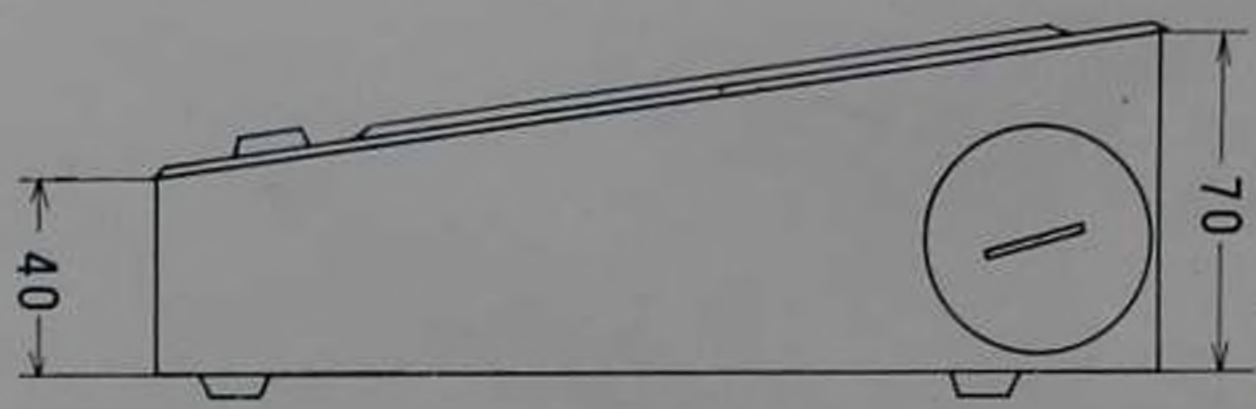


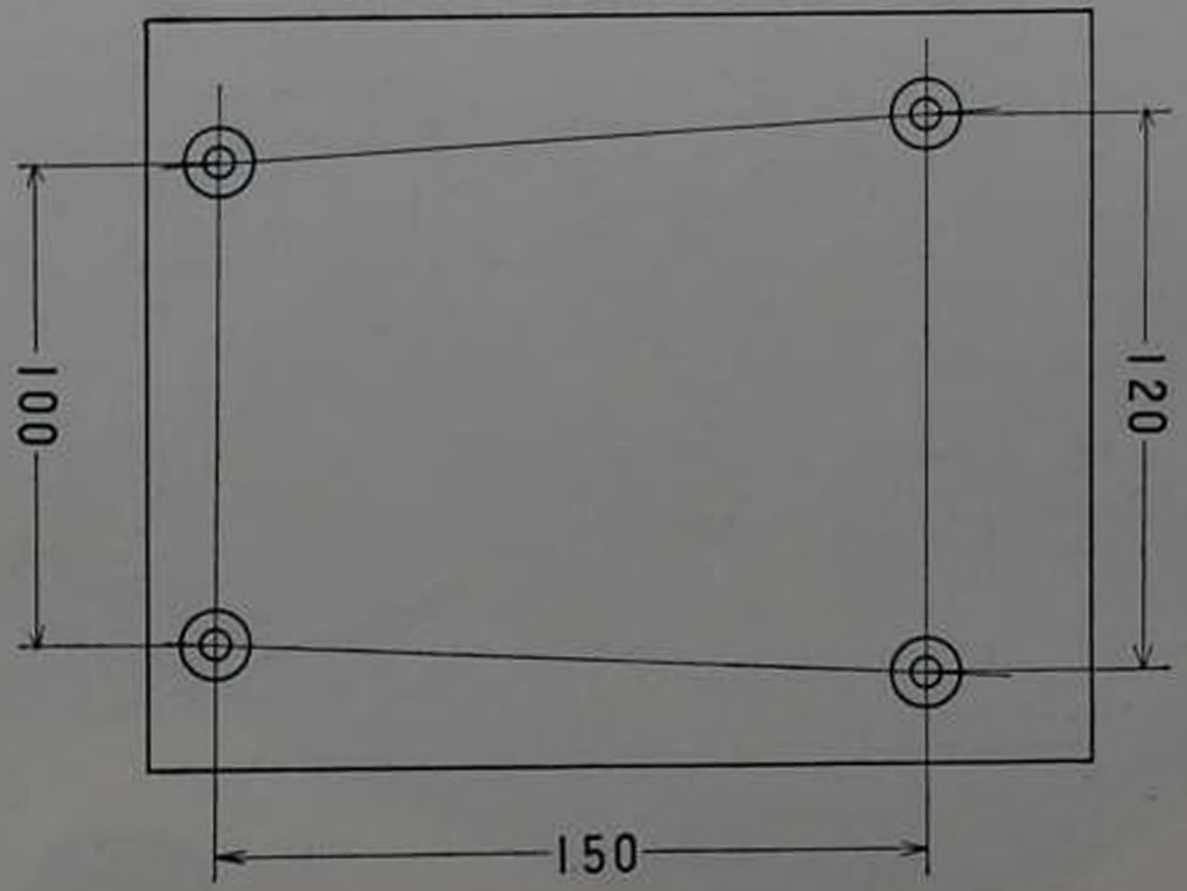
Motor circuit unit

【Specifications】

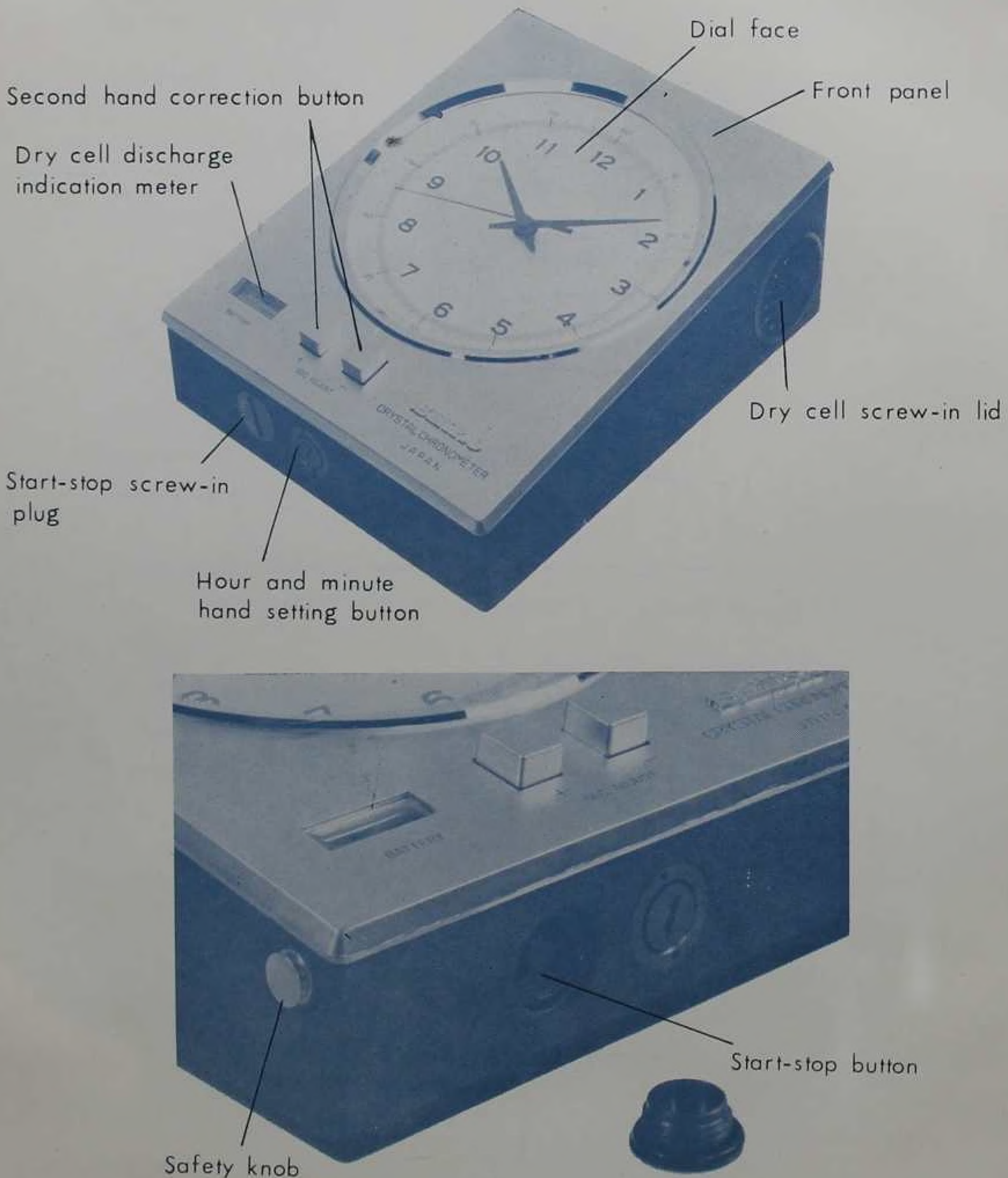
Accuracy	Daily rates (mean)	±0. 1 second (20°C)
	Variation of daily rates (mean)	±0. 05 second
	Temperature characteristics	±0. 2second(0°～40°C)
Temperature range		
	Guaranteed accuracy range	0°C～+40°C
	Guaranteed operation range	−10°C～+50°C
Dry cells used	UM-1	2 pcs.
Dry cell life		12 months (approx.)
Voltage characteristic		2. 2 V～3. 2 V
Current consumption		0. 8 mA (3 V)
Standard crystal oscillation		6. 269388 KC
Vibrationproof characteristic		Withstands 2 G vibration
Weight		2. 6 kg
Hands operation		Continus operation
Circuit system		All-transistorized
Dimensions	Width	160 mm.
	Length	200 mm.
	Height	40—70 mm.

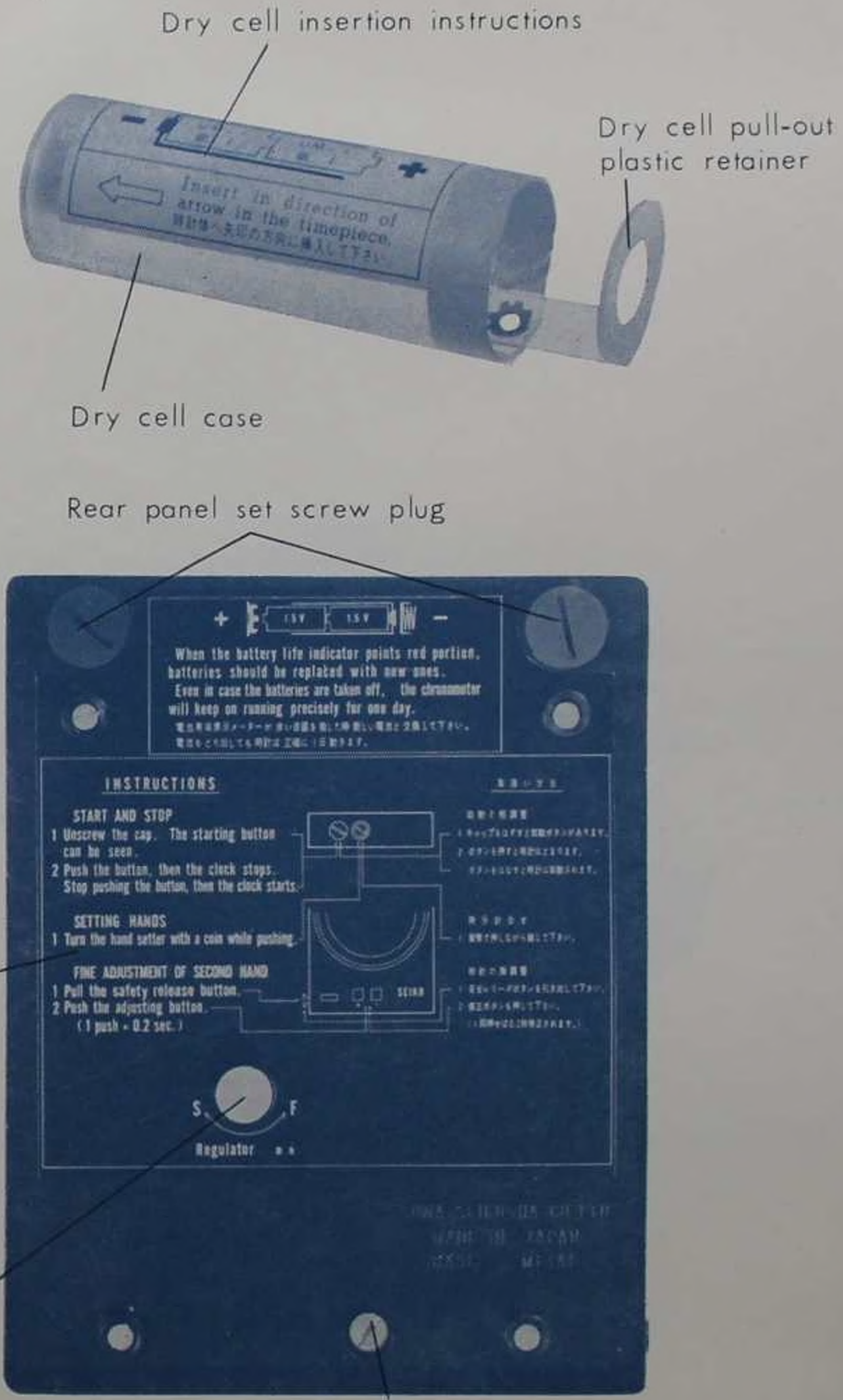
【Dimensions】 Unit : mm.

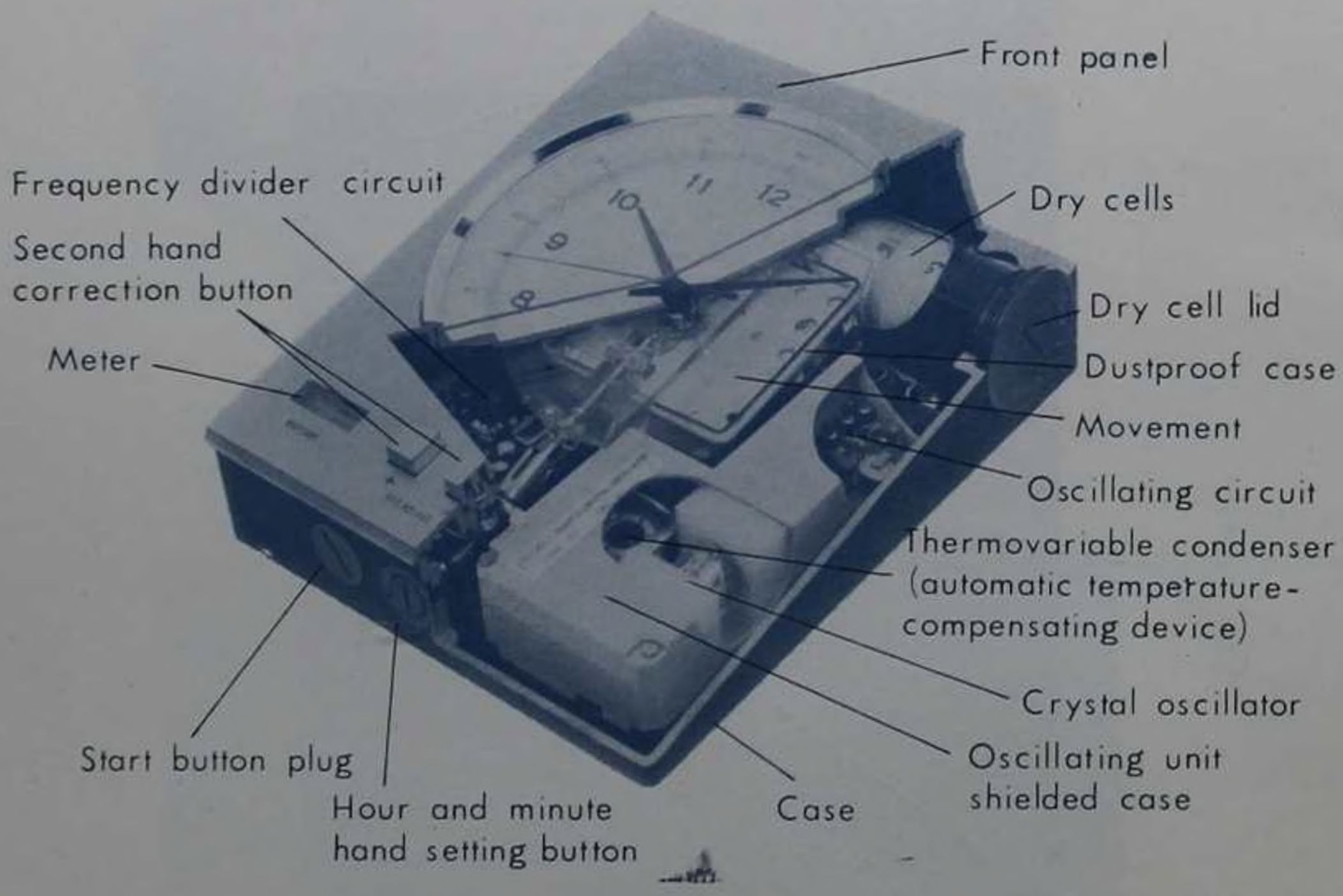



100
120
150

【Parts Nomenclature】




Dry cell insertion instructions
Dry cell pull-out plastic retainer
Insert in direction of arrow in the timepiece.
Dry cell case
Rear panel set screw plug
1.5V
1.5V
When the battery life indicator points red portion, batteries should be replaced with new ones.
Even in case the batteries are taken off, the chronometer will keep on running precisely for one day.
INSTRUCTIONS
START AND STOP
1 Unscrew the cap. The starting button can be seen.
2 Push the button, then the clock stops. Stop pushing the button, then the clock starts.
SETTING HANDS
1 Turn the hand setter with a coin while pushing.
FINE ADJUSTMENT OF SECOND HAND
1 Pull the safety release button.
2 Push the adjusting button. (1 push = 0.2 sec.)
SEIKO
S
F
Regulator
Handling instructions plate
Regulator plug
Rear panel set screw


Front panel
Frequency divider circuit
Second hand correction button
Meter
Dry cells
Dry cell lid
Dustproof case
Movement
Oscillating circuit
Thermovariable condenser (automatic tempetature-compensating device)
Crystal oscillator
Oscillating unit shielded case
Start button plug
Hour and minute hand setting button
Case

SEIKO

Modern Masters of Time

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