WATCH MOVEMENT

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COMMON ITEMS ON CITIZEN WATCH MOVEMENTS

PARASHOCK
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TECHNICAL INFORMATION

PARASHOCK
PROFIX
UNBREAKABLE MAINSPRING

CITIZEN WATCH CO.,LTD.

CONTENTS

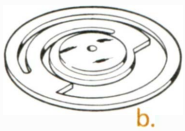
1. PARASHOCK

Parashock is a shock absorbing device that protects the heart of the watch, the balance staff, from shocks and impacts. Although it has a simple construction, as illustrated, its effectiveness has been thoroughly proved through various demonstration tests.

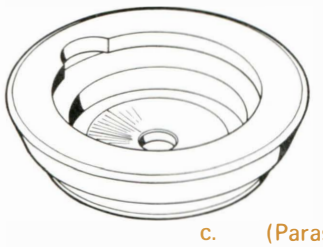
[CHARACTERISTICS]

1. High degree shock absorbing and impact preventing capabilities.
2. Quick and accurate recovery from shocks.
3. Outstanding oil preservation capability.
4. Disassembly, assembly and oiling can be easily performed.

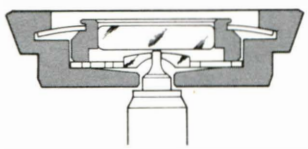
a. (Parashock)
Lower cap jewel



b. (Parashock)
Spiral spring
with jewel

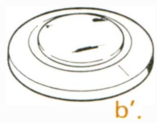


c. (Parashock)
Lower end-piece

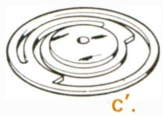


Gents' Watches

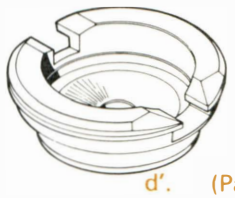
a'. (Parashock)
Lower cap
jewel spring



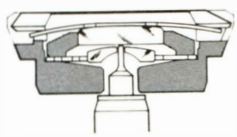
b'. (Parashock)
Lower cap jewel



c'. (Parashock)
Spiral spring
with jewel

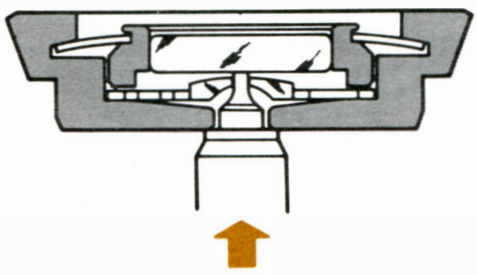


d'. (Parashock)
Lower end-piece

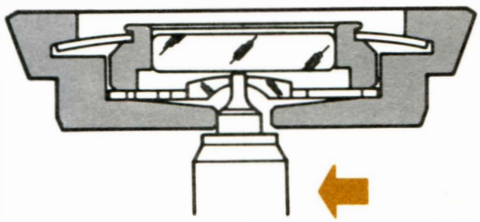


Ladies Watches

When receiving shocks in the pivot direction



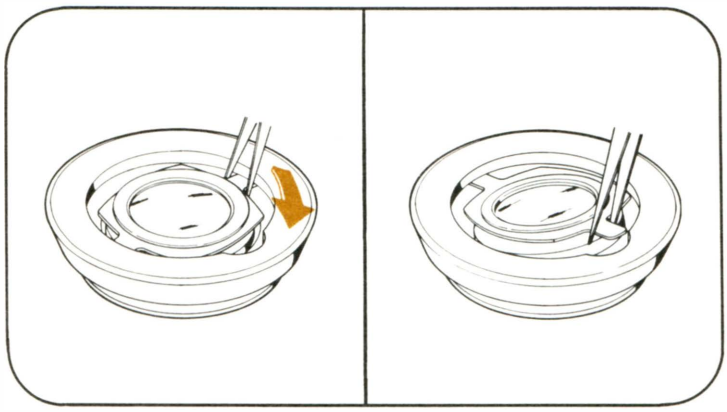
When receiving shocks in
a perpendicular direction to the pivot



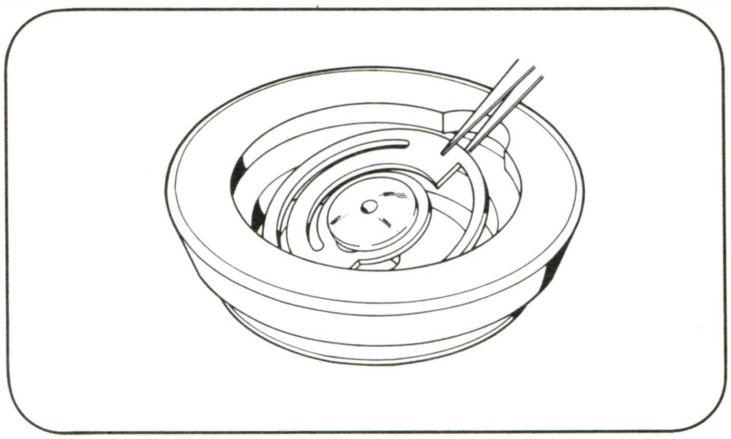
2. DISASSEMBLY, ASSEMBLY AND OILING

1-A Disassembly (Gents' watches)

a. Remove the Parashock cap jewel mounted.



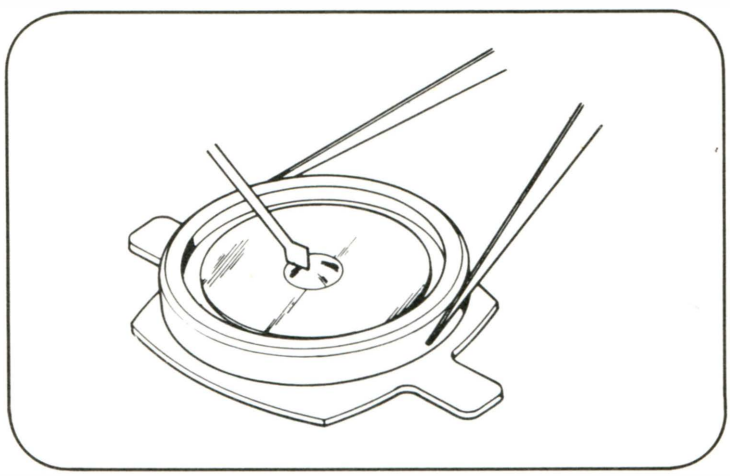
b. Remove the spiral spring with jewel.



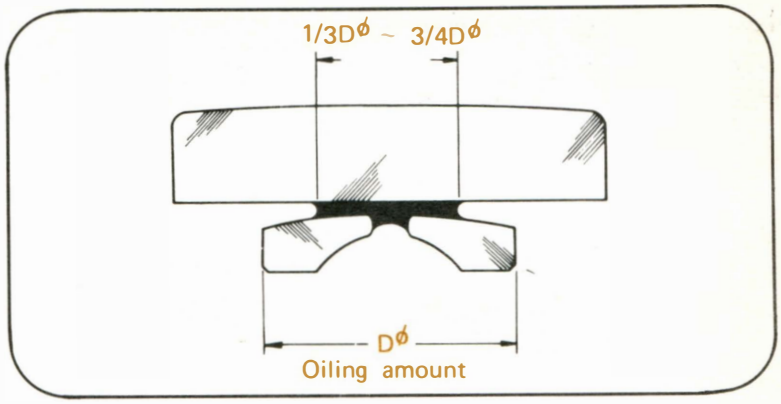
c. Clean the Parashock components.

2-A Assembly and Oiling (Gents' watches)

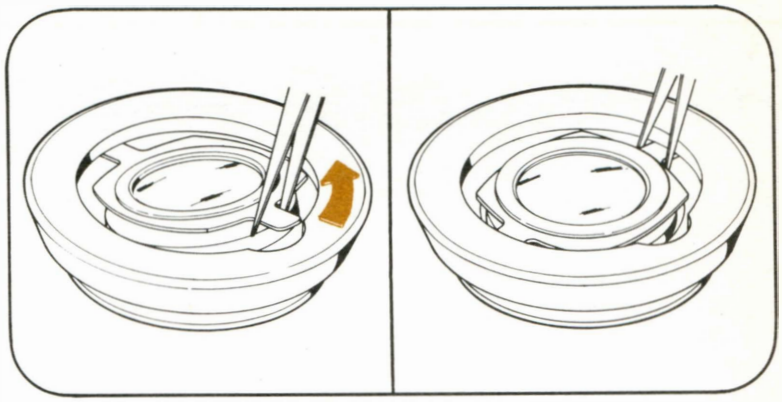
a. Insert the spiral spring with jewel. Make sure that it is positioned correctly and not upside down.



b. Oil the Parashock cap jewel.
Make sure that there is no dirt or stain on the jewel surface.

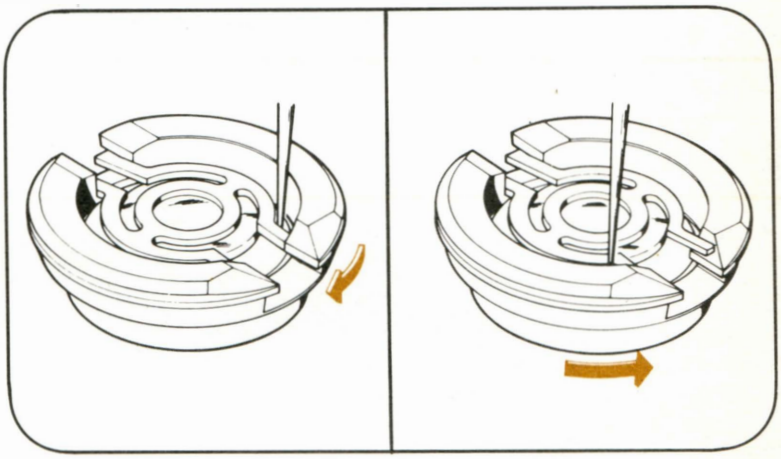


c. Insert the Parashock cap jewel mounted.
Rotate the spring 90° from its place of insertion.

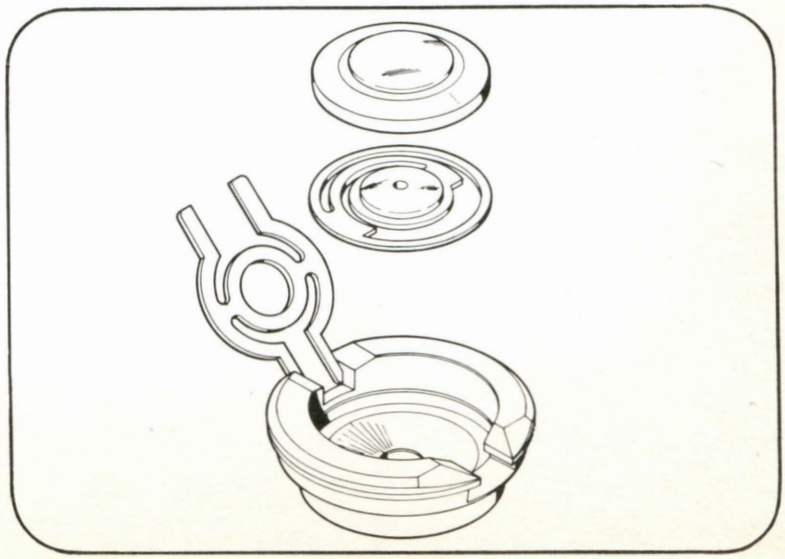


1-B Disassembly (Ladies' watches)

a. Remove the Parashock cap jewel spring.
Remove the lugs of spring, one by one, on the side with a matching mark.



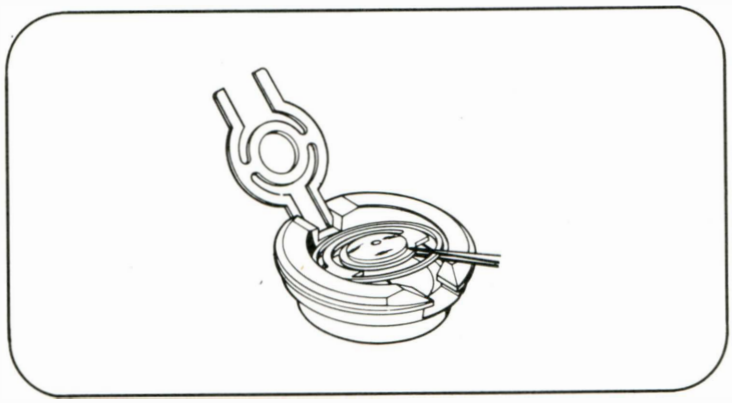
b. Remove the cap jewel mounted and the spiral spring with jewel.



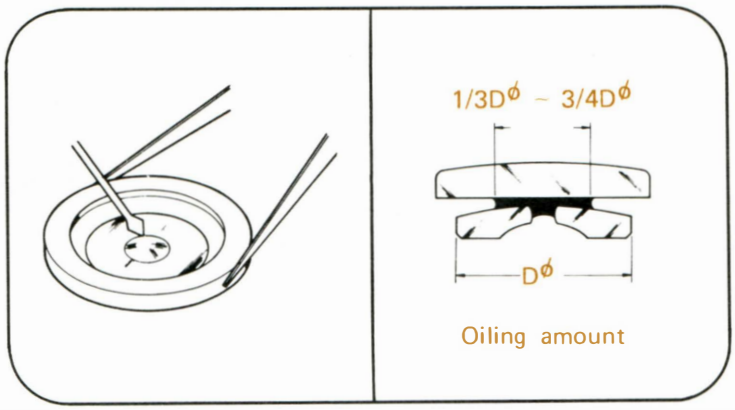
c. Clean the Parashock components.

2-B Assembly and Oiling

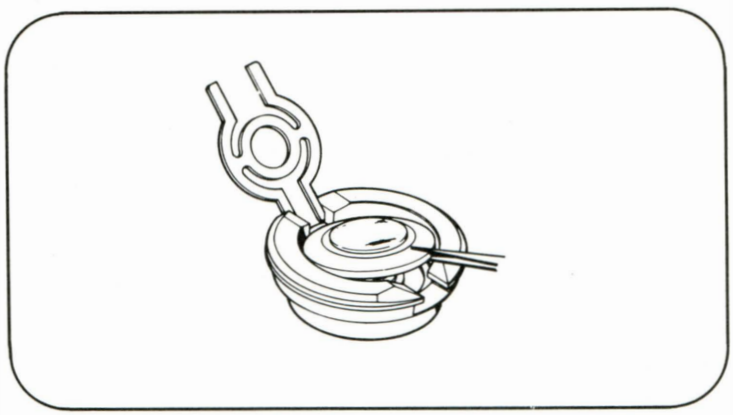
a. Insert the spiral spring with jewel.
Make sure that it is positioned correctly and not upside down.



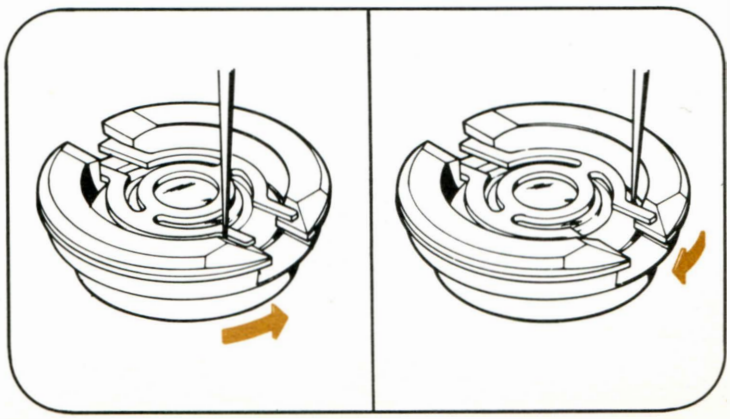
b. Oil the cap jewel.
Make sure that there is no dirt or stain on the jewel surface.



c. Insert the cap jewel mounted.

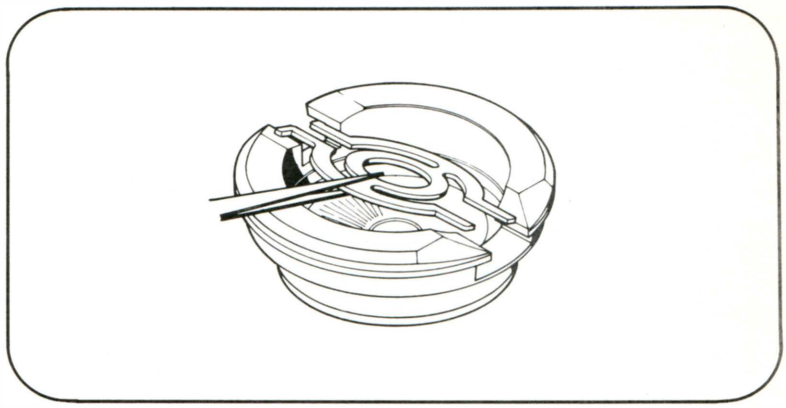


d. Fix the cap jewel spring.
Fix the springs, one by one.



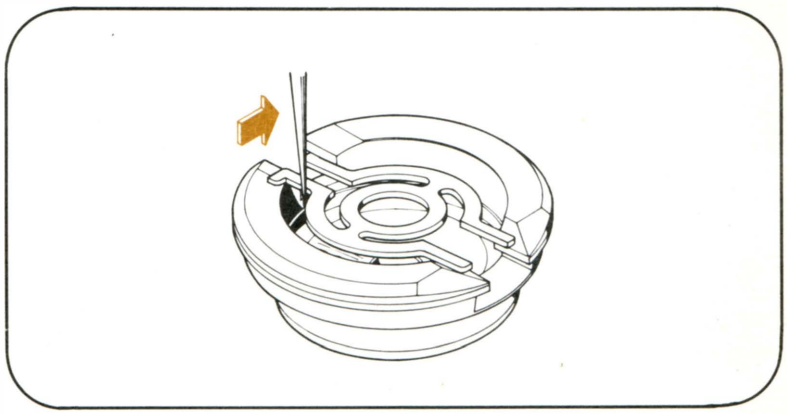
3-B Changing the Cap Jewel Spring

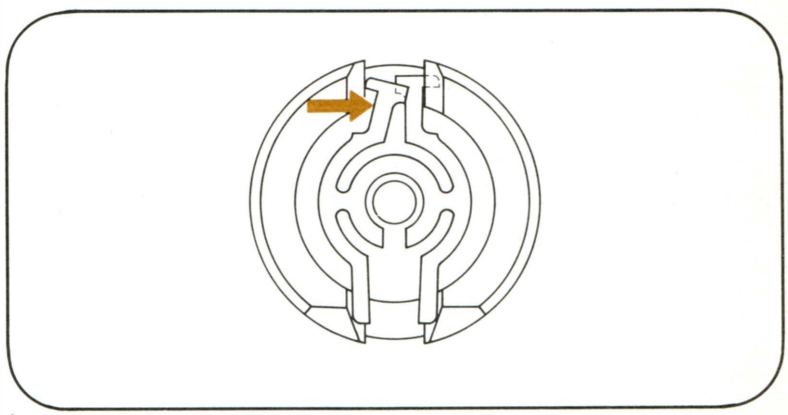
a. Remove the cap jewel mounted to be changed.



b. Insert one leg of a new cap jewel spring into the groove under the frame on the side with no matching marks.

c. Insert the other leg of the cap jewel spring also into the side groove by bending it inwards.



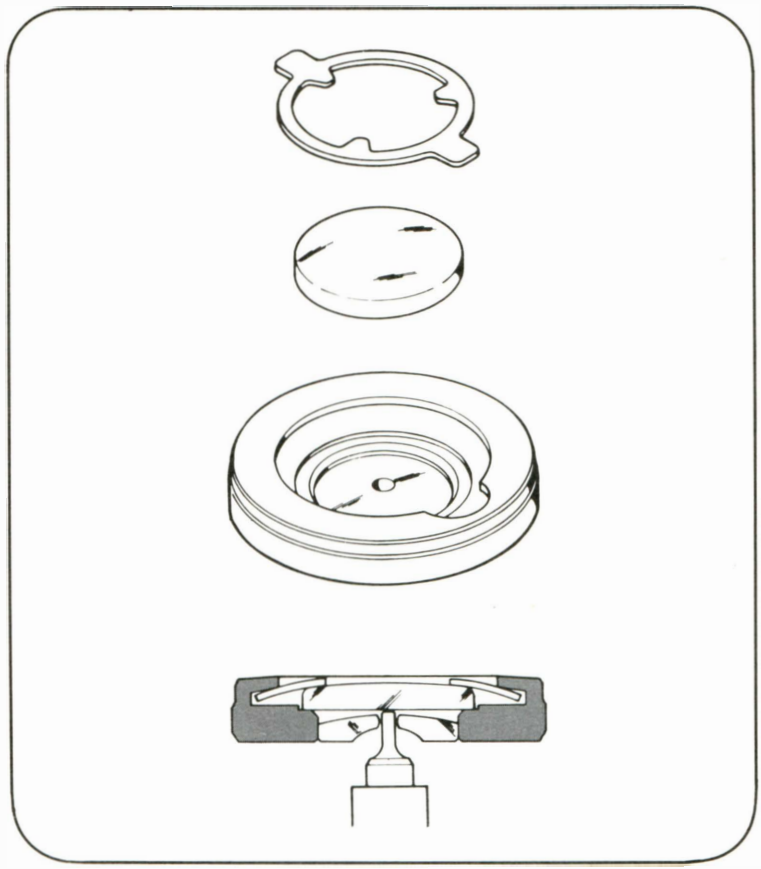


1. PROFIX

Profix is Citizen's unique oil preservation device which is used as a friction absorber on the upper and lower portions that accept the pivot of the third wheel, fourth weel, escape wheel, etc.

[CHARACTERISTICS]

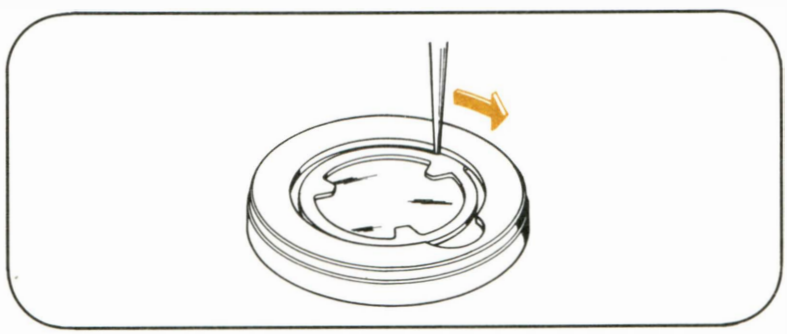
1. Excellent oil preserving capability.
2. Facilitates adjustment of end shake.
3. Disassembly, assembly and oiling can be easily performed.



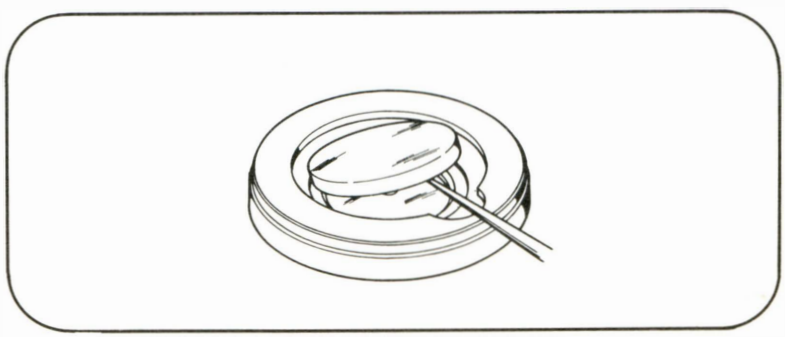
2. DISASSEMBLY, ASSEMBLY AND OILING

1. Disassembly

a. Remove the Profix cap jewel spring. Take care as not to deform the spring.



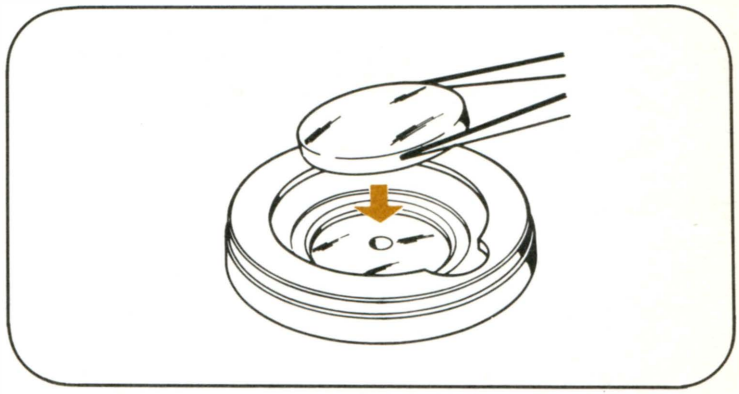
b. Remove the cap jewel.



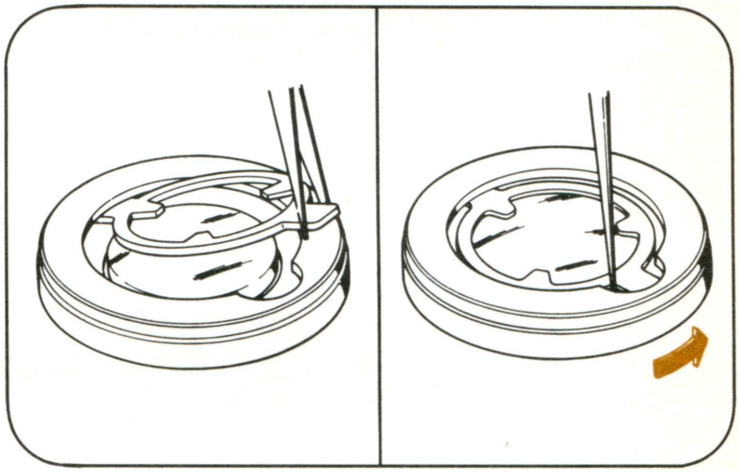
c. Clean the Profix components

2. Assembly

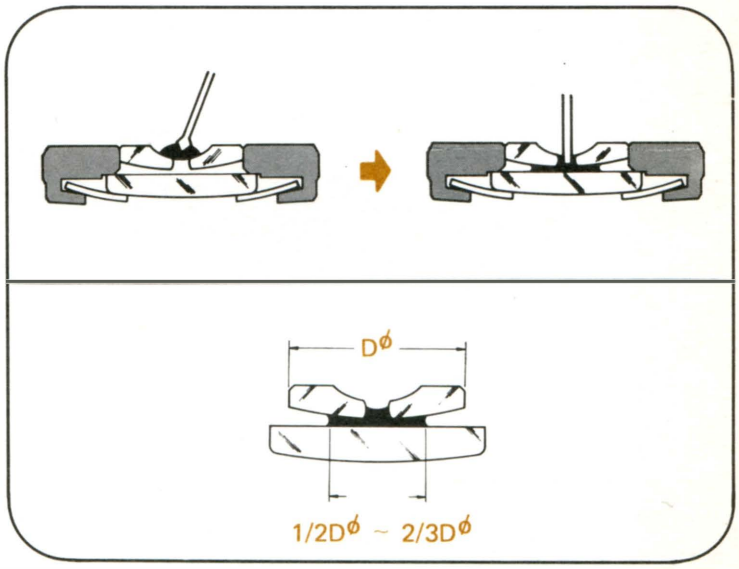
a. Insert the cap jewel.
Make sure that there is no dirt or stain on the jewel surface, and is positioned correctly and not upside down.



b. Insert the Profix cap jewel spring.
Rotate the spring 90° from its place of insertion.



c. Oil the Profix.



1. CITIZEN UNBREAKABLE MAINSPRING

The Citizen unbreakable mainspring is a spring made of special alloy. This mainspring is used as a motive source in high precision Citizen watches.

[CHARACTERISTICS]

1. Unbreakability
2. Rust-proofness
3. Long life
4. High elasticity

2. MAINSPRING COATED WITH POLYFLON

Mainsprings for Citizen hand-winding watches are coated with a thin film of resin. This material, tradenamed Polyflon, results in highly stabilized output of the mainspring for a prolonged period without the necessity of oiling. Cleaning or oiling the Polyflon treated mainspring will in no way affect its function.

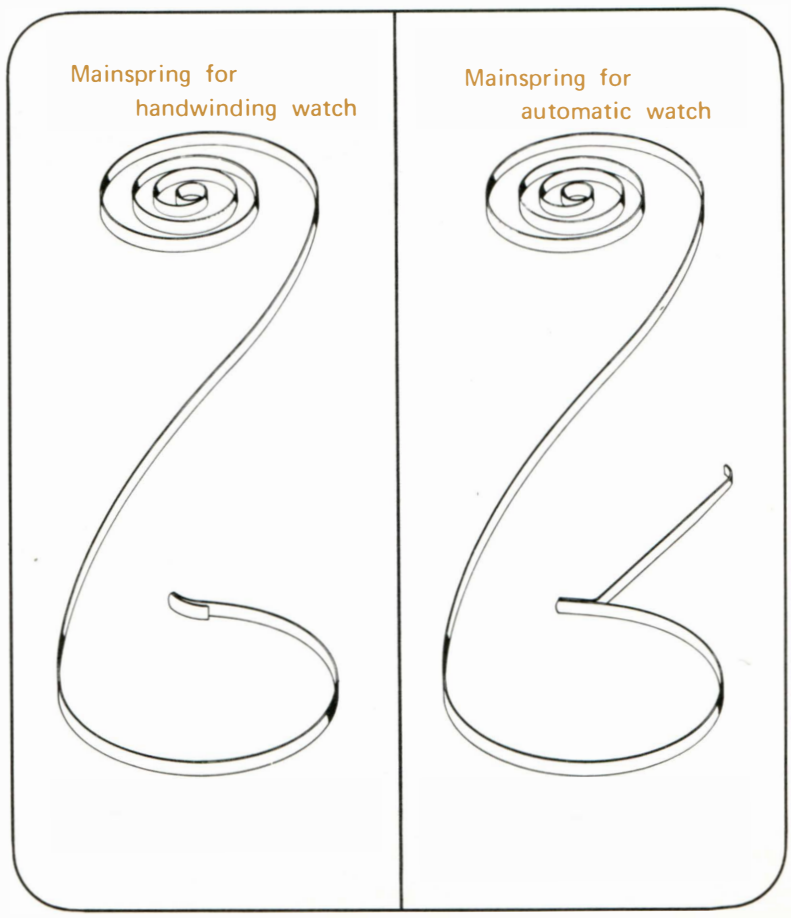
3. MAINSPRING FOR AUTOMATIC WATCHES

a. The mainspring for automatic watches has a special slipping attachment (see Fig. 1), which prevents overwinding, overbanking, and similar problems.

b. There is no groove on the barrel for the slipping attachment. As the mainspring becomes fully wound, the slipping attachment automatically slips around the barrel wall.

c. Durability and precision of the watch depend upon the proper functioning of the slipping attachment. Therefore, it must be handled with great care.

d. Since Citizen mainsprings are designed to retain their original performance characteristics for several years without lubricating or cleaning, a minimum of handling is necessary. In cleaning the watch, it is sufficient to clean the soiled portion of the barrel, unless a special problem with the mainspring is indicated.



(Fig. 1)

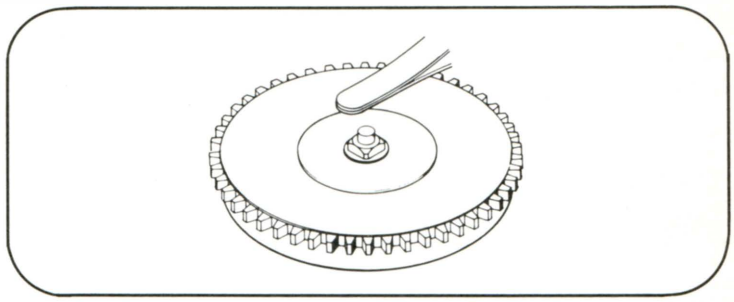
4. DISASSEMBLY, ASSEMBLY AND OILING

To clean the mainspring, the following procedures should be followed:

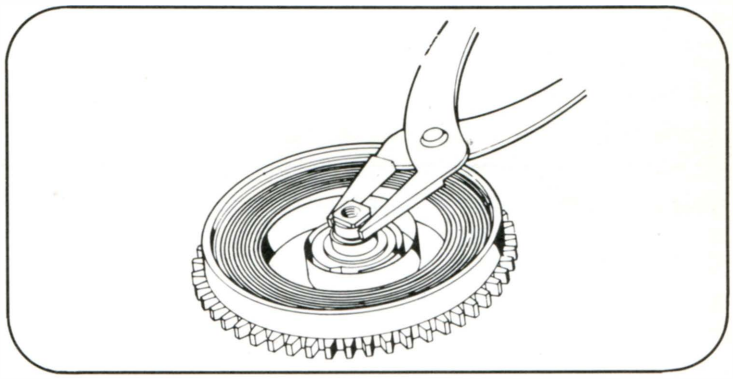
1. Disassembly

a. Remove the barrel cap.

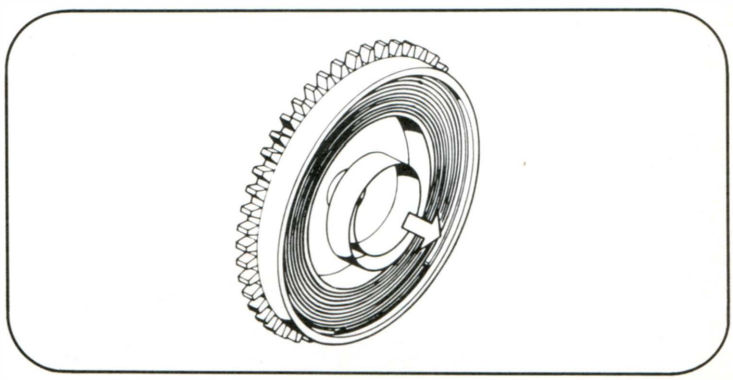
Hold the barrel with the covered side down, then push the barrel arbor down.
In case the barrel cover is out-side-fit type, remove the barrel arbor with a pry opener.



b. Take out the barrel arbor.
Be careful not to pull out the mainspring together with the barrel arbor.



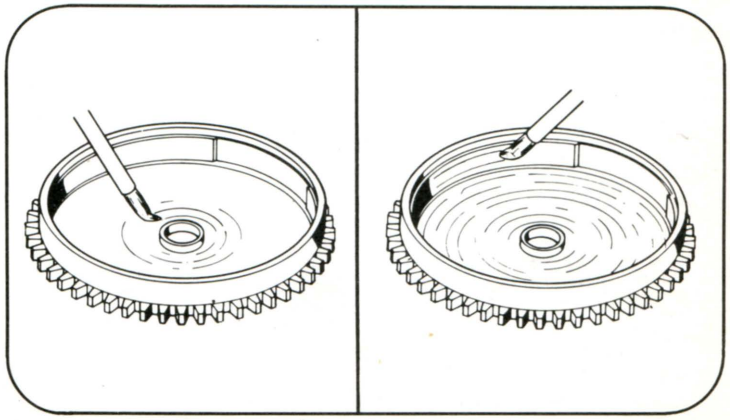
c. Remove the mainspring.
Be careful not to deform the mainspring during removal.



d. Clean the disassembled parts using the Ultrasonic Cleaning Machine.

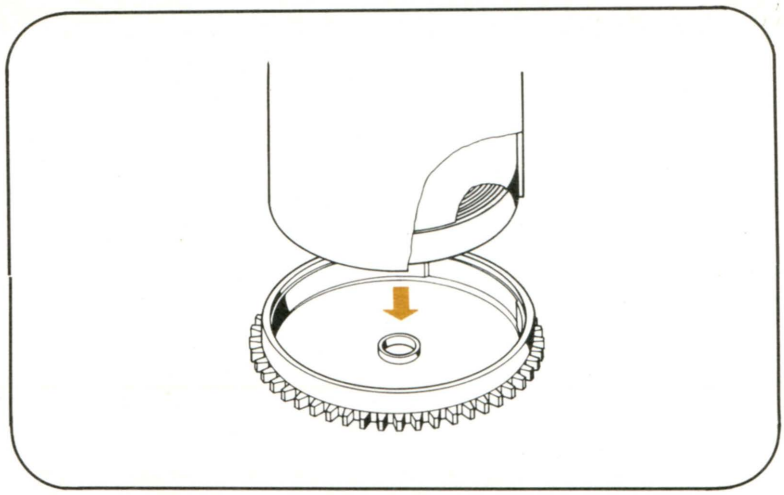
2. Assembly and Oiling

a. Oil the inner and bottom walls of the barrel with Citizen oil used exclusively for the mainspring.



For handwinding watch . . . CH–1
For automatic watch CA–1, CA–2
Calibers using CA–1 . . . . . Cal. Nos. 14, 22, 03 and 52 series
Calibers using CA–2 . . . . . Cal. No. 66 72 series

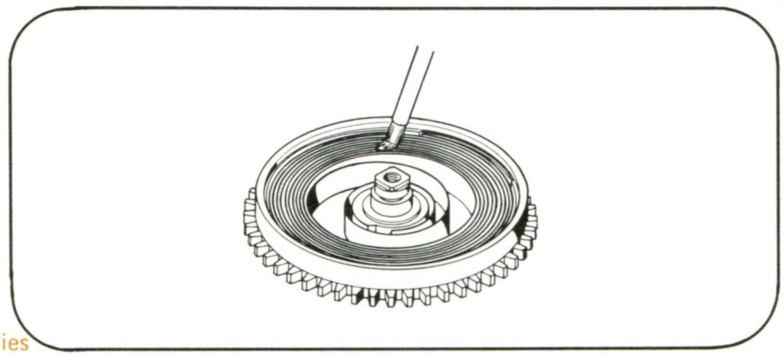
b. Insert the mainspring.
Use the mainspring winder.



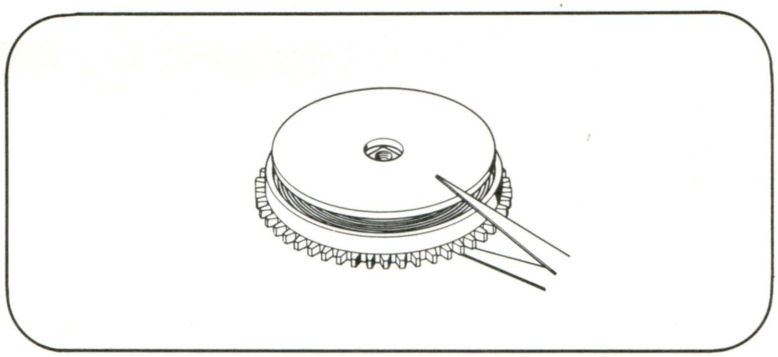
c. Insert the barrel arbor.

d. Apply oil to the mainspring.
Use the Citizen oil used exclusively for the mainspring.

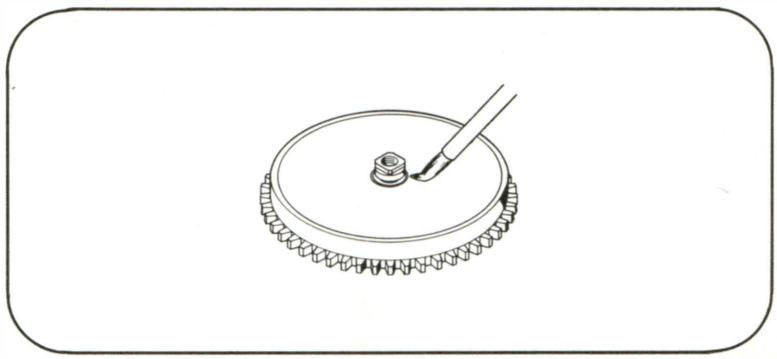
For handwinding watch . . . CH–1
For automatic watch CA–1, CA–2
Calibers using CA–1 . . . . . Cal. Nos. 14, 22, 03 and 52 series
Calibers using CA–2 . . . . . Cal. No. 66,72 series



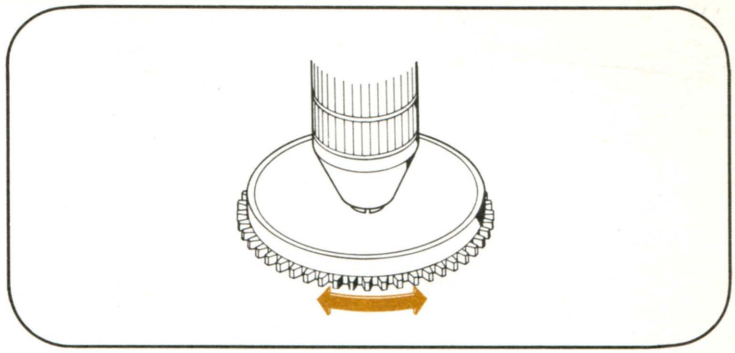
e. Close the barrel cap.
Check whether the shake of the barrel arbor is correct.



f. Apply oil to the upper and lower pivot portions of the barrel arbor.
Citizen oil CH–1 should be used.



g. Grip the barrel arbor with a pin vice while winding and rewinding so that the oil will spread to all areas. When holding the barrel arbor, use vinyl or rice-paper.



MAINSPRING INSPECTION OF AUTOMATIC WATCHES

The following procedures should be followed to check whether the slipping attachment needs replacement:

a. Assemble barrel into the movement.

b. Wind the spring more than 8 times while checking the number of rotations watching the ratched wheel or the slit on the barrel arbor.

c. Check the number of rotations by rewinding the mainspring.

Note:

If the number of rotations is below 5.5, the slipping attachment is loose. If it cannot be fitted tightly against the inner wall of the barrel, it should be replaced with a new one.

OUT-OF-BEAT CORRCTING DEVICE

1. OUT-OF-BEAT

Out-of-beat swing occurs when the swinging center of the roller jewel is not on the line of centers of the balance, pallet staff, and the escape wheel. The rate trace is printed by two wide dotted lines. (Refer to the "Rate measurement" section).

2. STRUCTURE

- Citizen employs an out-of-beat correcting device as shown in Figs. 1 and 2 for correcting the out-of-beat of the balane.
- A movable hairspring stud holder is provided between the balance cock and the regulator and the hairspring stud with the outer end of the hairspring fixed is screwed onto the hairspring stud holder.

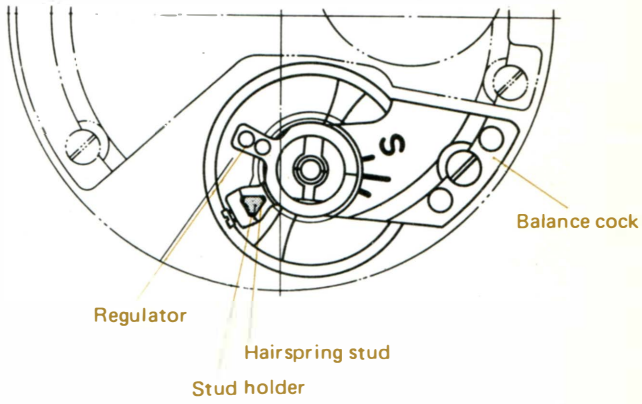


Fig. 1

3. CORRECTION METHOD

Moving the hairspring stud holder to the left or right will move the swinging center of the balance so correcting operation of out-of-beat can be carried out directly on the microphone, of the timing machine.

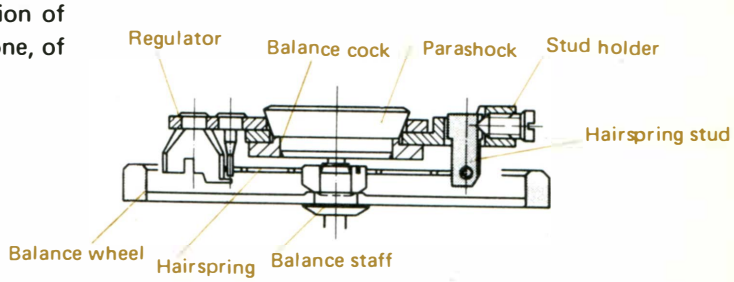


Fig. 2

SECOND HAND STOPPING DEVICE

Citizen high class wrist watches have a second hand stopping device which allows stopping the second hand at an optional position when the crown is pulled out and actuating to it when the crown is pushed in. This allows setting the time correctly to the very second. There are three types of second hand stopping devices.

1. Type 1

When the crown is pulled out to the time setting position (C), the tip of the setting lever moves the stop lever in the arrow direction and as the stop lever stops the fourth wheel, the second hand stops at an optional position (Fig. 1).

- Installed in Cal. No. 02 series.

2. Type 2

When the crown is pulled out to the time setting position (C), the stop lever coupled to the yoke moves in the arrow direction and as the stop lever spring stops the fourth wheel, the second hand stops at an optional position (Fig. 2).

- Installed in Cal. No. 52 series.

3. Type 3

When the crown is pulled out to the time setting position (C), the tip of the setting lever moves the stop connection lever in the arrow direction and as the stop lever touches the balance wheel, the second hand can be stopped at an optional position (Fig. 3).

- Installed in Cal. No. 72 series.

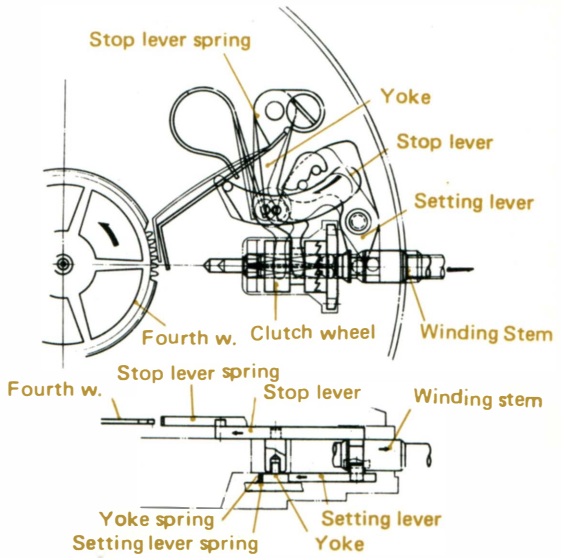
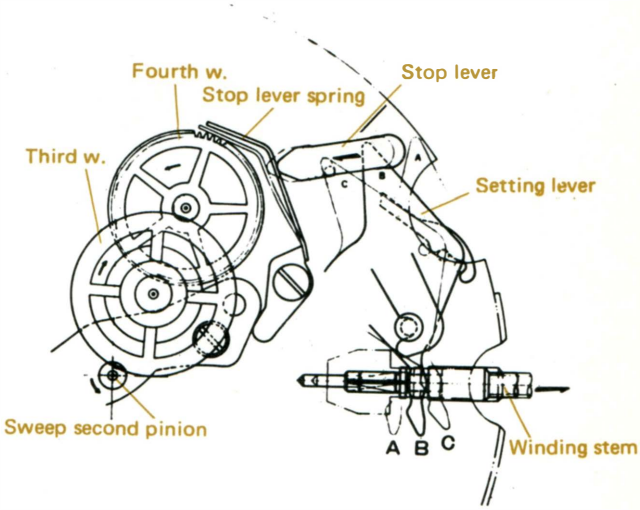


Fig. 1



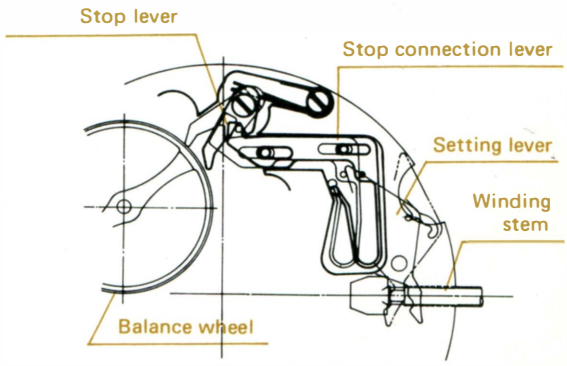


Fig. 3

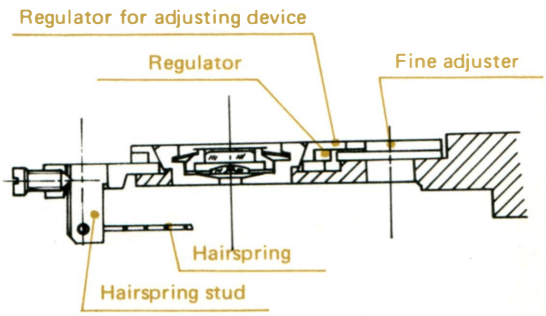
M 3

REGULATING DEVICE FOR FINE ADJUSTMENT

1. CHARACTERISTICS

Citizen high class wrist watches employ a regulating fine adjustment as shown in Figs. 1 and 2.
This device has the following characteristics.

- Fine adjustment of the rate can be made easily.
- A stabilized rate can be obtained.



2. STRUCTURE

The regulating device for fine adjustment consi
regulator, regulator for adjusting device and a fine adj

3. ADJUSTING METHOD

Insert a driver on the slot of the eccentric fine adjuster and by turning left or right, the fine adjustment of rate can be easily made.

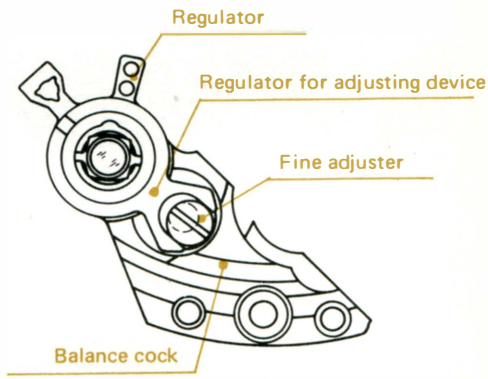


Fig. 2

OILING INSTRUCTION

TECHNICAL INFORMATION

OILING INSTRUCTION

CITIZEN WATCH CO.,LTD.

CONTENTS

1. GENERAL SUGGESTIONS ON OILING

Please pay attention to the following when oiling is performed.

(1) Do not use deteriorated or metachromatic oil.

(2) Be sure to rinse and clean the oil cup so it will be clear of used oil, filth, etc.

(3) Use different oil cups for different types of oil.

(4) Use oil by transferring a small amount from the oil container to the oil cup.

(5) Use a glass rod when transferring the oil to the oil cup from the container.

(6) Refrain from adding oil to the remaining oil in the cup.

(7) Be sure to have the portion to be oiled thoroughly cleaned before oiling.

(8) Do not use a brush when oiling except grease (CH–1, CA–1, CA–2).

(9) Oiling should be performed with a suitable amount of oil.

(10) Change with new oil at least once a week.

(11) Keep oil away from direct sunlight and always have the oil cup lid on securely.

2. SELECTION AND SYMBOL OF OIL TO BE USED

(1) Selection of oil

Refer to the "Citizen Watch Oil" section of this Technical Information Manual.

(2) The symbols of the oil used are as follows:

Synt-A-Lube Oil 

Synt-Visco-Lube Oil 

Handwinding Watch Oil (CH–1) 

Automatic Watch Oil (CA–1)  for Cal. 22, 14, 03, 52 series.

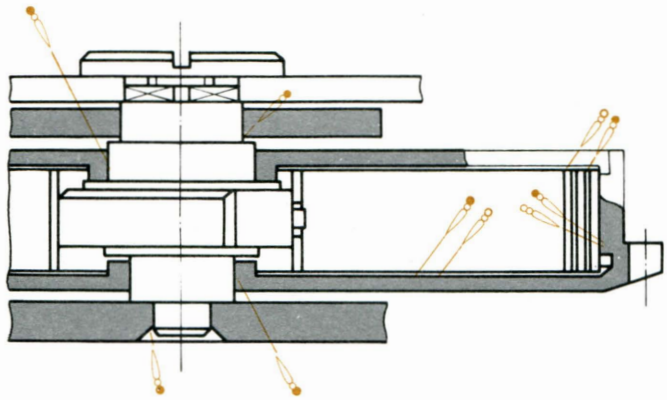
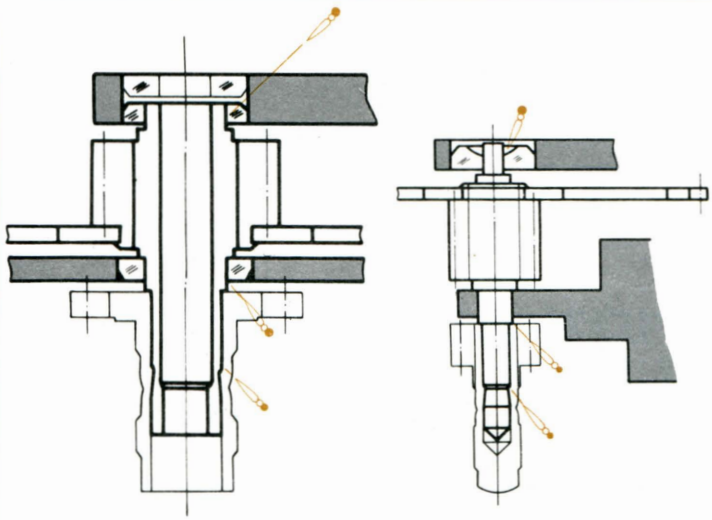
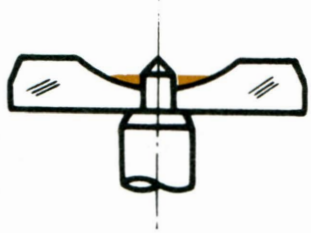
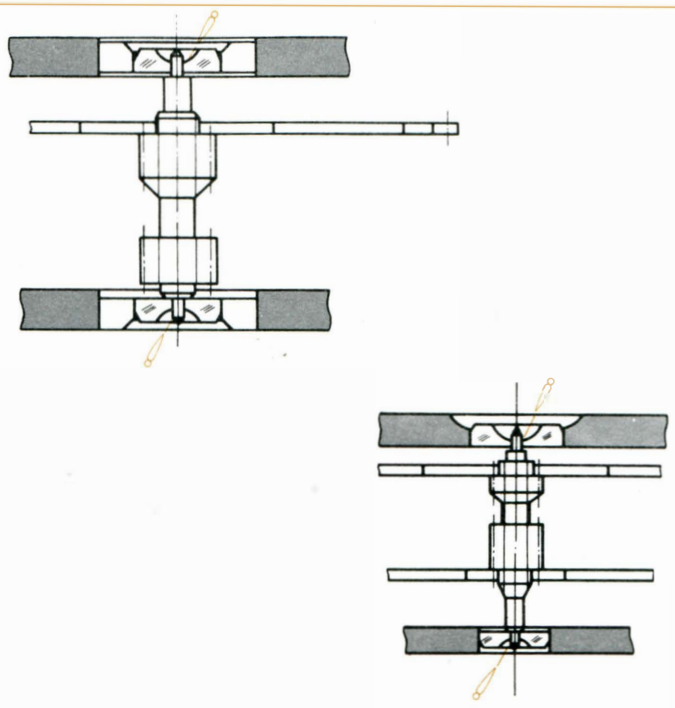
Automatic Watch Oil (CA–2)  for Cal. 66, 72 series.

Note:

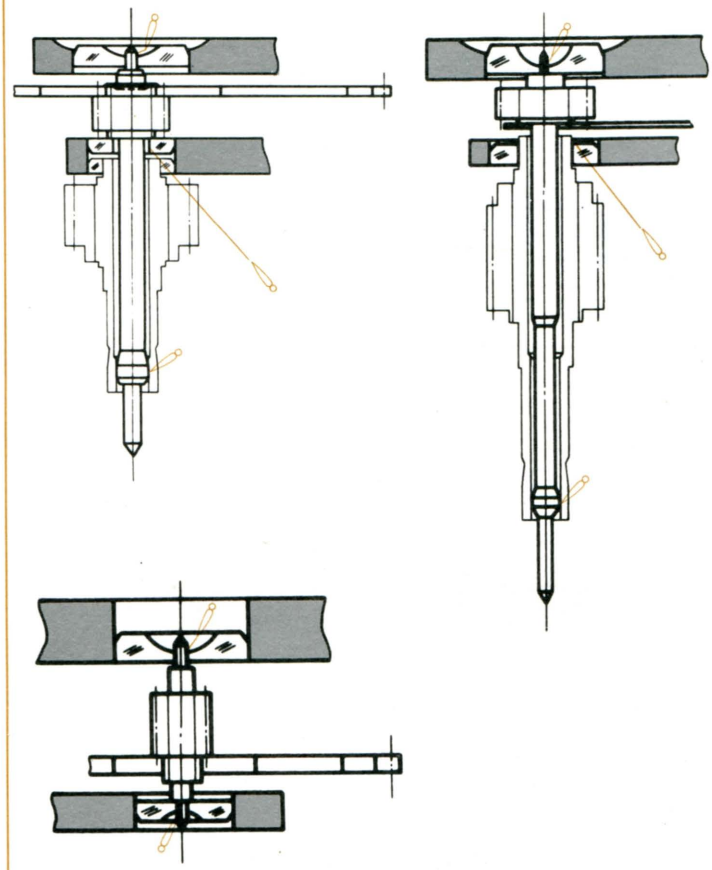
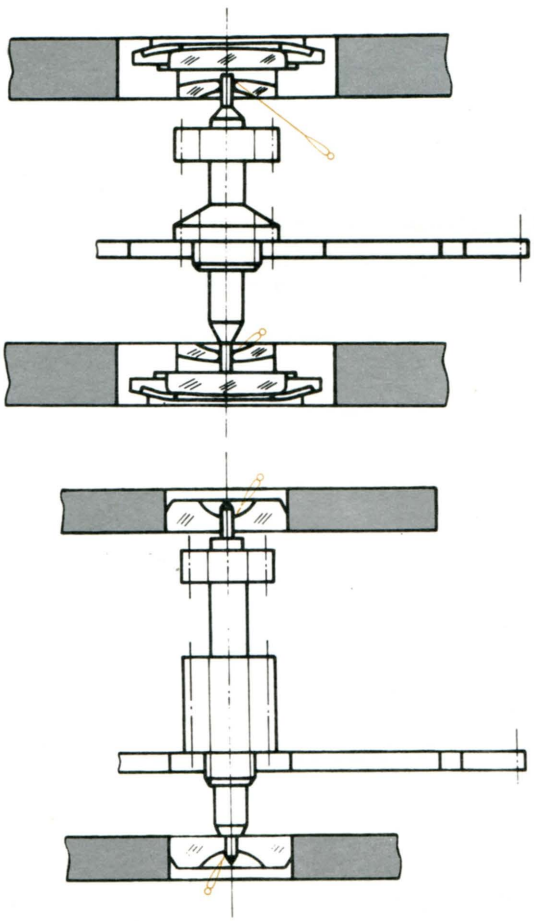
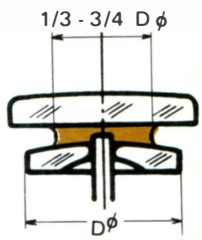
As a principle, the direction of the symbol indicates the oiling direction.

3. OILING GUIDANCE

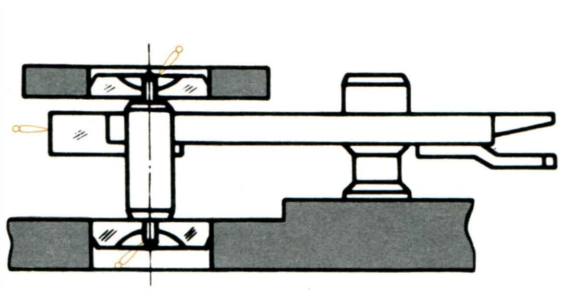
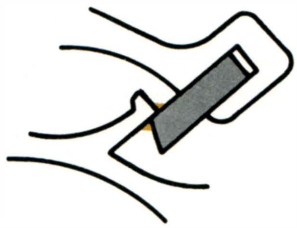
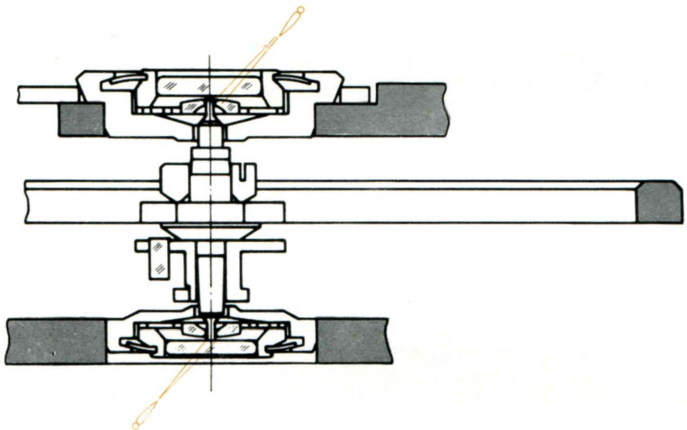
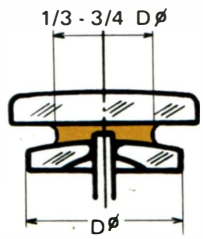
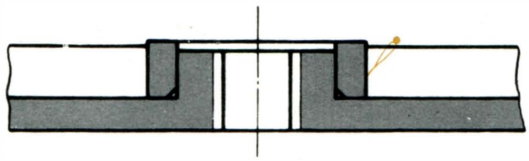
3 – 1. Basic Movement

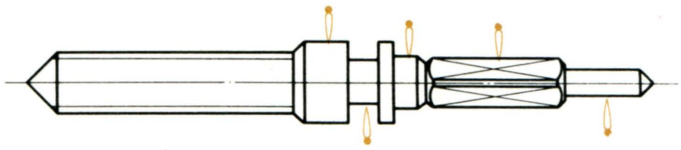
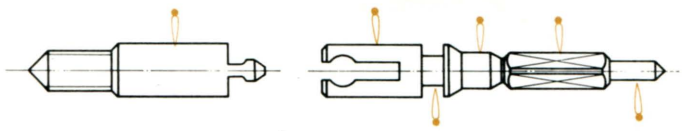
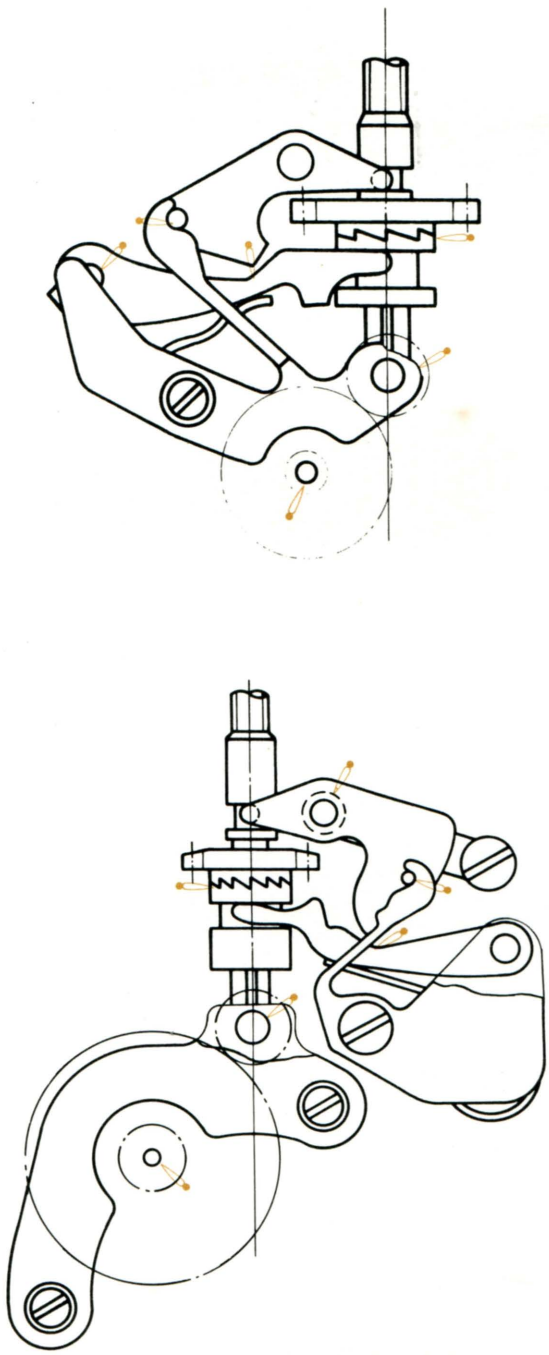
Name of Parts (Parts No.)	Portion to be oiled	Remarks
Barrel arbor (009) Mainspring (002)		Fit-to-purpose mainspring must be used: Handwinding watch - Use the mainspring oil exclusively for the handwinding watch. (CH–1) Automatic watch - Use the mainspring oil exclusively for the automatic watch. (CA–1) For Cal. 66, 72 series, CA–2 should be used.
Center wheel and pinion with cannon pinion (012)		Oiling amount 
Third wheel and pinion (017)		

Synt-A-Lube Oil Synt-Visco-Lube Oil Hand winding watch Oil(CH-1) Automatic watch Oil (CA-1) Automatic watch Oil (CA-2)

Name of parts (Parts No.)	Portion to be oiled	Remarks
Fourth wheel and pinion (023) Sweep second pinion (025)		
Escape wheel and pinion (032)		Oiling amount 1/3 - 3/4 D ϕ of hole jewel diameter  Refer to the Technical Information on "Profix".

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

Name of Parts (Parts No.)	Portion to be oiled	Remarks
Jeweled pallet fork and staff (035)	 	The upper and lower pivots are to be oiled to the extent of forming a thin oil membrane. Oiled condition.
Balance staff (043)		Oiling amount 1/3 - 3/4 Dϕ of hole jewel diameter  Refer to the Technical Information on Parashcok
Crown wheel ring (057)		

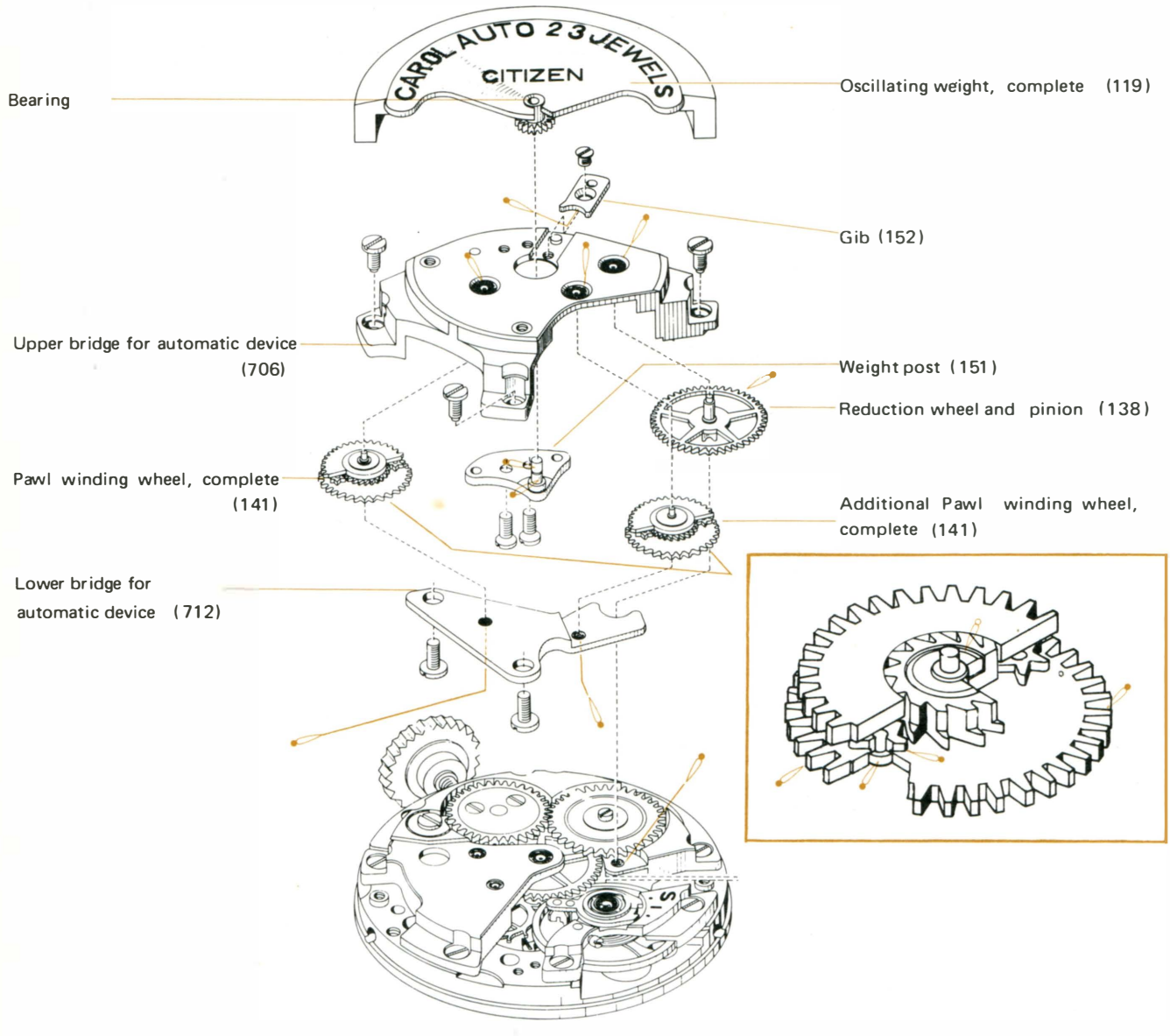
Name of Parts (Parts No.)	Portion to be oiled	Remarks
Winding stem (065)		
Joint winding stem (295)		
Winding pinion (063) Cluth wheel (064) Setting lever (068) Yoke (071) Setting wheel (076) Minute wheel and pinion (072) Setting lever spring (077) Minute wheel guard (079) Setting lever (067) Pressure spring for setting lever (903)		

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1)
Automatic watch Oil (CA-2)

3 – 2. Automatic Mechanism

Caliber No. 22 Series (Cal. No. 15※※, 20※※)

The teeth of the automatic train wheel should be oiled with a small quantity of oil.

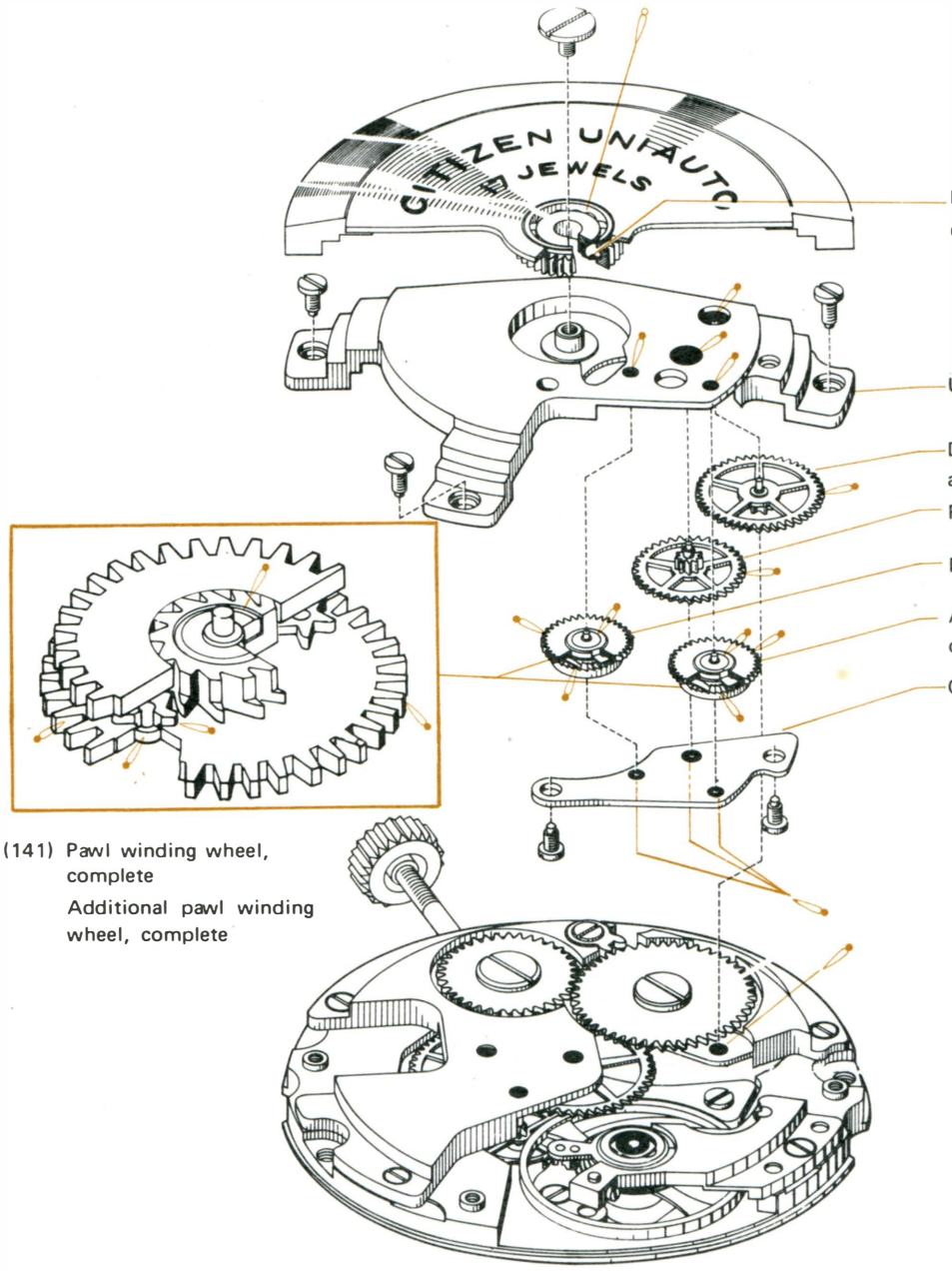


For oiling train Wheel, winding and setting mechanisms, refer to section 3–1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

Caliber No. 14 Series (Cal. No. 14 ※※ , 24 ※※ , 46 ※※)

The teeth of the automatic train wheel should be oiled with a small quantity of oil.



Ball bearing

Oiling for the ball portion is to be made at the 4 symmetric positions.

Upper bridge for automatic device (706)

Driving gear for ratchet wheel and pinion (138)

Reduction wheel and pinion (138)

Pawl winding wheel, Complete wheel (141)

Additional pawl winding wheel, complete wheel (141)

Center wheel cock (711)

(141) Pawl winding wheel, complete

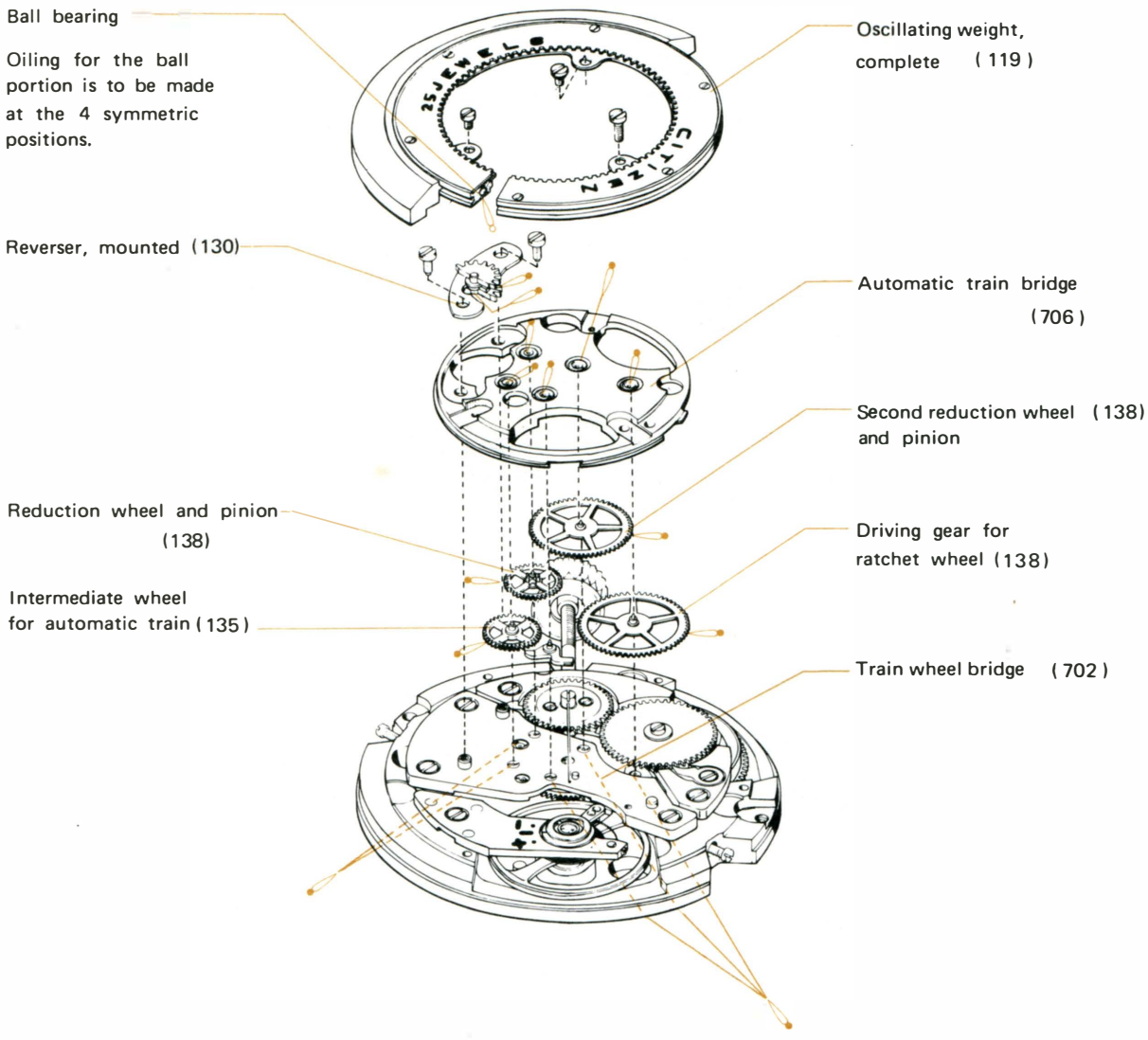
Additional pawl winding wheel, complete

For oiling train Wheel, winding and setting mechanisms, refer to section 3—1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

Caliber No. 03 Series (Cal, No 03※※ , 11※※ , 41※※)

The teeth of the automatic train wheel should be oiled with a small quantity of oil.

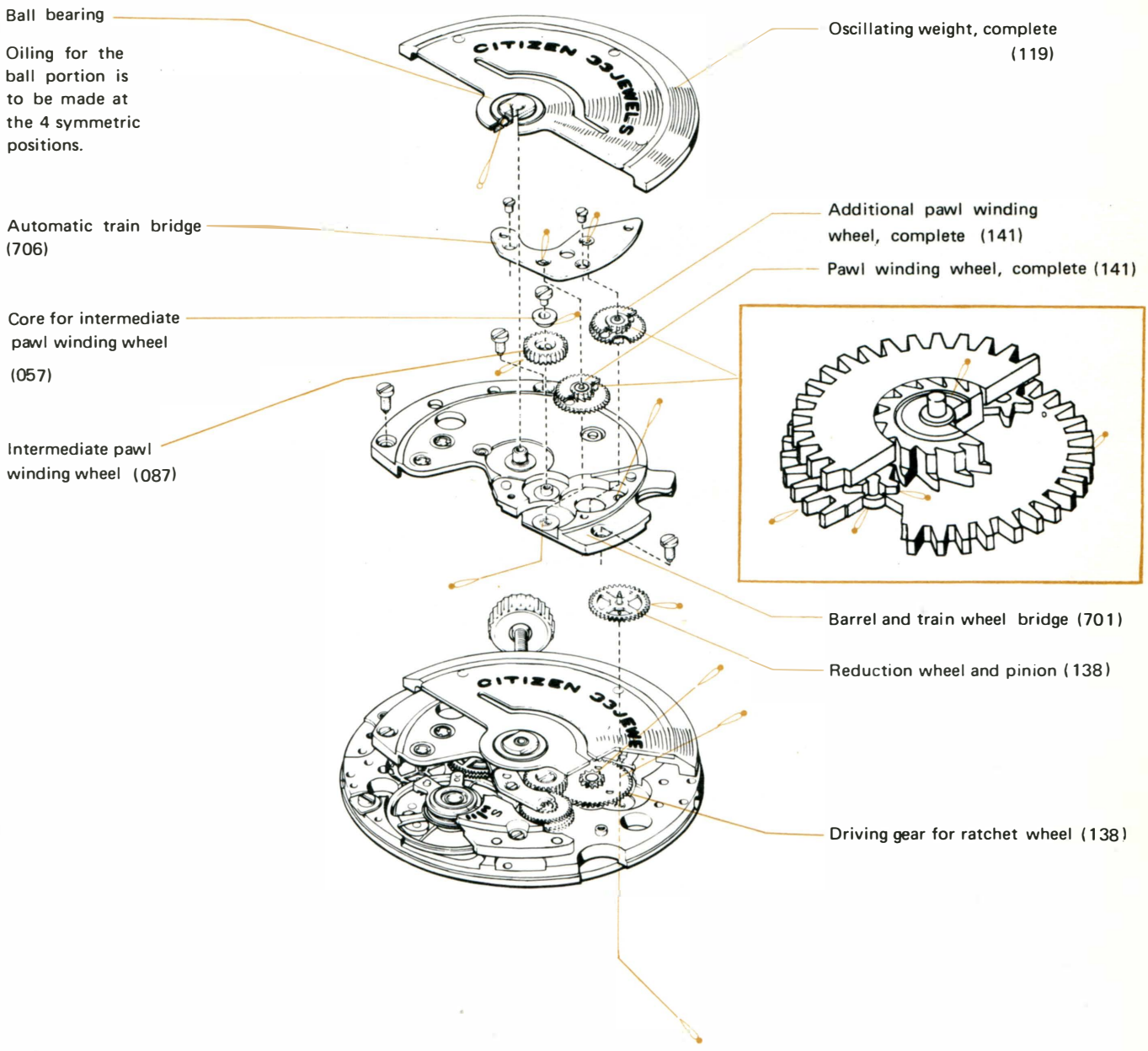


For oiling train Wheel, winding and setting mechanisms, refer to section 3—1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

Caliber No. 52 Series (Cal. No. 52 ※※ , 54 ※※ , 64 ※※)

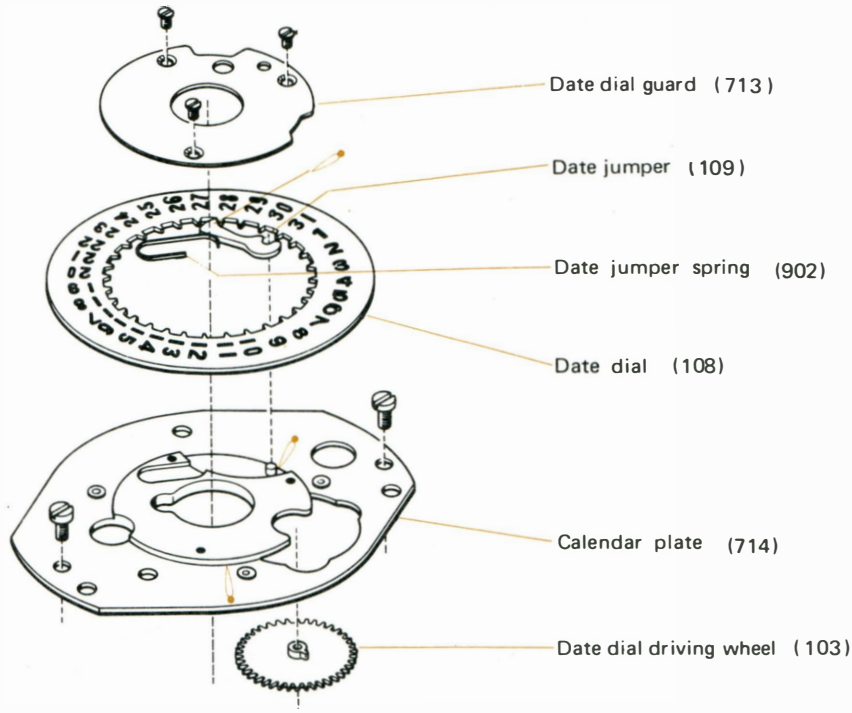
The teeth of the automatic train wheel should be oiled with a small quantity of oil.

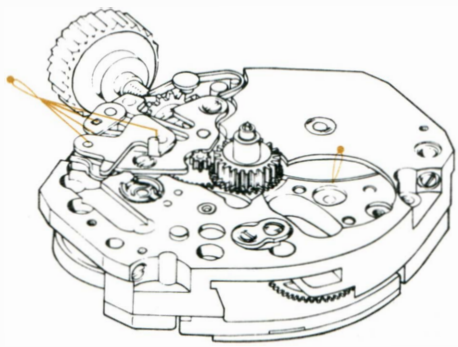


For oiling train Wheel, winding and setting mechanisms, refer to section 3–1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

Caliber No. 01 Series (Cal. No. 51 ※※ , 53 ※※)

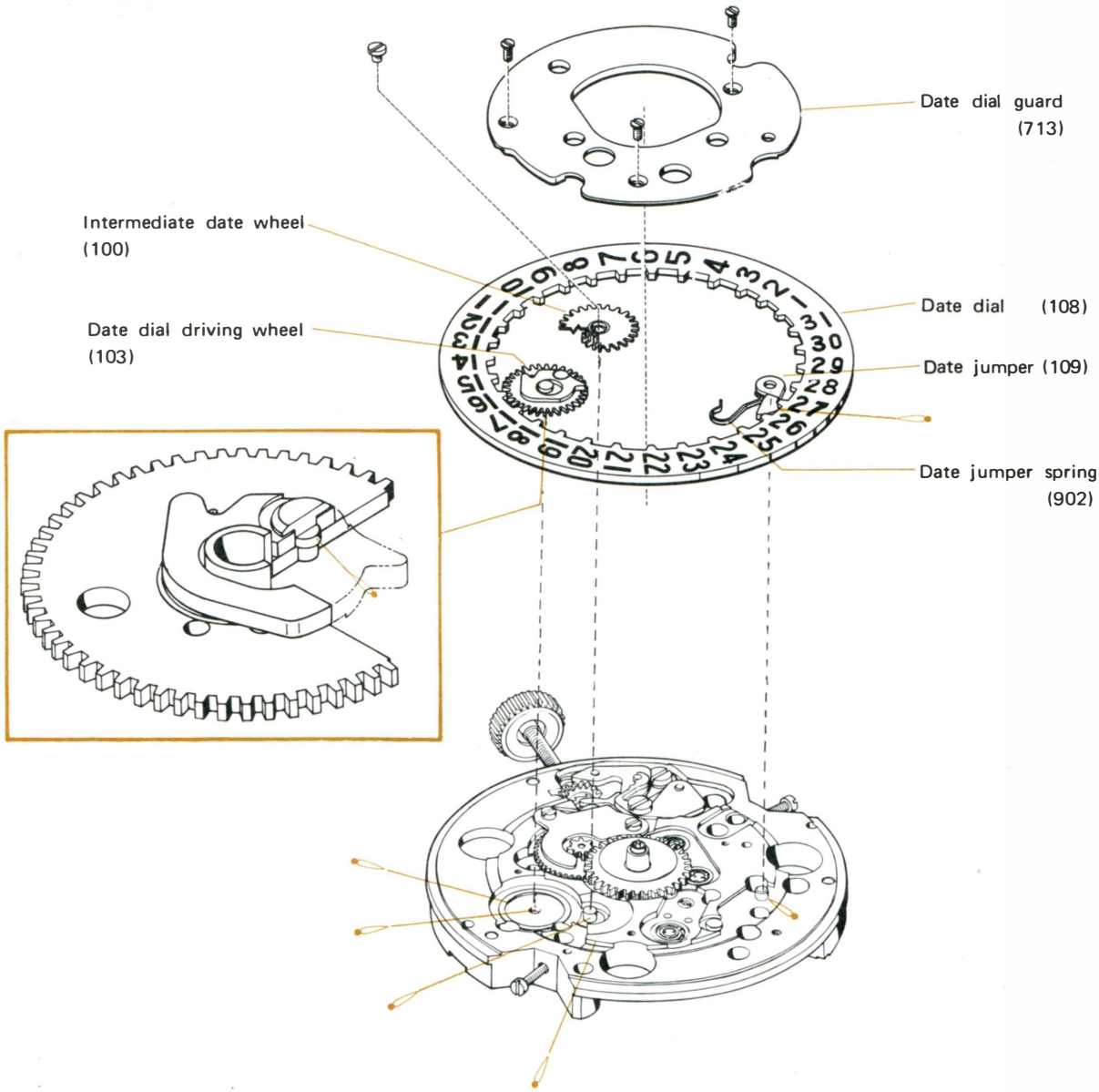




For oiling train Wheel, winding and setting mechanisms, refer to section 3—1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

Caliber No. 02 Series (Cal. No. 18※※ , 57※※)

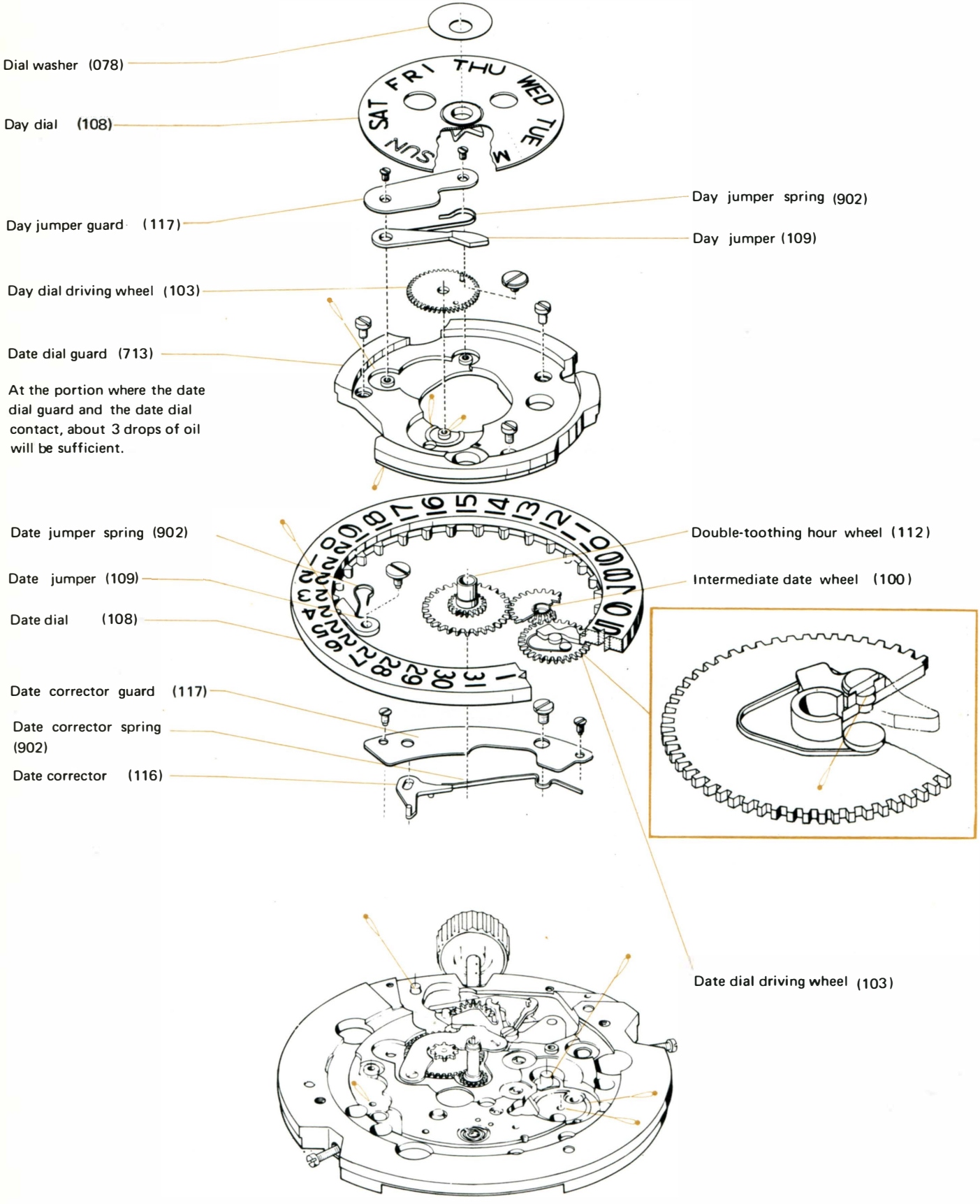


For oiling train Wheel, winding and setting mechanisms, refer to section 3–1, Basic movement.

Synt-A-Lube Oil Synt-Visco-Lube Oil Hand winding watch Oil (CH-1) Automatic watch Oil (CA-1) Automatic watch Oil (CA-2)

3 – 3. Calendar Mechanism

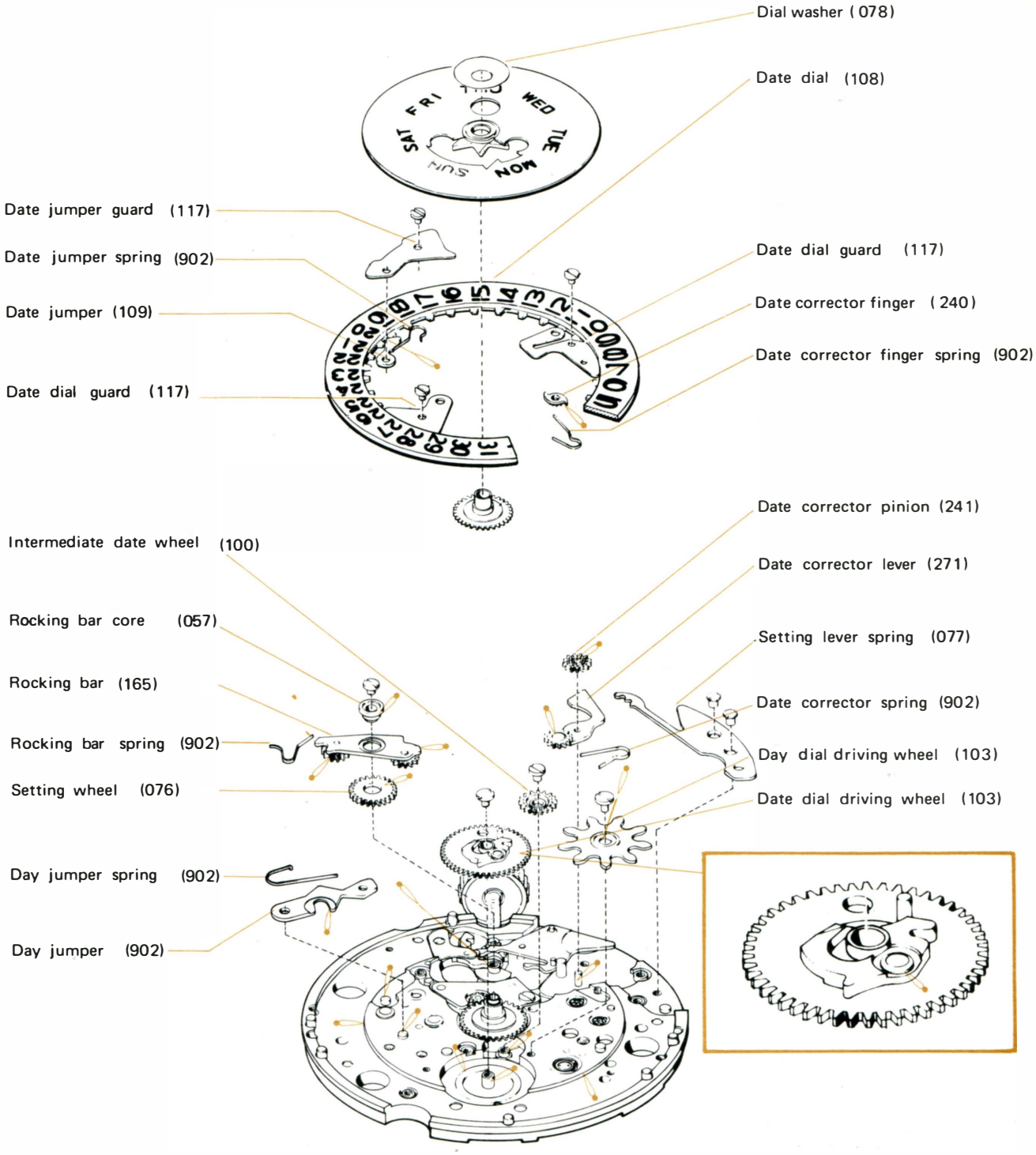
Caliber No. 03 Series (Cal. No. 11 ※※ , 40 ※※ , 41 ※※)



For oiling train Wheel, winding and setting mechanisms, refer to section 3–1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

Caliber No. 52 Series (Cal. No. 52 ※※ , 54 ※※)



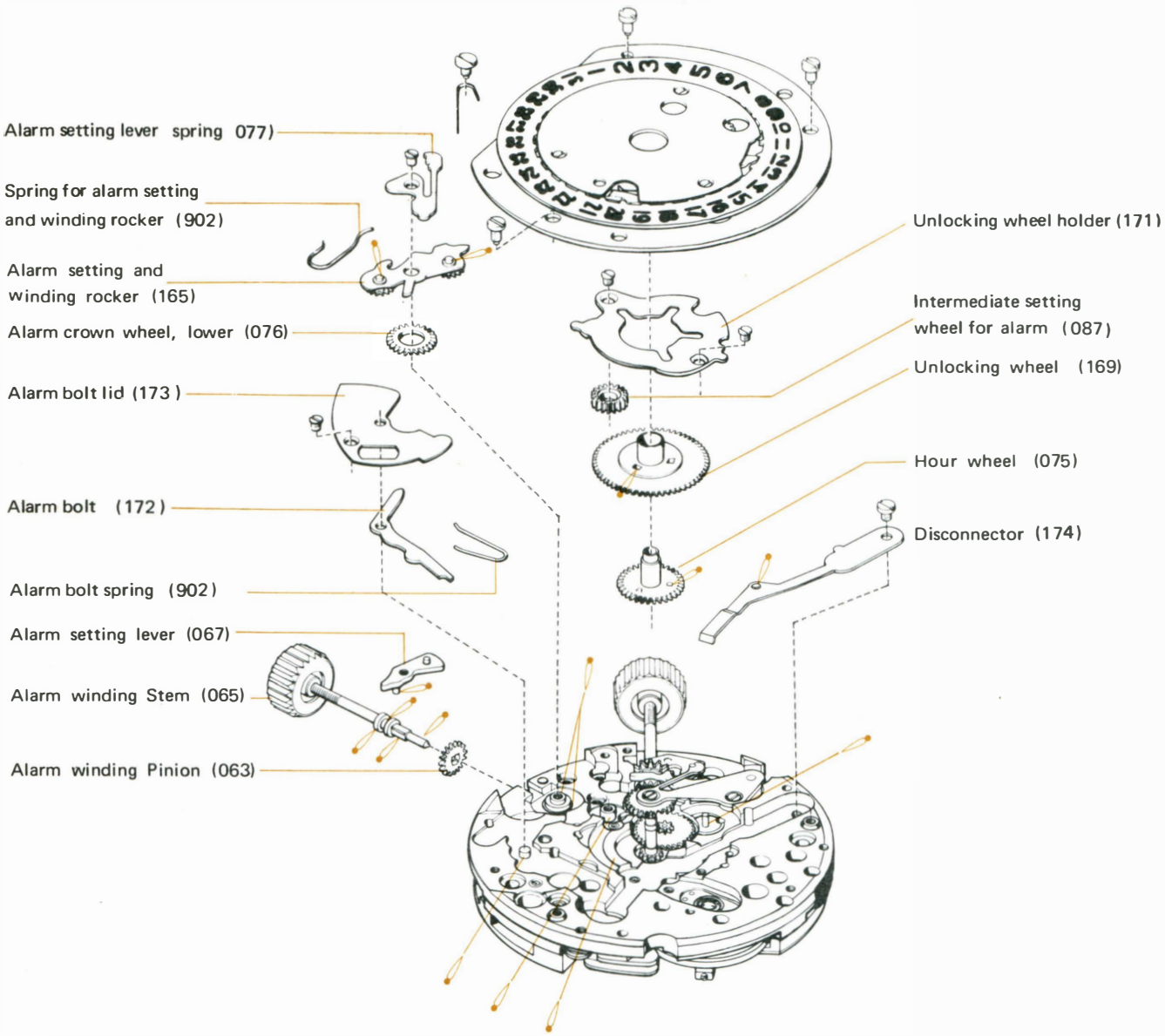
For oiling train Wheel, winding and setting mechanisms, refer to section 3—1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

3 – 4. Alarm Mechanism

Caliber No. 98 Series (Cal. No. 31※※ , 98※※)

Dial Side

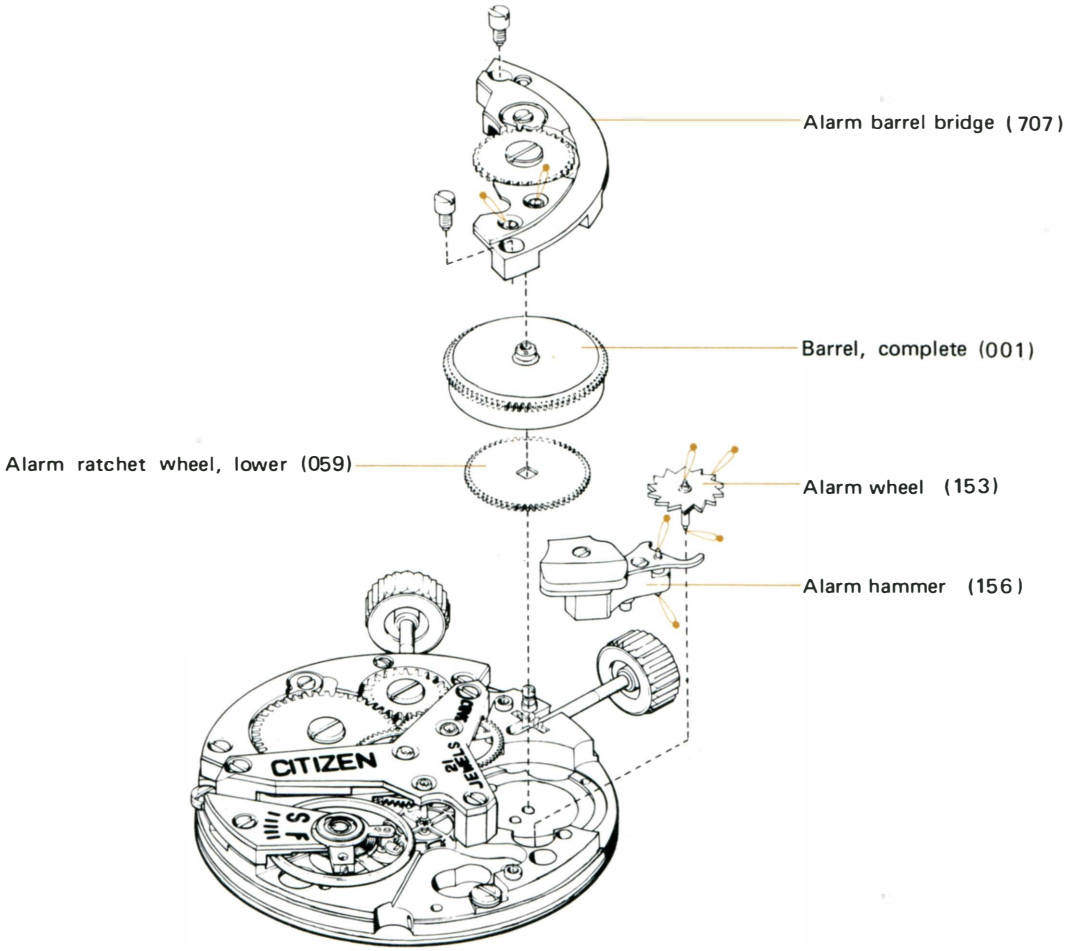


For oiling train Wheel, winding and setting mechanisms, refer to section 3–1, Basic movement.

Synt-A-Lube Oil Synt-Visco-Lube Oil Hand winding watch Oil (CH-1) Automatic watch Oil (CA-1) Automatic watch Oil (CA-2)

Caliber No. 98 Series (Cal. No. 31 ※※ , 98 ※※)

Bridge Side



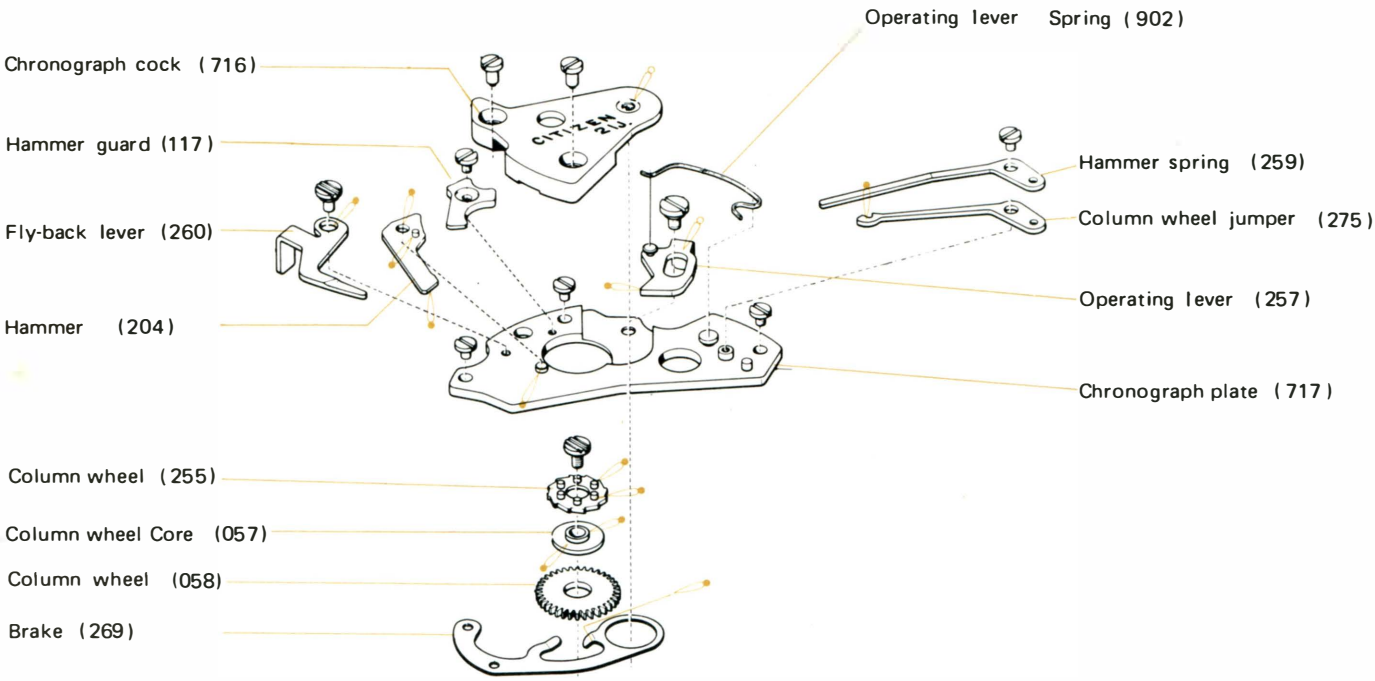
For oiling train Wheel, winding and setting mechanisms, refer to section 3—1, Basic movement.

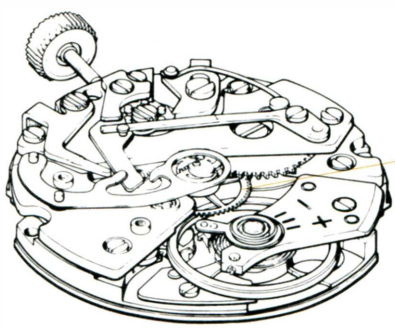
Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

3 – 5. Chronograph Mechanism

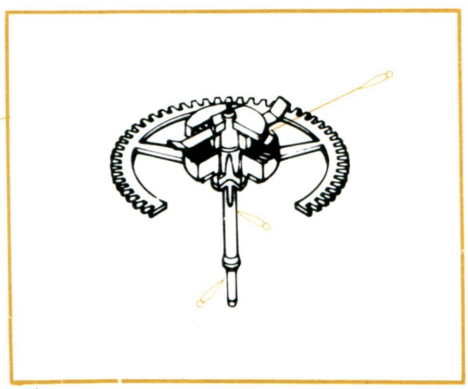
Caliber No. 02 Series (Cal. No. 57※※)

Oil a small amount to the portions where the chronograph plate and various levers contact.





Chronograph runner



For oiling train Wheel, winding and setting mechanisms, refer to section 3–1, Basic movement.

Synt-A-Lube Oil — Synt-Visco-Lube Oil — Hand winding watch Oil (CH-1) — Automatic watch Oil (CA-1) — Automatic watch Oil (CA-2)

CLEANING INSTRUCTION

CLEANING INSTRUCTION

Generally, watch parts are cleaned by brush washing. However, for thorough cleaning, the use of an Ultrasonic cleaning machine with a superior cleaning efficiency is recommended. The watch parts in the table below should be cleaned under the instructions listed.

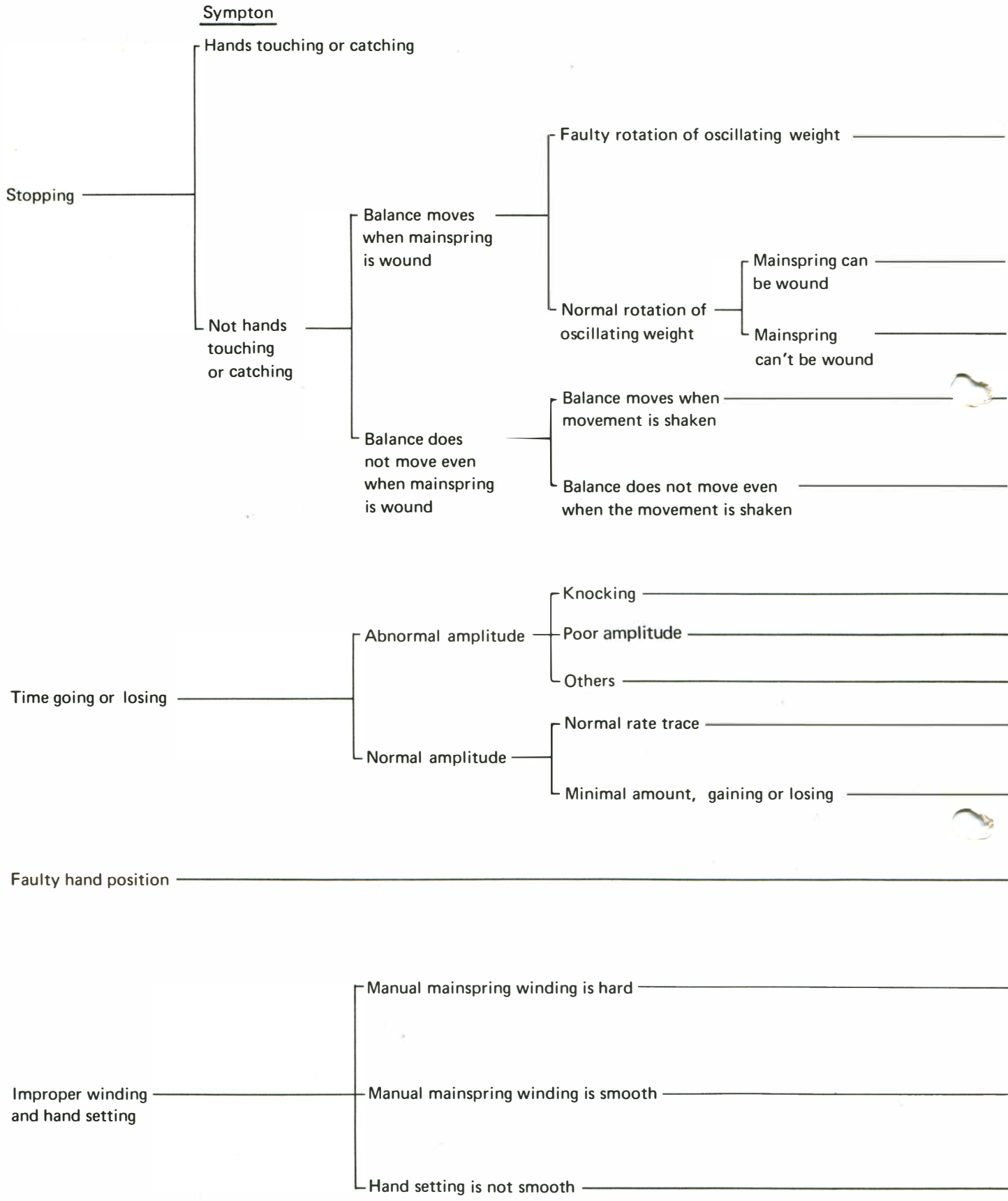
	Nomenclature	Cleaning method	Cleaning solution	Cleaning time	Cleaning solution prohibited to use	Notes
Movements parts	Barrel w/arbor	Wipe with cloth or champis wrapped rod	Not used			When it is badly solied, disassemble and clean.
	Escape wheel and pinion	Ultrasonic cleaning	Benzine Triclorethylene Chlorothene NU	within 10 minutes	Thinner Sonoclen Alcohol	
	Jeweled pallet fork and staff	Ultrasonic cleaning	Benzine Triclorethylene Chlorothene NU	within 10 minutes	Thinner Sonoclen Alcohol	Perform drying within 1 minute.
	Balance, complete	Ultrasonic cleaning	Benzine Triclorethylene Chlorothene NU	within 10 minutes	Thinner Sonoclen Alcohol	Perform dryin within 1 minute.
	(Parashock) spiral spring w/jewel	Ultrasonic cleaning	Benzine Triclorethylene Chlorothene NU	within 10 minutes	Thinner Sonoclen Alcohol	
	General movement parts	Ultrasonic cleaning	Benzine Triclorethylene Chlorothene NU	within 10 minutes	Thinner Sonoclen Alcohol	
	Case center body, bezel, case back, movement holder ring	Brush washing	Benzine	No limit		
	Plastic movement holder ring	Wipe with cloth	Alcohol (benzine)	Within 5 minutes	Thinner Sonoclen Triclorethylene	When using benzine, perform cleaning in a short period as possible.

Appearance parts	Packing, O-Ring	Wipe with cloth	Alcohol (benzine)	Within 5 minutes	Thinner Sonoclen Triclorethylene	When using benzine, perform cleaning in a short period as possible.
	Crown	Brush washing	Alcohol (benzine)	Within 5 minutes	Thinner Sonoclen Triclorethylene	When using benzine, perform cleaning in a short period as possible.
	Glass	Wipe with cloth or chamois wrapped rod				
	Dial, day and date dials, register ring, hands, reflector ring	Wipe with cloth or chamois wrapped rod	Not used			

Notes:

1. The temperature of the cleaning solution and the drying temperature should be under 40°C.
2. For electronic watch cleaning, refer to the 08 series cleaning method.
3. Cleaning time means the period from ultrasonic cleaning to drying.

TROUBLE SHOOTING CHART



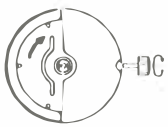
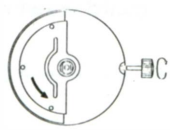
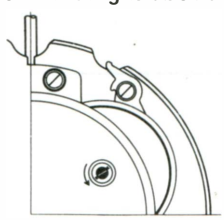
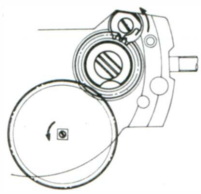
FOR WATCH MOVEMENT

Possible cause	Diagnostic procedures	Remedial action
Faulty function of pawl winding wheel	*1	
Faulty oscillating weight, complete	Remove the intermediate pawl winding wheel and check the rotation of the oscillating weight	Clean or replace
Oscillating weight touching	Check wheather or not it rubbs against bridge or case back	Adjust by bending the oscillating weight hub
Faulty end-shake of barrel arbor	Check in the mainspring unwound condition	Adjust
Faulty mainspring slipping	*2	
Lack of wearing hour	Check the wearing hour and the exercise amount for a day	Perform hand winding when locking of excercise and
Faulty reduction wheels	Check the pivots, riveted condition and etc. of the wheels	Replace wearing hour
Touching and squeaking of train wheels	Check the dial and bridge side train wheels	
Maixture of foreign particles in mechanical interior	Check the waste thread to the train wheels and the fall-off screws	
Over banking	Check the height and length of the guard pin	When the guard pin height or length is improper adjust it
Faulty escapement and others	Check the mixture of foreign particles, touching and squeaking of the escapment	
	Check each locks and end-shake of the escapement	Adjust when not proper
Strong mainspring	After full winding, judge by the rate trace condition or the amplitude	Replace the mainspring
Dirtied mechanical in interior	Particularly check the oil condition and dirt on the escapement	Clean and oil
Twisting and touching of hairspring	Check the piling of the hairspring caused by the oil and the touching of the balance cock and others	Clean or adjust
Something wrong with the indicating mechanism	Check the indicating mechanism	Tighten the cannon pinion when it is very loose
Regulater in improper position		Adjustment the regulator
Disingagement of hour wheel and minute wheel pinion	Check the end-shake hour wheel with dial attached	When the end-shake is large, adjust the dial. (Excluding calibers employed with day dial gib)
Loose fitting of hour and minute hand	Check by moving the hands with tweezer	Replace hands
Dirtied pawl winding wheels due to wear or excess oil		Clean and apply a proper amount of ill
Lock oil on the crawn O-Ring		Oil with O-Ring oil
Faulty end-shake of barrel arbor	Check with the mainspring removed	Adjust
Improper meshing of setting wheel and clutch wheel	Check the yoke operation	Adjust yoke spring and strengthen
	Check the fluctuation and wear of setting wheel	Replace setting wheel when worn
Imporper meshing of rocking bar wheel and intermediate minute wheel	Check whether or not hand setting is hard	Change the contact pressure at the setting lever pin by bending the setting lever spring arm
Faulty cannon pinion		Adjust cannon pinion

- Faulty day and date mechanism
  - Quick date setting impossible
    - Works proper when removed from case
    - Poor working condition even when removed from case
  - Improper date changing time or discrepancy of date dial position
  - Improper day changing time or discrepancy of day dial position
- Second hand stopping impossible
- Alarm does not ring or locks in ringing duration
  - Starts to ring when the case back is removed
  - Does not ring even when the case back is removed
    - Rings when the case screw is removed
    - Does not ring even when the case screw is removed
      - Rings when the hour and minute hands are removed
      - Does not ring ever when the hour and minute hands are removed
        - Rings when the disconnector is removed
        - Does not ring ever when the disconnector is removed
- Alarm starts ringing off set time
- When the alarm crown is pulled out, it will start ringing at any position
- Discrepancy of set time (The alarm hand moves)
- Dces not start nor stop
  - Faulty brake operation
  - Faulty hammer operation
  - Faulty column wheel operation
  - Faulty operation of operating lever
- Does not return
  - Faulty hammer operation
  - Faluty heart cam operation

- Squeaking of case pipe and crown → Oil crown or case pipe with O-Ring oil
- Faulty date corrector operation
  - Check the creaking of date corrector → Clean and oil or replace date corrector
  - Check the creaking of date jumper → Clean and oil or replace date jumper
- Faulty date corrector spring operation
  - Check the engaging condition or date corrector spring and date corrector → In case date corrector spring is off, set it back in position
  - Check the creaking of date corrector spring → Clean and oil or replace date corrector
- Disengagement of date corrector pinion and date corrector finger → Check the gap of the date corrector guard and the date corrector finger → When there is a gap, remove the gap
- Catching of date corrector finger → Turns the hands and check whether or not the date dial operation is smooth
- Finger spring of date corrector guard crawling under → Adjust
- Faulty date dial operation → *3
- Faulty day dial operation → *4
- The operation of stop connection lever is faulty → Pull (Push) the crown and check the squeaking of the stop connection lever → Replace stop lever
- Faulty stop lever operation
  - Check the squeaking stop lever → Disassemble and cleam
  - Check the position of stop lever spring
- Faulty contact of hammer and the alarm dowel → *5
- Touching of the hammer with the case screw washer → Check whether or not the case screw washer on the hammer ride has been smashed and widened → When the washer is deformed, replace it and recheck the touching condition
- Faulty meshing of the hammer pin and the disconnector due to touching of hour and minute hands → Check the minute hand clearance with the alarm hand and the hour hand in piled condition → When touching, adjust the hand clearance
- Meshing between the disconnector and the hammer pin is too deep → *6
- Broken alarm wheel and hammer arbor → In case it is broken, replace it
- Hour and minute hands off position against alarm hand → Re-attach hour and minute hands to the proper time
- Disengagement of disconnector and hammer pin → *7
- Loosened unlocking wheel → Check the wear condition of unlocking wheel holder and unlocking wheel and the loosening of unlocking wheel holder screw → Repalace the unlocking wheel, when it is worn
- Faulty chronograph runner → *8
- Faulty confirguration of projection → Adjust bent portion
- Hammer spring exhausted → Repair or replace
- Squeaking of hammer → Clean or replace
- Touching with hammer guard → Adjust position or height of hammer guard
- Column wheel jumper exhausted → Adjust or replace
- Touching with hammer guard → Adjust position or height of hammer guard
- Squeaking of operating lever → Clean or replace
- Operating lever spring exhausted → Adjust or replace
- Squeaking of hammer → Clean or replace
- Faulty fly-back lever stroke → Bend and adjust fly-back lever
- Faulty chronograph runner → Replace
- Loosened heart cam → Replace chronograph runner

*The checking and repair methods for causes from 1 – 8 are listed on the following page.

Possible causes	Diagnostic procedures	Remedial action
1. Faulty function of pawl winding wheel	(1) When the mainspring is wound manually with the movement slanted about 30 degrees, the pawl winding wheel is faulty if the oscillating weight turns in the same direction. When the oscillating weight turns in the clockwise direction, For 52, 65 and 72 series, faulty pawl winding wheel for 66 series, faulty add. pawl winding wheel. When the oscillating weight turns in the counter-clockwise direction, For 52 and 72 series, faulty add. pawl winding wheel for 65 and 66 series, faulty pawl winding wheel.  Fig. 1  Fig. 2 clockwise direction counter-clockwise direction (2) After replacing the faulty pawl winding wheel, check the operation in (1) above again.	When faulty, replace the parts.
2. Faulty mainspring slipping	If the running hour is short even though it is fully wound, the mainspring is faulty. Fully wind the mainspring and after leaving it for 5 minutes, unwind the mainspring slowly and while watching the rotation of the slot in the barrel arbor, count the number of windings (If normal, the number of winding is about 6).  Fig. 3  Fig. 4	It becomes fully wound when the crown is wound about 24 times.
3. Malfunction of date dial	The working of date dial is faulty when the date does not change at about 12:00 midnight or the fingure indirection is off the window frame.	Oil the contact portion of the plate with the date dial teeth tip, and the date jumper with the date dial teeth with Synt-V-Lube. Fig. 5   Fig. 6 When the date jumper spring is weak, adjust it.
4. Malfunction of day dial	The working of day dial is fully when the day does not change at about 0:20 a.m. or the figure indirection is off the window frame. For Cal. No. 6600, day changes at about 2:30 a.m.	When the warping of the dial washer is great, leassen it and when the end-shake of the hour wheel is not proper, adjust it.

5. Faulty contact of the hammer and the alarm dowel

When it starts ringing upon removing the case back, the contact of the hammer weight, case back and the alarm dowel is faulty (over-touching).

It stops ringing when the case back has been removed once and retightened, although it was working normally prior to disassembly, the case back position has eigher moved from the former position or the movement has moved it position. Remove the case back again and retighten (In this case, have both crowns pushed in).

When it does not still ring, refer to the repair method mentioned on the right column.

Bend the alarm dowel on the case back or adjust it by chiseling it with a file.

Adjusting by bending: Clamp the alarm dowel with pliers and bend towards the case back center.
When its is suddenly bent strongly, the fixing between alarm dowel and case back will weaken and there is a fear of causing faulty water-proofing. Thus, it should be bent slowly little by little. Moreover when it is bent too far, the alarm noise will become weak (Fig. 7).

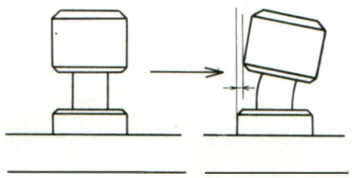


Fig. 7

When chiseling with a file:

Chisel one side of the alarm dowel with a thin file in a right angle direction to the case back center (Fig. 8).

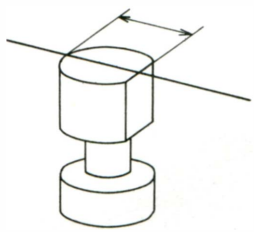


Fig. 8

6. The meshing of the disconnector and the hammer pin is too deep.

Pull out the crown in a condition where the alarm mainspring is unwound and turn the alarm hand and match the contacts points on the hour wheel with the contact point escape hole on the unlocking wheel. In this case, the time disconnector flats up. (when normal) The disconnector tip and the hammer pin is disengaged (Fig. 9). Check by moving the hammer. When the meshing does not disengage, it is faulty (Figs. 10 or 11). Check the touching the disconnector and the hammer pin. Move the hammer by its weight and check.

Fig. 9

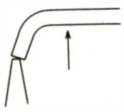


Fig. 10

Fig. 11

When faulty, bend the disconnector and adjust (Fig. 12)

Fig. 12

Clamp the encircled above portion and bend upwards. When checking the bending amount, adjust according to the touching condition.
After adjustment, check that "ringing" will start with hour wheel and unlocking wheel in piled condition and will "stop" in all other positions.

7. Disengagement of the disconnector and the hammer pin meshing

When the disconnector and the hammer pin is not meshing or meshing is very small in a condition where the hour wheel contact points are off position with the escape holes of the unlocking wheel, it is faulty (Figs. 14 or 15).

Fig. 13

Fig. 14

Fig. 15

When faulty, bend the disconnector and adjust (Fig. 16).

Fig. 16

The bending amount is decided according to the conditions found in checking.

After adjustment, check that "ringling" will start with the hour wheel and the unlocking wheel in piled position and will "stop" in all other position.

8. Faulty chronograph runner

Replace or adjust. It should be adjusted so the B portion of the spring touches the fourth wheel core when the chronograph spring is freed and the B portion separates from the fourth wheel core when the A portion is pushed (Figs. 17 and 18).

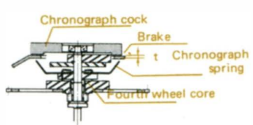


Fig. 17

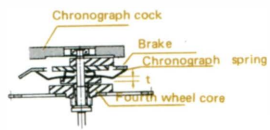


Fig. 18

GUIDE OF CALIBER NUMBER

GUIDE OF CALIBER NUMBER

LADIES'			GENTS'					
	CAL. No.	BASIC CAL. No.		CAL. No.	BASIC CAL. No.		CAL. No.	BASIC CAL. No.
0	011 *	01 **	0	020 *	02 **	6	600 *	65 **
	013 *	"		027 *	"		640 *	52 **
	014 *	"		091 *	"		642 *	"
	015 *	"		092 *	"		650 *	65 **
	017 *	"		093 *	"			
						7	720 *	72 **
2	230 *	01 **	1	180 *	02 **		721 *	"
	232 *	"		181 *	"		722 *	"
				183 *	"		723 *	"
				184 *	"		725 *	"
5	510 *	01 **		185 *	"		727 *	"
	511 *	"		186 *	"		728 *	"
	512 *	"		187 *	"		729 *	"
	530 *	"					743 *	"
	531 *	"					747 *	"
	532 *	"	3	300 *	02 **		760 *	"
6	610 *	61 **	5	520 *	52 **			
	611 *	"		521 *	"			
	620 *	"		522 *	"			
	660 *	66 **		523 *	"			
	670 *	67 **		524 *	"			
	671 *	"		525 *	"			
	681 *	"		526 *	"			
	690 *	66 **		527 *	"			
				529 *	"			
				540 *	"			
				541 *	"			
				542 *	"			
				543 *	"			
				544 *	"			
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