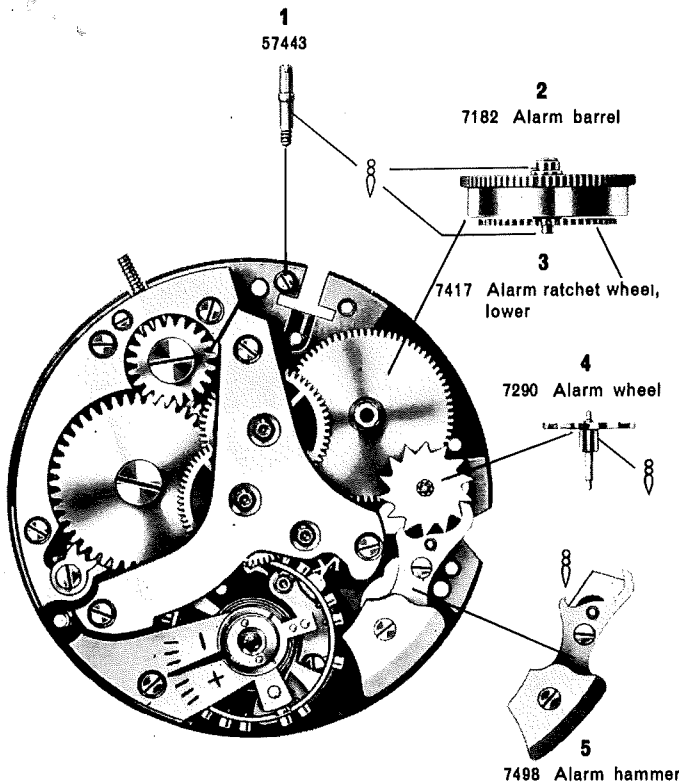


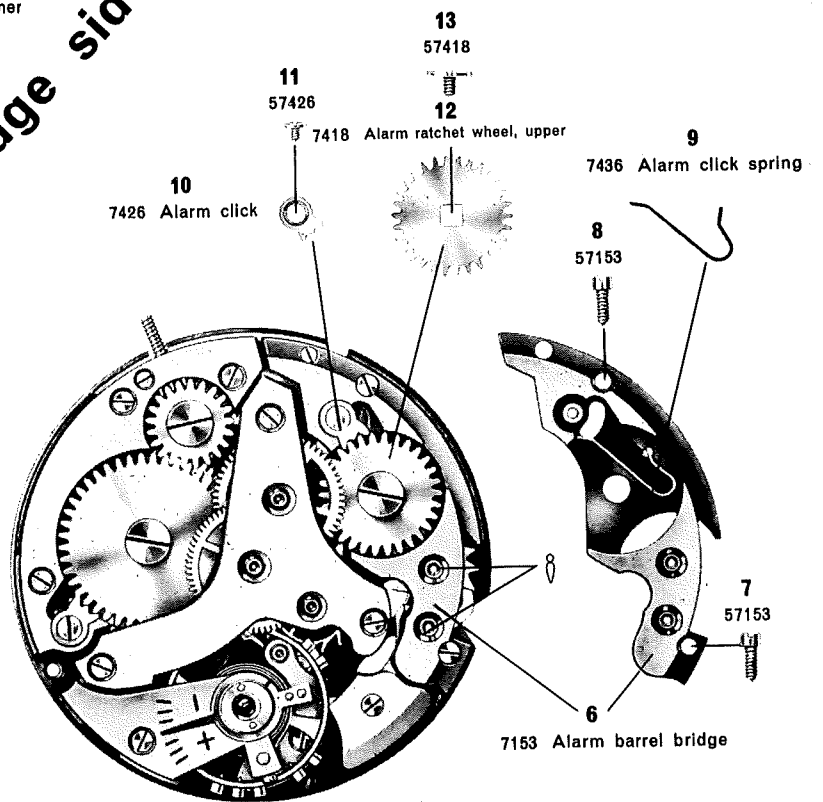
BENRUS MODEL DS WRIST ALARM



ASSEMBLY AND DISASSEMBLY INSTRUCTIONS FOR ALARM MECHANISM



Bridge side

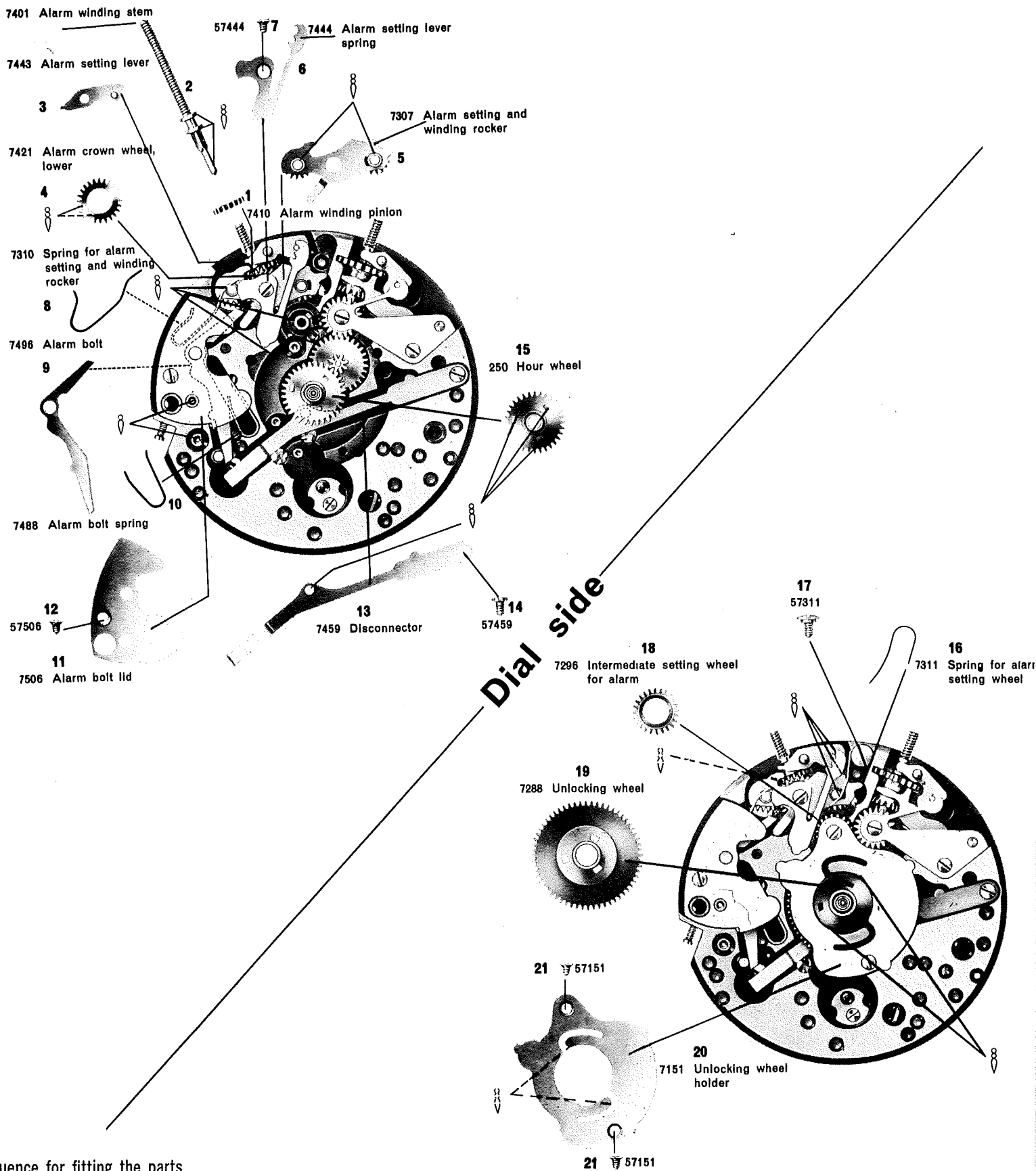


The numbering in bold face gives

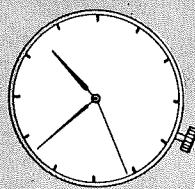
Lubrication:

- = fine oil
- = thick oil or grease
- = fine oil underneath the part
- = thick oil or grease underneath the part

Function of the Stems



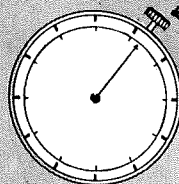
the sequence for fitting the parts



Movement winding stem

In home position:
Winds the watch mainspring

In drawn-out position:
Sets the watch hands



Stem for alarm mechanism

In home position:
Winds alarm mainspring; striking mechanism locked up.

In drawn-out position:
Moves alarm setting hand; striking mechanism released. The alarm-hand can only be turned counterclockwise. In the opposite direction, the winding stem merely turns idle.

LIST OF PARTS FOR MODEL DS (ALARM)

PART #	DESCRIPTION	PART #	DESCRIPTION	PART #	DESCRIPTION
#100	MAIN PLATE	#445	SETTING LEVER SPRING	#7496	ALARM BOLT
#105	BARREL BRIDGE	#450	SETTING WHEEL	#7498	ALARM HAMMER
#110	TRAIN WHEEL BRIDGE	#705	ESCAPE WHEEL AND PINION,	#7506	ALARM BOLT LID
#121	BALANCE BRIDGE		STRAIGHT PIVOTS	#7771A	ALARM MAINSPRING, UNBREAKABLE
#125	PALLET BRIDGE	#710	PALLET COMPLETE	#8102	CASE SCREW
#126	CENTER WHEEL BRIDGE	#714	PALLET ARBOR	#8105	BARREL BRIDGE SCREW
#182	BARREL & COVER	#721	BALANCE COMPLETE	#8110	TRAINWHEEL BRIDGE SCREW
#195	BARREL ARBOR	#723	BALANCE STAFF	#8121	BALANCE BRIDGE SCREW
#206	CENTER WHEEL, DRILLED FOR SWEEP SECOND	#730	ROLLER WITH JEWEL	#8125	PALLET BRIDGE SCREW
#210	THIRD WHEEL	#770A	HAIRSPRING, UNBREAKABLE	#8126	CENTER WHEEL BRIDGE SCREW
#227	SWEEP SECOND WHEEL	#7151	UNLOCKING WHEEL HOLDER	#8420	BEARING PLATE SCREW, FOR SWEEP-SECOND
#240	CANTION PINION	#7153	ALARM BARREL BRIDGE	#8415	RATCHET WHEEL SCREW
#250	HOURL WHEEL	#7182	ALARM BARREL WITH COVER	#8420	CROWN WHEEL SCREW
#260	MINUTE WHEEL	#7196	ALARM BARREL ARBOR	#8425	CLICK SCREW
#301	REGULATOR	#7288	UNLOCKING WHEEL	#8443	SETTING LEVER SCREW
#311	BALANCE BRIDGE ENDSTONE, KIF	#7290	ALARM WHEEL	#8445	SCREW FOR SETTING LEVER SPRING
#330	PLATE ENDSTONE, KIF	#7296	INTERMEDIATE SETTING WHEEL FOR ALARM	#8445	SCREW FOR SETTING LEVER SPRING
#343	BEARING PLATE, NON-JEWEL, FOR SWEEP SECOND WHEEL	#7307	ALARM SETTING AND WINDING ROCKER	#8445	SCREW FOR SETTING LEVER SPRING
#401	WINDING STEM	#7311	SPRING FOR ALARM SETTING WHEEL	#8445	SCREW FOR SETTING LEVER SPRING
#407	CLUTCH WHEEL	#7401	ALARM WINDING STEM	#8445	SCREW FOR SETTING LEVER SPRING
#410	WINDING PINION	#7410	ALARM WINDING PINION	#8445	SCREW FOR SETTING LEVER SPRING
#415	RATCHET WHEEL	#7417	ALARM RATCHET WHEEL, LOWER	#8445	SCREW FOR SETTING LEVER SPRING
#420	CROWN WHEEL	#7418	ALARM RATCHET WHEEL, UPPER	#8445	SCREW FOR SETTING LEVER SPRING
#422	CROWN WHEEL WASHER	#7421	ALARM CROWN WHEEL, LOWER	#8445	SCREW FOR SETTING LEVER SPRING
#425	CLICK	#7426	ALARM CLICK	#8445	SCREW FOR SETTING LEVER SPRING
#430	CLICK SPRING	#7436	ALARM CLICK SPRING	#8445	SCREW FOR SETTING LEVER SPRING
#435	CLUTCH LEVER	#7443	ALARM SETTING LEVER	#8445	SCREW FOR SETTING LEVER SPRING
#440	CLUTCH LEVER SPRING	#7444	ALARM SETTING LEVER SPRING	#8445	SCREW FOR SETTING LEVER SPRING
#443	SETTING LEVER	#7459	DISCONNECTOR	#8445	SCREW FOR SETTING LEVER SPRING
		#7488	ALARM BOLT SPRING	#8445	SCREW FOR SETTING LEVER SPRING

HOW THE MECHANISM WORKS

The Alarm

The ringing mechanism consists of merely three parts—the barrel, the alarm wheel and the hammer. The powered barrel rotates the alarm wheel which functions like an escape wheel. This is accomplished by adjusting the fingers of the hammer “shallow” producing a “trip-ping” action.

Sound is produced when the hammer strikes a metallic post riveted to the back of the case.

The Stop

Located on the under side of the hammer is a stud and pin. Blocking either of these locks the hammer.

1. Stem-In Position (Winding Only)

The lower tip of the alarm bolt under tension of its spring butts against the stud locking the hammer.

2. Stem-Out Position (Setting and Alarm)

The disconnector lip blocks the pin.

The Release—Stem Out Position Only)

The alarm hammer is unlocked only when the disconnector jumps up, thus, removing its block lip from the path of

the hammer.

WHEN AND WHY RELEASE OCCURS

Hour Wheel Control

The disconnector's rise and fall is controlled by the hour wheel. This wheel while rotating is under upward and downward pressures. Upward pressure is caused by the spring action of the disconnector (13). Downward pressure is caused by the spring arms of the unlocking wheel holder (20).

While the wheel rotates three prongs on its face rub along the bottom of the unlocking wheel (19). This wheel contains three corresponding slots. When *all three prongs* match up with the three slots above—and only then—the hour wheel pops up. The freed disconnector rises and the alarm is released.

The Wind-Set Mechanism

The wind-set mechanism is controlled by the setting and winding rocker with its attached wheels (5). The wheel closest to the stem is the *setting wheel* the opposite one is the *winding wheel*.

Winding (Stem-in)

The wind wheel engages the lower ratchet wheel. If the crown is back-wound the wind wheel merely idles.

Setting (Stem-out)

Pulling the stem-out see-saws the rocker. Thereby the wind wheel is disengaged and the set wheel meshes with the intermediate set wheel (18).

Note that the intermediate set wheel will turn in only one direction. If the direction is reversed by the crown the setting wheel on the rocker is pushed along its slot and is disengaged.

DISASSEMBLY

NOTE—Some waterproof cases are made with recesses into which case screws fit. The case screw nearest the hammer cannot be removed unless the hammer is released.

Important—

1. Removing the Hands.

Follow These Steps:

- Turn the alarm hand until the alarm rings, (or if defective—is in the ringing position. The prongs of the hour wheel are now in the slots of the unlocking wheel).
- Turn the movement hands counterclockwise. (The prongs are now locked in the slots of the alarm lock wheel).
- Remove the hands with a hand-remover.

Warning:

Failure to follow these steps may cause the hour wheel prongs to be crushed.

- Examine the functioning of the ring, stop, release and wind-set mechanism to pre-determine corrections.
- Follow the Chart.

The chart contains a numbered sequence for assembling. Simply start backwards, highest number first.

Assembling

1. Follow the Chart.

Begin with number one and proceed.

Bridge-side Checks and Assembly Hints

- a. The lower ratchet wheel which is friction-fit to the square of the arbor must be pressed home and flush with the top of the square.
- b. Check end shakes of barrel, alarm wheel and hammer.

DIAL SIDE

General Comments

- a. To simplify location many parts have locating lip which fit into recesses of the plate. Proper use of these will save time in fitting.
- b. Springs can easily be inserted when held in their recesses with the back of peg-wood. Then with tweezers properly position the opposite end.

(NOTE — Unless the springs are properly seated in their recesses, they may malfunction).

- c. Lubricate carefully. Follow the chart's directions. Check all points. Do not lubricate excessively.

Checking and Assembly Hints

1. The alarm set-wind rocker (5) must see-saw freely. Its wheels must turn easily. The set-wheel must slide back and forth in its slot freely.
2. When number 12 of the chart is reached, check the *whole winding unit*.
Stem-In Checks
 - a. Wind-wheel of rocker is engaged with lower ratchet wheel.
 - b. Tip of bolt holds against hammer stud.*Stem-Out Checks*
 - a. Wind wheel is disengaged.
 - b. Tip of bolt forced away from hammer.
3. After fitting stud disconnecter (13) and its screw (14), check its locking lip. It must clear the alarm pin.
4. Check condition of the three prongs of the hour wheel. Replace wheel if necessary.

5. When number 18 on the chart is reached, check the *whole setting unit*.

Stem-Out Checks

Set wheel of rocker should engage with intermediate setting wheel, when crown is turned for alarm setting. When its direction is reversed, the set-wheel should slide along the slot in the rocker.

6. Fitting the unlocking wheel requires special care. It must be properly centered so that it does not bind against the rim of the unlocking wheel holder (20).

Follow These Steps:

- a. Screw down loosely the screw of the holder farthest from the setting wheel.
- b. Hold down the other end with peg-wood.
- c. Grasp the post of the unlocking wheel with tweezers and center it into rim of the wheel holder.
- d. Screw down the opposite screw loosely.
- e. Gently turn the crown to properly align the wheels.
- f. With *movement crown* turn setting counterclockwise until hour wheel pops up.
- g. Tighten both screws.

NOTE: Check that the locating lips of the holder are down in their recesses and flush with the plate.

Checking the Release

1. Push in the stem and wind the alarm.
2. Pull out the stem and turn the setting wheels with the crown. When the three prongs of the hour wheel (*must be all three*) pop through the slots of the unlocking wheel, the disconnecter rises and the hammer is released.

NOTE: In this position the hour wheel should have some end-shake.

Fitting the Hands

1. Follow steps 1 and 2 in the section under Removing the Hands.
2. Fit the alarm hand. Set to 12 on the dial by turning the *MOVEMENT SETTING* counterclockwise.
3. Fit the hour hand at 12. Check alarm let-off. Reposition if necessary.
4. Fit minute hand loosely. Recheck let-off. Tighten hand when let-off is correct.

Repair Problems

No Ringing—Possible Causes

- a. Failure of power.
- b. 1. Insufficient upward tension of disconnecter.
2. Disconnecter's lower section bent down too far. (Either condition will maintain lock).
- c. Minute hand pushed down below its shoulder on the canon pinion preventing the hour wheel from popping up.

Continuous Ringing—

- a. Depressed or worn prongs of hour wheel.
- b. Lower section of disconnecter bent up too much preventing lock.

Off-Time Ringing

- a. Hands set improperly!
- b. Worn hour wheel prongs or unlocking wheel slots or both.
- c. Broken teeth in the hour wheel or unlocking wheel.

Alarm Stem Pulls Out

The alarm set lever (3) is under tremendous strain as a result of its continuous use. Its screw, consequently, may sometimes loosen. A simple method of correction is:

1. Remove lever.
2. Place on a stump—face up.
3. Flatten the burr at its threaded hole with a flat punch.
4. Refit and screw down tight (the flattened burr acts as a back-stop).