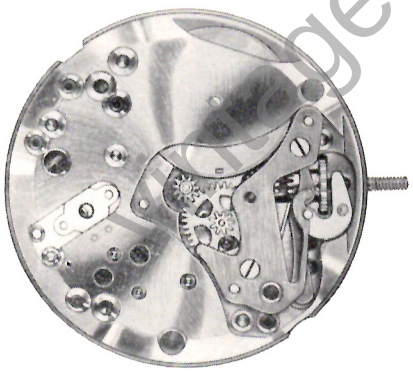
SERVICE AND REPAIR DATA
ON HAMILTON 8/0 MOVEMENT
GRADE 748

HAMILTON SERVICE BULLETIN 203

Actual Size

2x Actual



2x Actual

DESIGN AND CONSTRUCTION DATA

Hamilton Grade 748 is a direct drive center seconds watch movement. The time train is of unique design to provide more rugged, trouble-free operation (see "Special Features" for detailed description). No stabilizer spring is employed. As in all Hamilton watch movements, the bridges and pillar plate of Grade 748 are made of nickel-silver and rhodium-plated. Steady pins in bridges and balance cock are of the integral type. Because the movement is round, a case alignment slot has been provided in the pillar plate to assure accurate and positive location of the movement in the watch case.

Hamilton Grade 748, like its companion movement, Grade 747, is a thoroughly engineered American timepiece. It is a fine looking movement and made to Hamilton's standards of quality. Moreover, it is an easy movement to service or repair. A summary of the principal features of Grade 748 is as follows:

Size	8/0 Round
Jewels	18, Direct friction-set
Winding-Setting	Rugged construction, smooth action, excellent interchangeability of parts
Stem Hole	Entirely in pillar plate
Cannon Pinion	Improved fit to center staff
Click Spring	Extra long to reduce stress
Setting Cap Spring	Steady pins in pillar plate insure accurate location and assembly convenience
Mainspring	Extra long for improved performance
Train	Maximum freedom, smoothness, and efficiency; no pinion possesses less than eight teeth.
Escapement	Lever type, highly responsive. NOTE: The escape wheel and the pallet are inverted and therefore operate in reverse.
Balance	Monometallic; 18,000 oscillations per hour
Balance Cap, Upper	Camlock type for accurate alignment; no screws employed
Balance Cap, Lower	Steel, nickel-plated; employs two screws which thread *into cap* from train side of pillar plate
Hairspring	Hamilton Elinvar-Extra, overcoiled
Hairspring Stud	V-seated for accurate locating and convenient assembling
Hairspring Stud Screw	Long head with deep slot
Regulator	Smooth, positive action
Screws	New series of thread standards
Interchangeability	Complete except for hairspring which should be matched to balance wheel
Service Convenience	Excellent

HAMILTON WATCH CO. LANCASTER, PENNSYLVANIA

SERVICE BULLETIN

PERFORMANCE CHARACTERISTICS

The performance characteristic most desired in a timepiece is low deviation tolerance or steadiness of rate. In the Grade 748, performance will more than maintain the Hamilton tradition. It is a fine watch and incorporates much of the advanced knowledge and experience acquired during World War II in the design, development, and manufacture of the now famous Hamilton Marine Chronometer and all other special war timepieces.

The design improvements which make the most significant contributions to performance of the Grade 748 are: the Hamilton Elinvar-Extra hairspring (see Technical Bulletin 200); direct drive of the center seconds hand; the train, which approaches the ultimate in freedom and smoothness; the escapement, which has been made acutely responsive; the barrel assembly, which permits the use of an extra long mainspring; and a new type click which, because it possesses greater recoil, relieves undue strain on the mainspring at full wind.

SPECIAL FEATURES

The Balance Upper Endstone Cap assembly on Grades 747 and 748 is completely new in design, employing an adaptation of the cam principle. (See Figs. 1 and 2.) The new design affords accurate alignment of the upper endstone cap and the regulator, and thus reduces the need for hairspring manipulation.

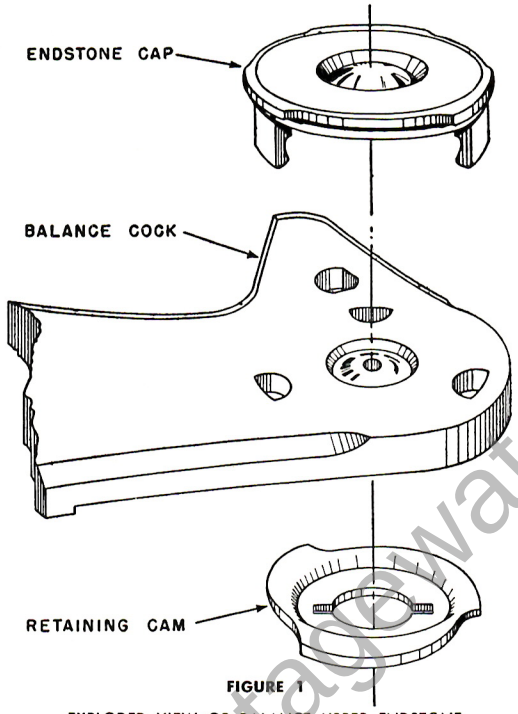


FIGURE 1
EXPLODED VIEW OF BALANCE UPPER ENDSTONE CAP ASSEMBLY

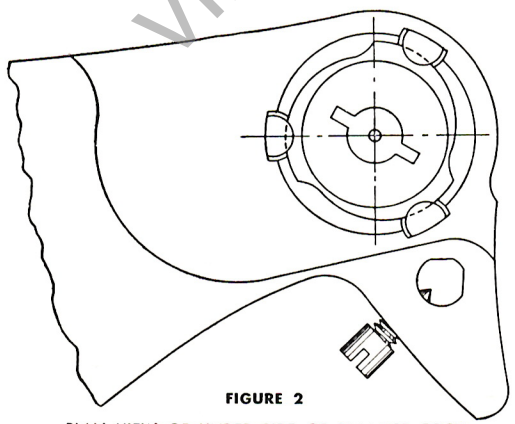


FIGURE 2
PLAN VIEW OF UNDER SIDE OF BALANCE COCK WITH RETAINING CAM ASSEMBLED

The Balance Lower Endstone Cap on Grades 747 and 748, unlike this part on other Hamilton grades, is held by two screws which enter from the train side and *thread into the cap* which is made of nickel-plated steel. This feature is employed to eliminate the occasional annoyance of stripped threads in the pillar plate. Flat fillister head screws are used to secure a flat seating of the part.

Balance Wheel Screws used in Hamilton Grades 747 and 748 are different from those used in any other Hamilton movement; they employ a new thread standard and are not interchangeable with other Hamilton balance screws. So that these screws will be distinguished readily, they have been designed with a dog point instead of the cone point commonly used.

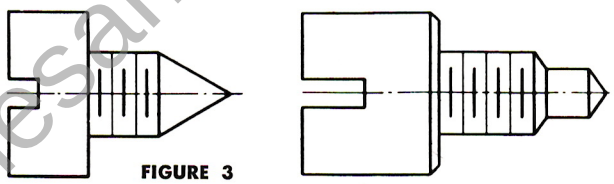


FIGURE 3
CONE POINT BALANCE SCREW — BALANCE SCREW USED IN HAMILTON GRADES 747 AND 748

The Escape Wheel in the Grade 748 revolves opposite to the conventional direction. *The pallet,* is, of course, also inverted, which reverses the normal positions of the "L" and "R" stones. This inversion is the result of the unique means by which direct drive of the center seconds hand is achieved—the introduction of an additional mobile element (fifth staff with wheels)—between the center seconds and the escape. This is illustrated in Figure 4.

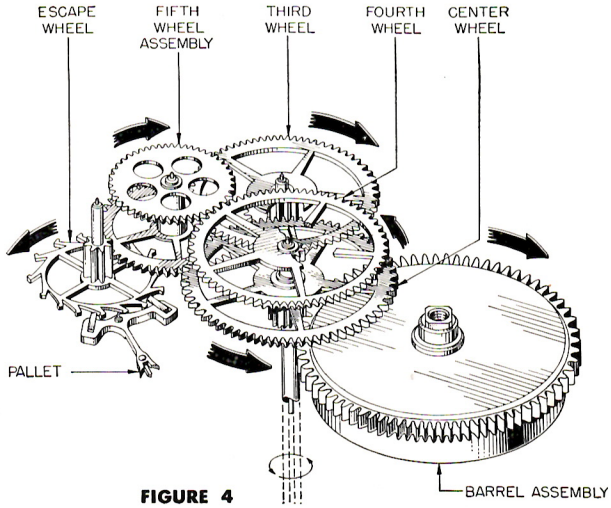


FIGURE 4

SERVICE SUGGESTIONS

Disassembly of the Grade 748 movement can follow the conventional order. To disassemble the balance upper endstone cap, remove the balance cock, invert it, and with a screw driver of proper width unlock the cam as you would unscrew a screw and remove it. If the cap does not drop free from the balance cock it should be gently pushed out by placing it on an anvil over a proper size hole and progressively pushing on each of the cap feet. The *balance lower endstone cap* cannot be disassembled until the balance has been removed.

Assembly of the Grade 748, with a few notable exceptions, can follow the usual order.

The *balance lower endstone cap* should, for reasons of convenience, be among the first parts to be assembled to the pillar plate. This can be done by placing the cap bottom side up on the bench; then the pillar plate, with the cap recess aligned with the cap, can be lowered into position. A round pointer can be used to line up the screw holes in the cap with the holes in the pillar plate. The screws can then be positioned and fastened.

The *third lower jewel plate* should then be assembled on the train side of the pillar plate. Since the third lower jewel is not accessible from the dial side, it should be *oiled before assembly.* This should be done by holding the jewel plate with tweezers or supporting it on a block, with the cup side of the jewel up, so that the flat side of the jewel is not in contact with any surface. This precaution must be taken to insure retention of the oil in the jewel cup.

There is one other construction characteristic which influences the order of assembly. Since the third wheel of the train overlaps the winding wheel and obstructs accessibility to one of the winding wheel screws, the winding wheel and its hub must be assembled to the barrel bridge before the third wheel and the remainder of the train are assembled to the movement.

Care should be taken to see that all train wheels are true in the flat, that adequate clearance exists, and that all wheels and pinions mesh properly. To insure these conditions, proper endshake of each element of the train is highly important. Freedom of the train should be tested particularly to make certain that the staff of the fourth pinion does not rub against the hole in the thrust plate. This plate is employed only for endshake control of the fourth pinion.

Be sure to oil the *center upper jewel* before assembling the thrust plate. Oil the lower endshake shoulder and the large diameter at the lower end of the fourth pinion prior to inserting the fourth pinion into the center pinion.

Assembly of the *balance upper endstone cap* is a simple operation; *reverse the steps outlined in disassembly*, making sure that the cam is snugly anchored but not forced.

IMPORTANT

In assembling the hands to the Grade 748 movement *be careful when pressing the hands into position.* Very little pressure is needed. Too much pressure will disturb the location of the center and fourth upper jewels and may even cause damaged parts. A little extra caution on this operation will save time and trouble. The simplest and safest method of assembling the slotted type minute hand to the Grade 748 movement is as follows: (1) place the minute hand on the bench, top up; (2) gently wedge the blade of a screw driver into the slot in the hand; (3) place the hand in position on the cannon pinion; and then (4) holding the hand in position with peg wood, withdraw the screw driver from the slot.

The hour wheel and the hour hand should be assembled to the dial prior to positioning the dial on the movement; with this procedure care should be taken to prevent the hour hand from scratching the dial.

When inserting the movement in the case, be sure that the alignment slot in the pillar plate is properly lined up with the tongue in the case *before* seating the movement.

REPAIRS

Replacement of Balance Staff requires removing the collet, hairspring, and roller, following which the rivet or the lower shoulder of the balance staff should be turned off in a lathe with a sharp graver. The old staff can then be safely pushed out with a standard staking set. Insertion of a new staff and restaking it can be done in the conventional manner.

Replacement of Jewels. All balance and train jewels in Grade 748 are friction-set directly in the plate and bridges. Removal or replacement of these jewels *requires that they be pressed—not driven* —in or out of position. Friction-set jewels should, of course, be pressed out in the opposite direction from which they were inserted.

To replace bar hole jewels, use a flat-faced punch *larger* than the diameter of the jewel. Press jewels into position from the *inside* of the pillar plate and the *train side* of the bridges. In the model 748 as in model 747 the lower bar hole jewels should be positioned flush with their respective recesses. Endshake adjustments should be restricted to upper jewels; such adjustments are best made with the same punch used to remove the jewel.

Replacement of the Mainspring requires removal of the balance unit, the pallet, and the train. Although this procedure may appear inconvenient, *it is not likely that it will be frequently* encountered because the mainspring, the barrel arbor and the click action in 748 have been designed with

a more liberal safety factor than in the average movement. As a result mainspring failures are infrequent.

ADJUSTMENTS

Hairspring Manipulation. The inherently accurate alignment characteristics of the new balance upper endstone cap and regulator assembly (used

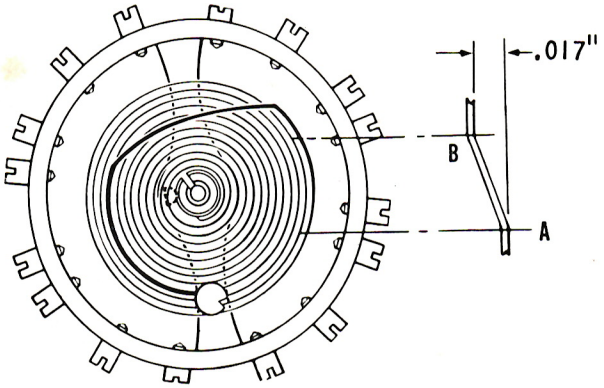


FIGURE 5

on both Grades 747 and 748) eliminate many of the causes for hairspring overcoil adjustment. This design improvement, combined with the ruggedness of the Elinvar-Extra hairspring, reduces hairspring problems to a minimum. When and if manipulation of the hairspring overcoil is essential, Fig. 5 showing the characteristic shape and position of the overcoil should prove helpful.

CLEANING AND OILING

Annual cleaning and oiling of Grade 748 will, under normal conditions, prove adequate. Thorough cleaning procedures are highly important. And this means complete disassembly of the movement. Particular attention should be given to the center pinion hole to see that it is thoroughly clean. After cleaning, all pivots, hole jewels, and endstones should be carefully inspected to see that they are in prime condition. Parts which cannot be restored to prime condition should be replaced with new ones. Any good watch oil may be employed on Grade 748. Oiling operations, excepting the several deviations described on Page 3 under "Assembly," are entirely conventional. For additional information on cleaning and oiling Hamilton movements, request the Technical Bulletin on this subject. Address: Technical Publications Section, Hamilton Watch Company, Lancaster, Pa.

GENUINE REPAIR MATERIALS FOR HAMILTON GRADE 748

The following is a complete list of the available repair materials for the Hamilton 8/0 Size, Grade 748 movement. Material orders should always be sent to Hamilton Material Wholesalers. A list of the company's Material Wholesalers will be furnished on request to the Material Sales Department, Hamilton Watch Co., Lancaster, Pa. Always order material by catalog number and part name to insure accurate filling of orders.

Cat. No.	Material
7211	Arbor, barrel
7234	Arbor, pallet
7253	Balance, with screws
7254	Balance, (with screws) and staff
7255	Balance, complete
7205	Barrel
7206	Barrel and arbor
7209	Cam, balance upper endstone cap retaining
7219	Click
7215	Clutch
5065	Collet, hairspring
7279	Endstone Cap, balance upper
7280	Endstone Cap, balance lower
7210	Hub, winding wheel
*7367	Jewel, center upper
2568A	Jewel, center lower
7269	Jewel, third, fourth or fifth, upper
7270	Jewel, third or fifth lower
7273	Jewel, escape upper
7275	Jewel, escape lower and pallet upper or lower
7277	Jewel, balance upper or lower
2983	Jewel, roller
7281	Stone, pallet receiving
7282	Stone, pallet, discharging
7218	Lever, clutch
7222	Lever, setting
7221	Mainspring
*7356	Pallet, and stones
*7357	Pallet, complete
6095	Pin, banking
*7329	Pinion, cannon
*7333	Pinion, escape
7214	Pinion, winding
*7301	Plate, thrust
7258	Regulator
2963	Roller, combination, complete
7284	Screw, balance
7293	Screw, balance lower cap
7286	Screw, bridge or balance cock
7288	Screw, click
7291	Screw, dial
7295	Screw, hairspring stud
7294	Screw, pallet bridge
7297	Screw, ratchet wheel
7294	Screw, setting cap spring
7300	Screw, setting lever
7293	Screw, third lower jewel plate
*7302	Screw, thrust plate
7293	Screw, winding wheel hub
7220	Spring, click
7225	Spring, clutch lever
7240	Spring, setting cap
7261	Spring, hair, Elinvar-Extra
7227	Staff, balance
*7303	Staff, fifth—complete with wheels
7226	Stem, winding
6266	Stud, hairspring
*7345	Wheel, center and pinion
*7348	Wheel, third and pinion
*7350	Wheel, fourth and pinion
*7352	Wheel, escape and pinion
7241	Wheel, hour
7242	Wheel, minute
7216	Wheel, setting
7207	Wheel, ratchet
7208	Wheel, winding

** Parts applicable to Grade 748 only. All other parts interchangeable with Grade 747.*