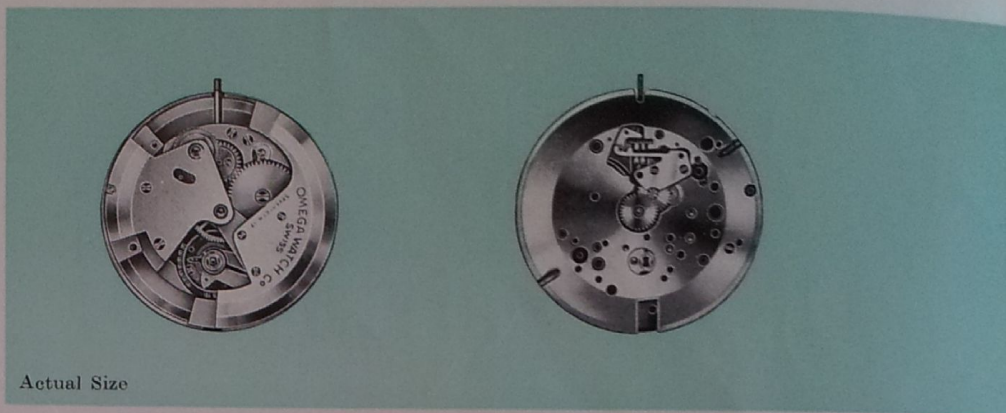
OMEGA Ω

TECHNICAL GUIDE

No. 1

Repairing Omega self-winding watches

Self-winding calibre No. 332



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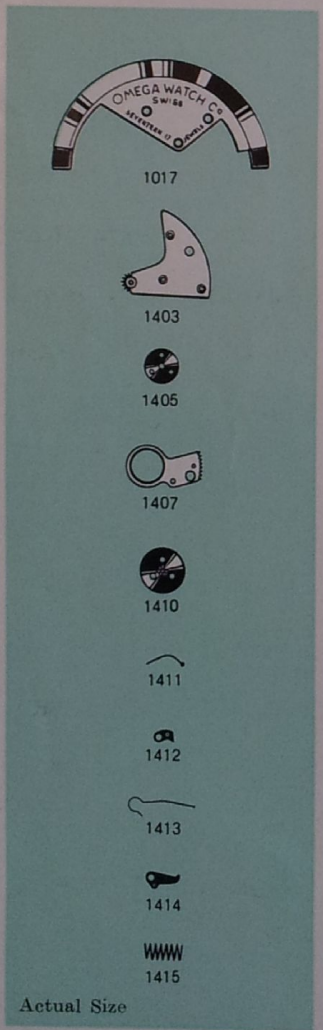


Actual Size

In these repair instructions, those parts of the basic movement already familiar to Omega agents are not dealt with. The intention is solely to familiarise the repairer with the special features of the self-winding work so that he may be able to repair watches of this kind in a satisfactory manner.

Repairing Omega self-winding watches

The increasing popularity of self-winding watches has led to the repairer encountering them frequently. If he is unfamiliar (or only partly familiar) with the features of the various types of self-winding work he is liable to make mistakes and, in any case, he may lose a considerable amount of working time which he cannot reasonably charge to his customer.

The Omega self-winding watch is probably the most widely distributed; it is tried and proved, its accuracy is a source of great pleasure to its owner, and its simple and robust design facilitates the work of the repairer. These are the principal reasons for its universal success.

Letting down

When any watch requires to be overhauled, whether it be simple, or complicated as for instance self-winding, its mainspring must be let down.

How is this to be done as regards the Omega self-winding watch ?

Self-winding watches contain two winding mechanisms : the normal keyless work, which enables the watch to be wound manually from the winding button, and the self-winding work which draws its power from the swinging weight.

To let down the mainspring it is therefore necessary to release both the normal click and the clicks in the self-winding mechanism. This double operation is carried out as follows :

The connection between the swinging weight and the self-winding work is first disconnected by releasing the self-winding ratchet ; to do this, a long fine point is inserted obliquely, as shown in fig. 1, through the opening in the upper weight bridge. This pointed pin is moved outwards from the centre of the watch to engage the pin in the winding click and carry it clear of the self-winding ratchet ; as it is moved further beneath the bridge, it next engages with the back-stop click, and moves that clear also. The pointed pin should be left in this position, and the normal click withdrawn from the teeth of the barrel ratchet with a piece of pegwood, the watch may now be let down in the normal manner (see fig. 2). The mainspring should be prevented from running back sharply by restraining the motion of the winding button with the fingers.

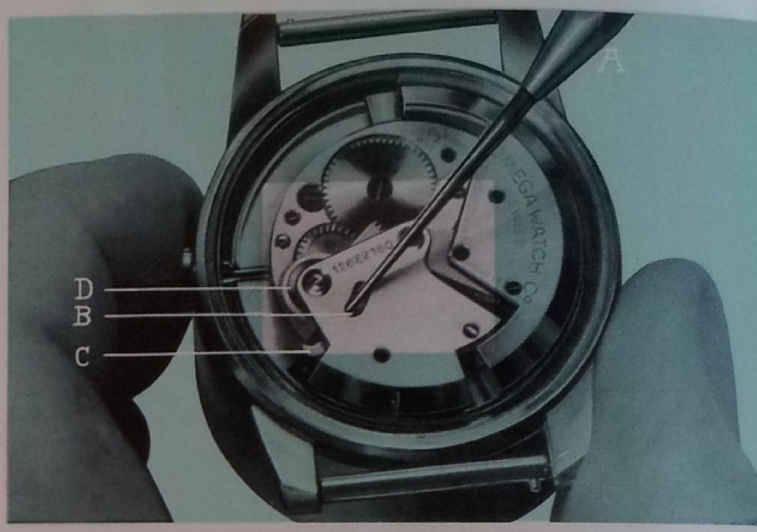
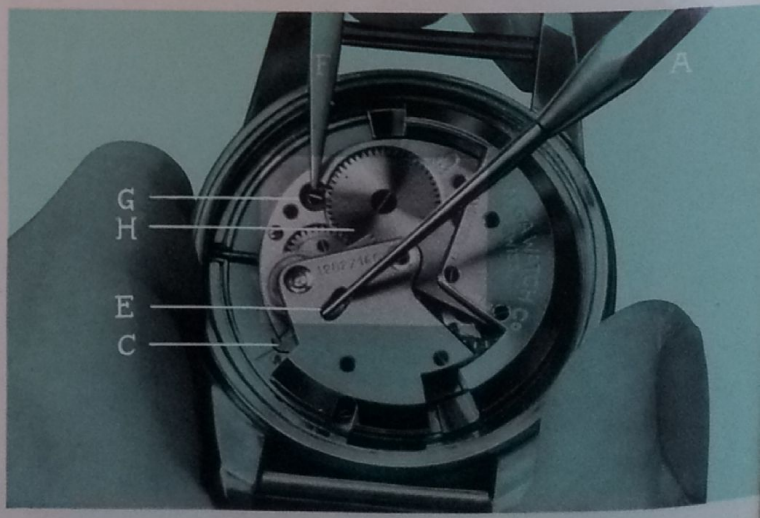


Fig. 1. To disconnect the swinging weight from the self-winding mechanism, the long fine point A should be inserted through the opening B in the centre bridge. The pointer is then moved outwards from the centre of the watch to engage with the pins in the winding and retaining clicks, which both engage with the self-winding ratchet D. The two clicks are then lifted clear of the self-winding ratchet D with the pointer A, thus making it free to turn.



The barrel and mainspring

The barrel of a self-winding watch differs from that of the normal variety, since it must contain an arrangement to prevent over-winding and consequent breakage of the mainspring. This protection is essential, since automatic winding will continue if the watch is being worn, whether the mainspring is fully wound or not. For this purpose a slipping attachment is provided, consisting of a section of spring somewhat thicker than the mainspring itself; it is located inside the barrel next to the barrel wall, where it occupies rather more than one turn so that the two ends overlap. The inner end of the attachment is provided with a hook, and this engages with the end of the conventional riveted hooking-piece on the end of the mainspring. The slipping attachment is in contact with the barrel wall under considerable outward pressure, owing to its tension (fig. 3). When the mainspring is nearly fully wound, it pulls on the hook of the slipping attachment and tends to relieve its outward pressure on the barrel wall, thus reducing the friction at this point. When the mainspring is virtually fully wound the friction grip must be less than the pull exerted on the slipping attachment, so that this will therefore commence to slide round the inside of the barrel. This will cause the mainspring to relax slightly, and its pull on the slipping attachment hook decreases until equilibrium is re-established between the force exerted on the slipping attachment and the latter's grip on the barrel wall.

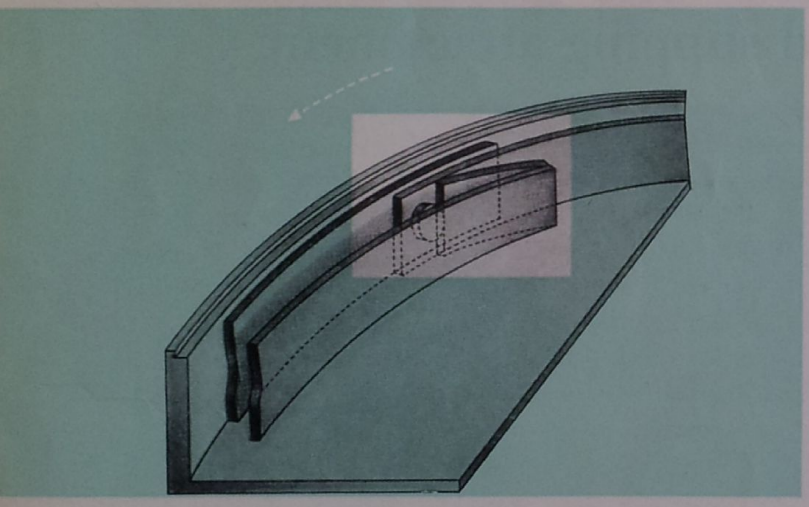


Fig. 3. Slipping attachment and mainspring.

Certain relationships must be observed between these various parts—the mainspring, slipping attachment, and barrel wall. If these conditions are not fulfilled the action of the slipping attachment will not be satisfactory; either there will be excessive winding with the attendant risk of knocking or slipping may occur prematurely before the mainspring is sufficiently wound. In the latter case, one will have lost the principal advantage of a self-winding watch—a mainspring wound almost continually to its maximum condition—and furthermore the reserve of going time will be insufficient.

The correct conditions for the operation of the slipping attachment may be compromised by wrong manipulation during repair work. This may be avoided by taking the few precautions detailed below.

◀ Fig. 2. The pointer A is left in position; note how the pointer has moved the click C clear of the self-winding ratchet. It is thus possible, with a second pointer F, to hold the click G clear of the barrel ratchet H, so that the spring may be let down.

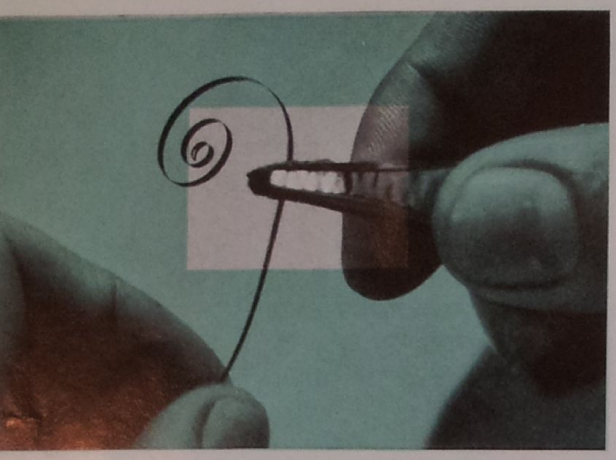


Fig. 4. The mainspring should be cleaned by passing it between the points of a pair of tweezers covered with fine linen rag, which will absorb the old oil.

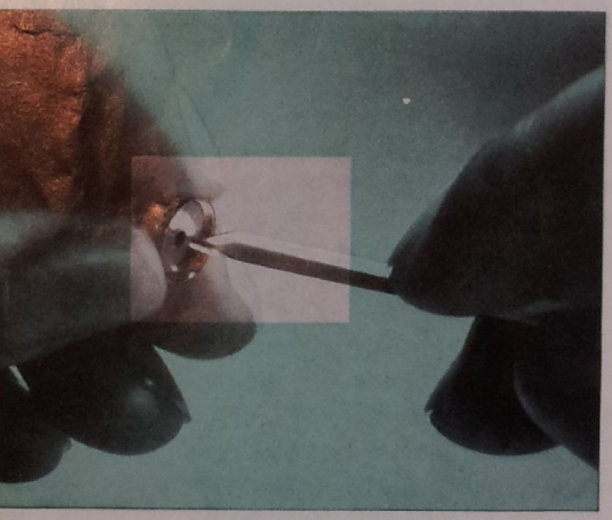


Fig. 5. Before putting in the slipping attachment a piece of oiled pegwood should be passed round the inner surface of the barrel wall.

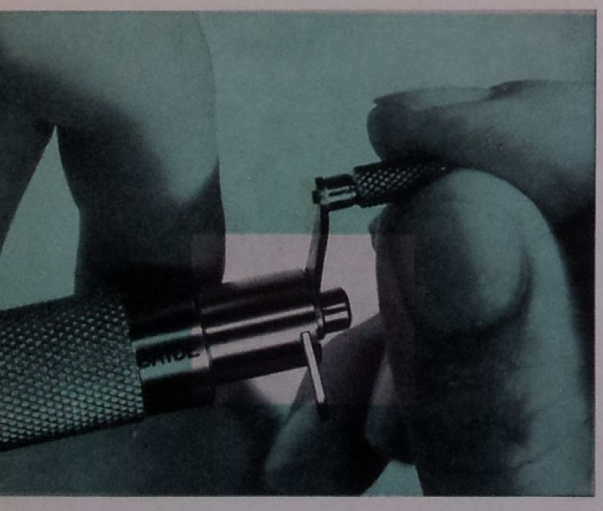


Fig. 6. Winder for inserting the slipping attachment.

Cleaning the mainspring

The mainspring may be removed from the barrel, as in the case of an ordinary watch. Generally, the slipping attachment is left in position, but if the barrel is found to be completely dry or the oil is old and thick it must be taken out.

The mainspring should be carefully wiped, using a piece of dry clean rag, held in the points of a pair of tweezers ; the whole length of the spring should be passed between the tweezer points. This operation should be carried out with considerable care so as to avoid deforming the spring (see fig. 4). *Do not immerse the mainspring in a cleaning fluid!* If the slipping attachment has also been removed from the barrel it should be cleaned in the same way as the mainspring.

The *barrel* can be cleaned like the other parts of the watch, in the cleaning machine, for example.

Replacing the mainspring and slipping attachment

Before replacing the mainspring and slipping attachment it is essential to lubricate them both by passing them between the points of a pair of tweezers again covered with rag, but this time the rag must be *oily*; in this way, both sides of the mainspring will receive a film of oil. Moebius lubricant is recommended for this operation, and the rag should be impregnated with it.

Before putting in the slipping attachment a piece of oiled pegwood should be wiped over the inner surface of the barrel wall (see fig. 5).

Putting in the slipping attachment

This should be done with a special winder sold by material dealers ; it is not advisable to insert the slipping attachment with the fingers. This latter procedure would appear more economical than buying a special winder, but it entails the double risk of reducing the life of the spring, and also of upsetting the correct operation of the self-winding work. These risks are due on the one hand to deformation of the slipping attachment, and on the other to corrosion set up by contact with the fingers (see fig. 6).

The mainspring is inserted into the barrel with a mainspring winder, exactly as in the case of an ordinary watch.

After having put in the barrel arbor and snapped on the barrel cover, check the action of the slipping attachment. The slipping attachment is functioning correctly if it commences to slip after *at least 5 turns of winding of the mainspring*.

When the watch leaves the factory the mainspring may be wound 5½ turns before slipping occurs.

The slipping attachment functions correctly if it is scarcely possible to feel its movement. A jerky action can never be tolerated ; to correct a defect of this kind, the mainspring and slipping attachment should be taken out of the barrel and the condition of the outer surface of the slipping attachment examined to see that it is perfectly smooth.

It may prove impossible to obtain smooth slipping ; in such a case, it is advisable to change the slipping attachment.

If slipping commences before the mainspring is wound 5 turns the slipping attachment should be replaced by one which is thicker.

Precautions to be taken before re-assembling the self-winding work

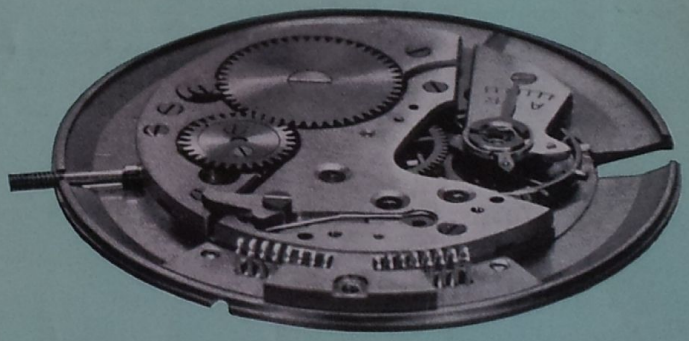


Fig. 7. Movement ready to receive the self-winding work.

Before re-assembling the self-winding work, the basic movement must be carefully assembled, just as in the case of an ordinary watch ; it is then in the state shown in fig. 7. It is most desirable to check the time-keeping of the watch at this stage. The amplitude of oscillation of the balance should be sufficient to ensure good time-keeping, but not so great that there is a risk of knocking.

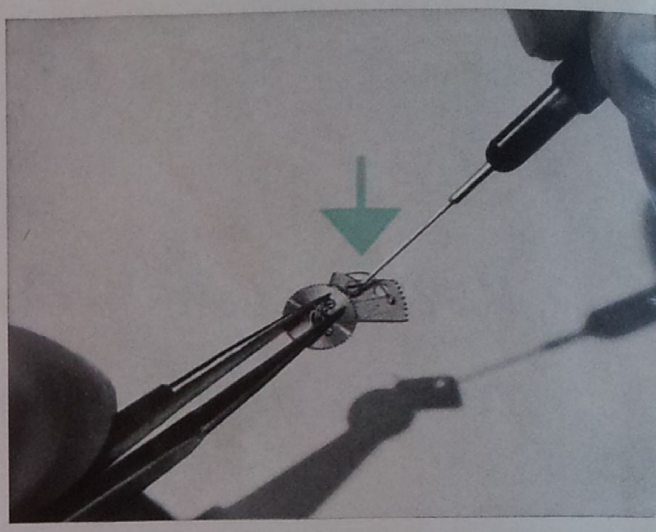
If the repairer uses this procedure, he will not lay himself open to the annoying necessity for removing the self-winding work again at a later stage.

Assembling the self-winding work

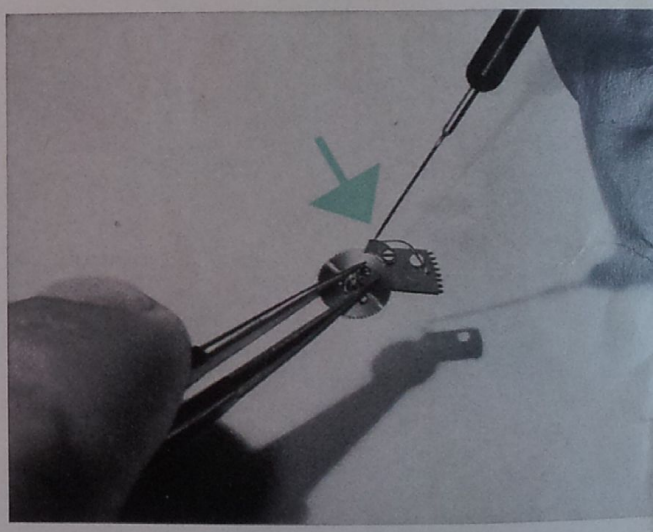
The self-winding work must only be re-assembled after every part has been conscientiously cleaned, and closely inspected with an eye-glass. The object of this examination is to discover any signs of wear; one should be most meticulous as regards the clicks, the bearings of the swinging weight, the rocking-piece which carries the winding click and the self-winding ratchet.

If these components are in good condition it is only necessary to lubricate them, and this must be done correctly. The oil recommended for this purpose is Moebius No. 1 chronometer oil, or Synt-A-Lube oil made by the same firm. It should only be applied at the points mentioned below (apart from the pivots), and a very small quantity only is required—just sufficient to form a thin film. The oil is applied with a piece of pegwood, previously impregnated with oil, or with a small watch oiler; the parts to be lubricated should be lightly touched with either of the above. The points concerned are as follows:

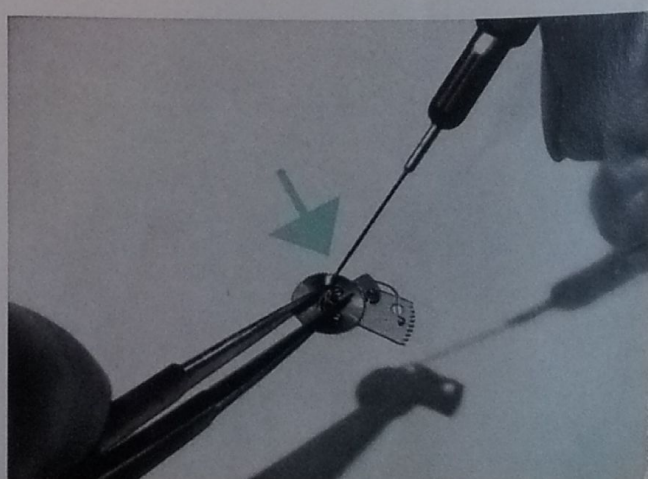
1. The beaks and pivots of winding and retaining clicks, and the points of contact between them and their springs.
2. The teeth of the self-winding ratchet.
3. The teeth of the crown wheel.
4. The teeth on the swinging weight supporting member.
5. The teeth on the rocking-piece which carries the winding click.
6. The bearing surfaces of the rocking-piece which carries the winding click, where it turns between the centre piece and the self-winding ratchet.
7. The lower pivots of the reduction pinion and the swinging weight, *before assembly*.
8. The upper pivots of these components.



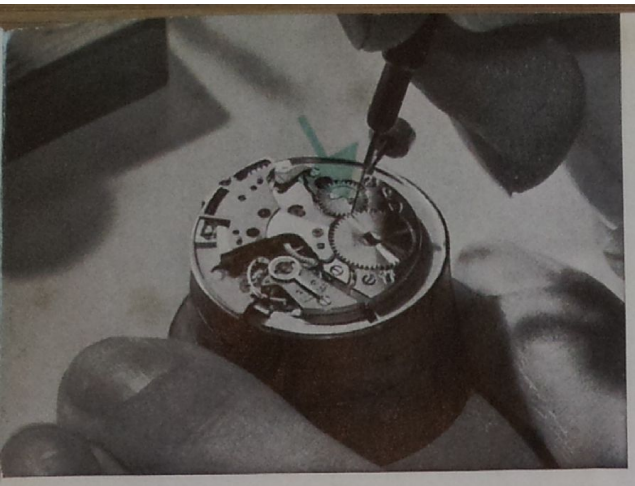
The winding click *is in action almost continually; it should be lubricated to prevent wear, but little lubricant should be applied. For this purpose, a small quantity of Moebius No. 1 chronometer oil should be applied to its base when it is mounted on the rocking-piece.*



The back of the click should also *receive a very small drop of Moebius No. 1 chronometer oil where its spring bears against it.*

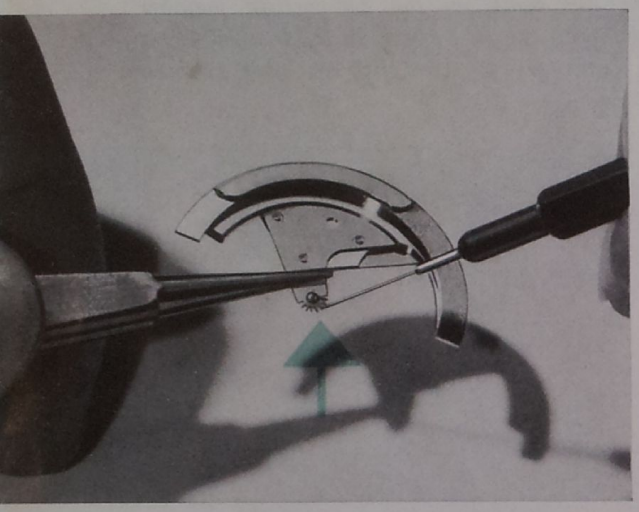


The beak of the winding click works continually with the self-winding ratchet; it should be lubricated, as should the teeth of this ratchet itself. Lubrication should be applied, as in the former cases, after assembly.



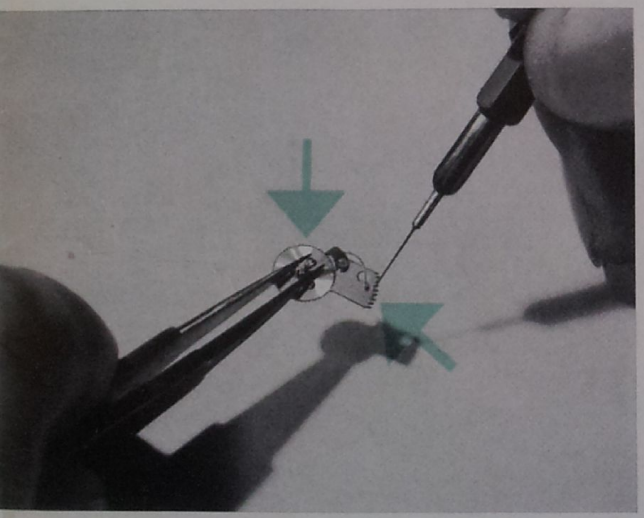
◀ *Unlike the procedure adopted with an ordinary watch,* the teeth of the barrel ratchet and crown wheel, *which are constantly in motion, must be lubricated with Moebius No. 1 chronometer oil.*

The retaining click, ▶ *which is mounted on the train bridge, should be lubricated with Moebius No. 1 chronometer oil in the same way as the winding click.*

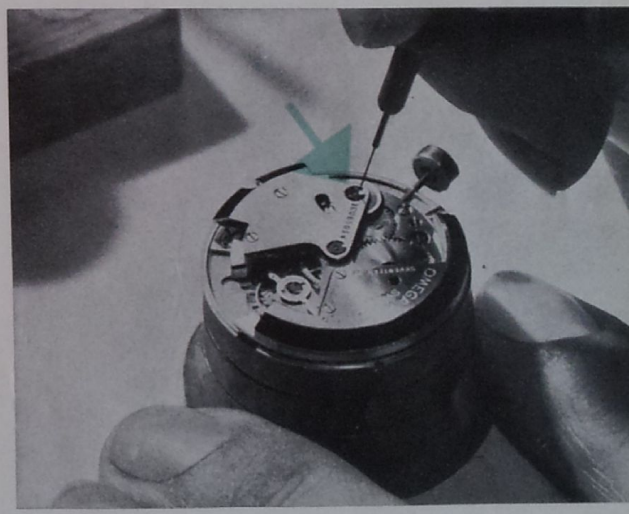


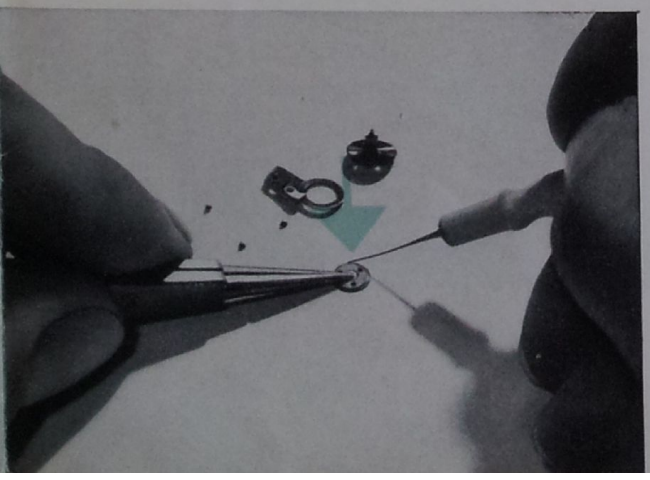
◀ The lower pivot of the swinging weight *is also lubricated with Moebius No. 1 chronometer oil; a drop of oil should be applied to the shoulder of the pivot before putting the swinging weight into position in the movement. The teeth of the sector should also be lubricated.*

The upper pivots of ▶ both swinging weight and reduction pinion *should be lubricated in the same way as the other pivots, i. e. after assembly in the movement. Moebius No. 1 chronometer oil should be used.* ▶



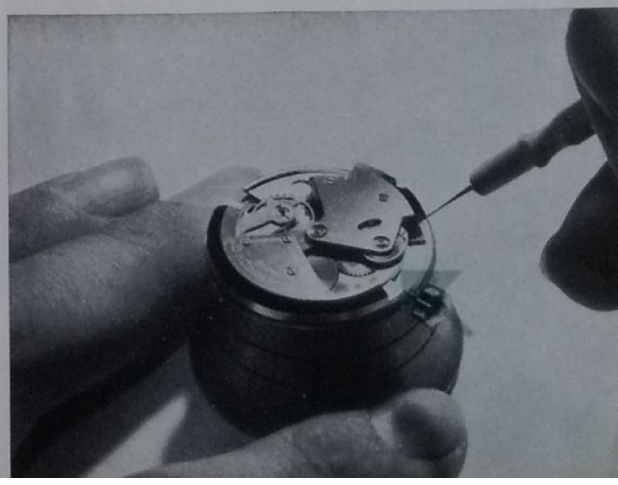
◀ To lubricate the lower pivot of the reduction pinion, *a drop of oil should be applied to the pivot shoulder before putting the assembly into the movement; this assembly consists of the self-winding ratchet, the rocking-piece and the winding click. At the same time, one should lubricate the teeth of the rocking-piece slightly. In this case also, Moebius No. 1 chronometer oil is recommended.*





◀ *The* centre piece, *around which the rocking-piece turns, should be lubricated in the same way as the crown wheel centre : two small drops of Moebius No. 1 chronometer oil should be applied to the bearing step.*

Finally, when every- ▶ *thing is assembled and the click is engaged with the self-winding ratchet, apply a small amount of Moebius No. 1 chronometer oil to the* beak of the back-stop click.



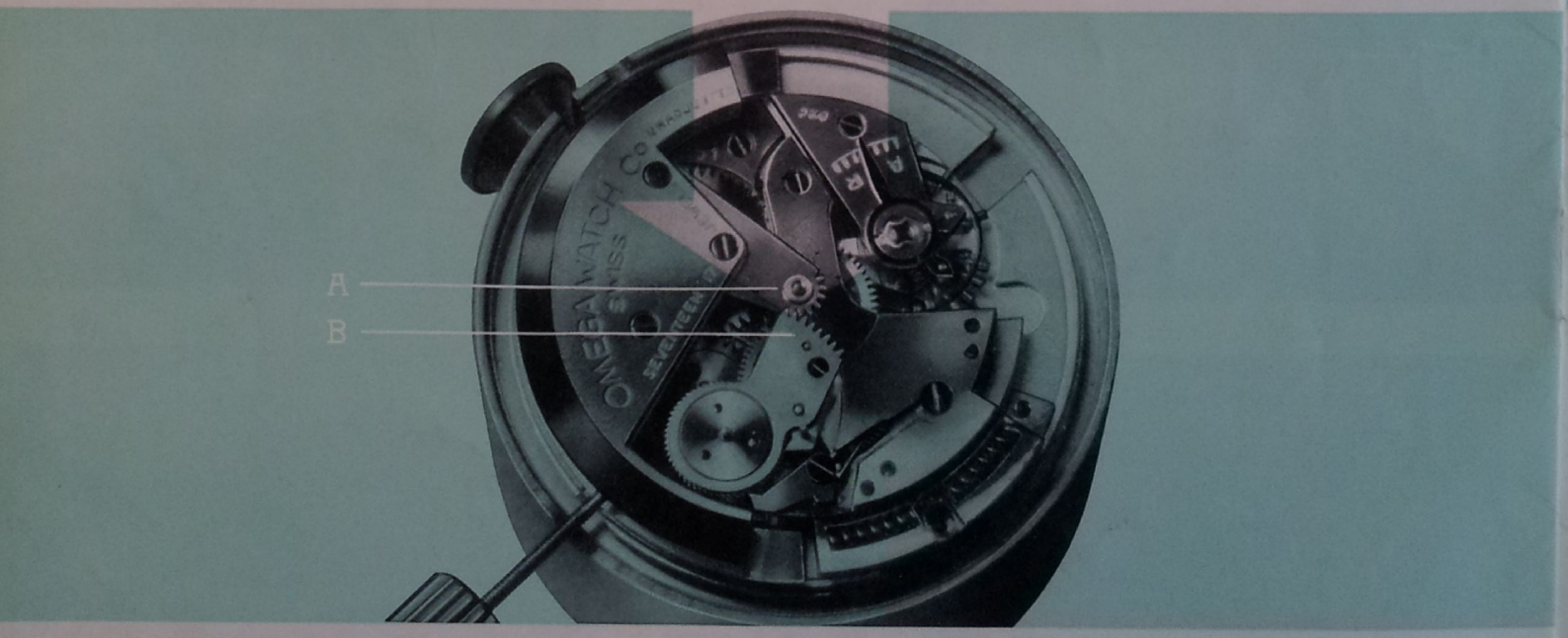
It is possible that wear may occur between the buffer springs and the plate or bridge ; it is therefore necessary to lubricate these springs, in particular their outer surfaces, by wiping them over with an oily linen rag.

To lubricate the pivots, a watch oiler of suitable size should be used in the ordinary way, and according to our experience Moebius No. 1 chronometer oil, or Synt-A-Lube made by the same firm, are to be recommended. After assembly, the clicks must be perfectly free and one should take particular care to see that this is so. Check them also for end-shake ; if this is excessive, there is a risk of the click coming clear of the self-winding ratchet. Excessive end-shake *must not be tolerated on either click.* Grooves are provided in the flanks of the clicks to receive the click springs ; make sure that the springs act on the clicks at the correct points.

The rocking-piece which carries the winding click is mounted on the self-winding ratchet, and the swinging weight supporting member is secured rigidly to the weight proper. These two components engage with one another, and to ensure that the swinging weight can turn through the maximum angle *it is essential that the last tooth on the supporting member coincides with the first space in the toothed sector on the rocking-piece* (see fig. 8). *This is most important.*

IMPORTANT

Fig. 8. *During assembly make sure that the supporting member A is correctly engaged with the rocking-piece B, which carries the winding click. The last tooth on one of these components should coincide with the last space on the other—the number of teeth and number of spaces on these two components correspond exactly.*



Final inspection

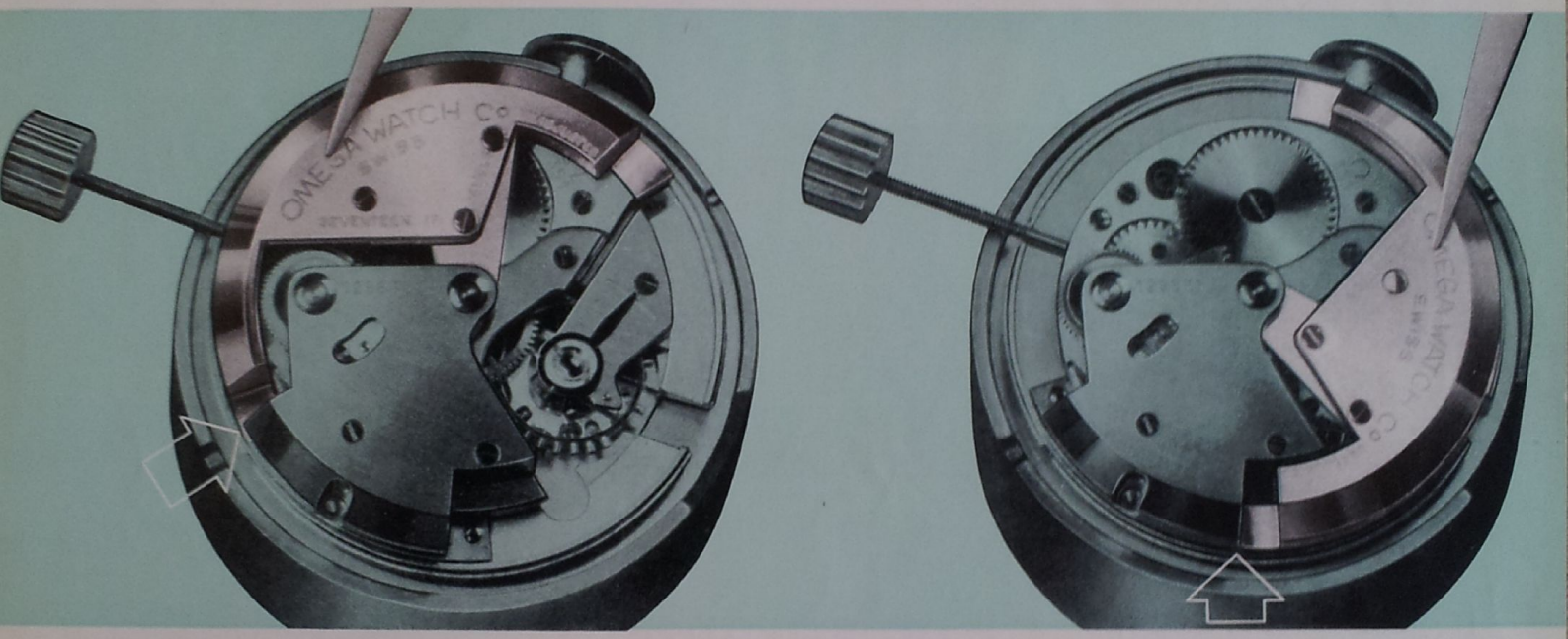
After assembly, some important points remain to be checked. If these checks are not carefully carried out, the entire effort spent in repairing the self-winding watch may be wasted. Even a very minor defect – often easy to correct – is sufficient to render pointless all the care, skill and knowledge which have been brought to bear during the earlier stages of the job.

In the case of the Omega self-winding watch, it is essential to make the following final checks :

a) When the swinging weight moves through its total travel, three teeth of the self-winding ratchet must pass the retaining click.

b) As in the case of the clicks, *the end-shake of the self-winding ratchet and the swinging weight supporting member must be small.* These components engage with one another, therefore, the two sets of teeth *must* lie at the same height and swing in the same plane. The swinging weight rotates about an axis passing through the centre of the plate ; its motion must take place in a plane parallel to that of the plate. Excessive shake can lead to the weight rubbing against the case or some part of the movement ; these two possibilities must be eliminated if destructive wear is to be avoided, and the weight is to be free under all conditions. The weight must be able to swing freely between the two buffer springs. *Complete freedom is utterly essential to the effective functioning of the self-winding work.*

It is also necessary to check that *manual winding can be carried out correctly ;* winding



Figs. 9 and 10. Final inspection. When the swinging weight is in position beneath its bridge it should be caused to move to and fro, checking that it can in both directions reach the true end of its travel, with its thinned end passing under the bridge at the point indicated by the arrows. This end then comes up against one or other of the buffer springs.

should be easy, and *the rocking-piece which carries the winding click should not be disturbed by it.*

c) A final check, with the movement held in the hand in a vertical position, the bridge side of the movement towards the workman, the swinging weight should remain at the bottom and not rotate with the rest of the movement if the movement is turned in both directions. If the weight moves, one must conclude that it is not completely free ; the cause of any lack of freedom should be discovered and eliminated. This test must be carried out before the mainspring is wound, as otherwise one might attribute displacement of the weight to a fault, whereas it would actually be due to the resistance of the mainspring to the motion of the weight.

Conclusion

The foregoing instructions should serve to show the repairer that the Omega self-winding watch presents no special difficulty as regards repair. If the instructions are carried out to the letter, any repair work will prove satisfactory, and it will be done rapidly. A repairer who takes the trouble to become familiar with the self-winding mechanism and its action will have no difficulty in discovering any defect. His work will be done speedily and conscientiously, to the common benefit of his customer, himself and to us. We take the greatest care to ensure that our products are perfect and we are grateful for your co-operation in keeping them so.

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