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The following was compiled by Brian Shaw (Shaw@courier3.aero.org) and downloaded from the Listserv E-mailing list Clocks. Please see the file signup.mcc for details on how to join this mailing list.

## Clock Lubrication

### 1. Clock Lubrication Issues.

#### Gunk:

As oil ages some components evaporate, causing the oil to thicken. Thickening, combined with the tendency of oil to collect airborne dirt, creates "gunk".

#### Torque Fluctuations:

Mainspring grease sold by dealers can cause variations in spring torque, resulting in fluctuations in the rate of time keeping. Especially noticeable on carriage clocks and others with platform escapements.

#### Mainspring Binding:

When oil is often applied in drops to the top edge while in the barrel. Binding of the mainspring has been noticed when it was wound tightly. Noise could be heard from the mainspring as the clock began running down or the chime went off.

#### Retention versus spreading:

Oils stay in pivot holes through cohesion and capillary action between the pivot and the hole. On escapements, there are no clearances to hold the oil in place - the open surface allows the oil to spread over the escape wheel. When the oil spreads the teeth are left dry, causing the pallets to wear down and become grooved. A good clock oil does not spread, keeping the escape teeth and pallets lubricated.

### 2. Oil Quality Issues.

#### Expensive Oils:

Highly refined oils reduce the "gunk" effect caused by evaporation of certain elements of oil. Clock pivots have large tolerances and, therefore, do not require the use of expensive highly refined oils.

### 3. Oil Recommendations:

#### Pivots:

3-in-1 light machine oil:

Doesn't evaporate; Right viscosity for clocks; Readily available; Cheap.

3-in-1:

Per Penman, Laurie. The Clock Repairer's Handbook.

Kroil:

Reported to be very effective.

Mobil 1, or any automotive synthetic, using the lightest multi-grade available.

Etsyntha 859:

Used by several clock manufacturers. Simply the best.

The following information is off the container of Etsyntha 859:

Dr. Tillwich

Etsyntha Chemie  
7240 Horb-Ahldorf  
Germany

#### MAINSPRINGS:

SAE 15 Motor Oil. Motorcycle fork oil.

Etsyntha B-52. Allows coils to slide smoothly and not 'pop'.

Mobil 1, or any automotive synthetic, using the lightest multi-grade available.

Raylube SAE 30. Used for years with no problems whatsoever.

Presumably any brand of 30-weight oil is okay.

(For more pertinent information about mainsprings see file spring.mcc)

#### 4. Oil Testing And Acceptance:

##### "The Thread Test":

A drop of a proposed mainspring oil is placed on the thumb and pinched with the forefinger, separating them quickly. If the oil briefly forms a thread before disappearing then it will not get squeezed out by the pressure of clock mainsprings.

##### Penman's Test of Stickiness:

Spill a little oil from each new tin onto an exposed metal surface like the top of the tin itself. If the oil goes tacky then the oil is probably not good to use.

##### Follow manufacturer's recommendations:

Clock manufacturer's use and recommend specific oils (Etsyntha 859 and B-52).

Their R&D has proven them, therefore it is good advise to follow.

#### 4. Application Procedures.

##### PIVOTS:

Jewelers Screwdriver:

Use as oiler to wet the pivot and partially fill the oil sink.

##### MAINSPRINGS:

(For more pertinent information about mainsprings see file spring.mcc)

##### Syringe:

Very small amount around the bottom edge of spring while in the barrel. Will appear between coils at top of spring in about five minutes. Don't use too much or it creeps out!

##### Air Brush:

Spray the top of the spring evenly while in barrel. Eliminates overspray or excess oil.

##### Oiling Cloth:

3-in-1 light machine oil. After extending mainspring to inspect and clean with a kerosene-dampened cloth, 0000 steel wool, and again with the cloth.

Slick 50 HP a Synthetic Engine Formula is superior for mainsprings. It has micro-granulated PTFE (Teflon) particles which, under pressure, bond to the spring and drastically reduce the turn-to-turn friction that we feel in a mainspring when it is nearing fully wound.

In order to accomplish this wind the spring three times fully (letting is down each time of course) because that will "transfer" the PTFE onto the spring, thereby impregnating it.

### Drops On Spring Edges

Three drops on edge of mainspring when reinserting into barrel, while coils are still loose. Another drop or two on other side after mainspring is replaced in barrel. For American clocks - two drops on each side and three or four drops distributed along the loose mainspring after cleaning by ultrasonic and steel wool.

I want to thank Brian Shaw for unselfishly sharing all of his hard work.

A service from, E-mail address: Mike@atmos-man.com  
Mike Murray Founder of Clocksmiths

A specialist in Atmos and 400-day clock repair.  
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