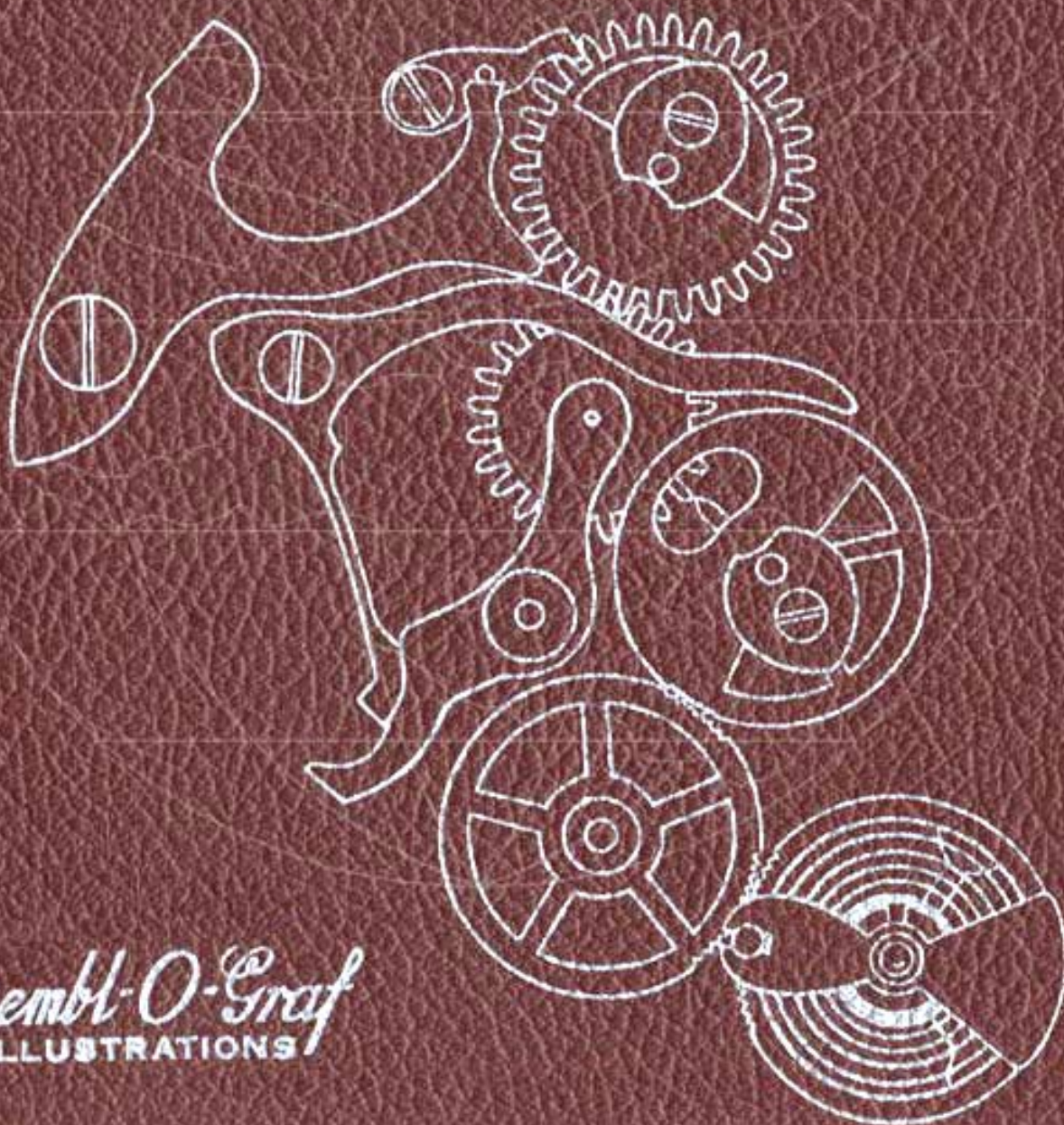


**WORLD'S ONLY FULLY ILLUSTRATED
CHRONOGRAPH WATCH COURSE**

**INDEX BOOK
VOLUME 25**

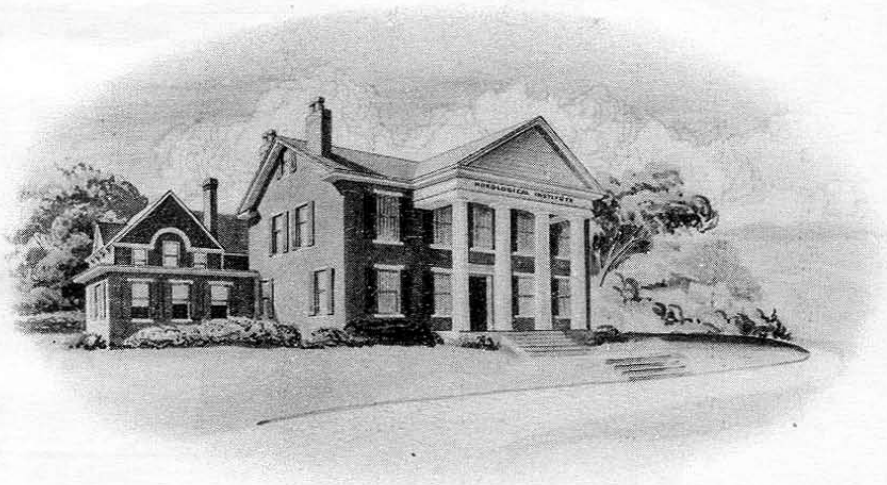


Esseml-O-Graf
ILLUSTRATIONS



ESEMBL-O-GRAF

THE WORLD'S FIRST FULLY
ILLUSTRATED TEXT BOOK
ON
CHRONOGRAPH REPAIRING
AND ADJUSTING



BY
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PRESIDENT AND TECHNICAL DIRECTOR
AND
William O. Smith, Jr.
CHIEF ENGINEER, RESEARCH LABORATORIES

WESTERN PENNSYLVANIA HOROLOGICAL INSTITUTE, INC.
PITTSBURGH, PENNSYLVANIA

INSTRUCTIONS FOR THE USE OF THIS BOOK WHEN IDENTIFYING CHRONOGRAPHS

There are three basic ways to identify a chronograph:

1. By dial name.
2. By trade mark and caliber number.
3. By comparing the chronograph that you wish to identify, with Illustrations of chronograph mechanisms.

We will take up each of the above methods of identifying a chronograph, one at a time, and explain the procedure for each.

1. IDENTIFYING A CHRONOGRAPH BY DIAL NAME

Any one of the following names of manufacturers, appearing on a dial of a chronograph, is the name that must be used in the identification of that chronograph.

IMPORTANT: Most names, other than the names listed below, that appear on the dials of chronographs, are of no value or help in identifying a chronograph.

Manufacturers Names that Appear on the Dial

Angelus
Lemania
Tissot

Longines
Mido
Movado

Pierce
Rolex
Universal

For instance, if the manufacturers name, Longines, is found printed on the dial, you would immediately know that the name used in identifying that chronograph, would be Longines. Now to identify the Longines chronograph completely, look on the index page for the name Longines. Turn to the page indicated. On that page you will find the complete identification for a Longines chronograph. Also listed on that page, will be the number of the Volume in the Esembl-O-Graf Library that covers its repair. This procedure should only be followed for each of the names which are listed above.

2. IDENTIFYING A CHRONOGRAPH BY TRADE MARK AND CALIBER NUMBER

Remove the dial from the chronograph, and look for the trade mark stamped on the plate. Compare any trade mark stamped on the plate, with the trade marks listed below.

Trade Mark	Manufacturer	Trade Mark	Manufacturer
	Valjoux		Landeron
	Venus		Fontainemelon

For instance, if the trade mark  was found stamped on the plate, this would indicate that the manufacturer is Valjoux, and thus, Valjoux would be the name that must be used in identifying the chronograph in question. To completely identify this Valjoux chronograph, and to find the Volume in the Esembl-O-Graf Library that covers its repair, proceed with the reading of the text A, "Identifying a Valjoux Chronograph" on the next page.

In the following paragraphs, A, B, C and D, listed under separate headings, is the procedure for completely identifying a Valjoux, Venus, Landeron and Fontainemelon chronograph. Only read the procedure under the manufacturers name, of the chronograph you are seeking to identify.

A. IDENTIFYING A VALJOUX CHRONOGRAPH

1. Look for the number stamped beside the trade mark. This is the caliber number of the chronograph.
2. Look on the index page for the name Valjoux, with the caliber number. Turn to the page indicated. On that page you will find a complete identification for this caliber Valjoux chronograph, and also listed on the page, will be the number of the Volume in the Esembl-O-Graf Library that covers its repair.

B. IDENTIFYING A VENUS CHRONOGRAPH

Look on the index page for the name Venus. You will notice that there are six Venus chronographs listed on the index page. Turn to each of the six pages, and compare the chronograph mechanism you wish to identify, including any hour register, date, or split second mechanism, with the chronograph mechanisms illustrated on these pages.

Once the comparison has been made, and one of the Illustrations of Venus chronographs matches exactly with the chronograph you wish to identify, you will find on that page a complete identification for the Venus chronograph. Also listed on that page, will be the number of the Volume in the Esembl-O-Graf Library that covers its repair.

REMARKS

The number stamped beside the trade mark on the plate of Venus chronographs, does not necessarily indicate the caliber number of the chronograph. The number stamped beside the trade mark, is the caliber number for the watch and minute register mechanism only. Venus chronographs which have additional mechanisms, such as hour register, split second, etc., are identified by another caliber number, which is not stamped on the plate. This new caliber number, which must be used to identify the watch, minute register mechanism, and all additional mechanisms, is given on the pages in this book, designated for identifying the various calibers of Venus chronographs.

C. IDENTIFYING A LANDERON CHRONOGRAPH

Look on the index page for the name Landeron. You will notice that there are two chronographs listed on the index page. Turn to these two pages, and compare the parts on the chronograph you wish to identify, with the Landeron chronograph mechanisms which are illustrated in this book.

Once the comparison has been made, and one of the Illustrations of the Landeron chronograph matches exactly with the chronograph you wish to identify, you will find on that page, a complete identification of the Landeron chronograph, and also listed on the page, will be the number of the Volume in the Esembl-O-Graf Library that covers its repair.

D. IDENTIFYING A FONTAINEMELON DATO-GRAPH

Look on the index page for the name Fontainemelon. Turn to the page indicated. On that page you will find a complete identification of the Dato-Graph, and also listed on the page, will be the number of the Volume in the Esembl-O-Graf Library that covers its repair.

3. IDENTIFYING A CHRONOGRAPH: BY COMPARING THE CHRONOGRAPH YOU WISH TO IDENTIFY WITH ILLUSTRATIONS OF CHRONOGRAPH MECHANISMS

You will notice that this book has been separated into various sections. The first section identifies chronographs with minute register mechanism only. The second section of this book deals with identifying chronographs with minute register and hour register mechanisms. The third section deals with additional mechanisms, etc., throughout the book. To eliminate turning to each page in this book to identify a chronograph, it is advisable to determine the mechanism on the chronograph you wish to identify, such as minute register, combination minute and hour register mechanism, etc. Once this is determined, you can turn to the section in this book, dealing with that particular mechanism. Then of course, you must compare the chronograph mechanism you wish to identify, with Illustrations of the chronograph mechanism on each page in that section of the book. If the chronograph mechanism matches exactly with the Illustration of a chronograph mechanism on one of the pages in this book, you will find on that page the complete identification of the chronograph. Also listed on that page, will be the number of the Volume in the Esembl-O-Graf Library which covers its repair.

ORDERING PARTS

To order parts, state clearly the following information:

1. Manufacturers name.
2. Size of movement.
3. Caliber number of movement.
4. Whether it is a 30, 45, or 60 minute register.
5. The name and number of the part which you need, taken from the Esembl-O-Graf Library.
6. To order screws for a chronograph, state the name and number of the part which the screw holds in place.
7. When ordering chronograph push buttons, specify whether case is waterproof or non-waterproof.

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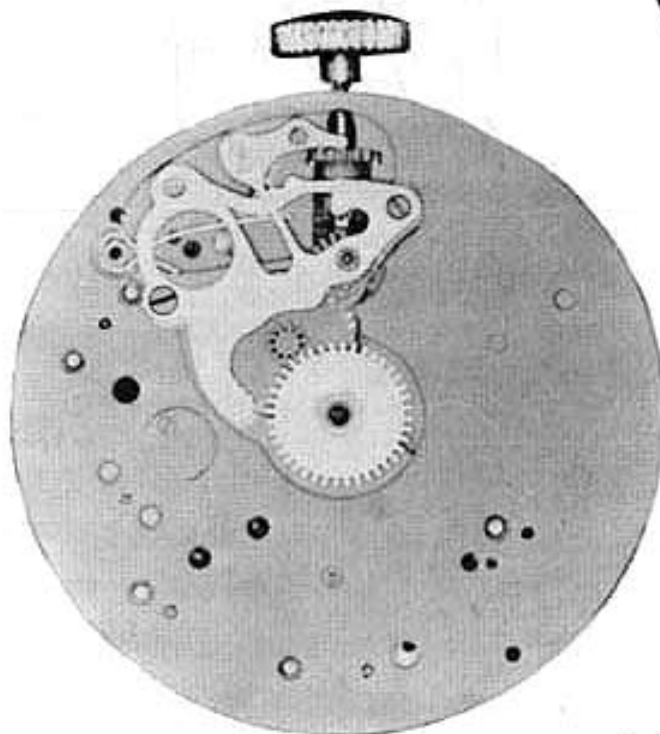
IDENTIFICATION OF CHRONOGRAPH

ALTERNATE
SHAPED FLYBACK LEVER



Ensemble O-Enaf

VOLUME 1



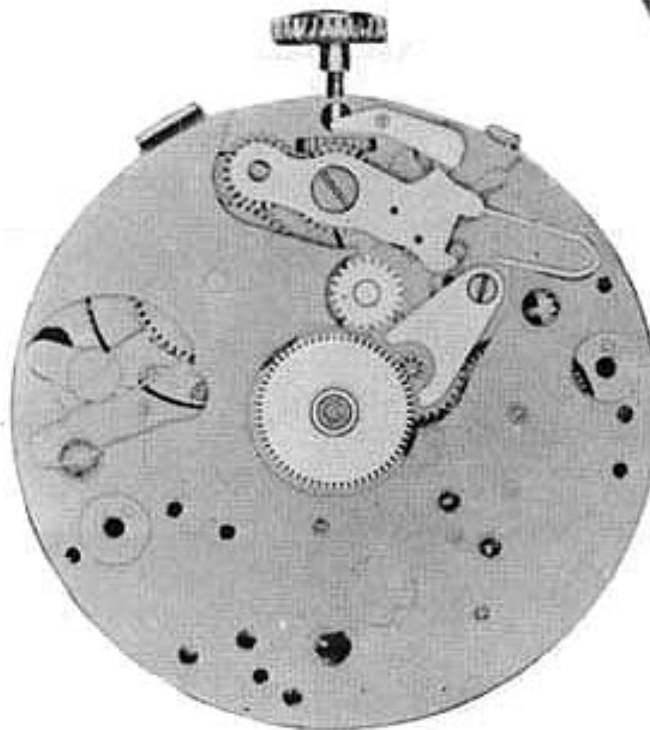
LANDERON
CAL. 51 - 13-3/4L
CAL. 55 - 14L
MINUTE REGISTER

IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Case

VOLUME 2



12-1/2L



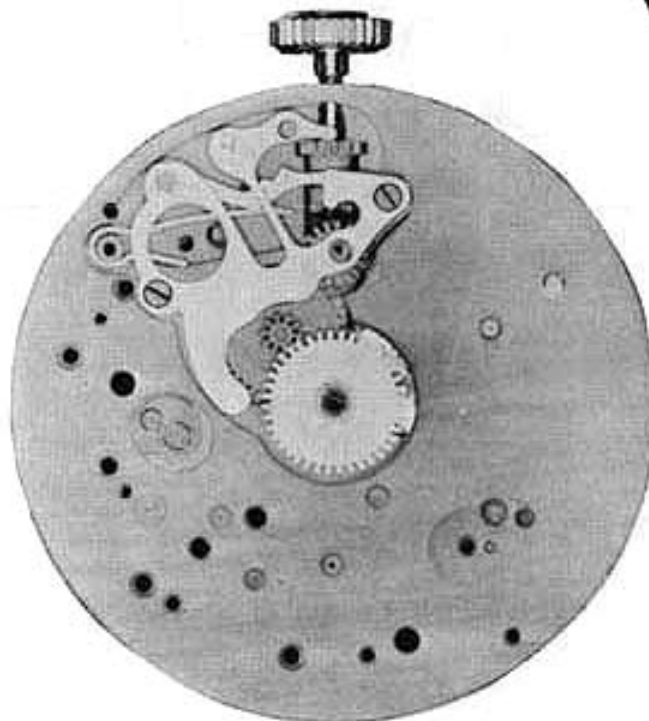
2

VENUS
CAL. 170
MINUTE REGISTER

IDENTIFICATION OF CHRONOGRAPH



Esomble-O-Graf
VOLUME 3



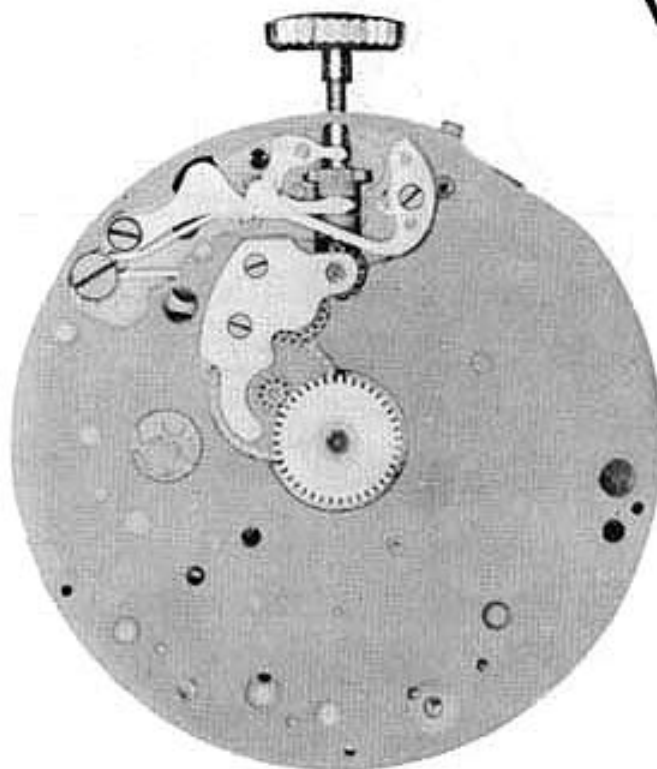
LANDERON
CAL. 48 - 13-3/4L
CAL. 54 - 14L
MINUTE REGISTER

IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Trap

VOLUME 4



13L



**VALJOUX
CAL. 23
MINUTE REGISTER**

IDENTIFICATION OF CHRONOGRAPH



Essemblé O-Enaf

VOLUME 5



10-1/2L



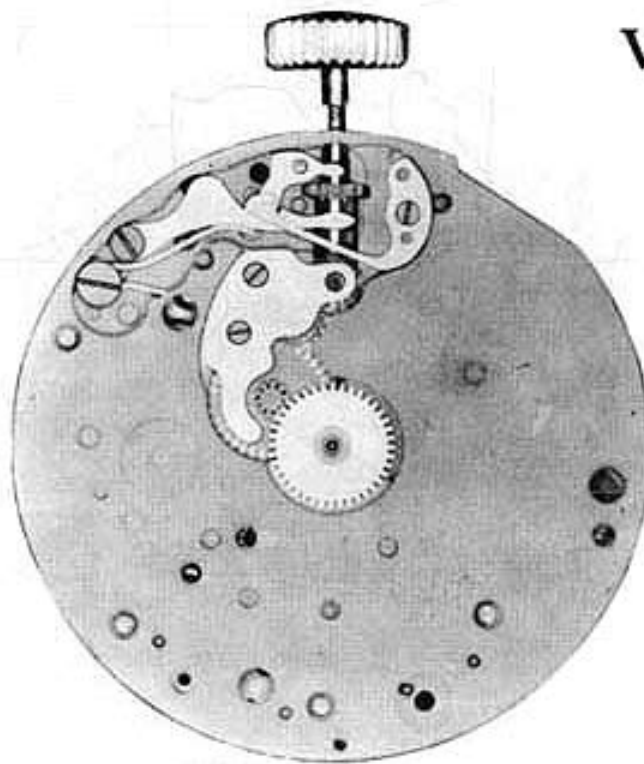
**VALJOUX
CAL. 69
MINUTE REGISTER**

IDENTIFICATION OF CHRONOGRAPH



Essembl. O-Graph

VOLUME 7



13L



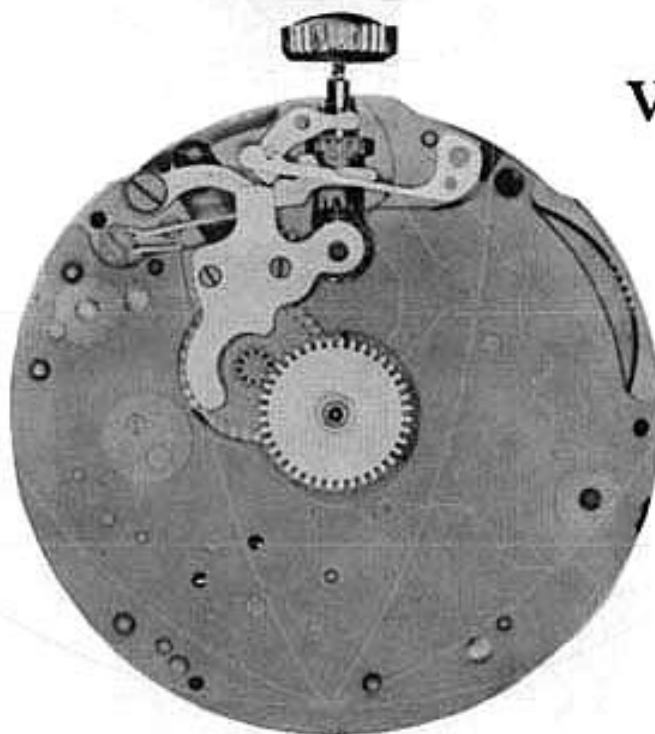
**VALJOUX
CAL. 23
MINUTE REGISTER
(OLD MODEL)**

IDENTIFICATION OF CHRONOGRAPH



Ensemble O'Enaf

VOLUME 8



**ALTERNATE
SETTING PARTS**



Cal.285-14L Cal.287-15L
Cal.385-14L Cal.387-15L
Cal.386-14L Cal.292-15-5/6L

UNIVERSAL

**UNI-COMPAX
MINUTE REGISTER**

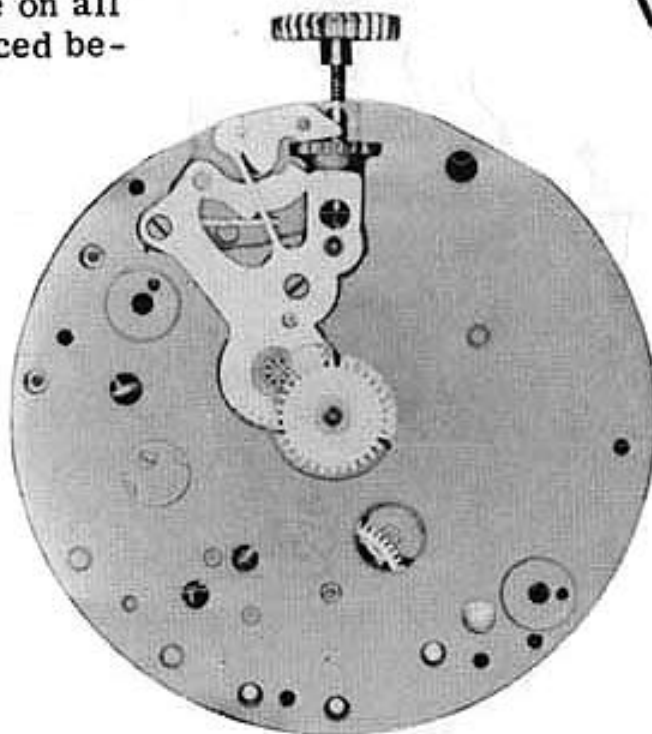
IDENTIFICATION OF CHRONOGRAPH



These two springs of this shape are on all models produced before 1947.

Esombl-O-Graph

VOLUME 9



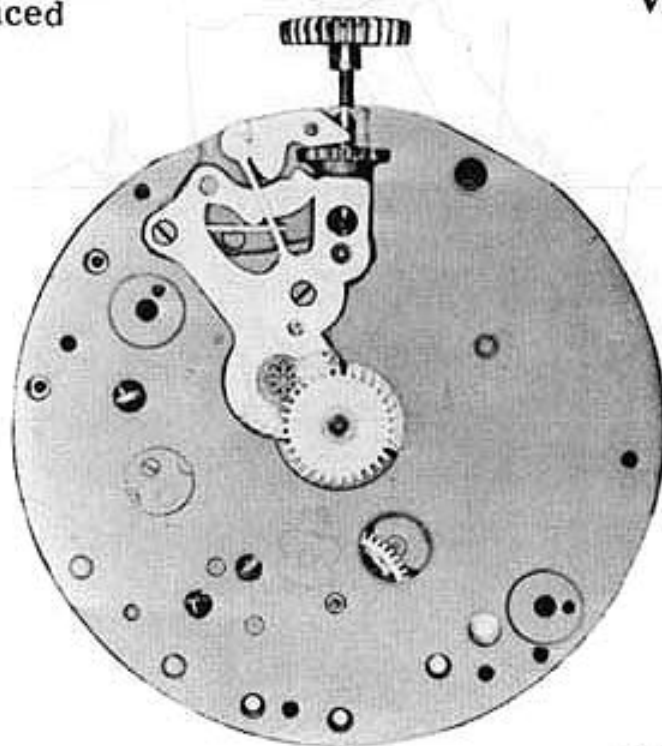
VENUS
CAL. 150-13L
CAL. 175-14L
MINUTE REGISTER
(OLD MODEL)

IDENTIFICATION OF CHRONOGRAPH



These two springs of this shape are on all models produced since 1947.

Essemtl. O-Graf
VOLUME 9



VENUS
CAL. 150-13L
CAL. 175-14L
MINUTE REGISTER
(NEW MODEL)

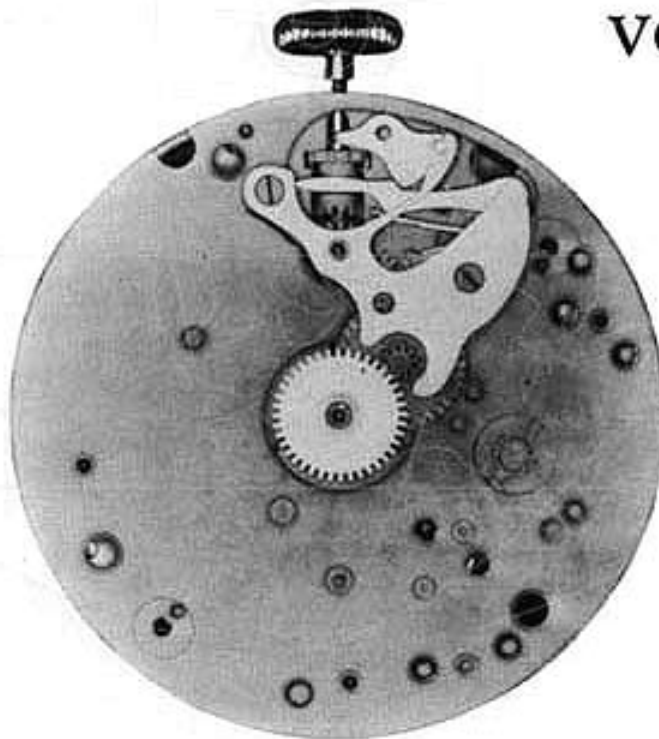


IDENTIFICATION OF CHRONOGRAPH



Essemble O-Sraf

VOLUME 11



15L
LEMANIA
CAL. 15TL-2P
MINUTE REGISTER



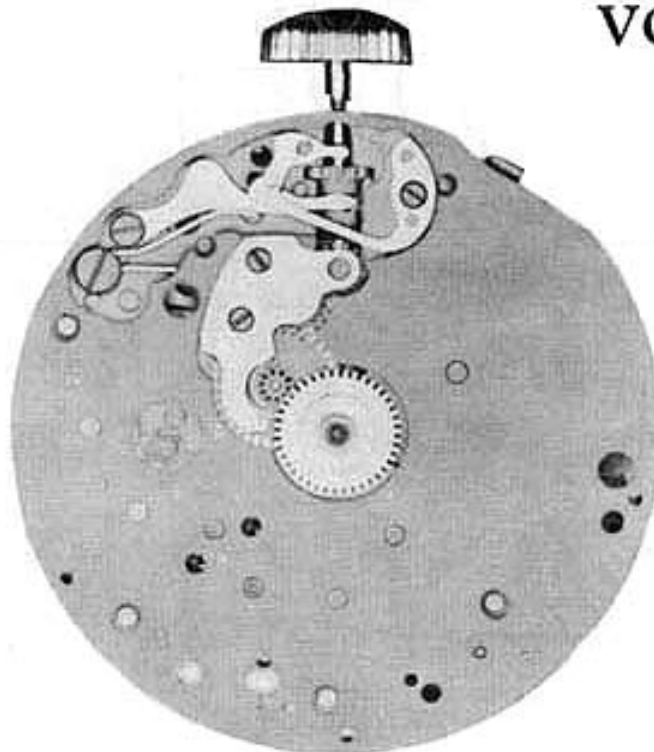
14-3/4L
TISSOT
CAL. 33.3
MINUTE REGISTER

IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Snaf

VOLUME 12



13L
MIDO



CAL. 1300
MINUTE REGISTER

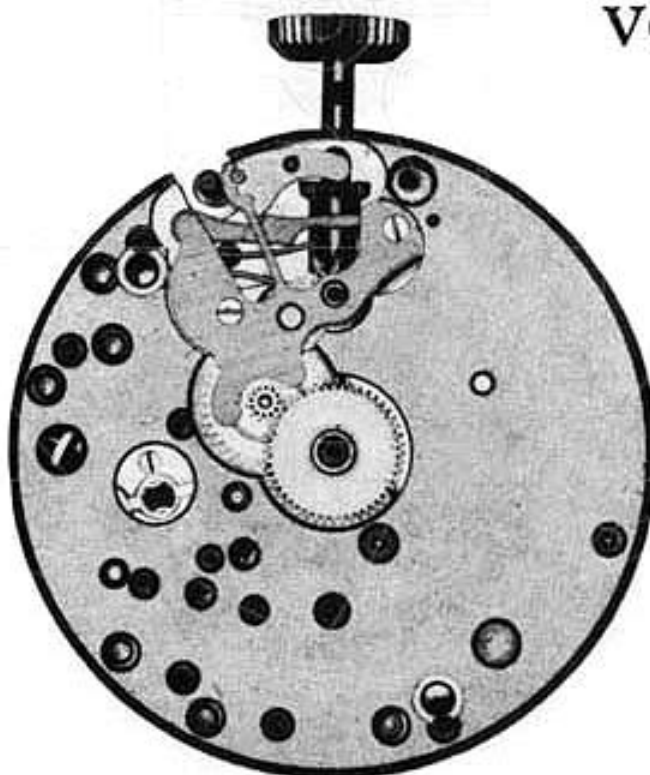
IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Enaf

VOLUME 14

When repairing the chronograph identified on this page, disregard the section in Vol. 14 from pages 1 to 9 inclusive, that covers the repair of an hour register mechanism. Only use the section in Vol. 14 designated for repairing the minute register mechanism, which is identified on this page.



**12L
LEMANIA
CAL. CH 27
MINUTE REGISTER**



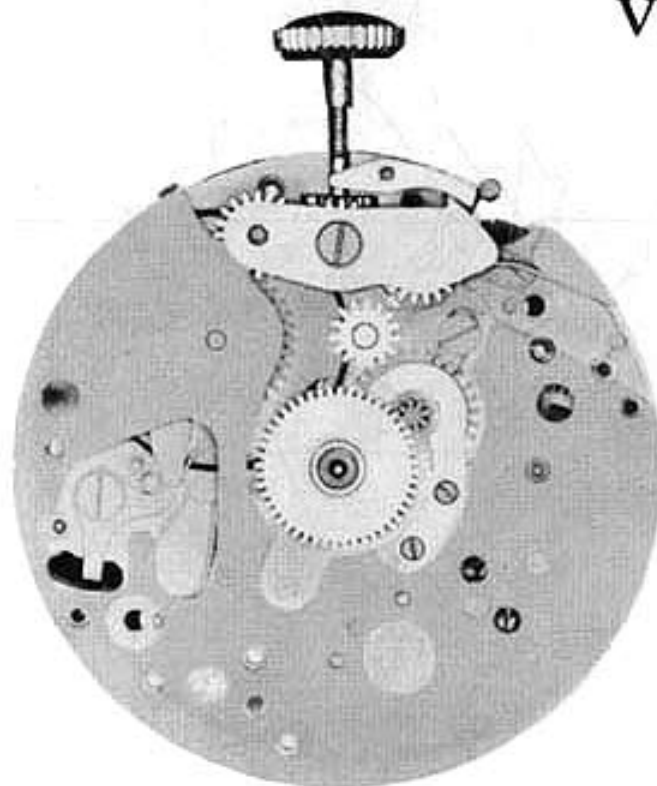
**12L
TISSOT
CAL. 27.41
MINUTE REGISTER**

IDENTIFICATION OF CHRONOGRAPH



Essemblé O'Enaf

VOLUME 15



**13L
PIERCE**



**CAL. 134
MINUTE REGISTER**

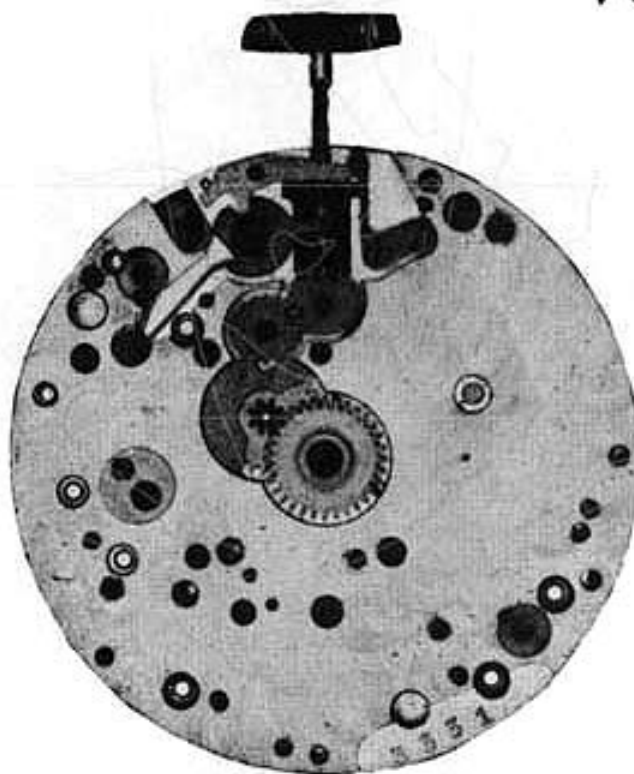
IDENTIFICATION OF CHRONOGRAPH



Exomble O'Graf

VOLUME 17

When repairing the chronograph identified on this page, disregard the section in Vol. 17 from pages 1 to 11 inclusive, that covers the repair of an hour register mechanism. Only use the section in Vol. 17 designated for repairing the minute register mechanism, which is identified on this page.



**12L
MOVADO**



**CAL. 90-M
MINUTE REGISTER**

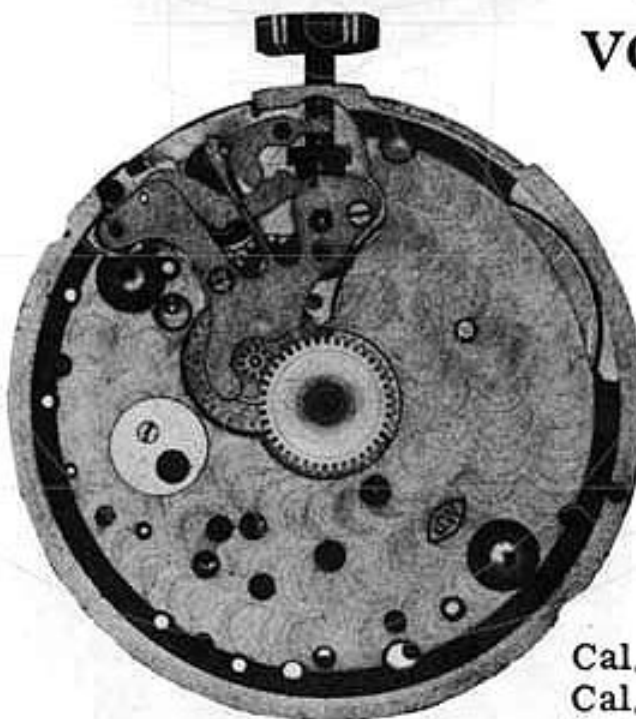
IDENTIFICATION OF CHRONOGRAPH



Esomble O. Hat

VOLUME 18

When repairing the chronograph identified on this page, disregard the section in Vol. 18 from pages 1 to 8 inclusive, that covers the repair of an hour register mechanism. Only use the section in Vol. 18 designated for repairing the minute register mechanism, which is identified on this page.



**ALTERNATE
SETTING PARTS**



Cal. 281 - 12L
Cal. 381 - 12-1/4L
Cal. 283 - 13L
Cal. 383 - 13L
Cal. 481 - 14-1/4L

**UNI-COMPAX
MINUTE REGISTER**

UNIVERSAL

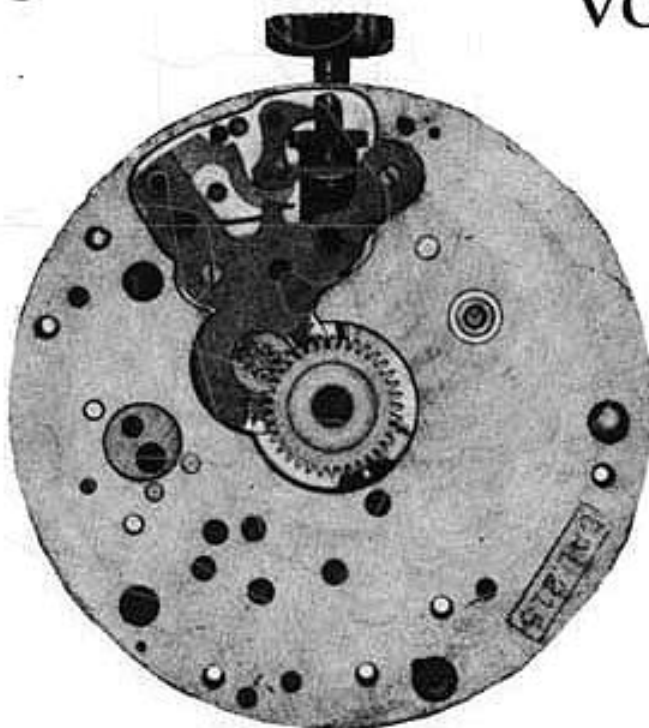
IDENTIFICATION OF CHRONOGRAPH



Essembl. O. Laaf

VOLUME 26

When repairing the chronograph identified on this page, disregard the section in Vol. 26 from pages 1 to 18 inclusive, that covers the repair of a calendar mechanism. Only use the section in Vol. 26 designated for repairing the minute register mechanism, which is identified on this page.



**14L
ANGELUS**



**CAL. 215
MINUTE REGISTER**

IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Enaf

VOLUME 27



13L



VALJOUX
CAL. 77
MINUTE REGISTER

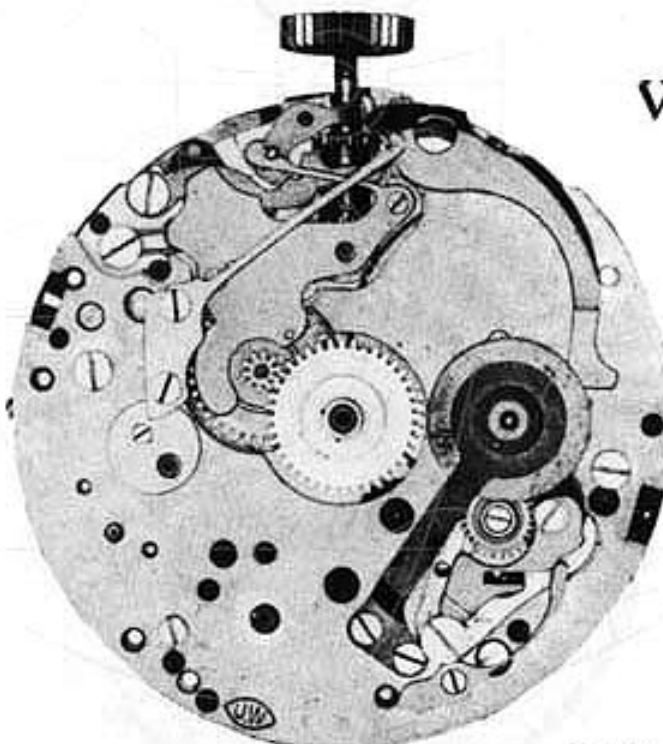
IDENTIFICATION OF CHRONOGRAPH



Essemtl O-Inst

VOLUME 8

When repairing the chronograph identified on this page, use Vol. 18 from pages 1 to 8 inclusive, to cover the repair of the hour register mechanism. Then use Vol. 8 to cover the repair of the minute register mechanism.



Calibers listed below that have both hour and minute register combined with date mechanism, proceed as follows. Use Vol. 20 from pages 1 to 14 inclusive, to cover the repair of the hour register and date mechanism. Then use Vol. 8 to cover the repair of the minute register mechanism.

ALTERNATE SETTING PARTS

Cal.285-14L Cal.287-15L
Cal.385-14L Cal.387-15L
Cal.386-14L Cal.292-15-5/6L

UNIVERSAL



COMPAX
MINUTE REGISTER
AND HOUR REGISTER

IDENTIFICATION OF CHRONOGRAPH



Esombl-O-Sraf

VOLUME 9

When repairing the chronograph identified on this page, use Vol. 23 from pages 1 to 11 inclusive, to cover the repair of the hour register mechanism. Then use Vol. 9 to cover the repair of the minute register mechanism.



VENUS
CAL. 152 - 13L
CAL. 178 - 14L
MINUTE REGISTER
AND HOUR REGISTER

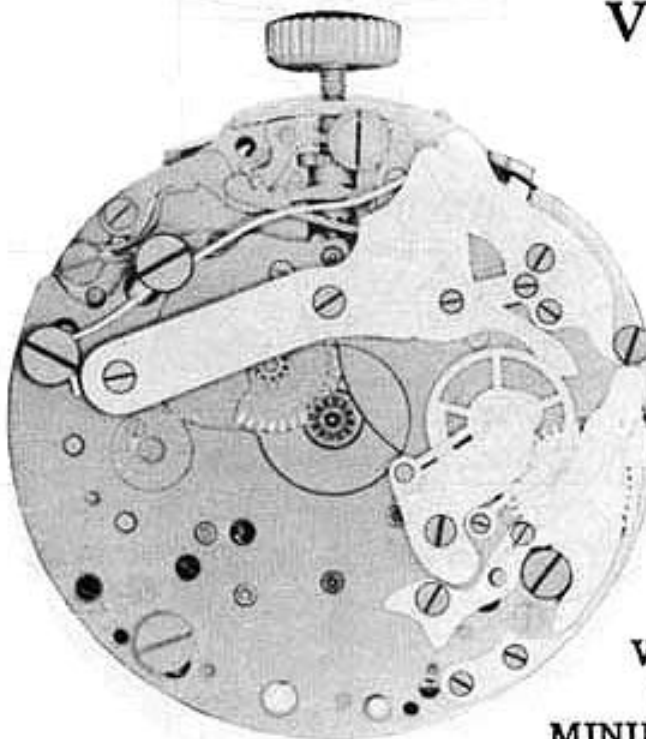
IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Unit

VOLUME 13

Valjoux Calibre 22 is a chronograph with minute register only. When repairing this chronograph with the use of Vol. 13, disregard the section in this Vol. from pages 1 to 14 inclusive, that covers the repair of an hour register mechanism. Only use the section in Vol. 13 designated for repairing the minute register mechanism.



14L



20

**VALJOUX
CAL. 22
MINUTE REGISTER**

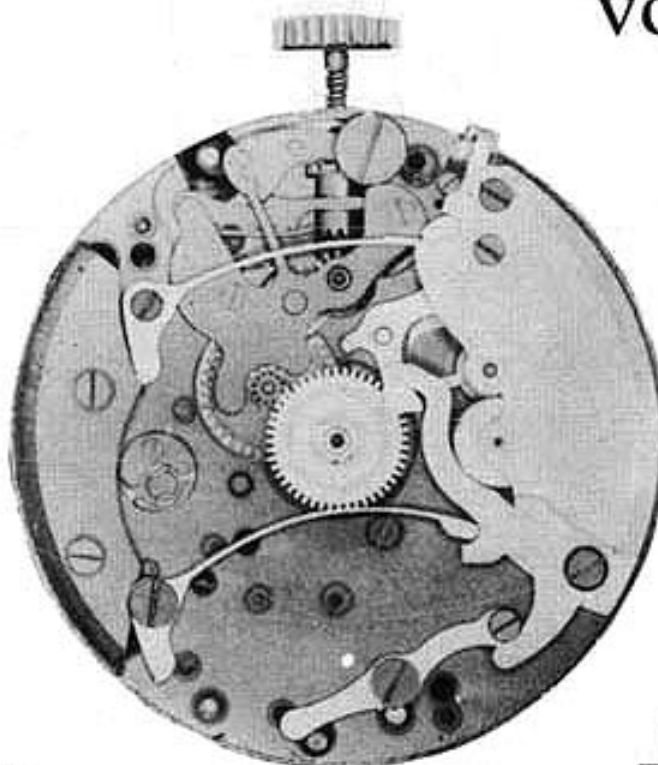
**VALJOUX
CAL. 71
MINUTE REGISTER
AND HOUR REGISTER**

IDENTIFICATION OF CHRONOGRAPH



Esombl. O-Snaf

VOLUME 14



12L
LEMANIA
CAL. CH27C12
MINUTE REGISTER
AND HOUR REGISTER



12L
TISSOT
CAL. 27.41H
MINUTE REGISTER
AND HOUR REGISTER

IDENTIFICATION OF CHRONOGRAPH



Essemtt-O-Sraf
VOLUME 17



**12L
MOVADO**



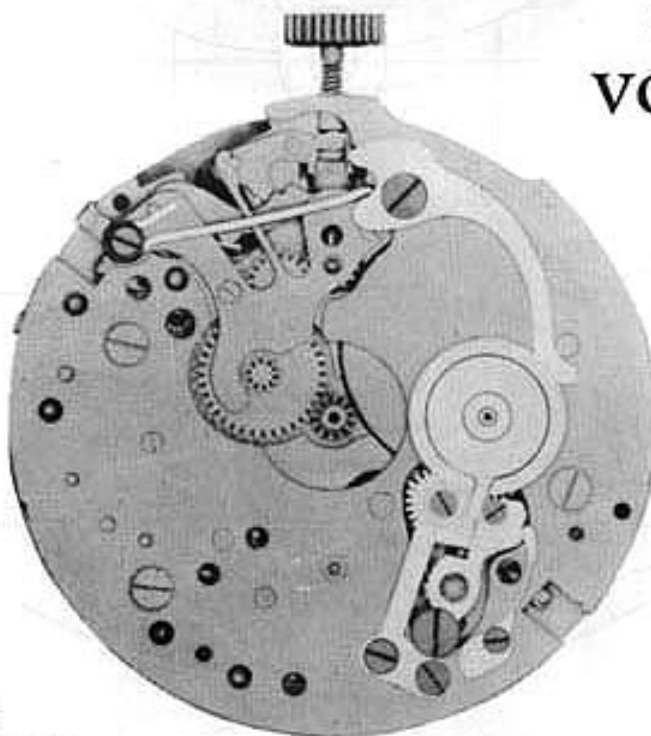
**CAL. 95-M
MINUTE REGISTER
AND HOUR REGISTER**

IDENTIFICATION OF CHRONOGRAPH



Essemble O'Etat

VOLUME 18



Cal. 281 - 12L
Cal. 381 - 12-1/4L
Cal. 283 - 13L
Cal. 383 - 13L
Cal. 481 - 14-1/4L

UNIVERSAL

**ALTERNATE
SETTING PARTS**



**COMPAX
MINUTE REGISTER
AND HOUR REGISTER**

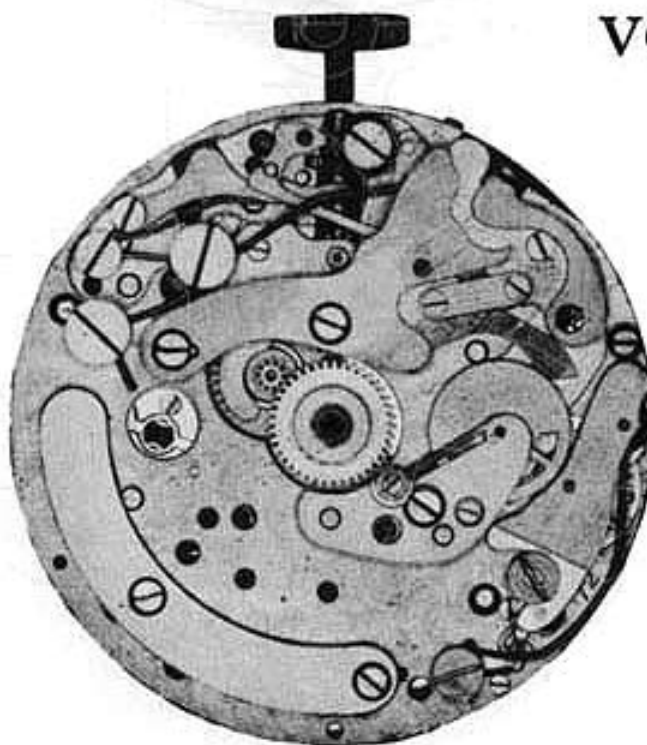
IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Engr

VOLUME 21

When repairing the chronograph identified on this page, disregard the section in Vol. 21 from pages 1 to 15 inclusive, that covers the repair of a calendar mechanism. Only use the section in Vol. 21 designated for repairing the minute register and hour register mechanism, which is identified on this page.



13L

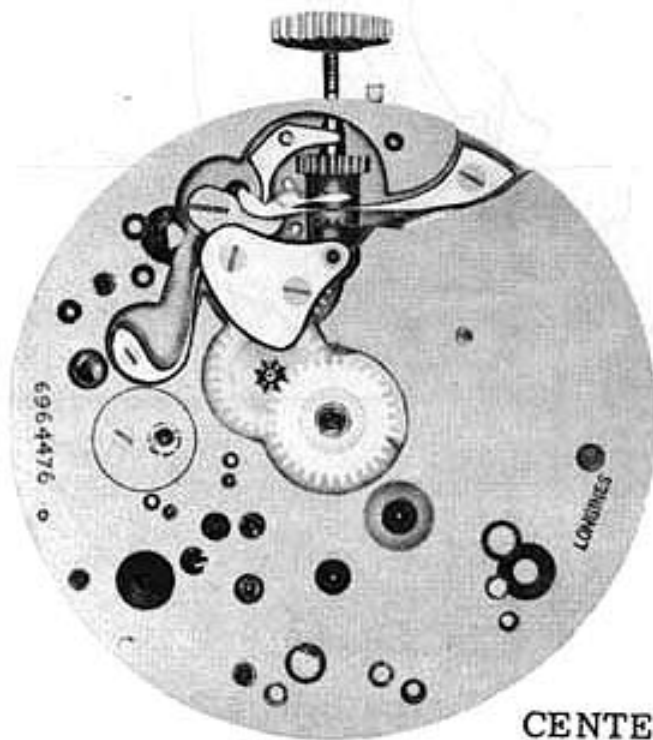


**VALJOUX
CAL. 72
MINUTE REGISTER
AND HOUR REGISTER**

IDENTIFICATION OF CHRONOGRAPH



Esombl-O-Saat
VOLUME 22



**13L
LONGINES**

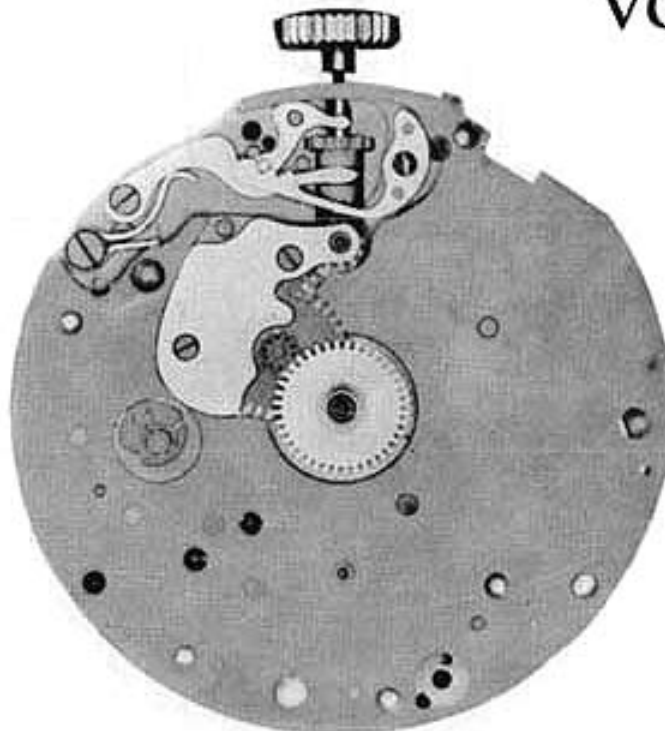


**CENTER MINUTE
REGISTER CHRONOGRAPH
AND HOUR REGISTER
CAL. 13ZN**

IDENTIFICATION OF CHRONOGRAPH



Ensemble O-Snap
VOLUME 10



14L



**VALJOUX
CAL. 84
MINUTE REGISTER
AND SPLIT SECOND**

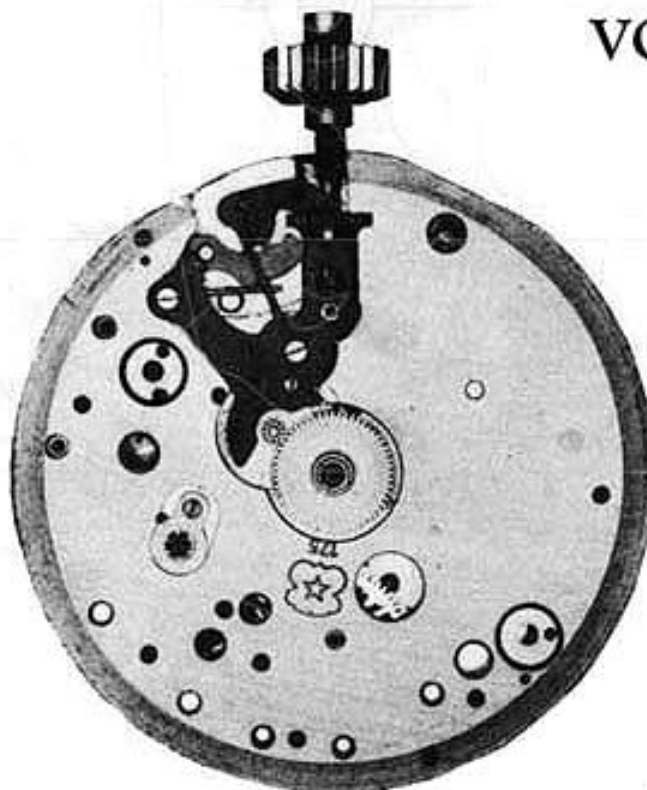
IDENTIFICATION OF CHRONOGRAPH



Essemblé O'Eruf

VOLUME 23

When repairing the chronograph identified on this page, disregard the section in Vol. 23 from pages 1 to 11 inclusive, that covers the repair of an hour register mechanism. Only use the section in Vol. 23 designated for repairing the minute register and split second mechanism, which is identified on this page.



14L



VENUS
CAL. 179
MINUTE REGISTER
AND SPLIT SECOND

IDENTIFICATION OF CHRONOGRAPH



Esomble-O-Graf

VOLUME 23



14L



28

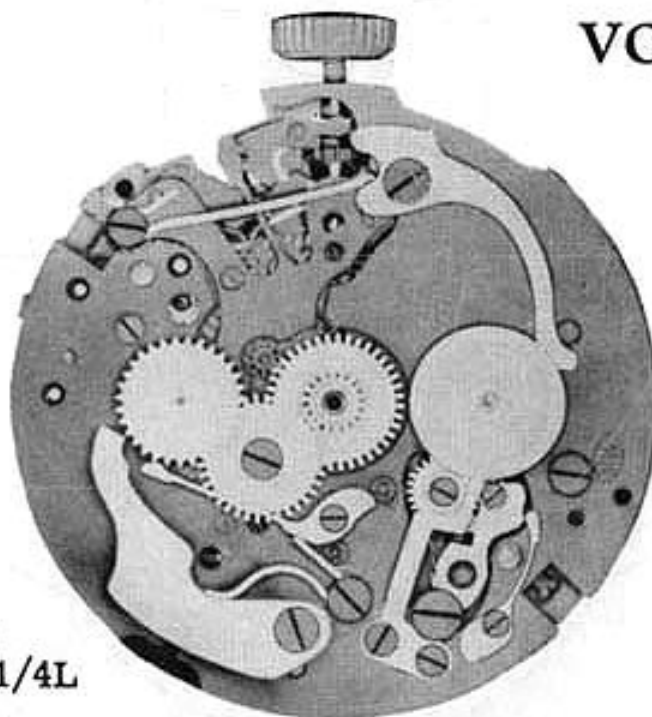
VENUS
CAL. 185
Minute Register, Hour
Register and Split Second

IDENTIFICATION OF CHRONOGRAPH



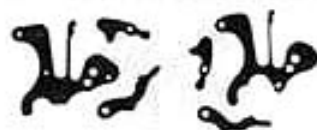
Ensemble O-Trap

VOLUME 20



Cal. 281 - 12L
Cal. 381 - 12-1/4L
Cal. 283 - 13L
Cal. 383 - 13L
Cal. 481 - 14-1/4L

**ALTERNATE
SETTING PARTS**



UNIVERSAL

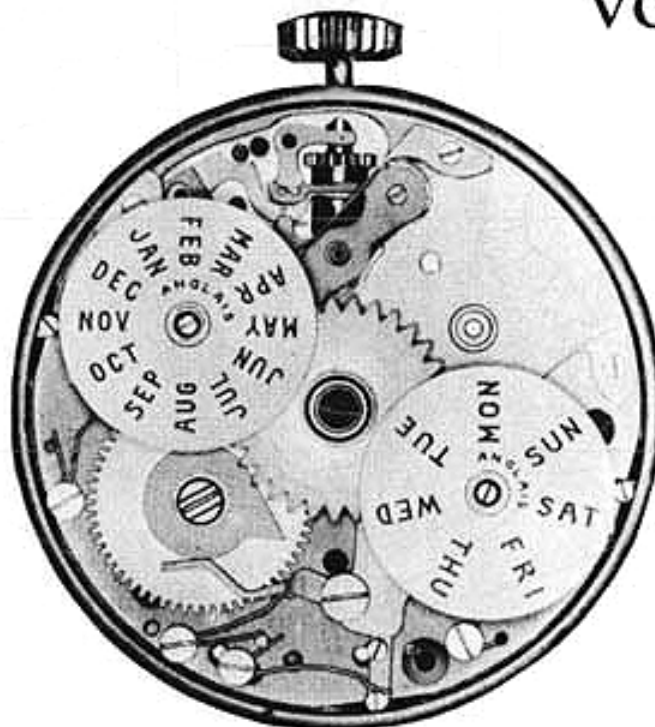
DATO-COMPAX
Minute Register, Hour
Register and Date Mechanism

IDENTIFICATION OF CHRONOGRAPH



Esomble O'Grady

VOLUME 26



14L
ANGELUS



CHRONODATO
CAL. 217
MINUTE REGISTER AND
CALENDAR MECHANISM

IDENTIFICATION OF CHRONOGRAPH



Essemblé-O-Graph

VOLUME 21



VALJOUX
Calibers 88 and 90 come with an added feature, Moon Phases, which necessitates a few added parts. Vol. 21 will cover the repair of the above two Calibers, with the exception of the Moon Phases mechanism.

13L



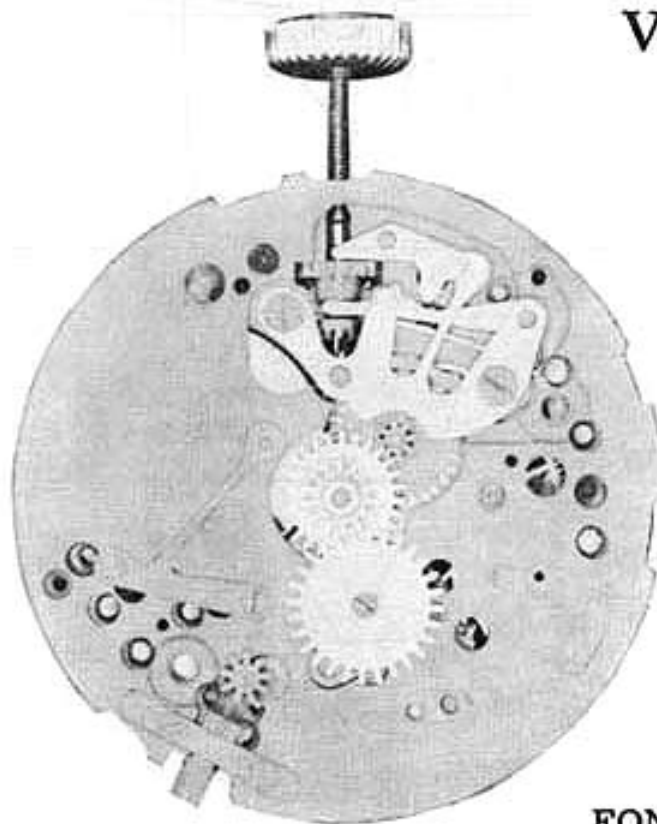
VALJOUX
CAL. 72C - Minute Register, Hour Register and Calendar Mechanism.

IDENTIFICATION OF DATO-GRAPH



Esomble O-Sat

VOLUME 6



11-1/2L



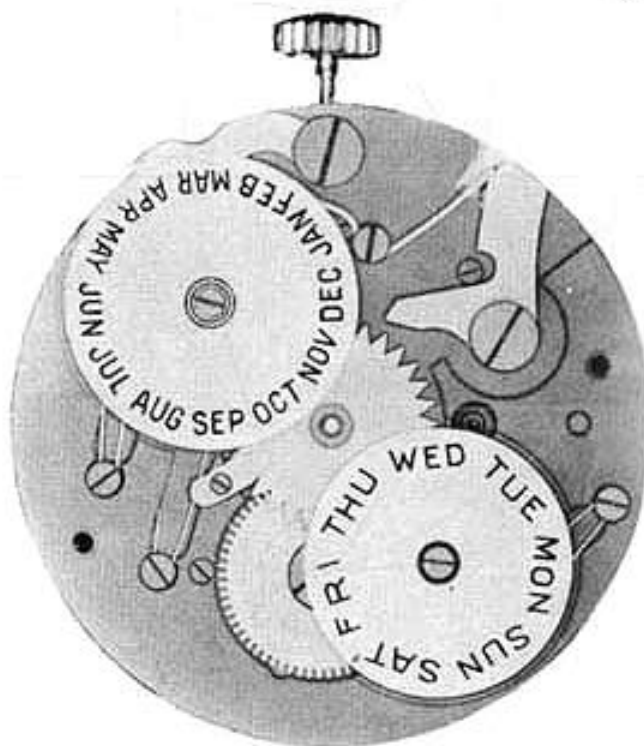
121

**FONTAINE-MELTON
CAL. 205
DATO - GRAPH**

IDENTIFICATION OF CALENDOGRAPH



Esombl-O-Snap
VOLUME 16



10-1/2L
MOVADO



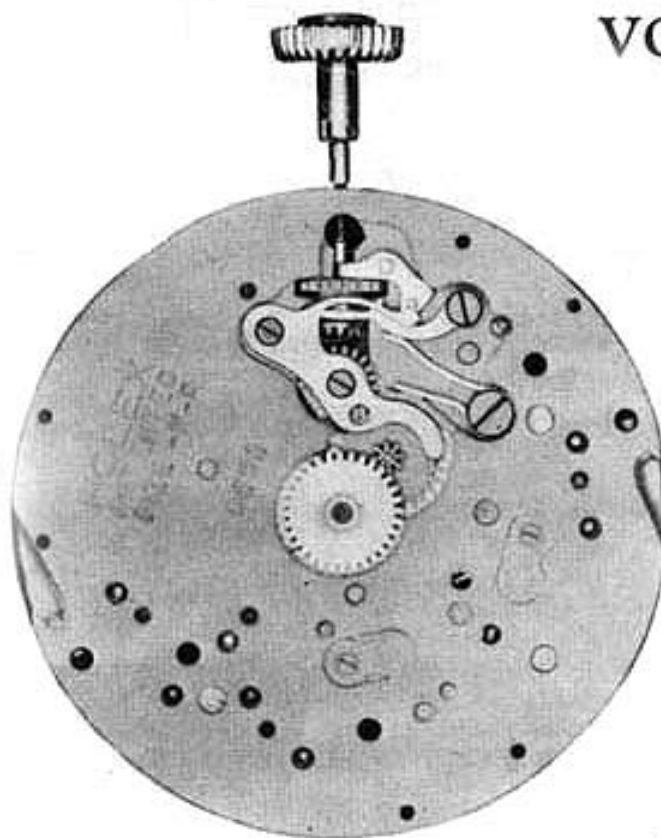
CAL. 475 CLD
CALENDOGRAPH

IDENTIFICATION OF SELF WINDER



Esomblt O-Graf

VOLUME 19



ROLEX
OYSTER



PERPETUAL
CHRONOMETER
(SELF WINDER)

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ESEMBL-O-GRAF

The

CHRONOGRAPH WATCH

Mainspring Guide



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THINGS YOU SHOULD KNOW ABOUT THE ESEMBL-O-GRAF METHOD OF INSTRUCTION

Whenever we release any publication for the benefit of the watchmaker, now or in the future, you can be sure that it has been planned and written in accordance with the Esembl-O-Graf time-saving methods. In our research work we strive for perfection, not only in obtaining the information, but also in presenting the information to you in the simplest, most direct form.

Once the outline of a particular text is down on paper, our Laboratory technicians rewrite the text over and over again until they have eliminated all unnecessary words that waste time and space. We realize that the busy watchmaker has no time to study; that whatever he has to read must be short and to the point. Thus, you will find that once you have read the brief instructions for any Esembl-O-Graf books, you can obtain all information quickly thereafter.

TESTIMONIALS PROVE SUCCESS

That this method of instruction is practical, is proved by the thousands of letters we have received from watchmakers, telling of their success in repairing chronograph watches with the Esembl-O-Graf Library. All this would not have been possible if the work had not been planned with one thought in mind: that because the watchmaker has no time to study, the instruction book must be used on the job and laid back on the shelf until again needed.

The Esembl-O-Graf system is more than an invention or an idea. Its success is due largely to the fact that, regardless of time or expense, the books are written over and over again until we have established beyond doubt, by repeated testing, that the method prescribed actually saves time. The Esembl-O-Graf Library is so planned that each operation must minimize the chances of breaking or injuring a part. Here, again, repeated trial-and-error of research proves the advantage of assembling one part in preference to another which, at first observation, might just as well come first in the assembly sequence.

PROCEDURE PROTECTS WATCHMAKER

And so, as a result of this careful research, there is a definite reason for the disassembly and assembly procedure of every part, protecting the watchmaker who may not be as thoroughly familiar

with the chronograph as he is with the regular timepieces.

Most Horological books are over-written in our estimation. Any writer can write fluently about how a certain task should be accomplished, and many a thick volume of instructions has been written in this manner. But we have found that this unintended "padding" of textual material has actually detracted from the value of many otherwise good books. We know that the only book that will be any good to the watchmaker, is a book which is written with difficulty a book which gives all necessary information in the least possible number of words, in the simplest possible manner, and with the least number of pages required to do the job.

Therefore, after you use the Esembl-O-Graf, you will readily appreciate the concentrated instructions therein and the hundreds of infinite details molded into a couple of short paragraphs for each and every part. You will also observe that in no instance do we continue instructions on another page, as the instructions for each part are confined in all cases to the page opposite the Esembl-O-Graf chart.

The research work to produce this worlds first chronograph course, required two years with the help of fourteen technicians to assist the authors and inventors of the chart system and instructions.

A large percentage of this time was consumed in the re-writing, testing and re-testing of the actual bench work. This was done with one thought in mind, the Esembl-O-Graf Library must work, and it must be perfect, without a flaw that would tend to slow up completing the disassembly and the re-assembly and adjusting, oiling, etc., of the chronograph mechanism.

Otherwise, the books would have been too thick and cumbersome, and not practical to use on the bench.

A PERSONAL MESSAGE FROM THE ESEMBL-O-GRAF RESEARCH LABORATORY

In order to be sure of the correct size of mainspring for the various calibers of chronographs, we ordered each model chronograph from the manufacturer. After receiving these chronographs, we checked each one for rate and length of run to be sure that the mainspring in these chronographs performed satisfactorily. Then we disassembled each chronograph and measured the width, strength and length of the mainspring.

The reason for going to such lengths to obtain the mainspring size is because in the past we have noted that the size of mainspring the manufacturer recommended for the various caliber chronographs was in many cases different than the size of the mainspring actually placed in the chronograph by the manufacturer or the assembler.

In general, the mainspring found in the chronographs was shorter and stronger than the mainspring recommended by the manufacturer. Thus in order to give a practical list of sizes for each chronograph, we have listed in this book the size of the original mainspring found in each caliber chronograph to perform satisfactorily.

In addition to the mainspring sizes given in this book, we have listed the least number of parts that should be removed from each caliber chronograph to replace a mainspring. This of course is only for the owners of Esembl-O-Graf Libraries, as the repairman must have the particular Volume for the chronograph in order to understand the procedure.

Most of the following information on mainsprings is generally known but we thought it would be worth while for even the oldtimer to review all details, mainly because the fitting of a mainspring to a chronograph is considerably more serious than for a regular timepiece due to many extra parts having to be removed, should you find that the mainspring you inserted did not function properly.

THE HEART OF A WATCH

Since the function of the mainspring is to produce the motive power to run the watch, it is the mainspring that is usually referred to as the heart of the watch.

For the proper functioning of the mainspring in any watch, and for the proper functioning of the watch, the mainspring must be correct in width, thickness and length, and be of correct shape. Too much emphasis cannot be placed on the importance of this when replacing a mainspring.

Since, as stated, the size and shape of the mainspring is so important, it would be worth while to consider generally what effect the dimensions and shape of the mainspring can have upon a watch.

It is generally known that the width and thickness of the mainspring determines the strength of the spring. The width of the mainspring is determined by the height of the barrel. If the mainspring is too wide, it may prevent the barrel cap from being replaced or if the cap is replaced, the mainspring would not have sufficient clearance and would rub the cap and bottom of the barrel. This would cause the coils of the mainspring to bind, reducing the power delivered to the train, eventually causing the watch to stop. The clearance of the mainspring in the barrel should be about .08 to .10 of a millimeter.

If the thickness of the mainspring, usually referred to as the strength, is not correct, the proper oscillation of the balance may not be attained. Too thin a mainspring will cause too small an oscillation of the balance, while on the other hand, too thick a mainspring will cause too great an oscillation.

The length of the mainspring also plays an important part in the function of the watch. The length of the mainspring controls the length of time the watch will run. Too long a mainspring will give the same effect as that of too short a mainspring. If too long a mainspring is placed in the barrel, there would not be sufficient space in the barrel for all the coils to be wound fully. Thus, only a portion of the mainspring could be wound, giving the same effect as too short a mainspring. In either case, too long or too short a mainspring would prevent the

watch from running the prescribed length of time. A mainspring, generally speaking, should fill about one third of the barrel when it is the correct length. Of course, in a given barrel, if a thicker mainspring is replaced, it must also be shorter in order that too large an area of the barrel is not filled by the mainspring. It is always wiser when selecting a mainspring for a watch, for which the size is not listed, to use as weak and as long a mainspring as possible, because you will then be assured of more equal power as the watch runs down, and a longer run of the watch.

Finally, the shape of the mainspring must be considered. If the mainspring is set, a new one should be replaced. To determine if a mainspring is set, observe the inner coils of the spring. If these coils do not spiral, and the complete diameter of the spring is not one-seventh of its length, the mainspring is set, and a new one should be replaced. The reason for placing such importance on the spiral of the inner coils of the mainspring is because these inner coils supply the power to run the watch during the last hours, and unless these coils are in good shape, they will cause a great change in the oscillation of the balance due to the loss of power as the watch runs down.

INSTRUCTIONS FOR INSTALLATION OF MAINSPRINGS

When replacing a mainspring in a watch or chronograph, care should be taken that the mainspring is not damaged. One of the most frequent causes of mainspring breakage is due to kinks in the mainspring. Kinks in the mainspring are many times caused by an improper mainspring winder. If the hook of the tool arbor protrudes too far beyond the eye of the spring, it should be filed or stoned down until it is barely over the thickness of the mainspring. Thus, the hook cannot cause any undue tension in the coils placed over it.

Another cause for breakage, is the practice of cleaning the spring in the cleaning machine. The mainspring should not be brought into contact with Benzine, Benzol, or similar rinsing agents. For cleaning a mainspring, we use a leather-tipped tweezer that was dipped in mainspring oil (Moebius Oil).

When winding the spring into the mainspring winder barrel, be sure there is enough room to take all the coils, otherwise the eye of the mainspring may break out.

Finally, care should be taken to place the barrel cover correctly onto the barrel. The barrel cover should be replaced in the same position it was in when removed. This is to center the arbor correctly. Also, the barrel cover should snap onto the barrel. If it does not snap onto the barrel, it may come off later in the watch and give trouble.

INSTRUCTIONS FOR ESTIMATING THE COST OF REPLACING A MAINSPRING IN A CHRONOGRAPH

1. Identify the chronograph with the use of the Chronograph Calibre Guide book. Once the page number is found on which the chronograph in question is identified, you can then refer to the estimating table on the following page for the same page number and you will find listed the time it should take to replace a mainspring in that particular chronograph.

2. Assume a flat rate, say \$4.00 per hour for the work required, plus the cost of the mainspring.

For example, we will say that a mainspring is to be replaced in the type of chronograph identified on page 8 of the Chronograph Calibre Guide. By referring to the table on the following page for page 8, you will find that with the use of Volume 9, the time to complete a mainspring job for this chronograph would be one hour. Therefore, the cost of replacing a mainspring in this instance would be \$4.00, plus the cost of the mainspring.

In the estimating table, the time was computed for replacing a mainspring using the Esembl-O-Graf system, which is outlined for each caliber chronograph in this book.

FACTORS AFFECTING HOURLY RATE

Certain factors must be considered in determining the hourly rate watchmakers should charge for chronograph work. Much depends on store overhead; and if top wages are paid for this work, a time charge of \$5.00 or \$6.00 per hour may be necessary. In determining this amount, both ethical and practical aspects of the question are significant.

You cannot afford, as a watchmaker and a business man, to quote exorbitant charges on your regular watch work for fear of hurting your business volume, especially in jewelry department sales. It is only common sense that these same considerations apply to estimates on chronograph work.

One must remember that the watchmaker who takes in the work and does the estimating can make or break a store if that department is left entirely to his discretion. Fair and just estimates on repairs affect sales in your store, and this is especially true under normal business conditions.

However, we should realize that a higher hourly rate for chronograph work than for ordinary watch work is fully justified. This is obvious because the chronograph technician demands — and should receive — a higher salary, not only for repairing chronographs, but because he enables the jeweler to open an entirely new avenue of income in chronograph watch sales. If chronographs have previously been sold, the volume of this business will naturally increase with intelligent and modern chronograph repair procedure.

If a definite procedure is not followed in the process of replacing a mainspring, more than likely, many parts will be removed that could as well have stayed in place. This will naturally increase the time it will take to replace a mainspring.

From tests made, we have found that if the Esembl-O-Graf system is not used, it will require up to twice the time to replace a mainspring in a chronograph.

The following Estimate Table time was computed for each caliber chronograph by actual test of watchmakers at the bench using the Esembl-O-Graf system.

MAINSRING ESTIMATE TABLE

Page	Time to Complete Mainspring Job
1	With the use of Volume 1 ----- 50 Minutes
2	With the use of Volume 2 ----- 50 Minutes
3	With the use of Volume 3 ----- 45 Minutes
4	With the use of Volume 4 ----- 55 Minutes
5	With the use of Volume 5 ----- 50 Minutes
6	With the use of Volume 7 ----- 55 Minutes
7	With the use of Volume 8 ----- 55 Minutes
8	With the use of Volume 9 ----- 1 Hour
9	With the use of Volume 9 ----- 1 Hour
10	With the use of Volume 11 ----- 1 Hour 5 Minutes
11	With the use of Volume 12 ----- 55 Minutes
12	With the use of Volume 14 ----- 1 Hour 5 Minutes
13	With the use of Volume 15 ----- 1 Hour 15 Minutes
14	With the use of Volume 17 ----- 45 Minutes
15	With the use of Volume 18 ----- 55 Minutes
16	With the use of Volume 26 ----- 1 Hour 5 Minutes
17	With the use of Volume 27 ----- 55 Minutes
18	With the use of Volume 8 ----- 1 Hour
19	With the use of Volume 9 ----- 1 Hour 10 Minutes
20	With the use of Volume 13 ----- 55 Minutes
21	With the use of Volume 14 ----- 1 Hour 5 Minutes
22	With the use of Volume 17 ----- 1 Hour
23	With the use of Volume 18 ----- 1 Hour
24	With the use of Volume 21 ----- 55 Minutes
25	With the use of Volume 22 ----- 1 Hour 10 Minutes
26	With the use of Volume 10 ----- 1 Hour 5 Minutes
27	With the use of Volume 23 ----- 1 Hour 20 Minutes
28	With the use of Volume 23 ----- 1 Hour 20 Minutes
29	With the use of Volume 20 ----- 1 Hour
30	With the use of Volume 26 ----- 1 Hour 5 Minutes
31	With the use of Volume 21 ----- 55 Minutes
32	With the use of Volume 6 ----- (Same as ordinary watch)
33	With the use of Volume 16 ----- (Same as ordinary watch)
34	With the use of Volume 19 ----- 50 Minutes

COMMENTS ON THE USE OF THIS BOOK

- A. To replace a mainspring in a chronograph, there are certain parts that must be removed from the chronograph mechanism in order that the barrel bridge can be removed. Since it is not necessary to remove all the parts of the chronograph mechanism to replace a mainspring, much time could be saved if the repairman knew exactly which parts are necessary to be removed, and the proper sequence for the removal of these parts. This is one of the main purposes of this book, to list the least number of parts that should be removed from each caliber chronograph mechanism in order to save time, and eliminate all hazards when replacing a mainspring.

By following this method of replacing a mainspring, outlined for each caliber chronograph in this book, you will remove no more parts from the chronograph than is necessary, and in a sequence that will eliminate the difficulties that may normally be encountered when a definite procedure is not followed.

- B. Another purpose of this book is to list the mainspring sizes of each caliber chronograph. These mainspring sizes are listed at the bottom of each chronograph illustration page in this book.

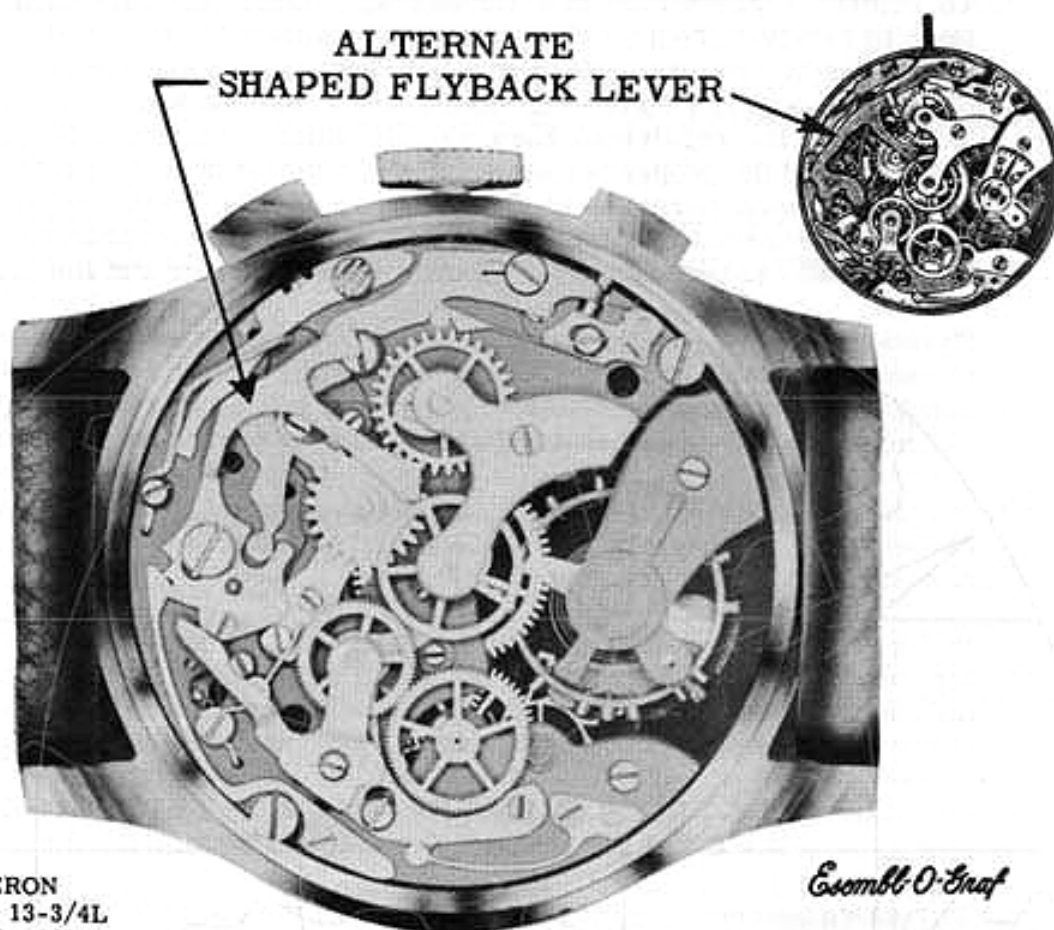
In the past, it was difficult, if not impossible, to find the mainspring size for chronographs, as they were not listed in the material catalogue. Now for the first time, a list is compiled for the mainspring size for each caliber chronograph, which in itself will be a great aid to the chronograph repairman.

INSTRUCTIONS FOR THE USE OF THIS BOOK WHEN REPLACING A MAINSPRING

To replace a mainspring in a chronograph with the use of this book, proceed as follows:

1. Identify the chronograph with the use of the Chronograph Calibre Guide Book. Once the page is found on which the chronograph in question is identified, you can then turn to the same page number in this Mainspring Book, and on that page you will find a complete list of parts that must be removed from that caliber chronograph mechanism to replace a mainspring. Also on that page, you will find the size of mainspring for that caliber chronograph.
2. Remove the parts in the sequence they are listed. Since only the Esembl-O-Graf number is given, for complete identification of the parts listed, refer to the Volume in the Esembl-O-Graf Library that covers the repair of the chronograph in which a mainspring is to be replaced. When all the parts listed are removed, remove the barrel bridge, the barrel, and replace the mainspring.
3. After replacing the barrel and the barrel bridge, then proceed to assemble the chronograph parts. When assembling the chronograph parts, use the reverse procedure of the disassembly. In other words, the last part to be removed, will be the first part to be replaced, etc.

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



LANDERON
CAL. 51 - 13-3/4L
CAL. 55 - 14L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 1

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 6
together with Part No. 5 and
Part No. 4 removed as one
unit

Esembl-O-Graf Part No. 7
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 13
Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 16

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.35	4-1/2	.15	7	14-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VENUS
CAL. 170 - 12-1/2L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 2

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 2
Esembl-O-Graf Part No. 3
Esembl-O-Graf Part No. 4
Esembl-O-Graf Part No. 5
Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 9

Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 17
this part does not have to be
removed but screw SS-10 that
helps hold this part in place
is a plate screw. This part
will stay in place when screw
is removed

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.85	9-1/2	.12	9-1/2	13-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



LANDERON
CAL. 48 - 13-3/4L
CAL. 54 - 14L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 3

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 3
Esembl-O-Graf Part No. 4

Esembl-O-Graf Part No. 5
Esembl-O-Graf Part No. 10
together with Part No. 8 and
Part No. 7 removed as one
unit
Esembl-O-Graf Part No. 15

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.35	4-1/2	.15	7	14-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 23 - 13L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 4

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 2
Esembl-O-Graf Part No. 3
Esembl-O-Graf Part No. 4
Esembl-O-Graf Part No. 5
Esembl-O-Graf Part No. 7

Esembl-O-Graf Part No. 15
together with Part No. 13 and
Part No. 12 removed as one
unit
Esembl-O-Graf Part No. 17
Esembl-O-Graf Part No. 19
together with Part No. 18 re-
moved as one unit
Esembl-O-Graf Part No. 20

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.14-1/2	7-1/2	14

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 69 - 10-1/2 L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 5

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 7

Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 16
together with Part No. 14 and
Part No. 13 removed as one
unit

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.50	6	.10	11	12

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 23 - 13L
MINUTE REGISTER
(OLD MODEL)

Esembl-O-Graf
VOLUME 7

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 3
Esembl-O-Graf Part No. 4
Esembl-O-Graf Part No. 5
Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 8
Esembl-O-Graf Part No. 15

Esembl-O-Graf Part No. 16
together with Part No. 14 and
Part No. 13 removed as one
unit
Esembl-O-Graf Part No. 17
Esembl-O-Graf Part No. 19
together with Part No. 18 re-
moved as one unit
Esembl-O-Graf Part No. 20

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.14-1/2	7-1/2	14

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



UNIVERSAL
Cal.285-14L Cal.287-15L
Cal.385-14L Cal.387-15L
Cal.386-14L Cal.292-15-5/6L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 8

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 7
Esembl-O-Graf Part No. 8

Esembl-O-Graf Part No. 9
Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 13
Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 21

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.15	7	16-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VENUS
CAL. 150-13L
CAL. 175-14L
MINUTE REGISTER
(OLD MODEL)

These two springs of
this shape are on all
models produced be-
fore 1947.

Esembl-O-Graf
VOLUME 9

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 2
Esembl-O-Graf Part No. 5
together with Part No. 4 and
Part No. 3 removed as one
unit
Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 7

Esembl-O-Graf Part No. 8
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 16
Esembl-O-Graf Part No. 20
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 23
Esembl-O-Graf Part No. 25
together with all the chrono-
graph parts fitted on it, re-
moved as one unit.

MAINSRING SIZE

	WIDTH		STRENGTH		LENGTH
	Metric	Dennison	Metric	Dennison	Inches
Cal. 150-13L	1.50	6	.13	9	15-3/4
Cal. 175-14L	1.60	7	.15	7	16-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VENUS
CAL. 150-13L
CAL. 175-14L
MINUTE REGISTER
(NEW MODEL)

These two springs of
this shape are on all
models produced
since 1947.

Esembl-O-Graf

VOLUME 9

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 2
Esembl-O-Graf Part No. 5
together with Part No. 4 and
Part No. 3 removed as one
unit
Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 7

Esembl-O-Graf Part No. 8
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 16
Esembl-O-Graf Part No. 20
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 23
Esembl-O-Graf Part No. 25
together with all the chrono-
graph parts fitted on it, re-
moved as one unit.

MAINSRING SIZE

	WIDTH		STRENGTH		LENGTH
	Metric	Dennison	Metric	Dennison	Inches
Cal. 150-13L	1.50	6	.13	9	15-3/4
Cal. 175-14L	1.60	7	.15	7	16-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



LEMANIA CAL. 15TL-2P-15L
MINUTE REGISTER
TISSOT CAL. 33.3 - 14-3/4L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 11

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 2
Esembl-O-Graf Part No. 3

Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 7
Esembl-O-Graf Part No. 13
Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 15

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.45	5-1/2	.16	6-1/2	13-3/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



MIDO
CAL. 1300 - 13L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 12

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 5
together with Part No. 4 and
Part No. 3 removed as one
unit
Esembl-O-Graf Part No. 8
Esembl-O-Graf Part No. 10

together with Part No. 9 re-
moved as one unit
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 19
Esembl-O-Graf Part No. 20
Esembl-O-Graf Part No. 21
(just loosen screw and turn
this part, so that the next part
can be removed)
Esembl-O-Graf Part No. 22

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.40	5	.13	9	14-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



LEMANIA CAL. CH27-12L
MINUTE REGISTER
TISSOT CAL. 27.41-12L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 14

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 16
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 22

Esembl-O-Graf Part No. 23
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 25
Esembl-O-Graf Part No. 27
Esembl-O-Graf Part No. 31
(in order to remove this part,
Part No. 30 must be moved
aside)

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.12	9-1/2	12-3/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



PIERCE
CAL. 134 - 13L
MINUTE REGISTER

Esembl-O-Graf

VOLUME 15

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 2
Esembl-O-Graf Part No. 3
Esembl-O-Graf Part No. 4
Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 13
Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 16
(before replacing Part No. 16,
the screw SS-4 which holds
Part No. 12 in place should
be loosened about one turn.
This will lower Part No. 12,
making it possible for Part

No. 16 to be replaced without
any tension on this Part.)

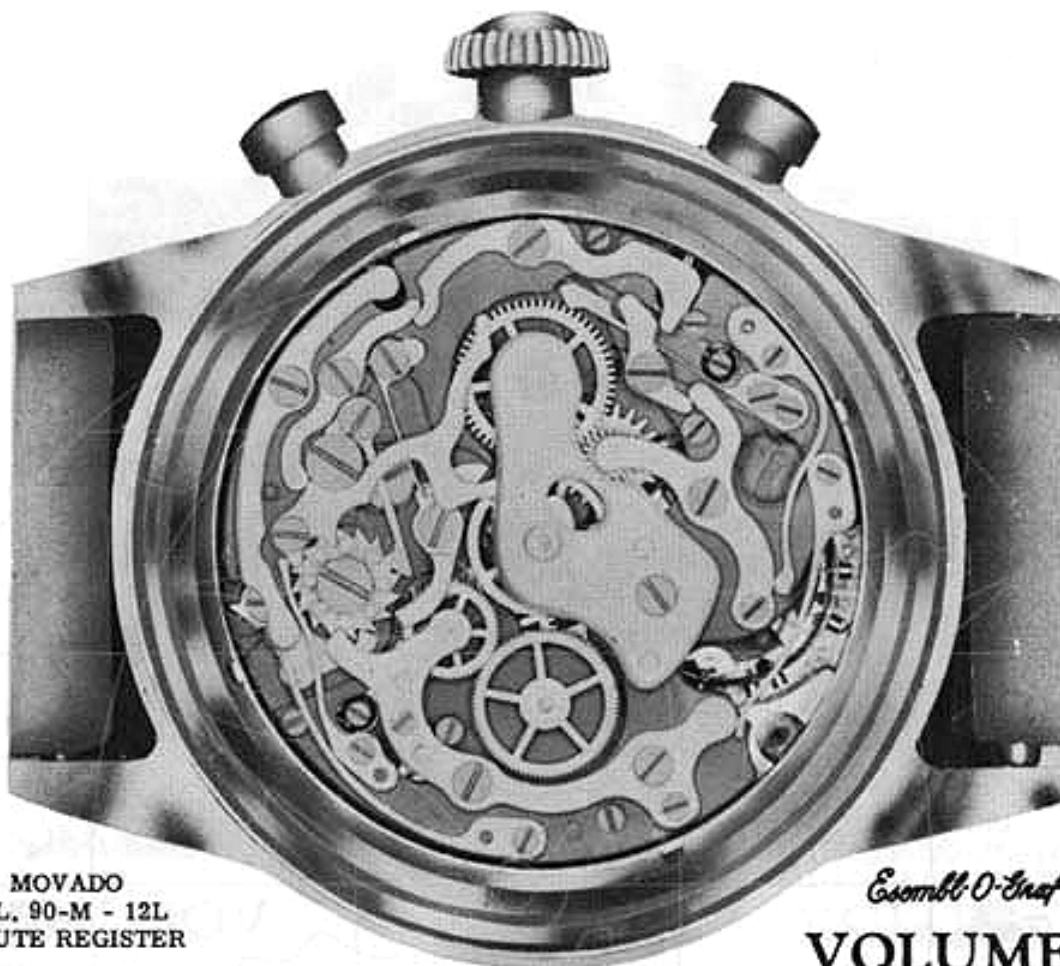
The screw SS-4 should not be
tightened until Part No. 13 is
replaced.

Esembl-O-Graf Part No. 17
Esembl-O-Graf Part No. 21
(This part does not have to be
removed if a large brass pin
is placed through the hole in
this part and into the pivot
hole in the plate. This will
hold Part No. 21 in place.)
When assembling the chrono-
graph, before replacing Part
No. 17, the brass pin must be
removed from Part No. 21.

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.50	6	.11	10	12-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



MOVADO
CAL. 90-M - 12L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 17

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 35
together with all the chrono-
graph parts fitted on it, re-
moved as one unit

When replacing Part No. 35
together with all the parts fit-
ted on it, direct your attention

on the following parts so that
they return to their original
position without causing da-
mage or being damaged. Part
No. 31, Part No. 34, Part No.
22, and Part No. 14
Esembl-O-Graf Part No. 26
Esembl-O-Graf Part No. 27
Esembl-O-Graf Part No. 31

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.11	10	15-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



UNIVERSAL
Cal.281-12L Cal.381-12-1/4L
Cal.283-13L Cal.481-14-1/4L
Cal.383-13L
MINUTE REGISTER

Esembl-O-Graf

VOLUME 18

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 9
Esembl-O-Graf Part No. 14
together with Part No. 13 and
Part No. 12 removed as one
unit.

Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 17
together with Part No. 16 re-
moved as one unit
Esembl-O-Graf Part No. 18
Esembl-O-Graf Part No. 23
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 25

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.13	9	13-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



ANGELUS
CAL. 215 - 14L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 26

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 19
Esembl-O-Graf Part No. 23
together with Part No. 22 and
Part No. 21 removed as one
unit
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 26
Esembl-O-Graf Part No. 28

Esembl-O-Graf Part No. 29
Esembl-O-Graf Part No. 30
Esembl-O-Graf Part No. 31
Esembl-O-Graf Part No. 32
together with Part No. 20 re-
moved as one unit
Esembl-O-Graf Part No. 33
Esembl-O-Graf Part No. 34
Esembl-O-Graf Part No. 36
Esembl-O-Graf Part No. 37

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.70	8	.16	6-1/2	15-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 77 - 13L
MINUTE REGISTER

Esembl-O-Graf
VOLUME 27

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 5
Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 9

Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 18
Esembl-O-Graf Part No. 19
Esembl-O-Graf Part No. 20

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.50	6	.13-1/2	8-1/2	14-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



UNIVERSAL
Cal.285-14L Cal.287-15L
Cal.385-14L Cal.387-15L
Cal.386-14L Cal.292-15-5/6L
Minute Register and Hour Register

Esembl-O-Graf
VOLUME 8

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove all hands, the dial,
and the hour wheel
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 7
Esembl-O-Graf Part No. 8
Esembl-O-Graf Part No. 9
Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 13

Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 21

Now refer to Volume 18 and
remove from the dial side of
the chronograph, the screw
SS-4 which holds Part No. 7
in place.

MAINSPRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.15	7	16-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VENUS
CAL. 152 - 13L
CAL. 178 - 14L
MINUTE REGISTER
AND HOUR REGISTER

Esembl-O-Graf

VOLUME 9

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove all hands, the dial,
and the hour wheel

Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 2
Esembl-O-Graf Part No. 5
together with Part No. 4 and
Part No. 3 removed as one
unit

Esembl-O-Graf Part No. 6
Esembl-O-Graf Part No. 7
Esembl-O-Graf Part No. 8
Esembl-O-Graf Part No. 11

Esembl-O-Graf Part No. 16
Esembl-O-Graf Part No. 20
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 23
Esembl-O-Graf Part No. 25
together with all the chrono-
graph parts fitted on it, re-
moved as one unit.

Now refer to Volume 23 and
remove from the dial side of
the chronograph, Part No. 9,
and from the train side of the
chronograph, Part No. 37.

MAINSRING SIZE

	WIDTH		STRENGTH		LENGTH
	Metric	Dennison	Metric	Dennison	Inches
Cal. 152-13L	1.50	6	.13	9	15-3/4
Cal. 178-14L	1.60	7	.15	7	16-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 71 - 14L
MINUTE REGISTER
AND HOUR REGISTER

Esembl-O-Graf
VOLUME 13

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 17
Esembl-O-Graf Part No. 18
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 22
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 27

Esembl-O-Graf Part No. 30
together with Part No. 29 and
Part No. 28 removed as one
unit
Esembl-O-Graf Part No. 31
Esembl-O-Graf Part No. 33
together with Part No. 32 re-
moved as one unit.
Esembl-O-Graf Part No. 34

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.50	6	.16	6-1/2	17-3/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



LEMANIA CAL. CH27C12 - 12L
Minute register and hour register
TISSOT CAL. 27.41H - 12L
Minute register and hour register

Esembl-O-Graf

VOLUME 14

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 16
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 22

Esembl-O-Graf Part No. 23
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 25
Esembl-O-Graf Part No. 27
Esembl-O-Graf Part No. 31
(in order to remove this part,
Part No. 30 must be moved
aside)

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.12	9-1/2	12-3/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



MOVADO
CAL. 95-M - 12L
MINUTE REGISTER
AND HOUR REGISTER

Esembl-O-Graf
VOLUME 17

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove all hands and the dial
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 35
together with all the chrono-
graph parts fitted on it, re-
moved as one unit

When replacing Part No. 35
together with all the parts fit-
ted on it, direct your attention

on the following parts so that
they return to their original
position without causing da-
mage or being damaged. Part
No. 31, Part No. 34, Part No.
22, and Part No. 14

Esembl-O-Graf Part No. 26
Esembl-O-Graf Part No. 27
Esembl-O-Graf Part No. 31

MAINSPRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.11	10	15-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



UNIVERSAL
Cal.281-12L Cal.381-12-1/4L
Cal.283-13L Cal.481-14-1/4L
Cal.383-13L
Minute register and hour register

Esembl-O-Graf
VOLUME 18

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove all hands, the dial,
and the hour wheel

Esembl-O-Graf Part No. 7
(Only the screw SS-4 which
holds this part in place must
be removed. Part No. 7 it-
self does not have to be re-
moved.)

Esembl-O-Graf Part No. 9
Esembl-O-Graf Part No. 14

together with Part No. 13 and
Part No. 12 removed as one
unit.

Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 17
together with Part No. 16 re-
moved as one unit

Esembl-O-Graf Part No. 18
Esembl-O-Graf Part No. 23
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 25

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.13	9	13-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 72 - 13L
MINUTE REGISTER
AND HOUR REGISTER

Esembl-O-Graf
VOLUME 21

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 29
Esembl-O-Graf Part No. 30
Esembl-O-Graf Part No. 31
Esembl-O-Graf Part No. 32
Esembl-O-Graf Part No. 33
Esembl-O-Graf Part No. 35
Esembl-O-Graf Part No. 40
(After Part No. 40 is removed

replace the screw SS-19 that
held this part in place.)
Esembl-O-Graf Part No. 45
together with Part No. 43 and
Part No. 42 removed as one
unit
Esembl-O-Graf Part No. 46
Esembl-O-Graf Part No. 48
together with Part No. 47 re-
moved as one unit
Esembl-O-Graf Part No. 49

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.14-1/2	7-1/2	14

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



LONGINES
CAL. 132N - 13L
CENTER MINUTE
REGISTER CHRONOGRAPH
AND HOUR REGISTER

Esembl-O-Graf
VOLUME 22

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Remove hour register hand
Esembl-O-Graf Part No. 3
Esembl-O-Graf Part No. 4
Esembl-O-Graf Part No. 5
together with Part No. 2 and
Part No. 1 removed as one
unit
Esembl-O-Graf Part No. 7
Esembl-O-Graf Part No. 8
Esembl-O-Graf Part No. 9
Esembl-O-Graf Part No. 10
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 13
Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 19

Now remove intermediary
driving pinion shown as "A"
Illustration 1, Page 30-C.

This pinion can be removed
by placing two small screw-
drivers opposite each other
under the intermediate dri-
ving pinion. One screwdriver
is turned clockwise while the
other screwdriver is turned
counter-clockwise. This will
raise the pinion, freeing it
from the center wheel post.

To remove the plate screw
that is located under the joint
hook, Part No. 23, the joint
hook should be moved to clear
the plate screw.

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.65	7-1/2	.13	9	14-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 84 - 14L
MINUTE REGISTER
AND SPLIT SECOND

Esembl-O-Graf
VOLUME 10

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 1
Esembl-O-Graf Part No. 3
Esembl-O-Graf Part No. 6
together with Part No. 5 and
Part No. 4 removed as one
unit
Esembl-O-Graf Part No. 7

Esembl-O-Graf Part No. 10
together with Part No. 9 and
Part No. 8 removed as one
unit
Esembl-O-Graf Part No. 11
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 17
Esembl-O-Graf Part No. 18
Esembl-O-Graf Part No. 19

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.50	6	.15	7	15-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VENUS
CAL. 179 - 14L
MINUTE REGISTER
AND SPLIT SECOND

Esembl-O-Graf

VOLUME 23

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove split second hand
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 13
Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 16
Esembl-O-Graf Part No. 18
Esembl-O-Graf Part No. 19
Esembl-O-Graf Part No. 20
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 22
Esembl-O-Graf Part No. 25
together with Part No. 24 and
Part No. 23 removed as one

unit

Esembl-O-Graf Part No. 26
Esembl-O-Graf Part No. 27
Esembl-O-Graf Part No. 28
Esembl-O-Graf Part No. 31
Esembl-O-Graf Part No. 36
Esembl-O-Graf Part No. 39
Esembl-O-Graf Part No. 41
together with Part No. 40 re-
moved as one unit
Esembl-O-Graf Part No. 42
Esembl-O-Graf Part No. 44
Esembl-O-Graf Part No. 46
together with all the chrono-
graph parts fitted on it, re-
moved as one unit
Esembl-O-Graf Part No. 47

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.60	7	.15	7	16-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VENUS
CAL. 185 - 14L
Minute Register, Hour
Register and Split Second

Esembl-O-Graf
VOLUME 23

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove all hands, the dial,
and the hour wheel
Esembl-O-Graf Part No. 9
Esembl-O-Graf Part No. 12
Esembl-O-Graf Part No. 13
Esembl-O-Graf Part No. 14
Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 16
Esembl-O-Graf Part No. 18
Esembl-O-Graf Part No. 19
Esembl-O-Graf Part No. 20
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 22
Esembl-O-Graf Part No. 25
together with Part No. 24 and
Part No. 23 removed as one
unit

Esembl-O-Graf Part No. 26
Esembl-O-Graf Part No. 27
Esembl-O-Graf Part No. 28
Esembl-O-Graf Part No. 31
Esembl-O-Graf Part No. 36
Esembl-O-Graf Part No. 37
Esembl-O-Graf Part No. 39
Esembl-O-Graf Part No. 41
together with Part No. 40 re-
moved as one unit
Esembl-O-Graf Part No. 42
Esembl-O-Graf Part No. 44
Esembl-O-Graf Part No. 46
together with all the chrono-
graph parts fitted on it, re-
moved as one unit
Esembl-O-Graf Part No. 47

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.60	7	.15	7	16-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



UNIVERSAL
Cal.281-12L Cal.381-12-1/4L
Cal.283-13L Cal.481-14-1/4L
Cal.383-13L
Minute Register, Hour
Register and Date Mechanism

Esembl-O-Graf

VOLUME 20

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove all hands and the dial
Esembl-O-Graf Part No. 13
(Only the screw SS-7 which
holds this part in place must
be removed. Part No. 13 it-
self does not have to be re-
moved.
Esembl-O-Graf Part No. 15
Esembl-O-Graf Part No. 20
together with Part No. 19 and

Part No. 18 removed as one
unit.
Esembl-O-Graf Part No. 21
Esembl-O-Graf Part No. 23
together with Part No. 22 re-
moved as one unit.
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 29
Esembl-O-Graf Part No. 30
Esembl-O-Graf Part No. 31

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.13	9	13-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



ANGELUS
CHRONODATO
CAL. 217 - 14L
MINUTE REGISTER AND
CALENDAR MECHANISM

Esembl-O-Graf
VOLUME 26

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 19
Esembl-O-Graf Part No. 23
together with Part No. 22 and
Part No. 21 removed as one
unit
Esembl-O-Graf Part No. 24
Esembl-O-Graf Part No. 26
Esembl-O-Graf Part No. 28

Esembl-O-Graf Part No. 29
Esembl-O-Graf Part No. 30
Esembl-O-Graf Part No. 31
Esembl-O-Graf Part No. 32
together with Part No. 20 re-
moved as one unit
Esembl-O-Graf Part No. 33
Esembl-O-Graf Part No. 34
Esembl-O-Graf Part No. 36
Esembl-O-Graf Part No. 37

MAINSPRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.70	8	.16	6-1/2	15-1/4

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CHRONOGRAPH



VALJOUX
CAL. 72C - 13L
CAL. 88 - 13L CAL. 90 - 13L
Minute Register, Hour Register
and Calendar Mechanism

Esembl-O-Graf
VOLUME 21

PARTS THAT MUST BE REMOVED FROM THIS CHRONOGRAPH TO REPLACE A MAINSPRING

Remove movement from case
Remove sweep second hand
Remove minute register hand
Esembl-O-Graf Part No. 29
Esembl-O-Graf Part No. 30
Esembl-O-Graf Part No. 31
Esembl-O-Graf Part No. 32
Esembl-O-Graf Part No. 33
Esembl-O-Graf Part No. 35
Esembl-O-Graf Part No. 40
(After Part No. 40 is removed

replace the screw SS-19 that
held this part in place.)
Esembl-O-Graf Part No. 45
together with Part No. 43 and
Part No. 42 removed as one
unit
Esembl-O-Graf Part No. 46
Esembl-O-Graf Part No. 48
together with Part No. 47 re-
moved as one unit
Esembl-O-Graf Part No. 49

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.30	4	.14-1/2	7-1/2	14

ESEMBLO-GRAPH METHOD OF REPLACING A MAINSPRING IN A DATO-GRAPH



FONTAINE-MELON
CAL. 205 - 11-1/2 L.
DATO - GRAPH

Esembl-O-Graph
VOLUME 6

To replace a mainspring in this Dato - Graph, the same procedure should be followed as is followed when replacing a mainspring in an ordinary watch. Since the Dato - Graph mechanism is on the dial side of this movement, this mechanism does not interfere with the removing of the barrel bridge to replace a mainspring.

MAINSRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.45	5-1/2	.10-1/2	10-1/2	13-1/2

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A CALENDOGRAPH



MOVADO
CAL. 475 CLD - 10-1/2L
CALENDOGRAPH

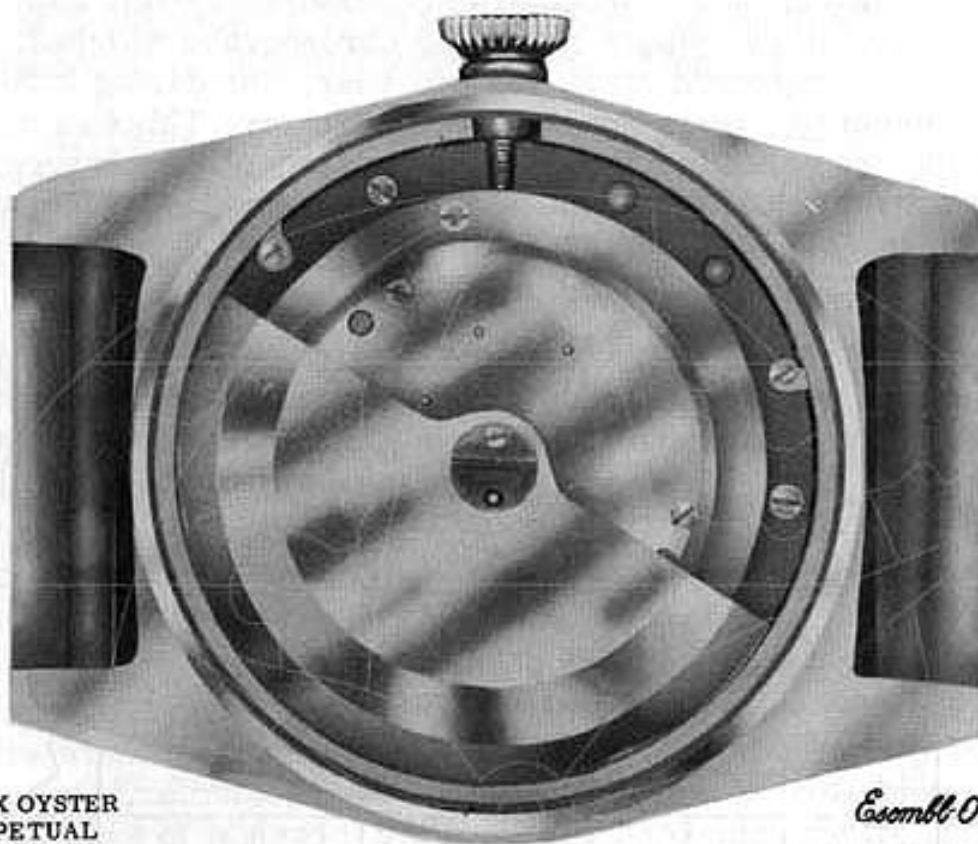
Essemblo-O-Graf
VOLUME 16

To replace a mainspring in this Calendograph, the same procedure should be followed as is followed when replacing a mainspring in an ordinary watch. Since the Calendograph mechanism is on the dial side of this movement, this mechanism does not interfere with the removing of the barrel bridge to replace a mainspring.

MAINSPRING SIZE

WIDTH		STRENGTH		LENGTH
Metric	Dennison	Metric	Dennison	Inches
1.10	2	.10-1/2	10-1/2	12

ESEMBLO-GRAF METHOD OF REPLACING A MAINSPRING IN A SELF WINDER



ROLEX OYSTER
PERPETUAL
CHRONOMETER
(SELF WINDER)

Esembl-O-Graf

VOLUME 19

PARTS THAT MUST BE REMOVED FROM THIS SELF WINDER TO REPLACE A MAINSPRING

Removing of movement from
case is not necessary

Esembl-O-Graf Part No. 2

Esembl-O-Graf Part No. 13

Esembl-O-Graf Part No. 14

Esembl-O-Graf Part No. 15

Esembl-O-Graf Part No. 16

Esembl-O-Graf Part No. 17

Esembl-O-Graf Part No. 18

Esembl-O-Graf Part No. 21

MAINSRING SIZE

	WIDTH		STRENGTH		LENGTH
	Metric	Dennison	Metric	Dennison	Inches
Cal. A295-10-1/2L	1.55	6-1/2	.10	11	11-1/2
Cal. N. A.-9-3/4L	1.40	5	.08	13	10-1/2
Cal. A. R.-8-3/4L	1.35	4-1/2	.07	14	10-1/2
Cal. P. A.-7-3/4L	1.15	2-1/2	.06-1/2	14-1/2	8-1/2