Master WATCHMAKING

SHOP TRAINING JOB GUIDES

LESSON 8

Assembling Watches

—

Sections 205 - 218

CHICAGO SCHOOL OF WATCHMAKING

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MASTER WATCHMAKING

A Modern, Complete, Practical Course

CHICAGO SCHOOL OF WATCHMAKING

Founded 1908 by Thomas B. Sweazey

Lesson 8

Sections 205 to 218

Lesson 8 — Assembling Watches

Section 205

THE trains and escapements of modern watches, large or small, are much the same, and when you understand the mechanism and relation of the different parts in one you will have little difficulty in mastering others.

In demonstrating this first lesson on taking down and assembling a watch movement I have used a 16 size Elgin, three quarter plate model, shown in figure 169.

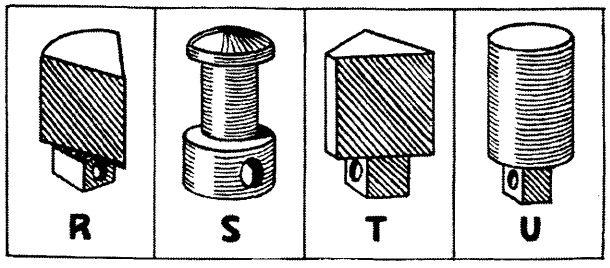
It is expected by this time that you will have no trouble taking the movement out of the case and that you realize the necessity of letting down the power before going further.

Sec. 206 — Balance, Hairspring and Hairspring Stud

The balance with hairspring is the most delicate part of a watch, and it is well to remove this first when taking a movement apart. The outer end of the hairspring is pinned into the stud which is held in the balance cock by means of a screw. In order to do this it is necessary to have the hairspring between the balance and the balance cock.

The earlier American watches were equipped with an "undersprung balance", that is the hairspring was under the balance — between it and the top plate — and the outer end of the hairspring was held in a heavy stud attached to the plate by means of a screw. (See figure 8 in lesson 1).

Do not get the idea that all modern hairspring studs are shaped alike or treated the same in taking down and assembling the movement with which they are connected. In figure 165 are drawings of four different styles of studs in common use. The one shown at R is the style found in the 16 size Elgin movement used with this lesson, S is the Hamilton type of stud described in the next section, T the Waltham model described in section 208 while U is the conventional round stud. A later type of round stud has one side flattened and is known as a D stud. Another style has a groove running lengthwise into which the stud screw sets, thus holding it in a fixed position. In movements fitted with these last three studs, the balance cock generally is lifted out with hairspring and balance attached as shown in figure 82 in lesson 5, and the stud is released from the cock after the whole assembly has been lifted away from the movement.

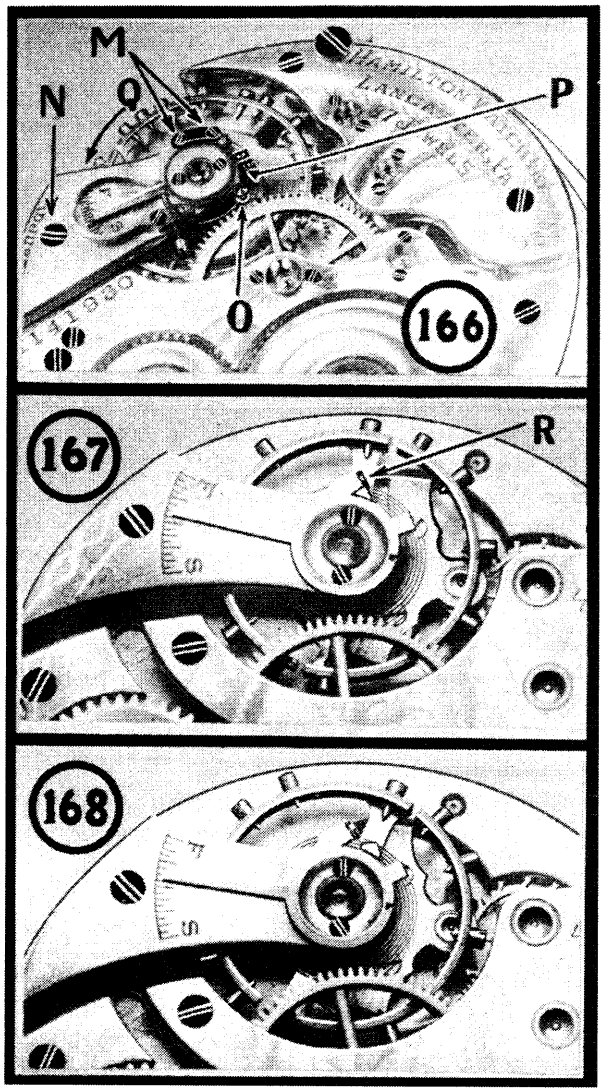


No. 165

Sec. 207 — Hamilton Type of Stud.

With the Hamilton floating stud shown at S, figure 165, it is possible to remove and replace the balance with hairspring attached without danger of distorting the overcoil. To do this unscrew the two stud cap screws at M, figure 166, about one and a half turns before taking out the balance cock screw at N. Do not attempt to pick the stud from under the stud cap as this is liable to bend the hairspring at the curb pins, but after taking out the screw N, lift the balance cock with the balance suspended by the hairspring, up and away from the movement in order that the balance may not catch on the center wheel. By tilting the balance cock toward the stud side, the stud will fall out.

In replacing, pick up the balance by the arm or rim, using the tweezers, and place in position on the lower plate with the lower pivot in the balance jewel and the roller jewel or jewel pin in the slot of the fork. Move the balance around until the stud is outside the curb pins, set the balance cock in place, and turn



down the screw N, noting that the balance is free while doing this. Now the stud floats free on the outside of the curb pins at P as seen at O. Holding the movement in its movement holder in the left hand, with the forefinger of the same hand swing the balance around to the left in the direction of the arrow Q.

With your tweezers in the right hand, slip the upper shoulder of the stud under the cap with the overcoil of the hairspring on the outside of the curb pins. Slip the overcoil between the curb pins and allow the balance to swing back until the roller jewel is in the fork and the overcoil is free between the curb pins. Hold the balance in this position and tighten the two stud cap screws at M.

Sec. 208 — Waltham Hairspring Stud.

The Waltham stud, shown in figure 167 is triangular shaped and is released from the bridge before removing the balance cock screw. All that is necessary is to turn back the stud screw at R enough to allow the stud to be released, after which the balance cock screw is loosened and the bridge removed.

In replacing the balance with hairspring and stud attached, set the assembly in place with the stud floating between the curb pins and the stud screw, as shown in figure 168, using care to see that the roller jewel is in the slot in the fork before tightening down the balance cock screw. After doing this, hold the movement on edge and swing the stud into position, securing it there by means of the screw at R as in figure 167.

Sec. 209 — Elgin Stud

The three cornered stud shown at A figure 169 is a typical Elgin style stud similar to R in

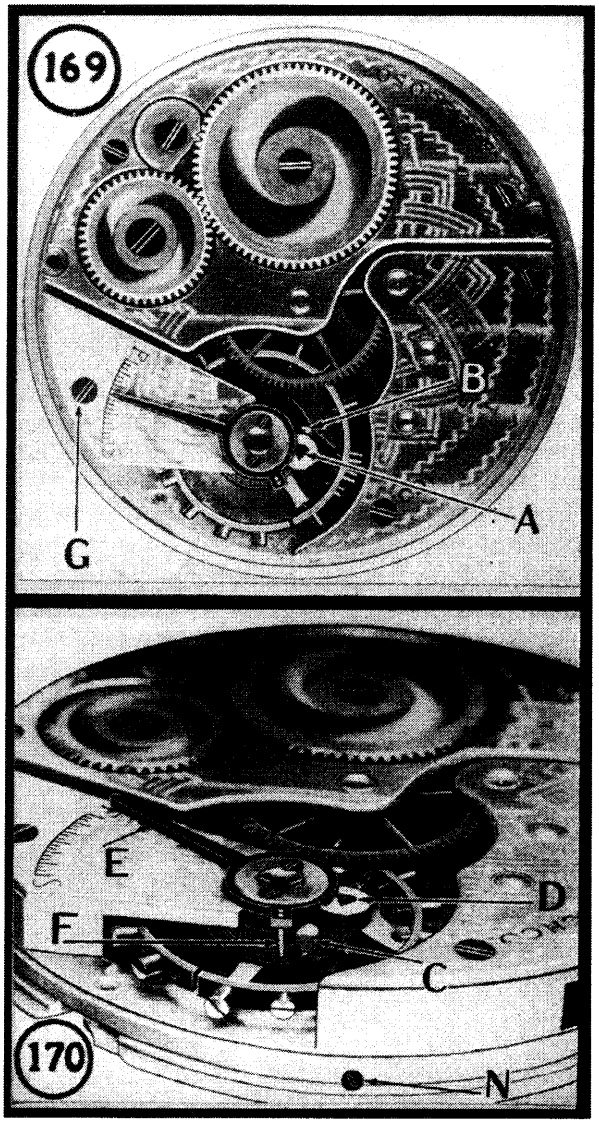
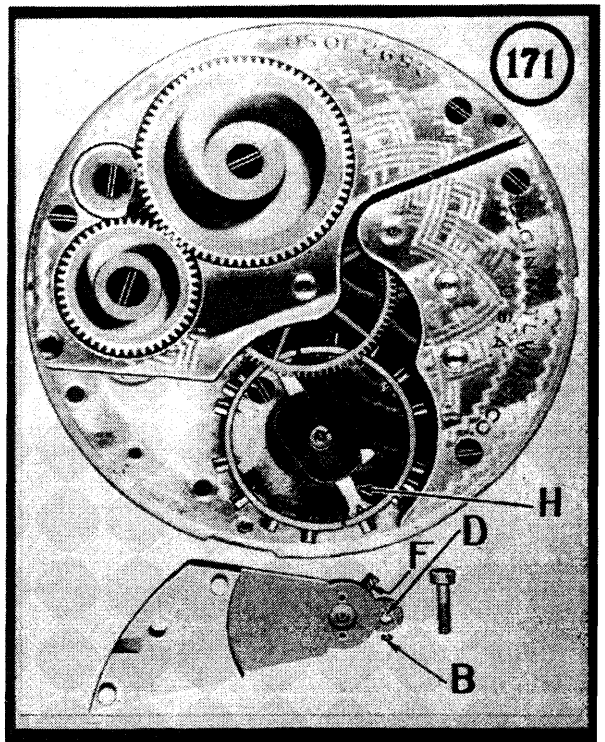


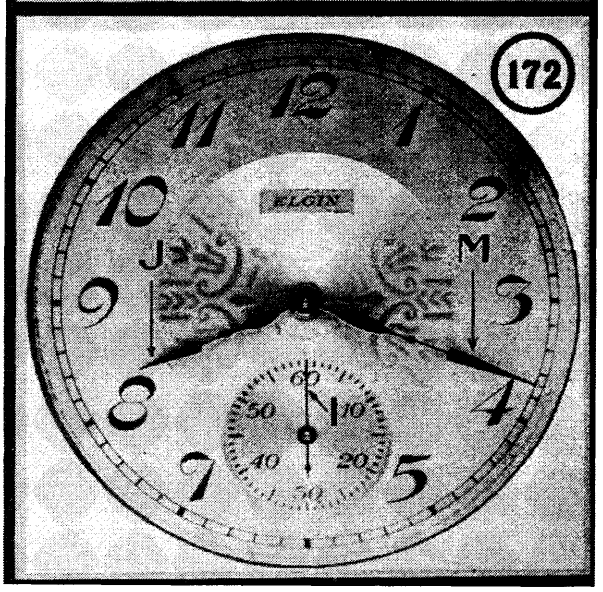
figure 165, and fits in a triangular shaped hole in the bridge being held in place by the stud screw at B. In taking the balance out, loosen this screw and carefully push the stud down until it is free of the bridge as shown in the enlarged view at figure 170 in which C is the stud after having been pushed free from the hole D in the cock. Here the regulator E has been pushed over far enough to give more room for the stud between the curb pins at F and the projecting end of the balance cock in which is located the stud hole D. Be sure and do this *before* you loosen the balance cock screw at G figure 169.

After freeing the stud, take out the balance cock screw, lift off the balance cock turning it over as shown in figure 171, and study it from the lower side. At F are the two curb pins commonly called the regulator pins. D is the hole for the hairspring stud and B the stud screw. Before proceeding further it is well to turn the stud screw in as far as it will go so there will be no danger of its being lost. The balance may now be lifted out and set to one side by grasping the arm at the point H using your tweezers in doing this. Be careful not to bend the lower pivot.

Although many watchmakers take the balance and balance cock out before loosening the stud screw as explained in Section 131 of Lesson 5, I have found that the average beginner runs less risk of distorting the hairspring when he follows the method just described in connection with this model of Elgin movement.

Having taken care of the balance, turn your movement over and set it in the movement rest, dial up, with hands attached as shown in figure 172. I is the second hand which revolves once a minute, M the minute hand which revolves once an hour and J the hour hand which makes one revolution in 12 hours.





Sec. 210 — Removing the Hands

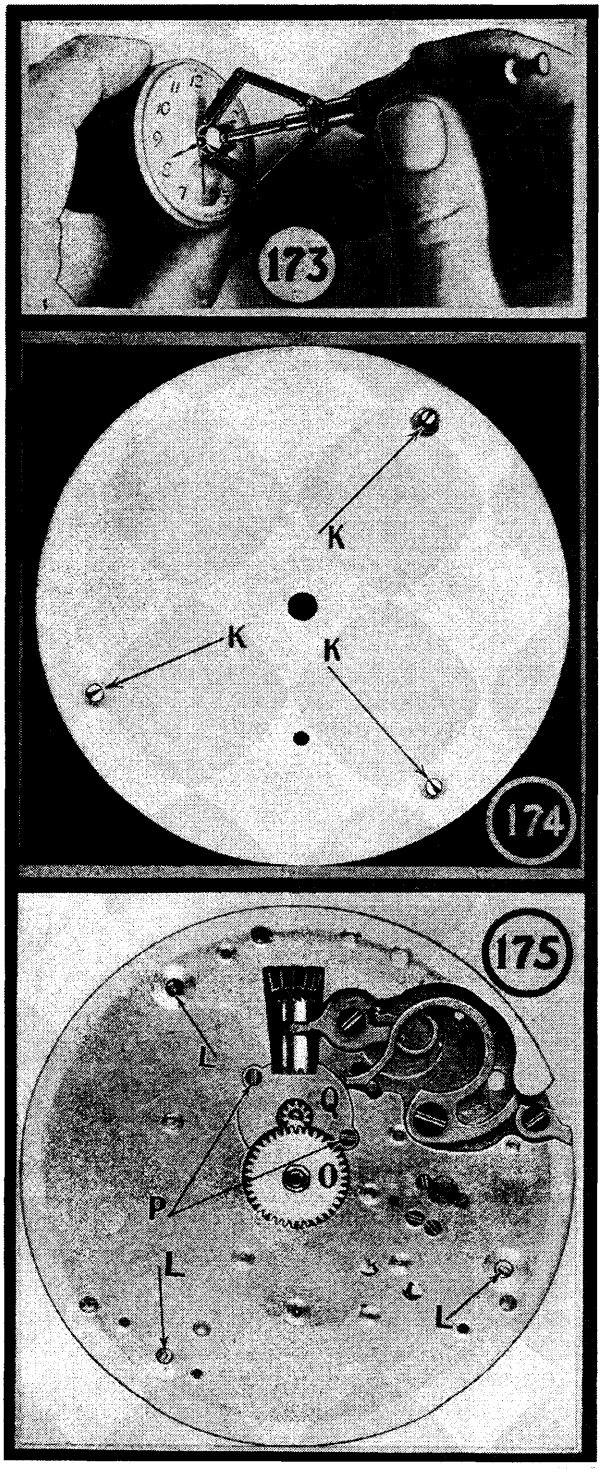
Use a hand remover to take off the hour and minute hands as shown in figure 173. Press on the top to spread the jaws and slip them under the hour hand at the center. Then by pressing down on the handle as shown here, the two hands will be pried off. It is well to slip a small sheet of celluloid between the hand remover and the dial to prevent scratching the dial.

The second hand may be removed by using two thin bladed screw drivers, one under each side in the center, twisting the blades until the hand is released from its position on the 4th pinion. Here too it is well to slip a piece of celluloid between the screw driver blades and the dial.

The dial has three pins fastened to the back which fit into holes in the pillar plate and are held in place by means of small screws at the edge. These pins are the *Dial Feet* and the screws that hold them in place are *Dial Screws*. In figure 174 is shown the back of the dial with the dial feet indicated by the arrows K. At N in figure 170 is shown the location of one of the dial screws.

Locate the dial screws along the edge of the plate and with a screw driver that properly

fits the head, turn each screw partly out, just enough to free the dial foot. With a fairly wide screw driver pry the dial up from the plate using great care not to injure it. Pry at two or three places, it being best to do this at the points where the dial feet are located. If the dial does not come off easily it may be that the dial screws are not backed out far enough. Although the metal type of dial will stand more springing without injury than an enameled one, it must be handled with care to avoid scratching. In removing an enameled dial there is the danger of prying a little too hard, with a resulting crack in the enamel.



As soon as you take off the dial it is well to turn the dial screws in as far as they will go to prevent their dropping out and getting lost. The movement will now appear as in figure 175 with the tips of the three dial screws extending into the dial foot holes at L.

The hour wheel which carries the hour hand is shown at O. With your tweezers lift it off, take out the two screws at P and remove the *minute wheel clamp* at Q.

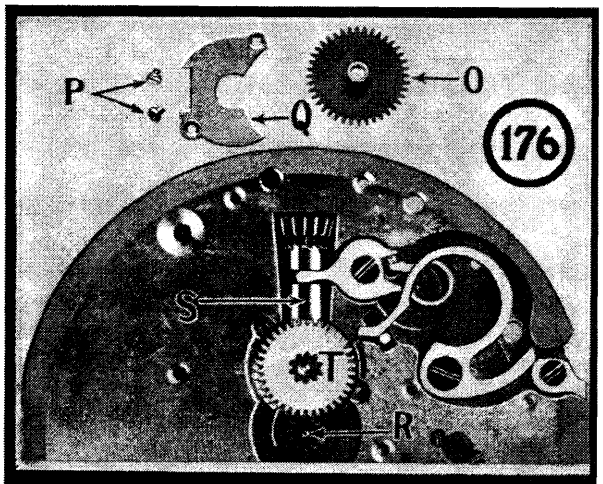
This part of your movement will now appear as at figure 176 with the hour wheel O, the minute wheel clamp Q and the two minute wheel clamp screws P along side. The minute hand is carried on the *cannon pinion* at R. This cannon pinion fits on the center staff with sufficient friction to carry the hands around with the center staff as it turns, yet free enough to be turned on the center staff when setting the watch, without bending any teeth.

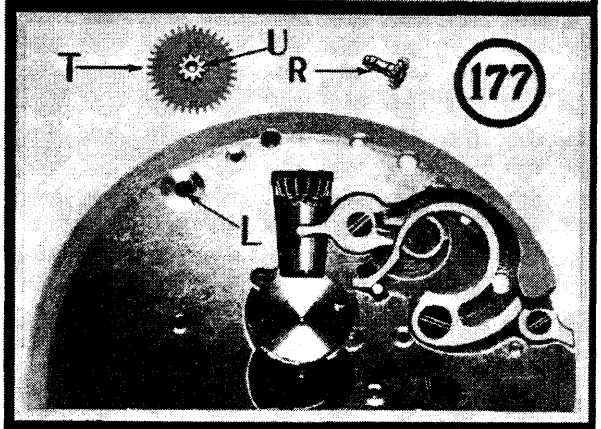
The clutch S, is in the setting position with its teeth engaging the teeth of the minute wheel T. In setting the watch the clutch is turned by means of the stem in the winding arbor and its power is transmitted through the minute wheel to the cannon pinion and minute hand.

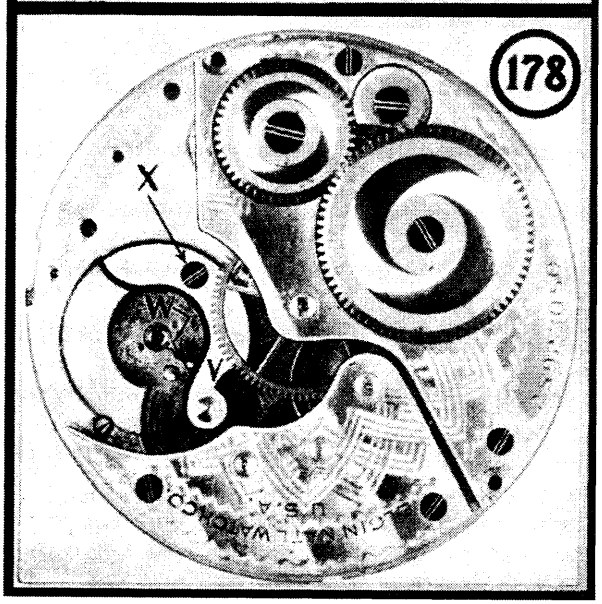
The cannon pinion may be removed by grasping it with a pair of strong tweezers and pulling straight out. If it is extra tight use a pair of brass lined pliers to remove it. The minute wheel is lifted out of its place and the movement from the dial side will appear as in figure 177. At T may be seen the minute wheel with the cannon pinion at R. The minute wheel has a small pinion attached at U, and it is this pinion that gears into the hour wheel as seen in figure 175.

Now return to the train side of the watch by turning it over and placing it on the other side of the movement rest.

The power having been let down, take out the *pallet fork* by removing the *pallet bridge screw* at X figure 178, and the *pallet bridge* V. In taking out any bridges from a movement see that none of the pivots is caught in a pivot hole as they are easily broken. Where a bridge is unusually tight it can be loosened by inserting the blade of a screw driver with a twist-







ing motion. Sometimes you will find a slot cut in the edge of the bridge for this purpose.

Before you remove the pallet fork, notice particularly how it is placed in the watch and replace it in the same position when assembling. If the model is one with a single roller the guard pin will set at a right angle to the fork and project upward. If a double roller, the guard dart will be below and parallel with the fork. The model shown here has a double roller and the guard dart at W is below the fork.

After removing the pallet bridge, the pallet fork with pallet arbor attached is easily lifted out, and the movement appears as in figure 179 with the pallet bridge at Y, the pallet fork and arbor, often abbreviated as the *P. F.* and *A*, at Z, and the pallet bridge screw at X. Viewing the pallet fork and arbor from the lower side at Z gives you an opportunity to see how the guard dart is attached at the slotted end of the fork.

The Train Bridge is now removed by taking out the screws at B and lifting the bridge out of its place as shown in figure 180, in which A is the Train Bridge and B the train bridge screws. The 3rd, 4th and escape wheels and pinions are now seen in their proper positions.

These may be lifted out, taking the escape wheel first, then the 4th wheel and finally the 3rd wheel. Notice that the 4th pinion has a long pivot on the lower end. This long pivot carries the second hand and cannot be removed from the movement until the second hand has been taken off.

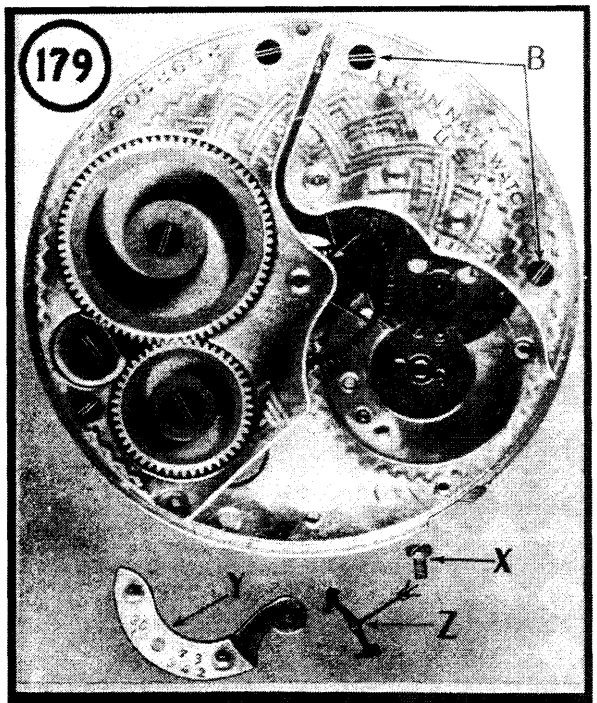
Now remove the barrel bridge by taking off the ratchet wheel at C, the crown wheel at D and then the Barrel Bridge screws. At this point you might have some difficulty in releasing the crown wheel screw at E. This screw has a *left hand thread* and in removing it should be turned to the *right*.

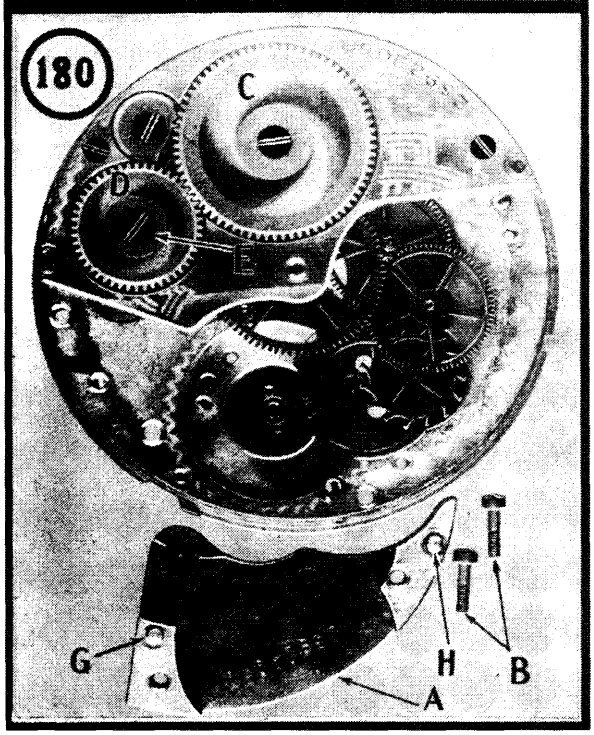
If in loosening a screw in the winding parts of any watch, it does not start as easily as you might expect, try twisting it the other way for you will frequently find such screws with left hand threads. Beginners often forget this and in attempting to force such a screw, use too much pressure and break the head leaving the threaded portion imbedded in the bridge.

Manufacturers differ sometimes as to the trade name of parts. The manufacturers of this movement list the wheel at D as the *main wheel* while others designate the first wheel shown at Q in figure 119, in lesson 6 as the *main wheel*, and the wheel which corresponds to this main wheel is called the *crown wheel* shown in figures 115, 128 and 131.

In these lessons I will give the technical and trade names which I have found to be most used among the members of the trade.

With the barrel bridge removed, the movement appears as in figure 181, the center wheel at E and the barrel at F. These may be lifted





out of their places and the plate will appear as in 182. This is a going barrel and the cap being *down* we know by our rule of a former lesson that the mainspring coils to the left in the barrel. In this model is found also a safety pinion on the center staff.

At this point it is well to examine every wheel and pinion using your double loupe to see that there is no dirt in any of the teeth or leaves and that none of the teeth is bent. Should you find dirt in the leaves or teeth, *peg it out.* This is done by sharpening a piece of pegwood to a point much as you would a fine pointed pencil and rubbing this point back and forth wherever needed.

In this watch I found oil smeared over the plate from G to H figure 181, showing that whoever repaired it last used too much oil when reoiling. Too much oil does as much damage as too little oil although in this particular instance not much harm would result in the time keeping parts.

In this first attempt at taking down and assembling a watch I would advise you to take no more parts off the plate. The object of this lesson is to train you in manipulating such parts as constitute most of the time keeping portion of the watch. All the rest will be taken up in succeeding lessons and in a way I really believe will give a better insight into their workings than could be given now.

When assembling a watch movement use an assembling block and lay the lower plate in the recessed part as shown in figures 181. 182 and 183.

Sec. 211 — Study the Train

Before starting to reassemble this movement place the whole train upon the plate as shown in figure 183 and study it thoroughly. Notice that the leaves of the third pinion and escape pinion are above their wheels when assembled. So in placing them on the plate, first set the escape wheel and pinion in its proper place, next the third wheel and pinion and then the barrel. The leaves of the fourth and center pinions being below their respective wheels are set in last.

After they are placed, see that the teeth of each wheel come in proper contact with the leaves of the succeeding pinion, that is, the teeth in the barrel should be lined up with the leaves of the center pinion, the teeth of the center wheel with the leaves of the third pinion and so down to the escape pinion.

At first you may have some difficulty in telling the difference between the third and fourth wheel, but by noting that the fourth pinion has a long lower pivot which carries the second hand, you should have little trouble on that score. If a watch has no second hand you can tell the difference by examining the teeth and leaves. The teetn and leaves of the third wheel and pinion are somewhat coarser than those of the fourth wheel and pinion.

Sec. 212 — Assemble the Train

Start assembling the movement by placing the train on the plate *without* the barrel as this may be easily slipped into place after you have set the train bridge in position. Now place the train bridge with the two steady pins G and H in figure 180 directly over the holes J and K in figure 183.

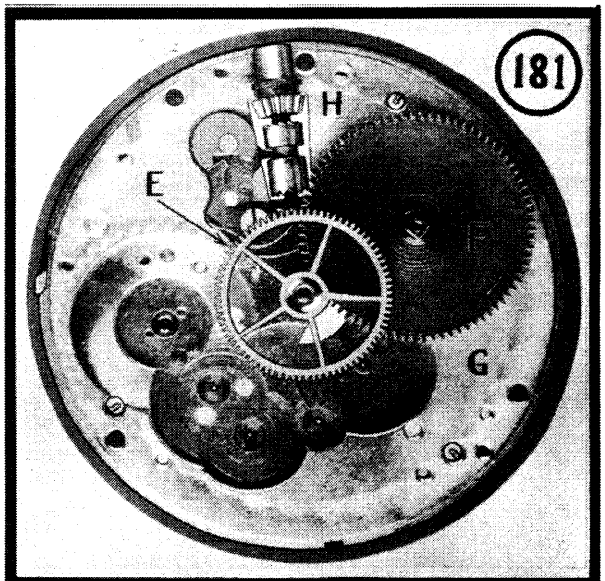
Take the movement holder and watch assembly in the left hand, holding the train bridge in its proper position as shown in figure 184 — using watch paper to protect from finger marks — and with a pair of fine pointed tweezers manipulate the upper pivot of each pinion into its proper pivot hole in the train bridge. At times you will find one of the upper pivots slightly longer than the others. If so fit the longest pivot first. Hold your work as close to the top of the bench as possible and do not put too much pressure on either the plates or the pinions. At first you will have a tendency to force the pivots into place but will soon learn that it is merely a matter of getting the pinions straight up and down and when the pivots are brought to the proper position very little effort is required to guide them into place.

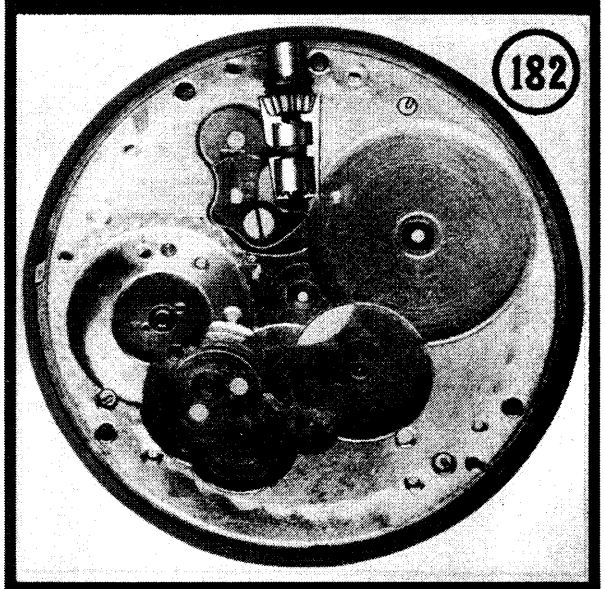
Still holding the bridge in place with the left hand, with the tweezers pick up one of the screws for the train bridge and set it in place, then with the proper size screw driver turn the screw down being careful to see that none of the pivots gets out of place. In the same way replace the other train bridge screw and then with your tweezers test each pinion by moving it up and down to see that it is perfectly free and has end shake.

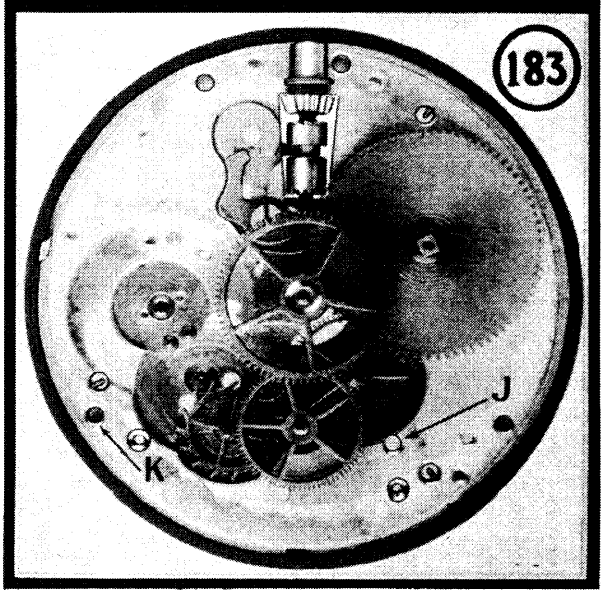
Slip the barrel under the center wheel with the square end of the arbor up as shown in figure 185 and replace the barrel bridge, fitting the upper pivots of the center staff and the barrel arbor in their proper holes. This bridge will usually fall right into place and you should experience no trouble here. Set the screws in the barrel bridge and your train is now assembled and should appear as in figure 186.

Although I am not asking you to oil this watch, I want to show you two places that many Watchmakers overlook. On this model it is well to place a small amount of clock oil on the raised ring under the ratchet wheel at M figure 186 and also on the one under the crown wheel at L. This often will make quite a difference in the amount of strength required in winding.

The crown wheel with washer is next put in place, being held by the crown wheel screw. Adjust the ratchet wheel with the square hole



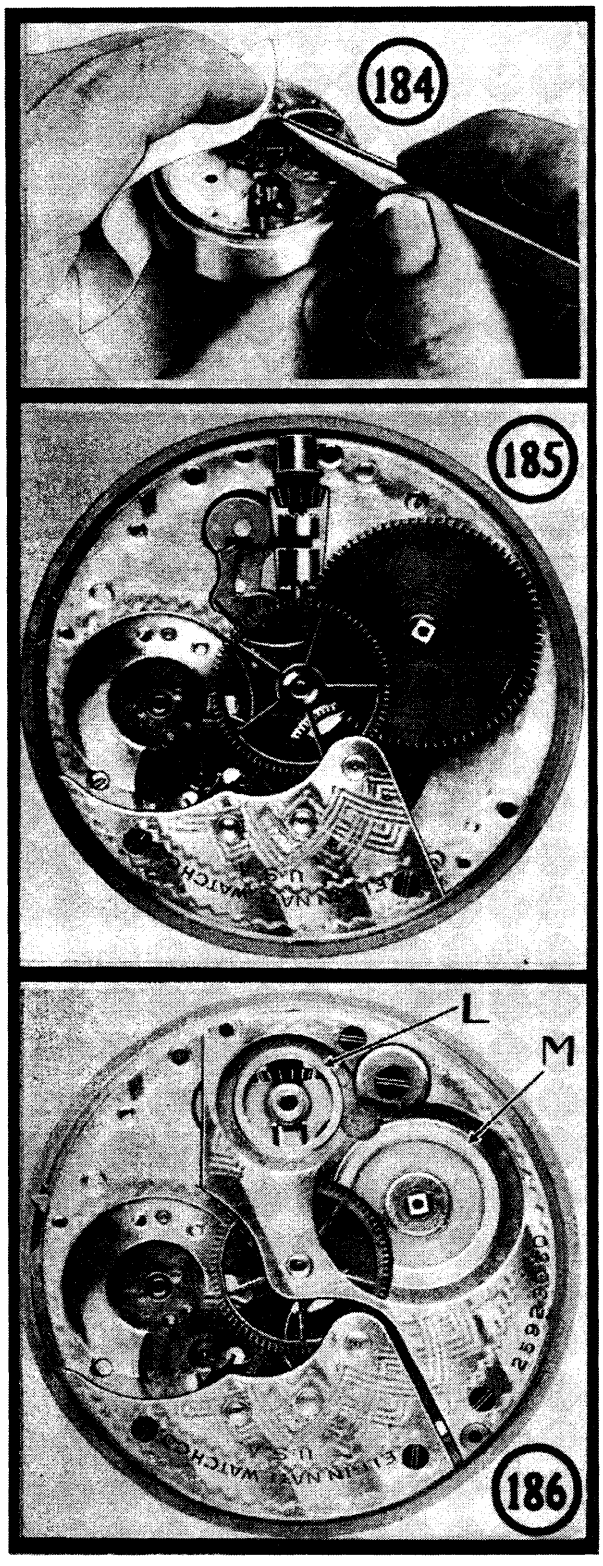




properly set over the square of the barrel arbor and secure with the ratchet wheel screw.

Sec. 213 — Test the Train

At this time you should test the freedom of your train. Take a bench key of proper size to fit the winding arbor, press in far enough to shift the parts to the winding position and give the key three or four turns. If everything is as it should be the wheels in the train will immediately start revolving with such rapidity that finally the momentum will carry them beyond a "state of rest" after which they will back up in the other direction or *recoil.* The recoil is gauged by watching the fourth wheel.



If your train runs down freely even though there is no recoil let it go at that, as in this example we are only practicing assembling and the lack of recoil might be caused by gummy oil, a set mainspring or some other cause which you will master later on.

The pallet fork is now set in place with the lower pivot of the pallet arbor in its proper pivot hole. Adjust the pallet bridge in position and if in dropping the bridge in place the upper pivot does not at once enter the pivot hole it is an easy matter to guide it into place with your tweezers.

Apply power to your train by giving the winding arbor three or four turns with your bench key. This will hold the fork over against one of the banking pins as shown at O in figure 188. If you now take the point of your tweezers and press the fork away from the banking pin it immediately should fly over to the other banking pin. Move the fork back and forth and study the action of the escape wheel teeth in giving these impulses to the fork.

Sec. 214 — Action of the Escapement

It is here that the power of the train is transmitted to the balance. The balance (wheel), hairspring and roller with the roller jewel are all fastened together on the balance staff and act as one piece. The slot in the fork strikes the roller jewel, throwing the balance around in a circular motion, but the hairspring, the outer end being fastened to the balance cock, resists this motion and finally brings the balance to a stop and immediately forces it to turn in the opposite direction.

As it returns to its original position the roller jewel enters the slot in the fork pushing it away from the banking pin just as you have done with your tweezers. At once the escape wheel tooth throws the fork in the other direction and the same thing occurs again. The slot in the fork strikes the roller jewel throwing the balance in the opposite direction only to be stopped and brought back by the hairspring and so it continues at the rate of 300 vibrations each minute.

Such is the action of the lever escapement and when you have mastered one you have made good progress toward mastering them all. As the watch comes from the factory the escapement has been adjusted to perform properly but often it is thrown out of order by inferior workmen and you are never sure that the escapement is correct until you have examined it. In later lessons we will take up the proper matching of the escapement in a thorough manner showing you how to test for errors and how to make the correct adjustments.

Sec. 215 — Replacing the Balance

In replacing the balance and balance cock, it is best to assemble these parts before placing in the watch. Lay the balance cock on the bench in an inverted position as shown in figure 171, first seeing that the stud screw at B is out far enough to allow the stud on the hairspring to enter the hole D without difficulty. *Do not* take this stud screw entirely out of the balance cock.

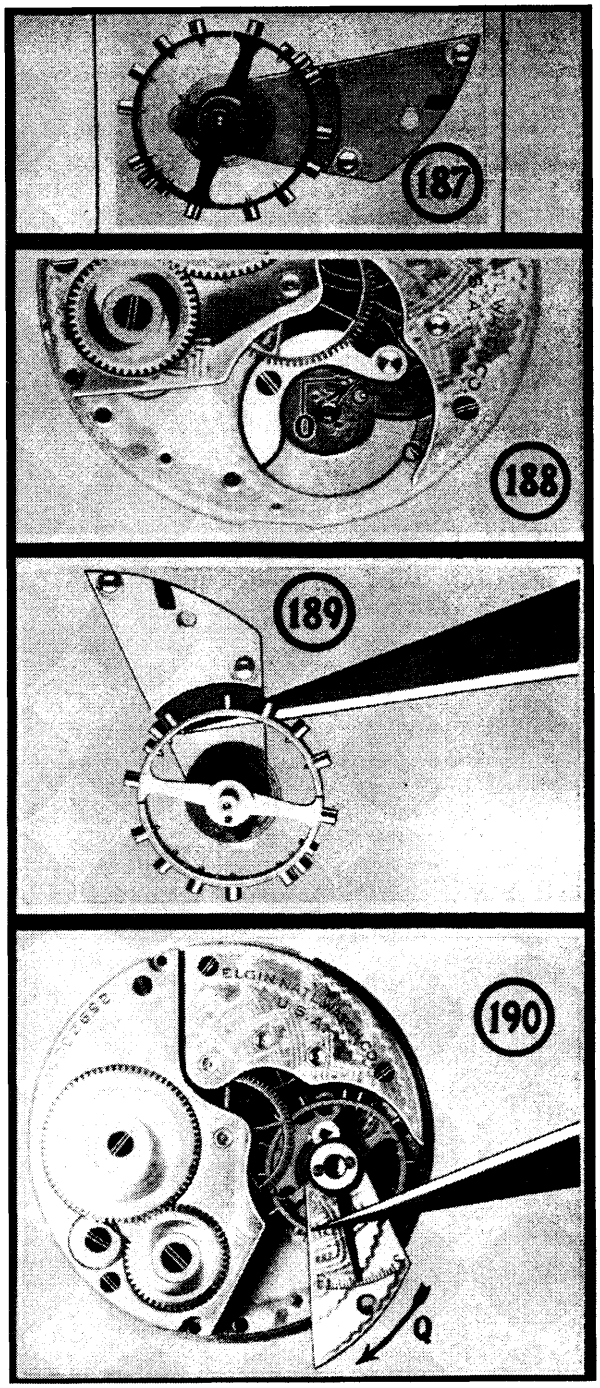
With the balance cock in this position lay the balance on top with the upper pivot of the staff in the jewel and the stud directly over the hole. See that the overcoil (the coil that is raised above the body of the hairspring) lies directly between the curb pins (regulator pins) and lightly press the stud into its place, using care not to hit the hairspring. Your hairspring should now lie level or parallel with the balance cock. Still holding it in this position set your stud screw by means of a small screw driver and your assembled balance and cock should appear as in figure 187.

Now slip your tweezers under the balance cock as shown in figure 189 and turn it over, allowing the balance to hang suspended by the hairspring.

As you have already applied power to the train, the fork should be resting against one of the banking pins. If it is not resting against the one further from the edge of the plate, move it over to that position as shown at O, figure 188.

In replacing the balance in the watch be sure that the roller jewel will swing into the slot of the fork from the open side. If the jewel were to get outside the slot the watch could not run.

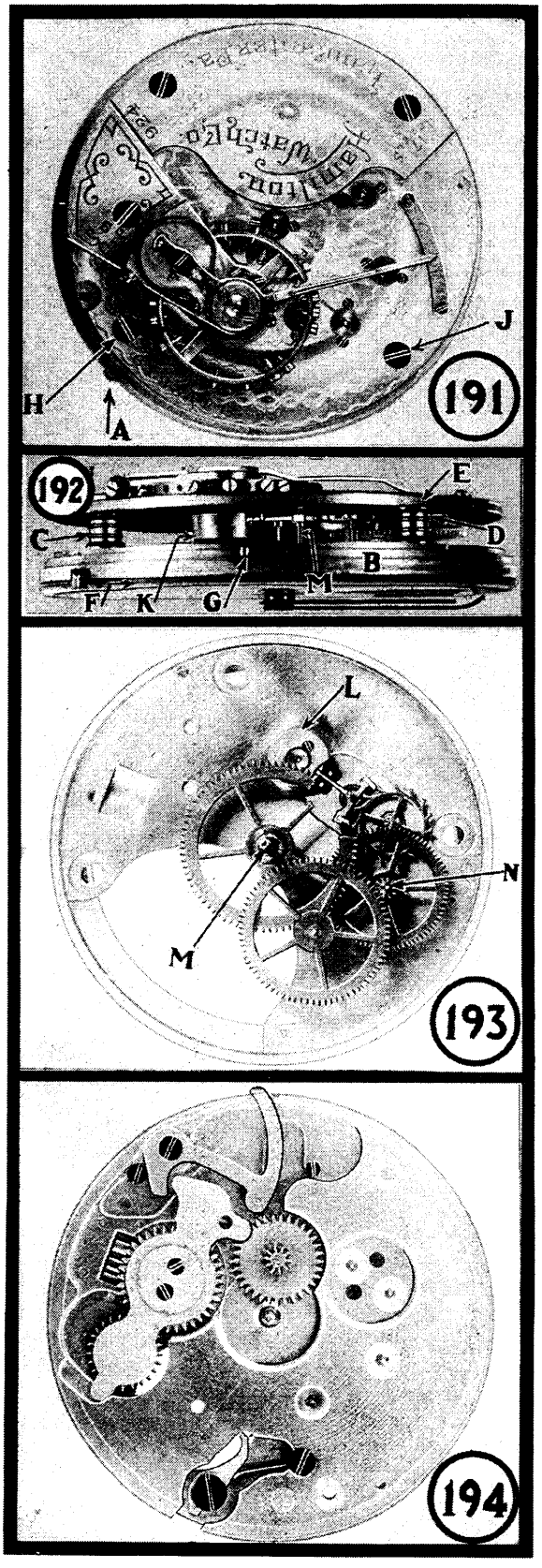
Do not attempt to set the balance bridge straight down into position but rather swing it in from the side. Holding it as shown in figure 190 slip the balance under the center wheel and then bring it down until the lower pivot of the staff is resting in the center of the lower jewel. Now your roller jewel is opposite the open side of the fork.



With the balance in this position twist the balance cock to the left as indicated by the arrow Q until the steady pins on the balance cock are directly over their holes in the lower plate. Lower into place, adjust the pivots in their jewels and see that the balance is free to turn in both directions. If everything seems O. K. set your balance cock screw and your watch should start right off.

In setting the balance cock in place you may

at first get the roller jewel on the wrong side of the fork. If so do not attempt to force it over to the other side, but lift up the entire assembly and try it again. After you have practiced this a few times it will make no difference which way the fork is banked. You can see from which direction the roller jewel must enter and manipulate the balance cock accordingly.



Sec. 216 — Replacing the Cannon Pinion

After satisfying yourself that your watch movement is functioning properly, turn it over on your movement rest and replace the cannon pinion. The cannon pinion should press down on the center staff with no difficulty by merely using a stiff pair of tweezers. In a higher jeweled watch where the pivot of the center staff fits in a jewel as in a 17 or 21 jeweled watch, it is well to support the lower end with a stump in order to prevent loosening or breaking the jewel.

Replace the minute wheel, its clamp and screws; set the hour wheel in place over the cannon pinion. See that the teeth and leaves are all in proper alignment, and then set the dial in place after backing out the dial screws.

If necessary to press a dial into place do so directly over the dial feet and thus avoid springing the dial. This applies especially to enameled dials as they crack or chip very easily. See that it is down far enough to rest on the plate all the way round, then set the dial screws to hold it in place.

Next press the hour hand in place on the hour wheel. The hour hand should be close enough to the dial to give room for the minute hand and yet not catch on the second hand. Adjust the hour hand parallel with the dial. In making the adjustment of the hands with a metal dial do not let your tweezers slip or drag as such dials show the slightest scratch.

Before placing the minute hand, turn the hour hand until it points exactly to some hour, 3 or 9 for example, then place the minute hand to point exactly at 12 and press it down on the cannon pinion. Placing the hands in this way at some exact hour causes them to "register correctly".

The second hand is now pressed on the long pivot of the fourth pinion which extends up to the center of the *second bit* in the dial.

After these are placed, use your bench key in the winding arbor with the parts in the setting position and turn the hands around the dial noting whether they clear each other at all points.

If the watch is now cased see that the minute hand does not rub on the glass.

Sec. 217 — Assembling a Full Plate Movement

One of the older types of watch movements, the full plate model, offers some difficulty to the beginner who attempts to take down and assemble it without instructions.

By a full plate model is meant one similar to the one shown in figure 81 in lesson 5 or figure 191 in this lesson. The trouble usually encountered by beginners is caused by not freeing the lower pallet arbor pivot from its jewel or pivot hole in the lower or pillar plate, before lifting off the top plate.

Figure 192 shows a side view of this movement looking at it in the direction of the arrow A, figure 191. The lower plate, B in figure 192 is called the pillar plate, and to it are attached the pillars, C and D, which support the top plate E. Here also may be seen the dial F and one of the dial screws G.

In taking this model apart, it is best first to remove the balance and balance cock. Next take off the barrel bridge and lift out the barrel. Take out the pillar screws, two of which are shown at H and J, figure 191, these screws extending through the top plate into the two pillars C and D figure 192. Now you are ready to lift off the top plate but in doing this you must be sure that the lower pivot of the pallet arbor is free.

At K in figure 192 is shown the potance and this is what causes most of the trouble in taking down or assembling this type of full plate movement. This potance is a support for the lower balance jewels, being attached to the top plate. Another view of the potance is at L figure 193. The end of the fork extends inside the potance, and in lifting the top plate the potance will catch on the end of the fork lifting it up and unless the lower pivot is freed from the lower pallet arbor jewel, break or bend that pivot or break the jewel.

All that is necessary in taking off the top plate is to so raise it that there is just room enough to permit the pivot on the lower end of the pallet arbor, M figure 192, to be lifted out of the jewel or pivot hole in the pillar plate by reaching in with the tweezers. After this the top plate may be lifted off without further trouble.

In assembling this style of movement many watchmakers set the wheels of the train in place on the pillar plate and then with the pallets and the escape wheel and pinion set in place on the top plate, tip the two plates together manipulating the pivots into the proper holes. The beginner will find it much more convenient to set up the train and pallets on the top plate, first setting the plate in one of the assembling blocks as shown in figure 193. Here the center wheel is partly cut away in order to show the pallets and how the end of the fork projects into the potance.

The pivots on the center staff at M and the fourth pinion N are much longer than the others and in lowering the pillar plate into the position shown in figure 194 the center staff is first fitted through the center jewel, the fourth pivot through the fourth jewel and finally the other pivots into their proper jewels. After all the pivots are in position the movement is turned over, while holding the plates, and the pillar screws are set in place. The balance of the movement is then assembled as has been described.

Sec. 218 — Be Careful

The main thing in watch repairing is to use care in all your work. Get into this habit and it soon becomes second nature to do your work as it should be done the first time over.

The inexperienced individual is inclined to use too much muscular energy at times. If a part does not readily go into place, he endeavors to force it. This is not necessary as these parts fit together with a precision that the average man is not used to and when lined up, go together with very little effort. If you come to a point where it seems you must clamp down hard in order to assemble a watch, examine closely and no doubt you will find something out of place.

The beginner generally thinks that the taking down and assembling of a watch is a very difficult thing to master, this being in line with the belief that a watch is such a complicated machine. In going through this lesson you must have realized that there are not a great number of difficulties to overcome nor are there as many parts to learn as most people suppose. Occasionally I have asked prospective students how many wheels they supposed were in the time-keeping part of the watch—how many in the train and have had them estimate all the way up to seventy-five and even one hundred.

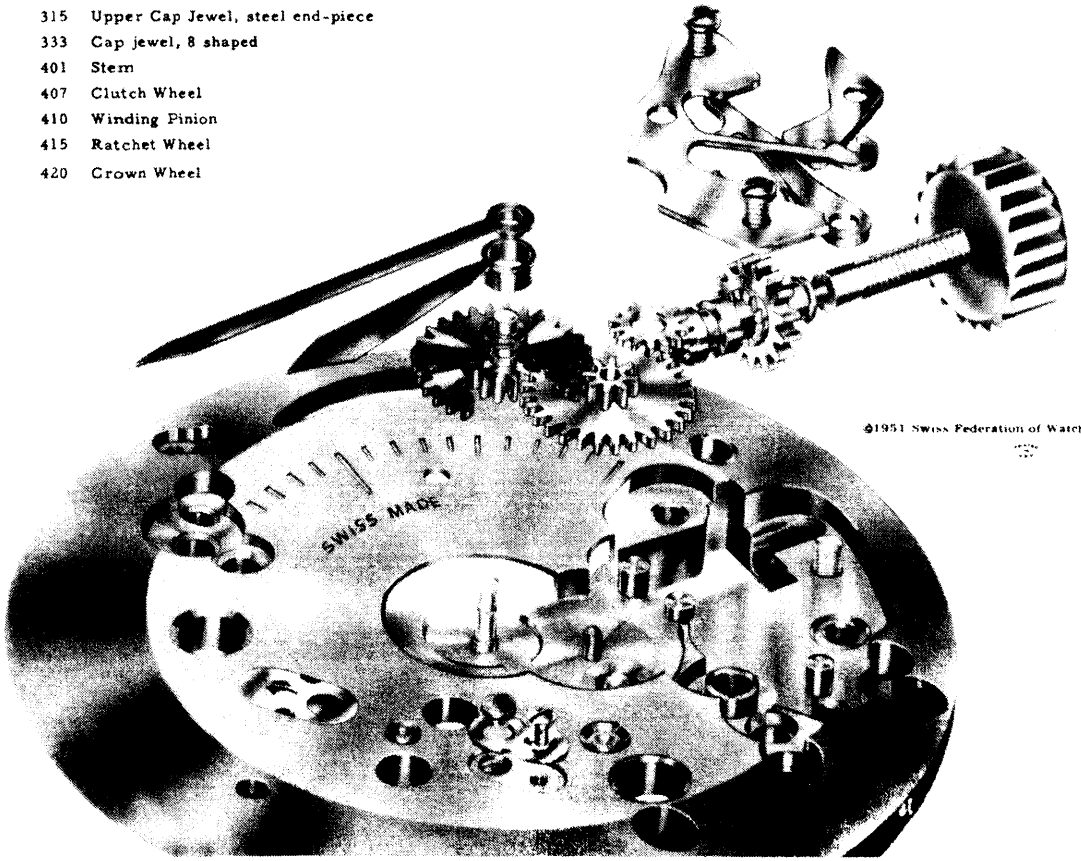
Do you realize that between the plate and bridges of this movement there are exactly six wheels including the barrel, escape wheel and balance. Yet when you have mastered and can replace each part connected with these wheels and their pinions and thoroughly understand the action of the escapement, you have mastered the majority of the repairs that come to the average Watchmaker.

Behind the Dial of the Fine Swiss Watch

Official Swiss Parts Identification

NO.	NOMENCLATURE
100	Plate
105	Barrel Bridge
110	Train Wheel Bridge and Jewels
122	Balance cock for Breguet Hairspring
125	Pallet Clock and Jewel
185	Barrel Drum
190	Barrel Cover
195	Barrel Arbor
201	Center Wheel and Pinion
210	Third Wheel and Pinion
224	Fourth Wheel and Pinion with Second Hand Bit
240	Cannon-pinion (Steel)
260	Minute Wheel
302	Regulator for Breguet Hairspring
315	Upper Cap Jewel, steel end-piece
333	Cap jewel, 8 shaped
401	Stem
407	Clutch Wheel
410	Winding Pinion
415	Ratchet Wheel
420	Crown Wheel

NO.	NOMENCLATURE
425	Click
435	Yoke (Clutch lever)
440	Yoke Spring
443	Setting Lever (Detent)
445	Setting Lever Spring
450	Setting Wheel
703	Escape Wheel and Pinion with lower conical pivot
710	Jewelled Pallet Fork and staff
720	Pivoted Balance Wheel
723	Balance Staff
730	Roller with Jewel Pin
735	Breguet Hairspring, regulated, stud and collet
770	Mainspring



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