



Master WATCHMAKING

SHOP TRAINING JOB GUIDES

LESSON 2

Crowns, Stems, Sleeves and Bows

Sections 41 - 65

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 2

**Sections
41 to 65**

Lesson 2. — Crowns, Stems, Sleeves and Bows.

Section
41

EXCEPT in Railroad watches, the modern watch is "pendant set". By this we mean that to set the hands, the crown (and of course with it the stem) is pulled out to a different position than when winding the mainspring. In one position the winding parts are thrown into gear while in the other the setting parts are brought into play.

This necessitates some means of holding the winding stem in two different positions. In most American pocket watches this is accomplished by means of an adjustable "sleeve" screwed into the pendant of the case and through which the stem extends.

At 1 in figure 27 is shown the stem and sleeve assembled, ready to be inserted in the pendant of an Open Face case. The upper part of the sleeve at H is threaded and the inside of the pendant of the case is likewise threaded so that the sleeve with the stem attached is screwed into the proper position in the pendant by means of a sleeve wrench.

At 2 is shown the sleeve alone and at 3 the stem.

The lower part of the sleeve at J is divided into four parts so that it really makes four steel fingers. These fingers grip the stem in either one of the slots K or L holding it in position, yet allowing the stem to turn freely inside the sleeve.

When the stem is in the winding position these fingers grip the upper slot at K. When the watch is to be set the stem is pulled straight out until the fingers of the sleeve are forced over the shoulder on the stem and are holding in the slot L. Bear in mind that this sleeve, once placed in its position in the case is stationary; the stem slides within this sleeve.

As seen at 1 the stem is held by the sleeve in the winding position.

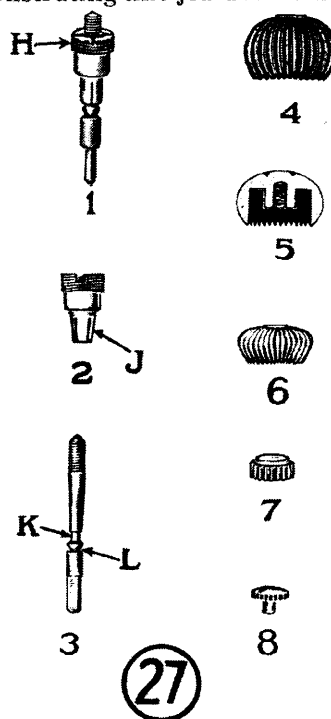
The crown as shown at 4 is screwed on the upper end of the stem after the sleeve with stem is in place in the pendant of the case.

At 5 is shown a sectional view of the crown, the center being drilled and threaded to fit the upper threaded part of the stem.

The crown shown at 4 is known as a round crown, used only on the older style cases, 6 is a more modern antique shape while 7 and 8 are crowns used on Wrist and Bracelet watches.

Sec. 42 — Movement from Case

In demonstrating this job I have used a twelve



size Illinois movement in a S. B. and S. B. Case. After removing the back from the case the movement will appear as in figure 28.

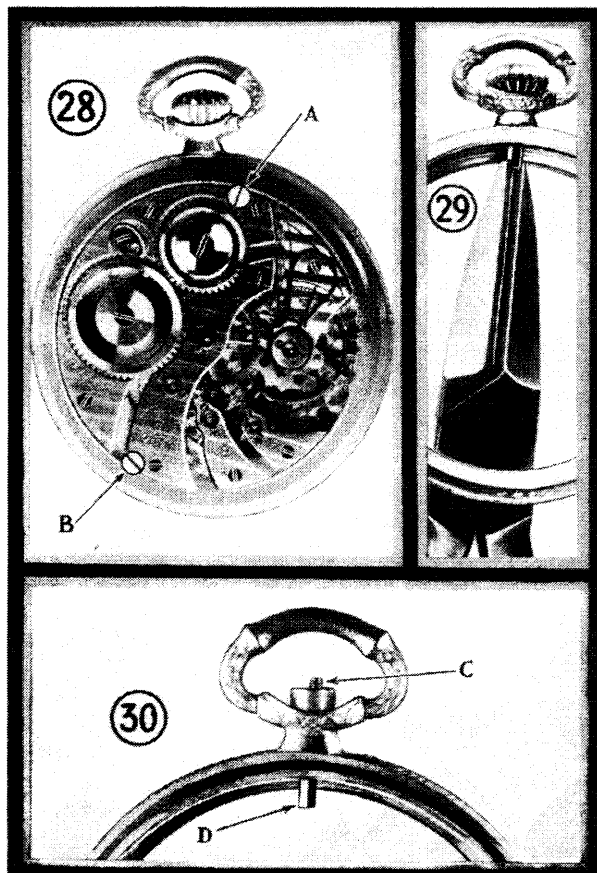
The two case screws at A and B are full head as explained before. In section 17 I explained that it was best to take out the full head case screws whereas with half head it was only necessary to turn them part way around when taking the movement from the case.

With this case it is only necessary to remove the screw B and then by loosening A a few turns

and pulling the crown out to the setting position the movement comes easily from the case.

Sec. 43 — Removing the Crown

In order to get at the sleeve after the movement is out of the case, it is first necessary to remove the crown from the stem and this is done



by holding the lower end of the stem by means of a pair of flat pliers held in one hand as shown in figure 29 and with the fingers of the other hand twist the crown to the left continuing to turn it until it is separated from the stem. Now it will appear as in figure 30, the upper threaded end of the stem from which the crown has been removed showing at C while the lower or square end may be seen at D, this photo being enlarged in order to show these parts better.

Sec. 44 — Using a Sleeve Wrench

One of the popular forms of sleeve wrenches is shown in use in figures 31 and 32. Each of the several prongs on this model is shaped at the end into a wrench giving a variety of sizes suitable for most of the sleeves in pocket watches. In adjusting the sleeve, a prong is selected of the proper size and shape to go inside the pendant and fit into the slots in the upper part

of the sleeve. These slots can be seen at the top of the sleeve in 1 and 2 in figure 27. Some sleeves have two slots on the top, while others have four. On the sleeve wrench some of the prongs are made with two projecting lugs and others with four to fit the two styles of sleeves. When selecting the proper prong on the wrench observe whether you need it for two or four slots.

When adjusting the sleeve the crown is removed from the stem but the stem is left in its place through the center of sleeve.

Another type of sleeve wrench has but four prongs, suitable for the smaller sleeves and is known as a bracelet sleeve wrench. This wrench works on the same principle as the one shown in figure 31 and 32.

Sec. 45 — Removing Sleeve and Stem

Selecting a prong of the right size to go into the pendant without friction and of a style to suit the sleeve, place the tip in the slots of the sleeve inside the pendant as shown in figure 31. Be sure that your sleeve wrench prong is not too large in diameter or it may cut and ruin the threads on the inside of the pendant. With the wrench in the position shown in figure 31 it is now possible to twist the sleeve to the left and as you continue turning, the sleeve and with it the stem will gradually come out as shown in figure 32, where the threaded part of the sleeve is shown at E part way out of the pendant. Continue until the sleeve is free when it may be removed from the case.

At figure 33 is shown the assembled sleeve and stem as lifted part way out.

After removing from the case, the sleeve may be pulled off the threaded end of the stem as shown in the enlarged view in figure 34.

Sec. 46 — New Sleeves

In any watch depending upon a sleeve to hold the stem in proper position for winding or setting, you as a watchmaker will have jobs coming in needing replacements of these parts — a new sleeve, stem or crown. A customer brings in his watch complaining that it suddenly gains or loses an hour or more without apparent cause. Upon testing you may find that the stem slips from the winding to the setting position and the chances are that the lower part of the sleeve which grips the stem has become worn to such an extent that it will not hold the stem in place. Sometimes one or more of the steel finger-like tips has been broken. In either case replace with a new sleeve.

Sec. 47 — New Crowns

When your customer complains that his watch winds too hard you may find upon examination that the crown is worn so that it tends to slip between the fingers unless gripped tight enough to tire the hand. Occasionally the crown may be too small in diameter. In either event replace with a new crown of proper shape and size.

Again the stem may be broken right at the crown with a small piece of the steel remaining inside so that it is impossible to twist it out. If the crown is of gold, gold filled or nickel the piece of stem can be dissolved by means of a dilute solution of sulphuric acid or a saturated solution of alum in water. The sulphuric acid solution is made by pouring one part of the acid slowly into three or four parts of water. Never pour the water into the acid as this causes a violent chemical reaction. Even when pouring the acid slowly into the water there will be quite a little heat generated. This solution should be made in a glass or porcelain cup and the crown immersed in it. Of course there should be no oil or grease on the piece of stem imbedded in the crown if the solution is to work at its best. The solution should start working on the steel part at once as can be seen by a tiny row of bubbles arising from it. This should continue until the steel is entirely dissolved.

Be careful not to get any of the sulphuric acid solution on your clothes, as it will destroy any cotton threads or goods with which it comes in contact. Also avoid inhaling the fumes.

A saturated solution of alum in water will affect steel the same way and on account of its being less dangerous might be better for the beginner to use. It works slower than the acid solution. The action of either of these solutions can be hastened somewhat by heating.

Before attempting to dissolve the steel end of a stem from a crown it is best to examine the crown to see that it is worth the extra effort.

The majority of watchmakers do not go through this process except with a valuable crown but instead sell the customer a new stem and a new crown whenever such a job comes in.

Sec. 48 — New Stems

If the stem is broken or worn, select a new one of proper shape and size, and after pushing the old stem out of the sleeve, press the new one far enough through that the fingers of the sleeve are in the proper notch on the stem. The stem is placed in the sleeve by starting the threaded portion through the lower or finger

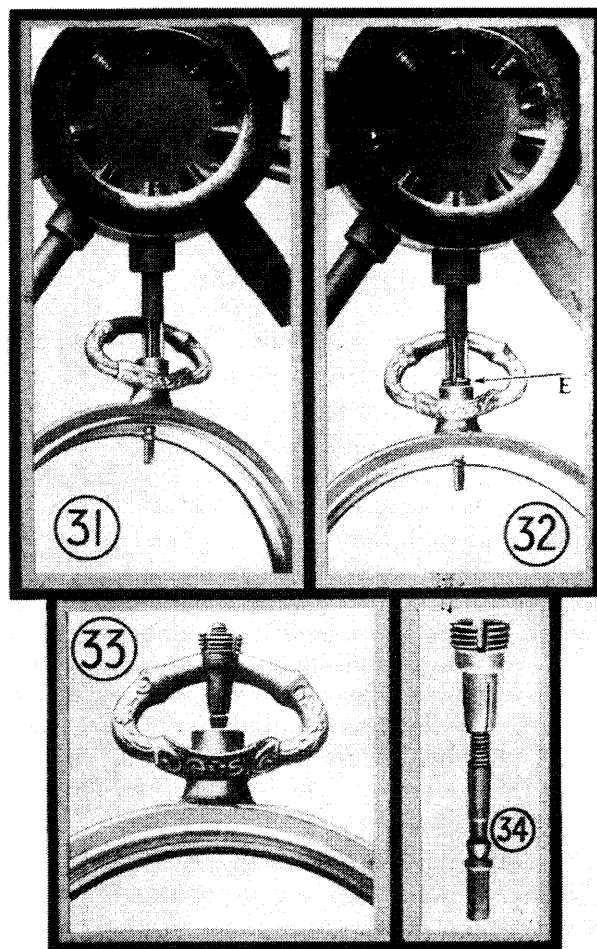
end and pressing into place, see figure 34. It often requires quite a pressure before it goes into place.

Whenever you find it necessary to put in a new stem, be sure to try the square of the stem in the winding arbor of the movement to see that it fits properly. Also try the threaded end in the crown to be sure that the threads are of correct pitch and diameter.

These tests only take a few seconds and always should be made.

Sec. 49 — Replacing Stem and Sleeve

In replacing the stem and sleeve assembly in the case it is necessary to adjust the sleeve so that when the stem is pushed in, it will wind



and when it is pulled out you will be able to set the hands. In removing an old or broken sleeve or stem, it is a good plan to remember approximately how far the sleeve was screwed in the pendant so that when you replace the new one you can place it in about the same position as it was before.

After turning in the sleeve and stem to the

distance you judge is correct, screw the crown on the end of the stem and then replace the movement in the case. Do not try the winding and setting until the case screws are in place and holding the movement in the same position it will occupy when the job is completed and ready to be given to the customer.

If you find that you can set the hands correctly but upon pushing in the crown and stem to the winding position you cannot wind the watch, the sleeve has not been screwed in far enough. Then remove the crown and screw down the sleeve until it winds properly.

Should you find that the watch winds properly in the case but does not set when the stem is pulled out to the setting position it will be necessary to turn the sleeve out until it will set.

If you have difficulty in making it set or wind, which you do not seem able to overcome by making these adjustments, there may be some trouble in the setting arrangement in the movement itself. Take the movement out of the case and test with one of your bench keys, selecting a key of proper size. Press the key into the movement and try the winding. Then pull the key out slightly and see that the setting is O. K. If the set and wind work outside the case you should have no trouble in adjusting the sleeve so they will work while in the case.

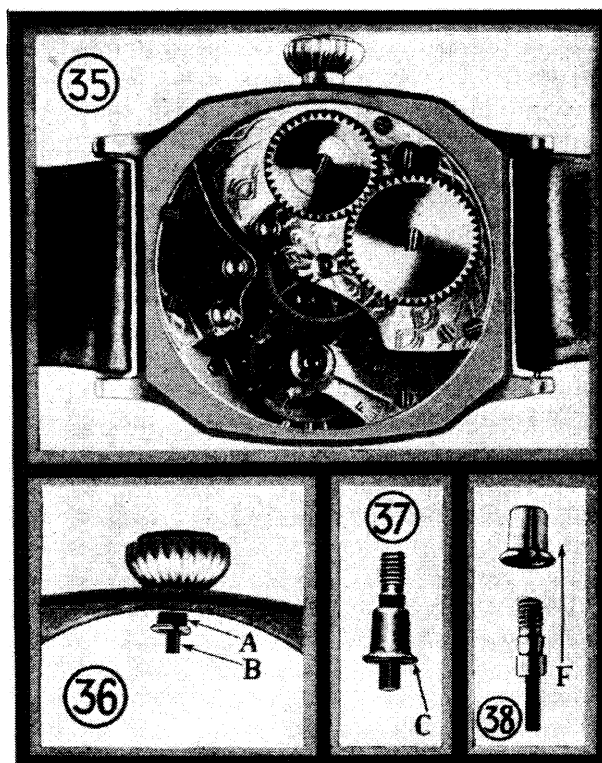
Sec. 50 — New Stem Too Long

In replacing a new stem for an old one you occasionally may find the square is so long that it would be impossible to make the watch set without having the sleeve too far out of the pendant. Then it is only necessary to file off the proper amount from the lower end of the square to make it work. The same is true of the other end. If the threaded part is so long that the crown is held too high, this end should be cut off. But be sure the fault lies in the stem being too long before you start filing. If you must file take off a little bit at a time. It is an easy matter to cut off too much.

Sec. 51 — Oiling Stem and Sleeve

If the stem and sleeve are dry it is necessary to oil the parts where they come in contact with each other. This will make it easier to move the stem back and forth when shifting from winding to setting position and will eliminate a slight squeak that may occur in winding and setting when these parts are not oiled.

To take care of this, place a very small amount of watch oil at the point K or L on the stem (see 3 in figure 27) after the stem is in the sleeve.



Sec. 52 — The Reversible Sleeve

Another type of sleeve used on some models of watch cases is called the reversible sleeve.

Figure 35 is a view of a Waltham Wrist watch with the back removed. This is the snap form of case so that the back is pried off with a case opener. Before removing the movement it is also necessary to take off the front. In many of these wrist watches there are keys and key seats to help locate the exact position of front and back as explained in section 23 of lesson 1. In this one it is not necessary to have such help in locating the position of the back.

After taking out the case screws and removing the movement from the case, the crown, stem and sleeve will appear as in figure 36. Here you will notice that the sleeve at A is not held firmly in the case but when the movement is taken out falls to the position shown.

By gripping the square at point B with a pair of pliers the crown may be twisted off as described before. The stem and sleeve come out easily and will appear as in figure 37. Here you will notice that the sleeve itself has no threaded portion, merely the shoulder at C. When the stem and sleeve are in the case the sleeve is held in its proper position by the pressure of the movement against this shoulder C. There is a slight recess in the case into which this shoulder is pressed by the watch movement so that only

when the movement is in the case is the stem and sleeve in position to function properly.

In figure 38 the stem and sleeve are shown separated.

In comparing this assembly with that of the other type of sleeve you will notice that the larger portion of the sleeve is toward the square end of the stem. In other words in replacing this the threaded portion goes through the sleeve in the direction of the arrow F figure 38.

Sec. 53 — Bows

In figure 39 are shown some of the numerous shapes of bows used on pocket watches. The round form shown at M is used only on the older models. The plain antique at N is a later model than the round bow. At O is shown a French Antique bow and at P a so called stream line bow. All these bows are plain polished.

Some of the modern bows as now furnished on watch cases are getting away from these plain standard shapes and are found in a variety of designs. At S, T, U, V and W are shown the pendants and bows of several different American made cases.

The majority of bows are held in position on the case by merely springing them into place. The pendant has a recessed place or ear, on each side into which the end of the bow fits. The bow is usually sprung on by spreading it with a pair of bow pliers or a bow expander until it will just slip into place. Sometimes a bow is too loose and it is then necessary to close it up slightly by means of a bow plier or a bow tightener.

Sec. 54 — Bows with Pegs

Some of the fancy bows are held in place by screw pegs and these bows are removed or replaced by means of the screw pegs and without being compelled to spring the bow in place. At Q in figure 39 is shown one of these bows with one of the screw pegs removed and shown by itself at R.

Sec. 55 — Necessary Material

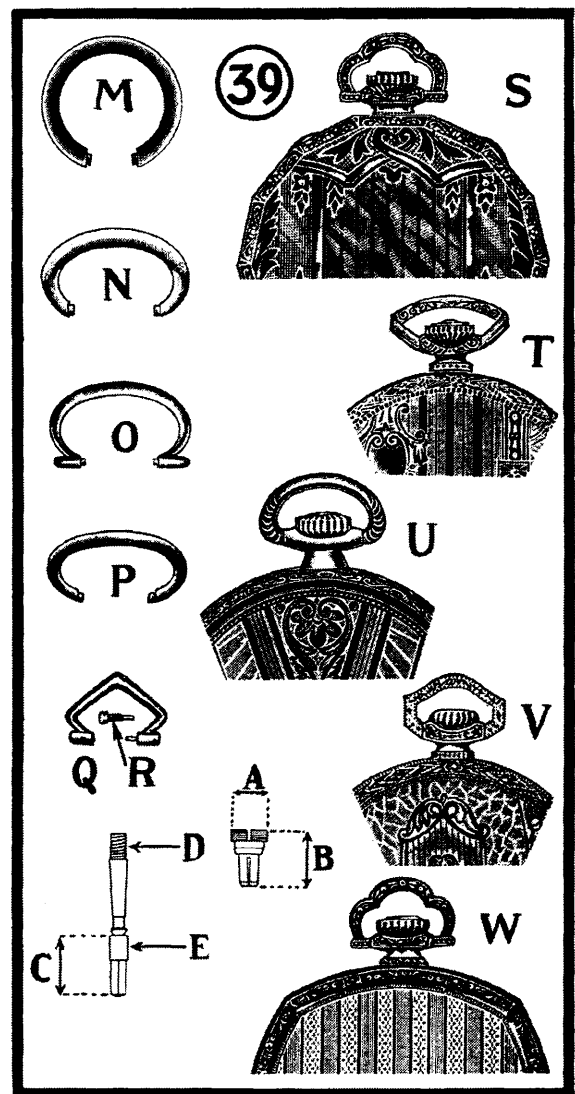
Watchmakers whether in a retail jewelry store or in an exclusive repair shop, find it necessary to carry a line of the different parts or materials needed in the work of servicing and repairing time pieces. Crowns, stems, sleeves and bows are some of the things that are used almost daily. It is not necessary to get these in large quantities but by buying in small assortments it is possible to have a supply that will fit most of the jobs that come in.

Having the material right on hand makes it possible to get the jobs out sooner and this will

be more satisfactory to the customer than to wait several days and also saves valuable time for the workman. Again in buying your material in assortments, you make quite a saving on the cost when compared to the price charged for matching a single piece.

If you have one of the better assortments of stem and sleeves, you will find that there is a compartment for each size and make so that it is not at all difficult to make your selection.

In some of the cheaper assortments it is possible to get a nice variety at a moderate price but the pieces are not separated and you will have to pick each piece by comparison.



Sec. 56 — Selecting a Sleeve

In a sleeve it is necessary that the threaded portion A figure 39 is the correct diameter, that the threads are of correct pitch and the length B is right.

Using your old sleeve as a pattern select one from your assortment that seems about the same size. Lay the new one right along side the old one and see that it is the same length and as near as possible the same diameter. Test the diameter A figure 39 by trying the sleeve in the pendant of the case. Slip the stem in the sleeve and try with the case and movement.

If you find it necessary to order a new sleeve, give the size of the case for which it is intended and the manufacturers name or trade mark found in the back. Also be sure to send in the old sleeve as a sample. In ordering *any* piece of material for a watch or case *always* send in the old piece as a model from which to make a selection. This is very important and will often save delays and misunderstandings.

Sec. 57 — Fitting Stems

In the better assortments of stems, as in sleeves, each size and model is in a separate compartment. In picking out a stem from a mixed lot see that the square is of proper size and that the distance from the end of the square to the slot for the sleeve, C figure 39, is correct, that the round part at E is about the same length as the old one and that the whole stem is at least as long as the old stem. See that the threaded portion D fits the crown properly. If the lower end C figure 39 should be too long it is possible to file off the end of the square, provided of course that the round part E does not extend down too far.

When ordering a stem for a case give same particulars as in ordering a sleeve and don't forget to send the sample stem.

Sec. 58 — Replacing Crowns

In replacing a crown see that the new one is of proper shape and color to match the bow and case, that the threaded portion fits the stem and that the crown is free on the pendant of the case. Of course it should be of the same quality as the case, a gold crown on a solid gold case, a gold filled crown on a gold filled case and a nickel crown for a nickel case.

In ordering a new crown it is well to give size and style of case and of course send old crown for sample. If crown is lost send case with stem in place and crown can be supplied to match size, color and shape of case.

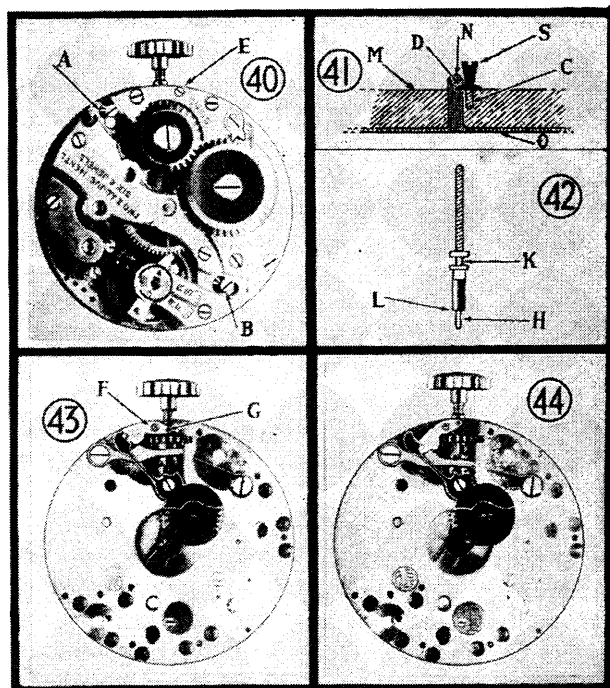
Sec. 59 — New Bows

It is well to carry an assortment of bows to match the average job that is brought in. As watches come in for repairs make a note of the styles carried by your customers. In this way

you can select your stock of materials and findings more intelligently.

You are always safe in having an assortment of antique bows in different sizes in gold filled as these are staple supplies that must be carried at all times. It will hardly pay for you to attempt carrying the many fancy shapes at first. It is better to order these as you need them.

In selecting a bow for a round case, as a general rule it is possible to use one found in one of the regular assortments of bows, either in an old model round if it is a real old case with round crown or an antique bow to match an antique crown on a more modern case. The bow of course must be of such a size that when it is sprung on the pendant there will be no play or shake. It must match the case in color and quality.



Sec. 60 — Swiss Stem and Crown

As already stated the position of the wind and set mechanism in most American Pendant Set Pocket Watches is controlled by a sleeve and this sleeve is held in the *case*.

In most Swiss watches this mechanism is held in position by a set lever in the movement itself and this lever is connected to and controlled by the stem.

In the American system the sleeve and stem are assembled with the *case*. In the Swiss style referred to, the stem is made by the manufacturer of the *movement* and comes with it.

In this section of the work I am not going into detail as to the mechanism of winding and set-

ting parts in Swiss movements as this will be dealt with in a future lesson under Winding and Setting Mechanisms. In this lesson however, I want you to become familiar with the way the stem operates on the set lever.

Sec. 61 — Swiss Style of Setting

In figure 40 at E you will see the head of the set lever screw. This set lever screw extends down through both plates and is threaded into the set lever on the dial side as seen at F in figure 43. On the other side of the set lever is a pin the riveted end of which shows at G. This pin fits into a slot in the stem and when the set lever screw F is tightened it holds the pin in the slot so that as the stem is pulled out to the position shown in figure 44 it pulls the set lever right along with it throwing the parts into the setting position. And when it is pushed back it carries the set lever back to its former position with the mechanism in the winding position as shown in figure 43.

In figure 42 is shown a drawing of one of these stems. As you will notice it differs somewhat from the style of American stem which I have already shown you. At the lower end, H, is shown the pilot. This fits in a hole in the plate of the watch to keep the stem properly aligned. At K is shown the slot into which the pin on the set lever fits.

You will notice that the upper end of this stem is threaded for a much longer distance than the American style. This long thread enables the watchmaker to fit this stem to practically any thickness or width of case or length of pendant, and in fitting one of these stems it is cut off on the threaded end until it is the proper length so that the crown projects the right distance from the case.

Sec. 62 — Ordering Swiss Stems and Crowns

In ordering a new stem or crown it is best to send a sample of the old one. This is possible with the stem as it is nearly always in the movement even if the crown is gone. Often, however the crown is lost but with an assortment of crowns it is an easy matter to select one matching the case.

In selecting a new stem for a Swiss watch endeavor to have the pilot about the same length and diameter as the old one, the square the same length and the slot K the same distance from the lower end of the square at L. Of course if you have the old crown it is necessary to see that the threads fit.

Stem and crown replacements in Swiss wrist and bracelet watches are a profitable part of

the watchmaker's business and it is necessary that you become familiar with this work.

However, I want to warn you again not to work upon the smaller watch movements. As a general rule the beginner is safe in replacing stems and crowns on these smaller watches but should never attempt to work on the train, escapement or any of the more delicate parts until he has gone much further with his lessons.

Sec. 63 — Types of Dial Screws

In most American movements the dial is held in place by means of dial screws inserted in the edge of the pillar or lower plate, the ends of these screws coming in contact with and holding the dial feet. When the dial feet are held in this way you can see that it is necessary to have the movement out of the case before removing or replacing a dial.

In the Swiss style shown here it is possible to remove or replace the dial while the movement is in the case. In other words, if it is necessary to take off the dial at any time to examine the pillar plate you can do so without taking the movement out of the case. Whenever you make repairs which require the removal of the dial on this type of watch, it is good practice to postpone replacing the dial until you have the movement in the case. This gives you an opportunity to see that the winding and setting mechanism is assembled correctly.

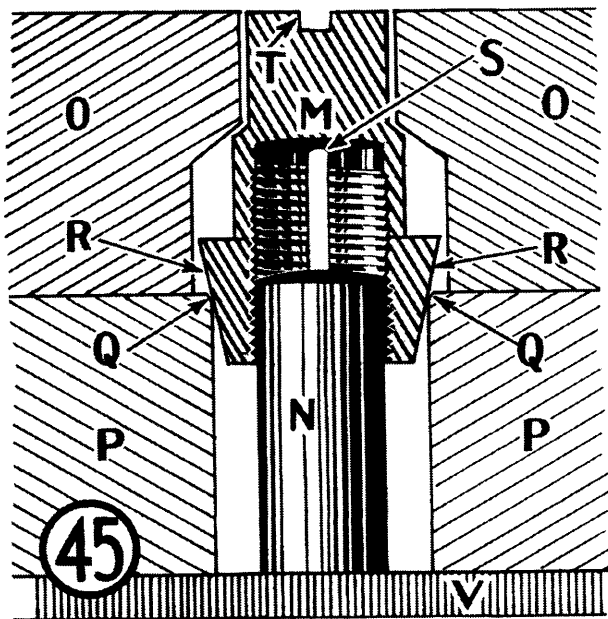
Figure 40 shows a typical Swiss 10½ ligne movement slightly enlarged. Instead of having the dial screws in the edge of the pillar plate they are placed on the plate as shown at A and B. Pins or dial feet are fastened to the dial and project through the holes in the plate seen right beside the screws. By means of these dial feet the dial is held in its place on the other side of the pillar plate.

In figure 41 is shown a drawing of one of these dial screws as fitted in the plate. N represents the dial foot extending through the plate M and attached to the dial O. S is the dial screw, the threaded part of which at C screws into the plate. The base of the screw fits in a slot in the dial foot as shown in the drawing at D. Part of the base of this dial screw is cut away, somewhat like the head of a half head case screw so that the dial foot can be pushed through the plate far enough for the slot to come in line with the base of the dial screw.

Before doing this the dial screw should be screwed down on the plate with the open side of the base directly over the dial foot hole. See A figure 40. After pressing the dial in place so

that the foot comes through the hole, the screw is backed out and the base of the screw fitting in the slot of the foot, lifts the dial foot until the dial is held against the plate on the other side.

This dial screw having a right hand thread is turned down, or to the right when you release the dial foot and backed out, or to the left when you wish to tighten it.



Sec. 64 — A Later Type of Swiss Dial Screw

Another type of Swiss dial screw is shown in figure 45. Here the hollow dial screw M is somewhat in the form of a split chuck fitting in a recess formed by holes drilled through the two plates, the hole in the upper plate being small enough at the top to prevent the dial screw from falling out. In this drawing O represents the upper plate and P the lower plate. The edge of the recess in the lower plate is slightly beveled at Q and the portion of the dial screw at R is cut on a taper. The hollowed out portion of the dial screw is threaded and slotted, having four slots similar to the one shown at S.

This screw fits over the dial foot N and is tightened by pressing down with the screw driver in the slot at T, the tapered side of the screw at R pressing against the plate at Q forces the threads into the soft metal of the dial foot N. Then by turning the screw to the right with a screw driver in the slot T the threads act on the metal of the dial foot at the same time drawing the dial V firmly against the lower plate P. The dial screw being of tempered steel and the foot N being of soft copper allows the hollow

thread of the screw to hold firmly on the dial foot.

In loosening this type of a dial screw it is only necessary to give it a partial turn to the left when it immediately frees itself from the dial foot. The same is true in tightening it, that is, it requires only a part of a turn after pressing the screw down to hold the dial foot and the dial firmly in place.

Before taking off the dial on either of these types of Swiss movements it is necessary to remove the minute and second hands. The hour hand may be left attached to the hour wheel and brought away from the movement with the dial. After the dial is removed the dial side of the movement will appear as in figure 43.

Sec. 65 — Be Fair to Your Customer and to Yourself

It is not the best policy to do repairs right before your customer. Of course if it is work done without pay you are justified in giving a demonstration of your skill and speed. There is always a temptation to show off, to let your customer see how quickly and perfectly you can do some of the minor jobs in watch repairing. However, this often makes him feel that you are not giving a square deal if you charge for doing something which may take only a few minutes. He does not stop to think that only after much study and practice are you able to determine just what is the trouble and turn out first class work in such a short period of time. In replacing parts, a new stem and crown for instance, even though you may be able to do it at once it is best to have the customer leave the watch and promise it for a future date, rather than to do the work while he waits. But be sure it is finished when promised.

At times you may have customers come in with a stopped watch where there is a temptation to overcharge. I have seen a watchmaker get \$3.00 for repairing a watch where the only thing that was needed was an adjustment of the second hand to such a height that it would not catch on the hour hand, the work of only a few seconds. His defense was that he was not charging for the time it took him to do this but rather for his skill and ability to make the proper adjustment. I believe you will find that if you do such little jobs as this right before your customer and then charge him nothing, you will be the gainer in the long run. Such acts establish confidence not only in your ability but in your honesty as well and nowhere else is honesty appreciated more by the public than in the jewelry and watchmaking profession.

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- W2-J5 - Stem: Swiss Type.
- W2-J6 - " Two-piece Snap-in.
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UNIT	WI
LESSON	2

Master Watchmaking
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JOB SHEET
W2-J1

STEM: Pendant Type With Screw Sleeve

TOOLS, EQUIPMENT AND SUPPLIES:

Sleeve Wrench - Flat Pliers - Screwdrivers - File - Case Opener

PROCEDURE

REFERENCE

HOW TO REPLACE NEW STEM IN PENDANT TYPE CASE USING SCREW TYPE SLEEVE

1. Remove movement from case. Les. 1
2. Remove crown. Les. 2 - Sec. 43
3. Remove stem and sleeve assembly. Sec. 44 - 45
4. Select new stem. Sec. 48
5. Insert stem into sleeve. Oil at point of contact. Sec. 49 - 51
6. Screw sleeve with stem into pendant to approximate position of original.
7. Replace crown.
8. Replace movement. Put case screws in place and tighten.
9. Snap crown into winding position. Check winding.
10. Pull crown into setting position. Check setting.
11. Make required adjustment to stem. Re-check winding and setting. Sec. 50

UNIT	VI
LESSON	2

Master Watchmaking
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JOB SHEET
W2-J2

SLEEVE: Screw Type

TOOLS, EQUIPMENT AND SUPPLIES:

Sleeve wrench - Flat pliers - Screwdrivers - Case opener - Assembly tweezers

PROCEDURE

REFERENCE

HOW TO REPLACE SCREW TYPE SLEEVE

1. Select the correct sleeve. Les. 2, Sec. 46
2. Assemble stem and sleeve. Oil at point of contact. Sec. 48 - 51
3. Screw stem and sleeve assembly into pendant to approximate position of the original. Sec. 49
4. Put on crown
5. Replace movement in case. Tighten case screws. Les. 1
6. Check winding and setting. Les. 9
7. If sleeve position requires adjustment, remove movement and crown and make adjustment.
8. Make final check for proper function of the stem and sleeve.

UNIT	WI
LESSON	2

Master Watchmaking
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JOB SHEET
W2-J3

STEM: Reversible Sleeve Type

INTRODUCTORY INFORMATION

These stems are selected by the size of the square, length and the tap size. Send sample of stem and sleeve when ordering.

TOOLS, EQUIPMENT AND SUPPLIES:

Flat pliers - Bench block - Case opener - Screwdrivers

PROCEDURE

REFERENCE

HOW TO REPLACE NEW STEM IN CASE WITH REVERSIBLE TYPE SLEEVE

- | | |
|---|--------------|
| 1. Remove movement from case. | Les. 1 |
| 2. Remove crown from stem. Stem and sleeve should slip out. | Fig. 29 - 37 |
| 3. Remove stem from sleeve. | Fig. 38 |
| 4. Select stem. | |
| 5. Insert stem into sleeve. | Fig. 38 |
| 6. Replace stem and sleeve and screw on crown. | |
| 7. Replace movement. | Les. 1 |
| 8. Make certain movement is in line and will wind and set properly. | |
| 9. Replace back and bezel. | |

NOTE: If crown does not fit close to case ring when in winding position, make required adjustment to threaded portion of stem.

UNIT	WI
LESSON	2

Master Watchmaking
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JOB SHEET
W2-J4

SLEEVE: Reversible Type

TOOLS, EQUIPMENT AND SUPPLIES:

Sleeve wrench - Screwdrivers - Case opener - Assembly tweezers - Flat pliers

PROCEDURE

REFERENCE

HOW TO REPLACE REVERSIBLE SLEEVE

1. Select the correct sleeve.
2. Assemble stem and sleeve. Sec. 52
3. Oil point of contact between stem and sleeve. Sec. 51
4. Place stem and sleeve in pendant and put on crown.
5. Replace movement in the case.
6. Check winding and setting for proper function.
7. Make required adjustment.
8. Final check for proper function.

NOTE: When ordering an individual sleeve, send sample sleeve and the stem.
If sample sleeve is not available send case also.

UNIT	WI
LESSON	2

Master Watchmaking
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JOB SHEET
W2-J5

STEM: Swiss Type

TOOLS, EQUIPMENT AND SUPPLIES:

End cutting pliers - File - Pin vise - Screwdrivers - Case opener - Assembly tweezers

PROCEDURE

REFERENCE

HOW TO REPLACE NEW SWISS STYLE STEM

1. Remove movement from case. Three piece and water-proof type of case require removal of stem before movement can be taken out. Sec. 60, 61
See W1 - J3.
2. Remove the old stem. Sec. 61
3. Identify movement and select stem. Les. 4
4. Insert new stem into movement. Make sure it is in winding position.
5. Replace movement into case and cut off the excess threaded portion which protrudes from case.
6. Remove stem.
7. Place stem in lathe or pin vise and smooth end of threaded portion with a file or stone.
8. Replace crown.
9. Replace stem and crown in movement.
10. Tighten set lever screw.
11. Replace movement in case.

UNIT	WI
LESSON	2

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JOB SHEET
W2-J6

STEM: Two-piece Snap-in

INTRODUCTORY INFORMATION

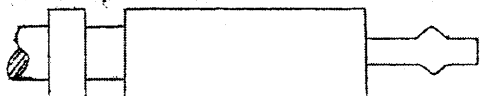
This type of stem is most commonly used with water resistant cases which do not have a removable back. The stem comes in two pieces which interlock when snapped into position. The two pieces are called the stem and the crown neck.

In order to remove the movement from the case the crown and crown neck must be detached from the stem. This is done by gripping crown firmly and pulling outward. After removing the movement from the case the set lever screw can be released to remove the stem.

Stems and crown necks come in a variety of lengths. Stems may have either a male tip locking end or a female lock slot. Crown necks also come in a variety of lengths and are available with both male and female lock ends with either male or female thread.

When ordering stems or crown necks always send correct identification of the movement. (Lesson 4.) If a sample of the part required is not available and included with order, the following must be furnished: distance between set lever slot and end of stem, indicate whether male or female stem. When ordering crown neck furnish length, indicate whether male or female locking and thread. The watchmaker generally carries a small selection of different lengths of stems and crown necks for replacement purposes.

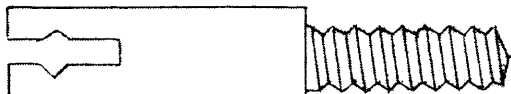
STEM: Male lock end



STEM: Female lock end



CROWN NECK: Female lock - Male thread



CROWN NECK: Male lock - Female thread



NOTE: Crown necks also with both ends female or both male.

TOOLS, EQUIPMENT AND SUPPLIES:

Screwdrivers - Flat pliers

PROCEDURE

HOW TO FIT TWO-PIECE STEM

1. Select the correct stem for the movement.

PROCEDURE CONTINUED

2. Insert stem in the movement.
3. Tighten set lever screw.
4. Test for proper function of the stem.
5. Put movement in back of case.
6. Assemble bezel, crystal and back.
7. Select the correct crown neck.
8. Screw the crown neck into the crown.
9. Place crown and neck in stem opening of the case.
10. Turn crown slowly as you press inward until parts snap in place and interlock.
11. Test winding and setting.

NOTE: If only stem is being replaced follow steps: 1, 2, 3, 4, 5, 6, 9, 10, 11.

If only crown neck is being replaced follow steps: 4, 5, 6, 7, 8, 9, 10,
11.

UNIT	WI
LESSON	2

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JOB SHEET
W2-J7

CROWN: Pendant Type

TOOLS, EQUIPMENT AND SUPPLIES:

Case opener - Screwdrivers - File - Flat pliers

PROCEDURE

REFERENCE

HOW TO REPLACE NEW POCKET WATCH CROWN

1. Remove movement from case. Les. 1
2. Select crown of proper size, shape, tap size and color to fit case. Sec. 47
3. Place crown over the pendant opening. (Should fit freely.)
4. Screw crown on stem.
5. Snap crown into winding position and make sure the crown covers the pendant opening.

NOTE: If crown does not cover pendant opening, a shorter post crown is required. If it does not snap into winding position a longer post crown is required.

6. Replace movement into case.

UNIT	WI
LESSON	2

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JOB SHEET
W2-J8

CROWN: Regular Swiss Type Bracelet

TOOLS, EQUIPMENT AND SUPPLIES:

Case opener - Screwdrivers - File - Flat pliers

PROCEDURE

HOW TO REPLACE NEW CROWN (WRIST WATCH)

1. Remove the movement from the case.
2. Remove the stem from the movement.
3. Select a crown of the color, size, opening, post length and thread size to fit the case and stem.
4. Screw crown on stem.
5. Replace stem and crown in movement.
6. Replace movement in case.
7. Check for proper clearance of crown and case.
8. Check for proper winding and setting.

NOTE: If winding and setting are not functioning properly the following corrections may be necessary:

Crown resting against the case, movement not winding properly; this is generally an indication that a crown with longer post or a new stem is needed.

Too much clearance between case and crown; either replace crown with short post crown or reduce the length of the thread on stem.

UNIT	WI
LESSON	2

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JOB SHEET
W2-J9

CROWN: Water-proof

INTRODUCTORY INFORMATION

In selecting a crown for a water-proof case, it is necessary to know the tap size, the case pipe or tube diameter, length of crown post, and color.

TOOLS, EQUIPMENT AND SUPPLIES:

Flat pliers - Screwdrivers - Case opener - Case vise

PROCEDURE

HOW TO REPLACE NEW WATER-PROOF CROWN

1. Open case.
2. Remove stem from movement.
3. Place crown over case pipe tube. Make certain it fits all the way down to the case ring. (The crown has a gasket inside so it will fit quite tight.)
4. Screw crown on stem.
5. Replace stem into movement.

NOTE: If crown does not fit down to case ring, the stem can be shortened.

If crown will not snap into winding position you should replace with a crown with a longer post or replace with a new stem.

UNIT	WI
LESSON	2

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JOB SHEET
W2-J10

BOWS: Antique, Round, Fancy

TOOLS, EQUIPMENT AND SUPPLIES:

Combination bow pliers (opening and closing)

PROCEDURE

REFERENCE

HOW TO REPLACE NEW BOW

1. Select bow of proper size and style to fit the case. Les. 2. Sec. 53, 54
2. Spring bow open with bow pliers and snap in place on pendant.
3. Check for snug fit.
4. If too loose, tighten with bow pliers.

NOTE: When ordering a new bow, indicate style of bow, size of case, color and measurement between contact points.

UNIT	WI
LESSON	2

Master Watchmaking
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JOB SHEET
W2-J11

STEMS: Tap Sizes

INTRODUCTORY INFORMATION

Information on tap sizes, Swiss & American.

SWISS STEMS sizes Tap #0 to #10.

Tap	*O.D. in MM	Inches
0	2.05	.081
1	2.00	.079
2	1.85	.073
3	1.65	.065
4	1.55	.061
5	1.45	.058

Tap	*O.D. in MM	Inches
6	1.35	.053
7	1.25	.049
8	1.15	.045
9	1.05	.041
10	.95	.037

AMERICAN STEM sizes from 18s to 3/0

Size	*O.D. in MM	Inches
18s	2.27	.089
16s	1.45	.058
12s	1.18	.046

Size	*O.D. in MM	Inches
6s	1.18	.046
0s	1.18	.046
3/0s	1.18	.046

*Outside Diameter.

TOOLS, EQUIPMENT AND SUPPLIES:

Stem with known tap size, wood, plastic or metal handle. Drill.

PROCEDURE

HOW TO MAKE A TAP GAUGE

1. Select stem with known tap diameter.
2. Break off pilot.
3. Drill hole in handle slightly smaller than the square on stem.
4. Mount stem in handle.
5. Mark tap size on handle.

NOTE: These sizes may vary as much as .03 to .04 of a millimeter, but are generally close enough to determine the right tap size of a crown.

