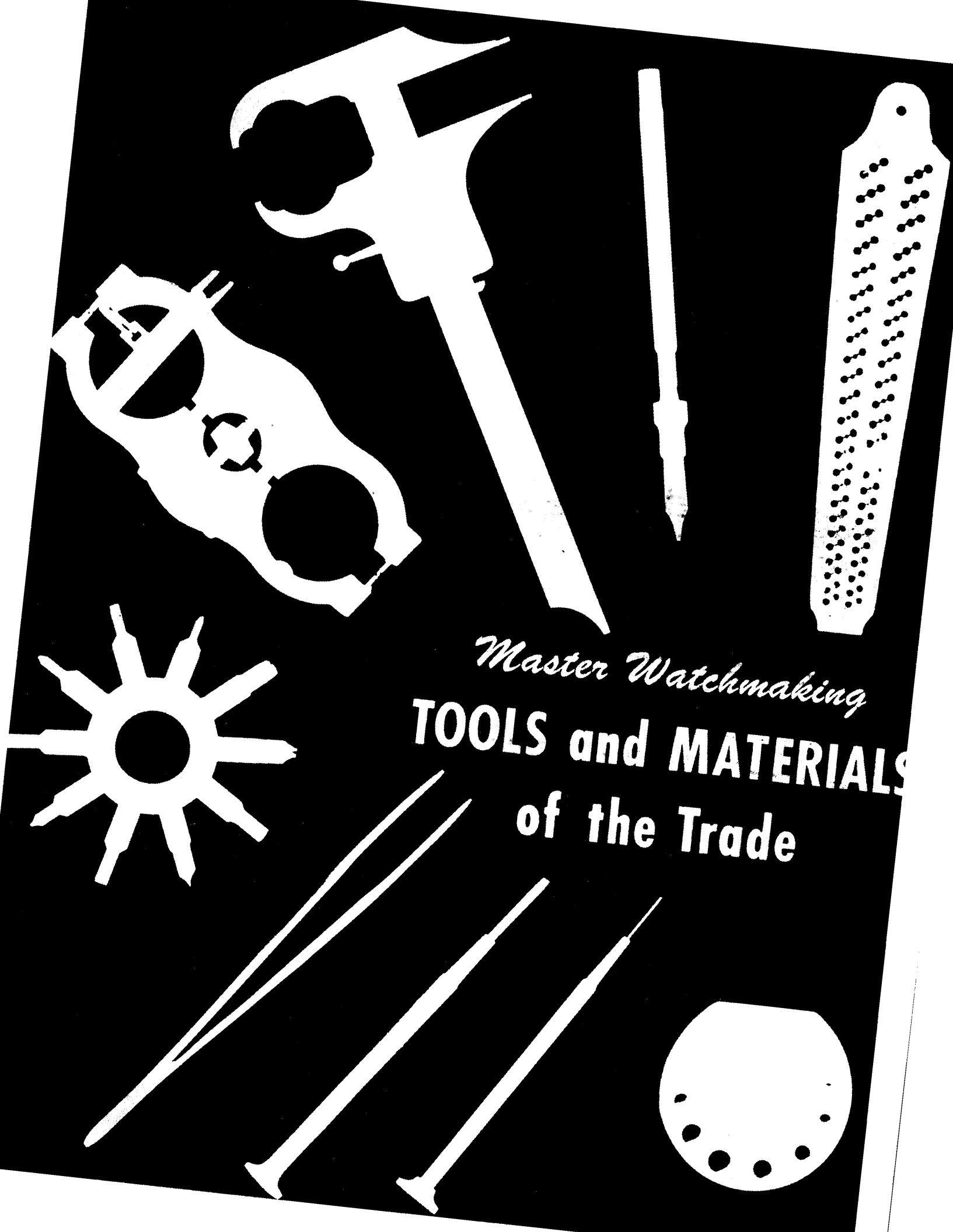
Master Watchmaking
TOOLS and MATERIALS
of the Trade

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Master Watchmaking

TOOLS and MATERIALS of the Trade

By

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Director, Chicago School of Watchmaking

1952

CHICAGO SCHOOL OF WATCHMAKING

Chicago, Illinois

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FOREWORD

This text was prepared with two thoughts in mind: One, to give you in brief form an understanding of the common tools used in watchmaking, particularly those used with Lessons in Master Watchmaking. Second, to assist you in the oftimes difficult task of ordering materials. Lack of knowledge about proper tools and right ways to order materials can be serious stumbling blocks for newcomers to watch repair. I hope this text will remove these barriers to learning and enable you to concentrate your full attention on mastery of watch repair itself.

These pages may come as a revelation to those who have the impression that the only tools needed for watch repair are a loupe, screwdrivers, and a pair of pliers. Watch repair is precision work and demands precision tools. Skill and knowledge alone are not enough, especially if you intend to work for profit.

In the old days, watchmakers made most of their tools. Some still do. There is less need to do so now, since most tools are generally available at moderate prices. Indeed, dollar-wise watchmakers realize it is better to spend their time today in profitable watch repair than at arduous and unnecessary toolmaking. Moreover, it is possible to buy a first rate set of tools for a very modest sum if you buy wisely. You should look upon tools as an investment rather than an expense, because they will repay their initial cost many times over in their long years of service.

The tools described herein include the basic tools most likely to be acquired as well as some others you should know about. Not every tool can be covered in the limited space. Those described should be considered only as representative. No attempt has been made to compare the merits of one manufacturer's item against another's. All that is intended is to give you an understanding of what a tool should do. Knowing this, you can more ably judge the advantages claimed for any particular make.

Even so, the task of selecting tools is not easy. Manufacturer's catalogs present a tempting -- but bewildering -- array. The ever-present question is "Which tools should I buy first?" A few suggestions may help determine the answer.

First, consider your aim in watchmaking. Hobby? Or career? Obviously the needs for both are not the same. The professional ordinarily requires more tools than the amateur. This is not only because he handles a greater variety of work, but he must do it fast and economically if he expects to make a profit.

Next, consider how often you will use a tool. If you are going to have frequent use for it, and can do better work with it than without it, you probably should buy it. By limiting your first purchases to the tools you will habitually use, you avoid tying up money in special purpose or limited-use tools. These will come later when you see the need for more speed or more convenience.

A third consideration is what you can afford. It is sound advice to buy the best tools, if you can. This may not be possible in your situation. Students, especially, must often economize. If this is true of you, you should have a good understanding of what tools are used for. You can then more readily decide where you can hold off buying a tool, or can use a less expensive one, and where it would be a false economy to buy a cheap tool. For instance, it is no particular disadvantage to use an inexpensive set of screw drivers while learning. You can buy a better set later at no great cost. But it would be folly to buy a cheap truing caliper or similar tool where accuracy demands a precision tool of high quality.

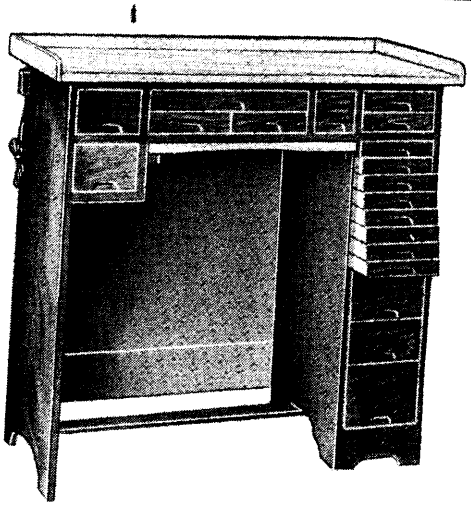
As a further help for those who must economize while learning, this text suggests some substitutes for certain tools, enabling you to postpone their purchase until you can afford them. These substitutes make use of other tools you are likely to have or other methods for doing the work. Such makeshifts are usually adequate for training, but should be replaced with the genuine article the first chance you have. In any event, don't force any tool beyond the limits for which it was intended.

When it comes to ordering materials, you should find these pages of considerable help. Typical methods for ordering and the type of information required are included to guide you in getting the exact material you want. Vague orders are a great expense, both for you and your supply house. They can mean extra correspondence, time lost and dissatisfied customers. If you realize this, you will understand the importance of this training and the value of this section of the text.

It ordinarily takes some years of practical experience to acquire the information that is presented so compactly here. I hope, therefore, that you will use these pages to advantage in speeding your progress.

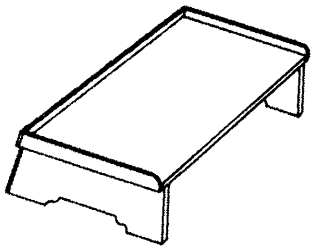
B. G. S.

WATCHMAKER'S BENCH



Watchmaker's benches are generally made of wood. They come in different finishes such as mahogany, oak and walnut. The bench contains small drawers and compartments in which the watchmaker can place his tools and materials. Average height is about 38 inches, width 22 inches and length 42 inches.

AUXILIARY BENCH

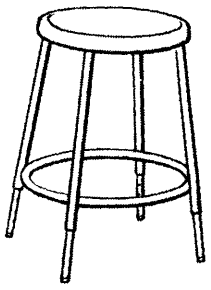


The beginner can improvise a working surface such as a table or drawing board. In order to raise the height of a table to 42 inches, it is advisable to make an auxiliary bench which can be set on an ordinary table and be readily removed and stored when not in use.

TOOL CHEST

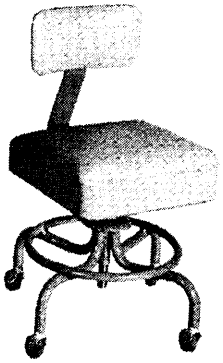
This portable cabinet is convenient for holding tools and materials if a regular bench is not available. It measures about 20 inches long by 9 inches wide by 12 inches high.

STOOL



A small stool is the most common form of seat used by the watchmaker. It should be adjusted to a height which allows the workman to rest his arms on the bench, at the same time keeping his shoulders back. This allows him to work without tiring as the bench supports the arms and proper breathing results. The beginner can use an ordinary chair.

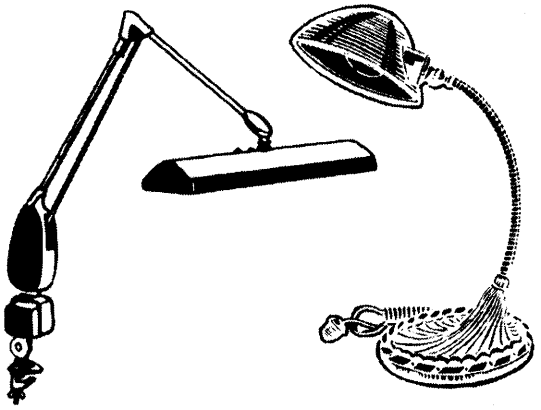
POSTURE CHAIR



The posture chair illustrated is becoming more and more accepted among watchmakers as a welcome addition to their equipment in making working conditions better. The better shops use this type of equipment, not only for watchmakers, but for all persons who sit down to do their work. It can be readily adjusted to fit the individual's requirements.

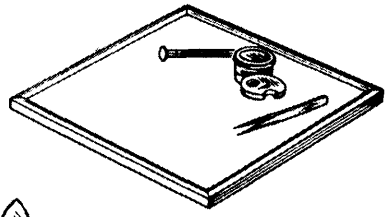
BENCH LAMPS

Good light is important. The watchmaker's bench should be placed as near to natural light as possible. North light is the most ideal. It is usually necessary to supplement the natural light with artificial light and there are many types of lamps for this purpose. A common gooseneck lamp with a round or oval reflector using about a 60 watt bulb is ideal. Another type is the fluorescent lamp which has been power corrected for watchmakers and is generally cooler.



BENCH PLATE

An auxiliary working surface of some sort of white material is recommended. A surface of hard enamel is not recommended. The beginner can use a piece of Bristol board or any white paper which will lie flat.

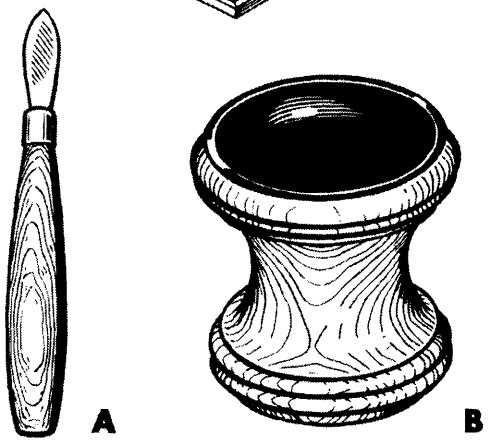


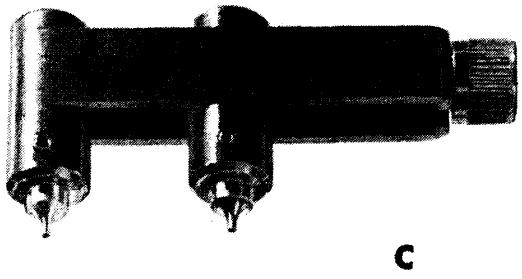
CASE OPENERS

A - Case openers are used to pry open the front and back of snap type cases. They come in many shapes and styles. They can be made from a piece of flat steel which has a curved edge and ground to a dull knife edge. It should be hardened and tempered. The beginner can use the blade of a small knife.

B - A rubber suction grip type of case opener can be used to remove the back and bezel on screw type cases of pocket size. The beginner may substitute a piece of rubber such as a small piece of inner tube.

C - A waterproof case opener is usually a type of wrench used to remove screw-back waterproof cases. There are many types of backs, requiring a variety of wrenches. The illustrated opener has reversible tips, which will open most types of screw backs.

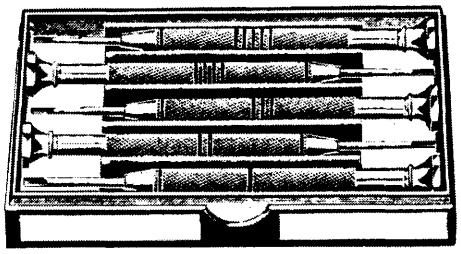


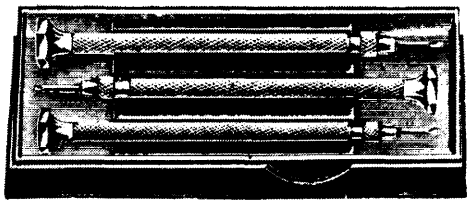


DOUBLE POLISHING CLOTH

This type of polishing cloth is comprised of an outer cloth, which keeps the hands clean when polishing metal, and an inner cloth which has been impregnated with rouge. It can be used to brighten all types of gold and silver jewelry, including the family silverware.

SCREWDRIVERS





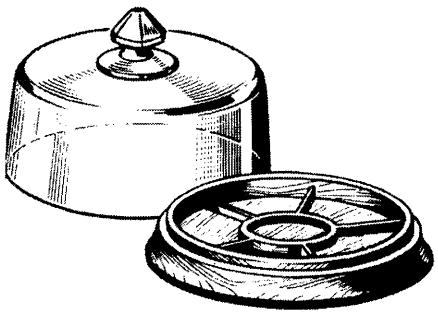
The blades of watchmaker's screwdrivers are made of hardened and tempered steel. The head of the screwdriver remains stationary against the finger which is placed upon it, while the stem and blade revolves freely when in use. Screwdrivers are made in a variety of blade widths to fit the wide variety of screw head diameters. It is necessary to select a screwdriver of a width slightly smaller than the screw head so as not to damage the screw head or the plate.

The smaller screwdrivers, used to remove jewel screws, range in size from .60 mm to .85 mm.

ASSEMBLY TWEEZERS

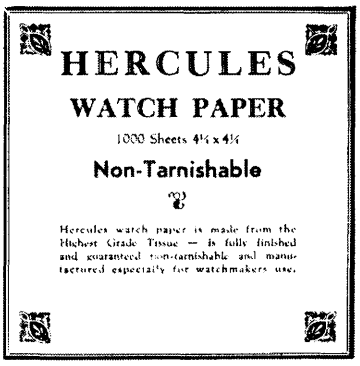
There are many types of watchmaker's tweezers. The assembly tweezer is a general purpose tweezer used for assembly work and handling watch material. The type illustrated is an excellent tweezer for general work but there are many other different styles and shapes of points.

MATERIAL TRAY AND COVER



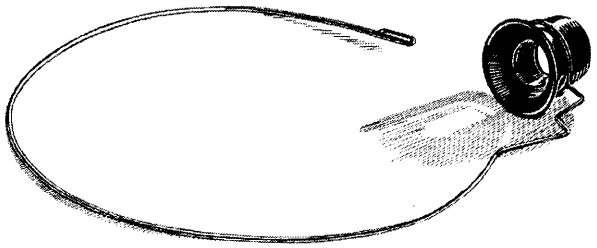
Most material trays are divided into sections in which to place the parts of a watch as it is disassembled. For example, train wheels in one section, balance and escapement in another, and so on. Most trays are covered in order to keep the parts free of dust and moisture. The beginner may use a clean porcelain dish, such as a saucer with an inverted glass.

WATCH PAPER



Watch paper is used when handling parts of watches or watch movements. It is made from high grade, tarnish-proof tissue and usually comes in sizes about 2-1/4 x 2-1/4 and 4-1/4 x 4-1/4 inches. The tissue is placed between the fingers and the movement or parts when handling. The beginner can substitute a good grade of tissue which has been cut to either of the dimensions given. Watch paper is also used to wrap parts of watches and materials when sending samples to the supply house.

LOUPE OR EYEGLASS

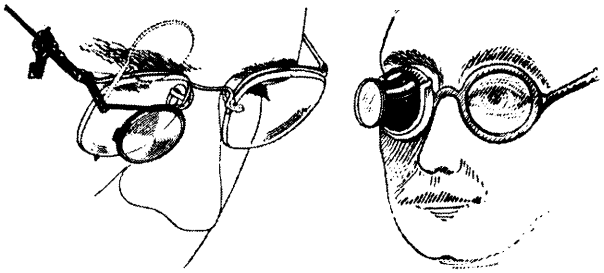


For the person who is not required to wear glasses a single eyeloupe is recommended for all general purposes. It can be held in place by using a head wire. The loupe should be approximately a 3 inch focus. This is comparable to a magnification of 3.3 times.

DOUBLE LOUPE

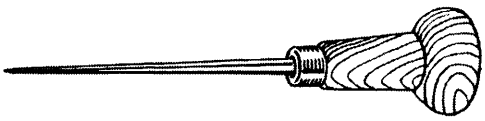
A two lens loupe used for close work and more magnification. The outer lens can be removed, thus reverting to a single loupe. Double loupes are available in many different powers and focus. The ideal double loupe for general work should magnify approximately 7-1/2 times.

SPECTACLE LOUPE



For the person who must wear glasses to correct vision, this type of spectacle loupe is preferred. It is quickly attached and detached. A 3 inch focus is recommended for general bench work. For those wearing bone rim glasses, a loupe similar to this is made to fit the frame. A loupe holder may also be used to attach the regular loupe to the glass frame.

AWL

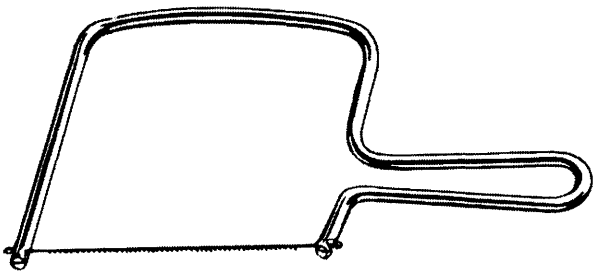


An ordinary awl is extremely handy around the watchmaker's bench. It can be used for punching holes in leather, opening clasps on bands and marking outlines in plastic etc. Any sharp pointed instrument may be substituted.

SOLDERING TWEEZERS

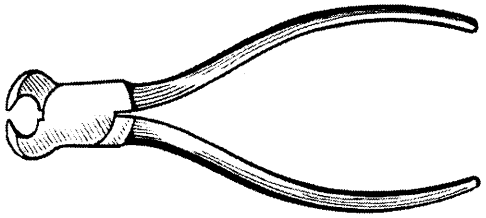
These tweezers are used to hold materials when heating, hardening and soldering. Some tweezers have a clamp as an added feature.

COPING SAW



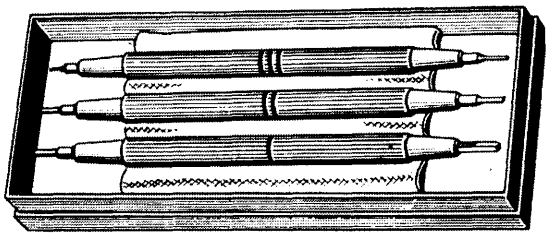
A small inexpensive coping saw is useful for cutting wood and plastic. It can be obtained at most hardware stores.

END CUTTING PLIERS



An end cutting plier of the type illustrated is another of the common type of watchmaker's pliers. It is made to cut soft steel, brass, nickel, and other materials.

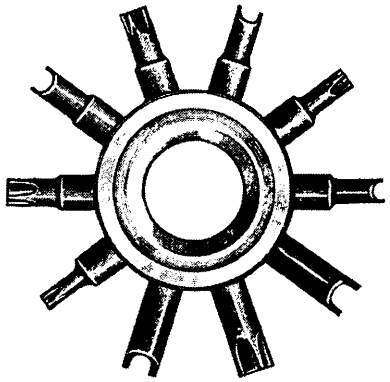
BENCH KEYS



These usually come in sets of three with double end and are used for winding and setting watches after removal from the case. They are seldom applicable to watches of Swiss manufacture, which use a different type of winding and setting arrangement. The beginner can readily make a set of bench keys from steel rod. After the pieces have been shaped to the proper size squares they should be hardened and tempered to a blue color. They can then be mounted in handles of metal or wood. The following dimensions are the most common:

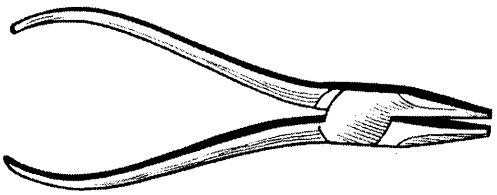
Length of square	Thickness of square
.6 mm	1.5 mm
5.5 mm	1.3 mm
4.5 mm	1.1 mm
4.5 mm	1.0 mm
3.3 mm	.8 mm
3.3 mm	.6 mm

SLEEVE WRENCH



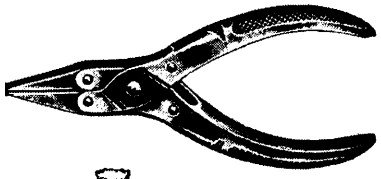
Sleeve wrenches have 3, 6 or 10 prongs. The prongs are of varied shapes and sizes and are used to remove or adjust sleeves, generally in pocket watch cases.

FLAT PLIERS



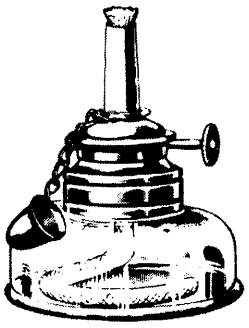
Flat pliers have a variety of uses to the watchmaker and jeweler. A flat plier of good quality, approximately 4-1/2 inches long, is ordinarily used. The beginner may use any type of plier by taking precaution not to mar the surface of the parts being worked on.

PARALLEL JAW PLIERS



Used to hold small objects more securely. They differ from the conventional flat nose pliers in that the jaws remain parallel whether open or closed.

ALCOHOL LAMP

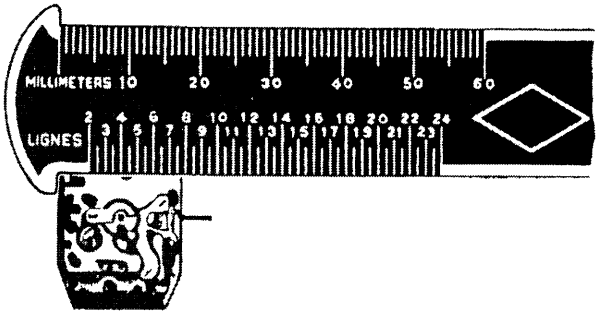


A small alcohol lamp similar to the one shown is a necessary piece of equipment for the watchmaker's bench. The fuel for these lamps is usually obtainable in a drug or paint store and is a denatured alcohol suitable for burning.

BENCH KNIFE

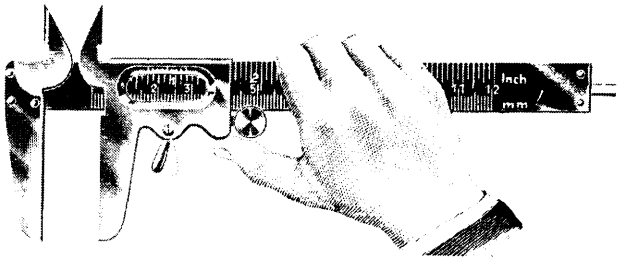
A small sharp knife used to sharpen peg wood. Any small pocket knife will suffice as a substitute.

LIGNE GAUGE



A small ligne gauge is usually obtainable from your supply house. It is handy to measure the diameter of movements to determine the size; however, it is not generally as accurate as the millimeter gauge.

MILLIMETER GAUGE

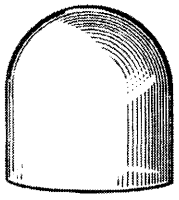


The gauge illustrated is a common type of millimeter gauge with a vernier for subdividing the millimeters into tenths. It is used for measuring the length and outside diameter depth in millimeters. MM is the abbreviation for millimeter. Later a description will be given of the micrometer, which measures to one/one-hundredth of a millimeter.

CLOCK OIL

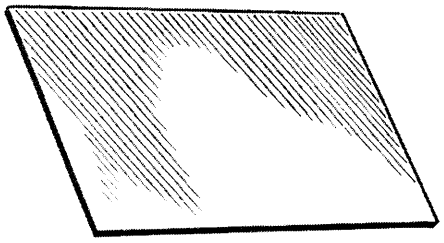
Clock oil, while principally used for oiling pivots on a clock, is used by the watchmaker to oil mainsprings and the winding and setting parts of the watch. It should be kept covered at all times and in a dark place. It should be removed from the bottle several drops at a time and placed in an oil cup. This assures the watchmaker of having clean, fresh oil at all times. Do not add fresh oil to the oil cup without first disposing of any remaining old oil.

CRYSTAL FORMER



For the beginner, any half round object of glass or metal and about 4 inches across will serve. A smaller size is desirable for small crystals. The crystal is shaped over the former and should be formed high enough to let the hands of the watch rotate without rubbing.

CRYSTAL MATERIAL

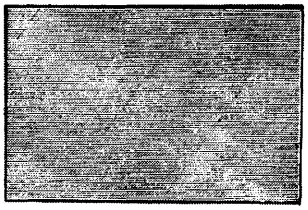


Crystal material for making and forming fancy shape watch crystals is usually of plastic, the most common of which is known by the trade name PLEXIGLASS. It can be formed and polished with a minimum of effort.

POLISHING PASTE

A good silver polishing paste can be used to polish the edges of a crystal after the rough edges have been smoothed with crocus paper. This polish can also be used to polish silverware and jewelry.

CROCUS PAPER

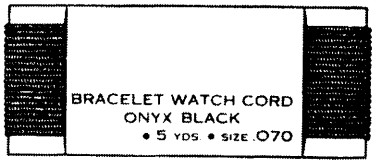


This is an abrasive material which is glued to smooth paper. It is used to remove scratches from metals and plastic. The student may use it to smooth the edge of non-breakable watch crystals.

CRYSTAL CEMENT

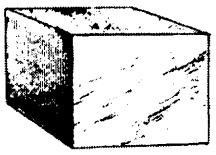
Crystal cement generally comes in tubes. These tubes are made with a needle cap which allows the cement to flow freely. Replacing the cap will keep the cement clean and liquid. It is used primarily as a sealer between the bezel and the crystal to keep dust from entering and not to hold the crystal in place.

BRACELET CORD



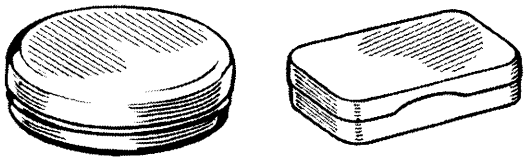
Replacement cords for ladies watch bands come in different diameters. The principal color is black. The old cord is used as a guide when replacing the cord. After the new cord has been cut to length, the ends should be dipped in hot wax.

PARAFFIN WAX



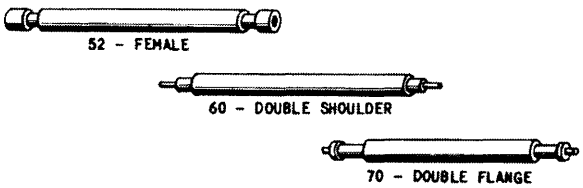
A small piece of paraffin wax is ideal for tipping the ends of the cord bands used on ladies' watches. The wax can be heated in a small material can.

MATERIAL CAN



Small metal containers of varying shapes are known in the trade as material cans. They are usually furnished by the supply houses to hold watch material in mailing.

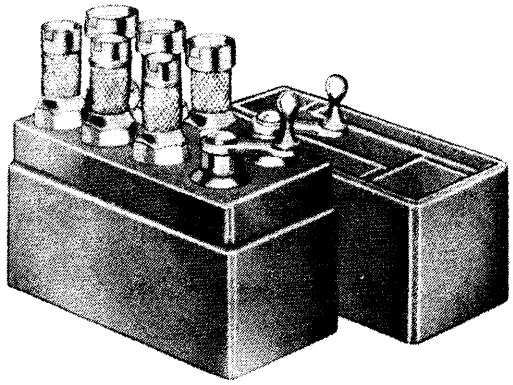
SPRING BARS



A small assortment of spring bars should be kept handy at all times. They come in assorted lengths in either regular or thin diameters.

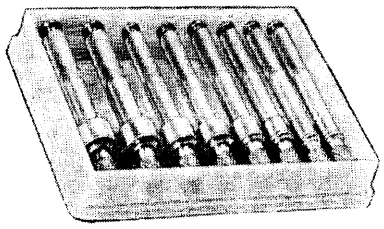
MAINSPRING WINDER for Pocket Watches

The mainspring winder is an indispensable tool used to insert the mainspring in the barrel. The winder illustrated has six loading barrels, the smallest being 8.8 mm, and is graduated up to 16.0 mm. It comes with two sizes of winding arbor. This winder is used on pocket size watches.



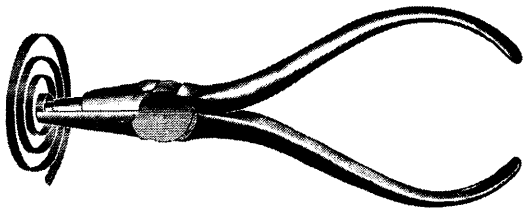
MAINSPRING WINDER for Bracelet Watches

This set of 8 mainspring winders for bracelet watches ranges in size from 5 mm to 10 mm. They are a necessity for the watchmaker who works on small watches. There is no practical substitute for a mainspring winder.



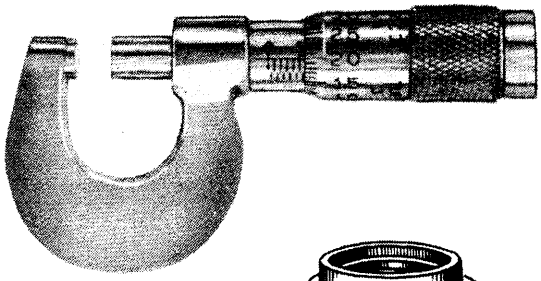
MAINSPRING COILING PLIERS

These pliers, with a specially designed end, are used to adjust the inner coil of a mainspring to fit the arbor. Slight alterations can be made with a pair of heavy tweezers if care is used not to snap off the end.



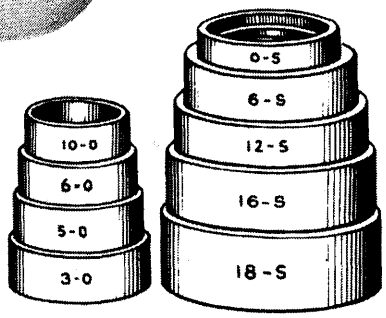
MICROMETER

The illustrated metric micrometer is graduated in 1/100 of a millimeter. This is a must item for the beginner as well as the professional. Practically all working parts of a watch are gauged in hundredths of a millimeter.



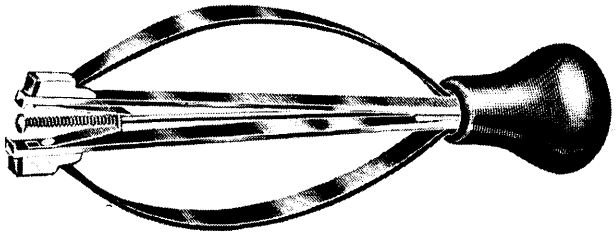
ASSEMBLY BLOCKS

The assembly block is a cylinder used to hold the movement while working on it. The illustrated set is of plastic and ranges in size from 7-3/4 lignes to 18 size.

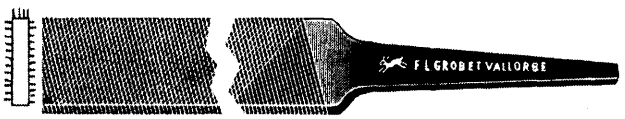


HAND REMOVER

This tool is designed to remove the hands of a watch without damage to the dial. Some of the old time watchmakers use two small screw drivers to pry up the hands while protecting the dial with either celluloid or watch paper.

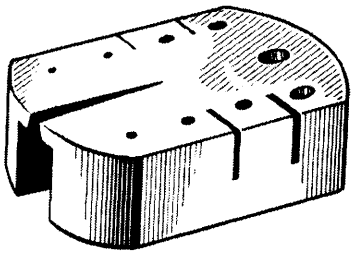


FLAT FILE



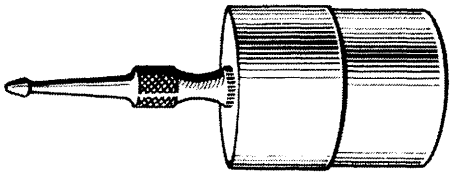
An ordinary file is in order around the watchmaker's bench. As a general rule, watchmakers have a variety of small files, but the reference here is to a flat file from six to ten inches long and with a medium cut.

BENCH BLOCK OR ANVIL



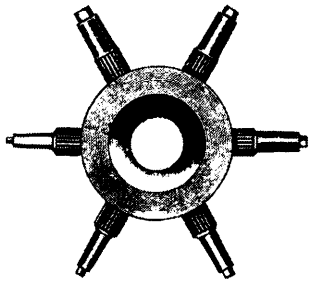
This steel block has various size holes and slots to support different parts of the watch on which work is being done.

BLOWER



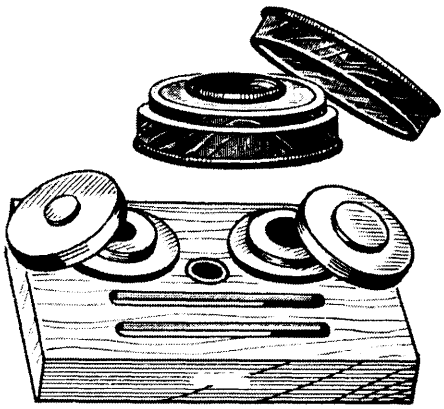
Used to blow off particles of lint or for drying certain parts of the watch, such as the balance and pallet fork. Not an essential item for the beginner, but a must for the professional. The beginner may substitute a small rubber syringe which can be purchased in a drug store.

JEWEL PUSHER



This tool is used to push out jewel settings such as a cap and balance jewel in setting. The tool has several size pushers to match different size settings. The beginner may use pegwood cut to the required size.

OIL CUP



Watchmakers use a small covered receptacle to hold oil. Only a little oil should be kept in the cup at a time and the cup should be cleaned frequently. The watchmaker should have at least three oil cups:

1 for clock oil
1 for regular watch oil
1 for bracelet watch oil

The beginner may be able to obtain small glass salt cups for this purpose.

HARD WATCH BRUSH

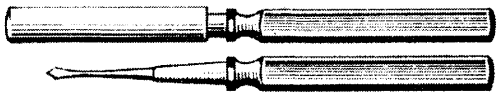
This brush is used in the hand method of cleaning watches to scrub plates and other parts. It is made of materials that will not set up a chemical reaction in the solutions, which might cause corrosion.

SOFT WATCH BRUSH

Used to remove any particles of dust or lint that may settle on the parts of the movement after cleaning. This brush should not be used after the movement has been assembled due to the presence of oil and the possibility of smearing it.

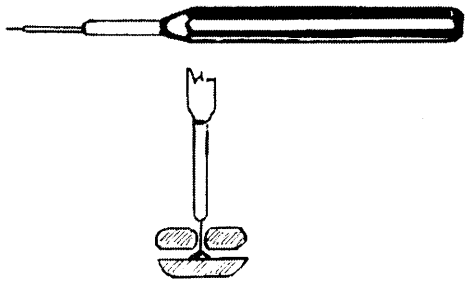
WATCH OILERS

Used to oil the parts of the watch. They are usually made of steel or nickel ground to a diamond-shaped tip. They are available in a variety of sizes, the smallest being used to oil those parts requiring the smallest amount of oil, and so on. The beginner may make his own oilers from needles. The illustration shows the shape of the tip.



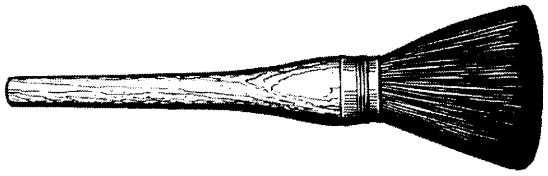
OIL INSERTER

This tool is used to induce oil through the balance hole jewel onto the cap jewel. The beginner may make one by reducing a fine piece of steel such as a needle to a very fine point, approximately 5/100 mm.



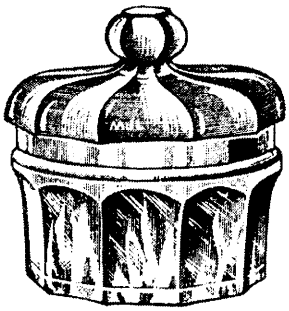
DIAL BRUSH

Used to brush off the dial after the movement has been assembled as well as to remove any dust or lint before casing the movement.



ALCOHOL CUP

Used by the watchmaker as a container for alcohol, benzine, naptha, and so forth. These are solutions used in cleaning. The alcohol cup is usually fitted with a ground glass top, which retards evaporation. The beginner may use any small glass jar.

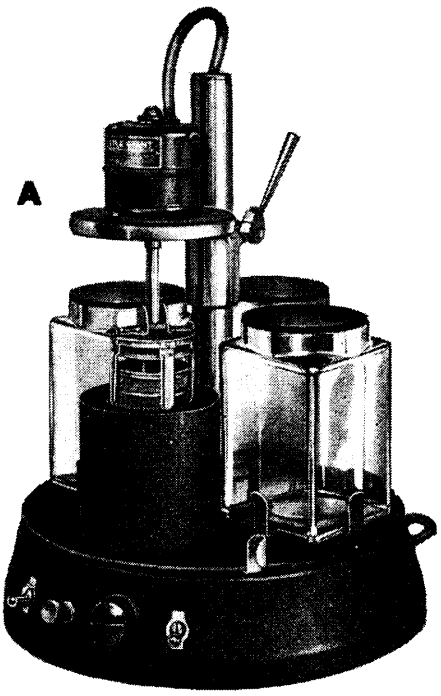


GLASS JARS

These pint jars hold cleaning solutions. The beginner may use mason jars or any other good substitute so long as there is not a rubber seal on the jar. Cleaning solutions will cause rubber to dissolve and contaminate the solution.

BRASS WIRE

Used to string parts for hand cleaning. Also used in lathe work.



A

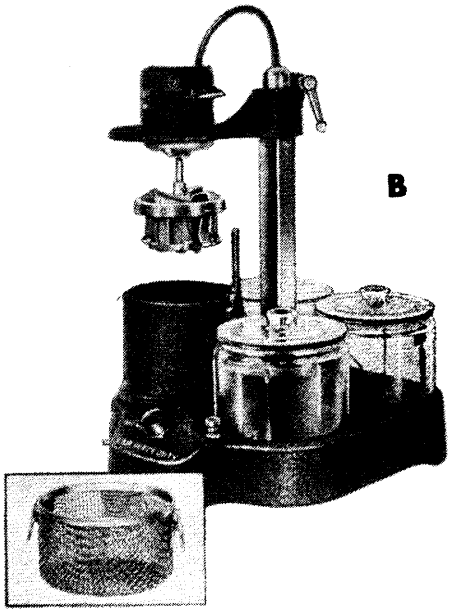
CLEANING MACHINES

Cleaning machines are a modern, time-saving device used to clean watch parts. They are generally found in the best shops; and, when properly used, have increased the profits of the repair department.

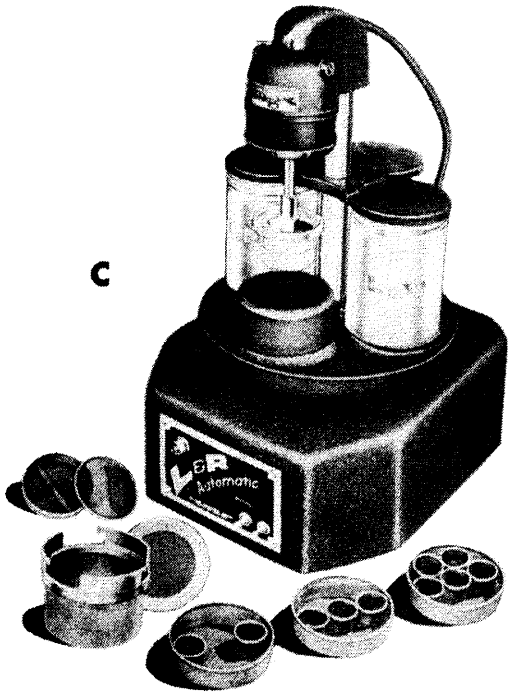
When first introduced, there were some claims that the watch need not be taken apart for cleaning. This brought quick condemnation from expert watchmakers and, for a while, the machine was not accepted in the trade. Nonetheless, as with everything that has merit, it was gradually adopted by watchmakers who began to use it properly and found it produced excellent results. It remains a fact, however, that any machine in the hands of an indifferent workman will not produce the best results.

There are many good machines on the market. They are all similar in that the watch must be completely disassembled, the parts placed in a basket which is attached to the machine, run through a series of cleaning and rinsing solutions, and then dried.

Some machines have a built-in electric dryer. They differ in the amount of automatic operation. Some have automatic reversing in which the basket moves automatically from one solution to another, and will clean as many as three watches at a time. The choice of a machine and solutions will depend on the needs of the individual.



B



C

Figure A is a general all-purpose cleaning machine electrically-driven, with a revolving base. It illustrates the four-section wire basket in place. This type of machine is generally recommended for the average watchmaker.

Figure B is a heavy duty machine, used in production work. It will clean three separate movements at one time. It also features a basket for clocks.

Figure C is a fully automatic watch cleaning machine. After the basket has been placed in the machine and the machine started, it automatically takes the parts through the cleaning and rinsing solutions and dryer.

WATCH OIL

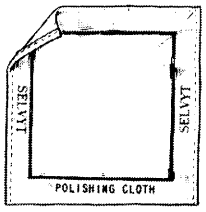
A fine grade animal or fish oil is used to lubricate the moving parts of a watch.

OILSTONE POWDER

This abrasive powder is used in finishing metal. It is mixed with oil into a paste. When applied to a grinding slip, it may be used to grind pivots or other steel surfaces.

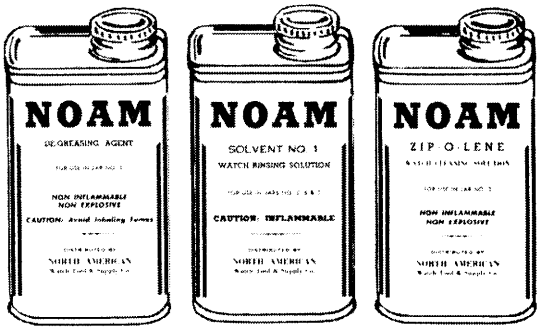
SELVYT CLOTH

This type of cloth is used by watchmakers and jewelers in handling watches and jewelry to keep it free from finger marks. It is a lint-free, washable cloth.



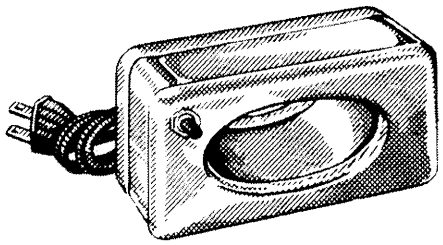
CLEANING AND RINSING SOLUTIONS

There are many commercially prepared cleaning and rinsing solutions in use. They are alike in this respect: they remove the old oil, clean and brighten the parts, and dry without leaving any sediment. Many watchmakers prepare their own solutions, using formulas that have been found to give satisfactory results.



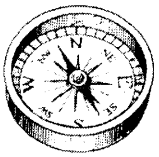
DEMAGNETIZER

This is an electrical device used to remove magnetism from a watch movement. It is a desirable piece of equipment, for there is no other convenient method of demagnetizing.



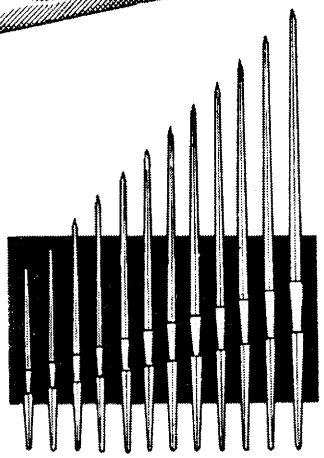
COMPASS

A small magnetic compass is used to detect magnetism in a watch.



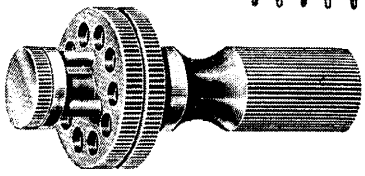
LARGE BROACHES

These are tapered cutting tools designed to enlarge holes. They are usually made up in assortments of different sizes. They are used in fitting hands to movements and similar jobs.



HAND BROACHING DEVICE

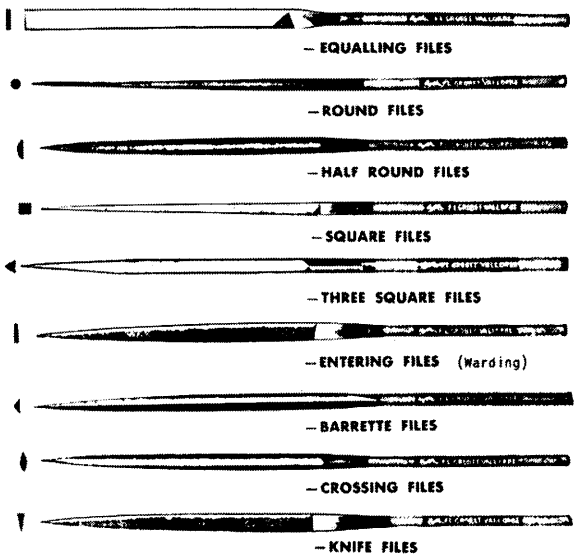
This vise-like device is used to hold hands while they are being broached.



NEEDLE FILES

These are small, fine-cutting files that come in a variety of shapes. They are used on many jobs requiring fine work, such as fitting and shaping of regulator pins.

The first five files illustrated are the ones most commonly used by the watchmaker.



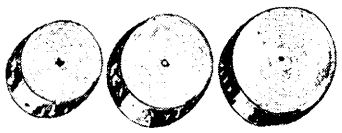
PEGWOOD

These are round sticks of Dogwood used for cleaning purposes. They are usually obtained from France. Pegwood comes in three sizes: small, medium and large. The last is usually called "clock pegwood" because its main use is for clock work. The medium size is more commonly used by the watchmaker. The smallest size is handy for tiny bracelet watches.

Pegwood can be sharpened to a point like a pencil. It is used in cleaning to reach hard-to-get-at places, such as pinion leaves. It can also be wet with naptha and used to peg out pivot or jewel holes. Cut to size, it can serve the beginner as a jewel pusher.

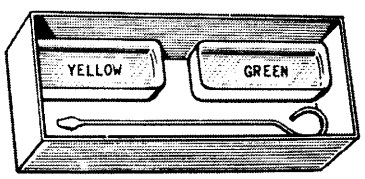
PITHWOOD

A soft, sap-free wood from the center of Elder tree branches. The watchmaker finds many uses for it. The sponge-like nature of the wood allows delicate parts to be pushed into it without damage. One use, therefore, is to clean oil from pivots before inspection. Another is to hold wheels, pinions and staffs while they are being measured or examined. Fine pointed tools, watch hands, and so forth can also be stuck into pithwood for safekeeping.



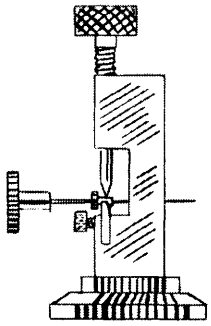
LUMINOUS PAINT KIT

A compound which may be used to refinish luminous hands. The mixture has a wax base and comes in a paste form. It is applied to the hands with a metal applicator, which has been warmed and dipped into the pan of paint. The heat causes a small amount of paint to stick to the applicator and melts the paint enough to flow it onto the hand while still warm. If the result is uneven, it may be trimmed with a knife blade.



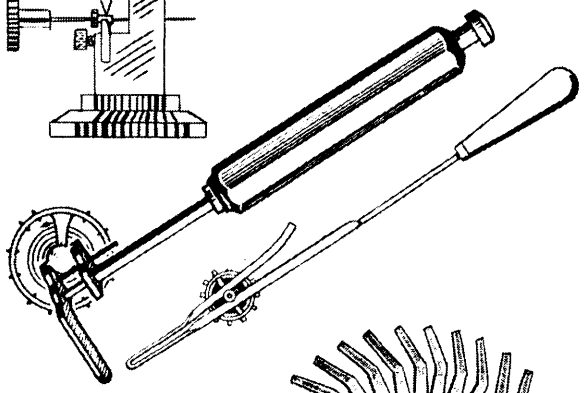
CANNON PINION TOOL

Used to tighten a cannon pinion. There are other methods used to close or fit a cannon pinion but the cannon pinion tool is considered the most practical and safest method.



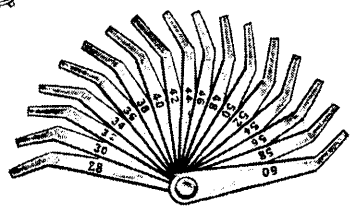
ROLLER JEWEL SETTER

Used to hold and conduct heat to the roller table in order to set or make adjustments to the roller jewel.



ROLLER JEWEL GAUGE

A feeler gauge used to measure the pallet fork slot to determine the proper size of roller jewel.



TIMING WASHERS

These are small brass washers used in poising balance wheels and timing of watches. They come in assortments, and are segregated in sizes and weights to fit the different sizes of watches. The weight is designated by a listing of the approximate amount of time it will alter a watch, such as 1 minute, 2 minutes, etc. This listing refers to a pair of washers placed on opposite screws near the neutral point on the balance wheel rim.

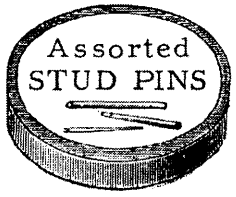
GENUINE AUNES
For American and Swiss Watches

COMPLETE ASSORTMENT No. 5
TIMING WASHERS
From 3¾ Ligne to 18 Size

Bottle	Ligne	Min.	Bottle	Size	Min.
47	3¾	2	57	10/0	1
48	4¼	1	58	10/0	2
49	4¾	2	59	0	1
50	5¼	1	60	0	2
51	6	2	61	6	1
52	6½	1	62	6	2
53	7		63	12	1
54	8		64	12	2
55	9		65	16	1
56	10		66	16	2
			67	18	1
			68	18	2

STUD PINS

Small tapered brass pins used in studding hairsprings. May also be used in replacing regulator pins etc.



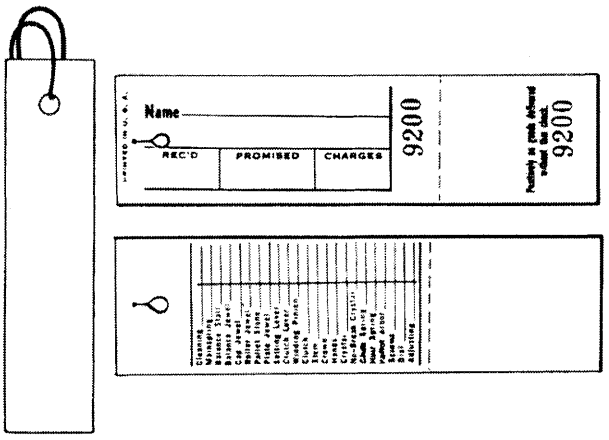
SHREDDED SHELLAC

This shellac is used in cementing roller jewels.

STICK SHELLAC

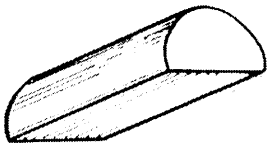
Used with the lathe in cementing jewel settings, staffs, etc. This cement may also be used for setting roller jewels if you have no shredded shellac.

WATCH TAGS



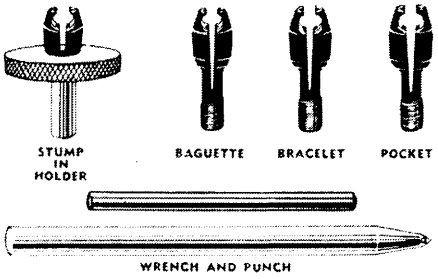
Tags are used by a watchmaker to identify a customer's watch during repair. These tags may be plain, in which case you will fill in the desired information, such as name, date, charge, and so forth. More elaborate tags include a tag number, space for explanation of work performed, and the like. Tags are excellent for the beginner to use in recording repairs made in his practice work.

ROLLER JEWELS



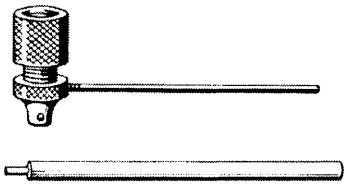
When doing repair work it is desirable to have an assortment of roller jewels in a complete range of sizes, including both short and long jewels to fit both single and double rollers. The "D"-shape jewels are the most commonly used. They are gauged in 1/100 mm.

ROLLER REMOVER



This tool is used to remove roller tables and is designed for use with a bench block or staking tool. See page 22.

STAFF REMOVER



This tool is designed for use with the staking tool and is used for removal of riveted balance staffs. See page 22.

PIVOT ROUNDER

This small tool is fitted with a sapphire end which is placed over the bent pivot. Revolving the rounder between the fingers forces the pivot back to its original position. It also removes burrs and polishes the pivot.

PIN VISE

A small hand vise is used to hold small objects, such as a stem, needle, and similar items.

SCREW HEAD FILE

A very fine-cutting, knife-edge file used to cut the screw driver slot in the head of a screw. It is also used to shape regulator pins and the like.

FRICTION JEWELING TOOLS

This tool is used to ream, press in and make adjustments to friction jewels. If the jewel to be replaced is a friction jewel, you need only press out the cracked or otherwise damaged jewel, determine the size of the hole (if the hole is not damaged), press in a friction jewel of the proper diameter and pivot hole size and adjust for proper end-shake. If the hole has been damaged, you should ream it with the next size reamer and then press in the proper size jewel.

In replacing other types of jewels with friction jewels, a more thorough knowledge of jewels and jewel settings is needed. This additional information can be found in Lessons in Master Watchmaking 12, 13 and 14.

BASIC SET

The basic set will usually consist of the following:

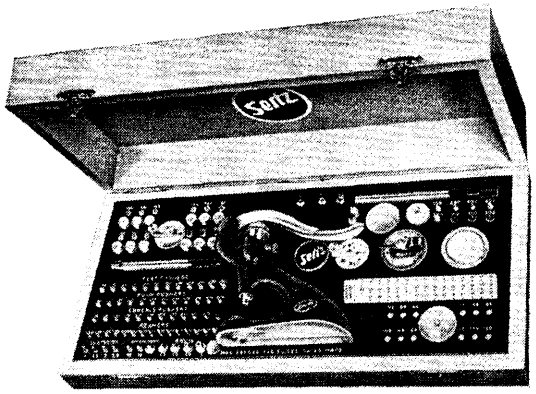
- Friction jeweling tool (with micrometer adjustment to control depth)
- Reamer holder
- Reamers (12 to 15)
- Pusher holder
- Pushers (12)
- Anvils (5)

COMPLETE SET

The complete set will usually include in addition to the basic parts:

- Concave pushers
- Pump pushers
- Hole reducing punches
- Set of tools for setting friction pallet arbors.

DELUXE SET



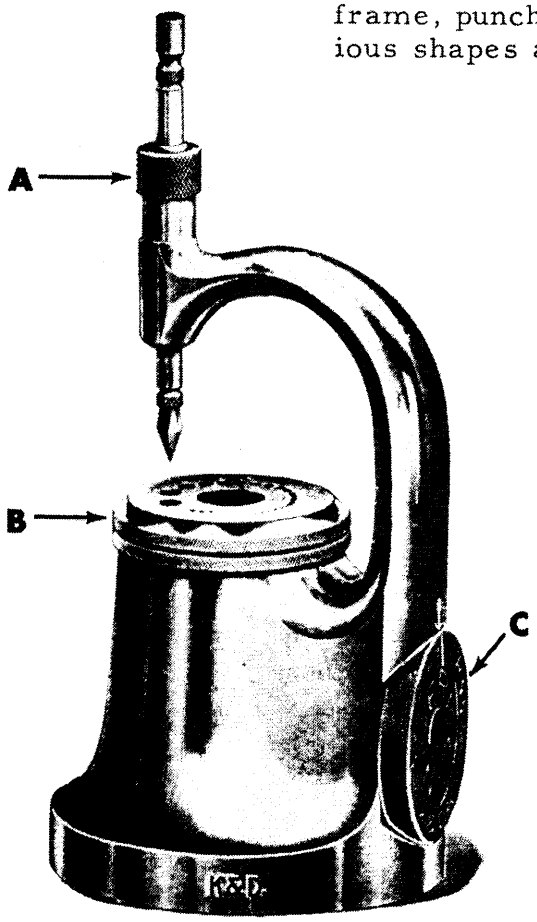
The deluxe set will usually include in addition to the parts listed above:

- Grinding stone (for refacing pushers)
- Holder for jewel settings
- Face plate with additional clamps
- Set of centering points
- Set of pushers and anvils for setting hands.
- Handle with set of chucks
- Tool for straightening pivots
- Pivot gauge
- Uprighting pump tool

THE STAKING TOOL

The staking tool is a tool of many uses, such as, removing and replacing a balance staff, closing pivot holes, removing or replacing pinions, replacing hands, replacing a hairspring, etc. With a few exceptions the following information will apply to all staking tools.

The staking tool consists of the following parts: the staking frame, punches in various shapes and sizes, and stumps in various shapes and sizes.



STAKING FRAME

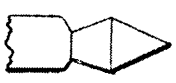
STAKING FRAME

The punch guide A is aligned with the die plate B so that the punches will always be perpendicular to the die plate. The die plate may be turned so that any hole may be aligned with the punch. Turning the knurled wheel at C will lock the die plate in any desired position. The holes in the die plate are gauged and centered and give you the right spread of sizes from small to large.

STAKING PUNCHES

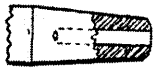
Practically all work on the staking tool will require that the proper hole in the die plate be aligned with the punch. The centering punch serves this purpose.

CENTERING PUNCH



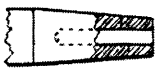
First determine the hole in the die plate to be used. Then insert the centering punch through the punch guide into the hole in the die plate and lock the die plate in position before removing the punch.

ROUND FACED HOLLOW PUNCH



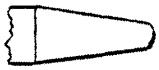
Its most common use is in staking balance staffs. After the die plate has been centered, the staff with wheel in place is placed in the die plate, and a round faced hollow punch of a size just slightly larger than the collet seat is used to spread the rivet on the staff.

FLAT FACED HOLLOW PUNCH

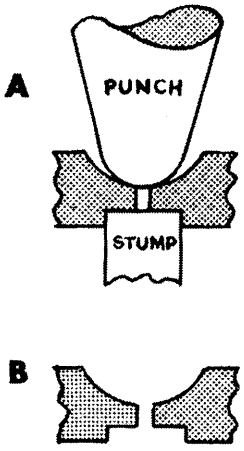


Used for finishing the riveting of balance staffs. After using a round faced hollow punch to spread the rivet, a flat faced hollow punch of the same size hole is used to finish off the top of the rivet. This punch has many other uses, such as pressing the hairspring collet on the staff, hands on watches, and the like.

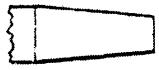
ROUND FACED SOLID PUNCH



Generally used for closing pivot holes etc. The proper size of punch to use is determined by the size of the oil cup and should fit as shown in illustration A. The bottom of the plate should be properly supported with a stump or inverted punch and if there is a recess as shown in illustration B, the stump should be of a size which will fit the recess. This punch has a variety of other uses such as closing the hole in a minute hand, closing the hole on a single roller, and so forth.



FLAT FACED SOLID PUNCH

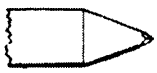


Generally used as an inverted stump.

HOLLOW TAPER MOUTH PUNCH

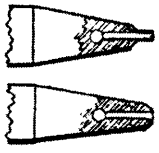
Used for closing holes, such as hour hand, and for closing collets, etc. Use care in selecting the proper size of punch.

STAR PUNCH



Sometimes known as the triangular point punch. It is used to close the hole in rollers by raising small burrs equidistant around the edge of the hole.

CROSS HOLE PUNCHES

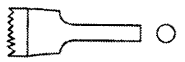


Used in removing and replacing Waltham friction staffs. These punches are designed to fit over the pivot and rest on the cone rather than against a shoulder.

ROLLER DRIVING PUNCH

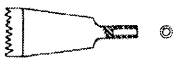
This punch was designed to replace single rollers. It is a flat face hollow punch with a slot cut in the edge to accomodate the roller jewel. Modern methods of replacing a roller do not require the use of this punch.

SCREW KNOCKING PUNCH



This punch is designed to drive out a screw which has been broken off in the plate. This is practical only if you have an oversize screw available and also a tap of the proper size to cut new threads, as the old threads will be stripped. The more practical method of removing a broken screw is to use an acid solution which will dissolve the steel screw and leave the brass or nickel threads intact.

INCABLOC ROLLER PUNCH



This punch is designed for use in replacing an incabloc roller. The incabloc roller has a raised edge on the bottom. This punch fits within this edge and so minimizes the possibility of damage to the roller.

STUMPS

The manufacturers have done little to modernize their assortment of stumps. In most staking sets may be found stumps no longer in common use, as more modern tools and methods have been devised. Using the inverted style of tool, any of the punches can be turned over and used as stumps.

FLAT FACE SOLID STUMP

This type of stump has a variety of uses. Most staking sets have several of these stumps in different sizes. They may be used any time a flat solid surface is desired.

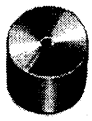
FLAT FACE HOLLOW STUMPS

Most staking sets are equipped with these stumps in a variety of sizes. They may be used to support a plate when drilling, broaching, etc.

FLAT FACE TAPERED HOLLOW STUMPS

Used to support the hub on a Waltham friction type balance when the staff is being removed.

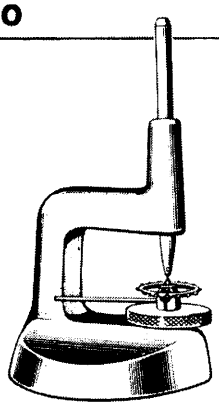
FLAT FACE STRAIGHT HOLE STUMP



Used to support a Waltham friction staff while the wheel is being staked on.

ROLLER REMOVING STUMPS

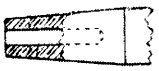
These stumps were designed for use in removing roller tables. More modern tools and methods have been devised to remove rollers.



A PRACTICAL STAKING SET for Beginners

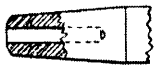
This set consists of a small, solid base frame, ten punches, five stumps, plus a reamer holder, reamer, and jewel pusher for friction jeweling. The various pieces are all standard size and may be used in other staking sets. Additional punches, stumps or attachments, such as a roller remover (illustrated), can be added.

FLAT FACED HOLLOW PUNCHES



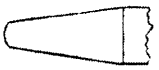
This type of punch is used to replace wheels on pinions, and to finish the riveting on balance staffs. It is a very versatile punch.

ROUND FACED HOLLOW PUNCHES



Round faced hollow punches are most commonly used to rivet over the countersinks on balance staffs and pinions.

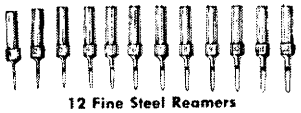
ROUND FACED SOLID PUNCHES



This type of punch is used for peening (flattening or spreading metal) and for closing holes in plates or bushings.

REAMER HOLDER AND REAMER

The reamer holder and reamer are used in friction jeweling. They will fit all standard staking frames. Reamers for this holder are available in the following sizes (millimeter measurement):

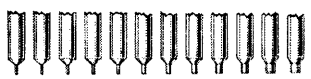


12 Fine Steel Reamers

.69	.99	1.39	1.79
.79	1.09	1.49	1.99
.89	1.19	1 59	2.29

FRICTION JEWEL PUSHER

This pusher is made with end sizes as listed below, which enables the watchmaker to remove, replace and adjust friction jewels and bushings, or to remove and replace balance hole and cap jewels in settings. Pushers can be made from 3/16 inch (4.7 mm) round steel stock, which should be hardened and tempered to a blue. These end measurements are in millimeters.



12 Polished Steel Pushers

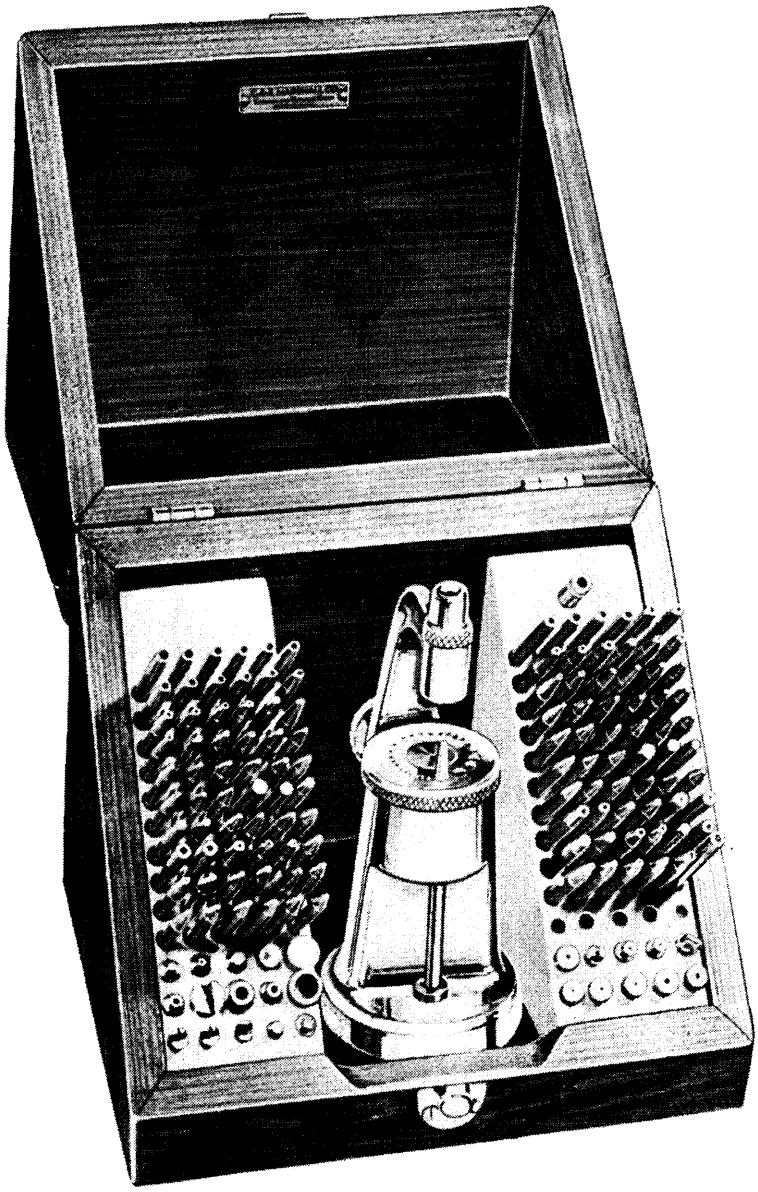
.55	.85	1.30	1.85
.65	.95	1.50	2.10
.75	1.05	1.60	2.65

STUMPS

Stumps are useful when milled or recessed surfaces are to be worked on. The base of the frame is drilled to accomodate the stumps, as well as other attachments, such as a roller remover, which also can be used on the frame.

WATCHMAKER'S STAKING SETS

The professional watchmaker's staking set usually contains from 80 to 120 punches and 20 stumps. More punches allow a greater variety of sizes to be handled. This is important to the watchmaker who has to work on many different makes of watches. Having the proper size punch readily available will speed up the work. For the beginner who intends to follow up watchmaking as a career, this investment should be carefully considered. The set illustrated here has 120 punches and 25 stumps and can be equipped with a friction jeweling attachment. The punches can be inverted as illustrated. As shown in the table below, it is also possible to start with a smaller set and add other punches as necessary or as you can afford them. A staking set will last a lifetime, if given average care.



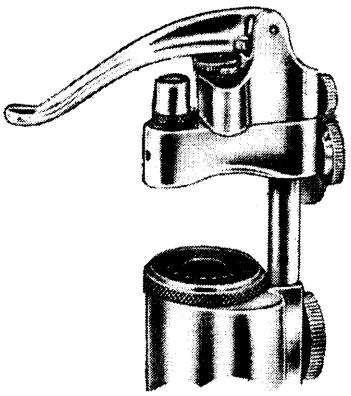
Staking tool sets can be purchased in different combinations, the most common of which are listed below:

133	punches	25	stumps
120	"	20	"
* 100	"	20	"
* 80	"	20	"
60	"	12	"
** 48	"	8	"
** 36	"	6	"
** 24	"	4	"

* These sets come in boxes drilled for 120 punches and 30 stumps. Thus, you can add punches and stumps to these sets at any time.

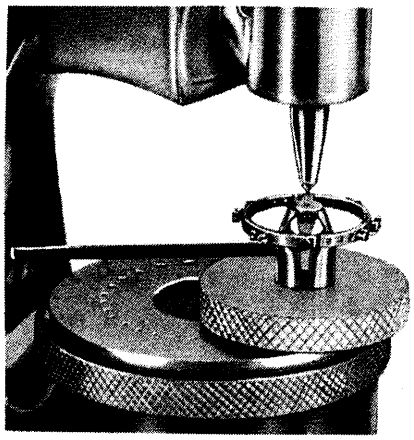
** These sets come in boxes drilled for 60 punches and 15 stumps, enabling you to add punches and stumps to these sets at any time. They are useful starter sets.

FRICTION JEWELING ATTACHMENT



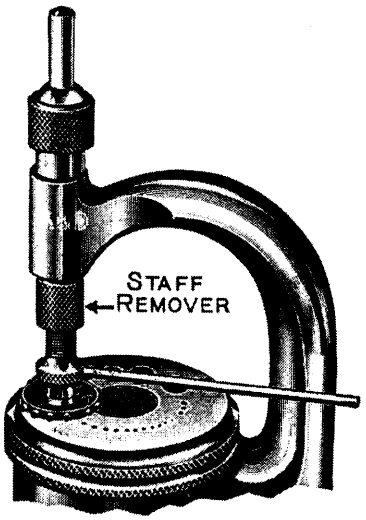
Many manufacturers of staking sets also make a friction jeweling attachment to fit the staking frame. It is more desirable to have a separate friction jeweling tool, but for those doing watch repair as a hobby or side line, this attachment will take care of most needs. With the attachment are included reamers, reamer holder and pushers. This attachment may be permanently attached to the staking frame without interfering with normal use of the tool.

ROLLER REMOVER



This tool, used in the removal of single or double rollers, is designed for use with the staking tool. The illustrated tool has three adjustable stumps in different sizes which allows the tool to be used to remove rollers in practically any size watch.

STAFF REMOVER



This tool, also designed for use with the staking tool, is used in the removal of riveted balance staffs. The staff and wheel are placed on the die plate in a hole just large enough to accommodate the hub of the staff. Using the screw adjustment on the staff remover, the arms of the wheel are pressed down firmly against the die plate, thus preventing the arms from bending when the staff is driven out.

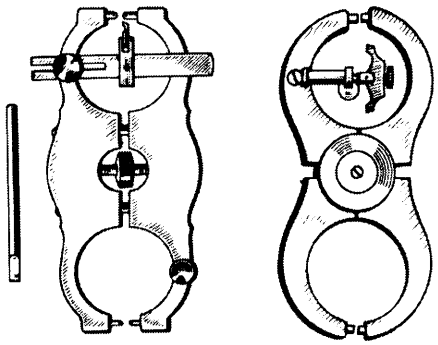
(A more desirable method than this of removing a balance staff, is to place it in a lathe and cut away the hub. This method minimizes the chance of damage to the wheel.)

BRASS HAMMER

This brass hammer is used with the staking tool. A steel hammer should never be used as it will damage the punches. About 3 oz. weight is the proper size hammer.

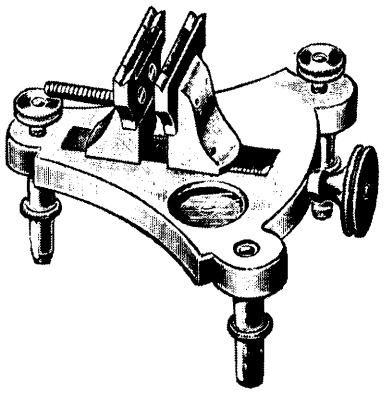
TRUING CALIPERS

A tool in which to place a balance wheel to check for truth in round and flat and make the necessary adjustments. Two types of calipers are illustrated; one with a screw adjustment to open and close, and the other which works with hand pressure. Each tool has a moveable indicator and a wrench to make adjustments of the arms of the balance.



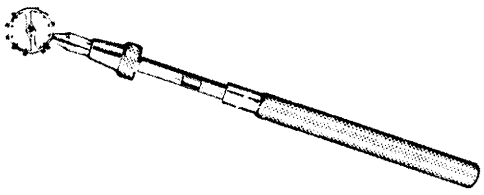
POISING TOOL

This tool is used in checking the poise of a balance wheel. The one shown has three legs. Two of these are adjustable so as to level on your working surface. The jaws are of highly polished sapphire or ruby jewels. With general use and care, these jaws will never need refinishing. The adjustable jaws make it possible to use this tool for any size of balance. Poising tools also come equipped with highly polished steel jaws and this type is equally serviceable if the jaws are kept highly polished.



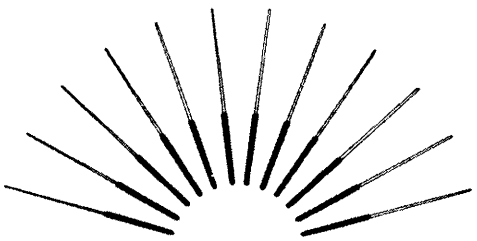
BALANCE SCREW HOLDER

This tool is used to hold and remove a balance screw after it has been loosened with a screw driver. Undercutting to remove weight can be done after removing the screw from the holder while timing washers may be added without removing the screw from the holder.



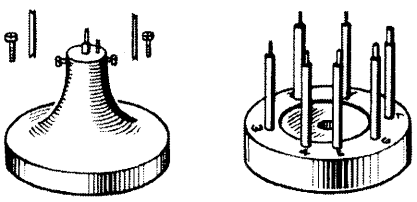
PIVOT BROACHES

These come usually in assortments of twelve and are available in sizes to correspond with the smallest pivots. They are used to broach or clean pivot holes in train bushings or plates.

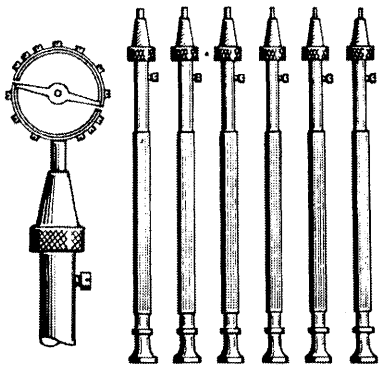


UNDERCUTTERS

Used to remove weight from a balance screw by cutting from the under side of the screw head. A set ordinarily has the variety of sizes necessary to undercut the different size balance screws.

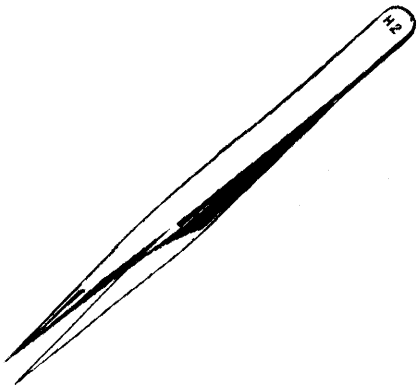


BALANCE SCREW CUTTERS



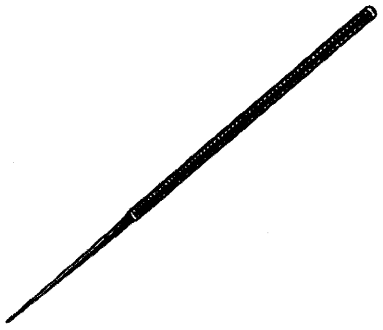
This is a Swiss type balance screw cutter used to remove weight from the balance wheel. It cuts a cone in the head of the screw without taking the screw from the wheel. The preferred method is to undercut with the lathe or the undercutting tool; however, many Swiss manufacturers use this type of cone cutter.

HAIRSPRING TWEEZERS



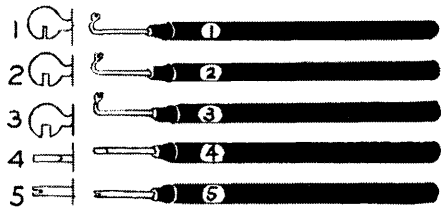
These are fine-pointed tweezers used only on hairsprings. Due to the delicate points it is not recommended that you use these tweezers for any other work. The tips are graded from very fine to coarse. Each manufacturer has a different system for designating the fineness of the tips. Usually the largest number will designate the finest tip. The beginner should start with a medium-fine tip and then add others as the need arises.

TAPER PIN



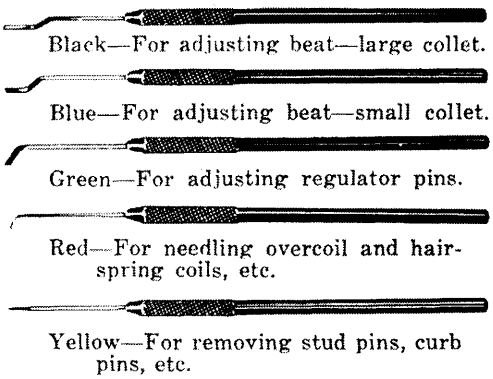
A steel pin used in working on hairsprings. It is mainly used as a holding tool for the collet and hairspring. It is tapered to a size that will accomodate all sizes of collets. You may substitute a broach or other tapered steel rod.

HAIRSPRING LEVELER SET



This set of five tools is designed to make adjustments to the hairspring while in the watch. It has three sizes of hairspring leveler tools, one tool for centering and one tool to adjust the regulator pins. These tools are not necessary for the beginner.

HAIRSPRING 'PIX'



Black—For adjusting beat—large collet.

Blue—For adjusting beat—small collet.

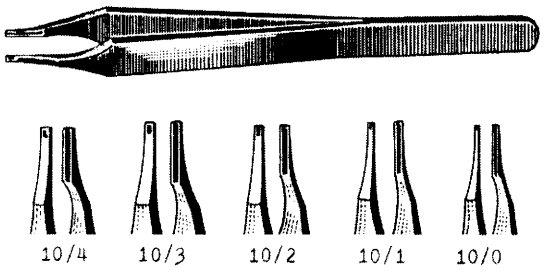
Green—For adjusting regulator pins.

Red—For needling overcoil and hairspring coils, etc.

Yellow—For removing stud pins, curb pins, etc.

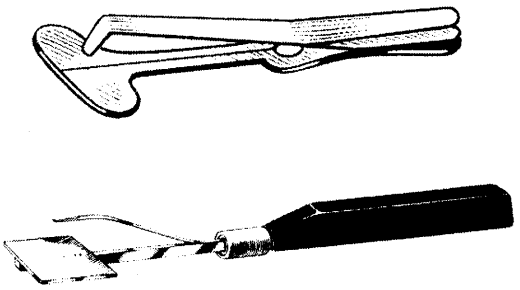
This set of five tools is used in the manipulation of the hairspring. The illustration explains the use of each tool.

OVERCOILING TWEEZERS



These tweezers are used to form the overcoil of a hairspring over the body of the spring. The illustrations show the different sizes of curved tips. 10/0 or 10/1 are recommended for general use. This tool is not essential for the beginner as the overcoil may be formed by using a pair of hairspring tweezers and a taper pin.

PALLET WARMER

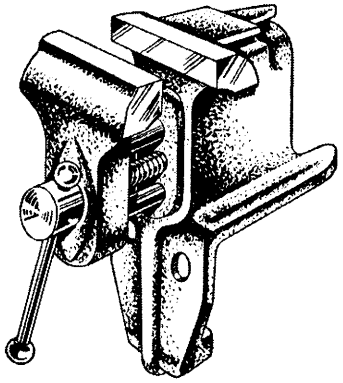


This tool is used to hold and apply heat to a pallet fork. The pallet stones are cemented into the fork with shellac. This cement will melt when heat is applied. Therefore, this becomes an essential tool whenever a pallet stone has to be adjusted or replaced. Heat should never be applied directly to the pallet fork, as direct heat will draw the temper from the steel fork and arbor. The part of this tool which holds the pallet fork is split to allow each pallet to be heated separately.

BOILING CUP AND BOTTLE

When ever it is found necessary to remove shellac from any part of a watch, such as the pallet fork, roller, etc., the recommended method is to boil the part in alcohol. The illustrated bottle with hole cut in cap is used to contain the part and alcohol (half full will be sufficient). A small amount of water is placed in the boiling pan, the bottle placed in the pan and heat applied until the alcohol boils sufficiently to dissolve the shellac. A low flame, such as an alcohol lamp, should be used to minimize the chance of igniting the alcohol fumes. Alcohol is highly inflammable.

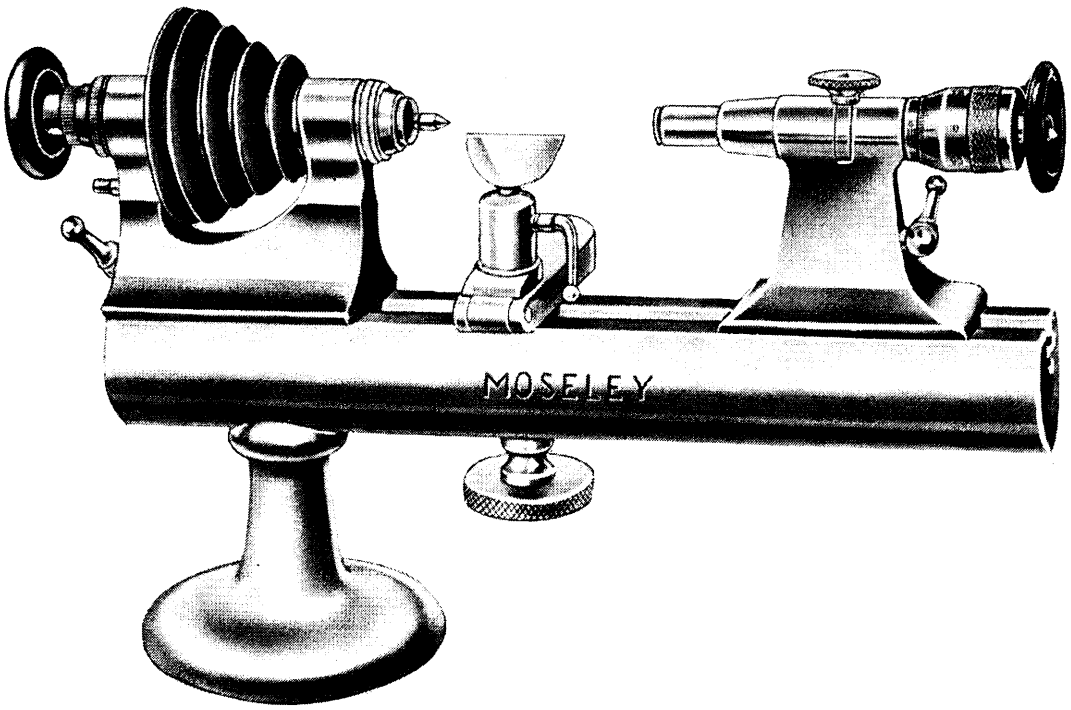
BENCH VISE



The bench vise has always been part of the watchmaker's equipment. It is used in the making or refinishing of tools and other small watch parts. The beginner will find it necessary to make certain tools which cannot be purchased, and so a bench vise should be a part of his equipment.

THE WATCHMAKER'S LATHE

The watchmaker's lathe is the most versatile tool at his command. With the lathe and its attachments, all manner of work can be done, from delicate, precision fitting of parts to making a complete watch, if need be. It enables the watchmaker to handle repairs he might ordinarily have to send out. And many jobs can be done in minutes with a lathe that would take hours to do by hand.



No simpler or more effective machine has yet been devised to do the multitude of jobs that the lathe can handle. Wheel cutting, jeweling, polishing, grinding pallet jewels, making balance staffs, opening wheels and jewel holes, uprighting, tapping screw holes, pivoting staffs -- these are but a few of the tasks that can be done efficiently on a lathe. Even though it is possible today to buy practically any part for any watch, many of these will need alteration to make a perfect fit. Alterations like changing the diameter of the roller seat, the collet seat, or the wheel seat on a balance staff can be done properly only on a lathe. As a result, the lathe is an investment that is well worth while. Even if used but a few minutes a day, it will repay its purchase price many times over. Properly used and maintained, the lathe will last a lifetime. It is considered a "must" tool for the professional.

THINGS TO LOOK FOR IN SELECTING A LATHE:

Choosing a lathe is largely a matter of personal choice and available budget, for today it is possible to find good lathes in almost every price range. However, price alone should not be the deciding factor, as accessories and minor features, such as finish, somewhat control the price. There are more basic things to look for:

The lathe bed should be of firm construction and preferably formed from a single casting. The head stock should be movable on the lathe bed, so the pulley can be aligned with the pulley on the motor. The pulley should be a step pulley to permit adjustment of speed and power desired. It should also turn freely, bearings should be fitted, and no end shake or side shake should be apparent. It should be possible to adjust the bearings.

The spindle should take standard size chucks and have a key way to assure each chuck fitting in the same position. Both lathe and chucks should run perfectly true.

An index should be affixed to the pulley. An index is a circular plate with evenly spaced holes into which an index pin may be placed to lock the moving parts in any desired position. The lathe also should have a hinged or tip-over T-rest.

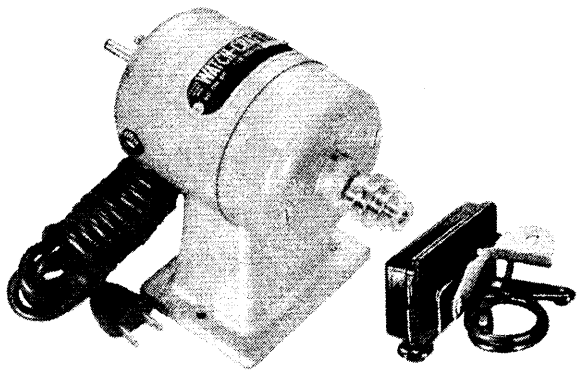
The tailstock is less used than formerly when the individual watchmaker had to make most of his parts himself. The beginner can postpone purchase of a tailstock. The professional usually acquires one in time.

There are many accessories that can be had for use with the lathe. A few are described in the following pages, but these are by no means all that are available. Some are necessities. Others are simply an added convenience on certain jobs and can be considered special-purpose tools in nature. The type of work habitually done as well as available funds will largely determine the worth of an accessory to the individual watchmaker. The beginner is advised to start with just the basic items and add others only as a need is felt for them.

Space here permits but a hint on the selection and usefulness of the lathe and its accessories. For detailed information on its possibilities, we refer you to Ward Goodrich's authoritative book on the subject: "The Watchmaker's Lathe."

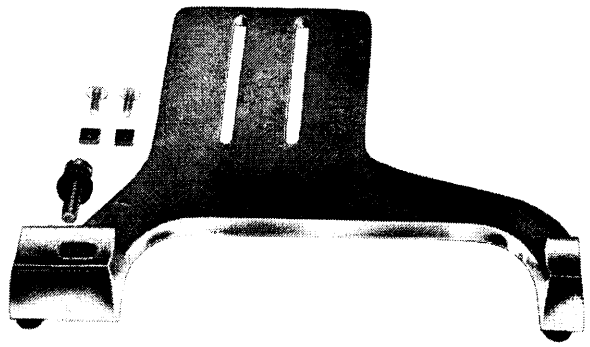
LATHE MOTOR

In years past the lathe was powered by a foot wheel. This may still be used in areas of the world where there is no electric power available. The modern method is to use a small, electric, reversible motor, about 1/10 horsepower, equipped with a foot rheostat to control the speed of the motor. It is best to select a motor designed for use with the lathe. The paint, enamel or chrome finish on the motor casing may somewhat control the price.



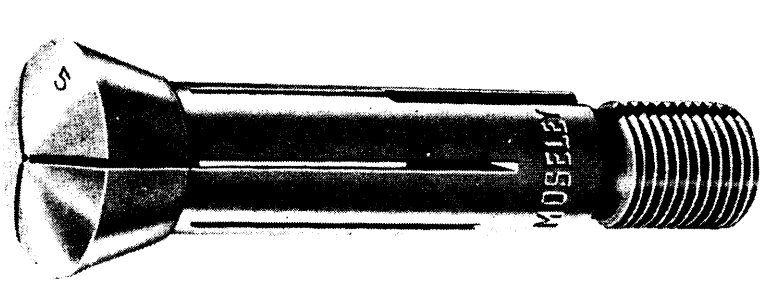
LATHE MOUNT

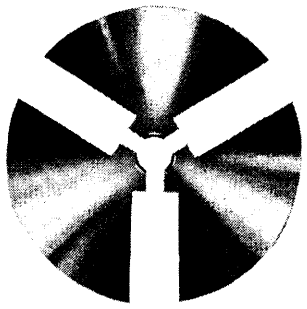
A portable lathe mount on which the lathe and motor are fastened is recommended for those who have no permanent working surface or who do not wish to mount the lathe and motor directly on the bench.



CHUCKS

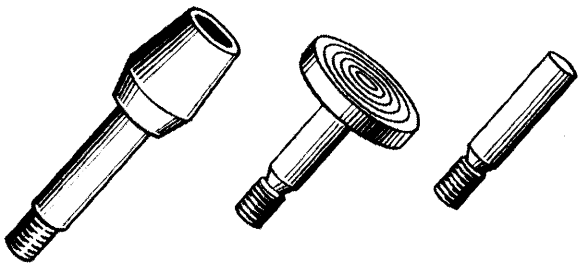
Chucks are gauged in tenths of a millimeter. A number 20 chuck is twenty-tenths (20/10) of a millimeter. A No. 7 chuck is seven-tenths (7/10) mm., and so on. A beginner should have Nos. 16, 20, 32, and 40 chucks, plus a chuck for holding a cement brass. Other chucks may be added as the need arises. A chuck should be used only with metal stock of the same size, as spreading or compressing the jaws of a chuck will cause damage to the gripping surface and also cause the chuck to be off center.



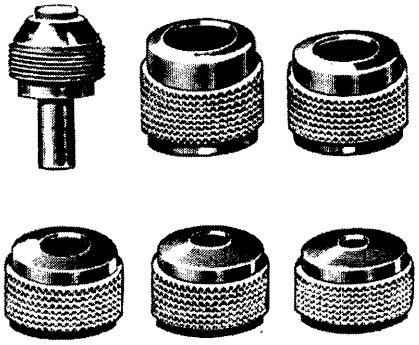


SCREW CHUCK WITH CEMENT BRASSES

The cement brass is used on the lathe as a working surface for small parts that cannot be held in an ordinary wire chuck. The part, such as a jewel setting, is cemented and spun true on the cement brass.

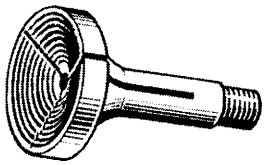


CROWN CHUCKS



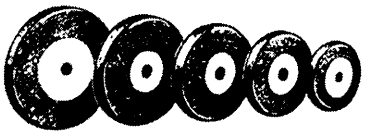
These chucks are used to hold crowns which have to be opened on the under side to fit over the pipe on the pendant of a case. They are designed primarily for crowns for pocket size watches. In lieu of this type chuck, as well as for smaller sizes, the crown may be cemented to a cement brass and the opening enlarged with a graver.

WHEEL CHUCK



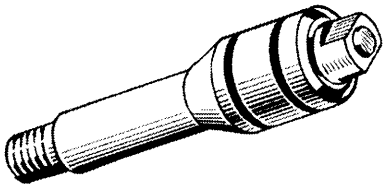
This chuck is used to hold a train wheel in the lathe when polishing pivots, and so forth. The chuck will hold more than one size wheel. This chuck grips the ends of the teeth and so care should be taken to use the proper size chuck and not apply too much pressure or the teeth will be damaged. This chuck need be used only when too little of the pinion extends past the wheel to be gripped with a wire chuck. Another method of setting up this wheel would be to cement it to a cement brass.

CARBORUNDUM WHEELS



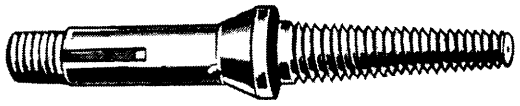
Small carborundum wheels can be mounted on an arbor chuck for grinding small steel work. When using these wheels on the lathe, take care to keep particles of carborundum from the bearings. Clean the lathe carefully after using carborundum.

ARBOR CHUCK



This chuck has a solid body and can be used to carry circular saws, wheel cutters, and the smaller size carborundum wheels.

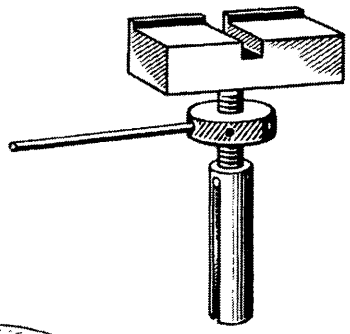
BUFF CHUCK



This solid body chuck has a tapered screw on which to mount polishing buffs. Buffing should be confined to small jobs and the same care should be taken of the lathe as when carborundum is used.

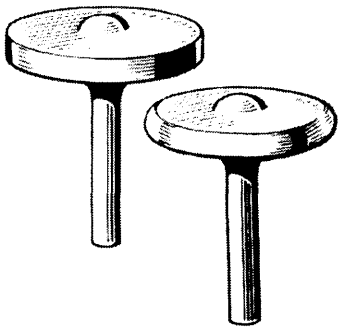
FILING FIXTURE

This fixture replaces the rest on your T-rest. It is used when filing across work held in the lathe, as when filing the square on a stem.



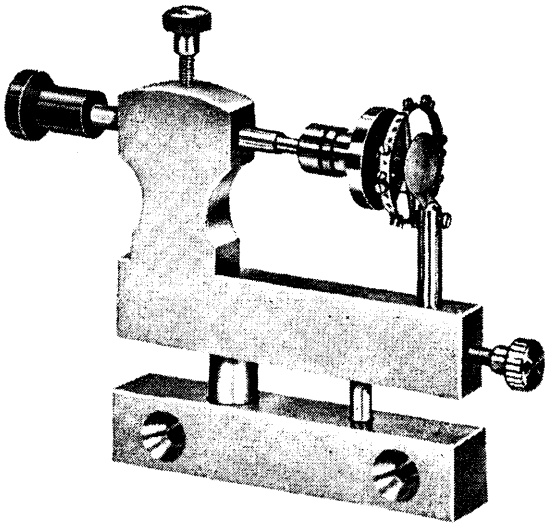
CARBORUNDUM WHEEL WITH ARBOR

This type wheel comes in several shapes and grades. It can be had in hard Arkansas stone and Aloxite for grinding watch crystals. However, as mentioned before, it is not advisable to use grinding wheels to excess in your lathe.



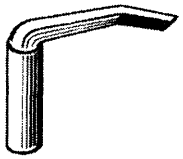
PIVOT POLISHER

This attachment is mounted on the lathe and is used to hold pivots while they are being straightened, burnished, ground, or polished. It is adjustable to fit all balance staffs. The pivot to be worked on extends all the way through the end bearing plate.



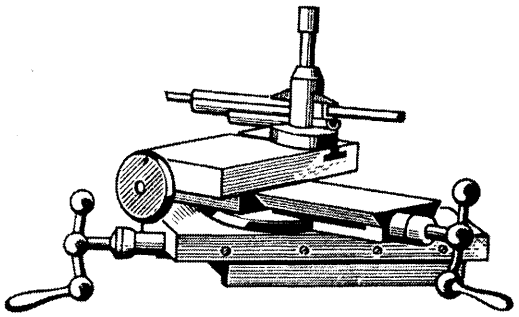
"L" TOOL REST

This tool rest is used with the face plate. Its design will allow close adjustment to the plate.

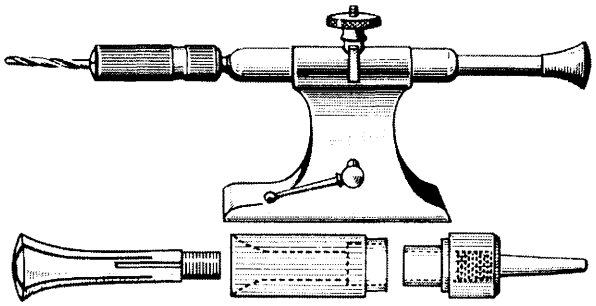


SLIDE REST

This lathe attachment is of little use to the average watchmaker of today. It has various uses for the watchmaker who specializes in making watch parts. It is also used by model makers.

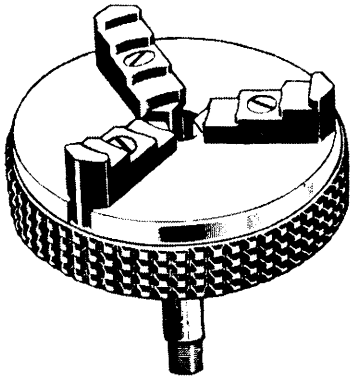


TAIL STOCK CHUCK HOLDER



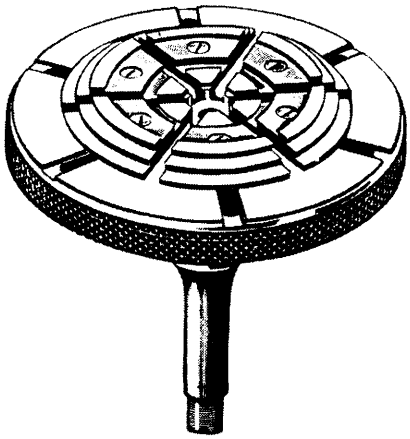
This device is used to hold regular wire chucks in the tail stock. This is desirable when drilling so as to hold the drill in direct line with the work.

THREE JAW CHUCK



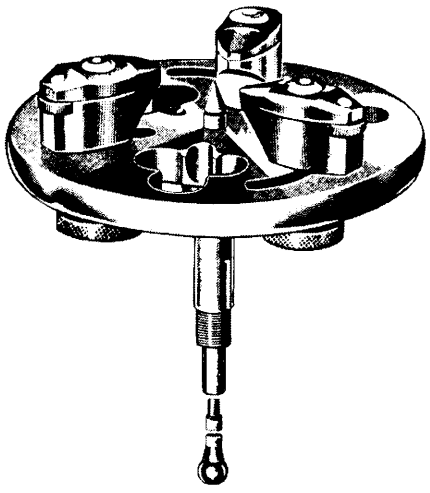
This chuck is used for heavier kinds of work. The jaws are adjustable and reversible. This chuck can be used for holding clock barrels and work by model makers.

BEZEL CHUCK



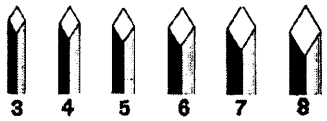
This is a special chuck used primarily for holding bezels, either by the inner or outer edge.

FACE PLATE



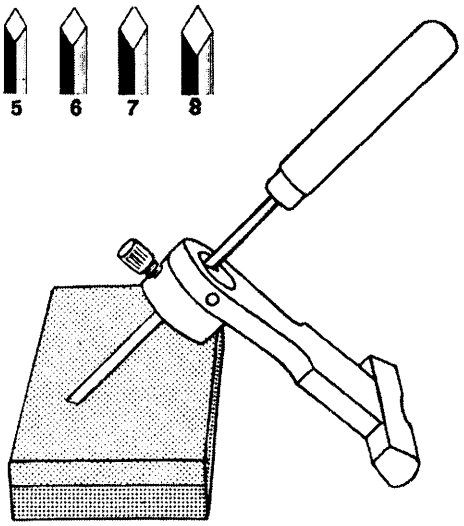
This lathe attachment is used to mount watch parts, such as plates, for uprighting a pivot hole. The jaws are adjustable, which allows free movement of the plate to any desired center.

GRAVERS



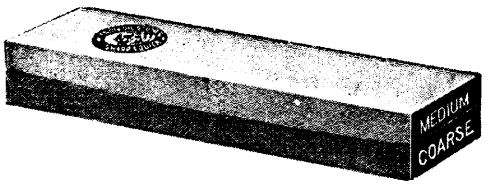
The tools used for cutting on the lathe are known as gravers. They come in many shapes and sizes. The gravers most commonly used are the #4 or #6 square. It is essential that gravers be kept sharp.

GRAVER SHARPENER



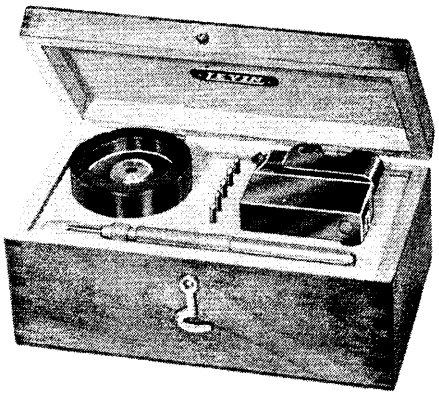
Gravers may be sharpened by hand, but it takes considerable experience to get the right result. An easier and more convenient method is to use a graver sharpener, which holds the graver in a fixed position during the sharpening process. The tool may also be used to shape the tip on a new graver or to reshape a broken tip. Engravers may likewise use this tool.

OILSTONE



For sharpening gravers, a combination oilstone with coarse and fine sides is recommended. Kerosene or light machine oil should be used on the stone at all times.

CARBOLOY GRAVER SET



This carboloy steel graver set is used on hardened or tempered steel, as when cutting out balance staffs from the balance wheel. When the gravers need sharpening, they must be ground on a special diamond-impregnated wheel. A set usually includes blades, handle, lap wheel, and compound.

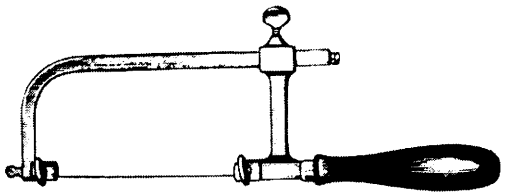
BOXWOOD SLIP

This slip is a hard, almost grainless wood used to polish pivots. Polishing compound, such as diamantine or rouge, is applied to the slip. Full explanation of the use of the boxwood slip will be found in Lesson 31, Master Watchmaking.

PIVOT BURNISHER

This tool is used to burnish a pivot, remove burrs and so forth. It is a very hard steel with a slightly rough surface. No grinding or polishing compound is ever used on this tool. When used as illustrated and described in Lesson 31, Master Watchmaking, it will compress, harden and close the pores in steel, thus giving it a smooth, hard and polished surface.

JEWELER'S SAW FRAME

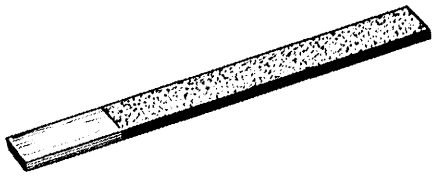


A saw frame designed to hold saw blades that are used to cut metal.

JEWELER'S SAW BLADES

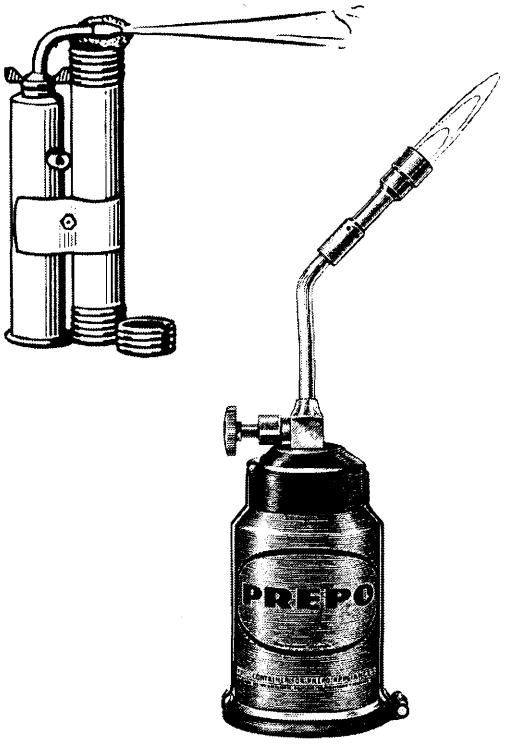
For use in jeweler's saw frame. They are made of narrow, tempered, flexible steel wire into which teeth have been cut. The teeth in a jeweler's saw should point toward the handle of the saw frame. The sizes are 5-4-3-2-1-1/0-2/0-3/0-4/0-5/0-6/0-7/0-8/0. The most useful size to the watchmaker is No. 2.

EMERY BUFFS



These are small strips of wood covered with abrasive cloth or paper. They are graded from coarse to fine grit: 2, 1, 0 2/0, 3/0, 4/0. They are used to polish steel surfaces by starting with the coarse buff and working to the fine ones.

ALCOHOL TORCH

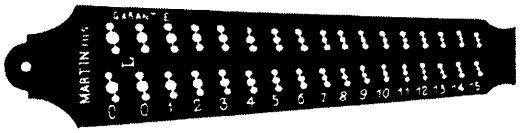


All watchmakers will at some time need to harden and temper a piece of steel. The beginner will find it advisable to practice hardening and tempering steel to make pivots, etc. A small torch will usually supply enough heat to harden properly. The beginner may use any gas flame that will give sufficient heat.

"PREPO" TORCH

This torch is ideal for use by the watchmaker or jeweler. It will produce a minimum heat of 2200 degrees F. It is equipped with a "throw-away" type of container which holds a liquid gas under high pressure. Ordinarily the container should last a minimum of four hours of continuous use. The empty container is easily removed and replaced with a new one.

SCREW PLATE



A threaded die plate with graduated hole sizes used in threading screws or making taps.

ORDERING MATERIAL

It is possible to get nearly any part for almost any watch now being manufactured as well as for many obsolete watches. Watch parts made by the maker of the watch are known as genuine parts, but other companies make replacement parts which have proven satisfactory in general. However, it is best to use genuine parts whenever they are available because they usually require less alteration.

Parts such as balance staffs, stems, crowns, mainsprings, roller jewels, friction jewels, friction bushings, and the like, may be purchased in assortments or singly. The advantage in having assortments is that you will have the part needed when you need it. You'll have no delay in completing the repair job and can give your customer faster service. The cost per part in assortments is usually less than the single part price, so there is some saving of money as well as time. You may make up your own assortments by ordering in 1/4 or 1/2 dozen lots as the need arises.

Before ordering a part for a watch, you must identify the watch by make, size, and model. To order a part for an American watch, it is advisable to include the manufacturer's name, size, number of jewels, and serial and/or movement number, which is stamped on the bridge of the watch. Some late model American watches have a model or grade number stamped on the bridge. Include this number also. When ordering staffs or wheels, list the pivot diameter size. In ordering jewels, list the hole size of the jewel or the diameter of the pivot on which the jewel is to fit.

The identification of a Swiss watch is a little more involved. The name on the dial means little in establishing the manufacturer of a Swiss-made movement. Bulova watches are usually identified by a model or caliber number stamped on the bridge, such as 7ap, 6am, 6ak, and so on. This is the only identification needed. Gruen watches usually have a model or caliber number stamped on the pillar plate and which can be seen between the barrel and train bridges or under the balance wheel. If no identification can be made on this side of the movement, remove the

dial. You may then find a model or caliber number such as AS 976 or ETA 735. This listing will identify the maker and the model number.

You may find only a symbol to identify the maker. Most material catalogs list all well-known symbols and manufacturers who use them. If you find only a symbol, you still must identify the watch by model or caliber number. You can do this by means of the setting parts; that is, the set bridge, set lever and clutch lever. Manufacturers make their models with setting parts slightly different in size and shape. Material catalogs show these setting parts according to their size and shape and list their identifying model number. Close comparison of the setting parts in the watch at hand with these listings should enable you to identify the watch. If you are not familiar with this method of identification, a few minutes' study of a material catalog will make it clear to you.

Occasionally, you may have some trouble identifying a movement due to improper listing. If you are not able to positively identify a movement, you should send it to your material jobber for identification. Be sure, however, to wrap it carefully so it will not be damaged in transit.

Besides the identification, it is well to include the part you want replaced as a sample for comparison. Always package sample parts in a material can or similar container to insure safe arrival.

When ordering a balance staff for a Swiss watch, you should designate the type of balance jewels; that is, regular, Incabloc or Shock-resist. When ordering a regulator, you should indicate the type of hairspring; that is, flat or overcoil. When ordering a cannon pinion, you should furnish the exact length, if no sample is available, as cannon pinions for some Swiss watches come in as many as nine different lengths.

The following pages will guide you further in ordering specific parts. If you always include all the information shown in the samples, you should experience little trouble in getting exactly what you want.

When ordering material for a watch, the following information should be furnished:

Make:
Size:
Model or Grade (if known):
Serial Number (American only):
Number of jewels:
Description of part (Include factory number, if known):

SAMPLE ORDER (American)

FROM Your Name

Your Address City State

QUANTITY	ARTICLE	PRICE
1 only	Train jewel in setting, upper 4th wheel.	
	Pivot hole size .28 mm. Factory part	
	No. 6492. (Sample enclosed)	
	For Elgin, 12/s, 17J, No. 2304978.	

VIBRATE HAIRSPRING
☐ Flat
☐ Breguet

CRYSTAL
☐ Waterproof ☐ Cylinder
☐ Regular ☐ Flat Top
☐ Unbreakable ☐ Heavy
☐ Other

DIAL ☐ As is
☐ Change finish to:
☐ Change figures to:

WATCH TOOL & SUPPLY CO.

SAMPLE ORDER (Swiss)

FROM Your Name

Your Address City State

QUANTITY	ARTICLE	PRICE
1 only	Set bridge for Eta 735,	
	Ebauche part No. 445.	
1/4 doz.	Stems for Bulova 7AP.	
	Newall series No. 729-3/4. (Samples enclosed)	

VIBRATE HAIRSPRING
☐ Flat
☐ Breguet

CRYSTAL
☐ Waterproof ☐ Cylinder
☐ Regular ☐ Flat Top
☐ Unbreakable ☐ Heavy
☐ Other

DIAL ☐ As is
☐ Change finish to:
☐ Change figures to:

WATCH TOOL & SUPPLY CO.

CRYSTALS

Crystal jobs can be sent out to be fitted. Your material jobber will handle this for you. Be sure to indicate the type of crystal desired.

FROM Your Name

Your Address City State

QUANTITY	ARTICLE	PRICE
	Fit crystal to enclosed bezel.	

VIBRATE HAIRSPRING
☐ Flat
☐ Breguet

CRYSTAL
☐ Waterproof ☒ Cylinder
☐ Regular ☐ Flat Top
☐ Unbreakable ☐ Heavy
☐ Other

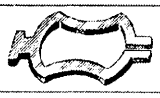
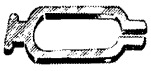
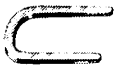
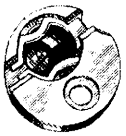
DIAL ☐ As is
☐ Change finish to:
☐ Change figures to:

WATCH TOOL & SUPPLY CO.

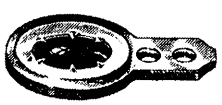
INCABLOC AND SHOCK-RESIST JEWELS

Replacement parts may be purchased from your jobber. You may also obtain assortments. When ordering parts, always include a sample.

INCABLOC

			
UPPER AND LOWER CAP JEWEL HOLDER SPRING No. 1000	LOWER CAP JEWEL HOLDER SPRING No. 1001	LOWER CAP JEWEL HOLDER SPRING No. 1002	UPPER ASSEMBLY LOCK No. 1003
UPPER CAP JEWEL .25 M/M Thick No. 1004	LOWER CAP JEWEL .16 M/M Thick No. 1005	UPPER AND LOWER BALANCE JEWEL IN SETTING No. 1006 –Hole .08 No. 1007 –Hole .09 No. 1008 –Hole .10 No. 1009 –Hole .11	SCREW FOR LOWER ASSEMBLY No. 1010
			
COMPLETE UPPER ASSEMBLY No. 1011—2.75 M/M Dia. No. 1012—2.95 M/M Dia. No. 1013—3.10 M/M Dia.	COMPLETE LOWER ASSEMBLY No. 1014	COMPLETE LOWER ASSEMBLY No. 1015	COMPLETE LOWER ASSEMBLY No. 1016

SHOCK-RESIST

				
UPPER BALANCE CAP JEWEL ASSEMBLY No. 1050—2.65 M/M Dia. No. 1051—2.80 M/M Dia. No. 1052—3.00 M/M Dia. No. 1053—3.10 M/M Dia.	LOWER BALANCE CAP JEWEL ASSEMBLY No. 1054—2.10 M M Dia. No. 1055—2.45 M M Dia.	UPPER AND LOWER BALANCE JEWEL WITH COIL No. 1062—Dia. 1.60—Hole .09 No. 1063—Dia. 1.60—Hole .10 No. 1064—Dia. 1.60—Hole .11 No. 1065—Dia. 1.80—Hole .09 No. 1066—Dia. 1.80—Hole .10 No. 1067—Dia. 1.80—Hole .11 No. 1068—Dia. 2.10—Hole .09 No. 1069—Dia. 2.10—Hole .10 No. 1070—Dia. 2.10—Hole .11	UPPER AND LOWER BALANCE JEWEL ASSEMBLY No. 1056—Dia. 1.90—Hole .09 No. 1057—Dia. 1.90—Hole .10 No. 1058—Dia. 1.90—Hole .11 No. 1059—Dia. 2.10—Hole .09 No. 1060—Dia. 2.10—Hole .10 No. 1061—Dia. 2.10—Hole .11	REGULATOR No. 1071

TRAIN WHEELS

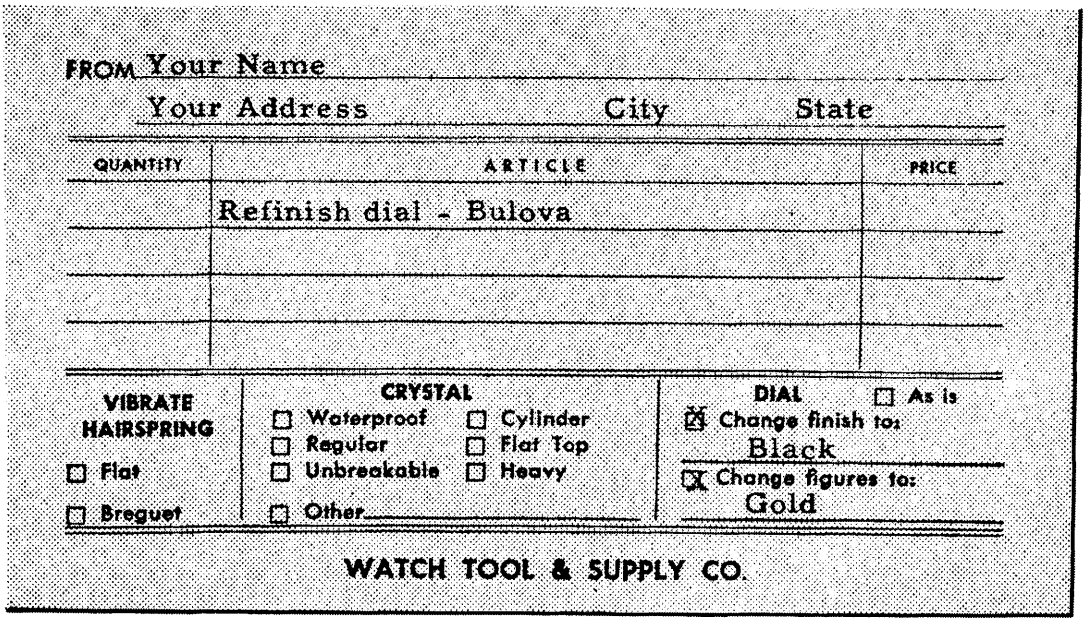
In addition to identifying the watch, when ordering train wheels, you should furnish the pivot size and indicate if the pivots are square shoulder or conical. Always enclose sample.

SCREWS

When ordering plate screws, jewel screws and the like, indicate if the screw should be regular or oversize. Damaged threads in the plates may sometimes be corrected by replacing with an oversize screw. It is helpful to buy assortments of screws from which you can usually select the one you need.

DIAL REFINISH

Dial refinishing is usually sent out to a specialist in that line. Your material jobber will handle this for you. On the material envelope you should give the name you want printed on the dial and the finish of dial and figures. If you want the dial refinished as it was originally, indicate "As Is". If a change is desired, indicate the change.


FROM Your Name

Your Address City State

QUANTITY	ARTICLE	PRICE
	Refinish dial - Bulova	

VIBRATE HAIRSPRING
☐ Flat
☐ Breguet

CRYSTAL
☐ Waterproof ☐ Cylinder
☐ Regular ☐ Flat Top
☐ Unbreakable ☐ Heavy
☐ Other

DIAL ☐ As is
☒ Change finish to: Black
☒ Change figures to: Gold

WATCH TOOL & SUPPLY CO.

SPRING BARS AND BANDS

Spring bars come in assortments of sizes and styles or may be purchased individually. It is good practice to keep an assortment on hand for necessary replacements. It is also good to have on hand a few leather bands for mens' watches as well as replacement cord for ladies' watches. Your material jobber can inform you on available assortments of these items.

FROM Your Name

Your Address City State

QUANTITY	ARTICLE	PRICE
1 only	Balance staff. Pivot size .08 mm.	
	Hamilton 14/0 size. Model 980.	
	(Sample enclosed)	

VIBRATE HAIRSPRING
☐ Flat
☐ Breguet

CRYSTAL
☐ Waterproof ☐ Cylinder
☐ Regular ☐ Flat Top
☐ Unbreakable ☐ Heavy
☐ Other

DIAL ☐ As is
☐ Change finish to:
☐ Change figures to:

WATCH TOOL & SUPPLY CO.

NOTE: When ordering a balance staff, give the pivot size. If both pivots are broken, send the upper and lower jewels so that a proper staff can be fitted. Always enclose sample staff (removed from the wheel) for comparison.

Swiss staffs are ordered in the same manner.

BALANCE HOLE JEWELS AND CAP JEWELS

Furnish the hole size of the jewel. In many American watches, the cock (balance bridge) jewel setting is of a different size, so you should mention whether cock or foot jewel is needed. Enclose sample.

Upper and lower cap jewel settings in both American and Swiss movements are usually different in size. Also, Swiss balance hole jewels are usually either friction-fit or burnished in the plate. They should be replaced with friction jewels.

ROLLER

In addition to identifying the movement, you should indicate if the roller is single, combination, two-piece, Incabloc or Shock-resist.

BALANCE COMPLETE

This includes a balance wheel, staff, roller and hairspring which has been colleted, vibrated and fitted to the wheel. In ordering, you should identify the movement and designate whether the hairspring is flat or breguet (overcoil).

FROM Your Name

Your Address City State

QUANTITY	ARTICLE	PRICE
	Furnish and vibrate hairspring.	
	Balance wheel and balance bridge	
	enclosed. FF120.	

VIBRATE HAIRSPRING
☒ Flat
☐ Breguet

CRYSTAL
☐ Waterproof ☐ Cylinder
☐ Regular ☐ Flat Top
☐ Unbreakable ☐ Heavy
☐ Other

DIAL ☐ As is
☐ Change finish to:
☐ Change figures to:

WATCH TOOL & SUPPLY CO.

HAIRSPRINGS

New hairsprings can be sent out to a specialist to be vibrated and fitted to the wheel and bridge. Your material jobber will handle this for you. When ordering a new hairspring for either an American or Swiss watch, you should identify the watch and include the following parts:

a. Balance wheel with staff and roller. It must be true in the round and flat and in poise. Pivots must not be bent or broken.
b. The collet and stud.
c. Balance bridge with regulator. Balance and cap jewels should be clean and in place on the bridge.

Wrap and package all parts carefully to prevent damage.

NOTE: A hairspring fitted in this manner may need some further adjustment when fitted to the watch.

FROM Your Name

Your Address City State

QUANTITY	ARTICLE	PRICE
1/4 doz.	Mainsprings AS 1194. Tongue end.	
	1.60 x 10 x 10-1/2.	

VIBRATE HAIRSPRING
☐ Flat
☐ Breguet

CRYSTAL
☐ Waterproof ☐ Cylinder
☐ Regular ☐ Flat Top
☐ Unbreakable ☐ Heavy
☐ Other

DIAL ☐ As is
☐ Change finish to:
☐ Change figures to:

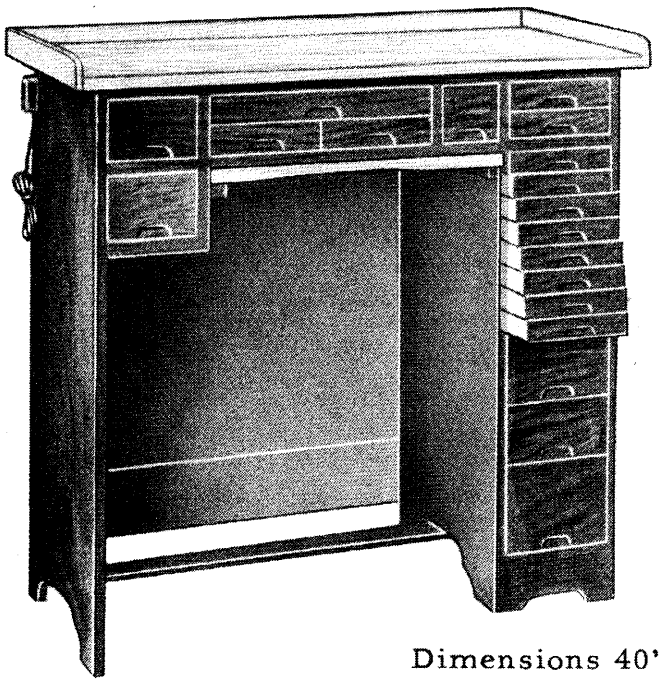
WATCH TOOL & SUPPLY CO.

WATCHMAKER'S EQUIPMENT

Benches • Lathes • Motors • Staking Tools
Friction Jeweling Tools • Cleaning Machines

CATALOG NO. 524

No. 25 WATCHMAKER'S BENCH has 19 drawers of various sizes; an apron slide; replaceable working top; foot rest and two chuck and staking tool blocks.



Bench is made of kiln-dried cabinet hardwood and laminated plywood. All work is tenon and mortise joints, all in accordance with the most approved cabinetmakers' methods.

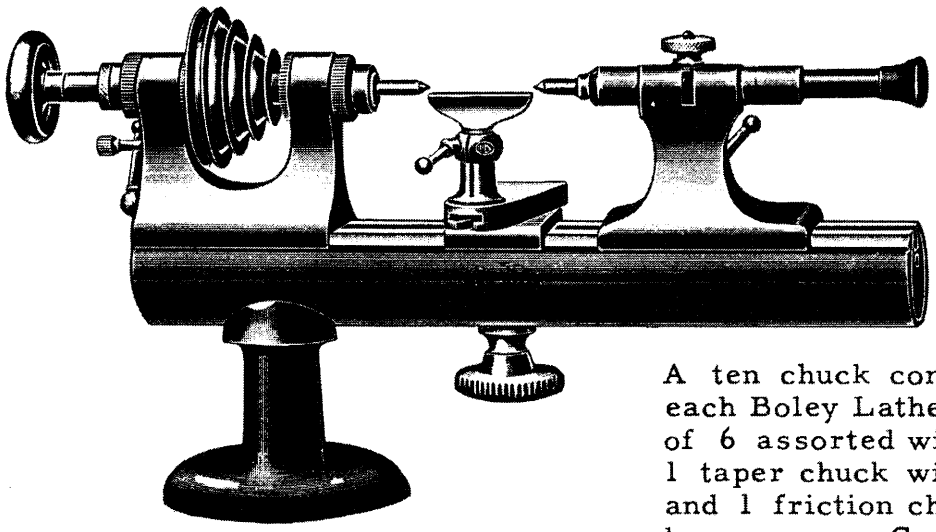
The drawers are tenon and groove with bottoms of 1/8" strong, noise absorbing "DURON."

The sides of the drawers extend 3" beyond the back. Metal runners are used as slides, except where construction prevents their use. Depressed front acts as pulls.

Finishes: Ebony Black, Oak, Mahogany and Walnut. Highly lacquered and moisture resistant.

Dimensions 40" x 20" x 38" high to working surface.

The BOLEY LATHE ..... one of the all time great names in precision lathes. This fine, German-made lathe is mechanically accurate and accurate alignment of all parts is guaranteed.



GENUINE BOLEY
LATHE

No. 800

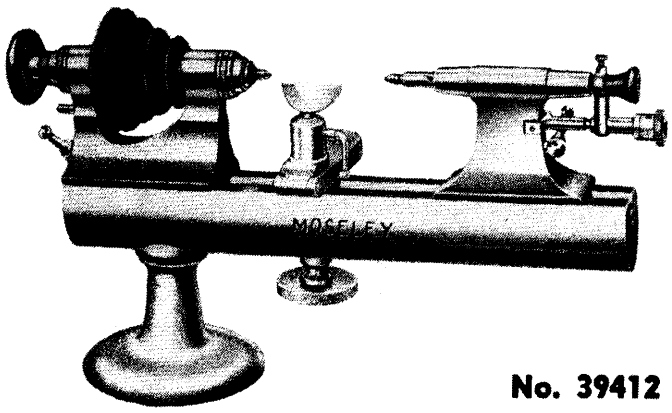
A ten chuck combination is furnished with each Boley Lathe. The combination consists of 6 assorted wire chucks, 2 wheel chucks, 1 taper chuck with male and female tapers, and 1 friction chuck with 8 assorted cement brasses. Complete with wood chuck box.

TELEPHONE:
Dickens 2-6464

North American Watch Tool & Supply Co.
2320 Milwaukee Avenue • Chicago 47, Illinois

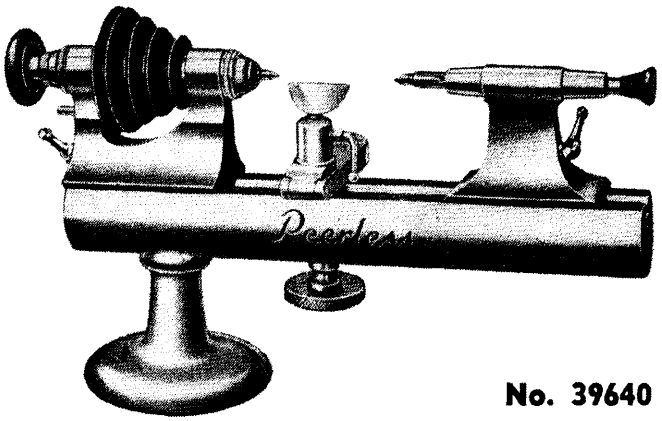
WATCHMAKER'S PRECISION LATHES

MOSELEY



No. 39412

PEERLESS



No. 39640

Length of Bed . . . 12" | **Distance, Center to Bed . . . 2"** | **Swing . . . 4"** | **CHROME PLATED**

Hardened and Ground STEEL BEARINGS Individually Lapped

10 CHUCK COMBINATION AND MICROMETER SCREW TAIL FEED

No. 39412. MOSELEY LATHE complete with Micrometer Tail Feed and tip-over "T" Rest, including taper chuck with center, screw chuck, six ¼" cement brasses, 8 wire chucks, belting and chuck box with hinged cover and block for chucks.

No. 39640. PEERLESS LATHE with tip-over "T" Rest and 10 chuck combination . . . 8 wire chucks, 1 taper chuck with taper, 1 screw chuck with 6¼ inch cement brasses. Complete with chuck box and leather belting.

LATHE BED

Made of cast Meehanite, the finest close grained cast iron made. Cast only by licensed foundries under rigid laboratory control. Seasoned to eliminate strain in the metal and prevent any distortion. After seasoning, the bed is machined to shape and ground on all surfaces to a micro finish, insuring perfect alignment of headstock and tailstock. The bed is then polished and given 3 coats of plating; copper, nickel and then chromium, insuring perfect protection for long service.

HEADSTOCK AND TAILSTOCK

Cast Meehanite, same quality as lathe bed. Machined, seasoned, polished and plated same as lathe bed. Hand scraped so they will fit the bed at any position and remain in perfect alignment.

SPINDLE BEARINGS

Highest grade tool steel . . . not bronze (See note below). Machined and hardened to 62 plus Rockwell, then ground on all surfaces to a ZERO TOLERANCE. Then fitted to the lathe headstock for lapping to the spindle, which is of double cone construction for accuracy and strength.

MAIN OR LIVE SPINDLES

Highest grade tool steel, machined and hardened same as bearings, ground on all surfaces to a ZERO TOLERANCE. Spindle then lapped into bearings to a mirror finish . . . no possibility of side shake or end shake. Inside angles of spindle that support the chuck and the draw-in-spindle are then ground and polished while the spindle is running in the headstock IN ITS OWN BEARINGS. A lock nut is provided to take up any end shake in the live spindle, if that ever becomes necessary. Experience has proved that under ordinary conditions, and if the lathe is not taken apart, no adjustments are necessary for at least 25 years.

CONE PULLEY

Molded Bakelite on heavy flanged metal hub. Pulley is balanced perfectly to eliminate vibration. Flanged end of hub is drilled with 60 holes for indexing.

TAILSTOCK SPINDLE

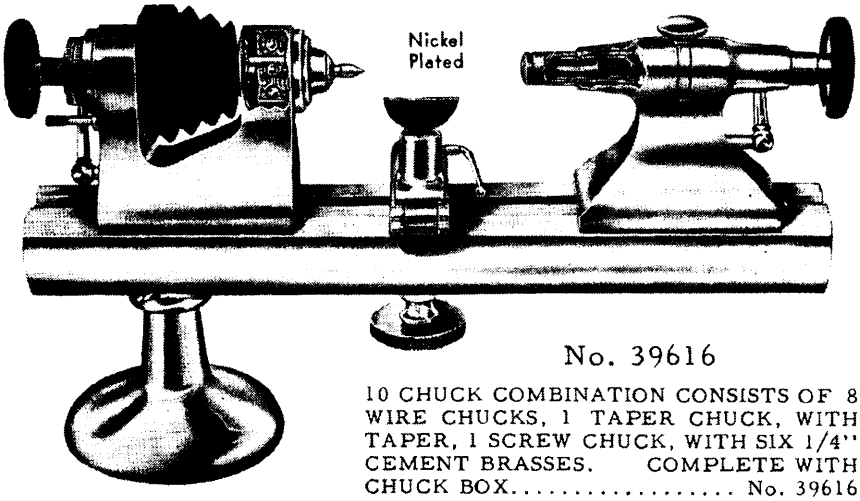
Highest grade tool steel hardened and ground, fitted after tailstock bearings are honed. Honing and lapping of bearings produces the velvety smoothness of operation. And with the protective coating of oil, the spindle actually floats.

T-REST

No shoe required for fitting. Made of oil hardened tool steel, hardened and polished and locked securely by positive locking lever that will hold "T" secure at any height within its range.

PEERLESS AND MOSELEY LATHES

have been in constant manufacture for 89 years and have always had hardened and ground steel bearings and spindles. **And the makers have never resorted to bronze or composition bearings which can be fitted without grinding or lapping because of their softness.**



Ball Bearing Lathe

With Chuck Holding Tailstock

No. 39616

10 CHUCK COMBINATION CONSISTS OF 8 WIRE CHUCKS, 1 TAPER CHUCK, WITH TAPER, 1 SCREW CHUCK, WITH SIX 1/4" CEMENT BRASSES. COMPLETE WITH CHUCK BOX..... No. 39616

Pre-loaded Ball Bearings are sealed in oil for life. No oiling necessary. Their scientific design eliminates side or end shake in spindle.

There is no need to obtain special attachments as all WW Style Chucks and attachments are interchangeble on this lathe.

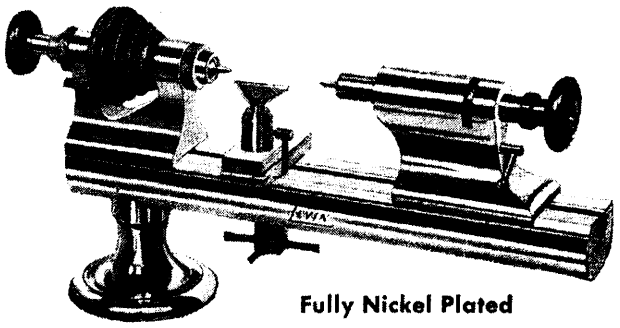
JEVIN CONE BEARING LATHES

Both models are identical except for the spindle bearings. In the model B they are of bronze, while in the model H they are made of hardened steel, ground and lapped to fit the spindle.

Standard accessories supplied with either lathe are tip-over "T"-rest, 2 taper chucks with hard centers, 2 brass cement chucks, ¼" diameter, 1 brass cement chuck ½" diameter.

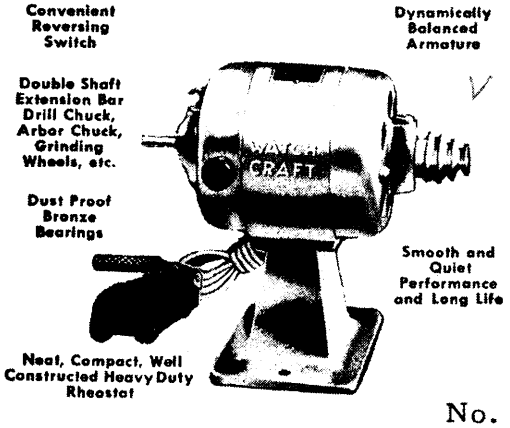
MODEL B
Bronze Bearings

MODEL H
Hard Steel Bearings



Fully Nickel Plated

WATCH-CRAFT LATHE MOTOR

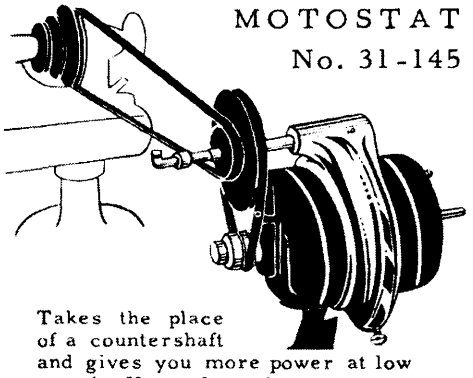


Variable Speed, Reversible, Foot Control Rheostat

1/10 H P. reversible motor. Six-speed rheostat for 110-120 volt A.C.-D.C. Full speed 6,000 R.P.M. under load. 3-step cone pulley, extended shaft on opposite end, cord and plug. Compressed composition bronze sleeve bearings require oiling only about six times a year. Height 6", base 3" x 3".

No. 39920

MOTOSTAT No. 31-145

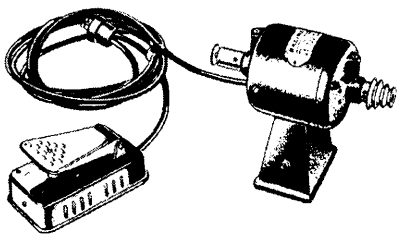


Takes the place of a countershaft and gives you more power at low speed. Heavy face plates etc. can be turned slowly for the most accurate work, yet the motor will have its full power and will not stall.

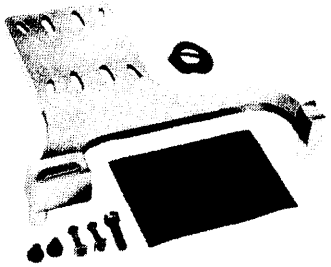
RACINE UNIVERSAL MOTOR

1/12 H.P. reversible motor provides reliable power. Dynamically balanced armature assures smooth, quiet operation. Foot control rheostat gradually steps up speed to 13,000 R.P.M. without load—6,000 R.P.M. under full load.

No. 1360 . . . Black Finish
No. 1360A Chrome Finish



LATHE MOUNT No. 1258



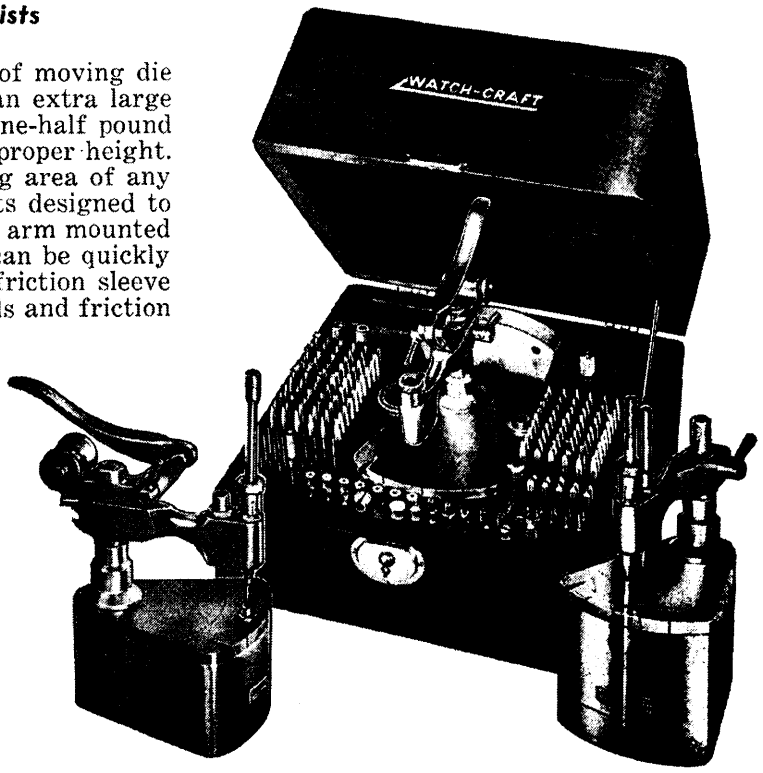
Portable lathe mount for mounting watchmakers lathe and motor.

WATCH-CRAFT TRI-DUTY OUTFIT

REG. U.S. PATENT OFFICE No. 348436

Finest, Most Complete Tool of It's Kind . . . Built and Priced to Lead in Quality and Value!

Tested and Approved by Leading Horologists



A superior quality chrome plated staking tool. Instead of moving die plate which has to be set each time it is used, it has an extra large accurate solid die plate fastened securely to a six and one-half pound base—a solid foundation for riveting work and just the proper height. The die plate is extra large with four times the riveting area of any other staking tool. Has two rows of holes and four slots designed to take care of all special and regular work. A special radial arm mounted on a heavy solid steel base swings to any position and can be quickly centered and locked over any hole. It is provided with friction sleeve guide for punches, also extra guide to accommodate drills and friction jeweling reamers and punches.

Punches are reversible and can be inverted in the base and used as stumps, which makes possible a very wide range of work. Each one is individually turned out by hand, hand finished, lapped and polished on the face to a mirror finish.

The Watch-Craft Tri-Duty tool is equipped completely for Friction Jeweling; all reamers, punches, stumps, etc., are supplied. The tool has an accurate micrometer adjustment so that the jewel can be set at just the proper depth in plate or setting for proper end shake.

The drilling attachment every watchmaker will appreciate. Pivot drilling, holes in plates, removing broken screws, attaching dials, etc., can be done with more accuracy and precision than in a lathe. Twenty-four finest quality Magic pivot drills are supplied with this outfit.

The Greatest ADVANCEMENT in the History of STAKING TOOLS!

3 Complete Outfits In 1!

Outfit Includes:

1. Staking Tool

133 Punches
25 Stumps
Punches Can Be Inverted in Frame and Used as Stumps.

2. Complete Friction Jeweling Equipment

12 Reamers 12 Pushers
7 Friction Jeweling Stumps
Reamer Holder—Pusher Holder—Micrometer Depthing Adjustment—Built-in Direct Pressure Lever

3. Precision Drill Press

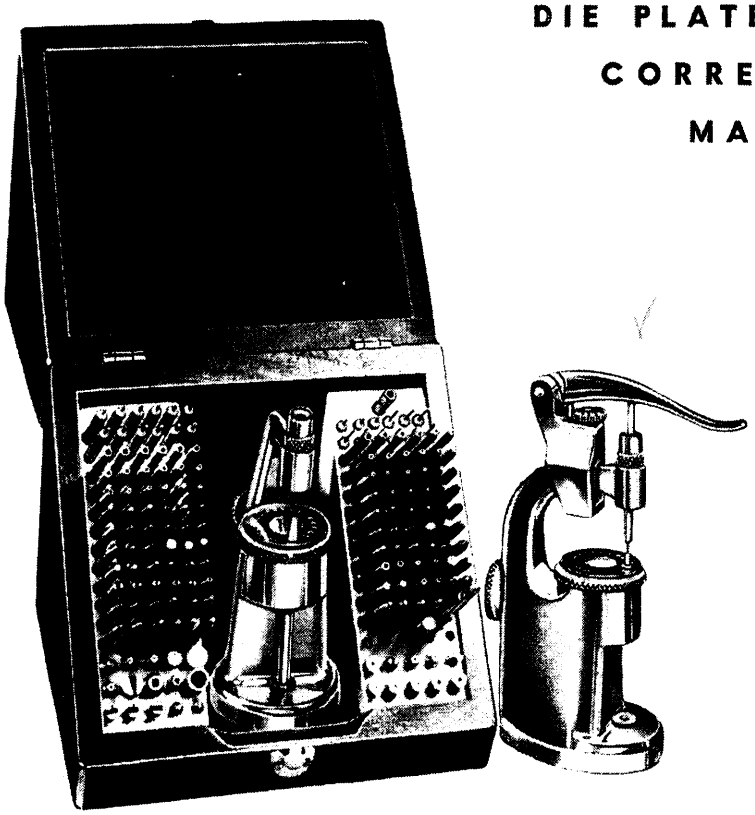
24 Magic Pivot Drills
2 Drill Holders
Spring Wire Belting, Pulleys and Full Equipment for Operating With Power from Lathe

No. 42694 Watch-Craft Tri-Duty Precision Staking tool, Friction Jeweling tool and Drill Press, combined as one convenient compact unit. Includes 133 Punches, 25 Special Stumps, 24 High-Grade Magic Pivot Drills and complete set of reamers, pushers and stumps for Friction Jeweling, all in a heavy solid walnut cabinet. A combination outfit that is beyond a doubt the finest precision watchmaking tool of its kind ever built.

BUILT and PRICED TO LEAD THE WORLD IN QUALITY and VALUE!

MOSELEY STAKING TOOL

With Attachment, Also a Friction Jeweling Tool



DIE PLATE OF TOUGHEST ALLOY STEEL CORRECTLY HARDENED TO GIVE MANY YEARS OF SERVICE

Die plate is easily locked into position with the knurled screw shown on illustration. After centering the die plate with the centering punch, included as standard equipment, you simply twist the screw to lock the die plate securely in the right position for staking. The die plate is made of the toughest alloy steel known to science and correctly hardened to give many years of service. Every die plate is surface ground for accuracy and drilled by hand on super-sensitive drill presses. The die plate has 26 holes which means the right size hole for any modern watch from smallest to largest. Holes are properly gauged and centered and give you the right spread of sizes from small to large.

STAKING TOOL PUNCHES

All punches supplied with MOSELEY Staking Tools are correctly gauged and graduated . . . you are assured of the right punch in the right combinations. Punches are uniformly cut from steel rod by our Swiss Type Automatic Screw Machines. Then they go through a series of hand operations which insure exactness and precision . . . including lapping and polishing punch faces to a mirror finish. Hole punches are drilled dead center, an operation that will not vary from one punch to the next. With Moseley, as with our other staking tools, any punch found defective in workmanship will be replaced free of charge. However, the best of punches can be broken occasionally . . . so be sure to use the right size punches for all work. And always use a brass hammer for staking so you will not flatten the head of the punch, as you might with a steel hammer.

ALL PUNCHES NUMBERED

All punches supplied with Moseley are numbered for quick identification. For instance, if a punch number B22, a round faced hole punch, is used to spread the shoulder of the balance staff, the companion punch for riveting the same staff is number A22, a flat faced punch, found in the same relative position on the opposite side of the case. This system, found only in WATCHCRAFT and MOSELEY Staking Tools, eliminates tedious searching for the right punch each time.

6 PUNCH AND STUMP COMBINATIONS

No. 42717—Moseley Staking Tool, consisting of 120 punches, 25 stumps and fitted with friction jeweling attachment complete.

No. 42716—Moseley Staking Tool, consisting of 100 punches, 25 stumps and fitted with friction jeweling attachment complete.

No. 42715—Moseley Staking Tool, consisting of 80 punches, 20 stumps and fitted with friction jeweling attachment complete.

No. 42714—Moseley Staking Tool with 120 punches and 25 stumps.

No. 42713—Moseley Staking Tool with 100 punches and 25 stumps.

No. 42712—Moseley Staking Tool with 80 punches and 20 stumps.

No. 42718—Friction Jeweling Attachment only, for above tools, consisting of:

ATTACHMENT.....12 Reamers

12 Pushers.....1 Reamer Holder.....1 Cone Miller

ACCURACY — STURDY CONSTRUCTION

The Moseley Staking Tool is completely chromium plated, giving the tool an attractive appearance, the first thing you look for in your staking tool. It is designed so punches can be reversed, inserted in frame and used as stumps. The frame is cast in one piece, giving you a rugged, sturdy tool that will stand up under continuous usage. This is very important, since a staking tool is a long time investment. You want it to last . . . sturdy construction is as important as accuracy. And both are emphasized in the Moseley Staking Tool. The frame is relieved so punches can be easily inserted and removed . . . so any watch parts driven out through die plate drop clear of frame. The punch guide is equipped with a friction sleeve which holds punches in any position. All Moseley Staking Tools are drilled for 120 punches and 30 stumps. Thus you can add punches and stumps to the smaller sets at any time.

LITTLE GIANT

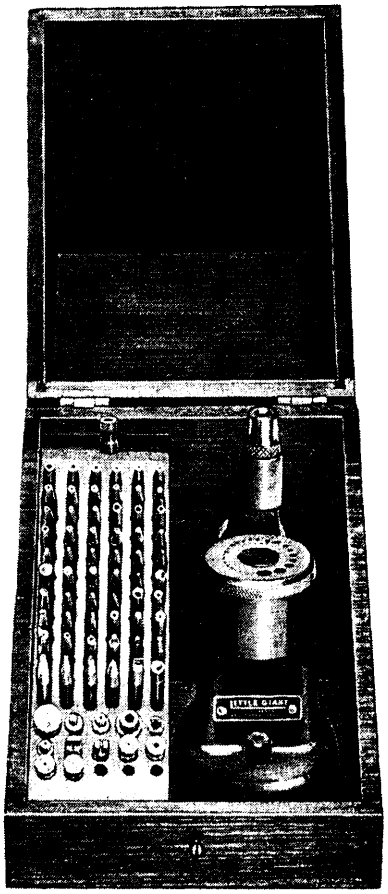
REG. U.S. PATENT OFFICE NO. 349883

STAKING TOOL

A High Quality Tool At Low Cost

The Little Giant Staking Tool is like the famed Moseley in general appearance and construction. It has the same frame and die plate, but has a lower cost . . . baked enamel . . . gunmetal finish. The tool comes in a smaller wood case with one insert . . . holding a maximum of 60 punches and 15 stumps. It has the same punches as the Moseley, but a smaller number of punches. The economies in this tool are confined to quantity, not quality.

The Little Giant comes in 4 different combinations of punches and stumps, with each insert drilled to hold a maximum of 60 punches and 15 stumps. You can add punches and stumps to the smaller sets at any time.



LITTLE GIANT STAKING TOOL PUNCHES

Little Giant Staking Tool punches are made from carefully selected high grade steel . . . the same as for Moseley and Watch-Craft punches. You are always assured of getting the right punches in the right combination regardless of the set you buy. Punches are uniformly and correctly hardened on a special machine . . . there is no guesswork about how hard they should be. That means they will give you satisfactory service for many years if they are properly used. Faces of punches are lapped and polished to a smooth finish . . . not sand blasted or acid finished. Punches are numbered for quick selection of the right punch. And they are inserted at an angle in the plastic holder so you can see the right punch without stretching or standing. Punches can be reversed, inserted in frame and used as stumps.

The frame is cast in one piece, giving you all the advantages of a solid piece of metal. Frame is relieved so punches can be easily inserted and removed . . . so any watch parts driven out through the die plate drop clear of frame. The punch guide has a friction sleeve which holds punches in any position.

THE LITTLE GIANT IS THE IDEAL STAKING TOOL FOR YOU WHOSE WORK DOES NOT REQUIRE THE MORE COMPLETE WATCH-CRAFT OR MOSELY

4 COMBINATIONS OF PUNCHES AND STUMPS

Number	Punches	Stumps
42720	60	12
42721	48	8
42722	36	6
42723	24	4

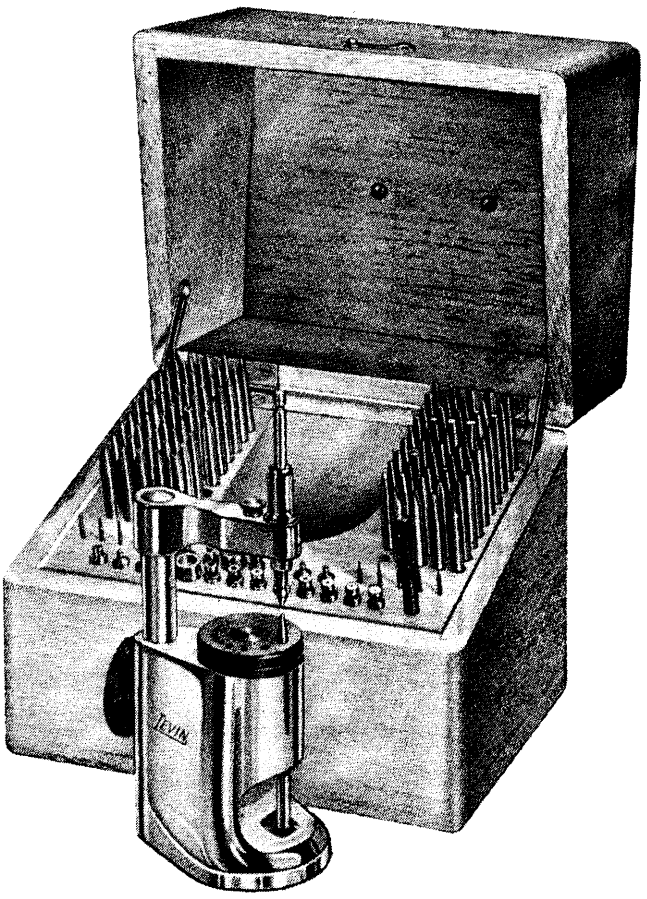
HEAVY DIE PLATE

The heavy die plate is easily locked into position with the knurled screw shown on illustration. It is made of the toughest alloy steel known to science and correctly hardened to give many years of service. The die plate is also surface ground to exactly the right flatness and depth for accuracy. It has 26 holes which gives you the right size hole for any modern watch from smallest to largest. The holes are properly centered and gauged to give you the right spread of sizes from small to large.

LEVIN STAKING TOOL

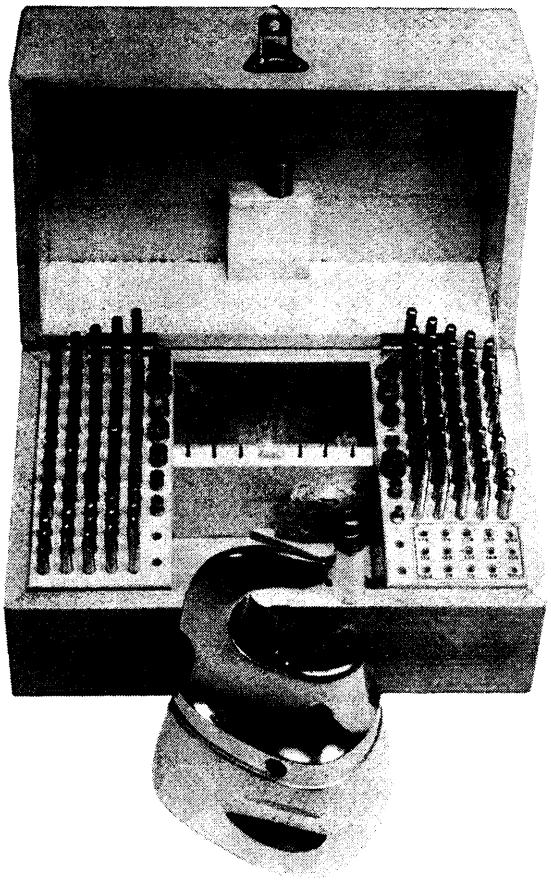
Since its introduction some years ago, the Levin staking tool has been universally recognized for its high quality. The frame is made of Meehanite with a stainless steel column. The arm contains a simple on and off friction device which cannot get out of order. The die plate is made of the finest tool steel 5/16" thick and lapped to a polish. Punches may be inverted so they can be used as stumps. The inclined block in the case contains 120 holes for punches, allowing room for additions to the regular set.

The same box is used with both sets.



100 punches, 20 stumps, 10 sub punches and punch pick-up.....Cat. No. STIM

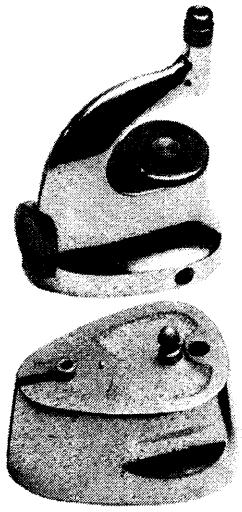
80 punches, 20 stumps, 10 sub punches and punch pick-up.....Cat. No. ABBE



BOLEY STAKING TOOL

(Imported)

The Superior staking tool. Punches can be inverted when auxiliary base is used. Frame is easily removed from auxiliary base when desired. Extra die plate fits on auxiliary base for use as a bench block.



Contains 114 punches and 14 stumps. Put up complete in finely finished, sturdy wood box.

No. 805 Without Jewelling Attachment.

No. 810 With Jewelling Attachment.

THE INVERTO "DELUXE" NO. 18R

Containing:

... 100 specially selected punches for modern watches

... 20 selected stumps

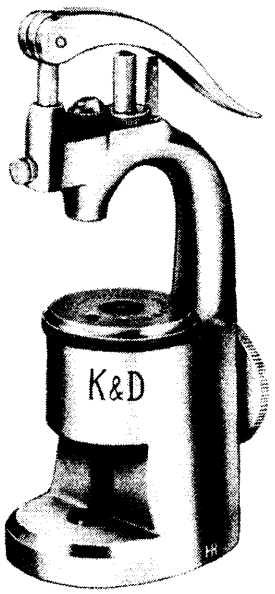
... complete Friction Jeweling Attachment including 18 reamers and holder, 7 sub punches and holder, 6 graduated flat face hollow stumps

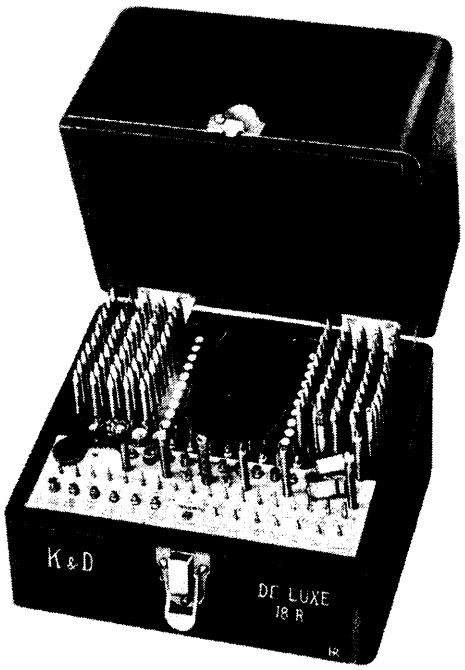
... two balance staff removers for large and small watches

... two adjustable roller remover stumps

... two sets cannon pinion closing punches and stumps

... 10 sub punches and holder for driving out screws and similar work

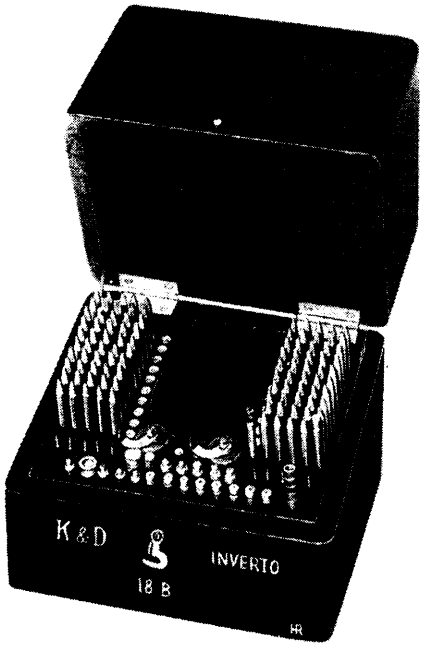


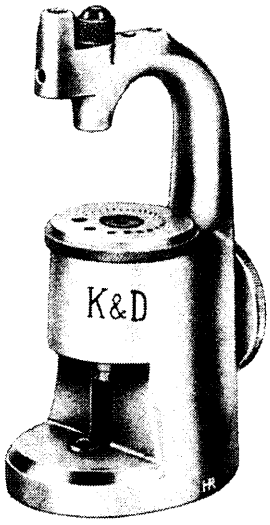


No. 43-018R.

K & D

NEW INVERTO STAKING TOOL NO. 18B





containing:

... 100 specially selected punches for modern watches.

... 20 selected stumps.

... two adjustable roller remover stumps.

... 10 sub punches and holder for driving out screws and similar work.

Provision has been made on the new 18B frame to facilitate the addition of K & D Friction Jeweling Attachment. It is not necessary to send these new models to the factory to have this work done.

No. 43-018B.

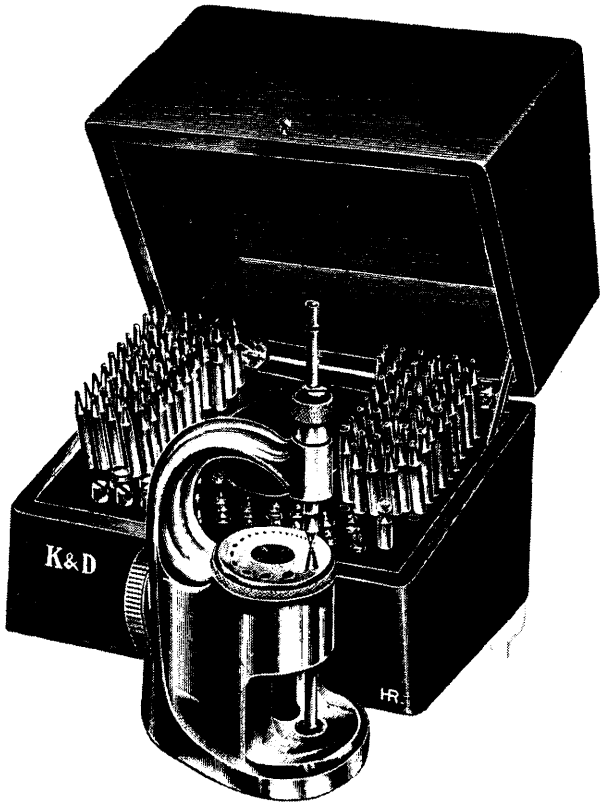
K & D

JUNIOR INVERTO
STAKING TOOL NO. 600 SERIES

This tool has all the features of the regular Inverto, but is lighter and has a smaller die plate.

No.	Punches	Stumps
600	60	20
601	80	20
602	100	20
**610	120	20

** is furnished in 18B Inverto Box.



NEW "R" SERIES

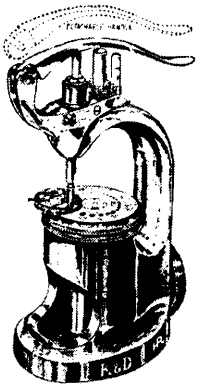
Furnished with Complete Friction Jeweling Attachments, 2 Balance Staff Removers, 2 Adjustable Roller Remover Stumps, 2 sets Cannon Pinion Closing Punches and Stumps, and De Luxe Box as shown with 18R De Luxe on Page 1.

No.	Punches	Stumps
601R	80	20
602R	100	20
610R	120	20

When ordering, specify above factory numbers preceded by 43.
Example: #601 Staking Tool becomes ***No. 43-601.***

K & D

FRICTION JEWELING ATTACHMENTS



No. 43-540 FRICTION JEWELING ATTACHMENT. Lever type Friction Jeweling Attachment with a micrometer stop that reads to 1/100 m.m. Can be fitted to all K & D frames except the smaller types such as 5B and 504, and the new 18B frame.

Full directions for attaching are included with the tool, but we strongly recommend sending in your frame to have this done.

No. 43-540R FRICTION JEWELING ATTACHMENT. Lever type Friction Jeweling Attachment with micrometer stop for the new 18B frame as illustrated under 18B Staking Tool. Can be easily fitted by the watchmaker.

No. 43-018X COMBINATION SET. This combination converts your K & D Staking Tool to Friction Jeweling and consists of:

. . . large Deluxe box

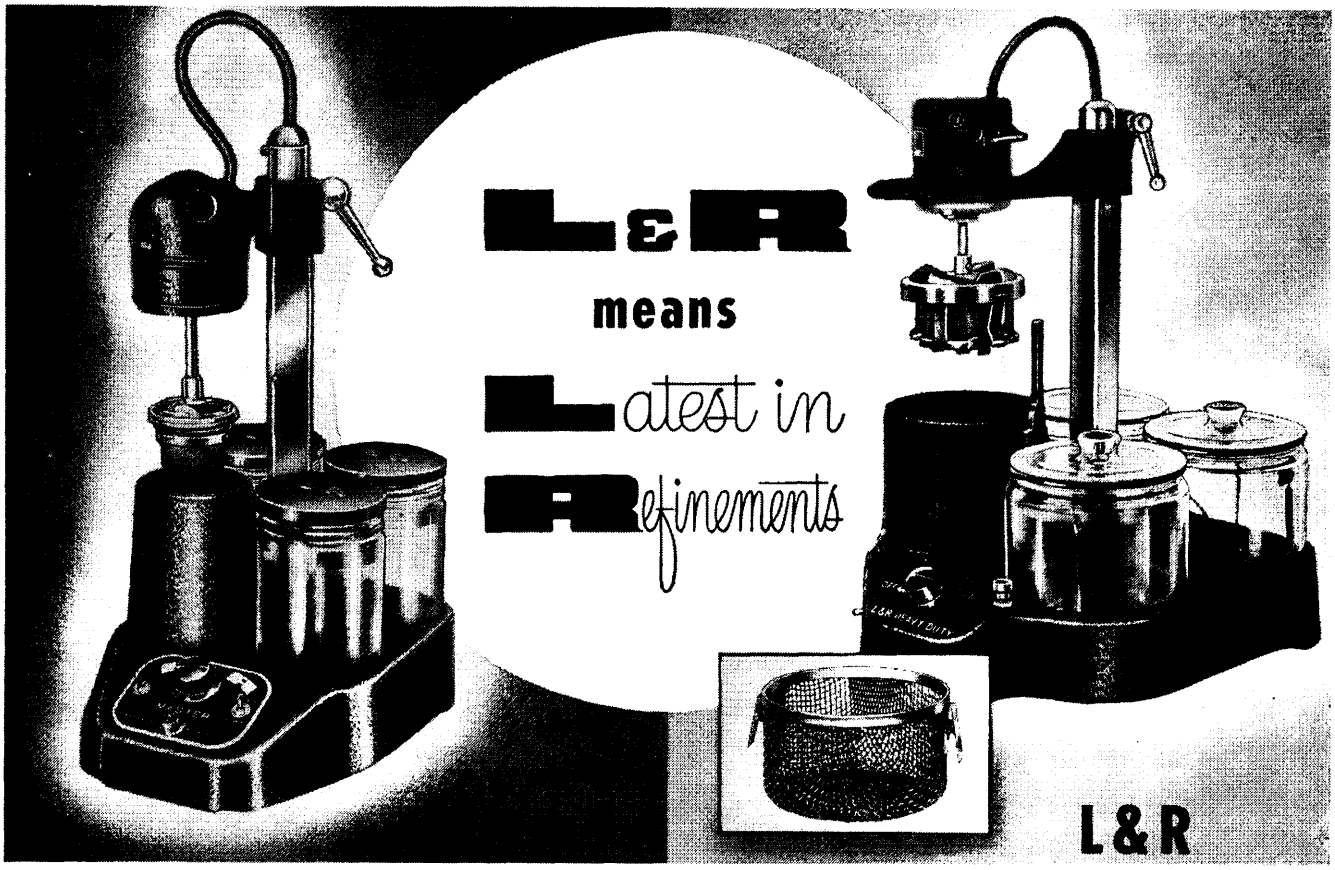
. . . 540 or 540R Friction Jeweling Attachment

. . . 322B set of 18 Reamers

. . . 321 set 7 sub punches and holder

. . . 324 set of 6 hollow stumps

we fit 540 attachments to your old frame



L & R Master Watch Cleaning Machine

Trimmer, more efficient, with all controls on new front panel. The most popular watch cleaning machine ever made will now, more than ever, lead the field. Powered by L & R's own motor.

Heavy Duty Watch Cleaning Machine

A true production unit now made even better with the new clock basket ----- double the capacity of former basket. Ingenious clips permit one hand attaching and removing. Fits all Heavy Duty Shafts ----- new or old.

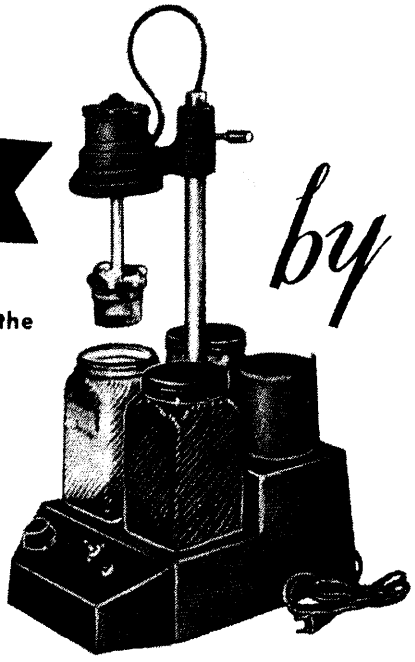
LEADER

Watch Cleaning Machine

The *finest* budget-priced Machine on the Market!

Compare!

1. Powerful, precision-built Overhead Motor
2. 3 Square Jars
3. Drying Chamber
4. Speed Control
5. Fully Guaranteed



by Zenith

Quality —

Satisfaction —

Dependability —

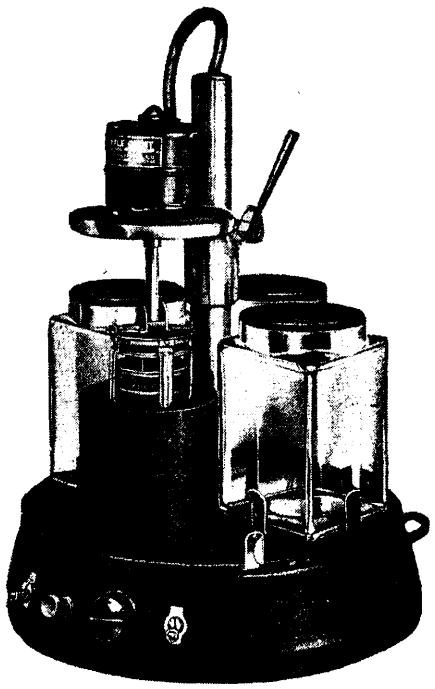
and the same superior workmanship of other ZENITH Watch Cleaning Machines!

LITTLE GIANT

WATCH CLEANING MACHINE

Featuring the Reversing Operation

The Little Giant is the choice of watchmakers who demand efficiency, satisfactory performance and economy . . . the best machine in its field.



INDEX TURNTABLE KEEPS WORK ALWAYS IN FRONT

BALL BEARING MOTOR

Wound for both forward and reverse operation.

FINGER-TIP LOCKING DEVICE

Designed to lock the motor at any position on the column. It affords the utmost convenience, for there are no knobs to turn or screws to tighten. Simply release pressure of your fingers on the locking device and it locks automatically.

PUSH BUTTON REVERSING

To make the basket turn in reverse to its normal operation, you simply press a button. The reverse operation will give a greater flow of solution over and through the basket, insuring perfect cleaning of all parts.

SQUARE JARS

Rest on an open turntable which is easily cleaned. The jars are held rigidly so there is no rattling while the machine is operating. They are extra high to permit the lower half for solution and the upper half for throwoff.

BAKELITE JAR COVERS

Made of fine grade Bakelite, they are durable and add to the appearance of your machine. Machine has chromium and black wrinkle finish.

STAINLESS STEEL BASKET

Made of stainless steel or Monel metal, the basket is constructed to the various sections fit together in one frame. Thus the solution passes through only one thickness of mesh straight to the parts to be cleaned.

METAL SHIELDED HEATING UNIT

An exposed heating coil will oxidize and wear out much sooner than this, which is covered. The purpose of this shield is twofold, being also designed to give uniform heat to the watch parts.

No. 36119

SEITZ FRICTION JEWELING TOOLS

Set consisting of:

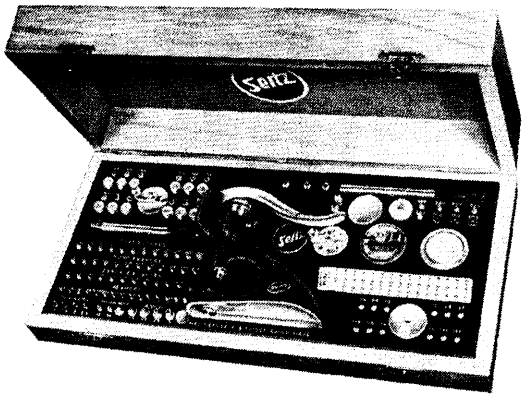
Friction Jeweling Stake
15 Reamers with Holder
12 Flat Jewel Pushers
5 Stumps
1 set Micrometrical Anvil, Pusher and Bushnut.
1 leatherette, felt-lined Case.

No. 28-020...Set

Set consisting of:

Friction Jeweling Stake
15 Reamers with Holder
12 Flat Jewel Pushers
12 Pump Pushers
11 Concave Jewel Pushers
5 Stumps
1 set Micrometrical Anvil, Pusher and Bushnut.
4 Hole Closing Punches
Set x3 of Pallet Arbor Setting Tools.
1 leatherette, felt-lined Case.

No. 28-026. (as illustrated)



SEITZ FRICTION JEWELING TOOL

Complete set consisting of:

...All parts in Set No. 28-026
...Set No. 28-101. Hand Setting Tools
...Set No. 28-103. Face Plates x 3
...Set No. 28-105. Holder for Brass Settings
...Set No. 28-106. Chuck Holder with 3 Chucks
...Set No. 28-109. Self centering Points x 12
...Set No. 28-113. Grinding Stone
...Set No. 28-114. Pivot Straightening Tool

No. 28-035. (as illustrated).....Set

JEWELS

No. 702A. SEITZ BALANCE, PLATE AND CAP JEWELS. 2 Jewels in each bottle, total 100 Balance, 196 Plate and 30 Cap Jewels in wood cabinet.

No. 711. SEITZ BALANCE, PLATE AND CAP JEWELS. 1 Jewel ea. of 67 Balance, 138 Plate and 3 ea. of 15 Cap Jewels in wood cabinet.

No. 721. SEITZ CENTER JEWELS. 1 ea. of 100 numbers in wood cabinet.

No. 731. SEITZ BALANCE JEWELS. 1 ea. of 108 numbers in wood cabinet.