Master WATCHMAKING

SHOP TRAINING JOB GUIDES

LESSON 7

Selecting the Mainspring

—

Sections 185 - 200

CHICAGO SCHOOL OF WATCHMAKING

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MASTER WATCHMAKING

A Modern, Complete, Practical Course

CHICAGO SCHOOL OF WATCHMAKING

Founded 1908 by Thomas B. Sweazey

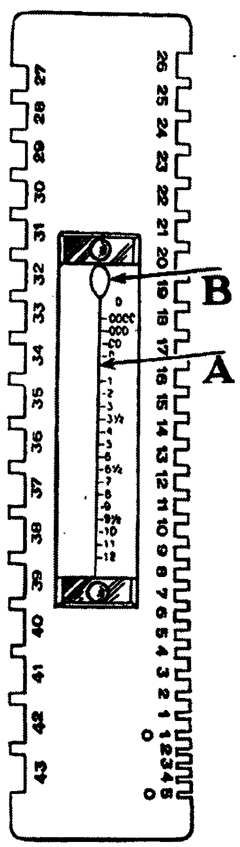
Lesson 7

Sections 185 to 200

Lesson 7 — Selecting the Mainspring

Section 185

IN the preceding lessons you have learned the importance of replacing set mainsprings, the necessity of using good oil and how it is applied, the more popular forms of tips made by manufacturers, and certain tests that are used in locating errors in winding caused by either broken or improperly attached mainsprings. You have been shown the proper methods of placing mainsprings in watches without distorting them and have been impressed with the importance of using a good winder in your work.



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All these things are essential but your knowledge has little value unless applied to a mainspring that is suited to the watch you are working upon. Not always will you find the old one of proper size and you must be capable of judging by its appearance in the barrel whether it is of standard dimensions and if wrong, to select one that is right. Should a broken mainspring as it lies in the barrel, appear to be of correct size it is best to replace it with one of the same dimensions as to width, thickness and length, and with the proper tip.

Sec. 186 Dennison Type of Gauge

Your first step then is the selection of a good mainspring gauge. The one illustrated in figure 145 has been standard for a long time, but in recent years mainsprings are being gauged more and more by means of the metric system with its measures of greater accuracy.

Sec. 187 — Width

This gauge in figure 145 consists of a plate with notches of varying widths around the edge. In gauging for width, the mainspring is tried in these until one is found in which the flat side of the mainspring will just fit. If it will enter the notch marked 18 when held flat against the gauge, but will not enter 17 we consider the mainspring 18 wide by this system

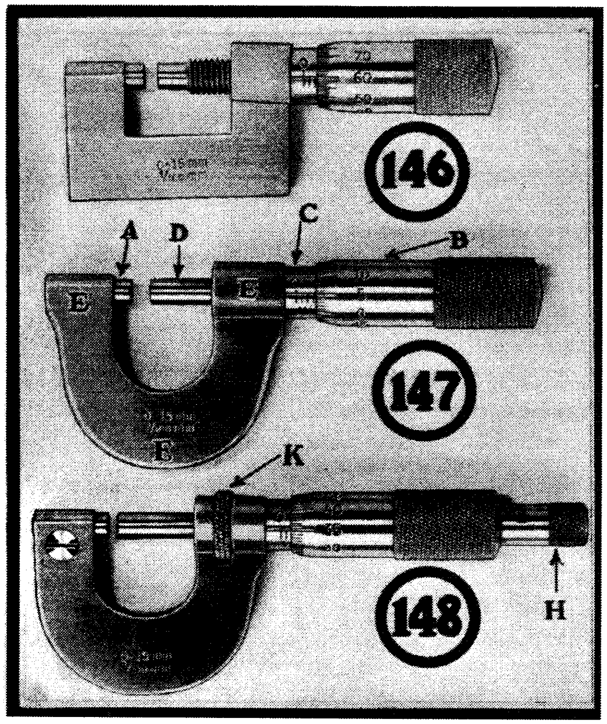
Sec. 188 — Strength

The thickness or strength of a mainspring is shown by the tapered slot at A. Push the mainspring, tip end first, through the hole at B, and lightly press down in the slot until it stops and note what figure is opposite the lower edge. This figure will give you the strength.

In listing dimensions from this gauge the width and strength are often shown with an x between as follows: 19x5 meaning that the mainspring is 19 wide, by 5 strength.

This type of gauge is not always accurate. The difference between each succeeding notch is approximately one tenth of a millimeter, number 1 being one millimeter wide, number 2 one and one tenth millimeters, number 3 one and two tenths millimeters (1.2mm), number 11, two millimeters — number 21, three millimeters, etc. In some watches mainsprings are used with a width of 10½, 11¾ or 19½ according to this method, but with this gauge there is no way of measuring such widths accurately.

The slot for measuring the thickness becomes worn and even on new gauges there often will be found a variation, if comparisons are made between given positions on the scales. Again the numbers on the slot are confusing in that the larger the number the smaller the actual measurement, number 5 on the thickness gauge measuring about .18 mm while number 10 is equivalent to .11 mm.



Sec. 189 — Gauging by the Metric System

The metric system was rendered legal for all transactions in the United States by an Act of Congress, approved July 28, 1866, and is now legal or obligatory in all commercial countries. In many parts of the world including Europe, more metric measurements are in use than any other system.

The metric unit of length for watchmakers is the millimeter, or one thousandth of a meter, and this is being used more and more in the gauging of watch parts and material. One inch equals almost exactly 25.4 millimeters.

The diameters of pivots are gauged in hundredths of a millimeter as are the holes in jewels. The outside diameters of balance jewels and train jewels are gauged in tenths of a millimeter while roller jewels are gauged in hundredths of a millimeter. All fancy watch glasses or crystals are gauged in tenths of a millimeter and many manufacturers of round ones are also gauging their products in tenths of a millimeter.

There are several types of metric gauges that are used for different purposes, such as the pivot gauge divided into hundredths of a millimeter; vernier slide caliper for inside and outside diameters, combined with a depth or shoulder gauge, measuring in tenths of a millimeter; the degree type of gauge, or spring caliper with vernier capable of measuring to 1/100 mm and the finest and most accurate of all, when properly made, the micrometer caliper in hundredths of a millimeter, which can be used in measuring dimensions of staffs, pinions, wheels, pivots, jewels, mainsprings and which should be found in every Master Watchmakers set of tools.

Sec. 190 — The Metric Micrometer Caliper

In figure 147 is shown a popular type of metric micrometer caliper. The spindle D is attached to the thimble B and they turn as one piece, the spindle passing through the sleeve C. The sleeve C is fastened to the frame E and remains as a fixed part of the frame. Part of the spindle is threaded to fit threads inside the sleeve. When the thimble is revolved to the left it causes the spindle to recede from the anvil A and when turned the other way the spindle advances toward the anvil.

The piece to be measured is held between the anvil A and the end of the spindle D. The spindle is then brought against the piece by turning the thimble B. This should only be turned as far as it will go with a light pressure.

Memorize these parts:

A—Anvil

B—Thimble

C—Sleeve

D—Spindle

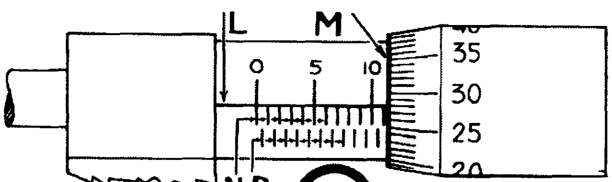
E—Frame

The amount of the opening is indicated by the lines and figures on the thimble and sleeve. The thread on the concealed part of the spindle is of such a pitch that one turn advances the spindle and with it the thimble, one half or 50/100 of a millimeter. The short vertical lines on the sleeve correspond to the pitch of the thread. The upper series of these lines indicated by N touch the horizontal line L as shown in the drawing at figure 149 and indicate the millimeters. The lower short vertical lines at P are half way between the upper lines N and indicate the half millimeters. Every fifth line of the upper series is longer than the rest and numbered, 0, 5, 10 etc. These numbers indicate the number of millimeters when the thimble is opened to this point.

The beveled edge of the thimble at M is marked with 50 divisions, every fifth division being numbered from 0 to 45. Knowing that one whole turn of the thimble moves the spindle lengthwise 50/100 of a millimeter it follows that turning the thimble 1/50 of a complete turn or the distance from one division line to the next on the thimble will move the spindle 1/50 as far or 1/100 of a millimeter.

Sec. 191 — Reading the Micrometer

A little practice will enable you to read your micrometer on any sized opening up to its capacity. Start by turning the spindle until it



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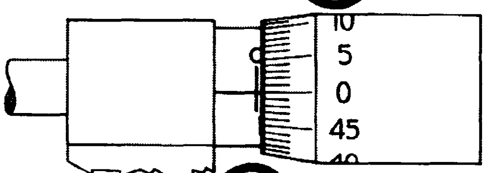

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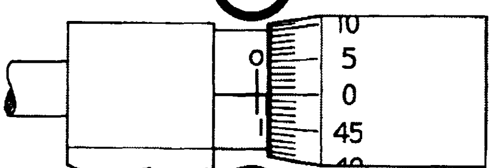

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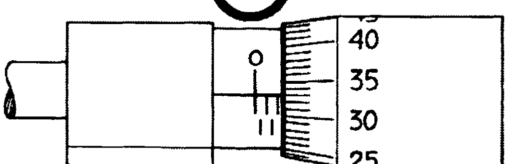

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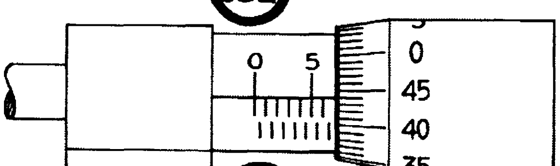

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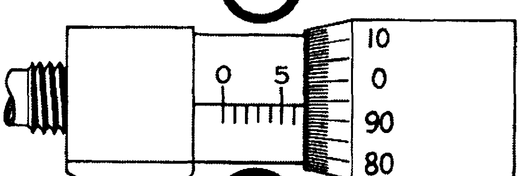

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is against the anvil. The beveled edge of the thimble then should be even with the zero line on the *sleeve* and the zero line on the *thimble* should coincide with the *horizontal* line L on the sleeve.

Occasionally you may find that the anvil and spindle do not come together on account of there being dust between them. If your lines do not coincide as described above, draw the spindle away from the anvil and insert a clean piece of watch paper, then turn the spindle until the paper is held but can be withdrawn without tearing. After pulling the paper out, without releasing the spindle, no doubt you will find that your caliper registers correctly.

When measuring with a micrometer caliper always bring the anvil and spindle together with a light pressure. By using undue force it is easy to spring the tool and ruin it for accurate measurements. For this reason the beginner will get better results by having his micrometer equipped with a ratchet stop and thus get the same amount of pressure at all times.

Having your micrometer caliper closed to register at 0, open it by giving one full turn of the thimble until the 0 on the thimble again registers on the horizontal line on the sleeve as illustrated at figure 150. Notice that the beveled edge of the thimble now coincides with the first of the lower series of vertical lines on the sleeve, indicating one half or 50/100 of a millimeter usually written .50 mm. (see figure 150). If you turn the thimble two full turns from the anvil until it is even with the first of the upper series of vertical lines counting from the 0 line it indicates one millimeter, written 1 mm. (see figure 151).

When the horizontal line on the sleeve does not coincide with the 0 line on the thimble it is necessary to add the extra hundredths indicated. In figure 152 the thimble is a trifle past the 2 millimeter line and the 33 line on the thimble coincides with the horizontal line on the sleeve this showing exactly two and thirty three hundredths millimeters, written 2.33 mm.

In figure 153 the thimble is drawn out still further. Here it is past the line indicating 6.50 mm and shows .44 on the thimble. Adding 6.50 and .44 gives 6.94 mm.

The pitch of the spindle thread on the micrometer shown in figure 146 is coarser and one turn of the thimble moves the spindle exactly one millimeter instead of one half millimeter as in the other. On this spindle there is but one series of vertical lines, each line being one millimeter apart.

On the thimble there are 100 divisions, each division indicating one one-hundredth of a millimeter. Thus if you back the spindle from the anvil one full turn it will have moved exactly one millimeter. The drawing at figure 154 shows the difference between the two methods of indicating the same measurements. The drawing at 154 shows 6.94 mm by this system and figure 153 shows 6.94 mm by the other system.

Figure 148 shows much the same type of micrometer as figure 147 with the addition of a ratchet stop and lock nut. The ratchet at H will slip when more than a certain amount of pressure is applied on the spindle and removes the danger of springing the tool. The lock nut at K enables you to lock the micrometer in any position.

A satisfactory way to hold the micrometer is shown in figure 155. Here the frame is held against the hand by the second finger leaving the thumb and first finger to manipulate the thimble.

Sec. 192 — Metric Width

In measuring a mainspring to find its width in millimeters the outer coil is held between the frame and anvil as shown in figure 156 and the thimble is turned until the mainspring is held with slight pressure, after which the reading is taken as explained before. The measurement for the metric width is expressed in millimeters and for this particular mainspring it is two and eighty three hundredths millimeters or in decimals, 2.83 mm.

Sec. 193 — Metric Strength

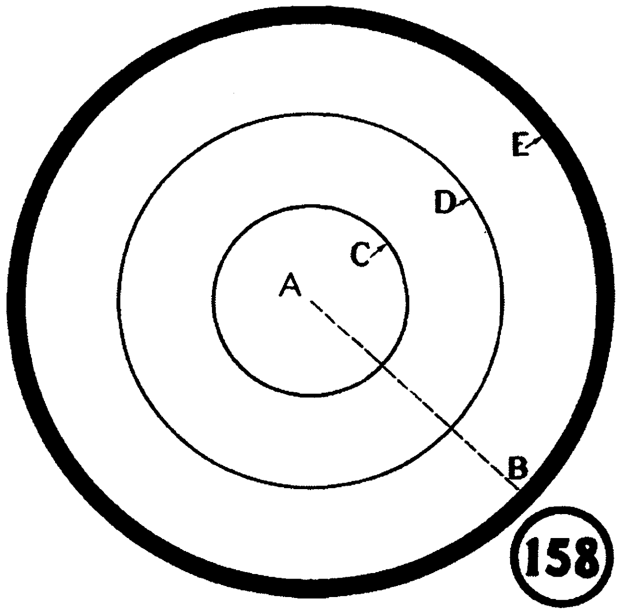
To obtain the strength or thickness of an old mainspring it is sometimes necessary to straighten a portion of it, especially if it is set. Otherwise the curved part lying between the spindle and anvil, will give a higher reading than the actual strength of the mainspring. By holding the spring between the fingers as in figure 157 it is possible to straighten out enough of it to gauge the actual thickness by applying the micrometer caliper to this straight portion.

It is seldom necessary to take the measurements on new mainsprings especially for American watches, as in the better grades, each one comes packed in a separate envelope with the Dennison and metric measurements plainly marked on the outside, but you may have occasion to measure new ones for Swiss movements or to check up on American sizes and it is possible to follow this same procedure without injury to the spring.

Sec. 194 — Length

The length of a mainspring determines the number of coils in the barrel. If your mainspring is of correct thickness and length, it will occupy the proper space in the barrel and will have the right number of coils.

The average watch should have 11 or 12 coils in the barrel and these coils should occupy one half the area between the arbor and the outer shell of the barrel. If you will exam-



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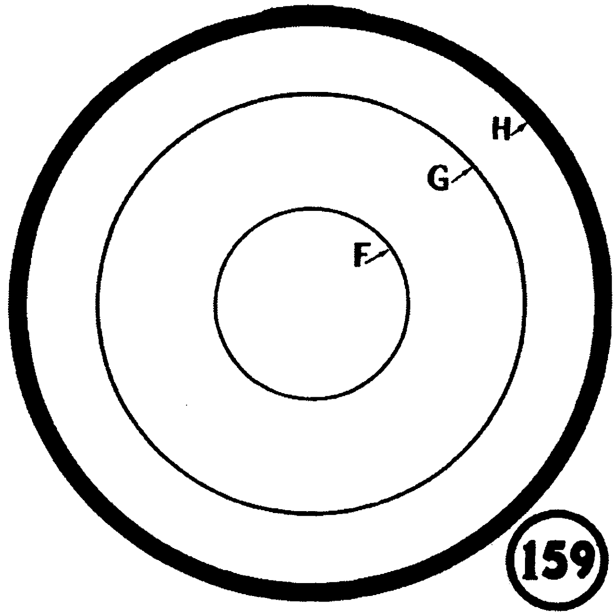


159

ine the photograph in figure 91 lesson 5 you will see there are almost 12 coils counting from the tip inward toward the arbor.

Some of the finer R. R. movements are fitted with longer and thinner mainsprings having more coils, yet occupying the proper amount of space in the barrel — one half the area between the arbor and the outer shell — this giving a longer running period on one winding. A very good example of this type is shown in figure 134 from a Bunn Special Railroad movement. This mainspring with nearly 14 coils occupies one half the area between the hub and the outer shell of the barrel and is known as a 60 hour mainspring.

Sec. 195 — A Rule to Remember

One of the rules applying to the mainspring is that in order to obtain the greatest number of turns the length and strength should be such that the occupied part of the barrel outside of the arbor is equal to that of the unoccupied part; in other words a mainspring should occupy one half of the area between the outer diameter of the arbor and the inside shell of the barrel. Some watchmakers apply this rule by dividing the radius into three equal parts, giving the arbor one third, the unoccupied part one third and that part occupied by the mainspring, one third.

This rule applies fairly well as far as the arbor is concerned as you will find it is generally just about one third the inside diameter of the barrel — in the majority of watches being under rather than over this proportion, but the distance from the arbor to the inner shell of the barrel should be divided into two equal areas, when comparing the open space with that of the space occupied by the mainspring, and the area of these two equal spaces are not contained as equal radial measurements.

In figure 158 I have drawn two circles inside an outer circle in order to divide the radius A B into three equal parts. This however does not mean that the total space, enclosed by C is equal to the total space between the circle C and D or that the space between C and D is equal to the space between D and E. As a matter of fact as the diameters increase the areas increase.

In figure 159 the circle F is the same size as C in figure 158 but the circle G divides the space between F and H into two equal *areas*, that is the area of the space between the circles F and G is the same as that of the space between G and H. If the heavy circle H were to represent the shell on the watch barrel and the circle F the diameter of the arbor, a properly fitted mainspring will exactly fill the space between G and H when entirely run down and in like manner occupy the space between F and G when wound tightly around the arbor. You will find that the diameter of the circle G representing the inner coil of the mainspring when run down is almost exactly three fourths the diameter of the circle H representing the inside shell of the barrel.

Keeping this in mind it is an easy matter to tell by the appearance of a mainspring in the barrel whether it is of correct thickness, provided you know how many coils it should have. By knowing what proportion the mainspring should occupy you can figure out its proper strength for any barrel.

In like manner, knowing the strength of a given mainspring it is possible to figure how many coils should be in the barrel to give the best results.

Sec. 196 — To Calculate Strength

Here is a simple rule that will give you the approximate strength of a mainspring with any given number of coils where you have the inside diameter of the barrel and the diameter of the arbor.

(a) Subtract one half the diameter of the arbor from one half the inside diameter of the barrel (AB minus AC figure 158).

(b) Take 38¼ per cent of this difference.

(c) Divide the result by the number of coils desired and this will give proper strength of mainspring to give most turns on the barrel.

Let us take as an example the Hamilton barrel shown in figure 140.

The inside diameter is 15.5 mm.

The diameter of the hub, (F in figure 159) is 5 mm.

Number of coils 12.5

(d) Subtracting one half the diameter of the arbor (2.5 mm.) from one half the inside diameter of the barrel (7.75 mm.) we obtain 5.25 mm.

(e) 38¼ per cent of 5.25 mm. gives 2 mm.

(f) Dividing 2 mm by 12.5 (number of coils) gives .16 mm as the proper strength for a mainspring for this movement.

Sec. 197 — To Calculate Number of Coils

Given the strength of a mainspring to find number of coils.

(g) Divide 38¼% of space by strength of spring.

In the above barrel if the mainspring we wish to put in the barrel is strength .16 mm. Divide 2 mm (e in sec 196) by .16 mm equals 12½, number of coils for best results.

Sec. 198 — Some Interesting Experiments

The majority of watchmakers have their own ideas as to the amount of space that a mainspring should occupy in a barrel but few know the correct method of determining this space and what the proper proportions are. You will find that a great many go on that idea of one third of the space on the radius as explained in section 195.

The watchmaker of an investigating turn of mind will get some rather interesting results if he will go to the trouble of making a few experiments on an ordinary grade of watch. He will find that some factories provide their watches with mainsprings that are too long. In order to overcome friction and poor adjustment on these movements it is necessary to provide springs of goodly strength and in doing this they apply a stronger spring of the same length as the weaker springs on higher grade movements.

In my work of instructing I have made various experiments and have shown where more turns of the barrel often could have been secured by shortening the mainspring. At A figure 160 is a barrel from a 16 size 7 jeweled American watch with a 16 size mainspring as recommended by the manufacturer of the movement. This mainspring is .20 mm thick and would be accepted as the proper size by a great many watchmakers.

The unoccupied space on the radius of the barrel is about the same as that covered by the mainspring and as I have said before, this is the rule that many watchmakers use in determining whether the mainspring is of correct strength and number of coils.

Experiment A.

If we compare this portion however to the drawing in figure 159 we find that the mainspring is occupying altogether too much of the barrel. In experimenting with this mainspring barrel in the movement, I found that by winding it up as far as it would go and then allowing it to run down, the minute hand made 36 2/5 revolutions or if we could imagine that the watch would run as long as this with its escapement in place, 36 hours and 24 minutes.

Experiment B.

I next took this mainspring out of the barrel, broke off 33 millimeters from the outside end, put on a new tip and wound it into the barrel as shown at B. Replacing in the movement and winding up as before, it ran down with 37 2/3 turns of the minute hand. Here you see the mainspring was 33 millimeters shorter and yet ran an hour and 16 minutes longer.

Experiment C.

Again I removed the mainspring and broke off 29 millimeters from the end and replaced in the barrel as shown at C. Upon winding this mainspring and letting it run down it showed turns amounting to a trifle more than 38 hours.

Experiment D.

Next I broke off 25 millimeters more and the mainspring appeared as in D. When this was wound up and allowed to run down it showed 38 hours and 14 minutes, a gain of nearly two hours over the full length mainspring shown at A.

If you will examine the proportions shown in D you will find that they approach very nearly our ideal shown in the drawing in figure 159.

I continued breaking off portions of the mainspring and testing them with the train in the movement with the following results:

Experiment E.

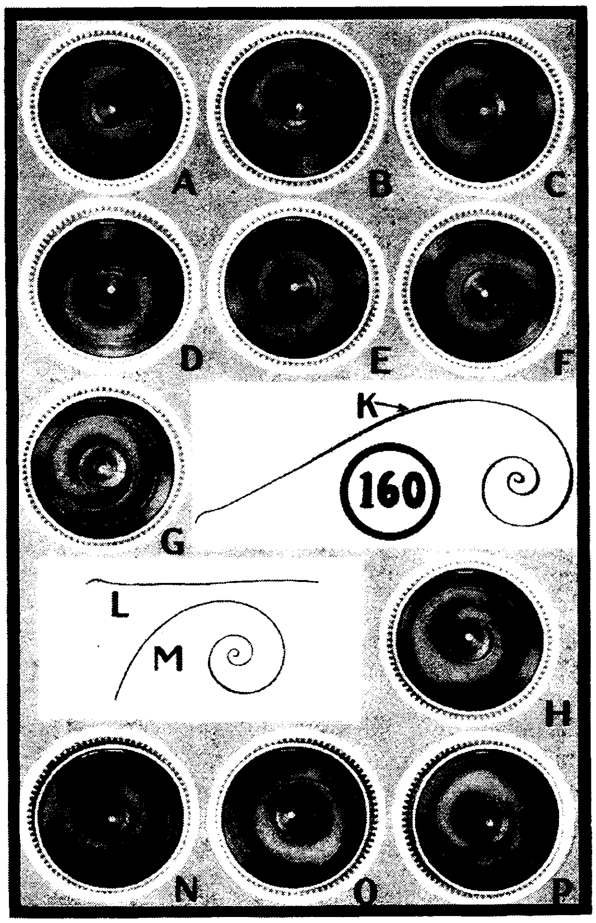
The portion of mainspring shown at E, 25 millimeters shorter than D, ran 37 hours and 58 minutes.

Experiment F.

F. 25 millimeters shorter than E ran nearly the same as E, 37 hours and 52 minutes.

Experiment G.

Finally I broke off 50 millimeters more making the mainspring at G 50 millimeters shorter than F yet it ran down showing 36 hours and 42 minutes.



Comparing figure A with figure G you should appreciate the fact that having a longer mainspring does not always make the watch run a greater length of time. Here in figure A we have the full length mainspring which gives turns amounting to 36 hours and 24 minutes. At figure G the same mainspring after breaking off a large portion and then having been wound up so many times that it began to show the effects on the inner coil, which is set, gives more turns than in A.

Experiment H.

Taking another new mainspring of the same make and the same strength as the one used in experiment A, I broke it off at the point K, thus dividing it into two parts as shown at L and M, the portion L being about 180 mm. or a trifle over seven inches long. I then placed a tip on the end of portion M and wound it into the barrel as shown at H. Placing this shorter mainspring in the movement and winding it up completely I found that it made turns equivalent to 37 hours and 22 minutes before it was completely run down.

Here again, is demonstrated the paradox of making a mainspring give more turns to the barrel by taking off a generous portion. It would appear as though much of the part L of this mainspring was of little value in the watch as we get better results by using the part M alone. Comparing the results of this short mainspring with the complete mainspring used in the barrel at A, we find that this short one ran 58 minutes longer than when using the entire spring.

If we substitute a weaker mainspring of about the same length, we may expect a greater number of turns as a result of winding it up and letting it run down. What we gain in turns however, we lose in power. Thus it is that the finer the workmanship on a movement in a given size the less the strength needed in the mainspring to give a proper motion to the balance.

Experiment N.

In this same movement I placed a mainspring with a thickness of .16 mm which filled the barrel as shown at N figure 160. This spring you will observe has only a fraction more than the number of coils in the stronger spring shown at A but comes nearer to occupying the ideal space in the barrel.

On account of the better proportions of space and mainsprings we should expect this to give more turns on the barrel than any of the previous mainsprings.

The result of winding and allowing it to run down gave a number of turns equal to 51½ hours.

Experiment O.

Breaking off 31 mm, which gave approximately one coil less as shown in O, gave the number of turns equal to 53⅓ hours, a gain of nearly two hours.

Another test was then tried with No. 0 by placing the balance and escapement in the movement, winding the mainspring up to its limit and allowing the watch to run in one position until it stopped which it did in 51 hours and 58 minutes, this lacking about 1⅓ hours of running as long as it did when there was no resistance to the train.

Experiment P.

As a further test I broke off 24 mm more as shown in P and allowed it to run down which it did with a number of turns equal to 52½ hours as compared with 53⅓ hours with O.

Here it is evident that I have broken off a trifle too much, and the mainspring occupies less than one half the actual area between the arbor and inner rim of the barrel, and does not give as much power as with the length shown at O.

You should now see the fallacy of thinking that because a watch does not run as long as should be expected, it has a mainspring that is too short. There are probably more mainsprings by a large majority of a greater length than is necessary than there are mainsprings too short, being carried in watches today.

From these last three experiments you might get the idea that all that is necessary is to keep reducing the strength of the mainspring and the watch will give better service but this will not prove true. The power needed is determined to a great extent upon the condition of the movement. Thus it is that a 21 jeweled grade uses a weaker spring than does a 7 or 15 jeweled movement made by the same manufacturer. Not only do the extra jewels reduce the friction in the train but in the higher grade movements the escapements are matched closer.

It is not customary to break off the end of a mainspring in order to get the correct length for American watches. As a general rule you will find that some manufacturers have a tendency, especially in the lower grades, to use springs of too great a length, but it will hardly pay for you to change the length of every one you put in.

The better way is to put each one of your repair jobs in such good condition that a weaker mainspring will make the watch motion properly.

Sec. 199 — Choosing a Mainspring for An American Watch

Before taking any mainspring from its barrel examine carefully to see that it occupies the proper space, has the correct number of coils and that the upper edge of the outside coil comes a trifle below the shoulder in the barrel where the cap snaps in place, this showing the proper width.

Remove the mainspring and gauge it for width and strength. Notice the type of tip and then from the mainspring chart you should be able to select the proper mainspring for that movement.

On the following pages you will find descriptive charts of mainsprings for eleven different American made Watches. Some of the factories making these movements have gone out of business but as long as these watches continue to be brought in for repairs it is necessary to list mainsprings to fit them even as it is necessary to list those for discontinued models made by the more successful factories.

In these charts the various types of tips are illustrated and this will help you in selecting a mainspring to match any particular one. Following the style column is given the company's number, then the size followed by the column giving the description of that particular mainspring or the movement for which it is intended. The next two columns give the Dennison width and strength as found by the gauge shown in figure 145.

The columns designated as Width Metric and Thickness Metric are the ones to be used for those using the metric system of gauging. Under the Width Metric Column are shown the widths of the mainsprings in millimeters and in the next column are shown the Strengths or Thicknesses in Millimeters, usually in hundredths and occasionally in thousandths of a millimeter.

Suppose that a 16 size Hamilton Watch is brought to you and you find it needs a new mainspring. How will you go about selecting a new one? After seeing that it fills the proper proportion of the barrel, remove and measure its width and thickness. You find that it has a T end and measures 2.85 mm. wide and .19 mm. thick. Looking on the chart, under Hamilton, 16 size, you find that number 355 in the first column is the one needed. In like manner you can find the proper spring for any American Watch.

Sec. 200 — Carrying Mainsprings in Stock

Broken mainsprings are among the most common replacements made by the Master Watchmaker and it is of the greatest importance that he shall have a fairly complete assortment on hand in order to give his customers prompt service. It is not necessary that this should consist of a great quantity of each size nor that you carry every number listed on our charts. Generally you will find that certain makes of watches are most popular and your stock of mainsprings should be heaviest on these lines. You can purchase assortments already made up in sizes to suit nearly every purse. By purchasing an assortment you are able to buy at the dozen or gross price which makes quite a saving as compared to the cost when only one mainspring is selected.

The cost of good quality mainsprings is so small compared to the retail price for replacing them in watches, that it does not pay to buy the cheapest quality or job lots. The cheaper mainsprings nearly always will be found of inferior quality and the few cents more profit will hardly make up for the loss of a good customer when such a mainspring "sets" in his watch.

CHART SHOWING WIDTH AND STRENGTH IN MILLIMETERS and EQUIVALENT IN DENNISON NUMBERS

WIDTH		WIDTH		WIDTH		WIDTH		STRENGTH	
M.M.	Denn.	M.M.	Denn.	M.M.	Denn.	M.M.	Denn.	M.M.	Denn.
.50	5/0	1.80	9	3.40	25	5.00	41	.20	3½
.60	4/0	1.90	10	3.50	26	5.10	42	.19	4
.70	3/0	2.00	11	3.60	27	5.20	43	.18	5
.75	2/0½	2.10	12	3.70	28			.17	6
.80	2/0	2.20	13	3.80	29			.16	6½
.85	1/0½	2.30	14	3.90	30			.15	7
.90	1/0	2.40	15	4.00	31	STRENGTH		.14	8
.95	½0	2.50	16	4.10	32	M.M.	Denn.	.13	9
1.00	1	2.60	17	4.20	33	.28	0000	.12	9½
1.10	2	2.70	18	4.30	34	.27	000	.11	10
1.20	3	2.80	19	4.40	35	.26	00	.10	11
1.30	4	2.90	20	4.50	36	.25	0	.09	12
1.40	5	3.00	21	4.60	37	.24	0½	.08	13
1.50	6	3.10	22	4.70	38	.23	1	.07	14
1.60	7	3.20	23	4.80	39	.22	2	.06	15
1.70	8	3.30	24	4.90	40	.21	3	.05	16

Always use a Metric Gauge for measuring mainsprings. Most Dennison gauges are not accurate. After being in use a short time, the thickness gauge becomes spread or worn. If your Dennison gauge does not give the same reading as shown on the above chart when compared with metric measurements, it should not be used.

Accurate gauging of mainsprings can be accomplished only by using a precision gauge calibrated in hundredths of millimeters.

MAINSPRINGS FOR AMERICAN WATCHES

WALTHAM

Our No.	STYLE	Co.'s No.	Size	Description	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
130		2232	8 day	Auto & Desk..	37	1½	4.60	.22	30
100		2202	18	Old Model....	19½	2	2.85	.22	23
101		2203	18	17J	20	2	2.90	.22	21
102		2204	18	Nar'w Bar'l...	16	2	2.50	.22	21
103		2205	18	Wide 7 to 15J.	21	2	3.00	.22	21
104		2222	18	Mod. 1892....	23	5	3.25	.18	25
107		2208	16	Lever Set.....	14	2	2.30	.22	21
108		2218	16	P. S. 7 to 15J.	19	4	2.80	.19	25
106		2227	16	P.S. 17 to 23J	19	5	2.80	.18	25
109		2210	14	Lever Set.....	12	2½	2.10	.21	19
110		2211	14	L. & P. S.....	16	2	2.50	.22	19
112		2224	12	Hook End....	12½	7	2.15	.15	19 1/4
113		2224A	12	Hole End.....	12½	7	2.15	.15	19 1/4
128		2234	12	Colonial A....	4	5½	1.30	.175	19
129		2237	12	Colonial B ...	8	6	1.70	.165	19 1/4
114		2214	10	¾ Plate K. W	14	3	2.30	.21	19
115		2215	6	Lever Set.....	10	2	1.90	.21	16
116		2217	6	L. & P. S.....	10	4	1.90	.19	16
117		2219	6	Steel Bar'l....	12	7	2.10	.15	16
118		2216	1 & 0	S. W	8	6	1.70	.165	16
120		2228	0	Model 1900...	8	9	1.70	.13	15
119		2220	0	Model 1891 ..	6	7	1.50	.15	16
121		2230	0	Model 1907 ..	12	9½	2.06	.12	15
122		2221	00	S.W. & P.S ...	6	7	1.55	.15	14 1/2
123		2226	Jewel Series	6/0 Mod. 1898	6	9½	1.50	.12	13 1/2
124		2235		6/0-Mod. 1912	4	9	1.30	.13	13 1/2
125		2229	10L	Ten Lignes...	6	11	1.50	.10	10 1/4
126		2233	9L	1913 Model...	2	11	1.08	.10	10 1/4
127		2236	7½L	5¼L. Rect...	2	13	1.10	.08	9
131		2238	7¼L	Rectangular...	4	11	1.30	.11	12 1/2
132		2239	6½L	Oval . ..	2	12	1.10	.09	

HAMILTON

Our No.	STYLE	Co.'s No.	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
351		15	18	17J	19	3¼	2.85	.205	22
352		15	18	19 to 21J	19	3½	2.85	.20	22
354		232	18	Motor Barrel...	22	5	3.10	.18	25 1/2
353		14	18	Motor Barrel ..	23	5	3.20	.19	25 1/2
355		318	16	17J	19	4	2.85	.19	22
356		317	16	19 to 21J . .	19	5	2.85	.18	22
358		534	16	Motor Barrel...	19	6½	2.75	.16	22
359		1228	12	Motor Barrel..	8	5	1.70	.18	20 1/2
361		1536	0	Lady Ham....	5	7	1.40	.15	14
362		1535	0	Motor Barrel ..	5	7½	1.40	.145	14
363		1721	6/0	17J	4	8½	1.30	.135	11 1/4
364		2321	6/0	17J.	5	9½	1.40	.12	
365		2621	6/0	979 Model......	5	9¾	1.40	.115	
366		2721	18/0	6¾L Oval.......	2	12	1.10	.09	

ILLINOIS

Our No.	STYLE	Co.'s No.	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
400		53	18	19 to 23J........	20	3¼	2.90	.202	21 1/2
402		53	18	Up to 17J.......	20	2	2.90	.22	21 1/2
404		365	16	Old Model.......	16	3	2.50	.22	20
406		573	16	N. M. to 17J.....	18	3½	2.70	.205	20 1/2
407		573	16	N. M. 19-23J....	18	5	2.70	.18	20 1/2
405		124	16	N. M., Wide.....	20	4	2.90	.19	20 1/2
409		1759	16	60 Hour.........	21	6½	3.00	.16	27 1/2
408		1952	16	Mot. Bar........	17	6	2.70	.18	22 1/2
410		1236	12	New Model......	11	4	2.00	.19	18 1/2
411		1845	12	Mot. Bar.......	5	5	1.40	.18	18 1/2
412		1953	12	M. B. Thick Model	11	6	2.00	.17	18 1/2
413		171	6	.. ..	9	5	1.80	.18	14
414		981	0	....	8	8	1.70	.14	13
416		1422	6/0	....	3	9	1.20	.13	10 1/2
419		358	12/0	....	3	9½	1.20	.12	
417		2092	18/0	Tongue End....	3	10	1.20	.11	9 3/4

MAINSPRINGS FOR AMERICAN WATCHES

ELGIN

Our No.	STYLE	Co.'s No.	Size	Description	Average Dennison Width	Average Dennison Strength	Width Metric	Thickness Metric	Length Inches
							mm	mm	
221		4457	37	8 Day........	37	0	4.63	.24	29
202		812	18	17 J	20	1½	290	.225	21 1/2
203		812	18	7 to 15J.....	20	1	290	.23	21 1/2
201		812	18	21 to 23J.....	20	2½	290	.22	21 1/2
200		1956	18	Steel Barrel ...	30	5	390	.18	25 1/2
204		817	16	17 to 21J.....	17	4	265	.19	21 1/2
206		817	16	7 to 15J.....	17	3½	265	.205	21 1/2
207		2542	16	Steel Barrel....	17	4	264	.19	21
208		1712	12	Steel Barrel....	13¼	4	2.23	.19	20
209		1720	12	Wide.........	13¼	4	2.23	.19	20
210		2339	12	Narrow.......	11½	4	205	.19	20
211		2874	12	Thin Model....	7	5	165	.18	20 1/4
212		824	6	15J...........	10	5	190	.18	17 1/2
214		825	0	Narrow.......	4	7	127	.16	16
215		2097	0	Wide.........	7½	8	165	.14	16 1/2
216		2097	3/0	D. B..........	8	8	165	.135	16 1/2
222		4789	4/0	Legionnaire ...	10	10	190	.11	15 1/2
217		2705	5/0	7J...........	4	8½	125	.13	10 3/4
218		2890	5/0	15J...........	4	10	125	.115	11 1/2
219		2890	6/0	15J...........	4	10	125	.115	11 1/2
220		1957	10/0	15J...........	4	10	125	.115	9 3/4

HOWARD

Our No.	STYLE	Co.'s No.	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
600		55	18	Old Model... ...	19	3½	2.80	.20	23 1/2
602		328	16	23J. New Model..	18	6	2.70	.17	21 1/2
603		329	16	19J. New Model...	18	5	2.70	.18	21
604		552	12	17-21J. New Model	10	7	1.90	.15	19 1/2
605		553	12	17-21J. New Model	8½	7	1.75	.15	19
606		796	10	Tongue End... ..	6	7	1.50	.15	16

INGERSOLL MODELS

Our No.	STYLE	Co.'s No.	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
654		344	16	Trenton.	15	1½	2.40	.225	17 1/2
650		365	16	Ing. Trenton......	15	3½	2.40	.20	19
651		1365	16	Ing. Reliance.....	11	1	2.00	.23	17 1/2
652		2365	16	Ing. Reliance.....	12	2½	2.10	.21	18 1/2
653		316	12	Ing. Waterbury....	12	7	2.10	.15	19 3/4
655		6335	6/0	Alden.	7	7	1.60	.15	

SETH THOMAS

Our No.	STYLE	Co.'s No.	Size	Description	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
701		536	18	New Style........	24	4½	3.30	.185	21 1/4
702		729	18	Cent., wide..	24	2	3.30	.22	20

NEW YORK STANDARD

Our No.	STYLE	Co.'s No.	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
500		2189	18	Reg. Model......	20	1	2.90	.23	20
501		2190	18	New Model......	21	1½	3.00	.23	20
502			16	Excelsior........	14	2½	2.30	.215	22 1/2
505		3196	16	New Model......	16	2	2.50	.22	20 1/2
504		3349	16	Thin Model......	15½	2	2.45	.22	20 1/2
513		1321	16	Crown..........	15½	5	2.45	.18	20
506		4144	12	Model "B"......	10	2	1.90	.22	19
507		4284	12	Model K........	9	3½	1.83	.20	18
514		1322	12	Crown..........	11	5	2.00	.18	19
509		7080	10	Model K........	6	6½	1.50	.16	16 1/4
510			6	Reg. Model......	10	4½	1.90	.185	16 1/2
511		5134	6	New Model......	10	5	1.90	.18	16
512		6133	0	New Model....	6	7	1.50	.15	15
515		1323	000	Crown.........	7	7	1.60	.15	13
516		1324	10/0	Crown..	3	12	1.20	.09	9 1/2

SOUTH BEND

Our No.	STYLE	Co.'s No.	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
550		19528	18	1st and 2nd Model..	21	3¾	2.97	.195	21 1/2
551		217528	16	1st Model.........	17	5	2.59	.18	20 1/2
552		27528	16	2nd Model.........	19	5	2.82	.18	21 3/4
553		55528	12	1st Model.........	11	5½	1.98	.175	19
554		3528	6	1st Model.........	10	4½	1.88	.185	16 1/2
555		22528	0	3rd Model.........	7½	8	1.65	.14	13 1/2

ROCKFORD

Our No.	STYLE	Co.'s No.	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
450		644	18	1888 Model......	20	2	2.90	.22	22
451		822	16	New Model......	18	3½	2.70	.20	20 1/2
452		932	12	New Model......	11	5½	2.00	.172	18 3/4
453		1077	0	1st Model....	8	8	1.70	.14	13 3/4

HAMPDEN

Our No.	STYLE	Co.'s No	Size	DESCRIPTION	Average Dennison Width	Average Dennison Strength	Width Metric mm	Thickness Metric mm	Length Inches
301		1696	18	7 to 15J. ...	20	1	2.90	.23	21 3/4
300		1696	18	17 to 23J........	20	3	2.90	.205	21 3/4
302		2696	16	Model 1890......	20	4	2.90	.19	21 3/4
303		3696	16	¾ Plate Mod....	18	3	2.65	.20	21 1/2
304		3696	16	Bridge Mod......	18	4½	2.65	.185	21
305		4697	16	Pat. Barrel......	18	5	2.65	.18	21
306		5697	16	Pat. Barrel......	18	5	2.70	.18	21 1/2
307		6696	12	7 to 17J........	9	5	1.80	.18	18 1/2
308		12696	12	Paul Revere....	5	5½	1.35	.172	19
309		8696	6	7 to 15J..	8½	6	1.75	.165	16 1/4
310		9696	3/0 5/0	7 to 15J	5½	6½	1.45	.16	13
311		15696	8/0	Mary Jane.... Josephine.....	3½	8	1.23	.14	8 1/4
312		11696	11/0	... .	3	10	1.20	.11	9 1/4
313			5½L	Rectangular..	1	12	1.00	.09	

MAINSPRINGS FOR AMERICAN WATCHES

SIZE	CO.NO.	NU VIGOR NUMBER	WIDTH	STR.	LENGTH	METRIC WIDTH	METRIC STR.	METRIC LENGTH	END	DESCRIPTION
FOR:	**ELGIN**									
8 DAY	4457	75	37	0	29	4.63	.25	737	DB&H	
18	812	76	20	3	21½	2.90	.21	546	DB&H	21 JLS.) 18S FULL PLATE
18	812	77	20	2½	21½	2.90	.215	546	DB&H	15 JLS.) 18S ¾ PLATE WITH
18	812	78	20	2	21½	2.90	.22	546	DB&H	7 JLS.) GOING BARREL
18	812	79	20	1	21½	2.90	.23	546	DB&H	7 JLS.)
18	1956	81	30	6	25½	3.90	.17	648	HOOK	21 JLS.) 18S ¾ PLATE WITH
18	1956	80	30	5	25½	3.90	.18	648	HOOK	19 JLS.) STEEL SAFETY BARRELS
16	6164	125	20	4	24¼	2.93	.19	622	DB&H	GRADES 571 THRU 575 INCLUSIVE
16	817	82	17	4½	21½	2.60	.185	546	DB&H	21 JLS.) ALL 16S MODELS
16	817	83	17	4	21½	2.60	.19	546	DB&H	17-19 JLS.) WITH GOING
16	817	84	17	3¾	21½	2.60	.195	546	DB&H	17-19 JLS.) BARRELS
16	817	85	17	3½	21½	2.60	.20	546	DB&H	7-15 JLS.)
16	2542	86	17	5	21	2.60	.18	533	S.B.	19 JLS.) ALL 16S WITH STEEL
16	2542	87	17	4	21	2.60	.19	533	S.B.	17 JLS.) SAFETY BARRELS
12	1712	88	13	4½	20	2.26	.185	508	S.B.	7-15 JLS.) 2ND&3RD MODELS
12	1712	89	13	4	20	2.26	.19	508	S.B.	7 JLS.) WITH STEEL BARRELS
12	1720	90	13	4½	20	2.26	.185	508	DB&H	
12	1720	91	13	4	20	2.26	.19	508	DB&H	
12	2339	92	11	4½	20	2.00	.185	508	DB&H	15 JLS.) 2ND & 3RD MODELS
12	2339	93	11	4	20	2.00	.19	508	DB&H	7-15 JLS.) WITH THIN GOING
12	2339	94	11	3¾	20	2.00	.195	508	DB&H	7 JLS.) BARRELS
12	2874	95	7	5	20¼	1.60	.18	514	DB&H	19 JLS.) 4TH MODEL
12	2874	96	7	4½	20¼	1.60	.185	514	DB&H	17-19 JLS.) STREAMLINE AND
12	2874	97	7	4	20¼	1.60	.19	514	DB&H	17 JLS.) CORSICAN
10	5726	127	7½	7	17½	1.65	.15	445	DB&H	17-21 JLS.) 5TH & 6TH MODELS
10	5726	126	7½	6	17½	1.65	.17	445	DB&H	15 JLS.) WITH GOING BARREL
6	824	99	10	6	17½	1.90	.17	445	DB&H	7-15 JLS.) 1ST & 2ND
6	824	98	10	5½	17½	1.90	.175	445	DB&H	7-15 JLS.) MODELS
0	825	100	4	7	16	1.30	.15	406	DB&H	7-15 JLS.) 1ST MODEL
0	825	101	4	6¾	16	1.30	.155	406	DB&H	7-15 JLS.)
3/0&0	2097	102	7½	8	16½	1.65	.14	419	DB&H	7-15 JLS.) 2ND & 3RD MODELS
3/0&0	2097	103	7½	7½	16½	1.65	.145	419	DB&H	7 JLS.) WITH GOING BARRELS
4/0	4789	104	10	10	15¾	1.90	.11	400	DB&H	17 JLS.) 1ST MODELS
4/0	4789	105	10	9½	15¾	1.90	.12	400	DB&H	7-17 JLS.) WITH GOING
4/0	4789	106	10	9	15¾	1.90	.13	400	DB&H	7 JLS.) BARRELS
5/0	2705	107	3½	9	10¾	1.25	.13	273	DB&H	15 JLS.) 1ST MODEL USED
5/0	2705	108	3½	8½	10¾	1.25	.135	273	DB&H	15 JLS.) ONLY IN GRADE 380
6/0	2890	109	3½	11½	11½	1.25	.095	292	DB&H	15 JLS.) 1ST & 2ND
6/0	2890	110	3½	11	11½	1.25	.10	292	DB&H	7-15 JLS.) MODELS
6/0	2890	111	3½	10	11½	1.25	.11	292	DB&H	7-15 JLS.)
6/0	2890	112	3½	9¼	11½	1.25	.125	292	DB&H	7 JLS.)
8/0	5219	121	7½	10	12	1.65	.11	304	DB&H	15-17 JLS.) 1ST MODEL
10/0	1957	115	3½	11	9¾	1.25	.10	248	DB&H	15-17 JLS.) 1ST MODEL
10/0	1957	113	3½	10	9¾	1.25	.11	248	DB&H	7-15 JLS.) 4TH&5TH MODELS
10/0	1957	114	3½	9¼	9¾	1.25	.125	248	DB&H	7-15 JLS.)
15/0	5550	123	3½	10	12¼	1.27	.11	311	DB&H	17-21 JLS.) 1ST MODEL
20/0	5015	119	2	12	8¼	1.10	.09	210	DB&H	15-17 JLS.) 1ST MODEL, OVAL
21/0	5327	122	3¾	11¾	9½	1.28	.095	241	DB&H	7-15-17 JLS.) 1ST MODEL
21/0	5724	124	3½	12½	7-3/8	1.25	.085	187	DB&H	19 JLS.) 4TH MODEL WITH GOING BARRELS
26/0	5131	120	2	13	8¼	1.10	.08	210	DB&H	7-17 JLS.) 1ST MODEL

10/0 SIZE MAINSPRINGS GENERALLY MAY BE USED FOR 16/0 AND 18/0 SIZES

		NU VIGOR				METRIC				
SIZE	CO.NO	NUMBER	WIDTH	STR.	LENGTH	WIDTH	STR.	LENGTH	END	DESCRIPTION
FOR:	**HAMILTON**									
18	14	225	23	4½	25	3.25	.185	635	HOOK	
18	15	226	19	3½	21	2.80	.20	533	TEE	
18	15	228	19	3¼	21	2.80	.205	533	TEE	
18	15	227	19	3	21	2.80	.215	533	TEE	
18	232	229	22	5	25	3.10	.18	635	MB	
16	534B	252	21	6¾	23½	3.00	.155	597	MB	MODEL 992B
16	317-318	231	19	5	21	2.80	.18	533	TEE	
16	317-318	230	19	4	21	2.80	.19	533	TEE	
16	318	232	19	4½	21	2.80	.195	533	TEE	
16	534	235	19	6¾	22	2.80	.165	559	MB	MODEL 992
16	534	234	19	6½	22	2.80	.16	559	MB	MODEL 992
12	1228-3028	236	8	5½	21¼	1.70	.175	540	MB	REGULAR
12	6021	250	6	6	17¼	1.52	.17	438	DB	MODELS 917,921,923
12	3328	238	5	6½	18½	1.40	.16	470	MB	MODEL 400
0	1536	239	5½	7¾	14	1.45	.145	356	TEE	MODEL 981,983
0	1535	240	5½	7¾	14	1.45	.145	356	MB	MODEL 985
6/0	2621	245	5	9¾	11½	1.40	.115	292	TEE	MODEL 979
6/0	2521	244	5	9½	11½	1.40	.12	292	TEE	MODELS 987A,987S,987, 987F,979
6/0	2321	243	5	9¼	11½	1.40	.125	292	TEE	MODELS 986A,987E
6/0	1721-1921	241	5	8½	10	1.40	.135	254	TEE	MODELS 986,988
8/0	7221	253	6	11½	13¾	1.50	.095	349	DB	MODELS 747,748
12/0	4128	246	3	9¾	14½	1.20	.125	368	TEE	MODEL 401
14/0	5021	249	4	10	11½	1.30	.11	292	DB	MODELS 980,982
18/0	2721	247	2	12½	11	1.10	.085	279	TEE	MODEL 989
21/0	7421	254	5	14	8½	1.40	.07	216	TONGUE	MODEL 750 - 17 JEWELS
21/0	2921	248	1	13½	10	1.00	.075	254	TEE	MODELS 997,995,995A,721
22/0	6221	251	5	14½	7¾	1.40	.065	197	DB	MODEL 911
FOR:	**HAMPDEN**									
18	1696	371	20	3	21¾	2.90	.21	552	TEE	
18	1696	370	20	2	21¾	2.90	.22	552	TEE	
16	2696	372	20	4	21¾	2.90	.19	552	TEE	MODEL 1890
16	5697	377	18	6	21½	2.65	.165	546	HOLE	
16	4697	376	18	5	21	2.65	.18	533	BRACE	
16	3696	375	18	4½	21	2.65	.185	533	TEE	MODEL 1902
16	3696	374	18	4	21	2.65	.19	533	TEE	MODEL 1902
16	3696	373	18	3½	21	2.65	.20	533	TEE	MODEL 1902
12	7696	384	9	7	18½	1.80	.15	470	TEE	MODEL 1910
12	7696	385	9	6	18½	1.80	.17	470	TEE	MODEL 1910
12	6696-7696	378	9	5	18½	1.80	.18	470	TEE	MODEL 1910
12	12696	379	5	5½	19	1.35	.175	483	TEE	
6	8696	380	9	6	16¼	1.80	.17	413	TEE	ALL JEWELS
3/0	9696	381	5	6½	13	1.40	.16	330	TEE	M.STARK-DIADEM
8/0	15696	382	3	8	8¼	1.20	.14	210	TEE	M.JANE-JOSEPHINE
11/0	11696	383	3	11	9-1/16	1.20	.10	230	TEE	ALL JEWELS

SIZE	CO.NO	NU VIGOR NUMBER	WIDTH	STR.	LENGTH	METRIC WIDTH	STR.	LENGTH	END	DESCRIPTION
FOR: **HOWARD**										
18	55	446	20	3	23½	2.90	.21	597	HOLE	
18	55	445	19	3	23½	2.80	.21	597	HOLE	
16	328	447	18	6	21½	2.70	.17	546	HOLE	
16	329	448	18	5	21	2.70	.18	533	TEE	
12	552	449	10	7	19½	1.90	.15	495	HOLE	
12	553	450	9	5½	19	1.80	.175	483	TEE	
10	796	451	6	7	16	1.50	.15	406	TONGUE	
FOR: **ILLINOIS**										
18	47301	295	20	3½	21½	2.90	.20	546	TEE	OLD NO.53 1ST TO 6TH MODELS
18	47302	296	20	3	21½	2.90	.21	546	TEE	OLD NO.53 1ST TO 6TH MODELS
18	47303	297	20	2	21½	2.90	.22	546	TEE	OLD NO.53 1ST TO 6TH MODELS
16	47309	298	21	6¾	27	3.00	.155	686	MB	60 HOUR 13TH-14TH-15TH MODELS
16	47333	305	20	3½	20½	2.90	.20	521	TEE	OLD NO.124 4TH & 5TH MODELS - THICK BARREL
16	47314	299	18	5	20½	2.70	.18	521	DB	OLD NO.573 21-23 JEWELS SMALL BARREL
16	47315	300	18	4½	20½	2.70	.185	521	DB	OLD NO. 573 SMALL BARREL
16	47316	301	18	4	20½	2.70	.19	521	DB	OLD NO. 573 17-19 JEWELS SMALL BARREL
16	47317	302	18	3½	20½	2.80	.20	521	DB	OLD NO. 573 7-15 JEWELS SMALL BARREL
16	47326	303	18	6	22½	2.70	.17	572	MB	OLD NO. 1954 11TH & 12TH MODELS
16	47327	304	18	5½	22½	2.70	.175	572	MB	BUNN SPECIAL OLD NO. 1954 11TH & 12TH MODELS
16	47320	307	18	5	22½	2.70	.18	572	DB	OLD NO. 1770 LARGE BARREL 6TH TO 9TH MODELS
16	47321	308	18	4½	22½	2.70	.185	572	DB	OLD NO. 1770 LARGE BARREL 6TH TO 9TH MODELS
16	47334	306	16	3	20	2.50	.21	508	TEE	OLD NO. 365 1ST-2ND-3RD MODELS THIN BARREL
12&13	47336	309	5	6½	18½	1.34	.16	470	MB	OLD NO. 1845 EXTRA THIN 1ST TO 3RD MODELS
12&13	47337	310	5	6	18½	1.34	.17	470	MB	OLD NO. 1845 EXTRA THIN 1ST TO 3RD MODELS
12&13	47338	311	5	5	18½	1.34	.18	470	MB	OLD NO. 1845 EXTRA THIN 1ST TO 3RD MODELS
12	47349	314	11	7	18½	1.99	.15	470	MB	OLD NO. 1953 5TH & 6TH MODELS
12	47350	315	11	6½	18½	1.99	.16	470	MB	OLD NO. 1953 5TH & 6TH MODELS
12	47343	312	11	6	18½	1.99	.17	470	DB	OLD NO. 1236 1ST TO 4TH MODELS
12	47344	313	11	5	18½	1.99	.18	470	DB	OLD NO. 1236 GOING BARREL 1ST TO 4TH MODELS
6	47353	333	9	6½	14	1.80	.16	356	TEE	ALL JEWELS 1ST MODEL
0	47357	316	8	9¼	13	1.70	.125	330	TEE	OLD NO.981) 1ST TO 4TH
0	47358	317	8	9	13	1.70	.13	330	TEE	OLD NO.981) MODELS AND
0	47359	318	8	8½	13	1.70	.135	330	TEE	OLD NO.981) IMPROVED 4TH
6/0	47363	319	3	9¼	10½	1.18	.125	267	DB	OLD NO.1422 O.F.) 1ST TO
6/0	47364	320	3	9	10½	1.18	.13	267	DB	OLD NO.1422 O.F.) 3RD
6/0	47365	321	3	8	10½	1.18	.14	267	DB	OLD NO.1422 O.F.) MODELS.
6/0	47370	322	5	10	12½	1.41	.11	318	DB	OLD NO.1095 HTG) 4TH TO
6/0	47371	323	5	9¾	12½	1.41	.115	318	DB	OLD NO.1095 HTG) 6TH MODELS
12/0	47376	324	3	9½	14½	1.18	.12	368	DB	OLD NO. 358) 1ST
12/0	47377	325	3	9¼	14½	1.18	.125	368	DB	OLD NO. 358 ALL JLS) MODELS
18/0	47383	326	3	12	10	1.20	.09	254	DB	OLD NO. 2092) 1ST TO 5TH
18/0	47384	327	3	11½	10	1.20	.095	254	DB	OLD NO. 2092) MODELS 15
18/0	47385	328	3	11	10	1.20	.10	254	DB	OLD NO. 2092) JEWELS
18/0	47380	332	3	11	12	1.20	.10	305	TONGUE	OLD NO. 2092 1ST MODEL-HOOK IN BARREL
21/0	47387	329	1	13	8-3/10	1.00	.08	211	DB	)
21/0	47388	330	1	12¾	8-3/10	1.00	.0825	211	DB	) 1ST MODEL
21/0	47389	331	1	12½	8-3/10	1.00	.085	211	DB	)

SIZE	CO.NO.	NU VIGOR NUMBER	WIDTH	STR.	LENGTH	METRIC WIDTH	METRIC STR.	METRIC LENGTH	END	DESCRIPTION
FOR INGERSOLL RELIANCE										
16	1365	872	11	2	17½	2.00	.22	445	TEE	
16	2365	873	11	2	18½	2.10	.22	470	HOLE	
FOR: INGERSOL TRENTON										
16	365	802	15	3½	19	2.40	.20	483	TEE	
FOR: INGERSOL WATERBURY										
12	316	942	12	6	19½	2.10	.17	495	TONGUE	
FOR: NEW YORK STANDARD										
18	2189	585	20	1	20	2.90	.23	508	HOLE	
18	2190	586	20	1	20	2.90	.23	508	TEE	
16	1032	588	16	3½	21	2.50	.20	533	HOLE	
16	1321	655	15½	5	20	2.45	.18	508	TEE	
16	3196	590	15½	2	20½	2.45	.22	511	TEE	
16	3349	589	14	3	20½	2.30	.21	521	TEE	
16	1730	587	14	1	22½	2.30	.23	572	HOLE	
12	1322	656	11	5	19	2.00	.18	483	TEE	
12	4144	591	10	2	19	1.90	.22	483	TEE	
12	4282	593	9½	4	16	1.85	.19	406	TONGUE	
12	4284	592	9½	3½	18	1.85	.20	457	TONGUE	
10	7080	594	5¾	5¾	16¼	1.50	.168	413	TONGUE	
10	7080	595	5¾	4	16¼	1.50	.19	413	TONGUE	
6	5134	597	10	5	16	1.90	.18	406	TEE	
6	727	596	10	4½	16½	1.90	.185	419	HOLE	
0	6133	598	5½	7	15	1.45	.15	381	TEE	
3/0	1323	657	7	7	13	1.60	.15	330	TEE	
10/0	1324	658	2½	12	9½	1.15	.09	241	TEE	
FOR: ROCKFORD										
18	644	728	20	2	22	2.90	.22	559	TEE	
16	822	729	18	3½	20½	2.70	.20	521	TEE	
12	932	730	11	5½	18¾	2.00	.175	476	TEE	
6	544	731	12	5½	18½	2.10	.175	470	TEE	
0	1077	732	8	9	13¾	1.70	.13	349	TEE	
FOR: SETH THOMAS										
18	536	1073	24	3¾	21¼	3.30	.195	540	TEE	
18	141	1072	24	2	21	3.30	.22	533	TEE	
18	729	1074	24	1½	20	3.30	.22	508	TEE	
18	828	1075	20	2	20	2.90	.22	508	TEE	
16	2106	1076	14½	2	21	2.40	.22	533	TEE	
12	2521	1077	11	3½	21	2.00	.20	533	TEE	
6	1026	1078	10	3¾	14½	1.90	.195	362	TEE	
FOR: SOUTH BEND										
18	29528	517	21	4½	21½	2.97	.185	546	TEE	THICK
18	19528	516	21	3¾	21½	2.97	.195	546	TEE	THICK
18	69528	515	21	3	21½	2.97	.21	546	TEE	
16	47528	523	19	6	21-7/10	2.80	.17	551	TEE	THICK
16	67528	522	19	5½	21-7/10	2.80	.175	551	TEE	
16	37528	521	19	5	21-7/10	2.80	.18	551	TEE	
16	27528	520	19	4	21-7/10	2.80	.19	551	TEE	THICK
16	217528	519	17	5	20½	2.59	.18	521	TEE	
16	17528	518	17	3½	20½	2.59	.20	521	TEE	THICK

SIZE	CO.NO.	NU VIGOR NUMBER	WIDTH	STR.	LENGTH	METRIC WIDTH	METRIC STR.	METRIC LENGTH	END	DESCRIPTION
FOR: SOUTH BEND CONTINUED										
12	35528	526	11	6	19	1.98	.17	483	TEE	
12	55528	525	11	5½	19	1.98	.175	483	TEE	ALL MODELS
12	25528	524	11	5	19	1.98	.18	483	TEE	
6	3528	527	10	4½	16½	1.85	.185	419	TEE	ALL MODELS
0	22528	529	7½	8½	13½	1.65	.135	343	TEE	
0	12528	528	7½	8	13½	1.65	.14	343	TEE	ALL MODELS
0	32528	530	6	8	13-1/6	1.50	.14	335	TEE	
FOR: TRENTON										
16	567	1002	15	7½	17½	2.40	.215	445	TEE	
FOR: WALTHAM										
8 DAY	2232	150	37	2	30	4.60	.22	762	HOLE	SIZE 37
8 DAY	2232	151	37	1	30	4.60	.23	762	HOLE	SIZE 37
18	2203	152	20	3	21	2.90	.21	533	TEE	MODELS 1877 & 1879 17-21 JLS
18	2203	153	20	2½	21	2.90	.215	533	TEE	MODELS 1877 & 1879 17-21 JLS
18	2203	154	20	2	21	2.90	.22	533	TEE	MODELS 1877 & 1879 15 JLS
18	2203	155	20	1½	21	2.90	.225	533	TEE	MODELS 1877 & 1879 7-15 JLS.
18	2205	156	21	3	21	3.00	.21	533	TEE	MODEL 1883 17-21 JEWELS)
18	2205	157	21	2½	21	3.00	.215	533	TEE	MODEL 1883 17-21 JEWELS)
18	2205	158	21	2	21	3.00	.22	533	TEE	MODEL 1883 17-21 JEWELS)
18	2205	159	21	1½	21	3.00	.225	533	TEE	MODEL 1883 7-15 JEWELS)
18	2222	160	23	6	25	3.20	.17	635	HOLE	MODEL 1892 7-15 JEWELS)
18	2222	161	23	5	25	3.20	.18	635	HOLE	MODEL 1892 21-23 JEWELS)
18	2222	162	23	4	25	3.20	.19	635	HOLE	MODEL 1892 17-19 JEWELS)
16	2218	164	19	4½	25	2.80	.185	635	HOLE	MODEL 1888 7 JEWELS
16	2218	165	19	4	25	2.80	.19	635	HOLE	MODEL 1888 7 JEWELS
16	2218	166	19	3½	25	2.80	.20	635	HOLE	MODEL 1888 7 JEWELS
16	2227	167	19	7	25	2.80	.15	635	HOLE	MODELS 1899-1908 21-23 JLS
16	2227	168	19	6½	25	2.80	.16	635	HOLE	MODELS 1899-1908 21-23 JLS
16	2227	169	19	6	25	2.80	.17	635	HOLE	MODELS 1899-1908 17-19 JLS
16	2227	170	19	5	25	2.80	.18	635	HOLE	MODELS 1899-1906 17-19 JLS
16	2227	171	19	4	25	2.80	.19	635	HOLE	MODELS 1899-1908 7-15 JLS.
16	2247	224A	17	6	21¼	2.60	.17	540	DB&H	MODEL 1945 R.B. 7 JEWELS
16	2208	163	14	2½	21	2.30	.215	533	TEE	MODEL 1872
14	2211	173	16	2	19	2.50	.22	483	TEE	MODEL 1884
14	2210	172	12	3	19	2.10	.21	483	TEE	MODEL 1874
12	2224A	183	12½	9	19¼	2.15	.13	489	HOLE	MODEL 1894 17-21 JEWELS
12	2224A	184	12½	8	19¼	2.15	.14	489	HOLE	MODEL 1894 7-15 JEWELS
12	2224A	185	12½	7	19¼	2.15	.15	489	HOLE	MODEL 1894 7-15 JEWELS
12	2224A	186	12½	6½	19¼	2.15	.16	489	HOLE	MODEL 1894 7 JEWELS
12	2224	182	12½	7	19¼	2.15	.15	489	HOOK	BUTTON END
12	2237	179	8	7	19¼	1.70	.15	489	HOLE	COL. B. MODEL 1924
12	2237	180	8	6½	19¼	1.70	.16	489	HOLE	COL. B. MODEL 1924
12	2237	181	8	6	19¼	1.70	.17	489	HOLE	COL. B. MODEL 1924
12	2234	174	4	9½	19	1.30	.12	483	HOLE	COL. A
12	2234	175	4	9	19	1.30	.13	483	HOLE	COL. A
12	2234	176	4	8	19	1.30	.14	483	HOLE	COL. A
12	2234	178	4	6½	19	1.30	.16	483	HOLE	COL. A
12	2234	177	4	5	19	1.30	.18	483	HOLE	COL. A
6X8	2215	187	10	3	16	1.90	.21	406	TEE	MODEL 1873
6X8	2215	188	10	2	16	1.90	.22	406	TEE	MODEL 1873
6	2219	191	12	8	16	2.10	.14	406	HOLE	MODEL 1890
6	2219	192	12	7	16	2.10	.15	406	HOLE	MODEL 1890
6	2219	193	12	6½	16	2.10	.16	406	HOLE	MODEL 1890
6	2217	190	10	5	16	1.90	.18	406	TEE	MODEL 1889
6	2217	189	10	4	16	1.90	.19	406	TEE	MODEL 1889
1	2216	194	8	6	16	1.70	.17	406	TEE	MODELS 1882, 1887

SIZE	CO.NO.	NU VIGOR NUMBER	WIDTH	STR.	LENGTH	METRIC WIDTH	METRIC STR.	LENGTH	END	DESCRIPTION
FOR:	WALTHAM CONTINUED -									
0	2230	200	11¾	10	15	2.06	.11	381	HOLE	MODEL 1907
0	2230	201	11¾	9½	15	2.06	.12	381	HOLE	MODEL 1907
0	2230	202	11¾	9	15	2.06	.13	381	HOLE	MODEL 1907
0	2230	203	11¾	8	15	2.06	.14	381	HOLE	MODEL 1907
0	2228	197	8	10	15	1.70	.11	381	HOLE	MODEL 1900
0	2228	198	8	9½	15	1.70	.12	381	HOLE	MODEL 1900
0	2228	199	8	9	15	1.70	.13	381	HOLE	MODEL 1900
0	2220	195	6½	8	16	1.55	.14	406	HOLE	MODEL 1891
0	2220	196	6½	7	16	1.55	.15	406	HOLE	MODEL 1891
6/0	2248	2248	6	10	11½	1.50	.11	292	DB&H	MODEL 1945 R.B.
6/0	2226	204	6	10	13½	1.50	.11	343	HOLE	MODEL 1898 HTG & MODEL 1942
6/0	2226	205	6	9½	13½	1.50	.12	343	HOLE	MODEL 1898 HTG & MODEL 1942
6/0	2226	206	6	9	13½	1.50	.13	343	HOLE	MODEL 1898 HTG & MODEL 1942
6/0	2235	207	4	10	13½	1.30	.11	343	HOLE	MODEL 1912 J.S. SIZE 1912 O.F.
6/0	2235	208	4	9½	13½	1.30	.12	343	HOLE	MODEL 1912 J.S. SIZE 1912 O.F.
6/0	2235	209	4	9	13½	1.30	.13	343	HOLE	MODEL 1912 J.S. SIZE 1912 O.F.
10L	2229	210	6	12	10¼	1.50	.09	260	HOLE	
10L	2229	211	6	11	10¼	1.50	.10	260	HOLE	
10L	2229	212	6	10	10¼	1.50	.11	260	HOLE	
9L	2233	213	1½	11	10¼	1.08	.10	260	HOLE	
9L	2233	214	1½	10	10¼	1.08	.11	260	HOLE	
8¾L	2242	221	5	12	8¾	1.40	.09	222	HOLE	870 ROUND
7½L	2236	215	2	13	9	1.10	.08	229	HOLE	SAME AS 5¼L ROUND
750	2243	222	2	12	13	1.10	.095	330	HOLE	BARREL SHAPE 7½L
750B	2250	224C	2½	10½	12¼	1.15	.105	311	DB&H	7½L BARREL SHAPE R.B.
7¼L	2238	217	4	12	12¼	1.30	.09	311	HOLE	RECTANGULAR
7¼L	2238	216	4	11	12¼	1.30	.10	311	HOLE	RECTANGULAR
675	2249	224D	2½	15	8½	1.15	.06	216	TONGUE	R.B.
678	2251	224E	4	13½	9½	1.30	.075	241	DB&H	R.B. BARREL SHAPE
670	2244	224	2½	15	8	1.15	.06	203	HOLE	ROUND
6½L	2239	218	1½	11½	9½	1.05	.095	241	HOLE	SAME AS 450M
450	2241	223	1½	11½	10½	1.05	.095	267	HOLE	RECTANGULAR
4L	2240	220	2	12	8	1.10	.09	203	HOLE	400 RECTANGULAR
4L	2240	219	2	11	8	1.10	.10	203	HOLE	400 RECTANGULAR