

The
DISSTON
SAW, TOOL & FILE
BOOK



The
DISSTON
SAW, TOOL, AND
FILE BOOK

An illustrated book of information concerning the selection, care and use of saws, tools, and files.



REG. U. S. PAT. OFF.

HENRY DISSTON & SONS, INC.
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FOREWORD

The demand for an article of instruction on saw filing has been demonstrated to us not only by personal inquiry and letter, but also by the return of fine quality saws from users who pronounced them defective and rendered them useless, through lack of knowledge of how to keep them in order. These conditions have led us to print these instructions for the setting, filing, and general care of saws.

The information here given, if carefully followed, should assist in keeping a saw in proper working condition. It is based on long, practical experience in manufacturing, on a study of actual conditions, and on working tests of saws in the hands of users.

INTRODUCTION

The growth and success of any industry depend largely upon the policies of its founders. In proportion as the breadth of opportunity for the future is recognized so does an enterprise develop on broad lines or narrow. No product can make a reputation and build up any sizable sale for itself unless it be of really high quality. And conversely, very seldom does a good article fail to create a demand for itself.

Henry Disston knew all that, over eighty years ago, when he founded the Disston Saw Works. Although there was a strong prejudice against American made tools, he knew that his product would be good enough to over-come that feeling. His first demand was for steel. In order to be positive of that, to be sure that it always ran true to specifications, he built his own steel mill. Then he sought better treatment, especially in regard to temper. Finally he must have the most expert workmanship and finish.

Bringing all operations from the making of the steel to the finished article under his personal supervision gave Henry Disston his quality product. He never allowed the standard to fall. The Disston brand has continually been the guarantee of a good tool.

And as he believed and practiced, so have his sons and grandsons. The House of Disston will always support a statement of Henry Disston's "If you want a saw, it is best to get one with a name on it that has a reputation. A man who has made a reputation for his goods knows its value as well as its cost, and will maintain it."

In the following pages we have attempted to explain the uses of different types of saws. Too often an amateur saw-user expects a rip saw to cut across the grain successfully, or makes some other natural mistake. It is not lack of intelligence that causes these errors, but lack of information. Many men do not even know that there is a difference between cross-cut and rip saws.

However, it is human nature for a man, who has bought a saw he didn't want, to feel a little disgruntled; for him to feel that he has been badly treated, or that the saw is not a good one.

The aim of this book is to offset that possibility.

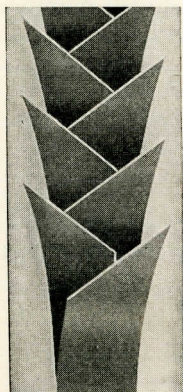
We have given a brief description of what the different types of saws are for,—whether for cabinet making or building a coal bin.

Furthermore, knowing that the best tool of any kind cannot give its best service unless it is properly cared for, we have included a short article on "How to Sharpen a Saw." There is also a brief story, "How a Saw Cuts" which is included because it has proved to be of great interest to those who have seen it.

WHAT TYPE OF SAW TO USE

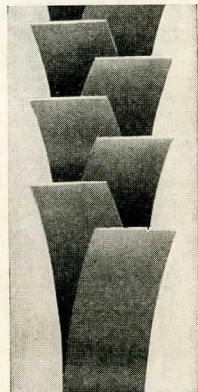
In the following, we will attempt to give general rules to be followed in selecting a saw. These rules must be varied according to your individual tastes and requirements but we feel that a general explanation of the reasons for, and use of, the various types of saws will be valuable, especially to the inexperienced user.

Cross-cut or Rip Saw.



Tooth edge of saw for cross-cutting

Hand Saws are divided into two main classes—the cross-cut saw for cutting across the grain of the wood and the rip saw for ripping or cutting with the grain. The difference between these two classes of hand saws is in the shape of the teeth; one being designed to cut across the grain with an action similar to a number of small knife blades and the other for ripping apart when cutting parallel to the grain with an action like that of many chisels, which is more fully



Tooth edge of saw for ripping

explained under the heading “How a Saw Cuts” on page 40. This is the first choice to be made in selecting a saw; your decision depends entirely on the kind of cutting to be done.

Skew-Back or Straight-Back. Skew-back or straight-back hand saws refers entirely to the shape of the back of the blade. The skew-back blade is cut on a curved line at the back as is illustrated in the D-8 saw, on page 10, while the straight-back blade, as the name implies, is cut on a straight line from butt to point. The advantage of one over the other is almost entirely a matter of personal preference. The skew-back blade is slightly lighter in weight. A straight back gives the blade more “body” or stiffness. Therefore, men who use a strong thrust pressure prefer the straight back saw.

What “Point” to Use. “Points to the inch” is a term used in determining the number of teeth in the cutting edge of saws. In measuring the number of teeth in a saw, the cutting edge is

measured from point of tooth to point of tooth and we speak of the saw as having so many "points to the inch"—meaning so many tooth-points to the inch. In measuring a saw blade in this way, you will find that the saw always has one more point to the inch than complete teeth in that inch. In a Disston Saw the points to the inch are graduated so that the teeth at the point of the saw are finer than those at the butt—this allows the user to start the saw in the cut easily.

The "points to the inch" in hand saws, either rip or cross-cut, indicate the degree of smoothness or coarseness of the cut that particular saw will make. This smoothness or coarseness of cut is regulated entirely by the size and set of the teeth. A saw with big teeth, 5 points to the inch, for example, will make a



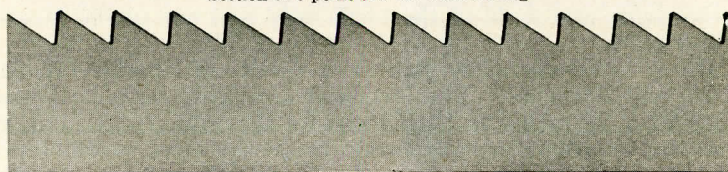
Section of 12 point saw for cross-cutting



Section of 8 point saw for cross-cutting



Section of 6 point saw for cross-cutting



Section of 4½ point saw for ripping

coarser cut than a saw with small teeth, say 11 points to the inch.

In determining what point of saw will best answer your requirements, remember that a saw with a few tooth-points to the inch (say 6 or 7) will cut fast and make a comparatively rough or coarse cut—this "point" is commonly used for ordinary con-

struction work and similar rough sawing. The saws with many tooth-points to the inch (10, 11, or 12) will make a smooth, even cut and are used mostly for interior finishing, furniture making, etc.

The degree of seasoning in the wood to be cut must be considered also, in determining what "point" to use. Green, wet wood requires a coarse saw (few points to the inch) while a fine tooth-point saw can be used to advantage in dry, seasoned lumber.

The medium point saws (7, 8, or 9 points to the inch) are in greatest demand and are perhaps the most satisfactory for the ordinary workman who desires a saw for a variety of uses.

Hand saws for cross-cutting are made in sizes varying from 5 to 12 tooth-points to the inch. The 7, 8, or 9 point saws, which are medium, are in greatest demand and are most satisfactory for ordinary work.

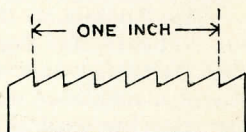
In rip saws for ordinary work, 5, $5\frac{1}{2}$, or 6 points to the inch are the standard sizes and from this basis they are purchased with fewer points when fast, rough cutting is desired and with more points when careful, accurate cutting is necessary.

Length of Saw to be Used. The length of a rip or cross-cut hand saw is always measured by the length of the cutting edge. For instance, a 26 inch saw means a saw measuring 26 inches long on the cutting edge of the blade. There seems to be a general impression among the inexperienced that all hand saws for cross-cutting are 26 inches long and all rip saws 28 inches long. This is not a fact. Both cross-cut and rip saws are made in a variety of lengths. The terms "cross-cut" and "rip" refer to the shape and style of the teeth only and not to the length of the saw.

Rip saws are regularly made in a variety of lengths—22, 24, 26, 28, and 30 inches. The carpenter ordinarily buys a rip saw either 26 or 28 inches in length and for the ordinary user one of these two lengths is usually found to be the most satisfactory.

Cross-cut saws are made in lengths ranging 16, 18, 20, 22, 24, 26, 28, and 30 inches. The most popular length is 26 inch.

Cross-cut saws, 24 inches and less in length are termed Panel saws. Panel Saws are exactly like cross-cut saws in every respect excepting the length of the blade and the number of teeth. Panel Saws usually have finer teeth than full size hand saws.



Tooth points to the inch

Various types of saws are used in the manufacture of furniture, cabinet making, and in general construction work. The different styles, designed for particular work, are illustrated and fully described in the accompanying pages.

Testing a Saw by "Feel". The first point to be observed in the selection of a saw is to see that it "hangs" right. Grasp it by the handle and hold it in position for working, to see if the handle fits the hand properly. These are points of great importance for comfort and utility.

The next thing is to try the blade by bending it slightly. It should curve regularly and evenly from the point of the butt, in proportion as the width and thickness of the saw vary. All Disston saws are specially ground so that they are thin at the point and gradually increase in thickness toward the butt. It is this special taper grinding that gives the exceptional balance and stiffness to the Disston saws.

The thinner you can get a stiff saw the better; it makes a smaller kerf and takes less muscle to drive. This principal applies to the well-ground saw. There is less friction on a narrow, thin saw than on a wide one.

See that it is well set and sharpened and has a good crowning breast, which means a curved or "crowned" cutting edge, being widest near the center of the saw.

For a hand saw of the greatest utility to the average user, we suggest the Disston D-8 (which is of good quality for average use as is fully explained on page 10) 26 inch, 8 point saw. The D-8 is a skew-back pattern, which is the choice of the majority of carpenters and wood-workers. 24 inch is a convenient length that is becoming increasingly popular with all classes of saw users. A 24 inch saw will fit in any standard size tool chest. Eight points to the inch is a medium point, being neither too fine or too coarse, and is recommended for its general utility in ordinary work such as laying floors, repairing porches, fences, doors, etc.

DESCRIPTION OF STANDARD SAWS AND TOOLS

HAND SAWS

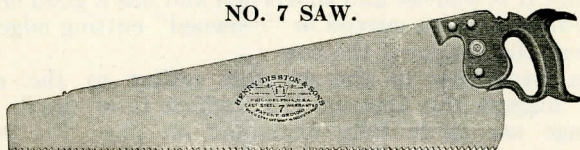
D-8 SAW.



This is the best and most popular Disston Saw for general, all-around work. It is "the saw most carpenters use." The D-8 is the original Skew-back saw and was originated and patented by Henry Disston in 1874. The shape of the blade and the position of the handle place the hand closer to the work, and, therefore, give the user better command and guidance of the saw, allow him to make a full stroke, and give more power to his cutting strokes.

When introduced, this saw created a demand which has constantly increased until now there are more Disston D-8 Saws in use than any other one type. It is medium in price. The blade is of the famous Disston-made Steel, taper ground. The handle is of apple-wood, nicely polished, and is fitted to the blade with five brass screws. The D-8 is regularly made in lengths from 16 to 30 inches with Cross-cut or Rip teeth.

NO. 7 SAW.



It is upon this saw, perhaps more than any other, that Henry Disston built his early reputation as a maker of good saws. The blade of this saw has a straight back. This gives more "body" or stiffness to the blade, and for that reason, this saw is preferred by some users who exert a very strong thrust pressure in sawing. The blade is of Disston-made Steel and is securely fastened in the well-polished beech handle by four brass screws. This saw, while being of the best materials, is not as highly finished as is the D-8 and is, therefore, somewhat lower in cost. It is fully warranted, as are all Disston Saws. It is made in lengths from 14 to 36 inches with Cross-cut or Rip teeth.

NO. 16 SAW.



This saw is made to suit those who prefer a straight-back saw with a narrow point—which gives a lighter saw and has advantages in certain kinds

of close work where the width of the saw becomes an important factor.

The blade is Disston-made Steel. The handle, of hardwood, is nicely carved and polished and is fastened with brass screws. This saw is equal in quality and workmanship to the D-8 and the cost is the same. It is made in lengths from 14 to 30 inches with cross-cut or rip teeth.

D-20 SAW.



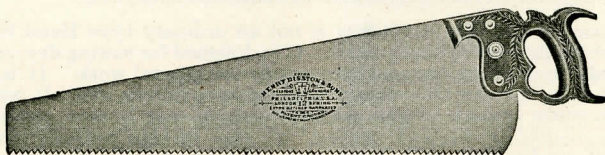
This is made particularly for those who prefer a "ship" or narrow width blade. This blade, skew-back in design, is $1\frac{3}{4}$ inches wide at the point and $6\frac{1}{4}$ inches at the butt instead of $2\frac{3}{4}$ inches at the point and $6\frac{3}{4}$ inches at the butt as in the D-8. This makes the D-20 a very light and easy saw to operate. This feature, together with the comfortable grip, makes the D-20 a favorite with some users.

The blade is of Disston-made Steel. The attractively carved and polished handle is of selected hardwood and is fastened to the blade by brass screws.

The finish, because it is a grade better than the D-8, makes this saw slightly higher in cost.

D-23. Exactly like D-20 saw excepting that the blade is straight back design.

NO. 12 SAW.



Many carpenters and saw users who take pride in having exceptionally well made and finished tools, are users of this saw. The No. 12 has a straight-back, full width blade of Disston-made Steel. This blade is extra tempered and will hold its cutting edge longer than the ordinary saw. It is ground one gauge thinner than other hand saws, for special clearance, and therefore requires little set. The handle is made of selected applewood and is carefully carved and polished. This saw is of the best Disston material and workmanship and is very attractively finished. Its cost is slightly higher than any of the saws so far mentioned. It is made in lengths from 16 to 30 inches with cross-cut or rip teeth.

No. 112 Saw. The Disston No. 112 Saw is exactly like the No. 12 excepting that it has a skew-back blade for those who prefer this type.

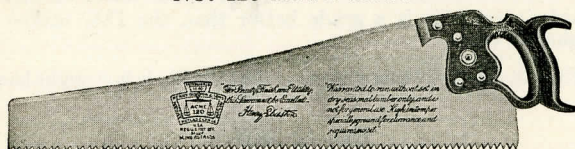
NO. D-115 SAW.



This is the finest product of the Disston Saw Works, and we believe, the best practical hand saw in material, workmanship, and finish that can be made. Carpenters and saw users who want a tool of unusual efficiency and beauty are users of this saw. We have made it as good in quality and beautiful in appearance as we can in a practical tool. The handle is of genuine rosewood, beautifully carved and polished; the five screws which fasten the handle to the blade are of brass, nickel-plated. Careful workmanship has produced a remarkable finish on the blade. The blade, which is of Disston-made Steel, has special workmanship through all the processes—hardening, tempering, setting, and filing. Altogether, it is a tool worthy of its place at the head of the line of Disston Quality Saws. It is made in lengths from 16 to 30 inches with cross-cut or rip teeth. The special care and workmanship in this saw naturally makes its cost higher than that of an ordinary tool.

The D-15 Saw is exactly like the D-115 except that the blade is straight-back.

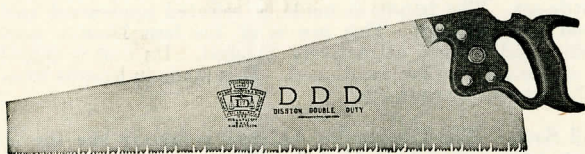
NO. 120 ACME SAW.



The Disston No. 120 Acme Saw is not an ordinary type Hand Saw and should not be used for ordinary work. It is designed for sawing dry, seasoned lumber **only**, and cannot be used successfully for general work. It is a fast, smooth-cutting saw for fine cabinet work, sawing mitres, etc. It will cut a joint sufficiently smooth to glue without planing, and is very popular with those doing extremely accurate sawing. It must be kept properly sharpened and should **not be set**.

The No. 120 Saw is very high in temper. The blade is specially **ground for clearance** and the teeth require no set. The cost of the No. 120 is slightly more than the No. 12 in the regular handsaws. It is made in lengths 16 to 30 inches with cross-cut or rip teeth.

D-17 SAW.



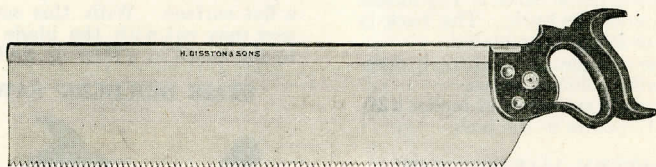
The most efficient saw ever made for double duty work—both cross-cut and rip sawing with the same tool. It is very popular for fast, rough sawing in general construction work of all kinds—studding up houses, shoring for sewers, making forms for concrete buildings, railroad work, farm use, etc. The D-17 can be used for cross-cutting, ripping, or sawing diagonally across the grain.

The combination of teeth in the saw—alternating sections of five regular cross-cutting and two-ripping teeth, separated by deep gullets for clearance, insures easy running and fast cutting in rough work. The saw is easily kept in order as the teeth are sharpened just as are ordinary cross-cut and rip teeth. It is occasionally necessary to deepen the gullets between the sections of teeth, and for this purpose we recommend the 4-inch Disston Mill File with two round edges.

The D-17 is of the same quality and finish as the D-8, but costs slightly more because of the special tooth-edge.

The D-117 is exactly the same saw as the D-17, excepting that the blade is straight-back.

NO. 4 MITRE BOX SAW.



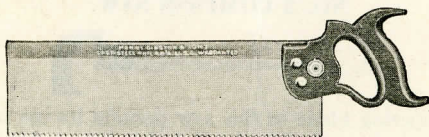
Accuracy is the prime essential of the mitre box saw, which is used for sawing mitres for all kinds of work—picture frames, moulding, cabinet work, pattern making, etc. Disston Saws have long been recognized as the standard for this work by prominent makers of mitre boxes. Every one of these saws is tested in a mitre box, to insure accuracy, before it leaves the factory.

Extra care is exercised in making these saws so they will run true and cut a smooth accurate joint.

To prevent the "butt" or "heel" from catching in the work when the saw is used in a mitre box, this type of saw is made so that the cutting edge is two inches shorter than the entire blade. Because of the nature of the work to be done, the blade is made quite thin (19 gauge or about $\frac{3}{64}$ of an inch) but reinforced for stiffness by having the upper edge inserted in a metal back. It is a fine toothed saw, being usually 11 points to the inch.

The blade is of Disston-made Steel, the handle of applewood, brass screws, blued steel back, made in 20 to 32 inches lengths, the blade being 4, 5, to 6 inches wide under the back.

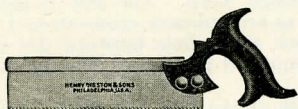
NO. 4 BACK SAW.



The No. 4 Back Saw, while smaller in size, is similar in quality and pattern to the mitre box saw, but is square on both ends and can be used without a mitre-box, for cutting fine joints on small work or stock of small dimensions.

The sizes range from 8 inches with narrow blades and fine teeth to 18 inches with widest blades and coarser teeth—the 12 inch, a popular size, being 3 inches under back and with teeth 14 points to the inch.

NO. 70 DOVETAIL SAW.

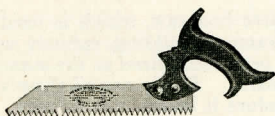


This is another style of saw for fine and accurate work—dovetailing. The extremely thin (26 gauge) blade, of Disston-made Steel, is $1\frac{1}{2}$ inches wide under the back. The back is made of steel, brass-plated.

The handle is hardwood, open grip, with polished edges.

Made in sizes 6 to 12 inches with teeth 17 points to the inch.

PATTERN MAKERS' SAW.



Some classes of small, accurate work in pattern and cabinet making necessitate the use of small saws with extra thin blades and very fine teeth—for which purpose this saw is made. The teeth are of special shape. The open handle is of hardwood. The blade is of Disston-made Steel, tempered and polished, $7\frac{1}{2}$ by $1\frac{1}{4}$ inches, 21 gauge, toothed 15 points to the inch.

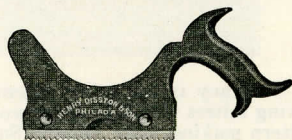
NO. 68 DOVETAIL SAW.



This is still another style of saw for dovetailing. The No. 68 has a straight handle. See illustration.

The No. 71 Dovetail saw is the same as No. 68 except that the handle is offset to permit work on a flat surface. With this saw the user may cut with the blade flush to the board in a floor or wall.

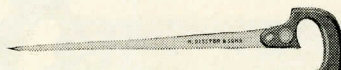
STAIR BUILDERS' SAW.



A special saw is for trenching out stringers, making slots in stair tread or risers, and similar work. The blade is Disston-made Steel and is adjustable in the back so that an even, accurate cut of specified depth can be made. The blade is removable so that the owner may use the same handle with new blades.

It is furnished with a beech handle, varnished edges, brass screws. The blade is 6 inches by $1\frac{5}{8}$ inches.

NO. 2 COMPASS SAW.



The narrow tapering blade in this saw permits its use in cutting circles, ovals, curves, etc., in boards after the start has been made by the use of an

auger or brace and bit. It is also used for starting the cut in laid flooring, siding, and similar work for the insertion of a hand saw.

The blade is of Disston-made Steel, and of a special temper to allow for the twisting and turning necessitated by the nature of the work. The handle is of hardwood, fitted with brass screws. Made in 10 to 18 inch lengths.

NO. 4 COMPASS SAW—INTERCHANGEABLE.



This saw is the same as the No. 2 Compass Saw except that the handle is of beech and the blade is slotted so that it may be removed and changed easily. When in place the blade is securely locked by a lever device on the handle. This gives, in one tool, a compass saw with a large or small, wide or narrow blade—which-ever is best suited for a particular piece of work. Made in 10 to 20 inch lengths.

NO. 5 KEYHOLE SAW.



In making a keyhole, first bore a hole. Then use one of these small tapered saws and cut to the shape desired. The No. 5 is made for this work and for light, irregular sawing of a similar nature.

The handle is of iron, white-metal finish. The blade may be adjusted to any length by sliding it back into the handle, or it may be pushed thru the handle, and the butt of blade used as a screw-driver.

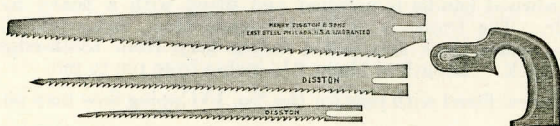
The blade, 7 inches long, is of Disston-made Steel, specially tempered for the work. It is held firmly in the handle by a knurled headed screw.

NO. 95 KEYHOLE SAW.



This Keyhole Saw is preferred by some on account of the style of the handle, which is round, made of hardwood, polished, with nickel-plated ferrules. The handle is slotted clear through, permitting the adjustment of the blade for length of cutting edge desired. This feature also allows for the blade to slide into the handle, which permits of carrying the saw in the pocket conveniently. Moreover, this means protection for the blade. The blade, of Disston-made Steel, specially tempered, is 10 inches long, ground to a thin-back, and is held in place firmly by means of a steel grip inside the handle. This grip is tightened by a set screw on the handle.

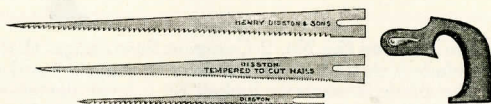
NO. 3 NEST OF SAWS.



This is a nest or combination of saws for general use. The handle is of beech, with varnished edges, and equipped with special adjustable lever tightener. There are three Disston-made Steel Blades of special temper—10 inch Keyhole Saw Blade, a 14 inch Compass Saw Blade, and a 16 inch Pruning Saw Blade.

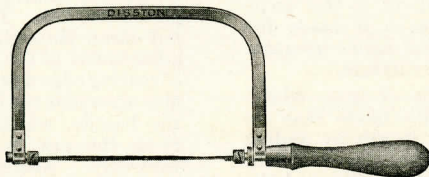
The Lever Tightener is adjustable to take in different thicknesses of blades. The convenience of this set of saws can readily be appreciated.

NO. 7 NEST OF SAWS.



This nest of saws is most commonly used by plumbers. It consists of a beech handle and three blades—a 14 inch Plumbers' Compass Saw Blade tempered to cut wood in which nails are embedded, lead pipe, and that class of work encountered in the ordinary course of plumbing; a 16 inch regular Compass Saw Blade, and a 10 inch Keyhole Saw Blade. This nest, like the No. 3, is a combination to permit the user to do the kinds of work mentioned, with only one tool.

NO. 10 COPING SAW.



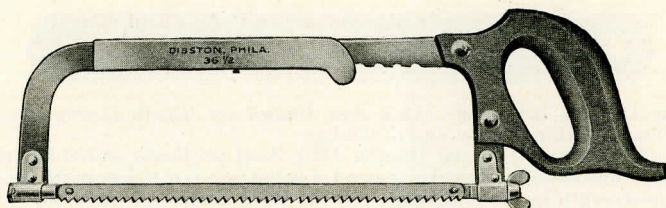
A Coping Saw is used for cutting on curved lines in such work as shaping the ends of moulding for joints, for narrow scroll work, making shelf brackets, wood toys, etc.

The No. 10 is a well-made Coping Saw and is much stronger and more efficient than the ordinary wire-back style. The blade is controlled or adjusted by two knurled stretchers for sawing sharp corners or angles, and is easily inserted or removed.

The hardwood handle is polished and fitted with a heavy nickle-plated steel ferrule. The frame is of Disston-made Steel, nickle-plated, $\frac{3}{8}$ inches wide by $\frac{3}{16}$ inches thick and is $4\frac{1}{2}$ inches deep from tooth-edge of blade to inside of back. Length of blade, $6\frac{1}{2}$ inches from pin to pin.

Extra blades, fitted with pins for the No. 10 Coping Saw may be purchased separately.

NO. 36½ HACK SAW EXTENSION FRAME.

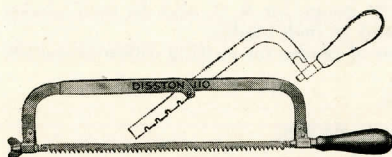


The No. 36½ is an extraordinarily well built Hack Saw Frame, widely used because of its strength, ease of adjustment, and efficient service.

The handle on the No. 36½ is very popular. It is of hand saw type and gives the user exceptionally good control of the saw. The grip is large and comfortable and does not slip from or cramp the hand. It is made of nicely finished hardwood.

The nickle-plated steel frame is ajustable by half inches for blades 8 to 12 inches long. The sockets are secured by rivets. The stretchers, which hold the blade rigidly in place, are reversible for sawing straight or sideways and will not fall out while re-adjusting blade. The frames are sold without blades.

NO. 110 HACK SAW ADJUSTABLE FRAME.



This is an excellent adjustable hack saw frame for general all-around use in cutting metal, and can be adjusted for blades from 8 to 12 inches long.

The frame is of nickled steel. The riveted sockets are reversible so that the blade can be turned to cut sideways. Black hardwood handle. The stretchers will not fall out while readjusting.

NO. 10 PLUMBERS' SAW.

This saw is made particularly for use in making repairs where it is necessary to cut through joists, rafters, flooring, and the like in which nails may be embedded, also for cutting soil pipe, gas pipe, etc. The blade is of Disston-made Steel, specially tempered and toothed for this work.



The hardwood handle is nicely carved and polished; adjustable to various positions most convenient for each piece of work. Length varies 16 to 24 inches.

CHROMOL HACK SAW BLADES FOR HAND USE.



The Disston "Chromol" Hack Saw Blades are widely known for their exceptional cutting quality and durability.

The blades are of special Disston Alloy Steel peculiarly suited for metal-cutting. The teeth are milled in instead of being punched to insure the greatest possible strength in the teeth and to make them sharp and clean cut. They are "set" in such a manner that every third tooth is straight—acting as a cleaner—while the two intervening teeth are set alternately to the right and left. This arrangement allows each tooth to do its full share of the work and the action of the "cleaner" tooth relieves the set teeth of part of the wear. This makes a faster, easier cutting blade and greatly prolongs its usefulness.

Disston Chromol Blades are hardened throughout by a Disston process which renders them hard and tough without being brittle.

Lengths measured from center of holes range from 8 to 18 inches.

For cutting the various classes of material we recommend blades, for hand frame use, of the following number of "points to the inch".

Soft steel, cast iron, etc., and all general work—16 points or 15 teeth to the inch.

Steel, light angle iron, and hard metals—18 points or 17 teeth to the inch.

Brass, copper, drill rods, iron pipe, and sheet metal—24 points or 23 teeth to the inch.

Tubing and metal thinner than 22 gauge—32 points or 31 teeth to the inch.

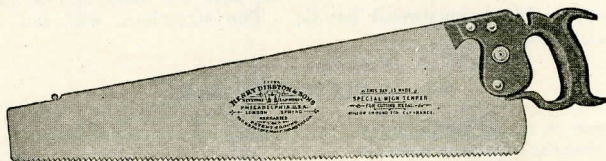
The stock sizes are $\frac{1}{2}$ inch wide, 23 gauge for 8, 9, and 10 inch blades and $\frac{9}{16}$ inch wide, 23 gauge for 12, 14, and 16 inch blades.

We manufacture various other styles of blades for cutting different metals by hand or machine.

Write to us for further information.

HAND HACK SAWS.

NO. 340



The Hand Hack Saw is made especially for the use of structural iron workers and others in places, and on work, where the framed Hack Saw cannot be used because of the limitation of depth of the cut that can be made with the Hack Saw Frame.

The Hand Hack Saw, being longer on the cutting edge, allows for a much longer cutting stroke and is therefore preferred where much cutting is to be done.

The blade, of Disston-made Steel, is given a special high temper; it is hollow ground for clearance, and **requires no set**. It is made 12 points to the

inch and in lengths from 16 to 30 inches. Do not set the teeth; an attempt to do so may break them.

This same style of saw is specially made for cutting various metals, as follows:

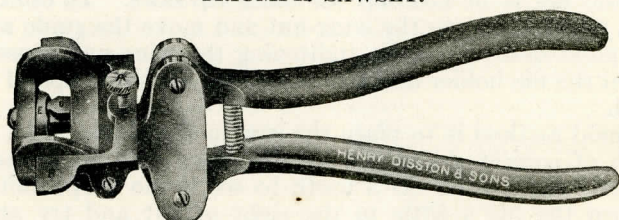
No. 341. For cutting Copper and Brass. 10 points to the inch. Length 16 to 30 inches. The teeth should not be set as the blade is ground for clearance.

No. 342. For cutting Metal Trim. This saw is for cutting light pressed steel shapes, steel mouldings, and metal trim of all kinds. It is made 16 points to the inch. The teeth should not be set as the blade is ground for clearance.

No. 343. For cutting Kalomine. This saw is made 11 points to the inch. The teeth in this blade can be set.

SAW SHARPENING TOOLS

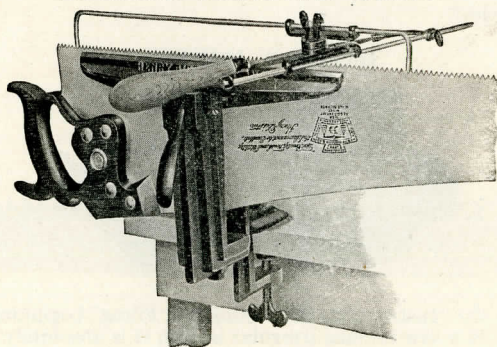
TRIUMPH SAWSET.



This tool operates by the use of two plungers. Pressure on the lower lever forces one plunger against the body of the saw thus holding it rigidly in position and preventing slipping. Pressure on the upper lever at the same time operates the second plunger to press against and set the tooth.

There is no reason why any person, with a little practice, should not be able to resharpen a saw, if he has proper instructions and exercises ordinary care in following them.

D3 FILING GUIDE AND CLAMP.



The D3 Filing Guide and Clamp is specially designed to assist those not skilled to file a saw correctly. By means of the file holder and sliding arrangement the file can be adjusted to any position required and so held during the entire operation of filing. Thus every tooth will be filed at the same angle without that variation so difficult to overcome in filing by hand alone. It is made to file both cross-cut or rip saws. Length of jaw $12\frac{1}{2}$ inches. Clamp, guide, file, and handle included.

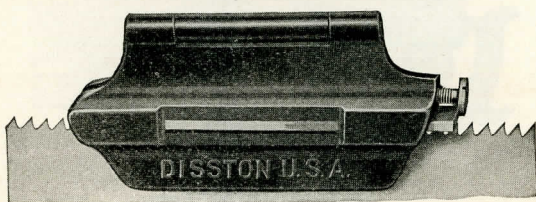
This illustration shows a saw and the guide in proper position for filing. There are three marks on the upper hub of the swivel attachment, and one mark on the lower. One of the three marks shows when the file is in position for filing one side of the teeth of a cross-cut saw, and another when it is in position for filing the other side. The third, or center mark, shows when the file is in position for filing rip saws. To obtain the correct position, loosen the wing-nut and move the guide around to the point desired. After tightening the wing-nut, loosen the screw in the file holder and adjust the file for the shape of tooth wanted.

A good method is to place the saw in the clamp, then select a tooth of correct shape and let file down into it; tighten set screw in handle, then file a tooth to see if the shape suits. If not, turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth. When one side is filed, reverse saw and attachment and file the other teeth.

For rip saws, place the file at right angles with the saw noting center mark as mentioned above, and file every tooth. Always keep the file as nearly horizontal as possible. Use a $5\frac{1}{2}$ inch Disston Slim Taper File.

Length of jaw $12\frac{1}{2}$ inches, clamp, filing guide, file, and handle included.

HANDSAW JOINTER.



As noted in the "Instructions for Setting and Filing" beginning on page 31, when the teeth of a saw become irregular in size, it is absolutely necessary to

dress them down until all are of an equal height and this should be done before attempting to re-set or sharpen.

To facilitate this work and insure evenness we fully recommend this handsaw jointer.

It is made of iron, japanned. It is hinged to open for positioning on the saw and adjusting the file, which is securely locked in place by a screw.

FILES



SLIM TAPER



TAPER



SQUARE



BLUNT BAND



MILL



FLAT BASTARD



HALF ROUND



ROUND



HALF ROUND WOOD RASP

Files. For accurately sharpening well-tempered saws, carefully made files of good cutting quality are prime essentials.

Disston Files are of Disston-made Steel, with well-formed teeth. They are hardened by a Disston special process.

We use over 35,000 dozen files annually in our own handle department, saw works, and machine shops. This enables us to watch and maintain a high standard of quality and efficiency.

Information regarding files suitable for sharpening hand saws will be found on Page 35.

CROSS-CUT SAWS

Cross-cut Saws are made primarily for cutting down, or "felling" trees, and for cutting the fallen trunk into logs of desired size—an operation called "Bucking". They are made in different types of saws to cut the various kinds of timber easily and quickly.

All Disston Cross-cut Saws are of the famous Disston-made Steel; are hardened and tempered by special Disston processes; and are finished with the same fine workmanship that has made the Disston Hand Saw **"the saw most carpenters use"**.

Disston Cross-cut Saws are taper ground—that is, are ground so that they are of the same thickness along the entire cutting edge and then taper, on lines parallel to the cutting edge, to a thin back. This gives a maximum amount of clearance for the blade without sacrificing any necessary weight, stiffness, or elasticity.

Disston High-Grade Cross-cut Saws, some styles of which are illustrated, are becoming increasingly popular because they are easy running and fast cutting saws of great durability.

The Suwanee, Virginian, Beaver, Buzz, and Cedar Savage One-Man are all high-grade saws. They are made for use where speed and ease in operation are essential. For anyone with much sawing to do, these saws will be very satisfactory. Whether the "four-cutter" or "two-cutter" type is to be used, is largely a matter of individual preference and is a question that can best be answered by your local hardware man.

All high-grade cross-cut saws are made with a "raker-tooth". The raker tooth is set between each group (either two or four) of scoring teeth and looks like a chisel. The scoring teeth cut a groove at the sides of the cut and this raker tooth planes out the material from the center. That is why "saw-dust" made with Disston High-Grade Cross-cut Saws looks like shavings.

The regular cross-cut saws, of which the No. 1 Tenon Tooth is an example, are the old type of saw and are used for ordinary sawing where speed and exceptional durability are not such important factors.

NO. 195 SUWANEE CROSS-CUT SAW.

The Disston Suwanee Cross-cut Saw is the first grade of the cross-cut saws made by Disston. In material, workmanship, and design it represents the best. It is largely used by experienced lumbermen because of its exceptional speed, ease in operation, and durability. The Suwanee is most commonly used for "bucking" or cutting fallen timber to lengths—a wide type blade being preferred by many for this work, although it is and can be successfully used for "felling" or cutting down standing timber. The Suwanee is a "four cutter with raker tooth" type. It is six gauges thinner on the back than on the tooth edge. Made in lengths 5 to 8 feet and longer if required.

NO. 289 VIRGINIAN CROSS-CUT SAW.

This saw is exactly like the Suwanee in design and is made for the same purpose. It is made to meet the demand from those users who prefer the "Two cutter" type. It is six gauges thinner on the back than on the tooth edge and is of the same quality and cost as the Suwanee. Made in lengths 5 to 8 feet and longer if required.

NO. 494 BEAVER (HOLLOW BACK) CROSS-CUT SAW.

For "felling" or cutting down trees a narrow type blade is most commonly used, being easier to operate in this work than a wider blade.

The Beaver, of the same good quality as the Suwanee and Virginian, is made primarily for "felling" although it can be used for other work. It is a "four-cutter" with raker tooth; the blade is narrow, cut with a curved or "hollow" back, and ground three gauges thinner on the back than on the cutting edge. Made in lengths 4 to 8 feet and longer if required.

NO. 470 BZZ CROSS-CUT SAW.

The Buzz, of the same quality of material and workmanship as the saws described above, is a blade intermediate between the wide (the Suwanee and Virginian) and the narrow Beaver types and is used for both "bucking" and "felling" where the trees to be cut are small. Similar in quality and price to the Beaver. Made in lengths 4 to 8 feet and longer if required.

NO. 410 CEDAR SAVAGE ONE-MAN CROSS-CUT SAW.



The Cedar Savage One-man Cross-cut Saw is especially adapted for cutting cedar. It is designed to be used by one man, although it can be fitted with auxiliary handle for two men's use. It is made of the same quality Disston-made Steel as Disston Hand Saws. The blade is narrower than the regular One-Man Cross-cut Saw (of which Disston makes a complete line) and, being ground to a taper, affords the necessary clearance with the least amount of set.

This is a "four-cutter" saw; the teeth are deep with special shaped under-cut and ample gullet room. It is fitted with a large handle with two horns, made of selected, thoroughly seasoned hardwood. The grip is extra large, suitable for gloved hand. Made in lengths 3 to 6 feet.

NO. 1 TENON TOOTH CROSS-CUT SAW.



This style of cross-cut saw is perhaps the oldest form in use. It is still used by a great many for bridge work, framing, and ordinary two-man sawing where one tool must do many kinds of work.

HANDLES FOR CROSS-CUT SAWS.

NO. 119 HANDLE.

This pattern of handle is made to be fastened on the edge of the saw and is preferred by some users. The handle is $13\frac{1}{2}$ inches long, $1\frac{3}{8}$ inches in diameter, is made of carefully selected, thoroughly seasoned hardwood; shaped for an easy, comfortable grip; fitted with heavy malleable iron castings, and a strong threaded bolt with wing nut.



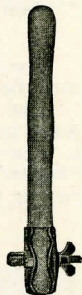
NO. 122 HANDLE.

This is the best and strongest loop handle made. It is easily and quickly adjusted to, or removed, from the saw. This handle has a very easy and comfortable grip. It is made of carefully selected, thoroughly seasoned hardwood, well-fitted with malleable iron castings.



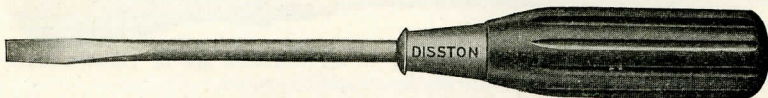
NO. 103 CLIMAX HANDLE.

A reversible handle—for holding the cross-cut saw in a horizontal or perpendicular position. Similar in style to the No. 119, excepting that the casings are of grey iron, of lighter weight, with malleable iron bolt and nut. Length $13\frac{1}{2}$ inches, $1\frac{3}{8}$ inches diameter.



SCREW-DRIVERS

NO. 38 SCREW-DRIVER.



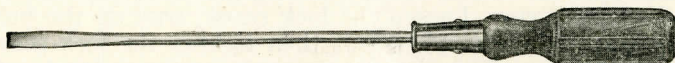
Automobilists, mechanics, and all workers who subject their screwdrivers to great strains will find this a very satisfactory tool.

The blade, of Disston-made Steel, is especially hardened and tempered throughout; it is subjected to severe "crow-bar" or pry tests and tests for toughness of the point before leaving our factory.

The handle is of hardwood, black finish, and the shape provides a firm grip. The ferrule is extra long and heavy and is nickle-plated. The blade is fastened in the handle by a special arrangement of splines which absolutely prevents turning in the handle.

Made in sizes from 3 to 12 inches. In all screwdrivers, length is measured by length of blade only.

NO. 36 SCREW-DRIVER.

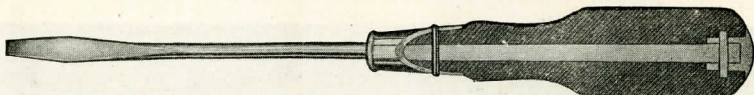


This is a special screwdriver for the use of cabinet makers and others requiring a light tool. It has a round steel blade, $\frac{3}{16}$ inch in diameter, carefully hardened and tempered, finished bright, and a red hardwood handle.

The tang of this screwdriver is driven in the handle, and a rivet, headed on both ends, extends through ferrule, handle, and tang. This prevents the blade from turning in the socket, making a strong, durable driver.

Sizes 2 to 12 inches.

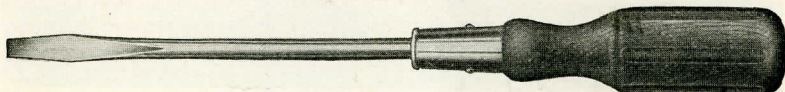
NO. 9 SCREW-DRIVER.

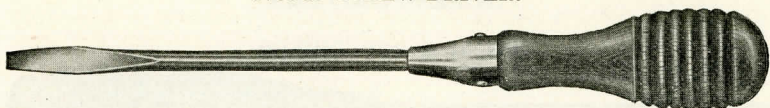


In the No. 9 Screwdriver, the blade extends through the handle and is capped on the end (as shown in illustration). In addition to this, a rivet extends through handle, ferrule, and blade to prevent turning of the blade in the handle. This construction gives a very strong, durable tool.

The handle has rubberoid finish. The blade, of Disston-made Steel, is carefully hardened and tempered and has polished finish. This screwdriver is made in sizes from 3 to 12 inches.

NO. 35 SCREW-DRIVER.



NO. 15 SCREW-DRIVER.

The round blades in Nos. 35 and 15 screwdrivers are of Disston-made Steel, forged to shape, carefully hardened and tempered.

In handling-up, the tang is driven into the handle and a rivet extending through ferrule, handle, and tang is headed on both ends. This prevents the blade from turning in socket, making a strong, durable screwdriver.

Made in sizes 3 to 12 inches.

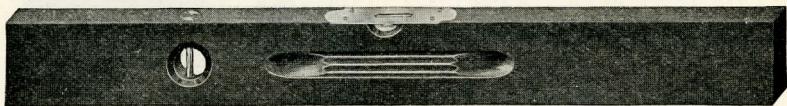
PLUMBS AND LEVELS

Disston Plumbs and Levels have achieved an enviable reputation for excellence in workmanship and design. They are all made of carefully aired and kiln dried hardwood stock.

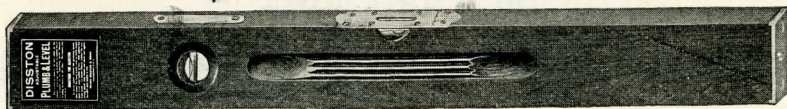
The Disston Plumb and Level Adjustment is the most simple and positive on the market.

The removal of two small screws gives immediate access to the working parts. Loosen the lock screw, true up the bubble by turning the adjusting screw, then tighten the lock screw—the job is done. This is a most simple arrangement to offset possible variations. The adjustment is solid when set and there are no springs to allow annoying inaccuracy. Moreover, this adjustment cannot rust fast, because the screws work directly into the wood.

Levels for all uses. The following are three representative styles.

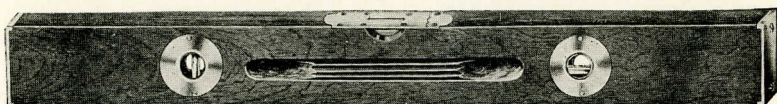
NO. 9 PLUMB AND LEVEL (NON-ADJUSTABLE).

A good, practical, non-adjustable level made of plain hardwood stock at a moderate price. The No. 9 has arch top plate over level glass, has two side views and is fitted with the Disston Corrugated Grip—a special grip that gives an unusually comfortable and secure hold on the level. Made 24 to 30 inch lengths.

NO. 16 PLUMB AND LEVEL (ADJUSTABLE).

A well-finished and very popular tool of medium price. The No. 16 is fitted with the Disston Adjustment described above. The stock is thoroughly seasoned hardwood, stained and polished. This level has arch top plate over level glass, two side views, Disston Corrugated Grip, and is reinforced with solid and very heavy brass ends for protection against breaking or chipping in case of accident. Made in 26 to 30 inch lengths.

NO. 24 PLUMB AND LEVEL (ADJUSTABLE).

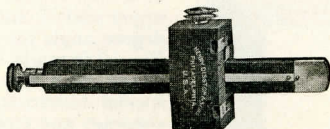


A well-made level, of hardwood stock, strained and highly polished. The No. 24 has the Disston Adjustment, Corrugated Grip, Arch Top Plate, Improved Duplex Side Views and solid brass ends—a carefully made and highly finished tool. The No. 24 is higher in finish than the No. 16 and, therefore, slightly higher in cost.

GAUGES

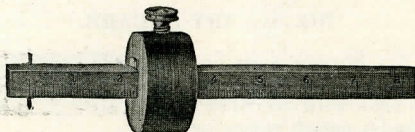
Gauges of this type are used in marking wood for cutting mortises, etc. Two popular gauges are shown from a complete line of over 20 different styles.

NO. 93 GAUGE.



This gauge is made for those who desire fine tools; the material, workmanship, and finish are of best quality. The gauge is of genuine rosewood stock, highly polished; the screw slide, head, and stem are protected with brass strips. The gauge is fitted with a brass thumb screw for tightening.

NO. 80½ GAUGE.



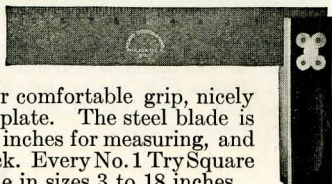
A practical gauge that is used extensively in manual training schools. It is made of hardwood stock, well finished, and has an oval shaped head with a brass tightening screw. Two brass strips are inlaid on the face. The marking point is steel. The oval shaped head on this gauge is a popular feature as it enables the user to manipulate the gauge more easily.

TRY SQUARES AND BEVELS.

The chief requirements of this class of tools, which are used for marking angles for sawing, etc., are accuracy and durability. All Disston Try Squares and Bevels are carefully made of good materials and tested for accuracy.

NO. 1 TRY SQUARE.

Try Squares are made for measuring and marking right angles. This is the kind of tool used in marking a board for a "square" end. The No. 1 Try Square has a genuine rosewood stock, hollowed for comfortable grip, nicely polished, and fitted with heavy brass face plate. The steel blade is tempered, has a blued finish, is marked with inches for measuring, and is accurately and securely fastened to the stock. Every No. 1 Try Square is tested at the factory for accuracy. Made in sizes 3 to 18 inches.



NO. 10 MITRE SQUARE.



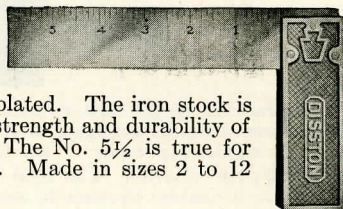
A Mitre Square can be used in place of a Try Square and, in addition, the upper end of the stock is cut with a 45 degree angle for marking mitres. The No. 10 is made of the same materials as the No. 1 Try Square above and the special construction absolutely insures accuracy and strength. The blade is a solid, "L" shaped, piece of steel. One arm of the blade extends through a slot

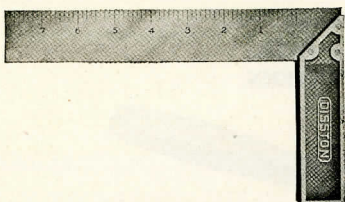
in the stock — flush with the back — and is fastened there with heavy brass rivets. This makes the stock and blade practically a one-piece tool.

Made in sizes $4\frac{1}{2}$ to 12 inches.

NO. $5\frac{1}{2}$ TRY SQUARE.

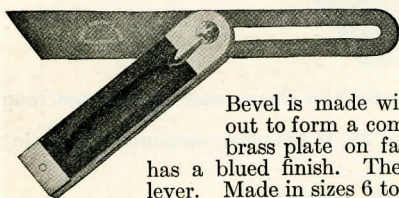
The No. $5\frac{1}{2}$ Try Square is similar in design and use to the No. 1. However, the No. $5\frac{1}{2}$ is made with steel blade, tempered and marked in eighth inches for measuring, and has an iron stock, nickel-plated. The iron stock is preferred by some because of the greater strength and durability of the tools than those with wood stocks. The No. $5\frac{1}{2}$ is true for marking on both inside and outside edge. Made in sizes 2 to 12 inches.





NO. 11 MITRE SQUARE.

This square is of the same style and construction as the No. 5½, excepting the upper end of the stock is cut at 45 degree angle for use in mitering work. Made in sizes 2 to 12 inches.



NO. 1 BEVEL.

The Bevel is an adjustable tool that can be set for marking a bevel at any desired angle. The No. 1

Bevel is made with genuine rosewood stock, hollowed out to form a comfortable grip, and fitted with a heavy brass plate on face. The steel blade is tempered and has a blued finish. The blade is set or released by a brass lever. Made in sizes 6 to 14 inches.



NO. 3 BEVEL.

The No. 3 is exactly like the No. 1, excepting that the stock is of iron, nickle-plated. The blade is tightened or released by a patented mechanism controlled by a thumb-screw at the butt of the stock. A quarter turn of this screw absolutely locks the blade in place. Made in sizes 6, 8, and 10 inches.

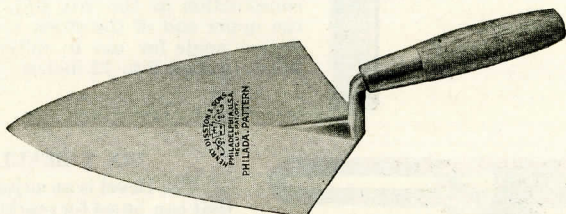
TROWELS

Each Disston Brick and Pointing Trowel is made of a single piece of Disston-made Steel, of a quality especially adapted for trowel blades, the tang being forged from one end gives a strong solid shank for the handle.

The blades are highly tempered, taper ground, and possess the requisite spring. The posts are made straight, (at right angle to the blade) which gives a proper balance to the tool. The handles, turned to form, give an easy, comfortable grip. They are reinforced with a strong ferrule and fastened on the tang by a special method to prevent them from coming loose.

While but few trowels are here illustrated the Disston line is complete and meets the requirements of the various users in all sections.

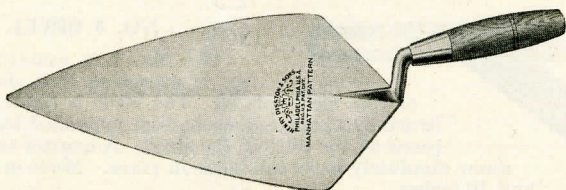
BRICK TROWEL.
NO. 10 BRICK TROWEL.
PHILADELPHIA PATTERN.



This is the regular Philadelphia pattern, a shape more widely used than any other one style.

Made in lengths of half inches from $7\frac{1}{2}$ to 14 inches, measured from point to heel of post on blade.

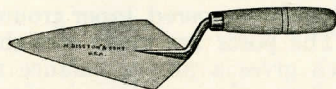
NO. 30 BRICK TROWEL.
MANHATTEN PATTERN.



The No. 30 Trowel has a wide heel and one edge more rounding than the other—a style preferred in some sections. The additional workmanship makes the cost slightly more than the No. 10 Philadelphia.

Made in lengths of half inches from $9\frac{1}{2}$ to 12 inches, measured from point to heel of post on blade.

POINTING TROWELS.
NO. 15 POINTING TROWEL.



For the pointing or shaping of the bond or mortar between the bricks or stones of a wall the No. 15 Pointing Trowel is the shape most generally used.

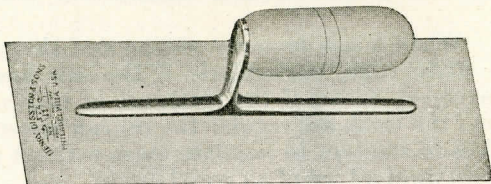
It is well made in every particular, has solid forged shank, firmly handled-up and is strong and durable.

Made in lengths of half inches from 4 to $6\frac{1}{2}$ inches, measured from point to heel of post on blade.

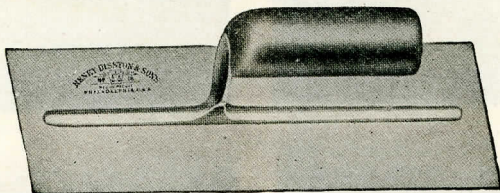
PLASTERING TROWELS.

The full line covers various patterns, short and long mountings, fastened with three, four, five, or ten rivets to the blade, some of the latter being made extra thin and specially ground as required.

The mountings are made of the best material for the purpose—malleable iron—fitted with handles which are fastened by an improved method and not liable to come loose.

NO. 1 PLASTERING TROWEL.

The No. 1 is a medium price trowel. The blade is fastened to the mounting with four rivets. This is a practical and most popular plastering trowel. Sizes of blades from 10x4½ inches to 12x5 inches.

NO. 18 PLASTERING TROWEL.

This is representative of a group of thin bladed trowels, with special design of mounting, some having a reinforced post, with polished wood handle, leather grip handle and others with extra thin blades.

No. 18, illustrated, possesses an accurately ground thin blade, fastened by ten rivets to an extra long mounting. The upright forms a shield for the protection of the hand. A long tang extends through the handle which is securely fastened by a flush barrel-nut. The end of the polished wood handle is beveled for thumb-rest.

This group of plastering trowels represent the most efficient and highest type of trowels ever placed on the market.

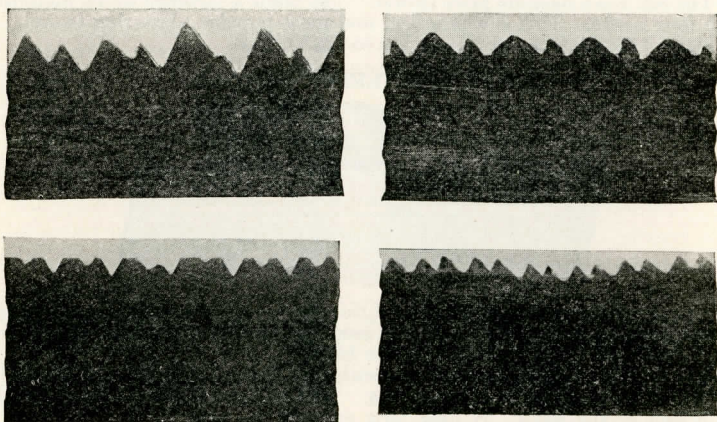
Size of blades from 10x4½ inches to 12x5 inches.

In addition to brick, pointing, and plastering trowels the Disston line—a complete line of trowels—includes trowels of special strength and durability for cementers' use, circle or cove trowels, corner trowels for inside or outside of corners, garden trowels, etc.

HOW TO SHARPEN A SAW

It is not necessary to reset the teeth of a well-tempered hand saw every time it needs sharpening. As a matter of fact, if the teeth are touched up with a file from time to time after the saw has been used (on the same principal as stropping a razor) the saw will run longer and better and sufficient set will remain to enable the saw to clear itself. Attention in this respect will not only cause the saw to give greater satisfaction but lengthens its life.

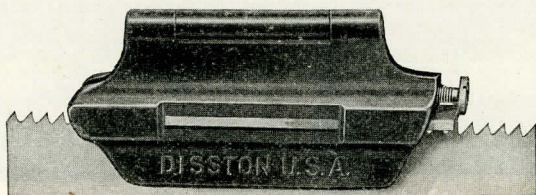
Jointing. When a saw requires setting and sharpening, first examine the tooth edge, particularly if the saw has been previously resharpened, to see if the teeth are of uniform size and shape. Unless the teeth are regular the set can never be regular and it is useless to attempt to regulate them without filing down (called jointing) until all are of an equal height.



The above are photographic reproductions of the actual condition of some saws returned to us and are typical of the manner in which many saws are used and abused. It is best to have saws, such as these, retooled at the factory.

To assist in dressing down the teeth (jointing) we fully recommend the Disston Hand Saw Jointer by the use of which the work is facilitated and evenness assured. The purpose of the latter, in addition to holding the file, is to guide the file and hold it squarely on the tooth edge, which prevents rounding of the points.

Running the jointer back and forth on the tooth edge, using light pressure, dresses down the teeth. This "dressing" must be continued until all the teeth are of an equal height, at the same time preserving the slight breast or rounding of the tooth edge, the crown of which should be at the center.



Hand Saw Jointer in position on saw.

After the saw is properly jointed, proceed to regulate the size of the teeth by filing straight through between the teeth. That is, make all the teeth uniform in size, the space between the teeth of equal depth, and give the proper angle on front and back of the tooth. If some of the teeth still show slight "tops", these should be given another cut with the file on front and back.

The teeth, now shaped and of an even height, are ready to be set.

There are quite a number of shapes of teeth, varying in angle, bevel, etc., each adapted for special work such as cutting dry seasoned lumber, wet green lumber, soft woods, hard woods, etc., but the purpose of this article is to treat only on the setting and filing, or sharpening, of those hand saws ordinarily used, the teeth of which are alike, whether large or small.

Setting the Teeth. The teeth of a hand saw should be set before sharpening to avoid injury to the cutting edges.

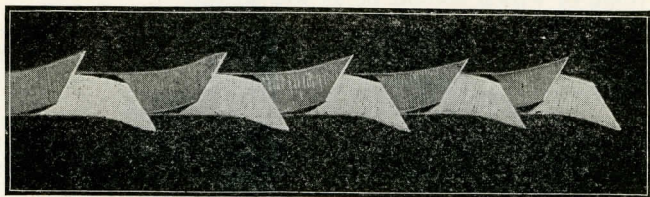
Purpose of Set. The purpose of setting the teeth of saws, that is, bending over of the upper part of each tooth, one inclined to the right, the next to the left, and so on alternately through-



Looking from back of saw; showing how teeth, when set, extend beyond edge of blade.

out the entire tooth edge, is to make the saw cut a kerf slightly wider than the thickness of the blade, thus giving clearance and preventing friction which would cause the saw to bind and pull hard in the cut.

Depth of Set. Whether the saw is fine or coarse, the depth of set should not go, at the most, lower than half the length of the tooth. If deeper than this it is sure to spring, distort, or crack the blade, if it does not break out the teeth.



Cross-cut saw properly set.

A properly ground saw requires a very little set to the teeth, for the blade, being of uniform thickness along the entire tooth-edge, tapers thinner to the back and also tapers from butt to point, which provides a measure of the clearance necessary for easy running.

Soft, wet woods require more set as well as coarser teeth than dry, hard woods. For fine work on dry woods only, either hard or soft, it is best to have a saw with fine teeth and little set.

Setting with Hammer and Anvil. Setting can be done by the use of a special anvil, which has a slightly beveled edge over which the teeth extend. The points of the teeth, extending over this beveled edge, are given the set by striking each a quick blow with a light hammer, the force of which bends the point the depth of the bevel on the face of the anvil. The further over the bevel the point extends the greater, of course, will be the depth of set. A highly tempered saw may require several blows as it is apt to break by attempting to set the tooth with too heavy a blow.

Setting by this method requires considerable skill and only by practice can the weight of the blow required be determined. This method is not recommended for the amateur.

Setting with Sawset. The general practice, outside of a saw works, is to set the teeth with the use of what is termed the spring set—bending over the point of tooth by pressure with a special tool known as a sawset. Many so called sawsets are impractical; they give too deep a set, or the pressure is improperly applied. As a result, the blade is buckled, crimped, cracked, or the teeth are broken out.

Recognizing this difficulty years ago, we invented and produced the Triumph Sawset and fully recommend it. The Triumph Sawset is illustrated and described on page 19.

Filing. Preliminary to the instructions for filing a saw it may be well to state that the best results in cutting can be obtained only when a saw is toothed and filed for the particular duty it is to perform.

Necessary Equipment. The only equipment necessary consists of a clamp and files. The clamp should be sufficiently strong to hold the blade firm enough to prevent chattering, and one in which the blade can be placed and tightened easily and quickly. The top of the clamp should be on line with the operator's elbows, to give the best working position. As to files, the operator should have a supply of one or more of the following kinds and sizes, according to the size of teeth in the saws to be sharpened.

7	inch Regular Taper Files for	3, 3½, & 4 Pt. Cross-cut Saws.
6	" " " " "	4½, 5, & 5½ Pt. " " "
4½	" " " " "	6, 7, 8, & 9 Pt. " " "
5½	" Slim " " "	10, 11, & 12 Pt. " " "
4½	" Regular " " "	4½, 5, 5½, & 6 Pt. Rip "
6	" " " " "	4 Pt. and coarser Rip "

There is nothing to be gained by using larger files than these for the "Point" saws mentioned, in fact it is useless expense.

The side of the file used should be but little more than twice the depth of the tooth; if larger the entire middle portion will be wasted.

How to Place Saw in Clamp. The first step, after fastening the vise of clamp firmly in place, is to position the saw blade between the jaws with the tooth edge extending just far enough above to allow the file to clear the top of the clamp. Then tighten the clamp. The closer the gullet line, or bottom of the teeth, is to the jaw of the clamp the less chance there is of the saw chattering or the file screeching and the more easily and accurately the filing can be done.

The following illustrations will show the best method of keeping the saw in proper working order and also will assist in the selection of a saw. These should be carefully studied.

FILING HAND SAWS FOR CROSS-CUTTING.

Position of File. The filer stands to the left of the clamp and at the point of the saw. He holds the file in the gullet of the first tooth at a right angle to the side of the blade. Then, turning the point of the file about 45 degrees toward the handle of the saw, he works in that direction against the front or the cutting-edges of those teeth set toward him (every other one).

After every alternate tooth has been filed to a uniform angle and bevel, the saw is reversed in the clamp. The filer changes

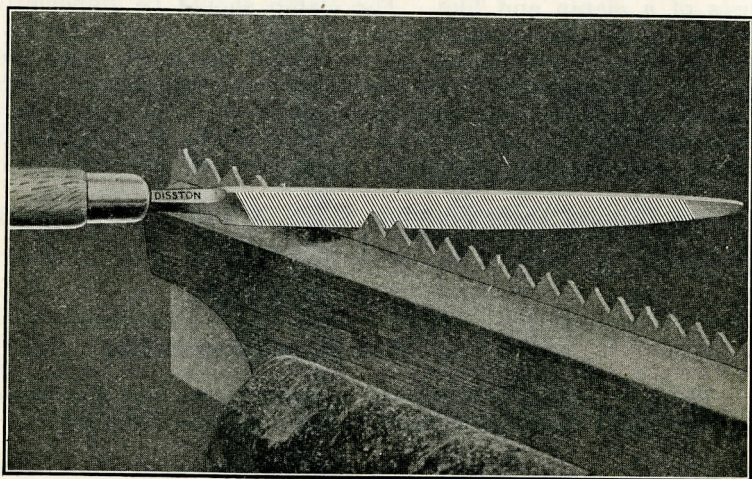


Illustration shows file in position near point of saw.

his position accordingly, and proceeds to file the alternate teeth on this side, again beginning with the first tooth set towards him.

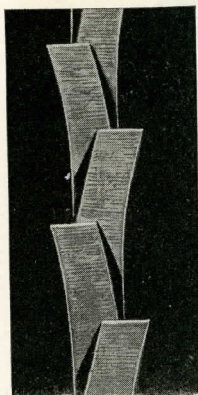
By this method, the operator is in better position to see if the points of the teeth are being "brought up keen". It also does away with the "feather edge" thrown up on the cutting-edge of the tooth,—which would happen if the point of the file were held toward the point of the saw. It is essential that the filer place the edge of the file well into the gullet between the teeth letting the sides of the file find their own bearing against the front and the back of the teeth. The angle of the file thereby becomes the same as that of the teeth and the original shape is maintained.

Determining Correct Position for File. A good way to determine the correct position to hold the file is to select a tooth of correct shape in the saw (there are some unused teeth near the handle-end) and fit the file into the gullet. Such teeth will also serve as a guide for shape and bevel.

"Side Dressing" After Filing. When the saw is properly set and filed, lay it flat on a true board, rub lightly over the side of the teeth with a smooth or partly worn file. This will regulate the set, insure smooth cutting, and make the filing last longer. After this operation, should the saw not run true, take another very light cut with the file over the side toward which it leads. A fast cutting saw for cross-cutting should have deep teeth.

FILING RIP SAWS.

As previously stated, a ripping or slitting saw for wood should have its cutting edge at about right angles to the fibre of the wood. Consequently, the rip teeth, differing from the cross-cut, have practically a straight front or face.



Rip teeth are filed straight across.

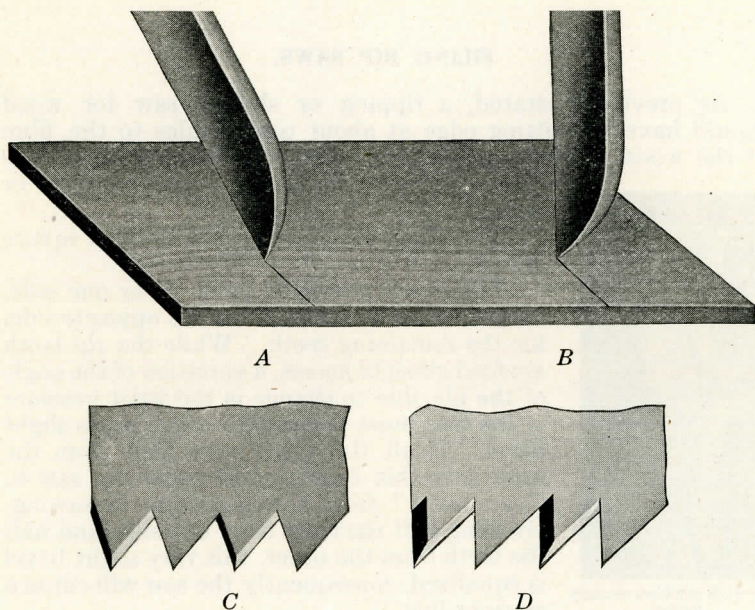
Therefore, this saw should be filed square across.

File every alternate tooth from one side, then turn the saw and, from the opposite side, file the remaining teeth. While the rip teeth are filed straight across, a variation of the angle of the file, due to change in the wrist pressure of the filer must necessarily cause some slight bevel. If all the teeth were filed from the same side, this bevel would cause the saw to "lead away" from a straight line in sawing. By filing half the teeth from one side, and half the teeth from the other, this very slight bevel is equalized, consequently the saw will cut in a straight line.

Rip teeth are filed straight across, and with that exception, the process of setting and filing a hand saw for ripping, is exactly like that of filing a hand saw for cross-cutting. (See page 36.)

Proper Angle of Teeth. The next point to consider is the angle of the teeth in saws for cross-cutting; for, this being one of the most important features, too much care cannot be taken to have the correct angle for the duty required.

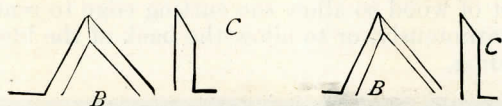
To illustrate this, the accompanying picture represents a board, across which we wish to make a deep mark with the point of a knife. Suppose we hold the knife nearly perpendicular as at B. It is evident that it will push harder and will not cut as smoothly as if it were inclined forward as at A. It follows, then, that the cutting edge of the cross-cut saw should be at an acute angle as at C rather than stand perpendicular as at D.



Too much angle and too heavy a set are very common faults, not only detrimental to good work but ruinous to the saw. By having a large amount of hook or pitch, the saw takes hold so keenly that frequently it "hangs up" suddenly in the thrust—the result, a kinked or broken blade. By having

too much set, the strain caused by the additional and unnecessary amount of set is out of proportion to the strength of the blade, and teeth are sometimes broken. The most common angle used is 60 degrees, though this may be varied a little more or less to advantage as occasion may demand.

Bevel of the Point. The proper amount of bevel to give the teeth is very important, for if there is too much bevel the points will score so deeply that the fibres severed from the main body will not crumble out as cut, but must be removed by continued rasping. B shows the tooth and C the bevel on point. These illustrations show—first, a tooth (enlarged) of a $5\frac{1}{2}$ point Cross-cut Saw with the same amount of bevel front and back. This saw is best suited for work in soft woods where rapid rather than fine work is required.



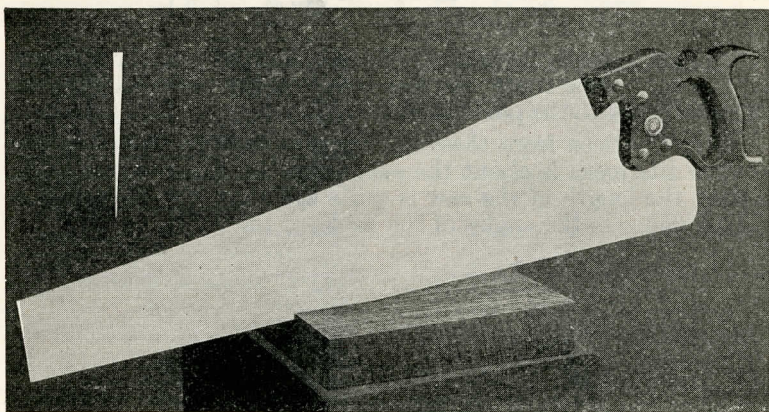
Second, a tooth (enlarged) of a seven point saw for medium hardwoods. This tooth has less bevel on the back which gives a shorter bevel to the point as at C.

It will be seen from these illustrations that the bevel on the front of the teeth is about the same, but the bevel of the point looking the length of the saw is quite different, depending upon the difference in the angles of the backs of the teeth.

HOW A SAW CUTS

An Explanation of the Construction and Operation of Hand Saws. Why cannot a board be cut by a blade with a knife edge when such blade is used in the same manner as a saw?

Of course we understand that an instrument of this kind will sever exceedingly thin stock. But when it comes to a board of ordinary thickness, the knife edge will merely score to a certain depth. This depth depends upon the length of bevel. The thicker portion of the beveled edge, coming in contact with the sides of the scoring, prevents the blade from entering further. The blade merely glides back and forth. If additional pressure is applied in an effort to force the cutting edge further into the work, the friction becomes so great that the blade will be jammed or wedged in the board. The reason for this is, that there is no displacement of wood to allow the cutting edge to reach more of the wood continuously, or to allow the back of the blade to slide without binding.

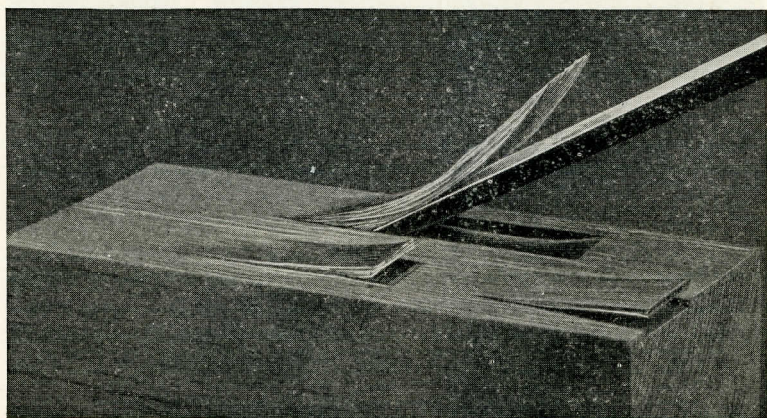


A knife edge with no means for clearance becomes bound or wedged in the wood.

Saw Action Similar to that of Chisel. The nearest approach to the cutting action of a saw is the action of a chisel. However, instead of cutting out small pieces of wood like sawdust, the chisel separates and removes a long shaving, by what may be appropriately termed "paring" or "slitting". Its comparatively broad sharp edge separates the fibres of wood lengthwise with

the grain and does not cut on the sides. The wedge-shaped end merely raises the shaving or chip and the chisel, pushed ahead, tears the fibre at the sides. The angle at which the chisel is held, the amount of bevel on the cutting edge, the pressure exerted, and the hardness of the stock are the factors which govern the thickness of the shaving.

The actions of both the knife and the chisel are employed in the cutting done by a cross-cut saw. A cross-cut saw moves successive pieces of material, not long shavings but small particles called sawdust, by scoring, cutting, and tearing.

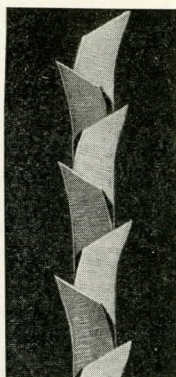
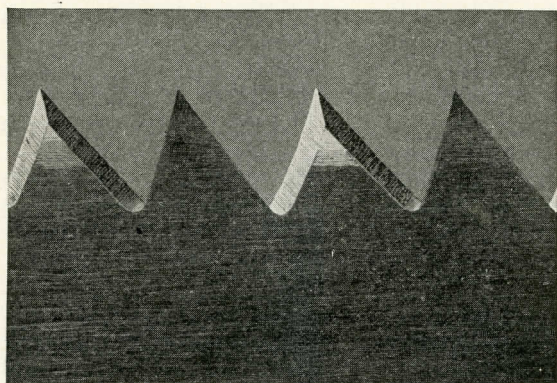


How a chisel cuts

The similarity comes to the rip saw in that its teeth are practically a series of small chisels.

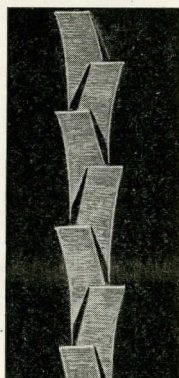
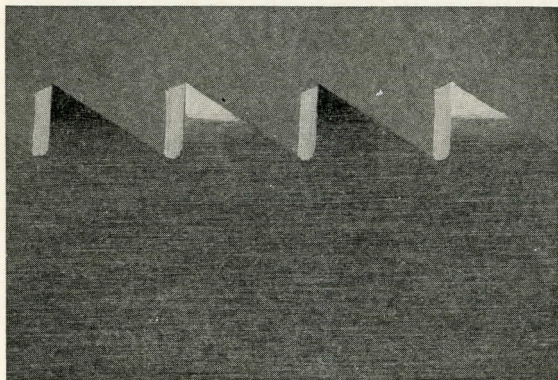
The hand saw for cross grain cutting possesses practically V-shaped teeth. The teeth are set or bent over slightly to clear the body of the blade in the kerf. Although the back of each tooth is beveled as is the front, it is the outside edge of the front of the point that does the cutting.

How a Hand Saw for Cross-cutting Cuts. Take a cross-cutting hand saw, properly set and sharpened, each tooth of uniform size, shape, set, and bevel. Make with this a light short cut across a smooth piece of lumber. One can see that the extreme points on both sides of the cutting width of the saw first made parallel scorings the width of the set.



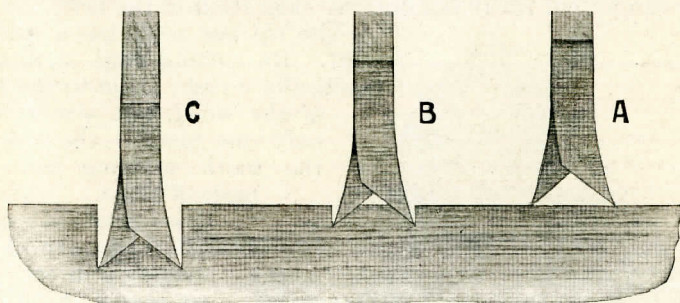
Side and end views of cross-cut saw teeth

These scorings are similar to the fine cutting of a knife across the face of the wood, thus starting the cut. Then as pressure is applied, the teeth enter deeper and deeper, gradually bringing into action the cutting edge on the outside front of the points. The forward motion of the blade causes the points and cutting edges to strike the fibre at a right angle to its length, severing it from the main body of wood on each side of the blade, and paring the ridge of wood between scorings. A continuation of the thrust pressure carries the teeth in farther until the full bite



Side and end views of rip saw teeth

is taken. With the points scoring continuously on each stroke and the outside edge of the tooth cutting, the beveled front edge of each tooth performs its duty, chisel-like, of crumbling up and dislodging the upper portion of wood left between the cutters. As each thrust of the saw the pieces of wood are carried out of the

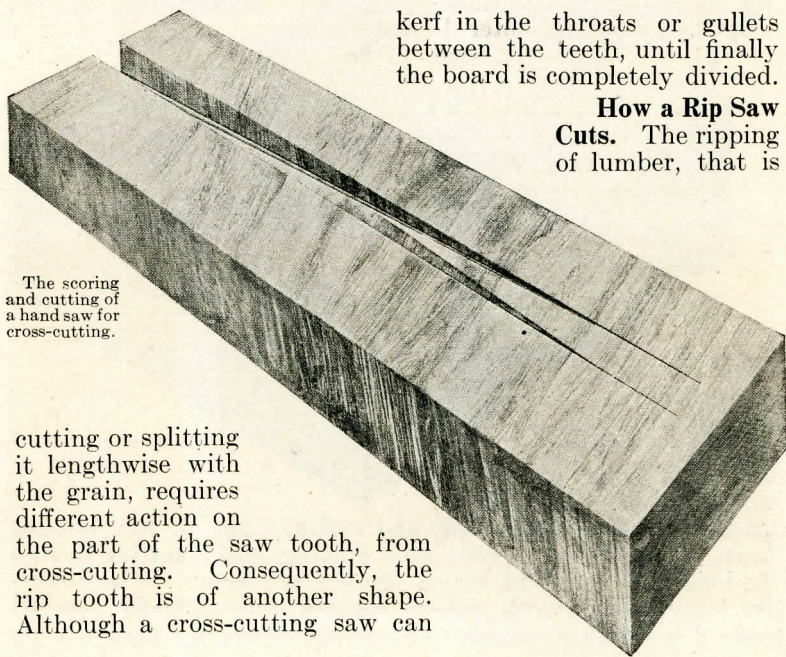


kerf in the throats or gullets between the teeth, until finally the board is completely divided.

How a Rip Saw Cuts. The ripping of lumber, that is

The scoring and cutting of a hand saw for cross-cutting.

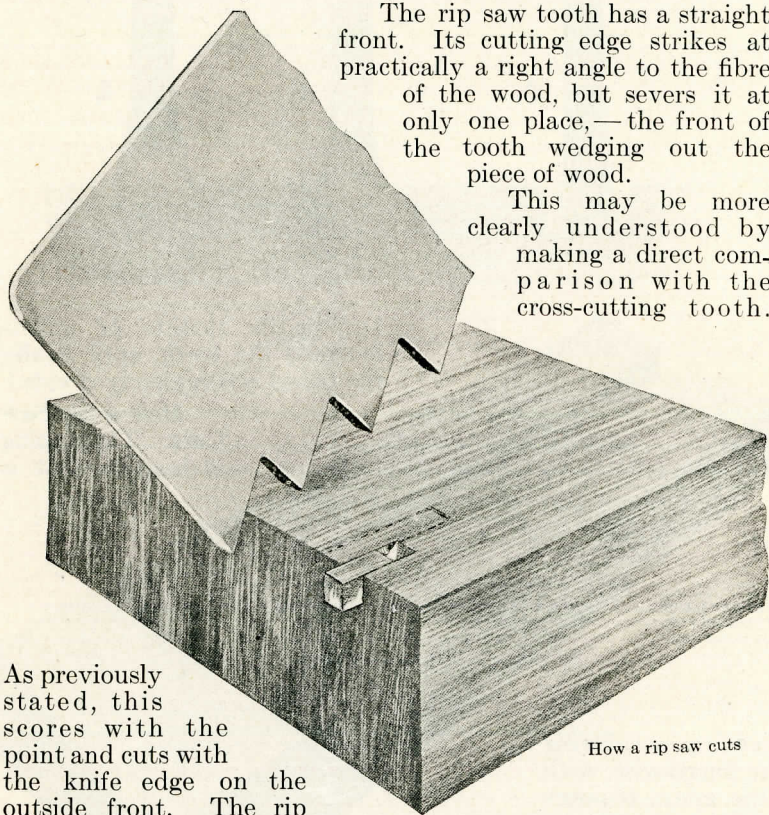
cutting or splitting it lengthwise with the grain, requires different action on the part of the saw tooth, from cross-cutting. Consequently, the rip tooth is of another shape. Although a cross-cutting saw can



rip lumber more easily than a rip saw can cut across the grain, the former operation would be slow and arduous work. The form of tooth in a cross-cutting saw does not properly sever the fibres in ripping because the line of the cutting edge runs with the fibre instead of across it. This being the case the saw cannot cut freely nor entirely clear itself in the kerf.

The rip saw tooth has a straight front. Its cutting edge strikes at practically a right angle to the fibre of the wood, but severs it at only one place,—the front of the tooth wedging out the piece of wood.

This may be more clearly understood by making a direct comparison with the cross-cutting tooth.



How a rip saw cuts

As previously stated, this scores with the point and cuts with the knife edge on the outside front. The rip tooth, with its straight front and cutting edge on top, strokes down. The comparatively wide cutting edge, cutting across the long fibres of wood, enters deeper and deeper. The wedge-like body of the tooth presses against the partially severed piece of wood until, unable to stand the strain, the fibres on the

side and bottom of the small section tear apart. Piece after piece, each successive tooth cutting its portion of half the width of the kerf, is thus separated from the main body of the board and carried out in the gullets of the teeth at each thrust of the saw. In this manner, the rip saw practically chisels out the kerf in small sections, leading to a complete division of the board.

On a cross-cutting saw the pointed teeth, set alternately to right and left, leave a shallow groove, which runs along the cutting edge from butt to point. This groove is deep enough to allow a needle to slide in it. This is not true with the rip saw. It will be noticed, on glancing down the cutting edge of the rip saw, that the square topped teeth extend entirely across and beyond either side of the blade. The inside of the tooth on the right barely overlaps the inside of the tooth on the left.

Only Small Part of Saw Tooth Actually Cuts. It is a common supposition that the entire tooth of a saw cuts. As a matter of fact, however, the actual cutting is done, with the cross-cut saw, by the points, and front cutting edges which extend only to where the right and left teeth overlap; and, with the rip saw, by the chisel-like edge of the teeth.

Because they are set alternately right and left, each tooth individually severs only half the width of the kerf. This division of duty by the numerous teeth in the hand saw makes possible the performance of quicker work, involving less effort and driving power than if the full width of kerf were cut by each tooth.

So it will be seen that, no matter what sort of a saw, the cutting edge of each tooth makes an incision across the long wood fibre. Then the base of the tooth plows out the small pieces thus separated. This is done continuously with each stroke of the saw. The saw enters farther with each thrust, the kerf becomes deeper, until a complete separation of the board is accomplished.

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