WOOD BORING BITS AND DRILLS
USE AND MAINTENANCE

1. GENERAL

1.01 This practice replaces CTSP 405-600-605 and provides instructions for the use and maintenance of standard wood boring bits and drills. This practice includes safety precautions to be observed in the use of wood boring bits and drills.

2. STANDARD WOOD BORING BITS

2.01 The standard wood boring bits for telephone use are *auger* bits, *ship auger* bits, *insulator pin* bits and *expansive* bits. The sizes are shown in the following paragraphs. Although a complete list of bits is covered, it is suggested that each employee select only those that have been approved for use in the area and which are required for use in his work. The size of a bit can be readily selected from a kit of bits by the "number" impressed in the shank of the bit. This number indicates the diameter of the bit in sixteenths of an inch. Number "3" indicates a 3/16-inch diameter bit.

2.02 *Auger Bit:* This bit consists of a solid center twist provided with a head containing a single cutter, a single spur, and a lead screw, the threads of which are 14 per inch on the three smaller sizes and 12 per inch on the remaining sizes. See Figure 1.

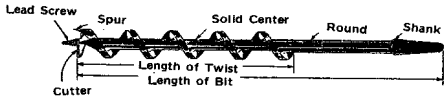

FIGURE 1. Auger Bit.

2.03 Fifteen sizes of *auger bits* are covered, ranging in size from 1/4-inch to 1-inch diameters in increments of 1/16-inch, and from 1-inch to 1-1/4-inch diameters in increments of 1/8-inch. The overall lengths range from 7-1/2-inches to 9-1/4-inches in increments of 1/8-inch. These bits are intended for general use in boring all kinds of wood where the hole depth does not exceed 4 inches for the smaller sizes of bits or 5 inches for the larger sizes of bits. In addition, the bits listed have the following specific uses:

TOOL	OVERALL LENGTH (INCHES)	DESIGNATING NUMBER	SPECIFIC USES
1/4-Inch Auger Bit	7-1/2	4	Inside wiring and installation work.
3/8-Inch Auger Bit	7-3/4	6	Inside wiring, installation work and boring holes in cedar and similar wood poles for pole steps. Also for boring holes when testing poles for hollow heart.
7/16-Inch Auger Bit	7-7/8	7	Boring holes for 3/8-inch bolts used in attaching braces to terminal boxes and crossarms.

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TOOL	OVERALL LENGTH (INCHES)	DESIGNATING NUMBER	SPECIFIC USES
1/2-Inch Auger Bit	8	8	Boring holes in chestnut, creosoted pine and similar wood poles for pole steps.
9/16-Inch Auger Bit	8-1/8	9	Boring holes for 1/2-inch bolts used in attaching back braces and vertical braces to crossarms and for 1/2-inch guy rods where the maximum thickness of the pole does not exceed 5 inches.
5/16-Inch Auger Bit	7-5/8	5	
5/8-Inch Auger Bit	8-1/4	10	
11/16-Inch Auger Bit	8-3/8	11	
3/4-Inch Auger Bit	8-1/2	12	
13/16-Inch Auger Bit	8-5/8	13	For general use where
7/8-Inch Auger Bit	8-3/4	14	there is occasional need
15/16-Inch Auger Bit	8-7/8	15	for bits of these sizes.
1-Inch Auger Bit	9	16	
1-1/8-Inch Auger Bit	9-1/8	18	
1-1/4-Inch Auger Bit	9-1/4	20	

NOTE: Number indicates the diameter of a bit in sixteenths of an inch.

2.04 *Ship Auger Bit*—This bit consists of either a solid center or a hollow center twist provided with a head containing a single cutter, a single spur and a lead screw having 12 threads per inch. The solid center twist type of construction bit is similar in design to the auger bit. Figure 2 illustrates the hollow center type.

2.05 Nine sizes of *ship auger bits* are covered ranging from 3/8-inch to 1-5/16-inches in diameter, being available in lengths of 12 inches and 18 inches which are suitable for boring holes to depths of approximately 8 inches and 12 inches respectively. These bits are intended for boring holes through poles, stubbing, building beams, etc.

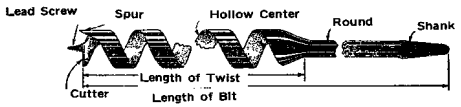

FIGURE 2. Ship Auger Bit.

TOOL	DESIGNATING NUMBER	SPECIFIC USES
3/8-Inch X (*) Inch (**) Center Ship Auger Bit	6	For boring holes through wood for a pair of inside wires. Where practicable a bell hanger bit should be used for holes of this diameter.
1/2-Inch X (*) Inch (**) Center Ship Auger Bit	8	For boring holes through wood for two pairs of inside wires.
11/16-Inch X (*) Inch (**) Center Ship Auger Bit	11	For boring holes through poles for standard 5/8-inch bolts (crossarm, stubbing, cable suspension, eye and machine bolts for deadending strand) and 5/8-inch guy rods.
3/4-Inch X (*) Inch (**) Center Ship Auger Bit	12	For boring holes through wood to a depth of 9-1/2 inches for deadending strand.
13/16-Inch X (*) Inch (**) Center Ship Auger Bit	13	For boring holes through poles for standard 3/4-inch eye bolts and machine bolts for deadending strand and for boring for 3/4-inch guy rods.
7/8-Inch X (*) Inch (**) Center Ship Auger Bit	14	For boring holes through wood to a depth of 10-1/2 inches for cable suspension.
1-1/16-Inch X (*) Inch (**) Center Ship Auger Bit	17	For boring holes through poles for standard 1-inch eye bolts and machine bolts for deadending strand and for boring for 1-inch guy rods. Also for boring holes for loading coil case supports.
1-1/4-Inch X (*) Inch (**) Center Ship Auger Bit	20	For boring holes through wood to a depth of 11-1/2 inches through building beams, etc.
1-5/16-Inch X (*) Inch (**) Center Ship Auger Bit	21	For boring holes through poles for 1-1/4-inch guy rods.

*NOTE: * 12 or 18 depending on the length desired.*
***Hollow or solid depending on the type adopted by the company.*
Designation number indicates the diameter of a bit in sixteenths of an inch.

2.06 The *ship auger bits* are tempered the entire length to prevent the bits being bent when side pressure is applied. The twists are ground and polished to the required dimensions to permit the chips to travel out through the spiral groove without turning and wedging

between the outer edges of the bit and the side of the hole, which would cause the chips beyond that point to pile up and clog the groove of the bit. The cutter of the bit is diametrically opposite the spur, which facilitates sharpening the bit.

2.07 *Insulator Pin Bit:* This bit consists of a solid center twist provided with a head containing a single cutter, a single spur and lead screw having 12 threads per inch. The length of the bit has been limited to 6-7/8 inches to permit operating the brace between crossarms having standard spacing. See Figure 3.

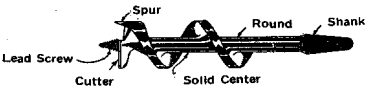

FIGURE 3. Insulator Pin Bit.

2.08 There are two sizes of bits which are intended for the following uses:

TOOL	DESIGNATING NUMBER	SPECIFIC USES
11/16-Inch Insulator Pin Bit	11	Intended for boring holes in crossarms for steel insulator pins and 5/8-inch bolts used in attaching break irons
1-1/4-Inch Insulator Pin Bit	20	Intended for boring holes in crossarms for respacing wooden insulator pins

NOTE: Designation number indicates the diameter of a bit in sixteenths of an inch.

2.09 *Expansive Bit*—This bit consists of a bit shank and round, terminating in a slotted head having a lead screw. The threads are 18 per inch and are provided with a cutter secured to the head with an adjusting clamp and screw. It is available in two sizes, large and small. Each size is furnished with a large and small adjustable cutter, both of which carry scales graduated in 1/32 of an inch to furnish adjustment to 1/16 of an inch on the diameter. The overall lengths of the large and small bits are 9-1/4 inches and 7-5/8 inches, respectively. The small bit has a 1/2-inch diameter head and bores holes from 1/2 inch to 7/8 inch, and 7/8 inch to 1-1/2 inches in diameter depending on whether it is equipped with a small or large cutter. The large bit has a 7/8-inch diameter head and bores holes from 7/8 inch to 1-3/4 inches, and 1-3/4 inches to 3 inches in diameter depending on whether it is equipped with a small or large cutter. See Figure 4.

2.10 Expansive bits are intended for boring holes through boards, where it is desired to cover a wide range of hole diameters with a minimum number of bits (an example of which is boring holes through terminal boxes for cable entrances).

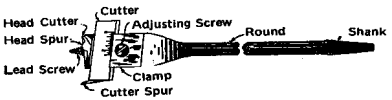

FIGURE 4. Expansive Bit.

FIGURE 5. Installer's Drill. (Bell Hanger Bit)

3. STANDARD INSTALLER'S DRILLS (BELL HANGER BITS)

3.01 The installer's drill (Figure 5) consists of a bit stock shank and long round provided with a short twist drill. The drill point is ground at an angle suitable for drilling in wood in which nails, screws, sheet metal or metal lath may be encountered as well as drilling through plaster walls. It is available in 5 sizes ranging by 1/8 of an inch from 1/4 inch to 3/4 inch in diameter. In general, the size of the drill is impressed on the round in thirty-seconds of an inch. All sizes, as listed below, are intended for boring holes where a variety of conditions may be encountered in connection with inside wiring and installation work.

TOOLS	DESIGNATING NUMBER
1/4-Inch by (*) Inch Bell Hanger Bit	8
3/8-Inch by (*) Inch Bell Hanger Bit	12
1/2-Inch by 18-Inch Bell Hanger Bit	16
5/8-Inch by 18-Inch Bell Hanger Bit	20
3/4-Inch by 18-Inch Bell Hanger Bit	24

*NOTE: *18, 24, or 30 depending on the length desired.*
Designating number indicates the diameter of the drill in thirty-seconds of an inch.

3.02 All installer's drills are provided with a hole through the web of the drill to facilitate fishing wires through the bored hole at the time it is withdrawn.

4. USING BITS AND DRILLS

4.01 Bits and drills will give the best service if they are kept in good repair. If a bit or drill requires pushing on the brace head to cut the wood, the indications are that it is in need of repair. *Never strike the brace with a hammer to start boring with a bit or drill.*

4.02 With bits, the appearance of the chip is an indication of the cutting edge and outlining spur condition. A clean-cut chip means a sharp cutter. A mangled or shredded chip usually means a dull cutter. A bit which does not feed itself properly may be in need of screw point repairs. A bent bit turns hard and ultimately binds, preventing further entrance in the hole. If the chips pile up in the hole, clearance may be too great or the bit may be covered with gummy material or rust. Difficulty of this nature may, however, be experienced when boring cedar poles especially those containing either pipe rot or checks. These conditions are similar to striking another hole, which permits the chips to drop and turn in the spiral groove. As a result, some of the chips tend to wedge between the outer edges of the bit and the side of the hole causing the chips beyond this point to pile up and clog the opening of the twist. There appears to be no way of overcoming this trouble so it will be necessary for employees working on cedar poles to clear the holes during the boring operation when required.

4.03 Before boring through siding, clapboard, panels, thin boards, etc., particularly if the hole is to be located near the end of the board, drill a lead hole in a diameter slightly less than the diameter of the lead screw with the standard automatic drill as a means of reducing the possibility of splitting the wood.

4.04 In general, a hole can be bored completely through the wood without cleaning the hole. After the bit has passed completely through the hole, clear the hole by hitting the head of the brace with the palm of the hand until the bit passes through for three or more inches. Then remove the bit by turning it counterclockwise and pulling on the head until

it is all the way out. Pulling the bit without turning it out may cause the loss of balance and result in an accident. If the bit turns hard making it necessary to clear the hole before completing the boring operation, back the bit out until the screw point is loose and then pull on the head of the brace and at the same time turn the brace clockwise until most of the chips have worked their way out of the hole.

4.05 If a nail or other piece of metal is encountered while boring with a bit, immediately back the tool out to clear the metal and then clean as described above. If the size of the hole permits, remove the obstruction with a cold chisel, and then proceed with the boring. Obstructions in small diameter holes will necessarily have to be bored through with an installer's drill.

4.06 Bits, particularly the expansive bits, have a tendency to break out the wood around the bottom of the hole when completing the boring operations. This can be overcome by firmly backing up the location of the hole with a small block of wood until the bit has passed completely through the hole being bored. This practice should be followed wherever practicable.

4.07 If the cutting edges of an installer's drill are dull, the boring will be difficult. If the edges are not of equal length, a hole larger in diameter than desired is obtained. If the cutting edges do not form a uniform angle with the axis of the drill, only one side will do the cutting. If the cutting edges of the drill have not been backed off sufficiently to provide the proper clearance or the web is too thick, considerable pressure will be required on the brace head to remove only a small amount of wood. When using an installer's drill in solid wood, the hole should be cleared of chips every 10 to 15 turns.

4.08 Bits or drills should not be placed or left on a highway, sidewalk, or property accessible to the public where they or vehicles may be damaged, or where they may constitute a potential hazard to persons or livestock.

4.09 When carrying a bit or drill, always direct the point away from the body and hands.

4.10 Before boring a hole, make certain that there is no obstruction (gas, water, or soil pipe) in the bit or drill path and that it does not come in contact with foreign wires or fixtures. Observe the direction of the lag bolts holding foreign wire pole attachments and obtaining clearance for the through bolt. Bear in mind that walls or other locations may conceal wires, pipes, or sliding doors.

4.11 When stationed on the opposite side of a partition, pole, etc., observe where the bit or drill is coming through. Assume a safe position so there is no chance of injury from the bit or drill suddenly projecting through the wall, pole, etc.

4.12 When boring a deep hole, sight along the bit after it has been started to determine if it will terminate at the desired location.

5. TRANSPORTING AND STORING BITS AND DRILLS

5.01 At all times, take proper care of bits and drills so that they will give satisfactory service and that injury or damage will not result from an exposed point or cutting edge. Bits and drills should be placed in tool rolls, racks or pockets of trucks or tool chests provided for protection purposes.

5.02 New bits and drills should be left in the original container until required for use. If the container is broken and it appears advisable to remove either the bits or drills from the

container or if bits or drills are returned from the field for storage, they should be placed on the shelves with the points facing the back of the shelf.

6. INSPECTION ROUTINE

6.01 Each employee should at all times assume the responsibility for determining that the bits and drills in his possession are in good condition.

7. INSPECTION OF WOOD BORING BITS AND DRILLS

7.01 Bits and drills should be examined to determine their condition as suggested below. In connection with the inspection of bits, the important conditions to look for are:

a. *Auger Bits, Ship Auger Bits and Insulator Pin Bits.*

(1) Broken screw point or threads badly marred.

(2) Dull spur or edge badly nicked or bent.

(3) Spur lower than cutting edge.

(4) Dull or badly nicked cutting edge.

(5) Twist of bit bent.

(6) Round of bit bent.

(7) Shank marred or rounded.

b. *Expansive Bits.*

(1) Broken screw point or threads badly marred.

(2) Dull or bent spur or edge badly nicked.

(3) Spur lower than cutting edge of head.

(4) Dull cutter spur or edge badly nicked.

(5) Top of cutter spur lower than cutting edge of cutter.

(6) Dull or badly nicked cutting edge of head.

(7) Dull or badly nicked cutting edge of cutters.

(8) Round of bit bent.

(9) Shank marred or rounded.

(10) Threads of adjusting screw stripped and slot badly marred.

c. *Installer's Drills (Bell Hanger Bits).*

(1) Dull cutting edges or edges badly nicked.

(2) Cutting edges of unequal length and angle formed with the axis of the drill not uniform.

(3) Insufficient clearance back of cutting edge.

(4) Twist broken, bent or less than 2 inches in length.

(5) Round of drill bent or broken.

(6) Shank marred or rounded.

7.02 If tools for repairing bits and drills have not been provided for that purpose and any of the above conditions are found to exist or if the condition of the bits and drills is such that they do not appear satisfactory from a safety standpoint, they should be exchanged at once for bits and drills in good condition.

7.03 If tools have been provided for repairing bits and drills and if any of the above conditions that warrant repairing are found to exist, they should be maintained in accordance with paragraphs 9 and 10.

8. TOOLS REQUIRED FOR MAINTAINING WOOD BORING BITS AND INSTALLER'S DRILLS (BELL HANGER BITS)

8.01 The following tools are required for maintenance of bits and drills as covered in this practice.

TOOL	USE
File, Auger Bit, 7-Inch	For use in sharpening screw point spur and cutter.
File, Lineman's	For use in dressing shank.
File, Round, Second Cut, 5-Inch	For use in thinning web of drill.
Hammer, Claw, 1-1/2 lb.	For use only in straightening the round of a drill or bit.
Hammer, Riveting, 7 oz.	For use in straightening the outlining spur.
Mallet, Wooden	For use in straightening the round and the twist of a drill or bit.
Paper, Abrasive, Fine	For use in polishing bad rust spots on the shank, center and twist of bits or drills.
Rag, Oily	For treating bits and drills to prevent rusting.
Rule, 2 ft. or 6 ft.	For use in determining the angle of the cutting edge of the drill.

9. MAINTAINING WOOD BORING BITS

9.01 The following maintenance methods have been found satisfactory for use by field forces. The illustrations cover the position for a right-handed man.

a. *Maintaining auger bits, ship auger bits, and insulator pin bits.*

(1) *Resharpening Screw Point*—The threads of the screw point should not be resharpened unless very dull or badly marred. To restore the threads, rest the bit on the edge of a supporting wood surface with the screw pointing upwards. Place an edge of auger bit file on the bottom of the thread near the cutting edge. Revolve the bit slowly and at the same time file the thread using short, light strokes. Continue this until the point of the screw is reached. See Figure 6. A screw point with the initial threads badly marred or broken off should be repointed with a file. If too blunt a point is obtained to take a hold in the wood, the bit is to be returned for a new one.

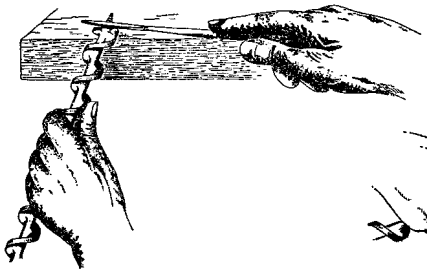

FIGURE 6.

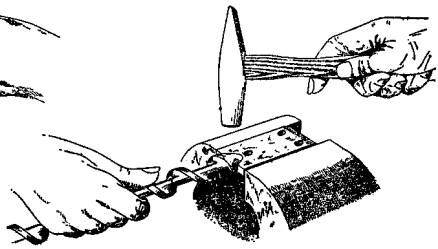

FIGURE 7.

(2) *Restoring Bent Spur*—If the spur of a bit has been bent, it should be straightened with a light hammer such as a riveting hammer as shown in Figure 7. If after straightening the spur the cutting edge appears to be jagged or rolled, the outside surface near the cutting edge may be "touched up" with a file.

(3) *Resharpening Spur*—Hold the bit against a wood support with the point up and then place an auger bit file on the inside of the spur on the front edge which performs the cutting. Sharpen this cutting edge by pressing lightly on the file and keeping it at an angle that will limit the amount of metal removed. See Figure 8. Except for "touching up", never file the outside of the spur as this destroys the clearance and causes the bit to bind or stick. The foremost edge of the outlining spur must extend beyond the cutting edge for efficient boring. If such is not the case, the bit should be returned for a new one.

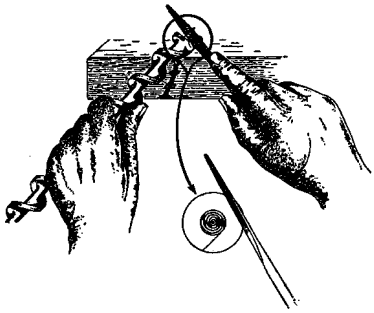

FIGURE 8.

(4) *Resharpening Cutter*–Hold the bit in the left hand with the point down, resting the top of the screw point against the edge of a bench or other suitable support so that the cutting edge is parallel with the edge of the bench or other support. Using light strokes, sharpen the cutting edge to a straight line with an auger bit file, keeping the bevel practically the same as it was when the bit was new. See Figure 9.

(5) *Straightening Bit*–To straighten a bit, bore a hole to the depth of the bend in a solid timber that has a direction opposite to the bend of the bit until the distance traveled is sufficient to remove the bend. If available, a vise may be used for holding the bit. The bit should be protected from injury by placing solid pieces of wood between the sides of the bit and vise jaws. If the bit remains slightly bent, it may be straightened by placing it on a solid, flat, wooden surface and tapping it lightly with a smooth faced wooden mallet or a hammer on the side opposite the bend. This method should also be used for sprung or slightly bent bits. See Figure 10. A badly bent bit that cannot be straightened by these methods in a reasonable time should be exchanged for one satisfactory for use. To determine whether a bit is straight, lay it on a flat surface, then roll it. If it rolls evenly it is straight.

(6) *Squaring Shanks*–Shanks with slightly rounded edges may be squared by filing the flat faces with a lineman's file. See Figure 11. If the shank bit edges are rounded to the extent that the brace chuck will not hold the bit after being filed, it should be exchanged for one satisfactory for use.

b. *Maintaining Expansive Bit.*

(1) *Resharpening Screw Point*–Maintain in accordance with paragraph 9.01 a. (1).

(2) *Restoring Bent Spur*–Maintain in accordance with paragraph 9.01 a. (2).

(3) *Resharpening Head and Cutter Spur*–Maintain in acordance with paragraph 9.01 a. (3).

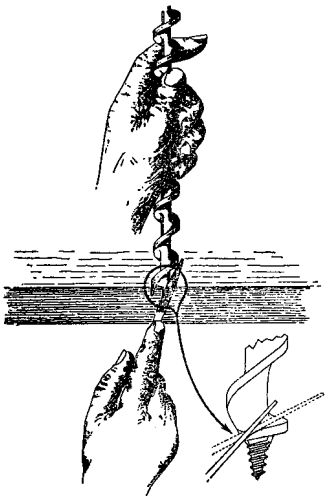

FIGURE 9.

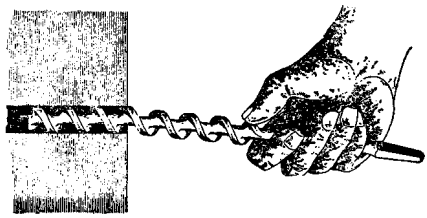

FIGURE 10.

(4) *Resharpening Head Cutter*–Hold the bit with the left hand resting on a solid surface as shown in Figure 12. With an auger bit file, sharpen the cutting edge to a straight line keeping the bevel the same as it was when new.

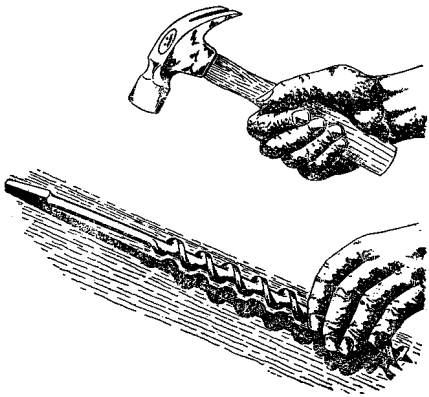

FIGURE 11.

(5) *Resharpening Edge of Cutter*–Move the cutter out to the maximum size hole that the bit is used for. Hold the bit in the left hand with the point up and back of the cutter, resting on a solid support as shown in Figure 13. With an auger bit file, sharpen the cutting edge using light strokes keeping the bevel the same as it was when new. Test the edge by drawing a small stick of wood across the cutting edge. If a sliver of wood is easily removed, the cutting edge is satisfactory for use.

(6) *Squaring Shank*–Maintain in accordance with paragraph 9.01 a. (6).

9.02 Moisture from the hand, as well as that found at seashores and in foggy territories or sap from green timber, etc., may occasionally cause rust spots to appear on a bit. To prevent this, the bit should be wiped with an oily rag. Fine abrasive paper may be used to polish bad spots on the shank, round or twist of bits. Such material, however, should not be applied to any cutting edge, spur, or screw.

10. MAINTAINING INSTALLER'S DRILL (BELL HANGER BITS)

10.01 In general, drills should be returned to the storeroom for resharpening where the work is performed on an abrasive wheel.

10.02 *Straightening Round of Drill*–Maintain in accordance with paragraph 9.01 a. (5).

10.03 *Squaring Shank*–Maintain in accordance with paragraph 9.01 a. (6).

10.04 *Removing Rust*–Maintain in accordance with paragraph 9.02.

10.05 A correctly ground drill should:

a. Provide the cutting edges with a uniform angle with the axis of the drill.

b. Obtain cutting edges with exactly equal length.

c. Obtain sufficient clearance behind the cutting edge.

d. Obtain sufficient groove depth.

11. SAFETY PRECAUTIONS

11.01 Take care and observe the following precautions when handling bits and drills:

a. Bits and drills should not be placed or left on highway, sidewalk or property accessible to the public.

b. Bits should be raised aloft on a pole by means of a canvas bucket or a handline. Bit should not be assembled in a brace to be raised aloft in a canvas bucket.

c. When placing bits and drills on shelves, the points should face the back of shelves.

d. Never transport bits and drills loose in tool boxes or compartments. (See paragraph 5.01.) Tools being returned for junking are exceptions.

e. Do not pull either a bit or a drill from a completed hole; back it out by turning. See paragraph 4.04.

f. Place the bit or drill in brace so that the jaws catch the edges of the shank.

g. When finished with bits and drills, place them in the receptacle provided for the purpose of protection.

h. When stationed on the opposite side of partition, pole, etc., observe where a bit or drill is coming through and assume a position so there is no likelihood of being injured if the bit or drill is suddenly projected through the wall, pole, etc.

12. STANDARD REPAIRS

12.01 The employees in the field, if furnished with maintenance tools, should maintain bits and drills in accordance with the instructions in this practice. All bits and drills requiring other repairs should be returned.

13. DISPOSITION OF WOOD BORING BITS AND INSTALLER'S DRILLS (BELL HANGER BITS)

13.01 Bits and drills found to be defective should be tagged "defective" or "N.G." and returned in accordance with the company's established procedure.

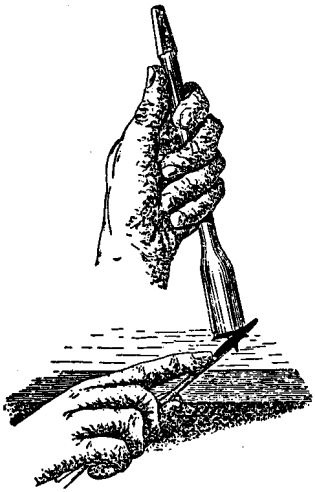

FIGURE 12.

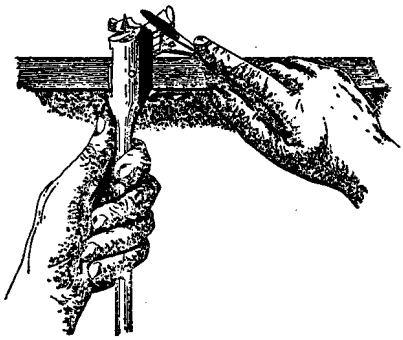

FIGURE 13.