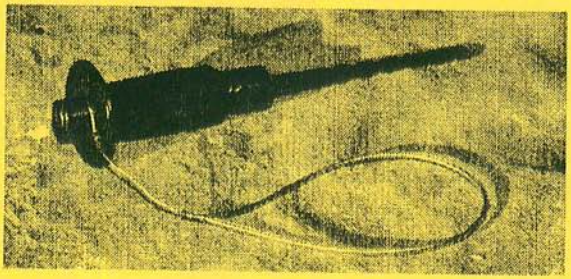
Hurricane Mountain Works
Wilderness Hand Drill



FEATURES

- Compact drilling system with two wrench tightening system which secures drill in the holder and allows for quick change of bits in the field.
- Interchangeable collet system allows use of any size drills, including SDS carbide tipped bits up to 1/2", with standard collet; or 1/4" to 3/8" straight-shanked drill bits, with optional collets (standard collet also accepts 25/64" straight shanked bits).
- Hardened Stainless Steel body and threaded nut with anti-mushrooming hardened steel insert on the striking surface.
- Rubber grip with flange for hand protection.
- Wrist loop which can be connected to a leash attached to the climber.

GENERAL DISCLAIMER

Drilling holes in rock and wielding a hammer are by their nature dangerous activities. It is the responsibility of the user to test and evaluate our product's potential and limitations before venturing in places where one's life depends on it. Hurricane Mountain Works cannot be held responsible for consequential damages, injury, or death arising from any use or misuse of its products.

Always wear safety glasses and gloves while drilling.
Never depend on a drill in a hole to hold a load.
Always have a back-up system.

Hammer and Safety Goggles Required!

HOW TO USE THE DRILL HOLDER

Do not tighten the nut onto the holder without a collet and the proper size drill in place: you may damage the collet and/or the threads of the nut and shaft.

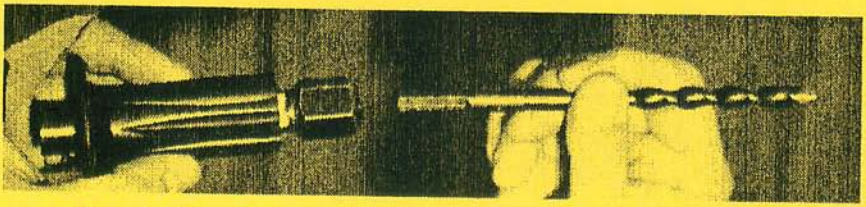
TO INSERT OR CHANGE COLLETS:

1. Remove threaded nut.
2. Check to make sure the collet cavity is clean, and that the threads are clean and well lubricated.
3. Insert collet into holder.
4. Replace threaded nut.

TO INSERT OR CHANGE DRILL BITS:

To change a bit, you do not need to remove the threaded nut. One or two full revolutions should be adequate to open the collet.

1. Loosen threaded nut.



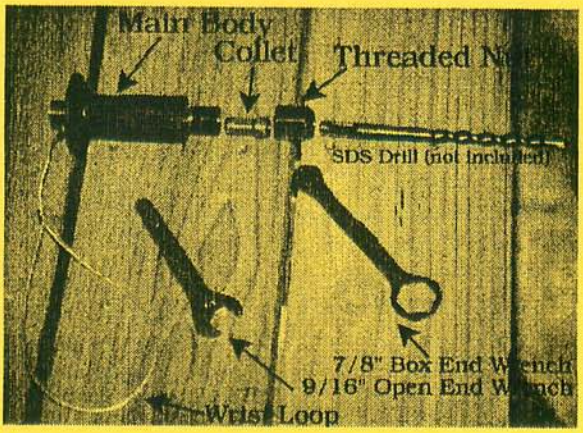
2. Insert drill, making sure it is of the proper size, and seat the drill all the way to the bottom of the collet. IMPORTANT: If the drill is not well seated before tightening the collet, the resulting shear force on a collet from a partially inserted drill could damage the collet.

3. Tighten the threaded nut onto the collet using the two wrenches provided. The nut needs to be tightened reasonably tight. The best method to tighten is to align the wrenches similar to a hand exerciser and grip tightly, as shown in the photo. Additional leverage may be gained from pressing the wrenches together against a flat surface.

PARTS LIST

1. Main body with rubber grip and tubing covered cable leash.
2. Hardened threaded nut.
3. Standard 25/64" Collet.
4. 9/16" Open Head Wrench.
5. 7/8" Box End Wrench.

Drill not included: standard collet is for 25/64" shanks (SDS size).



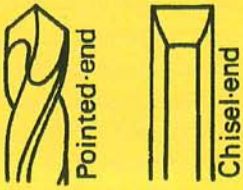
MAINTENANCE

The threads MUST ALWAYS be clean and well lubricated with an anti-galling coating in order to prevent the treads from seizing. Loctite (1-800-562-0560) Anti-Seize Thread Compound 767 is recommended and is available as a thread compound (preferred) or as an aerosol. Maintenance is especially important after the Hurricane Mountain Works Drill Holder gets wet or is exposed to dirt in order to properly to prevent galling corrosion, wear, and/or seizing of the threads. To clean, first remove dirt and clean threads with a toothbrush, and reapply a anti-seize coating on the threads.

DRILLS

We recommend the Hurricane Mountain Works Drill for our drill holder. Our drills are modified SDS bits with carbide tips with the overall length shortened, and a more specific-to-climbing grind on the tip. However, any SDS bit will work well for drilling with our holder and standard collet. SDS bits come in 1/4", 5/16", 3/8", and 1/2" sizes. Note: SDS bits actually drill oversize holes: for example, the 3/8" SDS bit actually has a 0.396" cutting edge. Likewise, the 1/2" SDS bit has a 0.528" cutting edge. For most bolts, this is good since specifications generally require a slightly oversize hole for a given nominal diameter.

We recommend that you become familiar with drill options any time before you venture out onto real rock. SDS bits with carbide tip inserts seem to perform best for rock drilling. Other options include regular High Speed Steel and Cobalt Steel machine drill bits, found at most hardware stores, modified with a chisel point. These drill are more susceptible to breakage than the SDS bits, but can be found in a greater range of sizes. It is imperative that you select the proper size drill that will create the proper diameter holes for the bolt that you intend to place. When in doubt, see the bolt manufacturer's specifications.

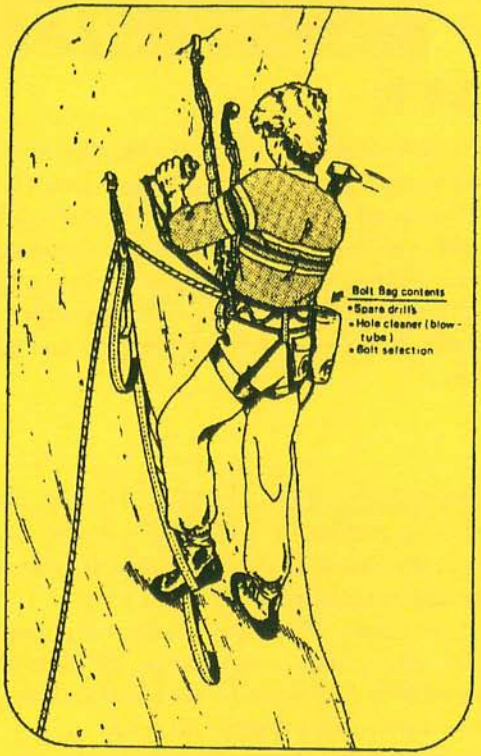


Tip types

COLLET INFORMATION

The standard collet is for 25/64" shanks and accepts all standard SDS carbide tipped drill bits in the 1/4", 5/16", 3/8", and 1/2" drill sizes.

Other size collets are available, in 1/8" to 25/64" in 1/64" increments. Each collet has a 1/64" range of collapse. For example, the standard collet will accept both a 25/64" and a 3/8" shank, and a 17/64" collet will accept both a 17/64" and a 1/4" shank. It is best, however, to buy the collet that fits each size shank perfectly that you intend to use. However, the inverse is not true: DO NOT TRY TO JAM A LARGER SHANK INTO A GIVEN SIZE COLLET, for example, trying to place a 17/64" shank into a 1/4" collet will break the collet.



BOLT AND HANGERS FOR ANCHORS

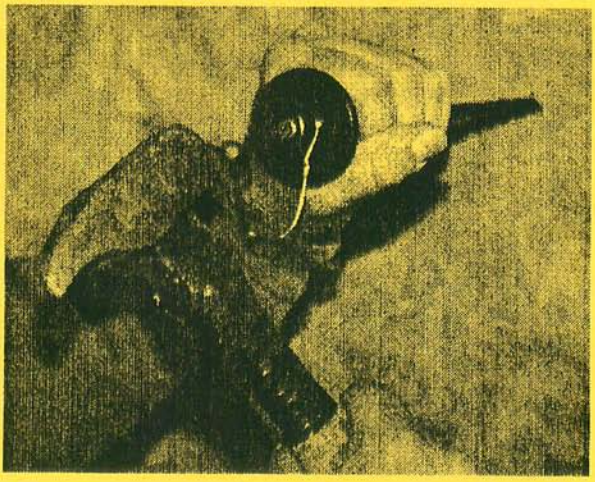
Nearly all bolts used for rock climbing are designed for industrial anchoring in masonry and concrete, NOT specifically for rock climbing. Therefore be aware that any bolt recommendations must be taken with caution. Always refer to manufacturer's instructions on both hole depth and diameter, and placement. The standard bolt used for rock climbing is the Rawlbolt manufactured by Rawl (Rochester, NY), in the 3/8" and 1/2" sizes. These bolts are available in regular and stainless steel and are among the strongest bolts available for their size.

DRILLING TECHNIQUE

The tried and true method of hand drilling bolts has become a lost art. With good drilling technique, which comes with practice, holes can be drilled in a matter of minutes. Here are the basics:

LOCATION: Pick an area in smooth, solid rock at least 6 to 8 inches way from the nearest fracture or edge, considering at the same time the line of pull and convenience for clipping. Avoid exfoliated or hollow sections by testing with taps of the hammer. Prepare the surface by chipping away small flakes so that the hanger will sit nice and flush with the rock, but be aware that excessive pounding will weaken the rock.

STARTING AND DRILLING THE HOLE



To begin the hole, use the drill as a chisel, cross hatching carefully placed blows in order to create a shallow circular indentation.

The hole should be drilled perpendicular to the surface of the rock, so it is important to keep the holder at a steady drilling angle to avoid an oversized or non-perpendicular hole. Turn the drill at least an 1/8 but no more than a 1/4 of a revolution between every hammer blow, and distribute the total number of blows at each orientation evenly with full rotation. Do not turn the drill during the impact of a hammer blow; rather, turn the drill between hammer blows.

As the hole progresses, grip the holder loosely, maintaining a steady angle and constant rotation, and allow the drill holder to rebound slightly (1/16" or so) after each hit. The resulting pneumatic effect helps displace dust, which otherwise slows drilling and encourages binding of the drill in the hole. Periodically remove the drill and purge the dust with a blow tube. Blow tubes can be fashioned out of a 2 foot length of 3/16" or 1/4" flexible plastic tubing found in any hardware store.

If the drill binds in the hole—usually not a problem with SDS bits, since their cutting edge is longer than the diameter of the drill body—lightly tap the drill on the end of the holder in hopes that the drill will rebound loose. DO NOT hammer side to side on a stuck drill. If the drill breaks from excessive pounding, you're usually out of luck, unless the hole is deep enough and you can remove the broken drill from the hole.

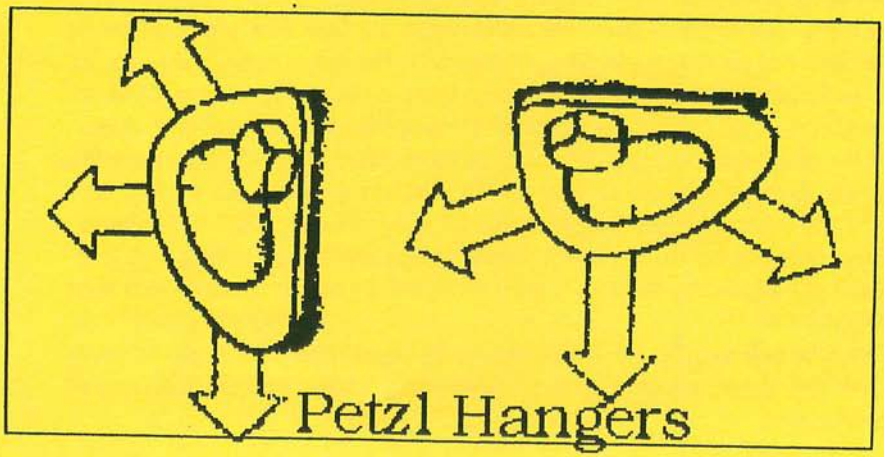
Once the hole is drilled to the proper depth, double check the depth by lining up the bolt with the drill marked at its furthest depth. Then, clean the hole out well and place the bolt.

The 3/8" by 3-1/2" bolt (minimum recommended) is rated by the manufacturer to withstand a 5590 pound pullout load in concrete, a force that will break most hangers before the bolt. In general, a bolt's rated pull-out strength (as opposed to its shear strength) is the significant factor of a bolt's overall strength. When tested in shear, a bolt crushes the rock around its hole in the direction of pull, and the bolt bends. Further pulling on the bent bolt results in both a shear force and a pull-out force. The failure of bolts even when tested in shear often results in the bolt pulling out of its hole rather than breaking, therefore, select bolts based on their pullout strength.

The Rawlbolt is not foolproof to place and requires careful technique and a clean, properly sized hole. As the bolt is placed in the hole, which usually requires some hitting with a hammer, rock-dust may get into the threads where the cone attaches, and as the bolt is tightened, the cone may seize on the bolt, preventing further expansion. Continuing to tighten the bolt after this happens will cause the bolt and cone to spin in the hole, confirming a useless bolt. For best results, make sure the hole is very clean before placing the Rawlbolt. Rawlbolts must be tightened in exact concordance with manufacturer's recommendations on torque, requiring generally 3 to 4 half-turns for full strength at which point the blue plastic sleeve starts to compress.

NOTE: the 3/8" Rawlbolts require a 1/2" wrench, and the 1/2" Rawlbolts require a 9/16" wrench. The wrench flat on the Hurricane Mountain Works drill holder is 5/16" wide and accepts a standard 9/16" mechanics wrench. The grip covers part of this flat. If you are using 1/2" RawlBolts which require a 9/16" wrench for tightening, we recommend that you expose more of the wrench flat by cutting back the rubber grip slightly so that only one 9/16" wrench is needed for both tightening of bolts and the drill holder. We do not recommend using our 9/16" wrench provided for tightening bolts.

Recommended hangers are those of the design first introduced by Petzl, which minimizes leverage for both a shear pull and a straight outward pull load. The Petzl hanger is designed such that for any angle of pull, leverage is minimized.



ON LEAD DRILLING TIPS

For drilling on lead, fast and efficient drilling technique is essential. Here are a few tips: Select a no-hands stance and quickly assume a balanced drilling position. Lowering the heels will delay the onset of calf burn. Hooks or temporary pro can be used to unweight the rope, or for aid. Optimize the height of the bolt with ease of drilling, which is efficient at about three inches below your maximum reach. Maintain a relaxed, steadfast attitude, and avoid procrastination: resting and shifting positions are usually inefficient. Difficult on-lead anchor placements is a forgotten art form, its perfection requiring experience with rapid drilling, boldness, and an adventurous character.

WHY DRILL BY HAND?

The advent of the battery powered drill has had repercussions never before seen in the history of climbing. A proliferation of bolts in high profile areas has concerned land managers to the point where climber's freedoms are now under the gun. It is now illegal to drill with powered equipment in recognized wilderness areas and National Parks. The BLM and Forest Service are also becoming aware of climber impact and are considering banning fixed anchors in general. The root of the problem is the notion of using construction equipment in pristine areas to establish rock climbing routes, an idea which is anathema to most non-climber's perception of a recreational activity. A major article in a worldwide news magazine, for example, states that bolts are "coated with epoxy resin and fired into the rock with a bolt gun", mixing fact with fiction when it comes to how we as climbers are perceived by the masses.

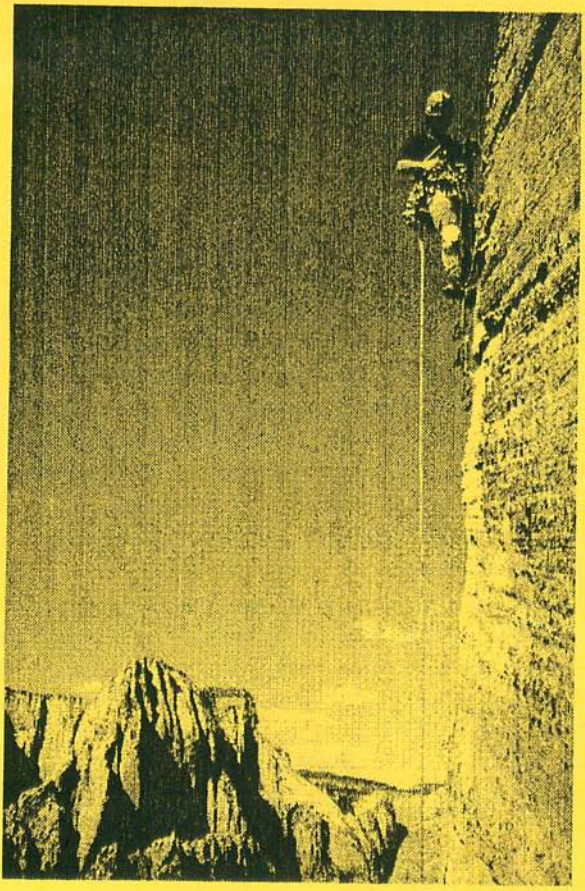
Drilling by hand in areas which have any potential for problems with land managers is one possible solution to today's problems. A hand drilled bolt requires more effort, but avoids the complications arising from using motorized equipment in the great outdoors, and with a good drill holder system and the correct drilling technique, strong bolts can be placed safely.

The Hurricane Mountain Works hand drill has features never before seen on a commercially available hand drill which enhance its ability to place bolt anchors quickly and safely.

Bolt Kit Checklist:

- •Drill Holder and wrenches.
- •Extra Drill(s)
- •Bolts with appropriate wrench for tightening.
- •Hangers
- •Blowtube
- •Bolt Bag
- ••Don't forget the Hammer and Safety Glasses!••

Good Drilling!



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