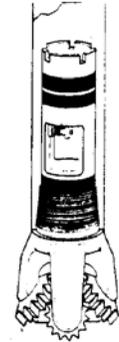


# Drilling Accessories

## Float Valves

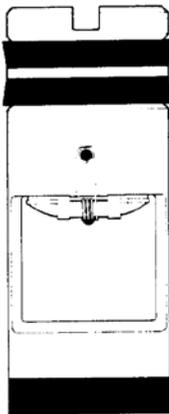
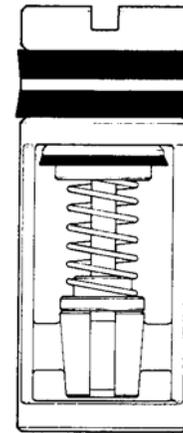
Mills Machine Co. stocks a wide variety of float valves at very competitive prices to sell separately or to install in our subs and stabilizers. We also stock the metal or rubber repair kits. Please contact us if you are not sure which type of float valve to use.



Baker		Demco		Box Tool Joint Size	Valve Diameter	Valve Length
Poppet Style	Flapper Style	Poppet Style				
1R, Model F				2 3/8 API Regular	1 21/32	5 7/8
1F-2R, Model F		27R		2 7/8 API Regular 2 7/8 API Full Hole 2 7/8 API Internal Flush	1 29/32	6 1/4
2F-3R, Model F	2F-3R, Model G	35R		3 1/2 API Regular 2 7/8 API Full Hole 2 7/8 API Internal Flush	2 13/32	6 1/2
3 F, Model F	3 F, Model G			3 1/2 API Full Hole	2 13/16	10
3 1/2, Model F				3 1/2 API Internal Flush	3 1/8	10
4R, Model F	4R, Model G	45R		4 1/2 API Regular	3 15/32	8 5/16
4F, Model F	4F, Model G			4 1/2 API Full Hole 4 API Internal Flush	3 21/32	12
5R, Model F	5R, Model G			5 1/2 API Regular	3 7/8	9 3/4
5F-6R, Model F	5F-6R, Model G	65R		6 5/8 API Regular	4 25/32	11 3/4
6F, Model F				8 5/8 API Regular	5 11/16	14 5/8

Baker is the Registered trademark of Supply Products Division, Baker Oil Tool Co.  
Demco is the Registered trademark of Retasco, Inc.

The Poppet (plunger) Style Valve provides positive and instantaneous shut-off against high or low pressure, assuring continuous flow of the fluid during drilling. It prevents flow-back when adding joints and keeps cuttings out of the drill pipe, preventing plugging while making connections.



The Flapper Style Valve incorporates a specially designed flapper which opens quickly and fully to provide a completely unrestricted bore through the hole. When circulation stops the flapper closes instantly to prevent cuttings from entering the drill string and plugging the bit. The flapper style compliments primary blowout prevention equipment.

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# Drilling Accessories

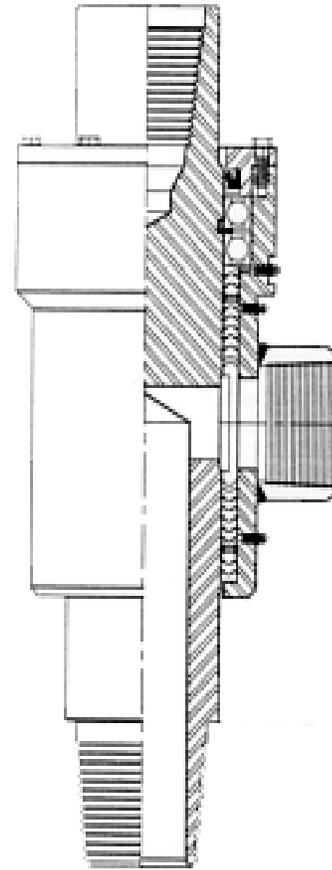
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## Water Swivels

Available are the top mounted swivels or the side inlet swivels. The top mounted swivel comes with a U-bolt bail for conventional drilling or with studs when used as a rotating head. The lower NPT connection can be right or left hand, depending on the drill rig, while the top connection is the standard right hand thread, straight up or with a goose neck.

The side feed swivels is used with hydraulic, top-head drive rigs to insure the prevention of contamination of the hydraulic fluid. They are also used with auger rigs to convert them to circulating, rotary drilling rigs. The bottom connection will be matched to your specific requirements while the side connection is a standard NPT thread. The top is a 1 5/8 or 2 hex pin.

Please specify the bottom connection, water connection and, for side feed, the tops drive connection. These connections will determine the water course diameter.



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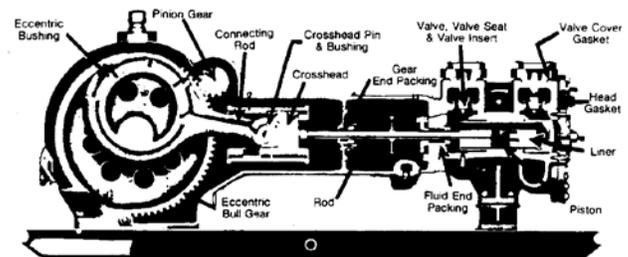
## Mud Pump Parts

Mills Machine Co., Inc. is your source for parts for the following mud pumps:

Gardner-Denver	Fluid end and gear end parts
Wheatly	Fluid end parts
Armstrong	Fluid end parts
Failing	Fluid end parts
Gaso	Fluid end parts
Harrisburg	Fluid end parts
L-K Industries	Fluid end parts
Worthington	Fluid end parts

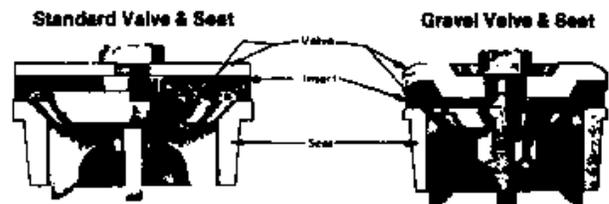
These are just a few of the pumps with parts available. When you call please have the following information available:

Name of pump,  
Pump size,  
Part Number and  
Description of the part.



Some of the parts available are:

Liner - Chrome and Premium  
Rods  
Pistons  
Piston Rubber  
Valve Seat - Standard and Gravel  
Valve Seat - Standard and Gravel  
Valve Insert - Standard and Gravel  
Valve Spring  
Liner Packing  
Rod Packing  
Head Gasket  
Valve Cover Gravel  
Junk Ring  
Lantern Ring  
Gear End Packing  
Eccentric Gear (Bull)  
Eccentric Bushing  
Pinion Gear (Driver)  
Cross Pin  
Cross Pin Bushing



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# Drilling Accessories

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## Drive Shoes

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Steel Drive Shoes are available in threaded or weld on design. They are designed to be attached to the bottom of the casing enabling it to be driven into bedrock at the bottom of the hole. We will need to know the size, weight per foot, thread and inner or outer taper design.



## Centralizers

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The Centralizers are designed to attach to the casing or pipe and keep it centered in the hole to insure even distribution during the grouting process. Please specify the pipe diameter and carbon or stainless steel.

## Pipe Thread Compound

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Pipe Thread Compound is carried in stock in one gallon buckets but other sizes are available. The different types available are; JLS –multi purpose tool joint compound, Z-40 or Z-50 Zinc base tool joint compounds. We also stock Pipe Dope Brushes for application of the pipe thread compounds.



## Pipe Thread Protectors

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We stock both plastic and steel thread protectors in a broad range of thread types and sizes. We use this product to protect the threads on our hole openers, stabilizers, etc. during shipping.

## Pipe Wipers

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Pipe wipers come in a range of styles and diameters and include reinforced steel rings for rigidity and strength. Many sizes are available on request. Please let us know if you need the solid or split style.



## Pipe Packers

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Packers with either single or multiple sealing flanges are available with the expander tool assembly. Please call for price and availability.

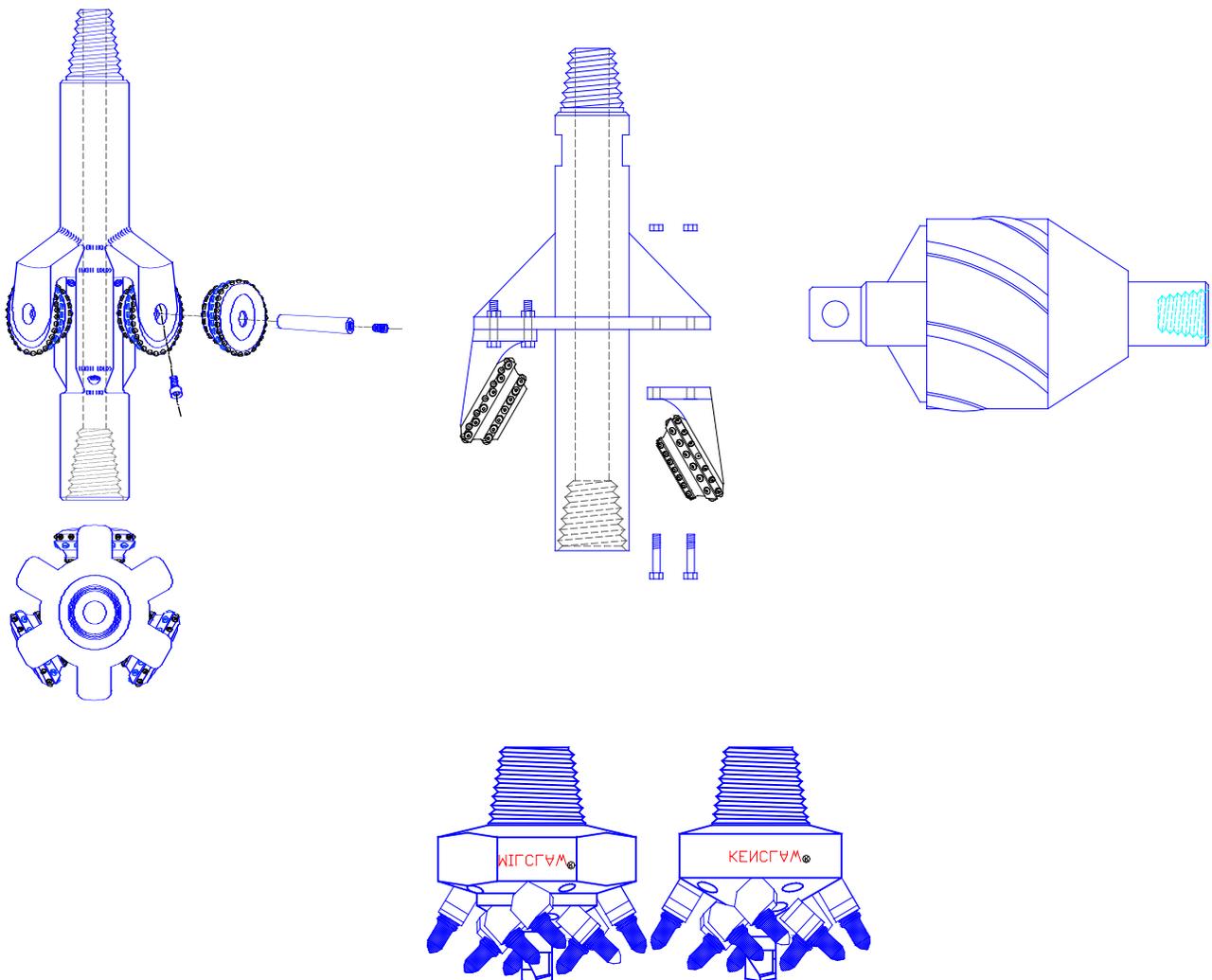
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# Horizontal Directional Drilling (HDD)

Horizontal Directional Drilling (HDD) continues to be the most popular method of installing electrical cable, fiber optics, utility conduits and irrigation lines in industrial, commercial and residential applications. This technology eliminates the need for open trenching to install utility lines and surface obstructions can be avoided with minimal environmental disturbance and limited interruptions to traffic or services.

Mills Machine has been manufacturing horizontal drilling bits, holeopeners and horizontal road boring bits for over twenty years. Specific information regarding these products is found in sections 4, 6, 7, and 8 of our general product catalog. We also, manufacture hollow stem augers and solid core augers that have HDD applications found in sections 1 and 4 of our catalog.

This new catalog section features Claw, Blade or Roller Horizontal Holeopeners and Claw, Blade or Roller Back Reamers.



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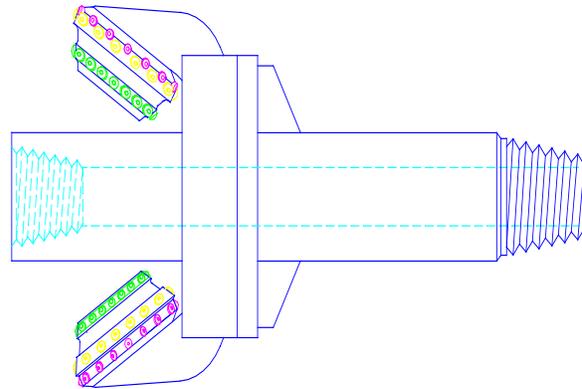
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# Horizontal Directional Drilling (HDD)

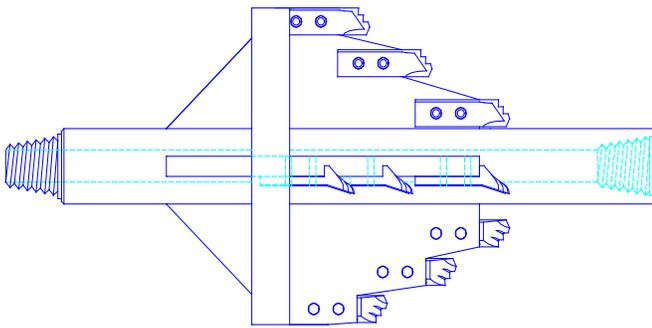
## Roller Cone Horizontal Holeopeners.

Mills Machine has over **forty-five years of experience** in manufacturing our custom designed horizontal roller holeopeners, which are, available in sizes from 6 to 120 (150 mm to 3 Meters) and larger. We custom manufacture these Holeopeners to meet your specific requirements. These ruggedly constructed units are made from **4142 alloy steel** and the roller rock bit cutters of your choice.

The horizontal holeopeners are available in single stage, two stages or multiple stage depending on the pilot hole and the finished hole size. The lead and trailing necks can be as long as you desire with breakout flats or lugs as needed. Circulation can be standard or reverse for horizontal or raised bore drilling and circulation can be fluid or air depending on your rig capabilities.



Roller Cone Horizontal Holeopeners are made with tricone roller rock bits and are available in Steel Tooth or TCI Button, in new, retip or rerun condition and with open or sealed journal bearings.

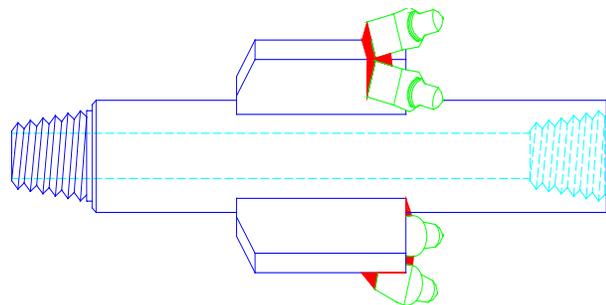


## Drag Type Horizontal Holeopeners

Mills also manufactures large drag (blade) Holeopeners for horizontal drilling using replaceable bolt on teeth in a step tooth or chevron apex tooth construction or a combination of teeth and bullet bits. This type of reamer is designed for soft to medium formations and can be made in any size with any thread front or back. Another option to this bit is to put cutters and jets on the back side of the bit if you have to reverse out of the hole.

## Bullet Type Horizontal Holeopeners

Truly one of the most versatile bits that we manufacture is the Bullet Type Reamer. Designed for hard compacted clay to soft limestone this rugged bit with replaceable carbide cutters offers the most capability and convenience for the money. It is a very aggressive cutting bit that will increase your production while reducing your overhead.

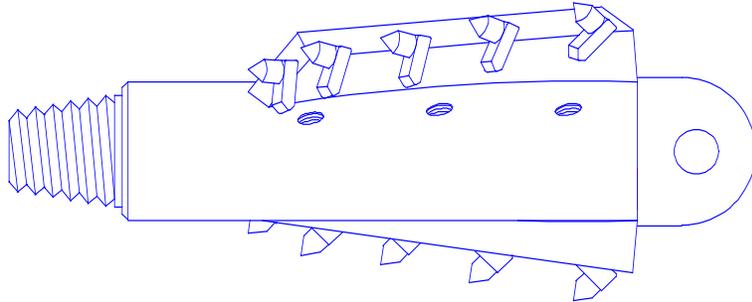


**The only limit of our capabilities is your imagination. Working together, we can help solve all of your tough drilling problems.**

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# HDD Components

## Winged Claw Backreamer



**Carbide bullet cutters rotate in their block to promote a self-sharpening action and reduce torque on the drill string. The** Inexpensive, replaceable cutters are easy to change in the field. This bit works well in unconsolidated formations where layers of soft and hard rock are encountered. Water jets clean the bullet cutters as you drill. We can add the box, pin or connection of your choice.

Available in sizes shown in the table or to meet your specific needs. On the sizes 10 and larger we can build this bit to include the pull swivel to reduce the overall length. Contact us for details.

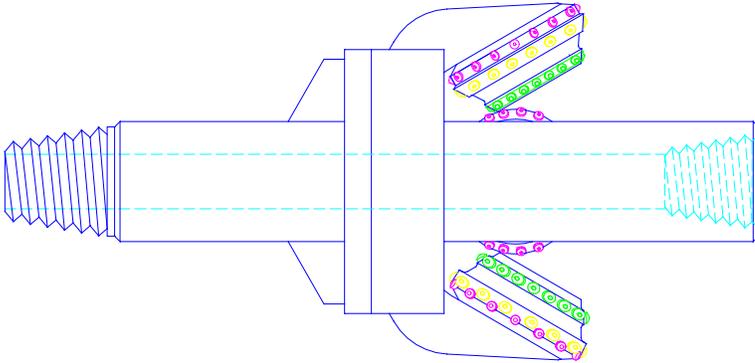
Part #	Description
CBBR6	6 Claw Backreamer, connections TBD
CBBR8	8 Claw Backreamer, connections TBD
CBBR10	10 Claw Backreamer, connections TBD
CBBR12	12 Claw Backreamer, connections TBD
CBBR14	14 Claw Backreamer, connections TBD
CBBR16	16 Claw Backreamer, connections TBD
CBBR18	18 Claw Backreamer, connections TBD
CBBR20	20 Claw Backreamer, connections TBD
CBBR22	22 Claw Backreamer, connections TBD
CBBR24	24 Claw Backreamer, connections TBD

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# HDD Components

## Roller Cone Backreamers

Mills Machine has over **forty-five years of experience** in manufacturing our custom designed horizontal roller holeopeners, which are, available in sizes from 6 to 120 (150 mm to 3 Meters) and larger We have transferred that technology to the design of backreamers. These ruggedly constructed units are made from **4142 alloy steel** and the roller rock bit cutters of your choice.



Horizontal backreamers are available in single stage, two stages or multiple stage depending on the pilot hole and the finished hole size. The lead and trailing necks can be as long as you desire with breakout flats or lugs as needed. Circulation can be standard or reverse for horizontal or raised bore drilling and circulation can be fluid or air depending on your rig capabilities.

Roller Cone Horizontal Backreamers are made with tricone roller rock bits and are available in Steel Tooth or TCI Button, in new, retip or rerun condition and with open or sealed journal bearings.

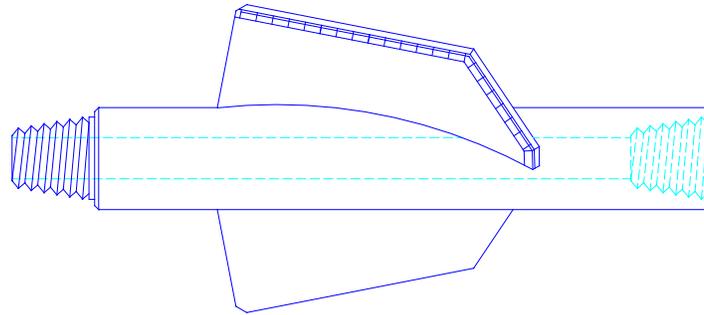
Part #	Description
RCBR6	6 Roller Cone Backreamer, connections TBD
RCBR8	8 Roller Cone Backreamer, connections TBD
RCBR10	10 Roller Cone Backreamer, connections TBD
RCBR12	12 Roller Cone Backreamer, connections TBD
RCBR14	14 Roller Cone Backreamer, connections TBD
RCBR16	16 Roller Cone Backreamer, connections TBD
RCBR18	18 Roller Cone Backreamer, connections TBD
RCBR20	20 Roller Cone Backreamer, connections TBD
RCBR22	22 Roller Cone Backreamer, connections TBD
RCBR24	24 Roller Cone Backreamer, connections TBD

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# HDD Components

## Spiral Blade Backreamer

Mills also manufactures spiral blade backreamers for horizontal drilling using carbide tipped drag blades. This type of reamer is designed for soft to medium formations and can be made in any size with any thread or connection on the front or back.



Part #	Description
DBBR6	6 Drag Blade Backreamer, connections TBD
DBBR8	8 Drag Blade Backreamer, connections TBD
DBBR10	10 Drag Blade Backreamer, connections TBD
DBBR12	12 Drag Blade Backreamer, connections TBD
DBBR14	14 Drag Blade Backreamer, connections TBD
DBBR16	16 Drag Blade Backreamer, connections TBD
DBBR18	18 Drag Blade Backreamer, connections TBD
DBBR20	20 Drag Blade Backreamer, connections TBD
DBBR22	22 Drag Blade Backreamer, connections TBD
DBBR24	24 Drag Blade Backreamer, connections TBD

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# HDD Components

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