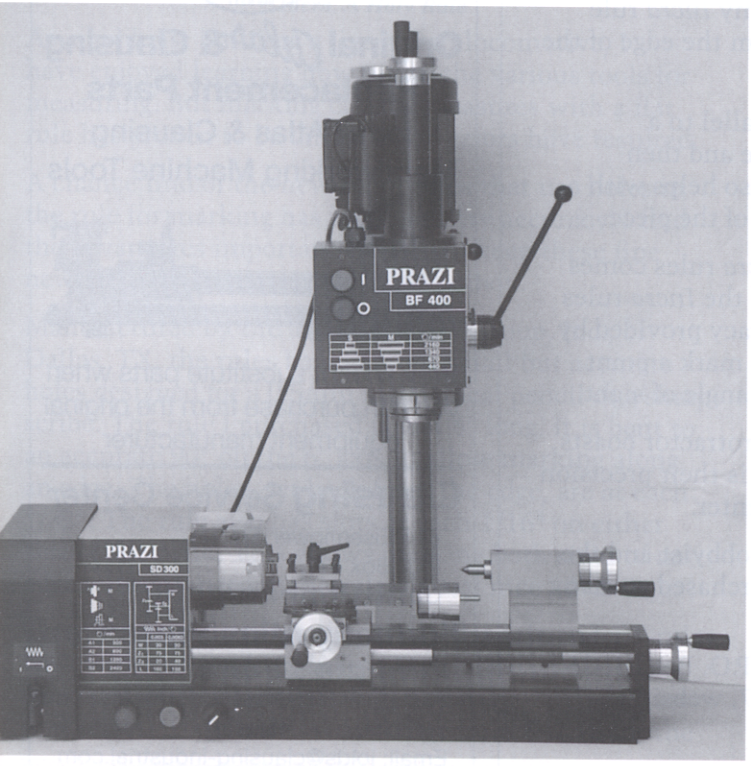
# Product Review

*by Don E. Jones*

Photos by Author




**PRAZI SD300 5×12" MASTERTURN METAL LATHE AND BF 400 VERTICAL MILLING AND DRILLING HEAD**

Prazi, the short word for precision in German, is back. This year, at the April NAMES show, I met John Szot, distributor and importer of Prazi products in North and South America. I was impressed by the Prazi SD 300 metal lathe and the accessory BF 400 milling head, which attaches on a column to the back of the lathe. This combination of lathe and mill-drill head makes for a very versatile machine.

I picked up the lathe and milling head at International Sales and Marketing Group in Huntington Beach, CA. Also, I brought home most of the accessories available for them. Everything was checked against the packing list to see that all the items were included with the shipment. Nothing was missing, so I continued to unpack the lathe and set it up on my heavy beech woodworking bench. The weight of this lathe is 100 lbs., which gives it the heft that makes the machine really perform. However, one does not need special lifting equipment to carry this lathe home and set it up on the bench.

Next, I went inside and read the manual. I am reminded of another manual that came with a German machine. It translated: "Achtung! Better to read the manual first." There was a little cartoon showing nuts and bolts flying from the lathe for those who didn't follow this advice. The manual is well written and the black and white pictures are very clear.

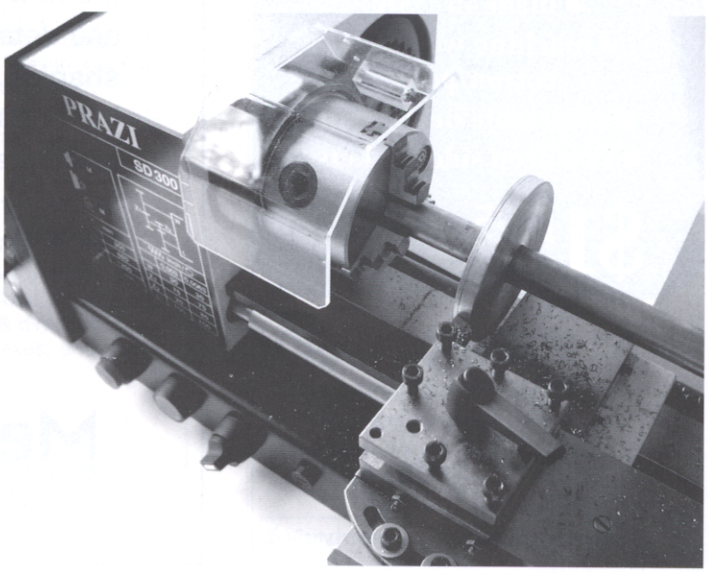
The lathe is almost ready to be used when received. I mounted the gear cover, safety shield and installed all of the handles.

Next, I installed the milling head support that is attached to the back of the lathe bed. I found that the hole used to fit a locating pin which protrudes from the milling column support casting was a little undersize. I suspect it was supposed to be reamed and this step was left out when the lathe was manufactured. I carefully enlarged the hole with a rattail file and mounted the part. Four mounting bolts hold this part onto the base of the lathe. Also, four bolts with locking nuts are used to align the column with the ways. The 68-lb. milling head was heavy, but I managed to get it into position by myself. One nice thing about this size machine is that it can still be manhandled by one person. I then installed the quill handle and the handle that moves the head up and down on the column. I found no problems with this operation.

After removing the top cross slide, I proceeded to mount the milling table accessory. It is made of aluminum and measures 4.9 × 6.6". It is held onto the cross slide with four socket head cap screws, which thread into T-nuts. The manual specifies that the socket head cap screws should have washers underneath each screw head. I found that if they are left out, the end of the screws will foul the cross slide. The information for this step is clearly stated in the manual that came with the milling machine head, but I got in a hurry and didn't look at this manual. See, I didn't follow the warning about reading the manual!

The lathe has four spindle speeds selected by changing the belts on the pulleys. These speeds are 300 through 2,400 rpm. The pulley and gear cover must be first lifted and then rotated to gain access to the interior. These gears are made of a plastic material – probably nylon – and when the machine is operated, little noise results from the gears as compared with metal gears. One nice feature is the spring loading on the drive belt system. It provides automatic tension for the belt drives.

In most lathes, a half nut engages the lead screw to



move the carriage along the ways. The SD 300 is a little different. To engage the lead screw, a lever is lifted and moved to the left. This would be done with the operator's left hand. When it becomes time to disengage the lead screw, the lever is pushed to the right without having to lift it again. The carriage can be cranked back to its original position or powered back by reversing the lathe motor. The reverse switch should never be operated while the lathe motor is in the "on" position.

Threading on this lathe requires a little different technique than that of most larger lathes. The lead screw engaging lever is used to control the start and ending of a thread cut operation. It is never disengaged at the end of a cut. The lathe is stopped and then the tool bit is backed off from the workpiece by moving the handle of the cross slide. The lathe motor is reversed and the on button is pressed. The carriage is then returned to its original position for the next cut, if required.

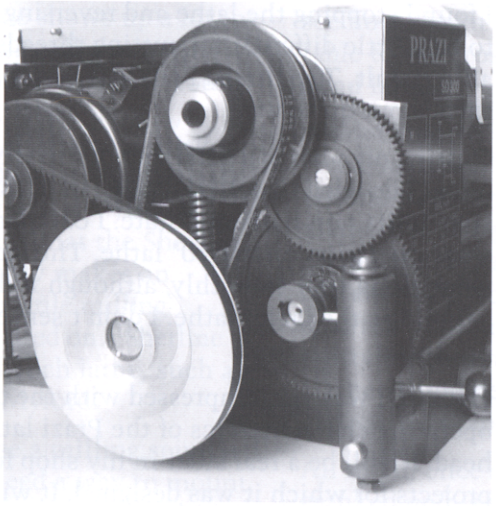
As received, the cross slide and carriage gibs were adjusted for a nice sliding fit. They weren't too loose, and both move very freely without excessive play.

#### CROSS SLIDE AND SADDLE HANDWHEELS

The manual specifies that the maximum play of the cross slide and the saddle handwheels should be two divisions, which would be .002". This was checked and found to be within specification. If necessary, this can easily be adjusted to bring the backlash within tolerance.

#### HEADSTOCK AND MAIN SPINDLE

The headstock is a robust aluminum alloy casting of .625" thickness in some places. The back is open to accommodate the motor mounting plate.



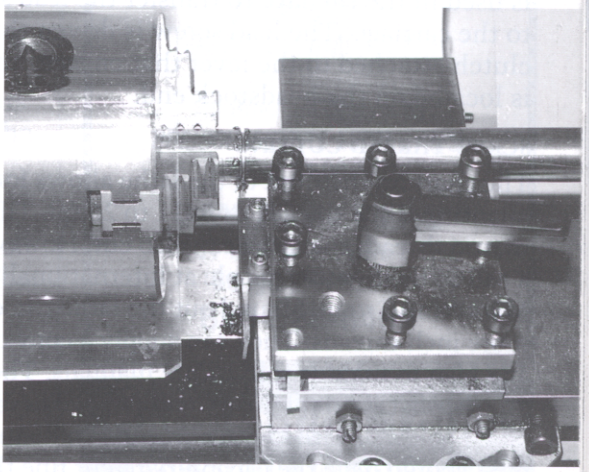
The main spindle has two precision bearings. One is an angular contact ball bearing and the other is a radial ball bearing. Provisions are made to adjust the axial play in the spindle by using adjustment nuts. The spindle has a Morse taper MK2 on it. The inside diameter is .472". The three-jaw chuck that comes with the lathe has three studs protruding from the back. When installed on the spindle flange, the nuts hold the chuck securely in place so the chuck can be run in either direction without fear of it becoming loose. The one drawback to this design is that the lathe operator will not win a speed contest in changing chucks.

#### MOTOR

The lathe motor has a rating of 475 watts. It is designed to operate on 110V AC at 60 Hz. The output of the motor is specified to be 250 watts, which would be 1/3 horsepower.

#### BED

The bed of the lathe is a high-grade continuous casting. It is different than a lot of lathes in that it is a round shape with a flat surface on the top. The length is 19.44" and the diameter is 1.58" with a 1.38" flat on the top. This way is ground on the carriage engaging surfaces. There was no evidence that it would easily deflect. The way length allows about an 11.25" length bar to be held between the face of the three-jaw chuck and a center placed in the tailstock. A longer bar could be turned, if it protrudes into the chuck or if it is turned between centers using the Turning-Between-Centers accessory attachment. The lathe is specified to turn a 12" long bar and I am sure this could be done if the Turning-Between-Centers attachment is set up on the lathe.



#### TAILSTOCK

The tailstock has a Morse WT1 taper in it and a travel of 1.57". The easily read dial on the handwheel is 1.57" in diameter and has 50 divisions. The dial is on a sliding ring, so it can be zeroed and will lock in this or any position. One turn of the handwheel advances the quill .059". This works out to be a little over .001" per division. Although I didn't take the tailstock apart to verify the pitch of the quill feed, my calculations indicate a pitch of 1.5mm. There are no graduations on the quill. Also, no provisions are made to set the tailstock over for taper turning or the purpose of alignment. The feed of the handwheel has a nice feel when it is turned.

#### COMPOUND SLIDE

The compound slide is made of high-duty cast iron. Both the cross slide and the compound slides have dovetails and there are gimbals to adjust the play. The compound has a protractor that allows radial movement of 45°. It pivots about a little pin and is locked in position with four screws. The pivoting compound allows for taper turning of short workpieces and bevels. Not obvious in the photos is a socket head cap screw located on the backside of the carriage. This is used to lock the carriage to the ways when performing operations like facing and cutoff functions. Perhaps this

is not as conveniently located as the locking device in some lathes, but I found it was not hard to operate with the hex wrench supplied with the lathe.

Mounted on the top of the compound is a toolholder that can hold four tool bits. They are held in place with two socket head cap screws on each side. A lever in the center allows the tool post to be rotated to any position and then locked in place.

The handles on the slides are the same design as those on the tailstock. They also have locking sliding ring-type dial scales.

#### LEAD SCREW

A sliding and thrust bearing are located in the headstock that supports the lead screw. At the handwheel end, a hexagon nut allows for adjusting the axial play of the lead screw. A wear-resistant bronze nut is used in the carriage to transfer the lead screw motion to the carriage. The lead screw is driven through a dog clutch attached to the lever that engages the feed. This is located on the headstock end.

#### SCREW THREAD CUTTING

The chart on the front of the lathe allows for cutting a quantity of ten threads from 11 to 26 tpi. There are 18 metric threads the lathe can also cut. However, after a call to the friendly people at International Sales and Marketing Group, I found out the lathe can cut many more inch threads. They can supply a copy of this chart and plan to include it in future manuals. The finest thread on their list is 60 tpi. I was very pleased to discover this fact. I believe a lathe with a maximum diameter capacity of 5" should have the capability to cut fine threads since it is going to be used for smaller projects.

#### BF 400 MILLING HEAD ACCESSORY

The milling head accessory is powered with an electric motor with a nominal output of 180W. Four speeds are available, ranging from 365 to 1800 rpm. The speeds are selected by changing a belt accessible by loosening two knurled thumbscrews on the side cover and rotating towards the top of the housing. Two hex bolts are loosened on the top so the motor can pivot a little to adjust the belt tension. The belt is then moved to the selected pulley groove position. The housing is also made from an aluminum alloy, and is of a heavy construction and quite solid. The milling head can also be mounted on a table, which is another accessory.

The spindle has a stroke of 1.97" and has an MT2 taper. An arm moves the spindle for drilling holes on the machine. Also, the milling head can be fed up and down by turning a crank on the top of the column.

A special feature Fine Feed accessory is available and it is attached directly over the top of the spindle. It has a handle and dial at the top for feeding the spindle. This item is easily removed for access to a drawbar accessory.

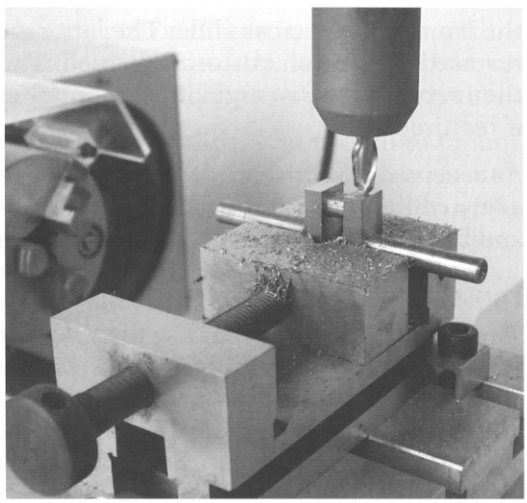
The head also can be tilted in the long axis of the table and a degree scale is located on the side. The scale has a range of plus or minus 60° with increments of 1°.

#### LATHE TESTS

A .625" diameter round bar was placed in the three-jaw chuck and the other end supported by a center in the tailstock. A cut was taken at both ends using the same setting. The headstock reading was .6222" in diameter and the tailstock reading was .6228". A difference of only .0006". Not bad at all. I was impressed.

A tenths dial indicator was placed against the spindle. The TIR was found to be around .0002".

Next, I machined a flywheel of 3.25" diameter to see how the lathe machines a larger diameter. I was quite pleased with the performance of the lathe. A slow speed adapter is also available that further reduces the spindle rpm of the lathe.



I thought it would be interesting to cut a thread using the method required to make threads on this lathe. I have cut many threads on a lathe that uses the conventional half nut engagement on the carriage. I found stopping the lathe and reversing the motor to be a little different for cutting threads but not at all difficult. The thread I cut was easily made and turned out quite well.

Cutting off a bar is a good test of the solidness of a lathe. I decided to cut off a piece of oil hardening tool steel in its non-hardened state. I compared this to the same operation on my 10" lathe. The cutoff operation went along very smoothly, although it didn't feel quite as solid as the larger lathe. I didn't sense any amount of chatter.

Overall, I was very impressed with the quality and operating characteristics of the Prazi lathe and milling head. It will be a real asset in my shop for the smaller projects for which it was designed. It will also light up my shop since it is canary yellow – not obvious in the black and white photos.