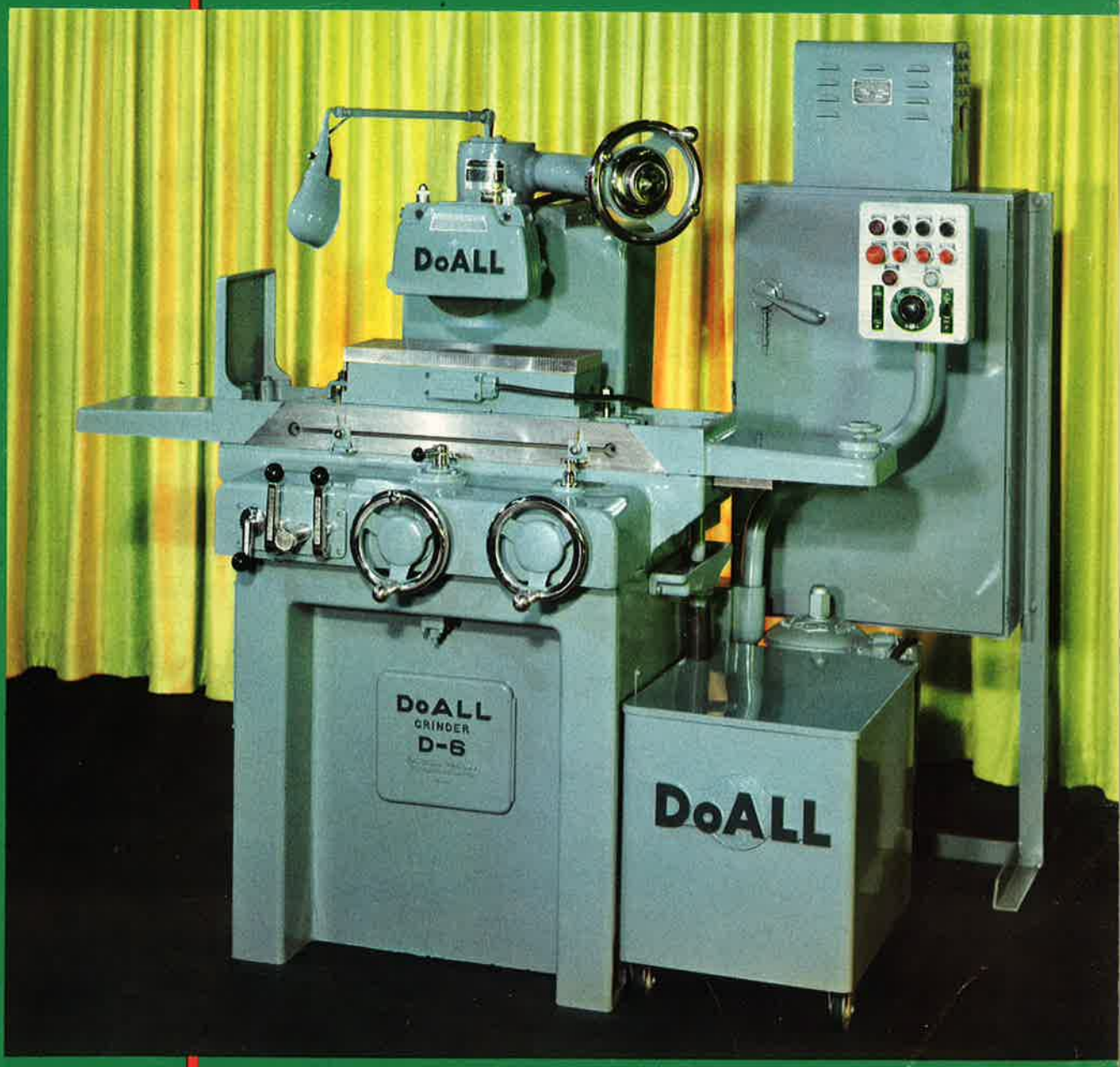
DoALL

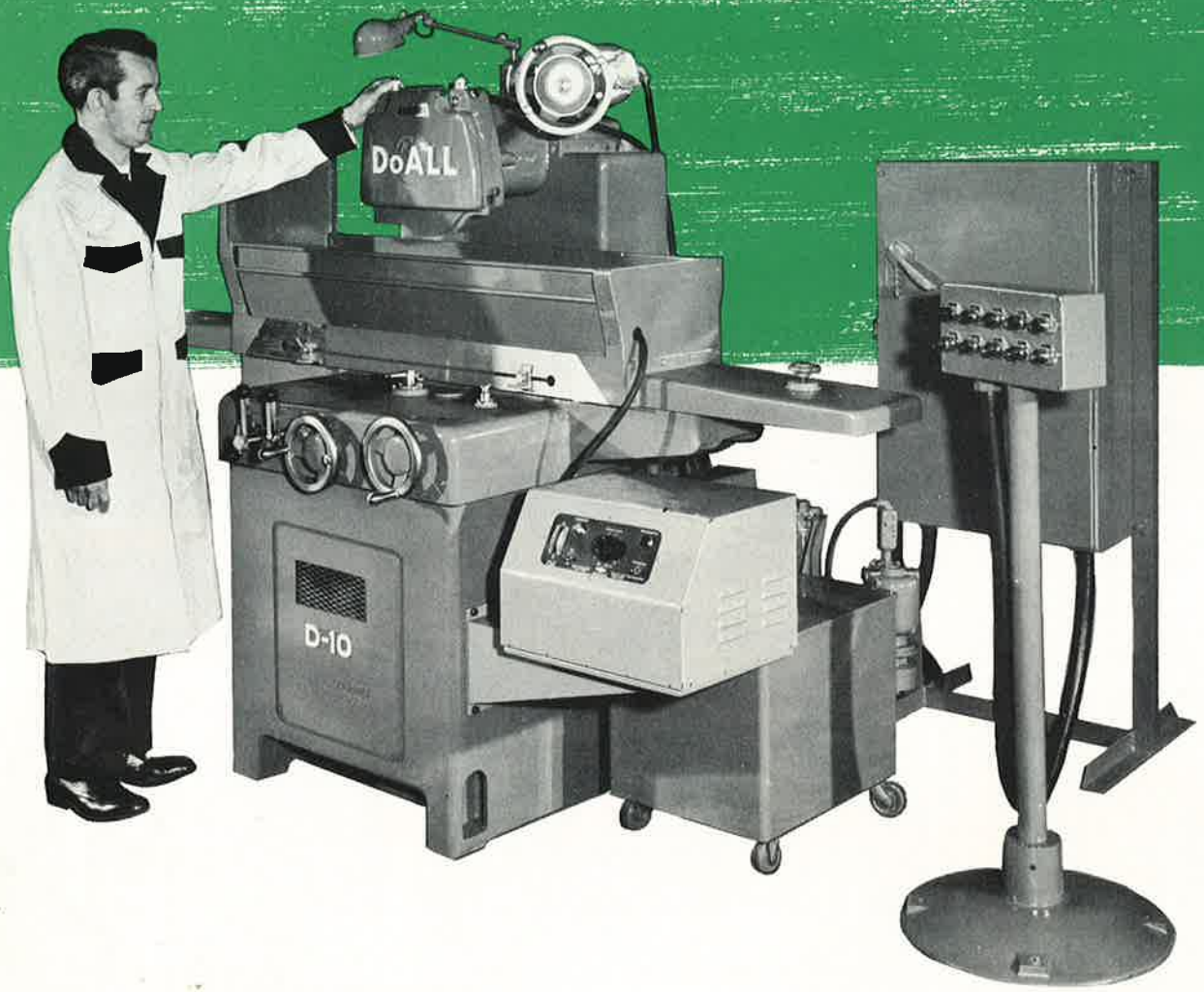
Precision

Surface

GRINDERS



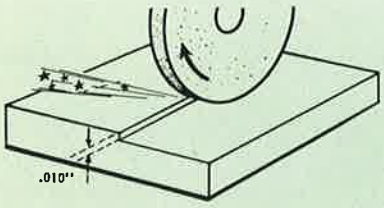
DoALL GRINDERS . . .



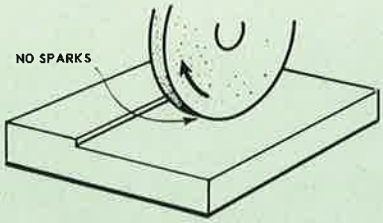
DoALL Precision Surface Grinders are new machines, completely modern in design and engineering principles, which definitely qualify them to accomplish any surface grinding job of the finest tolerance, no matter how dense the material.

The ever-present trend toward harder, tougher materials, and increasingly closer tolerances makes anything but a completely modern surface grinder impractical, and in many cases, incapable of producing the required results.

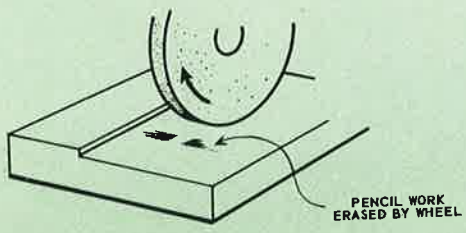
Can Your Surface Grinders Do This?



1. Take a .010" cut with .010" crossfeed in high-chrome high-carbon steel.



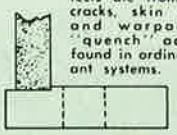
2. Run back over the same cut with no spark out!



3. Now lower the wheel just .0001", using nothing but the calibrated hand wheel, and erase a pencil mark on the work surface.

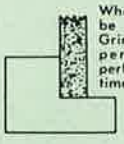
SHARPENING DIES

"Cool Grinding" protects die from surface cracks, skin softness and warpage. No "quench" action as found in ordinary coolant systems.



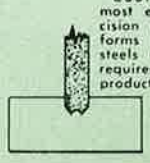
GRINDING TO A SHOULDER

Where visibility must be maintained, "Cool Grinding" provides superior cooling, with perfect visibility at all times.



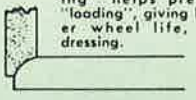
PLUNGE GRINDING

"Cool Grinding" is most efficient for precision cutting intricate forms in the toughest steels used in today's requirements of mass production.



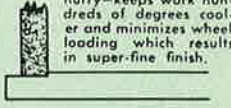
FORM GRINDING

Flushing action of coolant passing through the wheel in "Cool Grinding" helps prevent "loading", giving longer wheel life, less dressing.



DEEP, FAST CUTS

"Cool Grinding" can remove stock in a hurry—keeps work hundreds of degrees cooler and minimizes wheel loading which results in super-fine finish.



DRESSING AND FORMING WHEELS

With diamond or a crushing roll. The abrasive and bonding particles are flushed away from the wheel in "Cool Grinding" eliminating glazing action.

give you . . .

PRECISION • FLATNESS
PARALLELISM
FINE SURFACE FINISH
ACCURATE DIMENSIONS
and the
New, Improved "Cool Grinding"

Through scientific design and new principles of balanced construction, DoALL Precision Surface Grinders are setting new standards of grinding performance.

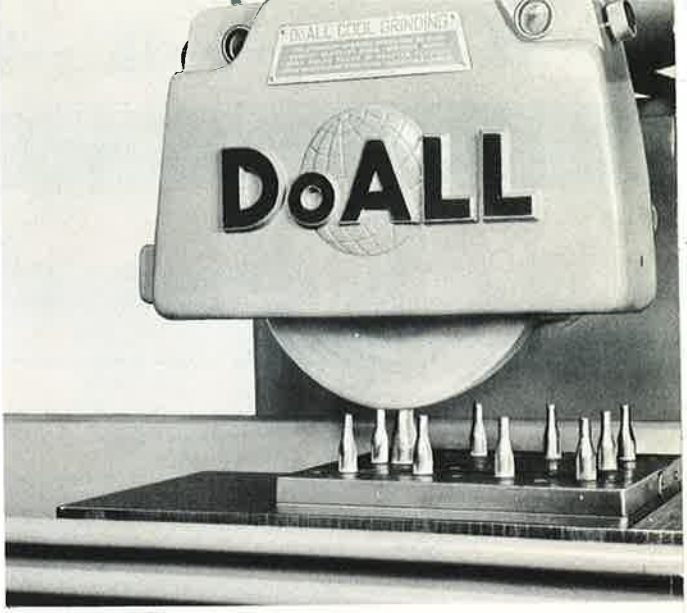
The new DoALL Surface Grinders will handle an unlimited variety of surface grinding, cylindrical grinding and form grinding jobs with heretofore unobtainable precision and speed. You have to see them perform to appreciate their capabilities.

Here are just a few of the many new feaures that are found in the new DoALL Grinders.

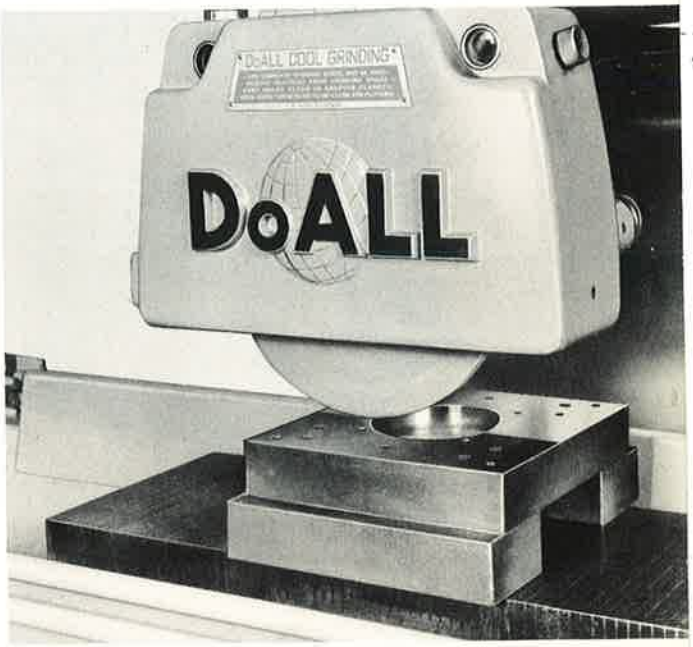
NEW SIZES—INCLUDING 6" x 24" AND 10" x 30"
NEW 12½" WORK HEIGHT CAPACITY
NEW SPEEDS—UP TO 75 F.P.M. TABLE TRAVEL
NEW RE-CIRCULATING "COOL GRINDING" SYSTEM
NEW RIGIDITY AND STURDINESS
NEW ATTACHMENTS AND ACCESSORIES
NEW CONVENIENT CONTROLS
NEW FULLY AUTOMATIC OPERATION
NEW WHEEL CAPACITIES—7", 8", 10", 12", 14"

Outstanding among DoALL's accomplishments is its exclusive "Cool Grinding" method which permits the grinding wheel to perform more efficiently without damaging the work.

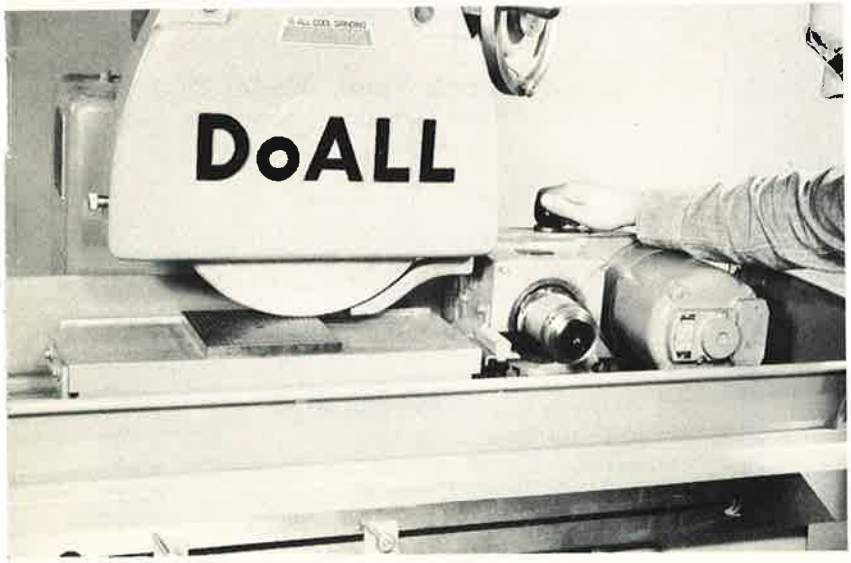
DoALL Surface Grinders are sold and serviced by our own factory trained Sales and Service Engineers. Call your local DoALL Sales-Service Store for personalized service.



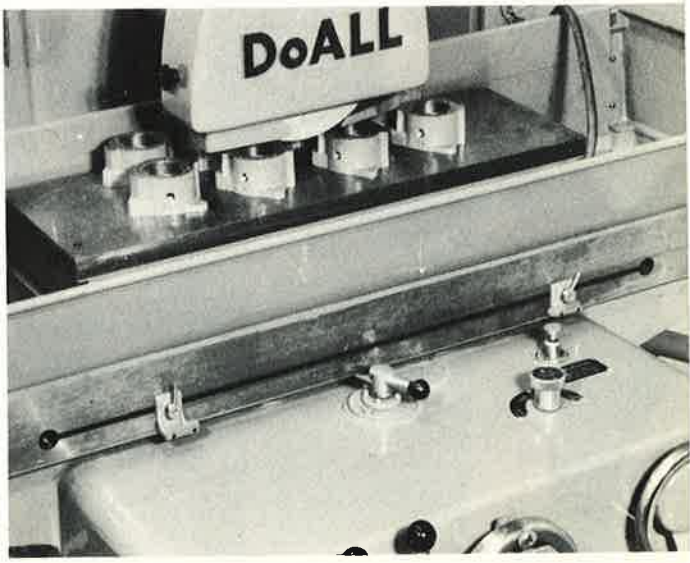
"Cool Grinding" prevents burning and softening of the critical cutting edges of these punches.



Extreme rigidity of DoALL Surface Grinders eliminates "rounded off" cutting edges in die sharpening. "Cool Grinding" maintains hardness.



A surface grinder with more than enough rugged sturdiness for crush form dressing and crush form grinding. Complete accessories and know-how available.

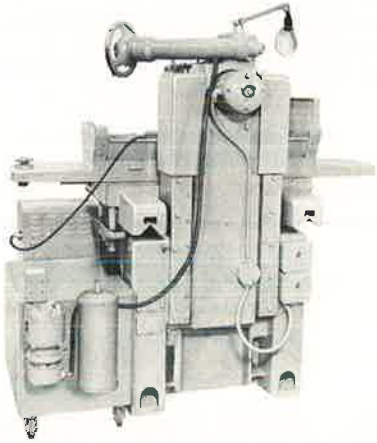


Toolroom super-precision is combined with speed and ease of operation for production work.

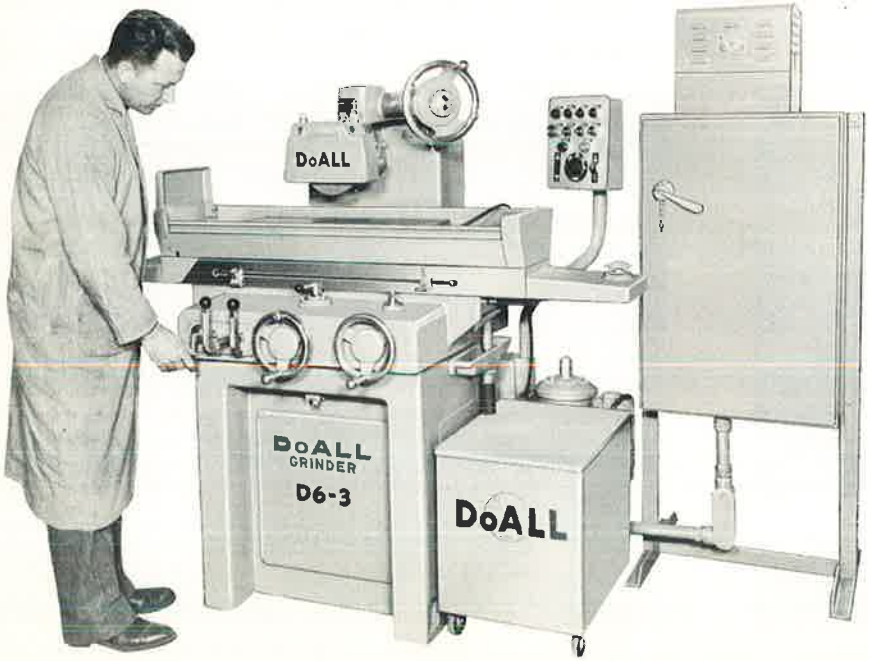
D6 Models—6″x18″—6″x24″—7″ and 8″ Wheel Sizes

Model D6-1

Table Size.....6½″ x 19″
Table Traverse.....7½″ x 20″
Work Height Capacity..12½″
Wheel Size.....7″ x ½″ x 1¼″
(Chuck, Selectron, "Cool Grinding" Optional)



Back View, Model D6-1
("Cool Grinding", Selectron and Chuck are Optional)



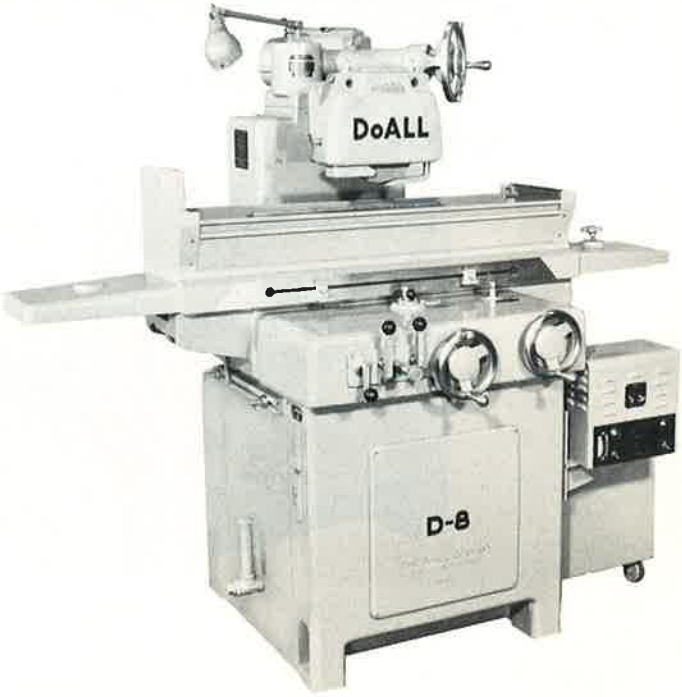
Model D6-3

Table Size.....6½″ x 24″
Table Traverse.....7½″ x 26″
Work Height Capacity.....12½″
Wheel Size.....8″ x ¾″ x 1¼″
(Chuck, Selectron, "Cool Grinding" and J.I.C. Electrical Equipment are Optional)

D8 Models—8″x24″—8″, 10″ and 12″ Wheel Sizes

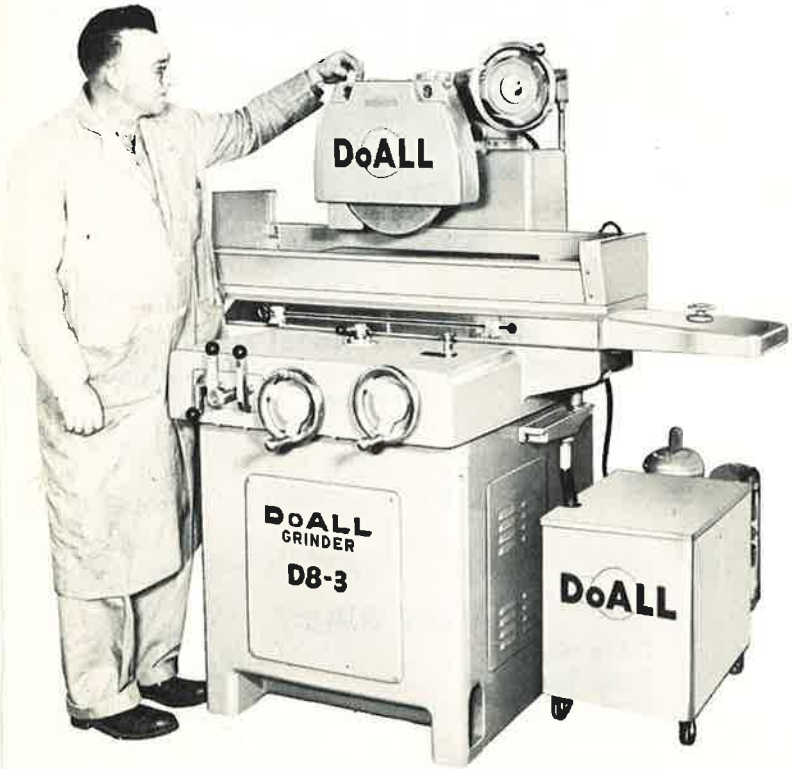
Model D8-0

Table Size ..... 8½″ x 24″
Table Traverse ..... 10″ x 26″
Work Height Capacity ..... 12½″
Wheel Size ..... 8″ x ¾″ x 1¼″
(Chuck, Selectron and "Cool Grinding" Optional)



Model D8-1

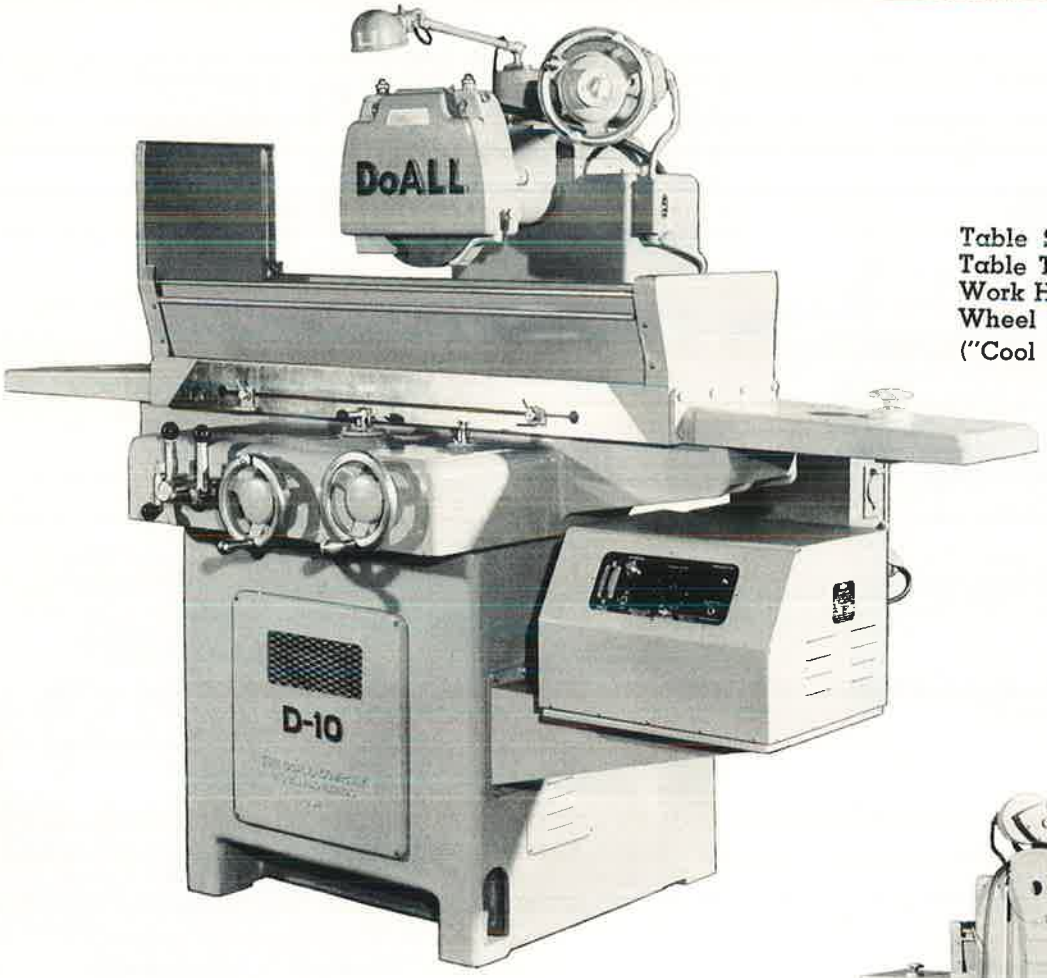
Table Size ..... 8½″ x 24″
Table Traverse ..... 10″ x 26″
Work Height Capacity ..... 12½″
Wheel Size ..... 10″ x ¾″ x 3″
(Chuck, Selectron and "Cool Grinding" Optional)



Model D8-3

Table Size ..... 8½″ x 24″
Table Traverse ..... 10″ x 26″
Work Height Capacity ..... 12½″
Wheel Size ..... 12″ x 1″ x 3″
(Chuck, Selectron, "Cool Grinding" and J.I.C. Electrical Equipment Optional)

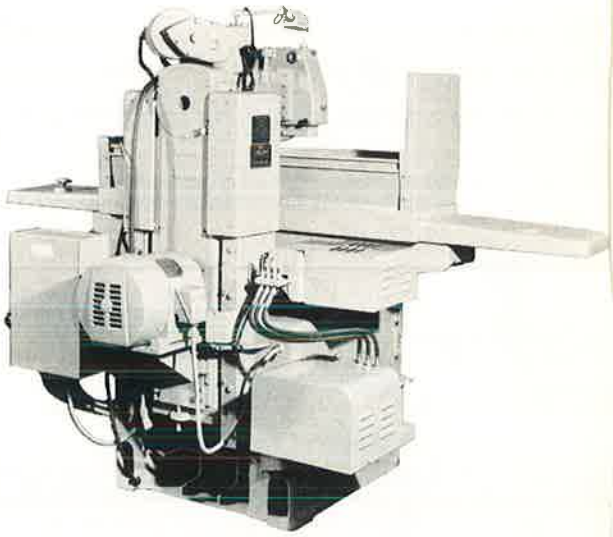
D10 Models—10″x30″—12″ and 14″ Wheel Sizes



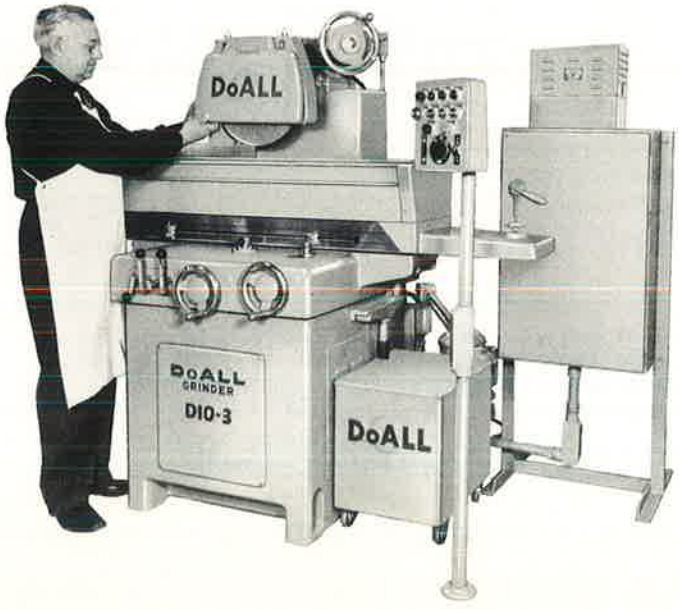
Model D10-1

Table Size	10″ x 30″
Table Traverse	12″ x 32″
Work Height Capacity	12½″
Wheel Size	12″ x 1″ x 3″

("Cool Grinding" Attachment shown is Optional)



Back View, Model D10-1
with "Cool Grinding" Attachment and Selectron



Model D10-3

Table Size	10″ x 30″
Table Traverse	12″ x 32″
Work Height Capacity	12½″
Wheel Size	14″ x 1″ x 3″

(Cool Grinding, Selectron, Chuck and J.I.C. Standards are Optional)

SPECIFICATIONS

Model	D6-1	D6-3	D8-0	D8-1	D8-3	D10-1	D10-3
Means of Operation	Manual Hydraulic	Manual Hydraulic	Manual Hydraulic	Manual Hydraulic	Manual Hydraulic	Manual Hydraulic	Manual Hydraulic
Chuck Size	6"x18"	6"x24"	8"x24"	8"x24"	8"x24"	10"x30"	10"x30"
Table Size (Working Surface)	6½"x19"	6½"x24"	8½"x24"	8½"x24"	8½"x24"	10"x30"	10"x30"
Grinding Wheel Size	7"x½"x1¼"	8"x¾"x1¼"	8"x¾"x1¼"	10"x¾"x3"	12"x1"x3"	12"x1"x3"	14"x1"x3"
Table Traverse	7½"x20"	7½"x26"	10"x26"	10"x26"	10"x26"	12"x32"	12"x32"
Work Height Capacity (Table to Wheel)	12½"	12½"	12½"	12½"	12½"	12½"	12½"
Longitudinal Table Speed	5-50 FPM	5-50 FPM	5-50 FPM	5-75 FPM	5-75 FPM	5-75 FPM	5-75 FPM
Same, with Crush-Grind Table Cycle	1"-50 FPM	1"-50 FPM	1"-50 FPM	1"-75 FPM	1"-75 FPM	1"-75 FPM	1"-75 FPM
Auto. Transverse Feed (Increments)	0"-.250	0"-.250	0"-.250	0"-.250	0"-.250	0"-.250	0"-.250
Wheel Dressing Speeds (Variable)	0-75 IPM	0-75 IPM	0-75 IPM	0-75 IPM	0-75 IPM	0-75 IPM	0-75 IPM
Hand Transverse Feed (Increments)	.0002"	.0002"	.0002"	.0002"	.0002"	.0002"	.0002"
Vertical Wheel Head Adjustment	.0001"	.0001"	.0001"	.0001"	.0001"	.0001"	.0001"
Wheel Surface Speed	6000 FPM	6000 FPM	6000 FPM	6000 FPM	6000 FPM	6000 FPM	6000 FPM
Spindle Motor	1 HP	1½ HP	1½ HP	3 HP	5 HP	5 HP	5 HP
Spindle Drive	Direct	Direct	Direct	Mult. V-Belt	Mult. V-Belt	Mult. V-Belt	Mult. V-Belt
Hydraulic Pump	3 gal. min.	3 gal. min.	3 gal. min.	Var. to 6 gal.	Var. to 6 gal.	Var. to 6 gal.	Var. to 6 gal.
Hydraulic Pump Motor	¾ HP	¾ HP	¾ HP	1½ HP	1½ HP	1½ HP	1½ HP
Column Raiser Motor	None	None	None	¼ HP	¼ HP	¼ HP	¼ HP
Floor Space (Max.)	46½"x81"	46½"x94"	66½"x105"	66½"x105"	66½"x105"	68½"x128½"	68½"x128½"
Over-all Height (Max.)	65½	65½	73	73	75	73	75
Net Weight	2350	2400	3675	3875	3950	5075	5550
Shipping Weight (Domestic)	2650	2700	4050	4250	4300	5550	6000
Automatic Lubrication	Table and Saddle Ways	Table and Saddle Ways	Table and Saddle Ways	Table and Saddle Ways	Table and Saddle Ways	Table and Saddle Ways	Table and Saddle Ways

Spindles on all models are of forged alloy steel, balanced and totally enclosed, run in super-precision anti-friction bearings.

Extra Equipment Available for Factory Installation

Motorized Spindle Raiser	X	X	X	Std. Equip.	Std. Equip.	Std. Equip.	Std. Equip.
Crush Grinding Table Cycle	X	X	X	X	X	X	X
Automatic Downfeed	X	X	X	X	X	X	X
Same, with Auto. Crossfeed Reverse	X	X	X	X	X	X	X
Automatic Skip Feed	X	X	X	X	X	X	X
Crush Dressing Spindle Drive				X	X	X	X
Variable Speed Spindle Drive	X	X	X	X	X	X	X
J.I.C. Lubricator	X	X	X	X	X	Std. Equip.	Std. Equip.

Accessories, Available for All Models

Combination "Cool Grinding" and Flood Coolant
Standard Flood Coolant
Magnetic Chuck
Selectron (Rectifier-Demagnetizer)
Diamond Wheel Dresser
Cylindrical Grinding Attachment
Magnetic Sine Chuck
Universal High-Speed Spindle
Radius and Angle Wheel Dresser
Wheel Balancer
Wheel Balancing Adaptors
Adapters for wheel sizes other than listed
Motor Driven Crush Form Dresser
Idler Type Crush Form Dresser
Dust Collector

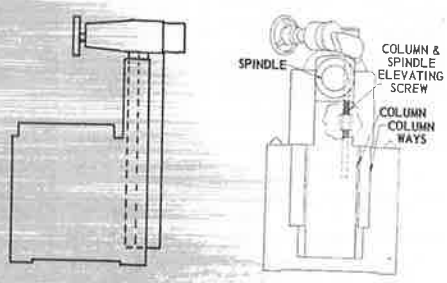
Other Specifications

Standard Electrical Equipment Recommended: 220, 440 or 550 volt, 60 cycle, 3 phase. Spindle and hydraulic motor pump switches across-the-line starter type with overload protection for D6-1, D6-3 and D8-0 models, and magnetic starters for the D8-1, D8-3, D10-1 and D10-3 models. Magnetic reversing type switch for column raiser. Refer to proposal forms for J.I.C. and other electrical specifications.

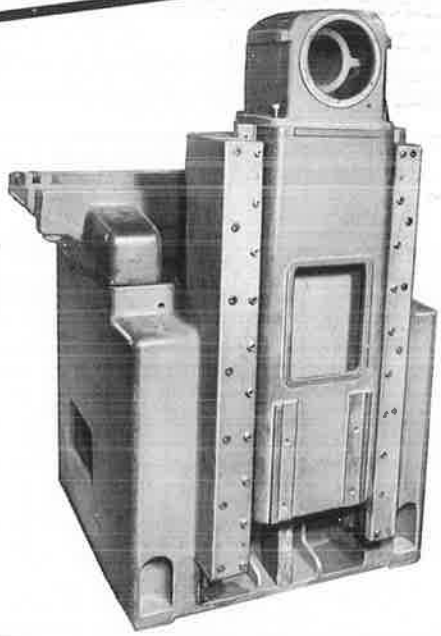
Standard Color: Machine Tool Gray; other colors available.

Included with each machine are two electrical outlets, adjustable work light, wrenches, five gallons of hydraulic oil, one grinding wheel, wheel adaptor and pulley, T-bolts, chuck squeegee, table dust guard and operator's instruction manual.

These Features Guarantee Better Grinding

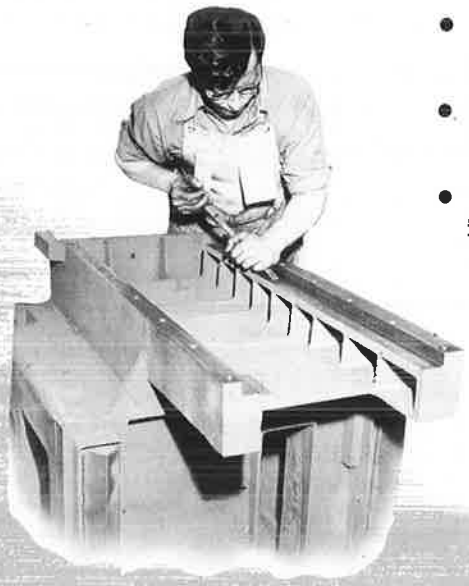


Maximum Rigidity—Because the column and spindle elevating screw is located near the center of gravity of the assembly, very low bearing pressures are experienced on the generously proportioned column ways. This results in long wear life for the ways, and virtually eliminates any wheel deflection or the tendency to "hang up" when down feeding the wheel. The cast iron column and spindle housing is a heavy deep box type structure to provide maximum stiffness and vibration damping capacity.

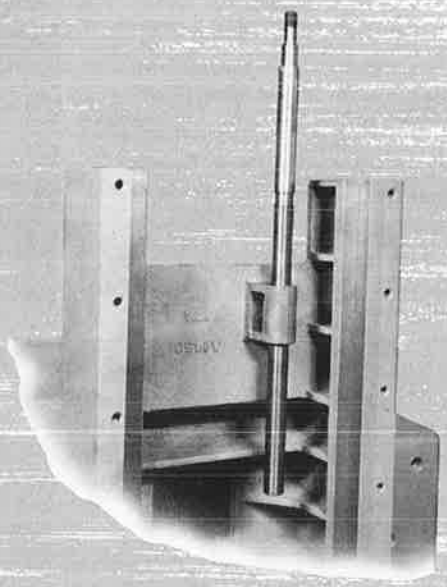


All Models Feature

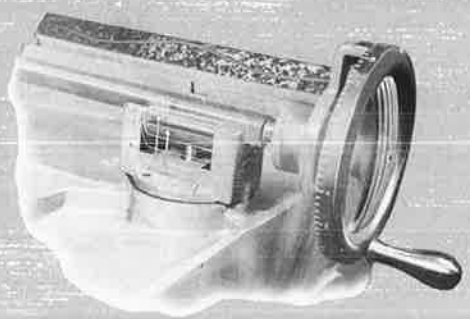
- Super-precision antifriction spindle bearings are pre-loaded and permanently lubricated.
- Full automatic hydraulic longitudinal and transverse feeds.
- Hand feeds that are completely and automatically disengaged when hydraulic power is used.
- Variable speed traverse for work-positioning, wheel truing, cylindrical and broach grinding.
- Heavy base and column support cast as integral unit.
- Castings are close-grain, nickel alloy iron, aged and stress relieved.
- All way areas precision hand scraped to optimum bearing surface.
- Lubrication is automatic to table and saddle ways.
- Vertical feed increments .0001". Crossfeed increments .0002".



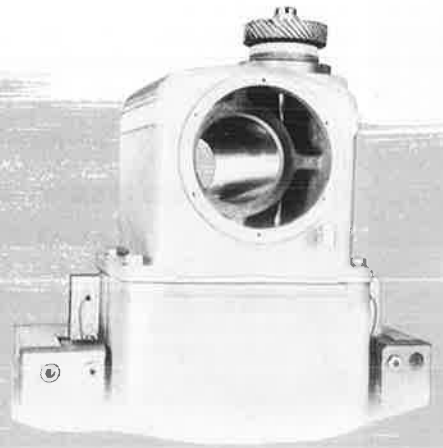
Skilled Craftsmen — The exceptionally long, wide area ways throughout the grinders like this column support are hand-scraped for perfect fit. Note heavily ribbed construction to assure rigidity.



Heavy Vertical Feed Screw—Vertical feed lead screw is 1¼" in diameter, and turns in a 4" bronze nut. Ribbed column support is an integral part of casting for utmost rigidity. Weight of column prevents even the slightest backlash.



Preserves Accuracy — The super-accurate ground lead screw for hand-operated crossfeed is automatically disengaged from long half-nut when using the automatic hydraulic crossfeed. This preserves the accuracy of the screw.



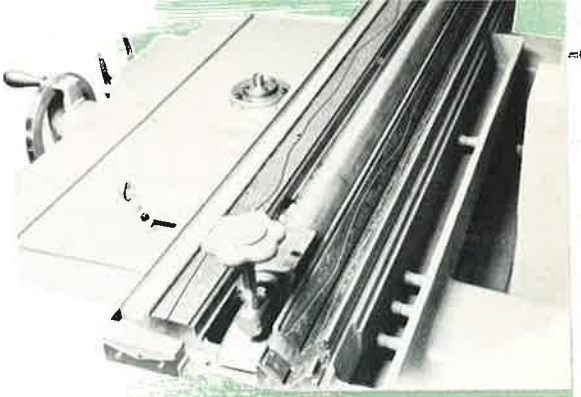
Spindle Support—Massive spindle mount is hand-scraped to perfect squareness, then dowelled and bolted to column and precision honed to receive spindle.

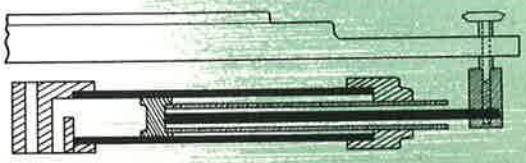
For perfect flatness, parallelism, size and surface finish you can rely on DoALL Precision Grinders. They will do the work in far less time than you ordinarily allow for precision surface grinding operations.

Weight, balance, automatic lubrication, super-precision spindle, large way areas accurately hand scraped, the finest of materials—all of these make possible the superior performance of DoALL Grinders.

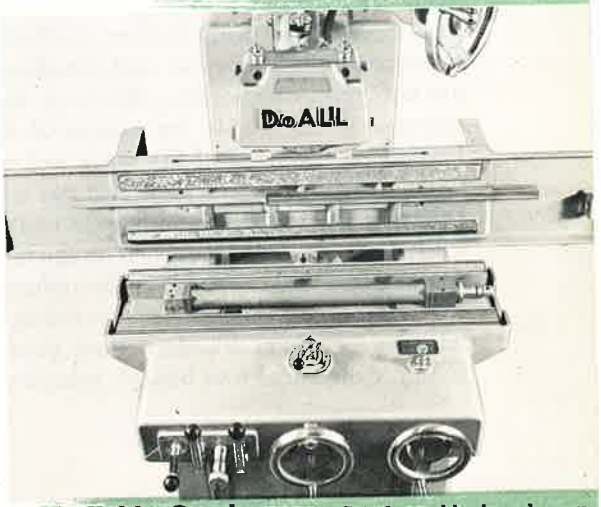
The massive, accurately honed spindle housing is mounted on a heavy box type vertical column and the column support is an integral part of the heavy, well-ribbed base casting. Long wearing areas between the column and its support are "scraped in". The great weight of the movable column and the carefully fitted column ways make certain that the settings of the vertical feed handwheel are reflected in a corresponding amount of stock removal, whether it be tenths or thousandths. There is no need to remove work for measurement after each pass where close tolerances are being held. The work may be measured only once, after which the calibrations of the vertical feed handwheel can be relied upon to control the exact amount of stock removal.

Sound engineering and meticulous craftsmanship are evident in the appearance, performance and output of the new DoALL Surface Grinder.

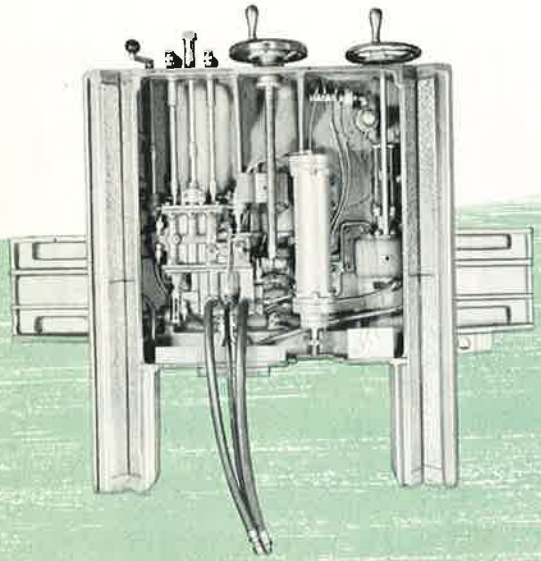




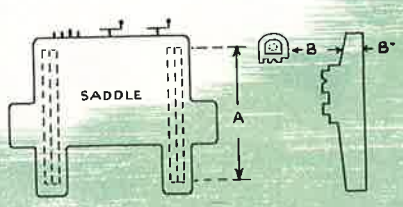
Floating Piston Rod—Exclusive construction feature prevents piston rod, that connects table to hydraulic cylinder, from touching cylinder. Temperature changes or cylinder misalignment cannot cause shifting of table. Table support ways on top of saddle are extra long.



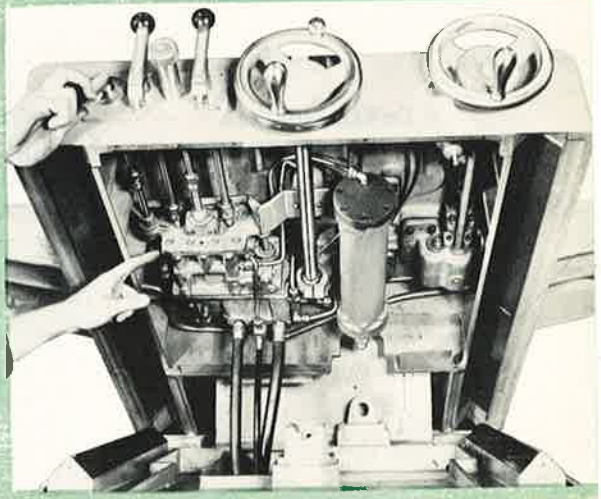
No Table Overhang — Grinder table has heavy ribbed construction with large precision-scraped way areas fully supported through entire work area. Table and saddle ways automatically lubricated from pressure side of hydraulic system, providing constant oil film for long life and greatest accuracy.



Balanced Crossfeed—Saddle crossfeed screw is located in exact center between large inverted V way areas. Hydraulic valve unit is also completely balanced.



Minimum Deflection-Saddle and table construction reduce deflection. Saddle casting is long and deep to insure feed accuracy.

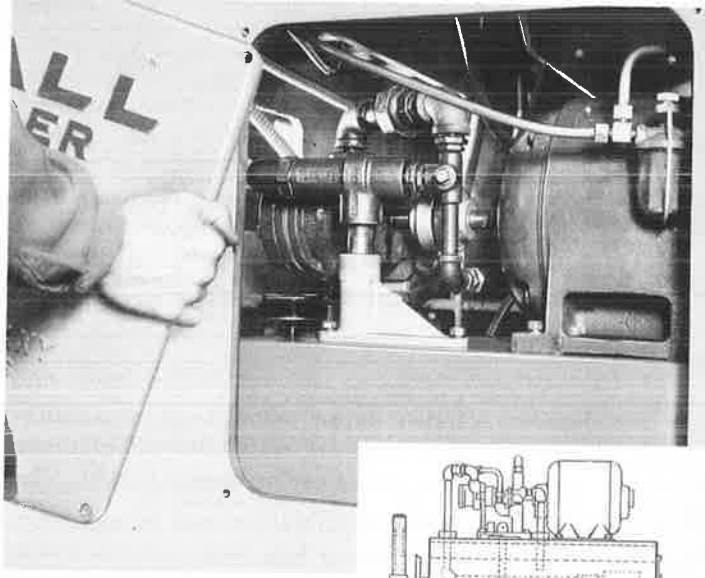


Centralized Controls — Note convenience of control panel, minimum use of hydraulic tubing, and inverted V ways that are automatically lubricated.

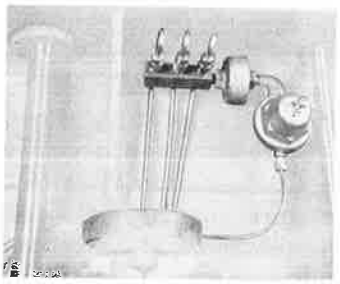
The hydraulic system used in DoALL Surface Grinders provides smooth, silent table traverse and saddle crossfeed through a balanced hydraulic valve unit. Metering valves automatically supply table and saddle ways with exactly the proper amount of filtered lubricating oil to maintain a constant oil film so necessary to accurate size control and fine surface finish.

Table and crossfeed handwheels may be quickly and easily brought into play but when using automatic traverse and crossfeed the hand controls are completely disengaged. The accuracy of the crossfeed screw is thus preserved for form grinding and other work where crossfeed calibrations must be relied upon.

The hand crossfeed control is calibrated in thousandths with vernier graduations in increments of .0002. The vertical feed control wheel is calibrated in half thousandths with vernier graduations in .0001 increments. Both vertical and crossfeed handwheels are equipped with zeroing slip rings. Automatic table traverse is adjustable by means of dogs centrally located on the front of the table and speeds are infinitely variable from 5 to 50 feet per minute on D6-1, D6-3 and D8-0 Models and 5 to 75 feet per minute on D8-1, D8-3 and D10 Models. With the Crush Grinding Attachment, table speeds can be reduced to one inch per minute. All models have variable speed saddle traverse for wheel dressing, work positioning, wheel truing, cylindrical and broach grinding.



Hydraulic power plant, assembled as one unit, is accessible for ease of maintenance.

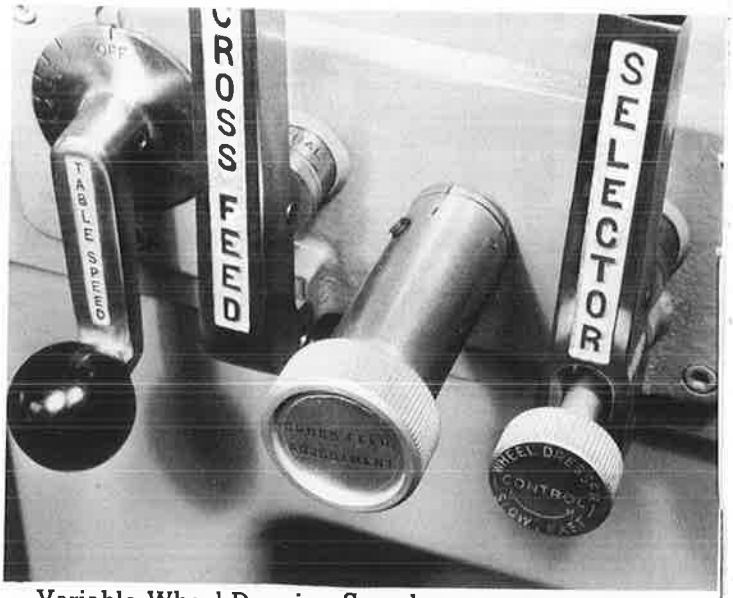


The pressure reducing valve, extra filter and metering units provide automatic lubrication to table and saddle ways. Check valves keep lines full at all times.

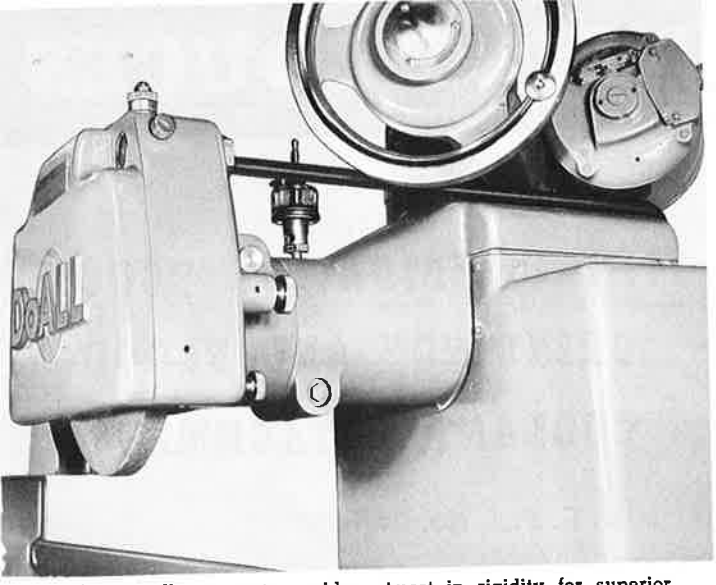
Exclusive Valve Unit — Combination valve unit is designed specifically for DoALL Grinders, and made in our own factory. This unit construction eliminates five separate valves and their respective fittings and tubing. Provides positive and convenient control of table and saddle feeds.

DoALL Grinders Must Pass Rigid Tests

Test records and sample bar give exact performance of each grinder. Finish must be better than 10 micro inches RMS, using standard wheels.

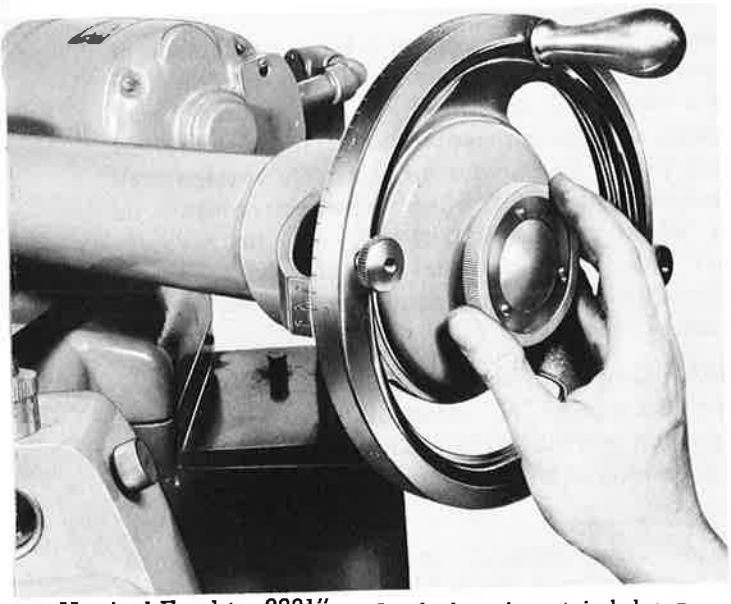


Variable Wheel-Dressing Speeds — The hydraulic wheel dressing feed is provided with infinitely variable speeds for coarse or fine dressing. This feature is also used for work-positioning, cylindrical grinding, broach grinding and similar work.

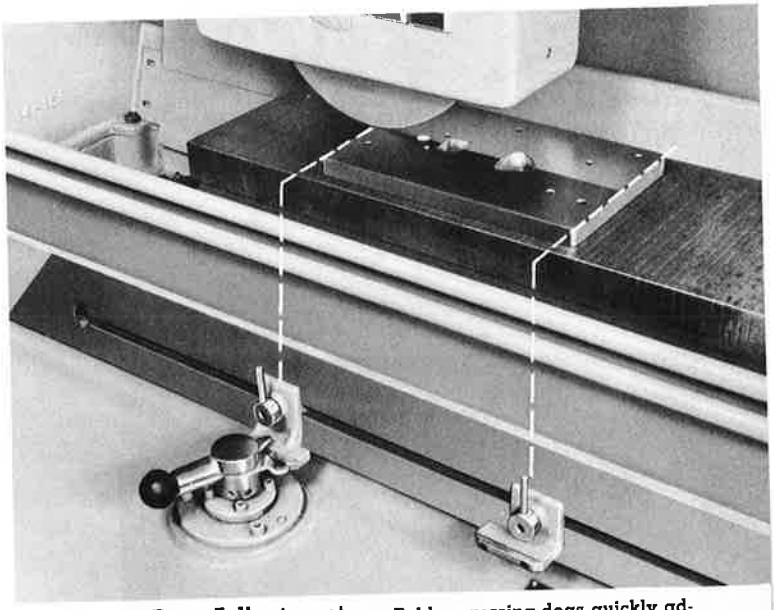


Husky spindle support provides utmost in rigidity for superior finish and precise size control.

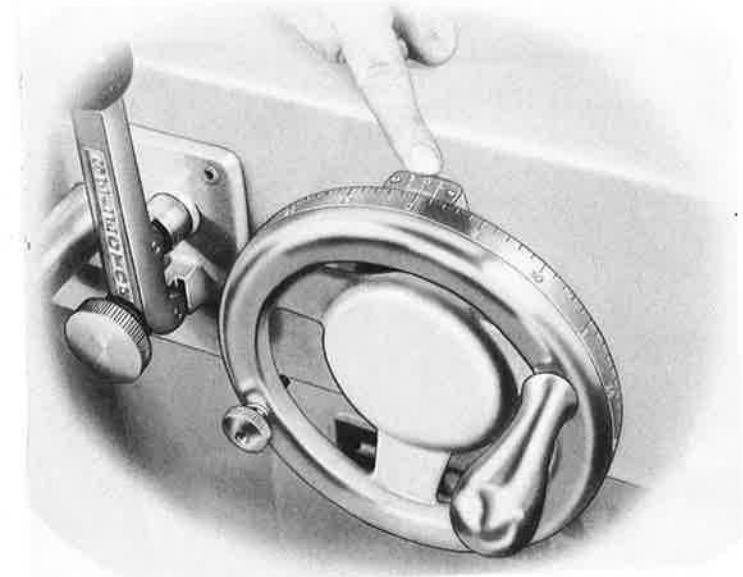
Super-precision spindles included as standard equipment have direct motor drive in the Model D6-1, D6-3 and D8-0 Grinders and are belt-driven in the larger machines. Precision anti-friction bearings are preloaded.



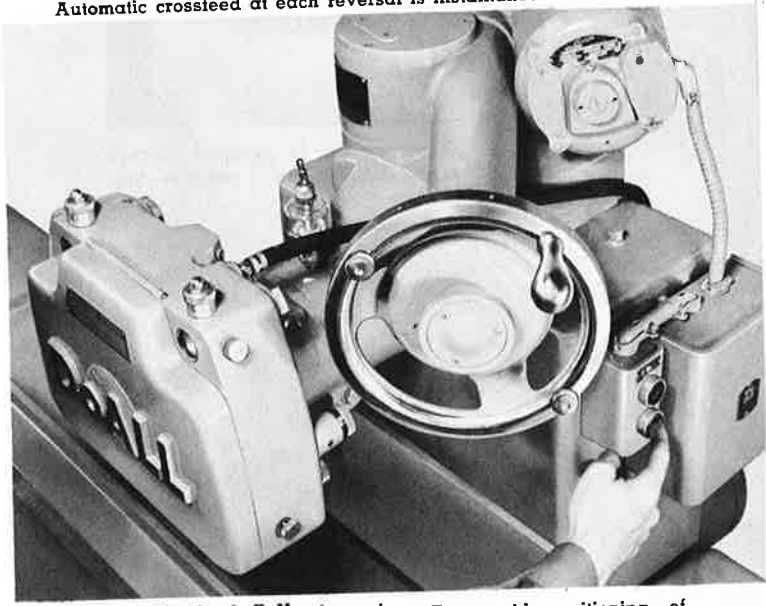
Vertical Feed to .0001" — Standard equipment includes a fine-feed hand wheel conveniently located in the center of the large vertical feed hand wheel. This adjustment is accurately calibrated to .0001".



Visual Dog Adjustment — Table-reversing dogs quickly adjusted to proper position by merely placing one to the left and one to the right of the workpiece, regardless of its location on chuck. Automatic crossfeed at each reversal is instantaneous.

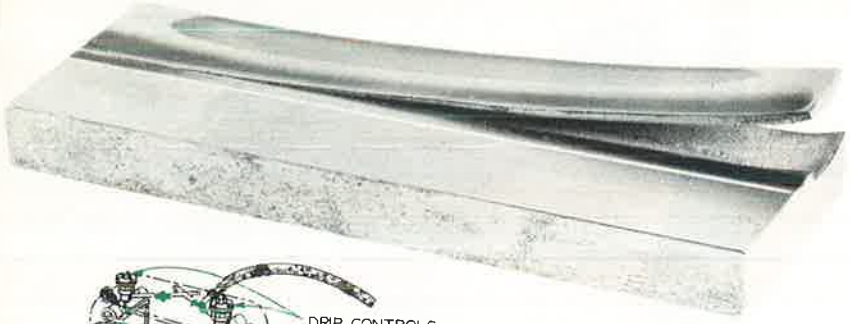


Slip Ring Zeroing Adjustment — Vertical and crossfeed hand wheels are provided with slip rings so that operator can adjust calibration to zero at any time. Crossfeed handwheel calibrated to increments .0002".



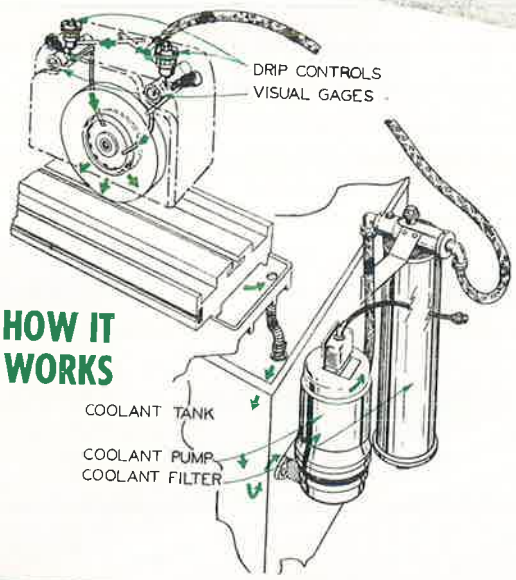
Power Vertical Adjustment — For rapid positioning of wheel heads. Relieves operator fatigue and speeds production. (Extra charge on D6 Models.)

"COOL GRINDING" REDUCES



THE COMBINATION "COOL GRINDING" AND FLOOD COOLANT ATTACHMENT

U. S. Pat. No. 2470350



HOW IT WORKS

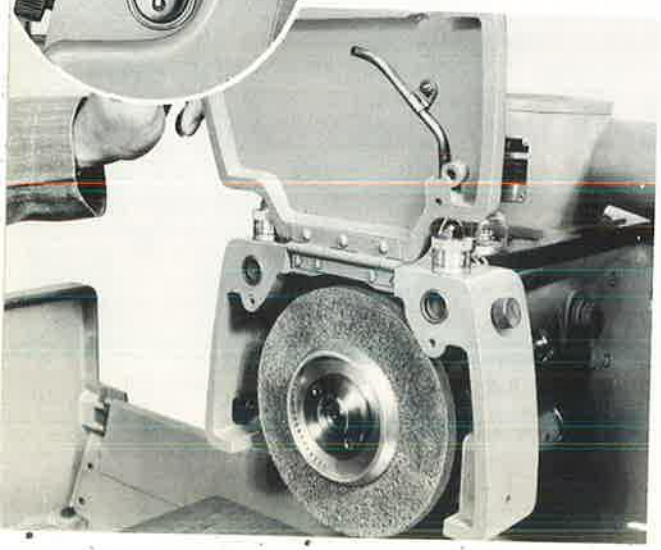
Cracks as large as the above are caused by too much heat and nothing more!

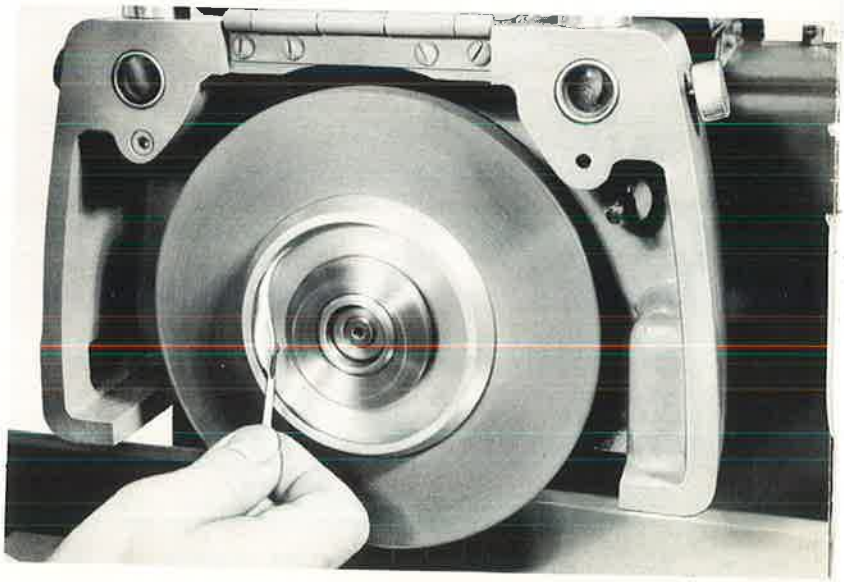
Excessive heat is the cause of a large percentage of all damage caused by grinding. Often the damage cannot be seen with the naked eye, for the cracks may be so small as to be imperceptible. Or, if the workpiece manages to get by without cracking, its surface may be annealed to the point where the effectiveness of its cutting edges or wearing quality will be severely reduced. The old conventional type of flood cooling is an improvement over dry grinding, for it serves to carry away some of the heat.

DoALL "Cool Grinding" is a new improvement in grinding technique. The secret of "Cool Grinding's" success is the fact that cutting particles in the grinding wheel are supplied with a constant flow of coolant.

Because "Cool Grinding" reduces heat, it helps to reduce cracking and annealing, provides better dimensional control, less warping, longer wheel life, faster grinding, less wheel dressing.

Clean coolant is supplied through visual gage valves to collector rings at sides of wheel.





Flame from match being drawn into center of the wheel illustrates centrifugal pumping action used in "Cool Grinding." No special grinding wheels are required.

GRINDING HEAT

The combination "Cool Grinding" and Flood Coolant Attachment includes all necessary equipment for storing, pumping, filtering, piping and regulating the flow of coolant to the grinding wheel.

The 20-gallon tank is of heavy welded steel construction, with weir-type baffles, mounted on swivel casters for convenience.

The pump is centrifugal type, with sealed ball bearings, capacity of 5 gallons per minute, driven by a separate motor mounted directly on pump.

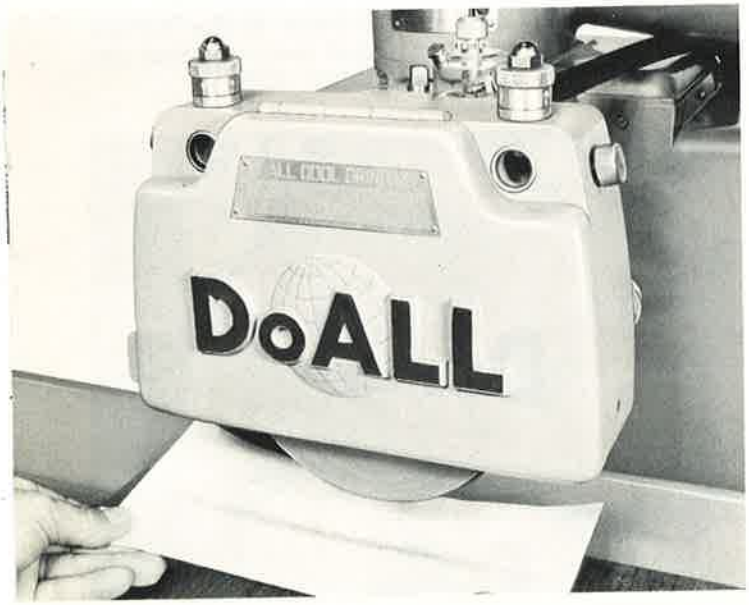
Coolant is pumped through replaceable-cartridge type filter which prevents dirt from being circulated to the grinding wheel.

After filtering, the coolant is pumped to the special wheel guard which has an in-built manifold, where it can be directed to the "Cool Grinding" wheel flanges, or to the Flood Coolant nozzle, or to both if desired. The tables and saddles of DoALL Surface Grinders are arranged for return of used coolant to the tank.

For ordinary work DoALL "Cool Grinding" Concentrate is recommended. For crush-form or plunge grinding thread-grinding oil may be used.

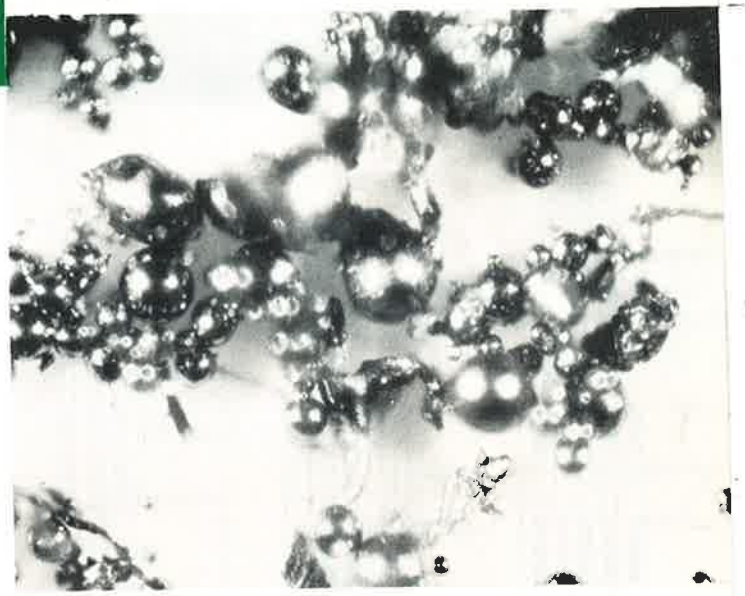
Splash guards are included, but are needed only when the Flood Coolant nozzle is used.

The microphotos at right reveal the effectiveness of "Cool Grinding" as compared to conventional flood or dry grinding. Only in "Cool Grinding" are there large, well formed chips. Notice in "flood", and much more so in "dry" grinding the reduced amounts of long chips—they have been melted and hardened into globules indicating the destructive effects of excessive heat.

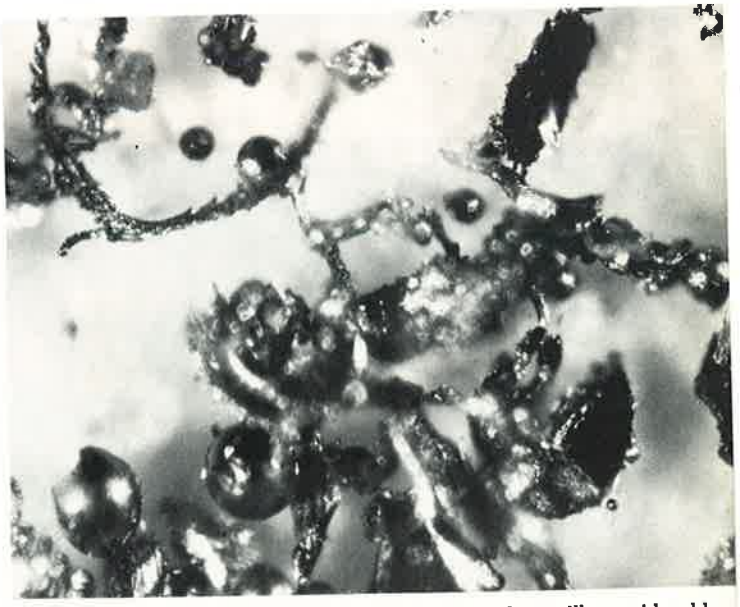


Blotter held under wheel shows coolant is forced from wheel as a fine, heat-dissipating mist right at point of cutting. Photo at right shows valve and nozzle for flood cooling.

CHIPS TELL THE STORY OF "COOL GRINDING"



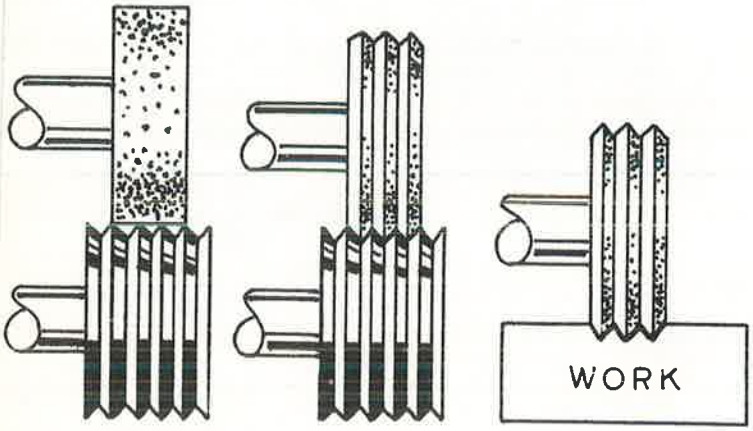
DRY GRINDING — Excessive number of globules indicates metal melted—the result of excessive temperatures.



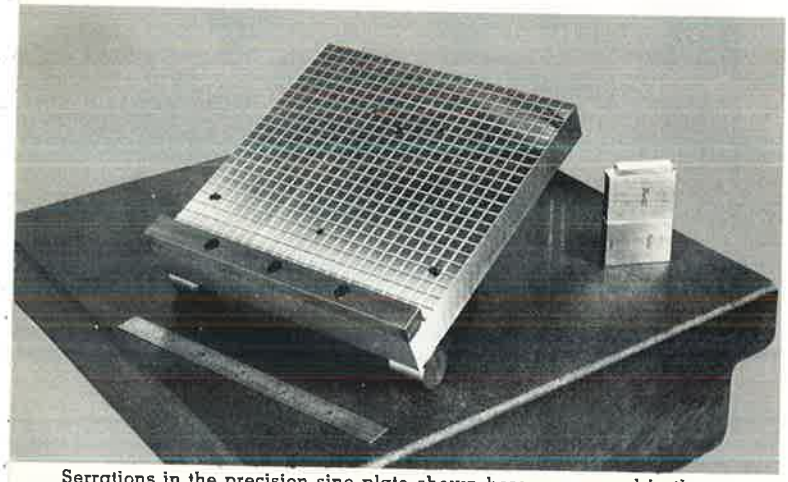
FLOOD GRINDING — Some long chips but still considerable amounts of globules due to inefficiency of this method.

"COOL GRINDING" — Complete absence of globules and presence of long chips indicate heat absorption by coolant, better finish and accuracy.

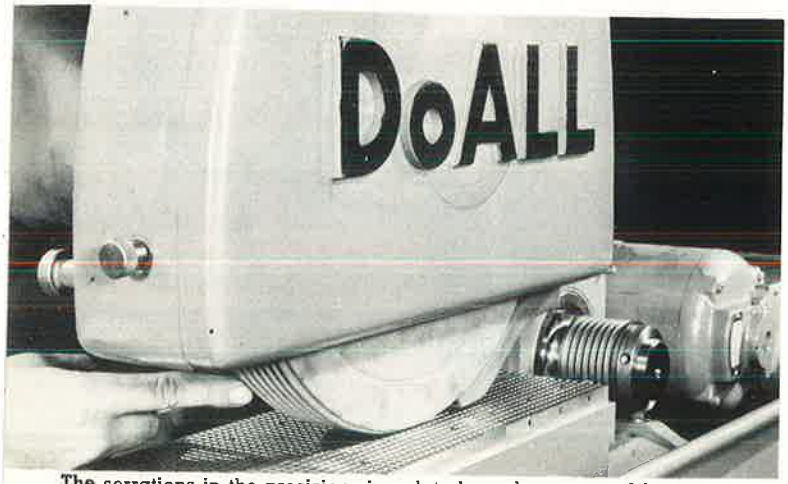
CRUSH FORM GRINDING



Principle of crush form grinding. The steel crush roll forms the grinding wheel to a complementary form and the grinding wheel reproduces the original form in the work.



Serrations in the precision sine plate shown here are ground in the hardened surface. Using the crush form grinding method, this is done nearly as quickly as would gang milling before heat treating — distortion from heat treatment is eliminated, serrations are smoother and more uniform in depth and appearance.



The serrations in the precision sine plate have been ground by the crush formed wheel. Seven serrations .030" deep are produced at a linear rate of 2½ inches per minute. Accurate response to feed controls makes the production of the serration pattern an easy operation.

Production Form Grinding with the Standard DoALL Surface Grinder

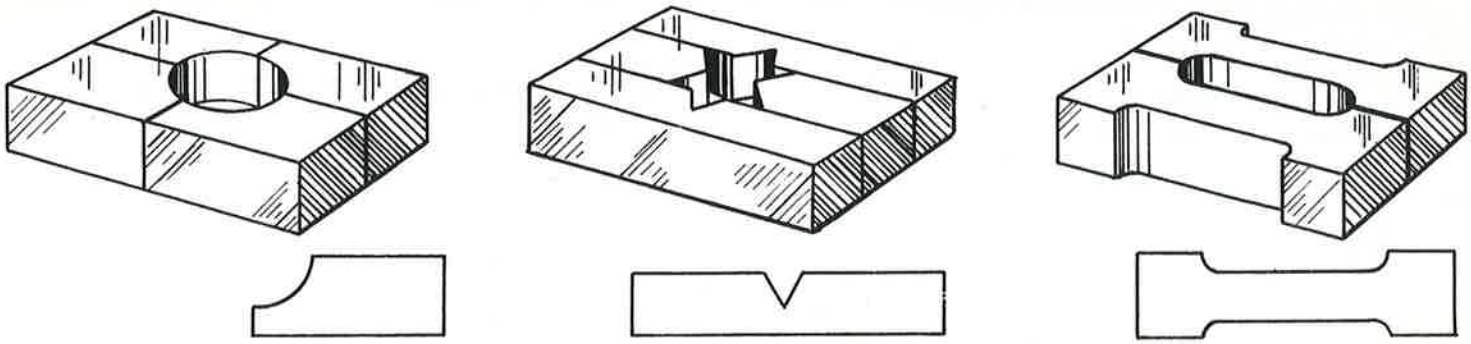
Crush form grinding, once used mainly in the production of thread forms on cylindrical grinders, is a technique rapidly being adapted by industry to surface grinders for the production of linear forms. Essentially, it makes possible the grinding of an irregular profile on solid, hardened stock. Since this operation may be performed after heat treating, distortion, surface decarburization and scale do not affect the accuracy or physical characteristics of the finished part. The growing use of heat and corrosion resistant, hardened alloys in intricate mechanisms ranging from jet engines to office computing machines and the necessity for complex shapes, close tolerances and high surface finish have spurred the development of crush form grinding.

When using this technique, the grinding wheel is dressed to the desired form by rolling it slowly under pressure against a steel roller having a profile identical to that which is to be produced in the work. The wheel periphery is crushed away in this manner until the wheel face assumes the complementary form of the steel crush roller. In crush form grinding, the nature of the work dictates the method of stock removal. In some cases, best results are obtained by grinding the form to full depth in a single pass, using a very slow table travel. In others, the table reciprocates in the normal fashion while the grinding wheel is fed down in small increments until the profile of the crush forming roll has been reproduced in the work. The accuracy and finish of parts produced by this method depend upon the ability of the grinder to withstand the considerable pressures encountered in crush dressing, the accuracy of its response to the feed controls, the correlation between the feed wheel settings and the actual amount of stock removed, and its ability to produce fine, ripple-free finishes.

These qualities depend on grinder ruggedness and rigidity of frame and spindle found to the highest degree in DoALL grinders. Crush form grinding can be performed on all DoALL grinder sizes.

After completing a number of pieces, the wheel must be dressed again to renew form and sharpness. The wheel and crush roll are rolled together slowly as shown, the operator maintaining pressure between the wheel and the roll with the downfeed control.

Precision Parts from the Solid with . . . One Machine — One Setup — One Operation!



Crush form grinding is ideal for grinding sectional dies since the individual parts of the die can be brought to a high finish and the desired shape regardless of the complexity of shape.

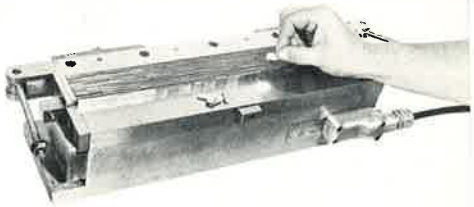
Wheel Dressing Improvements

A dressed wheel will begin to lose "form" and requires dressing after a number of pieces have been ground, depending on the material, size of the part, depth of cut taken and other factors.

The working roll also begins to lose form after a number of dressings. It may be trued by grinding it in "cylindrical grinding" fashion with the same grinding wheel which must first be dressed with a master crush roll.

The construction and absence of an outboard bearing on the DoALL motorized crush form dresser permits instant removal and replacement of crush rolls, the alignment being preserved by a shoulder on the spindle of the dresser. Furthermore, the motorized drive on the DoALL dresser can be used to turn the wheel at the proper rate for crush dressing where the grinder is not equipped with an auxiliary, slow, crush-dressing spindle drive. Just as easily, the motor drive is disengaged and the dresser can be used as an idler stand where the grinder *is* equipped with an auxiliary spindle drive.

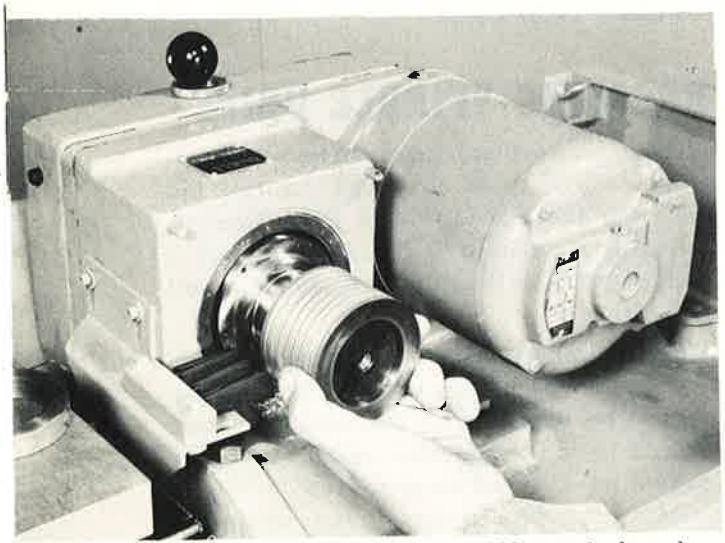
Vane used in power steering pump. Radius of contact edge is form ground to better than 15 micro inches RMS and at rate of 1200 pieces per hour.



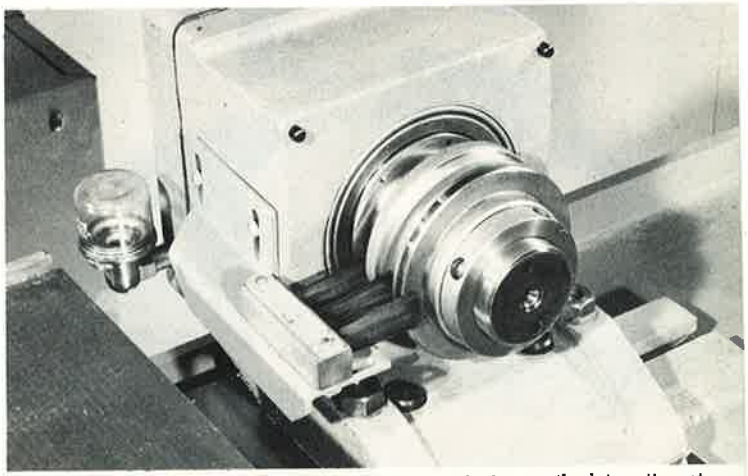
Vanes are mass ground hundreds at a time, alignment being maintained in the special chuck.

Roots of precision jet engine turbine blades are a typical application where crush form grinding excels.

Cavity insert supports for multiple molding dies used in production of vacuum tube sockets. These intricate forms are ground from the solid, 5/8 of original weight being removed in grinding.

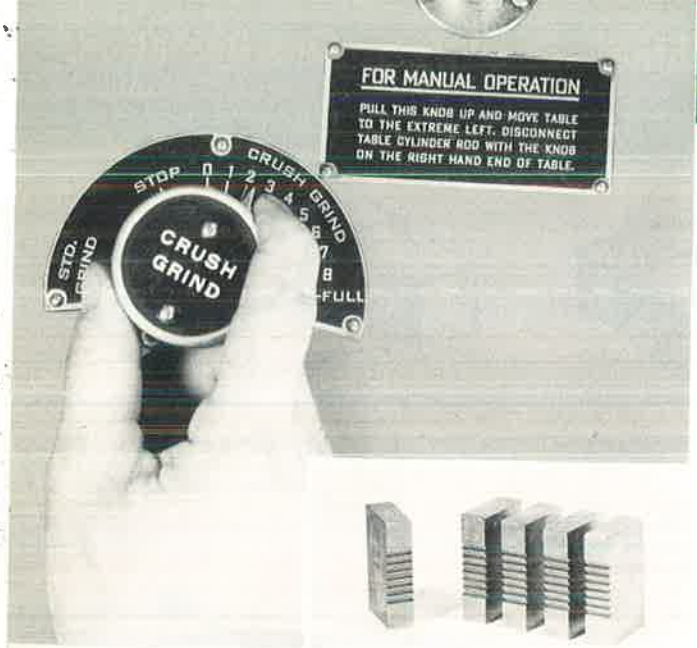


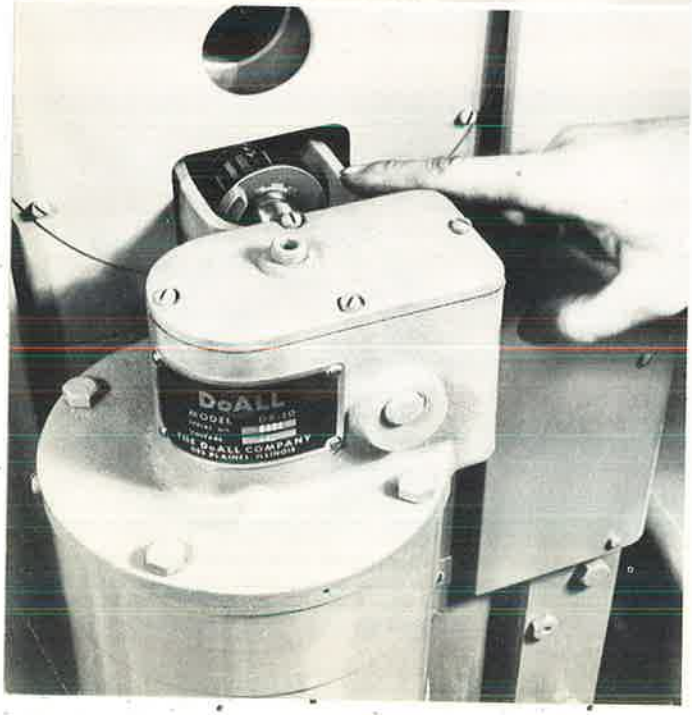
Absence of an outboard support on the DoALL motorized crush dresser permits rapid removal of a worn crush roll and substitution of a new roll or master roll. The master roll is to form the wheel precisely and this wheel, in turn, will be used to renew the correct form in the worn working roll



In many high production applications it is impractical to attempt reforming of working crush rolls on the same machine used for the production of work. The idler type dresser shown here is ideal for such applications—the working rolls being trued separately on another machine.

CRUSH FORM GRINDING





CRUSH GRINDING TABLE CYCLE

This attachment provides the smooth, steady, slow table speeds necessary for crush form grinding. Standard machine table speeds are infinitely variable from 5 to 50 FPM on the D6-1, D6-3 and D8-0 models; 5 to 75 FPM on the D8-1, D8-3, D10-1, D10-3 models. With the crush grinding attachment, a low speed of 1 inch to 50 feet per minute is provided, and 1 inch to 75 FPM, respectively. In the crush grinding range, the table traverses very slowly, in accordance with the position of the valve control, during the normal cutting stroke. At the completion of this traverse, the table automatically returns to its starting, or reloading position, at high speed. By merely turning the control to "Standard Grind", the machine instantly reverts to normal table speeds. Heavy duty spindles are standard on all models.

AUTOMATIC SKIP-FEED

The Automatic Skip-Feed Attachment provides the means for speeding up the grinder table "in between" work pieces when form grinding with slow table feed. As an example, jet engine parts are placed in individual fixtures and form-ground in lots of five. Because of the space taken up by the fixtures, the parts cannot be spaced closely together. By means of the special dogs and a special valve built into the saddle, (left) the table can be made to feed slowly while each part is being ground, and automatically traverse rapidly when there are no work pieces being ground. The length of the dog used controls the amount of rapid traverse, and the spacing controls the position at which the rapid traverse occurs. This feature is a tremendous timesaver for production form grinding. Available only on machines equipped with Crush Grinding Table Cycle.

CRUSH DRESSING SPINDLE DRIVE

This unit consists of an auxiliary motor drive which furnishes the proper wheel speed for crush forming the grinding wheel with the DoALL Crush Form Dresser. Power is supplied by a separate ¼ HP motor through a gear reducer which engages the grinder spindle through a special Bendix drive.

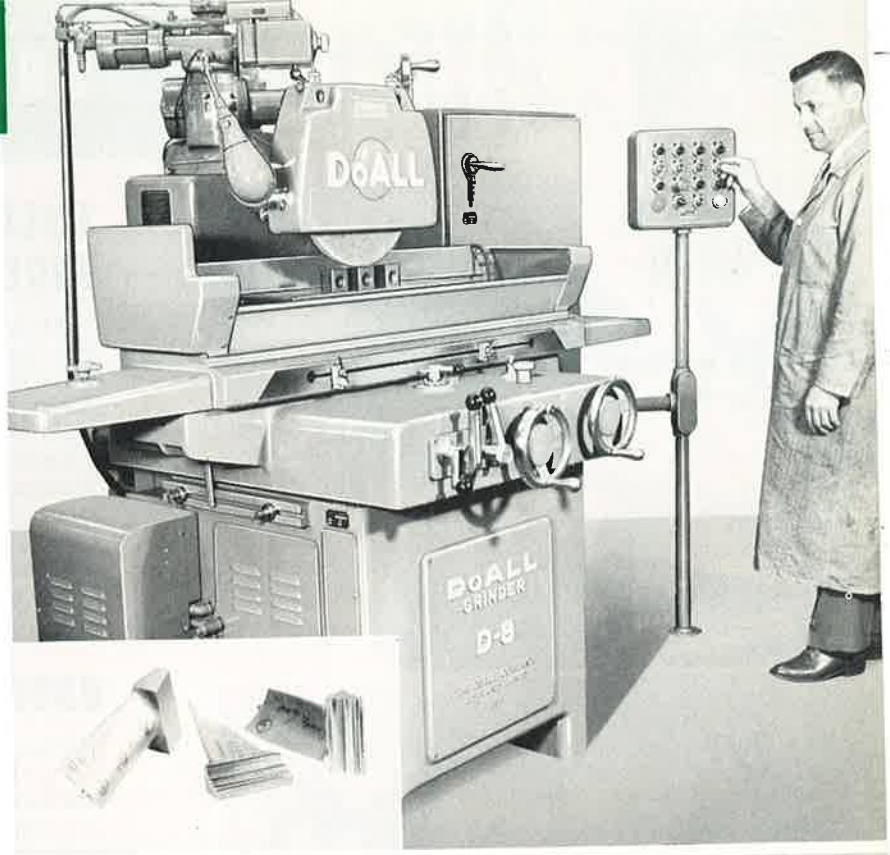
This feature makes it unnecessary to motorize the crush form dresser on those applications where the working crush roll is not to be reground on the machine when worn. An interlock switch is provided so that the slow speed drive cannot be engaged simultaneously with the main spindle motor drive. This equipment is available for the Models D8-1, D8-3, D10-1 and D10-3 only.

ATTACHMENTS

AUTOMATIC DOWNFEED

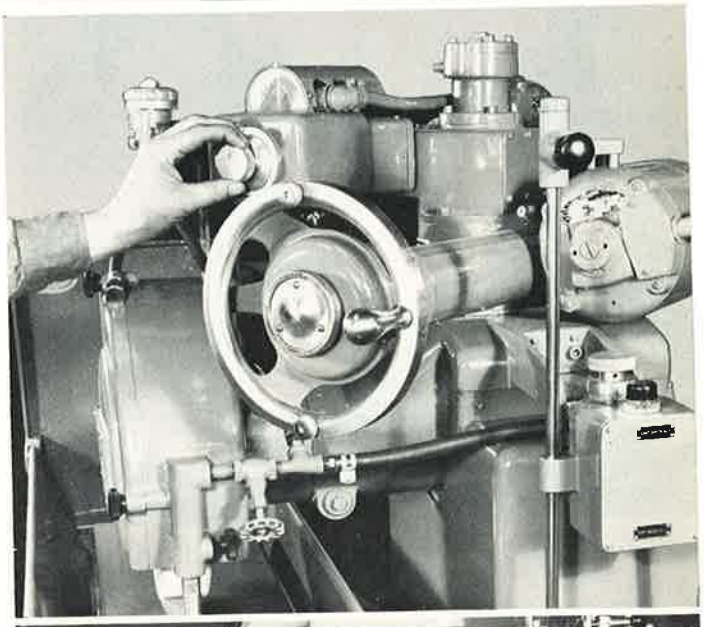
The massive frame and flexible hydraulic system of the basic DoALL Surface Grinder lends itself to automatic production grinding applications. Models incorporating automatic downfeed for plunge form grinding and automatic crossfeed reverse for production surface grinding are proving their worth on many critical applications in modern industry.

Automatic Downfeed is designed to speed production of parts which require plunge form grinding, such as the high-precision, mass-production jet engine parts shown at the right.



This model provides for automatic vertical feeds in any increment from .0002″ to .080″ at each table reversal, or at alternate table reversals. Automatic downfeed continues until the adjustable limit switch is actuated, stopping the grinding operation. Final finish cuts can then be made under manual control of the operator. The grinder is completely foolproof as a result of the interlocking control system. The automatic downfeed mechanism does not interfere with manual controls during ordinary operation.

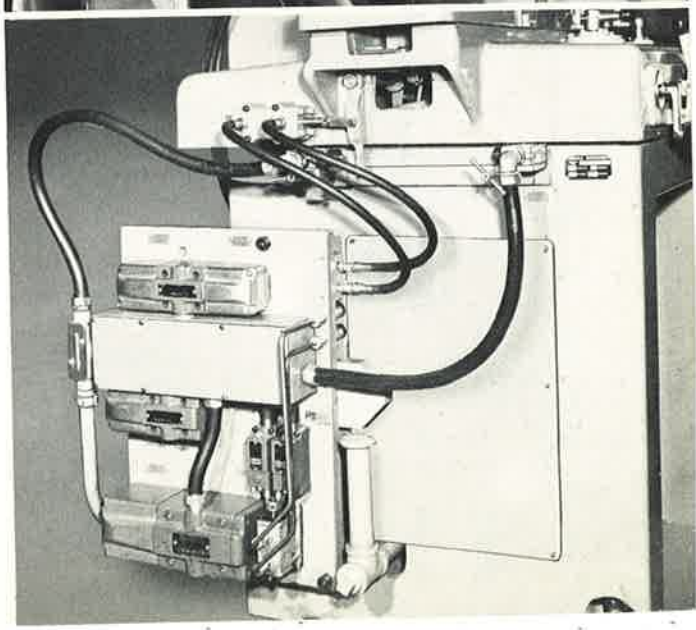
Shown at right are the automatic downfeed controls. The upper knob controls the increment of downfeed. It is graduated in thousandths and half-thousandths; one full turn increasing or decreasing the downfeed increment three thousandths of an inch. The knob at lower right, graduated in thousandths, provides for micrometer adjustment of the size control limit switch. The pilot light indicates the precise point at which the limit switch trips and provides a reference for accurate stock removal. An adjustable stop controls the motorized column raiser so that closing the column raiser switch will lift the wheel as little as twenty-five thousandths to clear a new work piece.



AUTOMATIC CROSSFEED

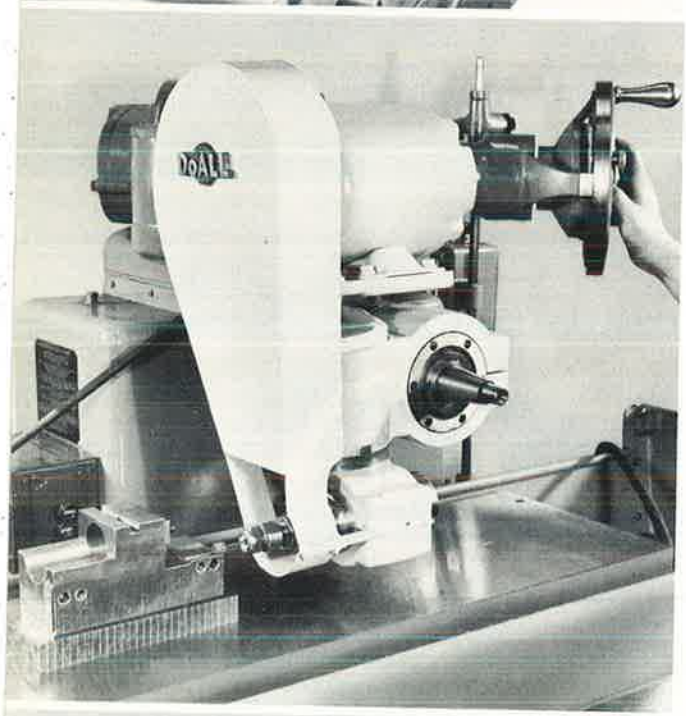
Automatic Crossfeed Reverse, not applicable to crush form grinding, is ideal for surface grinding jobs which require a large amount of stock removal. It makes possible continuous, automatic surface grinding. At the completion of each crossfeed traverse, automatic downfeed takes place, and the crossfeed is reversed, so that the machine will continue to grind without further attention until the downfeed limit switch is tripped. Here, also, single cycle operation is available for finish cuts.

At right is shown the hydraulic panel which coordinates the movements of table, saddle and downfeed. Adjustable crossfeed limit switches are mounted in the T-slot on the base. These control the action of a hydraulic cylinder which, in turn, reverses the standard directional control valve.



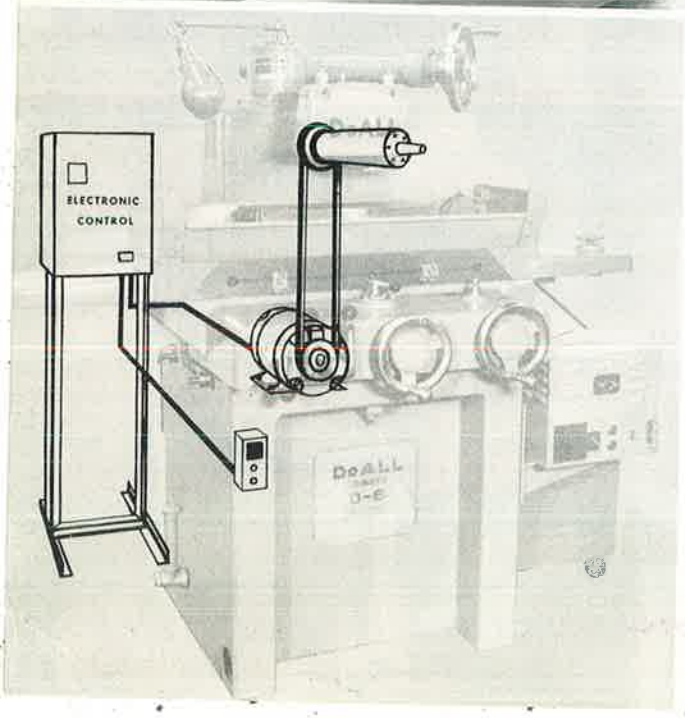
CYLINDRICAL GRINDING AND INDEXING ATTACHMENT

Makes your DoALL Surface Grinder even more versatile. Grinds cylindrical parts up to 7½" long by 6½" diameter, either on centers or in collets. Has 24 index divisions, and accurate two-way sine bar, making possible exact duplication of angles and tapers. Spindle speeds: 200, 400 and 700 RPM, through step pulley and hardened worm and fiber worm gear. 110 Volt AC/DC motor. Available accessories include collets, face and drive plates, step chucks, centers, index plates up to 360 divisions, finger stops for cutter grinding, 3 and 4-jaw chucks.



UNIVERSAL HIGH-SPEED SPINDLE

Designed primarily for use on the DoALL Surface Grinder, this flexible unit will function on any machine tool having a 4⅛" diameter mounting post. This unit is powered by its own ½ HP totally enclosed, ball bearing motor which permits complete freedom of adjustment vertically, horizontally or at compound angles. Motor belt and pulley combinations provide a selection of spindle speeds. These are 20,000 RPM, 11,430 RPM and 7,650 RPM; providing 6,000 FPM surface speed for wheels 1⅛", 2" and 3" in diameter, respectively. At 20,000 RPM satisfactory performance may be had from wheels as small as ¾" in diameter. The spindle is tapered to take standard quills or collet adaptor for stem-mounted wheels.



VARIABLE SPEED SPINDLE DRIVE

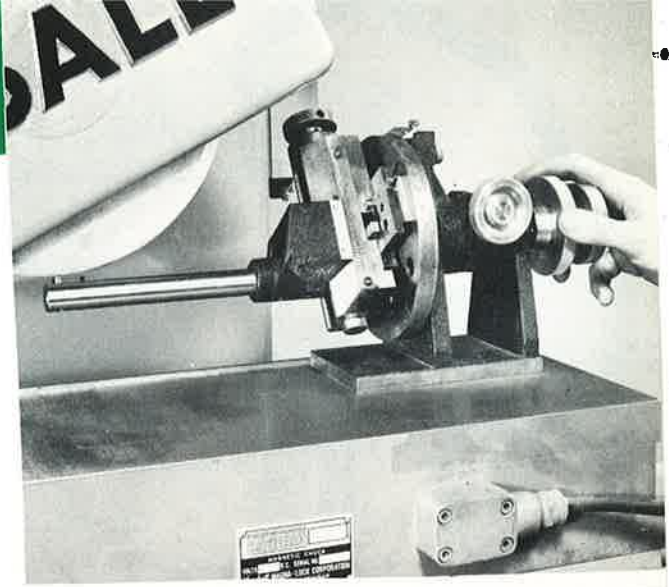
For special applications either one or two basic variable speed units are available. The first is illustrated schematically at left. The belted spindle is driven by a variable speed DC motor which is powered and controlled by an electronic rectifier and variable control unit. Maximum variation is 10 to 1 with a nominal top speed of 6,500 RPM.

For example, the grinder may be equipped to deliver spindle speeds of 400 to 4,000 RPM, or 650 to 6,500 RPM. Horsepower of variable speed drives need not be the same as the standard grinder on which it is to be mounted. The D6 normally equipped with a 1 HP, 3450 RPM spindle may be built with a variable speed drive delivering as much as .3 HP at maximum speed.

The second type of variable speed spindle drive (not illustrated) will provide a maximum ratio of high to low speed of 4 to 1 with a maximum speed of 20,000 RPM. For example, 4,000 to 16,000 RPM, or 5,000 to 20,000 RPM. Instead of driving the spindle directly from a variable DC motor as in the case of the first type, the DC motor is made to drive a frequency converter and the grinder is equipped with a frequency sensitive AC motorized spindle. As the control potentiometer at the push button station is rotated the DC motor either increases or decreases speed and the frequency converter either increases or decreases frequency. The AC spindle responds accordingly. Here, also, the horsepower of the spindle may be made to correspond to the requirements of the application.

RADIUS AND ANGLE WHEEL DRESSER

Dress any wheel for angle tangent to radius with precision, ease and speed. Simple to operate—zero the built-in micrometer dial and vertical scale and locate diamond to setting gage furnished with attachment. Using the built-in micrometer feature of the Tangi-Matic Dresser any radius down to .032 full 180 degrees can be quickly and accurately obtained. Save hours of setup time every day.

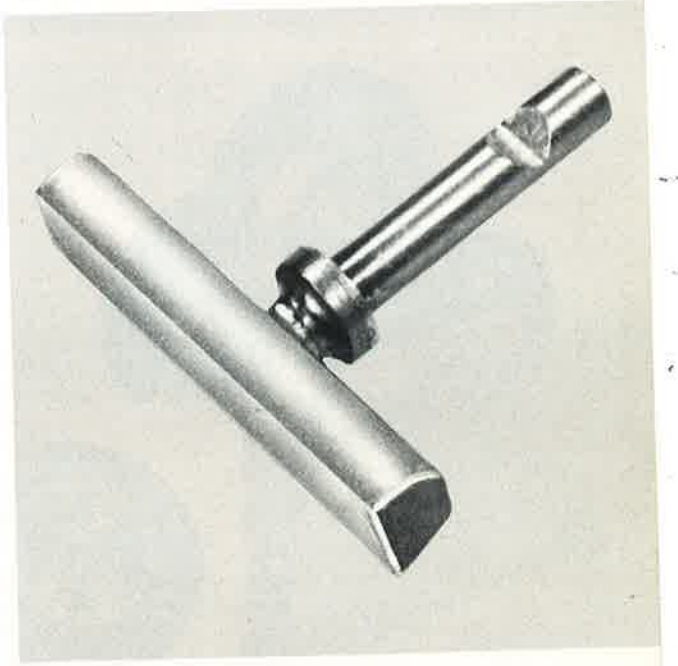


TEMPLATE FORM DRESSERS

These, and similar devices, add to the productiveness of the versatile DoALL Grinder. In form grinding the profile to be produced is sometimes more effectively developed by a diamond form dresser than by a crushing roll.

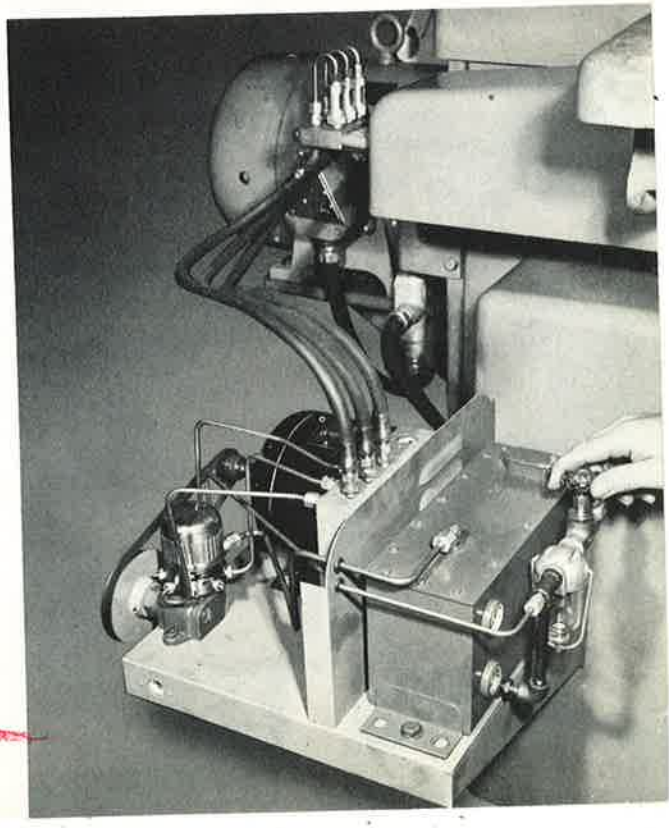
For example, the transverse portion of the part illustrated is an entirely different material than the stem. One must be ground to form with a diamond wheel, the other with an abrasive wheel. With a special adaptor both wheels are mounted on the DoALL Grinder spindle and diamond dressed simultaneously by a template form dresser.

Several excellent template diamond form dressers have been developed which can be used to adapt the DoALL Surface Grinder to special production form grinding jobs.



J. I. C. LUBRICATOR

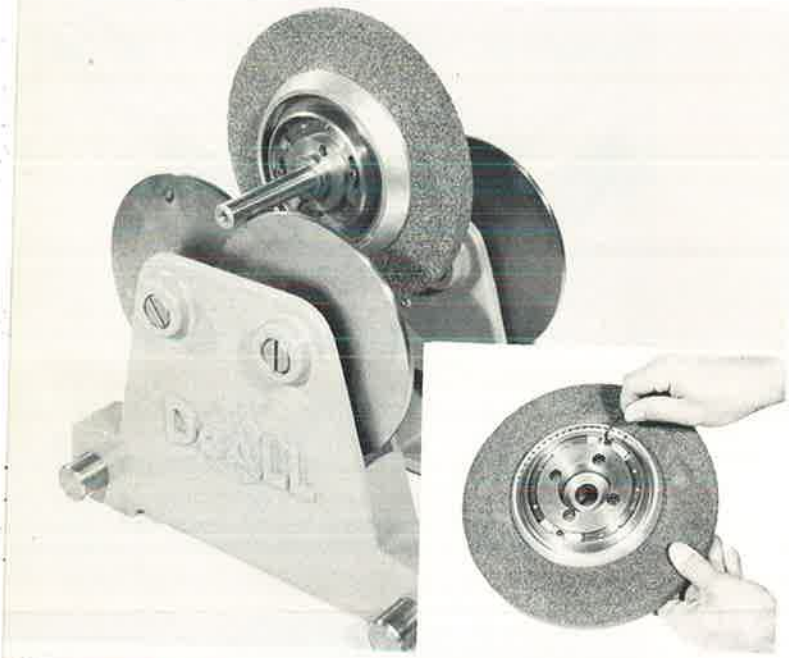
All DoALL surface grinders incorporate automatic lubrication to table and saddle ways, utilizing for this purpose oil from the hydraulic system. J.I.C. standards specify an independent lubrication system which may also be desirable under certain severe operating conditions. The DoALL Lubricator Attachment consists of a 6½ pt. reservoir, metering pump, ¼ HP totally enclosed ball bearing drive motor and oil-flow indicators to provide the correct amount of lubricant to table and saddle ways. A return system and filter permits continuous use of the lubricant supplied. The Lubricator makes possible the use of DoALL Way Lubricant, an oil with viscosity and surface tension characteristics ideally suited for maintaining the proper oil film between the hand scraped bearing surfaces of table and saddle ways.



GRINDING ACCESSORIES

DUST COLLECTOR

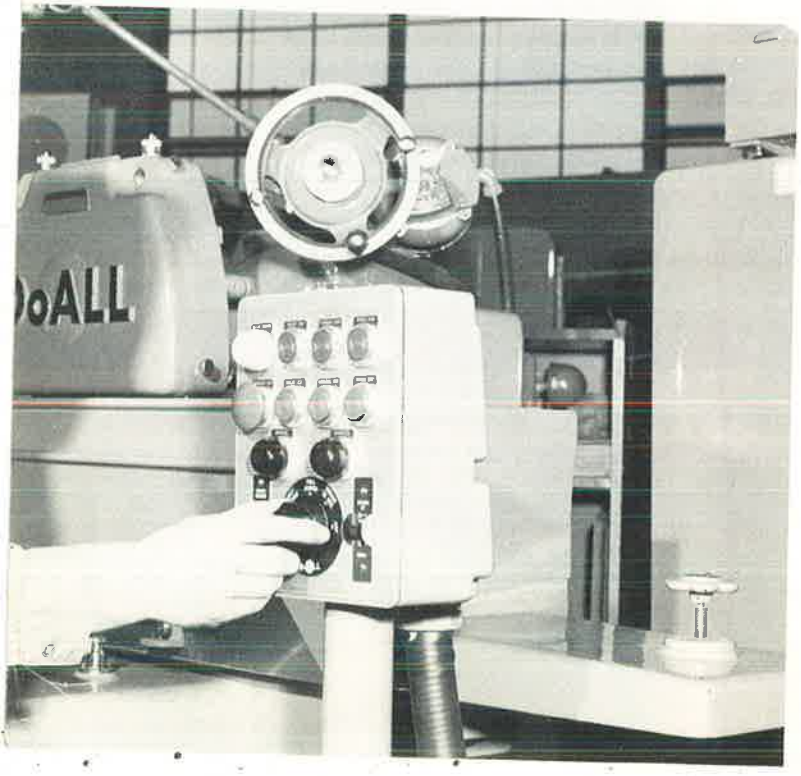
The Torit Model 75 Dust Collector is recommended for all dry grinding jobs on any model DoALL Surface Grinder. Easily installed by merely piping to the surface grinder, with flexible duck-covered tubing, furnished with dust collector. The motor, fan and fan housing are mounted in the steel cabinet and, with the set of chemically treated spark-resistant filters ingeniously placed, constitute a highly efficient method of air filtering in the smallest possible space. Cabinet is 22" wide, 25" front to back and 44" high. Complete with 1 HP motor and switch.



WHEEL BALANCER and ADAPTORS

Balancing equipment for abrasive wheels promotes greater accuracy, better finish, longer wheel life and longer spindle life—these are made possible through the sensitive DoALL Wheel Balancing Stand. Precision built and rugged, it has hardened steel discs that float on anti-friction bearings and has a capacity for balancing grinding wheels up to 14" diameter and 2" wide. Also available are balancing adaptors designed for use with DoALL "Cool Grinding" wheel adaptors. These have four locking screws and replace the threaded nut as used on the outer flange of a standard adaptor. This locking device positively secures the grinding wheel in its balanced position.

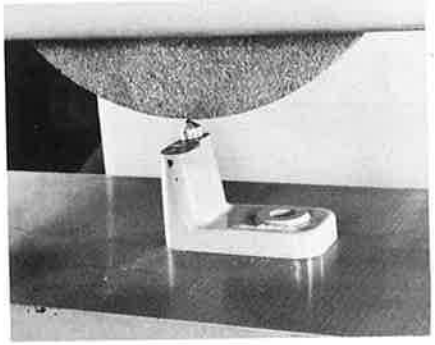
Note how easily lugs may be moved to obtain proper wheel balance.



SPECIAL ELECTRICAL CONTROLS

Three types of electrical control systems are offered as standard equipment for the DoALL Surface Grinder. Certain models may be equipped with across-the-line manual switches; all models may be equipped with line or reduced voltage magnetic starters. J.I.C. (Joint Industrial Conference) wiring standards are available as a third choice.

Shown at the left is a DoALL Grinder equipped with all necessary electrical equipment to conform with J.I.C. electrical standards including the remote control panel shown at the right of the grinder. J.I.C. electrical standards, developed largely by the automotive manufacturer, are now being demanded by many branches of industry. While there are various interpretations of J.I.C. standards, the fundamental requirements are: totally enclosed ball bearing motors, magnetic starters, reduced voltage controls, special electrical enclosures, minimum standards for wiring and size of components.



DRESSING DIAMONDS

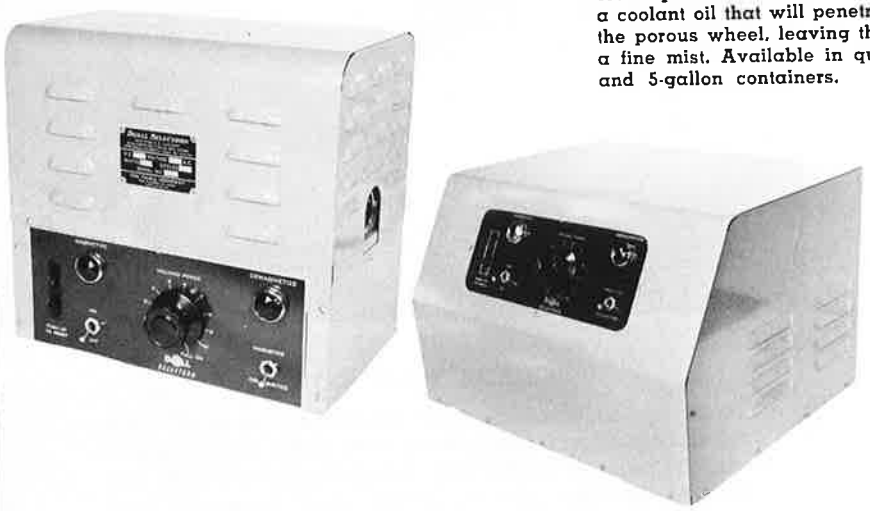
Diamond wheel dresser and holders are available from stock for all grinder models. Diamonds range from .60 to 1.10 carat weights.

"KLEEN KOOL"

When mixed with water in the proportion of 250 to 1, DoALL Kleen Kool Concentrate is a remarkable cooling agent. It has been especially prepared for use with the "Cool Grinding" attachment. This grinding method (covered by U.S. Pat. No. 2470350) requires a coolant oil that will penetrate through the porous wheel, leaving the wheel as a fine mist. Available in quart, gallon, and 5-gallon containers.

GRINDING WHEELS

Specified finish, increased production and longer tool life result when proper grinding wheels are selected for the material to be ground.

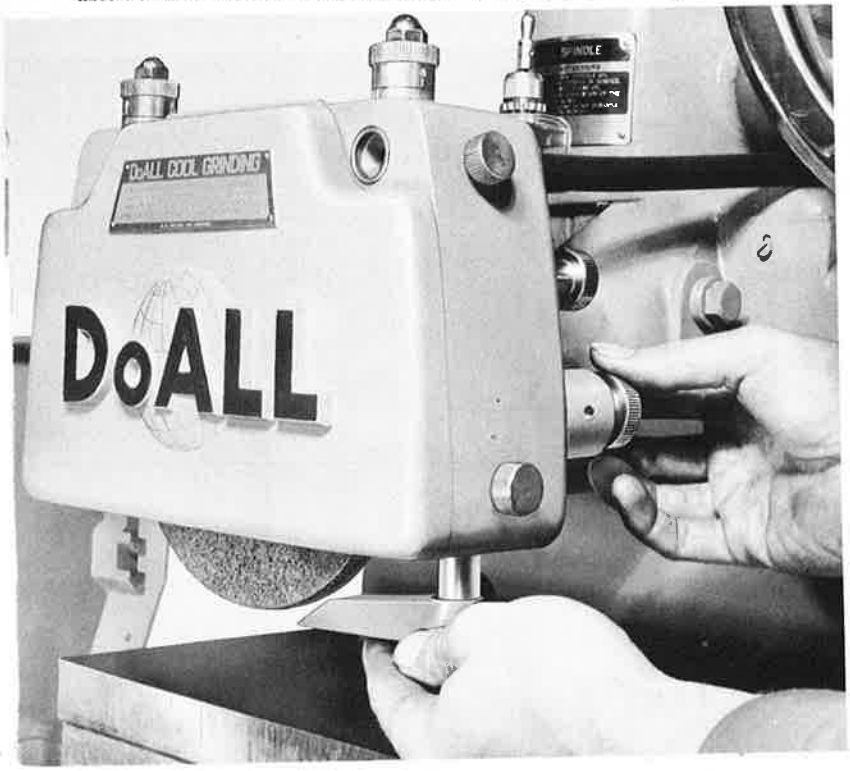


CHUCK POWER "SELECTRON"

The DoALL Selectron combines a rectifier and demagnitizer into one compact unit, for operating electromagnetic chucks, and has the additional advantage of providing variable holding power. This is an important feature in the grinding of thin work pieces which may be warped, for the holding power can be reduced by merely turning a dial to a setting which will hold the work without distorting it. Work is completely demagnetized in 15 seconds by flipping a switch. Input voltage 220/440/550 AC; output 230 volts DC only. Three sizes available . . . shown are 150 watt unit at left, 400 watt unit at right.

HANCHETT MAGNETIC CHUCKS

Magna-Lock Chucks provide holding power for large and small parts. The fine-mesh top construction provides 22% more magnetic surface than on lead-filled chucks. Available in all sizes and types, including swiveling chucks, sine chucks and angular-elevation chucks. Accessories include Magna-Vise Clamps for holding non-magnetic materials.



STANDARD FLOOD COOLANT ATTACHMENT

A coolant-circulating unit suitable for DoALL Grinders and other coolant-using machines. Has 1/12 h.p. motor, mounted directly on pump. Pump is centrifugal type, with sealed ball bearings, capacity to 5 gallons per minute. Tank is of heavy steel construction with weir-type baffle plates and is mounted on swivel casters. Capacity 20 gallons. Unit is complete with piping, nozzle and splash guards for grinder.

SPECIAL AUTOMATIC GRINDERS

DoALL standard grinders, arranged for automatic operation with standard DoALL attachments, offer the flexibility to meet most production form or flat grinding requirements. Occasionally, however, the need for precision grinding of certain parts peculiar in form dictates the use of a grinder specifically designed for the part. DoALL's Special Machines Department is available to provide the solutions to such problems.

DoALL standard and special automatic grinders have found application in diverse industries. The aircraft industry, for example, finds standard DoALL automatic grinders highly suitable for producing special precision parts used in jet engines and other mechanisms. At right above, a battery of special automatics crush form grinds precision parts for jet engines. Once the initial setup is made, operation is so simple that relatively inexperienced personnel are used to operate the machines. Function of the operators here is simply to load and unload the work fixtures and crush form dress the wheel after each piece. At this same plant 60 other DoALL automatic grinders are in use on similar work.

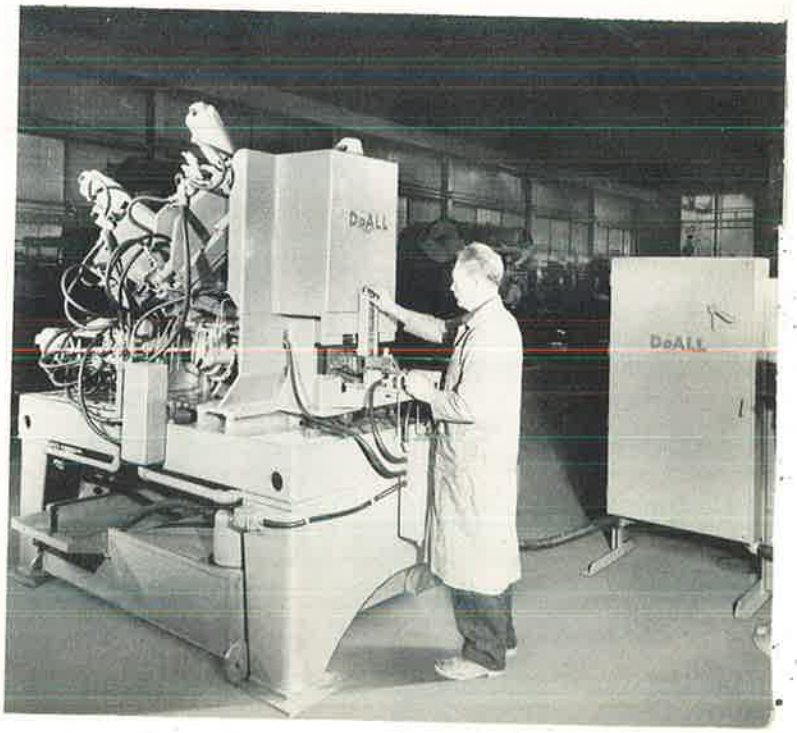
POWER STEERING

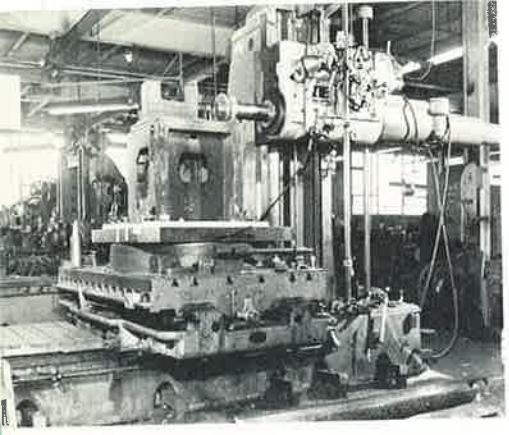
Problems encountered in producing power steering pumps at a relatively low cost were the basis for a unique special automatic grinder design. The "rotor grinder" illustrated below utilizes the basic DoALL grinder design but incorporates special automatic fixturing to handle these special parts. Rotors are hopper-fed to the grinding wheel, indexed and "located" before the grinding wheel makes a rapid plunge to finish both walls of a slot simultaneously. When the 12 slots have been ground, the finished part is ejected. An automatic diamond wheel dresser dresses the wheel after a predetermined number of slots have been ground and also lowers the column to compensate for wheel depth lost in dressing, as depth of slot must be maintained. The result—a phenomenal 80 to 90 rotors per hour per machine!

Radii on the vanes for these rotors (inset) are ground on a production basis on standard DoALL grinders with standard automatic attachments.

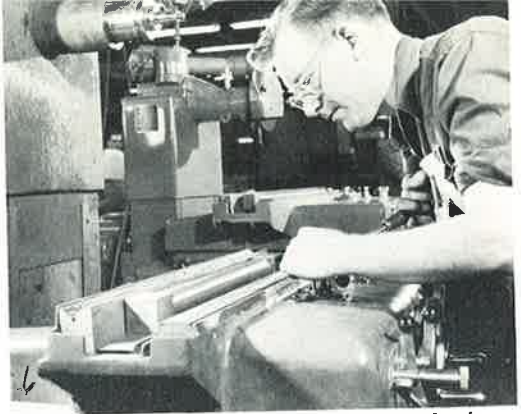
COLOR TELEVISION

To bring the price of color television sets within the reach of millions, production costs of the complex and critical parts must be kept correspondingly low. The special grinder shown below was designed and built by The DoALL Company for R.C.A. This unit is used in the production of extremely critical deflection yoke components which control the electron beams within the television tube. This grinder is entirely special, incorporating few parts used in standard DoALL surface grinders. Years of experience gained in the manufacture of standard automatic grinders make possible the compact design and simple, efficient, hydraulic operation of this high production machine.

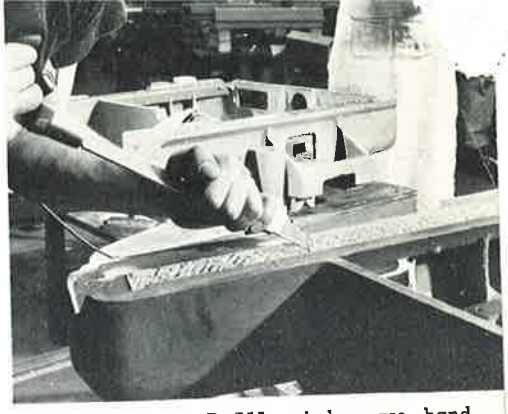




Modern equipment helps to produce modern surface grinders in the DoALL factory.

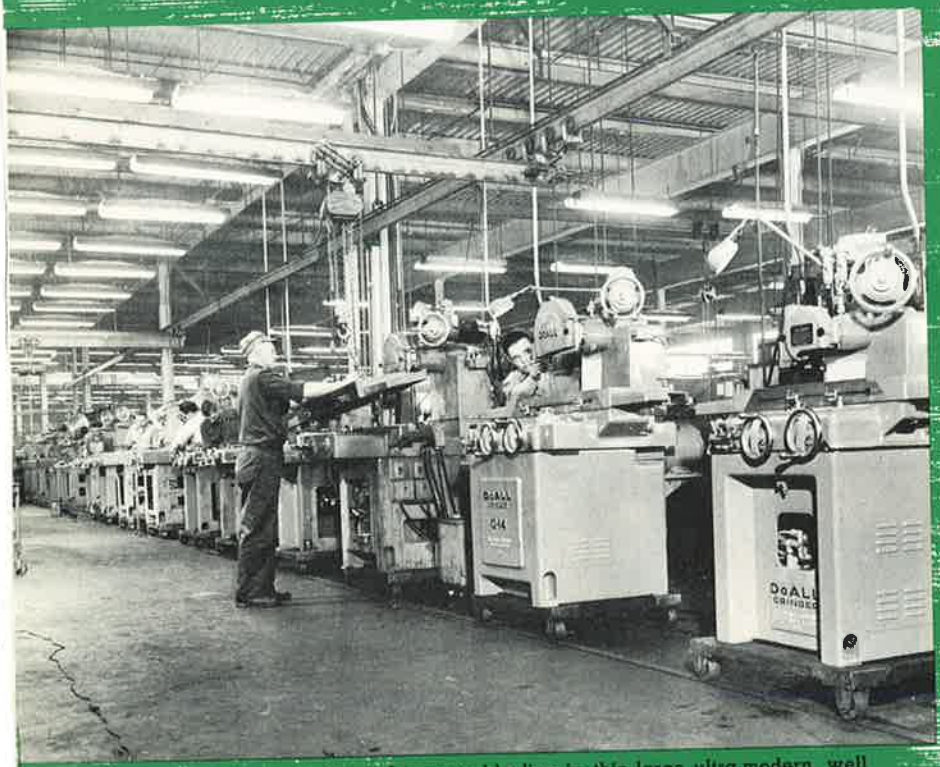


Craftsmen apply the final feather touch of scraping operation that produces long lasting bearing surfaces and assures precision performance.

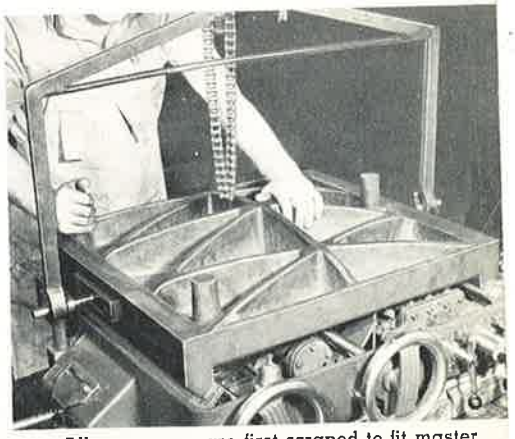


All ways in DoALL grinders are hand-scraped to high precision standards by meticulous craftsmen.

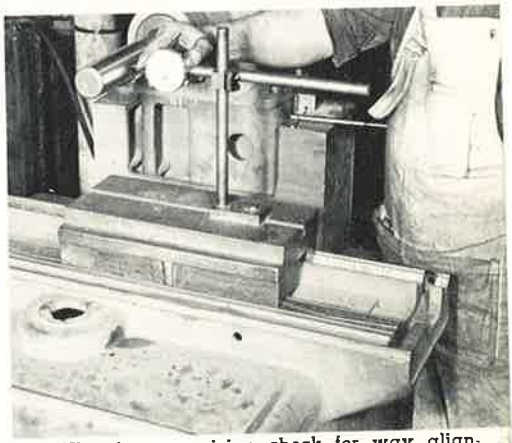
WHERE QUALITY IS BUILT INTO DoALL SURFACE GRINDERS



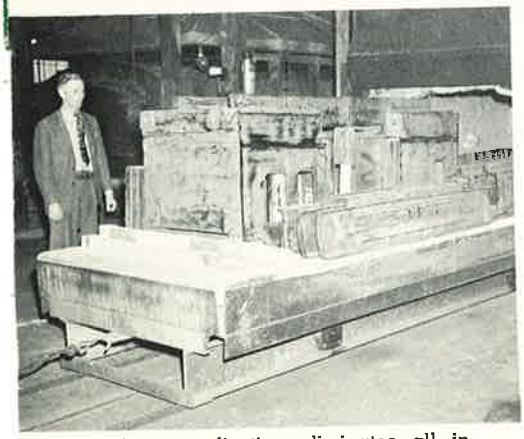
Above photo shows final grinder assembly line in this large ultra-modern, well equipped factory. World-famous DoALL Contour Machines and Gage Blocks are also produced in this plant.



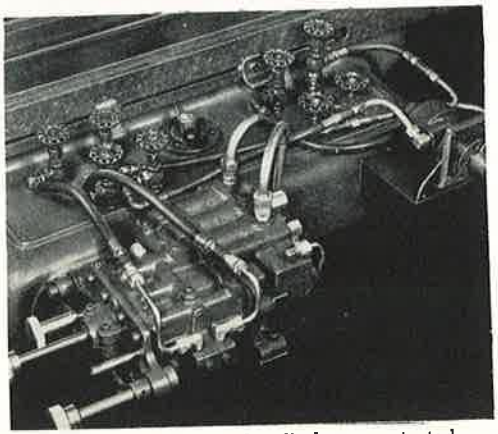
All way areas are first scraped to fit master fixtures. Final scraping accurately fits mating ways.



This is a precision check for way alignment. Table and saddle ways are scraped square with each other and aligned to the spindle.



Scientific normalization eliminates all internal stresses in the special nickel alloy castings of DoALL Grinders.



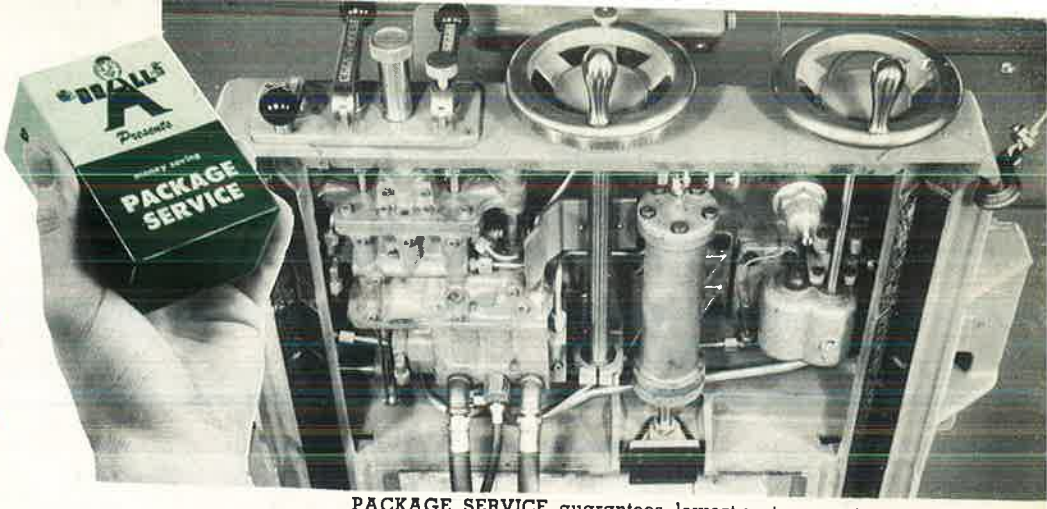
Hydraulic valves and cylinders are tested under pressures four times normal. Then they are "run in" under normal operating conditions before assembly.

Each small part of a DoALL grinder is made, assembled and checked with utmost precision, since final performance of the whole depends on each part.

DoALL Service Service

Danny DoALL

SERVICE



PACKAGE SERVICE guarantees lowest-cost preventative maintenance, modification or modernization.

FREE INSPECTION SERVICE

Down time or obsolescence can be very costly to your operation. Our factory-trained and equipped service engineer will gladly check the operating condition of your DoALL grinder, certify its condition and recommend parts needed to restore your DoALL to its original efficiency at lowest possible cost. A written Certificate of Inspection is furnished. This extra service costs you nothing.

When repairs or modernization are wanted, our service engineer can do the job in your plant or in our shop at prices you would ordinarily pay for parts alone. DoALL also offers Package Service with all costs predetermined.

TESTING FACILITIES

Difficult grinding problems are usually solved by calling your DoALL Machine Tool Specialist who employs the services of DoALL's Customer Research Testing Laboratory.

GRINDER DEMONSTRATION

To witness a grinder demonstration is to appreciate that an entirely new concept of surface grinding has been attained; better dimensional control, finish, flatness, parallelism, easier operation and a very minimum of maintenance.

Your DoALL Machine Tool Specialist can demonstrate the DoALL grinder in your plant, using his mobile unit, or at your DoALL Sales-Service Store. His service does not stop with the order but continues through its installation and years of dependable operation.

CALL YOUR DoALL SERVICE STORE

DoALL

The DoALL Company
Des Plaines, ILL., U.S.A.

Form No. 54 - 401 4-55 BNC 7M

"The specifications contained herein were in effect at the time this literature was approved for printing. The DoALL Company, whose policy is one of continuous improvement, reserves the right, however, to change specifications or design at any time without notice and without incurring obligations."

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