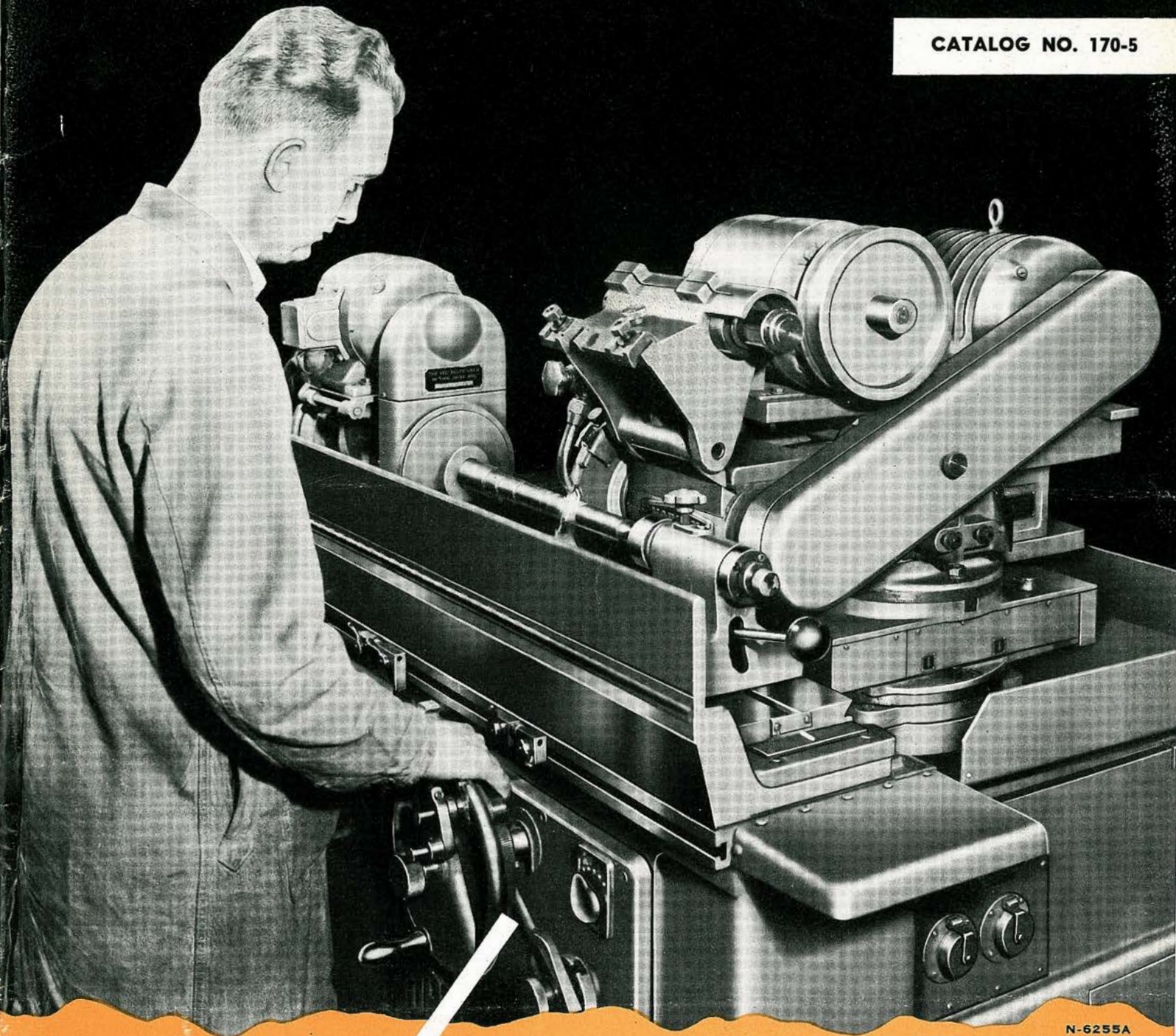


CATALOG NO. 170-5



N-6255A

**NORTON**

10" x 20" UNIVERSAL  
GRINDING MACHINE

*Making better products to make other products better*



# norton

## 10" x 20" UNIVERSAL GRINDING MACHINE

### SUPERIOR VERSATILITY THAT SIMPLIFIES JOBS!

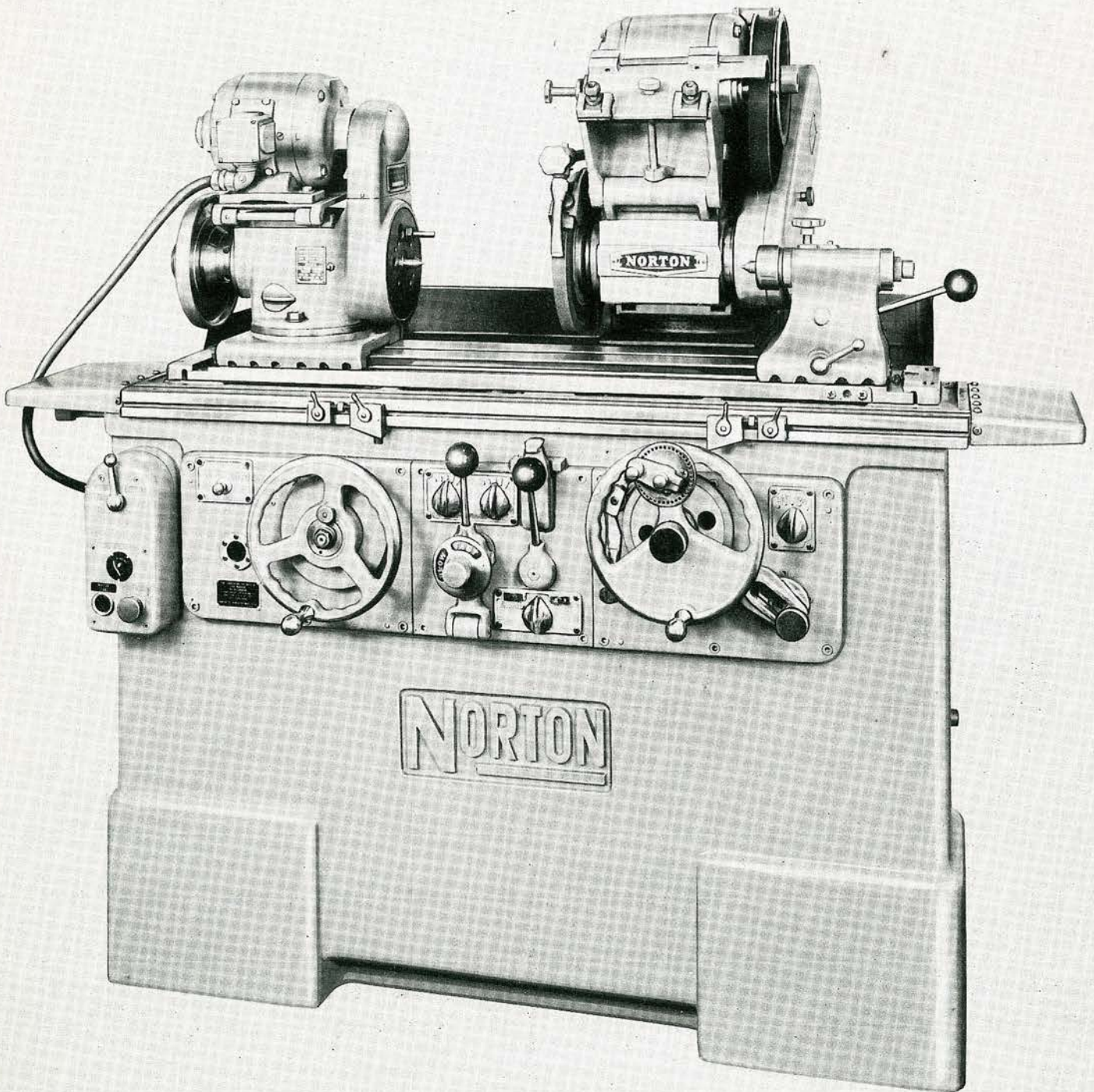
- Head and Footstock positions interchangeable—to simplify your set ups on jobs involving shoulders or spacers.
- Reversible headstock graduated to swivel 360° has dog-drive plate on one end of spindle for grinding on centers, and a 3" D-I cam lock nose on the other end of spindle for mounting chucks or fixtures. You only turn headstock 180° for changing from one to the other.
- Clear hole 1" diameter through headstock spindle gives additional capacity for grinding long shafts.
- Wheel head has compound swivels, each of which can be swivelled 360°. Graduations with vernier permit you to make quick and accurate set ups.
- Upper wheel head member can be positioned to extend capacity as required when slide is swivelled.
- Individually powered internal grinding attachment hinged to front of wheel slide — speeds your internal grinding jobs by permitting grinding of both internal and external surfaces of workpiece without disturbing set-up.
- Dovetail surface on front of wheel head provides convenient location for mounting fixtures.
- Work speeds from 50 to 500 R.P.M. at finger tip control by turning graduated dial. Easy to set for most efficient work speed.
- Wheel may be mounted on either left or right-hand end of spindle — providing extra flexibility for angular feed jobs.



→ This new NORTON Universal will bring economy to your grinding jobs that require a multipurpose machine in this size range. It is precise; it is extremely versatile; it makes rough cuts as readily as it produces the finest finishing. The convenience of its controls and adjustments give it a degree of handling ease that is outstanding.

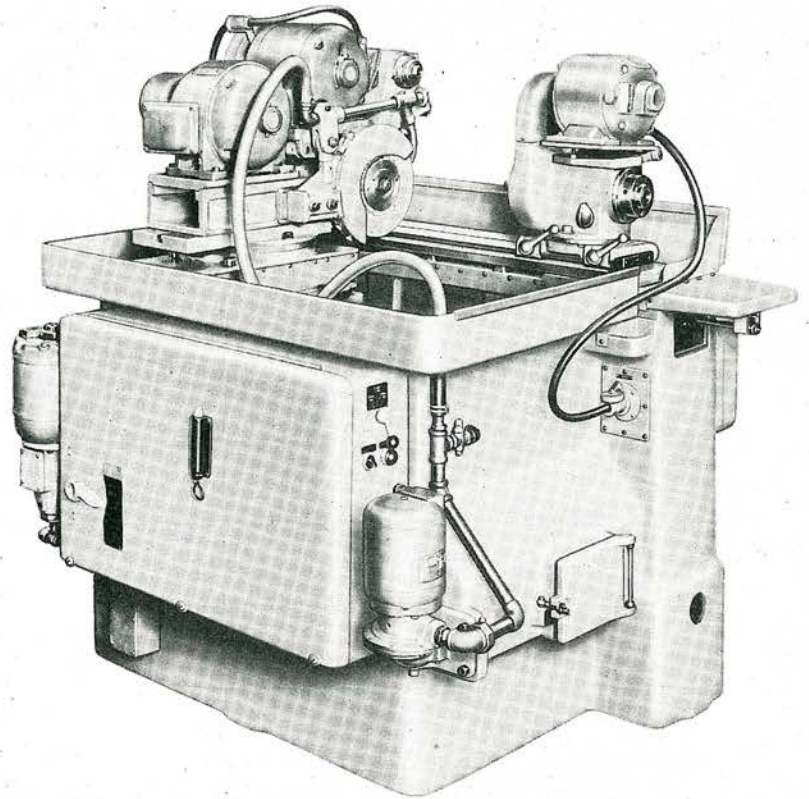
N-6287A

NORTON 10" X 20" UNIVERSAL GRINDING MACHINE  
(Splash Guards removed to show details)

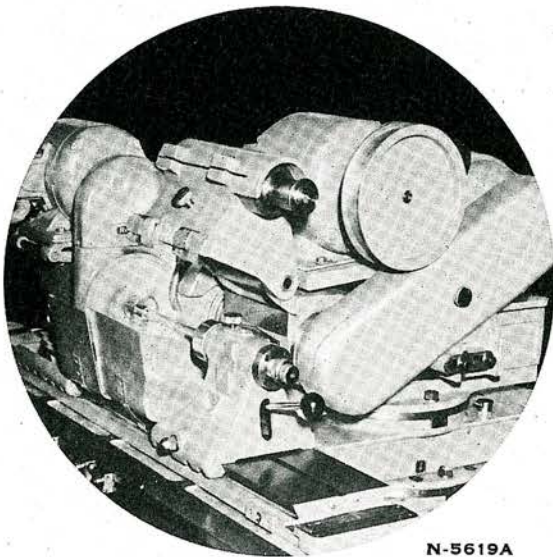




RIGHT REAR VIEW



N-5991A



N-5619A

### **cylindrical grinding**

You get exceptionally smooth hydraulic traverse with independent right and left-hand dwell control — automatic wheel feed at each reversal.

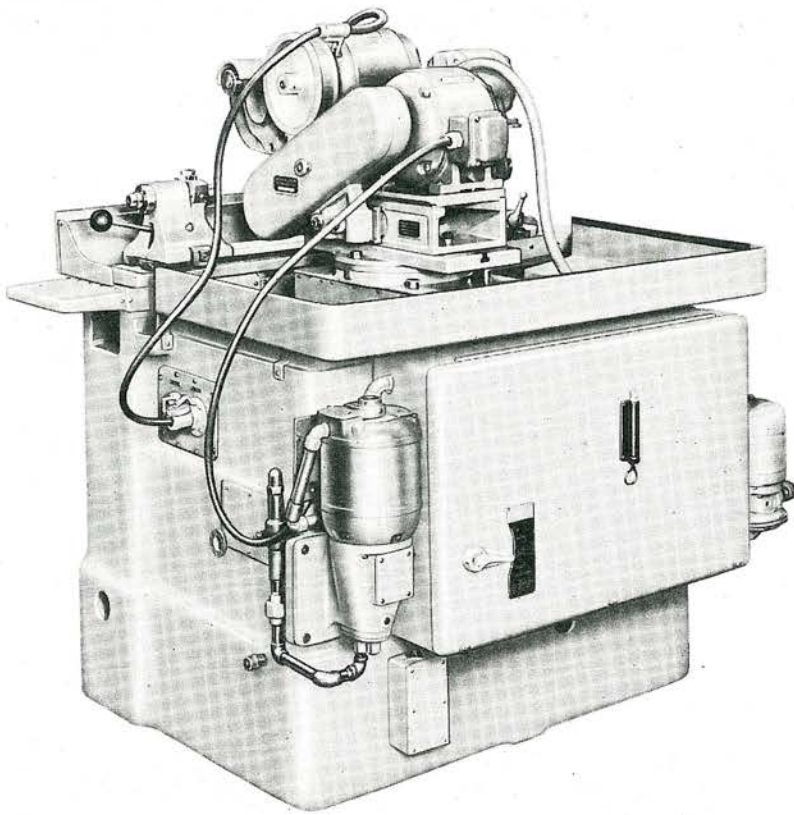


N-6019A

### **internal grinding**

You get individually powered internal spindle permanently hinged to front of wheel slide for maximum convenience and rapid set-ups.



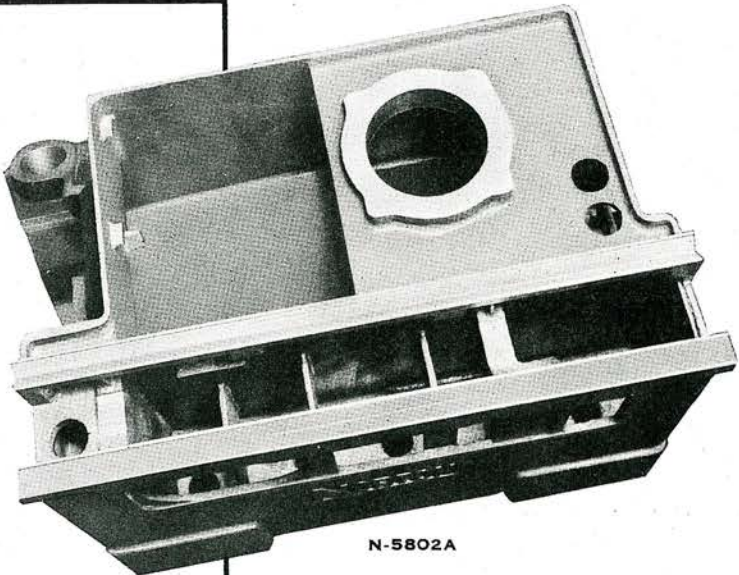


LEFT REAR VIEW

N-5992A

## base

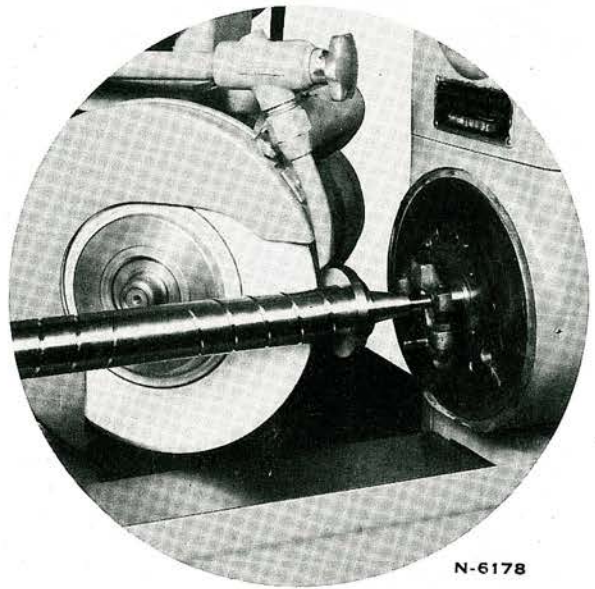
- Rectangular box type — gives you maximum stability of alignment
- Generously proportioned ways afford excellent table support
- Recessed front provides toe room for operator
- Coolant and hydraulic oil reservoirs of generous capacity cast integral with base
- Conveniently located clean-out door greatly facilitates coolant tank changes
- Pressure lubricated flat and vee way
- Base ways constantly protected by guards



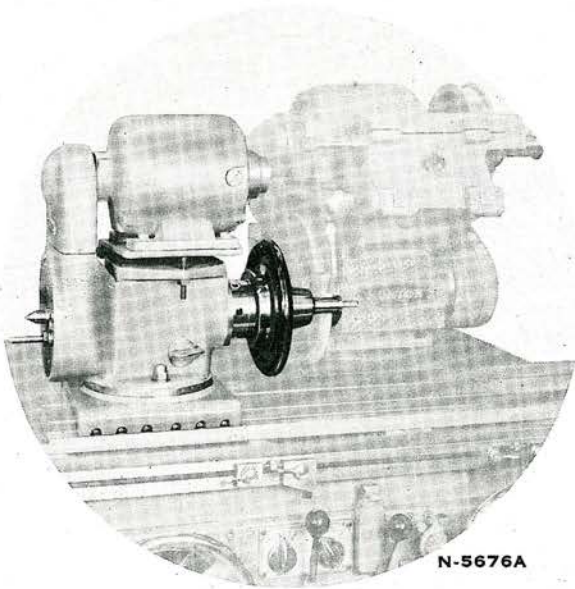
N-5802A

# reversible headstock

- Reversible. Headstock and footstock table positions can be interchanged and either end of spindle used toward the footstock
- Plug-in receptacle for headstock power connection provided at each end of base
- Lever-type clamps save time in positioning headstock at any point along table

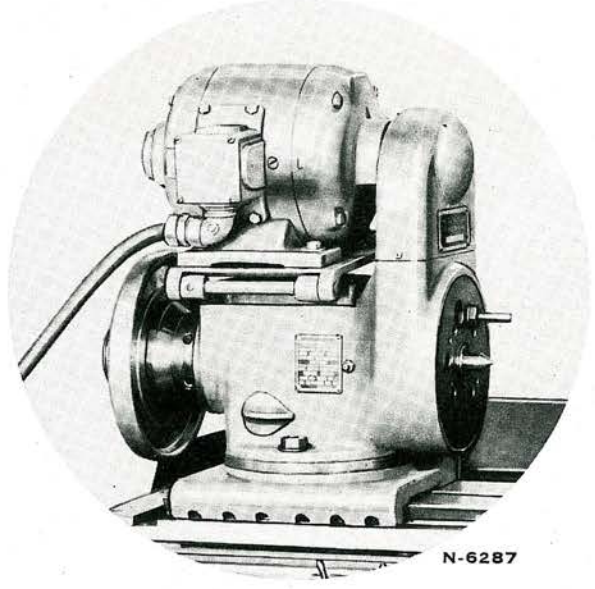


N-6178



N-5676A

- Live or dead center by operation of plunger in face plate
- Spindle locked or unlocked by control knobs on either side of headstock body
- Direct drive without use of backshaft



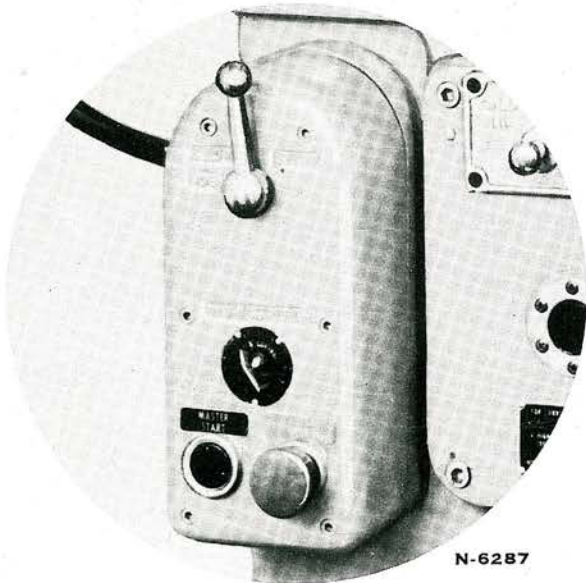
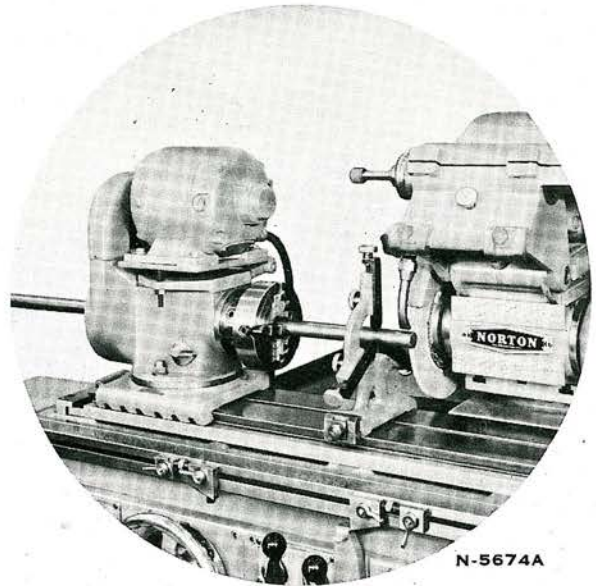
N-6287

- Conventional dog drive plate on one end of spindle and 3" cam lock nose on opposite end
- Chucks or face plates may be left mounted when grinding with dead centers, or if necessary, cam lock nose permits quick change
- Complete swivel feature permits quick set-up for using either end of spindle

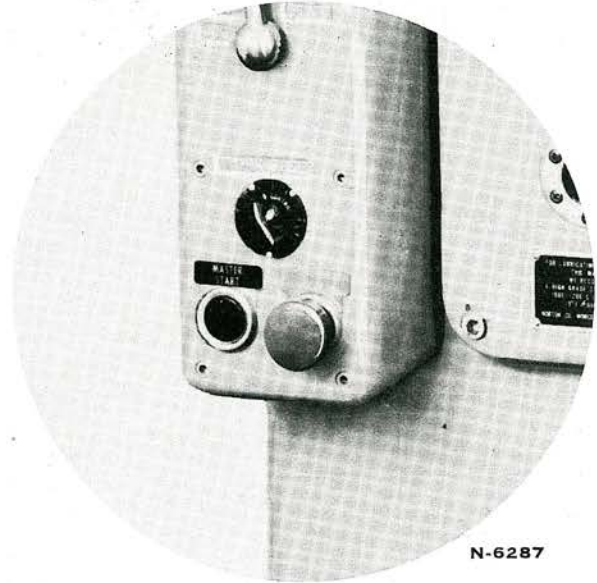


# features

- Headstock has hollow spindle
- Hollow spindle takes work up to 1" diameter
- Work 30" or longer easily accommodated by passing through spindle

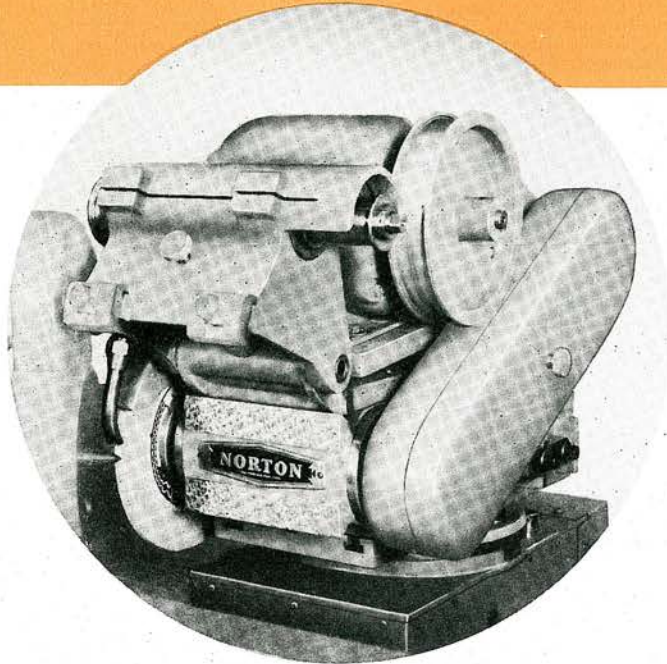


- Headstock work rotation control by means of a single fingertip positioned lever at operator's left hand
- Lever provides starting and stopping control and permits jogging



- Drive provides infinite number of work speeds in a range from 50 to 500 R.P.M. from A.C. power supply
- Work speed changes facilitated by a handy knob convenient to operator's fingertips

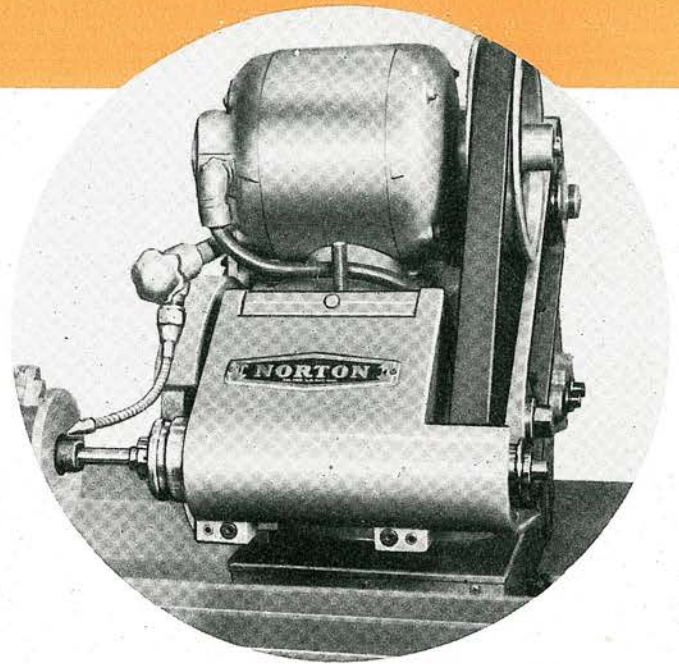
## external spindle



N-5681A

- Rugged anti-friction bearing type, lubricated-for-life external grinding wheel spindle, gives you long, trouble-free service
- Ruggedly proportioned for long service
- Cool running
- Direct drive from motor requires no idlers
- Grinding wheel can be mounted on either end

## internal grinding attachment



N-5673A

- Hinged type internal grinding spindle swinging upward, out of the way when not in use, permits you to grind O.D. and I.D. of work-piece without disturbing set-up
- Conveniently swings into grinding position
- Rigidly clamped on lower edge of dove tail when grinding
- Cartridge type, lubricated-for-life, anti-friction bearing spindle
- Swivels with wheel head through full graduated range enabling steep taper work
- Flexible coolant nozzle directs steady flow of coolant wherever desired



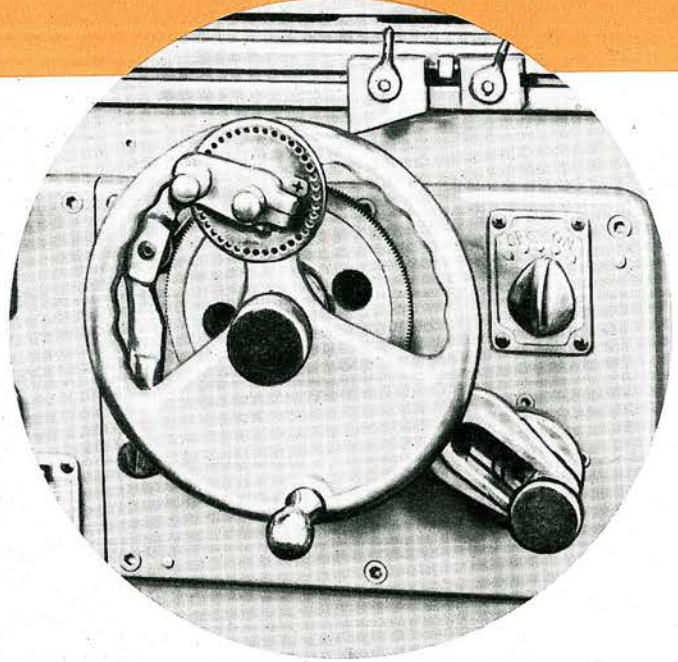
## universal wheel head



N-6019

- Swivels above and below slide permit you to set wheel at any angle and to feed at any angle
- Rigid construction gives you fine finishes
- Wheel spindle may be rotated through full graduated range of 360°
- Dovetail on front of wheel head accommodates commercial fixtures
- Wheel may be fed to work at any angle from 0° to 90° toward either headstock or footstock

## wheel feed



N-6287

- Automatic adjustable wheel feed at table reversals simplifies your traverse grinding jobs
- Hand feed by handwheel with target-type index
- Hand feed index reduces work diameter by increments of .0001"
- Same location of wheel feed control regardless of position of slide or direction of feed
- Feed screw end thrust easily adjusted



Reversible Headstock simplifies set-up problems—may be used at either end of table, with either end towards Footstock

Chucks or face plates quickly attached to 3" D-1 Cam Lock Nose on one end of Headstock Spindle

Headstock hollow spindle takes 1" maximum diameter stock clear through

Control Knobs on each side of Headstock for locking or unlocking spindle

Table Traverse Handwheel with adjustable graduated dial reads .250" per revolution in slow speed, and 2.500" in fast speed

Fast or Slow Table speed selector operates on simple in-out motion

Work Start-Stop-Jog lever easily operated from normal operating position

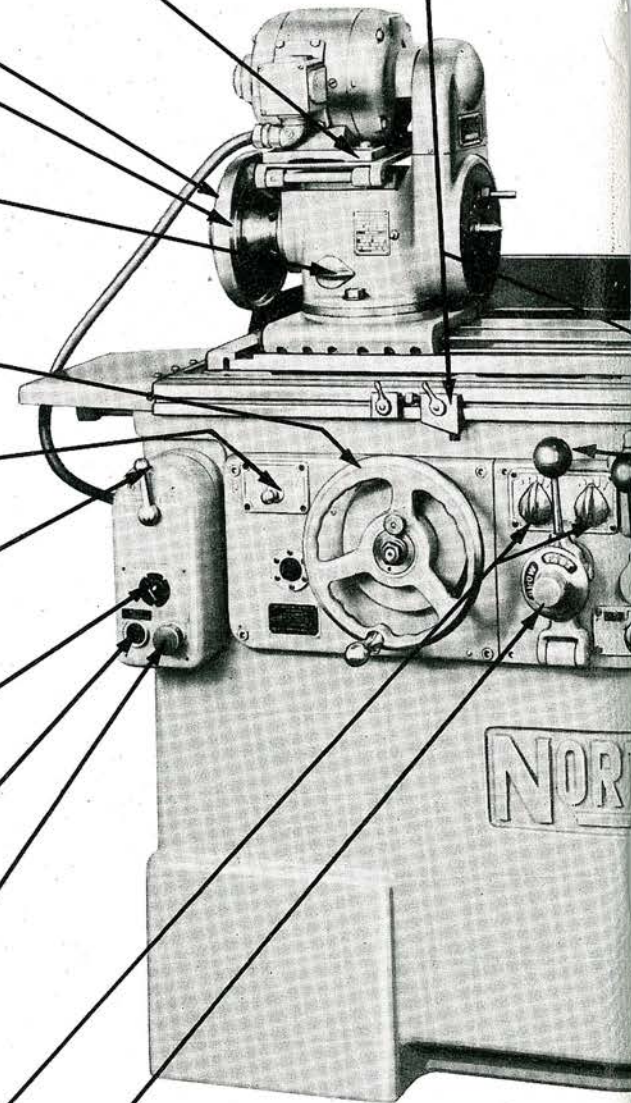
Instant response Work Speed Control provides desired work speed between 50 and 500 R.P.M. by merely turning dial

Master Start Button provides one button control of all motors

Projecting-type Master Stop Button for accessibility and knee-action stopping if desired

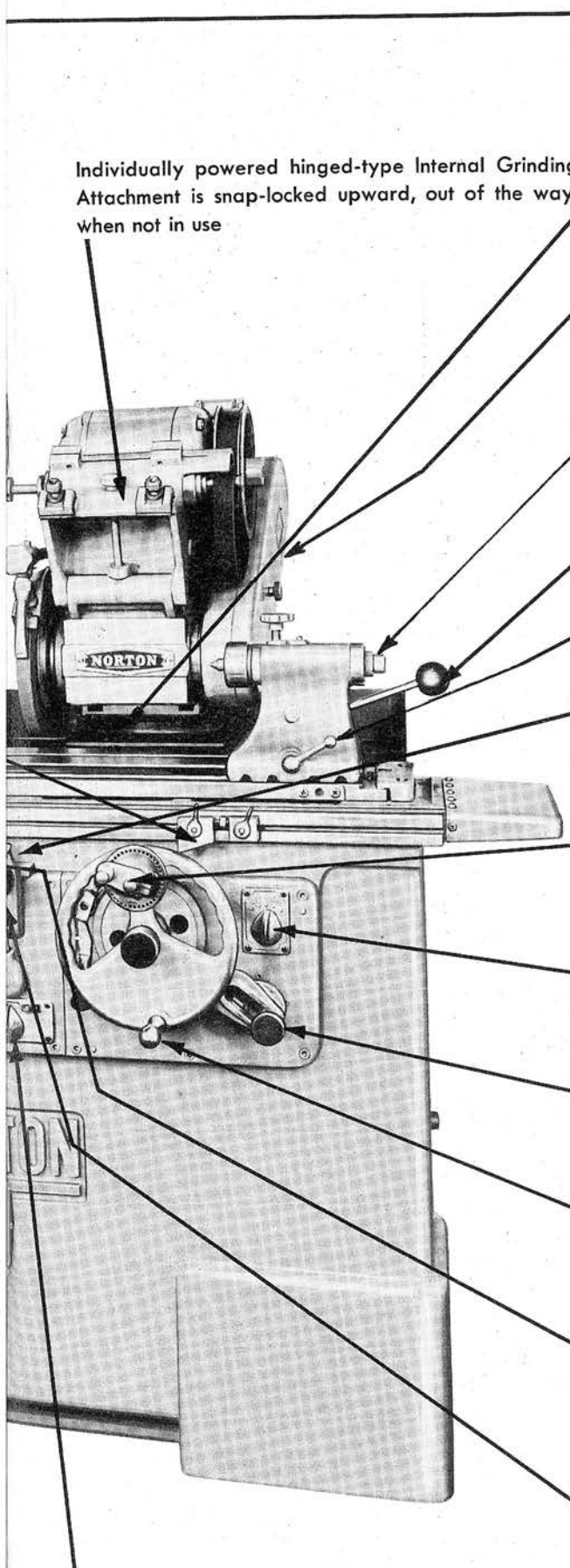
Separate controls permit selection of table dwell for right-hand and left-hand ends of table travel

Table Stop Dogs quickly set by hand



Quick-action Table Speed Control in center of operating position instantly provides desired speeds between 3" and 144" per minute





Individually powered hinged-type Internal Grinding Attachment is snap-locked upward, out of the way, when not in use

Wheel head mounted on double swivels, each being graduated to swivel  $360^\circ$  for quick and accurate setting

All guards are of quick-mount type to simplify either-end mounting of external grinding wheel

Accessible tension adjuster for Footstock Spindle Spring permits immediate selection of proper tension for job

Footstock Spindle Lever design assures easiest operation regardless of Footstock position

Footstock quickly hand clamped at any position along table

Dog-actuated Table Reverse Lever controls table traverse in normal traverse grinding

Feed increments quickly selected with target-type Indexing Mechanism, providing increments of  $.0001''$  in work diameter reduction

Picker Feed on-off selection by means of conveniently positioned flip-type control

Amount of automatic feed at table reversals quickly set by knurled knob

Wheel Feed Handwheel specially designed for ease of operation. One complete turn moves grinding wheel  $.050''$

Table Start-Stop Lever operates on short in-and-out motion. It will stop table traverse on pressure of operator's knee or body

Hand Operated Table Reverse Lever provides supplementary means of table control at will of operator

Pre-set Truing and Grinding Speed Control instantly gives best table speed for either function as determined from first piece of job

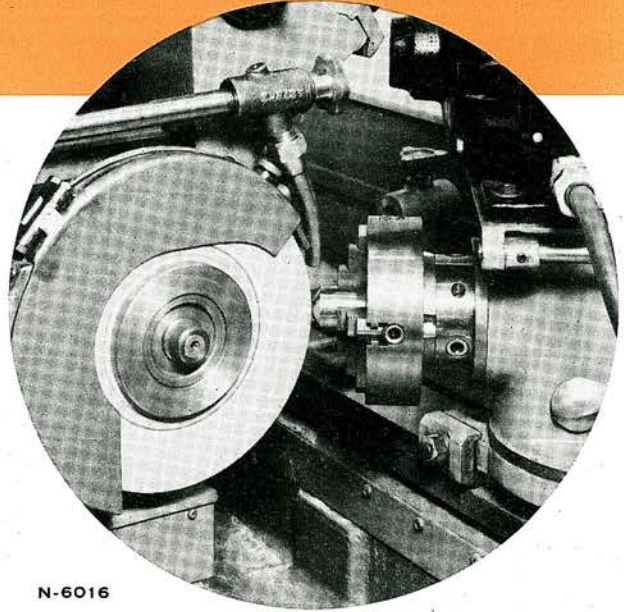


## set-up



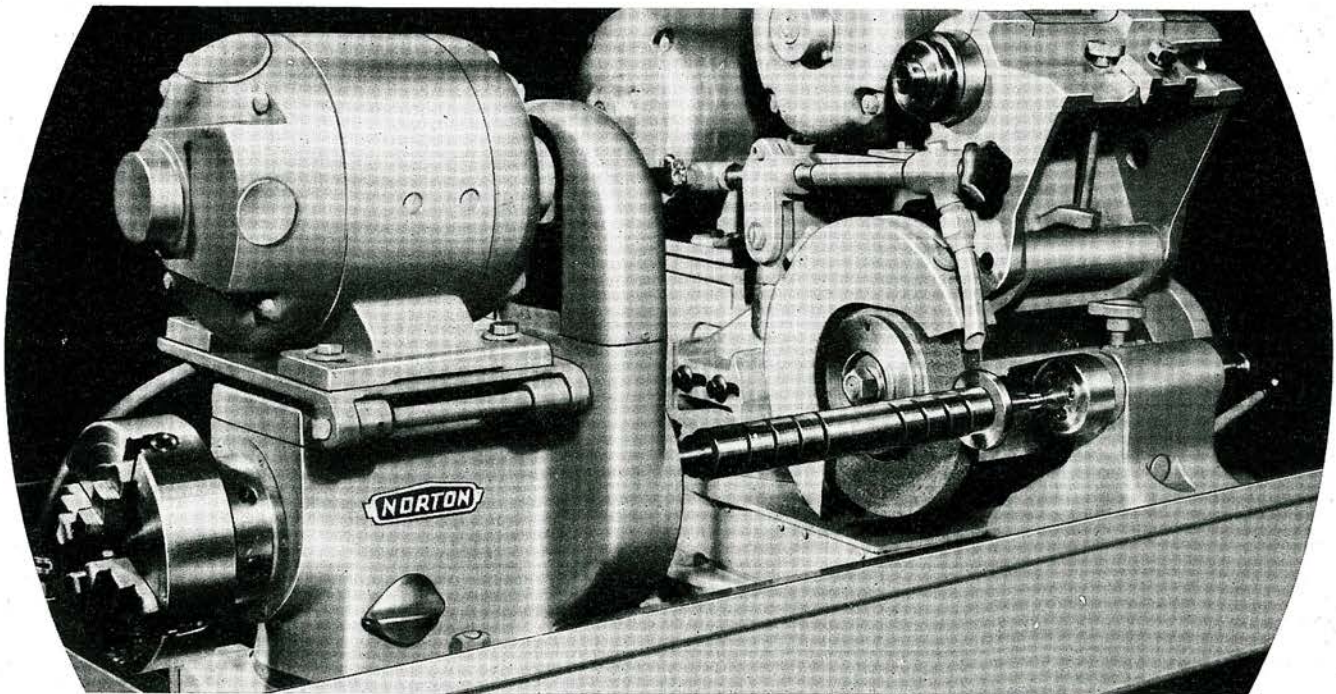
N-6826

Grinding shoulder on part held between centers. Note that the headstock and footstock positions have been interchanged for this particular job.



N-6016

Traverse grinding nose of a die held in chuck. The headstock is quickly swiveled for operations of this type, and chucking jobs are speedily performed because the chuck may be left mounted on one end of the spindle.



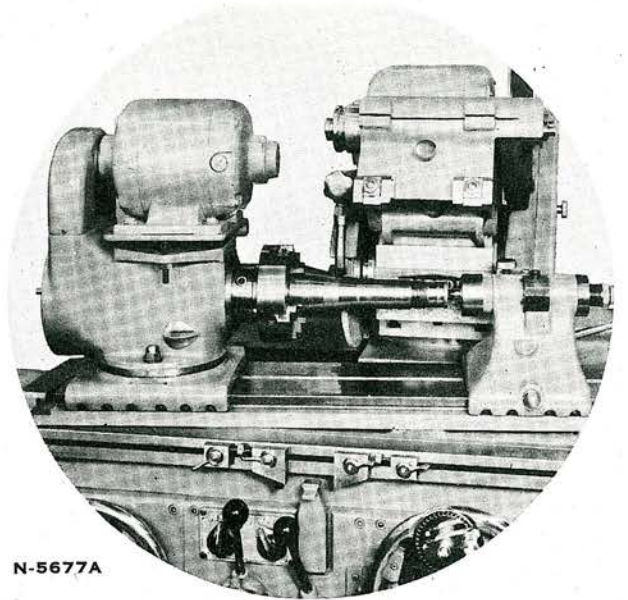
N-6825

Grinding with the headstock and footstock in conventional positions. Note that chuck may be left mounted on end of spindle for rapid performance of chucking jobs. Chuck remains inoperative when grinding on dead centers.

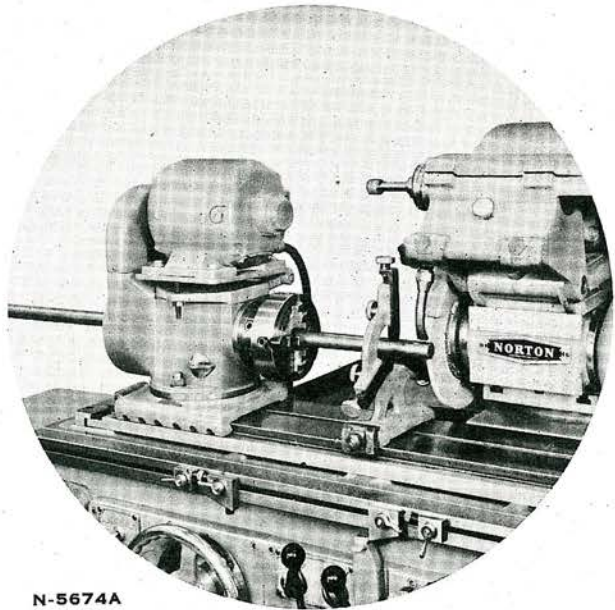


# versatility

Swiveling of table to grind taper on part held in a four jaw chuck on one end and supported by a footstock on the other end.

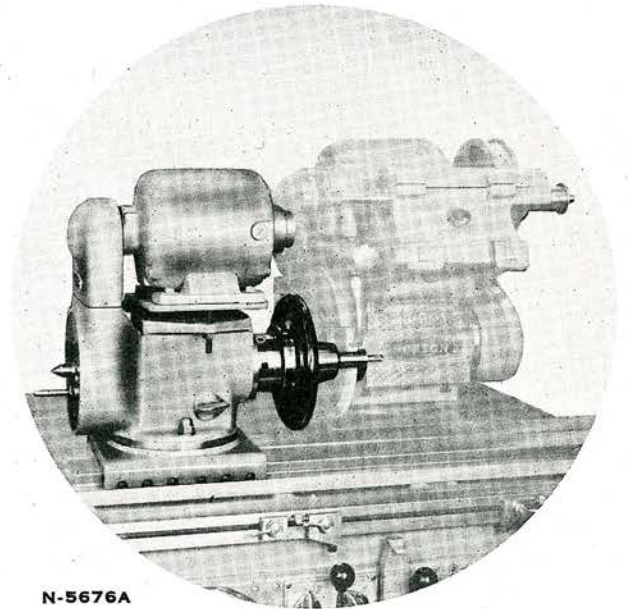


N-5677A



N-5674A

Long bar passing through headstock clamped in four jaw chuck and supported in grinding position by the center rest.

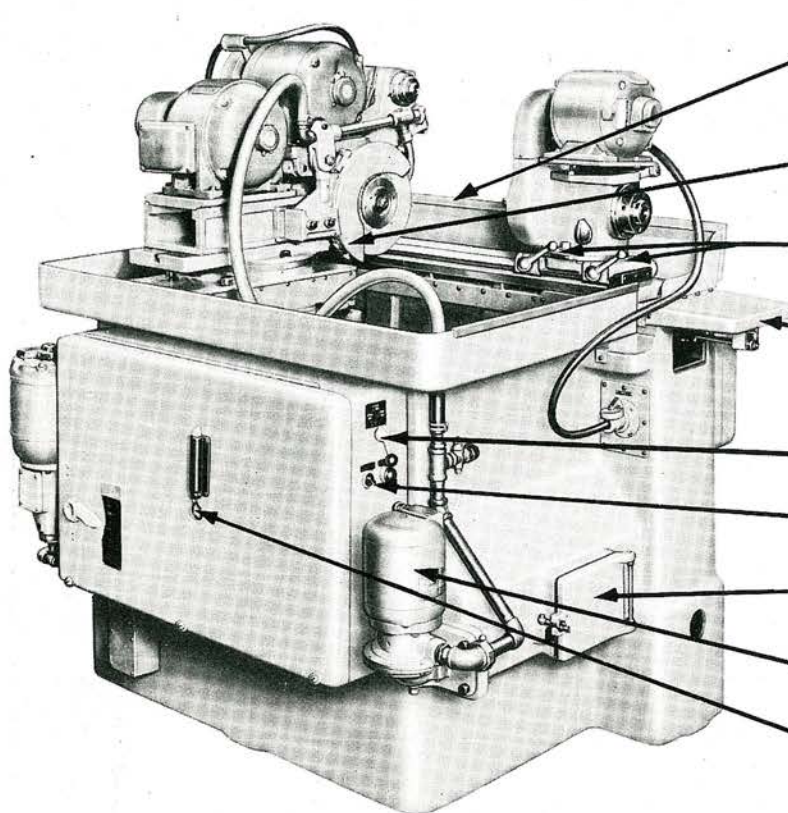


N-5676A

Grinding of a part held in a speed chuck. The part is easily clamped or released by stopping the motor, turning the spindle lock knob and rotating the handwheel on the chuck body.



# design highlights



- Hinged-type Water Guard for maximum operating convenience (shown in down position)
- Wheel Guard designed for quick-change mounting with wheel on either end of spindle
- Headstock hand clamped by quick-action levers
- Base ways completely protected by rigid guards
- Wheel rotation selector control
- Work rotation selector control
- Elevated coolant clean-out door for easy and speedy cleaning and coolant change
- Coolant Pump accessibly mounted
- Snap-catch for holding controls enclosure door in open position when inspecting controls

Internal Spindle quickly removed when desired by withdrawing hinge pin

Plug-in receptacles for Headstock and Internal Spindle motors

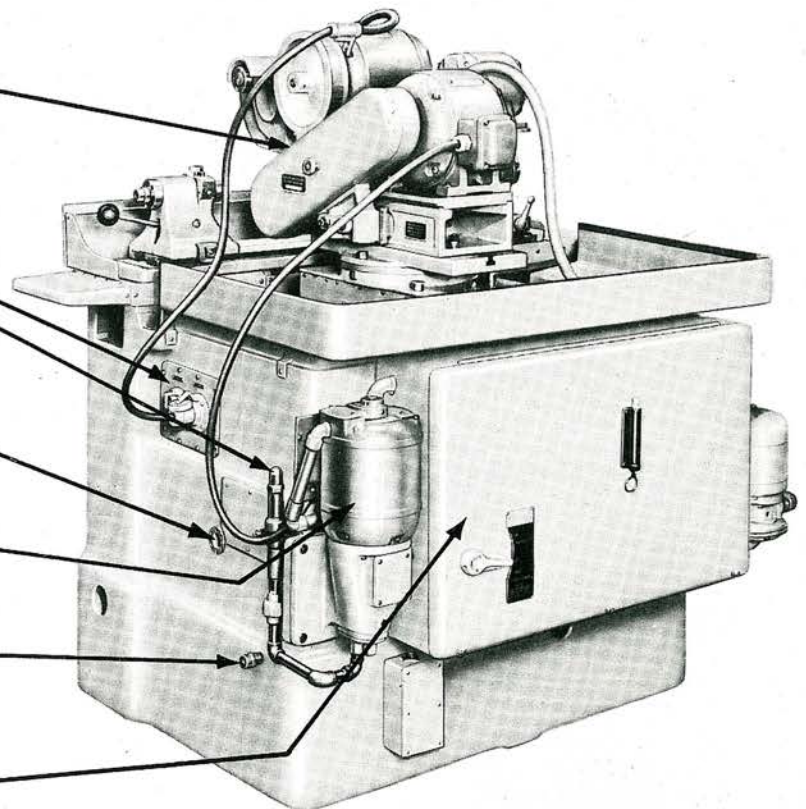
Accessible hydraulic pressure relief valve

Hydraulic Oil Reservoir sight gage

Hydraulic Pump motor unit mounted for maximum ease in maintenance

Hydraulic oil reservoir drain permits quick draining and flushing

Elevated Electrical Controls enclosure avoids floor-level dirt or moisture





## equipment and features included in price

Universal swivel work head (including No. 6 Jarno, carbide tipped, full center)

Lever type footstock (including No. 6 Jarno, carbide tipped, full center)

Wheel guard, 10"

Wheel sleeve—3" hole

Footstock type diamond toolholder (less diamond)

Table type diamond toolholder (less diamond)

Internal grinding attachment, hinged type, motor driven complete with PNC-3411 spindle and one quill (#P1183 unless otherwise specified)

6"—4 jaw independent chuck, cam lock type

Face plate for cam lock chuck

Center rest

2—Steadyrests

1—Set (2) work drive dogs (2½" and 4" capacity)

2—External grinding wheels (10" x 1" x 3")

1—Set internal grinding wheels (6—1¼" x 1" x ¾" or 6—1" x ¾" x ¼")

Hydraulic table traverse

Two speed hand table traverse with interlock

Swivel table

Universal wheel head with double swivels and double slides

Adjustable table dwell control

Permanently sealed anti-friction wheel spindle (cartridge type)

Double end wheel mounting arrangement

Automatic adjustable in-feed at each table reversal

Pre-set truing and grinding speed control

Hand grinding wheel feed

Complete coolant system

Wrenches, motor pulleys, and all protection guards

External wheel drive—1½ H.P., 3600 R.P.M. A.C. motor and control

Internal wheel drive—1 H.P., 3600 R.P.M. A.C. motor and control

Work drive—¼ H.P. D.C., 115-1150 R.P.M. adjustable speed motor operated from A.C. power circuit

Hydraulic pump drive—½ H.P. 1800 R.P.M. A.C. motor and control

Coolant pump drive—¼ H.P., 1800 R.P.M. A.C. integral type motor and control

Motors included in price of this machine are 50 or 60 cycle, with controls for any voltage up to 600 volts except where specifically noted D.C. These motors and controls are in accordance with Machine Tool Electrical Standards.

Note:—Due to the interrelationships in the function of this machine it is necessary that we supply all electrical equipment. Entire machine operates from A.C. power—NO D.C. necessary.

## extra equipment available

### WHEEL TRUING DEVICE (Without diamond)

Radial truing device, table type

### WHEEL BALANCING EQUIPMENT

Balancing arbor

Balancing stand

### TABLE STOP

Positive stop for table with micrometer screw

### DIAL INDICATOR ARRANGEMENT

For swivel table adjustment

### EXTRA CENTERS

Footstock, half center, No. 6 Jarno, carbide tipped

### EXTRA INTERNAL GRINDING QUILLS

(See listing on next page)

### CHUCKS

"Sjogren" collet chuck with 6 collets (⅛", ½", ⅝", ¾", ⅞", 1")

Extra collets for above

"Walker" permanent magnet, rotary type #7R (7" diameter with adapter)

"Walker" magnetic chuck, rotary type (must operate on D.C.)

7⅜" dia.

8⅜" dia.

"Jacobs" camlock chuck for "Rubber-Flex" collets 1/16" to 1⅜" capacity

"Rubber-Flex" collets for above:

1/16" - 1/8"	3/4" - 7/8"
1/8" - 1/4"	7/8" - 1"
1/4" - 3/8"	1" - 1 1/8"
3/8" - 1/2"	1 1/8" - 1 1/4"
1/2" - 5/8"	1 1/4" - 1 3/8"
5/8" - 3/4"	

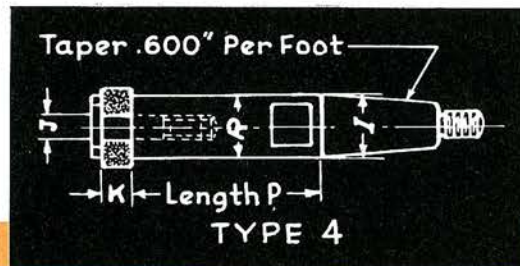
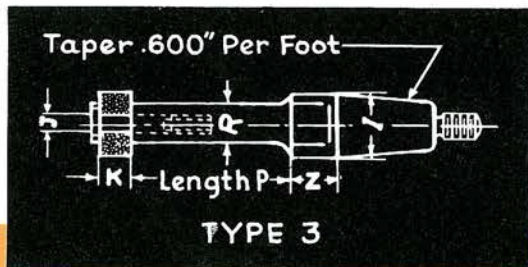
RECTIFIERS, "Electro-Matic" (for above D.C. chucks)

60 cycle

50 cycle



# internal grinding quills



SPINDLE #PNC3411 — 15,000 R.P.M.  
DIAMETER 1, LARGE END OF TAPER — 3/4"

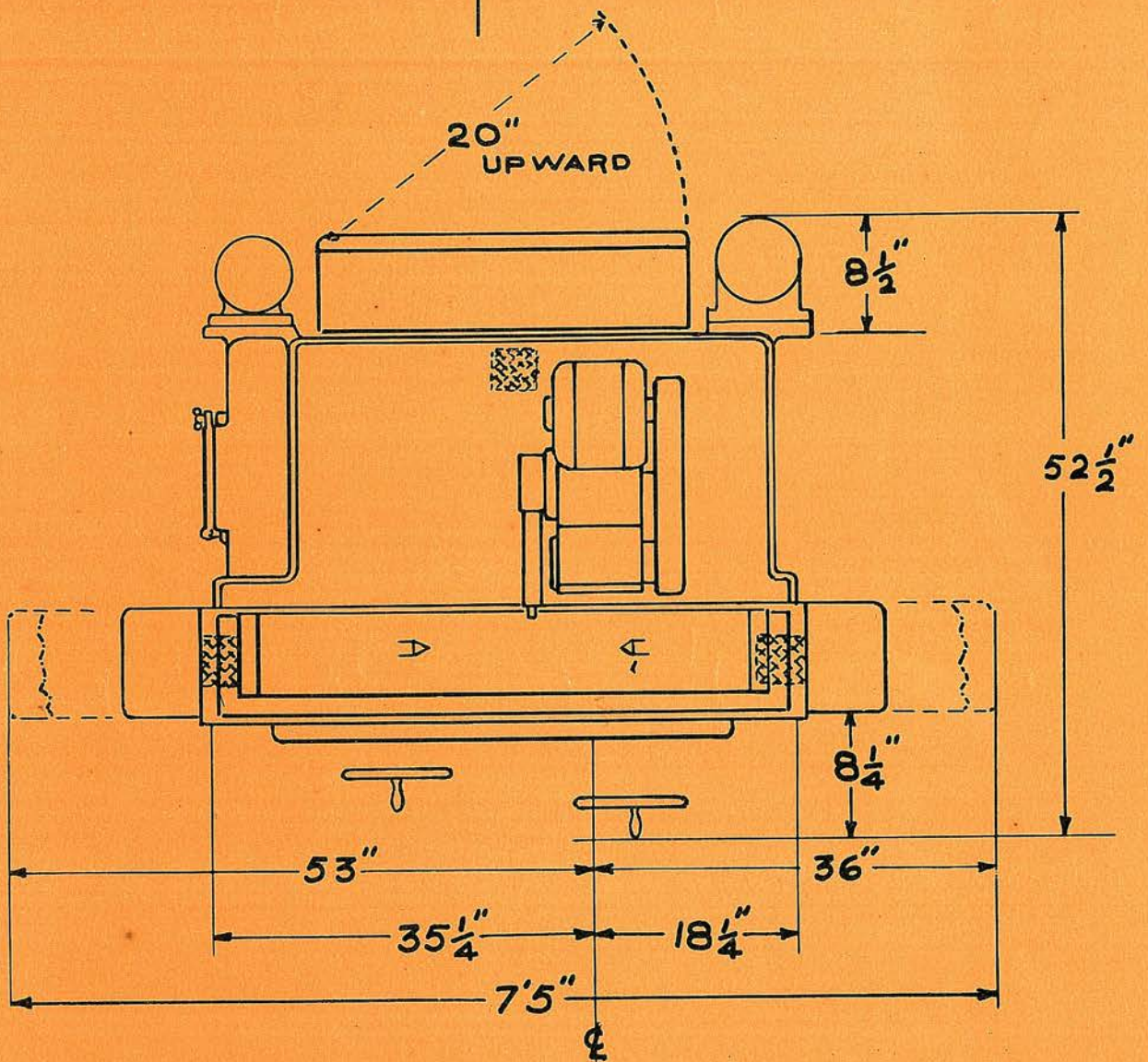
Length of Wrench Flat Z.	ARBOR Style No.	Type No.	Projection		Wheel Retain- ing Screw Diameter J.	Grinding Wheel Width of Face K.
			Diameter R.	Length P.		
1/4"	P-1155	3	3/8"	1 "	3/16"*	5/8"
	P-1156	3	3/8"	1-1/2"	3/16"*	5/8"
	P-1157	3	3/8"	2 "	3/16"*	5/8"
	P-1158	3	7/16"	1 "	1/4"	3/4"
	P-1159	3	7/16"	1-1/2"	1/4"	3/4"
	P-1160	3	7/16"	2 "	1/4"	3/4"
	P-1161	3	1/2"	1 "	1/4"	3/4"
	P-1162	3	1/2"	1-1/2"	1/4"	3/4"
	P-1163	3	1/2"	2 "	1/4"	3/4"
	P-1164	3	1/2"	2-1/2"	1/4"	3/4"
	P-1165	3	9/16"	1 "	1/4"	3/4"
	P-1166	3	9/16"	1-1/2"	1/4"	3/4"
	P-1167	3	9/16"	2 "	1/4"	3/4"
	P-1168	3	9/16"	2-1/2"	1/4"	3/4"
	P-1169	3	5/8"	1 "	3/8"	1 "
	P-1170	3	5/8"	1-1/2"	3/8"	1 "
	P-1171	3	5/8"	2 "	3/8"	1 "
	P-1172	3	5/8"	2-1/2"	3/8"	1 "
	P-1173	3	5/8"	3 "	3/8"	1 "
	P-1174	3	11/16"	1 "	3/8"	1 "
	P-1175	3	11/16"	1-1/2"	3/8"	1 "
	P-1176	3	11/16"	2 "	3/8"	1 "
	P-1177	3	11/16"	2-1/2"	3/8"	1 "
	P-1178	3	11/16"	3 "	3/8"	1 "
	P-1179	4	3/4"	1 "	3/8"	1 "
	P-1180	4	3/4"	1-3/4"	3/8"	1 "
	P-1181	4	3/4"	2-1/2"	3/8"	1 "
	P-1182	4	3/4"	3-1/4"	3/8"	1 "
	P-1183	4	3/4"	4 "	3/8"	1 "

\*NON-STANDARD WHEELS.

QUILLS LONGER THAN STANDARD ARE QUOTED UPON REQUEST.



# erecting drawing





# specifications

## CAPACITY

Maximum swing .....	10-31/32"
Nominal swing .....	10"
Nominal lengths between centers .....	20"
Maximum distance from internal spindle axis to work spindle axis	
In front of work spindle axis .....	3 1/4"
In back of work spindle axis .....	5 1/2"
Maximum diameter of work that can be ground with a 10" grinding wheel .....	10"
Standard grinding wheels .....	Straight Type I
Size .....	10 x 1 x 3"
Wheel guard capacity .....	10 x 1"
Steadyrests	
Maximum work diameter accommodated .....	2 1/2"
Center rests	
Maximum diameter accommodated .....	2 1/2"
Taper Graduations:	
Inches per foot, on diameter .....	3"
Coolant tank capacity .....	28 gals.
Hydraulic oil capacity .....	35 gals.

## HEADSTOCK

Type .....	Self-contained, Universal
Spindle, taper hole both ends .....	No. 10 Jarno
(No. 6 to No. 10 Jarno adaptor furnished as standard equipment)	

## MOTORS

External Wheel Drive .....	1 1/2 h.p.,	60 cycle	50 cycle
Internal Wheel Drive .....	1 h.p.,	3600 r.p.m.	3000 r.p.m.
Work Drive (Electronic Control from AC Power Supply) .....	1/4 h.p.,	3600 r.p.m.	3000 r.p.m.
Hydraulic Pump Drive .....	1/2 h.p.,	115-1150 r.p.m. adjustable speed	
Coolant Pump Drive .....	1/4 h.p.,	1800 r.p.m.	1500 r.p.m.
		1800 r.p.m.	1500 r.p.m.

## FLOOR SPACE

Floor space .....	75 1/2" x 89"
-------------------	---------------

## SHIPPING SPECIFICATIONS

Net weight .....	4000
Domestic shipping weight .....	4800
Foreign shipping weight .....	5200
Cubics .....	182

Because of variations in equipment and castings, exact weights and cubics cannot be given. The above weights are in pounds; cubics are in cubic feet. Motor weights are included.

The descriptions, illustrations and specifications in this booklet are correct at the time of printing. Machines built at later dates may differ in detail due to the policy of Norton Company to constantly improve its machines.

Work speed range .....	50 to 500 r.p.m.
Headstock swivels .....	360°

## FOOTSTOCK

Taper hole .....	No. 6 Jarno
------------------	-------------

## WHEEL HEAD

Wheel head, upper swivel .....	Swivels 360°
Wheel head, lower swivel .....	Swivels 90° each way

## WHEEL SPINDLE

Type .....	Anti-friction, Cartridge
Spindle speeds, 2 .....	2300, 2800 r.p.m.
Spindle drive from motor .....	Single belt

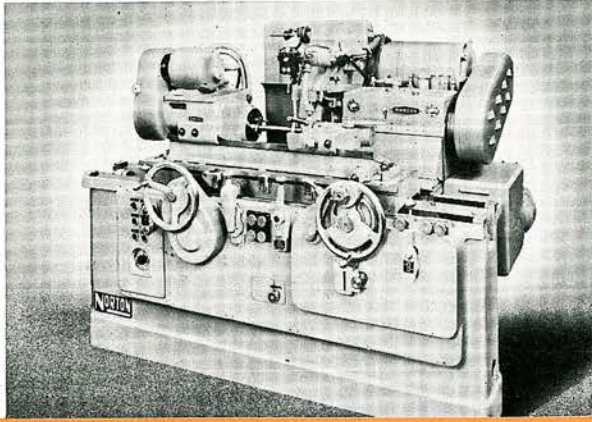
## WHEEL FEED

Work diameter reduction, hand feed indexes to .....	.0001"
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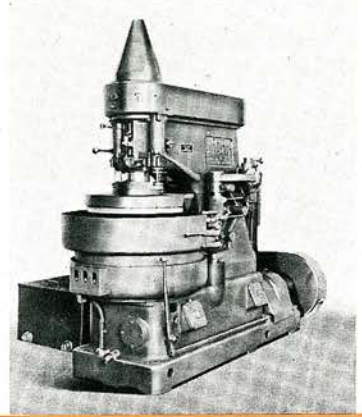
## SLIDING TABLE AND TRAVERSE SPEEDS

Traverse speeds (hydraulic valve control) .....	3" to 144" per min.
Lubrication of table ways .....	Pressure feed

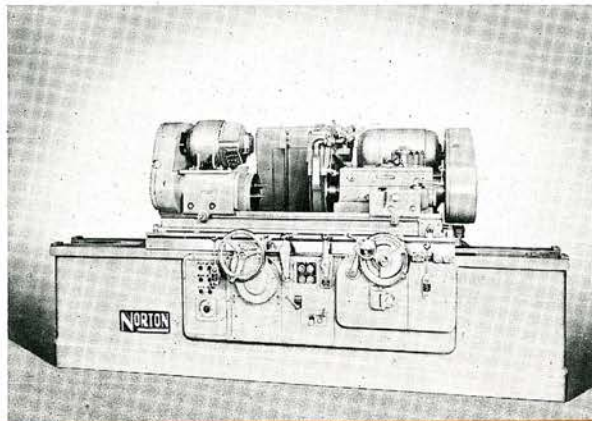




**6" x 18" SEMIAUTOMATIC  
CYLINDRICAL GRINDER**



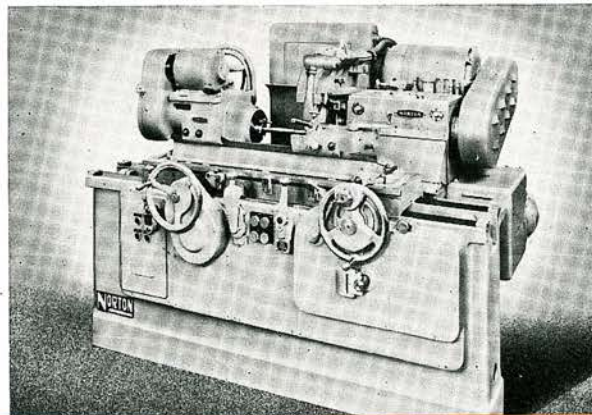
**No. 26 HYPROLAP  
LAPPING MACHINE**



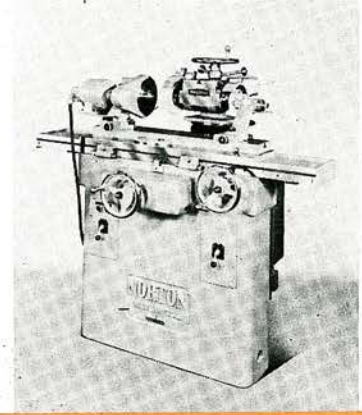
**10" x 36" TYPE CTU SEMIAUTOMATIC  
CYLINDRICAL GRINDER**



**8" x 24" SURFACE  
GRINDER**



**6" x 18" CYLINDRICAL  
GRINDER**



**No. 20 CUTTER AND  
TOOL GRINDER**



## PRODUCTS

ABRASIVES • GRINDING WHEELS • REFRACTORIES • FLOOR AND  
STAIR TILE • AGGREGATES • NORBIDE PRODUCTS • ENCAPSULAT-  
ING MACHINES

## MACHINES FOR

CYLINDRICAL GRINDING • SURFACE GRINDING • CYLINDRICAL  
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