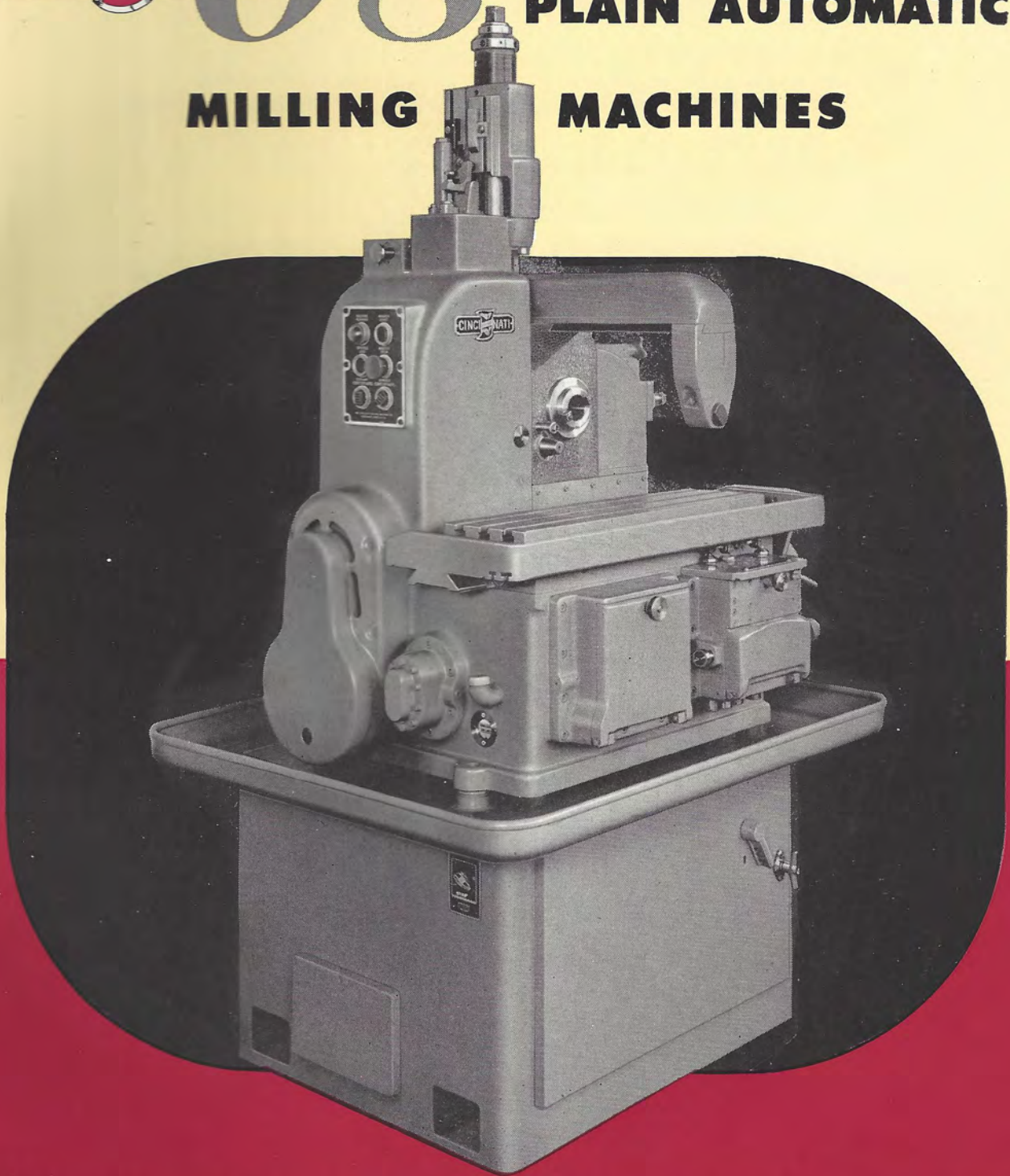


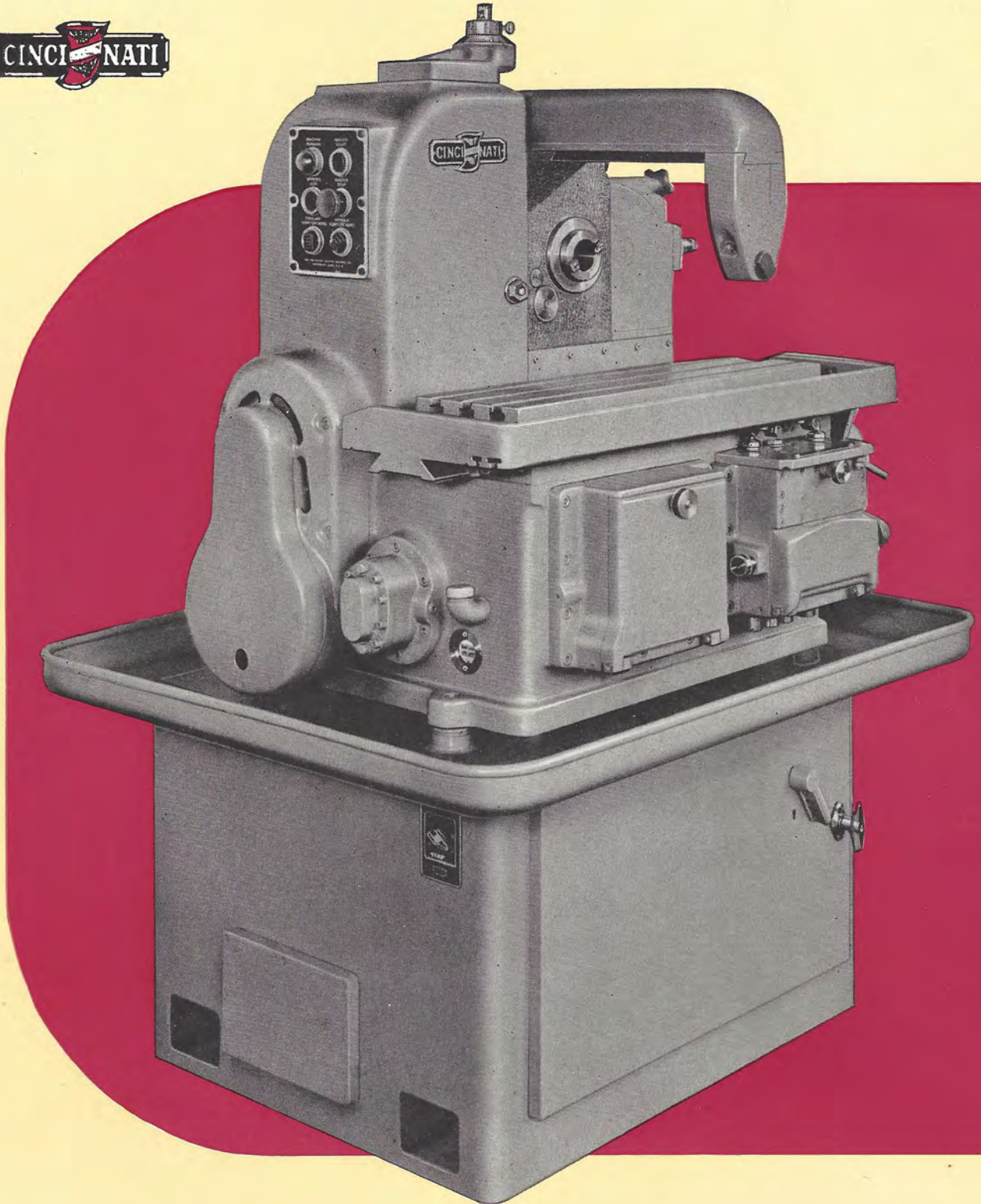


0-8

PLAIN AUTOMATIC MILLING MACHINES



THE CINCINNATI MILLING MACHINE CO • CINCINNATI 9, OHIO, U. S. A.



O-8 PLAIN AUTOMATIC without rise and fall spindle carrier

HIGHLIGHTS OF DESIGN...

and Accruing Benefits

FOR BASIC MACHINES WITH OR WITHOUT HYDRAULIC RISE AND FALL MECHANISM

1. COMPLETE OPERATING CYCLE FUNCTIONS AUTOMATICALLY, started with one lever. No excess time-consuming motions.
2. TABLE POWER RAPID TRAVERSE, 400" PER MINUTE. Minimizes "cutting air."
3. TABLE FEED TRIPS VERY ACCURATELY, assuring accurate length of cut.
4. SIXTEEN TABLE FEEDS, 1/2" to 20" per minute, changed with pick-off gears.
5. TWENTY SPINDLE SPEEDS, 80 to 3000 rpm; 10 speeds are direct V-belt drive—no gear contacts; 10 speeds are by V-belt and back gears—only 2 gear contacts.
6. AUTOMATIC BACKLASH ELIMINATOR. "Climb" cutting operations may be handled.
7. AUTOMATIC SPINDLE STOP, an important safety factor for the operator.
8. SPINDLE HAS DOUBLE MOUNTING OF ANTI-FRICTION BEARINGS, front and rear, self-compensating for axial expansion and contraction.
9. COMPLETE AUTOMATIC LUBRICATION reduces maintenance and increases useful life of machine.

PATENT NOTICE—The machines and attachments illustrated and described in this booklet are protected by issued and pending United States and Foreign patents. The design and specifications of the machines illustrated herein are subject to change without notice.

Compact and completely automatic, with "finger-tip" cycle starting lever, the 0-8's are ideally suited to "battery" operation. One man can operate several machines with a minimum of lost motion.


The basic machine, without rise and fall spindle carrier, is exceptionally efficient for simple milling cuts on small parts for which automatic table cycles can be used to advantage.

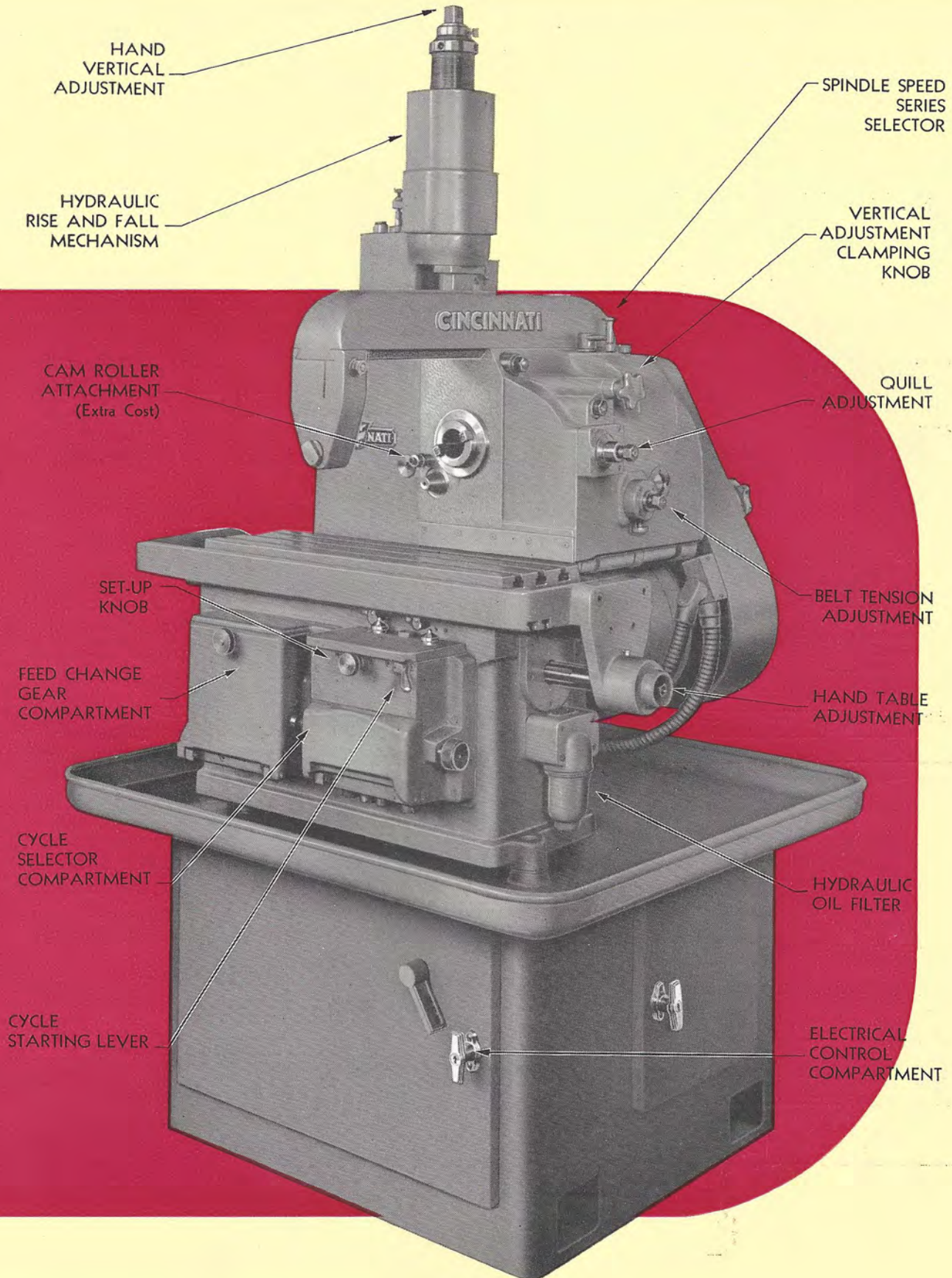
HIGHLIGHTS OF DESIGN

ADDITIONAL HIGHLIGHTS FOR MACHINES WITH HYDRAULIC RISE AND FALL MECHANISM

10. VERTICAL ADVANCE AND RETRACTION OF CUTTER AUTOMATICALLY CONTROLLED [AND TIMED WITH TABLE MOVEMENT. Desirable for work having projections which do not permit table to traverse directly into cut, and for work requiring vertical feed to depth. Retraction of cutter before rapid return of table also prevents marring finished surface.
11. SPINDLE CARRIER FEEDS AND TABLE FEEDS INDEPENDENT OF EACH OTHER.
12. DOG-CONTROLLED INTERMITTENT TABLE FEED CYCLES, TIMED WITH RISE AND FALL MOVEMENT OF SPINDLE CARRIER. Eliminates close attention by operator; one man may handle several machines.
13. POWER RAPID RISE AND FALL MOVEMENT OF SPINDLE CARRIER, 80" per minute. Minimizes "cutting air".
14. POWER VERTICAL FEED OF SPINDLE CARRIER, infinitely variable 1" to 10" per minute (down only), to positive stop. Assures accurate depth of cut at the correct feed rate for the job.
15. SPINDLE CARRIER AUTOMATICALLY CLAMPED TO HEADSTOCK DURING TABLE FEED CUT.



 PLAIN AUTOMATIC MILLING



HAND
VERTICAL
ADJUSTMENT

HYDRAULIC
RISE AND FALL
MECHANISM

CAM ROLLER
ATTACHMENT
(Extra Cost)

SET-UP
KNOB

FEED CHANGE
GEAR
COMPARTMENT

CYCLE
SELECTOR
COMPARTMENT

CYCLE
STARTING LEVER

SPINDLE SPEED
SERIES
SELECTOR

VERTICAL
ADJUSTMENT
CLAMPING
KNOB

QUILL
ADJUSTMENT

BELT TENSION
ADJUSTMENT

HAND TABLE
ADJUSTMENT

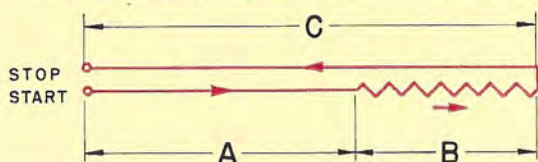
HYDRAULIC
OIL FILTER

ELECTRICAL
CONTROL
COMPARTMENT

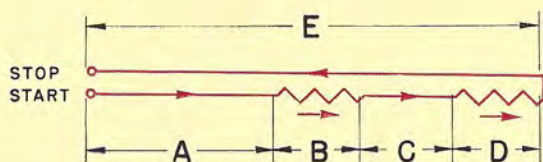
MACHINE... with rise and fall spindle carrier

Automatic Cycles . . .

WITH OR WITHOUT RISE & FALL SPINDLE CARRIER

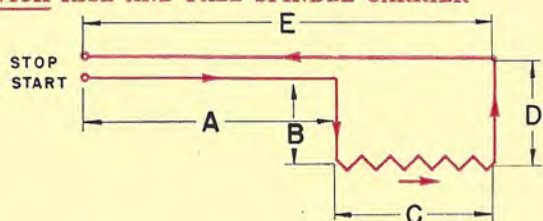


- Start cycle.
 A—Rapid advance table right.
 B—Feed table right.
 C—Rapid return table left.
 Stop cycle.

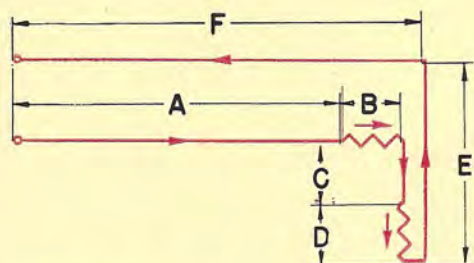


- Start cycle.
 A—Rapid advance table right.
 B—Feed table right.
 C—Rapid advance table right.
 D—Feed table right.
 E—Rapid return table left.
 Stop cycle.

WITH RISE AND FALL SPINDLE CARRIER



- Start cycle.
 A—Rapid advance table right.
 B—Stop table. Rapid advance spindle carrier down against positive stop.
 C—Feed table right.
 D—Stop table. Rapid return spindle carrier to top of stroke.
 E—Rapid return table left.
 Stop cycle.



- Start cycle.
 A—Rapid advance table right.
 B—Feed table right to accurate position.
 C—(Stop table. Rapid advance spindle carrier and feed spindle carrier to depth of cut against positive stop.
 D—positive stop.
 E—Rapid return spindle carrier to top of stroke.
 F—Rapid return table left.
 Stop cycle.

Wide Variety of Automatic Cycles . . . Quickly Changed

An extremely wide range of automatic cycles, either simple or complex, are controlled by a small hydraulic valve unit on the front of the bed.

This unit, actuated by the dogs under the front edge of the table, controls all functions of the table, and vertical movements of the spindle carrier for machines equipped with rise and fall mechanism.

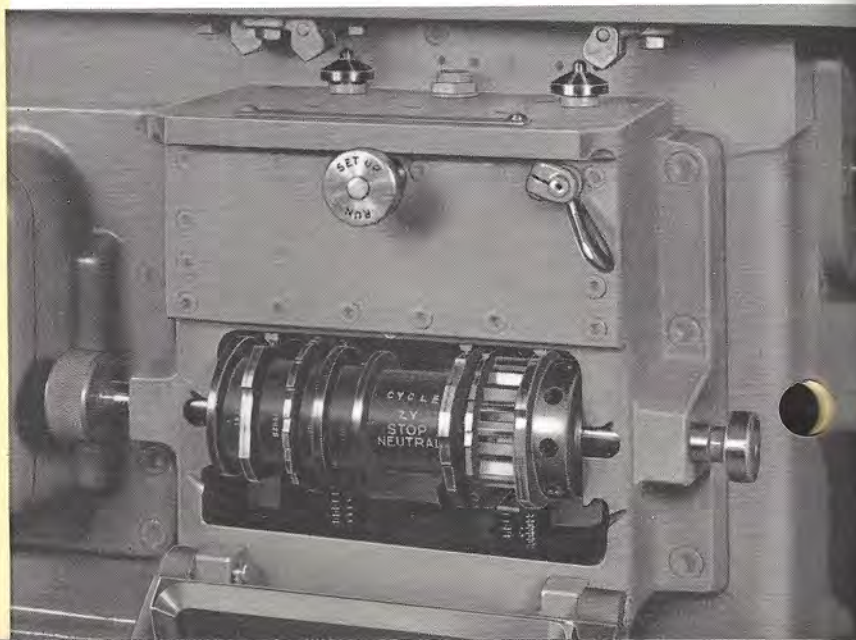
Changes of set-up from one cycle to another are accomplished so easily and quickly that even small quantities of parts can be produced economically.

The cycle selector (a pre-adjusted camshaft assembly) selects automatically the pre-determined function of a given automatic feed cycle.

When a different feed cycle is desired, the cycle selector may easily be replaced by another in less than a minute. A separate cycle selector may be obtained for each different feed cycle (sequence of operations) employed.

Standard cycles are considered as having feed from left to right, although feed in either direction may be obtained. The direction of feed is determined by the cycle selector.

● Control Unit with Door Open to Show Cycle Selector



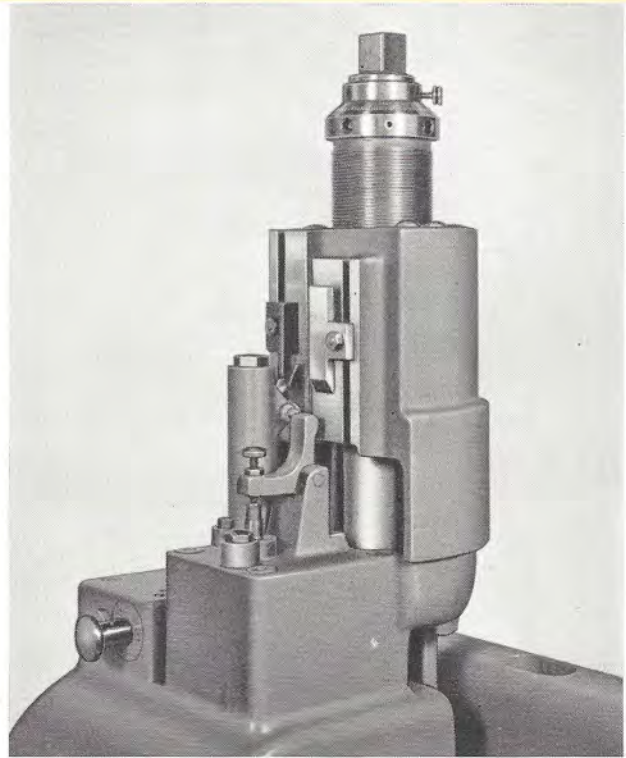
Rise and Fall Mechanism ♦ ♦ ♦

Extreme Flexibility with Rise and Fall Spindle Carrier

Automatic vertical movements of the spindle carrier, synchronized with table movements, provide a number of additional functions not ordinarily associated with automatic bed-type milling machines:

- automatic vertical feed to depth.
- "blind" cuts behind obstacles in work or fixture.
- retraction of cutter before rapid return of table to prevent marring the finished surface.

These automatic features are obtained on machines equipped with the hydraulic rise and fall mechanism. Consisting of an hydraulic cylinder and valving mounted in a bracket on top of the machine column, this mechanism makes possible a $2\frac{1}{2}$ " power vertical movement of the spindle carrier. The cutter approach to the work may be at a rapid rate of 80" per minute, an infinitely variable feed rate of 1" to 10" per minute, or varying combinations of both. An adjustable positive stop assures repeated accuracy of depth of cut. The cutter retraction from the work is always at the rapid rate of 80" per minute.



● Hydraulic Rise and Fall Mechanism for Spindle Carrier

The $2\frac{1}{2}$ " power movement may be utilized over any portion of the 7" total vertical range of spindle carrier movement.

On machines equipped with this mechanism, automatic hydraulic clamping of the spindle carrier in the cutting position replaces the hand clamping used on the basic machine without automatic rise and fall spindle carrier.

Profile Shapes Obtained Automatically . . . Accurately

The machine may be equipped (at extra cost) with the Cam Roller Attachment for automatic milling of profile shapes. The device consists of a tapered roller mounted in the spindle carrier, with graduated dial adjustment to compensate for cutter sharpening. During the feeding stroke of the table, the roller is held in engagement with a cam of the desired profile, bolted to the work-holding fixture. As the table moves, the cam raises or lowers the spindle carrier to reproduce its profile on the workpiece. This device will accurately handle all profile jobs within its range provided that the maximum rise does not exceed 30° with the horizontal.

Speeds and Feeds ♦♦♦



● Spindle Drive Compartment with Cover Open

Smooth Efficient Table Drive

Sixteen feed rates are obtainable in three different series which are optional at the time order is placed. Standard feed rates are considered to be $\frac{1}{2}$ " to 20" per minute. The optional series are 1" to 40" per minute and 2" to 80" per minute.

The use of helical gears on the higher speed shafts provides smooth, quiet operation. Hydraulically actuated multiple-disc type clutches for feed and rapid traverse assure efficient, positive drive for the life of the machine; never require adjustment.

Feed rates are changed by pick-off gears behind a hinged cover at the front of the machine. A built-in safety switch automatically stops the machine when the cover is opened. The sixteen feeds are obtained with four change gears and a unique built-in back gear arrangement which is engaged by reversing the position of the pick-off gears.

Unusually Wide Range of Speeds

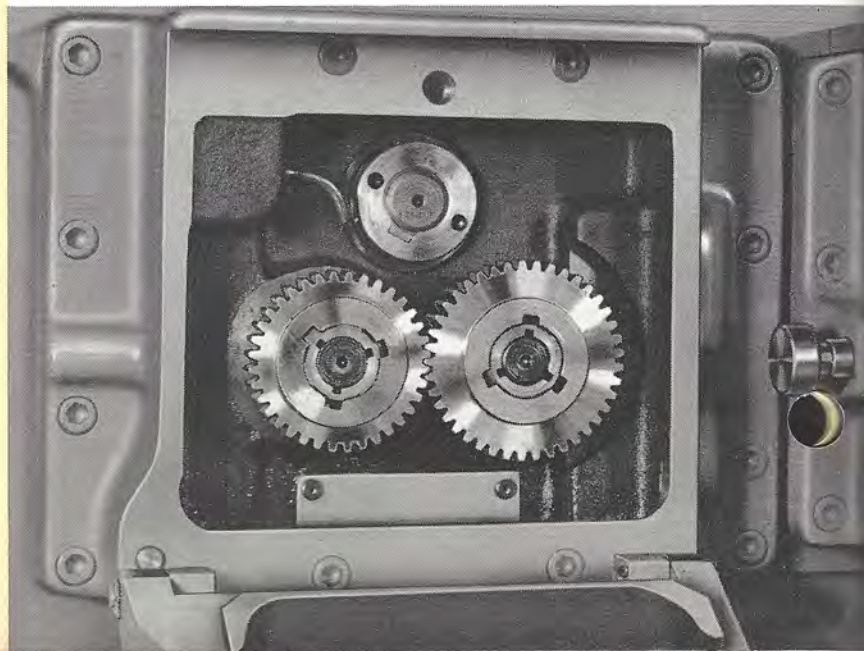
The machine has a unique spindle drive which provides an unusually wide range of speeds; twenty speeds are available from 80 to 3000 rpm.

The speeds are divided into two series: a low series from 80 to 449 rpm and a high series from 538 to 3000 rpm. In the high series, the spindle is driven by V-belt, the spindle being clutched directly to the driven shaft. In the low series the spindle is driven by the V-belt through a back gear arrangement embodying only two gear contacts.

Within each series the speeds are changed by shifting the V-belt. The driving sheave is mounted on a spline shaft in a unique, free-floating arrangement which permits alignment of any particular groove with any of three grooves in the driven sheave. Three speed changes may thus be made from each of the two inner grooves of the driving sheave, two speeds from each of the outer grooves, to give 10 speeds in each series.

The driving motor is carried beneath the spindle carrier unit on a hinged type mount, and adjustment of motor position for the various sheave combinations is quickly accomplished by means of an acme screw mechanism.

● Table Feed Change Gears



Other Important Features . . .

Automatic Lubrication Reduces Wear and Maintenance

Even the most inexperienced operator cannot harm this machine by overlooking the lubrication of important bearings.

Complete—automatic—positive! All bearings are lubricated from a central system by a combination of pressure circulation and splash. Lubricant is continuously filtered before distribution to the various bearings. Requiring only occasional cleaning of the filter, this system allows your operator to concentrate all of his time and attention to the actual operation of the machine.

The Cutter Stops at the Point of Maximum Safety

Maximum protection for the operator while loading and unloading the fixture is provided by the automatic spindle stop supplied as standard with the machine. The spindle drive motor is equipped with a multiple disc type hydraulic brake to provide instantaneous stopping at any predetermined point in the automatic feed cycle (controlled by the arrangement of cams on the cycle selector). The standard arrangement starts the spindle at the beginning of the cycle and stops it during the rapid return stroke of the table.

Conventional Milling or Climb Cuts with Backlash Elimination

The multiple advantages of "climb" or down-milling operations are made available through the use of the Automatic Backlash Eliminator (supplied as standard equipment). Inactive in rapid traverse, or in a conventional milling cut, the "hooking-in" action of the cutter in a "climb" cut immediately causes this device to function.

A pair of table-driving nuts mounted on the rotating leadscrew are automatically rotated in opposite directions, thereby creating a snug fit between the leadscrew and nuts—the basic requirement for "climb" cutting.

Built-in Coolant System (Extra Cost)

An individually motor driven coolant pump is available at extra cost. The coolant reservoir is built into the base of the machine and the coolant pump is mounted in a compartment within the base, hidden, yet easily accessible. When this item is supplied, a three-position switch on the control panel permits the selection of continuous coolant flow, complete shut-off, or automatic operation in which the starting or stopping of coolant flow is synchronized with the automatic feed cycle of the machine.



Conventional, or Up Milling . . .



Climb, or Down Milling . . .

PC-334

Dimensional Drawing ***

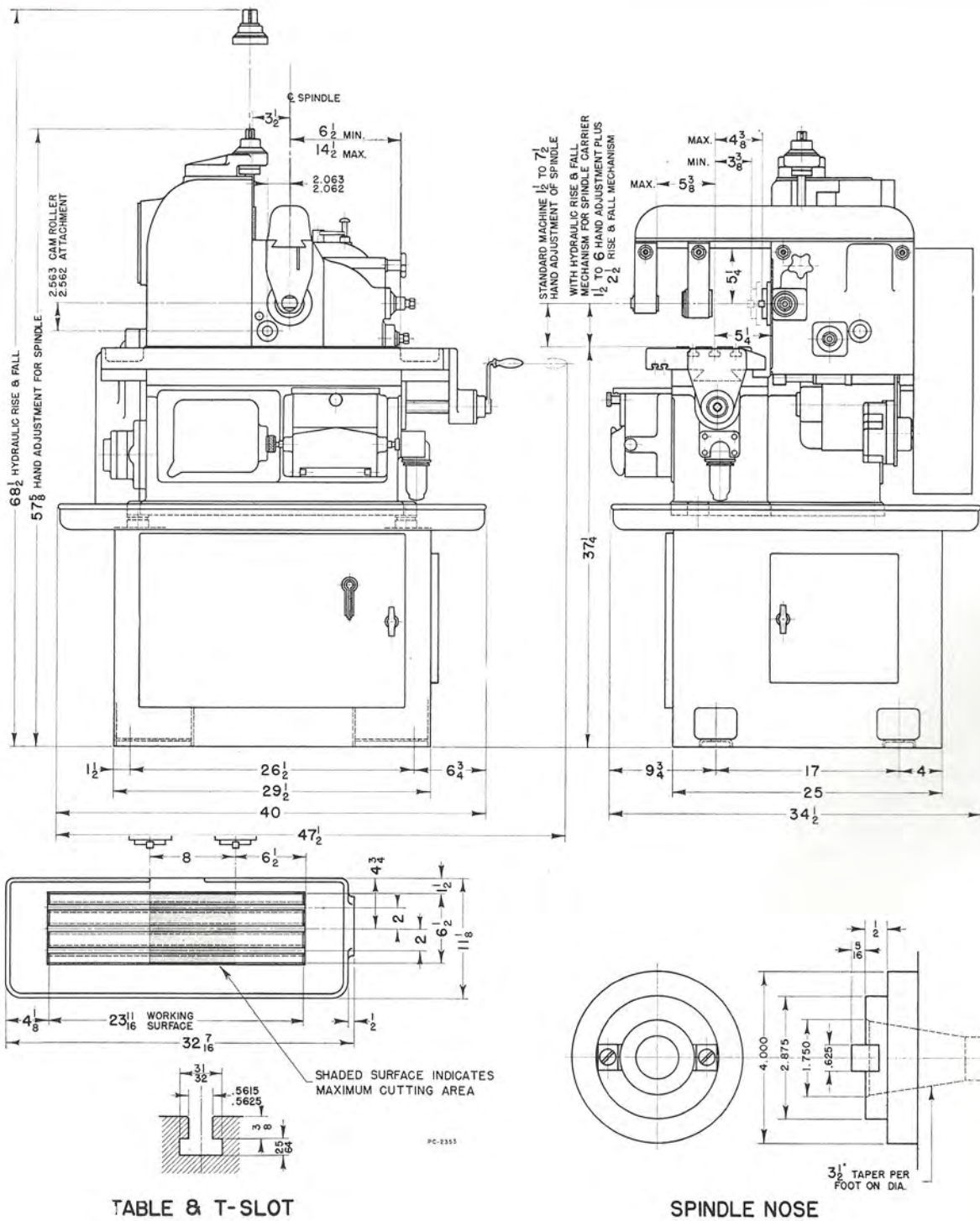


TABLE & T-SLOT

SPINDLE NOSE



O-8 PLAIN AUTOMATIC MILLING MACHINE

General Specifications * * * (MODEL OL)

	Machine without Rise and Fall Spindle Carrier	Machine with Rise and Fall Spindle Carrier
TABLE		
Working surface	6 $\frac{1}{2}$ " x 23 $\frac{11}{16}$ "	6 $\frac{1}{2}$ " x 23 $\frac{11}{16}$ "
Size overall	11 $\frac{1}{8}$ " x 32 $\frac{7}{16}$ "	11 $\frac{1}{8}$ " x 32 $\frac{7}{16}$ "
T-slots (number and size)	Three— $\frac{9}{16}$ " wide	Three— $\frac{9}{16}$ " wide
Distance between slots	2"	2"
RANGE		
Longitudinal (power table travel)	8"	8"
Vertical movement of spindle carrier—hand	6"	4 $\frac{1}{2}$ "
Power (automatic) vertical movement of spindle carrier	2 $\frac{1}{2}$ "
Maximum distance from centerline of spindle to table	7 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "
Minimum distance from centerline of spindle to table	1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "
Distance from centerline of table to face of spindle carrier	5 $\frac{1}{4}$ "	5 $\frac{1}{4}$ "
FULL WIDTH		
Maximum distance from spindle nose to inside of arbor support	9 $\frac{3}{4}$ "	9 $\frac{3}{4}$ "
Maximum distance from spindle carrier face to inside of arbor support	10 $\frac{5}{8}$ "	10 $\frac{5}{8}$ "
QUILL		
Adjustment, hand traverse	1"	1"
Diameter	4"	4"
Maximum distance from spindle nose to centerline of table	4 $\frac{3}{8}$ "	4 $\frac{3}{8}$ "
Minimum distance from spindle to centerline of table	3 $\frac{3}{8}$ "	3 $\frac{3}{8}$ "
Minimum distance from spindle nose to spindle carrier face	$\frac{7}{8}$ "	$\frac{7}{8}$ "
OVERARM		
Width of dovetail	2 $\frac{1}{4}$ "	2 $\frac{1}{4}$ "
Distance from underside to centerline of arbor	5 $\frac{1}{4}$ "	5 $\frac{1}{4}$ "
SPINDLE—Chrome Nickel Steel (National Standard Spindle End with No. 40 Series Taper Hole)		
Diameter of nose	2 $\frac{7}{8}$ "	2 $\frac{7}{8}$ "
Size of hole through	$\frac{11}{16}$ "	$\frac{11}{16}$ "
Speeds, number	20	20
Speeds, range	80-3000 rpm	80-3000 rpm
Clamping for spindle carrier	Hand	Automatic Hydraulic
FEEDS		
Table { Number (feed rates selected with pick-off gears)	16	16
Range (standard series)	$\frac{1}{2}$ " to 20" per min	$\frac{1}{2}$ " to 20" per min
Range (optional High Series A)	1" to 40" per min	1" to 40" per min
Range (optional High Series B)	2" to 80" per min	2" to 80" per min
Spindle carrier—down only (inches per minute)	1" to 10"
POWER RAPID TRAVERSE inches per minute		
To table—right and left	400"	400"
To Spindle Carrier—up and down	80"
SHIPPING DATA		
Net weight	1450 lbs	1500 lbs
Gross weight, domestic	1800 lbs	1850 lbs
Gross weight, export	2150 lbs	2200 lbs
Approximate size of case	50" x 66" x 44"	50" x 74" x 44"
Approximate cubic feet	84 cu ft	94 cu ft

General Notes ♦ ♦ ♦

SPINDLE SPEEDS

Twenty, 80 to 3000 rpm = 80, 97, 117, 141, 171, 207, 251, 307, 370, 449, 538, 650, 785, 950, 1150, 1385, 1695, 2050, 2480, 3000. Low range of 80 to 449 rpm obtained through back gears. High range of 538 to 3000 rpm by direct V-belt drive.

Note—Above speeds are for 1800 rpm driving motor. When 1500 rpm driving motor is used range is 67-2500 rpm with intermediate speeds in proportion.

TABLE FEED IN INCHES PER MINUTE—BASIC MACHINES WITH OR WITHOUT RISE AND FALL SPINDLE CARRIER—Table feeds from left to right.

Standard Series, Sixteen— $\frac{1}{2}$ " to 20" = $\frac{1}{2}$, $\frac{5}{8}$, $\frac{13}{16}$, $1\frac{1}{16}$, $1\frac{3}{8}$, $1\frac{3}{4}$, $2\frac{1}{4}$, $2\frac{3}{4}$, $3\frac{7}{8}$, $4\frac{5}{8}$, $5\frac{3}{4}$, $7\frac{1}{2}$, 10, $12\frac{1}{2}$, 16, 20. (Supplied as standard equipment unless otherwise specified on order.)

High Series A, Sixteen—1" to 40" = 1, $1\frac{1}{4}$, $1\frac{5}{8}$, $2\frac{1}{8}$, $2\frac{3}{4}$, $3\frac{1}{2}$, $4\frac{1}{2}$, $5\frac{1}{2}$, $7\frac{3}{4}$, $9\frac{1}{4}$, $11\frac{1}{2}$, 15, 20, 25, 32, 40. (Optional at time order is placed.)

High Series B, Sixteen—2" to 80" per minute = 2, $2\frac{1}{2}$, $3\frac{1}{4}$, $4\frac{1}{4}$, $5\frac{1}{2}$, 7, 9, 11, $15\frac{1}{2}$, $18\frac{1}{2}$, 23, 30, 40, 50, 64, 80. (Optional at time order is placed.)

Standard Equipment ♦ ♦ ♦

- Three table dogs.
- Adjustable arbor tightening rod.
- Wrenches.
- Arbor support for style "A" arbors with pilot end (optional, one support with $1\frac{7}{8}$ " adjustable arbor bushing for style "B" arbors).
- Rectangular overarm.
- Automatic backlash eliminator.
- Set of feed change pick-off gears.
- Automatic spindle stop.
- Spindle reverse.
- Electrical equipment including motors and controls.

Equipment supplied at extra cost ***

1. Table dogs and Cycle Selectors (Camshaft Assemblies). One selector and necessary dogs must be used before machine will operate. (See Cycle Numbers and Descriptions on Pages 6 and 14.)
2. Table dogs and Cycle Selectors (Camshaft Assemblies)—For dog-controlled automatic cycles which differ from those listed on page 14.
3. Cam Roller Attachment (Taper roller assembly mounted to face of spindle carrier for use when profile milling) but without cam. Maximum possible rise 30° with the horizontal. Roller diameter depends on the cutter diameter and profile to be milled. Consult Sales Engineering Dept. at Factory. Code Name—CAMER.
4. Cams for Cam Roller Attachment used for profile milling.
5. Pump, Cutter Coolant, individually motor driven, capacity 2 gallons per minute, including motor, control, wiring, piping and splash pan for machines equipped with cabinet base only. Code Name—PUMER.
6. Arbor Support with $1\frac{7}{8}$ " adjustable arbor bushing for Style "B" arbors.
7. Arbors, Reducing Collets, and Collet Adapters. See Arbor Catalog.
8. Two-Way Spindle Carrier Feed Cycle. Permits feeding spindle carrier up as well as down when supplied with Automatic Rise and Fall Spindle Carrier. Useful for "box-milling", or for jobs which require feed upward. Precludes use of "climb" milling on vertical cuts. Supplied at factory only. Code Name—AUSPC.
9. Table Travel Increased to 12". Useful when work or fixture requires greater travel than standard machine. Applied at factory only.
10. Vises. See Attachment Catalog.



Typical Operating Cycles ***

A wide variety of automatic cycles are available for these machines. Listed below are a few of the more popular ones. Table feed may be in either or both directions under the control of the cycle selector camshaft.

The letter "Y" after cycle number indicates that table feeds from left to right with power rapid traverse in both directions. The letter "X" after cycle number would indicate that the

table feeds from right to left, with power rapid traverse in both directions. The letters "XY" after cycle number indicate that the table feeds and power rapid traverse are in both directions. Most standard cycles have feed from left to right, although table may be fed in either or both directions under control of cycle selector.

For convenience, only "Y" cycles have been listed.

FOR MACHINES WITH OR WITHOUT RISE AND FALL SPINDLE CARRIER

Cycle No.	Description and Cycle	Code Name
2Y	Start cycle, rapid advance table right. Feed table right. Rapid return table left. Stop.....	DATCY
3Y	Start cycle, rapid advance table right. Feed table right. Rapid advance table right. Feed table right. Rapid return table left. Stop.....	DATKA
47XY	Start Cycle, rapid advance table to right. Feed right. Rapid traverse to left. Stop. Rapid traverse to left. Feed to left. Rapid traverse to right. Stop.....	CYXOL

FOR MACHINES WITH RISE AND FALL SPINDLE CARRIER ONLY

4Y	Start cycle, rapid advance table right. Stop table, *rapid advance spindle carrier down against positive stop. Feed table right. Stop table, rapid return spindle carrier to top of stroke. Rapid return table left. Stop.....	RAAVA
5Y	Start cycle, rapid advance table right. Feed table right to accurate position. Stop table, *rapid advance spindle carrier down and feed spindle carrier to depth of cut against positive stop. Rapid return spindle carrier to top of stroke. Rapid return table left. Stop.....	RAPAD
6	Start cycle, *rapid advance spindle carrier down and feed to depth of cut against positive stop. Rapid return spindle carrier to top of stroke. Stop.....	RISAT
7Y	Start cycle, rapid advance table right. Feed table right to accurate position. Stop table, *rapid advance spindle carrier down against positive stop. Feed table right. Stop table, rapid return spindle carrier to top of stroke. Rapid return table left. Stop.....	FALAT
8Y	Start cycle, *rapid advance spindle carrier down and feed to depth of cut against positive stop. Rapid return spindle carrier to top of stroke. Rapid advance table. Stop table rapid advance spindle carrier down and feed to depth of cut against positive stop. Rapid return spindle carrier to top of stroke. Rapid return table. Stop.....	WYRIS
49XY	Start cycle, rapid traverse table to right. Stop table, *rapid advance spindle carrier down and feed spindle carrier to depth of cut against positive stop. Feed table to right. Stop table rapid return spindle carrier to top of stroke. Rapid traverse to left. Stop. Rapid traverse to left. Stop table, *rapid advance spindle carrier down and feed spindle carrier to depth of cut against positive stop. Feed table to left. Stop table, rapid return spindle carrier to top of stroke. Rapid traverse to right. Stop..	CYXER
62XY	Start cycle, rapid traverse table to right. Feed to right to accurate position. Stop table, *feed spindle carrier to depth of cut against positive stop. Rapid return spindle carrier to top of stroke. Stop. Rapid traverse left. Feed left to accurate position. Stop table, *feed spindle carrier to depth of cut against positive stop. Rapid return spindle carrier to top of stroke. Stop.....	CYXAB

NOTE*—Combinations of rapid advance down and feed down of spindle carrier are not controlled by the cycle selector. They are a function of the rise and fall mechanism, and may be adjusted to suit the job. The wording of the down movement of the carrier is merely to suggest possible uses.

IMPORTANT—Three dogs are supplied with the machine as standard equipment and are not supplied with any of the cycle selectors. If any dogs, in addition to those already supplied with the machine, are required to operate any particular cycle, they are supplied with that cycle and included in the price.

Electrical Equipment ♦ ♦ ♦

All electrical equipment, including motors, controls, and wiring, is supplied as standard with these machines. A one-horsepower motor is supplied to drive the table feed and hydraulic pump, and a one and one-half horsepower motor is furnished for the spindle drive.

Motors of the following characteristics can be used with these machines:

Current	Cycles	Phase	Voltage	Speed rpm
AC	60	2 or 3	220/440/550	1800
AC	50	2 or 3	220/440/550	1500
AC	50	2 or 3	380/500/etc.	1500

Spindle Motor—Standard make NEMA frame, normal torque, normal starting current.

Feed Drive Motor—Totally enclosed, direct connected, rolled shell type motor built into headstock.

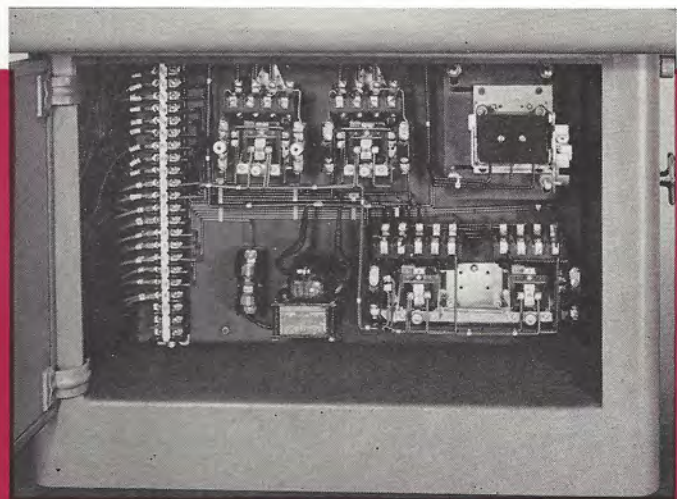
Controls—All electrical controls are built-into a compartment in the base of the machine. Standard make, enclosed type full voltage magnetic starter with thermal overload protection. Control circuit transformer and 110 volt coils are supplied when voltage exceeds 220, providing low voltage at push button station.

Separate “Master Start” and “Master Stop” push buttons are provided and an indicator light at the push button station indicates when machine is running. A selector switch is provided at the push button station for the spindle drive motor, to permit selection of continuous operation, or automatic starting and stopping of the spindle synchronized with the automatic cycle. A spindle jog button is provided for set-up purposes.

● **Electrical Control Compartment in Base**

The following electrical data must accompany each order:

- (a) Voltage.
- (b) Current (AC or DC). If AC also include:
 1. Phase.
 2. Cycle.
 3. Control circuit voltage.





*Direct Field Engineering Offices and Sales Representatives throughout
the United States and Canada and in all Principal Foreign Countries*

THE CINCINNATI MILLING MACHINE CO • CINCINNATI 9, OHIO, U. S. A.