



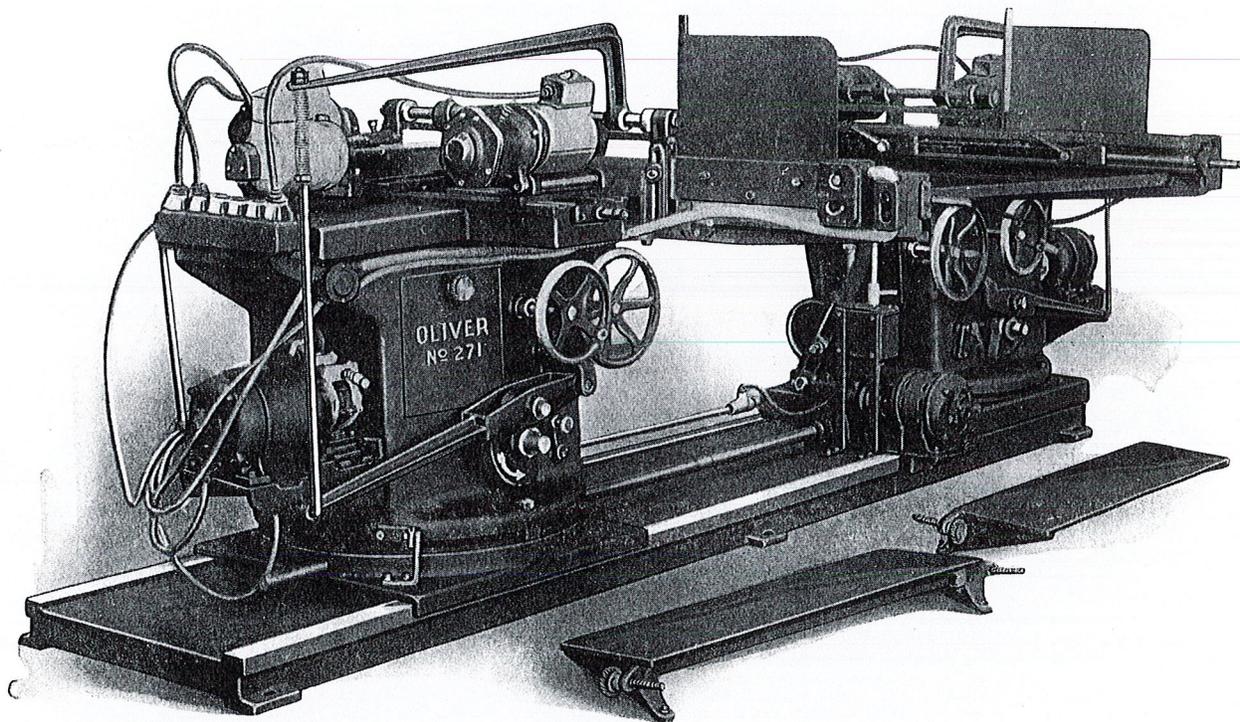
*"Every User
Is a Booster"*

"Oliver" No. 271

Double End "Convertible"

Automatic Boring Machine

(Multiple Spindle)



Front Left View of Machine Set Up As a Double End Borer With Automatic Magazine Feed.

*Automatic Action — Greater
Production — Usable either
as two separate single end
boring machines, or as a
double end borer, hence called
convertible.*

Manufactured By

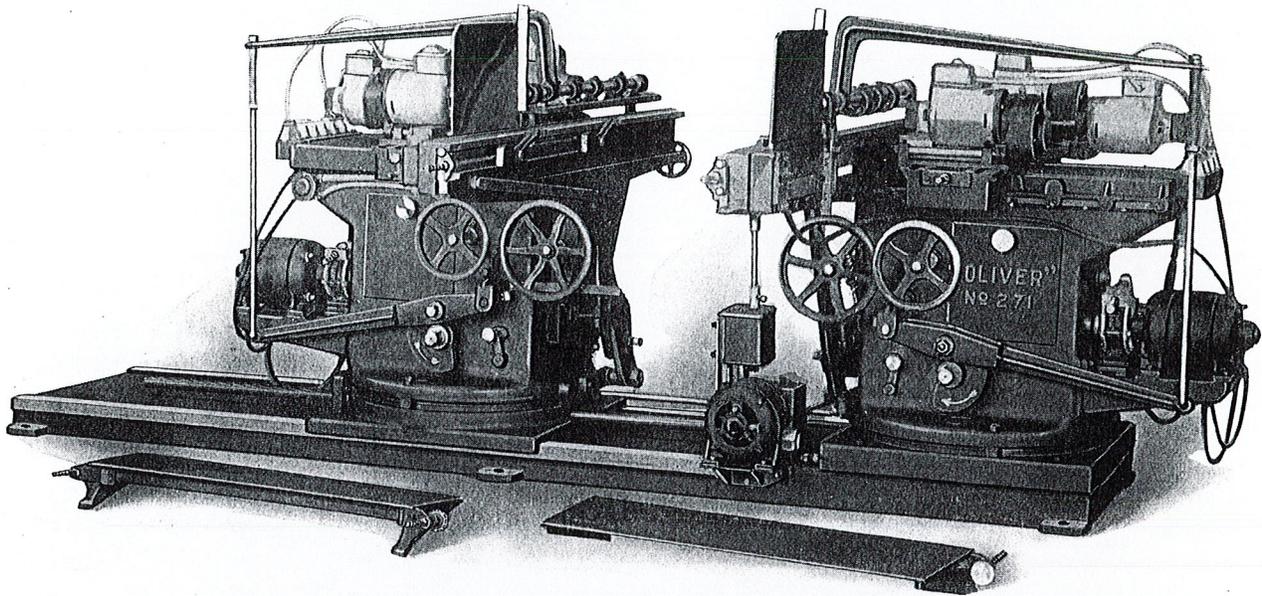
Oliver Machinery Co.

Grand Rapids, Mich., U. S. A.

BRANCH SALES OFFICES:

New York, St. Louis, Minneapolis, Los Angeles, San Francisco,
Chicago, Denver, Salt Lake City, Seattle, Manchester, Eng.

OLIVER MACHINERY COMPANY  GRAND RAPIDS, MICHIGAN, U.S.A.
NO. 271 DOUBLE END "CONVERTIBLE" AUTOMATIC MULTIPLE BORER



Front Natural View of Machine when used as a Double End Automatic Multiple Borer. The Two Tables shown on the floor in the foreground are easily superimposed on the guide bars so as to provide wide work tables when machine is used as two separate single end boring machines.

Purpose

The invention of this machine fills a long felt want for an automatic double end boring machine which can also be used as two separate single end boring machines so that in all furniture factories, cabinet works, and similar establishments, where there is a considerable amount of boring for dowel joints, the machine can be used for automatically boring both ends of rails simultaneously and when the double end boring is finished, by merely loosening two clamps the two units can be swung either completely around, or thru 90 degrees, and be used as two independent, separate, self contained, and completely automatic single end boring machines; or the two units may be located in a straight line, acting in unison, for boring side holes in extra long work.

Capacity

The regular machine when used as a Full Automatic Double End Borer, will bore simultaneously, one, two, or three holes at each end of stock up to 16 inches wide, from 15 inches to 76 inches long (or longer on special order), and up to 4 inches thick; the work being fed through an Automatic Magazine feed at the rate of 8, 11, or 15 pieces per minute, dependent on the kind and size of work, also the depth and size of holes.

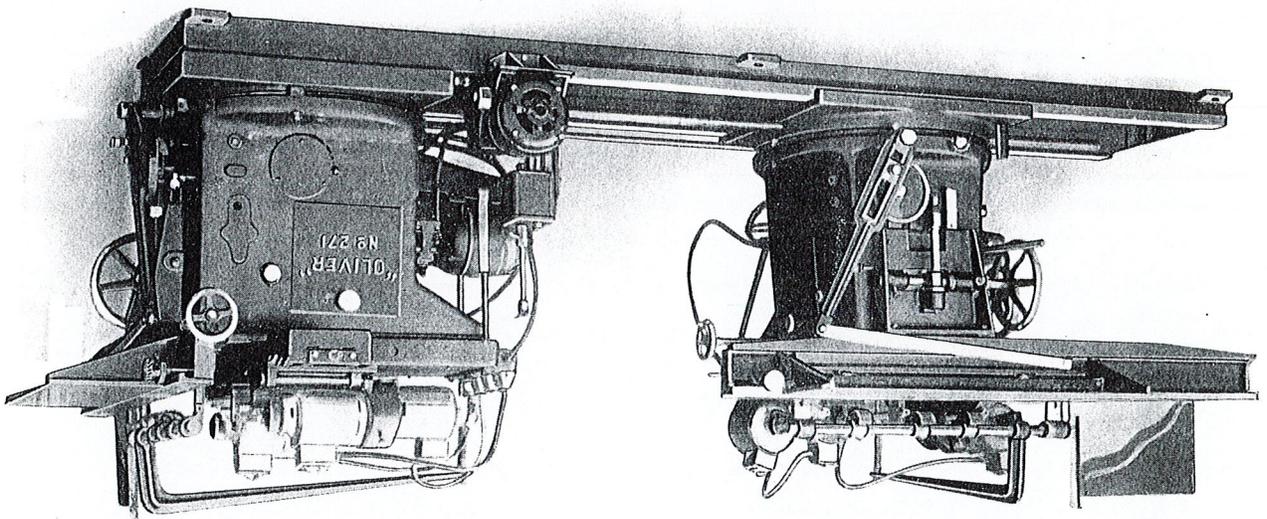
When the regular machine is used for boring holes on the side of extra long pieces both units are swung around so as to face the operator having two tables in a straight line and all boring spindles parallel to each other, and the two units are thus used in unison for automatically clamping and boring extra long stock, the holes being located in various groups as permitted by the two cross slides on which the heads are mounted.

When the regular machine is used as two separate Single End Boring Machines, the work is handled by two operators and each machine automatically clamps the work and bores one, two or three holes at a time with distance between bits of from $\frac{7}{8}$ -inch to 21 inches, making total distance between the outside spindles of 42 inches.

Screw shank brad point dowel bits or drills up to $\frac{5}{8}$ -inch diameter and holes up to $1\frac{5}{8}$ -inch deep is considered standard, but longer capacity of drills, deeper holes, and more spindles at either end, or at both ends can be arranged for when required. Correspondence regarding your boring problems is invited.

Design

At one end of a rigid common subbase is mounted a complete self contained automatic single end boring machine with a large ball bearing rotating trunion. At the opposite end of the base is slidably mounted a similar complete self contained automatic single end boring machine unit, with a power driven locating mechanism so that the sliding unit can be easily moved toward and away from the stationary unit, to locate at any desired distance for varying length of work, from the shortest of 15 inches up to the longest of 76 inches, on the regular machine; or longer if desired to suit special requirements. When the machine is used as a double end boring machine, there is an automatic magazine feeding arrangement acting in unison to feed the work automatically to-



Front View of Machine arranged for use as Two Spindle End Multiple Boring Machines. Note that one of the machines is turned completely around—end for end—while the other machine is turned only partly around to show various ways of using this machine as Single End Boring Machines.

wards the center positive stopping location, where the work is clamped, bored, then released, and replaced by the piece immediately following (all of these motions being performed entirely automatically), so that all the attendant has to do is to keep the magazine of the automatic feeder filled with work.

Method of Operation

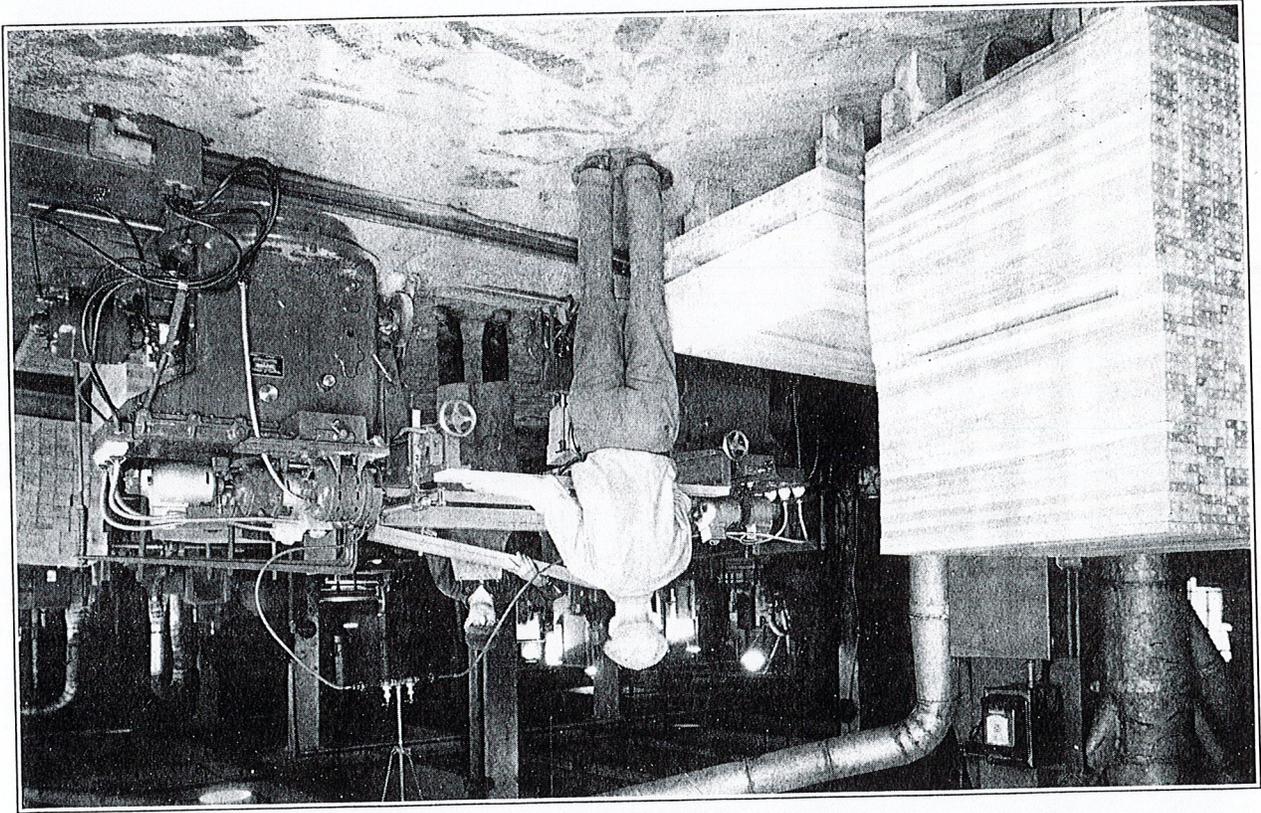
In each unit there is one motor with electric brake that operates the feed mechanism acting thru two cams mounted on the same shaft. One of these cams actuates the cross slide unit on which the boring spindles are mounted giving the same movement towards the work and away from the work, and the second cam actuates the automatic clamping mechanism which is actuated electrically and mechanically to act in conformity with the boring operation, so that the process at each end is that of clamping the work, boring the same, and releasing it automatically. This means that when the machine is used as two single end machines, all the attendant has to do is merely slide the work on the table to a stop and the work will be automatically clamped, bored, and released, without any further action on the part of the operator. The Automatic Magazine feeder used in connection with double end boring is also actuated from the shaft of the feed motors; hence, its action is perfectly timed with the clamping and boring movements.

Double End Boring

When double end boring is done, the machine can be located face to face with the tables exactly parallel in accordance with master stop jugs which assure parallelism; or the two units can be swung at an angular position; therefore it will bore holes on a miter at both ends, or square at one end and miter at the opposite end, or at any intermediate angle. The automatic clamping and boring operations will act positively and definitely at any one of these set-ups, but the automatic hopper feed mechanism will operate of course only when the tables are located in a parallel position for square end boring. When set up for double end boring work of any width up to 16 inches wide and any length from 15 inches to 76 inches long, also any thickness up to 4 inches thick, may be fed thru the automatic feeding mechanism, and automatically clamped and bored. This length capacity may be increased when so ordered. The work is fed to a positive stop station assuring accuracy in boring. These stop stations are of the disappearing type so that immediately after the boring is performed, when the clamps are released these center stops disappear and allow the piece which has just been bored to pass on and be automatically replaced by the next piece to be bored.

Single End Boring

Each of the two units which normally act one at each end on a double boring operation is mounted on a ball bearing trunion at the base so that by loosening the clamps each of these units may be swung around to any position desired, either both facing towards the front of the machine, or each facing outwardly at each end of the machine, or one unit facing towards the front and the other facing towards the rear, all depending on the type of work and the convenience in locating the work trucks. Each separate unit is complete in itself as a single end boring a flat table unit bolts directly to the front of the rails which are the guiding units in front of the boring bits, providing large surfaces for holding any work to be bored. The single end boring table units present a surface of 15 inches wide by 42 inches long for holding the work.



Rear View of Machine doing Double End Boring at the Plant of Kindel Furniture Co., Grand Rapids, Mich., U. S. A.

Features

- 1—Surprisingly large increase in production per man.
- 2—Boring operation costs reduced to one-half and in some cases even less.
- 3—Labor cost is doubly reduced because unskilled operators can be employed to do the same work in fewer hours at less cost per hour.
- 4—Can be set up to handle practically all production boring jobs both double and single end.
- 5—Will bore holes either in line or staggering.
- 6—Holes bored as close as 7/8-inch and as far apart as 42 inches.
- 7—Work clamped automatically—relieves operator of hard work—increases production.
- 8—Automatic power movement of boring bits—lessens fatigue of operator, sets the pace, increases output—more profit.
- 9—Table and work remain stationary while the boring heads move in and out a predetermined distance. This reduces the motions of the operator—greater efficiency results.
- 10—Cam mechanism provides slow motion while boring; but quick return of bits and quick release of clamp—thus, each interval of time is most economically utilized allowing maximum time for handling the work.
- 11—Each spindle motor driven with individual cut-out switch.
- 12—Single master push button at each end starts and stops entire machine; secondary push buttons individually control each single end borer. Time is saved—means more holes per hour.
- 13—Automatic Magazine feed of work for double end boring and individual large size table when used as two separate single borers—greater flexibility, greater output.
- 14—Three spindle heads at each end is regular equipment, but extra spindles can be added as required at extra cost.
- 15—All parts and units are interchangeable with gibs and laminated shims to compensate for wear.

*Spindle
Heads*

All spindle heads are individual motor driven and can be clamped anywhere on the cross slide. Five different kinds of heads are available as follows:

TYPE A HEAD, (called Left Side Head), is usually used at the Left Side of each group of heads; the motor is $\frac{3}{4}$ H. P., 3600 R. P. M., located at the left side of the spindle and geared to same in a totally enclosed splash lubricated gear case and mounted on a base with 3-inch vertical adjustment.

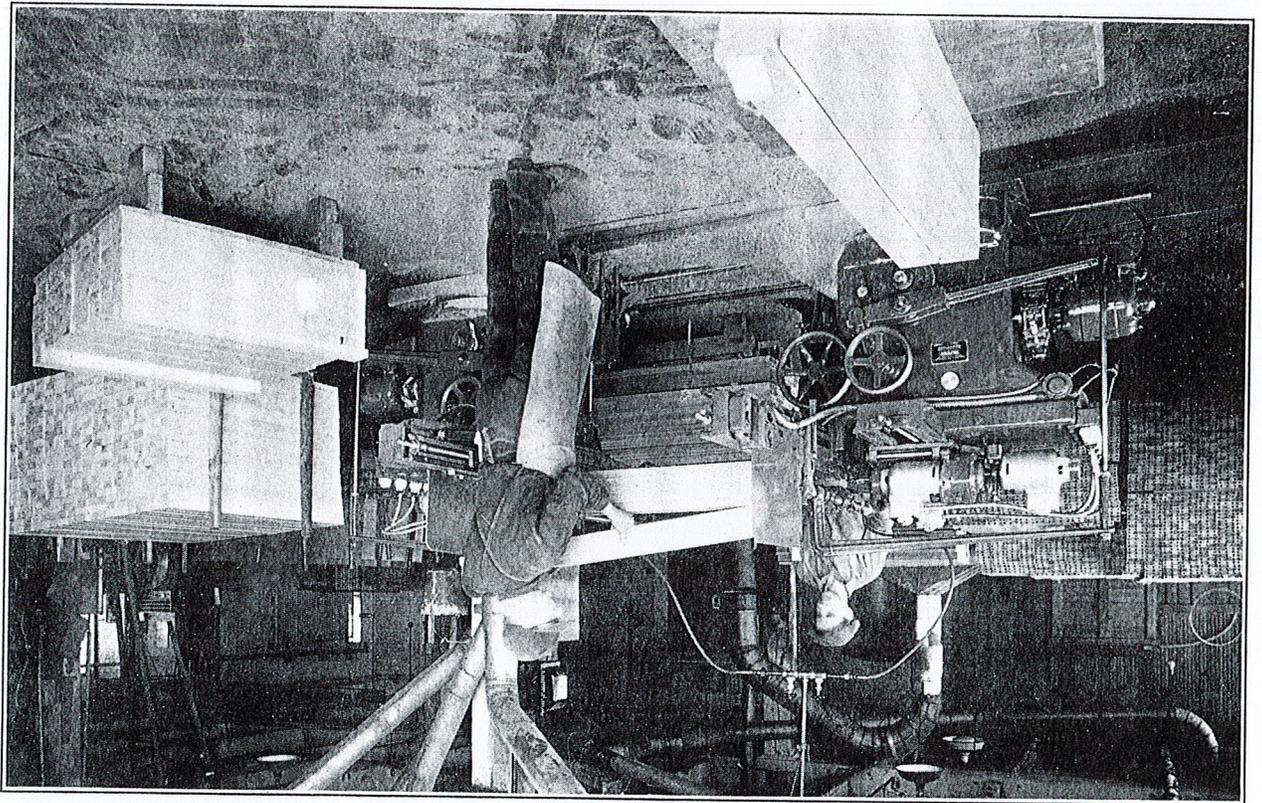
TYPE B HEAD, (called Right Side Head) is usually used at the Right Side of each group of heads; the motor is $\frac{3}{4}$ H. P., 3600 R. P. M., located at the right side of the spindle and geared to same in a totally enclosed splash lubricated gear case and mounted on a base with 3-inch vertical adjustment.

TYPE C HEAD, (called Center Head) is usually used at the center of each group; the motor is $\frac{3}{4}$ H. P., 3600 R. P. M., mounted directly on the extended rear end of the spindle in such a manner as to allow either of the side head spindles to come as close as $\frac{7}{8}$ -inch center to center with this Type C head which has no vertical adjustment.

TYPE D HEAD, (called Intermediate Head), can be clamped anywhere on the cross slide, but is usually used between the center head and a side head, giving $\frac{3}{16}$ inch center to center; the motor is $\frac{3}{4}$ H. P., 3600 R. P. M., mounted directly on the spindle with large ball bearing thrust bearing right at the front, making a short coupled head with 3-inch vertical adjustment.

TYPE E HEAD, (called Dual Purpose Head), can be clamped anywhere on the cross slide; the motor is 2 H. P., 1800 R. P. M., built directly on the ball bearing boring spindle; arranged with a sliding base and a cluster head holder so that this "Dual Purpose Head" may be brought forward and used either for boring single holes up to 2-inch diameter, or it may be shoved backward and be used for boring any reasonable number of close center holes such as required for mirror frame and similar work. Cluster heads, either fixed center or adjustable type, are made to suit the needs of our customers. Correspondence invited.

Front View of Machine doing Double End Boring at the Plant of Kindel Furniture Co., Grand Rapids, Mich., U. S. A.





Spindles
All Side Head, Center Head, and Intermediate Head spindles run at 3600 R. P. M. They are made of nickel steel. The spindle bearings are phosphor bronze with laminated shims to compensate for wear. Ball Bearings carry the forward and backward thrust.

Electric Motors
This machine is a complete electric motor driven machine, suitable for operation on either 2 or 3 phase, 60 cycle, 220 or 440 volts A. C. On the standard machine which has three spindles in each unit, there are in all nine electric motors used, and each of these motors are 3/4 H. P. in size. All of the boring spindle motors run at 3600 R. P. M. and the other motors run at 1800 R. P. M.

Electric Control Mechanism
All electric motors are wired in conduit to a single connecting box mounted on the base of machine. A push button automatic master contact unit is also furnished to be mounted near the machine and wired to the connecting box to suit the convenience of the operator. There is a master push button start and stop station and auxiliary control push button stations at the front and at the rear of the machine, so that, the machine can be instantly stopped by any attendant from the front, as well as from the rear. All wiring, with the exception of the initial contactor box, is mounted on the machine, self contained, assuring maximum convenience and workability.

Automatic Clamping
The eccentric clamps are timed to operate just ahead of the feed. The three rates of feed and the clamping are 8, 11, and 15 strokes per minute. The clamps are actuated by means of a cam with quick release. A compression spring with adjusting knob regulates the pressure to hold the stock rigid in place without marking it. The clamps are adjustable up from the table to accommodate varying thicknesses of wood. The clamping shoes are adjustable in position on the rod and are leather covered so as not to mar the work. Usually one is set over each boring bit.

Automatic Feed
The boring spindles and motors are mounted on the sliding carriages which move forward and back on carefully machined ways. The feeding mechanisms are driven by the same motors that run the clamps. The feeds are timed for boring to start immediately after stock is clamped firmly in place. A cam located within the cast iron column gives the carriage a steady forward motion and quick return. The three rates of feed, 8, 11, and 15 strokes per minute provide for different types of work. The stroke is adjusted for boring varying depths by the small handwheel at the side of each single machine. The depths of boring are maintained at a fixed depth by the lock nuts. When used for single end boring, the work is fed by the operator. When the machine is used as a Double End Borer, the work is fed by means of a Full Automatic Magazine Feed, one-half of which is self contained in the front work supporting bar of each single borer. Sliding bars with two disappearing dogs in each are moved in unison by levers actuated by crank plates located on the main feed shaft of each unit. A clever but effective electrical timing device and two disappearing stops assure accurate registering of the work as one piece is smoothly pushed out of the way and another is fed to the boring location, clamped and bored in exactly the same place as the preceding piece.

Equipment
Each regular machine consists of the floor base, two entirely complete single end boring machine units mounted on ball bearing trunnions—one stationary, one slidable; motor and reversing drum switch for moving the sliding unit, two feed motors with individual push button controls, six motor driven boring spindle units consisting of two side heads and one center head for each end of the machine, three extra plugs for one end, individual cut-out switch for each of the six boring head motors, two master operating start and stop push buttons, and one master contactor panel. The space occupied by the base on the floor of the standard machine is 132 x 32 inches. The space floor to the center of the center spindle is 42 inches high. The rails on each side may be lowered so as to be 36 inches from the floor and raised as high as 42 inches from the floor.

CODE, WEIGHT, ETC.

Code	Description	Weight in Pounds	Boxed Feet	Cubic Feet
Exrab	No. 271—Double End Convertible Automatic Multiple Boring Machine, motor driven, suitable for 3 phase, 60 cycle, 220 or 440 volt A. C.; complete with regular equipment as above listed and described	7000	8000	200