



THE  
MINNESOTA  
MULTIPLE SPINDLE  
**CARVING  
MACHINE**

28, 24, 20, 16, 12, 8 OR 4 SPINDLES

Fully Patented

Other Patents Pending

Sold Exclusively by

**Oliver Machinery Co.**

GRAND RAPIDS, MICHIGAN

U. S. A.

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I N T R O D U C T I O N

The art of hand wood carving reached its greatest perfection in England, France, Italy, and Germany, during the 14th and 15th centuries, but as it required considerable time to hand carve even the simplest designs, only Royalty or persons of great wealth were able to purchase the beautiful works of art then produced. As a result, hand carvings were very highly prized by those fortunate enough to possess them. Comparatively few artists devoted their lives to this occupation, but some attained marvelous skill and an unsurpassed standard of workmanship. Later due to the slow production and increased costs, demand gradually subsided, but recent years have witnessed another marked revival in commercial demands, based on the remarkably productive efficiency of Automatic Carving Machines.

Today, high grade wood carvings are made by machine from a master pattern on a large production basis, and the mechanical ability developed in these machines makes it possible to produce wood carvings in large quantities at low cost, and makes possible the many beautiful productions in furniture, plaques, vases, mirrors, mouldings, etc., to be seen in all manner of homes and places for public assembly.

No one can deny that well carved furniture is emblematic of smartness, refinement, and elegance, and one may observe on every hand that the present popularity of carved wood contributes much to home betterment and increased pride of possession. Carvings are now in large demand for many ornamental purposes.

Practically all manufacturers of furniture and allied wood products recognize this modern trend, and consider high grade carving machines essential equipment.

The Minnesota Multiple Carving Machine with its many improvements, exclusive features, and sturdy, smooth operating mechanism, completely solves quantity and quality wood carving problems. A complete description of this marvelous machine follows.

### SUPERIOR DESIGN

The following exclusive new and improved features of the Minnesota Carver, not found on any other carver, are responsible for its greater popularity and superior performance:

1. Whereas on other carvers it is necessary to move both the table and the carriage forward and back to get full length of cut, on the Minnesota Carver the carriage covers the full length of cut, the table remains stationary except for vertical adjustment to suit thickness of stock. This saves time as well as floor space.
2. The carriage which carries the cutter heads has 42-inch forward and back movement which is within the reach of an operator; however the carriage can be arranged to travel up to 72 inches on special order. This long travel of the carriage makes it unnecessary to slide the table forward and back, or to reset the work on the table, and assures greater accuracy of work.
3. Machine is entirely self-contained and wired ready for use; has nothing suspended from the ceiling, needs no props or braces; is so rigid that it does not even need to be fastened to the floor.
4. Center beams are spaced for length of stock by a crank and two quick acting screws which keep the center beams always parallel.
5. The wooden table tops are fitted with steel holding plates at the ends and can be removed and replaced without the use of a wrench as the clamping bolts are operated by hand knobs and always remain in place in the center beams, disappearing below the top when not in use. This greatly reduces the setting up time when changing from one type of work to another.
6. Each motor drives only two spindles by a single flexible fabric belt, assuring greater flexibility of operation and much better balance.
7. Sliding plug locks are provided to hold the spindles for changing cutters by the use of only one wrench leaving the other hand free to handle the cutter.
8. Each twin spindle unit is carried at the front end of an individual arm which is mounted on large ball bearing pivot points on the cross member of the carriage. This individual arm support to each twin spindle unit materially increases the steadiness of operation and makes the Minnesota the most sturdy multiple spindle carving machine on the market, producing the smoothest carvings that are possible.
9. Entire machine is extremely compact and built low so that maximum of light on the work and clear vision for the operator is assured. All other multiple carvers are built higher and shut off much light.
10. The carriage is very light operating and accurate in all its movements because its main cross member is supported by two accurately turned drum wheels fastened to the end of a central shaft running in Ball Bearings. These drum wheels are maintained parallel to each other and in correct relation to the machine by flexible metal equalizing bands or ribbons which are wrapped around the drum wheels and have take-up adjustment for maintaining parallelism.
11. The front and rear centers are carried by individual housings which uniformly rest on to a machined ledge on the inside of the front and rear beams; hence they remain in perfect vertical alignment, can be more readily adjusted horizontally and more perfect work results.
12. Set-up time for work between centers is minimized because all centers are of the disappearing point type and the front centers are provided with driving-in plungers which are driven against the front end of work and locked in position from the normal front working position of the operator.
13. When so ordered a Reverse Cutting Attachment, with quick change clutch box, can be furnished with any Minnesota Multiple Carving Machine, so that in addition to the regular work, wherein all cutters merely duplicate the pattern, the operator can cause all cutters on one side of the tracer to produce pieces exactly like the pattern while the cutters on the other side of the tracer produce simultaneously the reverse of the pattern thus getting right and left hand carvings from one master pattern and saving the cost of a reverse pattern.
14. The Minnesota Carvers produce an infinite variety of carvings with a rapidity and ease of operation that is surprising. An ordinary workman, by the use of these machines, can in a very short time produce carvings on a real production basis.





Carving adds charm and beauty and whets the desire to buy.



Carved portions of this chair lend charm and beauty.



Carved portions of this chair lend majesty and dignity.

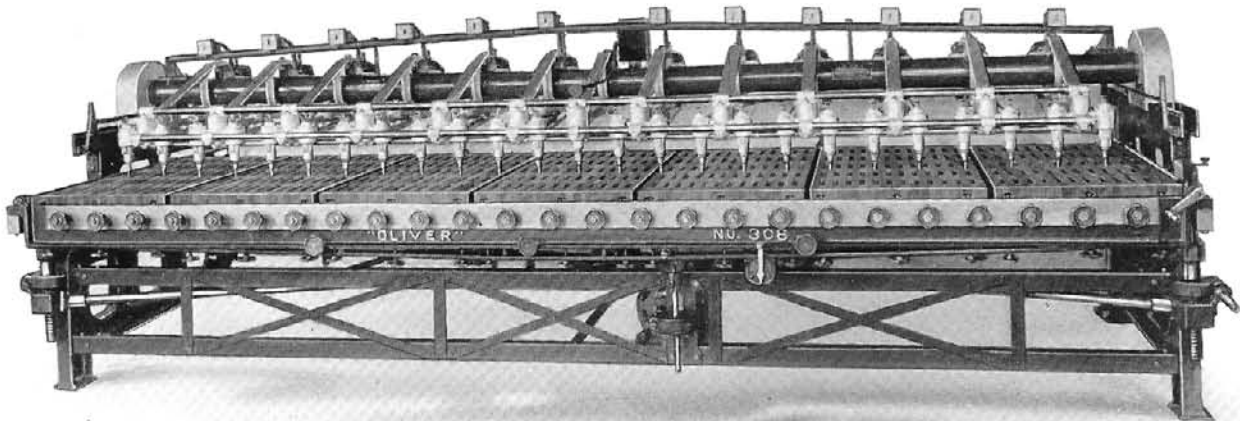
### Guarantee

We guarantee this machine to be commercially perfect both as to material and workmanship and to perform up to full capacity as represented by our literature, when properly operated, or no sale. We further guarantee to replace free of charge to purchaser, any part of any machine that may develop inherent defects during one year after shipment.

### Satisfied Customers

The Minnesota Carver is not an experiment — it is a proven and tested fact. Among its satisfied users are the following well known firms. "Every user is a booster," because the Minnesota Carver gives them easier operation, smoother finish, greater accuracy, increased production, less idle time, more floor space, quicker set-ups — all of which mean increased profits.

	No. of Machines
American Seating Co., Grand Rapids, Mich.....	1
American Wood Carving Co., Chicago, Ill.....	3
Artistic Wood Carving Co., Chicago, Ill.....	2
Baetz Bros. Furniture Co., Kitchener, Ont., Canada.....	1
Berkey & Gay Furniture Co., Grand Rapids, Mich.....	4
Bernhardt Furniture Co., Lenoir, N. C.....	3
Aaron Carlson, Inc., Minneapolis, Minn.....	1
Century Furniture Co., Grand Rapids, Mich.....	1
Chicago Art Wood Carving Co., Chicago, Ill.....	1
Chicago Wood Carving Co., Chicago, Ill.....	2
Colonial Desk Co., Rockford, Ill.....	1
DeVito Bros., Chicago, Ill.....	1
Doezema Furniture Co., Grand Rapids, Mich.....	1
Dunbar Furniture Mfg. Co., Berne, Ind.....	1
Dutch Woodcraft Shops, Zeeland, Mich.....	1
Empire Wood Carving Co., Chicago, Ill.....	2
Erskine Danforth Corp., New York, N. Y.....	1
Grand Ledge Chair Co., Grand Ledge, Mich.....	1
Grand Rapids Bookcase & Chair Co., Hastings, Mich.....	3
Grand Rapids Chair Co., Grand Rapids, Mich.....	3
Haddorff Piano Co., Rockford, Ill.....	1
Hastings Table Co., Hastings, Mich.....	2
Hill Bros. Furniture Co., Los Angeles, Calif.....	1
Hillenbrand Co., Batesville, Ind.....	1
Hubbard, Eldredge & Miller, Inc., Binghamton, N. Y.....	1
Imperial Carving Co., Allegan, Mich.....	1
Imperial Furniture Co., Grand Rapids, Mich.....	3
Robert W. Irwin Co., Grand Rapids, Mich.....	8
A. J. Johnson & Sons Furniture Co., Chicago, Ill.....	1
Karges Furniture Co., Evansville, Ind.....	1
R. G. Kittinger Shops, North Tonawanda, N. Y.....	1
Klise Mfg. Co., Grand Rapids, Mich.....	1
S. G. Krupka Co., Inc., Bridgeport, Conn.....	1
Lanham Furniture Co., Warsaw, Ky.....	1
Landstrom Furniture Corp., Rockford, Ill.....	1
C. P. Limbert Co., Holland, Mich.....	1
Linberg Bros., Minneapolis, Minn.....	1
Luce Furniture Co., Grand Rapids, Mich.....	1
Majestic Wood Carving Co., Chicago, Ill.....	1
Mengel Body Co., Louisville, Ky.....	1
Monitor Furniture Co., Evansville, Ind.....	1
Pullman Couch Co., Chicago, Ill.....	2
Gonzala Puyat & Sons, Manila, P. I.....	1
Schock Parlor Frame Co., Minneapolis, Minn.....	2
Sligh Furniture Co., Grand Rapids, Mich.....	2
Geo. Steck & Co., Neponset, Mass.....	1
C. F. Thauwald Co., Cincinnati, Ohio.....	1
Union Furniture Co., Batesville, Ind.....	4
Widdicomb Furniture Co., Grand Rapids, Mich.....	1



24 Spindle Minnesota Carving Machine with 8-inch center to center of spindles fitted with 12 motors to drive the 24 spindles, one motor to revolve the centers and one motor to raise and lower the table to suit the thickness of the work. Front view of machine ready for flat work to be fastened to the grill tables.

### Adaptation

A great variety of work can be carved economically, with precision and speed on the Minnesota Carving Machine. All flat work, such as plaques, frames, mouldings, etc., are fastened to the wood table by means of clamp screws, furnished with each machine, to the grille shaped hardwood sectional tops. These tops are easily and quickly attached to, or removed from, the center beams by merely turning the hand knobs directly below the front center beam. This ingenious method of bolting the wood tops means a considerable saving of time. Round and odd shaped work such as posts, table and chair legs, etc., are held between live centers in the rear beam and the cup centers in the front beam; both having disappearing center points. All pieces between the center heads are turned simultaneously by a convenient lever located at the operator's right hand. Face plates are provided to support larger work between centers.



Carvings adorn and beautify any cabinet at a minimum of cost.

### Sizes and Capacities

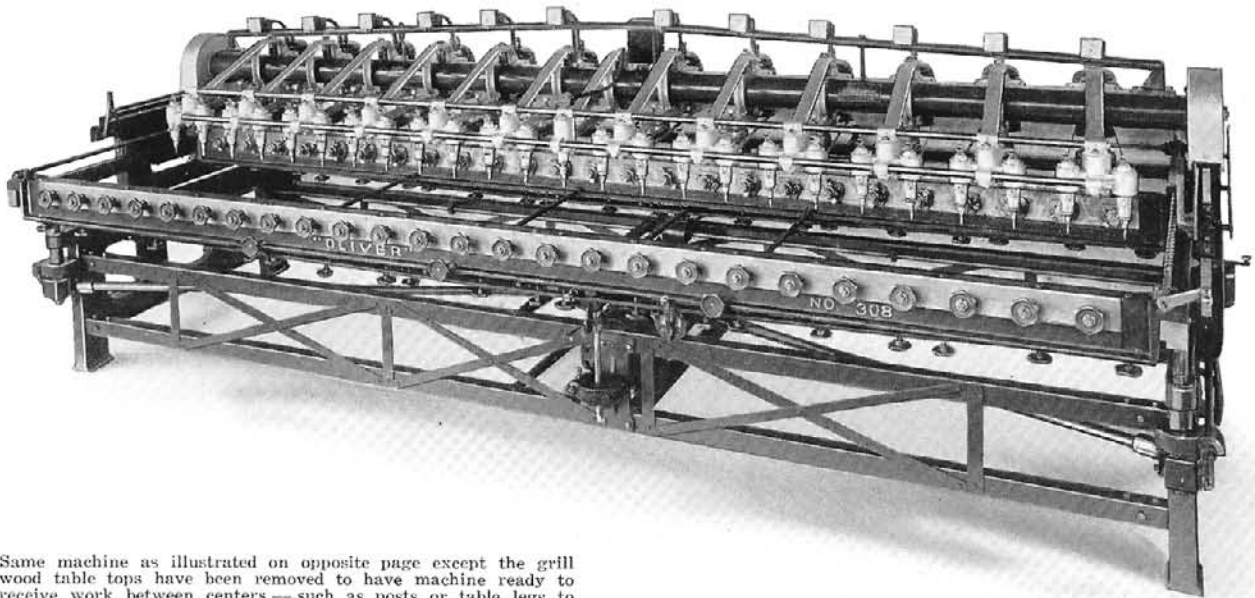
The Minnesota Carving Machine is manufactured in seven sizes, viz.: with twenty-eight, twenty-four, twenty, sixteen, twelve, eight and four spindles. Any shape cutters with  $\frac{1}{4}$ -inch shank can be used. The distance between centers of cutters on the twenty-eight spindle machine is 6 inches; twenty-four spindle machine is 7 or 8 inches; twenty spindle, 8 inches; sixteen spindle, 8 or 10 inches; twelve spindle, 10 or 12 inches; eight spindle, 10 inches. Greater distance between centers can be furnished on special orders. Stock 56 inches long can be held between the center beams. The carriage travels 42 inches forward and back, making it possible to cut carvings up to 42 inches long without resetting. The distance between cutters, or the travel of the carriage can be increased by special order to suit purchaser's requirements.

### Frame

This is composed of two heavily constructed cast iron end frames, with cross rib reinforcements, held in place by latticed steel beams constructed of angle iron and securely bolted to these end frames. Extending from the four corners are large tubular ties which assure additional strength and make a thoroughly rigid base on which are mounted the various working parts. The entire frame rests on four sturdy legs of I-beam section cast integral with the end frames and arranged to carry the four screws for elevating the table.

### Front Beam

Is a cored box shape one piece casting securely and rigidly bolted to the ends of the table, is machined on all sides and has a truss extending under the entire length which prevents sagging and maintains alignment with the rear beam and the carriage tube, making the machine in line throughout and insuring accurate lining up at all times. Bolted to this beam are the tail-stock or dead centers, symmetrically located. The dead center housings rest on a ledge that is accurately machined and calipered with the top of the beam which brings all centers at constant alignment in the horizontal plane. The side alignment is made by sliding the centers on the edge of the beams. All dead centers



Same machine as illustrated on opposite page except the grill wood table tops have been removed to have machine ready to receive work between centers — such as posts or table legs to be carved.

have an instant sliding sleeve adjustment with a screw handwheel locking device.

**Rear Beam**

The rear beam is made of cast iron reinforced to prevent sagging. It is machined on all sides and is supported at each end by a track which allows the beam to move parallel with the front beam by means of two lead screws geared together and attached to each end of the beam. On the front side of the beam is a ledge on which the housings of the driving centers rest, thus locating the rear centers in positive horizontal alignment with the front beam centers and the only adjustment ever necessary is to line up in the vertical plane. This beam also carries the shaft and worm gear mechanism for turning the live centers simultaneously.

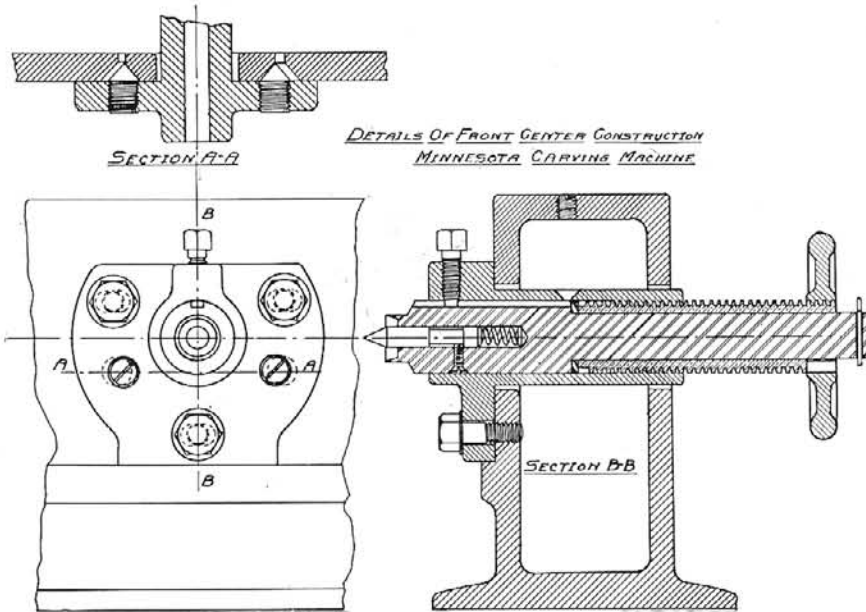
**Table**

The table of the Minnesota Carver is stationary — does not move forward or back, as the movement of the carriage fully takes care of the length of carvings. This is a very important feature, because it assures the position of the stock relative to the moving carriage always remaining the same regardless of the length of work or how often the cutters are changed. When both tables and carriage are moved, a defect in the finished pieces is often the result. The table is moved up or down for thin or thick stock by simply turning the lower lever at the right end of the machine. This lever actuates four sets of self-locking worm and worm gears and four vertical screws, which connect the table rigidly to the frame. All major parts of the table are made of steel, assuring strength and rigidity at minimum weight. The front center beam is stationary; the rear center beam is spaced in relation to the front beam by turning the top crank lever at the right end of the machine. This crank actuates two quick acting screws, one at each end of the machine, and moves the rear center beam forward or back to any definite desired position, always retaining the necessary parallel alignment with the spindles and the front center beam. The removable grill wood tables are slotted to provide means of attaching the clamps which are tightened by

small hand knobs on the underside of the tables and the beams. When the necessary adjustments are made and the locking devices are tightened, the table unit is extremely rigid, an important factor resulting in good workmanship.



This illustration shows some beautiful carving that the Minnesota Carver can make in production quantities.

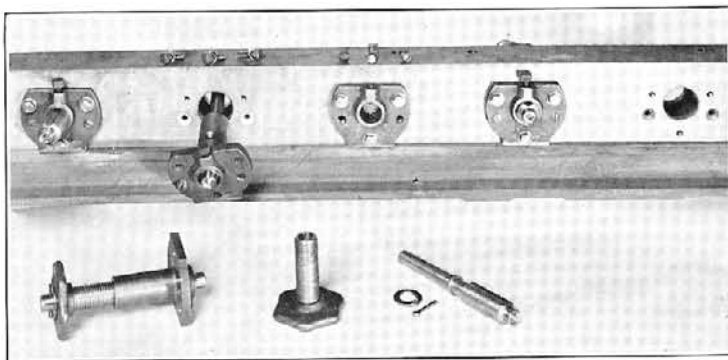


This zinc etching shows the new front center design — positive quick set-up.

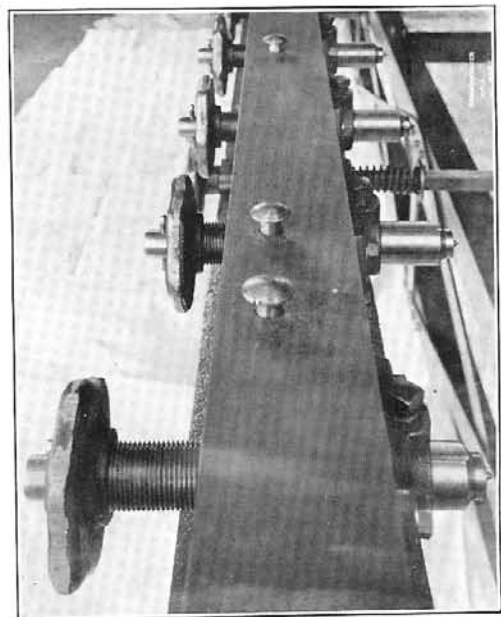
### Front Centers

All front center spindles extend thru their housings and may be driven into the work with a mallet from the operator's side. This speeds up the set-up as it is not necessary to use special forks or bars to assist in mounting the stock or go to the rear of the machine. The side adjustment of the centers is made by operating two cone end set screws in their respective conical holes. When the center housing needs alignment the set screw on the side opposite to the direction in which the center is to move is turned counter-clockwise and the one on the near side is turned clockwise the same number of turns. The cone of the set screw acting on one side of its conical hole moves the center housing to the opposite side. This eliminates the necessity of pounding the centers over and affords a most accurate

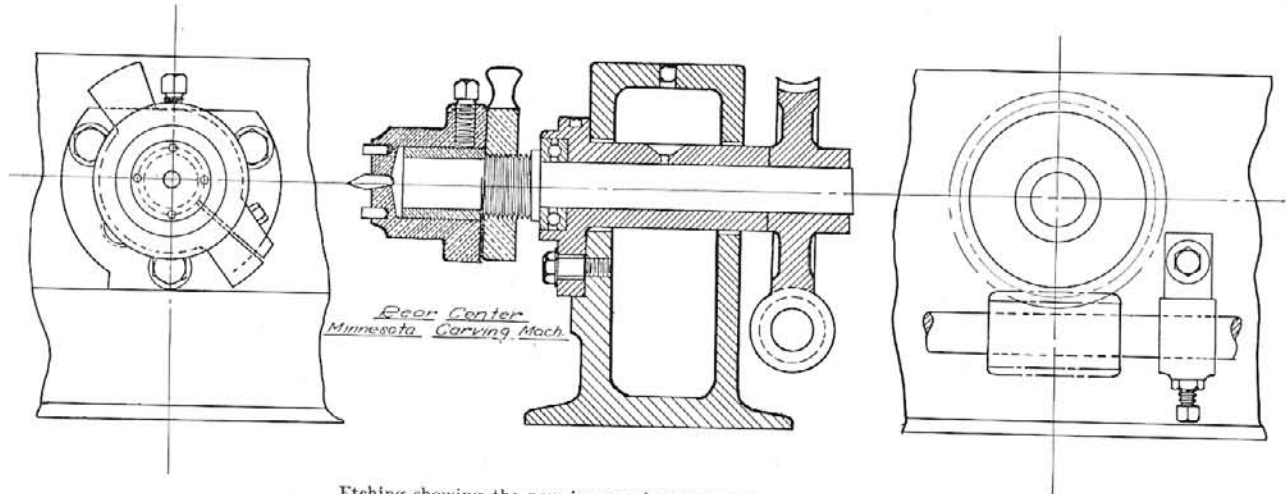
adjustment of the center, insuring absolute alignment. Perfect alignment of the centers is necessary for carvings on centers if the stock is to be cut on all sides; otherwise the cuts will not match on the complete turn. This new type center makes a rigid holder for stock, improving the finished product and adding to the simplicity of set-up.



Exploded view of front centers extending through and bolted to front center beam which is machined on all sides. Note countersunk holes for adjustment.



Top view of front beam showing how easily and effectively the front centers are operated.



Etching showing the new improved rear center — assures accuracy.

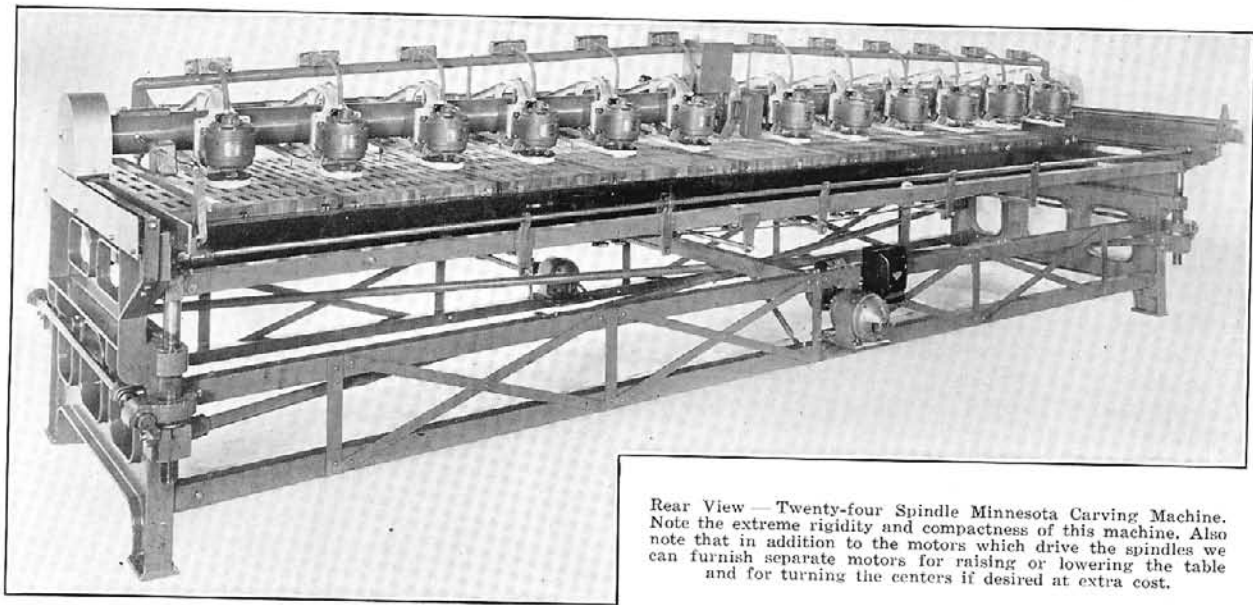
### Rear Centers

Alignment of the rear or live centers in the rear beam is the same as for the front centers. Another most desirable feature is the end adjustment of the rear live spindle to line up endwise stock that has been turned but not cut to exact lengths in order that the carved portions on all the pieces may start or terminate at exactly the same point regardless of slight inaccuracies in the length of the pieces. This adjustment is made by loosening the brass split nut on the rear center and screwing it in or out to relocate the shoulder against which the turning center head rests. It is not necessary to take the stock out of the centers or to place washers on the face of the turning centers. The spur heads also have a rotary adjustment to bring the stock between centers in the same relative face position. All

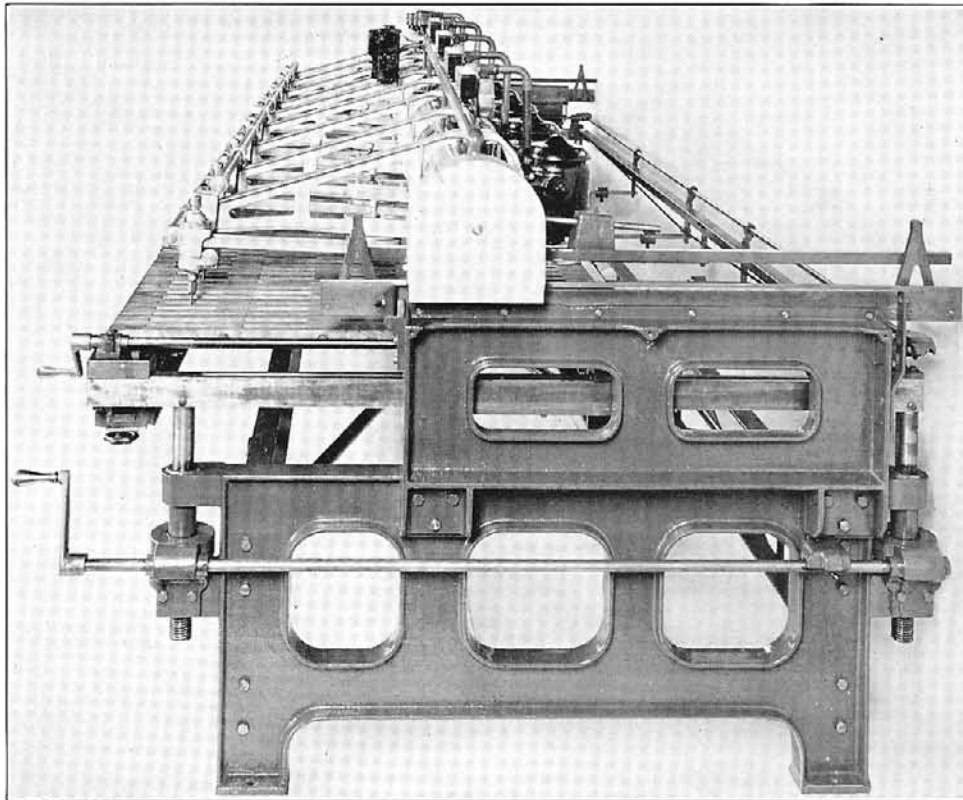
work between centers is turned simultaneously by means of a long shaft with worm and worm gear arrangement at individual centers controlled by a single crank directly in front of the operator, therefore all stock is uniformly carved in exactly the same place with great uniformity.

### Carriage

The travel of the carriage is regularly 42 inches, which is about as far as a man can reach over the table; on special order the carriage can be furnished to travel up to 72 inches. This length of travel of cutters makes it possible to carve long work without moving the table or resetting the stock. The cross member of the carriage consists of a large diameter steel pipe supported at the ends by two ball bearing, accurately



Rear View — Twenty-four Spindle Minnesota Carving Machine. Note the extreme rigidity and compactness of this machine. Also note that in addition to the motors which drive the spindles we can furnish separate motors for raising or lowering the table and for turning the centers if desired at extra cost.



End view of 16 Spindle Carver showing rugged construction and simplicity of design.

finished drum wheels which roll forward and back on steel tracks on the frame of the machine. These wheels are maintained parallel to each other and in correct relation to the machine by flexible metal equalizing bands or ribbons. There are two bands on each wheel having inside ends fastened to the wheel and the outer ends to the frame. One band winds on and the other winds off of the wheel as the carriage is moved forward and back. This is a very desirable construction, needs little or no attention, is frictionless, sensitive and very accurate in its workings. On the operator's side of the carriage is suspended the pantograph which carries the cutter head spindles, and on the rear of the carriage are located the electric motors which drive the spindles. These two are so proportioned as to have one balance the other, requiring only a small additional weight to create the correct balance, thus enabling the operator to carve with the greatest ease. A truss tube above the main tube positively prevents sagging.

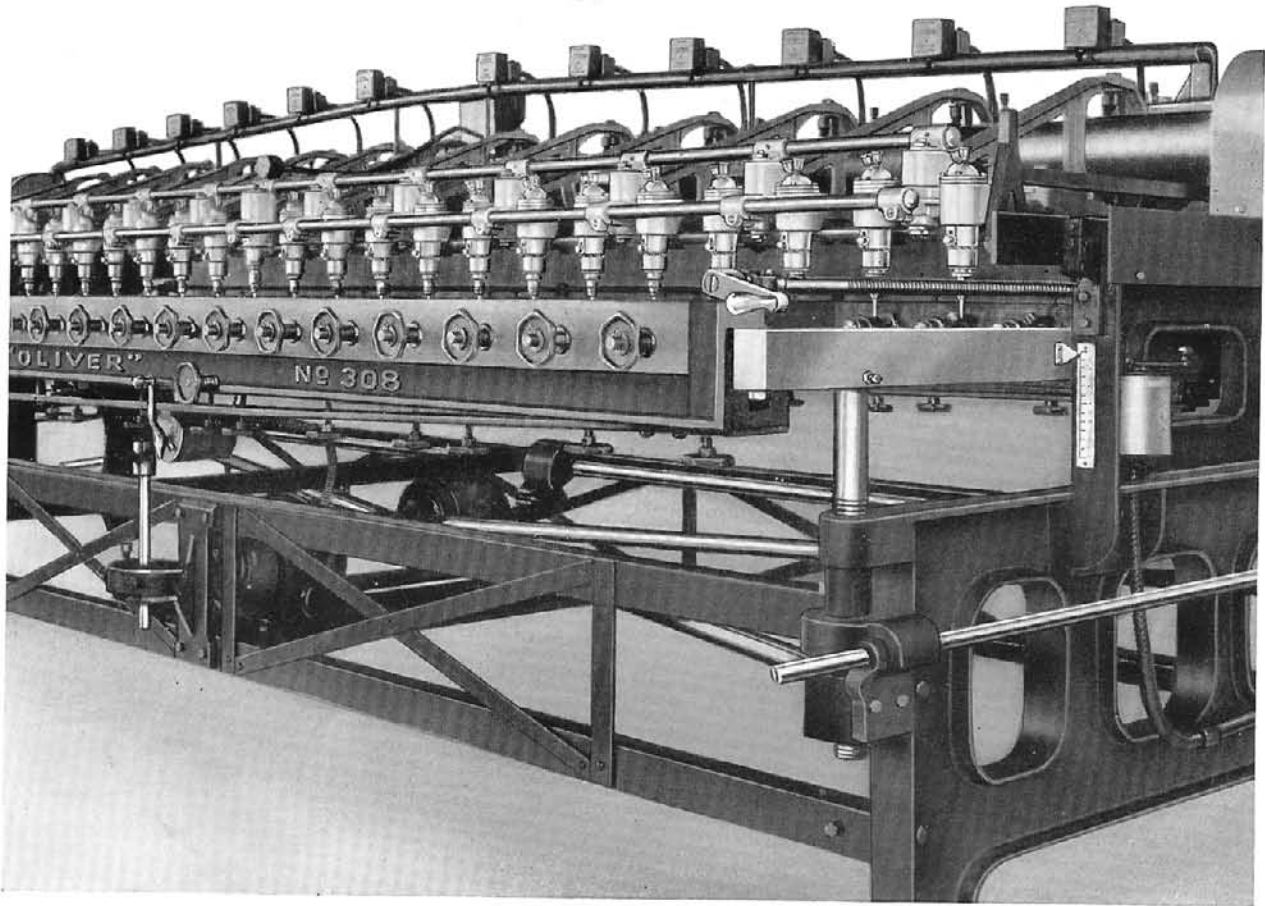
### Pantograph

On the tubular cross member of the carriage are mounted the aluminum arms which are equally spaced. These arms support the spindle units which are symmetrically spaced and rigidly connected by spacing bars which also act as guides for the individual spindles. Each arm is held in place on the tubular cross member by two ball bearing pivot joints and is fastened in the spacing bar at the front by two frictionless ball bearing adjustable pivot points. This design permits a very sensitive movement of the cutters and insures an exceptionally smooth and easy operating machine.

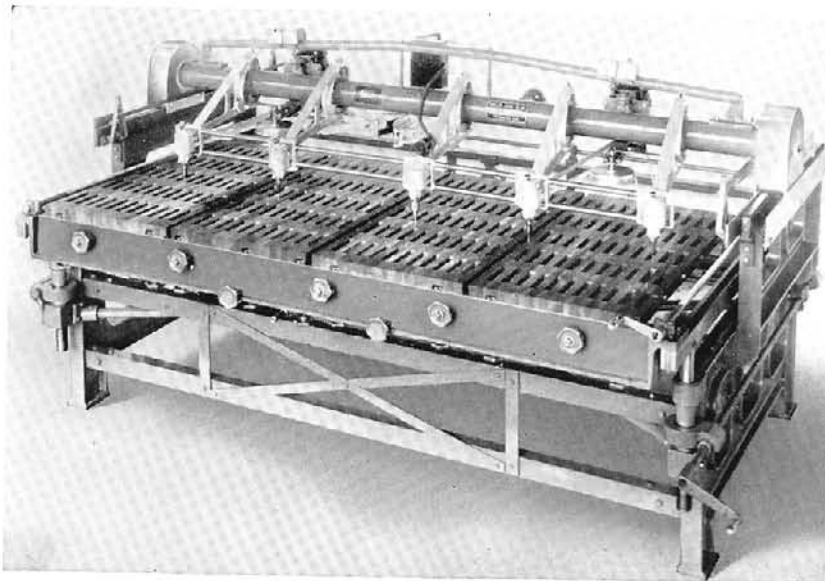
### Cutters

Any kind of standard carving cutter  $\frac{1}{4}$ -inch diameter straight shanks can be used. They are concentrically clamped in the universal chucks at the end of each spindle. Cutters are easily adjusted and rigidly clamped by using only one wrench, allowing the other hand free to handle the cutter.

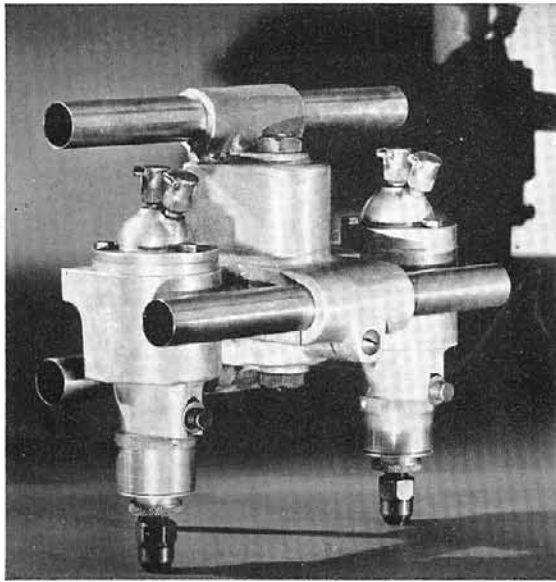




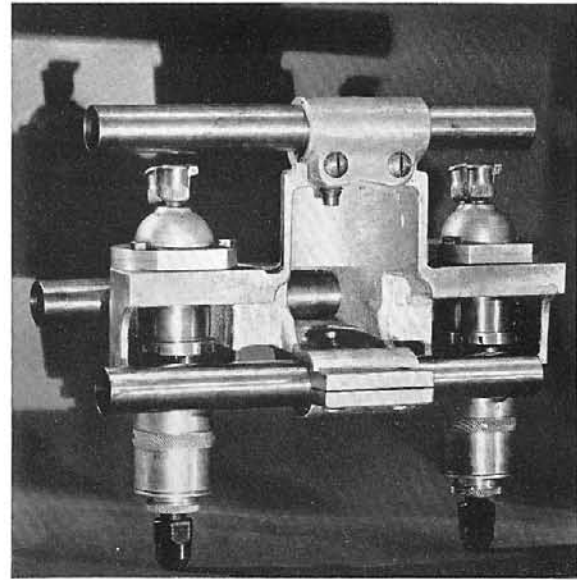
Close-up view of 24 Spindle Minnesota Carving Machine in readiness to carve work between centers. Note the separate motor for raising and lowering the bed and also the separate motor for revolving the centers.



Minnesota Four Spindle Carving Machine with reverse cutting attachment. This machine is very efficient in the sample room for cutting patterns and single sets for samples.



Front view of Twin Head Unit used exclusively in Minnesota Carvers. One-piece aluminum casting forms the housing for two spindles on one ball bearing pivot.



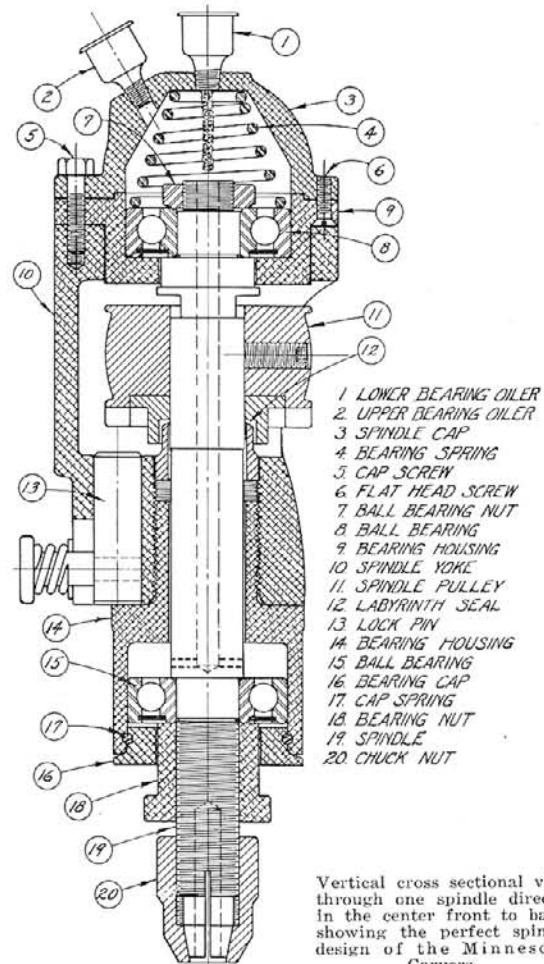
Rear view of Twin Head Unit used exclusively in Minnesota Carvers. Note the three steel tubes which form a triangular truss rigidly supporting all of the twin head units, yet allowing perfect swiveling motion in the ball bearing pivots.

### Spindle Heads

The new Patented Twin Head Unit design used exclusively on the Minnesota Carving Machines, has many important advantages. Each twin head unit consists of a one-piece accurately machined cast aluminum housing, carrying two spindle units, with a single central ball bearing universal pivot at the front end of one carriage arm. The twin head housings are longitudinally supported by three steel tubes rigidly clamped to the twin head units, insuring steady dependable running with minimum weight and least number of parts.

### Spindles

Cutter Spindles run at 10,500 R. P. M., are accurately machined, of chrome nickel steel, ground and bored true, so that the cutters run very steady. The lower end of the spindles run in floating type precision ball bearings locked to the spindles and automatically adjusted for smooth running fit and for wear. The upper end of spindles run in frictionless ball bearings, totally enclosed in dust proof housing which fit into the Twin Head Units above described, so that by merely removing three cap screws the spindle unit with the pulley and the enclosed ball bearing can be instantly removed from the head for examination, or for changing belts in the shortest possible time. Direct lubrication through oil reservoirs and wicks efficiently oils all bearings. The spindle pulleys are permanently fastened to the spindles and the lower rim of the pulley below the flange, is slotted in four places to receive the locking pin. Pushing up of this pin locks the spindle while the operator changes cutters by using only one wrench, having the other hand free to handle the cutter, thus materially speeding up the process of changing the cutters.



- 1 LOWER BEARING OILER
- 2 UPPER BEARING OILER
- 3 SPINDLE CAP
- 4 BEARING SPRING
- 5 CAP SCREW
- 6 FLAT HEAD SCREW
- 7 BALL BEARING NUT
- 8 BALL BEARING
- 9 BEARING HOUSING
- 10 SPINDLE YOKE
- 11 SPINDLE PULLEY
- 12 LABYRINTH SEAL
- 13 LOCK PIN
- 14 BEARING HOUSING
- 15 BALL BEARING
- 16 BEARING CAP
- 17 CAP SPRING
- 18 BEARING NUT
- 19 SPINDLE
- 20 CHUCK NUT

Vertical cross sectional view through one spindle directly in the center front to back, showing the perfect spindle design of the Minnesota Carvers.



Exquisite carvings like the above illustration can be made on the Minnesota Carving Machines 28 at the cost of one. The embodiment of modern carving achievement.

### Motor Drive

The Minnesota Carver is furnished only with self contained electric motor drive. Each set of two spindles are driven by a  $\frac{1}{2}$  H.P., 3600 R.P.M. Ball Bearing Motor fastened to the rear end of one carrier arm, at the front end of which is located a Twin Spindle Unit; thus the motor counterbalances the head, and the one set of ball bearing pivot points controls two spindles and the motor driving the same. Motor is fitted with an aluminum pulley, machined all over, and balanced, operating one endless woven flexible fabric belt looping around one aluminum Idler Pulley with constant spring automatic tension, to give a constant powerful drive, so that the operator does not have to hold back on the roughing cut, but can drive the machine at top speed, thereby reducing the roughing time to less than one-half. All users of Minnesota Carvers claim that they

can take heavier cuts on this Carver than on any other make. Should one motor fail for any reason, only two spindles will become inoperative. Therefore, the machine can still be run at almost full capacity.

### Electrical Control

The motors are operated from a stop and start master control switch mounted directly in front of the operator. Individual thermal cut-out switches are mounted on the tubular truss on the top of the carriage.

### Interchangeable Parts

All centers, spindles, pulleys, idlers, bearings, belts, arms, — in fact, all essential parts are completely interchangeable, — a convenience appreciated by all.

Add to Your Profits

By

Using Carvings

on a

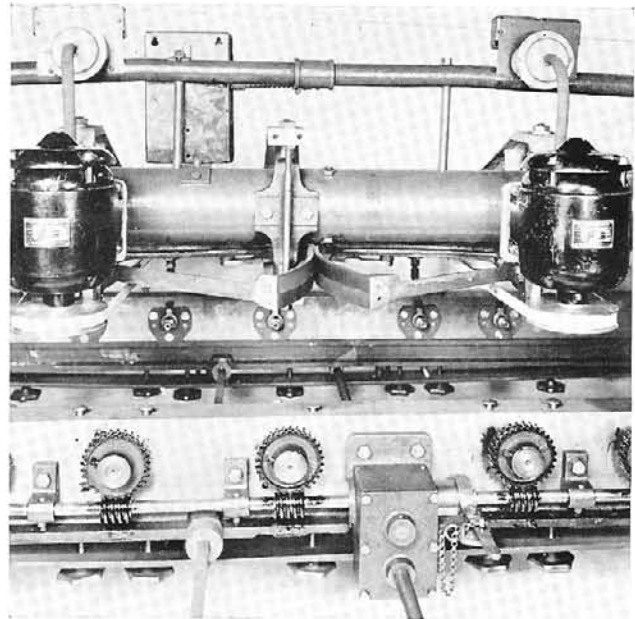
Production Basis



The Minnesota Carving Machines are a real necessity on work of this kind.

### Reverse Cutting Attachment

When so ordered all Minnesota Multiple Carving Machines can be furnished with a Reverse Cutting Attachment. In less than three minutes the Reverse Cutting Attachment can be placed in action; or, disengaged, to cause the normal action of the machine, as desired. The sectional views herewith illustrate clearly the superior features of the Reverse Cutting Attachment, invented by Mr. G. A. Parten and furnished only with the Minnesota Carving Machines. The segments at the top cause all the spindles on one side of the tracer to move towards the right while the spindles on the other side of the tracer move towards the left; thus with only one pattern both right and left hand work can be carved simultaneously. Note in the rear view the change gear box furnished with the Minnesota Carver, so that by only shifting one lever all of the centers on one side of the tracer will rotate clockwise, while the centers on the other side of the tracer will rotate counter-clockwise, thus enabling reverse cutting of legs and similar work held between the centers.



Rear view of machine with the reverse carving attachment. Note change gear box and lever for quickly reversing the rotation of centers.

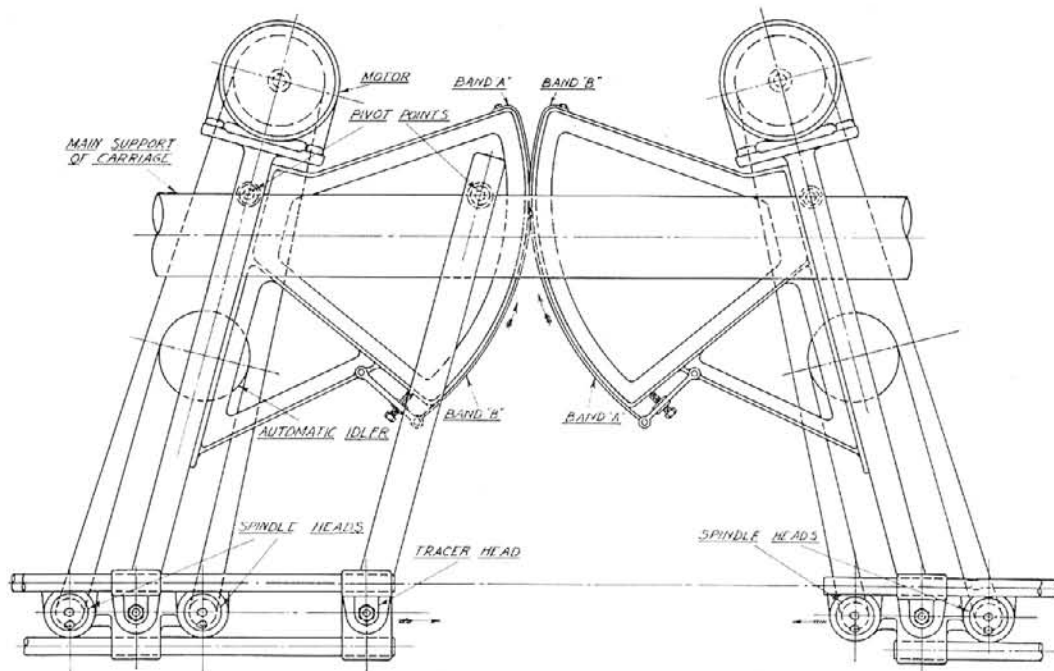


Diagram of the top view of center portion of carriage fitted with reverse cutting attachment. Note that the three pipe sections between the Tracer Head and the Twin Spindle Head Unit to the right have been removed and the reversing bands fastened in place; hence, when Tracer Head with the spindles left of it are moved towards the right, the spindles right of the Tracer will move towards the left, and vice versa.

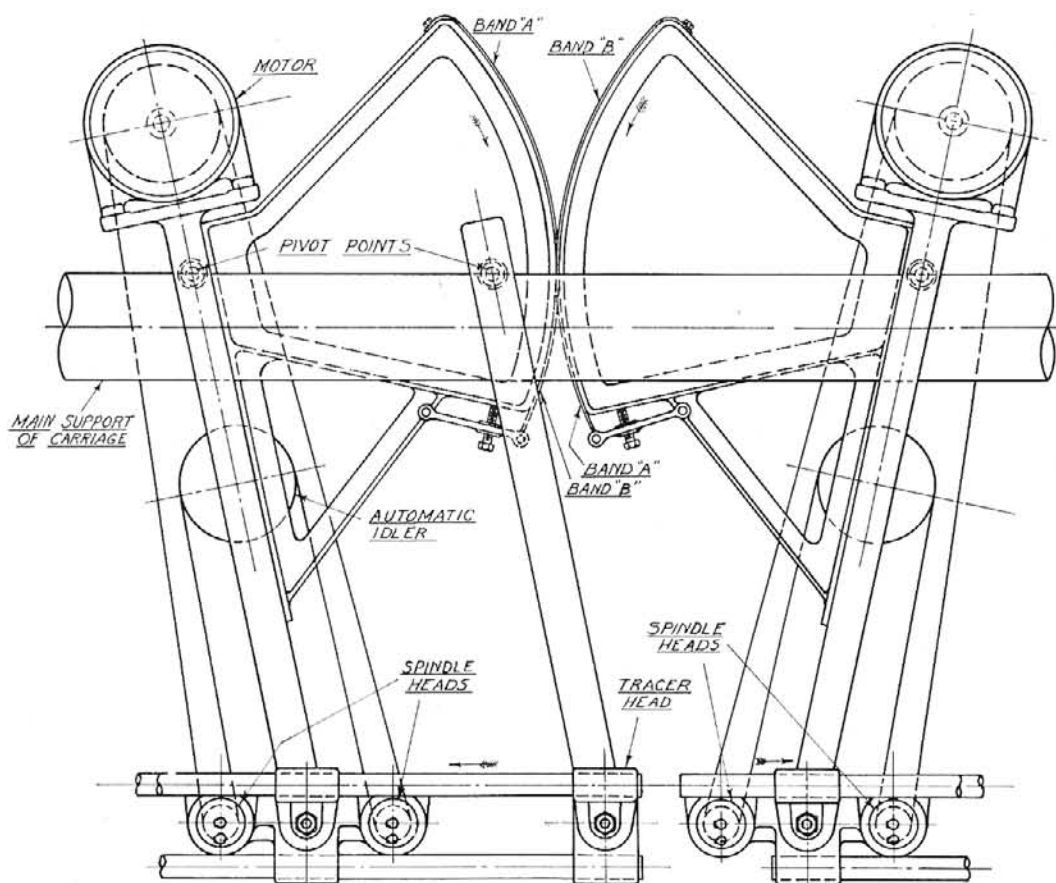
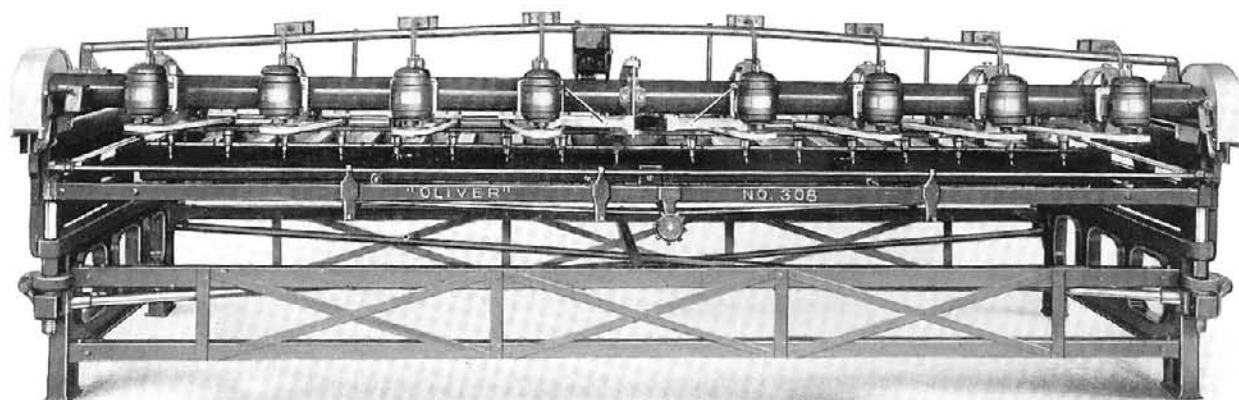
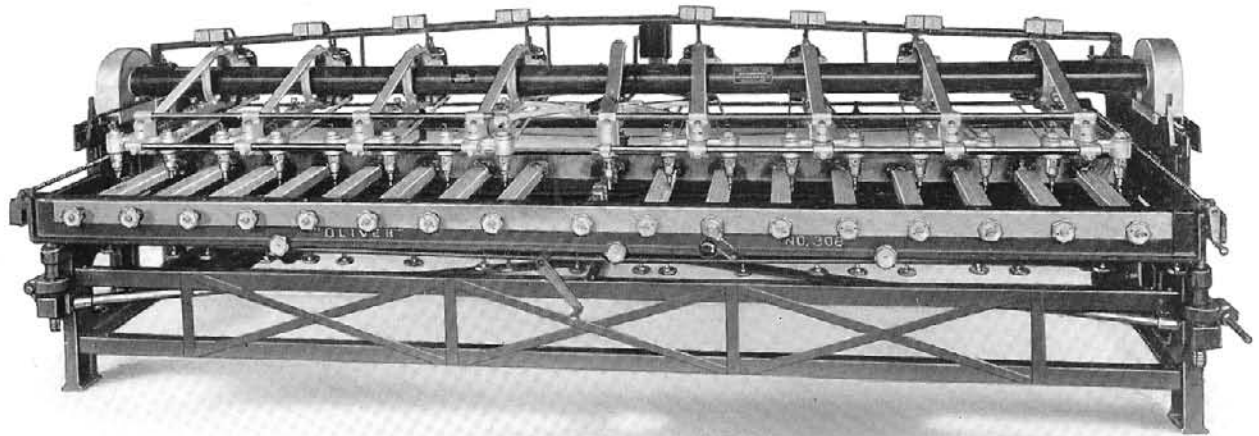


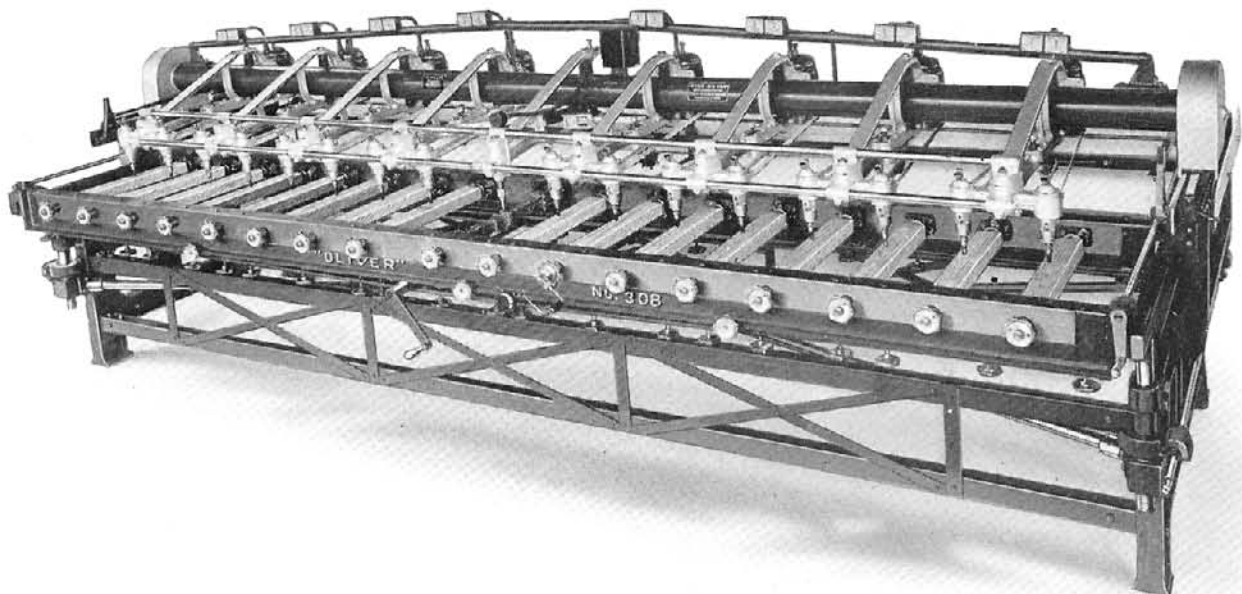
Diagram showing how all of the spindles on the right move to the right when the spindles on the left of the Tracer Arm (being connected with it) move to the left and vice versa. In less than three minutes the reversing bands may be disengaged and the connecting bars located in the front beam causing the machine to be a regular carving machine — all the spindles cutting in the same direction.



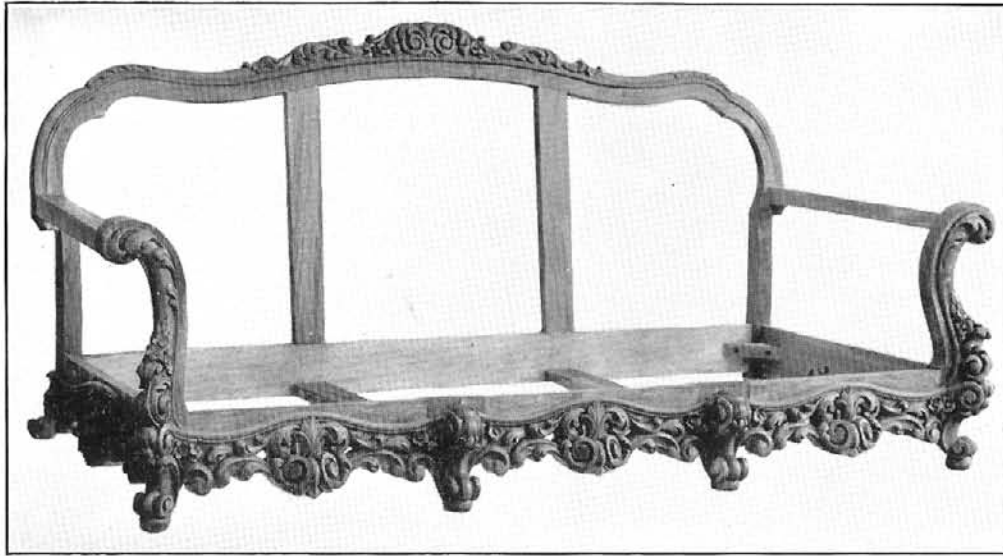
Rear view of 16 Spindle Minnesota Carving Machine with Reverse Cutting Attachment. Note the simplicity, rigidity and the easy accessibility of all parts.



Front view of 16 Spindle Minnesota Carving Machine with Reverse Cutting Attachment placed in action by removal of the three Connecting Pipe Sections from the front beam of the carriage and fastening the reversing band in place. Machine ready to carve work between centers.



View of the same machine as above with the Reverse Cutting Attachment. Rendered inoperative by disengaging the reversing bands and relocating the three connecting pipe sections in the front beam of the carriage so that the machine becomes a regular carving machine with all of the spindles moving in unison in the same direction.



The three pieces of furniture illustrated herewith are worthy examples of the carving art which adds bewitching charm and enticing grace to the surroundings of any home. Furniture like this become heirlooms to be cherished from generation to generation.



### Floor Space

The Minnesota Carving Machines are entirely self-contained and extremely compact, requiring less floor space than any other carver of equal capacity. They are shipped set up and conduit wired, complete ready for use as soon as the line wires are connected and the machine leveled; even bolting to the floor is not necessary. Twelve spindle carver requires floor space of only 13 feet by 6 feet; other sizes in proportion. The operator has an abundance of light as Minnesota Carvers are very low, having no parts higher than the operator's eye when in normal working position.

### Equipment

Each machine is regularly furnished complete with electric motors, starters, electric wiring in conduit, wood top tables, cup centers, spur centers, face plates, clamps for fastening stock to the tables, one set of followers, one set of points, and a complete set of eleven tracers; but without cutters which are selected according to the work and included at nominal cost.

CODE, WEIGHT, ETC.

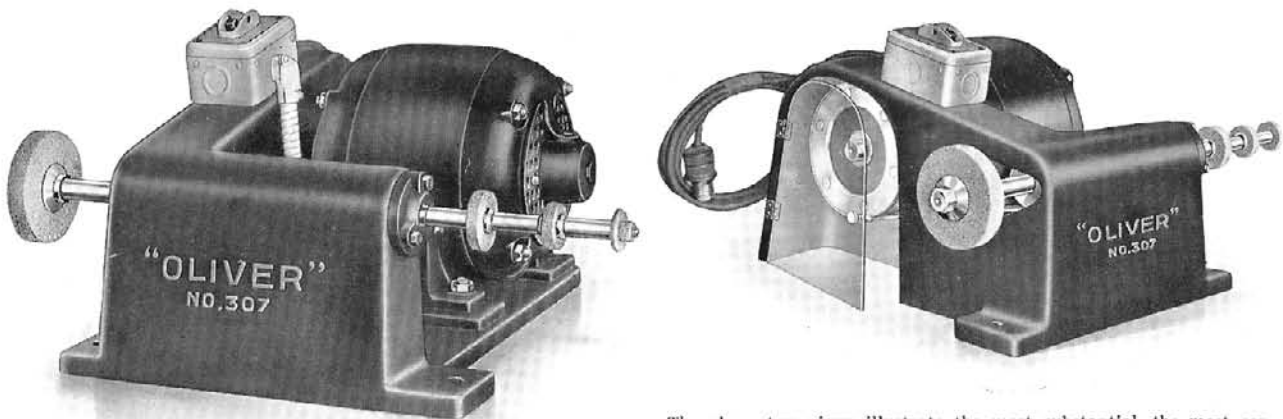
Code	Machine	Distance Between Centers	Carriage Movement	Centers Between Beams	Table Depth	Weight in Pounds		Cubic Feet
						Crated	Boxed	
Fesa	8 Spindle Regular.....	10"	42"	56"	46"	4400	5400	400
Fesab	12 Spindle Regular.....	10"	42"	56"	46"	4500	5800	500
Fesag	12 Spindle Regular.....	12"	42"	56"	46"	4800	5300	500
Fesak	16 Spindle Regular.....	8"	42"	56"	46"	5000	6000	500
Fesal	16 Spindle Regular.....	10"	42"	56"	46"	5500	7000	500
Fesalo	16 Spindle Regular.....	12"	42"	56"	46"	5700	7300	550
Fesam	20 Spindle Regular.....	8"	42"	56"	46"	5900	7400	600
Fesamo	20 Spindle Regular.....	10"	42"	56"	46"	6100	7700	650
Fesan	24 Spindle Regular.....	7"	42"	56"	46"	6500	8200	600
Fesao	24 Spindle Regular.....	8"	42"	56"	46"	6900	8600	650
Fesaob	28 Spindle Regular.....	7"	42"	56"	46"	7500	9200	700
Fesap	1 Spindle Reverse.....	18"	42"	56"	46"	2000	2500	200
Fesaq	4 Spindle Reverse.....	18"	42"	56"	46"	3000	4000	300

EXTRAS

- Fesas Extra for 48-inch carriage movement front to back, 63-inch centers between beams, table 52 inches deep.
- Fesat Extra for space for operator between spindles for all machines up to and including 20 spindle 8-inch center carver.
- Fesav Extra for Reverse Cutting Attachment. This applies on all machines.
- Fesaw Extra for 72-inch carriage movement front to back, 68-inch centers between beams, tables 72 inches deep, with space for operator between spindles. This applies on all 8 and 12 spindle carvers, and 16 spindle machine with 8-inch centers only. A machine with 72-inch carriage movement would have to be built considerably larger in all proportions than the standard machines, add extra 2000 pounds shipping weight.

## No. 307-D "OLIVER" CARVING TOOL GRINDER

Code — Fesa. Weight — 130 pounds.



The above two views illustrate the most substantial, the most convenient and the most accurate carving tool grinder obtainable. A one-piece casting supports all of the units of this compact high speed cutter grinder.

It consists of four emery wheels, one 4 x 3/4 inches mounted on one side and one each 2 x 3/8, 1 1/2 x 3/8, and 1 1/4 x 1/8 inches mounted on the other side of the double ended high speed (5000 R. P. M.) shaft, belt driven by a ball bearing 1/2 H. P., 3600 R. P. M., single phase, 60 cycle, 110 volt A. C., or 110 or 220 volt D. C. motor

mounted on a substantial base with switch, cord and socket attaching plug for operating from light socket (3 phase, 60 cycle, 220 volt A. C. motor with extra heavy snap switch mounted on machine and wired to motor, but without cord, furnished at same price).