



Left & Above from: *History of the Carriage*, by Laszlo Jarr

Below from: *Illustrations of Trades*
by Charles Tomlinson, 1860

XXIX.—THE COACHMAKER.

IF the various descriptions of craft used for conveying people over seas and rivers be numerous, so that it requires a special study to acquire their names and leading characteristics, not less varied are the wagons, coaches, and vehicles used for land carriage; to say nothing of sledges, sedans, palanquins, and litters, which preceded the introduction of the wheel; we have carts with solid wheels, or slices cut off from the trunk of a large tree; carts and wagons of wood bound with hide, and a flooring of the same material; carts tilted with canes and straw neatly wattled. We then have improvements in the wheel, and the introduction of springs for hanging the carriage and diminishing concussion; the introduction of two additional wheels with facilities for turning the vehicle. To trace all these varieties, and the improvements which have been from time to time introduced, would require a very long history; whereas all we propose to do is to give a few details respecting the trade of the coachmaker, and these must be imperfect, seeing how greatly the trade is subdivided, for in building a coach, we have to consult the *coach-body-maker*, the *carriage-maker*, the *coach-smith*, the *coach-plater*, the *coach-beader*, the *coach-carver*, the *coach-trimmer*, the *coach-luce-maker*, the *coach-lamp-maker*, the *harness-maker*, the *coach-wheelwright*, the *coach-painter*, the *herald-painter*, and some others.

The materials used in a coach, are timber, iron, plated

metal, leather, woven materials, paint, varnish, &c. The first operation in building a coach is to make a design, such as will show the forms and proportions of the various parts, the arrangements made for the comfort and convenience of the traveller, and the general effect of the whole. Thus the designer is to a certain extent an artist, and as new forms and fashions are constantly arising, there is usually a certain constant amount of work for him. He has also to make the working drawings, which are sketched on a black board on the same scale as the work to be executed. The mode of proceeding then very much resembles the plan adopted in ship-building, where, as already stated, *moulds* are formed in thin pieces of wood, for directing the shipwright in his work. In like manner, the *mould* of a coach is prepared by cutting out a number of thin pieces of wood according to the chalk marks on the board, to serve as a guide to the workman in cutting out the timbers, and this is the more necessary, since all the lines of a coach are curved, and many of the curves have a complex character.

The timber having been selected, it is cut up at the saw pit, first in the round, and afterwards for converting, that is, it is first cut into planks, and then roughly cut at another pit into the forms indicated by the pattern pieces. The most valuable wood used by the coach-builder is hedge-row ash, well adapted for the frame-work on account of its tough fibrous character, and its not



558. GIMLET.



569. GROOVING ROWTER.



571. SIDE ROWTER.



573. DRAW PIN.



570. SPOKESHAVE.



572. PISTOL ROWTER.



574. PLANE.



575. HAND PLANE.



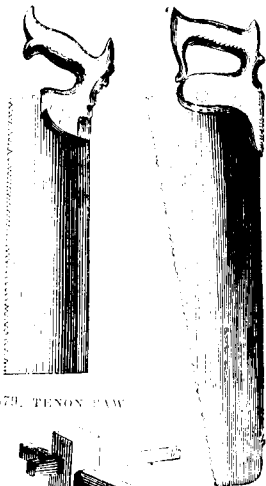
576. CONVEX PLANE.



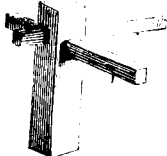
577. CONCAVE PLANE.



578. PLANE.



579. TENON SAW.

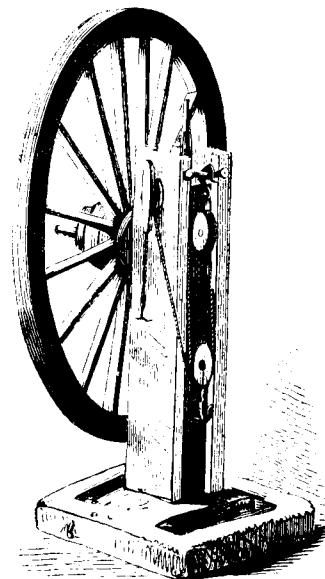


581. GAUGE.

580. HAND SAW.



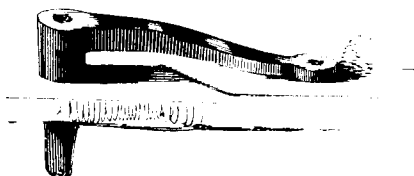
582. COACH-BODY MAKERS AT WORK.



583. WHEEL HORSE.



584. CHISEL.



586. HOLDFAST.



585. GOUGE.



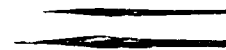
587. SQUARE.



588. SIDE AXE AND CHIPPING BLOCK.



589. HORSE.



590. PAINT BRUSHES.



591. PAINT POT.

being liable to warp. Beech is not used in the best coaches; elm is used for planking and also for the naves of wheels, and oak is preferred for the spokes of wheels and for those parts which require to be strong and durable. The panels are formed of Honduras mahogany, and sometimes of cedar, while deal and pine are also used in the floor and roofing, and a few other kinds of wood, such as fustick, lance-wood, birch, sycamore, chestnut, and plane, are employed to a limited extent.

The coach-builder applies the term *carriage* to the frame-work which lies beneath or around the body, and serves to support it, and to connect it with the wheels, pole, &c., so that there are two distinct sets of workmen, one known as *body-makers*, who construct the frame-work and panelling, &c., and the other as *carriage makers*, whose work is rougher. The pieces of the frame-work of ash having been cut to shape, are put together for the body, and as the meeting edges are seldom at right angles to each other, the joints are made by means of glue, bolts, nails, screws, tenon and mortice, lap-joints and grooves; constantly referring to the mould-pieces in executing the work. There is not much peculiarity in the tools, for they resemble those of the joiner. It will be seen, however, that the *planes* (fig. 576, 577,) are adapted to convex and concave surfaces. There are also various forms of *rowlers* (fig. 569, 571, 572,) or planes for forming grooves, for levelling the bottoms of cavities, &c. The *spoke-shave* (fig. 570,) is a small plane iron something like a pen-knife, set in the middle of a frame which can be used with both hands. It works easily in the direction of the grain, and is used for shaping and smoothing small rounded surfaces. The curved form is given to the panels by wetting the wood on one side and heating it on the other.

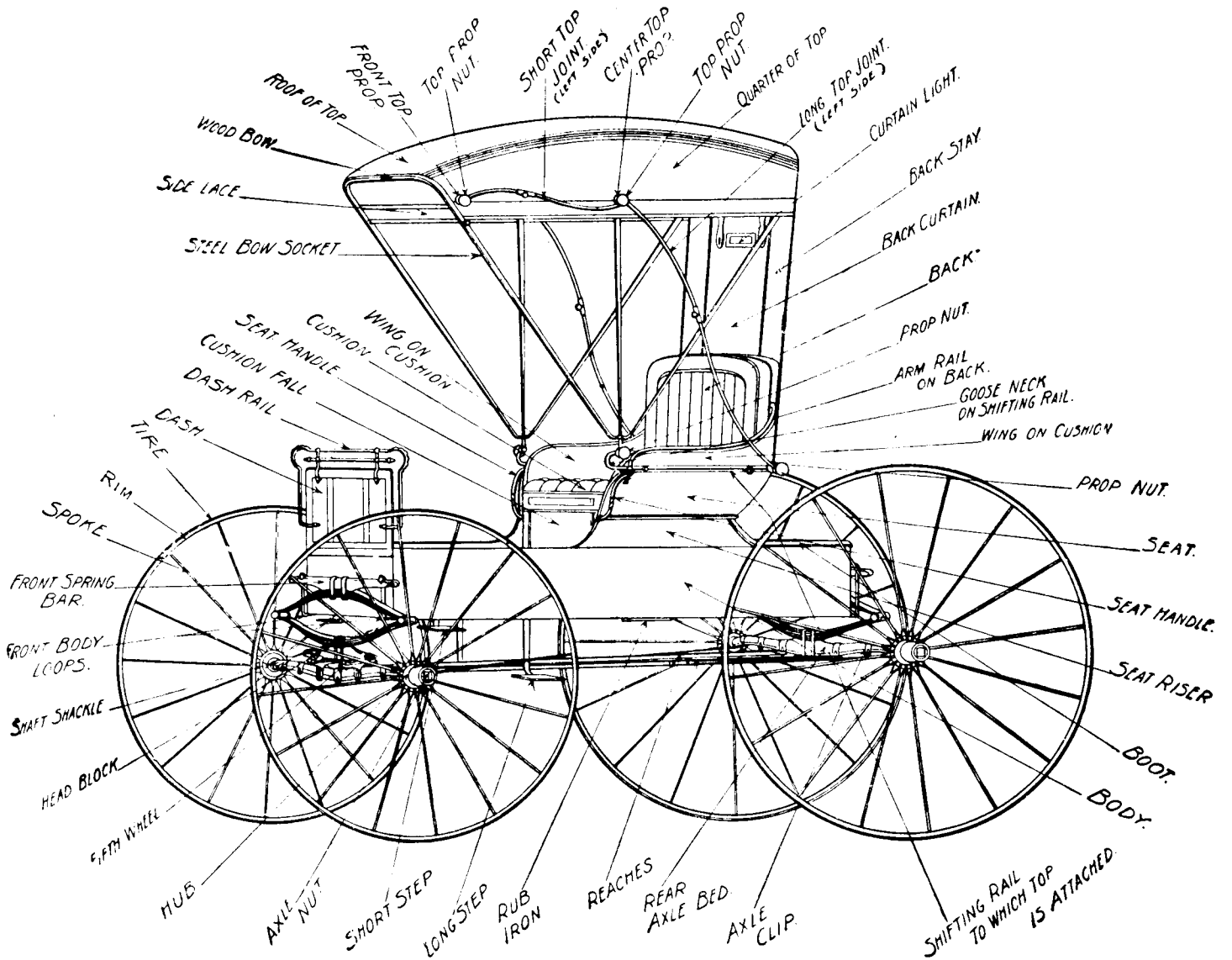
When the various parts of the body have been put together, and the carver has added the beadings and mouldings required, a thick coat of paint is laid on; but before this, for the best work, the roof and a portion of the sides, front and back, are covered with leather, for which purpose a large sound hide is selected, and having been well soaked it is thrown over the top and rubbed or pressed down on the roof, until it lies perfectly smooth and even. The workman then takes one of the hanging pieces and rubs it flat to one of the sides, trimming it off at a beading which separates the panels from the quarters or upper panels. He proceeds in like manner with the other parts, flattening the surface without making any incision in the skin; for this would be liable to let in the wet and ruin the carriage: by means of skilful rubbing and working, he is able to get rid of the folds or wrinkles at the corners: by working the leather gradually from these corners towards the centre of the sides and back, the puckers disappear, and the leather tightly adjusts itself to the form of the body. When the leather is properly adjusted, the painter sets to work, and it is a long business before he completes it, as many as from twelve to fifteen different coats being applied. There are from six to eight coatings of copal varnish, and the result is as beautiful and durable a polish as can be met with in any kind of wood-work.

It is scarcely necessary to do more than refer to the fine Spanish cloths, the rich plain and embossed silks, the embossed leather, the lace, and the cushions employed in finishing the interior of a coach. The lace may be of worsted or of silk,

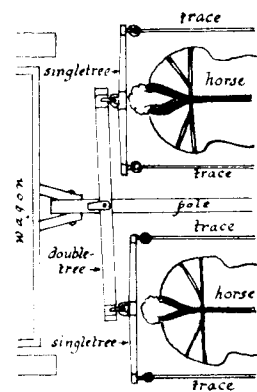
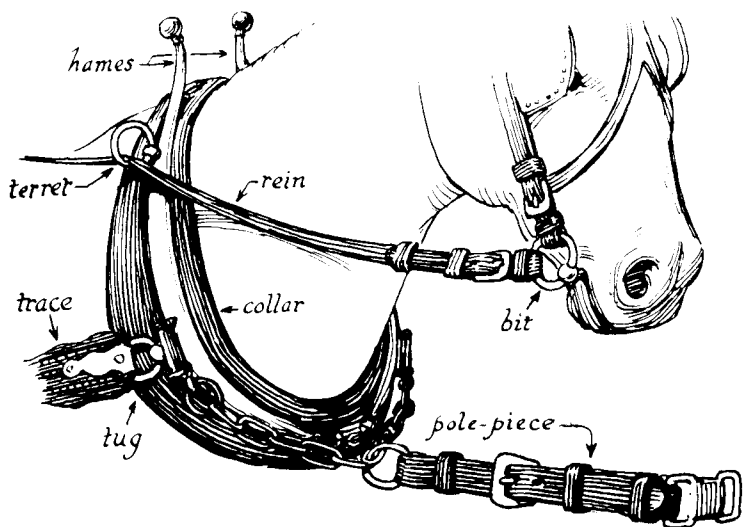
or of both materials combined, and it is used as a binding or edging: what is called *pasting lace* is used for concealing rows of tacks, and *seaming lace* for concealing seams and edges. The roof, sides, and other parts of the interior are made level by means of wadding and canvas, and are lined with cloth or silk. Cushions are stuffed with horsehair, and covered with cloth, silk, or morocco leather. The bottom of the coach and the folding steps are covered with carpet.

While the coach-body makers are at work upon the body, the carriage makers are engaged on their part of the structure. The springs have to be formed, either as *single elbow springs*, *double elbow springs*, *under springs*, *nut-cracker springs*, *C springs*, *S springs*, &c., while the smith has to form various pieces of iron-work, such as *plates*, *loops*, *stays*, *hoops*, *clips*, *bolts*, *steps*, *treads*, *joints*, *jacks*, *shackles*, &c.; some of which, however, belong to the body. The making of the wheels constitutes the distinct trade of the wheelwright. A wheel consists of a *centre* or *nave*, *radii* or *spokes*, and a circumference or the *felloes*. The nave is a short block of elm pierced with a hole for receiving the axle-tree: the spokes are rods of oak radiating from the nave, while the felloes are circular segments of ash, attached to the ends of the spokes, and uniting so as to form a circle: the felloes are all bound together by an iron hoop or *tire*. The nave is brought to shape in a turning lathe, and having been pierced for the axle, the mortices are chiselled out for the ends of the spokes. The mortices must be cut with great care, so as to give the spokes, or rather the wheel, a *dishing* as it is called, or slight concavity on the outer surface, so as to give more room for the coach body, and to avoid splashing. The oak for the spokes is cut into lengths of four feet, which are then shaped by hand; when the nave, being placed in a kind of socket in the floor, the spokes are driven in by means of a mallet. This is called *speeching* or *spoking*. The felloes being properly shaped by means of pattern boards and cutting tools, are drilled each with four holes; two for receiving the cylindrical ends of the spokes, and two for joining the felloes, end to end, by means of dowels of oak. After this, the whole is bound firmly together by means of a solid iron hoop, which is put on at a red heat, and well beaten, while it is being rapidly cooled by pouring water upon it. The tire in cooling contracts in dimensions and holds the frame-work tightly. Iron pins are driven through the tire and felloes, one on each side of every joint, and the points are riveted inside the felloes. The projecting parts of the nave are also furnished with iron hoops for the sake of strength. The axle consists of three parts; namely, the two *arms* which pass into the naves of the wheels, and the *bed* or central part which connects them together. The nave is lined with a well-fitting iron box for receiving the axle with little friction, and also for containing a reservoir of oil. The axle is usually turned at a lathe, and is then case-hardened, that is, its surface is converted into steel. White metal, or *albatu*, or white brass, is largely employed for beading, plates, locks, hinges, handles, rings, buckles, &c., but iron plated with thin sheet brass is also used. A good deal of the semi-cylindrical beading is made by drawing sheet metal through an iron or steel plate, and the concave side of the beading is afterwards filled in with soft metal and is furnished with points for fixing it. For the best work the beading is formed of sheet copper, coated with silver.

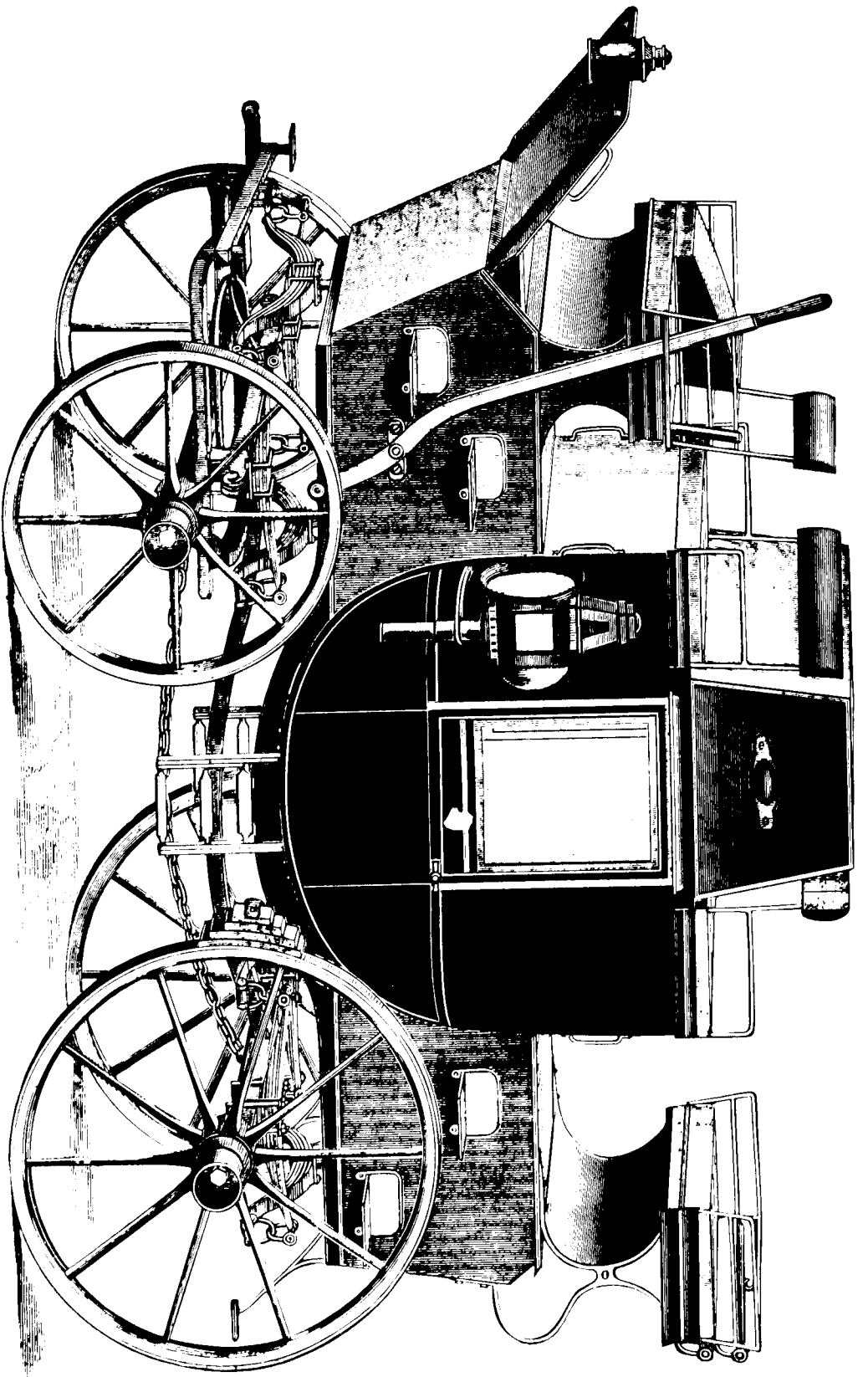
From: *American Carriages, Sleighs, Sulkeys, and Carts*, by Don H. Berkebile, Dover Publications



THE PRINCIPAL PARTS OF A CARRIAGE



From: *Wheels, a Pictorial History*, by Edwin Tunis, Thomas Crowell Company



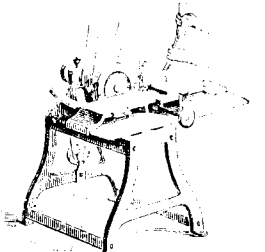
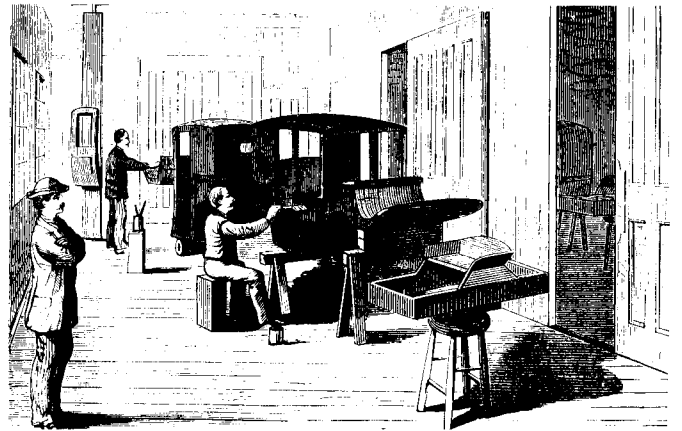
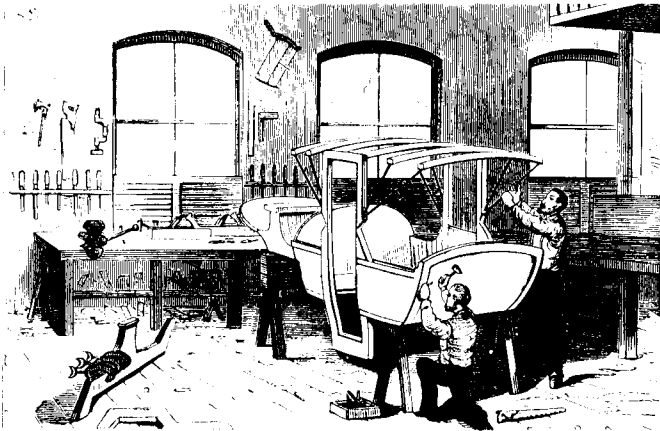
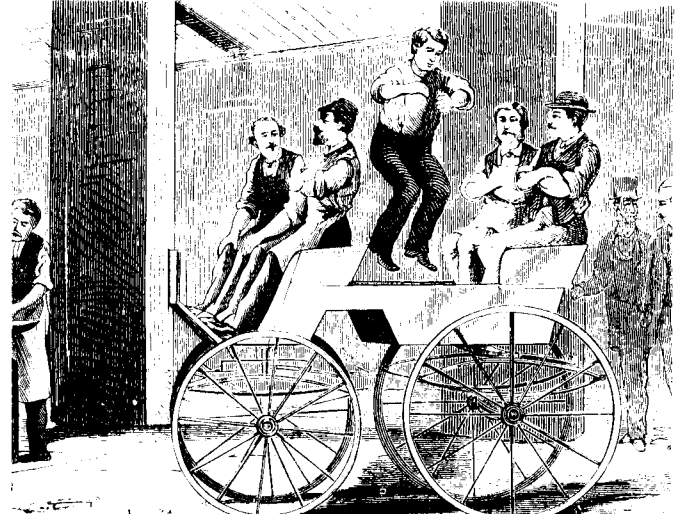
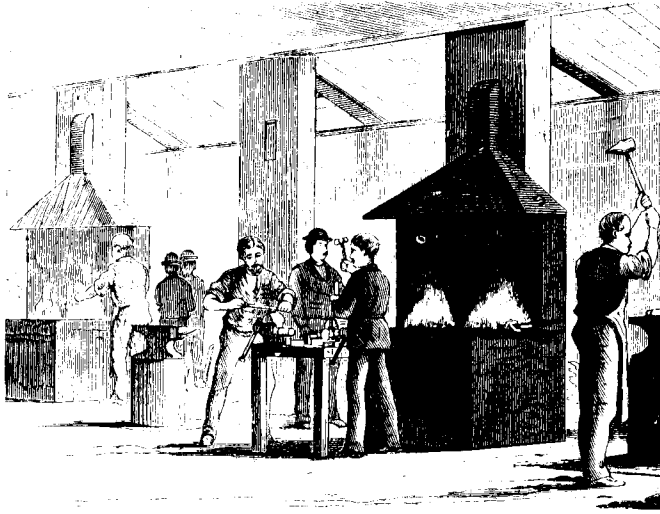
145. DRAG. This typical drag, by Hincks and Johnson, Bridgeport, Conn., contained ample space in the front and rear boots and in the imperial on the roof for the storage of equipment, food and drink. The imperial opened into a lunch table, and the door to the rear boot was hinged at the bottom, to provide a serving table when let down. Included in the equipment was an iron ladder to assist ladies in mounting the

roof seats. Servants rode inside. Lower panels of body bottle green. Coaching-red upper panels, rockers, seat risers and toe-board. Coaching-red carriage, with $\frac{3}{4}$ " black stripes. Drab cloth trimming inside; amber-colored French pigskin outside. Wheels 40" and 50". *The Carriage Monthly*, vol. 15, Oct. 1879, pl. 50.

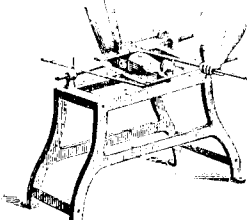


From: *Microcosm*, by William Henry Pyne, Benjamin Blom, Inc.

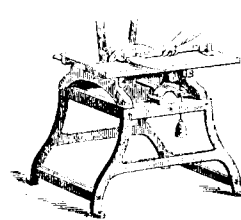
From: *Wheels across America*, by Clarence D. Hornum, Barnes



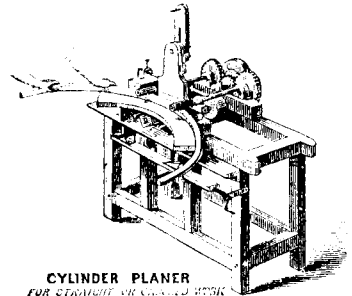
ROTARY PLANER
FOR STRAIGHT, GROUNDED OR BEVELLED WORK



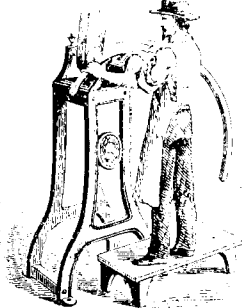
SPOKE SHAVING MACHINE



SPOKE FACING AND TAPERING MACHINE

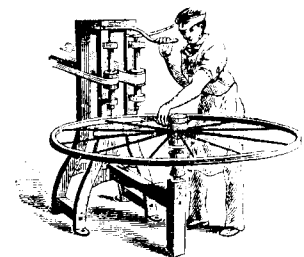


CYLINDER PLANER
FOR STRAIGHT OR GROUNDED WORK

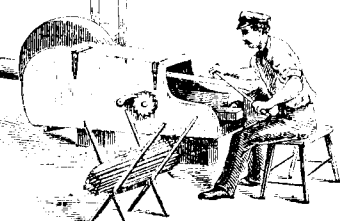


FELLOE ROUNDING MACHINE

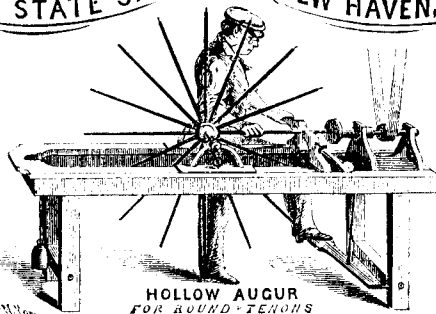
(((MACHINERY)))
FOR THE MANUFACTURE OF ALL KINDS OF
CARRIAGE WHEELS
MADE BY
G. F. KIMBALL,
WHEEL MANUFACTURER,
125 STATE ST. (NEW HAVEN, CT.)



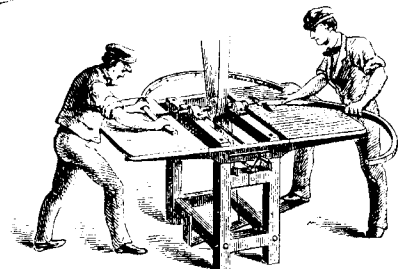
FOR RIVETING AND SCREWING FELLOES



SPOKE POLISHING MACHINE



HOLLOW AUGUR
FOR ROUND TENONS



BORING AND DOWELING MACHINE

Wheelwright Kimball, of New Haven, Conn., was proud of his modern mechanical equipment, featured in one of his advertisements.

ATTIC 1980 SPRING MEETING

Johnsonville at Moodus, Connecticut, Sunday, May 4, 1980

Johnsonville is a small mill village that was built around a water-powered cord and twine mill. Mr. and Mrs. Ray Schmitt have restored and added to the village to make it typical of the 19th century. Although lightning and a consequent fire destroyed the mill in 1972, the village has plenty to be seen as you can see from the enclosed sheets. The latest addition to the village is a 100 foot single-span covered bridge which is listed in the National Register of Covered Bridges.

PROGRAM

- 9:00 a.m. - Registration, Coffee & Donuts (in the Red House).
- Informal tailgate tool exchange in parking lot.
 (Enthusiastic tool traders may wish to come earlier than 9:00 a.m.)
- 10:00 a.m. - Short business meeting.
- Talk by Mr. Everett Berndtson, wheelwright and wagon builder. Please bring examples of wheelwright's tools for discussion.
- 12:00 p.m. - Lunch -- Bring your own picnic lunch and enjoy it at the tables by the covered bridge.
- 1:00 p.m. - Assemble at the covered bridge for a discussion with its builder, Mr. Thomas Kronenberger, followed by a guided tour of Johnsonville Village.
- After tour - What's-it session in the Red House.

Entrance fee: \$1.50 per person. Children under 16 free.

JOHNSONVILLE MAP KEY

- A. Up and Down Sawmill (1832) from Hadlyme, Conn. With sluiceway and an overshot waterwheel from West Baldwin, Maine.
- B. Wooden Dam (1880) reconstructed in 1972 and impounding a 16 acre mill pond on the Moodus River.
- C. Laminated Wood Arch Bridge.
- D. The Neptune Twine and Cord Mill Site (1832) destroyed by fire in 1972. Business was founded by Stanton S. Card and run as Card & Co. until Emory Johnson established the Neptune Twine Mills in 1860.
- E. Mill Office (1850's) remodeled in 1899. The building housed the Mill Office and Sales Room, a Post Office, and a coffin trimming business.
- F., G., and H. Mill Workers' Homes (19th century).
- I. Clock and Drug Store (1850's) formerly the Conference or Meeting House from Centerbrook, Conn. Vaulted ceiling.
- J. Frank Creamer's Country Store (1840's) from Peru, Mass. Second floor houses a Barber shop and a collection of Miniatures.
- K. Steam Engine (1888) from the Parker Stearns Co. of Brooklyn, New York. The steam engine is a single cylinder Watts Campbell girder frame Corliss type.
- L. Livery Stable (1870's) The carriage barn was for the Gilbert Clock Co. of Winsted, Conn. with collection of carriages and wheeled vehicles of the 19th century. The ground floor woodwork, stalls, and harness cases are from the Lt. Governor Todd stable in New Brunswick, Canada.
- M. The Red House formerly a mill worker's house — now converted to a reception center and restaurant.
- N. Johnson House and Gardens (1845) Victorian mill owner's home furnished in period antiques and accessories.
- O. Covered Bridge with adjacent picnic area.
- P. Gilead Chapel (1876) from Waterford, Conn. Built in Carpenter Gothic with stained glass windows and stenciled interior.
- Q. Ice House (1850's).
- R. Sternwheeler Riverboat replica similar to many which plied New England's rivers in the 1800's.
- S. One Room School House (1860 to 1908) from Canterbury, Conn. complete with all of its original interior furnishings.