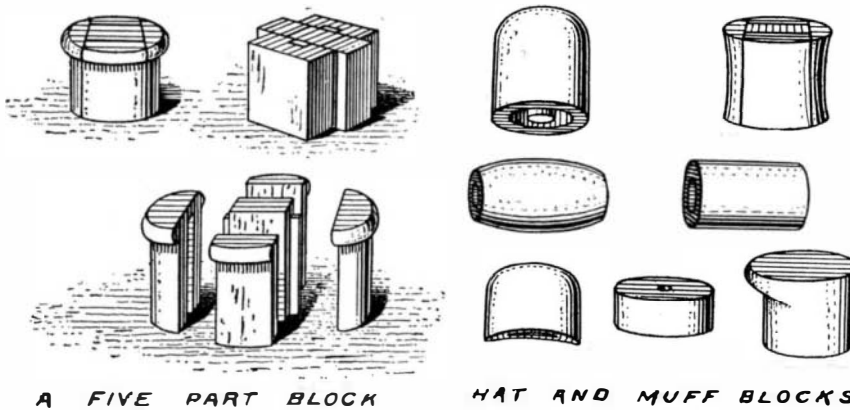


**MANUFACTURE OF HAT BLOCKS.**

A great number of the hats that are manufactured, such as golf, derby, yachting, silk hats, etc., are shaped over wooden blocks made from the whitewood tree. The trees grow principally in the Southern and Western States, and are straight grained, porous, and free of knots. The stock, which costs about \$60 per thousand feet, comes to the manufacturer in logs, measuring about 12 to 16 feet in length and from 7 to 8 inches in width and thickness. The material before being worked requires from six to twelve months' drying, the logs being cut up into short lengths and piled one on another in a room for that purpose and dried with steam heat. The blocks over which the yacht and golf hats are formed are made up into five parts, the pieces of wood being first sawed into the proper size, then planed, grooved, and glued. Two of the side pieces of these blocks are grooved out in the center, the groove being about one half of an inch in depth, about one inch in width, and about six inches in length. Glued to two of the sides of the center parts of the blocks are two tongues or strips of wood, which are made so as to fit perfectly when the blocks are put together in the grooves of the side pieces. After the pieces have been grooved and tongued a strip of paper, the width and length of each block, is glued between them, which holds the pieces together, so that after it has been oveled and finished it can be easily broken apart. The grooving is performed by the operator pushing the blocks, which are fastened to a sliding table of the machine, over a revolving knife traveling at the rate of about 3,500 revolutions per minute.

The corners of each block are first sawed off before

to hold the block during the next operation. The peg at one end is square, and is fastened securely in a wooden vise. The operator then places the block on the circular end of the peg and goes over the entire surface with a number of spokeshaves, trimming off the roughness. The block is then sandpapered by placing it on the end of a circular wooden peg, simi-



A FIVE PART BLOCK

HAT AND MUFF BLOCKS.

lar in shape to the other, which is connected to the end of the shaft of the machine. The machine, when in motion, travels at the rate of about 3,500 revolutions per minute, the operator holding a fine sheet of sandpaper on the revolving block, which smooths off the surface in about one minute. For derby and silk hats the bottoms of the blocks have to be curved.

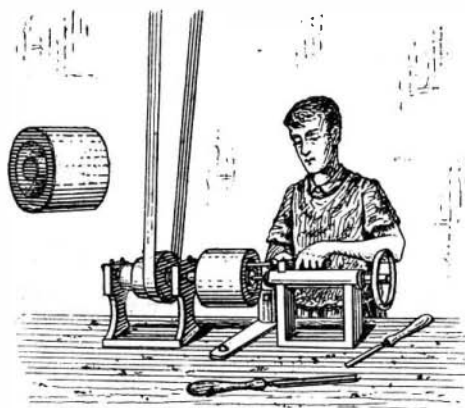
This is performed by fastening the blocks in a movable frame which the operator pushes over two revolving 10 inch knives, connected lengthwise to the shaft of the machine. The frame, containing the block, rests on two curved iron runners; over these the at-

**Gas Engines.**

In Germany the first application of gas motors to raising water was made at Duren, near Aachen, in 1884; and in the same year a steam engine was replaced by a gas motor for the same purpose at Quedlinburg. In 1886 Rattwill and Coblenz, in 1887 Furth and Peine, and in 1888 Karlsruhe and Munster followed suit; and these installations are still working with excellent results. According to a recent report of the Quedlinburg Gas and Water Company, the saving in the cost of pumping with gas engines, as compared with steam, taking the last year in which steam was used and the second with gas, was 42 per cent. While the gas motor occupies less space than the steam engine with its boiler and chimney, it has the advantage as regards attendance, for one man can look after several gas engines, while a steam engine plant of any importance requires an engineman and stoker, and often an additional hand to keep up the coal supply. Another advantage of the gas motor is the fact that it can at any time be put to work immediately, so that considerable water pressure may be made available in a few minutes, which is very important in case of fire, while the dimensions of reservoirs may be reduced if the motors be kept constantly running.

**By Rail from New York to San Francisco.**

The exact distance and time between New York and San Francisco are not very easy to remember, especially for persons like railroad men, who haven't the time, and editors, who haven't the money, to make the trip very often; and it is, therefore, worth noting that since the establishment of the last fast train by



CARVING HAND HOLES.



CURVING BLOCKS



SANDPAPERING

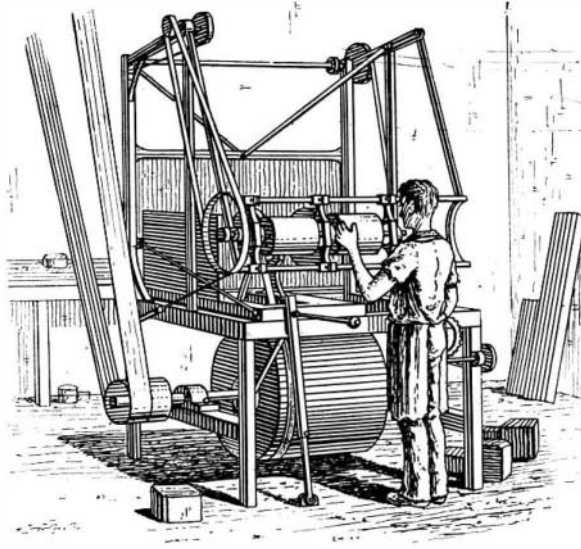
being oveled. The block and pattern are both securely ironed to a revolving shaft which is connected to a movable frame attached to the machine. The back and forward movement of the frame is caused by the revolving oval-shaped pattern bearing against a revolving wheel. The block to be oveled, which travels at the same rate of speed as the pattern, comes in contact with another wheel, connected to which are four hook-shaped knives about 1 1/4 inches in width. The knives are bolted to the wheel at an equal distance apart and travel at the rate of about 4,000 revolutions per minute. The knives make an upward cut, moving

tendant pushes the frame. The knives which come in contact with the bottom of the block cut out the proper curve as the frame passes over the runners. The knives travel at the rate of about 4,000 revolutions per minute, the curving operation taking about one-half minute. In cutting out hand holes the block is fastened in a lathe, the operator, by means of gouges, scoring out the holes as the block revolves. The hole is scored about from 4 to 6 inches in diameter, according to the size of the block, and about 2 inches in depth, a solid portion for the hand to grasp being left in the center about from 2 to 3 inches in diameter.

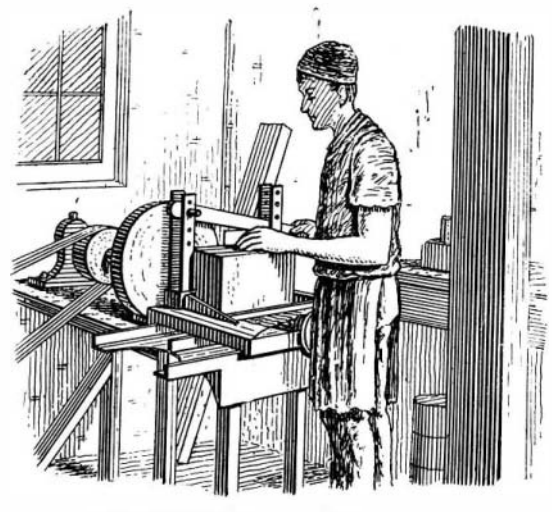
the Union Pacific the time is almost exactly 100 hours. This is the apparent time. By Eastern time the train arrives at San Francisco at 11:45 P. M., making the actual time consumed on the road 103 1/4 hours, the apparent time being 100 hours 15 minutes. The distance is 3,332 miles (New York Central, New York to Buffalo, 440; Michigan Central, Buffalo to Chicago, 535; Chicago & Northwestern, Chicago to Council Bluffs, 490; Union Pacific, Council Bluffs to Ogden, 1,034; Southern Pacific, Ogden to San Francisco, 833). The connecting train east of Chicago is the North Shore Limited, leaving New York at 4:30 P. M., and arriving



SHAVING BLOCKS.



OVALING MACHINE



TRIMMING BLOCKS

and cutting along the block until finished, the operation taking about three minutes. The pattern and block travel at the rate of about 200 revolutions per minute.

After the ovaling operation has been performed, an inch hole is bored into the center of the block, about two inches in depth, so that a peg can be placed in it

The blocks, when finished, are given a coating of raw linseed oil and paraffine. The finished blocks range in height from about 4 to 10 inches, their diameters being from 4 1/4 x 5 3/8 inches to about 6 3/8 x 7 1/2 inches. About 60 blocks daily can be turned out with the labor of about 5 men. The sketches were taken from the plant of Henry A. Ashwell, New York.

in Chicago at 4:30 P. M. the next day. The rate of speed, through, is 33.27 miles an hour, which includes the 1 1/2 hours' delay in Chicago. The rate of speed from Chicago is 30.7 miles an hour.—Railroad Gazette.

MILK is now successfully sterilized by subjecting it to an alternating electric current.