

## THE LOMBARD STEAM LOG HAULER AND EQUIPMENT

The Lombard Steam Log Hauler or Traction Engine, caterpillar type tread, has been in use in the United States and Canada since the year 1900 among our largest and most enterprising lumbering companies, hauling logs, both soft and hard woods, bark, cordwood, spool-bars and sawed lumber, from their yards to landing or railroad, over snow and iced roads.

These machines will operate on roads known as a wagon sled road, formerly used by horses, also on hilly roads, where it is practical to use horses, without injury to boiler.

The load that the machine can haul is governed by the road conditions, grades, number of sleds in train, and water used on roads to make ice. A machine can, in proper hands, haul on snow-iced roads a load of 300 tons. One machine that we have a record of made 138 trips for the season with an average of 220 net tons per trip, using 7 sets of sleds per train.

These machines require four men to operate them, engineer, fireman, pilot and one to couple up sleds, assist in taking on fuel and looking after the train of sleds when on the road.

The loads are hauled on sleds in trains of from 4 to 10 sleds in each train. There should be at least three of these trains to get the full working capacity of the machine, having one train at each end of the road, and one with the machine.

Width of sleds should exceed that of machine, so that the track of sleds should be on the outside of the track of machine.

The sleds are coupled together by means of reach poles, fitted with steel ends, fitting in irons at nose of runner and irons on back of bar or bench. Sleds are coupled to machine by means of V-pole fitted with steel ends suitable for the work.

Sleds for hauling logs should have rockers equipped with some good trip stake device.

When hauling short mill logs, cordwood, spool-bars or bark, sleds can be fitted with racks suitable for the work. The wood parts for sleds are usually made by the lumbering companies at their operation. Irons for sleds are illustrated on cut No. 12, for which Lombard Traction Engine Co. hold patent rights.

The machine is steered by means of hand wheel at front of machine, and a train of gears to quadrant and sled.

A snow plow or scraper can be furnished with machine, if wanted. It is attached under the frame, and is operated from front of machine by means of hand wheel, worm and worm gear. By its use it will keep the roads level. Scraper and parts for same are illustrated on cut No. 13 of catalog.

### DESCRIPTION AND SPECIFICATION OF MACHINE

The machine is built with a horizontal type boiler. A two-cylinder horizontal engine using gear and sprocket chain for transmission of power to driving members. The water tank is filled usually from brooks or water holes near roads, using an ejector in cab with suction hose of suitable length and size. Where possible, it is better to have tanks near roads and high enough to fill machine by gravity through large hose, which will save time, these tanks to be filled by some separate device.

Length: 30 ft. over all.  
Width: 8 ft. 2 in. over all.  
Height: 9 ft. (about) over all.  
Lowest Point: 12 in. (about).  
Speed: 5 miles per hour, maximum.  
Weight: 19 tons, shipping weight uncased.  
Engine: 2-cylinder, double-acting.  
Horizontal, reversible type, 9-in. bore and 10-in. stroke.  
90-horsepower at 175 lbs. steam pressure.  
250 R. P. M. equals  $4\frac{7}{10}$  miles per hour.  
Crank pins set at 90 degrees to one another.  
Valve, balance D type, eccentric driven, link motion.  
Cylinders equipped with automatic relief valves.  
Lubricator: Hills-McCanna pump lubricator.  
Engine Control: Throttle lever in cab.  
Hand reverse lever in cab.  
Boiler: Horizontal locomotive type with forced draft.  
200lbs. working pressure.  
80 tubes  $1\frac{3}{4}$  in. diameter, 107 in. long.  
Fire Box, length inside 52 in., width inside 29 in., height above grates 41 in.  
Rocking Grates.  
Grate area, about  $10\frac{1}{2}$  sq. ft.  
Distance from top of grates to bottom of ash pan 16 in.  
Stay bolts  $1\frac{1}{8}$  in. in diameter.  
Fusible plug  $\frac{3}{4}$  in. outside type.  
Prismatic water column.  
Water fed to boiler by two Hancock injectors, type C-17 $\frac{1}{2}$ .

Boiler covered with  $1\frac{1}{2}$  in. and 2 in. asbestos lagging and sheet iron jacket  
All steam pipes covered.  
Water Tank: Saddle type. Capacity 425 gals.  
Fuel Capacity: Coal,  $1\frac{1}{2}$  tons.  
Wood,  $\frac{7}{8}$  cord, when using extension rack.  
Gear Ratio: Between engine and driving member sprocket, 5.92 to 1.  
Drive: Gear and sprocket chain combination.  
Chain is roller thimble type.  
7300 lbs. working strength.  
Differential: Bevel gear type, all special nickel steel gears.  
Sprockets: Special Manganese steel.  
Bearings: All heavy duty bearings, bronze with compression hard grease cups.  
Frame: Seven inch,  $19\frac{3}{4}$  lbs. steel channels and well braced.  
Draw Bar: All steel construction with springs.  
Springs: Between frame and driving members.  
Driving Members: Two 6 ft. 4 in. centers. Steel construction with traction surface of 16 in. x 53 in. each.  
Total traction surface, 1696 sq. in.  
Each member has 29 lags and two roller chains.  
Present type of links,  $\frac{5}{16}$  in. x  $1\frac{1}{2}$  in. steel, put together with  $\frac{3}{4}$  in. rivets.  
Cab: Width 6 ft. 9 in.; length, 4 ft. 8 in.; height in center, 7 ft. 4 in.  
Center of Driving Members to Center of Steering Members: 15 ft. 8 in.  
Equipment: Full set of tools, steam hose to use in removing ice or snow from machine, 22 ft. of 2 in. heavy armored suction hose with strainer.

**WATER TANK.**—The tank is filled by means of an ejector located at rear of tank in cab. After putting hose in water hole, open cover on tank, open gate valve next to tank, then turn on steam to ejector slowly until it takes water. When through, close steam valve, close gate valve, take hose from water hole and hold in a position to drain, and turn on a little steam to blow out any water that may remain, to keep from freezing.

**BLOWER.**—There is a blower pipe and valve in cab to assist in starting fire.

**GRATES.**—There are seven grates, hitched up in two sections, which can be operated by lever in cab.

**ASH PAN.**—The ash pan is of good size and has a door, both forward and back, which is opened from the cab.

**DRIVING MEMBERS.**—Lags should not be allowed to get too slack. Lags can be taken up by loosening bolts on forward sprocket boxes, and forcing them forward by means of screw in rear of each box.

Sprocket chains can be adjusted by loosening bolts in axle box in center of driving member and forcing driving member back by means of a screw placed in driving member casting.

Roller chains can be adjusted by means of loosening forward chain guides, and forcing it ahead by means of a screw in driving member casting.

**CARE OF BOILER.**—Tubes in boiler should be brushed each day, or twice a day if in constant use. Boiler should be washed out each month. There are mud plugs through which mud can be removed and inspection made, one in front end of boiler in smoke box, one in rear head, which allows inspection of crown sheet, and one in each corner of water leg. A good deal of care should be taken in washing out boiler in the front water leg, where it gets mud from the barrel; also in water leg around fire door. Some good boiler compound should be used at regular intervals, such as, boiler compounds, graphite or kerosene.

## RUNNING HINTS

When running on the road one injector will supply enough water to boiler. For the best results in hauling good loads, don't carry too much water. When machine is standing on level road, there should not be over two gauges of water—between one and two gauges is best—for as soon as the engine begins to work, it raises water in boiler to about the third gauge. You cannot get good results with wet steam. It is a waste of water and fuel, and washes out oil in cylinder, and makes engine labor harder.

Don't be deceived when you stop, as the water level has raised when at work, and will lower when you stop. After a few runs, the engineer will readily understand these points, and guard against them without any trouble.

Don't try to fill boiler too full when approaching a down grade or hill. Keep a reasonable amount of water in boiler. When going down hill shut off steam, open cylinder drips, close drafts and open fire door.

If you wish to hold the load some with machine, draw back reverse lever toward center, and watch the action of driving members. Don't use steam, and don't allow the lag bed to stop.

These suggestions will be readily understood after a few runs.