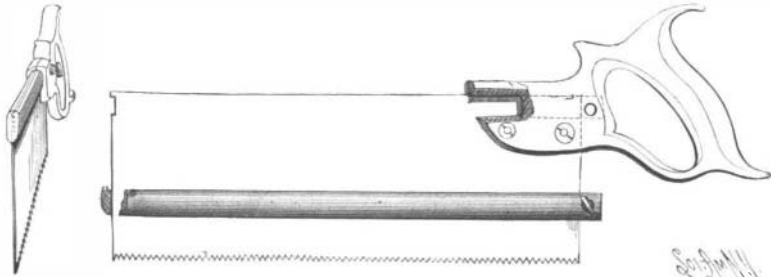


**AN IMPROVED SAW.**

According to the improvement represented in the illustration, the saw blade can be readily gaged to permit the operator to cut to a desired depth. A patent has been granted for the invention to Henry J. Edlund, of the Kings County Hospital, Kingston Avenue, Flatbush, Brooklyn, N. Y. The saw back is detachable, and is made U-shaped to fit both sides of the blade, the middle portion being formed with a projection adapted to engage a notch on the outer end of the blade, to hold the back in position when used as a back. The free ends of the back portion extend through recesses in the handle and are fastened in place by a thumb screw, the two ends of the back be-



EDLUND'S HAND SAW.

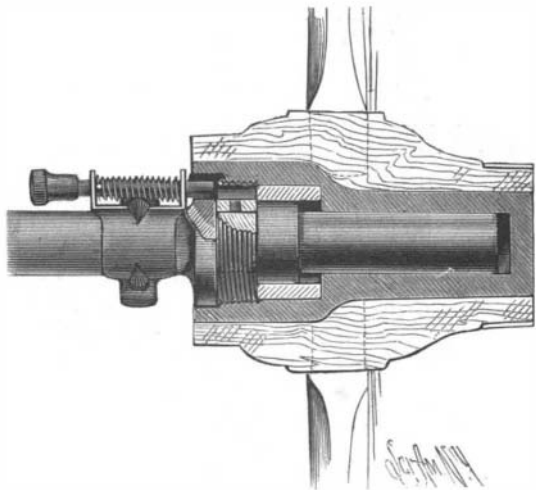
ing also similarly connected with each other at the rear of the saw blade when the back is used as a gage, as shown in the illustration.

**Mining Near the Equator.**

W. H. Adams, of Grass Valley, has a letter from his brother, Jas. B. Adams, who with three or four companions are working for the Playa de Ora Mining Company, in Ecuador, S. A., 200 miles back from the sea coast. The mine is three degrees from the equator, and they suffer the discomforts of heat, tornadoes and insect pests. At times the rainfall reaches ten inches in an hour, the streams rising twenty feet within a short space of time. The insects are prodigious in size and continuous in their operations. Vampire bats stealthily alight upon a person in deep slumber, inserting their beaks and gorge themselves with his life blood. There is also miasma in the atmosphere, and fever prevails. Nothing but liberal salaries could tempt civilized people to remain under all these discomforting conditions. The mining operations are superintended by educated and experienced white men, while the heavy manual labor is done by the natives at very low wages. Besides Mr. Adams, Edwin Ryan of North Bloomfield is foreman at the Playa de Ora. Wm. Davis of Nevada City is located at another mine, three miles distant. Mr. Blodgett, a former foreman of the mine, is on the way home to Nevada City. Five miners from Sierra County have lately arrived in the same country. The ore taken from the Playa de Ora is very rich and pays the owners large dividends.—Min. and Sci. Press.

**A HUB ATTACHING DEVICE.**

The illustration represents improved means for holding a vehicle wheel to the axle, preventing dust from passing to the spindle. The improvement has been patented by Hartwell T. Lewis, of Calumet, Mich. The socket of the wheel hub has at its inner end an enlarged portion with an internal screw thread, in which screws a nut turning loosely between collars on



LEWIS' HUB ATTACHING DEVICE.

the axle spindle. The nut has a longitudinal recess adapted to be engaged by the inner end of a pin sliding in bearings on the clip connecting the wooden portion of the axle with the metallic part. The pin is normally spring-pressed to hold it out of engagement with the nut, when the latter revolves freely around the axle, but on the outer end of the pin is a knob, and on pushing the pin inwardly its inner end engages the recess in the nut, preventing it from turning on the axle spindle, and allowing the hub to be thus unscrewed from the nut whenever it is desired to remove the wheel. A bushing jams against the outer end of

the loose nut, and against its inner end fits a flange of the axle, the outer end of the hub being closed, preventing the passage of dust and other impurities to the bearing. It will thus be seen that the wheel may be readily removed from the axle, to lubricate or for repairs, without the use of a wrench or other tools.

**The Frozen Milk Industry.**

Canada's representative in Denmark reports that during the past year a new industry has been established there which promises to prove both profitable and serviceable, and which might be followed with equal success on this side of the water, viz., the shipment of frozen milk to large cities. A year ago a Danish merchant experimented in this direction by taking Danish milk, which is peculiarly delicate and rich in flavor, freezing it by the use of ice and salt, and sending it in barrels by rail and steamer to London. On its arrival the milk proved to be as sweet and well tasting as if it had been just drawn from a cow in the middle of Sweden. The milk was so much in demand and proved so profitable an article of commerce that the exporter immediately took out a patent on the shipment of frozen milk from Sweden and Denmark to London. He then sold the patent to a stock company with large capital, which, on February 1 last, bought one of the largest Swedish creameries, converted it into a factory, and, having put in a special freezing apparatus, began, on May 1, the export of frozen milk in large quantities.

When the milk is received from the farmers it is pasteurized, that is, heated to 75° C., and then immediately cooled off to about 10° C., and now the freezing is commenced. Half the milk is filled into cans and placed in a freezing apparatus, where it will be thoroughly frozen in the course of three hours. The frozen milk is then filled into barrels of pine, the only kind of wood that can be used. The barrels, however, are only half filled with this frozen milk, the balance being filled with the unfrozen milk. This way of packing has proved to be the only practical one, as part of the milk has to be frozen in order to keep the whole cold, and part has to be in a flowing state in order to get the barrels exactly full, which is necessary in order to avoid too much shaking up on the road, by which the cream would be turned into butter; the floating masses of ice at the same time prevent the unfrozen milk settling in the cream. Milk which is treated in this way has proved to keep quite fresh for twenty-six days. Every barrel holds 1,000 pounds of milk, and twice a week there will be shipped fifty barrels, making in all about 100,000 pounds of milk a week.

The milk is shipped to Newcastle, and from there by rail to large manufacturing cities, where it is sold in the streets or in retail stores. It is reported that the patent has been bought for Ireland also at a cost of \$200,000, which proves how much the stock company expects from this new enterprise.

The time may not be far away when the dairy farms of the New England and Western States may be sending, not butter and milk, but frozen milk and cream, to the large cities of both continents.—Phil. Record.

**Solid Carbonic Acid.**

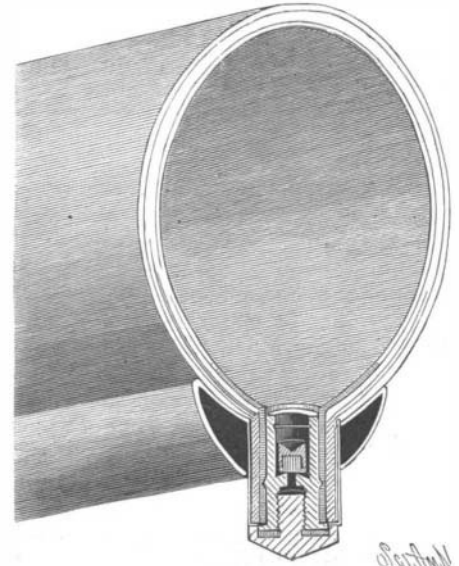
Dry carbonic acid was distilled and solidified in a wide refrigerated tube in which a thermometer had been introduced axially. The melting point of the solid acid was -56.7°. The pressure at the time was 5.1 atmospheres. The point of refrigeration was then observed and found to be -56.7° at the pressure of 5.1 atmospheres. This result agrees substantially with the figures found by Faraday. The point of ebullition of solid carbonic acid is at -79°. Regnault found -78.16 and Pouillet -79°. Ether mixed with solidified carbonic acid (carbonic snow) does not reduce the temperature. Methyl chloride behaves quite differently. Setting out from -65°, the carbonic snow dissolves without liberation of gas, and at the moment of complete saturation the thermometer marks -85°. The lowest temperature reached by means of carbonic snow in vacuo is -115°, a point which was maintained for nearly three hours.—P. Villard and R. Jarry.

**Fast Locomotive.**

The Baldwin Locomotive Works are building a 19 by 26 inch passenger engine for the C., B. & O., to carry 200 pounds steam pressure and have piston valves, and a trailing truck behind the drivers. It will be a simple engine and is for the purpose of hauling a train of six cars from Chicago to Galesburg, 163 miles, in three hours, or at an average speed of 54.3 miles per hour. The grate area is to be large and the locomotive will be very powerful. This engine is the outcome of the competition between the Burlington and the Northwestern in mail and fast passenger service.

**A PNEUMATIC TIRE INFLATING VALVE.**

The illustration represents a simple and inexpensive valve for the inflation of pneumatic tires, one which protrudes but little from the wheel rim, is easily secured in place, is airtight and dustproof, and not liable to get out of order. It has been patented by Frank Gustaveson, of Wabasha, Minn. A metal sleeve extending through the rim incloses a rubber and canvas sleeve extending into the tire, and in this



GUSTAVESON'S PNEUMATIC TIRE VALVE.

sleeve is fitted the valve casing, made with an external flange embedded in the interior sleeve. Centrally in the valve casing is an air passage and valve seat, the valve being preferably faced with rubber or similar material, and the air passing around the valve, when it is removed from its seat, to the interior of the tire. A wire across the inner end of the valve casing prevents the valve from falling out of its chamber. A cap screws into the outer end of the valve casing, a rubber washer forming an airtight closure, and to inflate the tire this cap is removed and an ordinary air pump is applied. The air forced in by the pump moves the valve from its seat and passes into the tire, the back pressure closing the valve when the pump is removed.

**The Siberian Railway.**

The Trans-Baikal section of the Siberian Railway is now completed. The original plans for this line were abandoned, owing to the fact that they would have necessitated the carrying of the line to an elevation of 3,000 feet above the sea, through arid districts where but few settlers could make a livelihood. A more southern route has now been adopted, which, though considerably longer, will run by four of the principal rivers, through regions rich in salt, soda, silver, copper, iron, lead and gold, and in which many mines have been opened. Some 750 miles of the Siberian Railway are open for traffic, viz., Chelabinsk to Omsk in the west, 500 miles; and Vladivostok to Grafskaja in the east, 250 miles. Thus Omsk is placed in direct communication with Moscow and St. Petersburg. Of the total length of 6,000 miles from St. Petersburg to Vladivostok, about 3,700 miles have still to be completed.

**AN IMPROVED TUBE CLEANER.**

The self-expanding boiler tube scraper shown in the accompanying illustration is easily operated and of approved efficiency. It has been patented by Mr. Robert Faries, and is manufactured by the Faries



THE FARIES BOILER TUBE CLEANER.

Manufacturing Company, of Decatur, Ill. It is readily contracted to enter the tube, expanding by a quick forward movement and contracting by a reverse motion, allowing easy withdrawal. It is adjusted for different size tubes by turning the scraper on the handle or turning the handle in the scraper. The blades are readily removed for repairs or renewal by unscrewing a single nut. In all sizes larger than 2½ inches a ram may be employed, with a slip joint admitting of limited withdrawal of the handle without moving the scraper, when a quick forward movement gives a hammer or ram action on the scraper, enabling tight places to be passed. The bars on the scrapers are of hard spring steel, the blades of chilled cast iron, and the other parts of steel and malleable iron. The scraper is made in different sizes for all dimensions of boiler tubes, and for water tube boilers an extra strong heavy scraper is made.