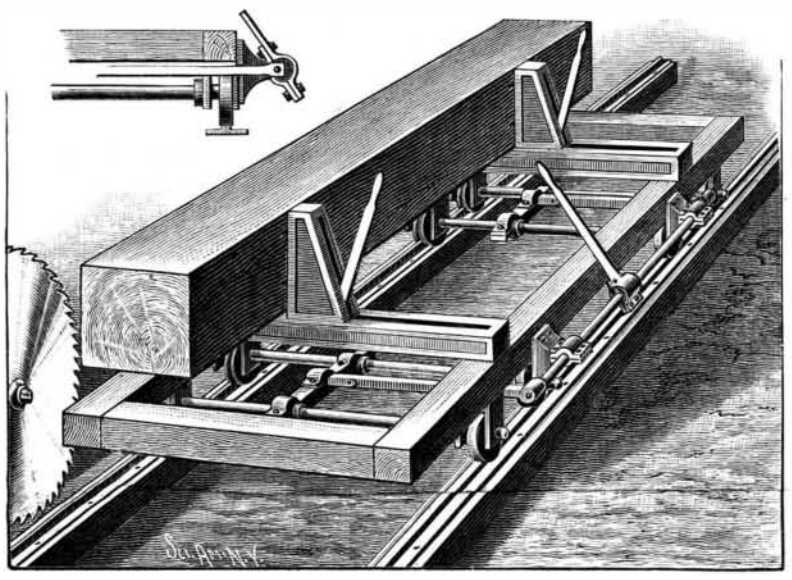
the center of the lever arms has a crank arm at each end for rotating the shaft, upon which are pinions, one pinion adapted to engage and reciprocate the approaching racks on each side of the ladder frame, while upon one extremity of the shaft a ratchet wheel is secured, adapted to be engaged by a pawl pivoted to the outer face of one of the lever arms. The ladder proper is made up of a series of rectangular frames arranged to form lazy-tongs, each frame having near its



ROSENBERG'S OFFSET FOR SAWMILL CARRIAGES.

forward ends a round, the rounds being in vertical alignment when the ladder is extended or elevated. The ladder is elevated by means of the crank handles on the transverse shaft, when the sliding rack operates to extend the several sets of lazy-tongs, the lever arms affording the means of inclining the entire ladder to the rear as far as desired. A platform is usually provided for the top of the ladder, the platform having hooks adapted to encircle one of the upper rounds. From the lower set of lazy-tongs are projected legs, provided with wheels, these legs being drawn from the ground when the ladder is elevated, and the ladder then resting upon its fixed frame, but when the ladder is folded down these legs assume an essentially perpendicular position, and form supports whereby the ladder may be guided on its wheels in any direction.

Eels that Scale Precipices.

One of the most novel sights in the spring of the year, at the rocks of the Willamette Falls, is the swarms of gyrating eels. They are friskiness itself, and show a low order of intelligence. If you put your hand in the water over the eels, or spit on it, instantly they are gone. But poke a stick down among the snaky things, and they do not notice it. The sense of smell seems to be their main guard against danger. Like salmon, they do their level best to dart up the rocks in order to ascend the river, and with good success. Says a fisherman:

"I have seen as many as a hundred bushels of eels hanging on the rocks at one time by the suckers of the mouth. They would wiggle and flutter their tails, and by the momentum thus obtained, letting go with their suckers, jump up about six inches higher. I caught about forty barrels last season that I salted and sold to the Columbia fishermen for bait. I picked them off the rocks with a fish hook tied to a pole. I started at the bottom row of hanging eels, and would silently pick off barrel after barrel. The upper rows hadn't sense enough to perceive the enemy. I have caught eels in the headwaters of the Santiam, in the Cascade Mountains. Suppose they had swum up from the Willamette."—*Oregon City Courier.*

MANY a man has ruined his eyesight by sitting in the bar room looking for work.

OFFSET MECHANISM FOR SAWMILL CARRIAGES.

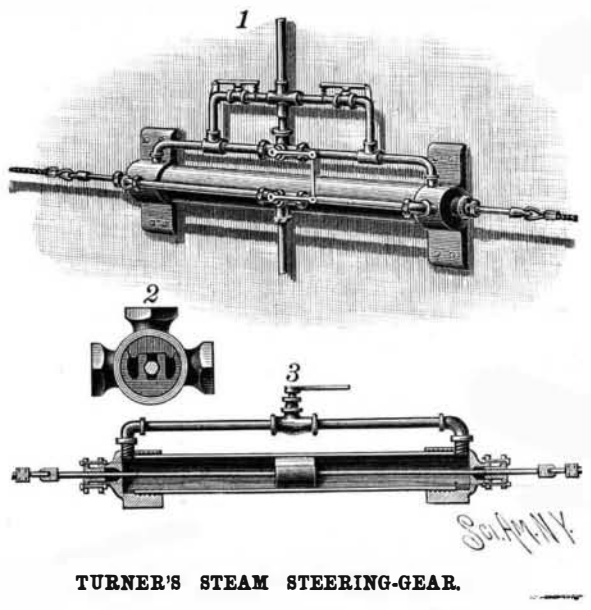
A simple and conveniently manipulated device, whereby the log frame and mechanism carried thereby on sawmill carriages may be shifted bodily in a line at right angles to the line of travel by the carriage, preparatory to "jigging back," is illustrated herewith, and has been patented by Mr. George Rosenberg, of Muskegon, Mich. The carriage is supported upon axles journaled in hangers, and upon the axles are keyed collars, each pair of axles being connected by a cross bar, the ends of the bars encircling the axles between the collars. Upon the side of the longitudinal beam of the carriage farthest from the saw a rock shaft is journaled, an eccentric or short crank being formed on each end of the rock shaft, the eccentric faces being turned down when the carriage is carried back for a cut. The rock shaft is manipulated by a lever secured thereto at or near its center. A short rod is passed centrally through the cross bars, uniting each pair of axles, the rod being provided at each side of the cross bars with a lock nut, and having a slot in the end facing the rock shaft, with which the rod is united by a link pivoted in the slotted end of the rod, the outer end having an integral sleeve in which the eccentric surface of the rock shaft is held to revolve. When the carriage is to be jigged back, the lever manipulating the rock shaft is moved from the saw, causing a tension to be exerted on the cross bar held between the central collars on the axles, so that the frame and its appurtenances are drawn away from the saw, while to throw the log into contact with the saw, the lever on the rock shaft is turned toward the saw, as shown in the illustration. The rock shaft may, if desired, be journaled inside the carriage frame, either above or below the axle.

A Great Steel Plant.

The steel plant of the Phœnix Iron Company, of Philadelphia, which has been in course of erection for the last four months, is now reported as completed. The engines weigh 370,000 pounds, and the roll train weighs 400,000 pounds. This is the largest plant in the country, not excepting that at Pottsville. The engines have a capacity of 2,000 pounds pressure, and the plant is expected to turn out steel suitable for armoring cruisers for the government and for making steel guns of any caliber.

AN IMPROVED STEAM STEERING-GEAR.

The steam steering-gear herewith illustrated, which has been patented by Mr. Frank B. Turner, of Portland, Oregon, consists in a long steam cylinder, with a piston whose rods reach through opposite ends of the cylinder, and are connected with the tiller ropes, Fig. 1 showing a side elevation, Fig. 2 a transverse section of one of the valves, and Fig. 3 a longitudinal section. The pipes entering opposite ends of the cylinder, as shown in Fig. 3, communicate with a central three-way valve, one of whose openings receives the steam



TURNER'S STEAM STEERING-GEAR.

supply-pipe. Similar pipes, also entering opposite ends of the cylinder, are likewise connected with a similar three-way valve, which receives the exhaust pipe, T's in the latter pipes communicating with safety valves arranged to resist the highest pressure the cylinder is obliged to bear in the regular working of the apparatus. The arms of the exhaust and live steam valves are connected by a link, so that the two valves will be moved simultaneously, and when steam is admitted into either end of the cylinder by the live steam valve, it is exhausted from the other end. By admitting steam to both ends of the cylinder at the same time, and closing it in, the piston will be held in any desired position along the length of the cylinder, the exhaust closing before the feed-valve, which may be left open just enough to give the required pressure on both ends.

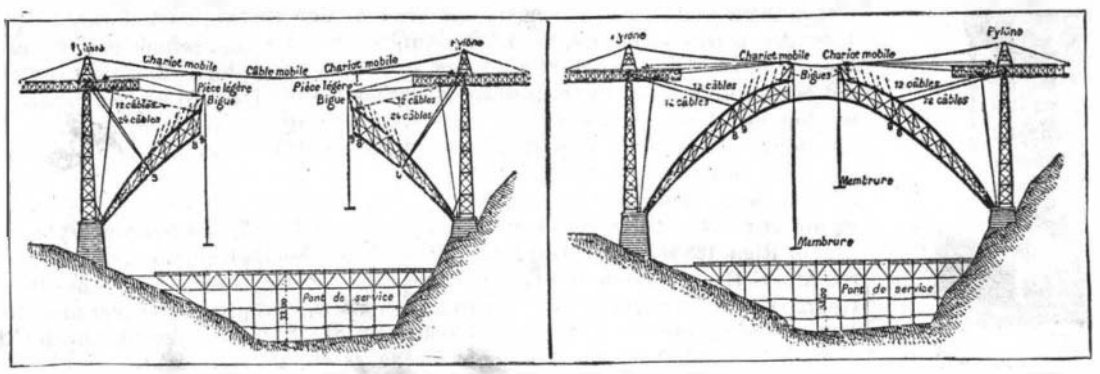
THE GARABIT VIADUCT.

We have already spoken several times of the Garabit viaduct—that colossal work which does so much honor to French engineers—and we have given the dimensions and principal arrangements of it, and have described the placing of a part of the superstructure. We shall now complete what we have already published by a description of the placing in position of the large central arch and the process employed for mounting this huge mass. We shall give a few details in regard to this point, as well as to the tests that have been made this year, and which are borrowed from the interesting book in which the lamented Beyer has given all the calculations relating to the viaduct.

The central arch of the viaduct, constructed by Mr. Eiffel, is, as is well known, of 540 feet span and rests upon two large piers, the metallic part of which is 195 feet in height. The total weight of this arch is 2,608,540 pounds.

The piers were first constructed, and then the two lateral parts of the superstructure were set up upon mounds of earth arranged as platforms. Next, these parts were swung into position on the large piers, and were made to project about 70 feet on the side toward the arch. Each, thus placed, was held very firmly by means of 28 steel wire cables fixed to the rear end and anchored to the abutments of the approaches.

This done, two scaffolds were erected in front of the



Figs. 1 and 2.—ANCHORAGE OF THE ARCH AND SUPERSTRUCTURE OF THE GARABIT VIADUCT.

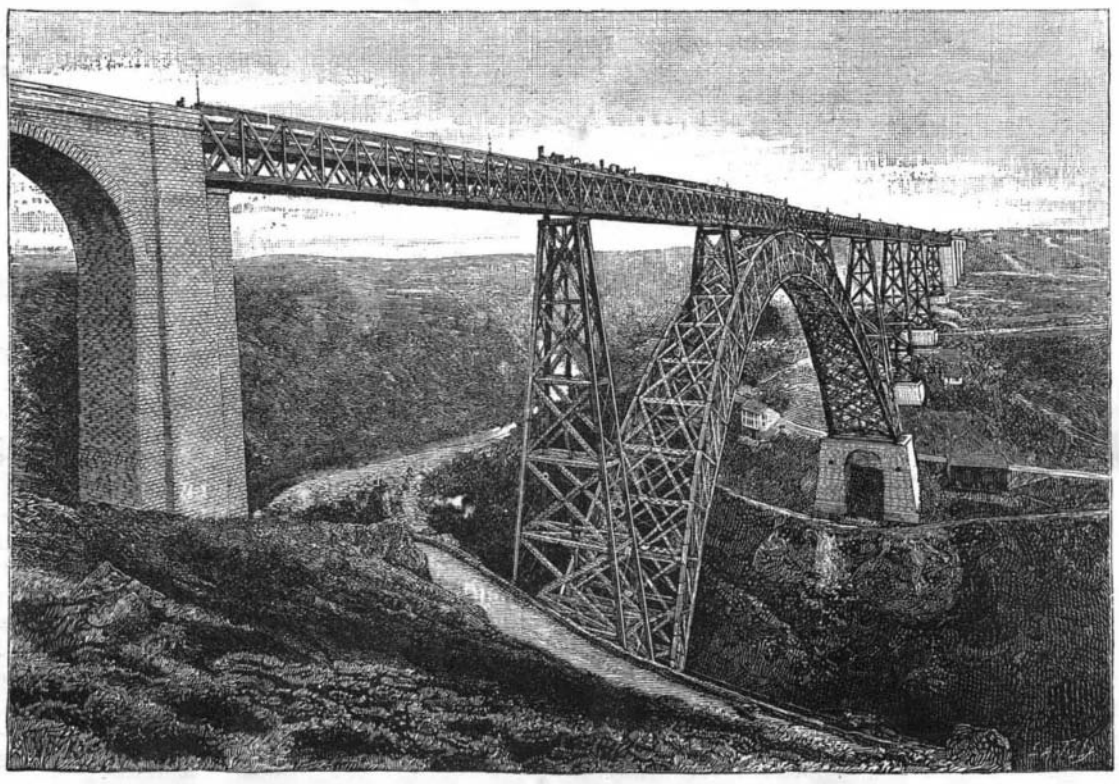


Fig. 3.—TESTING THE VIADUCT UNDER THE WEIGHT OF A 405 TON TRAIN.