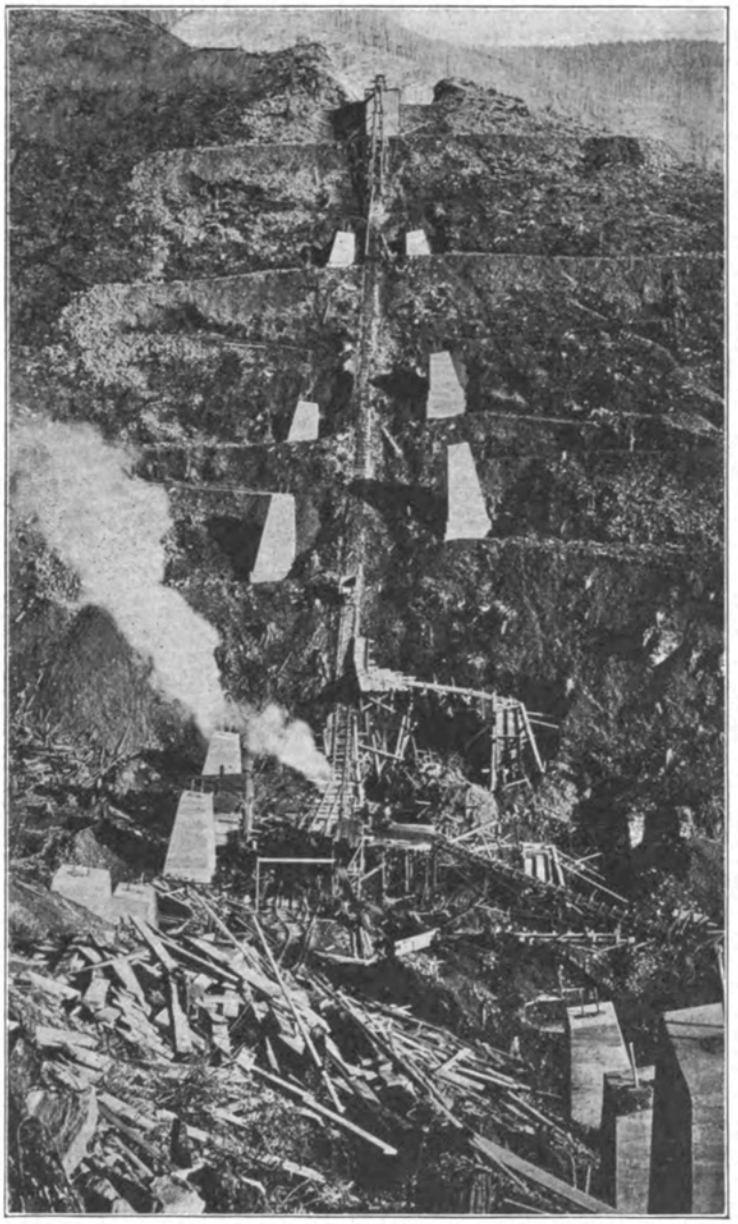

Courtesy of The Railway and Engineering Review.

Temporary incline train track, used in building Kelley Creek Viaduct, on the C. M. & Lt. P. Ry.

per annum. The navy taught me all I know of "productive industry."'

"The American Navy seems to be an industrial school worth taking into consideration. The industries of the country need well trained men. Schools are being established in many centers in order that the supply may be increased. The suggestion of the benefit of the modern naval training is a good one. The warship of to-day is not unlike a great industrial plant. The immense complexity of machinery which performs the various functions of the vessel, combined with the equipment which looks after maintenance and repairs, affords the opportunity for a practical training which should be of great value to a young man after his term of enlistment has ended, especially if he follows the trade in which he has been specialized. Moreover, the fact that he has lived under strict discipline is a consideration of a character not to be lightly discredited, it having taught him the full value of system."

A Remarkable Piece of Railway Construction.

IN the construction of railroads there is always some especially interesting industrial phase, and a recent issue of *The Railway and Engineering Review* (Chicago, Ill.), describes the erection of a viaduct on a new branch of the Chicago, Milwaukee and Puget Sound Railway in the following manner:

"In developing the mountain grades on both sides of the St. Paul Pass tunnel the engineering work was of an interesting character, the road doubling upon itself once on each of the two slopes. On the eastern slope this occurs on Dominion Creek, at Saltese. On the western slope this doubling of the line occurs at Kelley Creek, four miles west of the west portal of the St. Paul Pass tunnel, and near Adair, Idaho.

"As with the road east of Butte, the track is laid with 85-lb. rails of American Society standard section. The rails are spliced with Continuous joints, and the track is ballasted with gravel all along, there being an abundant supply everywhere except over the Bitter Root mountains.

"The bridge work, on this part of the line, is equally as interesting as that east of Butte. At a point three miles west of Missoula the road crosses the Missoula River by a plate-girder bridge of three 75-ft. spans and three 100-ft. spans, on concrete masonry.

"The Missoula is crossed the second time at Cyr and again at St. Regis, at the latter place by four-deck trusses of 113-ft. span. The concrete piers for the bridge at Cyr are 70 feet high.

"On the west slope there are several large viaducts. That at Kelley Creek is 850 ft. long and 217 ft. high. The tower and intermediate place-girder spans are 50 and 75 ft. long respectively. The illustration shows the foundations for the viaduct at Kelley Creek, with the temporary track up the steep mountain side for handling the concrete from the mixing plant, which is seen near the foot of the slope."

This picture is reproduced in this section for the purpose of bringing to readers a very strong and original example of the various difficult obstacles which are successfully overcome by the builders of the railroads. It presents an impressive illustration of the industrial spirit.

German Bending and Straightening Machine.

IN the September number of *Machinery* (N. Y.) is described "a machine for bending cold iron and steel of round, square, T, I, channel and other sections," as shown in fig. 1 of the accompanying illustrations, which are taken from the journal mentioned.

"This machine, which is built in Germany, is designed for bending and straightening small quantities