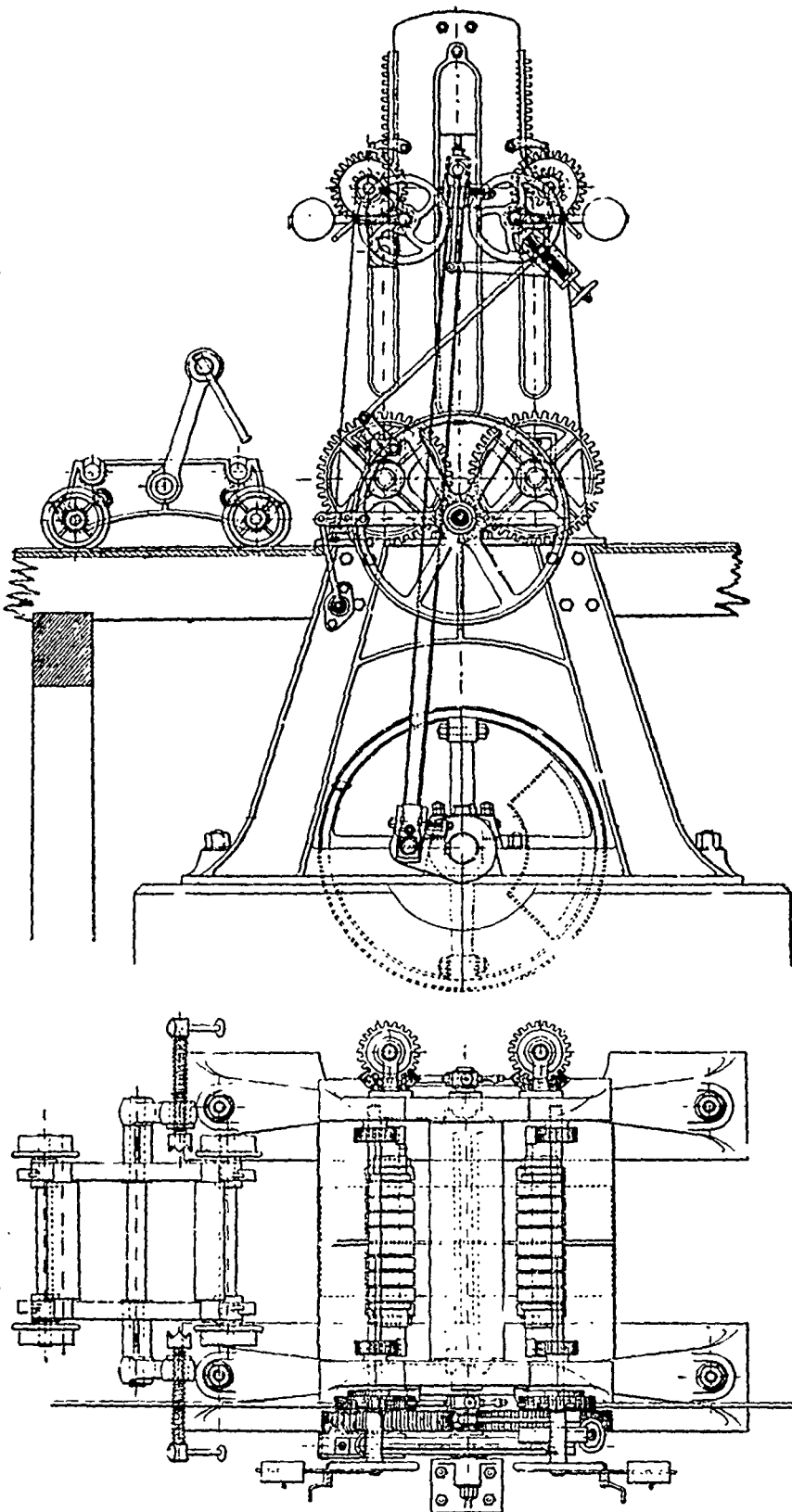


vided with a keyway, in which slides a block carrying a similar pinion gearing into a bevel wheel on the end of the shaft of the upper feed roller. It will thus be evident that in whatever position this latter may be, it will be always driven from the lower roller. As will be seen from the side elevation and section, these upper rollers have bearings that slide in suitable openings in the frame, and they are also attached to brackets carrying small toothed wheels, engaging in vertical racks bolted to the frames. By means of suitable gearing on one side of the machine, the upper rollers may be raised or lowered to any desired position, and detents are provided to hold them at any point.

With reference to the tensile strength of Lake Superior iron, the Detroit Free Press makes a record of the following experiments with iron made from Lake Superior ores, by the Wyandotte Company. A bar of railroad iron was put under the hammer, and bent, twisted, and tortured until no resemblance of the original bar remained. An effort was then made to hammer the head of the rail from the flange, but it proved unsuccessful. It must be understood the experiments were made when the iron was cold. The experiments with the chains were equally satisfactory and showed a great power of resistance. A Bessemer steel chain, $1\frac{1}{2}$ in. in thickness, withstood a test of 121,850 pounds to the square inch. The following comparisons will show the relative tensility of Lake Superior and English iron, the trials having been made by the use of the testing machine made by Riehle Brothers, of Philadelphia, which is that used for all tests in which the American Government is concerned. A one-fourth inch chain of American (Lake Superior) iron withstood a strain of 101,750 pounds, while a chain of English iron of the same size broke at a test of 76,500 pounds. A five-eighth inch chain, American, 24,875 pounds; English, 16,000 pounds. A three-fourth inch chain, American, 38,000 pounds; English, 26,000. A one-half inch chain, American, 15,825 pounds; English, 8,500, and a seven-sixteenth inch chain, American, 10,250 pounds; English, 5,750.

VELOCITY OF THE WIND.—Light air, 1 mile; light breeze, 3 miles; gentle breeze, 10 miles; moderate breeze, 15 miles; fresh breeze, 20 miles; strong breeze, 35 miles; moderate gale, 30 miles; fresh gale, 45 miles; strong gale, 50 miles; heavy gale, 70 miles; storm, 80 miles; hurricane, 100 miles and upwards per hour

In Germany alone the manufacture of beet root sugar from 1400 tons in 1837, had expanded to 263,000 tons in 1871. There was also an increase of 150 per cent. in the amount of sugar consumed per head between these dates.



VERTICAL LOG FRAME.