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DESCRIPTION OF THE HERCULES COMPANY'S SELF-ACTING TRAMWAY.

By SYDNEY THOW, General Manager.

THE Hercules Mine, situated on the western slope of Mt. Hamilton, a spur of Mt. Read, is connected with the terminus of the North-East Dundas Railway at Williamsford by means of an inclined self-acting tramway on the endless-rope system. The slope length of this line is 80½ chains, and the difference in elevation between the Government line and the "send-off" at the mine is 1642 feet. The average gradient is, therefore, 1 in 3·2, the maximum gradient being 1 in 1·5, and the minimum, *i.e.*, the approach to Williamsford terminus, 1 in 7·5.

The permanent way consists of double 2-feet gauge lines of 20 lbs. per yard steel rails, spaced 7 feet centre to centre of tracks. All joints are made with double fish-plates, and the rails are dogged to sleepers spaced at 2½ feet centres. The flanges of rails are notched to take dogs, in order to prevent the down-creep of tracks, and at intervals on the steep gradients extra heavy sleepers extend right across both tracks, and are bolted to the rock-formation, with the same object.

The controlling machinery house is placed above the level of the main surface tramway, which connects with all underground workings from which ore is at present produced for sale purposes; this allows of the inclined haulage-trucks being run underground in rakes, and filled direct from the various ore-passes. The distance from the "send-off" to the entrance of No. 2 tunnel (the lowest level of the northern workings) is 9·8 chains, and to the No. 4 tunnel (the most southerly portion of the mine workings) is 21·7 chains. Storage bins for ore from upper workings and surface benches are also situate upon this level.

Plate I. shows formation gradients. All cuttings are in rock, and embankments are formed from the spoil therefrom and rock side-cutting. The average rainfall of about 100 inches annually called for ample drainage provision in the shape of side-ditches and culverts.

The controlling machinery comprises two cast-iron grooved wheels, each fitted with dynamometer brake-bands, and the brakes are applied through a lever system connecting with a worm and hand-wheel. The multiplied leverage or pull on brake-band is 680 times the pressure imposed at the periphery of the hand-wheel, affording in practice a tension of three to four tons upon each brake-strap. The front wheel is 7 feet in diameter, and has three rope-grooves; the back wheel is 7½ feet diameter, with four grooves. The endless-rope is led to the lowest groove of the back wheel, and, after traversing a half-circle, leads direct in turn to the three grooves of the other wheel. The maximum bend in rope is therefore half round a 7-feet diameter wheel, and the rope leaves the wheel-house from the top groove of the back wheel (see figure 3, Plate II.). The two wheels are placed in the intense cold experienced in winter months renders all couplings brittle.

The quick variations in gradients make it necessary to attach the trucks to the rope in this manner, so that the rope may be free to rise and fall in accordance with the position of the loaded points.

By reference to Plate I., showing the line formation, it will be observed that the section generallyfalls short of attaining the ideal "catenary" curve, i.e., the curve in which a perfectly flexible cord hangs when suspended from two points. The distance between the rope and the track being a variable one prevents, in a large measure, the adoption of any system of continuous working with automatically-actuated grips; and, on the other hand, the gradients are so disposed that any attempt to adopt a "tail-rake system" of working, without exterior power, would be hampered by the fact that the returning empty rake would take a position upon a rising grade of 1 in 1½, when the corresponding loaded rake was upon a down grade of 1 in 5.2. It is found, therefore, that uploading is handled to best advantage by adopting the present system of a continuous rope with distributed loading.

The trucks are spaced upon both up and down roads, opposite each other, at 350-feet intervals. Therefore, an empty truck arrives at the top, and a loaded truck at the bottom, simultaneously. Two trucks are often coupled at the same station, and the average number of trucks attached to the rope at one time is 36. The iron skip-trucks carry 12 cwts. of bulk sulphide ore, or 8 cwts. of bagged gossan ore. The wooden trucks carry one ton of bagged gossan ore, and are used for the uploading of general goods and mine-timber. In general working, the number of truck-journeys each way per shift of eight hours averages 200 to 250. The percentage of up to down uploading is not up to tram's capacity, which is about 4 to 1. Seven men are required to operate this haulage; the labour costs, therefore, aboud 6d. per ton of loading. The capital cost of tramway and plant to date is about £8750.

At Williamsford terminus the bulk ore is emptied into storage bins, which discharge direct into the railway trucks, and the bagged ore is passed down a wooden shute, which also delivers into the railway trucks.

In addition to fulfilling the requirements of the Hercules Mine, general goods and merchandise are carried for the public at scheduled rates, and about 7,000 tons of ore has been carried for the British Mount Reid Mining Company, Limited.

30th June, 1902.

PLATE I.

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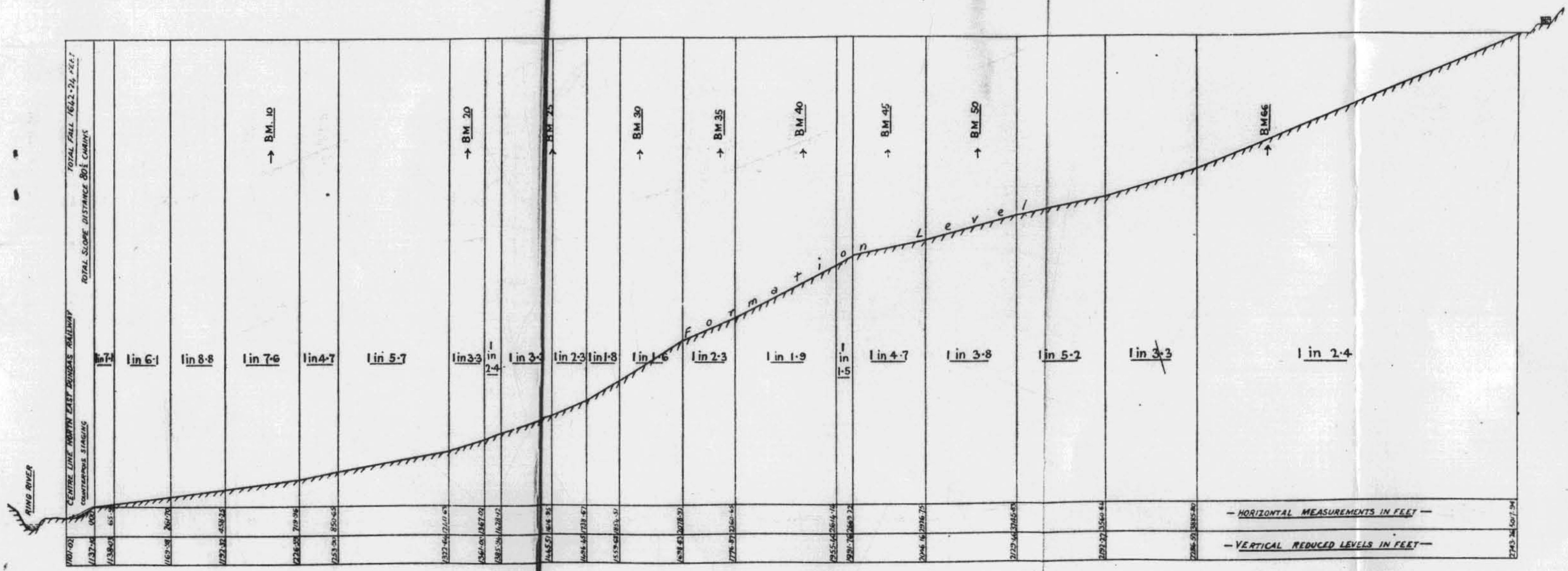
The Hercules Gold & Silver Mining Co.

INCLINED HAULAGE TRAMWAY



JOHN VAIL, GOVERNMENT PRINTER, TASMANIA.

LONGITUDINAL SECTION

5 cm

– Plate II –

Fig. 1.

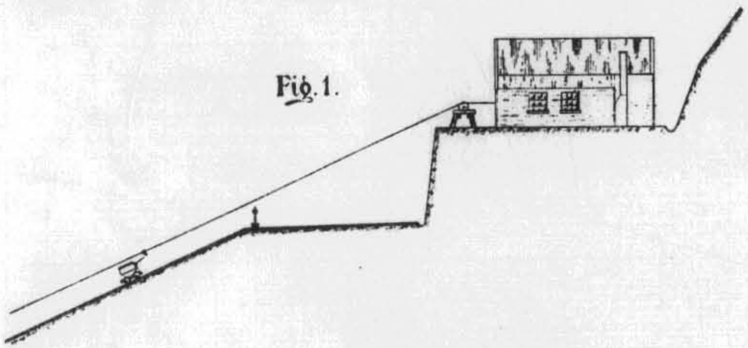
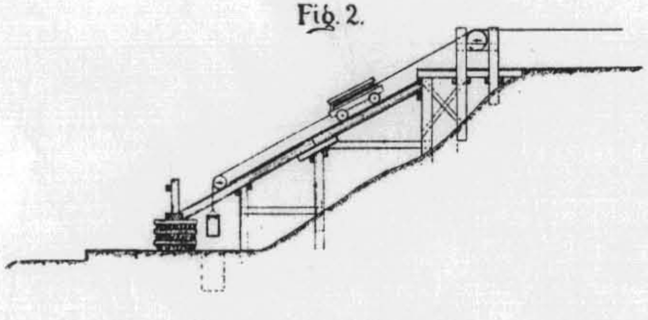


Fig. 2.



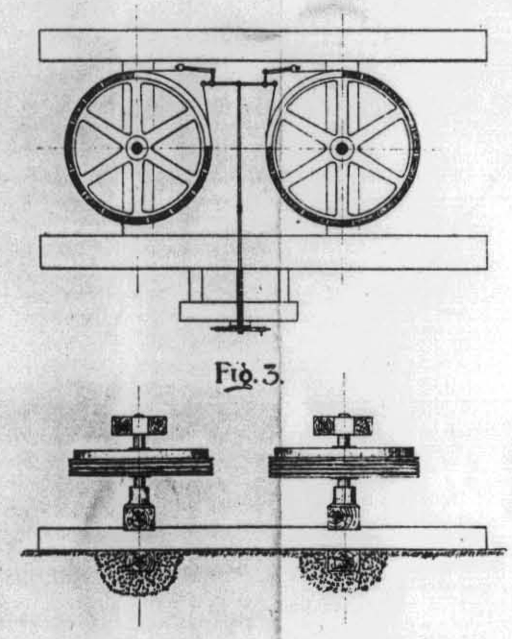


Fig. 3.

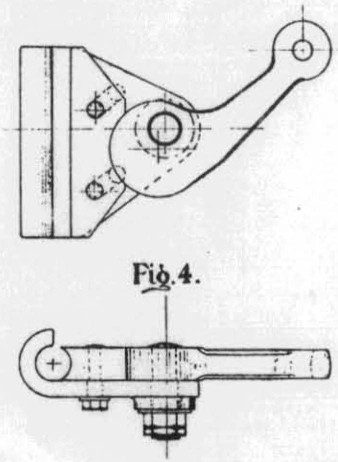


Fig. 4.

John Vail, Government Printer, Tasmania.