

hill, following the dip of the coal, which is very regular, having an inclination of about 1 in 10. On each side of the main tunnel there are back headings with stentons driven between them and the main road; and it is from these back headings that the coal is brought out by means of horses into the main tunnel. The coal is first cut up into large rectangular or square blocks of, say, 100 yards or more in length and width by running a series of headings through them, and from these headings the bords are driven each way, meeting about the centre of the block. In first opening out from the headings the bords are cut as narrow as possible in order to keep the headings good; they are afterwards gradually widened out to the whole width at which the bord is intended to be worked. The blocks are first traced by a network of bords, having longitudinal pillars running parallel with each other; and if these pillars are afterwards taken out they are blocked out in the following manner: A cross-cut or opening is made in the centre of the pillar and blocked out towards each heading; but very few of the pillars in this mine have been taken out, the object being to keep the pillars as narrow as possible consistent with safety, and to leave them until the whole of the area of coal intended to be worked from the main tunnel is cut up into pillars and stalls, so that the blocking-out may commence from the back end and worked towards the mouth. The regular dip or inclination of the coal seams admits of the coal being cut up in very regular square or rectangular blocks and the bords all parallel to one another.

When one of these blocks is taken out the headings remain protected by safety-pillars, which are not worked until the whole of the pillars to within a short distance of these headings are exhausted.

Haulage.

The underground haulage appliance is that known as the "tail-rope" system. This expression refers to the simultaneous employment of two ropes, one in front of the train of trucks or skips and the other behind, being attached to the last truck or skip.

The engine for working this rope is placed on the surface, and it works two winding-drums, on which are placed round winding-ropes made of steel-wire about $\frac{3}{4}$ in. in diameter. The rope termed the "tail-rope" travels on pulleys overhead in the tunnel, and the other rope, which is attached to the front end of the full train, is carried on pulleys and rollers on the ground. At every angle of the road there are pulleys to guide the hauling and tail-ropes and keep them always in the line of the haulage; these ropes are coupled to the front and back truck of the train, with detaching hooks, so that they can be disconnected at a moment's notice during the time the train is in motion. All the skips or trucks are coupled together with ordinary couplings. Each skip holds about 12 wet. of coal, and from fifty to seventy of these skips are brought up in one train, travelling at a velocity of about ten miles an hour. The wheels of the skips are mostly all cast-steel, about 12 in. diameter, and the rails used seem to be about 24 lb. per yard.

The great advantage of the tail-rope system of haulage is, that only a single line of rails is required in the main tunnel, and that the train can be made with no trouble to travel round a very sharp bend or curve, whereas the endless-chain system requires a double line of rails and long curves before it will work. Nevertheless there is less wear and tear on the endless-chain system, although expensive in the first instance; it is well adapted for underground haulage, especially where the main tunnels are tolerably straight, and can be worked at a less cost than the tail-rope system.

Ventilation.

This mine is divided into several districts, and each district is ventilated by a furnace. The furnace that I inspected was 22 ft. in length, 9 ft. in width, and 6 ft. 6 in. in height. It had fire bars the whole width, and for 18 ft. in length, and had five openings or furnace-doors, where coal was put in to feed it. At the end of this furnace there is a brick chimney 10 ft. in diameter inside at the bottom, and built up for a considerable height above the surface of the ground. All around the furnace and chimney the coal was taken out, and the roof lined with iron, having old railway rails running longitudinally below the iron, thence cross-rails which were supported with iron standards to the floor. The opening where the furnace was built, had the appearance of a strong iron chamber, which the manager informed me was necessary to guard against the possibility of the heat from these furnaces setting the coal on fire.

A furnace of this description is capable of supplying 93,000 cubic feet of air per minute when in full work. The manager informed me that he always endeavoured to allow 100 cubic feet of air per minute for every man, boy, and horse employed in the mine.

The air-courses are divided off, having over-casts across the main tunnels and headings, so that each portion of the district where the men are employed may receive as nearly as possible an equal supply of fresh air.

This company's mine is all freehold property. The greater portion of it is known to contain a good coal seam. It averages about 9,000 tons of coal an acre, and they have yet about 3,000 acres to work, or about 27,000,000 tons of coal unworked, so that at their present rate of output it will take fifty-four years to work out this seam.

Considerable difficulty was experienced all over this district some time ago in dealing with the miners, as they struck work for an advance of wages, and formed themselves into an association; but this difficulty is now overcome, an arrangement having been entered into between the miners and employers that a certain percentage per ton, according to the price the proprietors get for the coal delivered on board the vessels at the Newcastle wharf, shall be paid. If this price is only 9s. per ton, the miners receive for hewing and filling it into the skips or trucks 3s. 6d. per ton; and if the price goes up to 12s. per ton, the miners receive 4s. 6d. per ton; and a sliding-scale between these two rates is fixed in proportion to the price that the proprietor gets for the coal. The average price at the present time for coal is 11s. per ton, and the manager stated that the average wages the miners have made during last year was 13s. 6d. per day.

In order that the miners may know what they are making, they employ one of themselves.