The Telephone in Collieries.

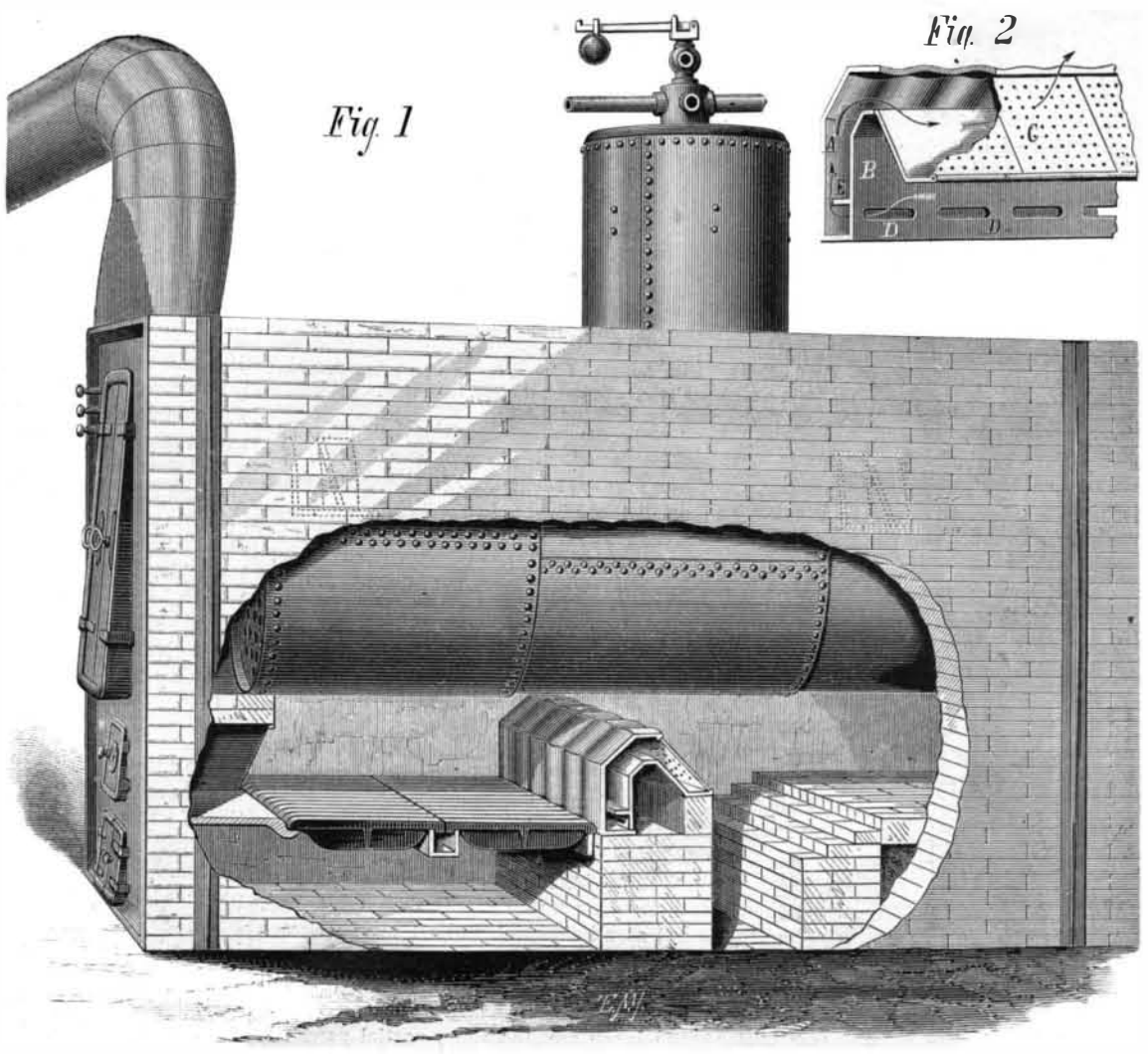
A number of gentlemen connected with the principal collieries in West Lancashire, Eng., lately assembled at Prescot Colliery, belonging to the Wigan and Whiston Coal Company, for the purpose of witnessing experiments with Professor Graham Bell's Telephone, but especially with reference to its use in the working of collieries. By an adaptation of Mr. Hall, Government Inspector of the mines of the district, one of Mr. Biram's anemometers used in collieries for testing the velocity of air passing through the workings had attached to it, instead of the regulator, a telephone, and it was to test whether the state of the ventilation could be ascertained at the surface that the experiments were made. Instead of the ordinary diaphragm, a small thin iron bar was substituted in the telephone attached to the anemometer, every tenth revolution of which caused this bar to vibrate. An anemometer thus provided was connected with the telephone placed in the colliery offices, and then taken down the shaft and fixed in the main intake—an ordinary coated electric wire, some 600 yards long, joining the two instruments. Mr. Hall and a party of underground managers had charge below ground. The vibration of the anemometer was distinctly heard by the instrument in the office, and it was found to give 28 beats to the minute, or 280 revolutions, which, multiplied by area of airway, showed the quantity of air passing. The result was considered eminently satisfactory, and was communicated to Mr. Hall. Experiments in speaking to those in the mine were then made, and Mr. Hall recognized the voices of several friends. At times word was sent from below that they could hear noises going on in the room, conversation between several of the gentlemen taking place, and this interfered with the distinctness of the messages. On the conclusion of the experiments, Sir W. Thomson, using the telephone, addressed a few words to those present, and to Mr. Hall. He expressed himself as both delighted and astonished with the result of the experiments. Never before had he heard the voice more distinct, and the experiments were very satisfactory. He explained the difference between previous telephones and Professor Bell's, and said that although he had often tested the telephone he had never before seen it made of practical use as in the present case.

THE CORRUGATED IRON AIR BRIDGE AND FUEL ECONOMIZER.

Mr. Robert K. McMurray, Chief Inspector of the Hartford Steam Boiler Inspection Company, is the inventor of the new steam boiler attachment herewith illustrated, which, it is claimed, provides an efficient means for economizing fuel, reducing the time and expense usually required for the renewal and repair of bridge walls and preventing smoke by the admission of a proper supply of heated air to the gases evolved by combustion. The principal feature of the device is that last mentioned, the inventor claiming positive advantages through the mingling of heated air instead of cold air with the gases. The bridge is also constructed so as to offer increased resistance against blows shocks, and the effects of expansion and contraction, while it may be easily removed for renewal or repairing.

The arrangement of the bridge in the furnace is shown in Fig. 1, and the device detached with portions broken away to exhibit its interior arrangement in Fig. 2. It consists of a fire plate, A, a back or base plate, B, and a dispersing plate, C. The plate, A, is corrugated in order to give it increased strength and is provided with a light bottom flange which rests upon the bridge wall and then cerises vertically for about two thirds of its height, at which point it is inclined at an angle of 45 degrees. The bottom plate, B, conforms in the relative position of three of its sides, to the plate, A, and terminates below in a horizontal foot. Both plates, A and B, are connected by bolts passing through thimbles, so as to form a hollow case. The perforated diffusing plate, C, is inserted in groves formed in the other plates. A series of air supply openings, D, are formed in the plate, B, near the base. Above them extends a deflecting flange, E. The device is so set that the lower edge of the fire plate, A, is slightly below the level of the grate bars, and its ends are closed by the side walls of the setting or by metal plates fitted therein, the latter arrangement allowing of the bridge being removed as desired by drawing it out longitudinally through the opening in the side wall.

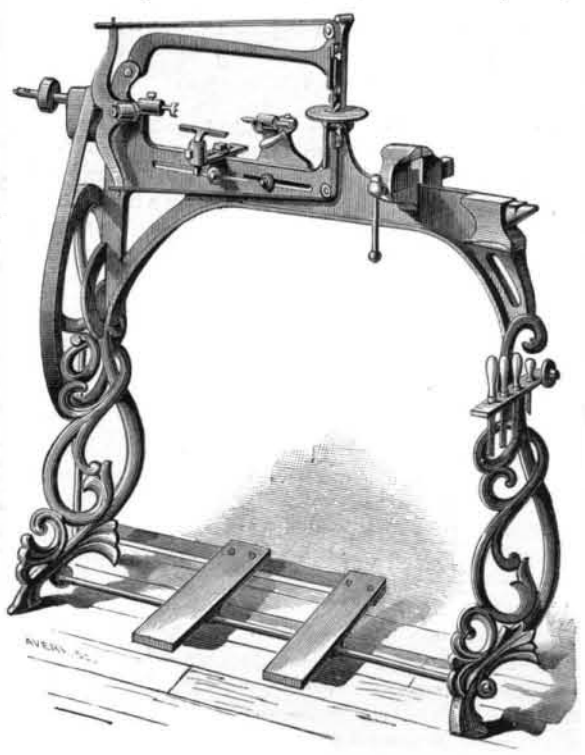
The fresh air enters the space between the back plate and fire plate through the supply openings, D, and is deflected by the flange against the heated surface of the fire plate and thence passes upward as indicated by the arrows, Fig. 2, along the space between the two plates. The air thus becomes introduced in a minutely divided condition into the combustion chamber at a temperature closely approximating that of the gases escaping from the furnace. It mingles with said gases, and is claimed to oxidize the carbonic oxide and to effect complete combustion, with a corresponding economy of fuel and prevention of smoke. The inventor informs us that the device has been well tested with uniformly successful results. Patented September 4, 1877. For further particulars, address Robert K. McMurray & Co., 285 Broadway, New York city.



THE CORRUGATED IRON AIR BRIDGE AND FUEL ECONOMIZER.

COMBINATION LATHE, SCROLL SAW, ETC.

The machine illustrated herewith is a combined foot power drill and turning lathe, scroll saw, grinding wheel, vise,



and anvil, in the construction of which many novel features are embodied. The body and legs are cast iron, the treadles wood, the belts leather, the wrench iron, the fixed screws polished iron, the set screws casehardened, the finish black japan with ornamental paintings. The lathe will turn work four inches by nine long. It is suitable to hand turning, has a press lever for drilling, and is furnished with steel spur and pointed centers. The rest has all the adjustments common to large turning lathes. The scroll saw plays vertically through the center of an iron table, which may be tipped on an angle for inlaid work. The saw is held by means of iron clamps and thumbscrews, said clamps being attached, each to the end of a leather band, which bands pass over friction pulleys and are hung to pins on the ends of the vibrating lever, which is driven by an eccentric on the lathe spindle. There are several pin holes in the upper band to adjust the strain to saws of varying lengths. An arm projecting over the table serves as a presser foot to hold the work down while sawing, and adjusts itself to varying thickness in boards. When the saw is disconnected to enter holes, said arm may be raised to admit the board, or it may be swung over to leave all clear above the lathe if desired. This machine swings fifteen inches under the arm, and the motion of the saw is in a straight line.

In carrying out this principle of operating the jig saw on a large machine, the saw is hung in sliding guides as usual, but the bands for reaching any distance on the work and the vibrating lever are the same as here shown.

It is claimed that no perceptible jar is felt in running a sixteen inch saw that will reach the center of work up to ten feet radius. This steadiness is caused by the vibrating lever being very short and well balanced, and by the cushioning effect of the inertia of the bands. The lever need not be over six inches radius to give the saw four inches stroke.

The vise and anvil are permanent attachments to the machine. The emery wheel on the spindle is heavy, and serves as a fly wheel to the lathe and saw. In the outer end of the spindle is a drill for bracket work. When desired, the manufacturer furnishes tools and extra parts with the machine, such as face plates for chucking, a drill plate, a circular saw, and table, turning gouges, chisels, etc.

Patent pending. For further particulars see Business and Personal column, or address W. X. Stevens, East Brookfield, Mass.

The Delicacy of the Telephone Circuit.

In a recent lecture before the Society of Telegraph Engineers in England, Professor Bell called attention to the remarkably slight earth connection which is needed to establish a circuit for the telephone. In describing an experiment showing this, he stated that while an assistant made connection at his end of the line by standing on a grass plot, he himself stood upon a wooden board. On trying the telephone Professor Bell was very much surprised to hear a continuous musical note uttered by his coadjutor, and on looking for the cause he found that a single blade of grass was bent over the edge of the board and that his feet touched it. The removal of the grass was followed by a cessation of sound from the telephone, but the sound became again audible whenever the Professor touched even the petal of a daisy with his foot.

Ferroux's Rock Drill at the St. Gothard Tunnel.

M. Ferroux's rock drill, which has been in operation since 1873 at the works of the St. Gothard tunnel, has recently been much simplified in the mechanism for the feed and the percussion. The piston of the percussion cylinder is formed conically at each face for the purpose of reversing it at the end of each stroke. When it arrives at the end of the stroke it strikes a small plug, which slides in a cylindrical opening and presses it inwards. This movement is simultaneously communicated by a lever to the small supply piston at the upper end of the cylinder by which the compressed air is shut off, and the exhaust opened. The percussion piston is then promptly returned to the upper end of the cylinder, where it strikes the small supply piston, and opens it for a fresh supply of compressed air, when the percussion piston makes the next down stroke. This rotation of the percussion piston and rod is effected by means of an inclined groove cut in the rod, in which a pawl is engaged. The pawl is one piece with a ratchet wheel, which turns freely with the pawl as it is swayed by the groove in the descending piston rod, but is prevented by a ratchet from returning. The ball being thus held stationary, the piston rod necessarily sways to the pawl in its turn, and makes a portion of a revolution, shifting the position of the jumper for each stroke. The weight of the new Ferroux drill is about 440 lbs. The calculated volume of air expended per stroke of the piston is 85 cubic inches.

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