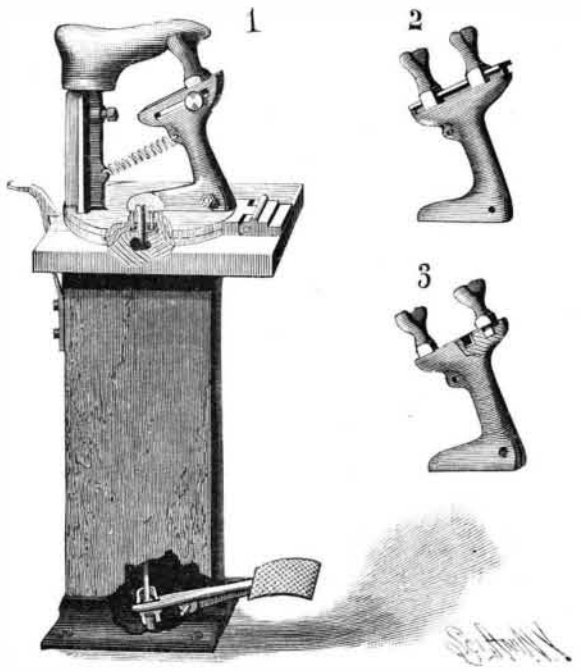
AN IMPROVED SHOEMAKER'S PEGGING JACK.

A jack by which the last may be securely supported, and held in an inclined, vertical, or horizontal position, or revolved in an inclined or horizontal position, to facilitate the pegging, heeling, and finishing of a boot or shoe, is illustrated herewith, and has been patented by Mr. George Dorwart, of No. 4628 Ridge Avenue, Roxborough, Philadelphia, Pa. Two circular plates are mounted upon a box stand, the upper plate adapted to revolve upon the lower one, and both plates being held in contact. The lower plate has a rear peripheral extension hinged to a block rigidly secured to the table, whereby both plates may be carried upward to a vertical position when desired. To retain the plates in their normal or horizontal position, there is a spring catch secured to the front side of the stand, and engaging with a lip integral with the lower plate. A post is cast integral with or attached to the outer face of the upper plate, a pin which holds the last being adjustably held in a longitudinal aperture of the post by a set screw. Opposite the post, upon the upper plate, and near its periphery, is cast a lug upon which is pivoted a standard adapted to carry the toe rest. This standard has at its base an inwardly projecting integral arm, resting upon the center of the upper plate, there being at the central point a recess in alignment with apertures in the two plates and in the bed of the stand. Through these apertures, and in contact with the arm of the standard, a rod is projected having a bearing at the lower end upon a treadle plate, the treadle, immediately below the lower end of the rod, having a rubber cushion. By pressing upon the treadle, the arm of the standard which carries the toe rest is raised to give an elevation to the last, which is returned to its normal or horizontal position, when the foot is removed from the treadle, by the coil spring. The toe rest supported upon the standard is capable of being detachably and adjustably secured thereto in many different ways, Figs. 2 and 3 showing other methods of attachment.



DORWART'S PEGGING JACK.

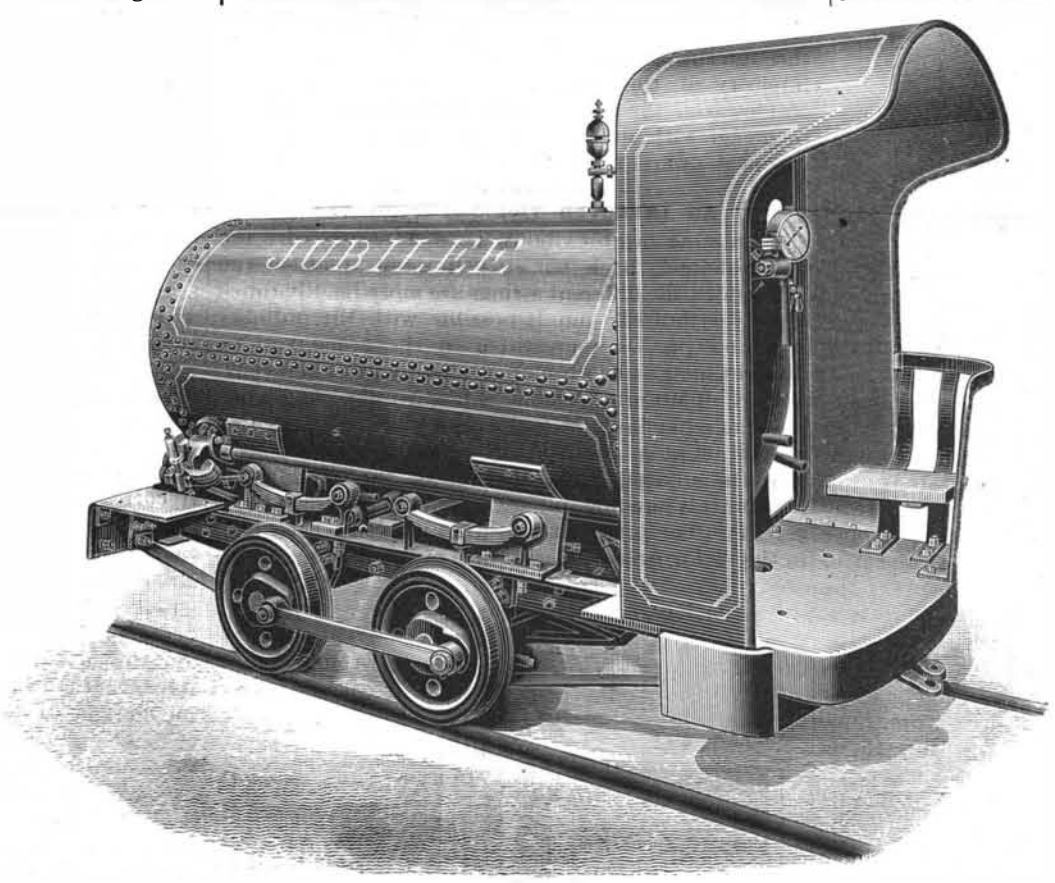
COMPRESSED AIR LOCOMOTIVE FOR UNDERGROUND HAULAGE.

Among the various systems of underground haulage shown at the Newcastle exhibition is one employing compressed air, and which deserves special mention. This system has been introduced by the Grange Iron Company, of Durham, and is in use in several pits in that district. We illustrate, in the annexed engraving, the locomotive exhibited at Newcastle. It is a four-wheeled engine, with inside cylinders, and the portion which in an ordinary steam locomotive would be the boiler is replaced by a cylindrical reservoir containing air under pressure. This locomotive has been shown in action since the opening of the exhibition, and drawing generally four tubs, but sometimes six, each weighing 25 cwt. The total weight of the engine is about 2 tons.

The cylinders are 4 in. diameter by 7 in. stroke, and the engine runs on a 33½ in. gauge. On a fairly good and level road it will exert a tractive force of 500 lb. on the drawbar, allowing a maximum load of 12 tons to be hauled. When drawing 5 tons on a fairly good road, the engine will run for about one mile before the air charge in the boiler becomes exhausted. The air compressor exhibited consists of a vertical engine with two steam cylinders each 12 in. diameter and two air cylinders each 8 in. diameter, the air being compressed in two stages to a final pressure of 400 lb. per square inch. The air is taken in at the top of the piston, and compressed through a water chamber into an annular space on the under side of the piston, whence it is delivered through a copper coil, immersed in water, to a receiver from which the locomotive obtains its supply of air, very much in the same way as an ordinary steam locomotive receives its supply of water through a hose.

The compressing machinery is usually placed on the surface, and the air under pressure is taken down the shaft and along the workings in wrought iron pipes, receivers being installed at suitable places throughout the mine. Each receiver has a cock and filling pipe with swivel joints attached, by means of which a locomotive coming up to the receiver can be supplied with a fresh charge. The whole operation of stopping, charging, and starting again is said to occupy scarcely a minute.

The engine is constructed for a working pressure of 75 lb., and the reducing valve, by which the air pressure in the reservoir is reduced to whatever may be required for the working of the line, is fitted to the reservoir shown in our illustration immediately behind the buffer plate. It might seem at first sight that the double conversion of energy entailed in this system would have the disadvantage of a low total efficiency, but as compared with rope traction this objection need not be considered. Mining engineers are accustomed to lose as much as 50 per cent, and in some cases 80 per cent of the total power available on the rope alone, and in coal mines, where fuel is cheap, the question of efficiency is not of great importance. On the other hand, a small locomotive, the speed of which is at all times under perfect control, has great practical advantages over the cumbersome method of rope traction, and it is no doubt due to this quality that these little mining locomotives are beginning to find an extended use.—*Industries.*



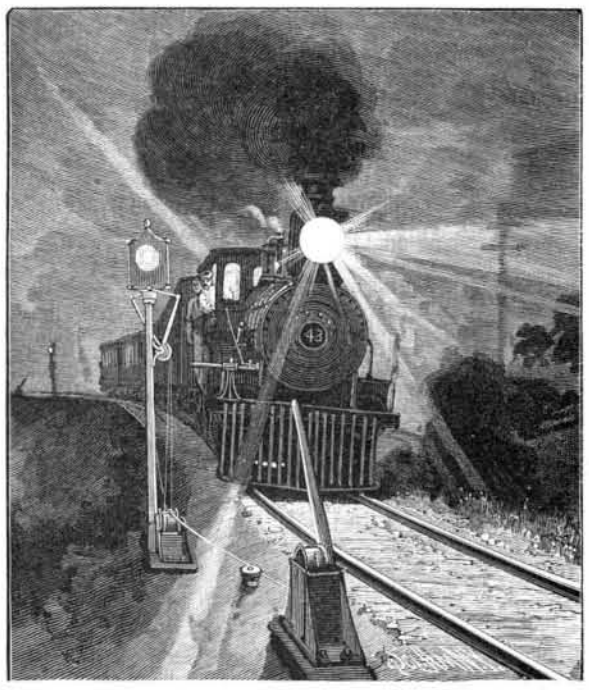
COMPRESSED AIR LOCOMOTIVE FOR UNDERGROUND HAULAGE.

A Large Shell for the Dynamite Gun.

Brown & Bros., of Waterbury, have completed the shell for a projectile of enormous size, for the dynamite gun to be used on the new cruiser now being built for the government. It is a seamless drawn brass shell, 6 feet 8 inches long, 14 inches inside diameter, three-sixteenths inch thick, and weighs 200 pounds. The shell with its conical head is all in one piece, being forced into shape by a heavy hydraulic ram. The drawing of the shell was witnessed by Lieut. Zalinski and G. H. Reynolds, consulting engineer of the Pneumatic Dynamite Gun Company. The shell is intended to carry 600 pounds of explosive gelatine, shells carrying 55 pounds only having been used in the recent experimental trial in New York harbor, when a small vessel was demolished at a distance of a little over a mile. The new 150 ton Krupp gun now being built will carry a shell 15½ inches diameter and 5½ feet long. This shell will weigh 2,310 pounds and require 1,067 pounds of powder to fire it. The difference in the cost of making and employing these two varieties of guns, carrying shells of about the same size, is something enormous.

AN IMPROVED RAILROAD SIGNAL.

A signal especially adapted for use at curves in railroad tracks, as a warning to engineers and trainmen that a train is on the curve close in front of them, or as notice that the track is clear at the curve, and likewise adapted for use at crossings, to signal the approach of a train, is shown herewith, and has been patented by Messrs. David Vinton, Jr., and F. H. Vinton, of Williamsburg, Mich. The signal is supported by a post at one side of the track, and consists of a box glazed at opposite sides with red and green glass, adapted to hold a lamp or lantern, and fitted to revolve on top of the post. A shaft is held in lugs fixed to the post, two rollers being journaled on the shaft, the rollers carrying rigid arms which stand at right angles to each other, and are connected at their outer ends by rods with diagonally opposite corners of the revoluble signal. In a box at the base of the post is journaled a drum, connected by cords with the peripheries of the rollers, so that the turning of the drum in one direction will pull the signal one quarter around, to display a different colored glass, and turning the drum back again will return the original signal to place, the red and green glasses with the lamp adapting the signal for day and night use. A rope or chain attached to the drum extends a distance along the track, being connected at its farther end with a roller journaled in a box carrying an arm adapted to be struck by a trip bar on the locomotive. A rope or chain extends, in a similar manner, from the signal post to a trip arm in the opposite direction. With this arrangement, when that portion of the track between the trip arms is clear of trains, the trip arms will both lean away from the signal, but the trip bar of an approaching locomotive, striking and throwing over the first trip arm, draws on the rope to turn the signal, thus indicating that a train is on this section, and at the same time swings over the farther signal, which is also struck by the trip bar of the locomotive in passing to turn the signal back again to safety. The trip arms or levers are to be set at a sufficient distance apart, and away from the signals, to give ample time for a train to pass safely from or clear of a curve in the track where the signal may be placed.



VINTONS' RAILROAD SIGNAL.

Trees and Soils.

Many have observed that in some localities trees of a special variety abound, while in the same vicinity other kinds flourish, and yet none of the kind found in another part of the same town. Some one has discovered that pines and their companions, the birches, indicate a dry, rocky, sandy, or gravel soil; beeches a dryish, chalky, or gravel soil; elms and limes a rich and somewhat damp soil; oaks and ashes a heavy clay soil; and poplars and willow a low, damp, and marshy soil. Many of these trees are found growing together, and it is only when one species predominates in number and vigor that it is truly characteristic of the soil and that portion of the atmosphere in connection with it.