

UPRIGHT DRILL PRESS USED AS A BORING LATHE.

The engraving shows a simple method of converting a vertical drill press into a boring lathe, which will be readily understood without description. A boring bar inserted in the drill spindle is guided in a bearing in the bed plate and carries the boring tool. This simple device for boring is employed on work of considerable size in the shops of the Boston and Albany Railroad.

The Ice Trade of New York.

During the midwinter ice season, nearly 10,000 men were employed in cutting and securing the ice of the Hudson River. Fully 2,500,000 tons have been cut and stored. The ice is described as of splendid quality, clear and solid, and it is believed will keep well. The ice fields from which New York dealers draw their stock extend from Rockland Lake, 253 miles up the Hudson, to Albany, embracing both sides of the river. Over \$5,000,000 is invested in the business. The largest operator in this city, if not in the country, is the Knickerbocker Ice Company, owning about fifty ice houses.

At Rockland Lake, which has a surface of 383 acres, there are three with a capacity of 150,000 tons. At Lake Meagh, in Westchester County, which has a surface of 100 acres, the company has one house with a capacity of 50,000 tons; at Marlboro, below Poughkeepsie, there is another, and from that point to Albany they are scattered along both sides of the river. This year the company began work on January 8, and finished February 6. During that time 8,000 men, on an average, were employed, and 1,500,000 tons were cut and stored. The cost of this work was about \$250,000. All of the houses are full to the roof. The company carried over from last year's stock enough for this winter's use.

Next to the Knickerbocker ranks the Mutual Benefit Company, which has harvested over 100,000 tons. This company has three ice houses—one at West Park, holding 50,000 tons, one at Staatsburg holding 20,000 tons, and one at Barrytown, in Dutchess County, holding 40,000 tons. It has employed about 600 men.

The Consumers' Ice Company has employed about 500 men, and has stored not more than 100,000 tons in its two houses at Catskill. The New York Company has two houses in Greene County, one at Catskill and one at Athens. From 500 to 600 men were employed, storing 100,000 tons. Other companies are the National, which has stored 80,000 tons, and the Glasgow, which has stored not more than 50,000 tons. Private purchasers are estimated to have stored 160,000 tons, and smaller ice companies enough to make an aggregate of between 2,000,000 and 2,500,000 tons.

UNDERGROUND ELECTRIC WIRES.

The practicability of laying underground electric wires has been determined, and the absolute necessity of removing the electric wires from poles on the streets and buildings is apparent, especially in our cities. The suspended cable system is deficient in many respects. To the practical thinking electrician, there is but one solution of the problem; the wires must be laid underground, and the question now is as to the best way of doing it. A noted enterprise of this kind is now being carried out between Marseilles and Paris, the distance being 536 miles. In this case the cable is inclosed in a cast iron pipe laid at the depth of about 5 feet; the pipe sections being protected at their joints by India-rubber washers and lead rings. Chambers or well holes are made in the ground about 1,500 feet apart, into which the cable is passed, and at which the wires may be inspected and connected to branch systems. Besides these well holes, there are manholes about 300 feet apart. The whole expense of this work is estimated at about eight million dollars.

A similar experiment in a small way is now being tried in Boston, where wrought iron tubes about 2 inches in internal diameter are used, and so far as the device has been tested, very satisfactory results have been obtained. The object now seems to be, simply to ascertain the best method of laying underground wires.

One of the objections to the pipes now in use for underground wires is, that the cable inserted from any manhole must be bent almost at right angles, in order to get it into the pipes. Again, these pipes being horizontal, accumulate water, which sooner or later will have a bad effect upon the cable. So far as experiment has demonstrated, the system of pipe laying invented by Mr. P. J. Duggan, of Boston, is complete and practicable, as it admits of perfect drainage along its whole length, allows the cable to be drawn in after the pipe has been laid, admits of inspection, and its intersection and connection points are always conveniently accessible.

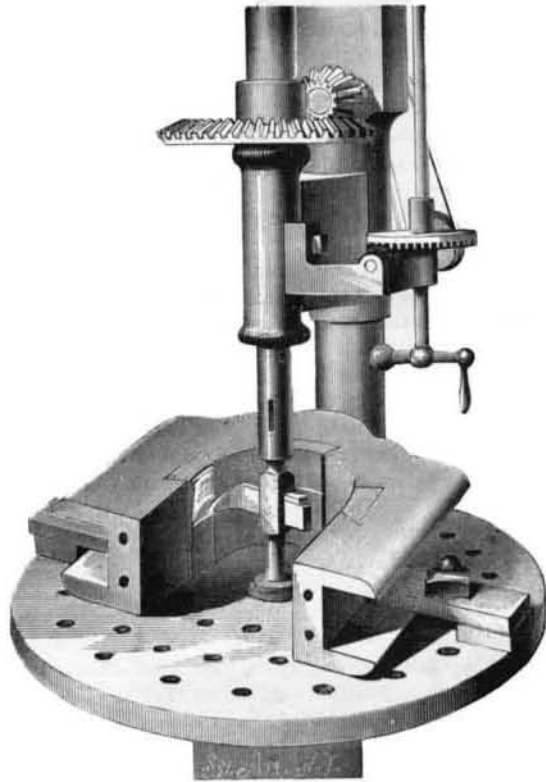
The importance and utility of Mr. Duggan's invention will be manifest when it is thoroughly understood.

A strong casing or frame surrounds the manhole, and a cover fits into it and protects the cover of the manhole. The

section of the pipe which is nearest the surface of the ground has an elliptical manhole for inserting and withdrawing its cables and for inspection.

The sections of the pipe are jointed together in any suitable manner, and are inclined, as shown, so that as they approach the central section, between the two manholes, they are deeper in the ground. The middle section is deepest of all, and has its center portion provided with a drainage or pump pipe.

The drainage pipe, when used as a pump pipe, is brought



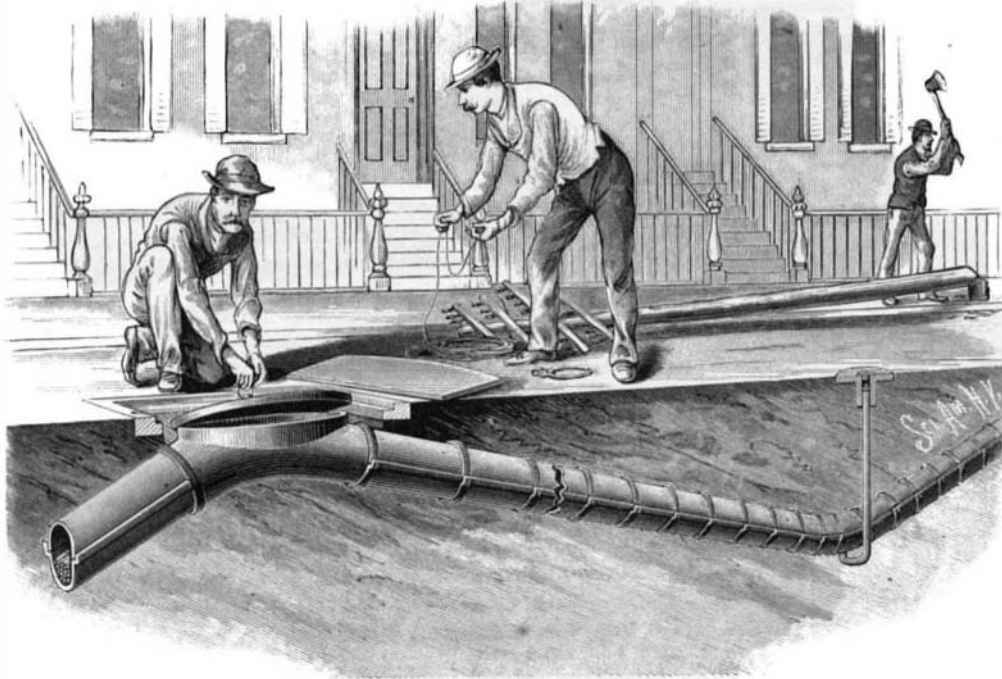
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to the surface, where a portable pump may be attached. In laying long wires or cables, each section of pipe should be divided longitudinally.

In laying the pipes, a trench is dug and properly graded, then the lower halves of the pipe are laid, after which the conducting wires are carefully placed in position, and, in addition to these conducting wires, one or more cords or wires are laid, which extend from one manhole to a distance equal to twice the space between the manholes. These supplemental wires or cords are used for drawing in new wires, but are not used as conductors.

When the conducting wires and supplemental wires or cords are properly placed, the upper halves of the sections of pipe are laid and the trench filled.

In using these devices for short circuits, the pipes may be



DUGGAN'S SYSTEM OF UNDERGROUND ELECTRIC WIRE.

whole and the wires drawn through from manhole to manhole, the circuits being completed by connections made at each manhole. This system has many advantages which should insure its general use.

Further information in regard to this invention may be obtained by addressing the New England Organ Company, 1,299 Washington Street, Boston, Mass.

The ballet at the Princess's Theater, Manchester, in which there are twenty-six ladies, has now been for the past month lit up with the small Swan lamp. Each lady carries a lamp in a small flower placed on her head, and at her side a small battery, the average weight of which is one and a half pounds.

Colorado Coal.

The coal deposits of Colorado are practically inexhaustible, and they are to be found in almost every portion of that State. The *Denver Republican*, in a recent issue, gives some interesting statistics concerning them. The northern belt—in three counties—some twenty mines, is now being worked, the coal from which is free-burning, semi-bituminous, and of fair quality, the output for last year having amounted to 550,000 tons. The middle region—that lying between Denver and Colorado Springs—from the only mine being worked the output during the last half of the year was some 34,000 tons; while in the southern belt, which includes Trinidad and El Moro, the entire region is rich in fine quality of coking coal. At the Starkville Mine 100,000 tons were mined and shipped last year, the value of which loaded on the cars was about \$2 per ton. At the same point forty coke ovens are in operation, the product of which is worth \$4.50 per ton, and all of which goes to Arizona. The Eagle Mine shipped 400,000 tons of coal and 12,000 tons of coke, and another mine produced 20,000 tons of coal. The output of coal from the Cañon region was 160,000 tons for the year; while that from the Gunnison country was 43,500 tons of soft and 2,000 tons of anthracite coal. The Colorado Coal and Iron Company manufactured at their mines at Crested Butte 10,000 tons of coke.

The area of soft coal land outside of Crested Butte is very extensive, coal of more or less degree of excellence being found under hundreds of square miles throughout Gunnison County. The anthracite coal is found over an extensive territory, but much of it is inaccessible and of an inferior quality. The best coal is found at the head of Anthracite Creek, about three miles from Crested Butte. An equally good quality is also found on Rock Creek; but the immense seams found down Anthracite Creek toward the North Fork of the Gunnison River hardly come up to the Pennsylvania standard of excellence. The anthracite trade of this region is yet in its infancy, but when preparations that are now being made for mining and handling it are once fairly under way, it will probably be able to furnish 200 or 300 tons per day, and the demand will inevitably increase. The coal is in all respects the equal of the Pennsylvania anthracite, chemical analysis and physical structure failing to show any material difference.

La Plata County is also very rich in excellent coal, the largest vein of which is the Mammoth, near Durango, which is 52 feet in width. In this county the seams are numerous and large, and for the most part so situated as to allow of cheap and expeditious mining. The character of the coal is mainly bituminous and well adapted to cooking, though some of the seams yield a steam coal of remarkably good quality. The output in 1882 from the various mines there was about 5,900 tons, to which should be added the output of the railroad mine at Monero, which is in this belt, which produced 12,000 tons, making a total of 17,900 tons for the county for the year. At Como, in Park County, 75,000 tons of coal and 96,000 tons of coke were sent to market.

In summing up, the *Republican* says: Coal was produced in other sections of the State of which no returns could be secured, but it is believed that 100,000 tons will cover it all.

The output was, in other words, nearly 2,000,000 tons, valued at about \$4,000,000 at the mines. The anthracite output, nearly 2,000 tons, value about \$10,000, and the coke production reached the sum of nearly 100,000 tons, valued at \$4.50 at least, a total of at least \$450,000, making the value of entire coal output \$4,460,000.

Ornamenting Glass.

J. B. Miller contributes to *Neuste Erfindung* a description of a rapid and practical method of printing designs or labels on glass. The ink employed consists of 90 parts of French oil of turpentine, 30 parts of Burgundy pitch, 10 parts of pulverized Syrian asphalt, and 2 parts of pulverized mastic. These are boiled together and form a pasty varnish, which is spread out on a plate of ground glass, from which it is transferred to the rubber type by means of a rubber roller. The ink must not be put on too thick. The glass is printed with this ink, and then dusted over with finely pulverized Syrian asphalt and heated in a sheet iron muffle until the ink and asphalt unite to form a brilliant varnish. If the glass is to be deeply etched, the dusting with asphalt must be repeated.

If the whole glass is not to be rendered matte, the remainder is covered, with the exception of a round or oval vignette, with a mixture of 1 part stearine and 2 or 3 parts tallow. It is then put in lye, and the part that is to be etched is well washed with water, when the glass is put in dilute hydrofluoric acid for five minutes, rinsed with water, and put in the "matte bath," where it is left fifteen or twenty minutes. It is afterward cleansed with hot lye and polished.

An elm near Lawrenceburg, Tenn., is 105 ft. in diameter from tip to tip of its branches, and 329 ft. in circumference.