

A NEW MINER'S DRILL.

In the accompanying illustrations we present a drill for miners, which is constructed to permit the passage of hot water or steam to the point of the drill, so that frozen ground may be readily thawed.

Referring to the sectional view, it will be seen that the drill-point is hollow and is provided with a steam-pipe supplied from a boiler. The admission of steam is controlled by a valve, the stem of which runs down to the point and up through the handle-bar, where it is provided with a cross-pin engaging slots in a spring-

**MINER'S DRILLING AND THAWING DEVICE.**

pressed sleeve, which can be either turned or moved longitudinally, owing to the key-hole form of the slots. In admitting steam to the drill-point, the sleeve is forced down against its spring so as to unseat the valve and permit the steam to thaw the frozen ground and to wash out the precious metals.

Should the hollow drill-point be clogged, the obstruction may be readily removed by pushing down the lower extension of the valve-stem. The downward movement of the sleeve is limited by a stop-pin projecting from the handle-bar and adapted to be engaged by a slot. When the stop-pin is in register with its slot, the sleeve can be moved down to the maximum distance, so that in addition to the unseating of the valve, the lower extension of the stem is pushed through the hollow spout. But when it is desired merely to unseat the valve without cleaning the point, the sleeve is turned so as to move the stop-pin out of register with its slot and to cause it to limit the downward movement of the sleeve.

The valve is under the complete control of the operator, for when he grasps the sleeve to force the drill into the ground the valve will open, but will immediately close when he relieves the pressure.

The inventor of this drill is Mr. Rufus E. Farrington, of Phoenix, Arizona Territory.

THE CRANKSHAFTS OF THE LINER "DEUTSCHLAND."

The accompanying photograph represents a piece of finished steelwork which is entitled to take its place among the things which are dignified with the title of "Largest in the World." It represents one of the crankshafts of what will be the most powerful twin-screw marine engines ever built. This shaft and its mate have recently been completed by the celebrated Krupp Company for the steamer "Deutschland," which is now building for the Hamburg American line. Each of the engines of this ship is designed to develop 17,500 horse power, and the two together are

and develop ordinarily about 13,000 horse power on a single shaft. The great size of this piece of work is best appreciated by comparing it with the man who is shown standing beside one of the cranks. The diameter of the shaft is 25.2 inches; the stroke of all four cranks is 72.84 inches, and the total length of the shaft over all is 59 feet 3 3/8 inches, while its total weight is 223,300 pounds. The nickel steel of which it is made has shown an ultimate breaking strength of 132 pounds to the square inch, with an elongation of 20 per cent in a length of 8 inches. In our issue of July 1 we gave some illustrations showing the construction of the keel and cellular double bottom of this ship. The chief dimensions of the "Deutschland" are as follows: length over all, 686 1/2 feet; length on the water line, 662 feet; beam, 67 feet 4 inches; and depth, 44 feet. The ship will have sleeping accommodations for 1,320 people, and while not so long as the "Oceanic," whose total length is 704 feet, she will have about 3 knots greater speed and, of course, a considerably larger total of horse power. We are indebted to Mr. Emil S. Boas for our illustration and particulars.

THE "POLYPHONE"—ATTACHMENT FOR PHONOGRAPHS.

One of the simplest and at the same time one of the most ingenious attachments for talking-machines which has yet appeared is found in the "polyphone," a phonograph sold by the Talking-Machine Company, of 107 Madison Street, Chicago, Ill.

It has long been a well known acoustic principle that when a sound has been reflected or repeated within an exceedingly short interval of time, the original and the repetition sound in unison. The makers of stringed musical instruments apply this principle by using sounding boards, upon the resonance of which the quality of the tone depends. In the "polyphone" a similar principle is employed.

"The "polyphone" is fitted with two diaphragms and two styli arranged one in front of the other so that the same sound is twice produced. At first blush it might appear that one diaphragm would reproduce one word and the second another word. But when it is considered that the cylinder makes two revolutions in a single second, it is evident that the interval between the two sounds is so small that the repetition and the original practically coincide. Since the repeated sound is equal in volume to the initial sound, it follows that the "polyphone" is capable of reproducing a word with twice the loudness of the ordinary phonograph. In addition to this increased volume the use of two diaphragms imparts to the sound that quality which, as before remarked, depends upon the application of the principle of resonance or of repetition.

The double diaphragm can be applied to any phonograph whatever, so that any ordinary talking-machine can be converted into a polyphone.

The Meeting of the International Acetylene Association.

The annual meeting of the International Acetylene Association was held in Chicago, July 11. The scope of the association was extended to include, in addition to manufacturers of gas generators and carbide, manufacturers of burners and other acetylene supplies. Arrangements were also made to permit individuals, inventors, etc., who were interested in the development of acetylene illumination to become associate members. The Acetylene Gas Journal, of Buffalo, was made the official organ of the association. The opin-

The Value of Small Inventions.

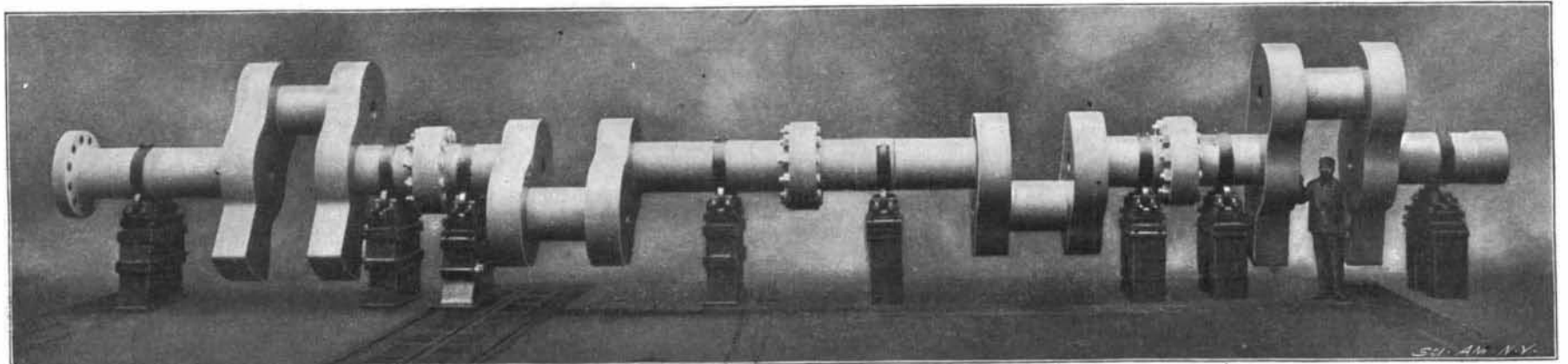
The inventor of the roller skate made £200,000. The gimlet-pointed screw has been responsible for more wealth than most silver mines. One hundred thousand pounds in first-class securities would not represent the fortune made by the man who first thought of copper tips to children's shoes. Even a little thing like the common needle threader is worth £2,000 a year to its owner, while the "Return ball"—a wooden ball fastened on a piece of elastic—yields £10,000 per annum; this is only one of many profitable toys.

We may mention the "Dancing Jim Crow," which produces £15,000 a year; the "Wheel of Life," worth in all fully £100,000; the walking figure "John Gilpin," and the "Chameleon top." The sale of the last named toy has been enormous, and the profits also enormous. Indeed, the "Chameleon top," as a profitable invention, has probably excelled any one discovery in modern times, however valuable and important this may have been. As far as profits are concerned, the invention of toys pays better than those of anything else.

Money has been, and always can be, made more easily out of simple patented inventions than out of any investment or occupation. Great discoveries take

**THE "POLYPHONE"—NOVEL ATTACHMENT FOR PHONOGRAPHS.**

so many years and cost so much to perfect that the fortunes made from them are small compared with those we have instanced. The man who discovered that a candle, if tapered at the end, would stick firmly into its socket, patented the idea and afterward founded the largest candle factory in the world. Might not any one have thought of this simple device? Out of the millions who own umbrellas, how many realize that these unfortunately indispensable articles represent wealth untold! The frame, the cover, the materials used, all are the result of numberless experiments and patents. An umbrella years ago used to be made of whalebone and gingham. It weighed as much as a portmanteau. Alpaca was substituted for gingham, then silk for alpaca. Each change meant a fortune to

**NICKEL-STEEL, QUADRUPLE CRANKSHAFT FOR THE "DEUTSCHLAND."**

Stroke, 72.84 inches; diameter, 25.2 inches; weight, 223,300 pounds.

expected to drive the great ship at a speed of 23 1/2 knots per hour on her trial trip, and to give her a sustained sea speed of 23 knots per hour. There is nowhere in the world, either ashore or afloat, a crankshaft which delivers anything like as much as 17,500 horse power, the nearest approach to it, we believe, being found in the Cunard steamers "Etruria" and "Umbria," whose engines are of the single screw type

ion was general that the acetylene business was on the eve of a very prosperous season, although the problems to be faced and overcome are such that establishments of small capital and experience are almost certain to meet disaster unless they feel their way very carefully. The president is George Landis Wilson; vice-president, W. T. Reynolds; and the secretary and treasurer is J. B. Carroll.

the inventor who brought it about. For a long time the ribs were solid; then Samuel Fox arose, took the umbrella and cut grooves along its ribs. He designed the "Patent Paragon Frame," and lived to see his invention used universally. At the death of Samuel Fox his heir benefited to the extent of £179,000—the residue of a total profit of at least half a million.—Patent Record.