

## A MARINE WONDER.

The latest torpedo-boat destroyer for the English navy is called the Viper. It is designed to make 40 miles an hour, the speed of an ordinary express train. This is accomplished by the use of the Parsons turbine engine. The Viper is not unlike the run of British torpedo-boat destroyers, except that she is larger. Her slim, finely-formed hull is 210 feet long, with a maximum beam of only one-tenth the length. She has a displacement or total weight of 325 tons, and draws only 5 feet 4 inches of water—quite 2 feet less than any other boat of her class. It is not until one's eyes rest on her stout, stumpy smokestacks, and the great gaping ventilators, down whose throat must go the fierce draft for her roaring furnaces, that one realizes a sense of hidden power.

The marine turbine is another adaptation of the modern windmill principle, but there the likeness ceases; for where the farmer's helper has a dozen blades, perhaps, Mr. Parsons' turbine has several thousand. In this turbine there are none of the piston rods, shifting valve gears, revolving cranks and fly or balance wheels, with which we are familiar. The propeller shafts become the balance wheels, the casings of the turbines become the cylinders, and the thousands of little blades studding the shaft collars become the pistons of old. These blades stud the collars as thickly as porcupine quills and are turned at just the proper angle to receive the maximum impulse of the entering steam, which passes from one end of the casing holding the turbine to the other. The steam, still full of vitality, then passes into another low-pressure casing, where it finally expends itself before going on to the condenser, to be

turned again into water for further use in the boilers. The blades in the first or high-pressure turbine are short, because the leverage upon them of the steam right from the boilers, at an initial pressure of 250 pounds is enough to balance the power developed in the low-pressure turbine, where the pressure is much less, while the blades are correspondingly longer to give added force to the lessened power of the steam. The casing fitting around the turbine is studded with other blades like those on the shaft collar, only they are immobile, and they are to guide the steam into channels leading directly to the moving blades. In the ordinary engine, steam is exhausted at a pressure of

seven or eight pounds, which means that seven or eight pounds of propulsive force simply goes into the condenser as so much waste. With the turbine, the steam is utilized thoroughly, and the exhaust is about one pound absolutely. This means that coal is not burned uselessly. Mr. Parsons has designed his own boiler, which is of the modern high-power, fast-steaming, water-tube pipe, and no small share of credit given the turbine is due to the fine working of these boilers.

A horse-power is a unit of mechanical measure represented by the force required to raise 33,000 pounds one foot in one minute; and 12,000 indicated horse-power, which, in the

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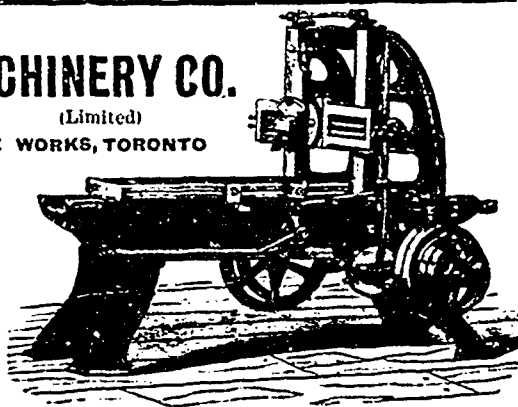
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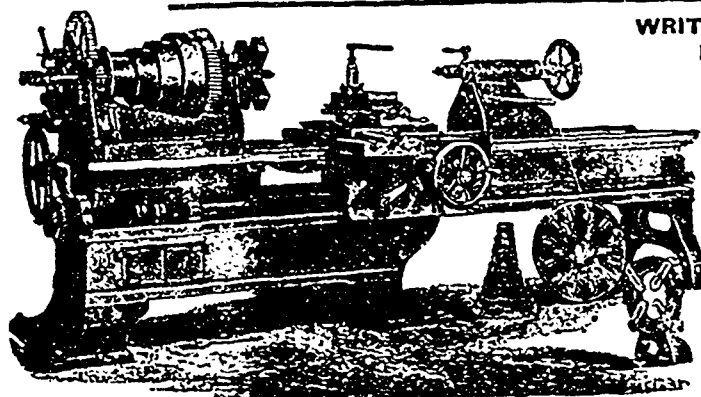
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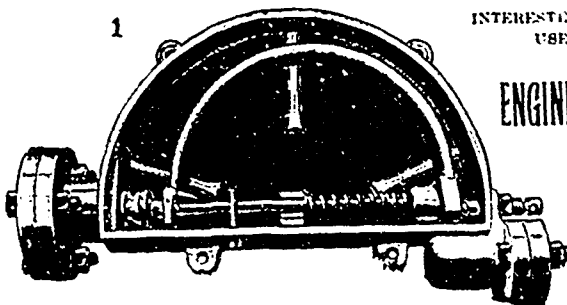
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