Science and Art.

Notes on the Progress of the Paddle and Screw.—No. 6.

In Shorter's plan (1800) the shaft had a universal joint, which allowed the propeller to be raised; Pumphrey (1829) detached the propeller at this joint; Taylor (1838) disconnected the shaft by drawing inwards the engine part, so that the propeller could be raised in vertical guides; Maudslay (1846) used a similar plan, and screwed one part of the shaft into the other, to connect them again; Galloway (1843) and Griffiths (1853) disconnected the whole apparatus by chains, which extricated the shaft from the bearings successively; Seaward (1846) lifted the propeller by rods which were screwed into the boss. Wimshurst (1850) used a similar plan, and disconnected the parts by withdrawing bolts; Wilson (1852) caused the propeller to be hoisted by screwing itself along the inclined shaft; Oxley (1845) enclosed the space occupied by the propeller (when at rest vertically) with water-tight doors, in a chamber kept dry by compressed air. The propeller was raised in a different manner by Perkins (1845) and Tucker (1850), who put it on an arm turning vertically round a horizontal pin above the shaft.

Some other inventions relating to the propeller shaft may be briefly noticed. Thus Buchanan (1846) supported the shafts on springs. Montgomery (1846) and Hunt (1854) made it yield to a twisting strain. Wimshurst (1850) and Prideaux (1853) inserted a dynamometer between its parts. Blaxland (1840) put a shaft on a single spherical bearing, so that its inner end could be raised.

Various plans were suggested for receiving the horizontal thrust of the shaft. Hays (1844), Buchanan (1846), and Prideaux (1853), received the end of the shaft in a water box; Penn (1845) upon a steel plate, revolving so as to present new surfaces to the point; Beale (1848) deflected part of the thrust along other transverse shafts by beveled wheels. A common groove and furrow bearing is used in the *Leviathan*. Penn (1854) put wood to work on metal for the bearings under water; Buchanan (1854) placed two shafts one above the other, and the propeller could be attached to either as the vessel was loaded; Napier (1856) worked the propeller shaft at different elevations by an adjusting vertical shaft and cog wheels; James (1857) pumped water through it, to be discharged at the ends of the blades, and thus to turn them.

To regulate the speed of the shaft, Galloway (1843) had a multiplying gear of bands and wheels. Maudslay (1843) used drums and an endless rope. Hays (1844) inserted an additional shaft and cog wheels, while Griffiths (1849) applied the sun and planet motion. Robertson (1856) used grooved friction wheels, and Struthers (1886) geared one shaft to the other by a cog wheel with internal teeth. Bodmer (1844) caused the propeller to turn with a velocity alternately increasing and decreasing. Hunt (1854) connected the shaft with the throttle valve, so that the steam was regulated by the degree of pitch of the blades; Roberts (1851) made the boss much larger than usual; and Griffiths (1849) tapered its after end to a conoidal point, and other forms of the boss were applied in connection with movable blades.

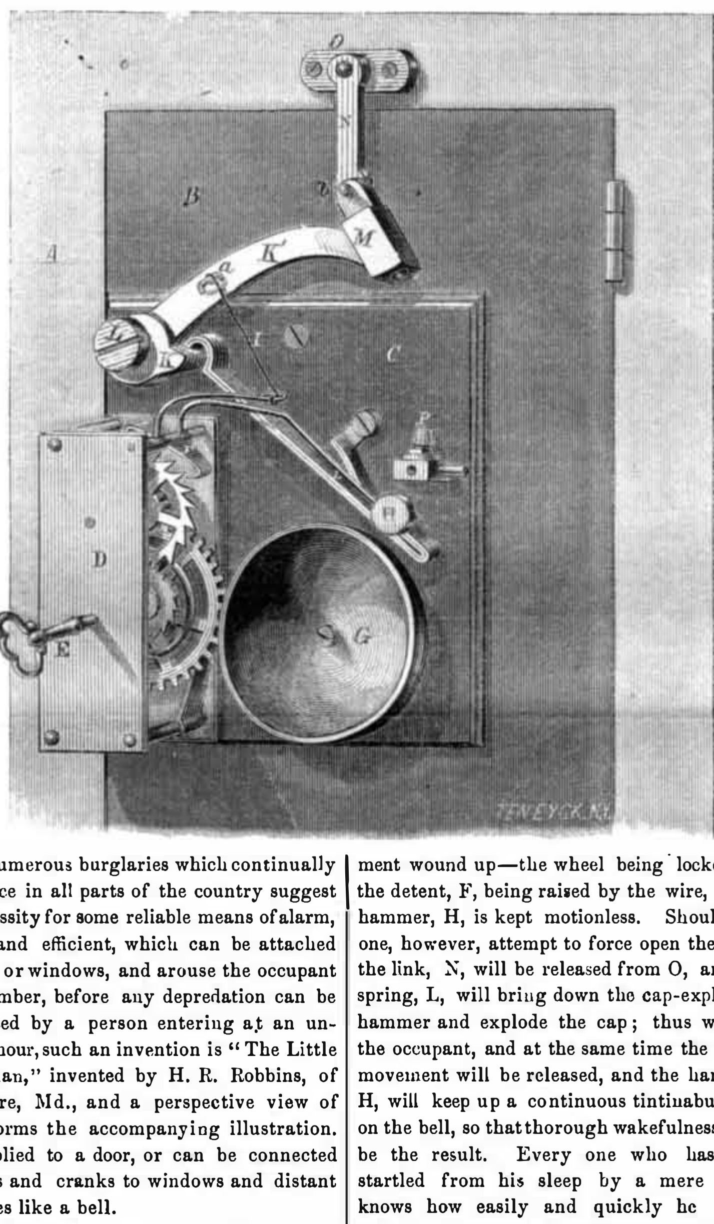
The forms proposed for propeller blades, both for outline and section, are innumerable. It is hoped that in noticing only a few, no injustice will be done to the other twists and curves and fanciful forms, so many of which remain unknown to fame.

We shall direct our attention first to blades not movable on the shaft. In 1825, Marestier had a screw of a "helicoidal surface." Woodcroft (1832) patented a propeller with an increasing pitch. Smith (1836) used two threads of a half turn each at the ends of a diameter. A right-angled triangle, wound upon a cylinder, traces a screw by its hypothenuse. When a spiral curve is put instead of the hypothenuse, the screw will have an increasing pitch. Fraissinet (1838) used a parabolic curve, and Rennie (1839) applied another curve. Beadon (1845) and Templeton (1846) made the blades of a volute form. Rosenberg (1845) reversed the usual curvature, by making the blade near the boss parallel to the shaft.

In the plans of Lowe (1838) and Borrie (1843) each blade revolves in a different plane. Haddan (1839) fixed two spirals at a distance from the shaft; Poole (1848) patented the "Bommereng" propeller, in which a bent blade turns about its center of gravity in the shaft; Joest (1841) shortened every alternate blade; Dundonald (1843) bent them towards the stern; Griffiths (1849) towards the bow, or alternately each way.

Samuda (1843) put the blades projecting inwards from a hollow drum. The surface they presented was made elastic in the plans of Duncan (1816), Macintosh (1847), Hendryckx (1850), and Hunt (1854). Oxley (1845) made it expansible by wedge pieces. Amongst other forms were Sunderland's (1843), and Southworth's (1856), bounded by areas of circles; Griffiths' (1849) open in the center, or with blades like lancets, and Lowe's (1852) with an indescribable twist. Griffiths (1849) proposed to determine the best form of curved blade by using balls floating in the wake of the propeller, so as to indicate the forces acting at different points by spring balances.

THE LITTLE WATCHMAN.



The numerous burglaries which continually take place in all parts of the country suggest the necessity for some reliable means of alarm, simple and efficient, which can be attached to doors or windows, and arouse the occupant of a chamber, before any depredation can be committed by a person entering at an unseemly hour, such an invention is "The Little Watchman," invented by H. R. Robbins, of Baltimore, Md., and a perspective view of which forms the accompanying illustration. It is applied to a door, or can be connected by wires and cranks to windows and distant entrances like a bell.

A is the frame of a door, on the top of which frame is placed a pin, O. To the door, B, is secured the plate C, that has attached to it the simple clockwork, D, wound up by the key, E; the verge and detent, F, has secured to it a small hammer, H, and a piece connected by the wire, I, to the hook, *a*, on the handle, K', that carries another hammer, M. This handle, K', is pivoted by a screw, L, to the plate, C, and can move freely upon it; a portion of the handle, K, is extended into the form of a little step, and on this bears one end of the spring, L, the other end of which is secured to the plate, C. A link, N, is attached by a pivot, *b*, to the cap-exploding hammer, M, to hold it in the position shown in our illustration when set. A cap nipple, P, is also secured to the plate, C, and a bell, G, is attached to the same plate.

The operation is as follows, and is very simple:—The door being closed, and the cap-exploding hammer being held raised by passing the hole in N over the pin, O, a cap being placed on P and the clock or alarm movement wound up—the wheel being locked by the detent, F, being raised by the wire, I, the hammer, H, is kept motionless. Should any one, however, attempt to force open the door, the link, N, will be released from O, and the spring, L, will bring down the cap-exploding hammer and explode the cap; thus waking the occupant, and at the same time the alarm movement will be released, and the hammer, H, will keep up a continuous tintinabulation on the bell, so that thorough wakefulness must be the result. Every one who has been startled from his sleep by a mere noise knows how easily and quickly he again falls into the "arms of Morpheus," but should the noise, as in this case, be continued, it is impossible to remain drowsy. The cap hammer may be held up by a pin when the door is opened in the morning, so that a cap will not have to be exploded every morning, but the same may remain on until exploded by a burglar.

This cheap and very perfect contrivance was patented Oct. 19, 1858, and any further particulars can be obtained by addressing Robbins & Co., 46 and 48 Light street, Baltimore, Md.

Photographs of Images on Glass.

Collodion as a photographic coating is exceedingly sensitive, and is well adapted for taking pictures quickly from life. An albumen coating presents more soft and beautiful tints than collodion, but is not so sensitive, yet for copying pictures of statues and such objects on glass, it is the best agent that can be employed. The following method of practising the albumen process in photography is described by Sir David Brewster, in the *North British Review*. He states that very large and extremely beautiful pictures have been taken in the manner he describes. Take the white of several eggs and add eighteen drops of the saturated iodide of potassium for each, then beat them up into a large mass of froth and allow them to stand for ten hours until they fall into a perfect liquid state. Now pour this liquid upon the surface of a clean glass plate, which should be revolved before a moderate fire until a perfect film of the albumen is spread over it. The plate is now dipped into a solution of the nitrate of silver, in strength 70 grains to the ounce of water, and twenty per cent of strong acetic acid added. When taken out of this solution, it is washed in clean water, and before being perfectly dry is placed in the camera and the picture taken. About six minutes is required to take the image, the glass is now taken out and the figure developed by pouring a saturated solution of gallic acid on the album en, and spreading it evenly with a piece of wool. The picture comes out slowly and of a reddish color at first, but when a solution of silver and gallic acid is applied it assumes a darker and more vivid appearance. It is now fixed with a solution of the hyposulphite of soda, washed with soft water, and comes out beautiful.

Salt for Horses' Feet.

Common salt absorbs moisture from the atmosphere, hence it has been in some instances applied with great success for keeping the hard-bound hoofs of horses moist. The hoofs of some horses become dry and oftentimes crack, thereby rendering them lame, if the animals are driven on hard roads. By bathing the hoof and fetlock joint with a salt brine three times a day, lameness from the above cause will be avoided. It is a common practice with some blacksmiths to rasp cracked hoofs in order to render them more tough, but salt brine is far superior to rasping for effecting this object.