

THE LONDON EXHIBITION.

It is our intention to give a series of articles—the information being collected and derived from reliable sources—on the machinery and articles in the Great Exhibition. We begin with

MARINE ENGINES.

With respect to the comparative character of the marine engines in the Exhibition, the London *Engineer* says:—"The triumph of the screw over the paddle is complete." All the engines are direct acting and the stroke in the largest does not exceed four feet. No new style of engine has been brought forward, but the mechanical skill exhibited in the construction of all receives high praise. The trunk engine which is commonly used for the war ships of the British Navy, was first designed by James Watt, and represented in the specifications of his patent of 1784, for a steam hammer. Maudslay Sons & Field, exhibit 800-horse power screw engines for the *Valent*, a new iron plated frigate. These are a pair of horizontal double piston rod engines with 82-inch cylinders, stroke 4 feet. The cylinders are steam jacketed, and the covers are also double to admit steam, so as to prevent inside condensation. The air pumps are worked by long rods directly from the pistons. There are two slide valves working simultaneously for each cylinder. Each is double ported, and steam is taken at once through four openings at each end of the cylinder. The steam pressure is nearly taken off the back of the valve by a counteracting balance pressure adopted for all the engines of this company. Another set of marine engines on exhibition are a pair of 400 collective horse power, by Messrs. Humphys & Tennant. They have horizontal cylinders, 64½ inches in diameter and 32-inch stroke. The valves are worked by a link motion, the link being a curved bar. The valves are double ported and placed on the sides of the cylinders. A pair of such engines is furnished on shipboard with a fire bar surface of 280 feet and a heating surface of 7,600 feet in the boilers and they carry 25 lb. pressure. Although rated at 400-horse power, they work up to 1,308-horse power.

Messrs. John Penn & Son, exhibit a pair of 600-horse power trunk engines made for the Spanish government, also one cylinder of the engines for the great new iron plated frigate, the *Achilles*. This cylinder is 112 inches in diameter, for stroke of 4 feet. It weighs 18 tons.

Messrs. Todd & Macgregor, of Glasgow, exhibit a pair of 60-horse power screw engines, with inverted cylinders 30 inches in diameter and 22-inch stroke. These engines are the only pair provided with surface condensers (Sewell's). They have a link motion as a reversing gear and an expansion gear besides. They are described by the London *Engineer* as being models of compactness and neatness of design.

In the French Department are a pair of 400-horse power engines from *La Compagnie des Forges et Chantiers de la Méditerranée*. Their general arrangement is like those of Maudslay Sons & Field, but they are peculiar in not having the eccentrics for working the valve rods, on the main shaft as is common on English engines. The eccentrics are on another shaft placed above and geared to the crank shaft—apparently a superfluous arrangement. The slide valves are fixed on the top of the cylinders, the latter are not steam jacketed. English papers state that the screw for the French engines has edges as sharp as a lady's fan while the British screws are rounded off at the corners. There can be no question of the fact that by rounding the edges of a screw propeller its useful effect is increased so much as to give an additional speed of about from 11 to 25 per cent to the vessel. One thing very striking and dissimilar between screw and paddle-wheel engines is the very short stroke of the former compared with that of the latter. For example, the new paddle-wheel steamer *Scotia*, which lately visited New York, has cylinders of 100 inches in diameter and 12-foot stroke, while the *Achilles*, mentioned above, has cylinders 112 inches in diameter and only 4-foot stroke. Engines to drive propellers by direct action make from 40 to 80 revolutions per minute according to the pitch of the screw. The short stroke is necessary to get up the proper speed on the screw. It is also contended by some engineers that there is less friction involved in a short than a long stroke, but this is mere fancy.

NOTES ON FOREIGN INVENTIONS AND DISCOVERIES.

A Kite Life Buoy.—A patent has been obtained by Lieut. G. Nayres, R. N., for a kite to be used for saving life in cases of shipwreck. The kite is made similar to those used by boys, but its central stem has a hinge, and the stretcher bar at the top is jointed to the vertical stem. It is covered with canvas, and by means of the jointed stretcher, it is adjusted so as to present more or less surface as may be required according to the strength of the wind. Two lines are used for the kite, one being in the position of the common string used in flying, but with a thimble, near the kite, through which a second cord is run, passing toward the lower part of the central stem, thence through a swivel, and extending to the hand. This kite is flown in the usual manner by the first line, and when it has reached a point directly above where it is to be lowered, the first line is slackened and the second held firm, when the kite is immediately brought down, and it may thus be used to draw a man ashore from a wreck, and when made hollow, it can be inflated and used as a life buoy.

Rolled Cast-Steel Rifle Barrel.—L. Cristoph and G. P. Harding, of Paris, and W. Hawksworth, of Linlithgow, Scotland, have obtained a joint patent for making steel tubes for rifle barrels without welding, by drawing and rolling. A peculiar form of mandrel, having two or more swellings, is used in drawing the tubes. The one which comes into action first is the smallest, and the size of each gradually increases. A thick draw plate with a conical hole is used, and the aperture corresponds with the graduated enlargements of the mandrel. In making a steel conical tube, such as may be used for a musket barrel, the skelp of steel is first cast hollow, or cast solid and bored out, then drawn and rolled over the mandrel to give it a true smooth cylindrical bore, and a slightly tapering outside form. The tube is lastly placed in a matrix, and a mandrel drawn through it having projections on it to cut rifle grooves, and thus obviate the tedious and expensive mode of cutting grooves with a rifling lathe.

Water-Proof Walls.—W. Smith, of London, has obtained a patent for a preparation, which he states, renders the walls of brick and stone houses completely water proof when applied to them. He takes flint or other such silicious substances, and reduces it to fine powder; then he adds to this some powdered alum, and mixes them thoroughly with water, reducing them to the consistency of common oil paint. The composition is now applied with a brush to the surface of the wall, and when it becomes dry it resists water. This composition while being applied, requires to be continually stirred in the vessel which contains it. It is cheap, and when applied to wooden buildings, it renders them almost fire proof.

Gunpowder for Blasting.—The gases which result from the explosion of gunpowder in mines are very offensive and deleterious, and is it therefore very difficult for miners to work for some period of time after a blast has taken place in a coal mine. To obtain a powder better adapted for mines, not as regards its expansive force, but to render it less injurious to the miner, respecting the pollution of the air which he inhales, I. Lobb, of London, adds a quantity of fresh slacked lime and a little dry saw dust, and uses about one half the quantity of the sulphur that is in common gunpowder. The dry lime prevents the powder from becoming deliquescent in such damp situations as mines, and at the same time, it tends to absorb some of the fetid gas.

Preserving Articles of Food.—A patent has been obtained by I. McCall and G. B. Sloper, of London, for preserving articles of food, the principle of the invention consisting of introducing into tin cans containing the food a substance for which oxygen has a greater affinity than for the meat or other article of food under preservation, and which at the same time shall be in no way detrimental to it. The patentees have found in practice that sulphite of soda is the best agent for their purpose. They prefer to incase or cover the sulphite of soda or other suitable material in composition as aforesaid, in gelatine or other suitable protecting coat, to prevent its coming into action before the coat has been dissolved by the heat to which the tin and contents are first subjected, and

the time of its solution they vary according to circumstances. About the time they have calculated for its solution, they hermetically seal the tin, and then for a short period apply a higher degree of heat, when the oxygen remaining in the tin and in the meat or other food will combine with the sulphite of soda.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list on another page:—

Spring Spur.—The object of this invention is to facilitate the putting on and taking off spurs and to arrange the fastening so that the spur will fit boots of different sizes, and also be held firm and thus be prevented from dropping off, and at the same time, should the rider be thrown, and the spur catch on the stirrup, it will be detached from the boot, preventing him being dragged on the ground. The invention consists in the application to a spur of two curved spring arms, bent in such a manner that when they are slipped or sprung over the instep of a boot they will draw the spur up tight against the heel and retain it firmly in its place. It consists further in combining with said curved spring arms a strap or wire which passes under the foot, which is provided with two loops, one on each end, to which the pants can be fastened. A. S. Hudson, M. D., of Sterling, Ill., is the patentee.

Piano Orchestra.—This invention consists in the application of musical instruments played by percussion, such as drums, cymbals, tam-tams, triangles, &c., to harmoniums, pianofortes, organs or other instruments played by keys, in such a manner as to allow the performer to bring the said instruments into play by making use of his hand or forearm during the execution of a piece of music, without causing an interruption of the harmonies or passages. Also in novel mechanism for playing upon the small or rolling drum, in order that when so applied and played by keys it may realize nearly all the effects executed by a skillful drummer with his drumsticks. Also in a mechanism applicable to harmoniums, organs and other wind instruments played in a similar manner, by means of which the keys may be stopped with their valves in an open condition, in order to permit the player to act freely on the percussion instruments during the sustained accords or tunes, whenever it is desired to produce a particular effect with the latter instruments. Also in a set of metallic funnels or trumpets adapted to the acoustical holes of harmoniums, &c., through which the sound, by applying the tremolo-valve, receives the character of a trumpet. And further, in uniting the said percussion instruments in one which, being played upon by a single artist in the same manner as any other instrument played by keys, may be employed in an orchestra or for accompaniment in general. We have seen in one of the French journals a very flattering account of this instrument as performed by Mr. Schalkenbach, the inventor, of Triers, Prussia. The assignee of the United States patent is E. Justh, of San Francisco, Cal.

Chimneys for Coal-oil Lamps.—This invention consists in combining a glass chimney and a glass cone in one piece so that they will be permanently attached, and having the chimney perforated near its base to admit air to the flame above the cone. The invention is designed to be applied to coal oil lamps and has for its object economy in the construction of the fixtures, greater facility in exposing the wick tube for trimming, durability as regards the fracturing of the chimney and cone either by heat, blows or casually dropping them, and also insuring a perfect combustion with a low or small flame. The inventor is William Howard, of Flushing, N. Y.

To KEEP BUGS FROM VINES.—A correspondent of the *American Agriculturist* gives this remedy for protecting melons and other vines from bugs:—Take common cotton batting, separate it into very thin layers, and spread over the plants as soon as they appear, putting a little dirt on each corner to prevent the wind from blowing it off. He has tried it for several years with success. The plants may attain considerable size before removing the cotton. The cotton does not interfere with light or moisture.