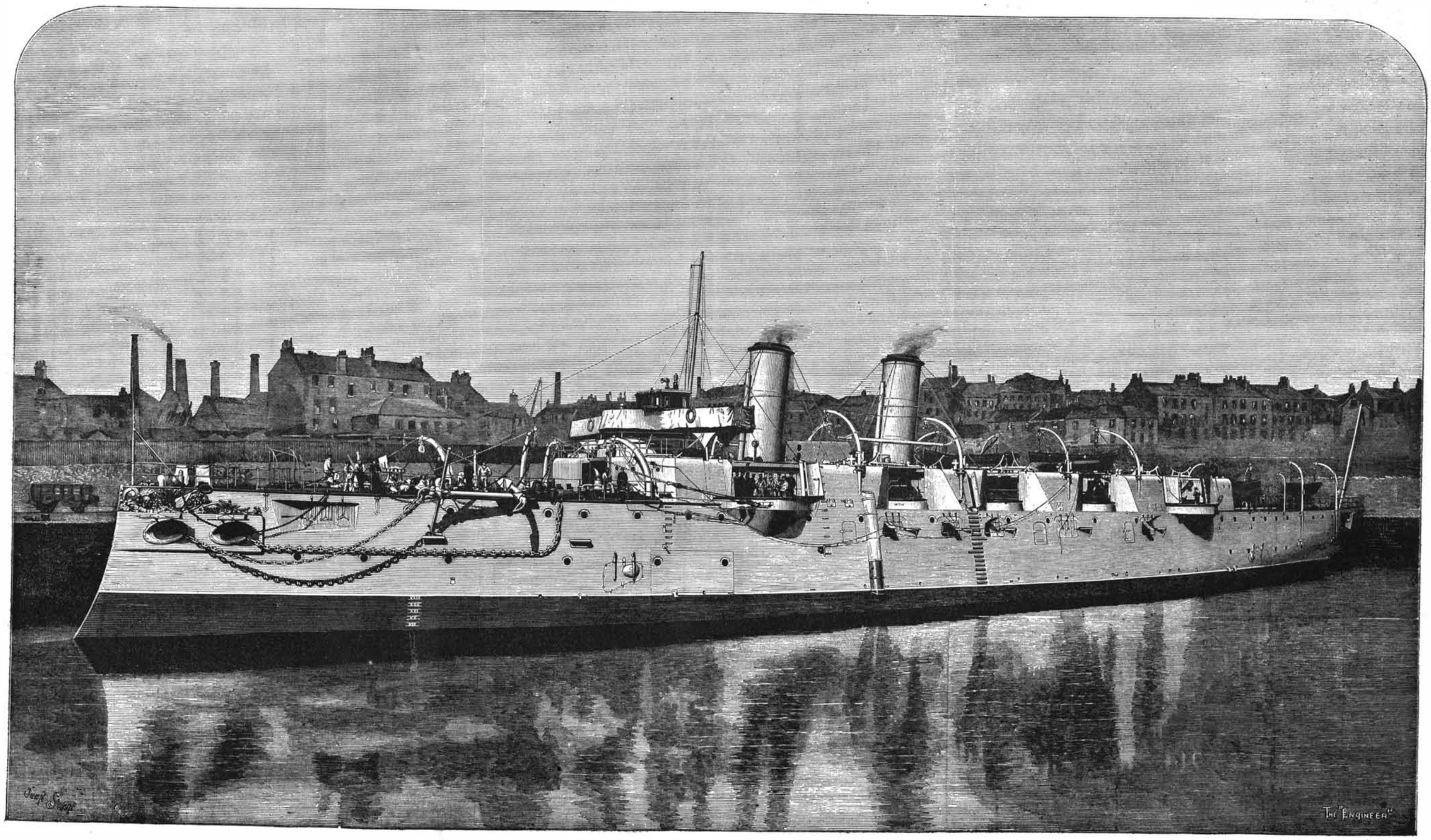
THE NEW BRITISH ARMORED WAR SHIP AUSTRALIA.

We illustrate one of the most recent additions to the British navy—we might almost say two, for the drawing would serve indifferently for either of the sister ships Australia or Galatea.

H. M. S. Australia and Galatea, built and engined by Messrs. R. Napier & Sons, Glasgow, belong, says the *Engineer*, to the class of swift and powerfully armed belted cruisers, specially designed for the protection of our national commerce. Their principal dimensions are: Length between perpendiculars, 300 ft.; breadth, extreme, 56 ft.; depth, moulded, 37 ft.; with a displacement of 5,000 tons at 19 ft. draught when in the normal fighting condition, but this may be increased to 6,000 tons when an extra supply of coal is shipped. The belt which protects the water-line for two-thirds of the length consists of steel-faced compound armor 10 in. thick, strongly supported by steel and teakwood backing, and terminates at each end in an athwartship iron bulkhead 16 in. thick to stop end-on shot. Level with the top of the armor belt is a protective steel deck, 2 in. thick on the flat and 3 in. on the angle where it slopes down below the water-line, and this deck also extends to the stem and stern respectively. All the machinery of vital importance, including the steering gear, air compressors, electric dynamos, etc., is placed under the



THE NEW BRITISH ARMORED CRUISER AUSTRALIA—5,000 TONS, 9,400 HORSE POWER.

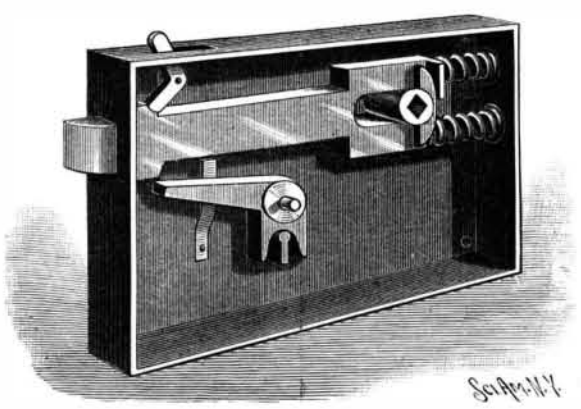
protective deck, while above it, for the length of the engine and boiler rooms, the sides are defended by coal, and an armor-plated conning tower on the upper deck is fitted with steering gear, telegraphs, etc., for working the ship when in action. While every precaution is thus taken to keep out shot and shell, the buoyancy in case of penetration is insured by the minute subdivision of the underwater portion of the hull, which contains upward of 130 separate water-tight cells and compartments. The armament consists of two long range 22 ton breech-loading guns and central pivot mountings on the upper deck, forward and aft respectively; ten 6 in. guns similarly mounted on the broadside; eight 6 pounder and eight 3 pounder quick-firing guns, also six torpedo tubes. The engines, which were designed by Mr. A. C. Kirk, the senior partner of Messrs. Napier's firm, were originally specified by the Admiralty to be of the ordinary compound type for 7,500 horse power; but from their previous experience, Messrs. Napier were able to show that by substituting triple expansion engines they could guarantee an increase of 1,000 horse power, and almost a knot more speed, thereby enormously increasing the value of the ship as a fighting machine, without adding to the total weight of machinery and coal, or occupying more space. This suggestion was eventually adopted by the Admiralty and also carried out in the other ships of the class.

The two sets of engines are of the three-crank horizontal type, working twin screws, and are placed one before the other in separate watertight compartments, the cylinders being 36 inches + 51 inches + 77 inches by 44 inches, and steam is supplied by four double-ended boilers, of the return tube type, which are placed forward of the engines in two independent stokeholds divided by water-tight bulkheads. The results of the official trials were highly satisfactory, and fully justified the contractors' proposal to introduce the triple expansion engines.

In the case of the Galatea, the collective horse power on the four hours' forced draught trial was 9,204, being more than 700 horse power in excess of the contract. The highest power developed during any single half hour was 9,665 horses, and the mean of the last three hours gave 9,415, equal to 1,915 I. H. P. above what was originally proposed by the Admiralty. This splendid result was attained on a consumption of 1·97 pounds of coal per I. H. P. per hour with an air pressure in the stokeholds of only 1¼ inches, and that while working as pure triple expansion engines, without passing boiler steam into the receivers, and the steam was supplied in such abundance that with the engines working at their maximum there was a constant blow-off.

AN IMPROVED LATCH AND LOCK.

The accompanying illustration represents a combined latch and lock wherein the latch may be manipulated only from the knob spindle, while two locking levers are employed to hold the latch in a locked position. This invention has been patented by Mr. Henry Kendall, of Xenia, Ohio. The latch has the usual beveled outer face, lugs projecting from its opposite sides engaging the inner face of the lock casing, against which they are normally held by two spiral springs attached to the rear end of the latch, and having a bearing on the inner end of the lock casing. Near the rear end of the latch is a longitudinal slot through which passes the knob spindle, having the usual follower, adapted to engage prongs on the end of the latch, these prongs permitting of the latch being reversed for attachment to the door opening either to the right or the left. An angular thumb piece is pivoted to project through a slot in the upper side and near



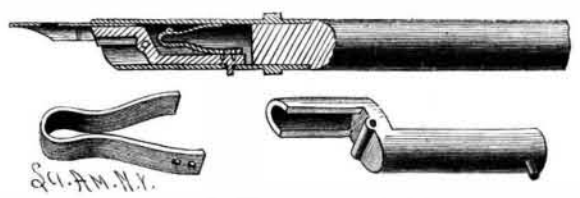
KENDALL'S LATCH AND LOCK.

the front of the lock casing, the lower member of this thumb piece being adapted to engage one of the lugs upon the latch, to prevent its being moved by the turning of the knob spindle.

An auxiliary angular locking bolt is pivoted below the latch, and adapted to engage the lug upon its under side, a member of this locking bolt partially encompassing the key opening. With this construction the latch can only be drawn inward by means of the knob spindle, but it may be locked in outer position by means of the thumb latch piece or by the key-operated locking bolt, either one or both of which may be employed to this end.

AN IMPROVED PEN HOLDER.

The illustration herewith shows a penholder patented by Mr. Fernand B. Poupart, and designed to hold the pen in its place by means of a spring clamp, which can be readily released when desired. A spring-actuated lever, as shown in one of the small views, is pivoted in the holder, the long arm of the lever having an outwardly projecting pin, opposite which, and bearing against the lever and the inner side of the casing, a spring is attached. The spring operates to hold the short arm of the lever firmly against the pen, but this hold can be readily released for the removal of the pen by pressing upon the pin.



POUPART'S PEN HOLDER.

For further information relative to this invention address Mr. Samuel Gautier, Lock Box No. 16, New Orleans, La.

Handling of Acids.

A correspondent informs us that he has met with a serious accident, caused by the spattering of some drops of muriatic acid into his eyes, while loosening the glass stopper of a five pint bottle containing it. He suggests that we caution our readers against similar mishaps, and he thinks that it would be a useful thing to repeat such cautions occasionally, even without waiting for the occurrence of an accident. We think this suggestion deserves attention, and, in compliance, will append here some cautionary remarks, which do not claim to embrace all that could be written upon the subject, but which may afford some practical hints at least for the younger and less experienced members of the profession.

When emptying *carboys* of acid, see that they are securely held. Do not tilt them over with one hand, while holding a receiving vessel in the other, unless they are so hung or placed that you have absolute control over them. A good way is to put the carboy on an elevated place, say about 18 to 24 inches high, so that when it lies on its side, its upper edge will be about three inches within the edge of the platform. If the carboy has a wooden strip or side rail, instead of a handle, it is best to tilt it on the side where this is situated, as this assists in keeping command over the carboy while it is tilted. If you have a carboy swing, be sure you see that the carboy is securely fastened, and that allowance be made for the change in center of gravity as it becomes more empty.

Never stand in front of a carboy while emptying it, but sideways, and use a receiving vessel with a substantial handle. Do not hold a bottle with a funnel under the mouth of the carboy, nor hold any vessel so that if it should overflow, the acid would run over your hands.

Choose such a place for emptying carboys, or any other containers of acid, as will suffer the least injury should the vessel be broken, or any of the acid be spilled.

Remember that the larger or the flimsier the container is, the more care and circumspection must be exercised. A person may have emptied a hundred or more carboys without any mishap, when unexpectedly an accident will happen, and in nine cases out of ten this is due to pure carelessness.

Never carry large containers of acid in contact with your body. Should they accidentally break, a most painful burn (sometimes turning out fatally) may be the result.

When opening acid bottles, for instance, the usual five pint sizes, first remove the cement from around the stopper, and wash and wipe the neck carefully to remove every trace of foreign matter. Then, if the stopper cannot be easily loosened by hand, place a coarse towel over the stopper and bottle, and while bearing with the thumb of one hand against the edge of one side of the stopper, tap the other side gently with the wooden (*not* metallic) handle of a spatula, when it usually will become loose. Should it be very obstinate, and the bottle at the same time appear to be of rather thin glass, place the bottle into a sufficiently deep and large acid-proof jar to receive the contents in case the bottle should break. The reason why a towel should be put over the stopper is almost self-evident. Our correspondent would have had no occasion to write to us had he used one. If a bottle of acid is exposed to a warm temperature, evidently some pressure will be developed within the bottle. By moving the bottle about, the neck and bottom of the stopper will be wetted with the acid, and if afterward the stopper is suddenly loosened, the compressed air or gases will throw out any particles of liquid which are between the neck and stopper.

All acids are not equally dangerous. Hydrochloric or muriatic is perhaps the least risky. Sulphuric acid comes next, as it does not evolve any gases. The greatest care, however, must be exercised with nitric acid, and still more so with aqua regia.

When compelled to work for any length of time with acids, it is well to have a vessel of fresh water close at hand, to wash off any drops that may have come in contact with the hands or face. Sometimes it may be advantageous to wear India rubber gloves, though most of those sold for this purpose are rather clumsy.

In packing acids, it should be made a rule to put them in a box by themselves, if at all possible. It would certainly be dangerous to pack sulphuric acid promiscuously with such articles as chlorate of potassium and organic substances.

In storing acids, equal care must be exercised. As a rule, they should be kept in a place so arranged that, if the containers should be broken, the acid would be unable to reach other substances.

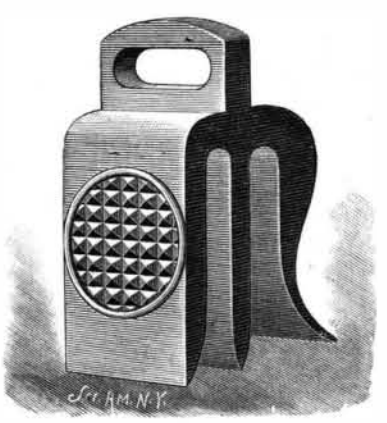
When diluting acids with water, remember always to pour the acid, gradually and under stirring, *into the water*, and not the water in the acid. In the case of sulphuric acid, for instance, the latter method may develop such an amount of steam at once that the whole liquid may be scattered about and do much damage. The last time we saw this happen was about a year ago, when several carboys of acid accidentally fell from the rear end of a truck in front of a factory of mineral waters. The acid collected in a pool in the gutter, and one of the workmen connected with the establishment, wanting to wash it into the sewer, turned a small stream of water upon it by means of a hose. The consequence was, a violent evolution of steam, almost resembling an explosion, and a number of the bystanders received more or less of the spray, to the damage of their skin and clothes.—*American Druggist.*

Gas and Electric Engines in the Lamp Posts.

M. G. A. Tabourin proposes to the Paris Municipal Council to fit each lamp post with arc light dynamo and gas engine. He has contrived a dynamo of minute parts and a gas engine ten inches in diameter for coupling up with it, and would put a dynamo and gas engine in the post under each of the gas lamps, as used at present in that city, utilizing the gas supply for feeding the gas engine. He shows by tables of cost and quantity, which he says are correct, that far more light, in the form of electricity, can be had by the use of this product of coal applied to the dynamo than when the gas is directly used for light. Then he sets out to show that the cost of apparatus would not be as large as, at the first blush, it would seem, and, considering the price paid per arc light per year, not costly; far less so than the Jablochkoff candle installation in l'Avenue de l'Opera some years ago. Should his scheme prove practicable, we might be enabled to give up the discussion of burying wires, so far as high tension currents are concerned, for it would not require any.

AN IMPROVED BUTTER WORKER.

A cheap and simple butter worker, adapted to puncture the butter so that salt may be introduced and buttermilk extracted, and also suitable for cutting the butter into desired portions, moulding it into balls, and stamping, is illustrated herewith, and has been patented by Mrs. Julia A. Graves, of Fair Haven, Vt. The device is preferably formed of a single piece of wood, made into a handle with three blades of approximately equal length, arranged side by side, one of the outer



GRAVES' BUTTER WORKER.

blades being concaved on its outer side. The other straight blade has a stamp on its outer side with which to stamp the butter.

Going with the Times.

"Professor, what are your views concerning the schools of medicine and theology?" Professor: "That depends upon circumstances. When I am slightly ill, I am a homeopathist and a Unitarian; but when I am very sick, I am an allopathist and a Calvinist."