[*Continued from first page.*]

off in jerking the hawser, but, as subsequently proved, a large and hard stone had cut through the iron skin forward of the end bulkhead, and since (as usual) the doors of the different bulkheads had been left open, the whole vessel was filled with water. A timber crib about 9 feet square was then filled with old rails and stones. This was hauled forward against the cylinder by a chain attached to it and passing under the cylinder, and with the help of a couple of hydraulic jacks working on the top of the crib the cylinder was once more in a few hours rolling seawards. As soon as the bottom plates came to the surface a patch was secured over the hole made by the stone, the vessel was pumped dry, and it only remained then to recall the tugs and let them haul off the ship, which they easily did. This obelisk will be erected in some prominent locality in London.

According to the New York *World*, the Khedive of Egypt has offered to present a monolith similar to the "needle," to the City of New York. The shaft now stands erect and is some seventy feet high. The English contractors who are now transporting the English stone are said to have offered to transport the Khedive's gift to this city, and to erect it in any location which may be chosen, for $100,000. It is proposed that this sum be raised by subscription among the citizens of New York.

A NEW ACID.—A new acid of phosphorus and oxygen has been discovered by Herr Salzer, of Worms. According to the old notation it consists of one atom of phosphorus and four atoms of oxygen. It has been named hypophosphoric acid.

IMPROVED DOUBLE SHEDDING HARNESS JACQUARD LOOM.

The annexed illustration of Ainley's double shedding harness jacquard loom, as manufactured by Messrs. Hutchinson, Hollingworth & Co., Dobcross Iron Works, Saddleworth, England, we copy from *The Textile Manufacturer*, with description of the chief movements employed. The first point which it is necessary to direct attention to is the fact that the jacquard machine is altogether independent of the general framework of the loom, being fixed upon beams at a proper elevation. This is a great advantage, since it avoids a very large amount of vibration to the jacquard. The double shed is produced as follows: The main lever at the left hand side, working upon a centralfulcrum fixed to the top rail of the loom, is the common medium of motion. This is actuated in the ordinary manner by the shell wheel below, making one motion for each pick, precisely as the common loom.

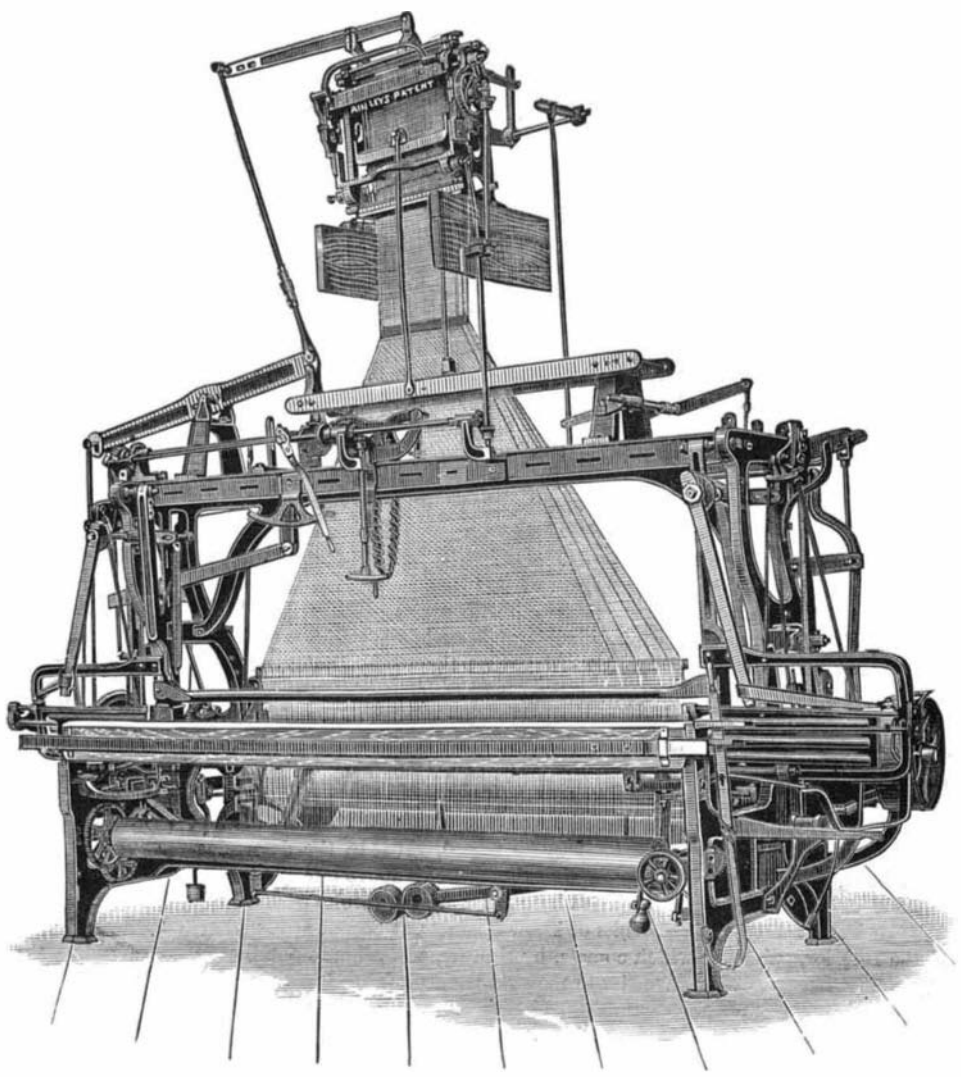
Connected with this are the other horizontal levers, one above and the other below the jacquard machine. The lever above lifts such hooks as are selected by the pattern card to be raised. The remaining hooks, supported on the descending footboard, are brought down by the other lever at one and the same time; the descending footboard being connected to the horizontal lever frame by two upright rods, one in front of the harness and one behind.

The rod shown at the right hand, from the top of the loom up to the jacquard, is for the purpose of opening and closing the card cylinder, and is worked by an eccentric on the main shaft of the loom. The rotary motion to the card cylinder is communicated by the upright shafts connected by bevel and pinion wheels with the picking and box motions in such a manner that on turning the loom either backwards or forwards the whole of the motions relating to pattern cards, shuttles, boxes, and picking are kept in their correct relative positions, an advantage which will be fully appreciated by the practical weaver.

Another great advantage is obtained by the graduated hooks and the harness tied in a beveled instead of level position, whereby the back part of the shed opens first, and consequently opens to a larger extent than the front part, thereby giving a greater and clearer space for the passage of the shuttle.

It will be at once noticed that, as the hooks in lifting have only to move half the distance of the shed required, the motion is very steady and the friction reduced to its lowest point; greater facility thus being given for speed, wherever that is desirable, combined at the same time with a perfection in the work otherwise unattainable.

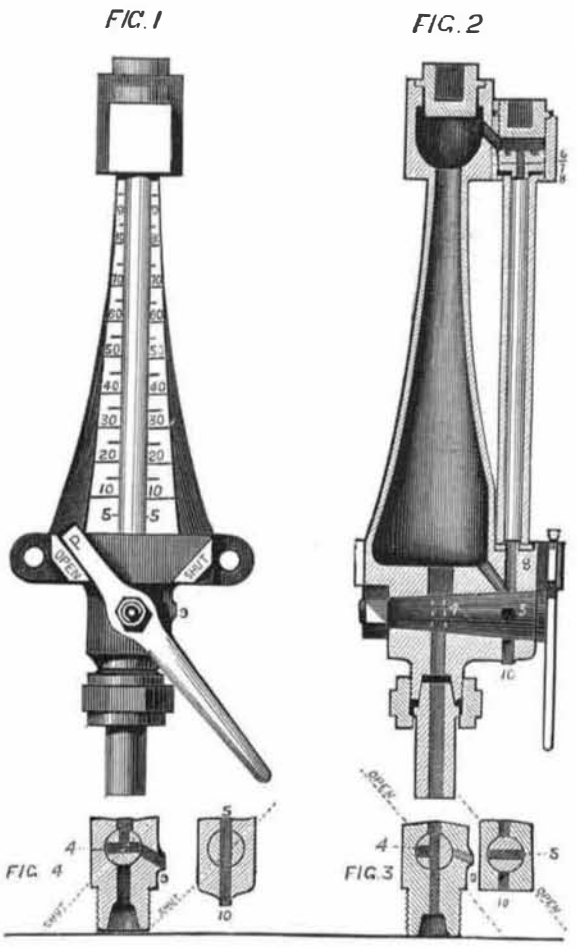
Another lever fixed on the left hand of the loom under the top rail is, by a catch arrangement, brought into action when the sheds are very variable in weight, as, where one or more picks of weft are upon the surface of the cloth, and the next on the back of the cloth. This lever, with a weight attached, is lifted with the light shed, so as to enable the loom to bring back with ease the large portion of the descended shed, thus equalizing the working motion of the loom under any varying circumstances.



AINLEY'S DOUBLE SHEDDING HARNESS JACQUARD LOOM.

ALLAN'S PRESSURE GAUGE.

We illustrate from *The Engineer* an improved form of the Allan gauge, as simplified by Mr. Alexander Allan, Jr., of Scarborough, England. The principle on which this gauge works consists in indicating pressure by the compressed condition of a measured volume of air within the gauge tube; this is acted upon by water—condensed steam—as a piston, contained in a bent pipe attached at one end to the gauge, and at the other to the boiler or vessel whose pressure is to be indicated. The gauge is a hollow pillar of brass of a differential internal capacity, connected by passages at top and bottom to a glass tube in which the surface water line indicates the pressure opposite a graduated scale. There is, as we have said, but one cock on the gauge worked by a handle with pointer, P, moved over a quarter of a circle only between two stops. The pointer, P, at "open" is open to the boiler to show pressure, and at P is "shut" for admitting a new spring of air into the gauge by apertures opened to the atmosphere. On the lower part is the usual screw union for connecting the gauge with the steam space of the boiler, by the exposed bent pipe, which will collect clear water by condensation. In order to work the gauge it is necessary to begin with the pointer, P, at "shut;" the exposed bent pipe will soon condense steam to give a supply of water, which will be known by the reduced temperature of the pipe. When sufficient water has been collected in the bent pipe, the pointer is turned to "open," when the water will rise until its level shows the pressure. The first indication may not be correct from the presence of some air in the bent pipe over the true measure; by again turning the pointer, P, to "shut," the incorrect spring and water will leave the gauge and a new spring of air will be admitted. On reopening the cock the true pressure will be shown in the glass tube opposite the index. With a supply of water in the bent pipe this test or correction can be repeated hourly, but it is not necessary to change the air spring for months.



In the accompanying engraving, Fig. 1 is a front elevation of the gauge, showing the glass tube, part index on pillar, stops "open" and "shut," handle and pointer, P, at "open" to show pressure; Fig. 2 is a side elevation in section showing passages connecting the gauge with the glass tube, the nut, 5, washer, 7, india rubber rings, 8, cock and passage, 4 and 5, and the position of 5 to 10, with pointer, P, at "open." Fig. 3 gives end sections of cock and plug at 4 and 5, in the plug, to 9 and 10, with the pointer, P, at "open;" the angular line shows the direction of the handle and pointer, P; Fig. 4 gives similar sections, and shows the position of the passages, 4 and 5 to 9 and 10, changing the air spring, and the angular line showing the direction of handle and pointer, P, at "shut."

This simple and ingenious gauge deserves more notice and popularity than it has received. The old Allan gauge has been worked with great success for many years, and the new gauge is much better in every respect.

Simple Tests for Flour Adulterations.

Dr. Himly, Professor of Chemistry at the University of Kiel, has suggested a method by means of which any person of ordinary intelligence may test the amount of adulteration of flour. It is based upon the fact that chloroform is specifically lighter than nearly all the substances usually employed for these adulterations, such as lime, chalk, barytes, plaster, marble, bone-powder, etc., while the genuine flour is again lighter than chloroform, in which none of the above named substances are soluble. The testing process is simple, and all the apparatus required is a small test tube about ⅜ inch in diameter, and 4 or 5 inches long. A teaspoonful of the flour to be tested is placed in the test glass and chloroform poured on to fill the vessel to about three quarters of its length, when it is well shaken, and then placed in a upright position, so as to remain undisturbed until the various substances mixed together have had time to find the level assigned them by their specific gravity, the flour swimming near the surface at the top of the vessel, while the mineral bodies will sink to the bottom. It should be observed that unadulterated flour often shows a slight filmy deposit of a grayish or brownish color, which it must be supposed is stone-dust, produced in grinding. A white deposit, however, will invariably indicate an adulteration with one or another of the substances mentioned above. If the materials are weighed before and after separation, the amount or degree of adulteration may be pretty accurately ascertained.

Artificial Ivory.

L' Union Pharmaceutique gives the following recipe for making artificial ivory: Two parts of caoutchouc are dissolved in thirty-six parts of chloroform, and the solution is saturated with pure gaseous ammonia. The chloroform is then distilled off at a temperature of 85° C. The residue is mixed with phosphate of lime or carbonate of zinc, pressed into moulds and dried. When phosphate of lime is used the product possesses to a considerable degree the nature and composition of ivory.

An Immense Block of Granite.

There was recently quarried without the use of powder, at the Barre granite quarries, for the use of the Oliver Granite Works, of Rutland, a block weighing about six hundred and eighteen tons, being forty feet long, seventeen feet high, and ten feet thick. This immense stone is said to be perfect in every respect, and is believed to be the largest block of granite ever quarried in the State.—*Rutland (Vt.) Herald.*