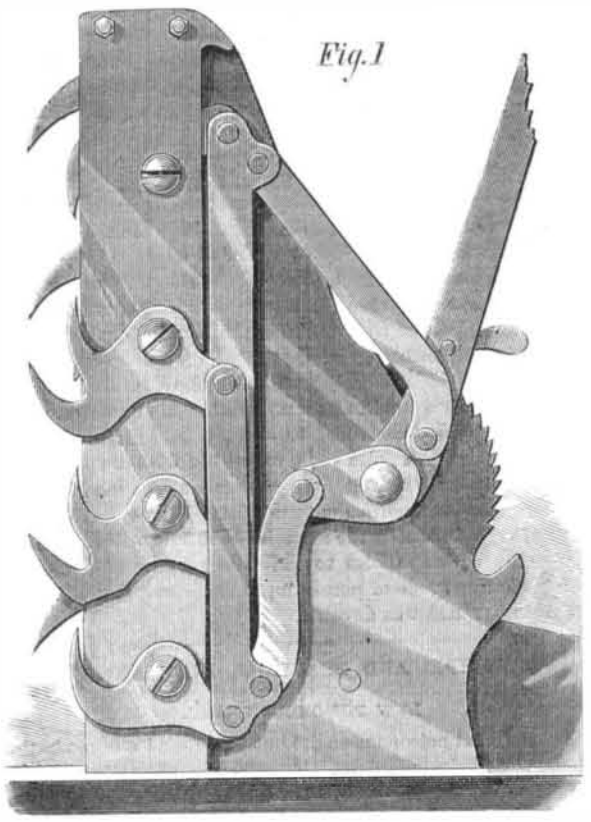
BECKWITH'S IMPROVED LUMBER DOG.

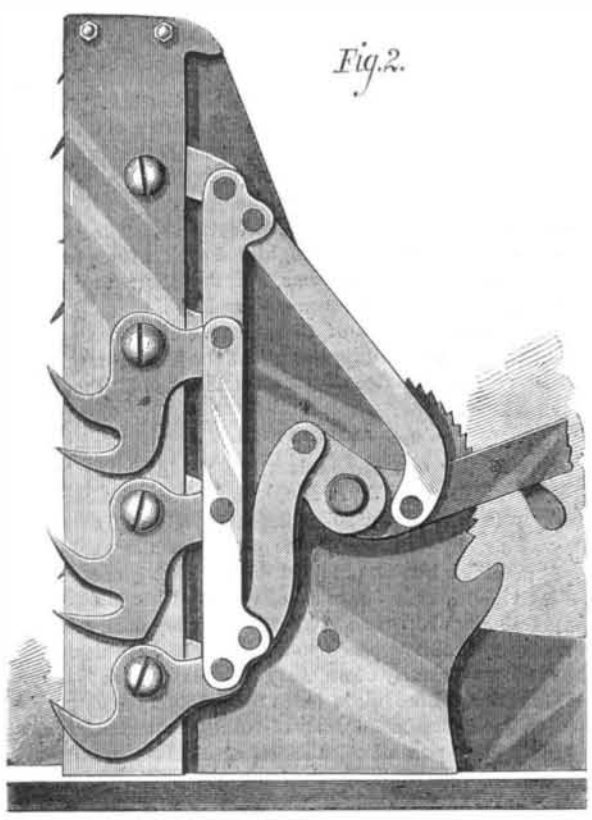
The annexed illustrations represent an improved form of lumber dog, the advantages of which are plainly set forth, and will be appreciated by those engaged in working lumber. The lever, when drawn up as shown in Fig. 1, and secured by the ratchet, thrusts two sets of teeth into the log, one pointing upwards and the other down. This arrangement is claimed to be the only one by which timber of any shape, square, round, or irregular, can be firmly seized, held, and drawn to the standard: and this advantage is secured by a very slight exertion of manual power on the lever. In Fig. 2, the device is shown with the lever down and the

Fig. 1



teeth in the normal position. These dogs may be attached to any ordinary standard. They are made of steel almost entirely. The pivots on which the teeth vibrate are solid with the bed plate, and are of cast steel one inch and an eighth in diameter. The ratchet and pawl on the lever prevent any possibility of the dogs letting go the log, and the double teeth, pointed in opposite directions, give a grip of great power. By applying a universal joint to the connecting shaft, the dogs may be attached to head blocks independent of each other, so that it makes no difference whether the standards move parallel with each other or not, as the dogs move simultaneously from the motion of one lever. The makers supply standards containing the dogs, which may be substituted for any other standard, winged or otherwise. These standards are made with wide faces; and as the teeth of the dog emerge from the center of the face, they have no tendency to spring the cant. Any size of log up to

Fig. 2.



18 inches may be sawn up from the first dogging, without rolling the log, as two teeth must enter the lumber, and these are sufficient to hold it securely. When the surface towards the dogs is wide, five or more teeth can be driven in, at the will of the operator.

Patented December 26, 1871, to N. F. Beckwith, and further protected by patents now pending. For further particulars address Messrs. Filer, Stowell & Co., Cream City Iron Works, Milwaukee, Wis.

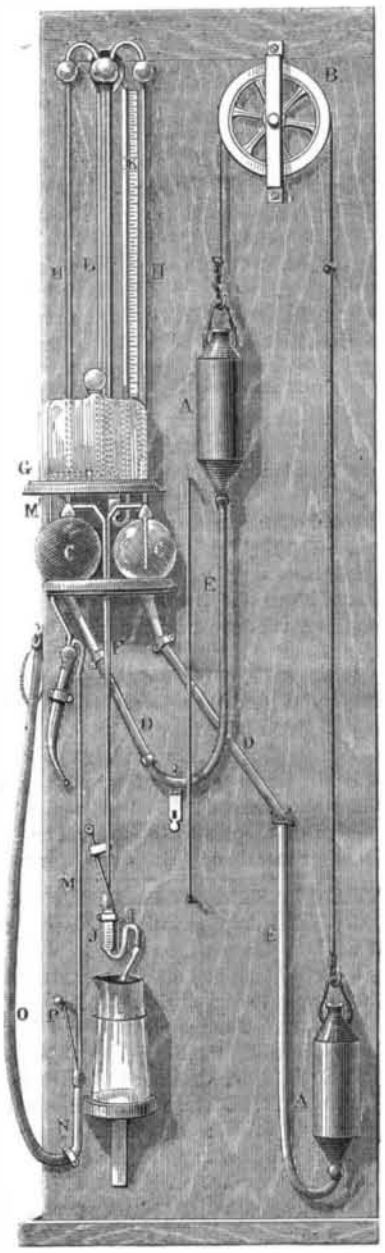
A NEW MERCURY AIR PUMP.

M. De Las Marismas has recently presented an air pump of his invention to the Academy of Sciences, Paris. It is somewhat similar to that of Mr. Sprengel, and the following advantages are claimed for it:

It is of easy and cheap construction, costing only about $7. It works rapidly and without causing fatigue. The vacuum is obtained within one millimeter (0·039 inch), in a receiver of the capacity of 1½ gallons in about four minutes. Experiments may be made at all pressures, from the atmospheric pressure up to absolute vacuum. It permits the reception of the air or gas contained in the receiver employed for experiment, and also, to within 0·039 inch, the admission of such gases as may be desired. It is self-acting, and therefore avoids all those errors incidental to the working of mercury air pumps of which the cocks are obliged to be worked by hand. Lastly, it can maintain the vacuum indefinitely.

The proportions of this machine, which are limited to the size of a laboratory instrument, may be augmented according to whatever requirements may be desired. Those parts which are constructed of glass may be made of iron, whenever it is not necessary to employ gases which attack that metal.

The following is a description of the instrument:



This machine is composed of two reservoirs of cast iron, A A, which counterpoise each other, and are supported by the pulley, B. They communicate with two glass balloons, C, by means of the glass tubes, D, and of the india rubber tubes, E. They are filled with mercury, which, when one of the reservoirs is lifted, passes into the balloon, and drives the air out of it, through the capillary tube, F, which is soldered to the top, at the same time that the other reservoir, in falling lower than 29·64 inches, causes the mercury to quit the other balloon, thus forming a barometric vacuum. The balloons communicate with the plate, G, by the glass tubes H, which plunge to within 0·39 inch of the bottom of the balloons. They are automatically closed as soon as the mercury rises within the balloons to drive out the air, and opened as soon as it retires to produce the vacuum. The air cannot re-enter the balloons by the tubes, F, after having been once driven out, because, in order to escape by the orifice, I, it is obliged to pass through a slight layer of mercury contained in the curved tube,; J and when the vacuum is formed in the balloons, the atmospheric pressure causes the mercury to mount up again in the tubes, and thus prevents the return of air. In order to receive the air or gas contained in the plate, or in the vessel to be experimented on, all that is to be done is to place the required recipient in communication with the orifice, I.

The degree of vacuum produced is indicated by the baro meter, K, which communicates with the plate by the tube, L, and enables experiments to be made at all pressures comprised between atmospheric pressure and absolute vacuum.

The return of the air is effected through the tube, M, which communicates on one side with the plate, and on the other plunges into the mercury contained in the bent tube, N. The level of the mercury may be changed by elevating or lowering the india rubber tube, O, and thus uncovering at will the extremity of the tube, M; the return of the air upon the plate is regulated to within 0·039 inch.

If it is wished to admit any other gas, the recipient containing it must be placed in communication with the tubular opening, P.

We select the engraving from the pages of the *Practical Magazine.*

DITTMAN'S IMPROVED LOCKING NUT.

The nut lock herewith illustrated, in perspective (Fig. 1) and section (Fig. 2), is so constructed as to prevent the backward rotation of the nut under the influence of jars and

Fig. 1

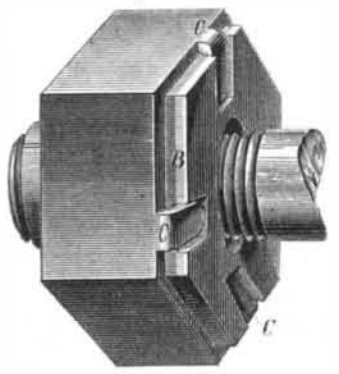
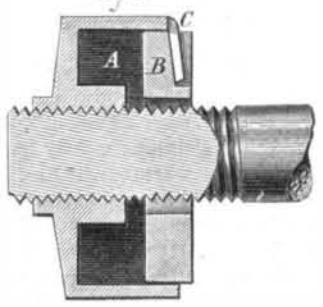


Fig. 2



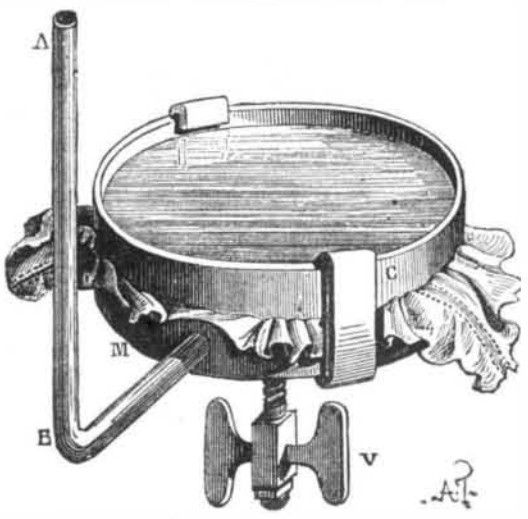
jolts, and also to take up automatically the expansion or contraction of the bolt, due to changes of temperature.

An iron nut is provided with an outer higher shell, the space between forming a chamber to receive the rubber, A. The latter extends almost to the top of the shell, and is, by the compressive force of a follower, B, expanded until it comes in frictional contact with the threads of the bolt. This prevents the nut from turning on the bolt, as the rubber serves as a lock, while the expansion and contraction of the bolt are taken up by corresponding expansion and contraction of the rubber. The washer or follower, B, has recesses inclined at the bottom and adapted to receive the lips, C, which project upwardly from the edge of the shell. This serves the purpose of holding the parts of the device together for transportation, etc., while it also locks the washer to the nut when the latter is screwed down upon a fish or other plate.

Patented through the Scientific American Patent Agency, September 8, 1874. For further particulars regarding sale of entire right during the next twenty days, or relative to licenses thereafter, address the inventor, Mr. Caspar Dittman, Leacock, P. O., Lancaster county, Pa.

APPARATUS FOR DETERMINING THE IMPERMEABILITY OF TISSUES.

We extract from *La Nature* the annexed illustration of a simple device for determining whether or not any given tissue is impermeable to gases. The utility of the device is principally found in testing silk and other fabrics used for



balloons, or for proving waterproof varnish when spread on tissues.

The apparatus is a metallic cup, M, to which a tube, A B, is affixed. The material to be tested is placed over the mouth and there strained between a band of rubber (attached to the exterior of the cup) and a ring, C, held in place by double clamps and a set screw. The fabric is then covered with water and air is blown in through the tube. If the stuff is not absolutely impermeable, minute air bubbles will make their way through and rise in the water.