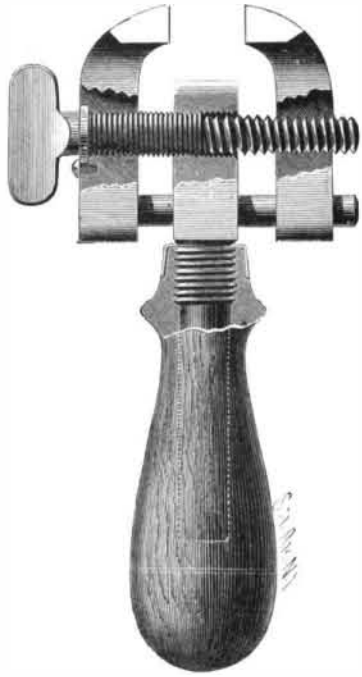


NEW HAND VISE.

The engraving shows a vise having jaws which are movable toward or from each other by means of a differential screw provided with threads of unequal pitch, the jaws being guided in their movement by a bar fixed to one of the jaws and movable in a stock and the shank of the opposite jaw. By this arrangement the opening between the jaws is always in a central position. By removing the vise from the handle it may be used in a lathe as a chuck for holding drills and other small articles, each jaw being traversed by a V-shaped



BUTLER'S IMPROVED HAND VISE.

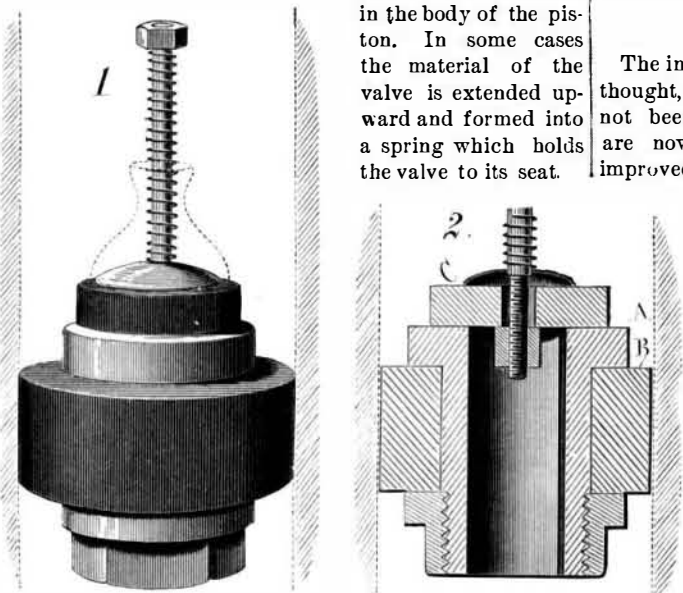
groove for receiving a drill or other tool, or for holding a pin to be filed.

This invention was recently patented by Mr. C. L. Butler, of Greenfield, Mass.

IMPROVED PUMP PISTON.

The engraving shows a new pump piston recently patented by Mr. Godfrey Miller, of Anita, Iowa. The body of the piston is a tubular casting having a flange, A, formed on its upper end and a collar corresponding in size to the flange screwed on its lower end. Between the screw collar and the flange there is a packing, B, ring of rubber or other elastic packing material, which is held in place by the collar and flange, and may be compressed endwise and expanded laterally by screwing up the collar.

A circular valve, C, of rubber is placed on the top of the piston head, and is apertured centrally so that it may move freely up and down on the piston rod. A washer rests on the valve and is pressed downward by a spiral spring surrounding the piston rod. The lower end of the piston rod screws into a crossbar in the body of the piston. In some cases the material of the valve is extended upward and formed into a spring which holds the valve to its seat.



MILLER'S PUMP PISTON.

This piston is easily expanded to compensate for wear, and is readily kept tight without undue friction. Any amount of pressure may be sustained by the piston without affecting the packing or increasing the friction. Both valve and piston are constructed so that they will remain tight and retain the water in the pump barrel. The addition of the spring to assist in closing the valve insures the retention of the greatest possible amount of water above the piston.

This piston is applicable to pumps of every description, but it is especially desirable for deep wells.

New System of Grain Transfer at Chicago.

The Chicago and Western Indiana Railroad Company are developing at the South Englewood Suburb of Chicago a new plan for transferring grain from the Western to the Eastern roads. An immense transfer house, one thousand feet long, is to be built. The loaded cars from the West

will be run into the house on a track twenty-three feet above the ground; and then with elevator shovels the grain will be unloaded into hopper scales holding a car load each, thus accurately ascertaining the weight of each car load. The grain will then be spouted into an Eastern car standing on the track below. The grain will be inspected at the yards, and the loaded Eastern cars made up into trains and started Eastward. The transfer thus made is quick and cheap, and the weighing accurate. The new house is expected to have the capacity of transferring five hundred car loads per day.

ENGINEERING INVENTIONS.

Mr. William G. Mills, of Merced, Cal., has patented an improved car-coupling, which consists of a draw-head having pivoted within it diagonally, on vertical pins, two opposite spring-actuated jaws for holding the coupling-pin. The rounded ends of said jaws are held in contact with each other centrally in the draw-head, and their outward extending ends are pivoted to the opposite ends of a knuckle-bar that is set horizontally and transversely across the top of the draw-head, and serves to lock the jaws in position.

Mr. Robert H. Dowling, of Newark, Ohio, has patented an improved car-coupling having a draw-head provided with a segmental aperture extending from top to bottom, and adapted to receive a segmental coupling-pin attached to an arm swinging on a pintle in the center of the circle of the segmental aperture, which arm is provided with top and bottom extensions. A guide-frame provided with elongated side loops and crank handles is loosely mounted on the ends of the transverse pintle, and is used to raise and guide the link.

A new feed-water heater and purifier, patented by Mr. Charles H. Shields, of Maywood, Ill., consists of a drum into which the feed-water is forced by pump or injector, which drum is connected with one end of the boiler by a check-valved pipe, through which steam and water pass from boiler to drum to heat the feed-water and cause a deposit of the sediment in the drum, and is connected with the other end of the boiler by a valved pipe through which the heated feed-water from the drum enters the boiler.

Mr. William O. Crocker, of Turner's Falls, Mass., has patented an improvement in turbine water-wheels, the object of which is to increase the capacity, speed, and efficiency of turbine water-wheels of the kind that receive the water on the outer side through perpendicular chutes, and discharge the water in a downward direction below the chutes. The wheel is constructed with a bell-shaped body having its largest diameter upward and its concave surface outward, the buckets, and the bell-shaped band having its smaller diameter upward and its convex surface inward, and having its smallest diameter equal to or a little greater than the largest diameter of the wheel-body. The wheel has other novel points which render it very efficient.

Mr. Henry Wells, of Glenwood, Iowa, has patented an improved car-coupling which consists of a flaring-mouthed curved faced draw-bar having a slotted triangular block or catch fixed centrally on its bottom within its mouth to assist in guiding and holding the coupling-link. Springs secured in the roof of the mouth assist in inclining and holding the coupling-link down and in engagement with the rear of the block or catch.

Manufacture of Oxygen Gas.

The industrial manufacture of oxygen has engaged much thought, while the uses, on a large scale, of that agent have not been very exactly determined. At Passy there are now works for producing the gas according to an improved method of MM. Brin freres, who attach the highest value to oxygen as an industrial agent, and indicate various applications of it. The process is the well-known one in which caustic baryta absorbs oxygen from the air, and gives it up under heat. By a special way of preparing the baryta, however (described in *Annales Industrielles*), they render it highly retentive of its absorbent power, obviating the necessity of frequent renewal. After four hundred operations there was (on microscopical examination) no appreciable change. The baryta is placed, at Passy, in metallic retorts connected, in groups of fifteen, in two furnaces heated with gaseous fuel. A locomotive engine drives Root blowers, which force air into the retorts; after peroxidation the oxygen is liberated by heat, and pumped into the gasometer through an apparatus which removes traces of carbonic acid. As it is found that the peroxidation takes place better with moist than with dry air, the air is passed through a saturator on its way to the retorts. For production of 5,000 cubic meters of oxygen a day in Paris, it is estimated (from the data at Passy) that the cost per cubic meter would be from 0.12 to 0.15 franc, according as coal or coke was used for fuel. The price of 100 kilogr. of baryta prepared by the new method is about 250 francs.

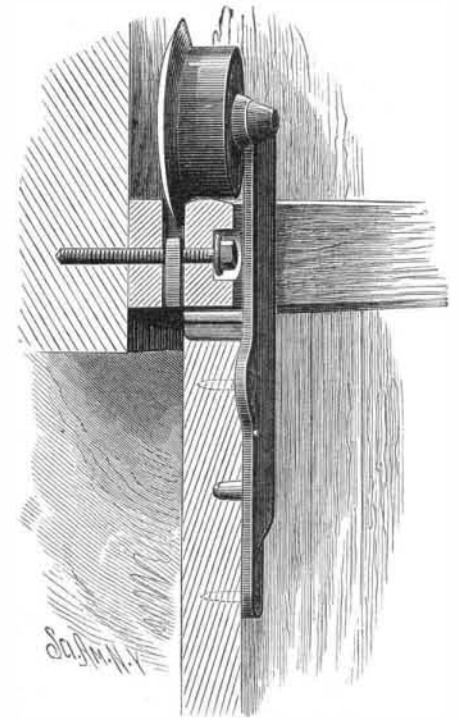
Pump Rod Counterbalance.

The Union shaft, on the Comstock, lately received a pump bob weighing 16 tons. It will carry, when in place, 30 tons as a counterbalance to the pump rod. The combined weight of the balance in the seven bobs at the Union shaft is 210 tons. The weight of the pump rod and water set in motion by every stroke of the engine is something

over 400 tons, run at a speed of from 3 to 10 strokes per minute. Four hundred tons per stroke, 2,800 tons per minute, 168,000 per hour, and 4,032,000 tons every twenty-four hours, is the weight moved by the pumping engine at the Union shaft.

NOVEL DOOR HANGER.

The engraving shows an improved roller hanger for barn doors and other heavy doors, gates, etc. The roller of the



IDE'S DOOR HANGER.

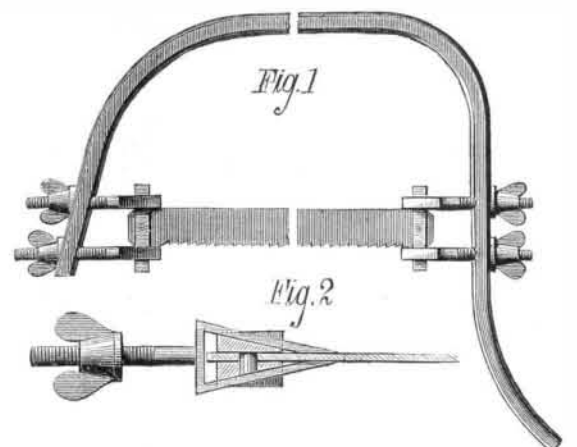
hanger has a flange beveled on both sides, which runs in the slot of the rail or track, and is capable of adapting itself to various positions while rolling on the track, without cramping or binding. The roller is pivoted in the usual way on a hanger attached to the barn door, and the outer rail upon which it runs is made slightly convex on its upper surface to permit the tread of the wheel to readily adjust itself to a good bearing. The outer rail is adjustable out and in, so that should the wooden bars forming the track become warped or sprung the track may be readily adjusted.

This form of door hanging insures the smooth running of the door, and is not liable to break should the door become loose at the bottom.

This useful improvement was recently patented by Mr. Samuel Ide, of Medina, N. Y.

NEW SAW FRAME.

We give an engraving of an improved saw frame for holding an ordinary buck-saw. The frame or bow is made of gas pipe, and the saw is clamped at each end by beveled clamping bars, two at each end of the saw, one of the bars having a pin projecting from its inner surface which passes through a hole in the saw and into a hole in the opposite bar, as shown in Fig. 2. These beveled clamping bars are inserted in the triangular eyes of bolts whose shanks extend through the bows or frame and are provided with wing nuts



BENNETT'S SAW FRAME.

which, when turned one way or the other, will tighten or loosen the saw.

By means of this device the saw is clamped securely at each end, so that it cannot twist or get out of place, and it is easily removed whenever necessary.

The frame is light, strong, and durable, and capable of being made inexpensively. It is the invention of Mr. Charles H. Bennett, of Blossburg, Pa., who may be addressed for further information.

Possible Shifting of the Course of the Lower Mississippi.

For some time a portion of the waters of the Mississippi River have escaped into the Atchafalaya River, a few miles below the mouth of the Red River. At a recent session of the House Committee on the Improvement of the Mississippi River, Capt. John B. Eads laid great stress upon the importance of closing this undesirable outlet, and predicted that if it were not closed the whole volume of the Mississippi would take that route to the sea.