

AN IMPROVED PUMP VALVE.

The illustration represents a valve of strong and simple construction, in which the valve disk is held to its place by an inclosed spring, whereby, in case the spring breaks, the pieces will be confined and not liable to injure the working parts of the machinery on which the valve is used. The improvement has been patented by George Parker, of Whiting, Ind. (box 102). The valve disk is made with a hub consisting of a thin cylinder flanged at its outer end, and the hub slides on a fixed valvestem, while surrounding the valve stem and attached to its outer end is a casing which receives in its open end the flanged end of the hub. As may be seen in the broken away portion of the engraving, a spring coiled on the stem within the casing presses on the flanged end of the hub. The space between the valvestem and the casing also forms an air chamber or cushion pocket which gives easy movement and assists in the quick closing of the valve.

AN IMPROVED WOOD BENDING MACHINE.

The engraving represents a machine capable of bending the lightest fellies used for carriage wheels up to the heaviest work required for farm wagon, truck and artillery wheels, bending hard wood as large as 5 inches in thickness and 12 inches in width, with adjustments to accommodate changes from 24 inch to 72 inch circles. The machine is made by the Defiance Machine Works, Defiance, Ohio. The frame is 9 feet 9 inches high, and the floor space necessary to accommodate it is, length 14 feet, greatest width 6 feet, lesser width 4 feet. A foundation of masonry is not required under the machine, as an average floor well supported is sufficient.

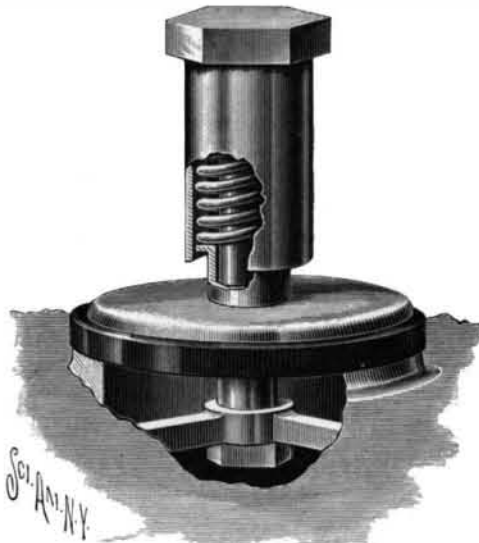
The machine embodies a new feature in the application of power, the object being a drastic longitudinal stress upon the timber to be bent, which is secured by means of an elastic cable railway held taut by four powerful springs which are capable of exerting an aggregate energy of six thousand pounds. Upon this railway roll the trucks by which are carried the inner or lower ends of the levers or bending arms. The

levers or bending arms form a level table when down, and are covered with a master strap to receive the straight material. They are of cast iron, made hollow and strongly re-enforced by trusses. The head blocks mounted upon their upper surfaces are furnished with an automatic, eccentric releasing device to release the augmenting end thrust which occurs during the process of bending. The cable chain which operates the bending arms of levers is fastened to their outer ends, passing over the sheaves at the top of the frame downward to a drum on which the chain is wound.

The chain drum is driven by a powerful worm screw and gear. To the outer end of the screw shaft two frictional clutch pulleys are fitted, one used for running the bending levers up, and it is driven with a 6 inch belt, the other with a 4

inch belt for backing the arms down, and they should revolve in opposite directions.

The forms for the bending of fellies are of cast iron turned true and with a collapsible section at each end of the arc to secure the easy removal of the stock after bending, and enabling the use of stock about 9 inches shorter than can be bent with an ordinary form, which



PARKER'S PUMP VALVE.

effects a large saving in material. A wooden cap is used on top of the form, which is of the same length as the diameter of the form, and it is always taken off with the bent wood, requiring one cap for each batch of timber bent, and it must be left in until the batch of timber is cold and thoroughly set, so as not to spring when the shackle is taken off. The forms are held on a sliding head stock, having a vertical movement by means of which the timber can be firmly held at the initial point of bending, thus securing it against

fracture on the outer arc and preventing it from retreating from the form at that point. After the operation of bending is completed the machine can be set to run down to the position for the succeeding operation and automatically arrested. The capacity of this machine is sufficient to bend about 2,500 fellies about 1½ inches, or about 1,200 wagon hounds in ten hours, and other classes of work in proportion.

X Rays and the Aurora Borealis.

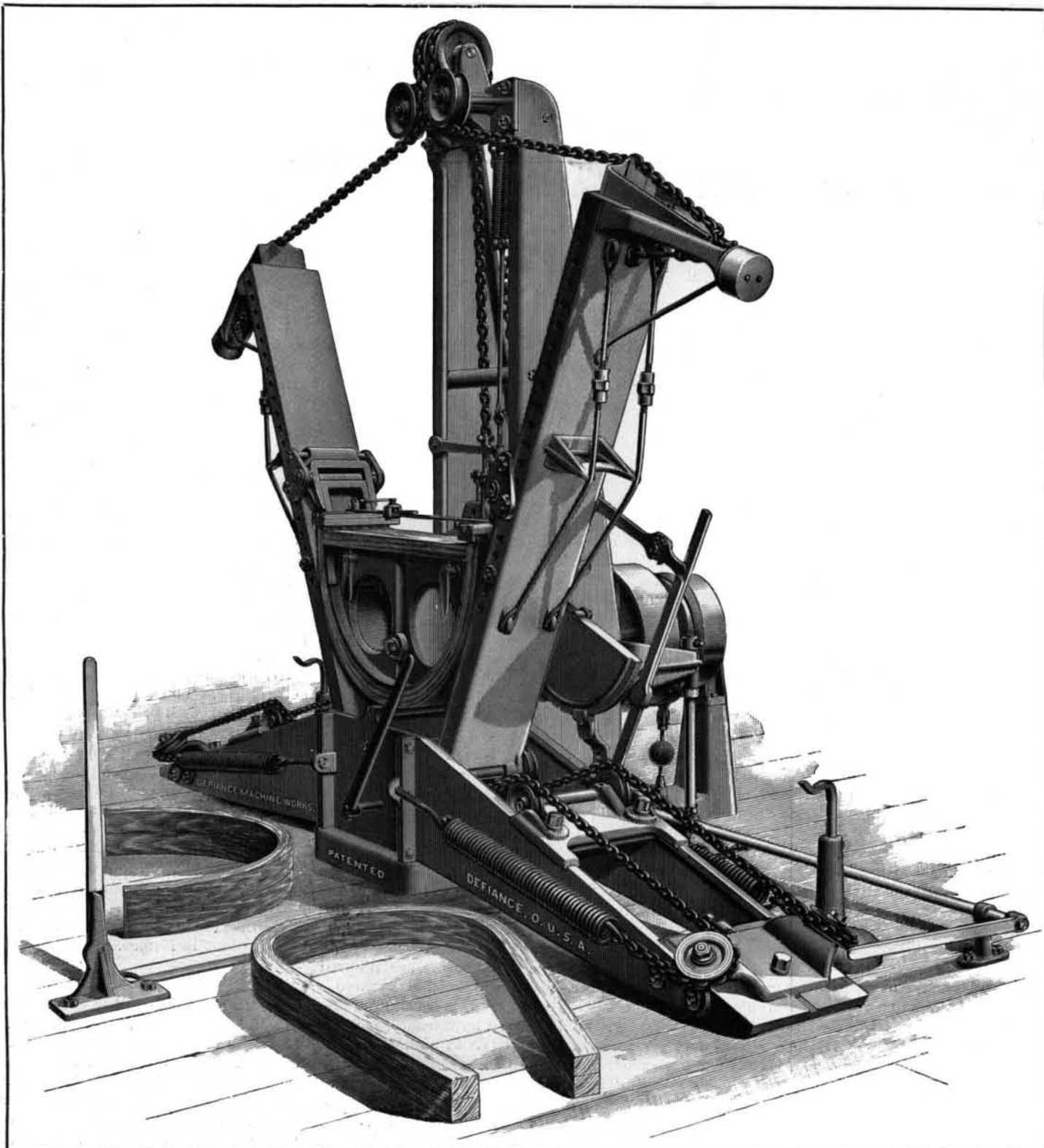
The following abstract of a note on this subject in *L'Electricien*, Paris, appears in the *Electrical Review*: "A series of experiments of the greatest interest, relative to the action of a powerful magnetic field upon the cathodic rays in Crookes or Hittorf tubes, has been undertaken by Mr. Birkeland, who has published the results thereof in the *Elektroteknisk Tidsskrift*, of Christiania. These experiments show that in such a field the cathodic rays are considerably deflected in the direction of the lines of force, and may even be concentrated upon the surface of the glass to such a degree as to cause the fusion of the latter. Much more than this, they clearly prove that the rays that emanate from one and the same cathode fall in groups whose physical constants are connected by some definite law, just as are the frequencies of the different tones emitted by a rod in vibration. These researches present some importance as concerns the theory of the aurora borealis. As well known, Mr. A. Paulsen, the learned director of the Meteorological Institute of Copenhagen, claims that the aurora borealis owes its origin to the phosphorescence of the air produced in the upper regions of the atmosphere. Mr. Birkeland puts forth the idea that terrestrial magnetism may be the cause of such phosphorescence, which becomes intensified in the vicinity of the terrestrial poles."

The Bacteriology of Arrow Poison.

The natives of the New Hebrides render themselves a terror to their enemies by using poisoned arrows, the tips of which they smear with earth from certain marshes. M. Dantec has made a bacteriological study

of these poisoned arrows, and finds that their fatal properties are due to the presence, in the earth with which they are smeared, of two deadly germs—a septic vibron and the microbe of tetanus. The first of these produces death from malignant edema in twelve to fifteen hours. In cases in which a septic vibron has lost its virulence, the tetanus bacillus which is present proves equally, although less speedily, fatal. This observation of M. Dantec proves the incorrectness of the former theory that the tetanus bacillus is derived from a horse, since this animal is unknown in the New Hebrides Islands.—*Modern Medicine.*

A THIRTY knot torpedo boat destroyer, the *Capitan Orella*, built by the Lairds for the Chilean government, made an average of 30.17 knots on her trial trip on the Clyde.



A 12 INCH AUTOMATIC RIM AND FELLOE BENDING MACHINE.