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Improved Adjustable-Jaw Vise.

The machinist, the blacksmith, the jeweler, and the workers at some other trades, know the value of a good vise. The vise-man in the machine shop who has a clean, well-ordered bench, a drawer of well-assorted files, gages, straightedges, etc., and above all, a reliable vise, ought to be satisfied with his means of working or—ought to quit the business. Yet, although each variety of vise with which we are acquainted possesses some advantage peculiar to itself, we have never seen one that appears to combine them all so completely as the one herewith represented.

The inventor cites these as the principal objections to the parallel vises now in use: "So constructed that a loss of squeezing power of about twenty per cent is sustained; not adapted to the same hight in all vises, while the rule for the elevation of the top of jaws is the level of the bend of the workman's elbow; the strain, concentrated at one point, increasing the possibility of easy breakage by hard use, having no elasticity, too much rigidity, and considerable wear to screw and nut; having nothing to receive the concussion of a blow; loss of motion, the screw sometimes making an entire revolution or more, before the jaws answer."

It is a leg or post vise, sustained both by the bench and floor, making it solid and firm, by which the full force of the blow is obtained, while it is adjustable in every direction required by the necessities of the work. The foot pivots in a step screwed to the floor, and the rear jaw has a semi-circular ear through which passes a screw bolt, the head of which moves in the segmental slot of a plate screwed to the top of the bench. This permits the whole vise to be swung in a horizontal plane, so as to present the jaws to the edge of the bench at any angle desired, when it may be held firmly by the bolt. The advantage of this is too apparent to the workman to require more than a reference to it.

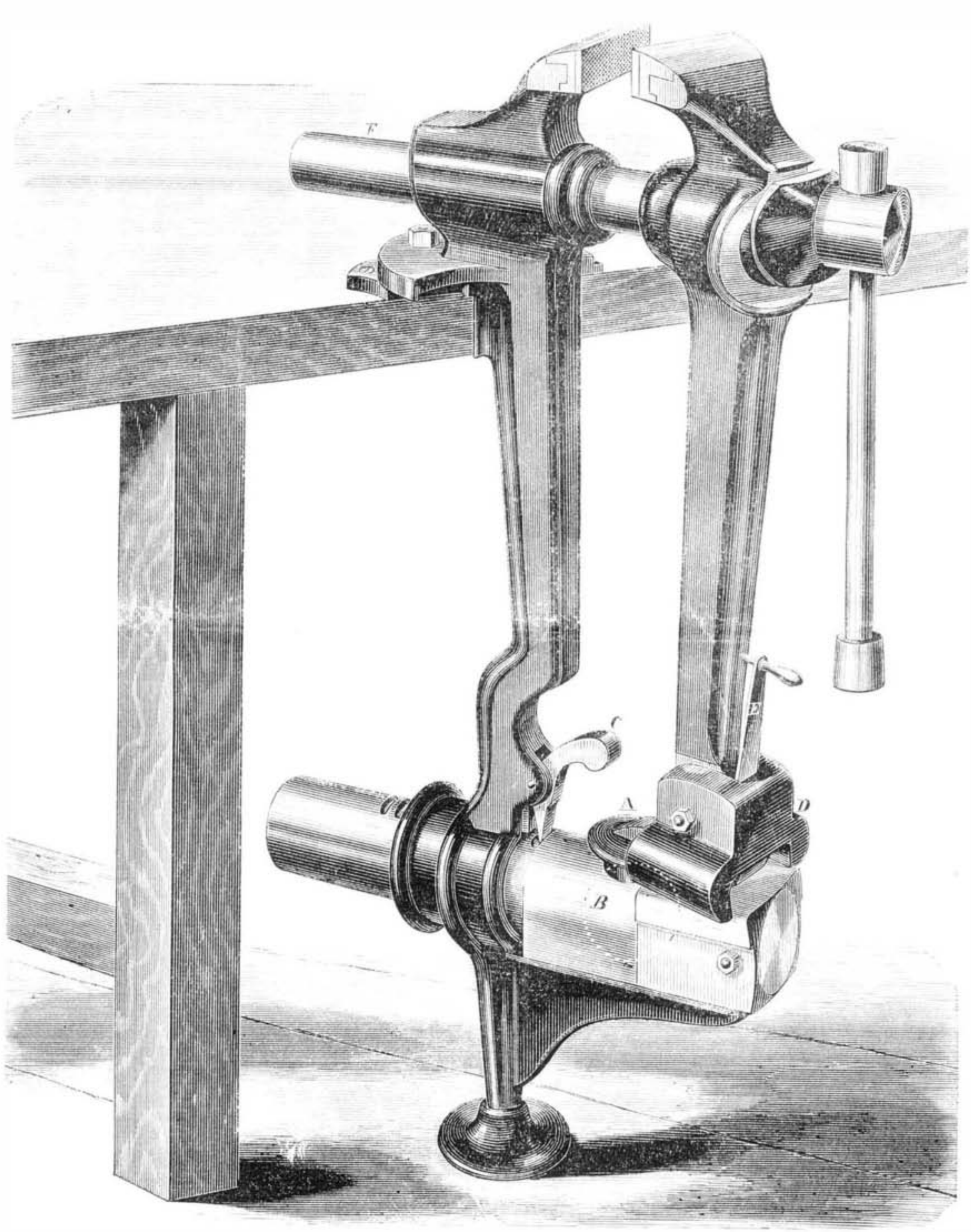
The front jaw has an offset, A, carrying a ball and socket joint inside the hollow sliding bar, B, that permits the jaw to swing in the usual manner, and also to be turned at an angle to the back or fixed jaw, this latter movement being intended for holding work, the sides of which are not parallel, as a key, etc. To permit this motion, the eye of the front jaw through which the screw sheath passes is made flaring, or trumpshaped, at the front. On the front jaw, encircling the screw, is a saddle washer, the inside of which is made to conform to the outside of the jaw face, so that in whatever position the jaw may be placed, this washer has a perfect bearing.

The sliding bar, B, may be moved in or out by sliding it through the collar in the lower part of the fixed jaw, and is held in position by a pivoted dog, C, the point of which engages with notches cut on the top of the sliding bar. This allows the foot of the movable jaw to be kept parallel with the faces of the jaws, and to be accommodated to the diameter of the work to be held. The spring that throws this jaw out is concealed in the hollow bar, B, and it acts in whatever position the jaw may be. The bar is sustained by a projecting shelf forming a portion of the fixed jaw, strengthened, as seen, by a flange underneath.

When the jaws are parallel they are held in that position by a clutch, D, on the front jaw that slides down and embraces, with its side projections, the squared portion of the sliding bar. When raised to permit the jaw to be set at an angle, it is held by a spring catch, E. The screw is at all times protected from chips, filings, or dirt, by the sheath, F, which is rigidly secured in the back jaw. The offset, A, does away with lost motion, the instant the screw is started the jaws moving simultaneously

The jaws proper are of the best cast steel, reinforced with Swedish iron, and milled to a gage. They are fastened with tapering steel pins and are made interchangeable, so that if they break or wear out they may be replaced at half the cost of annealing, re-cutting, and re-tempering the old style.

It will readily be seen that the strain is equally distributed from the top to the bottom of the vise, and the friction in working is reduced to the minimum. In strength, durability, handiness, and elegance, this vise has certainly no superior. These vises are made of all sizes from eight-inch jaws to jewelers' size. They are made of a combination of Lake Superior, and other ores well known for their toughness, strength, and resistance to percussion. Every vise is put to a test, three times as much as it is intended for in use, before it is sold.



GARDNER'S PATENT "NEW YORK" VISE.

Patented by O. H. Gardner, and made by the Fulton Manufacturing Company, to whom all orders should be addressed at Fulton, N. Y.

ON THE THEORY OF THE LUMINOSITY OF FLAMES.

In 1817, Sir Humphrey Davy published his theory on the causes of the illuminating property of flames. He stated that this phenomenon was due to the presence in the midst of the flame of solid particles which, undergoing partial combustion only, were rendered incandescent. In a candle these were supposed to be solid particles of carbon.

Recent experiments made by Dr. Edward Frankland seem to have entirely overthrown this theory. According to the researches of this eminent chemist many very brilliant flames exist in nature which cannot possibly contain any solid matter whatever.

If, says he, metallic arsenic be burned in oxygen gas it produces a most intense white light. It is, however, well known that metallic arsenic is volatilized at a temperature of 180° C., and that the product of its combustion itself, arsenious acid, is also vaporized at 218° C., while the temperature of incandescence of all solids has been proved to exceed 500° C., so that in this instance no solid particles could possibly exist in the flame.

The vapor of sulphide of carbon burned in oxygen gas or oxygen burned in sulphide of carbon produces a light so intense that the eye can scarcely bear it, and yet we are certain that no solid particles of matter are to be found here. The temperature of ebullition of sulphur, 440° C. is much below that of the flame produced in the above case.

If protoxide of nitrogen be substituted for oxygen in this experiment the result is identical; the light created possessing sufficient intensity for the taking of instantaneous photographs or for producing the phenomena of fluorescence.

Few bodies ignited in oxygen gas emit a more powerful light than phosphorus. The product of this combustion is phosphoric acid, which is gaseous at a red heat, and which could not possibly have contained solid particles at the temperature of a flame which is capable of melting platinum.

The conclusions arrived at by Dr. Frankland are that it is not solid particles which produce luminosity, but that the intensity of a flame depends on the radiation of dense but transparent hydrocarbon or other vapors. As a corollary to this theory he expresses his opinion, based on experimental researches, that a flame becomes luminous at a lower degree of temperature the denser the gases which enter into its composition, and he further infers that this luminosity is to a great extent independent of the nature of the vapor or gas, so that a gas which would burn without producing light at the pressure of the atmosphere, would become luminous, if submitted to a sufficient degree of compression.

In order to prove these facts, Dr. Frankland caused the combustion of jets of hydrogen gas and of carbonic oxide gas to take place in oxygen gas under gradually increasing tensions up to twenty times that of the atmosphere. This he did in very strong iron vessels furnished with thick glass windows which allowed him to witness what occurred in their interior.

Hydrogen gas, when burned in oxygen at the pressure of the atmosphere, gives a very feeble light. Under a pressure of two atmospheres this light is very noticeably increased, and at ten atmospheres a newspaper can be read at a distance of two feet without a reflector. Examined with the spectroscope the spectrum of this flame was bright, perfect, and continuous, from the red to the violet.

The intensity of an electrical spark sent through a gaseous medium is also proportional to the density of the gases, being weak in hydrogen gas, greater in oxygen, and very considerable in chlorine, sulphurous acid gas, etc.

A series of sparks from a powerful induction apparatus passing through air confined in a closed glass tube connected to a force pump, becomes brighter and brighter as the compression of the air is increased, and diminishes gradually in brilliancy as the air is allowed to escape.

The electrical arch, produced by fifty couples of a Grove battery, is much increased when the vapor of mercury is allowed to intervene between the points of carbon of the electric lamp.

The experiments of Frankland have elicited great attention from men of science, and a controversy is at present taking place on the subject at the Academy of Sciences, in Paris, where M. Sainte-Claire Deville affirms that H. Davy's theory is not subverted by the new discoveries, but that the facts