(No Model.) 2 Sheets—Sheet 1.

M. G. LEWIS.

BENCH VISE.

No. 279,260. Patented June 12, 1883.

FIG. 1.

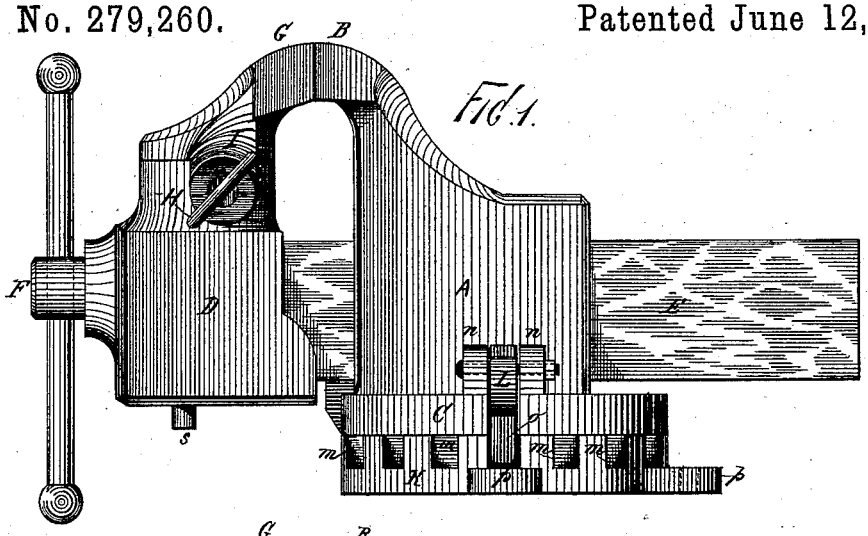


FIG. 2.

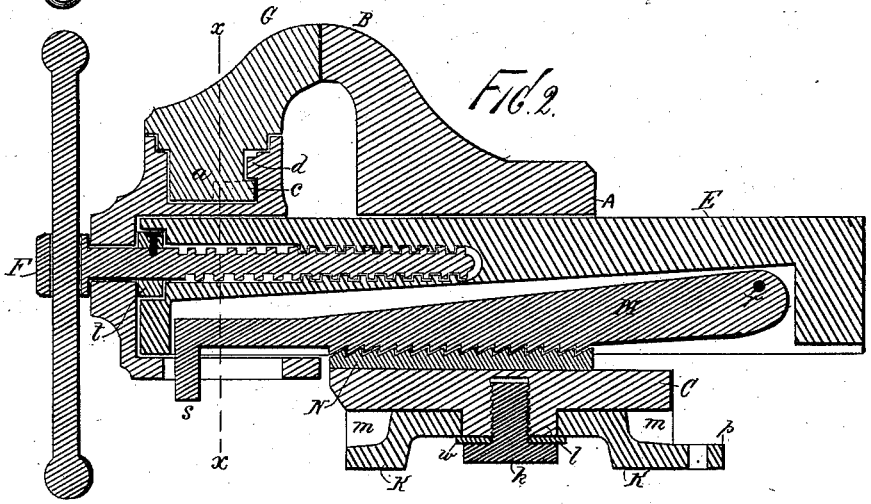
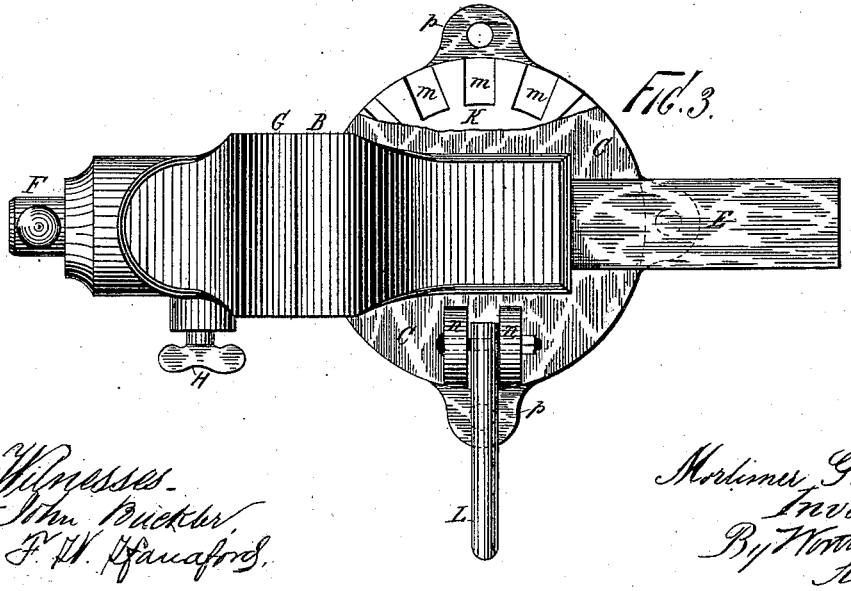


FIG. 3.



Witnesses.
John Buckler
F. W. Hancock.

Mortimer G. Lewis.
Inventor.
By Wm. Aspinwall
Attorney.

(No Model.) 2 Sheets—Sheet 2.

M. G. LEWIS.

BENCH VISE.

No. 279,260. Patented June 12, 1883.

FIG. 4.

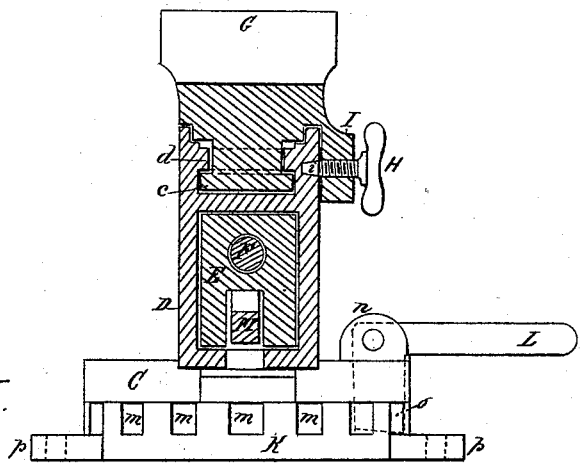


FIG. 5.

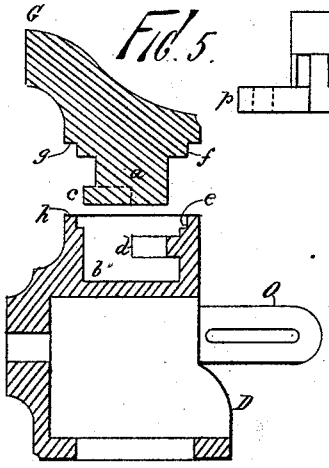
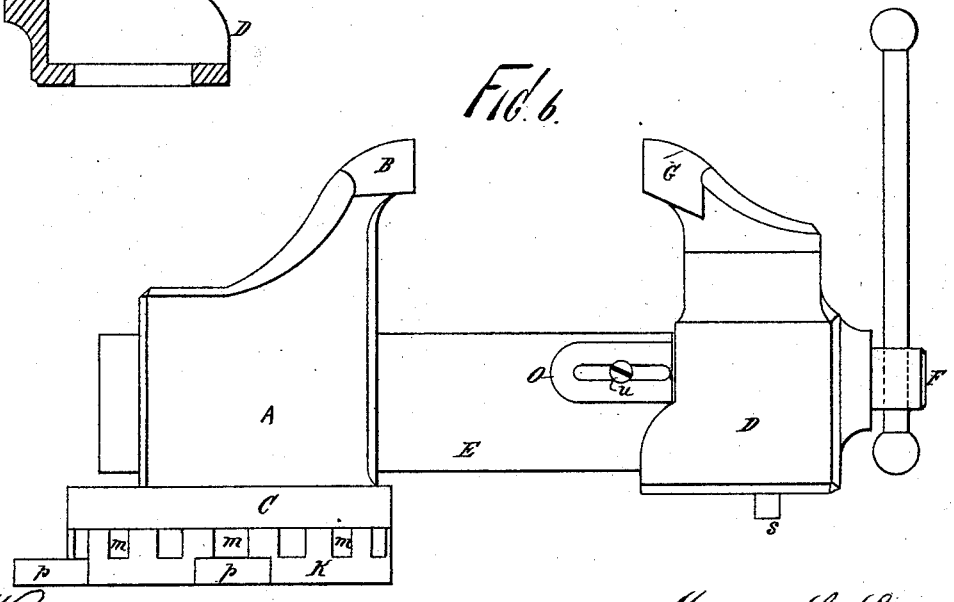


FIG. 6.



Witnesses.
John Buckler.
F. W. Hanaford.

Mortimer G. Lewis
Inventor.
By Wm. Edgecomb
Attorney.

UNITED STATES PATENT OFFICE.

MORTIMER G. LEWIS, OF LOWVILLE, NEW YORK.

BENCH-VISE.

SPECIFICATION forming part of Letters Patent No. 279,260, dated June 12, 1883.

Application filed September 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, MORTIMER G. LEWIS, of Lowville, county of Lewis, and State of New York, have invented certain new and useful Improvements in Bench-Vises, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention has relation to bench-vises, and particularly to the construction and arrangement of the adjustable jaw, by which the inclination of the bearing-faces of the two jaws with respect to each other is varied, in order that articles with sides not parallel to each other may be clamped and firmly held; to means for setting and holding the adjustable jaw when required; to the swivel connection with the bench, whereby the entire vise may be turned as convenience may demand; and to the means of adjusting the slide-bar and the vise-head upon the bar, and indicating and limiting the position of the head with respect to the bar.

The purposes or objects of my invention are to provide the vise with a strong and durable jaw having the required adjustability about a vertical axis, and a seat therefor with extended and protected bearing-surfaces, so as to insure a firm, unyielding grasp upon the article clamped, and one not likely to become damaged by hard usage or heavy work, or clogged up by chippings or filings, the joint being simple and inexpensive and permitting the ready removal of the jaw from the vise-head; to provide a simple, efficient, and handy means of setting and holding the movable jaw parallel with the other when required; to provide a foundation for the vise, having a swivel connection therewith, and simple positively-acting means for securely holding the vise in any position to which it may be turned; to provide a simple, strong, and durable ratchet-lever for holding the slide-bar in any position to which it may be readily and quickly set; and to provide a simple and convenient indicator by which the position of the head with respect to its limit of adjustment may be accurately and instantly determined, and the head be prevented from being accidentally displaced.

To accomplish all of this my improvements involve certain novel and useful peculiarities of construction and relative arrangements or combinations of parts, all of which will be herein first fully described, and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a bench-vise constructed in accordance with my invention and embodying my improvements. Fig. 2 is a vertical section, and Fig. 3 a top or plan view. Fig. 4 is a cross-section and elevation upon a plane passing through line *x x* of Fig. 2. Fig. 5 is a section and elevation showing the adjustable jaw and front vise-head detached from each other and from the slide-bar, the jaw being represented as turned into position ready to be inserted in the socket prepared for it in the vise-head, and showing the indicator in position upon the head. Fig. 6 is an elevation of the vise, showing the side opposite to that shown in Fig. 1, the jaws being represented as opened, and the front jaw, which is adjustable upon the movable slide-bar, being represented as occupying a position intermediate of its limits of adjustability.

In all these figures like letters of reference indicate corresponding parts.

A is one head of the vise, carrying the jaw B, and intended to be mounted upon the bench. It is capable of being turned by reason of the application thereto of a swivel connection, which will be hereinafter explained.

D is the traveling head of the vise, mounted upon a slide-bar, E, and adjustable back and forth upon said bar by means of the screw F, which turns within the bar and carries the head D back and forth, accordingly as the screw is advanced or retracted. The jaw G is cast or otherwise formed with a pillar, *a*, intended to enter a socket, *b*, formed for it in the top of the head D. At the base of *a* is a projecting half-ring or shoulder, *c*, and within the socket *b* is a corresponding interiorly-projecting half-ring or shoulder, *d*. A recess, *e*, in the upper part of the head D accommodates a corresponding enlargement, *f*, upon the jaw G, and the ledge *g* rests or bears upon the upper face, *h*, of head D. The jaw being

turned with respect to head D, as represented in Fig. 5, its pillar may be inserted in the socket provided for it. Then, upon turning the jaw, the flange or half-ring *c* passes under flange *d*, the upper face of the former bearing against the under face of the latter, and the two parts are thus securely held so as to permit movement of the one with respect to the other only in the desired circular direction.

To make the parts with little expense I cast the jaw and head substantially in the form represented in Fig. 5. Then, for all ordinary forms of vises, it will be only necessary to finish up the bearing-faces of *c* and *d*, seat *h*, and ledge *g*. All the work of finishing is circular, and may be readily accomplished on an ordinary lathe, whereby much expense is saved.

The pillar is made large and strong, and the bearing-surfaces are so extended as to afford a firm seat for the jaw, (the face *g* being a complete circle and the flanges *c* and *d* half-circles,) insuring perfect steadiness, under heavy work or blows, in whatever position the movable jaw is likely to be turned. The jaw completely covers the socket, so that clippings or filings are excluded from the joint, and the jaw thus kept free and clear to be easily moved whenever required. The projecting half-ring at the base of the pillar affords an extended bearing against the under surface of the half-ring upon the interior of the socket in all positions to which the jaw is likely to be turned for use. The jaw is always free to turn automatically as soon as brought to bear against any inclined or irregular piece of work, and does not require an adjusting or tangent screw, as in some forms of vices. The provision of the projecting half-rings, as described, also obviates the formation of a groove in the pillar, enables one to instantly locate the jaw or disengage it by simply turning it, (face to the rear,) and then lifting it up, and the joint is always firm, durable, and steady, not being liable to damage or wear, as in the styles of vises in which the swivel-jaw is held by a movable plug or screw.

To set the jaw G (as is sometimes required) I employ a screw, H, amply large and strong for the purpose. This screw passes through a tang, I, depending from or formed with the movable jaw, and so located as to be protected by the overhanging end of said jaw, at the same time arranged so as not to interfere with the free movements of the jaw when the screw is loosened. Being connected with the jaw, the tang and its screw are protected at all times, no matter what the position of the jaw may be.

To hold the jaw firmly, as well as to facilitate the seating of the screw, it (the screw) is provided with a slightly-conical head, *i*, entering a correspondingly-tapering perforation made for it in the wall of the head. Under this construction it will readily appear that by setting the screw firmly in its place the jaw will be forced to assume its proper parallel position, and this with a degree of accuracy not attainable by other means heretofore commonly employed. The conical head *i* prevents accidental unturning of the screw by reason of the friction against the walls of its conical socket, and it automatically adjusts itself to correspond with any wear. The screw being (so to speak) wedged to its seat, the jaw is held so firmly as to prevent that jar or play of the parts by reason of which undue wear is produced upon the holding contrivance. The use of the conical socket and conical screw-head renders it easy to apply the screw, obviating the necessity of accurately setting the jaw, as would be required in case a cylindrical socket and screw-head were employed, and this is particularly advantageous because of the fact that the screw-socket is concealed when the screw is in position to be adjusted. Both the vise-jaws may be similarly arranged to turn upon vertical axes, if desired.

The head A is slotted to accommodate the slide-bar E, and is mounted upon a circular base-piece, C, covering the bed-plate K. The base-piece C is provided with a central boss or stud, *l*, fitting a circular aperture in the bed-plate, and the two plates are connected by the bolt *k*, which enters the boss, an ordinary washer, *w*, being employed to reduce friction. The union thus made permits the vise to be revolved upon its foundation, and at the same time affords a solid, simple, cheap, and durable joint between the two parts. To hold these parts in any position to which they may be relatively adjusted, the bottom plate is provided with a series of radial apertures or recesses, *m m*, &c., and the plate C carries a hand-lever, L, hinged thereon, as between the standards *n n*, and provided with a projection, *o*, adapted to enter the said recesses. By elevating the end of the hand-lever the projection *o* is disengaged from the bottom plate, when the vise may be turned, using the lever to assist the operation. Upon depressing the lever the projection *o* enters one of the recesses and securely locks the vise upon its foundation. To facilitate engagement of the lever the projection *o* is made slightly wedge-shaped. The plate C covers the series of recesses, whereby they are kept free of chippings, &c. Suitable ears, *p p*, afford means for securing the vise upon the bench.

The bar E is slotted on its under side to accommodate the ratchet-lever M, hinged therein at the rear, as at *r*, and at a point well elevated, so that any pressure upon the hinge will tend to force the other end of the ratchet-lever down, or crowd it into closer contact with the rack, with which its teeth engage.

A rack-bar, N, suitably secured upon plate C, has teeth or serrations to correspond with those upon lever M.

A finger-piece, *s*, projects down through an elongated slot in the bottom of head D, convenient to the hand of the operator.

It will be readily understood that by elevat-

ing the ratchet-lever by the finger-piece the slide-bar will be free to be rapidly drawn out. The teeth are preferably so cut that the slide-bar may be pushed in without raising the ratchet-lever. The harder the work is compressed between the two jaws the tighter will the ratchet-lever and rack-bar be forced together, so that there is no danger of the slide-bar slipping. The finger-piece, being out of the way, (beneath the vise-head,) will not be accidentally moved, and when the bar is set to any position the ratchet-lever automatically falls into adjustment with the rack-bar. These are marked advantages over the friction-clamps heretofore proposed for holding the rapidly-movable slide-bar.

By use of the quick-setting slide-bar the jaws are brought nearly to their required clamping position, as is well understood. The clamping is completed by use of the gathering-screw F, which moves the front jaw upon the slide-bar. The socket in the slide-bar for the reception of screw F is made plain for a short distance from the front end, and large enough to admit of the ready insertion of the screw. Beyond the plain part is the female screw, well removed from the end.

At *t* is the usual collar upon the gathering-screw. The movement of the head D upon bar E is called the "gathering movement." The position of the head with respect to the end of the bar cannot be seen, and it becomes important to provide means for determining this position, so that when the vise is in use the head will not be drawn out too far, nor yet moved in too far; otherwise sufficient play might not be afforded in one direction or the other to admit of the proper gathering after the vise-head has been set by the ratchet-lever.

Upon the movable head D, and preferably upon the left side of the vise, as indicated in Fig. 6, I secure a thin strip, O, slotted as shown, and arranged to move in close proximity to the side of bar E. In the bar is embedded a pin or screw, *u*, which projects through the slot in strip O, and serves to indicate the position of the head with respect to the bar E, and also serves as a detent, by which the head is prevented from being accidentally withdrawn from the end of the bar. The pin is intended to be kept at about the middle of the slot, when the head will be in position to be either advanced or retracted, as occasion may require, when the work is to be clamped by turning screw F. This attachment is simple and effective, is always within view of the operator, and in no way interferes with the proper working of the vise. To remove the head the pin *u* is first disengaged from the bar.

The improvements as above explained will be found to admirably answer the several purposes or objects of the invention as previously set forth.

I do not desire to be understood as making any claim herein, broadly, to cover the "combination of the socketed vise-head having the plain bearing-surface on top, and the movable jaw provided with the bearing-ledge resting upon said surface and covering the socket, the two parts being locked together by the two semicircular projections or half-rings, and arranged to turn one freely within the other," this combination not being of my original invention.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bench-vise, the vise-head, socketed as explained, in combination with a pillar upon the jaw, provided with an interiorly-projecting half-ring located above the bottom of the socket, a circular recess above the half-ring, and a circular seat for the jaw upon the top of the head, and the movable jaw combined with said vise-head, substantially as shown and described.

2. In combination with the movable jaw, the setting-screw mounted in a tang upon one side of the jaw, and provided with a conical tip made to engage with a corresponding tapering perforation in the side of the vise-head, substantially as and for the purposes set forth.

3. In combination with the socketed vise-head and the movable jaw mounted thereon, the depending tang for the setting-screw, located and arranged upon one side of the jaw, as explained, so as to be protected by the overhanging end of the jaw, the said tang being movable with the jaw and around the upper part of the socketed vise-head, substantially as and for the purposes set forth.

4. In a bench-vise, the foundation or bottom plate provided with a series of radial recesses adapted to receive a projection upon the setting-lever, said lever being hinged upon the base of the main vise-head, and the latter arranged to turn upon the recessed bottom plate, substantially as shown and described.

5. The combination of the bottom plate, recessed as explained, the base of the vise-head swiveled thereon by the boss and holding-bolt, and the projecting hand-lever hinged upon the base of the vise-head and arranged to lock the two parts together, substantially as and for the purposes set forth.

6. In combination with the slide-bar, a ratchet-lever hinged thereon, and arranged to engage with a stationary rack-bar upon the base, said lever being provided with a projecting finger-piece, substantially as shown and described, and for the purposes set forth.

7. In combination with the adjustable slide-bar and the movable vise-head mounted thereon, an indicator-plate attached to and movable with the vise-head, and arranged to show the position of the head with respect to the end of the slide-bar, substantially as and for the purposes set forth.

8. In combination with the movable head

mounted upon the adjustable slide-bar, the indicator-plate, slotted as explained, and connected with the head, and the pin or detent applied upon the bar and working in the slot in the indicator-plate, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

M. G. LEWIS.

Witnesses:
JOHN BUCKLER,
WORTH OSGOOD.