(No Model.) 2 Sheets—Sheet 1.

G. A. COLTON.

VISE.

No. 320,224. Patented June 16, 1885.

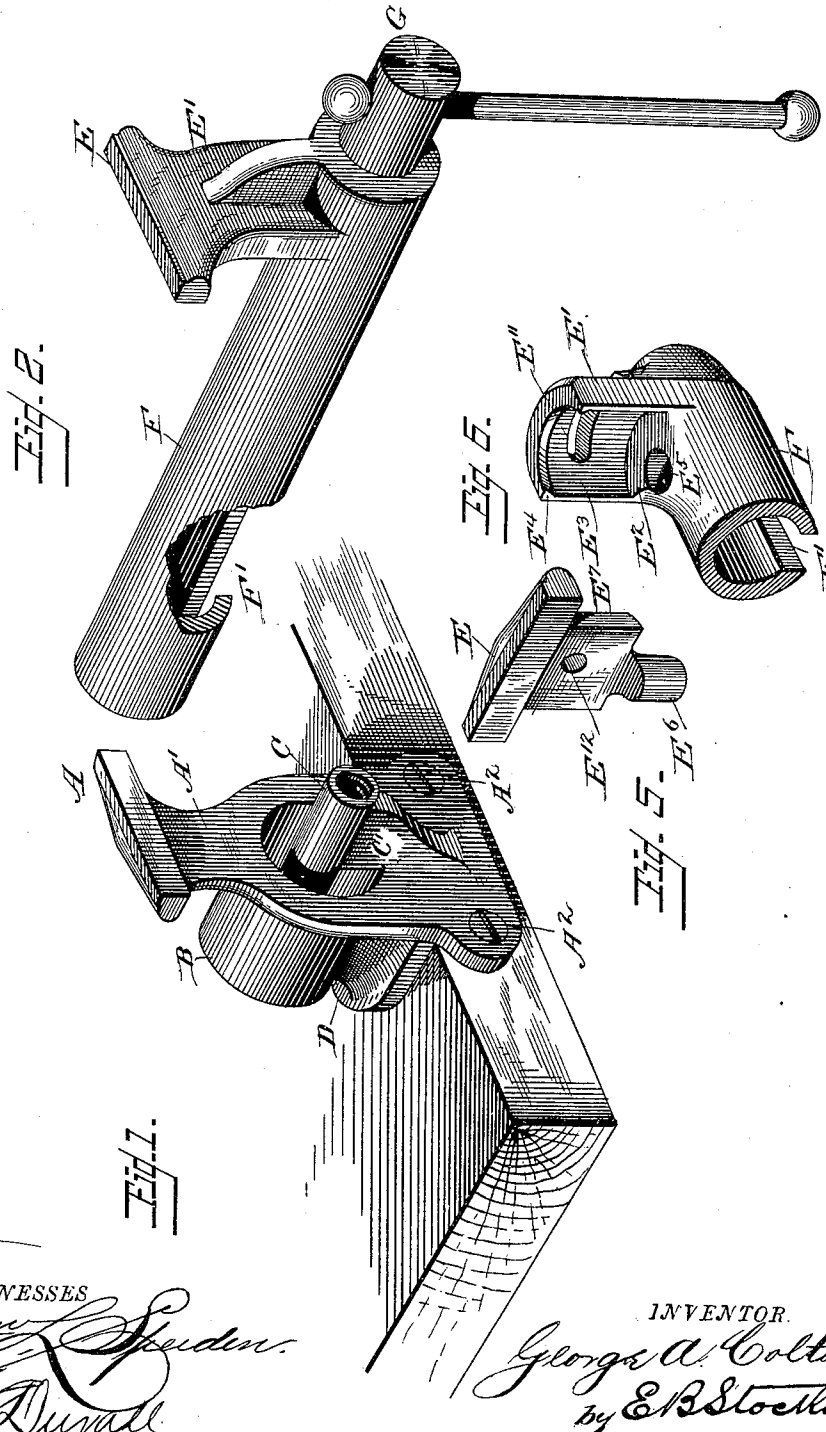

Fig. 2.

Fig. 6.

Fig. 5.

Fig. 7.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

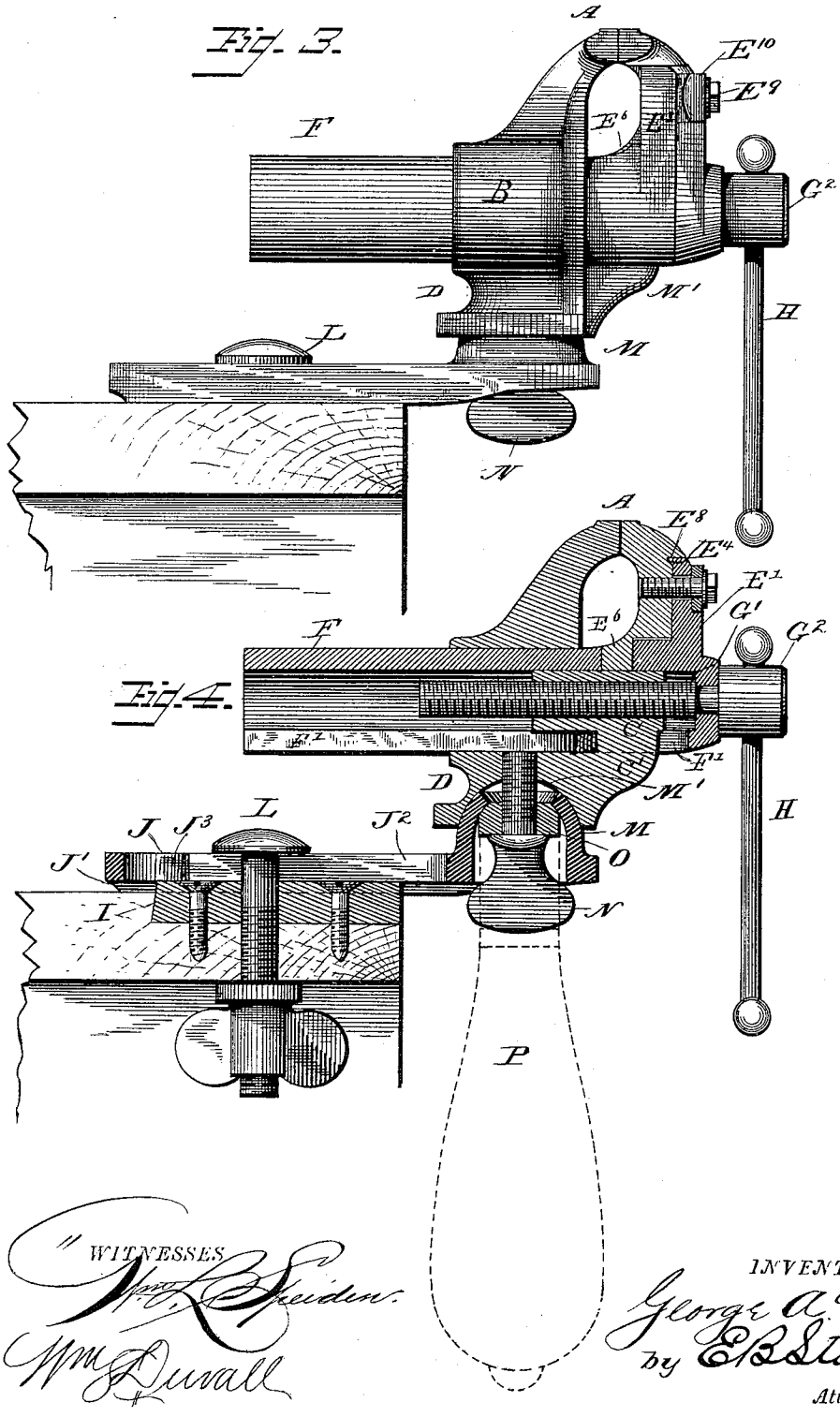

Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE A. COLTON, OF SYRACUSE, NEW YORK.

VISE.

SPECIFICATION forming part of Letters Patent No. 320,224, dated June 16, 1885.

Application filed October 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. COLTON, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Vises, of which the following is a specification, reference being had to the accompanying drawings.

This invention has relation to bench-vises, and among the characteristics sought to be provided is a minimum of expense of manufacture resulting from a reduced number of pieces or parts, and from the peculiar construction of each part, whereby they are capable of being cast in such form that each shall serve the functions of several pieces or parts, as heretofore constructed, and that each shall be readily applicable for presentation to ordinary machine tools for finishing said castings, the same being when finished (with a minimum amount of hand-work or labor thereon) capable of an assemblage and co-operation which results in a strong, serviceable, and accurate implement.

The peculiar configuration of each piece or casting, and the relative location and arrangement of its individual features are calculated with reference to ease of production by the ordinary methods of casting and of finishing by the ordinary machine tools.

Other objects, aims, and advantages of the invention will be hereinafter mentioned and particularly described, and the novel features thereof specifically pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective of the fixed jaw portion of the vise. Fig. 2 is a perspective of the sliding jaw portion with the jaw-operating screw arranged therein. Fig. 3 is a side elevation of the fixed and sliding jaw portions assembled in operative position, and provided with additional accessories. Fig. 4 is a longitudinal vertical section of Fig. 3. Figs. 5 and 6 are details in perspective of the swivel-jaw shown in Figs. 3 and 4.

Like letters indicate like parts in all the figures.

The fixed jaw A, the sleeve B, the nut C, and the attaching-bracket D are the principal elements which constitute one of the two castings employed in the vise, and which embody some of the important features of my invention. A vertical web or plate, A′, serves to connect the jaw with the sleeve and with the base, and is provided upon its inner face with a bracket, C′, which serves to support the integral nut C, so that it is concentric with the sleeve B; and, if desired, the said nut may be projected within the sleeve or terminate at a line passed along the inner face of the plate A′ and across the inner end of the sleeve. This manner of forming and supporting the nut is an important feature of my invention, because there being no standard within the sleeve, and extending from the bottom thereof to the body of the nut to support the same, any ordinary boring-tool may operate within the sleeve and throughout the entire length thereof to finish the same interiorly without obstruction by some device for supporting the nut centrally therein. Heretofore in some instances the nut has been made separate from the sleeve and set within a recess formed within the bottom thereof or outside thereof, so that when removed the sleeve could be finished; but such a construction requires a separate finishing of the sleeve, and of the nut or its standard, as well as the recess into which it is inserted, whereby additional cost of manufacture results. In the instance illustrated in Fig. 1, the wall A′ is extended below the base D to adapt it to be secured by screws or bolts A^2 to the edge of the bench, a similar screw or bolt (not shown) being passed through the base D downwardly into the bench. The nut C is interiorly screw-threaded for the reception of the screw of the vise, and its exterior outline in cross-section is that of a circle, as is also the interior configuration in cross-section of the sleeve B.

To persons skilled in the art of casting and finishing articles the advantage secured by the construction of the fixed jaw portion of the vise, as illustrated in Fig. 1, is apparent, the pattern being presented in the sand with the sleeve down, and the line of parting being, if desired, along the edge of the wall of the plate A′, the bracket and nut projecting upwardly, while, as before stated, the interior of the sleeve is wholly unobstructed, so that by the use of a simple reamer the sleeve is finished to exact size, and by the use of a sim-

ple drill and tap the nut is bored and screw-threaded. It is apparent that the general outline of this piece of the vise may be varied within the limits of having the desired taper from the plate in opposite directions—that is, along the sleeve and base and along the nut and bracket, which will facilitate withdrawing the pattern from the sand in the process of casting—the essential features of configuration, so far as my invention is concerned, being the collection of a fixed jaw, a sleeve, base, and nut in one piece, with the nut arranged concentric with the sleeve and supported by some portion of the casting which is arranged entirely without the sleeve. The companion and only other casting of the vise as made for ordinary purposes comprises the movable jaw E and the sliding bar F. The bar F is simply a tube, the exterior and interior conformations of which are in cross-section circles, and it is slotted at the bottom, as at F′, from one end to near the other.

To one skilled in casting articles of metal it is apparent that the pattern for the sliding bar and jaw would be tapered from the jaw to the end of the bar, the parting line being along the edges of the jaw and its standard, and to one familiar with finishing castings it is apparent that the bar being a circle when finished it is simply required that the jaw end or other portion of the bar be chucked in an ordinary lathe in order to finish the same to an accurate true circle. Interiorly, if desired, although it is not essential, the bar may be reamed or bored with any usual tool and drilled at its jaw end for the passage of the screw. Now, in view of the characteristics of the movable and the fixed jaw portions it is apparent that by ordinary machine tools the two castings can be adapted to accurately fit each other, and it only remains to make and insert the screw, retaining it within the bar by the usual pin passed through the slot and into the body of the screw; or by means of a shoulder formed on the body of the screw and a nut or head mounted on the outer end of the screw, through which the operating-lever is passed, retaining the same thereon. In the cheaper vises with smooth accurate castings no fitting of the bar to the sleeve will be absolutely required, as I have demonstrated. For the latter above-mentioned construction see Fig. 4, the screw G having a shoulder, G′, which impinges against the inner wall of the end of the sliding bar, and a nut or head, G^2, mounted upon the outer end of the screw, and held by the lever H, which passes through the head and the screw.

When the parts illustrated in Figs. 1 and 2 are assembled, as described, I have a vise which involves simply two castings and an operating-screw, and which can be cheaply manufactured, and is strong, serviceable, and accurate in its operation.

The location and arrangement of the nut C not only facilitates in a great degree the manufacture of the vise, but gives great strength to the same in use, by reason of the fact that the nut itself is directly between and below the jaws, so that pressure exerted by the jaws upon an object placed between them is directly applied and in a line passing centrally and longitudinally through the sliding bar, whereby there is less tendency in the movable jaw to raise when pressure is applied, and thus wearing the sleeve out of a true line and impairing the fit of the sliding bar therein is prevented.

I have added certain accessories to my vise to render it capable of inclination as a whole in various directions, and to render one of its jaws capable of horizontal inclination to adapt the vise to hold irregular work. These objects have heretofore been provided for in vises; but the different constructions employed have been attended with certain defects, which I have attempted to remedy. First, in the provision of a swivel-jaw I have sought to secure strength, simplicity, and firmness, as well as ease of manufacture. In the standard E′ I form a flat seat, E^2, having a curved rear wall E^3, terminating at the top with an inwardly-projecting V-shaped rib, E^4. The bottom of the seat E is bored, as E^5, which point is preferably the center of the curvature of the rear wall E^3, and in a vertical line drawn from the inner face of the swivel-jaw. The swivel-jaw E, Fig. 5, is adapted to fit the seat, and is provided with a depending cylindrical lug, E^6, the center of which is in a vertical line drawn from the face of the jaw, and the fixed rear wall E^7 of the swivel-jaw is upon the same curvature as the rear wall E^3, formed in the standard, and said wall E^7 is provided at its upper end with a V-groove, E^8, adapted to receive the V-rib E^4 of the standard. Now the objects and advantages of this construction of the swivel-jaw are that it turns about a center upon a vertical line passing through or across the face of the jaw itself, so that pressure upon an irregular object held by the jaws is taken wholly by them and by the standard E′, and not by the pivot of the swivel-jaw. The V-rib and the groove prevent any tendency upon the part of the jaw when pressed against an object to rise out of its seat. Ease of manufacture of these parts (the swivel-jaw and the standard for receiving the same) is apparent, in that the bore E^5 having been made, an ordinary reamer, having a center operating in the bore, may be revolved to give the suitable finish to the said seat, rear wall, and rib, while a hollow reamer may be employed in finishing the lug E^6 and the rear wall of the swivel-jaw; or the latter may be finished in a lathe, while the jaw is chucked either from lug E^6 or from its upper portion. Thus, as in the features heretofore described, the finishing of the casting may be accomplished by ordinary machine tools, and the desirable object of a minimum of hand-work is secured.

Although not absolutely essential by reason of the rib E^4 and groove E^8, I have illustrated a bolt, E^9, and washer E^{10}, the former passing

through a slot, E^{11}, and screw-threaded at E^{12} into the swivel jaw for the purpose of rigidly maintaining it in a desired position, either parallel with the fixed jaw or inclined thereto. This feature may or may not be employed. The remaining accessories provided are a ball-and-socket joint for the inclination of the vise as a whole, and a sliding bar and bench-plate which permits the adjustment of the vise as a whole in a position more or less projecting from the bench.

Referring more particularly to Figs. 3 and 4, the bench-plate I is secured to the bench and projects above the surface thereof to form a foundation and guide which fits the sliding bar J either between longitudinal flanges J′ formed on the bottom of the bar, or the bed-plate may be projected up into the slot J^2 formed in the bar, in which case the flanges J′ may be omitted. The rear end of the slot J^2 is widened, as at J^3, to permit the passage therethrough of the head of the securing-bolt L, so that by drawing the bar outwardly it may be removed from the bench. In other words, the slot J^2 is what is commonly known as a "key-hole slot." The outer end of the bar J is provided with a member, M, of a ball-and-socket joint, which in this instance is convexed, the opposite or concave member, M′, being formed in the base D of the fixed jaw. If desired, these members may be reversed. The bolt N is screw-threaded into the base and passes through fixed member M, and in this instance through a washer, O, and serves to bind the base to the bar. The convex member is hollow and its crown removed, so as to permit desired inclination of the base and bolt thereon.

In the smaller sizes of vises constructed in accordance with my invention a handle, P, (see Fig. 4,) provided with a screw end, may be secured in the concave member of the joint and in the base after the vise is removed from the bar J, so that the vise is adapted for hand use.

Although I have particularly described and have claimed certain features of construction involved in the accessories of the vise illustrated in Figs. 1 and 2, which of itself contains novel and important features of my invention, I do not limit the same to vises in which these accessories are present; but in order to adapt the vise illustrated in said figures to the various uses and purposes of the more popular forms I have illustrated and described such accessories, and claimed those having novel features of construction, whereby they are adapted to be used in connection with my novel vise. Furthermore, it is apparent that the novel features of both my vise and accessories thereof may in part be applied to existing forms of vises which differ in other respects from mine; and I therefore do not limit my invention, so far as any of the novel features thereof are concerned, to their assemblage with other particular features of this my invention. For example, the advantages of my peculiar construction of a fixed jaw and bracket with the integral nut supported independently of the walls of the sleeve may be employed in vises which radically differ in all other respects from that herein shown and described, and therefore I do not limit my invention in any of its novel features to the devices or construction associated with those features.

Various minor details in the construction of my invention may be made without a departure therefrom. For example, it is not absolutely essential that the nut C should be exactly concentric with the sleeve B, as a cylindrical sliding bar may be eccentrically bored for the reception of the nut and binding-screw G, in order that a preponderance of metal may occur above, below, or upon either side of the center of said sliding-bar—perhaps preferably below. Again, I may secure the advantages of facilitating the finishing of the sleeve interiorly, by reason of the absence from within the same of any parts connecting the nut therewith, even if said part or parts be not cast integrally with the sleeve; but for cheapness of manufacture I prefer to cast the parts as one piece. If the bolt N be passed directly through a bench and upwardly into its seat in the supporting-base D, the fixed jaw-casting may thereby be secured directly to the bench, and without change of construction the same casting may be by means of the same bolt secured to the ball-and-socket member of the sliding bar, and by the same or equivalent means said casting may be mounted upon a handle, so that the vise may be used as an ordinary bench-vise capable of horizontal rotation in the first instance, and capable of horizontal rotation and inclination in all directions, as well as horizontal extension, from a bench in a second instance, and as an ordinary hand-vise in the third instance.

Having described my invention and its operation, what I claim, is—

1. In a vise, a sleeve open at both ends and provided with a nut supported independently and outside of the inner walls of the sleeve, whereby the interior of the sleeve may be finished without removal of the nut, substantially as specified.

2. In a vise, a fixed jaw, a sleeve, an exterior nut, and its supporting-bracket arranged independent of the walls of the sleeve, the whole cast in one piece, whereby said sleeve may be interiorly finished, substantially as specified.

3. The combination of two castings, the one comprising a fixed jaw, a sleeve, a nut, and its supporting-bracket arranged independent and outside of the sleeve and a supporting-base, and the other comprising a jaw and a hollow cylindrical slotted sliding bar with a suitable jaw-operating screw, substantially as specified.

4. The combination of the fixed jaw A, plate A′, sleeve B, nut C, and bracket C′, arranged

as described and cast in one piece with the integral slotted sliding bar F and jaw E, substantially as shown and described.

5. The combination, with a sliding bar having a standard in which is formed a swivel-jaw seat and curved wall, of a swivel-jaw having a pivot in line with its face, and a wall curved to fit the standard, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE A. COLTON.

Witnesses:
GEO. L. SMITH,
ARTHUR BEEBE.