

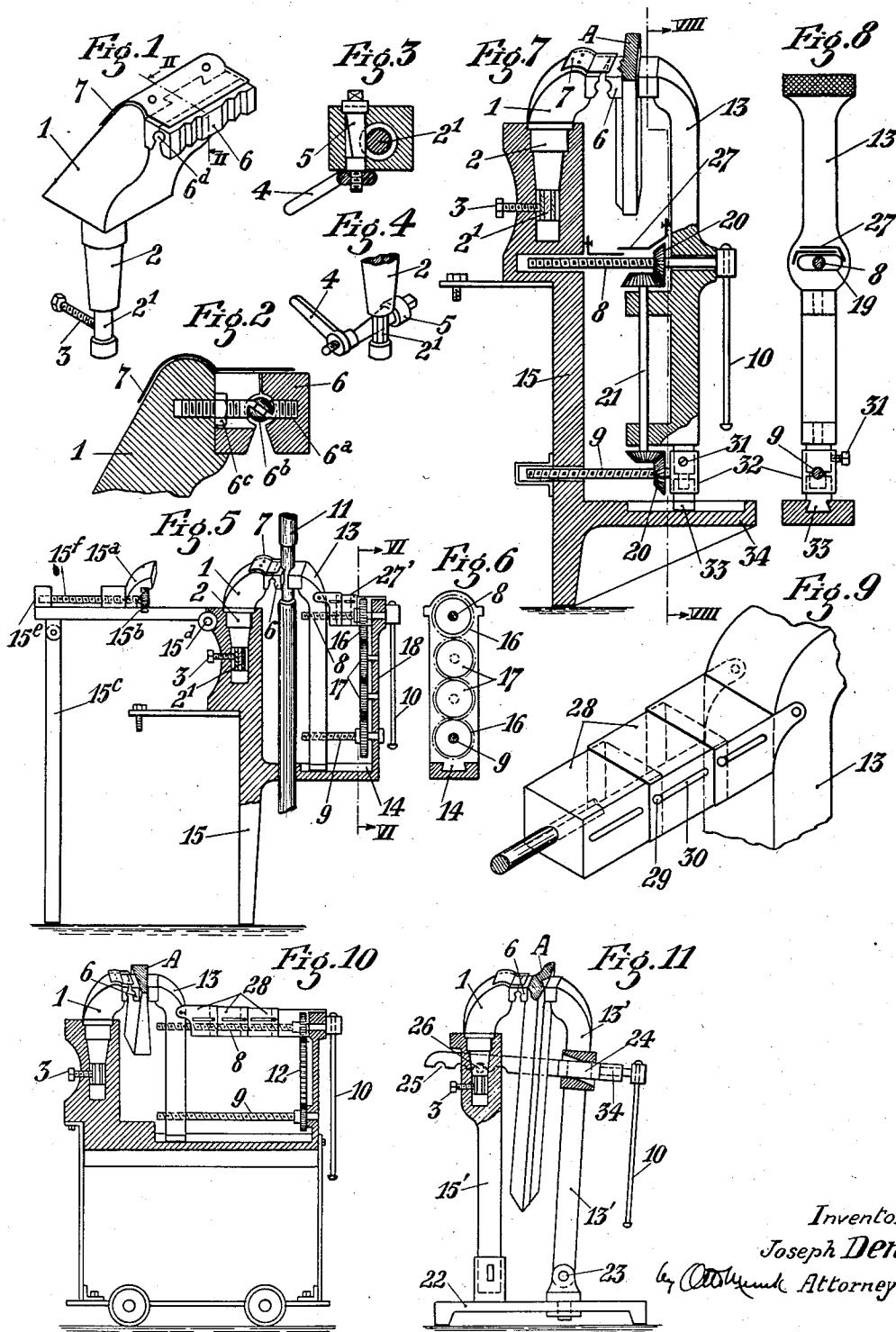
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UNIVERSAL VISE

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UNIVERSAL VISE

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In vises of the well known type the jaws thereof are to be interchanged each time according to the shape of the work-pieces, or auxiliary means are to be used for working pieces without injuring same. The screws retaining the jaws of the vise are to be removed and the jaw is generally to be withdrawn from a dovetailed guide, whereupon the jaws are replaced by other jaws of desired shape, mounted in the same way, which requires much time. A further objection resides in the absence of any arrangement for locking the pivoted jaws in a reliable way. In vises having rotating jaws the working pieces frequently slide in the working operation, whereby they will be injured. Vises enabling all the working pieces in general to be tightened in great depth and width between the two jaws have not been constructed heretofore. Sectional nuts and the like in quickly tightening vises are not reliable and are to be replaced each year owing to the rapid wear thereof.

Owing to my present invention the principal objections mentioned will be avoided, and all the working pieces in general may be immediately tightened and worked without auxiliary means, without unscrewing the jaws and without injury to the working pieces. The new universal interchangeable rotating jaw may be locked in any desired direction and immediately replaced by other spare jaws of shapes corresponding to the working pieces. The pivot pins of said interchangeable rotating jaws are circular or polygonal in cross section and the faces of the jaws are always shaped according to the faces of the working pieces. The tightening screws may be connected by means of sprocket wheels, spur or bevelled gear wheels or the like, with or without connection between the two jaws. In the latter case it is furthermore possible to tighten very deep and wide pieces. The wide and deep teeth in the spindle of the quickly tightening vise are hardened in such a way that they will be scarcely subject to wear. My invention enables me to obtain a serious technical improvement whilst saving much time.

In the accompanying drawing I have illustrated several embodiments of my invention by way of example. Fig. 1 is a view of a rotatable and interchangeable jaw according to this invention, having a cylindrical pivot, and a screw for locking said jaw in position. Fig. 2 is a sectional view along line II—II in Fig. 1, of a jaw as illustrated in Fig. 1, showing a particular mounting of the adjustable work-engaging face. Fig. 3 is a sectional view through the pivot of a rotatable jaw

according to Fig. 1, showing novel means for locking said jaw in position in the vise. Fig. 4 is a perspective view corresponding to Fig. 3. Fig. 5 is a side view, partly in section, of a vise provided with a jaw according to Fig. 1, for tightening extra wide and/or deep work-pieces, said vise being provided with an auxiliary jaw. Fig. 6 is a vertical transverse section through line 6—6 of Fig. 5. Fig. 7 is a side view, partly in section, of another form of vise according to this invention. Fig. 8 is a vertical transverse section through 8—8 of Fig. 7. Fig. 9 is a view of a detail of Fig. 5 on a large scale. Fig. 10 illustrates the application of the invention to a portable vise and Fig. 11 illustrates the application of the invention to still another form of vise.

The vise jaw 1, as illustrated in detail in Fig. 1, is a shortened foot vise having a pivot pin 2 which may be circular or polygonal in cross section and which has a reduced portion 2¹ of circular or polygonal cross section for securing the jaw 1 in a determined angle, by the set-screw 3 or the handle 4. The supporting foot of the jaw has a vertical socket in which the portions 2 and 2¹ of the jaw are rotatably supported. The set-screw 3 is screwed through the wall of the socket, or the handle is carried by an excentric cam 5 horizontally journaled in a perforation through the wall of the socket as shown in Fig. 3, so that by unscrewing the set-screw 3 or by reversing the lever 4 the rotatable jaw may be withdrawn immediately and replaced by a jaw of different shape. With the excentric cam 5, the portion 2¹ of the jaw will preferably be polygonal, but may be cylindrical as illustrated, and by turning the lever 4, the cam 5 is tightened against the said portion 2¹, whereby the jaw is pressed downwardly in the socket.

The pivotally supported work-engaging face 6, as illustrated in Fig. 1, is mounted on a ball or roller bearing 6a, allowing lateral displacement of said face, and covered by means of a protecting metal sheet 7 secured by screws or the like, in order to protect the bearings against dust and dirt. According to another form of mounting the face 6, shown in Fig. 2, the latter is mounted by means of screws 6a and nut 6c connected through a universal ball-socket joint 6b, whereby said work-engaging face is capable of taking any inclination. The work-engaging face 6 is also interchangeable.

Fig. 5 shows a parallel vise for tightening in depth and width the bed plate of which is provided with the interchangeable rotatable jaw 1, having the portion 2¹ of polygonal cross-section, and the

screws or spindles 8 and 9 being connected to each other by means of gear-wheels 17. In this arrangement the movable jaw 13 will be moved parallel to itself for the purpose of tightening the working pieces in depth, as the two standards of the vise are not connected by said spindles. This particular vise, permits of tightening working pieces having wide front parts, which is not possible with known vises, and it may be constructed as a stationary or as a portable vise. The vise is mounted on a supporting foot 15. According to the number of intermediate wheels 17, the lower spindle will be left or right threaded, whereby a very practical effect will be produced. The wheels are housed within the casing 18 and a guide-way 14 is also provided for the jaw 13. By turning the handle 10 from right to left the jaws 1 and 13 come further apart and a work-piece such as 11 may be inserted between them. The jaw 1 is locked in suitable position by means of the screw 3, and the work-engaging face 6 is turned also in suitable position. By turning the handle from left to right the work-piece 11 is firmly secured between the jaws and can be worked on. 27' designates protecting means for the screws which will be described with reference to Fig. 9. Moreover this embodiment has an interchangeable auxiliary vise jaw 15a, enabling very wide pieces to be tightened; said auxiliary jaw is displaced by means of the wheel 15b, the screw spindle 15f of which is fixedly but rotatably secured in fixed block 15e. For the use of said auxiliary vise, the jaw 1 will be removed. 15c is a supporting leg of more or less great length. The hinge 15d enables said auxiliary vise to be removed or turned downwardly along the supporting leg 15. Said auxiliary vise is applicable to any type of vise.

Fig. 7 is a form of the vise according to this invention, having extra wide jaws, of which the one is simply pivotal, whilst the other is pivotable and slidable. The vise comprises a main standard 15 secured to the bench, and which forms the socket for the pivotal jaw 1, as described with reference to Figs. 1 and 5, and comprising the same elements designated by the same reference numerals. The opposite jaw 13 is mounted slidable to and fro on a dovetailed slide 33 guided in a groove of corresponding shape formed in a horizontally projecting portion 34 of the standard 15. The jaw 13 is also horizontally pivoted in the slide member 33 provided with a vertical sleeve 32 which forms a bearing. 31 designates a screw, screwed through the sleeve 32 for fixing the jaw 13 in a certain angular relation to the jaw 1. The sliding of the jaw 13 is operated through two screw spindles 8 and 9. The upper spindle 8 passes through an oblong opening 19 formed in the jaw 13, to allow pivoting of the jaw, and is directly operated by the handle 10. The lower spindle 9 has its front end journaled in the sleeve 32 and is therefore not affected by the pivoting of the jaw. The connection between the spindles 8 and 9 can be provided by means of the vertical shaft 21 and the bevelled gear-wheels 20, but a sprocket wheel and chain connection may also be used. Above the upper spindle 8 there are overlapping metal plates 27 which protect the threads and toothed-wheels from the filings. A is the working piece.

Fig. 9 shows the protecting means of Fig. 5 in the shape of boxes formed of a plurality of members, the members 28 of which fit into each other, that is they may be opened and closed by means of pins 29 and slots 30. Fig. 10 illustrates a port-

able vise for tightening deep and wire work-pieces. This vise is provided with the rotatable jaw 1, and the movable work-engaging face 6 according to Fig. 1 or Fig. 2. The other jaw 13 is displaced in a manner similar to Fig. 5, by means of the screw spindles 8, 9, connected by means of a chain and sprocket wheel connection 12 and operated by means of handle 10. The top screw spindle 8 is protected by means of the boxes according to Fig. 9. Fig. 11 shows the application of the rotatable jaw 1 and movable work-engaging face 6 to a quick tightening vise, arranged on a base plate 22 and the supporting leg 13' of which is pivotally connected at the bottom by means of a double pivot 23 and held and supported at the top by means of a sleeve shaped bearing on a toothed tightening bar 24, the quick-tightening being obtained, in the known manner, by the teeth 25 engaging the pin 26 on the leg 15', the operator grasping the head 1 of the vise with his hand to this end. Arranged above the threads of the tightening screw is a metal protecting plate 34.

The operation of the device is the same for all forms of vise, and is quite simple. By turning the handle 10 in the proper direction, the jaws 1 and 13 come apart; the work-piece A or 11 is adjusted between the jaws, the jaw 1 being rotated and locked in suitable position and the work-engaging face 6 is set at the angle required; also the work-engaging face 6 may be interchanged according to the shape of the work-piece. By means of the handle 10 the work-piece is tightened between the jaws 1 and 13. In all the displacements of the jaw 13, the boxes 28 cover the spindles 8, 9 and the gear-wheels.

Fig. 5 shows a vise for tightening extra-wide, long and deep work-pieces 11. For very long work-pieces the jaw 1 can be dispensed with, and the jaw 15a used, by being adjusted by wheel 15b at the correct length. Fig. 7 shows a vise having extra wide jaws 1 and 13, mainly for very wide work-pieces. Fig. 10 shows a vise for wide and extra long pieces, the length here being adjusted forwardly by forward displacement of the jaw 13. Fig. 11 shows the application of the rotatable jaw 1 and adjustable work-engaging face 6 to a quick-tightening vise.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent, is:

1. In a universal vise, the combination with a supporting leg, a rotatable jaw mounted thereon, and a work-engaging face rotatable in any direction on said jaw, a lower-guide way projecting forwardly from said supporting leg, a second jaw movable in said guide way, an upper and a lower screw spindle extending and working through said second jaw, gear wheels connecting said screw spindles, a handle operating one of said spindles, of a metal sheet covering the rotatable jaw, and of telescopic covering means for the screw spindles and gear wheels.

2. In a universal vise, the combination with a supporting leg, a rotatable jaw mounted thereon, and a work-engaging face rotatable on said jaw in any direction, a lower guide way projecting forwardly from said supporting leg, a second jaw movable in said guide way, an upper and a lower screw spindle extending and working through said second jaw, gear wheels connecting said screw spindles, a handle operating one of said spindles, of a metal sheet covering the rotatable jaw, of boxes made of a plurality of parts for covering the screw spindles and gear wheels.

3. In a universal vise, the combination with a supporting leg, a rotatable jaw mounted thereon, and a work-engaging face rotatable on said jaw in any direction, a lower guide way projecting forwardly from said supporting leg, a second jaw movable in said guide way, and rotatable in a guiding member in said guide way, an upper and a lower screw spindle for displacing said second jaw in said guide way, a gear wheel connecting between said screw spindles, a handle operating one of said spindles, of a metal sheet covering the first said rotatable jaw, and of telescopic covering means for the screw spindles and gears.
4. In a universal vise, in combination a supporting foot having a socket therein, a rotatable jaw, a pivot pin for the jaw extending from said jaw and being rotatably mounted in said socket, said pivot pin having a portion of reduced polygonal cross-section, means in said socket, cooperating with said portion of polygonal section, for securing said jaw in a determined angle, a work-engaging face rotatable on said jaw in any direction, a guide way projecting forwardly from said supporting leg, a second jaw movable in said guide way and rotatable in a guiding member in said guide way, an upper and a lower screw spindle, the one left threaded and the other right threaded, a gear wheel connection operating said screw spindles inversely, a handle operating one of said spindles, a metal sheet covering the first said rotatable jaw, and overlapping covering means for the screw spindles and gears.

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