J. E. MESSENGER.

BENCH VISE.

APPLICATION FILED JUNE 1, 1920.

1,399,786. **Patented Dec. 13, 1921.**

Fig. 1.

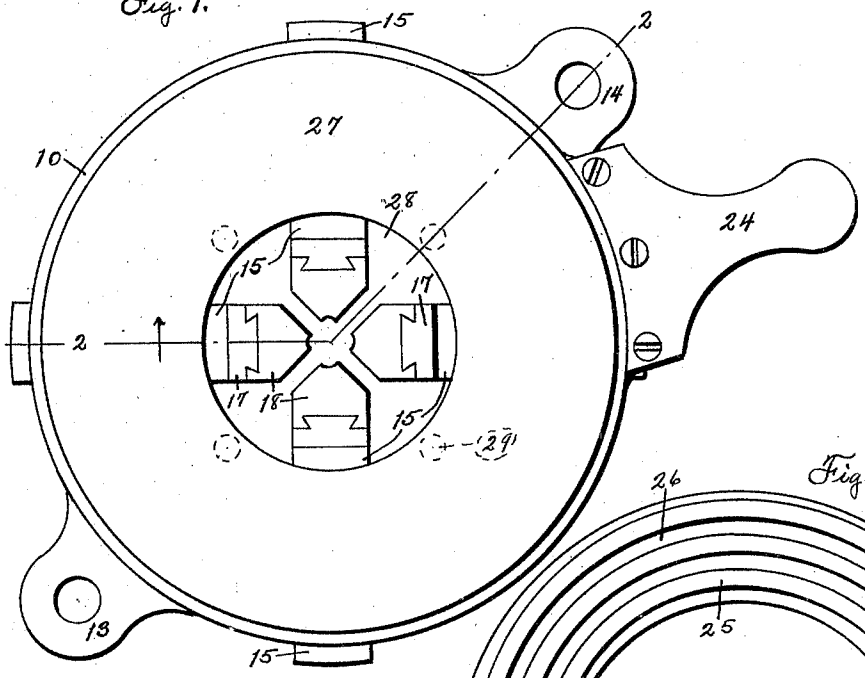


Fig. 3.

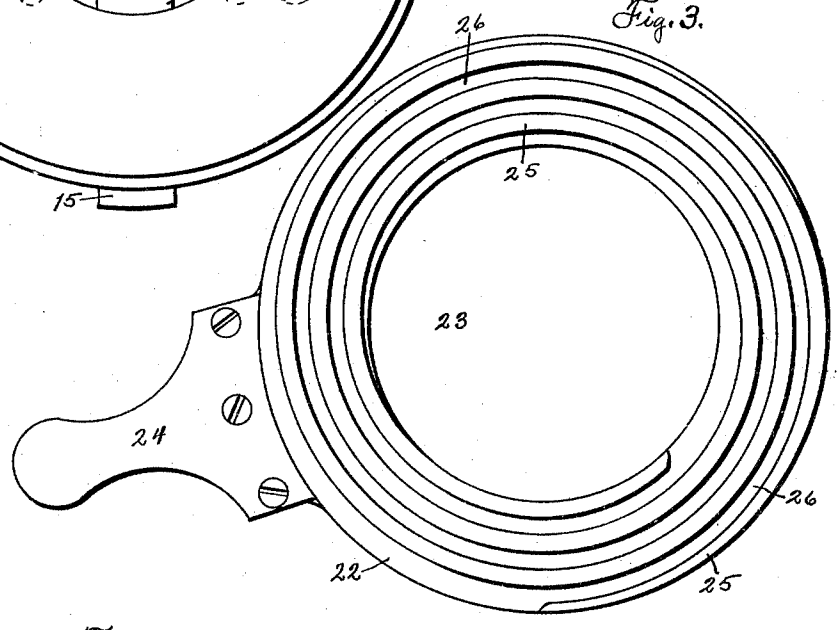


Fig. 2.

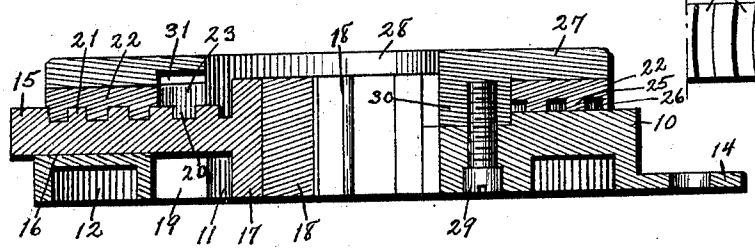
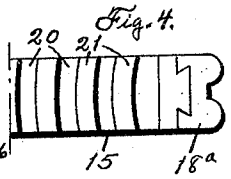


Fig. 4.



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BENCH-VISE.

1,399,786. Specification of Letters Patent. Patented Dec. 13, 1921.

Application filed June 1, 1920. Serial No. 385,498.

To all whom it may concern:

Be it known that I, JACK E. MESSENGER, a citizen of the United States of America, and resident of Des Moines, Polk county, Iowa, have invented a new and useful Bench-Vise, of which the following is a specification.

The object of this invention is to provide an improved tool adapted to hold work objects of different sizes.

A further object of this invention is to provide a vise having holding jaws and spiral engaging means adapted to move said jaws conjunctively relative to a center common to all of the jaws and also common to the engaging means.

A further object of this invention is to provide an improved construction for vises having a plurality of slidable jaws and interengaging spirally arranged operating means common to all of the jaws and adapted for rotation, whereby the jaws may collectively be moved relative to a common center.

My invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in the claims and illustrated by the accompanying drawing, in which—

Figure 1 is a plan of the complete device. Fig. 2 is a cross-section on the indicated line 2—2 of Fig. 1. Fig. 3 is a bottom plan of a rotatable operating device removed from the remaining elements. Fig. 4 is a detail plan of one of the jaws, a portion being broken away to economize space.

In the construction of the devices as shown the numeral 10 designates a base plate, which is substantially circular in plan, is formed with a central hole 11 of desirable capacity and an annular groove or channel 12 concentric with said hole and opening to the bottom of the plate. The plate 10 also is formed with apertured ears 13, 14 whereby it may be secured to a suitable support, such as a bench, in a common manner. A plurality of jaw-stems or shanks 15, in this instance four in number, are slidably mounted in radial slots or grooves 16 formed in the base plate 10. Each jaw-stem 15 is formed with a head 17 on its inner end and said head projects above and below the stem. A jaw member 18 is mounted, by a dove-tailed connection, on each head 17 and may be removed and replaced or substituted by another as desired. The jaw-stems 15 are equally spaced apart and the jaw members 18 are directed toward a common center which also is the center of the base plate 10 and of the hole 11 therein. The base plate 10 is formed with notches 19 intersecting the inner ends of the radial grooves 16 which notches are adapted to receive and contain the lower projecting portions of the heads 17 and jaw members 18 when the stems 15 carrying them are in expanded positions. The jaw-stems and members carried thereby are shown in contracted positions susceptible of still further contraction in order to grasp between the inner ends of the members 18 a relatively small work object. The upper faces of the stems 15 are formed with spirally arranged alternate grooves 20 and lugs 21, the inner faces or bottoms of the grooves lying in substantially the same plane as the upper surface of the base plate 10. An operating device 22 formed as a ring and having a central opening 23 greater than the opening 11 in the base plate 10, and of slightly less diameter than said base plate is mounted loosely on the upper surface of the base plate and is formed with a handle 24 preferably secured to and projecting radially from its periphery. The operating device 22 is formed with a spiral rib 25 fitting to and adapted to engage in grooves 20 of all of the jaw-stems 15; spiral slot 26 being formed by and between successive convolutions of said rib and adapted to receive the lugs 21 of all of the jaw stems. A cap plate 27, of substantially the same diameter as the operating device and formed with a central hole 28 registering with the hole 11 in the base plate, is mounted over the operating device and is secured to the base plate by screws 29 extending through said base plate and seated in the cap plate. The cap plate 27 also is formed with a boss 30 extending through the hole 23 and serving as a journal for the operating device 22. The cap-plate 27 and its boss 30 are formed with radial notches 31 registering with the notches 19 in the base plate and adapted to receive and contain the upper projecting portions of the heads 17 and jaw members 18 when the jaw-stems 15 are in expanded positions.

In Fig. 4 the jaw-stem is provided with a head 18^a having a notched inner end with rounded edges adapted to connect with a work object without damage to the surface thereof; whereas in Fig. 1 the jaw members 18 are formed with inner ends having edges

adapted to bite into and engage a work object. The jaw members 18 and 18ª may be modified in any desired respect and two cases thereof are shown to exemplify the possibilities.

When the device is secured by mounting the base plate 10 against rotation the jaw members may be separated widely to the extremity of their range of movement by manual rotation of the operating device 22 in one direction, the coacting rib, grooves and lugs changing rotary motion into rectilineal reciprocating movement of the jaw stems. By an opposite movement of the operating device manually the jaw members may be contracted upon a work object of any shape and of any size susceptible of being received within the hole 28 in the cap-plate; exception being made in respect of extremely small objects due to the form of the inner ends of the jaw members. The device is so constructed that substantially two and one-half revolutions of the operating device 22 may be employed to move the jaw members throughout the entire range of reciprocation thereof in one direction. Consequently the pitch of the spiral connection between the operating device and the jaw members is very slight and insures a firm and lasting grip of the jaw members upon the work object when said operating device is set manually to the position required to clamp the jaw members to the work object.

I do not desire to be understood as limiting myself to the exact form and construction shown, as the various parts may be modified within the scope of the appended claims.

I claim as my invention—

1. A vise, comprising a suitable base formed with a hole and also formed with radial notches intersecting said hole and also formed with radial grooves intersecting said hole and notches, an annular rotatable operating device overlying said base, jaw-stems slidingly mounted in said radial grooves and formed with heads adapted to be received in said radial notches and also formed with lugs, said operating device being formed with a spirally arranged groove receiving the lugs of said jaw-stems providing connections between said operating device and said jaw stems whereby rotary movement of the operating device effects rectilinear movement of the jaw stems.

2. A vise, comprising a suitable base, jaws mounted for rectilinear movement radially of said base, an annular rotatable operating device overlying said jaws, spirally arranged connections between said operating device and jaws, and a cap-plate overlying said operating device, said cap-plate being formed with a circular boss serving as a journal for the operating device.

3. A vise, comprising a suitable base, jaws mounted for rectilinear movement radially of said base, an annular rotatable operating device overlying said jaws, spirally arranged connections between said operating device and jaws, and a cap-plate overlying said operating device, said cap-plate being formed with a circular boss serving as a journal for the operating device and means for rigidly securing said base and cap-plate together.

4. A vise, comprising a base formed with a hole in its central portion, a cap member formed with a hole in its central portion and also formed with an annular boss surrounding said hole and resting on said base, screws rigidly securing said base to the boss of said cap member, said base being formed with radial grooves intersecting said hole therein, jaws slidably mounted in said grooves and formed with transverse arcuate grooves, and an annular rotatable operating member mounted between the outer portions of the base and cap members and journaling on the boss of the latter, said operating member being formed with a spiral rib engaging the grooves of said jaws.

5. A vise, comprising a base formed with a hole in its central portion and also formed with radial notches intersecting said hole and also formed with radial grooves intersecting said hole and notches, an annular rotatable operating device overlying said base, a cap member overlying said base and formed with a boss serving as a journal for said operating member, said cap member being formed with a central hole and also with radial notches registering with the notches of said base, and jaw-stems slidably mounted in the grooves of said base, there being spirally arranged operative connections between said operating member and jaw-stems whereby rotary movement of the operating device effects rectilinear movement of said stems, said jaw stems being formed with heads projecting in opposite directions from their bodies and adapted to be received within the notches of the base and cap member.

Signed at Des Moines, in the county of Polk and State of Iowa, this 15th day of May, 1920.

JACK E. MESSENGER.