

Sept. 28, 1965

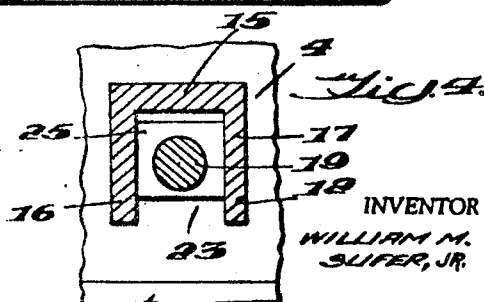
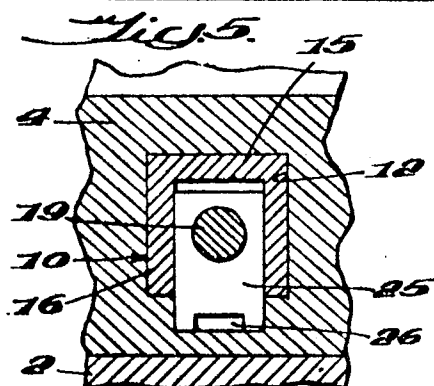
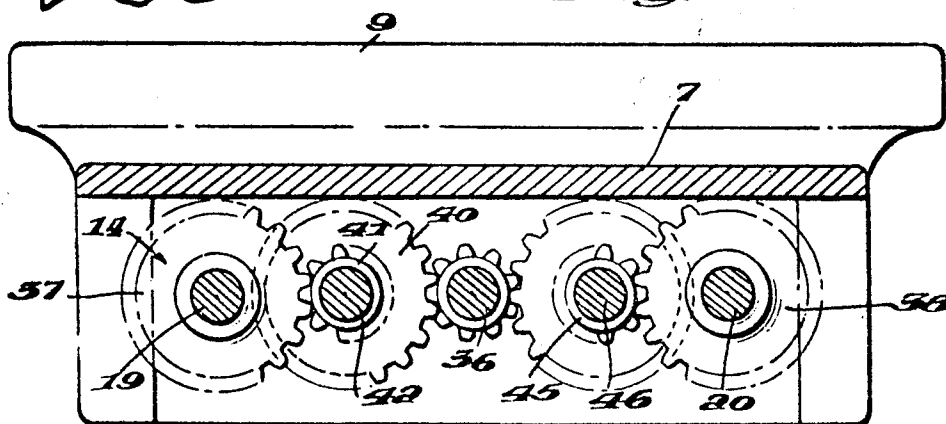
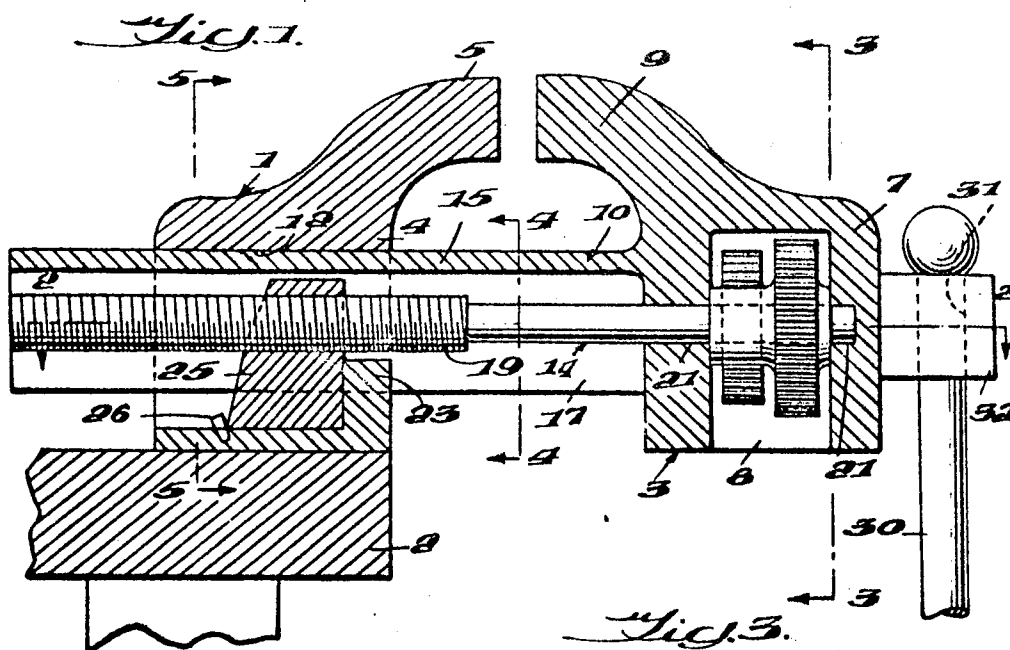
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3,208,744

BENCH VICE

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2 Sheets-Sheet 1



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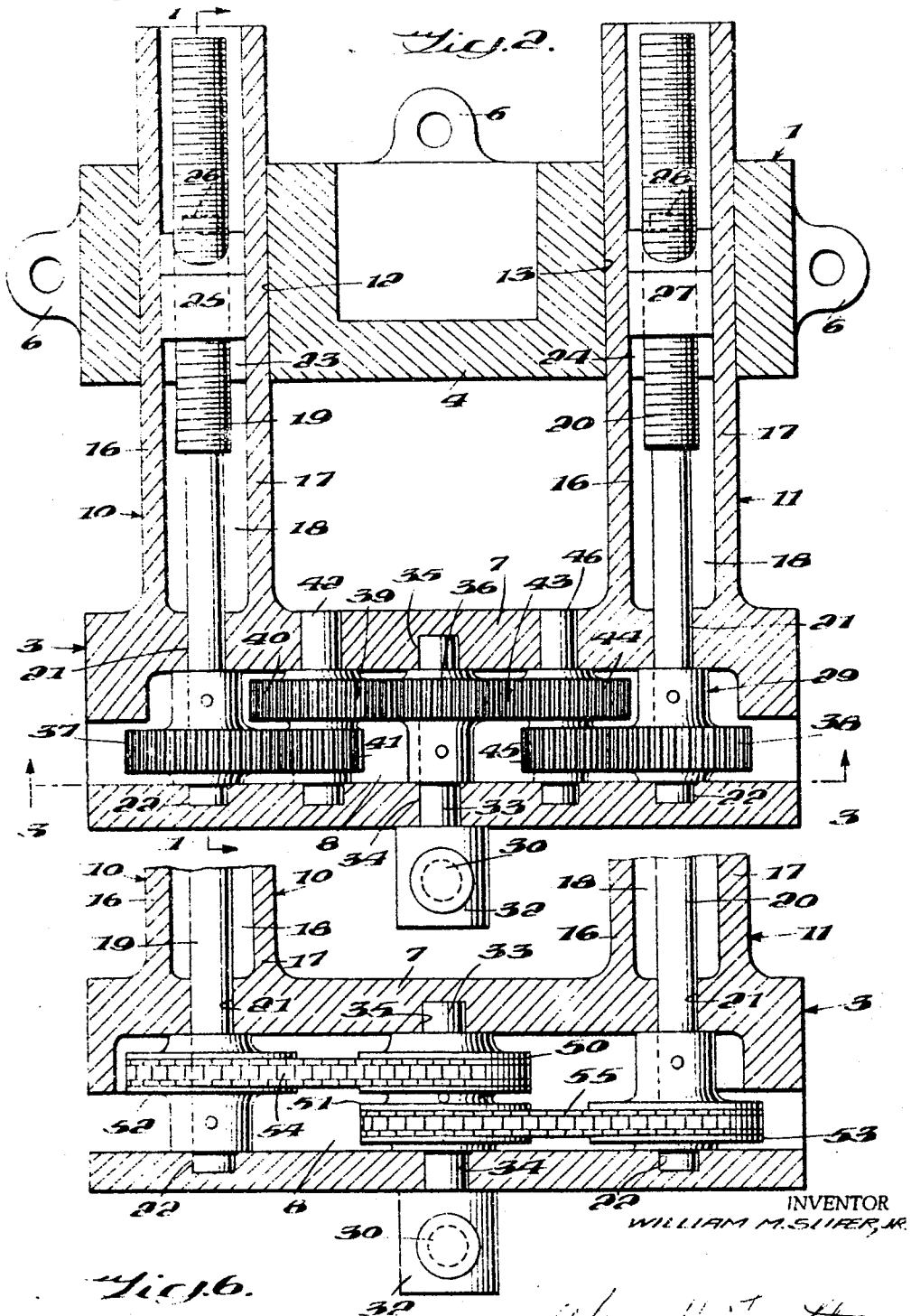
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BENCH VICE

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2 Sheets-Sheet 2



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BENCH VICE

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6 Claims. (Cl. 269-247)

This invention relates to what are generally known as bench vices which comprise a stationary member, which is adapted to be rigidly secured to a work bench, and a movable member which is carried by the stationary member and is adapted to be moved towards and away from the stationary member by interconnected screw means. The stationary member and the movable member are provided with similar opposed jaws between which a work piece is adapted to be firmly clamped.

One of the principal objects of the invention is to provide a vice of the aforesaid character which is of greater utility in use, in that it is capable of clamping various different work pieces in a manner not possible with presently known vices of this character.

Another object of the invention is to provide a vice of the aforesaid character by which a greater and more evenly distributed clamping force may be applied to a work piece.

Still another object of the invention is to provide a vice of the aforesaid character which is of simple sturdy construction and is relatively cheap to manufacture.

Having stated the principal objects of the invention, other and more specific objects thereof will be apparent from the following specification and the accompanying drawings forming a part thereof in which:

FIG. 1 is a transverse vertical section through a bench vice constructed according to my invention, the plane of the section being indicated by the line 1-1 on FIG. 2;

FIG. 2 is a horizontal sectional view taken on the line 2-2 on FIG. 1;

FIG. 3 is a vertical sectional view taken on the line 3-3 on FIGS. 1 and 2;

FIG. 4 is a fragmentary detail sectional view taken on the line 4-4 on FIG. 1;

FIG. 5 is a fragmentary detail sectional view taken on the line 5-5 on FIG. 1; and

FIG. 6 is a fragmentary horizontal sectional view through the movable member showing another means through which the two actuating screws are adapted to be rotated in unison.

The construction and operation of the device will now be specifically described in connection with the drawings with the use of reference characters. As shown therein the device comprises a stationary member, generally indicated by the numeral 1, which is adapted to be secured in fixed position on a work bench 2 along the forward edge thereof, and a movable member, generally indicated by the numeral 3, which is carried by the stationary member 1 and is adapted to be moved toward and away from the stationary member 1 by actuating means generally indicated by the numeral 14.

The stationary member 1 comprises a body section 4 having an upwardly and forwardly extending jaw 5 integral therewith and a plurality of outwardly extending ears 6 through which the member 1 is adapted to be securely bolted to the bench 2.

The movable member 3 comprises a body section 7 having a chamber or recess 8 therein, and an integral upwardly and rearwardly extending jaw 9 which is similar to and opposed to the jaw 5 on the stationary member 1. The movable member 3 is also provided with a pair of similar elongated longitudinally spaced parallel generally rectangular hollow sleeves 10 and 11 which are integral with the body section 7 thereof and extend rearwardly therefrom and are slidably mounted in complementary

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bore 12 and 13 respectively which are formed in the body section 4 of the stationary member 1. Each of the sleeves 10 and 11 comprises a horizontal disposed top wall 15 and a pair of spaced parallel vertically disposed side walls 16 and 17 thereby providing an elongated cavity 18 therebetween which is open at the bottom thereof.

The actuating means 14 by which the movable member 3 is adapted to be moved toward and away from the stationary member 1 comprises a pair of similar externally threaded elongated screws 19 and 20 which are rotatably mounted in suitable bearing bores 21 and 22 in the body section 7 of the movable member 3. The screws 19 and 20 extend rearwardly from the body section 7 of the movable member 3, one of which 19 is disposed in the cavity 18 in the sleeve 10, and the other of which 20 is disposed within the cavity 18 in the sleeve 11.

The front wall of the body section 4 of the stationary member 1 is provided with a tongue 23 at the forward end of the bore 12 which extends up into the cavity 18 in the sleeve 10 and terminates slightly below the screw 19 therein; and with a similar tongue 24 at the forward end of the bore 13 which extends up into the cavity 18 in the sleeve 11 and terminates slightly below the screw 20 therein.

The screw 19 is threaded through an internally threaded nut 25 which is mounted in fixed position in the bore 12 between the tongue 23, a retainer 26 and the side walls 16 and 17 of the sleeve 10, and the screw 20 is threaded through a similar internally threaded nut 27 which is mounted in fixed position in the bore 13 between the tongue 24, a retainer 28 and the side walls 16 and 17 of the sleeve 11. It will therefore be seen that if the screws 19 and 20 are rotated in unison the movable member 3 will be moved toward or away from the stationary member 1 depending on the direction of rotation of the screws 19 and 20. The construction is such that a long relatively narrow work piece may be disposed horizontally between the jaws 5 and 9 above the sleeves 10 and 11, or vertically between the jaws 5 and 9 and the sleeves 10 and 11, with the lower end thereof extending downwardly between the jaws 5 and 9 and the sleeves 10 and 11.

The screws 19 and 20 are adapted to be manually rotated through a gear train, generally indicated by the numeral 29, disposed within the recess 8 in the body 7 of the movable member 3, by a hand lever 30 which is slidably mounted in a bore 31 in a hub 32 which is secured to the outer end of a shaft 33 which is rotatably mounted in bearing bores 34 and 35 in the body section 7.

The gear train 29 by which the screws 19 and 20 are rotated in unison by the hand lever 30 comprises a small pinion gear 36 which is pinned to the shaft 33 and a pair of similar spur gears 37 and 38, one of which 37 is pinned to the forward end of the screw shaft 19, and the other of which 38 is pinned to the forward end of the shaft 20. A cluster gear 39 which comprises a gear 40 having a smaller gear 41 integral therewith is rotatably mounted on an idler shaft 42, disposed between the shaft 19, with the larger gear 40 in mesh with the pinion gear 36 on the shaft 33 and the smaller gear 41 in mesh with the gear 37 on the screw shaft 19. A cluster gear 43, which is similar to the cluster gear 39 and comprises the larger gear 44 and the smaller gear 45 integral therewith, is rotatably mounted on a shaft 46, disposed between the shaft 33 and the screw shaft 20, with the larger gear 44 in mesh with the pinion gear 36 on the shaft 33 and the smaller gear 45 in mesh with the gear 38 on the screw shaft 20. From the foregoing it will be seen that when the shaft 33 and the pinion gear 36 thereon are manually rotated by means of the hand lever 30 that the screw shafts 19 and 20 will be rotated in unison through the gear train 29 thereby mov-

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ing the movable member 3 and the jaw 9 carried thereby toward or away from the stationary member 1 and the jaw 5 carried thereby depending upon the direction of rotation of the shaft 33. It will also be seen that the torque applied to the shaft 33 will be greatly amplified between the shaft 33 and the screw shafts 19 and 20 by the gear train 29.

FIG. 6 shows a modified means for manually rotating the screw shafts 19 and 20 in unison by the hand lever 30. In this form of the invention a pair of side by side similar sprockets 50 and 51 are pinned or otherwise secured to the shaft 33. A sprocket 52 is pinned to the screw shaft 19 in alignment with the sprocket 50 and a sprocket 53, similar to the sprocket 52, is pinned to the screw shaft 20 in alignment with the sprocket 51. The sprockets 50 and 52 are connected together by an endless chain 54, and the sprockets 51 and 53 are connected together by an endless chain 55. It will therefore be apparent that when the shaft 33 and sprockets 50 and 51 thereon are manually rotated by the hand lever 30 the screw shaft 19 will be rotated by the sprocket 50 through the chain 54 and sprocket 52, and that the screw shaft 20 will be rotated in unison with the screw shaft 19 by the sprocket 51 through the chain 55 and sprocket 53. This form of the invention, as shown in FIG. 6, is especially adapted for use with smaller, less powerful vices of the aforesaid character.

From the foregoing it will be apparent to those skilled in this art that I have provided a very efficient mechanism for accomplishing the objects of the invention.

It is to be understood that I am not limited to the specific construction shown and described herein as various modifications may be made therein within the spirit of the invention and the scope of the appended claims.

I claim:

1. A vice of the aforesaid character comprising a stationary member which is adapted to be secured in fixed position and a movable member which is carried by said stationary member and is adapted to be moved toward and away from said stationary member, a pair of opposed similar jaws between which a work piece is adapted to be firmly clamped, one of said jaws being integral with said stationary member and extending upwardly and forwardly therefrom and the other of said jaws being integral with said movable member and extending upwardly and rearwardly therefrom, a pair of similar parallel sleeves which are longitudinally spaced from each other in a common horizontal plane to provide a vertical passage therebetween and are integral with said movable member and extend rearwardly therefrom and are slidably mounted in a pair of complementary bores in said stationary member, each of said sleeves comprising a top wall and a pair of spaced parallel side walls, a chamber formed in said movable member, a pair of similar longitudinally spaced parallel elongated externally threaded screw shafts rotatably mounted in said movable member and extending rearwardly therefrom with the rear ends thereof disposed within said chamber, one of said screw shafts being disposed in one of said sleeves and the other of said screw shafts being disposed in the other of said sleeves, a pair of similar internally threaded nuts through which said screw shafts are threaded, one of said nuts being mounted in fixed position in one of said bores and the other of said nuts being mounted in the other of said bores, and shaft rotating means disposed within said chamber by which

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said screw shafts are adapted to be manually rotated in unison to thereby move said movable member and the said jaw carried thereby toward and away from said stationary member and the said jaw carried thereby.

2. A vice of the character described as defined by claim 1 in which said shaft rotating means comprises an actuating shaft rotatably mounted in said movable member intermediate said pair of screw shafts with the rear end thereof disposed within said chamber and the forward end thereof disposed in front of said movable member, a hand lever operatively connected to the forward end of said actuating shaft by which said actuating shaft is adapted to be manually rotated, and interconnecting means within said chamber between said actuating shaft and said screw shafts through which said screw shafts are adapted to be rotated in unison by said actuating shaft.

3. A vice of the character described as defined by claim 2 in which said interconnecting means comprises a pinion gear secured to said actuating shaft within said chamber, a gear train interposed between said pinion gear and one of said screw shafts, and a similar gear train interposed between said pinion gear and the other of said screw shafts.

4. A vice of the character described as defined by claim 3 in which each of said similar gear trains comprises an idler shaft, a relatively larger gear secured to a screw shaft, and a cluster gear consisting of a larger gear and a smaller gear rotatably mounted on said idler shaft with said larger gear in mesh with said pinion gear and said smaller gear in mesh with the said relatively larger gear secured to said screw shaft.

5. A device of the character described as defined by claim 2 in which said interconnecting means comprises a pair of similar sprockets one of which is secured to each of said screw shafts, sprocket means secured to said actuating shaft, and chain means connecting said sprocket means to each of said similar sprockets.

6. A vice of the character described as defined by claim 2 in which said interconnecting means comprises a first pair of similar sprockets secured to said actuating shaft, a second pair of similar sprockets one of which is connected to one of said screw shafts in alignment with one of said first pair of similar sprockets and the other of which is secured to the other of said screw shafts in alignment with the other of said first pair of similar sprockets, a chain connecting the said one of said first pair of similar sprockets to the said one of said second pair of similar sprockets, and a second chain connecting the said other of said first pair of similar sprockets to the said other of said second pair of similar sprockets.

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