March 7, 1933. F. W. KUPPERSMITH 1,900,852

JIG AND FIXTURE LOCK

Filed Feb. 8, 1932 2 Sheets-Sheet 1

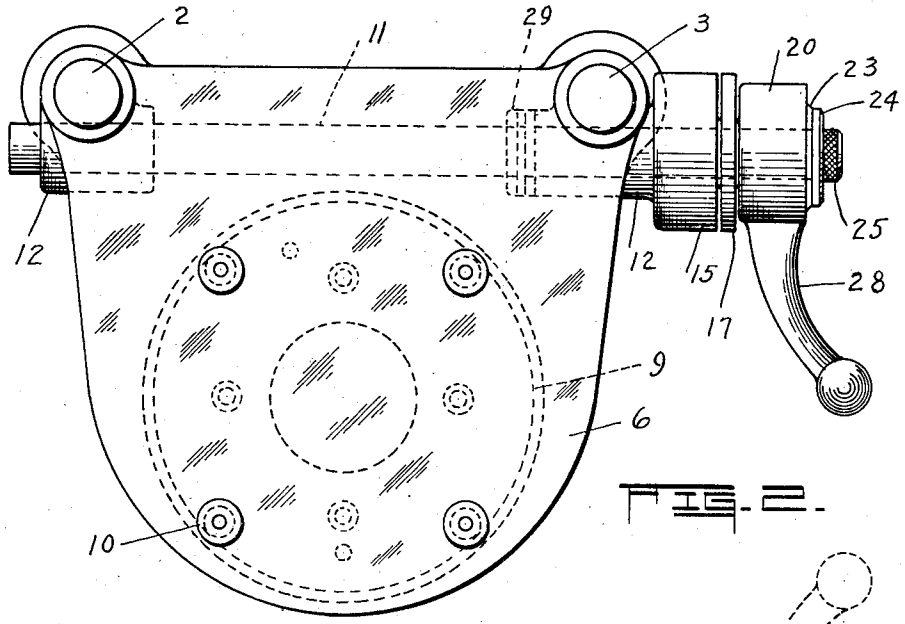

FIG. 2.

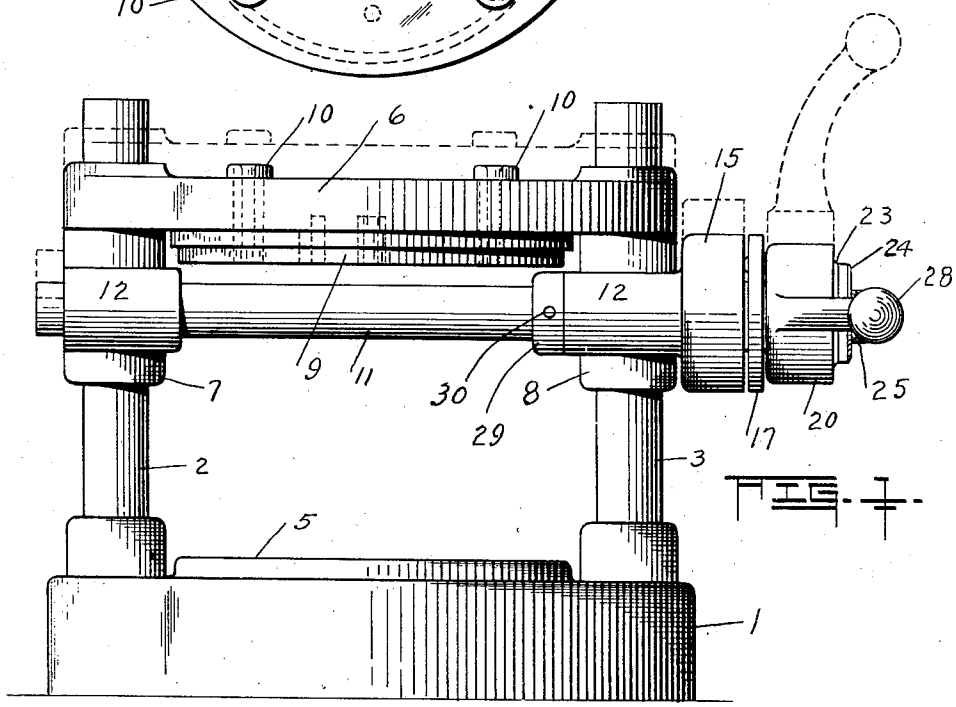

FIG. 1.

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Filed Feb. 8, 1932 2 Sheets-Sheet 2

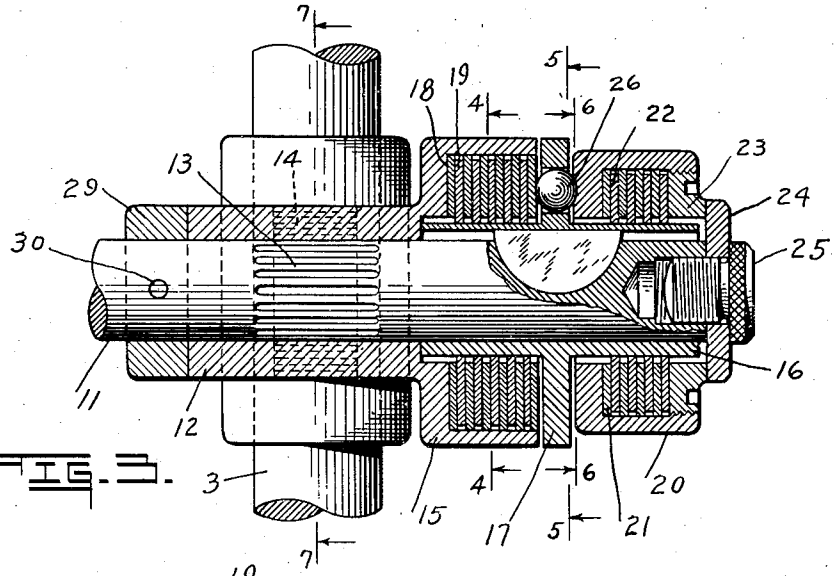

FIG. 3.

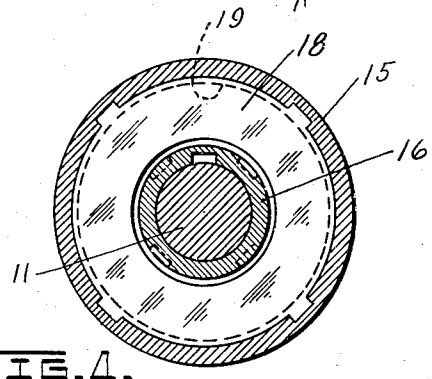

FIG. 4.

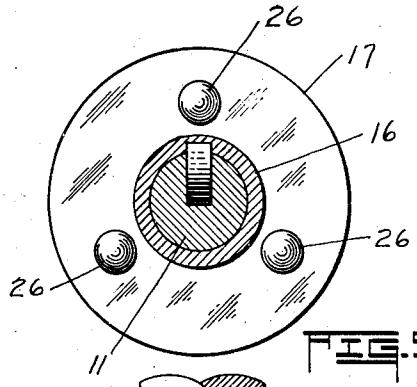

FIG. 5.

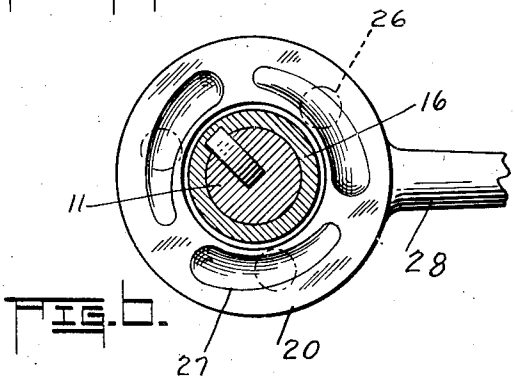

FIG. 6.

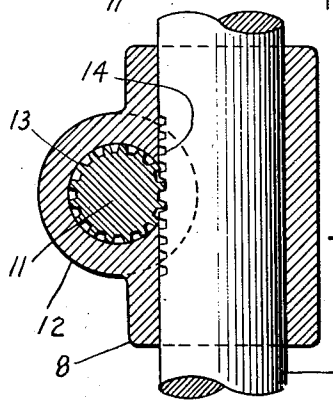

FIG. 7.

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Patented Mar. 7, 1933

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UNITED STATES PATENT OFFICE

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JIG AND FIXTURE LOCK

Application filed February 8, 1932. Serial No. 591,500.

This invention relates to improvements in jig and fixture locks.

It is an object of this invention to provide a means for quickly clamping material to be drilled and hold it firmly during the drilling by providing a lock which will positively hold the clamping means in place during the operation, which lock is actuated by the handle operating the clamping means and which is readily released by a movement of the handle in the opposite direction.

While the preferred form of this invention is illustrated upon the accompanying sheets of drawings, yet it is to be understood that minor detail changes may be made without departing from the scope thereof.

In the drawings;

Figure 1 is a view in front elevation of a drill jig embodying this improved fixture lock.

Figure 2 is a top plane view of Figure 1.

Figure 3 is an enlarged detail view partly in front elevation illustrating the shaft housing and locking mechanism in central vertical section.

Figure 4 is a view in section taken on the line 4—4 of the Figure 3 looking in the direction of the arrows.

Figure 5 is a view in section taken on line 5—5 on Fig. 3 looking in the direction of the arrows.

Figure 6 is a view in section taken on the line 6—6 on Figure 3, looking in the direction of the arrows.

Figure 7 is a view in section taken on the lines 7—7 of Figure 3 looking in the direction of the arrows and illustrating the guide post and rack in elevation.

The base 1 supports two parallel guide posts 2 and 3 which are rigidly secured thereto and supports upon its upper surface an integral circular pad 5 for engagement with the work to be held. Jig plate 6 is provided with depending bushings 7 and 8 which are adapted to slide over the guide posts 2 and 3 respectively and also with a depending work engaging pad 9 preferably arranged concentrically above the pad 5 upon the base. The plate 6 is provided with bushings 10 for the drills to pass through.

An operating shaft 11 is mounted to rotate in bearing 12 carried upon the bushings 7 and 8 respectively. The portions 13 of the shaft within the bearings are toothed to mesh with a corresponding toothed portion forming a rack 14 on each guide post 2 and 3 whereby upon rotation of the shaft, the jig plate 6 may be caused to approach or recede from the base to engage or release the material to be drilled.

In order to lock the jig plate automatically as it clamps the material to be drilled, the operating shaft 11 is extended beyond the bearing 12 and bearing 12 is provided with an enlarged housing 15 concentric with the shaft 11. A sleeve 16 is keyed to the shaft 11 and extends within the housing 15. The sleeve 16 is provided with a central outstanding flange 17 adjacent the open end of the housing 15. A plurality of disks are interposed between the closed end of the housing 15 and the flange 17 in which alternating disks 18 are keyed to the housing while alternating disks 19 are keyed to the sleeve 16, as shown in Figures 3 and 4. Another housing 20 is placed over the end of the sleeve 16 having a closed end adjacent the flange 17 and contains a plurality of alternating disks 21 keyed to the housing 20 and alternating disks 22 keyed to the sleeve 16. The open end of this housing is closed by a screw-threaded closure 23 which in turn is held by the washer 24 engaged by the screw 25 in the operating shaft 11. A plurality of balls 26 are mounted in apertures provided therefore in the flange 17 and are adapted to engage the adjacent disk within the housing 15 and the closed end of the housing 20. The closed end of the housing 20 is provided with a plurality of cam surfaces 27 in the form of depressions corresponding to the number of balls 26 and sloping in the same direction. The housing 20 is provided with an operating handle and the screw-threaded closure 23 is adjusted to place sufficient tension upon the disks 21 and 22 to cause the sleeve 16 to rotate with the movement of the handle and impart a similar rotation to the operating shaft 11. It is preferable to locate the deepest portion of the cam 27 op-

posite the balls 26 when the handle has been rotated to move the jig plate to the upper end of its travel.

When the material to be drilled is placed upon pad 5, the handle 28 is manually operated to cause the jig plate to descend and engage the said material and continued movement of the handle in the same direction causes the inclined surfaces of the cam 27 to force the balls 26 against the alternating plates 18 and 19 within the housing 15 with increasing pressure as the jig plate firmly engages the work which will lock the operating shaft against movement in the opposite direction until the operating handle is moved to release the pressure upon said disks whereby the material to be drilled once firmly engaged by the jig plate is positively held against vibration and will remain in that position during the operation of drilling and until the jig plate has been unlocked and caused to release the material.

The operating shaft 11 is held against longitudinal movement in the direction of the handle 28 by the sleeve 29 contacting the bearing 12 and secured to the shaft 11, as by the pin 30, and against movement in the opposite direction by the washer 24 secured to the end of the shaft engaging the housing 20.

While this improvement in jig and fixture locks has been described in connection with a work holder, it is to be understood that this improved lock may be applied in the same manner for the locking of any rotating shaft, particularly of the character described, and such as found in milling machine vices and fixtures without departing from the scope of this invention.

What I claim is:

1. A work holder including a base, a plurality of guide posts thereon, a jig plate reciprocable upon said guides, an operating shaft carried by the jig plate adapted to reciprocate the jig plate, an operating handle for the shaft, a multiple disk clutch connecting the handle to the jig plate including a fixed housing about the shaft, a sleeve therein keyed upon the shaft and extending therebeyond, an outstanding flange upon the sleeve exterior of said housing, a housing carried upon the handle surrounding said sleeve on the other side of said flange, a plurality of disks within the first housing alternately keyed to said housing and said sleeve, a plurality of disks within the handle housing alternately keyed to said housing and said sleeve, a plurality of balls interposed between the first housing disks and handle sleeve mounted in apertures provided therefore in said sleeve flange and a plurality of cam depressions in the handle sleeve adapted to co-act with the balls to exert varying pressure upon the housing disks upon rotation of the handle housing to lock or release the operating shaft.

2. A work holder including a base, a plurality of guide posts thereon, a jig plate reciprocable upon said guides, an operating shaft carried by the jig plate adapted to reciprocate the jig plate, an operating handle for the shaft, a multiple disk clutch connecting the handle to the jig plate including a fixed housing about the shaft, a sleeve therein keyed upon the shaft and extending therebeyond, an outstanding flange upon the sleeve exterior of said housing, a housing carried upon the handle surrounding said sleeve on the other side of said flange, a plurality of disks within the first housing alternately keyed to said housing and said sleeve, a plurality of disks within the handle housing alternately keyed to said housing and said sleeve, a plurality of balls interposed between the first housing disks and handle sleeve mounted in apertures provided therefor in said sleeve flange, a plurality of cam depressions in the handle sleeve adapted to co-act with the balls to exert varying pressure upon the housing disks upon rotation of the handle housing to lock or release the operating shaft, and means upon the handle sleeve to impart adjustable pressure upon the disks therein.

3. A work holder including a base, a plurality of guide posts thereon, a jig plate reciprocable upon said guides, an operating shaft carried by the jig plate adapted to reciprocate the jig plate, an operating handle for the shaft, a multiple disk clutch connecting the handle to the jig plate including a fixed housing about the shaft, a sleeve therein keyed upon the shaft and extending therebeyond, an outstanding flange upon the sleeve exterior of said housing, a housing carried upon the handle surrounding said sleeve on the other side of said flange, a plurality of disks within the first housing alternately keyed to said housing and said sleeve, a plurality of disks within the handle housing alternately keyed to said housing and said sleeve, a plurality of balls interposed between the first housing disks and handle sleeve mounted in apertures provided therefore in said sleeve flange, a plurality of cam depressions in the handle sleeve adapted to co-act with the balls to exert varying pressure upon the housing disks upon rotation of the handle housing to lock or release the operating shaft, means upon the handle sleeve to impart adjustable pressure upon the disks therein, and means for rotatably securing the handle housing to the end of the operating shaft.

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