Dec. 29, 1931. J. E. LOVELY 1,838,692

DRIVING FIXTURE

Filed April 8, 1930 2 Sheets-Sheet 1

Fig. 1.

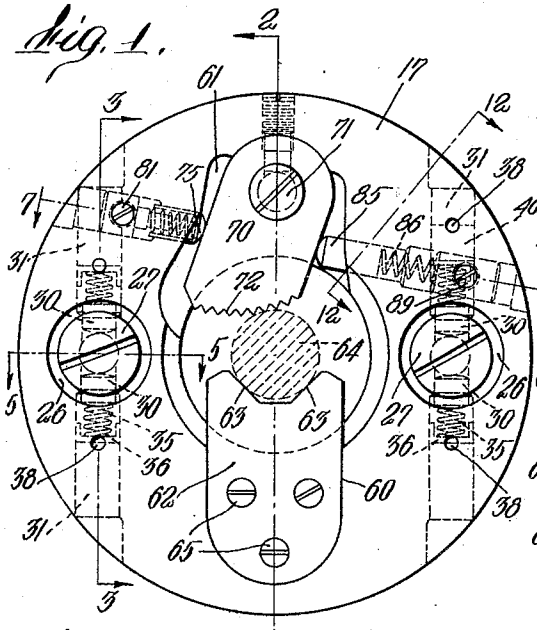


Fig. 2.

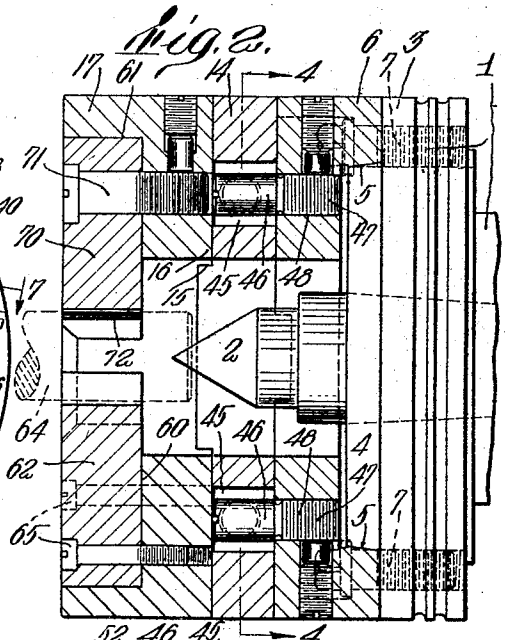


Fig. 3

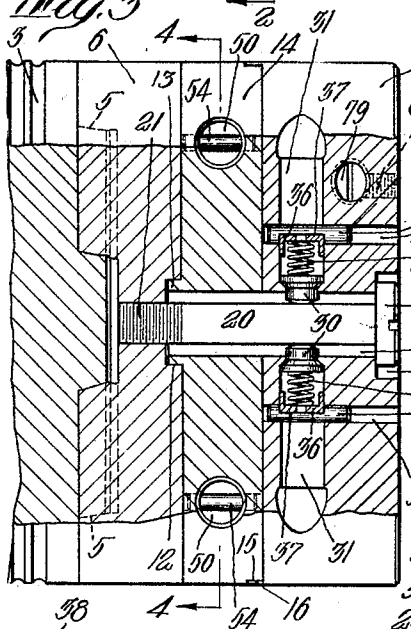


Fig. 4.

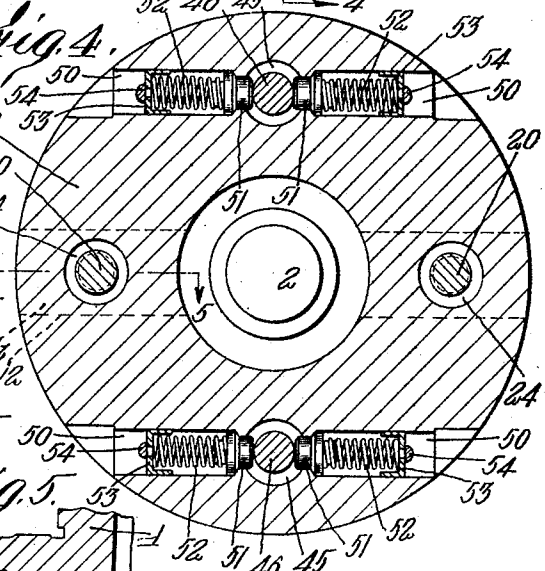


Fig. 5.

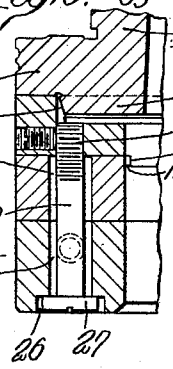
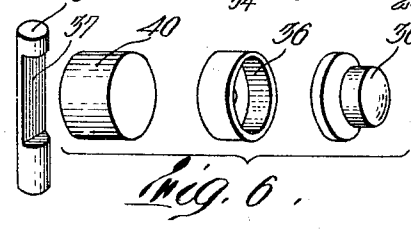


Fig. 6.



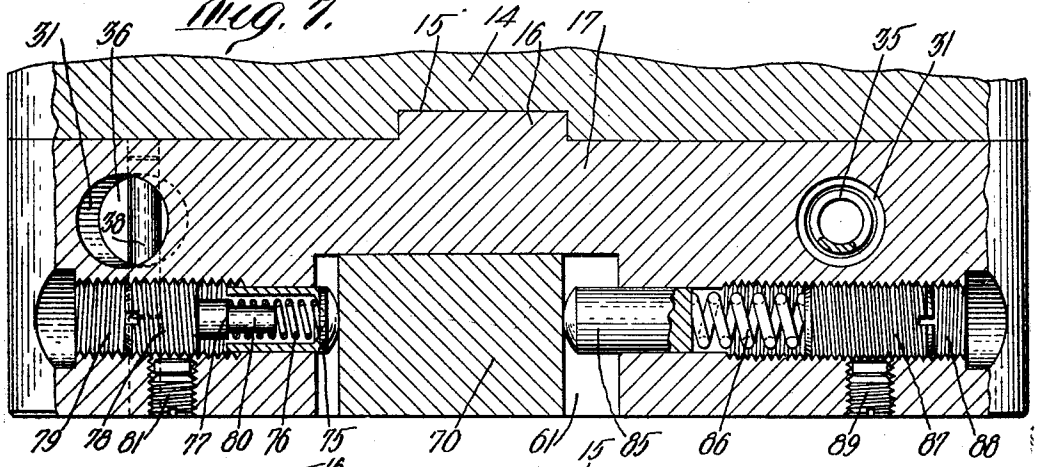
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Dec. 29, 1931. J. E. LOVELY 1,838,692

DRIVING FIXTURE

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Fig. 7.



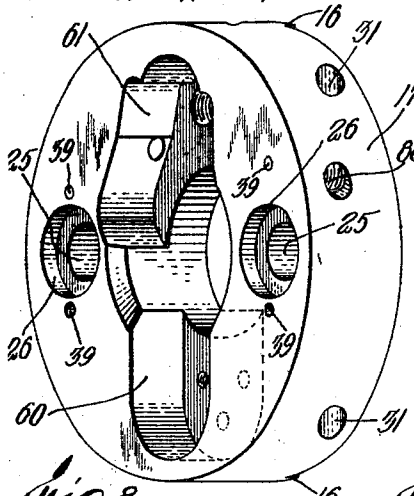


Fig. 8.

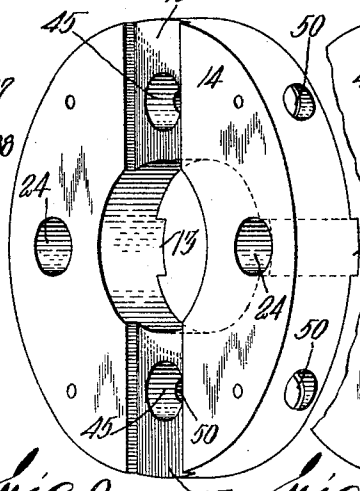


Fig. 9.

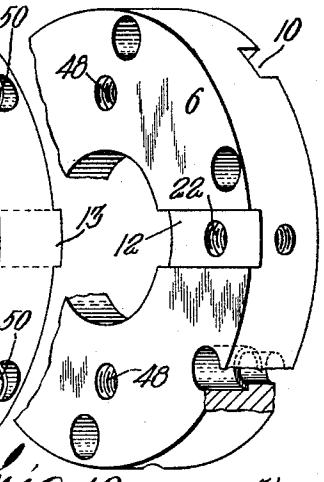


Fig. 10.

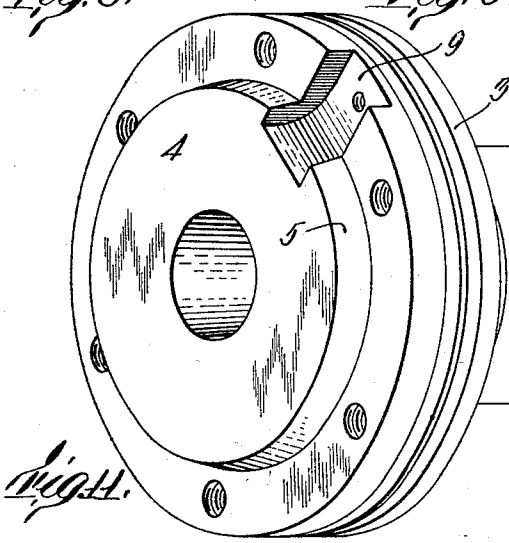


Fig. 11.

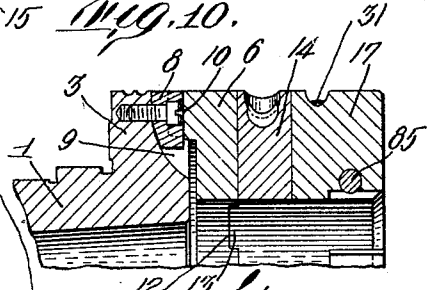


Fig. 12.

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UNITED STATES PATENT OFFICE

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DRIVING FIXTURE

Application filed April 8, 1930. Serial No. 442,563.

This invention relates to devices for grasping work to rotate it with a rotary work spindle and has for an object to produce such a device which will drive the work without subjecting it to unequal driving pressure and yet which will release the work readily when desired and which is simple and inexpensive to make. To these ends it comprises a ring having a fixed jaw and cooperating therewith a pivoted jaw, the pivoted jaw having an eccentric work-engaging face, the ring being mounted for floating movement in any direction transverse to the work axis so as to equalize the driving pressure of the jaws on the work.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which

Figure 1 is a front elevation of the device.

Figures 2 and 3 are sections on lines 2—2 and 3—3, respectively, of Figure 1.

Figure 4 is a section on line 4—4 of Figure 3.

Figure 5 is a detail section to a smaller scale on line 5—5 of Figure 4.

Figure 6 is a disassembled perspective of certain parts of a spring centering mechanism.

Figure 7 is a detail section to a larger scale on line 7—7 of Figure 1.

Figures 8 to 11 inclusive are perspectives, Figure 10 showing parts broken away, of certain of the elements.

Figure 12 is a detail section on line 12—12 of Figure 1.

Referring to Figures 2 and 11, at 1 is shown a work spindle carrying a live center 2. This work spindle is shown as provided with a nose portion 3 having a central circular projection 4 provided with a conical periphery as 5. In engagement with this nose portion and having a recess fitting against this conical periphery is a base ring member 6 which may be secured to the spindle nose as by means of the bolts 7. As shown in Figure 12, the member 3 may be provided with a key piece 8 seated in a slot 9 therein, as shown best in Figure 11, and in a notch 10 in the rear face of the base ring member 6, as shown in Figure 10, whereby rotation of the work spindle imparts rotation to the base member 6. This base member 6, as shown best in Figure 10, is provided with a transverse groove or guideway 12 on its forward face within which is slidable a pair of guide lugs 13 on an intermediate ring member 14 shown detached in Figure 9. This ring 14 has on its forward face a guideway or groove 15 arranged at right angles to the guide lugs 13 to receive guide lugs 16 on a jaw-carrying ring 17 shown detached in Figure 8. These three ring members are held assembled together by a pair of headed posts 20 best shown in Figures 3 and 5, these posts having their inner ends threaded as at 21 and engaged in threaded holes 22 in the base member 6. These posts 20 pass through enlarged openings 24 in the intermediate member 14, and 25 in the jaw member 17 and the openings 25 are provided with counterbored outer ends as 26 within which the heads 27 of these posts ride. This construction permits the intermediate member 14 to slide to a limited extent transversely of the base member 6 in one direction as limited by its guiding engagement with the base member and also permits the jaw-carrying member 17 to slide to a limited extent across the face of the intermediate member 14 in a single direction permitted by its engagement with the intermediate member at right angles to the motion of the intermediate members relative to the base member. By a combination of these two motions it will be evident that the jaw-carrying member 17 is permitted a limited floating movement in any direction in a plane transverse to the work axis.

Means are provided for yieldingly centering the jaw-carrying ring 17. To this end, spring means for centering the member 17 with reference to the intermediate member 14 comprise spring-pressed plugs 30 riding in openings 31 in the jaw-carrying member 17 and bearing against opposite sides of the posts 20 in the direction of relative movement between the member 17 and the member 14. As shown best in Figure 3, these plugs 30 are held pressed against the posts 20 by means of coil springs 35 reacting between the rear faces of these plugs and seat

cup members 36, a plug and a cup member being shown detached in Figure 6. All except one of these seat members 36 engages directly against a flattened portion 37 of a pin 38 seated in a perforation 39 extending from face to face of the member 17. The other of these seat members 36, four being shown in connection with the posts 20, is backed up by a plug or block 40 which is seated against a pin 38. This plug 40 is employed in this particular instance to permit the perforation 39 to be placed sufficiently far from the post 20 to avoid conflicting with centering mechanism for a jaw member, to be presently described. Spring means are also employed to center the intermediate member with respect to the base member as follows. The intermediate member 14 is provided with a pair of enlarged openings 45 within each of which extends the outer end portion of a post 46. Each of these posts has its inner end threaded as at 47 and engages in a threaded hole 48 in the base member 6. The intermediate member 14, as shown best in Figure 4, is provided with pairs of alined openings 50 within which are slidably mounted centering plugs 51 which bear against opposite faces of each of the posts 46 in a direction parallel to the relative sliding motion permitted by the engagements of the intermediate and base members. These plugs 51 are similar in construction to the plugs 30 hereinbefore described and are held pressed against opposite sides of the posts 46 by springs 52 seated in socket members 53 held by their engagement in the flattened portions of pins 54, all in a similar manner to the centering devices for the jaw ring 17 which are carried therein as previously described. Thus it will be seen that the jaw ring is yieldingly held centered with respect to the axis of the work spindle.

The front face of the member 17 is provided with a pair of oppositely disposed socket depressions 60 and 61. The depression 60 is formed to receive rigidly therein a work-engaging jaw 62 having its inner end forked to present a pair of inclined faces 63 for engagement with the work shown in dotted lines at 64 and the end of which is supported on the live center 2 in the usual manner. This jaw member 62 is fixed rigidly in position as by the screws 65. Cooperating with this rigid forked jaw member is a jaw member 70 which is so designed that its work-engaging face may yield away from the jaw member 62. For this purpose it is shown as pivoted as at 71 within the upper portion of the recess 61 and is provided with a work-engaging face 72 shown as serrated for the better engagement with the work, this face being arranged eccentric to the pivot 71. Thus as the jaw 70 is rocked, its work-engaging face is brought closer to or farther from the axis of the work. It is normally held centered with its work-engaging face spaced to receive and engage the work of the particular size for which it is designed during rotation of the spindle and so that it may be readily released when the spindle is stationary so that the work may be removed. This is accomplished by means of spring centering devices such as are shown best in Figure 7. As there shown one comprises a plunger 75 having a closed end engaging an edge face of the jaw member 70 and enclosing a coil spring 76. This spring reacts against an annular shoulder 77 on a plug 78 having threaded engagement with a threaded opening 79 extending inwardly from the edge portion of the jaw-carrying ring 17. This threaded plug 78 is also provided with a stem portion 80 which centers the spring 76. The plug 78 is shown as fixed in position by a set screw 81. The opposite spring pressed plunger is shown as a solid plug 85 against which bears a spring 86 reacting between the rear end of this plug and a threaded plug 87 engaging in a mating threaded opening 88 in the jaw-carrying member 17, this plug 87 being also fixed in position by means of a set screw 89. The spring 86 is stronger and stiffer than the spring 76 so that the jaw may yield readily in releasing direction when the operator desires to remove the work from the machine, this being important for the reason that the work must be moved away from the fixed jaw 62 in order to disengage it from the fixture. In normal driving condition, however, the rotating pressure of the fixture against the work resisted by the action of the tools tending to prevent rotation of the work holds the jaws in tight gripping relation to the work.

An embodiment of this invention having thus been described it should be evident to those skilled in the art that various changes and modifications might be made therein without departing from the spirit or scope of this invention as defined by the appended claims.

I claim:

1. In combination with a spindle, a base member coaxial with said spindle, an intermediate member carried by said base member and slidable transversely thereof in one direction, a jaw ring carried by said intermediate member and slidable transversely of said axis at right angles to the sliding direction of said intermediate member, means for yieldingly centering said slidable ring member coaxially with said spindle, a jaw having a pair of angularly disposed work-engaging faces fixed to said ring, a pivoted jaw carried by said ring diametrically opposite to said fixed jaw and having an eccentric work-engaging face, and spring means for holding said pivoted jaw in engagement with

work extending through said ring between said jaws.

2. In combination with a spindle, a base member fixed coaxially to said spindle, an intermediate member, said base and intermediate members being formed complementally to permit sliding of said intermediate member across the face of said base member and transversely of said spindle axis in one direction, a jaw-carrying member, said jaw-carrying member and intermediate members being formed complementally to permit said jaw member to slide across the face of said intermediate member at right angles to the direction of movement of said intermediate member relative to said base member, springs tending to hold said members in coaxial arrangement, and a fixed work-engaging jaw and a yieldable cooperating work-engaging jaw carried by said jaw member.

3. In combination with a spindle, a base member fixed coaxially to said spindle, an intermediate member, said base and intermediate members being formed complementally to permit sliding of said intermediate member across the face of said base member and transversely of said spindle axis in one direction, a jaw-carrying member, said jaw-carrying member and intermediate members being formed complementally to permit said jaw member to slide across the face of said intermediate member at right angles to the direction of movement of said intermediate member relative to said base member, a fixed work-engaging jaw and a yieldable cooperating work-engaging jaw carried by said jaw member, posts carried by one of said base and intermediate members and extending through enlarged openings in the other of said two members, spring means in said other member bearing on said posts to hold said intermediate member yieldingly centered with reference to said base member, posts extending through enlarged openings in one of said intermediate and jaw-carrying members, and spring means carried by one of said intermediate and jaw-carrying members to yieldingly center said jaw-carrying member with reference to said intermediate member.

4. In combination with a spindle, a base member fixed coaxially to said spindle, an intermediate member, said base and intermediate members being formed complementally to permit sliding of said intermediate member across the face of said base member and transversely of said spindle axis in one direction, a jaw-carrying member, said jaw-carrying member and intermediate members being formed complementally to permit said jaw member to slide across the face of said intermediate member at right angles to the direction of movement of said intermediate member relative to said base member, a fixed work-engaging jaw and a yieldable cooperating work-engaging jaw carried by said jaw member, spring means tending to center said intermediate member relative to said base member, and spring means tending to center said jaw-carrying member relative to said intermediate member.

5. In combination with a spindle, a base member fixed coaxially to said spindle, an intermediate member, said base and intermediate members being formed complementally to permit sliding of said intermediate member across the face of said base member and transversely of said spindle axis in one direction, a jaw-carrying member, said jaw-carrying member and intermediate members being formed complementally to permit said jaw member to slide across the face of said intermediate member at right angles to the direction of movement of said intermediate member relative to said base member, a fixed work-engaging jaw and a yieldable cooperating work-engaging jaw carried by said jaw member, posts extending through enlarged openings in said jaw-carrying and intermediate members and secured in said base member, posts extending through enlarged openings in said intermediate member and secured in said base member, spring means carried by said intermediate member and bearing on said last-mentioned posts and centering said intermediate member relative to said base member, and spring means in said jaw-carrying member and bearing on said first-mentioned posts for centering said jaw-carrying member relative to said intermediate member.

6. In combination with a spindle, of a base member fixed coaxially to said spindle, an intermediate member, said base and intermediate members being formed complementally to permit sliding of said intermediate member across the face of said base member and transversely of said spindle axis in one direction, a jaw-carrying member, said jaw-carrying member and intermediate members being formed complementally to permit said jaw member to slide across the face of said intermediate member at right angles to the direction of movement of said intermediate member relative to said base member, a fixed work-engaging jaw and a yieldable cooperating work-engaging jaw carried by said jaw member, headed posts extending through enlarged openings in said jaw-carrying and intermediate members and secured in said base member, posts extending through enlarged openings in said intermediate member and secured in said base member, spring means carried by said intermediate member and bearing on said last-mentioned posts and centering said intermediate member relative to said base member, and spring means in said jaw-carrying member and bearing on said headed posts for centering said jaw-carrying member relative to said intermediate member, the heads of said headed posts engaging

the front face of said jaw-carrying member and holding said members assembled.

7. A device of the class described comprising a member having means for securing it to the end portion of a spindle, and means carried by said member for gripping work arranged in axial alinement with said spindle, said gripping means comprising a jaw having a forked work-engaging face, a jaw pivoted to said member opposite to said forked face and having a work-engaging face eccentric to its pivot, said forked face jaw being rigidly secured to said member, said member securing means including connections permitting floating of said member transversely of the axis of said spindle in any direction and yielding centering mechanism.

8. In combination, a ring member, means for supporting said member from a rotary work spindle for yielding floating in any direction transverse to the axis of said spindle, a fixed forked work-engaging jaw carried by said member, a jaw cooperating with said fixed jaw to engage the work and pivoted to said member, said pivoted jaw having a work-engaging face eccentric to its pivot, and opposed spring means engaging opposite edges of said pivoted jaw for holding said pivoted jaw in position for rotation of said spindle in driving direction to cause said jaws to grip the work, said spring means tending to release said pivoted jaw having a stiffer spring than its opposed means to facilitate release of the work when said spindle is stationary.

In testimony whereof I have affixed my signature.

JOHN E. LOVELY.