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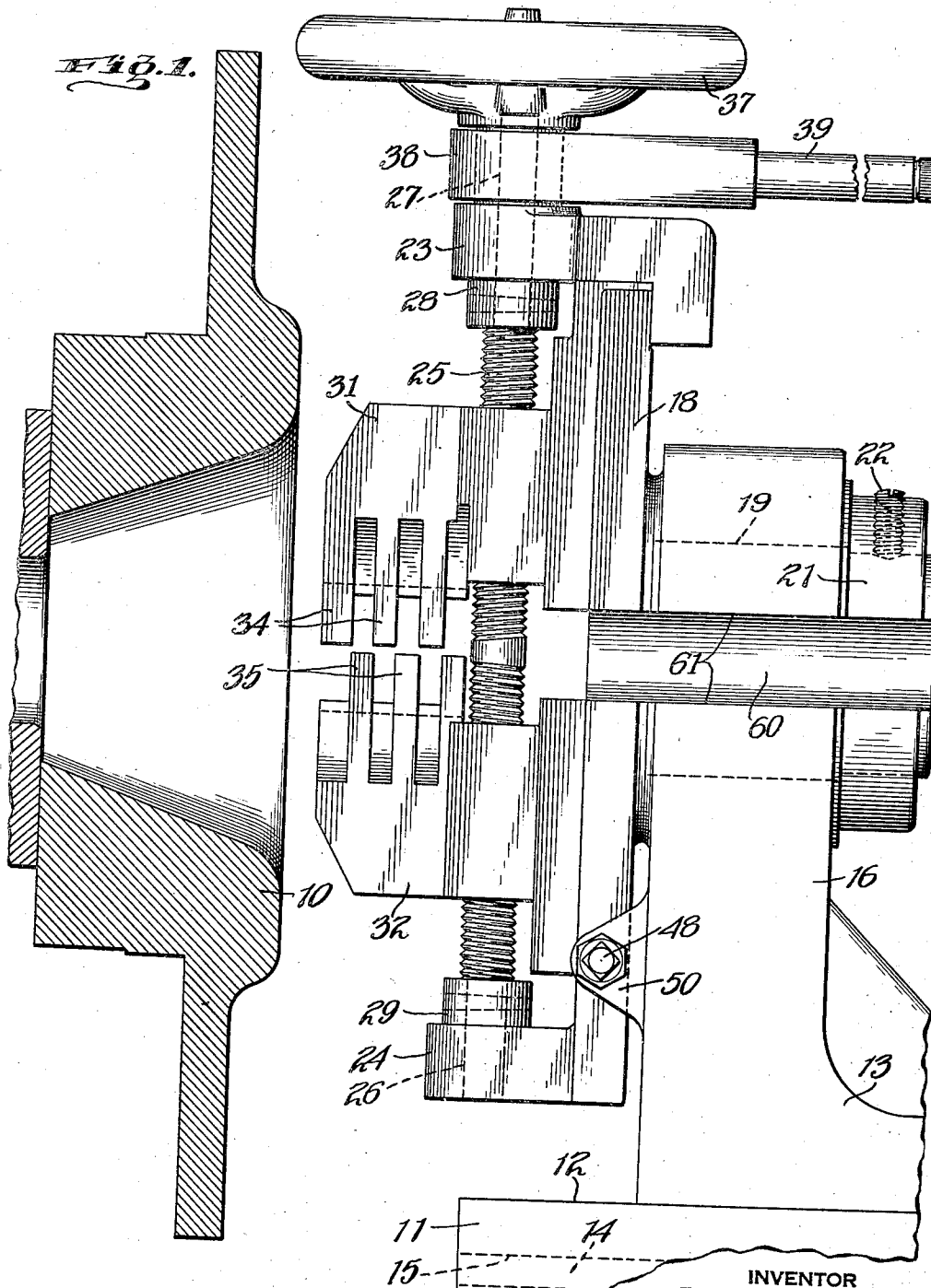
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2,240,688

WORK HOLDER FOR ROTARY SWAGING MACHINES

Filed Jan. 23, 1937

2 Sheets-Sheet 1



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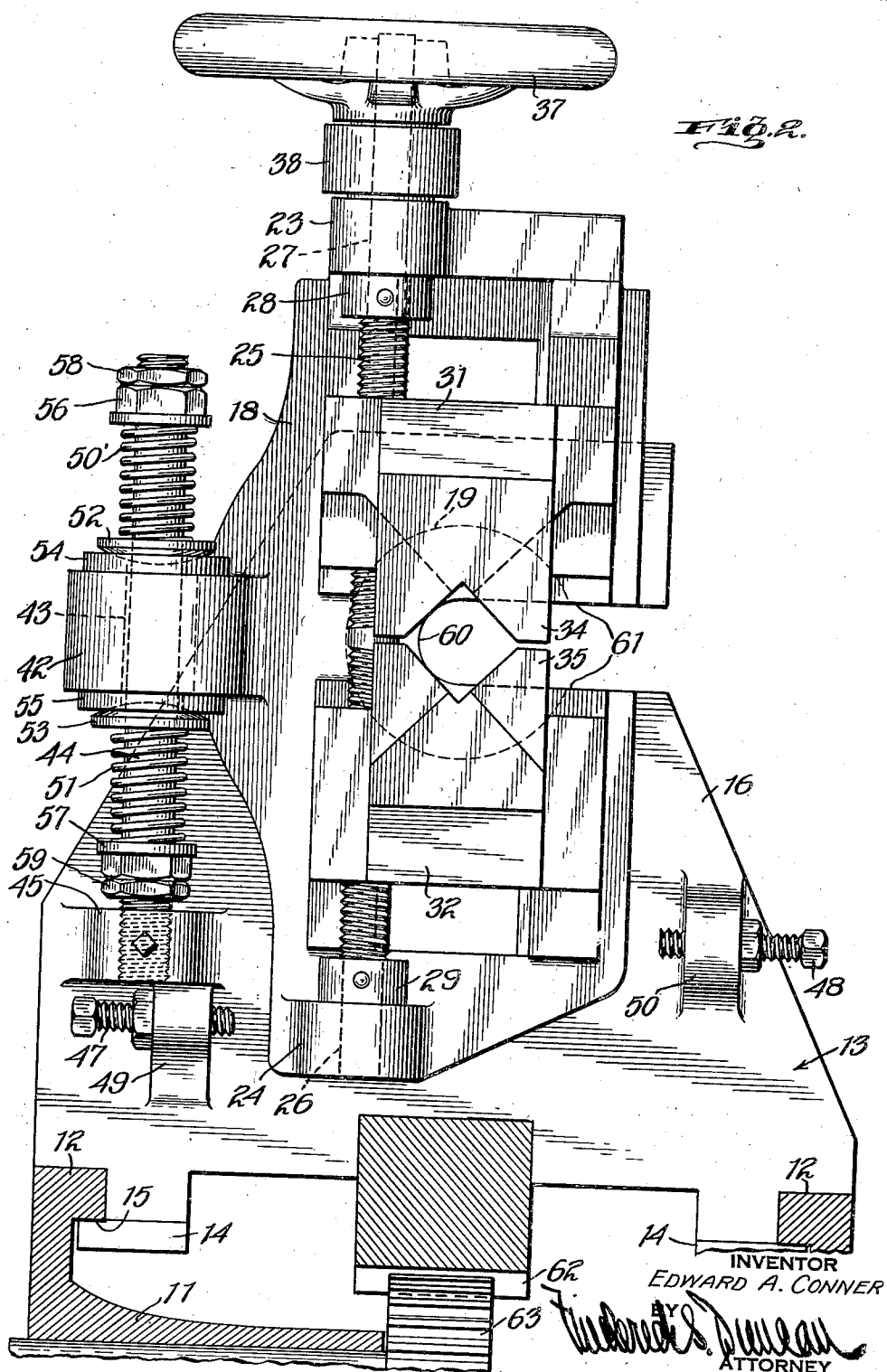
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UNITED STATES PATENT OFFICE

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WORK HOLDER FOR ROTARY SWAGING MACHINES

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13 Claims. (Cl. 78—101)

The present invention relates to work holders for rotary swaging machines. In such machines hammers or dies are arranged to deliver blows simultaneously at diametrically opposite points on the work, the hammers being revolved at high speed about the work so that the points of impact progress spirally thereon as the work is fed into the machine. At each impact the work is momentarily gripped by the revolving dies and dragged thereby rotationally. If such rotary movement were not resisted the work would be rotated at the same speed as the hammers revolve and the points of impact would not progress about the work. On the other hand, if the work were rigidly held against rotation it might be twisted and possibly broken off by the drag of the impacting dies. It is common practice to feed light work into a swaging machine by hand, thereby providing a non-positive resistance to rotation which will allow the work to recover between blows and prevent a cumulative effect of the intermittent dragging impacts. With long light work a mechanical holder which will resist rotation may be employed provided there is sufficient torsional spring in the work between the gripped portion and the swaged end to enable the latter to spring back between impacts. Heavy work, however, presents a difficult problem because of the difficulty of holding the work manually against the powerful drag of the revolving dies, and because, if the body of the work is positively held against torsion, the swaged end will be twisted, at least superficially, and the swaging will not be uniform.

An object of the present invention is to provide a work holder which will yield rotationally to the drag of the revolving dies but will recover between impacts.

A more specific object of the invention is to provide a work holder capable of limited rotational movement with respect to a supporting feed carriage, such motion being resisted by spring means in either direction from a normal position.

Another object of the invention is to provide a work holder into which the work may be conveniently introduced laterally instead of endwise when an enlarged end such as a sleeve or a ferrule is to be swaged on the end of an elongated member.

Other objects and advantages of my invention will appear in the following description of a preferred embodiment and thereafter the novelty

and scope of the invention will be set forth in the claims.

In the accompanying drawings;

Figure 1 is a view in side elevation of my improved work holder applied to a swaging machine, a portion of the swaging machine being shown in section; and

Fig. 2 is an end view of the work holder looking from the right hand side of Fig. 1.

The mouth of a swaging machine is shown at 10 in Fig. 1. The construction of the swaging machine plays no part in the present invention and it will be understood that the machine may be of any well known standard type. The frame 11 of the swaging machine is formed with slideways 12 on which a carriage 13 is mounted to slide. As shown fragmentally in Fig. 2, the carriage is provided with projecting rails 14 which bear against undercut faces 15 on the slideways 12. Rising from the body of the carriage is a bracket 16 which is adapted to provide a pivotal support for a work holder. This work holder comprises a vertically disposed body plate 18, integrally formed with a shaft 19 which is mounted to turn in a suitable journal formed in the bracket 16. A collar 21 is fitted upon the outer projecting end of this shaft and is suitably secured thereon, as by a set screw 22, so as to hold the shaft against axial displacement.

At the top of the plate 18 there is an overhanging bracket 23 and opposite this bracket at the lower end of the plate there is another bracket flange 24. A clamping screw 25 is provided with a lower extension 26 of reduced diameter which is journaled in a hole formed in the lower bracket 24. The upper end of the screw is also provided with an extension 27 of reduced diameter which is journaled in and passes through the upper bracket 23. Collars 28 and 29 are mounted on these extensions and bear respectively against the opposed faces of the brackets. The collars are pinned fast to the extensions so as to maintain the clamping screw against axial displacement.

The plate 18 is formed with vertical slideways in which are fitted slide blocks 31 and 32. The clamping screw 25 is threaded through these slide blocks, the upper half of the screw being reversely threaded with respect to the lower half thereof, so that upon turning the screw in one direction the slide blocks will be spread apart and upon turning the screw in the opposite direction they will be fed toward each other. The upper slide block 31 is provided with a series of

depending jaw plates 34 which are spaced apart to receive therebetween a similar set of jaw plates 35 projecting from the lower block 32. In each set of jaw plates there is a transversely disposed V-shaped slot, the slots being so relatively disposed that a rectangular opening concentric with the axis of shaft 19 is provided at all times between the jaws of the slide blocks, the size of this opening being variable by the extent to which the jaws are moved toward or away from each other.

In order to adjust these clamping jaws a hand wheel 37 is fixed to the outer end of the extension 27 of the screw 25. This provides a quick means of tightening the jaws upon the work or releasing them from the work. In order to provide a more powerful adjustment of the jaws so as to clamp the work very tightly, I provide a reversible ratchet mechanism 38. This may be of any standard form operable by ratchet lever 39, whereby after the work has preliminarily been gripped by the jaws, the latter may be tightened upon the work by operating the lever 39.

The work holder plate 18 is provided with an extension arm 42 projecting laterally and through which a vertical hole 43 is bored. A vertical shaft 44 passes loosely through this hole. This shaft is fixed at its lower end in a boss 45 on the carriage 13. Because of the clearance between the shaft 44 and the bore 43, the work holder may oscillate on its horizontal shaft 19, but to limit such rocking movement I provide a pair of stop screws 47 and 48 suitably spaced from opposite edges of plate 18. These stops are adjustable in bosses 49 and 50 respectively on the carriage 13.

To hold the extension arm 42 normally in horizontal position, I provide on the shaft 44 a pair of springs 50 and 51 which bear respectively against a pair of lenticular washers 52 and 53. The latter have convex faces seated in suitable concavities formed in leveling washers 54 and 55 respectively. These washers have flat faces which bear respectively against opposite faces of the extension arm 42. The outer ends of the springs bear against nuts 56 and 57 respectively threaded on the shaft 44 and firmly locked at desired adjustment by lock nuts 58 and 59 respectively.

The shaft 19 has a concentric bore 60 through which work may be introduced axially. In some cases where the body of the work is of smaller diameter than the part to be swaged it is desirable to introduce the work into the holder laterally instead of axially. To this end a slot 61 is cut through the shaft to the bore 60 and this lateral slot is also continued through the plate 18, bracket 16, and collar 21. The width of the slot 61 is equal to the diameter of the bore 60 in the shaft 19. Thus, when a piece of work is to be introduced into the machine the jaws are spread apart by operating the hand wheel 37 and then the work may be introduced laterally between the jaws through the slot 61 after which the hand wheel 37 is operated to grip the work and center it with respect to the mouth of the swaging machine. Thereafter the ratchet lever 39 is operated in the proper direction to tighten the jaws upon the work. The carriage 13 is now fed forward to introduce the end of the work between the swaging dies. This feed of the carriage may be effected mechanically. To this end the carriage carries a rack 62 which is engaged by a pinion 63 and the latter may be operated by

means of suitable gearing (not shown) to feed the work into and out of the swaging head.

As the swaging hammers impact the work they are momentarily clutched thereto causing the work holder to move angularly with them during the brief clutching period, but this angular motion is resisted by one of the springs and the greater the angle of motion of the holder the greater will be the spring resistance. Between impacts the holder swings back to and past normal position and such motion past normal is cushioned by the other of the springs. Thus it will be seen that I provide a floating work holder with spring means resisting torsional movement of the work in either direction from normal and tending to restore the work to normal position between impacts. Thus, the cumulative effect of the torsional drag of successive impacts is overcome.

While I have described a preferred embodiment of my invention it will be understood that this is to be taken as illustrative and not limitative and that I reserve the right to make various changes in form, construction and arrangement of parts without departing from the spirit and scope of my invention as set forth in the following claims.

I claim:

1. A work holder for a rotary swaging machine, comprising a support, a chuck mounted thereon and adapted to grip the work that is to be swaged, said chuck being angularly movable with respect to the support on the longitudinal axis of the work, and resilient means resisting such angular motion of the chuck in either direction.

2. A work holder for a rotary swaging machine, comprising a support, a chuck mounted thereon and adapted to grip the work that is to be swaged, said chuck being angularly movable with respect to the support on the longitudinal axis of the work, resilient means resisting such angular motion of the chuck in either direction, and means limiting such angular motion.

3. In combination with a rotary swaging machine, a holder for work to be swaged comprising, a carriage mounted to move in the direction of the axis of rotation of the machine, a chuck carried by the carriage and adapted to grip the work that is to be swaged, said chuck being mounted to move angularly on said axis, and resilient means opposing such angular movement of the chuck in either direction.

4. In combination with a rotary swaging machine, a holder for work to be swaged comprising, a carriage mounted to move in the direction of the axis of rotation of the machine, a chuck carried by the carriage and adapted to grip the work that is to be swaged, said chuck being mounted to move angularly on said axis, resilient means opposing such angular movement of the chuck in either direction, and means limiting such angular motion.

5. In combination with a rotary swaging machine, a holder for work adapted to be swaged in the machine, said holder comprising a carriage mounted to move toward and from the swaging machine in the direction of the axis of rotation of the machine, a chuck mounted on the carriage and adapted to grip and center the work with the longitudinal axis thereof in alignment with said axis of rotation, said chuck being angularly movable in its mounting on said longitudinal axis and being formed with a laterally projecting arm, and a pair of springs disposed respectively between the carriage and opposite sides of the arm

and adapted to hold the arm resiliently in a neutral position.

6. In combination with a rotary swaging machine, a holder for work adapted to be swaged in the machine, said holder comprising a carriage mounted to move toward and from the swaging machine in the direction of the axis of rotation of the machine, a chuck mounted on the carriage and adapted to grip and center the work with the longitudinal axis thereof in alignment with said axis of rotation, said chuck being angularly movable in its mounting on said longitudinal axis and being formed with a laterally projecting arm, a pair of springs disposed respectively between the carriage and opposite sides of the arm, and means for adjusting the springs to hold the arm resiliently in a neutral position.

7. In combination with a rotary swaging machine, a holder for cylindrical work adapted to be swaged in the machine, said holder comprising a carriage mounted to move toward and from the swaging machine in the direction of the axis of rotation of the machine, a chuck mounted on the carriage and adapted to grip and center the work with the longitudinal axis thereof in alignment with said axis of rotation, said chuck being angularly movable in its mounting on said longitudinal axis and being formed with a laterally projecting arm, a pair of springs disposed respectively between the carriage and opposite sides of the arm and adapted to hold the arm resiliently in a neutral position, and means for limiting such angular motion of the chuck.

8. In combination with a rotary swaging machine, a holder for cylindrical work adapted to be swaged in the machine, said holder comprising a carriage mounted to move toward and from the swaging machine in the direction of the axis of rotation of the machine, a chuck mounted on the carriage and adapted to grip and center the work with the longitudinal axis thereof in alignment with said axis of rotation, said chuck being angularly movable in its mounting on said longitudinal axis and being formed with a laterally projecting arm, a pair of springs disposed respectively between the carriage and opposite sides of the arm, means for adjusting the springs to hold the arm resiliently in a neutral position, and adjustable stops for limiting such angular motion of the chuck.

9. In combination with a rotary swaging machine, a work holder comprising, a carriage mounted to move in the direction of the axis

of rotation of the machine, a chuck formed with a stud, said carriage being formed with a bearing for the stud in axial alignment with said axis of rotation of the machine, and resilient means resisting rotation of the chuck with respect to said bearing, said bearing and said stud being laterally slotted to permit of introducing the work laterally into the chuck, the chuck including means for gripping the work and centering the same with respect to said axis.

10. In combination with a rotary swaging machine, a work holder comprising, a carriage mounted to move in the direction of the axis of rotation of the machine, a chuck formed with a stud, said carriage being formed with a bearing for the stud in axial alignment with said axis of rotation of the machine, and resilient means resisting rotation of the chuck with respect to said bearing, said bearing and said stud being laterally slotted to permit of introducing the work laterally into the chuck, said chuck being formed with opposed jaws adapted to grip and center the work with respect to said axis, and means for simultaneously operating the jaws in opposite directions and to the same extent.

11. In combination with a rotary swaging machine, a work holder comprising, a carriage mounted to move in the direction of the axis of rotation of the machine, a chuck journaled on the carriage and adapted to grip and center the work on said axis, and means limiting rotation of the chuck in its journal, the chuck and its journal being laterally slotted to permit of introducing the work laterally into the chuck.

12. In combination with a rotary swaging machine, a work holder comprising, a carriage mounted to move in the direction of the axis of rotation of the machine, and a chuck journaled on the carriage and adapted to grip and center the work on said axis, the chuck and its journal being laterally slotted to permit of introducing the work laterally into the chuck.

13. A work holder for a rotary swaging machine, comprising a support, a chuck mounted thereon and adapted to grip the work that is to be swaged, said chuck being angularly movable with respect to the support on the longitudinal axis of the work, and means yieldingly resisting such angular motion of the chuck in either direction and operating to return and cushion said chuck on its return to and past neutral position.

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