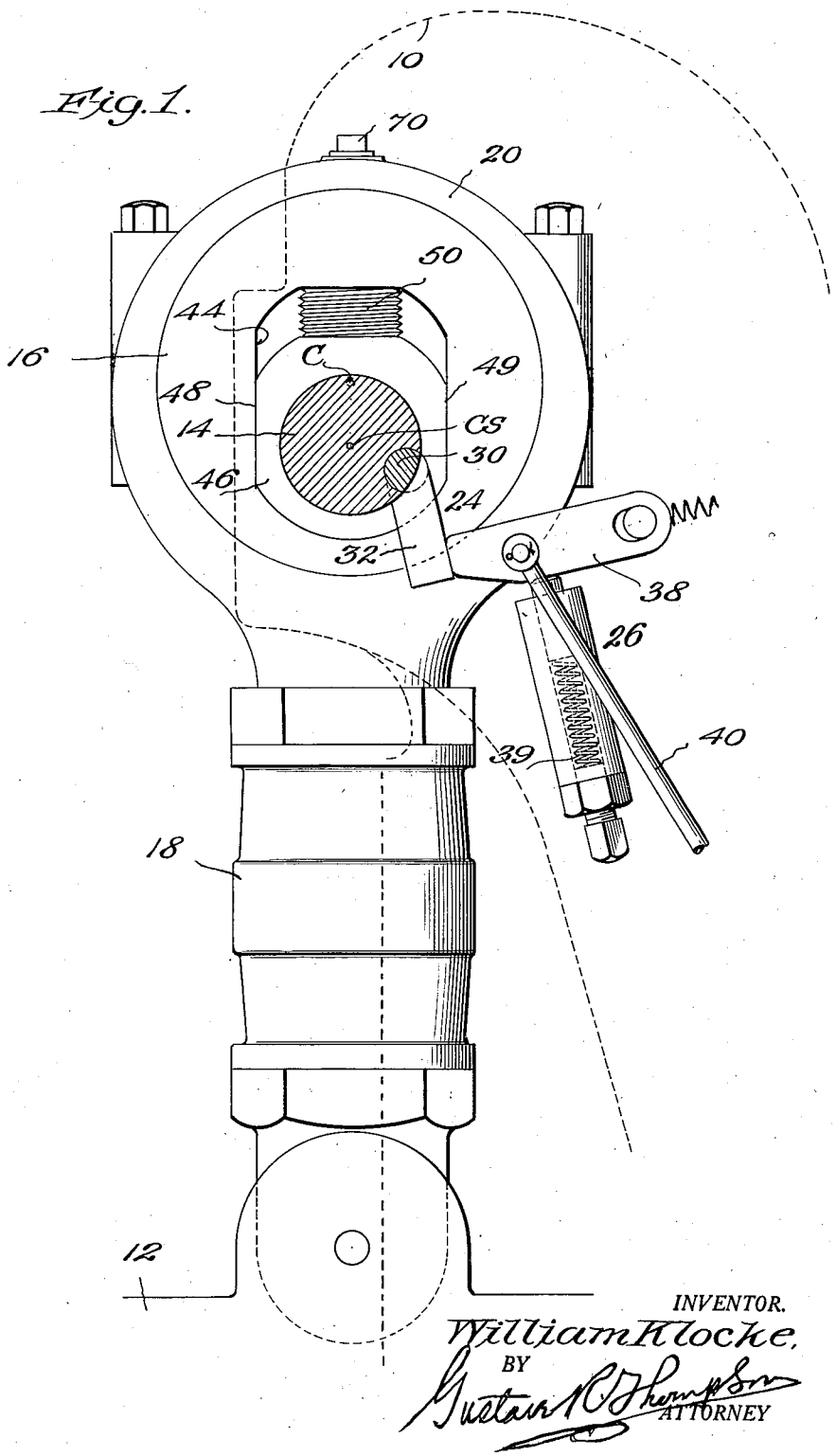
Sept. 3, 1935. W. KLOCKE 2,013,468

ADJUSTABLE STROKE PRESS

Filed April 14, 1934 2 Sheets-Sheet 1

Fig. 1.



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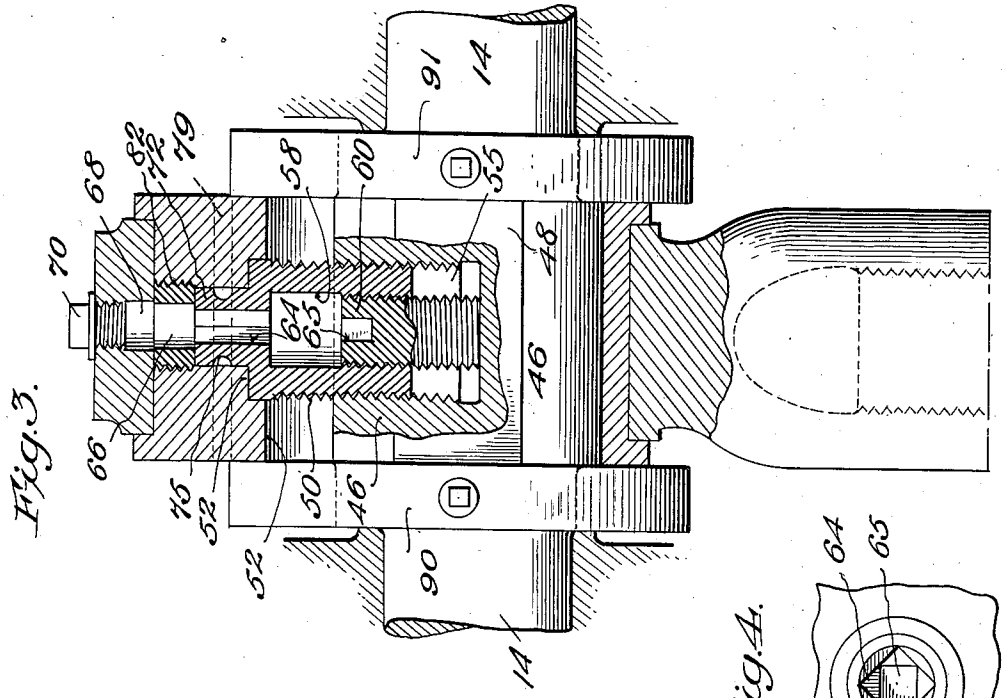

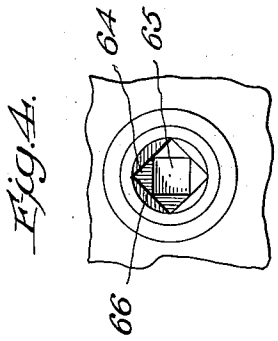

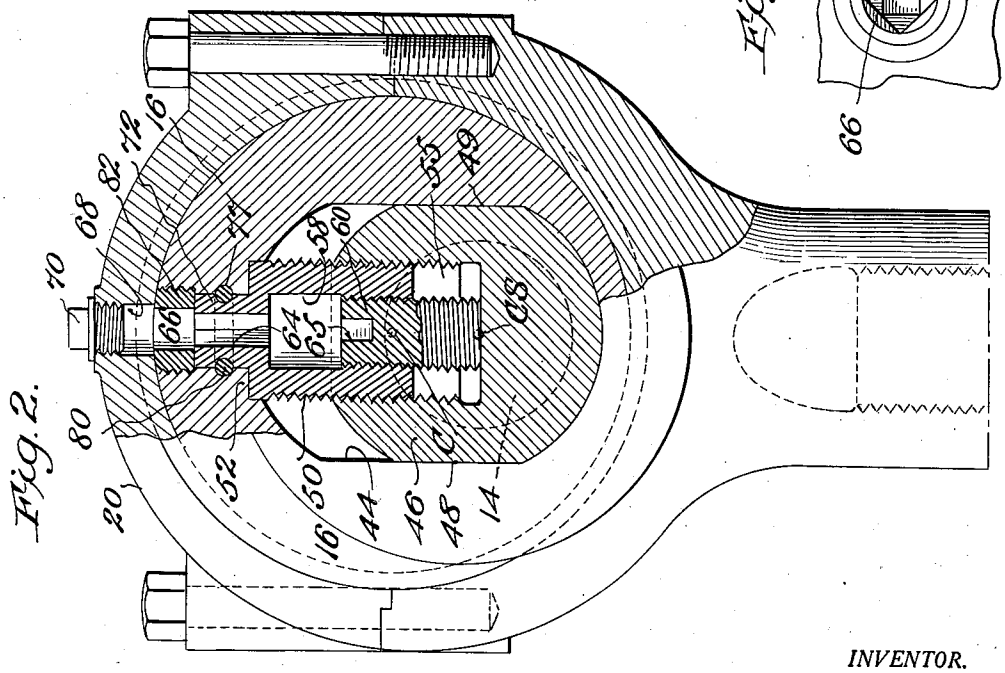

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UNITED STATES PATENT OFFICE

2,013,468

ADJUSTABLE STROKE PRESS

William Klocke, Woodhaven, N. Y.

Application April 14, 1934, Serial No. 720,551

6 Claims. (Cl. 74—571)

This invention relates to presses or the like, and more particularly to the slide-actuating mechanism thereof, and provides improvements therein.

It has heretofore been proposed to provide in a press means for adjusting the stroke of the slide, so that a single press, instead of having a stroke of but one length, may be made to have more than one length of stroke. The press-user with such a press may select one of a number of stroke-lengths permitted by the adjustment-means which is best suited to the work which he wishes to do from time to time, and thus enjoy an advantage comparable to having at his command a number of presses having different strokes.

The means previously employed usually require substitution of parts, or dis-assembling some part or parts of the press to make the adjustment. In many, the constructions are not well conceived from the standpoint of standing-up under the working strains encountered in press-operation, and are not amenable to ready adjustment.

Presses are customarily furnished with brakes and with a positive clutch of one type or another by which the movement of the slide is stopped on the completion of a complete stroke, and started to complete another stroke. The clutch and brake are usually timed to stop and start the slide from the top of the stroke. The principal advantages of this are; that the maximum clearance between the punch (carried by the slide) and the die (carried by the bed) is provided at the time the slide is at rest so the part of the metal forced into the die by the punch may be lifted out of the die with the maximum clearance between the punch and the article which has been lifted out of the die; and that the weight of the slide and connections when stopped in the top-position does not act against the clutch and brake, and hence there is an easier action on the clutch parts at the time of stopping, and also other advantages.

The present invention provides a slide-actuating mechanism by which the stroke may be adjusted and by which the stopping position, for each position of adjustment of the stroke-adjustment means, remains at the top of the stroke of the slide.

The invention further provides a slide actuating mechanism by which adjustments of the stroke-adjustment means may be effected without substituting dis-assembling or disturbing any part of the press or of the slide actuating mechanism.

The invention further provides a slide actuating mechanism in which the strains on the working stroke are transmitted by compression through the adjustment means to the shaft; and in which said adjustment means receive and transmit the working-strains through broad surfaces with a considerable factor of safety against shearing in the parts which receive and transmit said strains; and in which the adjustment means are of relatively simple construction, and in which the stroke-adjustments may be quickly and readily made.

An embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation of a press (with the frame shown in dotted lines and the fly-wheel omitted) embodying my invention.

Fig. 2 is a transverse view, partly in side elevation, and partly in section, of the slide-actuating mechanism, the slide and connecting-rod being omitted.

Fig. 3 is a front view, partly in elevation and partly section, of the parts shown in Fig. 1.

Fig. 4 is a detail view looking down through the top of the strap and into the sockets of the parts by which the adjustments are effected.

Referring to said drawings, numeral 10 designates the side frame of a press, 12 a reciprocating slide (on which a punch is customarily mounted), 14 a shaft, 16 an eccentric mounted thereon and driven thereby, 18 the connecting-rod between eccentric and slide, and 20 a strap on the connecting rod in which the eccentric turns.

Numeral 24 designates a clutch between the shaft 14 and the driving member, usually the fly-wheel (not shown), and 26 the clutch operating mechanism. The clutch 24 may be of the rolling-key type, as shown, and comprises a key 30 turning in a recess in the shaft and having a tail 32 by which it is turned into dis-engaging position. A spring (not shown) presses the key into the engaging position. A clutch of this type is disclosed in Patent #710,199. As here shown the clutch-operating mechanism comprises a dog 38 normally held in position to engage the tail 32 on the rolling key 30 by a spring 39. 40 designates the treadle-rod by which the dog 38 is moved out of the path of the tail 32, whereupon the key 30 may turn and enter a notch in the driving member, thereby coupling the driving member and shaft 14 so that the shaft 14 is turned and actuates the slide. Upon the release of the treadle-rod 40, the dog 38 moves into position to engage the tail 32 and disengage the clutch by turning key 30.

According to my invention, the eccentric 16 is provided with a slot 44 through which the shaft 14 passes. This slot 44 is somewhat elongated, and, to the end that the clutching and declutching may take place at the top position of the slide 12 irrespective of the adjustment of the stroke, the said slot 44 is made so that the center C of the eccentric 16 is movable along a radius or line from the shaft-center CS from one position of adjustment to another. The eccentric centers and the shaft center remain in one straight line in all positions of adjustment of the eccentrics.

The part 46 of the shaft 14 which passes through the eccentric is preferably enlarged to strengthen it, and made eccentric with its center between the centers C and CS. A torque-transmitting connection is also preferably provided between shaft 14 and the eccentric 16, and for this purpose the part 46 of the shaft may be provided with parallel flat faces 48, 49 which engage flat sides provided on the eccentric facing the slot 44.

The eccentric center C is movable toward and from the shaft center CS, and for fastening the eccentric 16 in its different positions of adjustment a means in the form of a screw 50 having points of bearing on the shaft 14 and on the underside 52 of the eccentric within the slot 44 is provided. The screw 50 preferably has a double bearing on the shaft 14. The part 46 of the shaft is provided with a recess 55 and may be provided with threads to engage external threads on the screw 50, thus providing one of said bearings. The screw 50 is also preferably provided with a threaded socket 58 in which fits a threaded plug 60, which may be forced against the bottom of recess 55, so that the screw 50 may also bear on shaft 14 through said plug. The plug 60 when forced against the bottom of recess 55, jams the internal and external threads on screw 50 and thus acts as a means to lock the screw 50 in its adjusted positions.

On laboring part of the working stroke, in which the shaft 14 and eccentric 16 move through an arc from 90° plus to 180° from the position shown in Figs. 1, 2, and 3, the strains are borne and transmitted from the eccentric 16 to the screw 50 through broad areas of contact between the head of the screw and the underside 52 of the eccentric; from the screw 50 to the shaft 14 through ample threads in the recess 55, and also through the plug 60 and ample threads in the socket 58. The strains are transmitted from the eccentric 16 to the shaft 14 by compression, and the parts are readily susceptible to being formed with a large factor of safety against sheaving strains. The torque-transmitting connection between the shaft and the eccentric also bears a part of the working strains.

Means are provided for turning the screw 50 and the plug 60. These means may be internal-nuts 64, 65 respectively on the screw and plug. The length of a side of the nut 64 is preferably made slightly larger than the diagonal across the nut 65, (Fig. 4) to facilitate the use of a wrench, passing through the nut 64, in the nut 65. An opening 66 through the eccentric 16 from its peripheral face provides access to the internal nuts 64, 65, and the strap 20 is also provided with an opening 68 which may be made to match the opening 66 when it is desired to turn the screw 50 and plug 60 to effect adjustments of the stroke. 70 is a screw-plug for closing the opening 68.

The screw 50 and associated parts are within the dimension of the eccentric, and by the means described manipulation of the requisite parts for adjusting the stroke can all be made without replacement or disturbing or dis-assembling any of the parts of the press or of the actuating mechanism. The adjustments moreover are capable of being quickly and easily made.

A swivel-means is preferably provided for retaining the screw 50 against longitudinal movement with relation to the eccentric 16. This may be a reduced neck 72 on the screw 50 which projects into opening 66, the latter being made large enough to accommodate the neck, and the internal-nut 64 being conveniently formed in this neck-portion. The neck may be grooved, as indicated at 75 and the wall of the opening 66 may be provided with a matching groove 77 forming part of a hole 79 extending laterally through the eccentric. A pin (or pins) 80 occupying the grooves 75 and 77 retains the screw 50 against longitudinal movement with relation to the eccentric. A threaded collar 82 engaging corresponding threads in the eccentric may be provided to provide a bearing for the top of the reduced-neck-portion of screw 50 and thus increase the bearing-area between the screw and the eccentric 16.

The recess 55 is made of sufficient depth, so that clearance is provided between the highest point of the screw 50 (when at the bottom of socket 55) and the underside of the eccentric within the slot 44, and provision thereby made for sliding the eccentric laterally over the shaft and screw 50 in assembling the parts.

Removable collars 90, 91 act as checks at each side of the eccentric 50 to restrain lateral displacement.

By arranging the eccentric center C above the shaft center CS in the position of the parts shown in Fig. 1, where the shaft 14 is in the position where the clutch pin 30 is engaged and disengaged, and where the slide 12 is at the top of its stroke, the construction is such that the top of the stroke will correspond to the clutch engaging and disengaging position for each position of adjustment of the stroke.

Operation

To adjust the stroke of the slide 12, the parts are brought to the position shown in Figs. 1, 2, and 3 of the drawings. The screw plug 70 is removed, and the wrench inserted through the opening 68 and through the internal-nut 64 into the internal-nut 65, and the screw-plug 60 turned to back it off from its seat against the bottom of the recess 55. The wrench is then withdrawn and another wrench of the size to fit the internal-nut 64 on the screw 50 is inserted through the opening 68, and the screw 50 turned in a direction to bring the eccentric center C toward the shaft-center CS, or vice versa. When the eccentric has been shifted to the desired extent with relation to the shaft center, the screw-plug 60 is again forced down against its seat at the bottom of the socket 55 jamming the threads between the plug 60 and the screw 50 and between the latter and the threads in recess 55. The screw 50 is thus securely fastened in its adjusted position.

As heretofore explained, the clutch engaging and disengaging position remains at the top-of-the-stroke position of the slide 12 for each position of adjustment of the stroke adjusting means, and the adjustments may be affected without disturbing or disassembling or substituting any of the press parts.

The invention may receive other embodiments

than that herein specifically illustrated and described.

What is claimed is:

1. In a press or the like, a reciprocating slide, and actuating mechanism therefor, comprising an eccentric, a shaft passing through said eccentric having a threaded recess therein, said eccentric being slotted in such manner that its center is adjustable toward and from the shaft center, and a screw within said eccentric engaging said threaded recess for fastening said eccentric in its adjusted positions, said screw having a threaded socket therein, and a threaded plug engaging said socket and having a seat on the bottom of the recess in said shaft.

2. In a press or the like, a reciprocating slide, and actuating mechanism therefor, comprising an eccentric, a shaft passing through said eccentric having a threaded recess therein, said eccentric being slotted in such manner that its center is adjustable toward and from the shaft center, and a screw within said eccentric engaging said threaded recess for fastening said eccentric in its adjusted positions, said screw having a threaded socket therein, and a threaded plug engaging said socket and having a seat on the bottom of the recess in said shaft, said screw and plug each having internal nuts in alinement, and said eccentric having an opening through its peripheral face also in alinement with said internal-nuts.

3. In a press or the like, a reciprocating slide, and actuating mechanism therefor comprising an eccentric, a shaft having parallel flat faces thereon, said eccentric having a slot therein of a width equal to the distance apart of said flat faces on the shaft, said shaft passing through the slot in said eccentric with the flat faces thereon in contact with the sides of said slot, said eccentric being spaced from said shaft to a limited extent at the ends of the slot, in such manner that its center is adjustable toward and from the shaft center, torsion being transmitted by said shaft to said eccentric through said flat faces, and a screw radially of the shaft center for fastening said eccentric in its adjusted positions, said shaft having a threaded recess therein also radially of the shaft center, said screw engaging the threads of said recess and projecting within the slot in the eccentric to provide a support through which radial stresses are transmitted from the eccentric to the shaft.

4. In a combination according to claim 3, said shaft being enlarged at the part within the eccentric and offset at the recess to provide additional metal for the formation of the said flat faces and recess.

5. In a combination according to claim 3, said screw having a reduced neck provided with an internal nut, said eccentric having a hole therein providing a socket for said neck and an opening for access to said internal nut.

6. In a combination according to claim 3, said screw having a reduced neck provided with an internal nut, said eccentric having a hole therein providing a socket for said neck and an opening for access to said internal nut, said recess being of such depth and said slot being of such length that the high point of the screw will clear the underside of the eccentric within said slot when the shaft and eccentric centers are most widely apart.

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