April 16, 1935. W. KLOCKE 1,998,242

ADJUSTABLE STROKE PRESS

Filed April 14, 1934

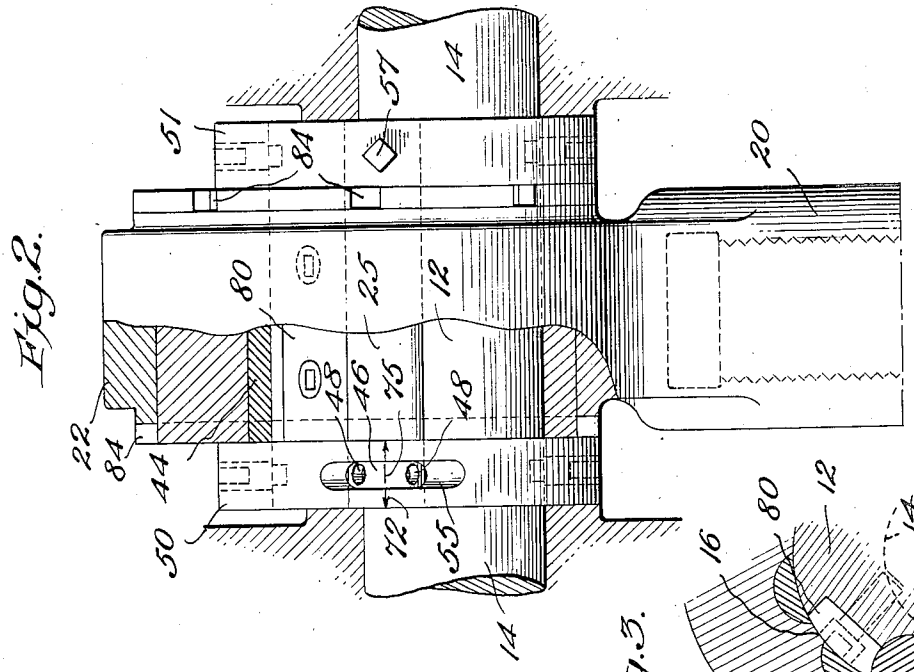


Fig. 2.

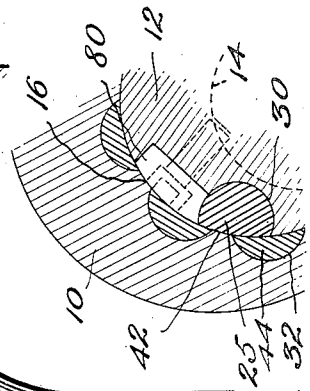


Fig. 3.

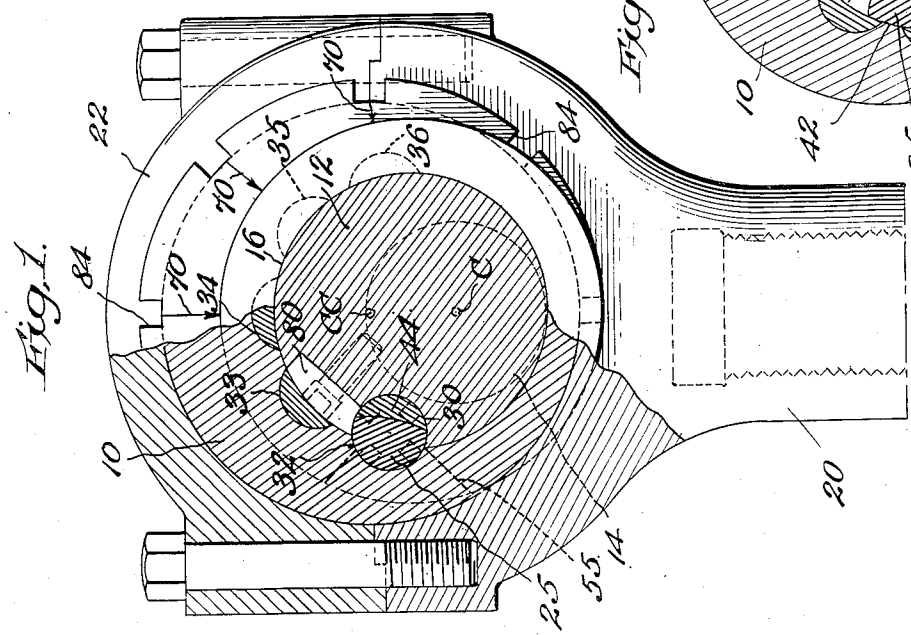


Fig. 1.

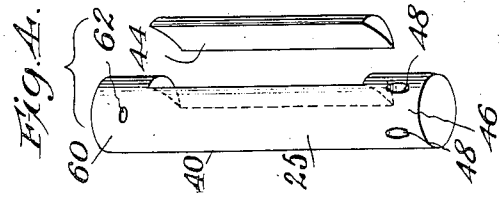


Fig. 4.

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ADJUSTABLE STROKE PRESS

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3 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 stand-point of standing-up under the working strains encountered in press-operation, and are not amenable to ready adjustment.

A plurality of superposed eccentrics which are relatively movable to vary the combined throw thereof, one of which is on a shaft, has heretofore been employed as part of the actuating means for press-slides, or the like. Novel means are provided by the present invention for locking such adjustable eccentrics together in various relative positions thereof, which locking means comprises segmental notches running across the faces of eccentrics which are in bearing-contact, and constituting complemental parts of a circle, the segmental notch in one eccentric being larger than its complemental notches in the other eccentric; and a key having a segmental portion which occupies the larger segmental notch, in one of its positions, and which occupies one or another of the smaller segmental notches and a substantial portion of the larger segmental notch when turned through 180°, thereby locking the eccentrics so that they are securely held against relative movement when the shaft in which the eccentrics are mounted is turned in either direction. The key may further comprise two segmental portions,—a larger one, as described, and a smaller one of a size which corresponds to that of the smaller segmental notches, so that when the two segmental key-portions together occupy complemental notches, the entire space within the notches is occupied and deflection of the larger segmental key-portion, when it occupies a position in both notches and a powerful force is transmitted through the eccentrics, is prevented. Key-segments corresponding to the smaller key-segment may be provided in each of the smaller notches, to change places with and to act the part of the smaller key-segment described above, at each of the adjusted positions of the eccentrics.

The present invention provides a slide actuating mechanism in which the parts of the stroke-adjusting means which sustain the stresses particularly the stresses on the laboring-part of the working stroke have an area of contact comparable to the area of contact of the slide-actuating shaft in its bearings, and in which the parts which sustain the torque are of such character as to virtually eliminate failure under stress; the mechanism is simple, strong and reliable, and sustains the driving torques with equal ability when applied in either direction.

The invention further provides a slide-actuating mechanism by which adjustments of the stroke-adjusting means may be effected without substituting or dis-assembling any part of the press or of the slide-actuating mechanism, and with relative ease and speed.

An embodiment of the invention is illustrated in the accompanying drawing; wherein

Fig. 1 is a view partly in side elevation and partly in vertical section of parts of the slide-actuating mechanism of the press;

Fig. 2 is a view, at right angles to Fig. 1, partly in elevation and partly in section;

Fig. 3 is a sectional view illustrating the mode of adjustment;

Fig. 4 is a view in perspective of the locking key;

Referring to said drawing, numerals **10** and **12** designate a plurality of eccentrics (here shown as two), and **14** a shaft or other suitable means for driving the eccentrics. The eccentrics **10** and **12** bear upon one another, as indicated at **16**, and are relatively movable so that the combined "throw" of the eccentrics with relation to the axis of rotation, may be adjusted, as hereinafter more fully explained. The eccentric **12** next to the shaft **14** is preferably formed as an enlargement or integral part of said shaft, as shown.

The slide is conveniently actuated from the eccentrics by means of a conecting rod **20** (part of which is shown) having a strap **22** surrounding the eccentrics and in which the eccentrics turn. In a cam-type-of-press the strap could be omitted.

During normal operation the shaft **14** and the eccentrics turn as a unit, and a means is pro-

vided for locking them together in various relative positions thereof, each locked position corresponding to a different length of stroke of the slide-actuating mechanism. The locking means comprises a key **25**, and notches in two eccentrics of a pair immediately related to one another, the eccentrics **10** and **12** in the embodiment illustrated, these being in immediate contact. One of the eccentrics, as the eccentric **12** has at least one notch **30** formed therein, and the other eccentric has a plurality of notches formed therein as indicated at **32, 33, 34, 35** and **36**. The notches **30, 32** etc, are segmental, and complemental, that is the notch **30** and notch **32** (or **33, 34, 35** or **36**) are complemental segmental parts of a circle. The segmental notch **30** is larger than each of the complemental segmental notches **32, 33, 34, 35, 36**. The key **25** in its locking position occupies two notches in register, as for example **30** and **32**, or the notch **30** and one or another of the notches **33** to **36**.

The means for locking the eccentrics is so made that the position of the eccentrics may be changed, to adjust the stroke, without dis-assembling any part of the press or slide-actuating mechanism. To this end, the key **25** and the notches **30** to **36** inclusive are formed so that the key may be turned or rotated in the notches, and the key is provided with an eccentric segmental portion **40**, which in the locking-position shown in Fig. 1, occupies two notches in register (notches **30, 32**), and in the unlocking position (Fig. 3) occupies space in only one notch (notch **30**, Fig. 3), the profile of its face **42** preferably conforming to the contiguous face of the related eccentric (i. e. to the profile of the common plane **16**).

The key **25** is preferably made as a split key comprising the larger eccentric segmental portion **40**, and a smaller complemental segmental portion **44**, as illustrated, the key being shown in detail in Fig. 4. The split is along the line or plane common to the related eccentrics **10** and **12**, so that the portion **44**, in the unlocking position of the key, is wholly within one notch, as for example notch **32**, as shown in Fig. 3. Relative movement between the key parts **40** and **44**, in the unlocking position of the key is thereby made possible.

The key **25** is provided with a portion **46**, by which it may be manipulated or turned. When the key extends across the eccentrics, as shown in Fig. 2, the portion **46** extends beyond the sides of the eccentrics, and the portion **46** is conveniently provided with sockets or holes **48**, spaced at 90°, into which a pin may be inserted for turning the key.

Means are preferably provided for confining the eccentrics against lateral displacement. These means are preferably collars **50, 51** fixed upon the shaft and projecting alongside of the eccentrics. The part **46** of the key extends into a collar, and in order that the sockets **48** in the key may be reached, a slot or opening **55** may be provided in the peripheral face of the collar, the length of the slot being corresponding to the angular distance between the sockets **48**.

Means are also preferably provided for locking the key **25** in its locking position. This means is conveniently in the form of a set-screw **57**, the end of which is arranged to bind the key, the key conveniently being formed with a portion **60** opposite the portion **46**, and being provided with a counter-sunk hole **62** for receiving the end of the set-screw **57**. The portions **46, 60** of the key may be made full round, and seat in recess partially in the collar **50** and partially in that part of the shaft forming the eccentric **12** and to which the collar is fastened.

Numeral **70** designates scratch marks on the eccentric **10** related to each of the notches **32** to **36** and the registering of any notch **32** to **36** with the notch **30** is facilitated by bringing these marks **70** into register with a mark **72** related to the notch **30**. A mark **75** may be provided on the key **25** for indicating its locking and unlocking position in the notches.

Each notch **32** to **36** inclusive is preferably provided with a segmental key-portion similar to **44**, so that the eccentric segmental portion **40** of the key **25** finds a complemental segmental part **44** at each notch **32** to **36**. The advantage of this is that any two notches in register are filled by the key (parts **40** and **44**) and the key part **40** is consequently sustained and reinforced against "springing" or bending under heavy impacts to be encountered in press-use. The portion of the eccentric **12** facing the notch **30** on the side where the strains and impacts are concentrated may be reinforced with a hard and tough piece of steel **80** inset in the eccentric.

Spanner-notches **84** may be formed in eccentric **10** so that a spanner-wrench may be used on eccentric **10** to turn it relatively to eccentric **12**, in making adjustments.

Operation

The parts being in the position shown in Fig. 1, and it being desired to change the length of the stroke of the press, the locking key **25** is turned to move its eccentric segmental portion **40** into segmental notch **30**. In the embodiment illustrated the face **42** of key **25** will be flush with the plane or surfaces of contact of the related pair of eccentrics **10, 12**, (Fig. 3). The line of split between the segmental parts **40, 44**, of a key **25** so formed, will likewise coincide with said plane or surfaces of contact. The turning of the key may be effected by a pin projected into the sockets **48** through the opening or slot **55** and to unlock the eccentrics **10, 12**, the key is turned to bring the key **25** to the unlocking position. Marks **75** may be employed to indicate the locking and unlocking positions of the key. With the key **25** in the unlocking position, the eccentric **10** is turned relative to the eccentric **12**, thus varying the distance of its center CC to the axis of rotation C, and thereby adjusting the "throw" of the eccentrics and consequently the stroke of the press. (The position of the parts during the turning of eccentric **10** on **12** is shown in Fig. 3). By such turning, one or another of the smaller segmental notches **32—36** (corresponding to the length of the stroke desired) is brought into registry with larger segmental slot **30** containing key **25**, such registry being indicated by the marks **70, 72**. The eccentrics **10** and **12** are then locked in their adjusted position by turning corresponding segmental key **25** (by the pin as previously described) to a position where the eccentric segmental portion **40** of the key occupies a position in each of the notches in register (position shown in Fig. 1). The driving force or torque on eccentric **12** will then be transmitted through the key **25** to the eccentric **10**, and the two will turn as a unit.

When any of the notches **32** to **36**, inclusive, provided with the key-part **44** is moved out of register with notch **30**, and another is moved into register, the key-part **40** philanders, figuratively

speaking, finding in the notch which is moved into register a counter-part of the part **44** in the notch which has been moved out of register. The key **25** turns to and from locking position with a part **44** of one notch of the series **32–36** the same as it does with a part **44** of another notch.

While the key is associated with a part **44** of one notch, the other parts are meanwhile ensconced in their respective notches and serve to provide a full bearing surface for the eccentric **10** on the eccentric **12**. Such a bearing surface is approximately equal in area to the bearing area of the shaft **14**.

The set-screw **57** is backed off from key **25** to allow it to be turned, and set against the key to lock it in its locking position.

The invention may receive other embodiments than that herein specifically illustrated and described.

What is claimed is:

1. In slide actuating mechanism for presses or the like comprising a shaft having thereon a plurality of superposed eccentrics having contacting bearing surfaces, which eccentrics are relatively movable to vary the combined throw thereof, and means for locking said eccentrics together in various relative positions thereof, characterized by the locking means comprising at least one segmental notch running across the face of an eccentric which is in bearing-contact with another, and a plurality of segmental notches running across the face of said other eccentric, the segments constituting complemental parts of a circle, and the segmental notch in one eccentric being larger than its complemental notches in the other eccentric, and a key having a segmental portion which occupies the larger segmental notch, in one of its positions, and which occupies one or another of the smaller segmental notches and a substantial portion of the larger segmental notch, when turned through 180°.

2. In slide actuating mechanism for presses or the like comprising a shaft having thereon a plurality of superposed eccentrics, which eccentrics having contacting bearing surfaces are relatively movable to vary the combined throw thereof, and means for locking said eccentrics together in various relative positions thereof, characterized by the locking means comprising at least one segmental notch running across the face of an eccentric which is in bearing-contact with another, and a plurality of segmental notches running across the face of said other eccentric, the segments constituting complemental parts of a circle, and the segmental notch in one eccentric being larger than its complemental notches in the other eccentric, and a key having two segmental portions, a larger one which occupies the larger segmental notch and a smaller one which occupies the smaller segmental notch, in one of its positions, the larger key-segment occupying one or another of the smaller segmental notches and a substantial portion of the larger segmental notch, and the smaller key segment occupying the remaining portion of the larger segmental notch, when the key is turned through 180°, and supplemental segmental key portions corresponding to the aforesaid smaller segmental key portion occupying the smaller segmental notches.

3. Means according to claim 1 further characterized by the larger key-segment having cylindrical ends and circumferentially spaced notches or the like therein for successive engagement by a tool so that 180° turning movements may be imparted to the key for effecting adjustments of the eccentrics.

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