

Sept. 15, 1936.

W. KLOCKE

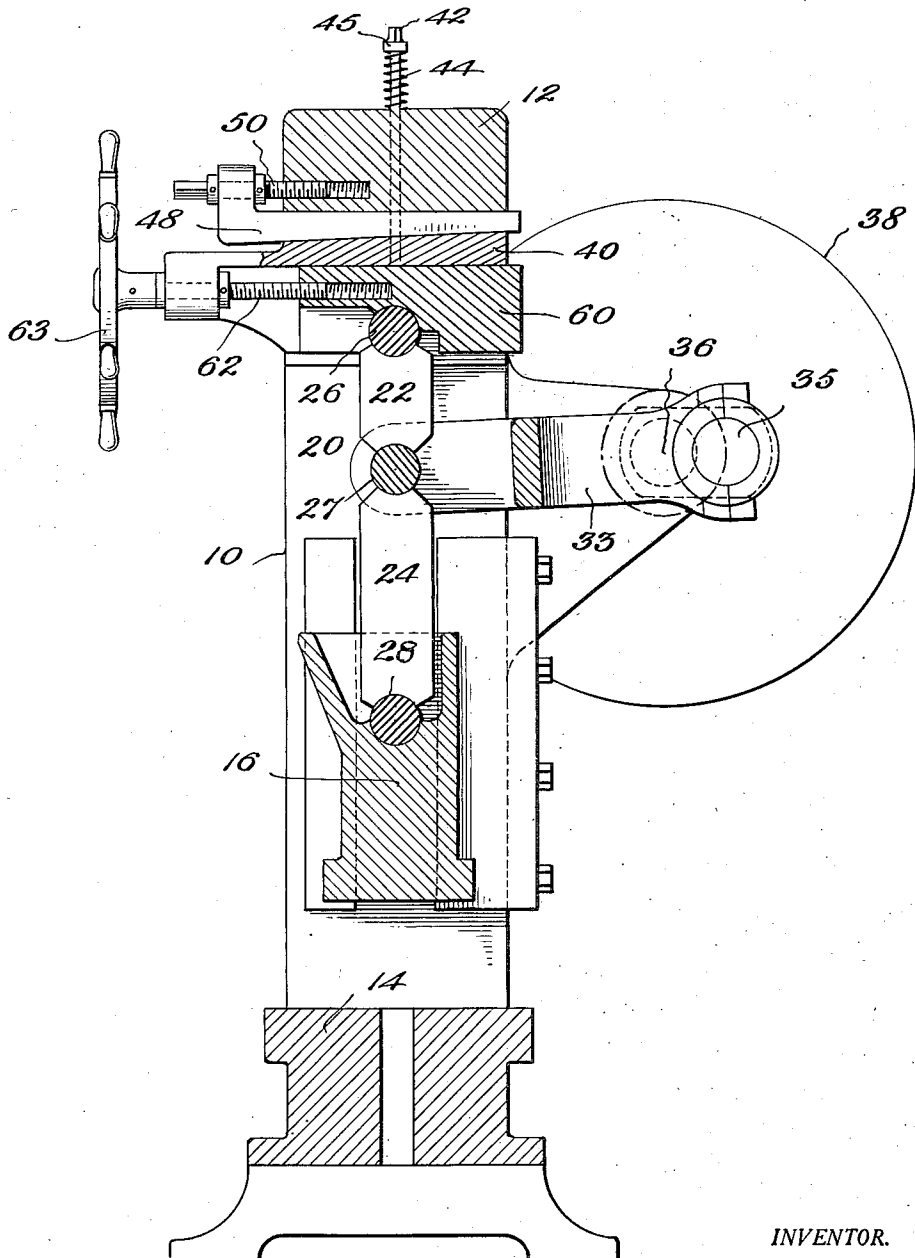
2,054,428

KNUCKLE JOINT TYPE PRESS

Filed May 5, 1934

2 Sheets-Sheet 1

Fig. 1.



INVENTOR.

WILLIAM KLOCKE

BY

Gustav R. Thompson

ATTORNEY

Sept. 15, 1936.

W. KLOCKE

2,054,428

KNUCKLE JOINT TYPE PRESS

Filed May 5, 1934

2 Sheets-Sheet 2

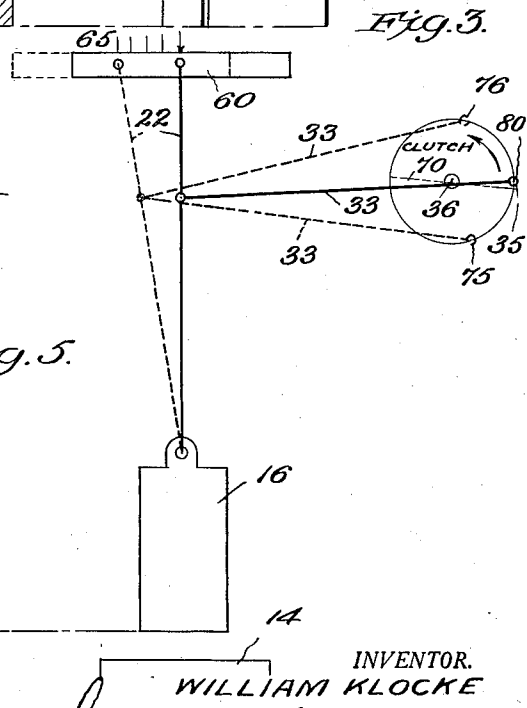
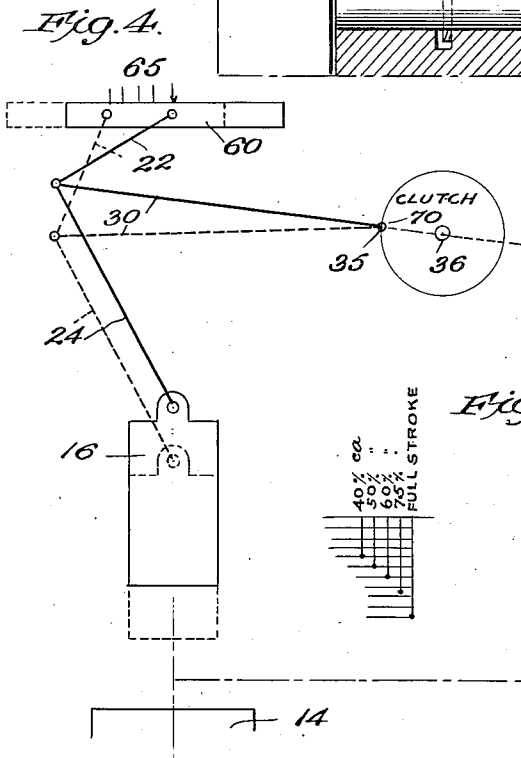
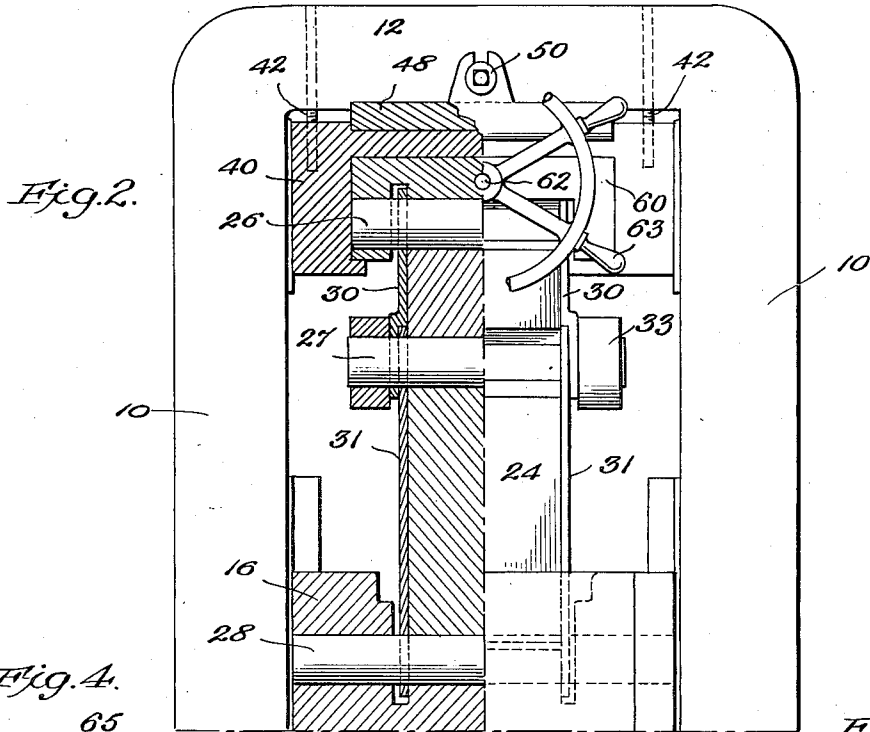
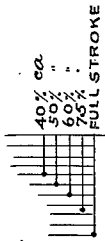


Fig. 5.



INVENTOR.
WILLIAM KLOCKE
BY
Gustave Thompson
ATTORNEY

UNITED STATES PATENT OFFICE

2,054,428

KNUCKLE-JOINT TYPE PRESS

William Klocke, Woodhaven, N. Y.

Application May 5, 1934, Serial No. 724,116

2 Claims. (Cl. 78—41)

This invention relates to presses of the knuckle-joint type and provides improvements.

Presses of the knuckle-joint type heretofore in use have strokes of fixed length. Different types of work require greater length of stroke than others, and for most types of work there is a length of stroke best suited for performing it. For press-users who have a variety of work to do, presses having a fixed stroke fail to meet their requirements in the most advantageous manner.

Moreover, with much of the work which is done in knuckle-joint type presses, particularly coining stamping, or embossing, it is often necessary to give the blank two strokes in order to impart the full design and finish of the dies to the work, so that the work has that quality referred to as "life".

The present invention provides a press of the knuckle-joint type in which the length of the stroke may be varied or adjusted to provide substantially different lengths of stroke, and thus enable the press user to set or adjust the stroke to that best meeting the requirements of the particular work which he has to do, and for each of a variety of work.

The invention further provides an adjustable stroke press of the knuckle-joint type, having the desirable feature of the tool-slide, for each of various stroke adjustments, having approximate top-stroke or raised positions corresponding to one and the same angular position of a rotating-part, so that a clutch may be provided having its engaging and disengaging positions at said one angular position of said rotating-part, and whereby the clutch-operation may occur at the same position corresponding to the top-stroke positions of the tool-slide for various stroke-adjustments.

The invention further provides presses of the knuckle-joint type having a single-stroke or a double-stroke in each cycle, together with stroke-adjustment.

The invention also provides a press having the above-described features which is of simple and rugged construction, well designed to stand the enormous pressures under which presses of this type work, which runs easily and smoothly, and in which the stroke-adjustments are easily made.

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

Fig. 1 is a vertical sectional view of said embodiment;

Fig. 2 is a front-view, with parts in section, of the construction shown in Fig. 1.

Figs. 3 and 4 are diagrammatic views illustrating the arrangement and operation of the stroke-adjusting and tool-slide actuating parts.

Fig. 5 is a graph illustrating the stroke-adjustments.

Referring to said drawings, numeral 10 designates the press-frame, having a crown 12, and a bed 14, and 16 designates a reciprocatory slide, the die parts or forming-tools (not shown) being mounted respectively on the bed and slide.

Numeral 20 designates a knuckle-joint connection between the slide 16 and crown. This connection may be in the form of levers or links 22, 24, bearing-pins 26, 27, 28, and straps 30, 31 at the sides of the knuckle-levers connecting the levers and pins.

The levers are turned angularly to reciprocate the tool-slide by suitable means, as a forked connecting-rod 33 and a crank 35 on a rotatable shaft 36, which may be connected and disconnected with a driving-part, as a fly-wheel driving pulley 38, through a clutch (not shown).

The bearing-pin 26 through which the thrust of the levers is transmitted to the crown 12 is usually mounted in a block 40 held up by rods 42, passing through the crown, and springs 44 reacting against the top of the crown and nuts 45 on the rods 42. The block 40 is movable in line with the axis of reciprocation of the tool-slide 16 by means of a wedge 48 arranged between the crown 12 and block 40 so that fine (micrometric) adjustments of the bottom-of-the-stroke position of tool-slide 16 may be made in setting the dies. The wedge may be moved inwardly or outwardly by a screw 50. The block and wedge construction is preferably a part of the present construction.

Means are provided according to this invention, for varying or adjusting the length of the stroke of the tool-slide 16 to provide substantially different lengths of stroke. In said embodiment, a slide 60 is provided in block 40 and the bearing-pin 26 is mounted in this slide. The slide 60 is movable transversely of the axis of reciprocation of tool-slide 16, and the transverse movement of the slide 60 may be effected through an adjusting screw 62 and hand-wheel 63. The screw acts to hold the slide in the different positions to which it is adjusted.

The adjustments of the strokes of tool-slide 16 and the arrangement of the slide and its connections, are illustrated in the diagrams Figs. 4 and 5. An infinite number of adjustments of the stroke-lengths within a given range may be effected by the adjusting means. In Fig. 3 the

tool-slide 16 is shown at the bottom of its stroke for two stroke-adjustments at the extremes permitted by the particular structures illustrated, and in Fig. 4 the tool-slide 16 is shown at the top of its stroke for the same two stroke-adjustments illustrated in Fig. 3, the positions of the parts for the long-stroke adjustment being shown in full lines, and for the short-stroke adjustment being shown in dotted lines, in each figure. As the slide 60 is moved to the left from the position shown in full lines a lesser and lesser amount of angular movement is imparted to the knuckle jointed levers, and a shorter and shorter stroke is provided. Five positions of adjustment of slide 60 are indicated by the line-marks 65 above the slide 60 in Figs. 3 and 4 and the substantially different stroke-lengths for the five positions of adjustment indicated by said line-marks 65 are indicated by the lengths of the five lines on the graph Fig. 5. Positions of slide 60 intermediate the line-marks 65 would give other stroke-lengths.

Moreover the knuckle-levers 22, 24, bearing-slide 60, connecting-rod 33 and crank 35 are so arranged that the tool-slide 16 for each of various stroke-adjustments, has approximate top-stroke or raised positions corresponding to one angular position of crank-shaft 36 indicated at 70. The clutch usually employed on presses is preferably arranged to operate at said angular position 70, as here it operates at the top-positions of the punch-slide 16 for various adjustments of stroke, and also the weight of the tool-slide 16 in said angular positions acts against the bearings of shaft 36 and this "locks" the slide 16 in its raised position. The position of the parts in the raised or top-stroke position of the tool-slide 16 for the longest and shortest strokes provided by the stroke-adjustment-means illustrated, is shown in Fig. 4, and it will be observed that the thrust of the connecting-rod 33 under the weight of tool-slide 16 is in each instance almost in direct line with the bearings of shaft 36, and for positions intermediate these shown in Fig. 4, the direction of thrust of rod 33 would be approximately the same, i. e. against bearing 36.

Means are also provided by the invention for imparting two strokes of the tool-slide 16 in each cycle of the press, so that the work between the dies is given two strokes or squeezes to better bring out the design of the dies on the work. An embodiment of said means is illustrated in Figs. 1-4, and the construction and arrangement of the parts is such that when the bearing-slide 60 is in any of its positions except those proximate that shown in full lines Figs. 3 and 4, the tool-slide 16 has two strokes for each revolution of crank 35. Take for example, the positions shown in dotted lines Fig. 3. At the two points 75, 76, the tool-slide 16 will be brought to its bottom-position, and thereby two strokes imparted to the slide in one revolution of crank 35. By arranging the connecting-rod 33 so that it is effectively shorter than the distance between the knuckle-levers 22, 23 in their position of alinement, and the position of the crank 35 at the limit of its "throw" indicated at 80, Fig. 3,

the tool-slide 16 will be given two strokes in each revolution of the crank 35, or cycle. When the bearing and slide 60 is in its positions proximate that shown in full lines Fig. 3, the tool-slide 16 has one stroke in each cycle. By limiting the range of adjustment of slide 60 to positions proximate the full-line position Fig. 3, adjustable single strokes may be obtained, and by excluding from the range of adjustment of slide 60 the positions proximate to the full-line position Fig. 3, adjustable double strokes may be obtained. With the full range of adjustment of slide 60 shown in Fig. 3, the invention provides an adjustable stroke-press having a tool-slide having single strokes and double-strokes in each cycle.

The operation has been explained above in connection with the description of the construction.

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

What is claimed is:

1. A knuckle-joint type press, comprising a frame, a reciprocatory tool-slide, knuckle-jointed levers connected at their ends to the slide and frame respectively, driving means connected to said knuckle-jointed levers for turning them about said joint to and from alinement, adjusting means for varying the amount of angular movement imparted to said levers to provide substantially different lengths of the stroke of said slide for doing different kinds of work, said adjusting means comprising a slide and a bearing thereon for one end of said jointed levers, said slide and bearing together being movable, transversely of the axis of reciprocation of said tool-slide, to anyone of a number of adjusted positions, and means for holding said slide and the bearing thereon in any position to which they have been adjusted, throughout the operation of the press for doing a particular kind of work.

2. A knuckle-joint type press, comprising a frame, a reciprocatory tool-slide, knuckle jointed levers connected at their ends to the slide and frame respectively, driving means connected to said knuckle-jointed levers for turning them about said joint to and from alinement, adjusting means for varying the amount of angular movement imparted to said levers to provide substantially different lengths of the stroke of said slide for doing different kinds of work, said adjusting means comprising a block, a slide and a bearing thereon for one end of said jointed levers, said slide and bearing together being movable on said block, transversely of the axis of reciprocation of said tool-slide, to any one of a number of adjusted positions, means for holding said slide and the bearing thereon, on said block in any position to which they have been adjusted, throughout the operation of the press for doing a particular kind of work, and means for adjusting the position of said block in line with the axis of reciprocation of said tool-slide for making the micrometric adjustments incidental to die-setting.

WILLIAM KLOCKE.