Feb. 26, 1924. 1,484,654

W. KLOCKE ET AL

MECHANICAL MOVEMENT

Filed Dec. 6, 1921 2 Sheets-Sheet 1

Fig. 1.

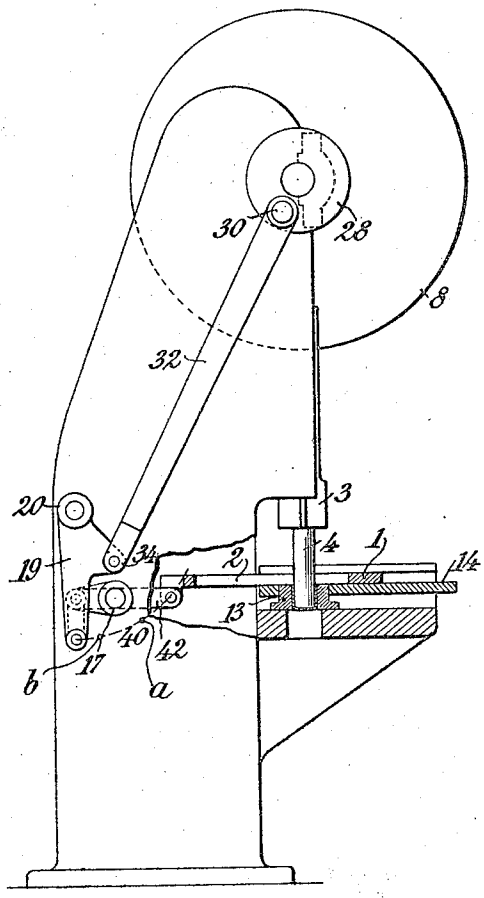


Fig. 2.

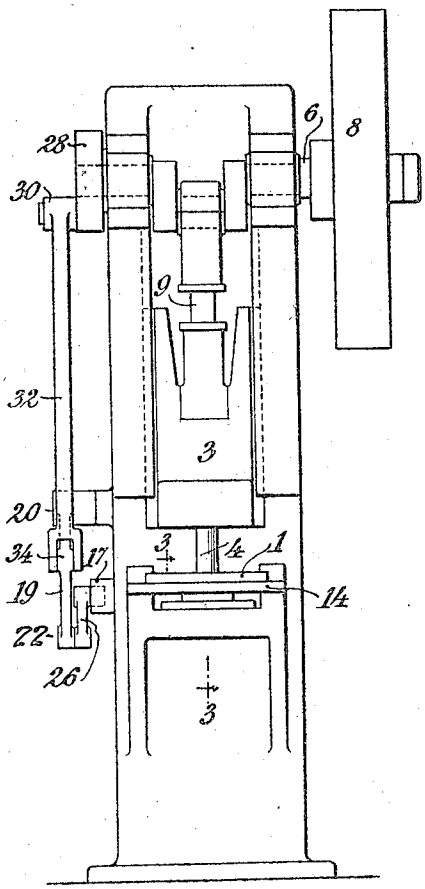
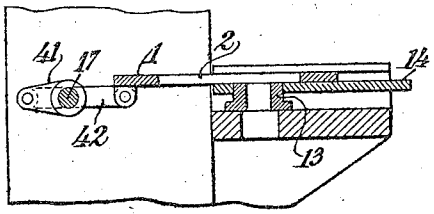


Fig. 3.



Inventors
William Klocke
and John E. Dobson.
By Attorneys,
Fraser Turk & Myers

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Fig. 4.

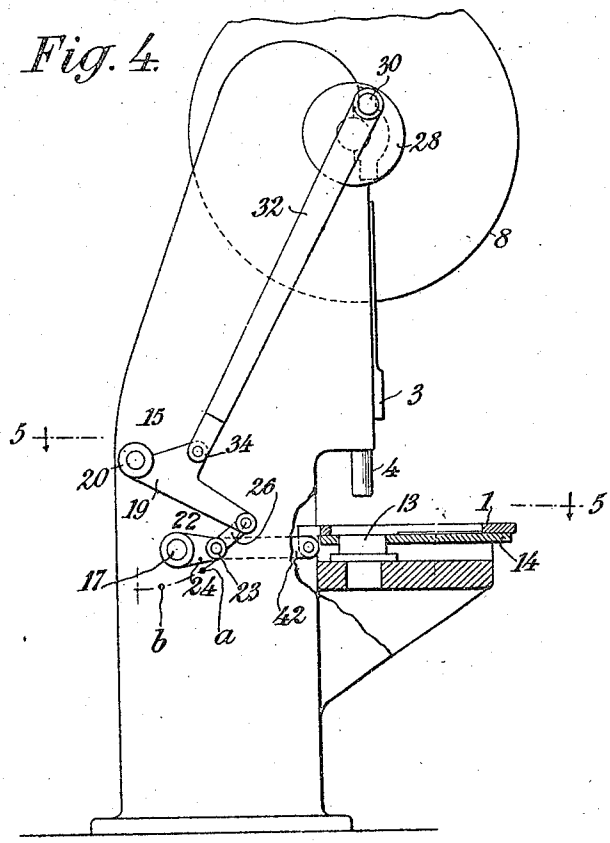
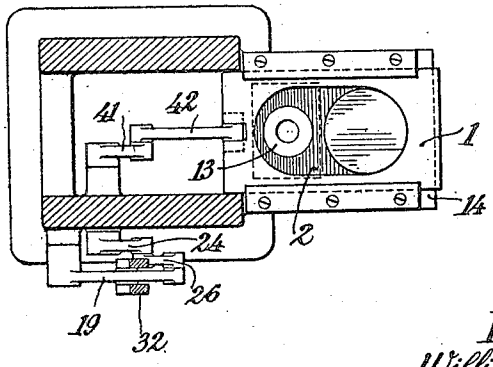


Fig. 5.



Inventors
William Klocke
and John E. Dobson,
By Attorneys,
Fraser Durk & Myers

Patented Feb. 26, 1924. 1,484,654

UNITED STATES PATENT OFFICE.

WILLIAM KLOCKE AND JOHN E. DOBSON, OF NEW YORK, N. Y., ASSIGNORS TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

MECHANICAL MOVEMENT.

Application filed December 6, 1921. Serial No. 520,308.

To all whom it may concern:

Be it known that we, WILLIAM KLOCKE and JOHN E. DOBSON, citizens of the United States of America, residing, respectively, in the borough of Queens and borough of Manhattan, city and State of New York, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

This invention relates to mechanical movements, and aims to provide improvements therein.

The invention provides a mechanism or so-called mechanical movement by means of which a part may be given a reciprocatory movement with a gentle retardation and acceleration at the extremes of its movement, and at the same time dwells of considerable duration given to the reciprocatory part at said extremes, the dwell at one extreme being capable of being prolonged beyond the dwell at the other extreme.

The invention further provides a mechanism or "movement" comprising a rocking part, a toggle, and a link, and which may be actuated by a rotary part, wherein the character of reciprocation referred to above may be carried out, and wherein the dwell of longer duration referred to above, may have a length corresponding to 120°—140° of movement of a crank or similar driving part.

The invention further provides a mechanism or "movement" wherein an angular movement of 180° may be imparted to a rocking part by a part having a short angular movement and a toggle connecting said latter part to said rocking part.

The invention further provides a novel combination of parts for effecting a movement of the character referred to above.

An embodiment of the invention applied as an operating means for the feed slide of a press, is illustrated in the accompanying drawings, of which embodiment,—

Figure 1 is a view in side elevation.

Fig. 2 is a view in front elevation.

Fig. 3 is a view in section on the line 3—3, looking in the direction of the arrow, and showing the connection between the slide and the rocking part 17.

Fig. 4 shows the parts in the position which they occupy when in the opposite extreme position to that shown in Fig. 1.

Fig. 5 is a view in section on the line 5—5 Fig. 4, looking in the direction of the arrows.

Referring to said drawings, numeral 1 designates a reciprocatory part to be actuated, as for example the feed slide of a press. Numeral 3 designates a plunger, adapted to carry a punch or the like and conveniently actuated by a rotary crank shaft 6, driven in any suitable manner, as by means of a fly-wheel pulley 8, the plunger 3 and crank shaft 6 being conveniently connected by a connecting rod 9.

13 designates a die, and 14 a table substantially flush with the top of the die, and along which a blank is adapted to be slid by the said slide to a position over said die, in line with the punch. The slide is suitably arranged for advancing the blank, and in the form here shown is provided with an elongated opening 2, equaling in length the throw of the slide plus the diameter of the blank.

15 designates the means or "movement" for imparting to the said slide 1, a reciprocatory movement of the character referred to, that is, one with a gentle retardation and acceleration at the extremes of its movement, and with dwells of considerable duration at said extremes. The mechanism 15 comprises a rocking part or shaft 17, a part 19 having a short angular or equivalent movement, as for example a guide link or lever turning around an axis 20, or a guide moving similarly to the end of said lever and a toggle 22 connecting said rocking part 17 and the part 19 having the short angular movement, the toggle 22 being constituted by an arm 24 on said rocking part 17, and a link 26 connected at the knee 23 to said arm 24 and to the part or lever 19.

The part 19 with the short angular movement is reciprocated through its arc of movement by any suitable means, conveniently, a rotary part, which may be a disc 28 on the crank shaft 6, having thereon a crank pin 30. A rod or link 32 serves to connect the crank pin 30 and one of the con-

nected parts 19, 26, conveniently the part 19. The part 19 may be provided for this purpose with a pin 34.

The rocking part 17 may be connected to the slide 1 by any suitable means, conveniently, as here shown, a toggle 40, constituted by an arm 41 on said rocking part 17 and a link 42 connecting said arm and slide, Fig. 3.

The arrangement of the parts of the "movement" is such that the joined ends of the part or lever 19, and the link 26, at one extreme of movement, move in substantially parallel arcs around their pivots 20 and 23 respectively; and at the same time the arrangement is preferably such that the link 42 and arm 41 of the toggle 40 are substantially in line; and at the same time the arrangement is further preferably such that the crank pin 30 is passing over its dead center; the combined effect of which is to provide a prolonged dwell of the slide 1 in one of its extreme positions, as for example that position where the slide 1 has moved the blank in line with the punch 4 (Fig. 1).

Operation: With the parts in a position shown in Fig. 4 a blank may be laid on the table 14 through the opening 2 in the slide, out of line with the punch. Movement of the part or lever 19 downward, will cause the parts 24, 26 of the toggle 22 to move together or close, thereby turning the rocking part 17 in a clock-wise direction, the rock shaft 17 starting from a condition of rest, and gradually accelerating as the parts 24, 26 of the toggle 22 close together, the turning of the rocking part 17 being quite rapid when the part or lever 19 has reached about one half of its arc of movement, position *a*, Figs. 1 and 4. The turning of the rocking part 17 will be gradually retarded as the part or lever 19 moves past its mid position (position *a*) toward its extreme position shown in Fig. 1. As the part or lever 19 moves from the vicinity of a point *b* in its movement to its extreme position shown in Fig. 1, there will be substantially no turning movement of the rock shaft 17, and consequently there will be a dwell of the slide 1 and the blank fed thereby in a position in alinement with the punch 4, owing to the fact that the point 27 at the joint of the part 19 to the link 26 is moving in an arc which is substantially parallel to an arc described by said point 27 around the point 23 joining said link 26 with arm 24. The dwell is made more pronounced by the employment of the toggle 40 and by its arrangement such that its legs 41, 42, approximate alinement at this period. The employment of the crank 30 and its arrangement such that it is moving across its dead center (at 270°) with respect to the rod 32, also contributes to the perfection of the dwell.

On the reverse movement of the part 19, the dwell continues until the point *b* is reached, at about which point a gradually accelerated movement of the slide 1 commences, which movement becomes quite rapid at about the point *a* in the movement of said part 19. At this time the slide 1 will be approaching the position shown in Fig. 4, the movement of said slide 1 being gently retarded as the position of Fig. 4 is reached, owing to the legs 24—26 of the toggle 22 straightening, and the simultaneous straightening of the legs 41—42 of the toggle 40 and the movement of the crank 30 towards its dead center position (at 90°).

The arrangement is preferably such that the punch 4 acts on the blank while the slide 1 dwells in the extreme position of Fig. 1 and the ejection of the drawn article may take place through the opening 2 in the slide, without regard to the position of the slide.

In the position of Fig. 4 there is a dwell owing to the relatively straight position of the legs 24—26 of the toggle 22, and the reversal of movement of said part 19, accentuated, when the crank 30 and toggle 40 are employed, by the movement of said crank 30 across its dead center (at 90°) and by the alinement of the legs 41—42 of said toggle 40. The cycle described is repeated at each reciprocation or oscillation of the part 19. By the arrangement described, the rock-shaft is given a movement through an angle of 180° as compared with an angle of about 60° described by the part 19 and the slide is given a dwell in the extreme position of Fig. 1 corresponding to about 125° of movement of the crank pin 30.

What we claim is:—

1. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned.

2. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means having a relatively short angular movement for swinging said toggle whereby said rocking part is turned, the arrangement being such that said rocking part is turned through 180°.

3. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, said guide and

toggle being so arranged that the movement of the swinging leg of the said toggle at its point of connection to said guide at one extreme of movement is substantially parallel to an arc described around the knee of said toggle, whereby a pronounced dwell is produced in said extreme position.

4. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means having a relatively short angular movement for swinging said toggle whereby said rocking part is turned, the arrangement being such that said rocking part is turned through 180°, said guide and toggle being so arranged that the movement of the swinging leg of said toggle at its point of connection to said guide at one extreme of the movement is substantially parallel to an arc described around the knee of said toggle, whereby a pronounced dwell is produced in said extreme position.

5. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, said swinging means comprising a crank.

6. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, said swinging means comprising a crank, and a link connecting said crank and one of the connected parts, the guide and the swinging leg of the toggle.

7. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, said guide and toggle being so arranged that the movement of the swinging leg of said toggle at its point of connection to said guide at one extreme of movement is substantially parallel to an arc described around the knee of said toggle, whereby a pronounced dwell is produced in said extreme position, said swinging means comprising a rotary part having a crank thereon, and a link connecting said crank and one of the connected parts, the guide and the swinging leg of the toggle, said crank being arranged to move in the vicinity of its dead-center in said extreme position.

8. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, and a second toggle connected at one end to said rocking part through which the motion of said rocking part is transmitted.

9. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, and a second toggle connected at one end to said rocking part through which the motion of said rocking part is transmitted, said second toggle being so arranged that the legs thereof are in substantial alinement in the extreme positions of said swinging means.

10. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, said guide and toggle being so arranged that the movement of the swinging leg of said toggle at its point of connection to said guide at one extreme of movement is substantially parallel to an arc described around the knee of said toggle, whereby a pronounced dwell is produced in said extreme position, and a second toggle connected at one end to said rocking part through which the motion of said rocking part is transmitted, said second toggle being so arranged that the legs thereof are in substantial alinement in the extreme positions of said swinging means.

11. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means for swinging said toggle whereby said rocking part is turned, said guide and toggle being so arranged that the movement of the swinging leg of said toggle at its point of connection to said guide at one extreme of movement is substantially parallel to an arc described around the knee of said toggle, whereby a pronounced dwell is produced in said extreme position, said swinging means comprising a rotary part having a crank thereon, and a link connecting said crank and one of the connected parts, the guide and the swinging leg of the toggle, said crank being arranged to move in the vicinity of its dead-center in said extreme position, and a second toggle connected at one end to said rocking part through which the motion of said rocking part is trans-

mitted, said second toggle being so arranged that the legs thereof are in substantial alinement in the extreme positions of said swinging means.

12. A mechanical movement comprising a rocking part, a toggle connected at one end thereto and adapted at its opposite end to swing around said rocking part, a guide attached to the swinging end of said toggle, and means having a relatively short angular movement for swinging said toggle and turning said rocking part through a greater angular movement.

In witness whereof, we have hereunto signed our names.

WILLIAM KLOCKE.
JOHN E. DOBSON.