

Feb. 23, 1926.

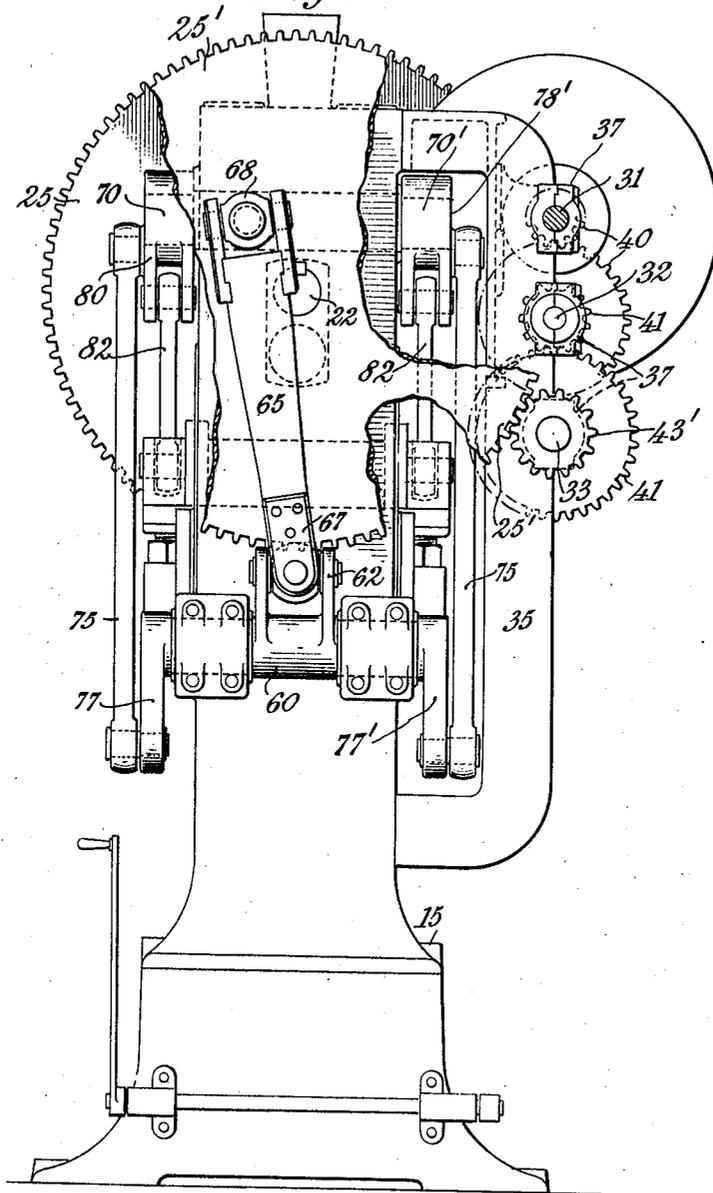
1,574,465

O. S. BEYER

DRAWING PRESS

Original Filed May 14, 1920 3 Sheets-Sheet 2

Fig. 2.



INVENTOR :

Otto S. Beyer

By Attorneys,

Francis Turk & Myers

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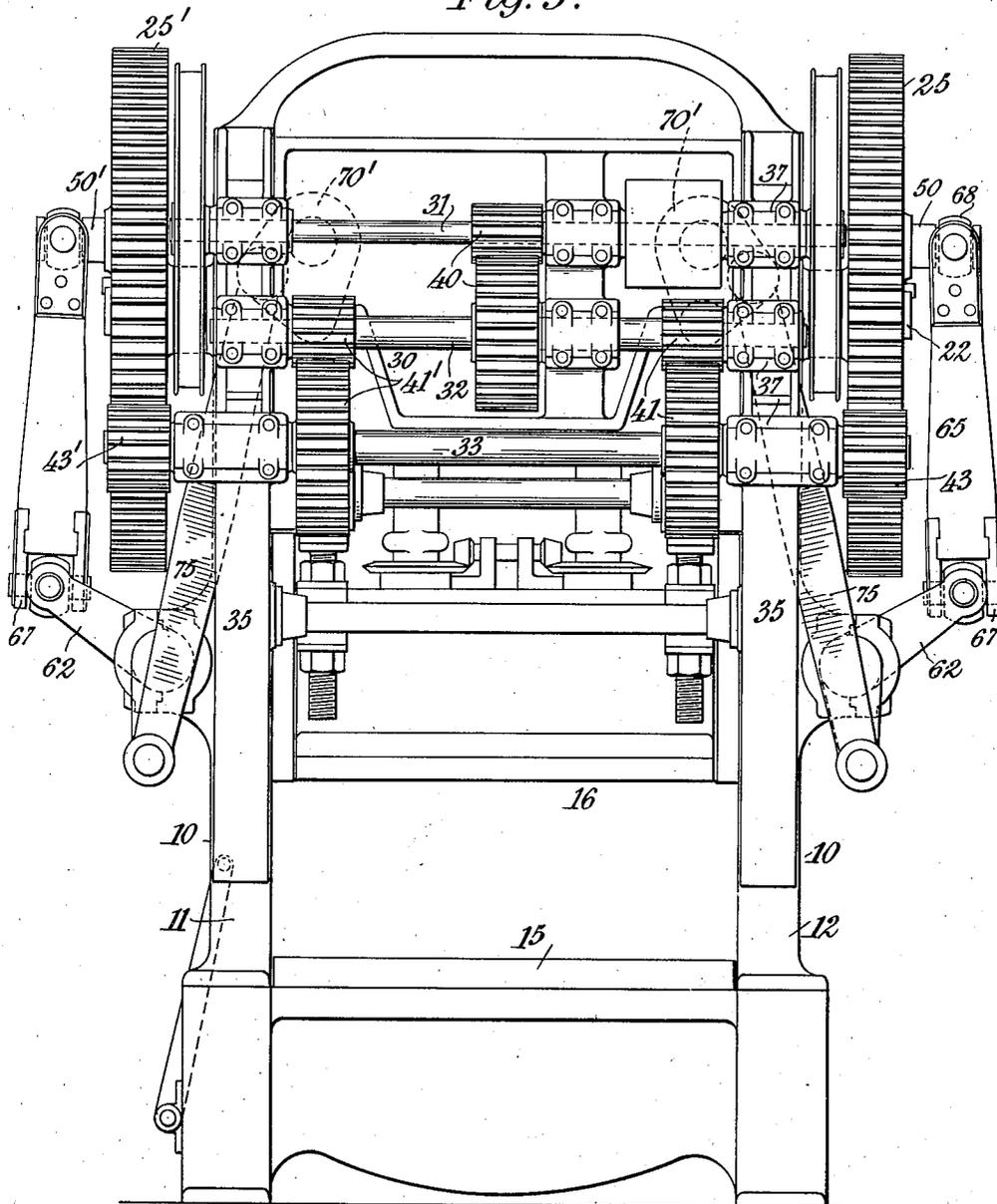
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Fig. 3.



INVENTOR :

Otto S. Beyer

By Attorneys,

Frazer Tucker Myers

UNITED STATES PATENT OFFICE.

OTTO S. BEYER, OF BROOKLYN, NEW YORK, ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

DRAWING PRESS.

Original application filed May 14, 1920, Serial No. 381,369. Divided and this application filed May 11, 1922. Serial No. 560,116.

To all whom it may concern:

Be it known that I, OTTO S. BEYER, a citizen of the United States of America, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Drawing Presses, of which the following is a specification, the present application being a division of my application filed May 14, 1920, Serial No. 381,369 (patented October 14, 1921, No. 1,511,214).

This invention relates to presses, especially drawing presses, and aims to provide improvements therein.

The present invention provides a novel means for driving a reciprocatory part of a press, particularly the slide carrying the blank-holder or die, and having a dwell in its movement.

The invention further provides a novel transmission for driving the main crankshaft, or the like, of a press, whereby the construction of the press and alterations of the transmission, are facilitated.

The invention further provides a construction wherein a counterweight may be provided for the slide in a part of the slide-actuating mechanism.

The invention further provides novel combinations and sub-combinations hereinafter more fully set forth and defined in the claims.

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

Figure 1 is a front elevation (with certain parts in section) of a drawing press embodying the present invention;

Fig. 2 is a side elevation of the construction shown in Fig. 1, and

Fig. 3 is a rear elevation of the parts shown in the preceding views.

Referring to said drawings, numeral 10 designates the frame of the press, which conveniently comprises the side pieces 11 and 12 connected by a yoke 13. Numeral 15 designates the bed of the press, and 16 a reciprocatory slide or part, in this instance being a blank-holder or die-carrying slide, the die or blank-holder being carried upon the slide 16, and the complementary part upon the bed 15.

20 designates a punch slide, in this case

being shown as working through or in the blank-holder slide 16. The slides 16 and 20 are here shown as upper slides, but it is common practice to invert the slides and have them arranged as bottom slides working upwardly. Moreover, instead of the punch slide 20 working through the slide 16, it may be arranged to work through the bed 15.

The punch slide 20 may be driven in any suitable manner. Conveniently, it is driven from the crank shaft 22, and where the said crank shaft is long, or the force to be transmitted is great, it is preferable to drive the said shaft 22 from two ends. The crank shaft 22 conveniently extends through the side pieces 11 and 12 of the frame, and has on the projecting ends one or more rotary driving parts 25, 25', which parts are conveniently large gears. The gears or driving parts 25, 25', conveniently have a driving force applied thereto through a suitable transmission 30. This transmission conveniently comprises a plurality of shafts 31, 32, 33, journaled in a bracket 35 formed as an attachment to the frame 10, and said bracket conveniently has the bearings for the said shafts 30, 31, 32, formed thereon, these bearings being preferably in line upon the face of the bracket, as indicated at 37. The shafts 31, 32, may be connected by a pair of gears 40, and the shafts 32 and 33 are preferably connected by two pair of gears 41, 41'. The shaft 33 drives the gear or gears 25, 25' through pinions 43, 43'. This arrangement of the transmission shafts and gears provides a balanced drive for the gears or driving parts 25, 25', and parts which may be driven therefrom. The construction of the bracket and transmission parts also enables the transmission to be changed with the minimum alteration in the present construction, inasmuch as all changes which it is desired to make can be effected upon the bracket 35 or the parts carried thereon.

The blank-holder or die-carrying slide 16 is driven in suitable manner, and preferably so that there is a dwell of considerable duration during the working stroke of the punch.

Preferably the driving means for the blank-holder or die-carrying slide 16 comprise a rotary driving part or parts, which

may be, and preferably are, the driving gears 25, 25' connected to the crank shaft 22. The driving gears 25, 25' are conveniently provided with eccentric parts 50, 50', as, for example, crank pins, and these eccentric parts are preferably upon the outside face of the driving parts or gears 25, 25'. The rotary driving parts 25, 25' are utilized for communicating balanced drive thrusts to the four rocking parts 70, 70'. This is best performed by providing rocking parts 60, 60', which are conveniently in the form of short rock shafts running across the sides of the press from front to rear and located beyond the periphery of the driving part or parts 25, 25'. The axes of movement of the rocking parts 60, 60' are thus at right angles to the axis of movement of the driving parts 25, 25'. Each rock shaft has an arm 62 connected thereto, preferably at or near its middle, and the arm 62 is conveniently connected to the eccentric part 50 by a link 65, the link being connected to the arm 62 through a universal joint 67, and the link being also connected to the eccentric part 50 through a universal joint or connection 68.

The driving means for the blank-holder or die-carrying slide 16 also preferably comprises a second rocking part or parts 70 or 70', which turn on axes running across the side or sides of the frame of the press (from front to rear), and thus being at right angles to the axis of the crank shaft 22.

The rocking parts 70 and 70' are symmetrically driven from the rocking parts 60 and 60' by links 75, 75' connecting arms 77 and 77' on both front and rear of the press to arms 78, 78' on the respective rocking parts 70, 70'.

The slide 16 is preferably connected to the rocking parts 70, 70' by toggles 80, each of which is conveniently constituted by an arm 81 on the rocking part 70, and a link 82 connected at one end to the arm 81, and at its other end to the slide 16. The toggles 80 are duplicated at the front and back sides of the slide (as shown in Fig. 2), and the rocking part 70 may conveniently be a rock shaft 84 passing through the frame, and having the arms 78 and 81 fixed thereon. The links 75 may be duplicated, at each end of the press, as here shown, to drive each of the rocking parts 70 separately, in which case each of the rocking parts 60 and 70 are provided with arms 77', 78' corresponding to the arms 77, 78 mentioned above. Where the rocking parts 70 have an embodiment wherein each rocking part 70 is independent of another, the mechanism comprising a link 75 for each rocking part 70, shown herein, is used.

The present invention provides a relatively simple and effective means of driving a reciprocatory slide (such as a blank-

holder slide) in a press in such manner that the strains are distributed symmetrically throughout the press. Thus the rocking parts 70, 70' on the front and rear of the press frame are driven independently (whether they be connected by rocking shafts passing through the frame and to which they are fastened, or not), so that each of the four toggles 80 receives and transmits the same stress without introducing any unbalanced torsional strains into the communicating rocking parts. It results that (as compared, for example, to the construction specifically shown in my parent application from which the present application was divided) that a press of the same size and weight may operate safely on heavier work, or it may be made to operate on larger work by simply widening the press by spacing apart its upright side frames and constructing the intermediate frame portions and the slide sufficiently stronger to carry with suitable rigidity the intervening strains, and without necessarily increasing the strength of any of the slide-operating parts.

It is obvious that the invention is not limited to the embodiment herein specifically illustrated and described, but that the inventive ideas may receive other embodiments and mechanical expressions.

What is claimed is:

1. In a press of the type having a plunger and a work-holder, a frame, a crank-shaft supported by the frame for operating the plunger, four toggle arms arranged on opposite sides of the frame and connected to the work-holder to raise and lower the same, said toggle arms arranged to swing in planes parallel to the axis of the crank-shaft, rods arranged in pairs exteriorly of the frame and at both sides thereof for operating said toggle arms, and actuating mechanism arranged exteriorly of the frame at both sides thereof and connected to the lower ends of the rods.

2. In a press of the type having a plunger and a work-holder, a frame, a crank-shaft supported by the frame for operating the plunger, four bell cranks arranged at opposite sides of the frame near the four upper corners thereof and arranged to swing in planes parallel to the axis of the crank-shaft, said bell cranks having arms operatively connected to the work-holder, and four rods arranged in pairs exteriorly of the frame at both sides thereof with their upper ends operatively connected to said bell cranks, and mechanism at both sides of the frame for actuating the rods.

3. In a press of the type having a plunger and a work-holder, a frame, a crank-shaft supported by the frame for operating the plunger, four bell cranks arranged on opposite sides of the frame near the four upper

corners thereof to swing in planes parallel to the axis of the crank-shaft and operatively connected to the work-holder, and means for operating said four bell cranks in unison comprising four rods, two arranged at each end of the frame and connected respectively to the two bell cranks on opposite sides thereof, and means at both ends of the frame and connected to the lower ends of the rods to actuate the same in unison.

4. A press comprising a blank-holder or die-carrying slide and means for reciprocating the same, said means comprising a pair of rocking parts, toggles connecting said rocking parts to said slide, a second pair of rocking parts on the side frame of the press, and links connecting each of the rocking parts on the side frame with each of the first-named rocking parts, and means for turning said rocking parts on the side frame.

5. A press comprising a blank-holder or die-carrying slide and means for reciprocating the same, said means comprising a pair of rocking parts, toggles connecting said rocking parts to said slide, a second pair of rocking parts on the side frame of the press, and links connecting each of the rocking parts on the side frame with each of the first-named rocking parts, and means for turning said rocking parts on the side frame, said press having duplicates of the aforesaid parts for reciprocating the blank-holder, the two sets of means for reciprocating the blank-holder being at opposite sides of the press.

6. A press comprising a blank-holder or die-carrying slide and means for reciprocating the same, said means comprising a pair of rocking parts, toggles connecting said rocking parts to said slide, a second pair of rocking parts on the side frame of the press, and links connecting each of the rocking parts on the side frame with each of the first-named rocking parts, and means for turning said rocking parts on the side frame, said press having duplicates of the aforesaid parts for reciprocating the blank-holder, the two sets of means for reciprocating the blank-holder being at opposite sides of the press, said means for turning said rocking parts on the side frame comprising a crank-shaft, and means at the

outer ends of said crank-shaft connected to said rocking parts.

7. In a press of the type having a plunger and a work holder, a frame, a plunger operating crank shaft, crank arms connected to the work holder and arranged on opposite sides of the frame to swing in planes parallel to the axis of the crank shaft, means for oscillating said crank arms comprising a pair of rods arranged at both ends of the frame, means for imparting a combined vertical and lateral swinging movement to the lower ends of the rods, means for transmitting movement from the upper ends of each of said rods to one of the crank arms, said connecting means constraining the upper ends of said rods to have a combined vertical movement and a swinging movement in planes parallel to the axis of the crank shaft.

8. A drawing press of the type comprising a frame, a crank-shaft, a work-holding slide, four toggles for operating it moving in planes parallel with the axis of said shaft, and comprising rocking parts above and links beneath, and driving means at opposite sides of the press for oscillating said rocking parts, characterized in that said driving means comprise rock-shafts at each side of the press on axes transverse to said crank-shaft and connected symmetrically at their opposite ends to said rocking parts respectively, to transmit equal movements to the four toggles.

9. A drawing press of the type comprising a frame, a crank-shaft having means for driving it equally at opposite ends, comprising gears on said shaft, a work-holding slide, four toggles for operating it moving in planes parallel with the axis of said shaft, and comprising rocking parts above and links beneath, and driving means at opposite sides of the press for oscillating said rocking parts, comprising rock-shafts oscillated from said gears respectively, characterized in that said driving means comprise symmetrical connections from the opposite ends of said rock-shafts to said rocking parts respectively, to transmit equal movements to the four toggles.

In witness whereof, I have hereunto signed my name.

OTTO S. BEYER.