Jan. 16, 1934. F. J. RODE 1,943,555

METAL WORKING PRESS

Filed June 10, 1932 2 Sheets-Sheet 1

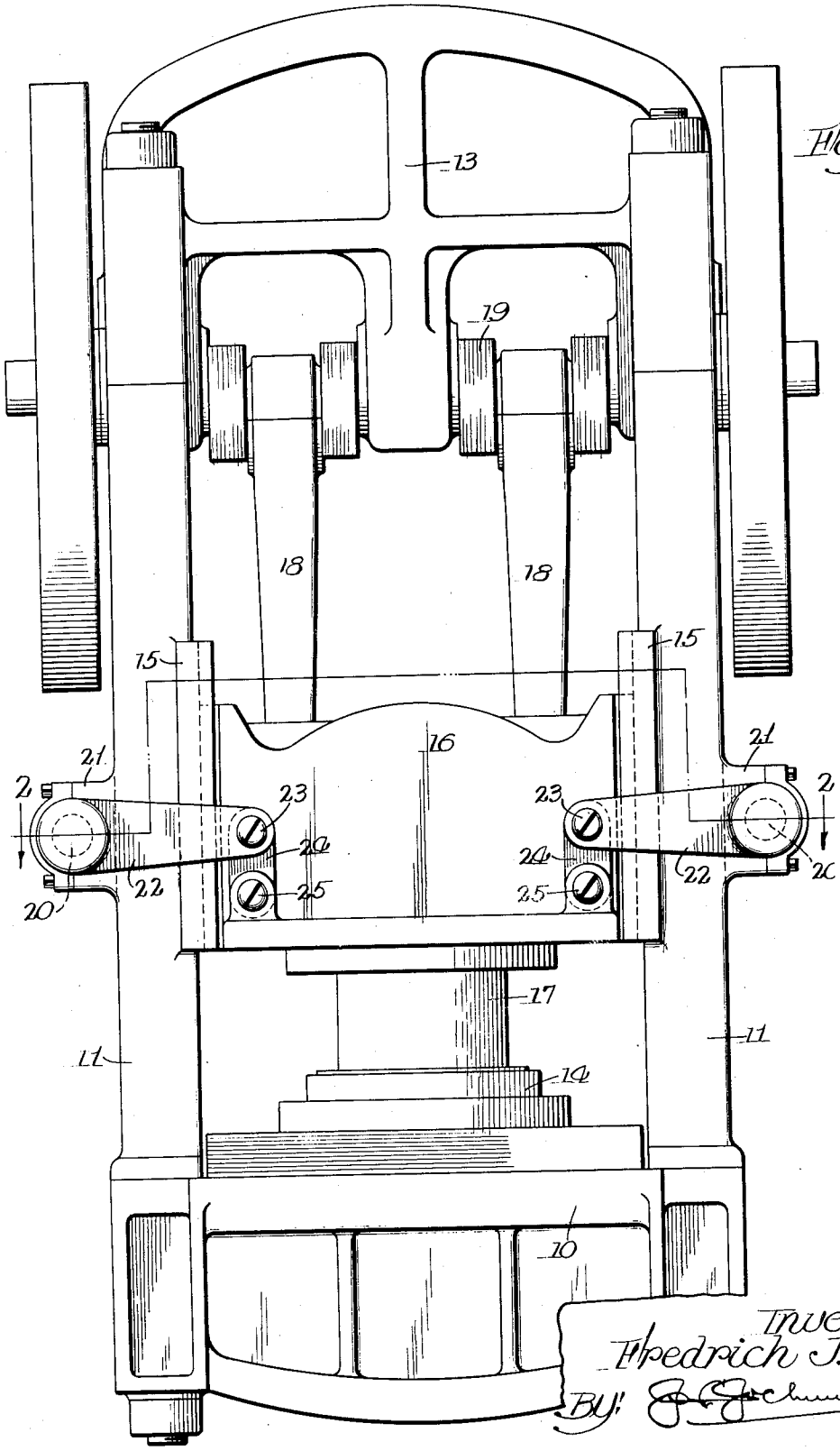


Fig. 1.

Inventor:
Fredrich J. Rode
By: [signature] Atty.

Jan. 16, 1934. F. J. RODE 1,943,555

METAL WORKING PRESS

Filed June 10, 1932 2 Sheets-Sheet 2

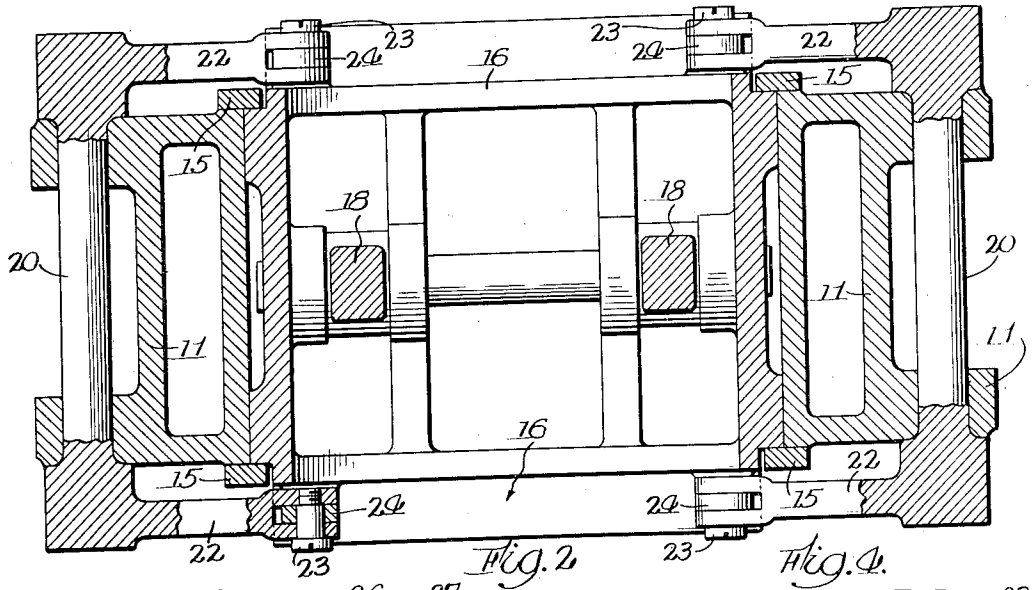


Fig. 2

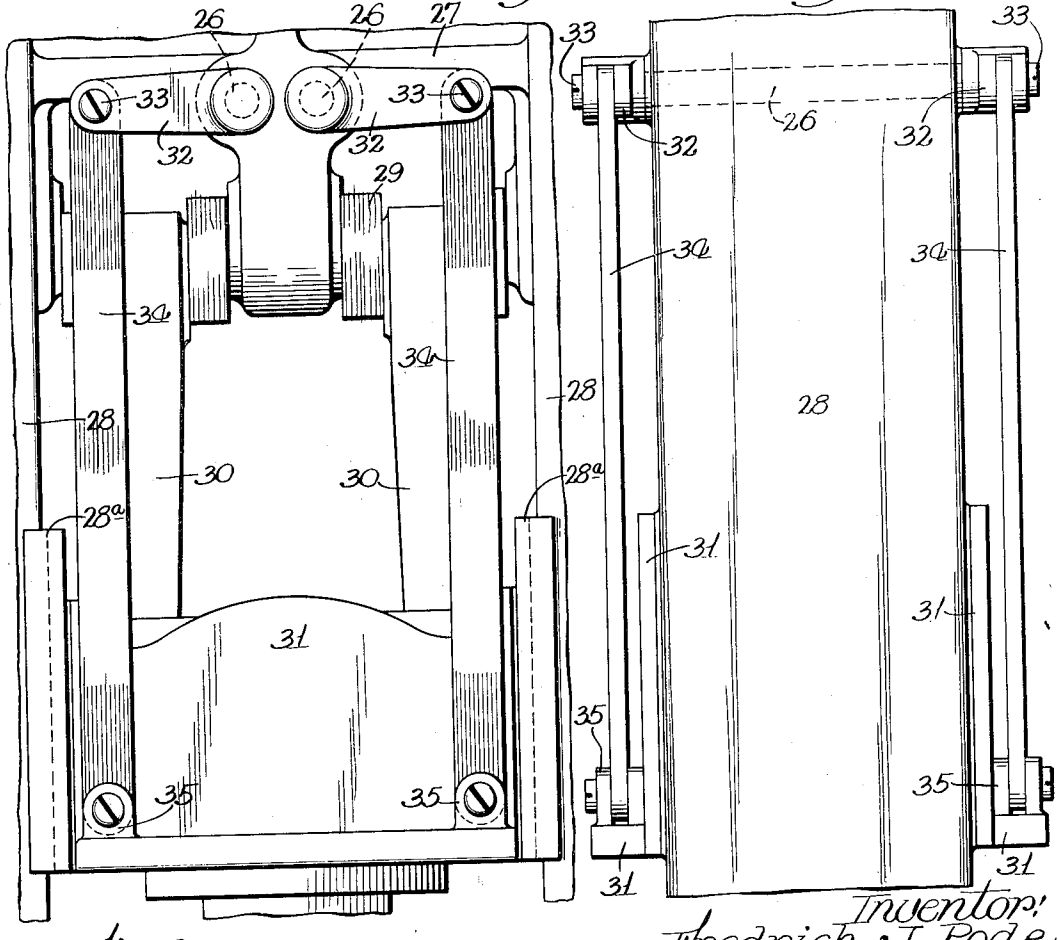


Fig. 3

Fig. 4.

Inventor:
Friedrich J. Rode
By: [signature]

Patented Jan. 16, 1934 1,943,555

UNITED STATES PATENT OFFICE

1,943,555

METAL WORKING PRESS

Fredrich J. Rode, Chicago, Ill.

Application June 10, 1932. Serial No. 616,373

10 Claims. (Cl. 113—38)

This invention relates to improvements in metal working presses.

In presses of this character and as usually constructed, considerable difficulty has been experienced in that the ram or die slide when being lowered, and when pressure is applied thereto, especially where the ram or slide is unevenly loaded with dies, will tilt or move out of its originally set position with respect to the work supporting surface.

Heretofore it has been proposed to overcome these objections by the use of one or more power shafts for reciprocating the ram or slide, and by connecting such shaft or shafts therewith in a manner that pressure will be exerted therefrom upon the ram or slide at spaced points on opposite sides of the center line intermediate and parallel with the front and rear edges of the ram; and also by means of the use of rock shafts, the centers of which are connected to crank throws symmetrically arranged on opposite sides of the longitudinal center of the crank shafts.

While very good results have been obtained by the use of these constructions, they are more or less expensive, necessitating considerable space, as well as providing a great number of parts which require considerable attention.

It is one of the objects of the present invention to improve and simplify the construction of presses of this character by eliminating such complicated mechanism and to provide means whereby the tendency of the ram or slide to tilt, will itself be employed as a means for causing the ram or slide to aright itself, with the result that the lower or die carrying surface or face of the slide will always be maintained in its originally set position with respect to the work supporting surface, in any desired position of the slide during the cycle of operation of the press, and against tilting, regardless of the position of the die with respect to the slide, even though the slide is unevenly loaded with dies.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a front elevation of a press of this character constructed in accordance with the principles of this invention.

Figure 2 is a sectional view taken on line 2—2, Figure 1, on an enlarged scale.

Figure 3 is a view in elevation of a portion of a press of this character showing a modified form of the invention and with parts omitted.

Figure 4 is an end elevation of Figure 3.

Referring more particularly to the drawings and in the form of the invention shown in Figures 1 and 2, the numeral 10 designates generally the bed of a press provided with uprights 11 and which uprights are connected at their top by means of a crown 13. Mounted upon the bed of the press is a suitable die 14 and reciprocable between the uprights 11 and preferably in suitable guides 15, is a ram or slide 16 carrying a die 17 which co-operates with the die 14.

The ram is reciprocated preferably by means of links 18 which are connected thereto and are also connected to a crank shaft 19, the shaft being rotated in any suitable manner (not shown) to cause the reciprocation of the ram.

During the operation of the press and when the pressure of the crank shaft is applied to the ram at the time that the die 17 is operating upon the work, it has been found that there is a tendency of the ram or slide to tilt. Especially is this true when the ram or slide is unequally loaded with dies or in the event that the die is not accurately positioned in the center of the slide.

In the present invention this tendency of the ram to tilt is utilized as a means whereby the ram will be maintained against tilting and the ram will be maintained in its originally set position with respect to the bed of the press, regardless of the position of the ram and at all times during the cycle of operation of the press.

This is accomplished in the present form of the invention preferably by means of rock shafts 20 which are journaled in suitable bearings 21 carried by the frame of the press, preferably the uprights 11 and connected to each of the shafts 20, preferably adjacent the extremities thereof, are arms 22 which project toward and terminate considerably short of each other, terminating preferably in proximity to the ends of the slide 16 and respectively adjacent the front and rear faces thereof.

Pivotally connected to the arms 22 and by one end thereof as at 23, are links 24, the other ends of the links being pivotally connected as at 25 with the slide or ram 16 so that during the

reciprocation of the ram the shafts 20 will rock freely in their bearings.

It will be manifest that during the operation of the press and when pressure is exerted upon the ram or slide on one side of the center thereof, or if the ram is unevenly loaded with dies, the tendency of the ram would be to tilt in a direction toward the back or front thereof but, as each side of the ram is connected to the rock shaft 20 through the medium of the links 24 and arms 22, any tendency of the ram to tilt would be manifested upon the arms 22 and rock shaft 20, with the result that no matter to what extent such tendency to tilt is manifested, the instant that the ram would have a tendency to tilt such tendency would be immediately divided between the front and rear edges of the ram, with the result that the rock shafts and arms together with the links 24 would overcome such tendency and maintain the ram against tilting and in its originally set position with respect to the bed of the press.

In the form of the invention shown in Figures 3 and 4, shafts 26 are journaled in the crown 27 which connect the uprights 28 of the press and these shafts 26 are located intermediate the uprights 28 and toward the longitudinal center of the crank shaft 29, which latter is connected by means of the links 30 with the ram or slide 31.

Connected with these shafts 26 which are mounted to rock freely in their bearings, are arms 32 one arranged adjacent each end of the shafts 26, and the arms of each shaft project in directions away from the arms of the other shaft.

The arms 32 may be of any suitable length and pivotally connected to the extremities thereof and by one end as at 33 are links 34, the other ends of the links being pivotally connected as at 35 with the ram or slide 31, the links connected to the respective shafts 26 being respectively connected to the ram 31 adjacent the front and rear thereof.

This form of the invention operates in the same manner as that disclosed in Figure 1. When the ram 31 is reciprocated by the links 30, the links 34 and arms 32 will cause the shafts 26 to freely rock in their bearings. When, however, an unequal pressure is exerted upon different portions of the ram 31 on one side of the center thereof or when the ram is unevenly loaded with dies, the stress exerted upon the ram 31 when operating upon the work and which would have a tendency to tilt the ram 31 from the front toward the back thereof or vice versa, will be overcome by the links 34, arms 32 and shafts 26. Such tendency to tilt would be immediately transferred from or be divided between the front and rear edges of the ram 31, thereby holding or maintaining the ram or slide against such tilting action.

In both forms of the invention it will be manifest that any tendency of the ram to tilt would be immediately overcome and such tendency would be neutralized by the operation or movement of the other side of the ram so that the ram would be maintained against such tilting movement.

While the preferred forms of the invention have been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. In a press, a frame, a reciprocable die slide operable therein, a shaft mounted in the frame, a direct pitman rod connection between the slide and said shaft, rock shafts journaled in a stationary part of the frame, the axes of said rock shafts intersecting the axis of the first said shaft, and lever and link connections between the rock shafts and different portions of the said slide for maintaining the slide against tilting.

2. In a press, a frame, a reciprocable die slide operable therein, a shaft mounted in the frame, a direct pitman rod connection between the slide and said shaft, and disconnected from the first said shaft, rock shafts journaled in a stationary part of the frame, and lever and link connections between the rock shafts and different portions of the said slide for maintaining the slide against tilting, the axes of said rock shafts being transverse to the axis of the first recited shaft.

3. In a press, a frame, a reciprocable die slide operable therein, a shaft mounted in the frame, a direct pitman rod connection between the shaft and slide, rock shafts journaled in a stationary part of the frame and disconnected from the first said shaft, laterally spaced arms connected with each of the rock shafts, and link connections between the die slide and the respective said arms for maintaining the slide against movement out of its originally set position with respect to the work supporting surface of the press.

4. In a press, a frame, a reciprocable die slide operable therein, a shaft mounted in the frame, means connectng the slide with the shaft, a direct pitman rod connection between the slide and shaft, means operating automatically when pressure is exerted upon the slide on one side of the center thereof tending to tilt the slide, to cause the portion of the slide on the other side of such center to be correspondingly moved and thereby cause the slide to be maintained against tilting, the last recited means embodying rock shafts journaled in a stationary part of the press frame, and disconnected from the first said shaft, arms connected with the shafts, and link connections between said arms and said slide.

5. In a press, a frame, a reciprocable die slide operable therein, a shaft mounted in the frame, means connecting the slide with the shaft, means operating automatically when pressure is exerted upon the slide or one side of the center thereof tending to tilt the slide, to cause the portion of the slide on the other side of such center to be correspondingly moved and thereby cause the slide to be maintained against tilting, the last recited means embodying rock shafts journaled in a stationary part of the press frame and disconnected from the first said shaft, arms connected with the shafts, and link connections between said arms and said slide, the axes of the rock shafts being transverse to the axis of the first recited shaft.

6. In a press, a frame, a slide reciprocable therein, a shaft mounted in the frame, direct pitman rod connections between the die slide and shaft, and means for maintaining the slide against tilting in any direction out of its originally set position with respect to the bed of the press, the last said means embodying arms mounted upon the frame for oscillation about fixed pivots, means connecting the arms with the slide, and means disconnected from said

shaft for causing said arms to move in unison about their pivots.

7. In a press, a frame, a die slide reciprocable therein, a shaft mounted in the frame, direct pitman rod connections between the slide and shaft, means for maintaining the slide against tilting in any direction out of its originally set position with respect to the bed of the press, the last said means embodying arms mounted upon the frame for oscillation about fixed pivots and disconnected from said shaft, means connecting the arms with the slide, and means connecting certain of the arms for simultaneous movement about their pivots.

8. In a press, a frame, a die slide reciprocable therein, a shaft mounted in the frame, pitman rods directly connecting between the slide and shaft, means for maintaining the slide against tilting in any direction out of its originally set position with respect to the bed of the press, the last said means embodying arms mounted upon the frame for oscillation about fixed pivots and disconnected from said shaft, links individual to the arms and connecting them with the slide, and means connecting the pivots of certain of the arms for causing them to move in unison.

9. In a press, a frame, a die slide reciprocable therein, a shaft mounted in the frame, a pair of rock shafts disconnected from the first said shaft and mounted in the said frame, the axes of the rock shafts intersecting the axis of the first said shaft, and means embodying levers and links connecting spaced portions on each rock shaft to corner portions of the said slide.

10. In a press, a frame, a die slide reciprocable therein, a shaft mounted in the frame, a pair of rock shafts disconnected from the first said shaft and mounted in the said frame, and means embodying levers and links connecting spaced portions on each rock shaft to corner portions of the said slide, the axes of said rock shafts being transverse to the axis of the first said shaft.

FREDRICH J. RODE.