

Feb. 28, 1933.

F. J. RODE

1,899,111

SHEET METAL DRAWING PRESS

Filed June 10, 1932

2 Sheets-Sheet 1

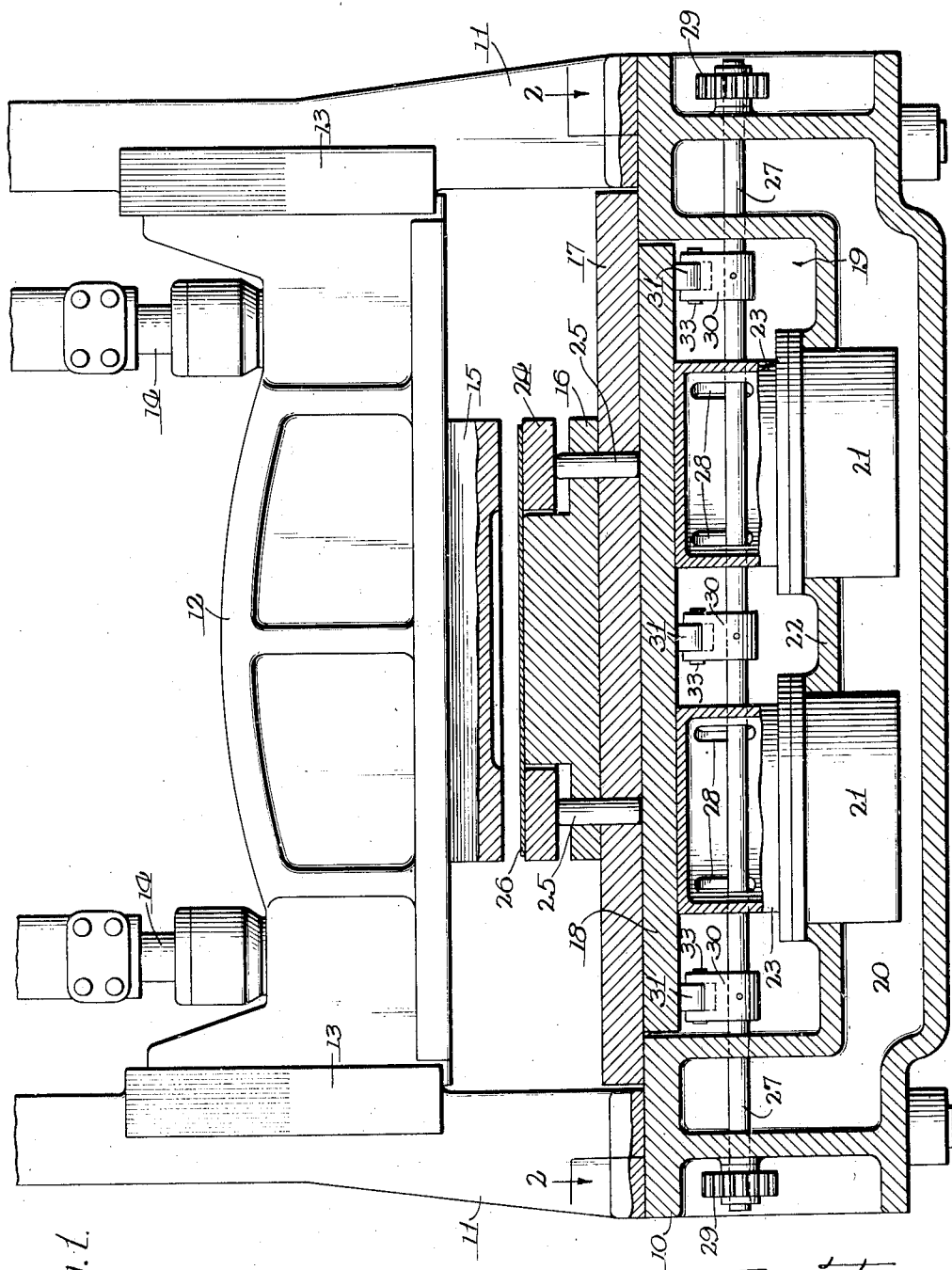


Fig. 1.

Inventor:
Fredrich J. Rode
By: *[Signature]* Att'y.

Feb. 28, 1933.

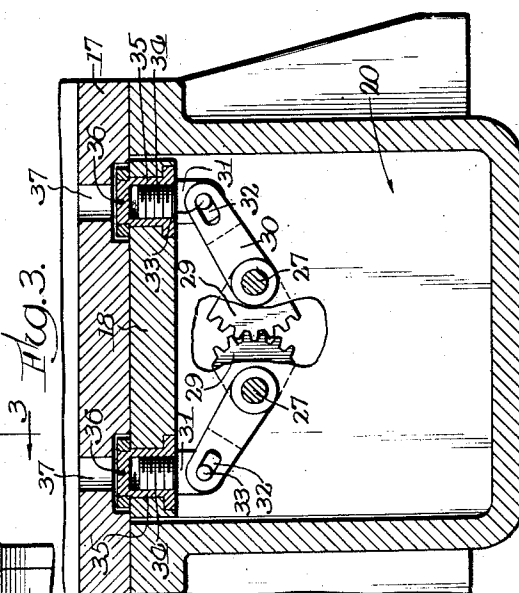
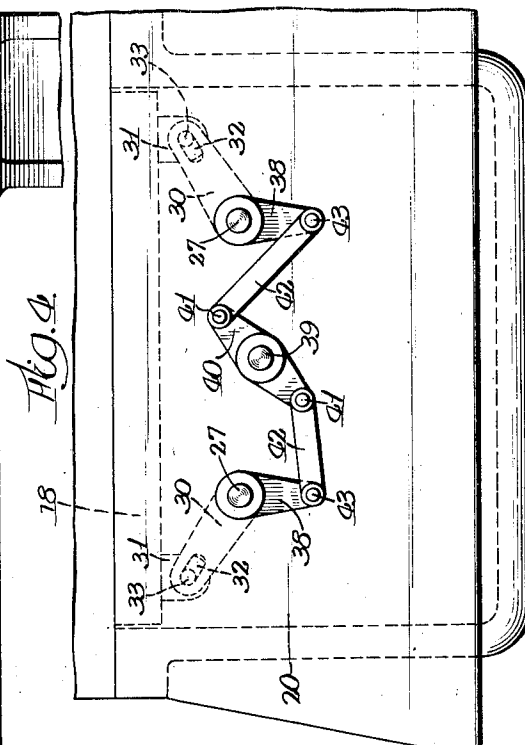
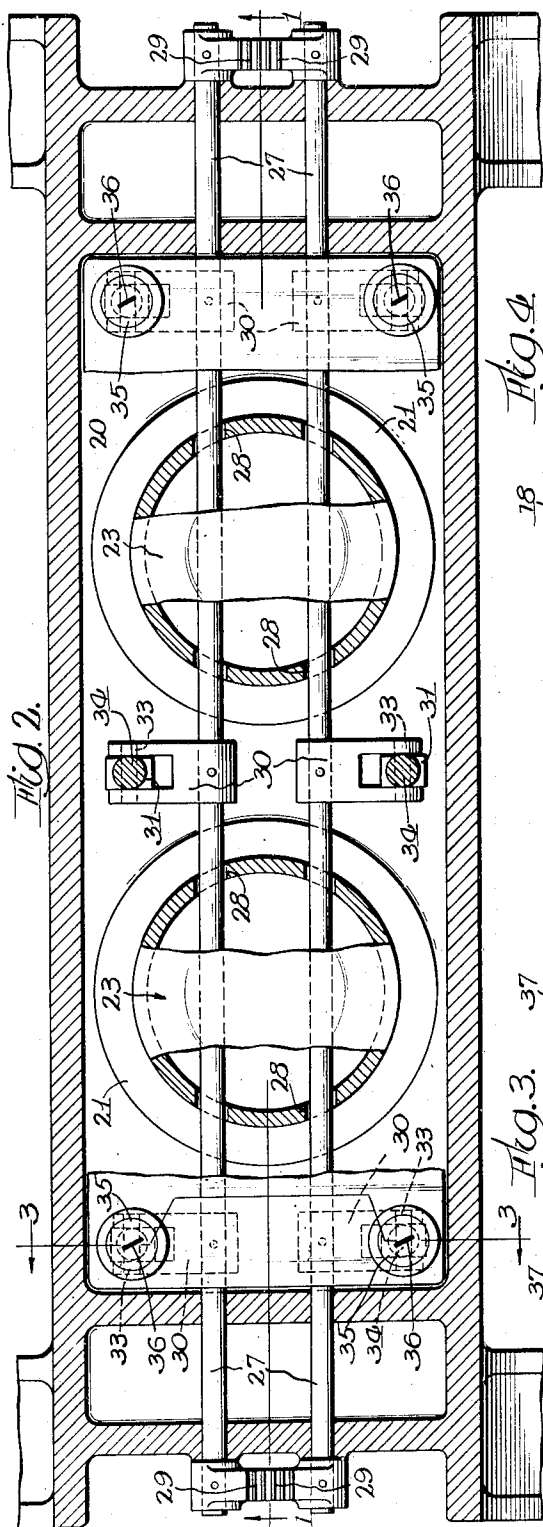
F. J. RODE

1,899,111

SHEET METAL DRAWING PRESS

Filed June 10, 1932

2 Sheets-Sheet 2



Inventor:
 Frederick J. Rode
 By: *[Signature]* Att'y.

UNITED STATES PATENT OFFICE

FREDRICH J. RODE, OF CHICAGO, ILLINOIS

SHEET METAL DRAWING PRESS

Application filed June 10, 1932. Serial No. 616,374.

This invention relates in general to sheet metal drawing presses, but more particularly to the blank or work holding means thereof.

Heretofore in presses of the character in which the work is formed between co-operating dies, one of which is reciprocable towards and away from the other, there is provided a blank or work holder which co-operates with one of the dies for clamping or holding the work while the latter is being formed by the dies.

It has been customary to provide a resiliently yielding cushion, embodying a pressure pad, operating upon the work holder to cause the material to be gripped or clamped with sufficient pressure to permit the material to "flow" during the shaping operation, and at the same time prevent the work from wrinkling, but not with sufficient pressure which would cause the material to become ruptured in the shaping operation.

It has been found that for various reasons and at times, such for instance, if the die is not centrally arranged on the base, or where it is desired to perform one operation on one side of the center of the base, in which the blank holder is necessary, and another and different operation on the other side of the center where the blank holder is not necessary, an unequal pressure will be exerted upon different parts of the pressure pad, with the result that there is a tendency for the pressure pad, as well as the work holder to tilt, causing the work to be gripped with unequal force at different points of the work holder, which is not desirable for obvious reasons.

It is one of the objects of the present invention to provide improved means for maintaining the pressure pad and the blank or work holder against a tilting movement under the stress of the operation of the ram upon the work, and to maintain a uniform pressure or gripping of the blank or work holder throughout the entire area thereof.

A further objects is to provide improved means operatively associated with the blank or work holder and the pressure pad, which will, when one portion of the holder or pad is depressed, cause the remaining portions

thereof to be correspondingly depressed and thereby maintain the pressure pad as well as the blank holder against tilting and in a level or horizontal position.

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 show in the accompanying drawings illustrating this invention and in which

Figure 1 is a view partly in elevation, partly in section, partly broken away and with parts omitted, of a press of this character constructed in accordance with the principles of this invention and as taken on line 1—1, Figure 2.

Figure 2 is a view taken on line 2—2, Figure 1, with parts omitted and parts broken away.

Figure 3 is a sectional view taken on line 3—3, Figure 2, and with parts broken away.

Figure 4 is an end elevation of a portion of the press showing a modified form of the invention.

Referring more particularly to the drawings the numeral 10 designates generally the base of the press having uprights 11 projecting thereabove. A ram 12 is reciprocable in guides 13 carried by the upright, and the ram is reciprocated by means of links 14 connected to the source of power (not shown). Carried by the ram 12 is a die 15 which co-operates with a stationary die 16 supported by the bed or bolster plate 17 of the press. Arranged beneath the bed plate 17 is a pressure pad 18 which preferably operates in a recess 19 in the base. The base is provided with a chamber 20 having tubular members 21 projecting through the top 22 thereof and reciprocable in the tubular members are pistons 23 upon which the pressure pad 18 rests, to be supported thereby. Fluid pressure in the cushion 20 serves as a means for returning the pistons 23 to their normal positions so that the pressure pad 18 will engage and rest against the lower face of the bed plate 17 and when the pressure pad is depressed,

the pistons 23 will be lowered against the fluid pressure in the chamber 20.

Co-operating with and encompassing the die 16 is a blank or work holder 24 which is supported by means of pins 25 that pass loosely through the bed or bolster plate 17 and engage and rest upon the pressure pad 18. These pins 25 are of such a length that when the pressure pad 18 is in contact with the bottom of the bed plate 17, the upper surface of the work holder 24 will be substantially flush with the top of the die 16 for supporting the work 26 in position to be engaged by the die 15 when the ram 12 is lowered, and the work holder 24 co-operating with the die 15, clamps and holds the work during the shaping or forming of the articles.

All of the above referred to parts are of the ordinary and well known construction.

It has been found that during the operation of the ram, and in many instances, for one reason or another, an unequal pressure will be exerted upon the work holder 24 and consequently the pressure pad 18. That is, a greater pressure will be exerted on one side of the center of the work holder and of the pad than on the other side, with the result that there is a tendency to tilt the work holder as well as the pressure pad. In machines of this character such an operation is undesirable for obvious reasons.

It is therefore one of the main objects of the present invention to provide improved means for maintaining the work holder 24 as well as the pressure pad 18 against a tilting movement under the stress of pressure exerted by the ram, so as to cause the pressure pad as well as the work holder 24 to be maintained in horizontal positions. This is accomplished in the following manner.

Arranged below the pressure pad 18 and journaled in suitable bearings preferably one of the walls of the cushion, are spaced parallel shafts 27 which extend across the press and project for a short distance beyond the outer faces of the press bed. These shafts 27 are spaced laterally from each other for any suitable distance and are so arranged that they will not interfere with the operation of the pistons 23. One form of arrangement is to provide suitable slots 28 in the portions of the pistons above the tubular members 21 and through which slots the shafts 27 loosely pass.

Secured to the end of each of the shafts 27, preferably adjacent the outer faces of the press structure, are toothed segments 29 which mesh with each other so that when one of the shafts 27 is rocked, the other shaft 27 will be correspondingly rocked.

Connected with each of the shafts 27 for oscillation therewith are arms 30, any number of which may be provided, and these arms are secured to the pressure pad 18 in any suitable manner, such as by means of an anchor 31

with which the free end of the arm 30 has connection, preferably by means of a slot and pin connection. A portion of the anchor 31 is provided with threads 34 which screw into a hollow member 35 rotatably secured to the pressure pad 18 and extending therethrough. The end of the element 35 is provided preferably with a slot or irregularly shaped recess opening through the top thereof, so that an implement such as a screw driver or suitable tool may be inserted through an opening 37 in the bed or bolster plate 17 to permit the element 35 to be rotated and thereby adjust the anchor member 31 with respect to the pressure pad, to raise and lower the point of connection of the arm 30 and anchor member 31 with respect to the pressure pad 18. This connection is provided for the purposes of adjustment.

In operation and assuming the parts to be in the position shown in Figure 1, when the die 15 is lowered to grip the work, and then lowered still further to shape the work with respect to the die 16, pressure will be exerted upon the blank or work holder 24. This pressure through the medium of the pins 25 will be communicated to the pressure pad 18 and the latter will be lowered. As the pad 18 is lowered, it will be manifest that the shafts 27 will be rocked through the medium of the arms 30 and the pin and slot connection 32-33 with the anchor member 31, with the result that the teeth of the segment 29 meshing with each other will cause a corresponding rocking movement to be imparted to both of the shafts, with the result that even though pressure may be exerted upon the blank or work holder or the pressure pad on one side or the other of the center thereof, both will be maintained against a tilting movement as the shafts 27 and the segments 29 will cause all portions of the pressure pad 18 to be lowered to the same extent and the pad will be maintained in a horizontal position.

In Figure 4 of the drawings there is shown a modified construction for accomplishing the same purpose. In this form of the invention, there is connected with the shafts 27 arms 38 which preferably depend below the shafts. Secured to the outer face of the stationary portion of the press structure by means of a trunnion 39 and intermediate its ends is a lever 40 and pivotally connected to each end of the lever 40 as at 41 is one end of a link 42. The other end of each of these links 42 is pivotally connected as at 43 to one of the arms 38 so that in lieu of the gears or toothed connections 29 between the shafts 27, the shafts 27 are connected by a series of links and levers which operate, when pressure is exerted upon the pressure pad 18, no matter at what point upon the pressure pad, the pad during its lowering movement will rock the shafts 27 and by reason of the link and lever

connections 42—40 between the arms 38, the shafts 27 will be correspondingly rocked and to the same extent, with the result that the pad 18 will be prevented from tilting and

will be maintained in a horizontal position.

With both forms of the invention it will be manifest that it will be impossible, no matter how great a pressure is exerted upon any one point or area, no matter what the extent of the area may be, or the point at which the pressure is applied to the pressure pad, it will be impossible to tilt the pad under the stress of the ram, with the result that both the pressure pad and the work holder will be maintained in horizontal positions to insure a proper gripping action of the work holder upon the work at all times during the operation of the press and the forming of the article.

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 pressure pad adapted to be lowered during the operation of the press, and positive means operating automatically to maintain the pad against tilting during its movement under pressure, regardless of the point at which said pressure is applied to the pad, the said means embodying rock shafts connected with different parts of the pad and connections between the shafts.

2. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating automatically to maintain the pad against tilting during its movement under pressure, regardless of the point at which said pressure is applied to the pad, the said means embodying rock shafts, arms connected with the shafts, means connecting the arms with different parts of the pad, and means connecting the shafts together for simultaneous rocking movements.

3. In a press, a pressure pad adapted to be lowered during the operation of the press, means for yieldingly resisting the movement of the pad in one direction, positive means operating automatically to maintain the pad against tilting during its movement under pressure, regardless of the point at which said pressure is applied to the pad, the said means embodying rock shafts connected with different parts of the pad, and connections between the shafts.

4. In a press, a pressure pad adapted to be lowered during the operation of the press, crank constructions pivotally mounted upon a fixed portion of the press, means connecting the cranks with different portions of the pressure pad whereby the cranks will be rocked

about their pivots under the effects of the movement of the pad, and means connecting the cranks together for simultaneous operation.

5. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating automatically to maintain the pad against tilting during its movement under pressure, regardless of the point at which said pressure is applied to the pad, the said means embodying rock shafts journaled to fixed portions of the press, means connecting the shafts to different points of the pad whereby the movement of the pad will rock said shafts, and means connecting the shafts together for simultaneous operation.

6. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally connected with a stationary portion of the press, means connecting said elements to different points of the pad whereby the movement of the pad will rock said elements about their pivots, and means connecting said elements together for simultaneous movement.

7. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally connected with a stationary portion of the press, means connecting said elements to different points of the pad whereby the movement of the pad will rock said elements about their pivots, and means connecting said elements together for simultaneous movement, the last recited means embodying intermeshing toothed elements.

8. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally connected with a stationary portion of the press, means connecting said elements to different points of the pad whereby the movement of the pad will rock said elements about their pivots, and link connections between said elements for causing them to be simultaneously rocked about their pivots.

9. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means

embodying a plurality of elements pivotally connected with a stationary portion of the press, means connecting said elements to different points of the pad whereby the movement of the pad will rock said elements about their pivots, means connecting said elements together for simultaneous movement, and means for adjusting the points of connection between the said elements and the said pad.

10 10. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally connected with a stationary portion of the press, means pivotally connecting said elements to different points of the pad whereby the movement of the pad will rock said elements about their pivots, and means connecting said elements together for simultaneous movement.

11. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally connected with a stationary portion of the press, means connecting said elements to different points of the pad and embodying pin and slot construction, whereby the movement of the pad will rock said elements about their pivots, and means connecting said elements together for simultaneous operation.

12. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally mounted upon a stationary part of the press, means connecting said element to different points of the pad whereby movement of the pad will rock said elements about their pivots, a lever pivotally mounted intermediate its ends upon a fixed part of the press, and link connections between the said elements and opposite end of said lever.

13. In a press, a pressure pad adapted to be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally mounted upon a stationary part of the press, means connecting said element to different points of the pad whereby movement of the pad will rock said elements about their pivots, and link connections between said elements.

14. In a press, a pressure pad adapted to

be lowered during the operation of the press, positive means operating to maintain the pad against tilting during its movement under pressure, regardless of the point at which pressure is applied to the pad, the said means embodying a plurality of elements pivotally mounted upon a stationary part of the press, means connecting said element to different points of the pad whereby movement of the pad will rock said elements about their pivots, links connected by one end with said elements, and means connecting the other end of said links together.

15. In a press, a pad adapted to be lowered during the operation of the press, and means operating automatically to maintain said pad against tilting during its movement under pressure regardless of the point or area at which said pressure is applied to said pad, the said means embodying mechanism for varying the originally set position of the pad.

16. In a press, a ram, a pad adapted to be lowered by pressure during the operation of the ram, and means operating automatically to maintain said pad against tilting during its movement under pressure regardless of the point or area at which said pressure is applied to said pad, the said means embodying means for adjusting the pad to a predetermined position with respect to the parallel position of the face of the pad with relation to the face of the ram.

In testimony whereof I have signed my name to this specification, on this 16th day of May, A. D. 1932.

FREDRICH J. RODE.