Nov. 25, 1941. C. J. RHODES 2,263,904

PRESS FOR DRAWING SHEET METAL

Filed Feb. 8, 1940

Fig. 2.

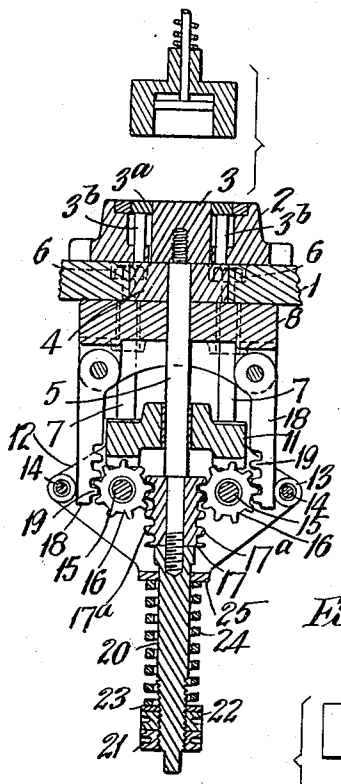


Fig. 1.

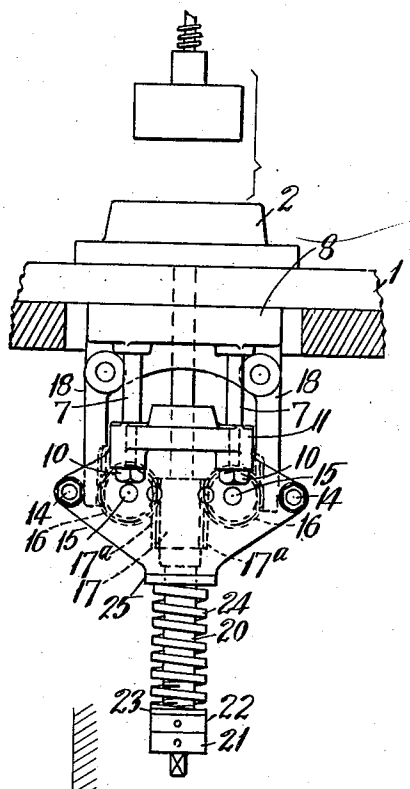


Fig. 3.

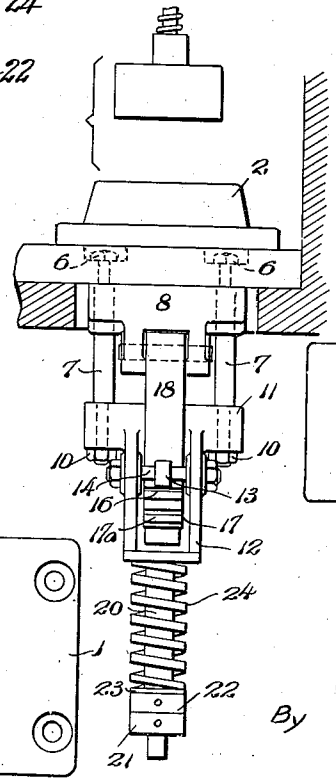


Fig. 4.

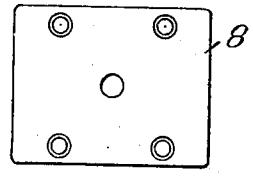
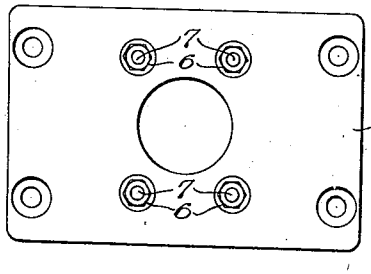


Fig. 5.



Inventor
Charles Joseph Rhodes
By Mocks Blum
Attorneys.

Patented Nov. 25, 1941

2,263,904

UNITED STATES PATENT OFFICE

2,263,904

PRESS FOR DRAWING SHEET METAL

Charles Joseph Rhodes, Wakefield, England

Application February 8, 1940, Serial No. 317,817
In Great Britain December 28, 1939

2 Claims. (Cl. 113—46)

This invention relates to presses for drawing sheet metal, and it refers to presses of the kind having an upper movable die with which cooperates a lower die having a block or former, provision being made whereby the block is caused to move towards the movable die during the drawing operation.

In presses of this type it has hitherto been necessary to provide the drawing dies with pressure pins which in order to bear upon the pressure platform are required to pass through the bed plate of the press as well as through the bottom of the die. These pins thus require to be of substantial length and many users of these machines find the presence of these pins objectionable.

Moreover it is found that with the existing presses owing to slight variations in the thickness of the metal sheet being operated upon there is a tendency for the body formed to become jammed in the die. The jamming just referred to prevents the operation of the spring which is provided to hold the pressure platform up to its work and to return the parts to their normal positions after the dies have completed the drawing of the metal. Should jamming take place the spring is unable to function properly with the result that instead of following up the parts as they move back to their normal positions, it is held in a compressed condition until it is able to overcome the resistance opposing its action. The sudden release of the spring causes the block to be drawn downwards with considerable force, imparting a hammer-like blow to the die on the pressure table, which, apart from being detrimental to the dies, is injurious to the machine as a whole.

With presses of this type it is also found that there is a tendency for the metal to wrinkle due to uneven pressure between the upper die and the draw ring.

The present invention has for its object certain improvements which are designed not only to overcome the aforesaid disadvantages but to enable the construction of the press to be simplified and at the same time to permit more ready access to the spring in order that its resistance may be adjusted in accordance with the thickness or hardness of the metal being operated upon.

With the foregoing objects in view according to the present invention the lengthy pressure pins for the draw ring are dispensed with and for them is substituted short pins which instead of bearing upon the pressure platform bear upon a plug, perforated for the passage of the rod carrying the forming block, interposed between the lower ends of the aforesaid pins and the pressure platform, and fitted within the perforation of said bed-plate so as to move rectilinearly and to be incapable of tilting, to thereby prevent tilting and jamming of the draw ring.

In order that the invention may be the better understood reference is made to the accompanying drawing in which—

Fig. 1 is a front view with certain parts in section of an embodiment of the invention.

Fig. 2 is a vertical section.

Fig. 3 is a side view.

Fig. 4 is a plan of the pressure platform.

Fig. 5 is a plan of the bed plate of the machine.

Referring to the accompanying drawing in which only such parts of the press are shown as are necessary for the proper understanding of the invention, 1 indicates the bed plate of the press upon which is mounted the bottom die 2 having a central opening for the passage of a block or former 3, said block at its base resting upon the plug 4, disposed in an opening formed in the bed plate, and which plug slidably engages the upper end of a rod 5 having a screw thread to engage an appropriate thread formed in a hole in the block 3. The draw ring 3a is supported by pins 3b resting on the plug 4. By employing a plug such as 4 the use of lengthy pressure pins is avoided. Secured to the bed plate 1 by means of nuts 6 countersunk into the upper surface of the said bed plate are downwardly projecting rods 7, the upper end of each of which is reduced in diameter where it enters the said bed plate and is screw threaded to engage one of the nuts 6. The rods 7, of which four are provided, form guides for a pressure platform 8, the rods serving to prevent the plate from tilting or rocking as it moves upwards and downwards and ensuring that the pressure upon the metal being acted upon is evenly applied over the whole surface thereof, and by this means not only preventing the formation of wrinkles but preventing the jamming before referred to due to variation in the thickness of the metal whereby the block in the bottom die would be wedged in the drawn body and as already described pulled upwards by the top die upon the return stroke.

The rods 7 are each reduced in diameter at their lower ends and each screw threaded for the reception of a nut 10 whereby there is secured to the said rods a plate 11 having formed in it holes for the passage of the lower ends of the said rods. The rod 5 passes freely through the bushed hole in the centre of the plate 11. The

plate upon each side is provided with projections or cheeks 12 suitably spaced apart to accommodate rollers 13 the spindles 14 of which are supported by said cheeks. Other spindles 15 supported by the cheeks 12 have freely mounted upon them pinions 16. The rod 5 at its lower end has secured to it a body 17 having upon opposite sides thereof racks 17*a* with which engage the aforesaid pinions 16. 18 indicate pendulous members pivotally mounted upon the underside of the pressure plate 8 and provided upon their inner faces with teeth indicated by 19 forming racks which engage the pinions 16, the engagement of the rack with the pinions being ensured by the rollers 13 which engage the outer surface of the members 18.

The arrangement of the parts just described is more clearly shown in Fig. 2. The lower end of the rod 5 is reduced in diameter and screw threaded to permit the connection thereto of an extension 20 screw threaded at its lower end and provided with lock nuts 21, 22, the nut 22 supporting a washer 23 against which abuts the lower end of a helical spring 24 encircling the said extension and having its upper end bearing against a transverse member 25 extending between the cheeks of the plate 11.

The tendency of the spring is to oppose the upward movement of the rod 5 carrying the block 3 and to ensure the return of the block as the upper die moves upwards. Should the block not be freed it would move upwards with the upper die until the spring exerts enough force to pull it down but in this case the force of impact between the contacting parts might be sufficient to damage the die. The arrangement just described effectively overcomes the possibility of any jamming taking place. A further advantage attending the provision of the guides for the pressure platform is that it enables a press of this type to be operated in an inclined position without requiring provision to be made to counter the weight of the parts which tend to sag. Without such provision it was found that vibration occurred which was not conducive to the production of good work.

The action of the parts is as follows:

As the upper die moves downwards on to the metal blank its pressure is transmitted through the draw ring 3*a* and pins 3*b* to the plug 4 and so to the pressure platform 8 causing same to be depressed. The depression of the platform 8 causes the racks upon the pendulous members 18 to operate the pinions 16, which, owing to their engagement with the teeth upon the body 17, cause the rod to be raised compressing the spring 24. Upon the upward movement of the upper die the parts are returned to their original positions. By arranging the spring 24 in the position shown it is readily accessible for the purpose of adjustment.

I claim:

1. In a press for drawing sheet metal, comprising an upper die, a lower die, means for bringing said upper die into and out of effective engagement with said lower die, a perforated bed-plate supporting the lower die, a rod passing upwardly through said plate, a former upon the upper end of said rod, a movable draw-ring, pins upon the upper ends of which said draw-ring is supported, a platform movable in a direction transversely with respect to its upper surface, toothed racks upon said rod, pinions supported in fixed relationship to and engaging said racks, members supported by the platform, racks upon said members, said racks engaging the aforesaid pinions, and a spring acting upon the former carrying rod to oppose the upward movement of the latter, in combination, a plug, perforated for the passage of said rod, and interposed between said platform and the lower ends of said pins, and fitted within the perforation of said bed-plate so as to move rectilinearly and to be incapable of tilting, to thereby prevent tilting and jamming of the draw-ring, together with four guide rods for the platform, rigidly carried at their upper ends in the base plate, and a plate fixed at the lower ends of said rods and perforated to form a guide for the former carrying rod.

2. In a press for drawing sheet metal, comprising an upper die, a lower die, means for bringing said upper die into and out of effective engagement with said lower die, a perforated bed-plate supporting the lower die, a rod passing upwardly through said plate, a former upon the upper end of said rod, a movable draw-ring, pins upon the upper ends of which said draw-ring is supported, a platform movable in a direction transversely with respect to its upper surface, toothed racks upon said rod, pinions supported in fixed relationship to and engaging said racks, members supported by the platform, racks upon said members, said racks engaging the aforesaid pinions, and a spring acting upon the former carrying rod to oppose the upward movement of the latter, in combination, a plug, perforated for the passage of said rod, and interposed between said platform and the lower ends of said pins, and fitted within the perforation of said bed-plate so as to move rectilinearly and to be incapable of tilting, to thereby prevent tilting and jamming of the draw-ring, together with a plurality of guide rods for the platform, rigidly carried at their upper ends in the base plate, and a plate fixed at the lower ends of said rods and perforated to form a guide for the former carrying rod.

CHARLES JOSEPH RHODES.