

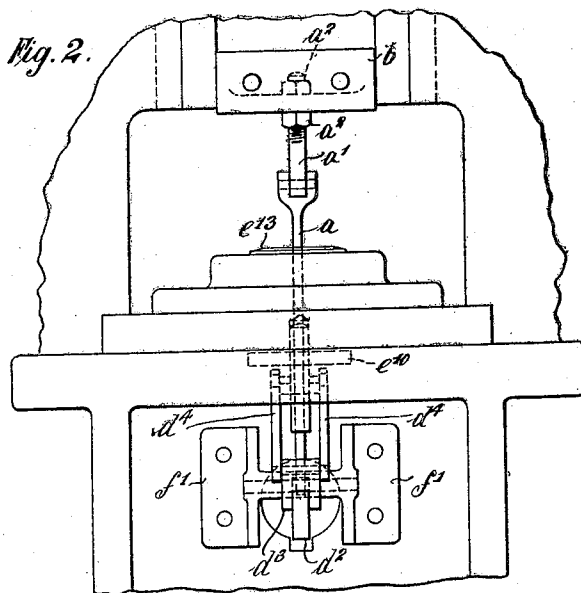
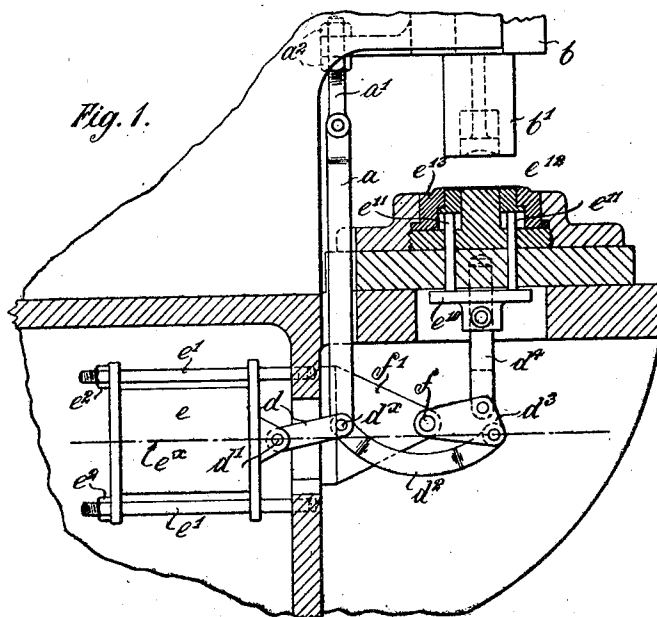
Dec. 16, 1924.

1,519,333

C. J. RHODES ET AL
DRAW PRESS FOR SHEET METAL

Filed Dec. 13, 1922

2 Sheets-Sheet 1



Inventors:

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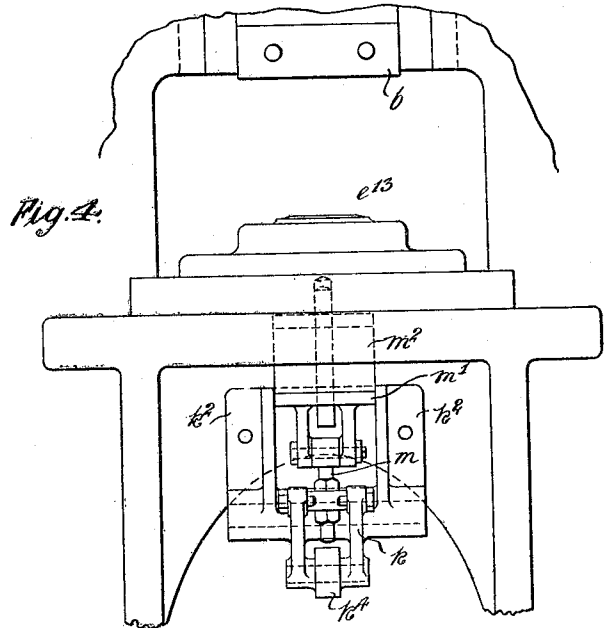
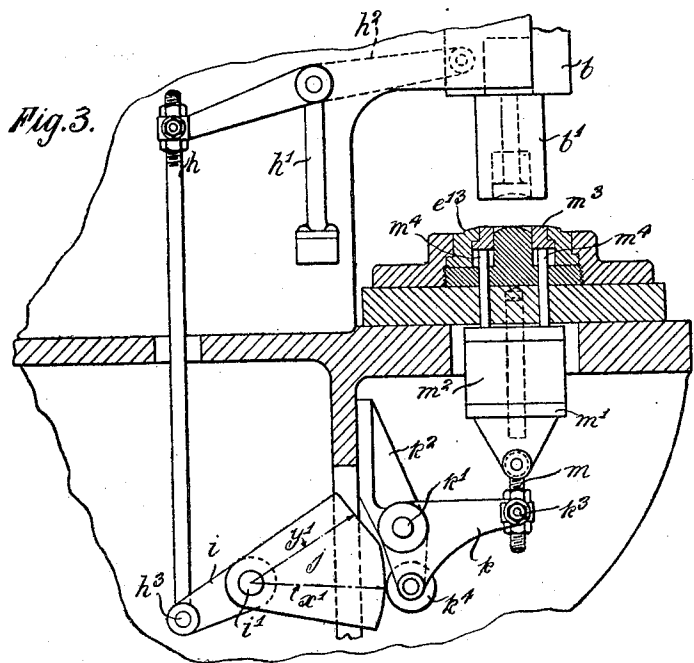
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UNITED STATES PATENT OFFICE.

CHARLES JOSEPH RHODES AND GEORGE WILLIAM BERRY, OF WAKEFIELD, ENGLAND.

DRAW PRESS FOR SHEET METAL.

Application filed December 13, 1922. Serial No. 606,742.

To all whom it may concern:

Be it known that we, CHARLES JOSEPH RHODES and GEORGE WILLIAM BERRY, residing at Wakefield, in the county of York, England, both subjects of the King of Great Britain and Ireland, have invented certain new and useful Improvements in Draw Presses for Sheet Metal, of which the following is a specification.

10 This invention relates to draw presses for sheet metal and more particularly to what are known as "combination" presses that is to say, those in which the lower die is provided with a movable pressure ring usually connected by pins passing through the bed of the press and operatively connected to a resilient buffer or "bumper" composed of rubber and which receives the pressure exerted by the top die during the drawing operation. In such machines the pressure exerted on the pressure ring and on the "bumper" is a gradually increasing one as the "draw" progresses and in practice is much greater than is required to efficiently draw the metal being shaped, this resulting in the resilient properties of the bumper being much impaired and its life reduced.

The present invention comprises means by which a constant pressure which may be previously determined is always maintained on the pressure ring of the lower die and consequently on the work, and in certain cases also on the "bumper" at all stages of the drawing operation and irrespective of the length or depth of "draw" being carried out.

Three forms of the present invention given as examples are illustrated in the accompanying drawings. Figs. 1 and 2, and Figs. 3 and 4 being respectively sectional side elevation and partial end elevation of the ram and die elements and associated parts of the two forms referred to.

In the embodiment of the invention shown in Figs. 1 and 2 a rod or bar a is adjustably connected, as by means of threaded link a^1 and nuts a^2 to the ram b or other suitable moving part of the press to obtain the required movement according to dies of different depth. The ram carries the upper die b^1 as usual and the rod is pivotally connected below the bed c of the press to oppositely extending links d d^2 one of which is piv-

otally connected at d^1 to the "bumper" e which is slidably mounted on horizontal rods, studs or the like e^1 and the degree of compression of which can be adjusted by means of nuts e^2 on said rods or other convenient means. The other link d^2 is connected through a quadrant d^3 and rod system d^4 with a pressure platform or plate e^{10} carrying the aforesaid pins e^{11} connected to the pressure ring e^{12} of the lower die e^{13} . The quadrant d^3 is anchored or pivoted about a fixed point f by means of a bracket f^1 carried by the body of the press and the degree of pressure desired on the pressure ring e^{12} and consequently on the metal being drawn can be predetermined by initially adjusting the position of the "bumper" on its rods or studs e^1 by means of the nuts e^2 or other devices provided.

The action of such construction is as follows:—

As the ram b descends, the aforesaid links d d^2 are depressed and during this displacement no movement of any other parts takes place until the pivotal point of connection d^x between the rod a and links d d^2 reaches a point which is a similar distance below the axis e^x of the bumper as it previously was above said axis. When this point is reached the upper die b^1 will have engaged the pressure ring e^{12} of the lower die which consequently descends due to the pressure of the "draw" action thereon and in doing so the quadrant d^3 and links d d^2 above referred to are acted on whereby the pressure platform e^{10} connected to the pressure ring is caused to descend at the same speed as the ram, but no further compression of the rubber bumper e takes place throughout the stroke of the press, since equal leverage of the links on both sides of the connecting rod is exerted. The pressure desired is previously determined and set as described and is maintained to the end of the "drawing" stroke.

In the form shown in Figs. 3 and 4 a link h is coupled up to the ram b or any other suitable reciprocating or rotating member of the press in such a manner as to produce an upward motion as the press ram descends for example by means of the rod and lever connection h^1 h^2 . The lower end of said link is pivotally connected at h^3 to a lever i

anchored on a shaft z^1 to which is also keyed a cam j . This cam has two faces a concentric path with radius x^1 and an angular face with radius y^1 which are engaged by a bell crank lever k which in turn is carried on a spindle l^1 mounted in a bracket l^2 supported on the body of the press. On the bell crank lever is mounted a coupling l^3 in such a manner as to allow same to swivel and through it passes an adjusting bolt m upon which hinges the buffer plate m^1 . The buffer m^2 is located below the press bed and directly connected to the pressure ring m^3 of the lower die by the usual pressure pins m^4 .

As the ram b descends the upper die b^1 engages the pressure ring m^3 the pressure pins m^4 bear upon and tend to compress the buffer m^2 but owing to the form of the cam j the buffer plate m^1 is allowed to descend at the same rate as the ram, thus maintaining the original pressure on the die throughout the stroke. During the time the ram is descending and until the upper die engages the pressure ring, the cam periphery of the radius x^1 engages a roller h^4 of the lever k , thereby transferring no motion to the bell crank. When however, the draw stroke takes place, the cam path of radius y^1 engages the roller and this cam path is so shaped or "timed" that the buffer recedes at the same speed as the ram descends, thus maintaining constant pressure also on the bumper.

The pressure desired is predetermined by adjustment of the bolt m and remains constant due to the form of the cam path y^1 . For different depths of drawn stampings all that is necessary is to adjust the length of the connecting link h so that when the upper die just engages the pressure ring of the lower die the cam roller is about to recede on said cam surface.

With the constructions above described the initial pressure on the pressure ring is maintained throughout the depth of the stroke and in the form shown in Figs. 3 and 4 this constant pressure is also maintained on the buffer thereby producing better work, prolonging the life of the dies and the buffer and effecting a considerable saving in power necessary to drive the machine, wear and tear being consequently diminished.

What we claim as our invention and desire to secure by Letters Patent of the United States is:—

1. In a combination draw press for sheet metal, a die, a pressure ring mounted therein, a plunger for said die and ring, means for placing the pressure ring under pressure, and additional means connecting said first-named means with the ram for actuating the first-named means independently of the plunger.

2. In a combination draw press for sheet

metal, a die, a pressure ring mounted therein, a plunger for said die and ring, means for placing the pressure ring under pressure, and additional means connecting said first-named means with the ram for actuating the first-named means independently of the plunger through a part of the downward cycle and in conjunction with the plunger through the remaining downward cycle of operation.

3. In a combination draw press for sheet metal, the combination of a ram carrying an upper die, a lower die with which said upper die cooperates, a pressure ring mounted in said lower die, means for placing said pressure ring under pressure, and additional means connecting said first-named means with said ram for actuating the first-named means independently of the upper die.

4. In a combination draw press for sheet metal, a die, a pressure ring mounted therein, a plunger for said die and rings, a resilient buffer connected to said pressure ring, means connecting said buffer with said pressure ring, and additional means connecting said first-named means with the ram for actuating the first-named means independently of the plunger.

5. In a combination draw press for sheet metal, a die, a pressure ring mounted therein, a bell crank having one arm adjustably connected to said pressure ring, a cam against which the other arm of the bell crank is adapted to bear, said cam having two surfaces, one concentric to the cam axis and the other angular thereto, and means for adjustably connecting said cam to a moving part of the press.

6. In a combination draw press for sheet metal, a die, a pressure ring mounted therein, a buffer directly connected to said pressure ring, a bell crank having one arm adjustably connected to said buffer, a cam against which the other arm of the bell crank is adapted to bear, said cam having two surfaces, one concentric to the cam axis and the other angular thereto, and means for adjustably connecting said cam to a moving part of the press.

7. In a combination draw press for sheet metal, a die, a pressure ring mounted in said die, a plunger for said die and ring, a resilient buffer connected to said pressure ring, and means connecting said buffer with the ram for placing the pressure ring under pressure independently of the plunger.

8. A draw press for sheet metal comprising a ram, a die, a pressure ring in said die, a plunger in said ram for said die and ring, and means connected to said ram for placing the pressure ring under maximum pressure independently of the plunger and before the plunger contacts with the pressure ring.

9. A draw press for sheet metal, a die, a pressure ring in said die, a plunger for said

die and ring, and means for placing the pressure ring under maximum pressure independently of the plunger and before the plunger contacts with the pressure ring.

5 10. In combination with a draw press for sheet metal including a plunger and a pressure ring, a pressure device for said pressure

ring comprising means for placing the pressure ring under maximum pressure before the plunger contacts with said pressure ring. 10
In witness whereof we have signed this specification.

CHARLES JOSEPH RHODES.
GEORGE WILLIAM BERRY.