

Sept. 25, 1928.

1,685,308

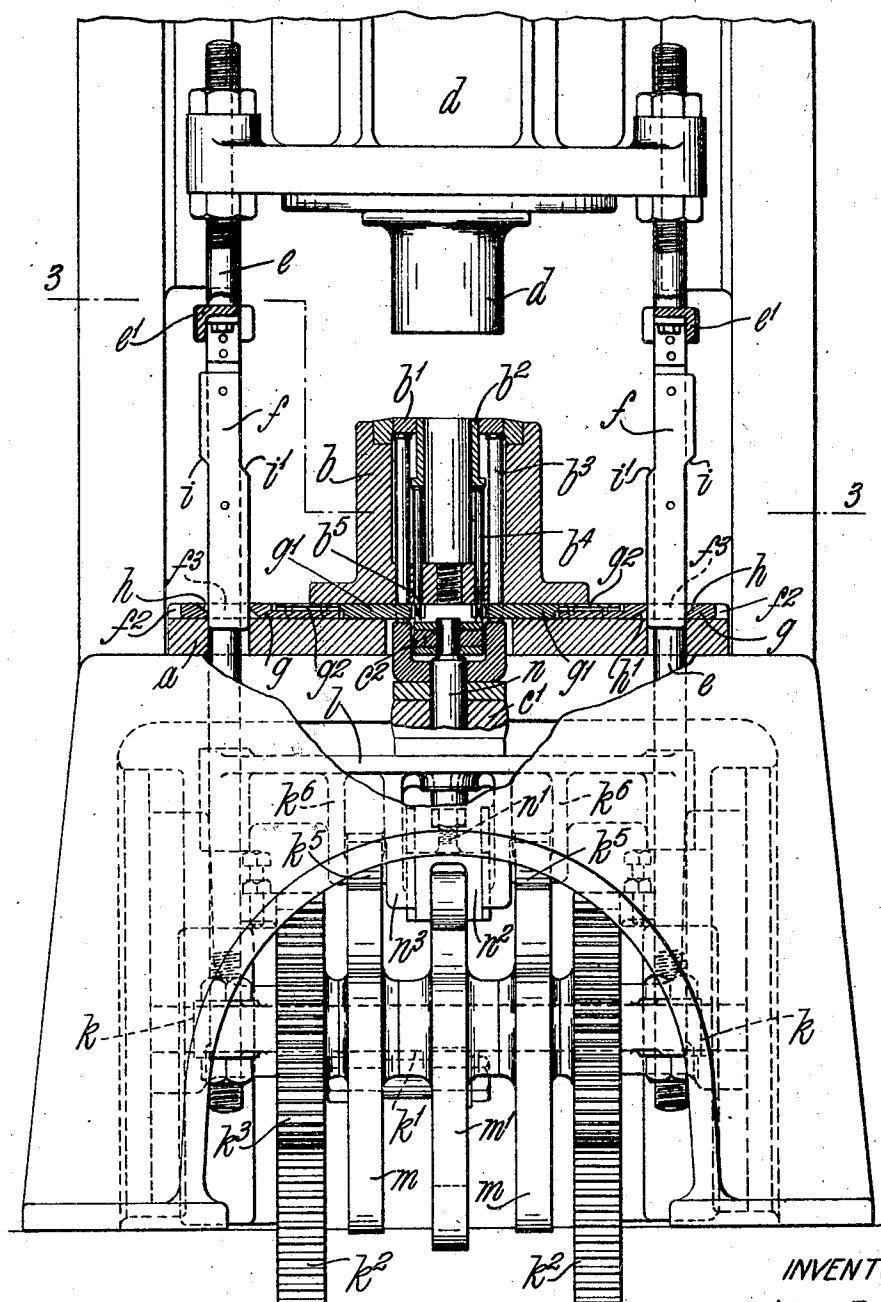
G. W. BERRY

PRESS FOR DRAWING SHEET METAL

Filed March 19, 1925

3 Sheets-Sheet 1

Fig. 1.



INVENTOR:

George William Berry.

ATTORNEY: W. H. Williams

Sept. 25, 1928.

1,685,308

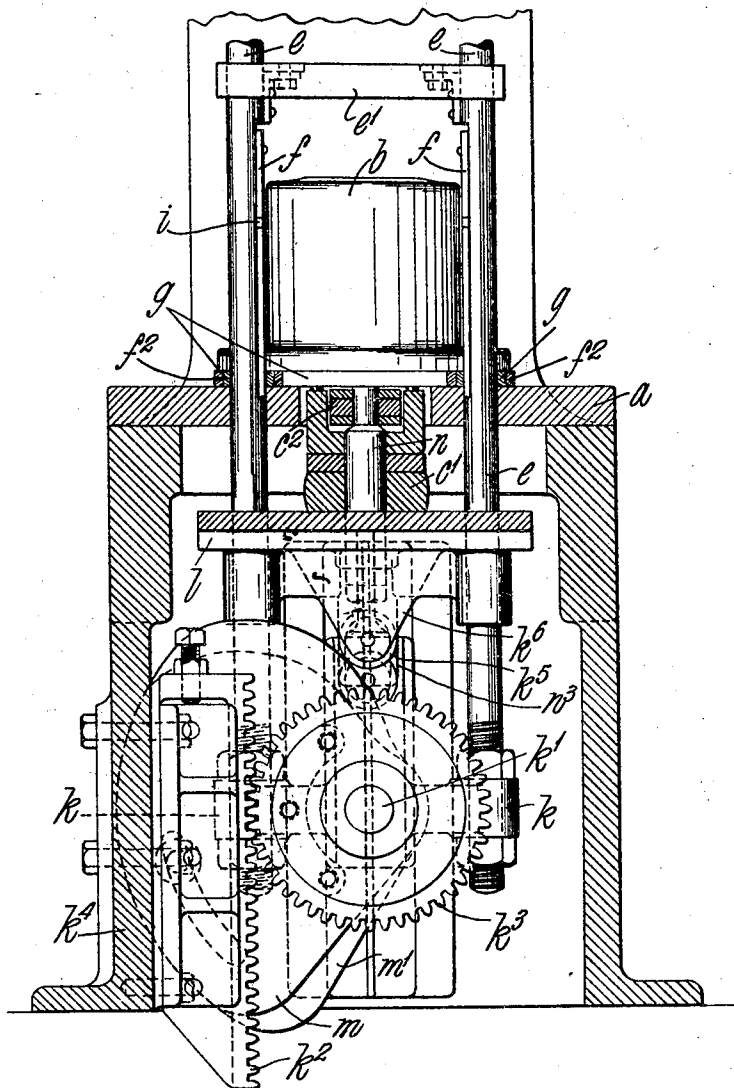
G. W. BERRY

PRESS FOR DRAWING SHEET METAL

Filed March 19, 1925

3 Sheets-Sheet 2

Fig. 2.



INVENTOR:

George William Berry.

ATTORNEY: *G. W. Berry*

UNITED STATES PATENT OFFICE.

GEORGE WILLIAM BERRY, OF LEEDS, ENGLAND, ASSIGNOR OF ONE-HALF TO CHARLES JOSEPH RHODES, OF WAKEFIELD, ENGLAND.

PRESS FOR DRAWING SHEET METAL.

Application filed March 19, 1925, Serial No. 16,670, and in Great Britain May 27, 1924.

This invention relates to presses for drawing sheet metal hollow ware such as vessels or receptacles of considerable depth in a plurality of stages, for example two, which may be termed the "draw" and "redraw" operations, such presses having cooperating movable and stationary dies the stationary die comprising inner and outer drawing members each supported as by pressure pins and under the action of separate cams by which the pressure and timing of operation of the respective pressure members are controlled.

The object of the invention is to provide means for taking the first draw pressure or relieving the "redraw" cam of pressure during the first drawing operation, so that no tendency is present for the mechanism to be thrown out of proper action due to oblique forces acting on intervening parts, such as the roller on which the redraw cam operates, up to the time the redraw member commences its function or descent.

The invention therefore comprises means for transmitting the pressure of the first draw to the bed or equivalent of the press by obstructing the movement of one of the drawing members through which said pressure is exerted and then subsequently removing the obstruction prior to the operation of said drawing member.

The invention also comprises other details of construction, arrangement and combination of parts as set forth in the appended claims and specified in the following description with reference to the accompanying drawings in which:

Fig. 1 is a vertical section of a press of the type described to which the present invention has been applied; Fig. 2 is a vertical section at right angles to Fig. 1 with certain parts removed and Fig. 3 is a cross section on line 3—3 of Fig. 1. The said drawings illustrate at *a* the bed of the press supporting the lower die *b* which comprises the outer drawing member *b*¹ and the inner or redraw member *b*², these members being supported respectively by pressure pins *b*³ *b*⁴ with which are associated respectively buffers *c*¹ *c*². *d* designates the ram or cross head carrying the upper die *d*¹.

There are connected to the ram *d* tie rods *e* which extend through the bed *a* of the press and are connected below to frames *k* which carry a cam shaft *k*¹, the latter having mounted thereon one near each end a pinion *k*³ which meshes with a rack *k*² carried by the press frame *k*⁴ one at each side thereof. On the tie rods *e* is slidably mounted a table *l* supporting the buffer *c*¹ associated with the outer or main drawing member *b*¹. This table or buffer support *l* engages two operating or first draw cams *m* loosely mounted on the cam shaft *k*¹ the table being provided with rollers *k*⁵ or other antifriction means carried by brackets *k*⁶ on the table for engagement with the cams *m*.

There is also provided at or about the centre of the table a "redraw" spindle *n* extending through the buffer *c*¹ and associated parts and acting on the second buffer *c*² pertaining to the inner or "redraw" member *b*², said redraw spindle being adjustably connected as by screw *n*¹ with a slide or the like *n*² guided in guides *n*³ below the table *l* and co-operating with another cam *m*¹ on the cam shaft *k*¹ which may be termed the redraw cam.

The aforesaid pinions *k*³ are anchored to the first draw cams *m* and all the cams oscillate on the cam shaft the latter however not oscillating but being caused to rise and fall through tie rods *e* with the movements of the ram. This cam control mechanism is the same as that employed in the press disclosed in my prior Patent No. 1,561,902 issued November 17, 1925.

There are attached to the tie rods *e* at each side of the press by which the cam mechanism is operated from the ram *d* as above described cross members or bars *e*¹ which carry vertical bars *f* *f*¹, in the nature of cam members, adapted to operate slides working in guides *f*² in the bed *a* laterally into and out of the path of movement of the supporting pins *b*⁴ for the drawing member *b*². The said slides are suitably formed of two relatively adjustable parts *g*, *g*¹, connected as by screw and slot connections *g*². They pass under the lower die *b* and serve as an abutment for engagement of the pressure pins *b*⁴ supporting the inner or redraw

member b^2 , said pins being shown as reduced in diameter to form shoulders b^5 for this purpose. The slide actuating cam bars f f^1 pass through slots f^3 in the slides, these slots having inclined faces h h^1 acted on by wedge members i i^1 , on the bars, so that the slides are inserted under and withdrawn from the pressure pins b^4 at the proper times in the reciprocation of the ram or strokes of the press.

With apparatus as described the draw commences using the redraw member b^2 as the plug for the draw of first diameter, the slides g , g^1 , being in position under the pressure pins b^4 and thus taking the resistance or pressure of the draw and transmitting same to the bed a of the press. When the first drawing operation is completed the bars f f^1 act on said slides by the action of the wedge members i^1 on the lower inclined faces h^1 of the slots f^3 in the slides and cause the latter to recede from under the pressure pins so that the redraw member b^2 may now operate or descend under control of its individual cam. The reverse action takes place on the opposite stroke of the press, that is to say, the wedge members i act on the upper inclined faces h and the slides are forced back again under the pins, as the redraw member b^2 reaches its original position.

A slight pause takes place between the sequence of the operations to allow the slides to be withdrawn before the second or redraw operation commences.

What I claim as my invention and desire to be secured by Letters Patent of the United States is:—

1. In a draw press, a die including a stationary member and a plurality of drawing members movable longitudinally relative to the stationary member and each other, a die movable toward and away from the stationary and drawing members and co-operating therewith to effect a drawing operation in successive stages, slides mounted to have movement transversely toward each other into the path and obstruct the movement of a drawing member and away from each other out of obstructing position, means carried by and participating in the movement of the movable die co-operating with said slides to move said slides at a predetermined point in the movement of the movable die in the drawing operation out of obstructing position and during the receding movement of the movable die to move said slides to and retain them in obstructing position.

2. In a draw press, a die including a fixed member and a plurality of drawing members movable longitudinally relative to the fixed member and each other, a movable die co-operating with said drawing members to effect a drawing operation in successive

stages, cam mechanism operative from the movement of the movable die to move in unison therewith for controlling the operation of the respective drawing members, means slidably mounted on the press bed to have movement transversely toward each other into the path and obstruct the movement of a drawing member and laterally out of obstructing position from said drawing member, means carried by and participating in the movement of the movable die to co-operate with said slidably mounted means at a predetermined point in the drawing operation of the movable die to move said means out of obstructing position and retain it in such position during a portion of a successive drawing operation, and operative at a predetermined point in the receding movement of the movable die to move said means to obstructing position and retain it in such position until actuated upon the successive drawing operation.

3. In a draw press, a die including a fixed member and a plurality of drawing members movable longitudinally relative to the fixed member and each other, a movable die co-operating with said drawing members to effect a drawing operation in successive draw and redraw stages, a cam for each drawing member reciprocatory in unison with the movable die and operative to control the movements of said drawing members, and sliding members arranged to have movement transversely toward each other into and away from each other out of the path of movement of a redraw member, and cam bars carried by and participating in the movement of the movable die operative during the receding movement thereof for positioning said slide members for engagement by and arresting the movement of the redraw member and transmit the pressure exerted thereon by the movable die to the press bed and relieving the cam for controlling said redraw member of said pressure through a portion of a successive drawing operation and until said latter member commences its drawing function.

4. In a draw press, a die comprising a fixed member and draw and redraw members movable longitudinally in relation to the fixed member and one another, a movable die co-operating with said drawing members to effect receding movements thereof in succession, and means controlled by the movement of the movable die for preventing movement of the redraw member and to transmit the pressure of said movable die thereon to the press frame until the time required for commencement of operation of said redraw member, comprising slides movable transversely toward each other and into the path of movement of and for engagement by said draw member and away from each other to be retracted from said position, and wedge

members carried by and participating in the reciprocatory movements of the movable die slidable in slots in the slides and co-operating with inclined walls of said slots during the movement thereof.

5. In a draw press, a die including a fixed member and a plurality of drawing members movable longitudinally of the fixed die and one another, a movable die co-operating with said drawing members to effect a drawing operation in successive stages, slidable elements movable toward each other transversely of the path of movement of the drawing members and to position to obstruct the movement of one drawing member for a definite period of the drawing operation and then away from each other to permit of movement of said drawing member, and wedge members carried by participating in the reciprocatory movements of the movable die co-operating with the slidable elements to actuate the same in timed sequence with the movement of the movable die.

6. In a draw press, reciprocatory and stationary co-operating dies one of which dies has a drawing member arranged concentrically thereof to have movement imparted thereto relative to said die member through the movement of the reciprocatory die, abutment means slidably mounted on the bed of the press to have movement transversely toward each other into the path of movement of and for engagement by said drawing member to hold the same against movement during a predetermined period of movement of the reciprocatory die and to be moved toward each other out of the path of movement of said drawing member at the termination of said predetermined period of movement and transmit the movement of the reciprocatory die to the terminus thereof to the drawing member and means carried by and participating in the reciprocatory movement of the reciprocatory die for effecting and controlling the movement of said abutments.

7. In a draw press, a die including a stationary member and a drawing member movable longitudinally of the stationary member arranged concentrically thereof, a reciprocatory die movable toward and away from the first die and adapted to transmit the movement thereof to the drawing member, means actuated from and participating in the movement of the reciprocatory die and co-operating with the drawing member to control and resist the movement thereof by the reciprocatory die, abutment means movable transversely of the movement of the drawing member toward each other into and away from each other out of the path of movement of the drawing member and means carried by and participating in the movement of the reciprocatory die to posi-

tion said abutment means for engagement of the drawing member during the initial movement of the reciprocatory die to hold the drawing member against movement by said die, and move the abutment means out of the path of movement of and release the drawing member at a predetermined point in the movement of the reciprocatory die to permit the drawing member to participate in the movement of the reciprocatory die.

8. A draw press as claimed in claim 7, wherein the abutment means movable transversely toward and away from each other into and out of the path of movement of and for engagement by the drawing member comprises a pair of slides slidably mounted on the press bed at opposite sides of the longitudinal axis thereof, and means carried by and participating in the movement of the reciprocatory die co-operating with said slides to actuate the same.

9. A draw press as claimed in claim 7, wherein the abutment means movable transversely toward and away from each other into and out of the path of movement of and for engagement by the drawing member comprises a pair of slides slidably mounted on the press bed at opposite sides of the longitudinal axis thereof, bars connected to and participating in the movements of the reciprocatory die arranged with cams slidably engaging in recesses in the slides to actuate the same.

10. A draw press as claimed in claim 7, wherein the abutment means movable transversely into and out of the path of movement of and for engagement by the drawing member comprises a pair of slides slidably mounted on the press bed at opposite sides of the longitudinal axis thereof to have movement toward and away from each other, bars connected to and participating in the movements of the reciprocatory die, said bars having cam portions slidably engaging the slides arranged to position the slides toward each other for obstructing the movement of the drawing member during the receding movement of the reciprocatory die and transmit the pressure of the reciprocatory die to the press bed during a predetermined period of the drawing operation and cam portions operative at the termination of said period to move the slides away from each other out of obstructing position and permit the drawing member to participate in the movement of the reciprocatory die and retain the slides in said position during the initial portion of the receding movement of the reciprocatory die and move the plates to obstructing position during the latter portion of said receding movement and when the drawing member has been returned to normal position.

11. A draw press as claimed in claim 7,

wherein the drawing member is supported by slidably mounted pins, and the abutment means to hold the drawing member against movement by the reciprocatory die comprises slides embodying longitudinally adjustable sections mounted on the press bed at opposite sides of the longitudinal axis of the press to have movement toward and away from each other and arranged for the engagement of said supporting pins in one position thereof, and means carried by and participating in the movement of the reciprocatory die to actuate said slides. 10

In witness whereof I have signed this specification.

GEORGE WILLIAM BERRY.