

June 19, 1951

J. C. MEYER
DOUBLE LEVER PRESS

2,557,554

Filed Oct. 2, 1945

3 Sheets-Sheet 1

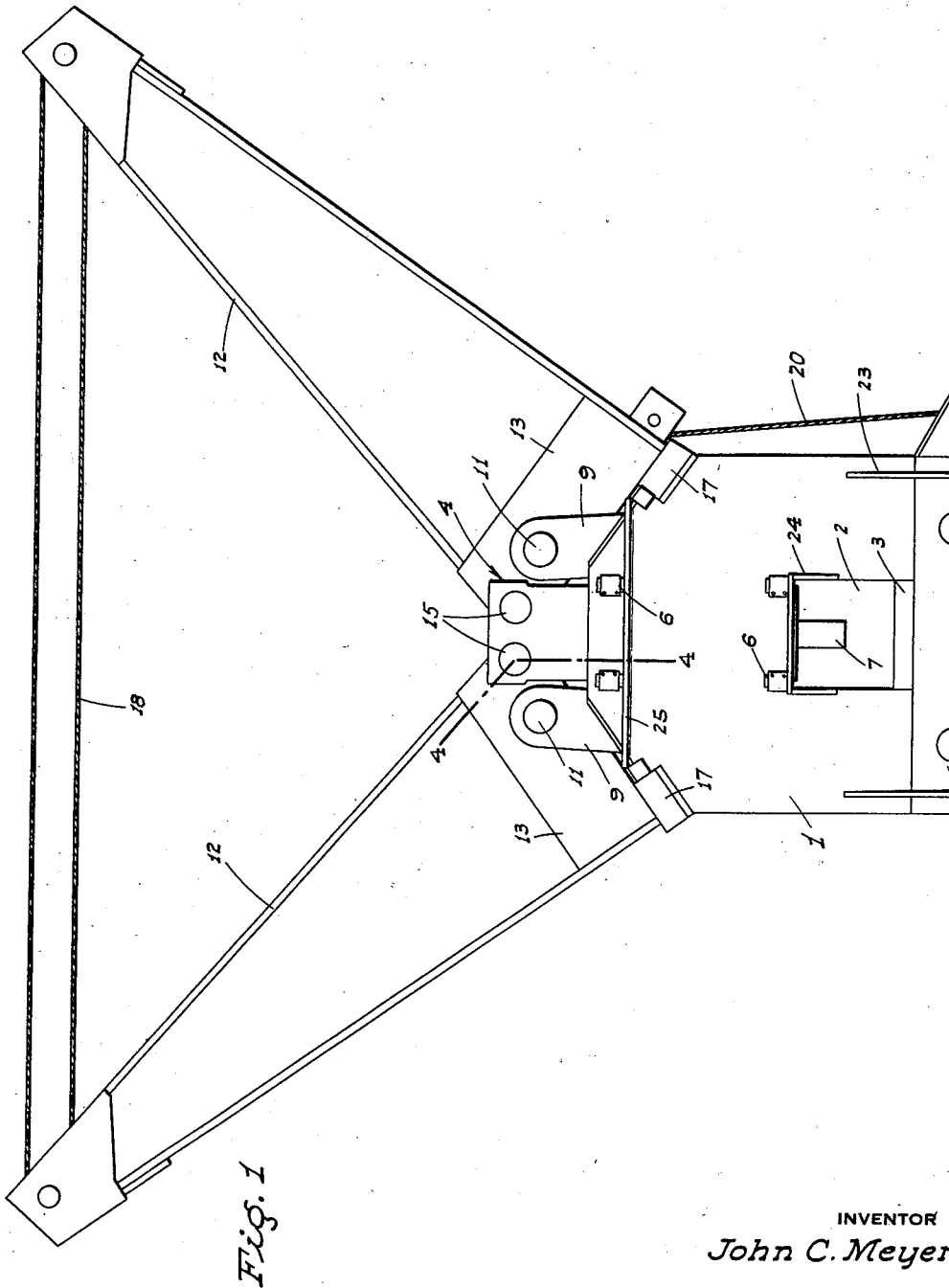


Fig. 1

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June 19, 1951

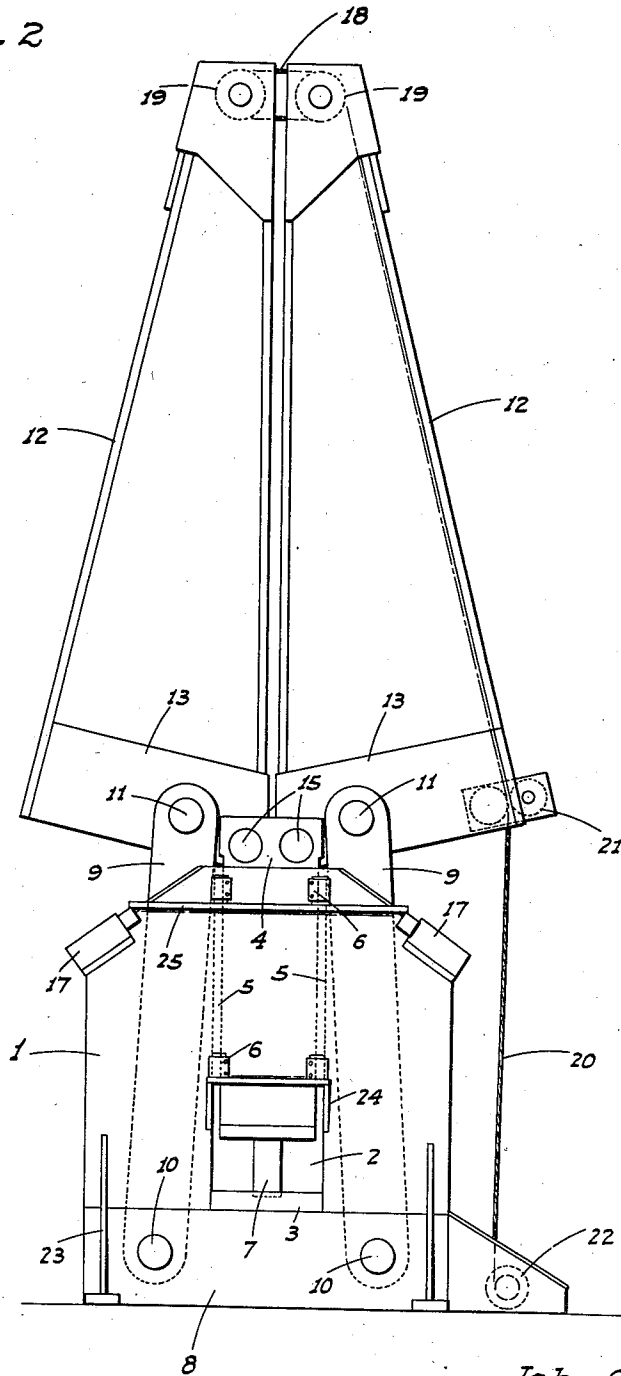
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Fig. 2



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Fig. 3

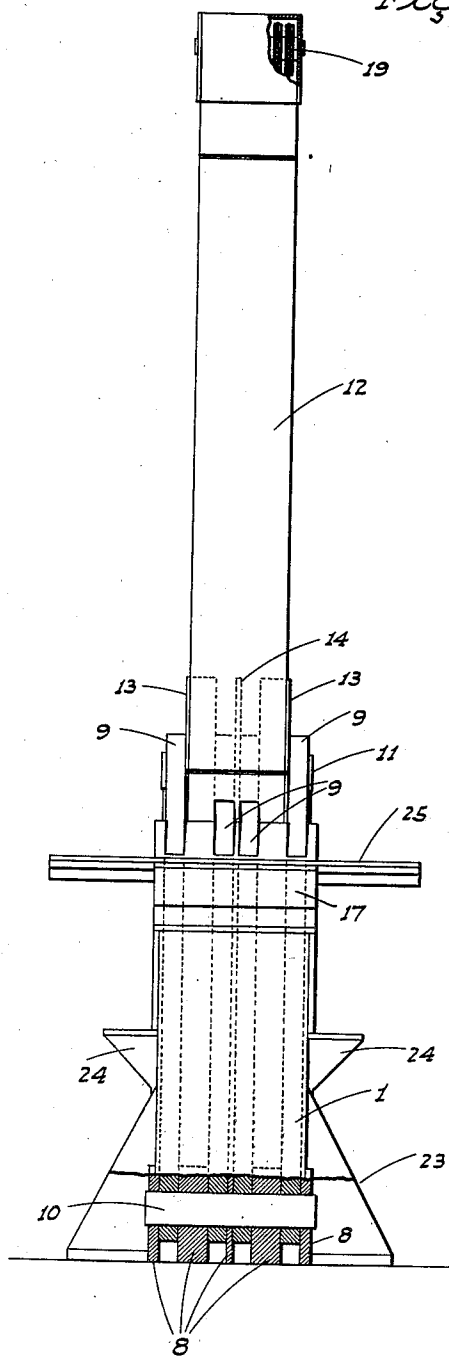
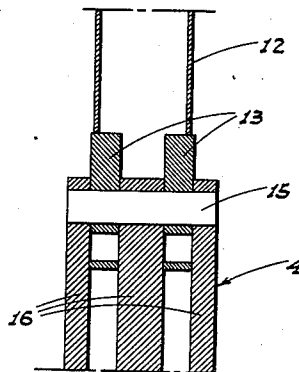


Fig. 4



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DOUBLE LEVER PRESS

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10 Claims. (Cl. 100—9)

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This invention is directed to, and it is an object to provide, a new and useful power press; said power press being designed primarily for industrial forging, but is adapted to many other uses.

Another object of the invention is to provide a practical, rugged heavy-duty press capable of forging relatively large work pieces, such as gear blanks, within close limits as to accuracy so as to reduce the amount of machining subsequently required thereon.

A further object of the invention is to provide a power press, as in the preceding paragraph, which includes a novel double lever and ram unit assembly arranged so that extremely high pressure moment may be applied to the ram unit.

An additional object of the invention is to provide a power press of the type described which comprises a body assembly having a ram unit mounted therein for guided vertical movement above a work supporting bed, and ram unit actuating means including a pair of laterally swingable, upstanding levers extending in normally diverging relation above the upper end of the ram unit and supported by banks of upstanding, pivotally mounted swing links disposed to opposite sides of said ram unit; the levers being pivoted at their lower ends inwardly of the links to the upper end of the ram unit in a manner to cause vertical downward movement of the latter upon swinging of the levers forcefully toward each other.

It is also an object of the present invention to provide a power press, as above, which is cable actuated; there being a block and tackle cable system connected between the upper ends of the normally divergent swingable levers.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is an elevation, on greatly reduced scale, of the double lever press in its normal position.

Figure 2 is a similar view but shows the swingable levers in closed position with the ram unit in its down position.

Figure 3 is an end view of the press, partly in section.

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Figure 4 is a fragmentary cross section on line 4—4 of Fig. 1.

Referring now more particularly to the characters of reference on the drawings, the press comprises an upstanding body assembly which is hollow but reinforced to support the relatively great load of the operating mechanism of the press. The body 1 is formed, from side to side thereof, with a work opening 2, in the bottom of which is a work supporting bed 3; such bed being mounted in the manner hereinafter described.

Above the work opening 2 and within the body assembly 1 there is provided a ram unit, indicated generally at 4, and which ram unit is vertically slidable in a guideway which includes a transversely spaced pair of vertical facing guide plates 5 which extend between opposite sides of said body assembly. The ram unit 4 is vertically, slidably mounted in said guideway, within very close limits of play, by means of adjustable guide devices 6 which cooperate with said ram unit adjacent the top and bottom thereof at the corners. At its lower end the ram unit is adapted to carry a work engaging punch or the like, indicated generally at 7, and which is adapted to cooperate with a die (not shown) secured to the bed 3.

At the bottom, the body assembly 1 includes a plurality of transversely extending, vertical base plates 8 disposed in parallel spaced relation for the reception therebetween, on opposite sides of the ram unit 4, of banks of heavy-duty upstanding links 9 disposed in spaced relation; said links being mounted at their lower ends in connection with said base plates and for lateral swinging movement in a vertical plane by heavy-duty, transverse link pins 10. Certain of the base plates 8 extend full width of the body assembly 1 below the work opening 2, and thus provide a firm and rigid support for the bed 3 which is attached to said plates by welding or the like.

At their upper ends the upstanding banks of links 9 extend above the body 1 and are pivotally connected by heavy-duty transverse link pins 11 with the lower end portion of normally upwardly diverging, relatively long levers 12. At their lower ends said levers 12 each include a pair of spaced-apart lower end plates 13 disposed vertically and extending at right angles to the link pins 11; an adjacent pair of links 9 of the corresponding bank thereof being disposed between the lower end plates, while others of said links are disposed to the outside of said plates.

The above-mentioned adjacent pair of links 9 is spaced apart, to prevent binding thereof, by a spacing member 14.

The link pins 11 extend transversely through

the lower end plates 13 of the levers 12 intermediate the ends of said plates, and at their inner or adjacent ends the same are pivotally attached by cross pins 15 to the upper end of the ram unit 4. Such ram unit includes, in rigid assembly, a plurality of vertical, spaced-apart heavy-duty plates 16; the lower end plates 13 of the levers 12 projecting between said plates 16 for pivotal connection by the cross pins 15.

By reason of the above described arrangement the links 9, levers 12, and ram unit 4 are connected in an operative assembly which is very stable. The ram unit 4 is normally in raised position under the influence of the levers 12 which tend to swing outwardly into the divergent position thereof, as shown in Fig. 1, and at which time said levers abut against stops 17 on top of the body assembly 1. When the ram unit 4 and levers 12 are in the above normal position, the upstanding links 9 are disposed slightly inwardly of vertical dead-center.

A heavy-duty block and tackle cable system 18 is connected between sheave units 19 on the upper ends of levers 12; there being a pull lead 20 extending downwardly from one of said sheave units over a direction-changing sheave 21 on the outside and lower end of the corresponding lever 12. From the sheave 21 the pull lead 20 extends downwardly to a high-powered, electrically driven winch which is here merely shown diagrammatically at 22.

When the above described double lever press is in operation the work is placed on the bed 3, and thereafter the winch 22 is operated in a direction to wind in the pull lead 20. This results in shortening of the block and tackle cable system 18, whereupon the levers 12 swing from the divergent or open position of Fig. 1 to the closed position of Fig. 2. When this occurs, and which is accomplished at a relatively high speed, the ram unit 4 is forced downwardly for work engagement. As the banks of links 9 are pivotally mounted, the levers 12, upon closing thereof, effect downward movement of the ram unit in a true perpendicular path, which is very desirable for accurate results.

After the pressing operation is complete the block and tackle cable system 18 is released, whereupon the levers 12 swing of their own weight outwardly to starting position.

In order to stabilize the press laterally of the direction of swinging movement of the levers 12 the body assembly 1 is flared outwardly and downwardly as at 23. Flash hoods 24 extend out from the body assembly 1 above the work opening 2, and platforms 25 on opposite sides of the body assembly 1 adjacent the top are provided for an operator attending to the servicing of the working parts of the press thereabove.

From the foregoing description it will be readily seen that there has been provided such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations therefrom may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired.

I claim:

1. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of nor-

mally divergent swing levers extending above the ram unit, means transversely pivotally mounting the levers adjacent their lower ends on the base for swinging movement toward each other, transverse pivots connecting the ram unit and levers adjacent the lower ends of the latter inwardly of the axes of said lever mounting means, and power actuated means operative to effect such swinging movement of the levers; said lever mounted means comprising, for each lever, a bank of transversely spaced, upstanding links pivoted on the base for swinging motion as a unit laterally of the ram unit, the base including a plurality of upstanding, spaced apart base plates spacing the links, and between which plates the links are pivotally supported by transverse link pins.

2. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of normally divergent swing levers extending above the ram unit, means transversely pivotally mounting the levers adjacent their lower ends on the base for swinging movement toward each other, actuating connections between the levers and the ram unit, and a power operated block and tackle cable system connected between the upper ends of the levers; said cable system including a pull lead depending from the upper end of one lever, a direction-changing sheave on the lower end of said one lever, the pull lead passing about said sheave, and a power winch to which the pull lead connects below said sheave.

3. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of normally divergent swing levers extending above the ram unit, means transversely pivotally mounting the levers adjacent their lower ends on the base for swinging movement toward each other, transverse pivots connecting the ram unit and levers adjacent the lower ends of the latter inwardly of the axes of said lever mounting means, and power actuated means operative to effect such swinging movement of the levers; the levers having transversely spaced, upstanding base plates at their lower ends, and the ram unit including a plurality of spaced, upstanding plates between which said base plates engage in predetermined order, said transverse pivots extending through said engaged plates of the levers and ram unit.

4. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of normally divergent swing levers extending above the ram unit, banks of upstanding, transversely spaced supporting links disposed on opposite sides of the ram unit below and corresponding to said levers, means transversely pivoting the links at their lower ends to the base and at their upper ends to the adjacent lower ends of the levers, actuating connections between the levers and the ram unit, arranged to cause the latter to move downward upon swinging of the levers toward each other, and power means to effect said swinging of the levers.

5. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of normally divergent swing levers extending above the ram unit, banks of upstanding, transversely spaced supporting links disposed on opposite sides of the ram unit below and corresponding to said levers, means transversely pivoting the links at

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their lower ends to the base and at their upper ends to the adjacent lower ends of the levers, actuating connections between the levers and the ram unit, arranged to cause the latter to move downward upon swinging of the levers toward each other, and power means to effect said swinging of the levers; said power means including a block and tackle cable system connected between the upper ends of said levers.

6. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of normally divergent swing levers extending above the ram unit, banks of upstanding, transversely spaced supporting links disposed on opposite sides of the ram unit below and corresponding to said levers, means transversely pivoting the links at their lower ends to the base and at their upper ends to the adjacent lower ends of the levers, actuating connections between the levers and the ram unit, arranged to cause the latter to move downward upon swinging of the levers toward each other, and power means to effect said swinging of the levers; the base including a plurality of vertical plates in transversely spaced relation, the spaced links engaging between the plates in predetermined order, and said link pivoting means for the lower ends of each bank of links comprising a link pin extending through said plates and links.

7. A power press as in claim 6 including a work supporting bed mounted on top of said vertical base plates between the banks of pivoted links.

8. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of normally divergent swing levers extending above the ram unit, banks of upstanding, transversely spaced supporting links disposed on opposite sides of the ram unit below and corresponding to said levers, means transversely pivoting the links at their lower ends to the base and at their upper ends to the adjacent lower ends of the levers, actuating connections between the levers and the ram unit, arranged to cause the latter to move downward upon swinging of the levers toward each other, and power means to effect said swinging of the levers; said actuating connections between the levers and ram unit comprising a plurality of transversely spaced vertical plates on the levers at the lower end engaged in alternate relation between transversely spaced vertical plates on the ram unit at the top, and cross pins connecting said engaged plates.

9. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, a pair of normally divergent swing levers extending above the ram unit, banks of upstanding, transversely spaced supporting links disposed on opposite sides

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of the ram unit below and corresponding to said levers, means transversely pivoting the links at their lower ends to the base and at their upper ends to the adjacent lower ends of the levers, actuating connections between the levers and the ram unit arranged to cause the latter to move downward upon swinging of the levers toward each other, and power means to effect said swinging of the levers; said actuating connections between the levers and ram unit comprising a plurality of transversely spaced vertical plates on the levers at the lower end engaged in alternate relation between transversely spaced vertical plates on the ram unit at the top, and cross pins connecting said engaged plates, said cross pins being disposed inwardly toward the ram unit relative to the pivotal axes of the connecting means between the upper ends of the links and the levers.

10. A power press comprising a base, an upstanding ram unit above the base and mounted therein for guided vertical movement, links on opposite sides of the ram unit and pivoted on the base for swinging motion laterally thereof, a pair of normally upwardly diverging swing levers extending above the ram unit, each lever being pivotally connected adjacent one end to one of the links and separately pivotally connected to the ram unit, the pivotal connections with the ram unit being inwardly of and above those with the links when the levers are spread apart, power means to effect swinging movement of the levers, each lever being shaped to provide a relatively wide inner end, the pivotal connections with the ram unit being adjacent the inner edges of the levers at said wide inner ends, and spaced stops on the top of the base, the edge of said wide inner end of each lever outwardly of the pivotal connection with the link engaging one of the stops when the levers are spread apart.

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