

[72] Inventor **William L. Pohjola**
Southfield, Mich.
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 [73] Assignee **Dover Corporation (De-Sta-Co Division)**

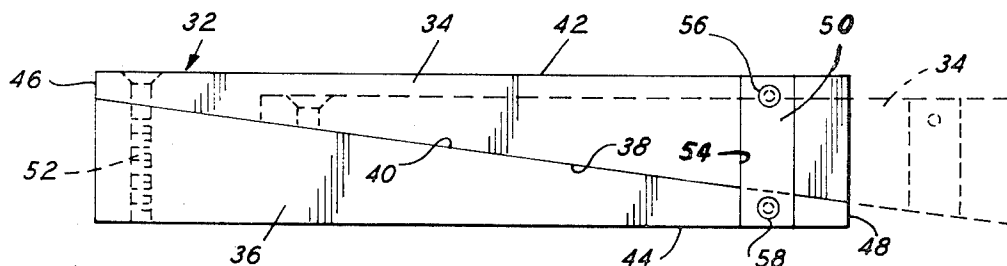
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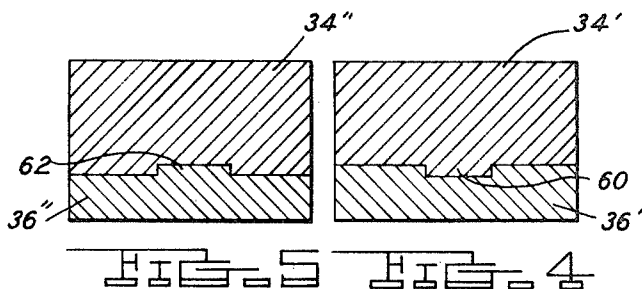
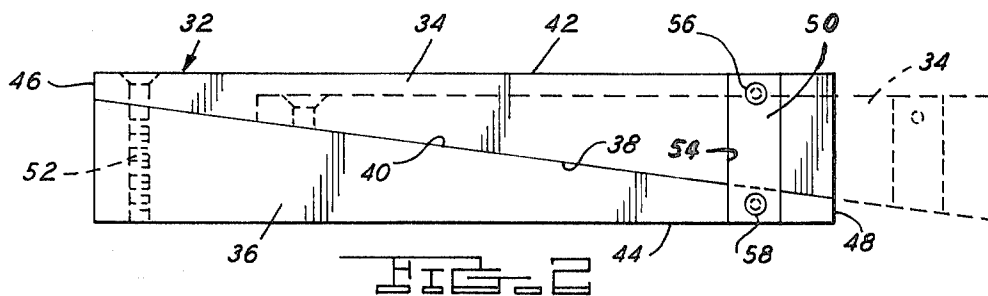
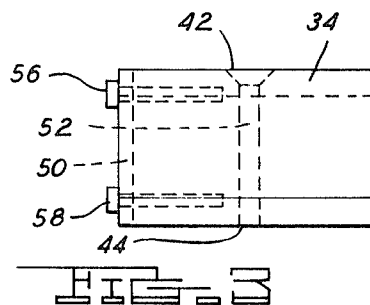
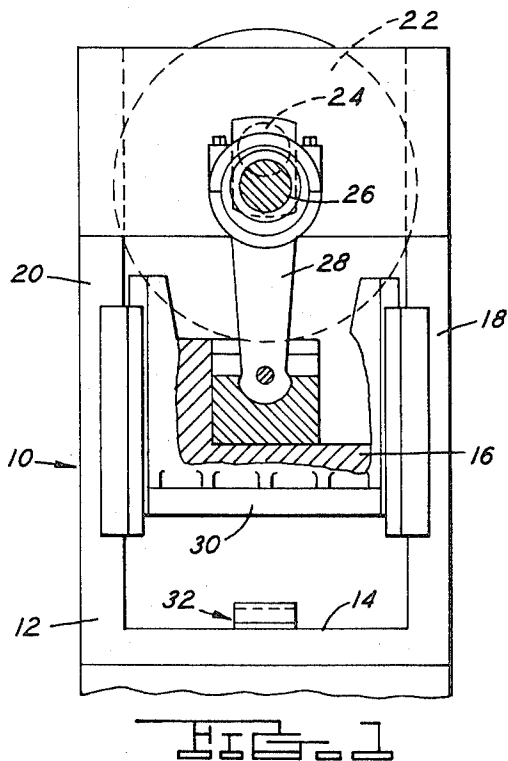
Primary Examiner—Charles W. Lanham
Assistant Examiner—Gene P. Crosby
Attorney—Farley, Forster and Farley

[54] **SLIDING PARALLEL WAYS FOR RELEASING
 JAMMED PRESS**
 6 Claims, 5 Drawing Figs.

[52] U.S. Cl..... **72/448,**
 100/53
 [51] Int. Cl..... **B21j 13/02**
 [50] Field of Search..... 72/448,
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ABSTRACT: Method and apparatus for freeing jammed press from dead center position comprising sliding parallel wedge members interposed between dies and die bolster plate adapted to retain fixed position during normal press operation and for relative sliding for relieving pressure upon press jamming.





INVENTOR
 WILLIAM L. PHOJOLA
 BY
Farley, Forster & Farley
 ATTORNEYS

SLIDING PARALLEL WAYS FOR RELEASING JAMMED PRESS

BACKGROUND OF THE INVENTION

Heavy duty presses which include an eccentric or crank mechanism for opening and closing a die set, to stamp and form metal parts from bar and sheet stock materials, are capable of tremendous pressures in performing such work and consequently are prone to jam or freeze in an overcenter locked condition, with the dies closed, when stock materials are over tolerance in thickness, more than one blank is accidentally placed between the dies, or some foreign member, such as a scrap clip or tool, is unintentionally caught between the dies.

When this occurs, the binding pressures are so great that it is virtually impossible to force the press through the dead center position or to back it off, without dismantling the press or burning out one or both of the dies.

Although some presses are made with tie bolts or like means to hold the ram and platen parts of a press together, and to facilitate dismantling when necessary, the excessive pressures usually require that a cutting torch be used even here, and down time is inevitable for both the tear down and repairs this may necessitate.

SUMMARY OF THE INVENTION

The present invention relates to heavy duty presses for stamping and forming sheet metal and bar stock parts and in particular to a simple and expedient means of relieving dead center locking condition which occur in the accidental jamming thereof.

Parallel sliding ways are used in the practice of this invention and are mounted on the bottom of a die set or on top of a die bolster plate in order to relieve overload locking pressures, when they occur, to permit the ram head to be returned. An interlocking keeper is used with the sliding parallels and they are mated and otherwise held and guided so that upon their release their relative height is reduced and the press bind is relieved.

No modification of an existing press is necessary to be able to use the present invention, other than to accommodate the parallel sliding ways under the die set or on the bolster plate, and it is a simple matter to free the sliding ways from each other and to tap one or the other, to cause them to react under the overcenter press load and part sufficiently to enable the press head to be raised, the ways to be reset, and the press operations to be continued as before.

The parallel ways provide an additional known increment of depth or thickness to the die set or bolster plate and one which is so relatively minor that it can be readily accommodated in any press. In essence, the ways are part of the die set or press, and yet they are not such an integral part that damage to them, should any occur, is of any serious consequence. They may be easily replaced and are of such simple construction as to be of no appreciable expense.

IN THE DRAWINGS

FIG. 1 is a front elevation of a press, showing the frame, overhead operating mechanism, bed plate and the use of parallel sliding ways of this invention therewith.

FIG. 2 is a side elevation of the parallel sliding ways, on and of themselves, with one of the parts shown in both a full line and a dotted line retracted position.

FIG. 3 is an end view of the ways.

FIGS. 4 and 5 are cross-sectional views showing interlocking forms of the inclined plane surfaces for the ways which may be used in alternate forms.

DETAILED DESCRIPTION

The press 10 shown in the first drawing figure includes a frame 12 with a bed plate 14 and a slide or ram head 16, guided on the frame side rails 18 and 20, which is reciprocal

relative to the bed plate by a crank throw arrangement operated by a large gear 22, shown in dotted outline. The eccentric throw 24 of the crankshaft 26 is shown in its overcenter position and with the connecting rod 28 disposing the die bolster plate 30, on the ram head, in spaced relation over the bed plate 14.

Normal practice is to mount the metal forming dies (not shown) on the bed plate 14 and bolster plate 30 as necessary for them to close together in serving their intended purpose.

When the ram head is driven down towards the bed plate, the crank throw 24 passes through a bottom dead center position and it is at this moment that maximum metal forming pressure forces are generated. It is also at this time when a press will seize or bind if it cannot pass through the die closing dead center position and the problem becomes one of how to relieve the pressure force for it to pass through or be backed off.

The parallel sliding ways 32 of this invention are shown as disposed on the bed plate 14 of the press. However, they may be provided on the bolster plate 30 or they may be fastened to one or the other of the forming dies of the set used in the press.

In FIG. 2, the parallel ways 32 are shown to include a pair of complementary wedge members 34 and 36 which have their inclined plane surfaces, 38 and 40 respectively, disposed together and, as so disposed, provide top and bottom walls 42 and 44 in relative parallel spaced relation to each other. The wedge members are truncated, that is, cut off at their ends, as at 46 and 48, so that they may be relatively separated without end wall interference, and they are fastened together by a cross key 50 at one end and a screw thread fastener 52 at the other end.

The cross key 50 is provided in a transverse slot 54 across the side wall face of both wedge members and it is fastened to each of them by screw fasteners 56 and 58. The other fastener 52 is used when this end of the wedge set is accessible so it can be removed. Otherwise, the sliding plane surfaces of the wedges should be formed for interlocking engagement, as shown in FIGS. 4 and 5, or as may otherwise be necessary to accomplish a like purpose.

In this latter respect, the wedge members 34 and 36 must be joined and held together to serve as the plane surfaced bearing block capable of withstanding all except perhaps the most severe press pressures, which might cause damage to dies or other press parts, and in so doing they must be incapable of shifting laterally as well as lengthwise, until they are released. FIGS. 4 and 5 show one means of precluding any side or lateral shifting between the wedges as assembled and also for assuring guided endwise movement in performing their intended function. The inclined plane surfaces are simply formed to include interfitting complementary shapes providing a center rail key 60, or 62, on one or the other of the wedge members, 34', 36' or 34'', 36'' and extending the full length thereof.

Although only one cross key 50 is shown, more than one and on other than just one side of the wedges may be used, if necessary. However, usually one will be sufficient.

In service, the parallel sliding ways 32, as disposed in a press between the die set and the press bed plate 14 or bolster plate 30, will enable a press which becomes locked in dead center condition to be freed by simply removing the end fastener 52, when provided, and the cross key 50, then tapping one or the other of the wedges to cause the binding press force itself to cause the wedges to slide relative to one another and allow the crank throw to pass through the dead center position and lift the ram head to separate the die set without damage thereto.

I claim:

1. The method of relieving binding pressure forces in a metal forming press, comprising; mounting parallel sliding ways transversely and relatively between a die set and a die mounting press part, keying said ways together for normal press operation use in a nonadjustable position to maintain a fixed thickness of the ways,

freeing said ways, relative to each other, for inclined planar slide movement thereof relieving binding pressure forces in said press, and returning the ways to the keyed position to restore said fixed thickness.

2. The method of claim 1, including

keying said ways together on an accessible sidewall face thereof.

3. In combination with a metal forming press subject to die set locking pressure forces, the improvement comprising; parallel sliding ways including complementary wedge members having inclined planar surfaces received together and providing upper and lower disposed walls in parallel relation apart,

means for disposing said ways in a press transversely between a die set and a die set supporting press part, means for keying said wedge members together for the transmission of press forces therethrough and for permitting relative movement therebetween for the relief of

binding press forces as required, and means to return said ways to a nonadjustable predetermined fixed position.

4. The improvement of claim 3,

said wedge members having truncated ends permissive of relative slide movement between the inclined planar surfaces thereof without end wall interference.

5. The improvement of claim 4,

said keying means including a key slot formed within and transversely across the sidewalls of said wedge members near one end thereof, and

a key plate received in said slot and including fastener means of engagement with the wedge members therebehind and for disengagement of said key plate therefrom.

6. The improvement of claim 5,

said wedge members having the inclined planar surfaces thereof formed to complement each other and preclude relative lateral movement therebetween.

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