

1

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PRESS PLATEN STABILIZER

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13 Claims. (Cl. 100—214)

This invention relates to presses in general and more particularly to means for stabilizing the movable platens primarily of presses utilized for heat sealing of thermoplastic materials.

So-called heat sealing machines include a press having a movable platen which is operated toward and away from a bed plate. The platen carries a die means having portions which define seal lines and often also include knife portions for cutting the material being sealed. It is essential that the spacing between the die and the bed plate in the lowered position of the platen be maintained within close tolerances in order to obtain satisfactory seals. In essence this requires the platen to remain parallel to the bed plate especially when heat sealing power is applied.

In prior art devices of this type movement of the platen was effected by utilization of a single double acting fluid cylinder positioned at the center of the platen. If the die knives were not symmetrically placed with respect to the axis of the cylinder the pressure exerted by the cylinder would cause the platen to tilt. In order to stabilize the platen against tilting, the prior art has provided guides which are widely spaced across the face of the press so as to provide side to side stability. However, front to back stability remained unsatisfactory. In other prior art devices individual guide rods were placed at the four corners of the platen. The latter construction is not only bulky and costly but has also proven to be unsatisfactory, principally because the mounting members for the bearings surrounding the guide rods were difficult to stabilize.

In order to overcome these disadvantages of the prior art the instant invention provides side mounted stabilizers which are generally triangular in form. Side to side stability is maintained in the usual manner and the triangular stabilizers provide front to back stability. Front to back stability is achieved by virtue of the fact that the stabilizers include triangular means so positioned that a portion thereof is placed in tension at such time as a force acts tending to tilt the platen either to the front or back. Since the tensile strength of the metal used to construct the stabilizers is very high, any tendency of the platen to tilt is strongly resisted. This is in contrast with prior art devices in which a high magnitude bending moment acted against the stabilizers and the latter was ineffective for the intended purpose of stabilization.

Accordingly, a primary object of the instant invention is to provide a novel means for stabilizing a movable press platen against tilting.

Another object is to provide a press platen stabilizing means which is simple and relatively inexpensive to construct.

Still another object is to provide a generally triangular side mounted platen stabilizing means.

A further object is to provide a novel means for stabilizing a press platen against front to back tilting.

These as well as further objects of this invention will become readily apparent after reading the following description of the accompanying drawings in which:

FIGURE 1 is a front elevation of a heat sealing machine including platen stabilizing means constructed in accordance with the teachings of the instant invention.

FIGURE 2 is a side elevation of the machine of FIGURE 1.

2

FIGURE 3 is a side elevation illustrating another embodiment of the platen stabilizing means.

FIGURE 4 is a perspective showing a one piece stabilizer construction for achieving both front to back and side to side stabilization.

Now referring to the drawings. The heat sealing apparatus 10 of the instant invention comprises press stand 11 mounted on four rollers 11a. Bed plate 12 is mounted to the top of stand 11 by means of screws 13 which provide levelling and height adjustment. Also mounted to stand 11 are generally C-shaped plate-like frame members 14 positioned in vertical planes spaced along the side to side axis of apparatus 10. Three transverse frame members 16 through 18, located one below the other and positioned parallel to the side to side axis of apparatus 10, maintain the spacing between C-shaped members 14. Double acting cylinder 19, having piston connected ram 20 extending vertically out the bottom thereof, is mounted between transverse frame members 17 and 18. The lower end of ram 20 is secured to platen 21 at the center thereof by means of nuts 22 which engage the threaded lower end of ram 20.

Symmetrically positioned on opposite sides of ram 20 are vertical guide rods 23A, 23B, connected at their lower ends to platen 21 and at their upper ends to transverse tie bar 24. Rods 23A, 23B are guided for vertical movement by bushings 27, 27 mounted to transverse frame member 17 and bushings 28, 28 mounted to transverse frame member 18.

The ends of tie bar 24 extend through vertical clearance slots 25 in the upper arms of C-shaped frame members 14. Abutment of tie bar 24 with members 14 at the upper extremities of slots 25 provides means for limiting upward movement of ram 20.

Disposed outboard of each C-shaped member 14 is an individual platen stabilizer 30. As best seen in FIGURE 2, stabilizer 30 is a plate-like member in the shape of an isosceles triangle whose height is much greater than the length of the base. In this illustration the height is almost twice the length of the base. Transverse flange 31 extending along the base of stabilizer 30 abuts the upper surface of platen 21 and is secured thereto by securing means 32. Additional securing means 33A and 33B fastens stabilizer 30 at its apex to one end of tie rod 24.

Die means 41 is carried by platen 21 and is secured thereto with insulators 42 interposed therebetween. As is well known to the art, the operation of fluid cylinder 19 causes platen 21 to move down and up thereby also moving die means 41 toward and away from bed plate 12. High frequency electronic heat sealing equipment (not shown), of the type illustrated in U. S. Patent 2,896,055, is mounted within stand 11.

The wide side to side spacing between guide rods 23a, 23b and also the even wider side to side spacing between stabilizers 30, 30 results in good side to side stabilization for platen 21.

Any tendency of platen 21 to tilt forward or backward is resisted by those side portions of stabilizers 30 which are placed in tension when there is a force acting to tilt platen 21 forwardly or backwardly. The other side of portions of stabilizers 30 are in compression at this time. More particularly if a force acts to tilt platen 21 downward to the rear (arrow A of FIGURE 2) the side portion 30a of each stabilizer 30 is placed in compression and the side portion 30b placed in tension. The reverse takes place when a force acts to tilt platen 21 downward and to the front of apparatus 10.

An effective lighter weight stabilizer can be constructed by removing the material, of each stabilizer 30, which lies between the phantom lines in FIGURE 2.

3

In another construction for a triangular stabilizer 50 (FIGURE 3) rods 51 are arranged as the sides of an isosceles triangle with its base at platen 52 and apex at transverse tie bar 53. A pair of nuts on opposite sides of platen 52 are threadedly secured to the lower end of each rod 51 and act in conjunction with wedge shaped spacer means 56 secure rods 51 at their upper ends to tie bar 53.

Side to side stabilization is improved by utilizing the embodiment illustrated in FIGURE 4. In this figure a single U-shaped member 101 provides both front to back and side to side stabilization. As will become apparent, stabilizers 30 of FIGURES 1 and 2 may be replaced by member 101.

More particularly, member 101 is U-shaped having web 102 which joins short arms 103, 104. Screw means 105 secure the ends of tie rod 24 to one side of arms 103, 104. The other side of each arm 103, 104 is provided with a turned out flange 107, 108, respectively, resting upon the upper surface of platen 21 and disposed in a plane transverse to web 102. Screw means 110 secure flanges 107, 108 to platen 21. Naturally, web 102 is positioned forward of tie rod 24 so as to be clear of frame members 14.

The generally triangular portion enclosed by the dashed lines on arm 103 provide front to back stabilization, as in the embodiments hereinbefore described, in cooperation with a similar triangular portion of arm 103. Web 102 provides side to side stabilization.

Thus, it is seen that the instant invention provides a pair of widely spaced generally triangular stabilizers for preventing the removal of a press from tilting in front to back directions as well as preventing side to side tilting. While the stabilizers have been illustrated and described as being isosceles triangles, it is noted that for particular applications this relationship may be modified by making one side longer than the other. In other instances limited portions at the apex of the triangle may be eliminated without going beyond the scope of the instant invention. Further, the actual stabilizer member need not be triangular if, as in FIGURE 4, a triangular area is defined by the securement points of the stabilizer member to the tie bar and platen. The foregoing points should be kept in mind when interpreting the claims that follow.

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. A device of the class described comprising a bed, a platen positioned above the bed, a frame having said bed and said platen mounted thereon, first means for moving said platen toward and away from said bed, second means for guiding movement of said platen along a predetermined line of action, third means to stabilize said platen against tilting; said third means including first and second spaced portions, tie means extending between said portions, each of said portions being generally triangular, each of said portions being secured at a side of its triangle to said platen and being secured at an apex opposite said side to said tie means.

2. A device as set forth in claim 1 in which the side secured to the platen is the base of an isosceles triangle.

3. A device as set forth in claim 2 in which the height line of each triangle is aligned with the line of action.

4

4. A device as set forth in claim 3 in which the height of the triangle is greater than its base.

5. A device of the class described comprising a frame including spaced side members, a stationary bed mounted to said frame, a movable platen mounted to said frame and positioned above said bed, first means for moving said platen toward and away from said bed, second means for guiding movement of said platen along a predetermined line of action transverse to said platen, third means to stabilize said platen against tilting; said third means including first and second spaced portions, tie means extending between and secured to said portions, each of said portions being generally triangular, each of said portions being secured at a side of its triangle to said platen and being secured at an apex opposite said side to said tie means, said portions being positioned outboard of said side members.

6. A device as set forth in claim 5 in which the first means includes a ram positioned between said portions and along said line of action.

7. A device as set forth in claim 6 in which the side secured to the platen is the base of an isosceles triangle.

8. A device as set forth in claim 7 in which the height line of each triangle is aligned with the line of action.

9. A device as set forth in claim 8 in which the height of the triangle is greater than its base.

10. A device as set forth in claim 5 in which each of said portions lies in and moves in a plane generally parallel to said side members.

11. A device of the class described comprising a bed, a platen positioned above the bed, a frame having said bed and said platen mounted thereon, first means for moving said platen toward and away from said bed, second means for guiding movement of said platen along a predetermined line of action, third means to stabilize said platen against tilting; said third means including first and second spaced portions, tie means extending between said portions; first fastening means fixedly securing each of said portions to said tie means and second fastening means fixedly securing each of said portions to said platen, said fastening means generally defining a triangle with said second fastening means at one side of said triangle and said first fastening means at an apex opposite said one side.

12. A device as set forth in claim 11 in which the first and second spaced portions provide front to back stabilization, said third means including another portion positioned in front of said tie means and extending between said spaced portions to provide side to side stabilization.

13. A device as set forth in claim 12 in which the spaced portions and said another portion form a single generally U-shaped member.

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