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EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.11.2003 Bulletin 2003/45

(51) Int Cl.7: B21D 43/05, B30B 15/30

(21) Application number: 03076302.3

(22) Date of filing: 02.05.2003

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

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(30) Priority: 03.05.2002 SV 201331

(54) Overload protection for a finger in a press

(57) The invention relates to overload protection for a finger 2 in a press, and to a press provided with overload protection for a finger 2, which overload protection incorporates a finger holder 4, a first recess 6 in the finger 2, a second recess 8 and a spring-loaded ball 10. The finger 2 is arranged to slide in the finger holder 4 in the axial direction of the finger 2 so that the finger 2 is moved from its normal working position by a translation

movement in the finger holder 4 in the axial direction of the finger 2 when the overload protection is actuated by the workpiece 1 which the finger 2 is intended to move having reached an incorrect position in the press whereby the finger 2 is subjected to a force acting in the axial direction A of the finger 2. The second recess 8 is arranged either in the finger holder 4 or in a beam in the press.

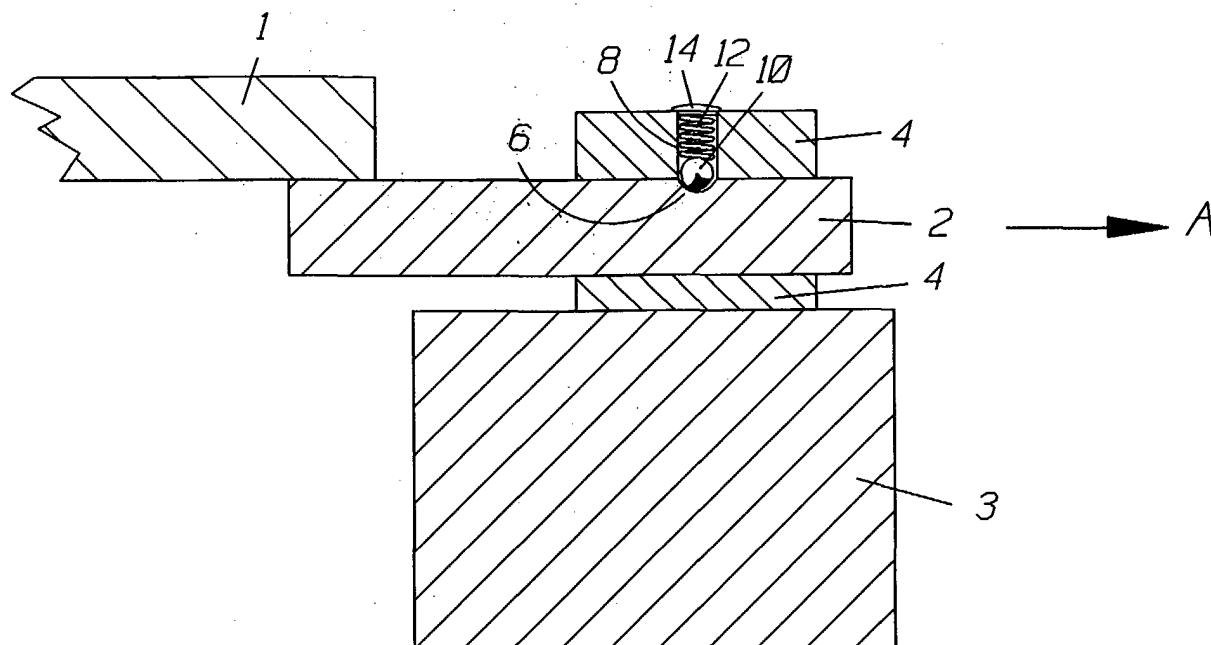


Fig. 1

Description

Technical field

[0001] The present invention relates to overload protection for a finger in a press, which overload protection incorporates a spring-loaded ball.

Background

[0002] A known practice in presses, e.g. transfer presses, is to arrange overload protection for fingers. One reason is to prevent finger damage when the workpiece which the finger is intended to move reaches an incorrect position in the press. Another reason is to reduce the time taken to bring the finger back to its normal working position when the overload protection has been actuated by the workpiece which the finger is intended to move having reached an incorrect position in the press which has resulted in the finger being moved from its normal working position.

[0003] An example of overload protection for a finger in a press, which overload protection incorporates a spring-loaded ball, is referred to in JP 10286639 A, which refers to overload protection which, when actuated by the workpiece which the finger is intended to move having reached an incorrect position in the press, results in the finger being moved from its normal working position by a rotary movement about a screw arranged through the finger.

[0004] A problem with overload protection for a finger according to the aforesaid JP 10286639 A is that at finger change, e.g. when a pin-shaped finger is replaced by a bifurcate finger, the finger cannot be removed easily and quickly from the press without tool use.

Brief description of the invention

[0005] The problem of it being impossible for a finger being changed to be removed easily and quickly from the press without tool use is solved according to the invention by arranging overload protection for a finger in a press, which overload protection incorporates at least one finger holder (in which the finger is arranged to slide in the axial direction of the finger), a first recess in the finger, a second recess and a spring-loaded ball.

[0006] Overload protection incorporating the features stated in claim 1 affords the advantage that a finger being changed, e.g. when a pin-shaped finger is replaced by a bifurcate finger, can be removed easily and quickly from the press without tool use. It also affords the advantage of providing overload protection which is actuated, when the finger is subjected to a force acting in the axial direction of the finger, by the finger being moved from its normal working position during the execution of a translation movement in the finger holder in the axial direction of the finger when the overload protection is actuated. Damage to the finger and other

equipment is thereby prevented when the workpiece which the finger is intended to move reaches an incorrect position in the press. A further advantage is a reduction in the time taken to bring the finger back to its normal working position when the overload protection has been actuated by the workpiece which the finger is intended to move having reached an incorrect position in the press which results in the finger having been moved from its normal working position. The time spent in dealing with production disturbances due to the workpiece which the finger is intended to move having reached an incorrect position in the press is thus reduced.

Brief list of drawings

[0007] The invention is explained in more detail below with reference to the attached drawings, in which:

Figure 1 depicts schematically a section of an overload protection according to a preferred embodiment of the invention, with the finger in its normal working position.

Figure 2 depicts schematically a section of an overload protection according to a preferred embodiment of the invention when the overload protection has been actuated and the finger has been moved from its normal working position.

Description of preferred embodiments

[0008] The present invention relates to overload protection for a finger 2 in a press. The press according to the invention may, for example, be a transfer press or step-by-step press with, for example, four stations whereby a workpiece 1 is shaped to become a finished article. The workpiece 1 is placed in the first station and is thereafter moved on step by step. The stepping movement is provided by beams 3 which are preferably coupled mechanically to the movement of the press slide. These beams 3 carry fingers 2 mounted by means of finger holders 4, with at least one finger 2 per beam 3. The stepping movement, i.e. the transfer between stations, is controlled, e.g. by means of an inductive sensor, so that the workpiece 1 will be in the correct position in the fingers 2. The press stops immediately upon it being detected that the workpiece 1 has reached an incorrect position, but this involves a finger 2 colliding with the workpiece 1 before the press stops.

[0009] According to the preferred embodiment, the overload protection incorporates a finger holder 4, a first recess 6 in the finger 2, a second recess 8 in the finger holder 4, a spring-loaded ball 10, a spring 12 arranged in the second recess 8, and a cover 14 arranged in the finger holder 4. The finger 2 is arranged to slide in the finger holder 4 in the axial direction A of the finger 2 so that the finger 2 is moved from its normal working position by a translation movement in the axial direction A

of the finger 2 when the overload protection is actuated by the workpiece 1 which the finger 2 is intended to move having reached an incorrect position in the press whereby the finger 2 is subjected to a force acting in the axial direction A of the finger 2. Thus if any finger 2 collides axially with the workpiece 1, the spring-loaded ball 10 is overloaded and releases its grip, resulting in the press stopping without damage to the finger 2.

[0010] The same reference notations are used throughout for the same features in the respective drawings.

[0011] Figure 1 depicts schematically a section of an overload protection according to a preferred embodiment of the invention, with the finger 2 in its normal working position and the workpiece 1 in a correct position in the finger 2. The overload protection according to the preferred embodiment incorporates a finger holder 4, a first recess 6 in the finger 2, a second recess 8 in the finger holder 4, a spring-loaded ball 10, a spring 12 arranged in the second recess 8, and a cover 14 arranged in the finger holder 4. The finger 2 is arranged to slide in the finger holder 4 in the axial direction A of the finger 2. When the finger 2 is in its normal working position, the spring-loaded ball 10 is situated at least partly in the first recess 6 in the finger 2 and thereby locks the finger firmly in the finger's axial direction A. In this normal working position, the spring 12 and possibly also part of the spring-loaded ball 10 are in the second recess 8. The cover 14 retains the end of the spring 12 which is not the end nearest to the ball in the second recess 8.

[0012] Figure 2 depicts schematically a section of an overload protection according to a preferred embodiment of the invention when the overload protection has been actuated and the finger 2 has been moved from its normal working position. According to the preferred embodiment, the overload protection incorporates a finger holder 4, a first recess 6 in the finger 2, a second recess 8 in the finger holder 4, a spring-loaded ball 10, a spring 12 arranged in the second recess 8, and a cover 14 arranged in the finger holder 4. The finger 2 is arranged to slide in the finger holder 4 in the axial direction A of the finger 2 so that the finger 2 is moved from its normal working position (see Fig. 1) by a translation movement in the axial direction A of the finger 2 when the overload protection is actuated by the workpiece 1 which the finger 2 is intended to move having reached an incorrect position in the press whereby the finger 2 is subjected to a force acting in the axial direction A of the finger 2 (see Fig. 2). The overload protection is actuated by the spring-loaded ball 10 springing out of the first recess 6 in the finger 6 and into the second recess 8 and thereby releasing the finger 2 in the axial direction A of the finger 2. In this released position, the spring 12 and the spring-loaded ball 10 are in the second recess 8. The cover 14 retains the end of the spring 12 which is not the end nearest to the ball in the second recess 8. Thus if any finger 2 collides axially with the workpiece 1, the spring-loaded ball 10 is overloaded and releases

its grip, resulting in the press stopping without damage to the finger 2.

[0013] The scope of the invention is not limited to the preferred embodiment alone but is determined by the claims set out below. The following, for example, are thus possible: the second recess 8 being arranged in a beam 3 in the press instead of in the finger holder 4; the spring 12 intended to spring-load the ball 10 being arranged in the first recess 6 in the finger 2 instead of in the second recess 8 (in which case the cover 14 is also arranged in the finger 2); the workpiece which is handled by the press being, for example, a piece of sheetmetal; the finger being of a different design, e.g. possibly provided with gripper or having the shape of a pin or a fork.

Claims

1. Overload protection for a finger (2) in a press, which overload protection incorporates a finger holder (4), a first recess (6) in the finger (2), a second recess (8) and a spring-loaded ball (10), **characterised in that** the finger (2) is arranged to slide in the finger holder (4) in the axial direction (A) of the finger (2) so that the finger (2) is movable from its normal working position by a translation movement in the finger holder (4) in the axial direction (A) of the finger (2) when the overload protection is actuated by the workpiece (1) which the finger (2) is intended to move having reached an incorrect position in the press whereby the finger (2) is subjected to a force acting in the axial direction (A) of the finger (2).
2. Overload protection according to claim 1, **characterised in that** the second recess (8) is arranged in the finger holder (4).
3. Overload protection according to claim 1, **characterised in that** the second recess (8) is arranged in a beam (3) in the press.
4. Overload protection according to any one of claims 1 to 3, **characterised in that** a spring (12) intended to spring-load the ball (10) is arranged in the second recess (8).
5. Overload protection according to any one of claims 1 to 3, **characterised in that** a spring (12) intended to spring-load the ball (10) is arranged in the first recess (6) in the finger (2).
6. Overload protection according to claim 4, **characterised in that** the overload protection further incorporates a cover (14) arranged in the finger holder (4).
7. Overload protection according to claim 5, **characterised in that** the overload protection further in-

corporates a cover (14) arranged in the finger (2).

8. A press, **characterised in that** it incorporates over-load protection according to any one of claims 1 to 7.

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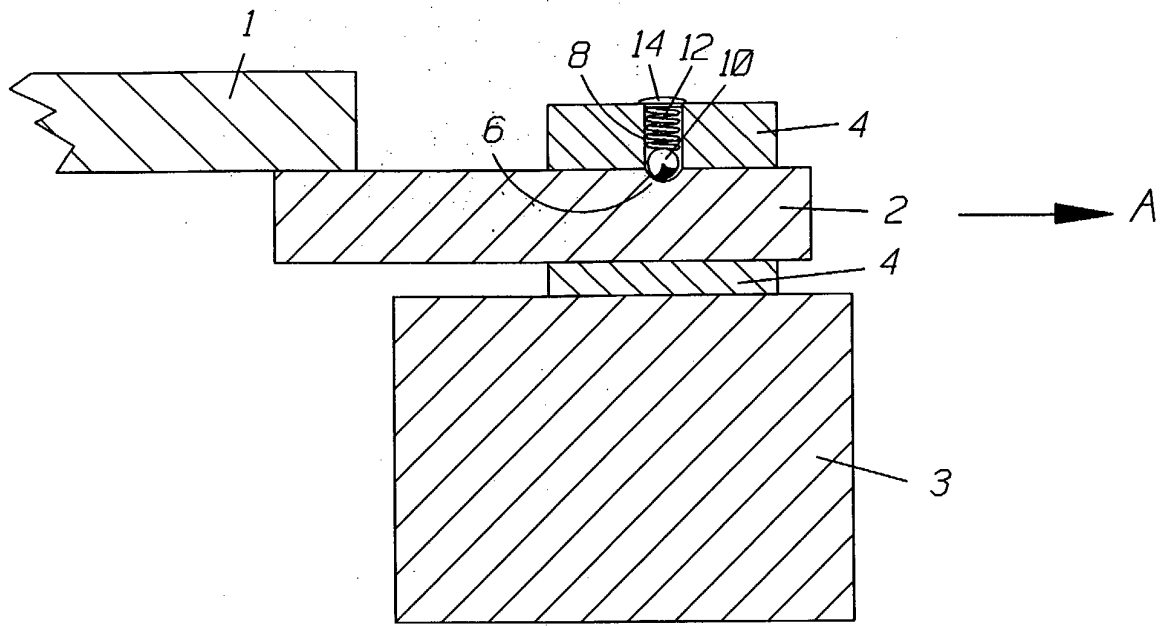


Fig. 1

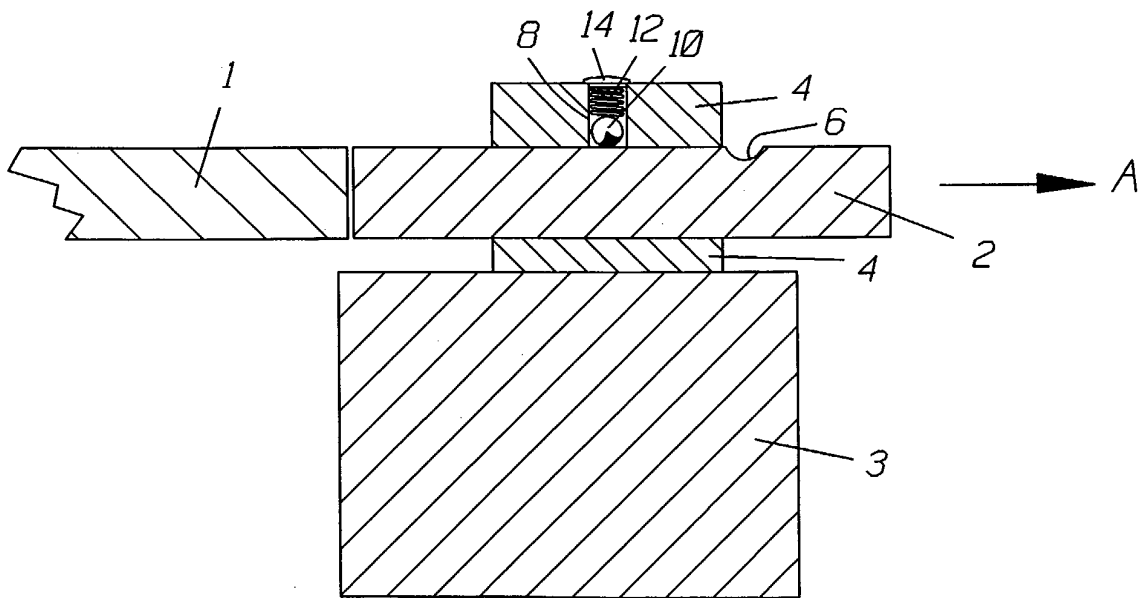


Fig. 2