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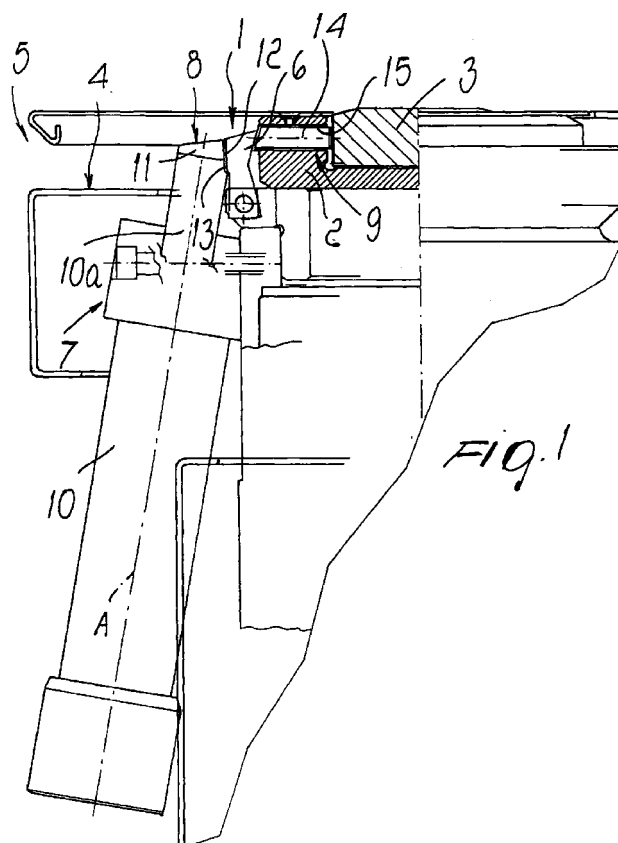
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(54) **Device for locking a die holder platform in punching machines for metal plates and the like**

(57) A device for locking a die holder platform (2) in punching machines for metal plates and the like, which comprises: a flat and horizontal track (4) for the sliding of said platform (2) which ends laterally with respect to the footing (5) of the punching machine; a retention tooth (6) which is articulated so as to rotate between two extreme positions, a raised active position rested against said platform (2) and a lowered position retracted below the sliding plane of said track (4); and means (7) for actuating the rotation of said tooth (6) which have shaped elements (8) for snugly resting on the back of said tooth (6) in the raised configuration.



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Description

[0001] The present invention relates to a device for locking a die holder platform in punching machines for metal plates and the like.

[0002] In punching machines, the die holder platform is arranged in a hollow seat formed in the footing that constitutes the worktable.

[0003] In particular, the seat has at least one side in which the edge is inclined for allowing, if necessary, to easily extract the platform therefrom.

[0004] The platform is also retained by a retention element comprising the end of a stem of a fluid-actuated cylinder, which is arranged under the platform proximate to the extraction side and which, by rising by a preset extent, prevents movements in the direction of the side.

[0005] Such embodiment of the platform locking in the seat entails that every time the platform is to be removed, it is necessary to fully remove the metal plate being worked, which is usually large and accordingly heavy, extract the die holder platform and replace it with another one, and then reposition the metal plate on the worktable; accordingly, this operation, as a whole, is tiring where repeated several times during the process and is time-consuming.

[0006] The aim of the present invention is to solve the above problems of the prior art by providing a device for locking the die holder platform in punching machines for metal plates and the like which allows rapid replacement of said platform with another platform without having to remove every time the metal plate being worked.

[0007] These and other objects which will become better apparent hereinafter are achieved by a device for locking a die holder platform in punching machines for metal plates and the like, characterized in that it comprises: a flat and horizontal track for the sliding of said platform which ends laterally with respect to the footing of the punching machine; a retention tooth which is articulated so as to rotate between two extreme positions, a raised active position rested against said platform and a lowered position retracted below the sliding plane of said track; and means for actuating the rotation of said tooth which have shaped elements for snugly resting on the back of said tooth in the raised configuration.

[0008] Further characteristics and advantages of the invention will become better apparent from the following description of a preferred embodiment of a device for locking the die holder platform in punching machines for metal plates and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic and partially sectional side view of the locking device according to the invention, in the active configuration;

Figure 2 is a corresponding partial view thereof in

the configuration for extracting the die holder platform.

[0009] With reference to the above figures, the reference numeral 1 designates a device for locking a platform 2 for holding dies 3 in punching machines for metal plates and the like.

[0010] The device 1 comprises a flat and horizontal track 4 on which the platform 2 is slideable; the track ends laterally with respect to the footing 5 of the punch.

[0011] A retention tooth 6 is mounted directly downstream of the track 4 and is articulated so as to rotate between two extreme positions, namely a raised active one in which it rests against the platform 2 and a lowered position in which it retracts below the sliding plane of the track 2.

[0012] The tooth 6 is actuated, in its rotation, by actuation means 7 which are in turn provided with shaped elements 8 for snugly resting on the back of the tooth 6 in the raised active configuration.

[0013] The platform 2 has, on the side for contact with the tooth 6, a means 9 for clamping the die 3 accommodated therein; said means acts automatically when the tooth 6 is in the active position.

[0014] The means 7 for actuating the tooth 6 are constituted by at least one fluid-actuated actuator 10 accommodated in the footing 5 of the punching machine and the stem 10a of which acts in an upward direction and has a head provided with the shaped elements 8 described hereinafter.

[0015] In the preferred embodiment of the device 1, the actuator 10 is arranged slightly at an angle with respect to the vertical so that the longitudinal axis A converges towards the tooth 6.

[0016] The shaped elements comprise a polygonal head 11 which is monolithically fitted on, or formed in, the end of the stem 10a and has at least one side provided with a flat face 12 for the resting of a corresponding complementary flat face 13 formed on the back of the tooth 6.

[0017] The means 9 for clamping the die 3 is constituted by at least one horizontal pin 14 which is freely slideable in a corresponding hollow seat 15 formed horizontally in platform 2 at the point of contact with the tooth 6; the pin 14 has an end which faces the hook 6 and is shaped so as to couple and rest thereon; the opposite end of the pin is meant to make contact with the die 3.

[0018] The operation of the invention is as follows: in the configuration for clamping the platform 2, the stem 10a of the actuator 10 is extended upwards and the face 12 of the head 11 rests against the complementary face 13 of the back of the tooth 6, which is rotated upwards and rests against the side of said platform 2 or, more precisely, against the end of the pin 14, which in turn presses against the die 3.

[0019] The inclination of the axis A of the actuator, combined with the particular tapering shape of the head

11 and of the back of the tooth 6 form a sort of half-dovetail interlock which maintains the platform 2 and the corresponding die 3 stably in position during the operation of the punching machine.

[0020] If it is necessary to replace the die 3 with another die of a different type, it is sufficient to retract the stem 10a into the actuator 10 and to rotate the tooth 6 into the idle configuration, retracted below the sliding plane of the track 4.

[0021] In this manner, the platform 2 is freely slideable on the track 4 and can be extracted horizontally therefrom, as if it were a drawer, without having to remove the metal plate, if any, present on the footing 5.

[0022] By way of the same track 4 it is also possible to reinsert another platform 2 provided with a correspondingly different die 3 and to re-lock it in the active position, making the actuator 10 intervene again; by expelling the stem 10a, the actuator pushes the tooth 6 against the pin 14 again, simultaneously clamping the die 3 in the platform 2 and the platform on the footing 5.

[0023] In practice it has been observed that the described invention achieves the intended aim and objects.

[0024] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0025] Moreover, all the details may be replaced with other technically equivalent ones.

[0026] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0027] The disclosures in U.K. Patent Application No. 9910303.8 from which this application claims priority are incorporated herein by reference.

[0028] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for locking the die holder platform (2) in punching machines for metal plates and the like, characterized in that it comprises: a flat and horizontal track (4) for the sliding of said platform (2) which ends laterally with respect to the footing (5) of the punching machine; a retention tooth (6) which is articulated so as to rotate between two extreme positions, a raised active position rested against said platform (2) and a lowered position retracted below the sliding plane of said track (4); and means (7) for actuating the rotation of said tooth (6) which have shaped elements (8) for snugly resting on the back of said tooth (6) in the raised configuration.

2. The device according to claim 1, characterized in that said platform (2) is provided, on the side for contact with said tooth (6), with a die clamping means (9) which acts automatically for contact with said tooth (6).
3. The device according to claim 1, characterized in that said means (7) for actuating said tooth (6) comprise at least one fluid-actuated actuator (10) which is arranged in the footing (5) of the punching machine, its stem (10a) acting from below and having a head (11) provided with said shaped elements (8).
4. The device according to claim 3, characterized in that said actuator (10) is arranged slightly at an angle with respect to the vertical, so that the longitudinal axis (A) thereof converges towards said tooth (6).
5. The device according to claim 3, characterized in that said shaped elements (8) comprise a polygonal head (11) which is rigidly fitted on the end of said stem (10a) and has at least one side provided with a flat face (12) for resting against a corresponding complementary flat face (13) formed on said back of the tooth (6).
6. The device according to claim 2, characterized in that said die clamping means (9) is constituted by at least one horizontal pin (14) which is freely slideable in a corresponding hollow seat (15) formed horizontally in said platform (2) at the point of contact with said tooth (6), said pin (14) having an end which is directed towards said tooth (6) and is shaped so as to couple by resting thereon and an opposite end for contact with the die (3).

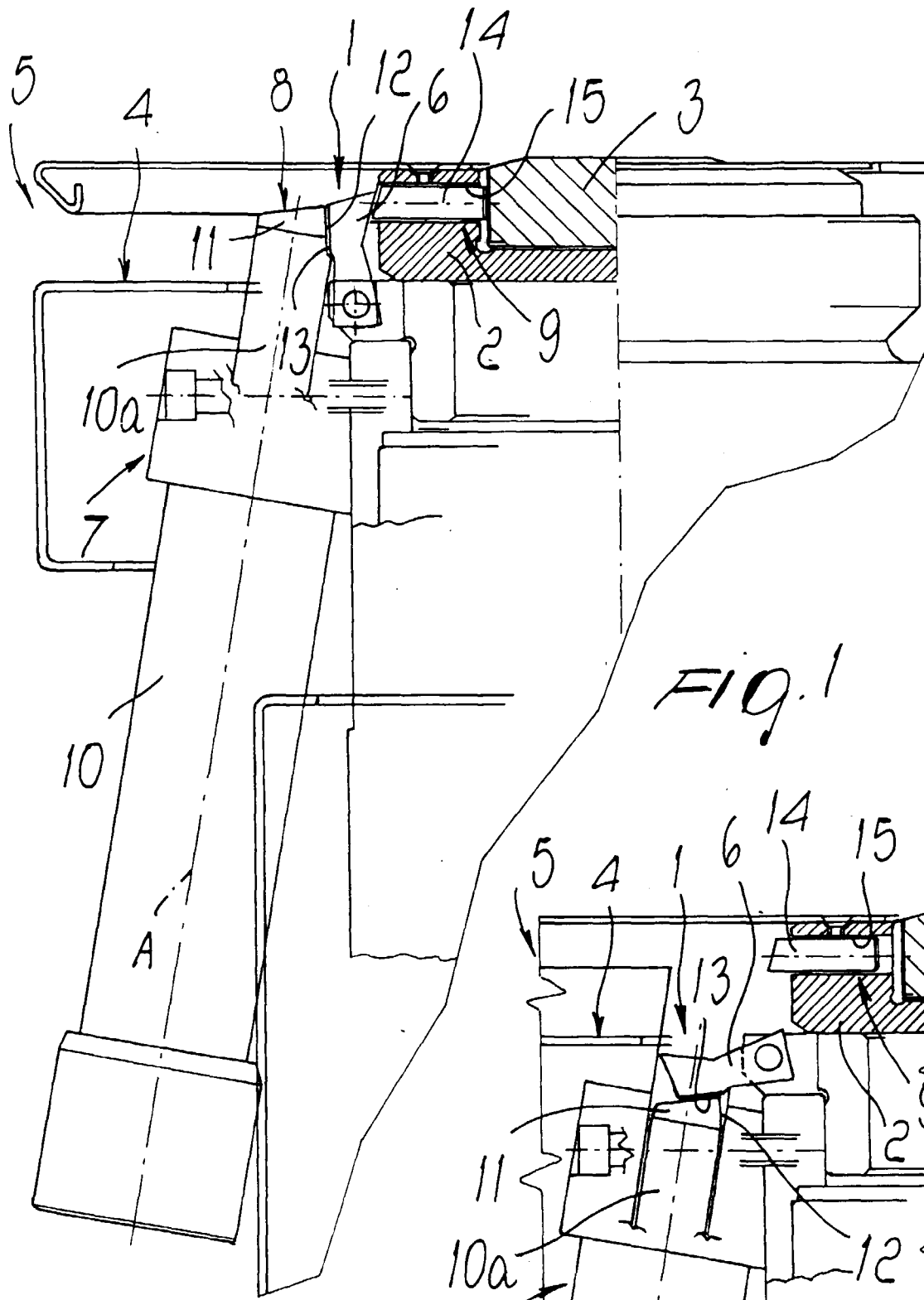


Fig. 1

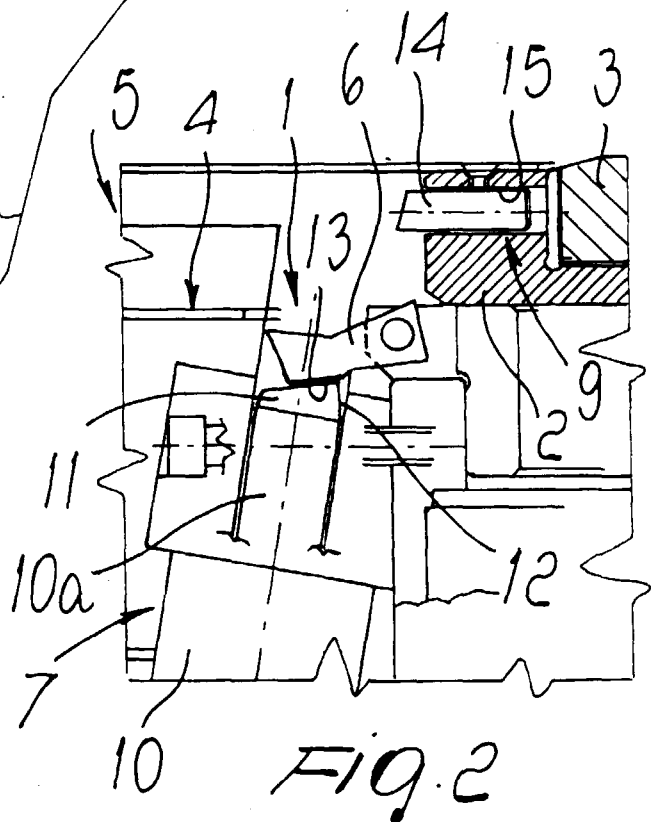


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 9069

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 3 779 122 A (W. A. WHITNEY CORP.) 18 December 1973 (1973-12-18) * column 2, line 60 - column 4, line 67; figures 1,2,5 *	1-3,6	B21D37/14 B21D37/04 B21D28/34
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B21D B23Q
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 27 June 2000	Examiner Vinci, V
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 10 9069

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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