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(54) **Insertion device for rolling machines**

(57) An insertion device (1) for rolling machines, including a fixed plate (2) and a reciprocating movable plate (3), a feed guide (5) for a plurality of blanks (4) to be inserted in an insertion point between the fixed plate (2) and the movable plate (3), an insertion pusher (6) which is adapted to convey a blank (4) into contact with the

movable plate (3); the insertion device (1) has a stop blade (7) that moves linearly between at least two positions: a position in which the blade (7) protrudes beyond a vertical edge of the fixed plate (2) and retains the blank (4), preventing it from entering between the plates, and a retracted position, in which the blade (7) leaves free the rolling region between the plates.

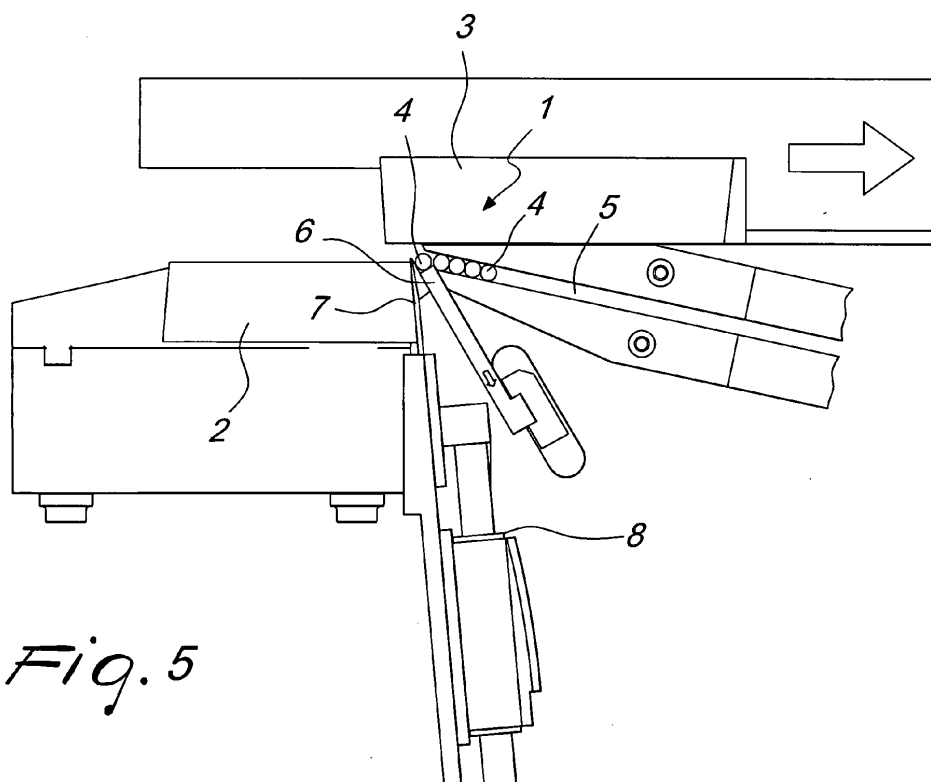


Fig. 5

Description

[0001] The present invention relates to an insertion device for rolling machines.

[0002] As is known, screws, bolts and rotational parts in general may be manufactured by means of rolling machines with flat dies, which generate the thread by cold rolling.

[0003] In an automatic rolling machine with flat dies, the blank is placed between two plates, one of which is motionless while the other performs a reciprocating motion, the plates causing the blank to roll under pressure.

[0004] The plates have protrusions which are inclined with the angle that corresponds to the pitch of the thread to be formed, they constitute a female thread which is spread flat and, by pressing the material, force the material, by pressure, to assume the shape of the thread.

[0005] The machine is provided with a feeder which picks up a blank that arrives from a feed guide and arranges it between the two plates.

[0006] Generally, blank insertion systems include a component, constituted by a retention blade, which is adapted to close the descent flow of the blanks along the guide, in order to prevent them from entering the rolling region during the machine cycle.

[0007] Such retention blade is then opened at the appropriate time, generally by the thrust of the blank that is pushed in turn by the insertion pusher. In other cases, a cam, again moved by the insertion pusher, opens the blade.

[0008] In any case, the insertion cycle is then completed by the insertion pusher which pushes the part between the dies, when it reaches its dead center toward the slider.

[0009] By varying the relative position of the dies, in the top dead center of the movable one, the correct timing of the rolling cycle is achieved.

[0010] This adjustment is laborious due to the fact that it is necessary to move the entire assembly of the spindle axis of the rolling machine.

[0011] DE-1935451 discloses a device for separating and aligning screw blanks in thread rolling machines, of the above described type. Such device comprises an inserter which moves the blanks via a guide to the tools. A separator tongue cooperates with the inserter. It is driven separately via a separate control mechanism to operate in synchronisation with the inserter. The control mechanism is connected with a cam which is adjusted to fix the position and motion of the tongue.

[0012] Adjusting the cam is a rather laborious and time consuming operation.

[0013] The aim of the present invention is to provide an improved insertion device.

[0014] Within the scope of this aim, an object of the invention is to provide an insertion device that allows quick and easy adjustment and timing of the system even during the operation of the machine.

[0015] A further object of the invention is to provide a device wherein the adjusting does not involve complicat-

ed mechanical operations, such as adjusting the position of a cam or other mechanical component.

[0016] Another object of the present invention is to provide a device that can be provided easily by using commonly commercially available elements and materials and is furthermore competitive from an economic standpoint.

[0017] This aim and these and other objects that will become better apparent hereinafter are achieved by an insertion device for rolling machines, as claimed in the appended claims.

[0018] Further characteristics and advantages will become better apparent from the description of preferred but not exclusive embodiments of the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of the blank insertion region in a rolling machine with flat dies, according to the present invention;

Figure 2 is another perspective view of the blank insertion region in a rolling machine with flat dies, according to the present invention;

Figure 3 is a further perspective view of the blank insertion region in a rolling machine with flat dies, according to the present invention;

Figures 4-8 are schematic views of the apparatus, illustrating the operating sequence thereof;

Figures 9-13 are schematic use, in enlarged scale with respect to the preceding ones, which illustrate the same operating sequence.

[0019] With the reference to the cited figures, the apparatus according to the invention, generally designated by the reference numeral 1, generally comprises a fixed plate 2 and a reciprocating movable plate 3.

[0020] A blank 4, which arrives from a feed guide 5, is placed between the two plates 2 and 3, which make the blank roll under pressure.

[0021] The plates 2 and 3 have protrusions which are inclined with an angle that corresponds to the pitch of the thread, thus constituting a female thread which is spread flat. The two plates press the material and force it to assume the shape of the thread, in a per se known manner.

[0022] According to the present invention, the system for the insertion of a blank 4 comprises an insertion pusher 6, which conveys the blank 4 up to contact with the movable plate 3, and a stop blade 7, which retains the blank 4 prior to its insertion between the plates.

[0023] The stop blade 7 is preferably moved by means of a linear motor 8. The insertion pusher 6 also is moved by means of a linear motor.

[0024] The operation of the insertion system according to the present invention is shown in Figures 4-8 and 9-13.

[0025] In the initial condition, which is visible in Figures 4 and 9, the insertion pusher 6 retains the blanks 4 by obstructing the sliding guide 5.

[0026] To begin the insertion operation, the insertion

pusher 6 retracts in order to cause a blank 4 to slide until it makes contact with the stop blade 7, as can be seen in Figures 5 and 10.

[0027] At this point the insertion pusher 6 conveys the blank 4 into contact with the movable plate 3, while the stop blade 7, which protrudes beyond the vertical edge of the fixed plate 2, retains the blank 4, preventing it from entering between the plates. This condition is visible in Figures 6 and 11, which also schematically show that the movable plate 3 retracts slightly in order to place the blank in the desired initial point, as shown by the circular arrow of the figures.

[0028] When the synchronization chosen by the operator by means of software and the operator panel provides clearance, the blade is made to retract, by means of the linear motor control 8, and simultaneously the insertion pusher 6 increases its thrust, so as to insert the blank exactly in the desired point of the movable plate 3, at the beginning of its longitudinal stroke. This condition is shown in Figures 7-8 and 12-13.

[0029] Figures 8 and 13 are views of the advanced rolling step, in which the stop blade 7 is by then completely retracted.

[0030] The present insertion device offers important advantages, including general ease of adjustment and in particular ease in determining the perfect timing before and during the working cycle simply by acting on the movement of the stop blade 7, which is also the simplest mechanical element of the entire insertion mechanism.

[0031] The precision and constancy of the mechanism ensure total and effective control of the process, with the best assurance of product quality.

[0032] In the insertion systems of the prior art, the insertion system is tuned by moving the entire assembly of the spindle axis of the rolling machine, in order to achieve the same effect of the present invention.

[0033] This invention also improves over the inserting systems provided with a separator tongue driven separately via a separate control mechanism to operate in synchronisation with the inserter. In fact, according to the present invention, the stop blade has a simple linear motion which does not require cams or any complicated control mechanism other than a linear motor.

[0034] The linear motion of the stop blade of the present invention provides for a reliable operation that requires less frequent adjusting.

[0035] The linear motor can be directly controlled electronically thus providing an immediate adjustment.

[0036] It is apparent how the present invention achieves the intended aim and objects, providing a device for inserting the blank between the dies of the machine that allows easy adjustment and timing of the apparatus by means of the control of the movement of the stop blade.

[0037] This application claims the priority of Italian Patent Application No. GE2010A000033, filed on April 12, 2010, the subject matter of which is incorporated herein by reference.

Claims

1. An insertion device for rolling machines, comprising a fixed plate and a reciprocating movable plate, a feed guide for a plurality of blanks to be inserted in an insertion point between said fixed plate and said movable plate, an insertion pusher which is adapted to convey to a blank into contact with the movable plate; the insertion device being **characterized in that** it comprises a stop blade that moves linearly between at least two positions: a position in which said blade protrudes beyond a vertical edge of said fixed plate and retains said blank, preventing it from entering between said plates, and a retracted position, in which said blade leaves free the rolling region between said plates.
2. The device according to claim 1, **characterized in that** the movement of said stop blade is controlled by actuation means which are synchronized by electronic control with the movements of said insertion pusher and said movable plate.
3. The device according to claim 2, **characterized in that** said actuation means of said stop blade is constituted by a linear motor.

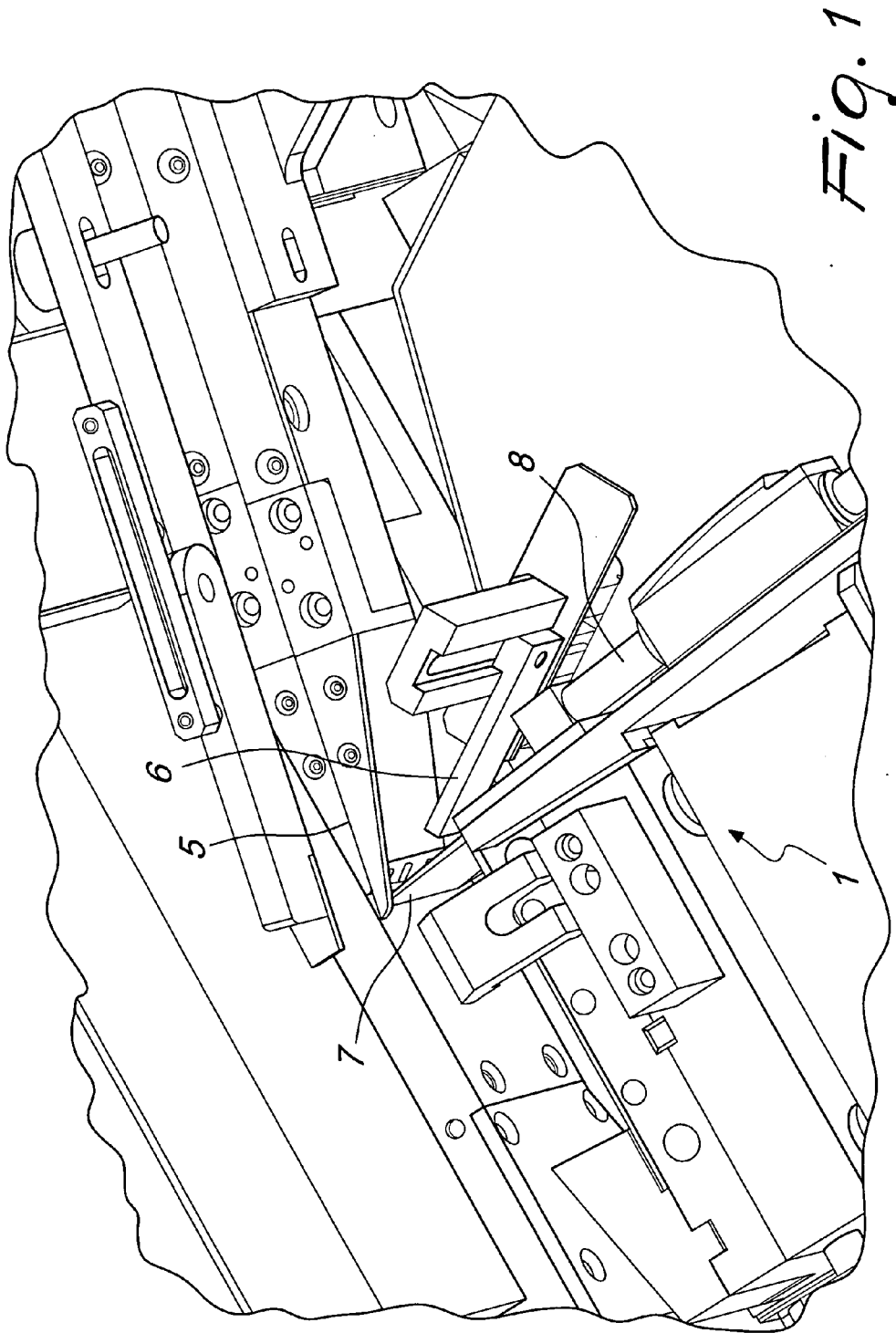
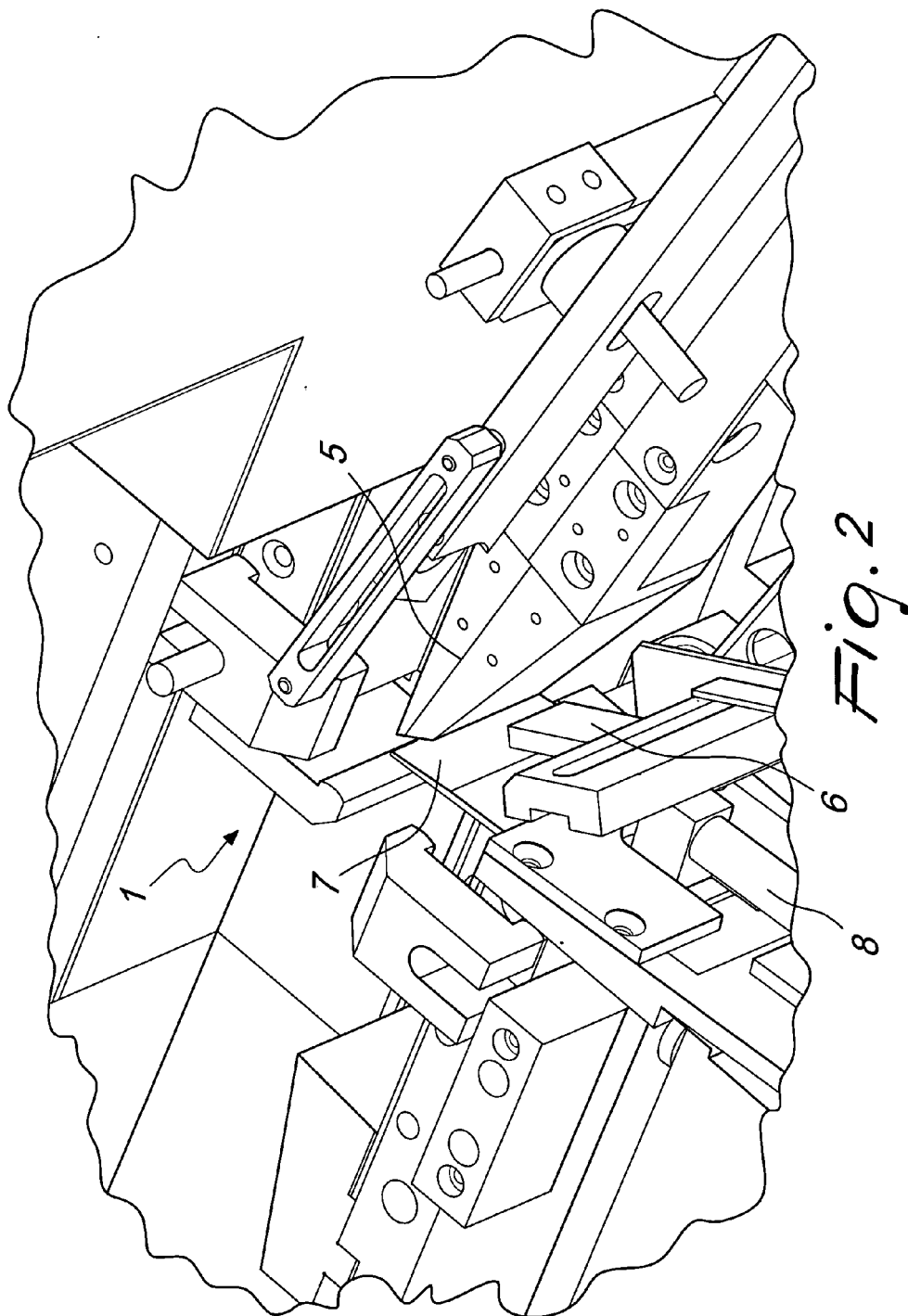


Fig. 1



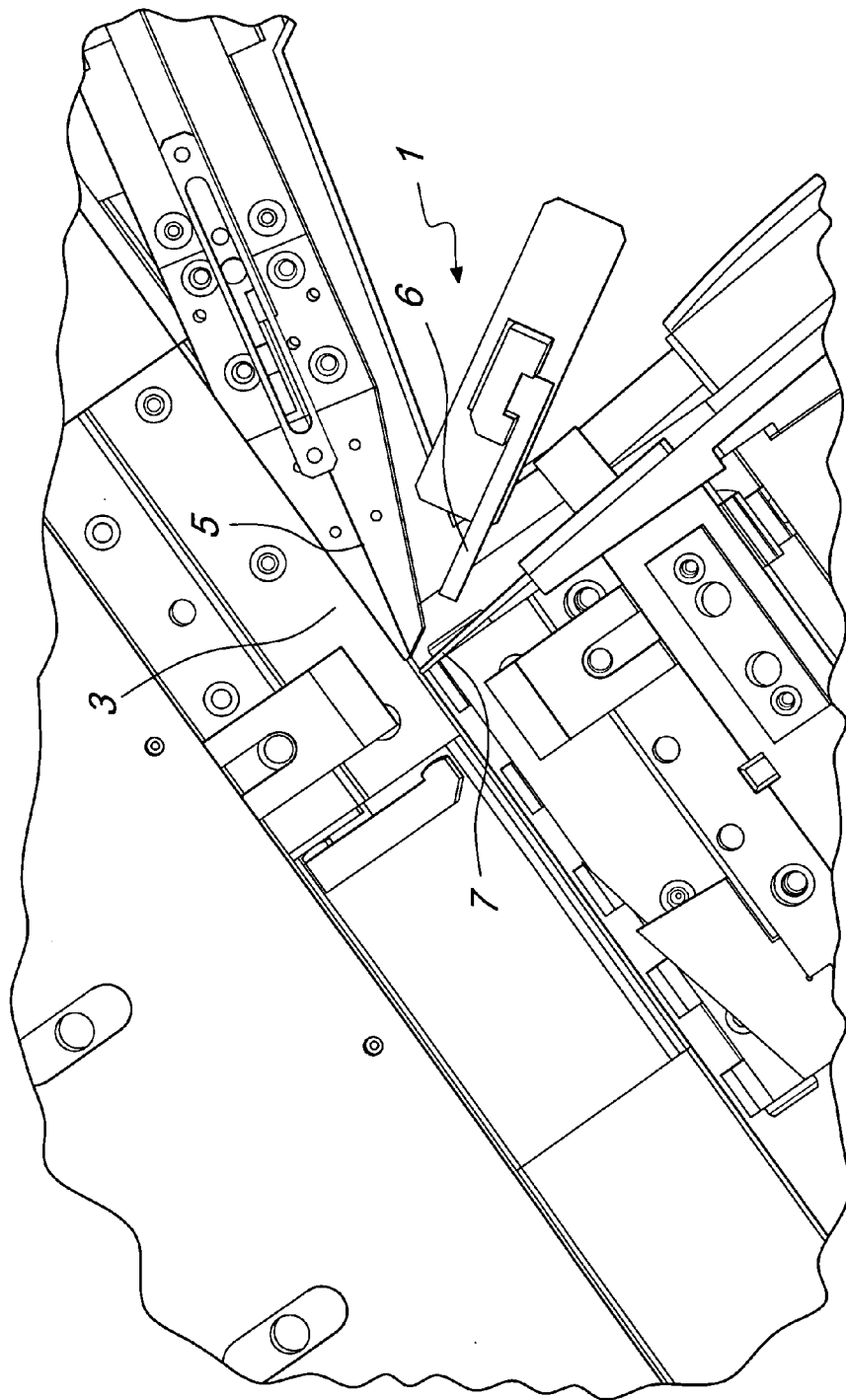


Fig. 3

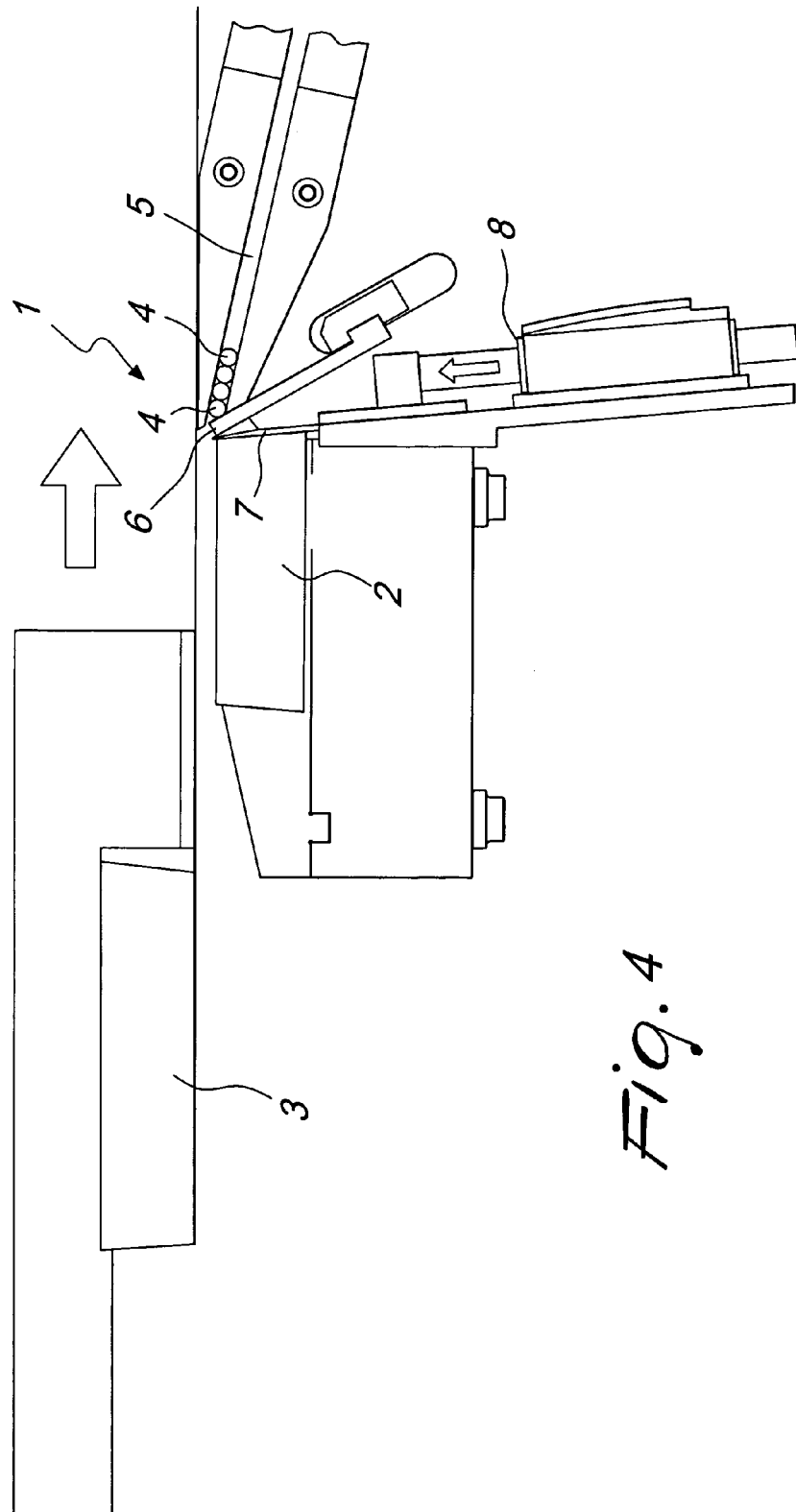
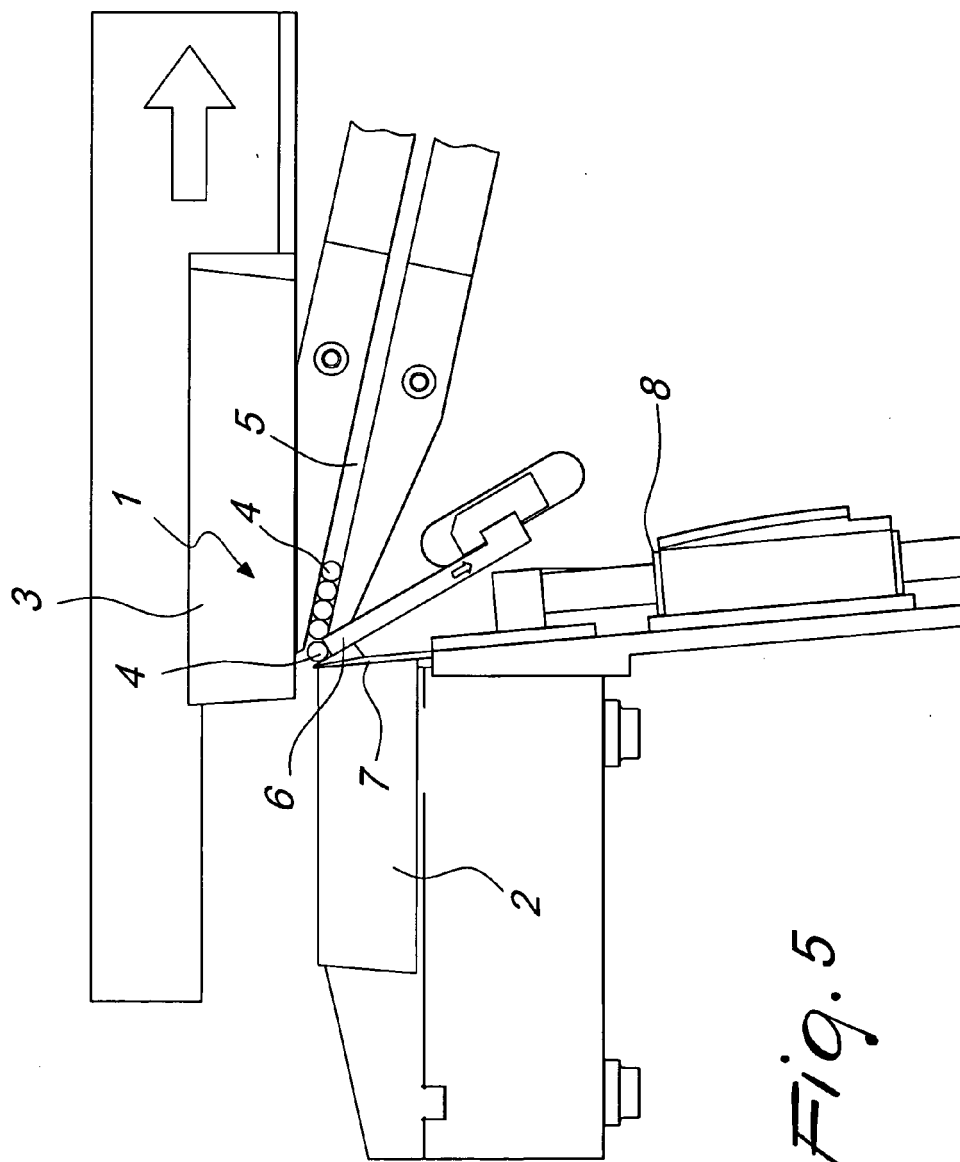
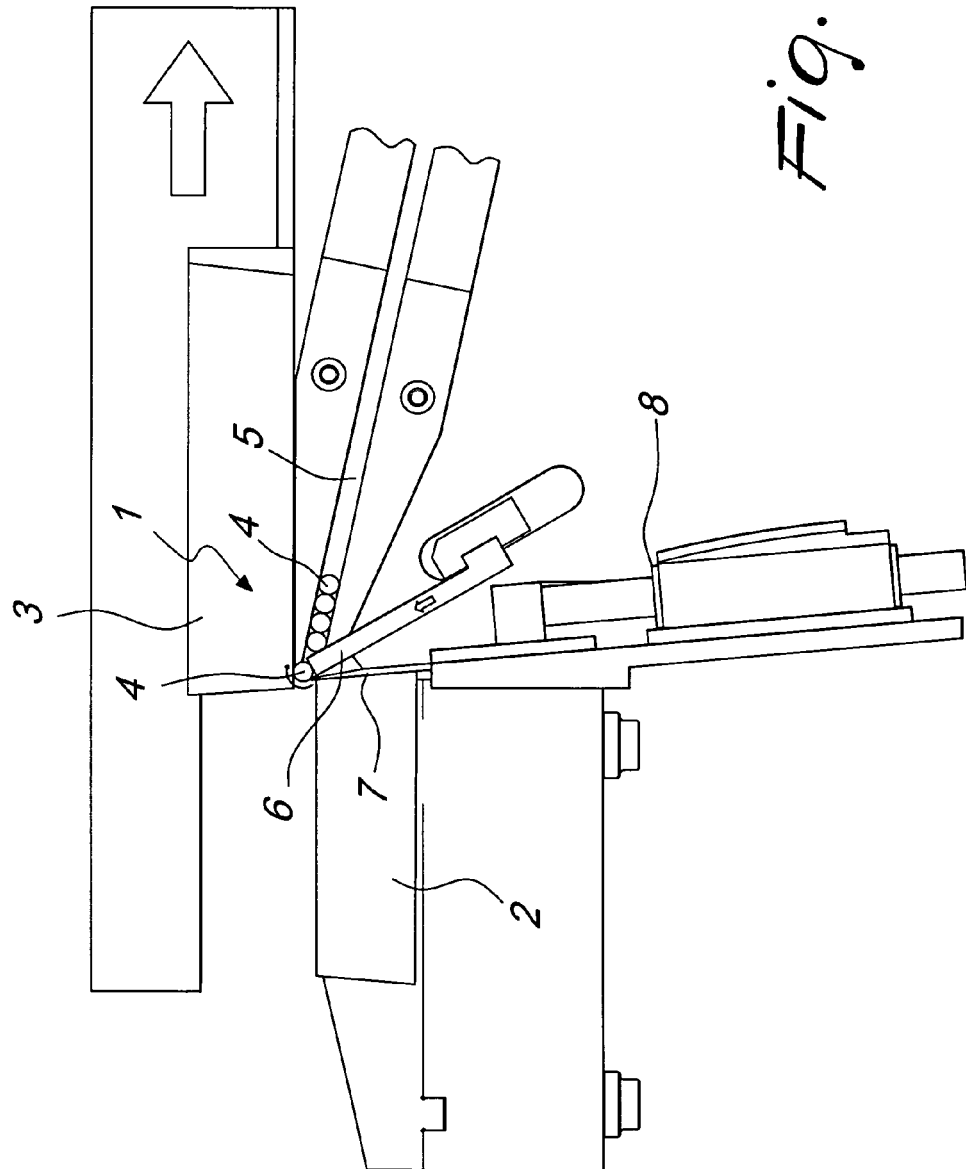
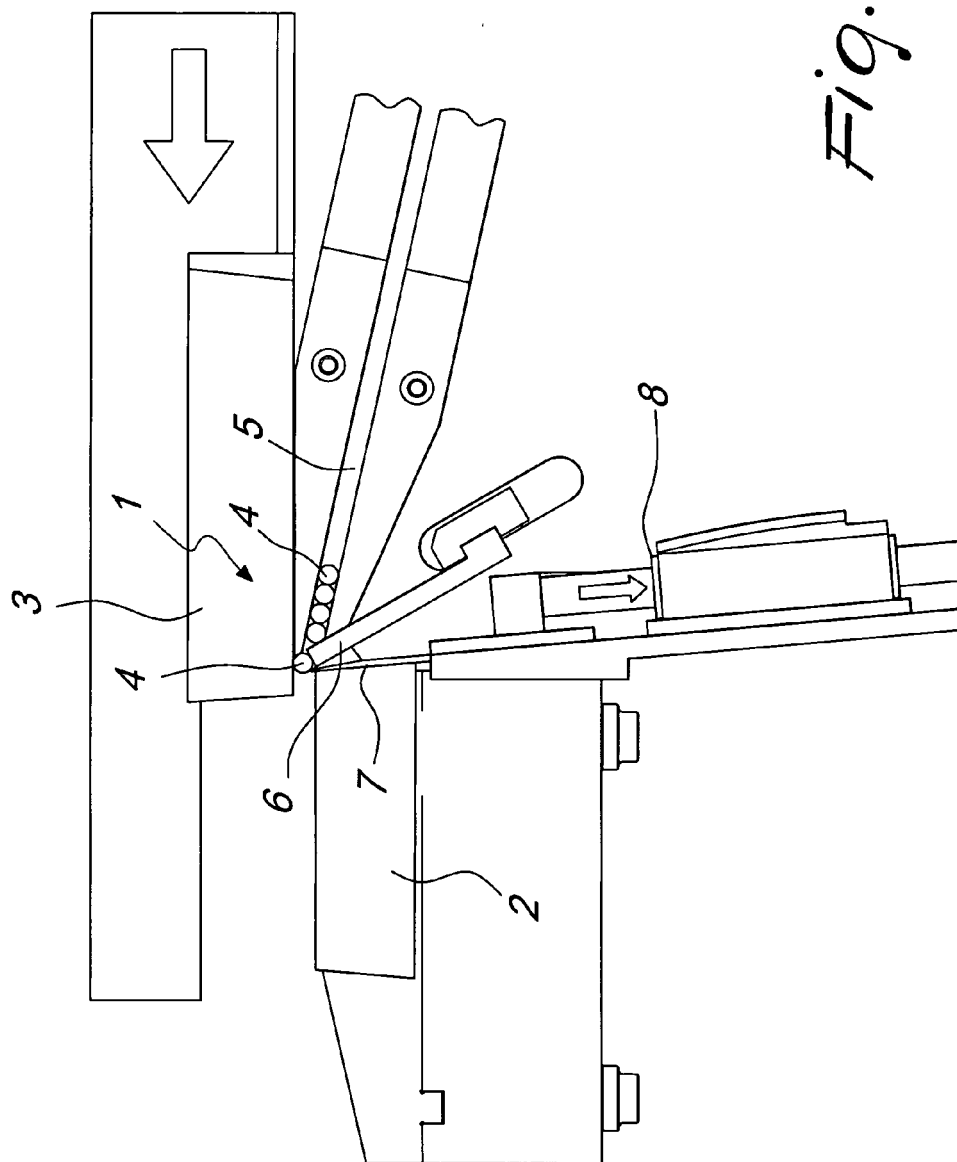


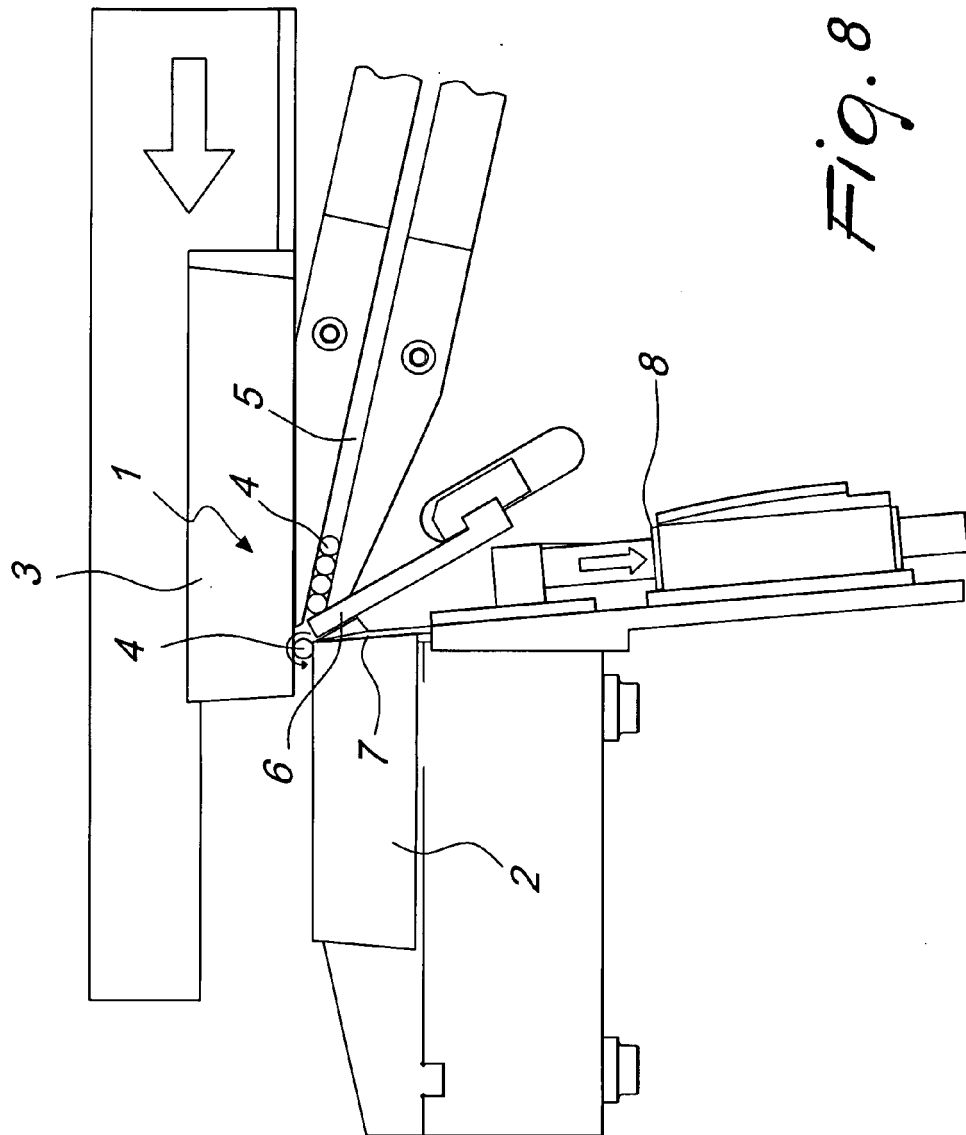
Fig. 4





9.614





8.617

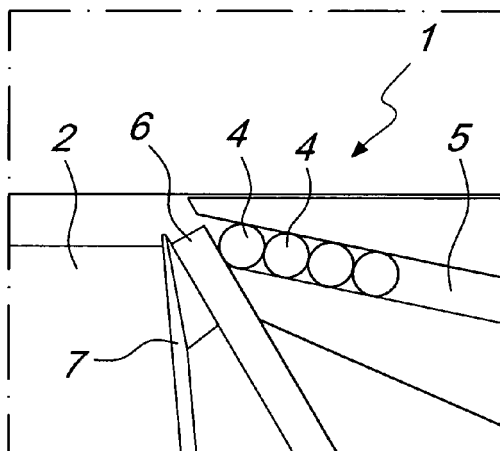


Fig. 9

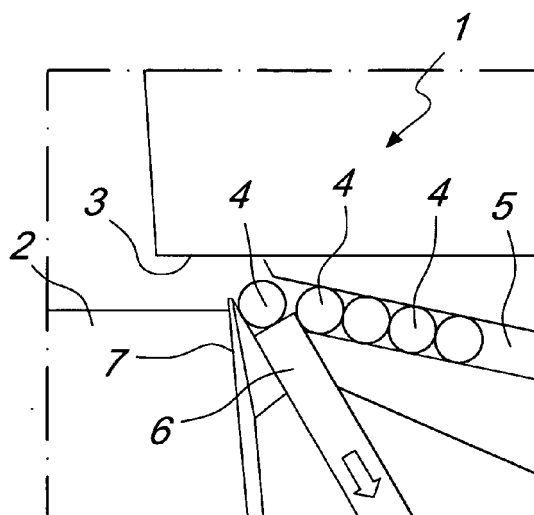


Fig. 10

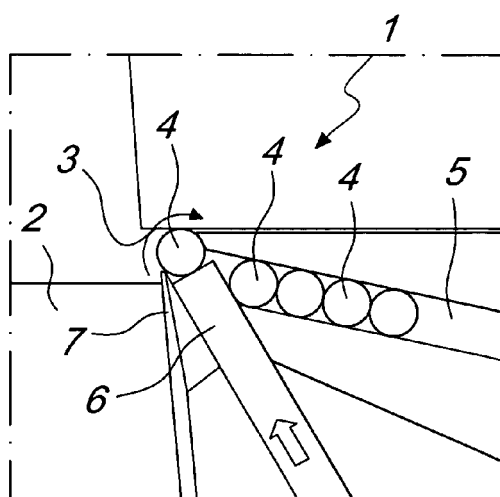


Fig. 11

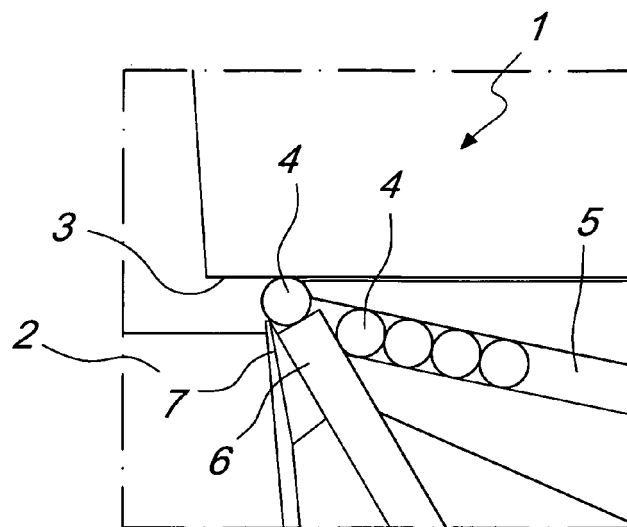


Fig. 12

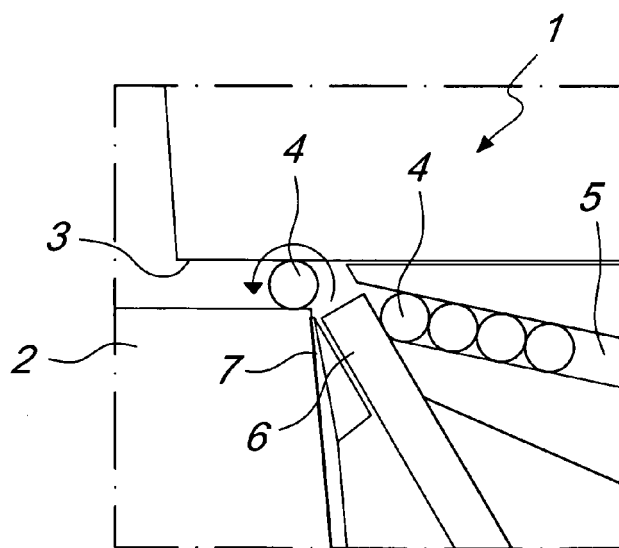


Fig. 13



EUROPEAN SEARCH REPORT

Application Number
EP 11 00 3060

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	* page 3, last paragraph - page 5, paragraph 2; figure 1 *	3	
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Place of search		Date of completion of the search	Examiner
Munich		5 August 2011	Ritter, Florian
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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EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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