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(54) **INSERTION DEVICE PARTICULARLY FOR
AUTOMATIC ROLLING MACHINES**

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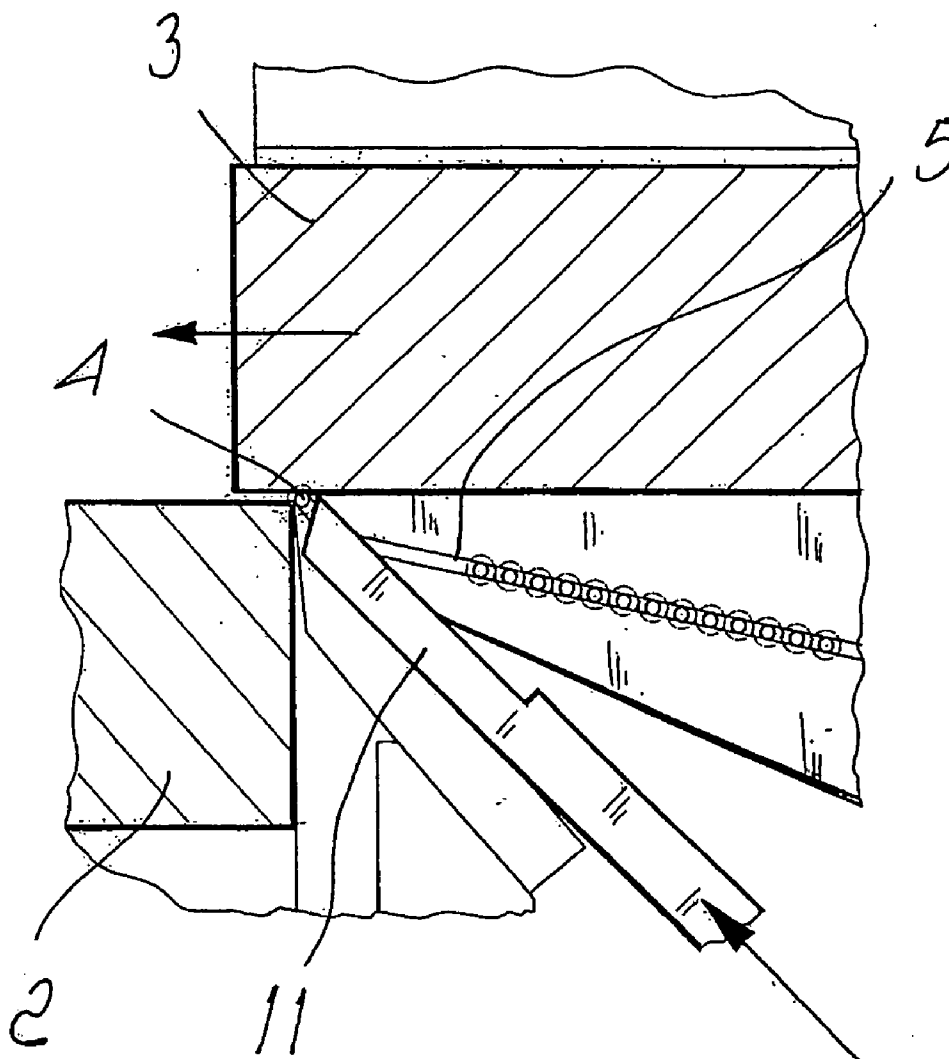
ABSTRACT

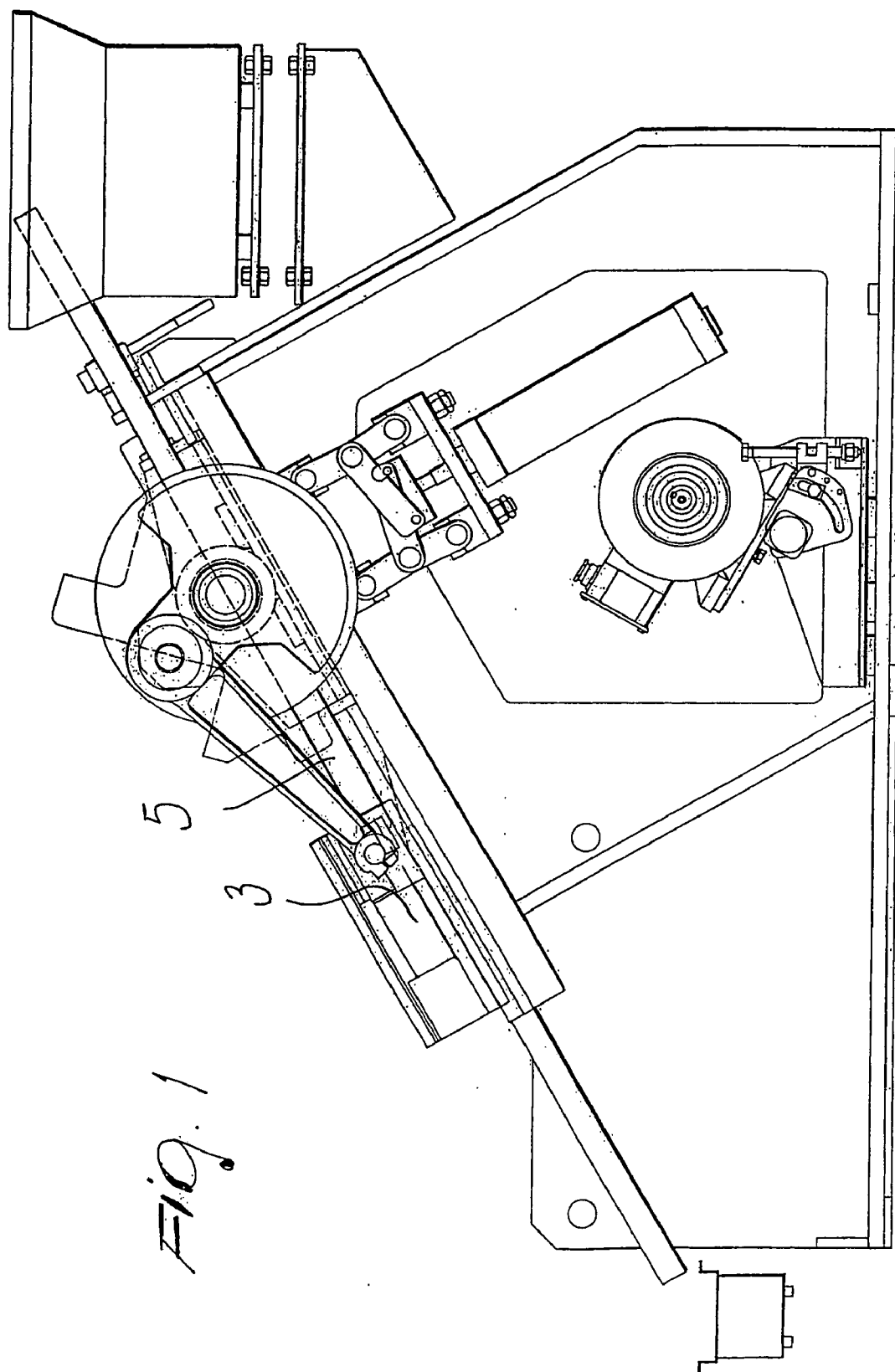
An insertion device, particularly for automatic rolling machines, which includes a reciprocation member that is provided with a means adapted to pick up a part to be machined from a guide and insert said part in a working position, wherein the reciprocating member is actuated by a linear motor.

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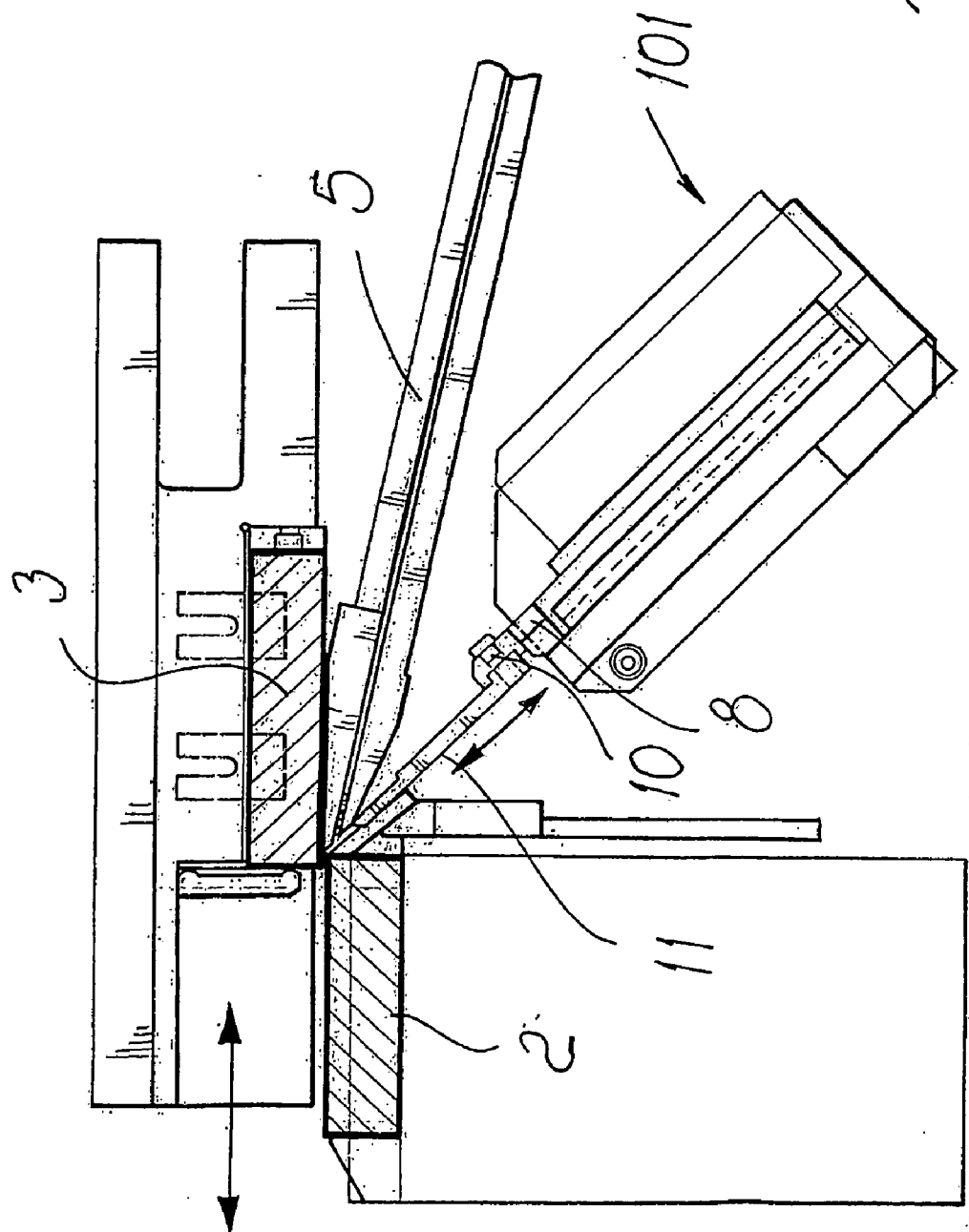
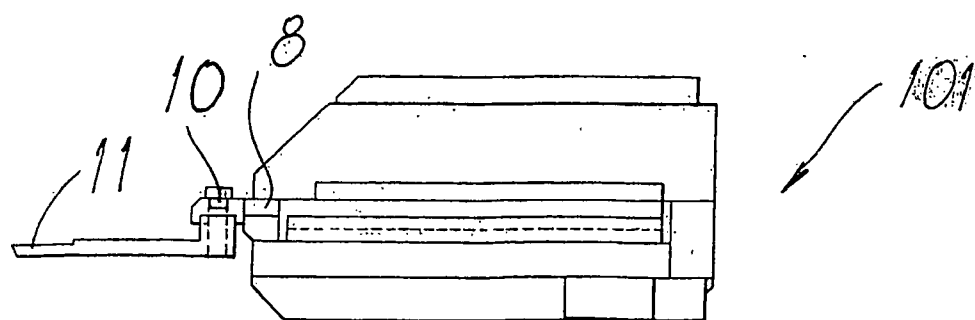
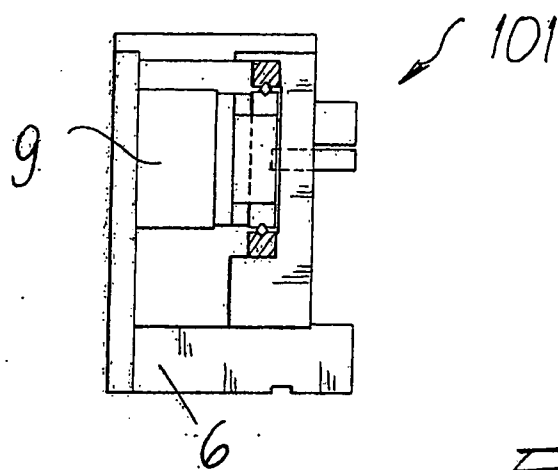
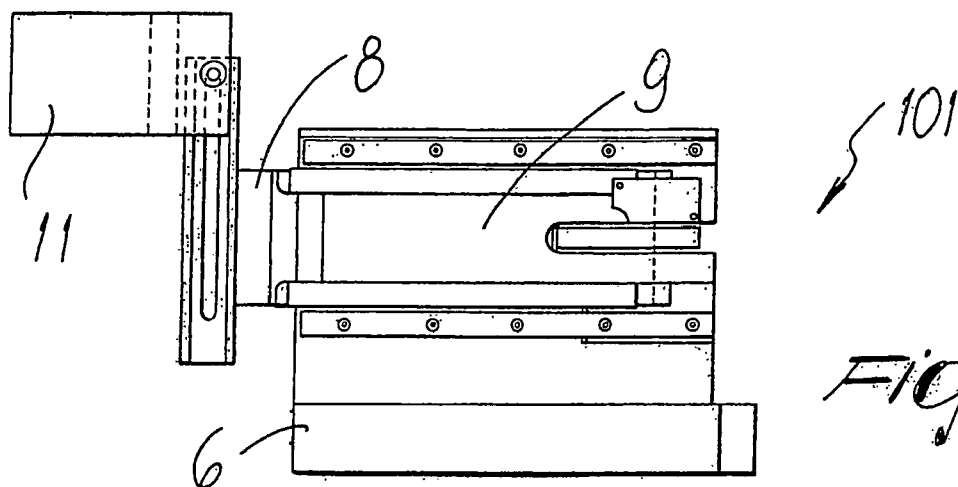
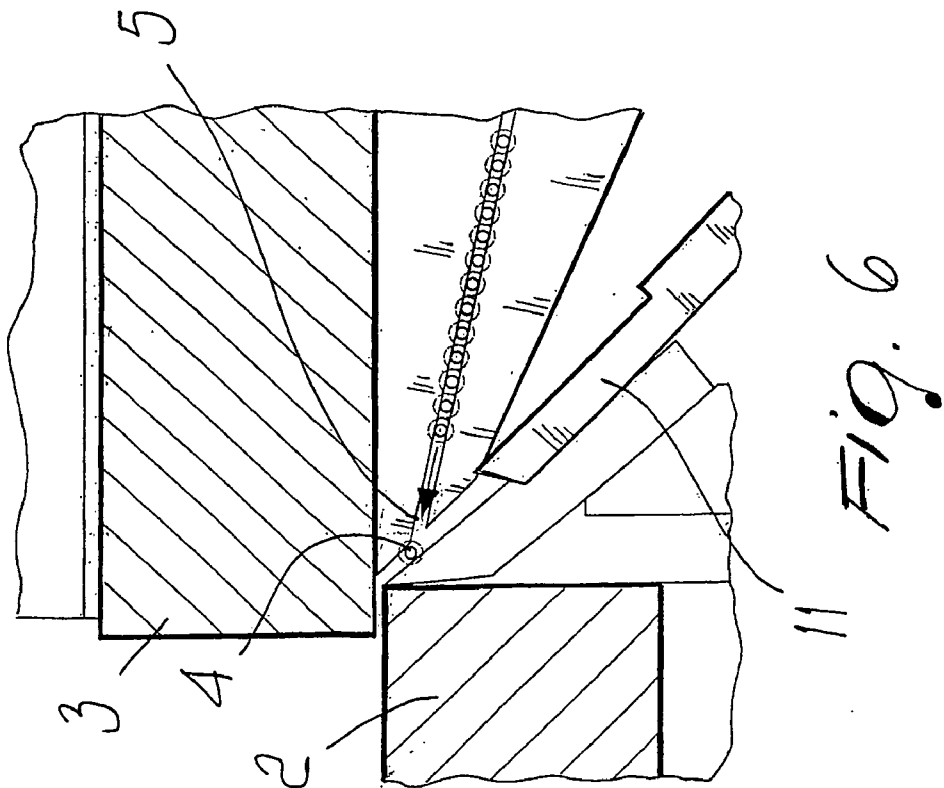
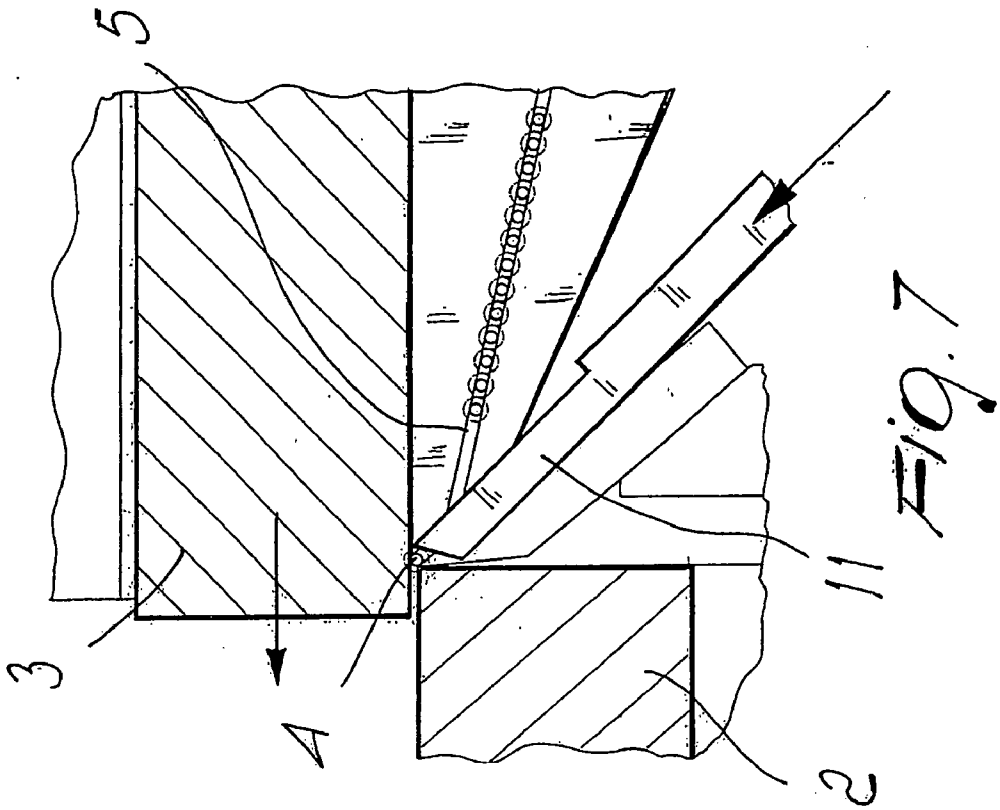


Fig. 2





INSERTION DEVICE PARTICULARLY FOR AUTOMATIC ROLLING MACHINES

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

[0002] Rolling machines can be used to produce screws and generate the thread by cold rolling.

[0003] In a machine of this type, the blank is placed between two plates, one of which is motionless while the other can perform a reciprocating motion, and the plates roll the blank under pressure.

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

[0005] GB-882125 discloses a thread rolling machine provided with a mechanism for feeding blanks into a gap formed by two rolling dies.

[0006] The ever-shrinking size of production batches on the part of screw manufacturers, together with the persistent difficulty in finding specialized personnel capable of working with a sufficient level of skill, have led to the need to provide machines that are functionally as simple as possible, i.e., have a very high degree of automation.

[0007] The aim of the present invention is to provide an insertion device particularly for automatic rolling machines that is more functional and efficient than insertion devices used in conventional machines.

[0008] An object of the invention is to provide an insertion device that ensures the best kinematic and dynamic characteristics.

[0009] A further object of the invention is to provide an insertion device that allows maximum containment of inertias.

[0010] A further object is to provide an insertion device in which the stroke of the mechanism is limited to the strictly necessary extent.

[0011] A further object is to provide an insertion device in which the rule of motion can be optimized easily, particularly as regards the ramps and pauses in the two directions of operation.

[0012] A further object is to provide an insertion device that facilitates the correct insertion of the part and is able to detect anomalies of insertion, such as for example initial slippage and the insertion of a plurality of blanks in the same rolling step.

[0013] Another object is to provide a device that also constitutes an efficient part counter, this being always a very critical function in these kinds of machine.

[0014] Another object is to provide a device that reduces the wear of the movable chaser in the insertion region, adjusting the contact pressure precisely.

[0015] This aim and these and other objects that will become better apparent hereinafter are achieved by an insertion device, particularly for automatic rolling machines, comprising a reciprocating member that is provided with a means adapted to pick up a part to be machined from a guide

and to insert it in a working position, characterized in that the reciprocating member is actuated by a linear motor.

[0016] Further characteristics and advantages of the present invention will become better apparent from the description of preferred but not exclusive embodiments thereof, illustrated by way of non-limitative example in the accompanying drawings, wherein:

[0017] FIG. 1 is a schematic side elevation view of the rolling machine according to the invention;

[0018] FIG. 2 is a schematic plan view of the insertion region of the rolling machine;

[0019] FIG. 3 is a side elevation view of the insertion device;

[0020] FIG. 4 is a front elevation view of the insertion device;

[0021] FIG. 5 is a plan view of the insertion device;

[0022] FIGS. 6 and 7 are enlarged-scale plan views of two steps of the operation of the insertion device.

[0023] With reference to the cited figures, the insertion device according to the invention, generally designated by the reference numeral 101, can be applied to an automatic rolling machine 1, which is essentially constituted by a fixed plate 2 and a movable plate 3, which has a reciprocating motion. The device can also be applied to automatic rolling machines of the roller and sector type.

[0024] A blank 4, arriving from a feeder guide 5, is placed by the insertion device 101 between the two plates 2 and 3, which roll it under pressure.

[0025] The plates have protrusions that are inclined at an angle that corresponds to the pitch of the thread, thus constituting a female thread spread flat, and by pressing the material they force it to assume the shape of the thread.

[0026] According to the invention, the insertion device 101 is constituted by a base 6, which is rigidly coupled to the frame of the machine 1 and supports a reciprocating member 8 that is actuated by a linear motor 9.

[0027] The reciprocating member 8 has a transverse guide 10, to which an insertion punch or pusher 11 is applied; its position on the transverse guide can be adjusted and is fixed for example by means of a screw system.

[0028] The linear motor is controlled electronically and the system therefore allows completely automatic adjustment.

[0029] The fact that the insertion device according to the present invention is driven by an electronic servosystem with a linear motor and the corresponding drive, differently from the systems of the prior art that have a conventional kinematic chain constituted by cams, belts, spherical joints, levers et cetera, provides several important advantages.

[0030] The device according to the present invention allows maximum containment of inertias and ensures the best kinematic and dynamic characteristics, limiting the stroke of the mechanism to the strictly necessary extent and at the same time facilitating the correct insertion of the part.

[0031] The device also allows to optimize the rule of motion, i.e., the ramps and pauses in the two directions of

operation, and minimizes the wear of the movable chaser in the insertion region, adjusting precisely the contact pressure.

[0032] In practice it has been found that the invention achieves the intended aim and objects, an insertion device for automatic rolling machines having been provided which is functionally and constructively superior to the devices used so far for the insertion of the parts to be machined.

[0033] The insertion device according to the invention is particularly advantageous in a machine that has a modular structure, so as to facilitate its optimum execution on machine tools of any size, at the same time ensuring an excellent level of quality.

[0034] Another important advantage of the device according to the present invention is that it facilitates and simplifies the operations for fine-tuning and adjusting the machine.

[0035] Another advantage of the device is that it allows to control initial slippage and avoid the insertion of a plurality of blanks in the same rolling step.

[0036] Another advantage of the device is that it also constitutes an efficient part counter.

[0037] The device according to the invention is susceptible of numerous modifications and variations, within the

scope of the appended claims. All the details may be replaced with technically equivalent elements.

[0038] The structure of the device according to the invention also contributes to strength and precision in construction, which together with an appropriate choice of materials ensure complete stability of the operating conditions.

[0039] The materials used, as well as the dimensions, may of course be any according to requirements and to the state of the art.

1. An automatic rolling machine comprising an insertion device wherein a reciprocating member is provided with a means adapted to pick up a part to be machined from a guide and to insert said part in a working position, and wherein the reciprocating member is actuated by a linear motor.

2. The automatic rolling machine according to claim 1, wherein said linear motor is driven electronically.

3. The automatic rolling machine according to claim 1, wherein said reciprocating member and said linear motor are supported by a base that is rigidly coupled to a frame of the machine.

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