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(54) **Operating device for punches in punch heads.**

(57) A punching device for punching machines, movable in a plane along two perpendicular axes, said device comprising an electric motor, a speed reducer (10) applied to the shaft of the electric motor, a bar (14) eccentrically rigid with the output shaft of the speed reducer, a link rod (18) pivoted to said bar, and a ram connected to the free end of the link rod, means (30, 36; 38, 40, 42)

for regulating the vertical position of a striker relative to said ram (20), characterised in that the striker (26) is housed within a striker gate (24) applied to the lower surface of the ram (20) and is maintained elastically resting against said surface, the regulation means consisting of a wedge (30) which becomes interposed between the lower surface of the ram and the striker (26).

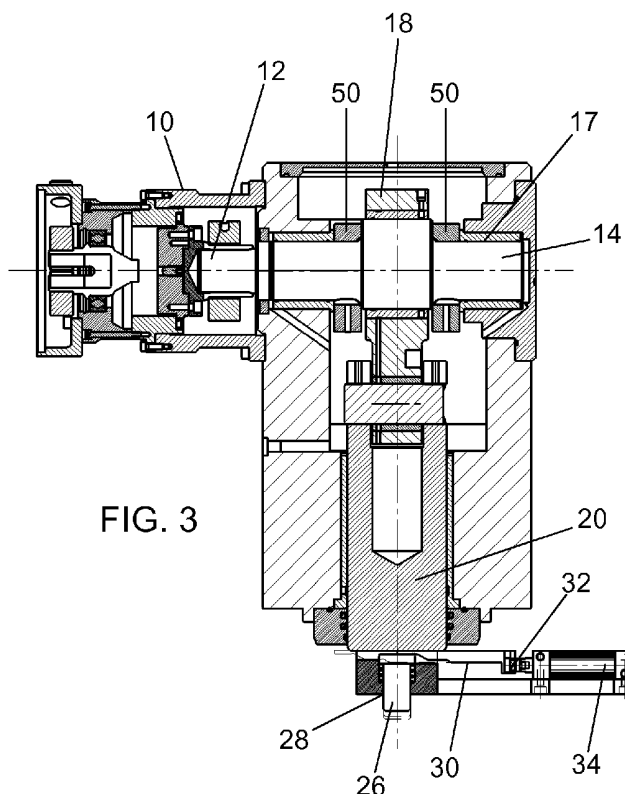


FIG. 3

Description

[0001] The present invention relates to an operating device for punches in punch heads.

[0002] Punching machines are known, inserted into metal strip processing lines. They generally comprise punch heads, the tools and punches of which are controlled, in accordance with the predetermined operative cycle, by hydraulic cylinders applied to the head itself, and act on a sheet metal strip to be processed, advancing between the punches and the respective dies.

[0003] A first punch head comprises a frame, mounted on which there are a die carrier carriage, a punch carrier carriage, and a cylinder with striker for selectively operating one of the punches.

[0004] The die carrier carriage, the punch carrier carriage and the cylinder are provided with means for moving them along three superposed corresponding beams disposed perpendicular to the advancement axis of the sheet metal strip.

[0005] This machine presents however the drawback of a large overall size, especially with regard to its vertical movement.

[0006] Punch operating devices are also known comprising an electric motor, a speed reducer applied to the shaft of the electric motor, a bar eccentrically rigid with the output shaft of the speed reducer, at least one link rod pivoted to said bar, a mass connected to the free end of the link rod, and a linear striker rigid with said mass.

[0007] This device presents however the drawback of requiring large-dimension motors and speed reducers.

[0008] Moreover, to punch metal sheets of different dimensions, the extent of rotation of the link rod has to be regulated, with consequent time loss.

[0009] More specifically, if punching large-thickness metal sheets, the link rod has to be completely rotated, while if punching small-thickness metal sheets, the link rod has to be partly rotated, and then returned rearwards.

[0010] The object of the invention is to provide a punching device for punching machines which enables the punching depth to be regulated in a simple and comfortable manner.

[0011] This object is attained according to the invention by a punching device for punching machines as described in claim 1.

[0012] The present invention is further clarified hereinafter in terms of a preferred embodiment and a variant thereof, described by way of non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is a front view of a punching device according to the invention,

Figure 2 shows it in lateral view,

Figure 3 shows the punching device in cross-section

Figure 4 shows it sectioned in lateral view,

Figure 5 shows a variant thereof in the same view as Figure 3, and

Figure 6 shows it in the same view as Figure 4.

[0013] As can be seen from the figures, the punching device according to the invention, indicated overall by 2, is slidable along a transverse beam 4 of a frame 6, the beam being slidable along a beam 8 perpendicular to it and parallel to the longitudinal axis of the frame 6.

[0014] In particular, the device 2 comprises substantially an electric motor (not shown in the drawings) of horizontal axis, coupled to a speed reducer 10, to the shaft 12 of which an eccentric bar 14 is fixed supported by bearings 17. Two counter-rollers 50 are rotoidally connected to said eccentric bar by keys, to dynamically balance the bar. Pivoted to said eccentric bar 14 there is a link rod 18, to the bottom of which a ram 20 is connected. A striker gate 24 is secured to the lower surface of the ram by screws 22, and comprises a seat housing a striker 26 maintained elastically resting against the surface of the ram by a solenoid spring 28.

[0015] Facing the striker gate there is a wedge-shaped rod 30, rigid with the piston rod 32 of a pneumatic cylinder-piston unit 34. Following elongation of the pneumatic cylinder-piston unit, the wedge 30 becomes inserted between the head of the striker 26 and the external surface of the ram, to cause the free end of the striker to move away against the action of the spring 28, to perforate the thickest metal sheets whatever the vertical position of the device relative to the frame. This is achieved without using large-dimension high power motors.

[0016] In the embodiment illustrated in Figures 5 and 6 the ram 20 is provided with a seat 36 in which the striker 26 is inserted, rotoidally connected to a ring gear 38 engaging a pinion 40 rigid with the shaft of an electric motor 42.

[0017] In this embodiment the striker stroke can be regulated by activating the motor, with consequent rotation of the ring gear 38 and travel of the striker within the interior of the ram 20.

Claims

1. A punching device for punching machines, movable in a plane along two perpendicular axes, said device comprising an electric motor, a speed reducer (10) applied to the shaft of the electric motor, a bar (14) eccentrically rigid with the output shaft of the speed reducer, a link rod (18) pivoted to said bar, and a ram connected to the free end of the link rod, means (30, 36; 38, 40, 42) for regulating the vertical position of a striker relative to said ram (20), **characterised in that** the striker (26) is housed within a striker gate (24) applied to the lower surface of the ram (20) and is maintained elastically resting against said surface, the regulation means consisting of a wedge (30) which becomes interposed between the lower surface of the ram and the striker (26).
2. A device as claimed in claim 1, **characterised in that** the wedge (30) is movable axially under the

command of a pneumatic cylinder-piston unit (34).

3. A device as claimed in claim 1, **characterised in that** the striker (26) is externally threaded and engaged in a corresponding threaded seat (36) provided in the ram (20). 5
4. A device as claimed in claim 3, **characterised in that** the striker (26) is rotoidally rigid with a ring gear (38) engaging a pinion (40) rigid with the shaft of an electric motor (42). 10

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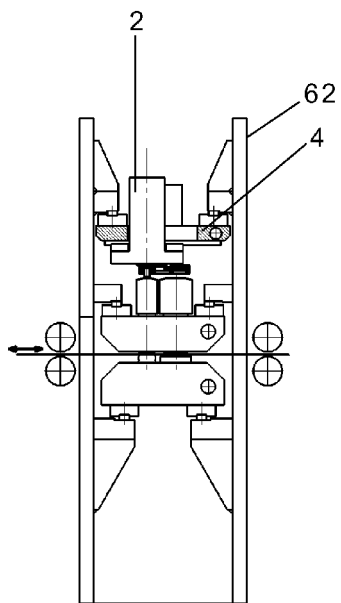


FIG. 1

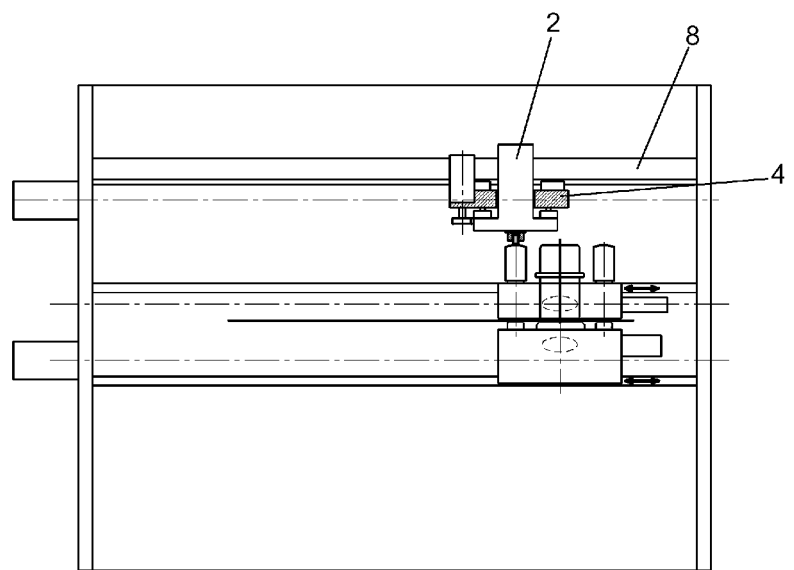
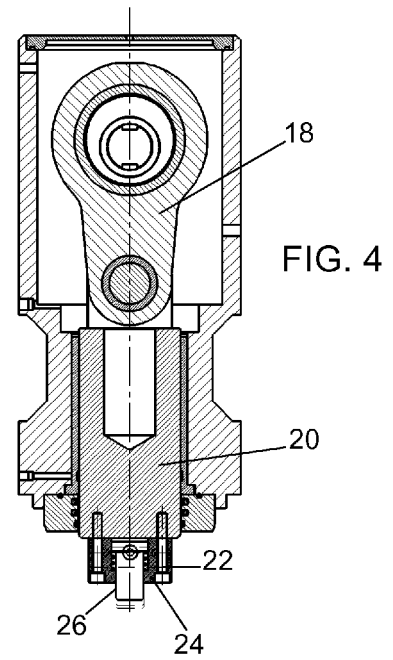
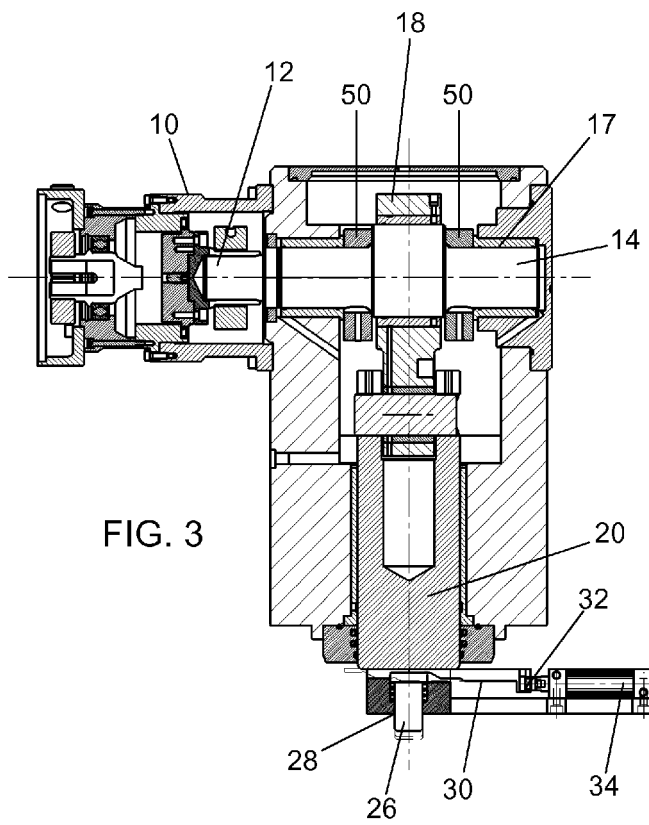
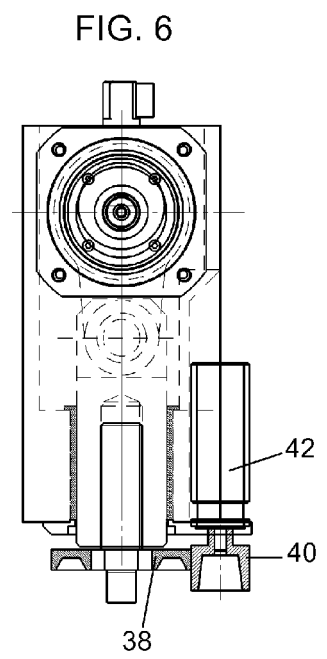
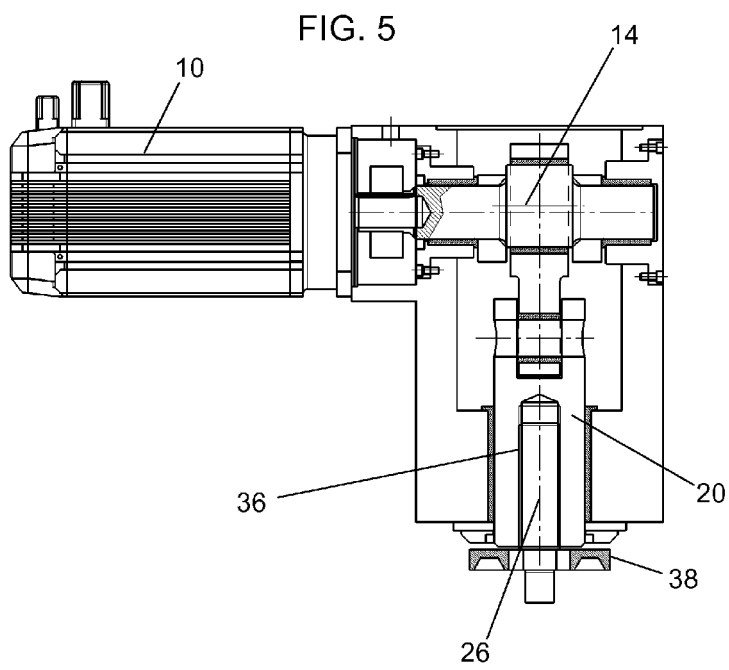


FIG. 2







EUROPEAN SEARCH REPORT

Application Number
EP 13 17 0545

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 September 2013	Examiner Pieracci, Andrea
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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The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82