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(54) A workpiece feeder for a press, with an integrated feed mechanism

(57) The workpiece feeder (1) is installed on a forming press with a horizontal plain (7) which is situated at a given distance (Z) from the floor. The feeder (1) comprises a sole carriage (6) for lifting the workpiece holder (14, 16) which also incorporates the feeder mechanism (9), to elevate the pieces (p) in direction "Z" and feed them in direction "X". The workpiece holder (14, 16) can be extended in direction "Y" for different pieces (p) by means of a motor mechanism (17) which is independent of the feeder mechanism (9). Only said feeder mechanism (9) is supported on the carriage (6) which is driven by a lifting device (4) secured to the press structure (2, 3).

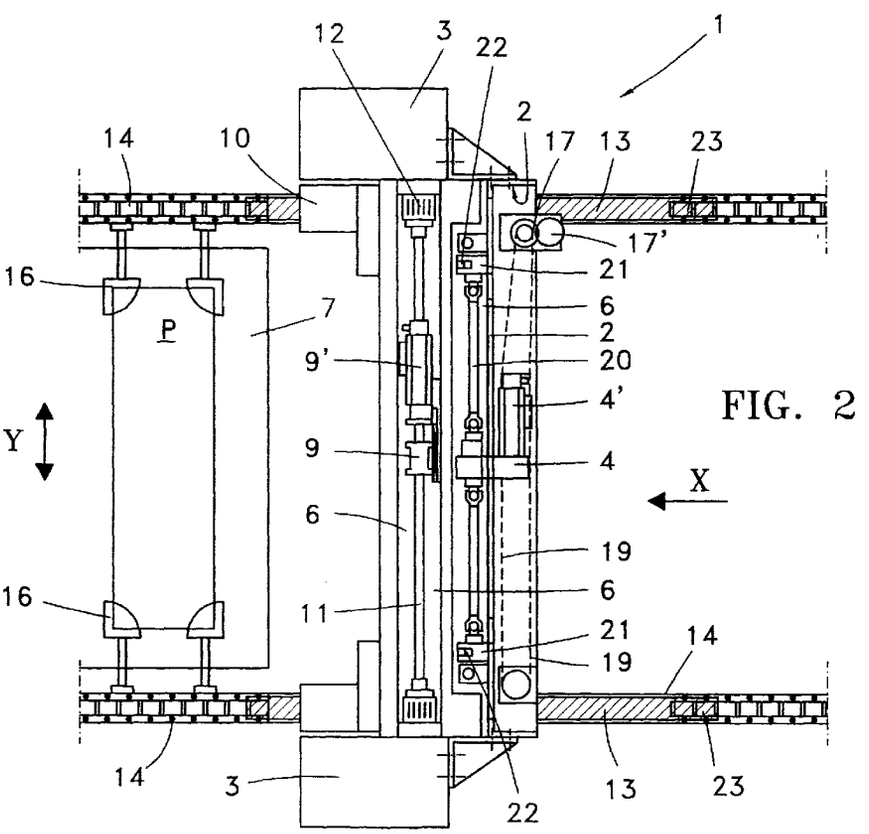

FIG. 2

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Description

The present invention relates to a device for feeding metal workpieces into a press by means of a mobile feed carriage and a piece-holder coupled to said carriage to attach the pieces by means of pincers, the feeder being fitted with mechanical transmission devices for moving the pieces to the press die.

Prior Art

GB-1415379-A describes a piece feeder for transferring pieces to be formed in a press, comprising a structure with rails for the horizontal displacement of a feed carriage and an arm with a set of pincers to hold the pieces on the carriage, and a mechanism to move the arm vertically to the carriage and raise the pieces at the end of the carriage run.

DE-4200923-A describes a linear driver on two axes by means of a motor which turns a drive shaft with a gear wheel attached to it which meshes with a drive belt to move a displaceable carriage orthogonally to the direction of the shaft, in which the drive motor is secured in a structure.
Said linear drive has two moveable carriages and conveys the pieces in the press only on a horizontal plane.

Disclosure of the Invention

The object of the invention is a feeder of different sized metal workpieces in a forming press, where the press plain is horizontal and is located at a given distance from the floor, having the feeder to lift the pieces to the press plain and then, move them toward the corresponding die, as it is defined in claim 1.

The feeder according to the invention has the advantage that it incorporates an only carriage, which lifts the workpiece holder to the level of the press plain, and so saving in the economic cost of the feeder. The carriage incorporates the feed drive so as to provide a compact construction taking up a small space inside the press frame. The sole carriage, of an elongated design in the direction orthogonal to the travel direction of the workpieces, and the reduced weight of the feeder components make it possible to cut the cost of the motor and the lifting carriage drive mechanism, the drive for the holder feed motion and the mechanism for opening and closing the piece holder tool. The last two components are constructed independently so that the feed drive does not have to move the tool opening/closing mechanism, which is located adjacent to the single carriage so as not to take up additional space in the press, but supported by a beam of the press.

The feeder uses a single motor for the motion of the piece holder, the motor weight borne by the carriage is less than fifteen per cent of the total carriage weight, and the carriage is driven by a lifting device fixed on the press structure.

Description of the drawings

FIG. 1 is a side elevation of the workpiece feeder according to the invention.

FIG. 2 is a plan view of the workpiece feeder in Figure 1.

Detailed description of the invention

With reference to figures 1 and 2 showing the preferred embodiment of the invention, the feeder 1 of the pieces P is supported by the support beam 2, which is held on the lateral columns 3 of the press, and transfers the workpieces P to the press plain 7 where the dies are located.

The feeder 1 comprises the lifting mechanism 4 driven by the motor 4', the carriage 6 raised by the mechanism 4 in the direction Z to the level of the die matrix on the plain 7 of the press, the workpiece holder 14 in the form of a horizontal frame where the pieces p are attached, the drive 9 supported on the carriage 6 for the movement of the holding bars 14 in the feed direction X of the pieces P, and the mechanism 17 to open/close the workpiece holder bar 14.

The support beam 2 is attached at a height greater than the press plain 7, and the device 4 and its motor 4' lift the carriage 6 in direction Z after picking up a piece P formed in a die, feeding it forward and down to place it in the following die, with which the piece holding bars 14 are also lifted. The lifting device 4 has a shaft 20 with two gears 21 secured to it which drive the racks 22 attached to the vertical side 6a of the carriage.

The workpiece holder comprises two bars 14 arranged parallel in direction X to form a horizontal frame where the pieces P are each secured by two pairs of pincers 16. The bars 14 close or open the separation between them in direction Y according to the size of the pieces P transferred to the press.

The carriage 6 is elongated in direction Y and is L-shaped in cross-section. The drive 9 for advancing the holding bars 14 is supported on the carriage 6, and comprises the feed motor 9', the rotary shaft 11 transmitting the feed, the two gear drive wheels 12 attached to the ends of the shaft 11, and the two transmission belts 13 moving the holding bars in direction X. Said transmission belts 13 are open and are coupled to each holding bar 14 by a pair of two-way rotary rollers. Each end 23 of the belt 13 is fixed to the associated bar 14 on each side of the carriage 6.

The workpiece holder 14 is coupled to the carriage 6 by two members 10 extended under the side 6b of the carriage in direction X, one on each bar 14. The mechanism 17 for opening/closing the frame of the holding bars 14 is supported on beam 2, and comprises the motor 17' and the closed transmission belt 19 which runs in both directions of axis Y between the two bars 14. Each coupling member 10 has two guided skids 24 under the side 6b of the carriage, which slide in direction

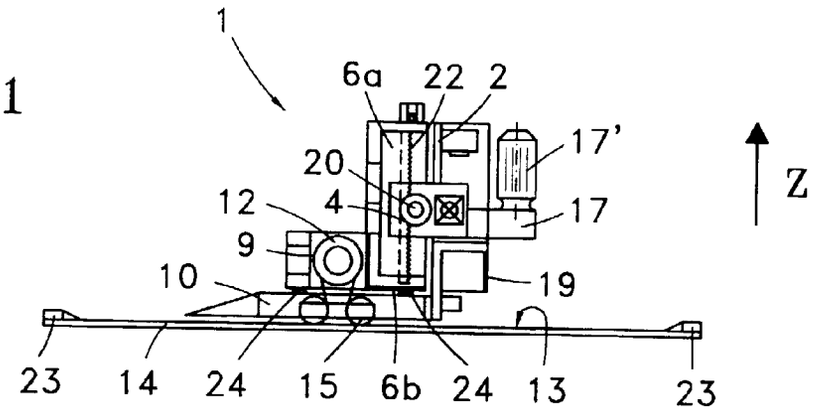
Y guided under the carriage 6, moving the bars 14 for their opening/closing.

Claims

1. A workpiece feeder for a press, being supported on the structure (2,3) of the press, wherein the transfer directions for the pieces (P) are "Z" and "X", comprising a workpiece holder (14, 16) arranged on a horizontal plane XY parallel to the press plain (7), and being extensible in direction "Y" to grip the different sized pieces (P), a mechanism (17) to open and close the workpiece holder (14, 16), a drive (9) provided with a motor (9') to feed the pieces (P) in the advancing direction "X", a mobile carriage (6) cooperating to lift the workpiece holder (14, 16) in the vertical direction "Z", and driven by a lifting device (4) and its motor (4'), characterised in that said mobile carriage (6) being the sole carriage of the workpiece feeder (1), raises the workpiece holder (14, 16), the lifting device (4) is secured to the structure (2, 3) of the press, the drive (9) to feed the pieces (p) is incorporated into the carriage (6), and the workpiece holder (14,16) is coupled to the carriage (6) by at least one intermediate member (10), which is driven in said direction "Y" by a motorized mechanism (17) supported on a beam (2) of the press structure.

2. The feeder of claim 1, wherein the elevator carriage (6) is elongated in direction "Y", and the workpiece holder (14, 16) is formed by two bars (14) securing the pieces (p) spaced and parallel transversally under the two ends of the elevator carriage (6), and each bar (14) individually moved by the feeding drive (9) through a respective open transmission belt (13) and two pairs of rollers (16).

FIG. 1


1
6a
22
2
17'
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4
17
12
9
10
19
Z
23
14
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6b
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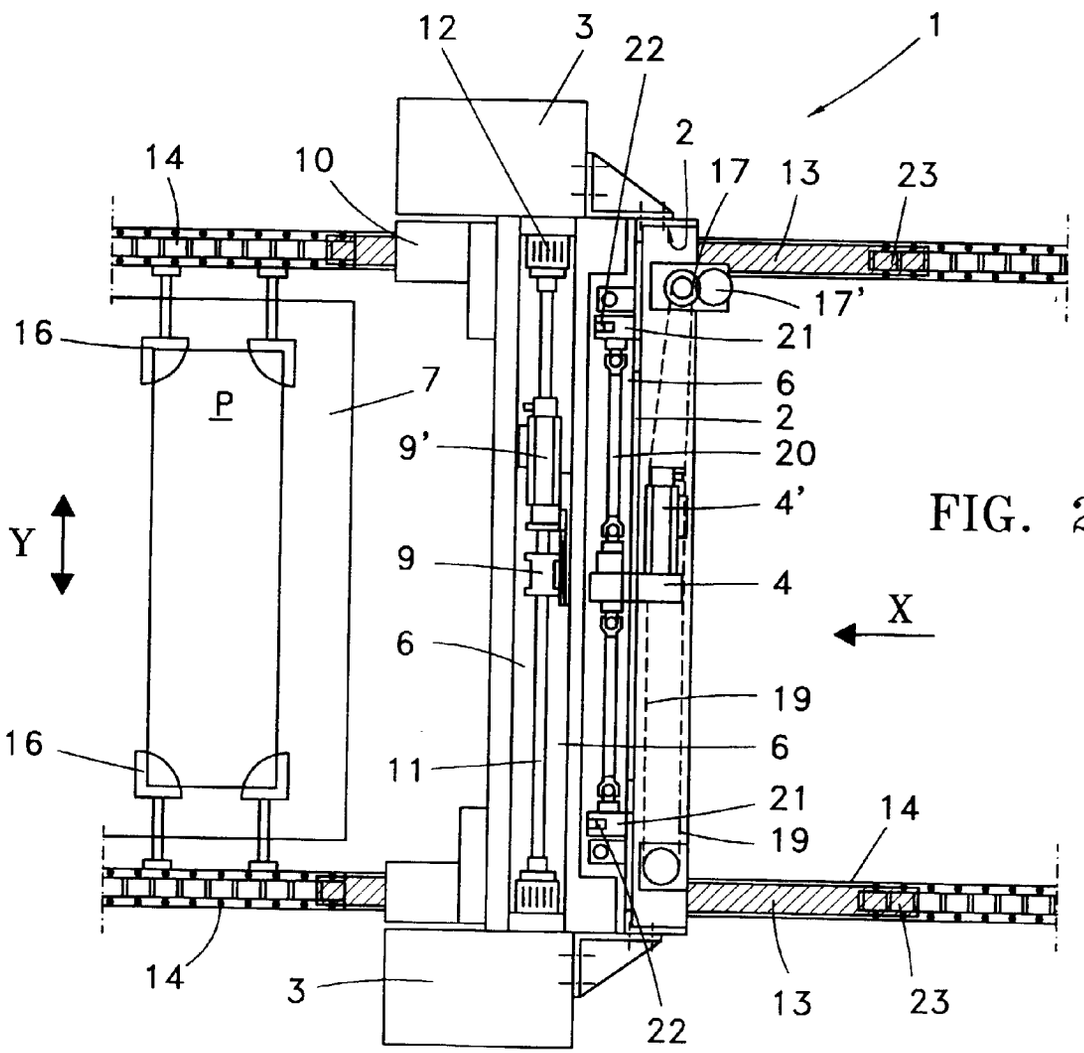
13
23


12
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14
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17'
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6
P
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Y
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X
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16
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FIG. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 50 0075

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	DE 32 33 428 C (MASCHINENFABRIK MUELLER WEINGARTEN) 1 June 1983 * column 2, line 13 - line 58; figures 1,2 * ---	1	B21D43/10
Y	GB 949 682 A (B. SCHLATTERER) * page 3, line 75 - page 4, line 7 * ---	1	
A	GB 2 118 129 A (AIDA ENG LTD) 26 October 1983 * abstract; figure 1 * ---	1	
A	GB 937 835 A (SOCIETE ANONYME DES USINES CHAUSSON) * claim 1; figures 1,2 * ---	1	
A	GB 2 006 077 A (SCHULER GMBH L) 2 May 1979 * abstract * ---	1	
A	FR 2 169 417 A (NORDA SPA) 7 September 1973 * claim 1 * ---	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
D,A	& GB 1 415 379 A ---		B21D
D,A	DE 42 00 923 A (STROTHMANN WILFRIED) 6 August 1992 * claim 1 * -----	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	20 August 1998	Korth, C-F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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