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(54) PUNCHING MACHINE FOR SHEET METAL STRIP

STANZMASCHINE FÜR EIN METALLBLECH

POINCONNEUSE POUR BANDE DE TOLE

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Description

[0001] This invention relates to a punching machine for sheet metal strip.

[0002] Punching machines in metal strip processing lines are known. They generally comprise punching heads, the tools (punches) of which are driven, in accordance with the predetermined operative cycle, by hydraulic cylinders applied to the head itself and acting on the metal strip to be processed, which advances between said punches and the respective dies.

[0003] The strip is advanced by a feed device controlled by a central control unit, as are the punch operating cylinders.

[0004] The punch heads consist essentially of a thick metal plate which is disposed vertically and cut to ring shape to display a horizontal slot for passage of the strip to be processed.

[0005] The punches and the respective operating cylinders are applied to one or both the sides of the upper part of this ring-shaped plate, the dies being applied to the lower part.

[0006] A drawback of these heads is a substantial cost due to the operating cylinders, the number of which corresponds to the number of punches used, as stated.

[0007] To eliminate this drawback, it has already been proposed to use heads comprising a loader for a plurality of punches positioned below a single cylinder provided with a piston rod with a rotary selector.

[0008] These heads have however the drawback of poor versatility as the number of punches usable is limited.

[0009] An object of the invention is to eliminate this drawback by providing a punching machine having high versatility while using only a small number of processing means.

[0010] This and other objects which will be apparent from the ensuing description are attained according to the invention by a punching machine for metal strip as described in claim 1.

[0011] The principle of invention is described in detail hereinafter with reference to the accompanying drawing showing a cross-section through a punching machine according to an embodiment of the invention.

[0012] As can be seen from the drawing, the punching machine according to a preferred embodiment of the invention comprises substantially a bed 2 for a carriage 4 provided with slide blocks 6 for its sliding along guides 8 disposed transversely to the bed.

[0013] To the carriage, which is also guided along a bar 10 rigid with the base walls, there is fixed a female screw 12 engaged by a screw 14 rotated by an electric motor 16 applied to the bed,

[0014] The carriage also presents a horizontal slot 18 faced by two C-shaped thick vertical metal plates 20, 20', with their cavities facing each other.

[0015] Each plate 20, 20' is rigid with a horizontal plate 22 rigid with the piston rod 24 of a hydraulic cylinder-piston unit 26 mounted on the carriage.

[0016] To the upper side of each vertical plate 20, 20' there is applied a loader 28 carrying punches 30 which are faced by corresponding dies 32 provided on the lower side of the plate.

[0017] The piston rod 34 of a rotary selector cylinder 36 rigid with the carriage acts selectively on the heads of said punches.

[0018] A control unit (not shown in the drawing) for controlling the advancement and movement of the strip, of the carriage 2 and of the plates 20, 20' and for controlling the operation of the cylinder 36 is associated with the machine.

[0019] The punching machine operates in the following manner:

the sheet metal strip unwound from a reel and advanced by drive rollers is inserted through the slot 18 in the carriage and the slot in the vertical plates 20, 20'. The carriage is moved transversely on the basis of the punching program, driven by the engagement between the screw 12 and the corresponding female screw 14 such as to position both the loader 28 carrying the punches 30, and the dies 32 to be activated, exactly in correspondence with that strip region in which punching is to be effected. The synchronized action between the drive rollers, the members controlling the strip advancement and the activation of the unit ensures that the punching process is correctly effected.

[0020] In the case of large-width strips not only is the carriage 4 moved transversely to the bed 2 but, by using the hydraulic cylinder-piston units 26, the plates 20, 20' are moved relative to the carriage, such that the loader 28 of one plate 20 or of the other plate 20' is positioned below the cylinder 36.

[0021] During processing; while the punches of one of the plates are under operation by the cylinder, it is also possible to move the other plate by using the hydraulic cylinder-piston unit 26, in such a manner as to be able to replace the loader with another carrying different punches.

Claims

1. A punching machine for metal strip **characterised by** comprising:

   - a carriage (4) movable transversely to the longitudinal axis of the machine and provided with a horizontal slot (18) through which the strip (38) to be processed passes,
   - a vertical plate (20, 20') provided with a horizontal slot through which the strip to be processed passes, on the upper side of said plate there being provided at least two loaders (28)

carrying punches (30) faced by corresponding dies (32) provided on the lower side of said plate,
- means (24, 26) for moving said plate relative to said carriage,
- a multiple selector actuator (34, 36) rigid with the carriage (4),
- a control unit for controlling the movements of said strip, of said carriage and of said plate; and for controlling the operation of said actuator.

2. A machine as claimed in claim 1, **characterised in that** said vertical plate is formed in two parts, each of which is C-shaped with their cavities facing each other.

3. A machine as claimed in claim 1, **characterised in that** the means for moving said plate consist of hydraulic cylinder-piston units.

Patentansprüche

1. Stanzmaschine für ein Metallband, **dadurch gekennzeichnet, dass** sie umfasst:

- einen Schlitten (4), der quer zur Längsachse der Maschine bewegbar und mit einem horizontalen Schlitz (18) versehen ist, durch welchen das zu verarbeitende Band (38) hindurchgeht,
- eine vertikale Platte (20, 20'), die mit einem horizontalen Schlitz versehen ist, durch welchen das zu verarbeitende Band hindurchgeht, wobei auf der Oberseite der Platte mindestens zwei Zuführungsvorrichtungen (28) vorgesehen sind, die Stanzen (30) tragen, welche entsprechenden Formen (32) zugewandt sind, die auf der Unterseite der Platte vorgesehen sind,
- eine Einrichtung (24, 26) zum Bewegen der Platte relativ zum Schlitten,
- eine Mehrfach-Auswahlbetätigungseinrichtung (34, 36), die starr mit dem Schlitten (4) vorgesehen ist,
- eine Steuerungs- bzw. Regelungseinheit zum Steuern bzw. Regeln der Bewegung des Bandes, des Schlittens und der Platte; und zum Steuern bzw. Regeln des Betriebs der Betätigungseinrichtung.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die vertikale Platte in zwei Teilen ausgebildet ist, von denen jeder C-förmig ist, wobei ihre Ausnehmungen einander zugewandt sind.

3. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung zum Bewegen der Platte aus hydraulischen Kolben/Zylindereinheiten besteht.

Revendications

1. Machine poinçonneuse pour bande de tôle, **caractérisée en ce qu'**elle comprend :

- un chariot (4) mobile transversalement à l'axe longitudinal de la machine et muni d'une fente horizontale (18) à travers laquelle la bande (38) à traiter passe,
- un plateau vertical (20, 20') muni d'une fente horizontale à travers laquelle la bande à traiter passe, sur le côté supérieur dudit plateau étant prévus au moins deux chargeurs (28) portant des poinçons (30) faisant face à des matrices correspondantes (32) prévues sur le côté inférieur dudit plateau,
- des moyens (24, 26) pour déplacer ledit plateau par rapport audit chariot,
- un actionneur sélecteur multiple (34, 36) solidaire du chariot (4),
- une unité de commande pour commander les déplacements de ladite bande, dudit chariot et dudit plateau et pour commander le fonctionnement dudit actionneur.

2. Machine comme revendiquée dans la revendication 1, **caractérisée en ce que** ledit plateau vertical est formé de deux parties, ayant chacune une forme en C avec leurs cavités se faisant face l'une à l'autre.

3. Machine comme revendiquée dans la revendication 1, **caractérisée en ce que** les moyens pour déplacer ledit plateau consistent en des unités hydrauliques à piston-cylindre.

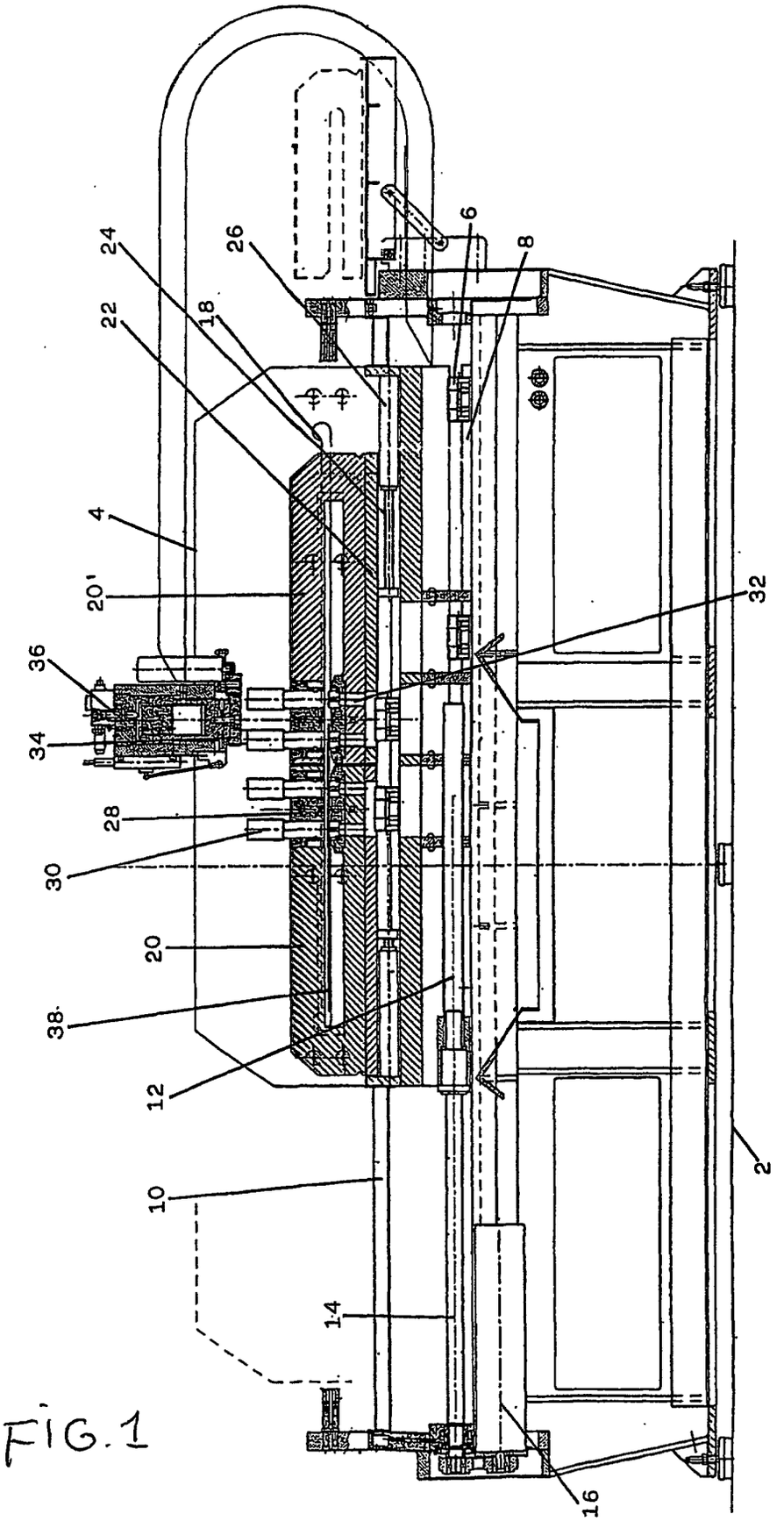

FIG.1