

[54] PUNCHING MACHINE-TOOLS

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[58] Field of Search 83/639; 100/269 R; 91/411 B

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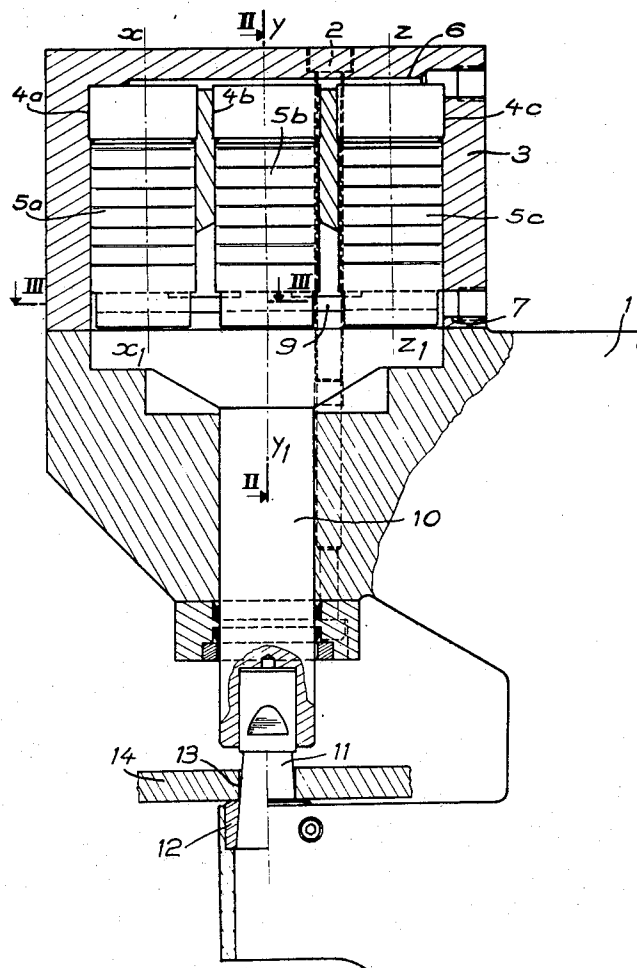
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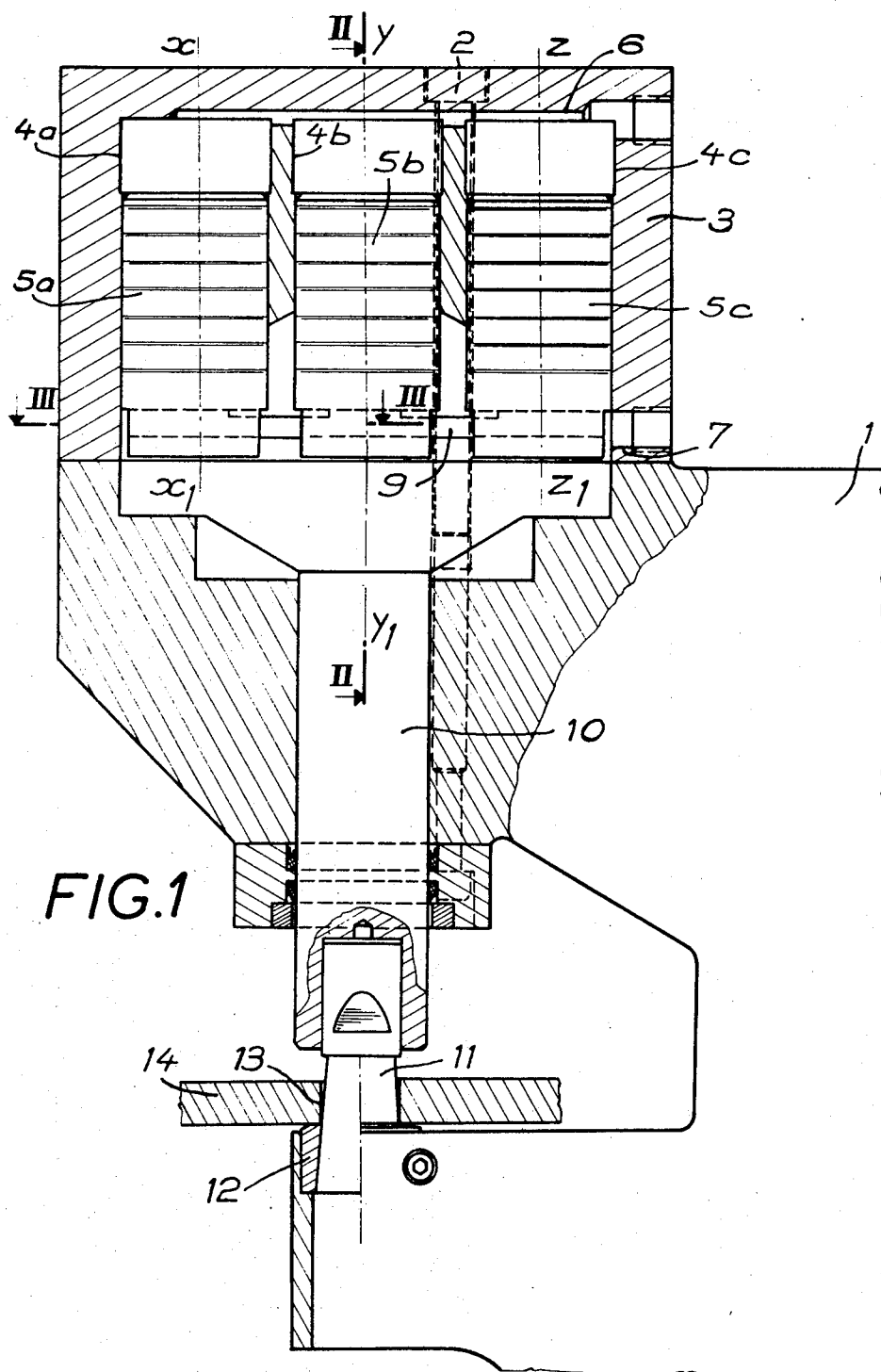
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[57] ABSTRACT

This invention relates to an improvement in punching machine tools comprising a frame in which is mounted a slide carrying at one of its ends a punching tool and connected at its other end to hydraulic control means, wherein a plurality of small diameter hydraulic cylinders are mounted on the frame of the machine which has a relatively small front width, in which cylinders pistons unitary with the slide are slidably mounted, said cylinders having their axes located in the same plane extending along the largest dimension of the frame.

2 Claims, 3 Drawing Figures





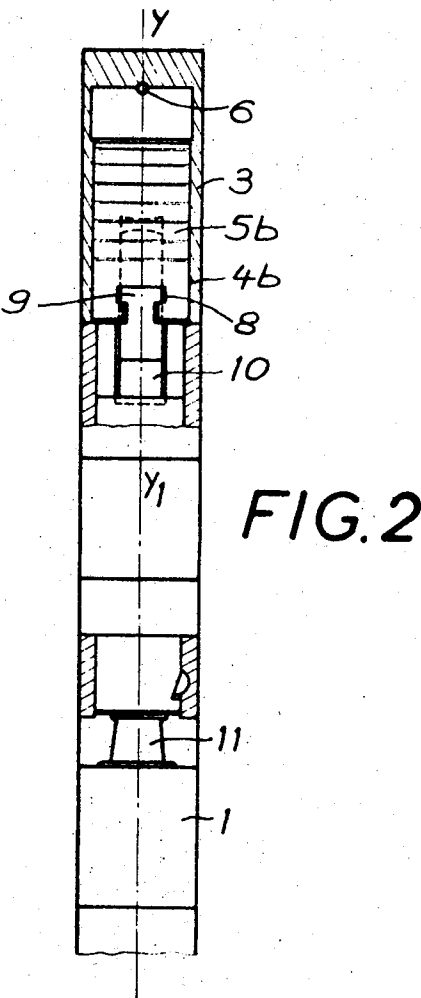


FIG. 2

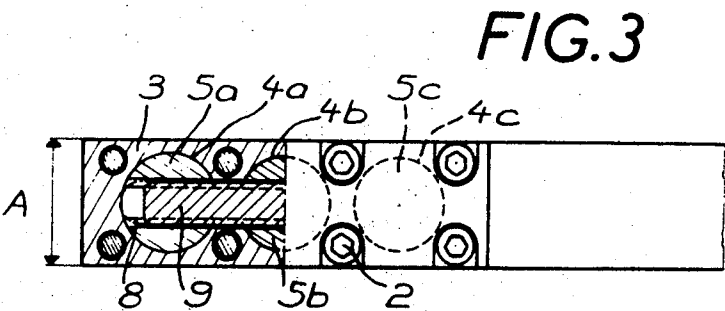


FIG. 3

PUNCHING MACHINE-TOOLS

The present invention relates to an improvement in punching machine-tools.

Machine tools are known which are used in particular in metal construction yards for punching holes in the metal sheets and sections, so that said latter may be assembled together by means of bolts or rivets.

In certain cases, it may be advantageous to make holes with a much reduced distance therebetween, by means of a plurality of coupled machines.

However, in order to carry out these punching operations, it is necessary to have a sufficient force of pressure and consequently a hydraulic cylinder with a large cross section.

This results in a relatively large bulk and a front width of the machine which determines a relatively wide distance between the tools of two adjacent machines. As indicated above, it is important for certain operations to carry out punching operations with much reduced distances.

In accordance with the present invention, a plurality of small diameter hydraulic cylinders are mounted on the frame of the machine which has a relatively small front width, in which cylinders pistons unitary with the slide are mounted to slide, said cylinders having their axes located in the same plane extending along the largest dimension of the frame.

In this way, there is a sufficient pressure surface of the pistons on the tool and it is possible to reduce the front bulk of the machine, by using a plurality of small section hydraulic cylinders arranged in line, these replacing a single large section cylinder.

The invention will be described in greater detail with reference to the accompanying drawings; in which:

FIG. 1 is a side elevational view in partial section of a punching machine-tool according to the invention.

FIG. 2 is a front elevational view and in partial section along line II-II of FIG. 1.

FIG. 3 is a plan view and in partial section along III-III of FIG. 1 of the machine.

Referring now to the drawings, a machine is shown for punching metal sheets or sections, which comprises a frame 1 whose front width A is relatively small. There is fixed to the upper part of the frame 1, by means of screws 2, a unit 3 comprising three cylinders 4a, 4b, 4c in which three pistons 5a, 5b, 5c are respectively mounted to slide, said pistons being subjected on their two end faces to the action of a hydraulic pressurized fluid which is brought into the cylinders 4a, 4b, 4c through two conduits 6 and 7 which extend into the

upper and lower parts of the three cylinders.

The pistons 5a, 5b, 5c have in their lower part a groove 8 in the form of a T in which is engaged a rib 9 of corresponding shape provided in the upper part of a slide 10 mounted to slide in the frame 1.

In its lower part, the slide 10 carries a punch 11 which cooperates with a die 12 fixed to the frame 1 for punching holes 13 in a metal sheet 14.

In accordance with the invention, the cylinders 4a, 4b, 4c and their respective pistons 5a, 5b, 5c are located in line and their axes x, xl, y, yl, and z, zl are located in the same plane which extends along the largest dimension of the frame 1.

This arrangement makes it possible to use a plurality of small diameter cylindrical cylinders 4a, 4b, 4c whose total section is equivalent to a single large diameter cylinder and it is thus possible to obtain a front width A of the machine which is as small as possible. In this way, it is possible to connect a plurality of machines together in order in particular to make holes in a metal sheet which are separated only by a short distance. By selectively directing hydraulic fluid under pressure through conduits 6 or 7 into the cylinders 4a, 4b, 4c, it is possible to act selectively or not on the three pistons 5a, 5b, 5c in order to lower or raise said latter and to drive the punch 11 by the slide 10 which is unitary with said pistons.

What is claimed is:

1. An improvement in hydraulic punching machine-tools comprising a frame in which is mounted a slide carrying at one of its ends a punching tool and connected at its other end to hydraulic control means, wherein a plurality of small diameter hydraulic cylinders are mounted on the frame of the machine which has a relatively small front width, in which cylinders pistons unitary with the slide, are slidably mounted, said cylinders having their axes located in the same plane extending along the largest dimension of the frame and said slide having in its upper part a T-rib which is engaged in a corresponding groove provided at one of the ends of said pistons, whereby hydraulic fluid from the hydraulic control means acts on the pistons so as to drive the punch by means of the slide and then return the punch by reduction in the fluid pressure.

2. Improvement in punching machine-tools as defined in claim 1, wherein the hydraulic cylinders are bored in a unit fixed to the frame and are fed with hydraulic fluid under pressure at their ends through two conduits in communication with all the cylinders.

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