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Gilev et al.

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[54] CHARGING DEVICE FOR AUTOMATIC PUNCH-PRESSES

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[52] **U.S. Cl.** .....**271/62 R**

[51] **Int. Cl.** **B65h 1/00**

[58] **Field of Search** .....271/62 R, 62 A, 88

[56] **References Cited**

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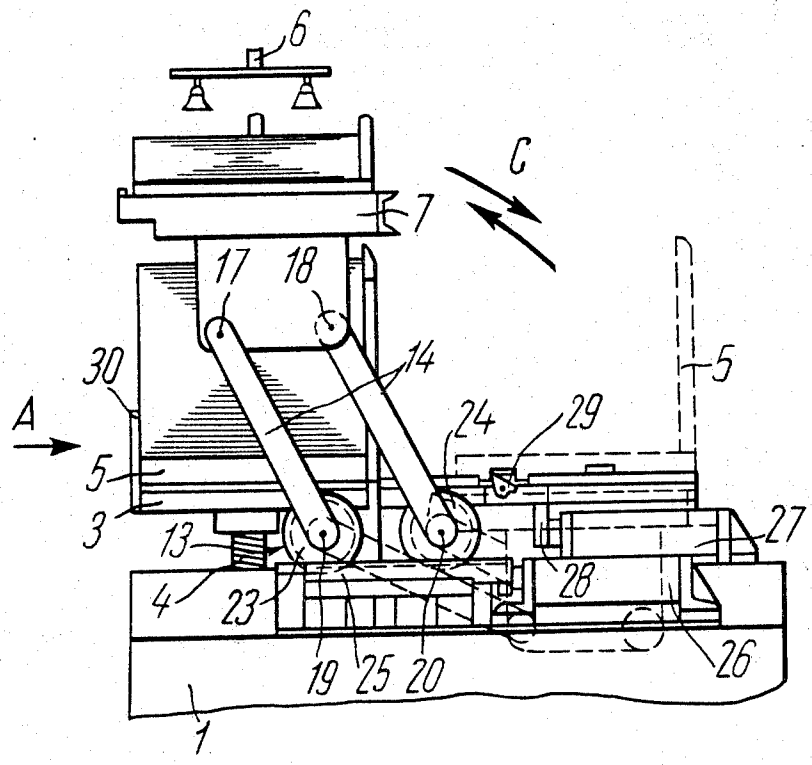
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Assistant Examiner—Hodd Lane
Attorney—Eric H. Waters et al.

[57] **ABSTRACT**

A charging device for automatic punch presses comprises an immovable platform, a lifting table accommodating thereon a cassette with sheet material, said cassette being lifted while the sheets are fed to the zone of stamping, and a bracket-shaped frame displaceable along an arc in a vertical plane and serving to displace the emptied cassette downwards onto the immovable platform. Arranged from the inside on the sides of the frame are retainers intended for holding the lifted cassette after lowering the lifting table.

3 Claims, 7 Drawing Figures



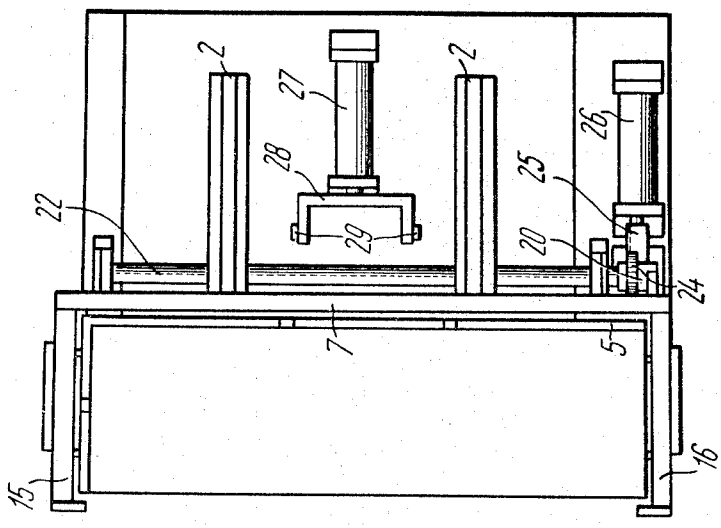

2
2
27
28
29
22
25
26
20
24
7
5
15
16

FIG. 2

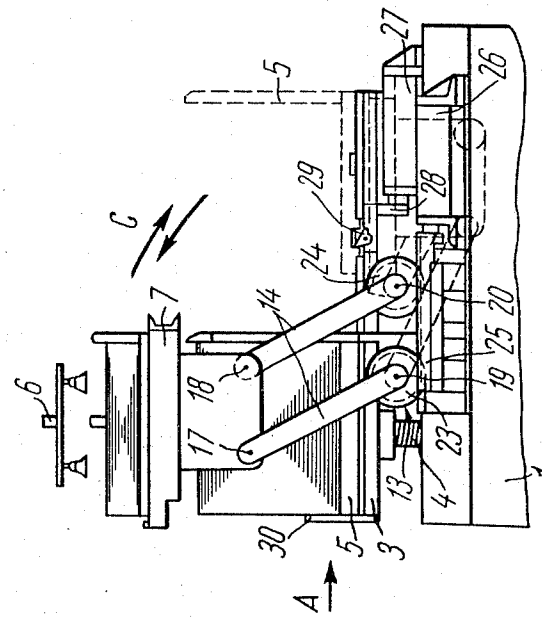

5
27
26
29
28
C
24
14
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6
18
19
17
23
13
4
1
30
5
3
A

FIG. 1

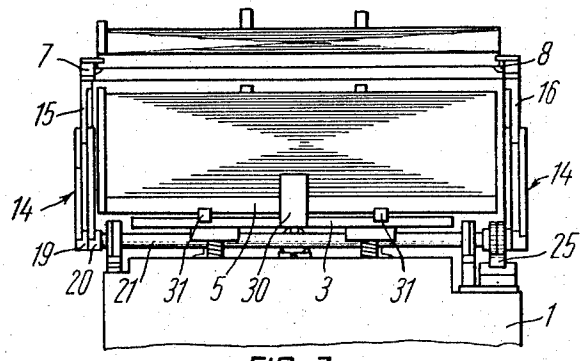


FIG. 3

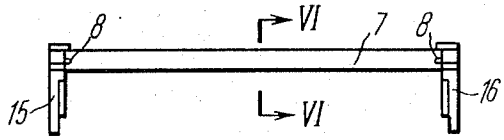


FIG. 5

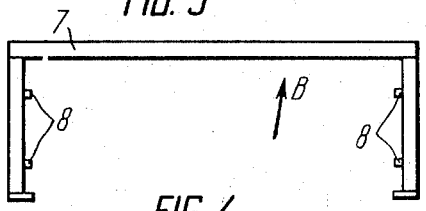


FIG. 4

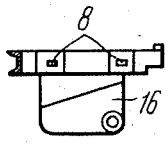


FIG. 6

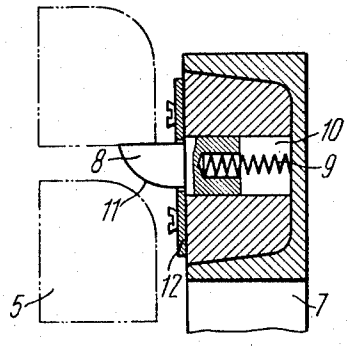


FIG. 7

CHARGING DEVICE FOR AUTOMATIC PUNCH-PRESSES

The present invention relates to charging devices employed to feed sheets to automatic punch presses and can be used in various branches of industry in connection with processing sheet materials, for example, in electrotechnical manufacture when stamping sheets of magnetic circuits of electrical machines.

At present, widely known in the art are charging devices for automatic punch presses, comprising on a bedplate an immovable platform and a lifting table accommodating a cassette with sheet material, said cassette being lifted while the sheets are fed to the zone of stamping.

The sheets are fed to the zone of stamping with the aid of conventional vacuum-operated or electromagnetic means which effect the separation of the top sheet from a stack of sheets in the cassette lifted by the lifting table and the feed of the separated sheet to the zone of stamping.

However, in such known charging devices the need for replacing an emptied cassette by a sheet-filled one brings about unproductive losses of time, for, in order to lift a subsequent cassette to the mechanism effecting the by-the-piece feed of the sheets to the zone of stamping after the sheets from the preceding cassette have been used up, it is necessary to lower the lifting table to the initial position, to remove the emptied cassette from the table and to shift the subsequent sheet-filled cassette from the immovable platform to the lifting table.

All this involves stopping the automatic press, in contrary to the basic requirements placed upon automatic presses designed to operate under automatic duty.

It is an object of the present invention to develop a charging device for use in automatic punch presses that would provide for a continuous supply of cassettes with sheet material to the mechanism used for by-the-piece delivery of sheets to the zone of stamping.

In accordance with said and other objects of the invention, a charging device for automatic punch presses, comprising on a bedplate an immovable platform and a lifting table accommodating thereon a cassette filled with sheet material and lifted while the sheets are fed to the zone of stamping, according to the present invention, is provided with a bracket-shaped frame displaceable along an arc in a vertical plane, having catches arranged from the inside on the sides of the frame to hold the lifted cassette after lowering the lifting table, and serving to displace the emptied cassette downwards onto the immovable platform.

Therefore, thanks to the provision of the charging device of the present invention with a bracket-shaped frame, the lifting table can be lowered before the cassette lifted by the table is emptied, and a subsequent cassette filled with sheets can be arranged on the table, while the displacement of the frame along an arc in a vertical plane makes it possible to automatically remove the emptied cassette and to arrange it on the immovable platform concurrently with the supply by the lifting table of the subsequent cassette to the zone of operation of the mechanism adapted for the by-the-piece delivery of sheets to the zone of stamping.

It is expedient that the displacement of the bracket-shaped frame be effected by means of a rack-and-pinion mechanism secured on the bedplate and connected through articulated parallelograms with the opposite sides of the frame, two neighboring apexes of each parallelogram being articulated on said frame while the other two apexes are connected with toothed wheels of said rack-and-pinion mechanism whose rack is connected with a drive imparting reciprocating motion to said rack.

The retainers arranged from the inside on the sides of the frame and used to hold the lifted cassette after lowering the lifting table may be fashioned as sinking spring-biased pins, each provided on the side facing the lifting table with a chamfer instrumental in sinking the pin under the effect of a cassette being lifted.

Therefore, the charging device according to the present invention for use in automatic punch presses provides, owing to the presence of a bracket-shaped frame displaceable along an arc in a vertical plane, for a continuous supply of cassettes with sheet material to the mechanism used for by-the-piece delivery of the sheets to the zone of stamping and, thereby, ensures the continuous operation of the automatic press.

The present invention is made apparent by the following detailed description of a specific embodiment of a charging device for use in automatic punch presses, with due reference to the accompanying drawings in which:

FIG. 1 is a general view of a charging device according to the present invention;

FIG. 2 is a general plan view;

FIG. 3 is a view along arrow A of FIG. 1;

FIG. 4 is a plan view of the bracket-shaped frame with retainers;

FIG. 5 is a view along arrow B of FIG. 4;

FIG. 6 is a section through VI—VI of FIG. 5;

FIG. 7 illustrates retainers made as spring-biased pins.

Referring now to FIGS. 1 and 2 of the drawings, the charging device according to the present invention for use in automatic punch presses has bedplate 1 mounting an immovable platform in the form of two guides 2 and lifting table 3 installed on screw jack 4. On table 3 is placed cassette 5 with sheet material which is lifted by table 3 to mechanism 6 adapted to effect the separation of the top sheet from a stack of sheets in cassette 5 and to feed said sheet to the zone of stamping. Used as mechanisms 6 are well-known vacuum-operated or electromagnetic mechanisms designed for the purpose.

Arranged above lifting table 3 is bracket-shaped frame 7 displaceable along an arc in a vertical plane to place the emptied cassette on the immovable platform. Provided from the inside on the sides of the bracket-shaped frame 7 are retainers 8 (FIGS. 4 to 6) serving to hold the lifted cassette 5 after lowering lifting table 3.

The retainers 8 are made in the form of pins biased with spring 9 (FIG. 7), each of said pins being arranged in a channel 10 in frame 7 and having a rectangular cross-section. Each retainer 8 is provided on its side facing lifting table 3 with chamfer 11. Due to the arrangement of retainer 8 in channel 10 and to the provision of chamfer 11, retainers 8 can be sunk in channels 10 by means of cassette 5 being lifted. The withdrawal of retainer 8 from channel 10 by means of spring 9 is limited by gib 12 secured on inside of frame 7.

The displacement of bracket-shaped frame 7 (FIG. 1) along an arc in a vertical plane (the direction of the frame movement is shown in FIG. 1 by arrows C) is effected by means of rack-and-pinion mechanism 13 secured on the bed-plate 1. The mechanism 13 is connected through the intermediary of articulated parallelograms 14 with the opposite sides 15 and 16 (FIG. 2) of the frame 7. Two neighboring apexes 17 and 18 (FIG. 1) of parallelogram 14 are articulated on sides 15 and 16 (FIG. 3) of frame 7, while two other apexes, 19 and 20 (FIG. 1), are connected by means of shafts 21 (FIG. 3) and 22 (FIG. 2) with toothed wheels 23 and 24 (FIG. 1) of the rack-and-pinion mechanism 13.

Rack 25 of the toothed-rack mechanism 13 is connected with drive 26 imparting reciprocating motion to said rack 25.

For displacement cassette 5 from the immovable platform to the lifting table, on bedplate 1 there is mounted hydraulic drive 27 which, with the aid of yoke 28 (FIG. 2) provided with a ratchet gear 29, serves to displace cassette 5 onto lifting table 3 until thrust against rest 3 (FIG. 3).

For effecting a directional displacement of cassette 5 along lifting table 3, on the surface of the latter provision is made of guides 31.

The charging device in accordance with the present invention operates in the following manner.

Cassette 5 filled with sheet material is installed in guides 2 (FIG. 1) of the immovable platform and, with the aid of yoke 28 imparted reciprocating motion from drive 27, full cassette 5 is moved from the immovable platform onto lowered lifting table 3.

When so doing, bracket-shaped frame 7 is placed above lifting table 3.

Lifting table 3 with the cassette 5 displaces upwards to place the cassette under mechanism 6. As the sheets are separated from the stack and fed to the zone of stamping by means of mechanism 6, the lifting table 3 acts to lift the cassette so that the top sheet in the cassette be always at the level of operation of mechanism 6. At the same time, cassette 5 enters gradually the space defined by frame 7. The side surfaces of cassette 5 rest against the chamfers 11 (FIG. 7) of the retainers 8 to sink the latter in channels 10 of frame 7. As soon as cassette 5 with the remaining sheets is lifted by table 3 somewhat above the level of retainers 8, the latter extend from channels 10 under the effect of spring 9. The lifting table is lowered, while cassette 5 is held by retainers 8 of frame 7. As soon as lifting table 3 assumes the initial position, the subsequent cassette filled with sheets and prearranged on the immovable platform is fed onto said table with the aid of yoke (FIG. 1).

When mechanism 6 extracts the last sheet from cassette 5, there operates the drive 26 of displacement of frame 7. The displacement of rack 25 causes a turn of the toothed wheels 23 and 24 connected with parallelograms 14. The latter act to displace frame 7 together with emptied cassette 5 along an arc in a vertical plane.

When so doing, emptied cassette 5 stays in guides 2 of the immovable platform, while frame 7 passes somewhat below the platform (the position of frame 7 is shown in FIG. 1 with a broken line).

At this moment, emptied cassette 5 is removed from the platform, after which frame 7 returns to the initial position above lifting table 3 which is then lifting a subsequent cassette towards mechanism 6.

We claim:

1. A charging device for automatic punch presses, comprising: a bedplate; an immovable platform mounted on said bedplate; a lifting table mounted on said bedplate close to said immovable platform; a cassette for sheet material, mounted on said lifting table and adapted to be lifted by the latter while the sheets are removed from the cassette and fed to the zone of stamping; a bracket-shaped frame arranged above said lifting table and intended to displace said cassette, when emptied, downwards onto said immovable platform; retainers provided from the inside on the sides of said bracket-shaped frame and adapted to hold said cassette after the lowering of said lifting table; a mechanism intended to displace said bracket-shaped frame along an arc in a vertical plane and mounted on said bedplate; and a mechanism adapted to separate the sheets and feed them into the zone of stamping, mounted above said lifting table.

2. A charging device of claim 1, wherein the mechanism adapted to displace the bracket-shaped frame along an arc in a vertical plane is essentially a rack-and-pinion mechanism connected via articulated parallelograms with opposite sides of the frame, two neighboring apexes of each parallelogram being articulated on said frame while the other two apexes are connected with toothed wheels of said rack-and-pinion mechanism whose rack is connected with a drive adapted to impart reciprocation to said rack.

3. A charging device of claim 1, wherein the catches are fashioned as sinking spring-biased pins, each provided on the side facing the lifting table with a chamfer instrumental in sinking the pin under the effect of a cassette being lifted.

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