Jan. 4, 1949. M. L. GRAPPE 2,458,160

PUNCH MACHINE

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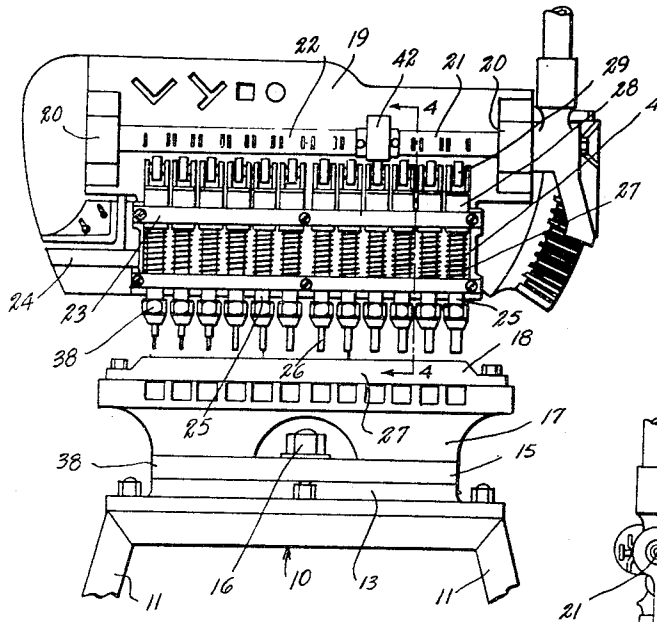


FIG. 1.

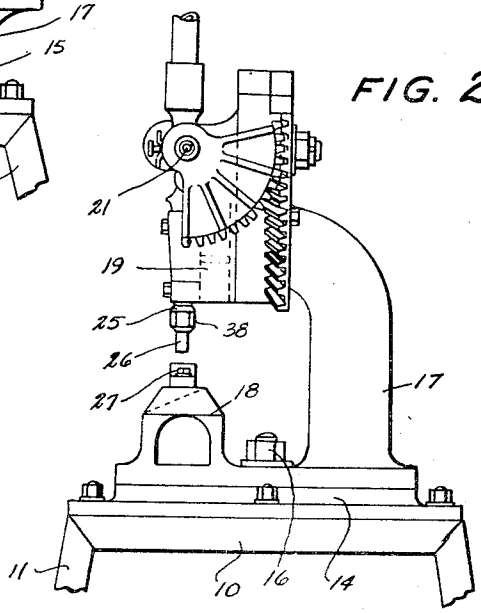


FIG. 2.

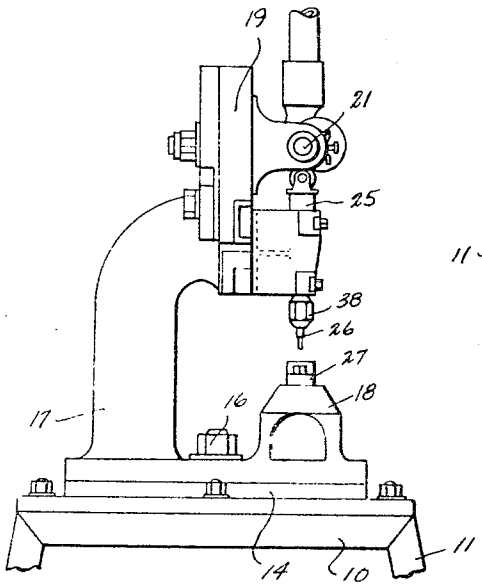


FIG. 3.

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FIG. 4.

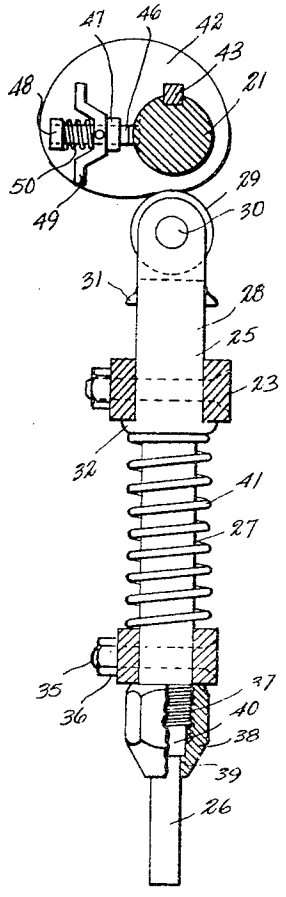
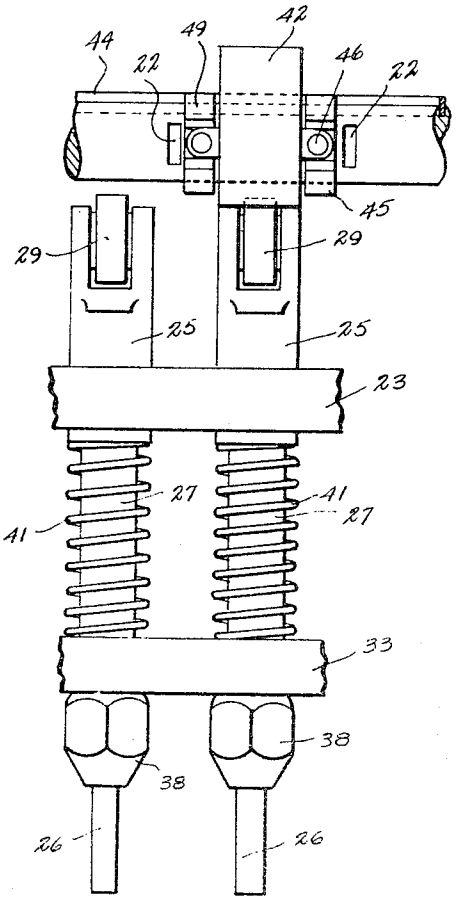


FIG. 5.



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PUNCH MACHINE

Marcellin L. Grappe, Fairlawn, N. J.

Application October 15, 1946, Serial No. 703,410

8 Claims. (Cl. 164—96)

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This invention relates to a punch machine, and more particularly to a combined hand or power-operated punch and shearing machine.

A primary object of this invention is the provision of a machine of this character wherein a plurality of punches can be selectively actuated for punching operations, and also varying shapes of metal materials can be sheared or cut in a single operation of the machine.

A further object of the invention is the provision of a machine of this character provided with a plurality of punches whereby punches of different sizes may be readily and easily substituted selectively.

An additional object of this machine is the provision of an improved means for mounting the punches and supporting pins therefor in the machine.

A further object is the provision of an improved means for facilitating the selective positioning of the punches in association with their various pins.

A more specific object of the invention is the provision of a cam selectively positionable on a shaft, together with improved catch means for holding the cam in a selected position in proper alignment with its associated punch pin.

This invention comprises an improvement, the particular improvement being set forth in the above objects, over my Patent No. 2,138,543, issued November 29, 1938.

Additional objects will in part be obvious and in part be pointed out as the description of the invention proceeds, and shown in the accompanying drawings, wherein there is disclosed a preferred embodiment of this inventive concept.

In the drawings:

Figure 1 is a side elevational view of one form of machine embodying features of the instant inventive concept.

Figure 2 is an end elevational view of the device of Figure 1, as viewed from the right hand side thereof.

Figure 3 is an end elevational view of the device of Figure 1, as viewed from the left hand side thereof.

Figure 4 is an enlarged sectional view taken substantially along the line 4—4 of Figure 1, as viewed in the direction indicated by the arrows.

Figure 5 is an enlarged front elevational view of certain details of construction, comprising substantially a front elevational view of the details disclosed in Figure 4.

Similar reference characters refer to similar

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parts throughout the several views of the drawings.

Referring to the drawings in detail, the machine constituting the present invention comprises a stand generally indicated at 10 having downwardly diverging supporting legs 11 and including a horizontally disposed top 13 on which is bolted or otherwise fixed a bed 14 of a circular form for a turntable 15, the latter being rotatably pivoted at 16 and constituting a base for a substantially V-shaped frame 17.

The frame 17 has a horizontally disposed bed 18 which opens in the direction of the front of the machine, and has formed therewith at the upper portion thereof and in overhanging relation to the bed 18 a vertically disposed flat plate-like head 19 carrying spaced bearings 20, in which is journaled a horizontal shaft 21 provided with a series of spaced slots 22 extending circumferentially, and aligned therealong.

Below the shaft 21 is a horizontally disposed punch rack 23 bracketed at 24 to the head 19. The rack 23 carries a cluster of vertically slidable punch carriers for punch pins 25 in the form of a plurality of plungers and having separably fitted therewith punches 26, which may be of different sizes with respect to each other, and which coact with a stationary perforated anvil or die 27 horizontally fixed on the bed 18 beneath the punches 26, and upon which rests the work to be punched. Perforations 28 are aligned for the accommodation of the punches 26 on actuation of the plungers 25 carrying the same, in a manner to be more fully described hereinafter.

One of the specific improvements in this invention over my previously mentioned Patent No. 2,138,543 comprises the construction of the punches 25. As best shown in Figures 4 and 5, each plunger comprises a tubular member 27 having a squared shank 28, the upper extremity of which is bifurcated and provided with a roller 29 carried by a pin 30. The squared shank is adapted to move in the frame 23, stops 31 and 32 being provided to limit the travel thereof. As is best seen in Figure 4, the frame 23 comprises spaced upper and lower pairs of flat plates, connected together, as by bolts 35 and nuts 36 positioned between the punches 27. The lower extremity of each plunger 25 is threaded, as at 37, and accommodates a nipple 38 having an interior recess forming a flange 39 to accommodate a head 40 of a punch 26. Thus, it will readily be seen that by simply unscrewing a nipple 38, the punch 26 may be readily interchanged as desired. A coil spring 41 surrounds each plunger

27 between the upper and lower frame members 23 in such manner as normally to bias the frame upwardly into engagement with a cam 42 slidably movable along the shaft 21.

The cam 42 is rotatable with shaft 21, being keyed thereto, as by a key 43 positioned in a longitudinally extending slot 44. As best shown in Figure 5, ears 45 extend outwardly from the sides of the cam 42 and have secured thereto pins 46 provided with collars 47 and heads 48.

Handle members comprising ears 49 surround and extend outwardly from each pin. A spring 50 is positioned between each head 48 and its associated handle 49, in such manner as to bias the pin inwardly with respect to the shaft 21, being adapted to engage in one of the slots 22 therein. Obviously, upon withdrawal of the handle member 49, it will be seen that the extremity 46 of the pin may be removed from its associated slot, and the cam member 42 slid longitudinally of the shaft 21 to position the same in juxtaposition with any one of rollers 29 carried by plungers 25.

It will thus be seen that any selected plunger and its associated punch may be moved by the machine as desired by a simple adjustment of the cam member, and further, that the punch members may be varied as to size and configuration with a minimum of effort and difficulty.

The shaft 39 may be rotated in any desired manner, either manually or by means of a power drive, and various other attachments, as for shearing metal, and as described in my previously mentioned Patent No. 2,138,543, may be provided as desired.

From the foregoing it will now be seen that there is herein provided a device which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. A machine of the character described comprising a frame having a bed, an upstanding head on said frame above the bed, a plunger rack comprising spaced pairs of stationary parallel bars above said head, plungers carried by said rack, a shaft rotatably mounted on said head above the plungers, an actuating eccentric slidably keyed to said shaft, means for rotating said shaft, said shaft having spaced aligned slotted apertures therein, and means carried by said cam selectively engageable in said slotted apertures for positioning said eccentric in operative relation to one of said plungers.

2. A machine of the character described comprising a frame having a bed, an upstanding head on said frame above the bed, a plunger rack comprising spaced pairs of stationary parallel bars above said head, plungers carried by said rack, a shaft rotatably mounted on said head above the plungers, an actuating eccentric slidably keyed to said shaft, means for rotating said shaft, said shaft having spaced aligned slotted apertures therein, and means carried by said cam selectively engageable in said slotted apertures for positioning said eccentric in operative relation to one of said plungers, said means including spring-pressed catch pins.

3. A machine of the character described comprising a frame having a bed, an upstanding head on said frame above the bed, a plunger rack comprising spaced pairs of stationary parallel bars above said head, plungers carried by said rack, a shaft rotatably mounted on said head above the plungers, an actuating eccentric slidably keyed to said shaft, means for rotating said shaft, said shaft having spaced aligned slotted apertures therein, and means carried by said cam selectively engageable in said slotted apertures for positioning said eccentric in operative relation to one of said plungers, said means including spring-pressed catch pins, and handle means for releasing said pins.

4. A machine of the character described comprising a frame having a bed, an upstanding head on said frame above the bed, a plunger rack comprising spaced pairs of stationary parallel bars above said head, plungers carried by said rack, a shaft rotatably mounted on said head above the plungers, an actuating eccentric slidably keyed to said shaft, means for rotating said shaft, said shaft having spaced aligned slotted apertures therein, and means carried by said cam selectively engageable in said slotted apertures for positioning said eccentric in operative relation to one of said plungers, said plunger including a squared guide section positioned for reciprocating movement between one of said spaced pairs of bars.

5. A machine of the character described comprising a frame having a bed, an upstanding head on said frame above the bed, a plunger rack comprising spaced pairs of stationary parallel bars above said head, plungers carried by said rack, a shaft rotatably mounted on said head above the plungers, an actuating eccentric slidably keyed to said shaft, means for rotating said shaft, said shaft having spaced aligned slotted apertures therein, and means carried by said cam selectively engageable in said slotted apertures for positioning said eccentric in operative relation to one of said plungers, said plunger including a squared guide section positioned for reciprocating movement between one said spaced pairs of bars, and stops carried by said guide sections limiting movement of said plunger.

6. A machine of the character described comprising a frame having a bed, an upstanding head on said frame above the bed, a plunger rack comprising spaced pairs of stationary parallel bars above said head, plungers carried by said rack, a shaft rotatably mounted on said head above the plungers, an actuating eccentric slidably keyed to said shaft, means for rotating said shaft, said shaft having spaced aligned slotted apertures therein, means carried by said cam selectively engageable in said slotted apertures for positioning said eccentric in operative relation to one of said plungers, said plunger including a squared guide section positioned for reciprocating movement between one of said spaced pairs of bars, stops carried by said guide section limiting movement of said plungers, and spring means between said pairs of bars biasing said plungers toward said eccentric.

7. A punch machine, comprising a support, a plunger rack mounted upon the support and including spaced pairs of parallel bars, plungers mounted upon the plunger rack, a shaft rotatably mounted upon the support above the plungers, an eccentric keyed to the shaft and slidable longitudinally thereon, means to rotate the shaft, the shaft having longitudinally spaced recesses in one side thereof, and means carried

by the cam selectively engageable in said spaced recesses to position the eccentric in operative relation to one of said plungers.

8. In a punch machine, a support, a plunger rack mounted upon the support and including spaced pairs of parallel bars, plungers carried by the plunger rack, a shaft rotatably mounted upon the support above the plungers, an eccentric keyed to the shaft and slidable longitudinally thereon, means to rotate the shaft, said shaft having longitudinally spaced recesses therein, means carried by the cam selectively engageable in the recesses to position the eccentric in operative relation to one of said plungers, each plunger including a portion provided with parallel flat faces positioned to reciprocate between one spaced pair of bars, stops carried by said plunger

portion to limit the movement of the plunger, and resilient means between the pairs of bars to bias the plunger toward the eccentric.

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