

[54] **STAMPING DEVICE WITH A
HORIZONTALLY MOVEABLE STAMPING
FRAME**

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[56] **References Cited**

UNITED STATES PATENTS

2,857,157 10/1958 Bonquet..... 83/615 X
3,785,235 1/1974 Peddinghaus..... 83/615 X

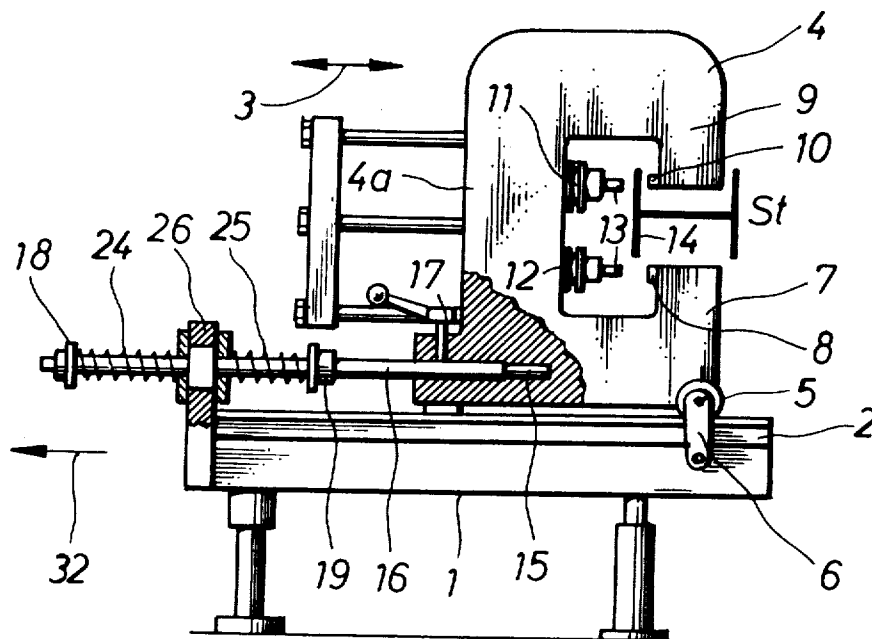
3,803,961 4/1974 Valente..... 83/560 X

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[57] **ABSTRACT**

A punching device in which a frame supports a matrix and a punch and receives a workpiece to be punched. When a punching operation is carried out the frame moves in one direction to engage the matrix with one side of the workpiece while the punch moves in the other direction to punch a hole in the workpiece. The frame is moveable on a base and has a rod connected thereto extending through an aperture in a stationary member fixed to the base. An abutment member is fixed to the rod and is slidable in the aperture while springs on the rod have inner ends engaging inner counterbearings slidable on the rod and engaging opposite sides of the abutment member and the stationary member. The springs are held compressed by outer counterbearings fixed to the rod at the outer ends of the springs.

9 Claims, 3 Drawing Figures



STAMPING DEVICE WITH A HORIZONTALLY MOVEABLE STAMPING FRAME

The present invention relates to a stamping device with a horizontal movable U-shaped frame which carries the matrix and horizontally guides the stamping punch, which frame when the punch impacts upon the material to be stamped is adjusted by said stamp so that the matrix will engage the material to be stamped while on the frame there are provided two coaxial springs which were separated from each other by a counterbearing and return the frame following the stamping operation to its starting position, said springs when occupying their starting position engaging said counterbearings under preload.

German Pat. No. 2047251 discloses a stamping device in which the U-shaped frame is by means of springs following the stamping operation returned to its starting position relative to the material to be stamped.

This heretofore known stamping device while operating satisfactorily has the drawback that the springs provided in said device oscillate in a damped manner over a period of time before the frame finally comes to rest.

It is, therefore, an object of the present invention to provide a stamping device of the above mentioned general type in which with the aid of simple means the damped post-oscillations of the heretofore known stamping device will be considerably reduced.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawing, in which:

FIG. 1 shows a side view of the stamping device according to the invention.

FIG. 2 illustrates on a larger scale than FIG. 1 the starting position of the frame rod and the springs.

FIG. 3 shows the spring arrangement in a position in which the punch frame has, due to the movement of the punch, left its central position.

The stamping device according to the present invention is characterized primarily in that the outer spring counterbearings of the springs located on a frame rod in the frame adjusting device are connected to said rod while the two inner counterbearings are displaceable on said rod and is furthermore characterized in that said inner counterbearings in the starting position of the spring engage a stationary abutment and are arranged on both sides of an abutment connected to said rod.

The invention is based on the idea when adjusting the punch frame from its central position while employing two springs, only one of the two springs is permitted to become effective whereas the second spring becomes effective only when the frame has moved beyond its central position. In other words, always one of the two springs on the frame rod takes care of the return of the frame to its starting position, whereas the second spring becomes effective only when the frame has moved out of said central position. The damped oscillations of two springs and thus the longer post-oscillating of the frame is avoided in this way.

The two springs are in the starting position of the frame inserted under preload so that they will be in the position to overcome the frictional resistance of the frame during the displacement movement of said frame and will be able to move the frame safely to its desired central position.

According to a further development of the invention, the stationary abutment is provided with a recess through which the frame rod extends while in the recess of the stationary abutment the abutment connected to the rod is displaceable. To this end, the inner counterbearings are greater than the recess so that the inner counterbearings in the starting position of the springs and when the spring is tensioned so as to exceed the preload, engage said fixed counterbearing, the respective spring not under load engages the movable abutment of the frame rod.

Preferably, the abutment connected to the rod is adjustable on said rod. The outer counterbearings are adjustable on the rod so that the counterbearings of the two springs determine the tension of the springs in conformity with their position. In order to be able to vary the central position of the frame, the frame rod on which the springs are arranged are adjustable and arrestable relative to the frame in the longitudinal direction of the rod.

Referring now to the drawing in detail, a guiding path 2 for the U-shaped frame 4 movable in the direction of the double arrow 3 is provided on the frame 1. By means of rollers 5, the frame is movable on the framework 1 and may be guided for instance by additional guiding means 6.

The frame has a lower leg 7 on which the matrix 8 is mounted and also comprises an upper leg 9 on which the upper matrix 10 is fastened. The web 4a of the frame has at the level of the two matrices 8, 10, two stamping devices 11, 12 the punches 13 of which are proportionally adjustable so that punch holes can be punched into the vertical flange 14 of an I-shaped material S₁ to be punched.

In the starting position of the frame as it is shown in FIG. 1, the matrices 8, 10 and the punches 13 preferably have a short and uniform distance from the flange 14 of the material to be stamped. When the punch moves toward the right with regard to FIG. 1 toward the stationary material S₁ to be punched and during this course impacts upon the flange 14, the frame 4 is moved toward the left with regard to FIG. 1 until also the matrix engages the flange 14 while during a further movement of the corresponding punch 13 arranged at the level of flange 14 in its horizontal direction of movement (toward the right hand side of FIG. 1), the punch hole will be made.

That section of frame 4 which faces away from the matrices 8, 10 has a horizontal longitudinal bore 15 which receives one end of a frame rod 16 which latter preferably has a round cross section and is adjustable longitudinally in the bore 15. By means of an arresting device 17, it is possible to hold the rod on frame 6 in any desired longitudinal position.

Two outer counterbearings 18, 19 are mounted on that end of rod 16 which faces away from the bore 15. These counterbearings 18, 19 are adjustable in the longitudinal direction of the rod 16 on the latter and by means of set screws 20 are arrestable in the desired position.

Between the two counterbearings 18, 19, two discs 21, 22 are arranged on the rod 16. The bores of said two discs 21, 22 are selected in conformity with the diameter of the rod 16 and are freely longitudinally displaceable on said rod 16. Between the counterbearings 18, 21 on one hand and 19, 22 on the other hand there are provided springs 24, 25 which with a slight preload

are inserted between the counterbearings 18, 21 and 19, 22 in the starting position of frame 4 so that due to the preload, the friction resistance of the rollers 5 on the supporting frame 1 are overcome in such a way that the frame will with identical thrust of the springs 24, 25 always occupy its desired central position.

Frame 1 has a vertical shoulder 26 which is provided with a recess 27 of a preferably round diameter. In this recess there is freely displaceable an abutment 29 which is adapted to be connected to the rod 16 by a screw 28. This abutment 29 may after loosening the screw 28 likewise be displaced on rod 26 and may likewise be arrested if the adjustment of the spring thrust 24, 25 toward each other should make such displacement necessary.

The diameter of the counterbearing discs 21, 22 is, as will be evident from FIGS. 1-3, greater than the recess 27 in the shoulder 26 so that the rim portions of the recess 27 on the shoulder 26 at 30 and 31 respectively form a stationary abutment for the discs 21, 22. In this way are formed on one hand the two mentioned stationary abutments and on the other hand the abutment 29 which is connected to the rod 16 and is movable therewith.

Inasmuch as the frame 4 is easily manually adjustable by means of the rollers 5, the frame 4 is first moved to its central position according to FIG. 1 while the flange 14 is spaced an equal distance from the matrices 8, 10 and the punches 13 and while the counterbearings for the springs occupy a position in which the springs 24 and 25 are under substantially the same preload.

If now in view of the described stamping operation, the frame 4 moves for instance toward the left with regard to FIG. 1, the frame 4 takes along the rod 16 in the direction of the arrow 32 in FIG. 1 whereby the parts 21, 24, 29, 18 and 19 carry out the same type movement toward the left. Merely the disc-shaped counterbearing 22 remains in engagement with the shoulder 31 of the stationary shoulder 26 whereby the spring 25 is compressed. When now frame 4 is to be moved to its central position, merely spring 25 is effective until the counterbearing 21 engages the shoulder 30 of the stationary abutment 26. This is the desired central position. When now the frame in view of its kinetic energy moves beyond its central position, the spring 24 exerts a braking effect. The same operation occurs when the frame should oscillate by a short distance in a direct opposite to the direction of the arrow 32. In such an instance the spring 25 becomes effective in the same manner so that each time first the second spring becomes effective when the frame moves be-

yond the desired central position.

It is, of course, to be understood that the present invention is, by no means, limited to the specific showing in the drawing but also comprises any modifications within the scope of the appended claims.

What is claimed is:

1. In a stamping device in which a U-shaped frame has a rest position and has a matrix therein and a moveable punch therein spaced from the matrix, said frame adapted to receive a workpiece to be punched and being moveable from said rest position in the direction of the line of action of the punch to engage the matrix with one side of the workpiece while the punch advances in the frame in the opposite direction to carry out a punching operation on the workpiece, and spring means biasing on said frame toward said rest position, the improvement which comprises; a rod connected at one end to the frame and extending therefrom in the direction of movement of said frame, said spring means comprising a pair of springs axially disposed on the rod, inner counterbearings slidable on the rod at the ends of the springs nearest each other, outer counterbearings fixed to the rod at the other ends of the springs, a stationary member between said inner counterbearings and engaging both thereof in the rest position of said frame, and an abutment member fixed to said rod between said inner counterbearings.

2. A stamping device according to claim 1 in which said stationary member has a recess through which said rod extends, said abutment member being axially moveable in said recess.

3. A stamping device according to claim 1 in which said inner counterbearings are larger than said recess.

4. A stamping device according to claim 1 in which said abutment member is adjustable along said rod.

5. A stamping device according to claim 1 in which said rod is axially adjustable in said frame.

6. A stamping device according to claim 1 in which said outer counterbearings are adjustable on said rod.

7. A stamping device according to claim 2 in which said abutment member has the same axial dimensions as said stationary member.

8. A stamping device according to claim 7 in which said outer counterbearings are adjustable on said rod and when said frame is in the rest position thereof hold said springs in a state of compression.

9. A stamping device according to claim 8 which includes a base moveably supporting said frame, said stationary member being fixed to said base.

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