Nov. 7, 1967 A. C. McCOY 3,351,003

STAMPING TOOL DIE MATRIX WITH MOVABLE ACTUATING HEAD

Filed Jan. 14, 1966 2 Sheets-Sheet 1

FIG_1

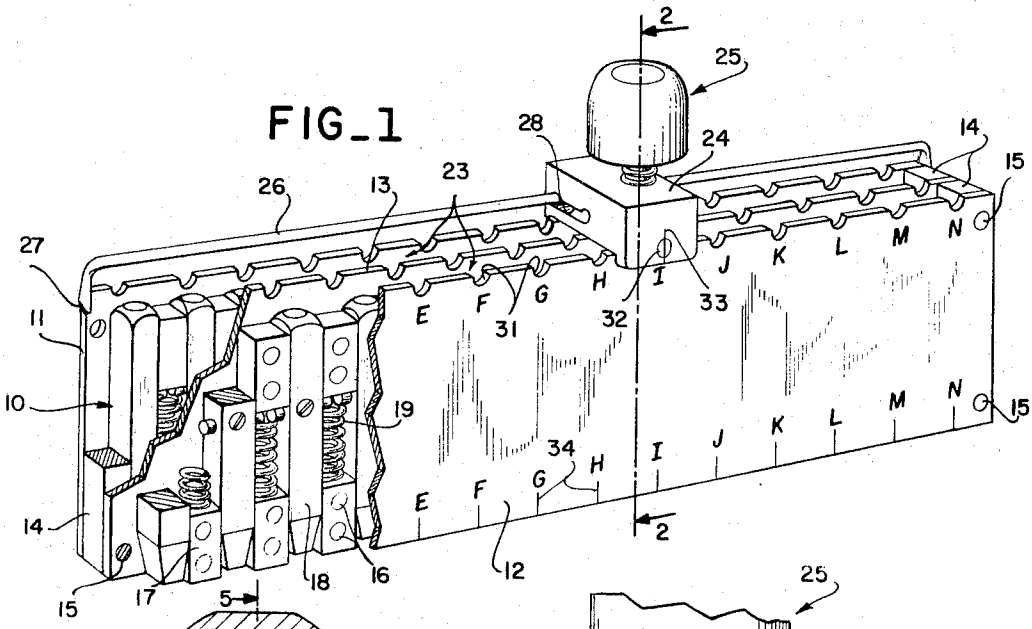

FIG_2

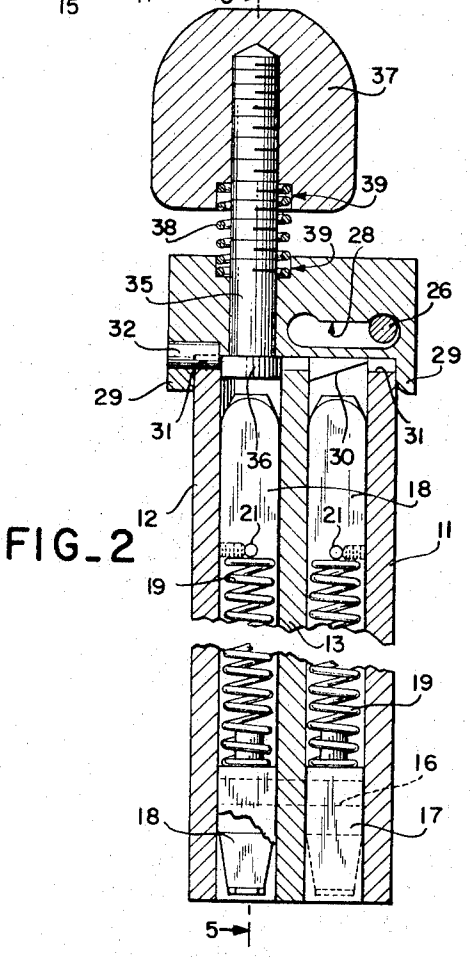

FIG_3

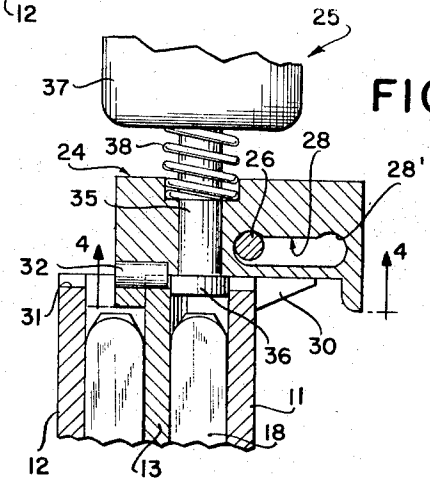

FIG_4

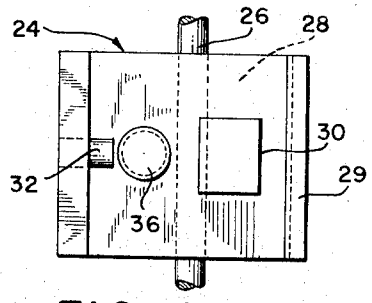

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FIG_5

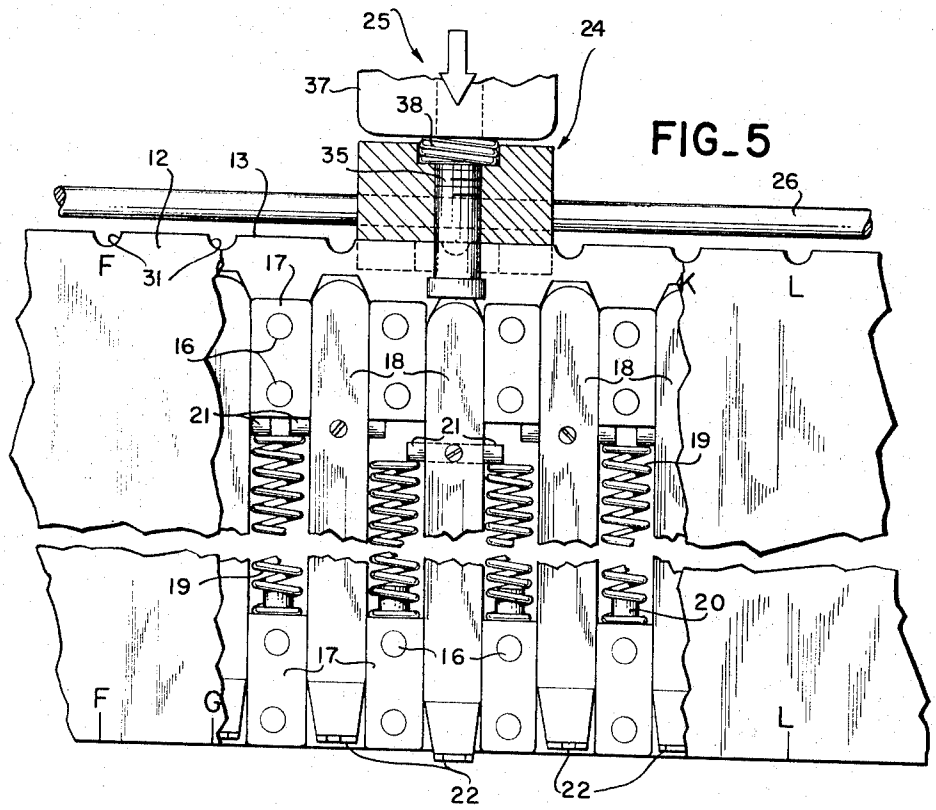
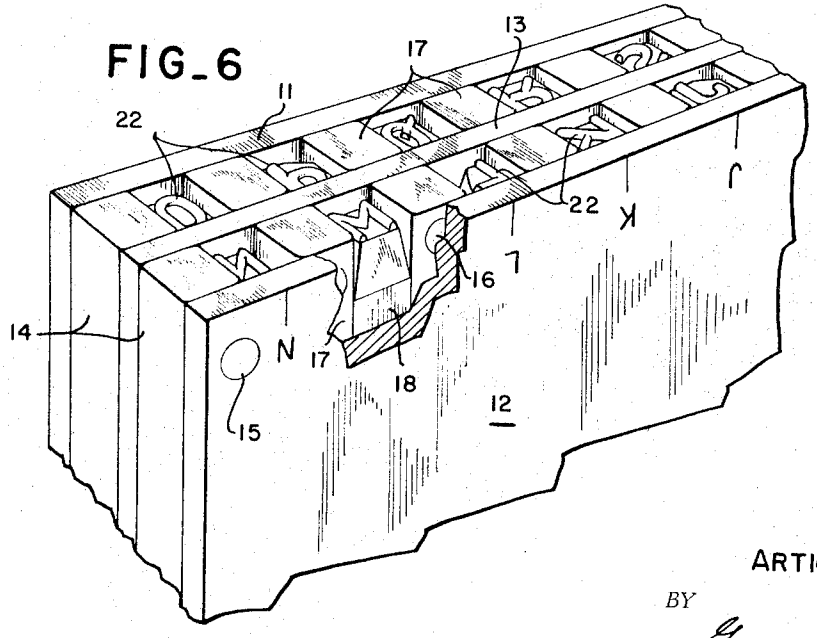


FIG_6



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3,351,003
STAMPING TOOL DIE MATRIX WITH MOVABLE ACTUATING HEAD

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3 Claims. (Cl. 101—18)

This invention relates to stamping devices and more particularly to a compact, portable stamping tool for punching identification markings on parts, especially those fabricated of the harder metals such as iron, steel and the like.

Because of the forces required to stamp or engrave hard metals, heavy and massive machines and presses have been employed which when operating are located in a stationary position and the parts or workpieces are brought to the machine or press, placed in proper position and the operation performed. Where it has not been possible to deliver the workpiece to the machine or to manipulate it into a proper position in the machine, resort has been had to hand chiseling in the simple case and to comparatively elaborate apparatus such as electrical or chemical etching devices under other circumstances.

In-the-field or on-the-spot operations usually require the hand chiseling method which has been improved to the extent that individual punch dies have been developed. These punch dies essentially comprise steel rods or bars with an end face that defines a sharp edged configuration of the mark, usually a letter, number or symbol, to be impressed in the workpiece. With this end face held flush against the surface of the workpiece the opposite end of the rod is struck with a hammer and the impact produces the impression.

While this relatively simple procedure accomplishes the job, it leaves much to be desired. Two or three dozen, or more, individual punch dies are usually required to complete a set which is easily broken when one or more of the dies are lost or mislaid. Such dies necessarily are small in cross section relative to the rod length making a true axial strike with the hammer difficult, particularly since the edge surfaces of the marks in contact with the workpiece are not sufficiently broad to ensure a flat and even abutment at the precise moment of impact. Where multiple marks, e.g., letters, digits, etc., comprise the identification, alignment of the successive marks is difficult and special reference tools, indicators or the like must be provided, adding to the logistics problem.

Such attempts as have heretofore been made to overcome the foregoing objections have resulted in unduly expensive devices, not only due to their original manufacture and fabrication but also due to their short service life under the normal abuse given such devices. Thus, these prior designs incorporate an objectionable number of parts, too many of which are required for interaction and relative movement making them prone to break or becoming inoperative in service.

Also, in order to provide the required number of marks or characters, many of these previously proposed devices include a disk on the peripheral face of which the several characters are formed in successive spaced arrangement. Such disks must be accurately formed and shaped raising problems in their manufacture and resulting in relatively expensive products. This is aggravated by the fact that the impact force applied in the stamping operation must be applied eccentrically, i.e., off or outside the plane of the disk, which results in their damage, misalignment, etc.—in short, a relatively brief service life.

The present invention contemplates the foregoing shortcomings in this area of the known art and is directed to a practical stamping or punching tool that is characterized by its durable, rugged construction completely devoid of complex manufacturing operations and yet thoroughly accurate and reliable in service. To this end the invention proposes to employ the existing punch dies so organized and arranged in compact assembly as to constitute a unitary tool for field and on-the-spot use in the marking of heavy metal parts.

In essence, this tool comprises a selected number of punch dies disposed in parallel, coextensive alignment for individual reciprocation in a case or housing. Thus mounted and disposed, the several dies are spring biased into an upward position with their metal marking ends disposed in a plane within the housing plane. At the opposite side of the housing there is provided a slidably mounted anvil having a striker element adapted to be aligned with a selected one of the die ends. The mounting of the anvil is such that it is movable in two directions, i.e., longitudinally and laterally of the tool whereby one or more rows of dies mounted and disposed within the housing as described may be employed. Reference and guide means are also incorporated in the tool to ensure the coaxial disposition of the striker element with reference to the selected die whereby the direction of the impact force is controlled.

With the above and other objects in view as will be apparent, this invention consists in the construction, combination and arrangement of parts all as hereinafter more fully described, claimed and illustrated in the accompanying drawings wherein:

FIGURE 1 is an isometric view of a tool constructed in accordance with the teachings hereof with portions broken away to disclose the several dies, their mounting and spacing;

FIGURE 2 is a transverse section taken along line 2—2 of FIGURE 1 to show two rows of individual dies and the associated anvil and striker element mounted on the tool for longitudinal and lateral movement and disposed in one extreme lateral position for coaction with a selected die in one of such rows, the center portion of the tool being broken away;

FIGURE 3 is a similar section in the area of the dies and striker element to show the other extreme lateral position of the striker for coaction with a selected die in the other row;

FIGURE 4 is a view taken along line 4—4 of FIGURE 3 to show the bottom face of the mount for the anvil and striker element by which it is slidably connected to the tool for longitudinal and lateral movement as well as the guides and indexing means to locate it in alignment with any one of the several dies;

FIGURE 5 is a section taken along line 5—5 of FIGURE 2 showing the striker element in contact with a die whereby the die face is extended from the tool into the work-stamping position; and

FIGURE 6 is an isometric view of a fragment of the tool from the bottom thereof to show the symbols or letters on the several die faces and the reference markings on the adjacent tool faces to facilitate the proper location thereof on the workpiece prior to and during the stamping operation.

With reference more particularly had to the drawings 10 designates a die bank which is a preassembled unit adapted to be enclosed by removable cover plates 11 and 12 to constitute a compact unit. The die bank 10 is formed by a rectangular, relatively thin plate 13 of rigid material, to the marginal ends of which on both sides

bars 14 are secured by fasteners or screws 15 having countersunk heads. Each such bar 14 has a length substantially equal to the width of the plate 13 whereby its opposed ends are disposed in the plane of the plate sides and one side of each bar 14 lies in the plane of the associated plate end.

Secured by appropriate fasteners or rivets 16 to each side of the plate 13 to be disposed in back-to-back alignment is a plurality of spacer elements 17 with alternate die punches 18 independently mounted therebetween. The several bars 14, spacers 17, and punches 18 have substantially the same transverse dimension whereby the successive spacers 17 and punches 18 are equidistant and their several side surfaces are located in a single plane. One end of the bars 14, spacers 17, and punches 18 terminates substantially flush with the associated edge of the plate 13 which constitutes the bottom of the ultimate stamping tool. Thus disposed the cover plates 11 and 12 are removably secured thereto by the fasteners 15.

Each spacer 17 is formed by a pair of vertically aligned blocks separated at adjacent ends to accommodate a compression spring 19. If desired a guide rod 20 may be provided on each lower block to extend centrally through the associated spring 19 and thereby maintain it in proper position. At its upper end each spring 19 abuts a pin 21 secured to and extending laterally from opposite sides of each punch 18. The several punches 18 are thereby normally held in the upper position with their stamping faces 22 inwardly of the tool as defined by the edges of the cover plates 11 and 12.

The upper ends of the bars 14 terminate in a common plane with the associated longitudinal edges of the plates 11, 12 and 13. The corresponding ends of the spacers 17 and dies 18, however, all terminate in a common plane below the top of the tool as established by the coplanar edges of the plates 11, 12 and 13. A channel 23 is thereby produced in the top of the tool above each row of dies 18 and spacers 17.

Associated with the top of the tool is a slide block 24 which constitutes a mount for a spring-loaded striker element 25. This block 24 is slidable on a guide rail 26 disposed in space relation to the upper edge of the cover plate 11 to which it is secured as by welding, soldering, etc., at its opposite ends as at 27. Adjacent what shall be referred to as its "aft end" the block 24 is pierced by a slot 28 which is disposed substantially parallel to the plane of the top of the tool and through which the rail 26 is adapted to pass. The length of the slot 28 is substantially equal to the width of each channel 23 whereby movement of the block 24 transversely of the tool from one end of the slot 28 to the other locates the center of the striker element 25 in the transverse center of one and then the other channel 23.

Where two or more rows of dies 18 are employed with a corresponding number of channels 23 the edge of the block 24 defining the slot 28 is recessed as at 28'. Each such recess 28' conforms to the transverse configuration of the rail 26 which is thereby seated therein to locate the longitudinal center of the striker 25 in the transverse center of the selected channel 23.

Preferably the block 24 terminates at opposite ends in depending ears 29 to define a space therebetween substantially equal to the overall width of the tool as defined by the remote faces of the plates 11 and 12. The block 24 thereby straddles and rests in flush abutment against at least two of the plates 11, 12, and 13 in each of its positions to ensure vertical alignment of the striker 25 with the several dies 18 underlying each channel 23. This position of the striker 25 is further assured by means of and through a projecting lug 30 on the lower face of the block 24 adapted to abut the face of one of the plates 13 or 11 in opposition to the ear 29 against the plate 12 or 13 respectively.

In order to ensure axial alignment of the striker element 25 with each of the several dies 18 the upper edges

of plates 12 and 13 are notched as at 31 and a pin 32 pressfitted or otherwise secured in the block 24 is adapted to peripherally engage each such notch 31. To facilitate this the opposite faces of the block 24 may be scribed with an index 33 and the adjacent surfaces of the plates 11 and 12 marked with the symbol or letter of the associated die 18. Similar indexes 34 and markings may be provided on the bottom of the plates 11 and 12 for alignment with reference marks on the workpiece.

The striker element 25 comprises a shank 35 adapted to pass through a hole provided in the block 24 therefor by which it is disposed in a vertical position when the bottom face of the block 24 abuts at least two of the plates 11, 12 and 13 as described. Thus disposed the pin 32 is, of necessity, engaged in a notch 31 and the shank 35 is in axial alignment with the adjacent die 18.

At its lower end the shank 35 terminates in an enlarged head 36 having transverse dimensions that correspond to the width of the channel 23 so as to coact in sliding relation with the sides thereof. At its upper end the shank 35 is threaded to be received and releasably secured in anvil 37. A compression spring 38 mounted on the shank 35 between the block 24 and anvil 37 serves to normally maintain the head 36 out of contact with the adjacent die 18 at all times. If desired, wells or seats 39 may be provided in the block 24 and anvil 37 respectively around the shank 35 to receive and retain each end of the spring 38.

In view of the foregoing construction and arrangement the striker element 25 is mounted for ready adjustment on the guide rail 26 to position its shank 35 in precise coaxial alignment with a selected die 18. In this adjustment the block 24 is rotated on and about the rail 26 to dispose the pin 32 clear of the notches 31 in plates 12 and 13 whereby the block 24 is free to slide longitudinally of the tool. Thus disposed the block 24 is also free to slide laterally of the tool through coaction of its slot 28 and the rail 26. Central alignment of the shank 35 in the desired channel 23 is effected by seating the rail 26 in the corresponding recess 28' in the block 24.

When the pin 32 aligns with a selected notch 31 as indicated by registration of the index 33 with the desired letter on the plate 11 or 12 the block 24 may be rotated on and about the rail 26 to bring the bottom face thereof into flush contact with the upper edge of at least two of the plates 11, 12, and 13. At this time the head 36 of the striker 25 is disposed between adjacent surfaces of adjoining plates 12 and 13 or 11 and 13 as the case may be to maintain it in a stable position. Thus, force applied to the striker 25 when the anvil 37 is struck by a hammer is assured of being directed longitudinally of the die 18.

It is to be understood that while this particular embodiment of the invention hereinabove illustrated and described is preferred, various changes and modifications thereto will be obvious to those skilled in the art without departing from the true spirit and scope of the invention. Such changes and modifications are intended to be covered by the appended claims which alone define the limitations of the invention.

What is claimed is:

1. A stamping tool comprising multiple rows of parallelly disposed punches, each punch mounted for independent axial reciprocation and having a die face of selected marking on one end thereof, resilient means operative on said punches to maintain them normally in coextensive alignment, a striker mounted adjacent the other ends of said punches for movement longitudinally and transversely of said rows and for reciprocation in a plane substantially parallel to said punches, and reference and guide means to locate said striker in coaxial alignment with any selected one of said punches, said reference and guide means including a relatively stationary guide rail parallelly disposed with respect to said rows, a slide block carrying said striker, a slot in said slide block for the passage of said rail therethrough, and one recess in

said block in communication with said slot for each said row conforming to the transverse configuration of said rail and located to receive and engage said rail when said striker is in alignment with the transverse center of each of said rows.

2. The stamping tool of claim 1 including a plate disposed on each side of each said row, one longitudinal side of each of said plates extending outwardly of said other ends to define a channel adjacent each said row, and wherein said slide block straddles at least one of said channels and rests in flush abutment against at least two of said plates when said striker is in each aligned position with the transverse center of each row as aforesaid.

3. The stamping tool of claim 2 including a groove in each said one longitudinal side corresponding to and adjacent each punch and a pin carried by said block and conforming in transverse configuration to said groove to be received and engaged thereby when said striker is in coaxial alignment as aforesaid.

References Cited

UNITED STATES PATENTS

471,455	3/1892	Abbott	197—6
579,047	3/1897	Dudley	197—53
1,789,831	1/1931	Pannier et al.	101—18
1,978,898	10/1934	Ford	101—109
2,142,009	12/1938	Siebert	101—18 X
2,501,447	3/1950	Lambert	101—109 X
2,505,729	4/1950	Zenner	197—53 X
2,577,064	12/1951	Zenner	197—1 X
2,639,017	5/1953	Croucher	197—2
2,838,156	6/1958	Griffith	197—53
2,903,962	9/1959	Henderson	101—109
2,935,018	5/1960	Lego	101—109
3,215,245	11/1965	Thiene et al.	197—2

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