

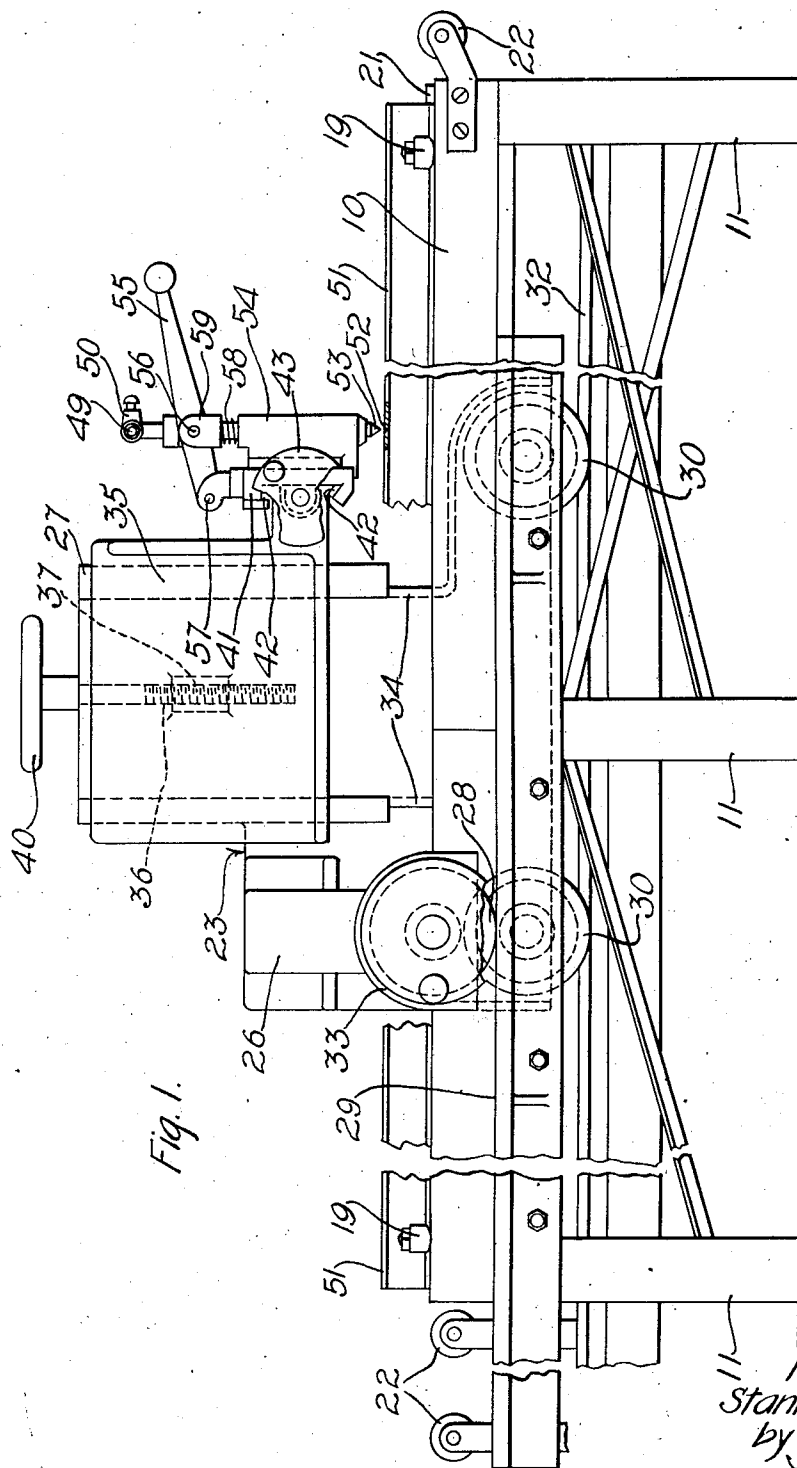
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MATERIAL WORKING APPARATUS

Original Filed Jan. 26, 1925 2 Sheets-Sheet 1



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April 24, 1928.

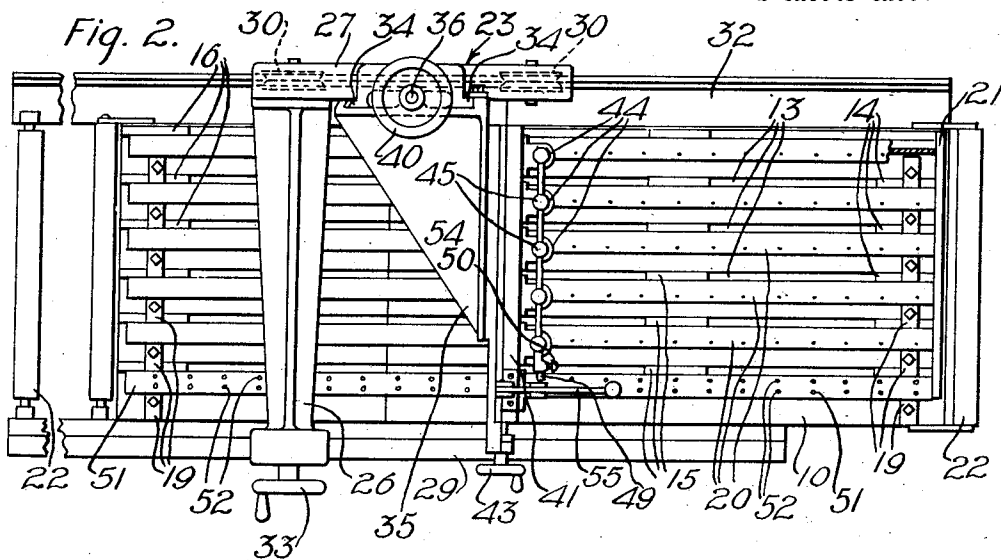
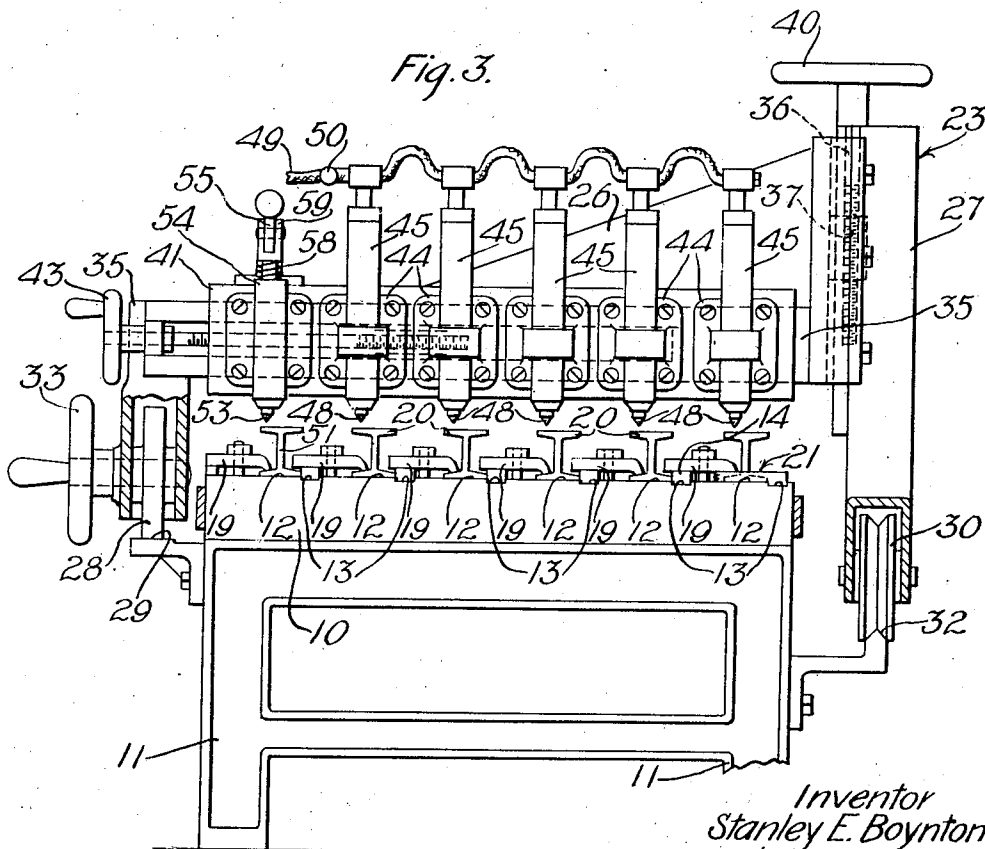
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MATERIAL WORKING APPARATUS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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MATERIAL-WORKING APPARATUS.

Application filed January 26, 1925. Serial No. 4,976.

This invention relates to material working apparatus, and more particularly to apparatus for duplicating work or layouts, and has for its primary objects the provision of an improved apparatus and an improved method whereby a plurality of blanks may be simultaneously marked or worked with expedition and precision.

In accordance with the general features of this invention there is provided in one embodiment thereof a carriage having a plurality of pneumatically operated punches, which carriage is movable in a plurality of directions to register an index carried thereby with work previously performed upon an article, or the indications forming a work layout on a template or other master record, thus positioning each of the punches in a corresponding position over a blank. The positioned punches are operated simultaneously to duplicate on the blanks the master record.

Other objects and advantages of the invention will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate one embodiment thereof, in which

Fig. 1 is a fragmentary side view of a work layout duplicating mechanism embodying the features of the invention;

Fig. 2 is a fragmentary plan view thereof upon a reduced scale, and

Fig. 3 is a fragmentary end view of the mechanism shown in Fig. 1.

Referring to the drawings wherein like reference numerals designate like parts throughout the several views, 10 indicates a bed plate of suitable rigidity supported upon upright standards 11. The work or blank supporting surface of the bed plate is divided into a plurality of work spaces 12 by depressions 13 formed therein and extending longitudinally thereof which are each fitted at intervals with aligning strips as indicated at 14, 15 and 16, which project above the top surface of the bed plate and against which the work or blanks, which may consist of angles, channels, I beams or other structural shapes are held by suitably shaped clamps 19 as clearly shown in Fig. 3. In the drawings a plurality of I beams 20 are illustrated as being laid out for subsequent drilling operations. A common aligning strip 21 is disposed at right angles to the strips 14, 15 and 16 at the right hand end of the bed

plate against which the right hand end of each I beam 20 is aligned. At each end of the bed plate 10 are mounted rollers 22 for convenience in mounting and removing work.

A table or carriage 23 comprising in plan view an L-shaped frame is mounted above the bed plate 10 and includes arms 26 and 27. The forward end of the arm 26 as viewed in Figs. 1 and 2 mounts a flat faced wheel 28 which rides upon a rail 29 carried upon the standards 11, while the arm 27 mounts a pair of spaced wheels 30 provided with grooved faces which ride upon a rail 32 having a correspondingly shaped face for engaging within the grooves at the wheel 30 (Fig. 3). The spaced grooved wheels 30 cooperating with the rail 32 function to prevent the carriage 23 from moving laterally with respect to the bed plate 10. By turning a hand wheel 33 secured to the shaft upon which the wheel 28 is fixed it will readily be seen that the carriage 23 may be moved longitudinally with respect to the bed plate 10. Reciprocally mounted for movement in a vertical direction upon the member 27 and suspended therefrom on suitable guideways 34 formed thereon is a forwardly projecting arm 35 adapted to be moved upwardly or downwardly through the medium of a screw threaded rod 36 suitably fixed from vertical movement upon the arm 27 and operating in a threaded opening 37 formed in the arm 35. The purpose of adjustably mounting the arm 35 will be made apparent hereinafter. A hand wheel 40 is provided for operating the screw threaded rod 36. Reciprocally mounted upon the arm 35 for movement in a lateral direction with respect to the bed plate 10 is a second carriage 41. The carriage 41 is mounted upon suitable guideways 42 formed upon the arm 35 and is adapted to be moved laterally of the bed plate through the rotation of a hand wheel 43 in a manner similar to the vertical movement of the arm 35 upon the carriage 23 by the rotation of the hand wheel 40 as hereinbefore described.

Carried upon a vertical face of the carriage 41 by brackets 44 are a plurality of air hammers 45, each of which is adapted to impart reciprocatory motion upon operation to a punching tool 48 in the usual manner characteristic of this class of devices, and such devices being well understood, they will not be described in detail. All of the ham-

mers 45 are connected to a main air line 49 supplied from a suitable supply source, the air under pressure therefrom to the hammers being controlled by a suitable hand controlled spring returned valve indicated at 50.

A master work piece 51, such as a template or a blank which has been marked, is secured by a set of clamps 19 to the bed plate 10 in a manner similar to the pieces or blanks 20 to be worked upon. The master work piece may be provided with indications laid out by hand in the present embodiment punch marks 52 which are to be duplicated upon the work piece 20 in the operation of the mechanism by the punching tools 48. Mounted upon the carriage 41 and above the master work piece 51 is a hand operated pointer or index 53 reciprocally mounted in a casing or bracket 54. The index is adapted to be moved downwardly by a lever 55 pivoted thereto as indicated at 56 and to the carriage 41 as shown at 57 (Fig. 1). A compression spring 58 may be mounted between the bracket 54 and a bifurcated end 59 of the index 53 to normally retain the engaging lower end of the index from contact with the master work piece as indicated in the drawings.

The operation of this mechanism is as follows: A plurality of work pieces, which may be I beams 20 or other structural shapes, are clamped to the bed plate 10 and against the aligning strips 14, 15, 16 and 21 along with the master work piece 51, which may be an I beam similar to the beams 20, with the punch marks 52 to be duplicated upon the I beams 20 formed thereon, or it may be a specially prepared template, depending upon the requirements of the parts to be laid out. The position of the punching tools 48 and the index 53 above the surfaces to be worked upon is suitably adjusted by operating the hand wheel 40 to provide a clearance of approximately one-sixteenth of an inch, and thereafter the hand wheel 33 is operated to cause the carriage 23 to move upon the rails 29 and 32 to position the hand operated pointer or index 53 adjacent the first punch mark or indication upon the master I beam at the right hand end thereof as viewed in Figs. 1 and 2. By manipulating the hand wheels 33 and 43 the index 53 may be positioned directly in line with the first punch mark and since the air hammers 45 along with the index 53 are all equally spaced on definite centers corresponding with the I beams 20 and carried upon the carriage 41 it will readily be seen that each of the punching tools 48 will be simultaneously positioned in the same position relative to the I beams 20 positioned thereunder. The index 53 is moved downwardly to the indication upon the master piece by pulling down on the lever 55 and thereafter the valve 50 is operated, whereupon the air hammers 45

are simultaneously actuated to cause the punching tools 48 to engage the I beams 20, thereby duplicating the punch mark 52 with which the index 53 is engaged, simultaneously upon each of the I beams 20 and at a predetermined point thereon. Upon releasing the valve 50 and lever 55 they are returned to their normal positions and the carriage 23 is then moved to the left by operating the hand wheel 33 until the index 53 is aligned with the next punch mark 52 upon the master I beam 51, whereupon the lever 55 and valve 50 are in turn operated as hereinbefore described and the operation of shifting the carriage 23 is repeated again and again until all of the punch marks 52 upon the master I beam have been duplicated upon the I beams 20. In case the work to be duplicated consists of two rows of punch marks 52 as illustrated, the operator may continue to adjust the carriage 23 step by step along one row of punch marks until they have been duplicated and then move the index 53 over in line with the other row by operating the hand wheel 43, and thereafter move the carriage step by step in the opposite direction until the second row has been duplicated. However, if desired, the index 53 may be alternately stepped laterally of the master I beam to align it first with one row and then the other and so on until all of the punch marks 52 have been duplicated upon the several I beams 20.

The advantages of the mechanism as hereinbefore described are that it provides means whereby a single operator in a given time may accomplish many times the amount of work which is possible where each work piece is laid out by hand separately and also results in the pieces being laid out with precision and greater uniformity.

What is claimed is:

1. In a material working apparatus, means for supporting a plurality of blanks upon definite centers, a plurality of work tools adjacent thereto and upon centers corresponding to the blanks, means for moving said tools longitudinally and laterally of the blanks, means associated with said tools and blanks and designed for movement independent of said tools for indicating when said tools are at a predetermined point with respect to said blanks, and means for causing said tools to perform work upon said blanks.

2. In a material working apparatus, means for supporting a plurality of blanks upon definite centers, a plurality of tools upon centers corresponding to the blanks, two carriages movable as a unit longitudinally of the blanks, one of said carriages supporting said tools and adapted to be moved independently of the other laterally of the blanks, means associated with said tools and blanks for indicating when said

tools are at a predetermined point with respect to said blanks, and means for causing said tools to perform work upon said blanks.

5 3. In a work layout duplicating mechanism, means for supporting a plurality of blanks upon definite centers, a plurality of marking tools upon centers corresponding to the blanks, means for moving said tools longitudinally, laterally and vertically of
10 the blanks, means associated with said tools and blanks and designed for movement independent of said tools for indicating when said tools are at a predetermined point with respect to said blanks, and means for causing
15 said tools to perform work upon said blanks.

4. In a material working apparatus, a work bed, means for securing thereto upon definite centers a plurality of blanks, means for securing a master record adjacent there-

to, two carriages movable as a unit longitudinally of the work bed, one of said carriages movable independently of the other laterally of the work bed, a plurality of work tools carried by the latter carriage upon centers corresponding to the blanks, indexing means associated with said master
25 record and movable as a unit with said work tools, means for associating said indexing means with a predetermined point upon said master record, thereby aligning said work
30 tools relative to the blanks at corresponding points thereon, and means for causing said tools to perform work upon said blanks.

In witness whereof, I hereunto subscribe my name this 16th day of January A. D.,
35 1925.

STANLEY EDWARD BOYNTON.