# United States Patent

**Flynn, Jr.**

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## [54] SINGLE PASS STRUCTURAL SHAPE PUNCH


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[52] **U.S. Cl.** ..... **83/255**, 83/516, 83/560

[51] **Int. Cl.** ..... **B26d 9/20**

[58] **Field of Search** ..... 83/217, 255, 513, 516, 519, 83/558, 560



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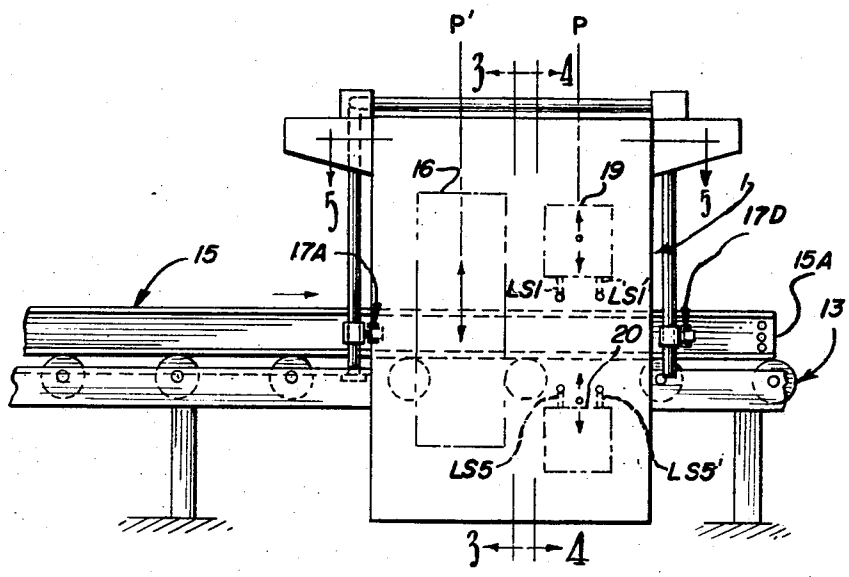
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[57] **ABSTRACT**

Individually movable, integral punch and die assemblies at a common punching station cooperate to complete punching of a structural member with a single pass of the member through the station.


**6 Claims, 9 Drawing Figures**



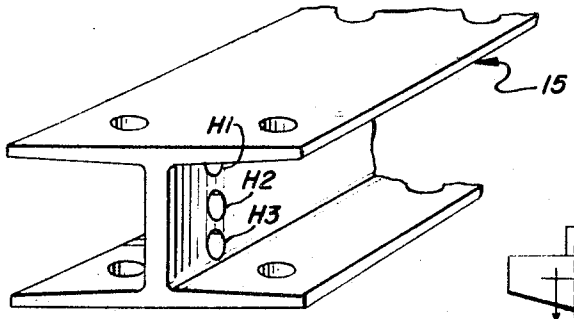



Fig. 2

Fig. 1

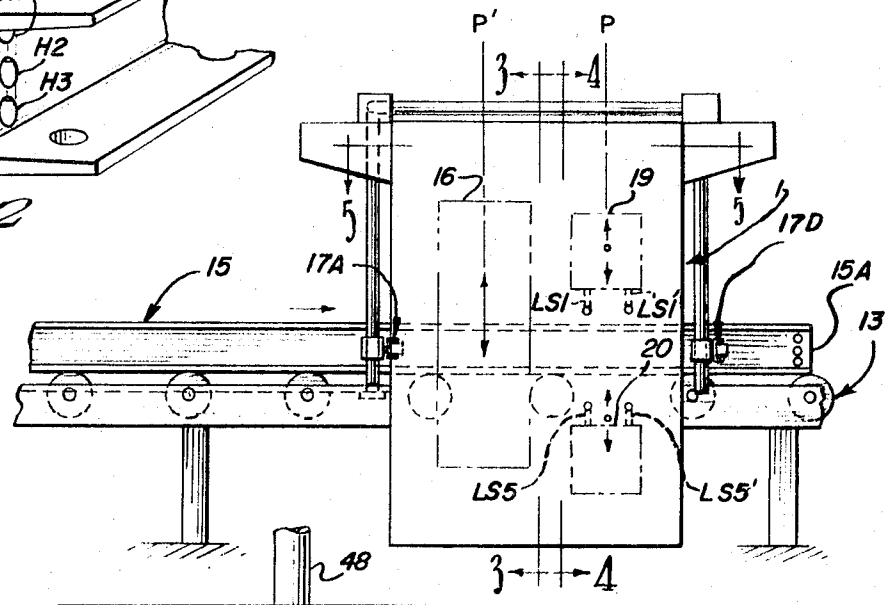
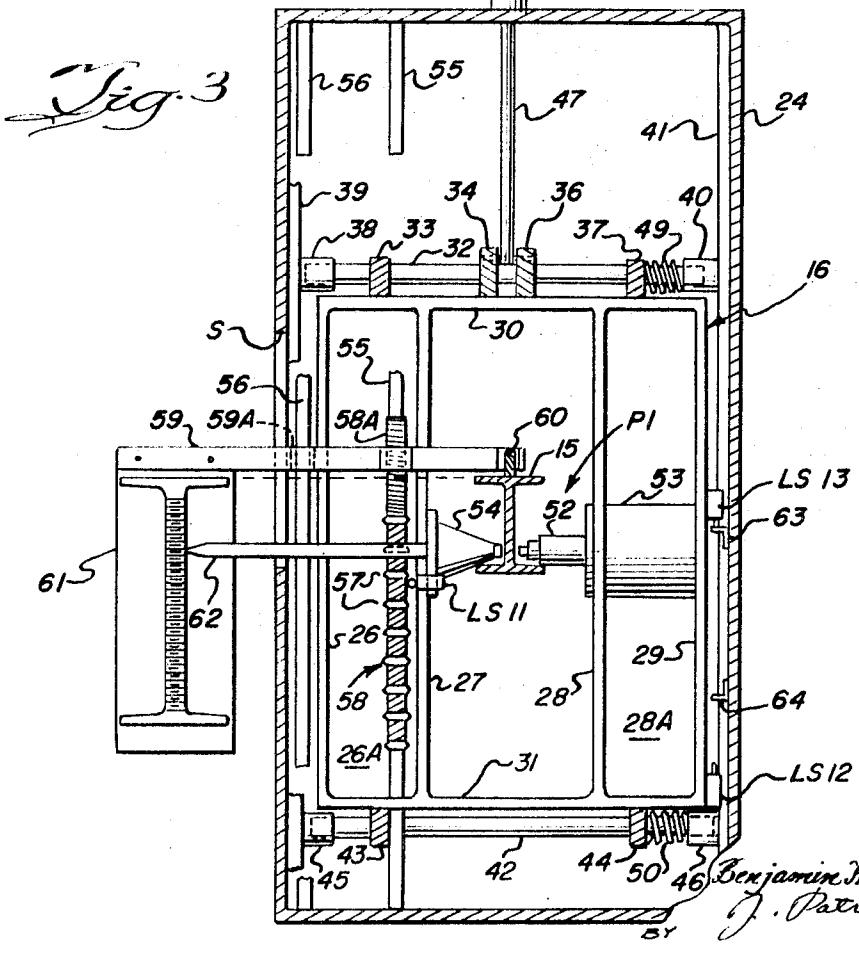



Fig. 3




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Fig. 4

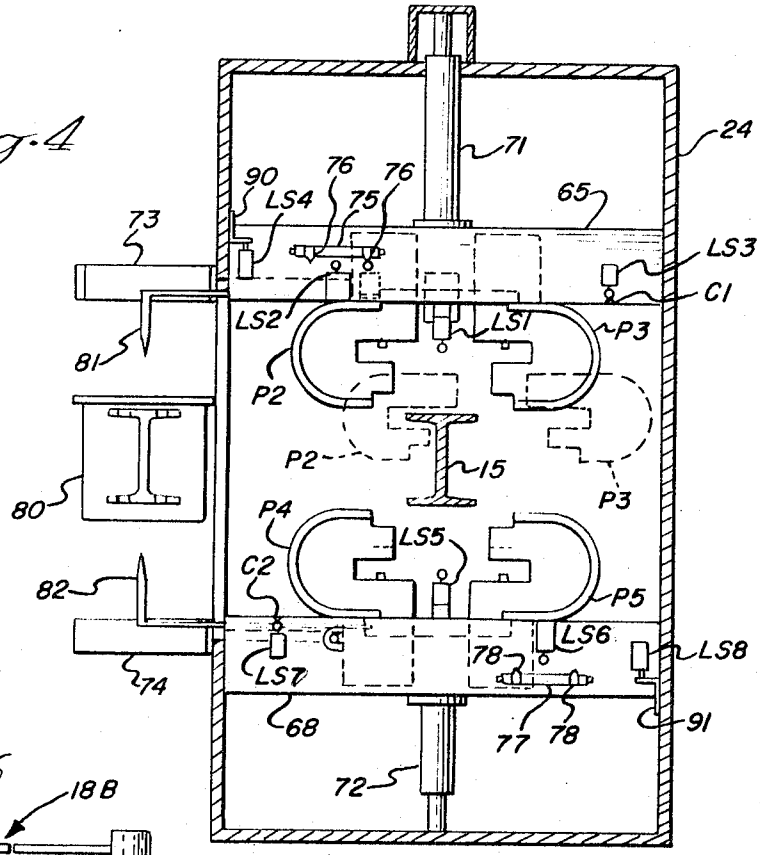



Fig. 6

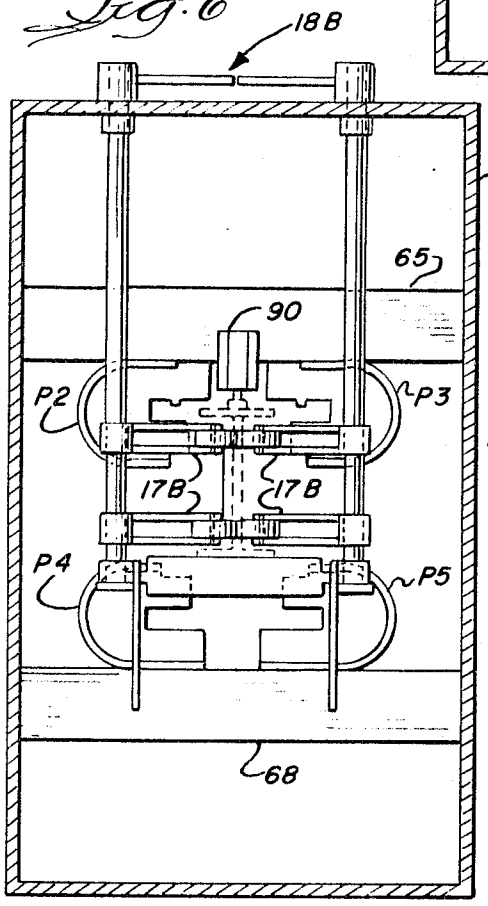
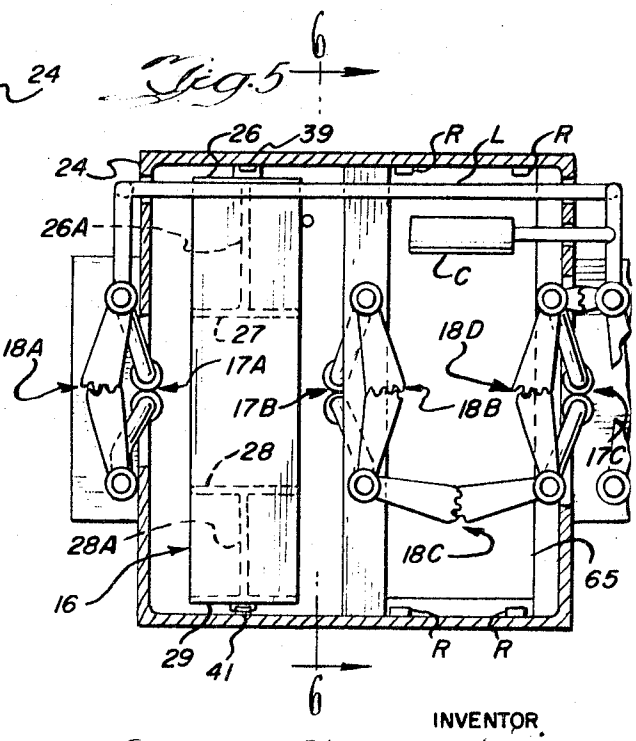



Fig. 5




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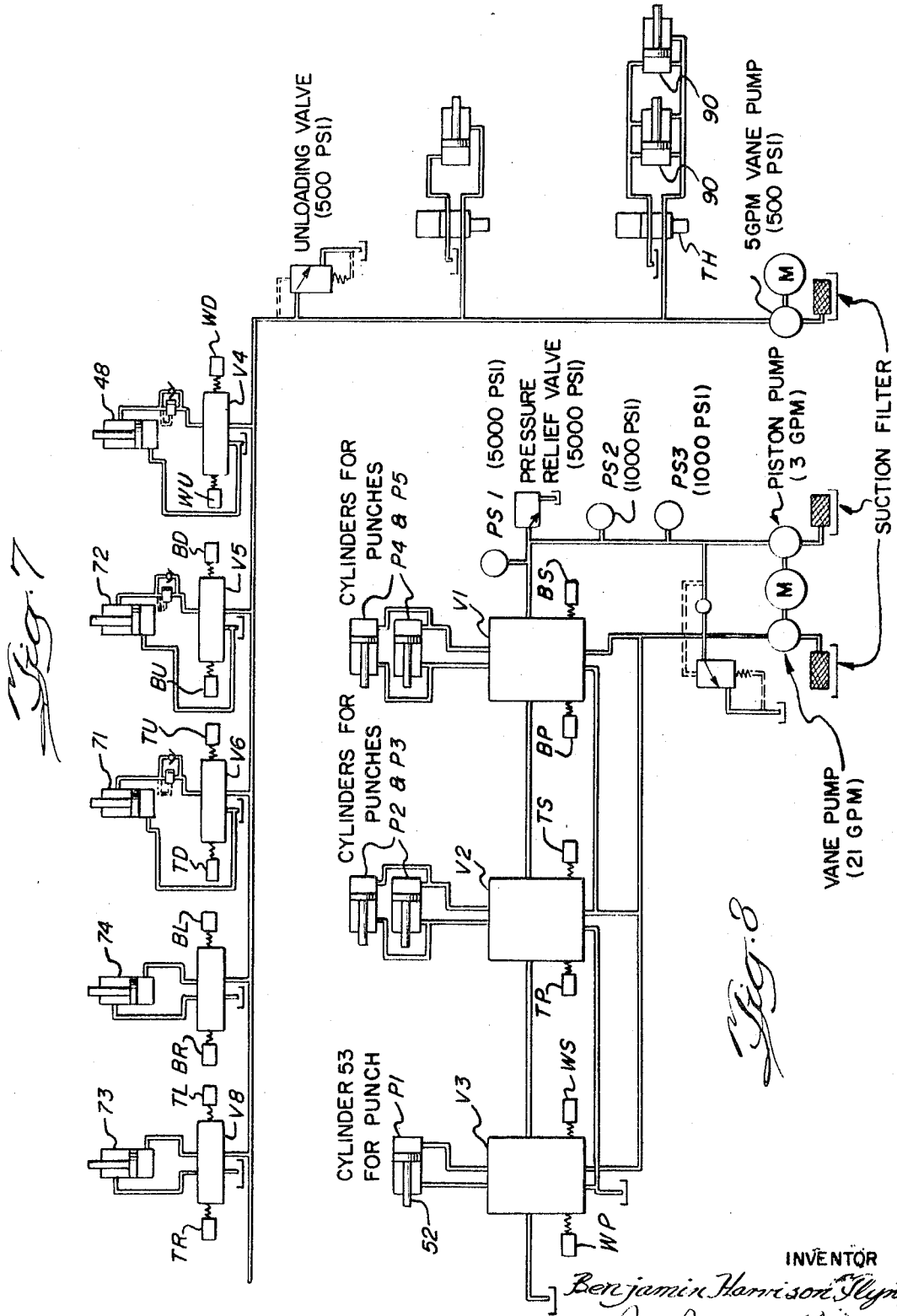



Fig. 7

Fig. 8

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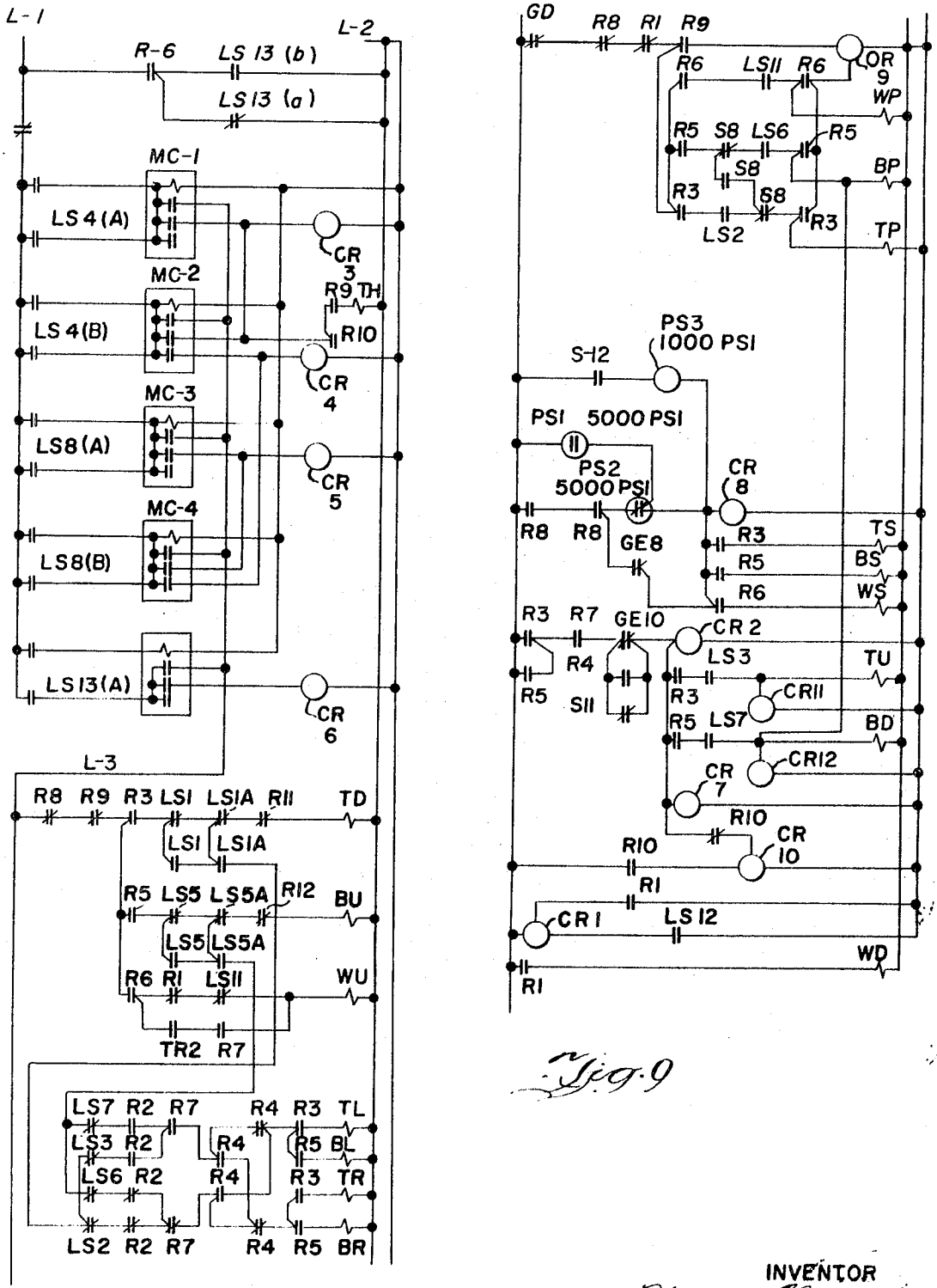



Fig. 9

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# SINGLE PASS STRUCTURAL SHAPE PUNCH

## BACKGROUND OF THE INVENTION

The present invention generally relates to the art of punching machines and, more particularly, relates to a novel punching machine capable of providing all punching operations on a structural member or shape with a single pass of the shape through the machine.

The inherent construction of conventional beam punches determine the location of groups of mating punches and dies so that only the top flange of a beam may be punched during a trip through the machine. The beam is then returned to its initial position, turned over and makes a second trip through the machine to have the lower flange punched. It is then returned to its initial position and laid on its side on a parallel conveyor to travel through another group of fixed punches.

The numerous trips and the handling of the material are time-consuming and add to working hazards. Also, the center-to-center distance of punches for both flange and web punching are fixed in a conventional punch during operation. To change these punching centers involves a considerable loss of time since the workpiece must be removed in order to relocate the punches and dies and should a beam be processed with different hole centers, additional trips through the machine are therefore necessary.

## SUMMARY OF THE INVENTION

In accordance with the present invention, these disadvantages are overcome by incorporating at common punch station individual, movable, integral punch and die assemblies for each flange (or horizontal leg) and the web (or vertical leg) of any structural member or plate being processed. Flange punch assemblies are moved laterally to space holes on any gauge on beam flanges or horizontal legs of a structural shape and vertically to accommodate any size beam or structural shape within the capacity of the particular size of the machine. A web punch is and need only be moved vertically to accommodate the web or vertical leg of a structural shape or plate.

A principal advantage of the punching machine of the present invention is that a great deal of time is saved by only having to make one pass through the punching machine. The mobility of the punching heads provide unlimited spacing of holes at the operator's will. The ability to provide center punch marks in extremely accurate locations (a normal function of the machine) that can be used for the location of other pieces to be later assembled on the workpiece is an additional advantage over conventional manual layout practice.

Other features and advantages of the invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which show structure embodying preferred features of the present invention and the principles thereof, and what is now considered to be the best mode in which to apply these principles.

## BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings forming a part of the specification, and in which like numerals are employed to designate like parts throughout the same:

FIG. 1 is an elevational view, greatly simplified, showing a conveyor having an I-beam thereon being processed at a punching station in accordance with the present invention;

FIG. 2 is a fragmentary perspective view showing an I-beam having holes punched in its flanges and web;

FIG. 3 is a sectional view taken, as indicated, along the line 3—3 of FIG. 2 and showing the web punch head substation;

FIG. 4 is a sectional view taken, as indicated, along the line 4—4 of FIG. 2 and showing the flange punch head substation;

FIG. 5 is a top plan view of the punching station of FIG. 2 and showing the pinch roll mechanism;

FIG. 6 is a sectional view taken, as indicated, along the line 6—6 of FIG. 5;



FIGS. 7 and 8 illustrate preferred hydraulic systems for controlling the positioning and actuation of the punches incorporated in the punching station of the present invention; and

FIG. 9 is an electrical circuit diagram of the punching station disclosed herein.

## DETAILED DESCRIPTION

Referring now to the drawings, and specifically to FIG. 1, a punching machine or station 1 in accordance with the present invention is shown positioned in intercepting relation along a roller conveyor 13 of conventional design. For purposes of illustrative disclosure, an I-beam 15 is shown to comprise the structural member or shape to be operated upon at the station.

As will be explained in detail hereinafter, the punching station 1 includes five conventional individual punch and die assemblies (hereinafter called punches), four of which are located at a horizontal or flange punch substation in one vertical plane P and the fifth of which is located at a vertical or web punch substation in a parallel vertical plane P' spaced from plane P. The four punches located in plane P are sub-divided into two groups of two punches per group, the punches of each group being rigidly mounted together in gang-coupled fashion to ride along a slide bed for movement laterally of the I-beam 15, one slide bed being provided by an upper vertically movable head 19, and the other being provided by a lower, vertically movable head 20. The fifth punch is mounted on a vertically movable head 16.

As will become evident, such arrangement of heads, slide beds and punches enables unlimited spacing of holes at the operator's will, as well as the ability to accurately locate center punch marks that can be later used as working points.

Briefly, in the operation of the invention, the workpiece is loaded onto the conveyor 13 and advanced into the vertical or web substation. As the end 15A of the beam passes the center line of the web punch carried by head 16, a conventional visual readout counter (not shown) is activated to advise the operator of the longitudinal distance of the beam end 15A from the center line of the punch (i.e., the zero reference point). At the desired distance, the beam is stopped and the desired web hole or holes are punched in the vertical leg (web) of the beam through vertical positioning of the web punch. Afterwards, the beam is caused to advance through to the horizontal substation where the desired flange hole or holes are punched in the horizontal legs (flanges) of the beam. Since the vertical punch substation and the horizontal punch substation are longitudinally separated, another conventional sensing indicator (not shown) is provided for the operator to determine the distance of the end 15A of the beam from this substation at all times.

With reference to FIGS. 5 and 6, it will be noted that the longitudinal vertical plane (i.e., the web) of the beam 15 is maintained in a centered relationship within the station which fixes and maintains its travel path by means of four sets of pinch rolls 17A, 17B, 17C and 17D which are interconnected through meshed gears 18A, 18B, 18C, 18D and 18E and hydraulically powered by a common cylinder C, all located topside of the station.

Referring to FIG. 3, the head 16 of the vertical punch substation is shown to comprise an open-ended box structure having a top wall 30, a bottom wall 31, end walls 26, 29 and a pair of spaced mounting walls 27, 28 extending between the top and bottom walls in spaced parallel relation to the end walls. A web 28A (FIG. 5) integrally joins mounting wall 28 with end wall 29 to provide structural strength. Similarly, web 26A (FIG. 5) joins mounting wall 27 with end wall 26.

The head 16 is mounted to slide up and down within the main station frame 24 by securing the top wall 30 through attached bearing blocks 33 and 37 to top support shaft 32 which has its opposite ends axially slidably mounted within saddles 38, 40 that are slidably interlocked with guide ways 39, 41 respectively. Similarly, the head bottom wall 31 is secured through attached bearing blocks 43, 44 to bottom alignment

shaft 42 which has its opposite ends axially slidably mounted within saddles 45, 46 that are slidably interlocked with guide ways 39, 41. A pin connects the shaft 47 of a hydraulic cylinder 48 between journal blocks 34, 36 for controlling vertical movement of the head 16. In order to allow for various thicknesses of workpiece webs, the entire head 16 is allowed to float slightly to the right during punching and stripping against compression springs 49, 50 which return it to center after punching and stripping is completed.

A hydraulic punch P1 is mounted approximately midway between the top and bottom walls 30, 31 of the head 16 between mounting wall 28 and end wall 29 and consists of a hydraulic cylinder 53, punch ram 52 and a mating die seat 54.

As will be described more fully below, the limits of up and down excursion of the head 16 within the frame 24 are established through the placement of stops 63 and 64 which are vertically adjustably mounted to the frame side walls. A pair of contact limit switches LS12 and LS13 are connected to control cylinder 48 and are fixed to ride with the head 16 to respectively engage the stops 63 and 64 at the limits of the desired head travel.

Vertical travel of head 16 is further controlled by an indexing arrangement which functions to sequentially position the punch P1 at predetermined vertically spaced punching locations relative to the workpiece 15. In the illustrated arrangement the indexing mechanism consists of a cam rod 58 which is slidably mounted on a guide rod 55 that extends vertically between the top and bottom walls of the main frame 24. The camrod 58 includes a plurality of cam lobes 57, the vertical spacings of which can be varied as required by the specific punching operation to be performed. The upper portion 58A of the camrod is threaded and is shown in mating threaded connection with a transversely extending cam roller arm 59. Arm 59 has an opening 59A slidably journaled to a guide rod 56 that extends vertically adjacent camrod 58. Cam roller arm 59 mounts at one end thereof a pair of cam rollers 60 (only one shown) and a web gauge scale 61 at the other. An indicator pointer 62 is connected to ride with the head 16 and extends transversely thereof through elongated vertical slot S provided in the side wall of the frame 24. A limit switch LS11 is connected to control both cylinder 48 and the punch P1 and is mounted to ride with the head 16 so as to engage the lobes 57. Upon engagement with one of the lobes 57, switch LS11 causes vertical movement of the head to cease and signals initiation of a punching operation. Upon completion of a punching operation, cylinder 48 is signaled to resume movement of the head until the switch LS11 engages the next lobe 57. Thus, it will be understood that the number and spacing of the lobes as well as the vertical position of the camrod 58 relative to the workpiece determines the number and location of holes to be punched. It will be noted that camrod 58 is maintained in the proper elevation relative to the workpiece even though there may be irregularities in the depth and camber of the workpiece as a consequence of the riding engagement of the cam rollers 60 with the workpiece.

FIG. 4 illustrates the horizontal or flange substation. As previously stated, this substation includes a top head 65 which is vertically movable along tracks R (FIG. 6) which extend vertically along opposite side walls of the main station frame 24. The head 65 provides a slide bed on which a pair of gang-coupled conventional flange punches P2 and P3 are horizontally movable transversely of the workpiece 15. Vertical movement of head 65 is controlled by a hydraulic cylinder 71; hydraulic cylinder 73, suitably fixed to ride outboard with head 65, controls horizontal movement of punches P2 and P3. In a similar manner, hydraulic cylinder 72 controls vertical movement of a lower head 68 and outboard cylinder 74 controls horizontal movement of gauged punches P4 and P5 carried by head 68.

As will be explained more fully below, downward travel of the top head 65 is controlled by limit switches LS1 and LS1' which are mounted in side-by-side relation (see FIG. 1) to the underside of the top head 65 so that upon engagement with the top surface of the workpiece, the punches P2 and P3 will be positioned at the proper relative elevation with respect to the top flanges of the workpiece 15. Similarly, upward travel of the bottom head 68 is controlled by limit switches LS5 and LS5' mounted to the topside of head 68. Stops 90 and 91, adjustably mounted to opposite sides of the main frame 24, are engageable with limit switches LS4 and LS9, riding respectively with heads 65 and 68 to establish an upper travel limit for head 65 and a lower travel limit for head 68.

To control horizontal movement of the top and bottom sets of punches relative to the workpiece, indexing mechanism comprising a horizontal cam screw 75, having adjustable cam lobes 76, and a horizontal cam screw 77, having adjustable lobes 78, are respectively fixedly mounted to the top and bottom heads. A limit switch LS2 is mounted to ride horizontally with punches P2 and P3 so as to engage the lobes 76. Similarly, limit switch LS6 rides with punches P4 and P5 so as to engage lobes 78. Thus, for example, once proper relative elevation of the top head 65 is established through engagement of limit switch LS1 with the workpiece, cylinder 73 is actuated to move the punches P2 and P3 either right or left, depending on which flange is to be punched. If it is desired to punch the left flange (as shown in FIG. 4) cylinder 73 is actuated to move the punches, as well as limit switch LS2, to the right (to the position shown in dotted in FIG. 4) until limit switch LS2 engages the right-hand preset cam lobe 76 at which time limit switch LS2 deactivates cylinder 73 and causes the punch P2 to be triggered to punch the flange. As will be explained below, in the form disclosed herein, upon completion of the punch operation, cylinder 73 is signaled to drive the ganged punches P2 and P3 to the left until they are again centered with respect to the workpiece. Accurate re-centering of the punches is established when a cam C1, which is fixed to ride with the punches along the slide bed of head 65, engages limit switch LS3 which is fixed relative to head 65.

Thus, it will be understood that the position of cam lobes 76, 78 determines the flange punch locations on the workpiece. To facilitate accurate setting of the cam lobes, a scale 80 and indicator pointers 81, 82, which are respectively fixed to ride with ganged punches P2, P3 and P4, P5 are shown incorporated in FIG. 4.

With reference to FIG. 6, in order to provide firm engagement between the workpiece and the die seats of the top set of punches P2 and P3, a pair of hold-down cylinders 90 (only one shown) are mounted on the front and back of the top head 65 to exert downward pressure on the workpiece so as to force the top head upwardly until the punch die of the previously positioned punch presses against the underside of the flange to be punched.

For purposes of complete illustrative disclosure, a typical hydraulic system for the cylinders controlling the position of the punches relative to the workpiece (cylinders 48 and 71–74) is shown in FIG. 7. A typical hydraulic system for the cylinders powering the five punches is shown in FIG. 8. In the presently preferred form, the hydraulic systems of FIG. 7 and 8 are complemented by the electrical system diagrammed in FIG. 9 such that the machine can be operated on a full manual basis by utilizing a jog system of operation (by the jog system it is meant that the operator must hold a particular push button down in order to maintain the function he wishes) or a particular punch may be cycled through all of its positioning and punching operations. The latter operations may be provided for by three "jog-cycle" switches (not shown) which respectively control the top and bottom heads 65, 68 of the horizontal substation and the head 16 of the vertical substation. Up-down, left-right, and punch-strip push buttons (not shown) and may be provided for jogging.

The following legend is keyed to the circuit diagrams of FIGS. 7 to 9:

| Symbol | Description |
|---|---|
| MC | Magnetic Contactor |

| | |
|---|---|
| L.S. | Limit Switch |
| CR 3 | Coil of Relay No. 3 |
| P.S. | Hydraulic Pressure Switch |
| R–7 | A set of contacts on Relay 7 |
| GE | On Delay Timer |
| TD | Off Delay Timer |
| T.H. | Top Holddown Solenoid |
| T.D. | Upper Head 65 Down Solenoid |
| B.U. | Bottom Head 68 Up Solenoid |
| WU | Web Head 16 Up Solenoid |
| T.L. | Top Head Left Solenoid (Cylinder 73) |
| T.R. | Top Head Right Solenoid *Cylinder 73) |
| BL | Bottom Head Left Solenoid (Cylinder 74) |
| BR | Bottom Head Right Solenoid (Cylinder 74) |
| WP | Web Punch Solenoid |
| WS | Web Strip Solenoid |
| TP | Top Head Punch Solenoid |
| TS | Top Head Strip Solenoid |
| BP | Bottom Head Punch Solenoid |
| BS | Bottom Head Strip Solenoid |

It will be noted that in the preferred form illustrated herein, the hydraulic cylinders driving punches P2 and P3 and the hydraulic cylinders driving punches P4 and P5 are each respectively controlled by solenoid actuated four-way directional valves V1 and V2 (FIG. 7). Similarly, cylinder 53 driving punch P1 is controlled by a solenoid actuated four-way directional valve V3. The punch positioning cylinders 48 and 71–74 each are controlled by solenoid actuated two-way directional valves V4–V8.

Detailed explanation of the hydraulic and electrical systems of FIGS. 7–9 is unnecessary. However, for the sake of completeness the operation of the hydraulic and electrical systems through job cycle sequences for punching the web, top left flange, and bottom right flange is briefly outlined below.

To initiate a job cycle sequence for punching, for example, the holes H1, H2, and H3 (FIG. 2) in the web of the workpiece, a web cycle starting switch (not shown) is actuated to cause current flow through the normally closed contacts of limit switch LS11 into the web head up solenoid WU raising the head 16 from its position as shown in FIG. 3 until limit switch LS11 engages the first preset lobe 57 on the camrod 58. This opens the normally closed contacts of LS11 thereby opening the circuit to solenoid WU, closes the normally opened contacts in limit switch LS11 thereby closing the circuit to the web punch solenoid WP. When the punch ram 52 advances to the end of its stroke, a pressure of 5,000 psi is built up permitting the current to momentarily go through pressure switch PS1 which closes the circuit to and through pressure switch PS2 and deactivate the ram punch advance solenoid WP. Directing the current through pressure switch PS2 activates the punch ram retractor strip solenoid WS. When the punch ram 52 has completed its retract stroke, a pressure of 1,000 psi is built up in pressure switch PS2 which deactivates the punch ram retract solenoid WS, closes a timed circuit to the web up solenoid WU and opens the circuit to pressure switch PS2. As cylinder 48 raises the head 16, limit switch LS11 loses engagement on the lobe and maintains the circuit, since the timer cuts off before limit switch LS11 will engage the next lobe. The above-described functions repeat until limit switch LS12 engages stop 64 which closes the circuit to limit switch LS12 and opens the circuit to limit LS11. When limit switch LS12 is closed, it activates the web down solenoid WD, causing the head 16 to go down until limit switch LS13 engages stop 63. This opens all circuits, ending the cycle.

The sequence of operation to punch the top left flange is initiated upon actuating a cycle switch (not shown) for punch P2 which closes a circuit to limit switches LS1 and LS1', thereby causing solenoid TD controlling cylinder 71 to activate to cause the top head 65 to move downward from the position shown in FIG. 4 until either of limit switches LS1 or LS1' touch the workpiece 15. Upon engagement of the workpiece by either limit switches LS1 or LS1', the circuit is directed to limit switch LS2 and the circuit is deactivated to the down solenoid TD. When the circuit is directed through limit switch LS2, the right solenoid TR controlling cylinder 73 is activated to cause the carriage TC to move to the right until switch LS2 engages the right cam lobe on the cam screw 75. The position at this time of the punches P2 and P3 is shown in dotted in FIG. 4. Upon engagement of the limit switch LS2, the top hold-down solenoid TH controlling hold-down cylinders 90 is activated, the solinoid for punch P2 is activated, and the right solenoid TR for cylinder 73 is deactivated. When the solenoid TH for the hold-down cylinders 90 is activated, the hold-down cylinders 90 exert downward pressure against the workpiece, causing the top head 65 to float upward until the punch die of punch P2 presses against the bottom of the top flange. It will be noted that this is accomplished by a check valve teed onto the hydraulic pressure lines serving the outside of the head elevating cylinder. (The lower side of the cylinder is never under pressure since the head comes down by virtue of its own weight when the solenoid valve is actuated for down motion).

It will be appreciated from FIG. 9 that the punch ram advance solenoid for punch P2 was also activated, but due to smaller volume of oil required by the hold-down cylinders 90, the upward motion of the head 65 is completed before the punch P2 contacts the flange or the workpiece.

It will be noted that the punch ram for punch P2 is on a separate hydraulic circuit (FIG. 8) from the positioning hydraulic circuit (FIG. 7). When the punch ram advances to the end of its stroke, a pressure of 5,000 psi is built up permitting the current to momentarily go through pressure switch PS1 which closes the circuit to and through pressure switch PS2 and deactivates the punch ram advance solenoid TP. Directing the current through pressure switch PS2 results in the punch ram retract or strip solenoid valve being activated. Then the punch ram for punch P2 has fully retracted a pressure of 1,000 psi is built up in pressure switch PS2 which closes the circuit to limit switches LS1 and LS1', deactivates the punch ram retract solenoid TS and opens the circuit to pressure switch PS2 and deactivates the hold-down cylinders 90. Closing the circuit to limit switches LS1 and LS2 results in energization of the upper head down solenoid TD thereby moving head 65 down so that limit switches LS1 or LS1' engage the top of the beam. Such closes the circuit to limit switch LS3 and deactivates the left solenoid TD. Closing of the circuit to limit switch LS3 activates the left solenoid TL for cylinder 73, there by moving the punches P2 and P3 to the left until the top carriage TC is centered limit switch LS3 contacts a cam lobe C1 on the punch slide bed. This directs the circuit to the top up solenoid TU and deactivates the left solenoid TL. The head 65 rises until limit switch LS4 engages stop 90 to open all circuitry and end the cycle.

The job cycle sequence of operation to punch the bottom right flange is initiated by actuating a cycle switch (not shown) for punch P5 which closes a circuit to limit switches LS6 and LS7 causing the up solenoid BU to activate, thus moving the lower head assembly 68 upward until limit switch LS5 or LS5' touch the beam. This closes the circuit to limit switch LS6 and deactivates up solenoid BU. When the circuit is directed through limit switch LS6 the left solenoid BL is activated causing the ganged punches P4 and P5 to move to the left until limit switch LS6 is engaged. This activates punch ram advance solenoid BP, activates the down solenoid valve BD, and deactivates left solenoid BL. When the down solenoid BD is activated, the head 68 lowers so that the die of punch P5 bears on top surface of the bottom right flange of the beam. The head 68 is not powered down by its elevating cylinder 72 but falls from its own weight which does not exert undue loading of the workpiece. When the punch ram (which it will be noted, is on a separate hydraulic circuit from the motion apparatus) advances to the end of is stroke, a pressure of 5,000 psi will be built up. This permits the circuit to momentarily go through pressure switch PS1 closing the circuit to pressure switch PS2 and deactivates punch ram advance solenoid BP. Directing this current through pressure switch PS2 activated

punch ram retract or strip solenoid BS. When the punch ram has fully retracted, a pressure of 1,000 psi is built up in pressure switch PS2 which closes the circuit to limit switches LS5 and LS5', opens the circuit to pressure switch PS2 and deactivates the punch ram retract solenoid BS. Closing the limit switch LS5 and LS5' circuit activates head up solenoid BU moving head 68 up so that limit switches LS5 and LS5' engage the bottom of the beam. This closes the circuit to and through switch LS7 and deactivates the up solenoid BU. Closing the circuit through limit switch LS7 activates left solenoid BL thereby moving punch P5 to the left until limit switch LS7 is contacted by means of cam C2 on the head slide bed. This deactivates the left solenoid BL, activates the down solenoid BD causing head 68 to lower to its initial starting point (FIG. 4), engaging limit switch LS8 to open all circuitry, ending the cycle.

It will be appreciated that the construction of this machine may be alternated or varied by different means of sensing the location of a punch head such as hydraulic, pneumatic, electronic of fluidic devices. The means of moving the punch heads and punching holes could be powered screws instead of hydraulic cylinders. Hydraulic, pneumatic, electronic, or fluidic circuitry may be substituted for the electrical circuitry used on the pilot machine.

Thus, while preferred constructional features of the invention are embodied in the structure illustrated herein, it is to be understood that changes and variations may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

What is claimed is:

1. In an apparatus for punching an elongated structural member, the combination comprising means for supporting the member in lengthwise-extending relation along a horizontal travel path, and means defining a punching station positioned in intercepting relation to the travel path and including main frame structure having opposed side frame portions in straddling relation to the travel path, first, second and third heads, each carrying separate punch assembly means for punching said member and mounted between said side wall portions in vertically tracked engagement therewith for movement in a direction transverse to the travel path, the first of said heads being movable in a first vertical plane transverse to the travel path, the other of said heads being movable in a common second plane paralleling said first plane and spaced therefrom, the punch assembly means carried by said other of said heads each being in horizontally tracked engagement with the corresponding head for horizontal movement in a direction transverse to the travel path, means for independently vertically moving said heads, and means for horizontally moving the last-named punch assembly means.

2. In an apparatus according to claim 1 wherein means defining a punching station further includes guide means engageable with the member for positioning the member in predetermined-punching relation within the station.

3. In an apparatus in accordance with claim 1 wherein means for independently vertically moving said heads includes separate hydraulic drive means for each of said heads, said means for horizontally moving the last-named punch assembly means including separate hydraulic drive means for each of said last-named punch assembly means.

4. In an apparatus for punching an elongated structural member having web and flange leg portions, the combination comprising: means for supporting the member in lengthwise-extending relation along a horizontal travel path, and means defining a punching station positioned in intercepting relation to the travel path, said punching station including a main frame, guide means supported by the frame and engageable with said member for positioning the same in said station with its web leg portion in a fixed vertical plane, a first head supported by said frame for vertical movement in a first plane transverse to said travel path, second and third heads supported by said frame for vertical movement in a common plane paralleling said first plane and spaced therefrom, a web punch assembly for punching web holes in said member and mounted to ride with said first head in embracing relation to said fixed vertical plane, first and second pairs of flange punch assemblies for punching flange holes in said member and respectively mounted in flanking relation to said fixed vertical plane for horizontal ganged movement along the second and third of said heads in a direction transverse of the travel path, first drive means for independently vertically moving each of said heads, and second drive means for individually horizontally moving each of said pairs of punch assemblies.

5. In an apparatus in accordance with claim 4 wherein said station further includes vertical indexing mechanism cooperable with said first drive means for effecting predetermined punching registry of the web punch assembly with the web leg portion of the member, and horizontal indexing mechanism cooperable with said second drive means for effecting predetermined punching registry of each said pairs of punch assemblies with the flange leg portions of the member.

6. In an apparatus in accordance with claim 4 wherein said first drive means includes separate hydraulic cylinder means for each of said heads, said second drive means including separate hydraulic cylinder means for each of said pairs of punch assemblies.

* * * * *