W. G. REID.

BEAM NOTCHING DIE.

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912,324.

Patented Feb. 16, 1909.

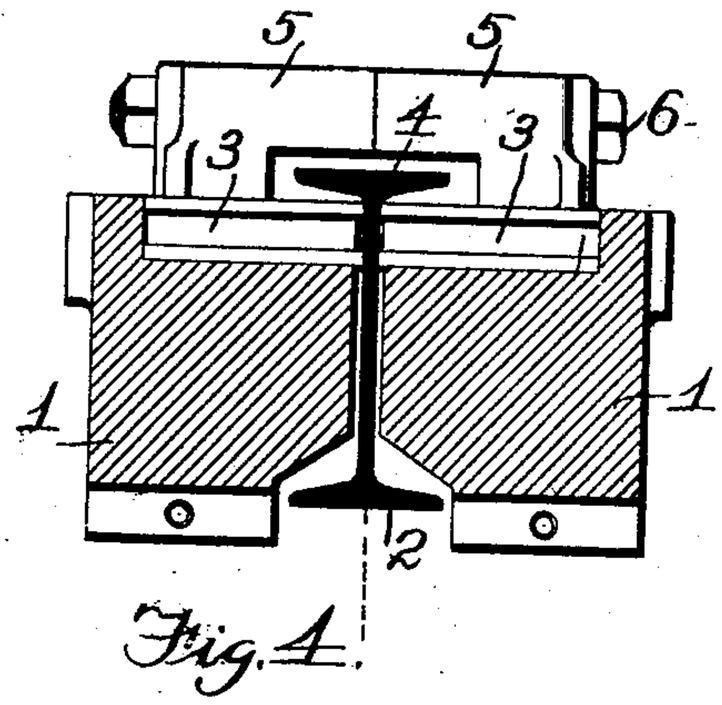

Fig. 1.

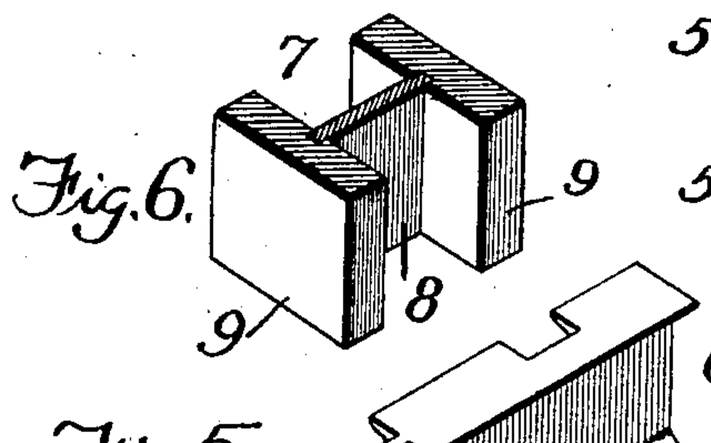

Fig. 6.

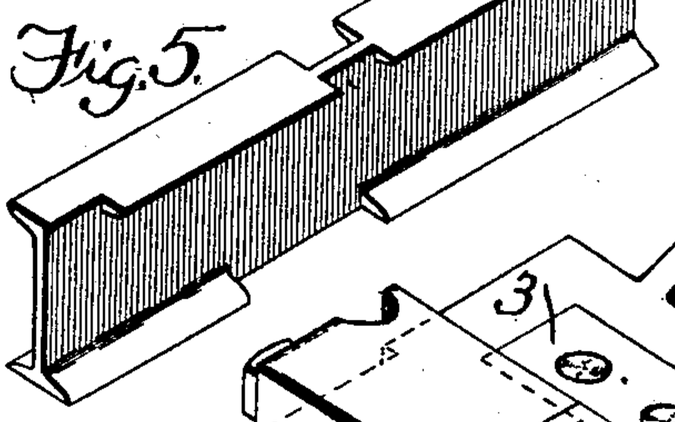

Fig. 5.

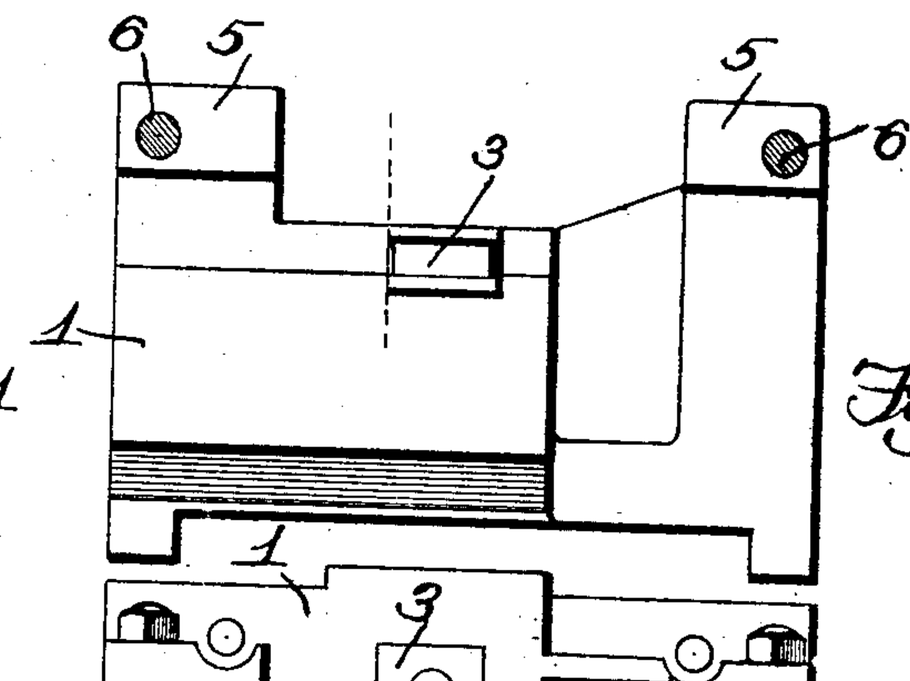

Fig. 3.

Fig. 2.

Fig. 1.

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BEAM-NOTCHING DIE.

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To all whom it may concern:

Be it known that I, WILLIAM G. REID, a citizen of the United States, residing at Cold Spring, Putnam county, New York, have invented certain new and useful Improvements in Beam-Notching Dies, of which the following is a specification.

This invention pertains to improvements in dies for cutting notches in the flanges of structural beams and will be readily understood from the following description taken in connection with the accompanying drawing in which:—

Figure 1 is a perspective view of a beam-notching die exemplifying my invention: Fig. 2 a plan of the same: Fig. 3 an elevation of the inside face of one of the die-blocks: Fig. 4 a vertical transverse section of the die: Fig. 5 a perspective view of an I-beam having several notches in the flanges illustrating the work of the die: and Fig. 6 a perspective sectional view of a plunger or punch adapted for use with the improved die. Fig. 5 is upon a smaller scale than the other figures.

In the drawing:—1, indicates a pair of die-blocks adapted to be secured to the stationary jaw of any ordinary suitable punching or shearing machine in which the notching tools are to be substituted for the usual punching or shearing tools, these die-blocks being disposed side by side with a vertical gap between them: 2, the vertical gap between the inner portions of the two die-blocks, this gap being of a width sufficient to freely admit the web of the beam whose flange is to be notched: 3, the dies proper, the same being secured to the tops of the die-blocks and having their inner ends a distance apart corresponding substantially with the thickness of the web of the beam, the upper corners at the inner ends and the sides of these dies being formed for shearing action: 4, an I-beam which has been passed through the gap between the inner ends of the dies and has its upper flanges resting on the dies at the location at which it is desired to cut the notches in the flange of the beam: 5, a pair of upwardly and inwardly extending lugs at each end of the die-blocks, to the front and rear of the dies, the upper inward portion of these lugs joining each other so that the lugs form arches over the beam to the front and rear of the dies: 6, bolts passing horizontally through the upper portions of the lugs and holding them firmly together, whereby the two die-blocks become solidly united and the two dies held in unyielding relationship to each other: 7, a punch adapted to be secured to the slide or movable jaw of the machine, over the dies and to coöperate with the dies, the punch having an H-shaped horizontal section: 8, the cross-bar portion of the punch, the same having a thickness corresponding with the width of the gap between the dies: 9, the heads of the punch, the cross-bar 8 joining these heads at their centers of width, the distance between the inner faces of the heads of the punch corresponding with the width of the dies, and the outward projection of the heads, from the cross-bar, being equal to the greatest projection of beam-flange or greatest depth of notch to be cut: and 10 depressions in the top of the die-blocks to the front and rear of the dies to permit the descent of the uncut portions of the beam flanges under the influence of the punch.

If the parts are to cut notches of invariable width then that invariable width would be the width of the dies, but if the dies are to be employed in cutting notches of variable width then the width of the dies is to correspond with the minimum width of notches to be cut.

The dies are to be so adjusted under the punch that the cross-bar 8 of the punch will pass down into the gap between the inner ends of the dies and the heads of the punch straddle the inwardly projecting ends of the dies. The cutting portions of the dies are provided with clearance, that is to say, they are relieved below the cutting corners, and the punch, following the usual practice of shearing tools will have proper clearance from its cutting corners upwardly. It is my practice, in making the dies, to form all of their corners, both upper and lower and end and side, as cutting corners, and to form central reliefs across their ends and along their side edges so that each die contains four cutting edges within itself, that is to say, the dies having been secured in the die-blocks may, when their active edges get

dull, be reversed endwise in the die-blocks, thus presenting new cutting edges, and they may also be turned over so as to provide two additional cutting edges for each die. In using the dies, the beam is to be pushed endwise through the gap between the blocks and between the dies, with the upper flange passing under the arches and resting on the dies in such position that the dies correspond with the position of the notches to be cut. In this condition the beam is held in a position of abnormal elevation by the inner corners of the dies engaging the fillets of the flanges. The punch is now to be brought down upon the beam and the motion continued till the lower end of the punch is below the top face of the dies. This motion of the punch results in pushing the beam downwardly, the cross-bar of the punch pushing downwardly on the metal over the beam, while the heads of the punch push downwardly on the flange metal to the front and rear of the dies. The result is that, when the beam has been thus pushed down, the dies cut opposite notches in each of the upper flanges of the beam, the wads or removed portions lying on the upper surfaces of the dies. The notches thus cut will have a width corresponding with the width of the dies, and if wider notches are wanted then the beam is replaced and additional bites taken out of one or the other of the shores of the notches. If it be desired to notch but one flange of the beam, then the appropriate one of the dies is to be removed. If it be desired to notch channel-beams, having but a single flange at each edge of its web then both dies may, if desired, be left in position the same as in notching both flanges of I-beams.

In Fig. 5 is illustrated a beam having near the middle of length of its upper flange a notch in each side flange, while near one end is shown a notch in one of the side flanges only, and at the opposite end the top-flange has had one side flange cut out clear to the end of the beam, and one of the lower flanges is shown as having a comparatively long notch.

I claim:—

1. Beam-notching dies comprising, a die-block structure having a gap to permit the entire lengthwise passage of the web of a beam, a pair of dies secured in the top of the die-block structure in such position that their inner ends will be over the gap in the die-block structure and separated from each other, and an H-shaped punch adapted to coöperate with the corners of the ends and sides of the dies, combined substantially as set forth.

2. Beam-notching dies comprising, a pair of die-blocks disposed side by side but separated from each other so as to permit the entire lengthwise passage of the web of a beam, a die secured to the top of each die-block in such position that the inner ends of the dies will be over the gap between the die-blocks and will permit the entire lengthwise passage of the web of the beam, and an H-shaped punch adapted to coöperate with the corners of the ends and sides of the dies, combined substantially as set forth.

3. Beam-notching dies comprising, a die-block structure having a gap to permit the entire lengthwise passage of the web of a beam, a pair of dies secured in the top of the die-block structure in such position that their inner ends will be over the gap in the die-block structure and separated from each other, an arch extending over the gap in the die-block structure at one side of the dies and adapted to permit the endwise passage under it of beam flanges resting upon the dies, and an H-shaped punch adapted to coöperate with the corners of the ends and sides of the dies, combined substantially as set forth.

4. Beam-notching dies comprising, a die-block structure having a gap to permit the entire lengthwise passage of the web of a beam, a pair of dies secured in the top of the die-block structure in such position that their inner ends will be over the gap on the die-block structure and separated from each other, arches extending across the gap in the die-block structure at each side of the dies and adapted to permit the entire endwise passage of beam flanges resting upon the dies, and an H-shaped punch adapted to coöperate with the corners of the ends and sides of the dies, combined substantially as set forth.

5. Beam-notching dies comprising, a pair of die-blocks disposed side by side with a gap between them to permit the entire lengthwise passage of the web of a beam, lugs projecting upwardly and inwardly from the tops of the die-blocks into abutting connection with each other and forming an arch extending over the gap between the die-blocks and adapted to permit the endwise passage of the flanges of a beam whose web is passing between the die-blocks, a pair of dies secured in the tops of the die-blocks and having their inner ends over the gap between the die-blocks and separated from each other, bolts passing through the lugs and clamping their abutting portions together, and an H-shaped punch adapted to coöperate with the corners and ends and sides of the dies, combined substantially as set forth.

6. A die-block structure having a gap to permit the entire lengthwise passage of the web of a beam, a pair of die-blocks secured

in the top of the die-block structure in such position that their inner ends will be over the gap in the die-block structure and separated from each other, said dies being reversible by being turned end for end and also reversible by being turned bottom side up, and an H-shaped punch adapted to coöperate with the corners of the ends and sides of the dies, combined substantially as set forth.

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