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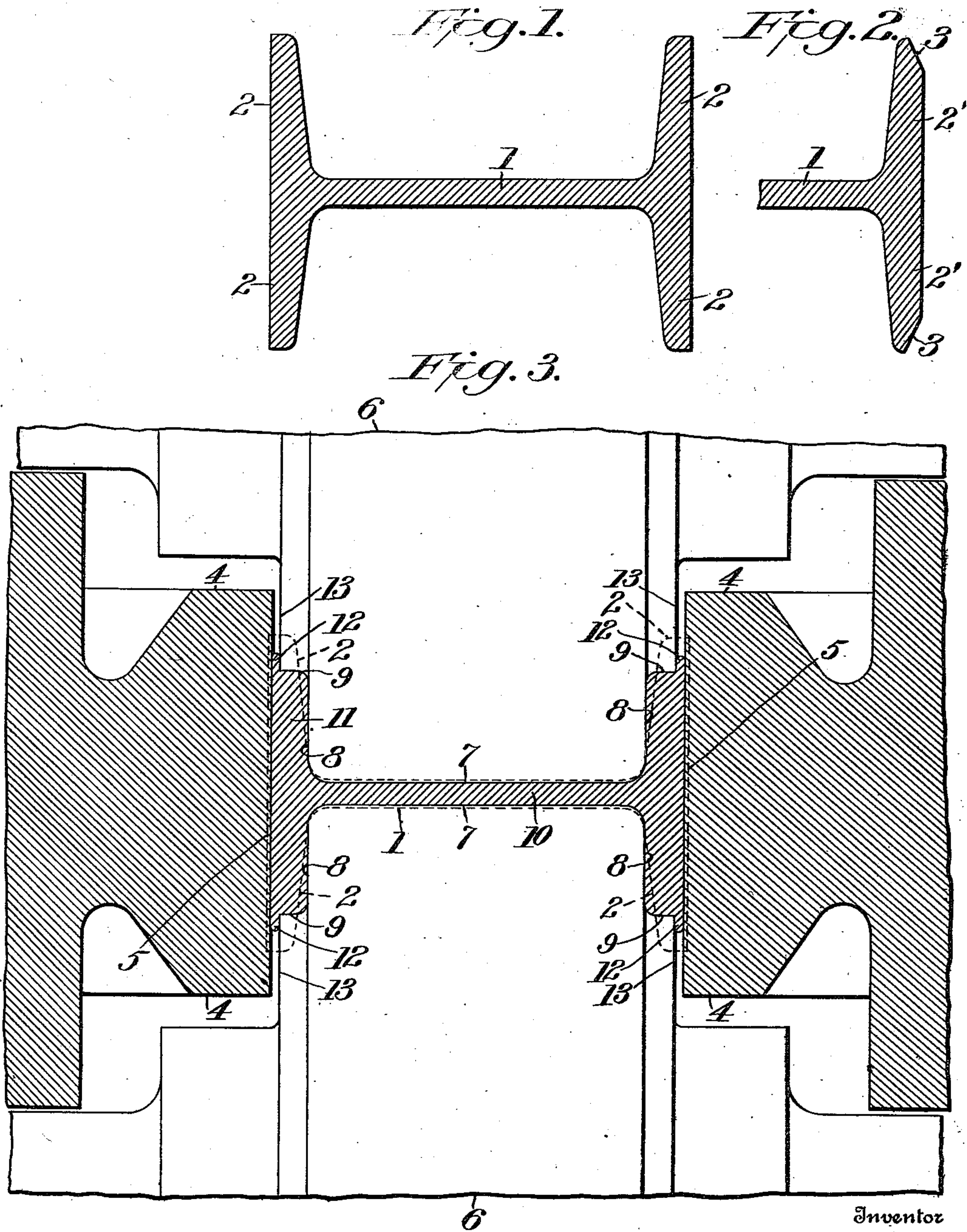
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METHOD OF FORMING I-BARS WITH TAPERLESS FLANGES.

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983,601.

Patented Feb. 7, 1911.



Inventor

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# UNITED STATES PATENT OFFICE.

HUGO SACK, OF DUSSELDORF, GERMANY; ADELHEID SACK SOLE HEIR OF SAID HUGO SACK, DECEASED.

## METHOD OF FORMING I-BARS WITH TAPERLESS FLANGES.

983,601.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed November 2, 1908, Serial No. 460,601. Renewed October 4, 1909. Serial No. 520,828.

*To all whom it may concern:*

Be it known that I, HUGO SACK, a subject of the Emperor of Germany, residing at Dusseldorf, Rhenish Prussia, Germany, have invented certain new and useful Improvements in Methods of Forming I-Bars with Taperless Flanges, of which the following is a specification.

This invention is a method of producing I-beams with taperless flanges.

Referring to the accompanying drawing; Figure 1 is a cross section of one preliminary form of bar from which the finished I-beam may be rolled; Fig. 2 is a cross section of a portion of a modified preliminary form of bar, and Fig. 3 is a front elevation of a mill having four rolls, arranged in the same plane, for rolling the preliminary bar into the finished I-beam, which is shown in section in the pass of the rolls.

In practicing the method, an I-bar, either of the types shown in Figs. 1 or 2 or of any other form having tapering flanges, is passed through a mill of the type shown in Fig. 3, comprising opposed vertical rolls having working faces which bear against the outer sides of the flanges, and opposed horizontal rolls having working faces which bear on the web and inner sides of the flanges of the bar, and shoulders which act on the edges of the flanges to displace the metal inward toward the plane of the web until both sides of the flanges are forced into contact with the adjacent parallel faces of the horizontal and vertical rolls.

The preliminary bar shown in Fig. 1 is of the ordinary commercial form, having a web 1 with pairs of marginal, tapering, oppositely-disposed flanges 2, the outer faces of the flanges being vertical and the inner faces on each side of the web converging toward the web.

The preliminary bar shown in Fig. 2 has a web 1 with opposite tapering flanges 2', the outer faces of which are vertical and the inner faces of which incline inward toward the web. The edges 3 of the flanges are outwardly beveled.

The mill shown in Fig. 3 comprises two vertical rolls 4, having cylindrical working faces 5, and two horizontal rolls 6, having horizontal working faces 7, vertical working faces 8, and horizontal shoulders 9.

In employing the universal mill illustrated to produce an I-beam with taperless flanges, the preliminary bar, for example that shown in Fig. 1, is drawn into the pass of the rolls, the end of the web 1 preferably being formed into a projecting tongue which is initially engaged by the working faces 7 of the horizontal rolls, to effect the required tension on the bar. The bar is then gradually drawn, by friction, through the pass of the rolls. The faces of the horizontal rolls slightly compress the web of the bar, reducing its thickness to that, 10, of the finished I-beam. The shoulders 9 of the horizontal rolls press on the edges of the flanges 2 of the preliminary bar and displace the metal inward toward the plane of the web, until the opposite faces of the flanges are forced into contact with the adjacent vertical faces 5, 8, of the vertical and horizontal rolls, thereby converting the tapered flanges of the preliminary bar into parallel-faced or taperless flanges 11. During the shaping of the preliminary bar into the finished I-beam, it is somewhat elongated; and a portion of the edges of the bar-flanges 2 is displaced in the form of thin fins 12, into the narrow spaces between the faces 5 of the vertical rolls and the ends 13 of the horizontal rolls. The vertical rolls are preferably set so that the distance between their working faces is somewhat less than that between the outer sides of the flanges 2 of the preliminary bar, so that the metal in the flanges is simultaneously forced inward toward the vertical faces 8 of the horizontal rolls, thus forcibly compressing the metal of the flanges and giving them a smooth surface.

The preliminary type of bar shown in Fig. 2 may, in some cases, be employed to advantage, since, by reason of the beveled edges 3 of the flanges, the shoulders 9 of the horizontal rolls bear primarily on the portions of the edges remote from the spaces between the vertical rolls and the ends of the horizontal rolls, so that the flange-metal is displaced inward toward the web and laterally against the faces 5, 8, to produce the taperless flanges, but is not forced outward in fins into the narrow spaces at the ends 13 of the horizontal rolls.

When it is desired to produce an I-beam having flanges of great width, a bar of the



preliminary form shown in Fig. 1 and having flanges of the requisite width may be rolled in a universal mill, for example, that shown in my U. S. Letters Patent No. 5 365,100, dated June 21, 1887.

I claim:—

1. The process of producing I-beams with taperless flanges, which consists in first rolling a blank into a bar having a web with 10 pairs of marginal, oppositely-disposed, tapering flanges, and then rolling said bar into an I-beam having taperless flanges, by simultaneously forcing supports having parallel elements against the outer sides of the bar- 15 flanges and between said flanges and applying pressure to the edges of said flanges, the pressure being directed inward toward the plane of said web, thereby displacing the flange-metal inward and laterally until it

fills the taperless passes between said supports. 20

2. The method of forming beams having non-tapering flanges, which consists in the rolling down of the ingot or billet to a beam having marginal oppositely-disposed taper- 25 ing flanges, and then upsetting such flanges by pressure applied in directions at right angles to the plane of the web while such flanges are laterally inclosed between parallel elements, whereby the metal of the 30 flanges is caused to fill the space defined by said parallel elements.

In testimony whereof, I affix my signature in presence of two witnesses.

HUGO SACK.

Witnesses:

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