A. KLOMAN.

Manufacture of Metallic Beams and Girders.

No. 164,379. Patented June 15, 1875.

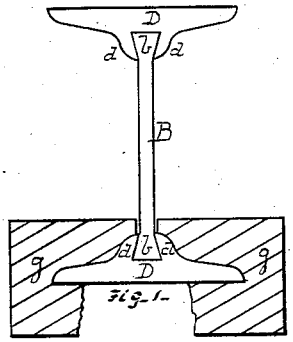

Fig. 1.

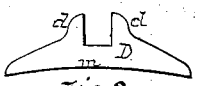

Fig. 2.

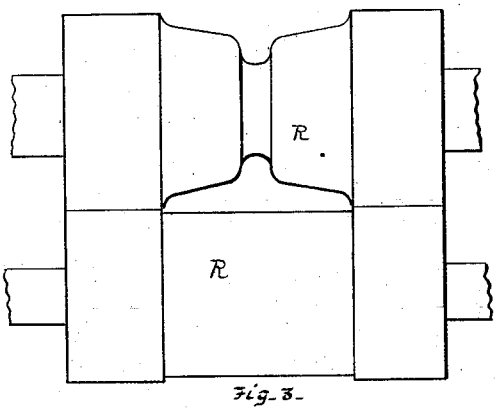

Fig. 3.

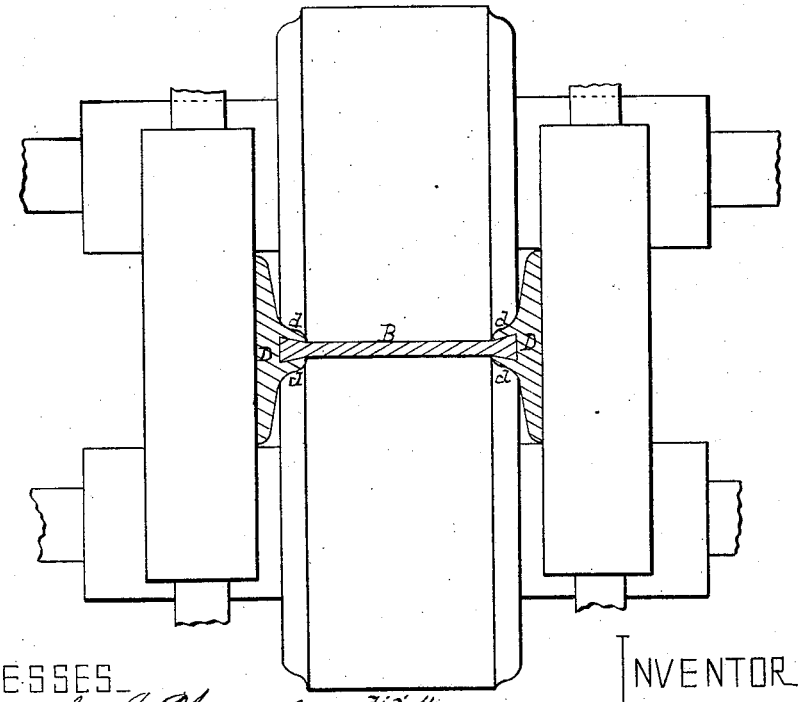

Fig. 4.

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UNITED STATES PATENT OFFICE.

ANDREW KLOMAN, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN THE MANUFACTURE OF METALLIC BEAMS AND GIRDERS.

Specification forming part of Letters Patent No. **164,379**, dated June 15, 1875; application filed March 27, 1875.

To all whom it may concern:

Be it known that I, ANDREW KLOMAN, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in I-Beams; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—like letters indicating like parts—

Figure 1 is an end view of my improved I-beam complete, and illustrative of a pair of compressing-dies for completing the same. Fig. 2 is an end view of one of the flanged heads of Fig. 1 as rolled preliminary to receiving the dovetail form in the groove. Fig. 3 is an elevation in outline of rolls suitable for the next pass of the head of Fig. 2. Fig. 4 shows a suitable set of compressing-rolls for completing the I-beam and the I-beam in sectional view.

My improvement relates to the manufacture of I-beams for use in bridges, large buildings, and other heavy structures. The beam is rolled in three separate parts—a web, base, and cap—and these are united by means of compression on a dovetail-joint. While it is capable of advantageous use in iron it is especially designed for use in making long steel beams, too long to be produced advantageously by former methods of operation. The web B of the beam is rolled in suitably-grooved rolls (the form of the grooves being obvious to the skilled iron-worker from the form of the web,) with the edges of the form in cross-section of the male part of a dovetail, as at *b b*. The flanged heads D are to be made with lips *d d*, Figs. 1 and 4, the space between which in cross-section gives the female part of the dovetail desired.

In making the flanged heads D D, I use grooved rolls, such as are common in iron-working, but with grooves (the form and arrangement of which will be understood by those skilled in the art) such as will, by successive passes, bring the material operated on to the form substantially as shown in Fig. 2, that which is to be the flat or outer side in the finished product being concave, as at *m*, and the adjacent faces of the lips *d* being parallel or slightly divergent, as in Fig. 2. Then, by another pass through a pair of rolls, R, properly grooved, such head-pieces are brought to the form shown in Figs. 1 and 4, so that the space between the lips *d* shall then give, in cross-section, the female part of a dovetail-joint; and in thus preparing these parts I so proportion them that the groove between the lips *d* shall at this stage of the operation be a little larger than the male part of the dovetail *b* in cross-section, whereby I am enabled to slip the male part lengthwise into the groove formed by the lips *d*. Then, by the use of suitable dies, such as are shown at *g g*, operated by hydraulic or other pressure, or by a swaging stroke, or by the use of an arrangement of suitably-grooved rolls, as the mechanical equivalent thereof, I press or force the lips *d* well down onto the parts *b*, so that they shall clamp the same firmly and securely.

The outline of two horizontal and two vertical rolls, such as are suitable for the purpose last named, are shown in Fig. 4; but in so far as relates to the present invention such rolls will form the subject-matter of a separate application.

This closing up and completion of the dovetail-joint will commonly be effected while the material is cold, or comparatively so, though coldness is not essential to the operation. The I-beam is then ready to be worked into the structure for which it is intended or is adapted.

The utility of this improvement in the form and use thus described arises partly from the fact that there is a growing demand for heavy steel beams of great length—say, from fifty to seventy feet—and it is almost a practical impossibility to keep such masses of steel, of such weight, length, and irregular form, at a working heat until finished by rolling, whereas by thus rolling them in sections, and uniting the sections as described, a beam possessing the necessary requirements can be produced without material difficulty.

What I claim as my invention, and desire to secure by Letters Patent, is—

The manufacture of I-beams in detached parts, with dovetail-joints united and compressed, substantially as set forth.

In testimony whereof I have hereunto set my hand.

ANDREW KLOMAN.

Witnesses:

JAMES M. CHRISTY,

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