

UNITED STATES PATENT OFFICE.

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ROLL FOR ROLLING BILLETS.

SPECIFICATION forming part of Letters Patent No. 663,485, dated December 11, 1900.

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To all whom it may concern:

Be it known that I, WILLIAM S. BIDLE, a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Rolls for Rolling Billets; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to improvements in rolls for rolling billets into blanks suitable for use in the formation of eyebars, and more especially into a blank for the purpose indicated, having each end terminating in a head and having a web connecting the heads together and enlarged centrally between the heads in thickness.

The object of this invention is to provide a pair of rolls of the character indicated that are exceedingly simple in construction and comparatively inexpensive, that have their blank-forming portions composed, respectively, of sections that are suitably assembled and separately secured together, and that are suitable for rolling blanks having short or long heads, as may be required.

With this object in view the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is an end elevation, in central vertical section, of a pair of rolls embodying my invention. Fig. II is a side elevation of the rolls. Fig. III is a transverse section on any one of lines III III, Figs. I and II. Fig. IV is a transverse section on any one of lines IV IV, Figs. I and II. Fig. V is a side view of a billet that is to be converted into a blank suitable for use in the manufacture of eyebars. Fig. VI is an end view of the billet. Fig. VII is a side edge view of the blank. Figs. V and VI show a billet *a*, that is to be rolled into the shape required to form the blank *b*, employed in the production of an eyebar and illustrated in Figs. VII and VIII. The billet is a piece of steel or wrought-iron quadrangular in end elevation and of suitable length.

The blank *b* has each end terminating in a

head *b'* and has a web *b²*, connecting the two heads. The web *b²* is enlarged in thickness centrally between the heads along about three-fifths of the length of the web. The web *b²* is provided upon each side with ribs *b³*, arranged transversely of the web and at suitable intervals longitudinally of the web.

Figs. I, II, III, and IV illustrate the rolls *c* employed in the formation of the blank. Two parallel rolls *c* and *c* are arranged horizontally, one directly above the other, and supported from housings or standards (not shown) and operated in any approved manner. Each roll upon its peripheral surface is provided with a channel *c'*, that extends circumferentially of the roll a suitable distance, preferably somewhat less than half-way around the roll. The end portions *c²* of the channel of each roll have greater depth than the remaining or central portion of the channel, and the heads *b'* of the blank *b* are formed within the deeper portions *c²* of the channels of the rolls. The web *b²* of the blank *b* is formed within the central or shallower portion of the channels of the rolls, and the end portions *c³* of the central or shallower portion of the channel of each roll are somewhat decreased in depth, as required, to form the thinner portion of the web next to the heads of the blank. The central outwardly-facing wall of the central or shallower portion of each channel *c'* is provided with grooves *c⁴*, that extend transversely of the said wall and are arranged at suitable intervals longitudinally of the wall, and the ribs *b³* of the blank are formed within the grooves *c⁴* of the rolls. The rolls rotate during their operation in the direction indicated by the arrows *d* in Fig. I, and each roll at the receiving end of its working receiving-channel is provided with a stop-forming shoulder *c⁵*, that forms an abutment and a gage for the work preparatory to the rolling operation, and the billet or work is pushed and held against the abutments *c⁵* of the two rolls until the rolls have commenced to operate upon the billet. The outwardly-facing grooved wall of the shallower portion of each roll constitutes the rolling-surface of the said roll, and the entrance of material from the billet or work being rolled into the grooves *c⁴* of the rolling-surfaces of the rolls

prevents creeping or displacement of the work circumferentially of the rolls during the rolling operation.

The opposing side walls of the channel of each roll are formed by different plates or sections 11 and 12, respectively. The sections 11 and 12 of each roll are fixed in place, as will hereinafter appear. The said members 11 and 12 are parallel and correspond in construction and dimensions and are arranged the distance apart required to form between them a channel of the proper width. The central and outwardly-facing wall of the channel of each roll is formed by a plate or section 13, that is interposed between and suitably secured to the sections 11 and 12 of the roll. The three channel-forming sections 11, 12, and 13 of each roll are preferably clamped together by bolts 14 and nuts 15 and have registering holes at suitable intervals circumferentially of the roll for the reception of different bolts, respectively, and the heads of the bolts are arranged to bear against the outer side of the outer sections, and the nuts engage the corresponding threaded shanks of the bolts and are arranged to bear against the outer side of the other outer section. In the case illustrated the three channel-forming sections 11, 12, and 13 of each roll are clamped together by three bolts 14 and a corresponding number of nuts 15. The channel-forming sections 11 and 12 of each roll are provided at their ends with tongues 16, that engage corresponding grooves 17, formed in and extending longitudinally of the body portion of the roll. The engagement of the tongues 16 with the grooves 17 is instrumental in preventing displacement of the roll-forming sections circumferentially of the roll. The sections 11 and 12 of each roll upon their outer side are provided, respectively, with a flange 18, that engages the body portion of the roll and has its outer surface snugly overlapped by a flange 19, that is formed upon a plate 20, that engages the edge of the aforesaid flange 18 and is bolted, as at 21, or otherwise secured to the body portion of the roll. The flanged plates 20 secure the sections 11 and 12 to the engaging body portion of the roll.

The length of the billet or work is such relative to the dimensions of the channels c' of the rolls that the distance between the shoulder c^5 of each roll and the adjacent end of the shallower portions of the channels of the rolls predetermines or gages the length of the heads of the blank into which the billet is rolled during the operation of the rolls. The shoulders c^5 are shown in the position required to enable the rolls to form a blank having short heads, and the shoulder c^5 of each roll is formed, preferably, by an end of a plate or block 22, (see Fig. 1,) that is interposed between the sections 11 and 12 of the said roll and secured to the section 13 of the roll removably by means of a bolt or screw 23. When a blank having long heads is to be formed, the plates or blocks 22 are removed from the rolls upon withdraw-

ing the bolts or screws 23, and the function that was performed by the shoulders c^5 is then performed by the flanges 24, with which plates 25, that are secured to the forward ends of the sections 11 and 12 of the rolls, are provided—that is, a flanged plate 25 is secured to the forward ends of the sections 11 and 12 of each roll, preferably removably, by means of bolts and screws 26, and has its flange 24 overlapping the peripheral surface of the section 13 of the said roll between the forward ends of the said sections 11 and 12, and the flanges 24 of the plates 25 then form the abutment for the work preparatory to the rolling of the work into a blank. I would here remark also that the plate or block 22 of each roll is preferably long enough to cause it when secured to the roll to engage the flange 24 of the plate 25 of the said roll, and thereby avoid any shearing strain upon the bolt or screw 23 employed in securing the member 22 to the roll, so that the entire strain upon the said plate 22 during the operation of the rolls is borne by and distributed between the bolts or screws employed in securing the said plate 25 to the roll.

The importance of forming the rolling outwardly-facing wall or surface of the channel of each roll by a section independent of the remaining parts of the roll is obvious, because the wear during the rolling operation is upon the said wall or surface, that will be worn out and require renewal before the side walls of the said channel.

What I claim is—

1. A pair of cooperating rolls provided each with a body portion having grooves 17 formed in and extending longitudinally of the said body portion, the channel-forming sections 11 and 12 arranged a suitable distance apart longitudinally of the roll and having tongues 16 engaging the aforesaid grooves and provided with laterally and outwardly projecting flanges 18 engaging the body portion of the roll, plates 20 removably secured to the roll's body portion and having flanges 19 overlapping the aforesaid flanges of the channel-forming sections and holding the aforesaid flanged channel-forming sections to the body portion of the roll, and the intermediate channel-forming section interposed between and secured to the aforesaid flanged channel-forming sections.

2. A pair of cooperating rolls provided each with the grooves 17, the channel-forming sections 11 and 12 provided each with a flange 18, the channel-forming section 13, the bolts and nuts 14 and 15, the plates 20 provided each with a flange 19, and the bolts or screws 21, all arranged and operating substantially as shown, for the purpose specified.

3. The combination with a pair of cooperating rolls provided with registering peripheral channels extending circumferentially of the rolls with the end portions of each channel deeper than the central portion of the channel, of an abutment-forming member 24

at the receiving or forward end of each channel, and a plate or block 22 within each channel next to the aforesaid abutment and removably secured in place; substantially as
5 and for the purpose set forth.

4. A roll instrumental in rolling a billet into a blank having the following: a circumferentially-extending peripheral channel c whose central portion is shallower than its
10 end portions and having its centrally and outwardly facing wall formed upon a section removably secured to and between the sections forming the side walls of the channel, the

abutment-forming plate 25 secured to the forward end of the aforesaid side-wall-form- 15 ing sections, the plate or block 22 within the channel next to the said abutment-forming plate and removably secured in place, substantially as and for the purpose set forth.

Signed by me at Cleveland, Ohio, this 21st 20 day of April, 1900.

WILLIAM S. BIDLE.

Witnesses:

C. H. DORER,
A. H. PARRATT.