

Oct. 21, 1930.

J. MEISER ET AL
APPARATUS FOR THE PRODUCTION OF SECTION
IRON WITH BOX SHAPED CROSS SECTIONS
Filed Aug. 4, 1927

1,779,185

2 Sheets-Sheet 1

Fig.1.

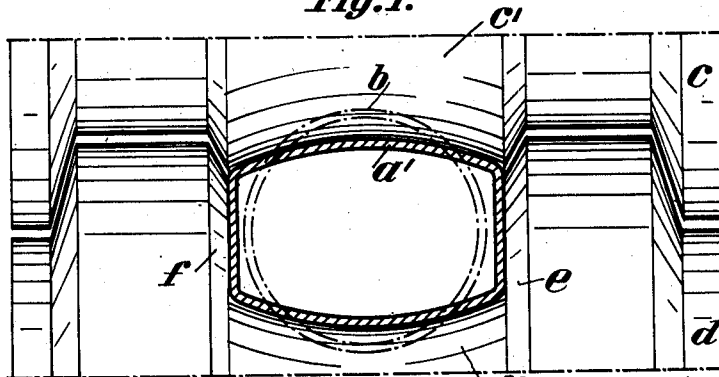


Fig.2.

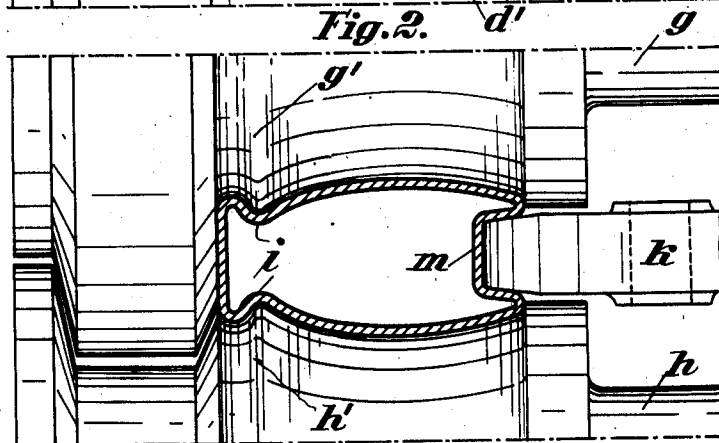
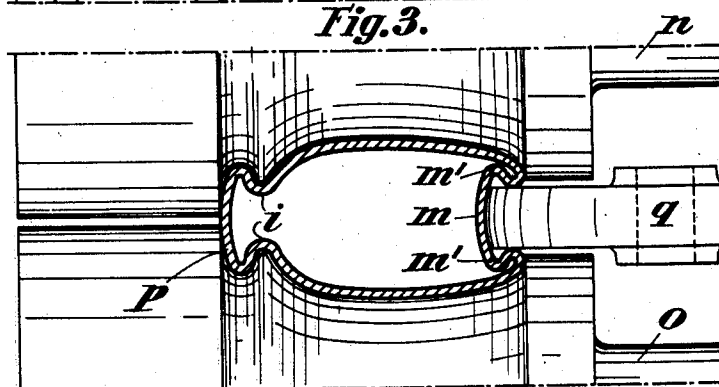


Fig.3.



Inventors
Josef Meiser
Wilhelm Kohler
By Mayers & Jones
attys

Oct. 21, 1930.

J. MEISER ET AL
APPARATUS FOR THE PRODUCTION OF SECTION
IRON WITH BOX SHAPED CROSS SECTIONS
Filed Aug. 4, 1927

1,779,185

2 Sheets-Sheet 2

Fig.4.

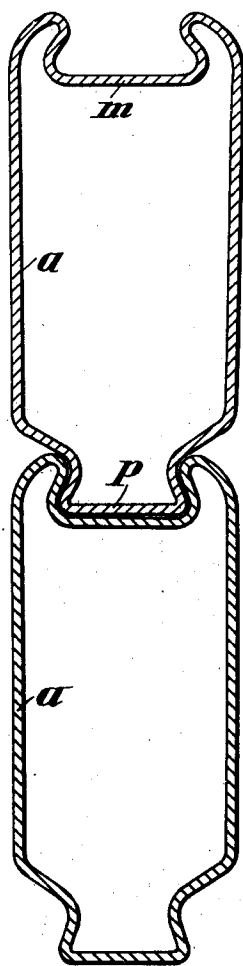
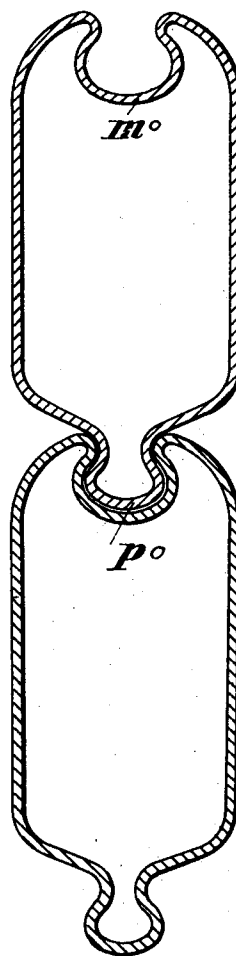


Fig.5.



Inventors
Joseph Meiser
Wilhelm Kohler
By Meyers & Jones Atty

UNITED STATES PATENT OFFICE

JOSEF MEISER AND WILHELM KÖHLER, OF DORTMUND, GERMANY

APPARATUS FOR THE PRODUCTION OF SECTION IRON WITH BOX-SHAPED CROSS SECTIONS

Application filed August 4, 1927, Serial No. 210,702, and in Germany August 14, 1926.

Our invention relates to apparatus for manufacturing section iron with box-shaped cross section from iron tubes having comparatively thick walls and for forming on the longitudinal sides of such sections fillets and channels, whereby adjacent sections may be made to interlock. Of late years elongated girders or section iron have been needed in industry, which have a "box-shaped" cross section, i. e., more or less rectangular and with thick walls. Such box-shaped sections are specially required for the construction of sheet-piling, in which case they should be provided with connecting members, which allow of each member of the piling interlocking with the adjacent one.

One of the primary objects of the present invention is the provision of apparatus for making tubes of the character in question in an expeditious and relatively inexpensive manner.

Our invention makes it possible to produce such box-shaped sections without seam and provided with connecting members adapted for interlocking with adjacent members.

As is known no difficulties occur in making tubes of circular cross section and having almost any desired thickness of wall, diameter and length. The invention is based on the idea that for the manufacture of girders with box-shaped cross section and provided with connecting members, a start should be made with circular tubes of corresponding thickness of wall and sufficient diameter and that these tubes should be converted into the desired form by box-passing and rolling down.

It is immaterial for the manufacture in view that the tubes should be faultless. Therefore, both scrapped and used tubes can be employed.

According to the invention the change of shape is brought about in several stages, in the first place the tube of circular cross section is converted into a tube the section of which approximates more or less to a rectangular shape; subsequently introverts are produced by further treatment, which provide the interlocking members. The introversion is specially carried out in such way

that a fillet-shaped connecting member is formed on one side of the tube and a dovetail channel-shaped member on the other side, the latter being adapted to enclose the fillet of an adjacent member with a good fit.

The treatment of the original tube and its conversion into the finished shape through one or more intermediate shapes is carried out in the present instance by passing the work through shaping rolls or through draw-plates or by a combination of both apparatus.

Figs. 1 to 3 show three different sets of rolls for carrying out the operation. Fig. 4 shows a finished section, produced by a further intermediate operation not shown. Fig. 5 shows another shape of the finished section iron.

A tube *b* (Fig. 1) preferably rolled without seam and made in the customary way constitutes the starting material for the individual member *a* of the sheet-piling shown in Fig. 4. This tube is passed, preferably when hot, through shaping rolls *c, d*, which press it flat between their grooves *c', d'*, whilst simultaneously the sides of the tube are flattened against the collar edges *e, f* of the rolls. The barrel-shaped section *a'* thus obtained is then passed through other rolls *g* and *h* (Fig. 2) which, whilst further flattening the section on one side by means of the collar edges *g', h'* also make the introverts *i* in the section. Another roll *k* operates on the material at the opposite narrow side of the barrel-shaped section and produces at *m* a channel-shaped introvert. At the third stage of the operations (Fig. 3) the introverts *i* are made deeper by passing the section between rolls *n* and *o*, so that a fillet-like connecting member *p* projecting outwards is formed on one side of the section iron. At the other side the edges *m'* of the channel-shaped introvert *m* are pressed inwards by the rolls *n* and *o* against a third roll *q* located on one side between the two other rolls. There is thus imparted to the introvert a shape the inside of which corresponds as far as possible with the outside of the fillet.

If necessary, by means of further tools constructed as rolls or die-plates, a further operation may take place on the piles, for exam-

ple, a closer approximation to the rectangular form, so that ultimately the finished section as shown in Fig. 4 has an exact rectangular middle portion, to one side of which is attached the trapezoidal fillet p , and to the other side the undercut introvert m of similar shape.

The manufacture of the section as shown in Fig. 5 is effected by essentially similar operations, save that in this case by means of a different contour of the rolls at g' and h' and of correspondingly narrower construction of the rolls k and q , there is formed on one side a guide rod p^0 of almost circular shape, and similarly at the other side the guide socket m^0 as enclosure for a round rod instead of a trapezoidal fillet.

It is to be understood that the invention is not limited to the special shape of the rolls used, and consequently not to any special shape of the final product. Many modifications are possible within the scope of the invention. Whilst the sections as shown in Fig. 4 provide a fairly rigid connection between adjacent box-shaped sections, the sections as shown in Fig. 5 allow of a certain flexibility. It is obvious that by suitably shaping the fillet p^0 and channel m^0 it is possible to obtain a comparatively large side movement of the section.

We claim as our invention:—

1. Apparatus for producing metal members of box-shaped cross section with integral male and female portions permitting interlocking with other similar members as described, comprising a first pair of parallel rolls having a contour adapted to change the cross sectional shape of a tube from circular to barrel shape, a second set of rolls co-operating comprising two parallel rolls and a third roll on an axis at right angles for producing a dovetail shape at one end of the section and simultaneously a re-entrant portion or introvert at the other end, and a third set of three rolls similar to the previously mentioned set of three rolls but of such shape as to produce substantially the final dovetail shape of one end of the section and simultaneously to produce substantially the final shape of the introvert on the other end of the section.

2. Apparatus for producing metal members of box-shaped cross section with integral male and female portions permitting interlocking with other similar members as described, comprising a first pair of rolls having a contour adapted to change the cross sectional shape of a tube from circular to barrel shape, a second set of rolls comprising two parallel rolls and a co-operating third roll on an axis at right angles for producing a dovetail shape at one end of the section and simultaneously a re-entrant portion or introvert at the other end, a third set of three rolls similar to the previously mentioned set of

three rolls but of such shape as to produce substantially the final dovetail shape of one end of the section and simultaneously to produce substantially the final shape of an introvert on the other end of the section, and a fourth set of rolls for producing the final shape of the member.

In testimony whereof we have affixed our signatures.

JOSEF MEISER.
WILHELM KÖHLER.