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H. LORANT

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METHOD OF MAKING TUBES BY EXTRUSION

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Fig. 1

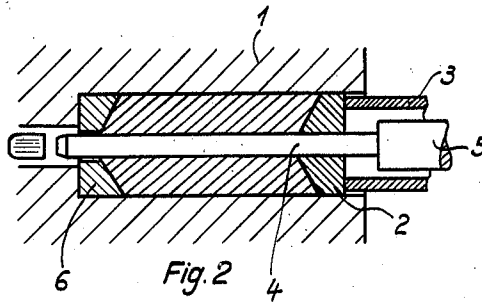


Fig. 2

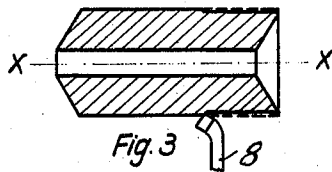


Fig. 3

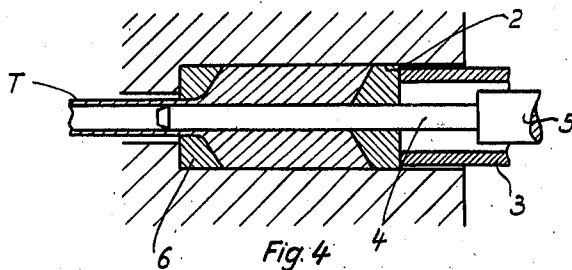


Fig. 4

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UNITED STATES PATENT OFFICE

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METHOD OF MAKING TUBES BY
EXTRUSIONHugo Lorant, Dusseldorf, Germany, assignor to
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Germany, a corporation of GermanyApplication April 3, 1935, Serial No. 14,416
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2 Claims. (Cl. 207—9)

My invention relates to a method of making metal tubes by extrusion from billets and has particularly reference to the extrusion of metals which on account of their hardness requires high pressures.

Heretofore, it has been the usual practice to turn the billets before their extrusion in order to remove their rough skin caused by the preceding casting, forging or rolling operations and then either to drill a central hole into the billets before their insertion into the container of the press, or to insert the billets in unbored condition and to pierce them by the mandrel of the press directly before their extrusion.

Both these methods are not free from drawbacks. The drilling of the billets is very costly on account of the high waste of such expensive materials, as high-alloyed steels are. Furthermore, the hardness of these steels requires the use of very heavy drilling machinery, results in a rapid wear of tools and takes considerable time, all of which items add to making this method very costly. When the billets are pierced by the mandrel of the press itself, the above mentioned drawbacks will be avoided as the waste will consist only of the small plug which is extruded from the bottom of the billets and because no drilling machinery will be required. On the other hand, however, since the hot billets will remain longer in the press, the mandrel, the die and the billet container will be exposed to a more rapid wear the more so, as they are subjected to heavier stresses. Furthermore, the mandrel is liable to deviate from its correct path while piercing the billets, since the latter are not always uniform as to their physical structure and temperature and since the mandrel will always tend to follow the path of least resistance, whereby the wall thickness of the tubes may become uneven.

It is therefore an object of this invention to provide a method of making tubes by extrusion in which the said drawbacks are avoided.

The novel method comprises the successive steps of piercing a central hole in a billet by the mandrel of an extrusion press, turning the pierced billet by the axis of said hole after having taken it out of the press and then extruding the pierced and turned billet after its reinsertion into the press. Thus, it will be seen that the present method corresponds to the second of the above mentioned methods insofar as the piercing of the billet in a press is concerned whereby the waste and the expenses inherent in the other method referred to are avoided. How-

ever, it is differentiated from the prior art in that the billet is turned after it has been provided with a hole and removed from the press. This makes it possible to shape the surface of the billet truly concentric with the axis of the hole, even if the latter should have happened to be pierced somewhat eccentrically so that all tubes will be extruded with even wall thickness. This is such a big advantage that the fact that with my new method, the billets will have to be taken out of the container between the piercing and the extrusion operations, is of no importance, the less so as the hot billet will be in uninterrupted contact with the press for a relatively short time only whereby the wear of the press parts will be accordingly reduced.

In the accompanying drawing in which I have diagrammatically illustrated some steps of my new method by way of example,

Fig. 1 shows a billet adapted for the use with my new method, while

Figs. 2, 3 and 4 show the three different steps of my new method.

At 1 is indicated a container of a press, at 2 the disc, at 3 the plunger, 4 is the mandrel, 5 the mandrel holder and 6 the die of an extrusion press. As all these parts are of conventional design, further description of them is deemed unnecessary. It will be readily apparent also from the following that my new method can be carried out on any suitable type of extrusion press.

Fig. 1 shows a billet A which is cut to the proper length for its insertion into the container of an extrusion press. In Fig. 2 this billet is shown as inserted into the container 1 and pierced by the mandrel 4, whereupon the billet is removed from the press. Fig. 3 shows the next step of my new method, according to which the outer face of the billet is shaped by a turning tool 8 concentric with the axis X—X of the hole previously pierced by the mandrel 4. Fig. 4 shows the billet as extruded by the disc 2 through the die 6 to form a tube T.

The removal of the pierced billet from the container 1 presents no difficulties.—After the piercing operation, the billets are left for a short time in the container to cool off whereby they become somewhat loosened from the walls of the container. The billets then can be readily removed from the container.

A further feature of my invention is the step of conically shaping the end surfaces of the billet during the piercing process as shown in Figs. 2-4, the disc 2 having cone shaped surfaces in conformity with the conical cavity of the die

6. From the foregoing it will be seen that the conical shape of the end surfaces of the billet will be obtained while the billet is being pierced so that the centering of the billets with respect to the container will be facilitated on their reinsertion after having been turned. This shaping of the billet ends has the further advantage of preventing a rapid cooling of the billet at its die end edge because the latter has an obtuse angle instead of a right one. This is of considerable importance as I have found that the die end edge of the billet is liable to cool more quickly than the other parts of the billet with the result that the equal flowing of the material through the die is impaired and defective products and a rapid wear of the die result therefrom.

I wish it to be understood that my invention is of course capable of various embodiments. Thus the piercing and extrusion operations can be carried out on different presses as well as on the same press.

I claim as my invention:

1. A method of making metal tubes by extrusion, comprising piercing a hole through a billet by the mandrel of an extrusion press, removing the pierced billet from the press, then shaping the outer surface of the billet concentric with the axis of its hole, and finally extruding the turned billet after its reinsertion into a press.

2. A method of making metal tubes by extrusion, comprising piercing a hole through a billet by the mandrel of an extrusion press, conically shaping the end surface of the billet at its die end simultaneously with the piercing operation, removing the pierced billet from the press, then shaping the outer surface of the billet concentric with the axis of its hole, and finally extruding the turned billet after its reinsertion into a press.

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