2 Sheets—Sheet 1.

G. F. MUNTZ, Jr.

MANUFACTURE OF METAL TUBES.

No. 9,782. Patented June 14, 1853.

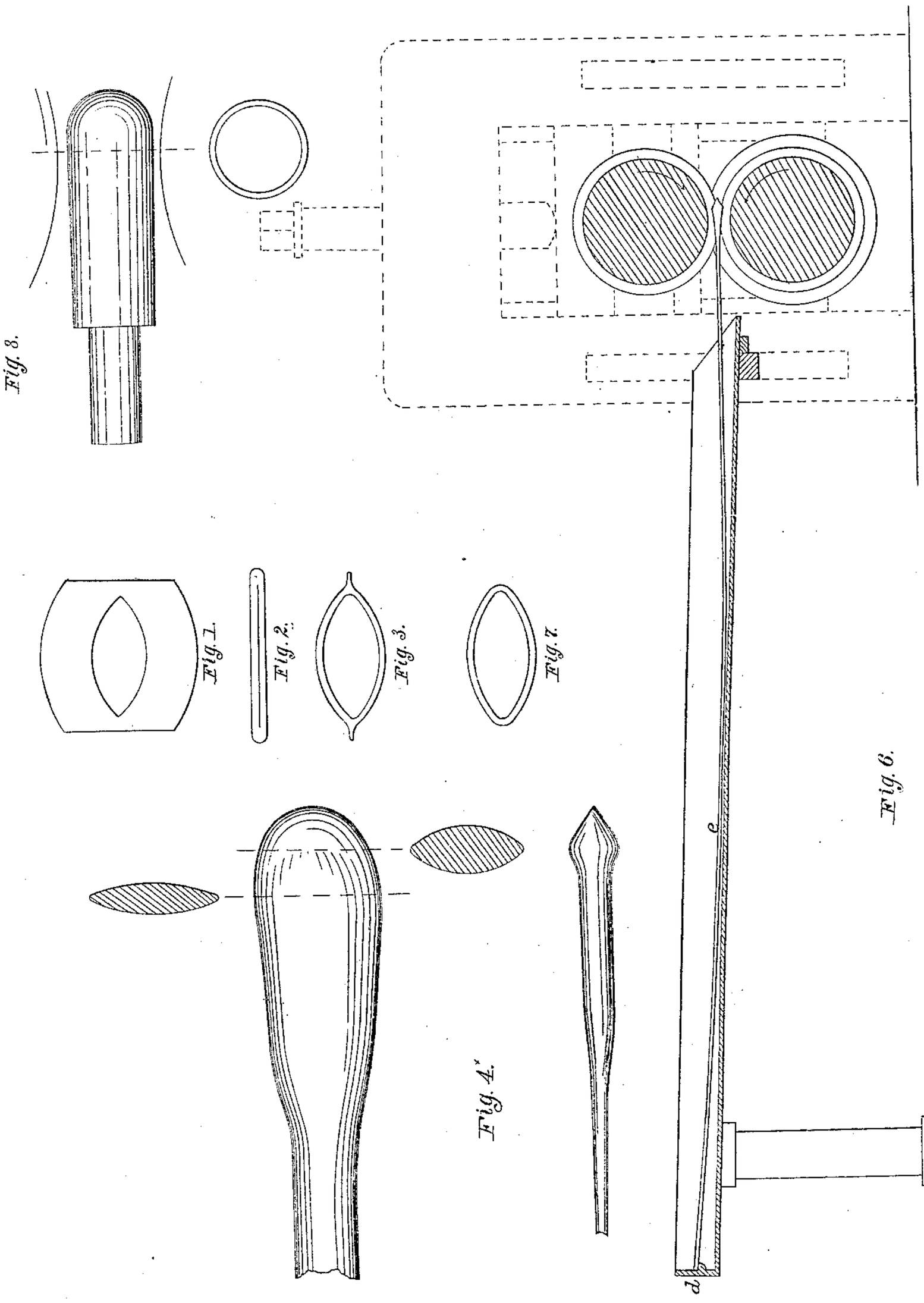

Fig. 8.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 7.

Fig. 4.

Fig. 6.

2 Sheets—Sheet 2.

G. F. MUNTZ, Jr.

MANUFACTURE OF METAL TUBES.

No. 9,782. Patented June 14, 1853.

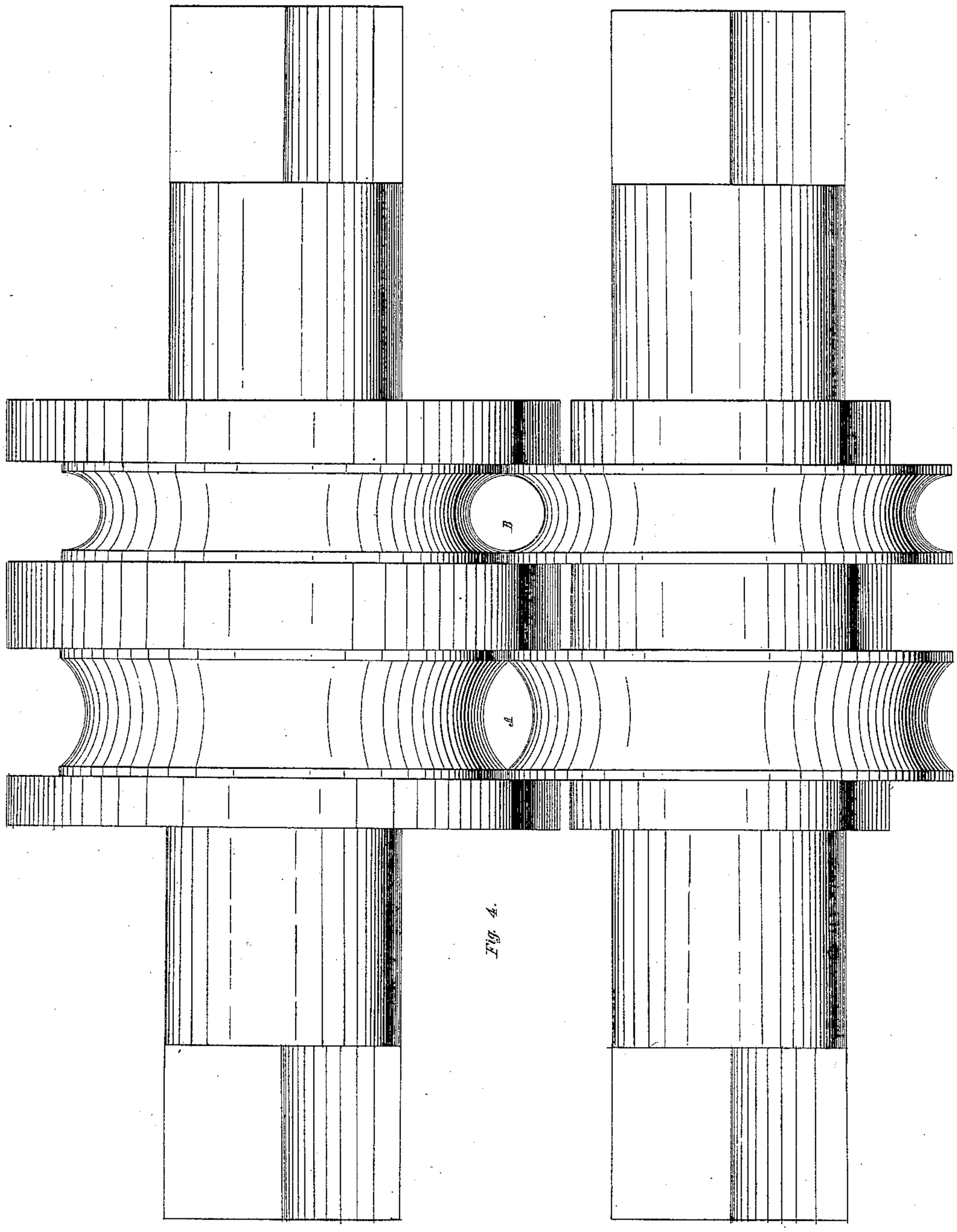

Fig. 4.

UNITED STATES PATENT OFFICE.

GEO. FREDERICK MUNTZ, JR., OF BIRMINGHAM, ENGLAND.

MANUFACTURE OF METAL TUBES.

Specification of Letters Patent No. 9,782, dated June 14, 1853.

To all whom it may concern:

Be it known that I, GEORGE FREDERICK MUNTZ, Jr., of Birmingham, England, a subject of the Queen of Great Britain, have invented or discovered new and useful Improvements in the Manufacture of Metal Tubes; and I, the said GEORGE FREDERICK MUNTZ, Jr., do hereby declare that the nature of my said invention and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed and to the figures and letters marked thereon—that is to say:

My invention consists of casting short tubes of a peculiar form or section rolling them flat to extend them in length and then opening them out and rendering them cylindrical as hereafter explained, and in order that my invention may be most fully understood and readily carried into effect I will proceed to describe the means pursued by me.

The metal which I prefer to employ is such a composition of copper and zinc with or without other metal as will roll hot and that which I find to be the best consists of sixty parts of the best copper and thirty-eight parts of good zinc. I do not however confine myself thereto so long as the metal is capable of bearing the process of manufacture herein described.

I first cast a short tube of a cross section such as is shown at Figure 1 and I have found that an iron mold with a sand core is most suitable for this purpose and I place such mold at an inclination as when casting strip metal and so that the thicker parts may be uppermost and undermost the metal being poured in between the mold and the underside of the core care being taken that the core is correctly in the center. The tube being cast and the sand core cleaned entirely out I wash the inside of the tube with lime and water containing as much salt as will be held in solution first heating the tube with or to the extent of boiling water. The object of thus washing the interior of the tube with such mixture is to prevent the interior surfaces adhering together when rolled flat. When the lime white has been applied the tube is to be heated to a red heat such as is usual when rolling like metal and the tube is then to be rolled between grooved rollers similar to those used in rolling flat bar iron but grooved to produce rounded edges as is shown at Fig. 2. The tube is to be passed through between the rolls with the thicker parts horizontal by which the tube will be rendered flat and extended in length and the thickness of metal made parallel and uniform at the sides but somewhat thicker at the two edges as indicated at Fig. 2.

I would remark that the arrangement shown by the drawing is for making tubes of one inch and three quarters diameter, and it will be evident that the sizes indicated by the drawing must be varied when making other sizes of tubes but from the description here given aided by the drawings a workman will readily vary the sizes of the castings and of the grooves in the rollers and also the mandrels used according to the sizes of tubes desired to be produced. The tube being thus rolled into a flat bar is to have one end opened for about six inches (which may readily be done when at a red heat by a sharp instrument) as is indicated at Fig. 3 and in this form when at a red heat it is to be passed through between the pairs of grooved rollers at A Fig. 4 the tube being entered on to the end of the mandrel by the workman. The rollers by their revolution cause the tube to be drawn over the head of the mandrel and on to the stem so that the tube will be thereby opened in its whole length and in doing so there will be a web or fin produced on either side as is indicated at Fig. 3. The rollers which are of the diameter shown at Fig. 4 are caused to revolve about one hundred times a minute and the wider part of the bulb of the mandrel Fig. 4* is placed so as to come at the pinch of the rolls. The end of the stem of this mandrel is retained fast at the end of the trough. See Fig. 6, at (*d*) where some of the parts are shown in section on a reduced scale.

Fig. 4* shows the form of mandrel used in this part of the process, it and its stem are of steel and the two sections will show the form of the widest and the thickest parts. The stem is of a section corresponding with the hole through between the rolls but smaller so that the tube may slide freely thereon. The stem is bent downward as shown at *e* in order that when the pressure causes it to bend more, the bending may take place downward with a view to the extent of bending being limited by the stem coming

against the bottom of the trough. The tube is to be supported and guided as it enters the rolls, and the rolls are to be screwed down as close as they will come. The webs or fins produced on the tube are to be cut off when the section of the tube will appear as shown at Fig. 7. The tube is next to be opened out into a cylindrical form by means of the grooved rollers Fig. 4 at B and the mandrel, Fig. 8, is to be used which is to be similarly held to that before described. The tube is to be at a red heat when passed through between these rollers and over this mandrel and the tube is to be held and guided up to the rolls with its longer axis upward so that the second rolling will be at right angles to the previous one and such guiding may be conveniently performed by having a fixed plate before the rolls with an oval hole through it large enough for the free passage of the tube, the longer axis of the oval hole being vertical. The tubes thus made when straightened will be ready for use, particularly if intended for steam boilers, but they may if desired be drawn through dies in cases where it is wished to have them planished and bright on the outside.

Having thus described the nature of my invention and the manner of performing the same I would have it understood that I do not confine myself to the precise details here given so long as the peculiar character of my invention be retained. By rolling the tube flat I am enabled to make it of a metal or composition of metals, (known as Muntz's metal) which is much cheaper than copper of which such tubes are usually made. The Muntz's metal can be rolled when hot, or heated to redness; but is very expensive and difficult to manufacture or roll when in a cold state; and this on account of its hardness. This quality, viz., hardness, renders it more useful and durable, than copper, when it is manufactured into a tube. The rolling flat is also a much readier and less expensive mode of reducing the thickness of the metal in a cast tube.

The advantage of my invention is the production of a less expensive and very much better tube than can be made by the common process of making copper or other hard metal tubes. The casting for the tube is made in the peculiar form, as exhibited, because it is more convenient for rolling flat, and also because, as the thinner parts of it are horizontal while being rolled, or are compressed toward one another, without much lateral elongation, they are required to be cast thinner than the other parts; otherwise, when the tubes expanded, there would be an unnecessary waste of metal.

What I claim is—

The above described mode or process of manufacturing a metallic tube of Muntz's metal, or other like metal or composition of metals; viz, by first casting the metal in a short tube of the form substantially as represented in Fig. 1; next heating it, as described, and rolling it flat, essentially as exhibited in Fig. 2, and elongating it at the same time, and finally opening it out, and removing the surplus portions or fins and reducing it to its final form in transverse section as herein before specified.

G. F. MUNTZ, Jr.

Witnesses:
Joseph Marquett,
B. Gobey.