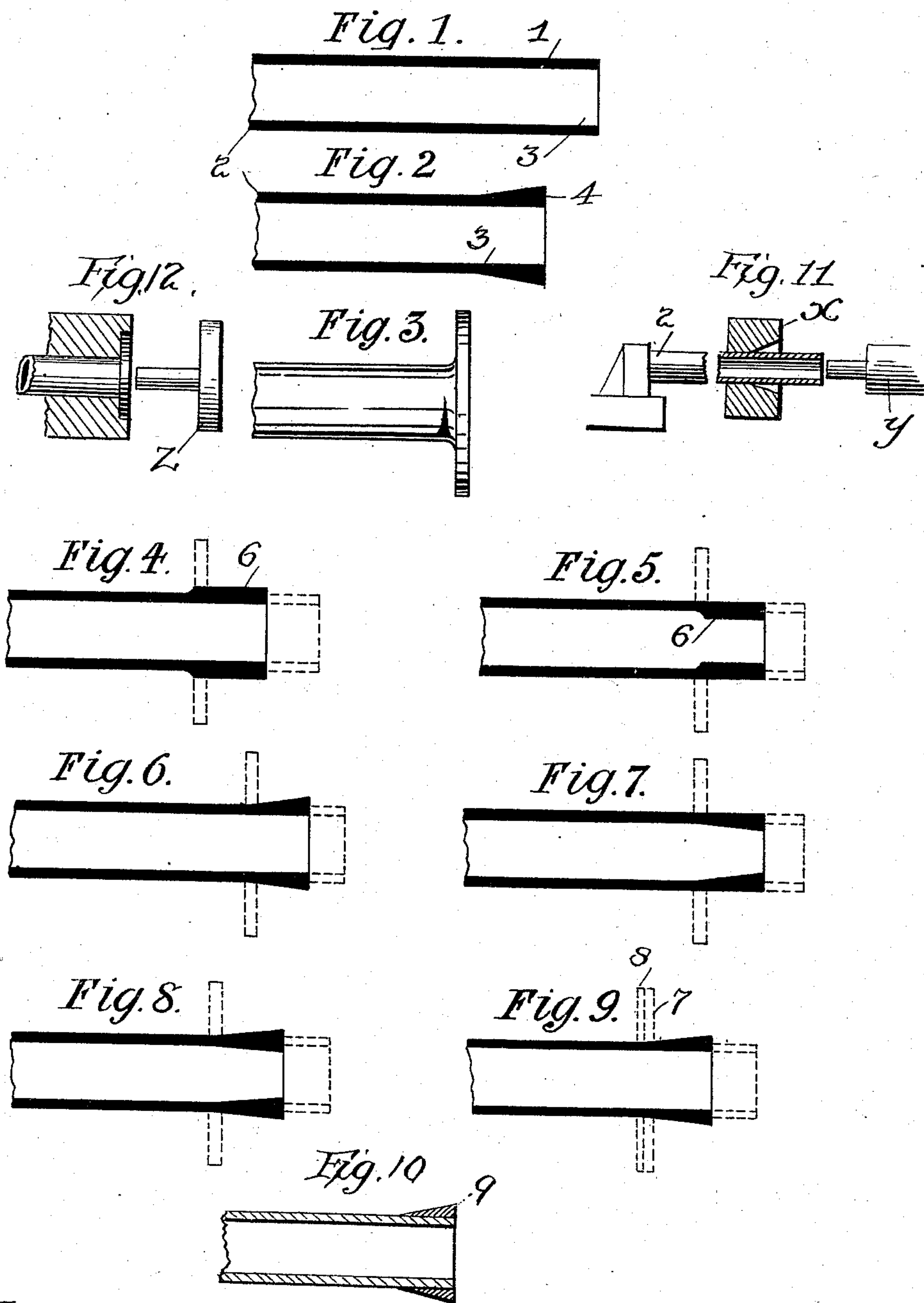


(No Model.)

S. E. HOWELL.
FORMING FLANGES ON METALLIC TUBES.

No. 540,314.

Patented June 4, 1895.



Witnesses.
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SAMUEL EARNSHAW HOWELL, OF SHEFFIELD, ENGLAND.

FORMING FLANGES ON METALLIC TUBES.

SPECIFICATION forming part of Letters Patent No. 540,314, dated June 4, 1895.

Application filed August 21, 1894. Serial No. 520,878. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL EARNSHAW HOWELL, a subject of the Queen of Great Britain, and a resident of Sheffield, in the county of York, England, have invented certain new and useful Improvements in Forming Flanges upon Metallic Tubes; and I do declare that the following is a full, clear, and exact description thereof.

This invention consists of an improved method of forming solid flanges upon ductile metallic tubes in contradistinction to making such flanges separately and either screwing or by like means securing them upon such tubes.

The invention is applicable to either solid drawn tubes, or lap welded tubes of any ordinary diameters.

The annexed sheet of drawings illustrates the invention, and some different forms in which the ends of the tube may be thickened by compression.

Figure 1 is a section of a piece of tube; Fig. 2, the same compressed; Fig. 3, the same formed into a flange. Figs. 4, 5, 6, 7, 8, and 9 show the different positions into which the heated metal may be compressed. The end of tube and flange are also indicated. Fig. 10 shows the end of the tube thickened by welding a ring thereon. Fig. 11 is a view of the dies and plunger for thickening the end of the tube, and Fig. 12 is a view of the flange-forming dies and plunger.

In carrying out my invention I proceed as follows: I take a length of steel tube 1 for example, as in Fig. 1, and bring one of its ends to a welding heat. I then place the tube in the hydraulic press with its cold end 2 against a suitable abutment and the heated end between a pair of dripping dies x which close upon it except a portion which projects beyond their face. The inside of this divided die facing the operating ram is turned out to a conical form of larger diameter than the tube (or to any other desired form such as those shown in Figs. 4 to 9) to receive and give shape to the compressed metal. The operating hydraulic ram y which is in line concentrically with the tube, is provided with a mandrel to fit into the bore of the tube, and a shoulder

or pressing face of the same diameter or thereabout of the intended flange. When the ram is in action the mandrel enters the tube to support it during the operation, and the shoulder or collar compresses the projecting end of the tube into the annular space round the tube in the enlarged end of the die, thus producing the thickened portion 4. Shown in Fig. 2. The end of the tube 3 is again heated and subjected to the action of one, or of a series of cones placed upon the mandrel which expands and opens out the end of the tube to the approximate form of a flange 5, the final flattening process being given by the pressure of the shoulder z which forces the flange into a circular recess in the front face of the gripping die.

It will be well understood that if a flange were opened out from the end of a tube without the process of thickening before described, such flange would be thinner at the outer edge, and would not answer its purpose.

I may vary the disposition of the compressed metal as may be found most effective or desirable. Thus in Fig. 4, I have shown the excess of metal 6 upon the outside, and in Fig. 5, it is in the inside. Fig. 6, shows it as an outside cone, Fig. 7, an inside cone; Fig. 8, a cone equally divided between inside and outside. Fig. 9, shows in dotted lines a flange 7 of thin proportions strengthened by the addition of an extra ring 8 welded upon the solid flange. I do not however confine myself to the several arrangements of the compressed metal shown, as further modifications may be made, and if desirable, in some cases I may weld a ring 9, Fig. 10, either upon the outside or inside of the end of the pipe, and then open out the end so strengthened by means of the tools and in the manner aforesaid. When pressing the flanges so constructed into the finished form I may produce one or more concentric rings upon the face of the flange, or other like male and female forms for use in making the joints of adjacent pipes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, declare that what I claim is—

The herein described process of flanging

tubes consisting in thickening the end, with
the thickened portion tapering from the ex-
treme end inwardly along the tube and then
upsetting this tapered portion into a lateral
5 flange, substantially as described.

In testimony that I claim the foregoing as
my own I have affixed hereto my signature,

in presence of two witnesses, this 17th day of
July, 1894.

S. EARNSHAW HOWELL.

Witnesses:

ROBT. F. DRURY,
BERNARD E. DRURY.