(No Model.)

S. J. ADAMS.

PIPE BALL.

No. 427,722. Patented May 13, 1890.

Fig. 1.

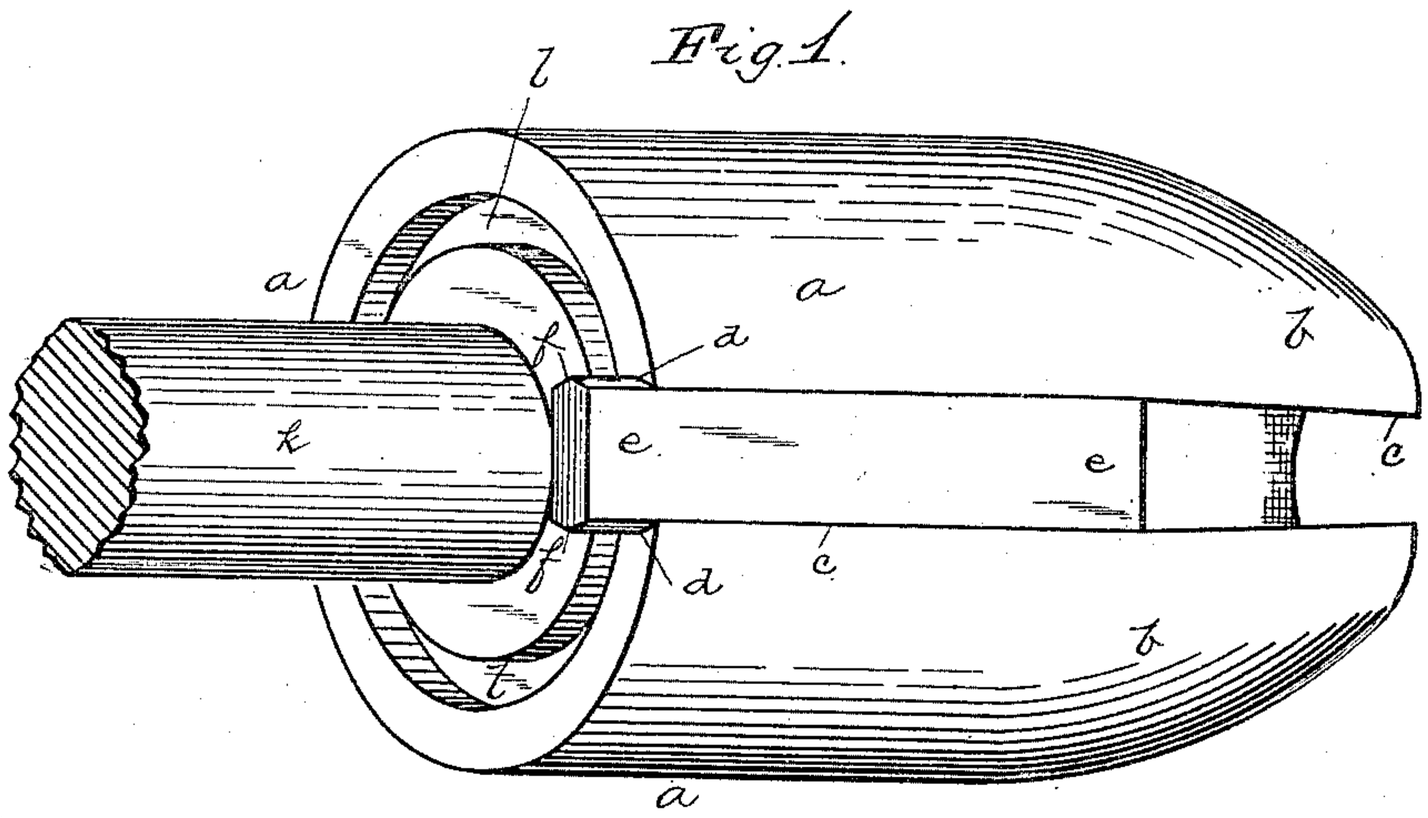


Fig. 2.

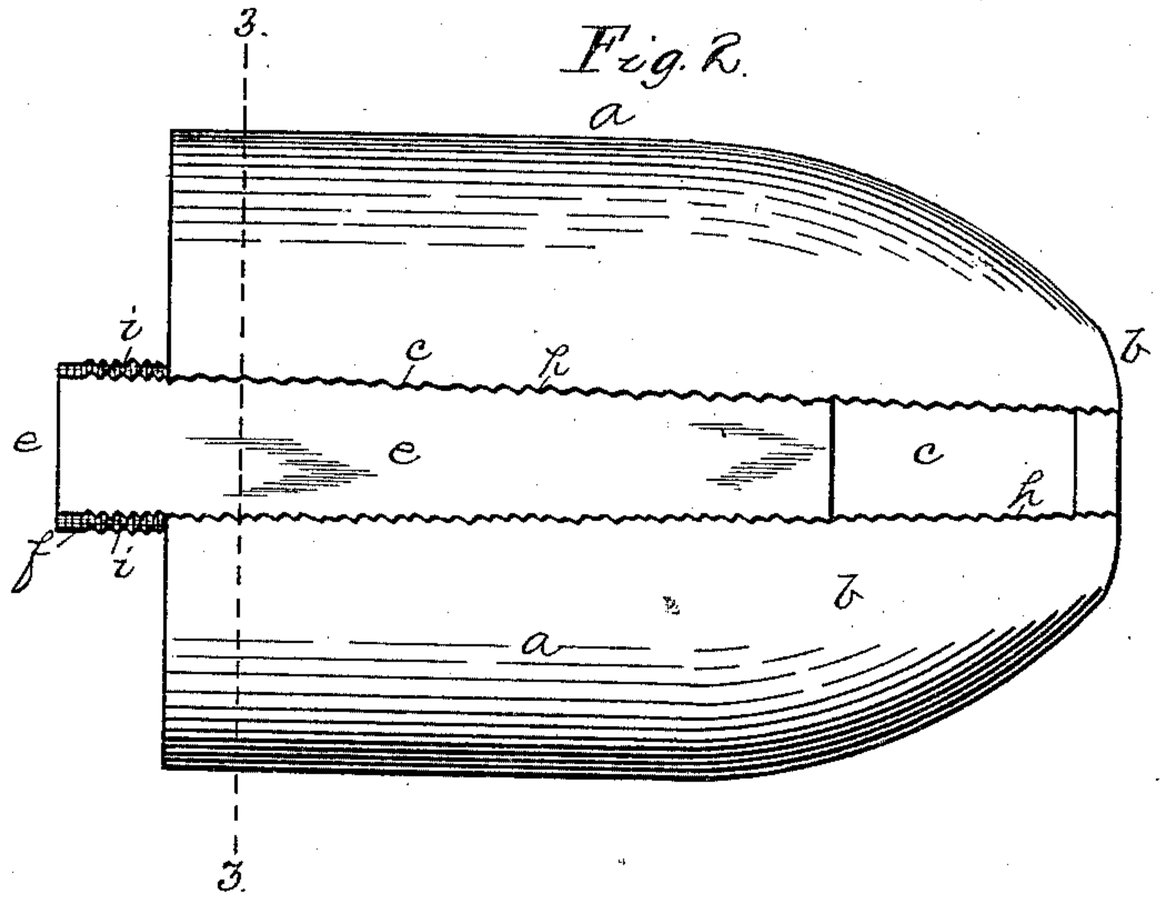
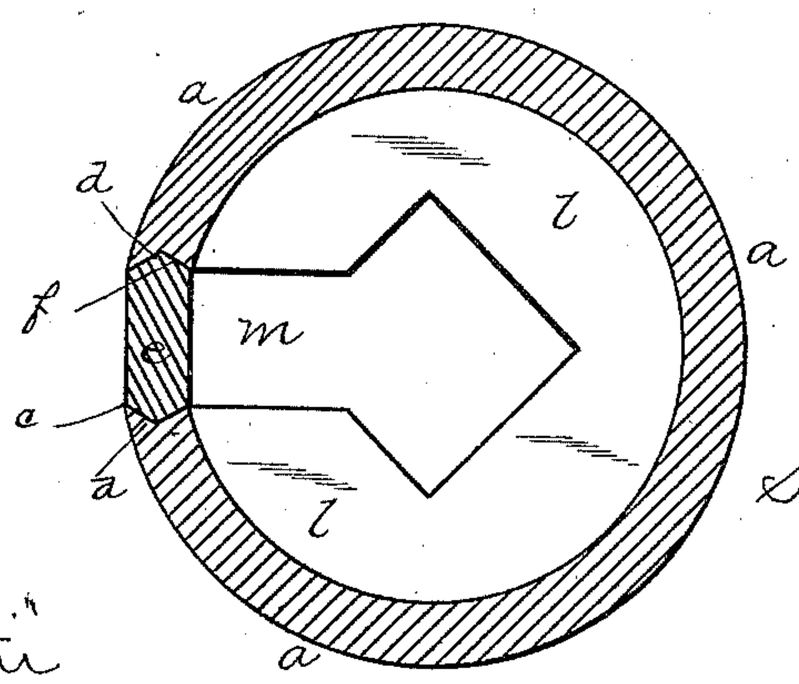


Fig. 3.



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UNITED STATES PATENT OFFICE.

STEPHEN JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

PIPE-BALL.

SPECIFICATION forming part of Letters Patent No. 427,722, dated May 13, 1890.

Application filed September 30, 1889. Serial No. 325,610. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN JARVIS ADAMS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Pipe-Balls; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to tube-welding balls, its object being to provide a ball which within certain limits is adjustable to different sizes, according to the desired size for the interior of the tube, and which can also be easily broken and removed from the tube in case of the formation of a "sticker." These balls are generally made of cast-iron metal, and it has been found necessary to form them accurately in size, the variation of the one-fiftieth ($\frac{1}{50}$) of an inch being considered fatal, and it being necessary either to cast the ball accurately to shape or, after such casting, to turn or grind it to bring it to the desired diameter.

According to the diameter of the tube to be formed, the thickness of the metal from which the tube is to be formed, and other like requirements of these tube-welding balls, it has been customary to form them of different sizes, varying about one one-hundredth ($\frac{1}{100}$) part of an inch in diameter, and as the outer shell of the ball is much harder than the metal in the interior thereof it has always been considered desirable to cast the ball accurately to shape and size.

One object, therefore, of the present invention is, first, to devise a ball which can be adjusted to different sizes within a certain limit, so overcoming the necessity of forming so many different sizes of patterns for the molding of these balls.

A further object is to provide a ball which, in case of "sticking" within the tube during the welding operation, can be easily broken and removed therefrom, so as to prevent the necessity of cutting out the ball and forming short lengths of tubing.

To these ends my invention consists, generally stated, in a tube-welding ball having a longitudinally-extending slot in its peripheral wall and combining therewith a filling-piece separate from the mandrel and fitting the slot of the ball, and so holding the ball against springing or yielding.

It also consists in forming the slot of the ball tapering longitudinally and employing a filling-piece which is correspondingly tapering, so that by driving the filling-piece farther into the slot the ball can be expanded as may be desired, so enabling me to provide in a ball cast to one size one capable of adjustment to three or four different sizes of ball.

It also consists of certain other improvements, as hereinafter set forth and claimed.

To enable others skilled in the art to use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a perspective view of the ball embodied in my invention. Fig. 2 is a side view of the same; and Fig. 3 is a cross-section on the line 3 3, Fig. 2.

Like letters of reference indicate like parts in each.

My invention is illustrated by the ordinary form of tube-welding ball, that being well suited for the purpose, though it is evident that my invention may be employed with any suitable form of tube-welding balls.

The body *a* of the ball shown has the tapering point *b*, and extending longitudinally of the ball is the slot *c*, which is formed in the body or peripheral wall *a*. This slot *c* is preferably formed tapering, as shown, from the rear end toward the point of the ball for the purpose of providing for the adjustment of the ball, as hereinafter described. The edges of this slot *c* are also preferably formed with what I have termed a "double incline," as at *d*, this double incline being of any desired form which will hold within the slot *c* the filling-piece *e*, as shown. In such case the filling-piece *e* has correspondingly-inclined edges *f*, and it corresponds in taper to the taper of the slot *c*, so that it may be driven into said slot. The filling-piece as it is driven into said slot will either simply seat itself firmly therein without expanding the body of the ball and increasing the diameter thereof or it may be driven in in such way as to expand the body of the ball and increase the diameter of the ball, a variation of from one to three or four one-hundredths of an inch in the diameter of the ball, and consequently a ball cast to the one diameter—such as a three-inch ball—can by means of such tapering

filling-piece be expanded for different sizes of the ball—such, for example, as for any size up to five one-hundredths of an inch.

In order to hold the filling-piece *e* in the slot and to sustain it against the pressure of the friction of the skelp passing over it, or scoria or scale which sometimes gathers within the tube during the welding operation, I prefer to form the edges of the slot *c* and filling-piece *e* serrated or roughened, as at *h* or *i*, respectively, the serrated edges of the two parts corresponding, so that when the filling-piece *e* is driven into the slot it will be bound therein by the serrated or roughened edges of the two parts. Such serrated edges may also form a guide to the operator in adjusting the ball to different diameters. If desired, however, the slot in the ball may be formed straight and its edges straight, the filling-piece simply holding therein by friction or by the mandrel within the ball, and in case the ball sticks within the tube when the mandrel is withdrawn it may be driven out of place by a blow on the surface of the tube. The outer surface of the filling-piece may either be flush with and curved corresponding to the curve of the ball or flat and below such surface, as may be desired.

The ball may be supported upon the mandrel *k* in any desirable way, that shown in the drawings being the ordinary angular seat for the end of the mandrel, as at *l*, except that the slot *c* extends also through said seat, as at *m*, and so provides for the expansion of the ball or leaves the ball unsupported for breaking in case of a sticker. Any supporting means may, however, be employed between the ball *a* and mandrel *k*.

When my invention is in use, the filling-piece *e* is driven into the slot *c* until the ball is brought to the desired diameter, which can be ascertained by calipers or guides or marks on the ball. It is then placed on the mandrel and employed in welding in the ordinary way, and, as the filling-piece is firmly held within the slot, it is evident that the ball is rigid and firm, and forms the necessary anvil for the welding of the metal by the pressure of the rolls. In case the scoria packs against the end of the ball, there is no liability of the filling-piece being driven out, as the roughened or serrated edges of the ball hold it in place. In case, however, that the sticker is formed, all that is necessary is to withdraw the supporting-mandrel *k*, and then, by a suitable instrument entering at the opposite end of the pipe and passing into the slot *c* of the ball, drive the filling-piece *e* out at the rear end of the ball, or, as above stated, drive down the filling-piece where its edges are straight by a blow on the tube. This leaves the ball unsupported, and therefore it can be easily broken when within the tube by a hammer or under a drop, and the pieces thereof removed from the tube, and the partially-welded tube placed in the furnace and welded to shape, the necessity of forming short lengths of tubing being thus overcome. I am thus enabled to provide a tube-welding ball which is not only rigid and firm during the welding operation, but has sufficient metal to prevent the rapid heating thereof, and can be adjusted to different diameters, as well as one which can be easily removed from the tube in case of the formation of a sticker and the length of tubing saved.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A tube-welding ball having a longitudinally-extending slot in its peripheral wall, in combination with a supporting-mandrel and a separate filling-piece fitting within the slot, substantially as and for the purposes set forth.

2. A tube-welding ball having a longitudinally-extending slot in its peripheral wall, provided with double-inclined edges, in combination with a filling-piece fitting in said slot and having correspondingly-inclined edges, so as to hold it in place, substantially as and for the purposes set forth.

3. A tube-welding ball having a tapering longitudinally-extending slot in its peripheral wall, in combination with a correspondingly-tapering filling-piece fitting therein, substantially as and for the purposes set forth.

4. A tube-welding ball having a longitudinally-extending slot in its peripheral wall, in combination with a filling-piece fitting therein and provided with serrated edges to hold it in place within the ball, substantially as and for the purposes set forth.

5. A tube-welding ball having a longitudinally-extending slot in its peripheral wall, provided with serrated edges, in combination with a filling-piece fitting in said slot and having serrated or roughened edges, substantially as and for the purposes set forth.

In testimony whereof I, the said STEPHEN JARVIS ADAMS, have hereunto set my hand.

STEPHEN JARVIS ADAMS.

Witnesses:

JAMES I. KAY,

J. N. COOKE.