(No Model.)

S. J. ADAMS.

TUBE WELDING BALL.

No. 250,477. Patented Dec. 6, 1881.

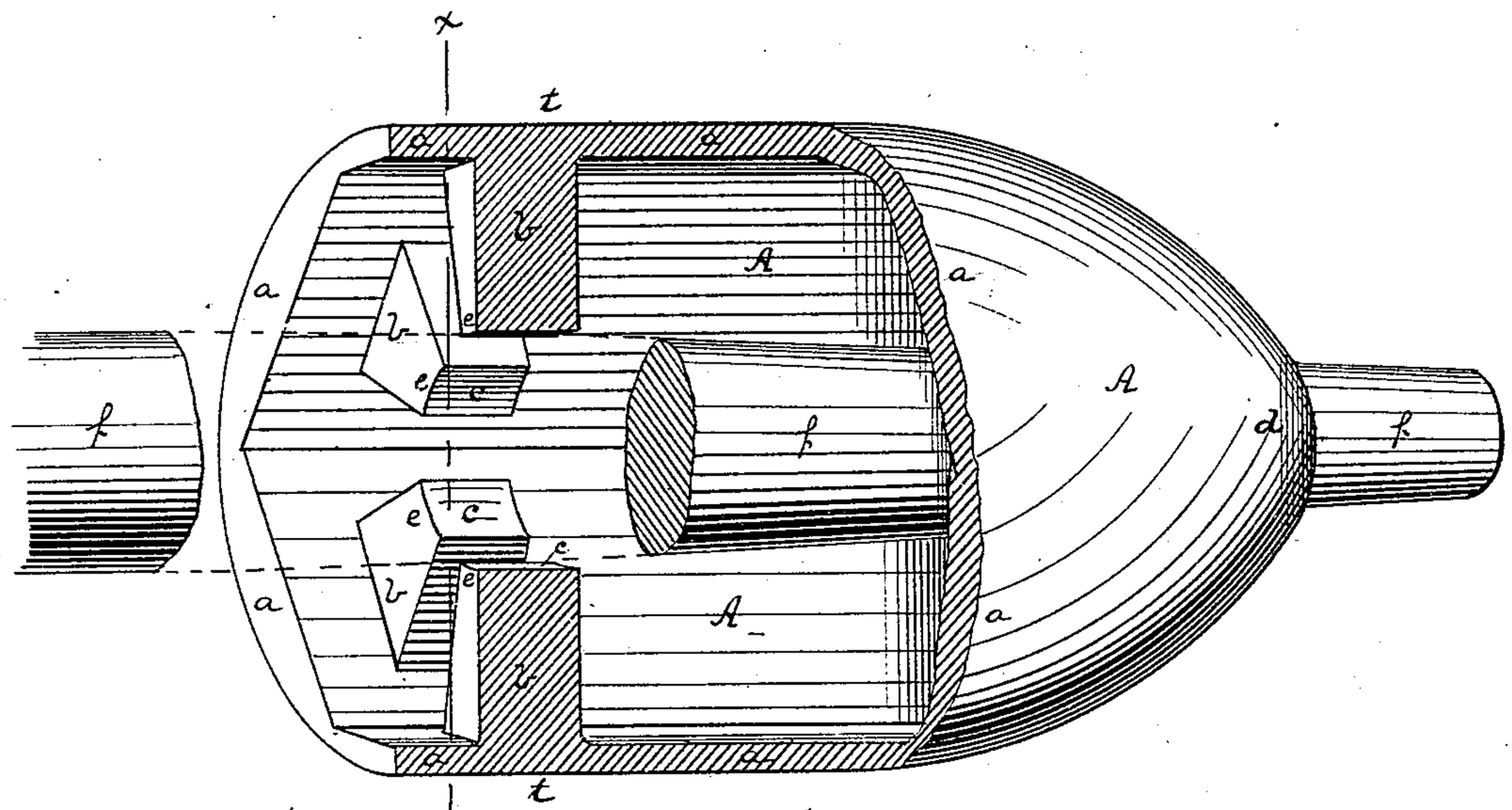

Fig. 1.

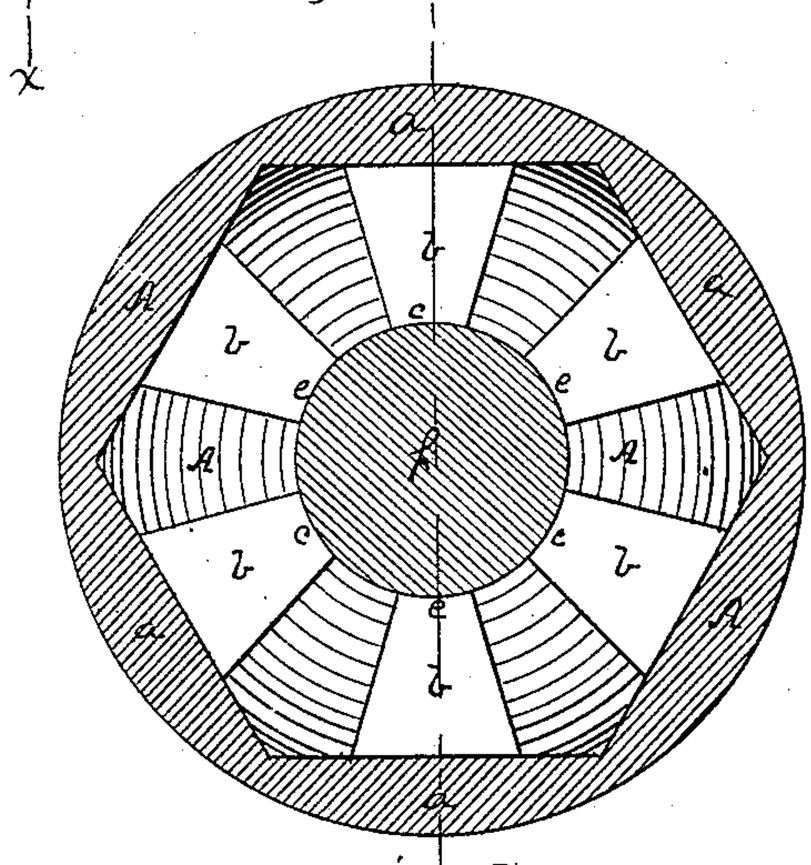

Fig. 2.

Witnesses
F. G. Kay
O. R. Terbrugh.

Inventor S. Jarvis Adams
By Attorney James L. Kay

UNITED STATES PATENT OFFICE.

S. JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

TUBE-WELDING BALL.

SPECIFICATION forming part of Letters Patent No. 250,477, dated December 6, 1881.

Application filed December 2, 1880. (No model.)

To all whom it may concern:

Be it known that I, S. JARVIS ADAMS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Tube-Welding Balls; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view, partly broken away, of my improved ball. Fig. 2 is a cross-section of the same on the line *x x*, Fig. 1.

Like letters of reference indicate like parts in each.

My invention relates to the balls used in the manufacture of wrought-metal tubing, to form a surface against which the rolls press the skelp in welding it into a tube. These balls are suspended on a long rod or mandrel between the welding-rolls, and after the welding of the tubing the rod is withdrawn by suitable mechanism, the ball being knocked off the rod by the end of the tube. The manufacture of these balls is difficult, as they must be made of exact size, the variation of one-fiftieth of an inch being fatal, and if they are not cast perfect in shape they must be ground or turned true before use. It is necessary that these balls possess great strength at the point of weld, as they would be crushed in welding the tube unless sufficiently strong to sustain the pressure of the rolls. When cast with a shell sufficiently thick to stand this pressure, another objection is encountered in the difficulty of breaking the ball if it becomes stuck in the pipe, it becoming necessary to cut the skelp or pipe to remove the ball, and thus spoil a length of tubing.

The object of my invention is to form a welding-ball which possesses the requisite strength at the point of weld, but can easily be broken out if it becomes lodged in the pipe.

My invention consists in a welding-ball formed of a thin or frangible shell provided on the interior with a series of separate lugs integral with the shell at the point of weld, said lugs being adapted to fit around and be supported by a central mandrel, so as to form a sufficient bracing for welding, but permitting the easy breakage of the shell when unsupported by said mandrel.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

In the drawings referred to, A represents my improved welding-ball, which is formed of cast metal, the front end of the ball being drawn to a point to direct the skelp into the welding-rolls. The ball is formed of a thin shell, *a*, which, when supported as hereinafter described, is sufficiently strong to bear the pressure of the welding-rolls, but when unsupported is weak and easily broken. The exterior of the shell is cylindrical, being either cast to shape or cast and then turned. The interior of the shell is preferably made angular to provide points or lines where the metal is thinned, so that it will break easily when necessary. I find that a hexagonal or octagonal interior gives good results, as, while at the same time it bears the pressure when braced, it presents a sufficient number of weak points to break easily by a blow from the outside when the bracing is not connected.

As there is no great strain on the ball at the point or in a large part of the body, no bracing is considered necessary; but in the interior of the ball, below the point where the welding-rolls have the greatest pressure on the skelp, as at *t*, (known as the "point of weld,") I form the series of lugs or braces *b b*, which extend down to the rod or mandrel *f*, on which the ball is supported. These lugs or braces are cast integral with the shell, and extend down so that their combined inner edges or surfaces, *e*, form a seat or bearing, *c*, for the mandrel *f*. The seat *c*, so formed is made slightly tapering in such manner that when the mandrel *f* is placed in the seat it will wedge therein, connecting the separate lugs or braces *b* fitting around it, so as to form a continuous support across the interior of the shell. The mandrel *f* is also tapered, so that it will wedge more firmly within the lugs and form a stronger brace to them. I prefer to make the tapering seat or bearing *c* round, to be used with a correspondingly-tapered round mandrel, as I find that the ball,

when wedged on the mandrel, is held firmly, and the mandrel braces the supports all around the seat, while at the same time the ball can be turned to present more perfect surfaces for welding than where the seat is angular. The seat *c* is preferably cast on a chill, so as to obtain a more perfect rest or bearing for the tapered mandrel than where a common sand core is used. The end of the mandrel may either be supported in the point *d* of the ball, or a suitable support therefor may be formed within the ball beyond the lugs or braces *b*.

When my improved welding-ball is in use it is placed on the end of the tapered mandrel *f*, the tapered seat *c*, formed by the edges *e* of the lugs *b*, fitting around and wedging the ball thereon. The wedged mandrel *f* connects and supports the separate lugs or braces *b*, so that there is a strong bracing from one side of the shell to the other, making practically a solid support across the interior of the shell at the point of weld sufficient to bear the pressure of the rolls in welding the tube. The ball is then placed between the welding-rolls and the tube welded thereon in the usual manner, the shell, supported as above described, being enabled to bear the pressure without breaking and perform its usual function in welding the tube. If the ball becomes stuck or lodged in the tube, and forms what is termed a "sticker," all that is necessary is to draw out the mandrel *f*, thus removing the continuity of the support. There being no connection between the separate lugs or braces, they will in no way interfere with the breaking of the shell, which can be done with a hammer by a blow on the outside of the tube, and the crushed ball removed. The tube can then be placed in the furnace, reheated, and rewelded, thus saving the length of tubing intact.

By this means I am enabled to form a thin or frangible shell which is light in weight, and therefore less expensive than the heavy balls, yet strong enough, when supported as described, to sustain the pressure of the rolls in welding the tubing. I also obtain a breakable shell and leave the shell unsupported, to be removed, as above described, by simply withdrawing the mandrel, and so save the trouble of breaking out the solid diaphragm, as described in a previous application made by me.

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

1. A tube-welding ball formed of a thin or frangible shell provided on the interior with a series of separate lugs or braces integral with the shell at the point of weld, said lugs being adapted to fit around and be supported by a central mandrel, so as to form a sufficient bracing for welding, but permitting the easy breakage of the shell when unsupported by the mandrel, substantially as described.

2. The tubular welding-ball A, formed of the thin or frangible shell *a* and a series of separate lugs or braces, *b*, the inner edges of which form the tapering seat *c*, in combination with the tapered mandrel *f*, substantially as and for the purposes set forth.

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

S. JARVIS ADAMS.

Witnesses:

HENRY C. JONES,

JAMES I. KAY.