(No Model.)

S. J. ADAMS.

TUBE WELDING BALL.

No. 361,567. Patented Apr. 19, 1887.

Fig 1.

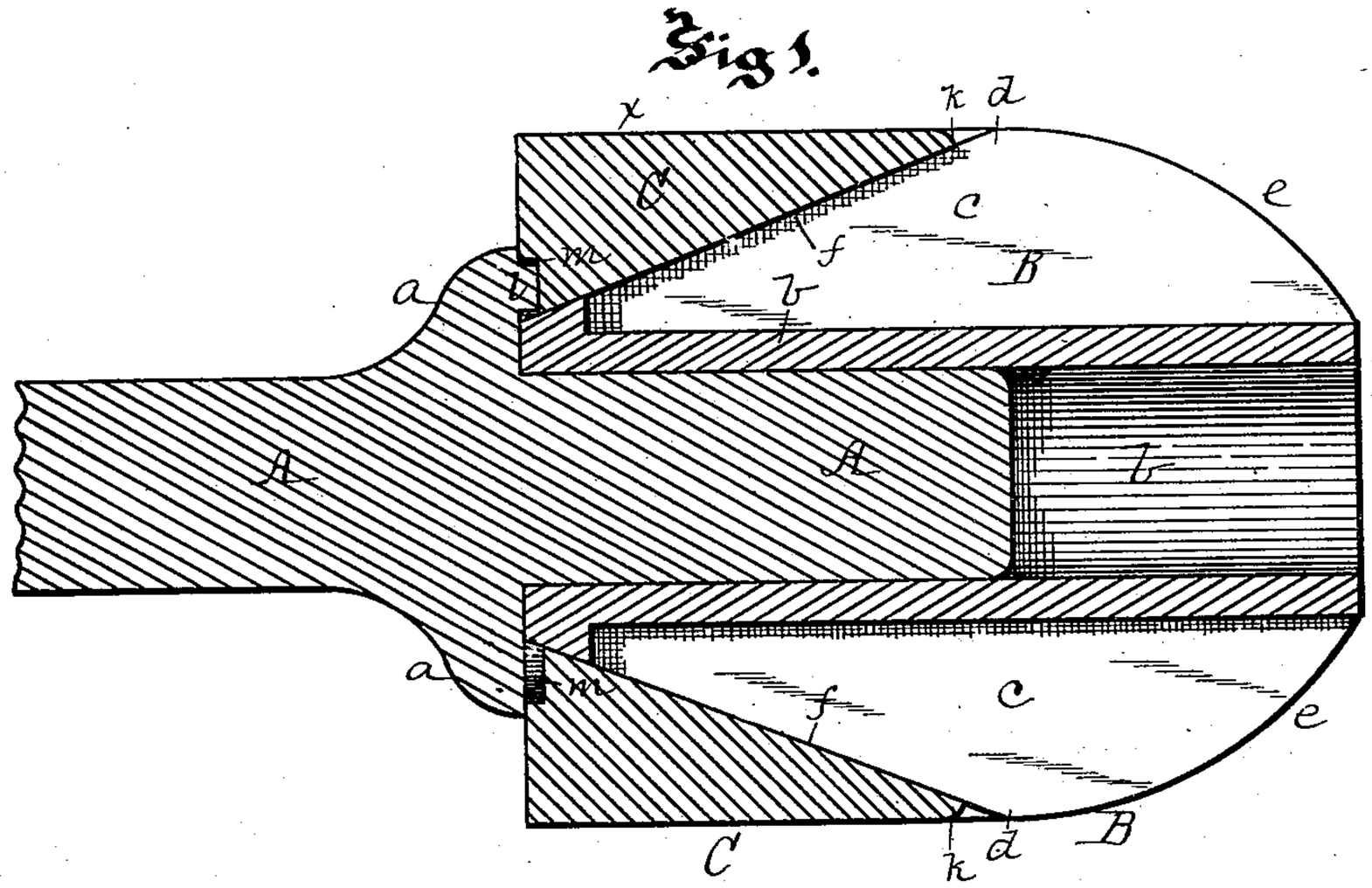


Fig 2.

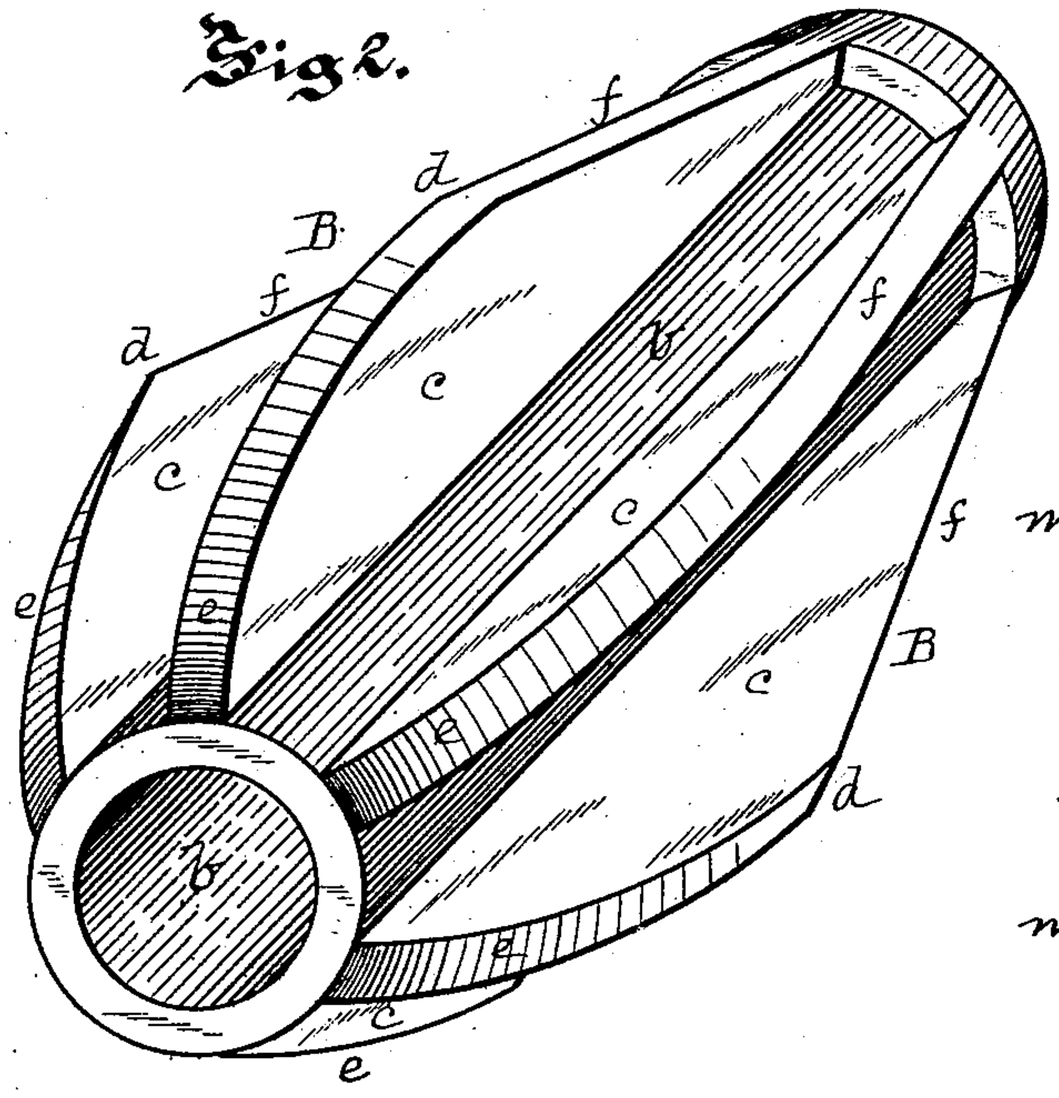
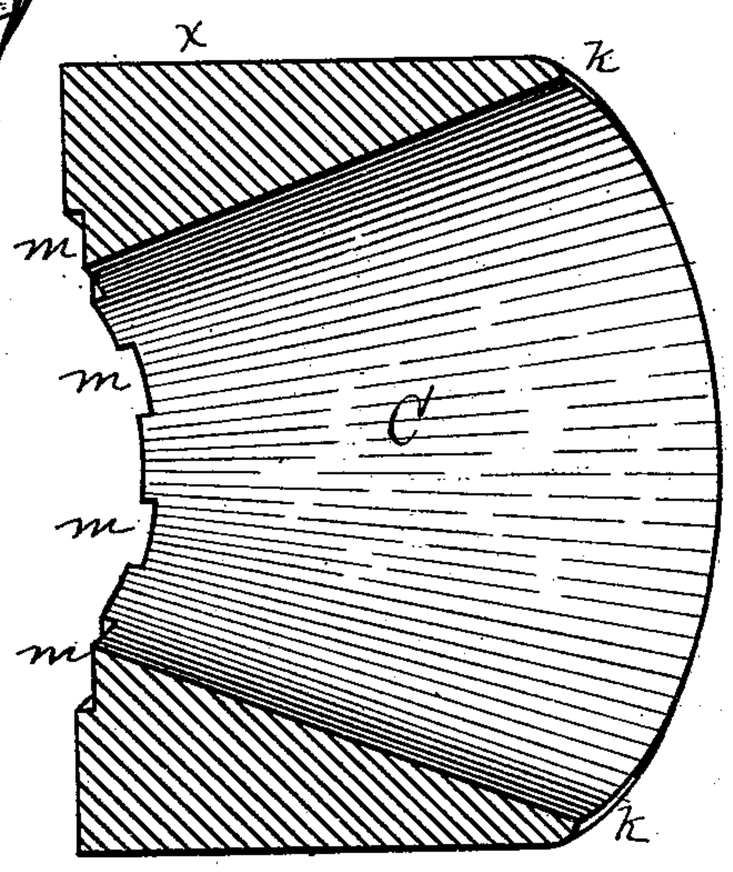


Fig 3.



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UNITED STATES PATENT OFFICE.

S. JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

TUBE-WELDING BALL.

SPECIFICATION forming part of Letters Patent No. 361,567, dated April 19, 1887.

Application filed November 15, 1886. Serial No. 218,876. (No model.)

To all whom it may concern:

Be it known that I, S. JARVIS ADAMS, of Pittsburg, in the county 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.

My invention relates to pipe-welding balls, having special reference to large balls—such as employed in the manufacture of tubing of ten inches and upward in diameter—its object being to provide a ball light in weight, which can be easily handled, and in which the wear comes on only a small portion, the principal part of the ball being employed over and over again. It has special reference to those classes of balls described and claimed in applications of even date herewith, Serial Nos. 218,874 and 218,875.

The special features of improvement in the ball forming the subject of the present application are in providing the supporting-rod with a shoulder to sustain back-pressure and forming the ball with a removable point fitting on the rod and a welding-sleeve fitting around and supported by the point, the welding-sleeve resting against and being sustained against back-pressure by the shoulder of the supporting-rod, the welding-sleeve receiving the pressure and wear in welding, while the removable point can be employed many different times for this purpose.

In my improved ball the removable point is skeleton in form, being composed of a tubular portion provided with a series of ribs, these ribs tapering from the point of their largest diameter forward to form the tapering forward end of the ball, by means of which the skelp is directed onto the welding-sleeve, and tapering from the point of largest diameter backward, so as to form a tapering support for the welding-sleeve, the body of which is triangular in cross-section and fits upon the backwardly-tapering portion of the point and against the shoulder on the rod, so that a small shoulder, which can easily be withdrawn from the finished tube, can be employed, and at the same time this shoulder acts to support both the point and the welding-sleeve, and sufficient metal for welding purposes is provided at the point of weld, while the welding-sleeve can be made light in weight, and consequently of less cost and more easily handled.

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

Figure 1 is a longitudinal section of my improved ball. Fig. 2 is a perspective view of the removable point employed, and Fig. 3 is a sectional perspective view of the welding-sleeve.

Like letters of reference indicate like parts in each.

The supporting-rod A is provided with the annular shoulder *a*, this shoulder being preferably made larger than the ordinary shoulder to support the welding-ball, but small enough to be easily withdrawn through the finished tube after the welding operation. Fitting on this supporting-rod is the removable point B, the point acting to direct the tube-skelp onto the welding-sleeve C, which is supported thereon.

The exact construction of the removable point is shown in Fig. 2, the point being skeleton in form and being preferably formed of the tube *b*, provided with a series of wings or ribs, *c*, extending out therefrom and tapering from their point of largest diameter, as at *d*, toward the forward end of the tube *b*, as at *e*, to form a tapering end to guide the skelp on the welding-sleeve, and tapering from the point *d* to the rear end of the tube *b*, as at *f*, to form the support for the welding-sleeve C. The same result can be obtained by coring out the removable point. This removable point thus forms the largest part of the ball, and as it is skeleton in form it can be made very light, as its only purpose is to hold the sleeve in position and direct the skelp onto it, and after the skelp once passes onto the sleeve the sleeve is sufficiently strong to sustain the pressure thereon, while the sleeve itself fits against the shoulder *a* of the rod, and is sustained thereby against longitudinal pressure, or the removable point may rest against the tapering sleeve and the sleeve in turn against the shoulder on the rod, if so desired.

The welding-sleeve C has its walls formed triangular in cross-section, one of the advantages of this construction, as set forth in the

application marked "Case A," above referred to, being that the mold for the sleeve can be formed without the employment of special cores, and it can thus be made more cheaply, and another advantage being that it can be supported upon the skeleton point, and at the same time the sleeve is sustained against back-pressure by the ordinary shoulder on the rod, which is not required to be too large to be easily withdrawn through the tube. Another special advantage is that a mass of metal is obtained at the rear portion of the sleeve, where the welding operation is generally performed, as at *x*, which is sufficiently thick to impart the required strength to the sleeve to support the pressure in welding and prevent the heating and cutting of the sleeve during the welding operation, while at the same time the sleeve is light in weight and the metal requisite to sustain this welding-pressure, &c., is only employed at the point necessary. The point B acts thus to support the welding-sleeve around the rod, and it is generally made to fit the sleeve neatly, so as to wedge therein and form a support or brace to the thin forward end of the sleeve, the point only coming in contact with the shoulder *a* on the rod A when it is so wedged in, and sustains the welding-sleeve.

As a skeleton point is employed with the ball, it is evident that the tubing-skelp might sag between the ribs *c* and catch against the forward end of the welding-sleeve, and so have its end forced out of shape or upset or prevent the passage of the skelp onto the ball. To overcome this I provide the welding-sleeve with the rounded forward end, *k*, which extends a short distance below the point of greatest diameter of the removable point B, and, in case the skelp should sag between the ribs, raises it so that it will pass onto the welding portion of the ball.

To prevent the sleeve from turning during the welding operation and arrange it for presenting different faces in its circumference to receive the principal welding strain, I provide a clutch-engagement between the welding-sleeve and the shoulder *a* on the supporting-rod, the preferred form of the same being a lug, *l*, on the face of the shoulder and a series of notches, *m*, on the end face of the sleeve.

By this construction of welding-ball I am enabled to form a very light ball which can be employed in the manufacture of the largest tubing, and in which the principal portion can be used over and over, the portion receiving the welding-pressure and wear only being required to be replaced. At the same time I form the ball in but two parts, so that it can be more easily handled, and I make the ball much lighter in weight, and consequently much cheaper, as the principal part thereof is skeleton in form. I am also enabled to dispense with any enlarged removable head on the rod A to support the welding-sleeve, as the sleeve presses directly against the shoulder of the rod. The ball can be formed of any size required, and the welding-sleeve can be turned upon the point to present different faces for the welding operation.

On account of the outwardly-flaring inner walls of the sleeve C, I am enabled to form it without expensive coring, and consequently the only part of the ball which receives any wear can be formed at a low cost.

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

1. In tube-welding balls, the combination, with the supporting-rod having the shoulder to sustain back-pressure, of the removable point fitting thereon, and the welding-sleeve fitting around and supported by the point and bearing against the shoulder on the supporting-rod, substantially as and for the purposes set forth.

2. The combination, in a tube-welding ball, of the skeleton point B and the welding-sleeve C, fitting around and supported by the skeleton point, substantially as and for the purposes set forth.

3. In tube-welding balls, the combination, with the removable point formed backwardly tapering from its point of greatest diameter, of the welding-sleeve having correspondingly-tapering inner walls fitting around the removable point, and the supporting-rod provided with a shoulder, against which the sleeve bears, substantially as and for the purposes set forth.

4. In tube-welding balls, the combination, with the supporting-rod having the shoulder to sustain back-pressure, of the welding-sleeve bearing against said shoulder, and the removable point having the tapering portion entering and wedged within the welding-sleeve, substantially as and for the purposes set forth.

5. In tube-welding balls, the combination, with the skeleton or ribbed removable point, of a welding-sleeve having rounded forward end, *k*, to direct the skelp onto the sleeve, substantially as set forth.

6. In tube-welding balls, the combination of the supporting-rod having a shoulder to sustain back-pressure, the welding-sleeve bearing against said shoulder, and clutch devices on the meeting faces of the shoulder and sleeve, 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:
JAMES I. KAY,
J. N. COOKE.