

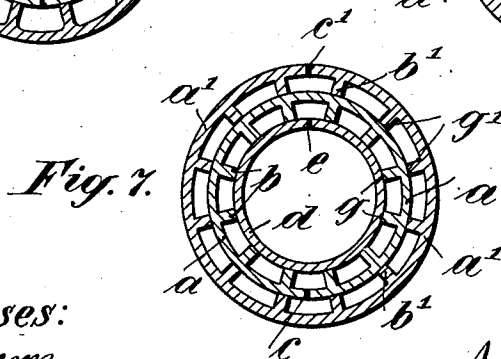
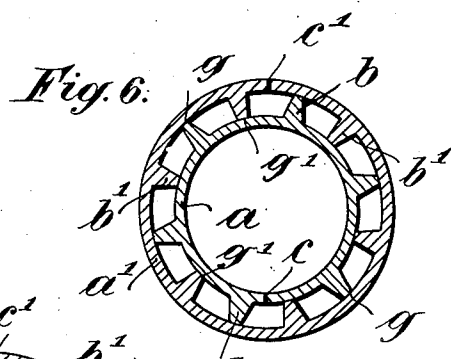
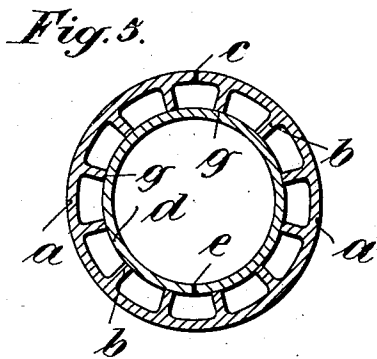
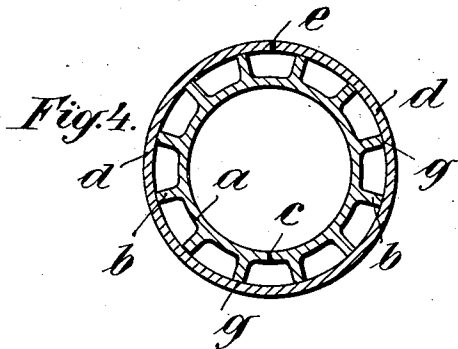
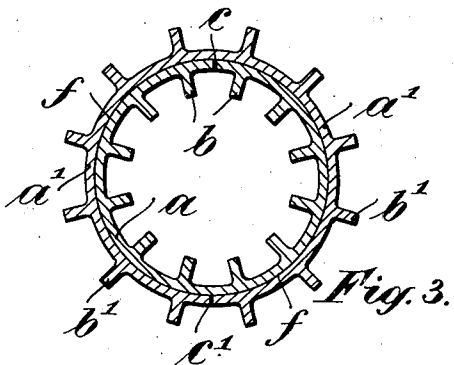
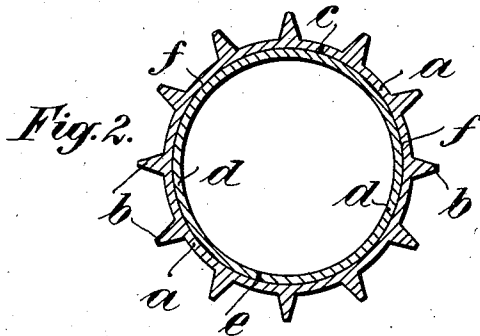
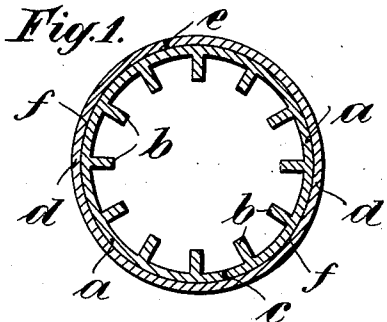
No. 813,918.

PATENTED FEB. 27, 1906.

A. SCHMITZ.

TUBE, SINGLE OR COMPOUND, WITH LONGITUDINAL RIBS.

APPLICATION FILED DEC. 29, 1899.



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UNITED STATES PATENT OFFICE.

ALBERT SCHMITZ, OF RAUNHEIM, GERMANY.

TUBES, SINGLE OR COMPOUND, WITH LONGITUDINAL RIBS.

No. 813,918.

Specification of Letters Patent.

Patented Feb. 27, 1906.

Application filed December 29, 1899. Serial No. 742,014.

To all whom it may concern:

Be it known that I, ALBERT SCHMITZ, a citizen of the Grand Duchy of Hesse, and a resident of No. 50 Frankfurterstrasse, Raunheim-on-the-Main, in the Grand Duchy of Hesse, German Empire, have invented certain new and useful Improvements in Tubes, Single or Compound, with Longitudinal Ribs, of which the following is a specification.

My present invention relates to improvements in tubes having longitudinal ribs or wings. Tubes of this kind are well known and are particularly employed on an extensive scale as heating or cooling tubes or in boilers. The two edges of the skelp from which these tubes are formed are joined together by the so-called "overlapped" welding, and since the joint thus formed extends the full length of the tubes the said tubes are weak at this place and do not offer sufficient security against their breaking by the high steam-pressures now in use and at their employment in steam-superheaters.

The object of my present invention is to overcome these disadvantages and to furnish a tube having longitudinal ribs or wings which stand sufficient resistance even to the highest steam-pressures and also has a great transverse and torsional strength. These improved tubes are made from two or more tubular members one or more of which (corresponding to the respective purpose of application) are provided with longitudinal ribs or wings turned inwardly or outwardly. In some modifications of my improved tube two of the tubular members may be entirely welded together and the ribs turned inwardly or outwardly or inwardly and outwardly, while in other modifications the smooth surface of one tubular member, being provided with longitudinal ribs or not, contacts with the free ends of the longitudinal ribs of another tubular member and is welded to said ribs, which may be turned inwardly or outwardly, whereby a number of separated radiating-chambers are obtained between the adjoining tubular members. In all modifications of my improved tube the adjacent tubular members, formed from skelps, are joined together in such a manner that the joint formed by the two edges of one skelp is disposed out of alignment with the joint formed by the two edges of the adjoining skelp, so that each tubular member acts to strengthen or bridge the joint of the other tubular member.

In consequence of the various modifica-

tions in their form and construction my improved tubes allow of an extensive employment—for example, as heating or cooling tubes or in boilers or other evaporating apparatus. Furthermore, they may be advantageously employed as hollow shafts or in the chemical industry for conducting two separate fluids or gases therethrough.

The manufacture of my improved tubes is effected by the process described in the United States Letters Patent No. 661,108, granted to me on the 6th of November, 1900.

In the accompanying drawings different modifications of tubes according to my present invention are shown in transverse sectional views.

In Figure 1 the ribs are turned inwardly and the other tubular member surrounds the ribbed tubular member, with its joint disposed out of alinement with the joint of said ribbed tubular member. In Fig. 2 the ribs of the ribbed tubular member are turned outwardly, while the other tubular member is inserted within. In Fig. 3 both tubular members are ribbed, the inner tubular member being turned inwardly and the outer tubular member being turned outwardly. In Fig. 4 the ribbed tubular member is turned outwardly and the other tubular member surrounds the same, being supported against the ribs. In Fig. 5 the ribbed tubular member is turned inwardly, while the other tubular member is inserted within the same and rests against the ribs. In Fig. 6 both tubular members are ribbed, the inner tubular member being turned outwardly, resting against the outer tubular member, and the outer tubular member being turned inwardly, resting against the inner tubular member, the ribs interprojecting. In Fig. 7 three tubular members are employed. The inner one is not provided with any ribs. The central tubular member has its ribs turned inwardly, bearing against the inner tubular member, and the outer tubular member also has its ribs turned inwardly, bearing against the central tubular member.

Like characters of reference indicate corresponding parts through the several views.

In the example shown in Fig. 1 the tube is composed of the two tubular members *a* and *d*. A skelp with longitudinal ribs *b* fixed upon it on one face is at first converted into a tubular member *a* by drawing it in the known manner through a cone. It is then placed with its seam *c*, formed by the two

edges of the skelp, downward upon a smooth skelp, and the latter is then similarly converted into the tubular member *d* around *a*, as more fully described in the United States Letters Patent No. 661,108, above mentioned. Hereby a double-walled tube is obtained, the inner side of which is furnished with longitudinal ribs *b*. The two faces of the two tubular members touching at *f* are then entirely welded together, the seam *c* of the tube *d* being out of alinement with the seam *c* of the tube *d*.

Fig. 2 shows a modification in which at first the flat skelp is drawn into tubular member *d*, and then a skelp having the ribs *b* is formed with said ribs outwardly around the smooth tubular member *d*. The two tubular members *a* and *d* are then likewise entirely welded together at *f*, the seams *c* and *e*, respectively, being out of alinement.

In the modification shown in Fig. 3 both tubular members are provided with ribs, the inner tubular member *a* having its ribs *b* turned inwardly and the outer tubular member *a'* having the ribs *b'* turned outwardly. The two tubular members are likewise entirely welded together at *f* and the seam *c* of the inner ribbed tubular member being disposed out of alinement with the seam *c'* of the outer ribbed tube.

I must remark here that the results obtained with my improved tubes are not obtained with the ribbed tubes hitherto used, even if the walls of the latter are made as thick, as I obtain the same in my improved tubes by using two tubular members, for it will be readily understood that my tubes in which two tubular members entirely surround, together stand a much greater resistance than tubes in which the two edges of the skelp forming the tube only overlap each other for a small distance.

In the example represented in Fig. 4 a ribbed skelp is at first converted into a tube having its ribs *b* turned outwardly, and then a smooth skelp is formed around said ribbed tubular member *a* in such a manner that the inner face of the tubular member *b* contacts with the ends *g* of the ribs *b*, to which it is welded. A similar tube is shown in Fig. 5. In this modification at first the smooth skelp is drawn into a tube and the ribbed tubular member *a*, having its ribs *b* turned inwardly, surrounds the latter, the ends *g* of the ribs *b* resting upon the smooth surface of the tubular member *d*, to which they are welded. The tube shown in Fig. 6 is composed of two ribbed tubular members *a* and *a'*, the ribs *b* of the inner tubular member *a* being turned outwardly and resting with their ends *g* against the inner side of the outer tubular member *a'*, to which they are welded, the interprojecting ribs *b'* of the outer tubular member *a'* being turned inwardly and resting with their ends *g'* against the surface of the in-

ner tubular member *a*, to which they are likewise welded. In the modification illustrated in Fig. 7 three tubular members are employed. The inner tube *d* is made out of a flat tubular member. The second tube *a* is ribbed and has its ribs *b* turned inwardly, the ends *g* of said ribs being welded to the surface of tubular member *d*. The outer ribbed tubular member *a'* also has its ribs *b'* turned inwardly, the ends *g'* of which being welded to the surface of tubular member *a*. As will be seen from Figs. 4 to 7, a number of radiating-chambers are obtained between two adjacent tubular members in this kind of tubes. Therefore the latter may be preferably applied in the chemical industry, for example, for quickly heating a fluid, in which case the latter may be conducted through the inner tubular member and steam through the radiating-chambers. The tubes of this kind also may be advantageously employed as hollow shafts, for they have doubtless as much capacity of resistance as those with a massive wall. However they are more easy in weight than those and offer a great saving of material.

The dimensions, the form, the position, and the number of the ribs or wings may be varied as required in the different modifications. However, in all modifications of my improved tube two adjacent tubular members must be joined together in such a manner that the joints of the same are not in alinement, so that, as already mentioned above, each tubular member acts to strengthen or bridge the joint of the adjacent tubular member.

Having thus particularly described my said invention, what I claim is—

1. A tube composed of two tubular members, one of which has longitudinal ribs or wings, said members being formed from two skelps and being entirely welded together and the joints formed by the edges of the two skelps being out of alinement, substantially as described and for the purpose set forth.

2. A tube composed of two tubular members both of which have longitudinal ribs or wings, said members being formed from two skelps and being entirely welded together and the joints formed by the edges of the two skelps being out of alinement, substantially as described and for the purpose set forth.

3. A tube composed of two tubular members, one of which has longitudinal ribs or wings and the other of which contacts with the ends of said ribs or wings and is welded to the same, the members being formed from two skelps and having the joints formed by the edges of the skelps out of alinement, substantially as described and for the purpose set forth.

4. A tube composed of two tubular mem-

bers both of which have longitudinal ribs or wings, each of said members resting against the ends of the ribs of the other member and being welded to said ribs, said members being formed from two skelps, the joints formed by the edges of the skelps being out of alinement, substantially as described and for the purpose set forth.

10 5. A tube composed of a plurality of tubular members one or more of which is provided with longitudinal ribs or wings, each of said ribbed members having the ends of its

ribs resting against the smooth surface of the adjacent member and being welded to the same, the joints of two adjacent members being out of alinement, substantially as described and for the purpose set forth. 15

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT SCHMITZ.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.