

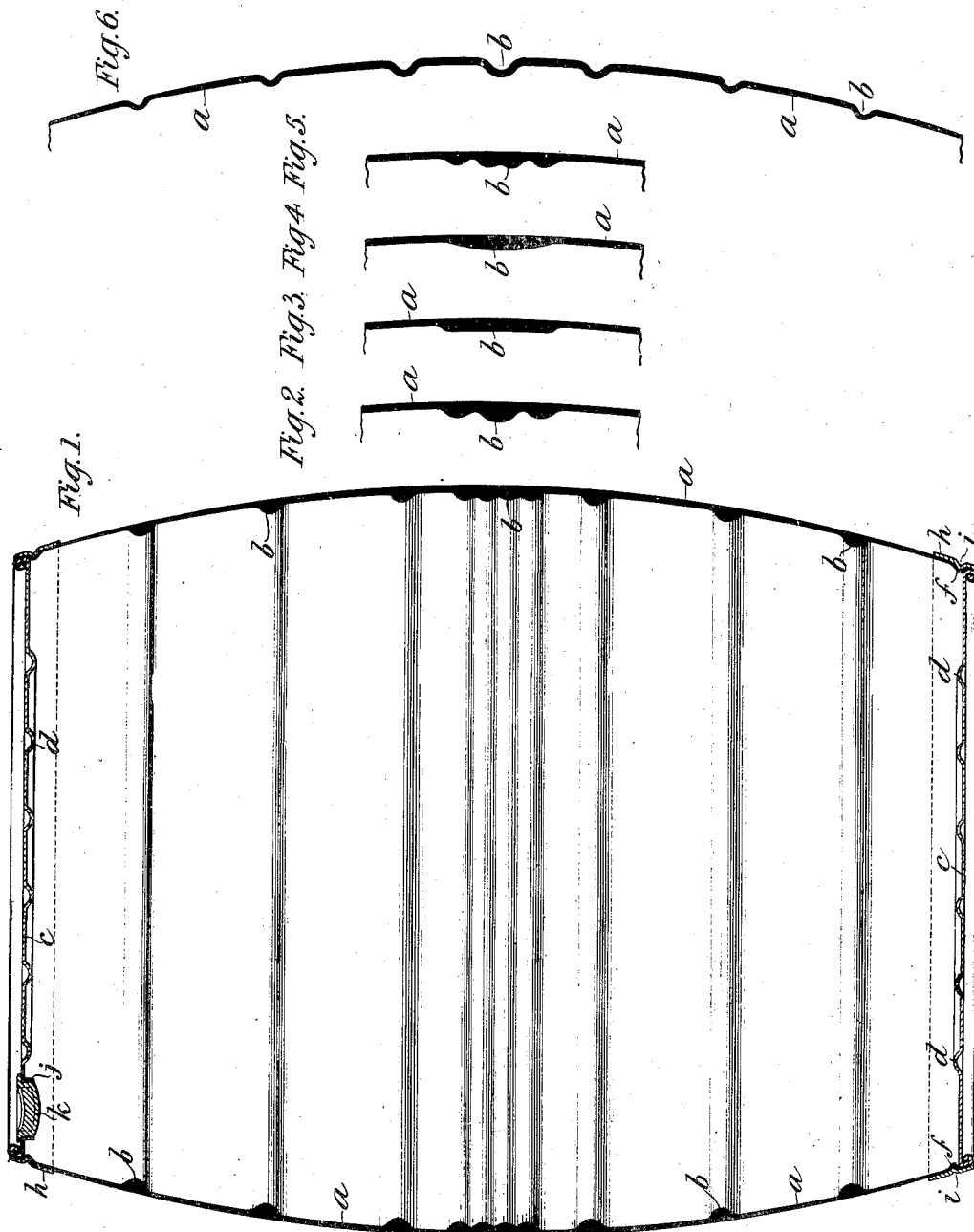
(No Model.)

3 Sheets—Sheet 1.

D. CAIRD.  
MANUFACTURE OF METAL BARRELS, &c.

No. 473,495.

Patented Apr. 26, 1892.



WITNESSES:

*John Becker*  
*Fred White*

INVENTOR:

*David Caird,*  
By his Attorneys

*Arthur C. Fraser & Co*

(No Model.)

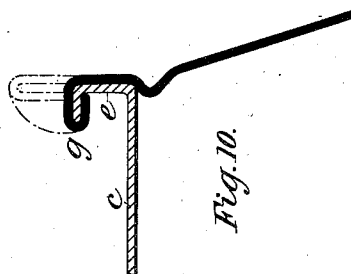
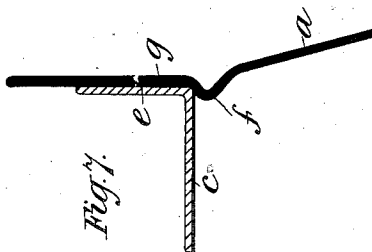
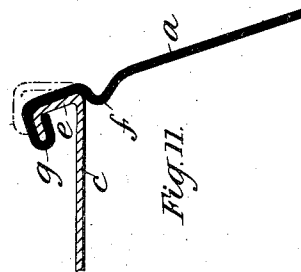
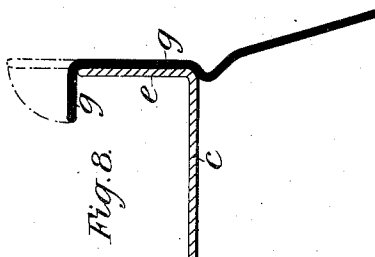
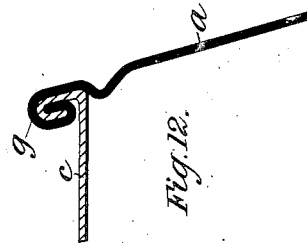
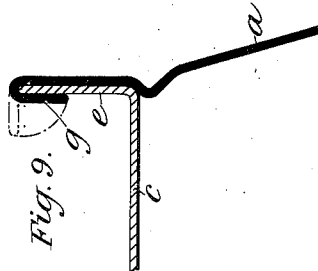
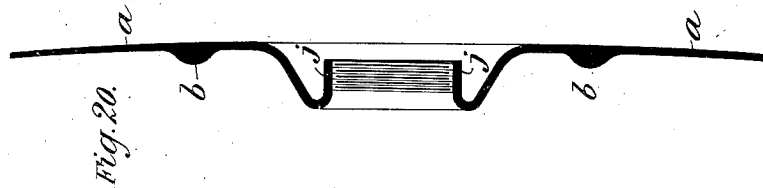
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3 Sheets—Sheet 3.

D. CAIRD.

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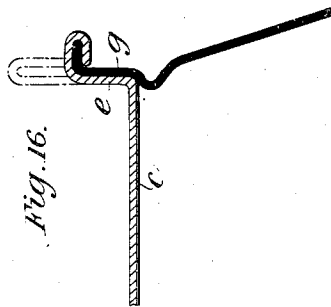


Fig. 16.

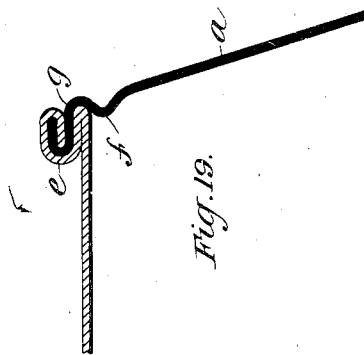


Fig. 19.

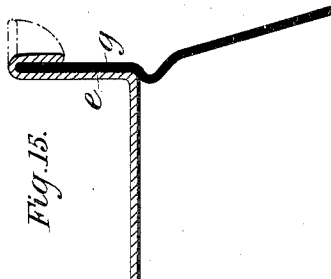


Fig. 15.

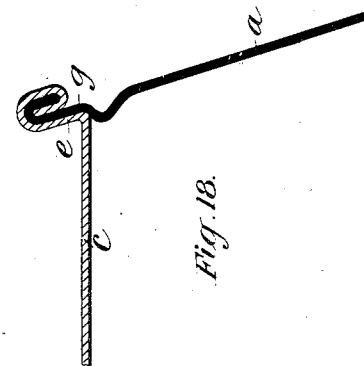


Fig. 18.

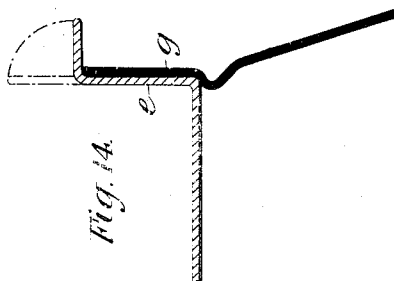


Fig. 14.

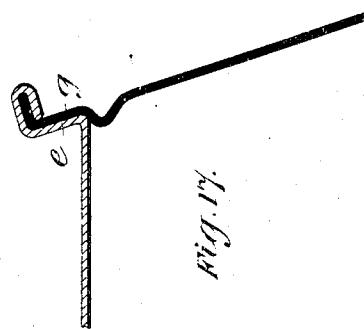
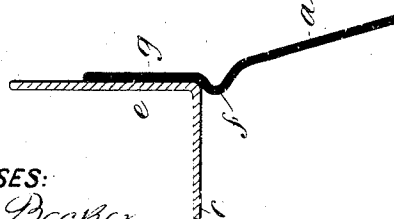


Fig. 17.

Fig. 13.



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# UNITED STATES PATENT OFFICE.

DAVID CAIRD, OF ULVERSTON, ENGLAND.

## MANUFACTURE OF METAL BARRELS, &c.

SPECIFICATION forming part of Letters Patent No. 473,495, dated April 26, 1892.

Application filed December 2, 1890. Serial No. 373,305. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID CAIRD, of Ulverston, England, have invented certain new and useful Improvements in Metal Barrels, of which the following is a specification.

My invention relates to barrels which are made of metal—such, for example, as steel; and the improvements consist, first, in a barrel the body part of which is rolled in one continuous piece, seamless, and preferably with circumferential strengthening ribs or projections so distributed as to give the greatest strength at the parts most subjected to strain or wear; second, in the combination, with a body part rolled in one continuous piece, with strengthening-ribs, as aforesaid, and having near its ends annular corrugations or analogous provisions, of metal hoops shrunk on the ends of such body and constructed to engage with such corrugations or provisions; third, in a particular mode or particular modes of joining the heads to the body part and forming the chines; and, further, in various other improvements in the details, as will be understood from the following description.

In the accompanying drawings, Figure 1 is a longitudinal mid-section of a metal barrel constructed in accordance with my invention in its most approved form. Figs. 2, 3, 4, 5, and 6, respectively, illustrate some of the various ways in which the strengthening ribs or projections can be modified. Figs. 7 to 12 illustrate the preferred mode of joining the heads to the body part and forming the chines. Figs. 13 to 19 illustrate a somewhat different mode. Fig. 20 shows how the body part can be depressed below the general level of the other parts at the place where an opening is formed to receive a bung or lid.

Referring first to Fig. 1, *a* is the body part of the barrel. This body part has strengthening ribs or projections *b b*, extending round its internal circumference and so distributed as to give the greatest strength at the parts most subjected to strain or wear. The position and form of these ribs or projections can obviously be very considerably varied, more particularly at the middle of the body part.

Figs. 2, 3, 4, and 5, already referred to, illustrate some of the many practicable forms of the variation. The body part *a*, with its ribs

or projections *b b*, is made of one continuous piece of mild steel or other suitable metal, and for the purpose of manufacturing it I preferably take a hollow ingot or weldless tube and roll it out on a mandrel which has indentations corresponding with the ribs to be formed. The cylinder thus rolled out and while still on the mandrel is put between rolls and expanded, as will be well understood, the rolls being plain or having slight swells corresponding with the indentations of the mandrel, unless it be required to form external ribs on the vessel to be manufactured. Then if the vessel is to be of barrel form I put the cylinder as produced by the rolls into a bellying-machine to give it the required shape. Instead of making the body part from a hollow ingot or weldless tube, as above explained, I can make it from a welded tube, which I put on a mandrel and then submit to the various operations above explained.

Although it is preferred for most purposes to make the body part with internal strengthening-ribs, as illustrated in Figs. 1 to 5, it may be made with external ribs instead thereof, or with both internal and external ribs; and the ribs, instead of adding to the thickness of the metal at the parts where they exist, may consist of corrugations, as shown in Fig. 6, (either internal, as illustrated, or external,) but in this case it is desirable to roll the body part thicker at and near the middle than at and near the ends, as seen in the figure.

*c c* are the barrel-heads or ends. They each consist of a metal plate, strengthened with annular and concentric channels or corrugations *d d*, as heretofore, the number of which can obviously be varied. The heads may be secured to the body part *a* in the well-known manner illustrated in Figs. 7 to 12, wherein the head *c* has a rim or outturned flange *e*, Fig. 7, and the body part has a projection *f*, in the form of a corrugation, which engages with the angle or corner formed by turning up the rim, the rim *e* lying against the projecting end part *g* of the body *a*, as seen in Fig. 7, and the projecting end *g* being of greater extent than the rim *e*. The end *g* is then turned over the edge of the rim—first as shown in Fig. 8, then as in Fig. 9—next the end *g* and rim *e* are folded inward together—first as in Fig. 10, then as in Fig. 11,

and finally as in Fig. 12, so as to bear upon the head *c* and constitute the chine. In the improved mode of securing the heads to the body part, as shown in Figs. 13 to 19, the rim *e* is of greater extent than the projecting end *g* of the body part, as seen in Fig. 13. It is turned over the end *g*—first as shown in Fig. 14, then as in Fig. 15—next the rim *e* and end *g* are folded together into the successive forms shown, respectively, in Figs. 16, 17, 18, and 19, Fig. 19 showing the final form. The heads *c c* having been secured to the body part *a* and the chines formed, as above described, I next shrink onto each end of the barrel or vessel a hoop *h*, Fig. 1, which is securely held in position by a corrugation *i* thereon engaging with the corrugation *f* of the body part *a*. It will be obvious that other analogous means of securing the hoop may be adopted.

The openings for the introduction and withdrawal of the contents of the barrels or vessels can be made either in the body part *a* or in one of the heads *c*, or in both the body part and head, as may be required for the particular purpose for which the barrel is to be employed. The said openings can be formed in any suitable way and be fitted with any suitable devices for closing them. They can, for example, be formed as shown in Fig. 1, in which a part of one of the heads is removed at the place where the opening is required and the edge of the metal around the hole thus made is turned in, as shown at *j*. This turned-in part *j* can either be screw-threaded, as shown, or be fitted with a bush, or it may be left plain, and a plug or lid *k* of corresponding form is fixed therein. In order to protect the plugs from injury, more particularly when they are inserted into openings in the middle of the body part *a* of the barrel, the metal of the body part where the opening is formed can be depressed below the general level of the other part—as, for example, in the manner seen in Fig. 20—so that the plug when in place shall be below the said level. To give a tight closure of the plugs or lids, a washer can be placed between their flanges and the tops of the bushes or some part of the surrounding metal. In any suitable part of the barrel or vessel a hole may be made for a vent-peg or for a spring-vent valve.

Barrels embodying my improvements as hereinbefore described are stronger and lighter and have greater capacity relatively to their bulk and weight than barrels of the ordinary construction.

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

1. A barrel having a bellied body of seam-

less rolled metal and heads united to the ends thereof.

2. A barrel having a bellied body of seamless rolled metal formed with circumferential strengthening-ribs.

3. A barrel having a bellied body of seamless rolled metal formed with circumferential corrugations constituting strengthening-ribs.

4. A barrel having a bellied body of seamless rolled metal formed with integral circumferential strengthening-ribs and with metal heads united to the ends of said body.

5. A barrel having a bellied body of seamless rolled metal, said bellied body being thickest in the middle and becoming gradually thinner toward the ends.

6. In a barrel, the combination of a metal body *a* and metal head *c*, having their edges crimped together, the end portion of the body being crimped inwardly and outwardly in planes overlying the head, and the flange portion of the head being crimped inwardly beneath the inward crimp of the body and extended upwardly, outwardly, and thence downwardly and inwardly around the outer edge of the body portion, so as to conceal that edge and itself receive the wear.

7. In a metal barrel or other similar vessel, the combination of a metal body *a*, having projecting ends *g* and corrugations *f* near its end, head *c*, having a rim or flange *e*, said flange and projecting end *g* folded so as to bear against the head, and a hoop *h*, shrunk on the vessel end and having a corrugation *i*, engaging with said corrugation *f* of said body, substantially as set forth and shown.

8. In a metal barrel, the combination, with a seamless metal body constructed with a corrugation *f* near its end, of a hoop *h* for said barrel, shrunk on the end thereof over said corrugation *f*, and having a corrugation *i*, coinciding with and engaging the latter, whereby when said hoop is shrunk on said body the two are locked together without the aid of rivets, substantially as set forth.

9. A barrel having a body of seamless rolled metal formed with a smooth face on one side and an integral circumferential rib on the other side, consisting of a thicker portion of the metal of the body, and with heads united to the ends of said body.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

DAVID CAIRD.

Witnesses:

JAMES BRYDE MCCLURG,  
THOMAS L. WHITEHEAD.