Jan. 18, 1944. A. H. BATES 2,339,245

SHEET METAL REEL AND METHOD OF MAKING SAME

Filed Jan. 23, 1941 2 Sheets-Sheet 1

Fig. 1

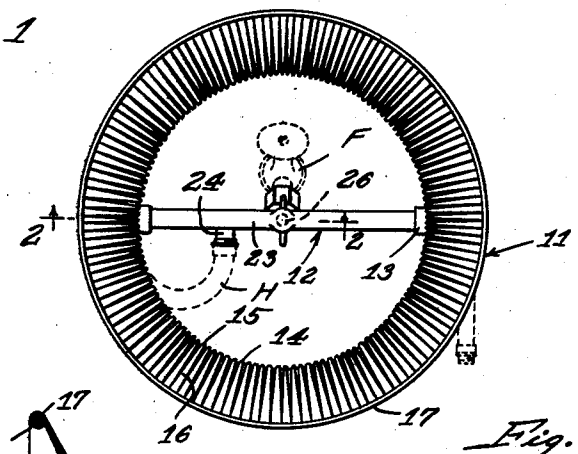


Fig. 2

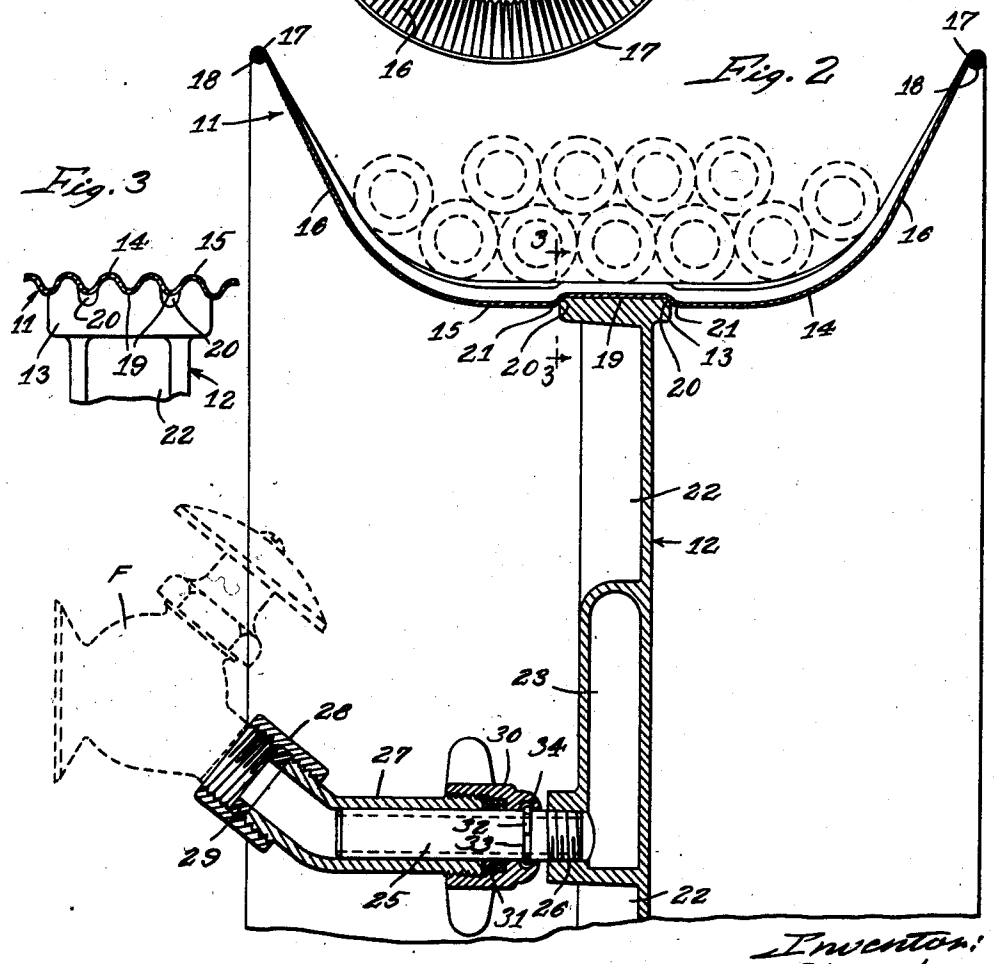


Fig. 3

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Fig. 4

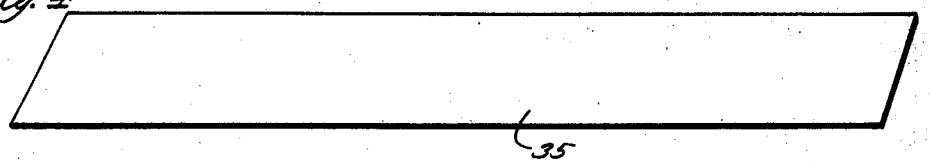


Fig. 5

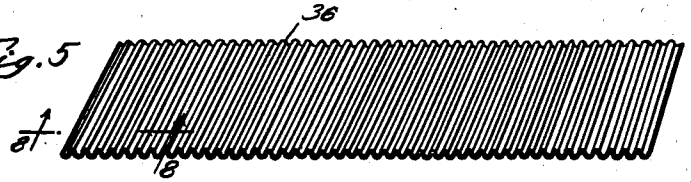


Fig. 8

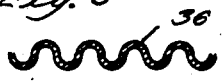


Fig. 7

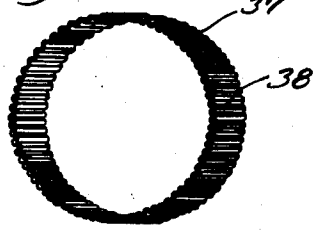


Fig. 6

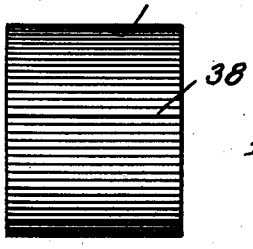


Fig 9

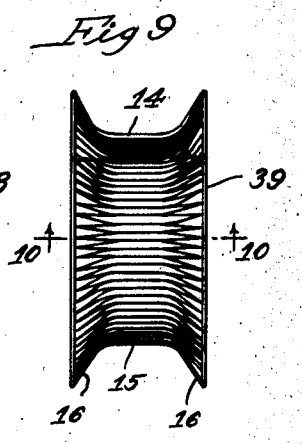
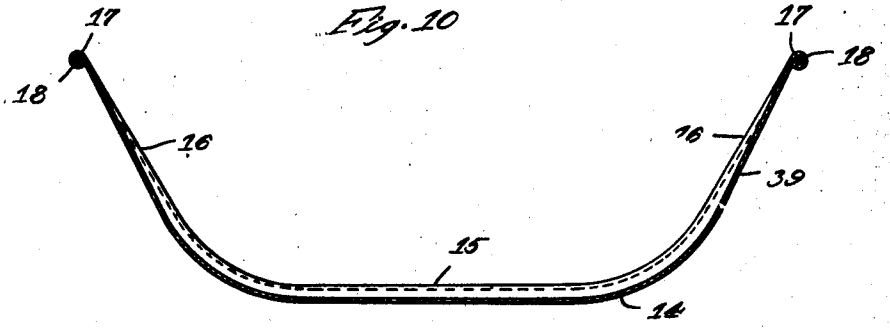


Fig. 10



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UNITED STATES PATENT OFFICE

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SHEET METAL REEL AND METHOD OF MAKING SAME

Albert H. Bates, Rockford, Ill.

Application January 23, 1941, Serial No. 375,582

11 Claims. (Cl. 242—123)

This invention relates to a new and improved sheet metal reel and method of making the same.

The principal object of my invention is to provide a reel, the body of which is of one-piece corrugated sheet metal construction, with a view to lightness, strength, and durability combined with low cost and attractive appearance.

Another object consists in the application of a corrugated sheet metal reel body on a one-piece cast cross-bar by means of which the reel is adapted to be mounted for rotation, as, for example, where the reel is to be used for garden hose and the support for the reel is attached more or less permanently to the faucet in a familiar fashion.

Another important object of the invention consists in the improved method of making the reel body so that the corrugations are of full depth in the portion of smallest diameter, tapering radially outwardly to very shallow or zero depth in both flanges and terminating in rolled or curled peripheral edge portions. This construction, in accordance with the invention, is obtained by corrugating a strip of sheet metal, rolling the same to circular form and joining the ends, and then forming, pressing, or rolling the ring-shaped piece substantially to the final flanged shape desired, although the corrugating may be done after the strip has been rolled to circular form and the ends joined together. In accordance with the invention, the edge portions of the flanges are finally folded or rolled and, if desired, a reinforcing wire is inserted in these rolled portions.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front view of a garden hose reel made in accordance with my invention and indicating in dotted lines how the same is adapted to carry a garden hose and be attached to and supported on a faucet;

Fig. 2 is a section on a larger scale on the line 2—2 of Fig. 1, with the reel turned so that the cross-bar is in the vertical plane of the faucet;

Fig. 3 is a sectional detail on the line 3—3 of Fig. 2;

Figs. 4, 5, and 6 are views illustrating three steps in the method of forming the reel body, Fig. 7 being a perspective view of the ring-shaped body blank illustrated in side elevation in Fig. 6;

Fig. 8 is a sectional detail on the line 8—8 of Fig. 5;

Fig. 9 is a view partly in section and partly in side elevation of the reel body as finally produced from the ring-shaped body blank of Figs. 6 and 7; and

Fig. 10 is an enlarged sectional detail on the line 10—10 of Fig. 9.

The same reference numerals are applied to corresponding parts throughout the views.

Referring first to Figs. 1 to 3, the numeral 11 designates the one-piece sheet metal body of the reel or spool of my invention, and 12 designates the one-piece cast cross-bar thereof secured by means of the pad portions 13 on its opposite ends to the inside of the reel at diametrically opposite points. The reel body 11 is produced in accordance with the method hereinafter described to provide longitudinal corrugations 14 of a predetermined depth in the portion 15 of smallest diameter, tapering radially outwardly in the flange portions 16 to shallow or zero depth at the curled or rolled peripheral edge portions 17. At 18 there are indicated reinforcing wires inserted in the rolled peripheral edge portions. A one-piece sheet metal reel body of such corrugated form presents a neat and attractive appearance and is light and rugged and not nearly so apt to bend out of shape as other reels with which I am familiar. The corrugations are used to advantage also in fastening the pad portions 13 of the cross-bar 12 to the reel body, the pad portions 13 having parallel grooves 19 formed therein to conform to the currugations and being recessed at the ends of at least two of these grooves, as indicated at 20, to fit in the fillets formed when the sheet metal of the reel body is bent radially inwardly on opposite sides of the pad portions 13 of the cross-bar at the corrugations registering with these grooves. This makes the cross-bar rigid with the reel body without necessitating riveting or any other kind of fastening. The cross-bar, which might be of any other shape suitable for the present purpose, is of channel cross-section between the pad portions 13, as indicated at 22, except for the short tubular portion 23 from one end of which a threaded neck portion 24 extends for attachment of the garden hose H. A nipple 25 is threaded in a hole 26 on the axis of rotation of the reel. This nipple is entered in an elbow fitting 27, which is arranged to be attached more or less permanently to the faucet F by means of a union 28, in which a gasket 29 is provided to avoid likelihood of leakage. A gland nut 30 threads on the other end of the elbow fitting 27 and compresses packing rings

31 to avoid leakage along the nipple 25 while allowing the same to turn rather freely relative to the elbow fitting. A split ring 32 fits in a groove 33 in the nipple and in a registering groove 34 in the gand nut 30, so as to prevent endwise movement of the nipple relative to the elbow fitting. An opening (not shown) is provided in the reel adjacent one end of the cross-bar 12 so that the inner end of the garden hose may be extended to the neck 24 for connection therewith, it being understood that the hose is arranged to be wound onto the reel and unwound without removing the reel from the faucet, the reel being rotatably mounted on the faucet by means of the nipple 25, and the hose being connected with the faucet through the same nipple.

The production of the double flanged body 11 of this reel or spool presented a rather difficult problem when viewed in the light of old methods commonly employed for flanging metal rings or drums, such as rolling, spinning, drawing, pressing or forming, and forging or extruding. Such operations have been performed by hot or cold working, depending on the thickness of metal used and on the height of flange desired. None of these methods used in the conventional way was found to be suitable for the present article for certain reasons. For example, the height of flange for any given metal thickness is strictly limited with these old methods by the ductility of the material, although flange height is sometimes increased by annealing and reworking, which, however, means proportionately increased cost. The novel method or process hereinafter outlined is especially suitable for thin sheet metal where high flanges in proportion to diameter are required. Lower flanges in proportion to diameter may, of course, be produced easily by this method, but the chief application of this method is expected to be to those constructions where height of flange or desired distance between flanges is not obtainable economically by any other method.

The body 11 of the reel or spool according to the novel method of my invention is formed from a single strip of sheet metal, indicated at 35 in Fig. 4. This piece is then corrugated transversely, as indicated at 36 in Figs. 5 and 8, and the corrugated piece is then rolled to the circular form indicated at 37 in Figs. 6 and 7 and the ends joined together along the line 38, as by welding, lock-seaming, soldering, or otherwise. If desired, the flat strip 35 may be rolled to circular form and the ends joined together and the corrugating can be taken care of at that point, although the other procedure is preferred, because it is simpler and eliminates any danger of disrupting or damaging the joint between the ends. The ring-shaped corrugated body blank in the form shown in Figs. 6 and 7 is then formed, pressed, or rolled to the flanged shape indicated at 39 in Figs. 9 and 10, in which the corrugations 14 remain the same depth in that portion 15 of the reel which is of smallest diameter and which is of the same diameter as the ring-shaped body blank 37 of Figs. 6 and 7. In the flanges 16, however, the corrugations diminish in depth radially outwardly, reaching shallow or zero depth at the outer edge portions 17, which may be folded or rolled but are shown as rolled over reinforcing wires 18. By the method outlined any angle of flange required may be produced. The wires may, of course, be omitted. The method involves minimum handling of the article and the cost of production is proportionately low. Furthermore the corrugated construction makes for strength and durability as well as attractive appearance. Due to the corrugations, lighter gauge sheet metal can be employed than would otherwise be possible and thus an appreciable saving in the cost of the material is realized.

With this improved method there is no trimming and consequent wasting of material and the procedure, as should be clear from the description, is very simple and subject to exact calculation. For example, assuming that a drum is required having a 14" inside diameter and 22" outside diameter and 12" width, the calculations are as follows:

L=length of sheet required=circumference of 22" circle=22×3.1416+allowance for welding or joining. In practice the sheet is usually made shorter than the figured length and is stretched somewhat in forming to help remove corrugations.

W=width of sheet+allowance for rolled edges.

After the sheet is cut to the dimension L x W, the same is corrugated to the reduced length *l*,

l=14×3.1416+welding or joining allowance.

When the ends of the corrugated sheet have been joined, one or both flanges may be formed by a single stroke of the press, or by any other process known to the trade. Various widths of drums may be made with the same equipment by merely varying the width W. The thickness of the sheet is determined to suit service conditions. For instance, if used for winding wire cable, the sheet employed is much thicker than where the drum, reel, or spool produced is intended to be used for cotton cord. The same method outlined may be used to construct a reel or drum of two-piece construction, wherein each annular half is flanged after corrugation and the two halves are joined together by welding or otherwise joining the parts circumferentially around the middle of the reel.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

I claim:

1. An annulus of sheet material comprising a hub portion having longitudinal corrugations of substantially uniform width and depth, and having an annular outwardly flaring flange on one end thereof projecting outwardly at substantially more than 90° relative to the hub and joined to the hub by a curved connecting portion of large radius in relation to the radial length of said flange, said flange having radial corrugations therein coextensive with the longitudinal corrugations and diminishing in depth at a substantially uniform rate throughout their length through the curved connecting portion between the hub and flange and from the inner to the outer circumference of the flange.

2. An annulus of sheet material comprising a hub portion having longitudinal corrugations of substantially uniform width and depth, and having an annular outwardly flaring flange on each end thereof projecting outwardly at substantially more than 90° relative to the hub and joined to the hub by curved connecting portions which are of large radius in relation to the radial length of said flanges, said flanges having radial corrugations therein coextensive with the longitudinal corrugations and diminishing in depth at a substantially uniform rate throughout their length through the curved connecting portions between

the hub and flanges and from the inner to the outer circumference of the flanges.

3. In combination, an annulus of sheet material having longitudinal corrugations of substantially uniform width and depth, and means intermediate the ends of said annulus for supporting the same, comprising a cross-bar having transversely grooved end portions fitting in the longitudinal corrugations, said cross-bar being disposed substantially diametrically in said annulus and held against axial displacement with respect thereto.

4. In combination, an annulus of sheet material having longitudinal corrugations of substantially uniform width and depth, and means intermediate the ends of said annulus for supporting the same, comprising a cross-bar having transversely grooved end portions fitting in the longitudinal corrugations, said cross-bar being disposed substantially diametrically in said annulus, and means for holding said cross-bar against axial displacement relative to the annulus, comprising integral radially inwardly bent portions of one or more of said longitudinal corrugations engaging the opposite sides of the end portions of the cross-bar.

5. The method of making a sheet metal reel or spool, which comprises cutting a rectangular strip of flat sheet metal to the length and width desired, the length corresponding substantially to the circumference of the outer periphery of the flanges of the ultimate reel, then forming the strip to circular shape and joining the ends to form a ring-shaped body, corrugating the sheet metal so that the corrugations extend lengthwise of the reel and substantially parallel to the axis of rotation thereof and so that the corrugated body is substantially equal in diameter to the hub portion of the ultimate reel, and finally gradually flaring the ends of the reel body on curves of large radius to form annular flanges projecting outwardly at substantially more than 90° relative to the hub and in which the corrugations diminish in depth at a substantially uniform rate throughout their length from the inner to the outer circumference of the flanges and through the curved connecting portions between the flanges and hub.

6. The method of making a sheet metal reel or spool, which comprises cutting a rectangular strip of flat sheet metal to the length and width desired, the length corresponding substantially to the circumference of the outer periphery of the flanges of the ultimate reel, then forming the strip to circular shape and joining the ends to form a ring-shaped body, corrugating the sheet metal so that the corrugations extend lengthwise of the reel and substantially parallel to the axis of rotation thereof and so that the corrugated body is substantially equal in diameter to the hub portion of the ultimate reel, gradually flaring the ends of the reel body on curves of large radius to form annular flanges projecting outwardly at substantially more than 90° relative to the hub and in which the corrugations diminish in depth at a substantially uniform rate throughout their length from the inner to the outer circumference of the flanges and through the curved connecting portions between the flanges and hub, the corrugations having substantially zero depth at the outer edge portions of the flanges, and finally folding the edge portions annularly to form a reinforcing rim on each flange.

7. The method of making a sheet metal reel or spool, which comprises cutting a rectangular strip of flat sheet metal to the length and width desired, the length corresponding substantially to the circumference of the outer periphery of the flanges of the ultimate reel, then forming the strip to circular shape and joining the ends to form a ring-shaped body, corrugating the sheet metal so that the corrugations extend lengthwise of the reel and substantially parallel to the axis of rotation thereof and so that the corrugated body is substantially equal in diameter to the hub portion of the ultimate reel, gradually flaring the ends of the reel body on curves of large radius to form annular flanges projecting outwardly at substantially more than 90° relative to the hub and in which the corrugations diminish in depth at a substantially uniform rate throughout their length from the inner to the outer circumference of the flanges and through the curved connecting portions between the flanges and hub, the corrugations having substantially zero depth at the outer edge portions of the flanges, and finally folding the edge portions over reinforcing wire rings to form a reinforced rim portion on each of said flanges.

8. The method of making a sheet metal reel or spool, which comprises cutting a rectangular strip of flat sheet metal to the length and width desired, the length corresponding substantially to the circumference of the outer periphery of the flanges of the ultimate reel, then corrugating the strip transversely so that the corrugations extend substantially parallel to the ultimate axis of rotation of the reel and so that the length of the corrugated strip corresponds substantially to the circumference of the hub portion of the ultimate reel, then forming the corrugated strip to circular shape and joining the ends to form a ring-shaped body, and finally gradually flaring the ends of the reel body on curves of large radius to form annular flanges projecting outwardly at substantially more than 90° relative to the hub and in which the corrugations diminish in depth at a substantially uniform rate throughout their length from the beginning to the end of the flared portions, including the curved connecting portions between the flanges and hub.

9. The method of making a sheet metal reel or spool, which comprises cutting a rectangular strip of flat sheet metal to the length and width desired, the length corresponding substantially to the circumference of the outer periphery of the flanges of the ultimate reel, then corrugating the strip transversely so that the corrugations extend substantially parallel to the ultimate axis of rotation of the reel and so that the length of the corrugated strip corresponds substantially to the circumference of the hub portion of the ultimate reel, then forming the corrugated strip to circular shape and joining the ends to form a ring-shaped body, gradually flaring the ends of the reel body on curves of large radius to form annular flanges projecting outwardly at substantially more than 90° relative to the hub and in which the corrugations diminish in depth at a substantially uniform rate throughout their length from the beginning to the end of the flared portions, including the curved connecting portions between the flanges and hub, the corrugations having substantially zero depth at the outer edge portions of the flanges, and finally folding the edge portions annularly to form a reinforced rim on each flange.

10. The method of making a sheet metal reel or spool, which comprises cutting a rectangular strip of flat sheet metal to the length and width desired, the length corresponding substantially to the circumference of the outer periphery of

the flanges of the ultimate reel, then corrugating the strip transversely so that the corrugations extend substantially parallel to the ultimate axis of rotation of the reel, and so that the length of the corrugated strip corresponds substantially to the circumference of the hub portion of the ultimate reel, then forming the corrugated strip to circular shape and joining the ends to form a ring-shaped body, gradually flaring the ends of the reel body on curves of large radius to form annular flanges projecting outwardly at substantially more than 90° relative to the hub and in which the corrugations diminish in depth at a substantially uniform rate throughout their length from the beginning to the end of the flared portions, including the curved connecting portions between the flanges and hub, the corrugations having substantially zero depth at the outer edge portions of the flanges, and finally folding the edge portions over reinforcing wire rings to form a reinforced rim portion on each of said flanges.

11. In combination, an annulus of sheet material having longitudinal corrugations of substantially uniform width and depth, and a cross-bar disposed diametrically in said annulus intermediate the ends thereof having end portions enlarged in a direction parallel to the axis of said annulus and provided with substantially parallel grooves in the outer faces thereof on lines substantially parallel to the axis of said annulus closely receiving longitudinal corrugations thereof, the ends of one or more of the grooves being recessed and the corrugations entered in said grooves having integral portions projecting radially inwardly into said recesses.

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