

W. M. FULTON.  
 PROCESS OF MAKING CORRUGATED WALLS.  
 APPLICATION FILED NOV. 20, 1916.

1,270,402.

Patented June 25, 1918.

2 SHEETS—SHEET 1.

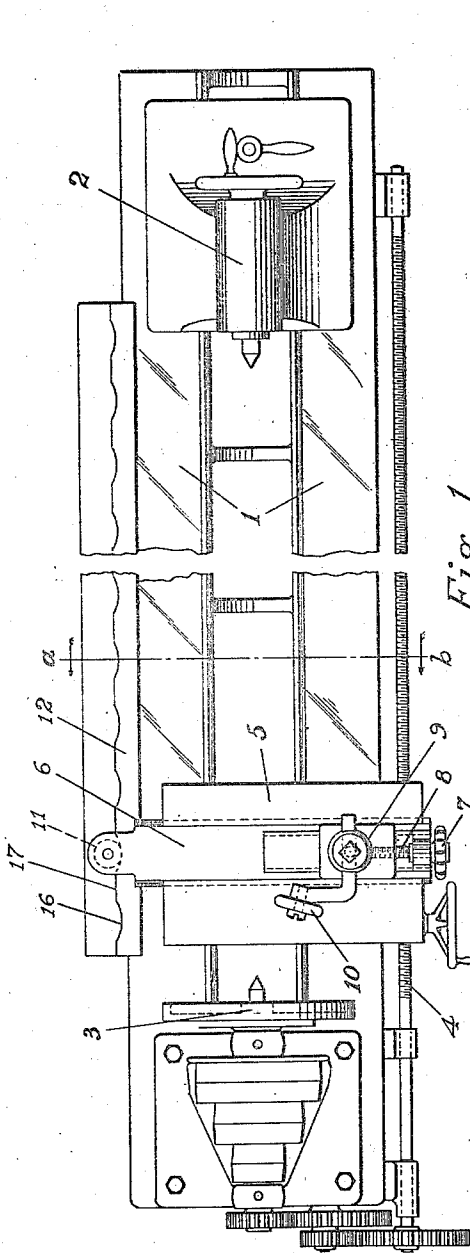


Fig. 1.

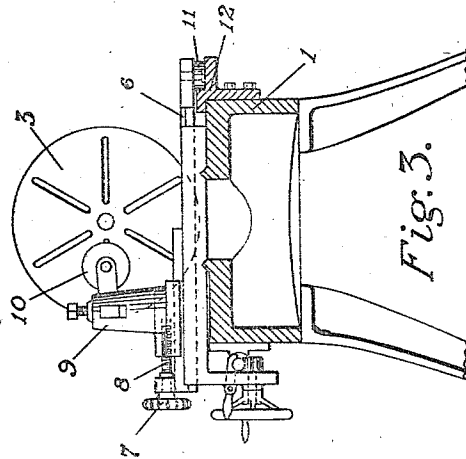


Fig. 3.

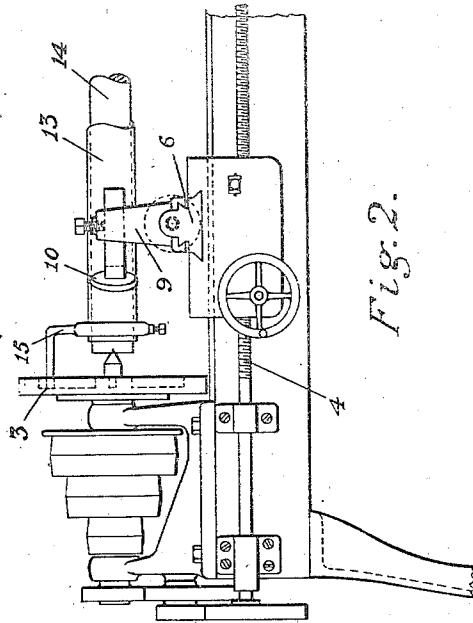


Fig. 2.

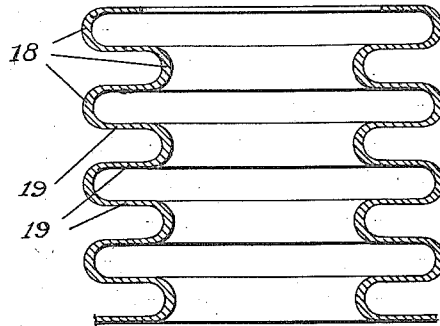
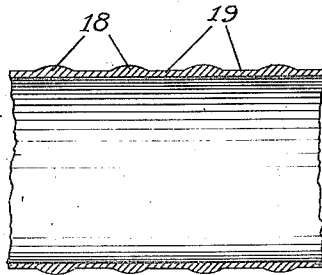
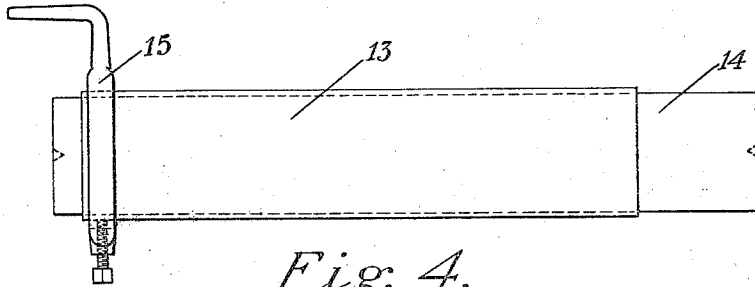
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# UNITED STATES PATENT OFFICE.

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## PROCESS OF MAKING CORRUGATED WALLS.

1,270,402.

Specification of Letters Patent. Patented June 25, 1918.

Application filed November 20, 1916. Serial No. 132,460.

### *To all whom it may concern:*

Be it known that I, WESTON M. FULTON, a citizen of the United States of America, and a resident of Knoxville, Tennessee, have  
5 invented a new and useful Improvement in Processes of Making Corrugated Walls, which invention is fully set forth in the following specification.

This invention relates to a process of  
10 shaping a blank by spinning and, while capable of use in the production of a large variety of articles, is of especial utility when used in the production of blanks for corrugated walls.

15 It is an object of this invention to provide a process of shaping a blank by spinning the same whereby the thickness of said blank is varied, preferably at predetermined intervals.

20 A further object is to provide such a process whereby the grain of the blank is displaced helically simultaneously with the production of the variations in thickness.

In my prior Patents No. 967,010, dated  
25 August 9th, 1910, and No. 1,049,572, dated January 7, 1913, I have disclosed the desirability of so forming a corrugated wall, particularly when designed to contain a suitable fluid and to expand and contract in accordance with variations of fluid pressure  
30 therein, that the grain of the material of said wall shall be inclined to the axis thereof that it may more nearly approach the direction of the resultant of the stresses to which said wall is subjected. In my prior  
35 Patent No. 1,095,100, dated April 28, 1914, I have disclosed the desirability of so forming a blank for a corrugated wall, particularly one to be used as above referred to,  
40 that there shall be a greater thickness of material in the bends of said wall than in the portions between such bends, whereby there shall be more material at the portions subjected to the greater wearing stresses to  
45 prolong the life of said wall.

It is a further object of this invention to provide a process of constructing a corrugated wall wherein both of the last-mentioned objects may be attained by a single  
50 operation.

Other objects will appear as the description of the invention proceeds.

The invention broadly comprises a process of shaping a blank consisting in moving a  
55 tool across a blank in contact therewith,

preferably under such conditions as shall displace the grain of the blank helically, and preferably varying the thickness of said blank at predetermined intervals. When said process is employed in the production  
60 of a blank for a corrugated wall, said intervals are so selected that the thicker portions will occur at the bends of the corrugations upon the subsequent corrugating of said blank.

The process of this invention is capable  
65 of being carried out by a wide variety of apparatus, both by automatic and by manually manipulated tools. For the purpose of disclosing one mechanism by which said  
70 process may be carried out, attention is directed to the drawings forming a part hereof, but it is to be expressly understood that the mechanism illustrated on said drawings is for purposes of illustration only and is  
75 in no way definitive of the limits of the invention.

Referring in detail to said drawings—

Figure 1 is a plan view of a lathe wherein the present process may be carried out,  
80 the mandrel and blank being omitted for the sake of clearness;

Fig. 2 is a side elevation of one end portion of said lathe;

Fig. 3 is a vertical cross section on the  
85 line *a-b* of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a diagrammatic view illustrating a blank supported on a mandrel prior to the  
90 practice of the present process;

Fig. 5 is a fractional cross section of a blank produced by the present process;

Fig. 6 is a vertical cross section of a corrugated wall constructed from a blank produced by the present process.  
95

1 represents any suitable form of lathe, said lathe being provided with the usual tail-stock 2, head-stock 3, feed-screw 4, and carriage 5.

Mounted in ways in the carriage 5 is a  
100 supplemental carriage 6 movable at right angles to the normal movement of the carriage 5. Mounted on said supplemental carriage 6 and adjustable thereon by manipulation, through hand-wheel 7, of screw 8,  
105 is a tool-carrying member 9 of any suitable construction. Carried by said member 9 is a spinning tool 10, said tool preferably taking the form of a roller mounted at a suitable inclination to the line of reciprocation of  
110

the supplemental carriage 6. Mounted upon the opposite end of said supplemental carriage 6 is a roller 11 designed to cooperate with a cam 12 extending throughout the length of travel of the carriage 5. Said cam 12 is provided with a plurality of depressions at selected intervals, whereby, owing to the intervening elevations, said spinning tool 10 shall, at selected intervals, bear with increased pressure upon a blank carried between the head and tail stocks above referred to.

In the performance of the process, a blank 13, shown (Fig. 4) as tubular, is mounted upon a mandrel 14 and snugly engages the same, whereby said blank has one of its surfaces supported uniformly by said mandrel. The blank is fixedly clamped to the mandrel adjacent one end by any suitable means, as by a dog 15. Said mandrel 14 is then mounted in the lathe between the tail-stock 2 and the head-stock 3, and the carriage 5 is positioned with the roller 11 in one of the depressions 16. Hand-wheel 7 is then manipulated to feed, through screw 8, the tool-carrying member 9 to such a position that the spinning tool 10 bears with the desired pressure upon the blank 13, whereby in the subsequent thinning of said blank the portions thereof of greater thickness shall be of the proper dimension. The lathe being started, carriage 5 will be fed longitudinally of the blank 13, the spinning tool 10 thinning said blank and displacing the grain of the blank helically owing to the rotation of said blank and mandrel. As roller 11 leaves one of the depressions 16 and rides upon the intervening elevated portion 17, the spinning tool will be forced to engage the blank with increased pressure, thinning to a still greater extent said blank. Upon the roller reaching the next depression 16, the resistance of the blank will force the supplemental carriage 6 in the opposite direction and, during the traverse of the depression 16 by the roller 11, a portion of greater thickness will be produced in the blank. By the selection of a cam 12 with the depressions at suitable distances, and by the selection of proper dimensions for the depressions, a blank may be spun having portions of increased thickness at the desired intervals and of the desired dimensions. As the blank is spun it will increase in length and, to this end, as illustrated in Fig. 4, the mandrel should be of greater length than the original blank.

A tubular blank as produced by the above described process is shown in Fig. 5, wherein 18 indicates the portions of greater thickness corresponding with the depressions 16 of the cam, and 19 represents the intervening portions of less thickness corresponding with the intervening elevated portions 17 of the cam.

In Fig. 6 is illustrated a corrugated wall produced by the corrugation, in any suitable way, of such a blank as illustrated in Fig. 5. As shown, the thicker portions 18 occur at the bends of the corrugations, while the intervening thinner portions 19 form the lateral walls joining the concave and convex portions of the bends.

While the invention has been described as applied to the shaping of a tubular blank, it will be apparent that the process is equally applicable to the shaping of blanks of other types by the selection of a suitable mandrel or blank support. Also, while the process has been illustrated as carried out in an apparatus in which the spinning tool is traversed across the blank, it will be apparent that the process could be carried out with equal facility in an apparatus wherein the blank was traversed with respect to the spinning tool. Therefore, the expression "moving a spinning tool across said blank" and similar expressions are to be construed of a scope to include the feeding of the blank across the spinning tool.

While the spinning tool has been illustrated as a roller, it will be obvious that any other suitable form of spinning tool may be employed if desired, and while the spinning roller has been shown as rotated only by contact with the blank, it is obvious that, if desired, the spinning roller may be positively rotated by suitable connections with the motive power of the lathe.

It will be understood that, in the initial setting of the spinning tool in contact with the blank and with the roller 11 positioned in one of the depressions 16, the spinning tool may be simply brought into light contact with the blank whereby the thicker portions 18 of the final product shall be of the same thickness as that of the original blank, or the spinning tool may be forced to bear with any desired pressure upon said blank, whereby the thicker portions 18 shall be of less thickness than that of the original blank.

While an apparatus for carrying out the process of this invention has been described with considerable particularity, it is to be expressly understood that the process is in no way restricted to the use of particular apparatus but is in fact capable of being carried out by a wide variety of devices. Reference is to be had to the appended claims for a definition of the limits of this invention.

What is claimed is:

1. The process of shaping a blank comprising rotating said blank, moving a spinning tool across said blank in contact therewith and varying the thickness of said blank by varying the pressure of the tool thereon.
2. The process of shaping a blank comprising rotating said blank, moving a spin-

ning tool across said blank in contact therewith and reducing the thickness of said blank at intervals by increasing the pressure of the tool thereon.

5 3. The process of shaping a blank comprising rotating said blank, displacing the grain of said blank helically by moving a spinning tool across and in contact with said blank, and varying the thickness of  
10 said blank by varying the pressure of the tool thereon.

4. The process of shaping a blank comprising rotating said blank, displacing the grain of said blank helically by moving a  
15 spinning tool across and in contact with said blank, and reducing the thickness of said blank at intervals by increasing the pressure of the tool thereon.

5. The process of shaping a hollow blank  
20 comprising rotating said blank with one of its surfaces supported uniformly, displacing the grain of said blank by moving a spinning tool across and in contact with the other surface of said blank, and varying  
25 the thickness of said blank by varying the pressure of the tool thereon.

6. The process of shaping a hollow blank comprising rotating said blank with one of its surfaces supported uniformly, displacing  
30 the grain of said blank by moving a spinning tool across and in contact with the other surface of said blank, and reducing the thickness of said blank at intervals by increasing the pressure of the tool thereon.

35 7. The process of shaping a blank comprising rotating said blank, thinning said blank by moving a spinning tool across and in contact with said blank, and varying the thickness of said blank by varying the pressure of the tool thereon.  
40

8. The process of shaping a blank comprising rotating said blank, thinning said blank by moving a spinning tool across and in contact with said blank, and reducing  
45 the thickness of said blank at intervals by increasing the pressure of the tool thereon.

9. The process of making corrugated walls comprising moving a spinning tool across  
50 and in contact with a blank, varying the thickness of said blank by varying the pressure of the tool thereon, and so corrugating the blank that the thicker portions come at the bends of the corrugations.

55 10. The process of making corrugated walls comprising rotating a blank, displacing the grain of said blank helically by moving a spinning tool across and in contact

with said blank, varying the thickness of said blank by varying the pressure of the  
60 tool thereon, and so corrugating the blank that the thicker portions come at the bends of the corrugations.

11. The process of making corrugated walls comprising rotating a blank, thinning  
65 said blank by moving a spinning tool across and in contact with said blank, varying the thickness of said blank by varying the pressure of the tool thereon, and so corrugating the blank that the thicker portions come at  
70 the bends of the corrugations.

12. The process of making corrugated walls comprising rotating a hollow blank with one of its surfaces supported uniformly, displacing the grain of said blank by moving  
75 a spinning tool across and in contact with the other surface of said blank, varying the thickness of said blank by varying the pressure of the tool thereon, and so corrugating the blank that the thicker portions  
80 come at the bends of the corrugations.

13. The process of making corrugated walls comprising spinning a blank to form at intervals portions of greater thickness than the remaining portions of the spun  
85 blank, and so corrugating the blank that the thicker portions come at the bends of the corrugations.

14. The process of shaping a blank comprising rotating said blank, moving a tool  
90 across and in contact with said blank with said tool oblique to the direction of movement thereof, and varying the thickness of said blank by varying the pressure of the tool thereon.  
95

15. The process of shaping a blank comprising rotating said blank, displacing the grain of said blank helically, and simultaneously varying the thickness of said  
100 blank at intervals.

16. The process of shaping a blank comprising varying the thickness of said blank by moving a tool across said blank with said tool at an angle to the direction of movement thereof and varying the pressure  
105 of the tool on said blank.

17. The process of making corrugated walls comprising rotating a tubular blank, moving a spinning tool across and in contact with said blank under such pressure as  
110 will displace the grain of said blank helically and thereafter corrugating said blank.

In testimony whereof I have signed this specification.

WESTON M. FULTON.