R. S. BOLGER.

METHOD OF AND MACHINE FOR MANUFACTURING PAPER BARRELS.

APPLICATION FILED JULY 14, 1919.

1,428,469. Patented Sept. 5, 1922.

3 SHEETS—SHEET 1.

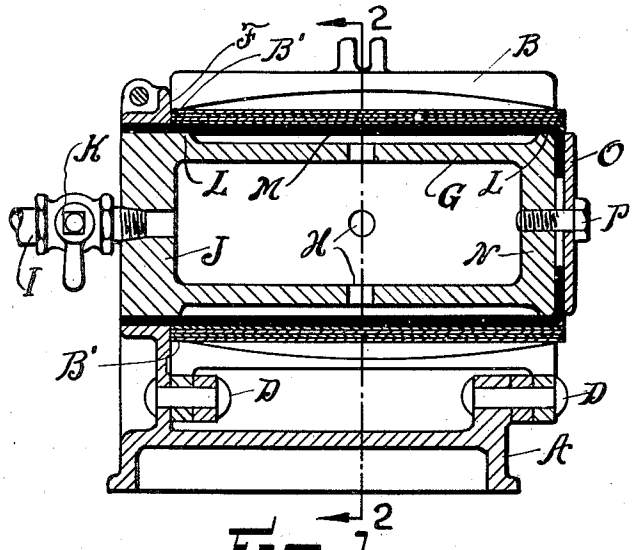


FIG. 1

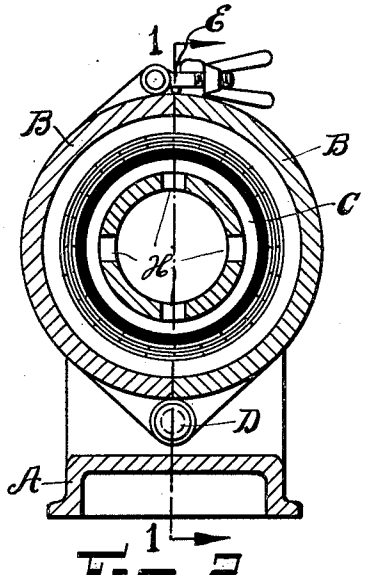


FIG. 2

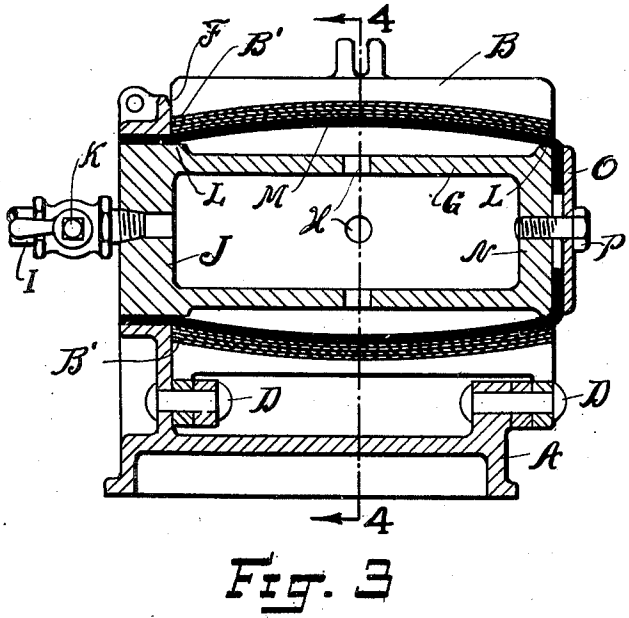


FIG. 3

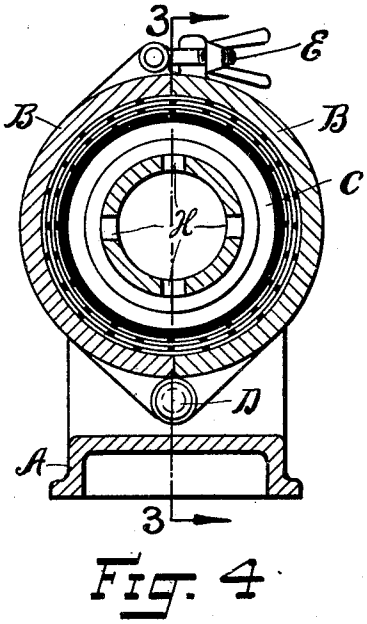


FIG. 4

Inventor
Robert S. Bolger

By His Attorney
A. L. Hines.

Witnesses:
Carcious H. de La Mare
Nancy L. Lucas

R. S. BOLGER.

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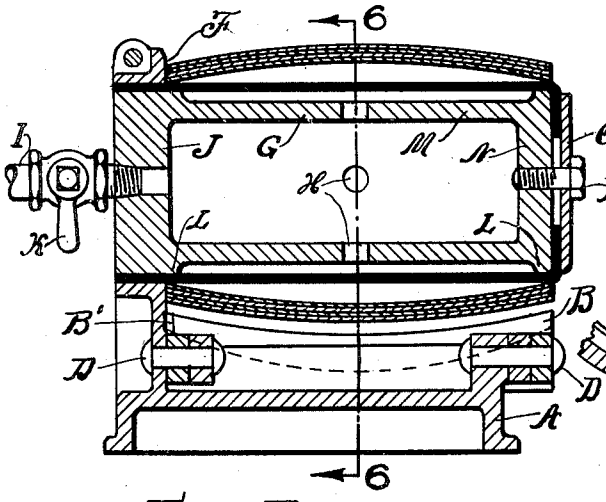


Fig. 5

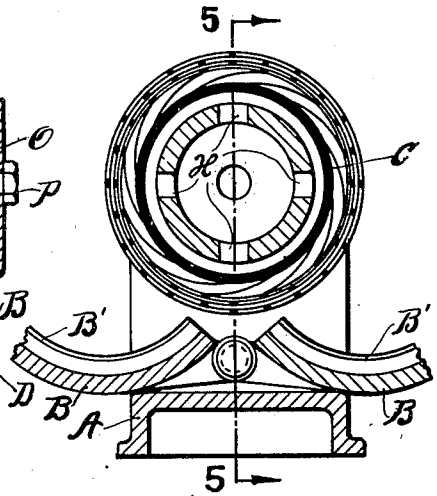


Fig. 6

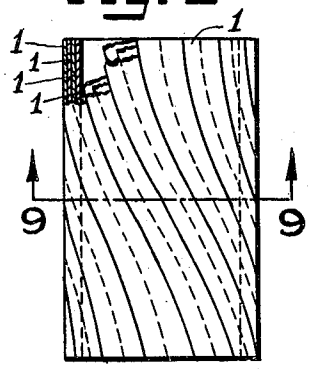


Fig. 7

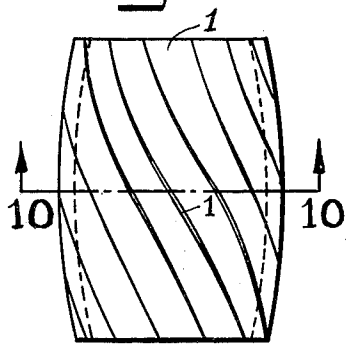


Fig. 8

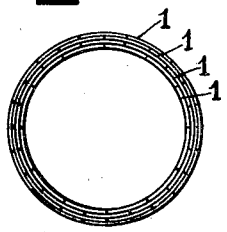


Fig. 9

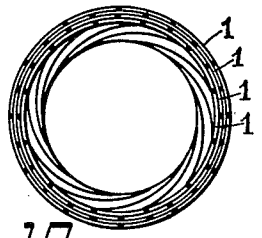


Fig. 10

Inventor
Robert S. Bolger

Witnesses:
Cascious H de La Monte
Nancy L. Leverett

By His Attorney
L. L. Lines.

R. S. BOLGER.

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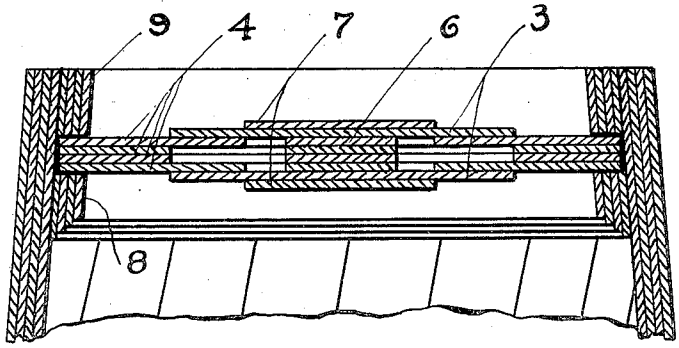


Fig. 11

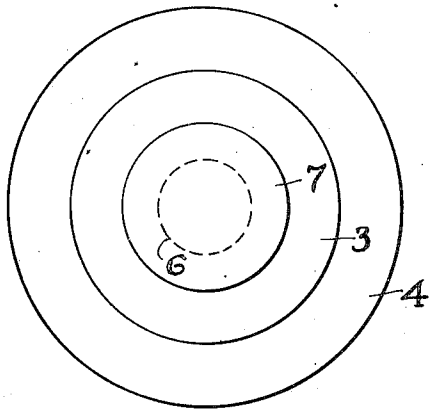


Fig. 12

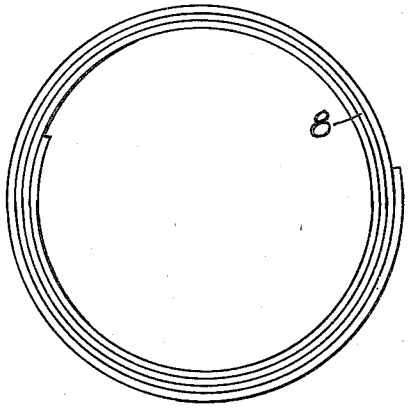


Fig. 14

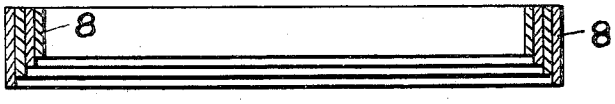


Fig 13

Inventor

Robert S. Bolger

By His Attorney

C. C. Hines.

Patented Sept. 5, 1922. 1,428,469

UNITED STATES PATENT OFFICE.

ROBERT S. BOLGER, OF RICHMOND HILL, NEW YORK.

METHOD OF AND MACHINE FOR MANUFACTURING PAPER BARRELS.

Application filed July 14, 1919. Serial No. 310,784.

To all whom it may concern:

Be it known that I, ROBERT S. BOLGER, a citizen of the United States, residing at Richmond Hill, in the county of Queens and State of New York, have invented new and useful Improvements in Methods of and Machines for Manufacturing Paper Barrels, of which the following is a specification.

My invention relates to machines for manufacturing bilged barrels and particularly those of the closed or imperforate wall type adapted for the storage and transportation of all kinds of goods and produce.

The main object in view is to produce a bilged barrel in a cheap way, without highly skilled labor and composed of cheap material, enabling barrels to be placed upon the market at less cost than the well known barrels now in use and generally constructed of wooden staves and hoops or bands.

Another object in view is to provide a machine which will produce a bilged barrel body of sheet material in the form of strips, assembled in such relation to each other and united in such manner as to provide a commercially practical, strong and lightweight article well adapted for the use above specified.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement herein fully described, illustrated and claimed, and in the method of manufacture herein disclosed.

In the accompanying drawings:—

Fig. 1 is a vertical diametrical section through the machine showing a barrel tube in position.

Fig. 2 is a vertical transverse section, on the line 2—2 of Fig. 1.

Fig. 3 is a section similar to Fig. 1, after the bilging operation.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 5 is a section similar to Fig. 1, after the pressure is released and the barrel body is ready to be removed from the machine.

Fig. 6 is a section on the line 6—6 of Fig. 5.

Fig. 7 is a side elevation of the barrel tube.

Fig. 8 is a side elevation of the bilged barrel body.

Fig. 9 is a section on the line 9—9 of Fig. 7.

Fig. 10 is a section on the line 10—10 of Fig. 8.

Fig. 11 is a fragmentary diametrical section, showing the barrel head in the body, and the head holding means.

Fig. 12 is a plan view of the head.

Fig. 13 is a diametrical section through the head supporting ring.

Fig. 14 is a plan view of the same.

The bilging machine comprises a base A forming a support for the outer and inner forms B and C, between which the wall of a barrel tube is confined during the bilging operation. The outer form is of sectional construction and embodies separable halves connected at the bottom by one or more hinge pins D to the base in order that said sections of the form B may be opened and moved apart to permit the finished barrel body to be removed from the machine. The sections of the form B are secured together at their free edges by any suitable clamping or fastening means indicated at E. The internal shape of the sections of the form B corresponds with the bilged external face and shape of the finished barrel body as in Figs. 1 and 3. At one end of the machine there is a fixed stop or annular abutment F preferably consisting of an integral part and extension of the frame or base A. During the bilging operation, the barrel tube rests at one end against the stop F, the position of the barrel tube being thus gaged and clamped in this position at the point B′ of the outer form for the purpose of keeping the ends of the tube in proper alignment.

The inner form or core of the machine, in the illustrated embodiment thereof, is expansible and collapsible and comprises a hollow cylindrical fixed member G having openings H therein, and also having a fluid inlet connection or pipe I in the head J thereof, the same being controlled by a valve or stop cock K.

The core member G, at the ends thereof, has annular flanges L forming raised and spaced seats for the end portions of a resilient, flexible sleeve or tube M constituting the inner form proper. One end of said sleeve or tube is held between the fixed stop F and the adjacent flange L of the member G. The other end of the sleeve or tube M may extend beyond the other flange L to be held against the head N at that end of the member G and a clamp O in the form of a

disk secured to said head by fastening means P. Normally the sleeve or tube M assumes a true cylindrical condition as shown in Figs. 1 and 5 but is adapted to assume the bilged shape of Fig. 3 when fluid (air or liquid) is admitted under pressure to the fluid pressure chamber formed within and by the fixed and resilient member G and M of the core or form C.

A barrel tube such as is drawn in Figs. 7 to 10 both inclusive, is placed over the free end of both the inner form C and over the expansible sleeve or tube M, as shown in Fig. 1. The sections of the outer form B are then closed and fastened as in Fig. 2. Valve K is then opened and the fluid under pressure fills the fluid pressure chamber, passing through the openings H, expanding the sleeve M and pressing the wall of the barrel tube firmly against the inside wall of the outer form B, the laminations of which are still free to change their relative positions as will appear. The pressure may be maintained until the setting of the adhesive, uniting the laminations of the body, has reached any desired stage or until it has completely set. The pressure is then released, permitting the sleeve or tube M to reassume its normal cylindrical condition. Then the sections of the outer form are unfastened and opened and the barrel body (now bilged) is removed from the machine. The above operation is repeated for each barrel body.

The barrel body is made up of strips 1 of sheet material, preferably consisting of dry, finished paper of suitable density or hardness, to produce a tough and commercially practical main barrel body wall, when said strips have been properly assembled and united together as hereinafter explained. In this first step in the production as long a tube as practicable is made and cut into sections each of suitable length to form one barrel body, such length being greater than the length of the completed article in order to allow for longitudinal contraction of the tube while undergoing the bilging operation above described.

The strips 1 are assembled on a suitable winding machine so that they will preferably extend spirally of the barrel body wall, as shown, as this results in a stronger and tougher barrel wall. The strips may however extend in other directions. However said strips are assembled with their lateral portions overlapping each other, as shown, and are united by a suitable adhesive. A slowly drying adhesive is preferably used for such purpose to allow ample time to carry out the bilging operation before the adhesive sets.

By the means above described and with the use of dry, finished paper or analogous sheet material cut into strips, a commercially valuable barrel body is formed, well adapted for the rough usage and the storage or shipment of all kinds of goods. Heads of suitable construction and material may be used in conjunction with such barrel body.

I claim:—

1. In a barrel body bilging machine, the combination of outer and inner forms between which the barrel body wall is adapted to be shaped under pressure, the inner form embodying a resilient wall held at both ends, the outer wall being bilged and non-resilient.

2. In a barrel body bilging machine, the combination of outer and inner forms between which the barrel body wall is adapted to be shaped under pressure, one form embodying a resilient wall held at both ends, and a fluid pressure chamber of which said resilient wall forms a part, the other form embodying a bilged imperforate wall.

3. In a barrel body bilging machine, the combination of outer and inner forms between which the barrel body is adapted to be shaped under pressure, the inner form embodying relatively fixed end portions and being capable of distortion under fluid pressure, and the outer wall being internally bilged and displaceable.

4. In a barrel body bilging machine, the combination of outer and inner forms between which the barrel body wall is adapted to be shaped under pressure, the outer form embodying an imperforate internally bilged and displaceable wall, and the inner form having a resilient wall held at both ends and adapted under internal fluid pressure to expand the medial portion of the barrel body wall and also adapted to be collapsed to permit the barrel body to be removed.

5. In a barrel body bilging machine, the combination of outer and inner forms between which the barrel body wall is adapted to be shaped under pressure, the outer form having an imperforate internally bilged wall, and the inner form embodying a fluid-pressure chamber having a deformable wall held at both ends and adapted to exert outward shaping pressure against the barrel body wall.

6. In a barrel body bilging machine, means for deforming a tubular cylindrical body and shaping such body into bilged formation, including a mandrel, and displaceable clamping means to hold one end of a barrel body on the mandrel during the bilging operation.

7. In a barrel body bilging machine, means controlled by fluid pressure for deforming a tubular cylindrical body and shaping the same into bilged barrel body formation, said means including a normally cylindrical but deformable element with relatively fixed end portions.

8. The method of manufacturing bilged barrel bodies, consisting in forming a tubu-

lar imperforate cylindrical body of sheet material and subsequently distorting such body into bilged barrel formation.

9. The method of manufacturing bilged barrel bodies, consisting in forming a tubular cylindrical body of sheet material adhesively held and subsequently and while the adhesive is in an unset condition distorting such body into bilged barrel formation.

10. The method of manufacturing bilged barrel bodies, consisting in forming a tubular cylindrical body of sheet material adhevisely held and subsequently and while the adhesive is in an unset condition distorting such body into bilged barrel formation and means for maintaining such formation until the adhesive is set.

11. The method of manufacturing unperforate bilged barrel bodies, consisting in superimposing and overlapping the lateral portions of strips of sheet material coated with a slowly drying adhesive until a tubular body of cylindrical formation is obtained, and distorting such body into bilged formation before such adhesive is allowed to set.

12. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping the lateral portions of adhesively coated strips of sheet material to form a tubular cylindrical body, and subsequently distorting such body into bilged formation.

13. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping the lateral portions of adhesive coated strips of sheet material to form a tubular cylindrical body, subsequently distorting such body into bilged formation, and maintaining such formation until the adhesive is set.

14. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping the lateral portions of adhesive coated strips of sheet material to form a tubular cylindrical body, and subsequently distorting such body into bilged formation, said strips being spirally disposed with relation to the major axis of the body.

15. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping the lateral portions of adhesively coated strips of sheet material to form a tubular cylindrical body, and subsequently distorting such body into bilged formation by subjecting the same to pressure before the adhesive is set.

16. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping the lateral portions of adhesive coated strips of sheet material to form a tubular cylindrical body of greater length than the finished barrel body, and subsequently distorting such body to decrease the length of the body and increase the diameter of the medial portion of the body to form the bilge.

17. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping the lateral portions of adhesive coated strips of sheet material to form a tubular cylindrical body, and subsequently distorting such body into bilged formation by subjecting the same to distorting pressure between the outside and inside forms.

18. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping adhesive coated strips of sheet material to form a tubular cylindrical body, distorting such body by pressure into bilged formation, and uniting to the inside surface of such bilged body rings of laminated formation extending circumferentially of the body and across the inner body-forming strips.

19. The method of manufacturing imperforate bilged barrel bodies, consisting in superimposing and overlapping adhesive coated strips of sheet material to form a tubular cylindrical body, distorting such body by pressure into bilged formation, uniting a head-retaining ring to the inner body-forming strips, placing a head within such body and against said ring, and uniting another head-retaining ring to the inner body-forming strips at the opposite side of the barrel head.

In testimony whereof I affix my signature.

ROBERT S. BOLGER.