2 Sheets—Sheet 1.

G. W. LARAWAY.

Manufacture of Barrel-Heads and other Articles from Paper-Pulp.

No. 206,396. **Patented July 30, 1878.**

Fig. 1.

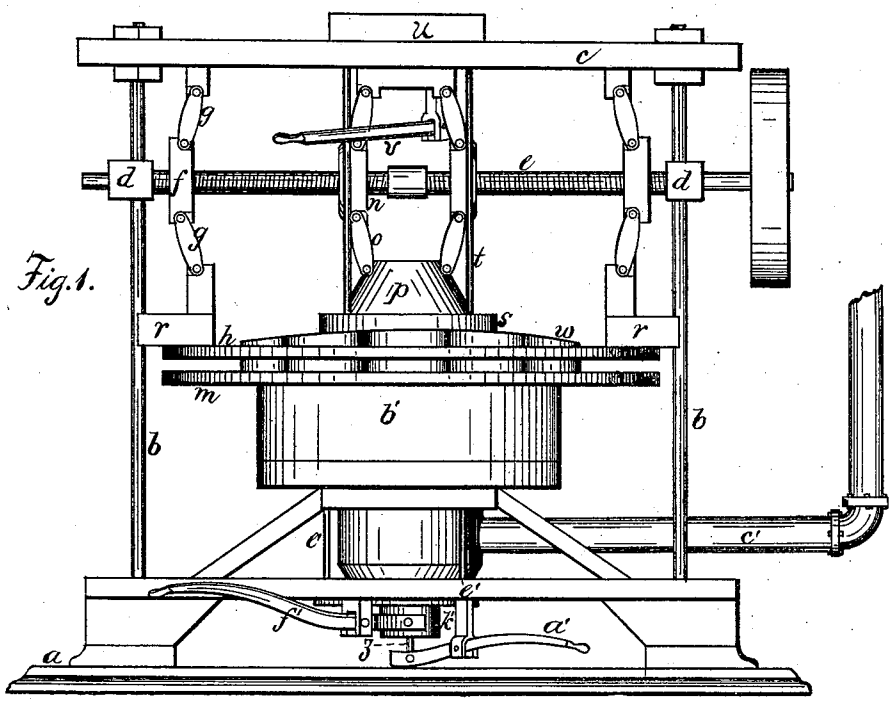
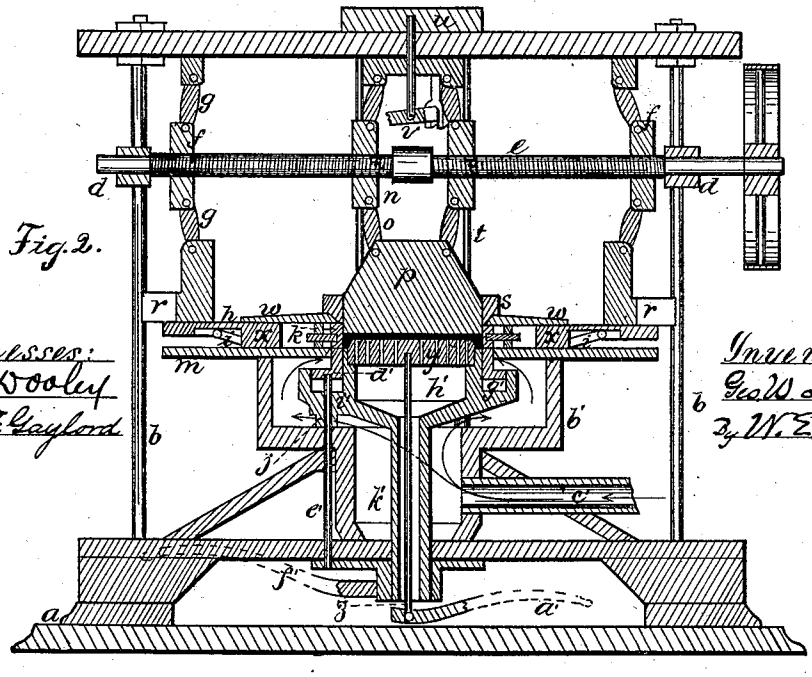


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3.

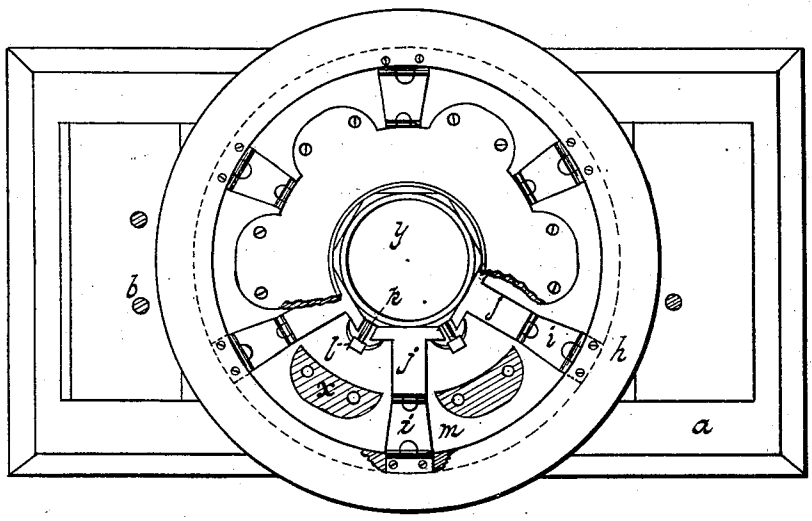


Fig. 4.

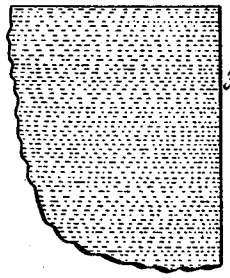


Fig. 5.

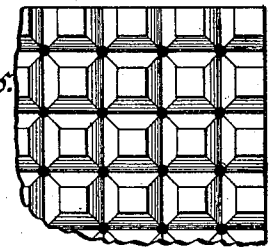
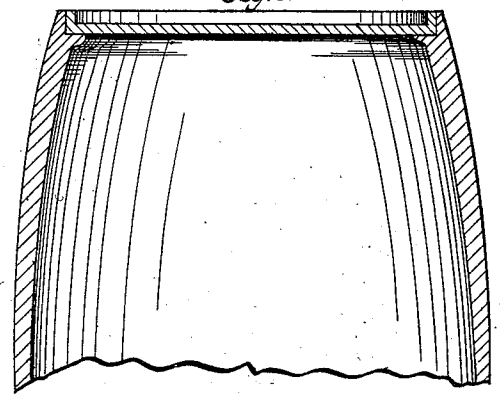


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE W. LARAWAY, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE AMERICAN PAPER BARREL COMPANY.

IMPROVEMENT IN THE MANUFACTURE OF BARREL-HEADS AND OTHER ARTICLES FROM PAPER-PULP.

Specification forming part of Letters Patent No. **206,396**, dated July 30, 1878; application filed December 26, 1877.

To all whom it may concern:

Be it known that I, GEORGE W. LARAWAY, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements pertaining to the Manufacture of Articles from Paper-Pulp, of which the following is a specification, reference being had to the accompanying drawings, where—

Figure 1 is a side elevation of a machine for making a barrel-head in accordance with my invention. Fig. 2 shows a vertical central section of the same. Fig. 3 is a plan or top view from just above the "ring-plate," a term hereinafter explained. Fig. 4 is a side view of a part of the face of one of the side compressors, showing the finely-perforated plate which forms such face. Fig. 5 is a similar view of a part of a side compressor, but with the finely-perforated plate shown in Fig. 4 removed, exposing the longitudinal and transverse grooving behind it, also the holes bored through the body of the side compressor. Fig. 6 is a central sectional view of a part of a barrel, showing the shape of the head made by the machine and its mode of fitting into the barrel-body.

The machine shown in the accompanying drawings is designed for making, all in one piece, a barrel-head of the specific shape—that is, the head proper with a rim-flange thereon, substantially at right angles to the head proper—direct from free pulp or pulpy matter made from animal or vegetable fiber, or both combined, or from other material that can be reduced to a pulp or a pulpy condition; but some of the principles of construction and operation and process are equally applicable to machinery and process of producing barrel-bodies, pails, and other articles.

The letter *a* denotes the base-plate of the machine; the letter *b*, standard-rods, running to the top plate *c*. The rods *b* are also supports for the bearing-blocks *d* of the screw-shaft. On this screw-shaft are hung the nuts *f*, jointed to toggle-arms *g*, one set whereof extend to the top plate, and the other set whereof extend to the ring-plate *h*, from which toggle-arms *i* extend to the plates *j*, which I will term "side compressors."

It is obvious that rotating the screw-shaft *e* in one direction causes the nuts *f* to approach each other, the ring-plate *h* to descend, and the side compressors *j* to advance radially toward a common center. This is the movement had when a head is being compressed. It is equally obvious that rotating the screw-shaft in the opposite direction retracts the side compressors radially. This is the movement had when the mold is opened to remove a barrel-head. But these side compressors do not make a complete circle. The interspaces are provided for by the interspace pressers *k*, held to place, but allowed to advance and retract radially by the springs *l* or other equivalent attachments. The side compressors and the interspace compressors rest and move on the plate *m*. On the screw-shaft *e* are other similarly-acting nuts *n*, with toggle-arms *o*, availing to raise and depress the end presser *p*, which compresses the head proper.

It is a valuable feature of this invention that the side compressors and the end or top presser both advance and do their work simultaneously, thereby avoiding compressing a part of the stock at one time and another part at another time.

The ring-plate *h* has guides *r* running on the rods *b*. The top presser is hung within the mold-closer *s*, which has vertical movement, depending by rods *t*, running through the top plate, to a uniting-block, *u*. The mold-closer is raised and lowered by means of the lever *v* or its equivalent. This mold-closer, which is also a guide for the top presser, is lowered in order to close the mold, and raised to open it. When lowered it shuts into a corresponding socket made in the socket-plate *w*, which is supported on the plate *m* by studs *x* intermediate between the toggle-arms *i*, and when the pulp is first let into the matrix, forms a part of the matrix.

The under and—relative to its position in the mold—inner side of the barrel-head is

formed upon the forming-disk *y*, which, when a head has been formed and the mold opened, can be raised, by means of rod *z* and lever *a'*, so that the head can be readily taken from the mold.

The pulp or pulpy matter finds access from an overhead tank, or under other forcing pressure, to the chamber *b'* through pipe *c'*, which has, or may have, a proper supply-gate. It is admitted to the matrix of the mold, when the mold is otherwise closed, through the annular gate *d'*, having vertical movement given through the medium of rods *e'* and lever *f'*. This annular gate is opened by lowering it into the recess *g'* expressly provided for it, and is closed by raising it, so that its upper face is flush with the plate *m*. This annular gate serves another and more important purpose than the mere admission of the pulp to the matrix of the mold. It is located close to the article formed, at its foot or base, and extends entirely around it. After an article has been formed in the mold, (the supply-gate in the supply-pipe having been shut,) this annular gate is dropped or opened into the chamber beneath. This leaves no support for water, which would otherwise collect around the base of the formed article, and by capillary attraction be absorbed into the article, and so injure it, particularly the lower end. After this gate is thus dropped the matrix of the mold is opened and the article removed.

The chamber *h'*, which contains the disk *y* and annular gate *d'*, may well be a casting, and rest by bosses *i'* on the supports *j'* rising from the inside of the chamber *b'*, which are not only such supports but are tubes to inclose the rods which run to the annular gate.

The side compressors and the interspace compressors are faced on the inner side with a plate full of minute holes. Back of this plate the side compressor is grooved longitudinally and transversely, and also bored through and through with larger holes. This allows of the escape of the water forced out of the pulp, but retains the pulp within the matrix.

The disk *y* is bored through and through with fine holes for the same purpose, and the top presser and all of the parts which form the walls of the matrix have the same or similar perforations to permit the escape of water. The water which falls down through the disk *y* falls into the chamber *h'* and escapes through the pipe *k'*, which not only serves this purpose but forms a guide and holder for the rod *z*.

This machine is operated and used as follows: The side compressors are retracted, the top presser lifted, the mold-closer is thrown down to close the mold, the annular gate is opened, and the matrix filled with pulp. The annular gate is then closed and power applied to the screw-shaft till the side compressors and the top presser have advanced to the proper point, which compresses the free pulp to the desired shape and expresses the water. The annular gate is now dropped, the mold-closer raised, and the side compressors and top presser retracted. The mold is now open. Now, by means of the proper lever, the disk *y* is raised, carrying the formed head with it, and the head is readily removed from the mold.

It will be observed that this machine contains new features of construction, which are applicable, with certain changes in shape, to adapt to desired shapes to machines for producing pails and packages and articles of various sorts, among which I mention, first, the idea or principle of perforated movable walls which will compress the pulp and express the water; second, the combination of the side compressors with the interspace compressors; third, the mold so constructed that the sides and one end of a hollow article can be formed and compressed at once. This idea is applicable to the production of pails, boxes, kegs, or barrels with one end, and a great variety of articles of the same class.

It will be observed that the shape of the barrel-head formed has peculiar advantages in the matter of the flange on the rim. The common flour-barrel needs a hoop just above the head and within the chine. I avoid the necessity for this separate hoop by making the flange on the rim.

In forming articles other than round ones, the annular gate can be changed in shape to adapt it to the desired shape of articles.

Although, in describing this machine I have described a mold having perforated and movable walls, and have also described a finely-perforated mold-face superposed upon a grooved backing, neither of these two features forms a feature of invention in this present patent, both of said features being described and claimed in another application for patent made by me, which said other application for patent may be termed another division of the application upon which these present Letters Patent issue.

What I do claim as my invention herein is—

1. The combination of the movable side compressors *j* and the movable end compressor *p*, both advancing to compress the pulp, and retracting therefrom simultaneously, substantially as set forth.

2. The annular vertically-movable gate *d'* surrounding the chamber *h'*, in combination with the side compressors *j*.

3. The combination of the movable side compressors *j* and the interspace compressors *k*.

4. In combination, the movable end presser *p* and the movable end-presser guide and mold-closer *s*.

5. In combination, the screw-shaft *e*, nuts *f*, toggle-arms *g*, ring *h*, toggle-arm *i*, side compressors *j*, nuts *n*, toggle-arms *o*, and end presser *p*.

6. In combination, the chamber *h'*, disk *y*, annular gate *d'*, rods *e'*, and chamber *b'*.

7. In combination, the screw-shaft *e*, nuts *f*, toggle-arms *g*, ring *h*, toggle-arms *i*, and side compressors *j*.

8. In combination, the movable side compressors *j*, the movable end presser *p*, the movable forming-disk *y*, and the operating-rod *z*.

9. In combination, the plate *m*, movable side compressors *j*, socket-plate *w*, mold-closer *s*, and end presser *p*.

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