(No Model.)

# A. DUNBAR.

## APPARATUS FOR CLOSING STAVES.

No. 571,516. Patented Nov. 17, 1896.

FIG. 1

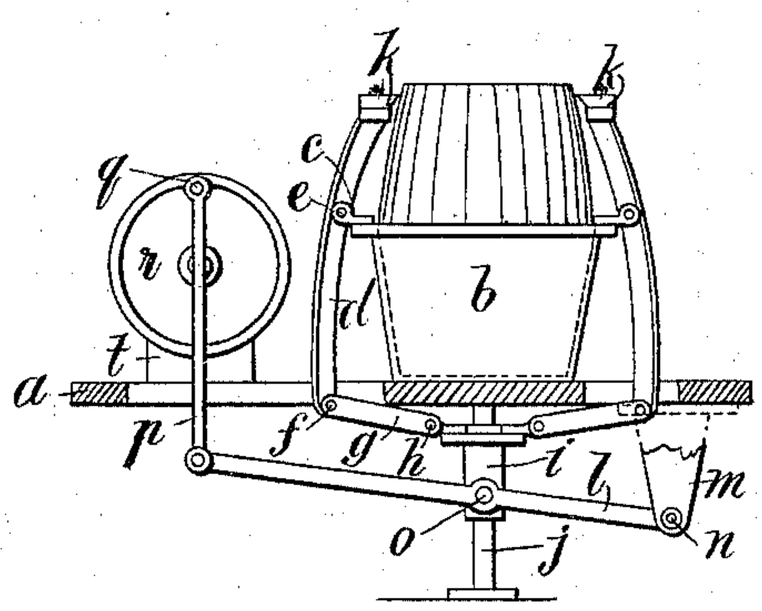
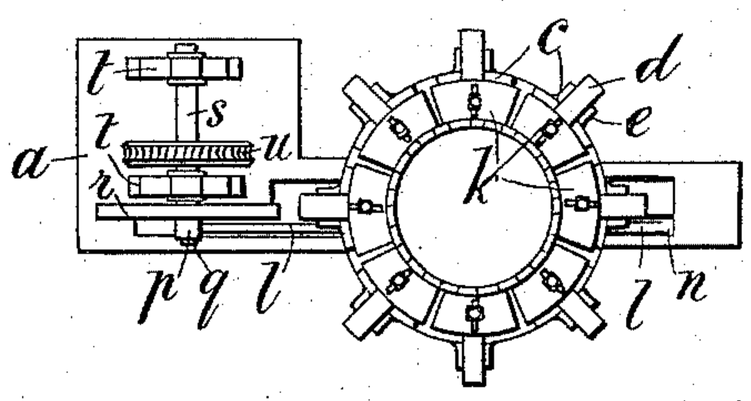



FIG. 2




WITNESSES

James Johnson

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# UNITED STATES PATENT OFFICE.

ALEXANDER DUNBAR, OF LIVERPOOL, ENGLAND.

## APPARATUS FOR CLOSING STAVES.

SPECIFICATION forming part of Letters Patent No. 571,516, dated November 17, 1896.

Application filed May 5, 1896. Serial No. 590,319. (No model.) Patented in England March 8, 1893, No. 4,999; in Spain February 5, 1894, No. 15,487; in France February 8, 1894, No. 236,129; in Belgium February 10, 1894, No. 108,661; in Italy February 19, 1894, No. 35,785; in Austria July 13, 1894, No. 3,198; in Hungary November 7, 1895, No. 4,517, and in Portugal January 20, 1896, No. 2,067.

*To all whom it may concern:*

Be it known that I, ALEXANDER DUNBAR, a subject of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster, England, have invented a new and useful Improvement in Apparatus for Closing Staves, (for which I have obtained patents in Great Britain, No. 4,999, bearing date March 8, 1893; in France, No. 236,129, bearing date February 8, 1894; in Belgium, No. 108,661, bearing date February 10, 1894; in Austria, No. 3,198, bearing date July 13, 1894; in Hungary, No. 4,517, bearing date November 7, 1895; in Spain, No. 15,487, bearing date February 5, 1894; in Portugal, No. 2,067, bearing date January 20, 1896, and in Italy, No. 35,785, bearing date February 19, 1894,) of which the following is a specification.

Figure 1 is a vertical section, and Fig. 2 is a plan, of apparatus constructed in accordance with my invention.

The invention relates to the manufacture of casks; and the object is to provide simple apparatus for closing or drawing together the outspread ends of staves gathered so as to form the frustum of a cone and held together by means of a hoop or hoops at or near the smaller end of the said frustum.

*a* is a frame carried by standards or brackets in any usual way. On the frame *a* is secured the receptacle *b*, into which the small end of the form of gathered staves is placed. *c* are lugs secured around the receptacle *b*. To the said lugs levers *d* are pivoted at *e*. The lower ends of the levers *d* are pivoted at *f* to links *g*. The links *g* are pivoted at *h* to a sleeve *i*. The sleeve *i* is free to move up and down on the spindle *j*, secured to the frame *a* centrally beneath the receptacle *b*.

To the upper ends of the levers *d* are fitted blocks *k* by means of set-screws, as shown, or similar means, so that the said blocks may be adjusted nearer to or farther from the center of the receptacle.

*l* is a lever pivoted at one end to a lug *m* at *n* and centrally to the sleeve *i* at *o*. The other end of the lever *l* is coupled, by means of the connecting-rod *p*, to the disk-pin *q* of the wheel *r*. The wheel *r* is secured to the shaft *s*, carried in bearings *t* on the frame *a*. *u* is a worm-wheel secured to the shaft *s*, through which slow motion is given to the said shaft *s* by means of a worm and any suitable motor. There are preferably about eight levers around the receptacle *b*, and the driving-gear is so made, as above described, or in any other convenient way, as to impart a sufficiently slow and regular motion to the levers *d*.

The action of the apparatus is as follows: Motion being given to the shaft *s* the lever *l* is slowly raised and lowered, and the sleeve *i* is caused to move up and down the spindle *j*. The sleeve *i* as it moves up and down causes the levers *d* to rock on their pivots *e* by means of the links *g*. In this way the blocks *k* are caused to approach and recede from the central axis of the apparatus. When the sleeve is depressed and the blocks *k* are farthest apart, the form of gathered staves is placed in the receptacle *b*. As the sleeve *i* rises the blocks *k* approach the center and bring together the ends of the staves, as shown. A hoop is then slipped over the ends of the staves and the cask is removed for trussing, and another set of gathered staves is placed in the receptacle.

It will be noticed that the motion of the parts is continuous and that no breakage can occur through over-travel, as, by adjustment, the blocks *k* will not approach sufficiently near to the center to cause the staves to jam. The closing motion of the ends of the staves will also be very gradual, regular, and quiet, owing to the system of gearing, and the greatest pressure will be given at the end of the stroke where it is required, because at that time the links *g* are at about right angles to the end motion of the levers *d*. Liners are used within the receptacle *b* to enable forms of gathered staves of different sizes to be closed. The staves are heated in any usual way, and a heater may be placed in the receptacle, if desired.

I claim—

1. In apparatus for drawing together staves, a receptacle for the staves, having pivoted thereto a series of levers, a sleeve having

links connecting the same with the levers, and means for moving the sleeve; substantially as described.

2. In apparatus for drawing together staves, a receptacle for the staves having pivoted thereto a series of levers, adjustable blocks upon said levers arranged to contact with the staves, a sleeve having links connecting the same with the levers, and means for moving the sleeve; substantially as described.

3. In apparatus for drawing together staves, a receptacle for the staves having pivoted thereto a series of levers, a rod located in line with the center of the receptacle, a sleeve upon said rod, links connecting the sleeve with the levers, and means for moving the sleeve along the rod; substantially as described.

In testimony whereof I have hereunto set my hand this 23d day of April, 1896.

ALEXANDER DUNBAR.

Witnesses:

JAMES JOHNSON,

W. B. JOHNSON.