(No Model.)

G. A. AYER.

MACHINE FOR BALLING COTTON WARPS.

No. 492,506. Patented Feb. 28, 1893.

Fig. 1.

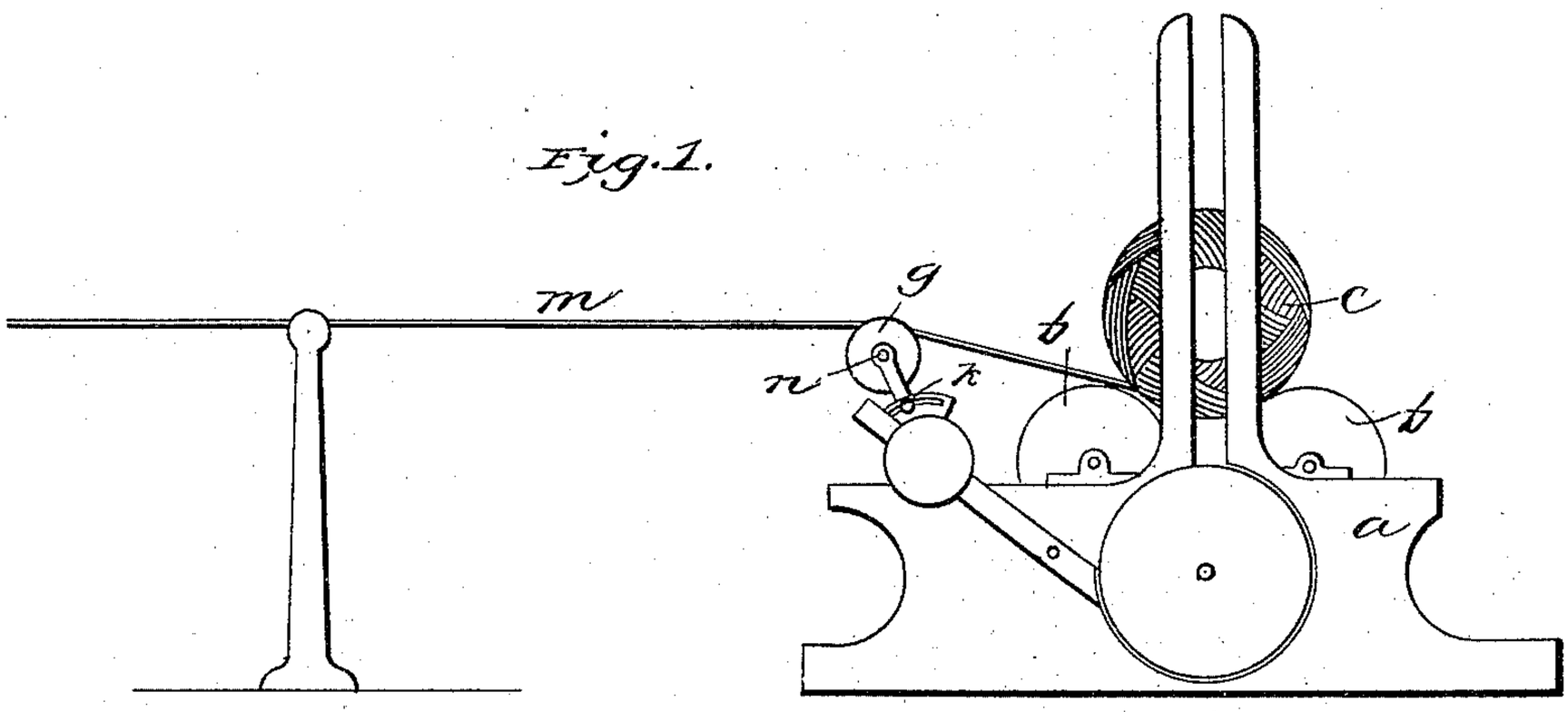
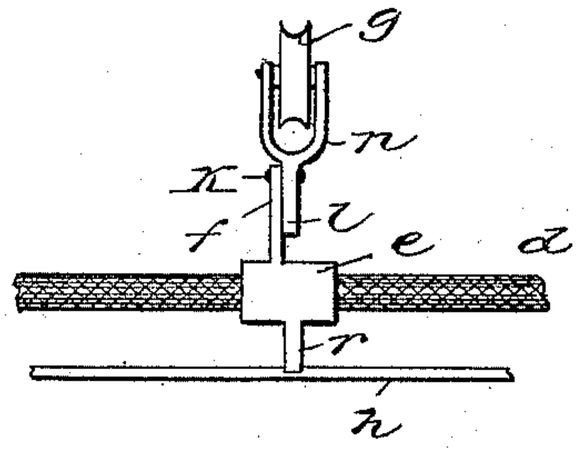


Fig. 2.

Fig. 3.



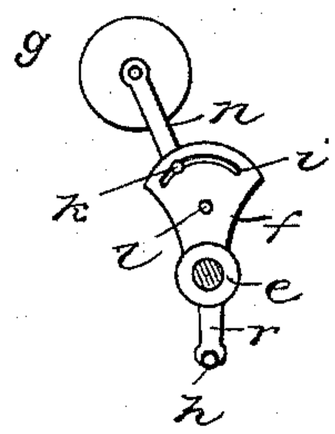
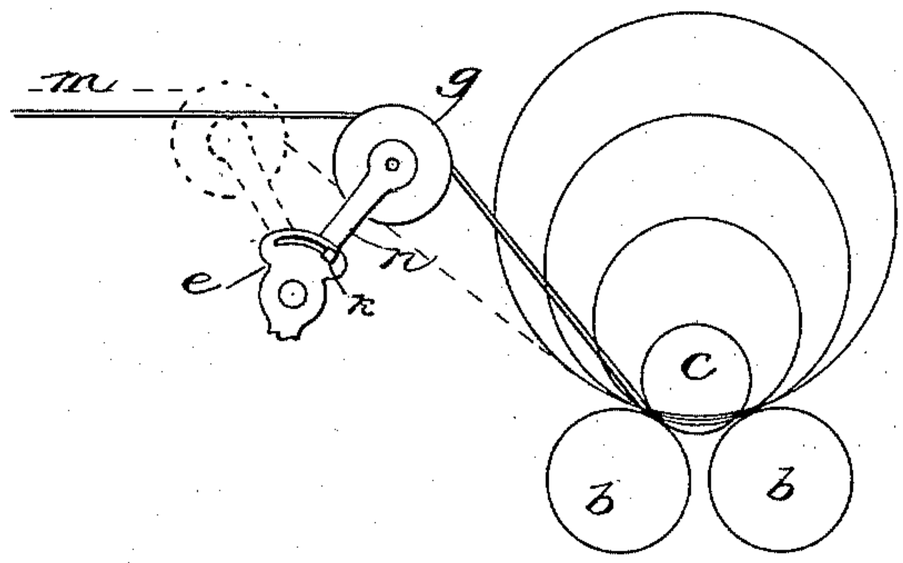


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR BALLING COTTON-WARPS.

SPECIFICATION forming part of Letters Patent No. 492,506, dated February 28, 1893.

Application filed March 30, 1892. Serial No. 427,130. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. AYER, a citizen of the United States, residing at New Bedford, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Machines for Balling Cotton-Warps, of which the following is a specification, reference being had to the drawings hereunto annexed.

This invention relates to machines for winding cotton warps into balls, so as to put such warps into merchantable shape, and condition for handling by weavers who do not produce the warps which they use; it being necessary to put the warp in such shape, that it may be unwound, colored, or otherwise treated; and put in the loom, without danger of becoming tangled. Heretofore such warps have been wound into balls, by passing the threads of said warp, through a trumpet on the traverse of the balling machine, and as the mass of threads of the warp, (amounting in the average, to about one thousand in number) passed from side to side in the opening of the trumpet, in its traverse in the act of balling, said threads were caused to roll upon each other at the sides, or edges of the mass, and become crossed upon each other, and in that position, wound upon the ball. This was caused by the fact that the trumpet had a fixed relation with regard to the spool—that is to say, it moved only in a horizontal plane, while the ball moved in a vertical plane. By this arrangement the relative positions of the warp-threads were disturbed as the ball increased in size, and more particularly at the ends of the ball when the trumpet was suddenly stopped and its movement reversed by the traverse mechanism. In order to make this statement clear, it is to be understood that the threads of the mass forming the warp form normally an approximate ellipse in cross-section, the major axis being on a horizontal plane. Thus the warp in being carried back and forth by the trumpet was crowded first against one side and then against the other side of the trumpet mouth. When the ball was small, the threads of the warp would retain their relation to each other; but as the ball increased in diameter and assumed a more pronounced spherical form, the threads of the warp in being crowded against the walls of the trumpet-mouth were caused to change their position, so that the major axis of the mass of threads would be made to occupy an angle of say fifteen degrees at one end of the ball, an angle of forty-five degrees at the center of the ball, and an angle of seventy-five degrees at the other end of the ball. In this latter position the major axis of the mass of threads was approximately at right angles to the horizontal axis of the trumpet-mouth, and as the traverse mechanism reversed the movement of the trumpet, the warp-threads were flattened down on the ball, and crossed and rolled upon each other in an obvious manner. Now when these warps were unwound from the ball, the above mentioned crossing of the threads, caused them to have a tendency to tangle, and not run off smoothly, as they would do, if the threads of the mass sustained the same relative position to each other when wound on the ball, which they did when just entering the trumpet.

The object of my invention is to provide means whereby the threads of the mass of warp, will sustain the same relative positions with regard to each other when wound upon the spool, as they do when entering the machine.

To this end my invention consists, in mounting upon the traverse of the balling machine, a wheel, having in its face, a groove of a size and shape, whereby the threads of the warp in passing over it, are not disturbed in their relative positions to each other, by the traverse motion of the machine; and in providing means for adjusting said wheel, to or from the spool, as may be desired.

In the drawings, Figure 1. is a side view of a balling machine, having my improvements attached. Fig. 2. is a rear view of a part of the traverse motion, showing my improvements mounted thereon. Fig. 3. is a side view of the same, showing the means of adjustment and Fig. 4 is a similar view, showing the respective positions occupied by the adjusting mechanism at the beginning and the finishing of a ball of warp.

Similar letters refer to similar parts, in the several views.

a, is the frame of the machine, in which are mounted the rolls *b*, *b*, which impart motion to the spool *c*, by frictional contact.

d, *e*, *r*, and *h*, represent a portion of the traverse motion, which is constructed in the ordinary and well-known way. The sleeve *e*, is provided with the quadrant *f*. having the slot *i*, projecting from its top, to which quadrant, is pivoted by the bolt *l*, the yoke *n*, bearing the grooved wheel *g*. The wheel *g*, is adjustable to and from the spool *c*, by means of the clamping bolt *k*, which passes through the slot *i*, and the shank of the yoke *n*.

The object for making the yoke adjustable to and from the spool *c* is as follows: When the ball is first started, there is but a small portion of the periphery of the spool that contacts with the rolls *b*, and as a consequence but a short length of the warp is pressed against the said rolls. Now if the yoke were stationary, as the diameter and the weight of the ball increased, a greater length of the warp would be pressed against the rolls, which would result in a flattening out of the warp and the crossing of the threads before referred to.

In Fig. 4, is shown the respective positions occupied by the yoke, and also the diameters of the ball from its start to its finish. When the ball is started the yoke and wheel are in the positions shown in full lines, in which adjustment the warp forms an angle of approximately forty-five degrees to a vertical line drawn through the axis of the spool. As the ball increases in diameter, the yoke is moved away from the spool until at the finish, as shown in dotted lines, the thread forms an angle of approximately thirty degrees to the aforesaid line. It will readily be seen that by this adjustment of the yoke, the same length of warp is pressed upon the rolls at all times during the process of balling, thus preventing any flattening and consequent crossing of the threads of the warp.

As before stated, the average number of threads of warp which are wound into a ball, is about one thousand; and in order to have this number of threads pass over the wheel *g*, as it is carried back and forth by the traverse motion of the machine, without the mass of threads being rolled or twisted upon each other, and in that condition, wound upon the spool, it is necessary that the groove in the wheel *g*, be from two and one half, to three inches wide, and about one and one half inches deep; and that its form shall be, about a true half circle, so that the wheel presents the same shape of surface, for the mass of threads *m*, to travel in, at all parts of the traverse, and then their relative positions with regard to each other, is not disturbed as they are wound upon the spool. In practice I have found that the best results are attained, by making the wheel *g*, about five inches in diameter and as before stated, about two and one half, to three inches wide. It is obvious that the threads of the mass *m*, in passing through the groove in the wheel *g*, which revolves, are very much less liable to become disturbed in their positions, than when drawn through a stationary groove of the same shape.

I claim—

1. In a machine for balling cotton warp, the combination, with the traverse-mechanism, of a yoke adjustably connected with the said mechanism and adapted to be moved to and fro in a plane at right angles to the horizontal axis of the spool on which the warp is wound, a peripherally grooved wheel carried by the yoke, and means for holding the yoke at any desired angle with relation to the spool, substantially as described.

2. In a machine for balling cotton warp, the combination with the sleeve of the traverse-mechanism of a rigid vertical quadrant having a curved slot in its upper portion, a yoke pivotally secured to the quadrant and carrying a peripherally grooved wheel, and a clamping bolt working in the said slot and engaging the yoke whereby to hold it at any desired adjustment, substantially as described.

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