No. 711,982. Patented Oct. 28, 1902.

W. B. LEE.

MACHINE FOR BALLING OR WINDING SLIVERS OF FIBROUS MATERIALS.

(Application filed Oct. 18, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1

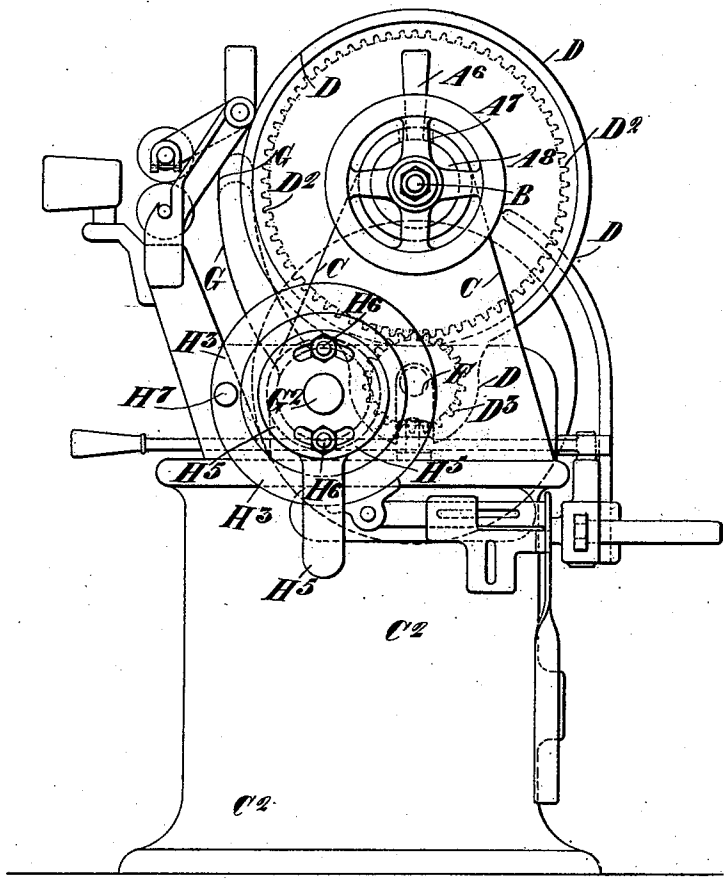
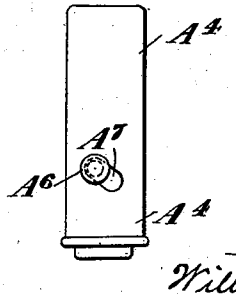


FIG. 3



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(No Model.) 2 Sheets—Sheet 2.

FIG. 2

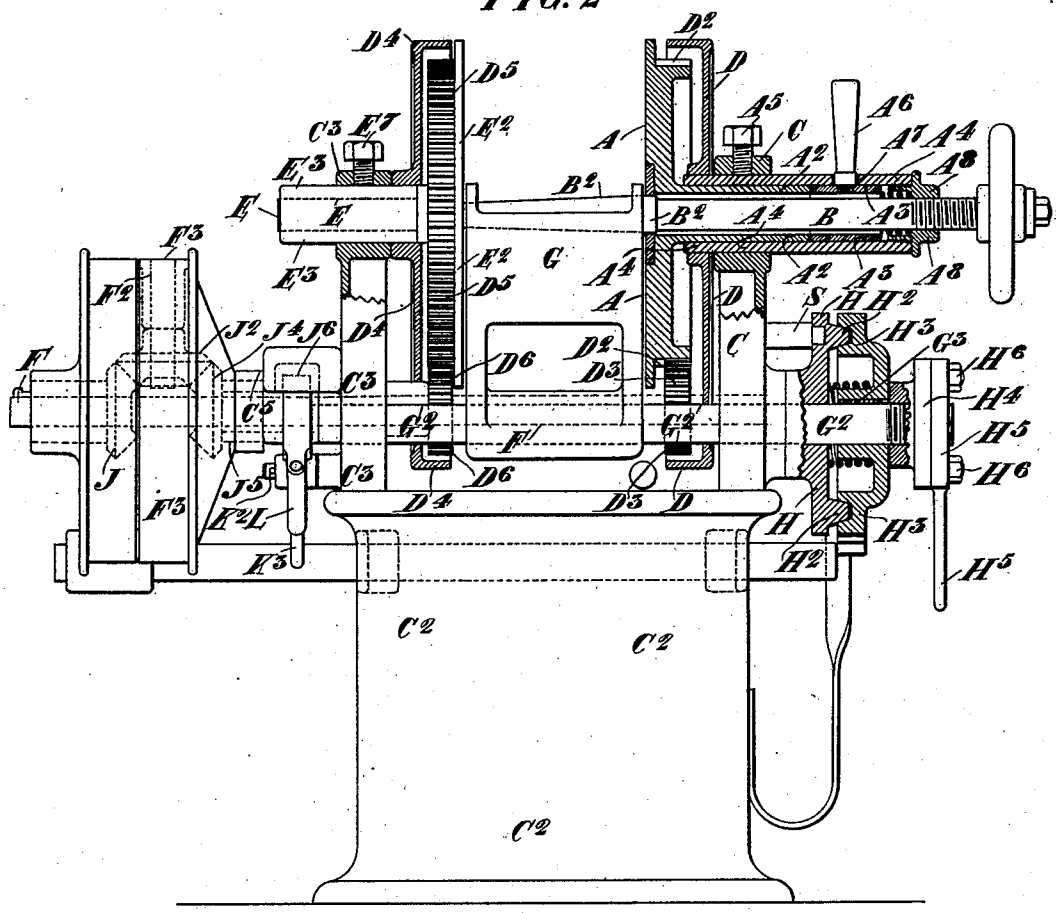


FIG. 4

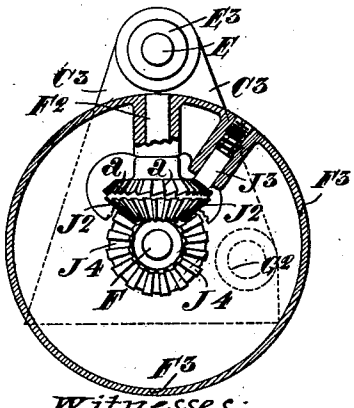
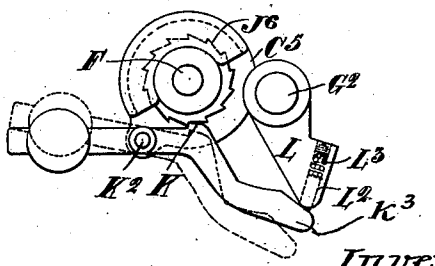


FIG. 5



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UNITED STATES PATENT OFFICE.

WILLIAM BROADLEY LEE, OF BRADFORD, ENGLAND.

MACHINE FOR BALLING OR WINDING SLIVERS OF FIBROUS MATERIALS.

SPECIFICATION forming part of Letters Patent No. 711,982, dated October 28, 1902.

Application filed October 18, 1898. Serial No. 693,938. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BROADLEY LEE, a subject of the Queen of England, residing at Providence Iron Works, Bradford, England, have invented a certain new and useful Improvement in Machines for Balling or Winding Slivers of Fibrous Material, of which the following is a specification.

This invention relates to an improvement in machines for balling—that is to say, winding in the form of a cheese—slivers of yarn preparatory to combing.

In the accompanying drawings, Figure 1 represents an end elevation of my improved machine. Fig. 2 is a side view, partly in section. Figs. 3, 4, and 5 are views of detail hereinafter referred to.

I fix the balling-disk A, through which the balling-spindle B is withdrawn to release the ball, upon the end of the sleeve A^2, surrounding the spindle, and the other end of this sleeve abuts against the collar A^3, and both the collar and sleeve are fitted into an external sleeve A^4, adjustably fixed by the set-screw A^5 in a hole made to receive it in the top of the standard C, fixed upon the box-bed C^2. The sleeve A^2 is confined laterally, so far as outward movement is concerned, by the collar A^3, and this collar has a hand-lever A^6, projecting through the inclined slot A^7, formed in the external sleeve A^4. Fig. 3 represents a separate plan view of the sleeve A^4. To relieve the pressure of the disk upon the ball preparatory to removing it, the handle A^6 is moved from the position shown in the slot A^7 to the other end of the slot. This forces the sleeve outward and leaves the disk free to be pressed outward by the pressure of the ball. A guard D for inclosing the disk-driving wheel D^2 and its driving-wheel D^3 is mounted upon the inner end of the sleeve A^4. The spindle E of the other balling-disk E^2 is mounted in a sleeve-bearing E^3, fixed by a set-screw E^7 in a hole formed in the top of the standard C^3, fixed upon the bed C^2. A guard D^4, fixed upon the inner end of the sleeve E^3, is provided to inclose the wheel D^5, driving the disk E^2, as well as its driving-wheel D^6. The wheels D^3 and D^6 are fixed upon the driving-shaft F, mounted in bearings formed in the standards C and C^3. The outer end of the spindle B is cut with a screw-thread, and the hand-wheel fitting thereon is screwed against the cap A^8 to facilitate starting the withdrawal of the spindle. The square inner end B^2 of the spindle fits a square hole formed in a metal disk sunk into the face of A. The boss of the hand-wheel on the outer end of the spindle B is cut with a female screw-thread fitting the male screw-thread on the end of the spindle, and to start the spindle preparatory to completely withdrawing it from the ball the hand-wheel is screwed against the end of the cap A^8, Fig. 2. When the spindle has been thus loosened, it is pulled bodily outward until the square end B^2 meets the buffer spiral spring located next to the cap A^8.

To maintain and regulate the pressure of the presser-plate G upon the ball as it is built up, I employ the cone-plate H, fixed to the standard C by a strong stud S and surrounding the presser-plate shaft G^2 with the annular male cone H^2, concentric with the shaft. The female cone-plate H^3, fitting the male cone, is keyed by the key G^3 to the shaft G^2, but is free to slide thereon, and the flanged nut H^4, screwed onto the end of G^2, is provided to bear against the female cone and force it with the required pressure against the male cone. To enable this pressure to be quickly removed and be readily brought back again to the same pitch, the arm H^5 is adjustably fixed upon the nut H^4 by the screws H^6 H^6, and a fixed stop H^7, projecting from the cone-plate H^3, is provided, and the arm H^5 is brought against this stop each time the pressure is applied. A spiral spring is fitted between the cone-plates to press the plate H^3 outward to disengage the conical faces when the pressure of the nut H^4 is removed. It will thus be seen that by the rotation of the handle the conical faces may be readily engaged and disengaged, and the contact of the handle with the fixed stop H^7 by limiting the movement of the handle limits the amount of frictional engagement of the conical faces. By means of the screws H^6 and slots the handle may be adjusted so as to contact sooner or later with the stop H^7, thus varying the amount of frictional engagement.

To reduce the speed of rotation of the ball when it has attained a certain diameter, I drive it through the medium of a sun-and-

planet motion inclosed within the driving-pulleys. This motion consists of a bevel-wheel J, fixed on the driving-shaft F, a bevel-wheel J^2, mounted on a radial stud F^2, fixed in the rim of the driving-pulley F^3 and engaging the wheel J, and a bevel-wheel J^4, loosely mounted on the shaft F and engaging the wheel J^2. The wheel J^4 is fixed on the sleeve J^5, extending through the bearing-bracket C^5, fixed to C^3 and carrying on its inner end a ratchet-wheel J^6. While, say, the first half of the ball is formed, the pawl K, mounted on the fixed stud K^2, holds the ratchet-wheel J^6, the sleeve J^5, and the wheel J^4 stationary. Consequently as the pulley F^3 revolves the wheel J^2 is driven by it, and the wheel J^2 drives the wheel J and driving-shaft F at twice the speed of the pulley. When, however, the ball has attained a certain size, the arm L on the presser-shaft engages the extension K^3 on the pawl K, and thereby disengages it from its ratchet, as shown in Fig. 5. The wheel J^2 is then no longer driven around on its stud F^2; but as the wheel J^2 has ratchet-teeth *a* formed on its back continuously engaged by the spring pin or pawl J^3, mounted in a radial hole in the pulley, the wheel J^2 is prevented from turning in the reverse direction to that in which it was driven by the wheel J^4. Therefore the wheel J^2 drives the wheel J at the same speed as the pulley F^3. A pin L^2 is preferably provided in the arm L, with a spring L^3 behind it, tending to press it outward, and when this pin first engages K^3 the pin is pushed inward, compressing the spring until the pressure is sufficient to begin disengaging the pawl K, and as the power required to do this then becomes reduced the spring expands and instantaneously releases the pawl.

The balling-spindle is preferably made hollow to reduce its weight.

I claim—

1. In a balling-machine, the combination with the balling-spindle, longitudinally movable to release the ball, of a longitudinally-movable sleeve surrounding said spindle, a disk carried by said sleeve, an outer bearing-sleeve encircling said movable sleeve, a rotatable collar encircling said spindle in rear of the movable sleeve and within the outer sleeve, a handle on said collar projecting through an inclined slot in said outer sleeve, a second disk opposing said first-named disk and means for rotating said disks, substantially as described.

2. In a balling-machine, the combination with the balling-spindle, longitudinally movable to release the ball, of a longitudinally-movable sleeve surrounding said spindle, a disk carried by said sleeve, an outer bearing-sleeve encircling said movable sleeve, a guard D carried by said outer bearing-sleeve, a rotatable collar encircling said spindle in rear of the movable sleeve and within the outer sleeve, a handle on said collar projecting through an inclined slot in the outer sleeve, a second disk encircling said first-named disk, a guard in proximity thereto, and means for rotating said disks, substantially as described.

3. In a balling-machine, the combination with the longitudinally-movable spindle, of the rotary balling-disks, the shaft for driving said disks, the driving-pulley loose on said shaft, a sun-wheel loose on said shaft and a sun-wheel fixed thereon, a ratchet planet-wheel carried by the pulley and engaging both sun-wheels and means for holding the loose sun-wheel stationary until the ball has reached a predetermined size, substantially as described.

4. In a balling-machine, the combination with the balling-disks and spindle with operating means therefor, of a ball presser-plate, a rock-shaft carrying said presser-plate, a rigid friction-ring, a coacting friction-ring having a splined connection with said shaft, a spring tending to force said rings apart, a nut threaded upon the outer end of the shaft, a handle adjustably connected to said nut, and a stop coacting with said handle, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM BROADLEY LEE.

Witnesses:

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SAMUEL A. DRACUP.