E ATKINSON & E. EDWARDS.

Top Roll Covering for Drawing and Spinning Frames.

No. 165,197 Patented July 6, 1875.

Fig: 1.

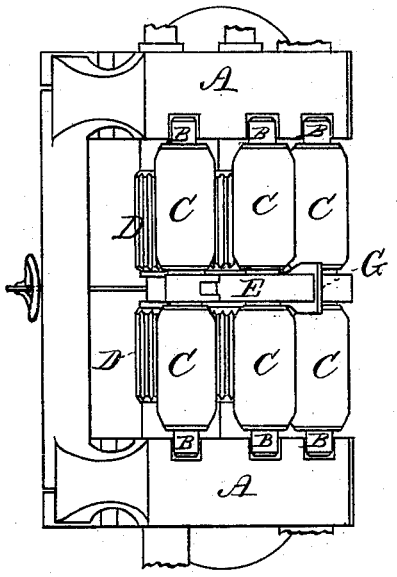


Fig: 3.

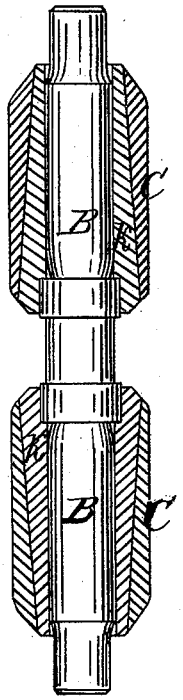
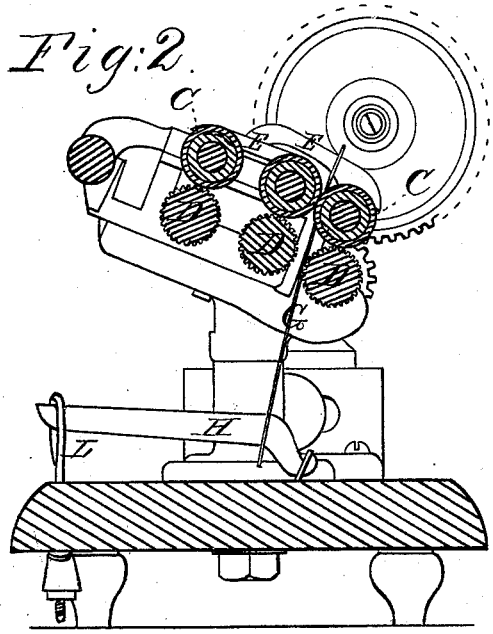


Fig: 2.



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UNITED STATES PATENT OFFICE.

EDWARD ATKINSON, OF BROOKLINE, AND ERNEST EDWARDS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN TOP-ROLL COVERINGS FOR DRAWING AND SPINNING FRAMES.

Specification forming part of Letters Patent No. **165,197**, dated July 6, 1875; application filed January 22, 1875.

To all whom it may concern:

Be it known that we, EDWARD ATKINSON, of Brookline, and ERNEST EDWARDS, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented a new and useful improvement in rolls used in machines for preparing cotton or other fiber for spinning, and also used in the machines for spinning such fibers; and we do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to improvements in machinery used in preparing cotton or other fiber for spinning, and also in machines used in spinning such fibers.

Prior to our invention the machines for these purposes were constructed as follows: When the rolls are used in drawing the cotton the lower one of each pair has been a fluted cylinder of metal. The upper rolls have been constructed in various ways. Sometimes a smooth metal cylinder has been used; but usually a metal cylinder, covered first with a cot made of woolen cloth, which is again covered with a cot made of leather, has been employed for this purpose. In the use of rolls thus constructed great practical inconvenience has been found. The metal cylinder, as an upper roll, has practically fallen into disuse in the manufacture of cotton, on account of its hard surface and irregularity of operation.

The cylinders covered with cloth and leather, which are substantially the only ones now in use, especially in cotton-mills, are liable to various objections. It has been found in practice that unless the cloth and leather to be used is of uniform texture and thickness the rolls will prove uneven, and will work irregularly; and it is a matter of great cost and experience to obtain such materials as are fit for this purpose. Rolls covered with cloth and leather are hard, unyielding, and of varying elasticity, requiring the use of heavy weights to hold the upper and lower rolls in proper relation to each other when running. In making such rolls the seam at the joint of union of the leather coating of the roll cuts the fiber. Further, in running these rolls electricity is generated to an inconvenient degree. We are also aware that attempts have been made to coat rolls for spinning machinery with alternate layers of hard and soft gelatine. This forms no part of our invention, and we do not seek to claim it as such.

The object of our invention is to provide rolls for the purpose heretofore named which shall avoid these and other difficulties, and at the same time furnish a cheap and practical substitute for those now in use. For these purposes we avail ourselves of the properties obtained by treating gelatine and similar substances with bodies such as bichromates, and drying the compound substances thus obtained at a moderate temperature. The compound substance thus obtained possesses great strength and tenacity; it generates electricity only in a slight degree, and the desired degree of elasticity may be given to it by the addition of more or less glycerine. By the method of preparation employed by us all seams or joints on the face of the rolls are avoided, and adhesion of fiber to the rolls is substantially prevented. By the use of these rolls we are also enabled to dispense with a considerable portion of the power required to run the ordinary roll.

We have found the following a convenient way of practicing our invention: Having dissolved two ounces of gelatine in six ounces of warm water, we add thereto one ounce of water containing in solution thirty grains of bichromate of potash and one and a half ounces of glycerine. The mixture is poured into a suitable oiled mold, in which the shell or roll to be covered is properly centered. As soon as the mixture is firmly set the shell or roll, with its gelatinous covering, is removed, the ends are trimmed, and it is dried at a temperature of 65° to 80° Fahrenheit. The drying should proceed till the water is evaporated, which will take from three to six days, when the roll is ready for use. When greater elasticity is required the amount of glycerine is increased. For greater hardness it is diminished, or entirely omitted.

For gelatine may be substituted albumen, gum-fibrine, or other bodies containing gelatine in various forms, in substantially the same

proportions; and in place of the use of bichromate of potash the formation of chromic acid in the gelatine may be effected by any of the methods which render gelatine insoluble. For the glycerine may be substituted an equivalent body, such as molasses, honey, and the like, in suitable proportions.

To illustrate our invention more fully we refer to the accompanying drawing, in which Figure 1 is a top view of a set of rolls as applied to a machine for preparing cotton or other fiber for spinning, the driving-gears and frame being omitted. Fig. 2 is a vertical section at the line *x x* of Fig. 1, with the frame and driving-gears added; and Fig. 3 is a detail view, on an increased scale, of a mandrel with a pair of our improved rolls thereon, the rolls being shown in section.

Similar letters indicate like parts in the several figures.

A represents the two ends of the ordinary inclined frame, in which are journaled the mandrels B, which carry the upper composition-rolls C and the shafts of the lower fluted cylinders D. The frame is erected in the usual manner upon a suitable foundation, and the driving shaft and gears are arranged in the ordinary way to drive the fluted rolls at the proper speed, the general construction of the machine being similar to those now in use, except in the substitution of our improved upper rolls for the ordinary upper leather-covered rolls. E is a saddle, made in two parts, to lie upon the centers of the mandrels B, and by which they are forced down to produce frictional contact between the improved upper rolls C and the lower fluted rolls D. From this saddle E hangs a bridle, G, connected at its lower end to pivoted beam H, which is either weighted at its end, or drawn down by a spring-rod, L, whereby the frictional contact between the surfaces of the upper composition and the lower fluted cylinder may be determined and maintained for the purposes well understood by those skilled. At Fig. 3, B is the mandrel upon which is slipped the shell K, having the coating or covering C.

We have found from experience that less frictional contact is necessary when our improved rolls are used than when the ordinary leather-covered rolls are employed, and as a consequence there is less likelihood of injury to the fiber passing between the rolls. When necessary to give a rougher surface to our improved rolls, so as to bite or gripe the sliver or strand more readily, and to give greater toughness and tenacity, we add to the gelatinous composition a sufficient quantity of a suitable gum or resin, such, for instance, as gum-shellac, which may be dissolved in alcohol, or in water with ammonia or borax, in the well-known way. We find the following to answer; but we do not confine ourselves to this or any particular formula: One ounce of borax is dissolved in sixteen ounces of boiling water, and as much shellac is added as the boiling solution will dissolve. This may be added to the roll composition in the proportion of one ounce to each four ounces of gelatine. Sometimes, also, we find it convenient, before applying the composition, to cover the rolls or shells with woolen or cotton cloth, paper, wood, india-rubber, flax, string-wire, or other suitable material. Sometimes, also, we groove or flute the rolls or shells, so as to give them a greater holding power for the composition.

We claim—

1. As an article of manufacture, a roll for spinning and other textile machinery, having a covering formed from a gelatinous compound, prepared substantially as described.

2. In machinery for treating cotton and other fibers, the combination of the fluted roll with the top roll, prepared substantially as described.

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