R. EICKEMEYER.

Hat Stretching Machine

No. 167,391. Patented Sept. 7, 1875.

Fig 1.

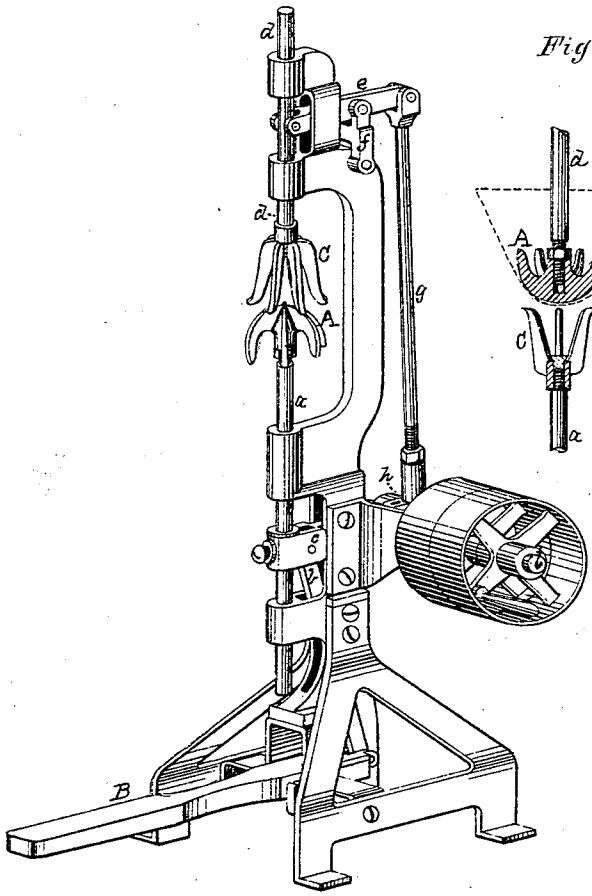


Fig 3.

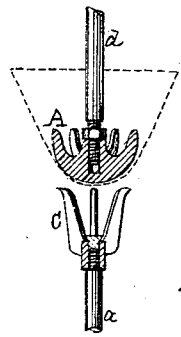


Fig 2.

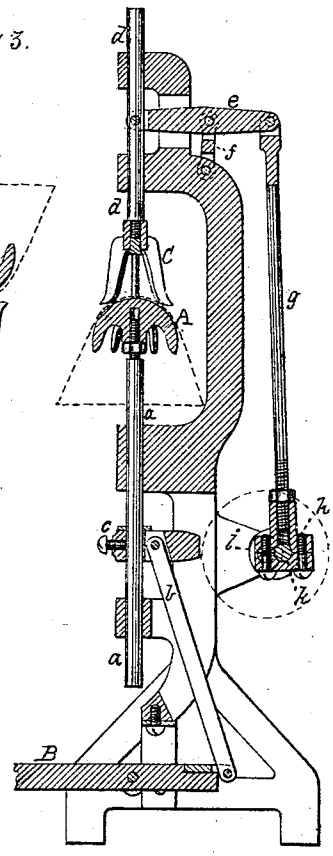
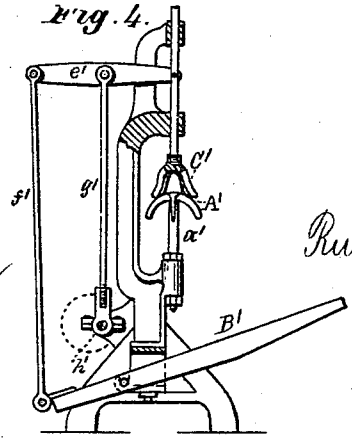


Fig. 4.



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UNITED STATES PATENT OFFICE.

RUDOLF EICKEMEYER, OF YONKERS, NEW YORK.

IMPROVEMENT IN HAT-STRETCHING MACHINES.

Specification forming part of Letters Patent No. **167,391**, dated September 7, 1875; application filed June 25, 1875.

To all whom it may concern:

Be it known that I, RUDOLF EICKEMEYER, of Yonkers, in the county of Westchester and State of New York, have invented a certain new and useful Improvement in Hat-Stretching Machines; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description thereof.

My said improvement relates to that class of machines which operate on the corrugation principle. Such machines necessarily involve the co-operation of two devices, having ribs or fingers arranged to engage with a hat-body when interposed between said devices, so that the ribs or fingers of each device will force portions of the hat-body into the spaces between the ribs or fingers of the other device, and thereby effect the stretching operation; and my invention consists in the combination of these co-operating stretching devices with operating or driving mechanism, whereby one of them may be rapidly operated with a reciprocating motion, and also with controlling mechanism, whereby the two devices may be gradually brought into proper working communication with each other for stretching the hat-body, and then separated from each other when the hat is to be removed.

It is well known to persons skilled in the art that a hat-body can only be stretched with uniformity by repeated action of the stretching devices, accompanied by a gradual rotation of the hat by the operative, so as to present alternately different portions thereof for contact with the surfaces of the stretching devices. It is also well known that the stretching strain on the hat-body must be gradually increased as the operation progresses.

In machines as heretofore constructed for operation on the corrugation principle, the co-operative stretching devices consist of a set of stretching-fingers, or their equivalent, and a ribbed former. In operation with these prior machines the ribbed former, with the hat-body thereon, is moved toward and into operative communication with the stretching-fingers, these latter being movable only so far as will permit of their radial adjustability—that is to say, the ribbed former has heretofore been movable vertically, and the set of stretching-fingers stationary.

In one form of my improved machine both the ribbed former and the set of stretching-fingers are movable. The ribbed former in this machine, as heretofore, is mounted on a sliding rod and controlled by a foot-lever; but, instead of imparting motion to the former by means of the treadle, in order that the hat may be forced against the stretching-fingers, the treadle serves as a medium whereby the two stretching devices may be gradually brought into such relation to each other that the rapidly-reciprocating stretching device may engage with a hat interposed between it and the co-operating stretching device. The rapidly-reciprocating device has a range of reciprocating movement fully equal to the length of the stretching-fingers, so that when the two devices are properly working their intermittent relative positions will admit of the requisite partial rotation of the hat-body by the operative.

To more fully describe my invention, I will refer to the accompanying drawing, in which—

Figures 1 and 2 represent, in perspective and in longitudinal vertical section, a machine embodying my invention. Fig. 3 represents, in section, the ribbed former and the stretching-fingers detached from the machine and reversed in position. Fig. 4 represents a machine somewhat differently constructed, but which also embodies my invention.

The machine here shown in Figs. 1 and 2, independent of my present improvements, is substantially like that shown and described in Letters Patent No. 140,903, issued to me July 15, 1873.

The ribbed and recessed former (shown at A) is mounted on a vertical sliding rod, *a*, actuated by the treadle B, by means of the link *b* and cross-head *c*. The upward movement of the former is limited by the contact of the cross-head with the lower end of the upper bearing, as described in said Letters Patent. The set of stretching-fingers C is here shown to be mounted rigidly on a hub; but they may be made radially adjustable, in accordance with said Letters Patent heretofore issued to me. As in former machines constructed by me, the stretching-fingers are mounted on a

rod, as at *d;* but, unlike them, this rod is mounted in slide-bearings in a line with the bearings of the lower rod, and these fingers as a whole are arranged to be vertically reciprocated. This reciprocating movement is attained in this instance by pivoting the rod to the walking-beam *e*, which has a fulcrum on the link *f*, which is, in turn, pivoted on the frame of the machine. The walking-beam is actuated by the connecting-rod *g* and the crank *h* on the driving-shaft *i*.

The connecting-rod *g* is provided with a screw-thread at its lower end, which engages with a thread in the tubular neck of a box, which embraces the crank-pin *k* on the driving-shaft. A nut is provided, as shown, near the lower end of the connecting-rod, which operates as a set-nut against the upper end of the neck, which receives the rod. The driving-shaft is provided with a tight and a loose pulley for connection by belt with power-shafting.

In practice I run the shaft *i* at from one hundred to one hundred and twenty revolutions per minute, thereby imparting the same number of downward movements per minute to the stretching-fingers.

In operation, a well-steamed, or otherwise softened, hat-body is placed on the former A, and elevated by the depression of the treadle until it is brought to such a point as will enable the lower ends of the stretching-fingers to engage with the hat-body. Between the downward movements of the stretching-fingers the hat-body is partially rotated by the operative, and the ribbed former is gradually raised until its highest position is attained. In this manner the hat-body is gradually drawn out to its required size in a much better manner, and in less than half the time requisite for performing the same operation in any prior machine known to me.

With a machine constructed as shown in Fig. 1 I have properly stretched from twenty to forty dozen hat-bodies in one hour.

In Fig. 3 the ribbed former is represented as if mounted on the vertically-reciprocating spindle *d*, and the stretching-fingers on the sliding spindle *a*. When so mounted the operative action would be the same as if mounted as shown in Figs. 1 and 2, and already described. The hat-body would be reversed in position, as shown in dotted lines in Fig. 3, instead of the position indicated in like manner in Fig. 2.

In Fig. 4 I show a modification of my invention. In this machine it will be observed that the ribbed former is mounted on a stationary spindle, *a'*, while the stretching-fingers C' not only are capable of being raised and lowered from and to the ribbed former, but they are also vertically reciprocated by means of the driving-shaft with crank *h'* and the connecting-rod *g'*, which is pivoted to the walking-beam *e'*.

In the machine shown in Figs. 1 and 2 the fulcrum of the walking-beam is on the link *f*, pivoted to the frame of the machine. In the machine shown in Fig. 4 the walking-beam *e'* is a lever of a different order, its fulcrum being at its outer end on the pivot, by which it is connected with the rod *f'*, which connects it with the treadle B'. In this latter form of machine the pivoted connection of the rod *g'* with the walking-beam *e'* constitutes a fulcrum, so far as relates to the temporary adjustment of the stretching-fingers C' with relation to the ribbed former A' for operating upon a hat.

In both machines one of the two stretching devices is combined with operating or driving mechanism, which communicates thereto the requisite rapid reciprocating movement, and with controlling mechanism, whereby the two devices may be brought into working relations with each other for operating upon a hat, and, also, whereby they may be widely separated for readily putting the hat into proper position to be stretched, and for afterward removing it from the machine.

It will be obvious, while the machines shown are each adapted to stretch the tip only, that it will simply require the stretching devices to be constructed as in other machines described in Letters Patent heretofore issued to me, if the tip and brim of the hat-body are to be stretched simultaneously; and, also, that the ribs may be arranged for stretching the brims only, and be successfully operated in this machine.

These operations involve only the peculiar construction of the stretching devices. I therefore do not limit myself to the precise construction of the stretching devices herein shown, nor to the mechanism employed for effecting the reciprocating movement of the stretching devices.

In Letters Patent No. 91,730, issued to me June 22, 1869, I show and describe a machine in which the ribbed former is vertically reciprocated automatically by suitable mechanism. In that machine, however, the stretching-fingers, or their equivalents, have no vertical movement.

In my former patent of June 22, 1869, the vertically-reciprocating ribbed former is connected with its actuating mechanism by means of adjustable devices, whereby its upward movement may be limited; and in the subsequent patent of July 15, 1873, the stretching-fingers are mounted on a vertical rod, and are susceptible of fixed adjustment at any required height.

Neither of those machines, however, embody controlling mechanism of the character herein described, whereby, while either of the stretching devices is being operated with a reciprocating movement, they may be readily placed into working relation with each other, and then separated for the removal of a hat, or placing one in position to be stretched.

I am well aware that by means of the mechanism shown in said patent, and by other well-known mechanism, a lower rod, with a stretching device thereon, may automatically be grad-

ually raised for stretching, and then dropped when a hat-body is to be removed, and that such mechanism may be substituted for the treadle-motion herein shown.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In a hat-stretching machine which operates on the corrugation principle, the combination of co-operating stretching devices with driving mechanism and controlling mechanism, substantially as described, whereby one of said devices is properly driven with a reciprocating movement, and the two devices gradually brought into working communication with each other for stretching a hat, and separated when the hat is to be removed, as set forth.

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