

(No Model.)

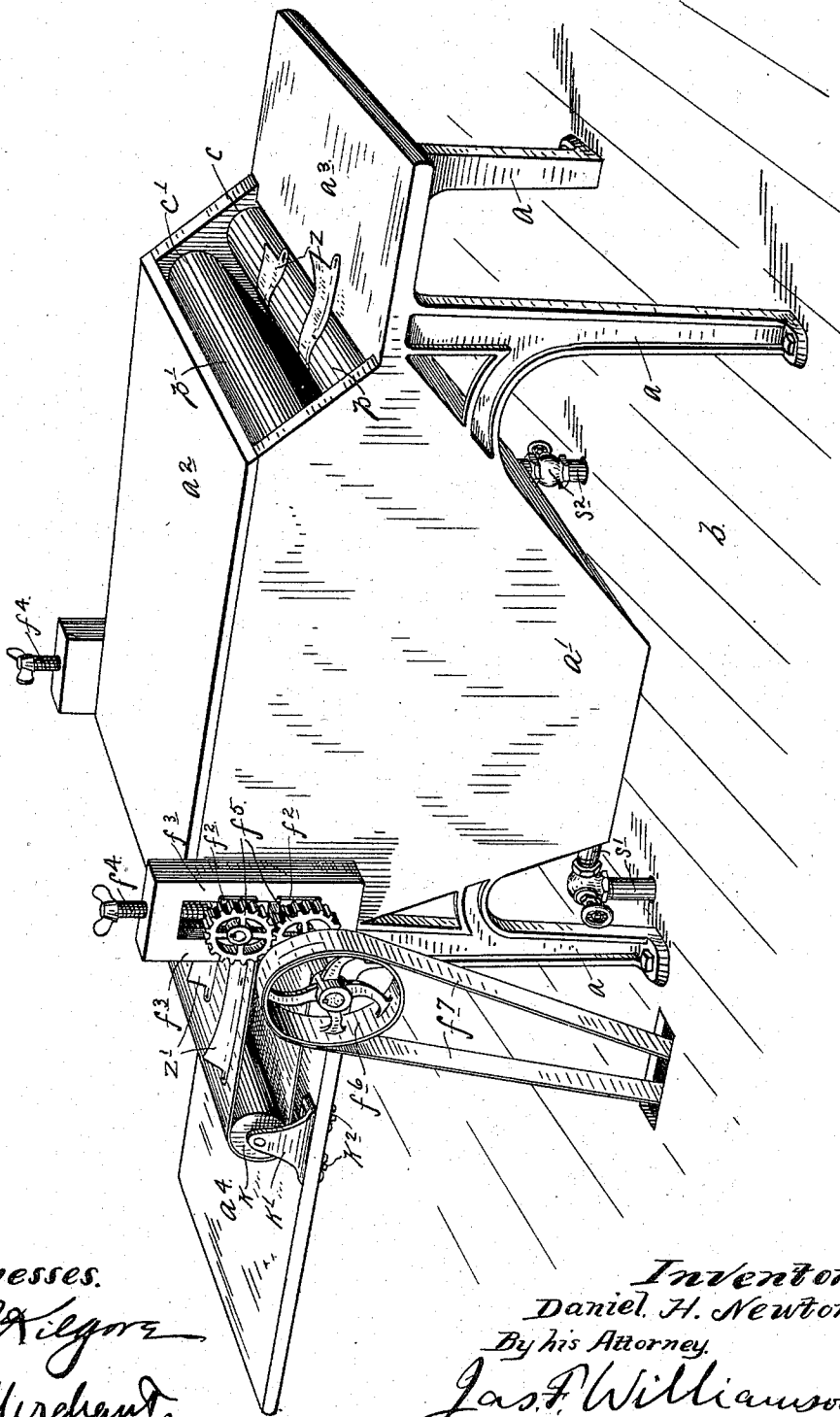
2 Sheets—Sheet 1.

D. H. NEWTON.
STARCHING MACHINE.

No. 571,281.

Patented Nov. 10, 1896.

Fig 1.



Witnesses.

C. F. Kilgore
A. D. Merchant.

Inventor.
Daniel H. Newton.
By his Attorney.

Jas. F. Williamson.

(No Model.)

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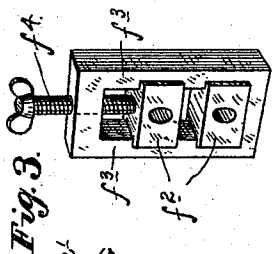


Fig. 3.

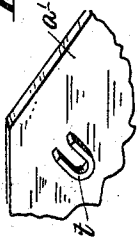


Fig 4.

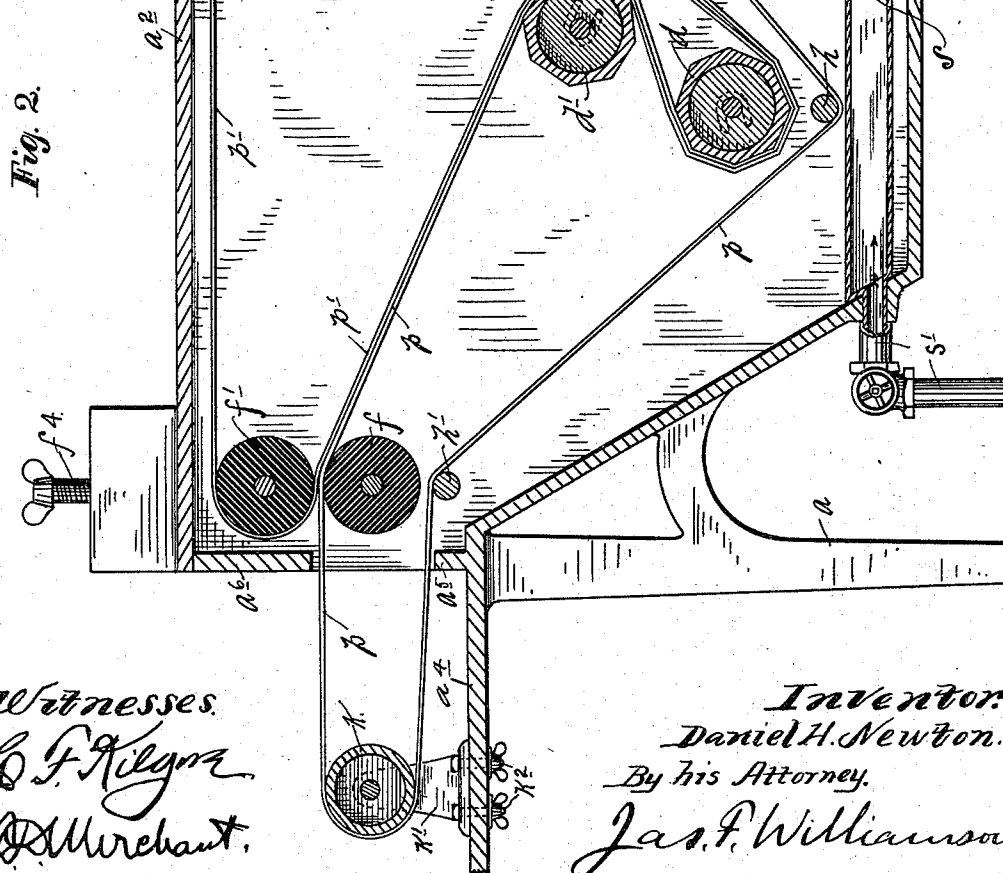


Fig. 2.

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UNITED STATES PATENT OFFICE.

DANIEL H. NEWTON, OF ROCHESTER, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO JENNIE C. DARROW, OF MINNEAPOLIS, MINNESOTA.

STARCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,281, dated November 10, 1896.

Application filed January 24, 1896. Serial No. 576,834. (No model.)

To all whom it may concern:

Be it known that I, DANIEL H. NEWTON, a citizen of the United States, residing at Rochester, in the county of Olmsted and State of Minnesota, have invented certain new and useful Improvements in Starching-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to starching-machines, and has for its object to improve the same, with a view of simplicity of construction, low first cost, better quality of work, and greater capacity.

The machine is especially designed for use in starching collars and cuffs, but is also capable of general application for starching many other kinds of articles.

To these ends my invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The accompanying drawings illustrate the invention. Therein like letters refer to like parts throughout the several views.

Figure 1 is a perspective view of the machine. Fig. 2 is a vertical central longitudinal section through the same. Fig. 3 is a detail in perspective showing the mountings for the wringing-rollers, and Fig. 4 is a detail showing the bearing-box used for all the inside rollers in the vat with the exception of the wringing-rollers.

a , a' , a^2 , a^3 , a^4 represent the fixed framework of the machine, as shown, of which parts a represents suitable supporting-legs adapted to be bolted to the floor b . a' represents the body or starch-vat proper; a^2 , the top thereof; a^3 , the feed-table at the head end of the machine, and a^4 the delivery-table at the foot or delivery end of the machine.

The vat a' is preferably made with converging ends and with its side walls extended above the tables a^3 and a^4 and having applied thereto the removable top plate or cover a^2 , leaving the vat entirely open at its receiving end in the part of the same extending above the feed-table a^3 . The delivery end is partly

closed above the table a^4 by a cross-flange a^5 , rising from the table and a cross-plate a^6 , fixed to the side walls directly under the cover a^2 , which construction leaves a sufficient opening between the said parts a^5 and a^6 for the outward passage of one of the aprons therethrough, as will be presently noted. Within the said vat are mounted a pair of receiving or feed rollers c c' , a pair of singly-acting saturating-rollers d d' , a pair of wringing-rollers f f' , suitable guide-rollers h h' , and on the delivery-table a^4 a delivery-roller k , mounted in bearings k' , secured to said table by nutted bolts k^2 . The receiving or feed rollers c c' are at the mouth of the vat in position to receive from the table a^3 . The wringing-rollers f f' are at the delivery end of the vat, and the saturating-rollers d d' are located a short distance above the bottom of the vat, but below the starch-level in the same. The said saturating-rollers d d' are preferably of polygonal form, being shown as of octagon form in cross-section.

On the rollers c , d , d' , f , h , h' , and k is mounted an endless apron p , and on the rollers c' , d , d' , and f' is mounted an endless apron p' . With this mounting of the said aprons p p' they will run together face to face throughout one section of their travel or circuit through the vat, thereby permitting their facing folds to operate as a conveyer for holding and carrying the cuffs, collars, or other articles to be starched through the vat, while the lower apron p will pass on outward through the delivery-opening of the vat and over the roller k above the delivery-table a^4 for the discharge of the starched articles onto the said table or their exposure on the top of the apron outside the vat for the removal therefrom by the attendant. The rollers c c' are so located as to afford a feed-opening between the aprons p p' at the mouth of the vat, and the saturating-rollers d d' are so located as to cooperate with the facing folds of said aprons p p' or the conveyer-section in succession from opposite sides of the same.

The receiving or feed rollers c c' and the saturating-rollers d d' , as well as the rollers h , h' , and k , may be of any suitable material, but are preferably made of tinned bronze.

The wringing-rollers $f f'$ are made of rubber, and the journals of the same are mounted in sliding boxes f^2 , held by vertical guides f^3 , and the upper boxes are subject to the action of hand-screws f^4 , screwed through the head ends of said guides. This construction permits the said wringing-rollers $f f'$ to be set under any desired pressure or tension. The journals of said wringing-rollers $f f'$ extend outward at one end beyond the adjacent guide f^3 and are provided with engaging gears f^5 . The lower wringer shaft or journal is provided with means for the application of power, which means is shown as in the form of a pulley f^6 , receiving motion from a belt f^7 , driven from a line-shaft or other source. (Not shown.) Circulating connections should also be provided for the supply of steam to keep the liquid starch hot within the vat. These connections may of course be of any suitable form. For the purpose of illustration I have shown a removable steam-pan s within the vat, which is connected to a valved steam-supply pipe s' at one end and a valved outlet or waste pipe s^2 at the other end.

The vat is filled with starch to a point above the level of the uppermost member of the saturating-rollers $d d'$. There may be any desired number of the said saturating-rollers $d d'$, but they must be singly-acting rollers and should coöperate with the facing folds or conveyer-section of said aprons in succession from opposite sides of the same. I have found that two of such saturating-rollers $d d'$, arranged substantially as shown, will do excellent work.

The aprons $p p'$ must be of flexible porous material and are preferably made of linen cloth or similar textile fabric.

All the rollers located in the vat, with the exception of the wringing-rollers $f f'$, are mounted in yoke-like bearings t , a specimen of which is shown detached in Fig. 4. These bearing-yokes t are open at one side, but are so placed with respect to the line of strain thereon from the aprons $p p'$ that the rollers will remain in proper working position. This construction permits all of the said rollers so mounted to be readily removed whenever necessary or desirable for any purpose.

As the wringer-rollers $f f'$ are positively driven they constitute the drive-rollers for imparting motion to the aprons $p p'$ and all the other rollers over which the said aprons move.

$z z'$ represent, respectively, collars entering and leaving the vat.

Having regard to the action on the goods, it is obvious from what has already been said that the collars, cuffs, or other articles will be carried through the vat between the facing folds of the aprons $p p'$ as a conveyer and be delivered over the table a^4 by the lower member p of said aprons. It is also obvious that inasmuch as the said aprons dip into the liquid starch in the common section of their circuits or travel they will carry the

articles into the liquid, thereby causing the aprons themselves and the exteriors of the collar, cuff, or other article to become loaded with the liquid starch before the article reaches the first or lowermost of the said saturating-rollers $d d'$. Under the action of the roller d against the facing folds of said aprons and the article held thereby the starch will be forced through the article and the external apron in one direction. On passing from the first to the second of said saturating-rollers $d d'$ the aprons will again become loaded with the starch, and under the action of the second roller d' the starch will be forced through the article and the external apron in the reverse direction from that which took place under the action of the preceding roller d . In this way the said saturating-rollers $d d'$, acting against the said flexible porous aprons as a bed and conveyer, will force the starch into and through all the interstices of the article, thereby thoroughly saturating the same with the starch. On reaching the wringing-rollers $f f'$, which are above the starch-level in the vat, the starch will be squeezed out from the article and the aprons to any desired extent, according to the pressure on said wringing-rollers, and the starch thus wrung out will fall into the vat, while the articles will be carried out over the delivery-table a^4 upon the lower apron p .

The polygonal form of the saturating-rollers $d d'$, which, as before stated, are of octagon form in cross-section, is of large importance in the saturating action. A flat-sided roller is thus afforded, which operates somewhat differently than a round roller. With the polygonal or flat-sided roller the corners between the faces serve to effect a cut-off between the starch to the rearward of the engaged corner and the starch ahead of the same on the apron and the article, so as to cage the same, as it were, until subjected to the flat face of the roller. In this way an abundance of starch is insured for the pressing or saturating action of the flat-faced roller. With a round roller the effect would be more similar to that of a wringing-roller; or, otherwise stated, the starch would be rolled backward from the article and the aprons rather than caged and squeezed through the same. For the reason of this caging action on the starch the octagonal rollers $d d'$ are very effective in the saturating action on the articles.

From the fact that the aprons and all the rollers over which they pass receive motion from the wringing-rollers $f f'$ at the delivery end of the machine, as hitherto noted, it must be obvious that the aprons $p p'$ are held taut in their forward travel through the vat or throughout their common circuit, wherein they serve as a conveyer for the articles to be starched, and from this fact it follows that there can be no buckling or lap-sections in the aprons or the article while under the starching action. Whatever slack there is

in the aprons will occur in the return parts of their circuits, where the same can do no harm.

From the foregoing statements it will be seen that the articles are saturated with the starch without any rubbing action thereon whatsoever and when the articles are held flatwise and taut. Hence there is no injury or mutilation of the fabric of the article and no bagging or creasing in any part thereof. It is also obvious that as the feed is a continuous one the capacity of the machine is greatly increased thereby over an intermittent feed. Owing to the effective action of the saturating-rollers *d d'*, this feed may also be a comparatively rapid one. Hence the only limit to the machine is the capacity of the operator or attendant to supply the articles at the receiving end and remove the same from the delivery end of the machine.

By actual experience with a full-sized working machine I have demonstrated all of the foregoing statements—that even with the rapid feed the articles will be thoroughly starched, will be delivered free from mutilation or creases, as above quoted, and therefore be capable of a much finer finish when properly ironed or calendered than corresponding articles starched by the old hand method or by any apparatus before known to me. As to the capacity, I have demonstrated that with a machine having rollers of nine inches in length and operated by hand with a crank-handle at the rate of fifty revolutions of the wringing-rollers per minute twelve hundred collars or cuffs may be thoroughly starched per hour and that the work will be so perfect as not to require any hand action whatsoever to complete the starching action.

It will be understood, of course, that minor details of the construction might be changed without departing from the spirit of my invention.

In machines of small size, for household use, &c., the power-pulley may be substituted by a crank-handle for operation by hand, and, owing to the rapidity or capacity of the machine, steam connections may be dispensed with in all cases except for heavy mercantile use, where continuous action is required for several hours at a time.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a machine, for starching collars, cuffs and other articles, the combination with a starch-vat, of a flexible conveyer, for the articles, formed by the facing folds of a pair of endless aprons or carriers, running together face to face in one section of their circuits through said vat, and two or more singly-acting saturating-rollers coöperating with said conveyer or facing folds of said aprons, from opposite sides of the same, in succession, substantially as and for the purpose set forth.

2. In a machine for starching collars, cuffs and other articles, the combination with a starch-vat, of a flexible conveyer formed by the facing folds of a pair of endless porous aprons or carriers running face to face, in one section of their circuits through said vat, and a series of two or more singly-acting saturating-rollers, coöperating with said conveyer or facing folds of said aprons, from opposite sides of the same, in succession, substantially as and for the purposes set forth.

3. In a machine for starching collars, cuffs and other articles, the combination with a starch-vat, of a conveyer, for the articles, formed by the facing folds of a pair of endless aprons or carriers running together, face to face, in one section of their circuits through said vat, and one or more singly-acting polygonal rollers coöperating with said conveyer or facing folds of said apron, substantially as and for the purpose set forth.

4. The combination with the starch-vat, of the receiving or feed rollers *c c'*, the octagonal saturating-rollers *d, d'*, the wringing-rollers *f f'*, the delivery-roller *k*, and suitable guide-rollers, as *h h'*, the textile-fabric apron *p* mounted on the rollers *c d d' f k h h'*, and the textile-fabric apron *p'* mounted on the rollers *c', d d' f'*, and means for imparting motion to said rollers and aprons, substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL H. NEWTON.

Witnesses:

JAS. F. WILLIAMSON,
FRANK L. DARROW.